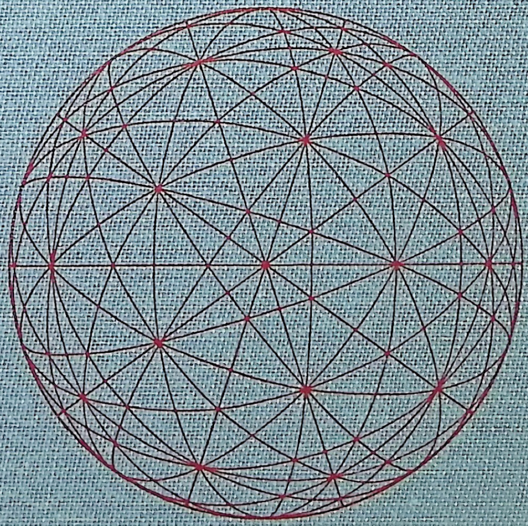
THE ARTIFACTS OF
R. BUCKMINSTER FULLER

A Comprehensive Collection of His Designs and Drawings



Volume Three

Artifacts of R Buckminster Fuller

Volume Three. The Geodesic Revolution, Part 1, 1947--1959

James Ward (Editor)

Garland Publishing, Inc. | New York and London

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Contents

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Volume Three

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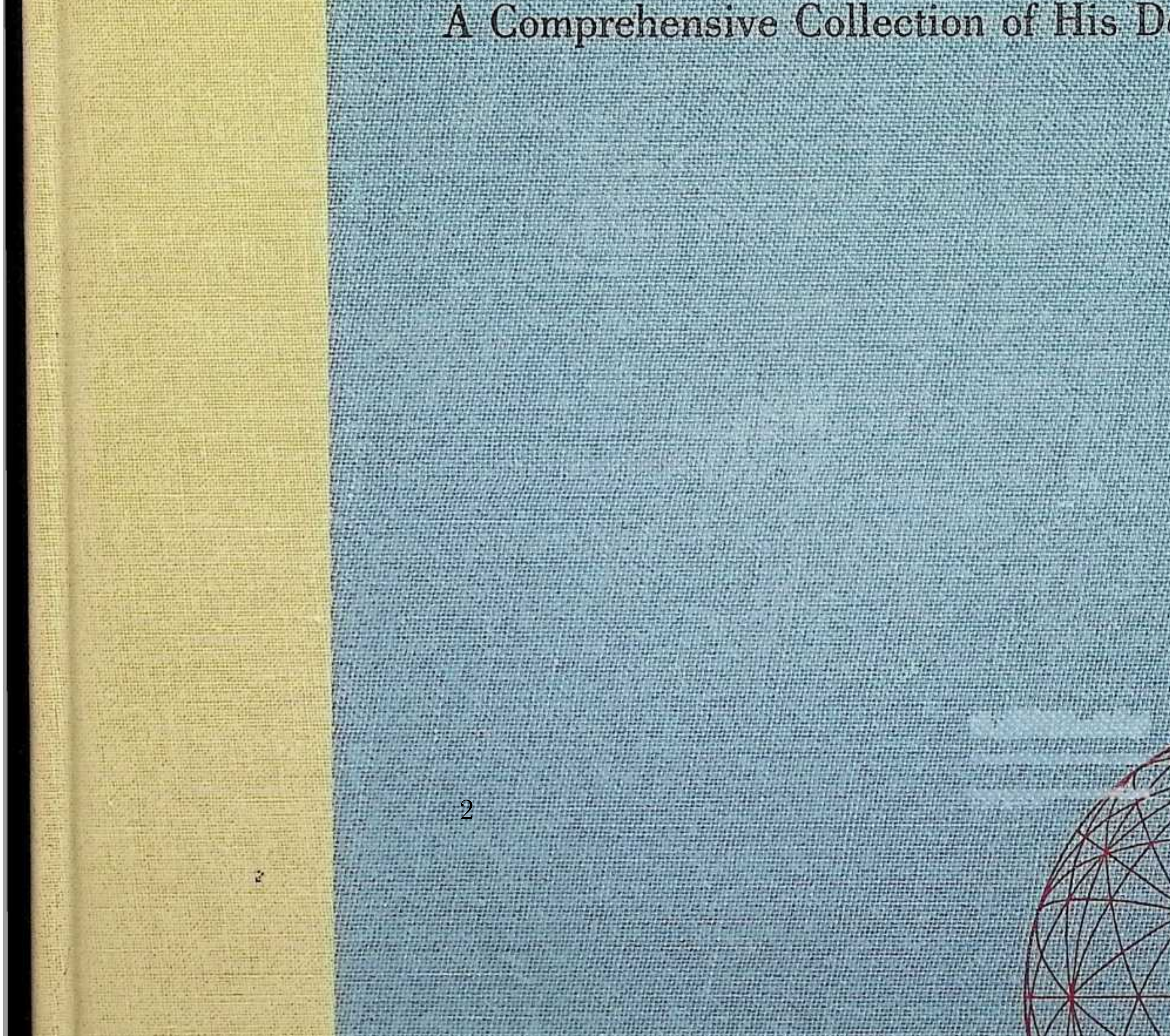
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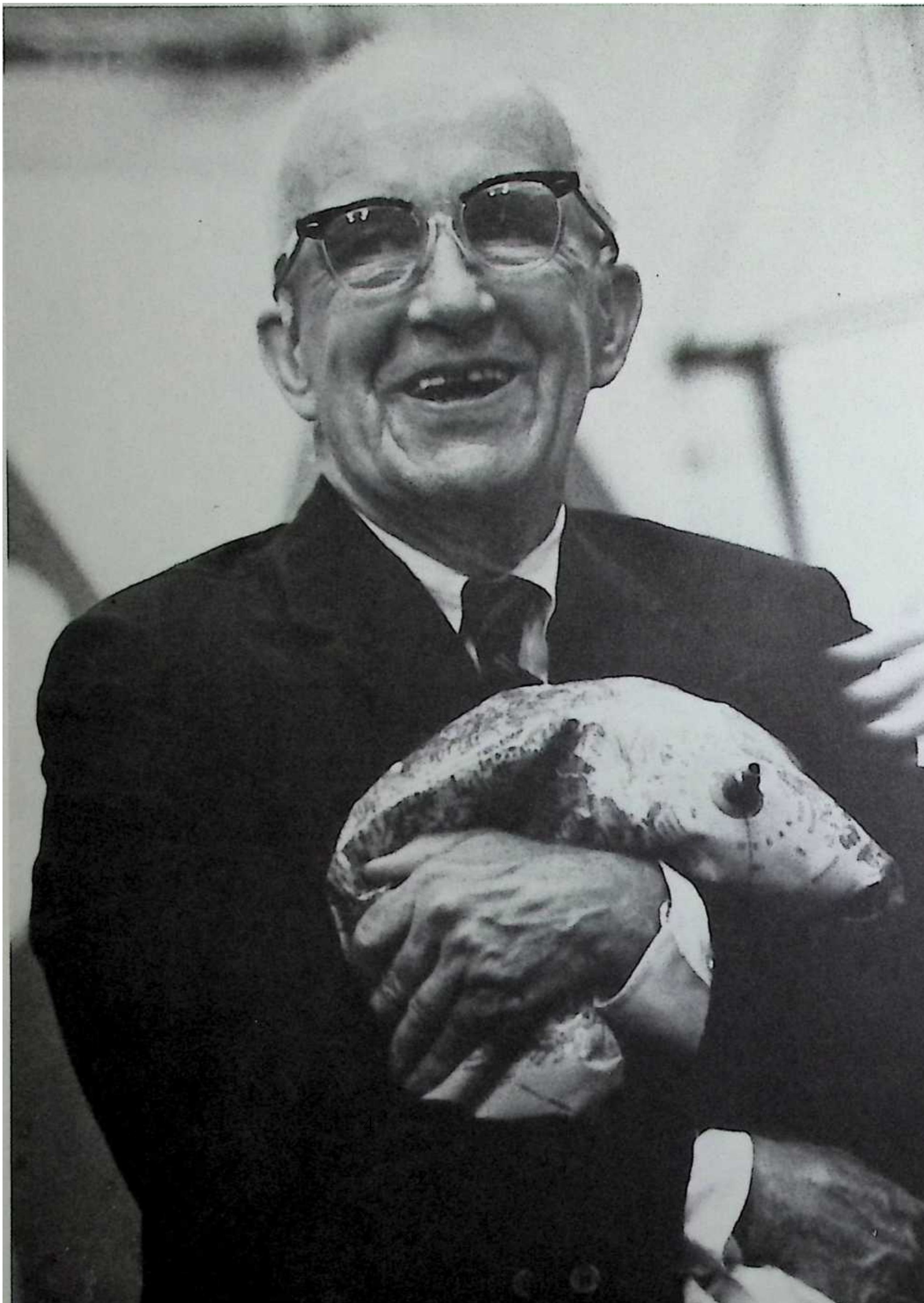

THE ARTIFACTS OF

R. BUCKMINSTER FULLER

A Comprehensive Collection of His Designs and Drawings in Four Volumes

Edited with descriptions by James Ward

A Garland Series

Volume One. The Dymaxion Experiment, 1926–1943

Volume Two. Dymaxion Deployment, 1927–1946

Volume Three. The Geodesic Revolution, Part 1, 1947–1959

Volume Four. The Geodesic Revolution, Part 2, 1960–1983

THE ARTIFACTS OF

R. BUCKMINSTER FULLER

Volume Three: The Geodesic Revolution

Part 1, 1947–1959

Edited with descriptions by James Ward

Garland Publishing, Inc.

New York and London 1985

ABOUT THE EDITOR

James Ward is presently a visiting professor at Trinity College, Hartford, Connecticut. He studied engineering as an undergraduate and received his Ph.D. in the history of art from the Institute of Fine Arts of New York University. His dissertation was on Le Corbusier's villa, Les Terrasses.

He has published articles on early modern architecture in Europe and has compiled a directory of New York architects before World War II.

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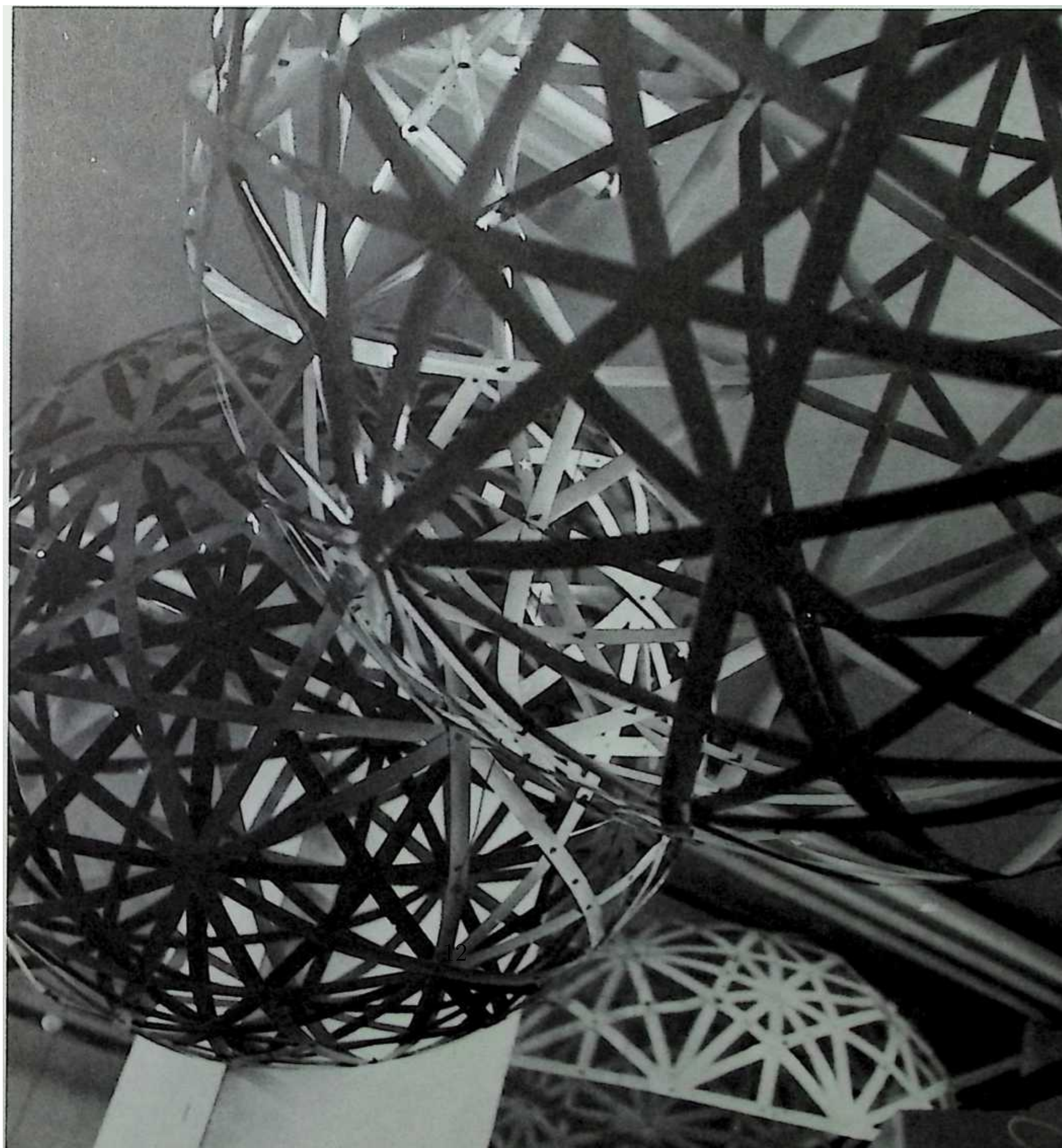
Printed in the United States of America

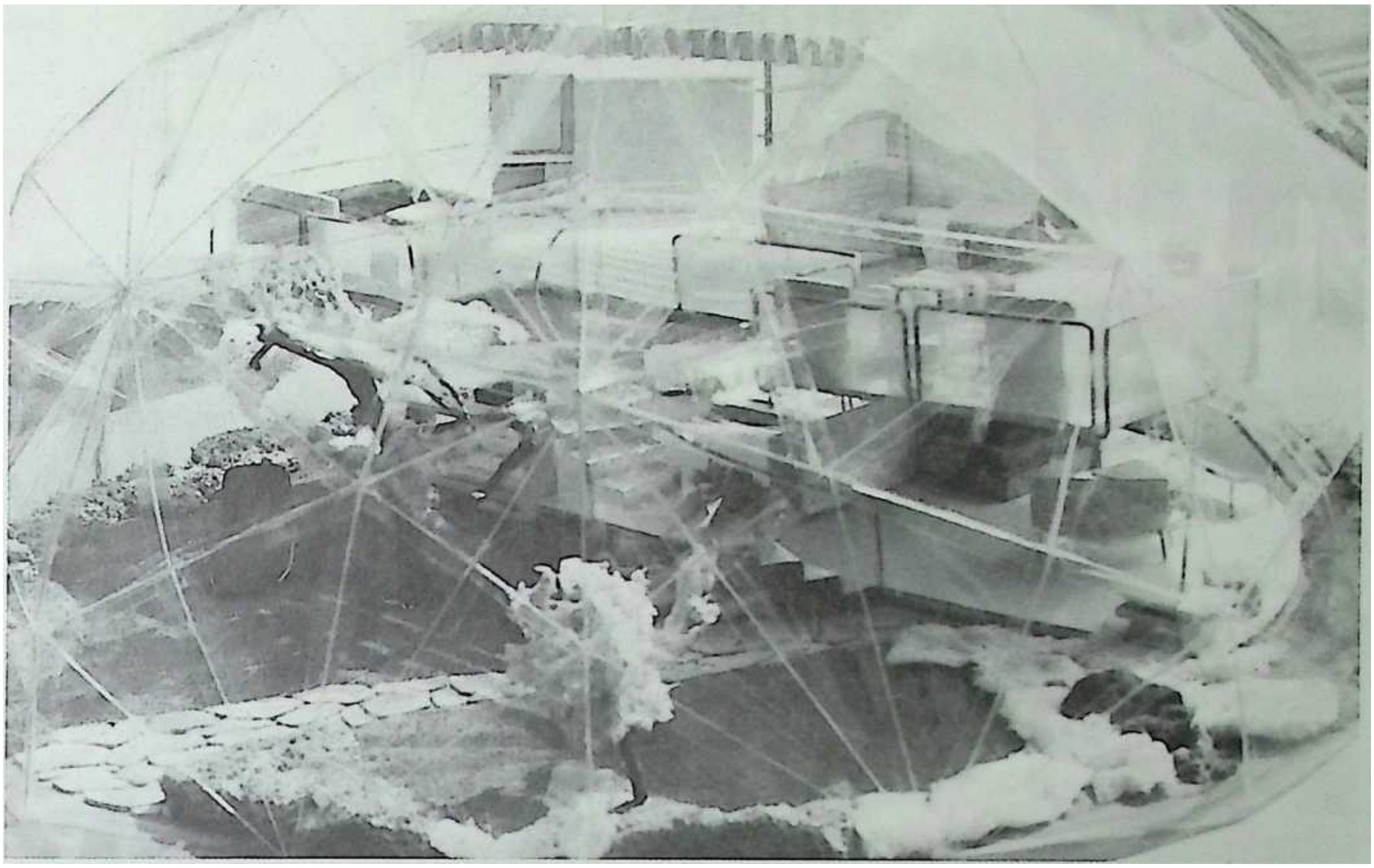
1 Maquettes for Early Geodesic Domes



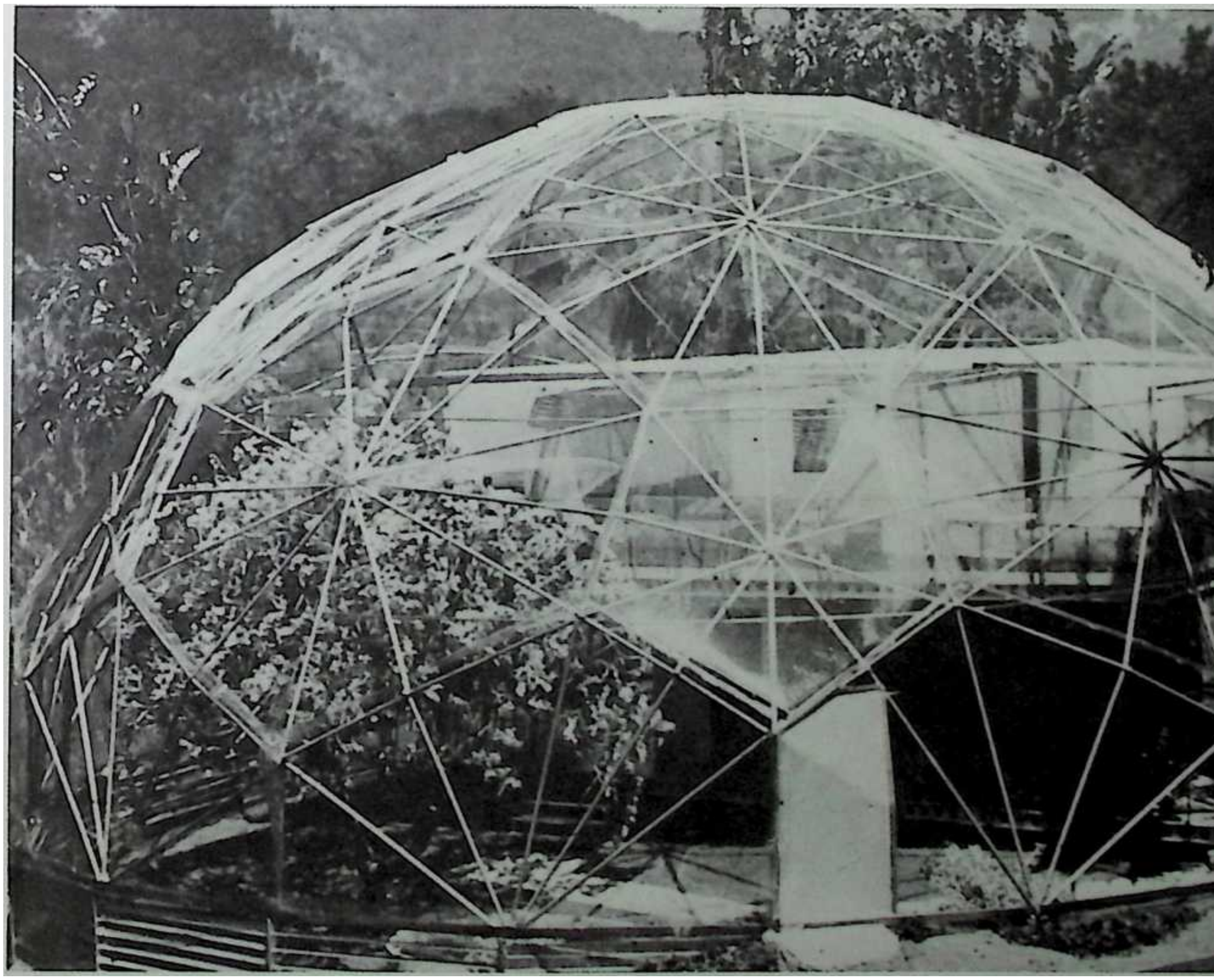
Buckminster Fuller geodesic spheres, 31 and 25 great circles.

Pentagon necklace structure, Black Mountain College, N.C., February 1949.

Pneumatic skin hex-pent involute, Black Mountain College, N.C., 1949.



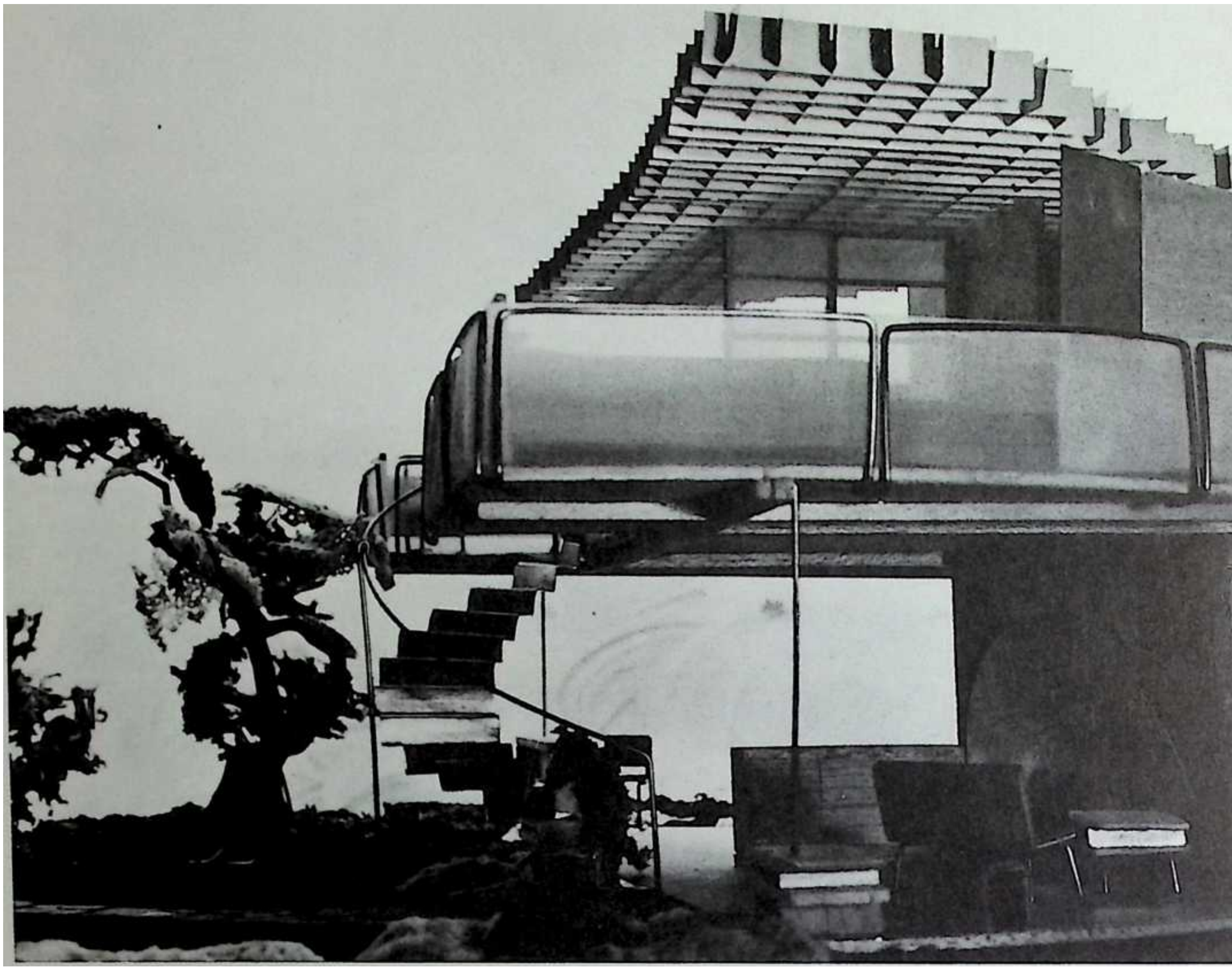
Autonomous dome developed for U.S. Air Force, 1949.



Autonomous dome (maquette). Black Mountain College, N.C.

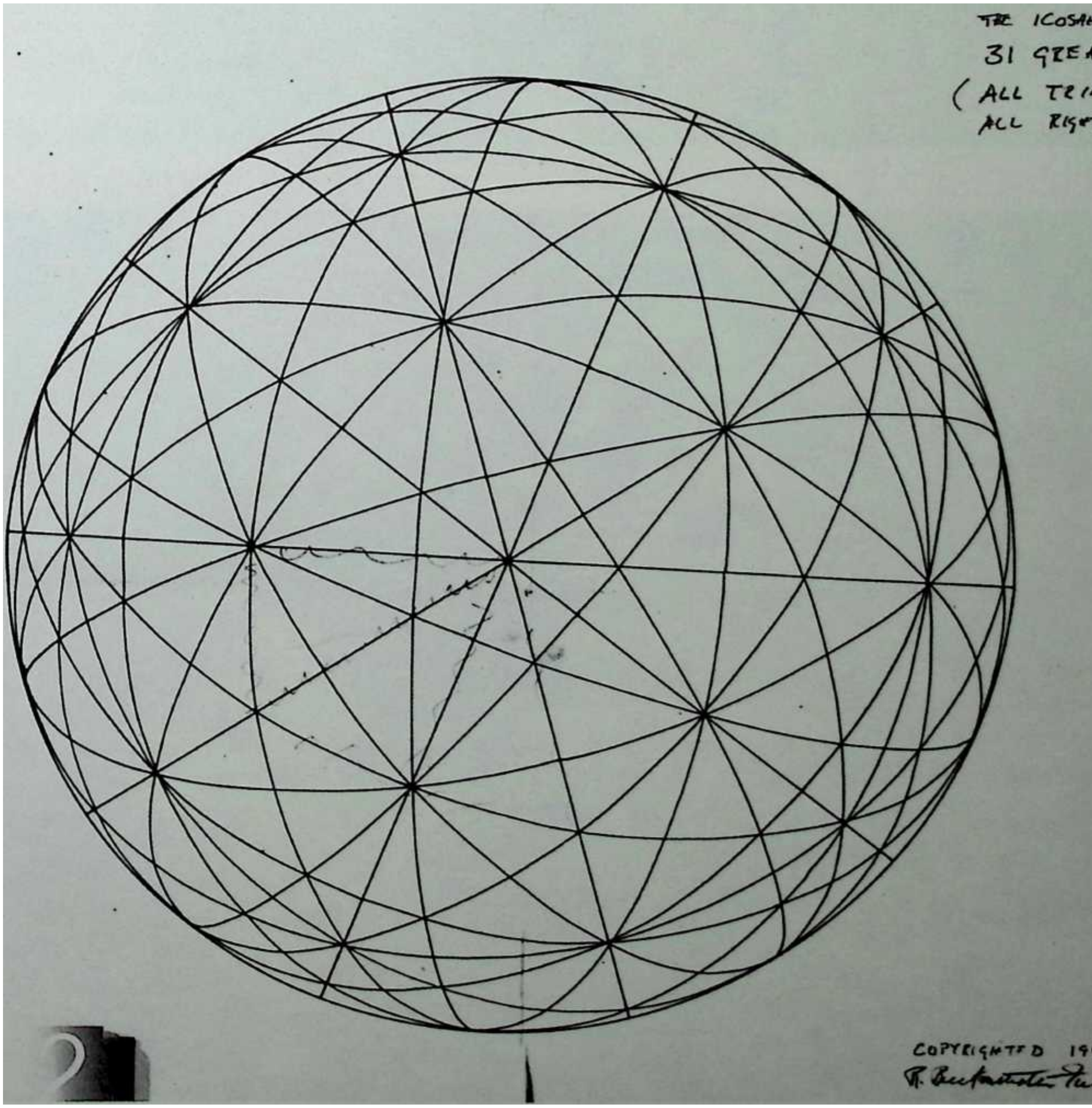
4 THE GEODESIC REVOLUTION, PART 1

Autonomous dome (model), Black Mountain College, N.C.

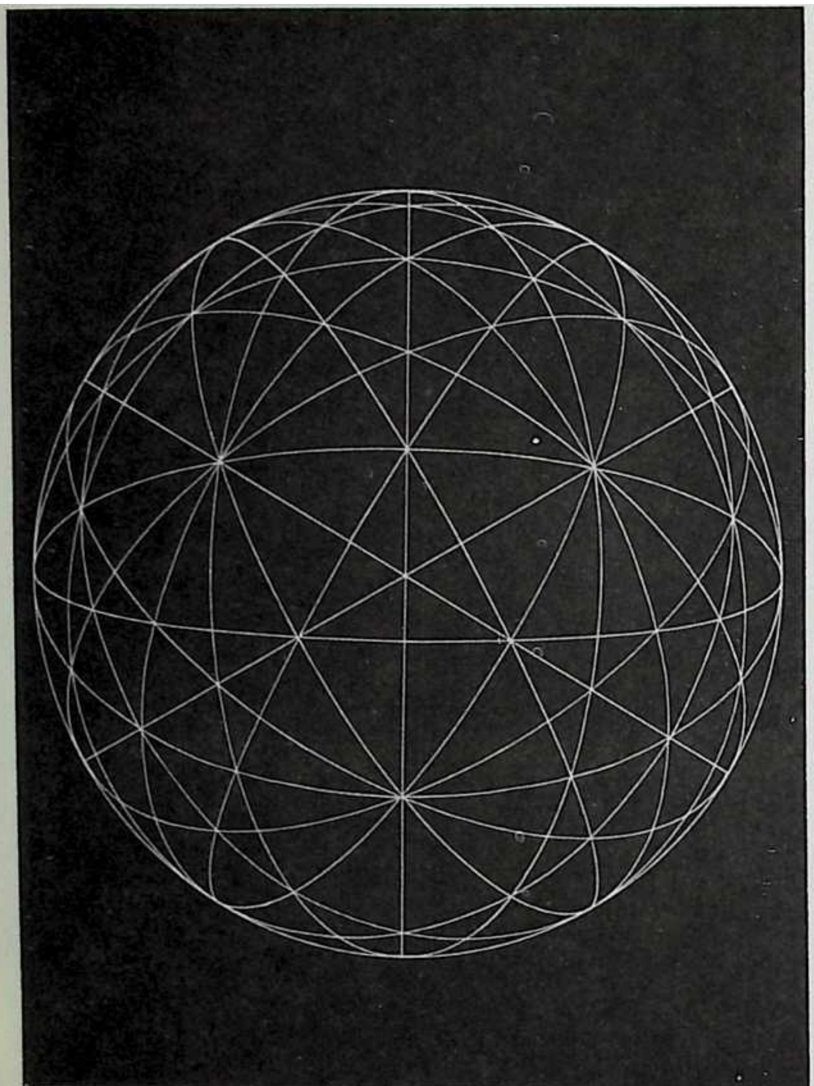


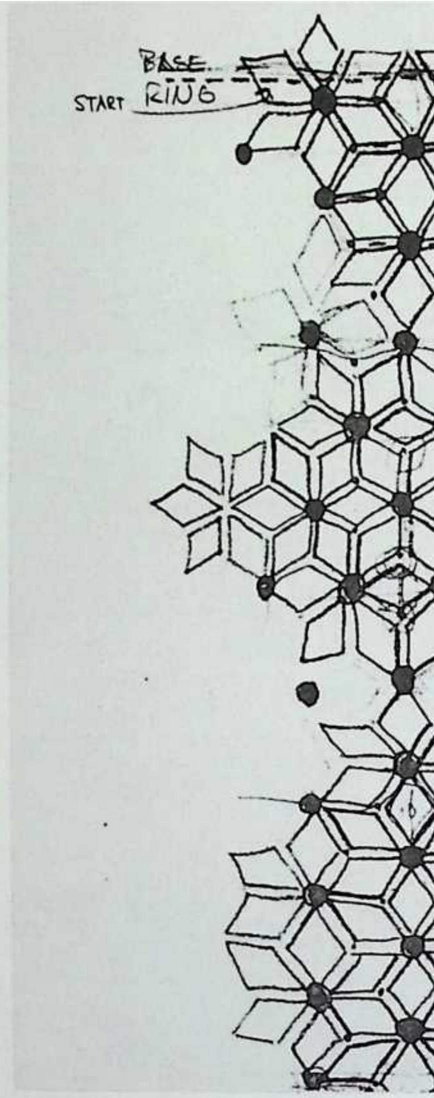
2 Preparatory Studies for the Geodesic Dome: The Icosahedron's Thirty-one Great Circles 1947

Fuller's invention of the geodesic dome is closely related to his invention of the Dymaxion World Map (ca. 1946). The studies of the thirty-one great circles that Fuller made and had copyrighted in 1947 initially were total abstractions; later he adapted them to his method of transcribing the surface of the earth to a flat surface. He diagrammed this method in a sketchbook entitled "Noah's Ark II" (1950), now preserved in the Fuller archive. Further proof of the interrelation between the Fuller geodesic domes and his map, which he began in 1943, is the wood slat globe that he had built at Cornell University in 1952 with metal appliques that represent the land masses of the earth.



6 THE GEODESIC REVOLUTION, PART 1

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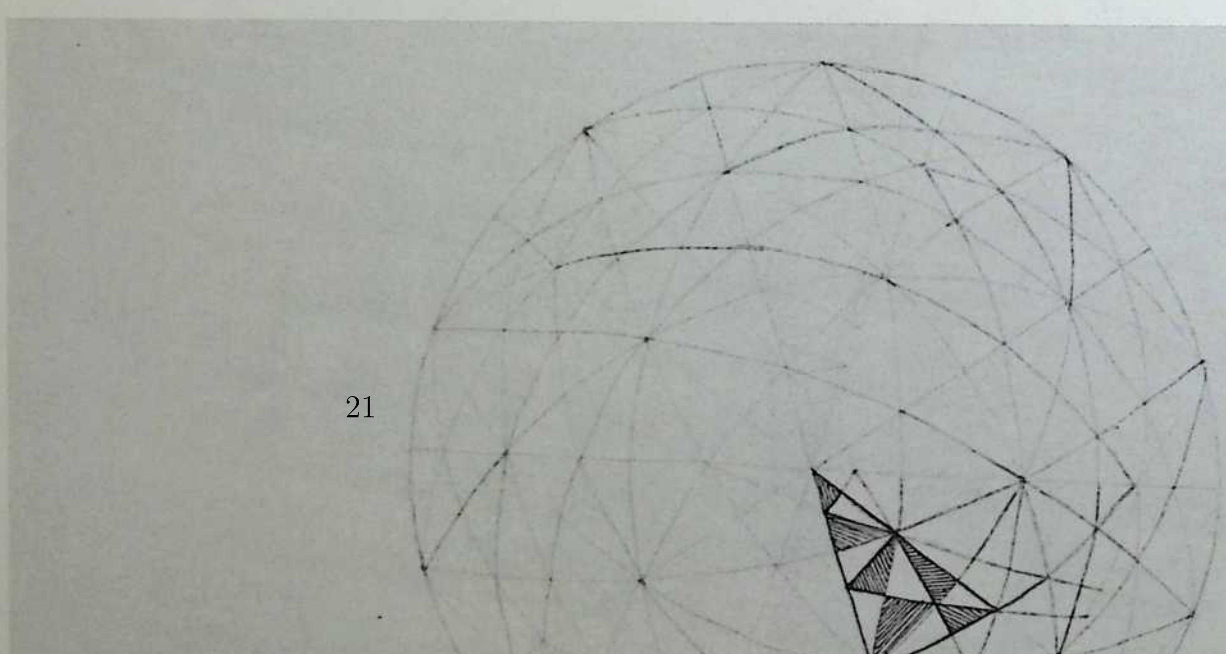

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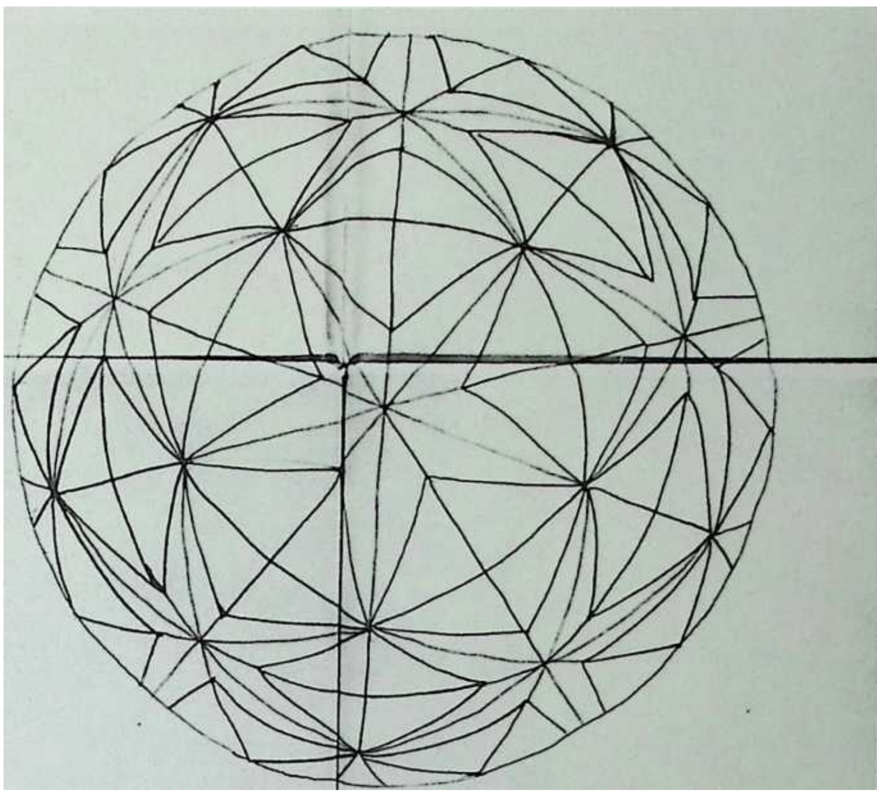
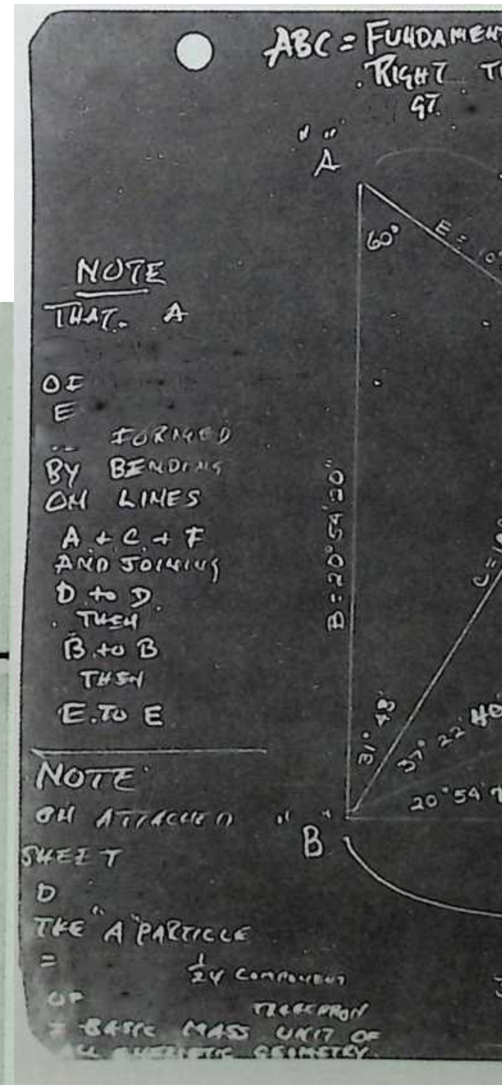
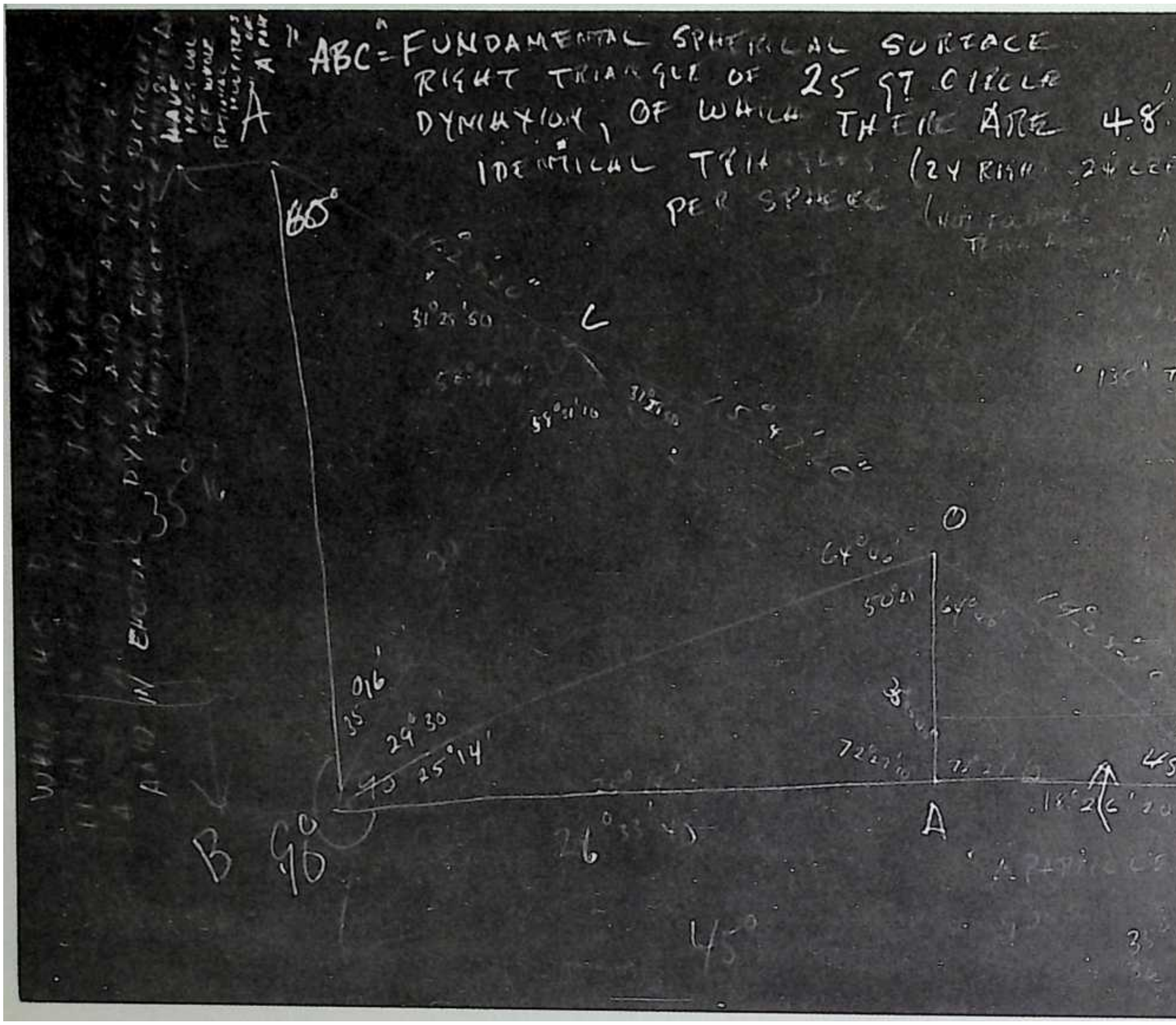
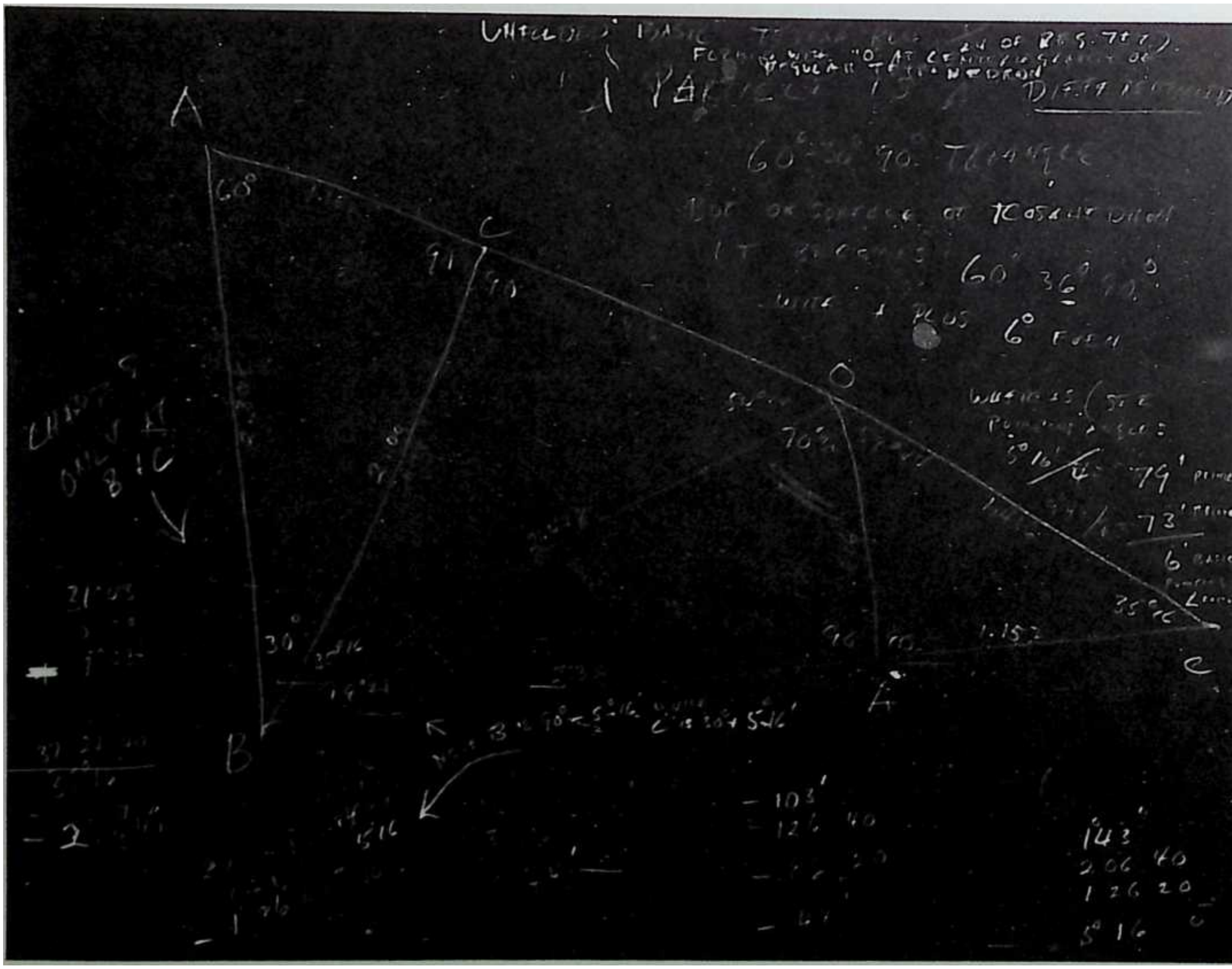



A
60°
NOTE
THAT A
OF
E
FORMED
BY BENDING
ON LINES
A + C + F
AND JOINING
D to D.
THEN
B to B
THEN
E TO E
B = 20°54'20"
31°43'
37°22'
20°54'
NOTE
ON ATTACHED
SHEET
D
THE "A" PARTICLE
OF
TETRAHEDRON
BASIC MASS UNIT OF
B


ABC = FUNDAMENTAL SPHERICAL SURFACE
RIGHT TRIANGLE OF 25 GT CIRCLE
DYMAXION, OF WHICH THERE ARE 48
IDENTICAL TRIANGLES (24 RIGHT 24 LEFT)
PER SPHERE
A
C
O
A
B
90°
60°
45°
26°
25°14'
29°30'



THE GEODESIC REVOLUTION, PART 1 9

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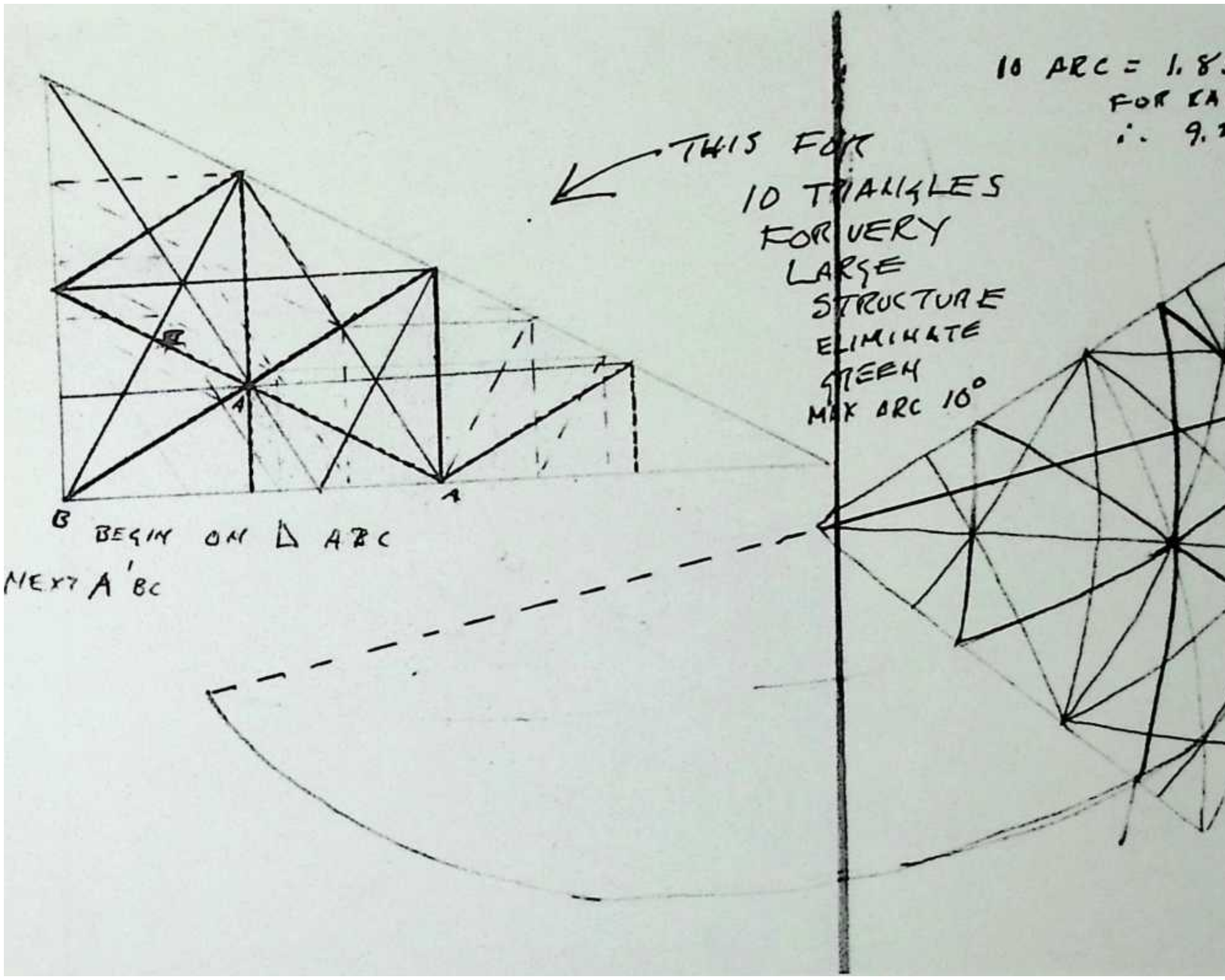
THIS FOR
10 TRIANGLES
FOR VERY
LARGE
STRUCTURE
ELIMINATE
MAX ARC 10°
B
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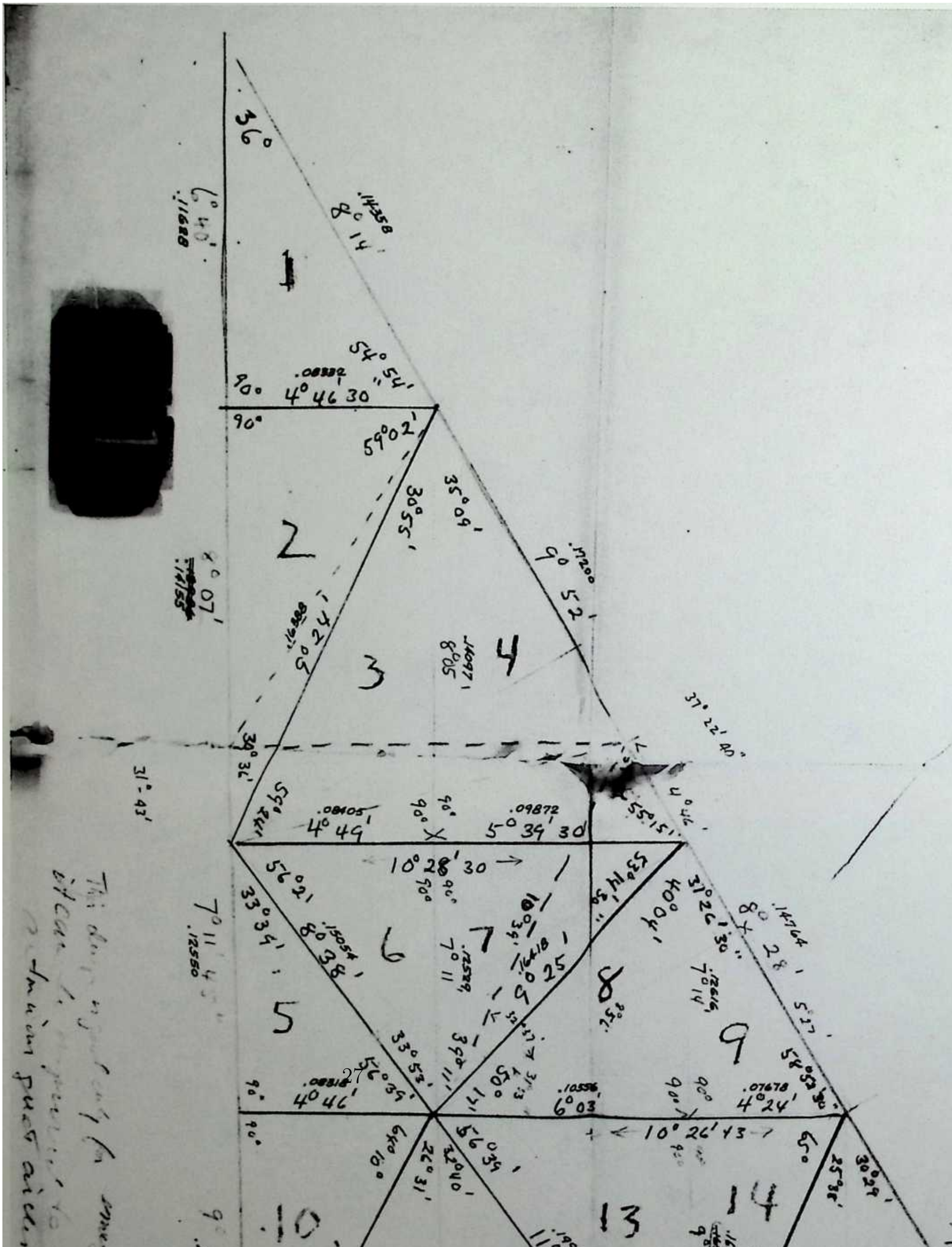
BEGIN ON △ ABC
NEXT A'BC



5 4' 10

3 Great Circle Mapping Device Booklet Late 1940s

FIG. 1

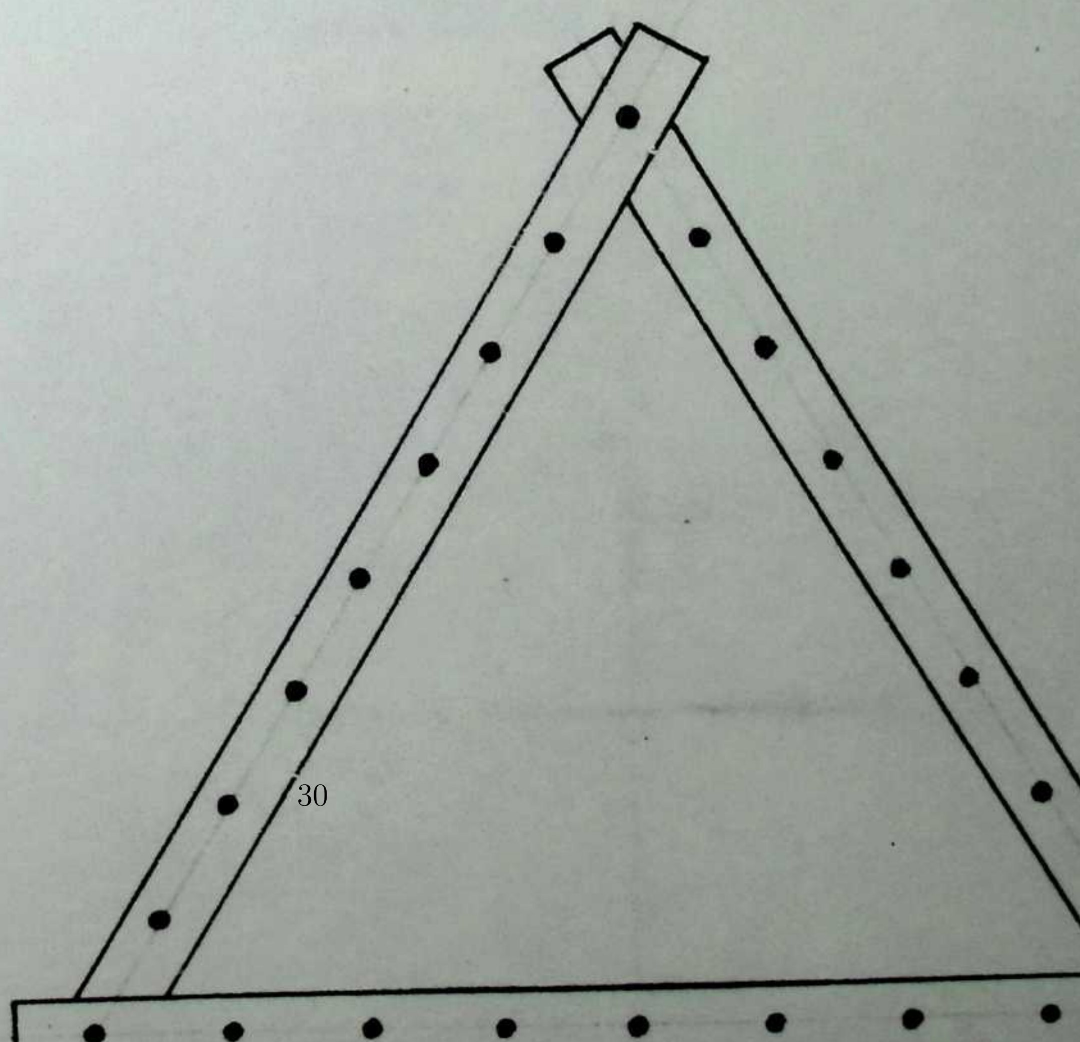


FIG. 2

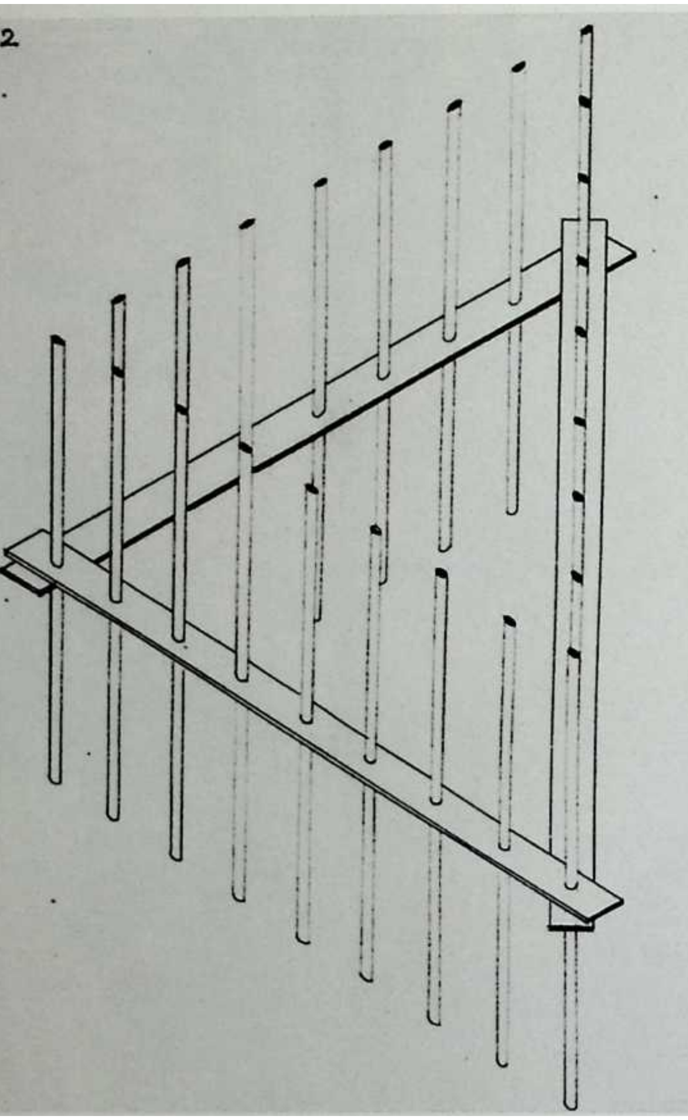


FIG. 3

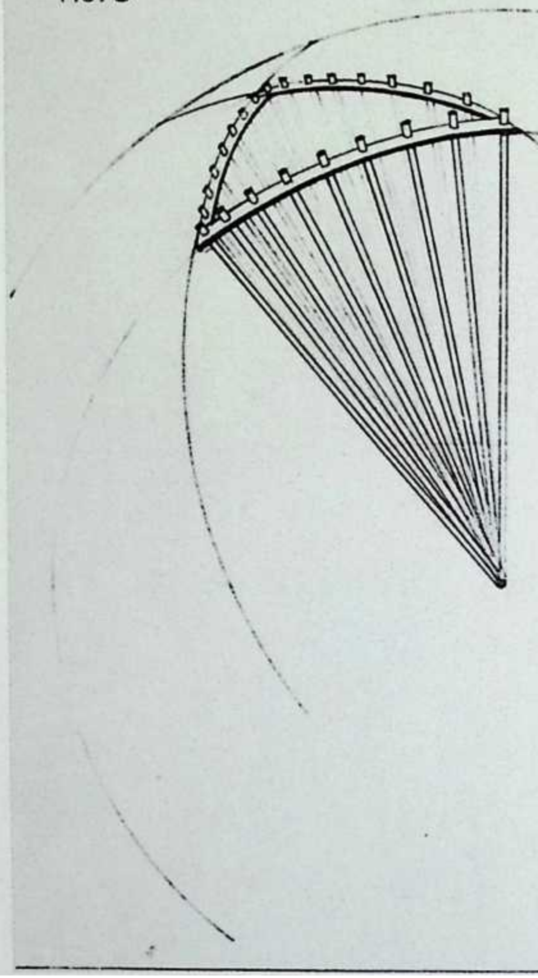


FIG. <*o*

FIG.T

FIG.a. a)

d.

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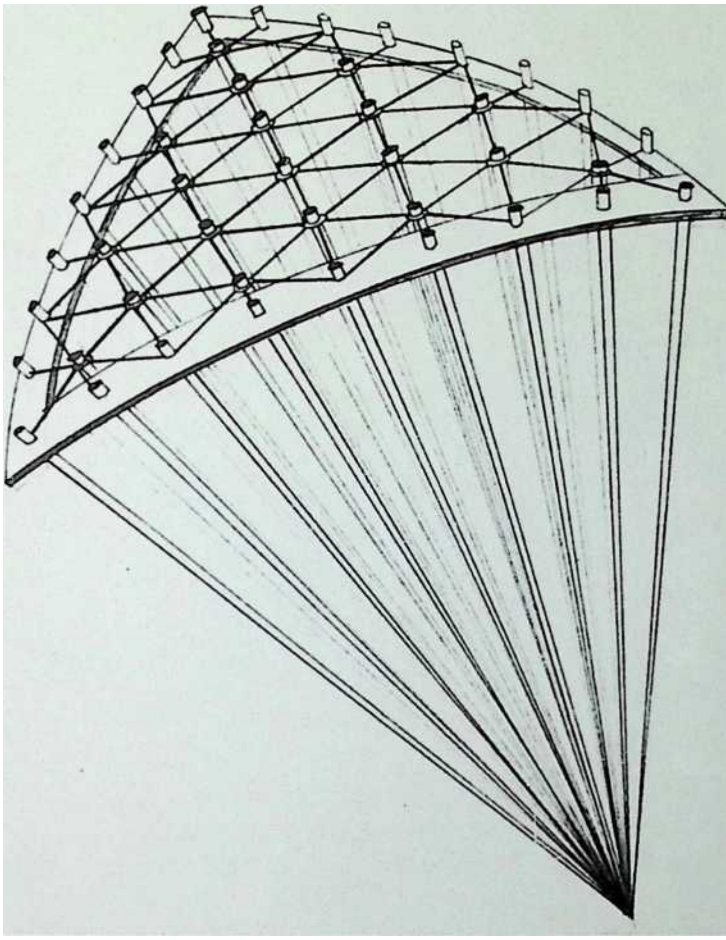
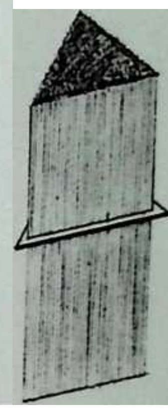
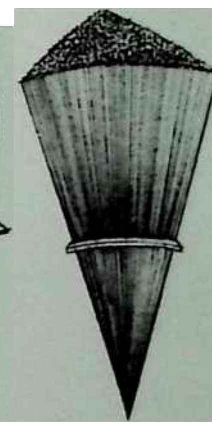
VERTEX OF MAIN SURFACE AMGL^ TXT







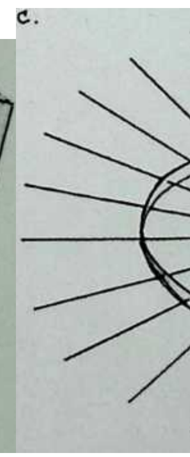

c.

FIG. 8 b)

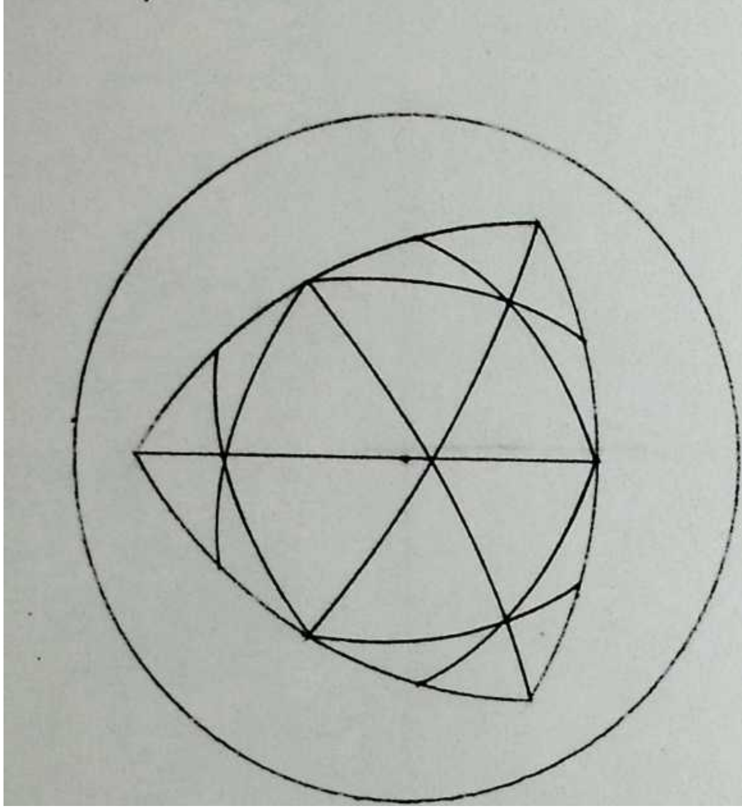
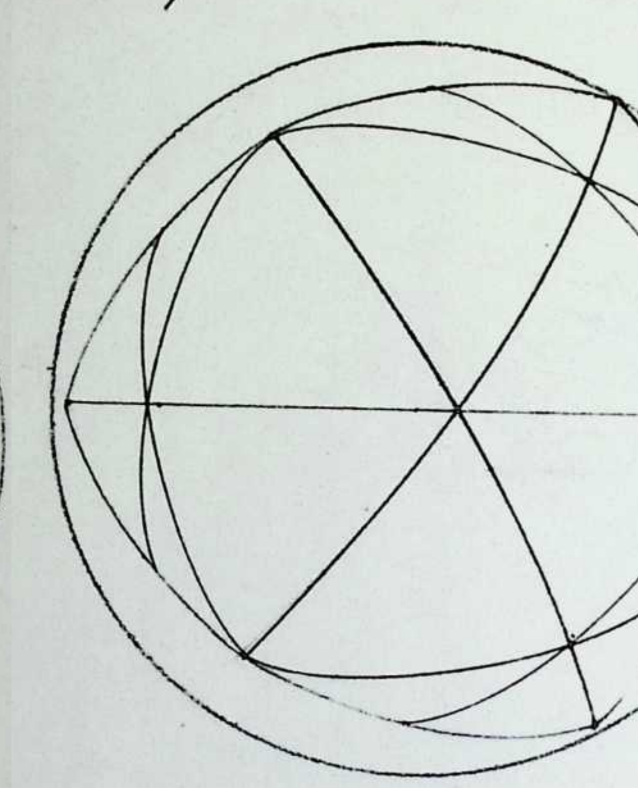


FIG. 8 c)



ONE SPHERICAL EQUIANGULAR. A

OF THE OCTAHEDRON'S 8

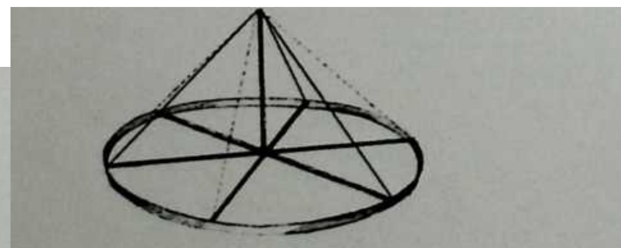
VEJETtX OF MAIN SURFACE. ANGLE “To^0

°NE SPERICAL EQUIANGULAR A

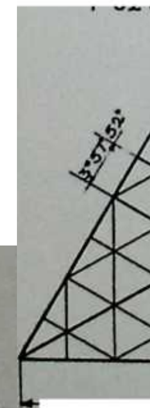
Of THE TETRAHEDRON'S 4

VERTEX OF MAIN SUETfccE. ANGLE |ZO°.

ONE SPHERICAL EQUIANGULAR Δ ALMOST 180°



e) ONE SPHERICAL EQUIANGULAR Δ OF THE HEMISPHERES TWO VERTEX OF MAIN SURFACE ANGLE EQUALS 180°



t=»G. <

65* 2 fa

BASIC DATA ON 15 GREAT CIRCLE TRIANGLES.

f.) PICTURE OP MILK DROP

I J SPLAGM /D'ARCY THOMPSON\ IDEWTlCAL? TO PHOTOGtAPH OP BdEOtE COLAP^E.

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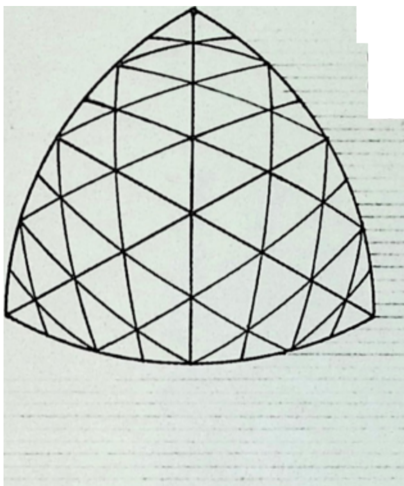

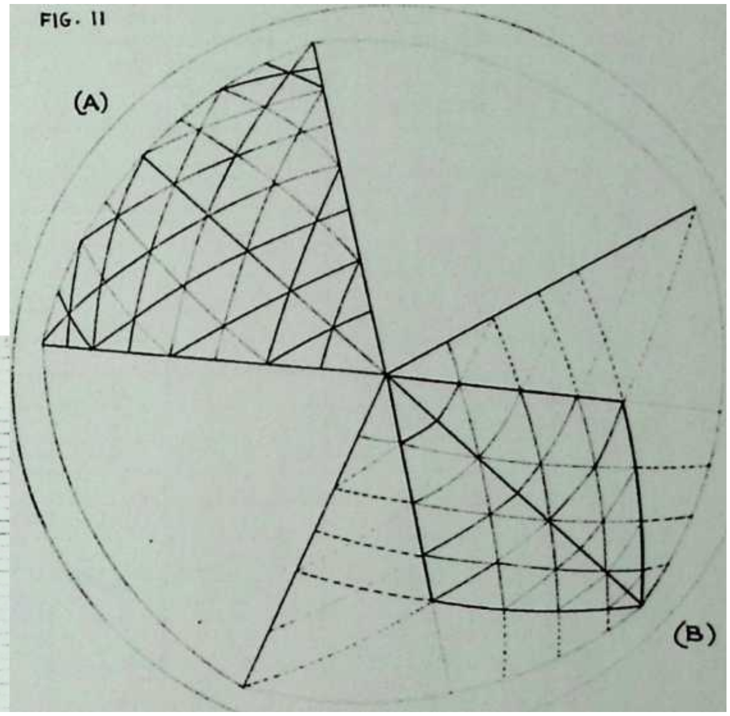

' **FIG-IO**

MODULE OF

20 Equi AMG.

OF EDGE. OF

Mo R X - TOTAL LENGTH .

STRUCTURAL ESTIMATING SCHEME

UNIQUE TO THREE-WAY- &RAATCIRCLE GRID ON UNIFORM BOUNDARY ICOSAHEDRON'S MAJOR

THE INTERVALS UNIFORM BOUNDARY SCALE OF SPHERICAL EQUISIDE-AND-AN&LE.- - LATERAL-ARG TRIANGLES.

THE NUMBER OF WHICH UNIFORM INTERVALS ALONG ONE EDGE OF ONE TRIANGLE. OF THE TEN TRIANGLES COMPOSING ONE. HEMISPHERE OF THE ICOSASPEEE [15] KEY NUMBER . XN FORMULA FOR CALCULATING LENGTH OF RIBS OF AN ICOSA-GEODESIC STRUCTURE.

THE NUMBER OF EDGE INTERVALS GOVERNS THE SIZE OF INTERSTICES AMD SPAM *TXX.* ANY SIZE OF HEMISPHERE, STATED IN RADIUS OF BASE, AMD THE NUMBER OF INTERVALS PER ONE EDGE OF ONE ICOSA - EQQLLATERAL'S MAJOR SPHERICAL TRIANGLE EQUALS 'X* . PAPIU6 OF HEMISPHERE EQUALS ‘R’.

FORMULA FOR LENGTH OF ALL Bi BS, OF ALL SPAMS TOTALS >

ESTIMATING FORMULA

(ACTUAL FORMULA — I5.70BRX * fed ee«0k}

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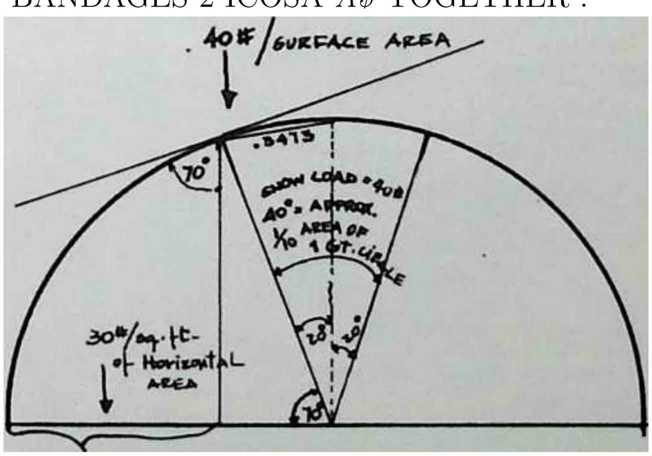
Ife RX • TOTAL LENGTH » lfc« 8*50 »s«4O Tt.

PLAN VIEW OF ICOSAHEDRON VERTEX , THE *S* OF ITS TRIANGLES AEOUN OWE VERTEX (AN TCOSACAP) REPRESENTING SURFACE AREA EQUAL ID AREA OF CNE GREAT CIRCLE OF ITS SPHERE . THE DIAMETER DF ICOSACAP EQUALS 85%, APRROX. OF DIAMETER OF ITS SPHERE.

ONE COMPLETE ”ICOSAHEDRON A,” 20 f>Efc SPHERE IS SHOWN AT (A) ONE COMPLETE ”DIAMOND” OF 30 FEE SPHERE SHOW AT(t} DIAMOND AT(B) COMPRISES BASIC STRUCTURAL ELEMENT FOR. 3-WAY GRlPDlNfe ANp BANDAGES 2 ICOSA *A$* TOGETHER .



UoR42OHtAL A^Rox.^p OFOME <SREAT CIRCLE .

FACTORSSTRESS CALCULATIONS Op STKUCWKE *fQK*

U&VU VogK CITY

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AND So 610°/

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I6oo»5| » ^,400# LIVE LOAD

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TOTAL LOAD

AS* DOME

44' DOME

14-1-512 I5HO.4-

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c-iecuN-FEReucE -

AREA 7

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(INSIDE DIAMETER) = 400#/FT. CIRCUMFERENCE)

FOR SUPER. 14V MCA Mfc WITH APPROX. DOUBLE THAT LIFT / GQ . *FC. OF* FLOOR AREA

" 1000 * OLc.iRCUNf-EfcB.HCE_.

UUMETtR LENGTHS STATED IS FEET OF MAXIMUM SPAN OF ANY RIB. IN A

GEODESIC HHUSPHERE STRUCTURE

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0 so' ; 00*	120	.08					4	
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1 24* * 86”	' 45	.24	.72	1.2	8.8	6	12	
3 57' ; 52*	16	.69	2.07	8.5	ID. 4			
5 17' ; 10*	tt	.92	2.76	4.6	18.8			
7 55' • 45*	8	1.58	4.14	6.9				

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9.22' span				
00*	1.89	5.87	9.45	

7 55« 45”)

10 51« 00-

FIG- |5 £cout.)

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-* FOR. 1° 55' 45" INTERVAL).

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51

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GROUPS **qeey. 3 ©**

GROUP 4

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l/ • •	1¿An *Z*	10	51	7	S4 *V>	&S '.I		7F⁴/.^

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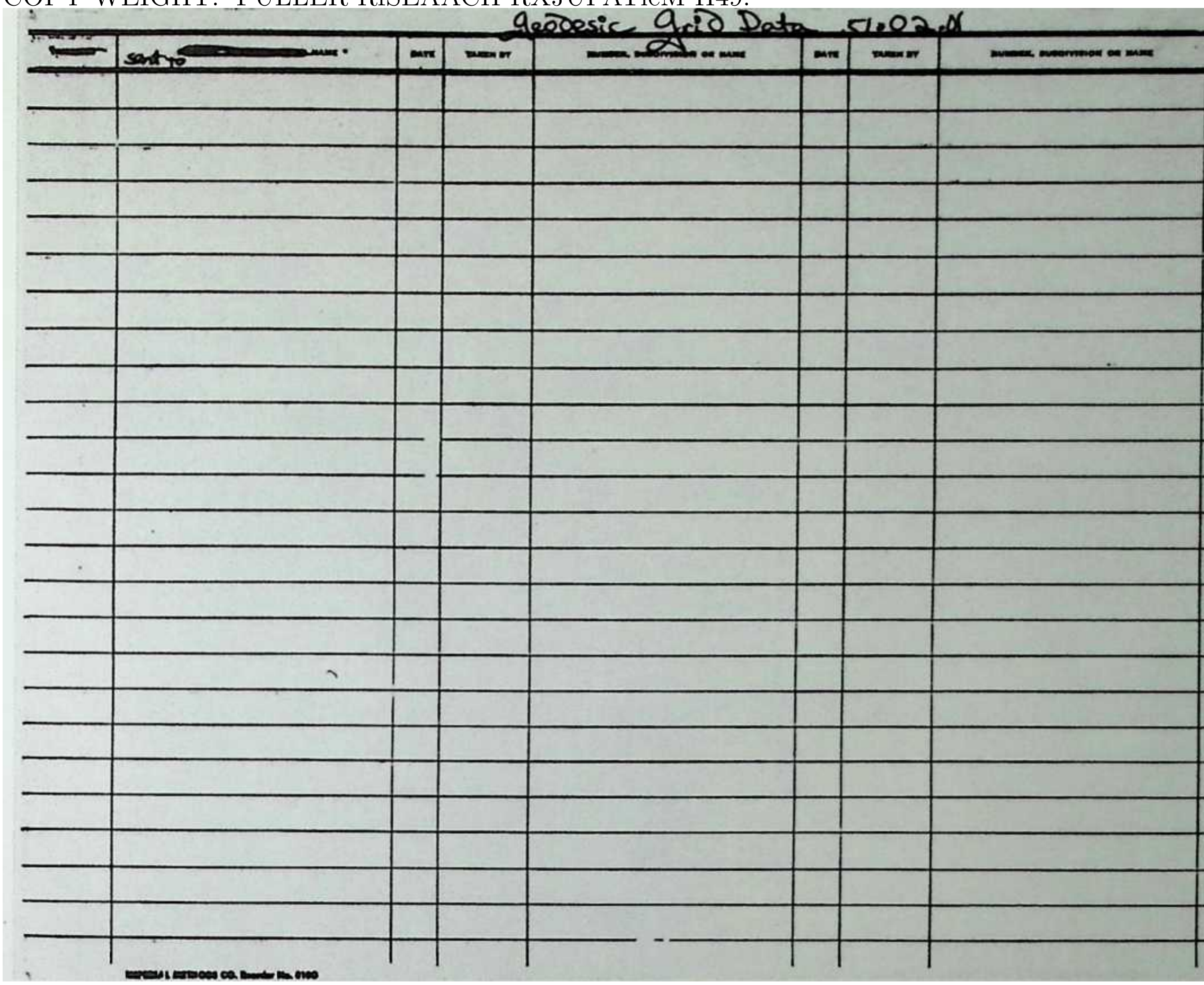
COPY WEIGHT.' FULLER RfSEAACH RXJUPATieM H49.



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GROUP 5

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DYMAtflON SjEODESlC STRUCTURE 3| @

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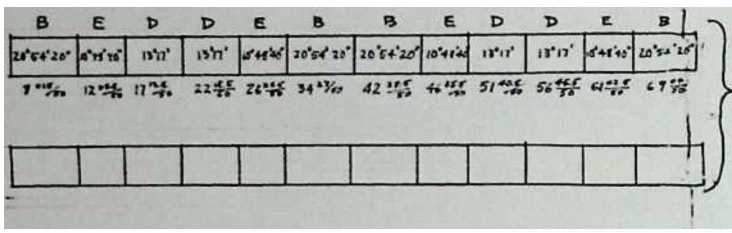

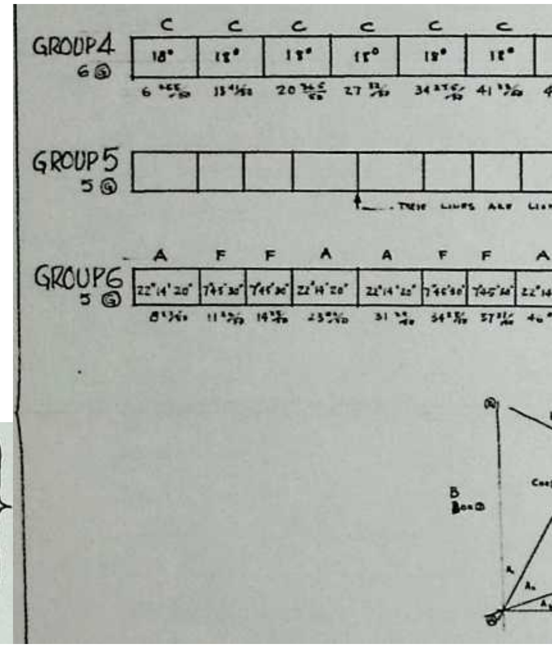

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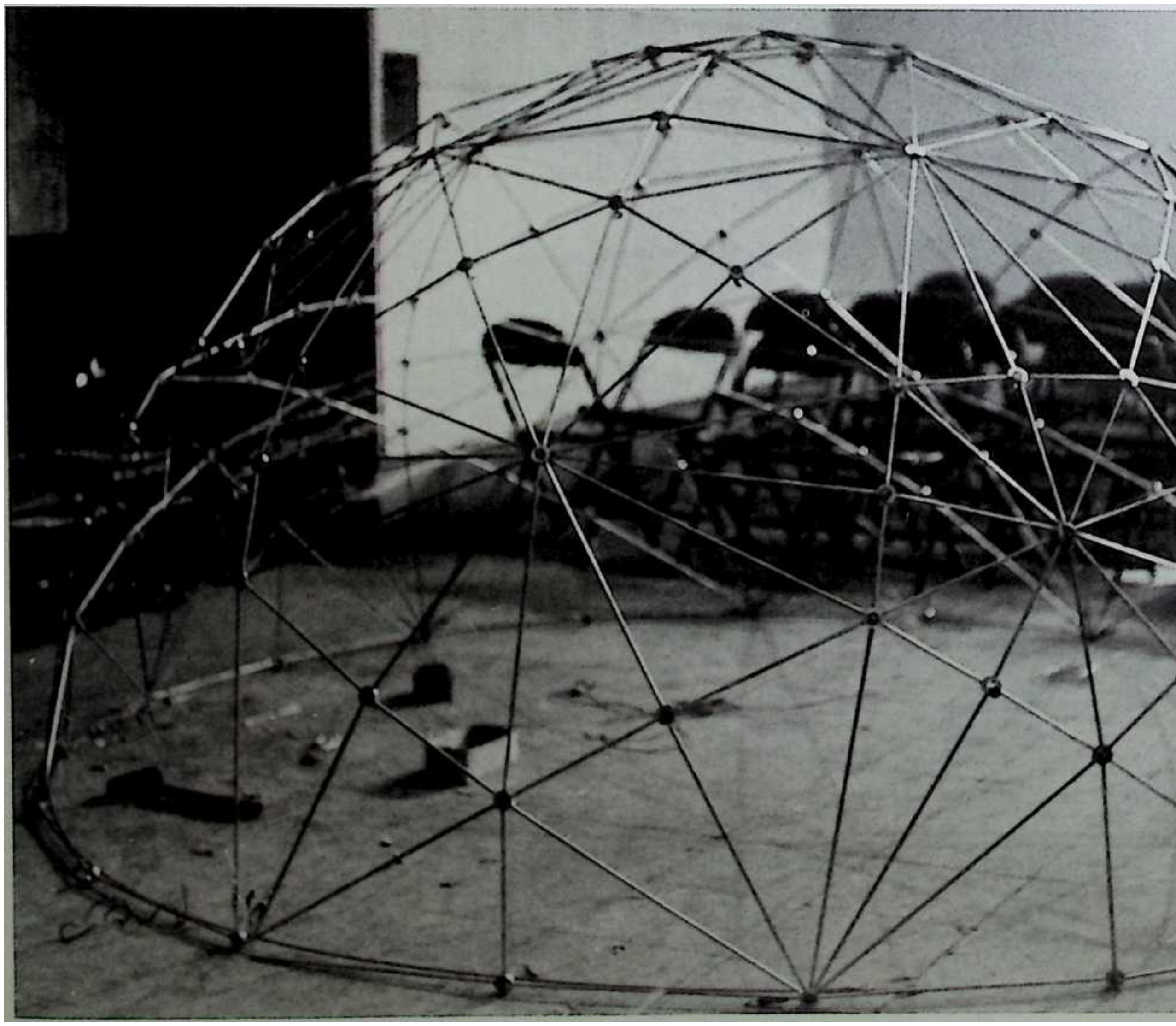
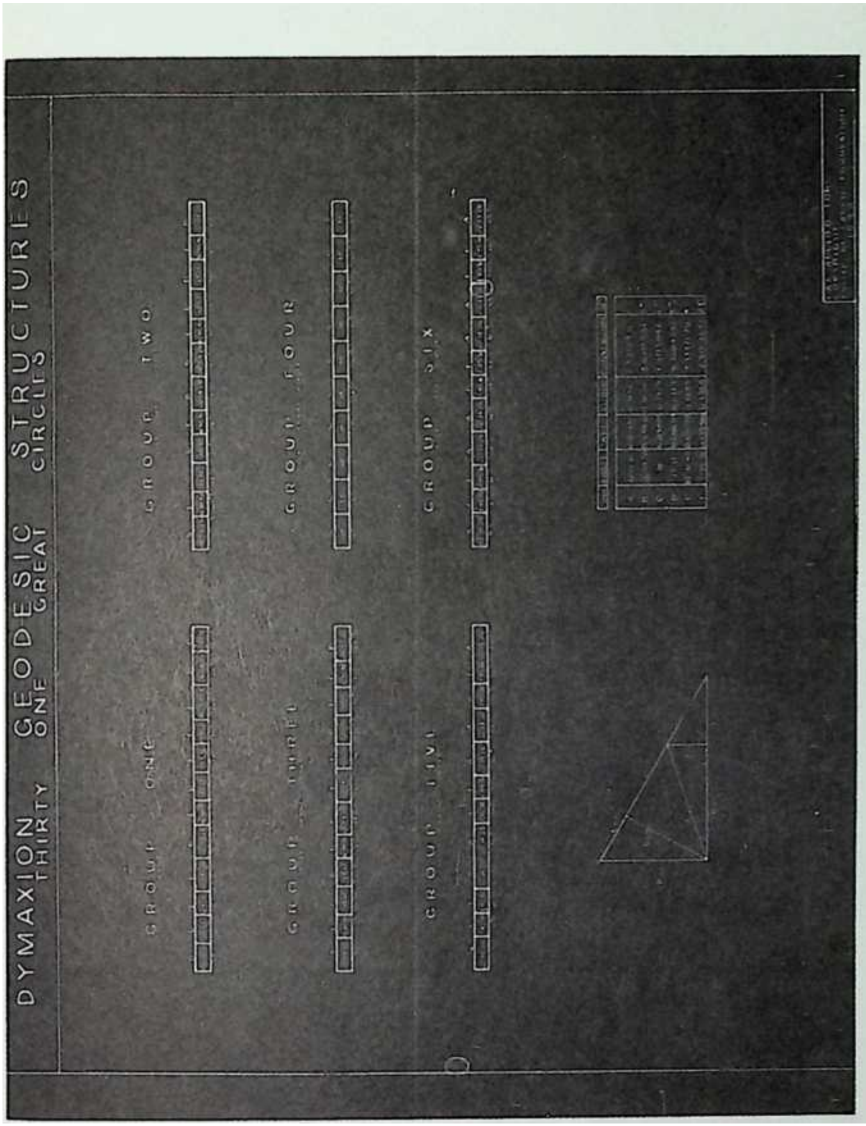
4 Dymaxion Geodesic Structures: Twenty-five and Thirty-one Great Circles 1949

Architecturally, the great circles represent the vector equilibrium and the icosahedron that became the chief models for Fuller's structural designs. His purely geometric constructions had been presented as an analog of nature's energy continuum. However, Fuller eventually developed a concrete means to translate the great circles (twenty-five and thirty-one) into architecture in 1949. These complex designs comprise two simple components: the strut and the hub (of which one finds eight distinct types). But despite the specificity of these designs, one gets no idea of how the struts were to be fastened to the hubs, nor the materials to be employed. These blueprints represent the structural transition between the intellectual geometry of the sphere and its concrete manifestation in the geodesic domes.

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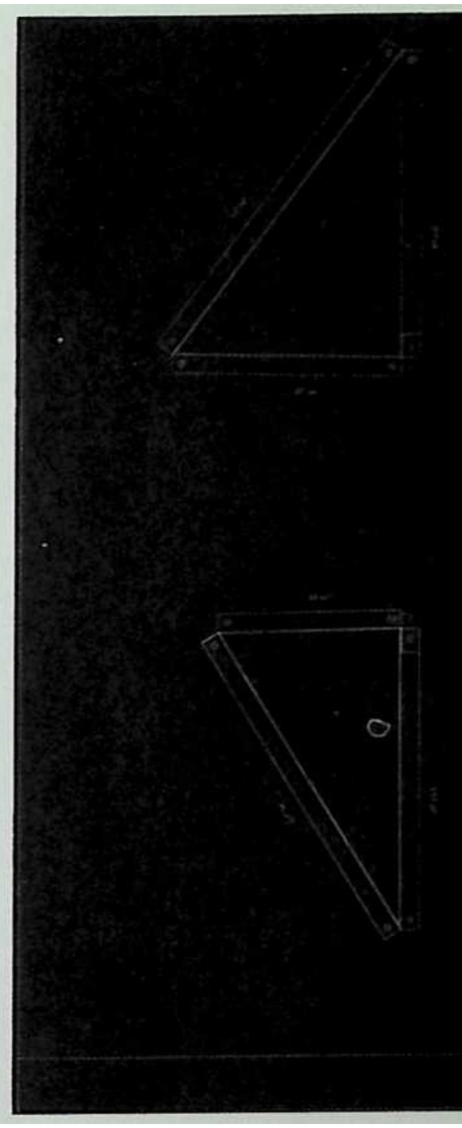
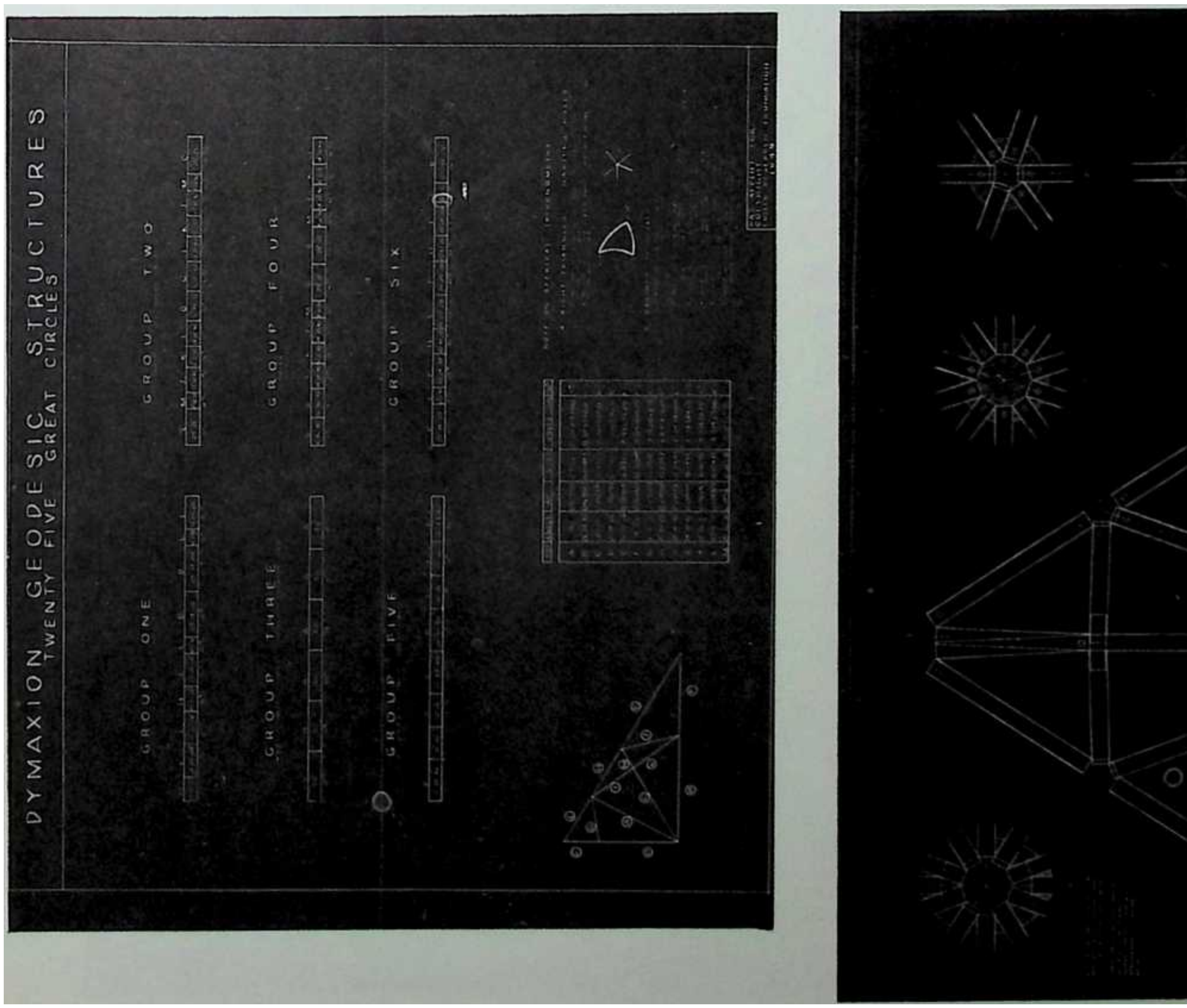
THIRTY ONE GREAT CIRCLES
GROUP ONE
GROUP TWO
GROUP THREE
GROUP FOUR
GROUP FIVE
GROUP SIX




DYMAXION GEODESIC STRUCTURES
TWENTY FIVE GREAT CIRCLES
GROUP ONE
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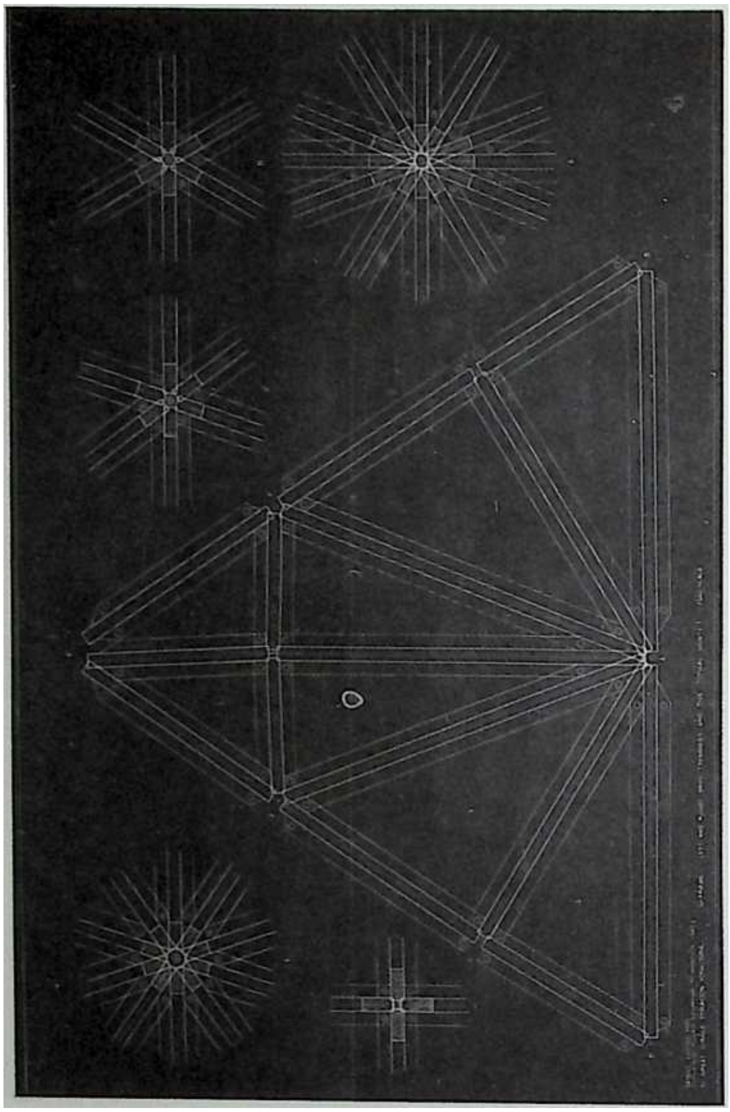
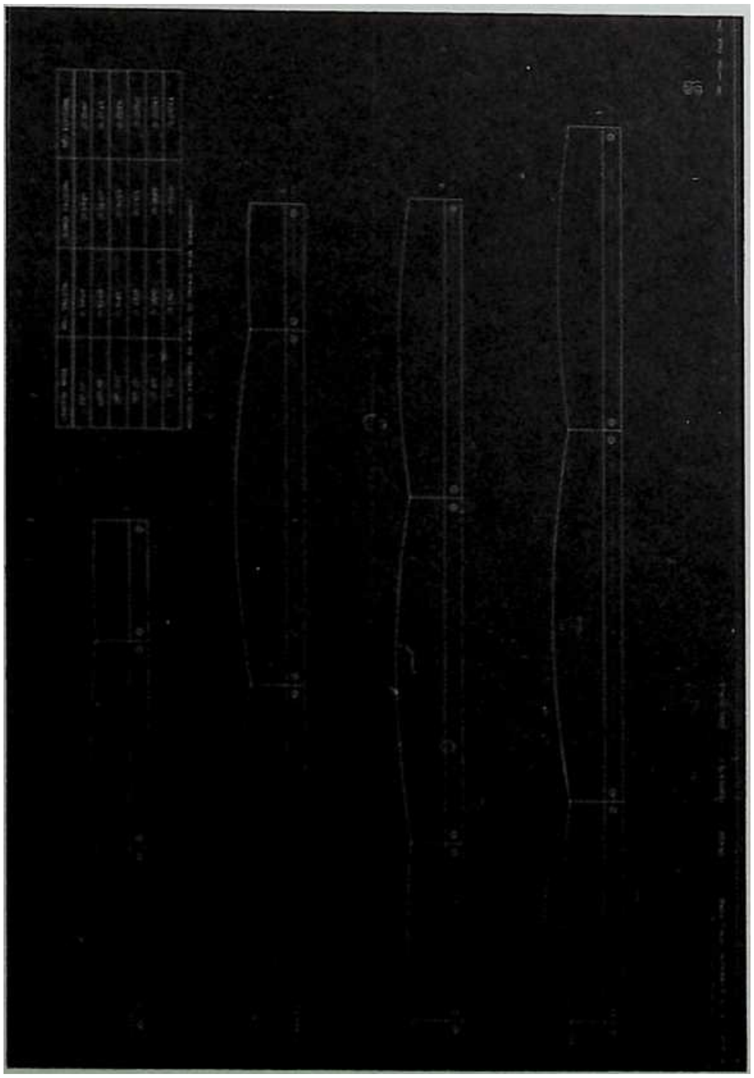
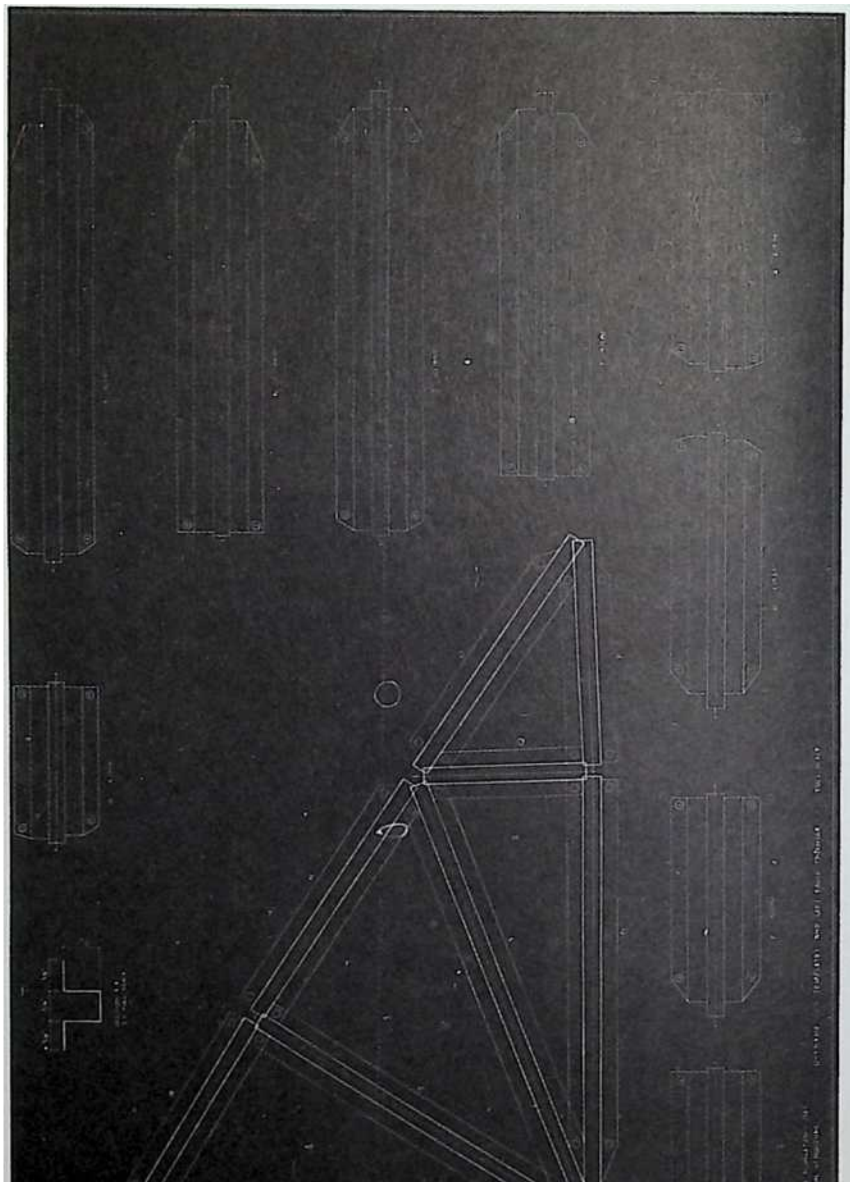
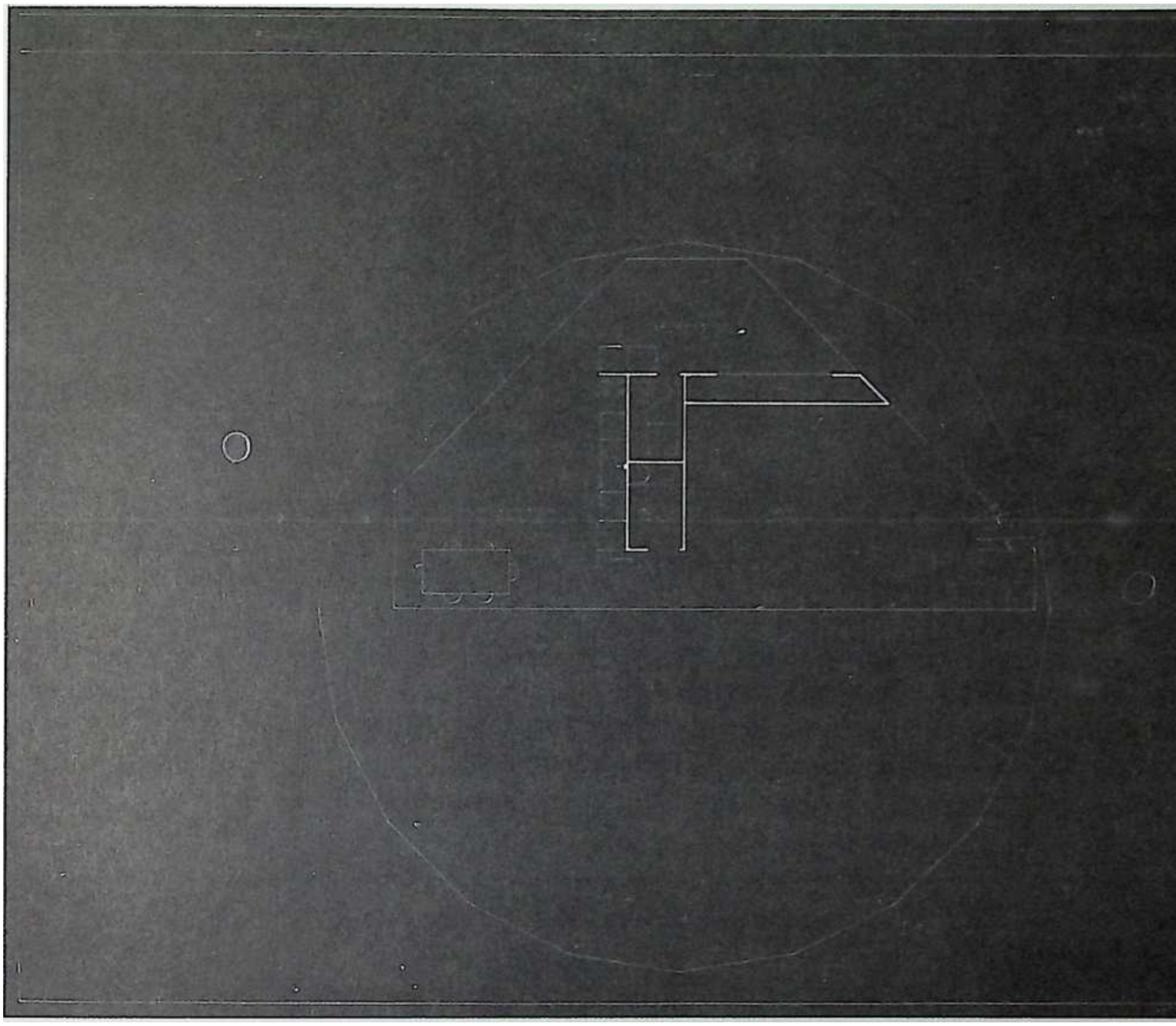
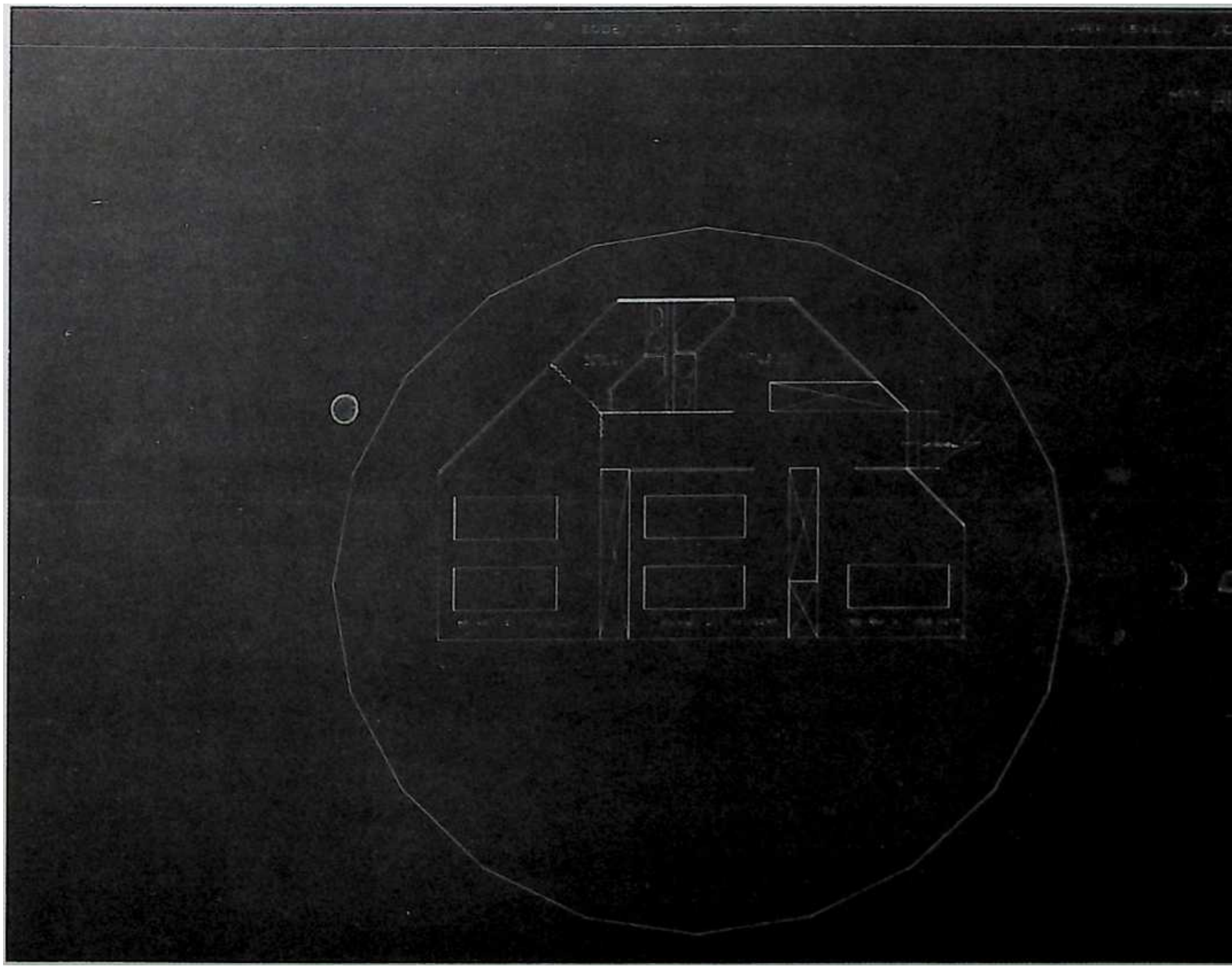
GROUP THREE
GROUP FOUR
GROUP FIVE
GROUP SIX



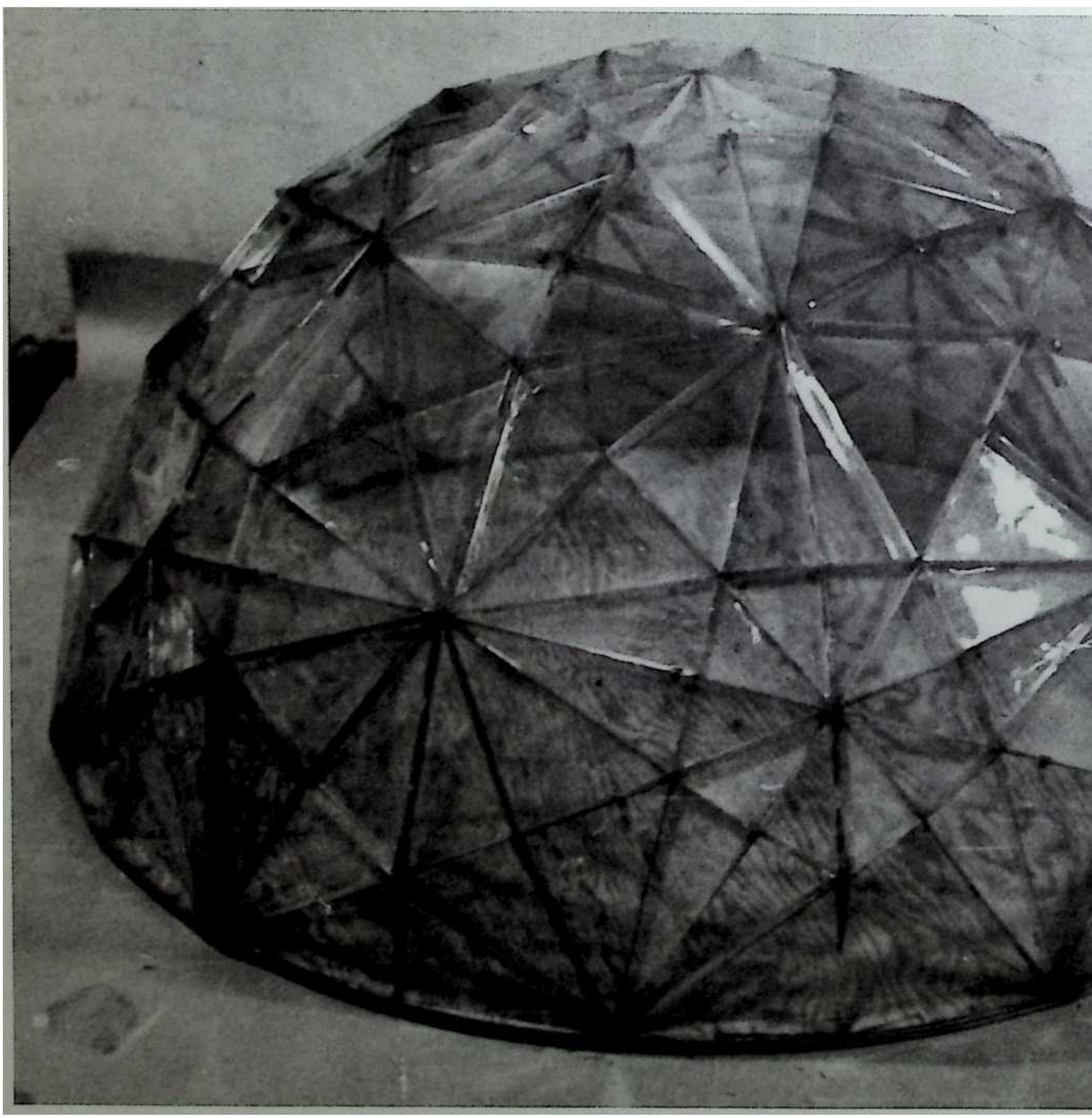


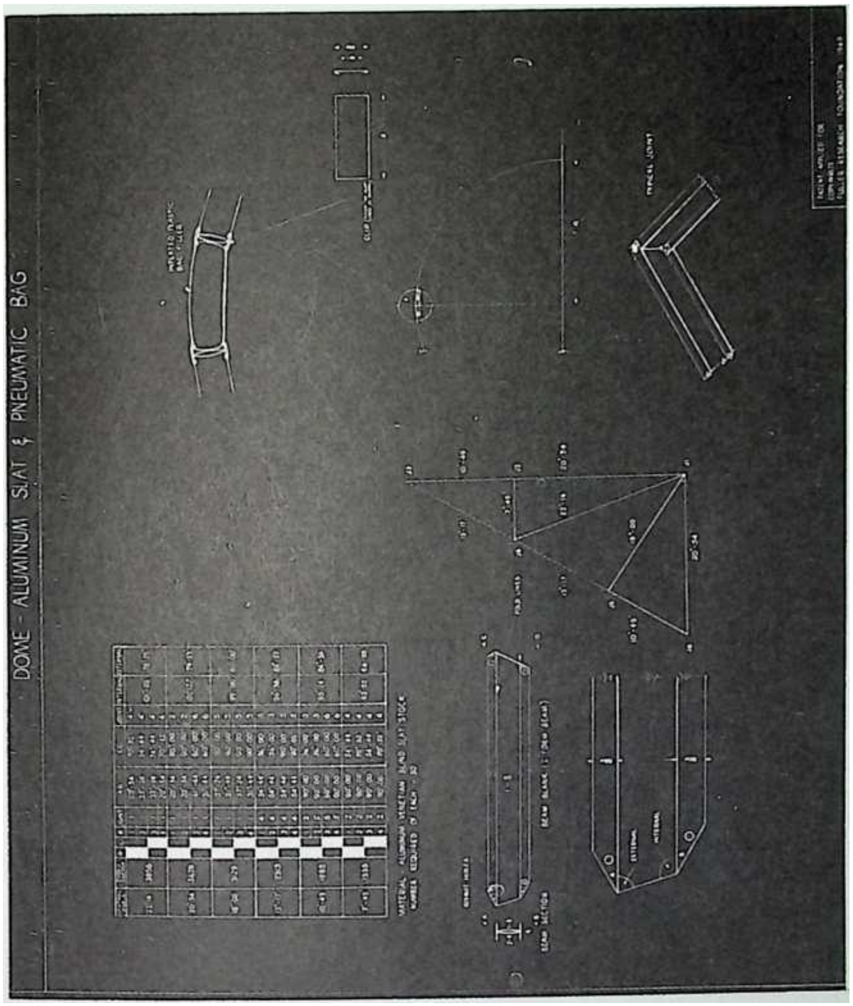


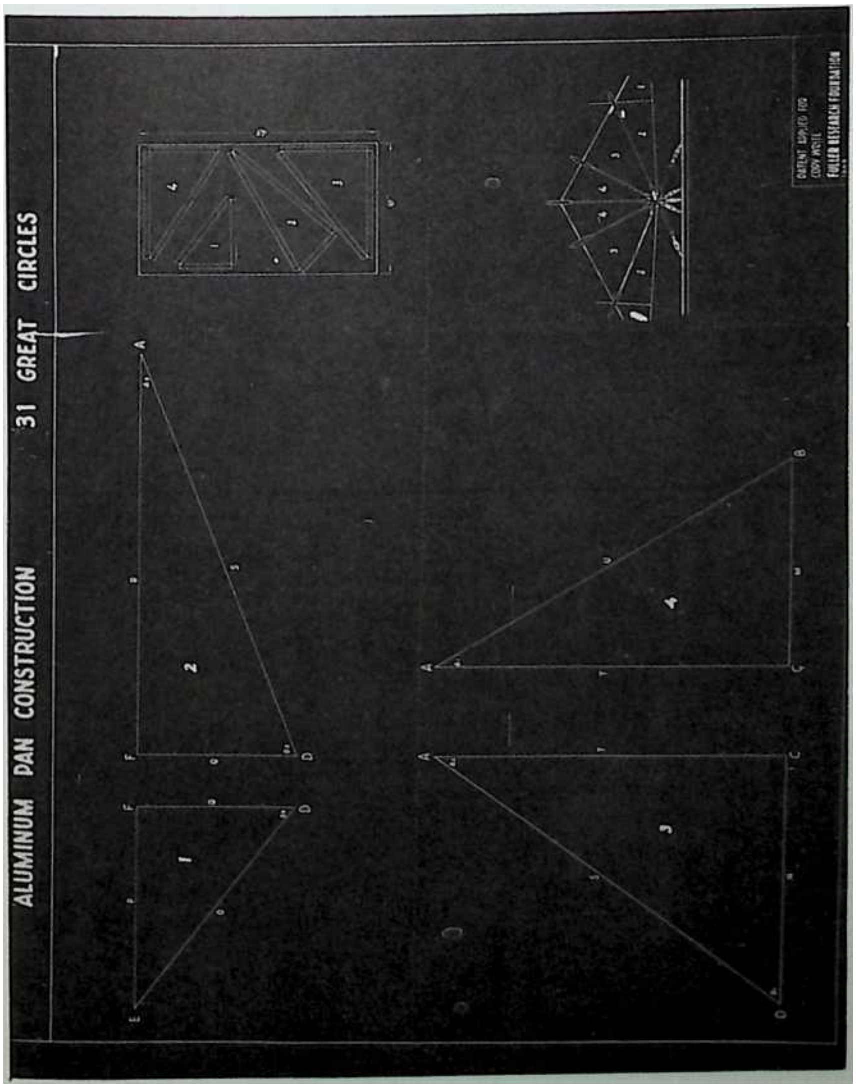


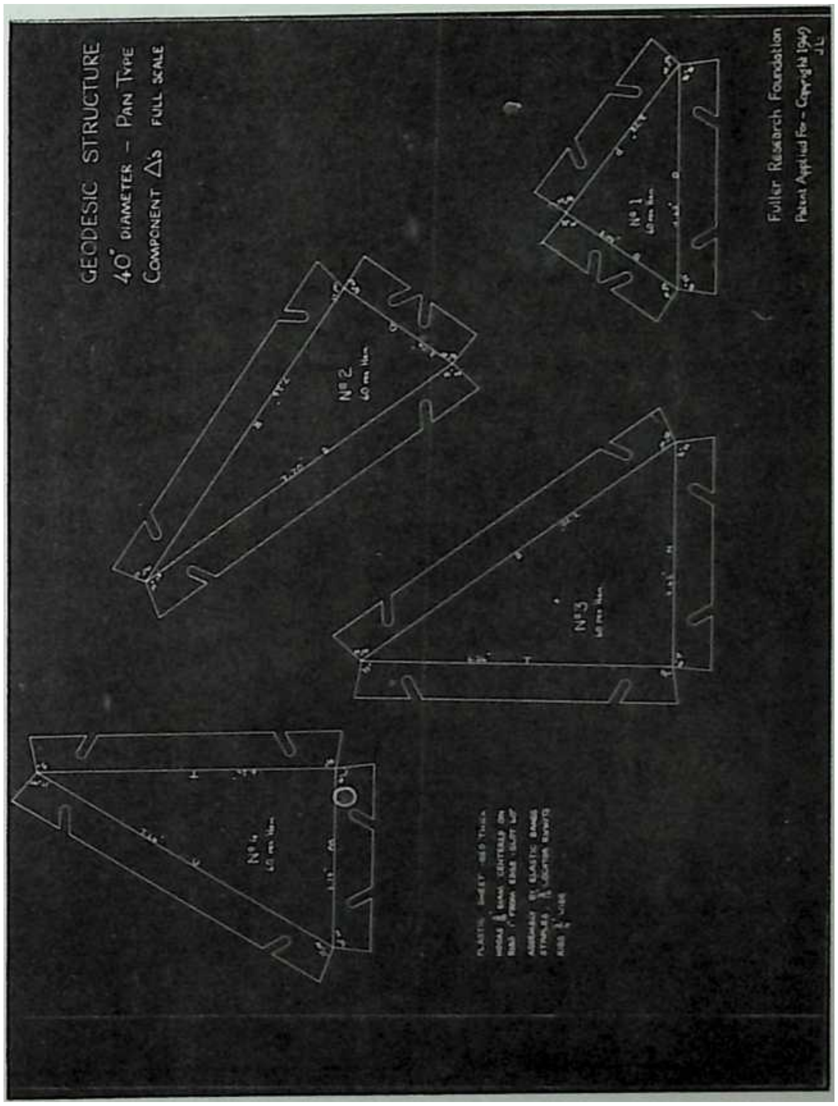


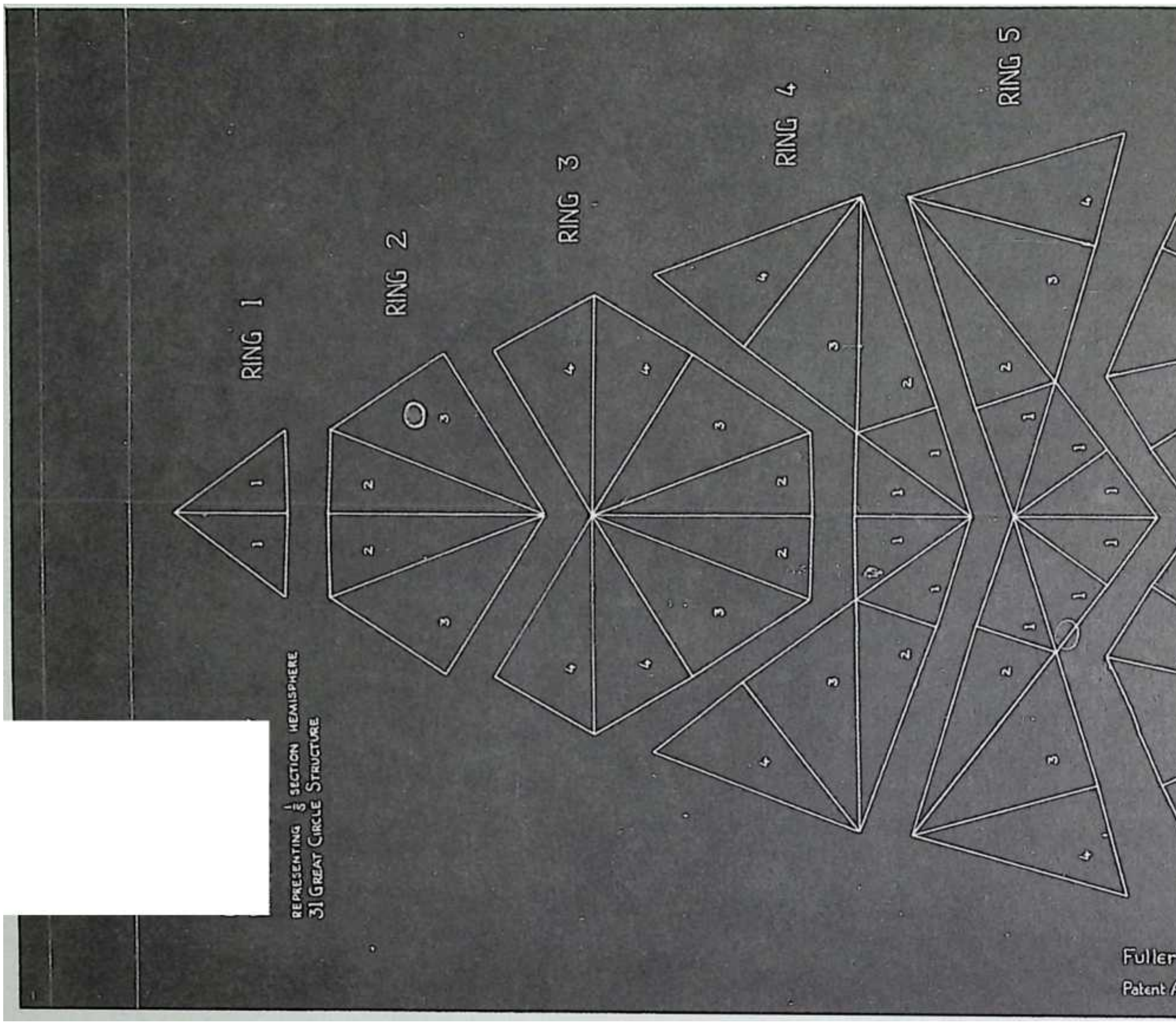
5 Plastic Model of a Pan-Type Geodesic Structure, Thirty-one Great Circles




DOME - ALUMINUM SLAT & PNEUMATIC BAG


ALUMINUM DAN CONSTRUCTION
31 GREAT CIRCLES
FULLER RESEARCH FOUNDATION


GEODESIC STRUCTURE
40' DIAMETER – PAN TYPE
COMPONENT Δs FULL SCALE
Nº 1
Nº 2
Nº 3
Nº 4
Fuller Research Foundation



GEODESIC

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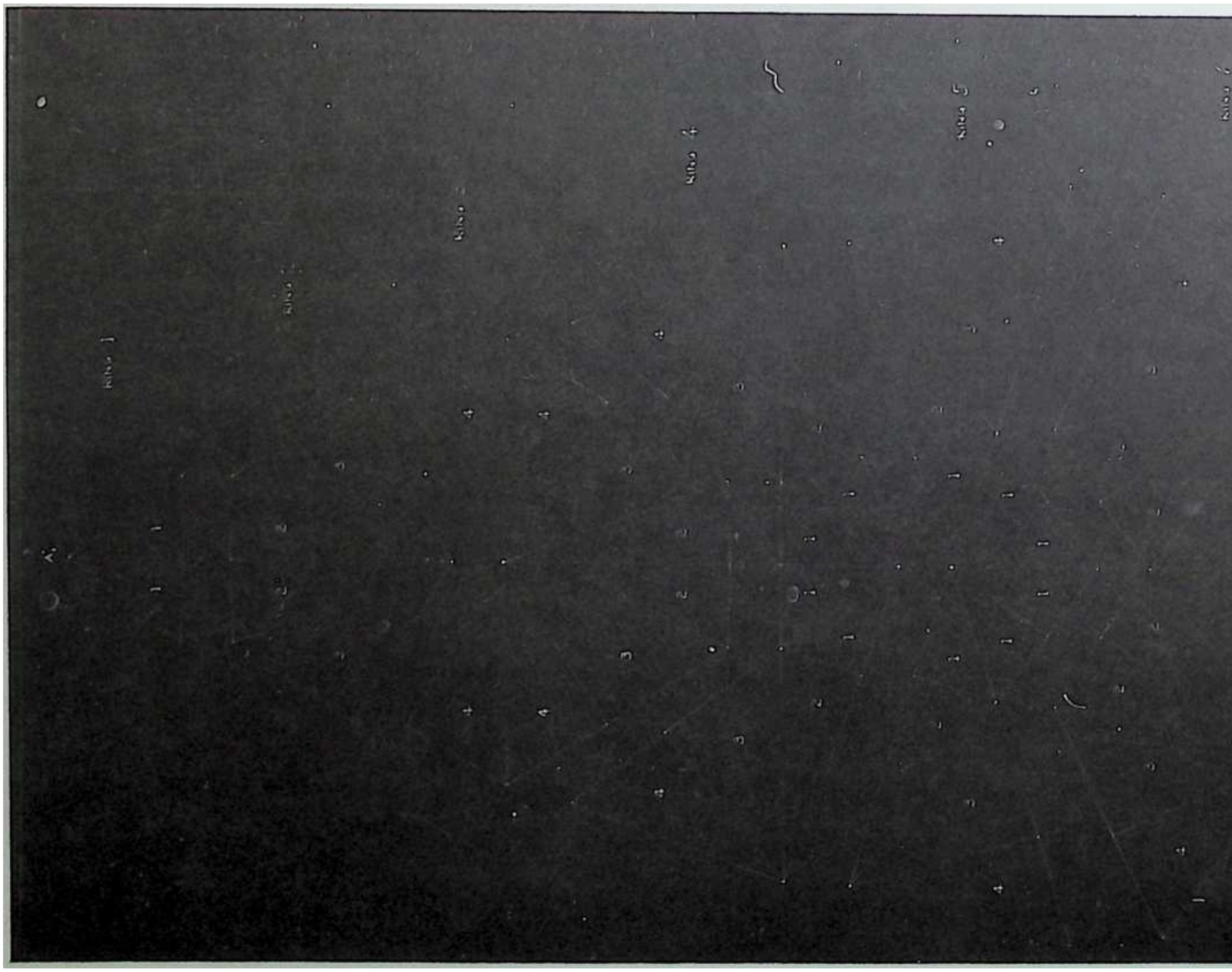

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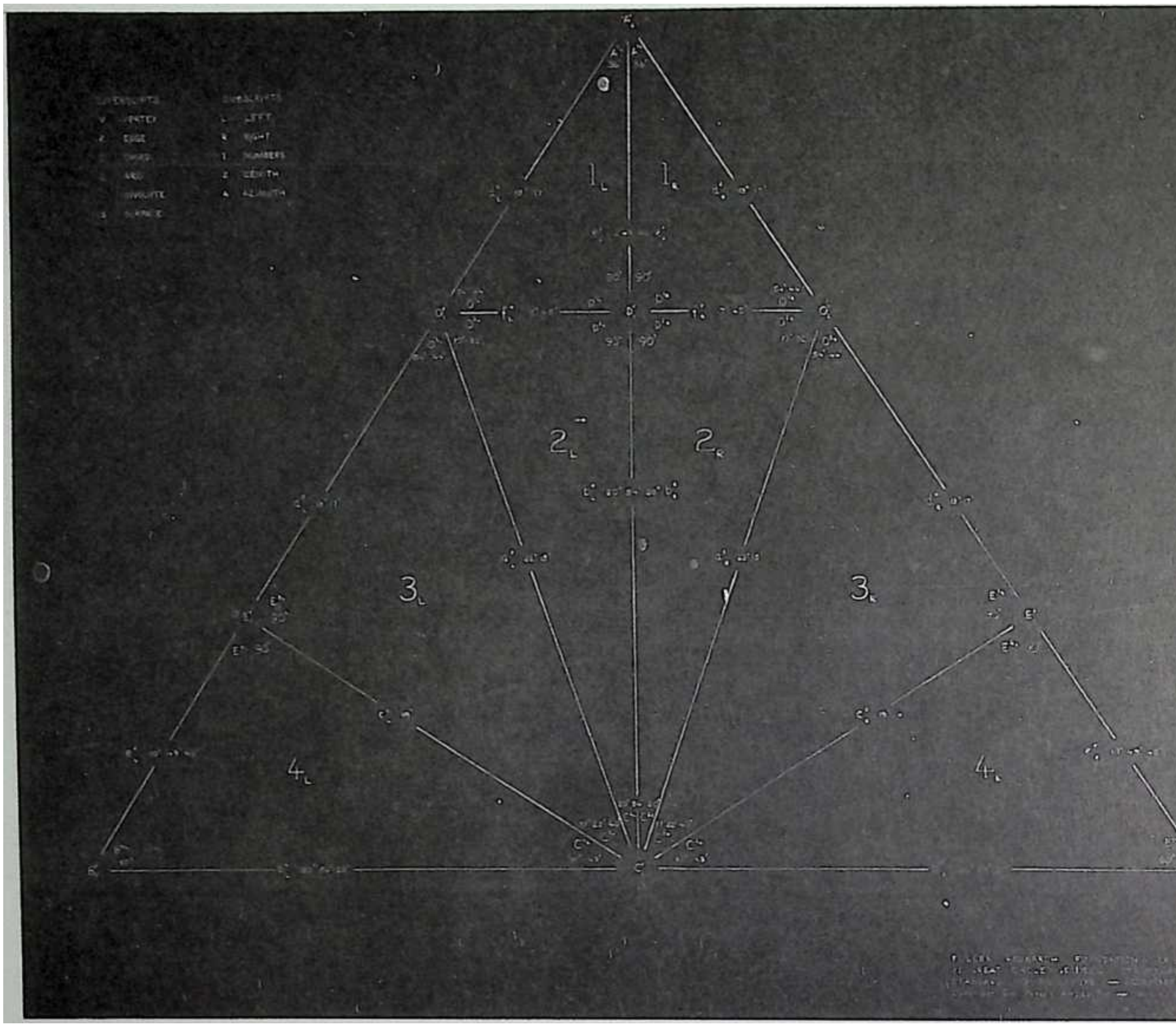

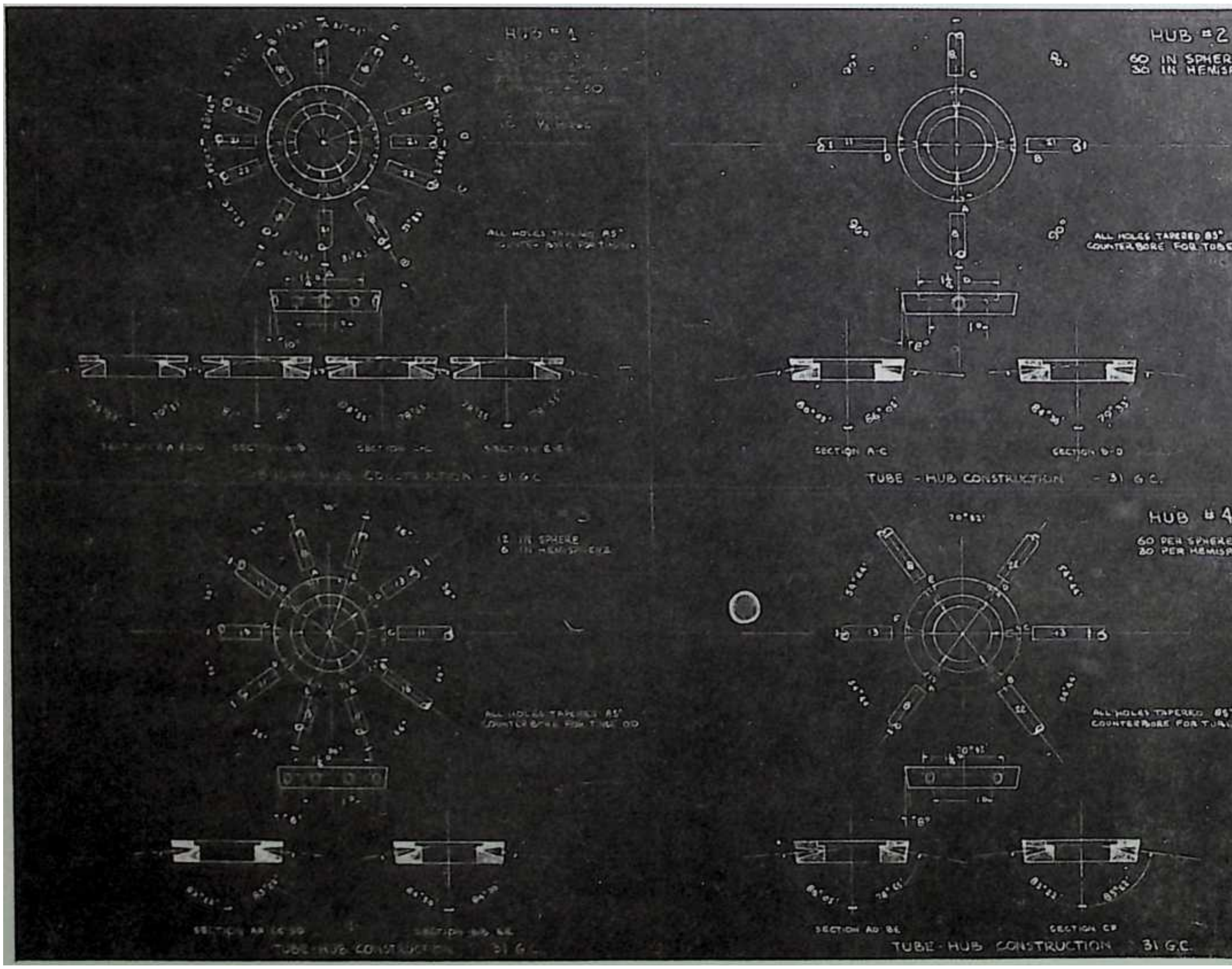
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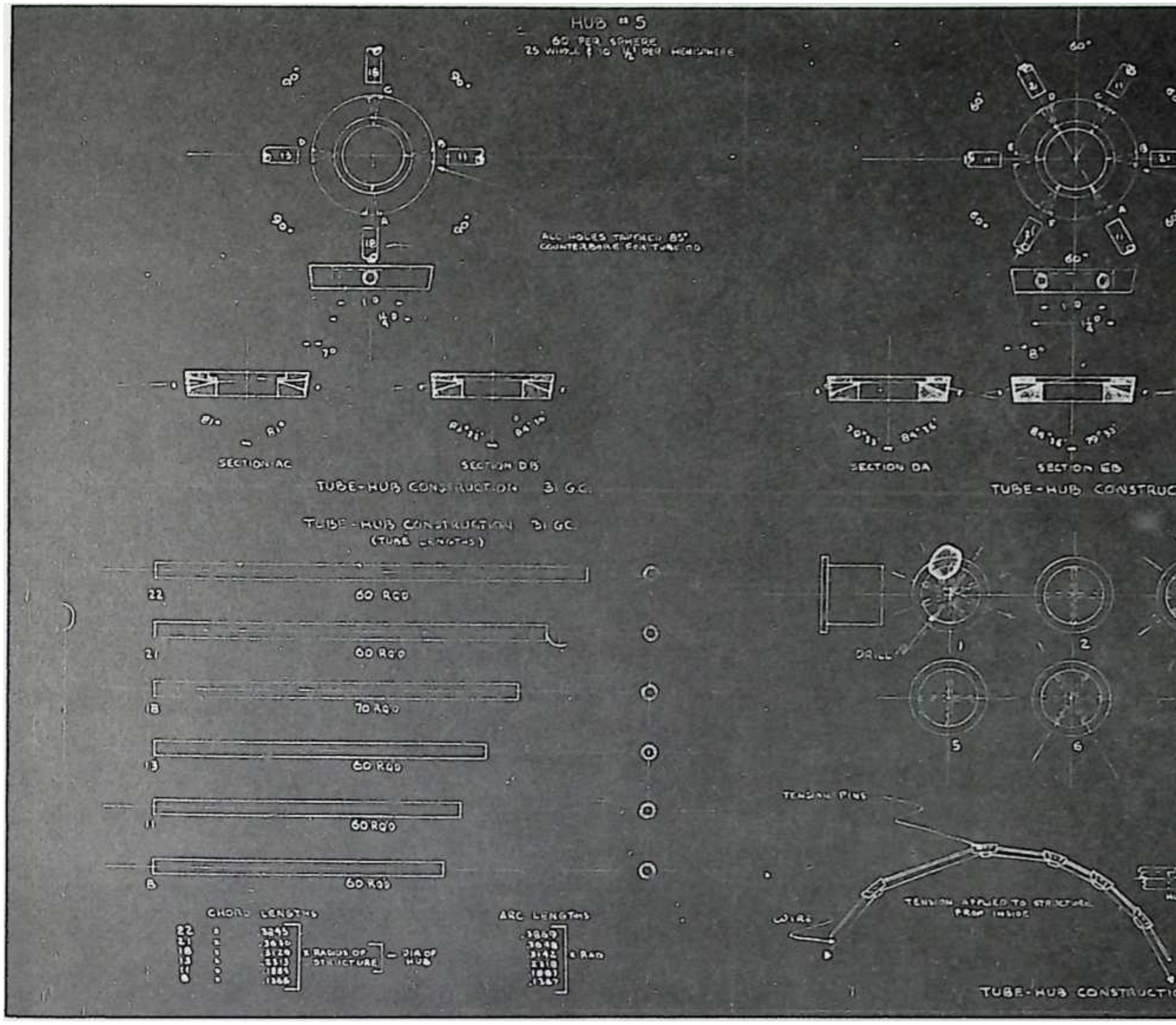
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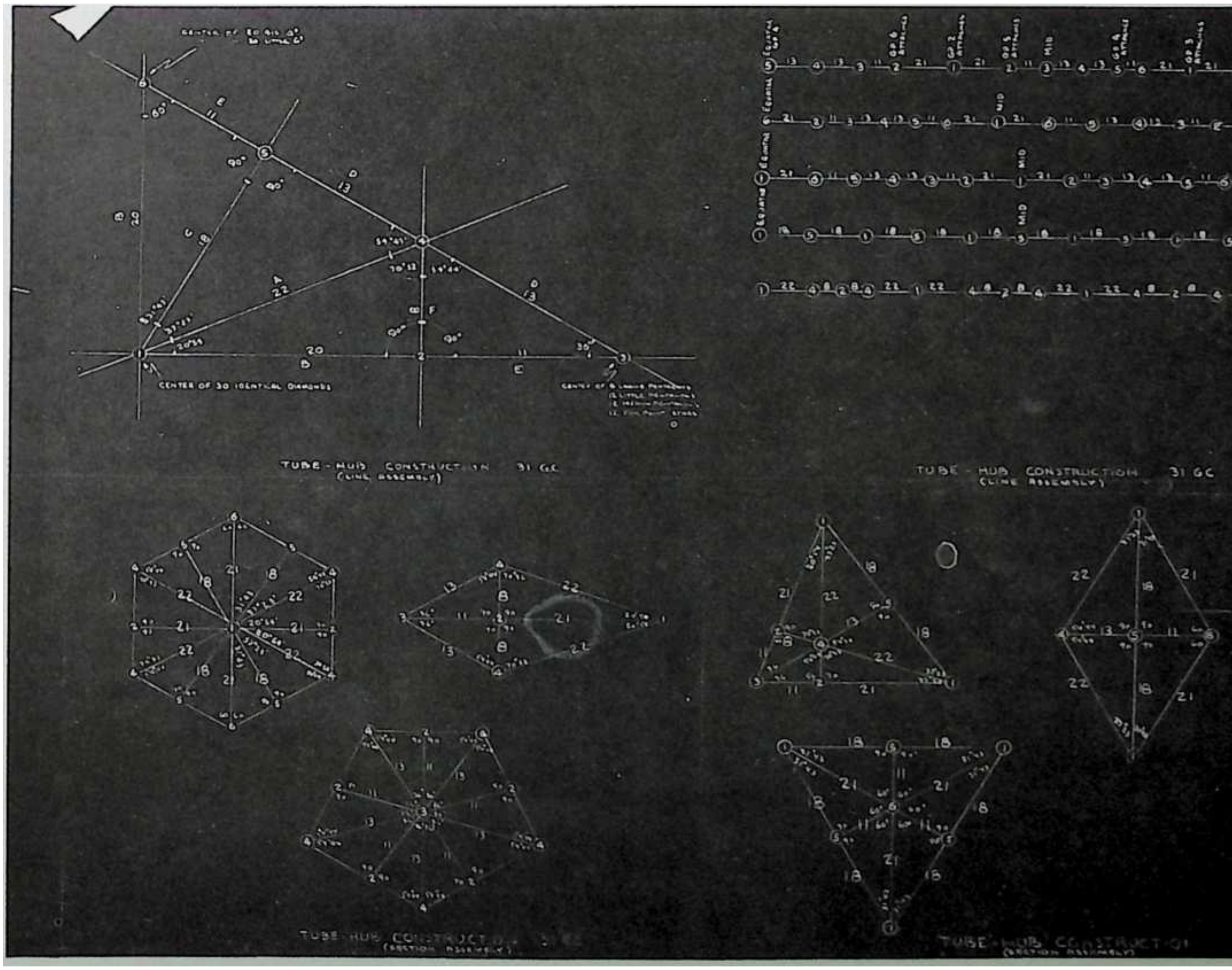
CENTER OF 30 IDENTICAL DIAMONDS
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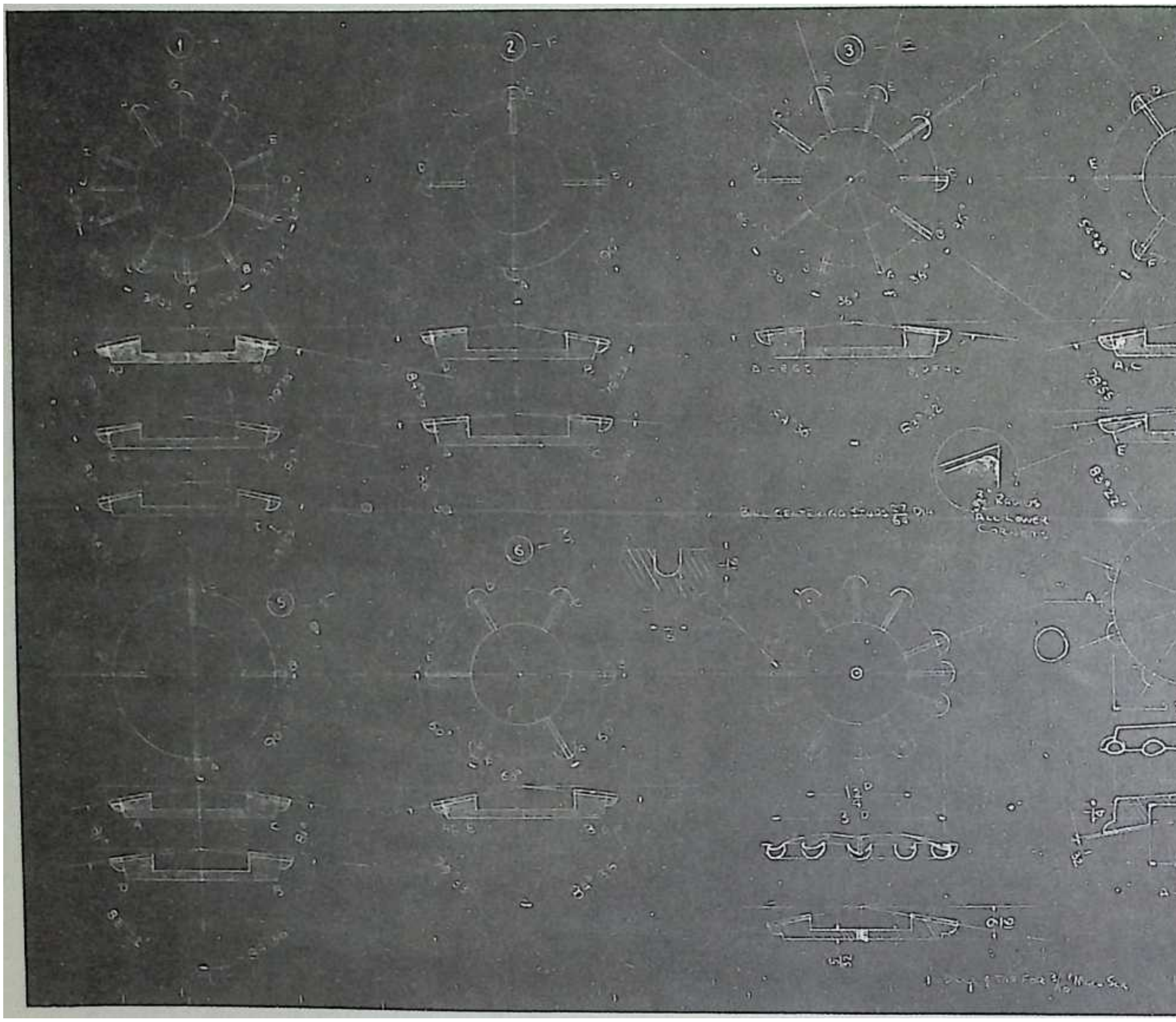
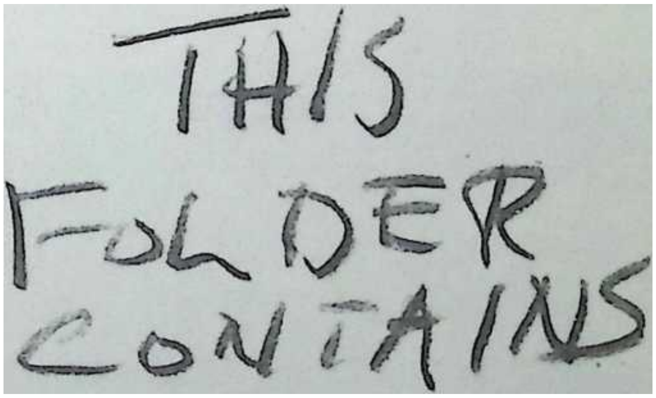
(LINE ASSEMBLY)
TUBE-HUB CONSTRUCTION 31 GC
(LINE ASSEMBLY)




THIS
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6 Geodesic Structures: "Noah's Ark II" 1950

The materialization of the great circles was achieved in Fuller's sketchbook "Noah's Ark II" which alludes to the teleological role he expected his applied geometry' eventually would play. However, even the figurative buoyancy connoted by this title would become literal in Fuller's later schemes for floating cities. In this sketchbook are the first studies of the hardware and materials that would make the domes a palpable reality. Among these studies are such structural formulas as the three-way geodesic grid; the six-diamond structure; the three- way eight-space grid; the high-speed expanding, skinned, and trussed three-way geodesic structure; the zigzag assembly; and the "A" and "B" zigzag strips. These templates of 1950 would inform a host of projects over the next quarter century.

Wil* .

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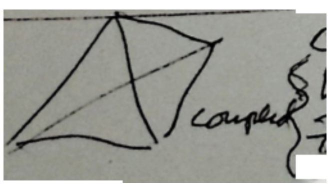

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4 «2-^O PU4-/4F 4<-r, S4«»,t/*G C. *IZ* ^eRncrS .

PM-$ at *ode i/£erFyT)_3*

s ^J/C/rj ^P^c/PGTS

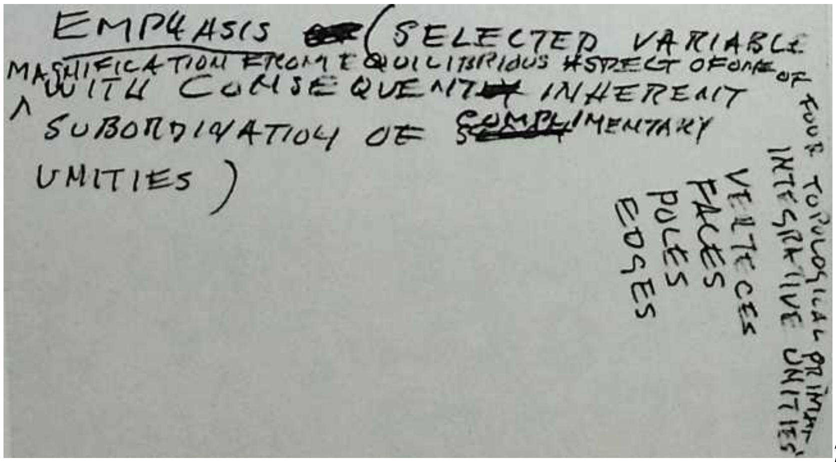
}/Jro c-

K^L- *V!K(f-* TT^oLTuT^-JLt

A*T y\/Q IMUL\ TTSou^CT /AWE f*

pT^ u Ui~rs (j-p- '/ft-' ojuiTA^/) S&ifi'/ct.

*p"Wp f/*A//^ *WCC T/AP'S-p F&uZ*


EMPHASIS (SELECTED VARIABLE
MAGNIFICATION FROM EQUILIBRIOUS ASPECT OF ONE OF
WITH CONSEQUENT INHERENT
SUBORDINATION OF COMPLIMENTARY
UNITIES)
FOUR TOPOLOGICAL PRIMARY
INTEGRATIVE UNITIES
VERTECES
FACES
POLES
EDGES

p^o^(^£CPC7^L

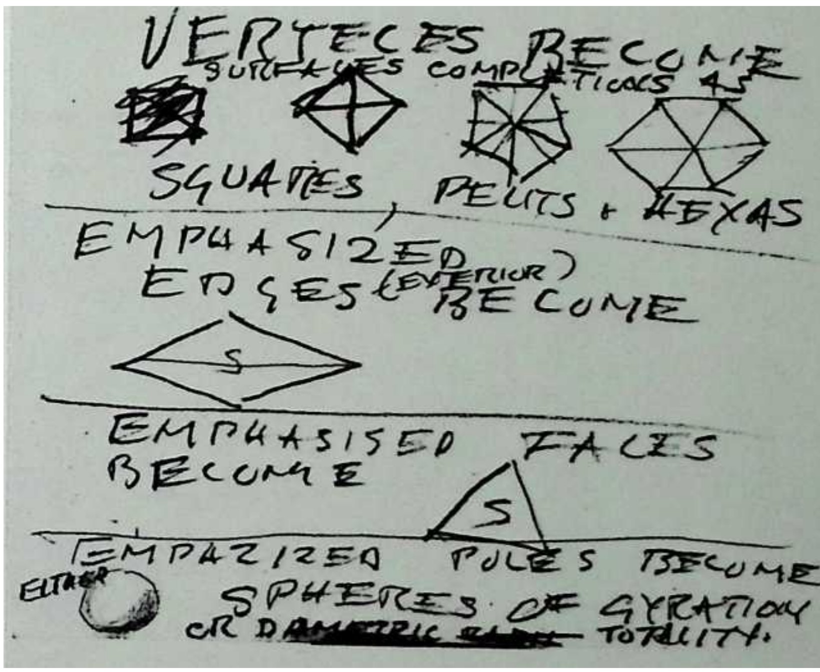
THE GEODESIC REVOLUTION, PART 1 33

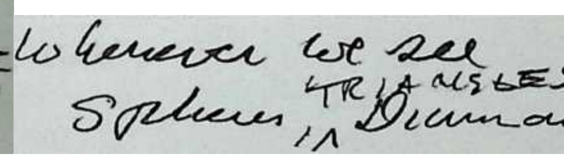
r^^X- T3

/^ &/1// $,6^£r

(To^ V '0dP^4' A

'A 3C2f





)

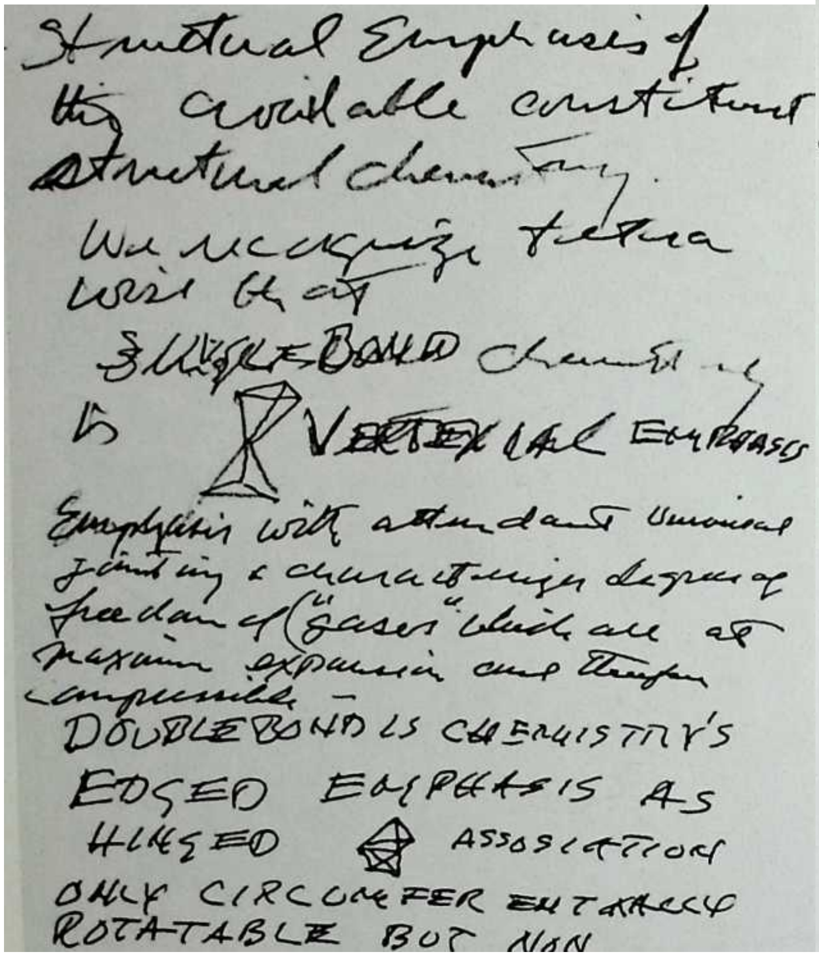
<2 *Ng&Z* ZA#W4/r<L/
4-V/y, *VorU- T&7fa*

A 6 4 /<T ^<jre<^. /2 '~3~2<<^ -/<<2^'` ^-^j? 2

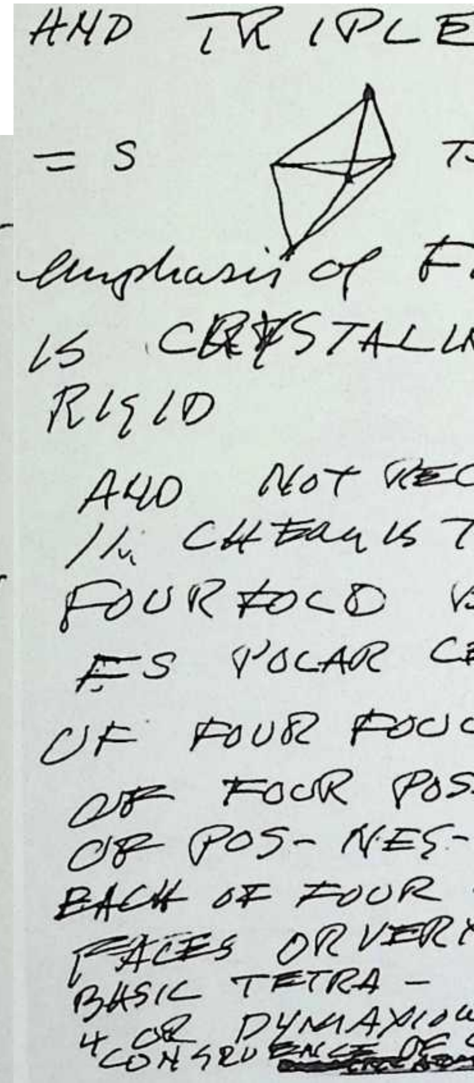
*Offset (</ £ 7^7^^*
fer^jOTZ^ *r*

Z <P^^^-r <S//?G^5 ^^ce 4/^*>(S X/^G^O /A/ OGTX^ Sr.

''S&uo 4 /Gndj^'r /^ £ZZ73''<j^-



Structural Emphasis of
the available constituent
structural chemistry.
We recognize tetra
were that
SINGLE BOND chemistry
is VERTEXIAL EMPHASIS
Emphasis with attendant universal
jointing & characterizing degrees of
freedom of "gases" which are at
maximum expansion and therefore
compressible —
DOUBLE BOND IS CHEMISTRY'S
EDGED EMPHASIS AS
HINGED ASSOSCIATION
ONLY CIRCUMFERENTIALLY
ROTATABLE BUT NON



AND TRIPLE
= S
emphasis of F
IS CRYSTALL
RIGID
AND NOT REC
IN CHEMISTR
FOUR FOLD
ES POLAR C
OF FOUR FOC
OF FOUR POS
OR POS- NEG-
EACH OF FOUR
FACES OR VERT
BASIC TETRA -
4 OR DYMAXION
CONGRUENCE OF

34 THE GEODESIC REVOLUTION, PART 1

fa ft Z *~7Ar£-LC^_ A'*/*

*A 5 6fA--r^t(7^* Aa/

$L>cJ4 ^TVl^QT^ <- £<> WPc&X&S TO^sr

Ac

Fi_&^o(14-i.G y VP 7%l8o /N T&-& ^Qo{E> ^Dfe &>o {$<_£ <f3a<-
(V -p#4J&$_c$

i-t>M>5 aft

A<RS- Wfa<Hi^S9^

Pl= *= S'

- ^'>'~i<'W*-s-<s L

JL f? ca^^JO !/&erzA:^ 1:9

,4A/n g-ip<^ S.5 — ^S>

nS-lciliOf CoX.T'-f-^^^' '^'^'

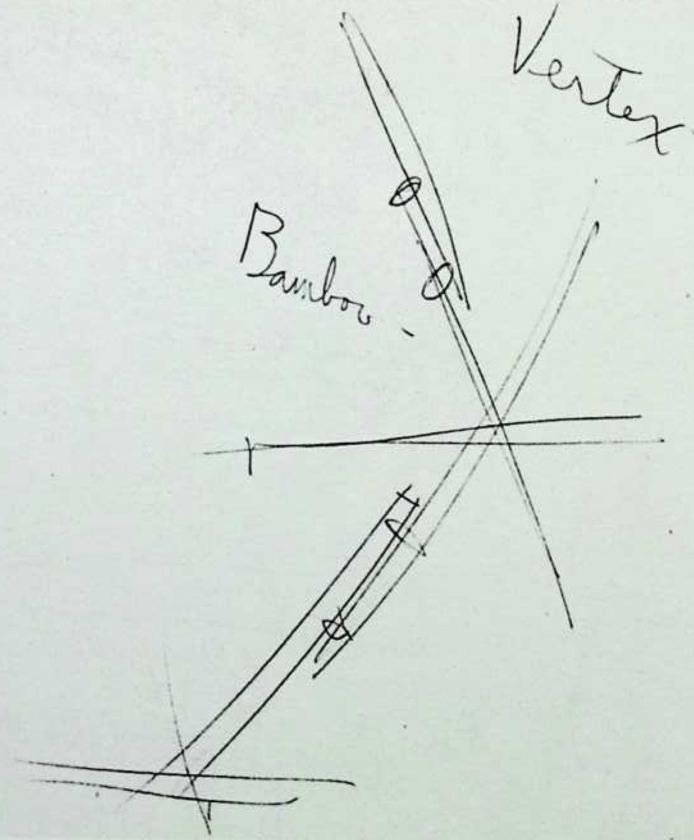
s NOAH'S ARK #II

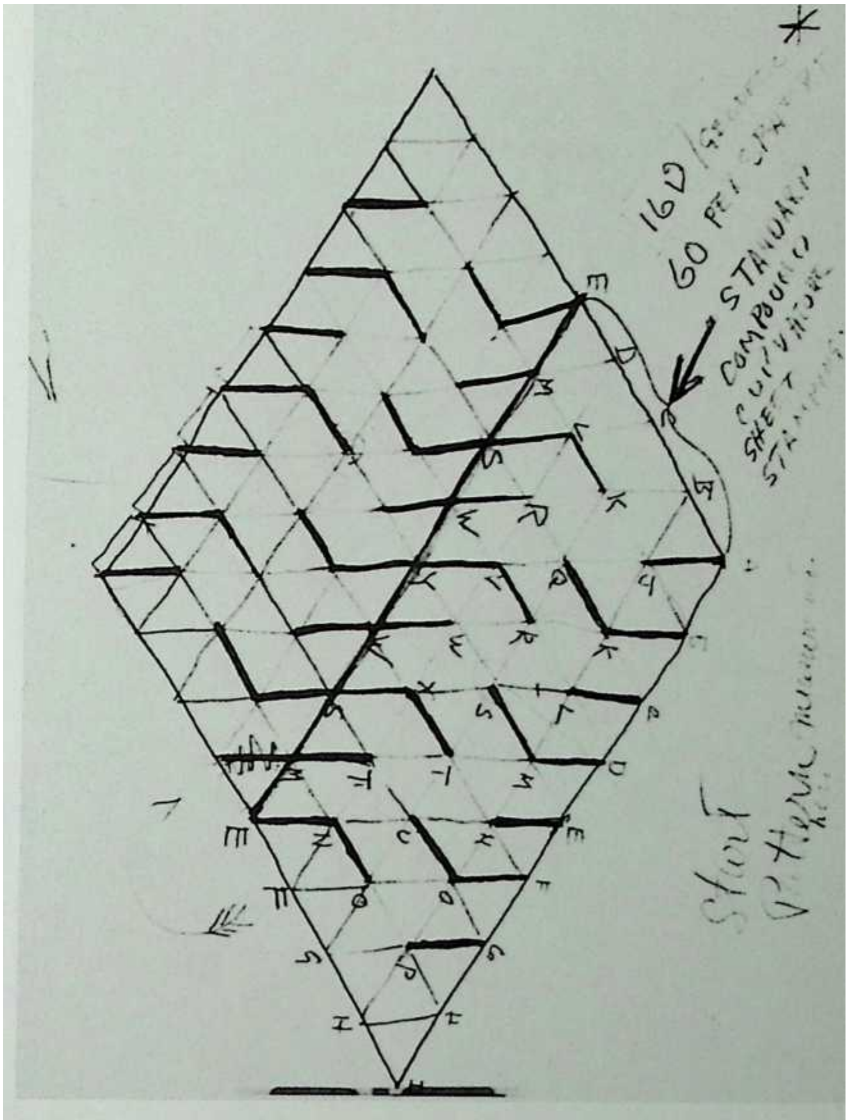
950 to July 1950 – Distributed in family
August 1950 – [illegible] [illegible] [illegible] his
Original Geodesic
first Geodesic Structure Dec 1950

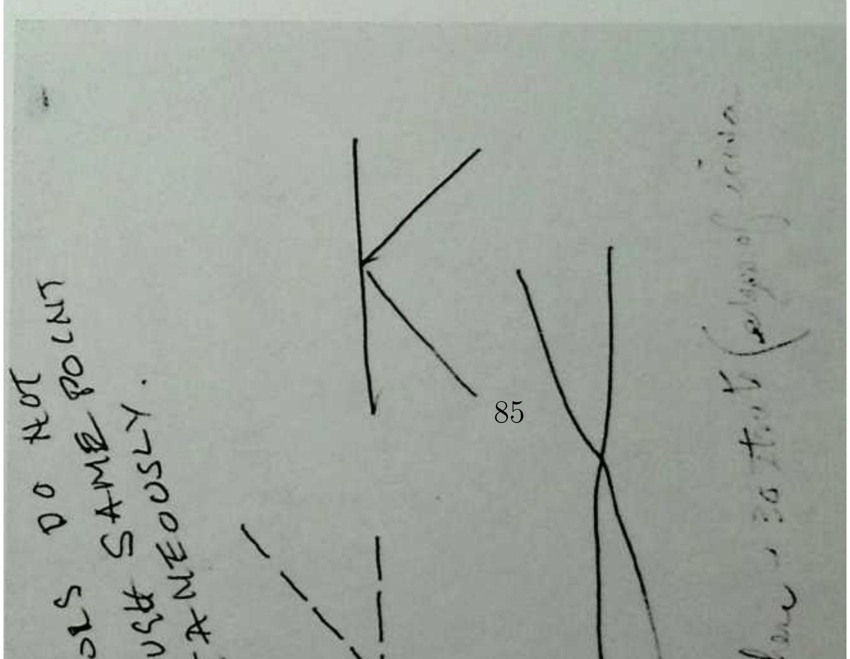
Structure drawings
of B.F. plus.

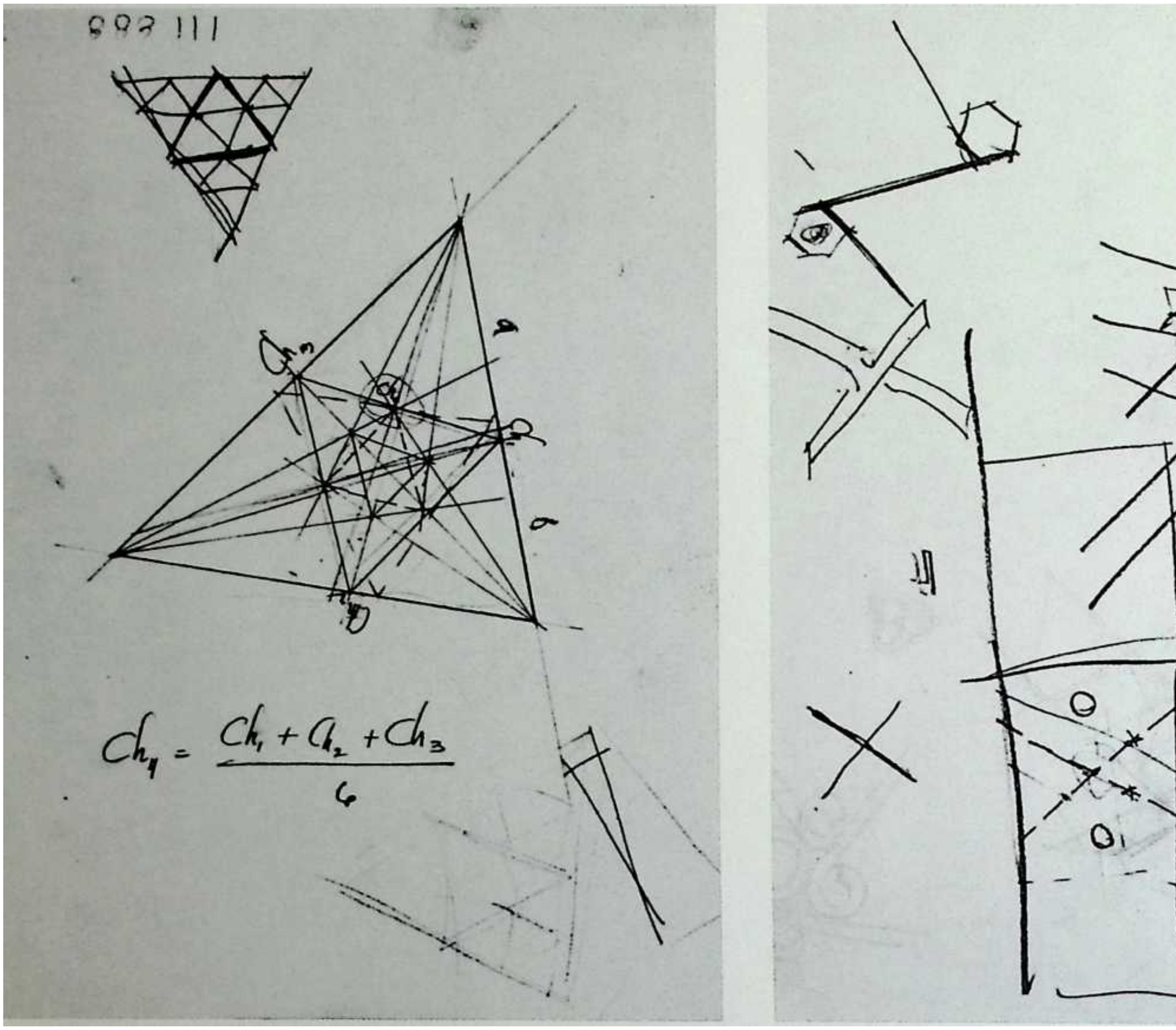
additional [illegible]
during immediately
following years:
of those who joined
with B.F.

~~Dixon~~
~~...the Foundation~~
~~...Street~~
~~...est Hills, L.I.~~
~~...ew York~~

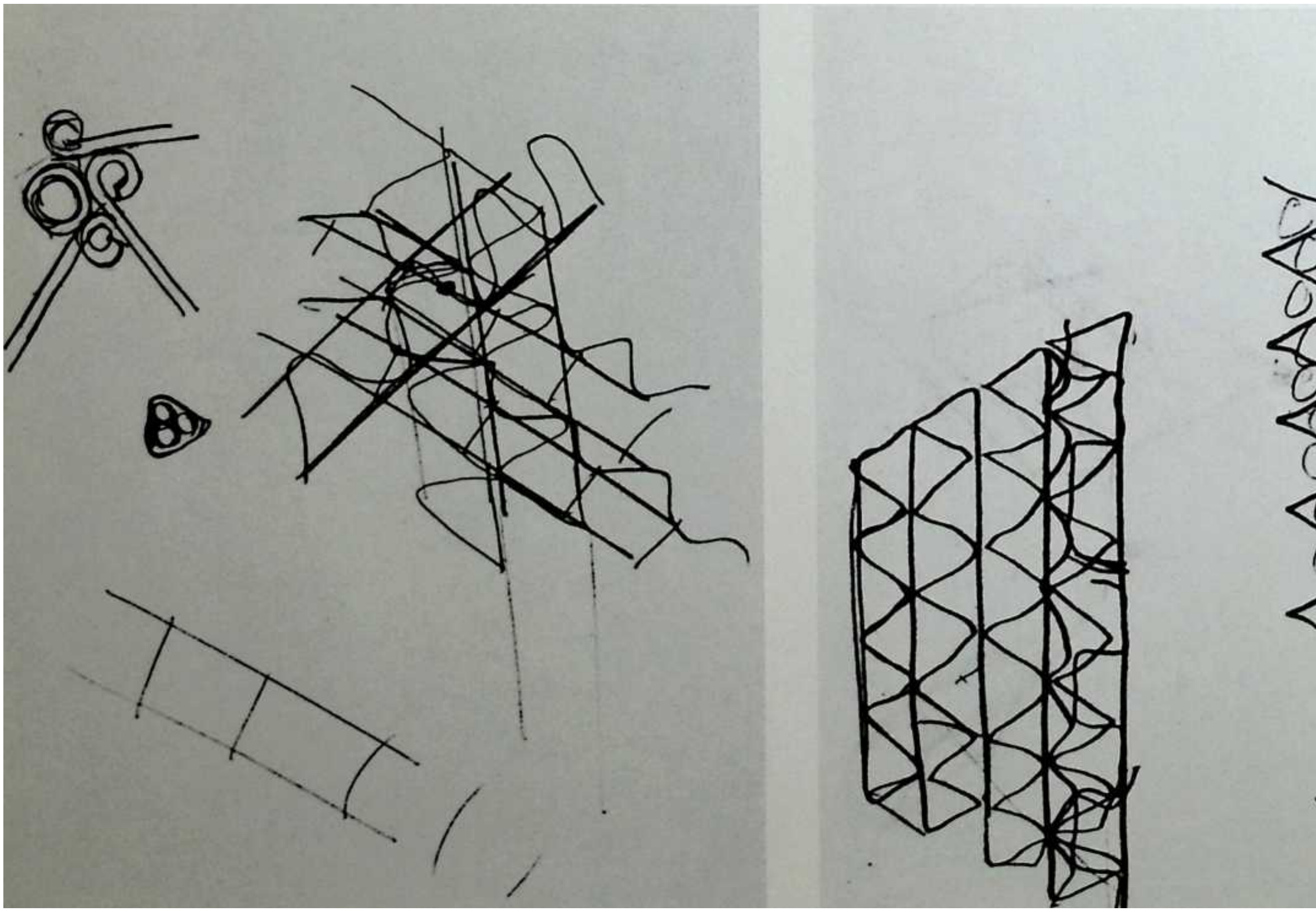



160
60 PER SPAN
STANDARD
COMPOUND
CURVATURE
SHEET
Start
Pattern


DO NOT
SAME POINT

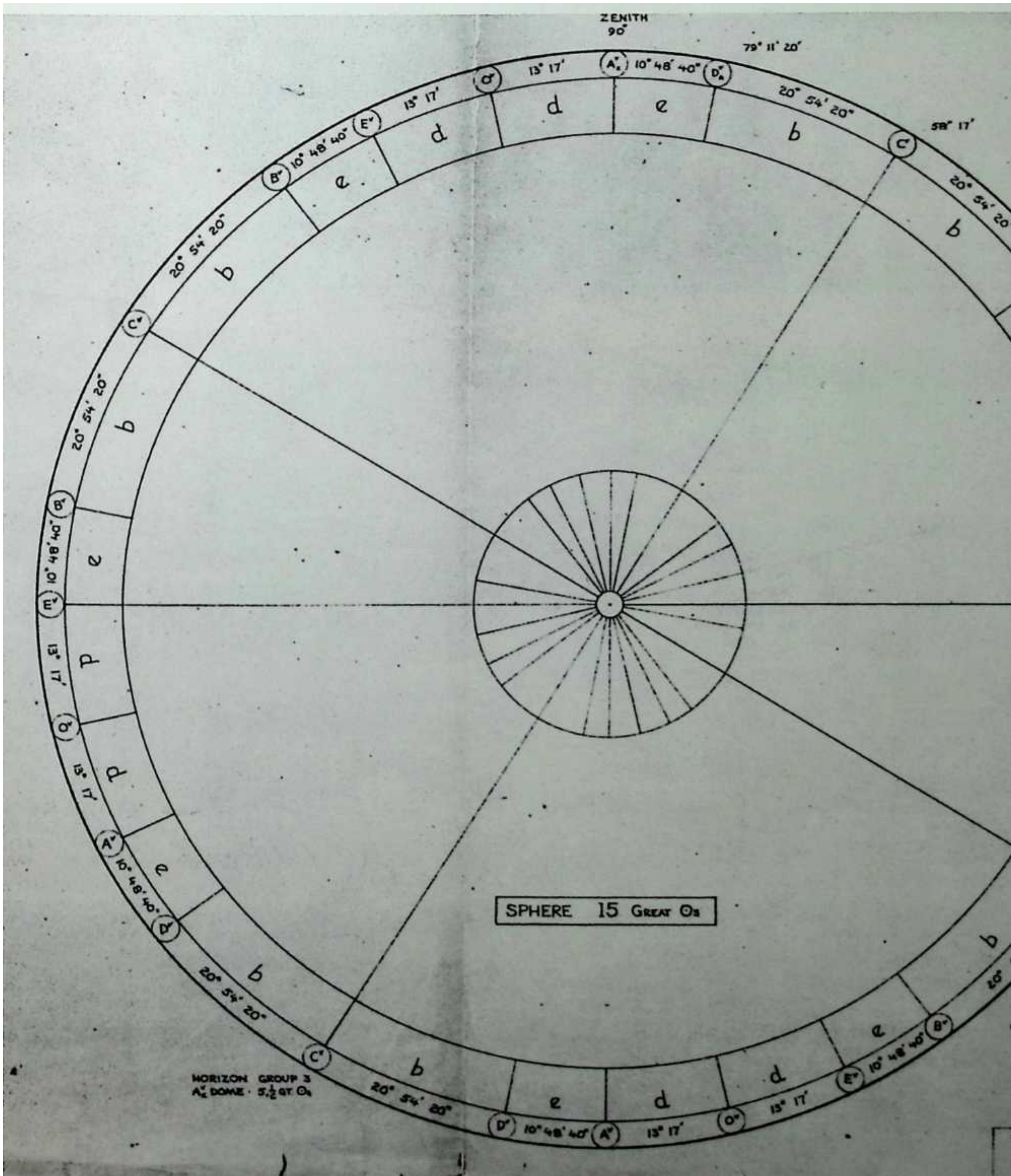


$Ch_4 = \frac{Ch_1 + Ch_2 + Ch_3}{6}$

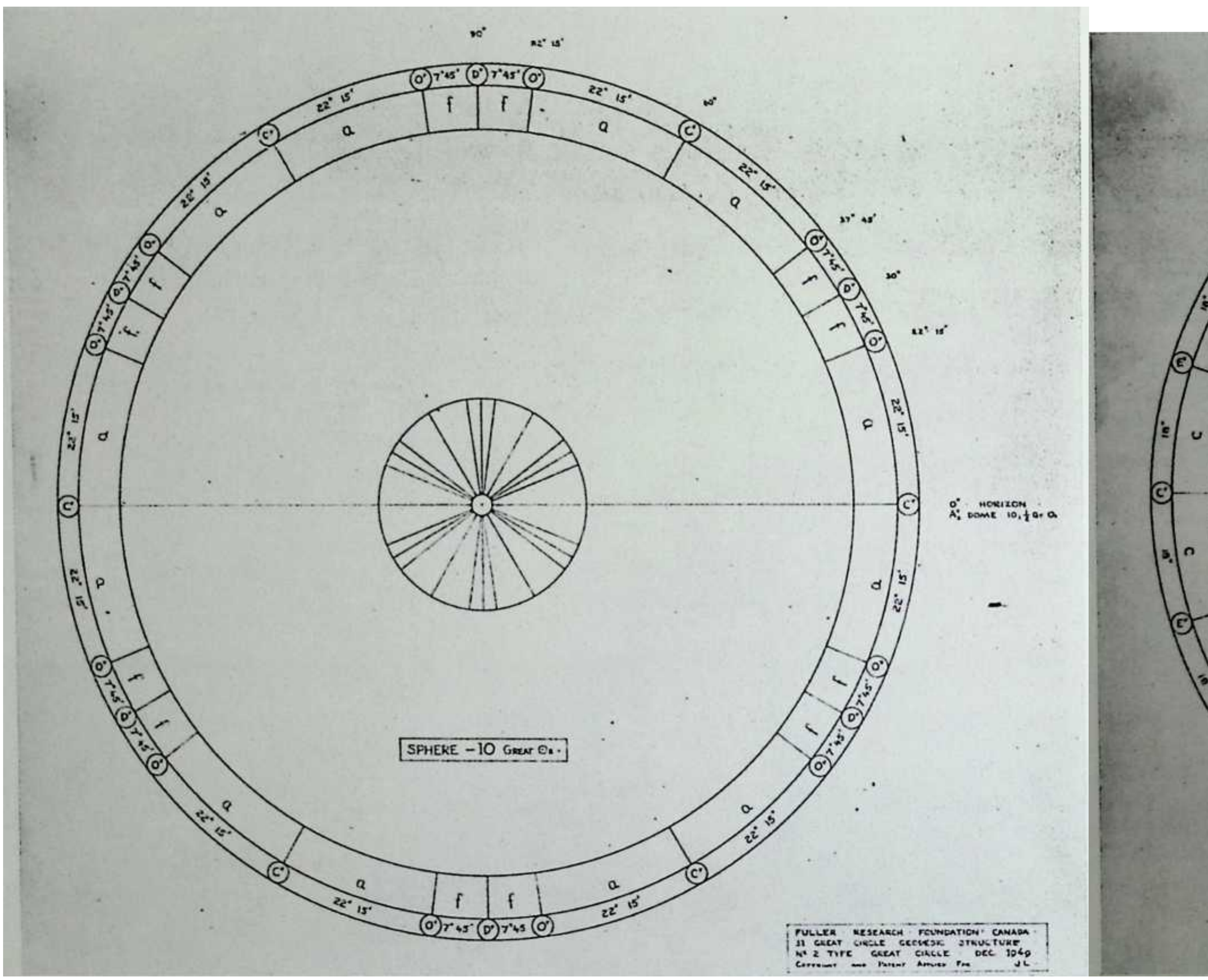


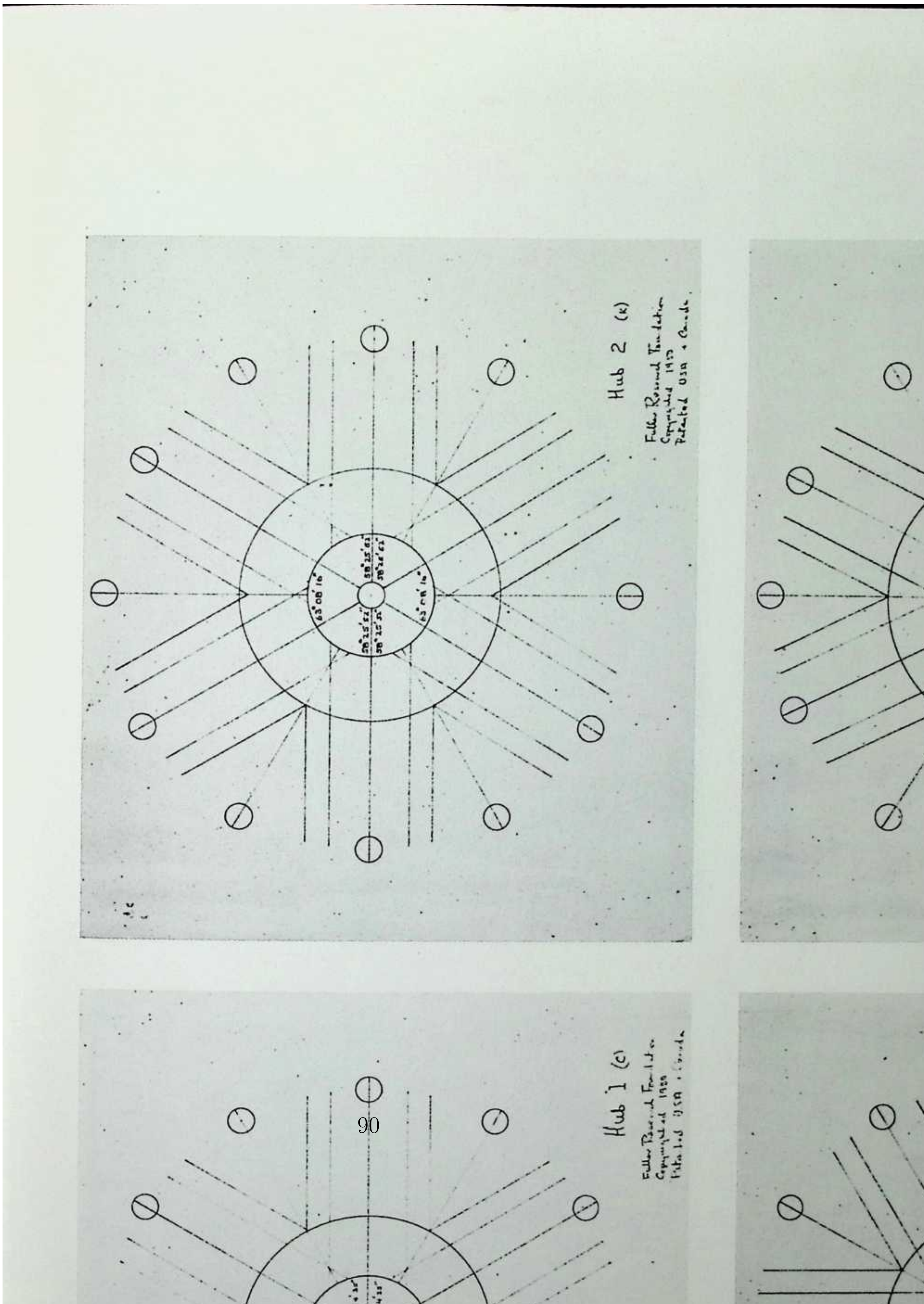
Miscellaneous

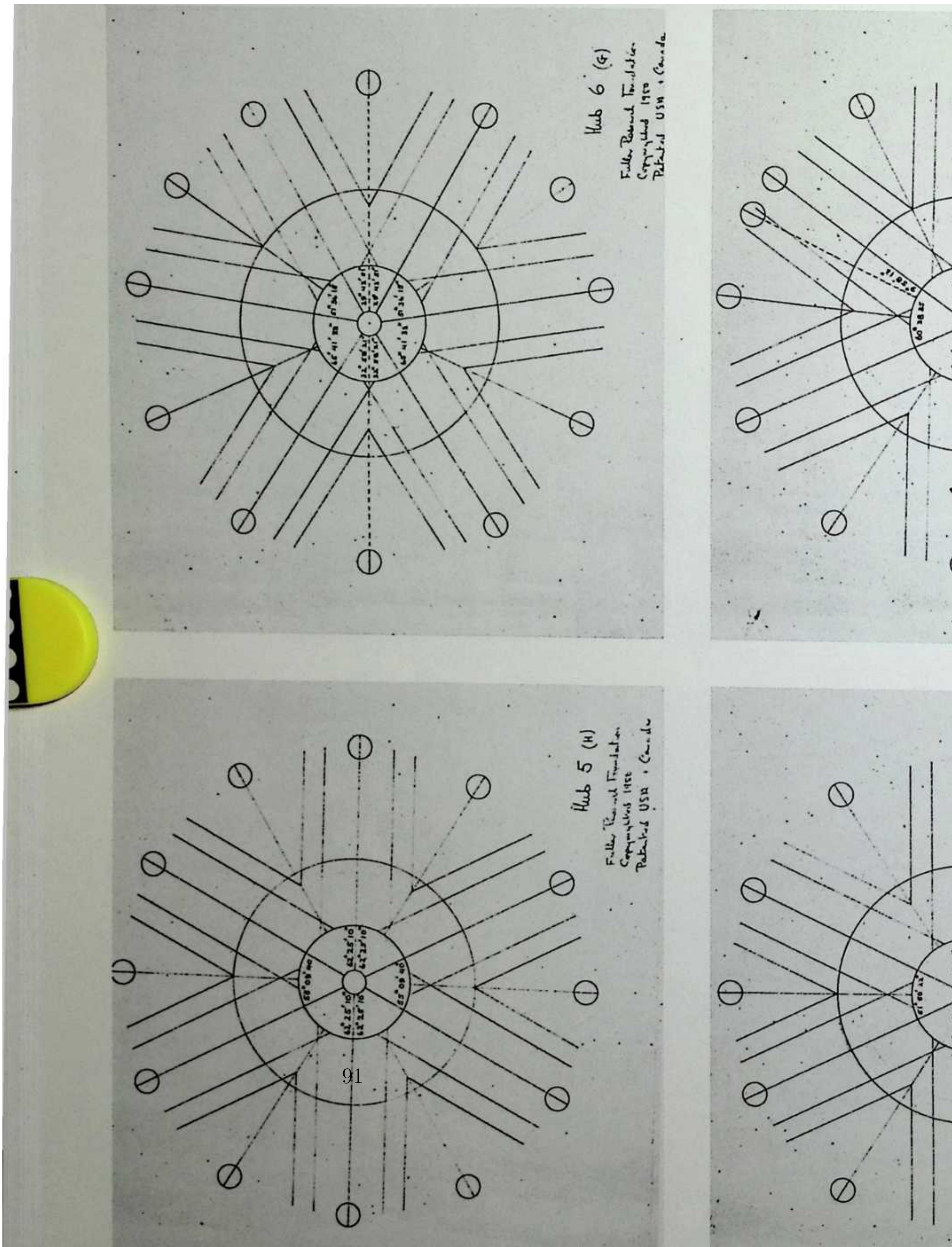
Geodesic Structures 1950

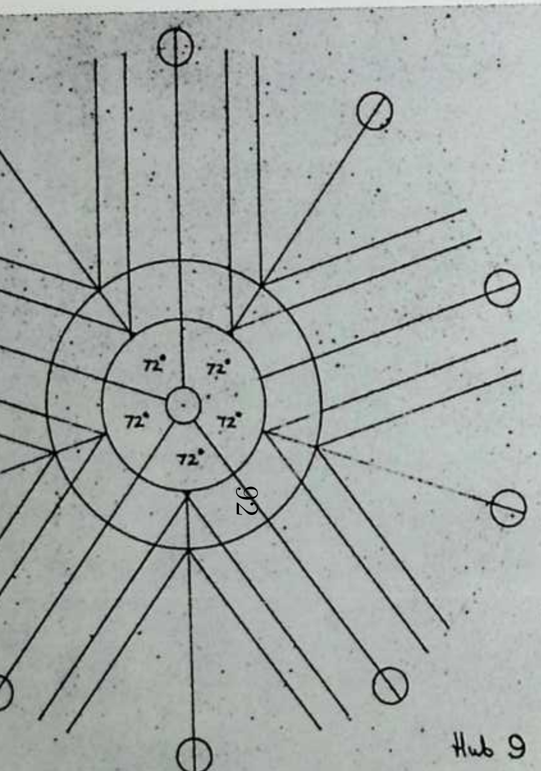

ZENITH
90°
79° 11' 20'
13° 17'
10° 48' 40"
20° 54' 20"
58° 17'
SPHERE 15 GREAT ⊙s
HORIZON GROUP 3

U—U-U——


SPHERE –10
0° HORIZON
FULLER RESEARCH FOUNDATION CANADA
31 GREAT CIRCLE GEODESIC STRUCTURE
Nº 2 TYPE GREAT CIRCLE DEC 1949
COPYRIGHT AND PATENT APPLIED FOR J L


Hub 2 (K)
Fuller Research Foundation
Patented USA + Canada
63°08'16"
58°25'52"
58°25'52"
58°25'52"
58°25'52"
63°08'16"
Hub 1 (C)


Hub 6 (G)
Hub 5 (H)



Hub 9 (A)

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TRIANGLES A' to J INCLUSIVE

CORE or OUTER ZIG-ZAG
LINKING JOINTS 5,8,2,8,4,1,6,4,6,9
R=1, CHORD FACTOR — CHORD @ R=25

β	.18342	4.586
α	.18910	4.727
γ	.18490	4.622
ξ	.17994	4.497
ι	.18316	4.580
μ	.17924	4.480
ν	.17762	4.440
π	.17560	4.390
ρ	.15056	3.765
	TOTAL	40.086

OUTSIDE TOP EDGE BEND AT MIDDLE LINKING JOINTS — 8,5,1,8,9.

β	.18642	4.586
η	.16544	4.085
ξ	.15416	3.855
ρ	.15058	3.765
	TOTAL	16.290

OUTSIDE BOTTOM EDGE, BEND AT MIDDLE LINKING JOINTS 5,2,4,6,8..

γ	.18490	4.622
ε	.16802	4.200
λ	.15778	3.945
ν	.17762	4.440

LAY-OUT SCHEDULE FOR,

—

FOLDABLE ZIGZAG TRUSS FOR 3-WAY GRID OF UNIFORM BOUNDARY MODULAR GEODESIC STRUCTURES OF FULLER RESEARCH FOUNDATION

[redacted]

TO BE COVERED WITH NYLON-OR POLYETHYLIN SKIN PRE-SEWN AND ATTACHED

TRUSS IS HOWEVER "FINAL" AND NOT IMPROVISED — MAY BE ENLARGED IN OPAQUELY ETC.

TRIANGLES G' to H' INCLUSIVE

CORE OF INNER ZIG-ZAG
LINKING JOINTS 7,5,4,2,1,4,4,6,7,8
CHORD FACTOR, R=1 — CHORD FACTOR, R=25

η	.16544	4.085
ζ	.17994	4.497
ε	.16802	4.200
δ	.17518	4.380
θ	.16706	4.177
κ	.17126	4.282
λ	.15778	3.945
μ	.17924	4.480
ξ	.15416	3.855
	TOTAL	37.401

INSIDE TOP EDGE, B[redacted]T
MIDDLE LINKING JOINTS 5,2,4,6,8.

γ	.18490	4.622
ε	.16802	4.200
λ	.15778	3.945
ν	.17762	4.440
	TOTAL	17.207

INSIDE TOP EDGE, BEND AT
MIDDLE LINKING JOINTS 7,4,1,4,7

ι	.18516	4.580
θ	.16706	4.177
θ	.16706	4.177
ι	.18516	4.580
	TOTAL	17.514

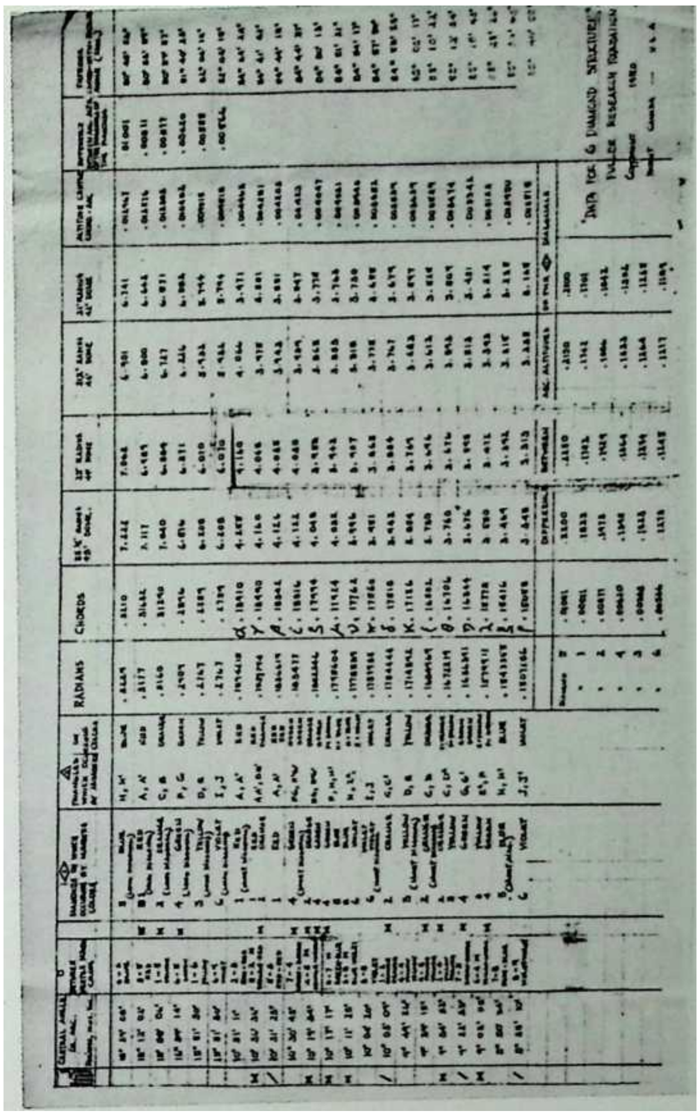
BOTH SCHEDULES LINK TOGETHER WHEN ASSEMBLED FORMING BASIC ASSEMBLY OF WHICH 60 UNIFORMLY COMPLETES SPHERE AND 60 IDENTICAL PARTS IS MAX. OF IDENTICALS INTO WHICH SPHERE MAY BE SUBDIVIDED (COULD BE 60 IDENTICAL ISOSCELES TRIANGLES AS SIMPLEST FORM - WHICH THESE 16 TRIANGLES MAY ALSO COMPRISE.

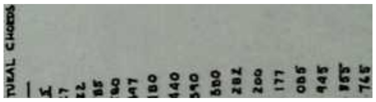
— 3-WAY-8-SPACE GRID STRUCTURAL COMPONENTS, BY GREEK ALPHABETICAL ORDER —

		Chord Factor Radius=1	Radius=25
ALPHA	α	.18910	4.727
BETA	β	.18342	4.585
GAMMA	γ	.18490	4.622
DELTA	δ	.17518	4.380
EPSILON	ε	.16802	4.200
ZETA	ζ	.17994	4.497
ETA	η	.16544	4.085
THETA	θ	.16706	4.177
IOTA	ι	.18516	4.580
KAPPA	κ	.17126	4.282
LAMBDA	λ	.15778	3.945
MU	μ	.17924	4.480
NU	ν	.17762	4.440
CHIE	ξ	.15416	3.855
PIE	π	.17560	4.390
RHO	ρ	.15058	3.765

"3-WAY-8-SPACE GRID STRUCTURAL CHORDS BY ORDER OF MAGNITUDE."

	R=1	R=25
α	.1891	4.727
γ	.1849	4.622
β	.1834	4.585
ι	.1852	4.580
ζ	.1799	4.497
μ	.1792	4.480
ν	.1776	4.440
π	.1756	4.390
δ	.1752	4.380
κ	.1713	4.282
ε	.1680	4.200
θ	.1671	4.177
η	.1634	4.085
λ	.1578	3.945
ξ	.1542	3.855
ρ	.1506	3.765


RADIANS
CHORDS
"DATA FOR 6 DIAMOND STRUCTURES"
FULLER RESEARCH FOUNDATION



FULLER RESEARCH FOUNDATION

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TRIANGLES A' to J INCLUSIVE

CORE OF OUTER ZIG-ZAG

LINKING JOINTS 8,8,2,8,4,2A,8,8,9

R=1, CHORD FACTOR — CHORD @ R=25

β	.18542	4.586
α	.18410	4.727
γ	.18490	4.622
ζ	.17994	4.497
ι	.18516	4.580
μ	.17924	4.480
ν	.17762	4.440
π	.17560	4.390
ρ	.15058	3.765
	TOTAL =	40.086

OUTSIDE TOP EDGE BEND AT MIDDLE LINKING JOINTS — 8,8,1,8,9.

β	.18542	4.535
η	.16844	4.085
χ	.15416	3.855
ρ	.15058	3.765
	TOTAL =	16.240

OUTSIDE BOTTOM EDGE, BEND AT MIDDLE LINKING JOINTS 8,2,4,6,8

γ	.18490	4.622
ε	.16802	4.200
λ	.15778	3.945
ν	.17762	4.440

LAY-OUT SCHEDULE FOR.

—

FOLDABLE ZIG-ZAG TRUSS FOR 3-WAY GRID OF UNIFORM BOUNDARY MODULE GEODESIC STRUCTURES OF FULLER RESEARCH FOUNDATION

[redacted]

TO BE COVERED WITH NYLON-OR POLYETHYLENE SKIN PRE-SEWN AND ATTACHED

TRUSS IS HOWEVER "FINAL" AND NOT IMPROVISED — MAY BE SHIPPED IN SPECIALLY ETC

TRIANGLES G' to H' INCLUSIVE

CORE OF INNER ZIG-ZAG

LINKING JOINTS 7,8,4,2,1,4,4,6,7,8

CHORD FACTOR, R=1 — CHORD FACTOR, R=25

η	.16844	4.085
ζ	.17994	4.497
ε	.16802	4.200
δ	.17518	4.380
θ	.16706	4.177
κ	.17126	4.282
λ	.15778	3.945
μ	.17924	4.480
χ	.15416	3.855
	total →	37.901

INSIDE TOP EDGE, B[redacted]T

MIDDLE LINKING JOINTS

γ	.18490	4.622
ε	.16802	4.200
λ	.15778	3.945
ν	.17762	4.440
	total →	17.207

INSIDE TOP EDGE, BEND AT MIDDLE LINKING JOINTS 7,4,1,4,7

ι	.18516	4.580
θ	.16706	4.177
θ	.16706	4.177
ι	.18516	4.580
	total →	17.514

BOTH SCHEDULES LINK TOGETHER WHEN ASSEMBLED FORMING BASIC ASSEMBLY OF WHICH 60 UNIFORMLY COMPLETES SPHERE AND 60 IDENTICAL PARTS IS MAX. OF IDENTICALS INTO WHICH SPHERE MAY BE SUBDIVIDED (COULD BE 60 IDENTICAL ISOCELES TRIANGLES AS SIMPLEST FORM — WHICH THESE 16 TRIANGLES MAY ALSO COMPRISE.

— 3-WAY-8-SPACE GRID STRUCTURAL COMPONENTS, BY GREEK ALPHABETICAL ORDER. —

		CHORD FACTOR RADIUS=1	RADIUS=25
ALPHA	α	.18410	4.727
BETA	β	.18542	4.565
GAMMA	γ	.18490	4.622
DELTA	δ	.17518	4.380
EPSILON	ε	.16802	4.200
ZETA	ζ	.17994	4.497
ETA	η	.16844	4.085
THETA	θ	.16706	4.177
IOTA	ι	.18516	4.580
KAPPA	κ	.17126	4.282
LAMBDA	λ	.15778	3.945
MU	μ	.17924	4.480
NU	ν	.17762	4.440
CHIE	χ	.15416	3.855
PIE	π	.17560	4.390
RHO	ρ	.15058	3.765

"3-WAY-8-SPACE GRID STRUC BY ORDER OF MAGNITUDE."

	R=1	R=2
α	.1841	4.7
γ	.1844	4.6
β	.1854	4.
ι	.1852	4.
ζ	.1799	4.
μ	.1792	4.
ν	.1776	4.
π	.1756	4.
δ	.1752	4.
κ	.1713	4.
ε	.1680	4
θ	.1671	4.
η	.1634	4.
λ	.1578	3
χ	.1542	3
ρ	.1506	3

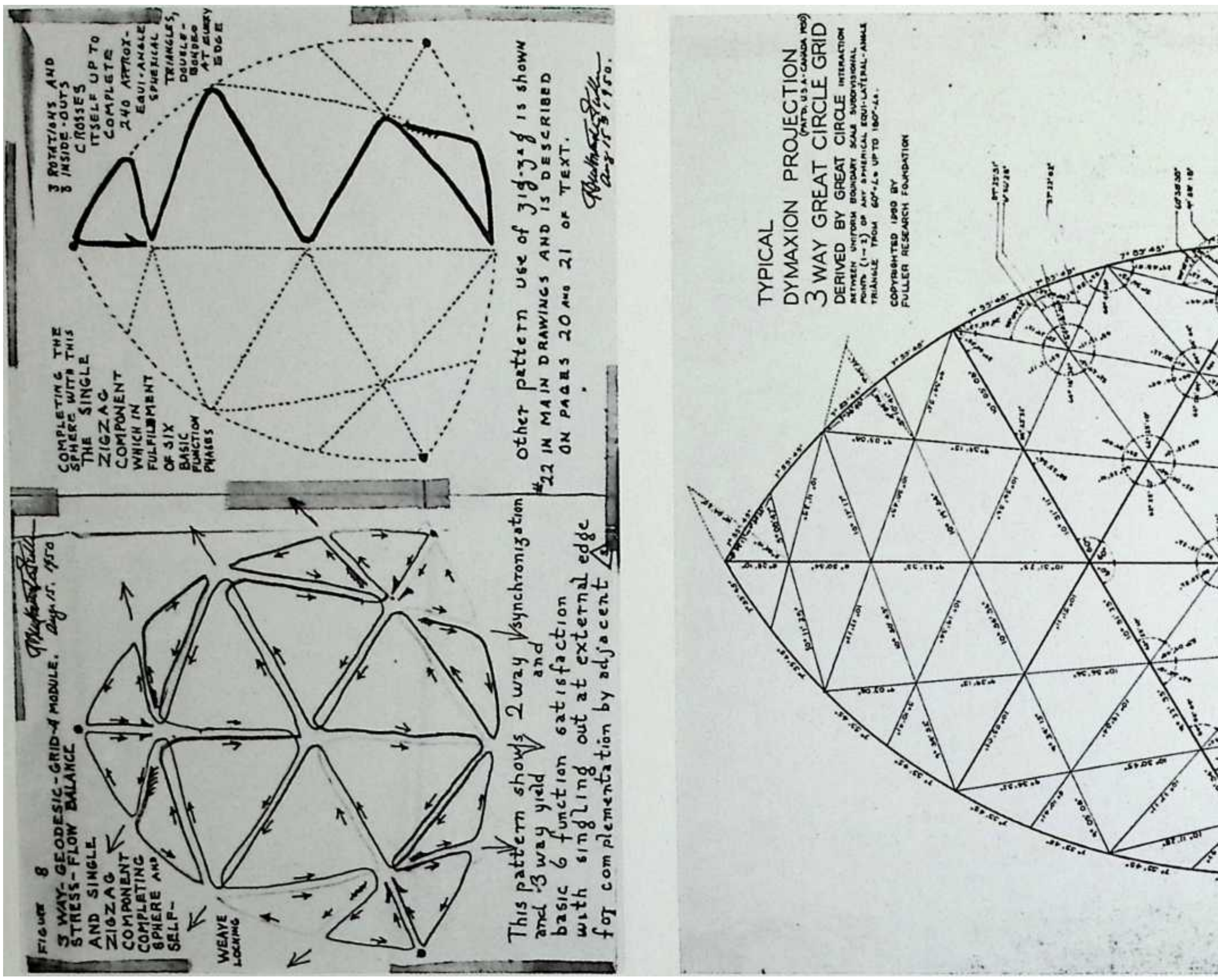
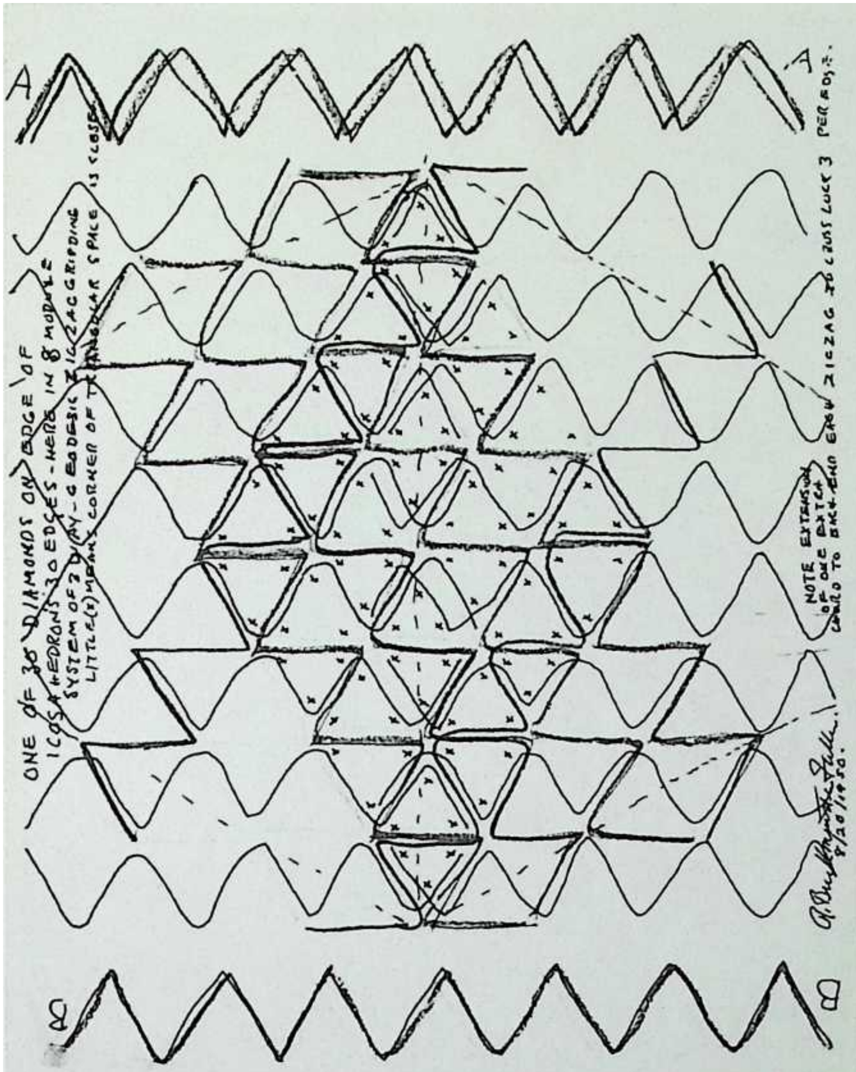
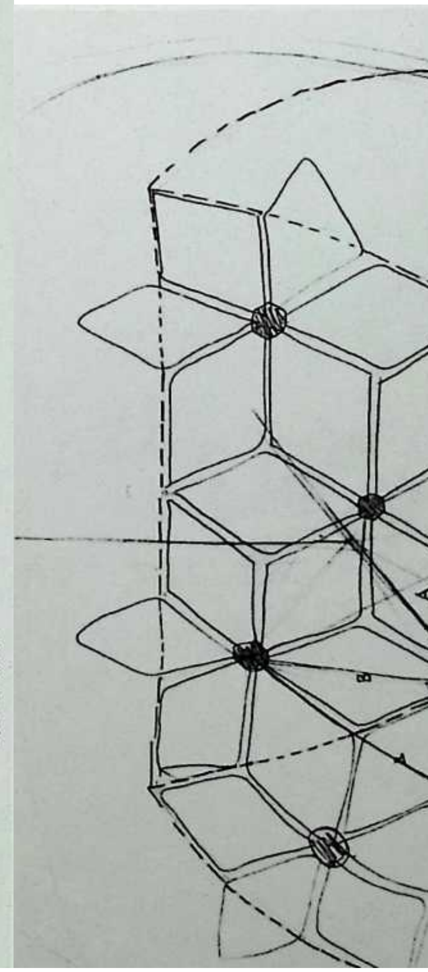
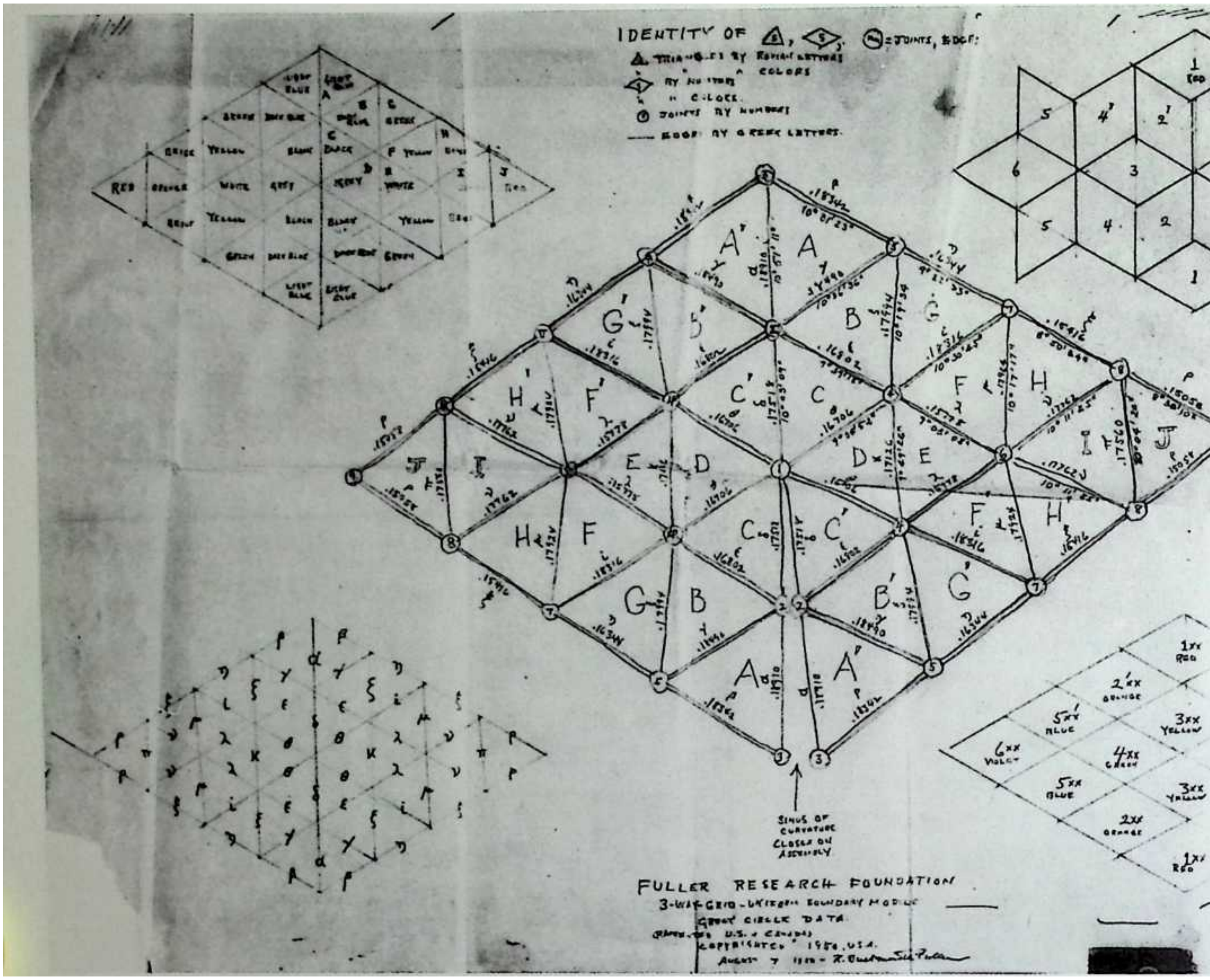


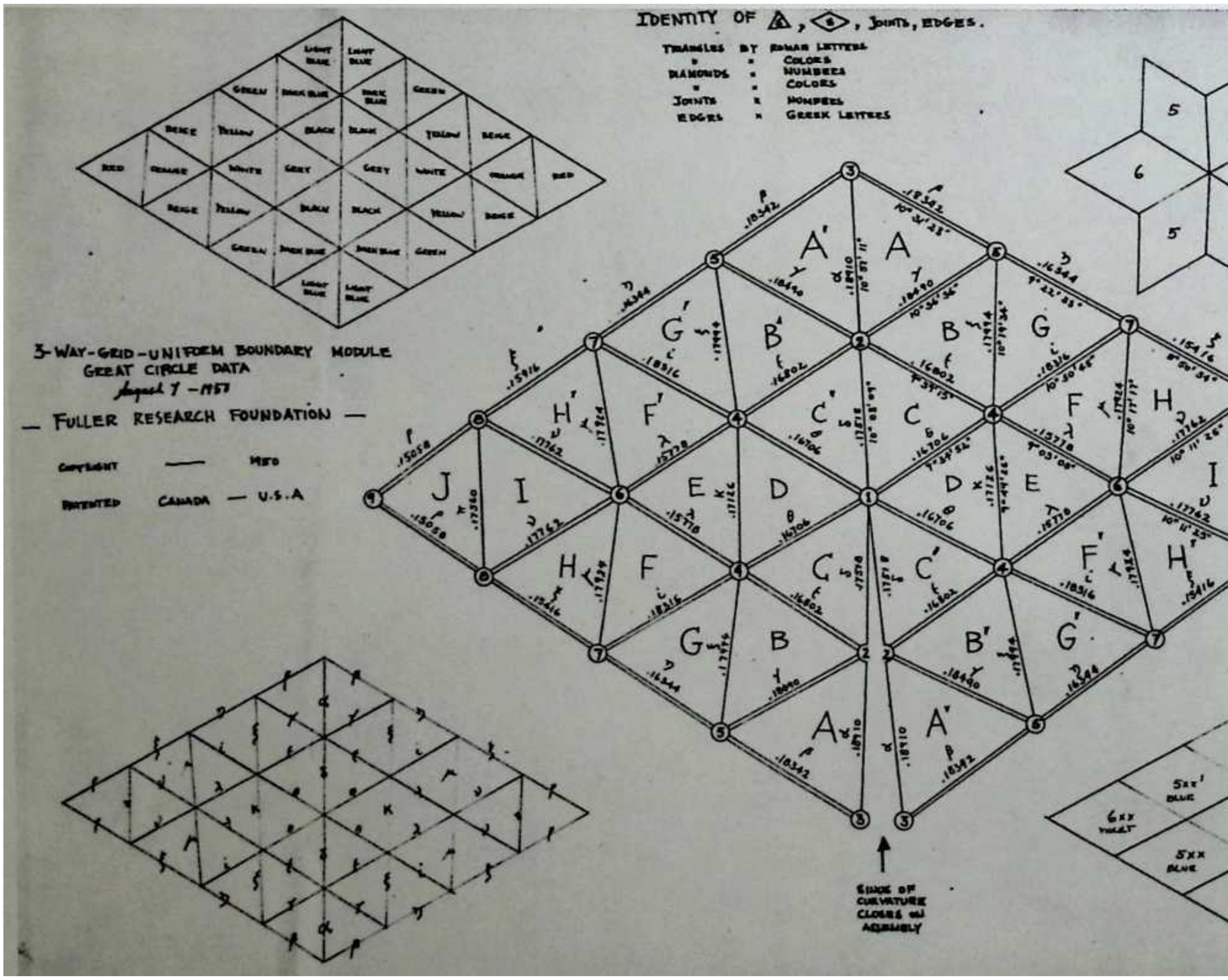
FIGURE 8
3 WAY-GEODESIC-GRID-4 MODULE, STRESS-FLOW BALANCE AND SINGLE ZIGZAG COMPONENT COMPLETING SPHERE AND SELF-
WEAVE LOCKING
Aug. 15, 1950
This pattern shows 2 way synchronization and 3 way yield and basic 6 function satisfaction with singling out at external edge for complementation by adjacent
COMPLETING THE SPHERE WITH THIS THE SINGLE ZIGZAG COMPONENT WHICH IN FULFILLMENT OF SIX BASIC FUNCTION PHASES
3 ROTATIONS AND 3 INSIDE-OUTS CROSSES ITSELF UP TO COMPLETE 240 APPROX-EQUI-ANGLE SPHERICAL TRIANGLES, DOUBLE-BONDED AT EVERY EDGE
other pattern use of zig-zag is shown #22 IN MAIN DRAWINGS AND IS DESCRIBED ON PAGES 20 AND 21 OF TEXT.
Aug. 15, 1950.
TYPICAL
DYMAXION PROJECTION
3 WAY GREAT CIRCLE GRID
DERIVED BY GREAT CIRCLE INTERACTION
COPYRIGHTED 1950 BY FULLER RESEARCH FOUNDATION


A
A
ONE OF 30 DIAMONDS ON EDGE OF
ICOSAHEDRONS 30 EDGES - HERE IN 8 MODULE
SYSTEM OF 2 WAY - GEODESIC ZIG ZAG GRIDDING
NOTE EXTENSION
B
B

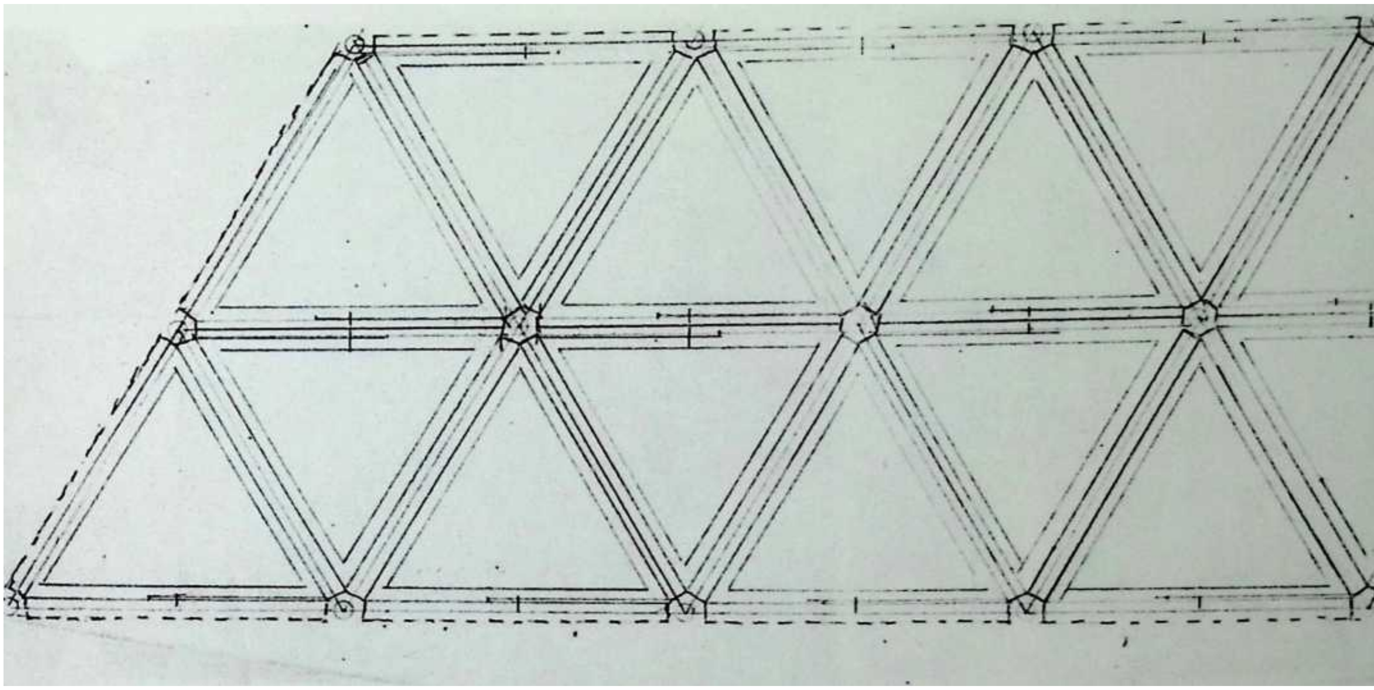


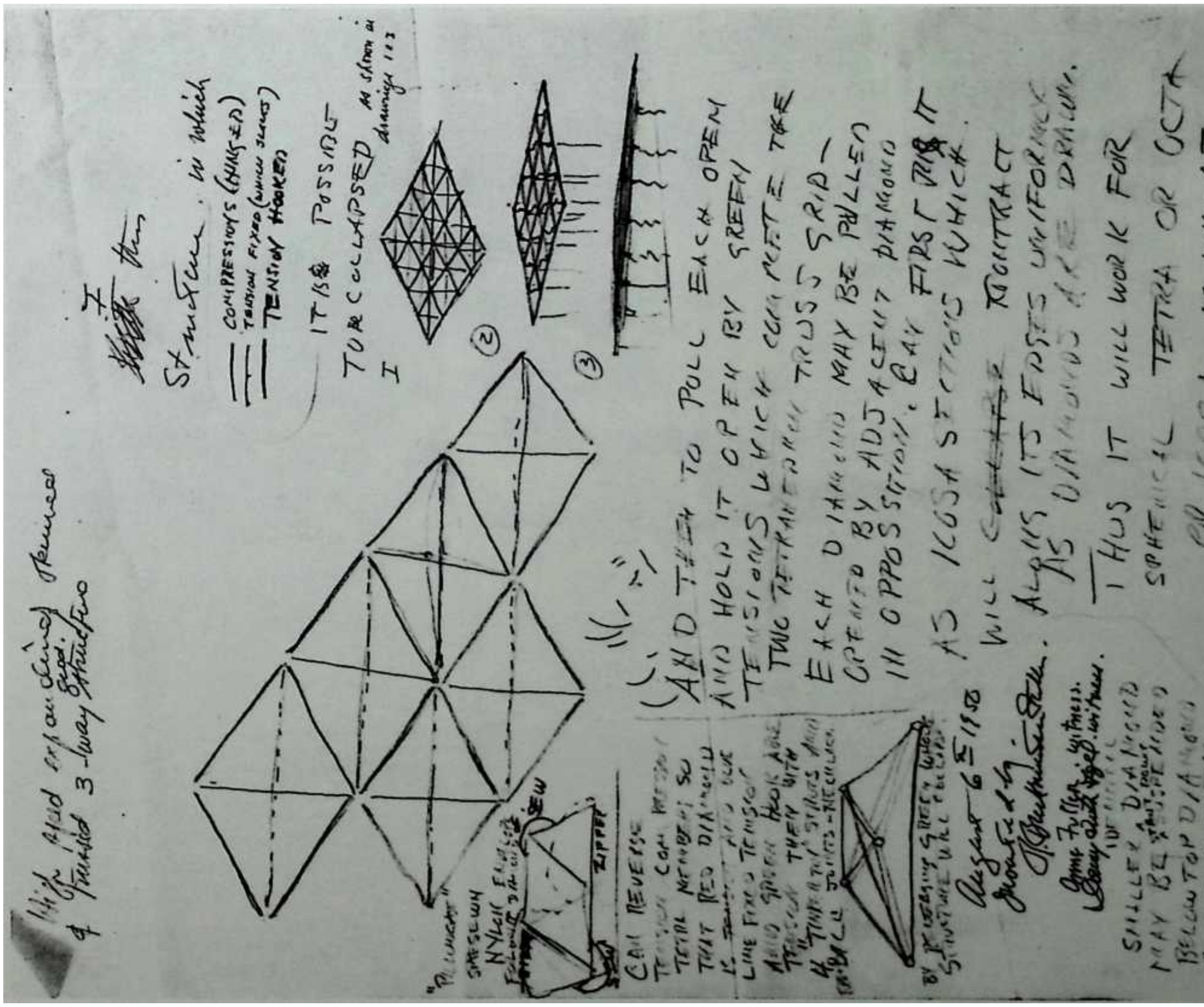


IDENTITY OF
JOINTS BY NUMBERS
EDGES BY GREEK LETTERS
SINUS OF CURVATURE CLOSES ON ASSEMBLY
FULLER RESEARCH FOUNDATION
3-WAY-GRID
GREAT CIRCLE DATA



IDENTITY OF , , JOINTS, EDGES.
TRIANGLES BY ROMAN LETTERS
DIAMONDS = NUMBERS
JOINTS = NUMBERS
EDGES = GREEK LETTERS
3-WAY-GRID-UNIFORM BOUNDARY MODULE
GREAT CIRCLE DATA
— FULLER RESEARCH FOUNDATION —
COPYRIGHT — 1950
PATENTED CANADA — U.S.A





HIGH SPEED EXPANDING , SKINNED

IT is POSSIBLE. TO COLLAPSE CTtucTvjt«.j AND THB.N TD PULL EACH OPBN &r G«:EN *C*) TENSIONS WHICH COMPLETE THE

TWO "rRtRAWflDRON* TRUSS GRID . EACH DIAMOND MAY BB PVU.CO OPENED by ADJACENT DIAMOND |K1 OPPOSITION).

CAN FIRST RICr IT AS ICOSASRCT1ONS WHICH WILL CONTRACT ALONC ITS Btxj.ni UNI FORMLY AS DIAMONDS ARB DRAWN. THUS IT WILL WORK FOR SPHERICAL TETRA

OR OCTA Ott I CoS A AC WHOLR SPHERE OR SECTION* OF ﬁPHBKE* /WHICH WOULD

BB AIS EM BLED AS CHDtD STRUCTURES).

IF NYLON) SKIN OF DIAMOND SHAPE 6HWN th) 4- steipl.

WITH XlPPEleS ** ARROUfUD EDGES AND FACTEWBP AT A 4 & > XT HAY THEN) Bits ZIPPED ON 4 EDGES TO ADJACENT DIAMOND AND to COMPLETE DOMK SKIN .

~F~ULl.EE KESEAECH TDONOATIObJ

CoPYHaHT IRCO

patbntcd Canada U.S.A

Can rbverse tension compeesliOm T&THLCX MBMBGRS , SOTWAT RE."D DIAMOND is TENSION (BLUE

Line (-) |ixmt> tension , And

GReCN (') HOOK CftBLE TENSION).

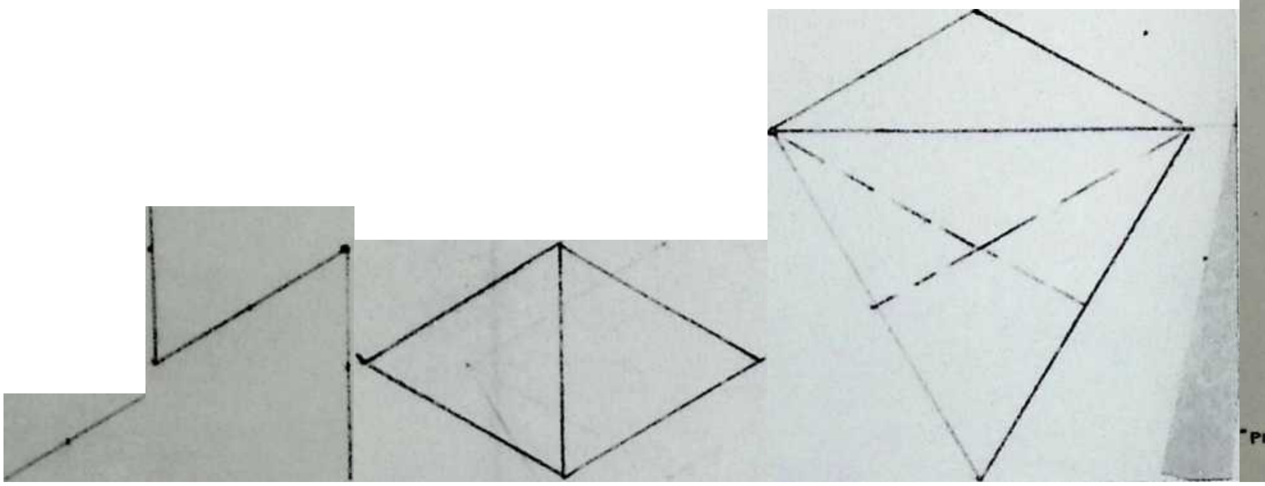
THEN WITH 4 * TINKBt TOY* STRUTS. ANO TUBE - DALL - CABLE NBCKLACt, BY RD-UBASiNG GKEBN /*)

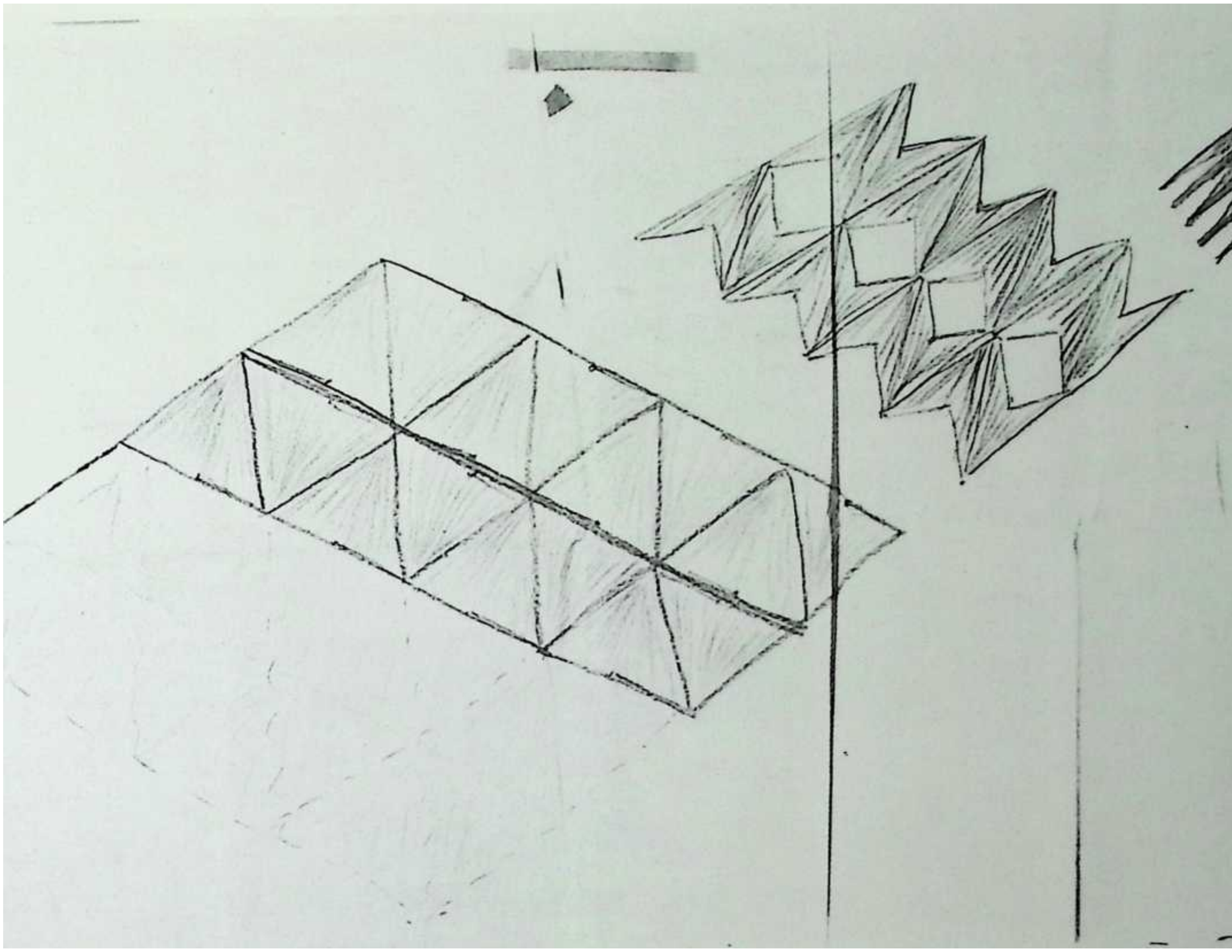
WHOLE STRUCTURE VUI LIT C.OLLAFA& .

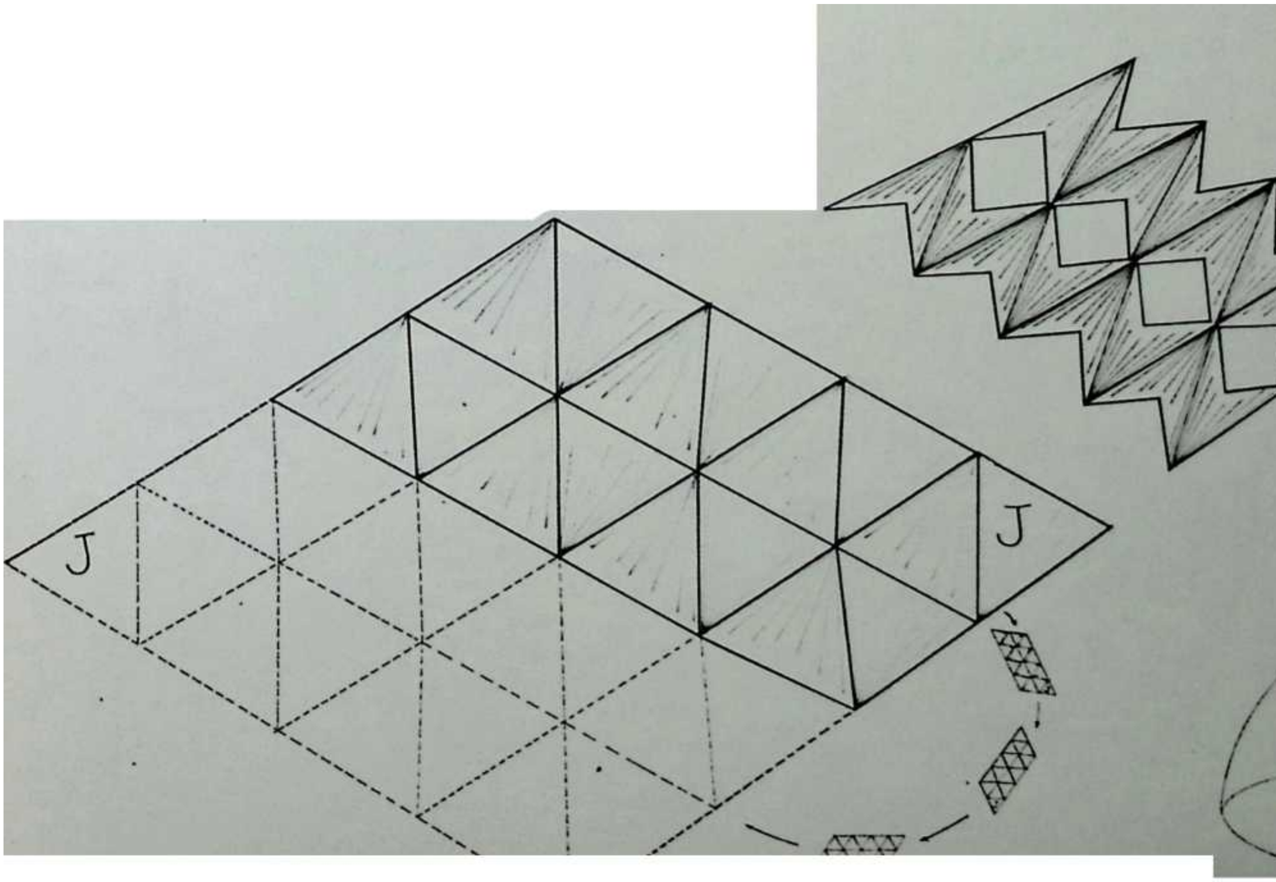
I'

Smaller idbntical diamond may be strut down puspcnded dulow top diamond and THUS WHEN ASSEMBLED , MAKE WHOLE STRUCTURE A DOUBLE. *KIM ANO FULL.TRUSS structure which When CtR-e.cn /) tdnsioNc are. hookg-d-im cannotcolat

compressions may be. TEL-UiCornp or Tosblr hinge Collapcmd TD enwreArr LINCTM of wu







PATTI NT£». ROUAKOUNP
PvOTS TV AMY

Assembly components and routine FOR PLASTIC FABRIC covered zig-zag TRUSS UNITS, (of metals , plastics or. fibrous board)

OF 3-WAY GRID UNIFORM EDGE (OEMreAKiNG) MODULE GEODESIC STRIXTURETTORMED ON SPHERICAL ICOSAHEDRON , COVERED BY U S A - and Canadian patents ano CopVRl&WEO I95TD BY r.bockmin-stee. fuller..

—1-1
4S THE GEODESIC REVOLUTION, PART 1

DIAMONDS

1

RED

—-'TIKI DIMENSION SttECM-OUT OF BASIC A> GEouPED Br DIAMONDS*— omnsere) ZL . IB44O A

2 ORANGE

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tow (Hl OKAUAK Ci)

- i'1<* ®   nsi» (?)

muw (io otaNse

5

YELLOW

4

GREEN

5

BLUE

VIOLET

KZO CM)

- 'WO @

2MD RUD <u)

-'MIO @

RKg (M). — F*t> CM) - OttWtvl ouwefwT

J«o1©

OCAMGE reY CtEEFkl /CEA

ISW0 .11414

.14104. @	.n.24 (g)	.niic©	..sna Q	.Hina @

J1L

MAHOE CM).

g.KAuae AC.

KEO (K) GtTEN

• 11124 g) BUS no va.CT *fr.1*

FULLER RfcSEAECH FOUNDATION

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WLTWHveo CANADA — U-S-A

VCr - . -rK/)

HJIIEO Rlsuncw rnilMOMTiOM

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GCTBH An amn BUJE CM)

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• 11141 © 11,14 @ • 1541fe (J) -15414 © 11124 @ (£

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Btue CM) BUIE IMr~ Vloirr *ftA)* MOLETYMT

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BUIE fg) VIOLET (M) VOLET (Ml VIOLET CL) VIOLET Ipl

- OrtKALL TKOSS LENGTH		OF 10 BASIC	TRIANGLES -
A	B	c	D
U&HT BLUE	»RK BLUE	BLACK	Gear
.I84RO	.16802	.16706	14706
• 18342	.18410	. 17518	. 16706
. 101 IO	• .17154	- 16802	. 17 124
.55742	.532«6	.51024	.30538

	G	H	I
		BEIGE.	WLANOB
.11424	.18516	.17762	• 17762
. 15776	. 17514	.17124	•17762
. 18316	. 16344	.15416	•17560
.32018	.52654	.51 102	.53084

• 11141 @ BLUE *CL.)*

E

WHITE

. ni2G . 15778 .15776 .48462

- SUMARY OF TRIANGULAR TRUSS DIMENSION TOR WHOLE SPEKE

.55742 .5528G . 51026' .52654

120

Jo

. 17560

. 15058

.15056

.47476

3. I 5828

D .50556 E .48682 I

I .55064 (

J . 47474 I

1 . 44180

40

EACH PER SPHERE 4 * 120 - 720 A

EA£.M PER SPHERE. 4 « 40 - 240 A

SUM — 720 4 2AO&. SCO TSiMIGIM

IPA>NIQQg-TYPES OFTRIANCLRS OF WMjCH 4 [GKOUP A) RfiPEA .S5.ofe.ovr.V1e/ MAKA.

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Mrw»«rlC—

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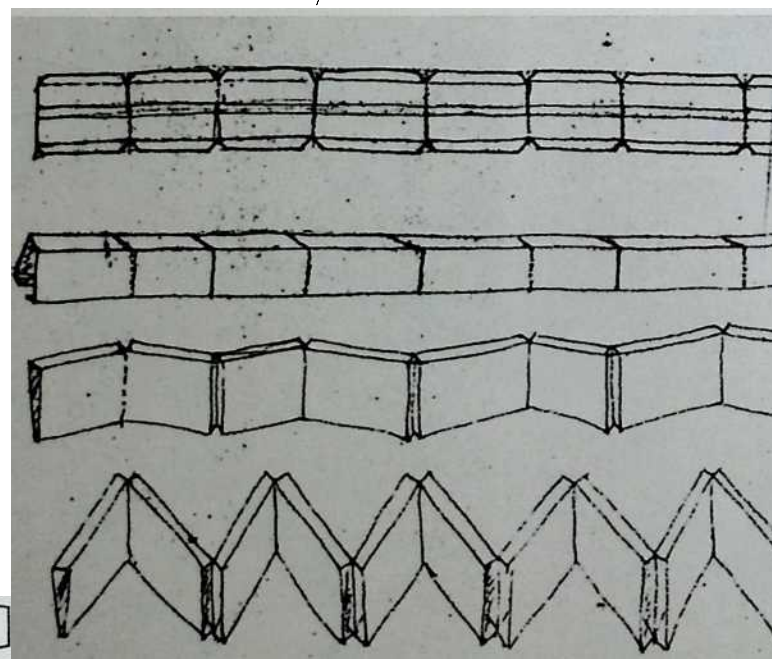
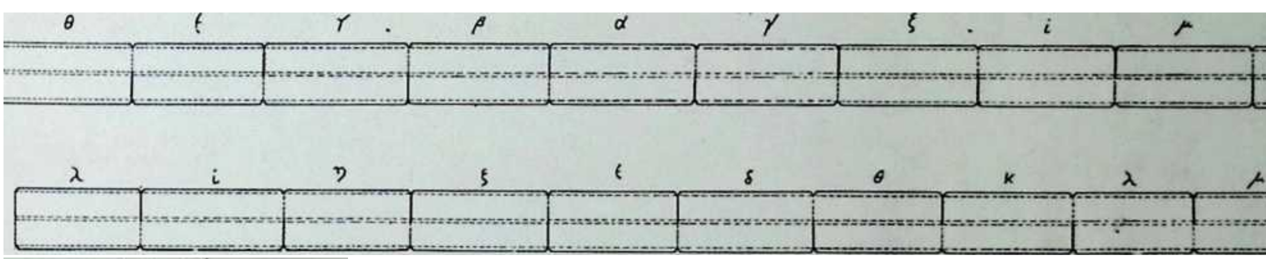
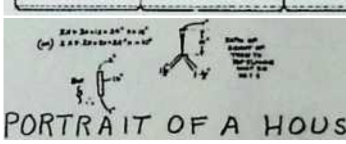
AHO Ca / Ykic.mtgo I^Fa uy ft bJCKHmSTB'i FJUUS/i. ’



PRODUCTION STRIP PATTERNS OF *A* **» V ZIG-ZAG WHICH IN-TERACT TO COMPRISE A COMPLETE 5-WAT GR»O TRUSSED ALL TRI-ANGLE SPHERE. REquiKING WO OTHER FASTENINGS





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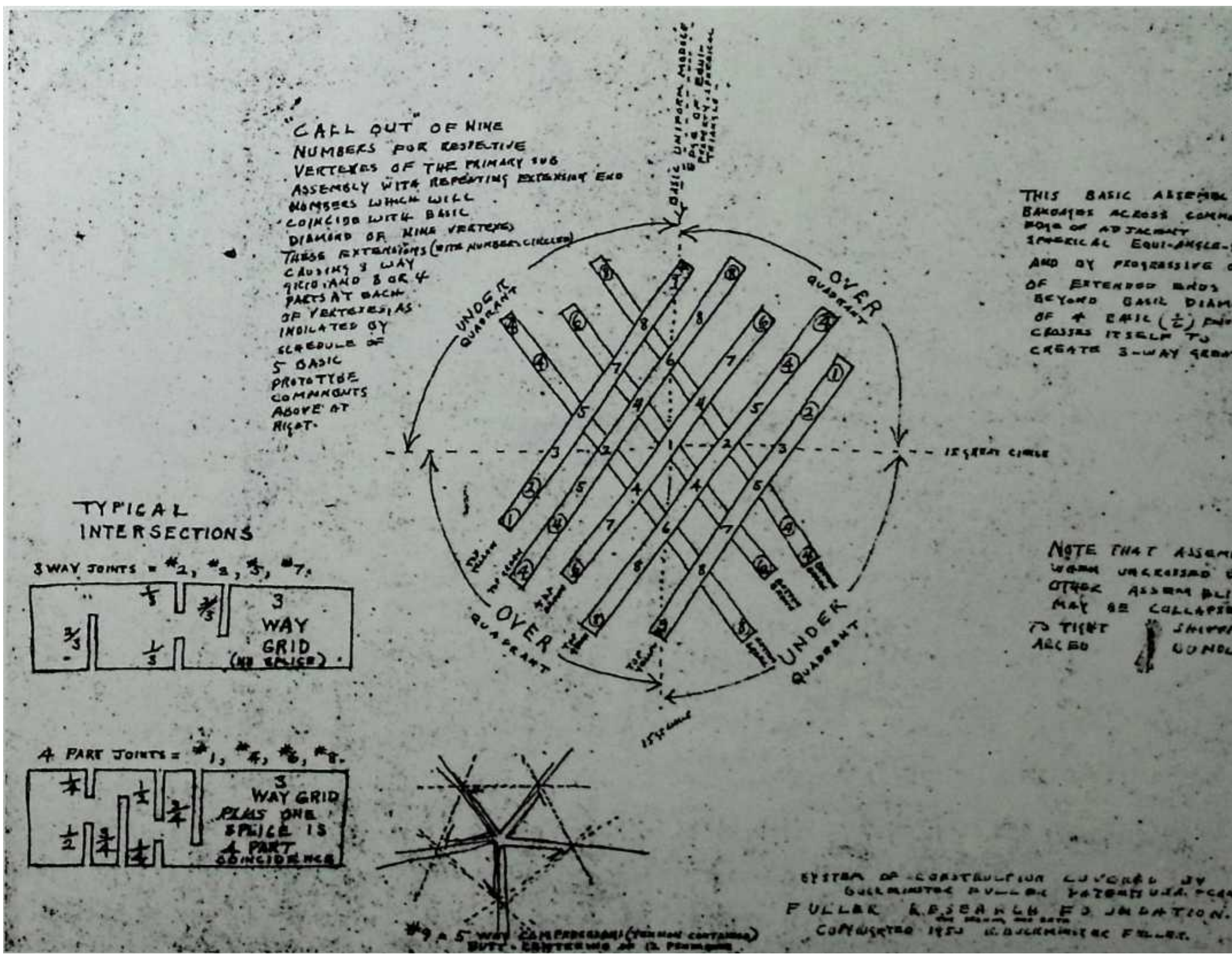
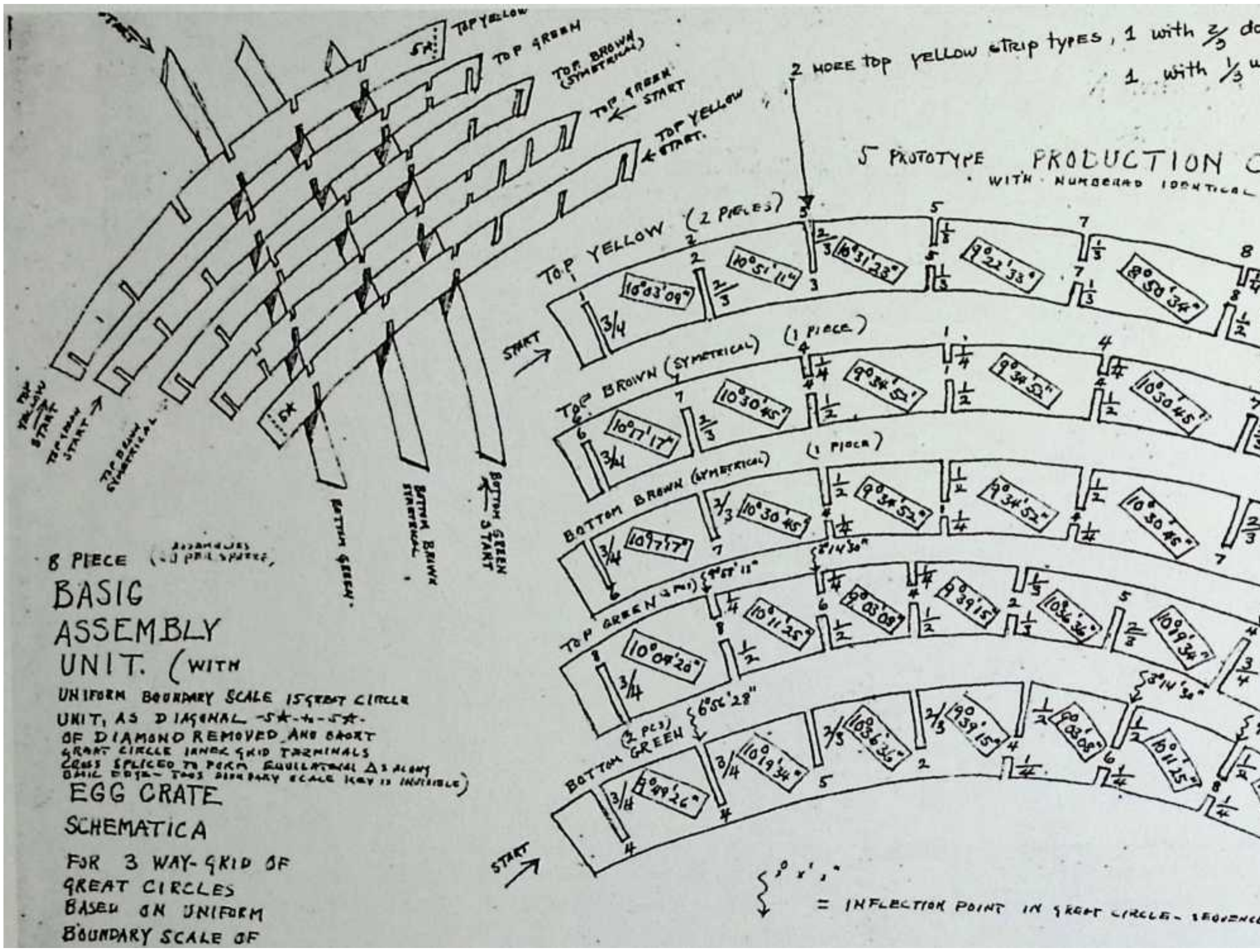
Corr<>*KTeo Hrs

rAieurtD CANADA — U-S A



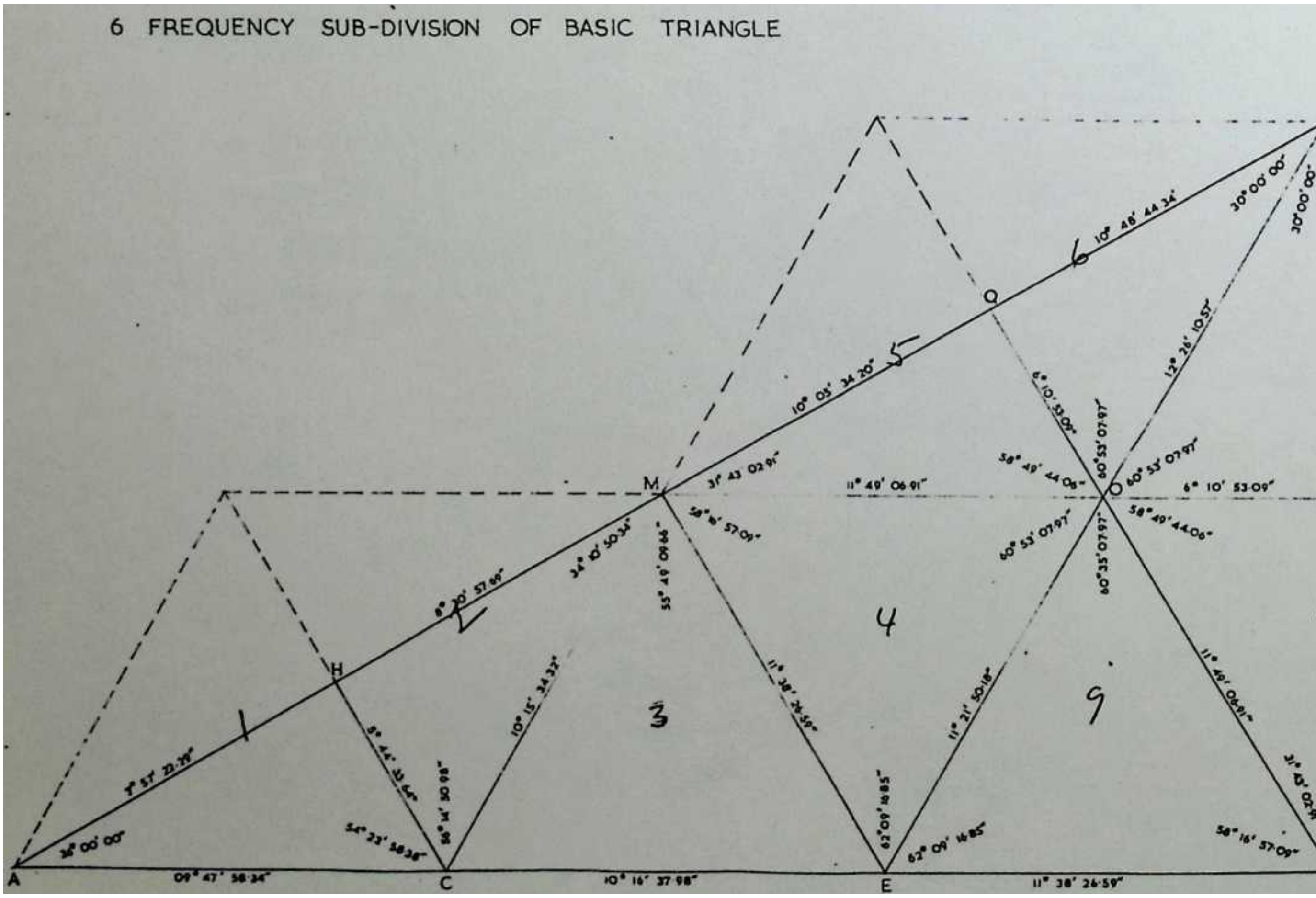


ttra

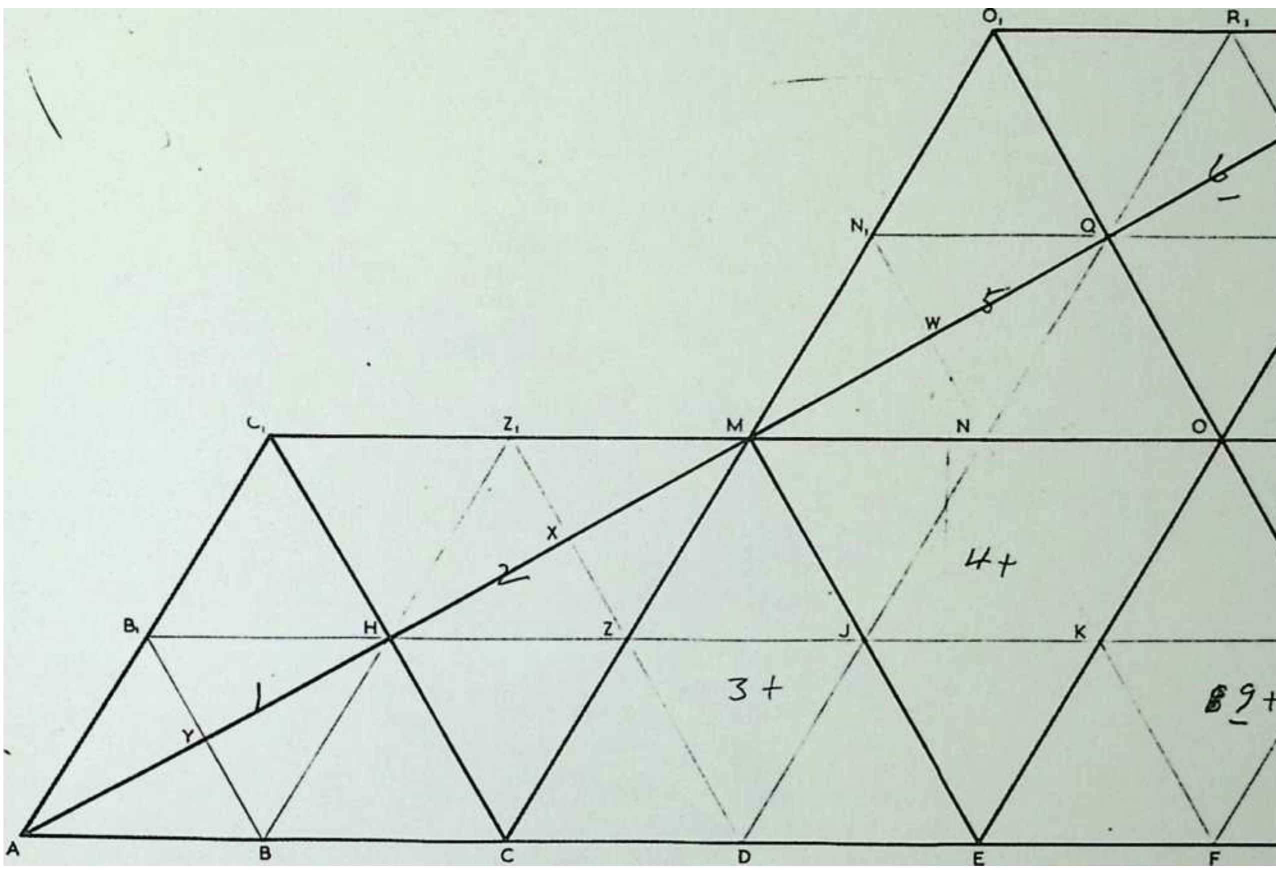
AH g P·UB

lH tMIFMft MQPUUS , Qp a

ZO1 CA>* rCM* A KESertivUA F=* G/fT/oN



OCTAHEDRON SUB-DIVISION OF 6 FREQUENCY



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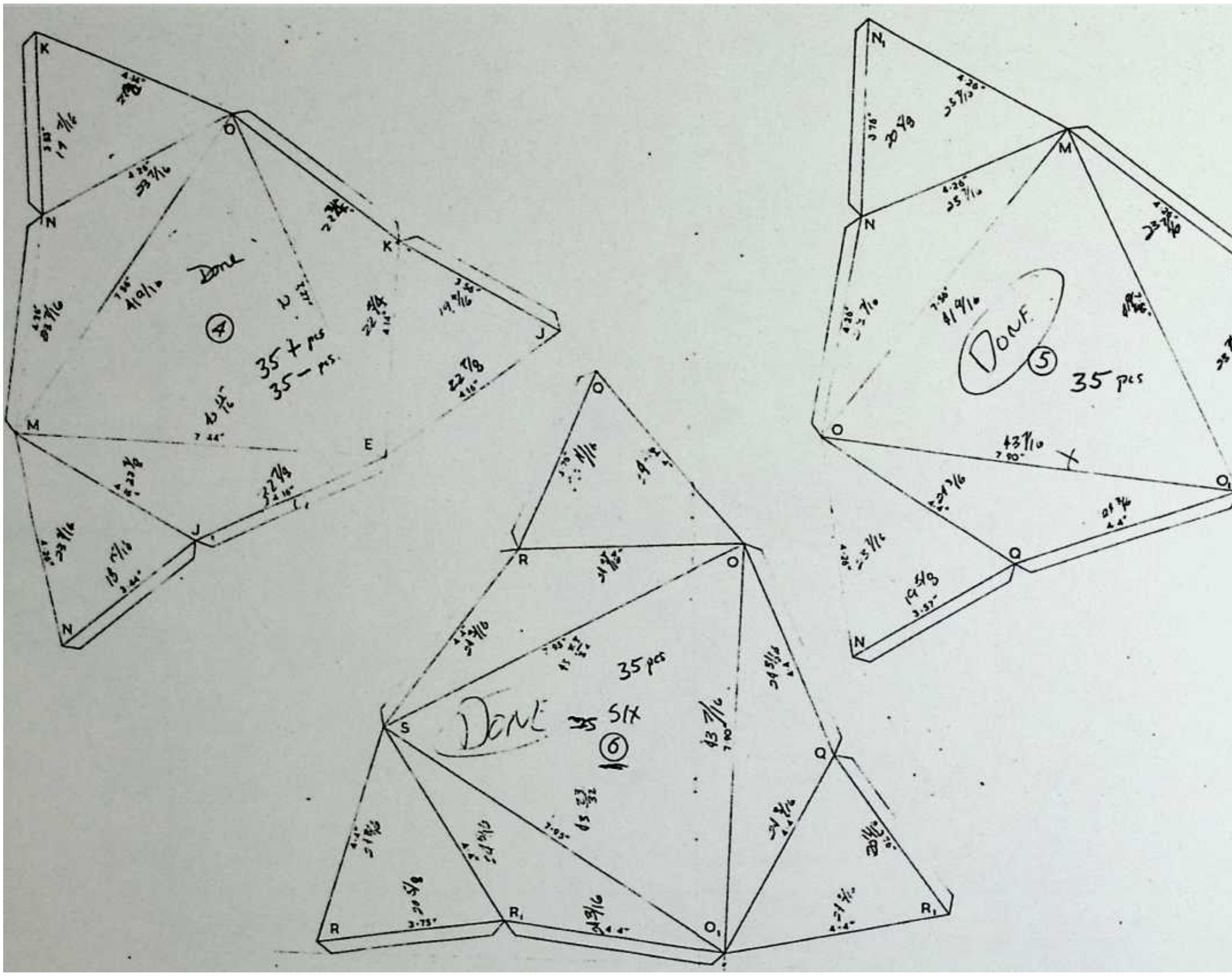
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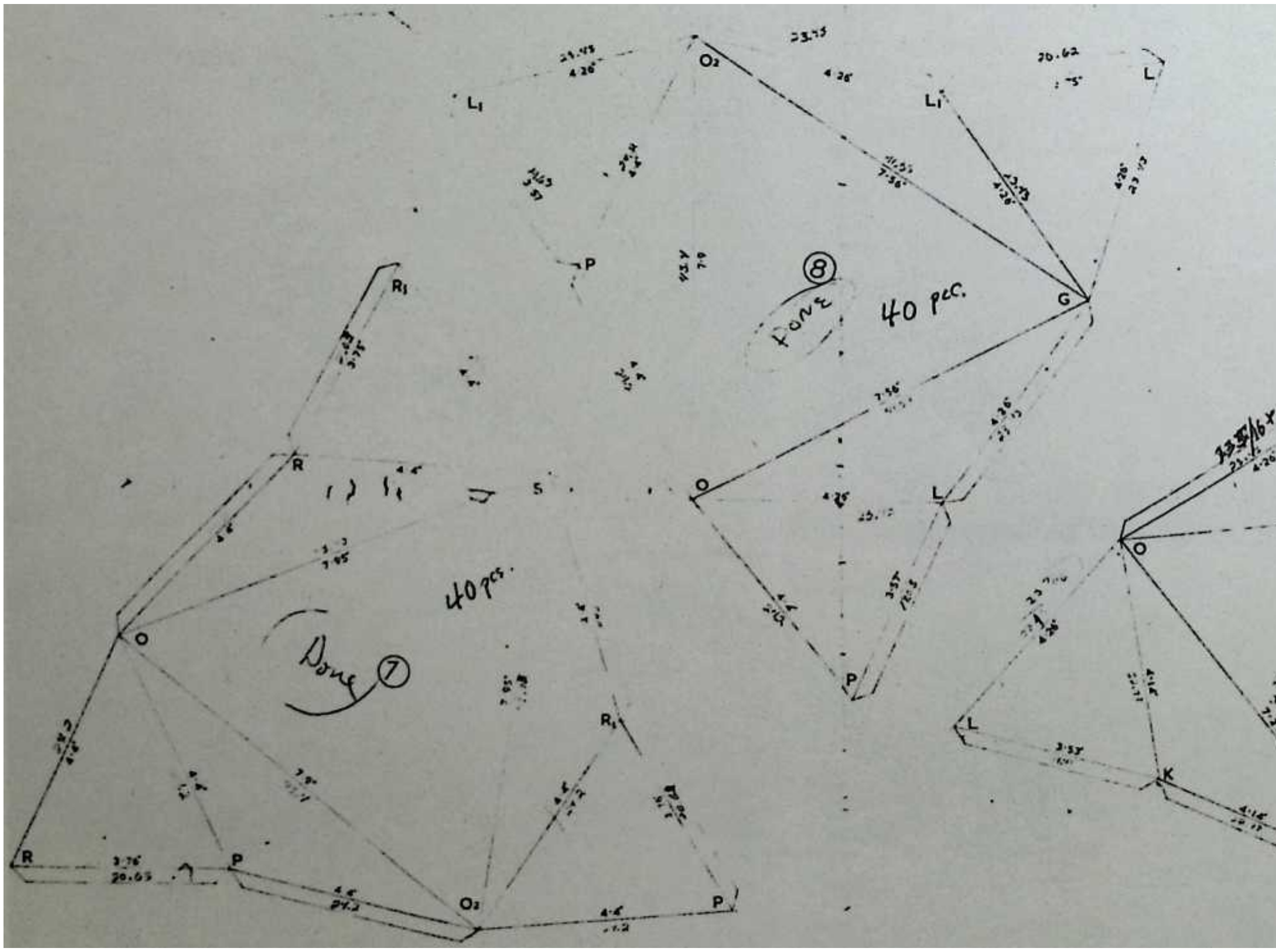
6



DATA IN ORDER OF MAGNITUDE

AN- GLE	ARC FACTOR	'CORD FACTOR! (R.11		1 % AN- GLE		
! io- si[1] ir	. 184421^	. IflTIO		Is' 23' *35'*	. 04435	84' 34' 25*
j 10' 36' 56*	. 1851744	. IB440	•	Is* 18' is”	.042+5	' 8+” 41' 42*

j 10’ 31'	. IS366I4	. 18342		5’ IS[1]	04171		i 84* 44’
23’				42*			18’
10’ 30‘	. 1854777	. .18516		5’ 15’	. 0^158	j	84’ 44'
45’				22*			38*
IO’ 14’	.	. 17444	1	S’ 4’	i		84” 50'
34’	I8O224G		1	47*	.08447		13*
10” 17'	.1745604	• 17424		I 5° 8'	.08462		«+’ 51'
17*				38*			22*
10° II'	•	.17762		5° 5‘ 4	. .0888 1		84’ 54'
25*	1778554			2*			16
10’ 04'	.	. 17560	1	i *5°* 02'	.08780		S4- 5T
20*	1757455			IO*			50* .
10’ 03’	.	' - 17518		S’ 1'	.		84’ 54'
OR”	1754444			*34!*	08754		26’
4° 44'	.	’ .17126		4° 54'	j .		85? 05’
Zb’	171+542			43*	08563		17’
4” 38'	.1684564	. 16802		4“ 44’	.		85’ 10*
15*				37*	08401		25*
4’ 34’	.	.I67OG		4° 47'	.08353		65’ 12’
52*	I67Z2I4			Z6*			34*
4’ 30	.	. 16 566		4-° 45'	.08285		S5* 14’
08*	1658450			04*			56*
q» *22'*	•	-16544		4° 41'	.		85’ 18'
33”	1656541			17*	O6I7Z		43*
4° 03'	. 1	.15778		4’ 31'	.		85’ 28’
08”	574411			34*	07884		26*
6’ 50'	.	. 154*1G*	j	4* 25'	.07708		83’ 34'
34”	1543355			17’ !			43*
8* 38'	.I5O72B6	. ISO58		4° 14'			85’ 40'
ICT				OS* j	07524		55’

7’ 55” 45*	. 1385401	• 15824	3* 57’ 52” I	. 00*11 2	86° OZ' 08*
5° |0' 41*	0405742	.04034	*1°* 55’ 20’	. 04- 517	87’ 24’ 40’
5’ OB' 47*	.0848215	.084 78	2’ 34' 23* |	. 0440*1	87’ 25' 37*

PIECES PER SET

ONE

TWO

TWO

FOUR

FULLER RESEARCH FOUNDATION.

TABLE OF CENTRAL ANGLES (ARC) CORD AND CORD SEGMENT (TRUSS OR TRUNCATED CENTRAL ANGLE (S OCELES ZS? OF THREE WAV GRID, UNIFORM EOTSa ' MODULE- EDGE , SPHERICAL EQUILATERAL ZX OF 8 SPACES (ON (COS AHEDRAL)

R. BUCKMINSTER FULLER

EULER'S LAW * • «—» . • « **f***

SUMIVIPED AS FOLLOWS .

UNIT ONE (yellow GO tx

SO X *6* - 340

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DATA SEQ&ENCE • • **of**

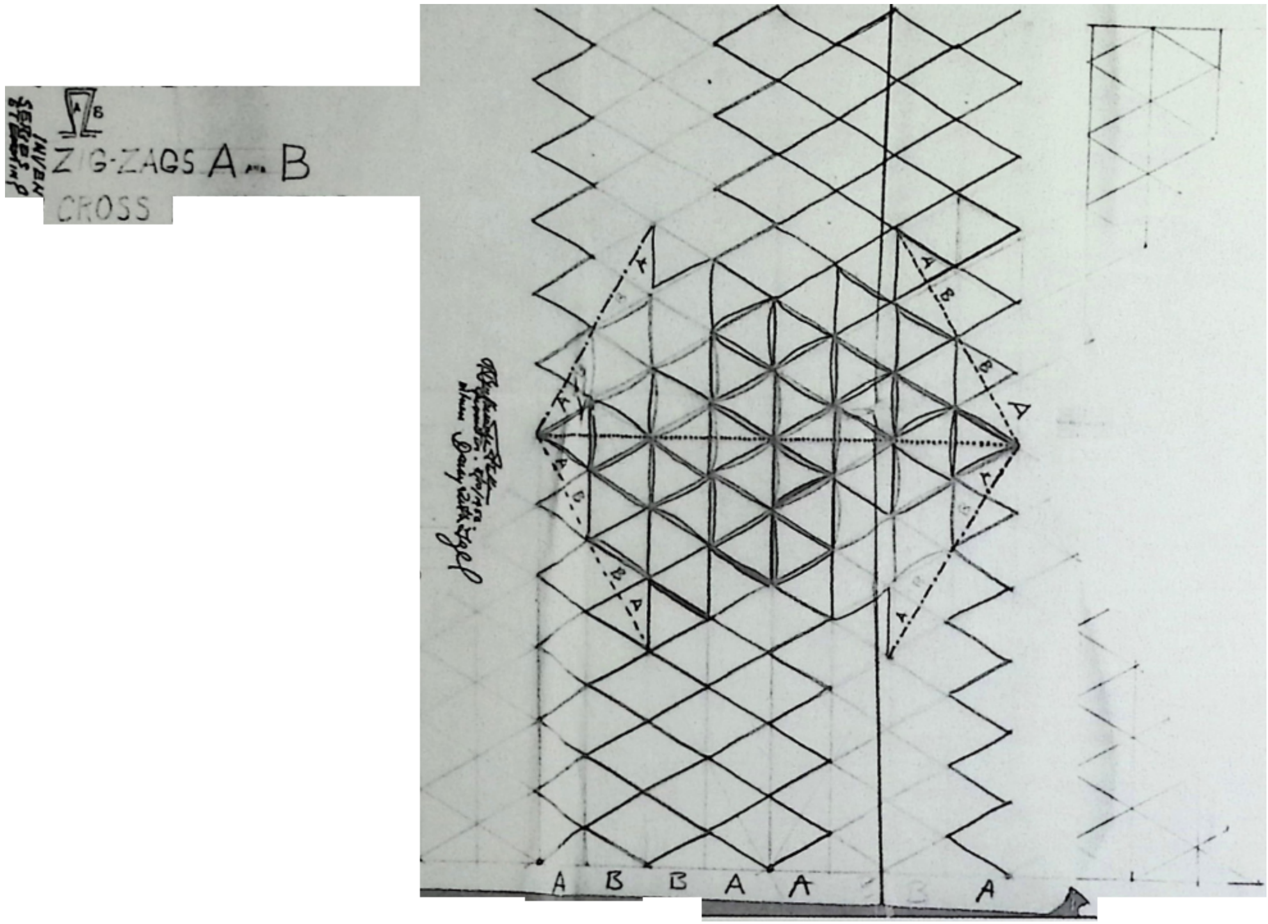
STRUCTURAL

TS> OF 3-w'AT GRID

CFS IWTERUAL iccSAnEDLCU.

UNIQUE

e suCkhimSteE-WLIH



STRUCTURED WITHOUT ANY FASTENINGS OTHER THAN
Held $ *DISCLOSED THE SUBLIHELY SIMPLE E)4TEH*
BY WHICH DOMES AND SPHERE? MAY BE DEEf

STKUpOREb WITHOUT AMY T STEM INGS OTHEl? THAN Tl)E SELF A
A A B b A

GRIPPING OF THE
£swwpt parts.

EACH OTHER *|jN SUCH A MANNER AS TC COINCIDE ONCE i^ONLY WHILE COMPLETING A 3- WAY GREAT CIRCLE. T* *G R*I D OF THE SPHERE ft ** 9 and each zig-zag is ^IHTERWfUi'PEP WITH THE OTHER BY THE METHOD

Ke OF PATTERNING THE STRIP IMMATERIAL .AS CONTINUOUS

i^ CMTOWHIG ALL

THE CUTTING AND pF'^ING LINES 'A^ ROTO PRINTED-

HERE IS DISCLOSED THE SUBLIMELY SIMPLE SYSTEM

BY WHICH DOMES AND SPHERES MAY BE DEEP TOSS

THE SELF

GRIPPING OFTHE

SITUCWEAL PARTS

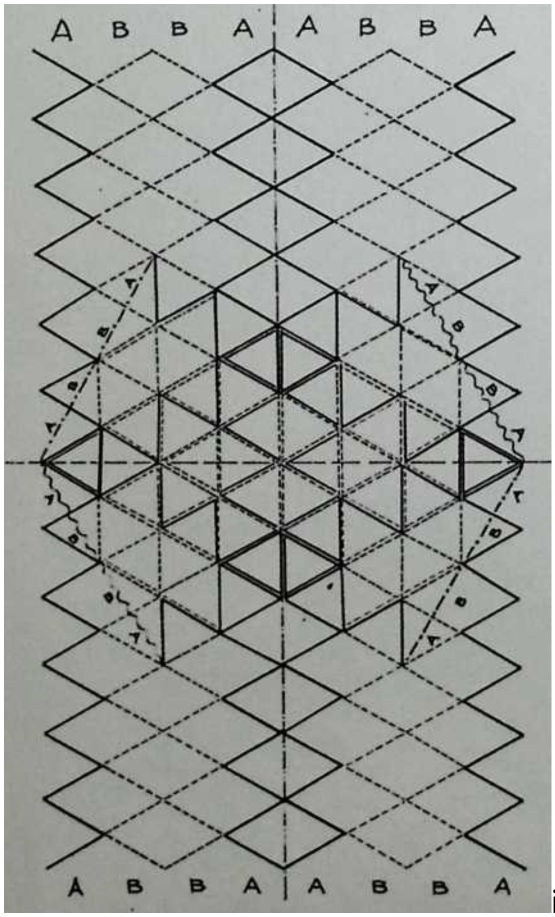
s

ZIG-ZAG A" 'B'

CEOSS EACH C5TMEP

IN SUCH A MANNED AS ID COINCIDE ONCE ONLY WHILE COMPLETING A 5-WAY GEEAT CIPCLE GEID OFTHE SPHERE AND EACH ZIG-ZAG IS

INTEPWRAPPED WITH THE OBlEE BY THE METHOD OF PATTEEWING THE STElP MATERIAL AS CONTINUOUS Eollep strip ONTO WHICH ALL the CUTT1NG- AND FOLDING LINES AEE ROTD PRINTED



invewnsv M.R tuxuiMSTT«k Fou-EK

FULLE R EESEAECH FOUNDATION

Cofnrtl&HTED IA5O

PATENTED CAMAVA — O-S-A ..

CP STRUCTURAL 'DIAMOND' (TWO SPHERICAL TETRAHEDRAE ,TRUSSED BETWEEN RADIUS CT 2 NAfcMTLOeS.)

&TYPES O» <3> F**' SPHERE

O» . WHICH. ' •

£ TYPES., u«r«AT INSIDE. OUT «* n TVOH- or

• : JB^ATWS "OF A*»*M»uy + APPLIC»TI#H _ • >.

r- 'TO SPHERICAL- STR.9CTUMU :

fcO 'wJcupF ARCH oeTHt. STfm - '

49C> ro» SVHKRA

LONG, WFOOHAU ASIN raUKMatlr OP BASIC SKHAOMD COMFUCTU MAMOHU K, A IRIK TCTMHBBUM

Rirwt

- **UNlRDKM —"A TT ® ®**

- **UAVWIMCN (K *r**

tcmiiHrxoU *m<

-i_ ® ' X

***vmwt«« aimaM Hen)**

UR it muuu i* *'< • «* chm*'»M.t** >.n«**

UOCUKCT K9W< 19 TATTMAH 10* «Cl' C«UWUtK..|| »LTtTU»< KF MKKIMVM *19* >*« • *IMATSLV B* C>«*> MUK*F'.l*

AN# UN#ER-TRIANGULATION O« 3 UNITING <J> FOkHk LARGE* TETKRHE#*ON FSTTILN AB CD

8 UNIFORM! BOUNDARY DIVISION* GENHRRTED 3 WAV CjRlD — <WO*MSIC -a- STRUCTURE

WITH A* WII* Mwarife. a A fC'siKHKIK* ' K*MA«*

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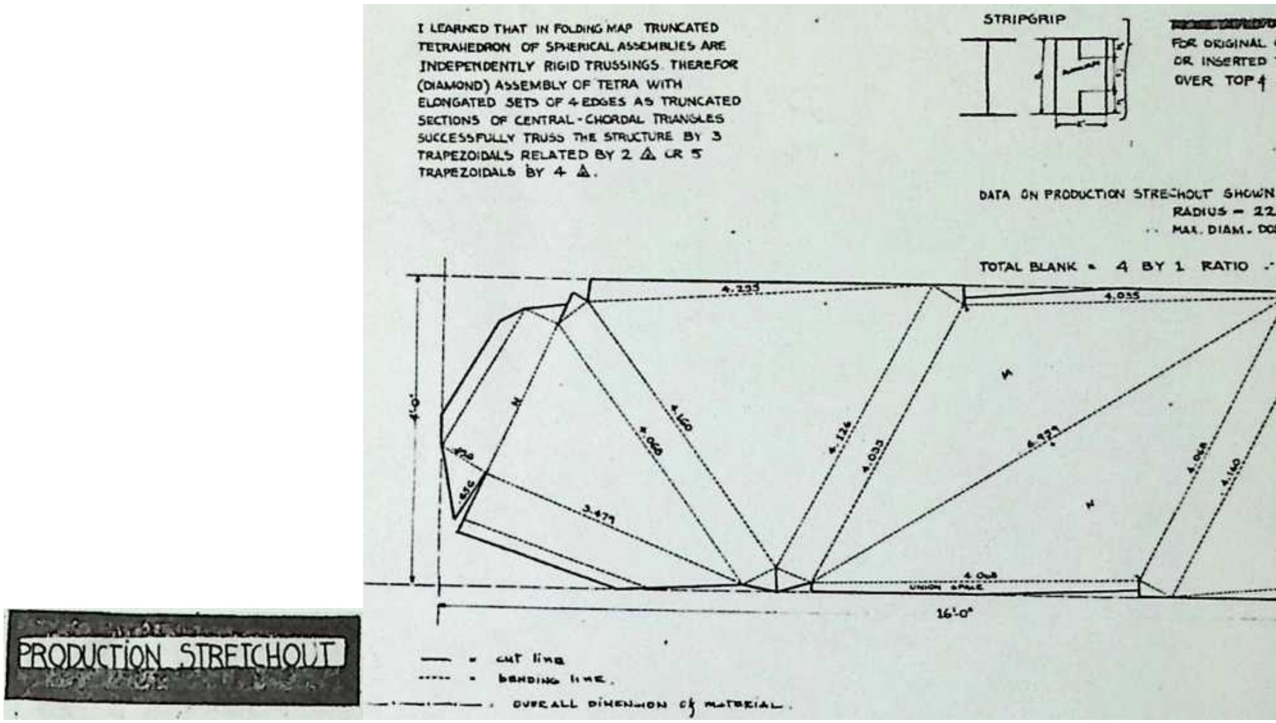
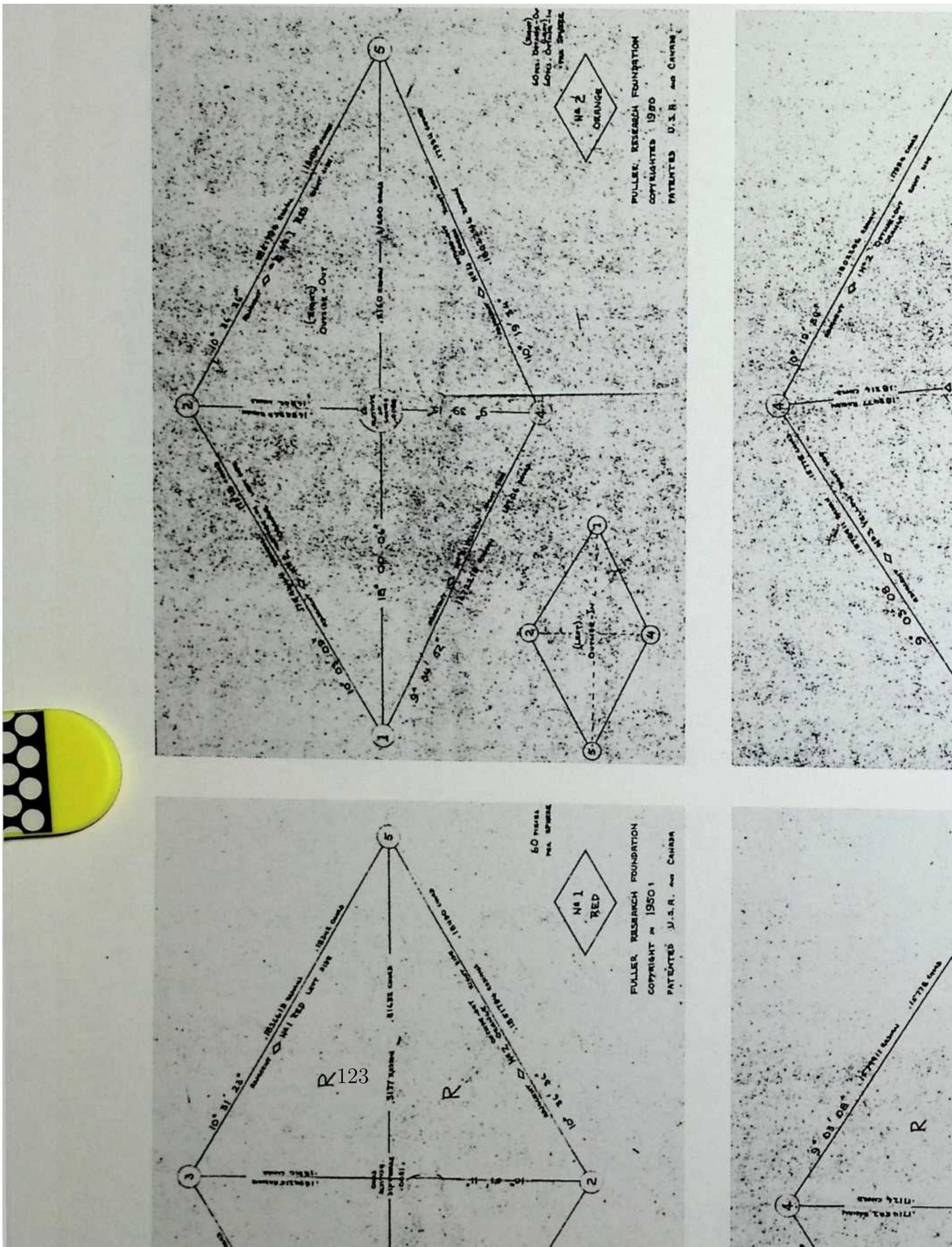
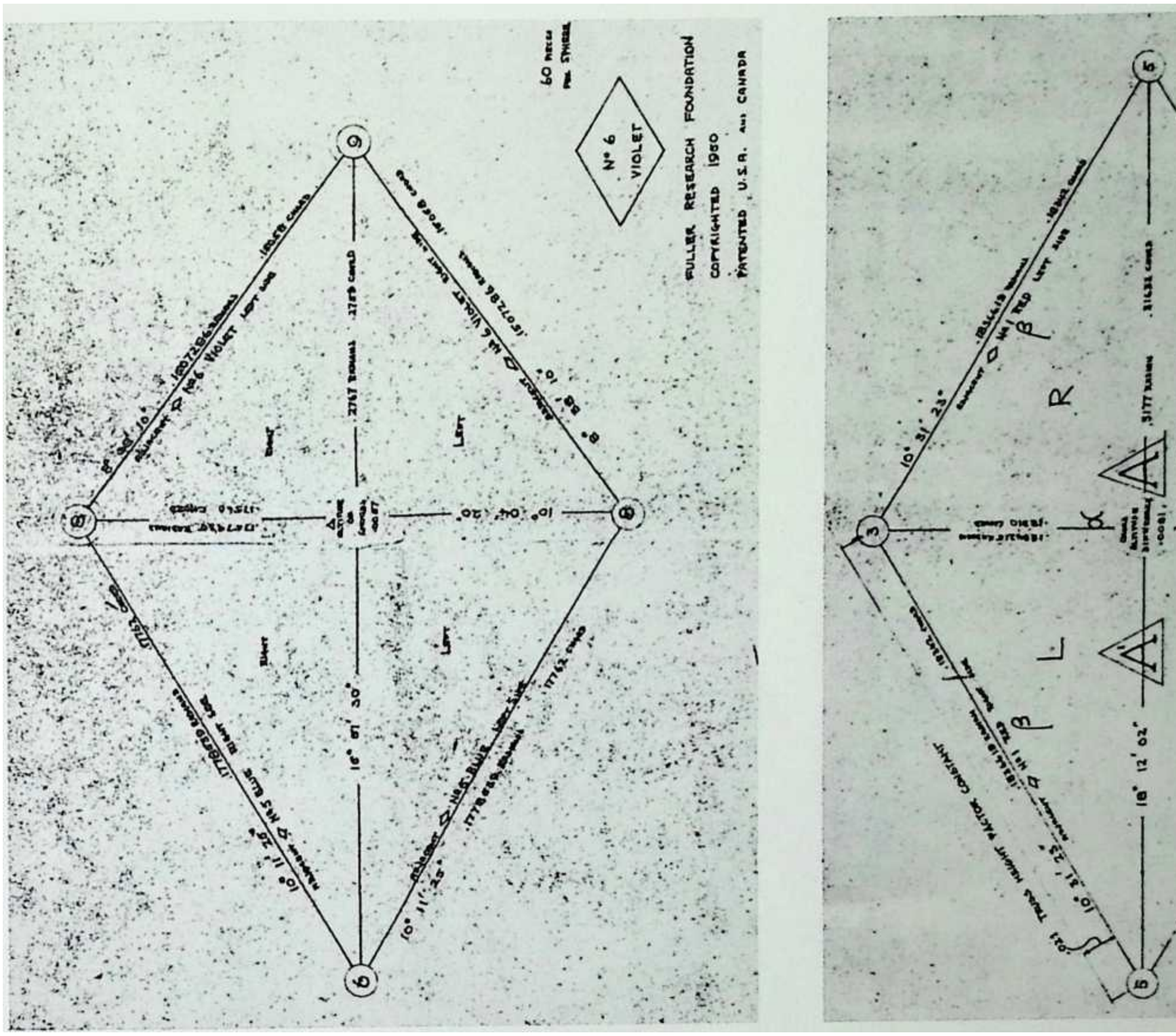
COPYRIGHTS# 1930

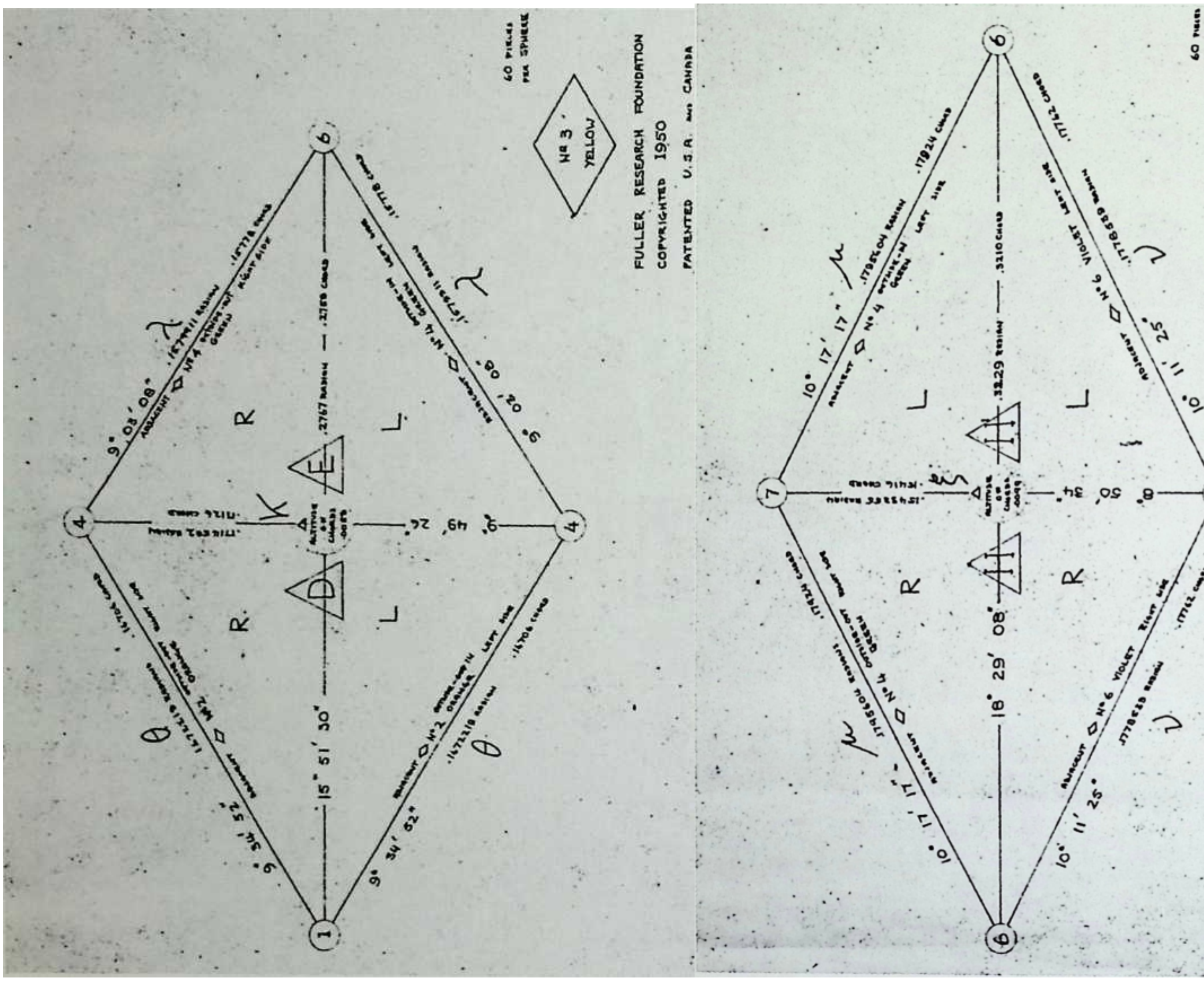
PATENTED U. S R. KM CAM***


I LEARNED THAT IN FOLDING MAP TRUNCATED TETRAHEDRON OF SPHERICAL ASSEMBLIES ARE INDEPENDENTLY RIGID TRUSSINGS. THEREFOR (DIAMOND) ASSEMBLY OF TETRA WITH ELONGATED SETS OF 4 EDGES AS TRUNCATED SECTIONS OF CENTRAL-CHORDAL TRIANGLES SUCCESSFULLY TRUSS THE STRUCTURE BY 3 TRAPEZOIDALS RELATED BY 2 ⚠ OR 5 TRAPEZOIDALS BY 4 ⚠.
STRIPGRIP
FOR ORIGINAL
OR INSERTED
OVER TOP
DATA ON PRODUCTION STRECHOUT SHOWN
RADIUS – 22
MAX. DIAM.
TOTAL BLANK = 4 BY 1 RATIO
4.225
4.035
4.160
4.060
4.124
4.035
4.979
4.068
4.160
3.479
4.068
UNION SPACE
4'-0"
16'-0"
PRODUCTION STRETCHOUT
— = cut line
----- = bending line.
—·—·— = overall dimension of material.

Him


FULLER RESEARCH FOUNDATION
COPYRIGHTED 1950
PATENTED U.S.A. and CANADA
No 2
ORANGE
No 1
RED
FULLER RESEARCH FOUNDATION
COPYRIGHT in 1950
PATENTED U.S.A. and CANADA
60 pieces per sphere


60 PIECES PER SPHERE
Nº 6
VIOLET
FULLER RESEARCH FOUNDATION
COPYRIGHTED 1950
PATENTED U.S.A. AND CANADA
16° 51' 30"
10° 04' 20"
10° 11' 25"
18° 12' 02"
10° 31' 23"



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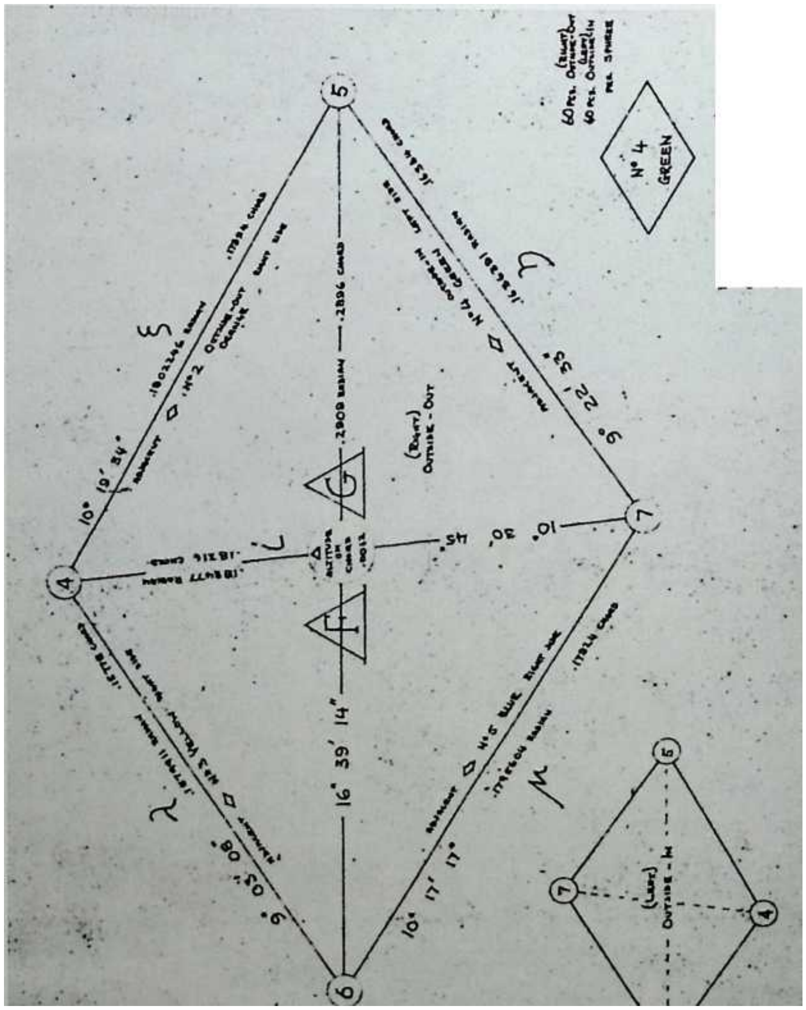


LOGISTICAL .t.e < - ENERGY - TIME - INPUT-OUTPUT.) EDGE STRUCTURES.

(.STRATEGIC COMPLEX OP TYPES-PARTS- WEIGHTS-

I INVENTORY OF 5-WAY GRID 8UNFF

FORMULA FDR FlNDlKo RAD»U* OF LAKvsfcsT DOME PERMITTED BY MViMAL

3 TYPES VERTEX (.of Which & AXE STAWOiRO AWOHt (-*) eepeAH ToTaL OF)

LO - TRIANGLE FACES (OF WHICH 3 ARE STANDARD ANO 5*« RcibraLO uses)

1G • EDGES C «O PNL-Y FOC. DIAMONDS AND G INTCENAL)

G • BASIC DIAMONDS (OF WHICH *A*- ARE STANDARD AND 2. 2*2 • DIAMONDS X XNSIDE our

8 • DIAMONDS PER ASSEMBLY

G -TO MANUFACTURE

10 • ARROWHEADS JDif^RS (G *« , lu USES)

. iflHIO • vUtKD FAuTCK CDCL LF IAK«£=T TKiArtoifi *UE OP 7

-aG4» . ALTITUDE CF EquclATEKAl. TkiAMaLt tOcKTKA*- |

I IHTEKVALS **J**

IS1IO» **. But. - •** IGSIG • FA^TCC OF MAYEAIA*_» **ALT»ruPt R>c s &mcc**

A-WAY G»*-II>

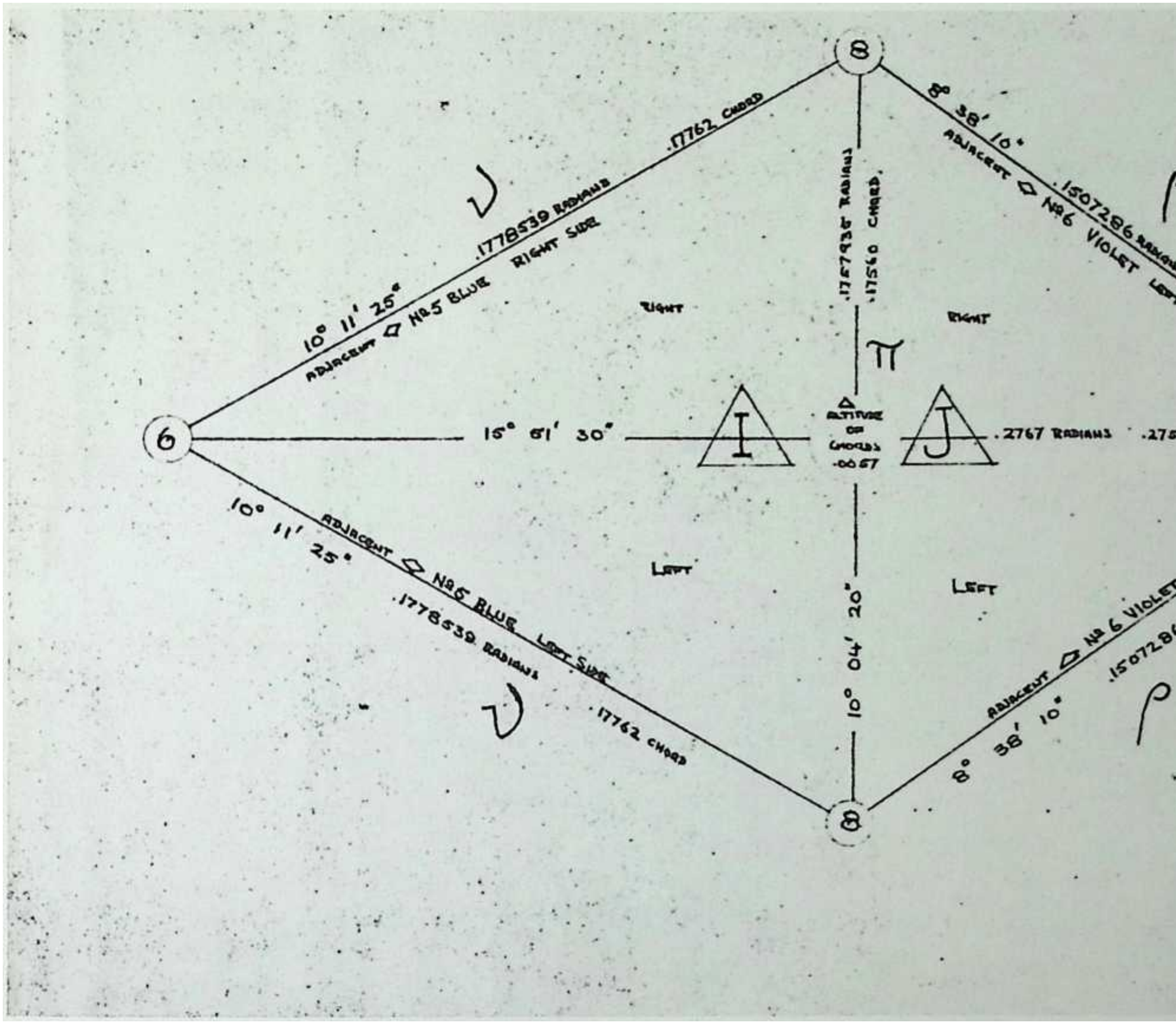
IT IS OBVIOUS THAT ASSEMBLY COMPLEXITY MUST BE HELD AT MINIMUM FCR UNTRAINED ASSEMBLIES AND ALL MUST BE COLOR *4* SYMBOL CODED REQUIRE NO SKILLED JOINING FRtHR PRt IOHMLU

FULLER REbEArtCH FCUNUAFCN.'

PArtNTuP ;k3

INtiC

AUY> CAXADA



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Z043G

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04.5

• **3,**

II'

ZOI7Z

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12

10* 14* 10'

17845

9' 55* 59'

T 52* 54'

@ 9* 25'48'

® I 9* 14' 54

• 9'*or* 48-

6* IB' 37

I73ZO

17226

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161240

' 5. 3535

J.

5. i960

84- 52' 55

B5 OZ'* 00.5'

5. 1676

4.9320

4. 8372

155904- ! 4.7712

14500 4. 3500

.13628

I36ZO

4 0860

85’ 05’ 33

85* 17* 06'

85- 22* 33’

j 85* Z6* 06* I 85’ 50’ 41.!

86* 05’ 36'

86* *C5'* 40'

13256

[1] KS	6-	51' *AT*	.11972 1	| 3.5916 ;	84’	34’ CA..S- j
i <*>	6’	49* 06* ;	. 11B 94	3. 5GB2	86-	35’ A6* [
it	6*	46’ 30’	.118184	3. 54553 I	84*	36’ 45’ ji
4	6’	45’ 34’	.11787	3. 53GI	66'	37* 13- |i
O'	6*	36* 37’	.115296	3.4509A	86'	41' 41.5H *1
t*	6*	34* 13’	.114606	3 4.3 B24	86”	”, J *l| 4Z,’ 53. S i|
&	G*	31- 51-	.11396	3.4188	86*	44* C4.5* if
X?	6”	3I‘ *AA**	.11366 —	3.4 164	BG‘	“ ‘ ’ ‘ | 4-4' 08“ j
e)	6'	ZB- 59*	.113085	3 39265	86*	45’ 30.5’ jj
S	6’	28* 07-	.113076	3.39ZZ8	84*	45’ 31.5* I
	6-	21' 12*	.11076	3. 5 240	86’	4-9* 24” S
£	6“	IB' 43’	.110108	3.30324	86’	DO’ ZB. 5* lj fi
	5-	59’ 00”	.10400	3. IZOO .	87'	O* 30* II
	3*	55’ 26*	.06843	*2. OS29*	SB*	oz’ 17- ,
	S’	53’ 42'	.06791	2. 0373	8B’	OB’ 14- f|
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86* IZ’ 04 5

«?. t?UCUAMA15T&G. puLLE-12 IXARCA 9, 1950

BA61C TClAMGLGr COAlTAlN^,- . IG r»iA.fJaL&s

- IS VtCTlC&S

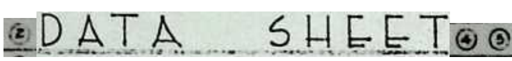
- 12 E-XT&eiOR tD&66

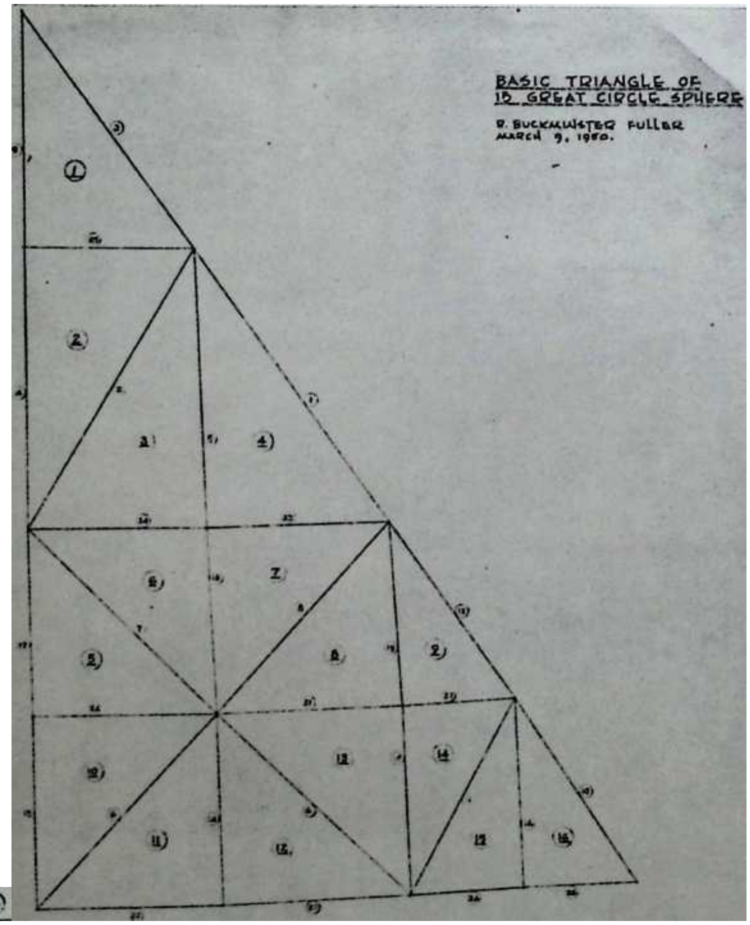
- IB IMT&BIOR &D&&4.

- 30 EDUeS = C&A1TRA-I- Z$

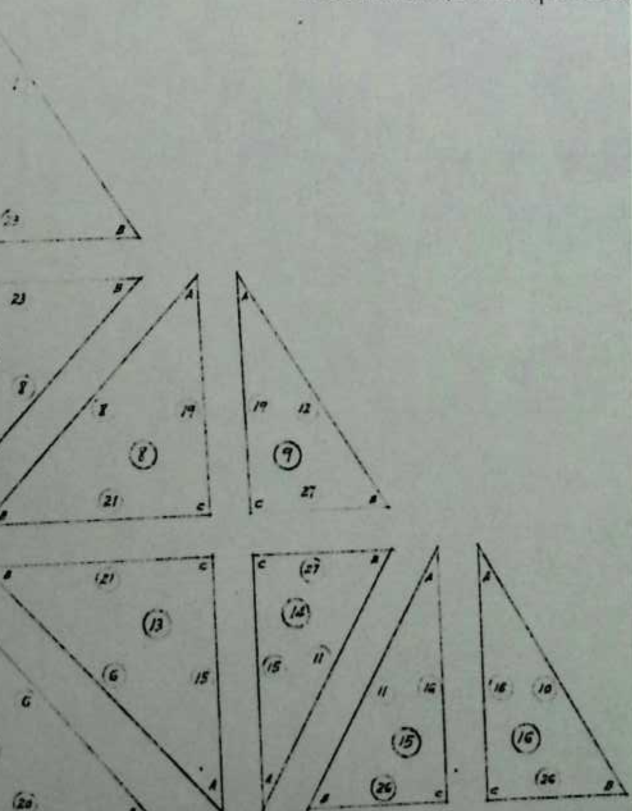
- 3 PAIR 6 op ID EXIT'CAP EDGES.

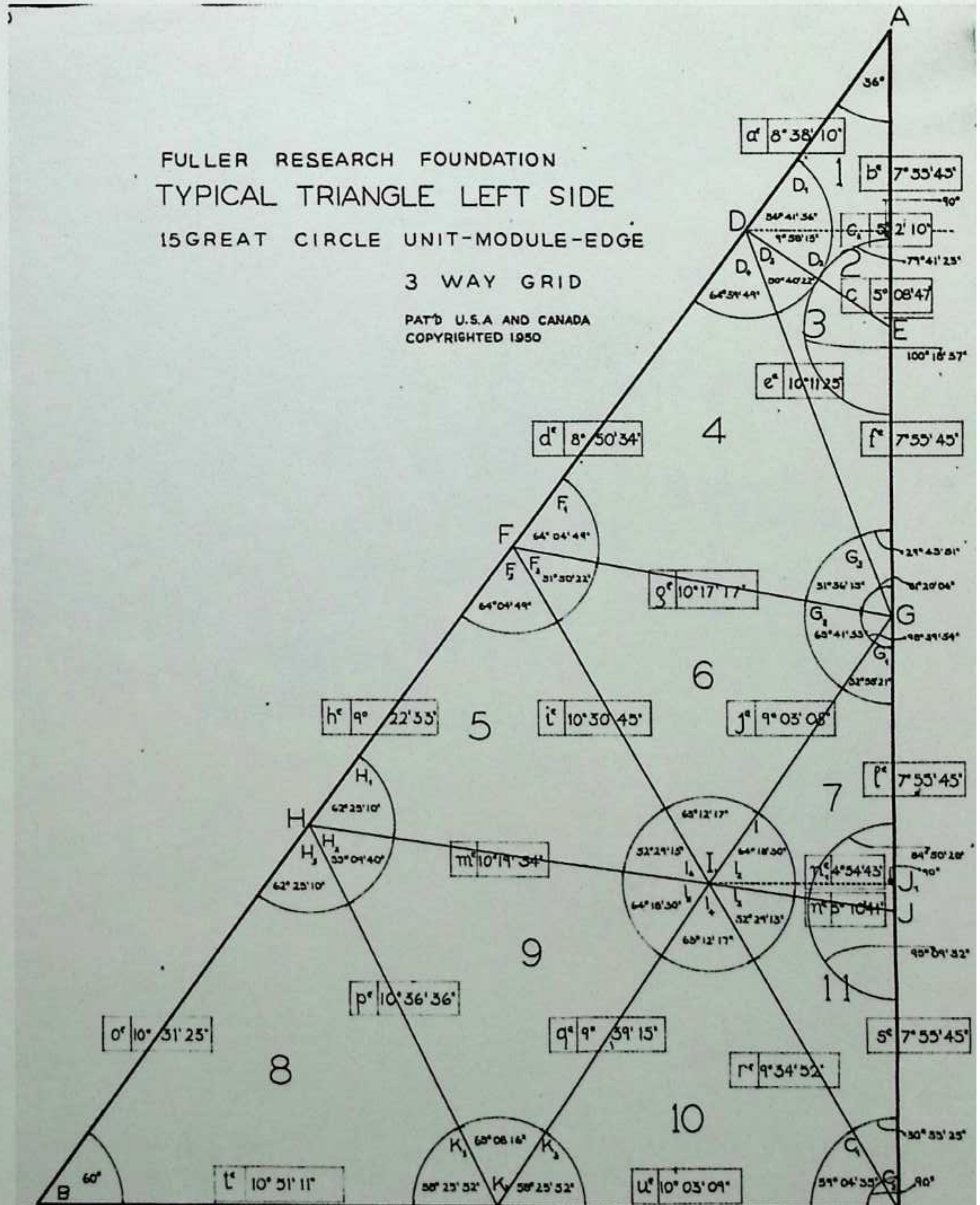
- THEREFORE 27 UNIQUE EDG&E.OIZ ARCS OR CENTRAL Z'.

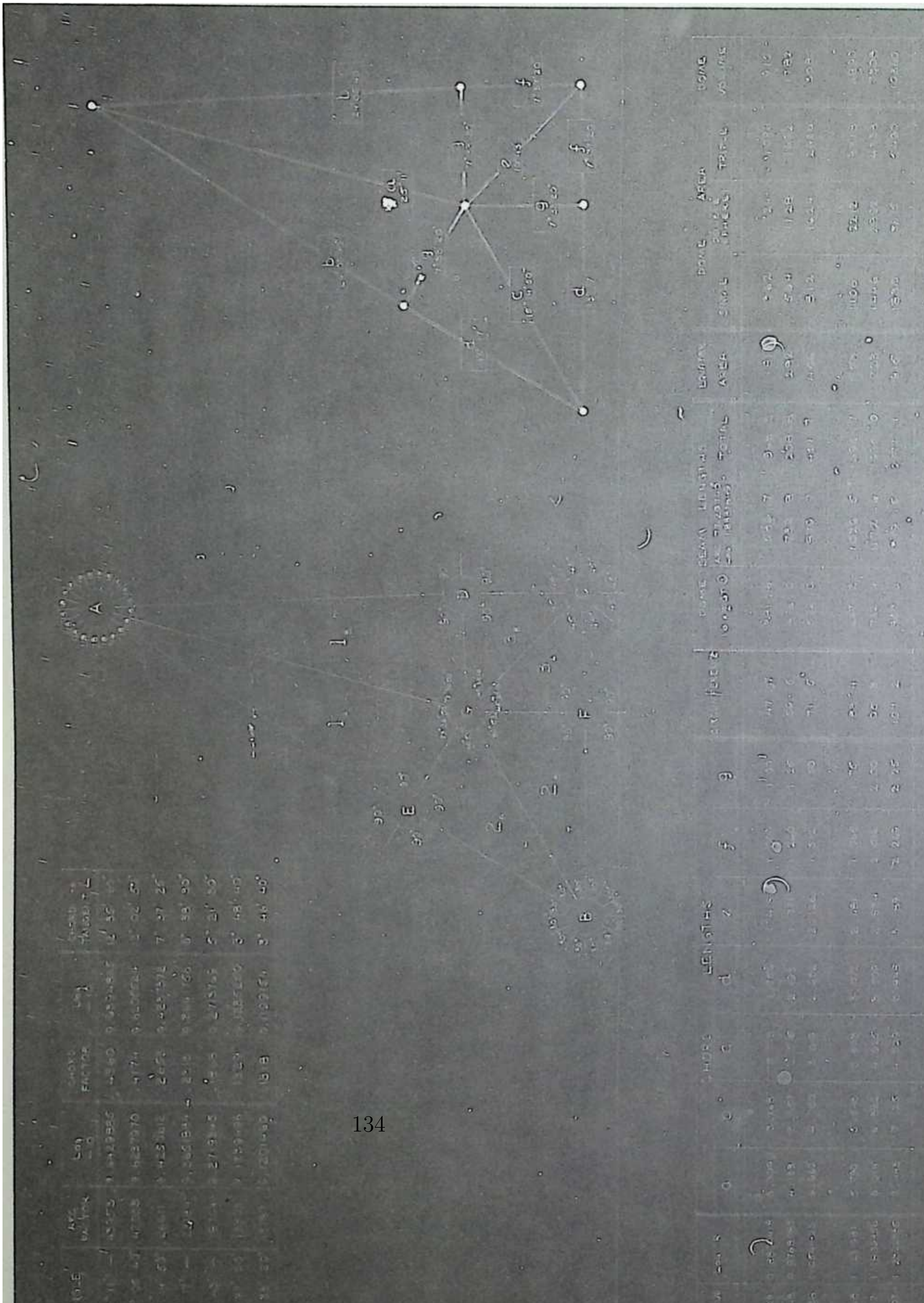

DATA SHEET

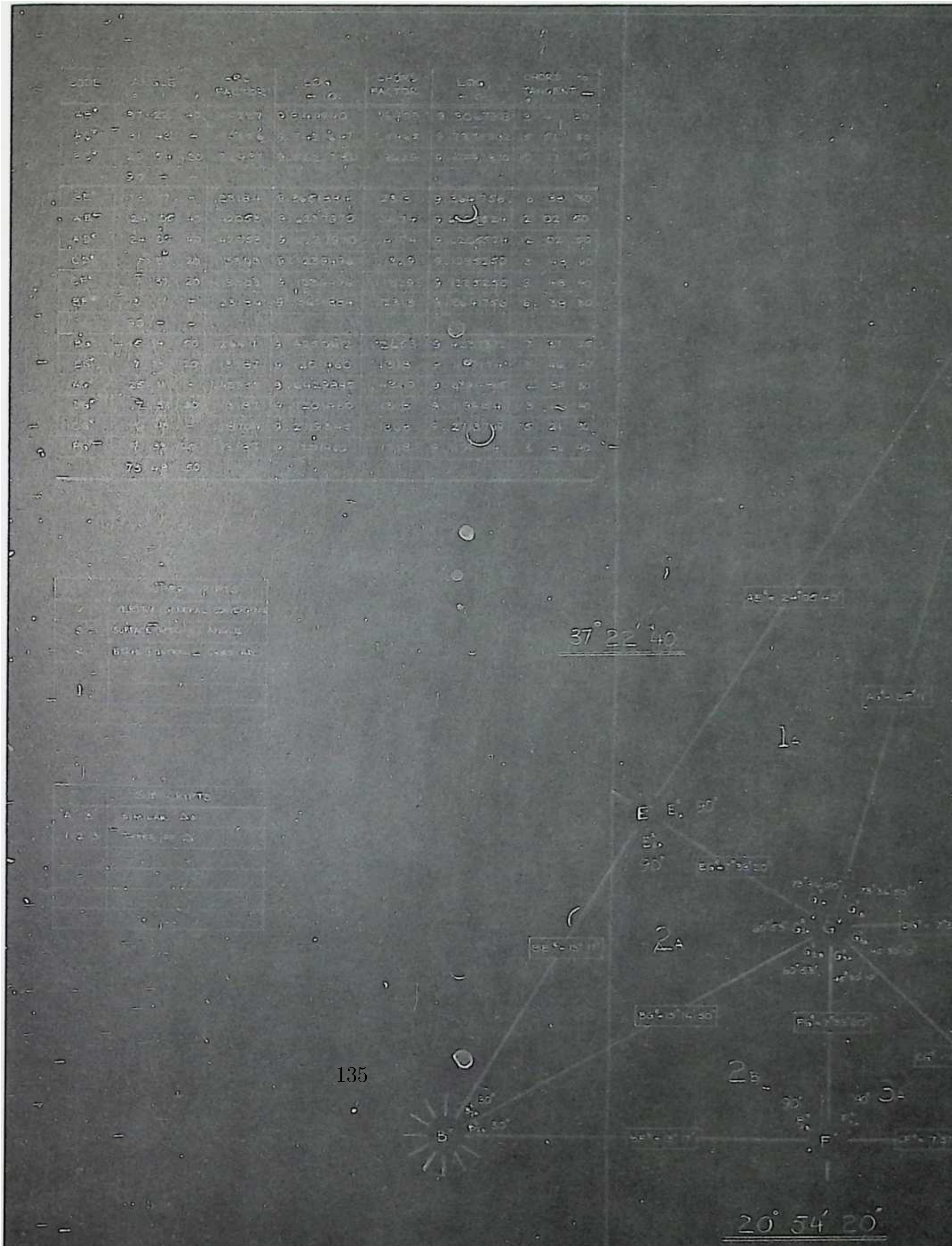

BASIC TRIANGLE OF
15 GREAT CIRCLE SPHERE
R. BUCKMINSTER FULLER
MARCH 9, 1950.

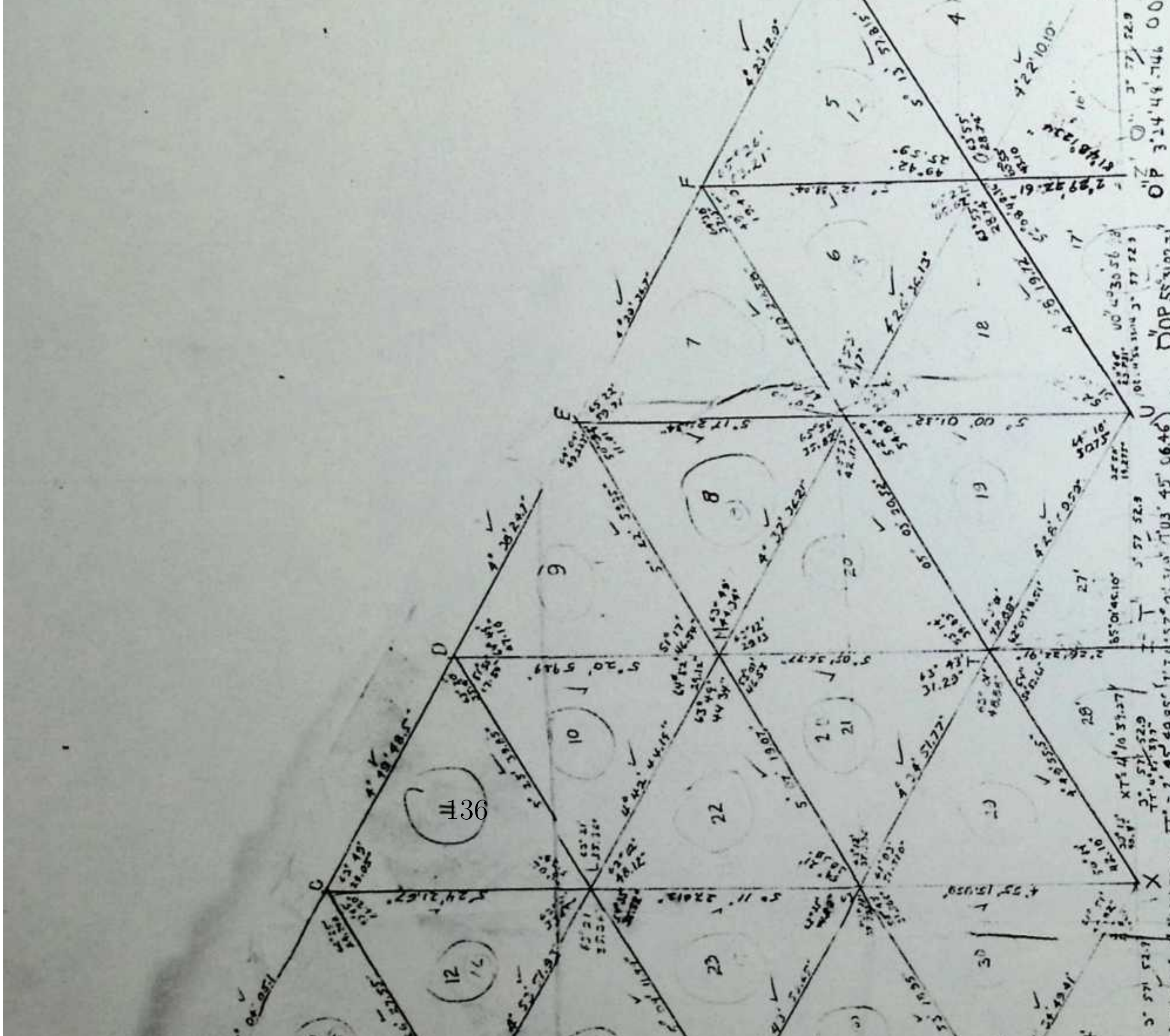
NO TRIANGLE	ANGLE "A"	ANGLE "B"	ANGLE "C"
1	36°00'00"	54°26'[illegible]	90°00'00"
2	31°13'25"	59°19'32"	90°00'00"
3	33°25'47"	58°46'35"	85°21'54"
4	32°51'31"	57°34'28"	90°00'00"
5	44°37'37"	45°44'50"	90°00'00"
6	43°21'21"	45°22'23"	94°31'06"
7	44°13'31"	46°01'33"	90°00'00"
8	45°22'[illegible]	45°46'52"	89°13'31"
9	30°35'[illegible]	59°[illegible]'20"	90°00'00"
10	43°[illegible]	46°49'52"	90°00'00"
11	43°56'50"	46°26'[illegible]	90°00'00"
12	43°56'50"	46°26'[illegible]	90°00'00"
13	[illegible]	[illegible]	[illegible]
14	30°[illegible]	60°[illegible]	90°00'00"
15	30°13'54"	[illegible]	[illegible]
16	[illegible]	[illegible]	[illegible]



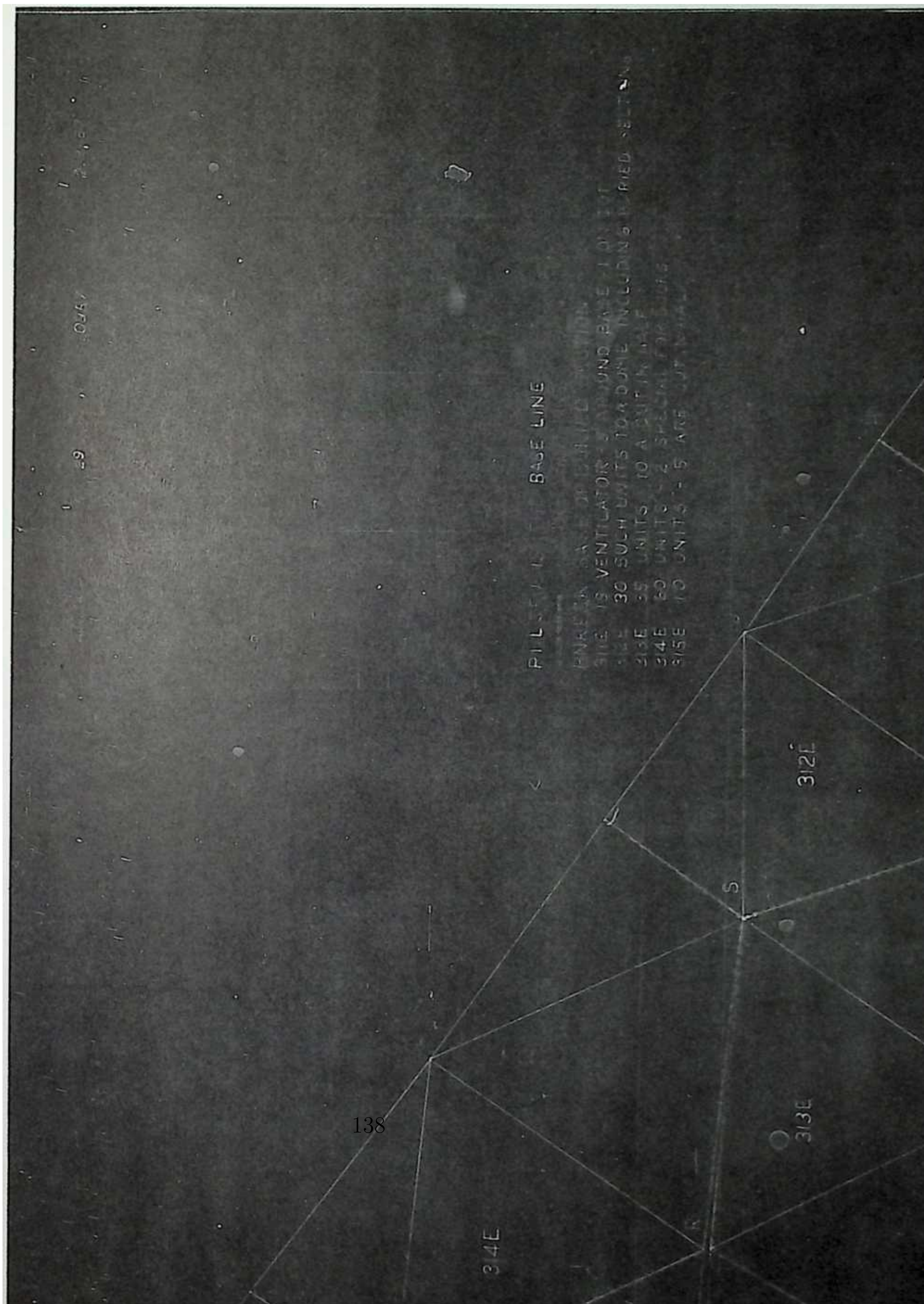


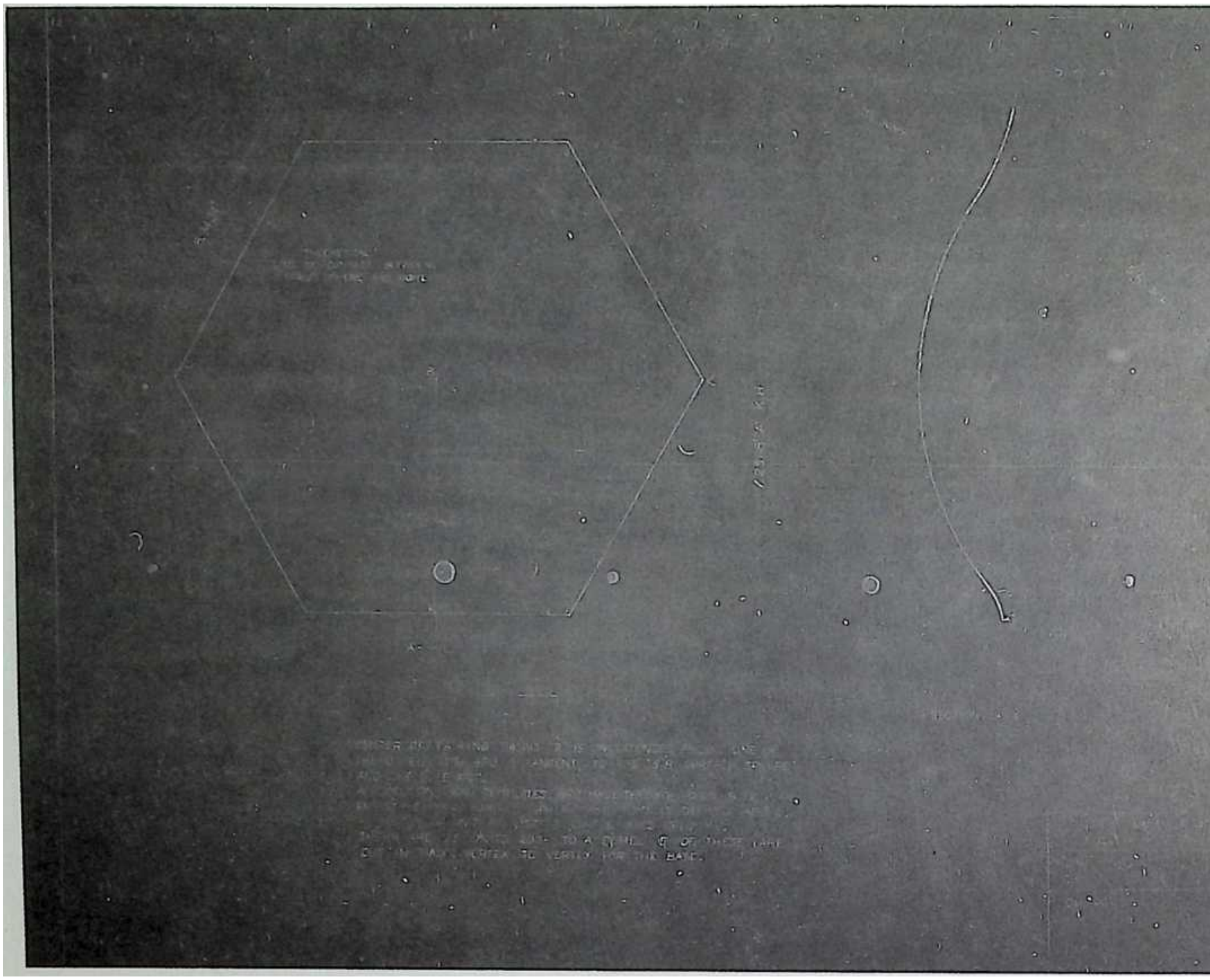


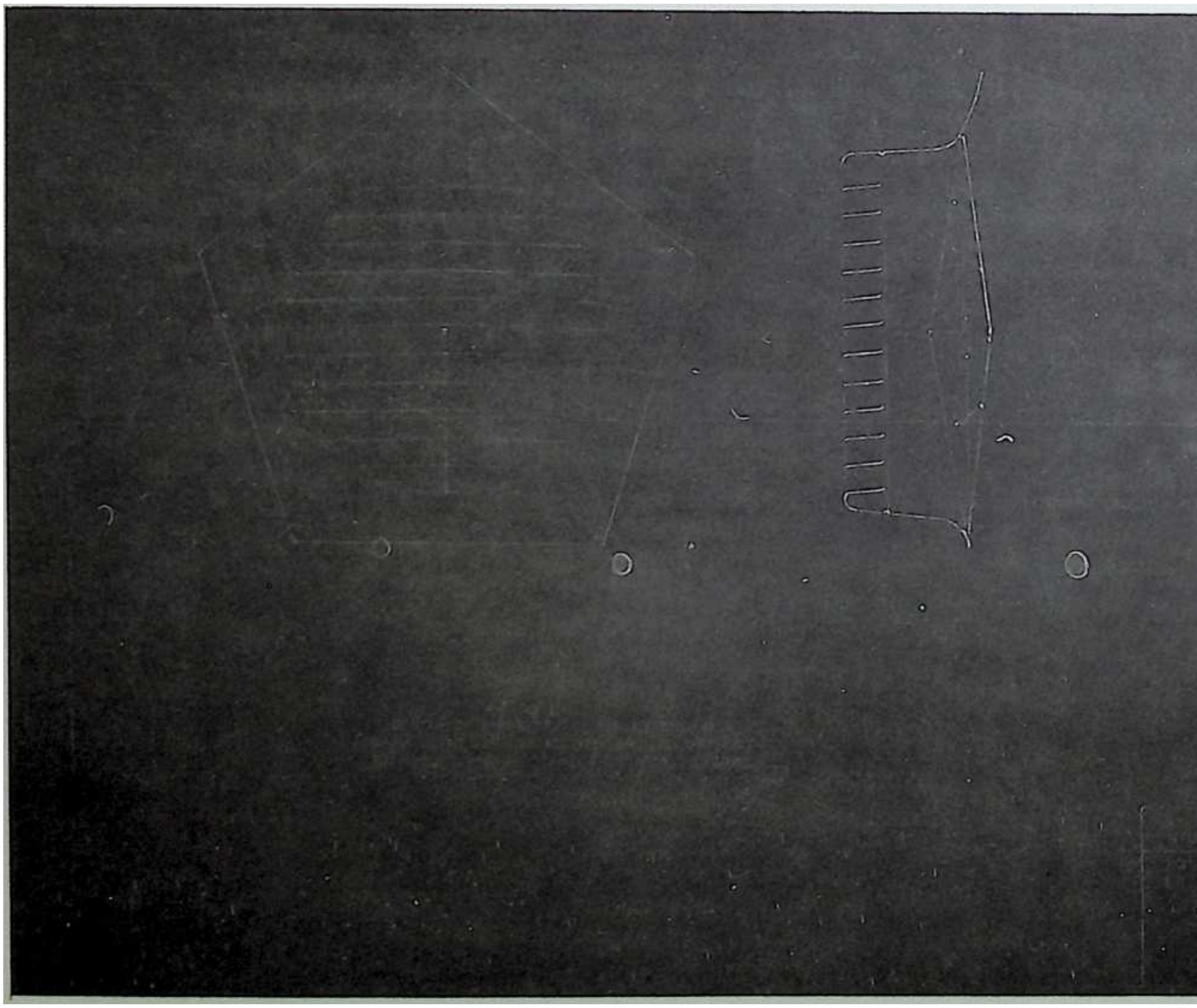

37° 22' 40
20° 54' 20

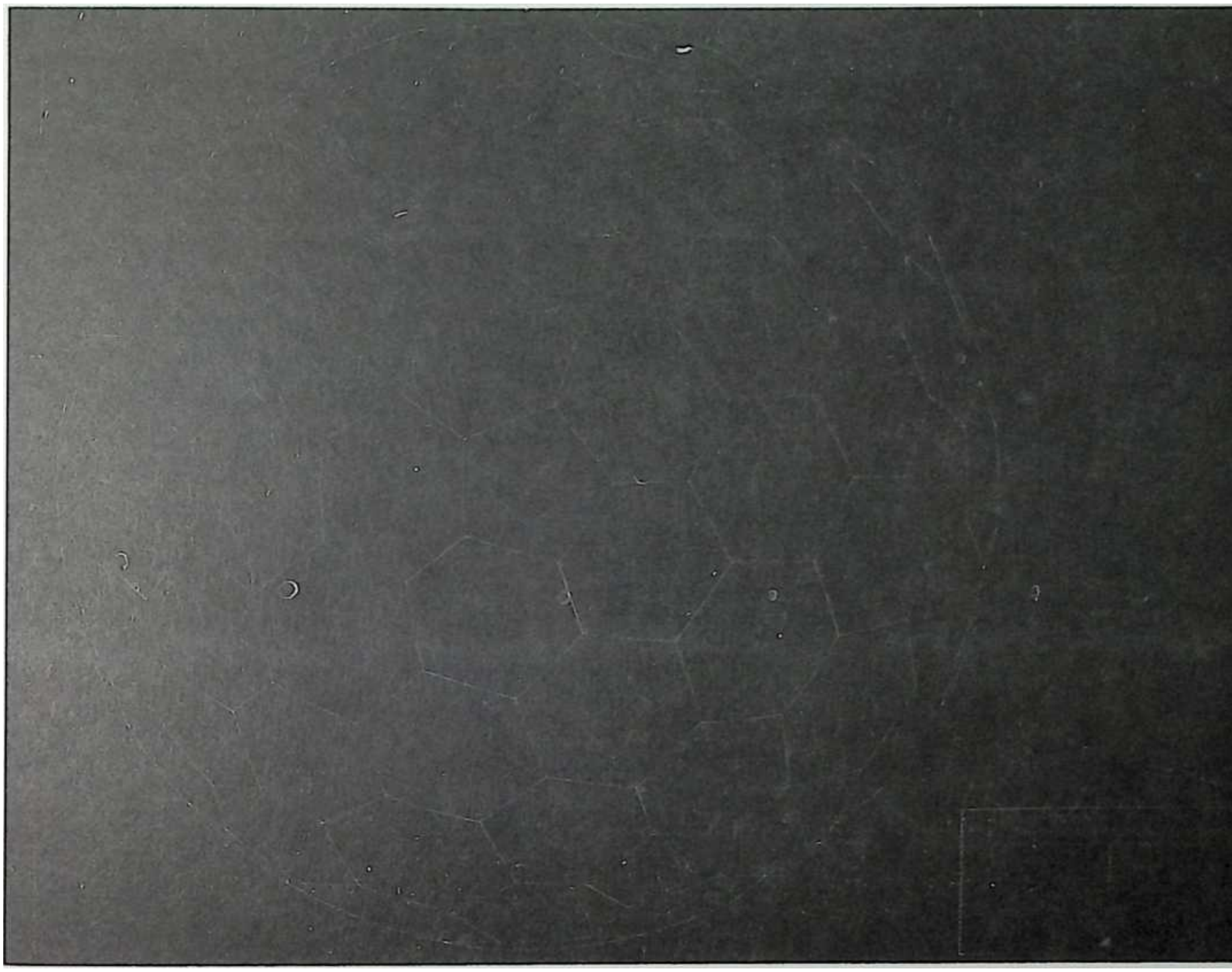


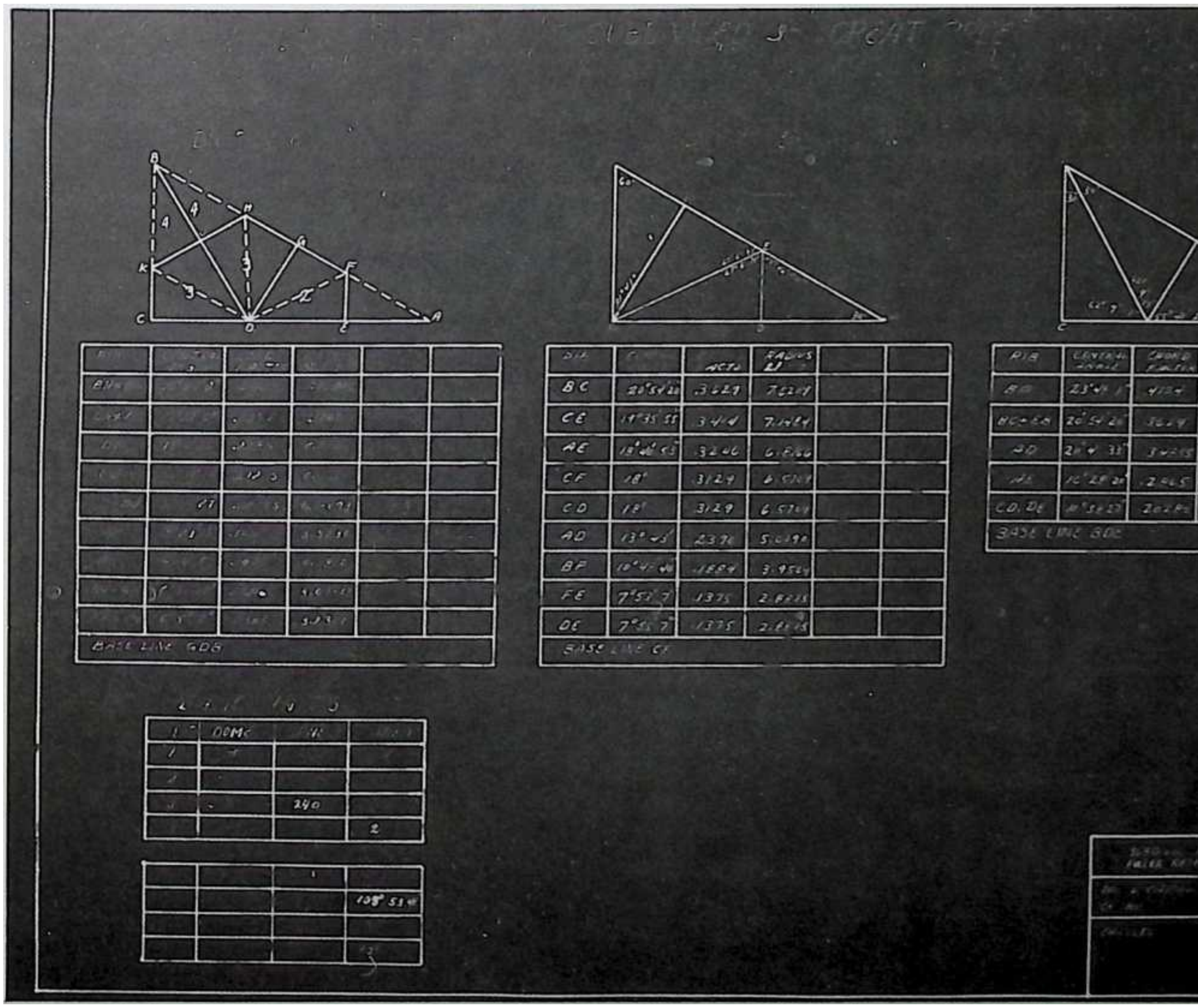
» **Mi**


BASE LINE
312E
313E
314E







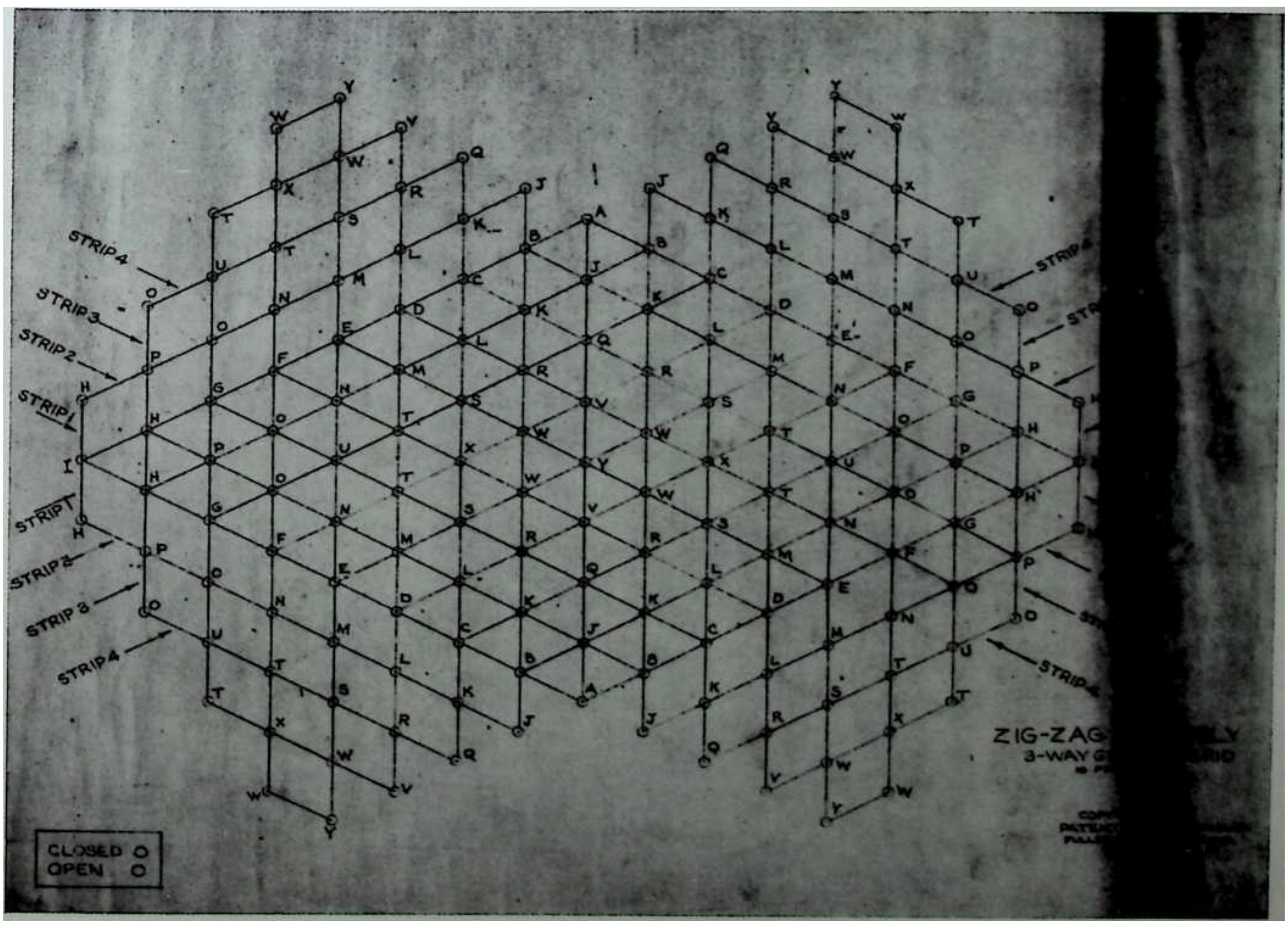


68 THE GEODESIC REVOLUTION, PART 1

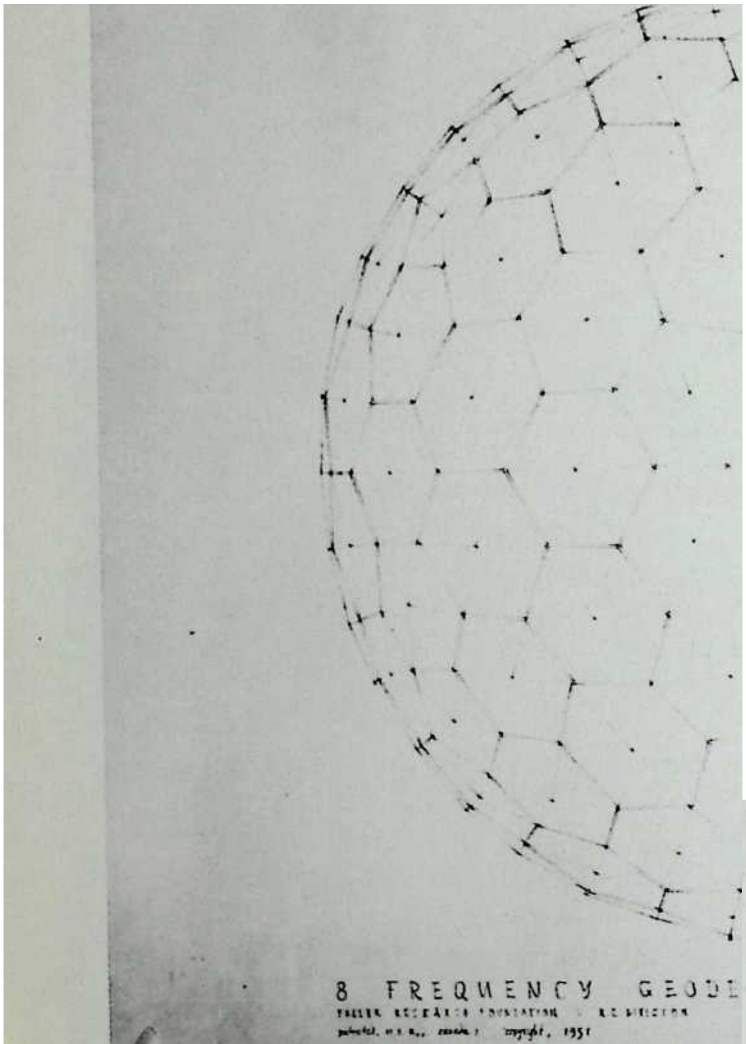
The two most important copyrights of 1951 are (1) the general structure of the typical geodesic dome and *(2)* the specific design of an aluminum vertex. The eightfrequency geodesphere reveals the dual nature of the domes at this stage. It comprises a wooden armature of stacked pentagons, all but one of which are of equal size. The open spaces of this armature are filled by pentagonal panels that project outward with a single vertex. One drawing of this group indicates that the struts are substantial rectangles of solid wood. On the contrary, Fuller's cast aluminum hub and tube terminal allowed the much faster construction of an aluminum dome that was also much lighter than its wooden counterpart. The assembly of a dome with hubs that called for the fastening of struts to specific points on the hub also entailed many inexpedient readjustments. However, the new aluminum hubs held the flanges on the ends of a strut like a spring clamp that was permanently tightened only after all struts were in place. The design of this hub made it possible to construct geodesic domes on a much larger scale than those made of wood.

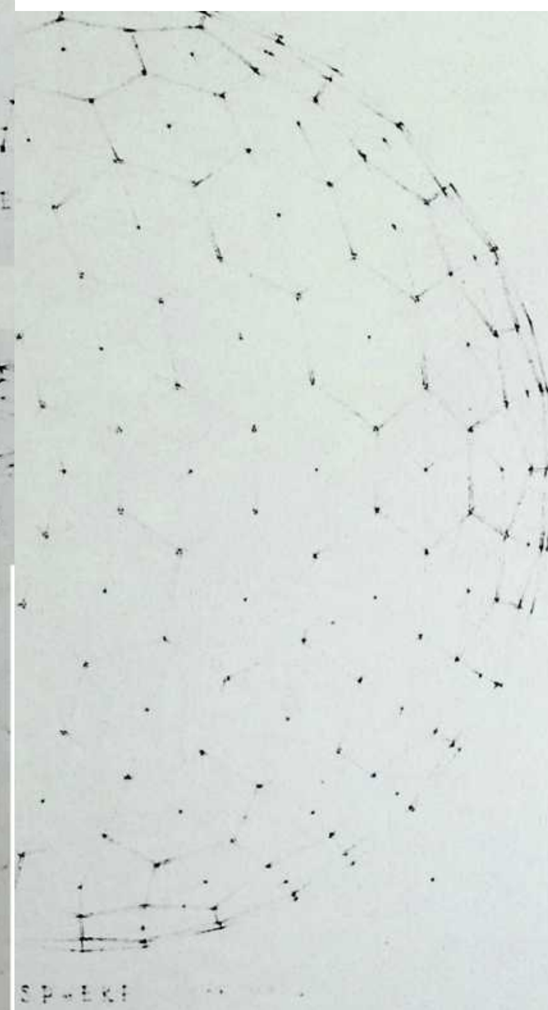
Miscellaneous

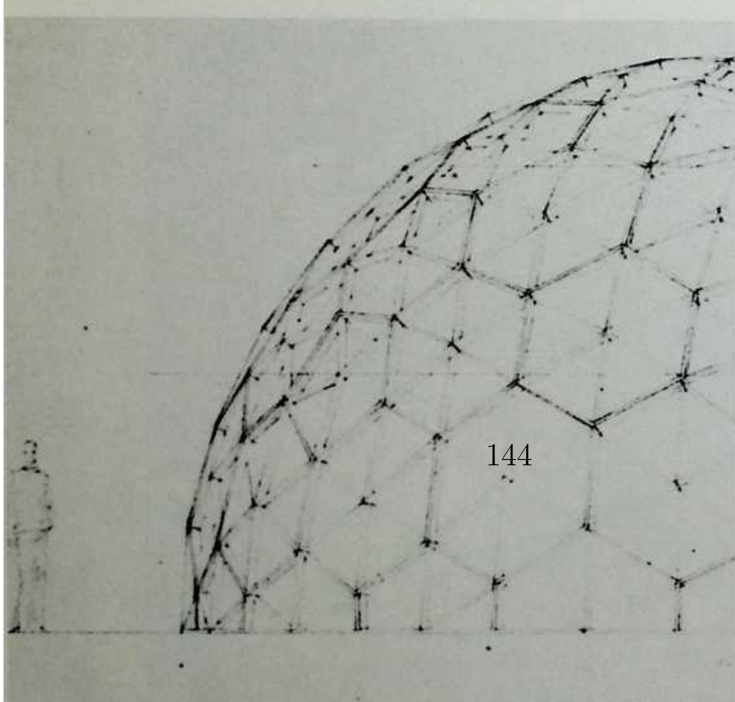
Geodesic Structures 1951

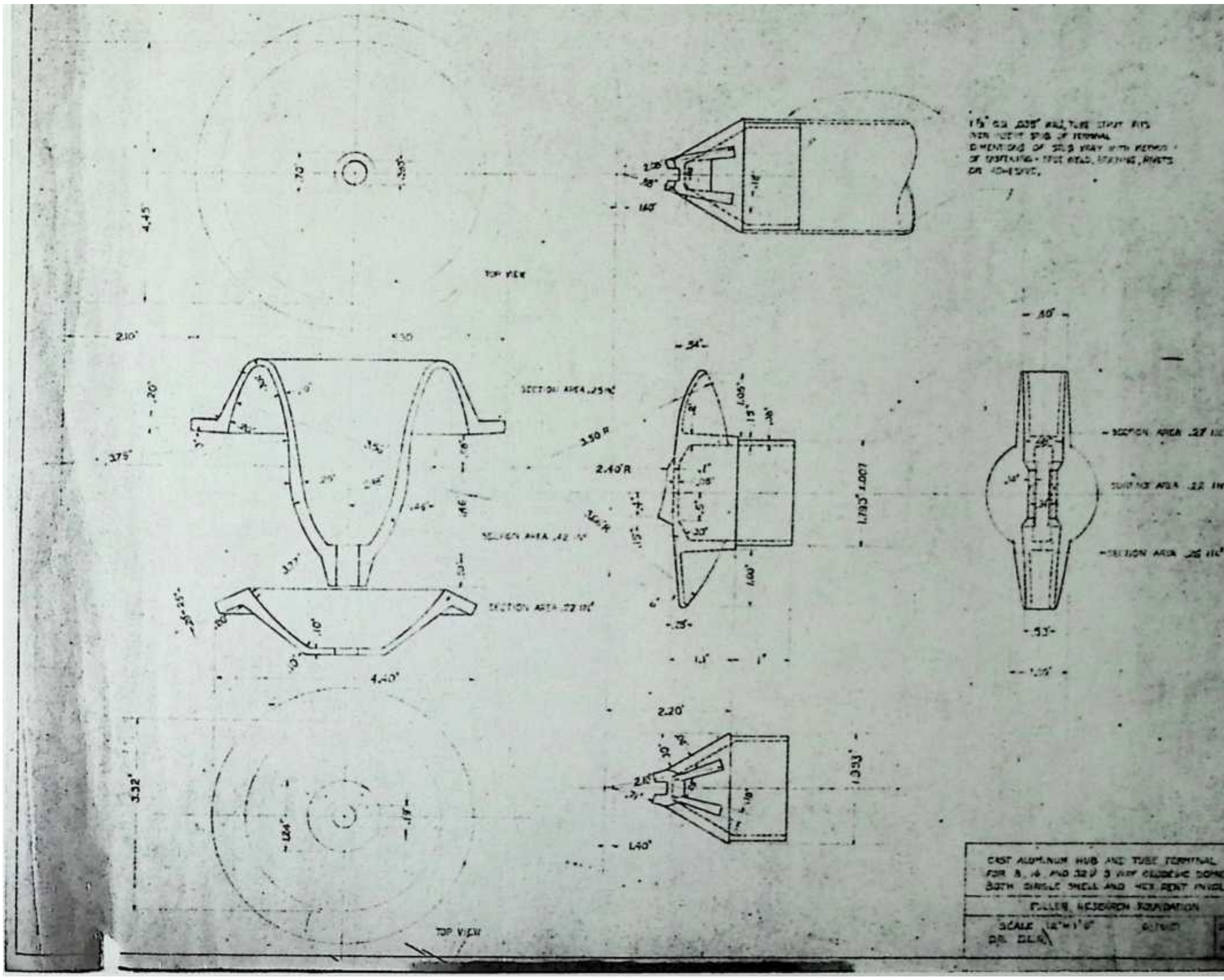


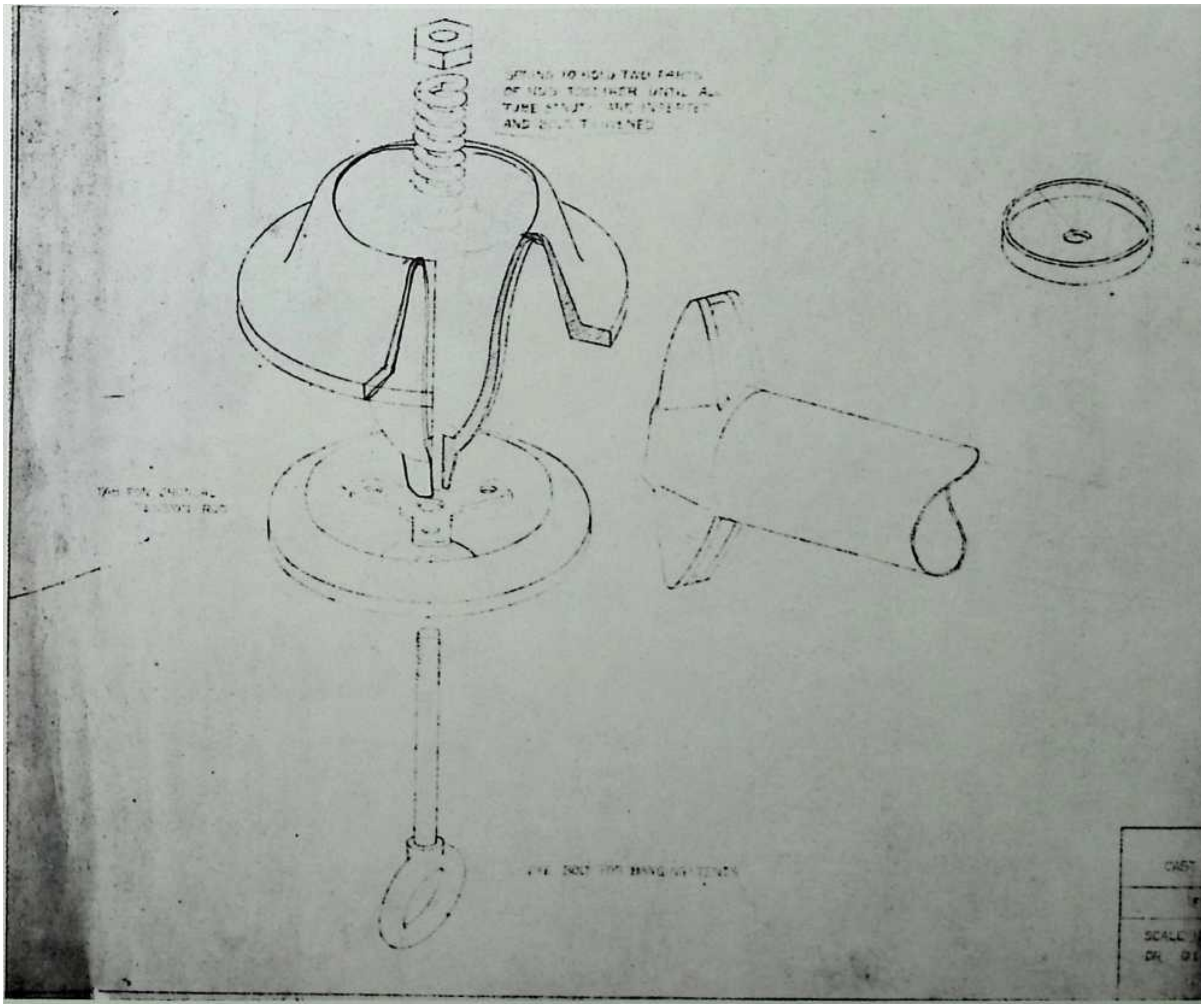
b.rimplfrl


8 FREQUENCY GEOD



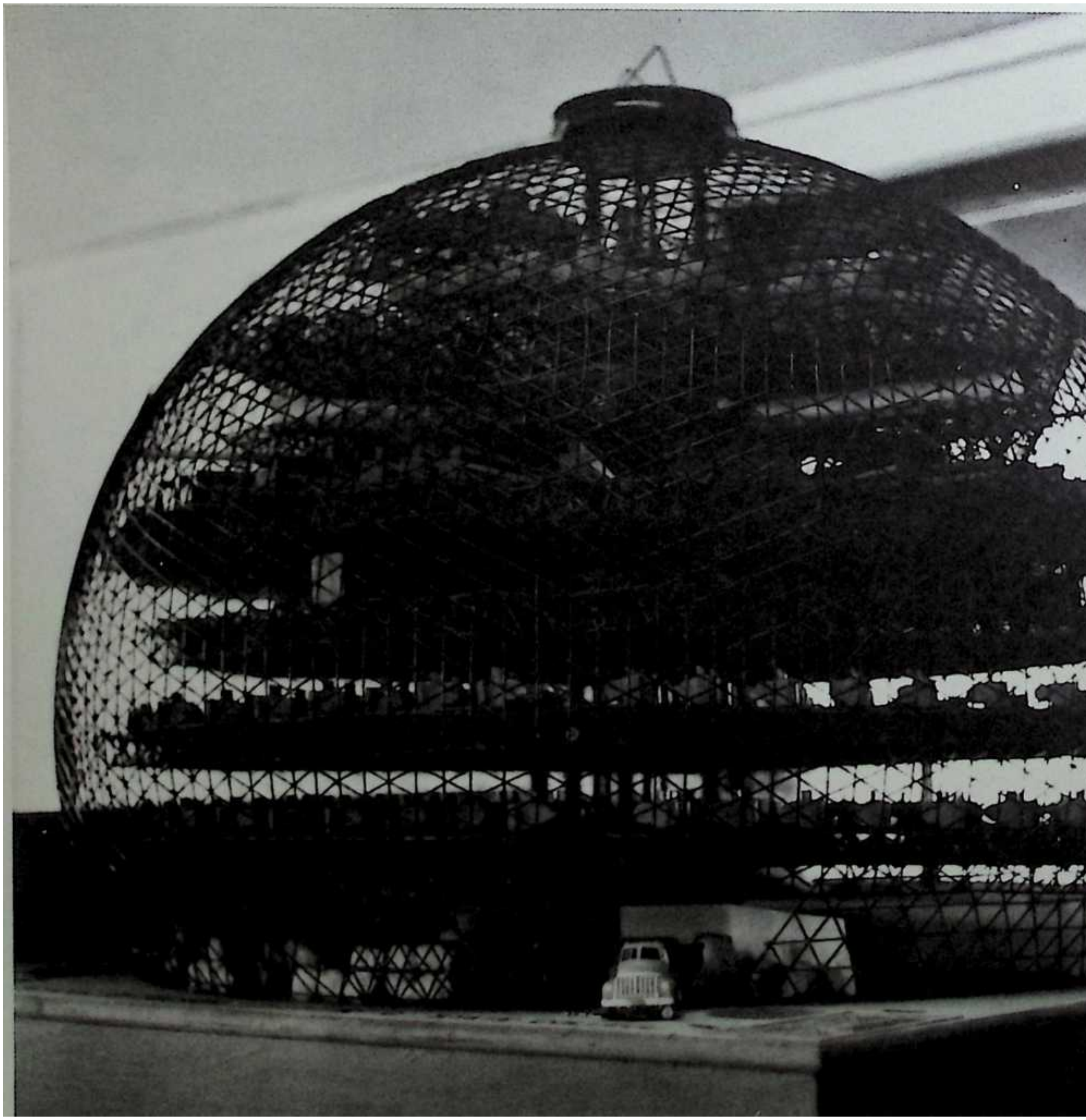


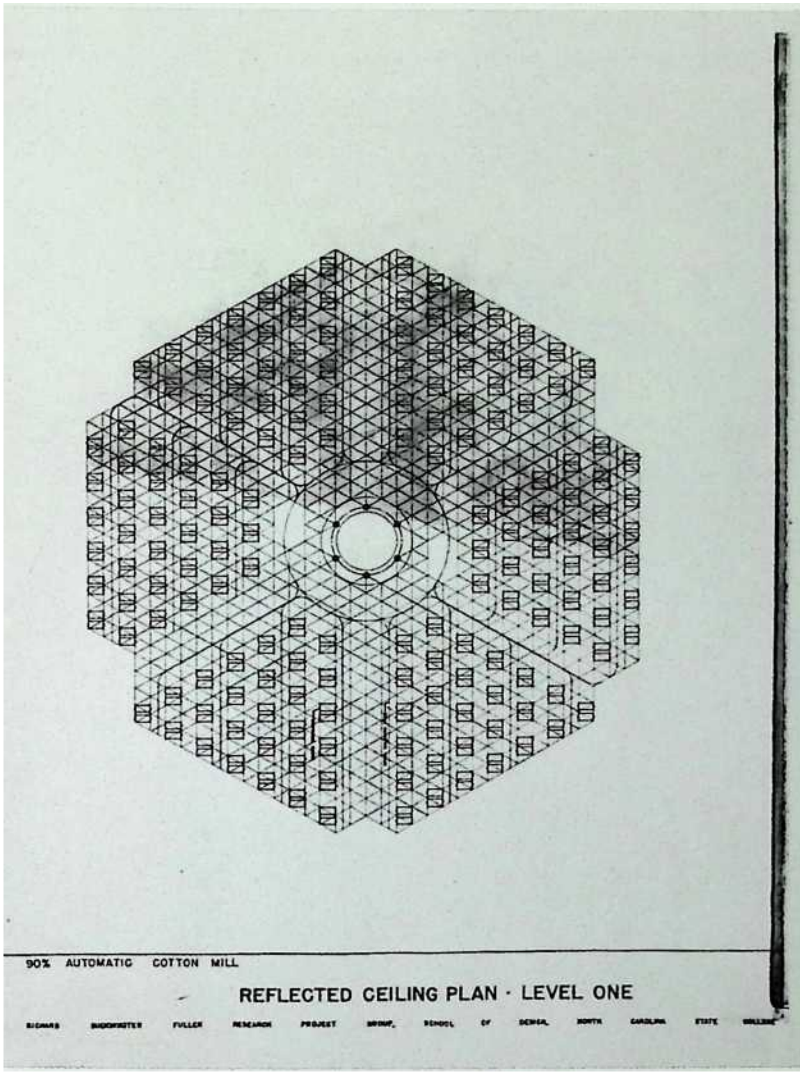

TOP VIEW
TOP VIEW
4.45
2.10"
.375"
4.40"
3.32"
2.40"R
2.20"
1.40"
CAST ALUMINUM HUB AND TUBE TERMINAL
SCALE

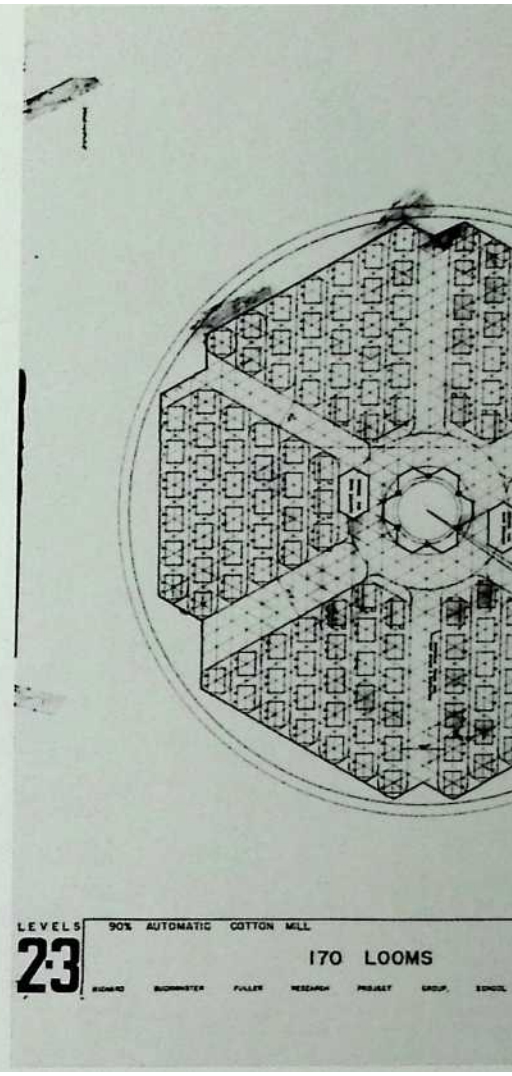


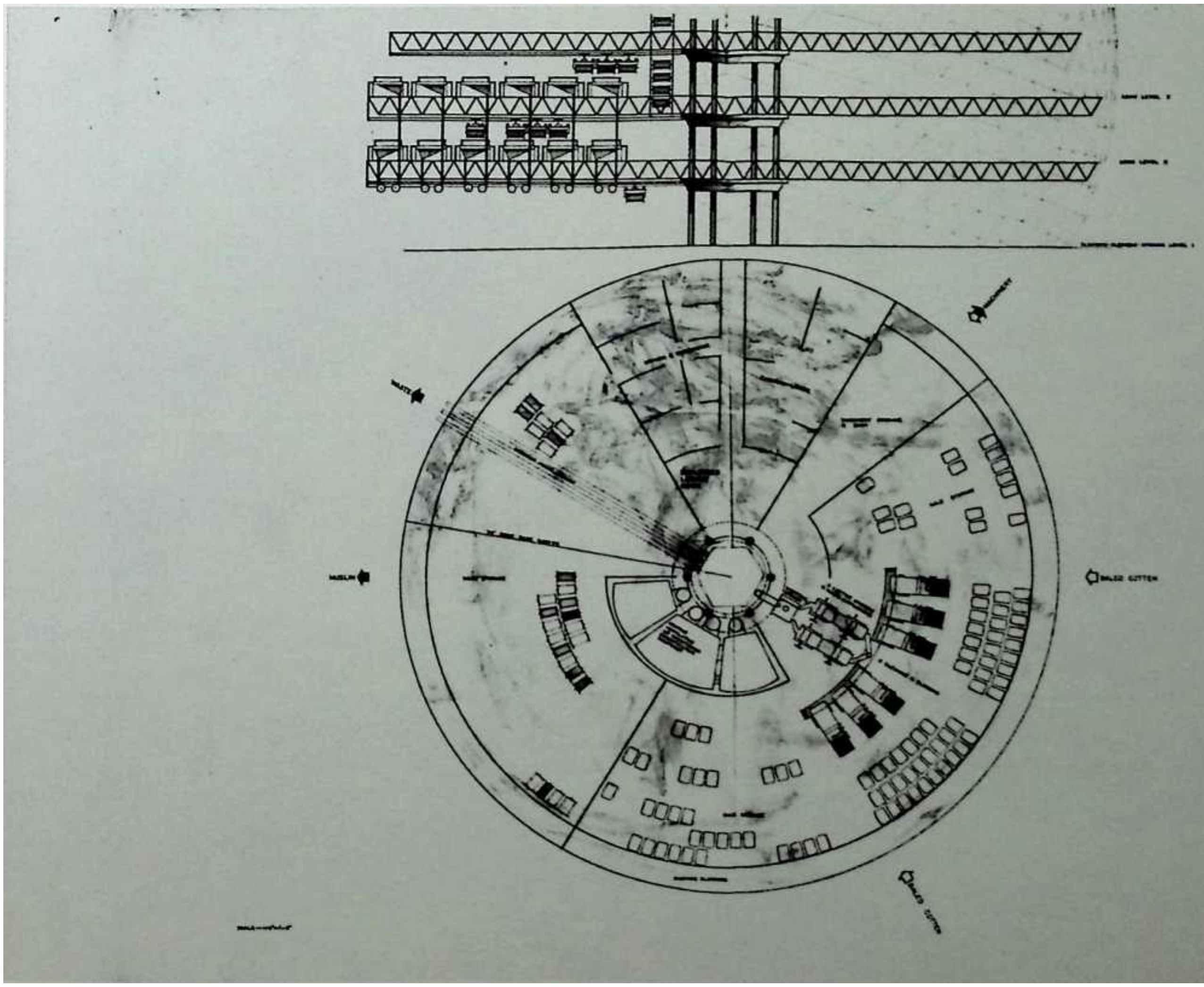
90 Percent Automatic Cotton Mill, School of Design, North Carolina State College 1951

This hivelike geodesic factory is the quintessence of Fuller's industrial design strategy, inasmuch as its production was to exceed its expenditure of energy by a wide margin. Illuminated by an omphaloslike opening at the apex of a geodesic dome, the raw cotton was then picked, carded, drawn, roved, spun, spooled, slashed, warped, creeled, loomed, and cleaned in this automatic wonder; unfortunately, only a maquette of the factory was ever executed. The eight floors were supported on cantilevered trusses; the dome provided auxiliary support. The single figure depicted on each floor indicates the drastic reduction in the cost of labor such automation might have effected.




90% AUTOMATIC COTTON MILL
REFLECTED CEILING PLAN · LEVEL ONE


LEVELS
2·3
90% AUTOMATIC COTTON MILL
170 LOOMS



74 THE GEODESIC REVOLUTION, PART 1

Ulii. ;

48 SPINNING MACHINES

tUMw taoacT KMOI **or »« . *Ktn*** *UKMH*

55* A'j’CVA’iC CGTW*i W LL*

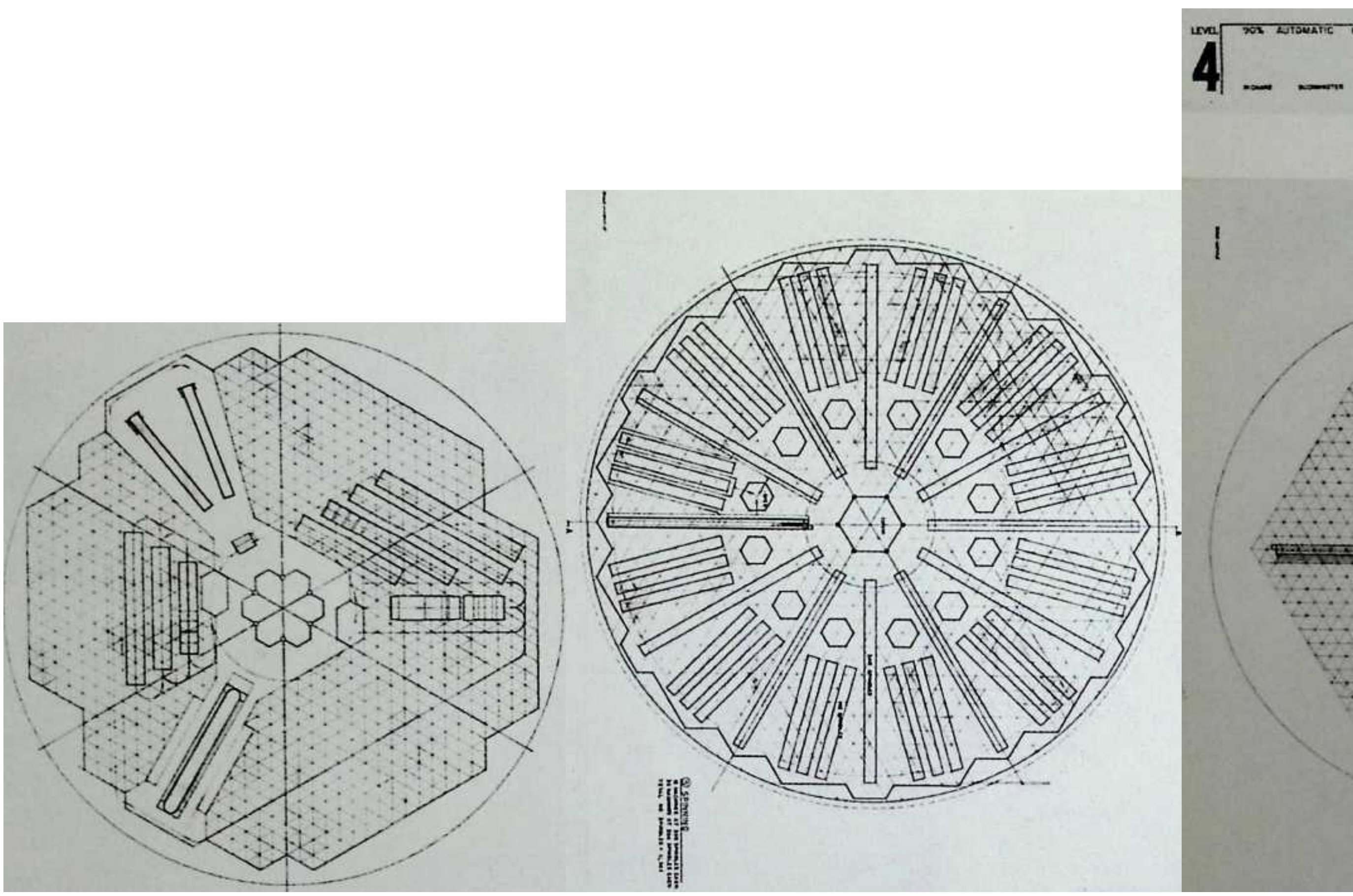
3 DRAWING 3 ROVING FRAMES

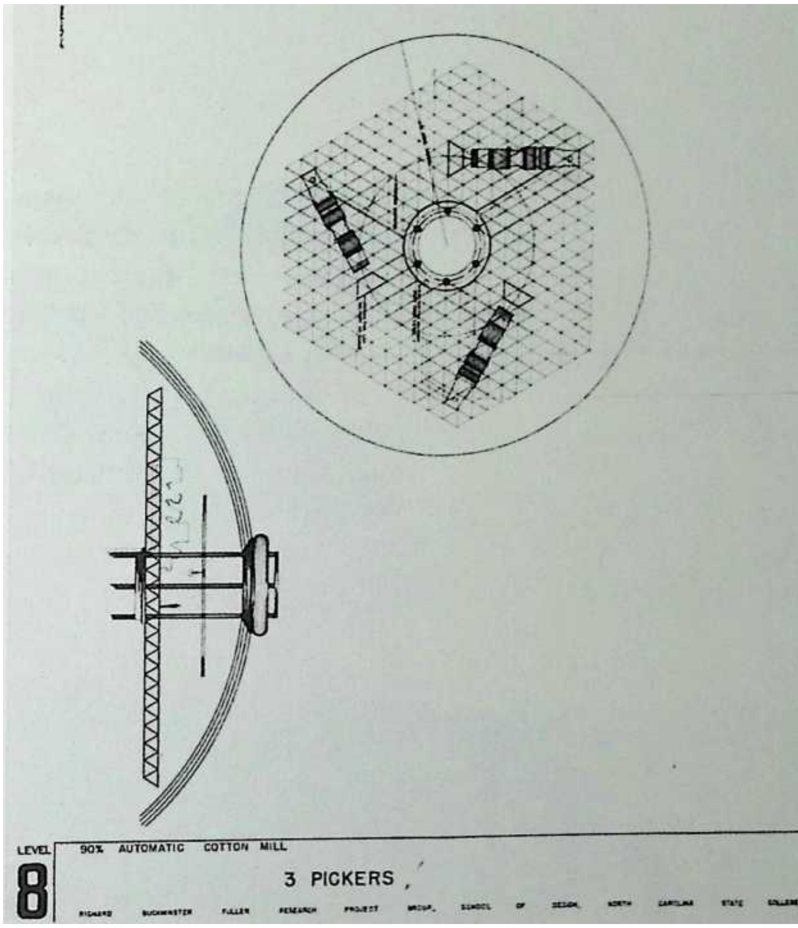
90% AUTOMATIC COTTON MILL

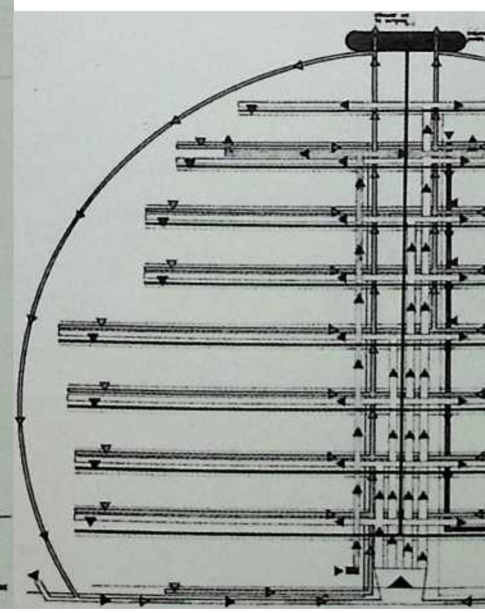
48 CARDS

• '«*<* » rv-LU* atMAiUM PMKCT

tlACUMA BTAtt







Skybreaks

1951

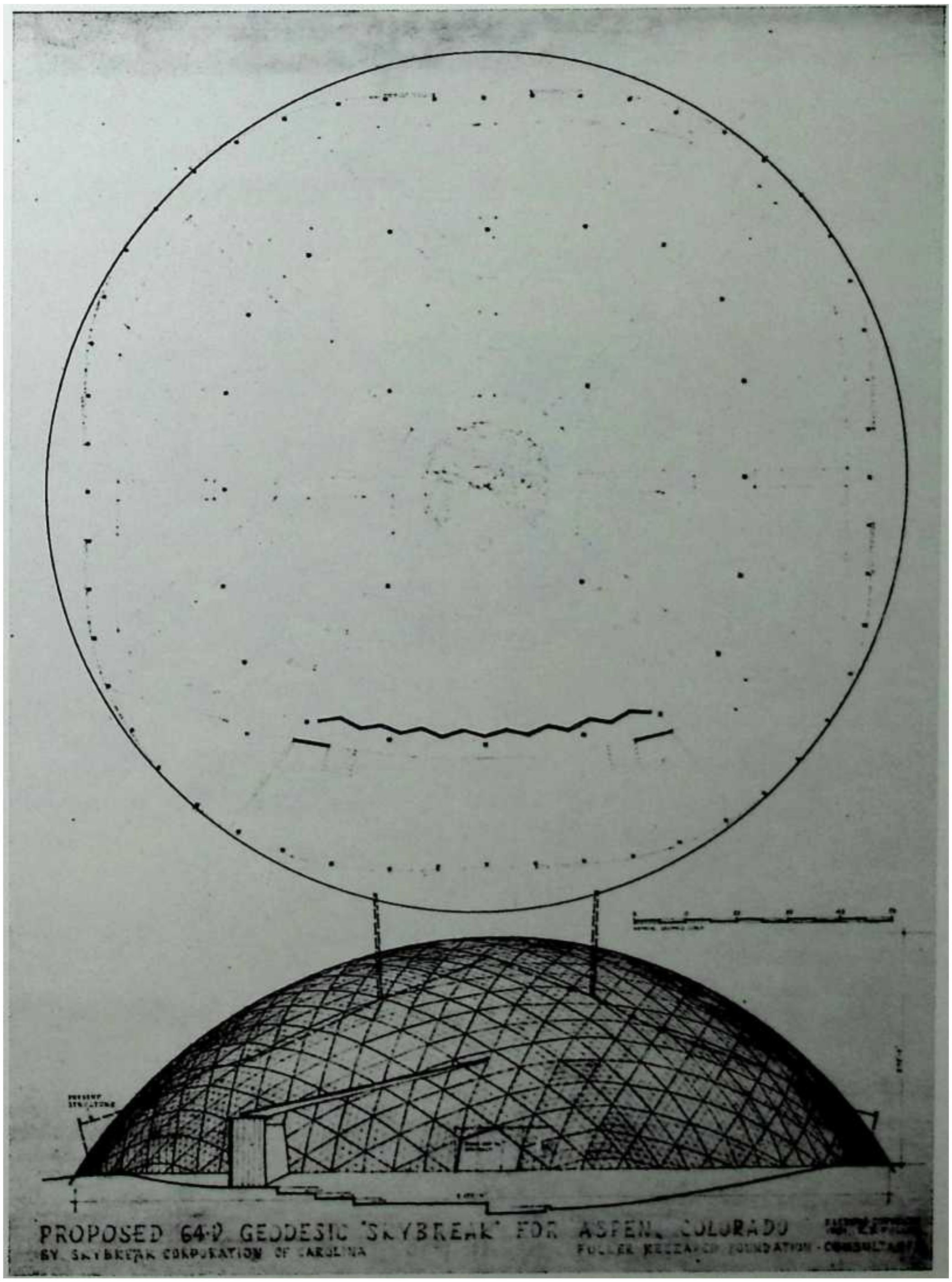
The architectural importance of the geodesic dome was never more tellingly presented than in this drawing of a skybreak for a theater in Aspen, Colorado. Designed to hold a cantilevered sun screen, the transparent dome is shown superimposed above the testudinate structure it was designed to replace. Fuller's dome would have eliminated the visual obstruction attending the columnar supports of the traditional structure and would have cost less to build.

Proposed Sixty-four-Foot

Diameter Skybreak for Aspen, Colorado

Skybreak Corporation

of Carolina, 1951



Geodespherical Skybreak: Icosahedronal Adaptation 1951

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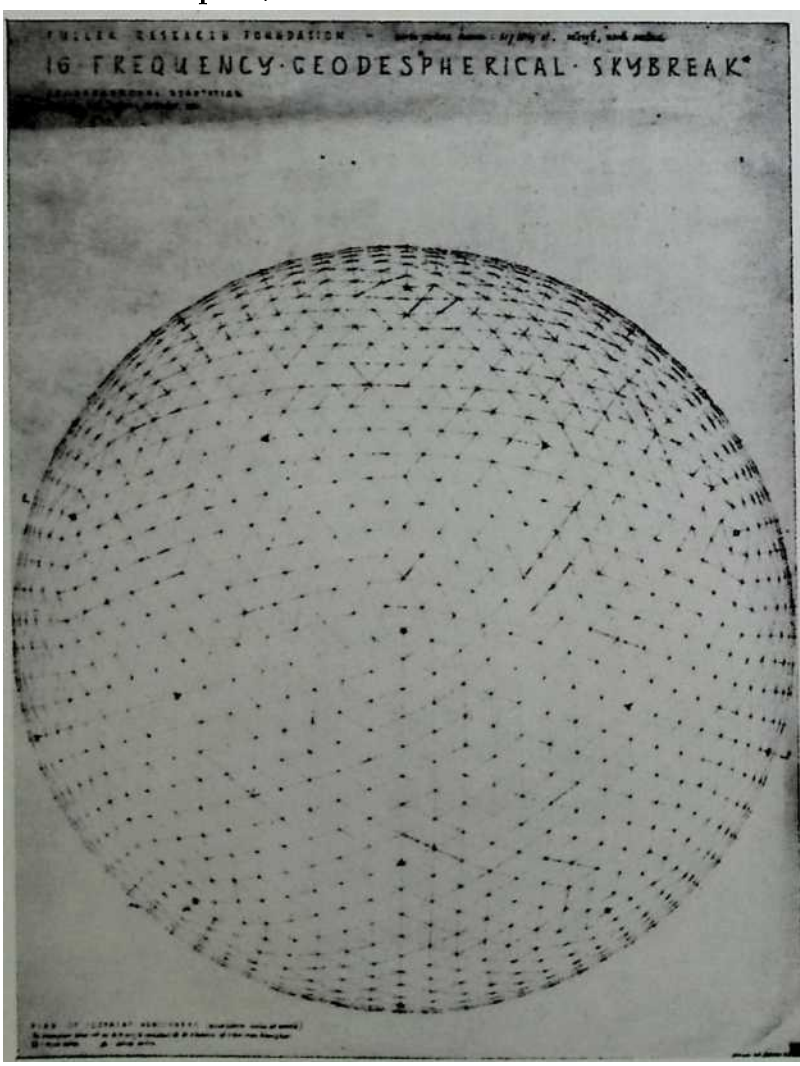
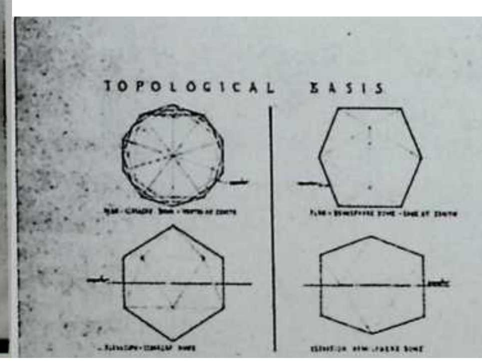
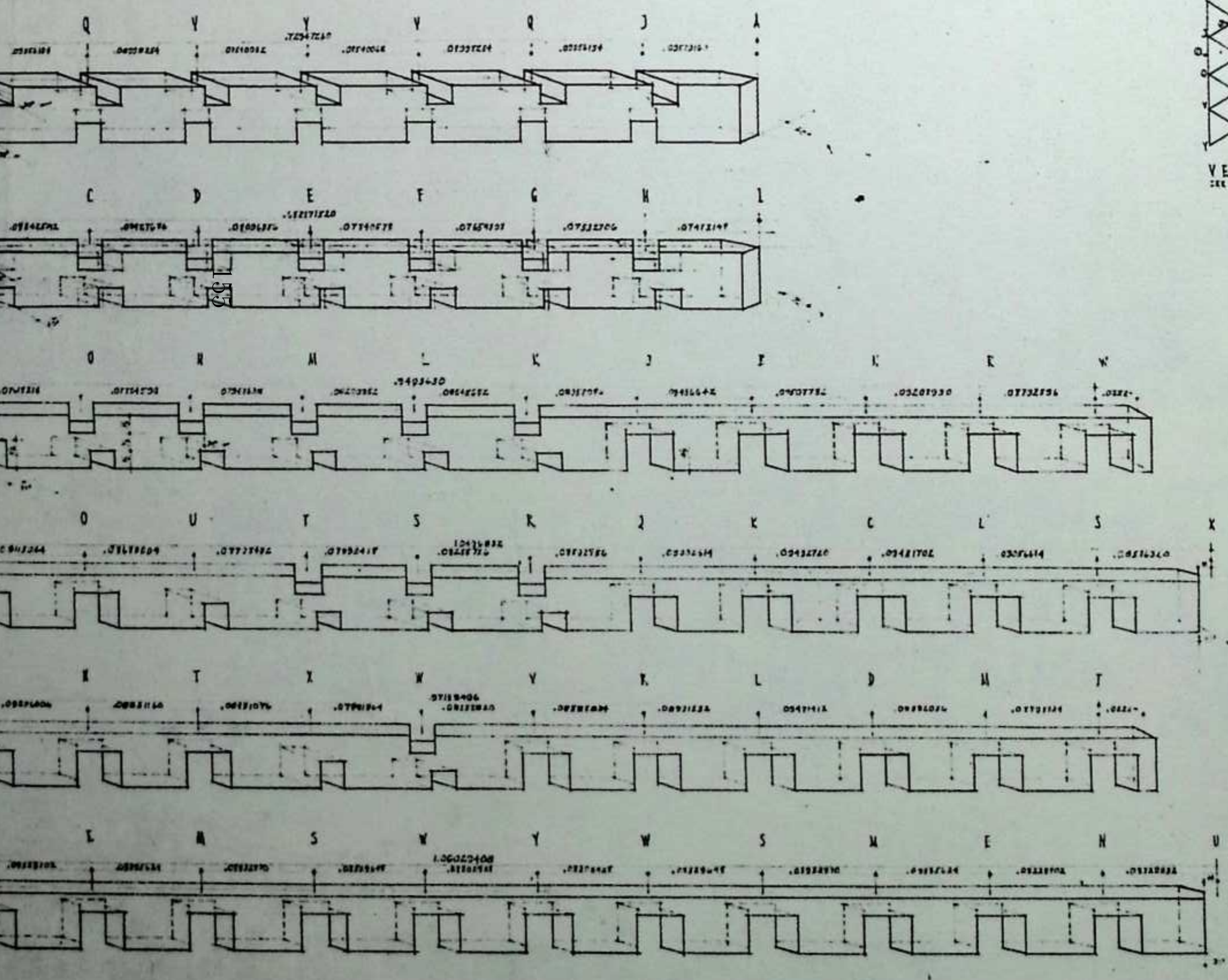
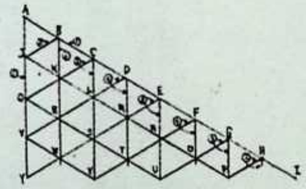




RCH FOUNDATION · NORTH CAROLINA DIVISION · RALEIGH, N.C

HEDULE · 16 FREQUENCY "SKYBREAK"





VERTEX LEGEND

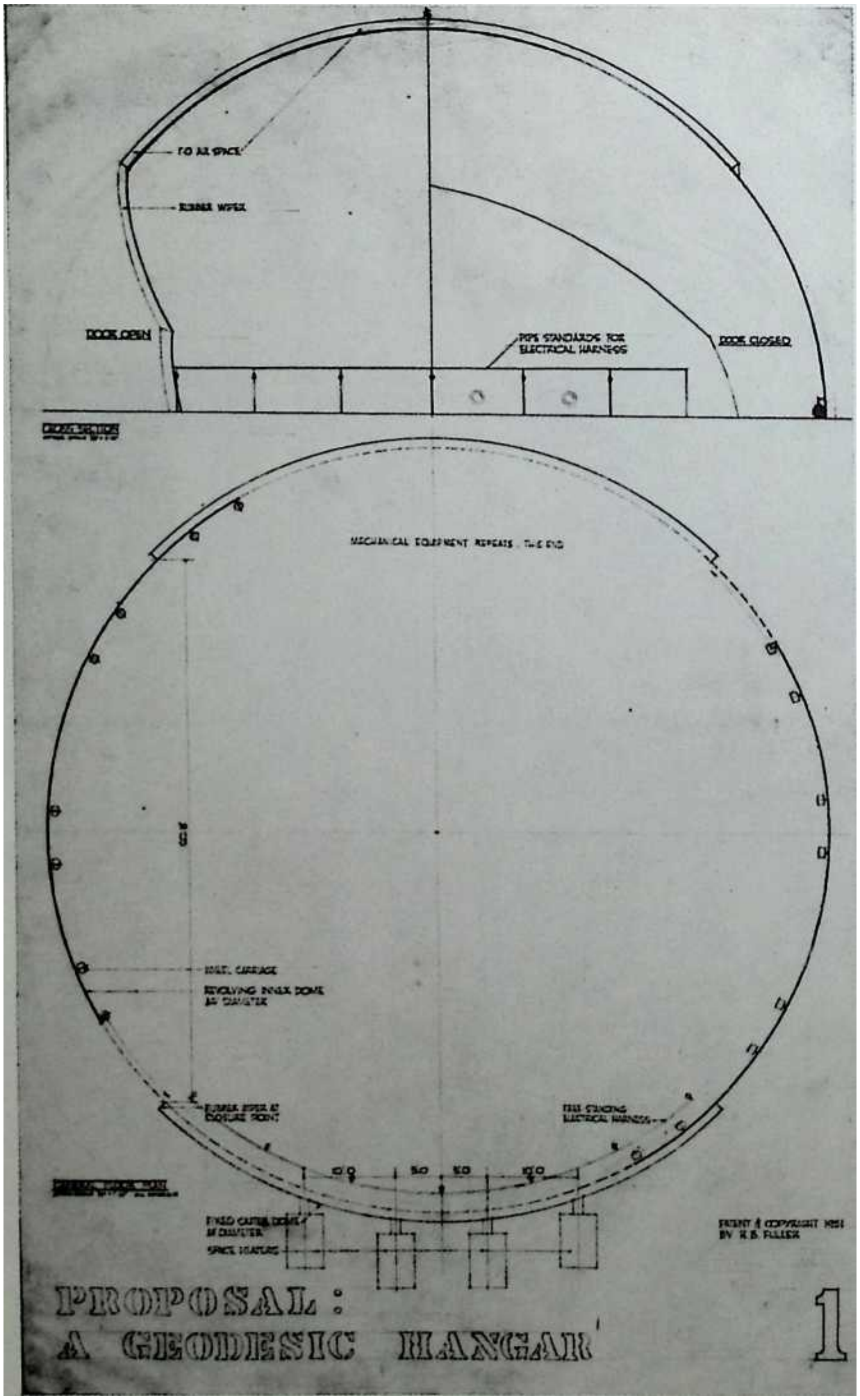
SEE "SCHEMATIC" SHEET FOR DETAIL.

MATERIAL SCHEDULE				
RADIUS OF SPHERE				
STRUCTURAL INFO.	MATERIAL SECT DIM. WT. PER LINEAL FT.			X
STRUT NO.	NO. REQ'D.	UNIT LENGTH	GROSS LENGTH	GROSS WT
1'	15			
1	10			
2				
3				
4				
5				
		TOTAL		

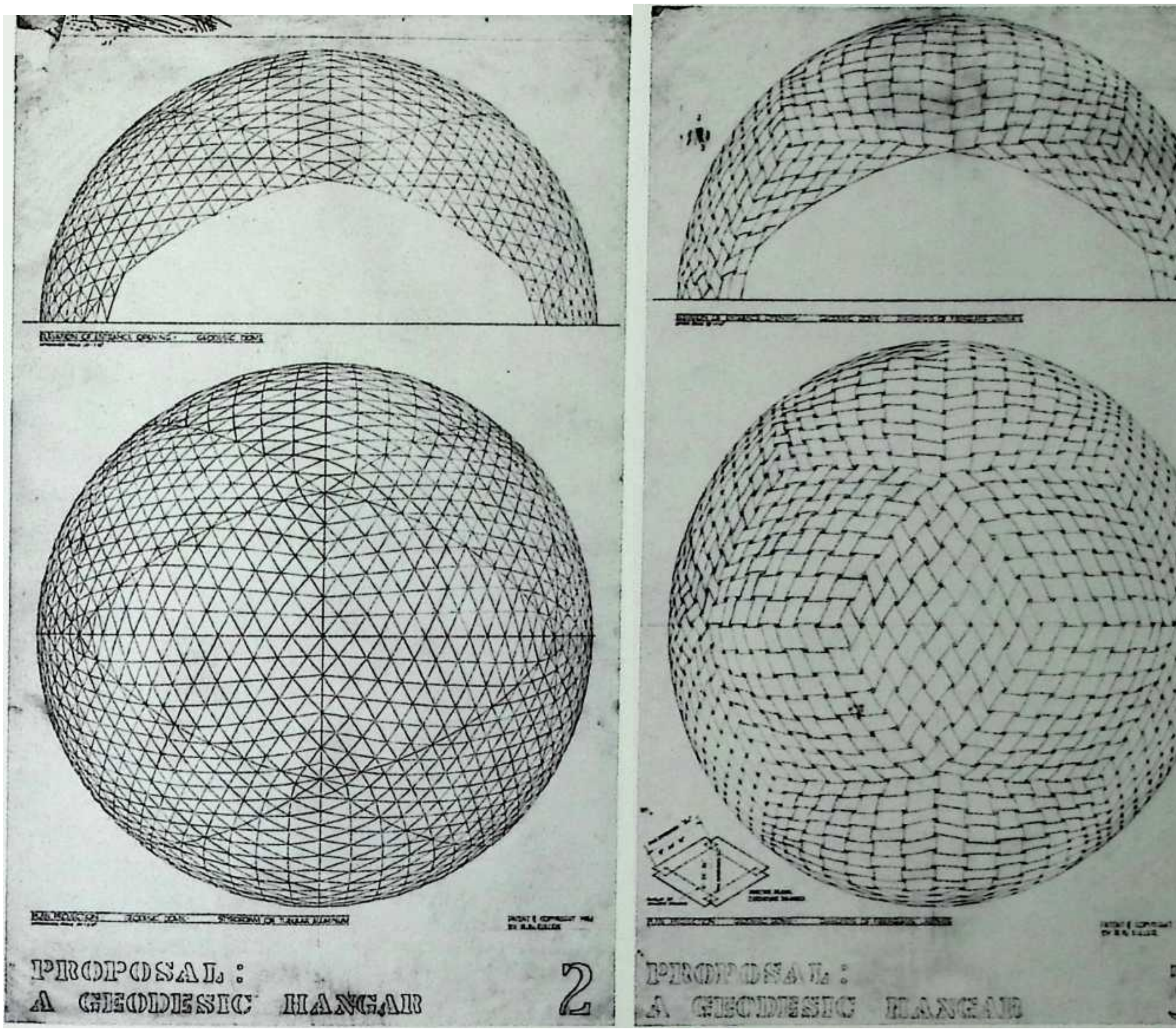
Proposal:

A Geodesic Hangar 1951

Fuller designed this hangar with students at M.I.T. in 1951 and produced a concept that would lead eventually to his long affiliation with the U.S. Marine Corps. This design surpassed in economy even the elegant reinforced concrete hangars produced by Pierluigi Nervi in wartime Italy because Fuller proposed that they be constructed entirely of styrofoam, tubular aluminum, or superimposed diamonds of fiberglass laminate. Large spherical segments on two sides served as doors that could be rolled open on a tract contiguous with the hangar's circumference.


DOOR OPEN
DOOR CLOSED
PIPE STANDARDS FOR
ELECTRICAL HARNESS
PROPOSAL :
A GEODESIC HANGAR
1

H?« U1LLWAI15



Illi

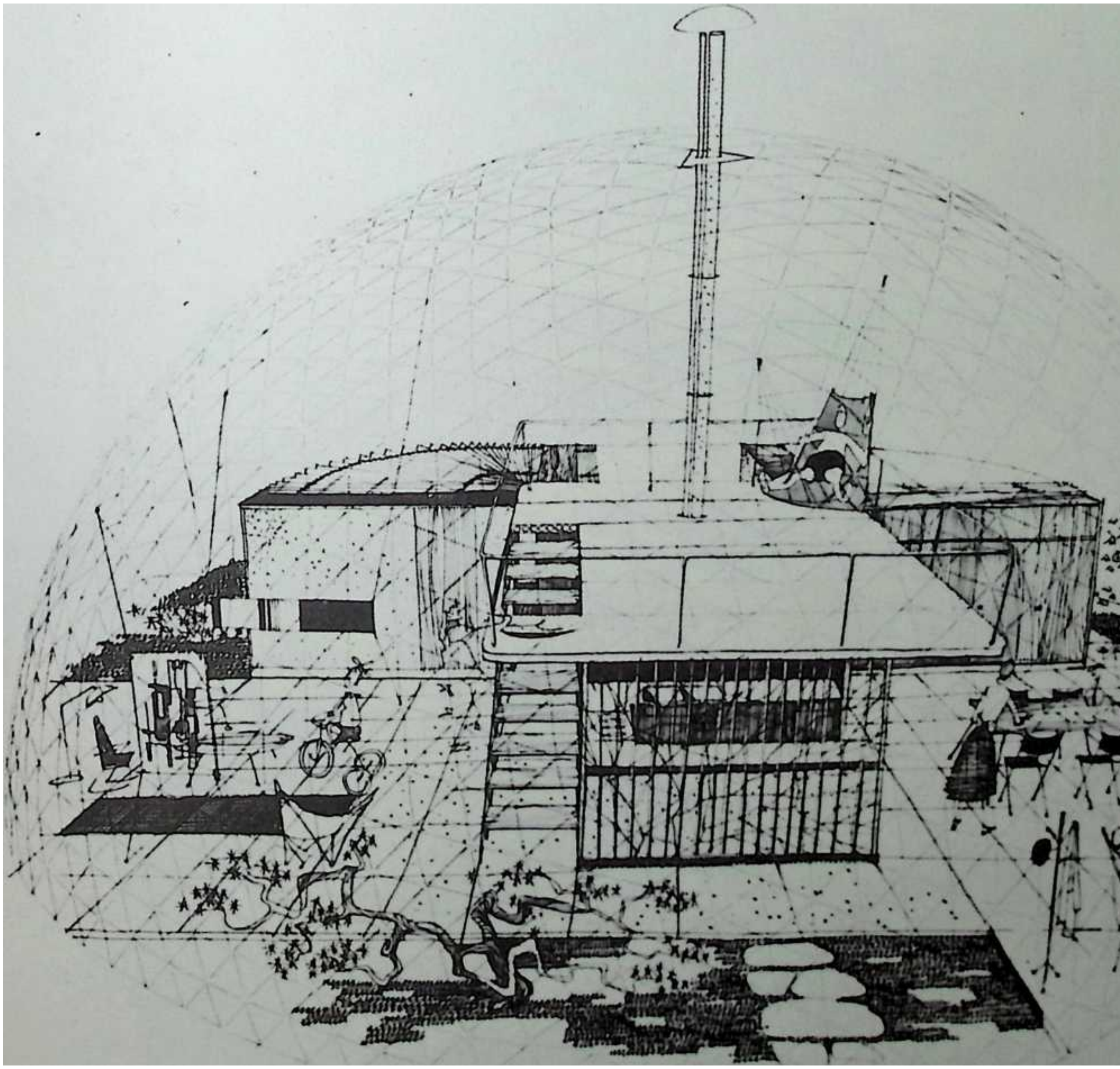
Eighty-Foot Skybreak

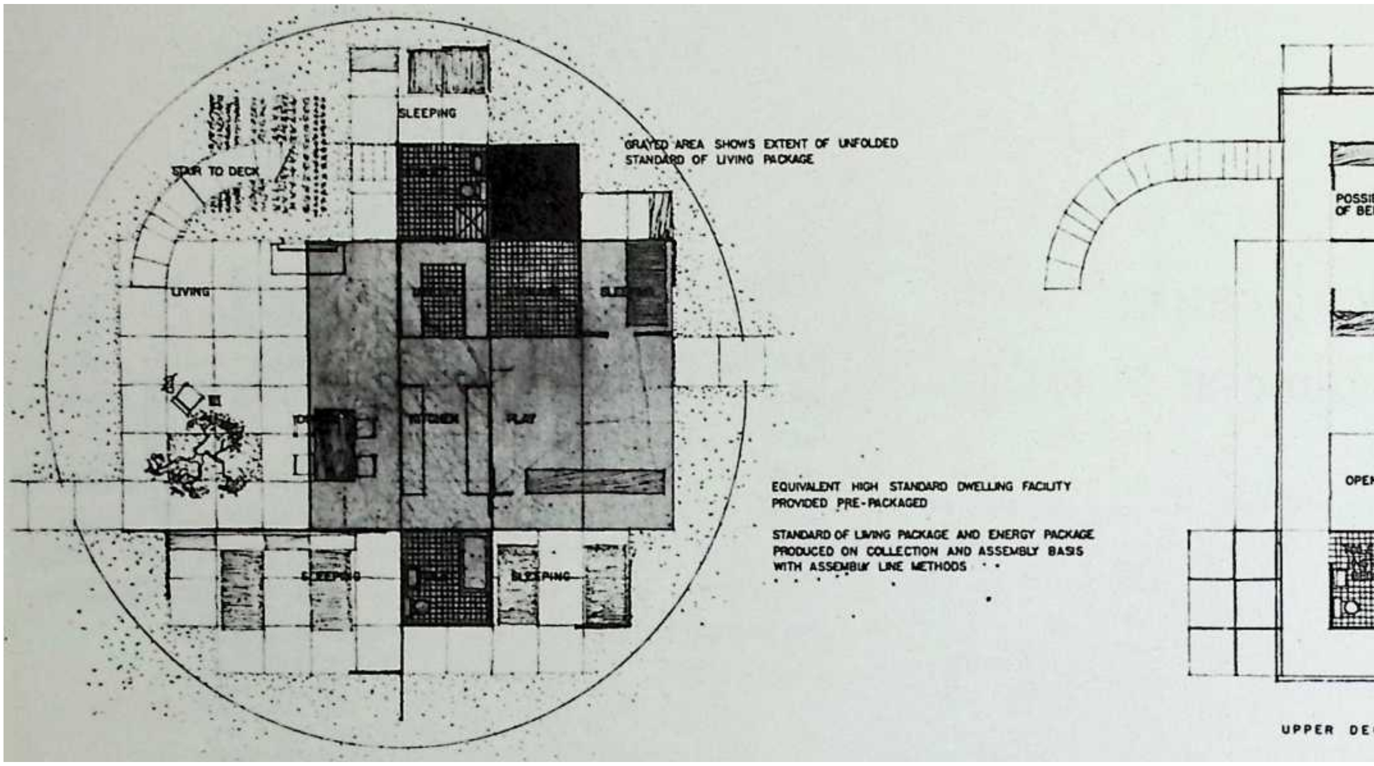
(Maquette)

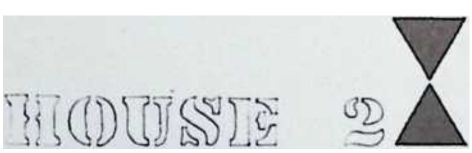
Exhibited at the Museum of Modern Art, 1952

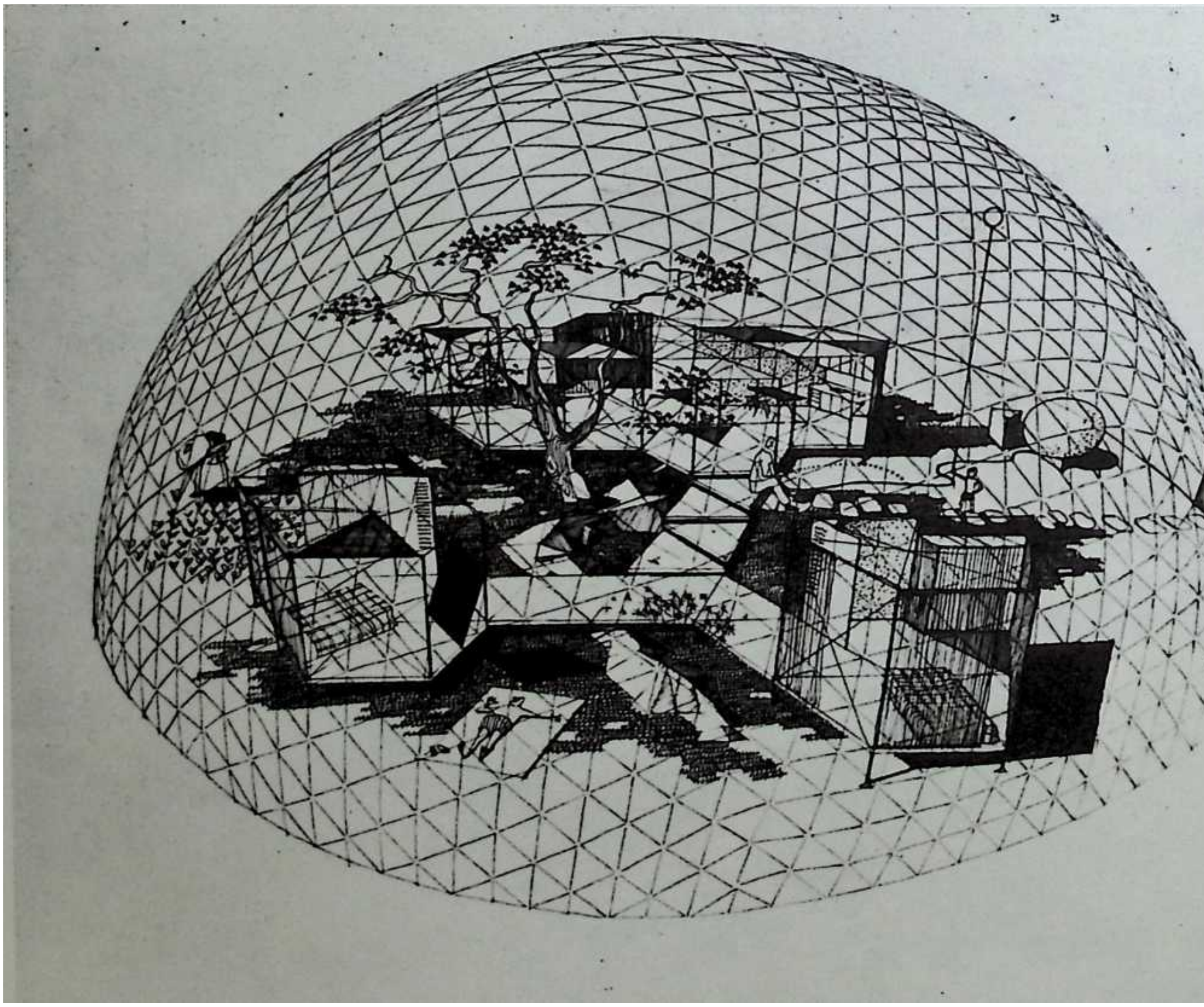
Geodesic Skybreaks Drawn by J. Rauma at M.I.T. 1952

These drawings are important inasmuch as they show an elaborate adaptation of the geodesic dome into a dwelling unit. Fuller himself had produced only one such model for the U.S. Air Force before 1950. perhaps because he was chiefly interested in the geometry' of the domes and in the development of new techniques for their inexpensive construction. The maquette of a similar dwelling made by Fuller ca. 1949 and exhibited at the Museum of Modem Art in New York in 1952 is the ultimate source of the drawings by Rauma.

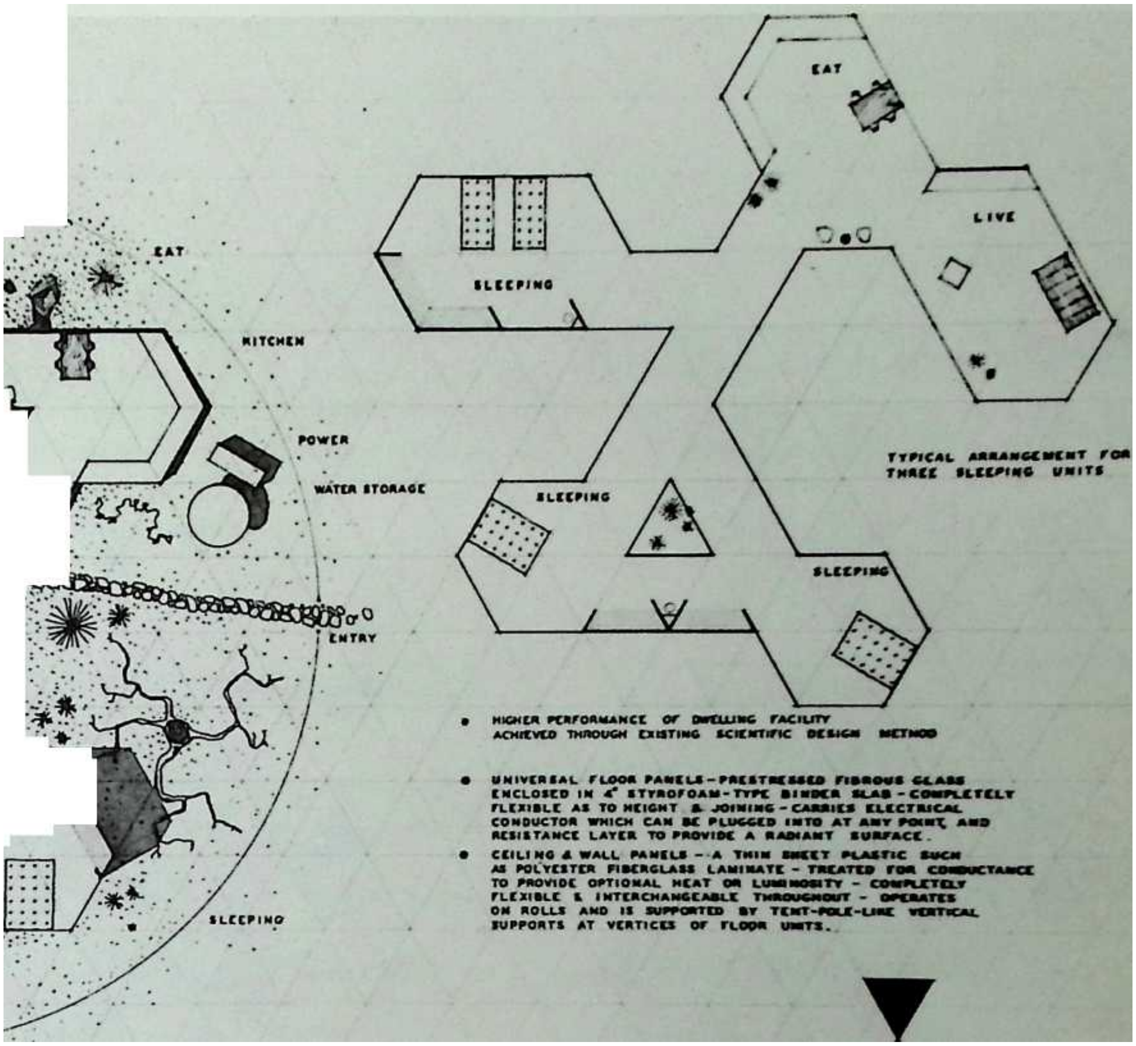


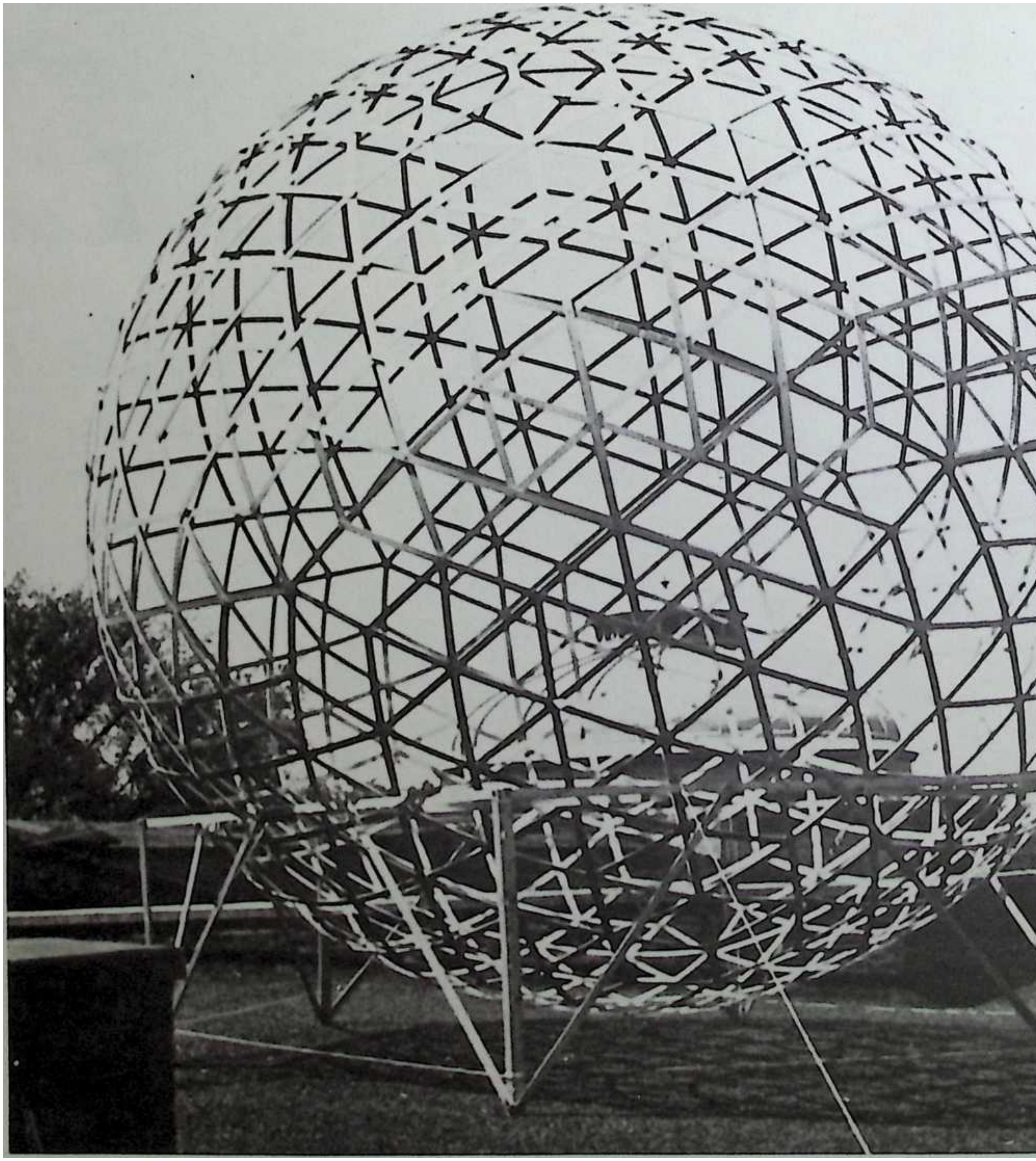

SLEEPING
TO DECK
LIVING
KITCHEN
PLAY
SLEEPING
GRAYED AREA SHOWS EXTENT OF UNFOLDED
STANDARD OF LIVING PACKAGE
EQUIVALENT HIGH STANDARD DWELLING FACILITY
PROVIDED PRE-PACKAGED
STANDARD OF LIVING PACKAGE AND ENERGY PACKAGE
PRODUCED ON COLLECTION AND ASSEMBLY BASIS
WITH ASSEMBLY LINE METHODS
UPPER


HOUSE 2



io


EAT
KITCHEN
POWER
WATER STORAGE
ENTRY
SLEEPING
EAT
LIVE
SLEEPING
SLEEPING
SLEEPING
TYPICAL ARRANGEMENT FOR
THREE SLEEPING UNITS
• HIGHER PERFORMANCE OF DWELLING FACILITY
ACHIEVED THROUGH EXISTING SCIENTIFIC DESIGN METHOD
• UNIVERSAL FLOOR PANELS—PRESTRESSED FIBROUS GLASS
ENCLOSED IN 4" STYROFOAM-TYPE BINDER SLAB—COMPLETELY
FLEXIBLE AS TO HEIGHT & JOINING—CARRIES ELECTRICAL
CONDUCTOR WHICH CAN BE PLUGGED INTO AT ANY POINT, AND
RESISTANCE LAYER TO PROVIDE A RADIANT SURFACE.
• CEILING & WALL PANELS—A THIN SHEET PLASTIC SUCH
AS POLYESTER FIBERGLASS LAMINATE—TREATED FOR CONDUCTANCE
TO PROVIDE OPTIONAL HEAT OR LUMINOSITY—COMPLETELY
FLEXIBLE & INTERCHANGEABLE THROUGHOUT—OPERATES
ON ROLLS AND IS SUPPORTED BY TENT-POLE-LIKE VERTICAL
SUPPORTS AT VERTICES OF FLOOR UNITS.

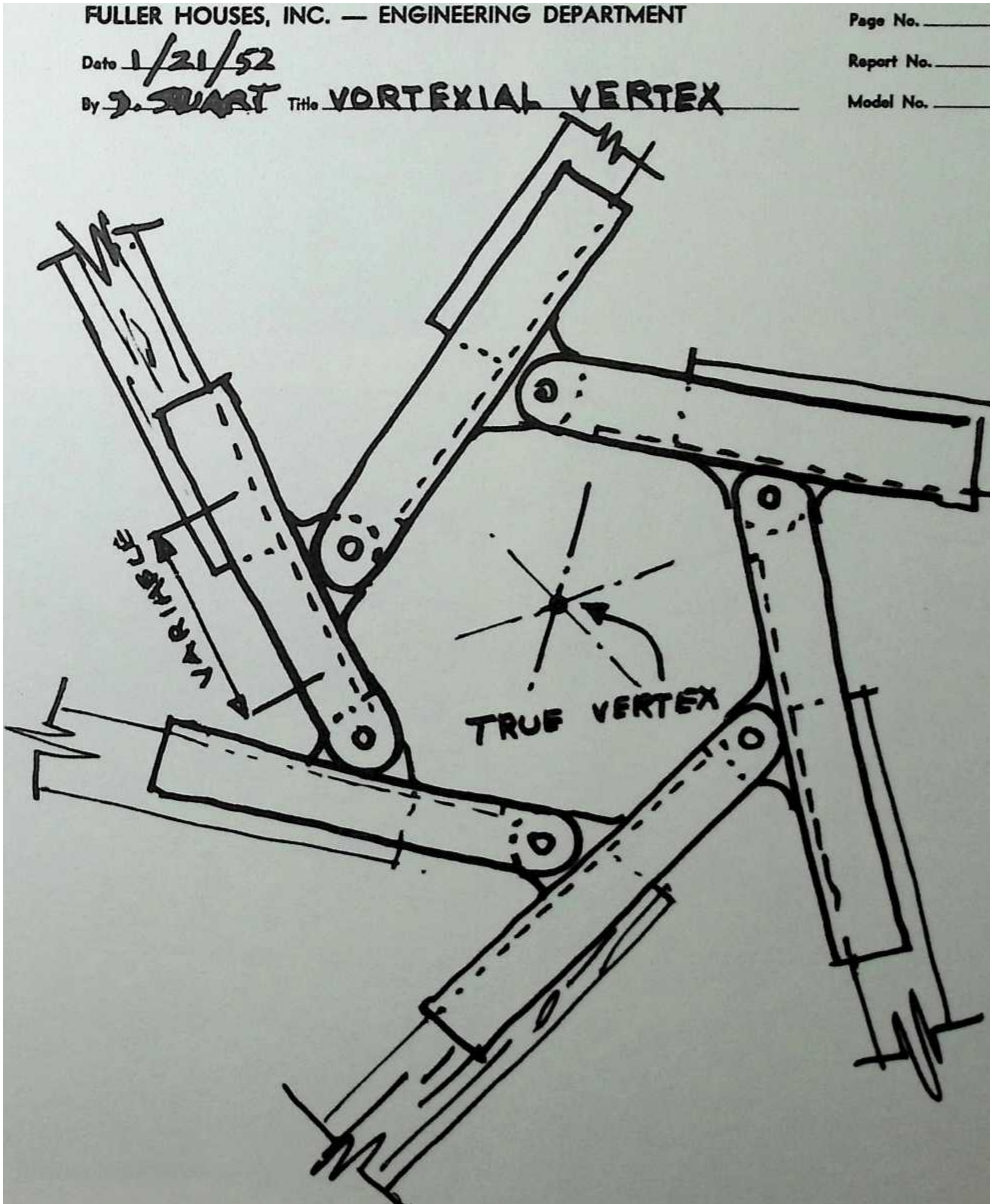


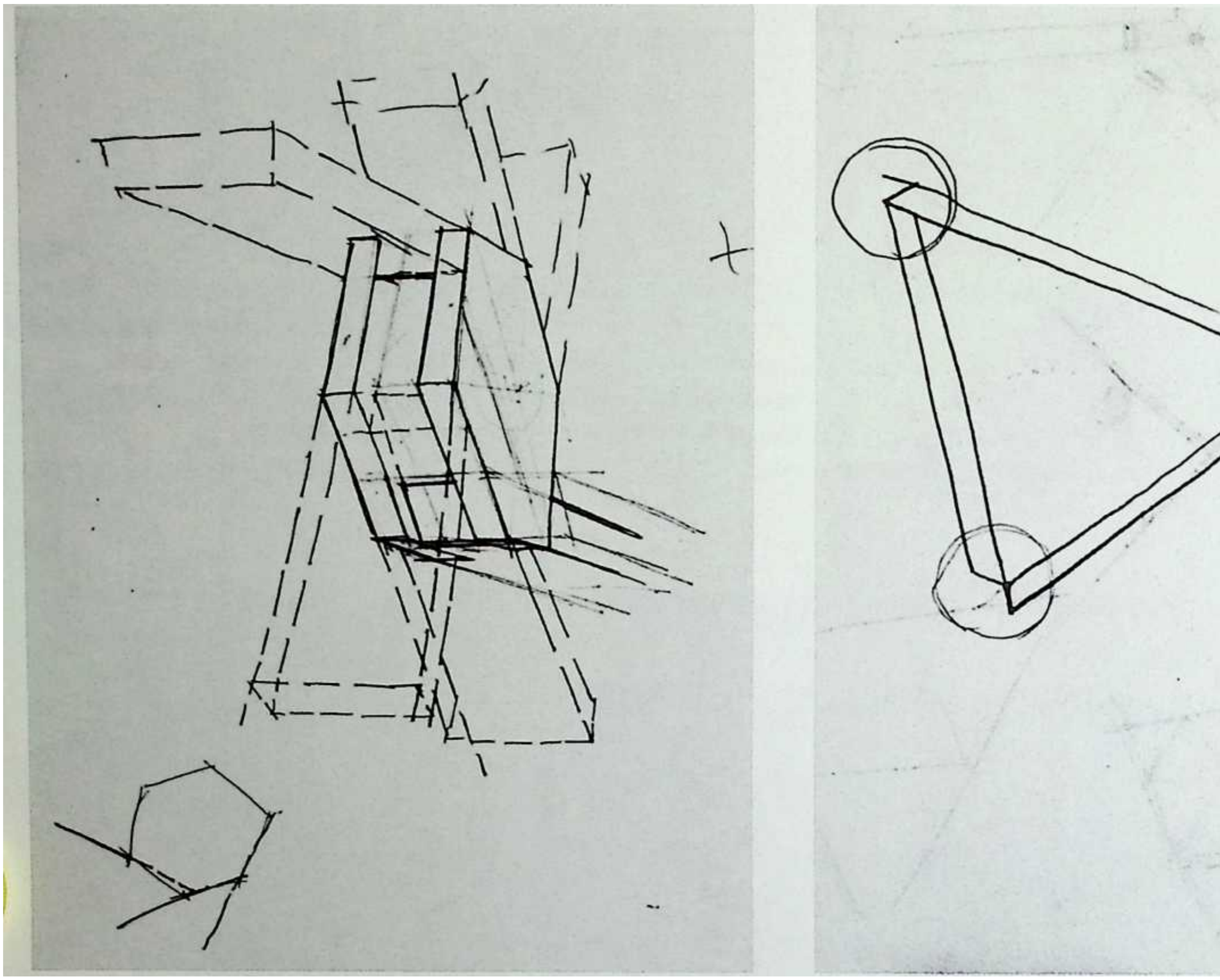
Twenty-Foot Globe of Wooden Slats, Cornell University 1952

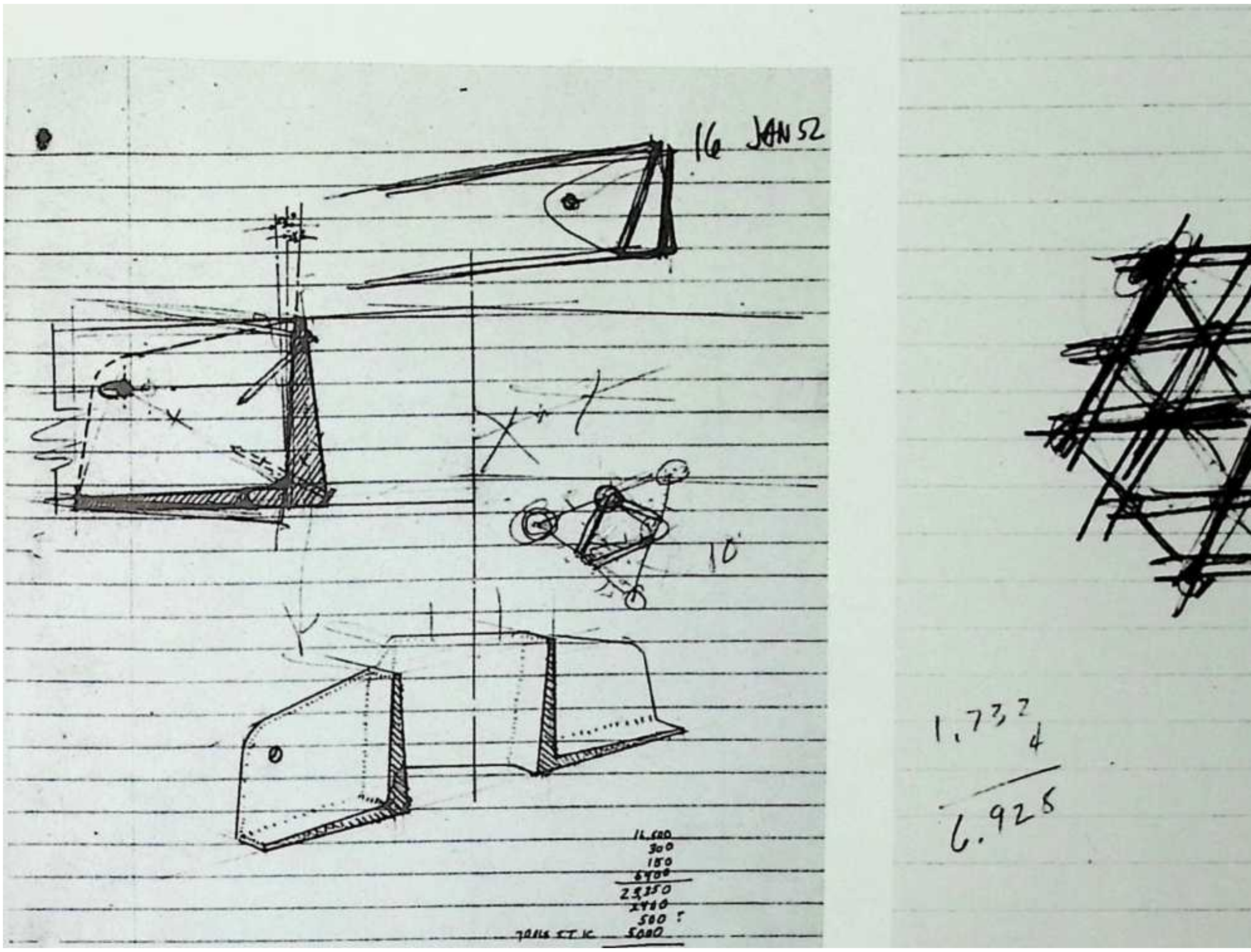
Fuller designed this globe for Cornell University in 1952 chiefly to convey the idea of the thirty-one great circles. Shoji Sadao, Fuller's future partner, then a student of architecture, was a member of the group that built the globe of wooden slats, metal tacks, and bronze mesh representations of the major land masses.

Vortexial Vertexes Fuller Houses, Inc. 1952

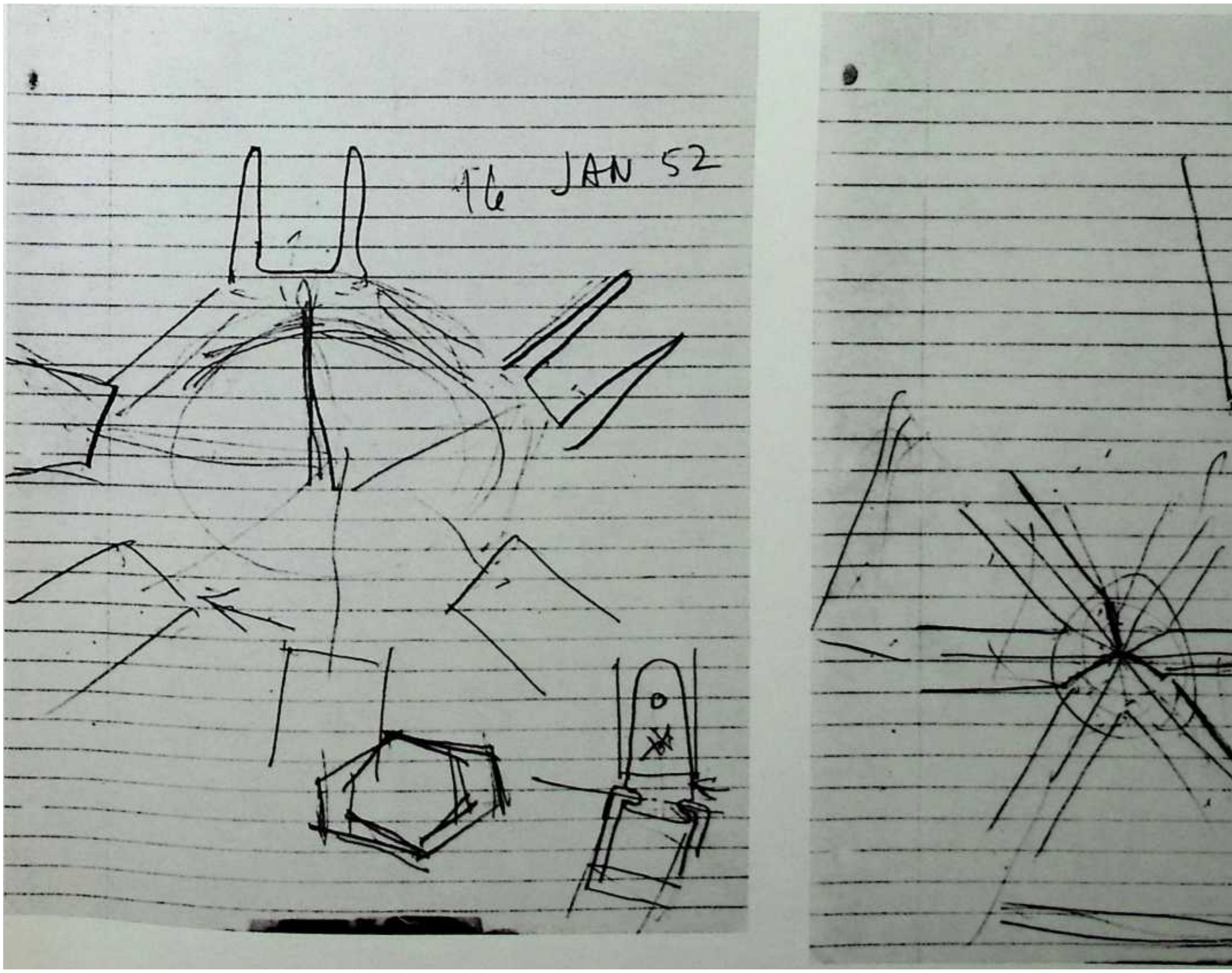
These sketches show Fuller's experiment with the design of a vertex that could be precise, strong, and flexible. The result is a prototype of five metal sockets hinged to each other in a pentagonal configuration, from which wooden struts would radiate.

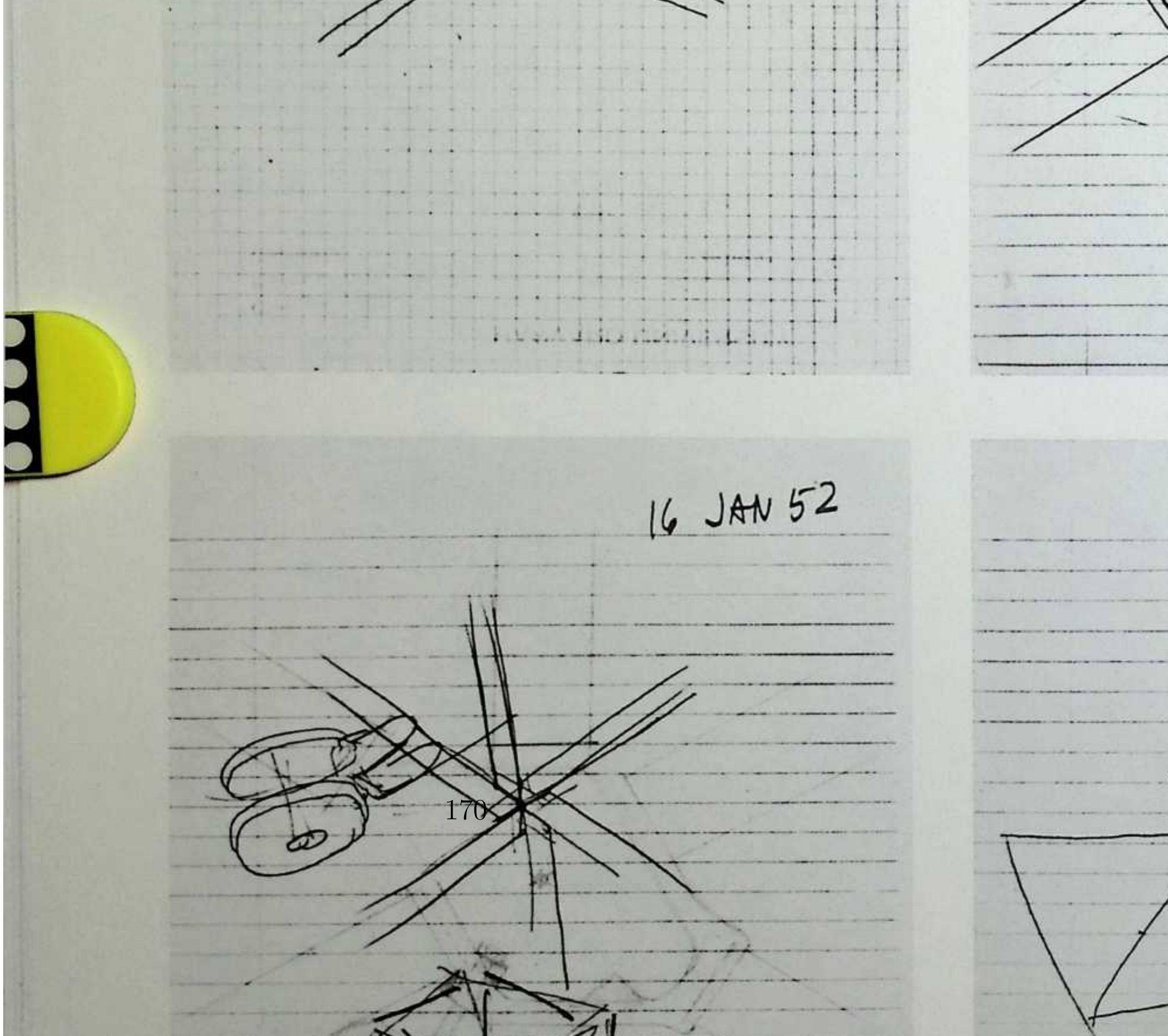

FULLER HOUSES, INC. — ENGINEERING DEPARTMENT
Page No.
Date 1/21/52
Report No.
By
Title VORTEXIAL VERTEX
Model No.
VARIABLE
TRUE VERTEX

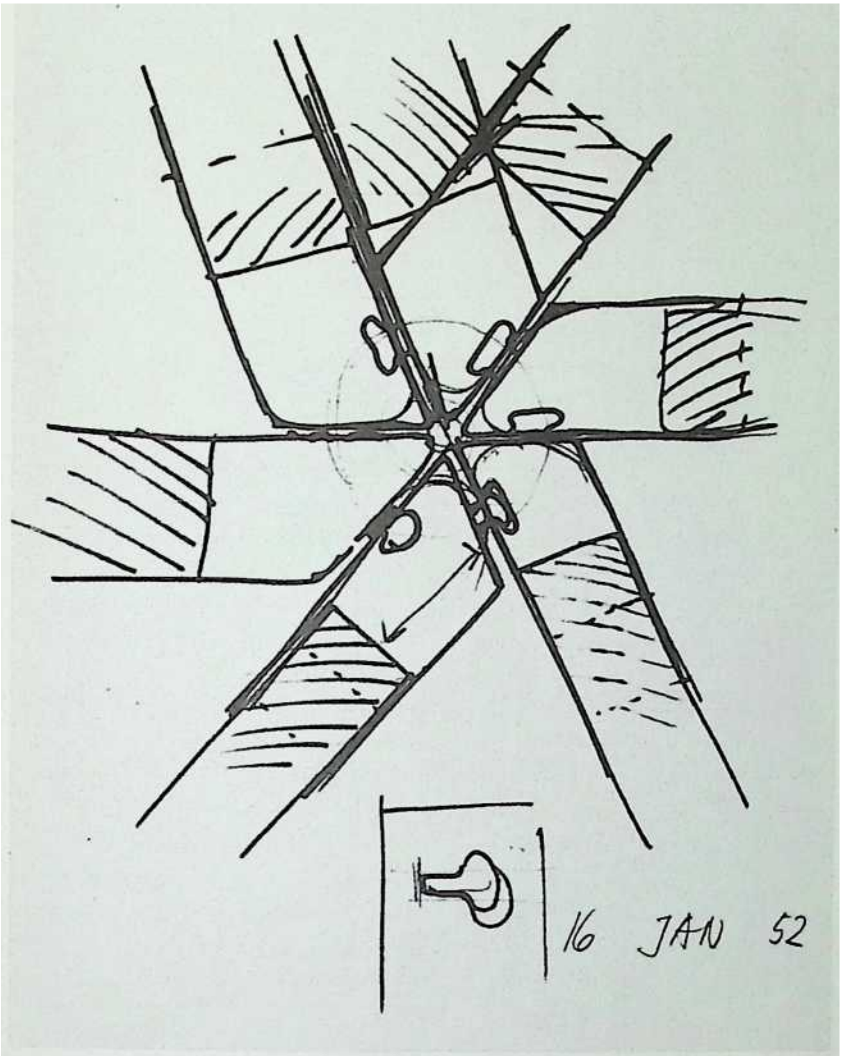


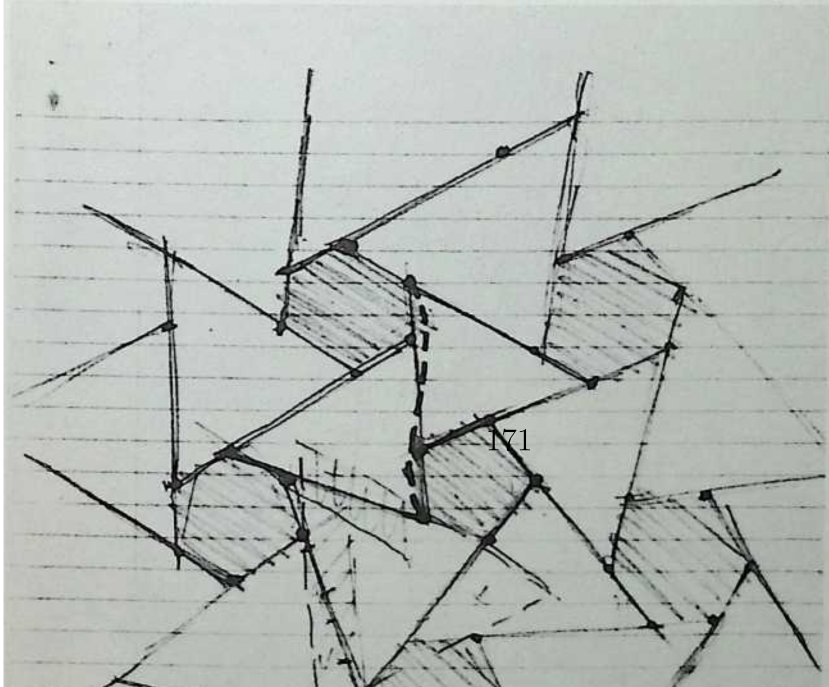


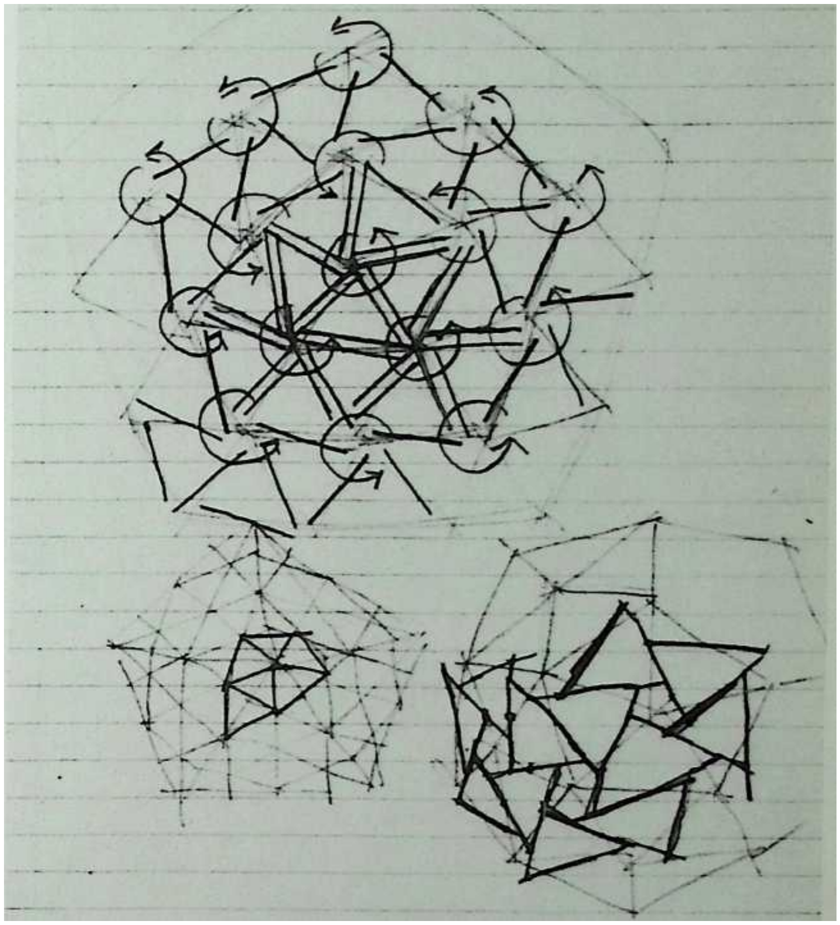
Jim jyco* , *3ZfSQ

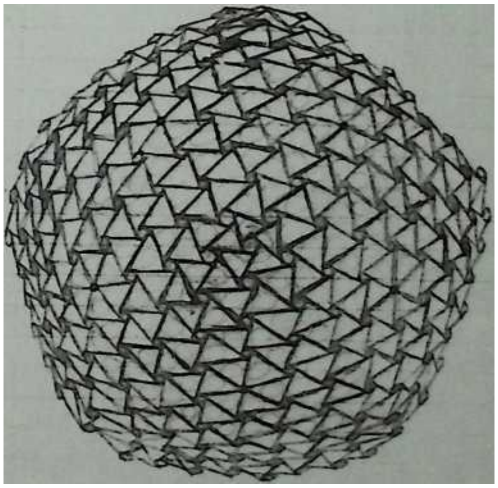

16 JAN 52

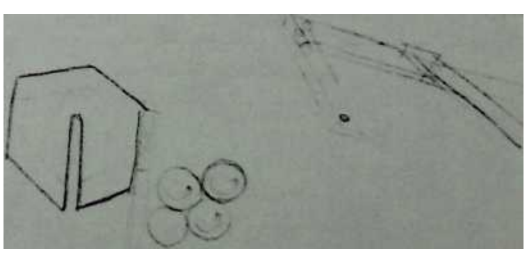

16 JAN 52

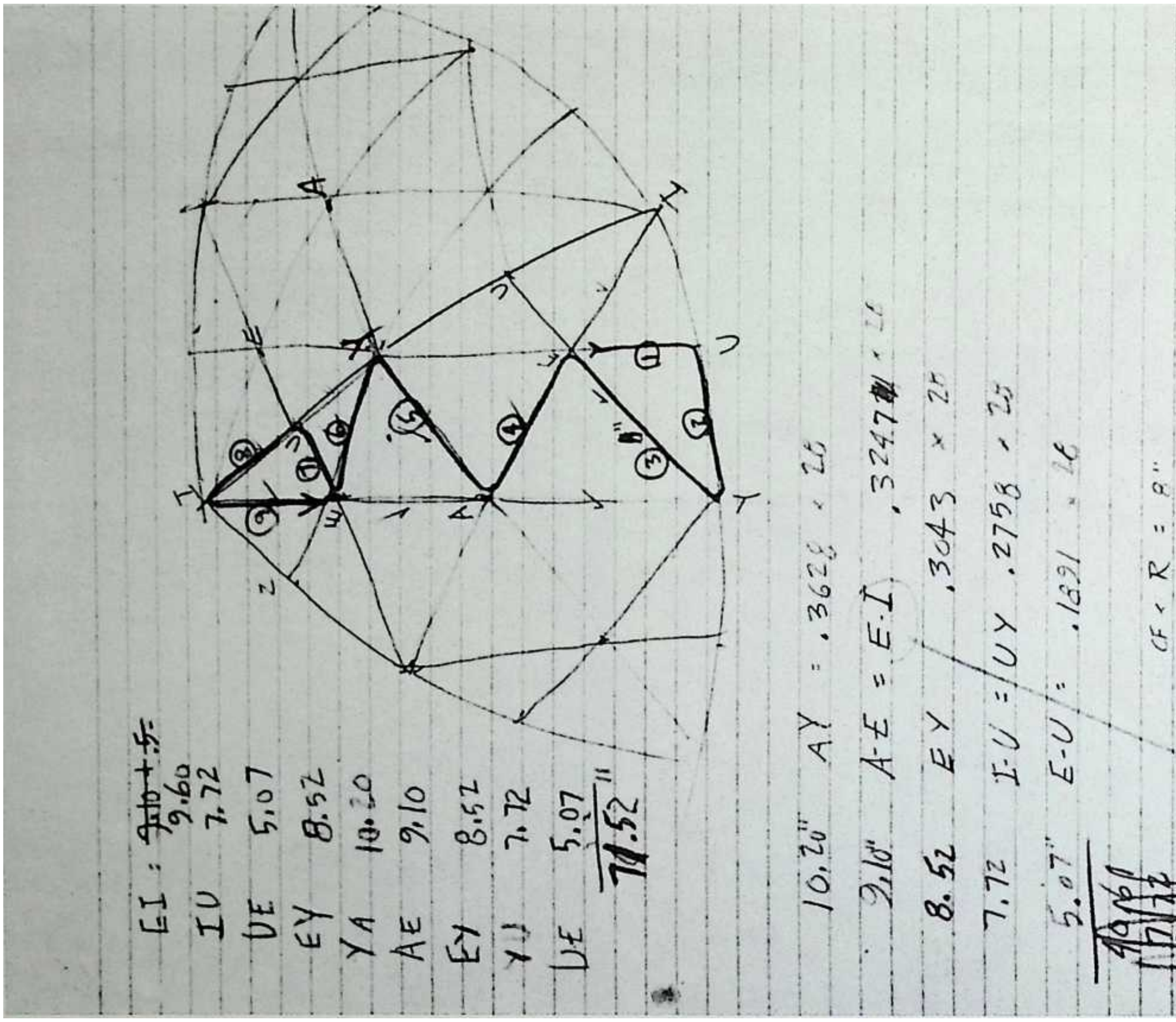

16 JAN 52

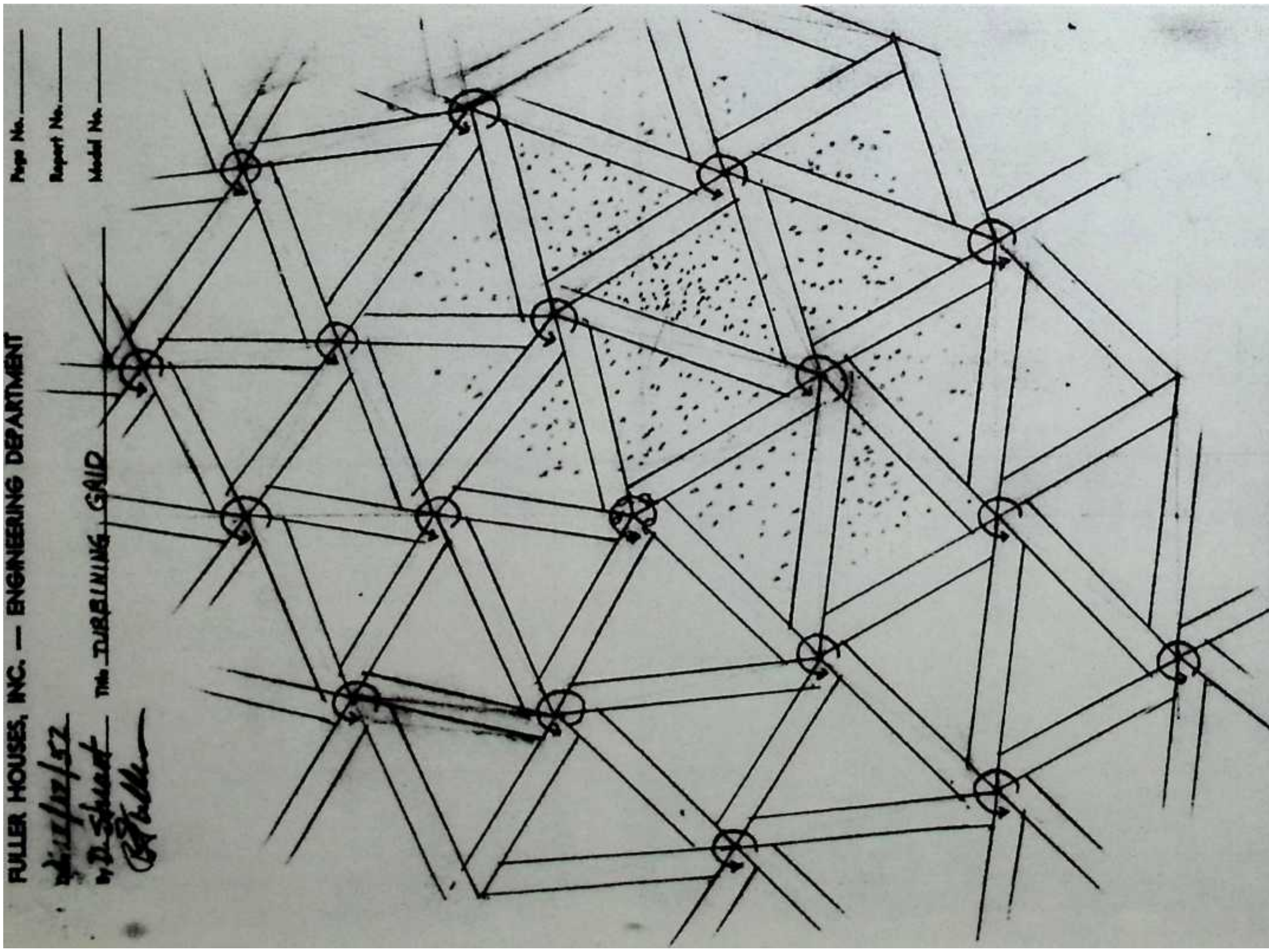


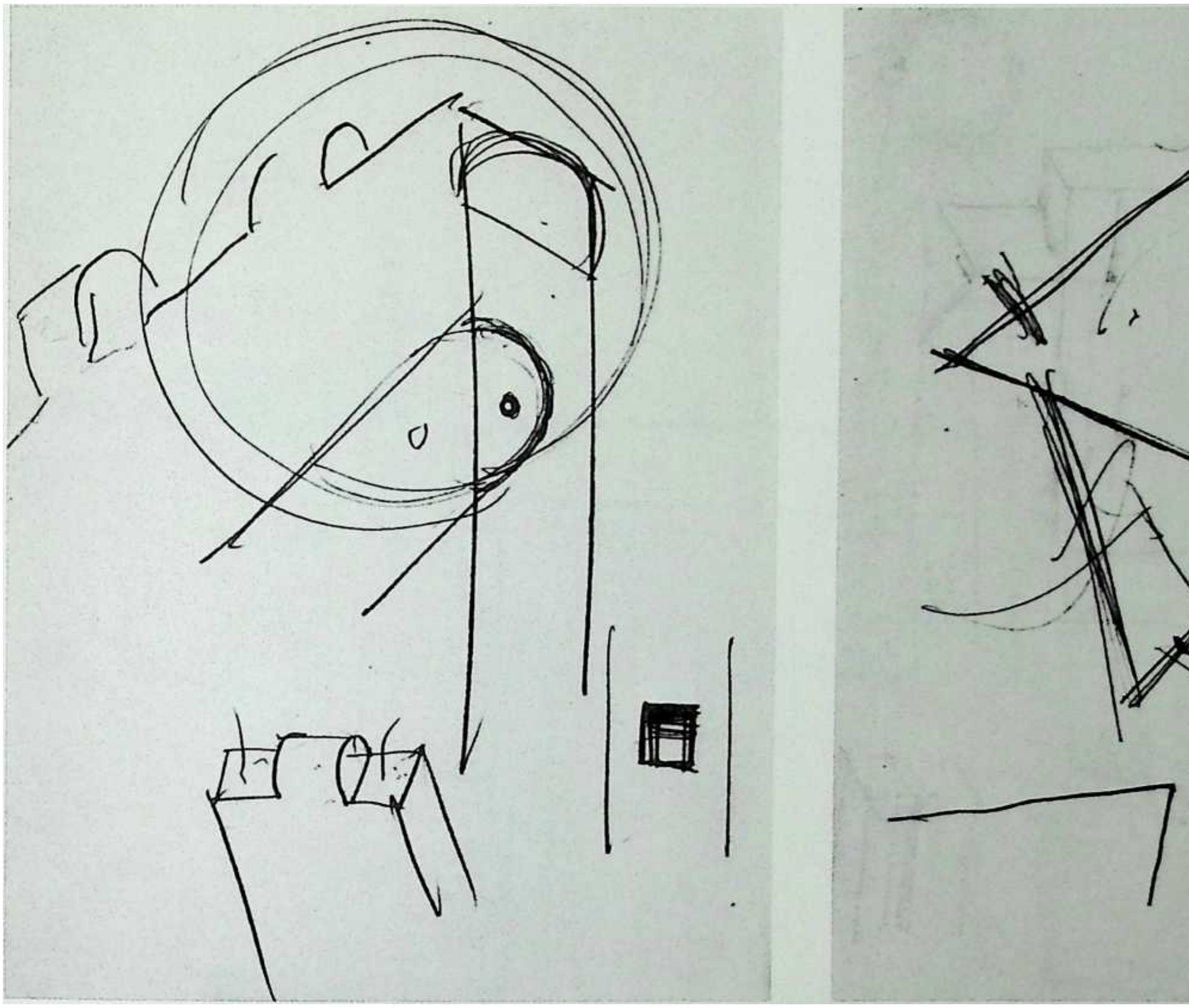


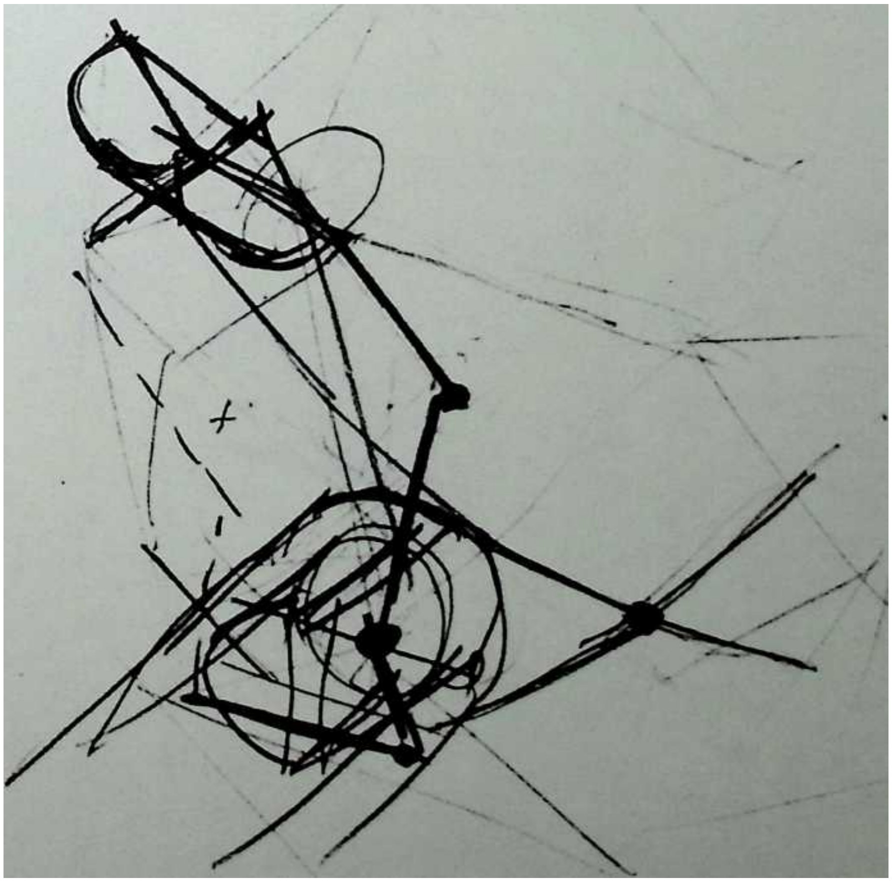


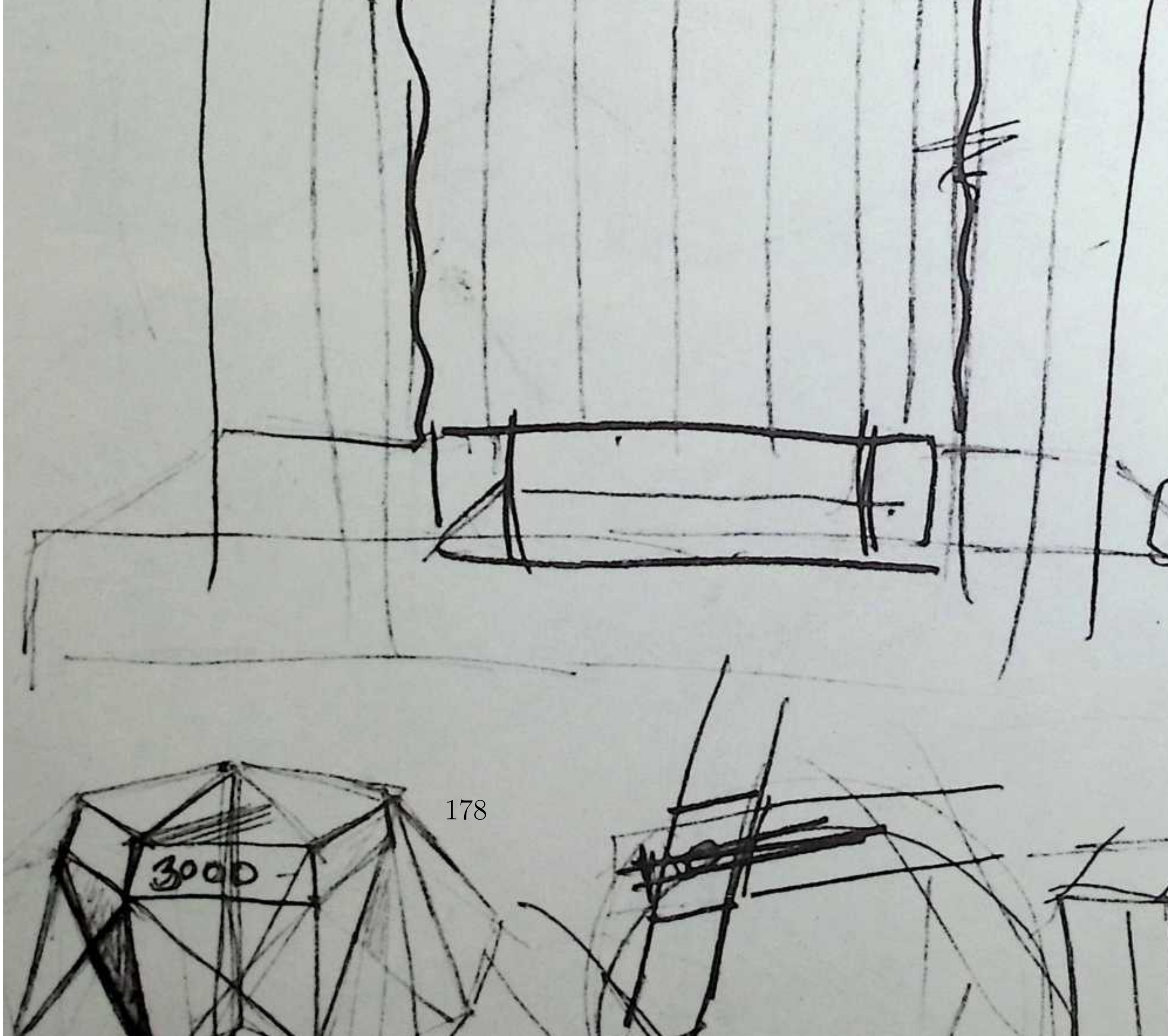



EI : 9.60
IU 7.72
UE 5.07
EY 8.52
YA 10.20
AE 9.10
EY 8.52
YU 7.72
UE 5.07
71.52"
10.20" AY = .3628 × 28
9.10" A-E = E-I .3247 × 28
8.52 EY .3043 × 28
7.72 I-U = UY .2758 × 28
5.07" E-U = .1831 × 28
CF × R = 8"


FULLER HOUSES, INC. — ENGINEERING DEPARTMENT
Page No.
Report No.
Model No.
Title TURBINING GRID



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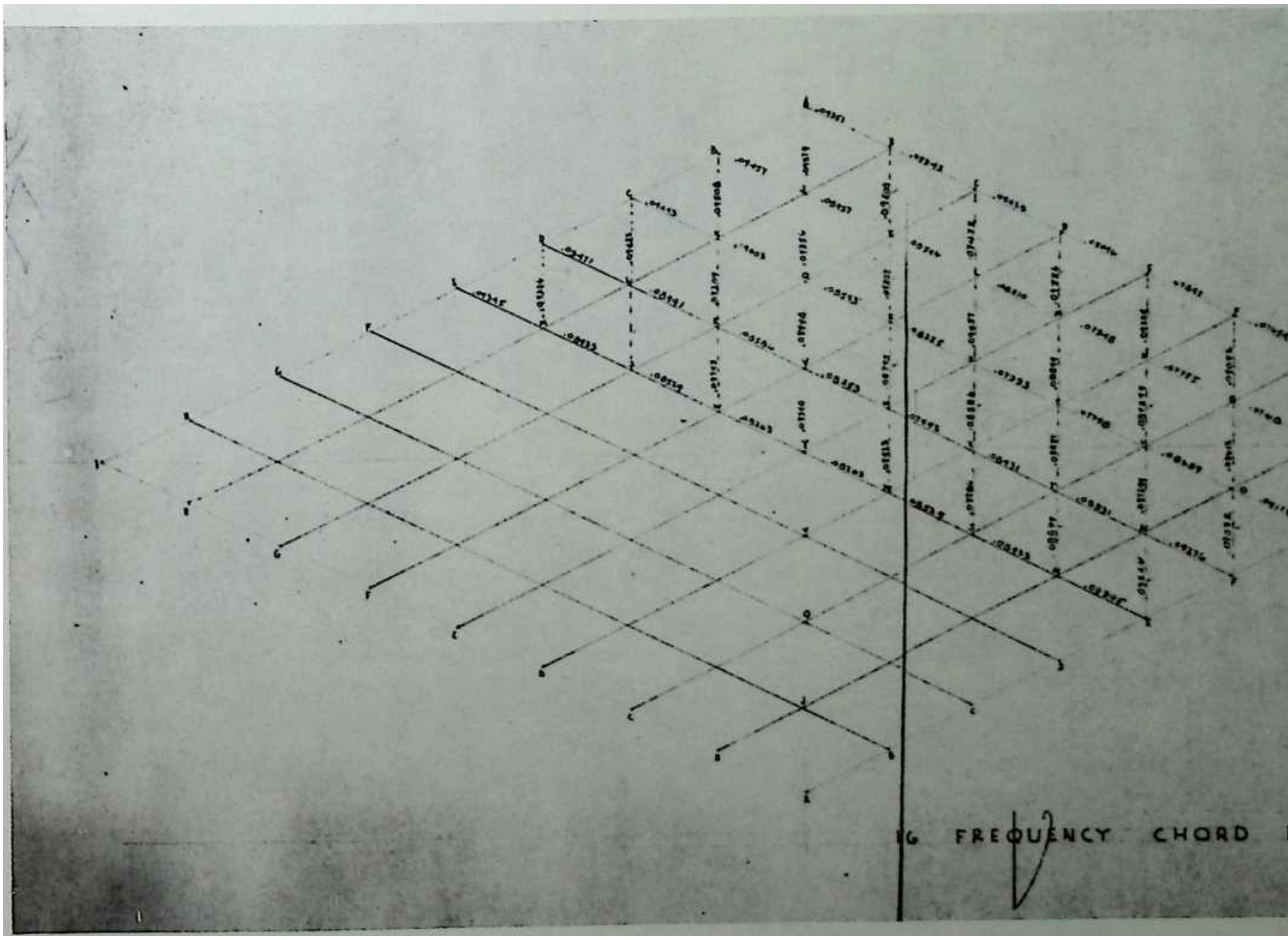


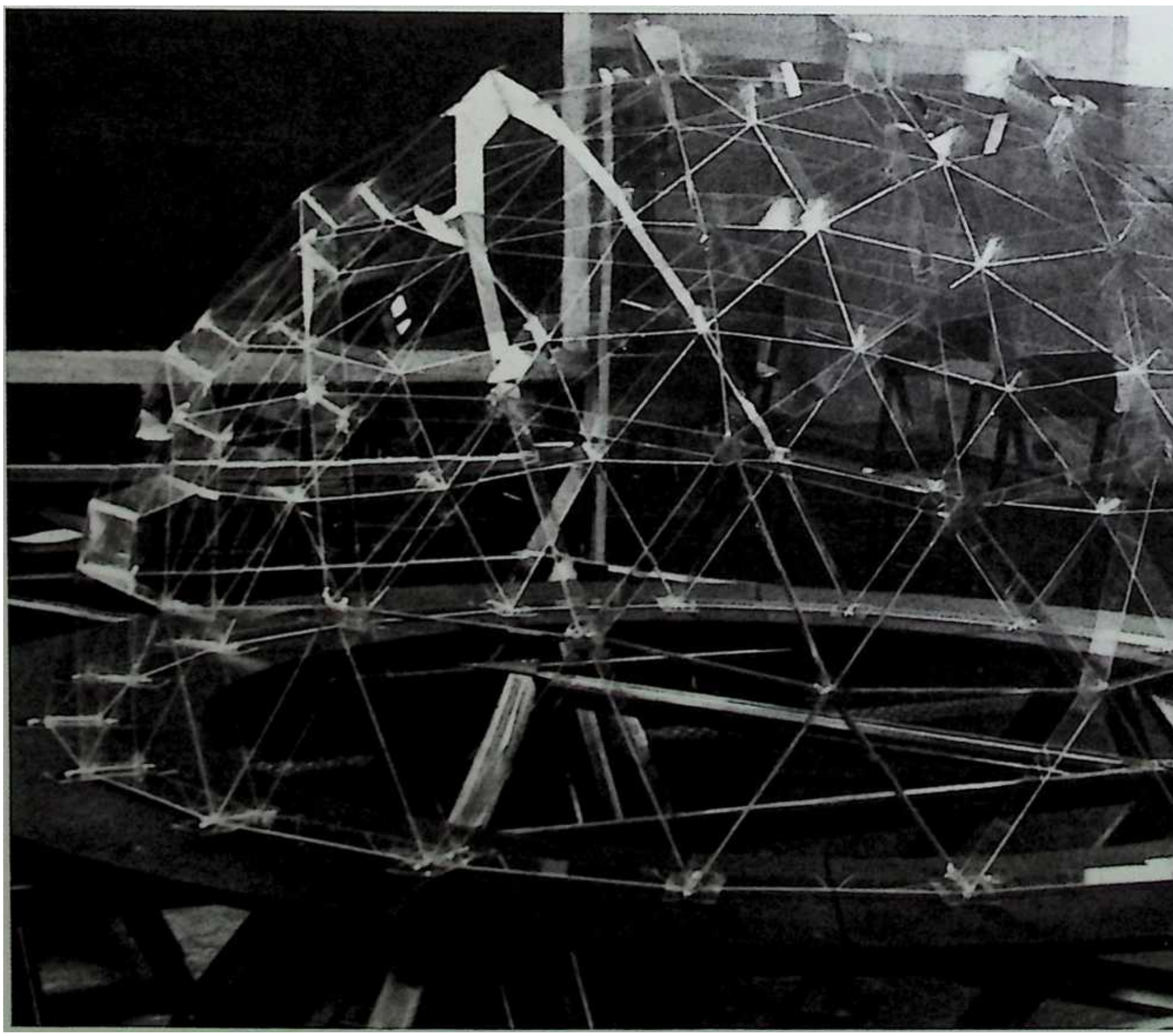
Sixteen- F requency

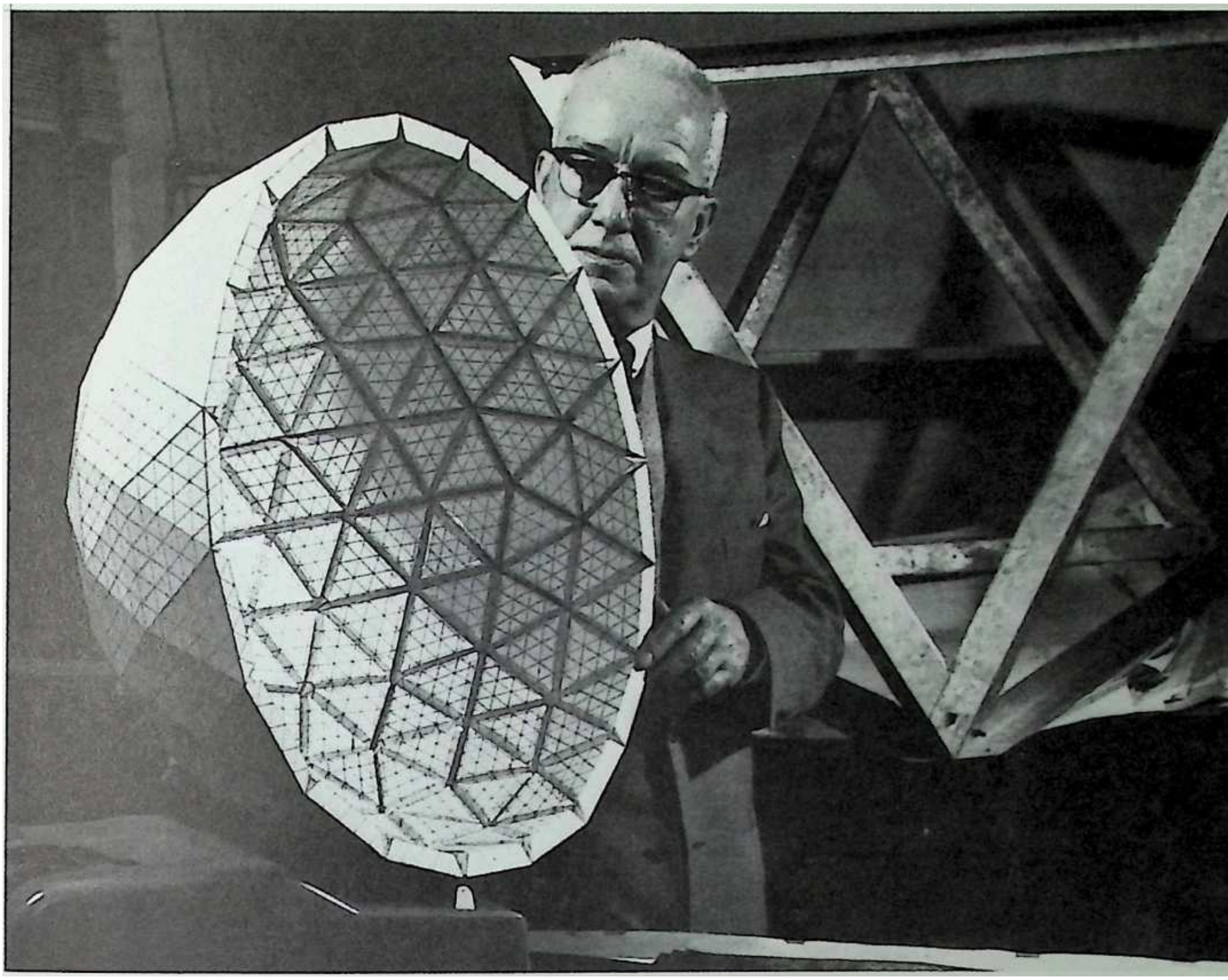
Chord Factors 1952

These chords embody the geometric formula for a geodesic dome.

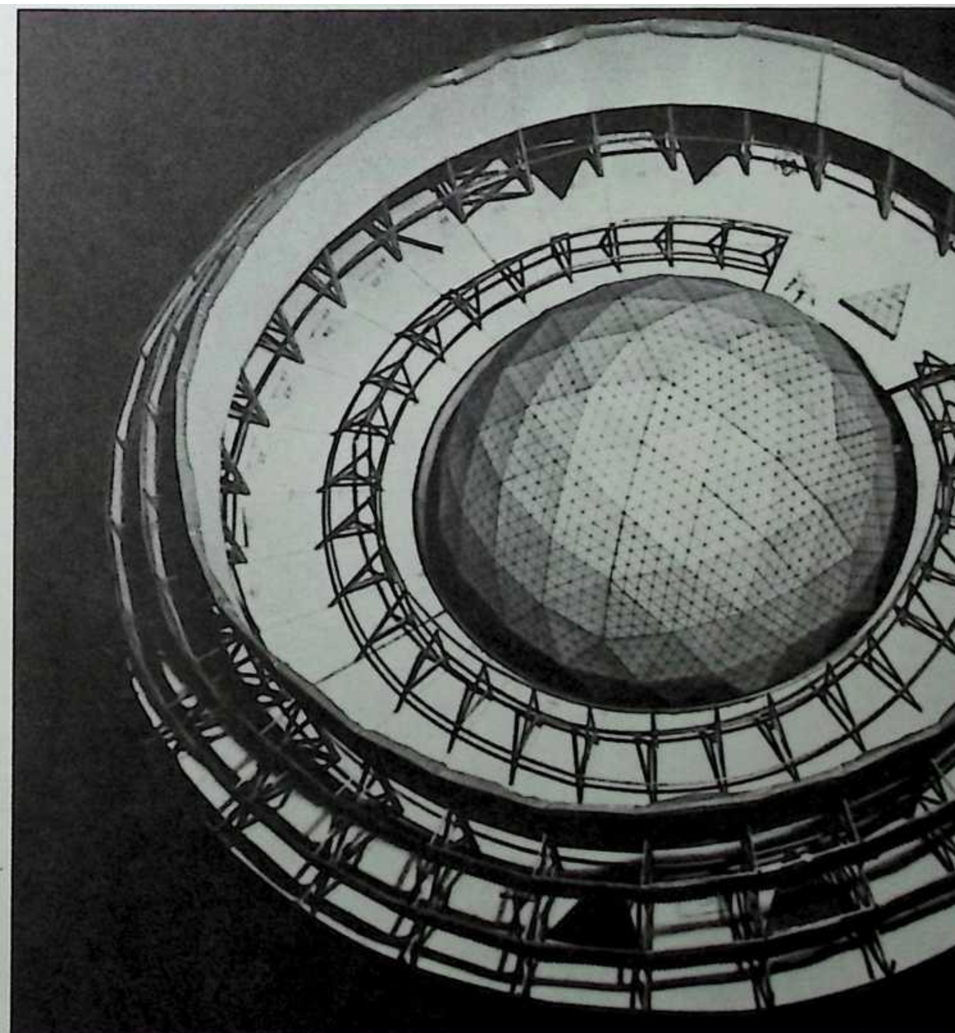
Spherical Truss for the Ford Motor Company Courtesy Building 1952-1953

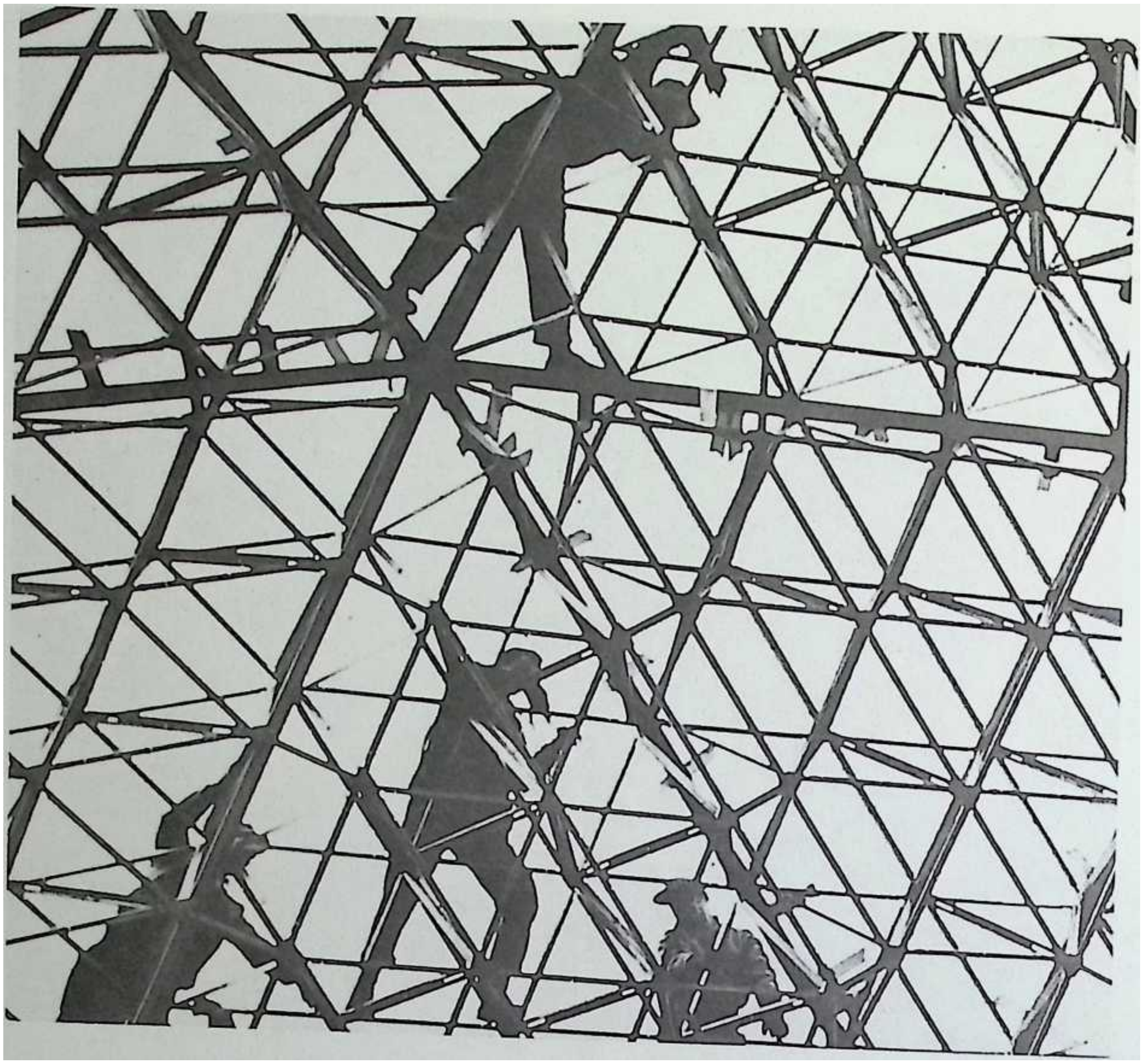
This aluminum and polyester dome (spanning a ninety- three-foot rotunda of the Ford Motor Company's Courtesy Building in Dearborn, Michigan) weighs only eight and a half tons but changed the course of modern architecture. It represents the first major corporate sponsorship of an architectural principle, which, though over a quarter of a century old, was still extremely futuristic as of 1953. Triangular subassemblies of aluminum make up the fifteen tetrahedra of the larger triangular trusses that are connected to hubs and clad in polyester resin. The success of the geodesic dome can be attributed in part to the stunning photograph of this advanced crystalline hemisphere published in *Life* magazine. More important than its scale and size was the fact that this dome became like an icon of the Ford Motor Company and a harbinger of the corporate patronage of modern architecure that occurred across the country shortly thereafter.

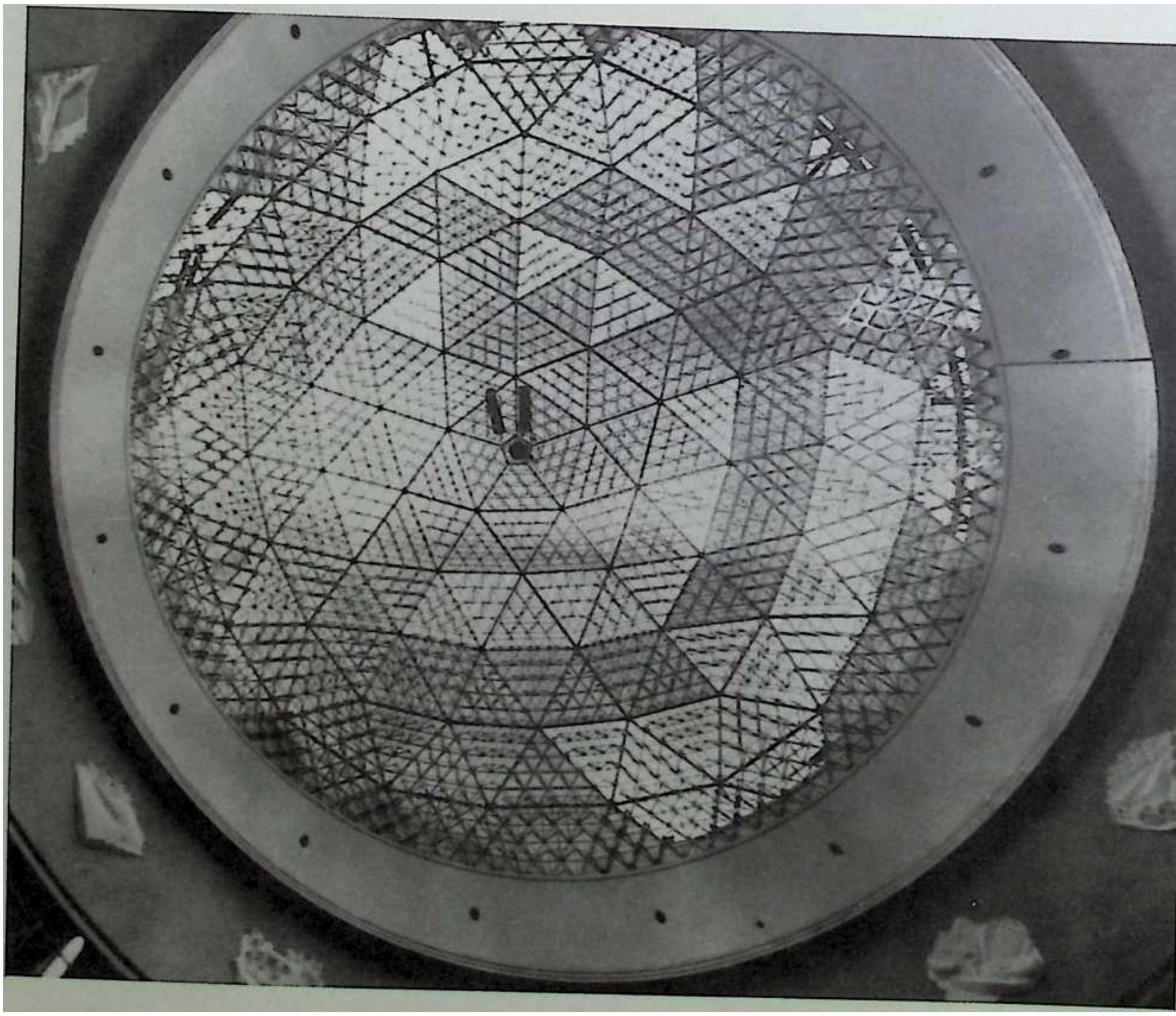


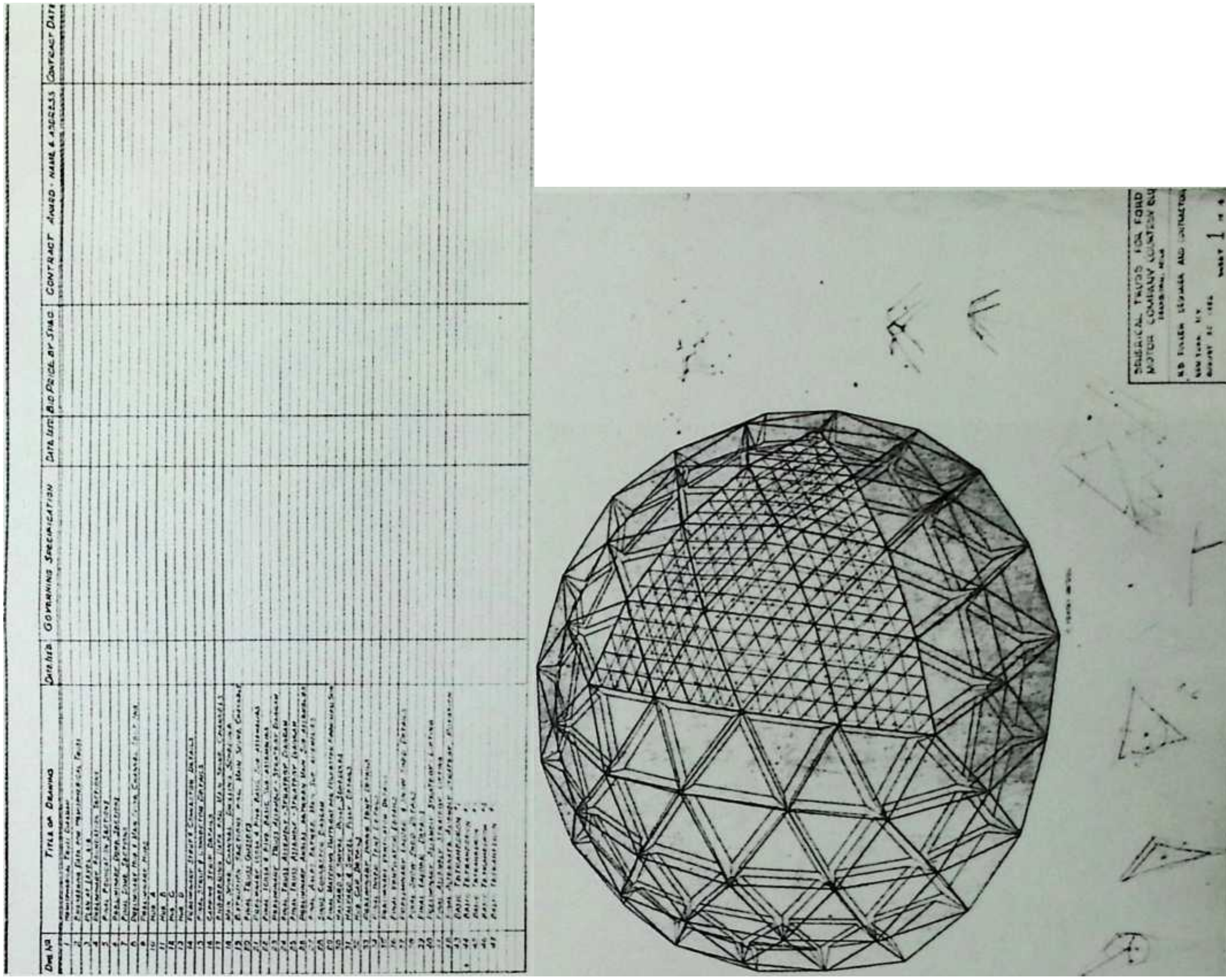


182





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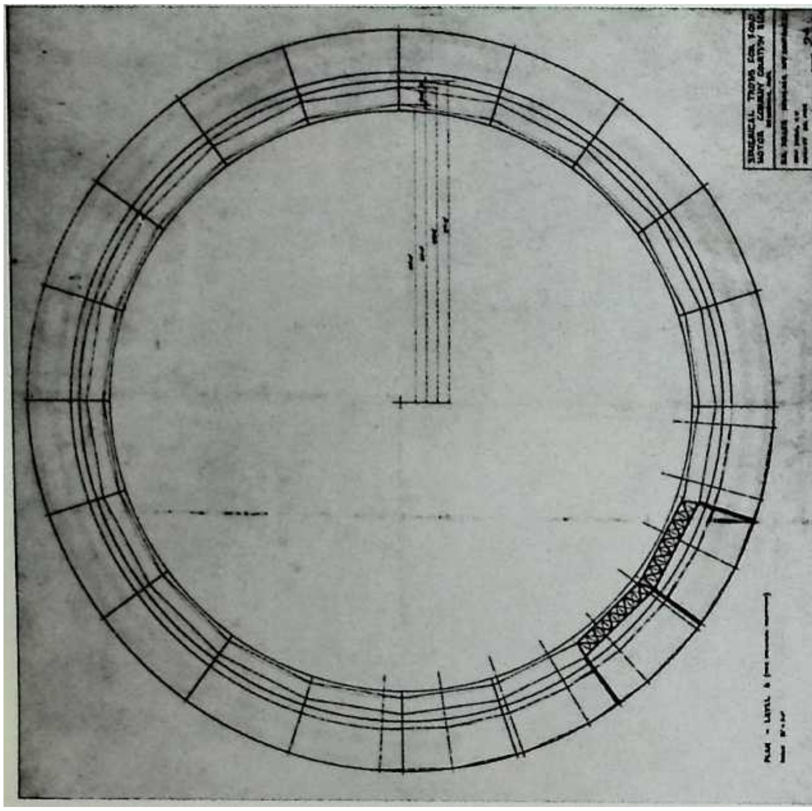
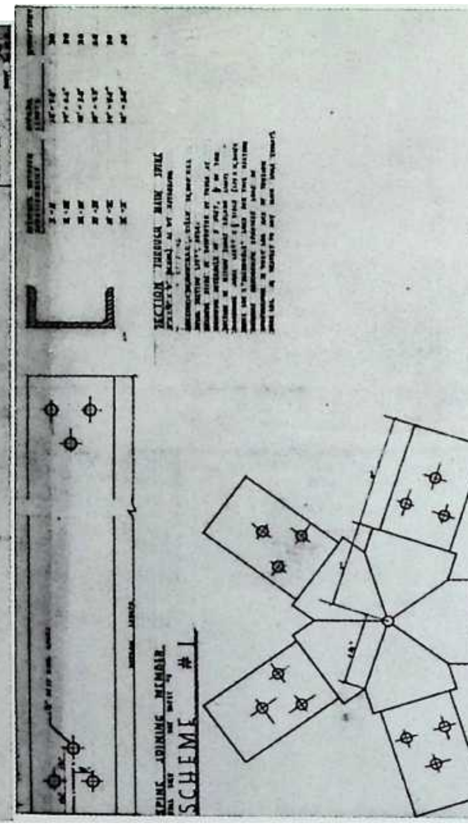
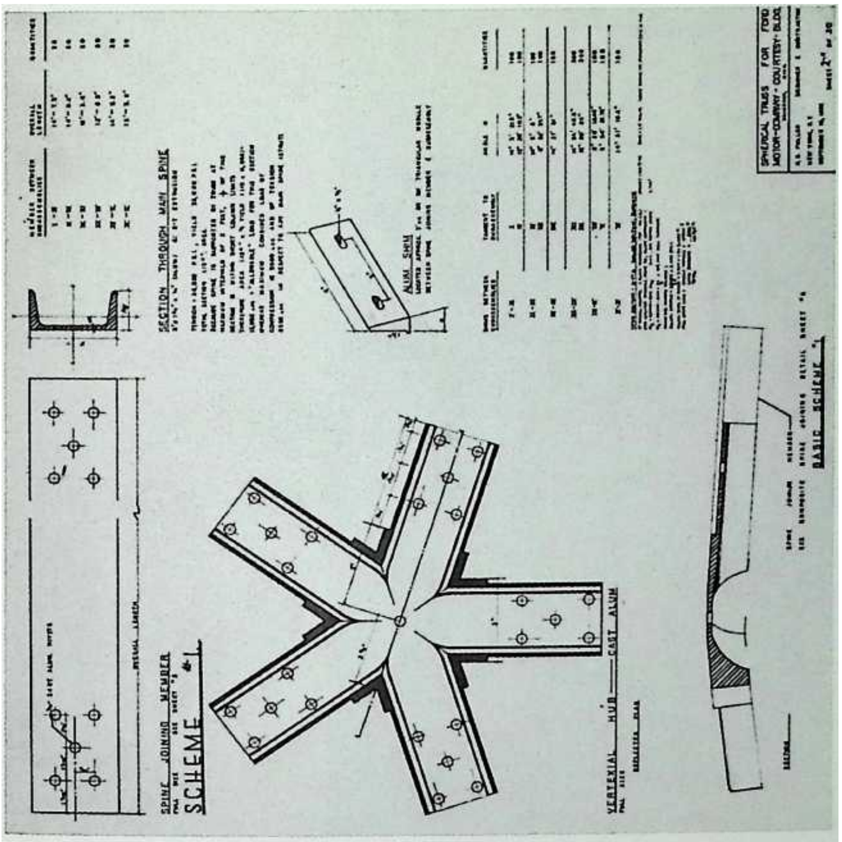
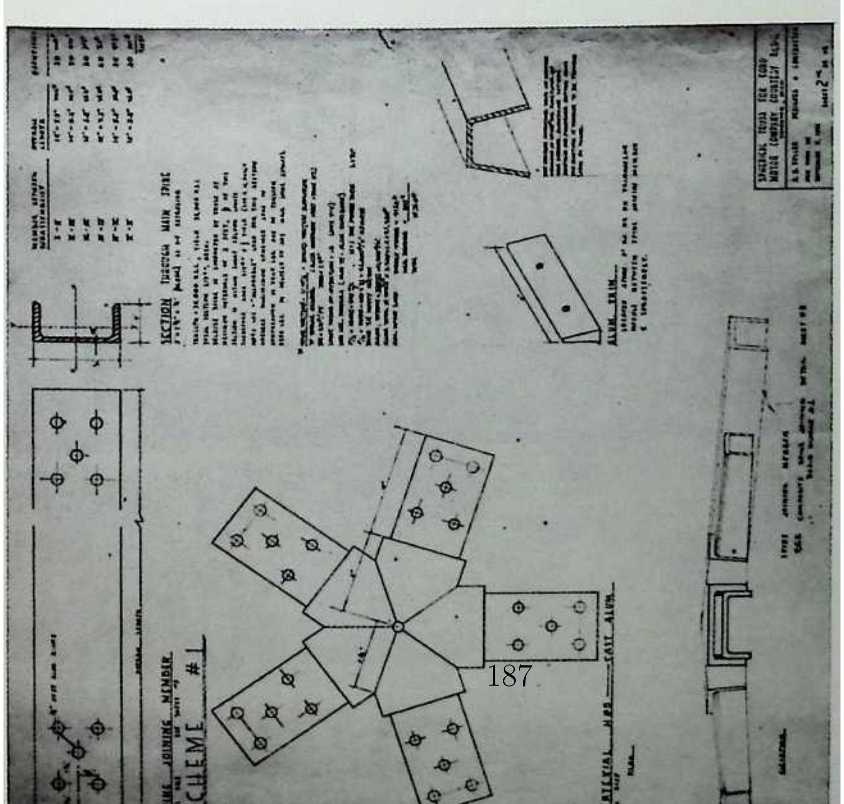
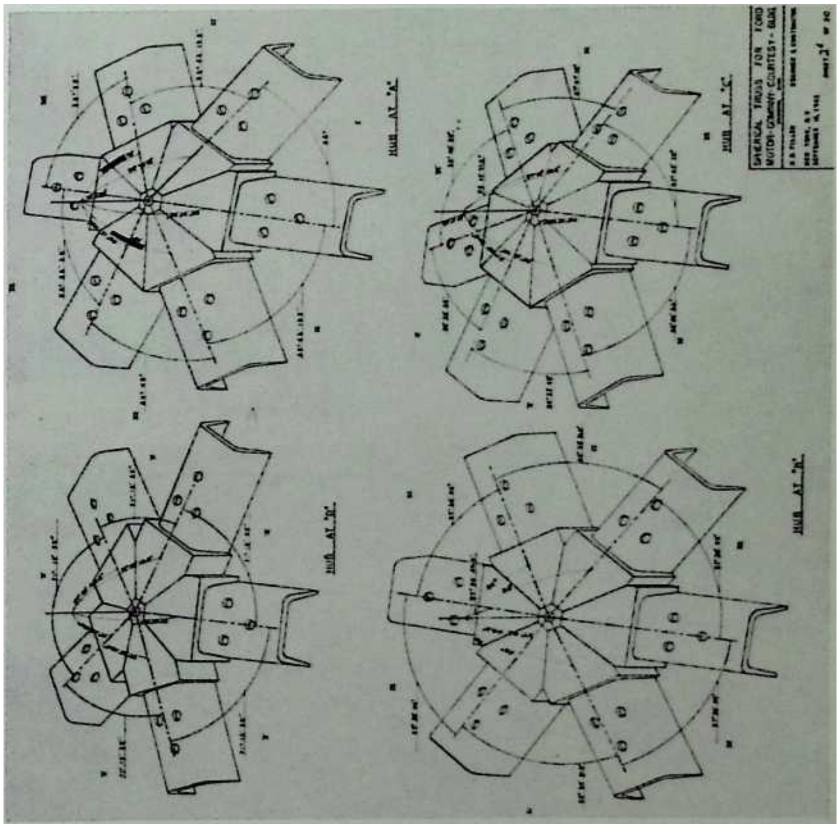
DATE ISSUED
GOVERNING SPECIFICATION
DATE LET
BID PRICE BY SUBS
CONTRACT AWARD - NAME & ADDRESS
CONTRACT DATE

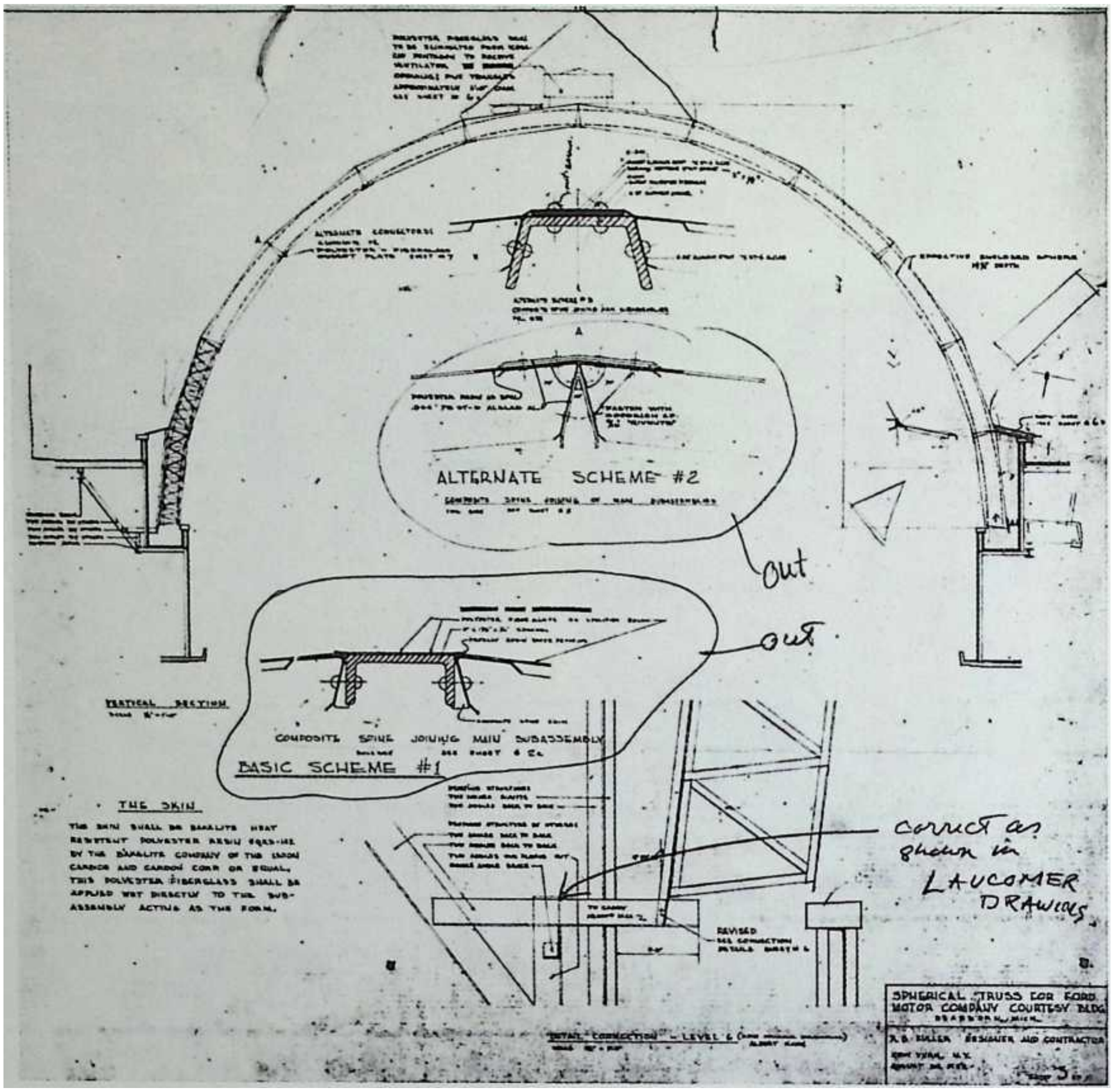


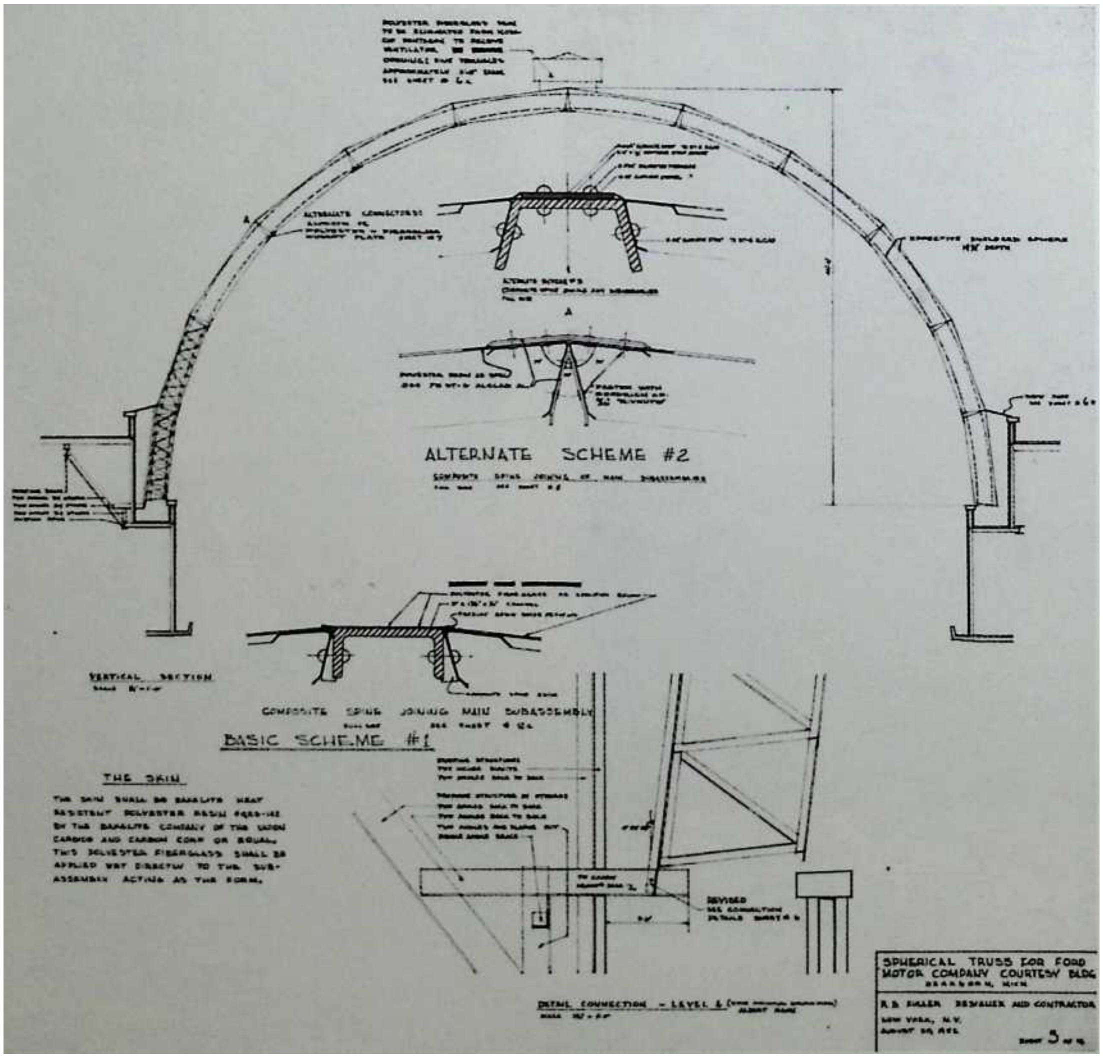

SECTION THROUGH MAIN TRUSS
SPINE JOINING MEMBER
SCHEME #1

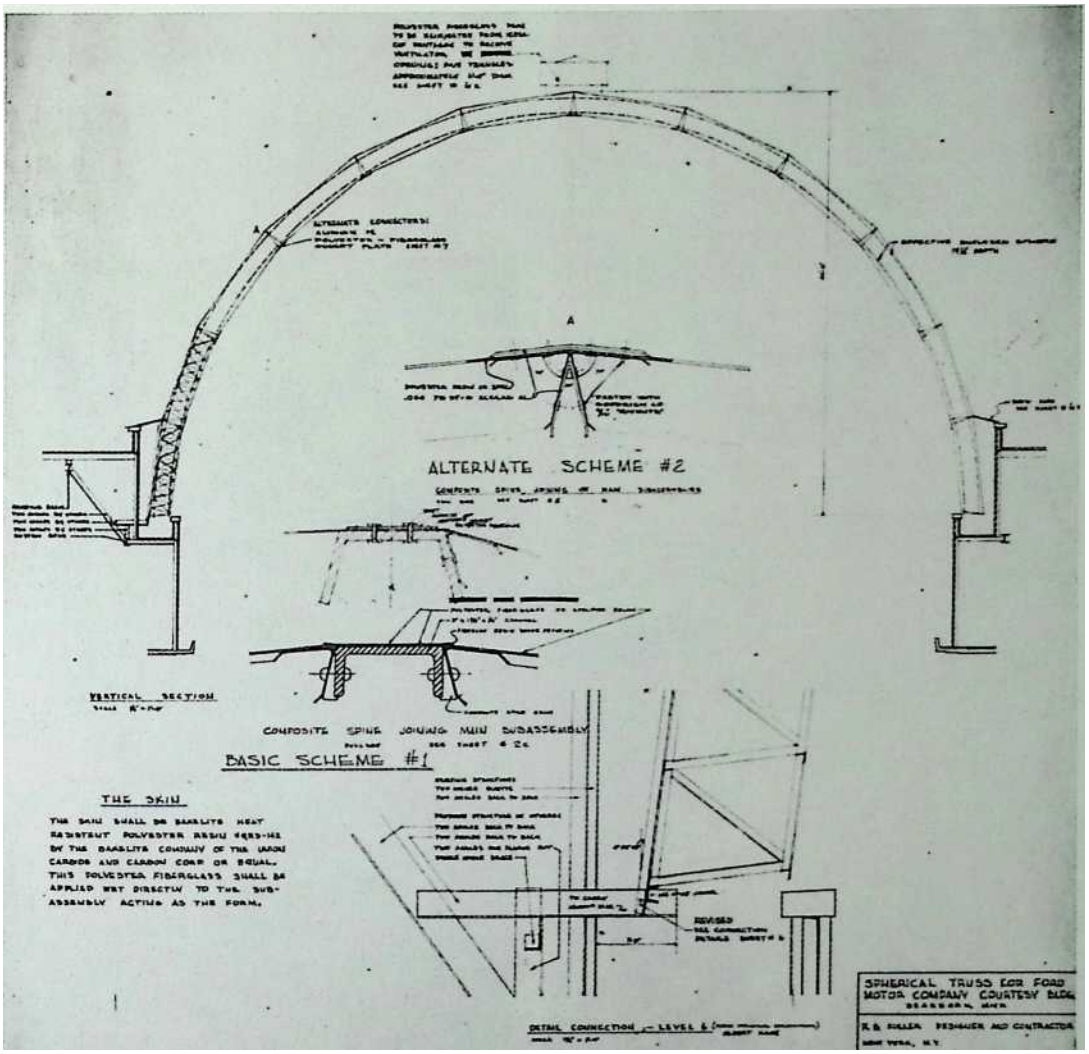

SPINE JOINING MEMBER
SCHEME #1
SECTION THROUGH MAIN SPINE
ALUM. SHIM
VERTICAL HUB — CAST ALUM.
BASIC SCHEME
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG.


SPINE JOINING MEMBER
SCHEME #1
SECTION THROUGH MAIN SPINE
ALUM. SHIM
VERTICAL HUB — CAST ALUM.


SPHERICAL TRUSS FOR FORD
MOTOR COMPANY COURTESY - BLDG


ALTERNATE SCHEME #2
Out
Out
COMPOSITE SPINE JOINING MAIN SUBASSEMBLY
BASIC SCHEME #1
THE SKIN
correct as shown in LAUCOMER DRAWINGS
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG


ALTERNATE SCHEME #2
VERTICAL SECTION
COMPOSITE SPINE JOINING MAIN SUBASSEMBLY
BASIC SCHEME #1
THE SKIN
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG


ALTERNATE SCHEME #2
VERTICAL SECTION
COMPOSITE SPINE JOINING MAIN SUBASSEMBLY
BASIC SCHEME #1
THE SKIN
REVISED
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG.
NEW YORK, N.Y.

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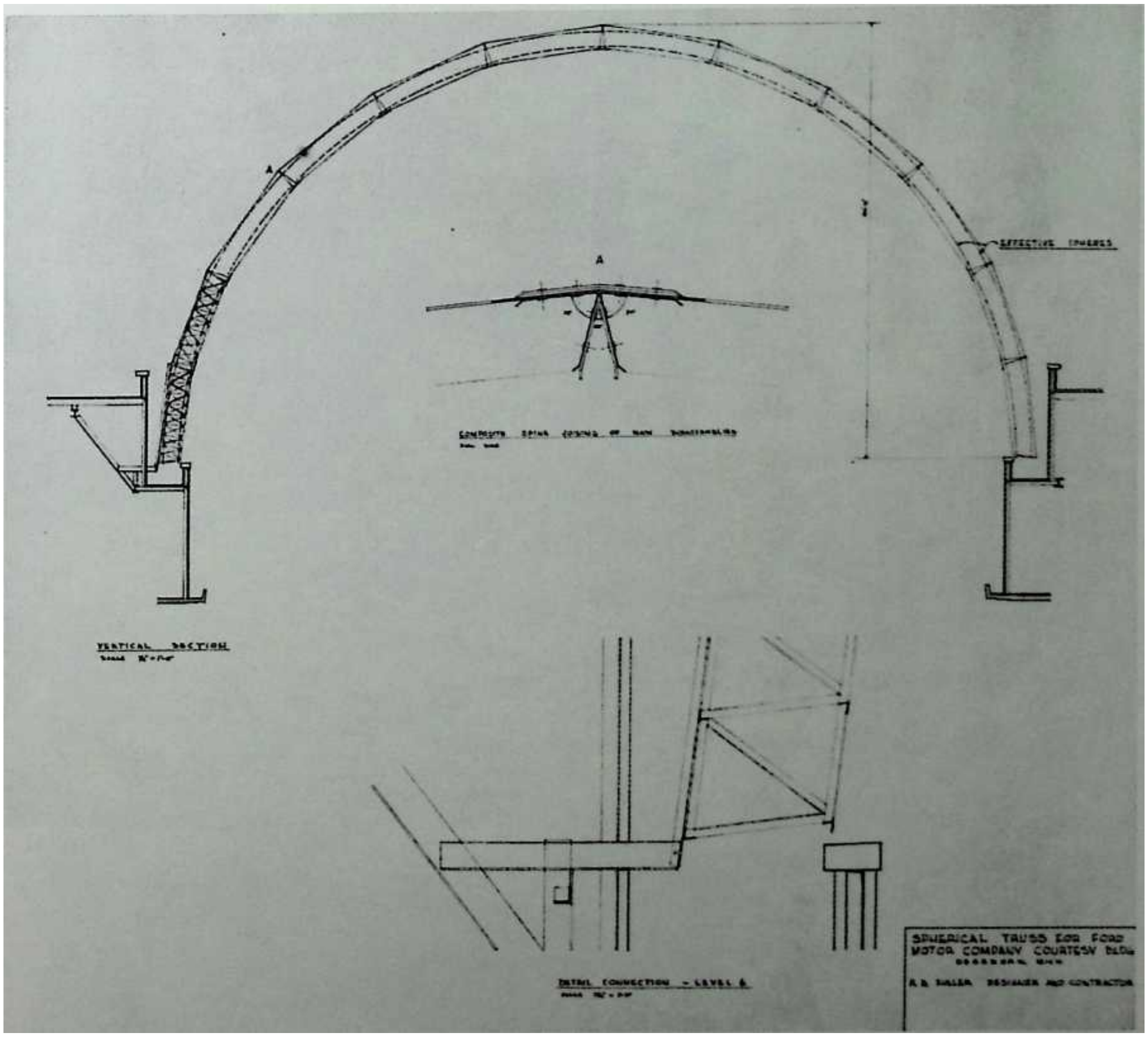
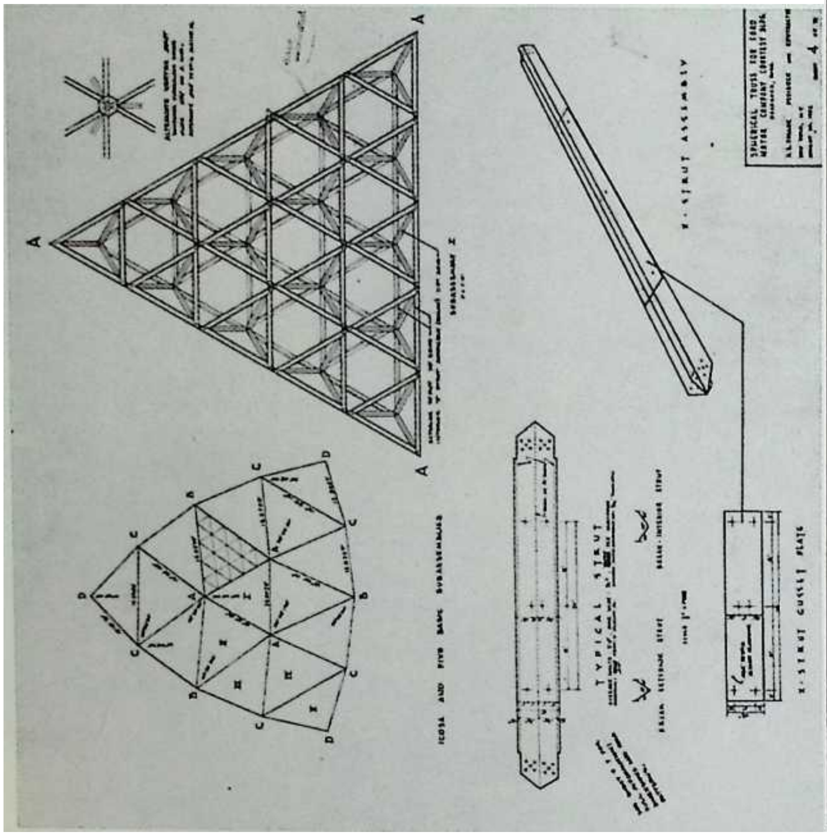
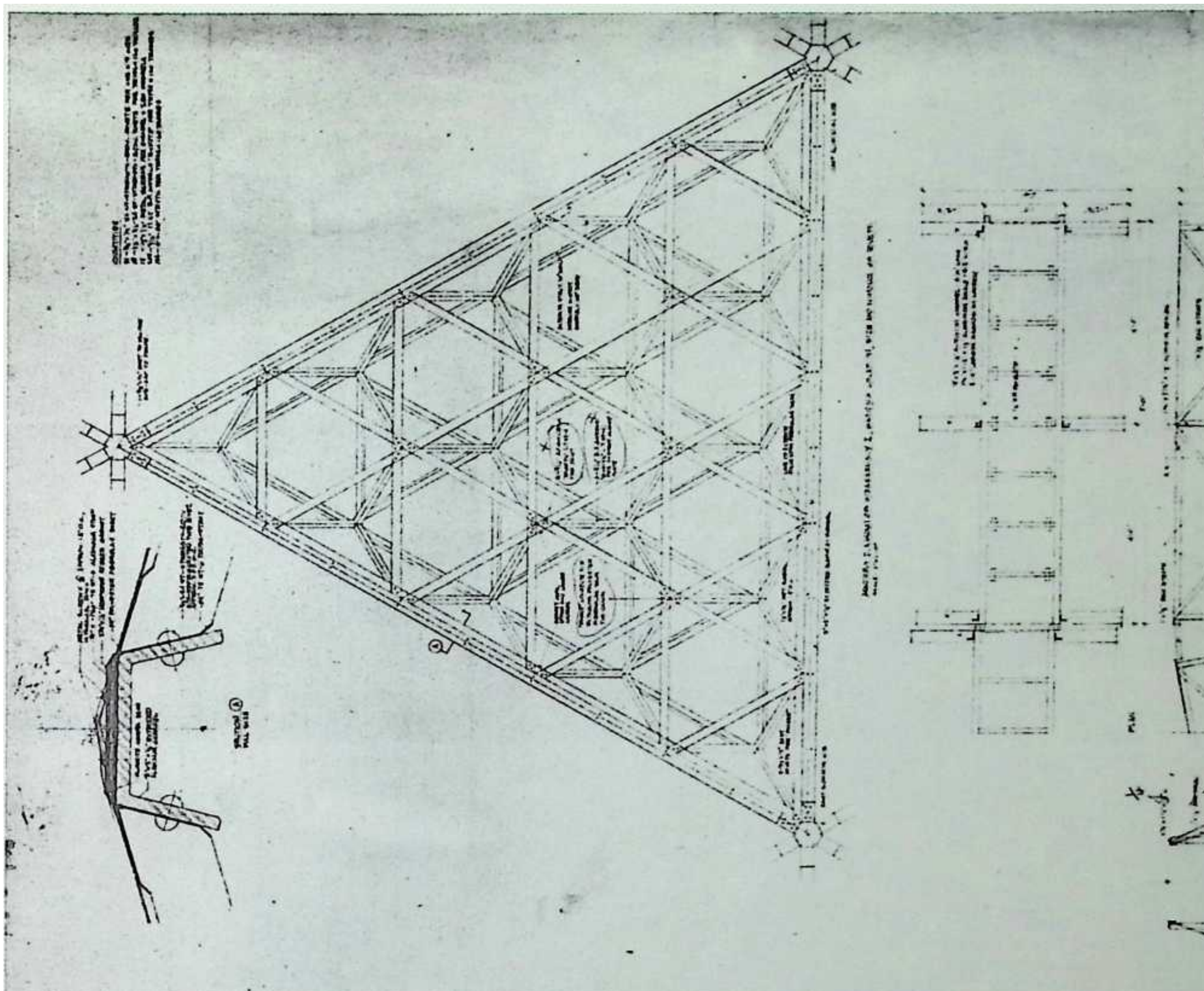
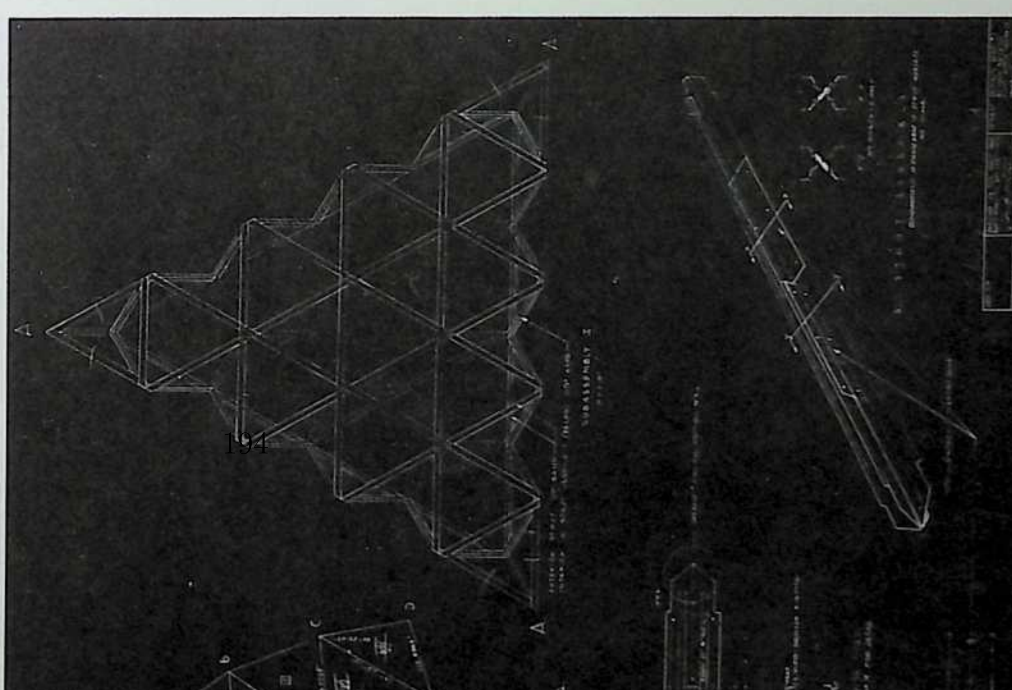
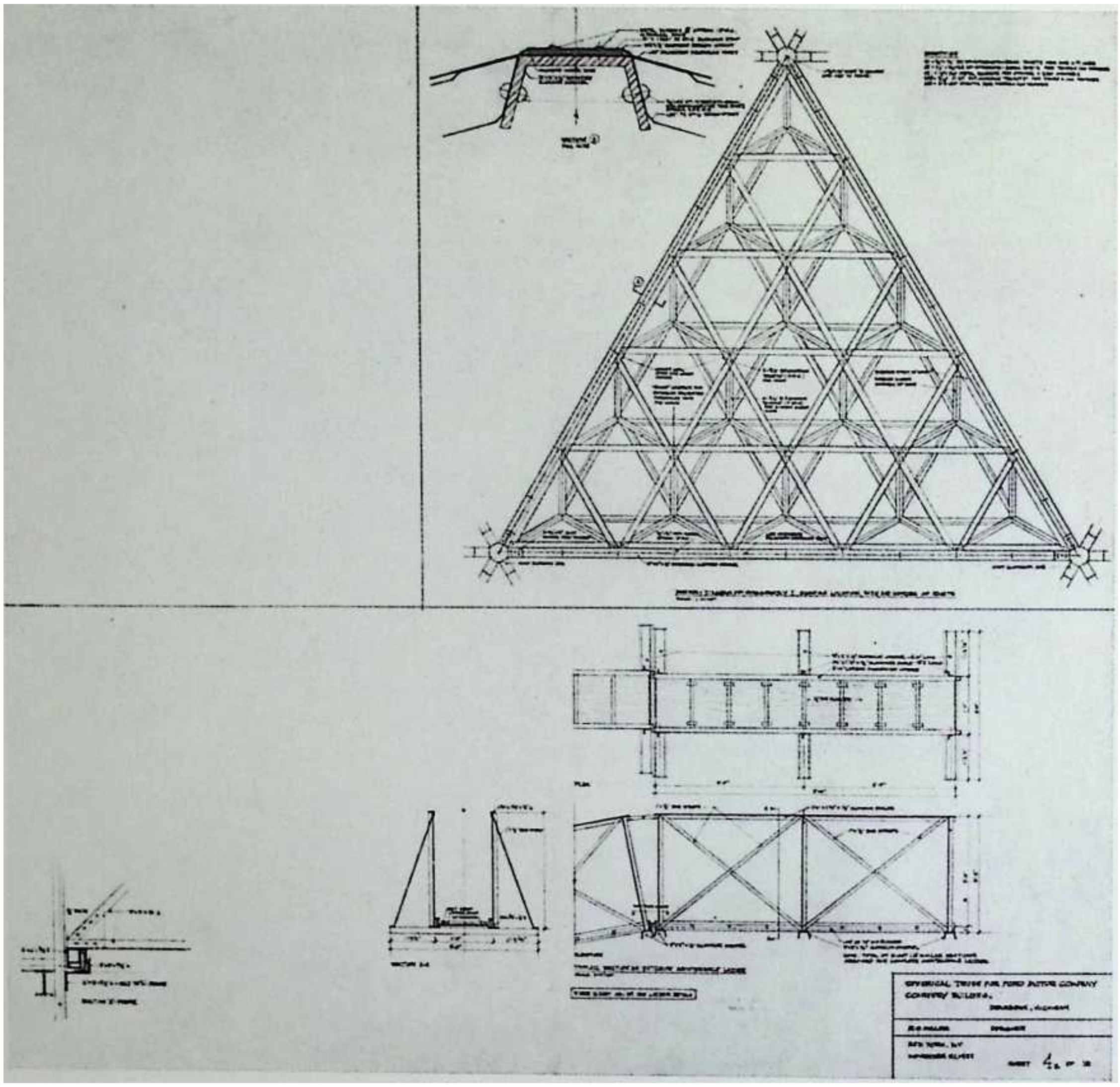
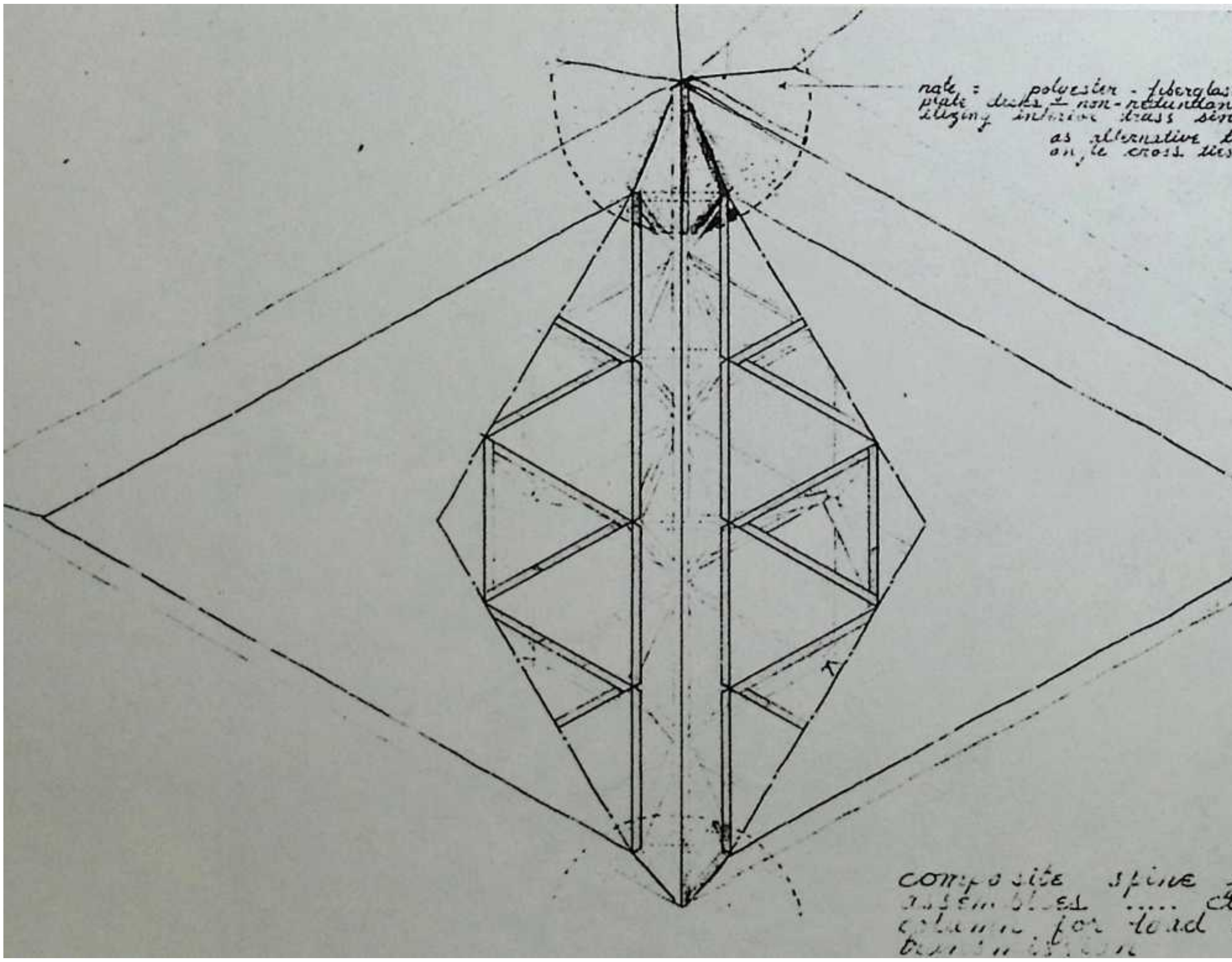

A
EFFECTIVE SPHERES
VERTICAL SECTION
DETAIL CONNECTION - LEVEL 6
SPHERICAL TRUSS FOR FORD
MOTOR COMPANY COURTESY BLDG
DESIGNER AND CONTRACTOR



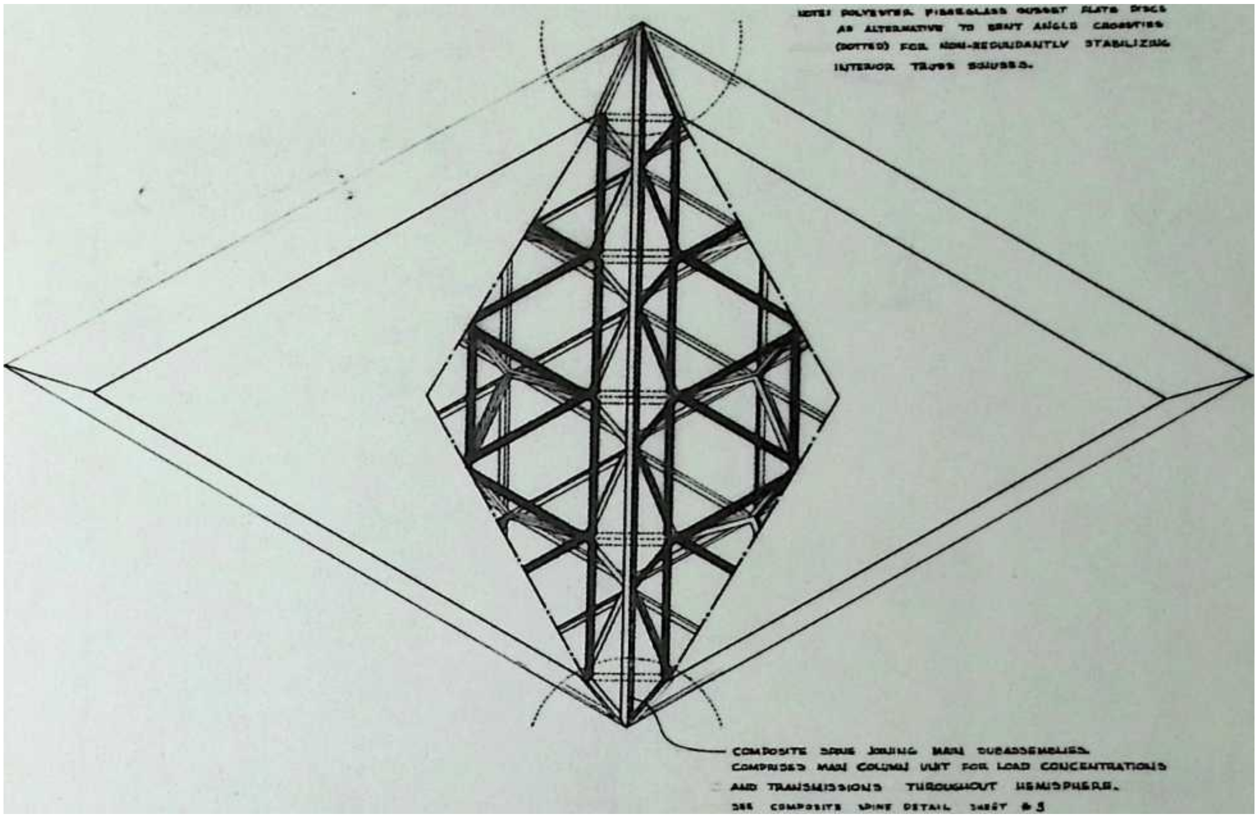




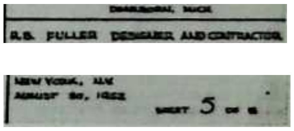


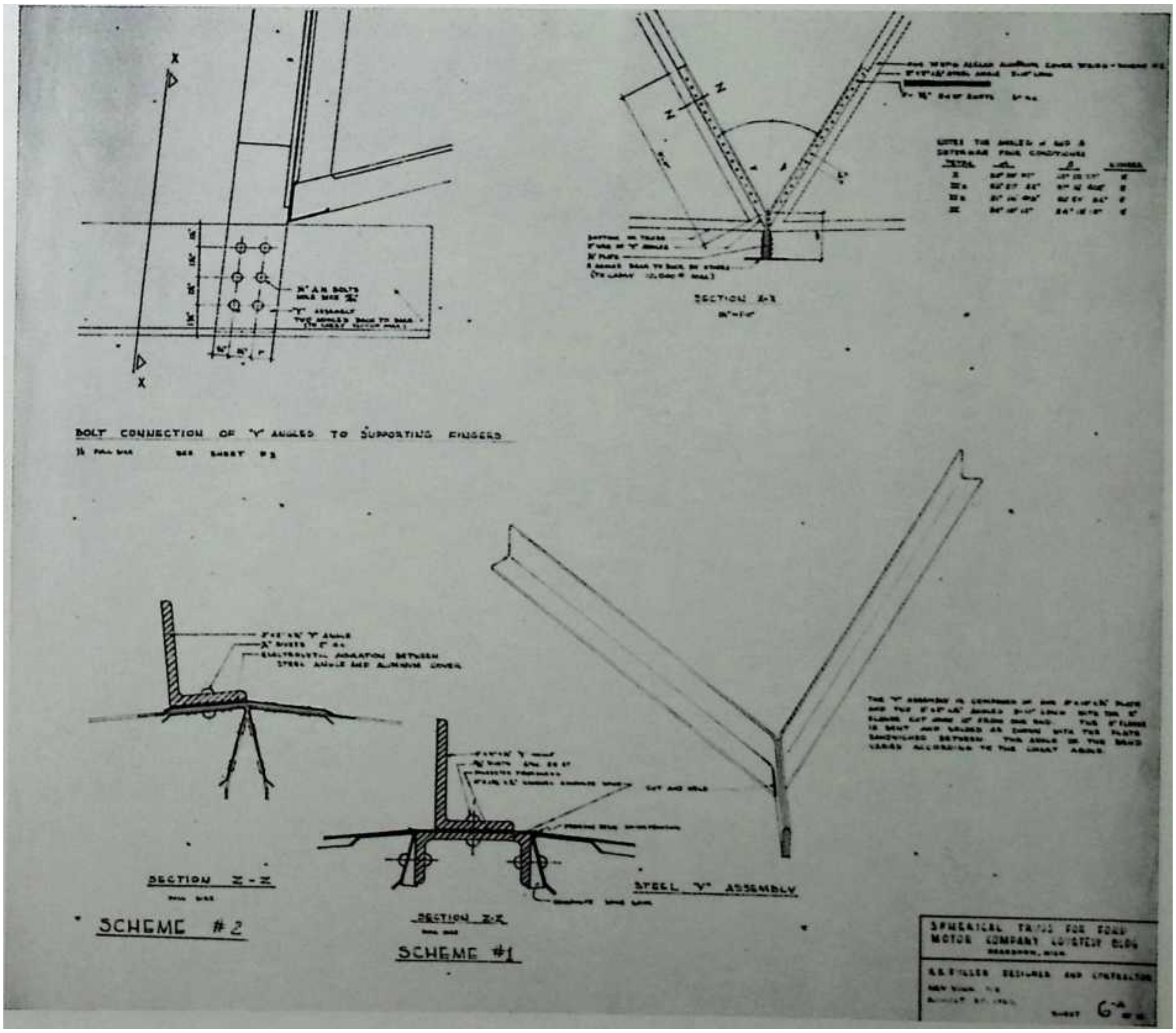


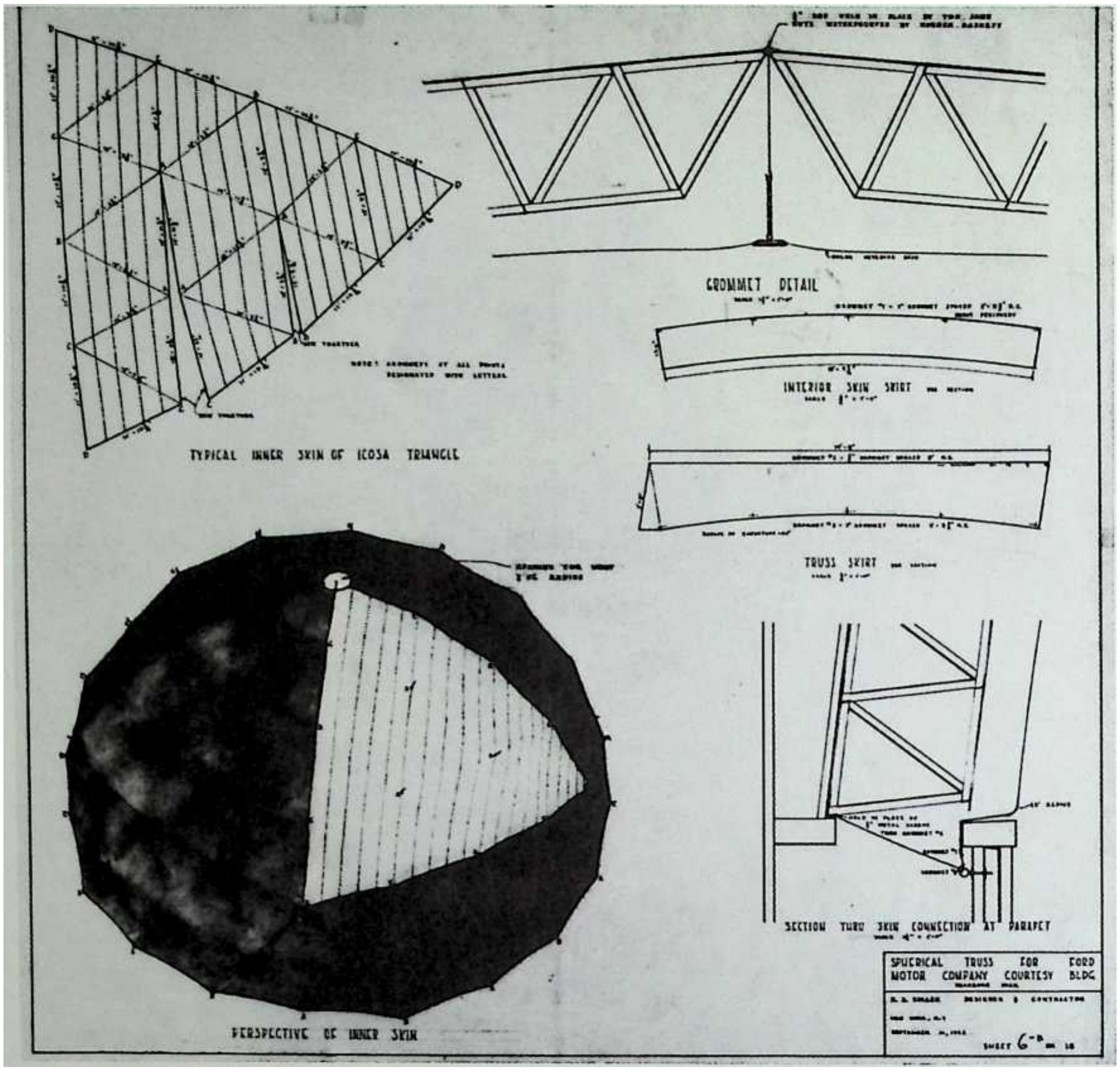
R. BUCKMIH5TER CULLLR dssignkr and contractor



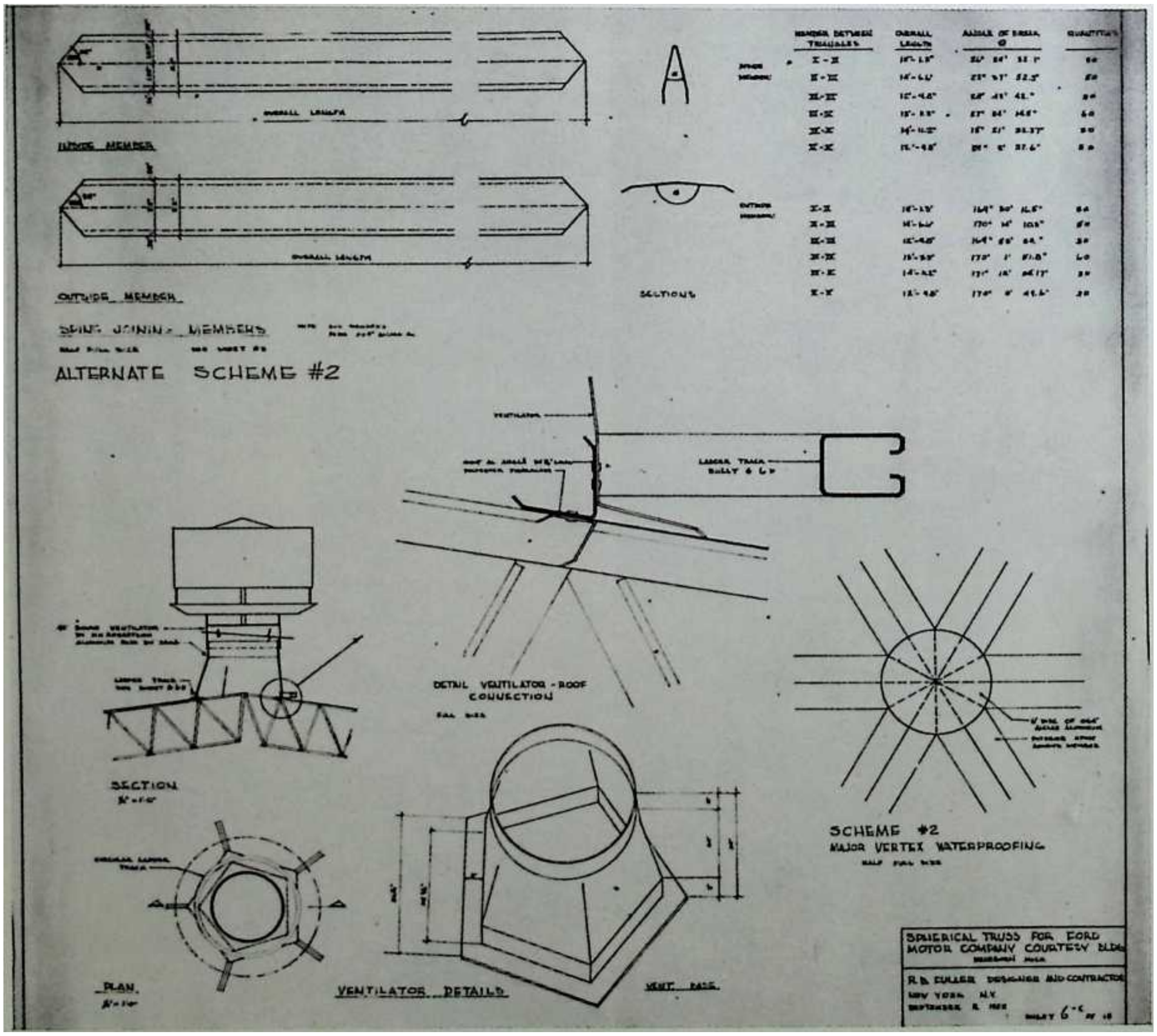
SPUiRlCAL TRU55 EQS CORP MOTOR CQM5AUV COURTS J*/ BUXk




BOLT CONNECTION OF "Y" ANGLES TO SUPPORTING FINGERS
SECTION X-X
SECTION Z-Z
SCHEME #2
SECTION Z-Z
SCHEME #1
STEEL "Y" ASSEMBLY



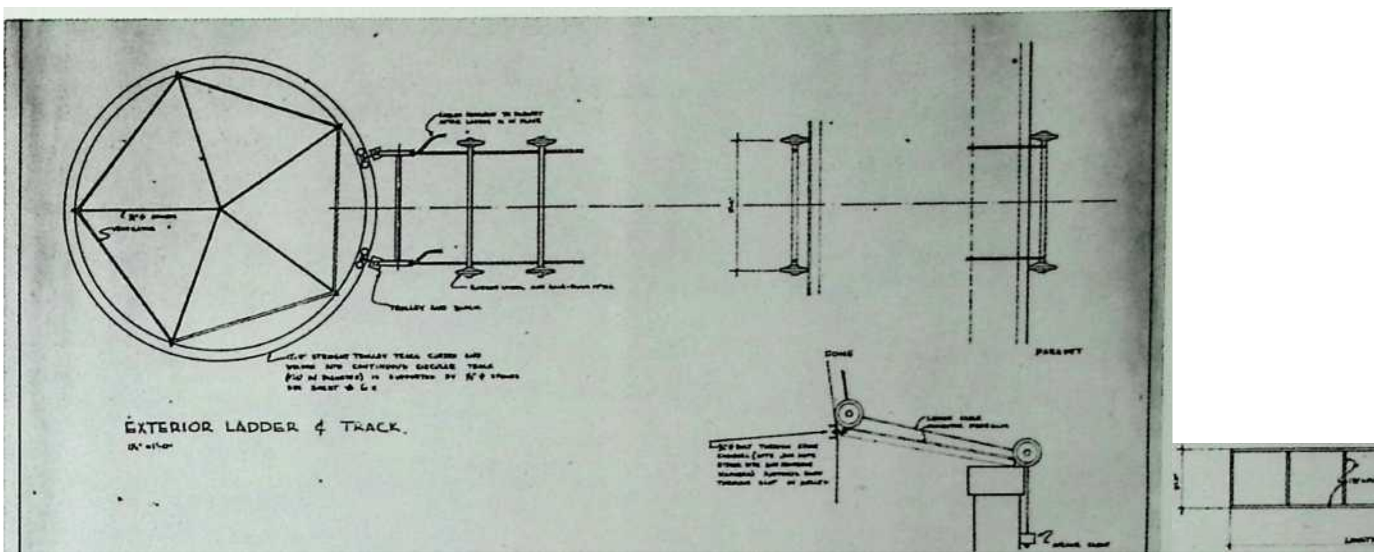
TYPICAL INNER SKIN OF ICOSA TRIANGLE
GROMMET DETAIL
INTERIOR SKIN SKIRT
TRUSS SKIRT
PERSPECTIVE OF INNER SKIN
SECTION THRU SKIN CONNECTION AT PARAPET
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG
SHEET 6-B

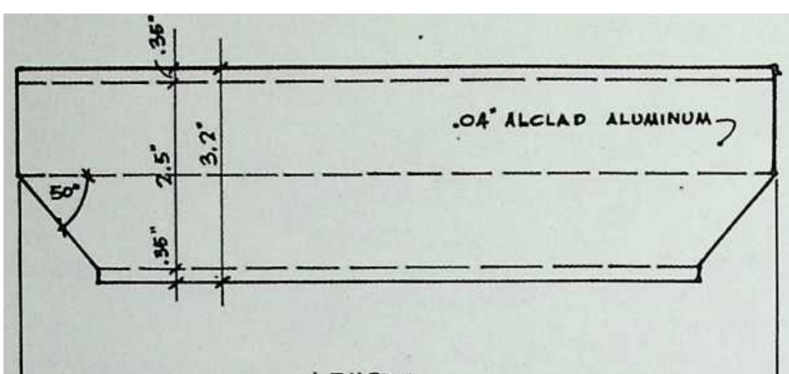


stcriou Tuaoum sxicu saso AMD PARAPET LADCGG. GOJMGCTfOJ

SklOW SMEDS

SPHERICAL. TRUSS PCft PCGO MOTOR. CCHPAMV CouQTES* BUS.


EXTERIOR LADDER & TRACK.
DOME
PARAPET


.36"
.04" ALCLAD ALUMINUM
2.5"
3.2"
50°
.36"
LENGTH

6U6A5SEMSLY CON.NEC" MEM BEE (BY TBIANGLEG)	r O B 6 LENGTH QUANTITY
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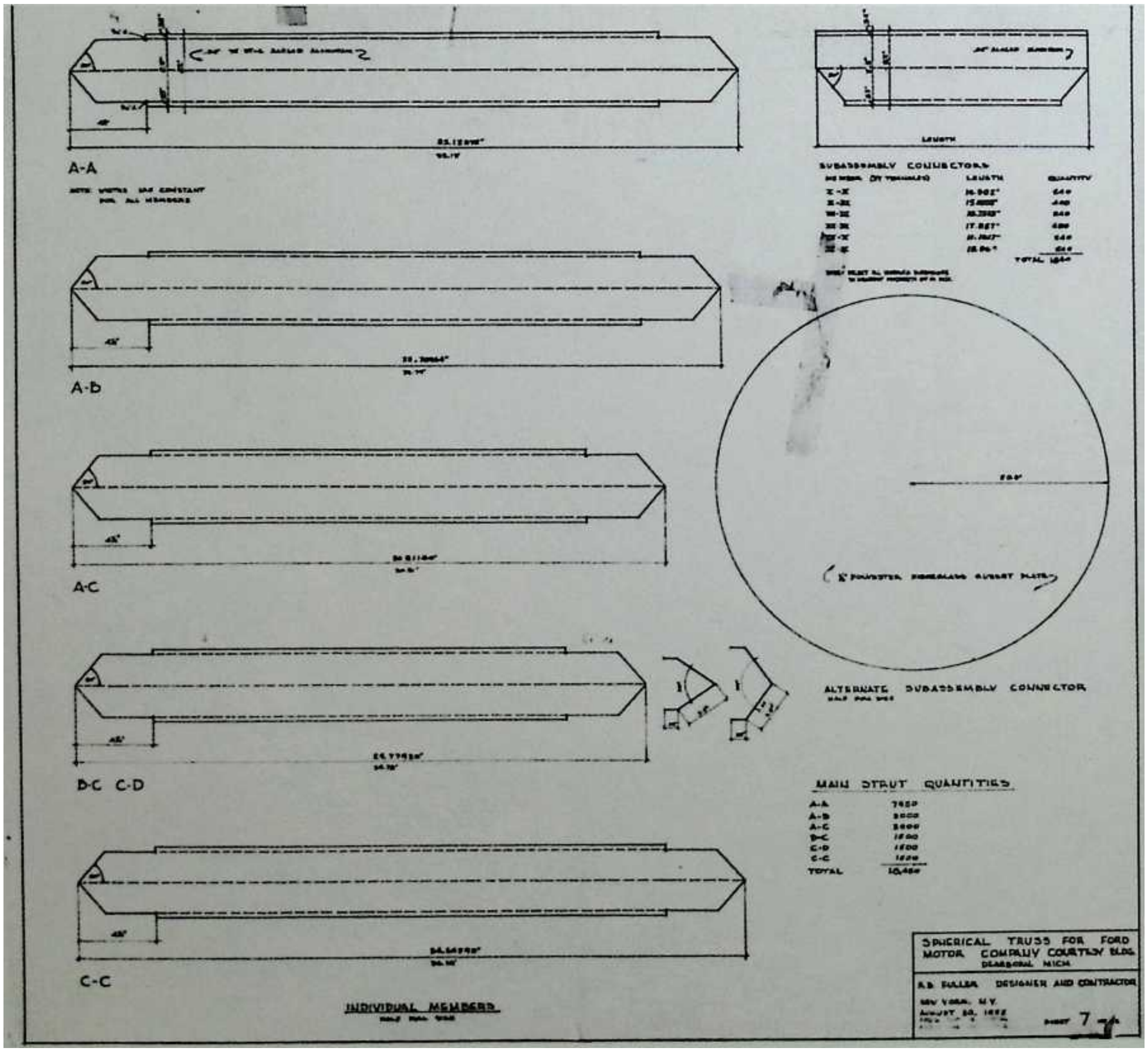
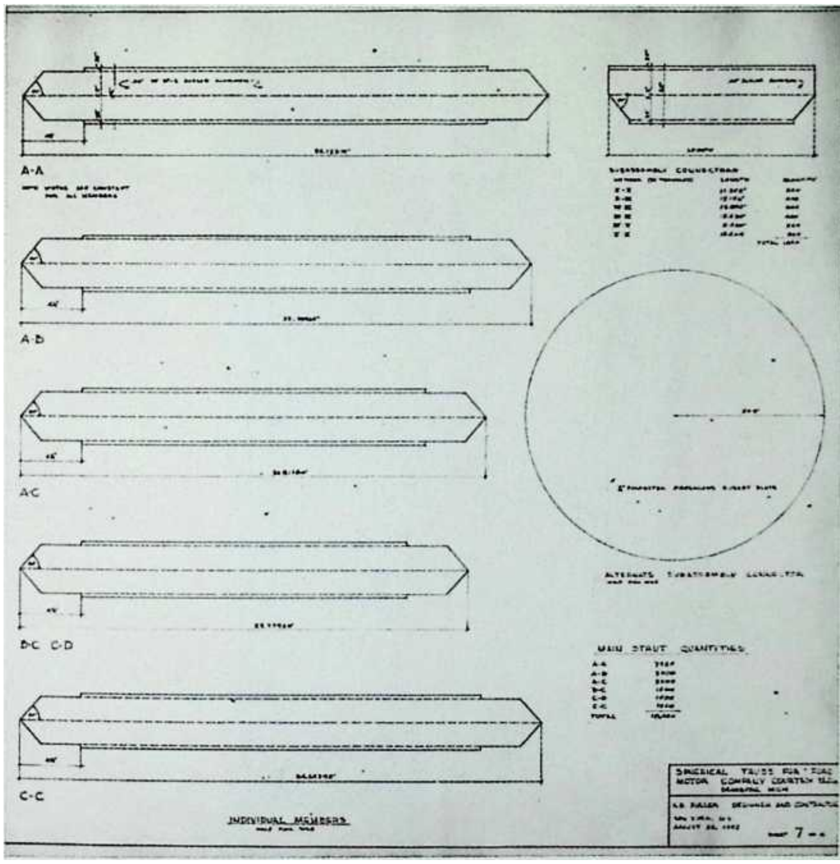
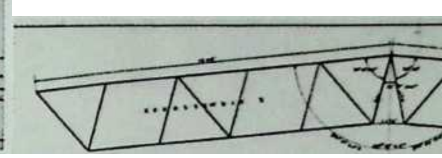
I -H n. -m ra-n nr-H If-1 I- T	IB. OSes- 400
	18.7^10' -240
	IT. q 67 ' 4- *8>O*
	II. Ifc7l " -240
	18. qfc - 240
	TOTAL 10 40

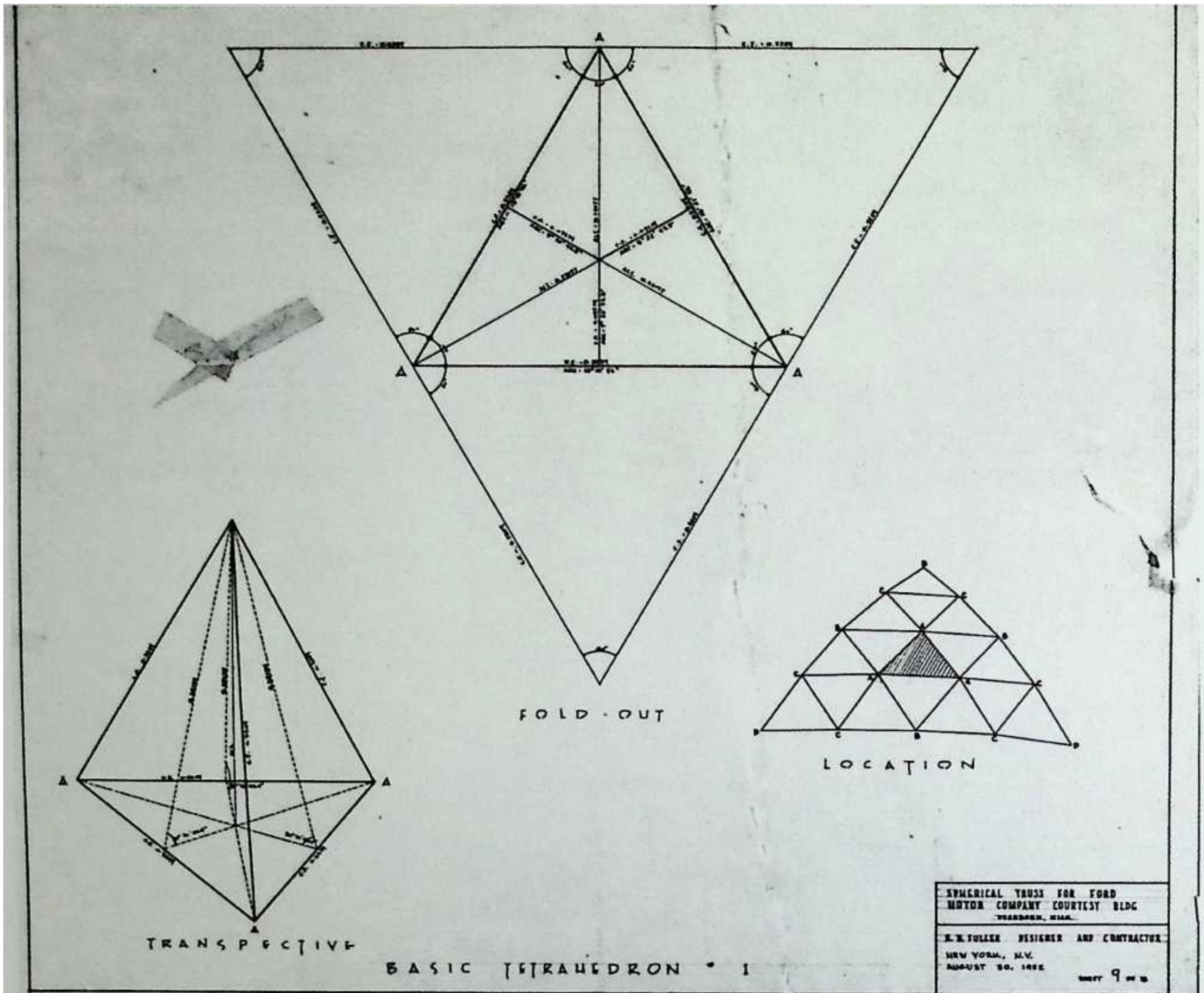
'.SPHECICAL TRUSS FOR FOOD MOTOG COAAPAMY
COURTESY BLDG DEABBOBN, UICM.

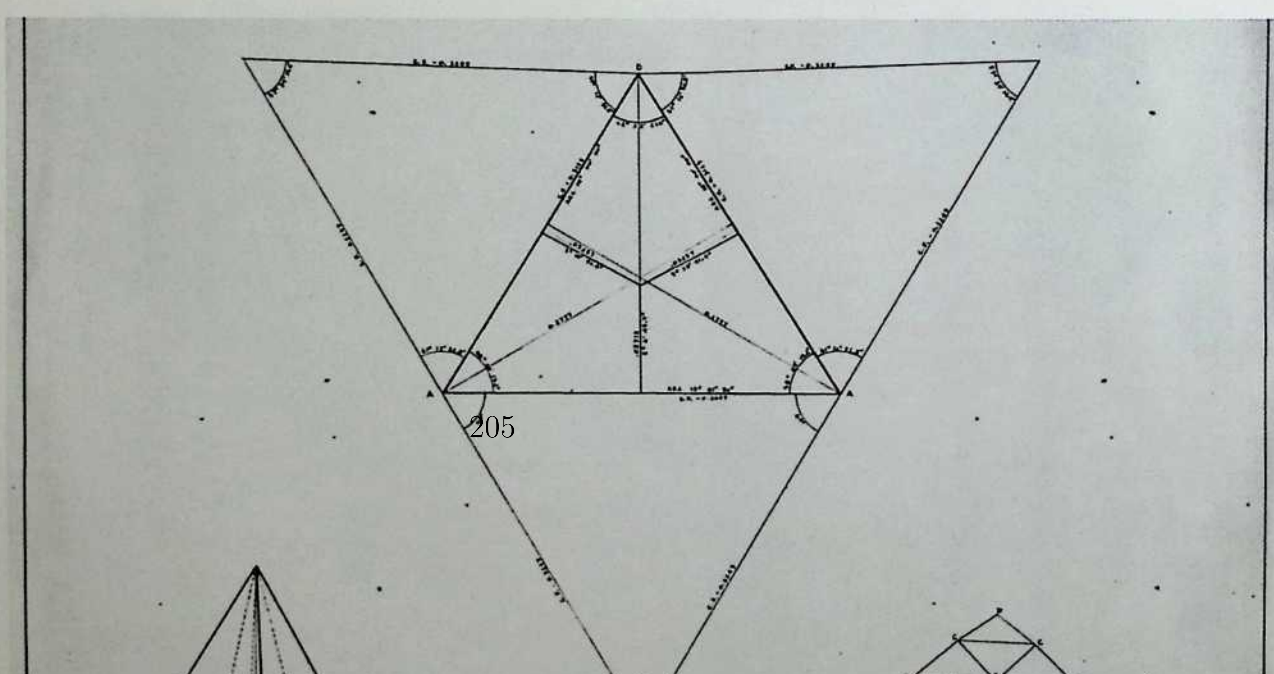
V.K FULLER	DESIGNED AND CONTDACTOE
HEW YO BK, N.Y	
SEPT. 18 , 1962	*t2EpeS3A/C£* sueer ~*J* OP *ta*

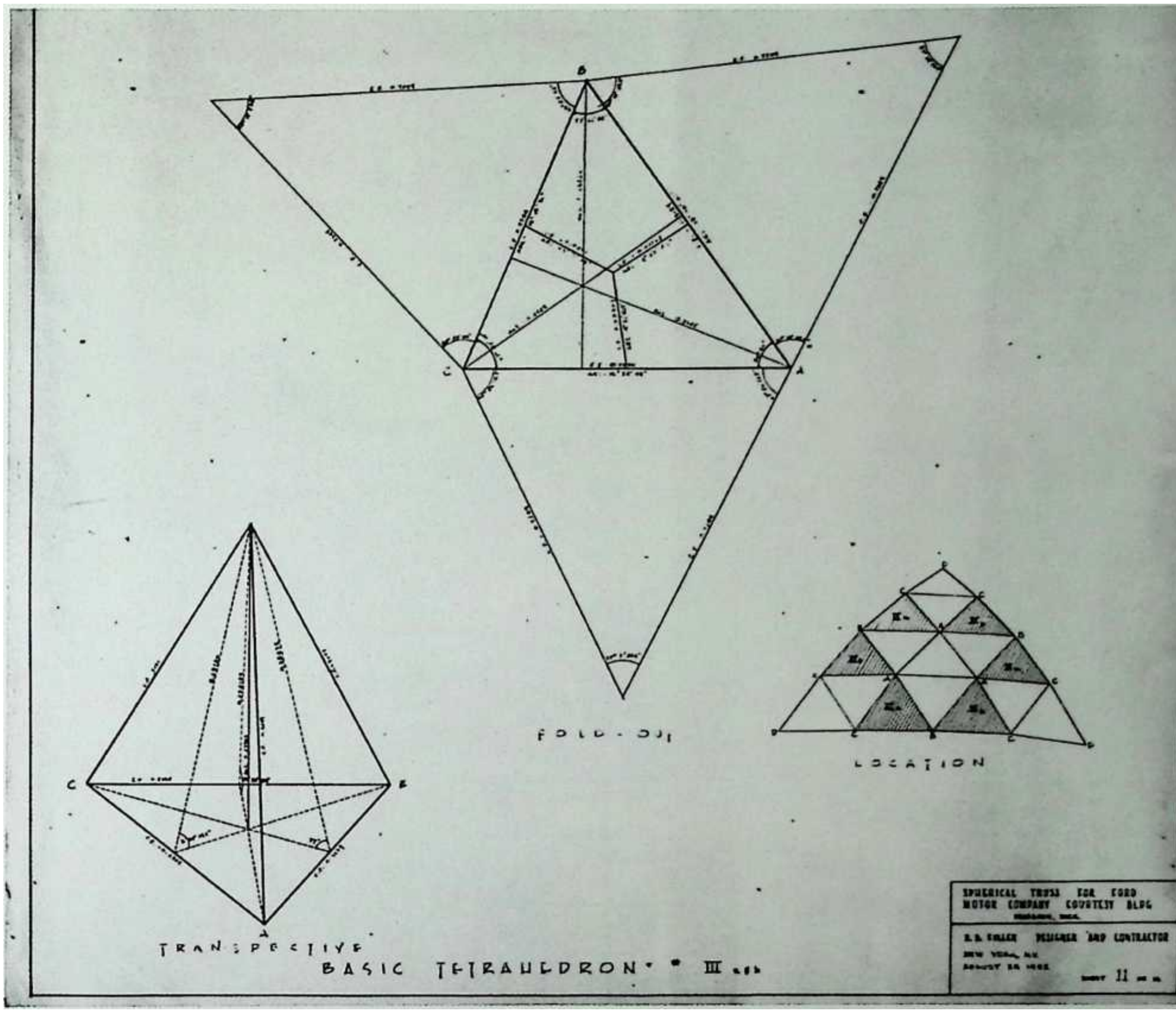

A-A
A-B
A-C
B-C C-D
C-C
INDIVIDUAL MEMBERS
LENGTH
SUBASSEMBLY CONNECTORS
LENGTH
QUANTITY
TOTAL
ALTERNATE SUBASSEMBLY CONNECTOR
MAIN STRUT QUANTITIES
A-A
A-B
A-C
B-C
C-D
C-C
TOTAL
SPHERICAL TRUSS FOR FORD MOTOR COMPANY COURTESY BLDG.
DEARBORN, MICH.
R.B. FULLER DESIGNER AND CONTRACTOR
NEW YORK, N.Y.
SHEET 7

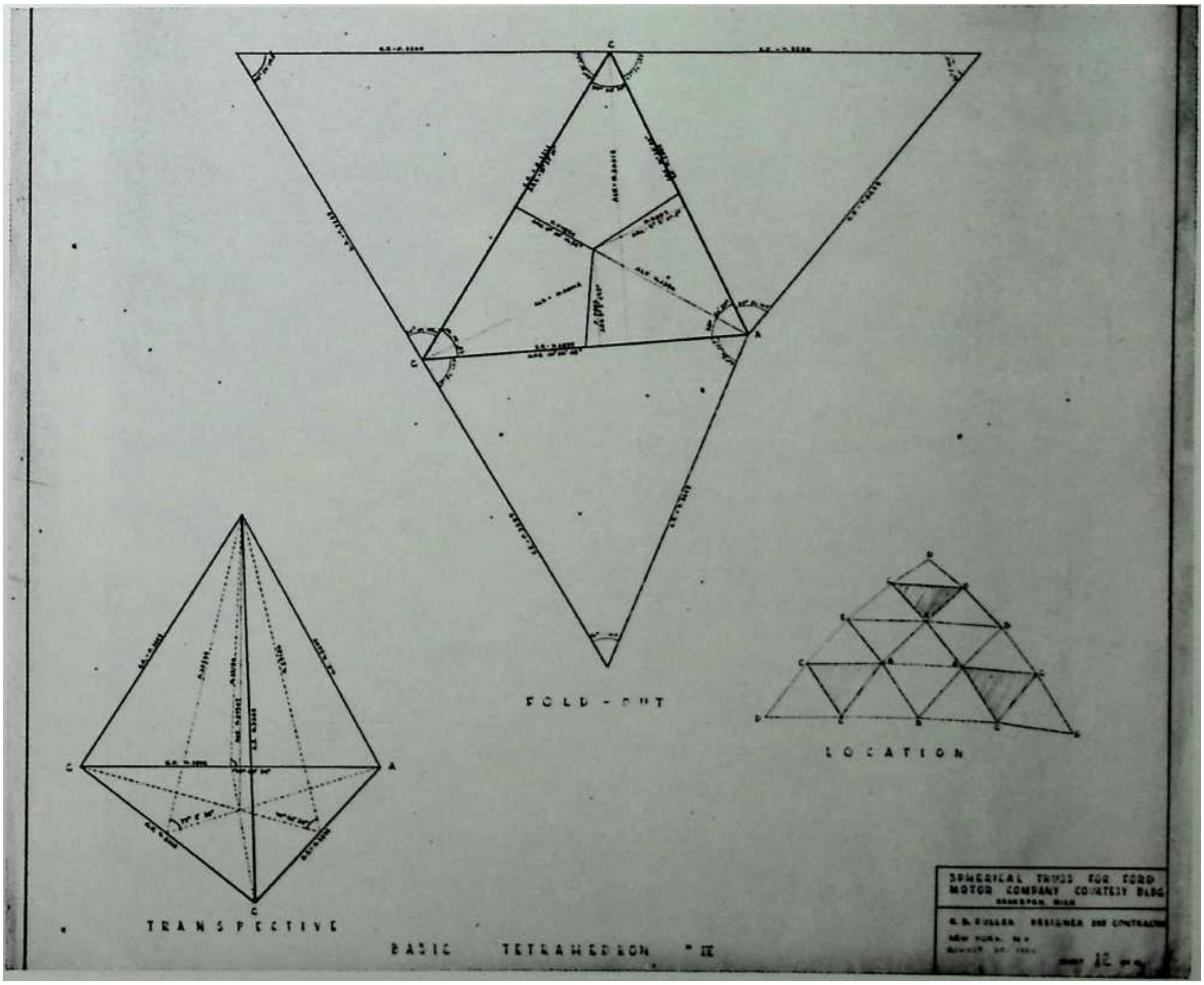

A-A
A-B
A-C
B-C C-D
C-C
MAIN STRUT QUANTITIES
INDIVIDUAL MEMBERS

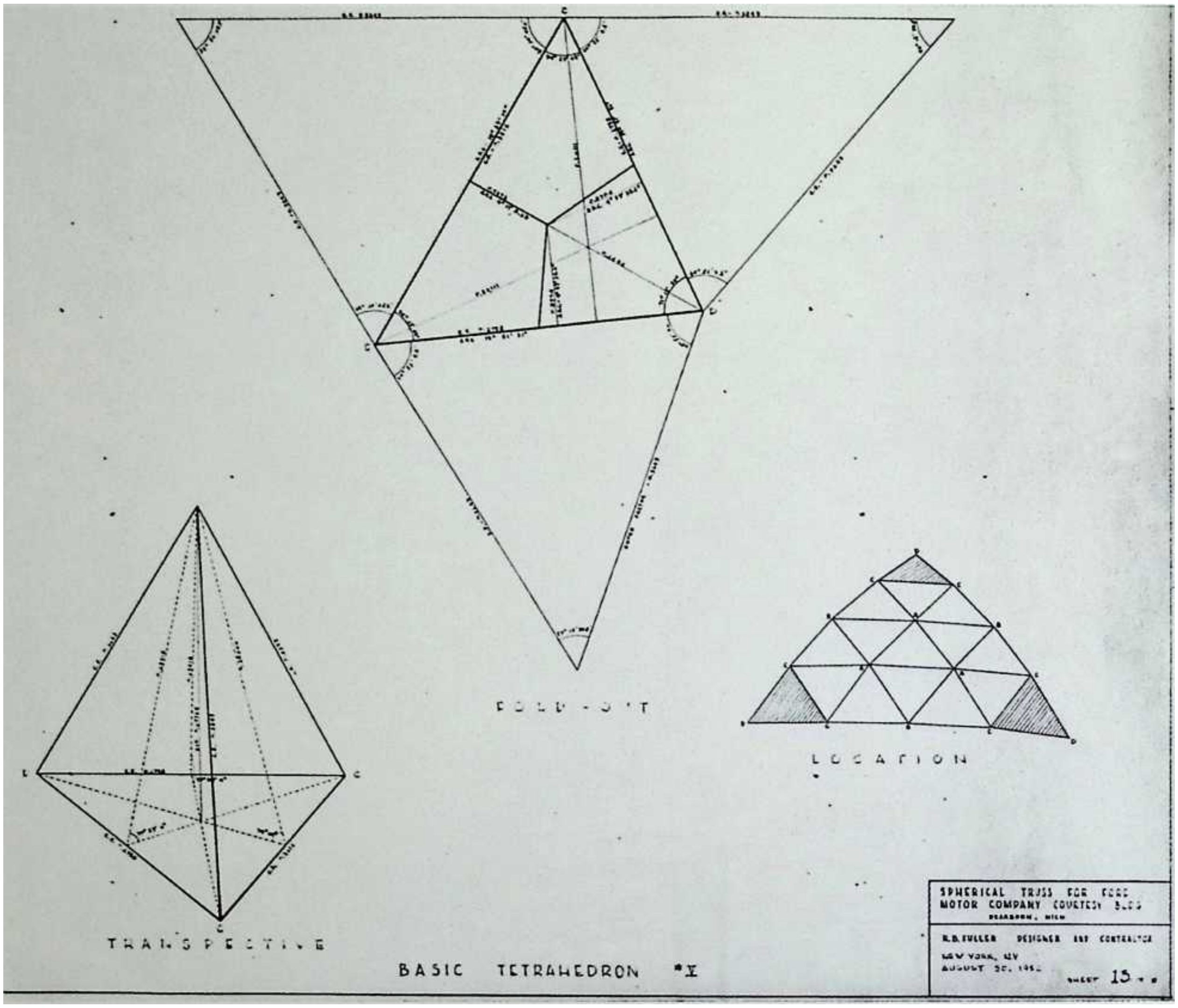


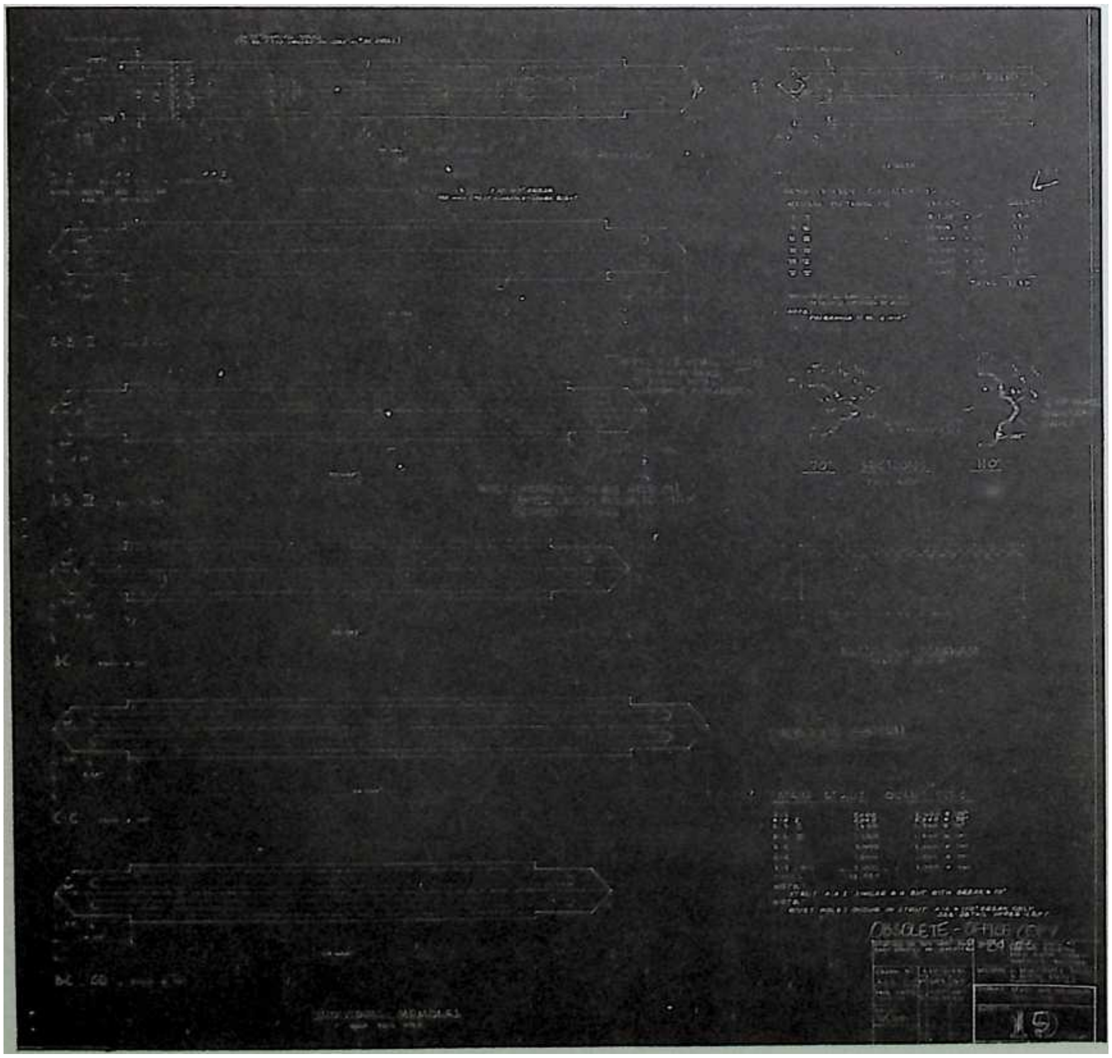

FOLD-OUT
LOCATION
TRANSPECTIVE
BASIC TETRAHEDRON • 1
SPHERICAL TRUSS FOR FORD
MOTOR COMPANY COURTESY BLDG
NEW YORK, N.Y.
SHEET 9




B
C
A
FOLD-OUT
LOCATION
C
A
TRANSPECTIVE
BASIC TETRAHEDRON III
SPHERICAL TRUSS FOR FORD
MOTOR COMPANY COURTESY BLDG
DESIGNER AND CONTRACTOR
NEW YORK, N.Y.
11


FOLD-OUT
LOCATION
TRANSPECTIVE
BASIC TETRAHEDRON
SPHERICAL TRUSS FOR FORD
MOTOR COMPANY COURTESY BLDG
NEW YORK, N.Y.


TRANSPECTIVE
LOCATION
BASIC TETRAHEDRON
SPHERICAL TRUSS FOR
MOTOR COMPANY
R.B. FULLER
NEW YORK,



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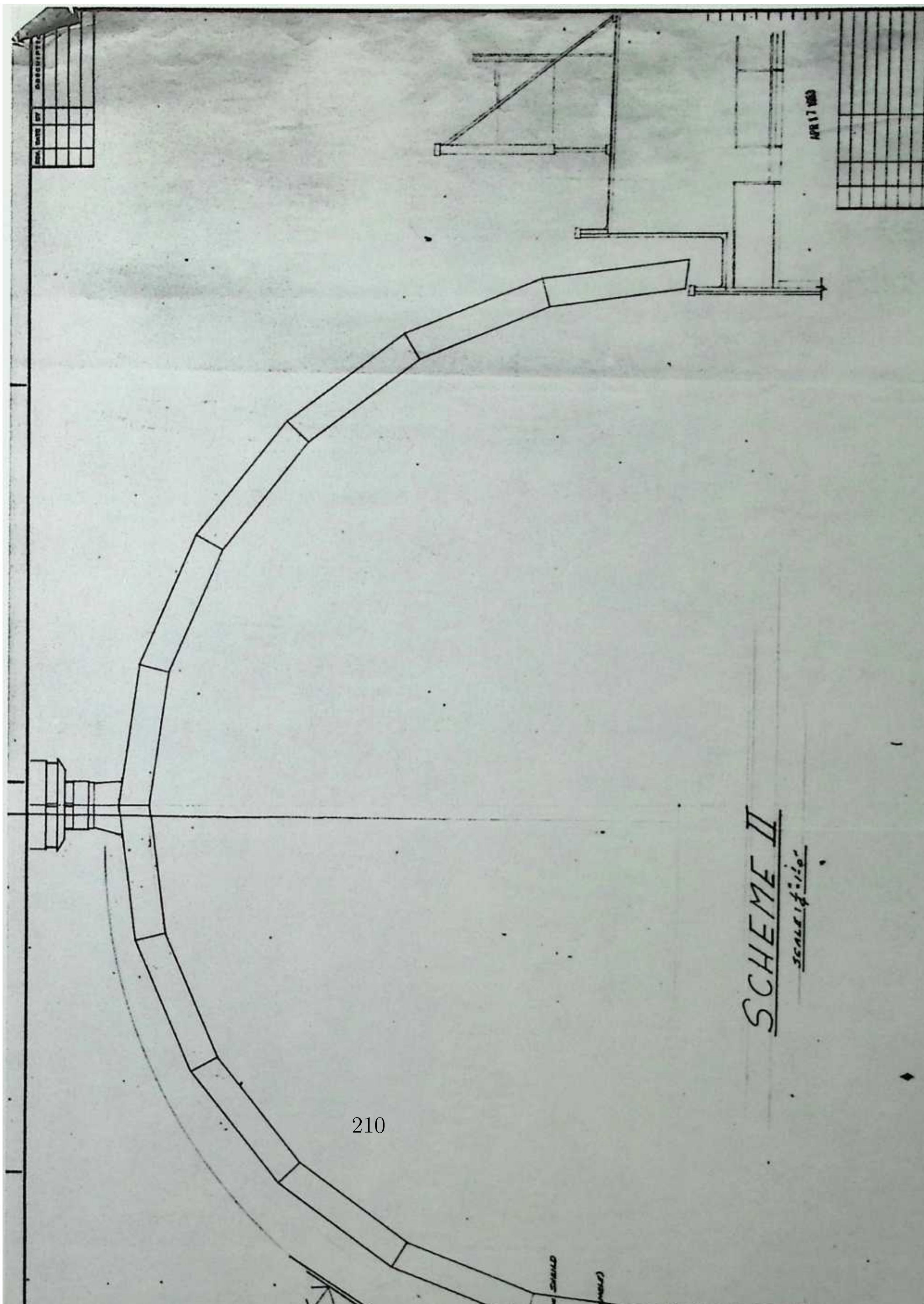
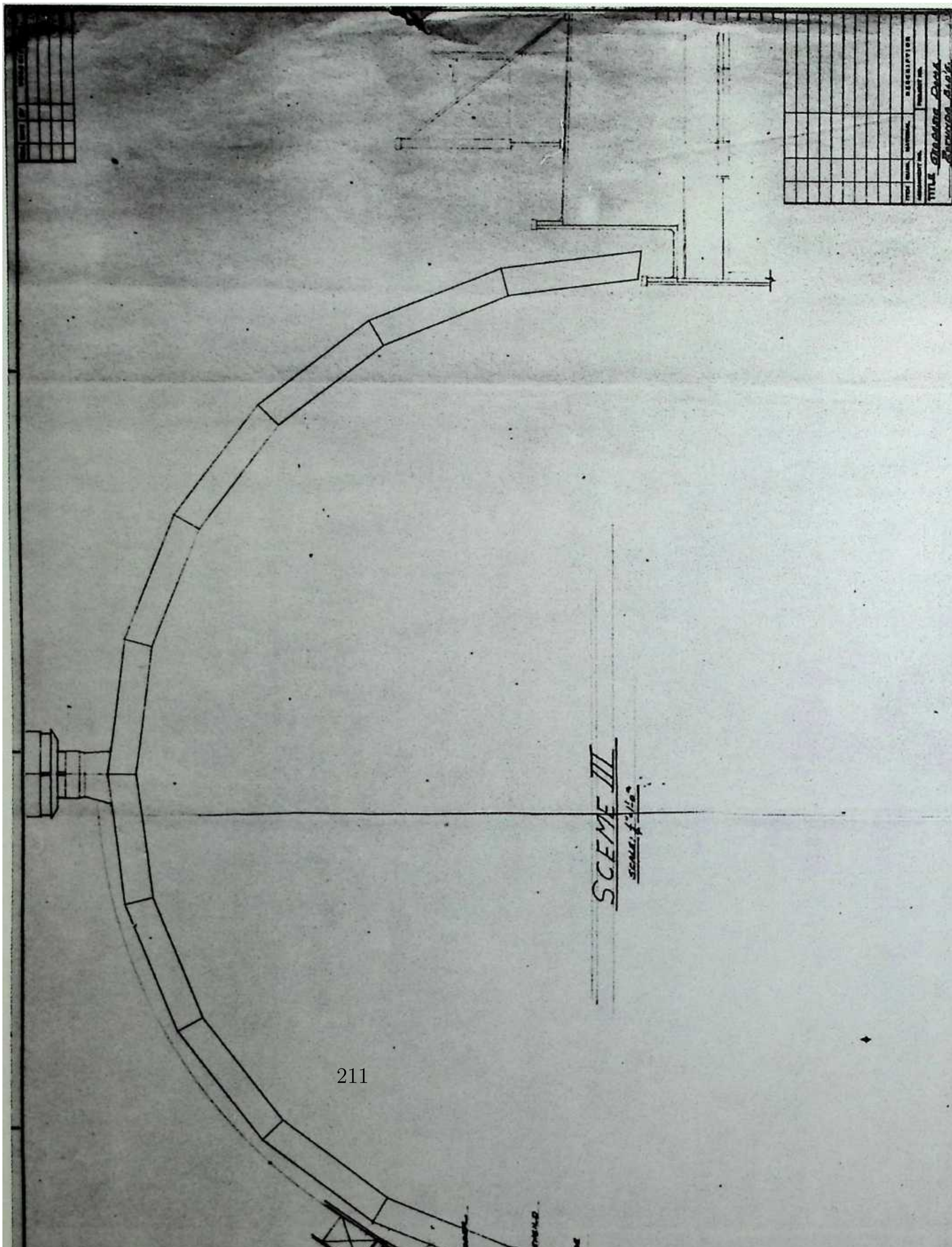
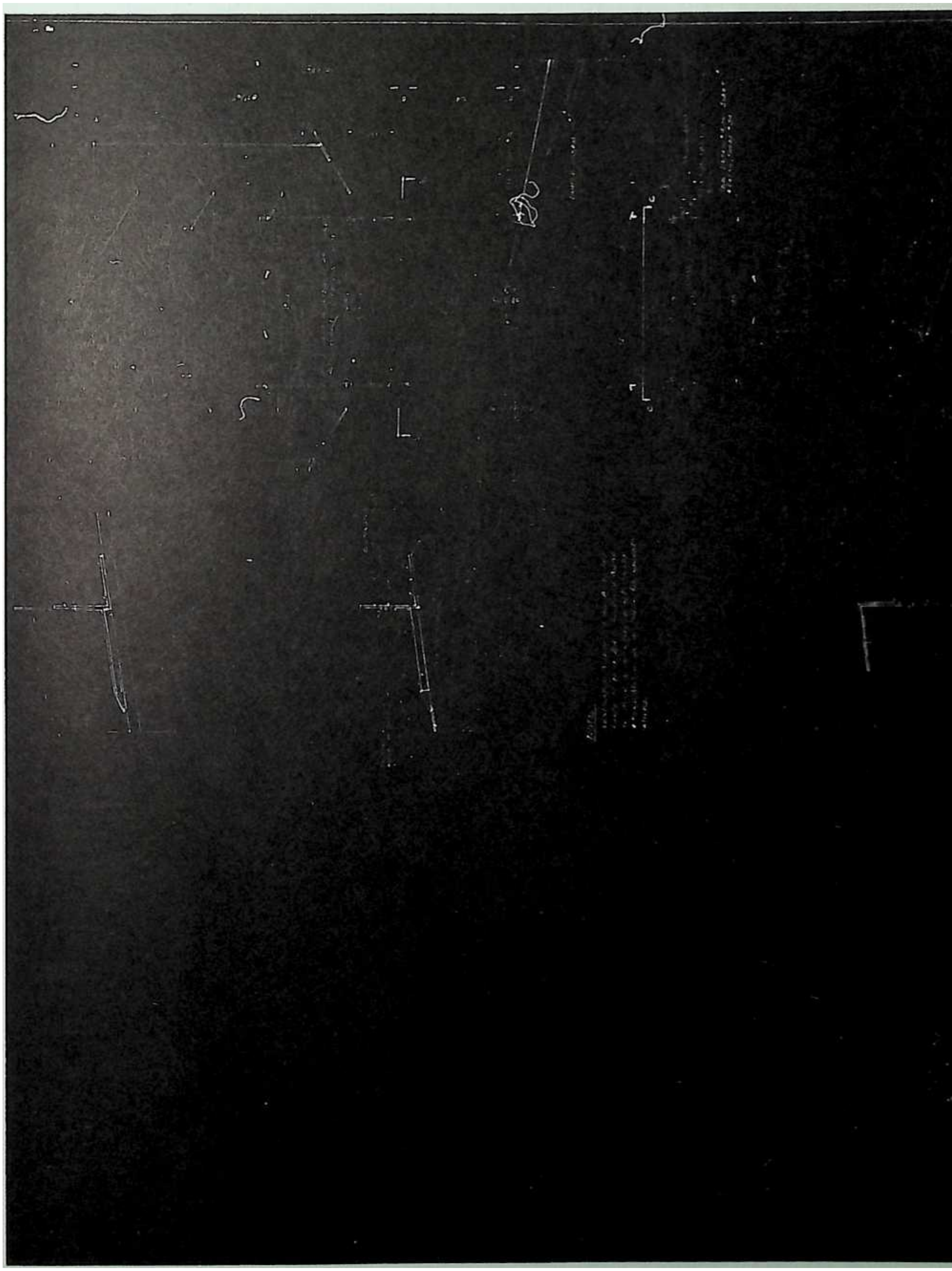
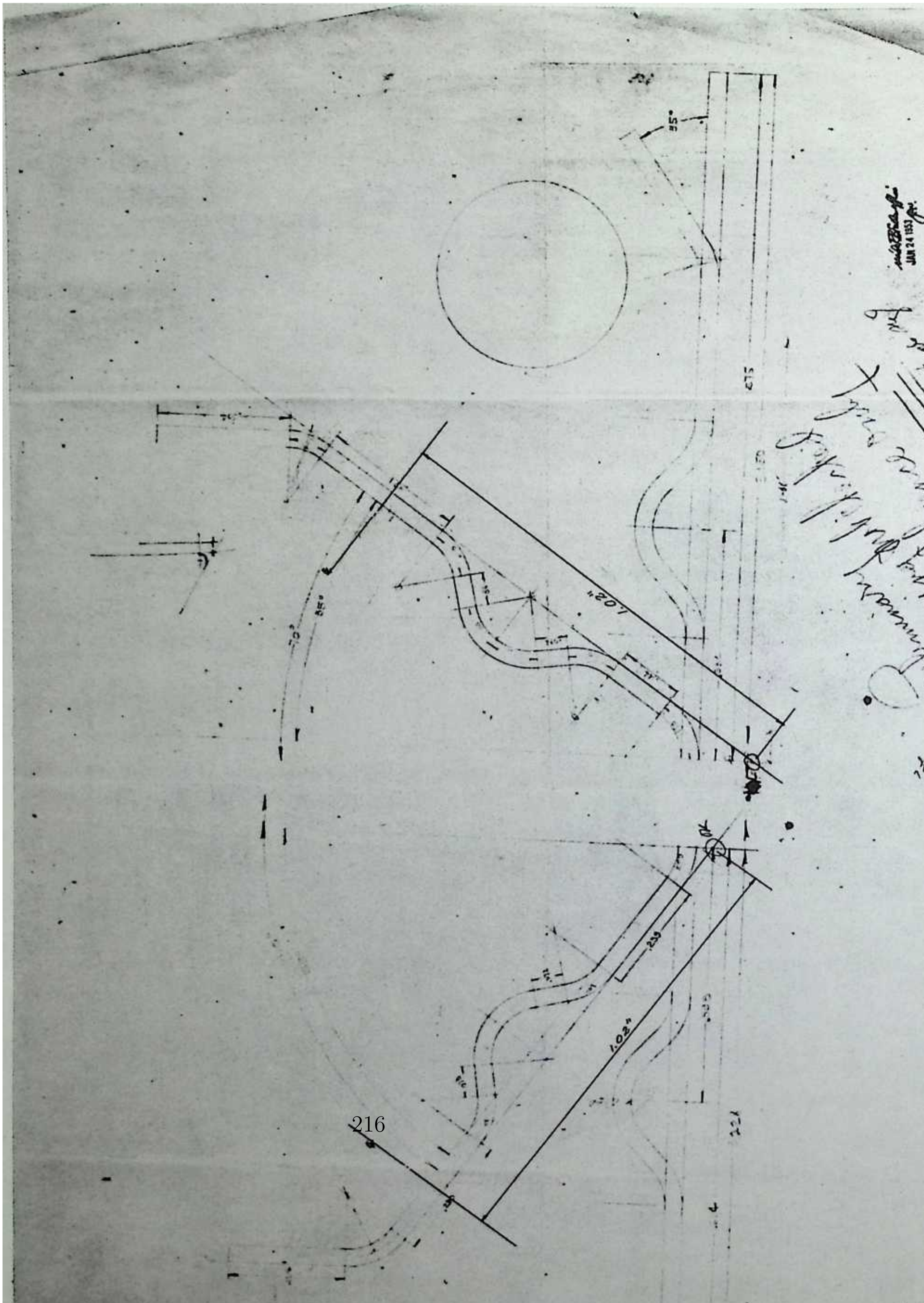

SCHEME II

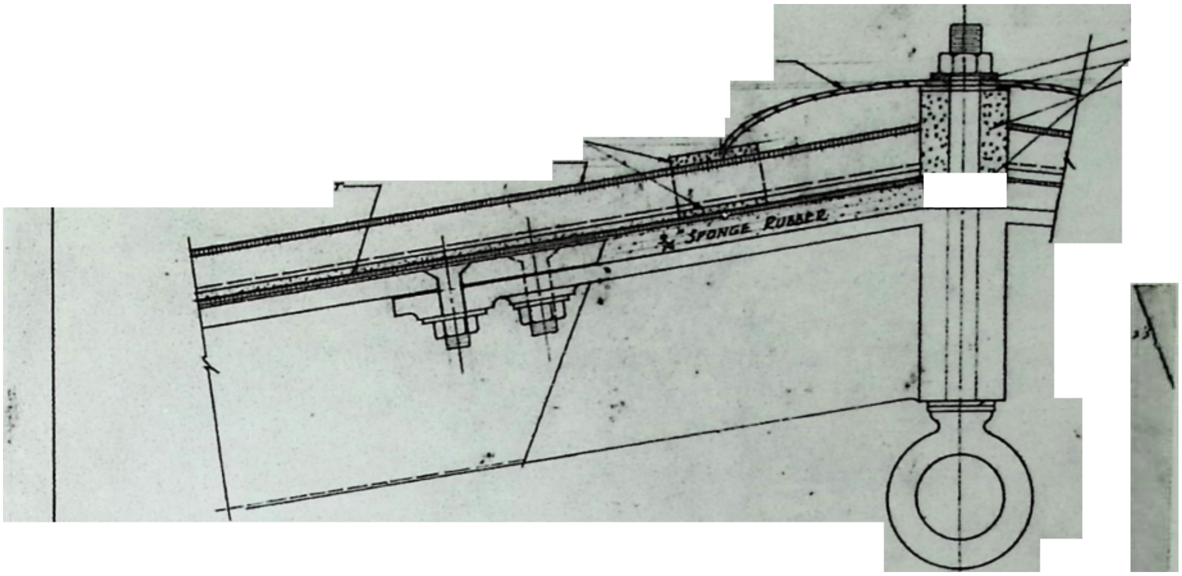

SCEME III



FINAL -SEKTICN . By *FCfZt> MTOR* tfMAWy

10 M *PILL SIZE*


1.02"



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PoLt'Ajrte. PwatAU THAA

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*HUP> CAP OE-TAIL^*

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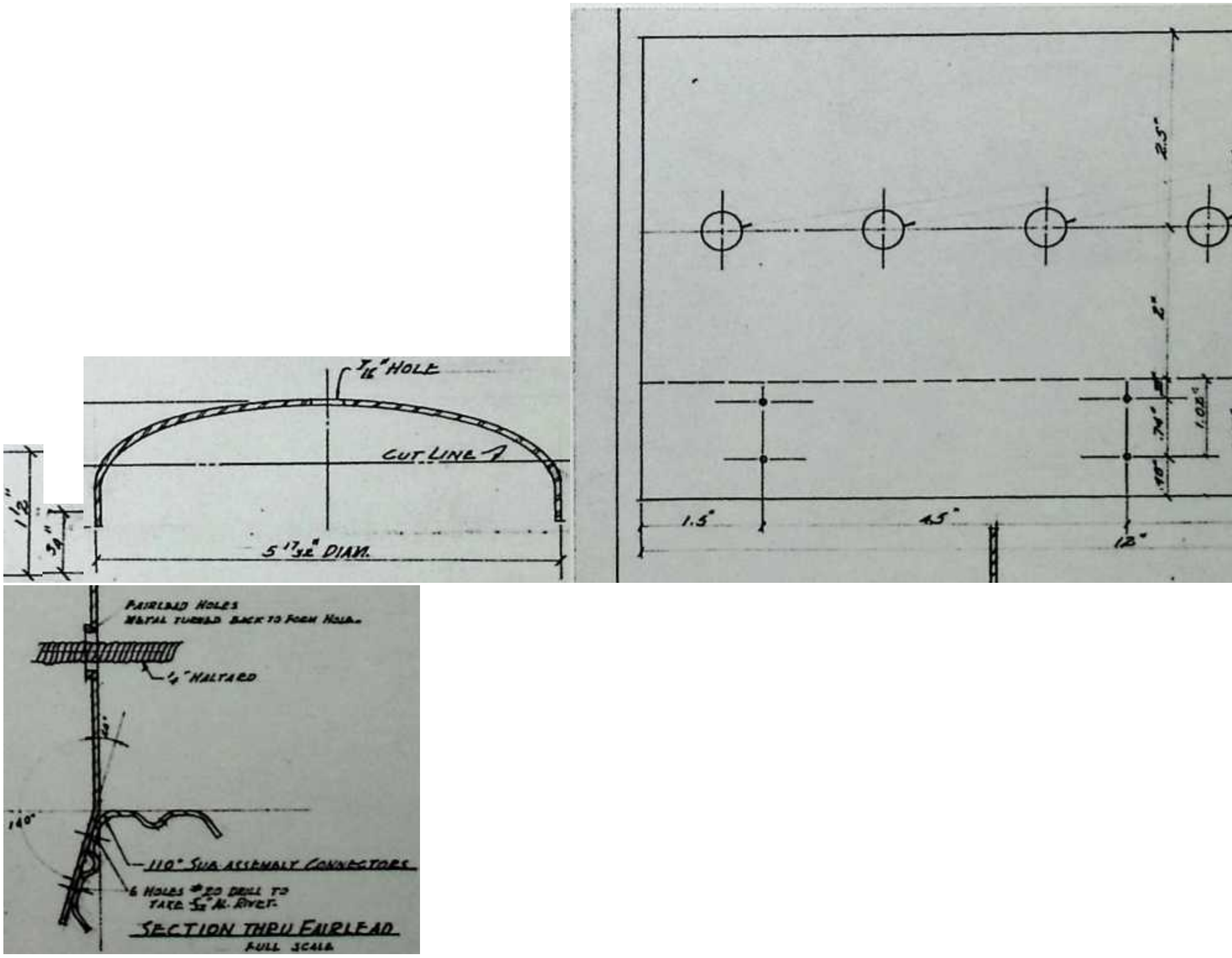
TUMAL DKbifUA OL HUB CAP dewef/c £OM£-

- ^.^ucr^fX^Tre



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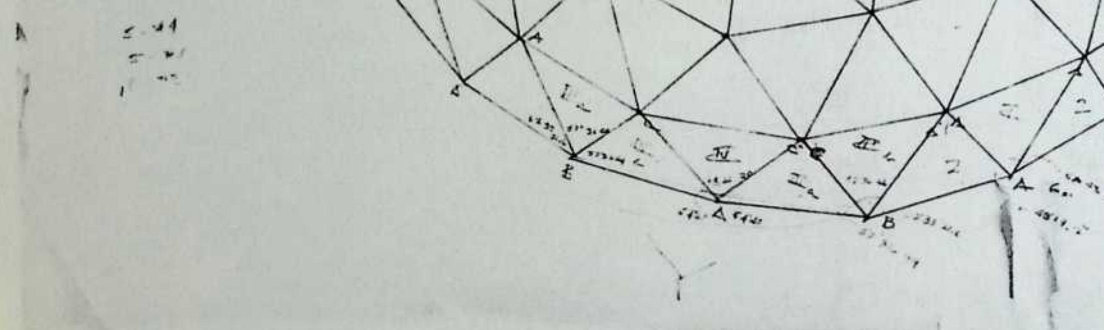
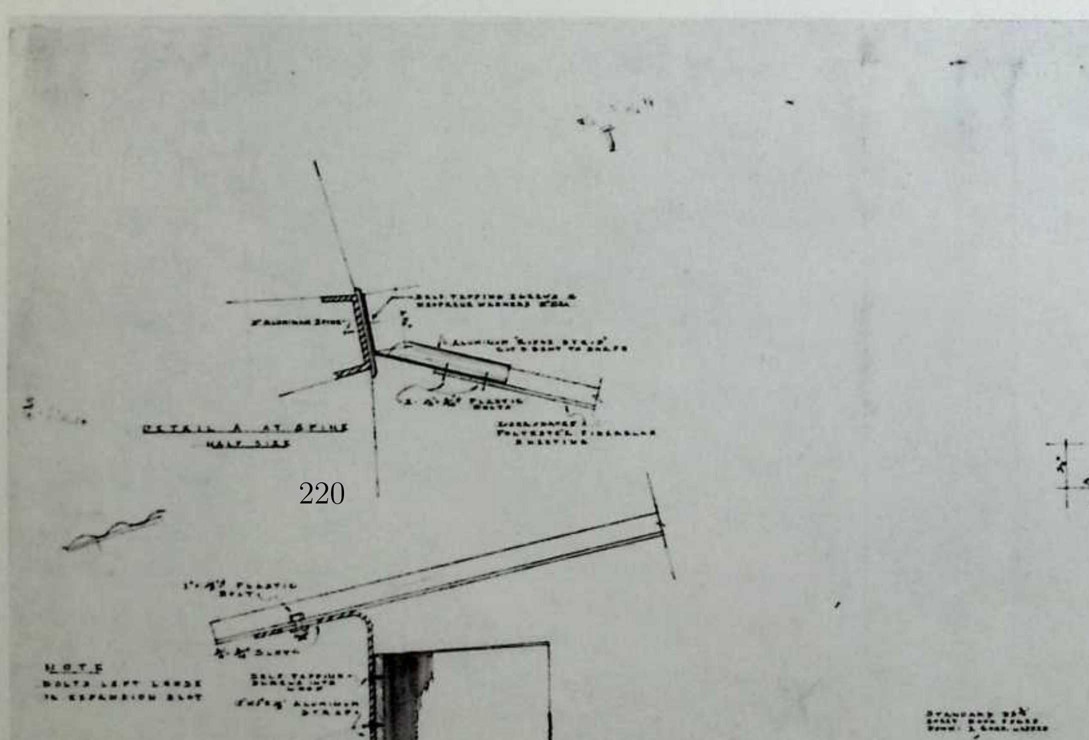
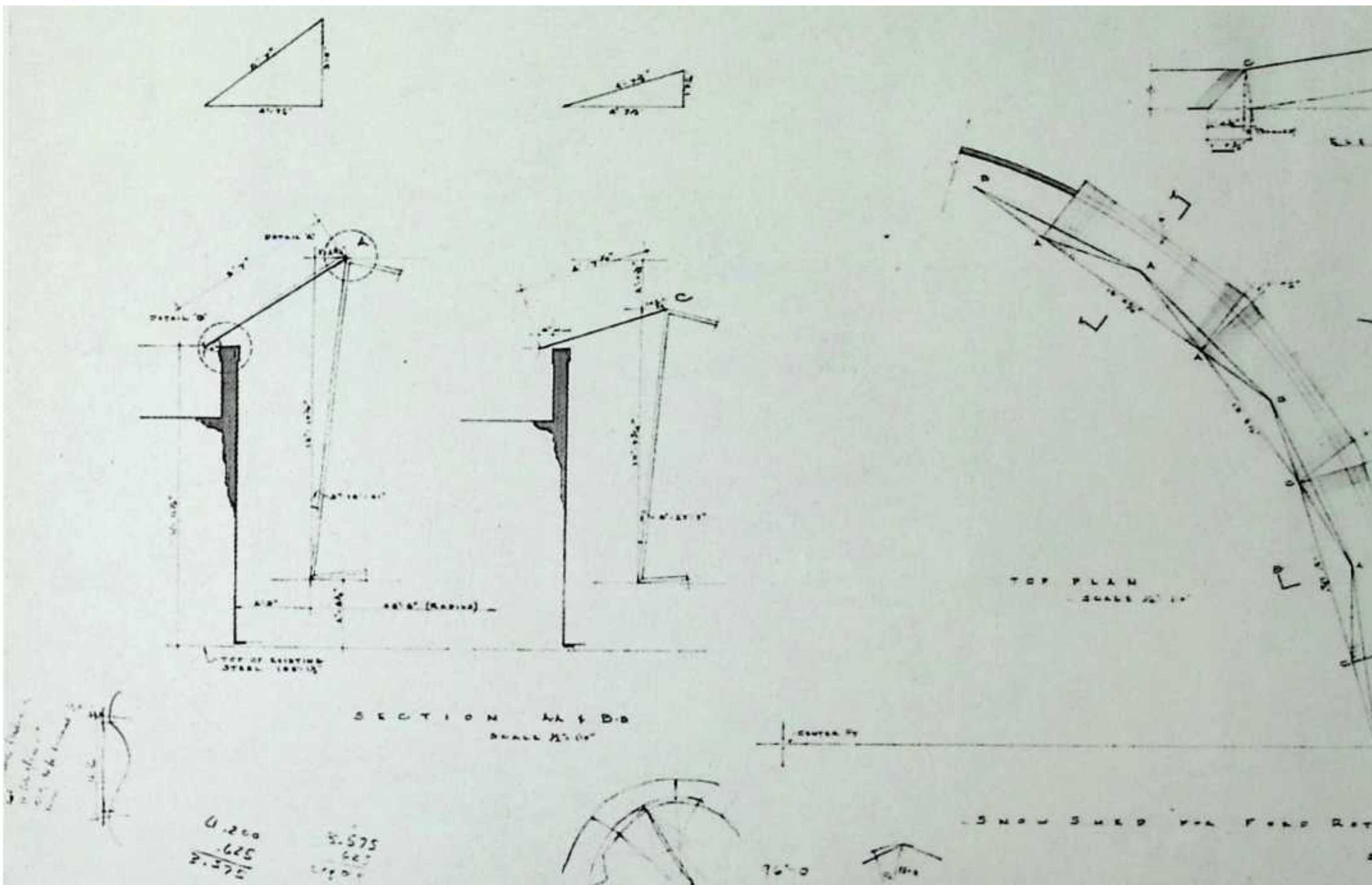
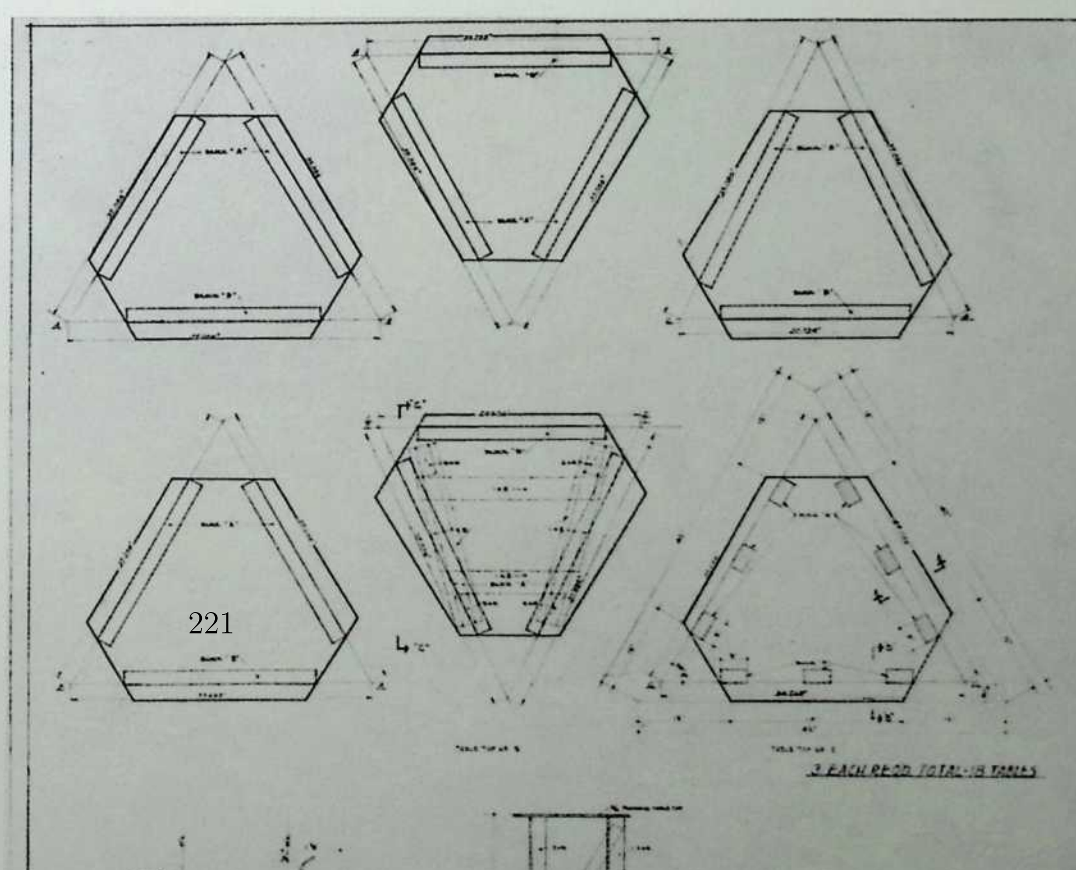
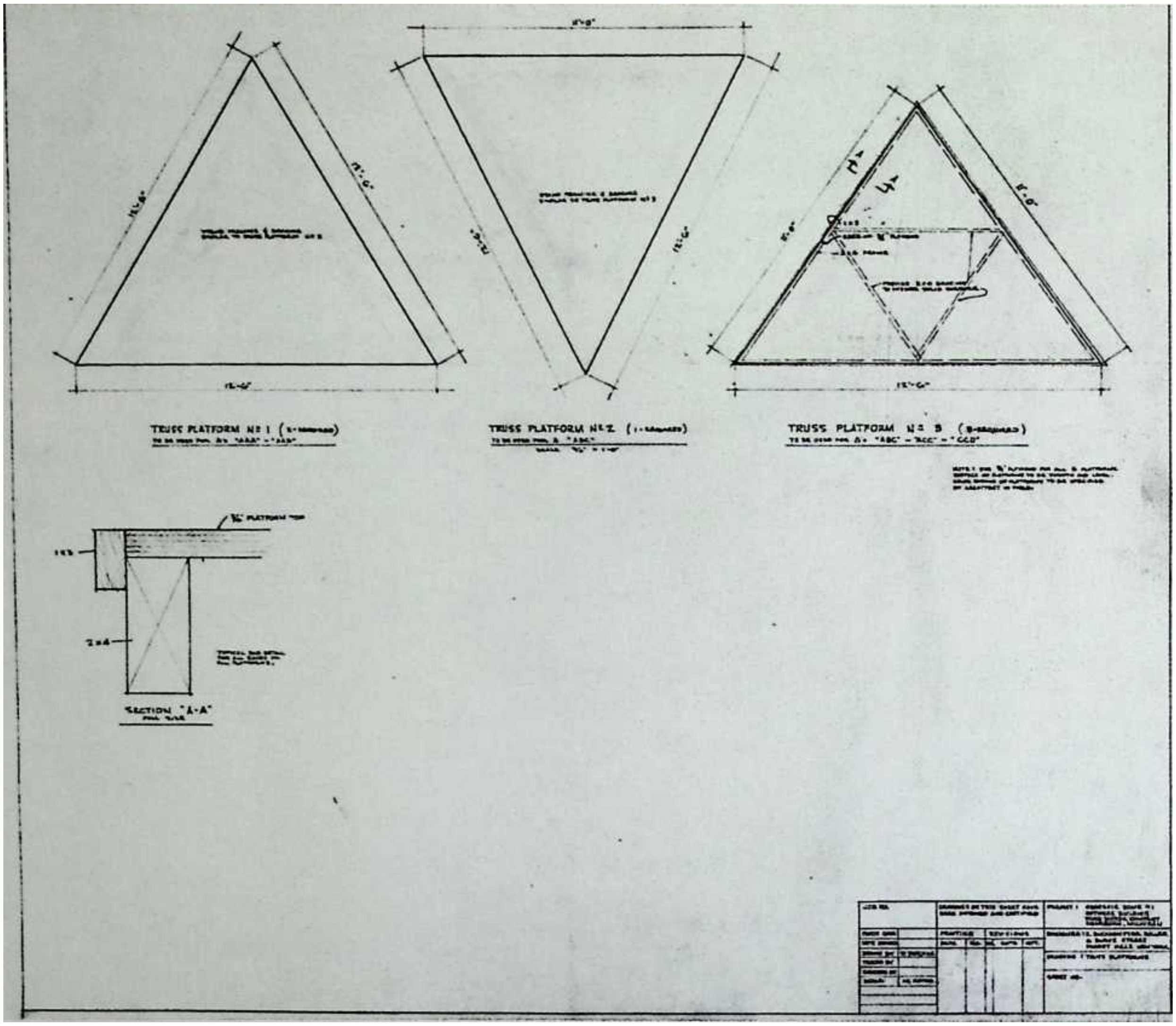
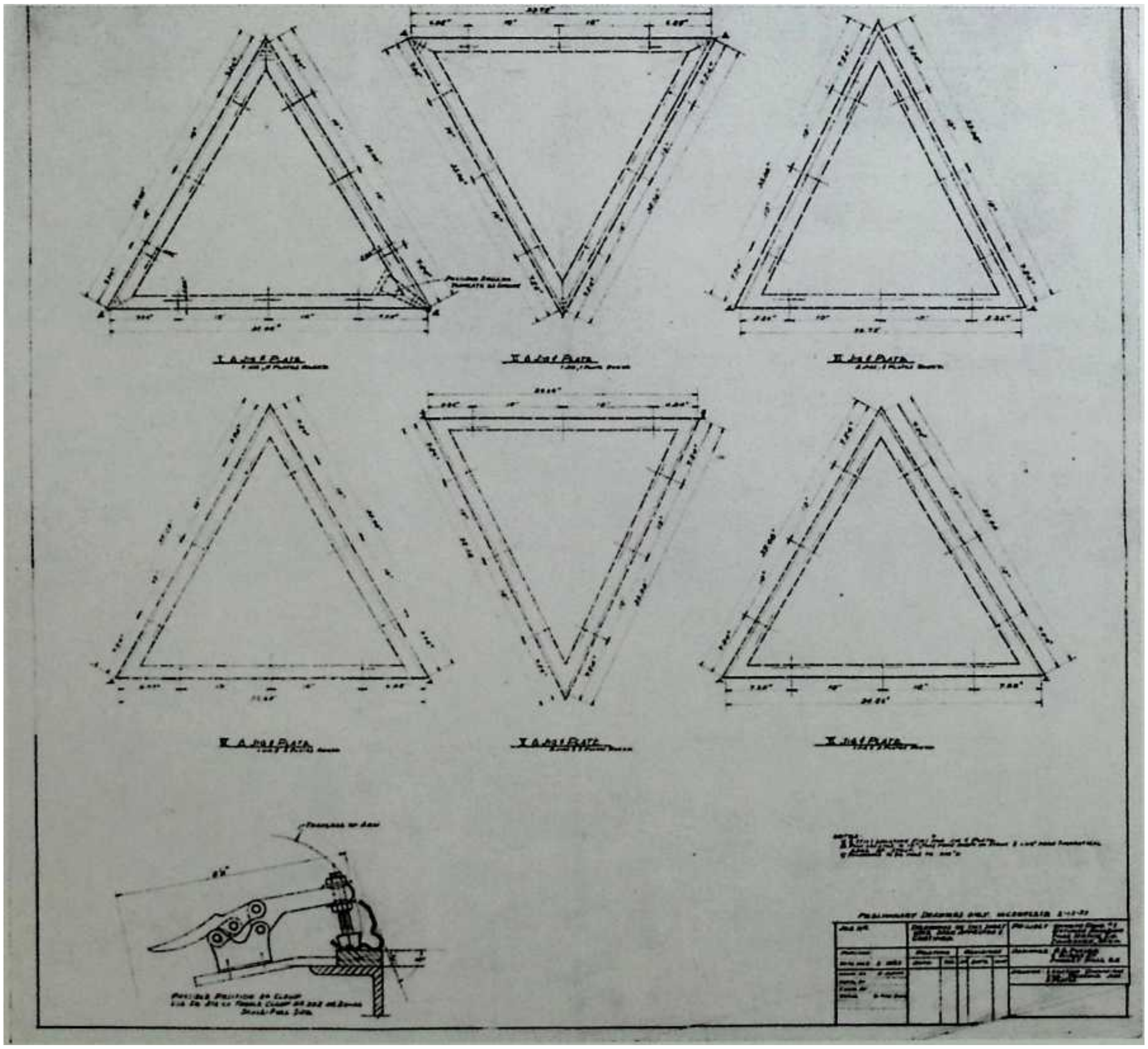


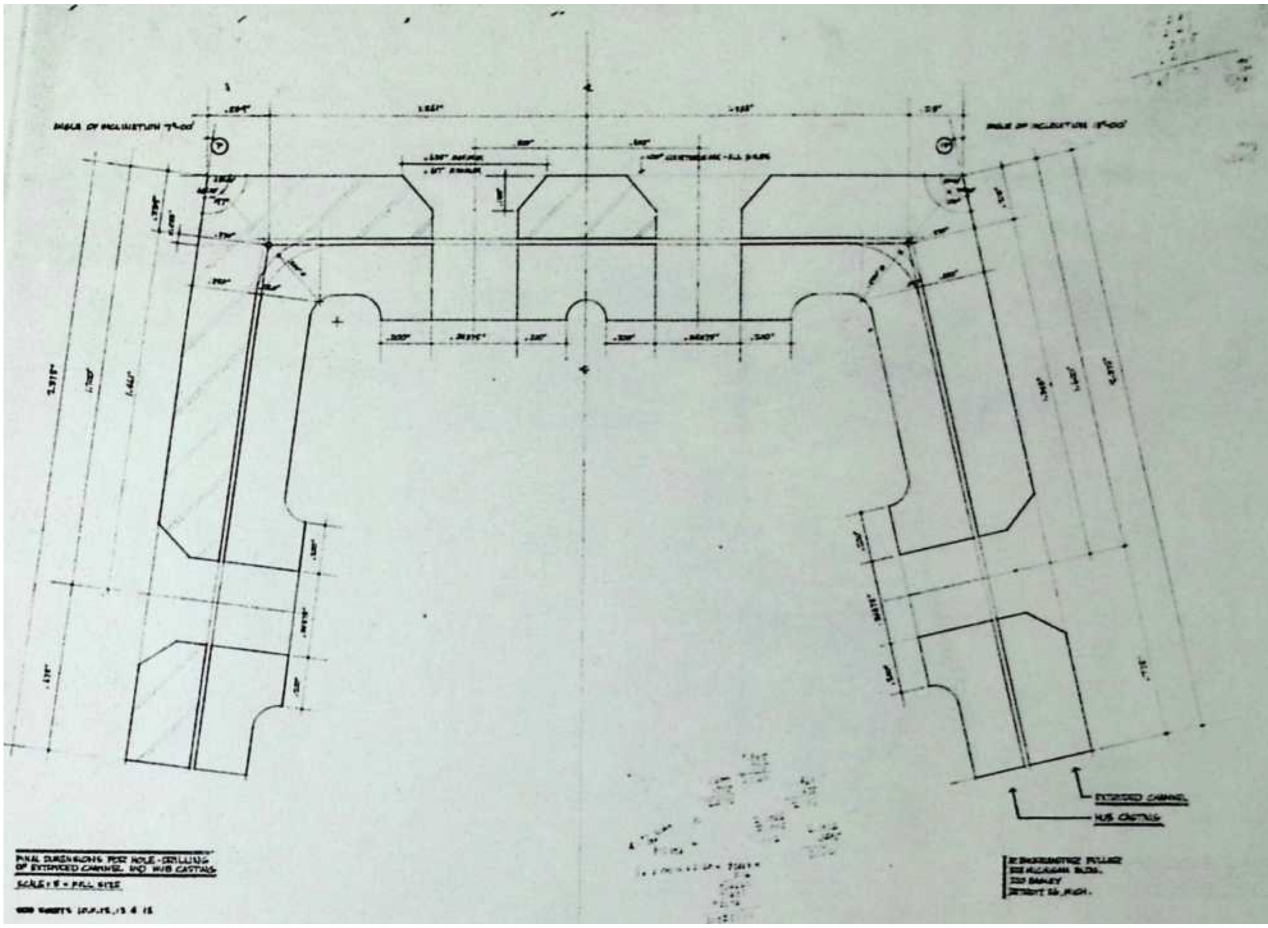

DETAIL A AT SPINE
HALF SIZE
NOTE
BOLTS LEFT LOOSE IN EXPANSION SLOT

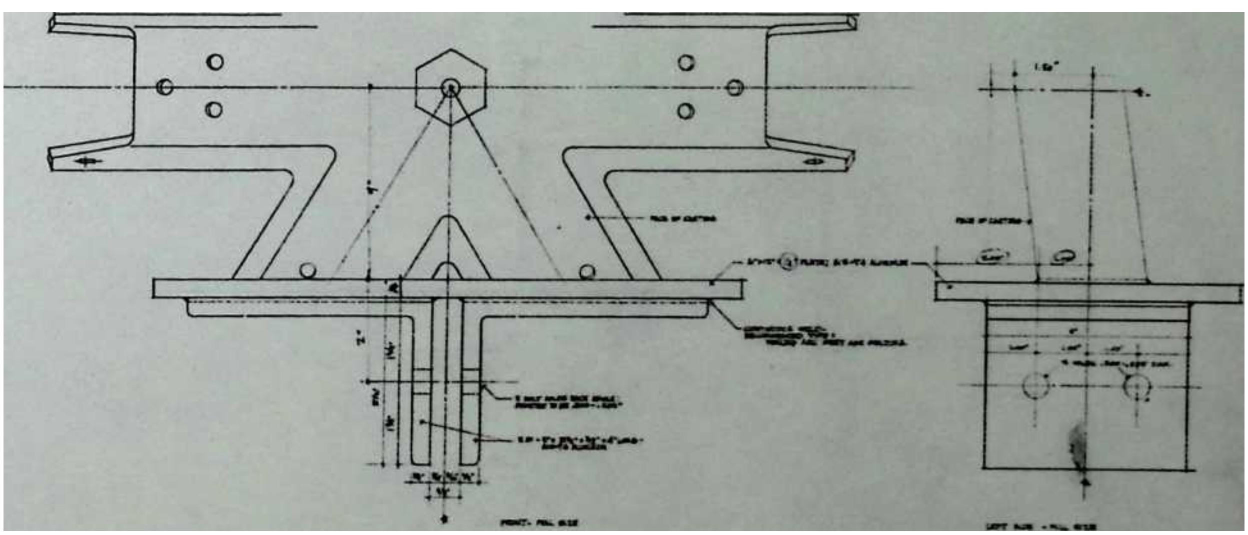

SECTION AA & B-B
TOP PLAN

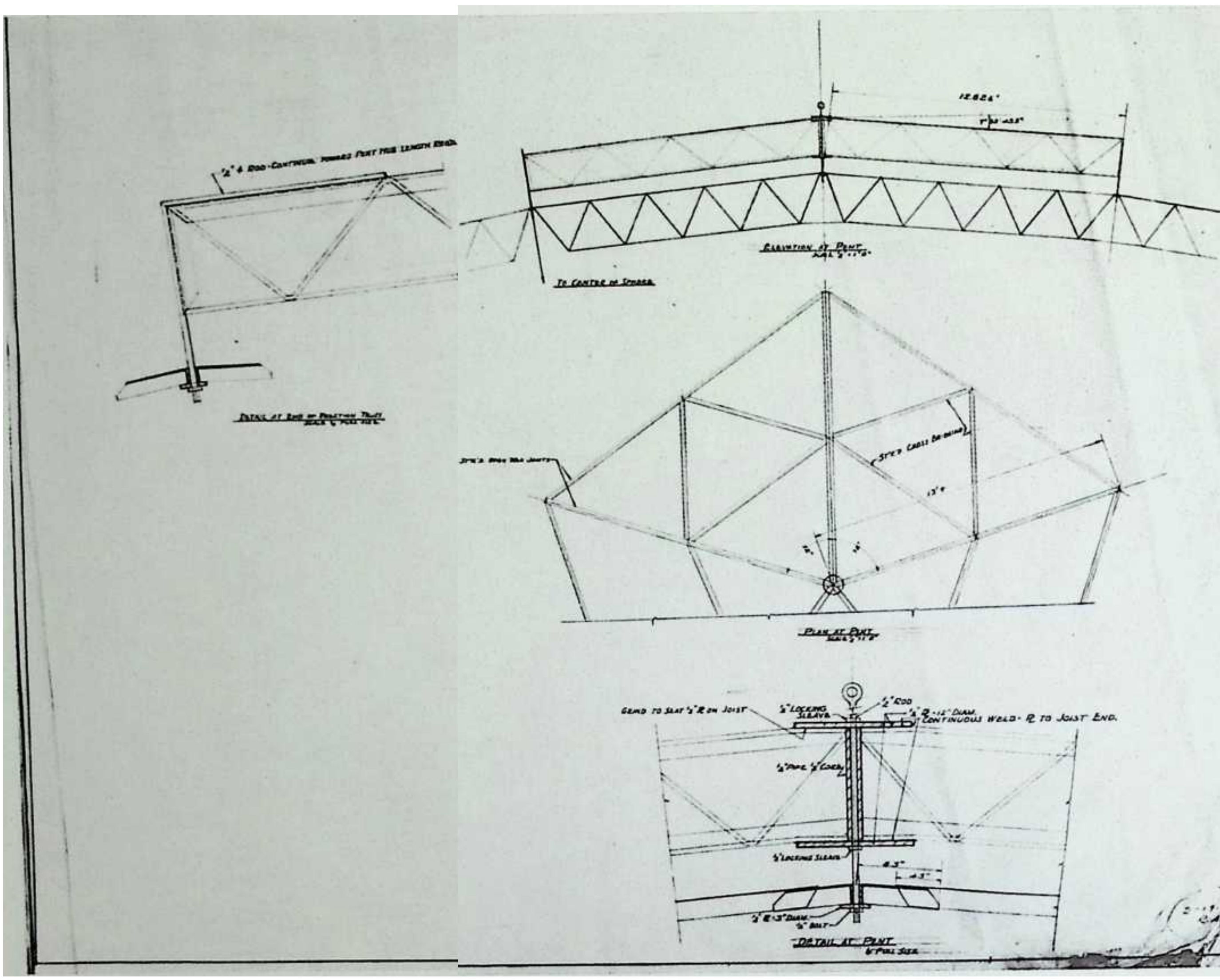


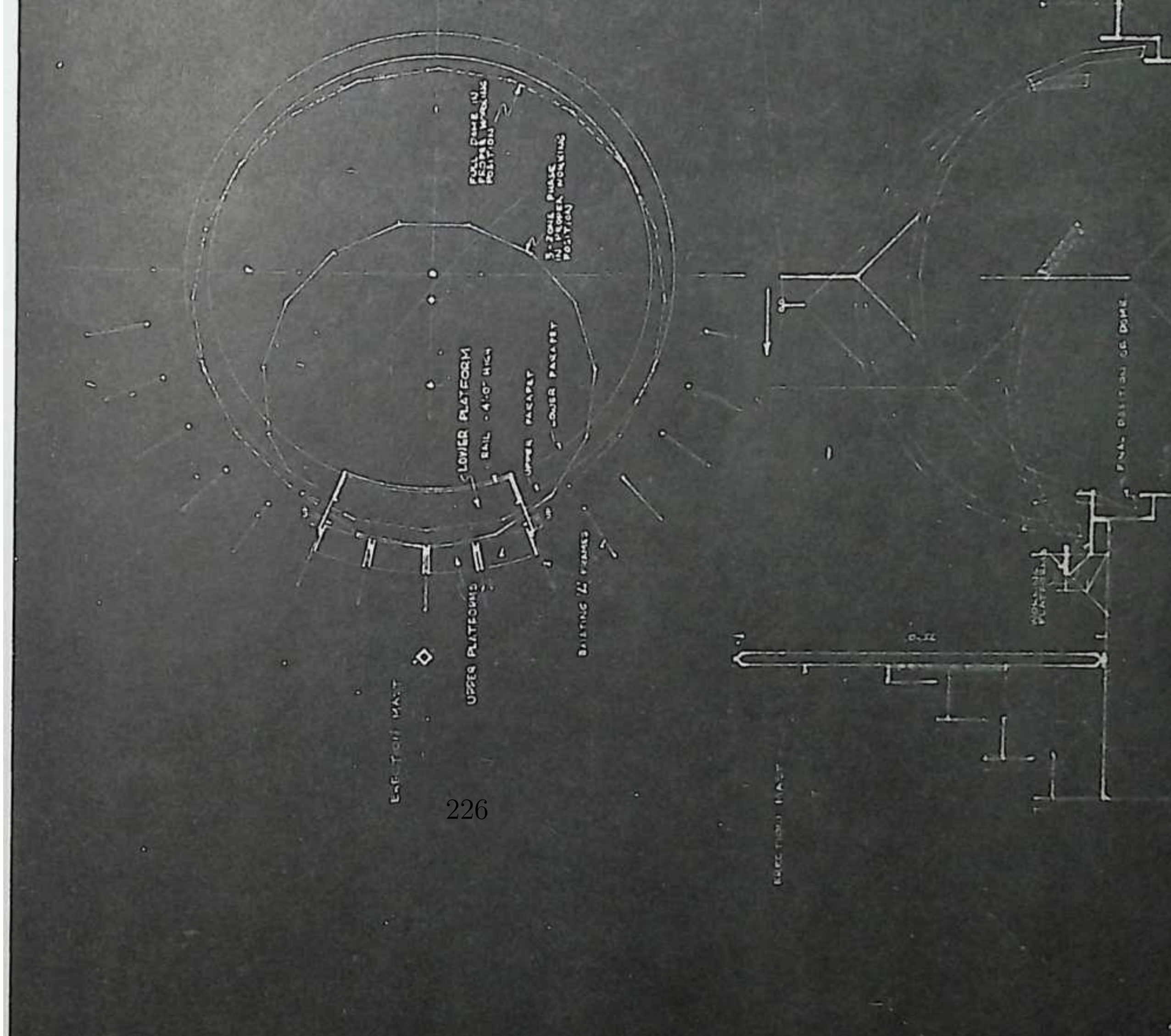

TRUSS PLATFORM No. 1
TRUSS PLATFORM No. 2
TRUSS PLATFORM No. 3
SECTION "A-A"

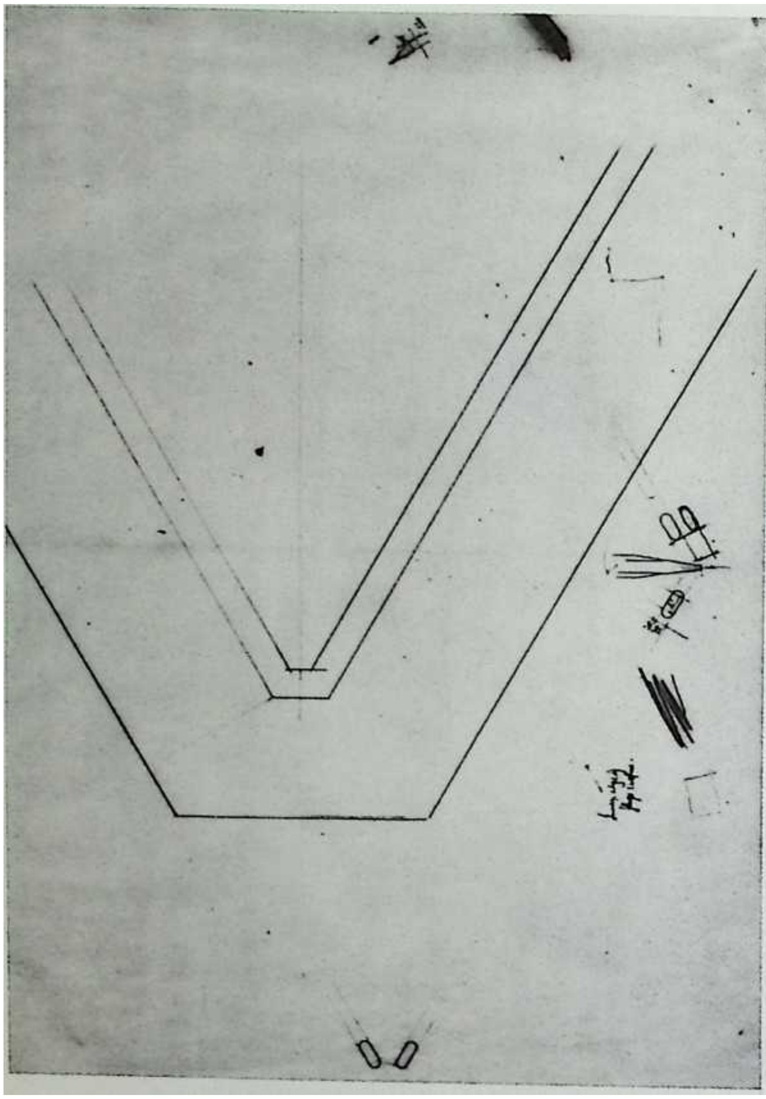


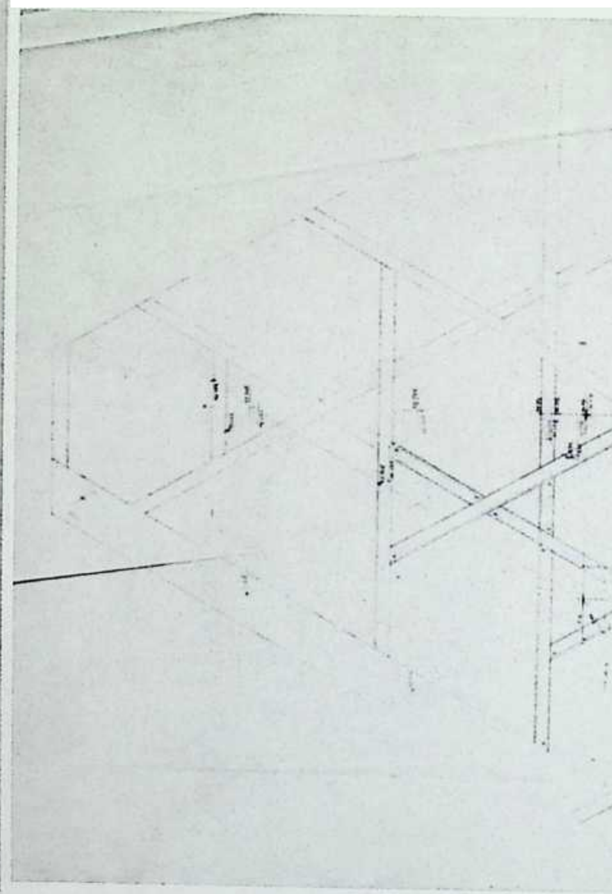


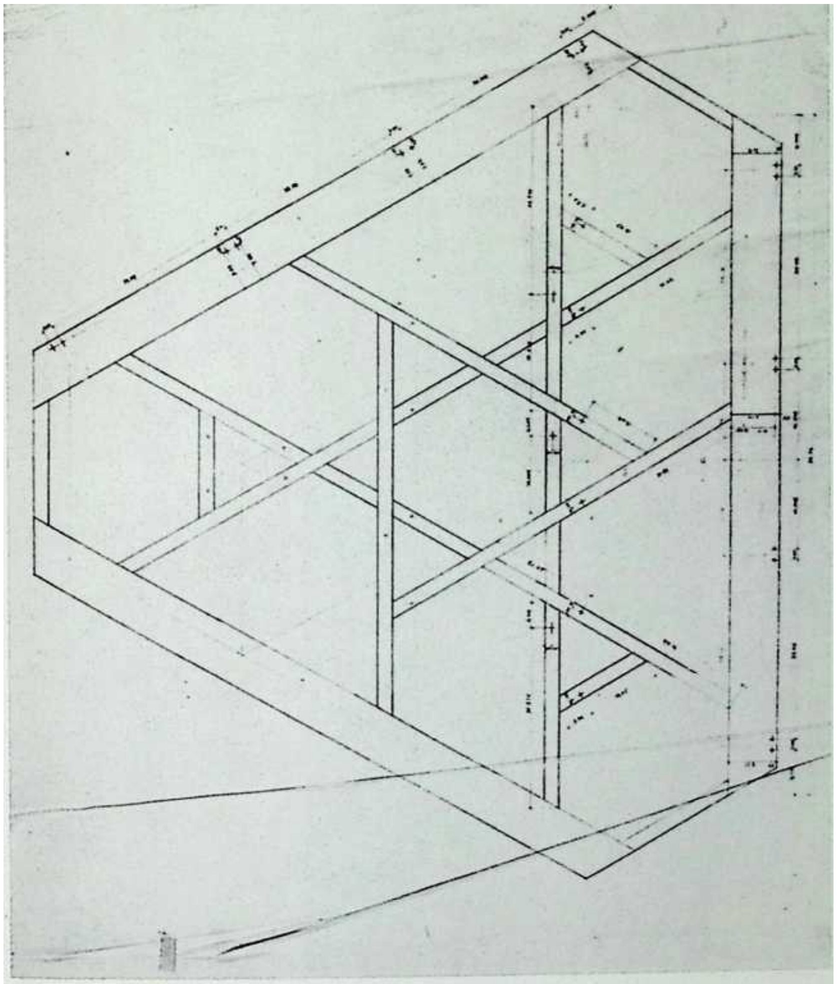


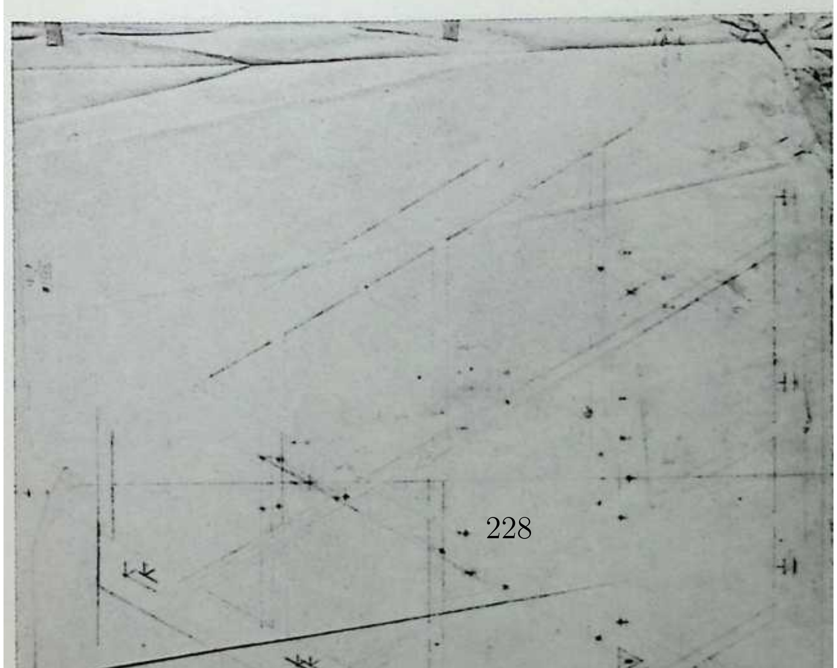


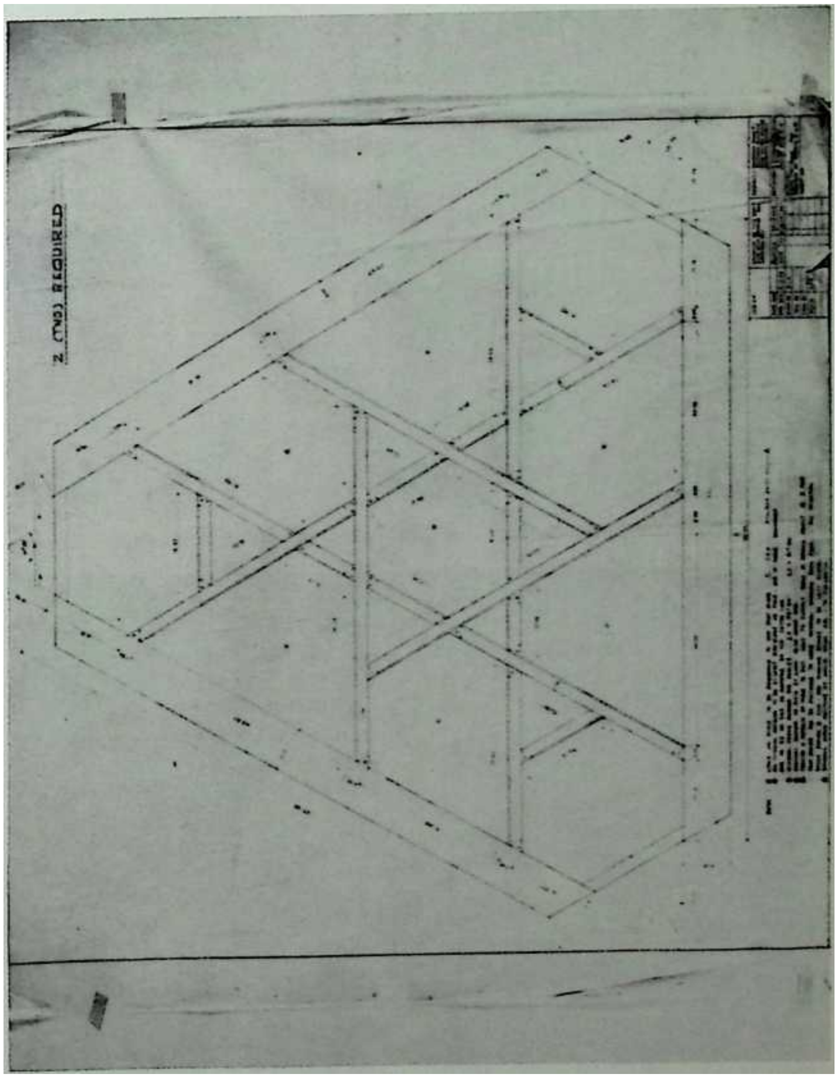

PLAN
ERECTION MAST
LOWER PLATFORM
UPPER PARAPET
LOWER PARAPET
UPPER PLATFORMS

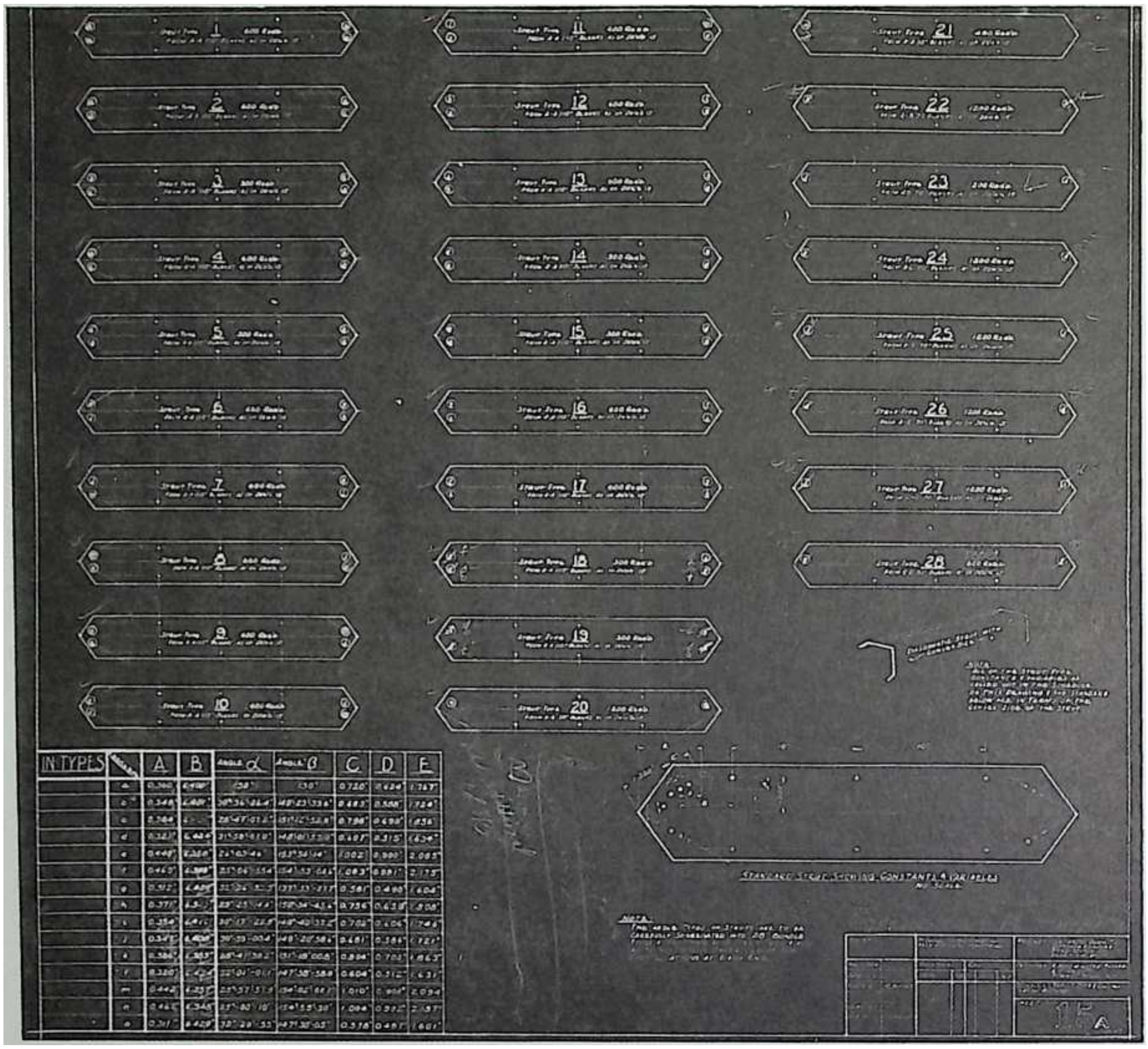


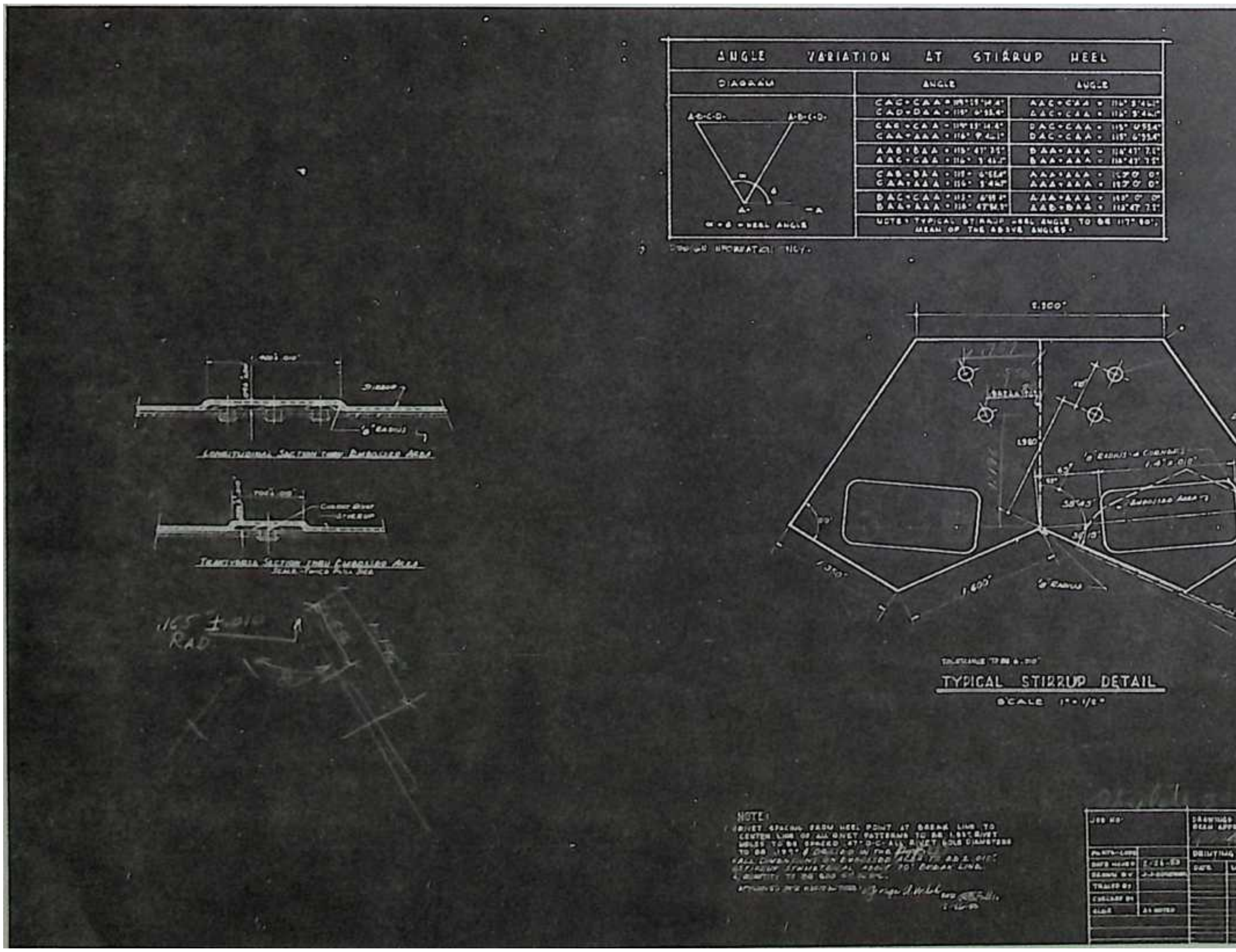


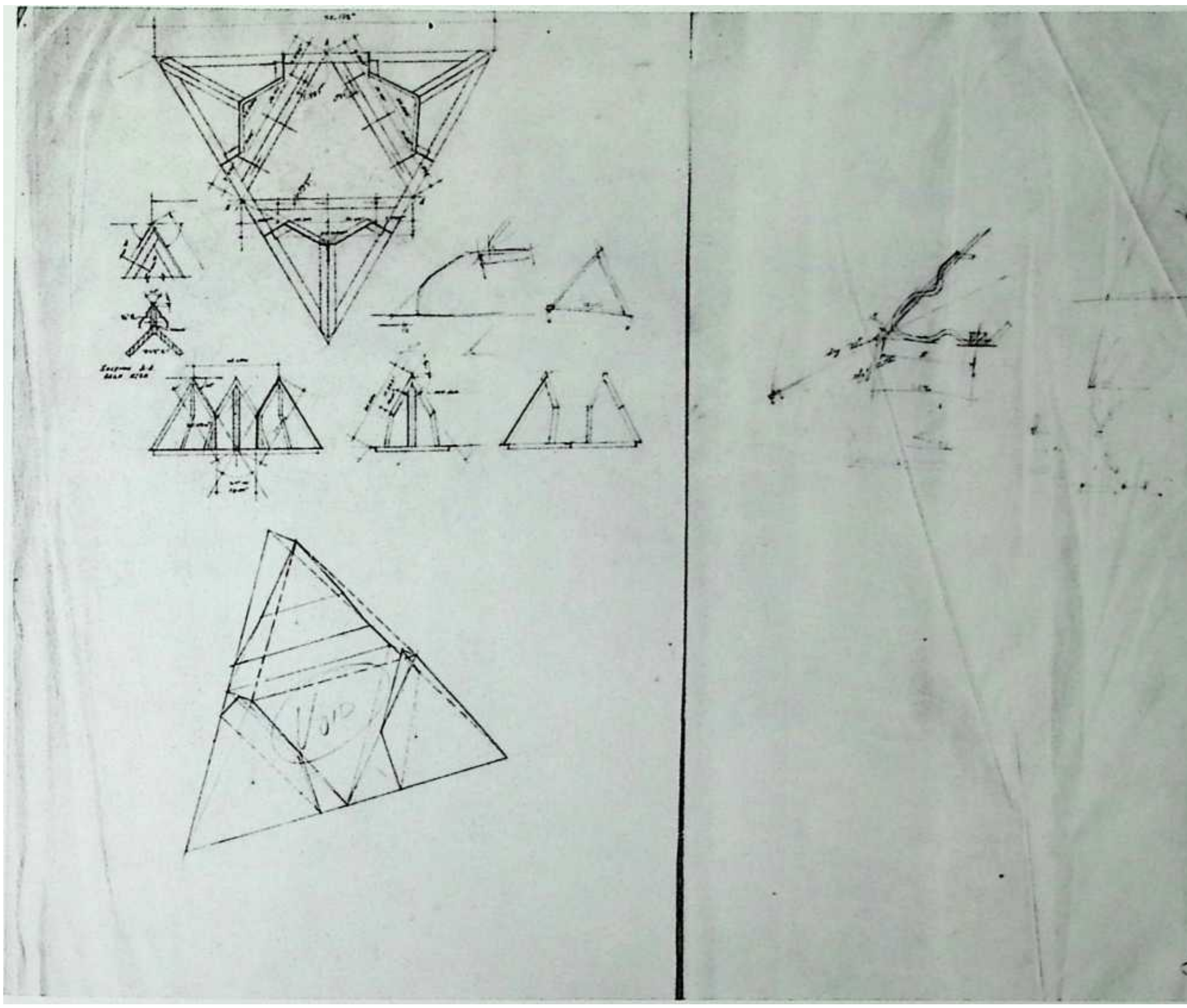


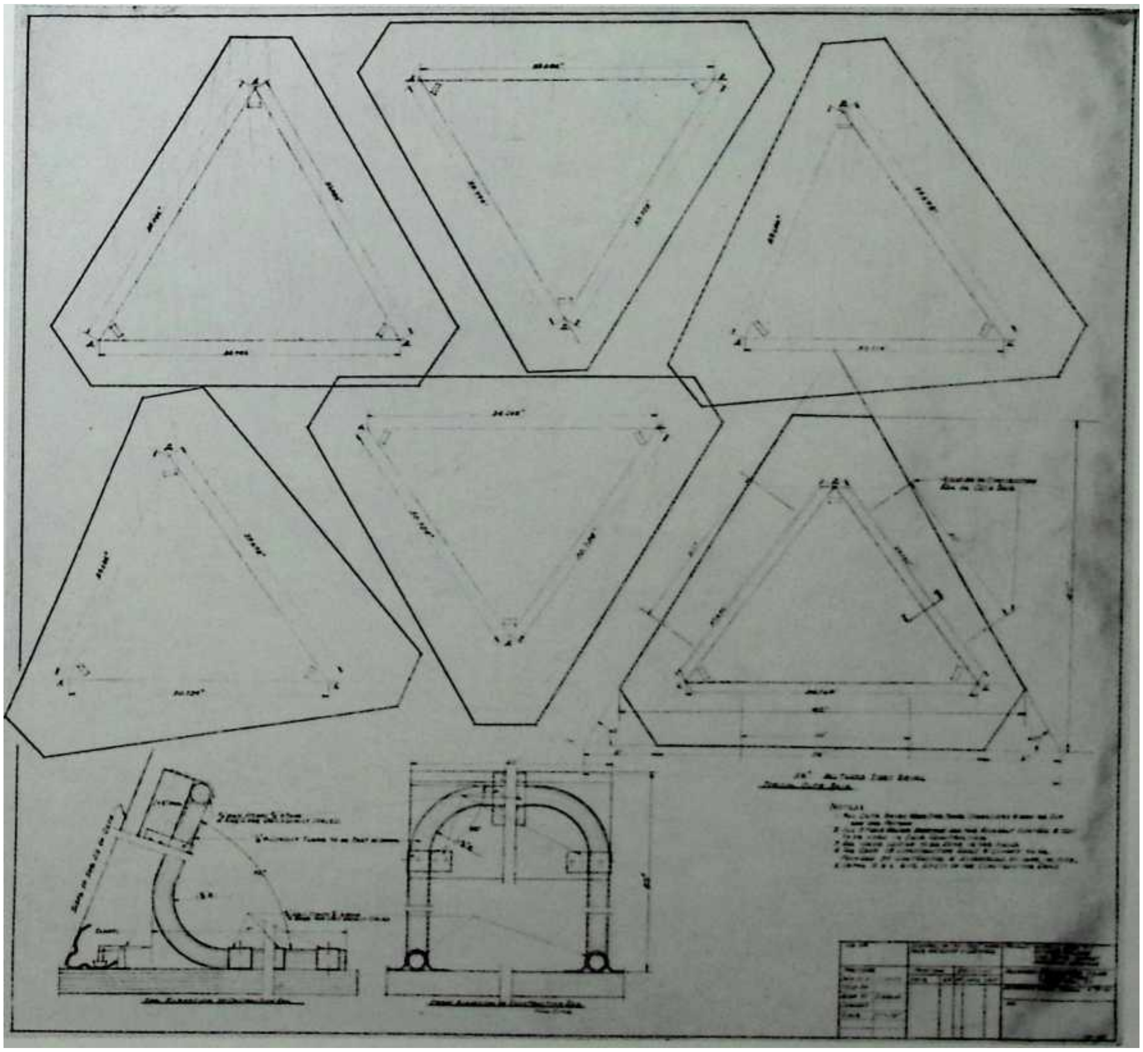



2 (TWO) REQUIRED

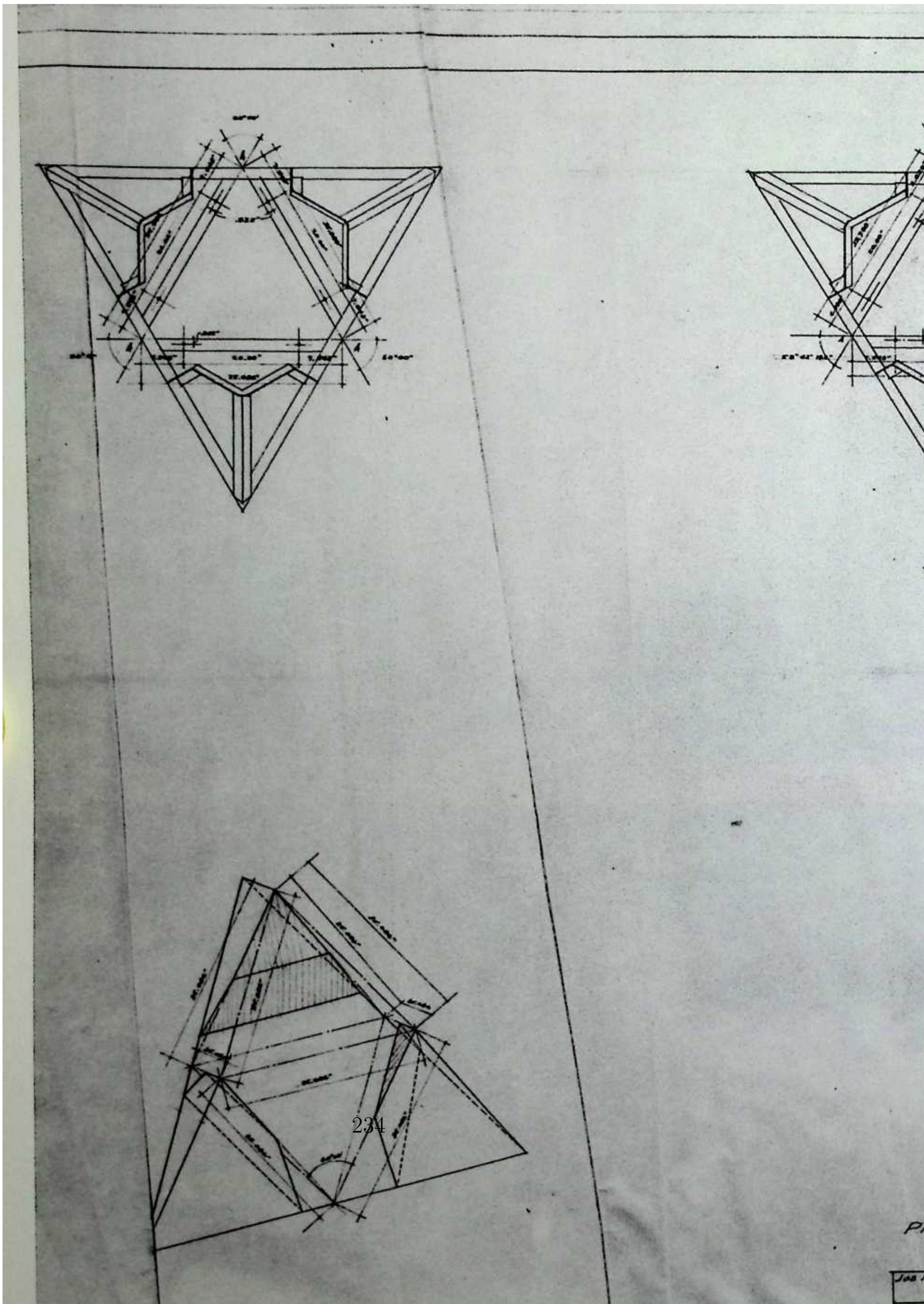

IN TYPES
A
B
ANGLE α
ANGLE β
C
D
E

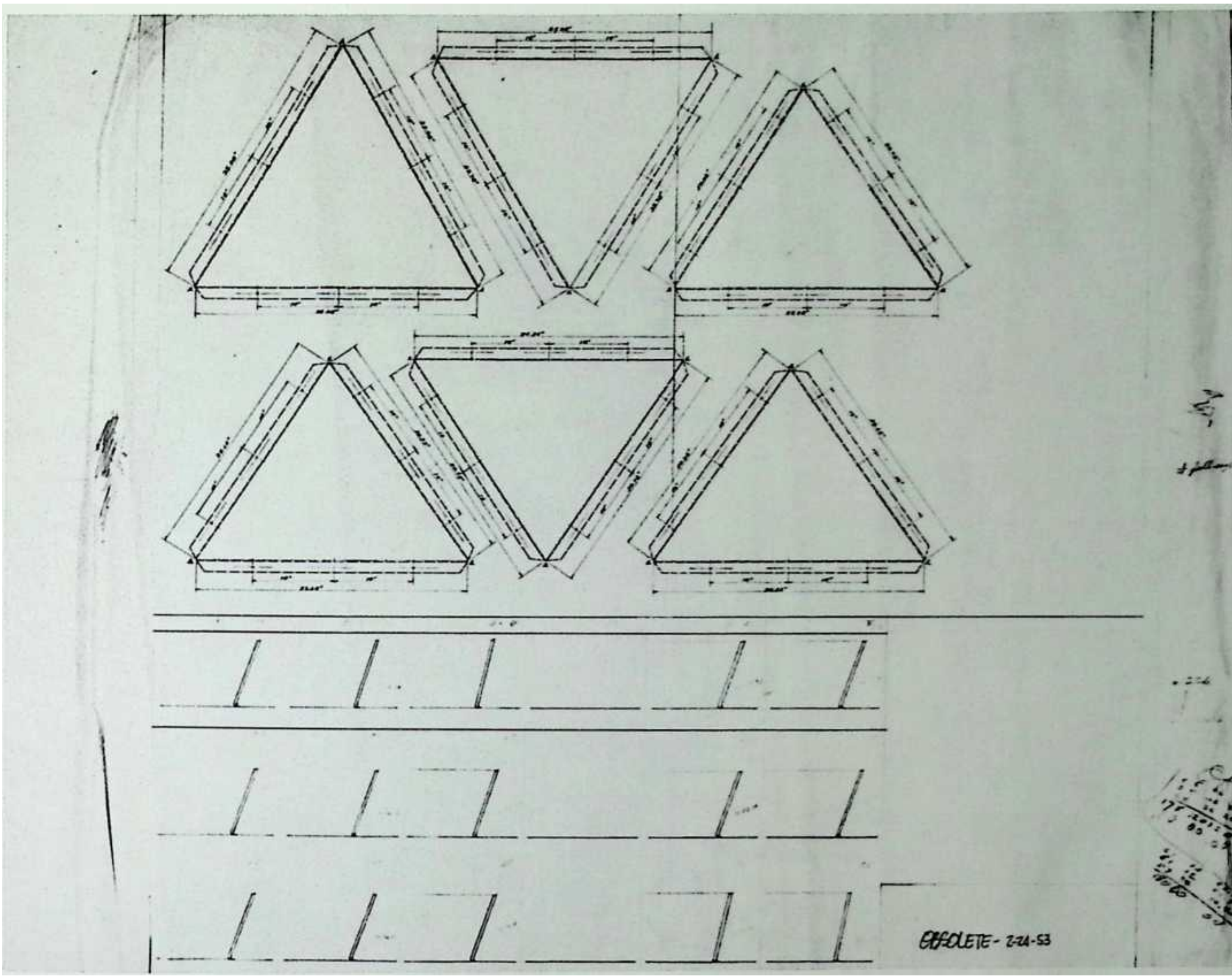

ANGLE VARIATION AT STIRRUP HEEL
DIAGRAM
ANGLE
ANGLE
TYPICAL STIRRUP DETAIL
SCALE 1"=1/2"
NOTE:

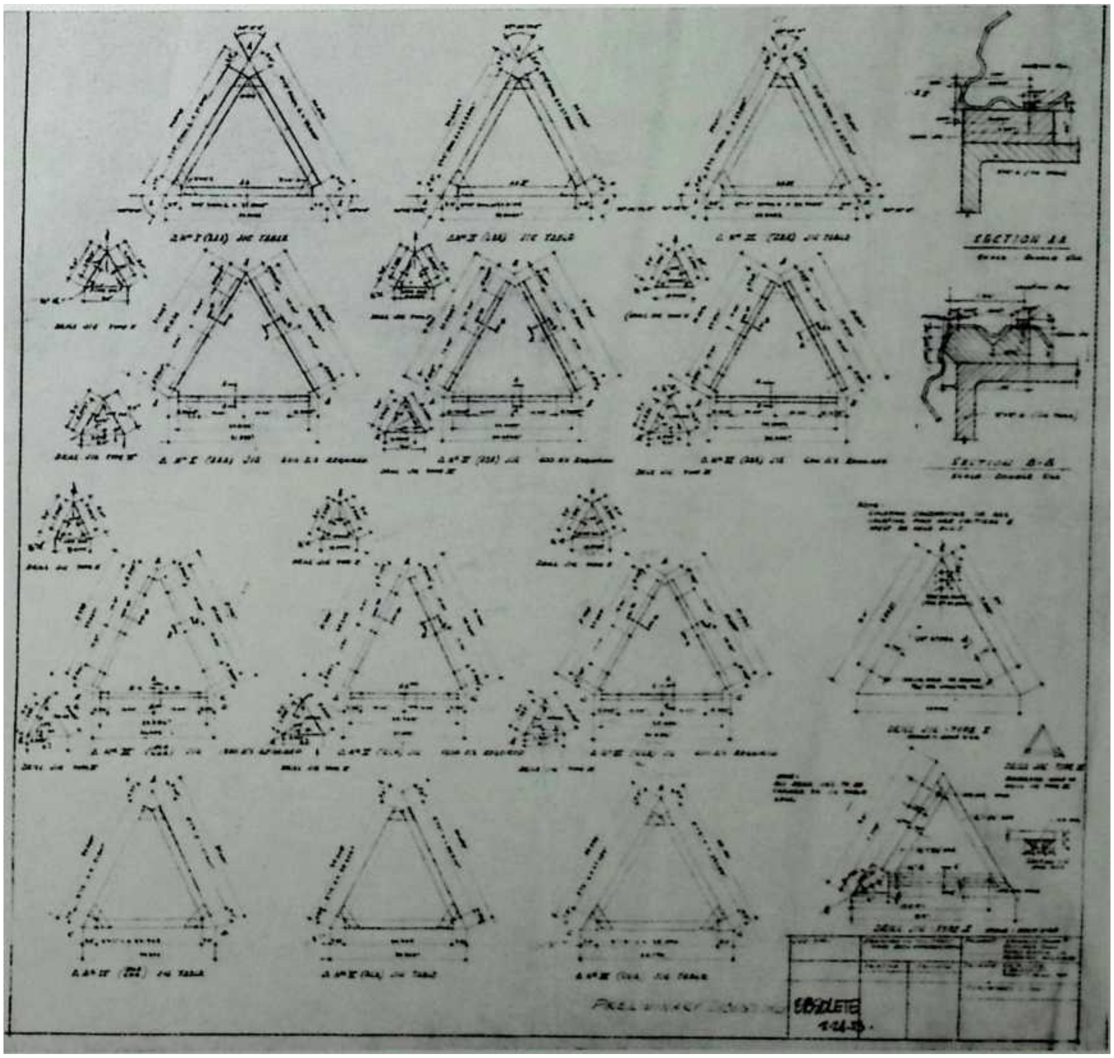


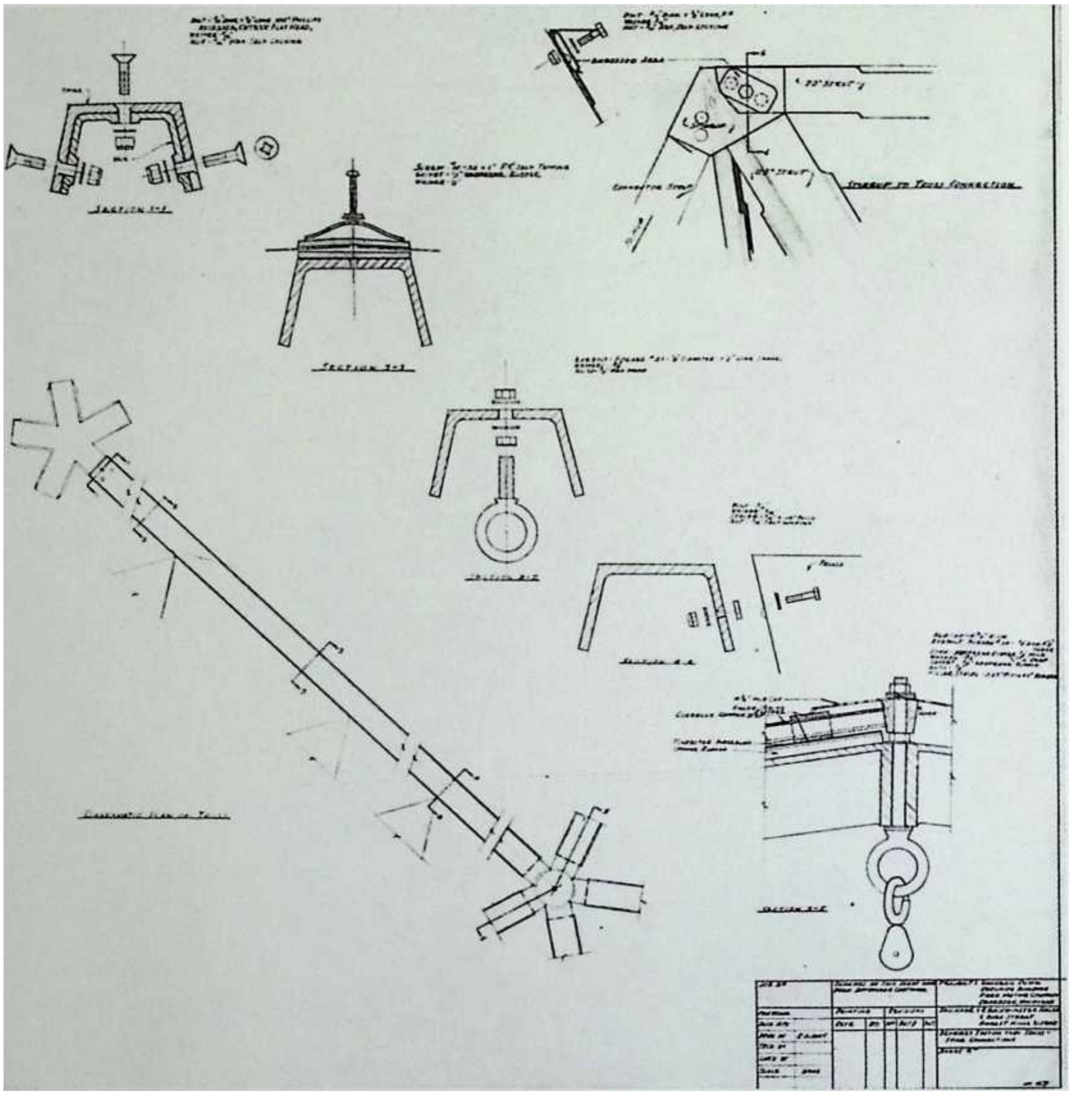


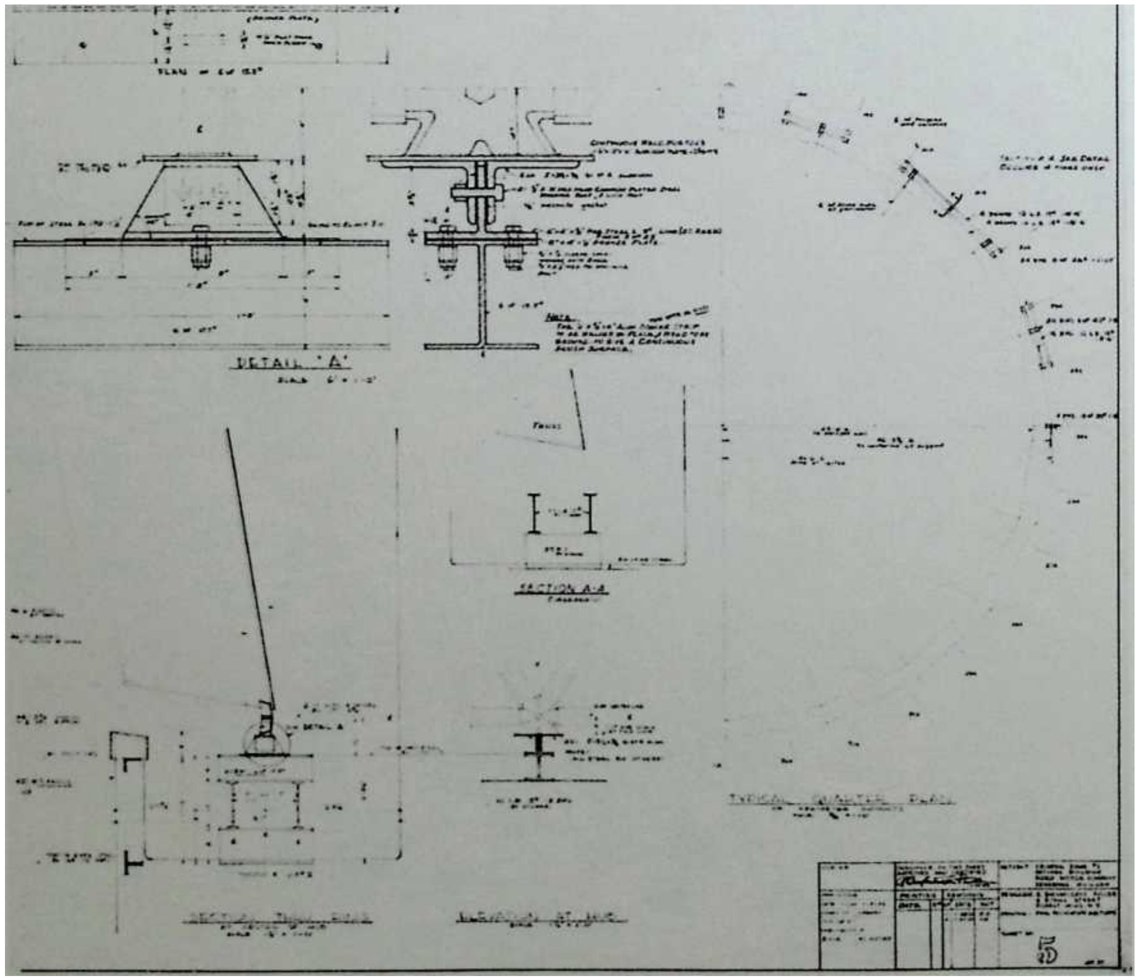
1

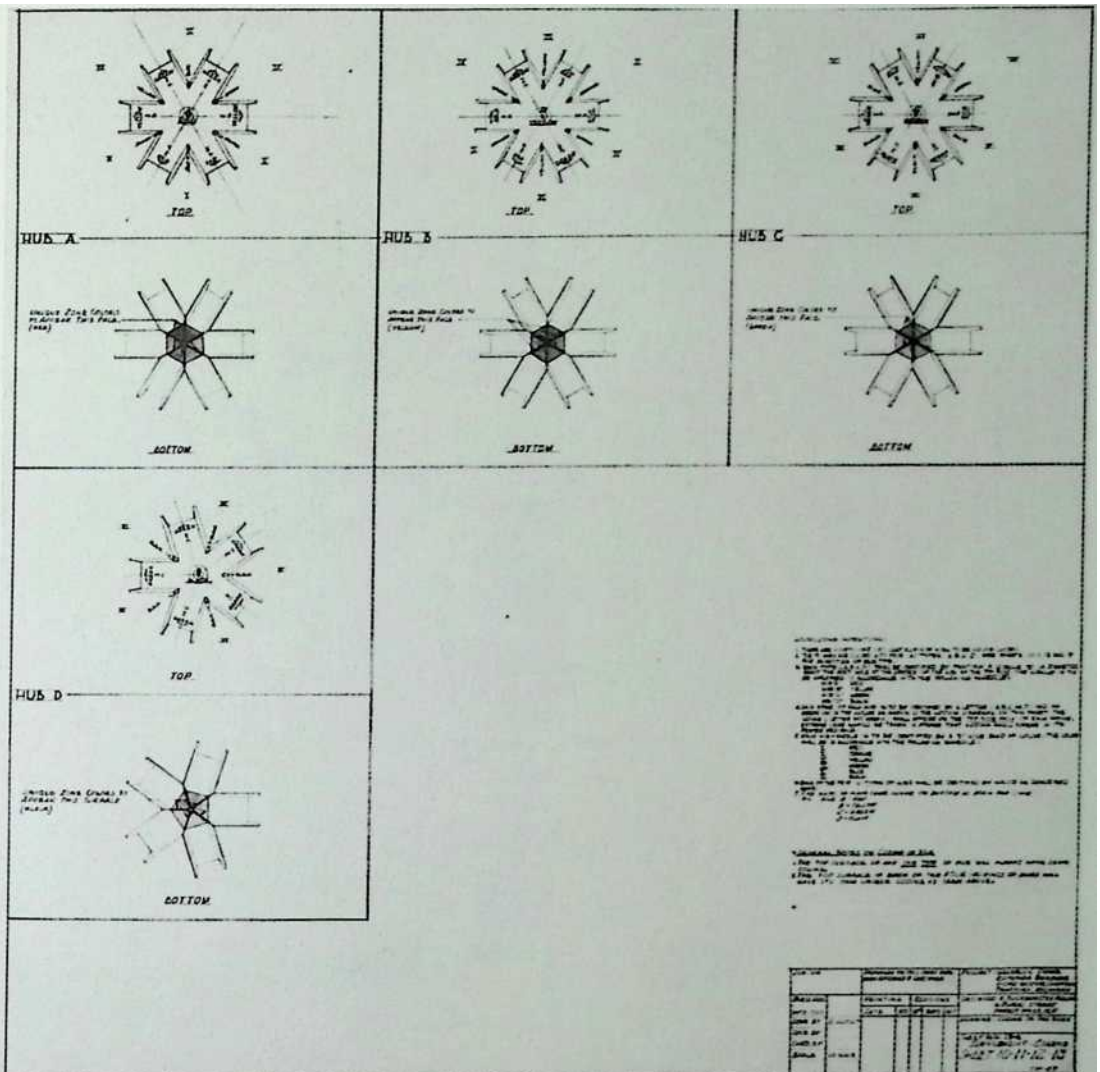


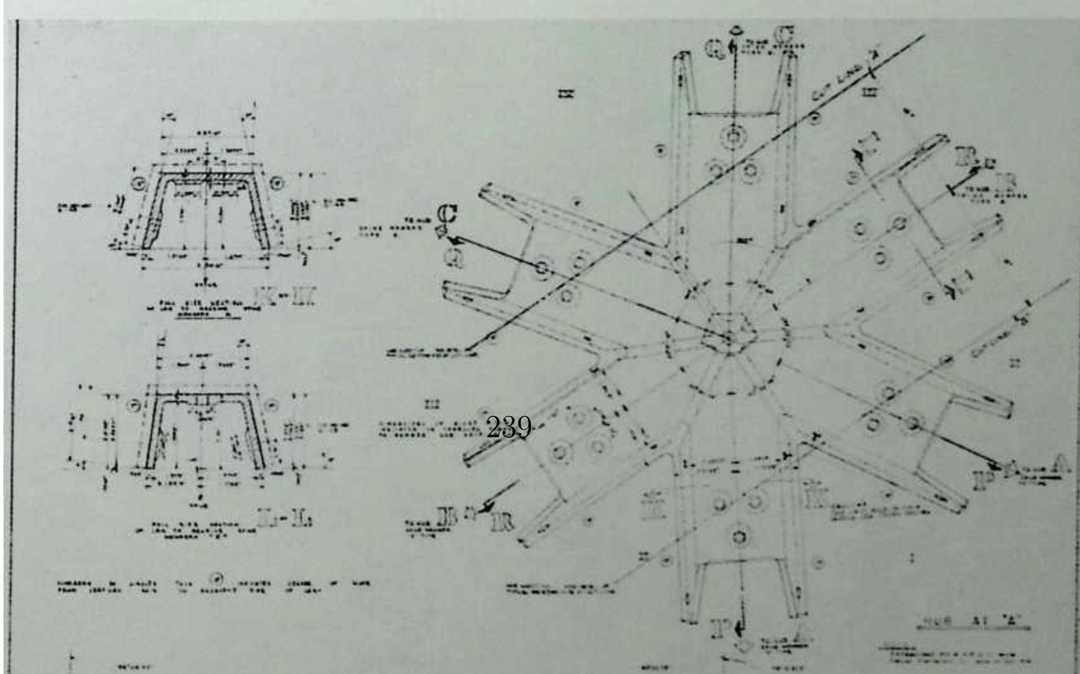

OBSOLETE - 2-24-53

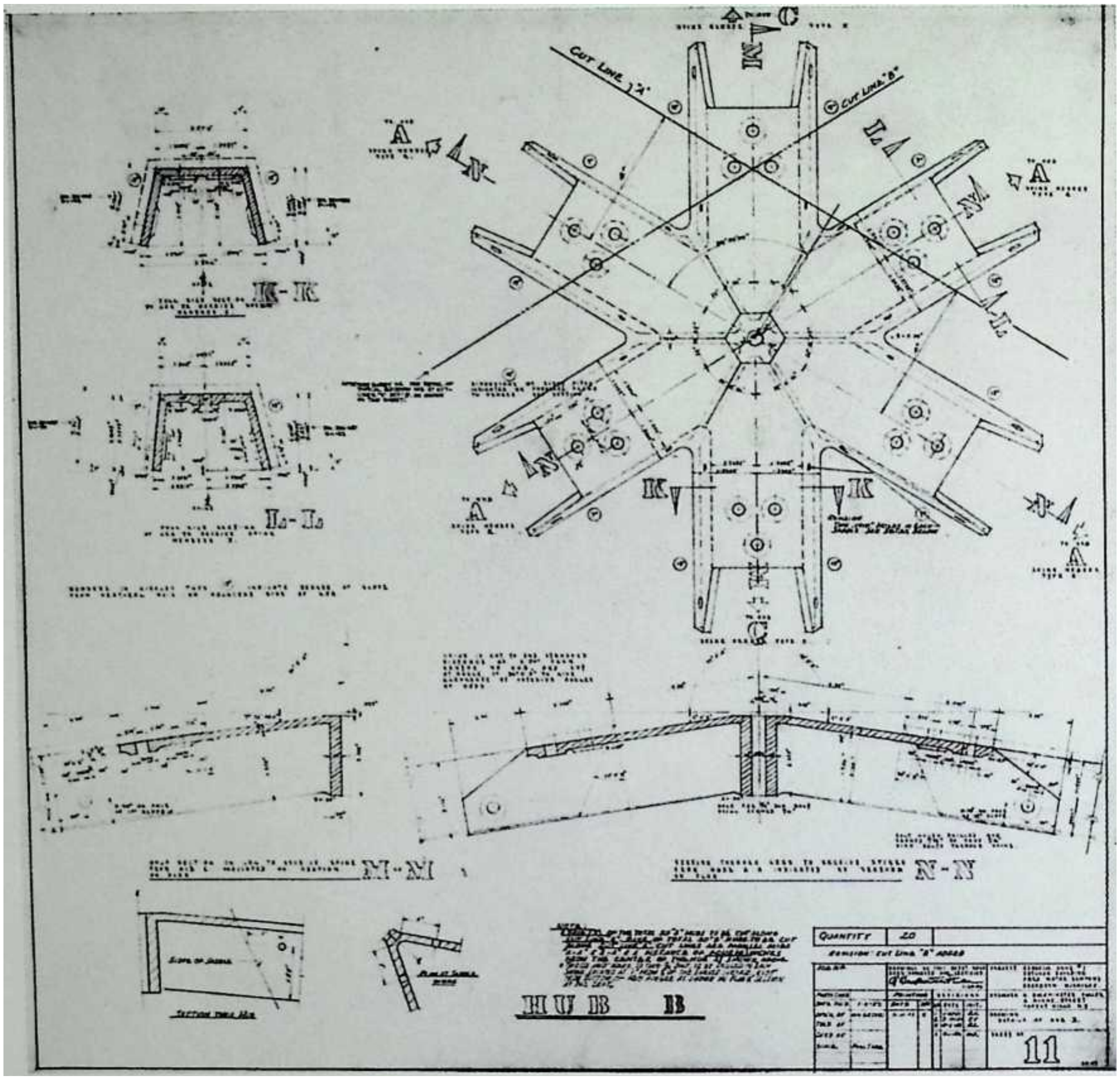




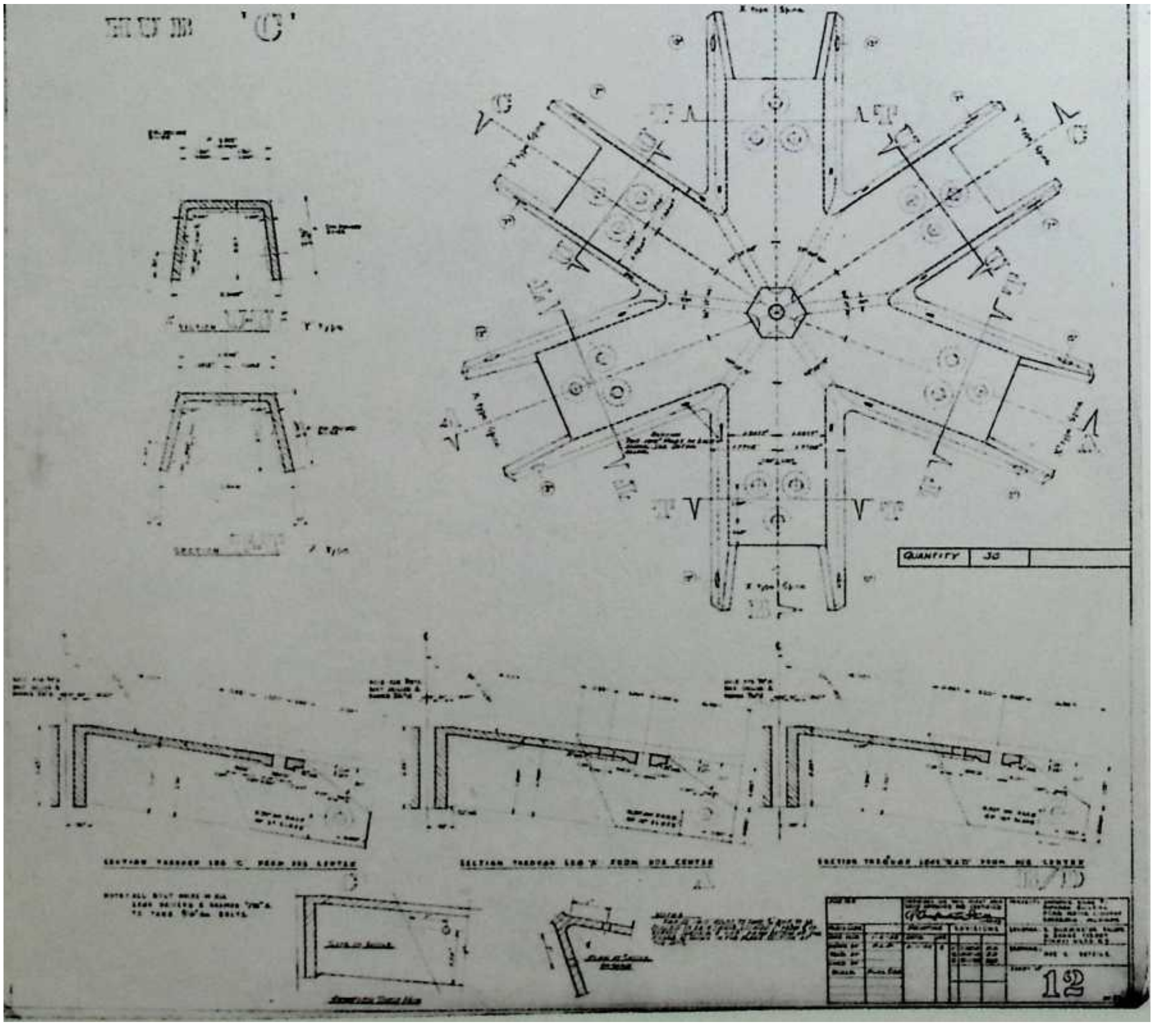



TOP
HUB A
BOTTOM
TOP
HUB B
BOTTOM
TOP
HUB C
BOTTOM
TOP
HUB D
BOTTOM

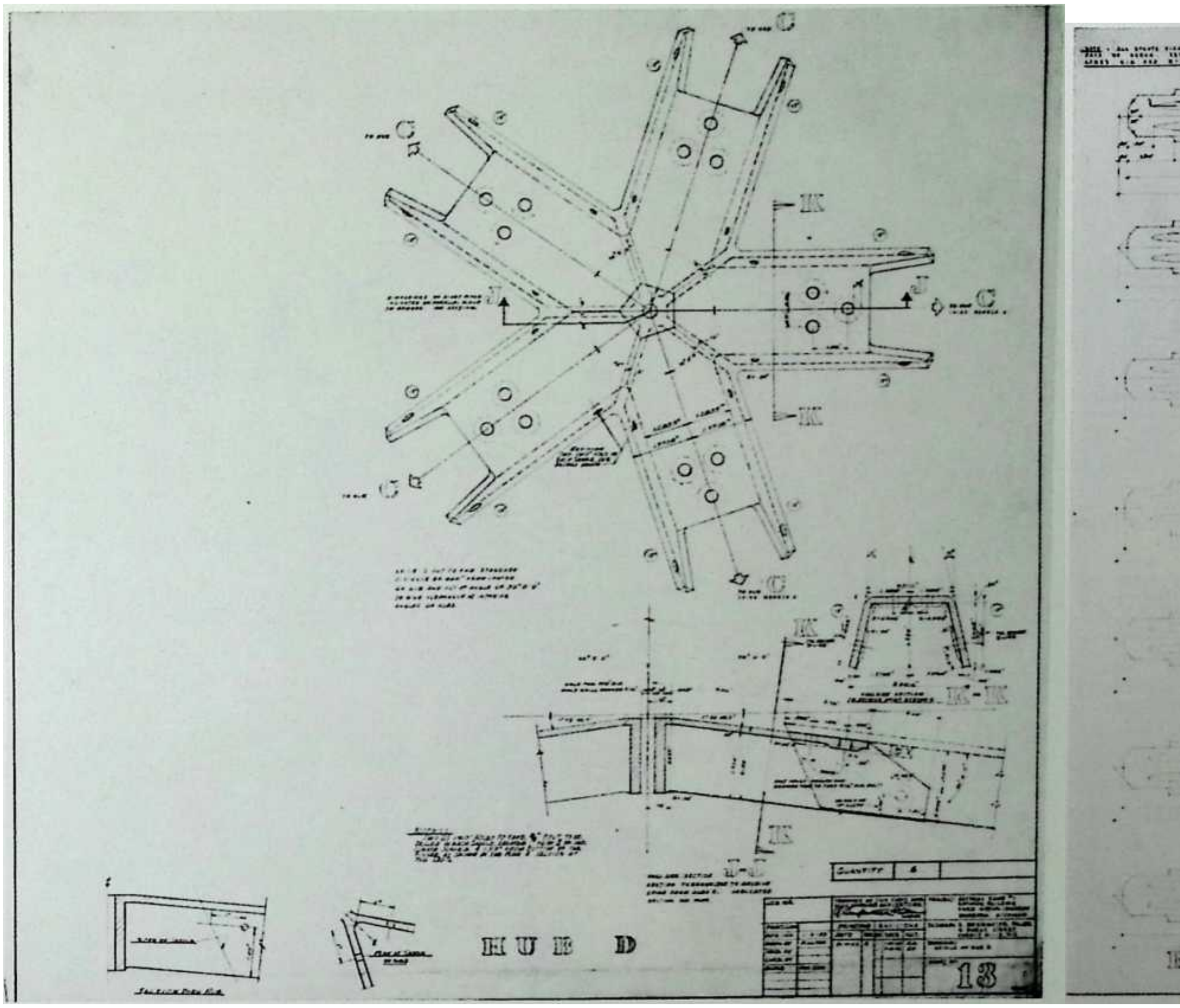


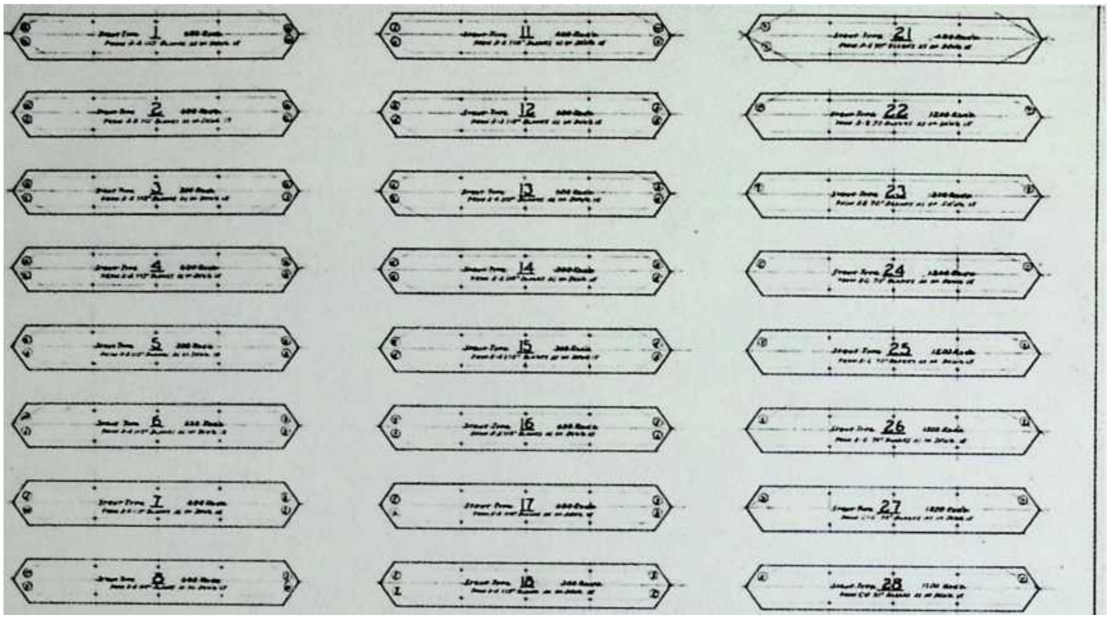


^35



THE GEODESIC REVOLUTIOxN, PART 1 137


HUB D
13


1
2
3
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11
12
13
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17
18
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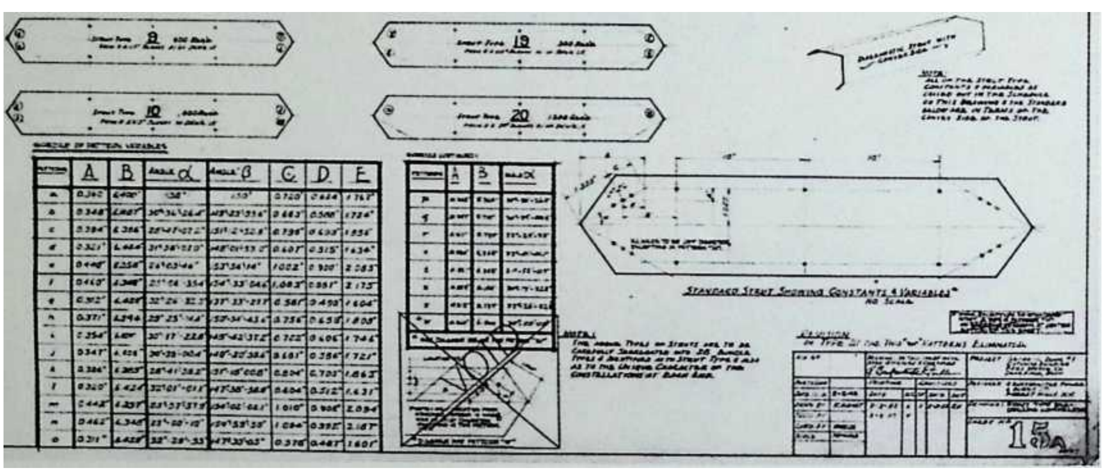
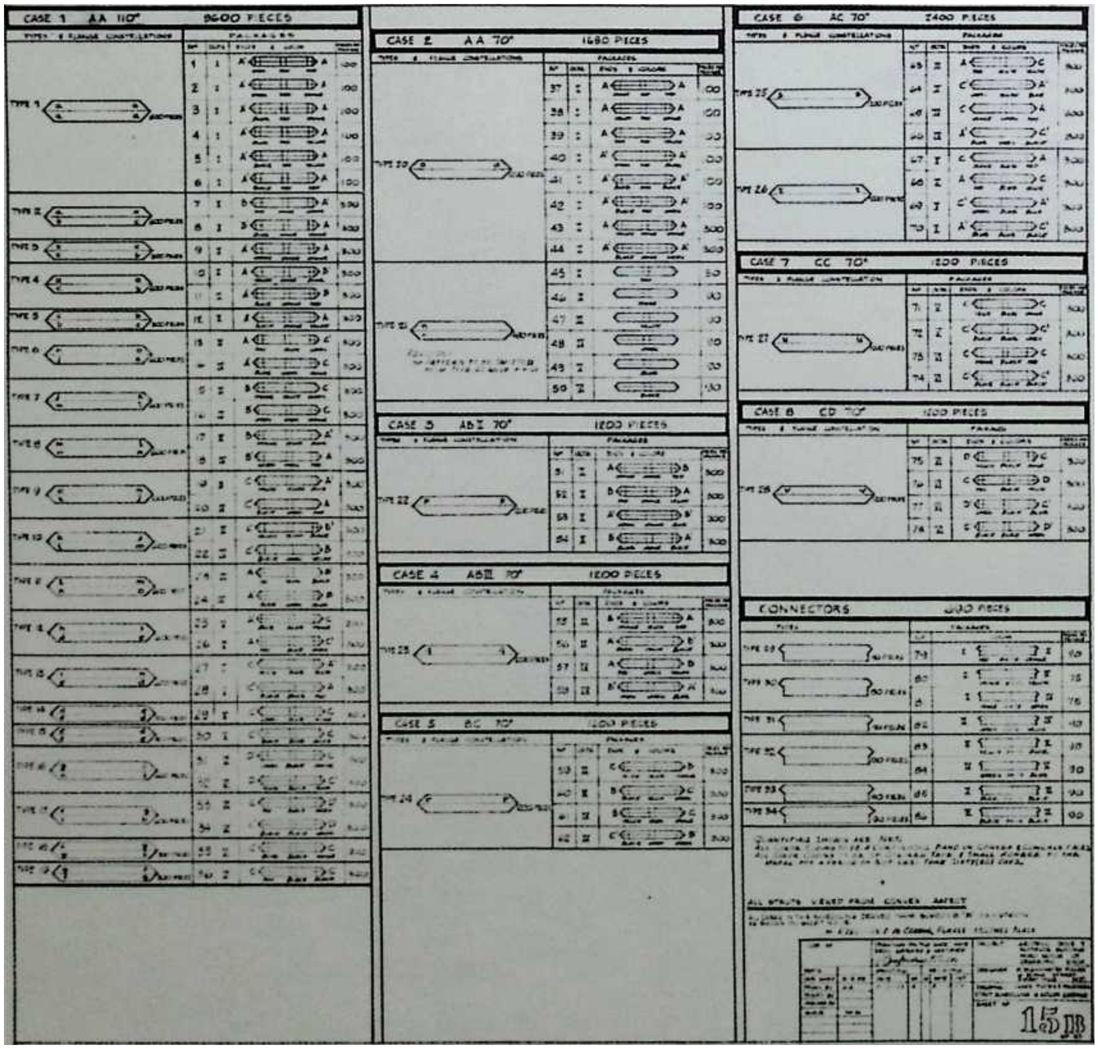
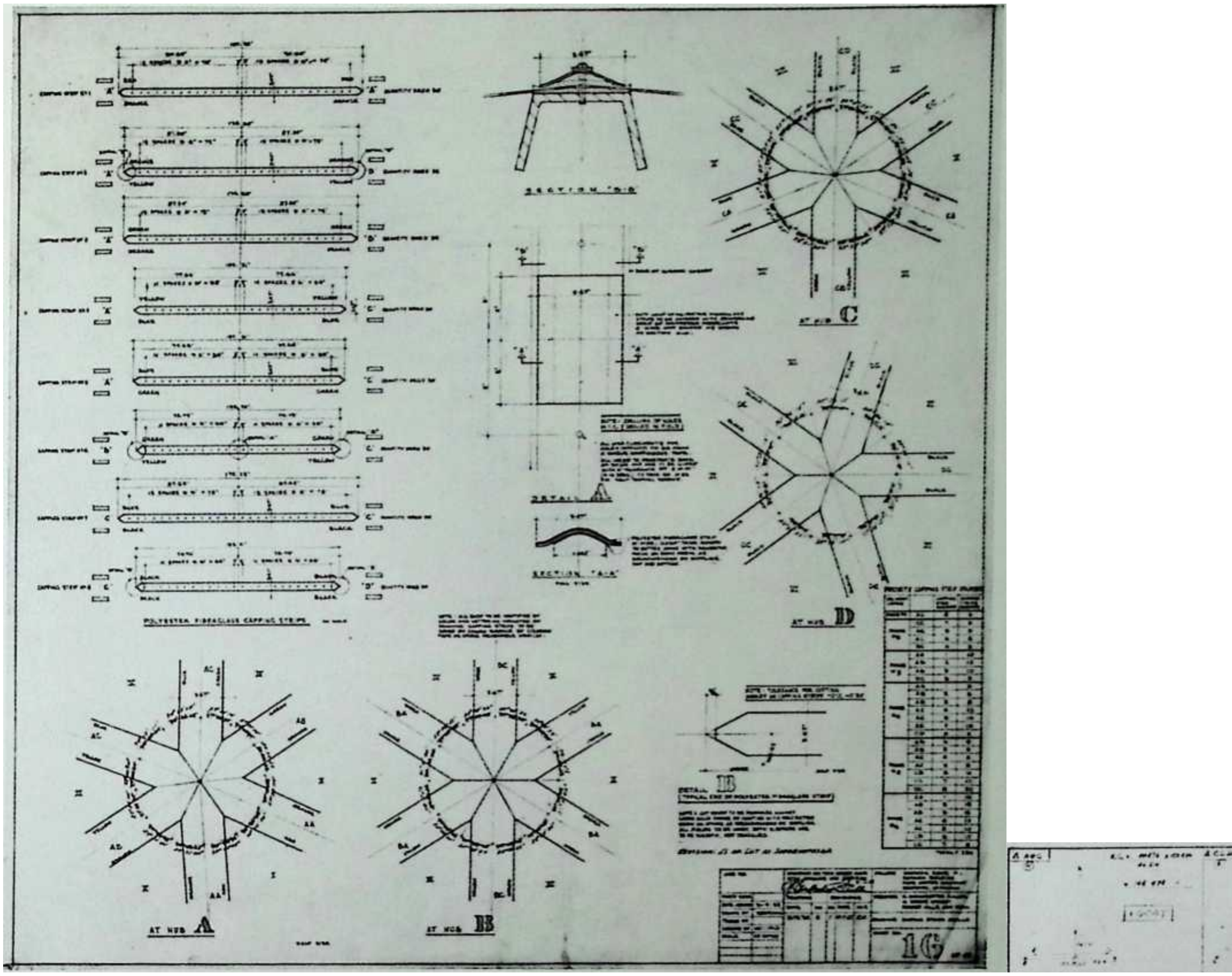
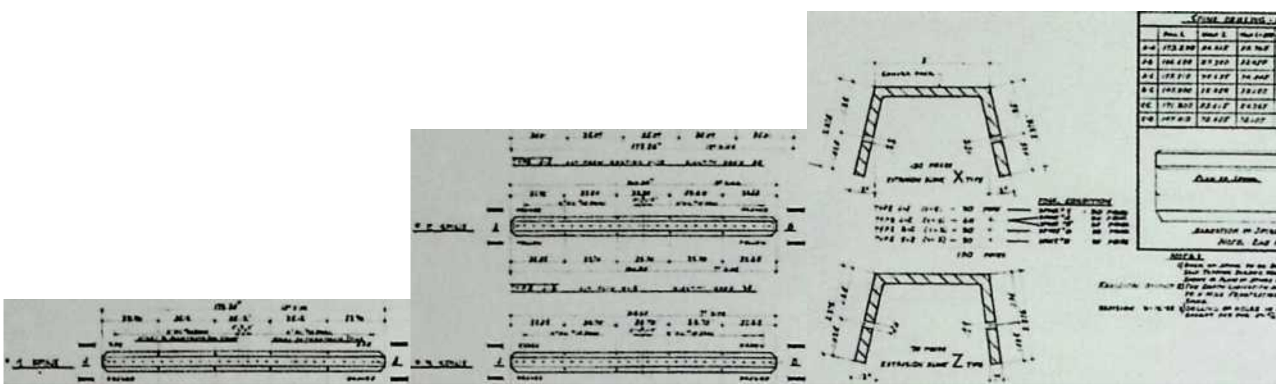
22
23
24
25
26
27
28

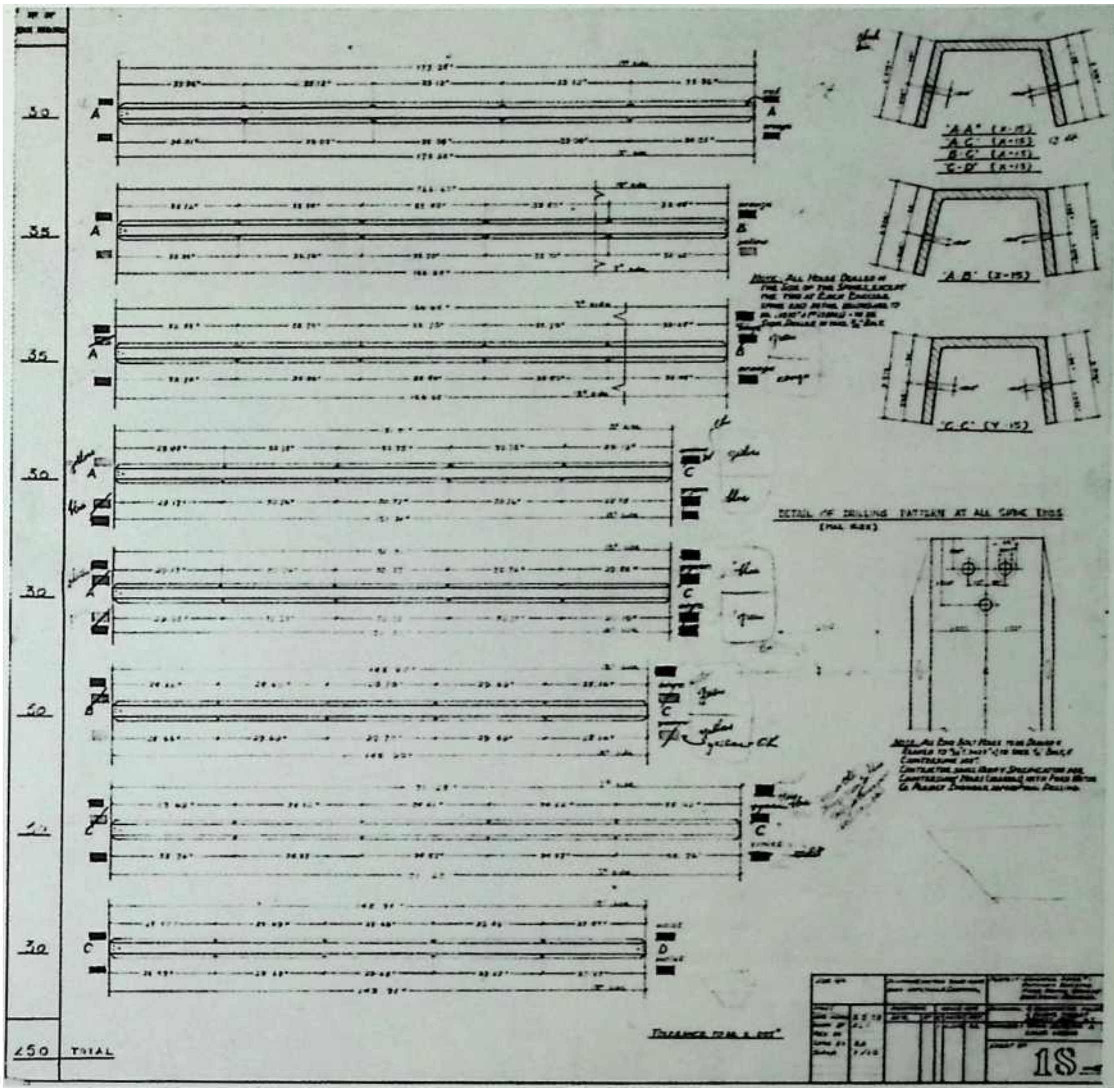
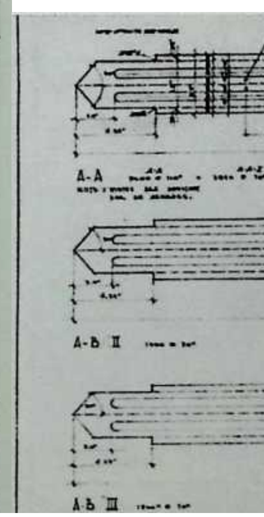

8
10
19
20
A
B
C
D
E
STANDARD STRUT SHOWING CONSTANTS & VARIABLES
NO SCALE
15

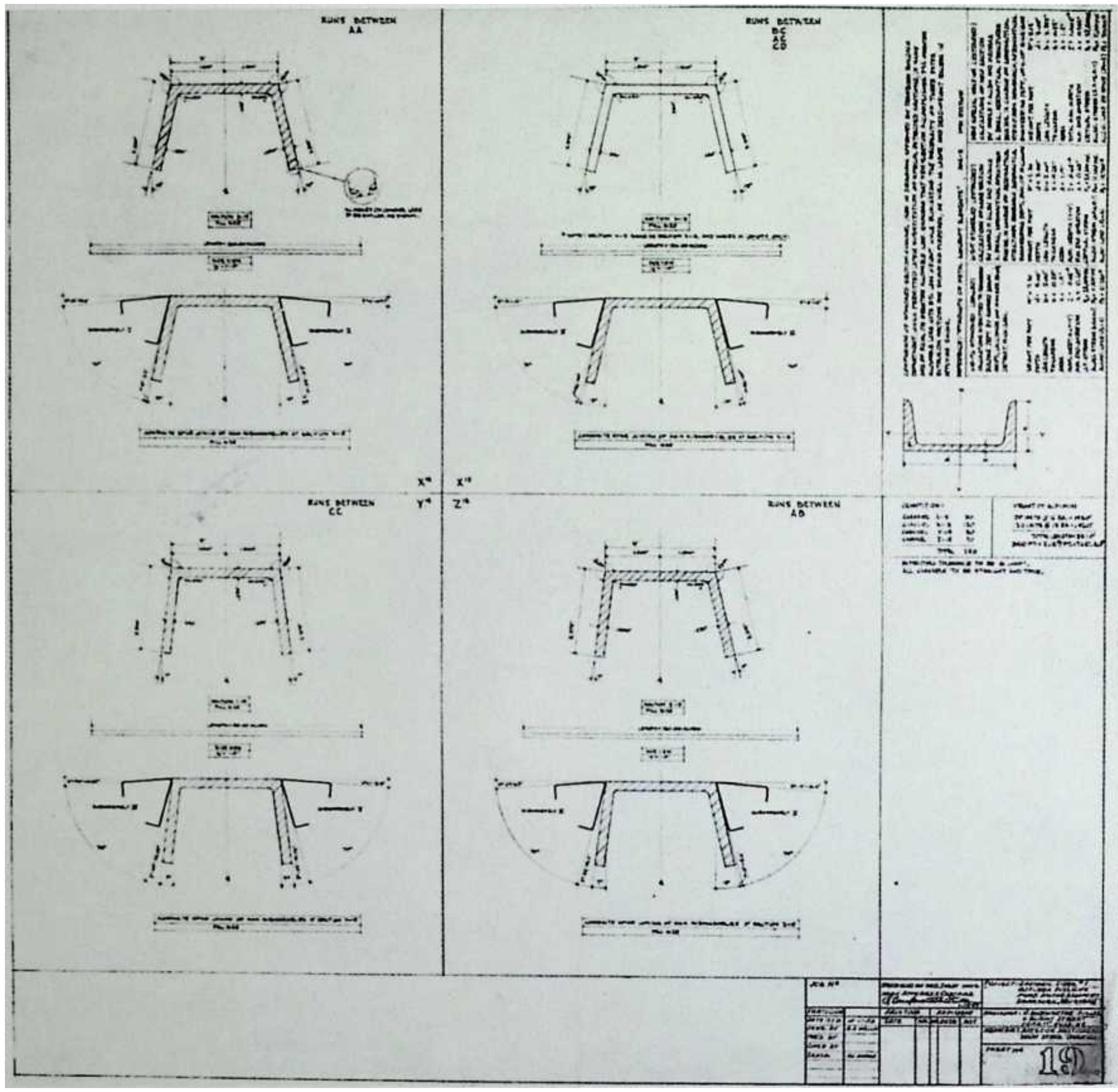

CASE 1 AA 110° 9600 PIECES
CASE 2 AA 70° 1680 PIECES
CASE 6 AC 70° 2400 PIECES
CASE 7 CC 70° 1200 PIECES
CASE 8 CD 70° 1200 PIECES
CASE 3
CASE 4
CASE 5 BC 70° 1200 PIECES
CONNECTORS
15DB

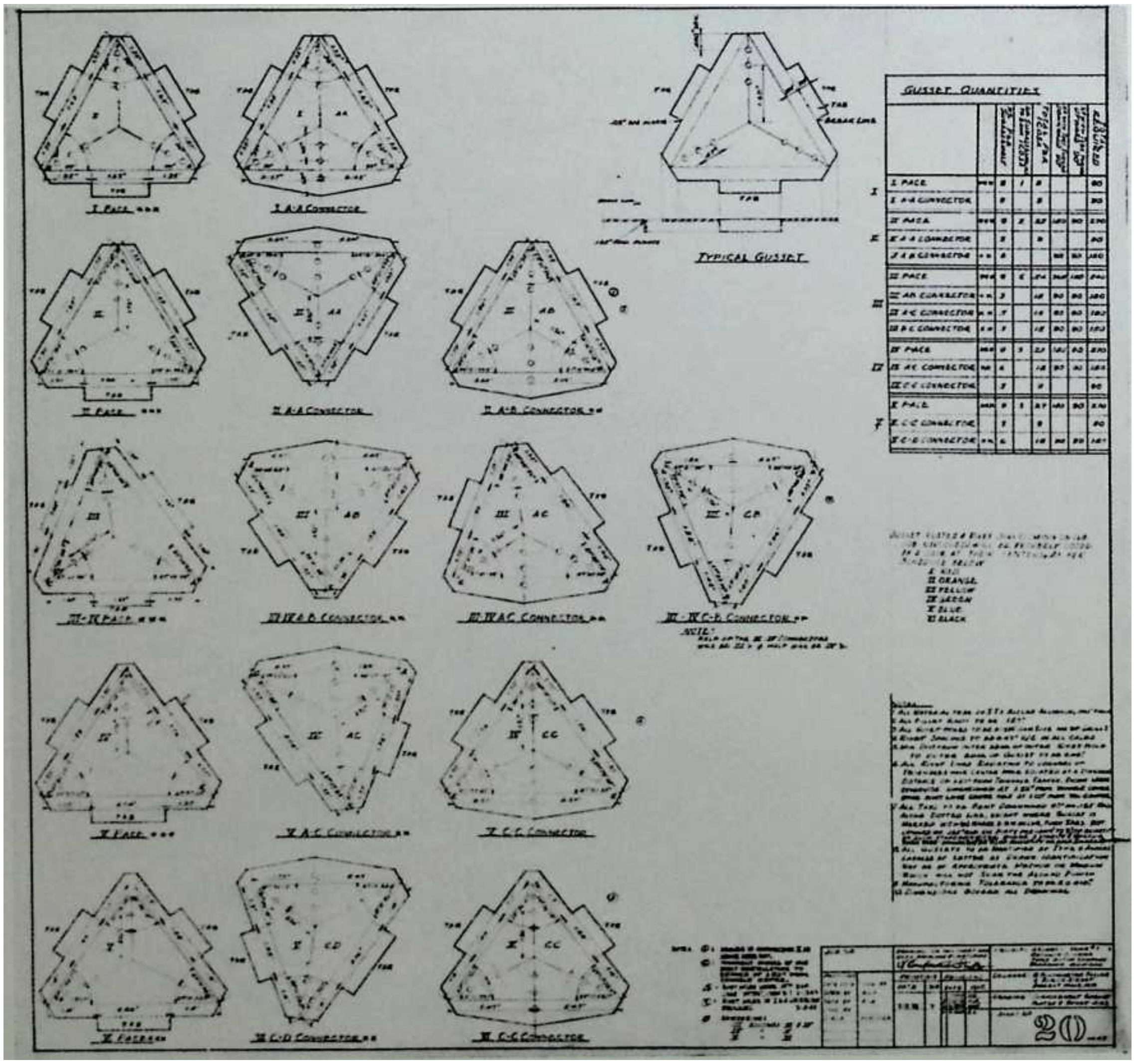
j •


SECTION "B-B"
AT HUB C
DETAIL A
SECTION "A-A"
AT HUB D
POLYESTER FIBERGLASS CAPPING STRIPS
DETAIL B
AT HUB A
AT HUB B
16




RUNS BETWEEN
AA
RUNS BETWEEN
RUNS BETWEEN
CC
RUNS BETWEEN
AD
X
X
Y
Z
19



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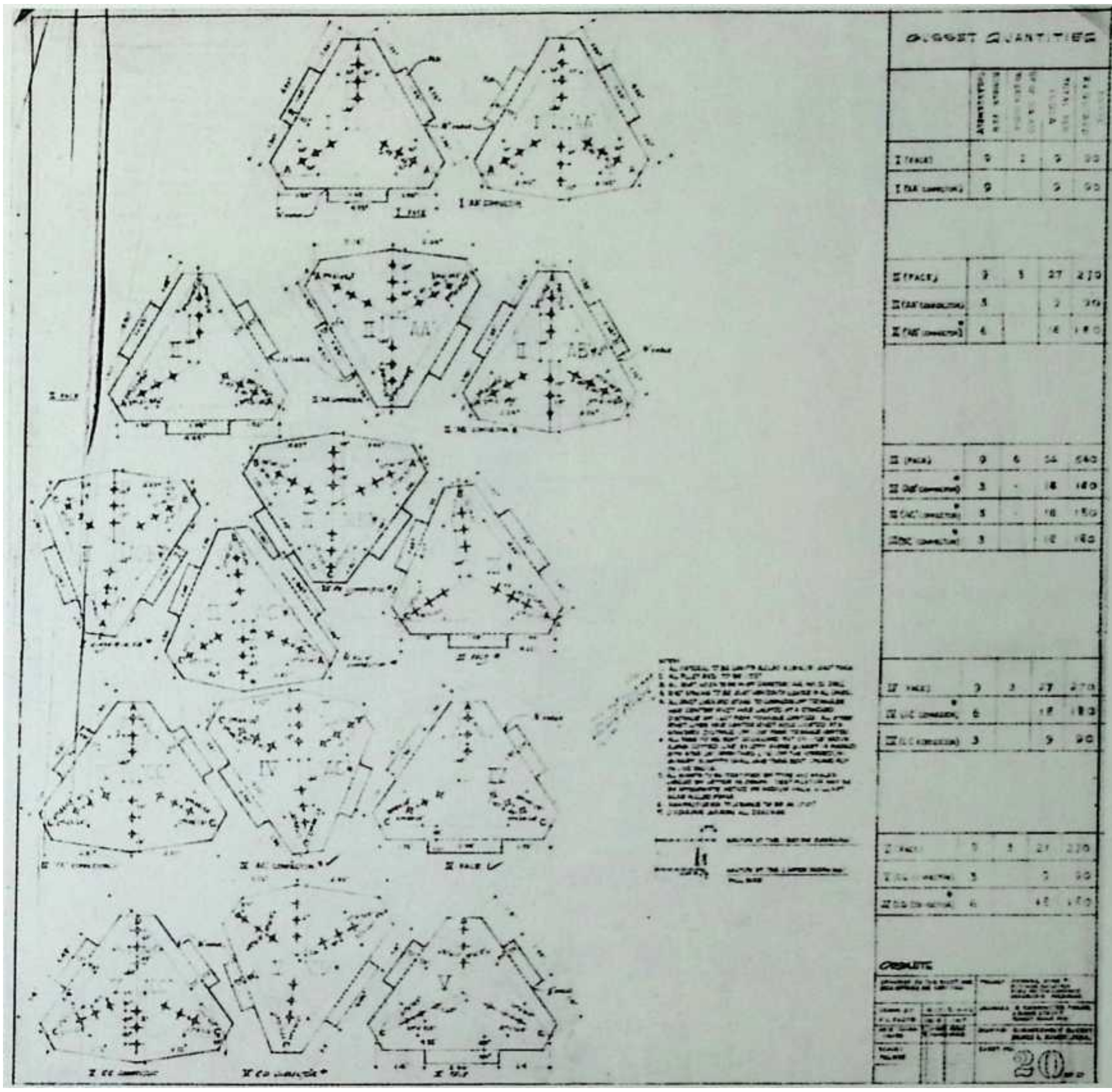
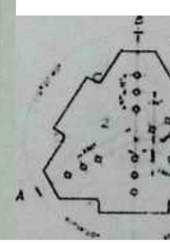
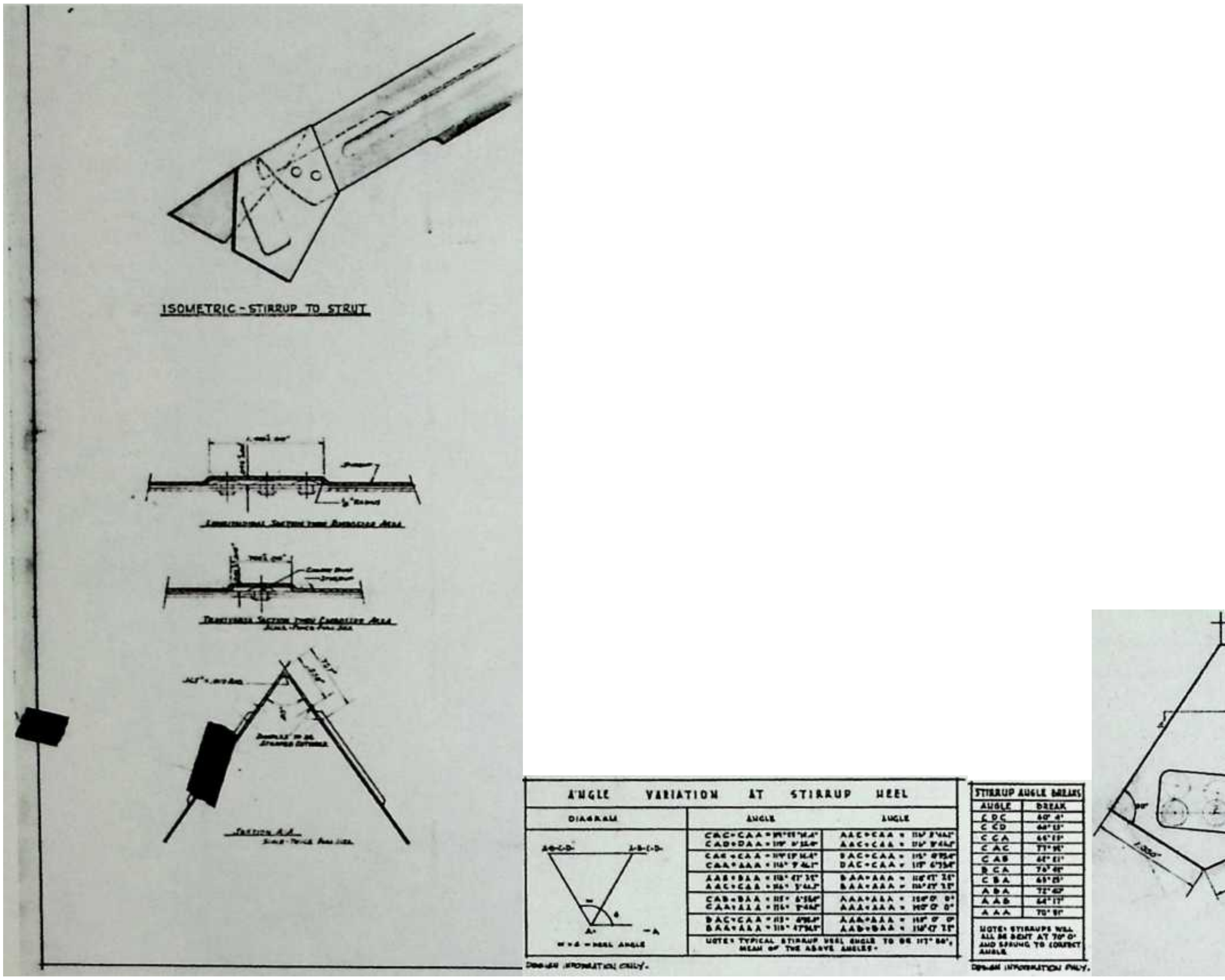
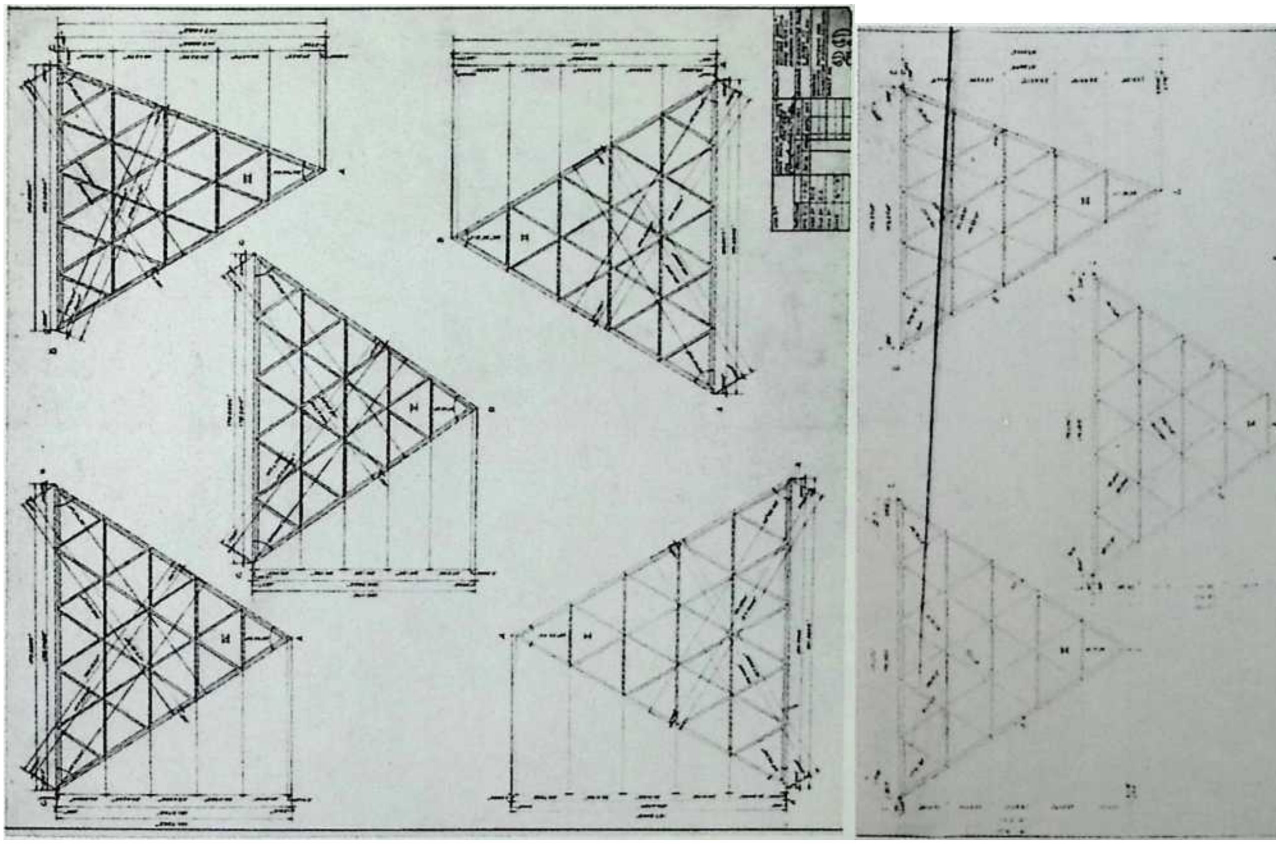
: Li'taci u*«uAt c.m o» u»r»m"n(

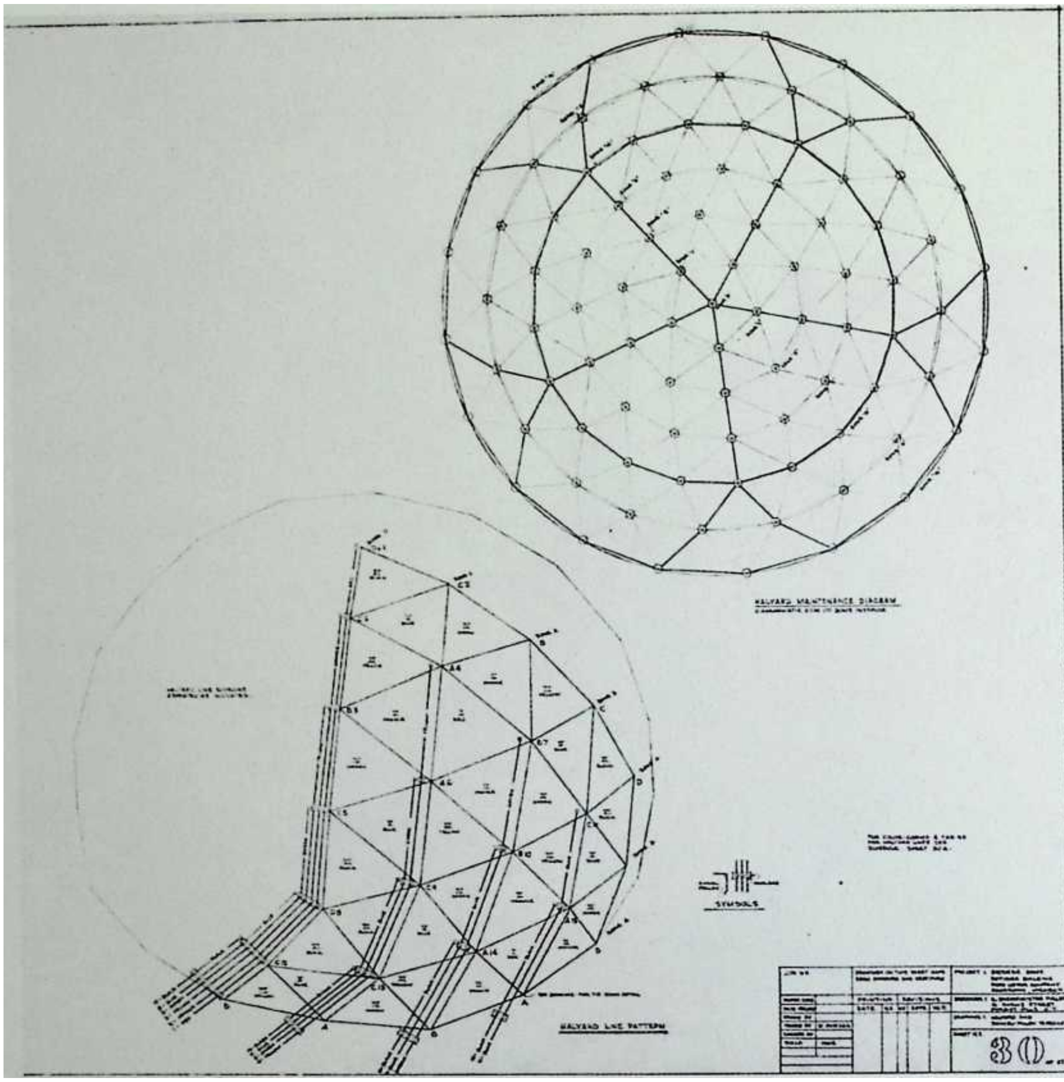

GUSSET QUANTITIES
20


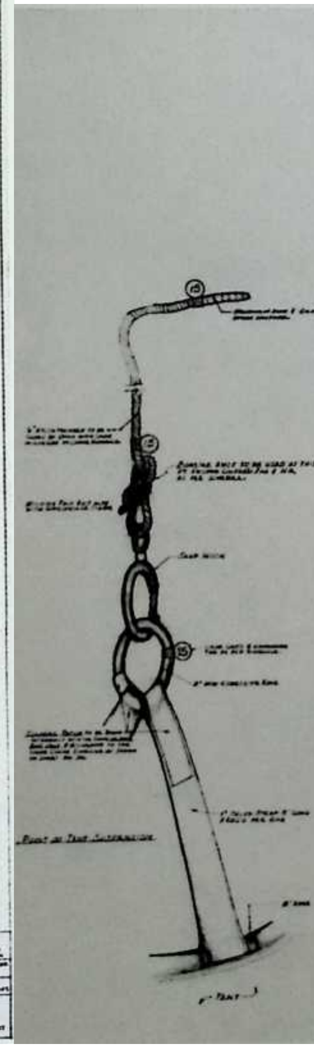


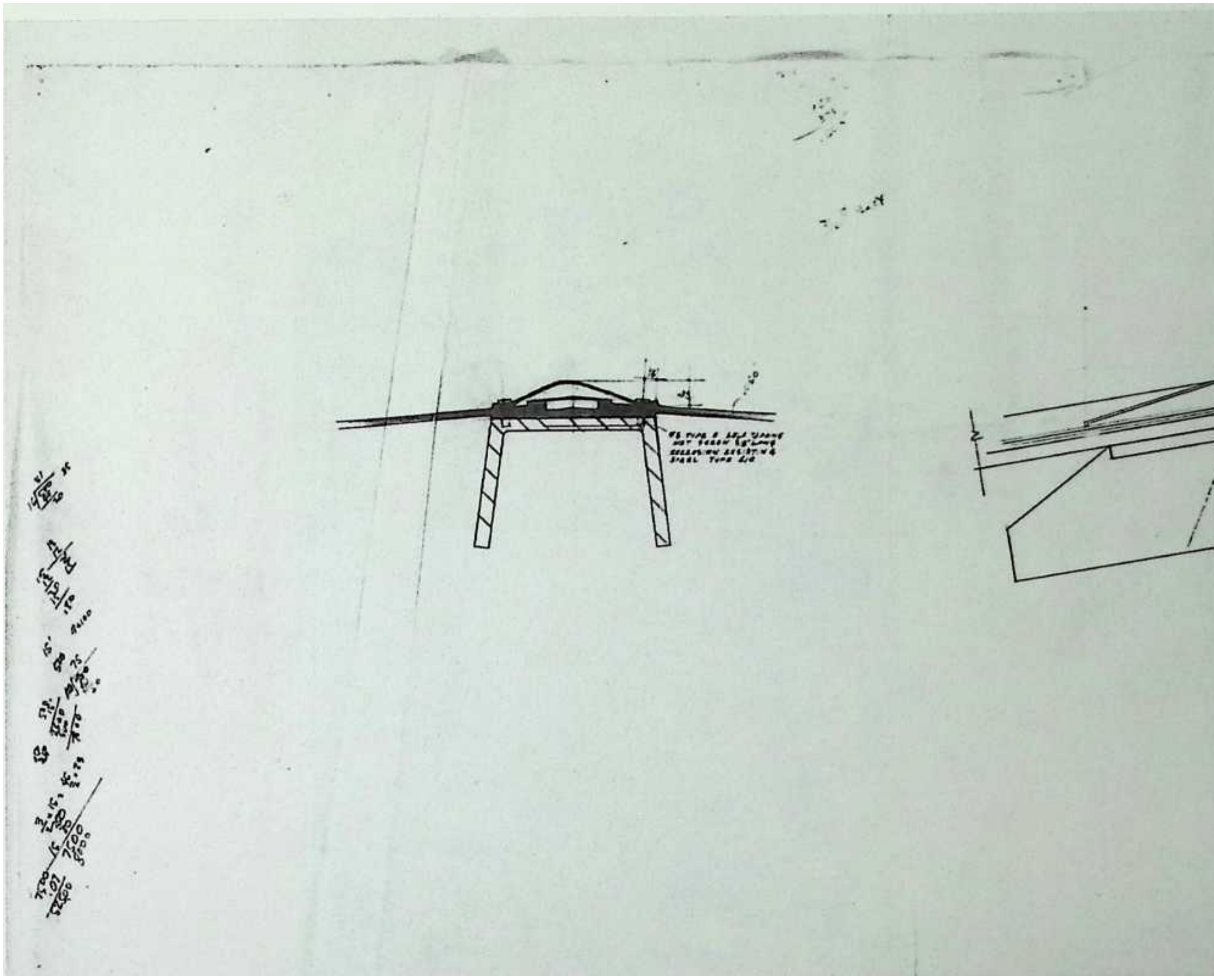
ISOMETRIC - STIRRUP TO STRUT
ANGLE VARIATION AT STIRRUP HEEL
DIAGRAM
ANGLE
ANGLE
STIRRUP ANGLE BREAKS
ANGLE
BREAK
C D C
C C D
C C A
C A C
C A B
B C A
C B A
A B A
A A B
A A A

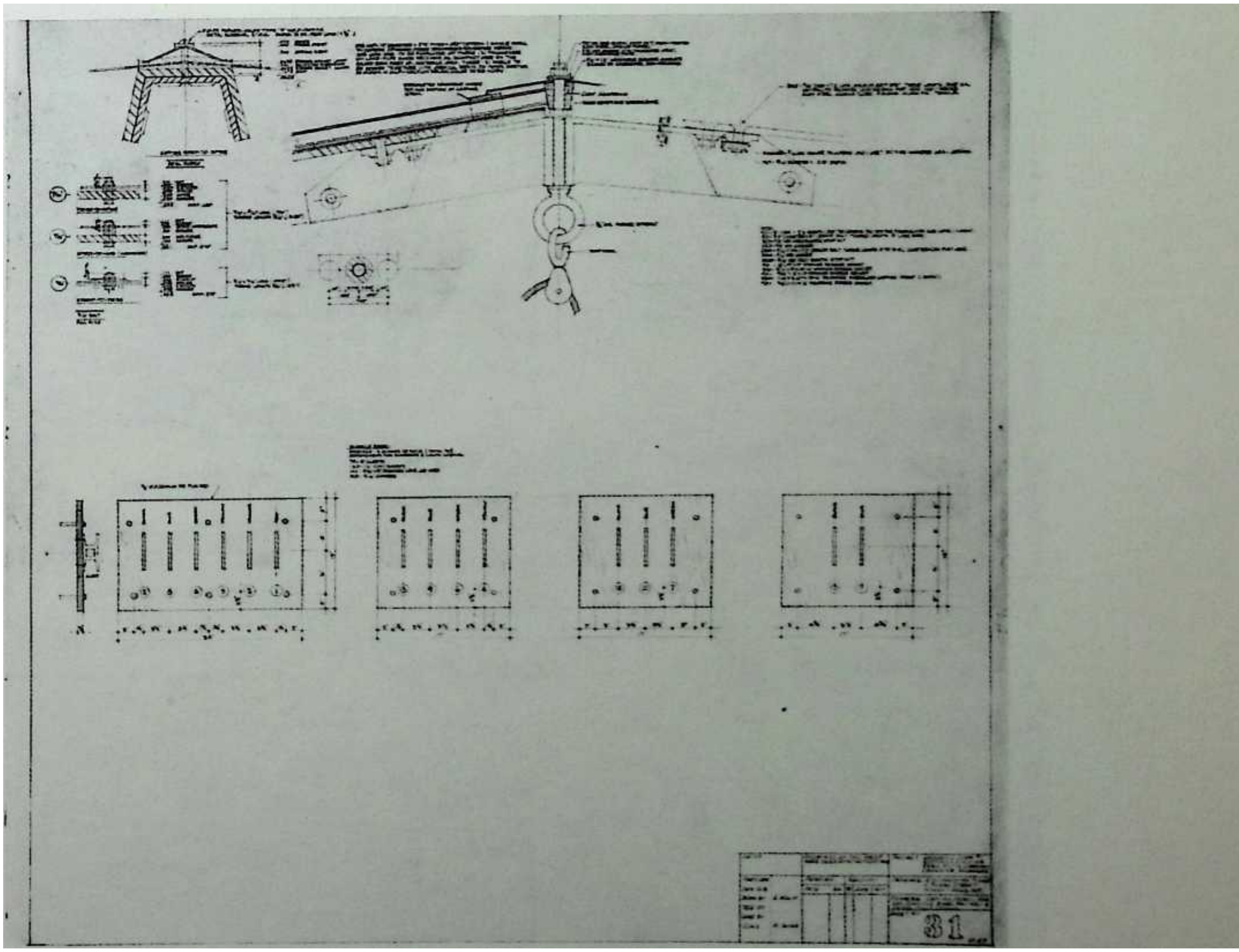


146 THE GEODESIC REVOLUTION, PART 1

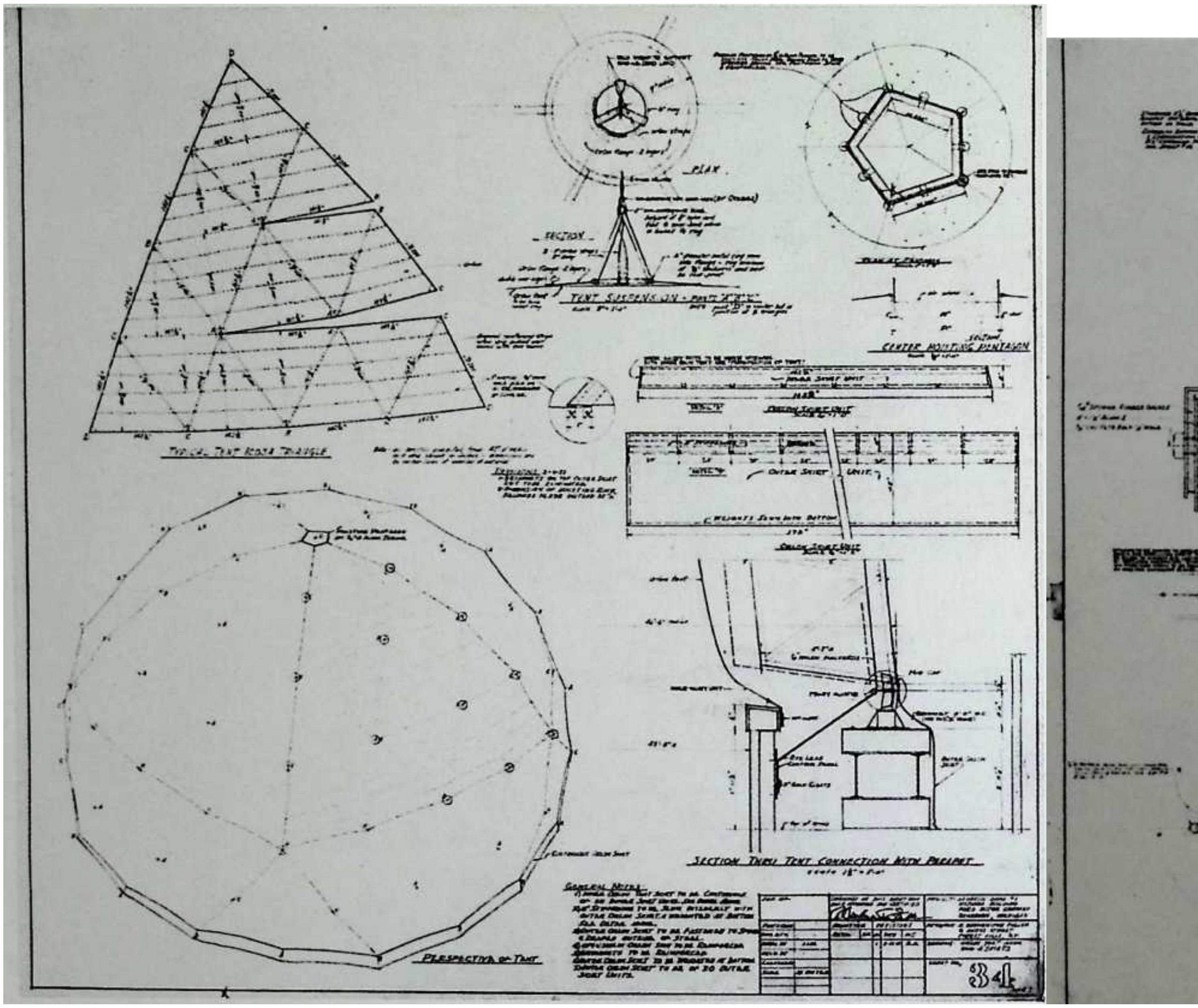


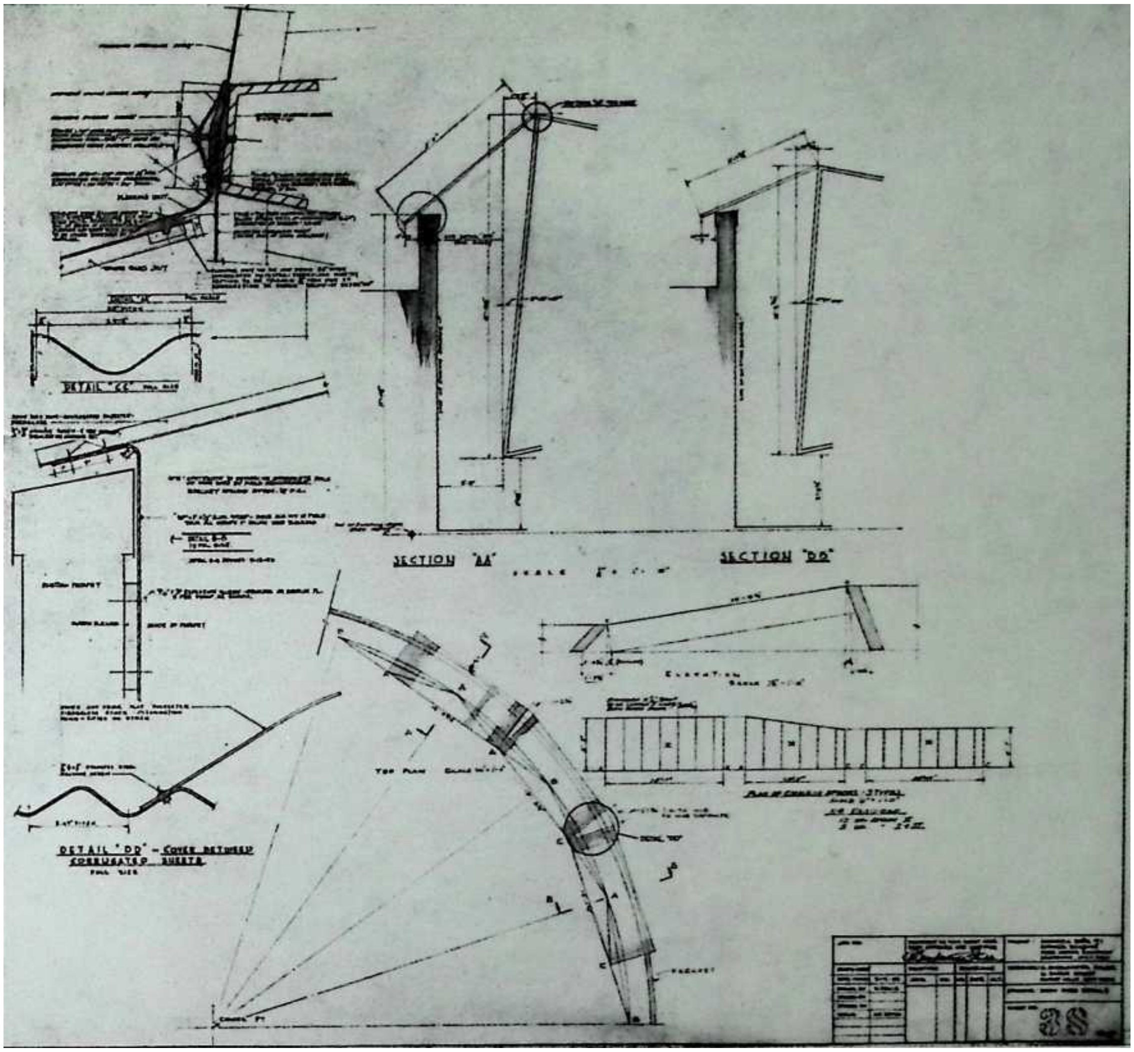


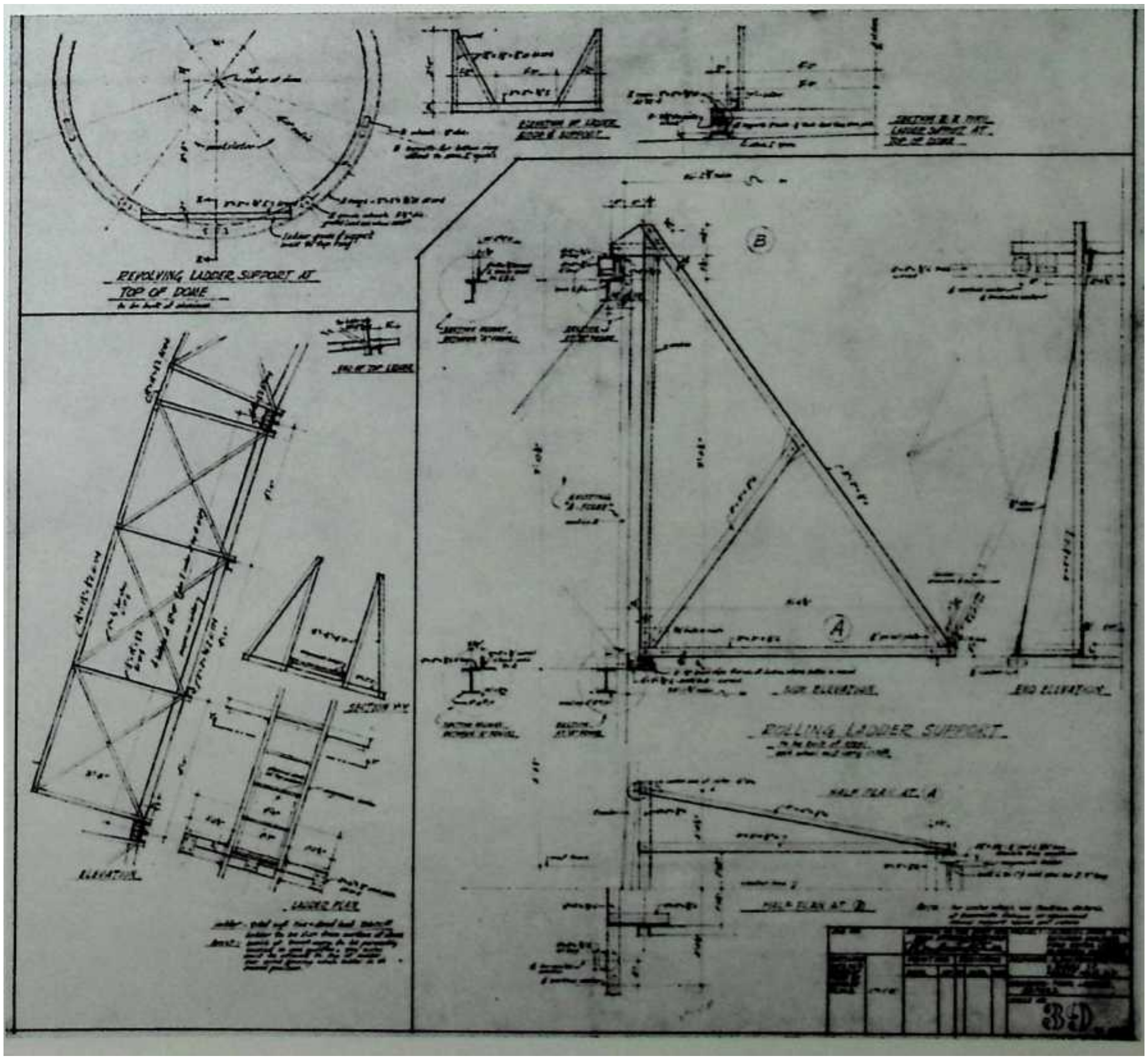


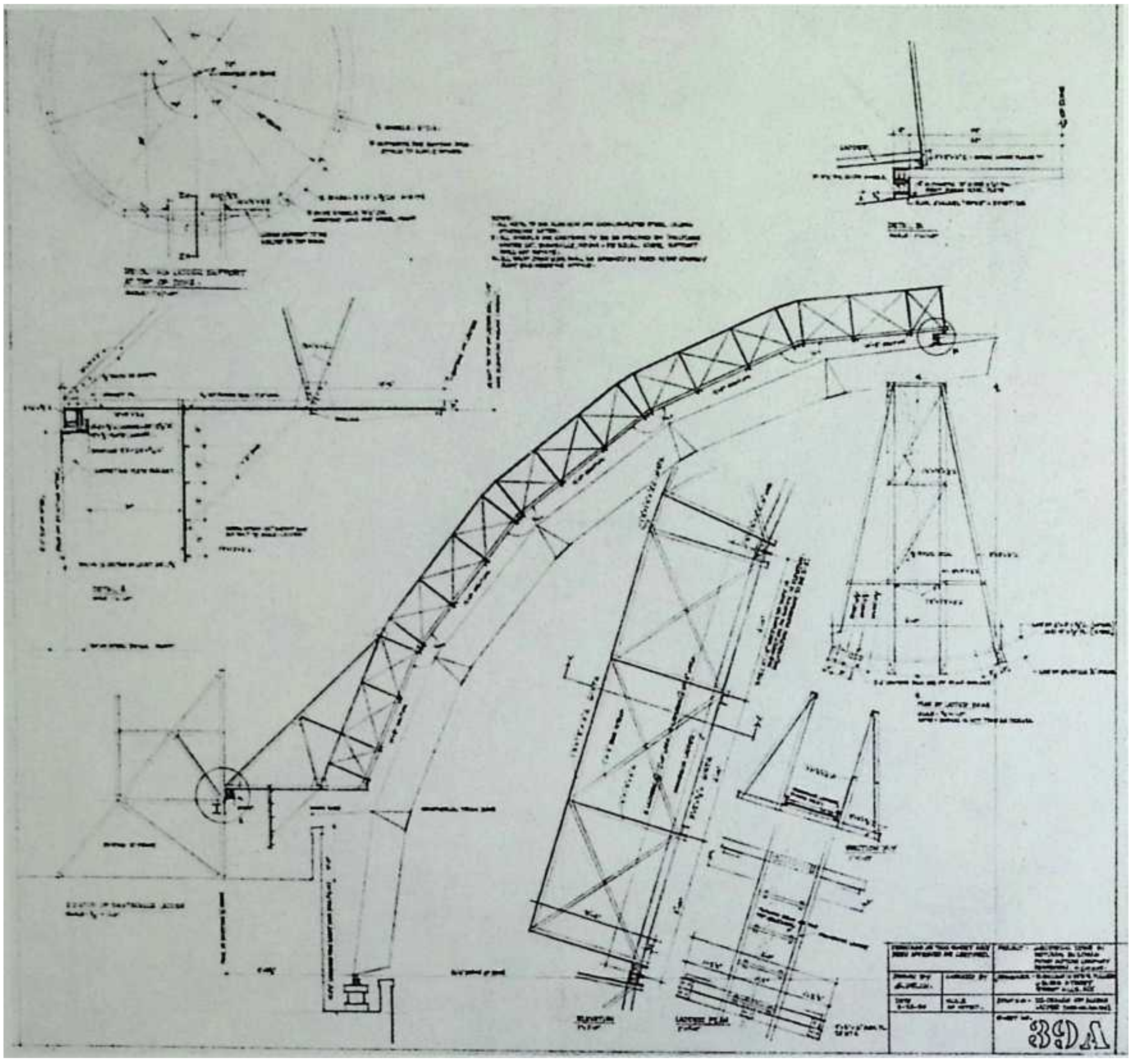


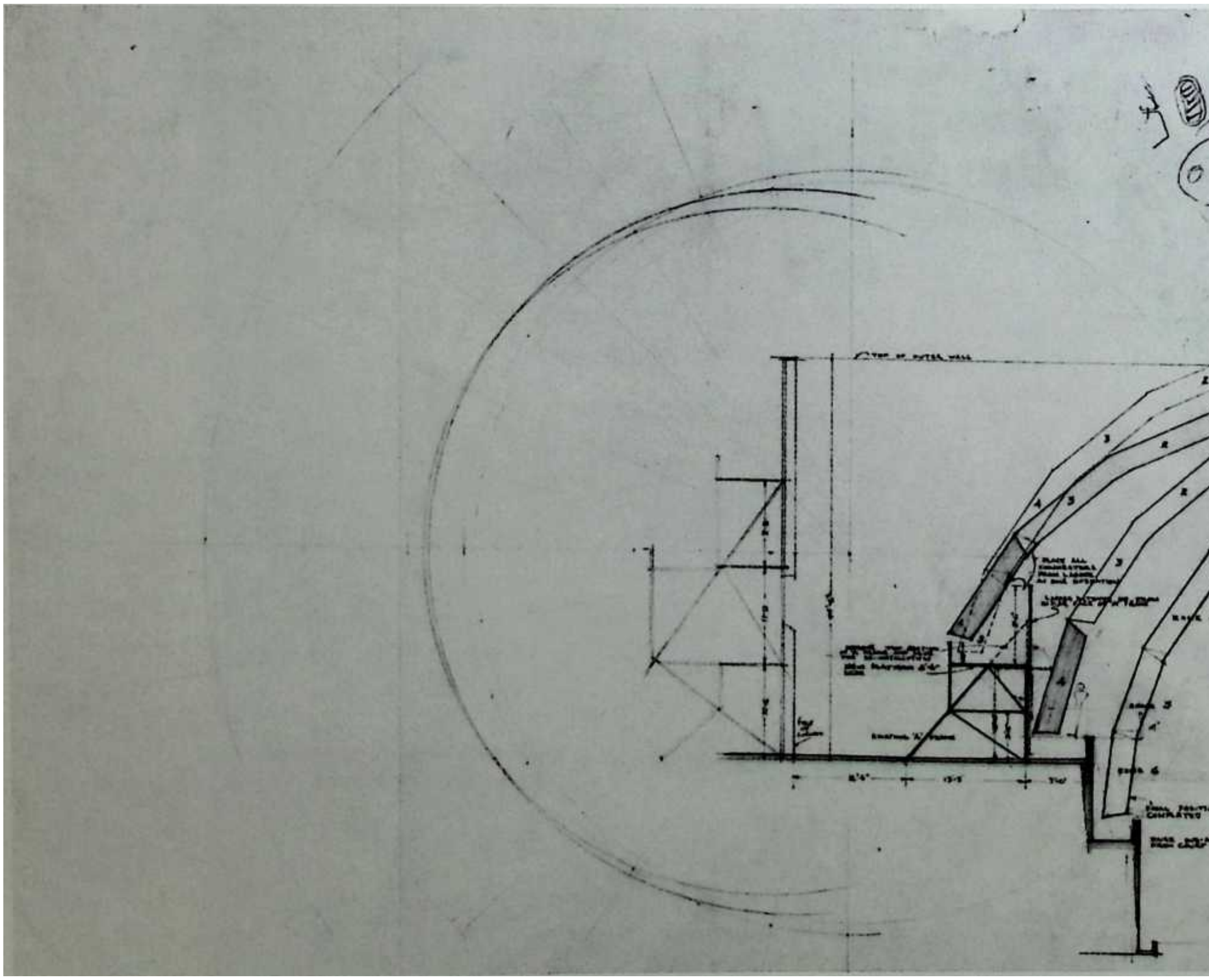
148 THE GEODESIC REVOLUTION, PART 1

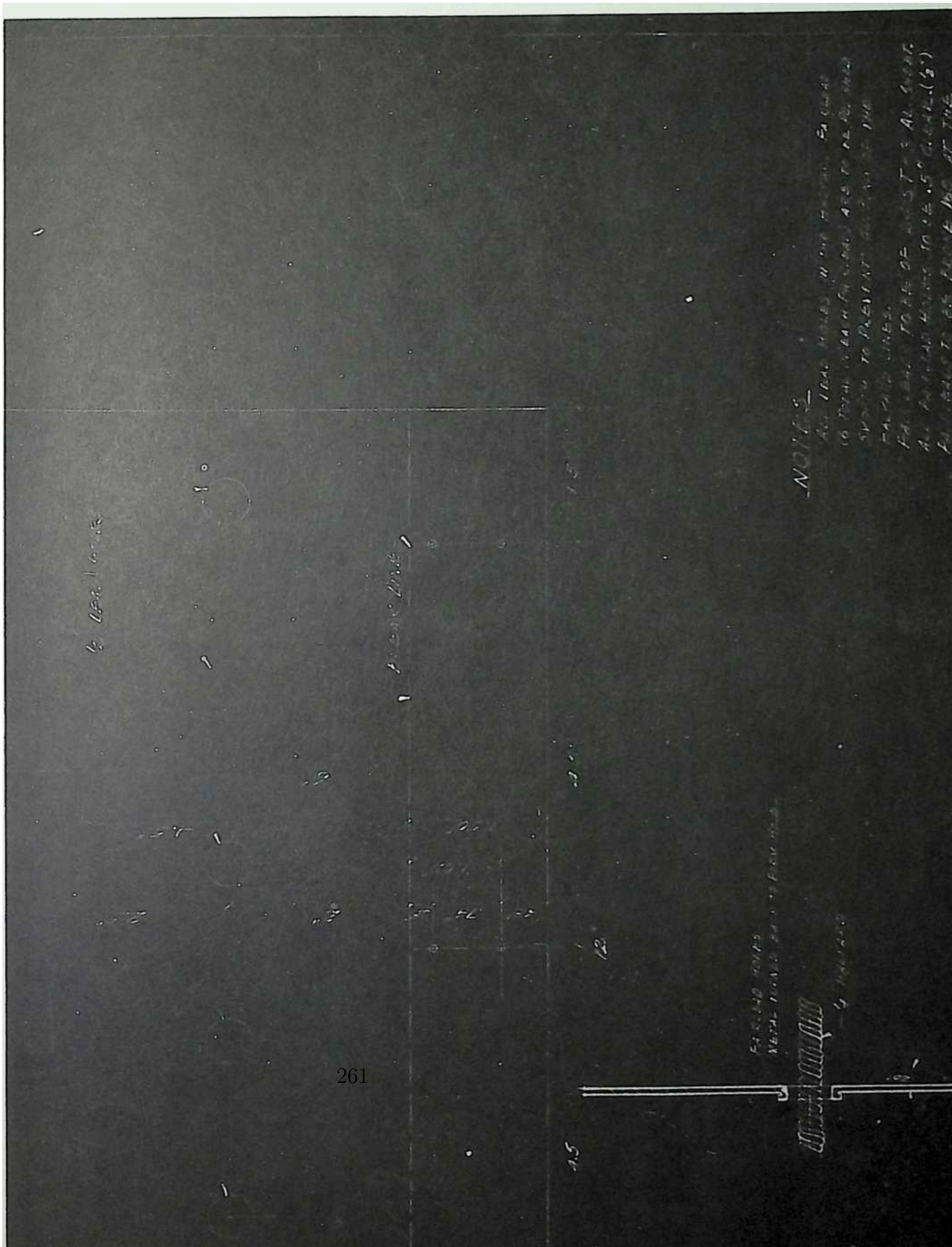

PLAN
SECTION
CENTER MOUNTING PENTAGON
PERSPECTIVE OF TENT
SECTION THRU TENT CONNECTION WITH PARAPET
GENERAL NOTES
34


SECTION "AA"
SECTION "DD"
DETAIL "CC"
DETAIL "DD" - COVER BETWEEN CORRUGATED SHEETS
TOP PLAN
ELEVATION
38


REVOLVING LADDER SUPPORT AT TOP OF DOME
ROLLING LADDER SUPPORT
END ELEVATION
ELEVATION
LADDER PLAN
HALF PLAN AT A
HALF PLAN AT B


39A



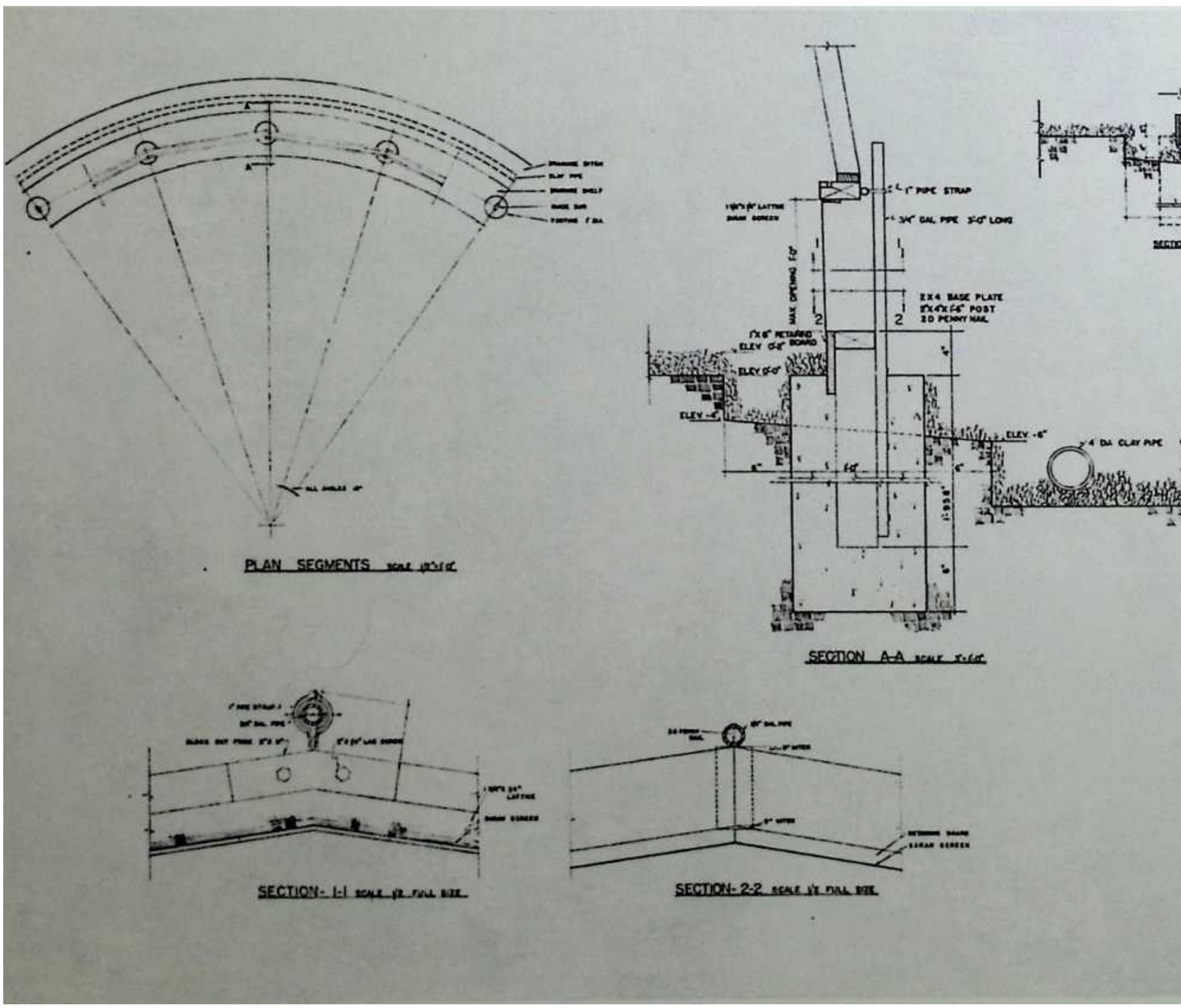

NOTES

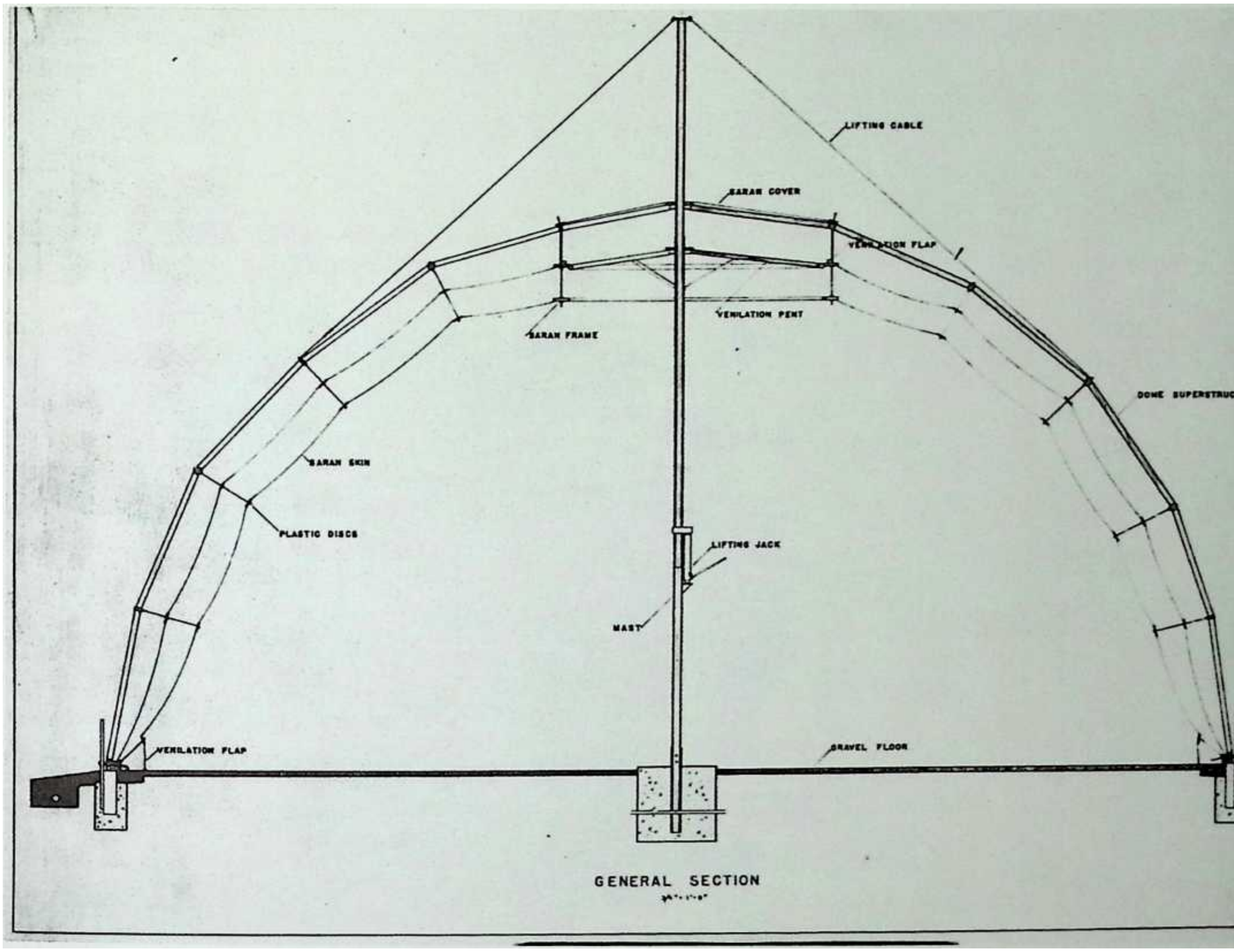
Experimental

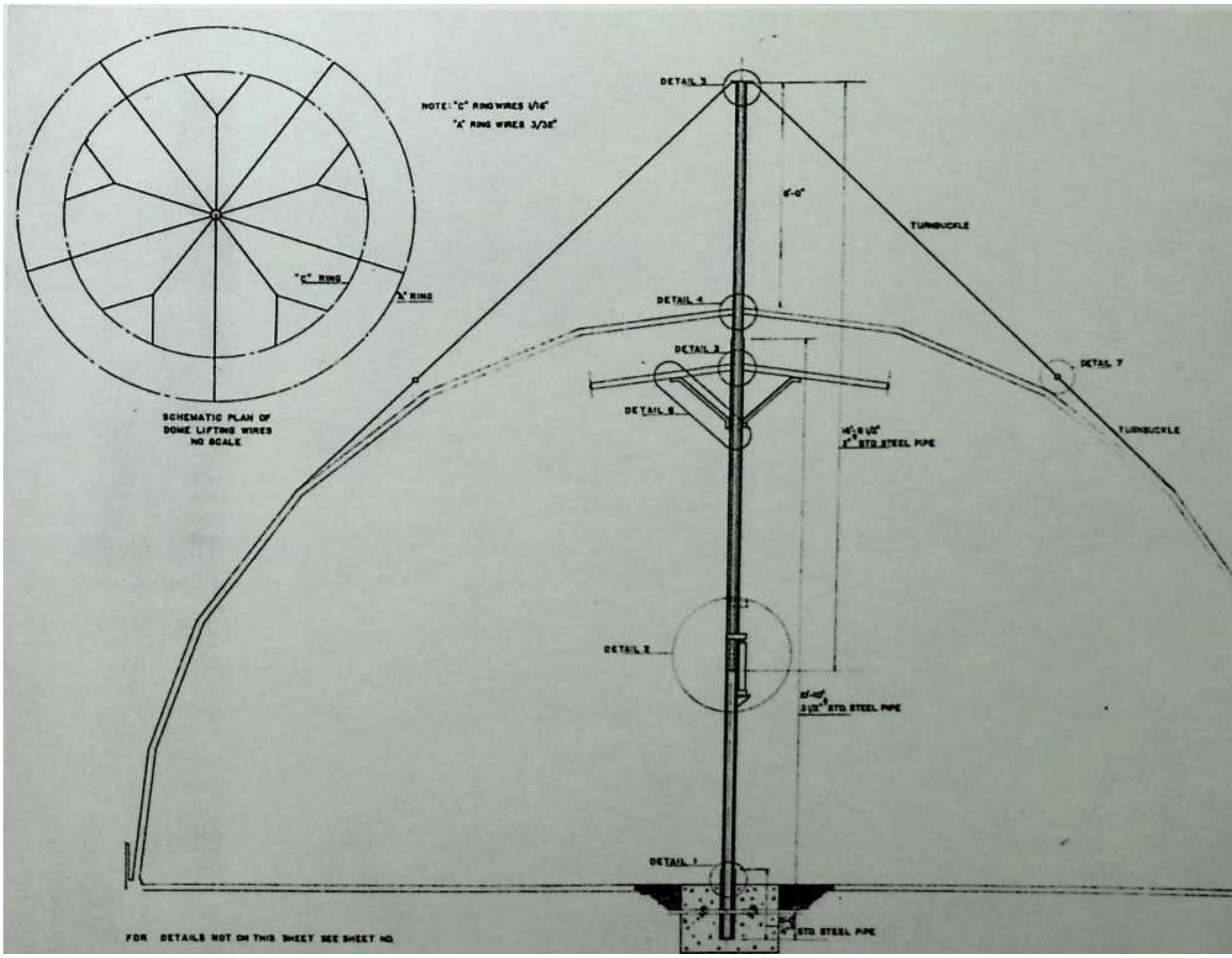
Greenhouse, School of

Design, North Carolina State College 1953

The experimental greenhouse erected at North Carolina State College was an academic exercise for Fuller's students to test the feasibility of the Skybreak designs that preceded it. Its wooden structure was hoisted and supported on a single mast and provided support for two veils of suspended Saran that served both as insulation and fenestration.

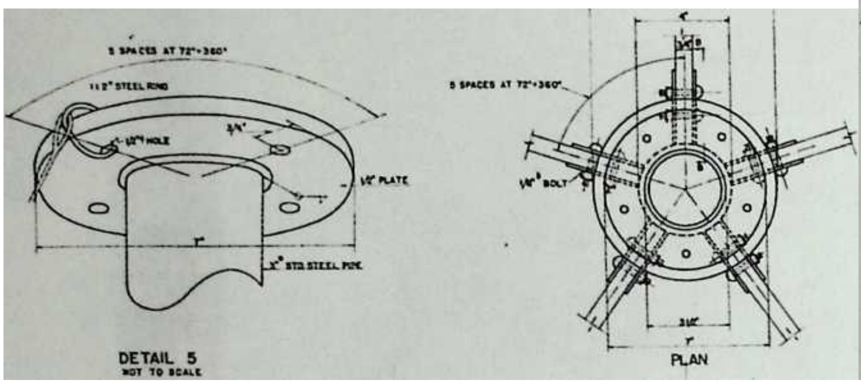


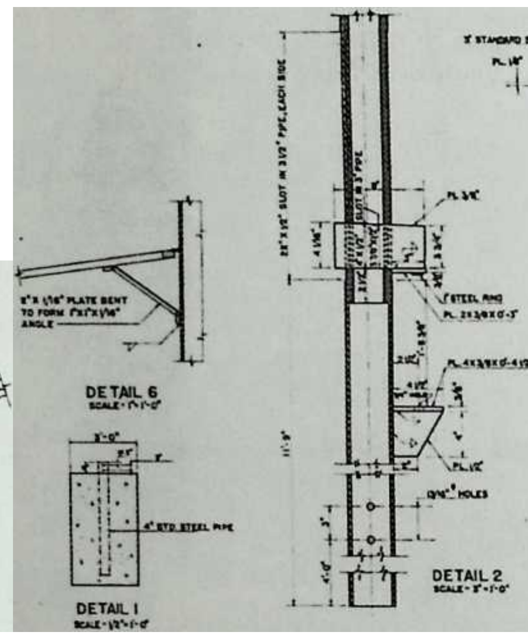

LIFTING CABLE
SARAN COVER
VENILATION FLAP
VENILATION PENT
SARAN FRAME
DOME SUPERSTRUC
SARAN SKIN
PLASTIC DISCS
LIFTING JACK
MAST
VENILATION FLAP
GRAVEL FLOOR
GENERAL SECTION

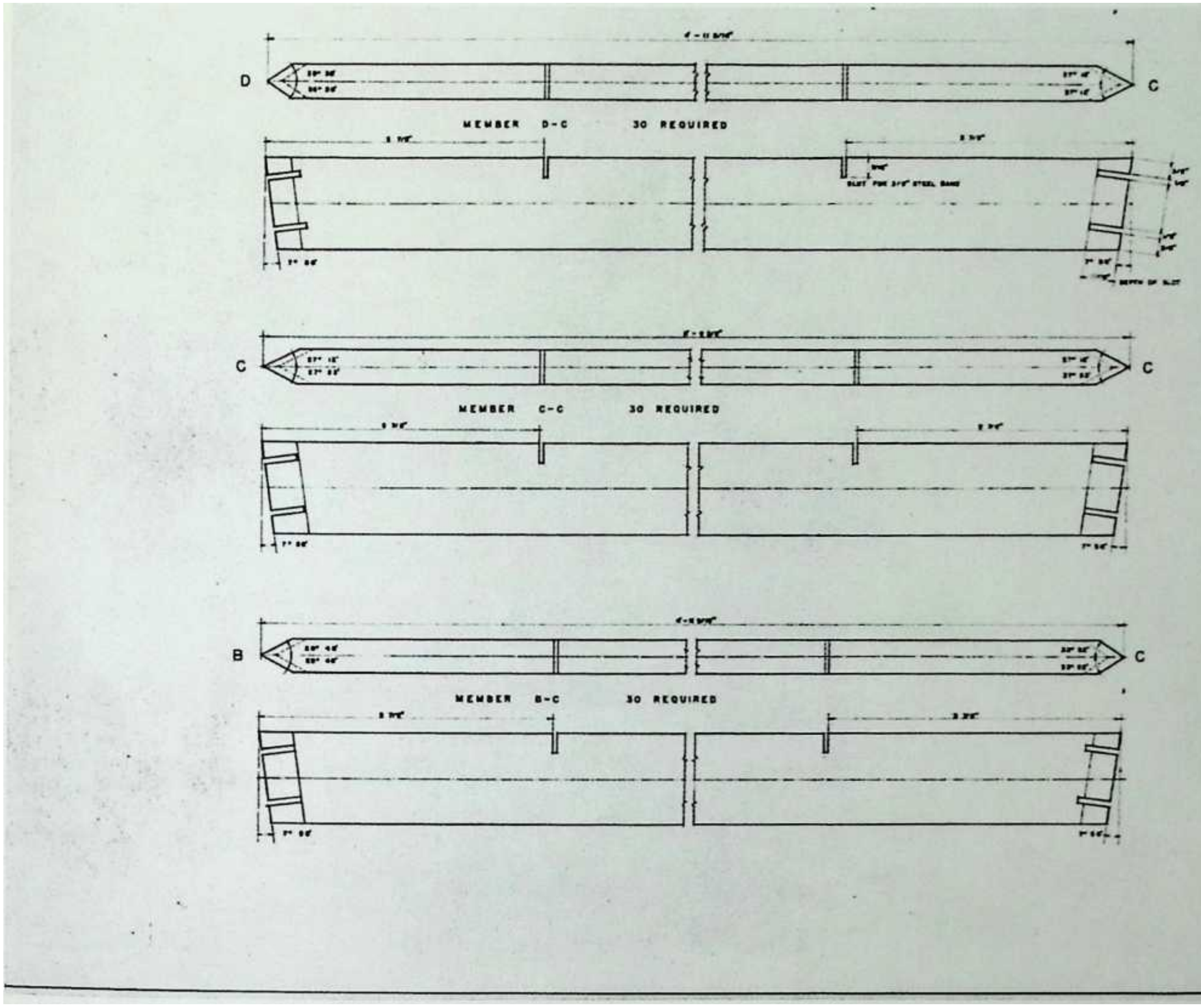


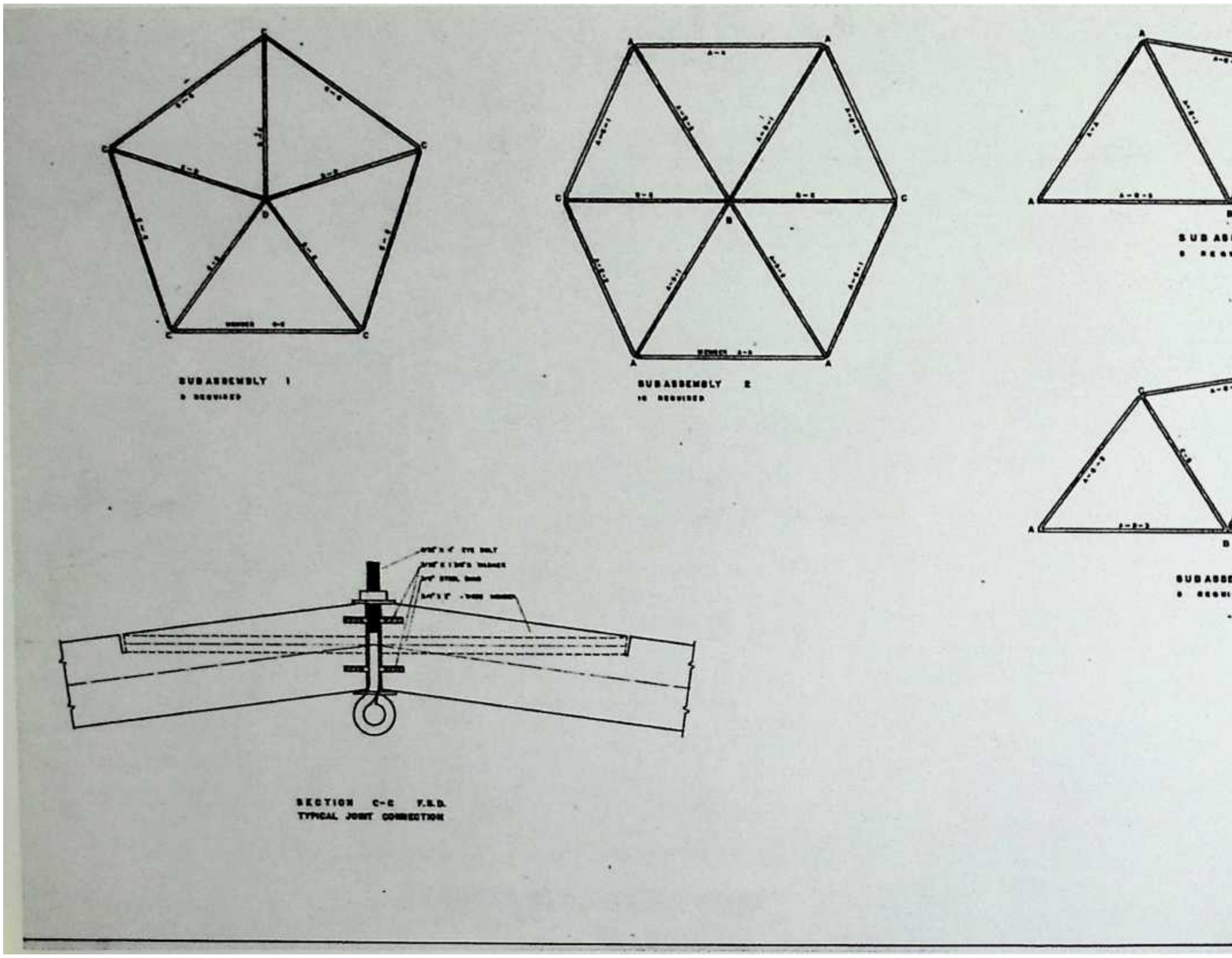
DETAIL 3

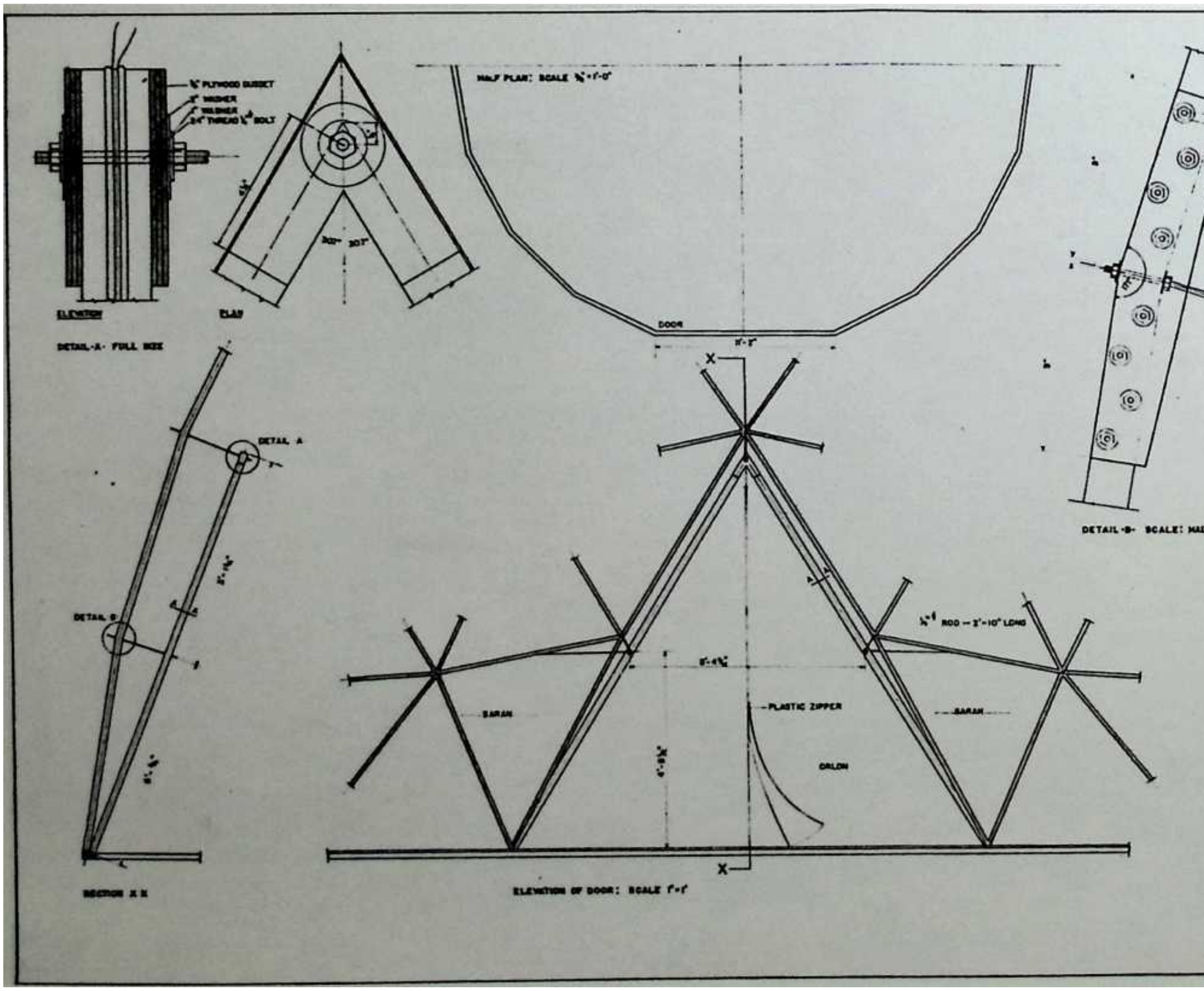
SCALE • </2 EULL sac

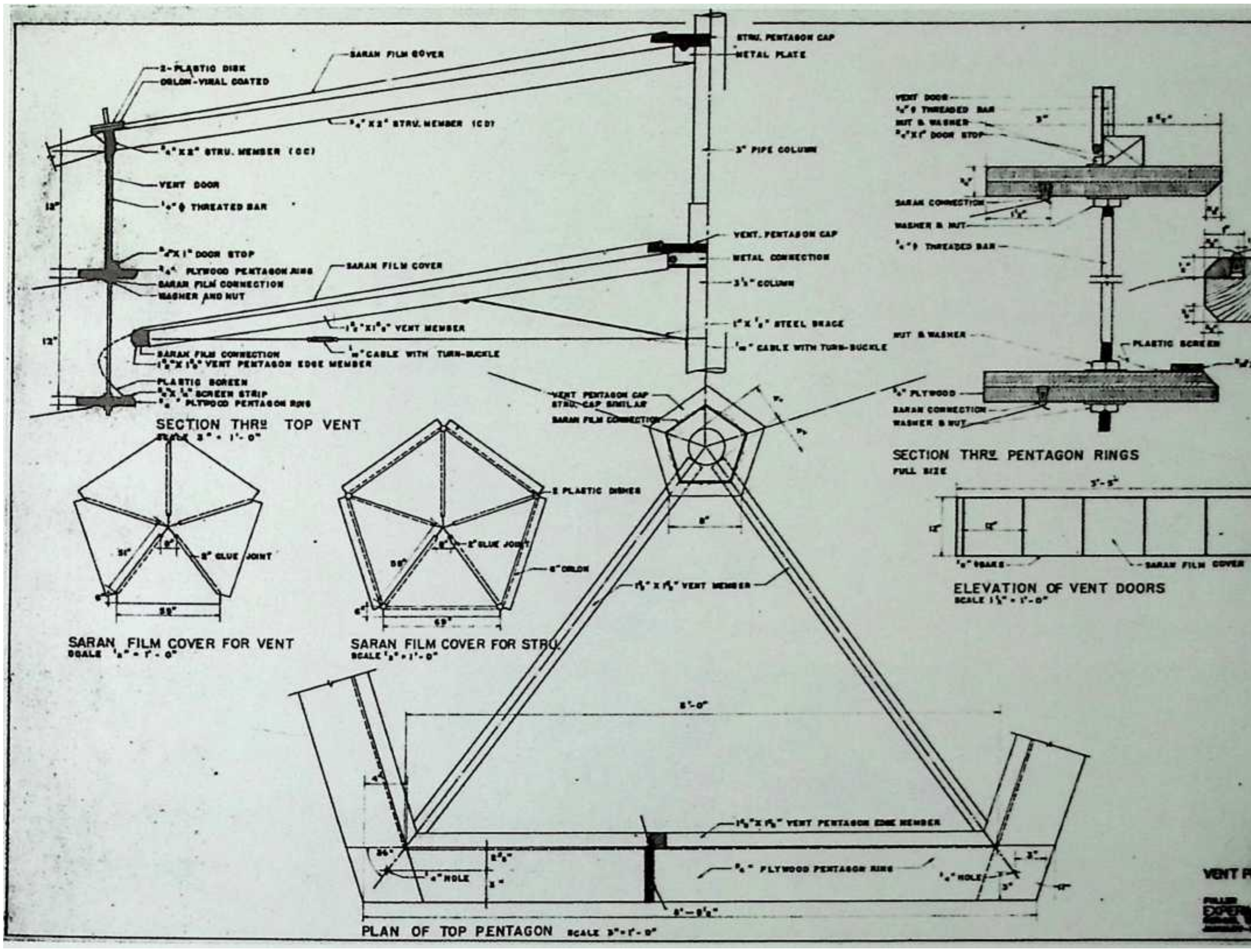

5 SPACES AT 72°=360°
DETAIL 5
NOT TO SCALE
PLAN

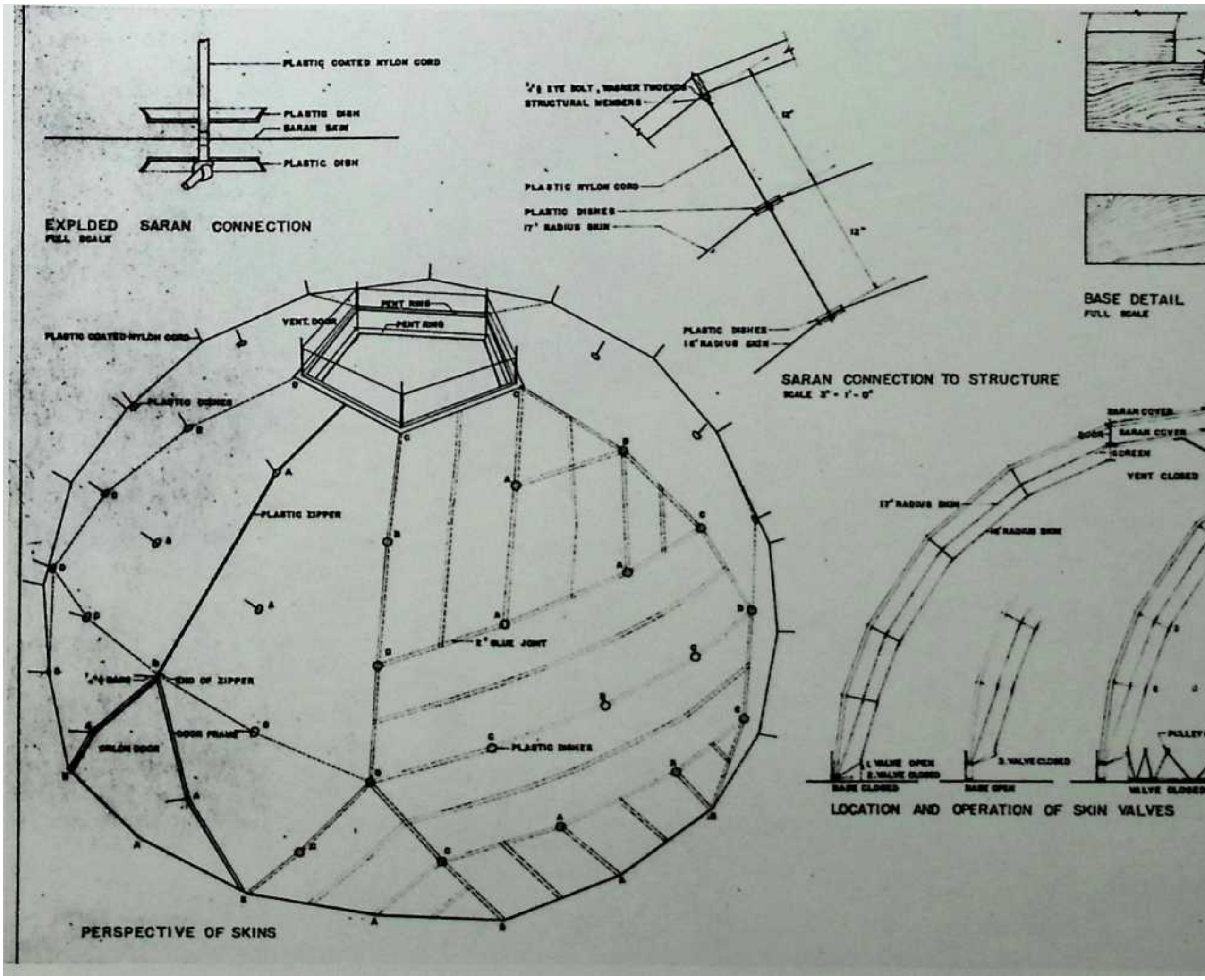

DETAIL 6
DETAIL 1
DETAIL 2


D
C
MEMBER D-C 30 REQUIRED
C
C
MEMBER C-C 30 REQUIRED
B
C
MEMBER B-C 30 REQUIRED


SUBASSEMBLY 1
SUBASSEMBLY 2
SECTION C-C F.S.D.
TYPICAL JOINT CONNECTION

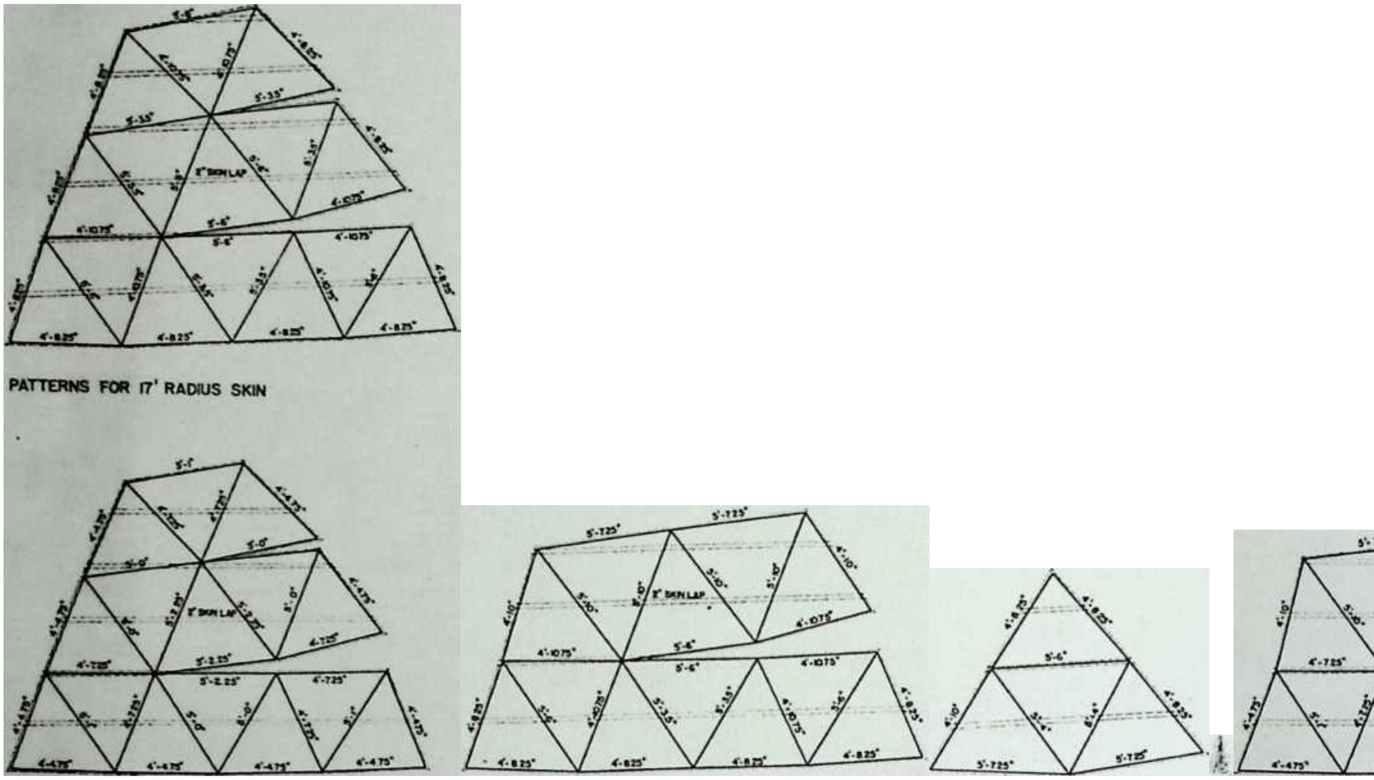



SARAN FILM COVER
2-PLASTIC DISK
ORLON-VINAL COATED
VENT DOOR
THREATED BAR
DOOR STOP
PLYWOOD PENTAGON RING
SARAN FILM CONNECTION
WASHER AND NUT
VENT MEMBER
CABLE WITH TURN-BUCKLE
VENT PENTAGON EDGE MEMBER
PLASTIC SCREEN
SCREEN STRIP
SECTION THRU TOP VENT
STRU. PENTAGON CAP
METAL PLATE
3" PIPE COLUMN
VENT. PENTAGON CAP
METAL CONNECTION
STEEL BRACE
VENT PENTAGON CAP
STRU. CAP SIMILAR
2" GLUE JOINT
2 PLASTIC DISHES
SARAN FILM COVER FOR VENT
SARAN FILM COVER FOR STRU.
VENT DOOR
THREADED BAR
NUT & WASHER
DOOR STOP
SARAN CONNECTION
WASHER & NUT
PLYWOOD
SECTION THRU PENTAGON RINGS
FULL SIZE
SARAN FILM COVER
ELEVATION OF VENT DOORS
PLYWOOD PENTAGON RING
HOLE
PLAN OF TOP PENTAGON



patterns for S' RADIUS skin

SARAN SKIN PATTERNS



Dome Project, University of Minnesota, School of Architecture

Winter—Spring Quarter, 1953

The Fuller dome at the University of Minnesota was relatively large for an academic experiment, comprising ten wooden subdivisions. All wooden components were color coded according to their dimension in this first realization of an idea that dates to 1951.

IMENTAL PROJECT

A —— SCHOOL OF ARCHITECTURE

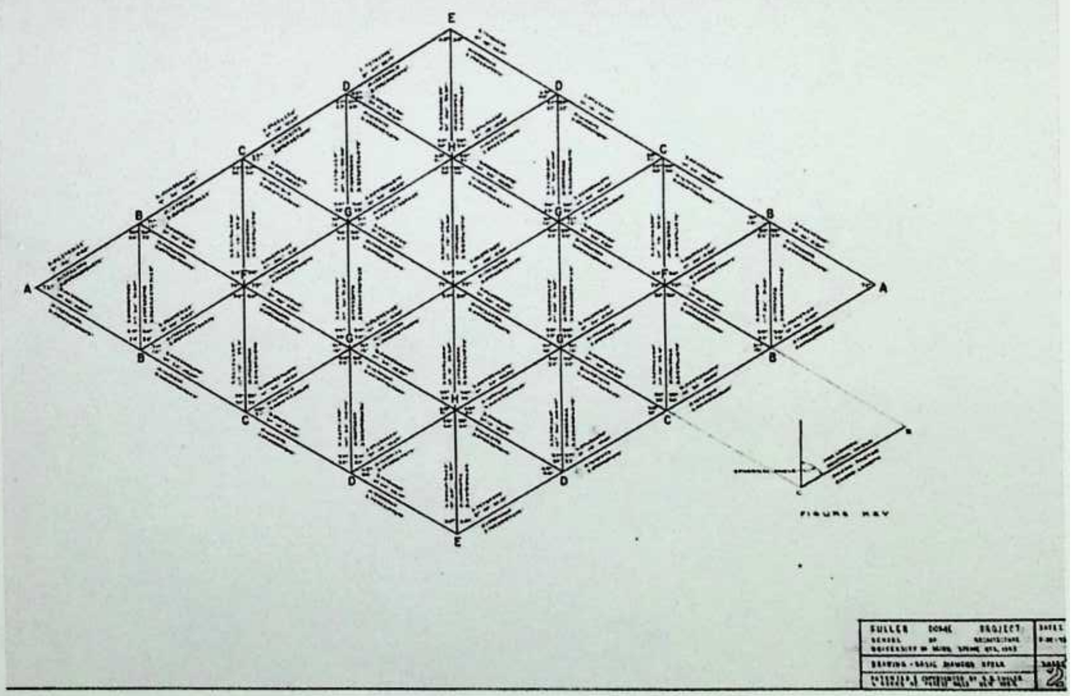
R —— 1953

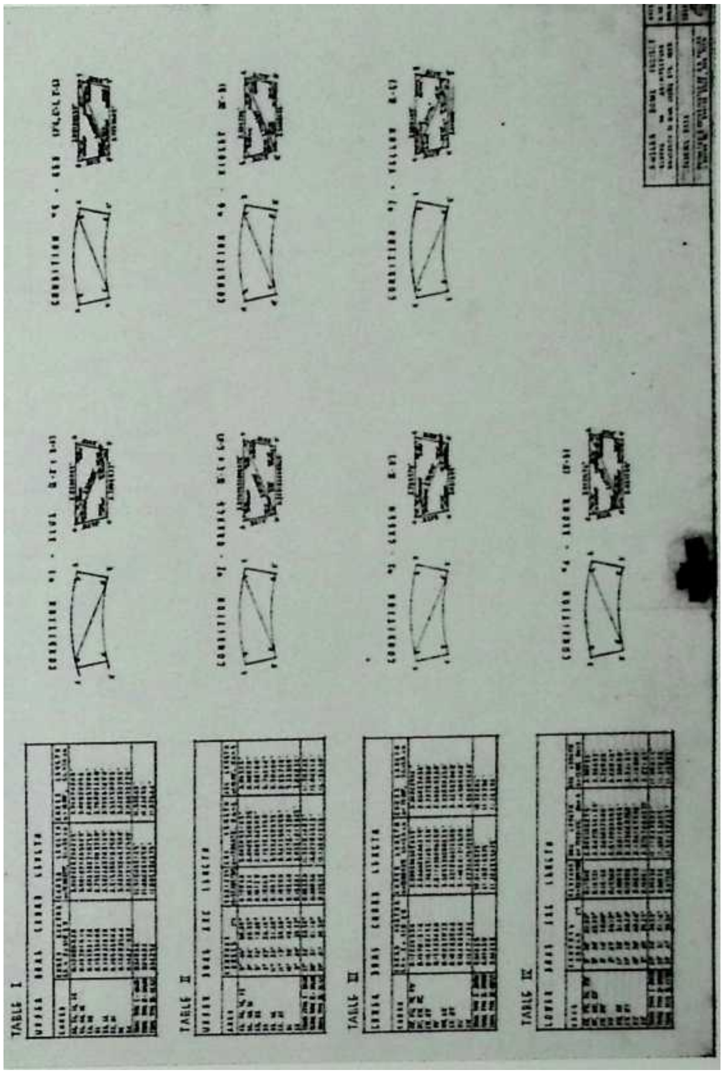
R. BUCKMINSTER FULLER —— VISITING CRITIC

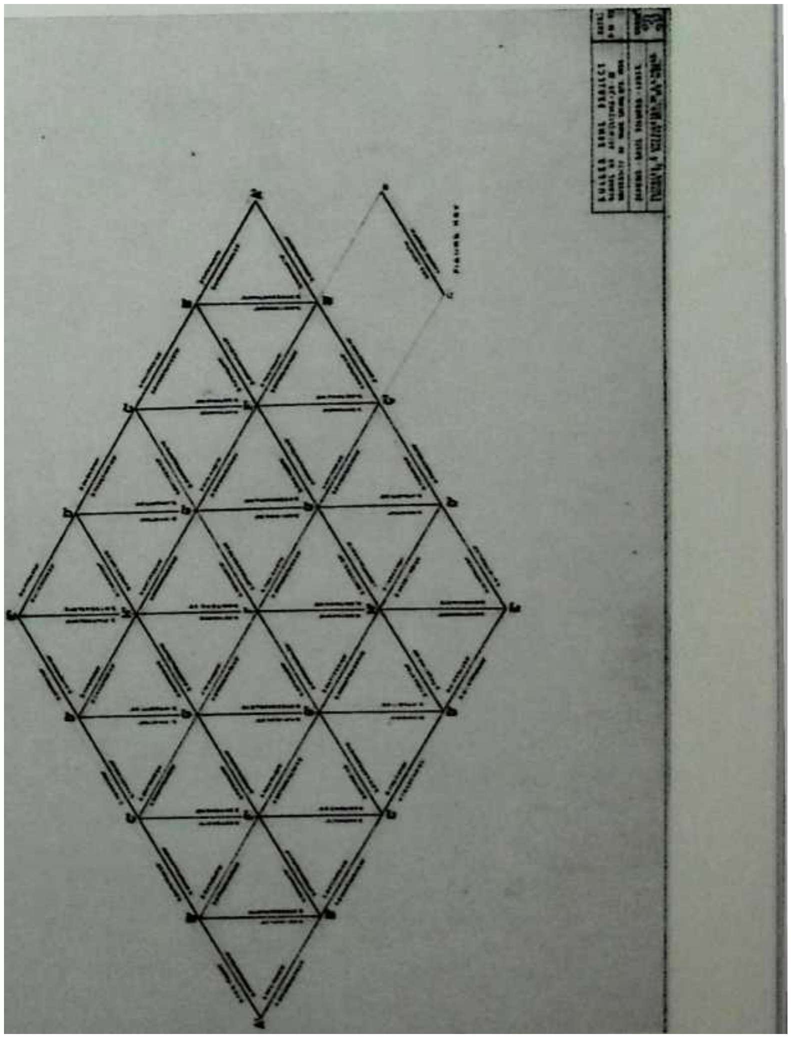
PARTICIPATING STUDENTS

ONNECTORS
JIG 14-A
G & LACING
LEGS
TAILS

CATON	KILSTOFTE
CHIKAMORI	NELSON
COLES	PERTTULA
DAMBERG	ROBERTS
DEFIEL	SCHLAFLE
DERDERIAN	THORSON
DREWS	VIRNIG
FAY	VOSBECK
GERHOLZ	VOZA
GRANDE	WIDEN
GRIFFITH	WILCOX
HAMMERSMITH	WILLIAMS
HERRICK	ZEJDLIK







5PAC1R BUCK bL TAILS

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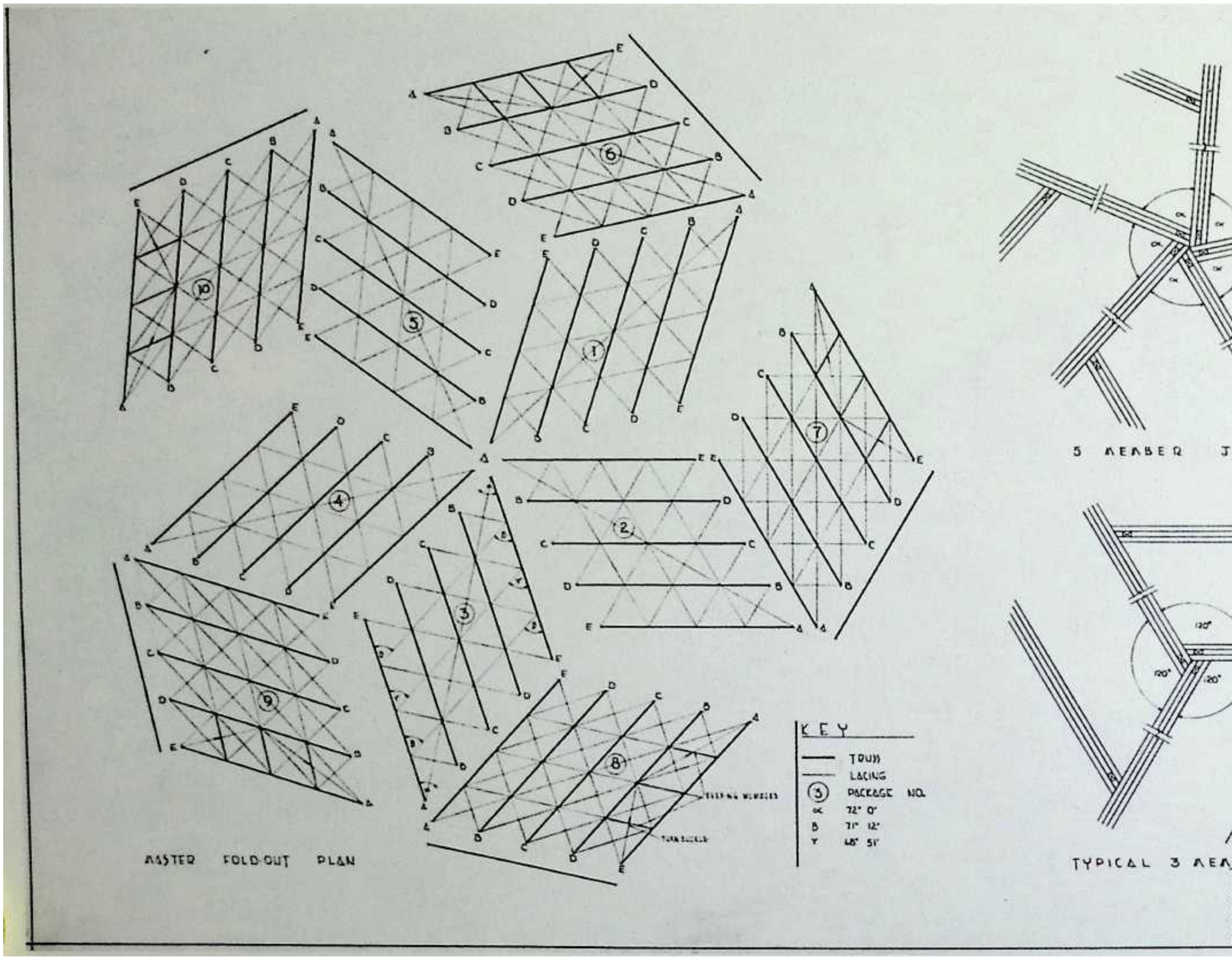
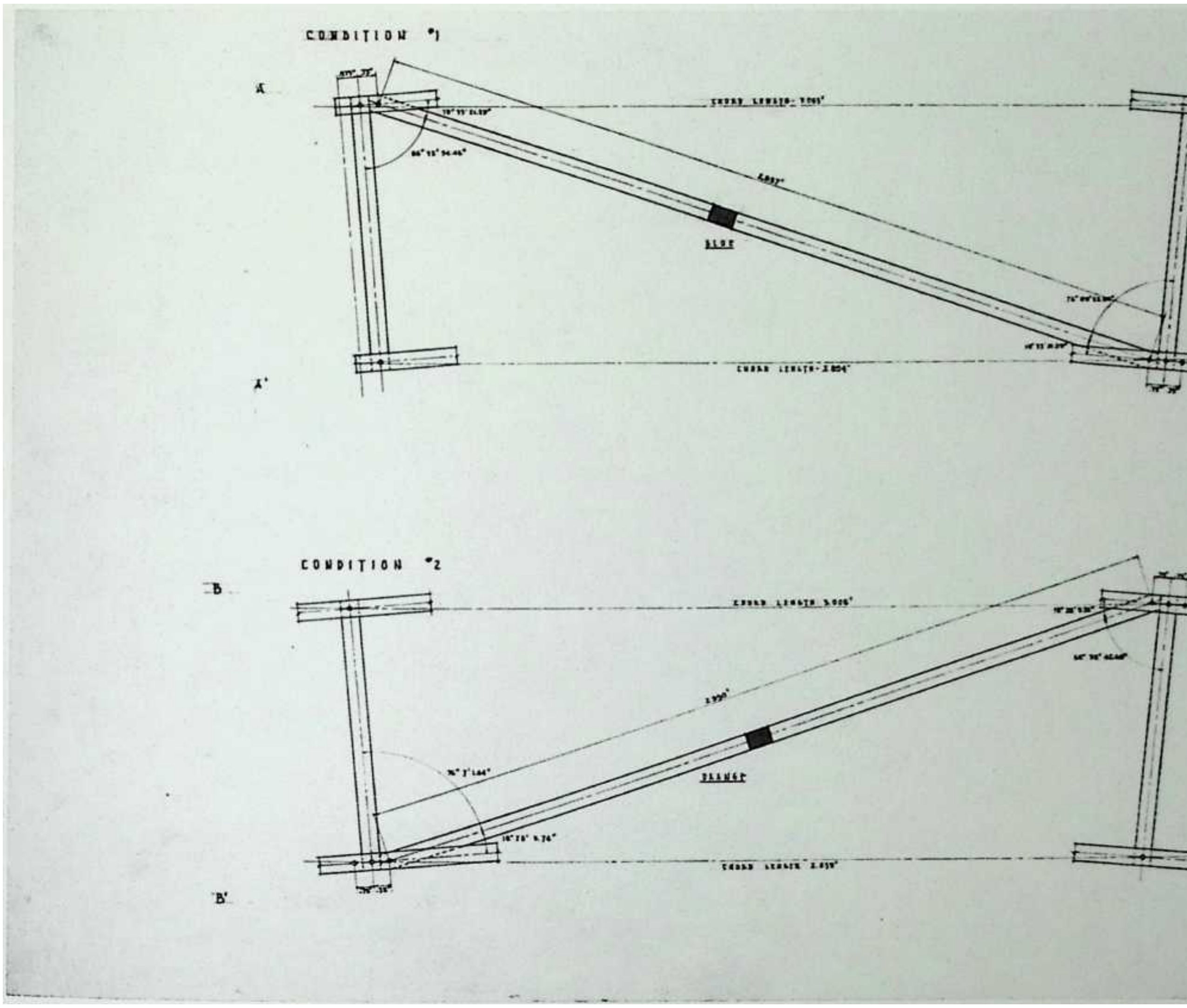
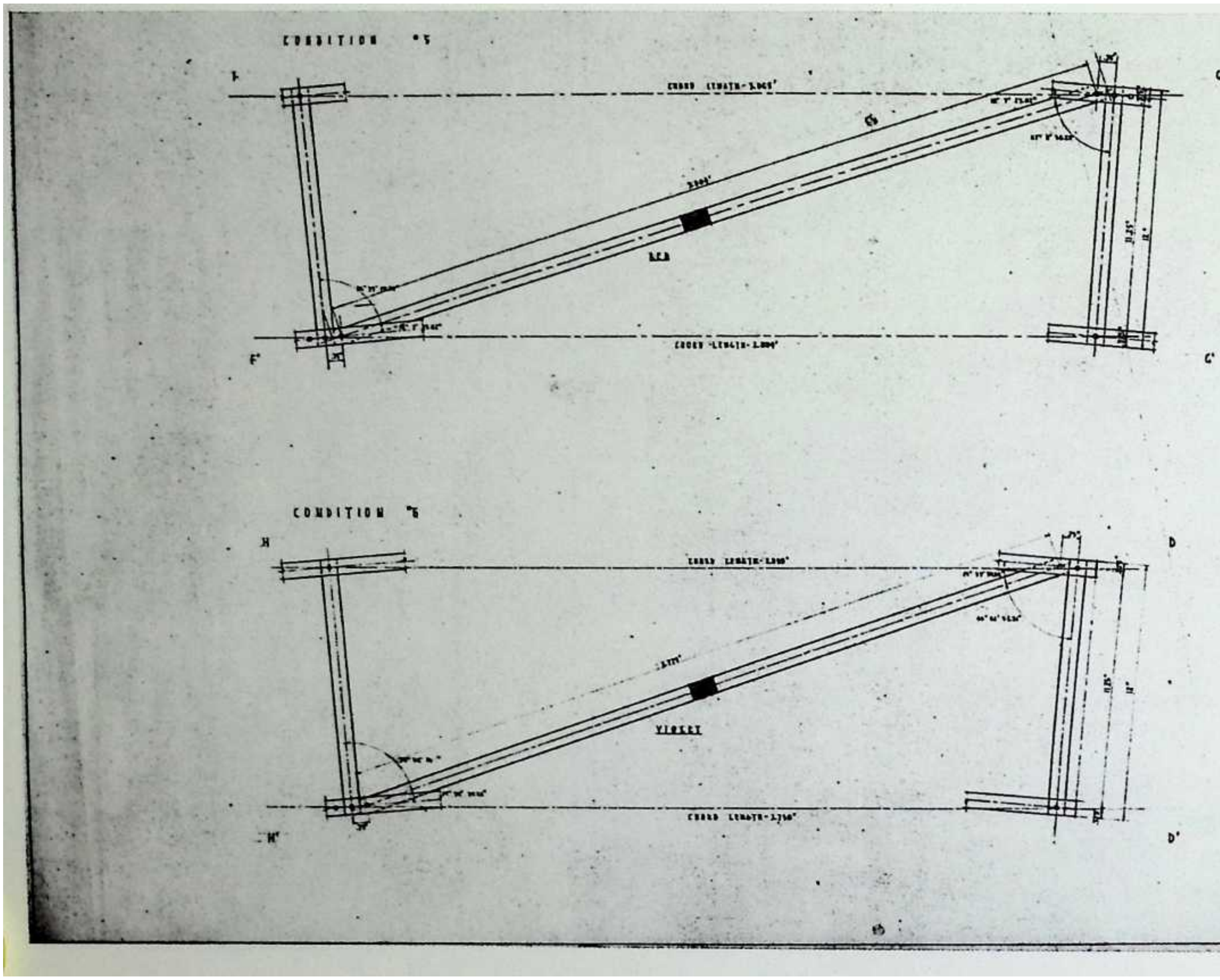
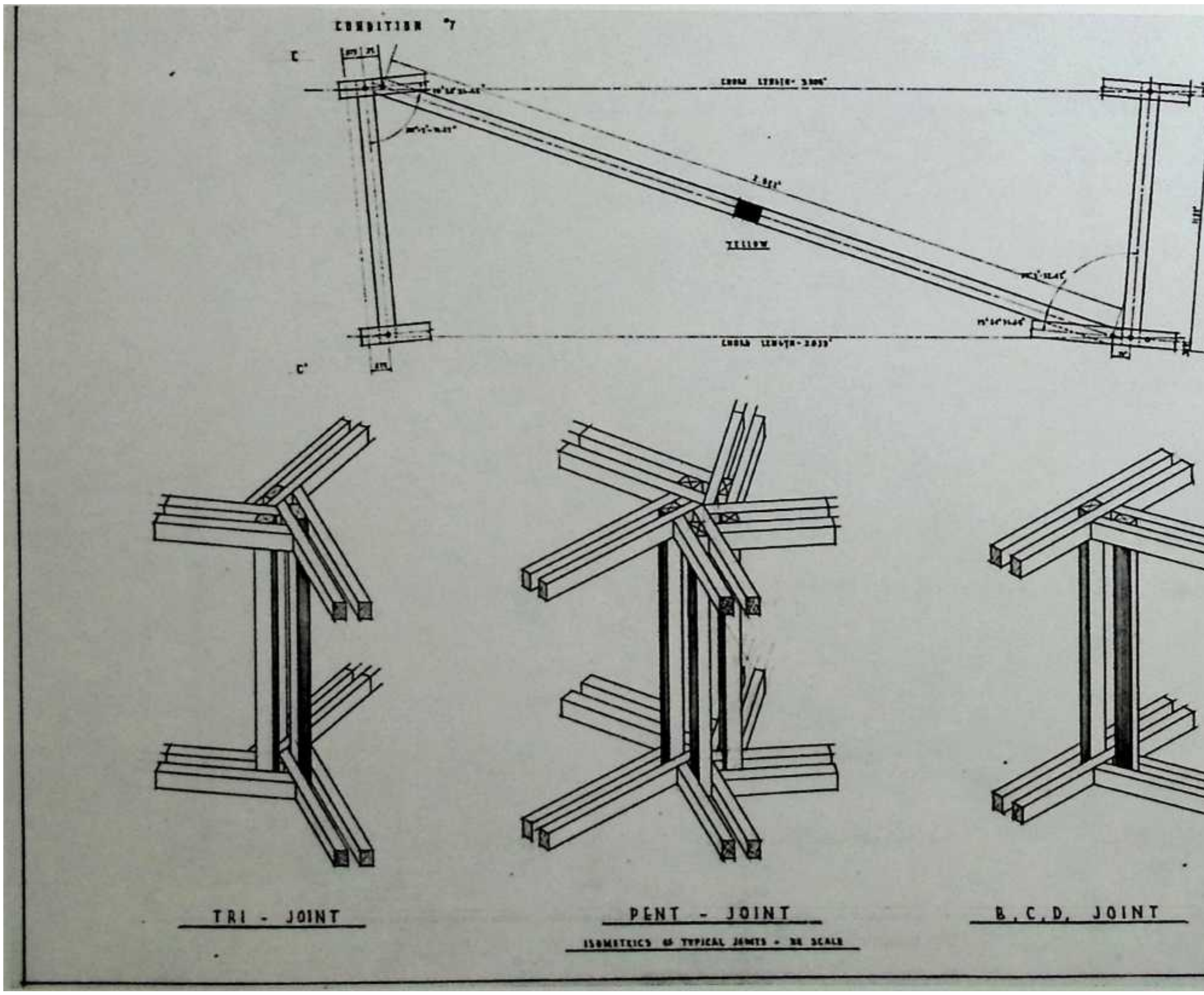
tKiiuui < C4t»t..«n» H t & tuut*. »i mitf mi »LN 'ii>

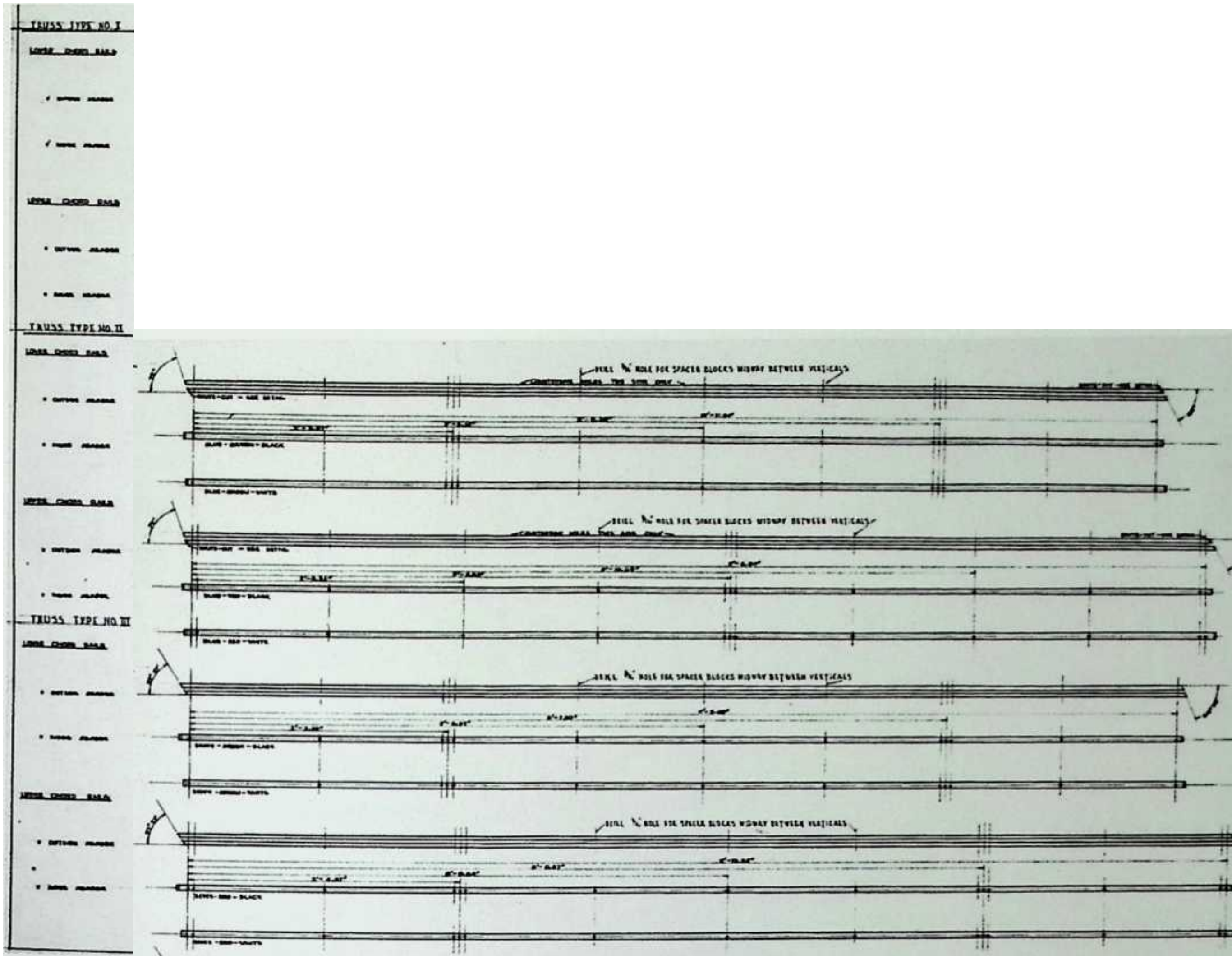


KEY
TRUSS
LACING
3 PACKAGE NO.
α 72° 0'
β 71° 12'
γ 68° 51'
MASTER FOLD-OUT PLAN
5 MEMBER J
TYPICAL 3 MEM
120°




CONDITION #5
CONDITION #6
VIOLET


CONDITION #7
YELLOW
TRI - JOINT
PENT - JOINT
B, C, D, JOINT



lUUlk bQMl F-ROJLCT i n it

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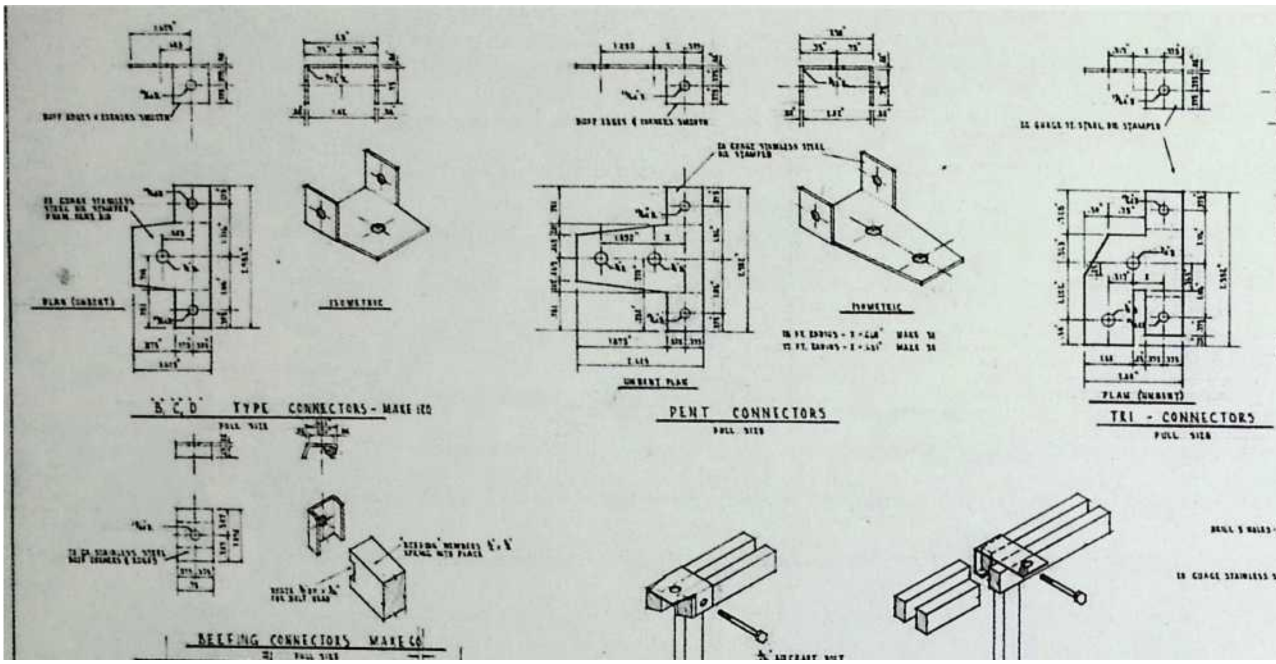

AZIMUTh JIG

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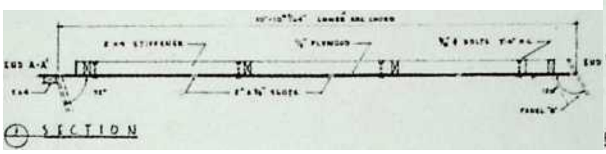
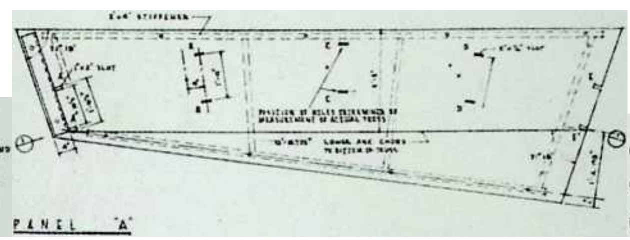
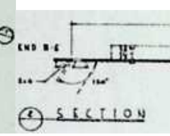
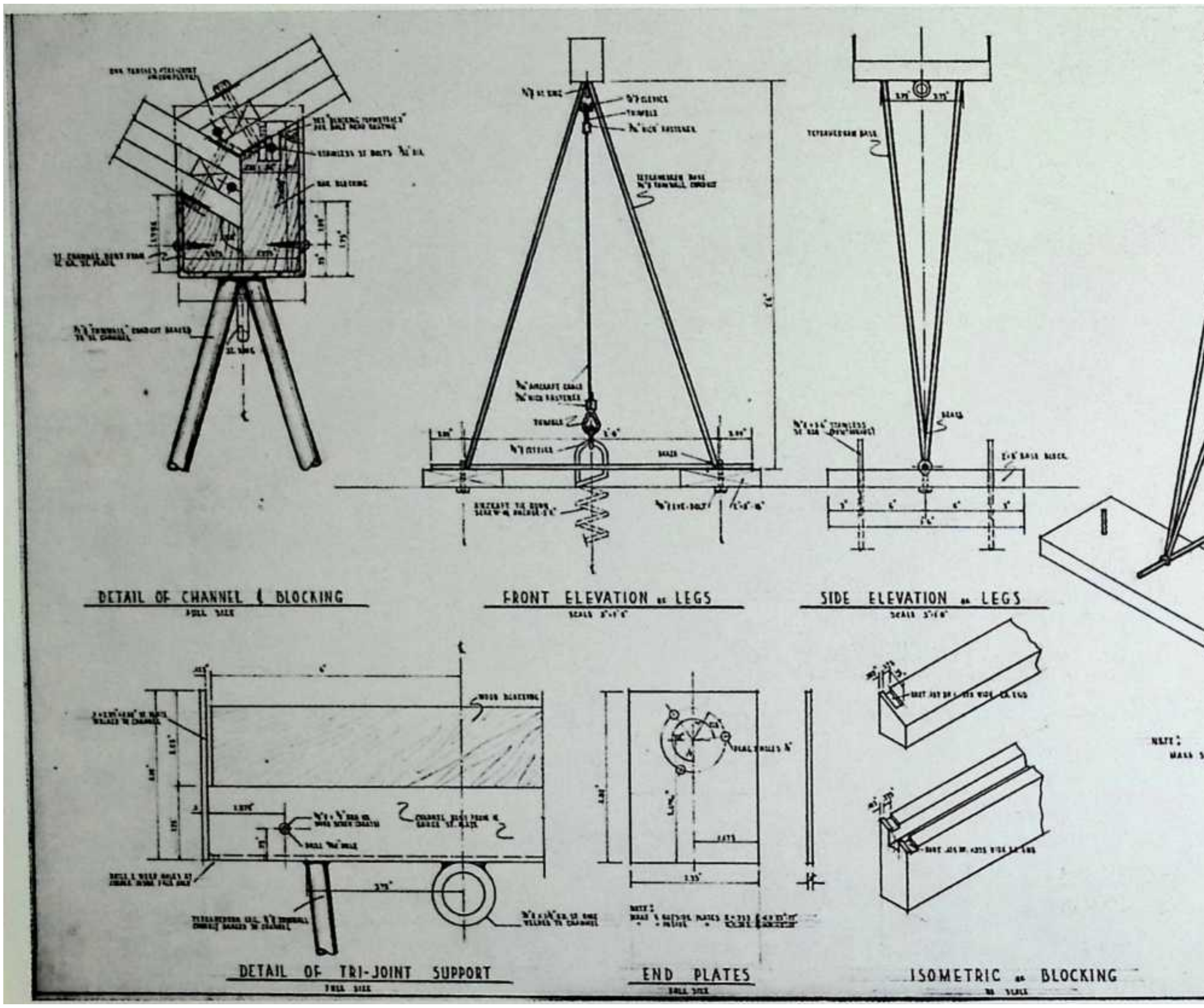
T/FICAl KNOT DIAGRAMS


SECTION


PANEL "A"

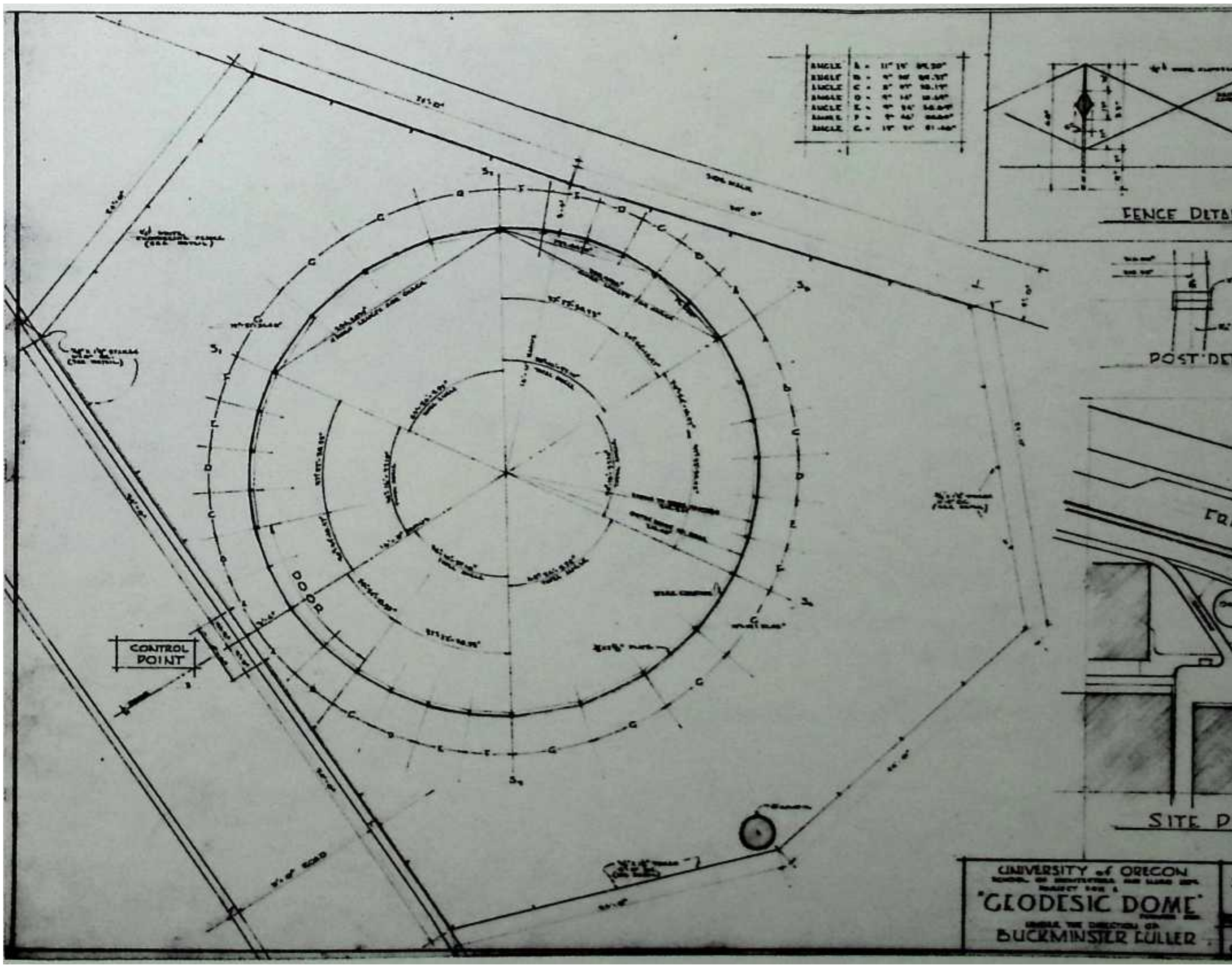

SECTION

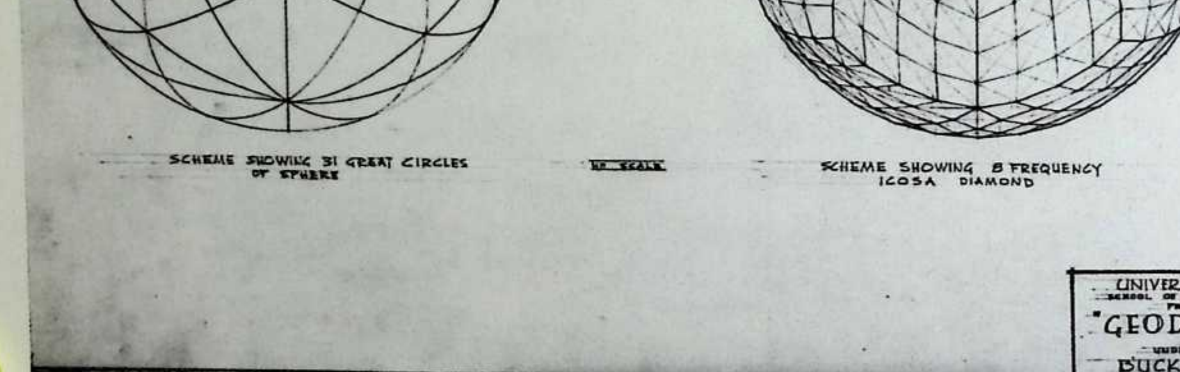


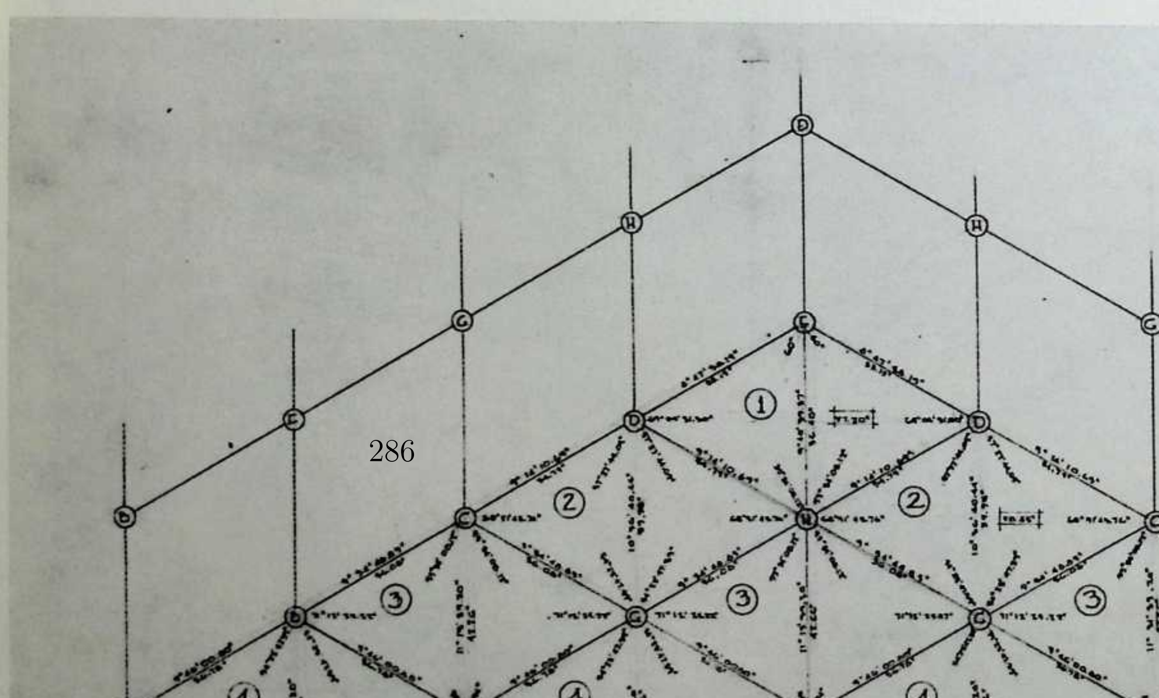
Geodesic Dome, University of Oregon, School of Architecture and Allied Arts

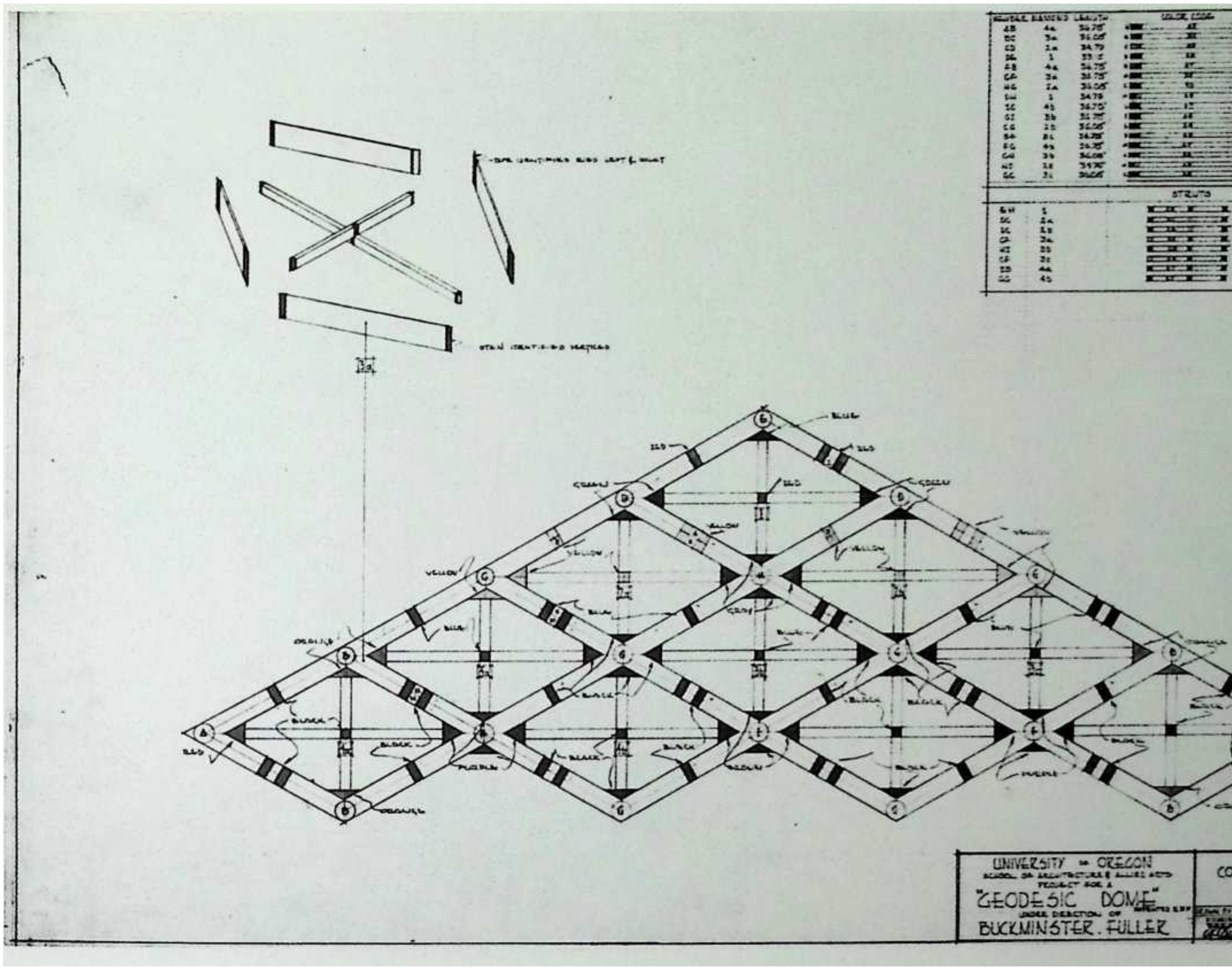
The dome executed by students of the University of Oregon in 1953 is distinguished from the other academic experiments by two features—its exterior geodesic ladder that conforms to the curvature of the hemisphere and its pentagonal door.

1953

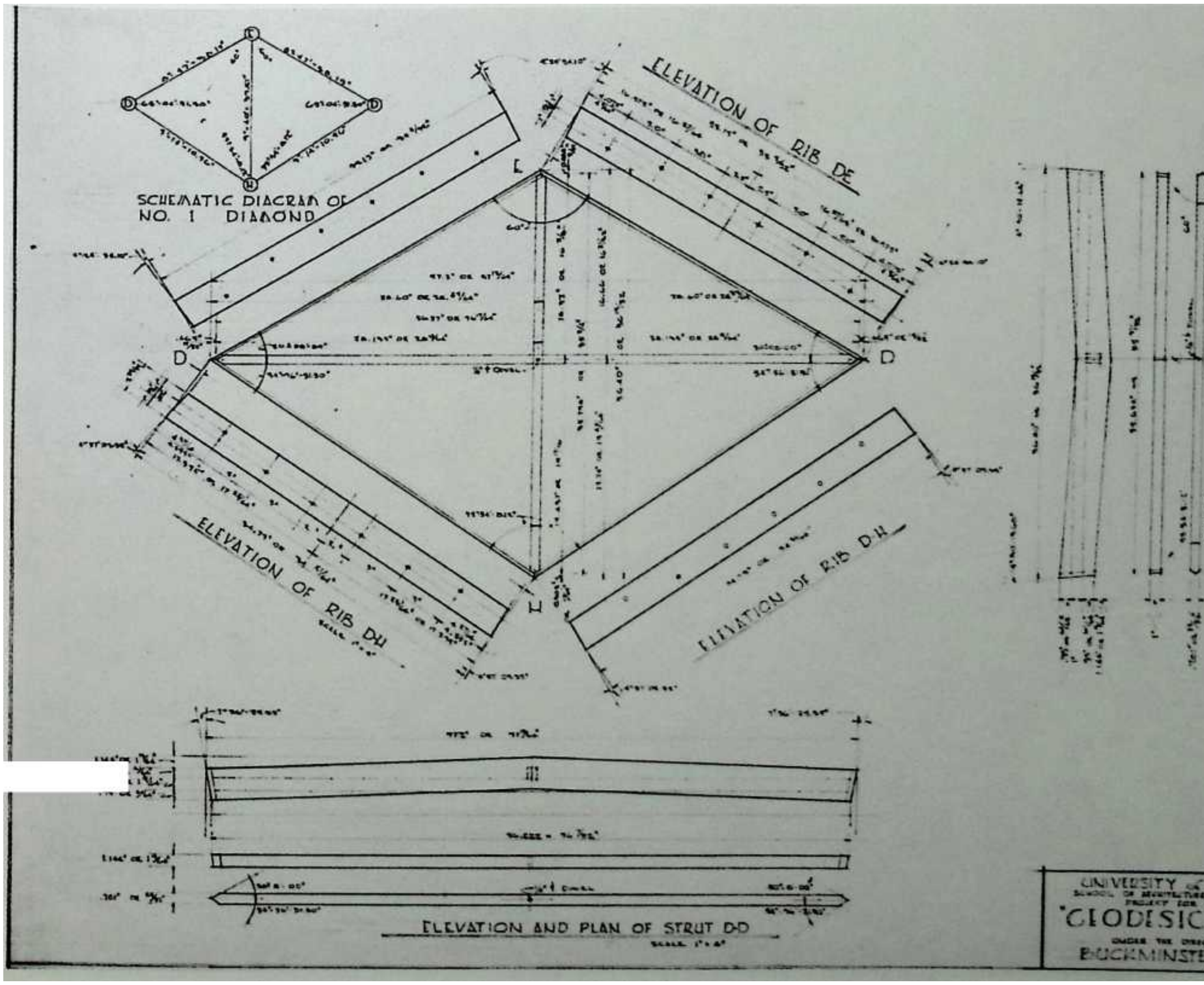

FENCE DETA
POST DE
SITE D
CONTROL POINT
DOOR
UNIVERSITY of OREGON
"GEODESIC DOME"
BUCKMINSTER FULLER


SCHEME SHOWING 31 GREAT CIRCLES
OF SPHERE
NO SCALE
SCHEME SHOWING 8 FREQUENCY
ICOSA DIAMOND

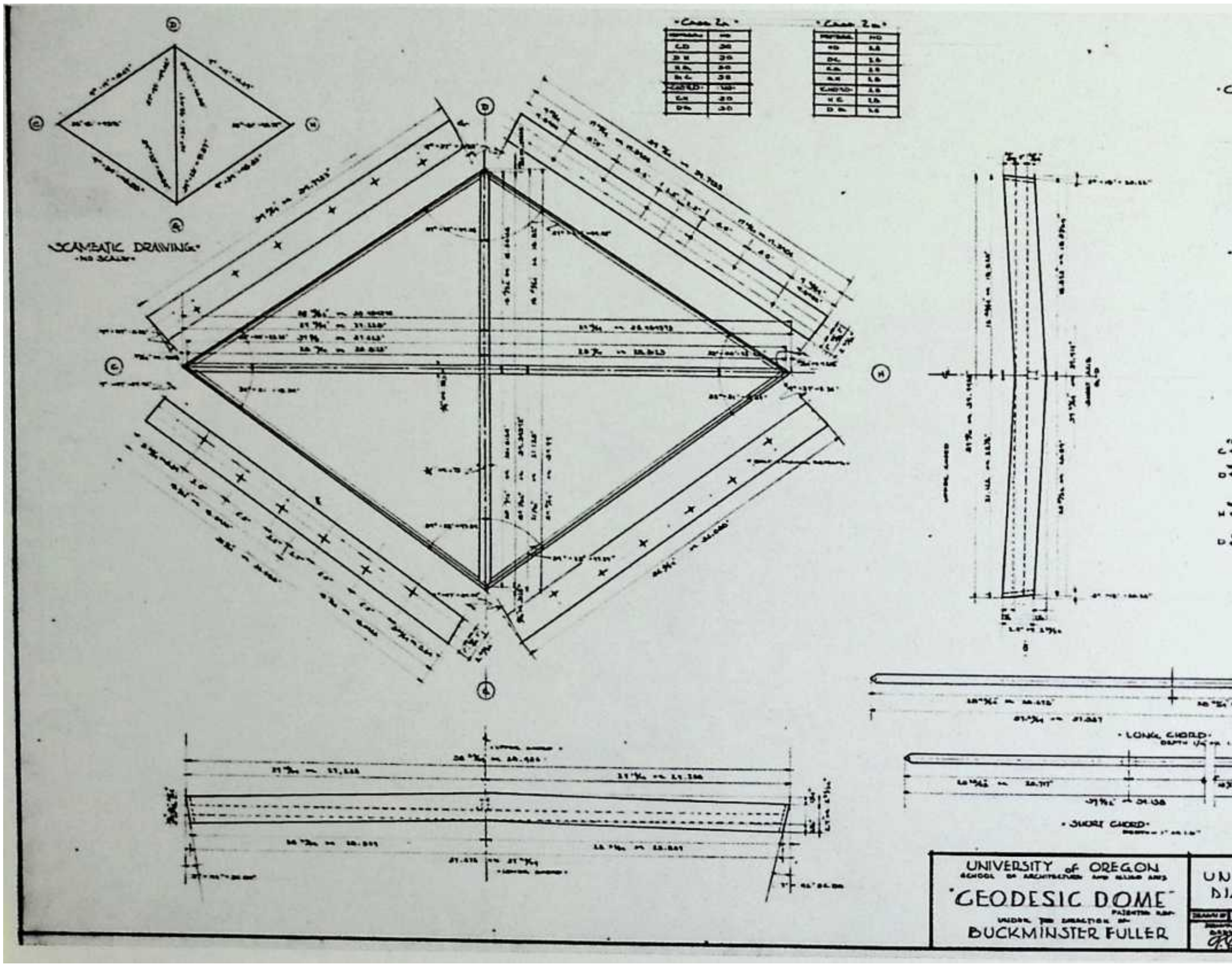


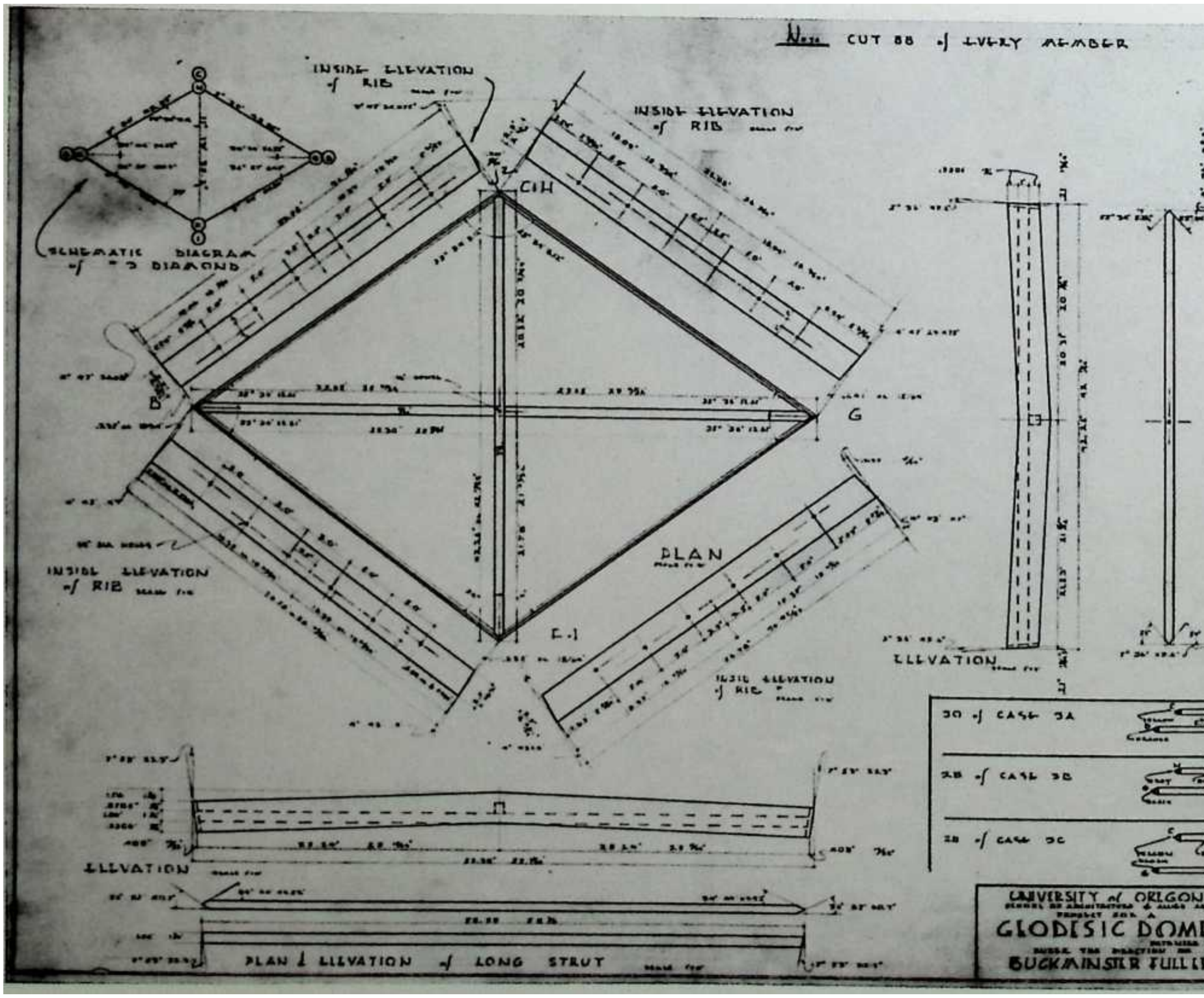


UNIVERSITY OF OREGON
"GEODESIC DOME"
BUCKMINSTER . FULLER


SCHEMATIC DIAGRAM OF NO. 1 DIAMOND
ELEVATION OF RIB DE
ELEVATION OF RIB DH
ELEVATION OF RIB D-H
ELEVATION AND PLAN OF STRUT D-D
UNIVERSITY OF
"GEODESIC
BUCKMINSTE

s ('* i

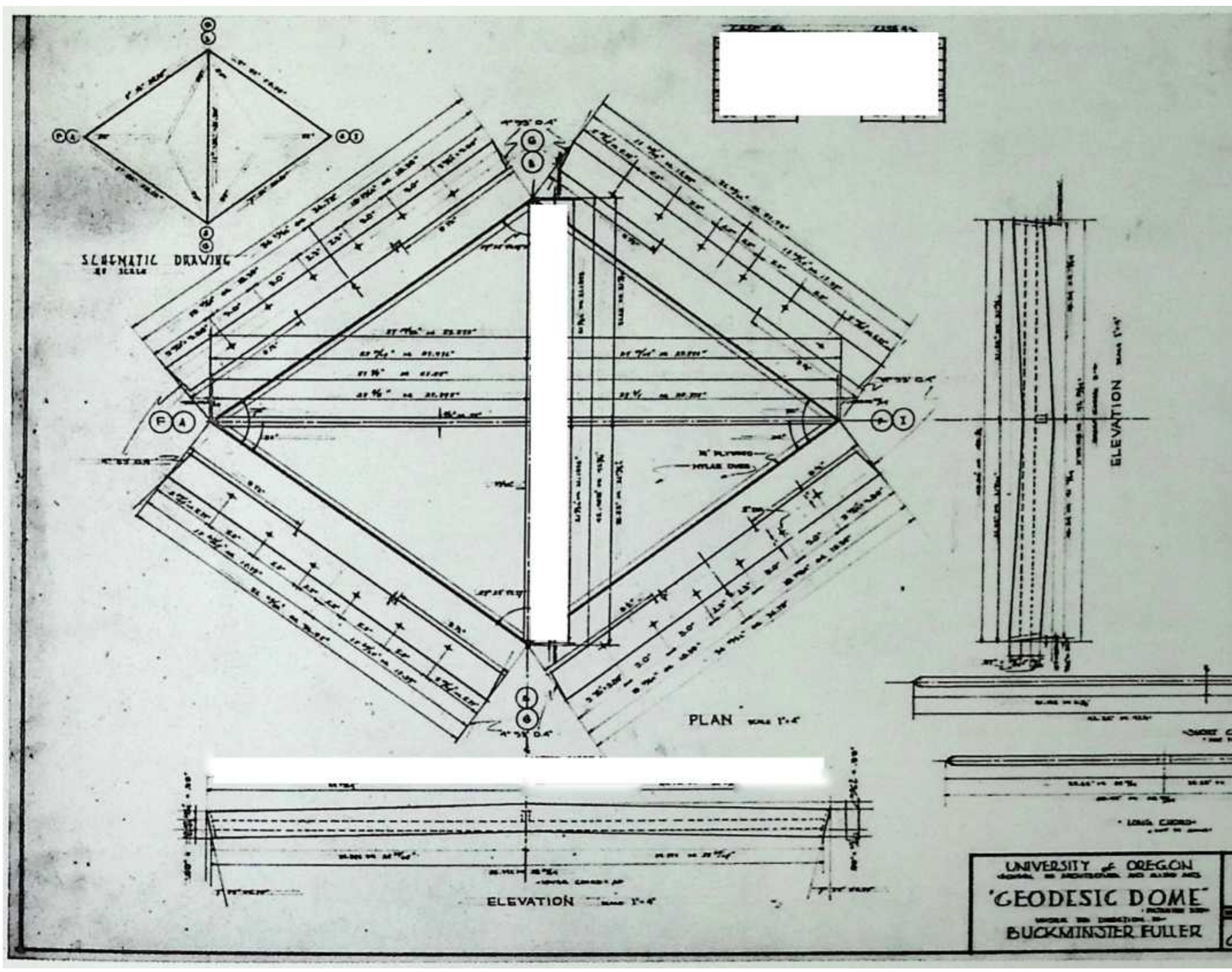

LONG CHORD
SHORT CHORD
UNIVERSITY of OREGON
"GEODESIC DOME"
BUCKMINSTER FULLER


NOTE CUT 88 of EVERY MEMBER
INSIDE ELEVATION of RIB
INSIDE ELEVATION of RIB
SCHEMATIC DIAGRAM of #3 DIAMOND
C-H
G
PLAN
INSIDE ELEVATION of RIB
INSIDE ELEVATION of RIB
ELEVATION
ELEVATION
PLAN & ELEVATION of LONG STRUT
UNIVERSITY of OREGON
GEODESIC DOME
BUCKMINSTER FULLER

f

1

L • I



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MORWiAY

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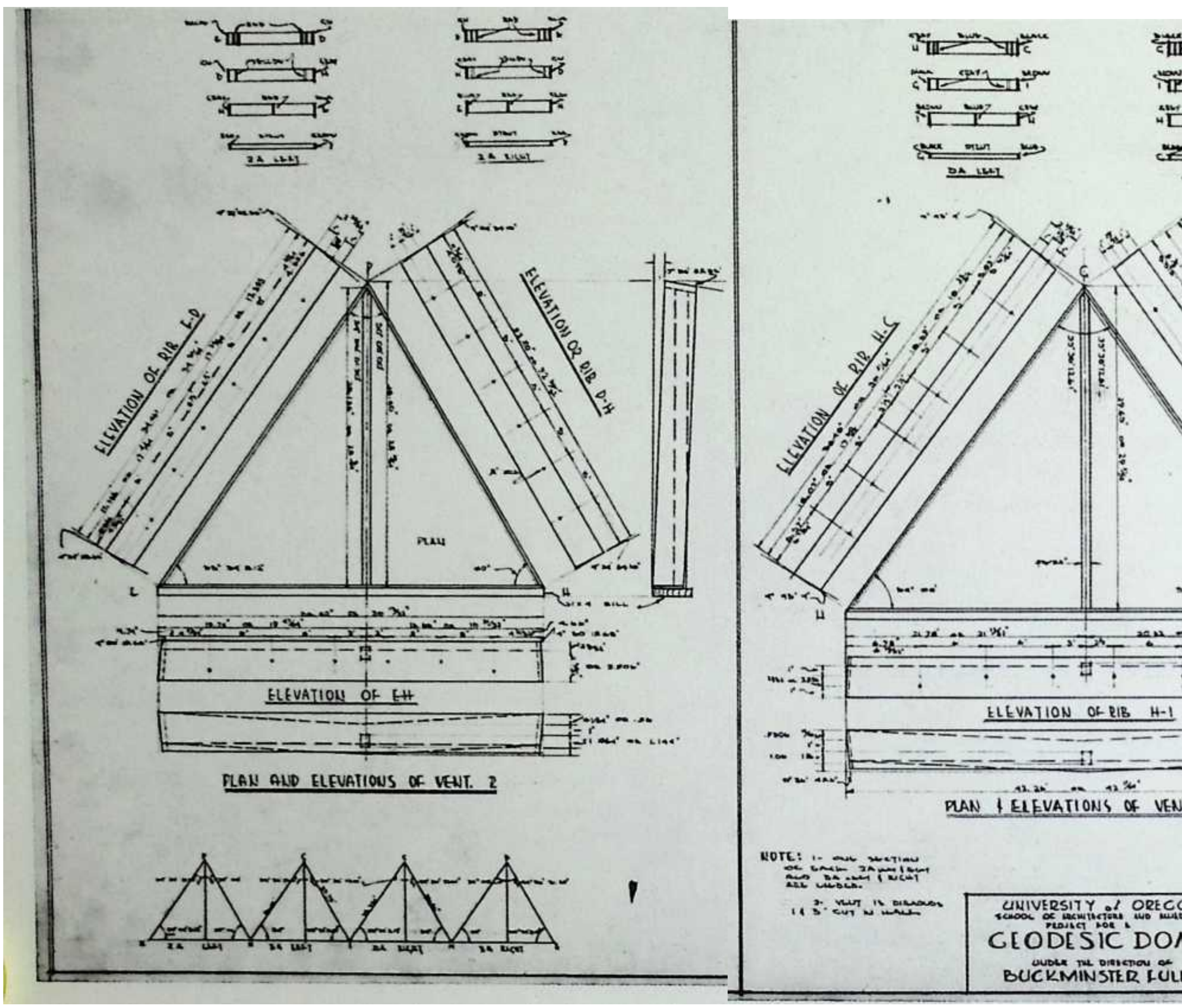
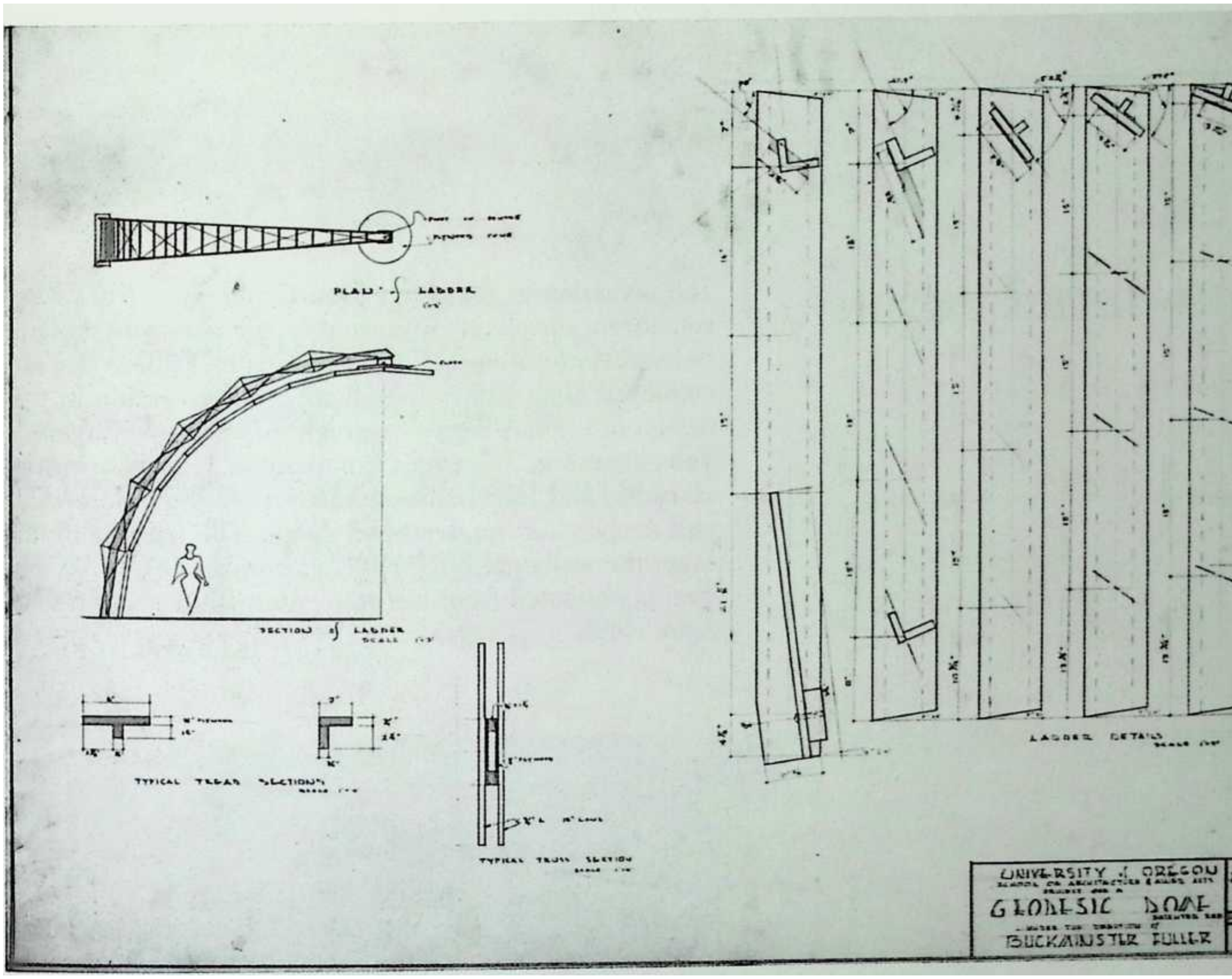


PROCUREwTENT \ MA.TERIM-5 CONTROL



Octahedron-Tetrahedron

Truss

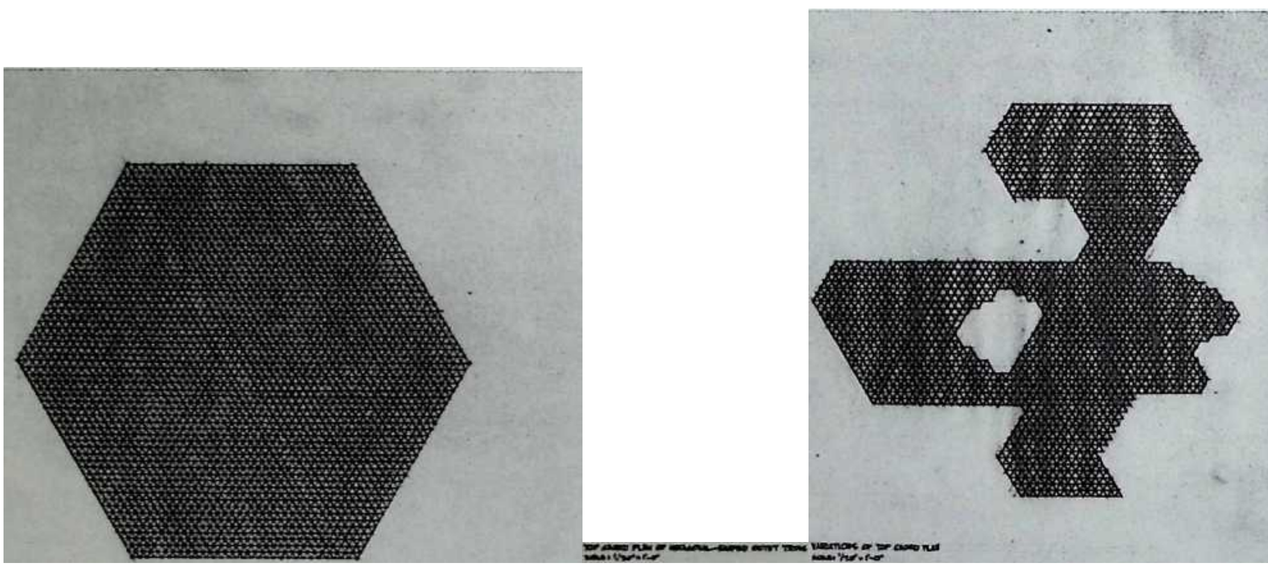
1953

The invention of the octahedron-tetrahedron truss was a concurrent development to that of the geodesic dome in the architectural career of Buckminster Fuller. It was employed almost immediately after its invention in the design of the new service garage for the New England Telephone and Telegraph Company of Hyannis, Massachusetts, and provided both shelter for the automobiles and support for the overhead doors. The truss is aluminum; the walls are cinder block; and the whole structure is protected from the elements with a coating of latex vinyl.

A

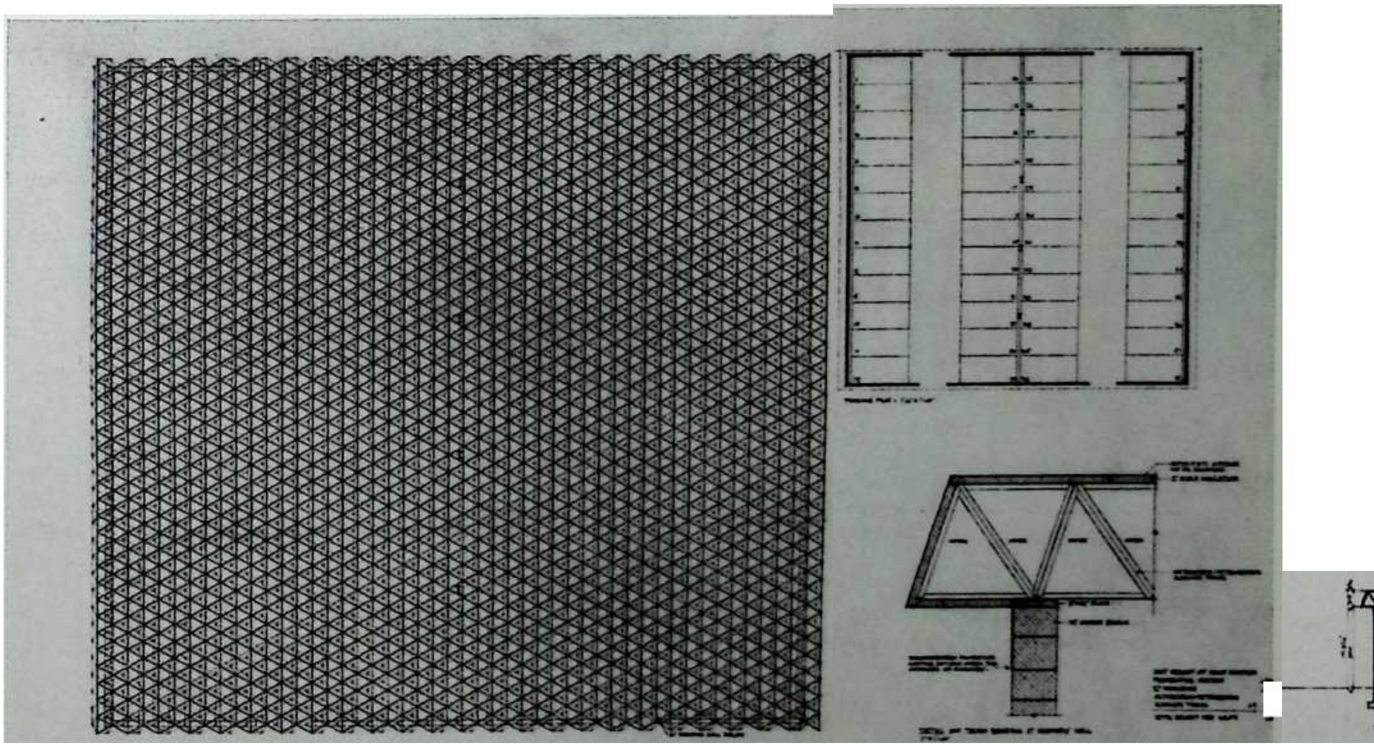
^a^a^aVaFaT/'isB

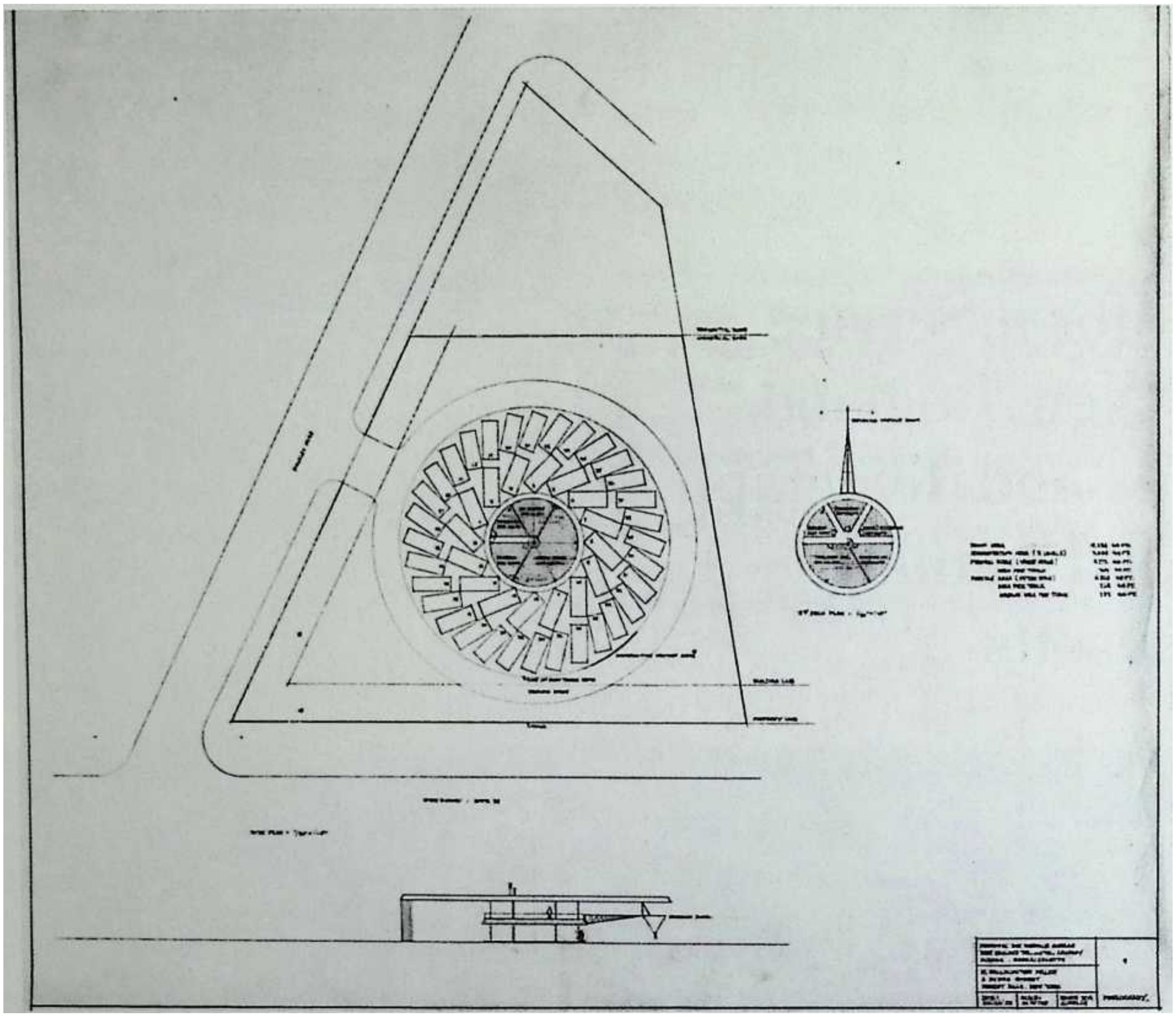
»VA»A*A»^aVaVaTaV^Ta'®B

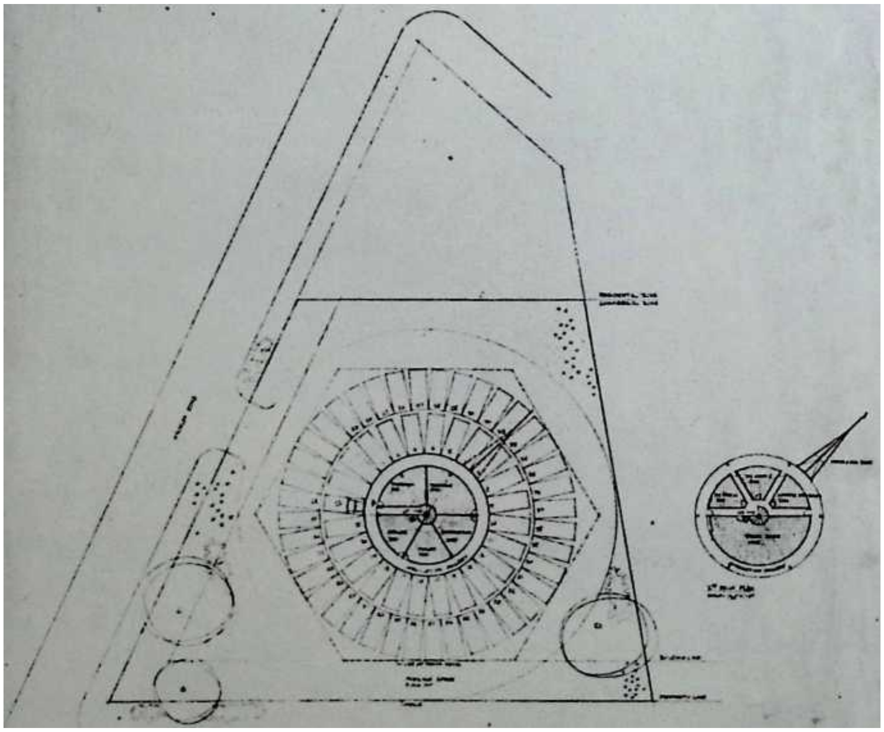


Proposal for a Service Garage, New England Telephone and Telegraph Company, Hyannis, Massachusetts 1953

ilk H

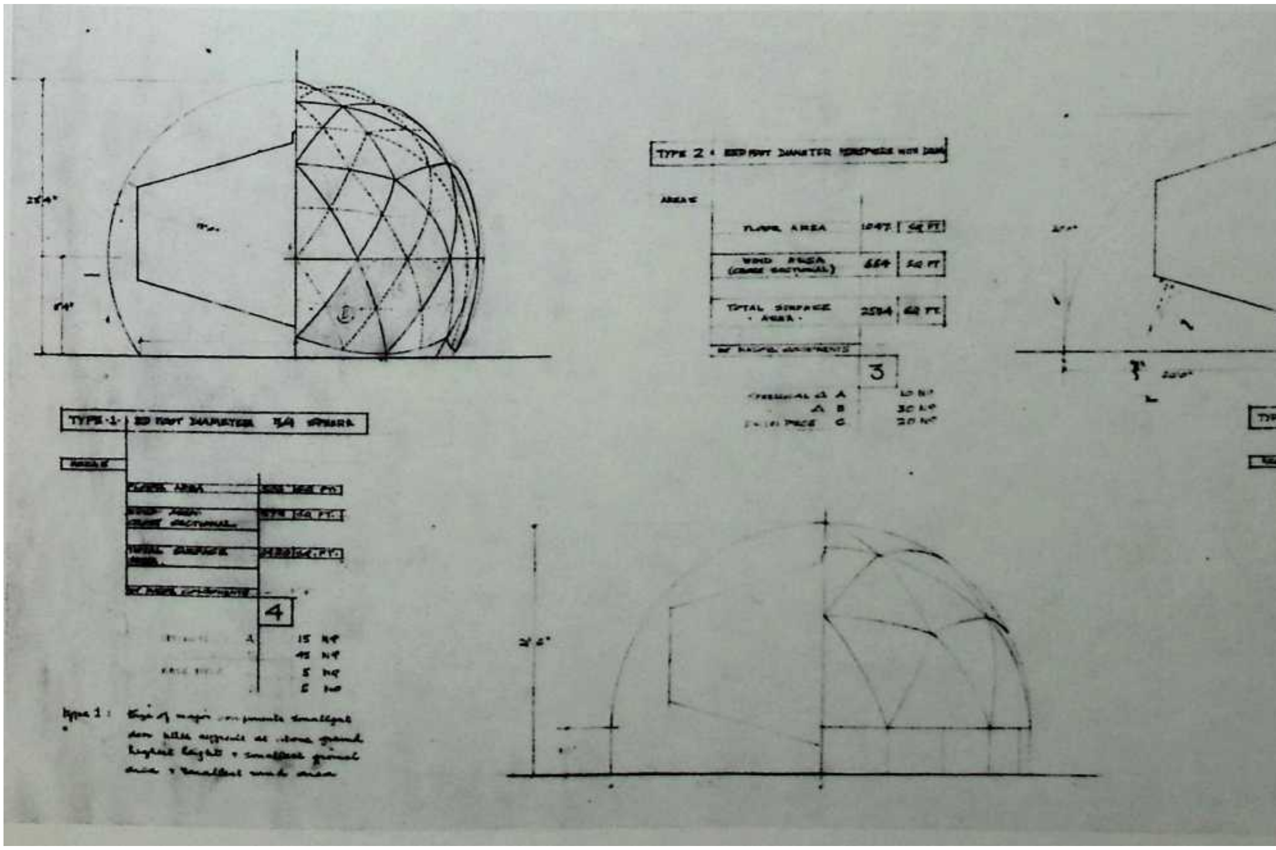




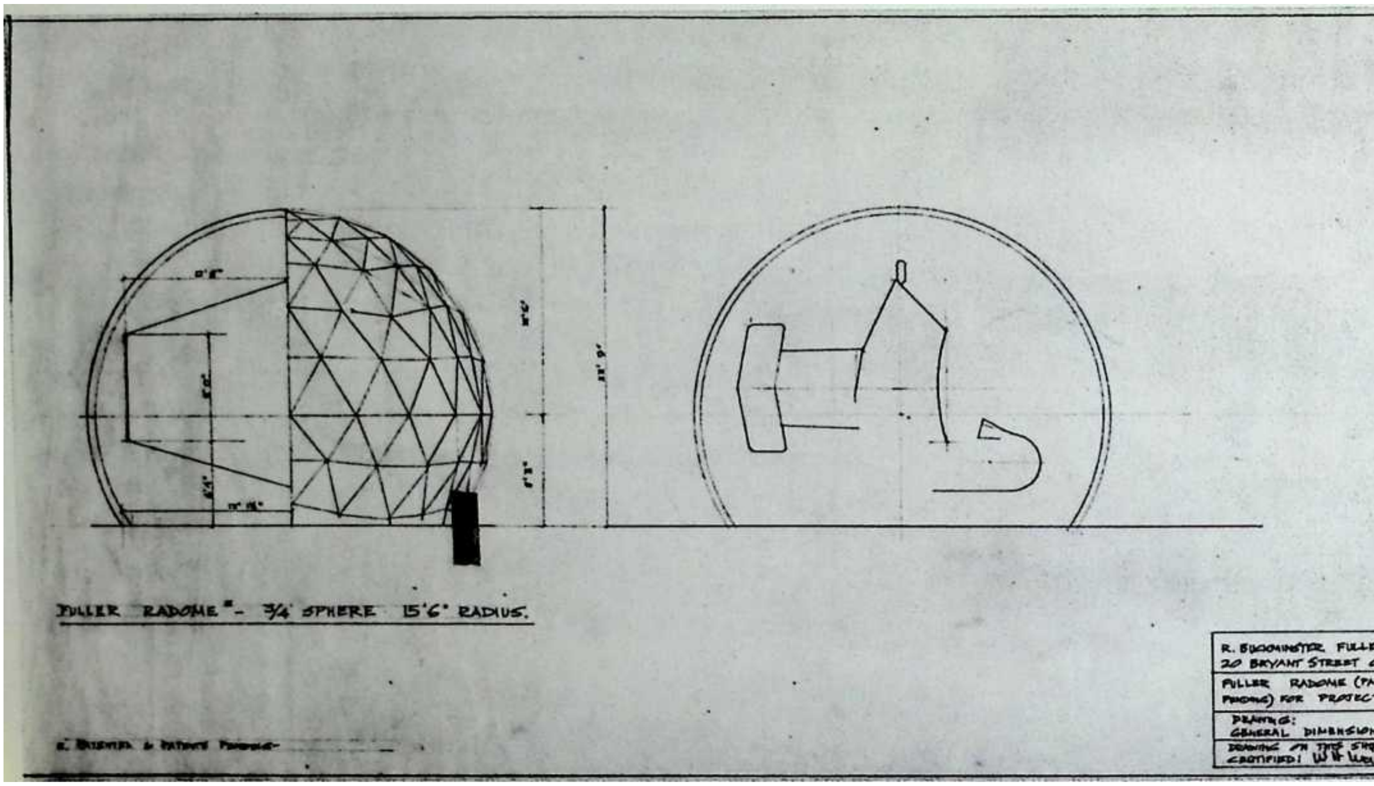


Geodesic Radome for Project Lincoln, M.I.T. 1953

The radome was developed by Fuller and his students at M.I.T. in December 1953 as Project Lincoln, Fuller's first design for the defense of the United States during the Cold War. The term "radome" alludes to radar protection. Bell Laboratories and Western Electric manufactured these structures to house radar equipment along the Distant Early Warning line during the 1950s. They are geodesic domes composed of rigid sheets of fiberglass in hexagonal and pentagonal forms, the flanges of which are lined with plastic gaskets and are latched or bolted together. Thus there is no need of a metal or wooden superstructure, reducing the overall weight and cost but none of the dome's compressive strength.



TYPE 2
FLOOR AREA
1047
WIND AREA
664
TOTAL SURFACE AREA
2584
3
TYPE 1
4
Type 1:



Discontinuous

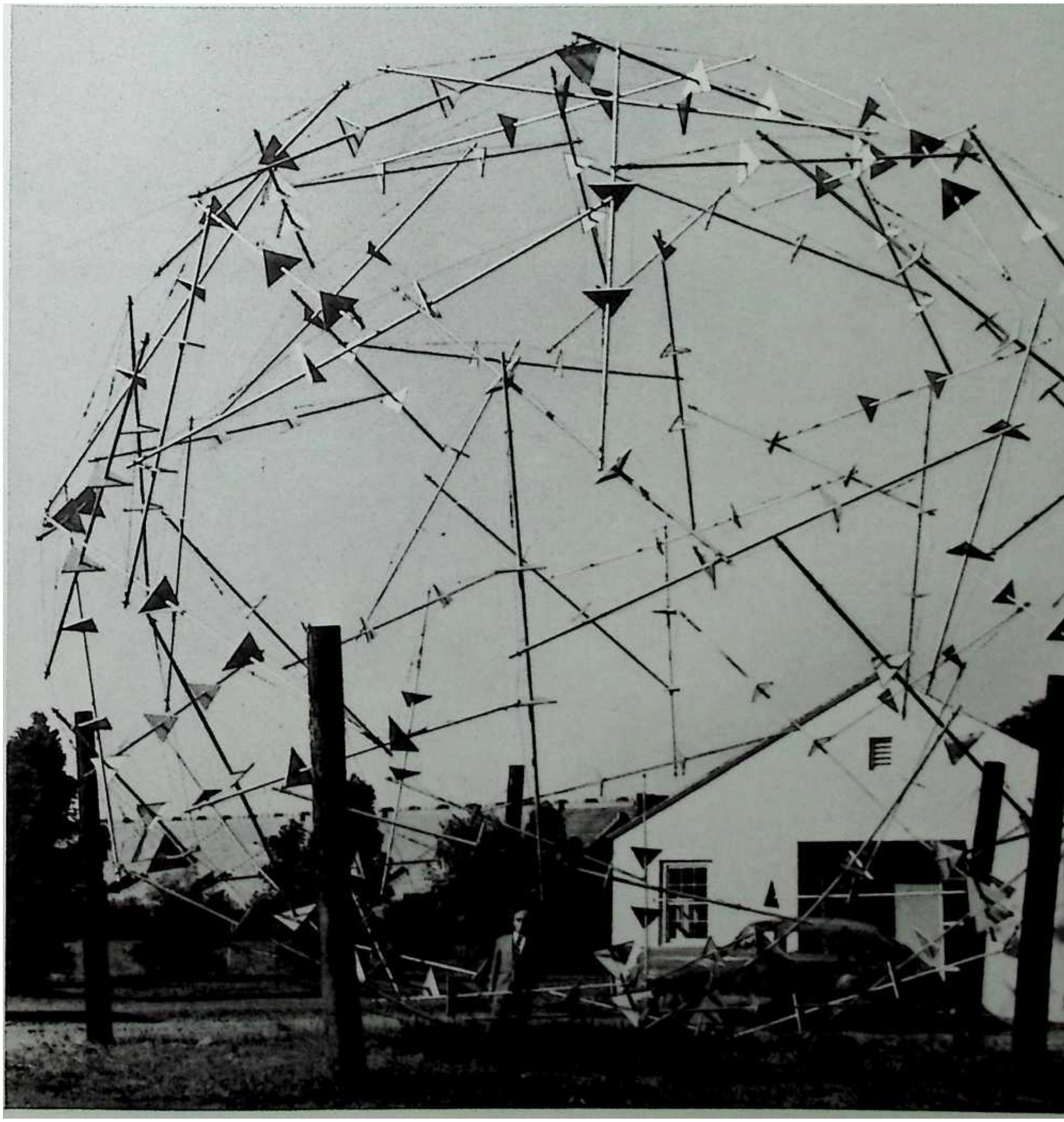
Compression Sphere,

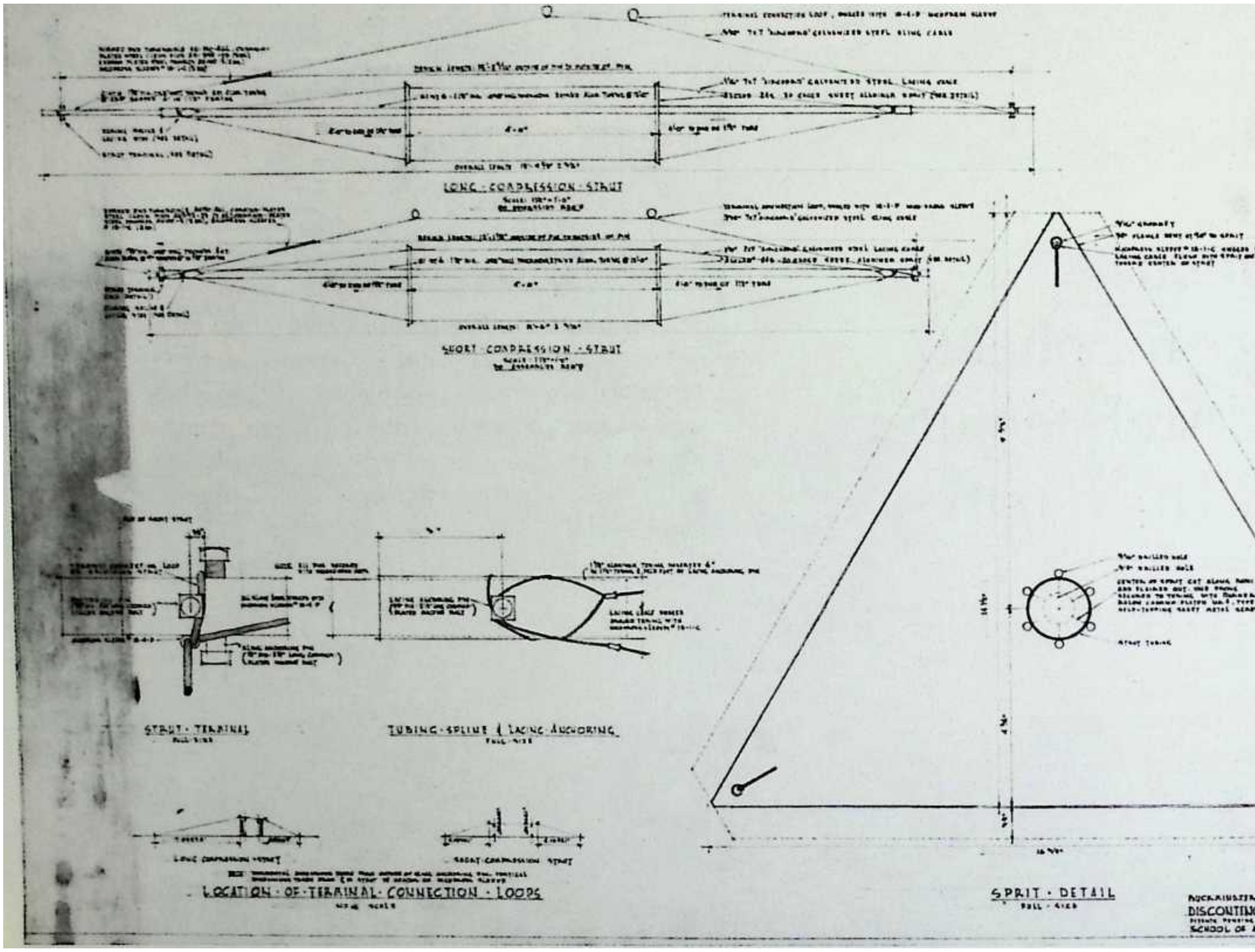
School of Architecture,

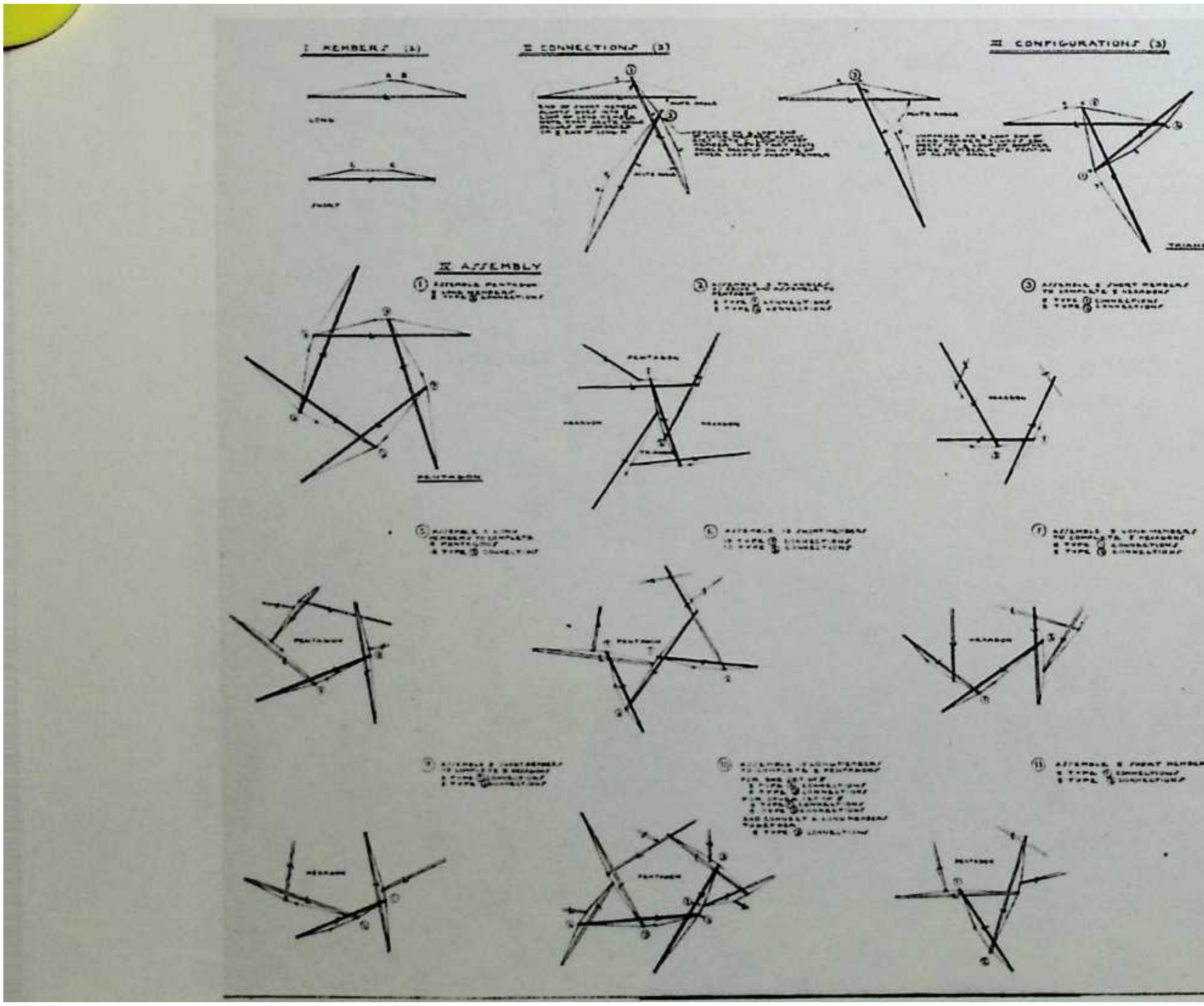
Princeton University

1953

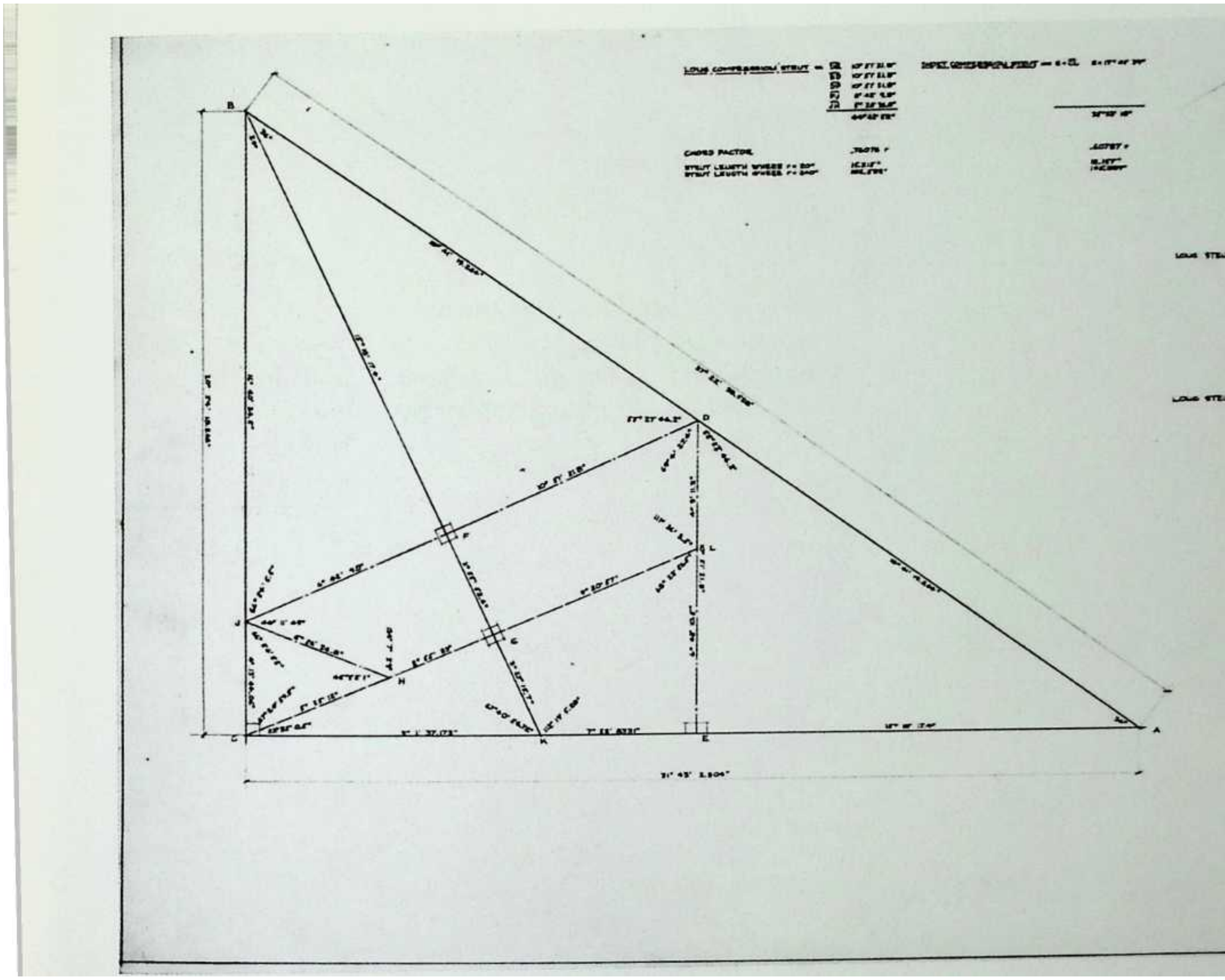
Tensegrity, a concept Fuller explored during the late forties, obtained its maximum coherence in his erection of the discontinuous compression and continuous tension sphere at Princeton University in 1953. Made up of ninety aluminum pipe struts held in place with tense wire cables projecting from each end, this seemingly magical, dematerialized orb was rebuilt later in 1959 and exhibited at the Metropolitan Museum of Art in New York.

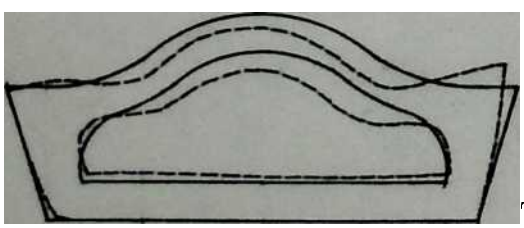



LONG · COMPRESSION · STRUT
SHORT · COMPRESSION · STRUT
STRUT · TERMINAL
TUBING · SPLINE & LACING · ANCHORING
LOCATION · OF · TERMINAL · CONNECTION · LOOPS
SPRIT · DETAIL



uiXZOiT GJKgaiX»QH 3PKU





These light fiberglass components were much easier to assemble with plastic pins and comma-shaped cams than they were to design. Every angle and dimension were critical to structural integrity.

Radomes

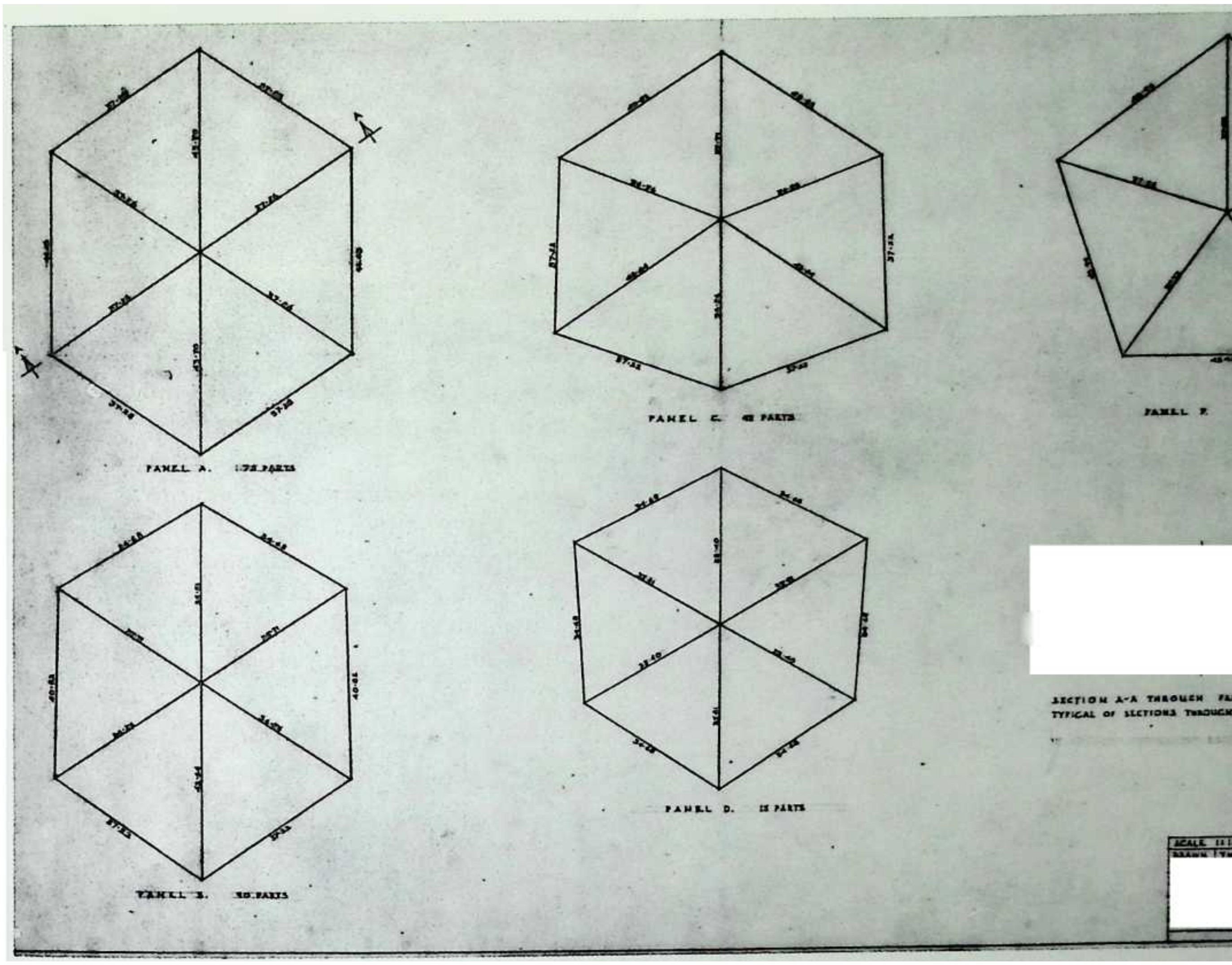
1954

- **BASKET A* SPECIFIED**

- **GA^ET AS JZWElVFP**

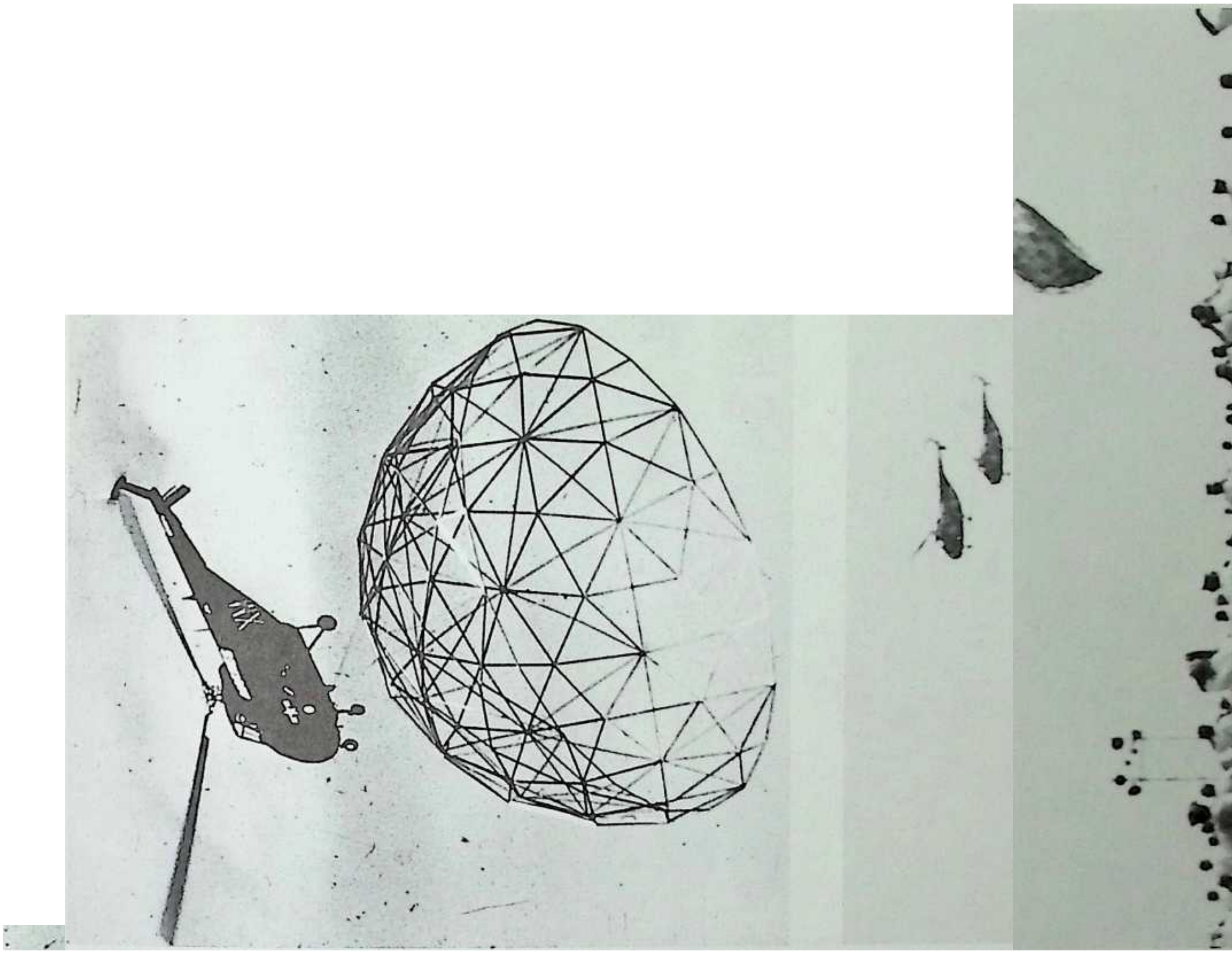
BASKET *fOK* HEX-PENT FULLER EWUE (PAT.ZWZm) Z!«|54- ZSEODE516S IKI.C. 4 &EATTLE STREET. ^AUPKIPCE B&MASS TELFPHOkle TK-AMU

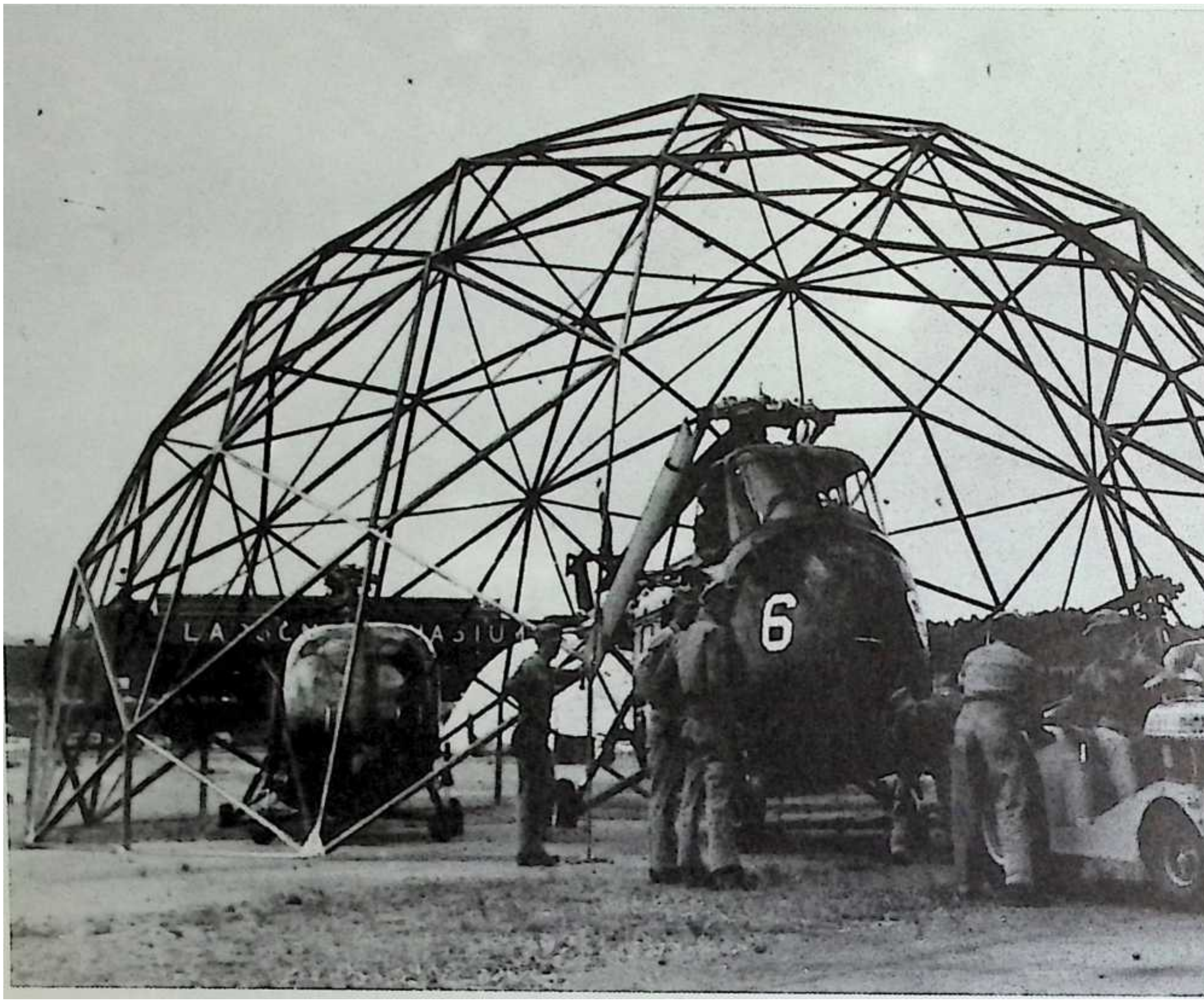
	i • / r_ji
r	r -r^J

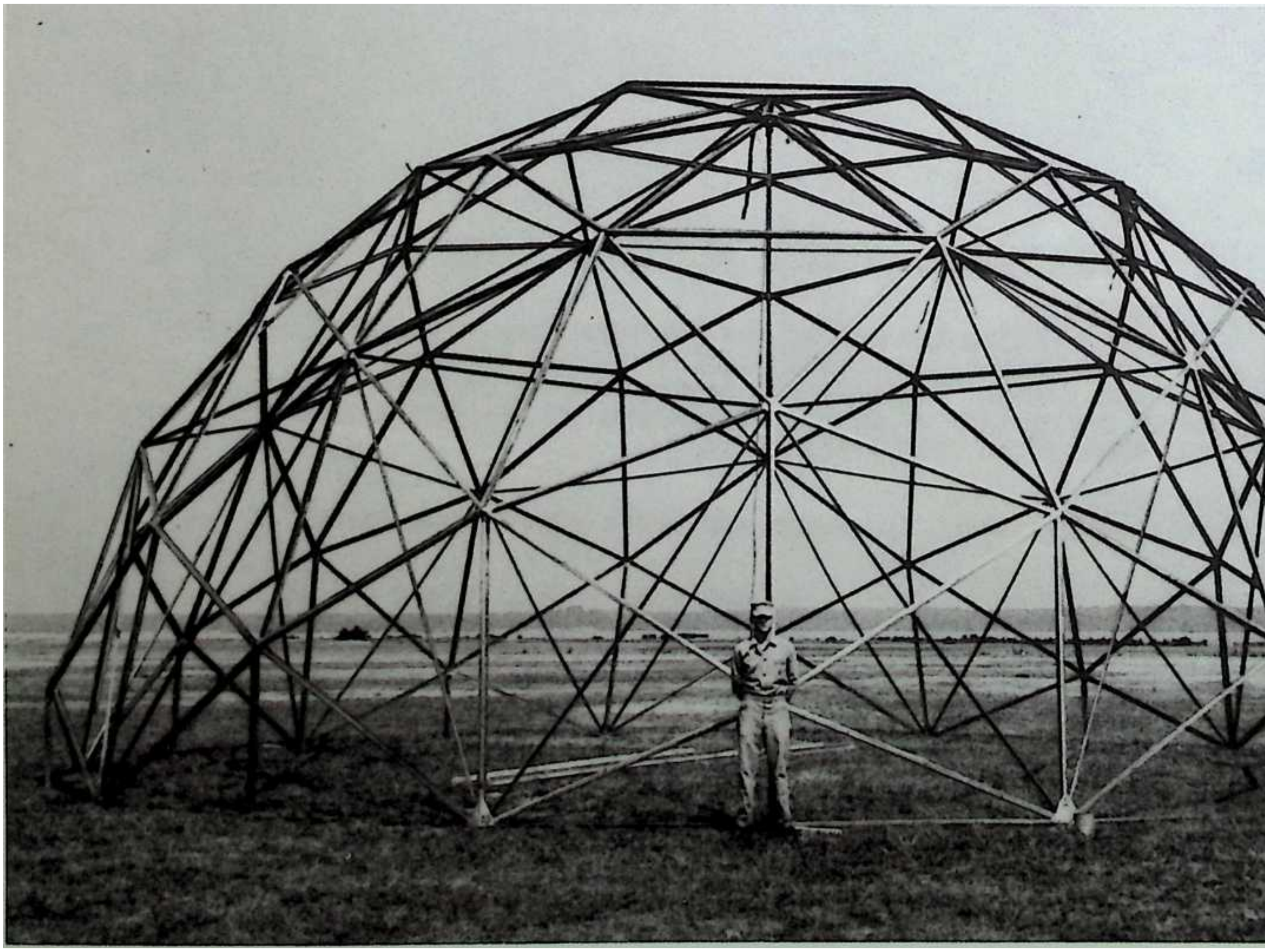


Fifty-Foot Magnesium Geodesic Hangar for the U.S. Marine Corps 1954

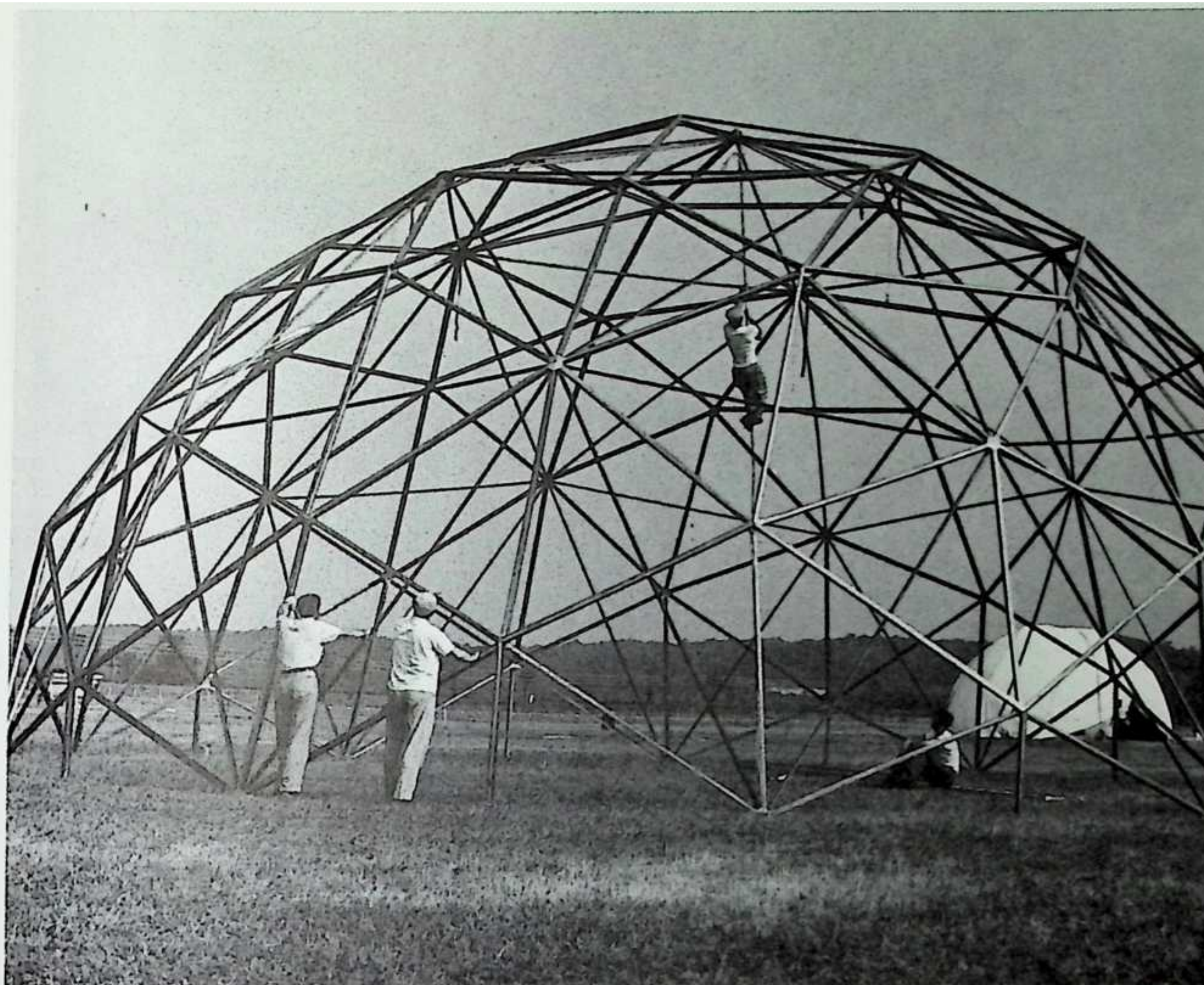
These helicopter hangars are developments of the earlier ones, but they are smaller, less expensive, and can actually be transported by the vehicles they were designed to house. The structure is magnesium extruded struts and is covered by tent material tailored somewhat like a Dymaxion World Map. This fabric cover is zipped into a shape that conforms perfectly to the contours of the dome. The popular image of these hangers dangling from helicopters was prescient of Fuller's later design for superbuoyant spherical cities, the vast weights of which would be sufficiently lighter than the surrounding atmosphere to produce the largest dirigibles ever designed.

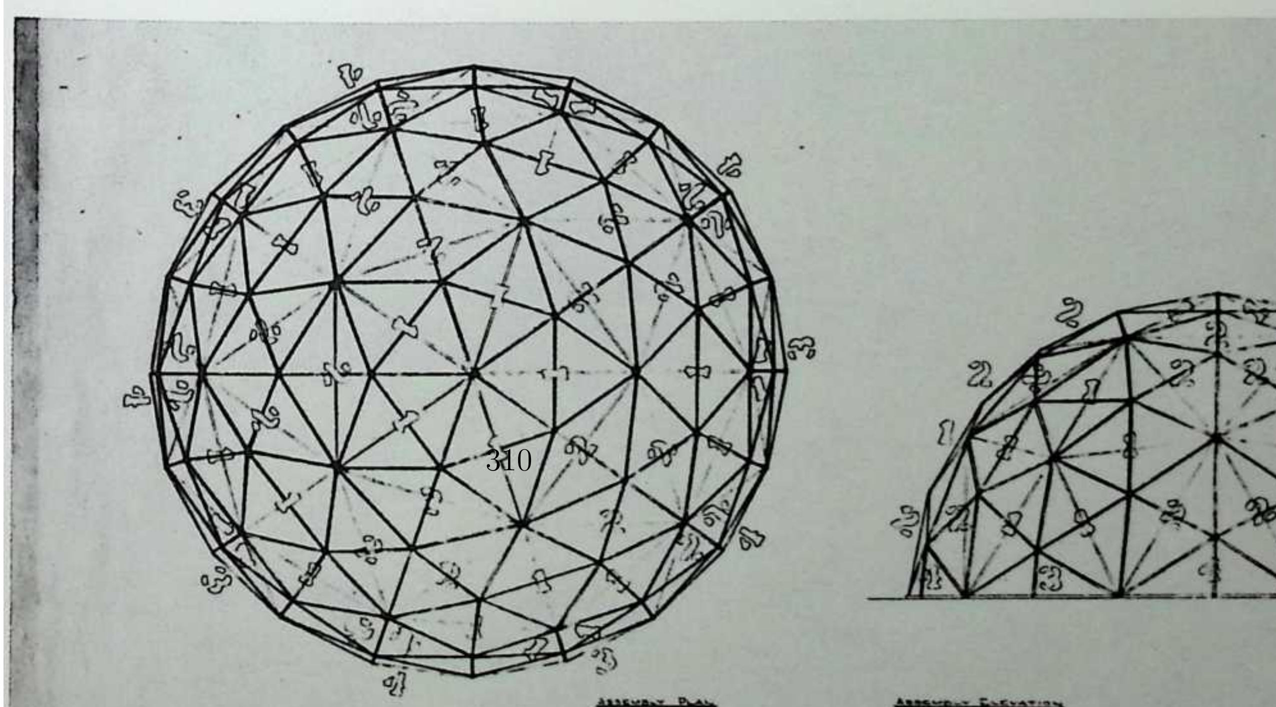


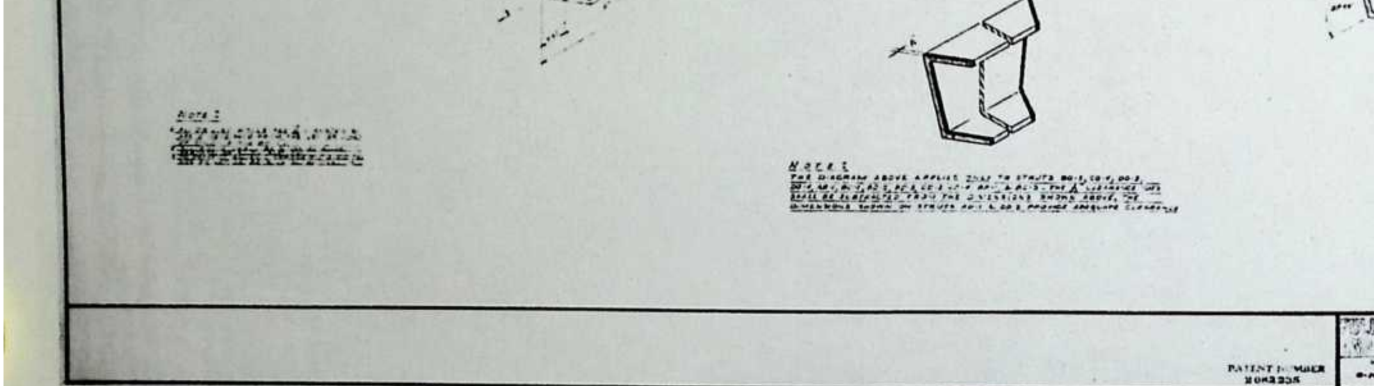

6

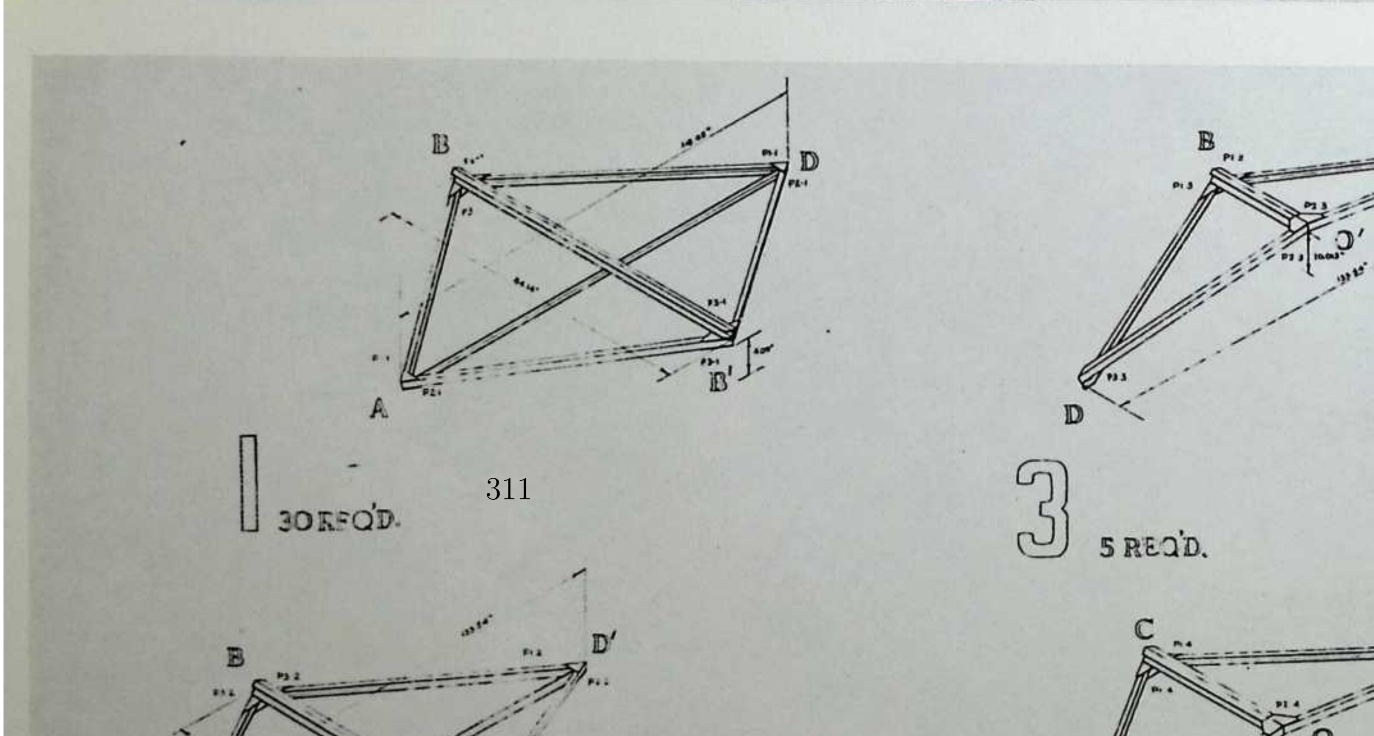


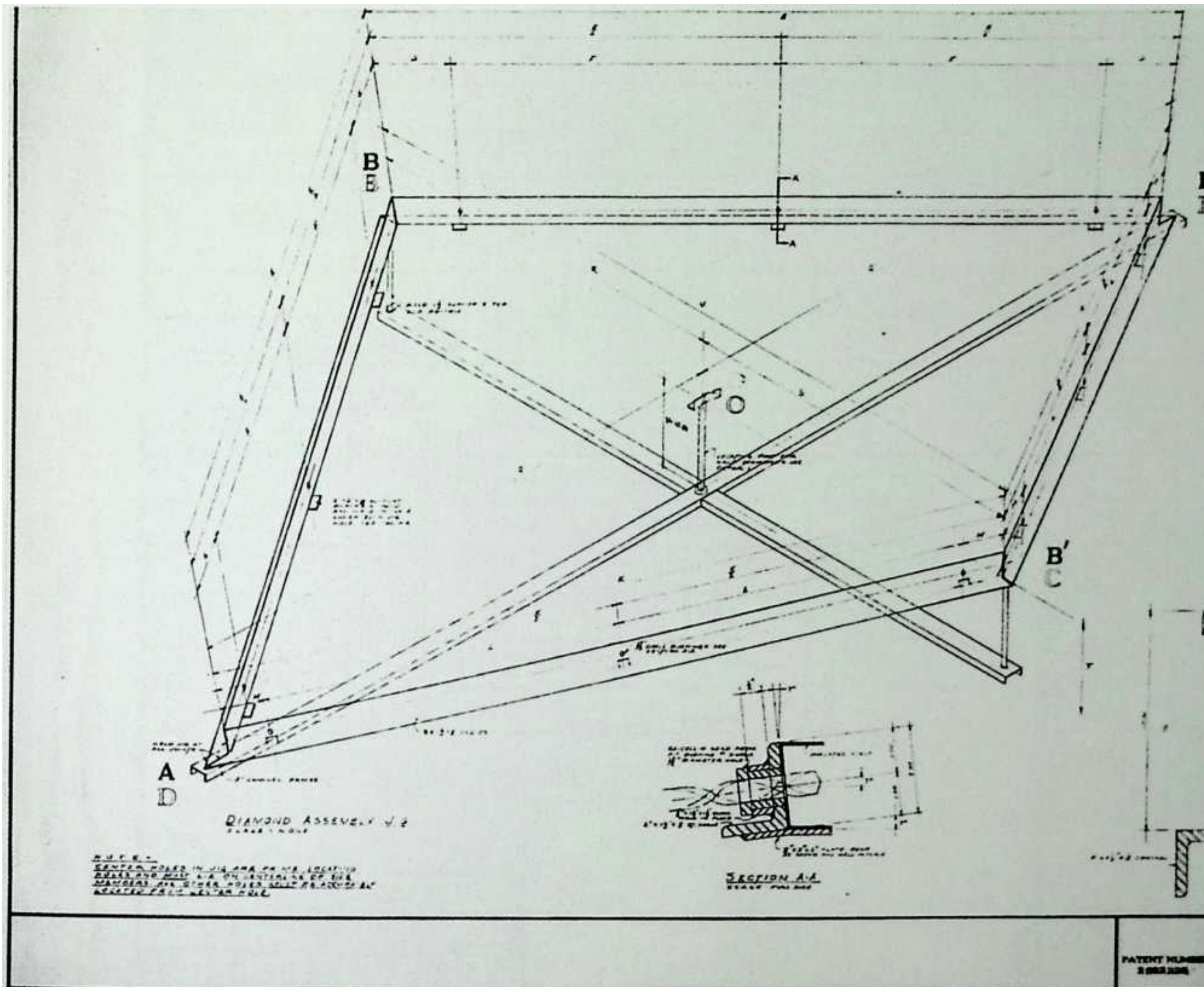
309

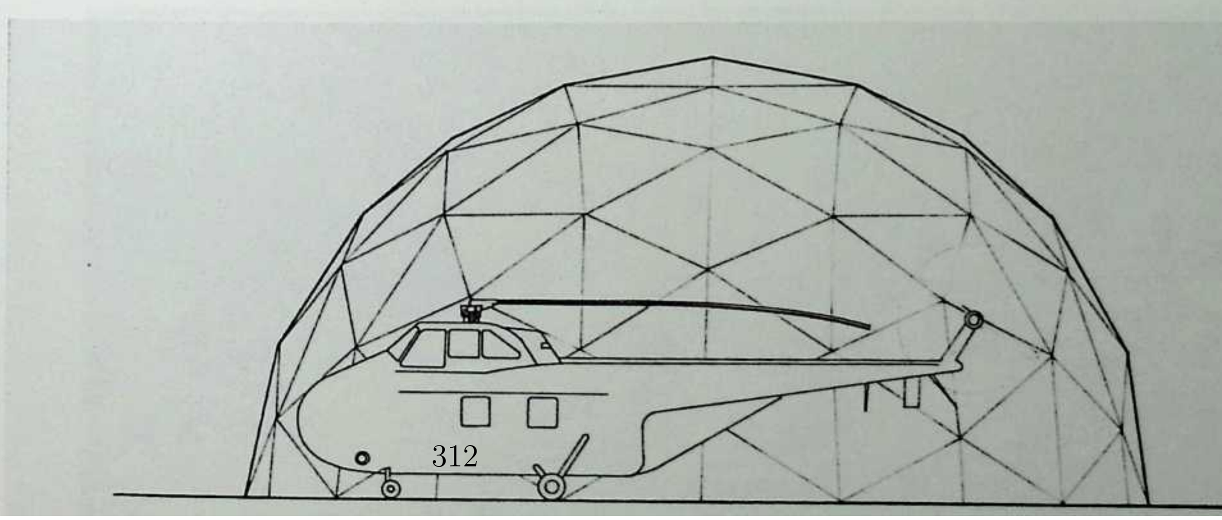





AD-1
DD-2
BD-3
AB-1
BD-1
BD-2
BD-3
CD-2
CD-4
DB-1
BC-2


B
D
A
B'
1
30 REQ'D.
B
D
3
5 REQ'D.
B
D'
C


B
B
B'
C
A
D
DIAMOND ASSEMBLY
SECTION A-A
PATENT NUMBER



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aᵖ©as 'ﬀBSDg ©. ss. S4id?sHans®E axnw>s
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taWWW[1]”[1][2][3]

4. GUSSET PLATE DETAILS

5. H tt U 4 . _ a - T

mm- BUB-ASSEMBLY	SEC-TION	LENGTH OF MEM-BER INCHES	NO. RED'D PER SUB AS-SEM-BLY	LENGTH OF MEM-BER FEET	TO-TAL NQ OF MEM-BERS	TO-TAL LENGTH FEKT	WT./FT	TO-TAL WT	REE DWG	RE-MARKS

1 SUB-ASSEMBLIES ” ‘ ’
2 ASSEMBLY PLAN
3 ASSEMBLY ELEVATION
EXTRUSION SECTIONS

zOB° i	1	[	100.6216'	2 LA	640179*	GO LA"	5041074*	2.A95*	I4.9	1.20B*	
											DHL HALF OF MEMBERS MARKED* HAVE RLVEQH END CONDITIONS (
W o fl		[	looeziG'	2CA	640179*	GO LA'	504.1071*	2.495*	14-9.40*	22, Cs	
22		[	I0Q82I6'	ZEA	640179	50 LA*	4200895*	Z.A95*	124 35*	22,Gs	
nw ° $		[	1006216'	ZEA	640179	10 LA.'	84.0175	Z.495*	24.952*	22®	
O£> o 22		c	108 8540'	ZEA	907IIG*	50 LA'	4535551	2.R9O*	134.50	22®	
OD° <		c	1063540*	ZEA	907116*	0 LA. ,	90.7116*	*2.6,90**	26.942*	22®	
zOD ° J	1	T	163.236'	ILA.	13.60503*	0 LA	406.090*	3.4AJ.'	103.24*	M	
D® o 22		T	165.432*	LA	15 2301'	25 LA	362.2525*	ate		M	

D® ° $		[	93.; 40*	ZEA.	7.700*	IOLA'	7760*	1 9)0*	2S.I0M*	
M)° $			93.360'	ZEA	7.760*	IOLA.'	77.60'	Z 310*	23. >0*	
W o	&	I	3B.O52'	ILA	3.171*	IOLA*	3171*	0- 941*	«.4I*	
OD° $		I	55.9G8'	ILA	4614*	IDEA.'	46.64*	t3S5*	13.952*	23®
	fl	I	IIGB2G0*	IEA	97355*	60 LA	584.130*	2- B9O**	n5.4<2»	22®
o 22		I	940156'	IEA	75346*	50 LA'	391.730*	2.3 3C*	II <4 SO*	22®
TOTALS						• SEE NOTE UNDER 'REMARKS	3zcG.4oia; c 'AO'SG^ii^ TOTAL		1 tfc8.CC*	

SLBASSEMBLY	SIZE	UNIT WT	SUB-TOTAL WX	REE DWG.
fl	30 EA	1316*	575.40*	
22	25 tA	1866*	472.00*	
0 0	5 LA	11.46*	57.40*	

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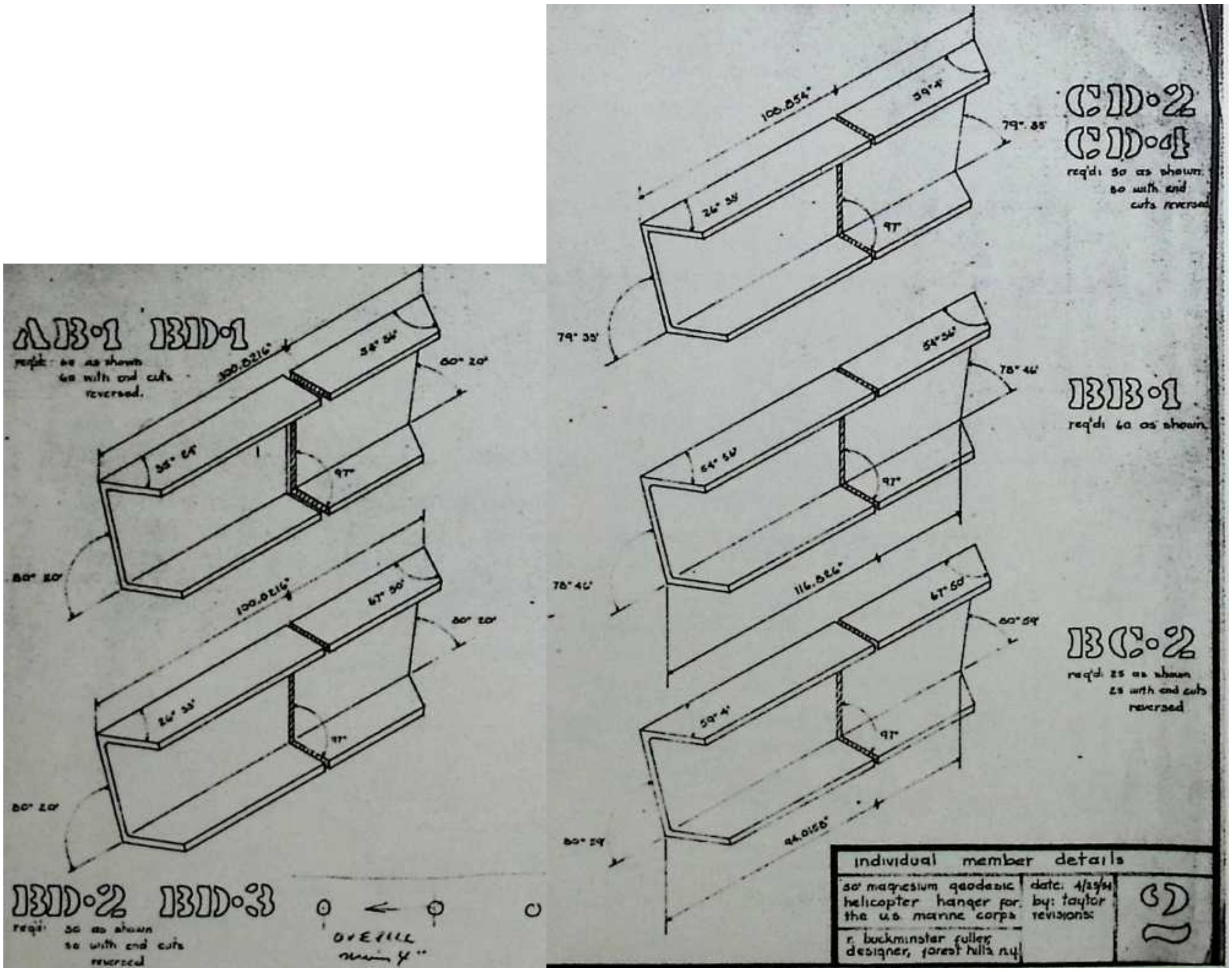
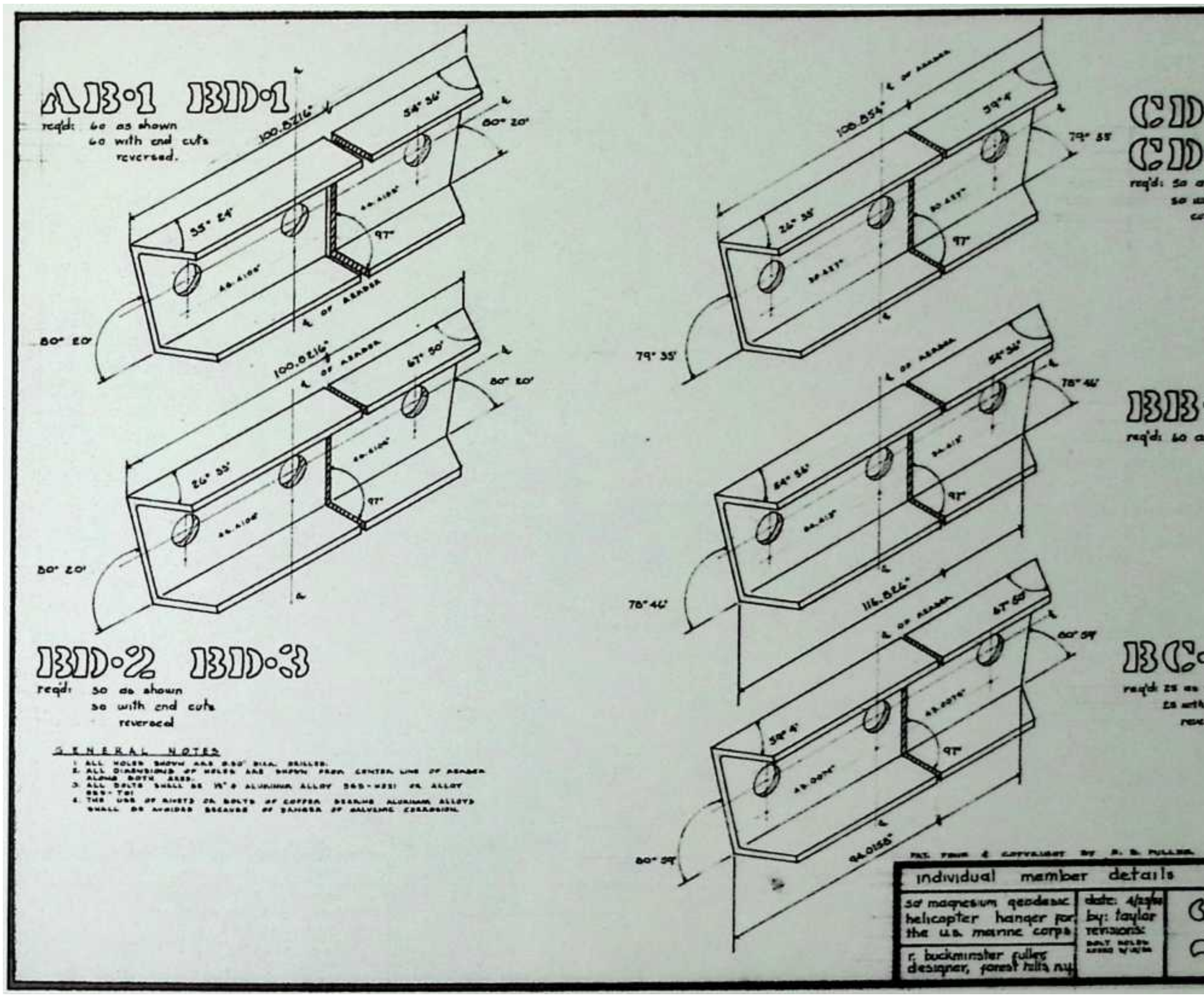
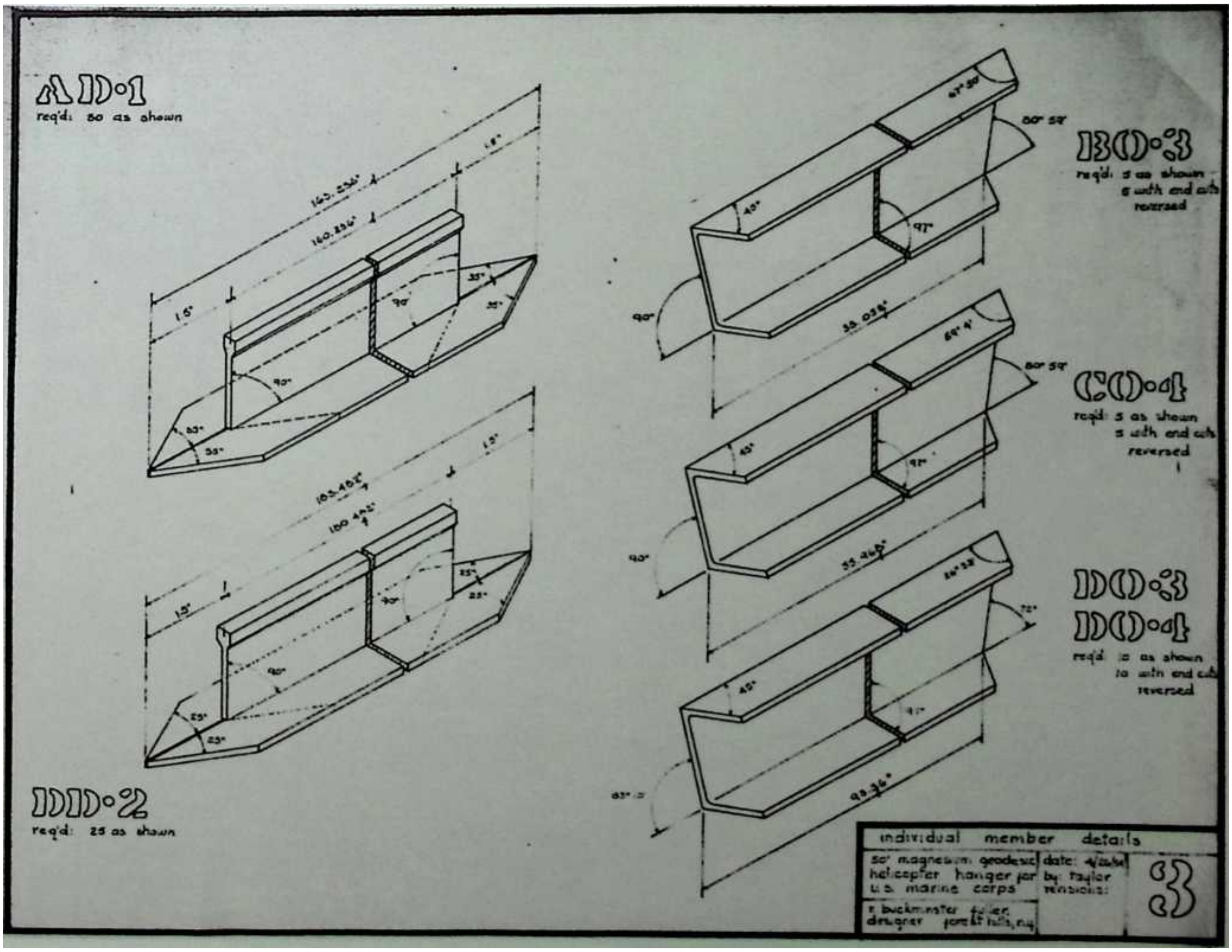
		bnernoeH subassembly schedule	
5EA12.76*	6360*	so	«oau^n
	1168.60*	magnesium	*7
		gcoocsic	43/54
		helicopter	B
		hanger for	by
		the US.	caldtv-
		marine	cll
		corps	Jreui-
		r buchmin-	sions
		ster fuller	.
		designer	
		forest	
		hills,n.y.	


AB·1 BD·1
req'd: 60 as shown
60 with end cuts
reversed.
100.0216"
58° 56'
80° 20'
35° 25'
97°
BD·2 BD·3
req'd: 50 as shown
50 with end cuts
reversed
CD·2
CD·4
req'd: 50 as shown
50 with end
cuts reversed
105.854"
59° 4'
79° 35'
26° 35'
BB·1
req'd: 60 as shown
54° 56'
78° 46'
116.826"
67° 50'
80° 59'
BC·2
req'd: 25 as shown
25 with end cuts
reversed
94.0158"
individual member details
50' magnesium geodesic helicopter hanger for the u.s. marine corps
date: 4/25/54
by: taylor
revisions:
r. buckminster fuller, designer, forest hills n.y.



AB·1 BD·1
reqd: 60 as shown
60 with end cuts
reversed.
100.8216"
54° 36'
80° 20'
55° 24'
97°
80° 20'
100.8216"
67° 50'
80° 20'
26° 33'
97°
80° 20'
BD·2 BD·3
reqd: 50 as shown
50 with end cuts
reversed
GENERAL NOTES
100.856"
59° 4'
79° 35'
26° 33'
97°
79° 35'
54° 36'
78° 46'
54° 36'
97°
78° 46'
116.826"
67° 50'
80° 59'
59° 4'
97°
80° 59'
94.0156"
individual member details
50' magnesium geodesic helicopter hanger for the u.s. marine corps
date: 4/23/54
by: taylor
tensions:
r. buckminster fuller designer, forest hills n.y.



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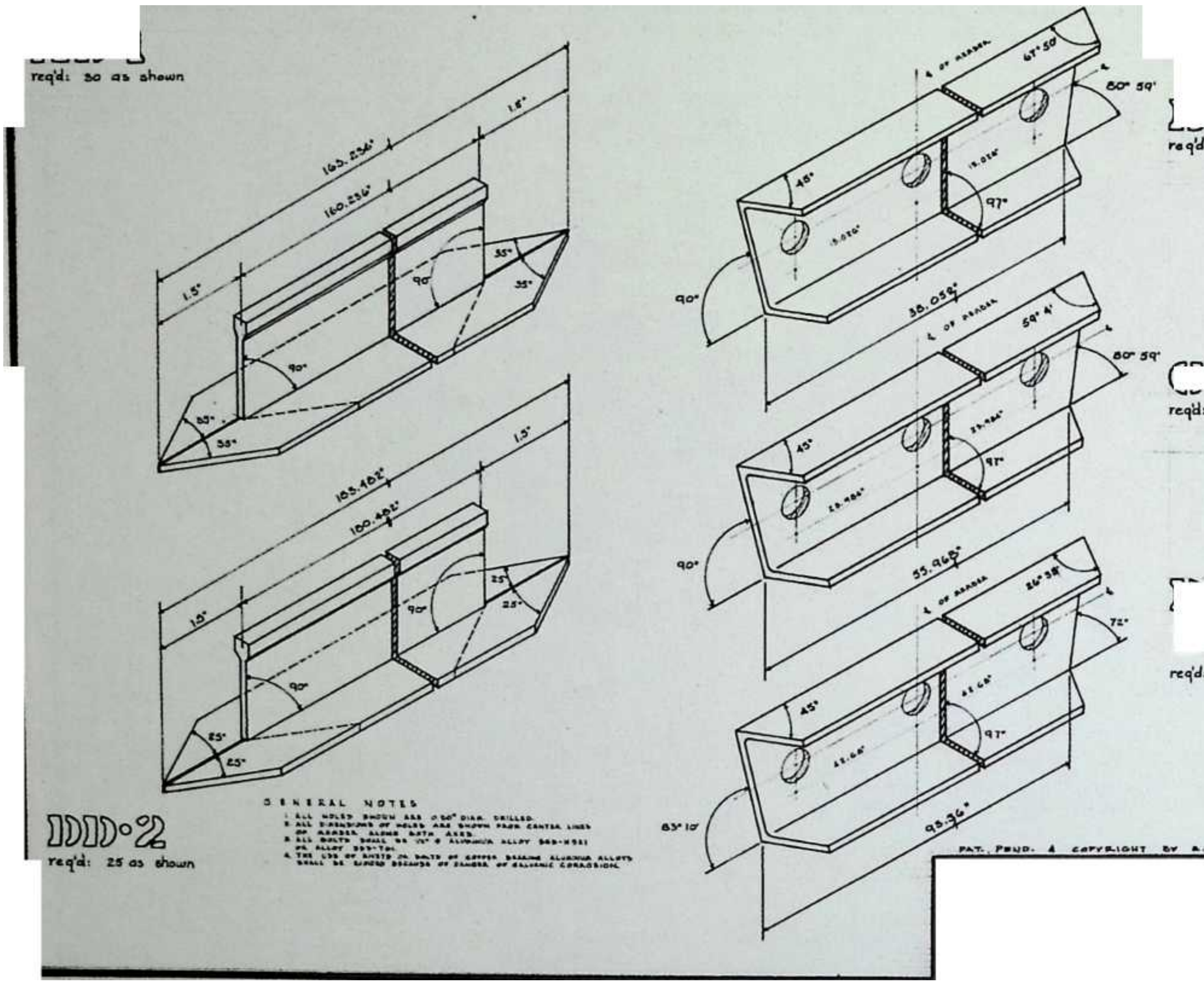
5o' magnesium geodesic helicopter hanger *for* u. s. marine *corps*	date: 4/24,/M bg: taqlor revisions:	*OX)* Q!)



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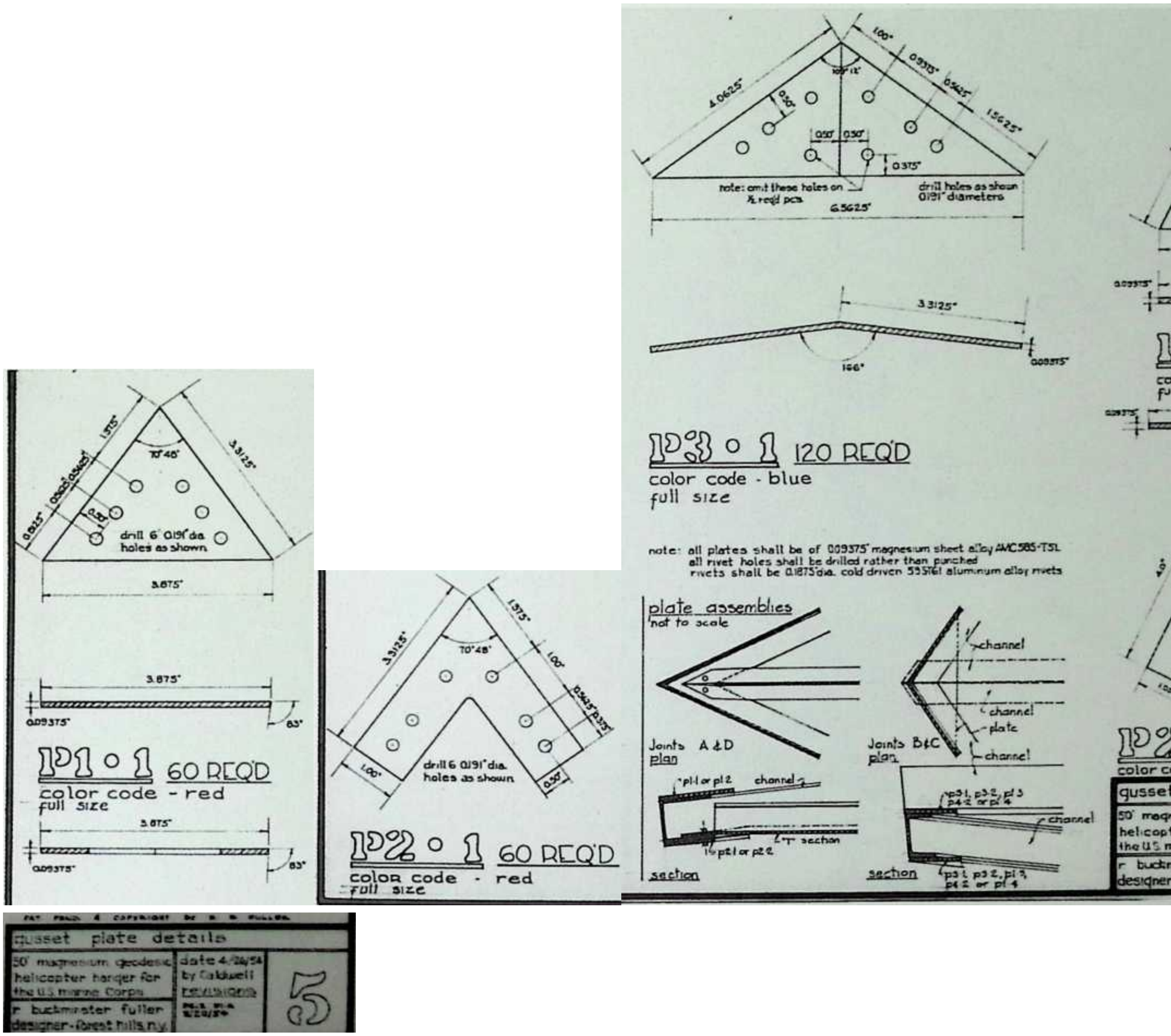

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assembly plan

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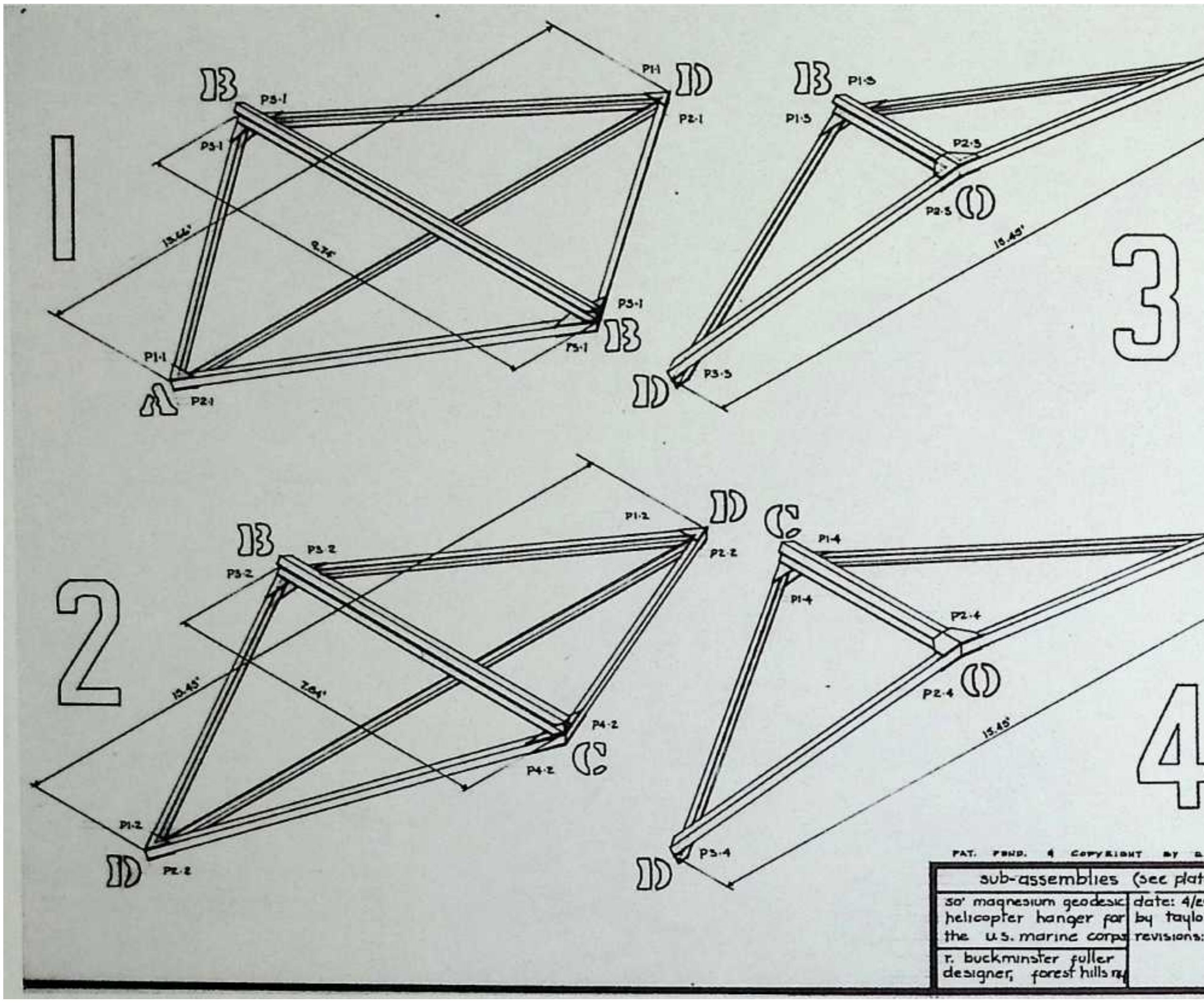

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assembly elevation

50 rnaqnesmrn geodesc data V2r/5T4. helicopter hanger for the US. mar.ne corps r bucbrrwsler fuller designer, forest btU^ny

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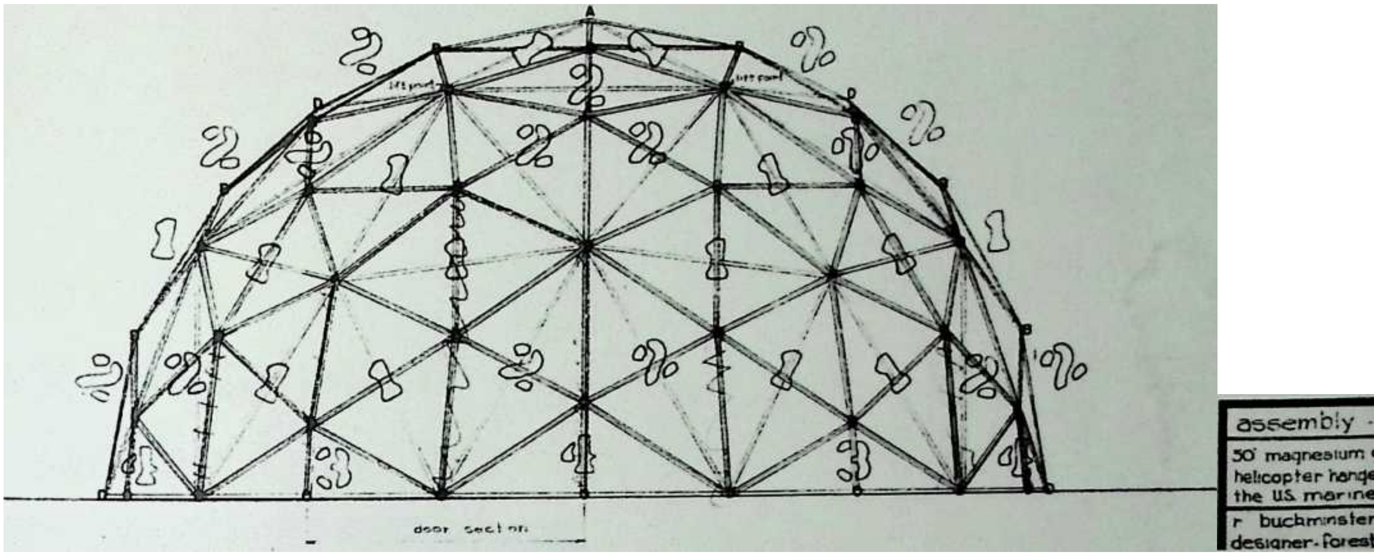

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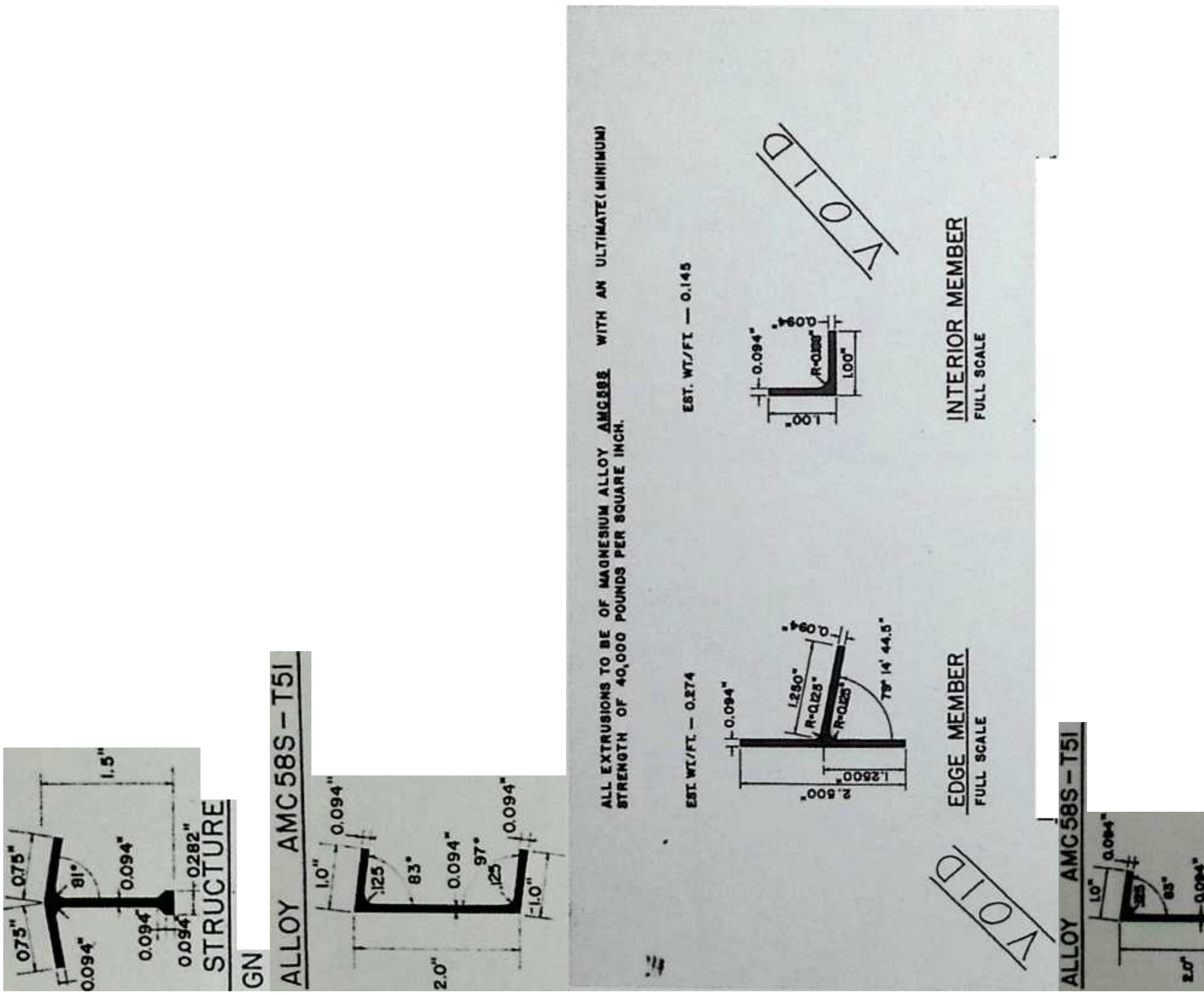
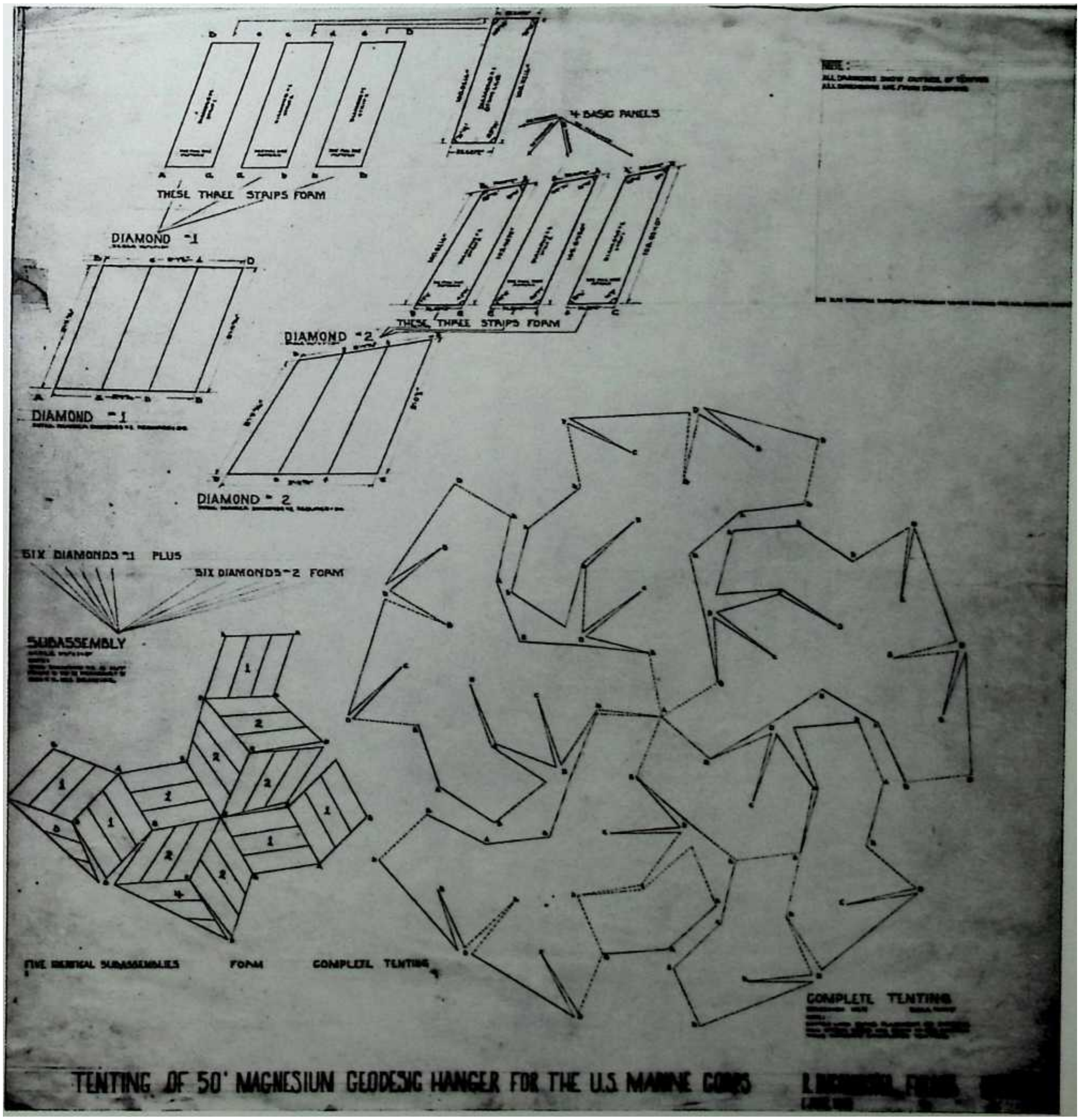
MAGNESIUM EXTRUSIONS FOR 50' GEODESIC STRUCTURE R. BUCKMINSTER FULLER — DESIGNER



Tenting for the Fifty-Foot Magnesium Hangar for the U.S.

Marine Corps 1954



Geodesic Dome Patent

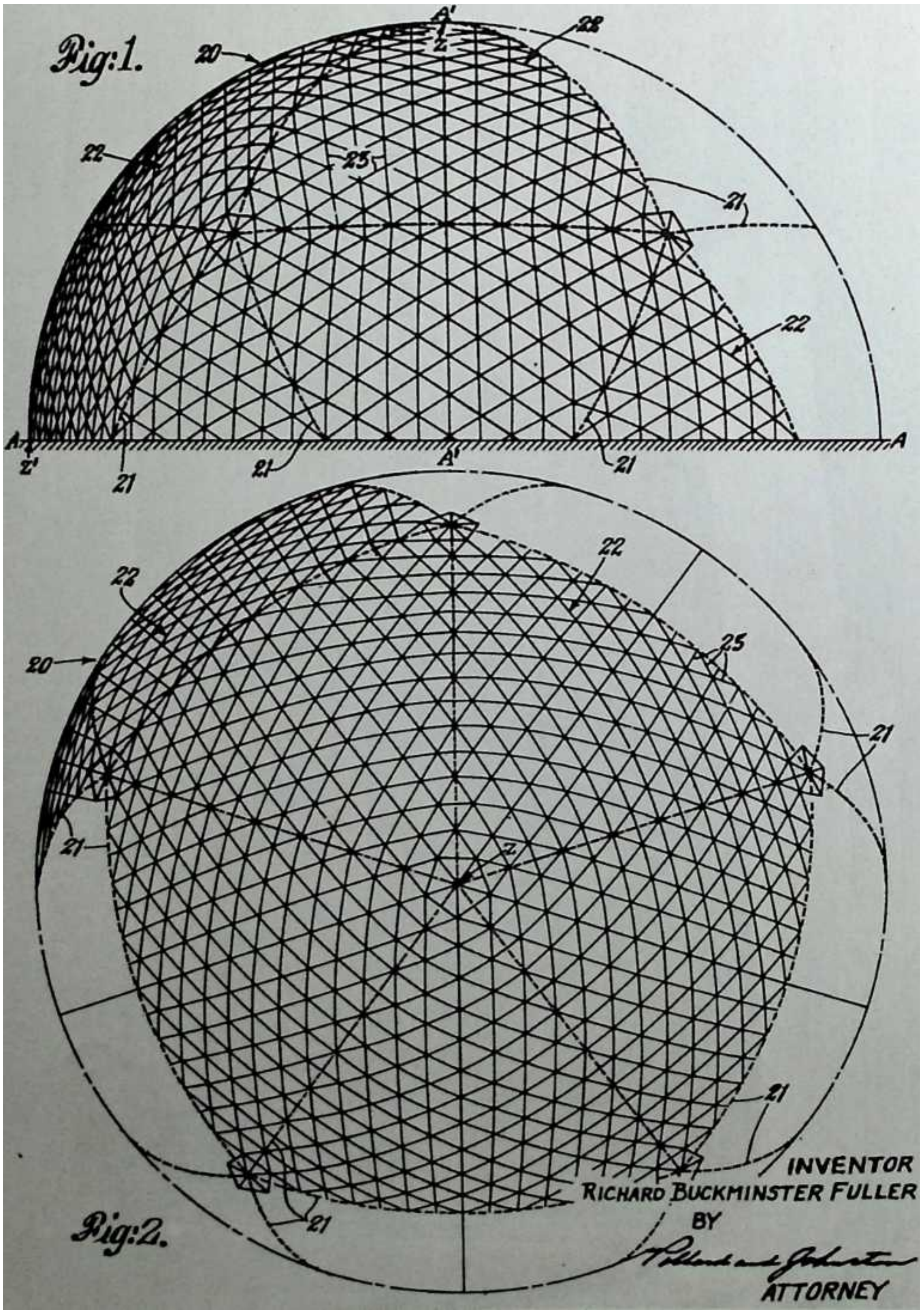
6/29/54

Fuller designed the geodesic dome in the course of his more general attempts to discover nature's own coordinate system. The lightness of modern alloys and plastics and the properties of geodesic structure allow a scale and afford a strength impossible in masonry construction.

June 29, 1954 r. b. fuller 2,682,235

BUILDING CONSTRUCTION

Filed Dec. 12, 1951 6 Sheets-Sheet 1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21
INVENTOR
RICHARD BUCKMINSTER FULLER
BY
ATTORNEY
Fig:2.

June 29, 1954

Filed Deo. 12, 1951

R. B. FULLER

BUILDING CONSTRUCTION

2,682,235

8 Sheet»-Sheet 2

June 29, 1954

Filed Dec. 12, 1951

R. B. FULLER

BUILDING CONSTRUCTION

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June 29, 1954

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R. B. FULLER

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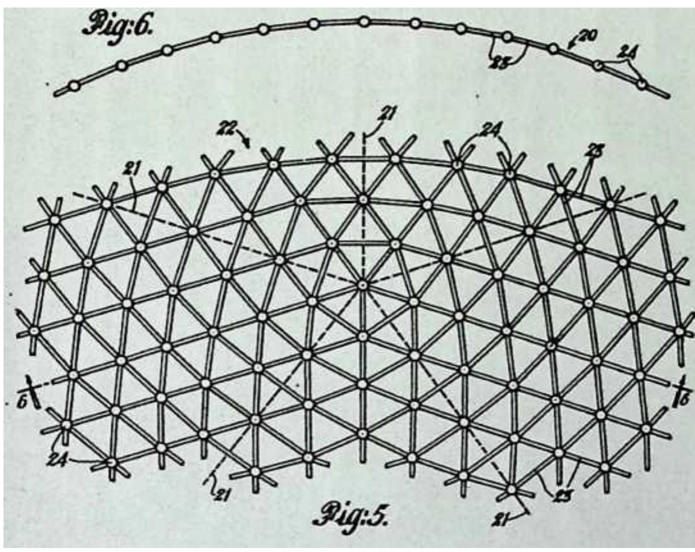
Fig:6.
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Fig:5.

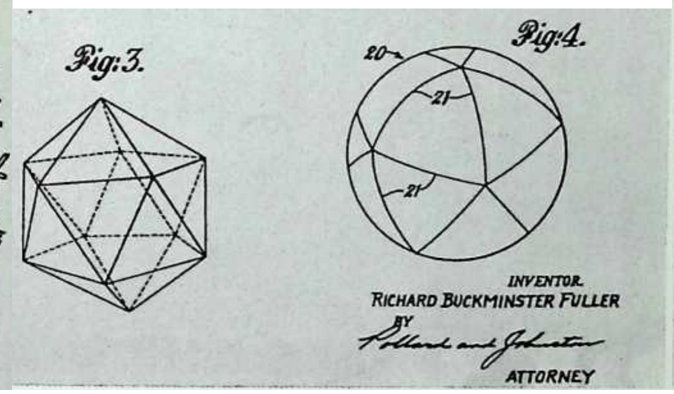
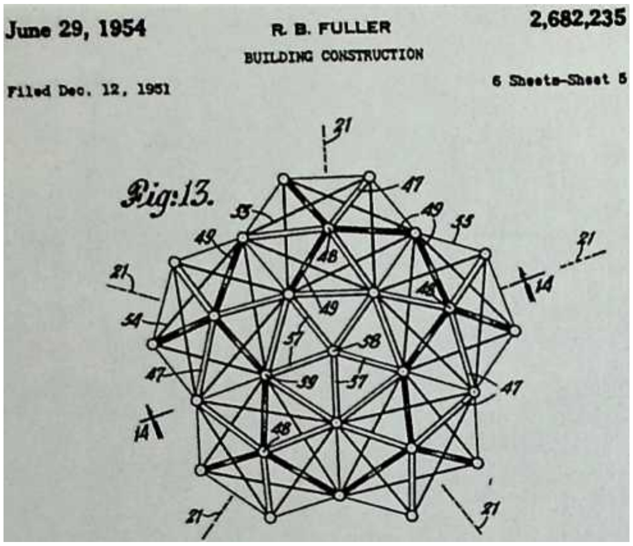
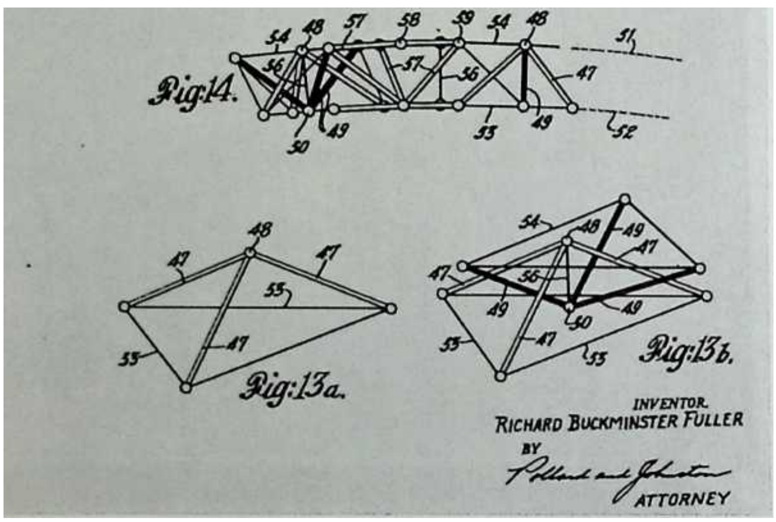


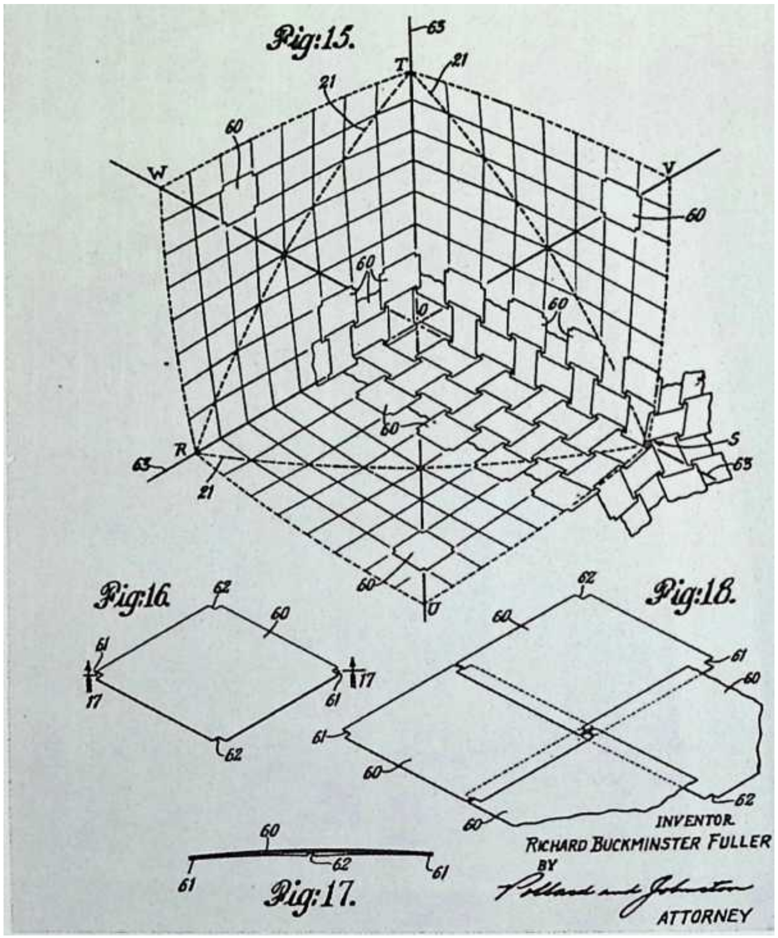
Fig:3.
Fig:4.
20
21
INVENTOR.
RICHARD BUCKMINSTER FULLER
BY
Pollard and Johnston
ATTORNEY





June 29, 1954 a b. fuller 2,682,235

BUILDING CONSTRUCTION Filed Deo, 12, 1951 6 Sheete-Sheet 6



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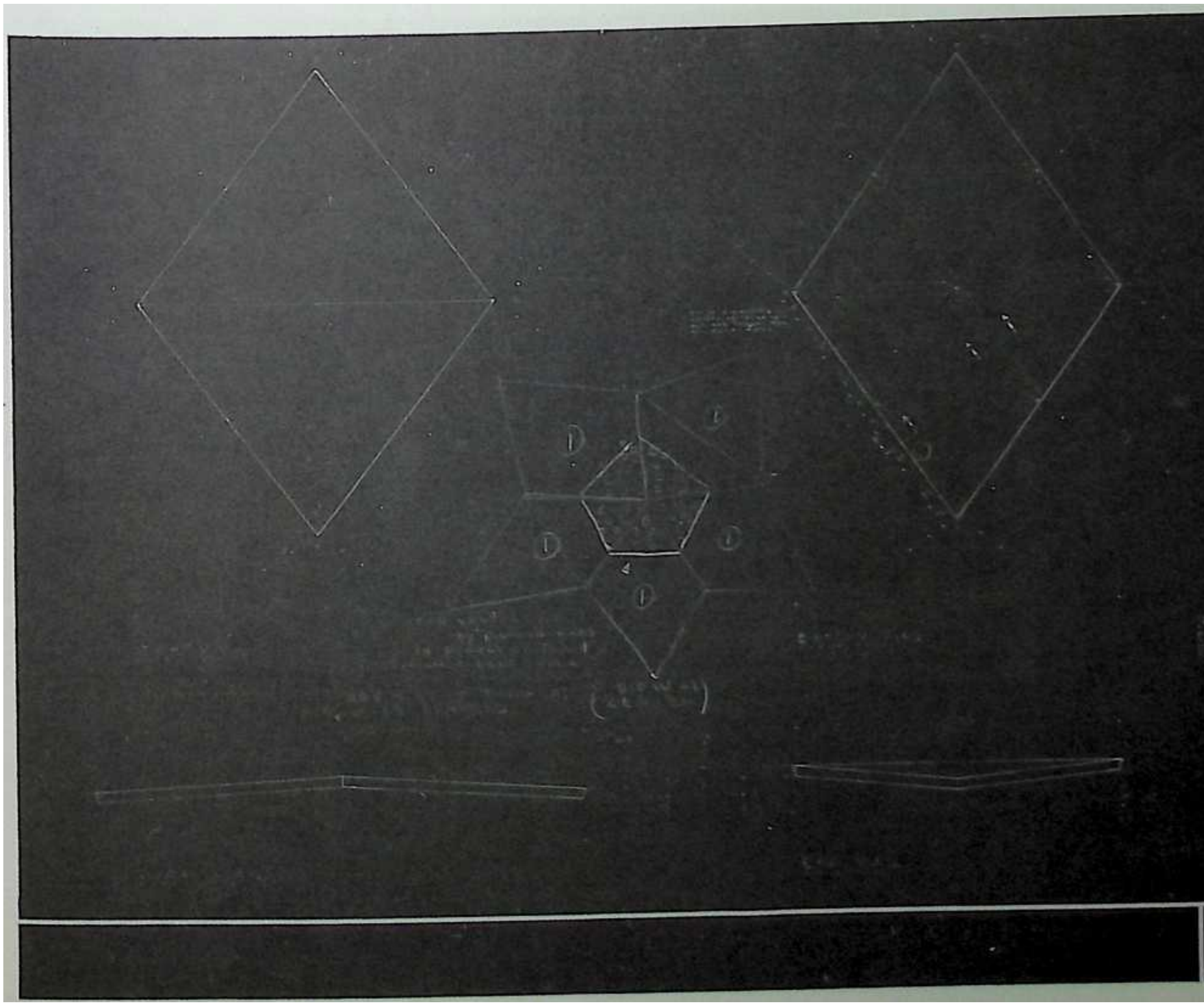
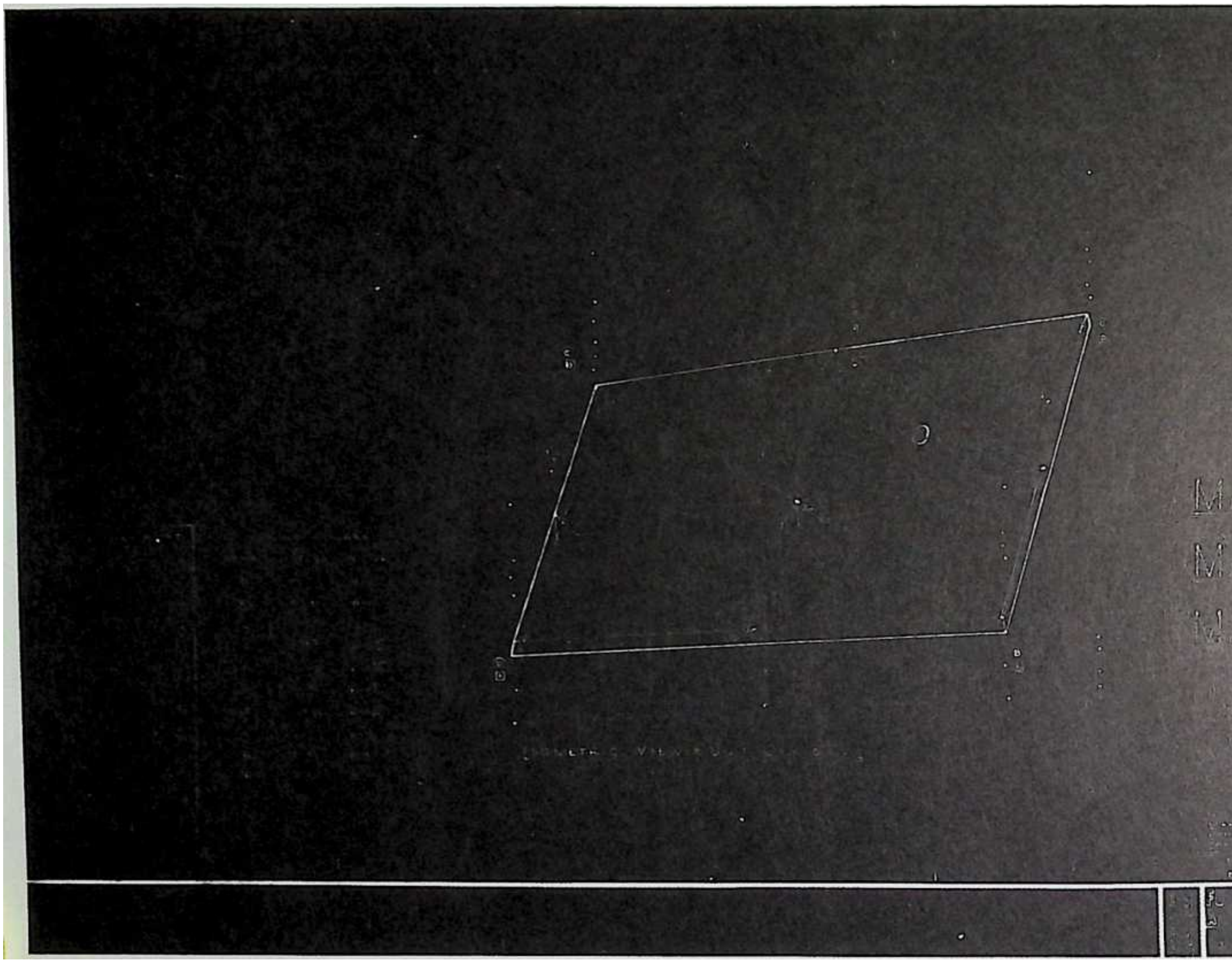
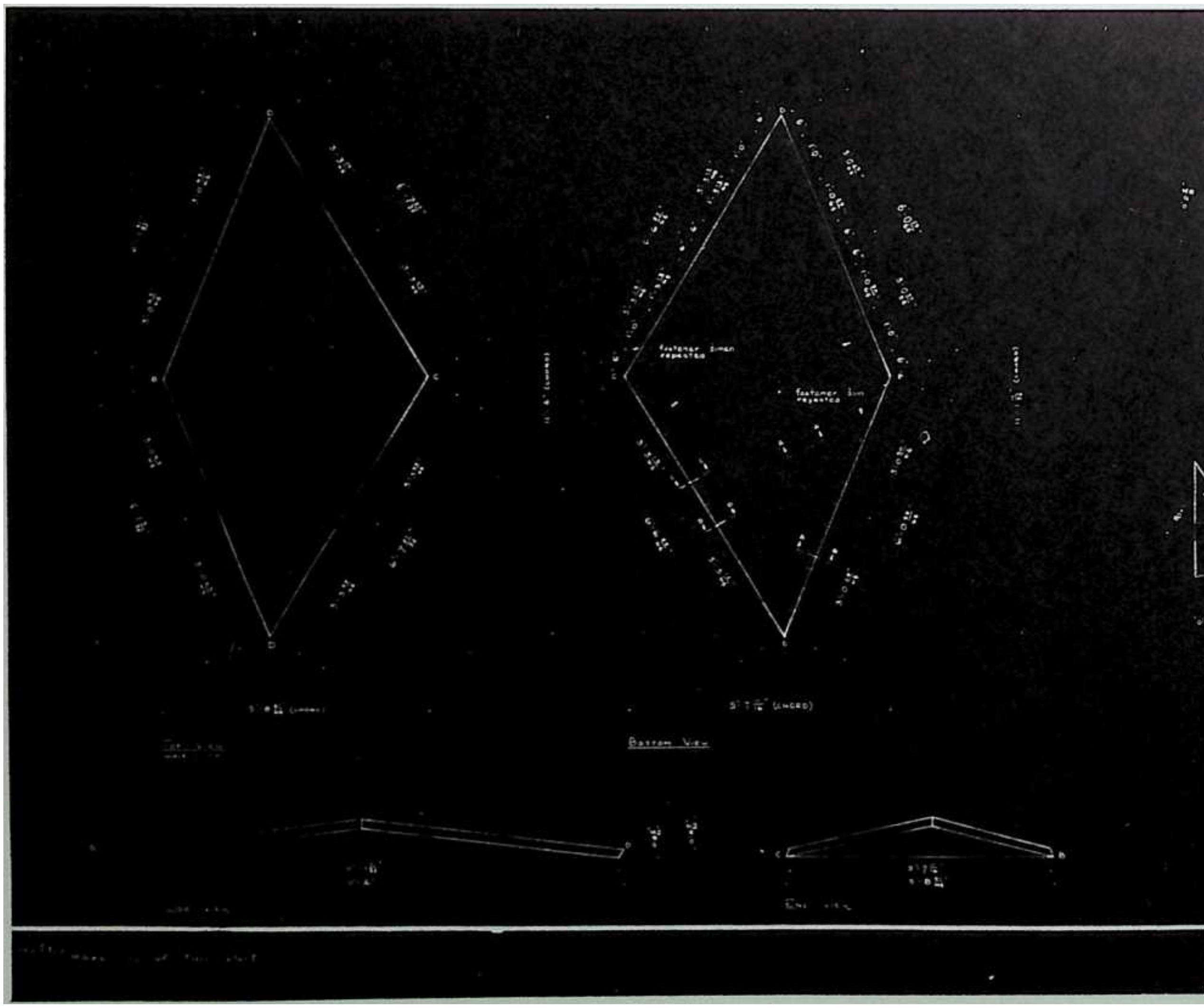
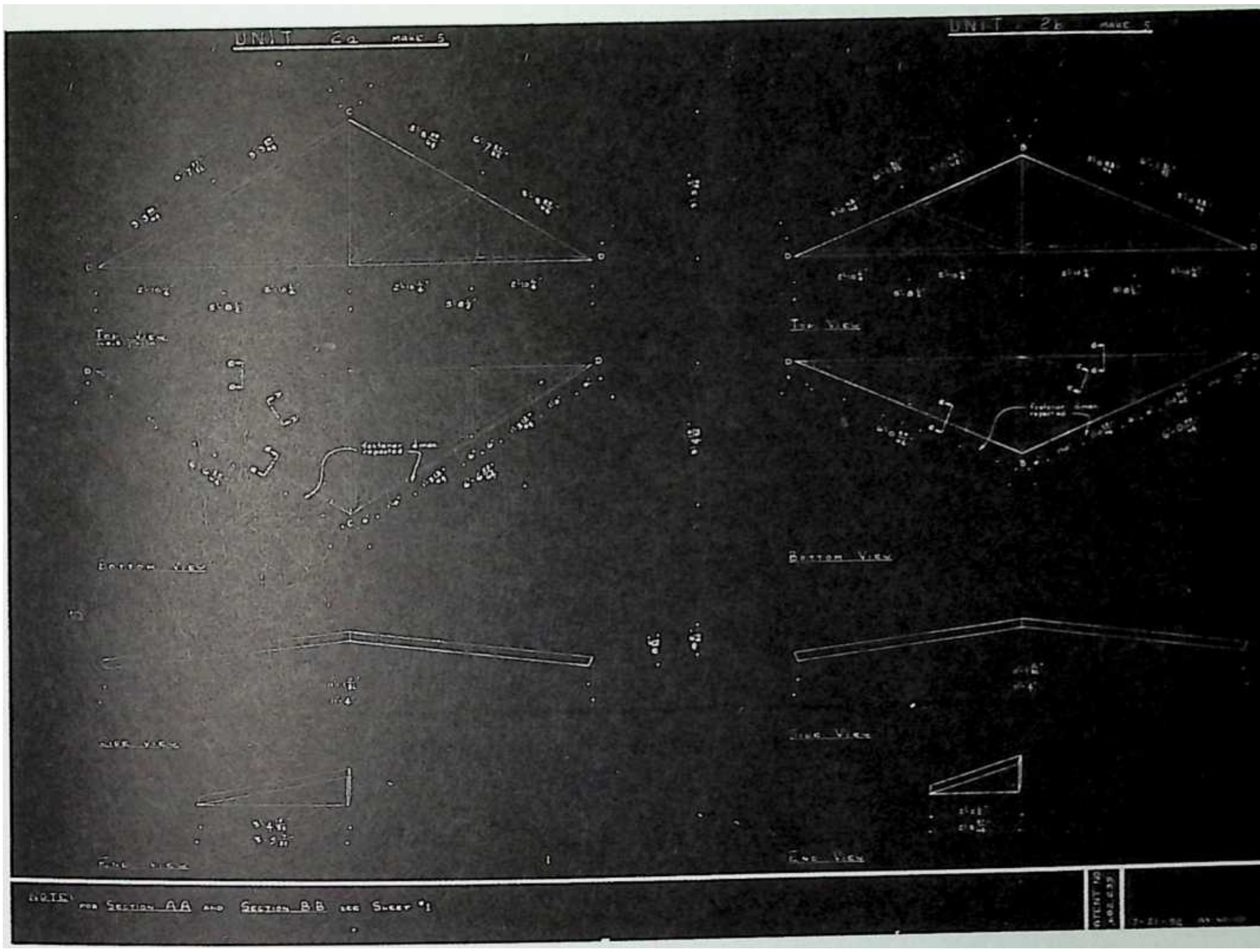
Geodesic Dome, Set of Four Studies 1954



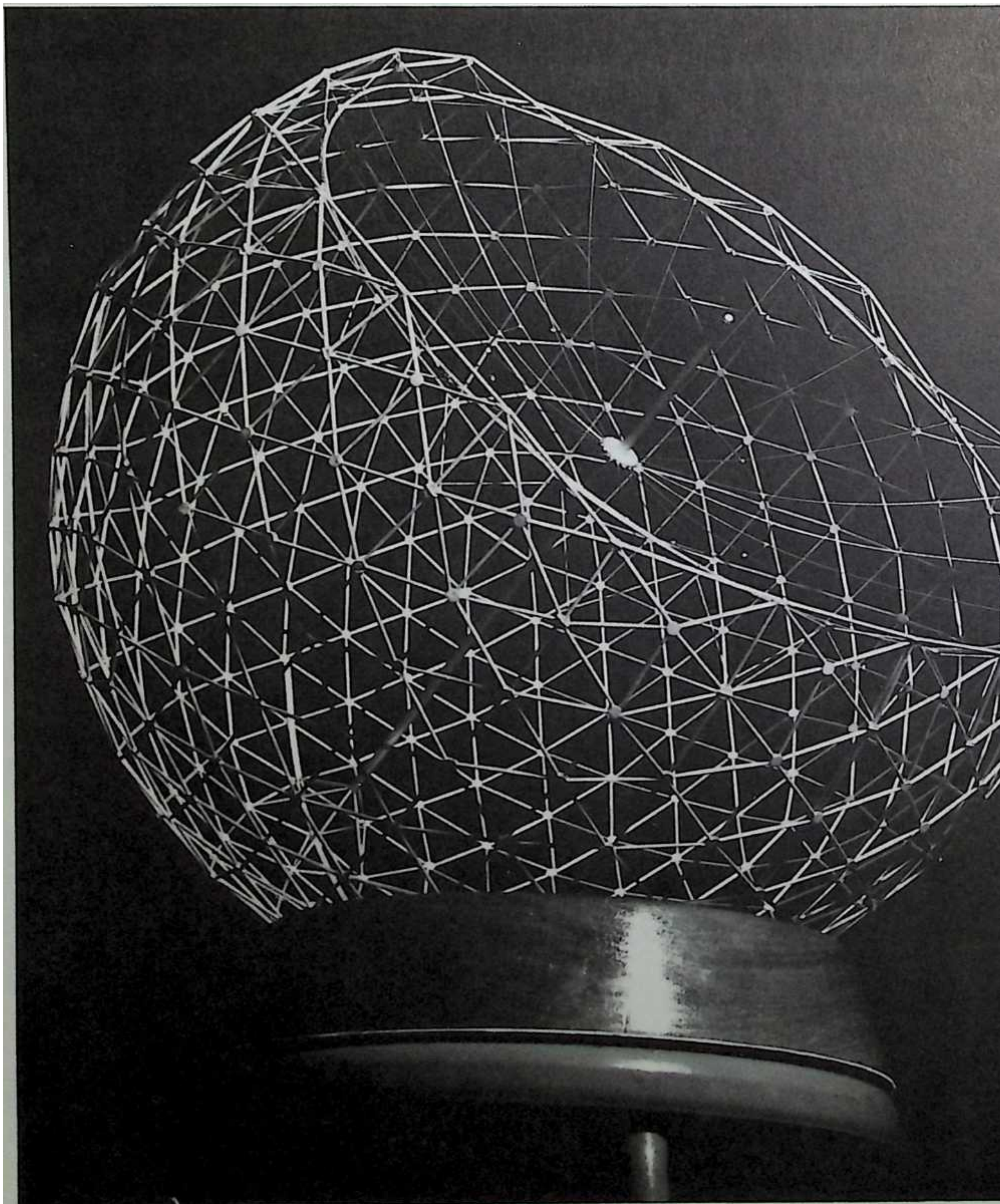


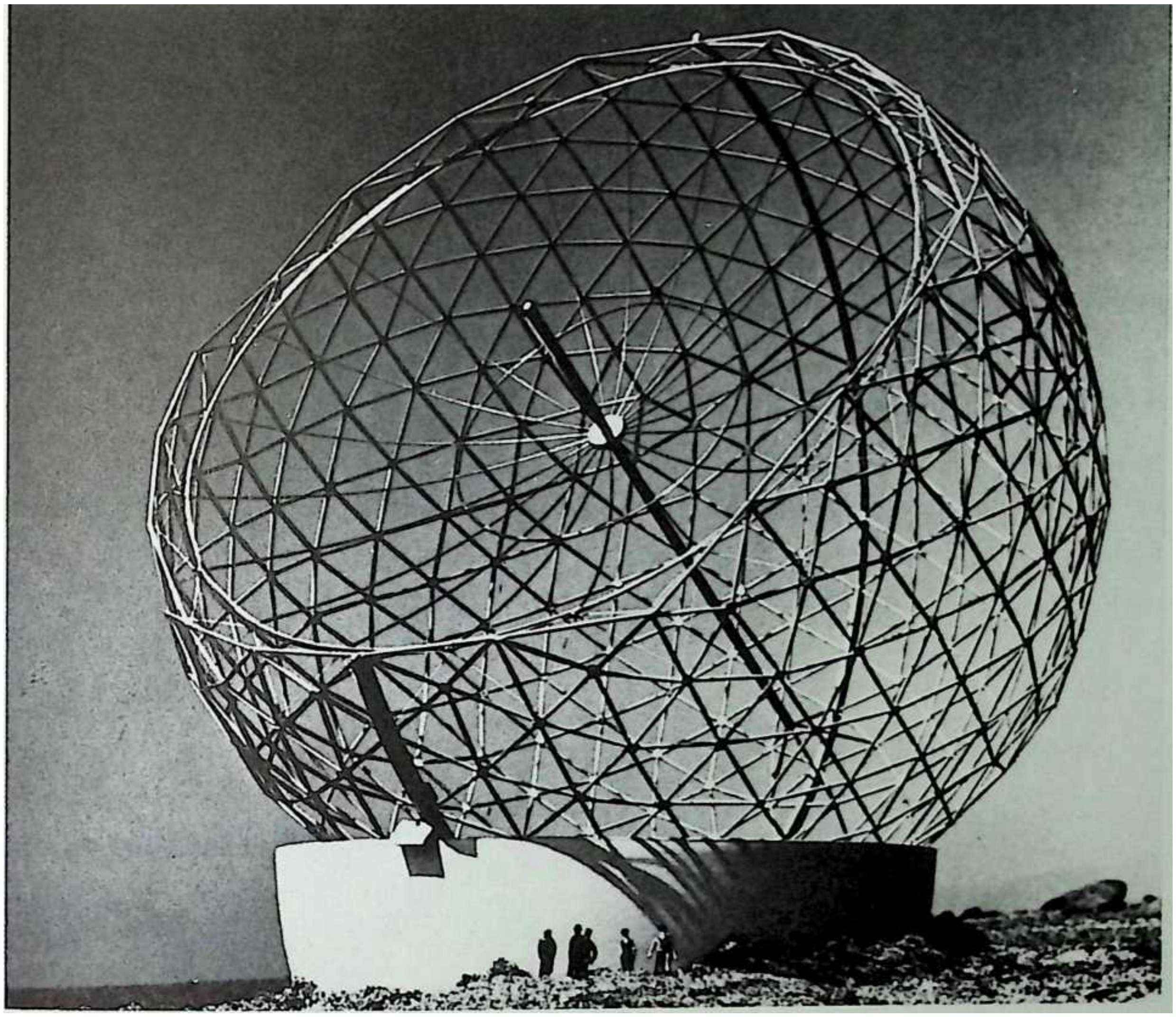

Bottom View



“Skyeye” Radio Telescope Designed with Charles Eames 1954

The “Skyeye” was designed to have a 100-foot parabolic reflector facing the sky and cradled by two arc trusses supported on four pylons. The architectural elements are by Eames, and the eye itself is a geodesic hemisphere.



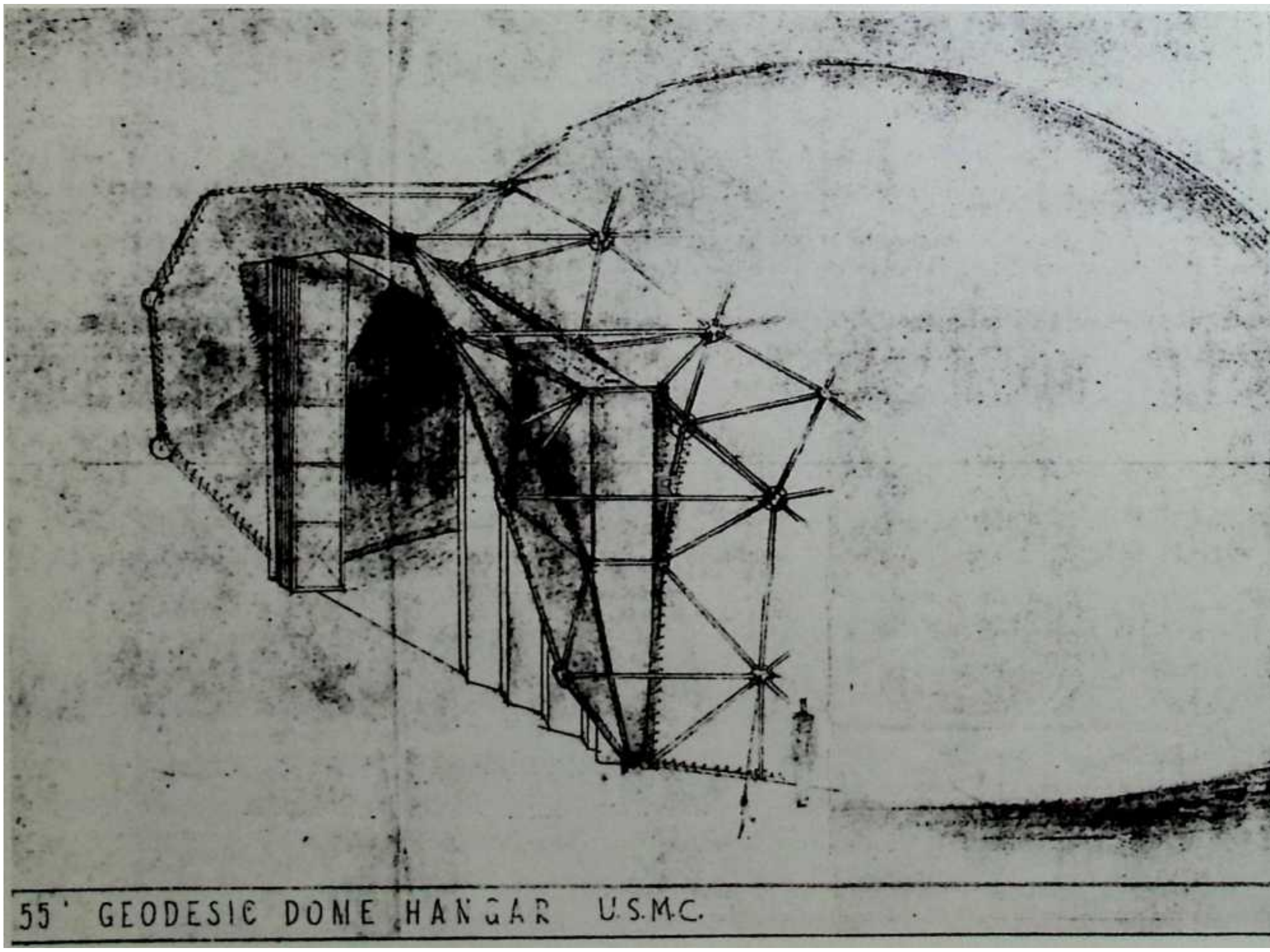


Fifty-five-Foot Geodesic Dome Hangar, U.S.

Marine Corps

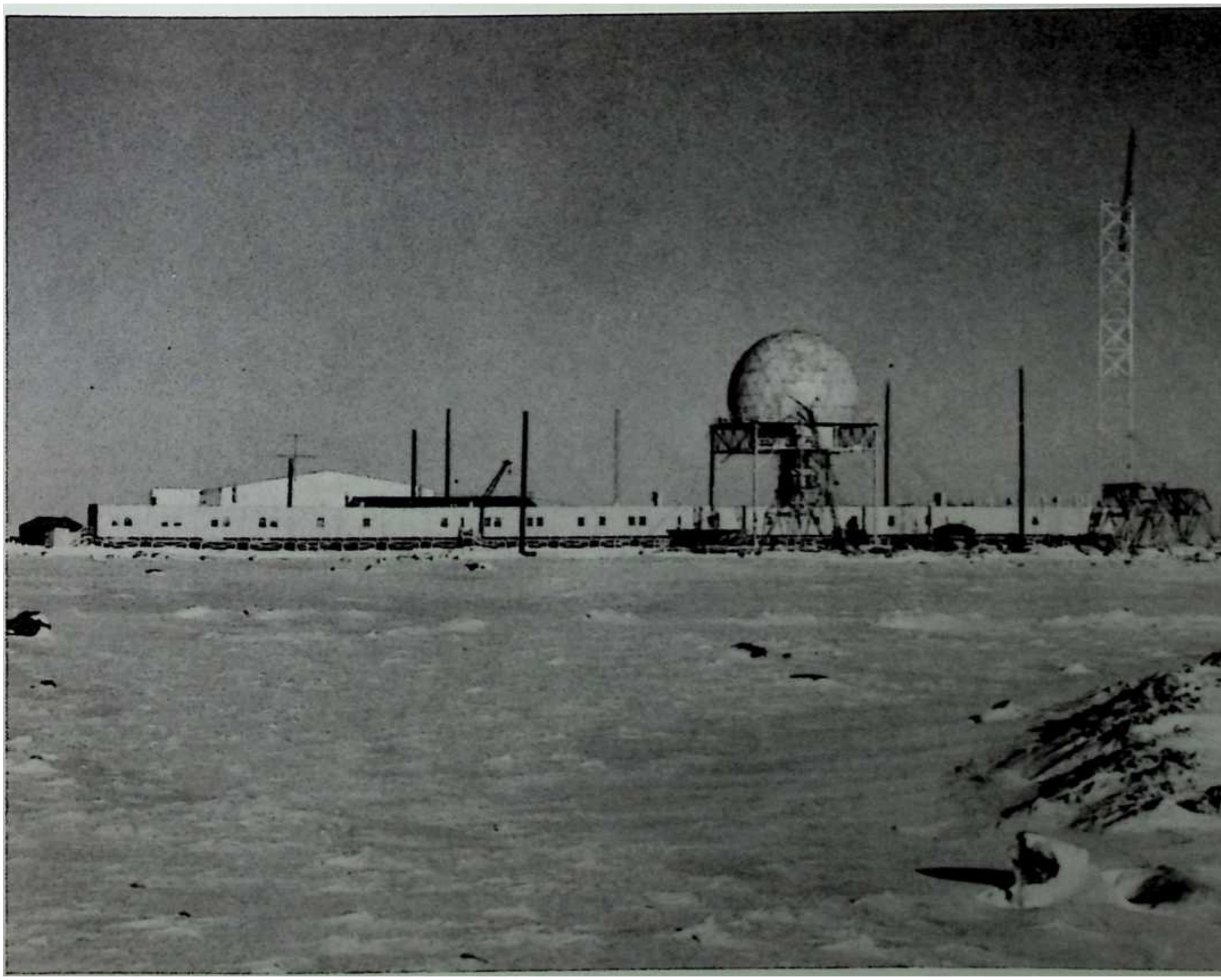
1954-1955

This variation on the portable geodesic hangar has two louver doors and a marquee. Instead of being covered by a one-piece skin, as were Fuller's earlier hangars, it has individual canvas panels lashed onto the metal structure.



Radomes

1954-1956



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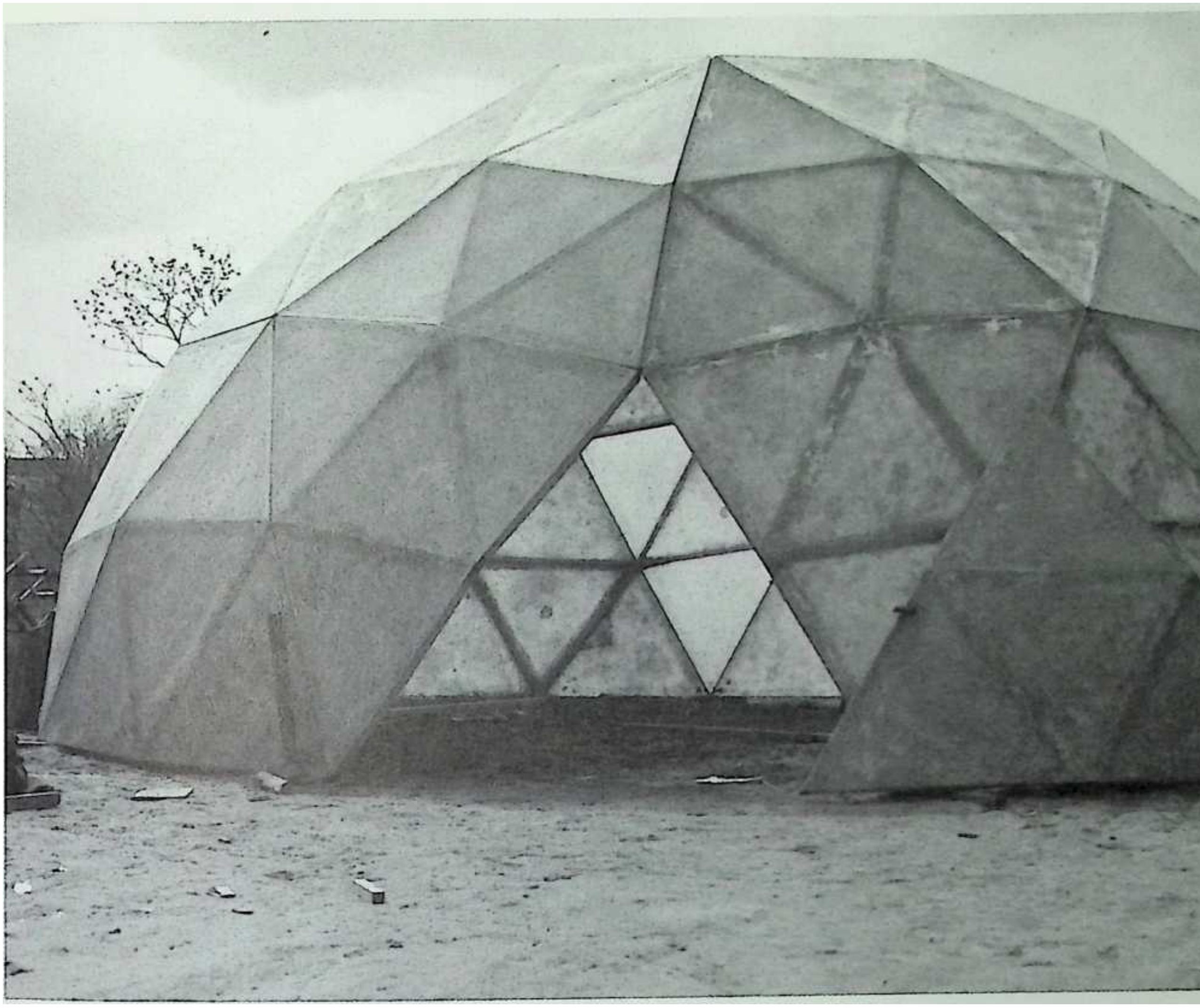
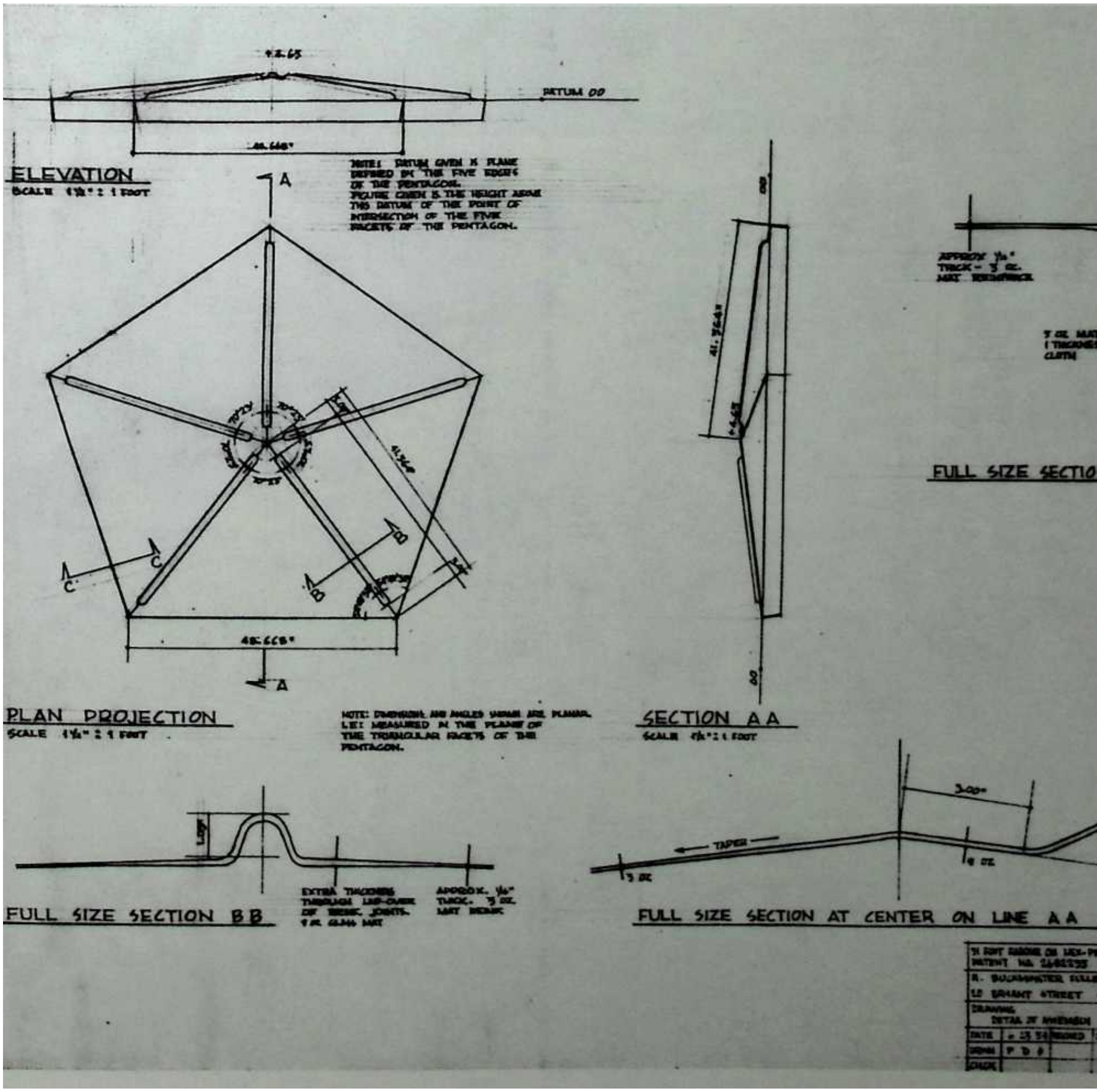



P299 -6




Thirty-one-Foot Radome on the Hex-Pent Pattern (Lincoln) 1954

The significance of this newer version of the radome is the shape of its fiberglass panels, which are hexagonal and pentagonal rather than triangular. Moreover, these panels are now reinforced by carefully designed V-shaped flanges fused to their inner faces.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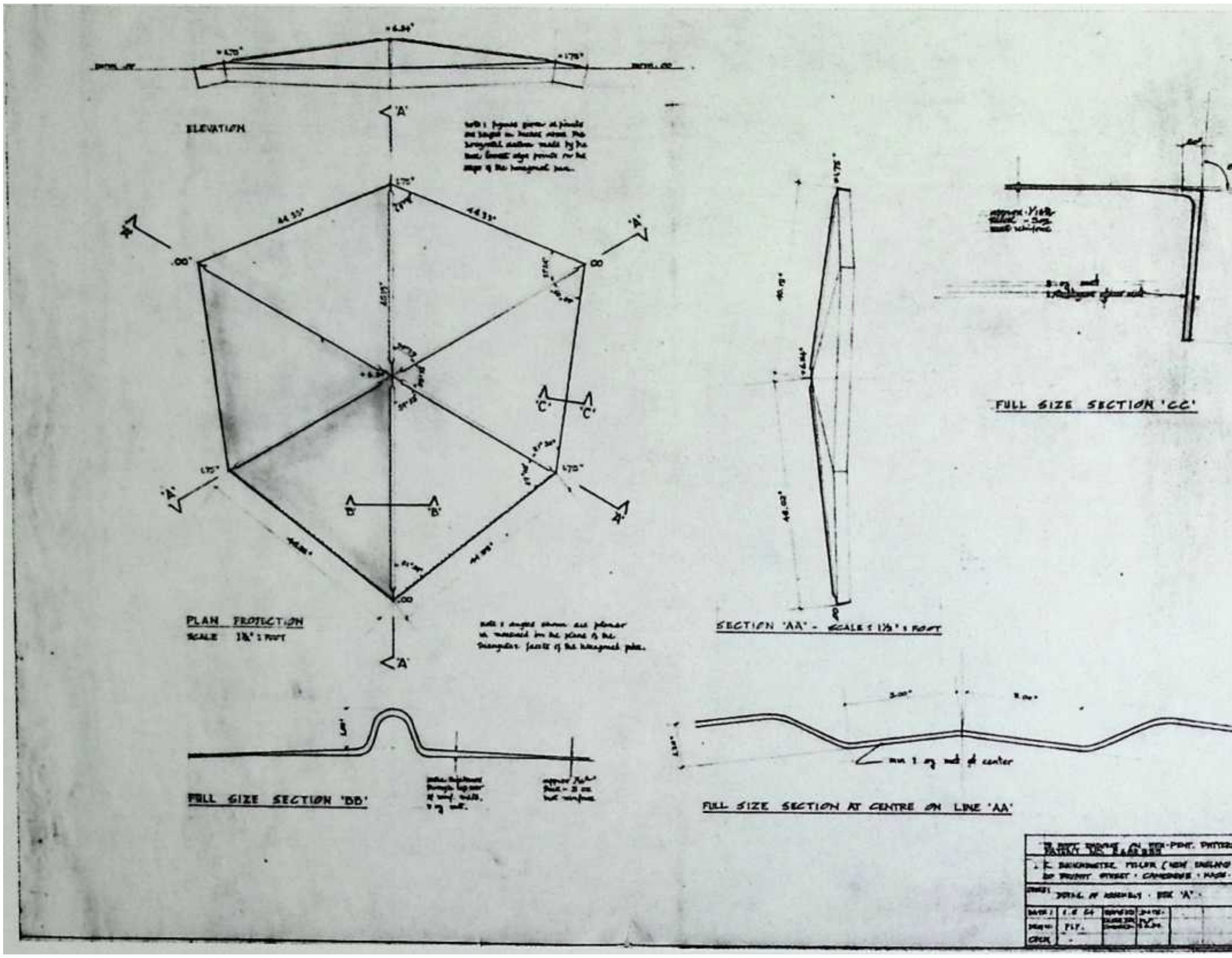
ELEVATION
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FULL SIZE SECTION 'BB'
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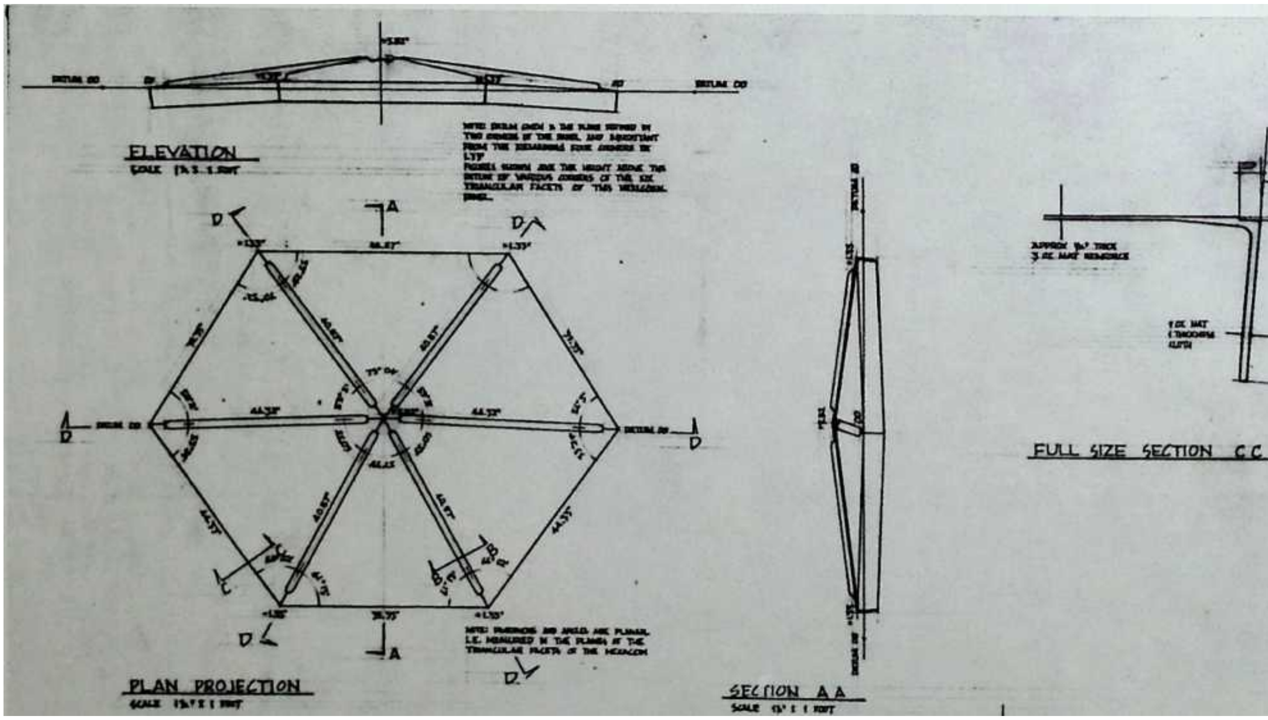
ELEVATION
PLAN PROJECTION
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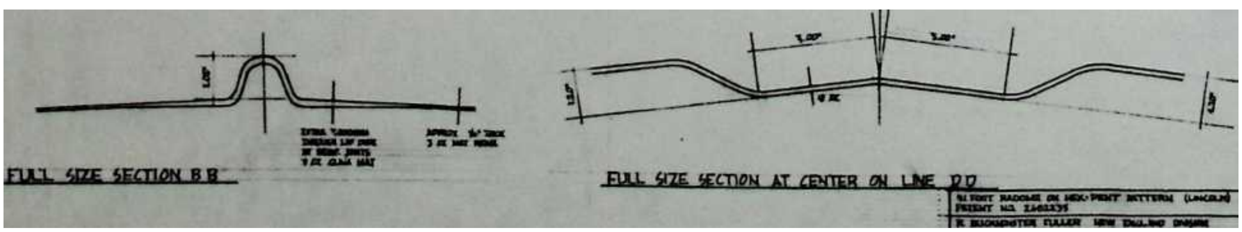
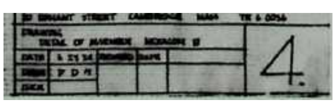
FULL SIZE SECTION CC


FULL SIZE SECTION BB
FULL SIZE SECTION AT CENTER ON LINE DD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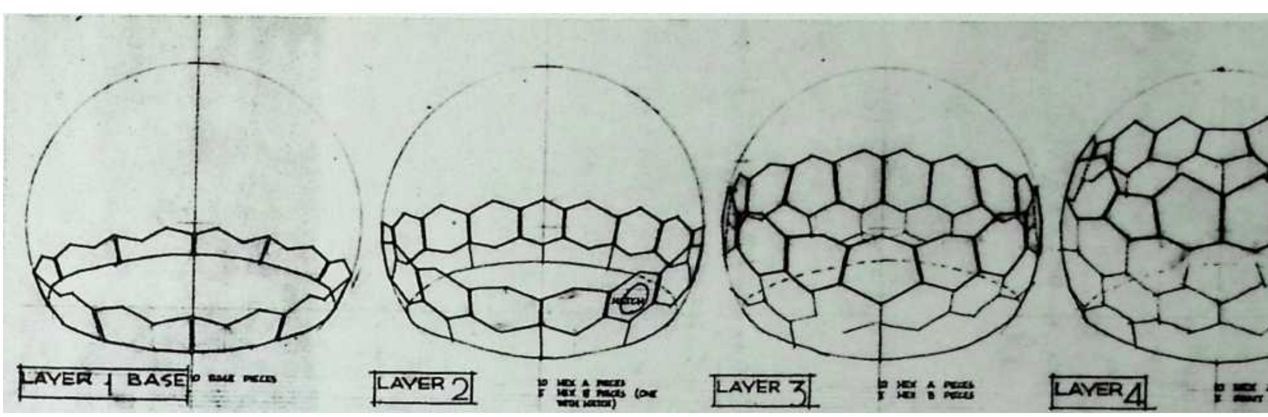
LAYER 1 BASE
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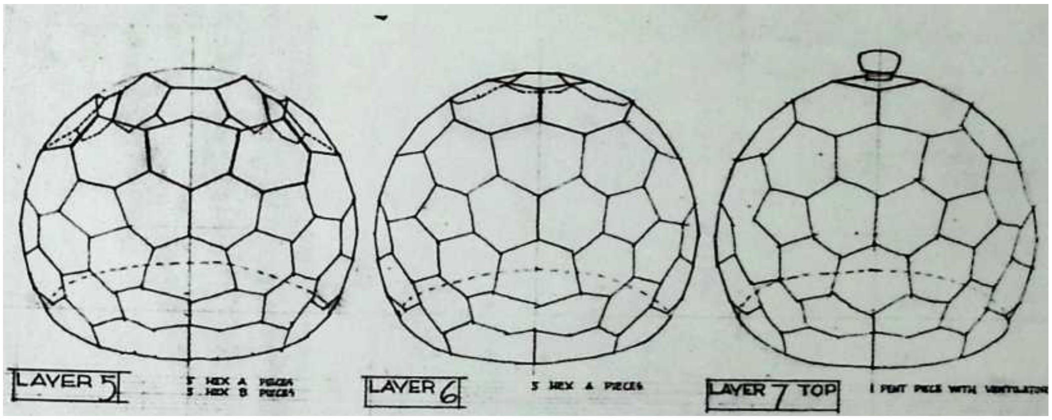
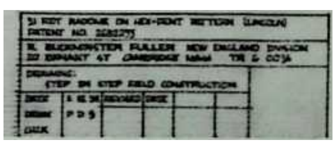
LAYER 4

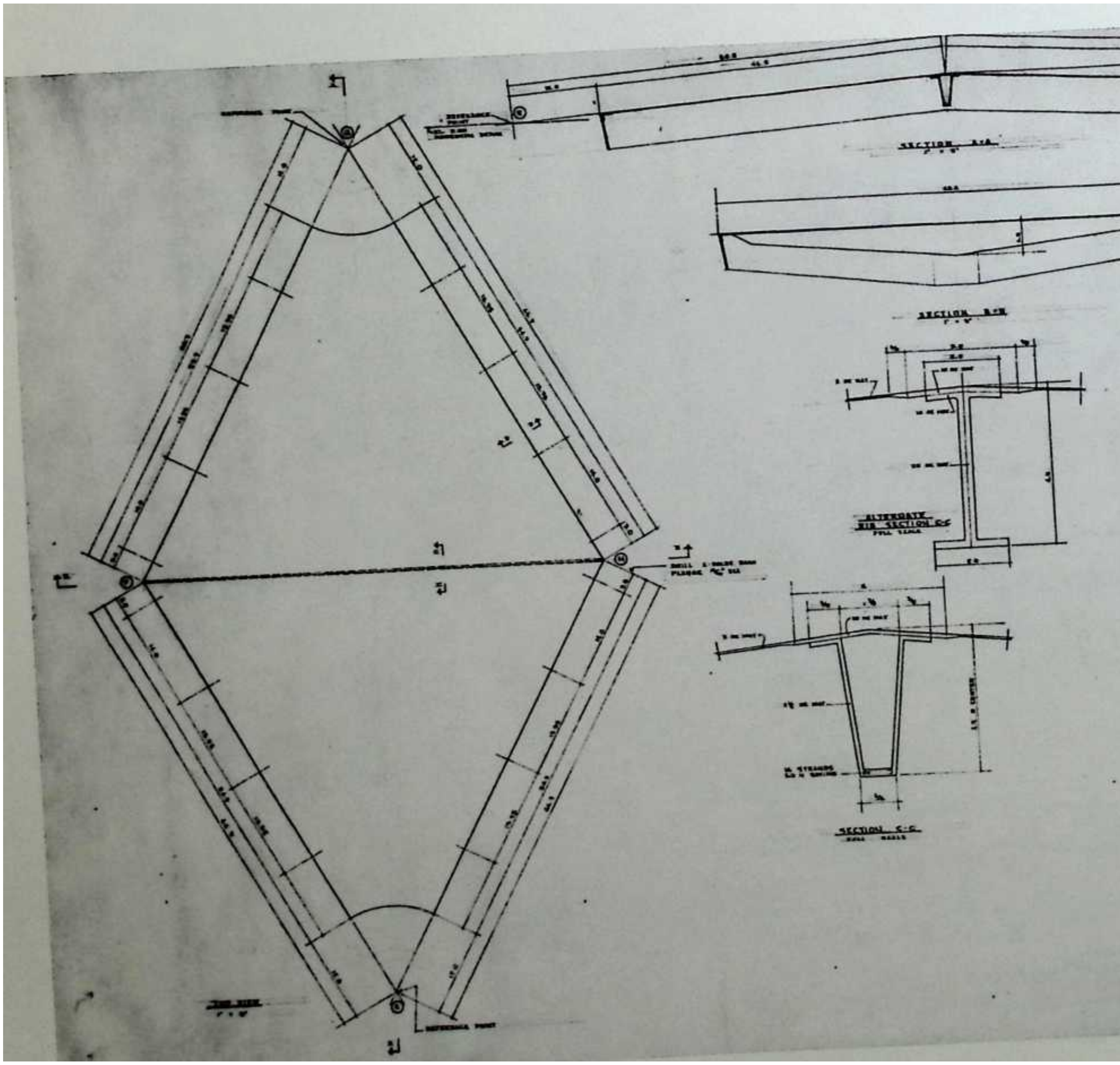




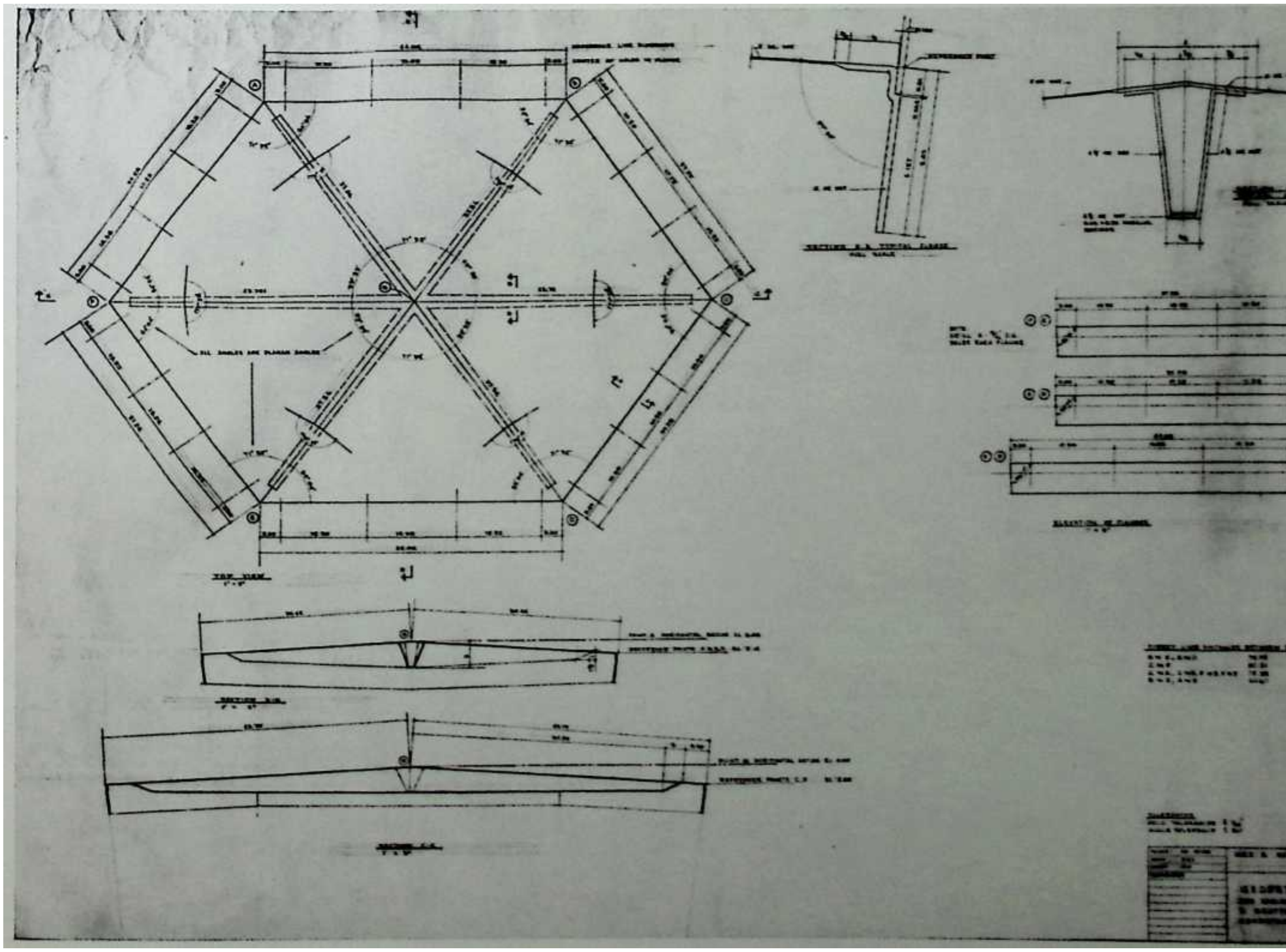
Diamond B Fifty-Foot Base Diameter Radome

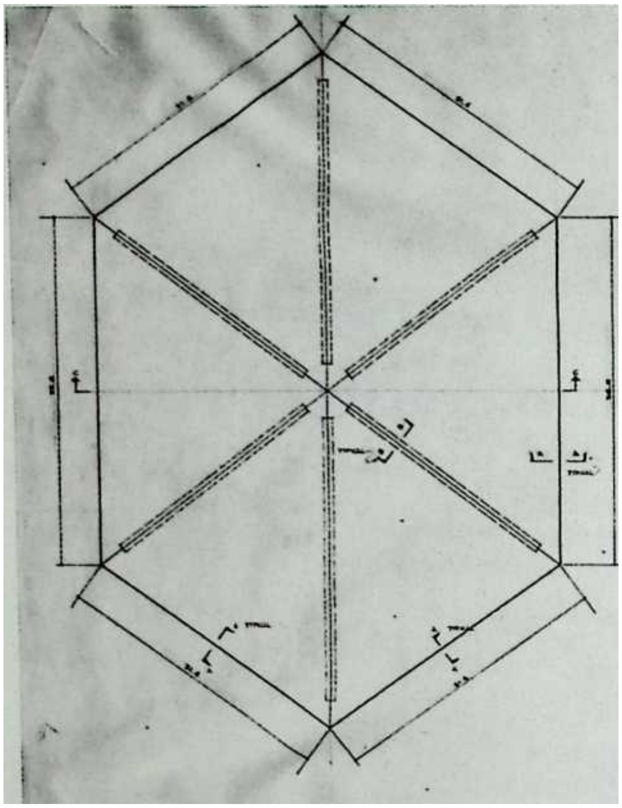
This radome is distinguished by its diamond panels.

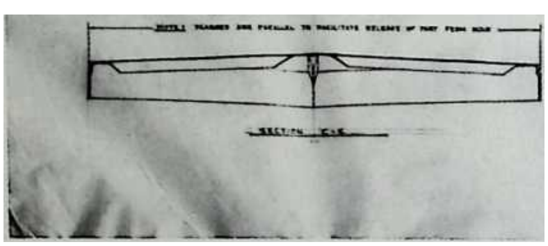
1954

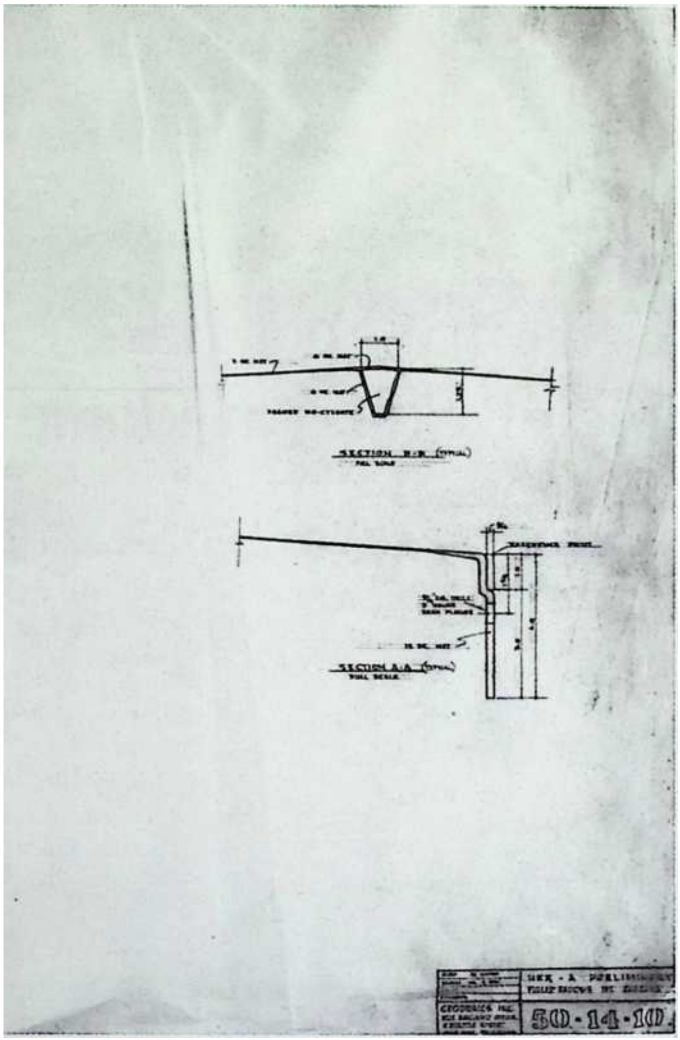


Hex A Fifty-Foot Base Diameter Fuller Radome 1954



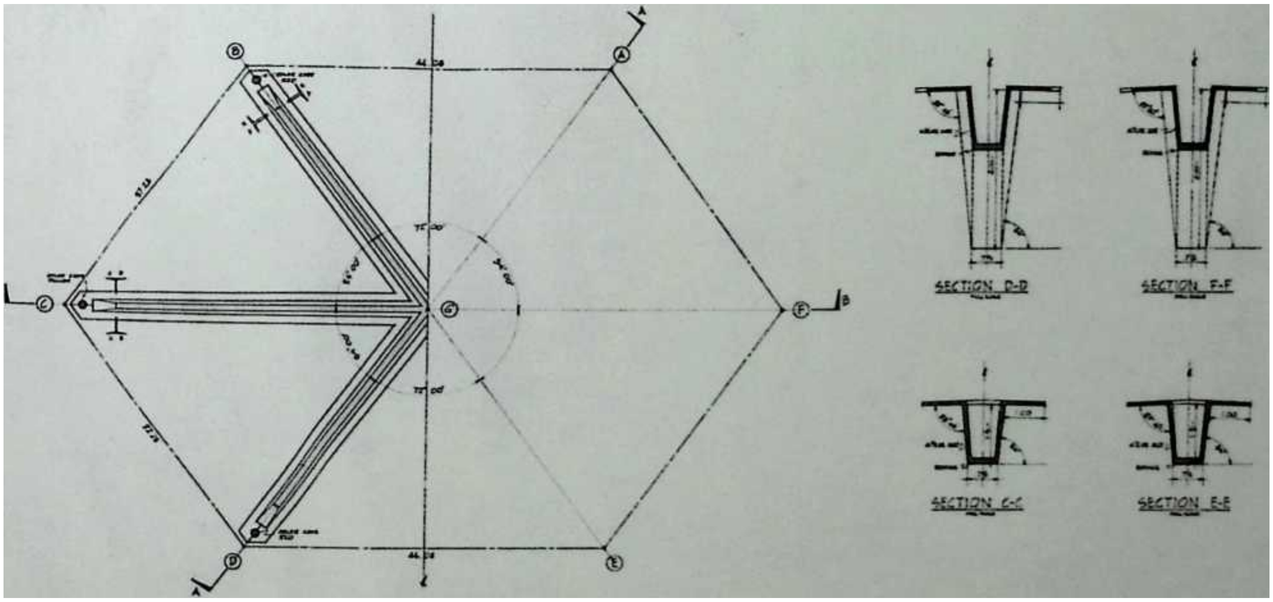


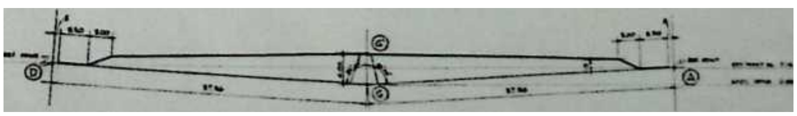


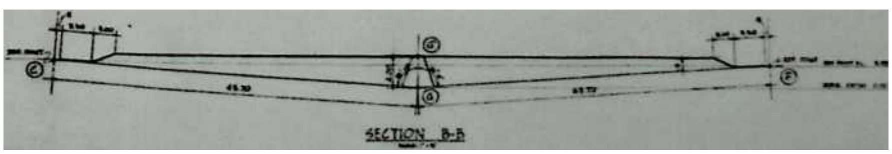


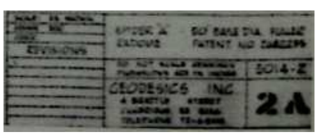
Spider A Fifty-Foot Base Diameter Radome

1954



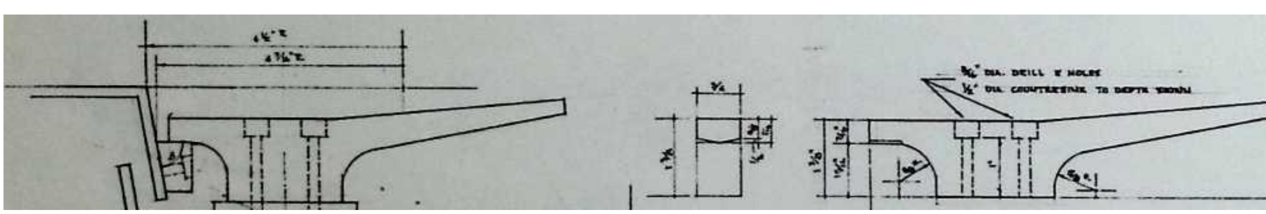


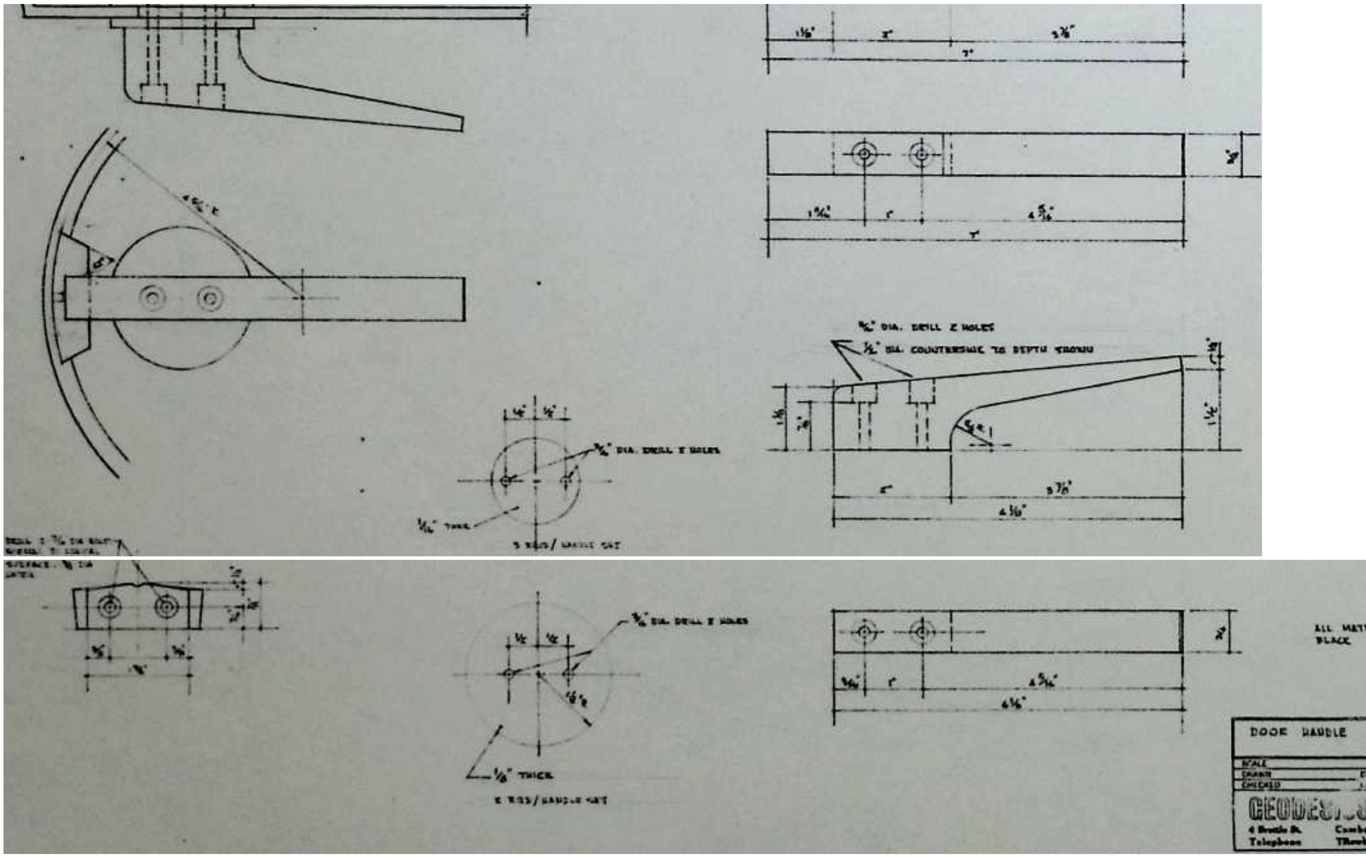




Radome Door Handle

1954





Twenty-one-Foot Fuller

Radome on the Hex-Pent

Pattern (Lincoln)

1954

The flanges of each panel are held together with pins that are secured by the pressure of a cam-shaped clamp.

FULLER RADOME - Va SPHERE — IO' G” RADIUS

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MOOSE EQUlPMEVr TP4 I

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ST BASE PIECES

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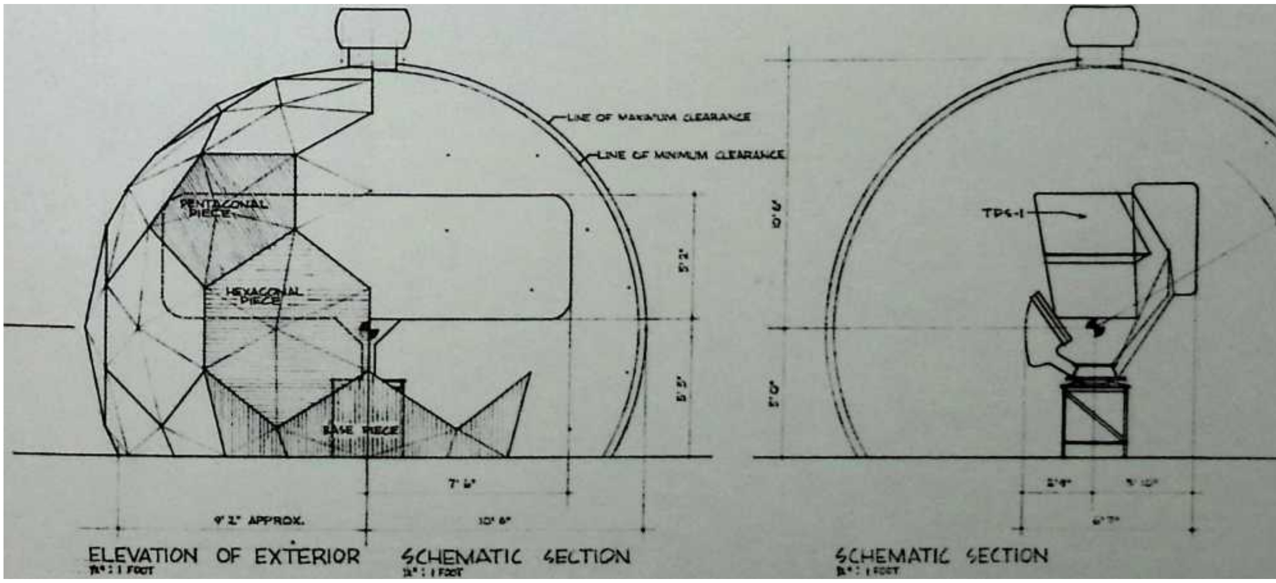

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PULL <J7E SECTION *CC*

FLAN PROJECTION

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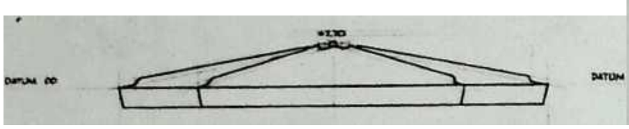

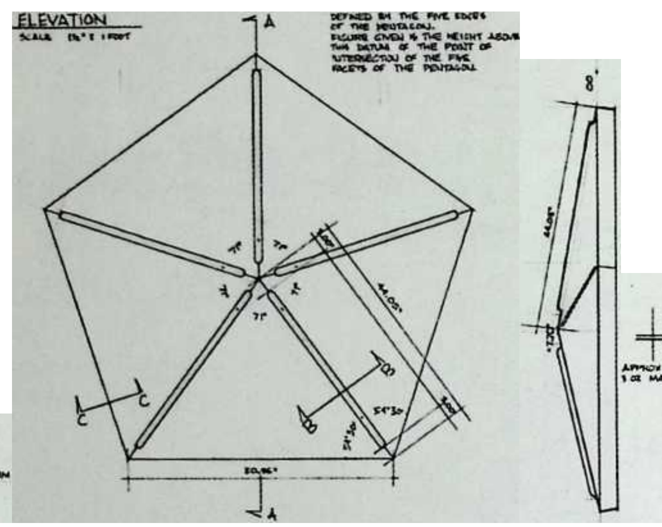

Fuller Radomes

These radome panels have flanges that are built in rather than welded to the polygonal surfaces.

(General): Flanges

and Panels

1954

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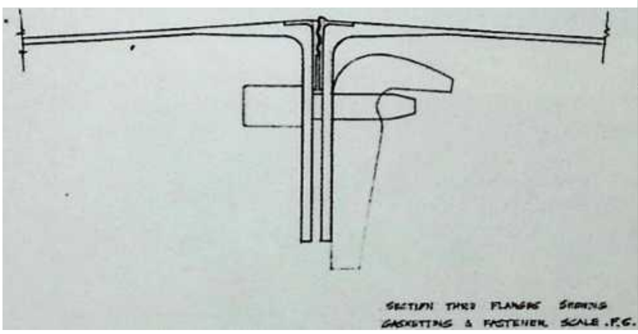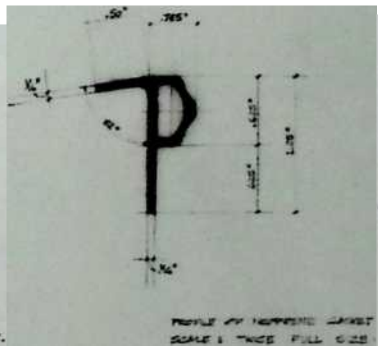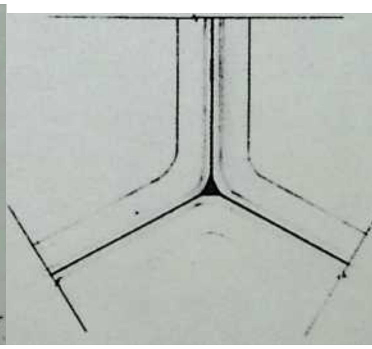

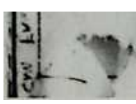
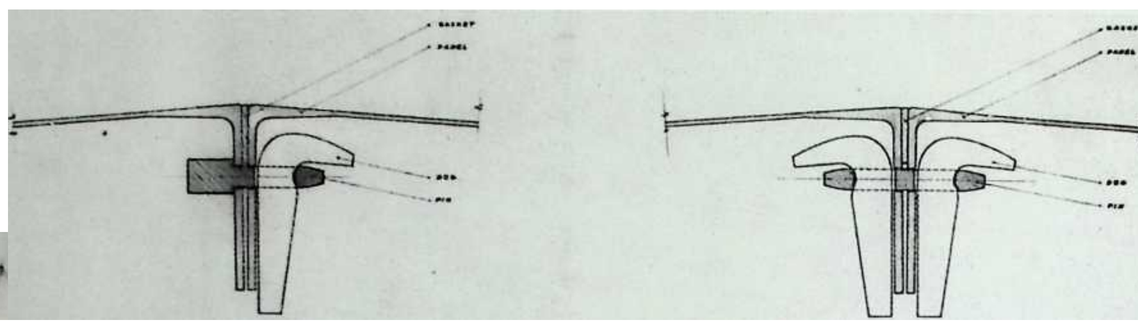
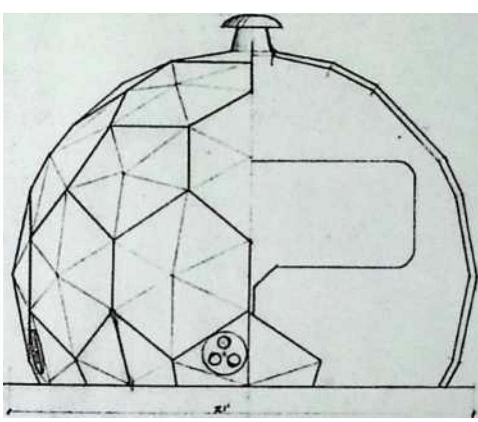
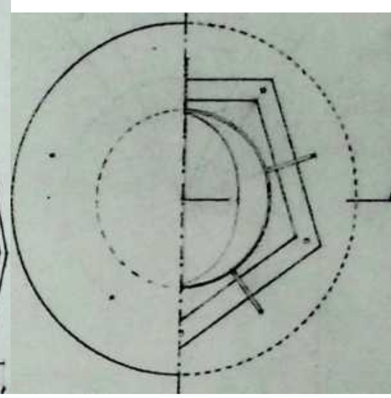
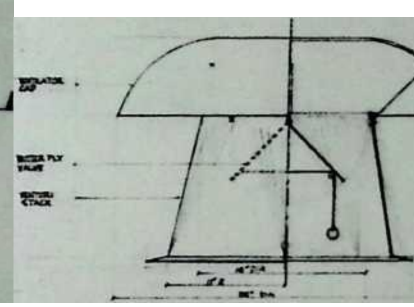

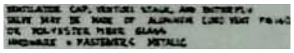

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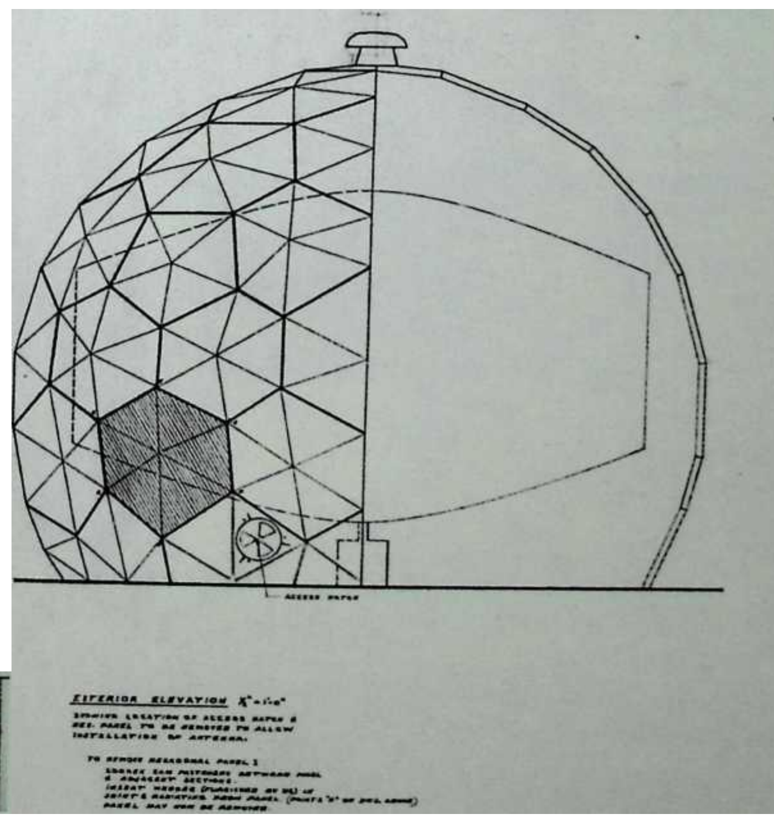

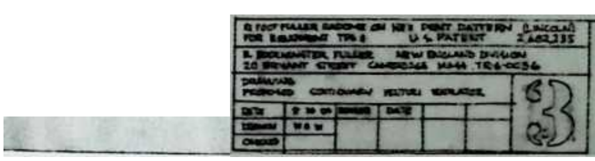

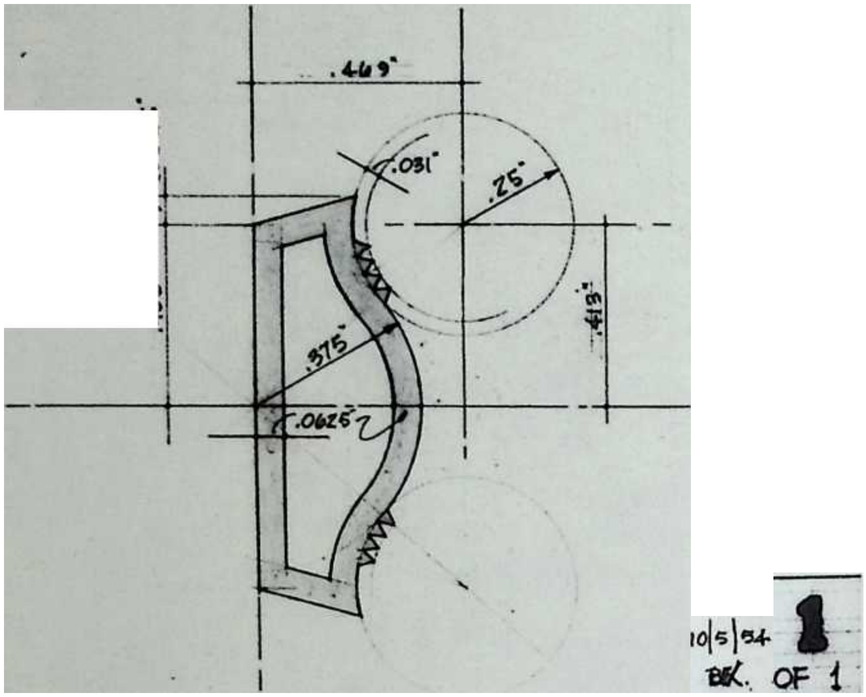

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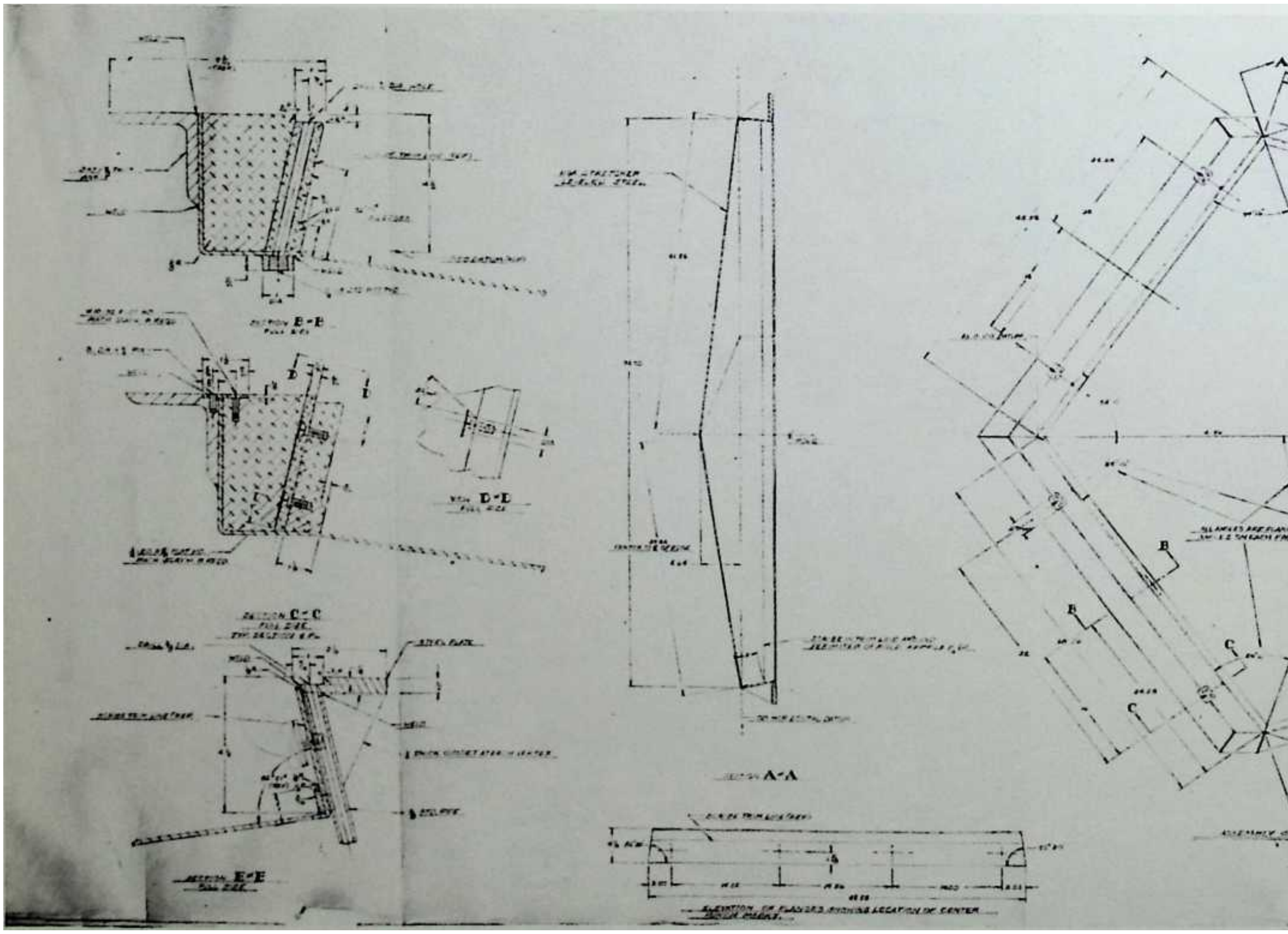
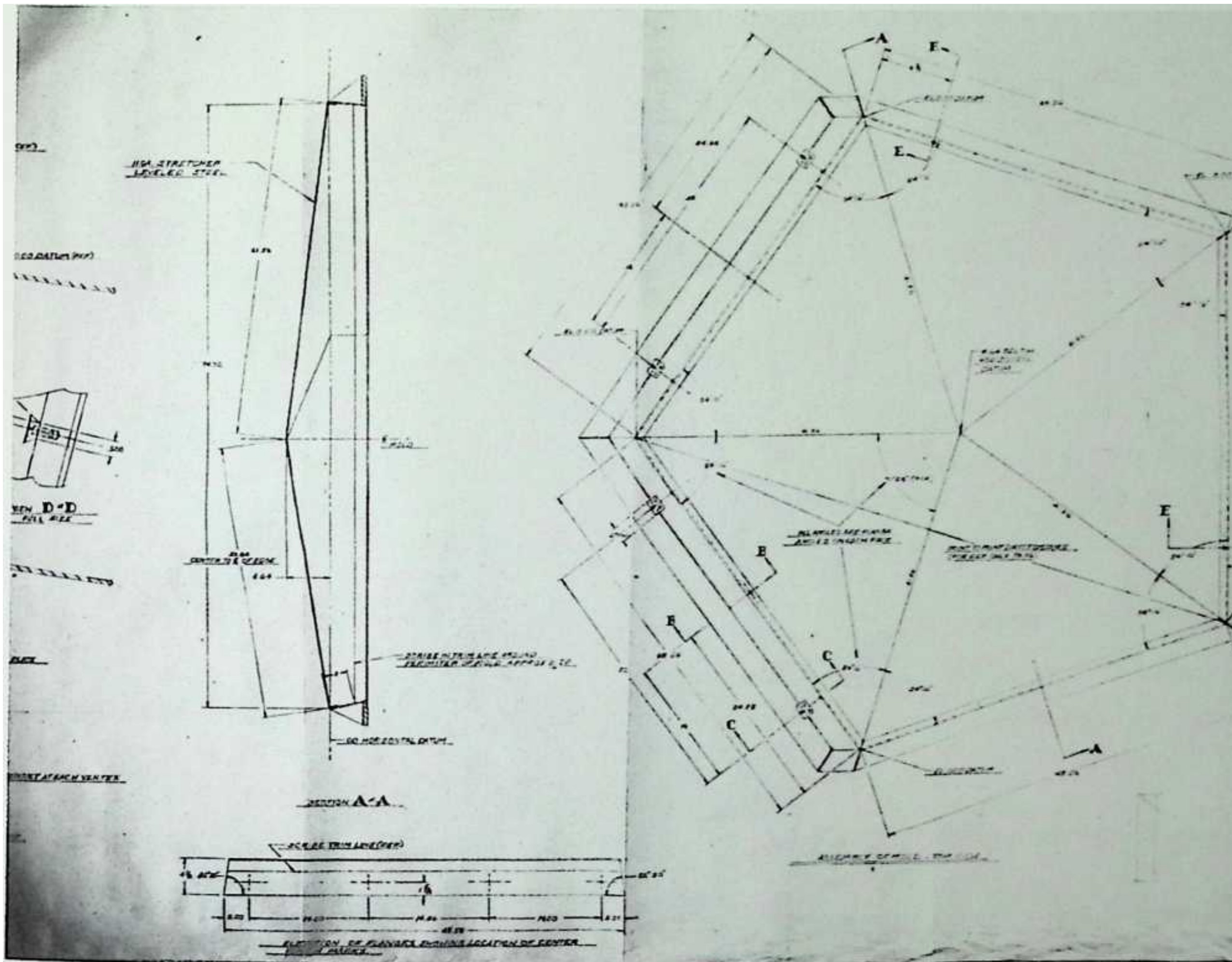
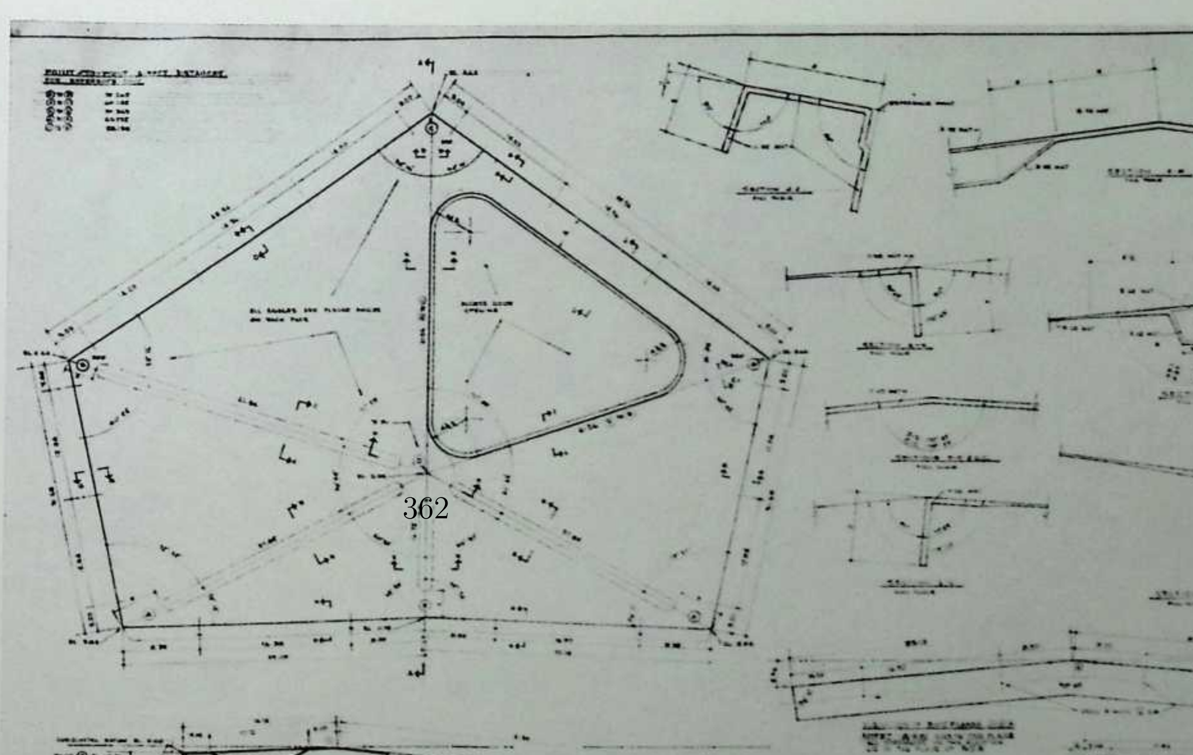
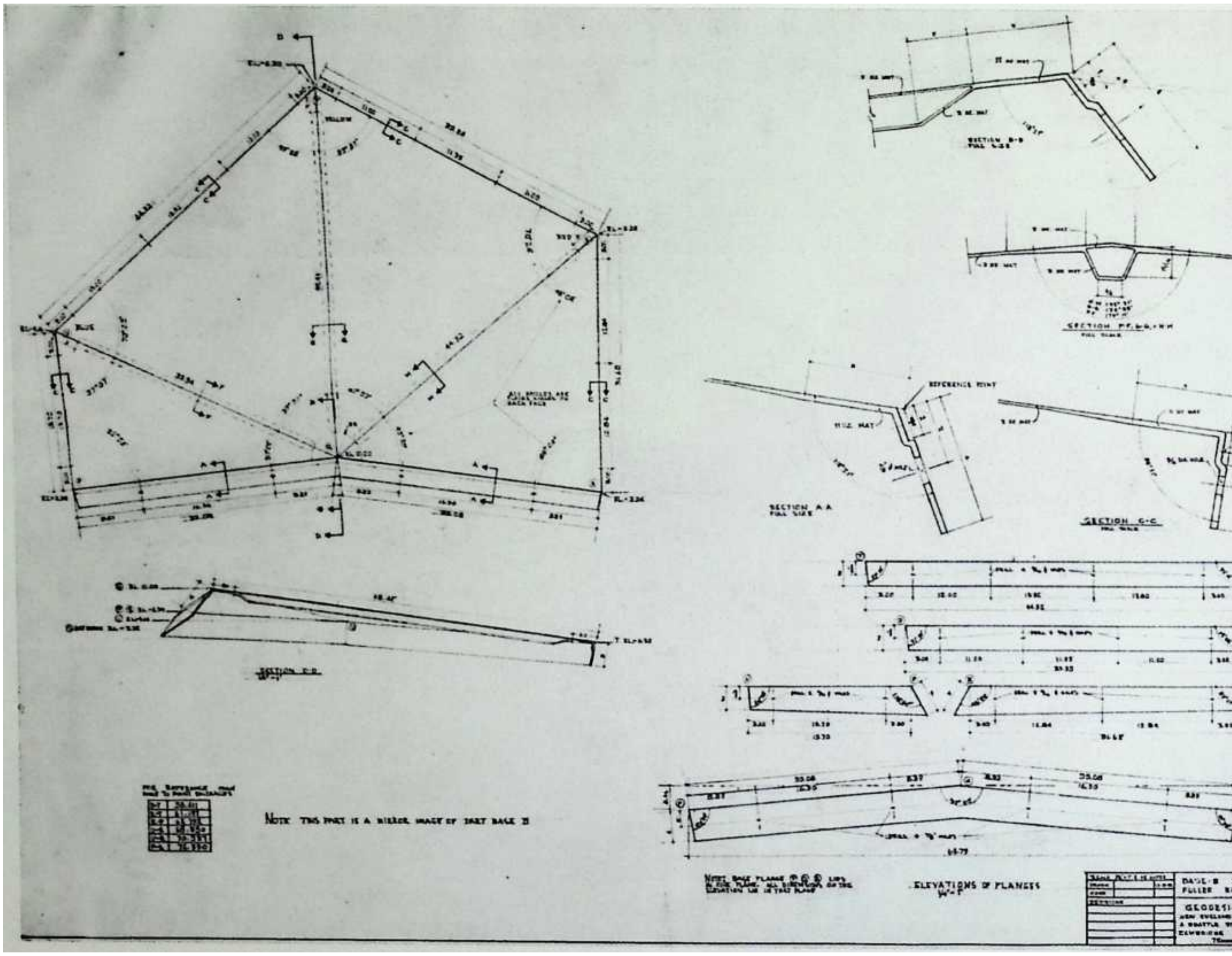
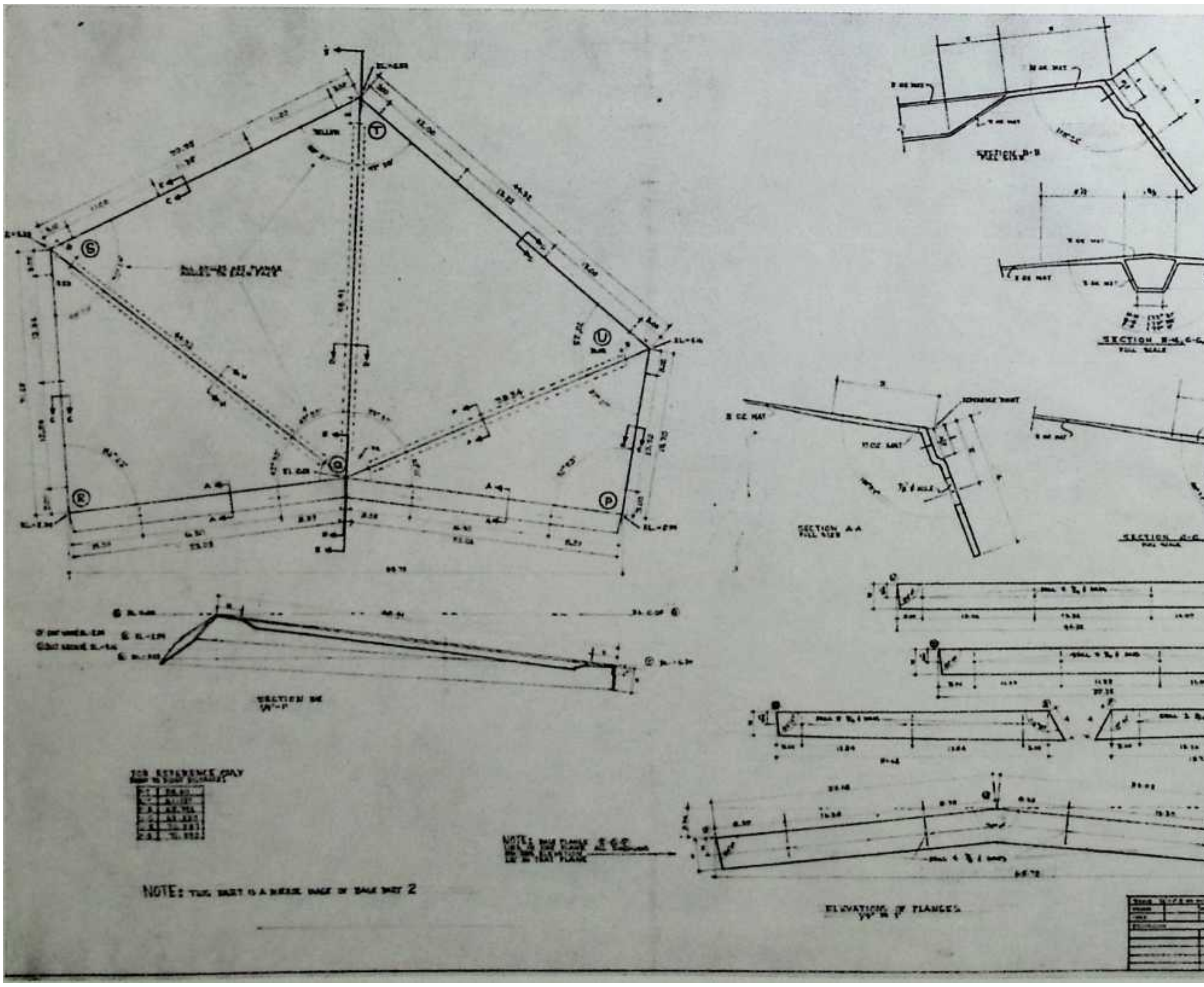
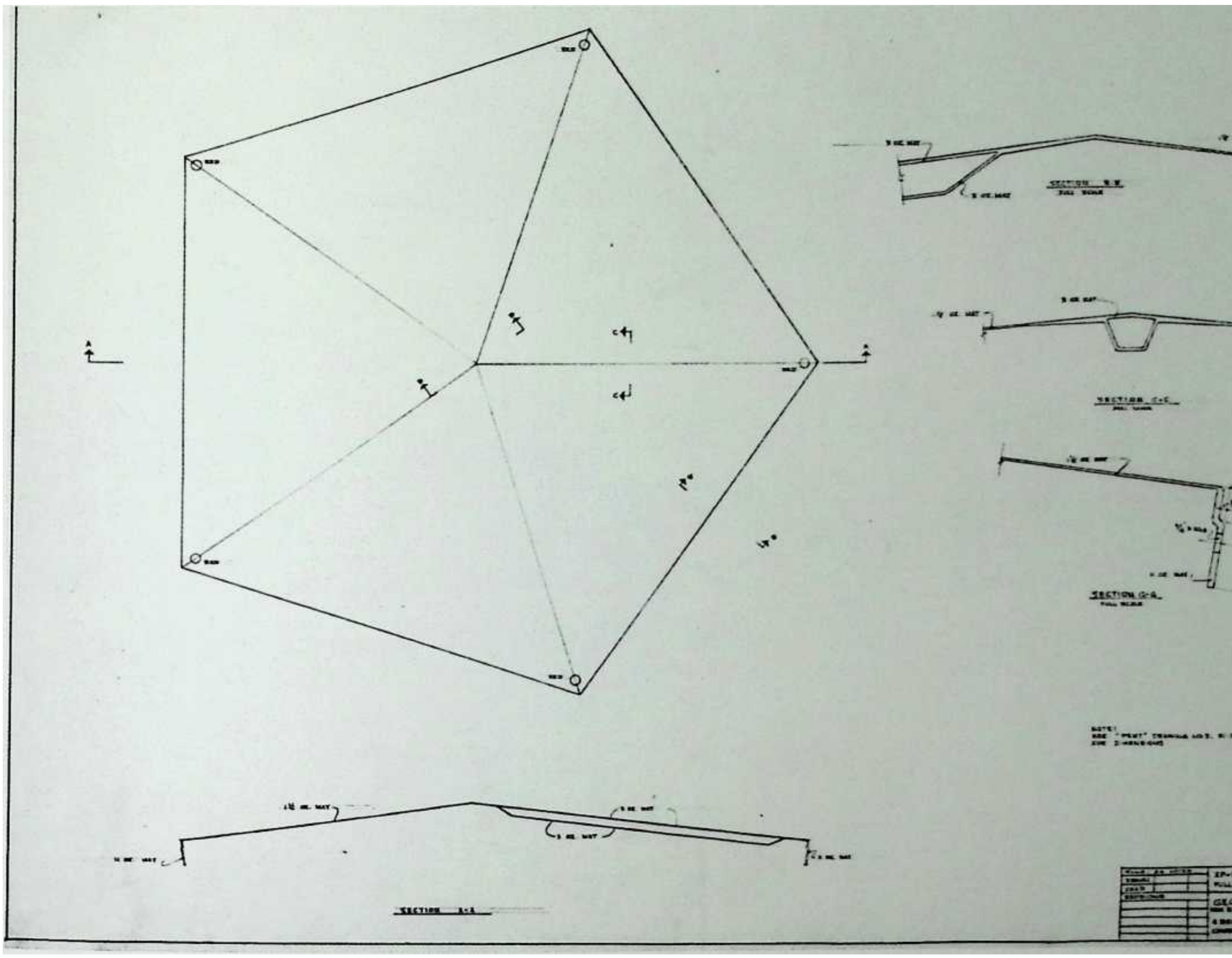


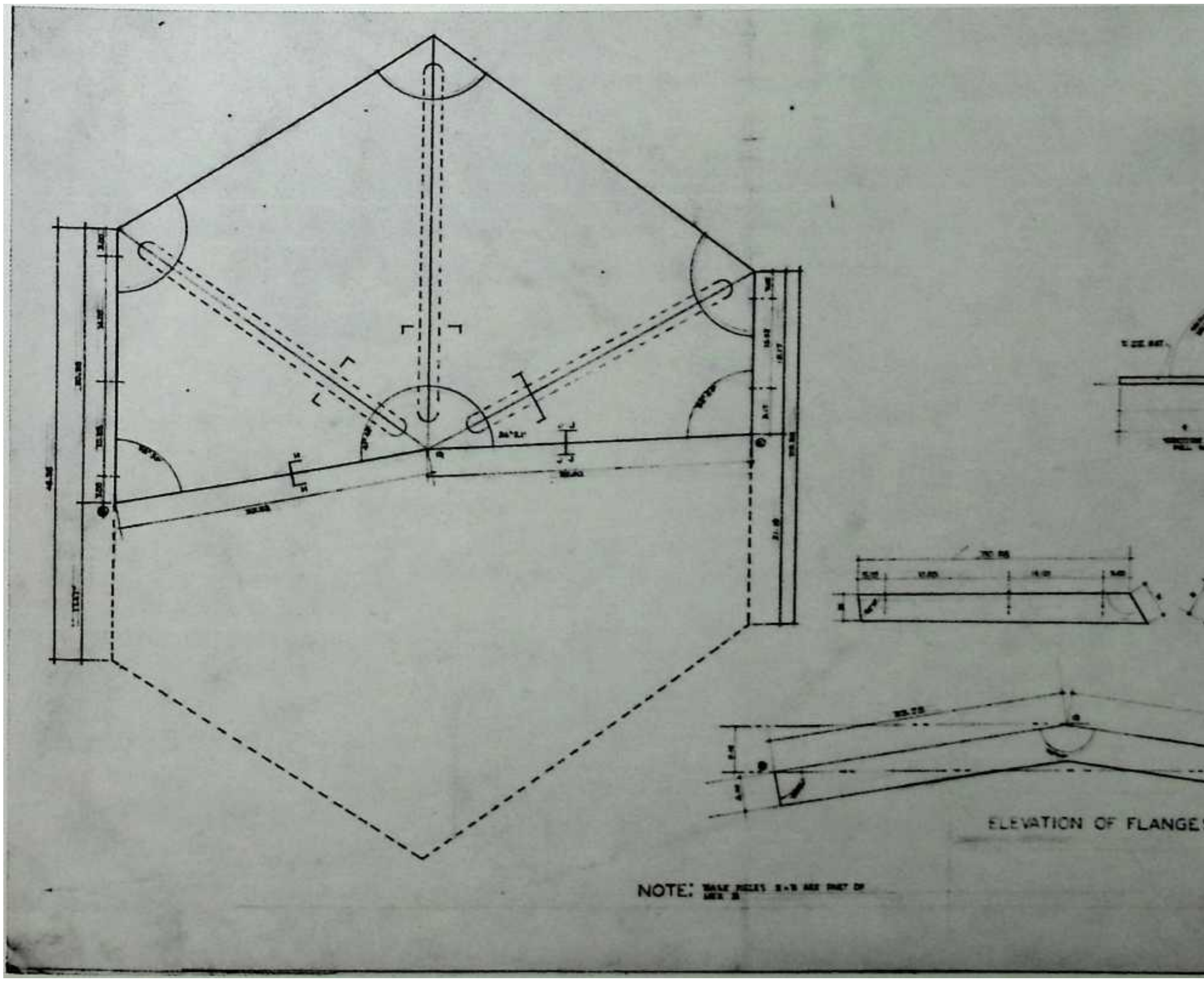

SECTION A-A

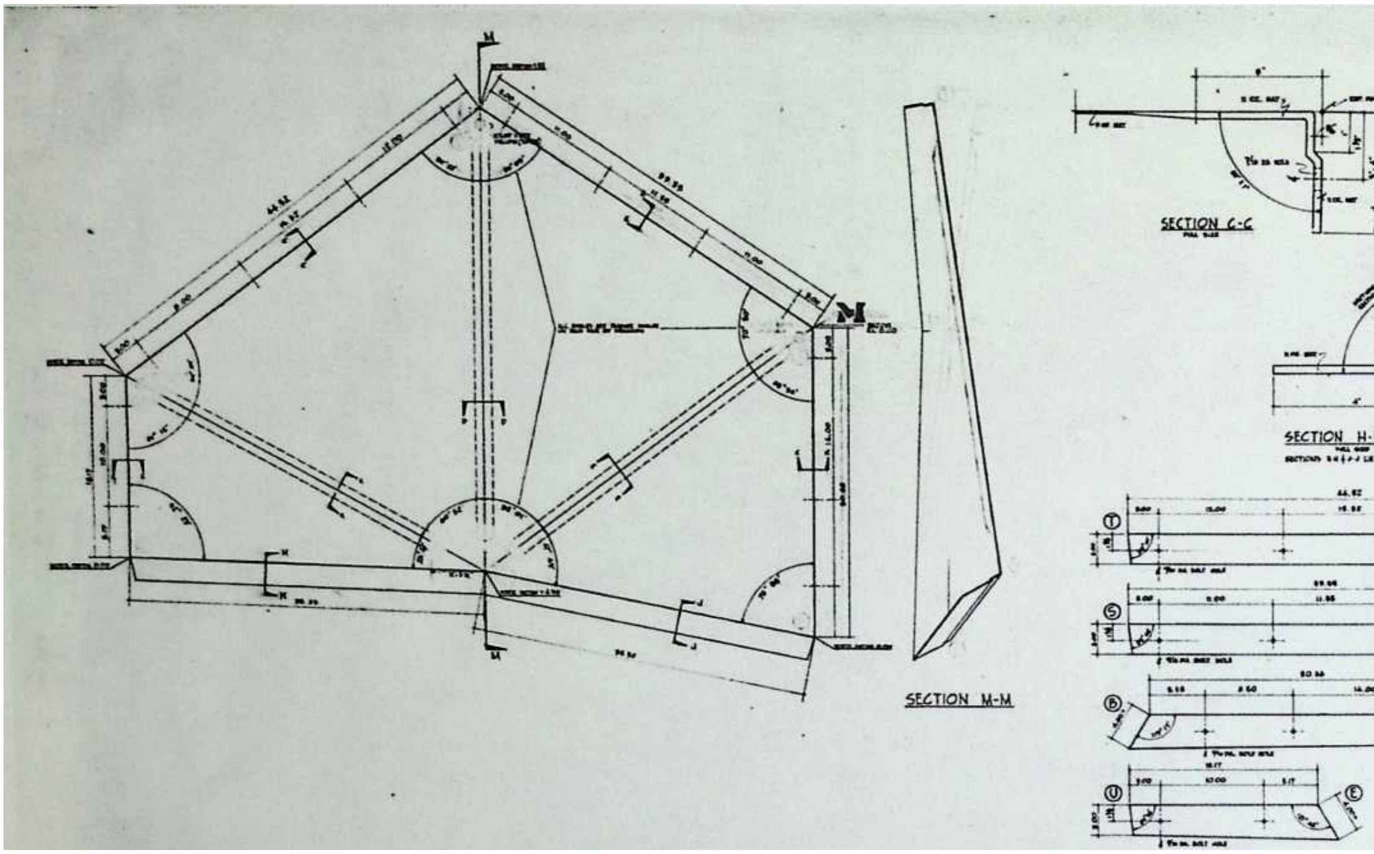



REFERENCE POINT
SECTION A-A
SECTION C-C
ELEVATIONS OF FLANGES




SECTION C-C


ELEVATION OF FLANGES
NOTE:



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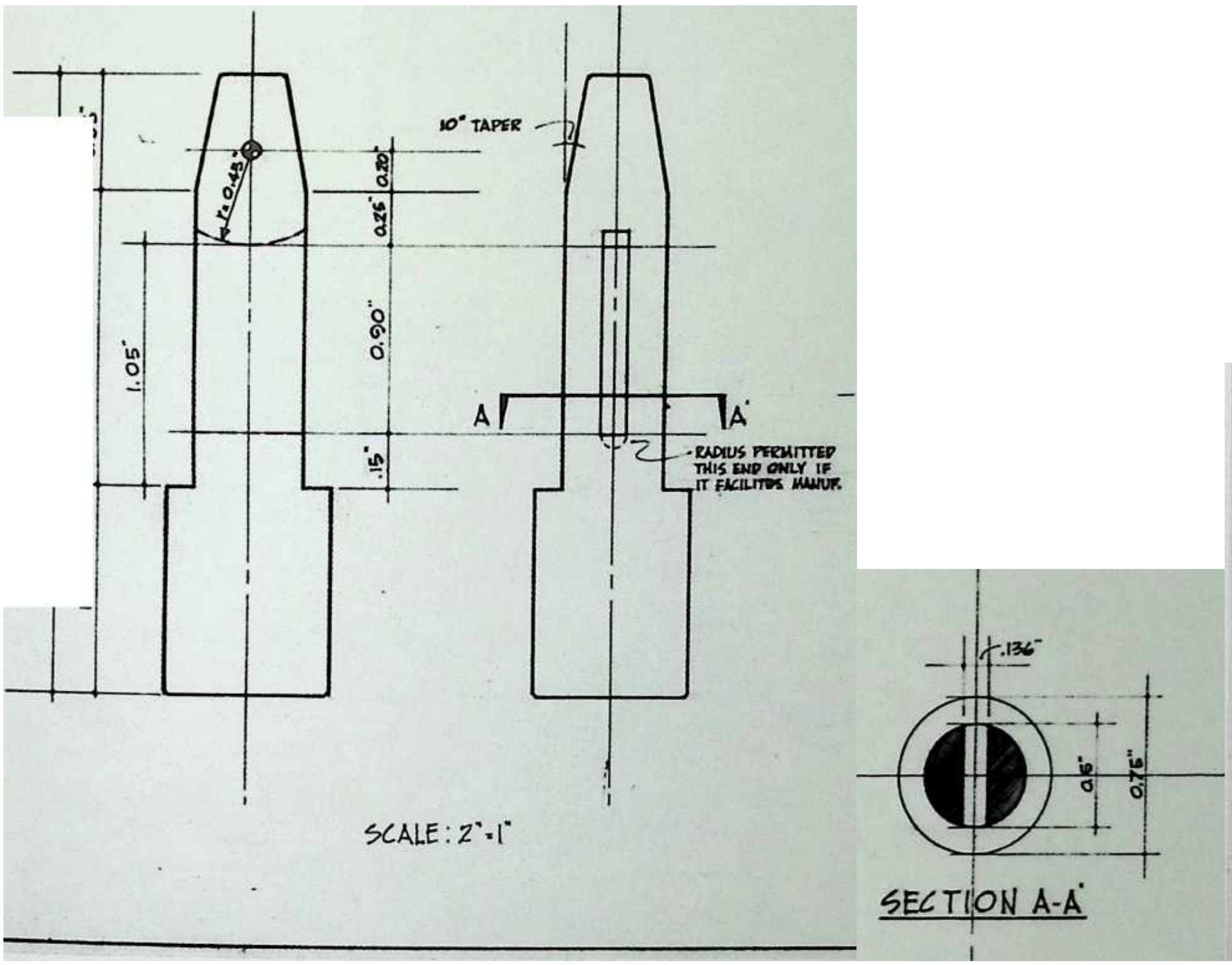

G£NE£AL DETAILS *bd* BASE DIA.

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GENERAL DETAILS 50* BASE' ' 10 y FULLER gADOHE.FAI ltt/215

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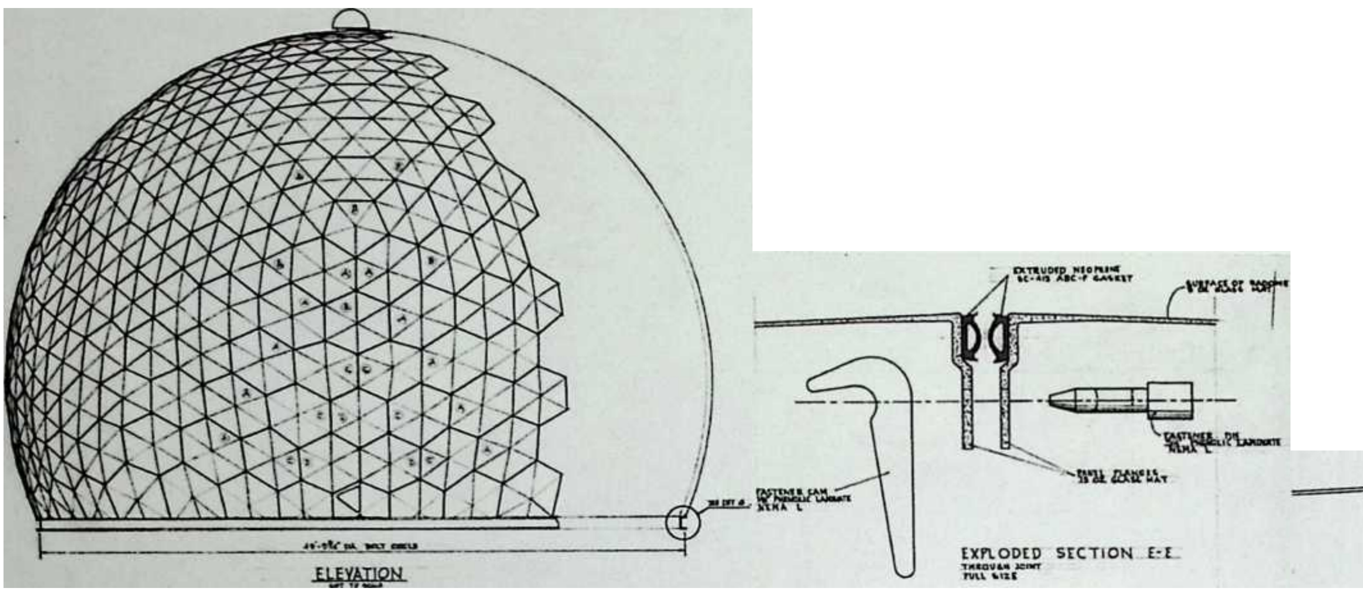


Fuller Radomes

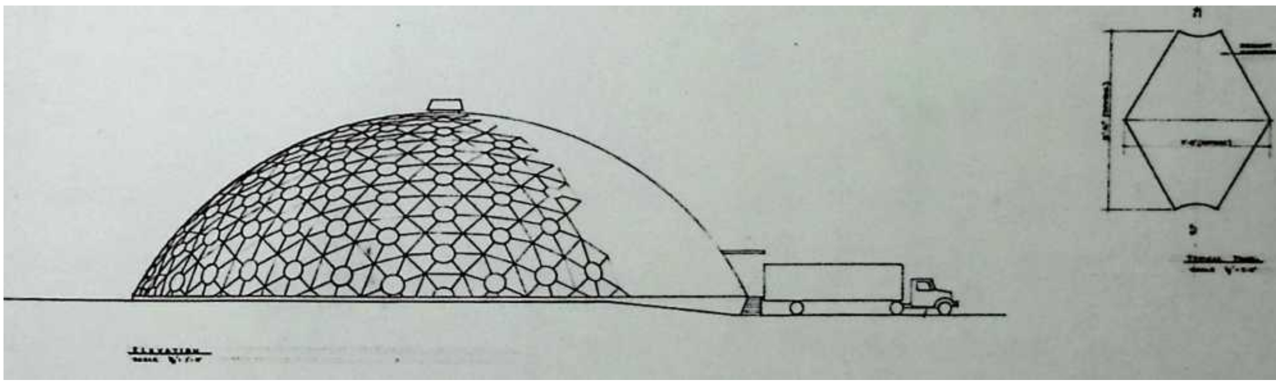
(General): Warehouse

Preliminary 112-Foot

Diameter

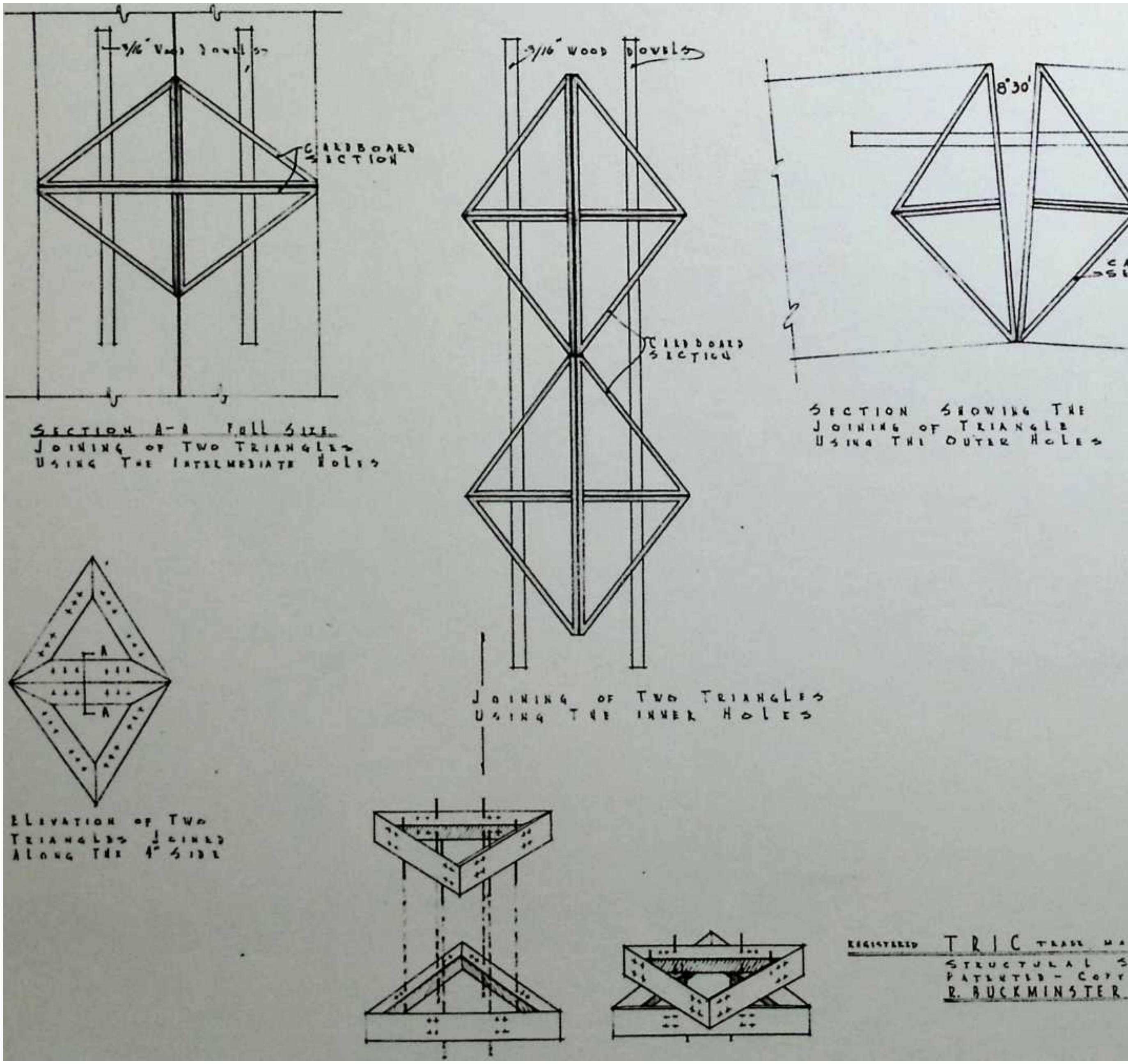
1954

This preliminary project for a warehouse shows a refinement of the typical radome panel. The acute ends of each diamond shape are cut off in an arc that forms a series of fiberglass-covered *yeux-de-boeufs* when all the panels are assembled. Artificial illumination during the day is unnecessary with this design because of the translucent surface material employed.

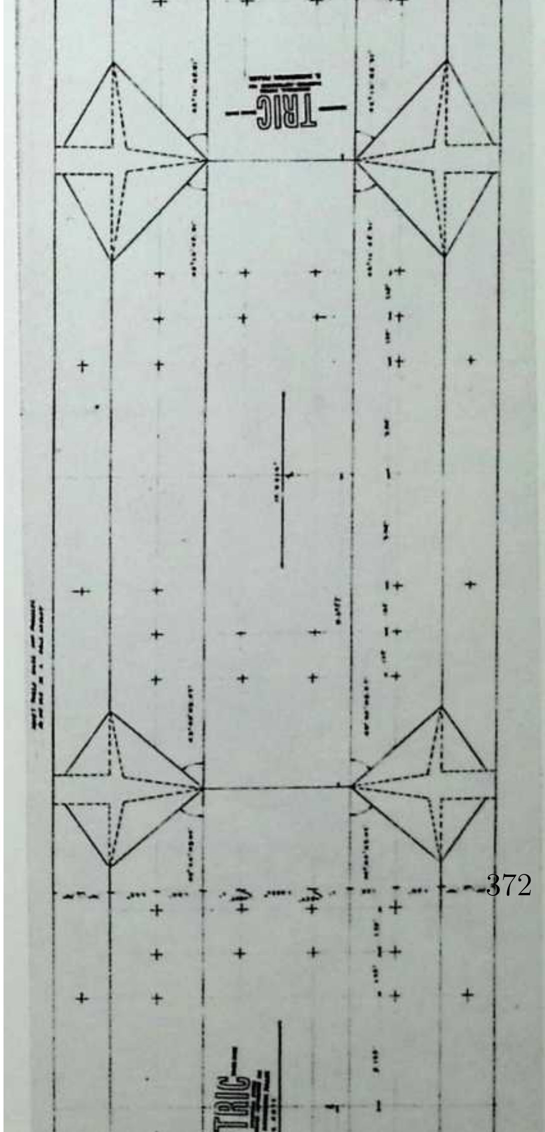


TRIG Structural System 1954

TRIC is the trademark for the Fuller structural system that comprises a truss made of stamped cardboard that produces a three-dimensional construction triangle when cut and assembled.



THE GEODESIC REVOLUTION, PART 1 23o


TRIC
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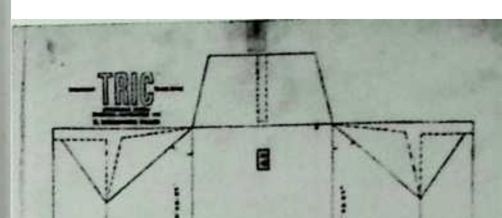
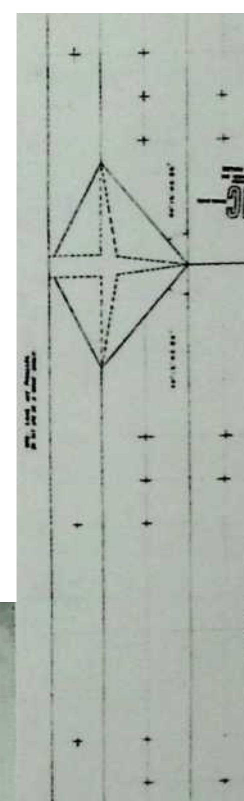
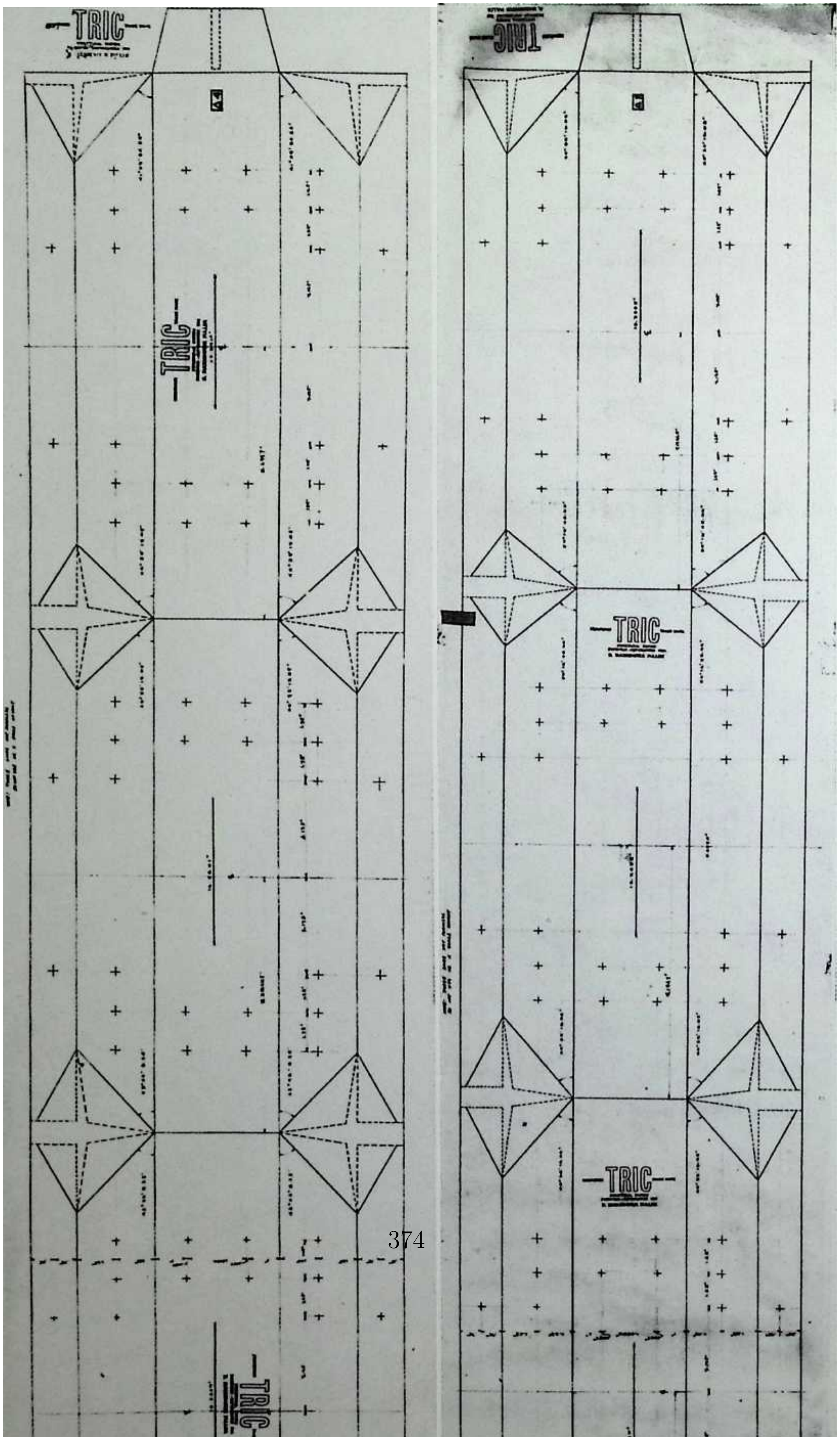

TRIC



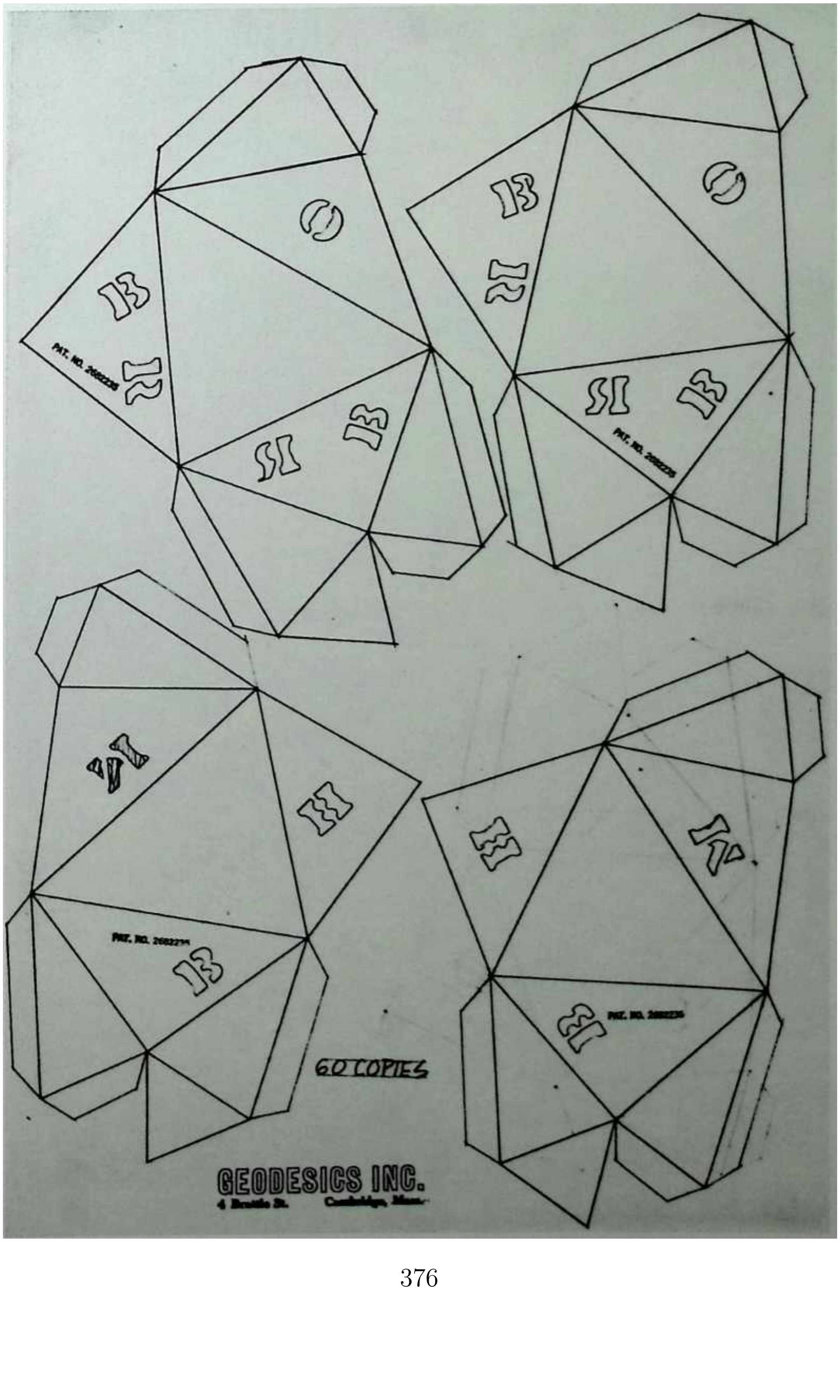
236 THE GEODESIC REVOLUTION, PART 1

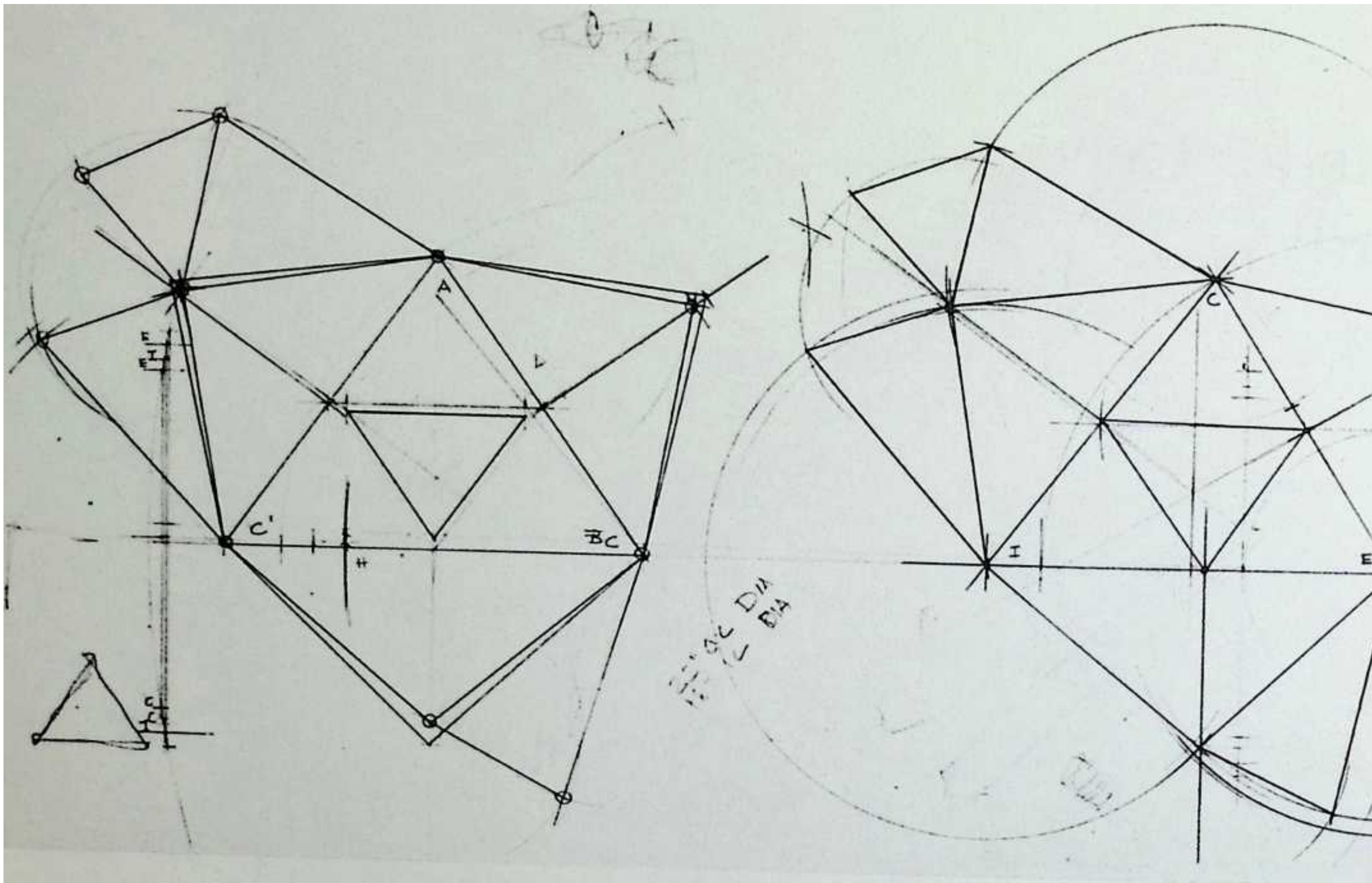

TRIC

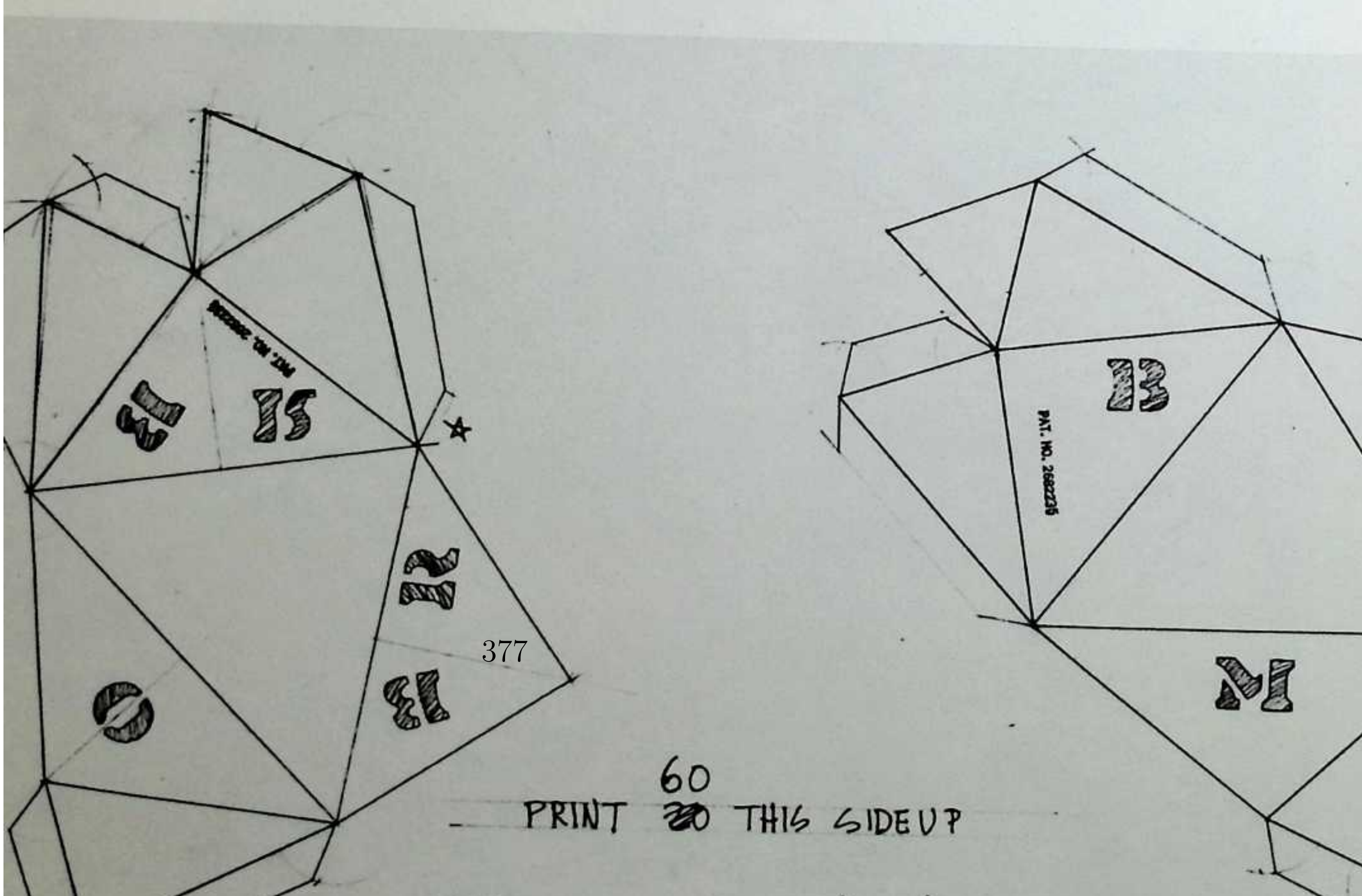
Dome Units for Geodesics

(Paperboard)

Mid 1950s


60 COPIES
GEODESICS INC.
4 Brattle St. Cambridge, Mass.



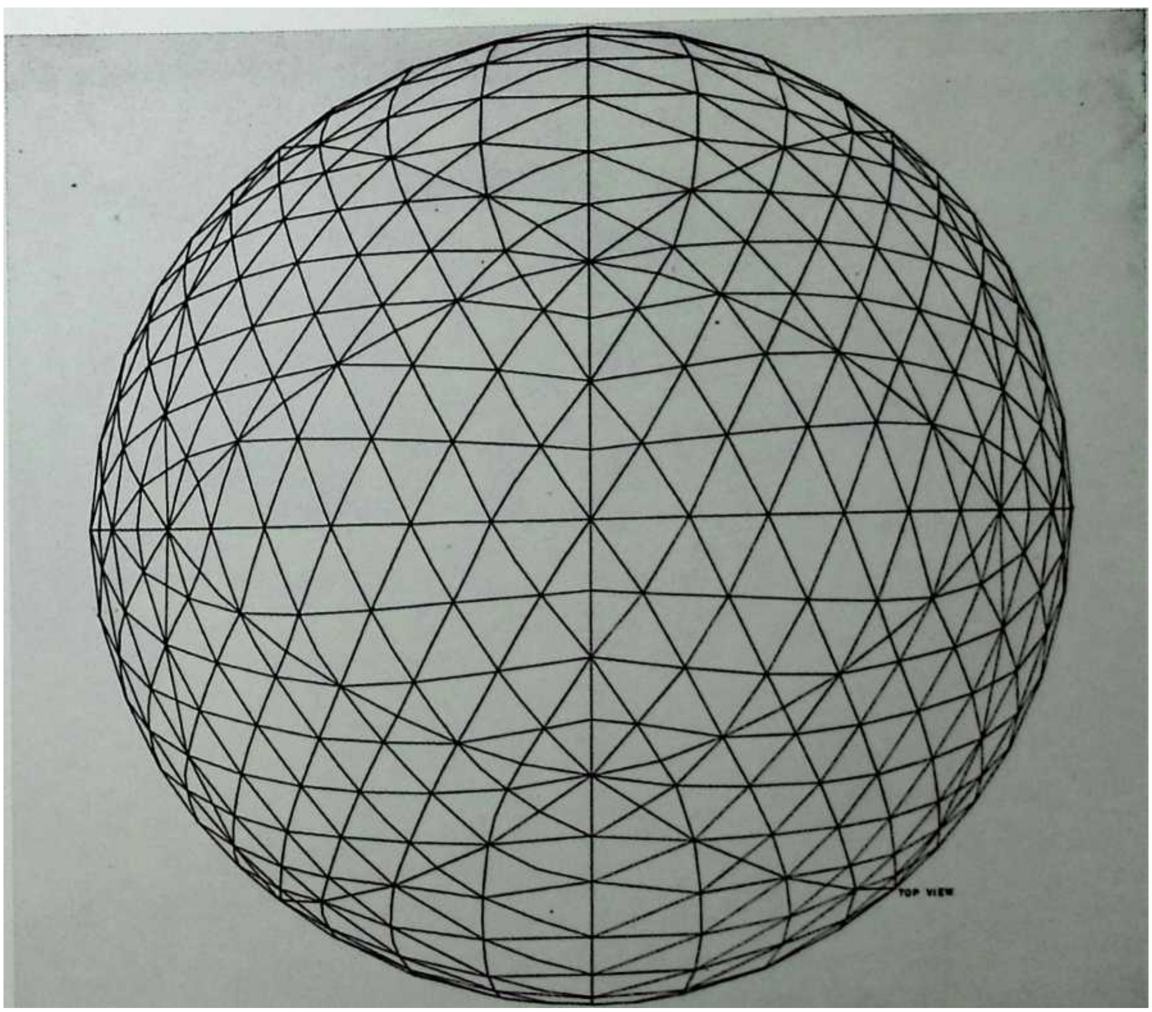

PAT. NO. 2682235
PRINT 60 ~~30~~ THIS SIDE UP

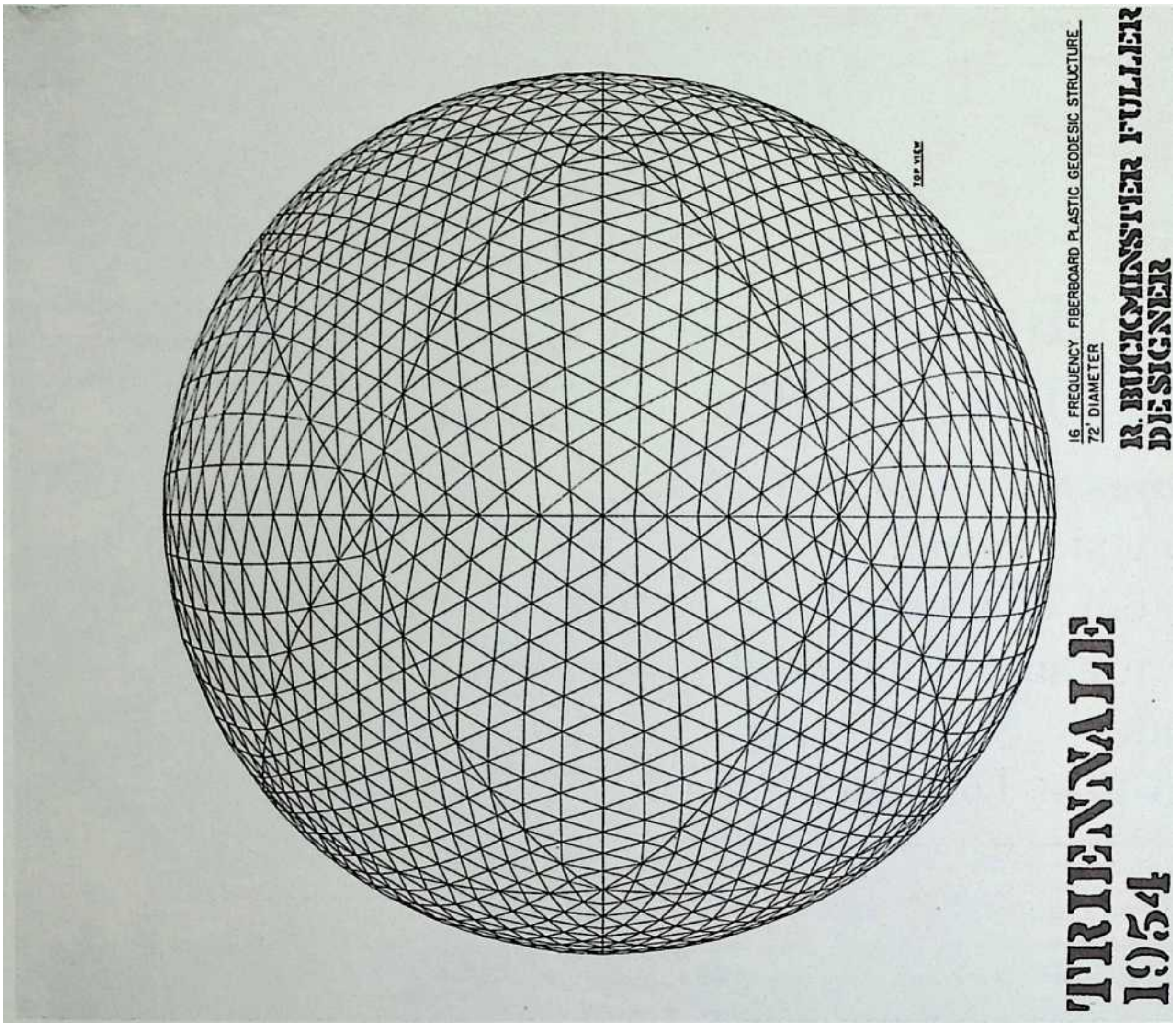
Triennale, Milan Exposition Domes, 1954 Eight-Frequency Fiberboard Plastic Geodesic Structure, Thirty-six-Foot Diameter; Sixteen-Frequency Fiberboard Plastic Geodesic Structure, Seventy-two-Foot Diameter

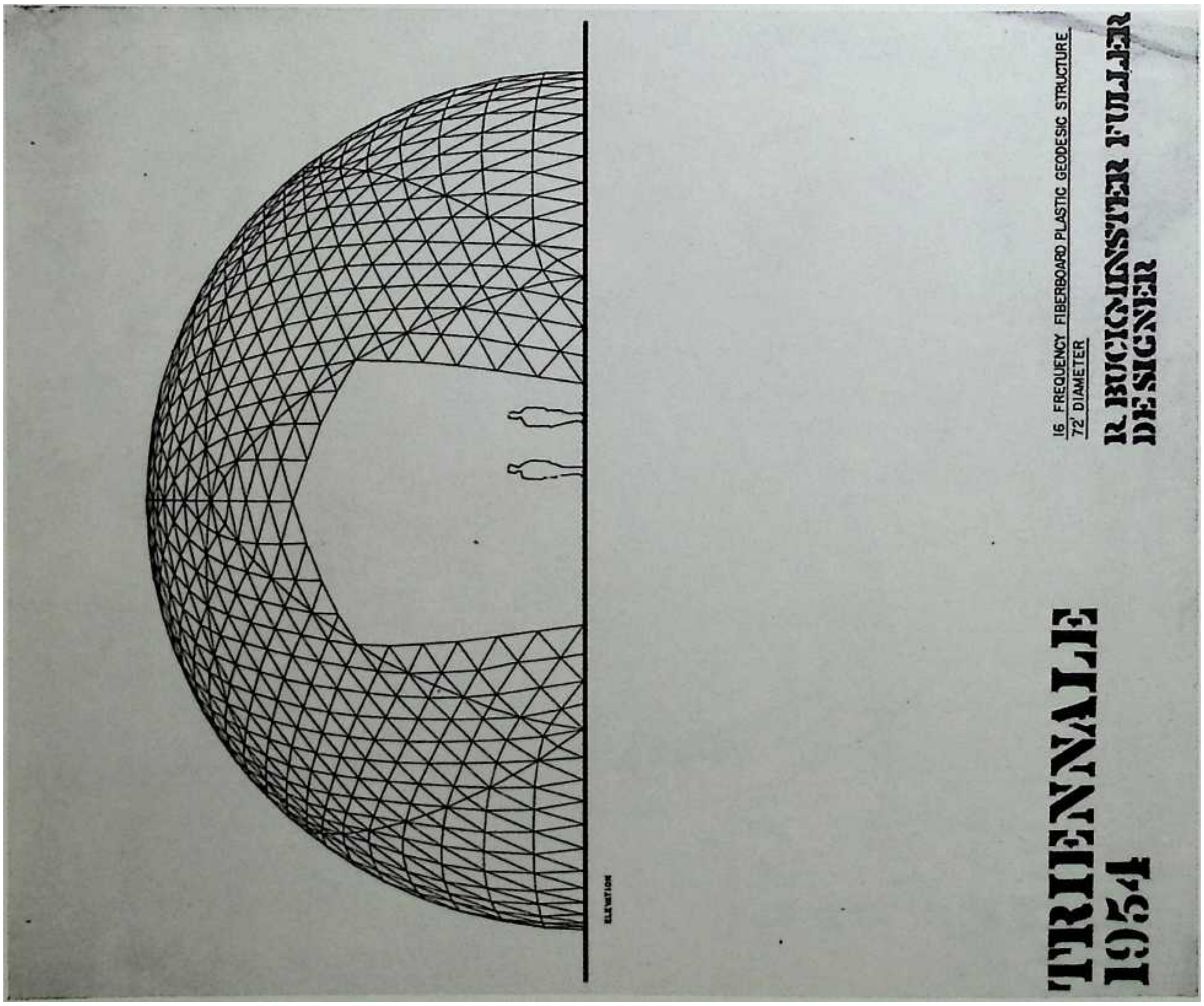
Two types of Fuller's dome were represented in the Triennale of 1954 in Milan. Both were made of fiberboard plastic. The larger seems to have been designed as a hangar.

R_FRFQUENCY FIBERBOARD PLASTIC GEOOE9C STRUCTURE 36* DIAMETER hruckmikster fuller mSSIGKER

TRIENNALE 1954

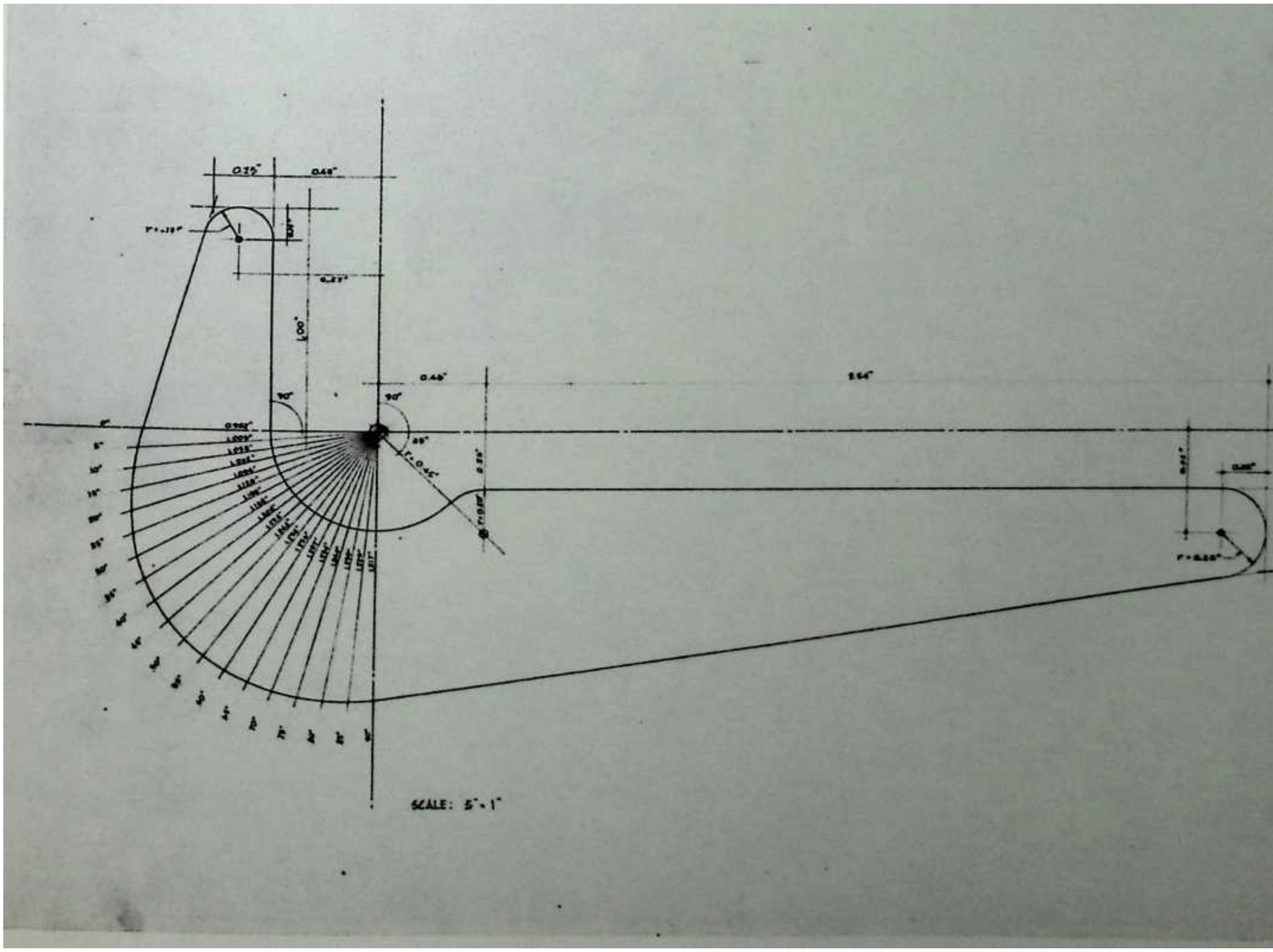



TOP VIEW
16 FREQUENCY FIBERBOARD PLASTIC GEODESIC STRUCTURE
72' DIAMETER
R. BUCKMINSTER FULLER
DESIGNER
TRIENNALE
1954



Fastener Cam for Radomes 1955

Finally in 1955, the fastener cam for Fuller's radomes was designed at extremely precise tolerances. The curved end is hooked through the pin that holds the fiberglass panels together.



117-Foot Geodesic Dome, Six-Plane Maintenance
Hangar
1955

This hangar, which was over twenty feet larger than the Ford dome, was commissioned by the U.S. Air Force. Perhaps because of its great dimensions, it was constructed of individual metal trusses with custom-made gussets and hubs. Like the earlier hangars, it has two sliding doors, but, unlike them, it was ventilated from its apex.

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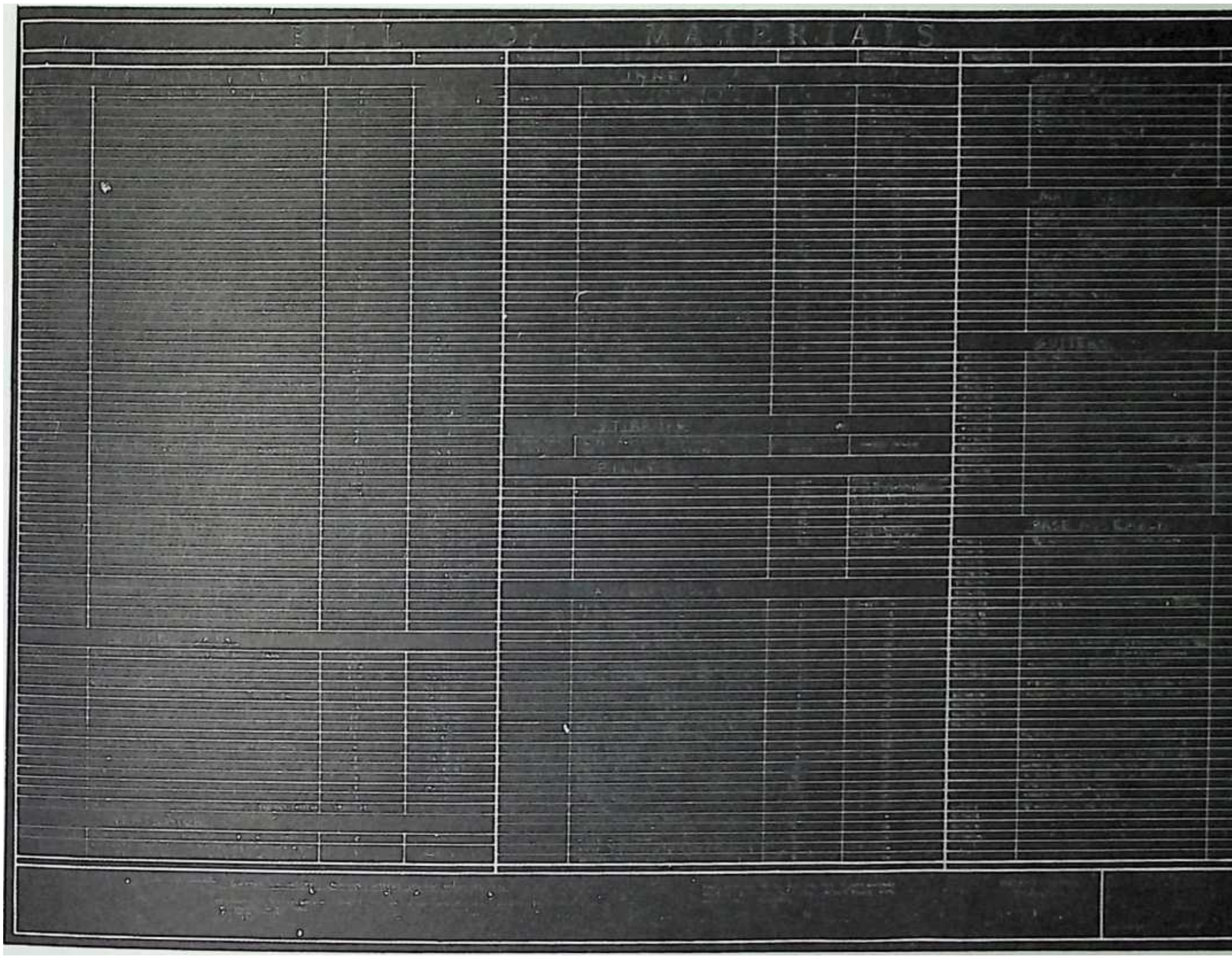

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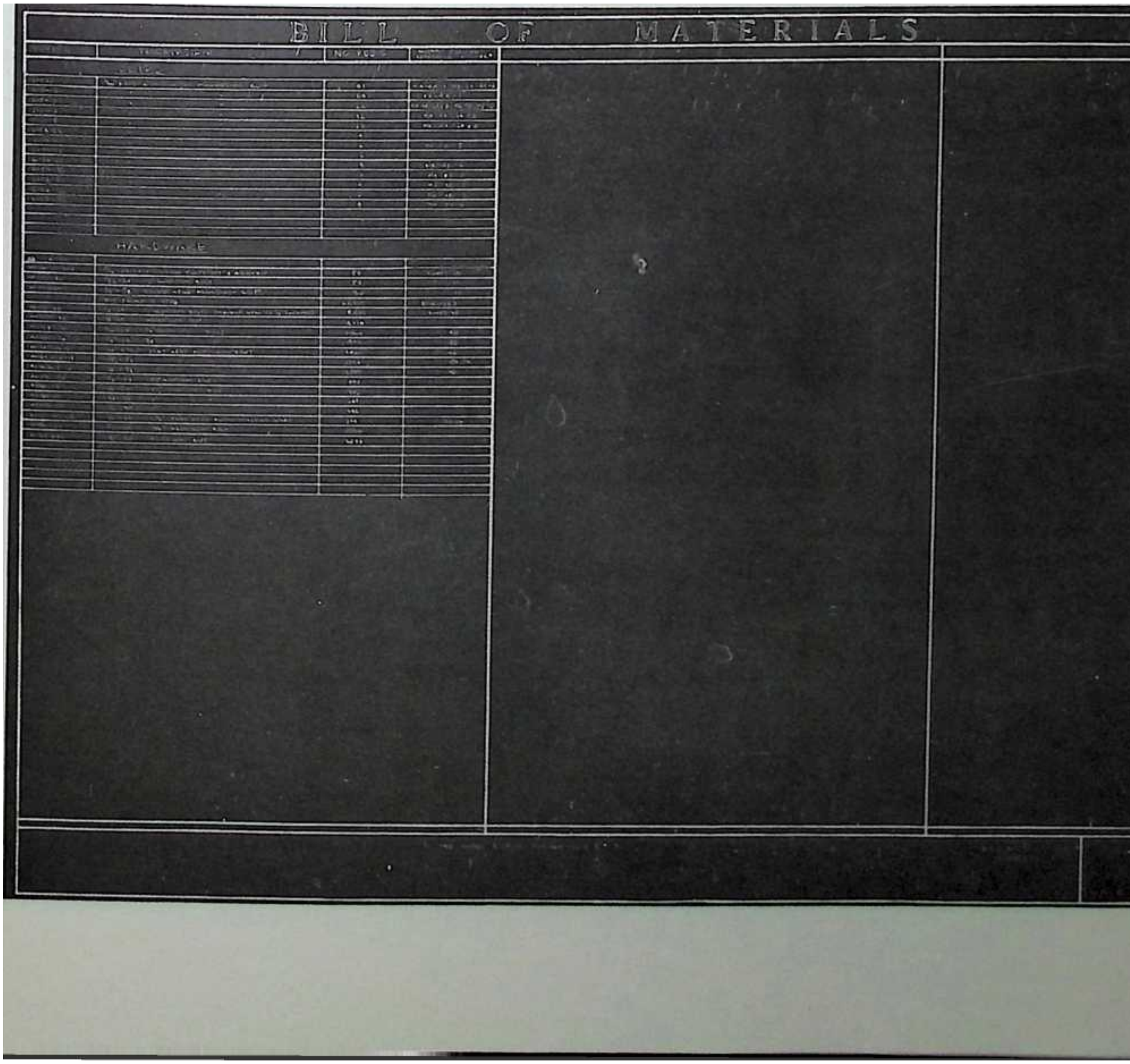
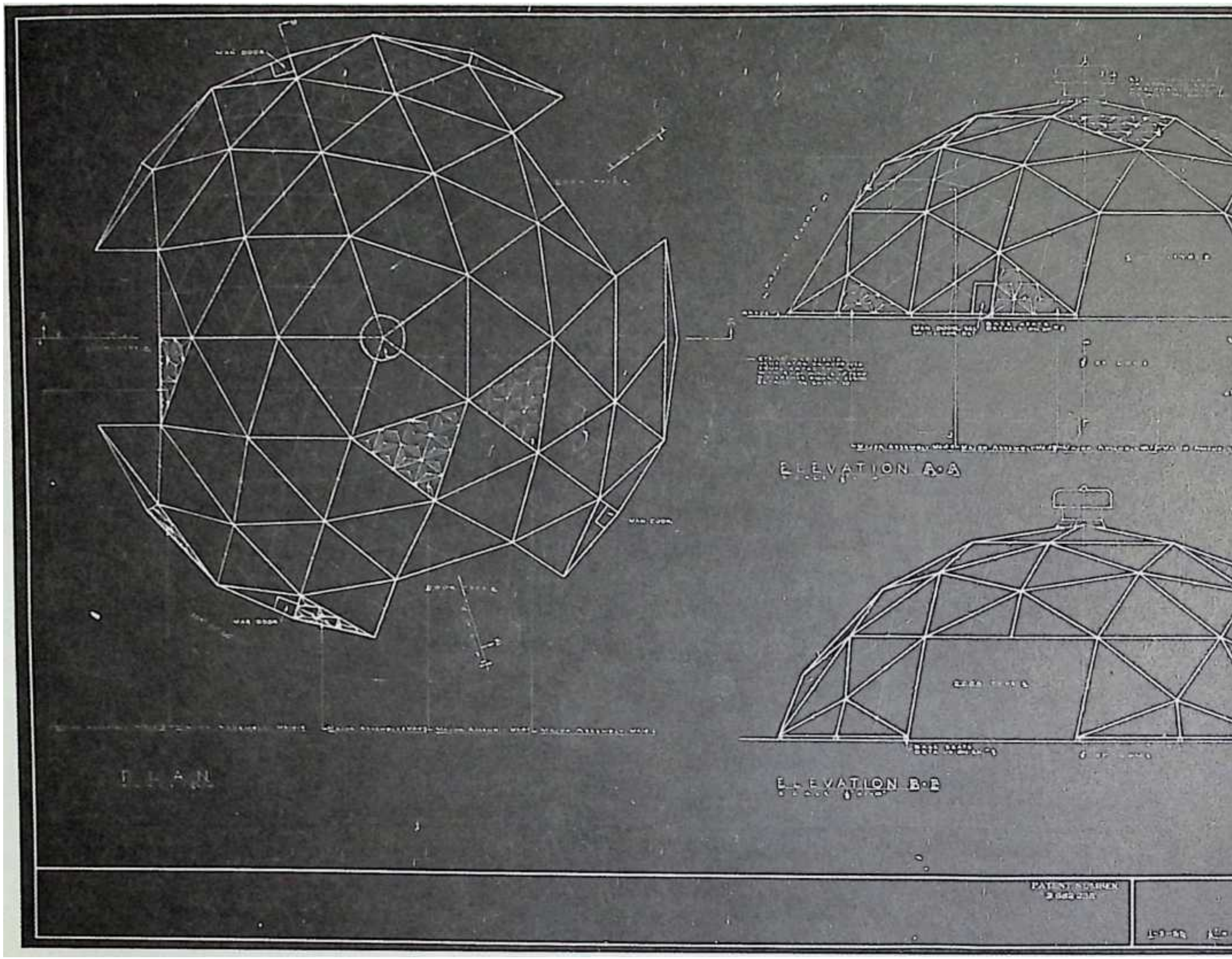
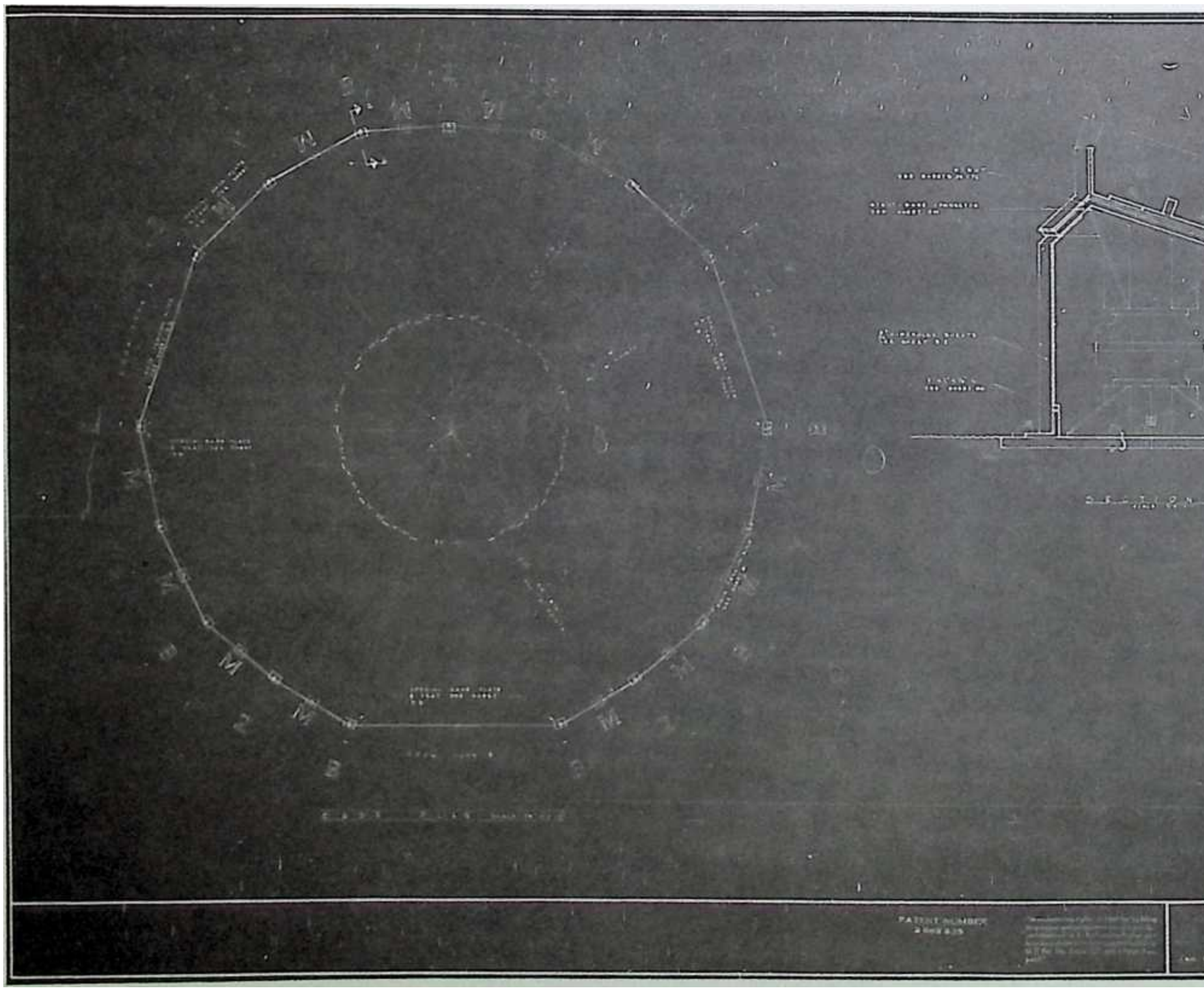

BILL OF MATERIALS


ELEVATION A-A
ELEVATION B-B
PLAN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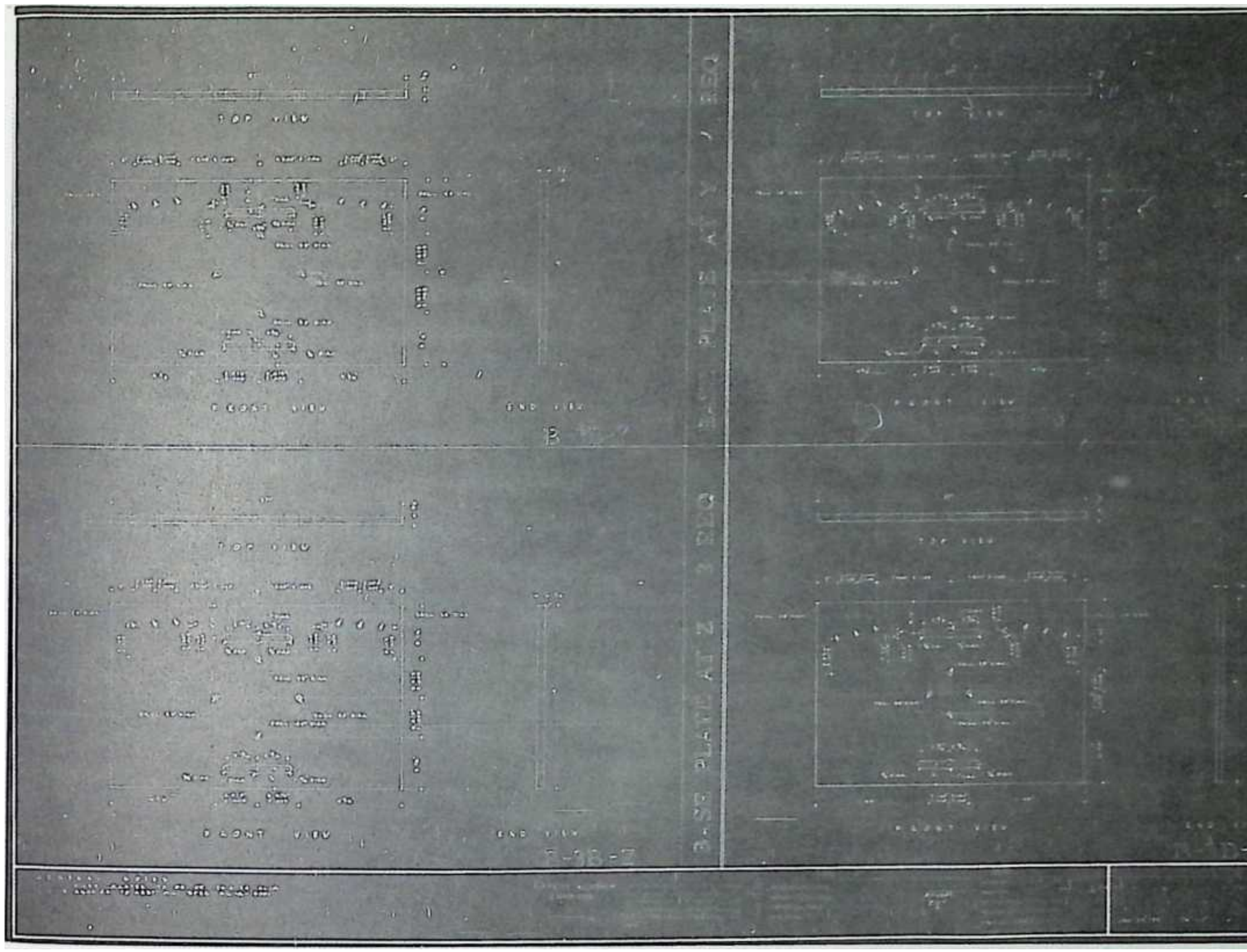
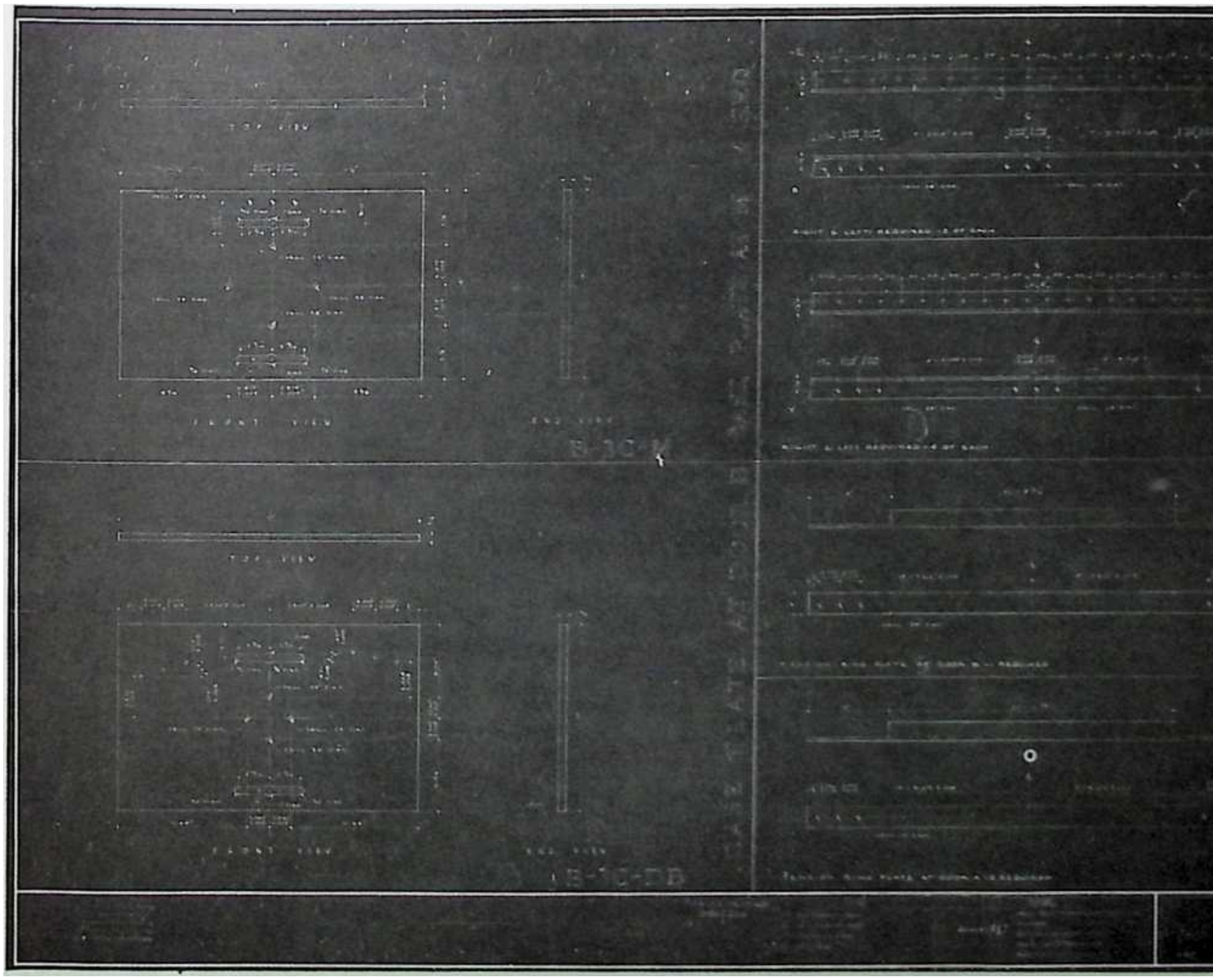
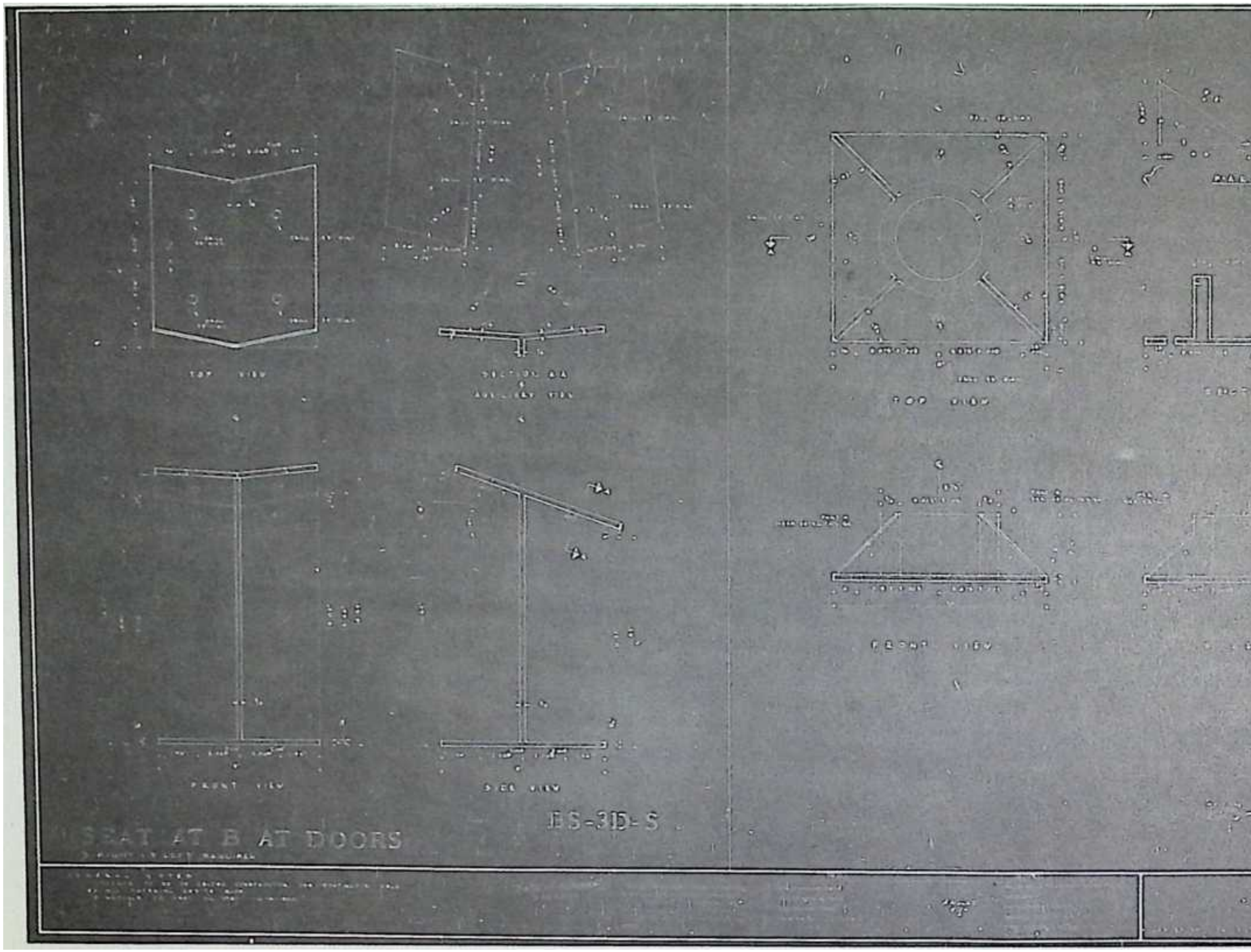
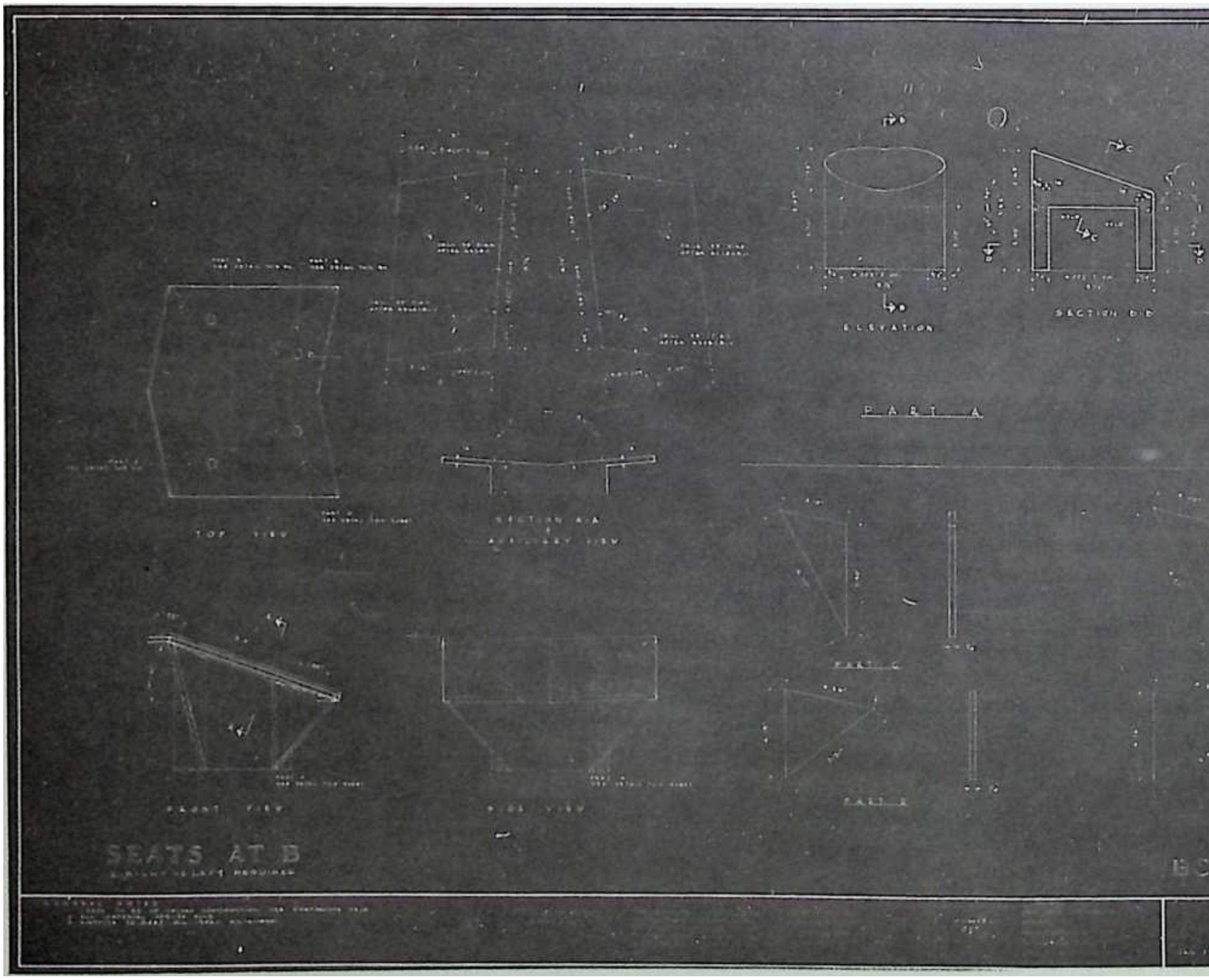
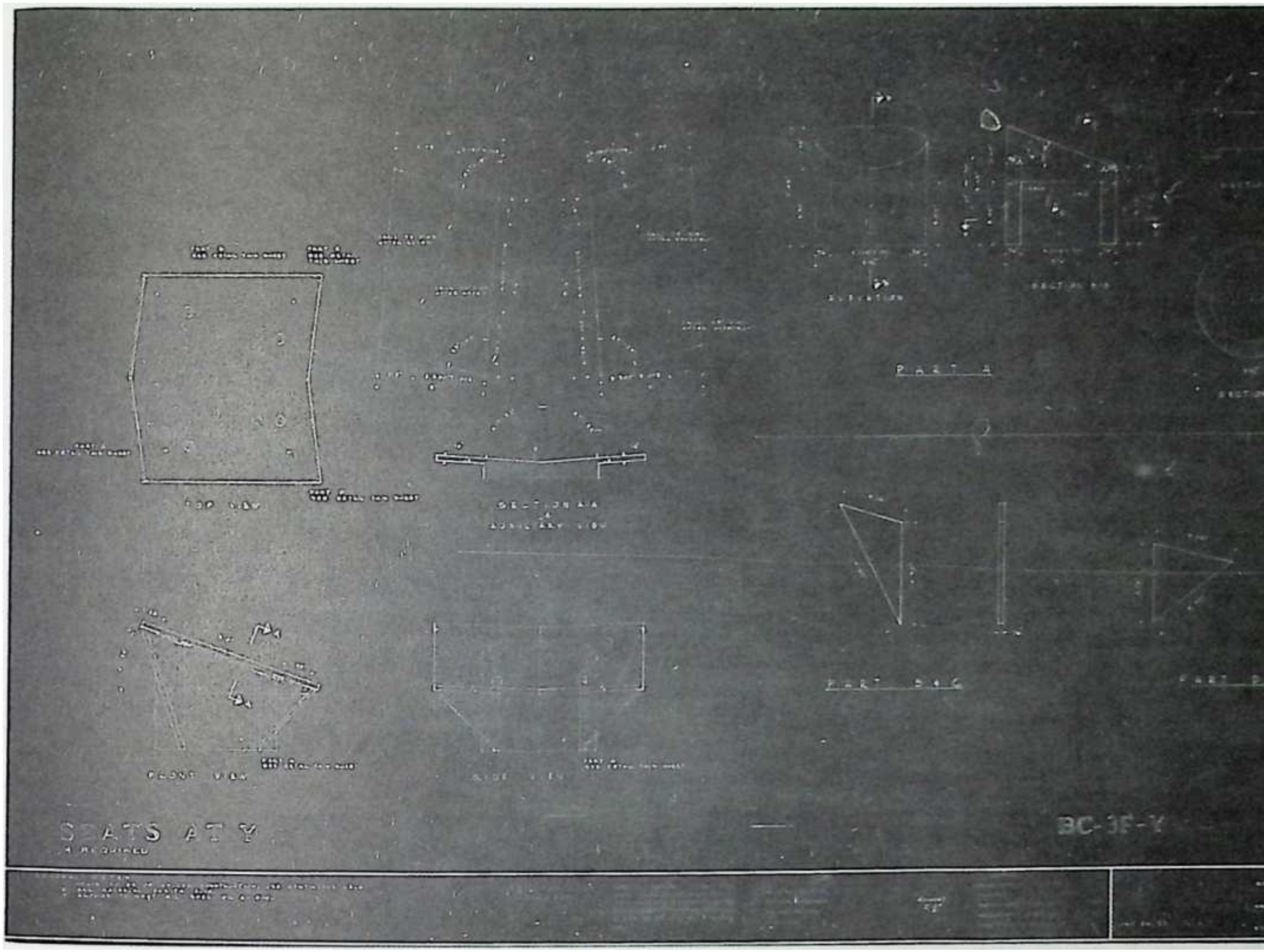
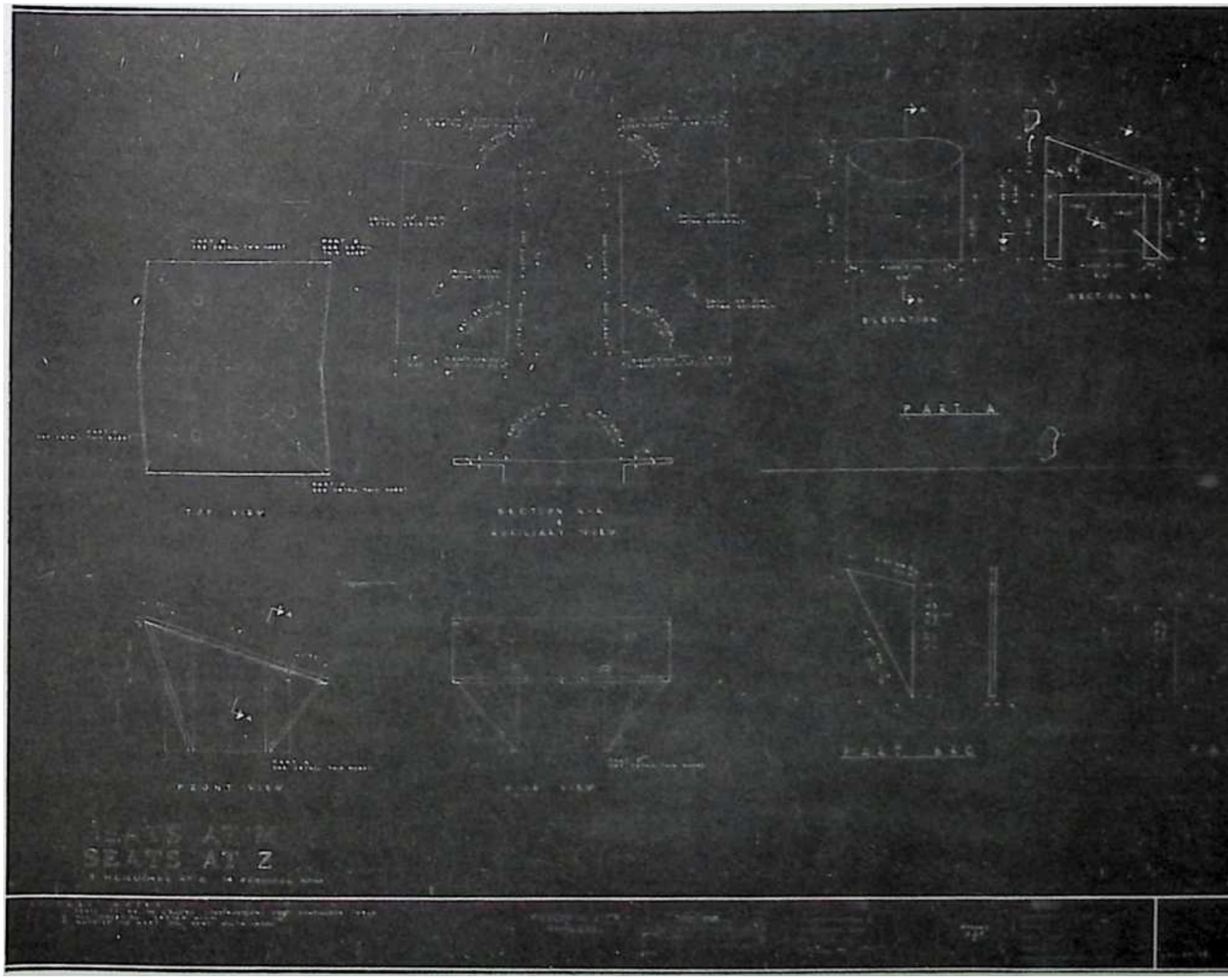

3-ST PLATE AT Z 1 REQ
FRONT VIEW
TOP VIEW
END VIEW



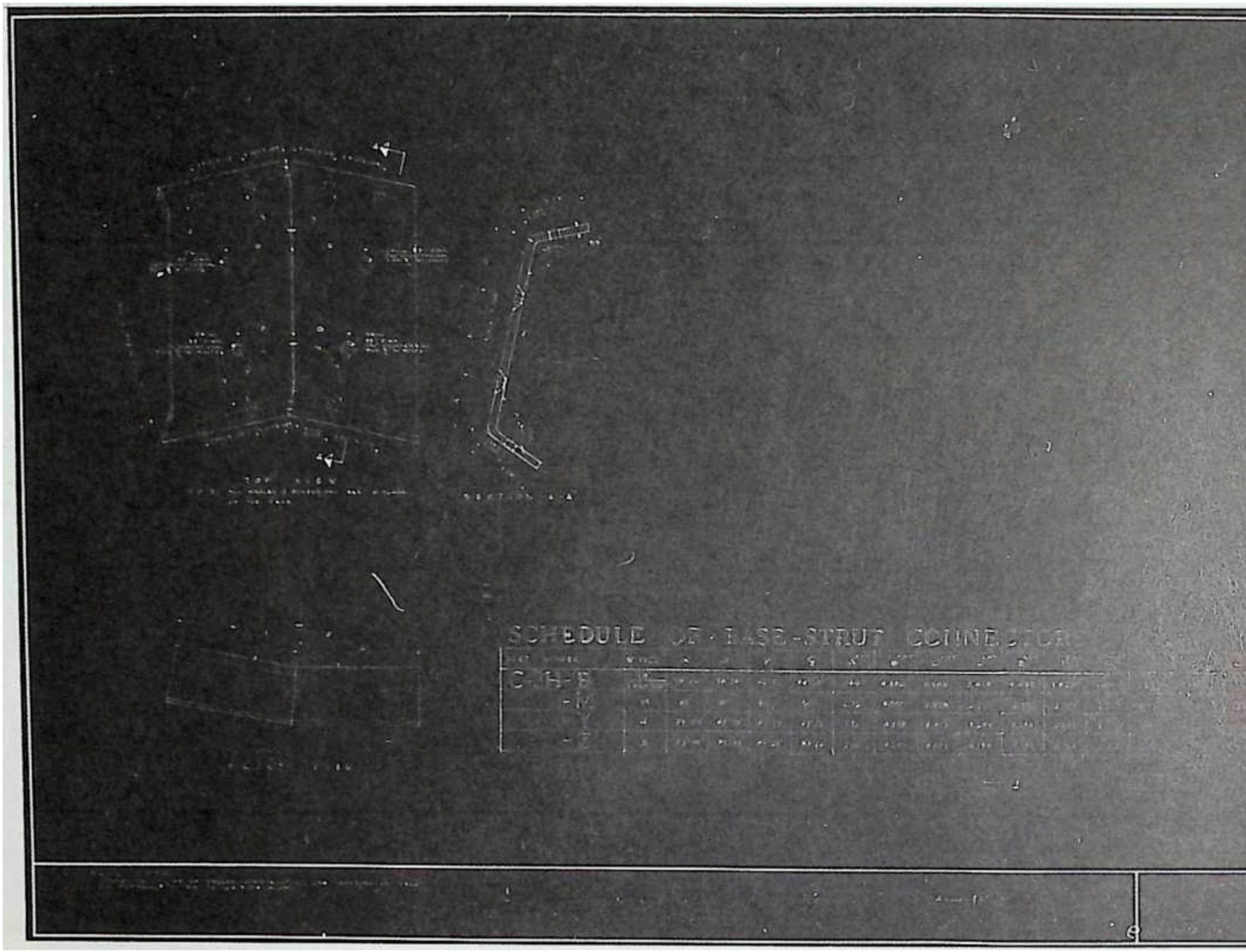

TOP VIEW
FRONT VIEW
SIDE VIEW
FRONT VIEW
ES-3D-S
SEAT AT B AT DOORS

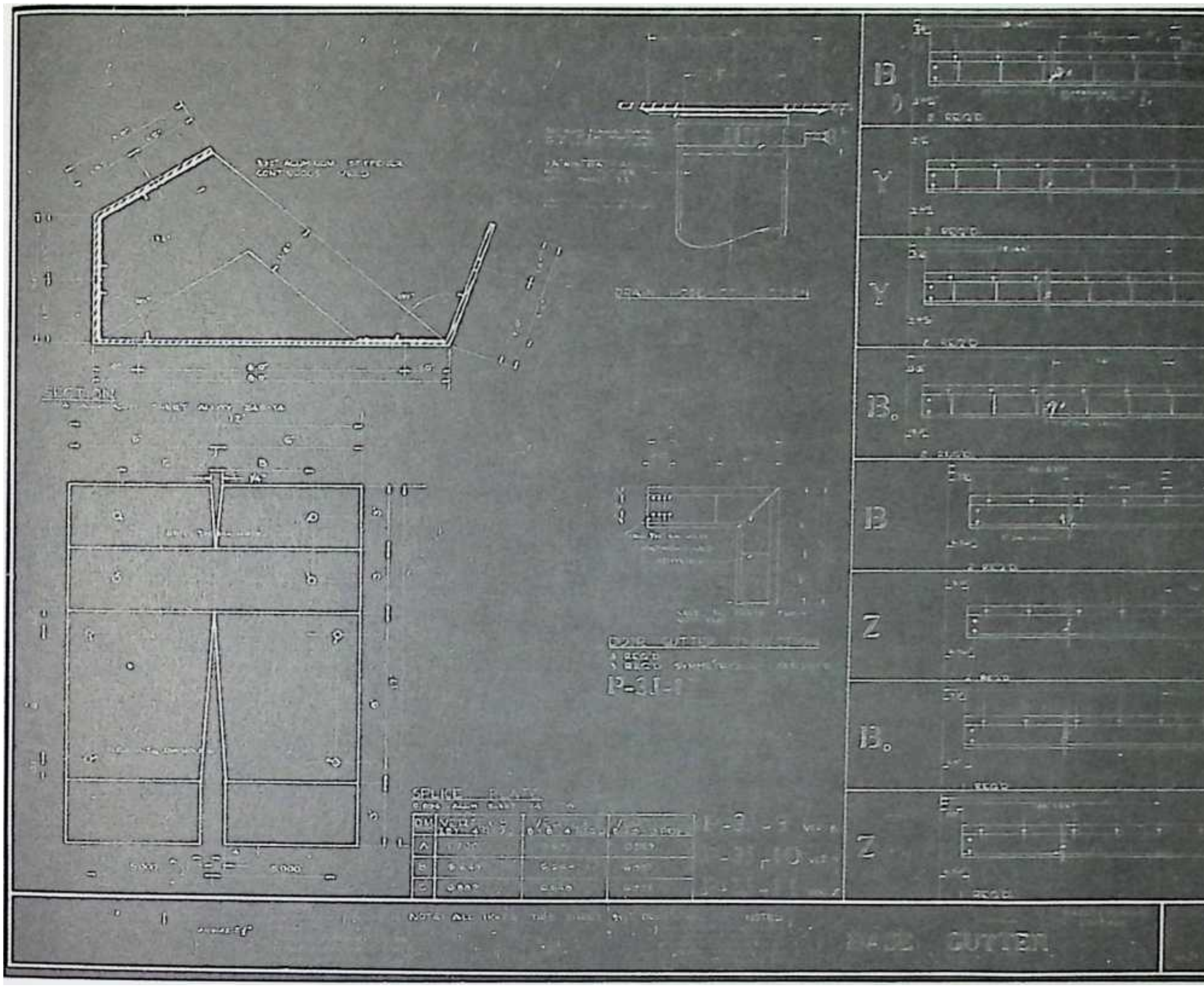

ELEVATION
SECTION D-D
PART A
TOP VIEW
SECTION A-A
FRONT VIEW
SIDE VIEW
SEATS AT B

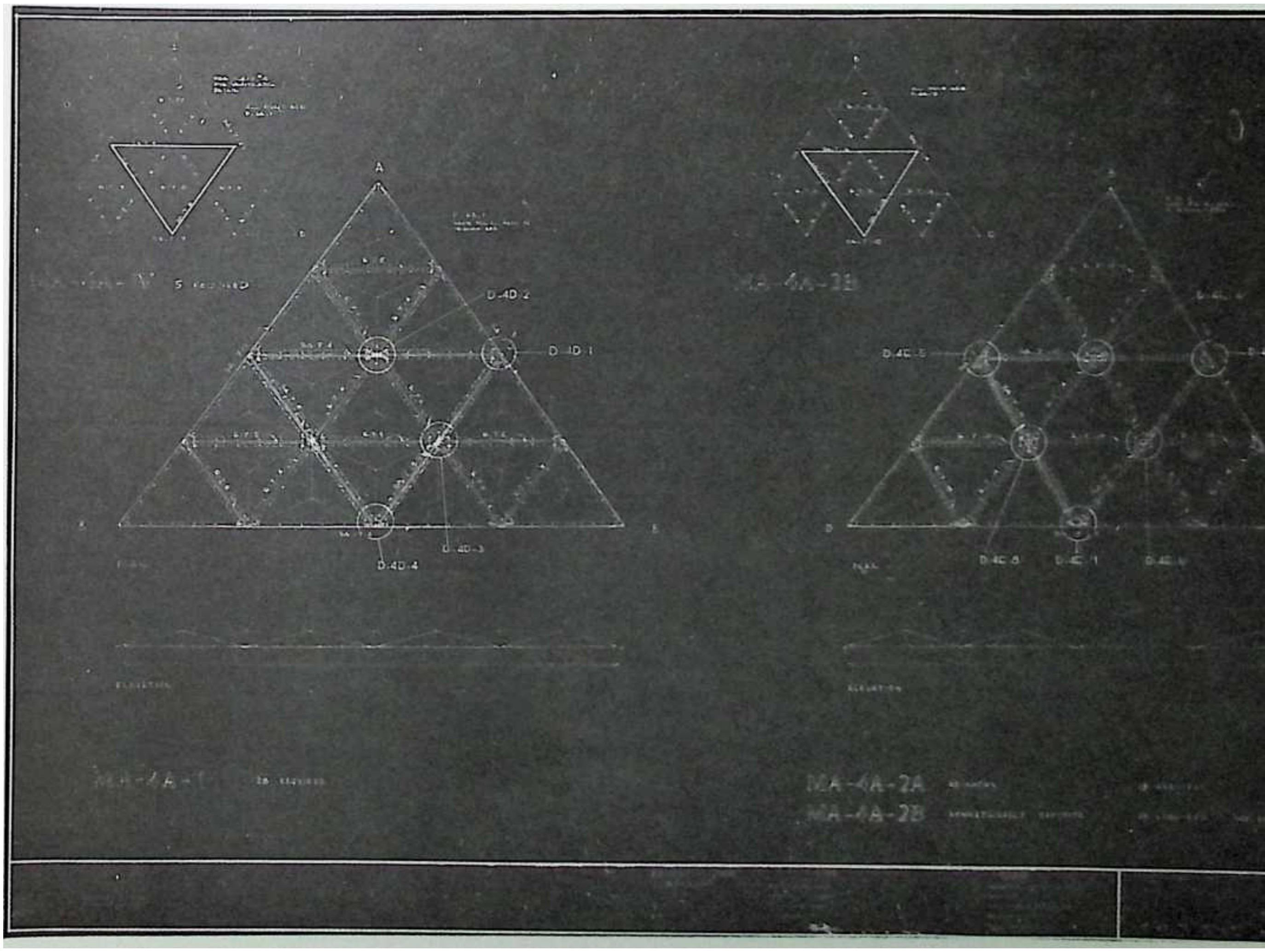

PART A
PART B&C
BC-3F-Y

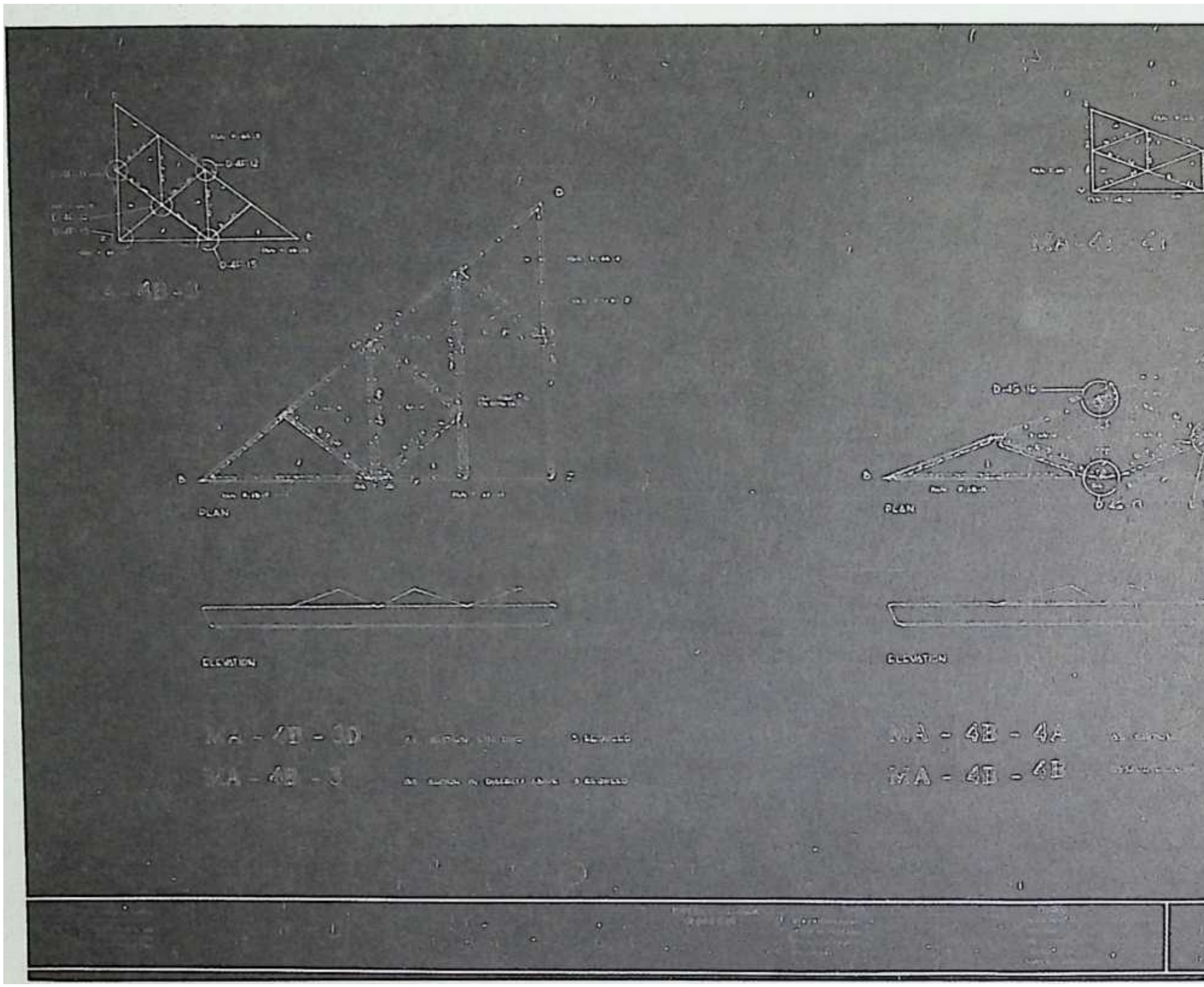


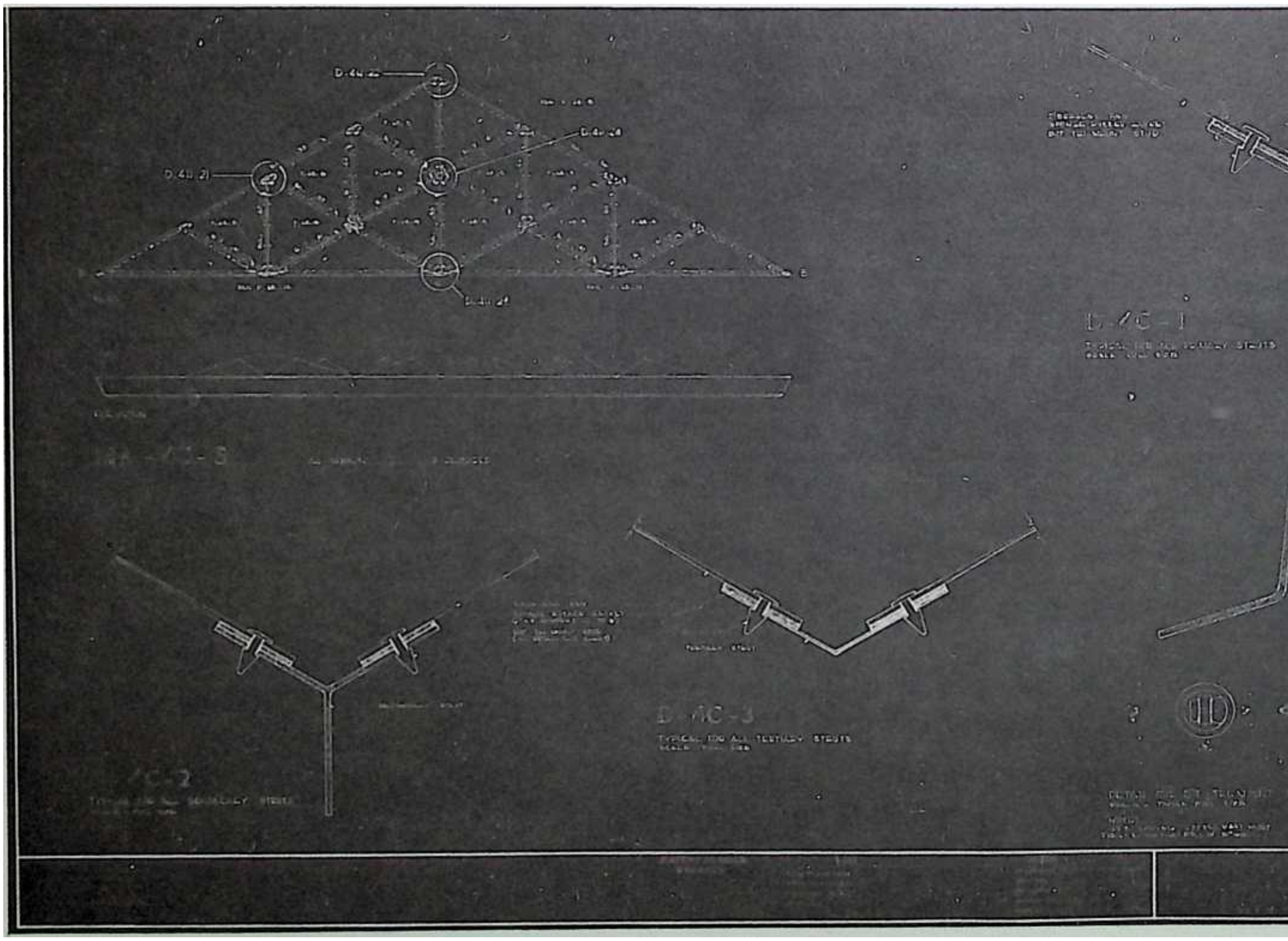
FRONT VIEW
SEATS AT Z
ELEVATION
PART A


SCHEDULE OF BASE-STRUT CONNE

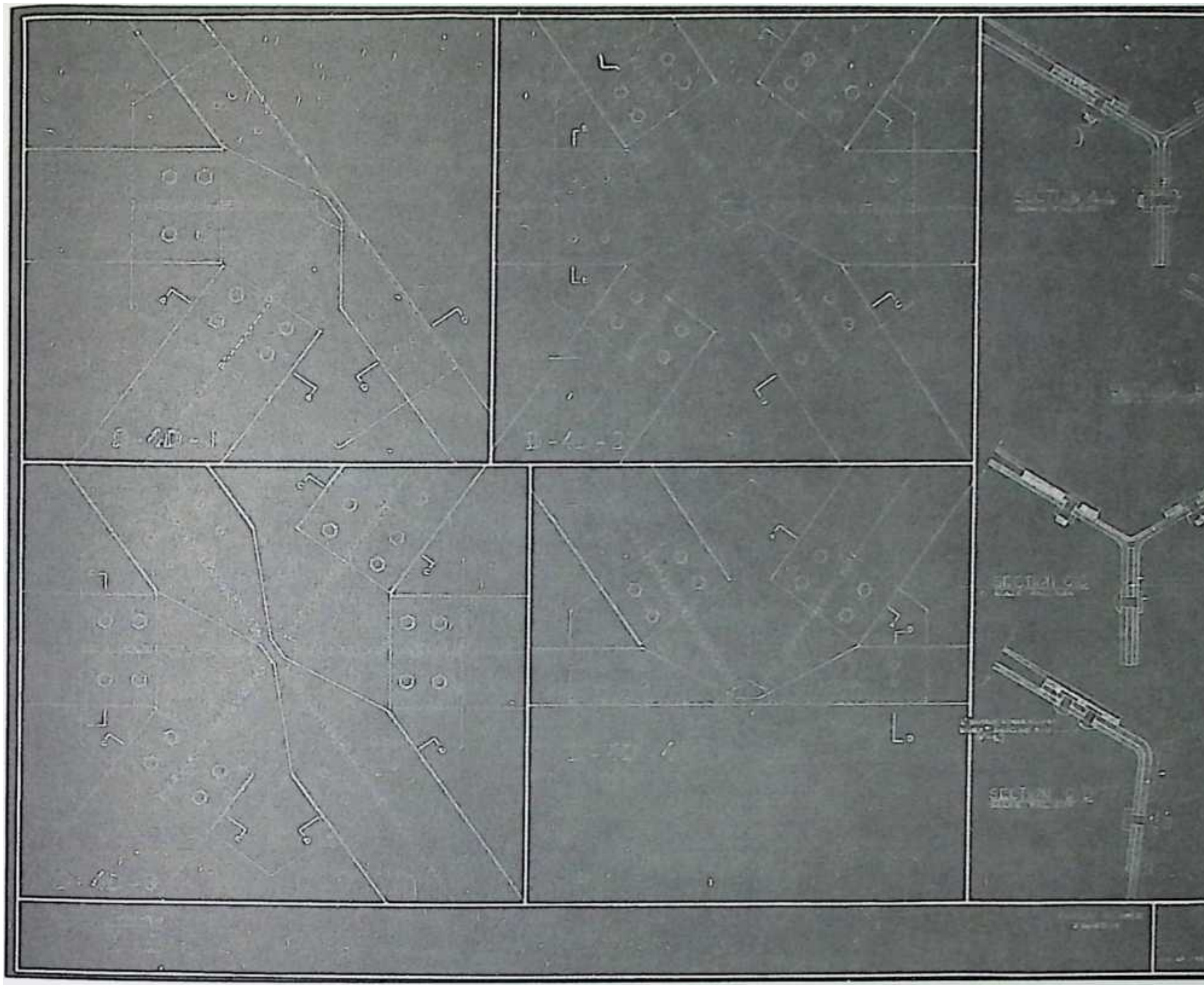


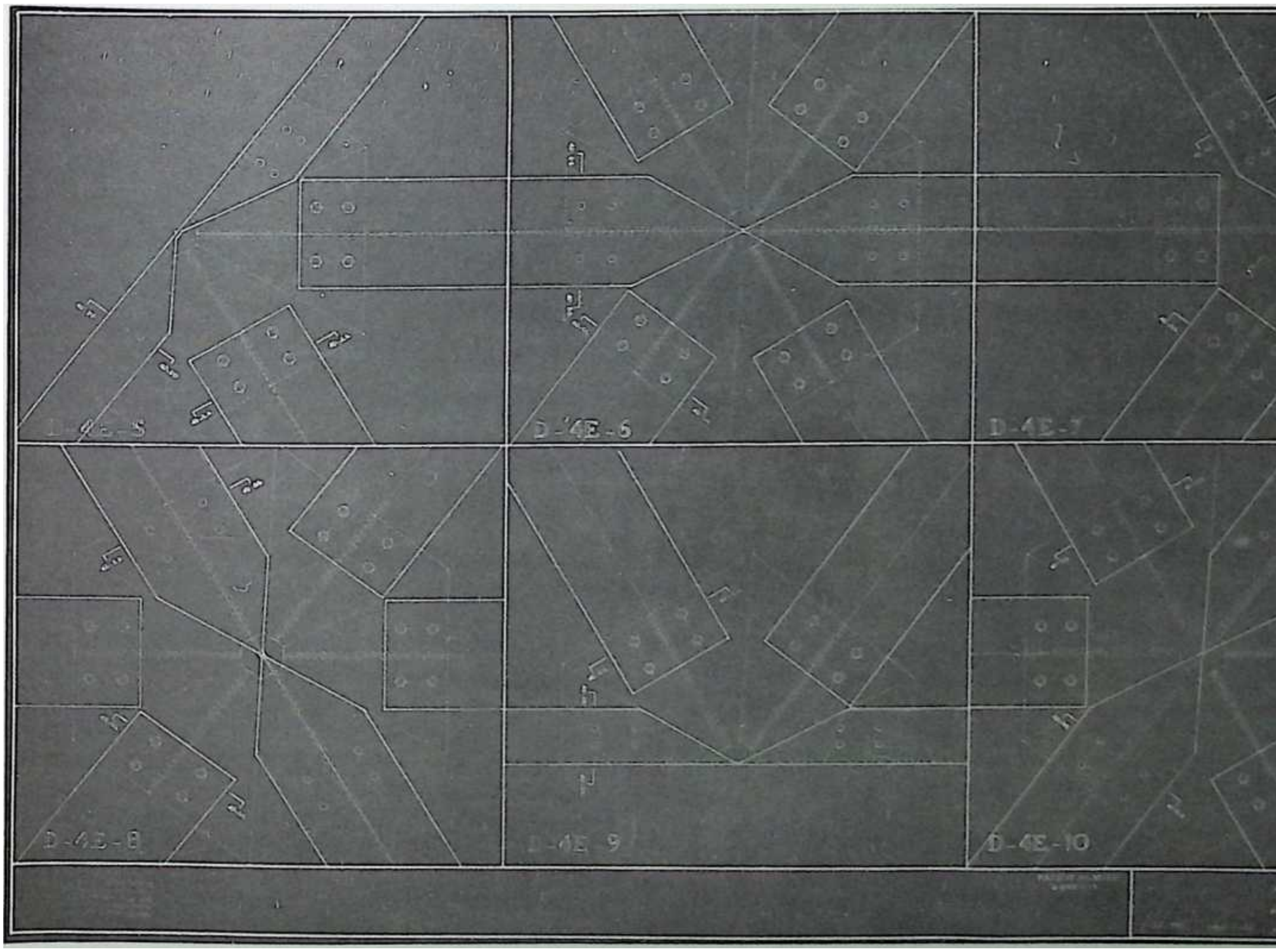

A
D-4D-2
D-4D-1
D-4D-3
D-4D-4
ELEVATION
MA-4A-1
MA-4A-2B
ELEVATION
MA-4A-2A
MA-4A-2B

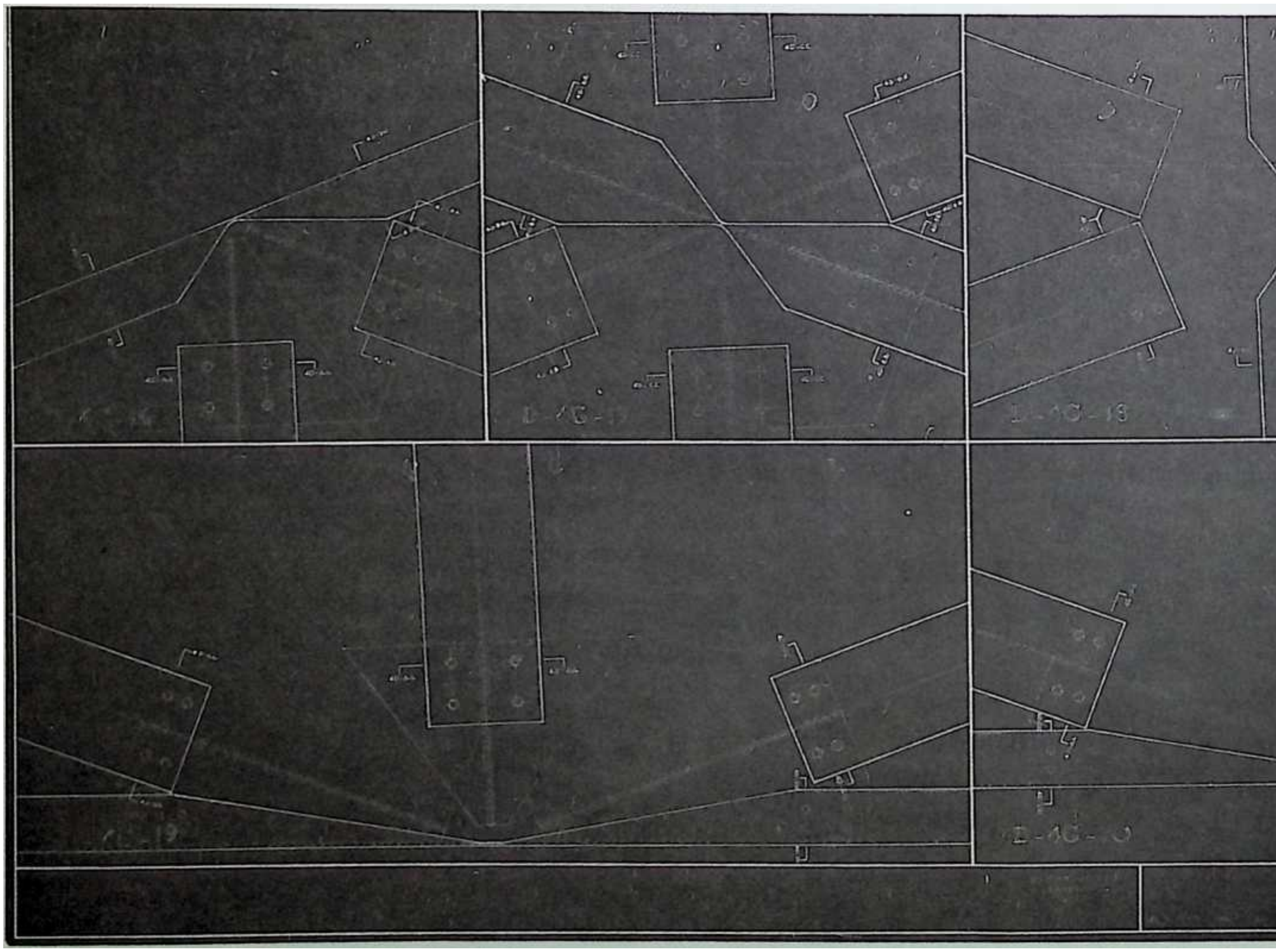

PLAN
ELEVATION
MA - 4B - 3D
MA - 4B - 3
PLAN
ELEVATION
MA - 4B - 4A
MA - 4B - 4B

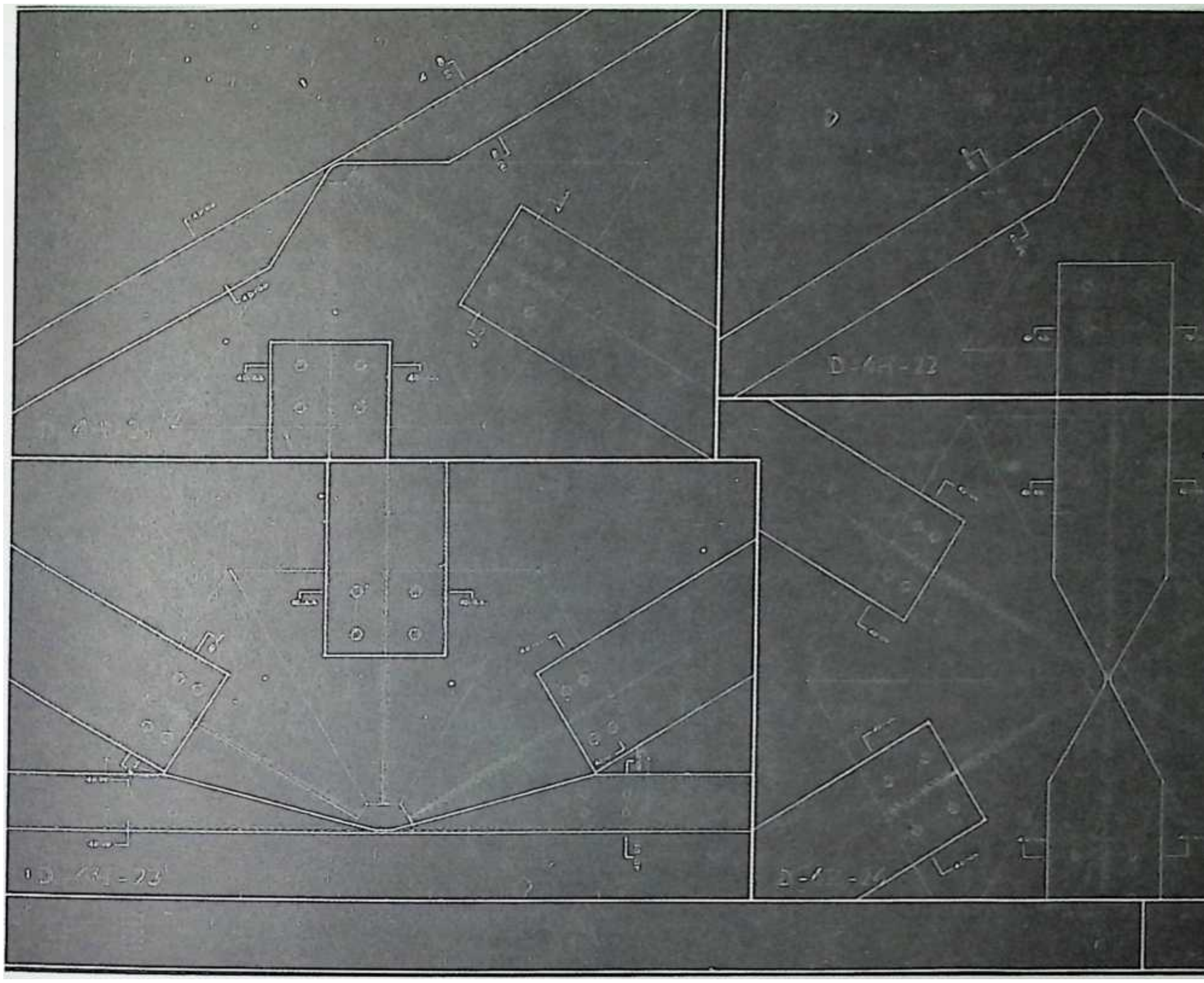


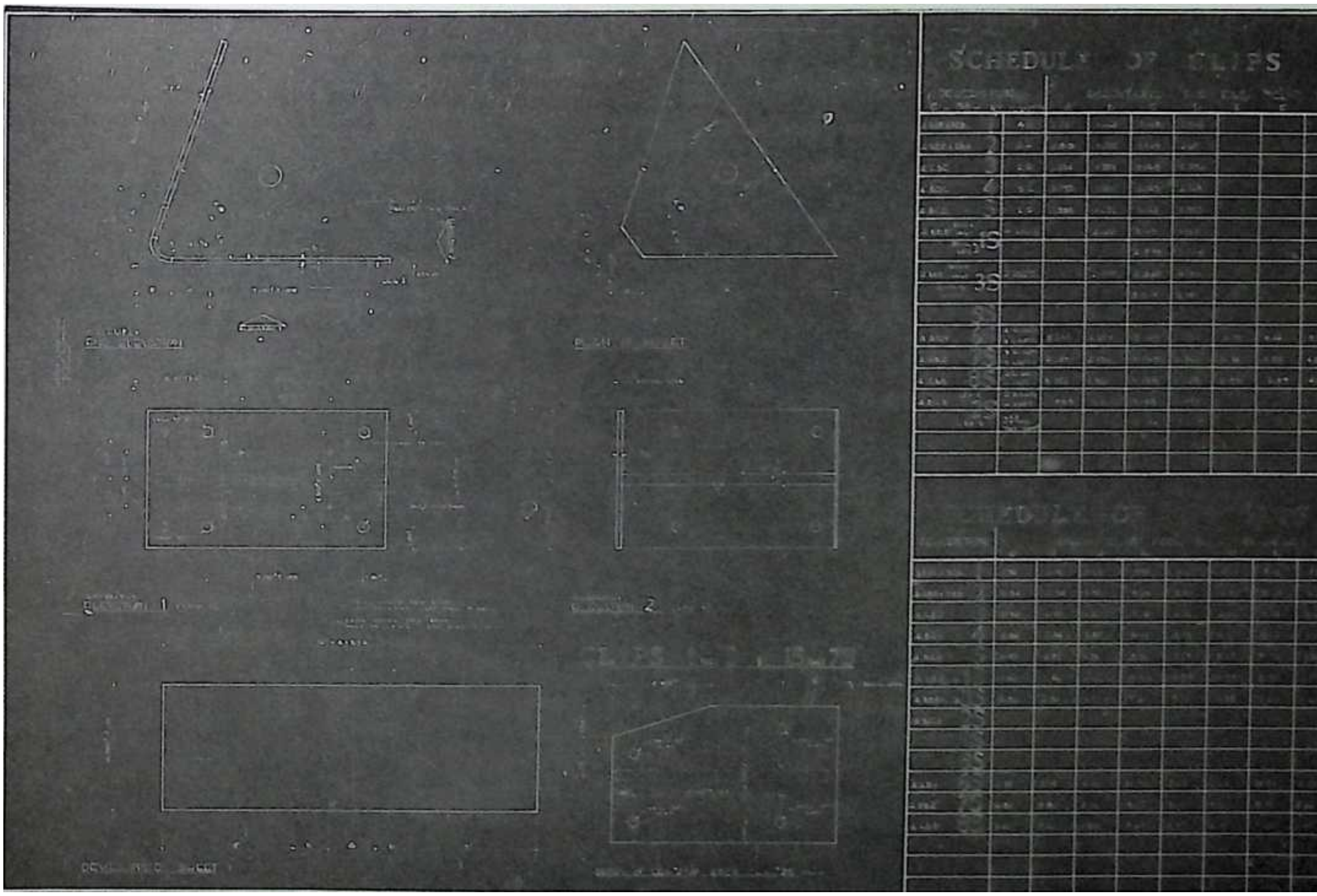
TYPICAL FOR ALL TESTUDY STRUTS

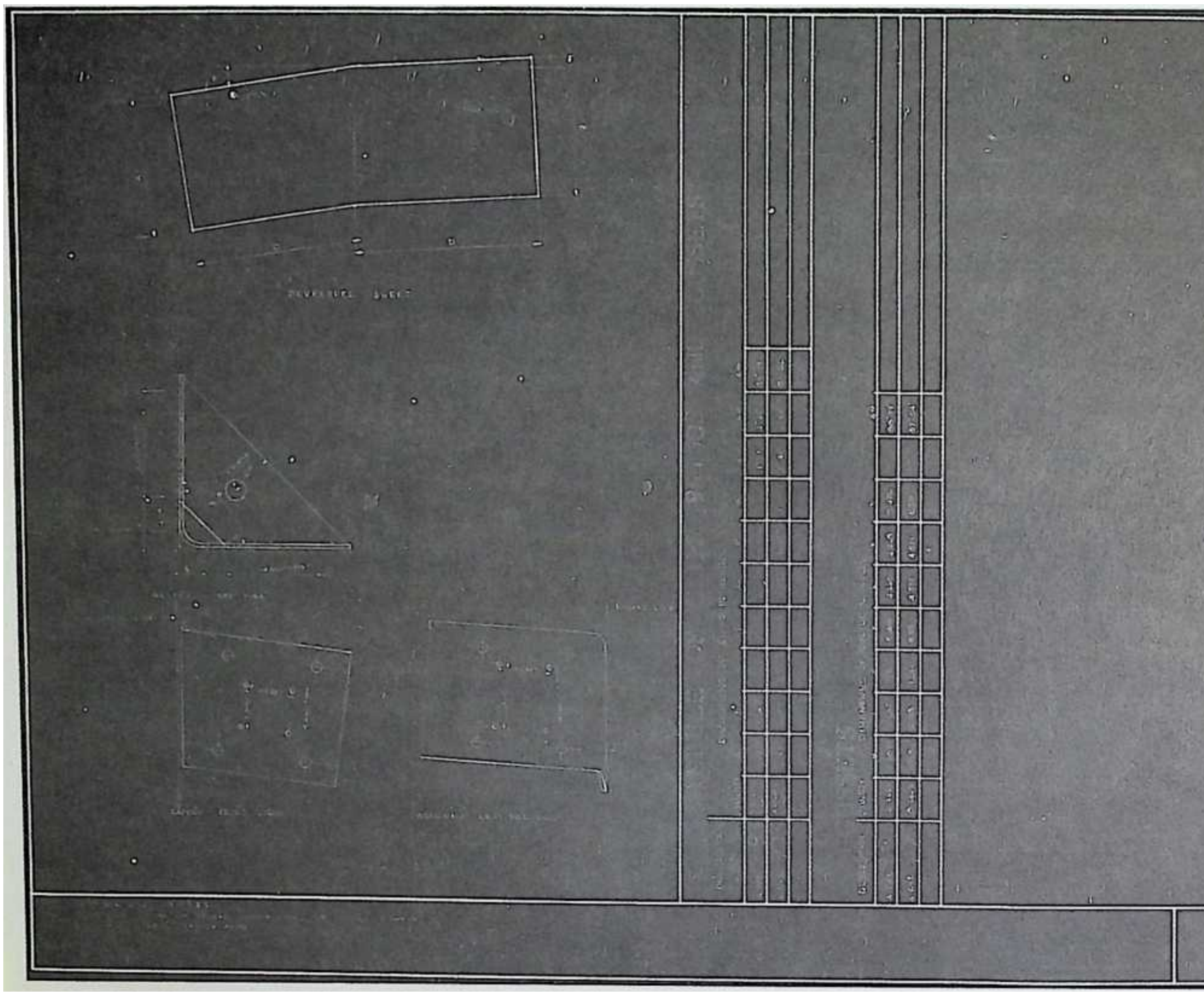


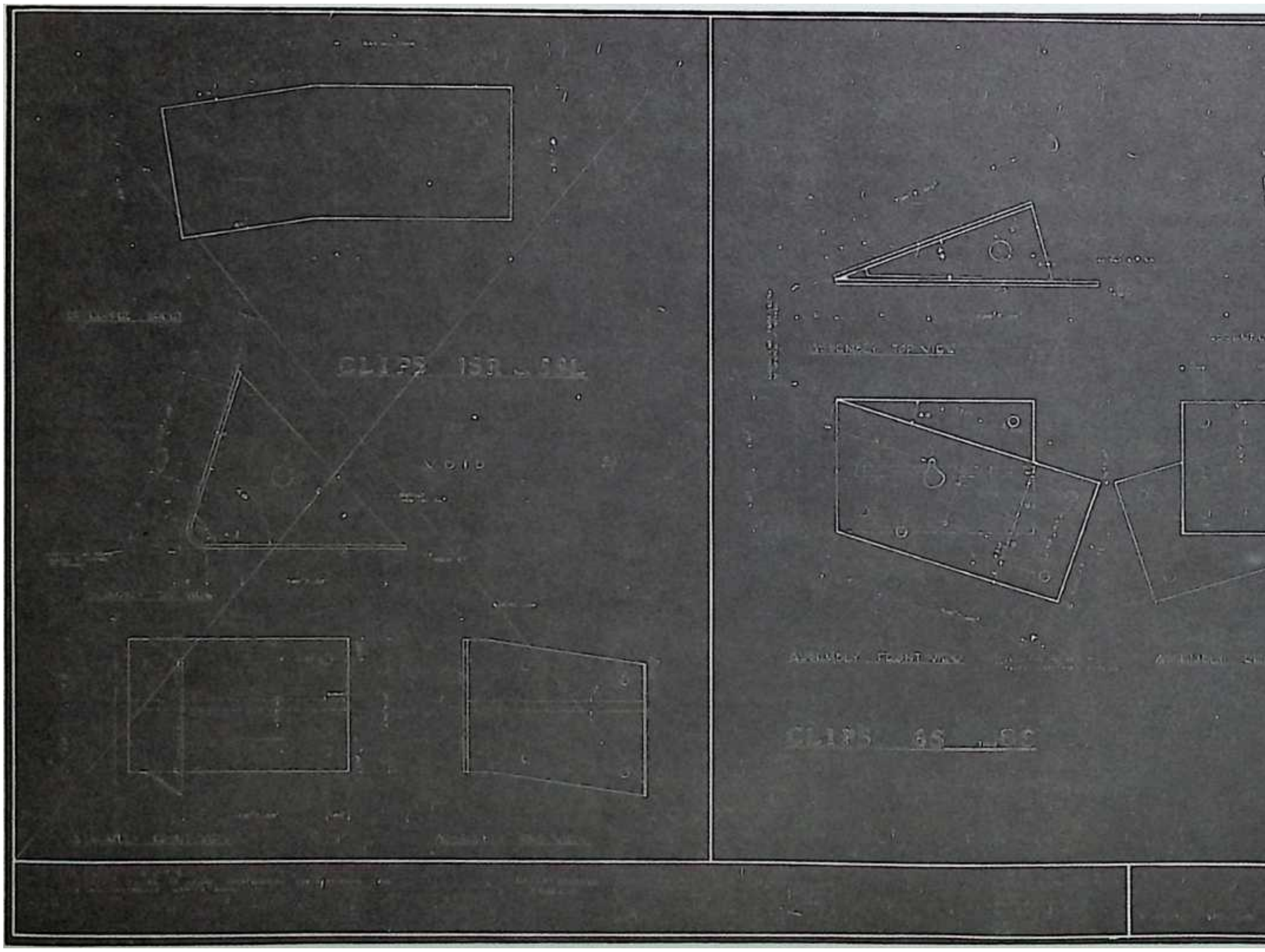

D-4E-5
D-4E-6
D-4E-7
D-4E-8
D-4E-9
D-4E-10

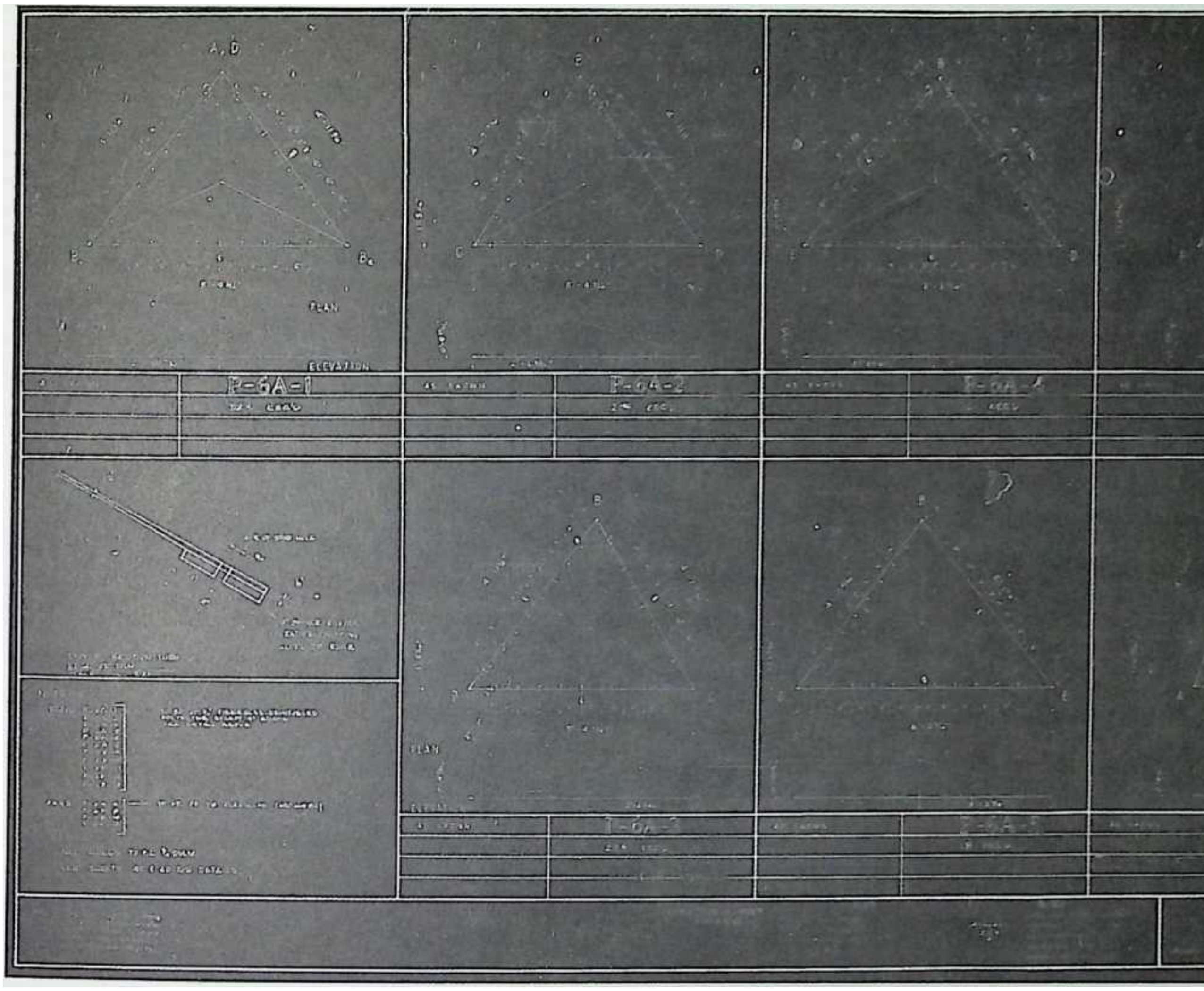




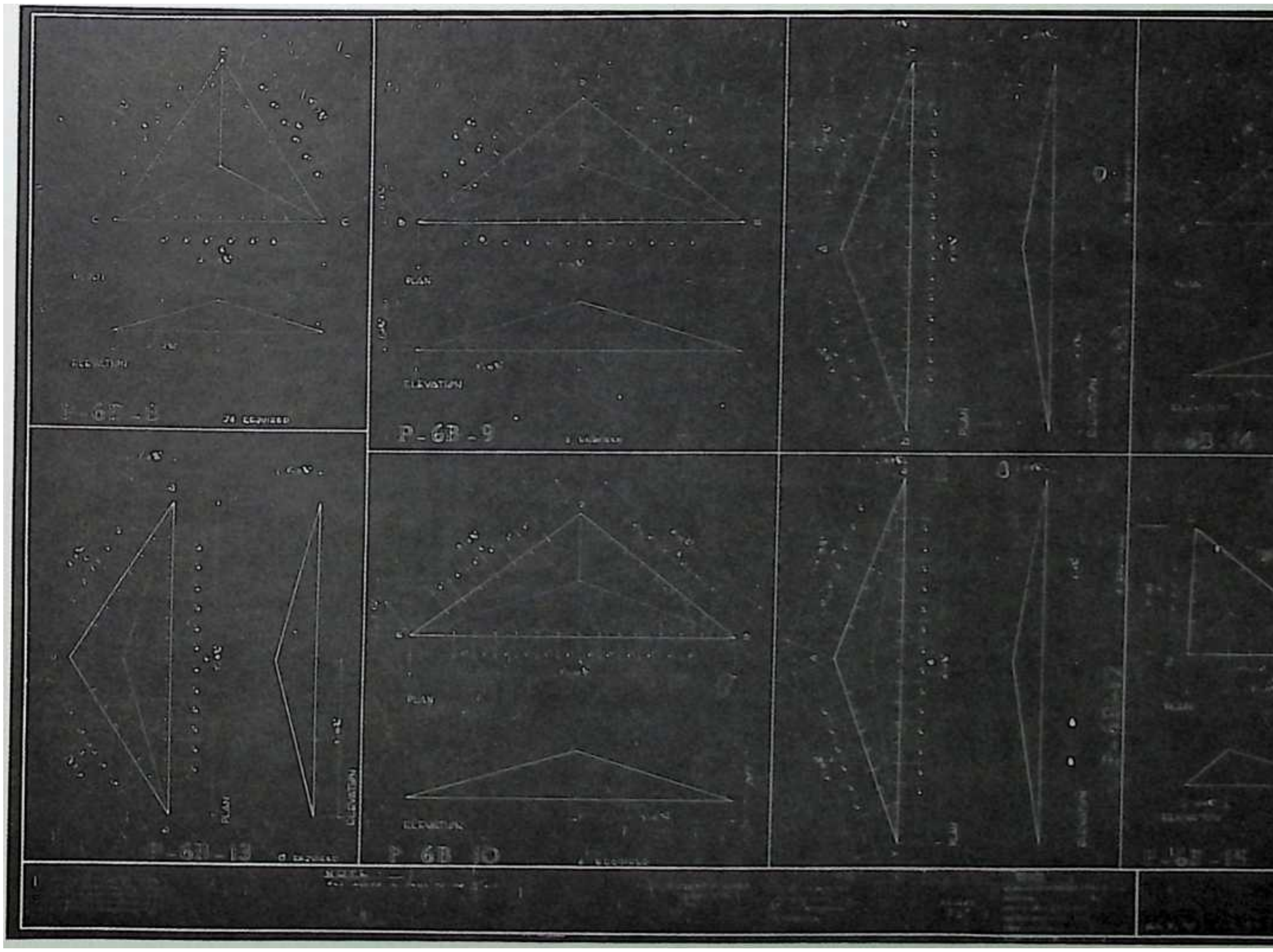


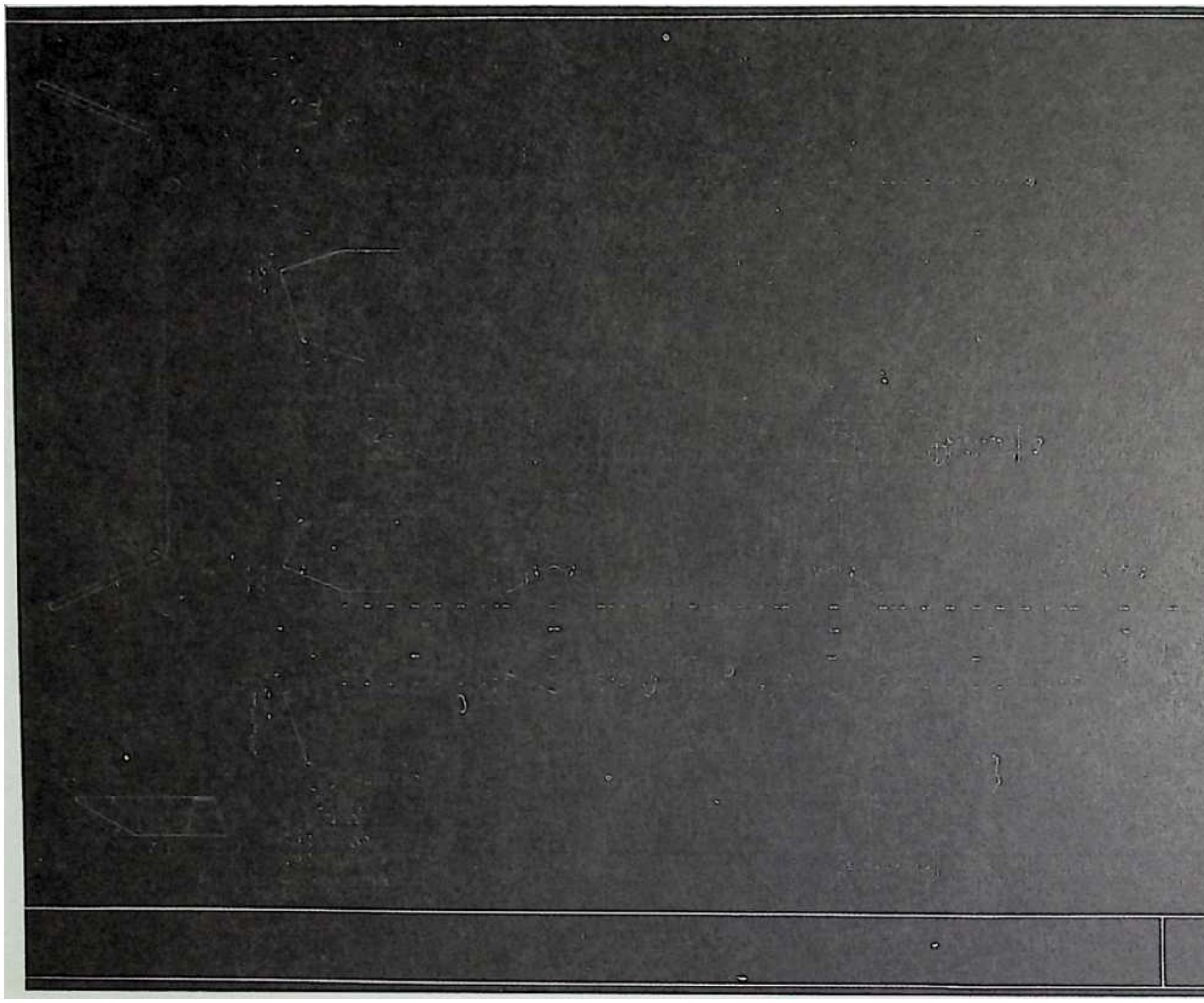


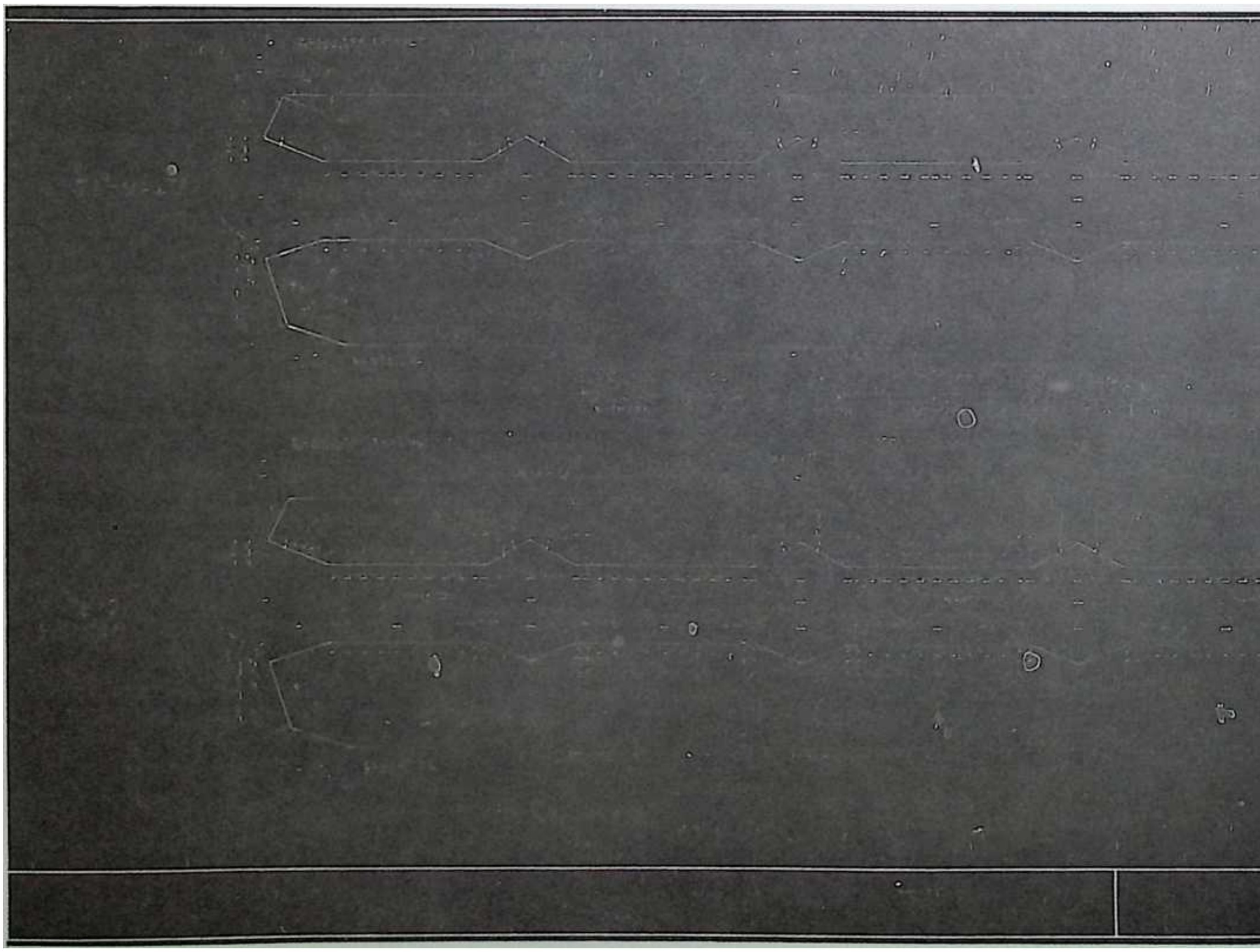

VOID
ASSEMBLY FRONT VIEW

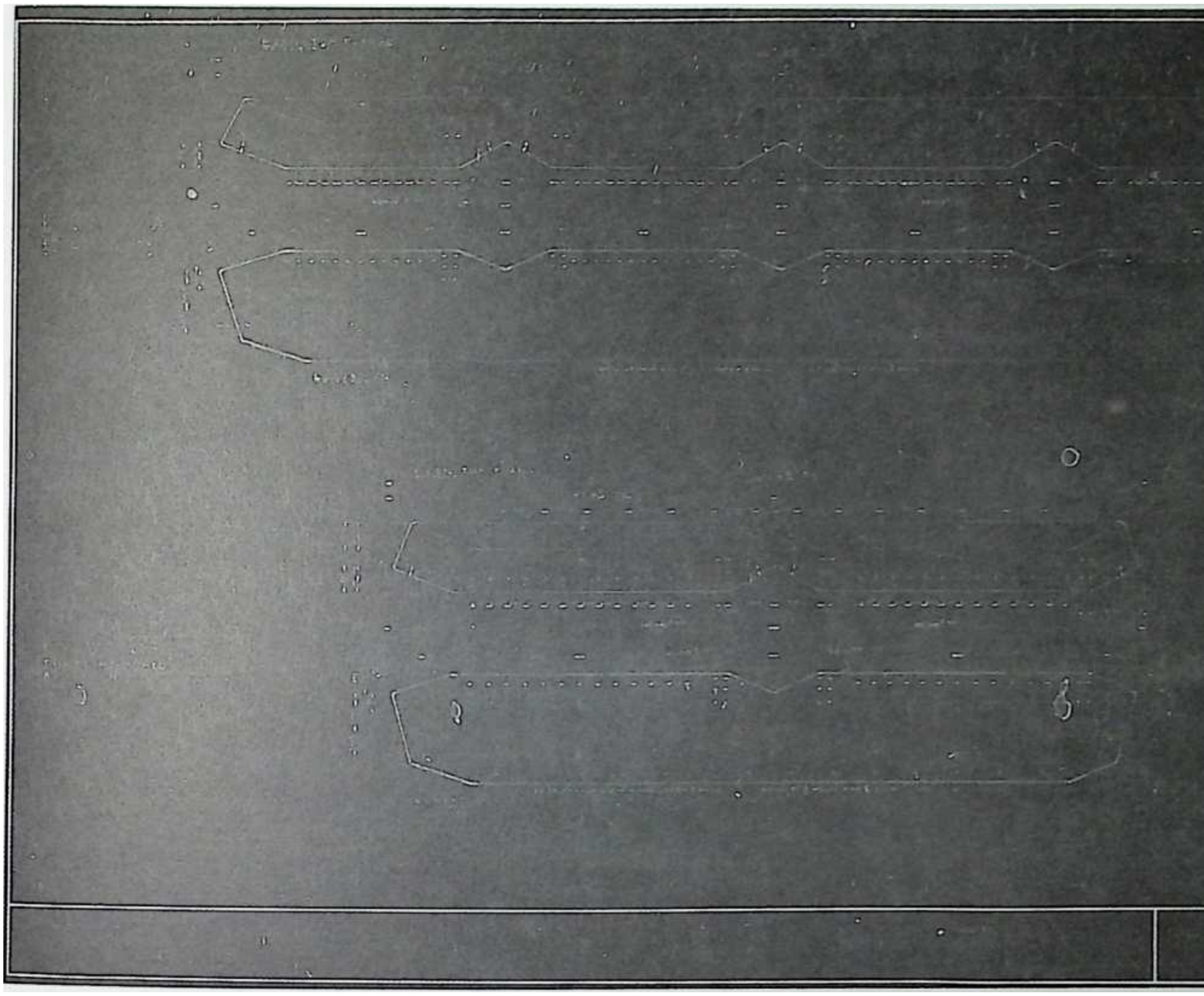


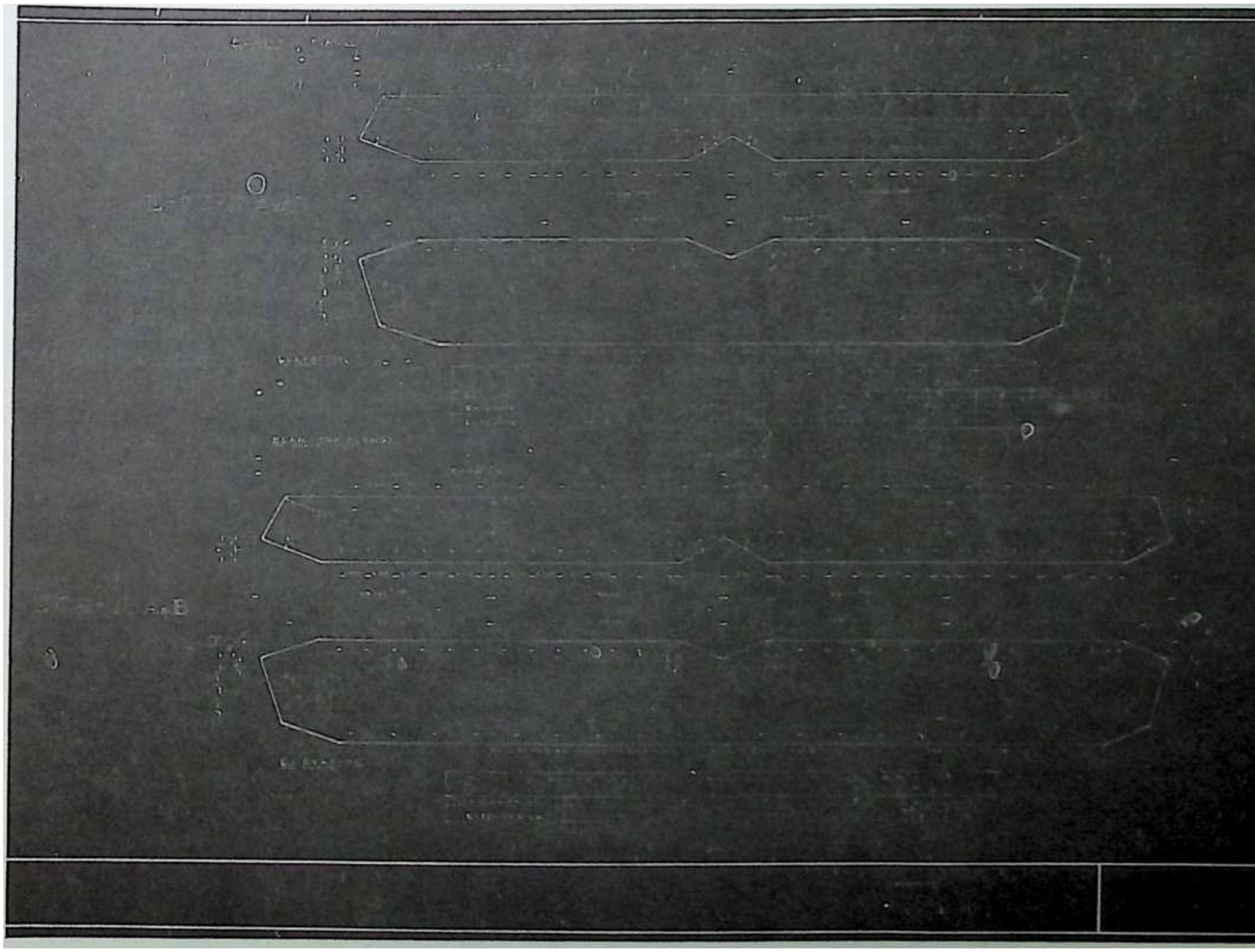
A, D
PLAN
ELEVATION
P-6A-1
P-6A-2

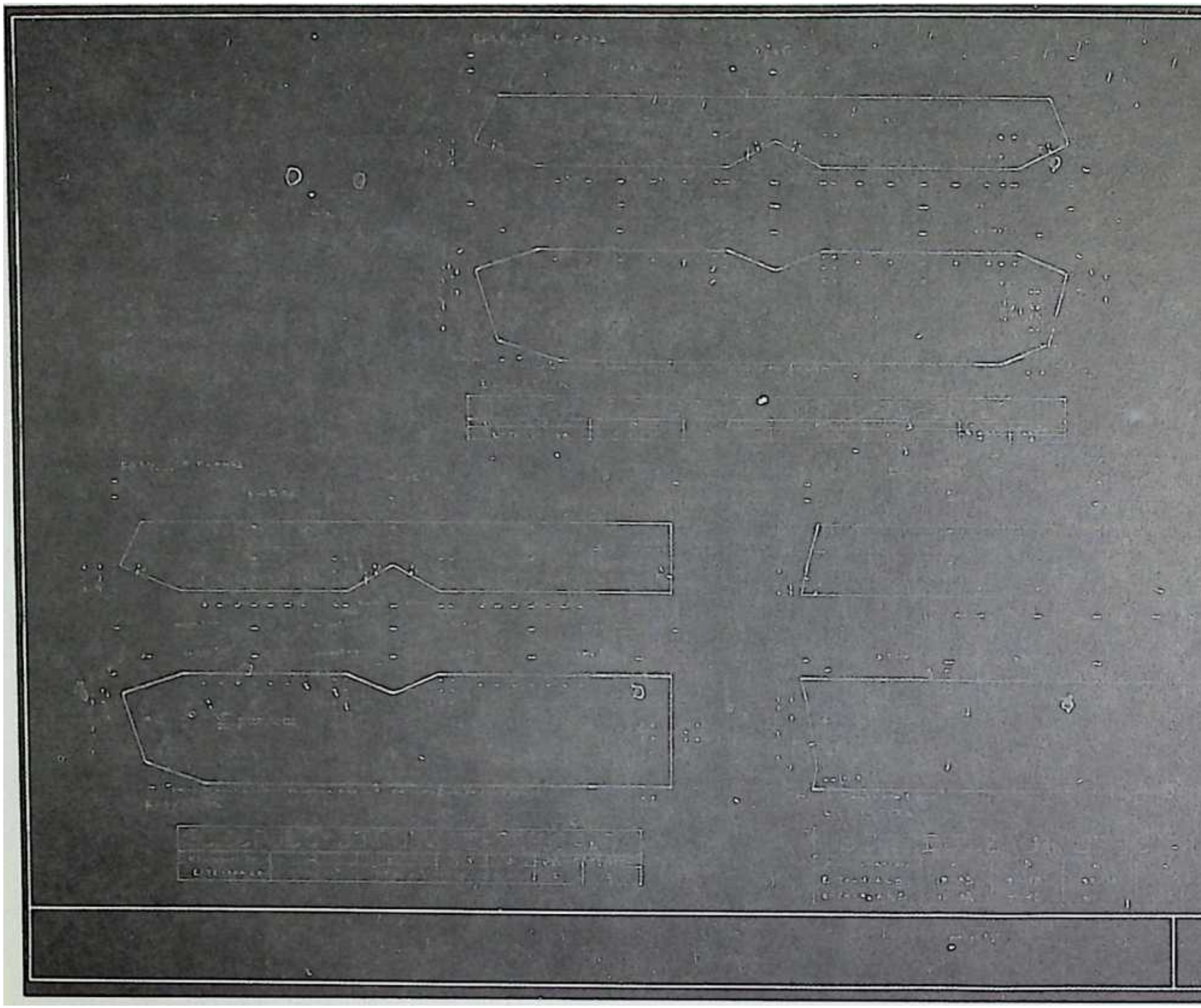

P-6B-9
PLAN
ELEVATION
P-6B-10
P-6B-13

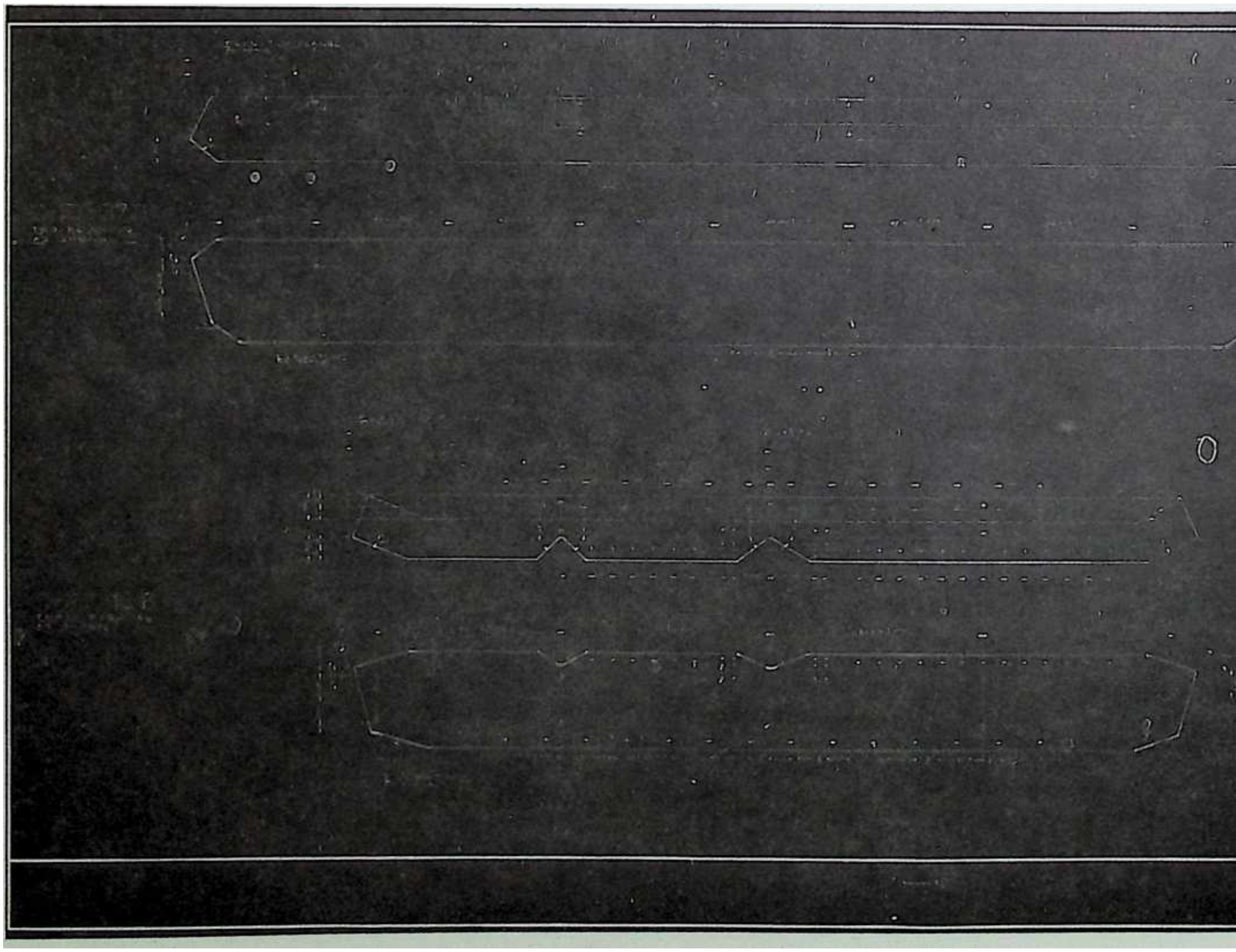


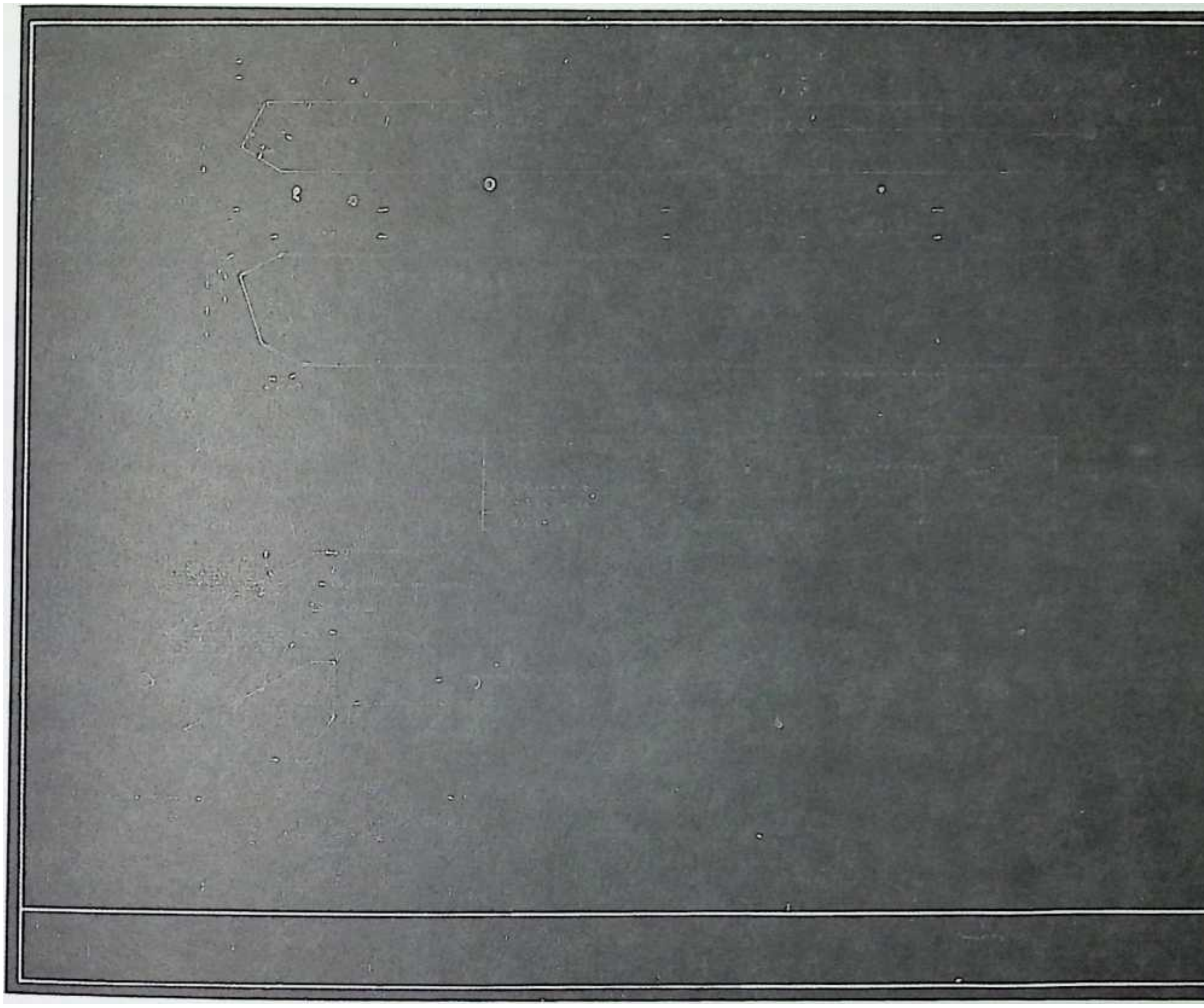


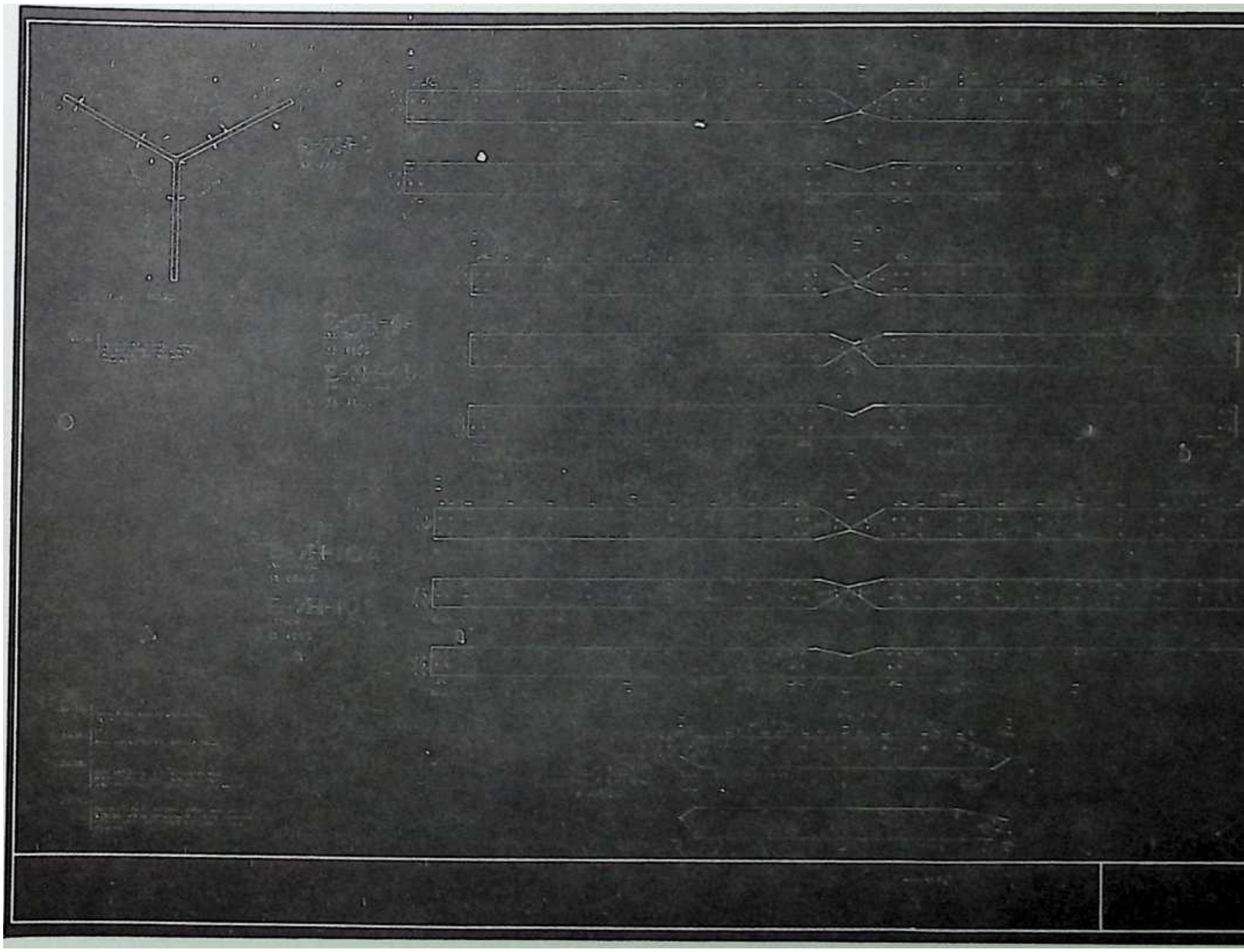


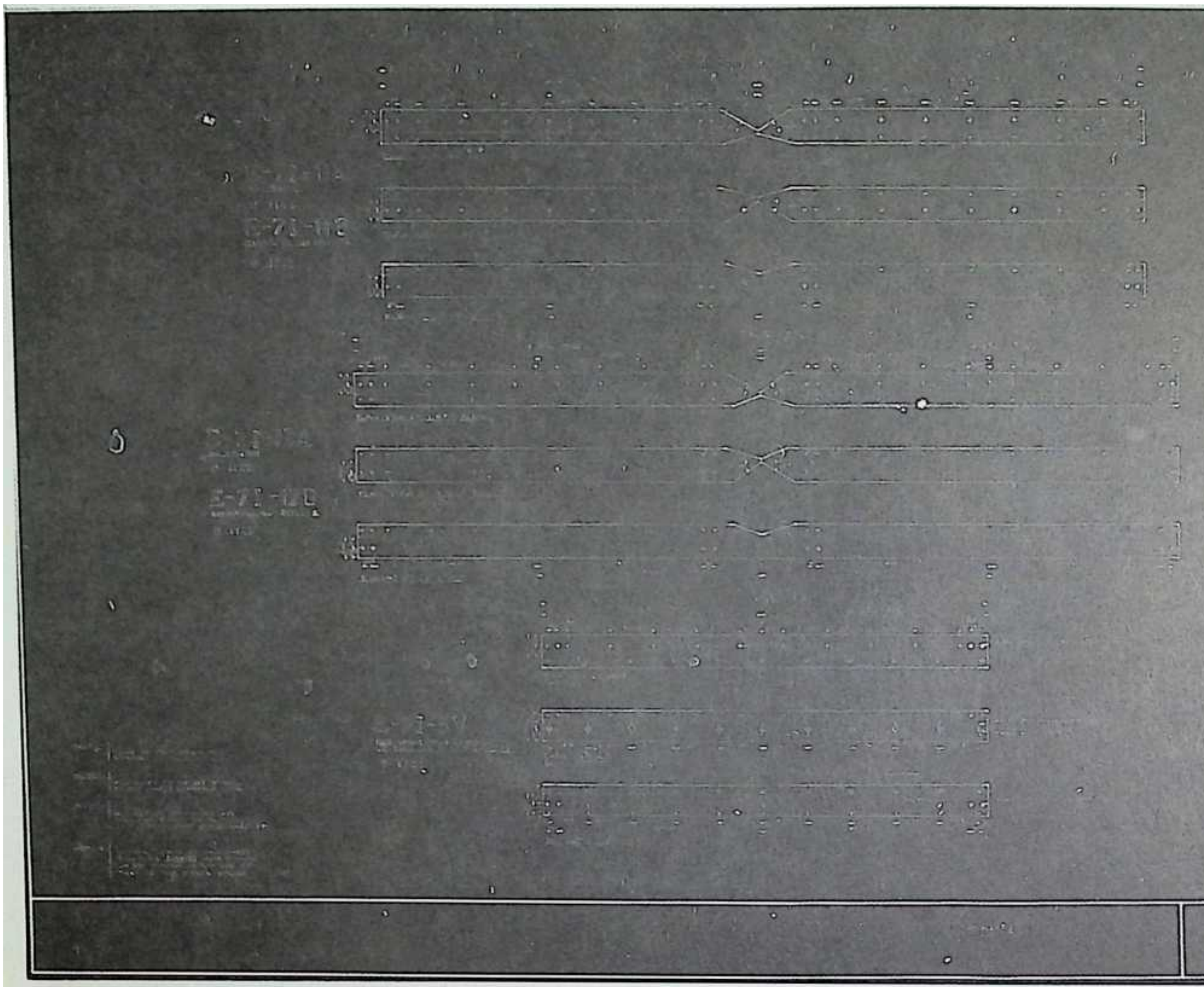


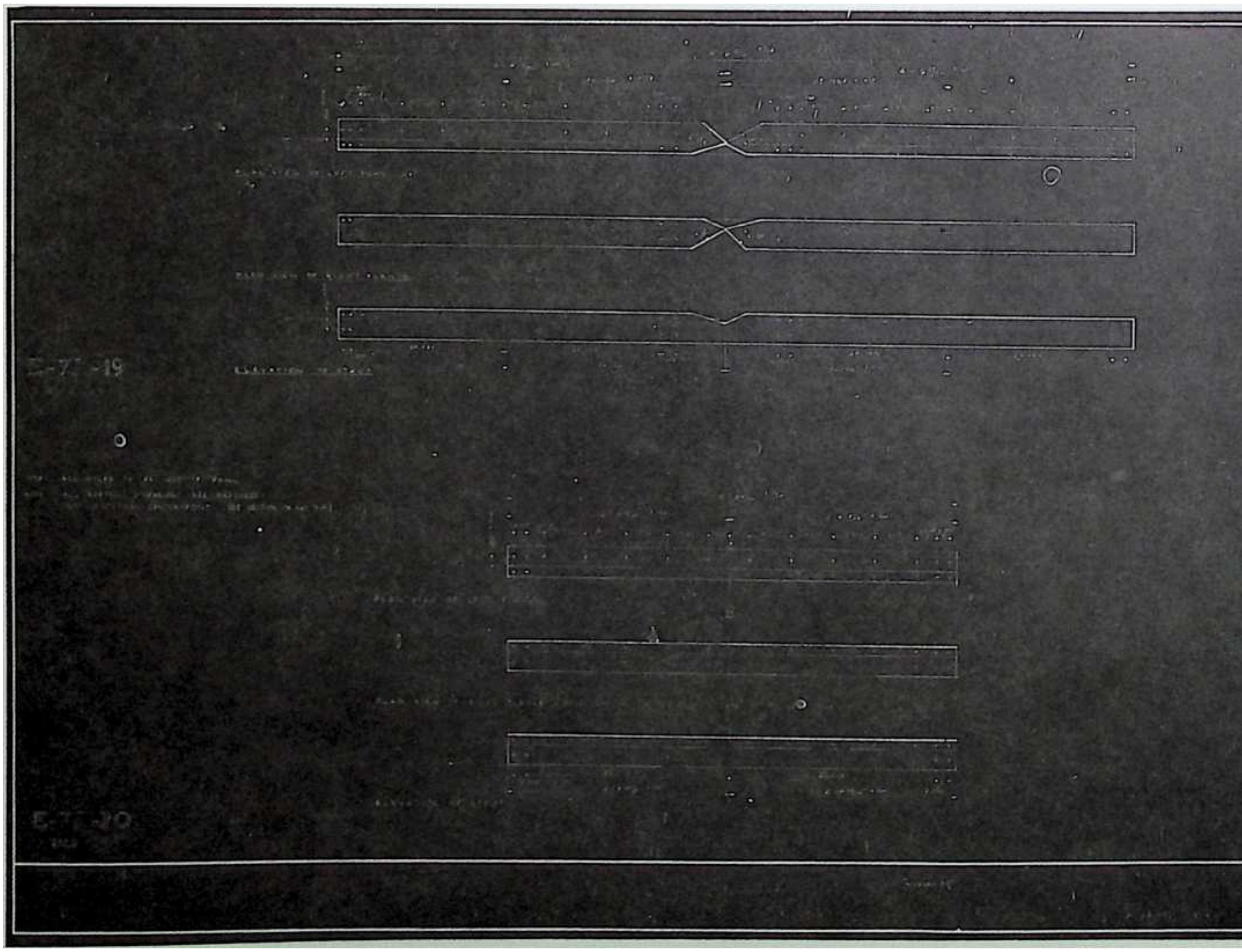




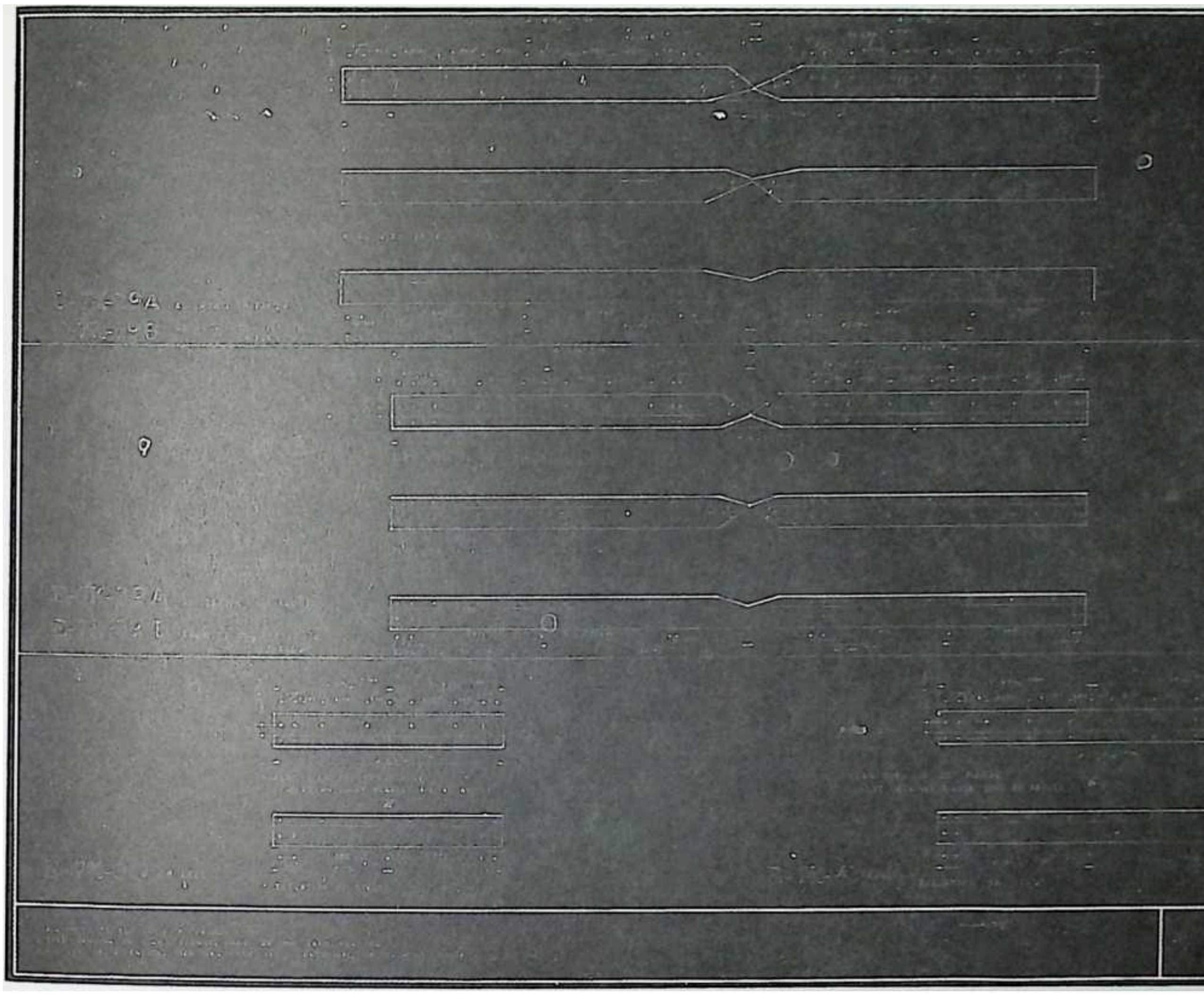


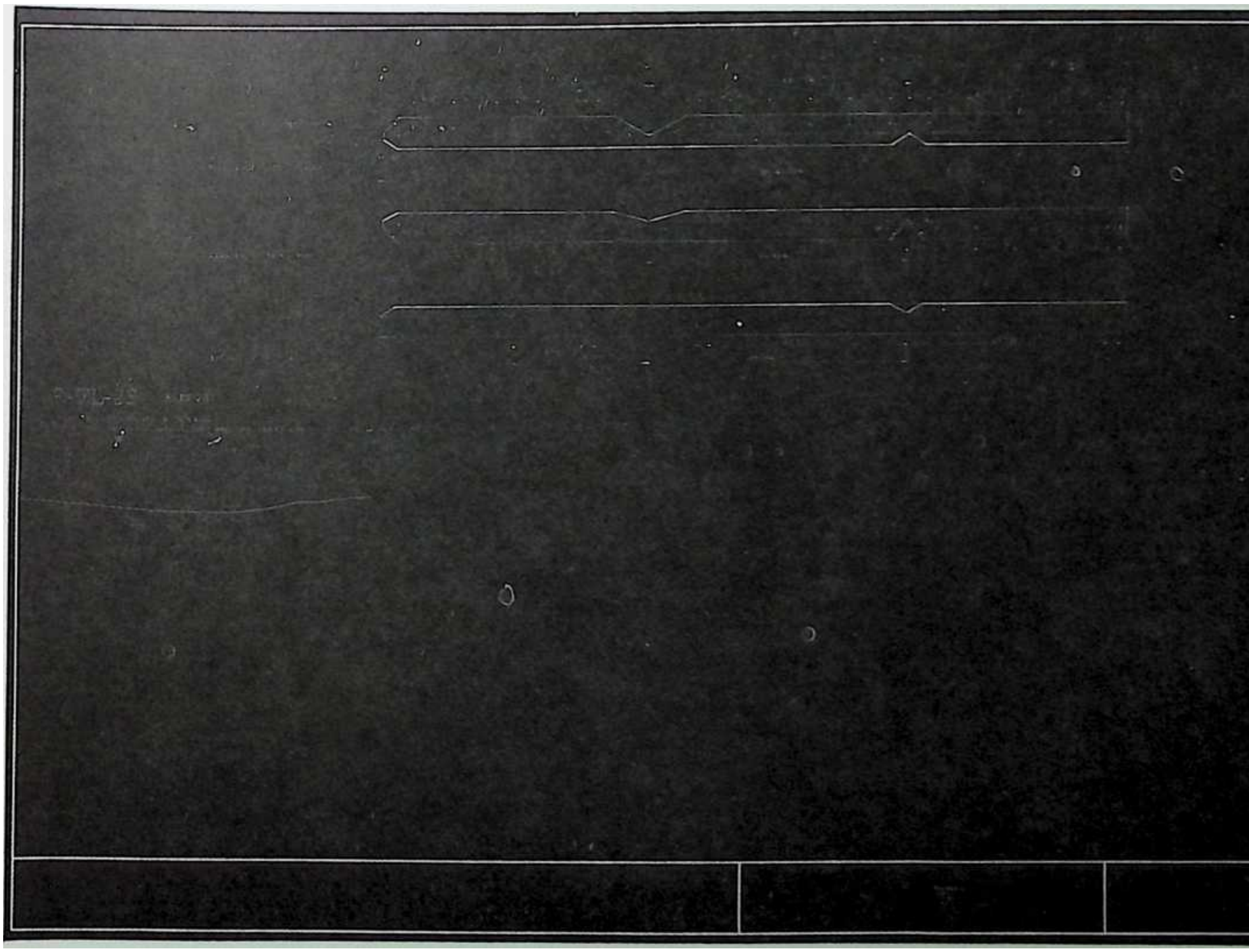






E-77-19
E-77-20





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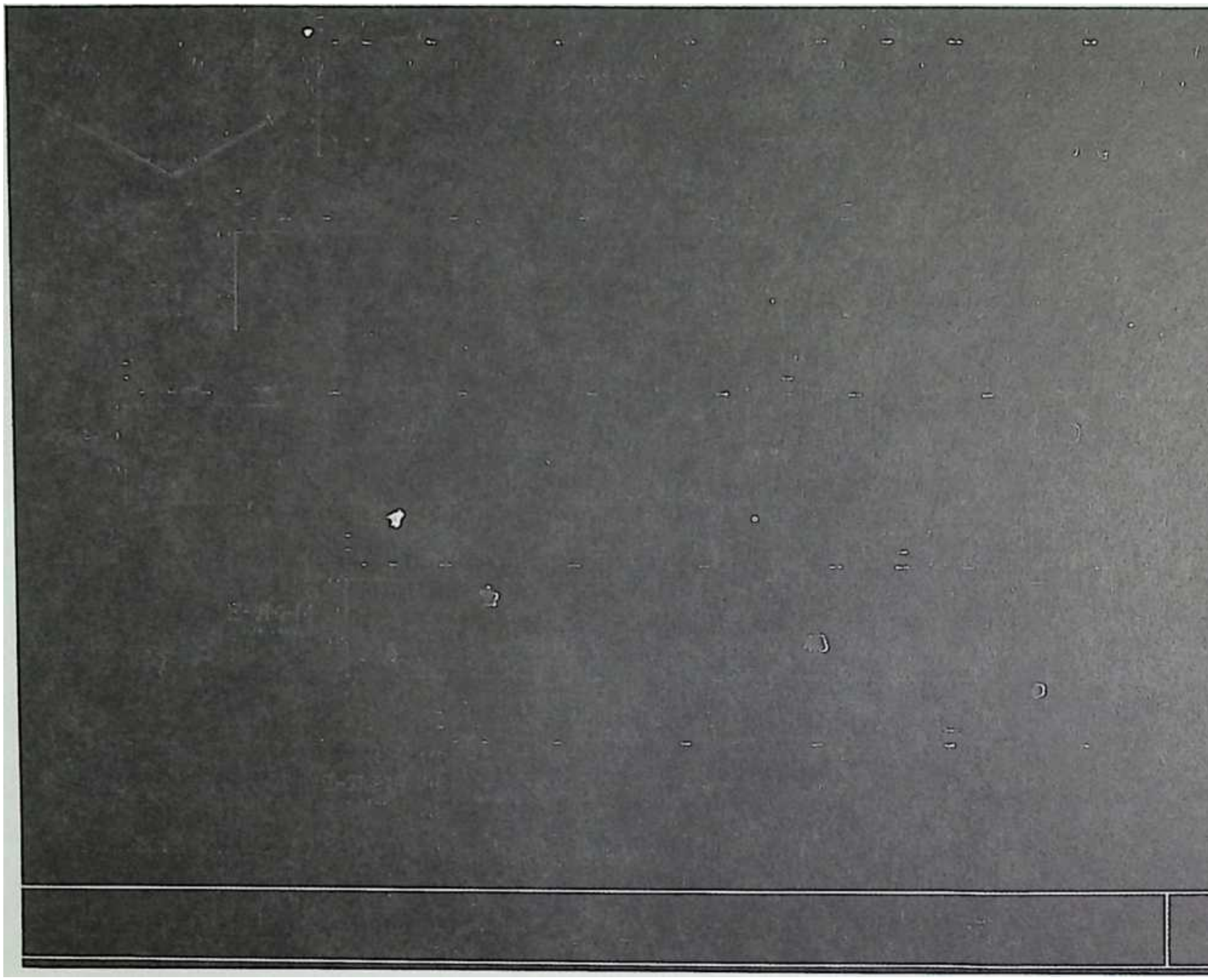
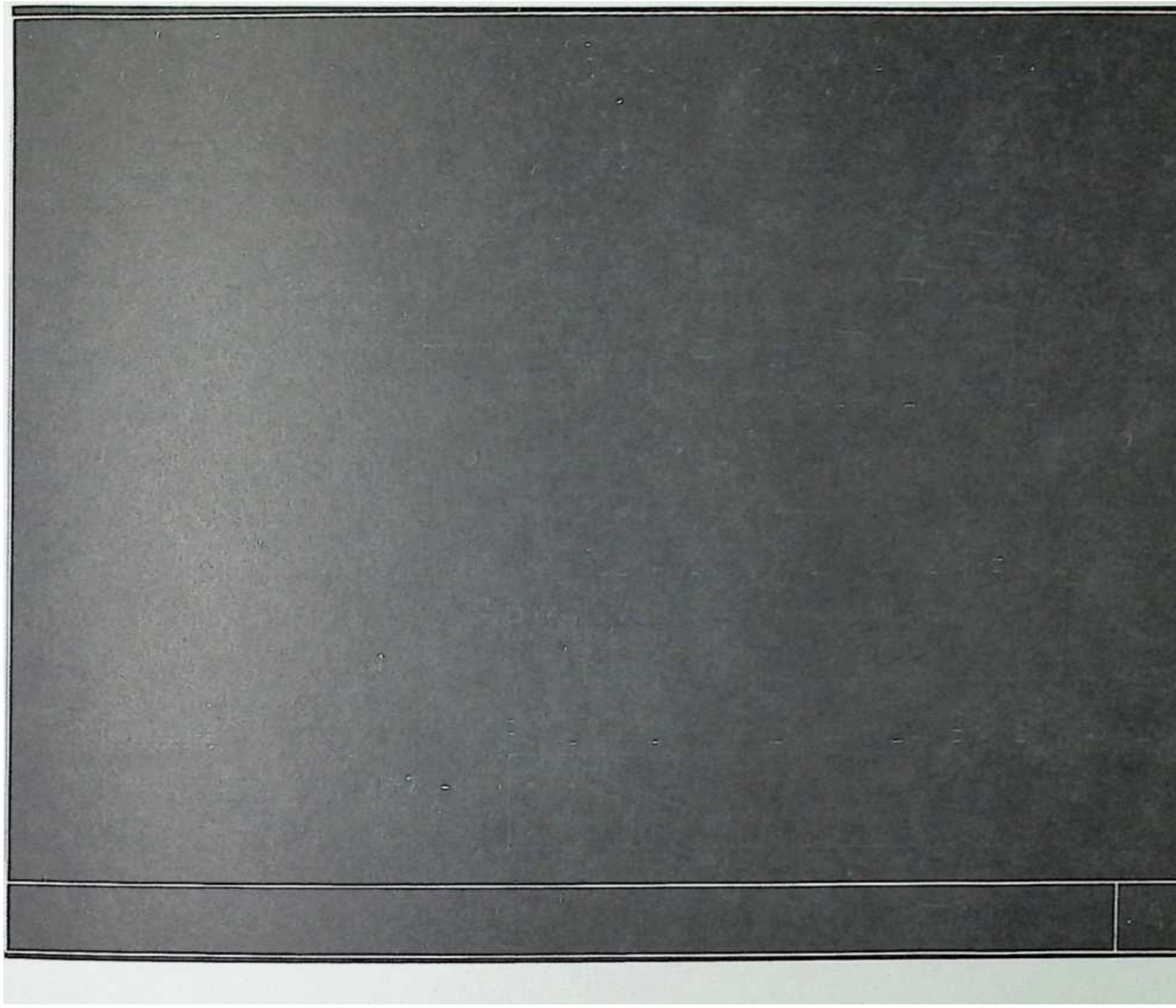
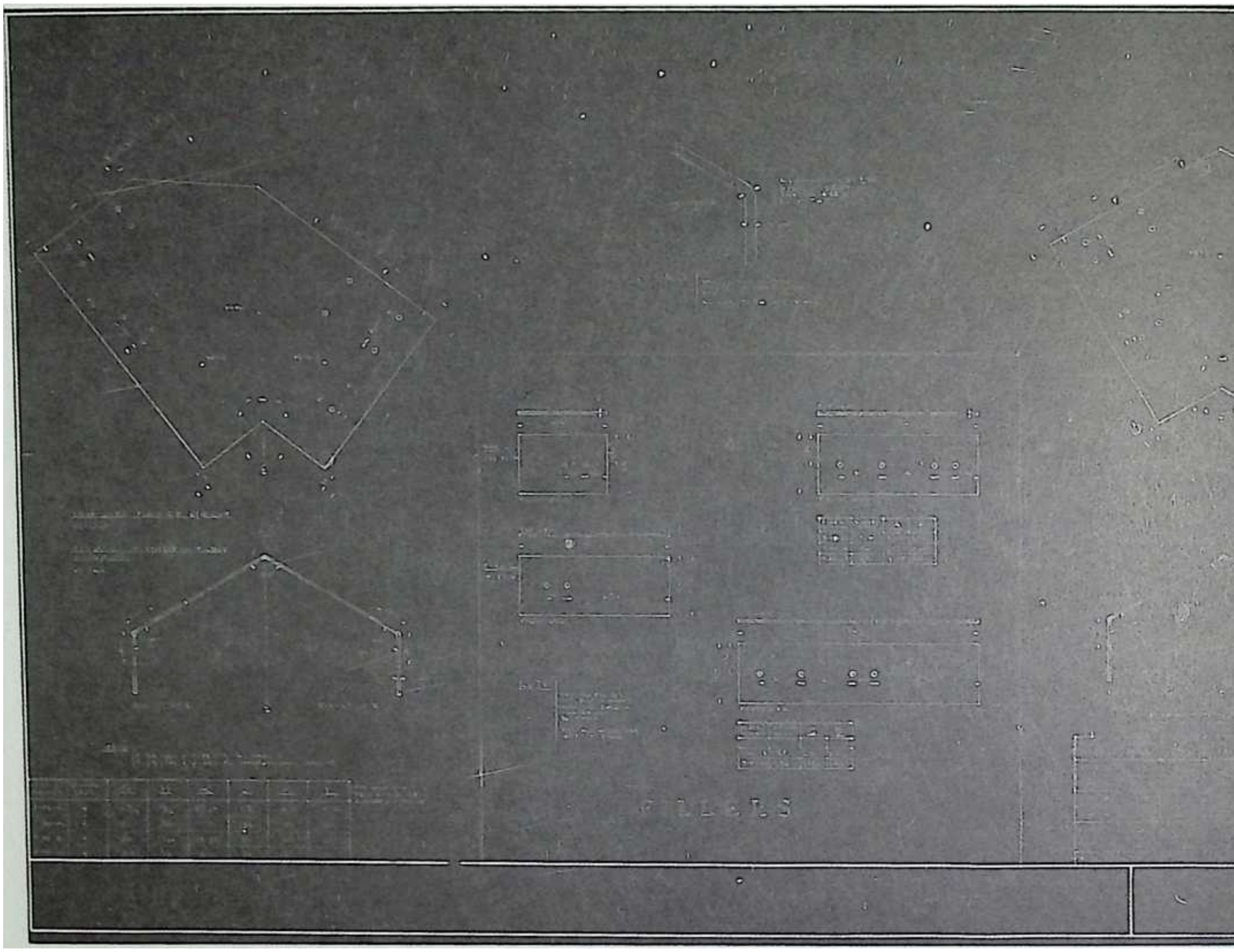
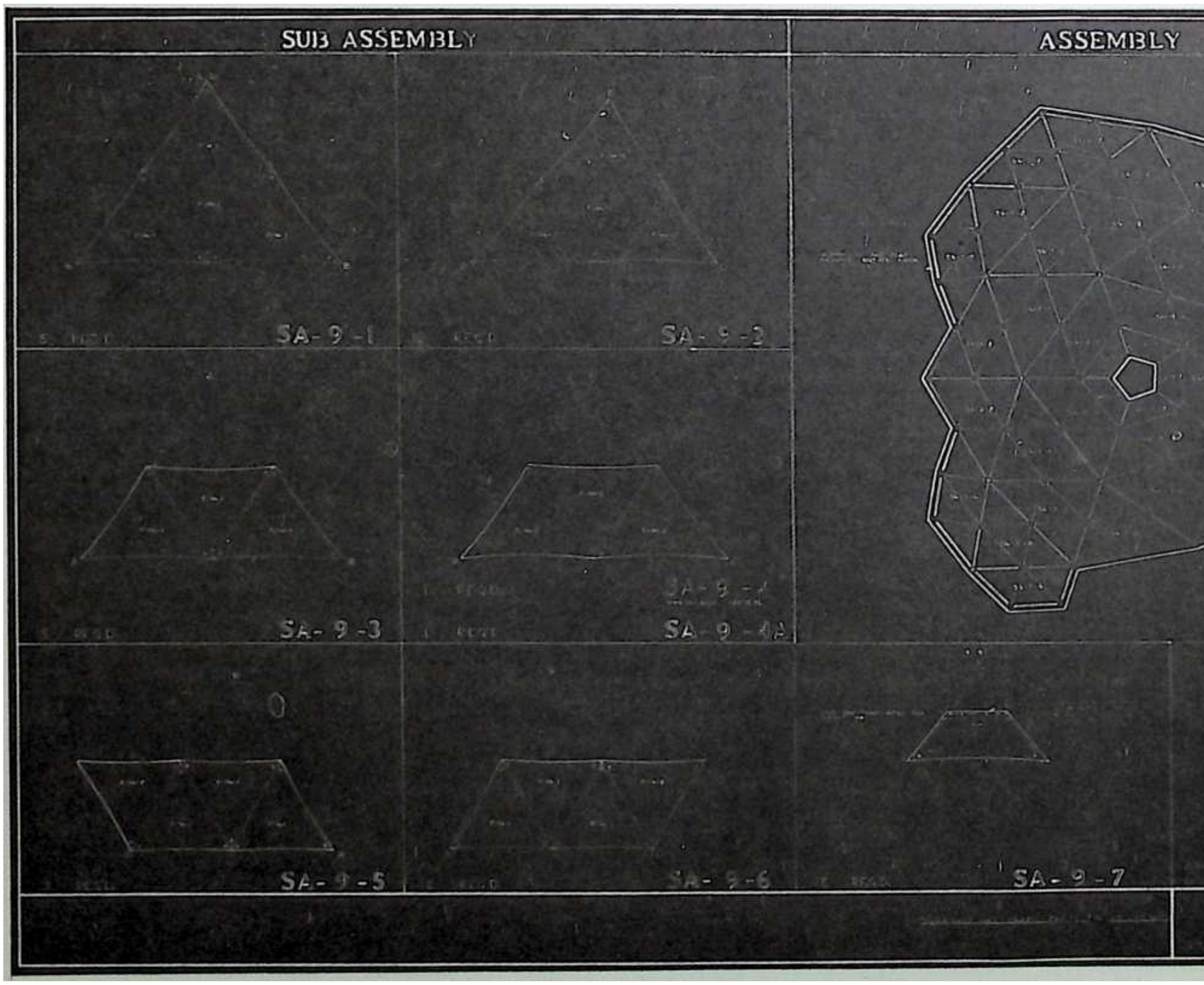


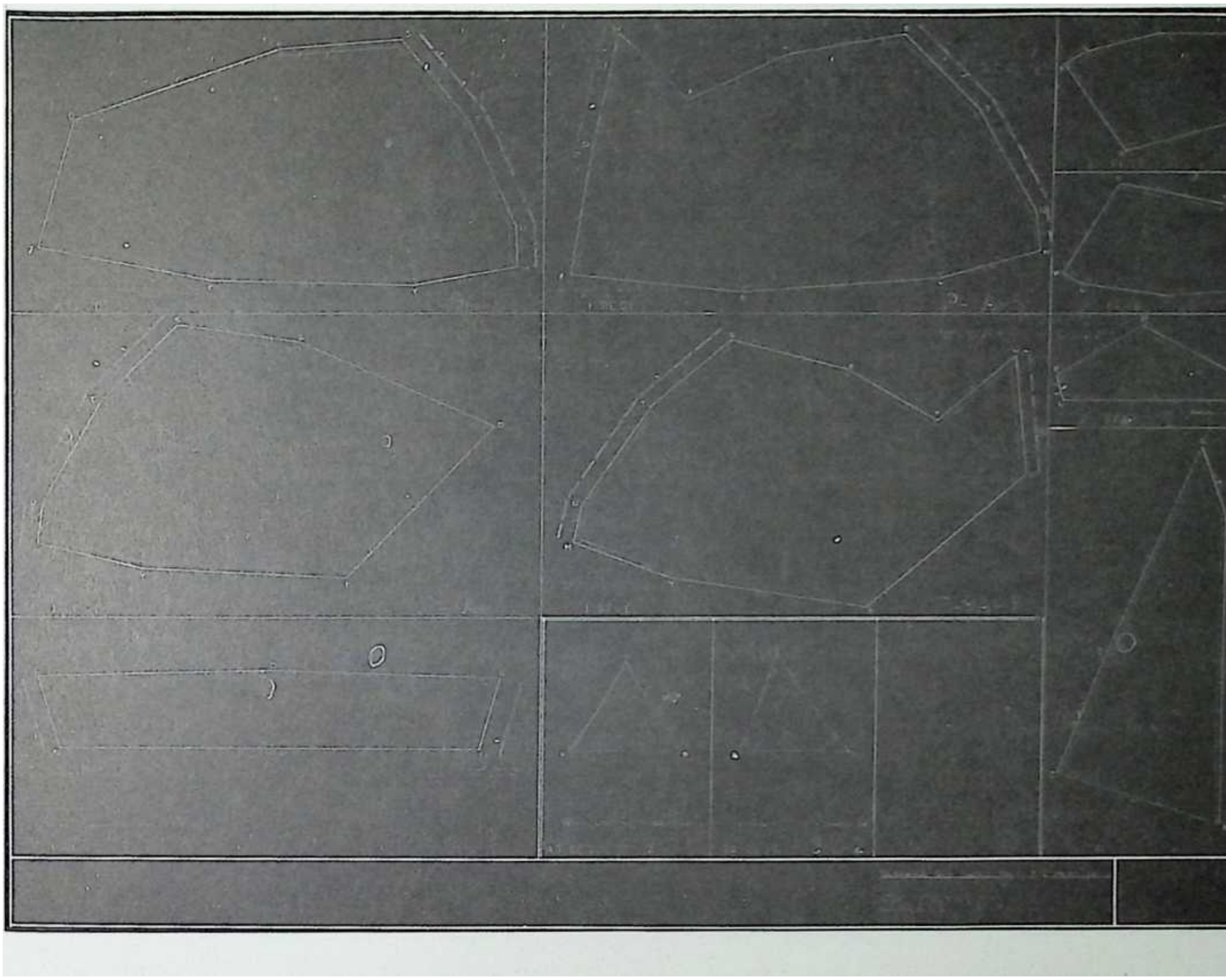
THE GEODESIC REVOLUTION. P/\RT 1 263

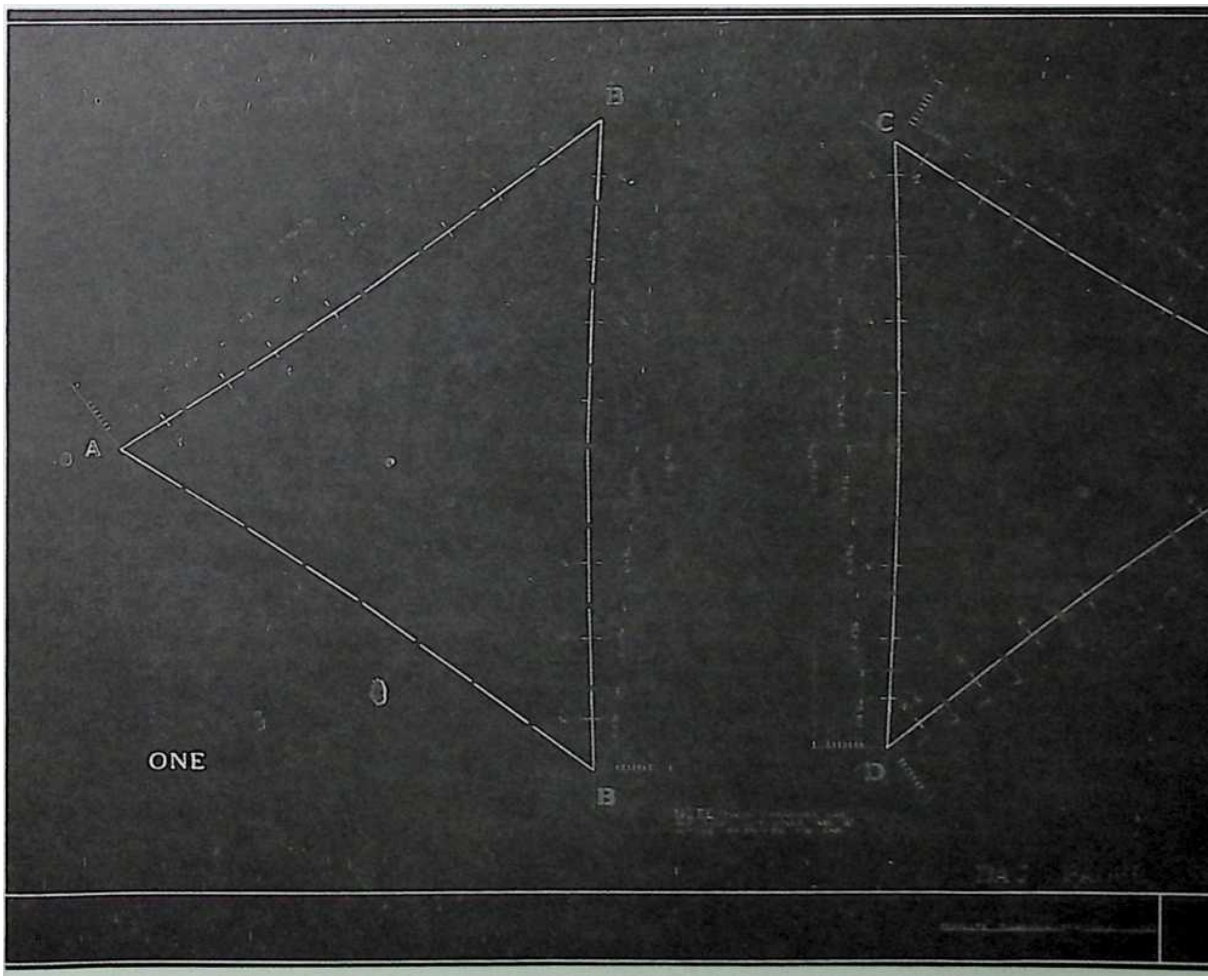






SUB ASSEMBLY
ASSEMBLY
SA-9-1
SA-9-2
SA-9-3
SA-9-4A
SA-9-5
SA-9-6
SA-9-7

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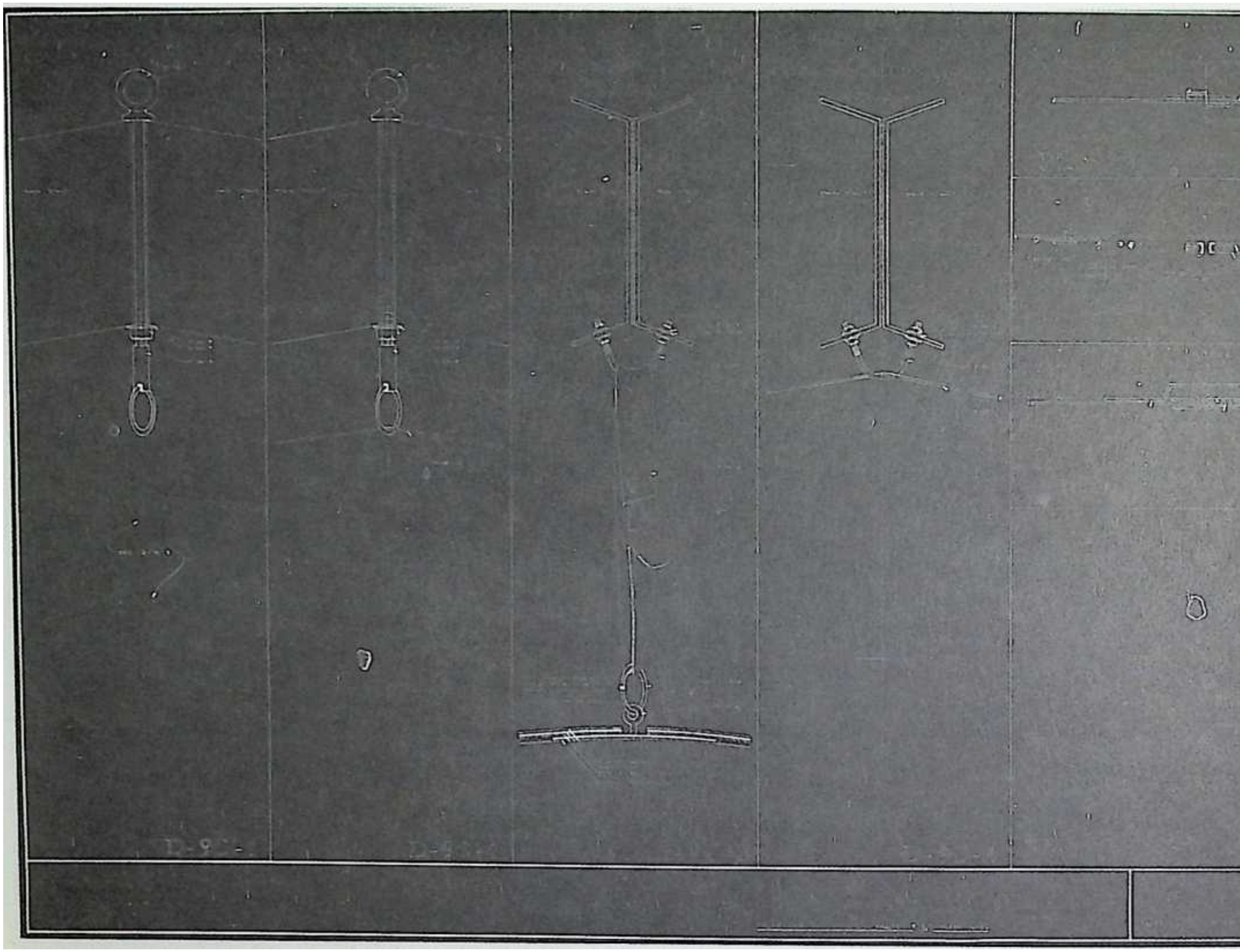

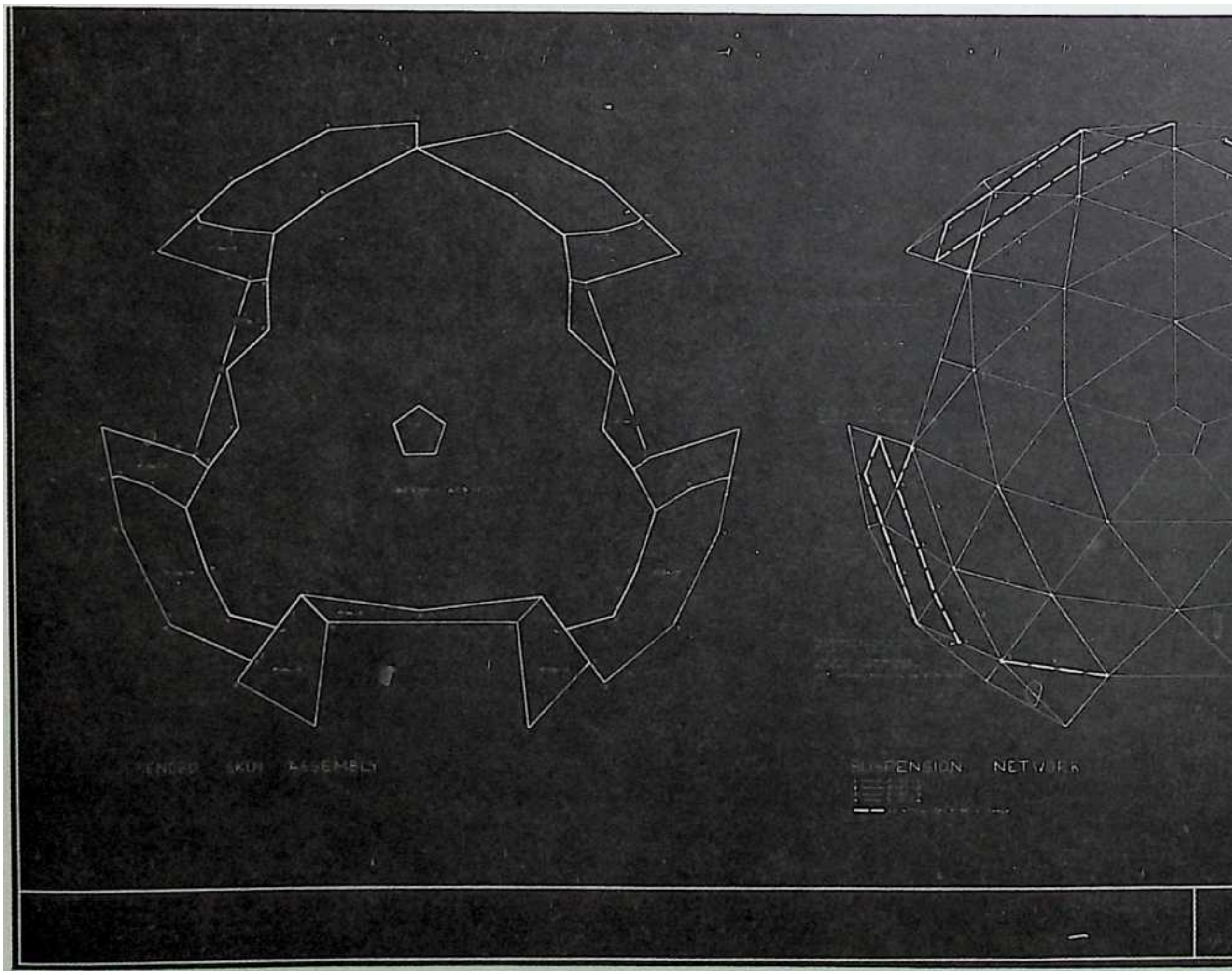

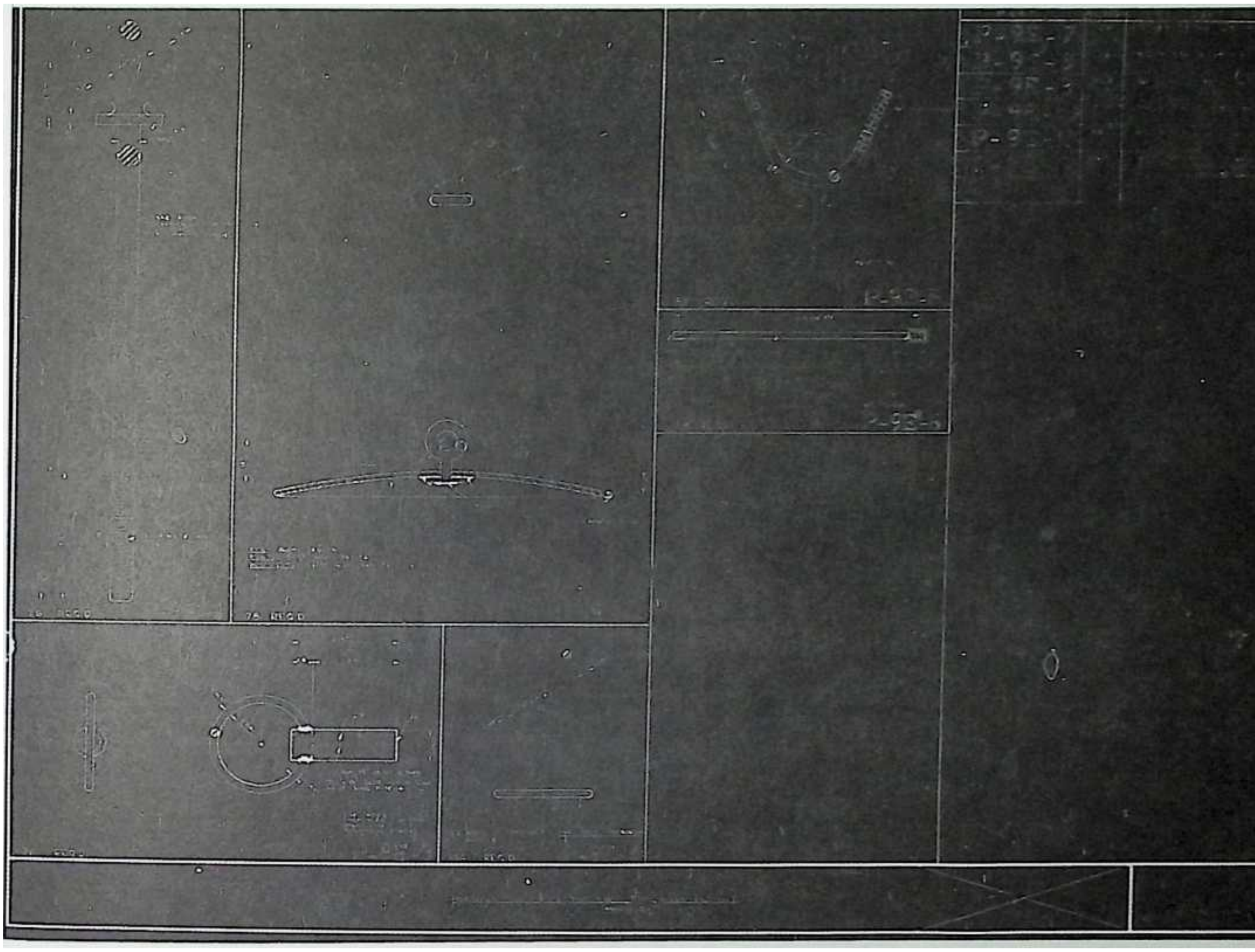

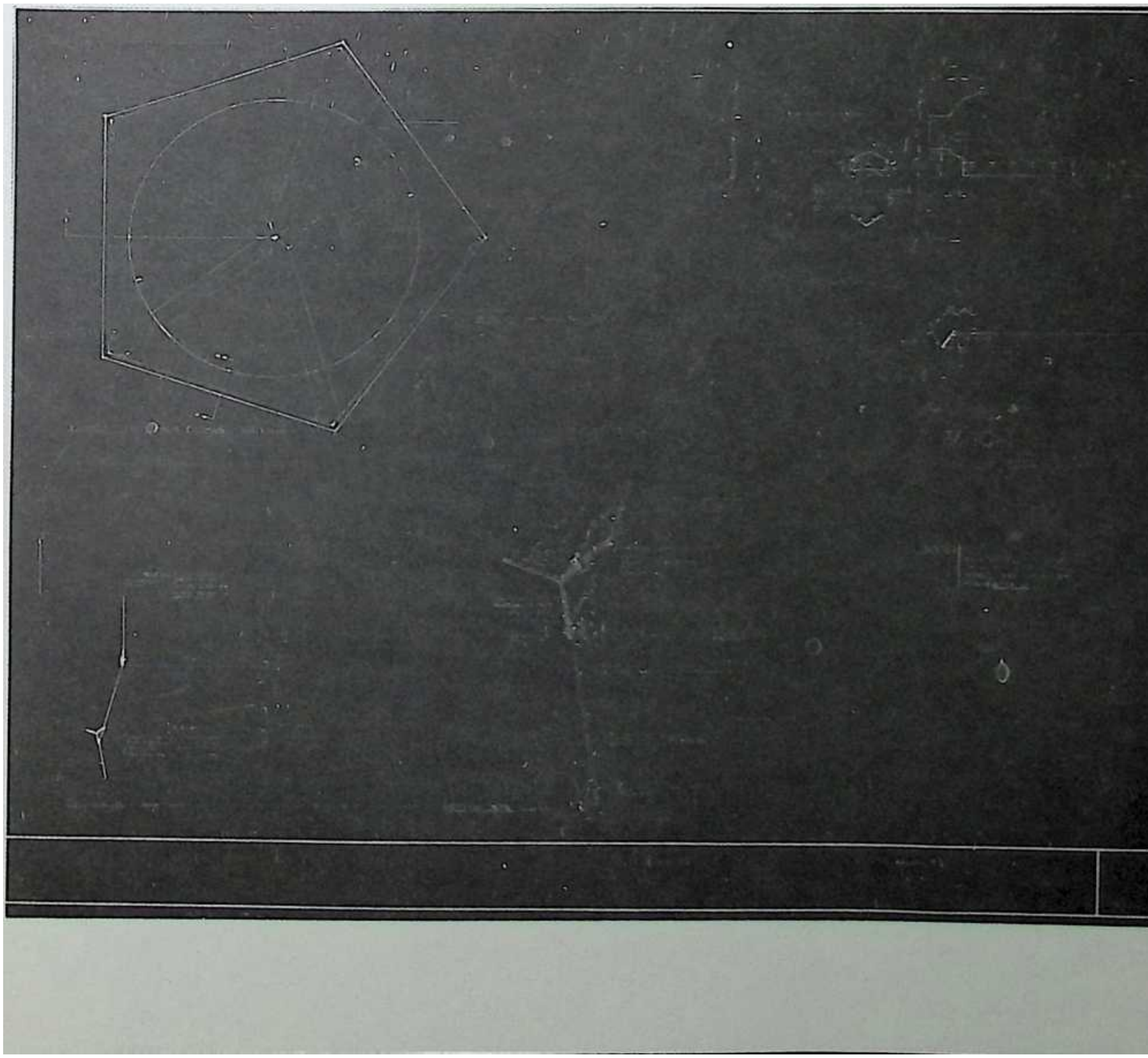

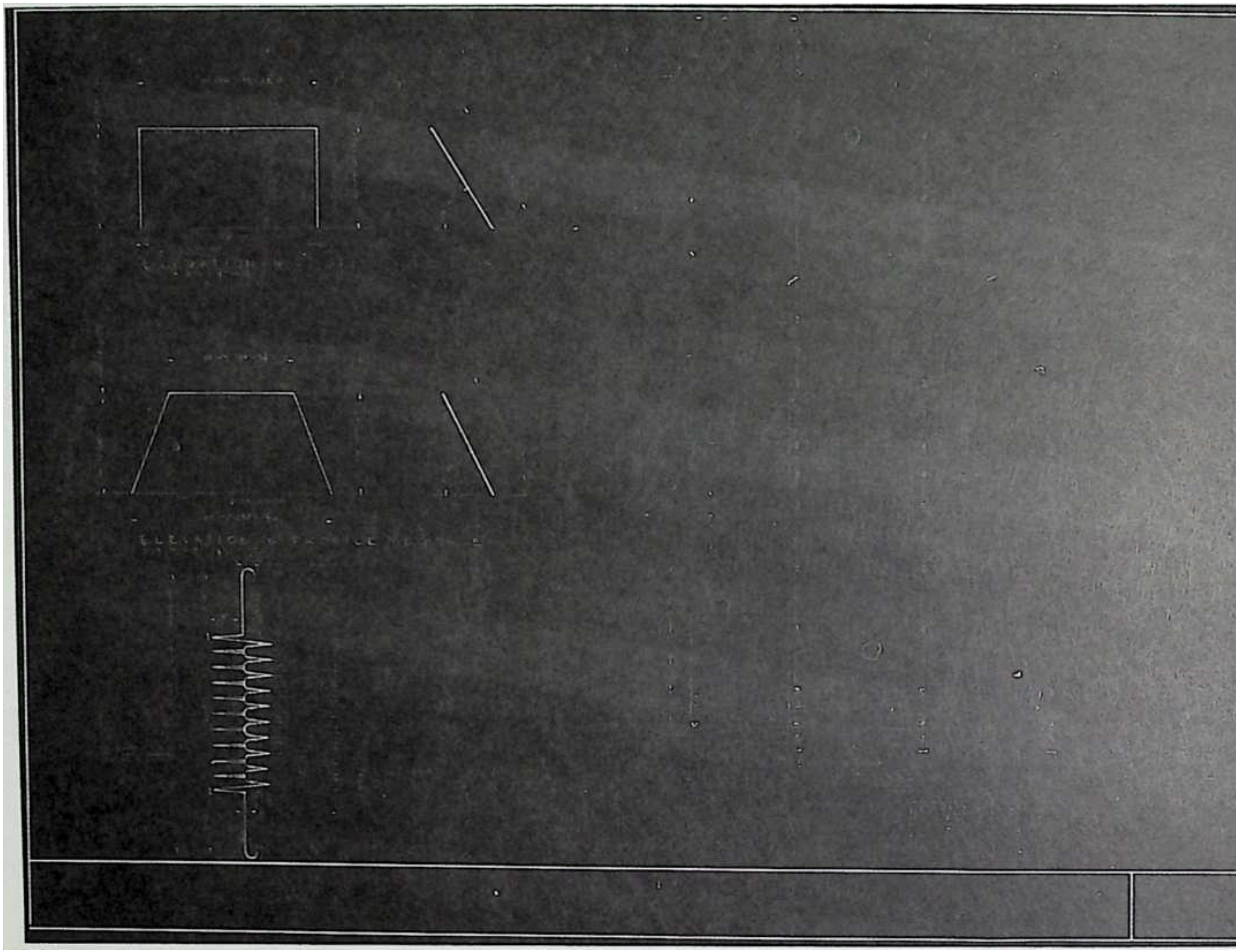

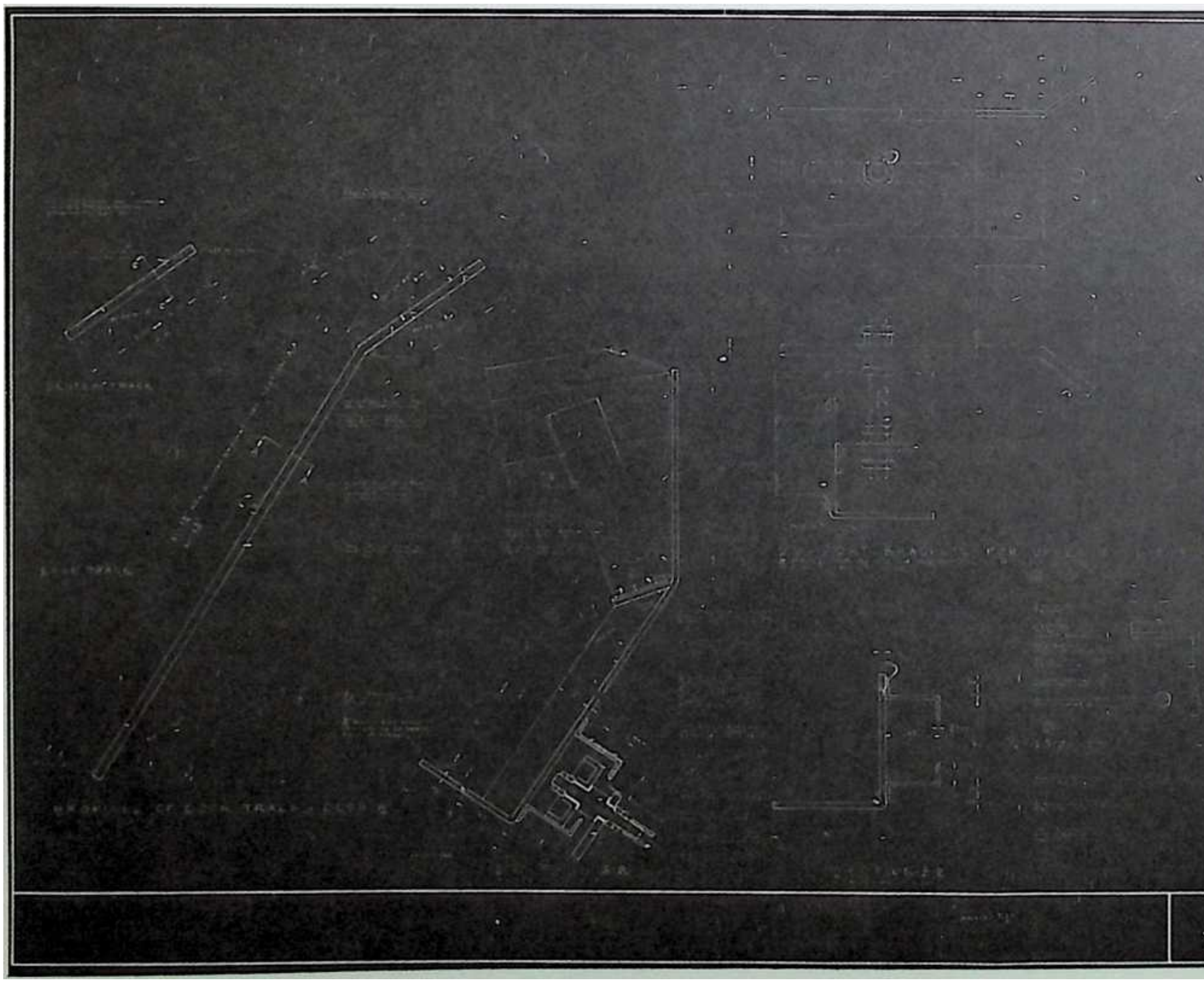

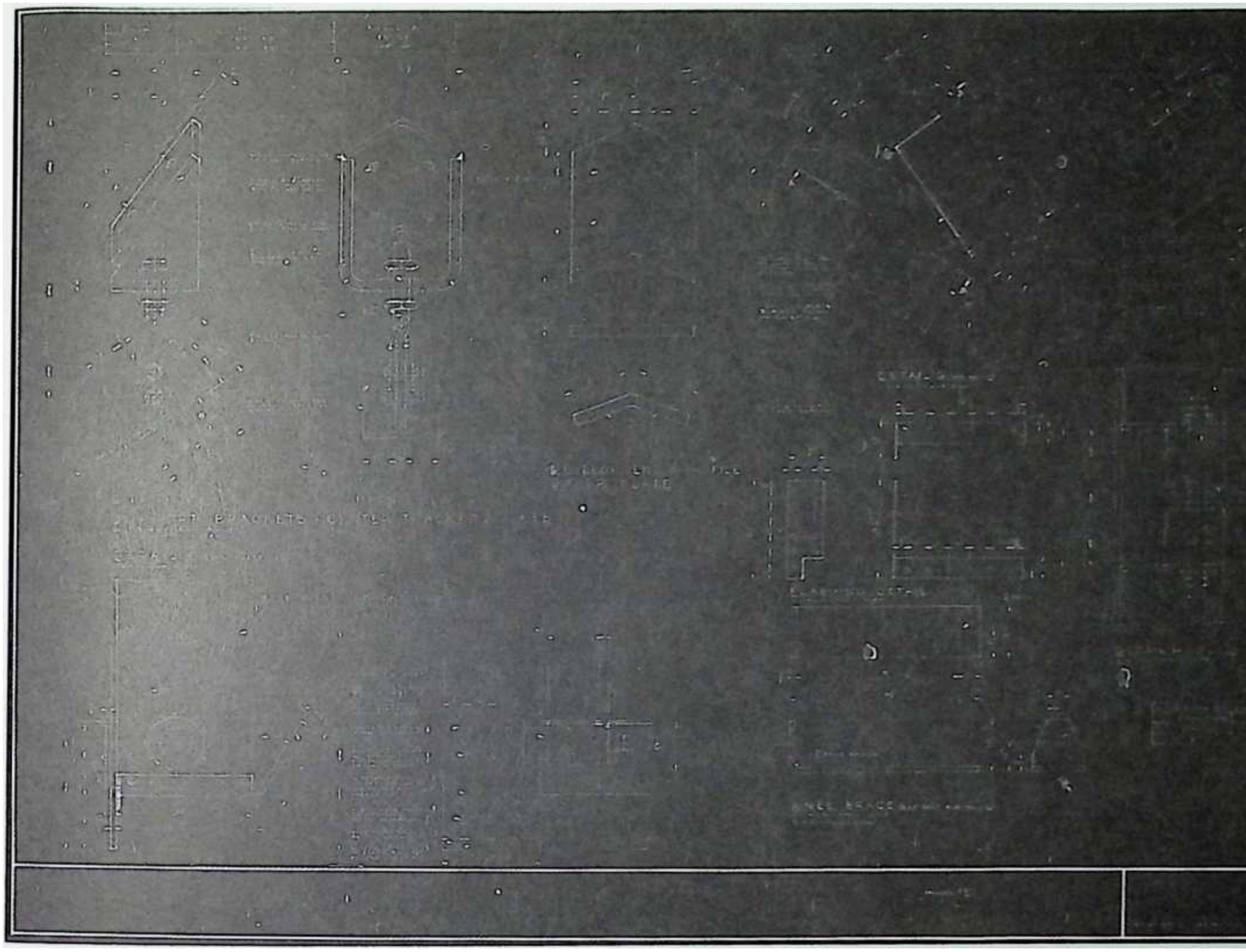

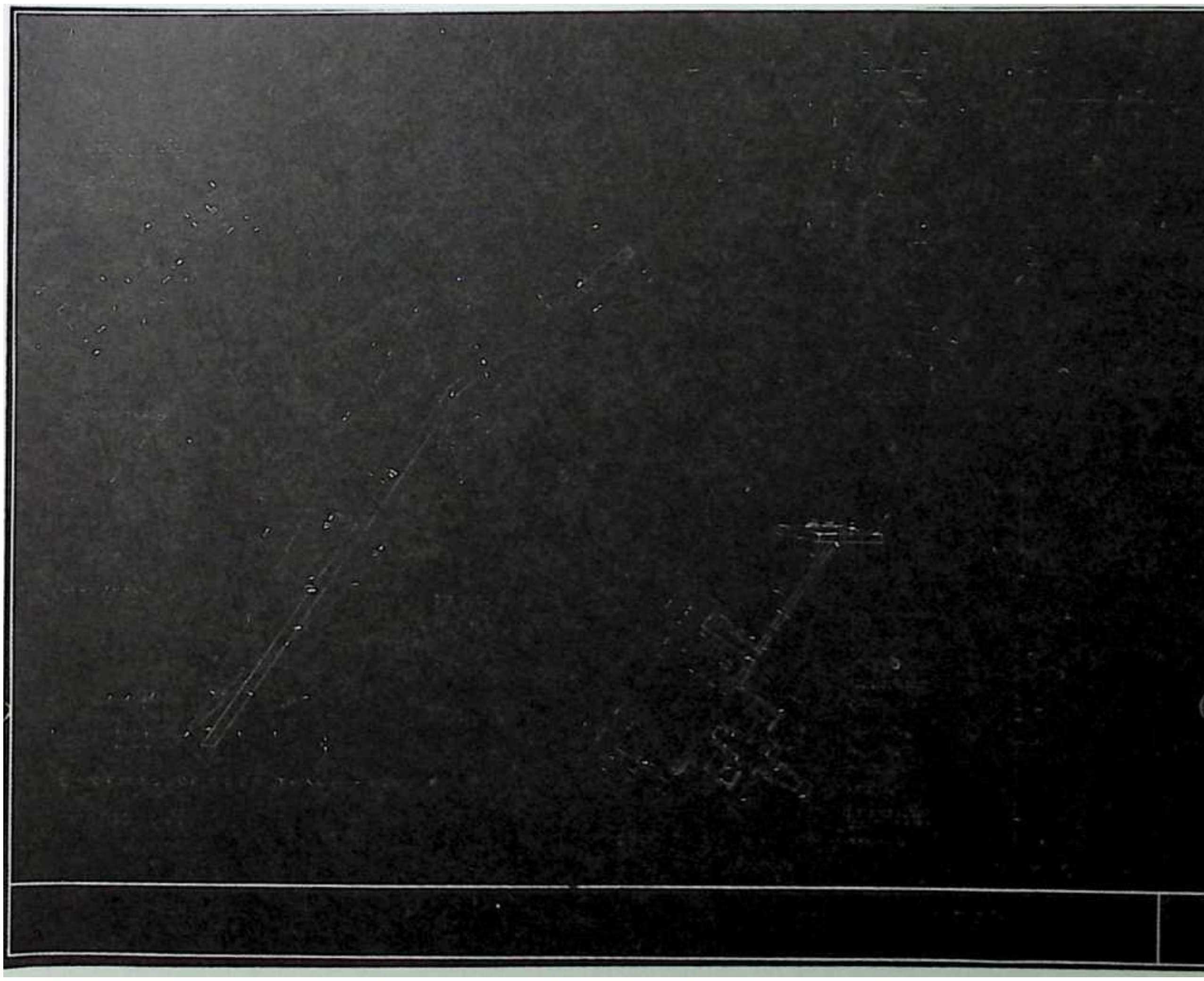

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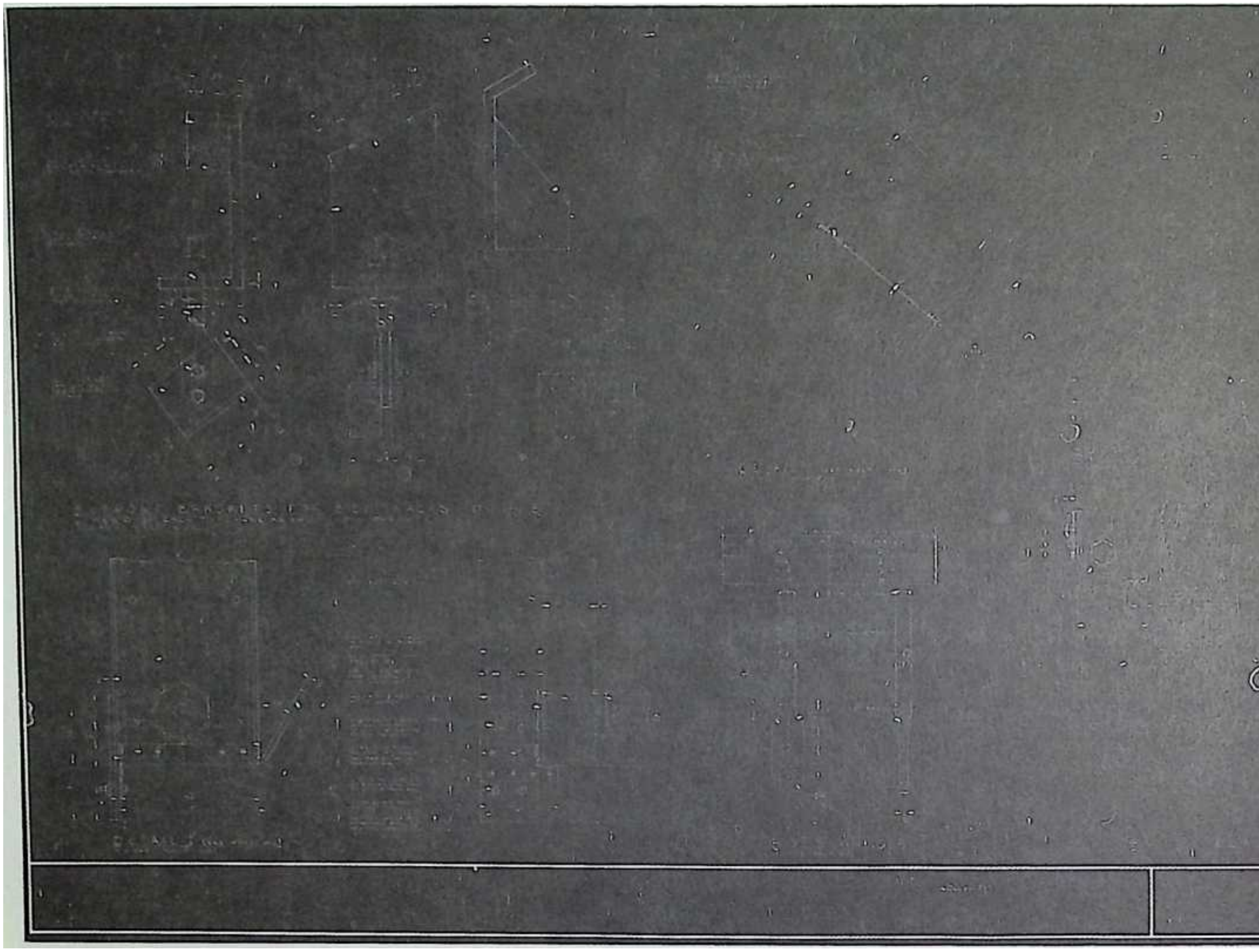

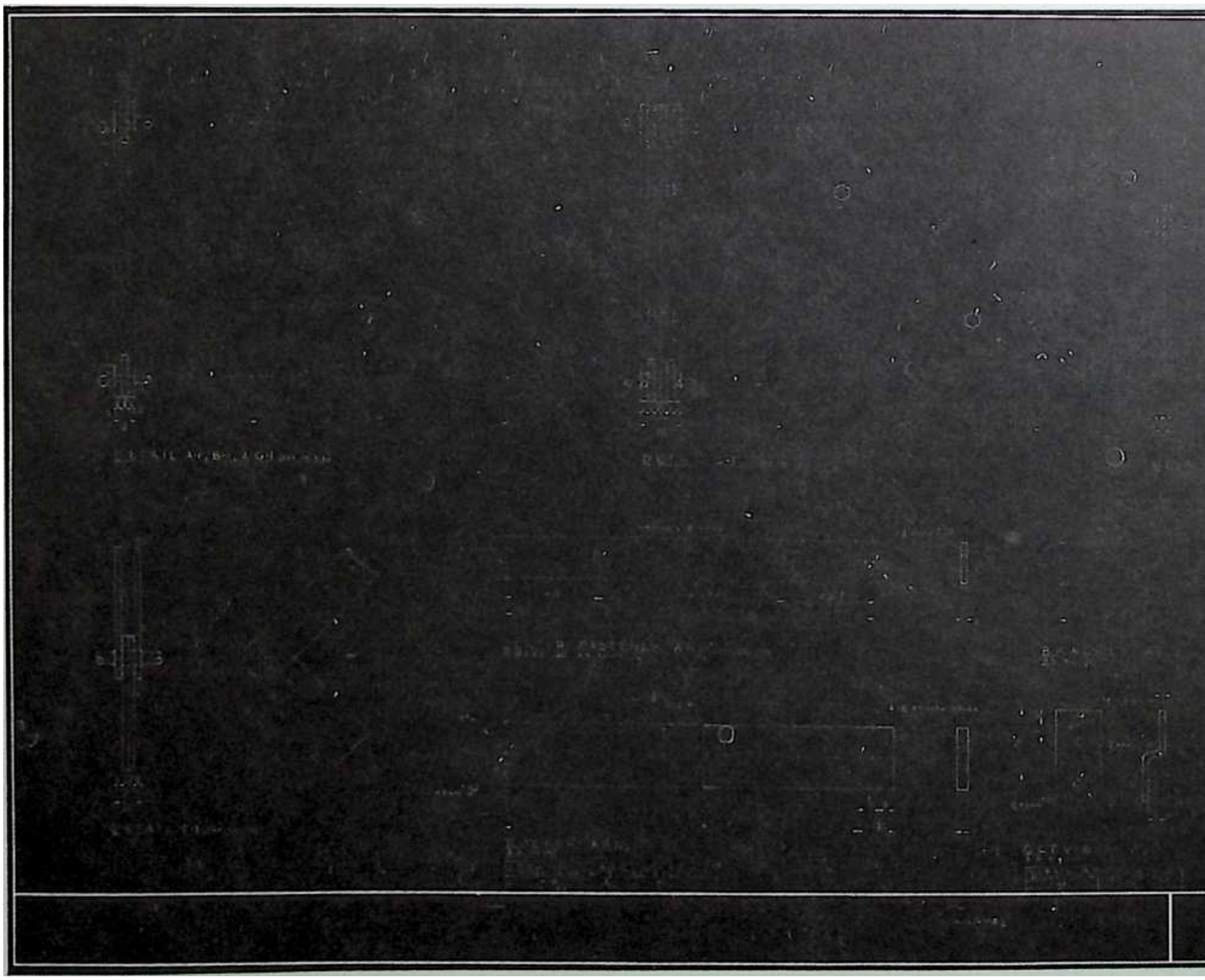

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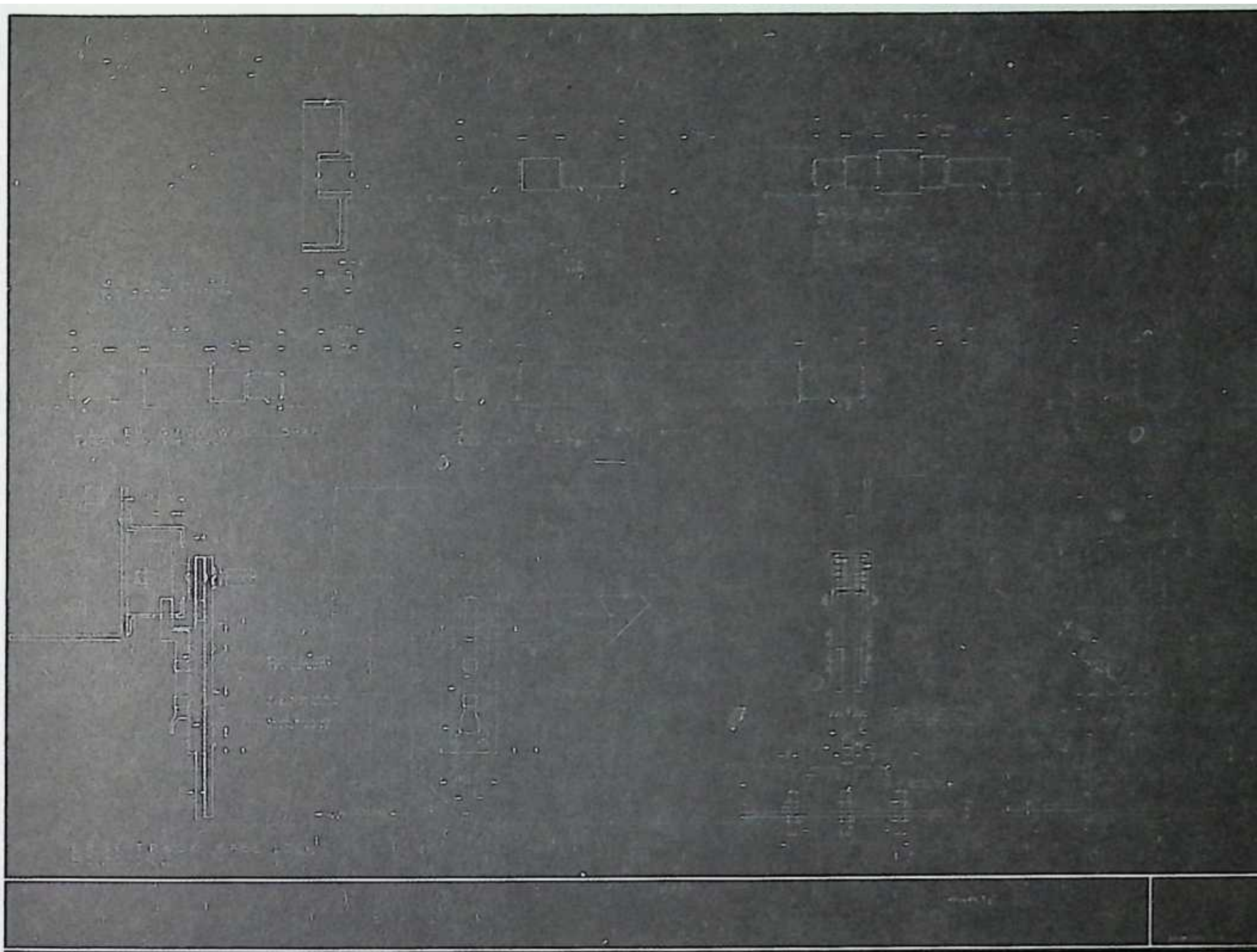
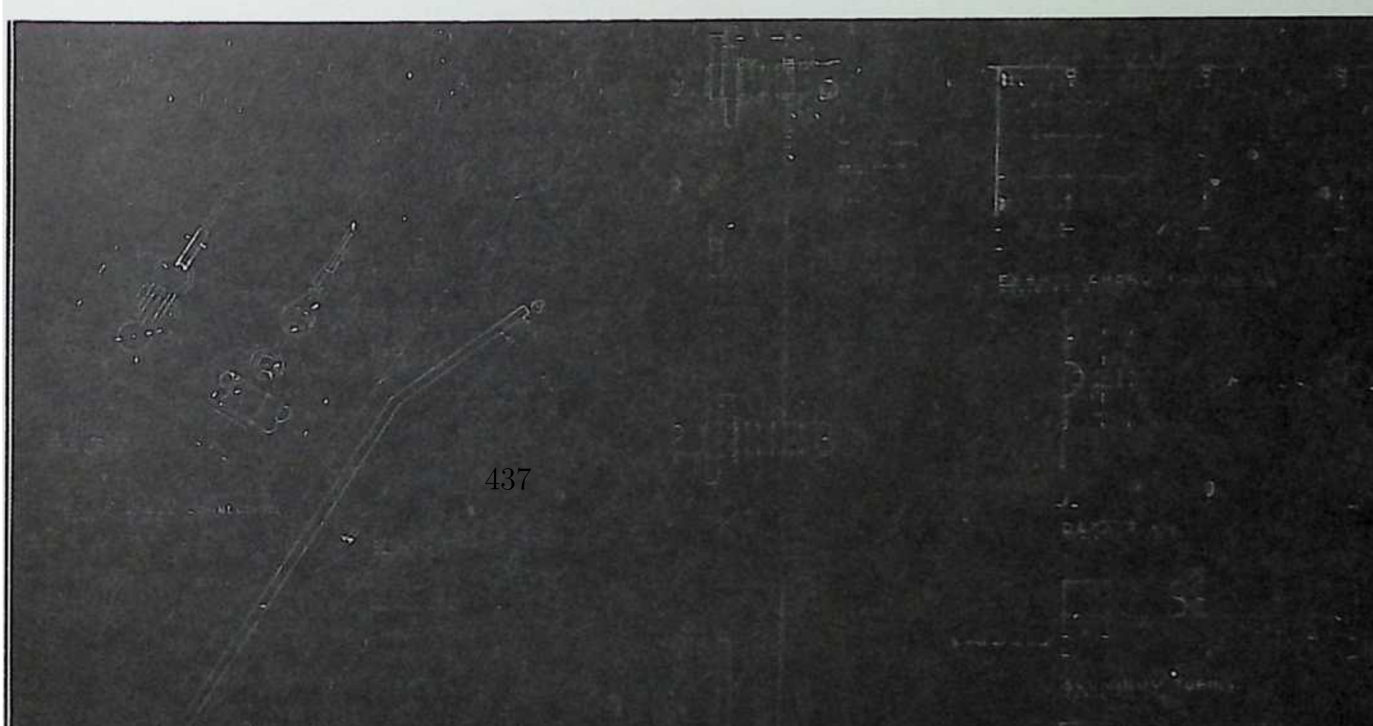
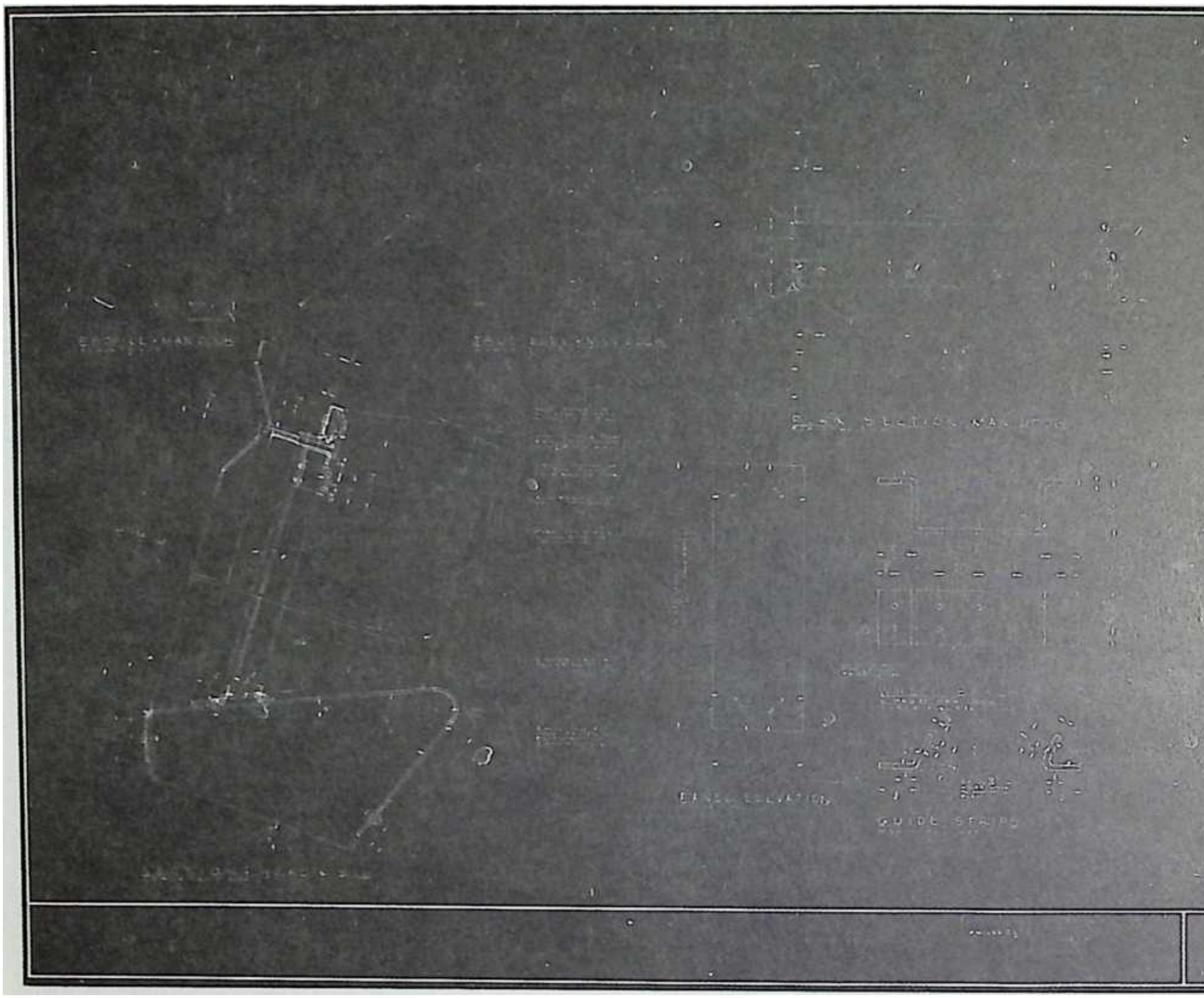
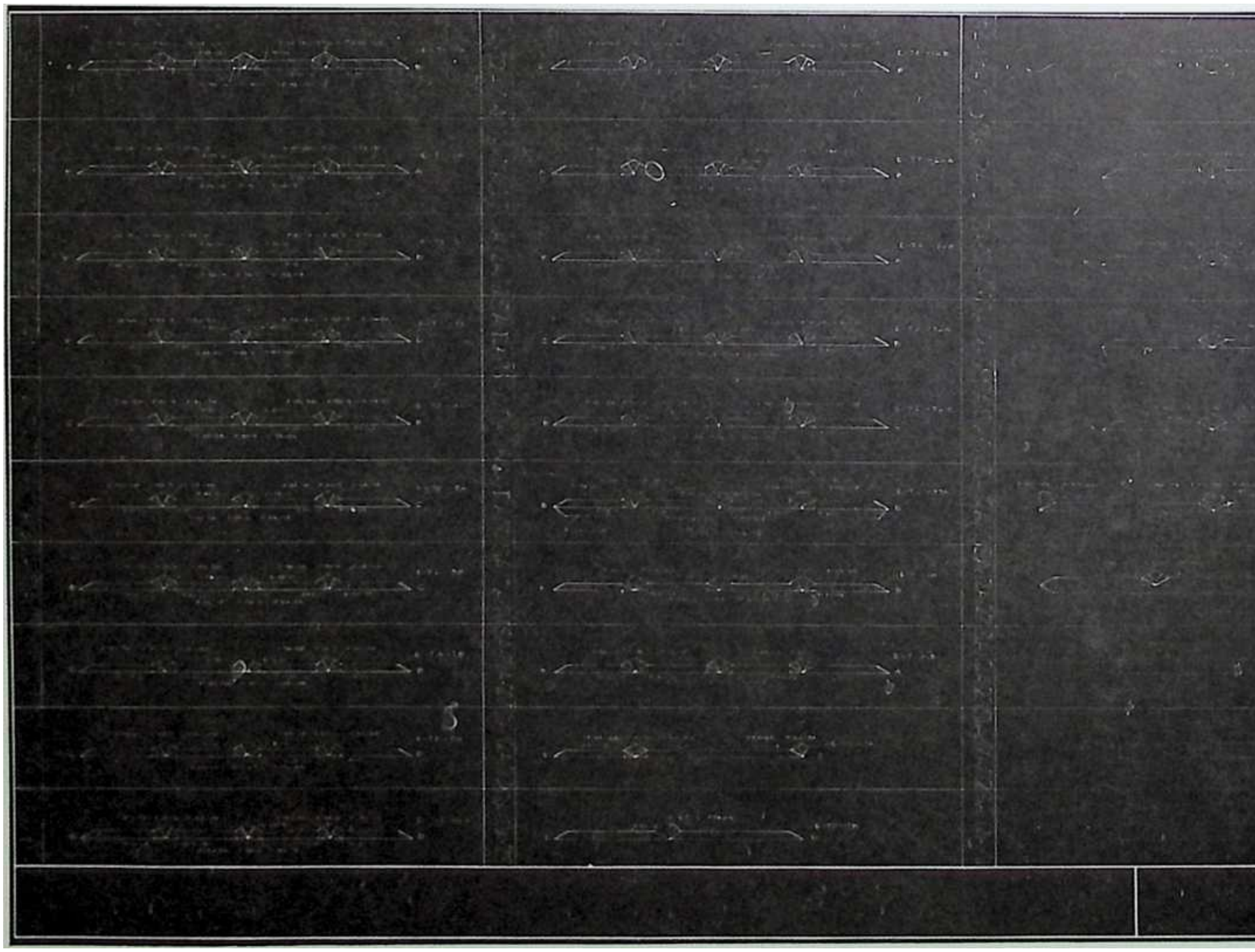
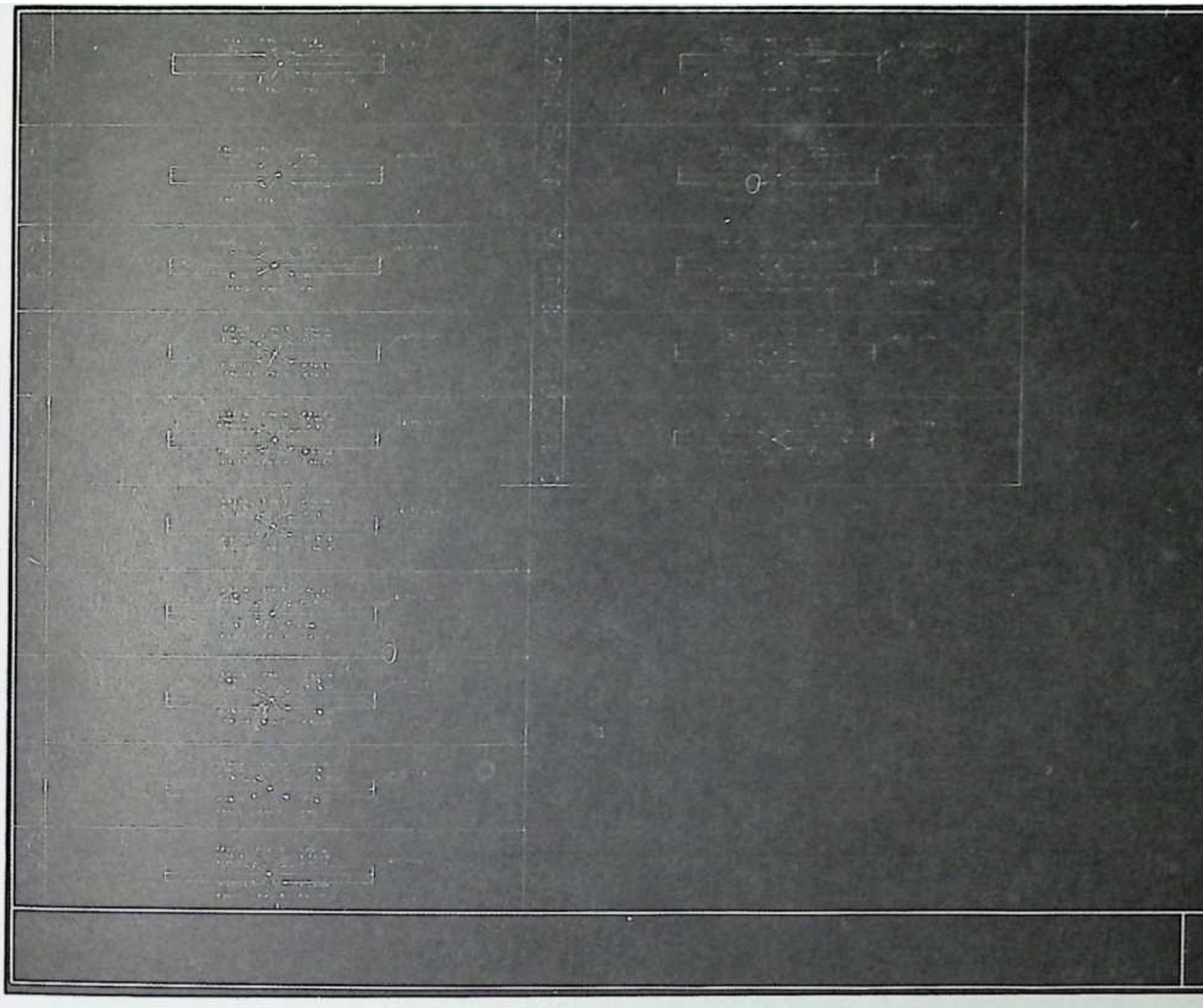
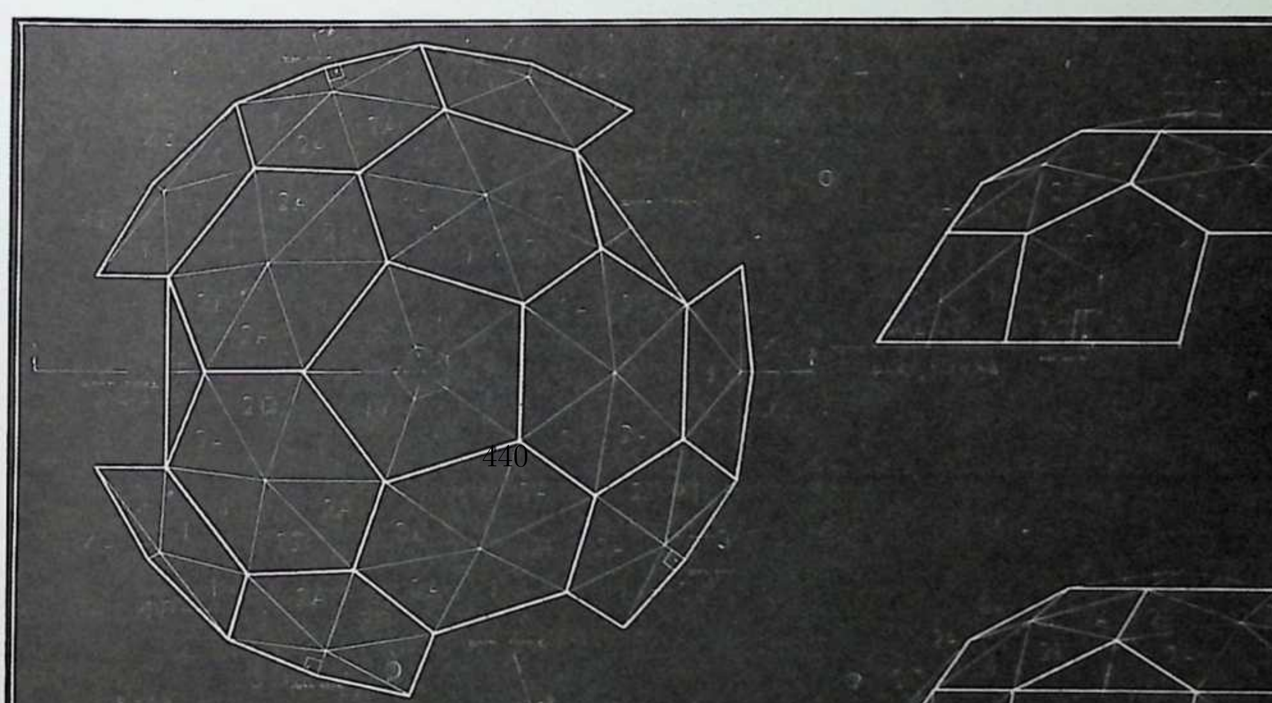


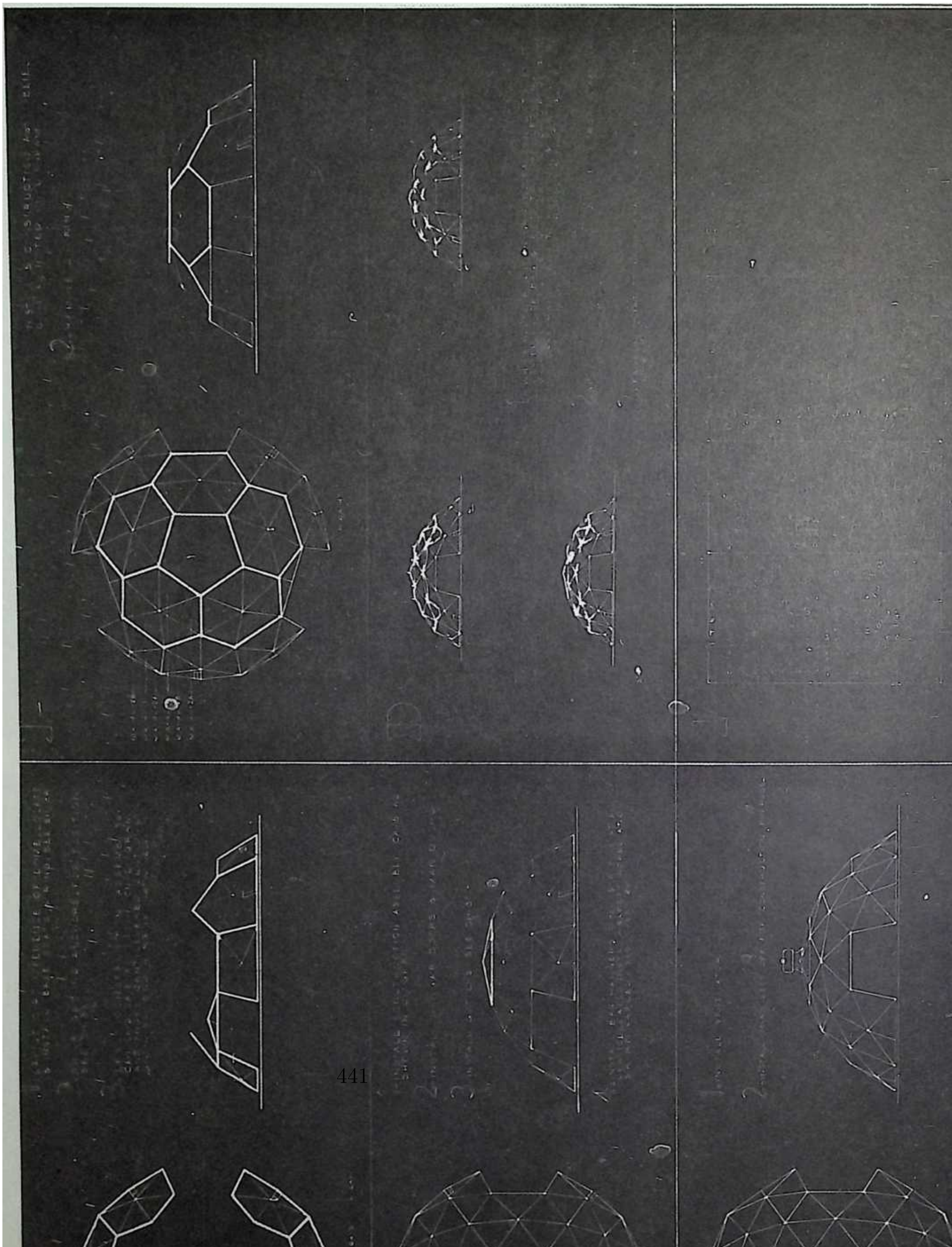






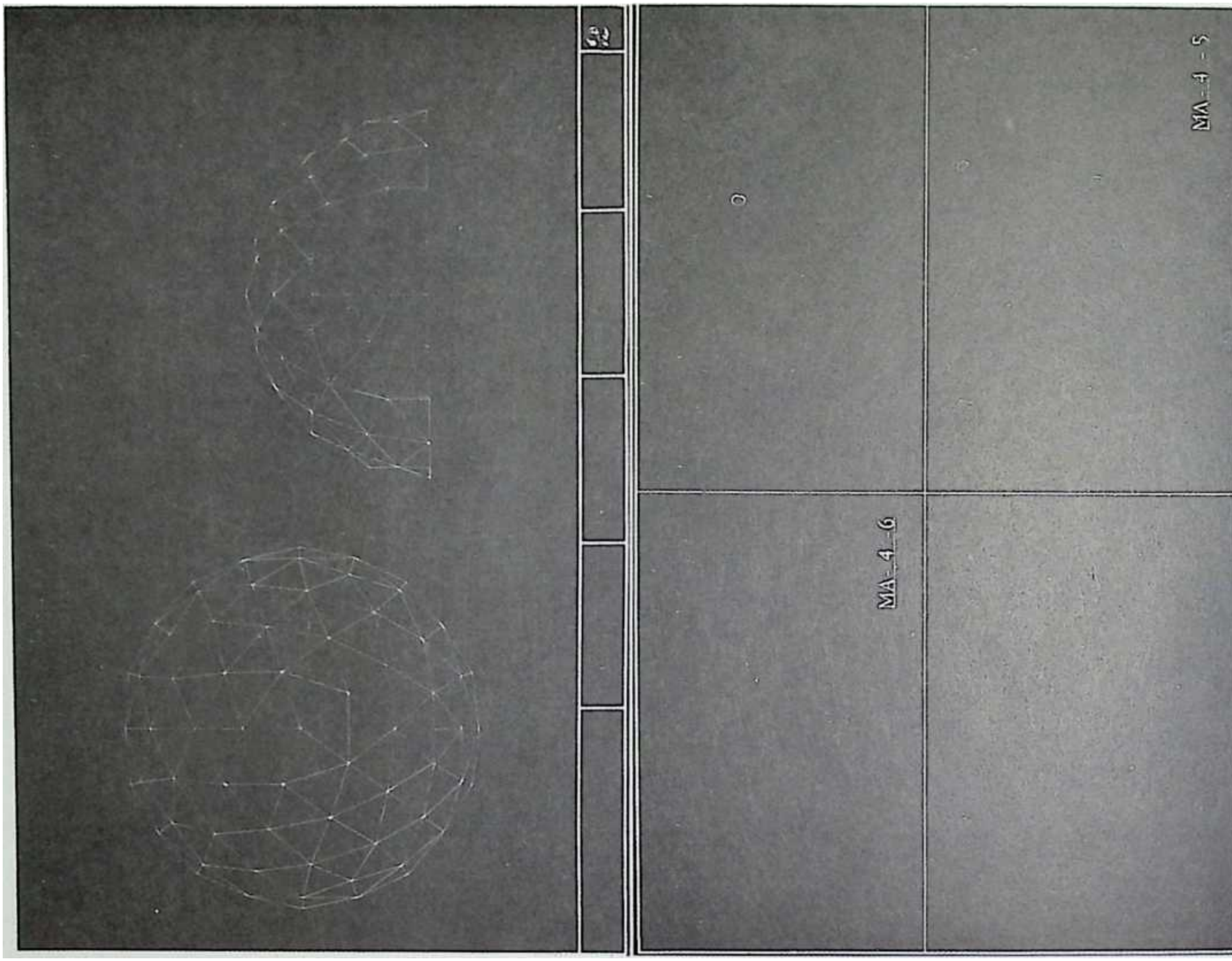






Fifty-five-Foot

Geodesic Hangar 1955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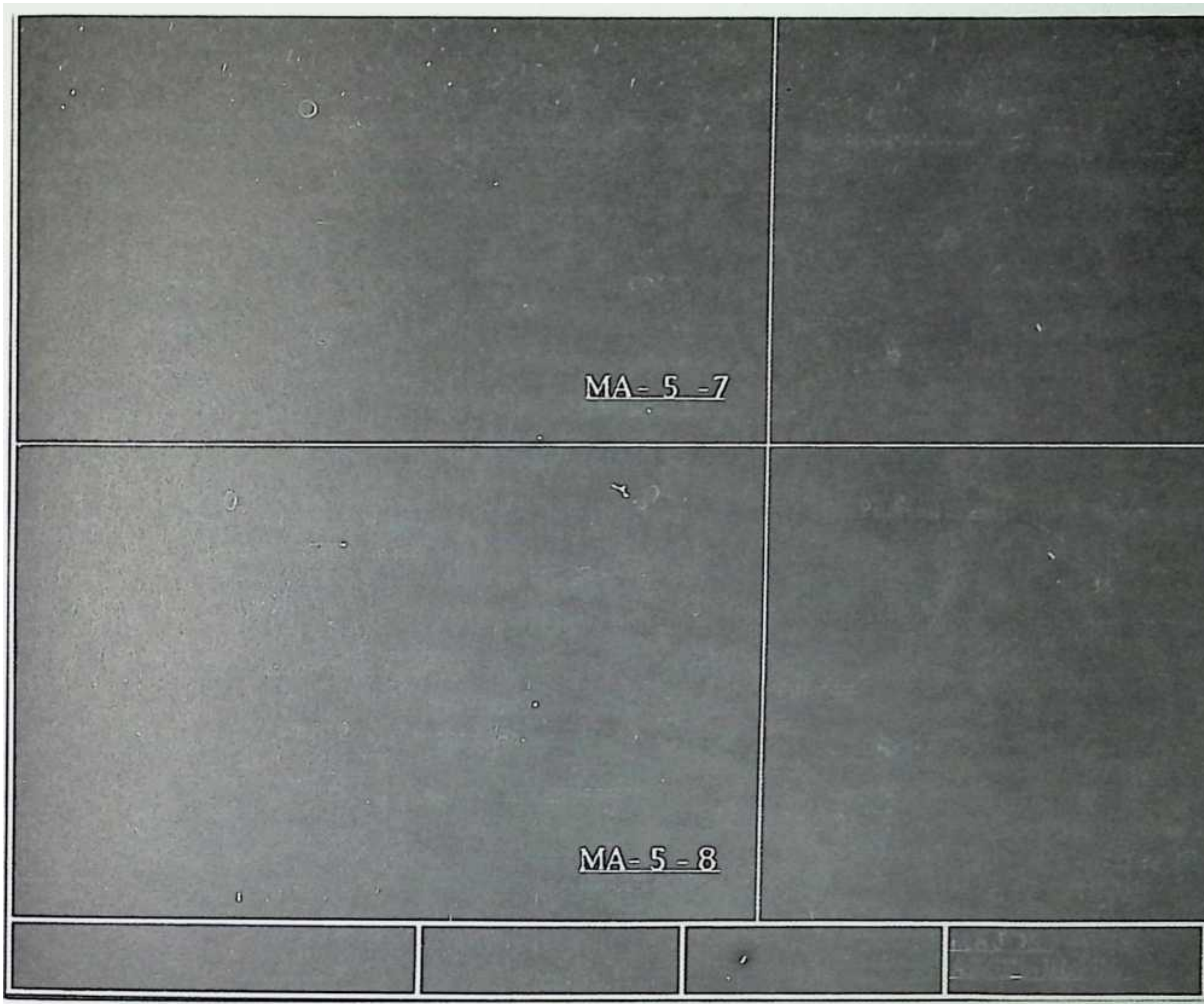
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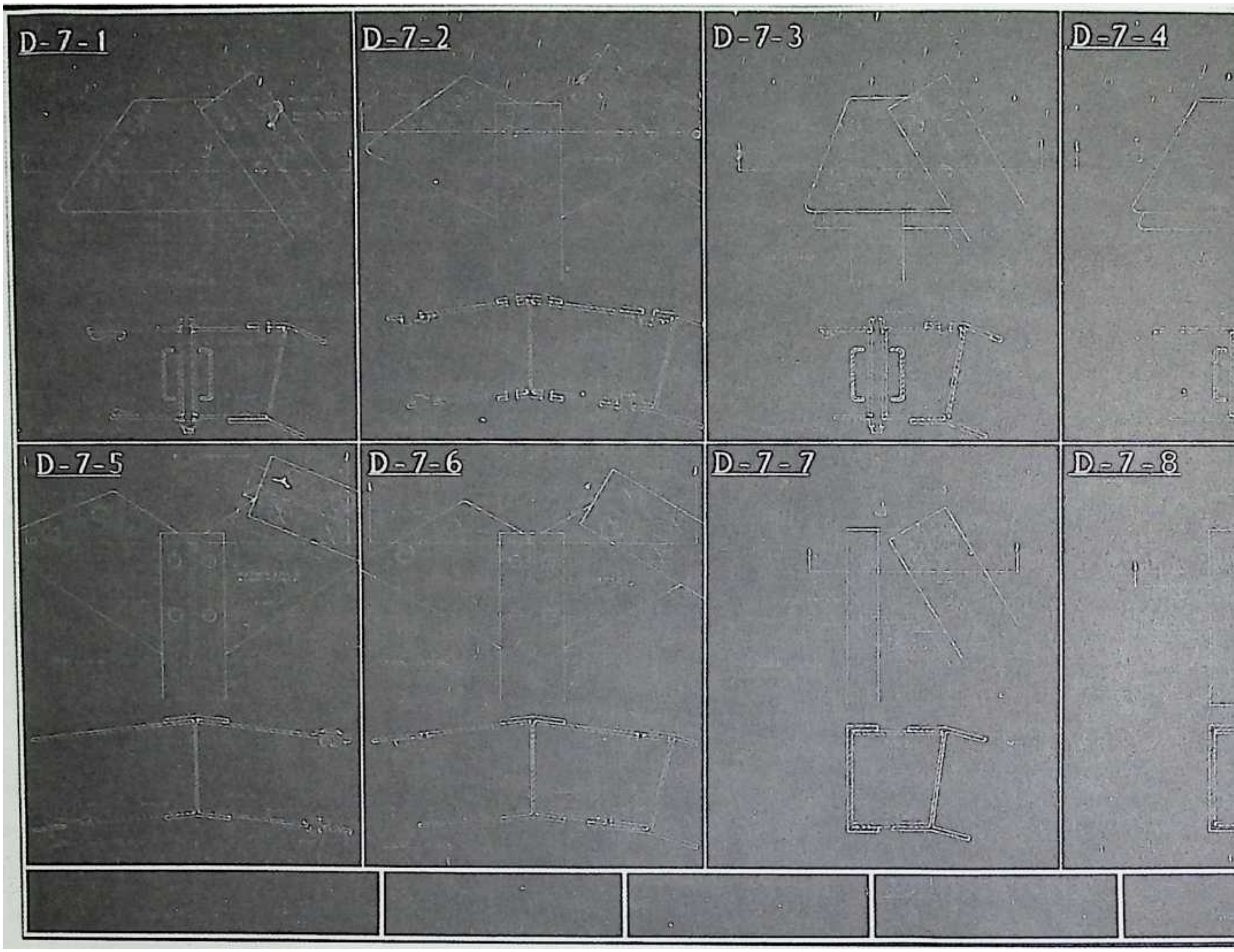
MA- 5 - 8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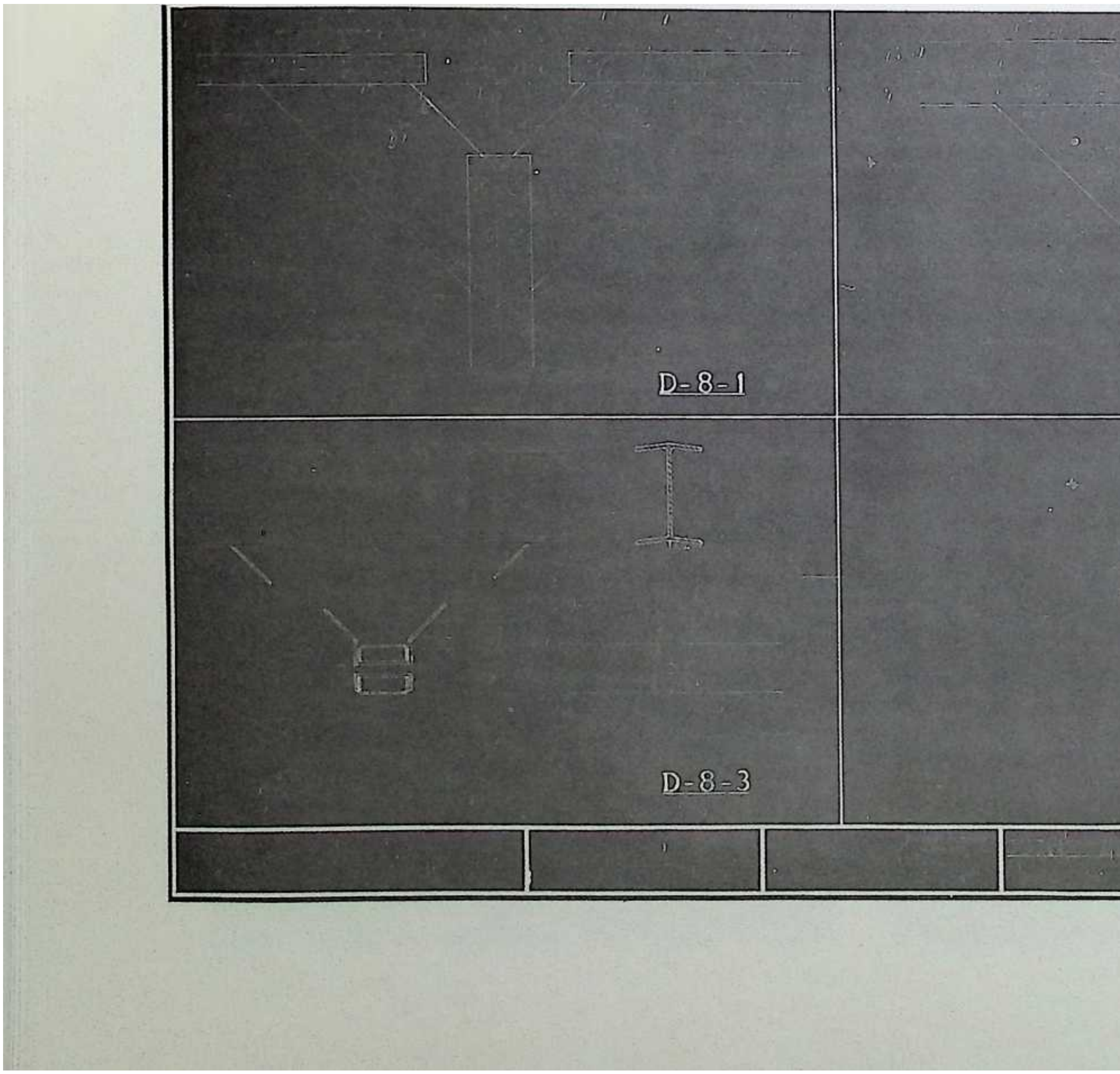
D-7-8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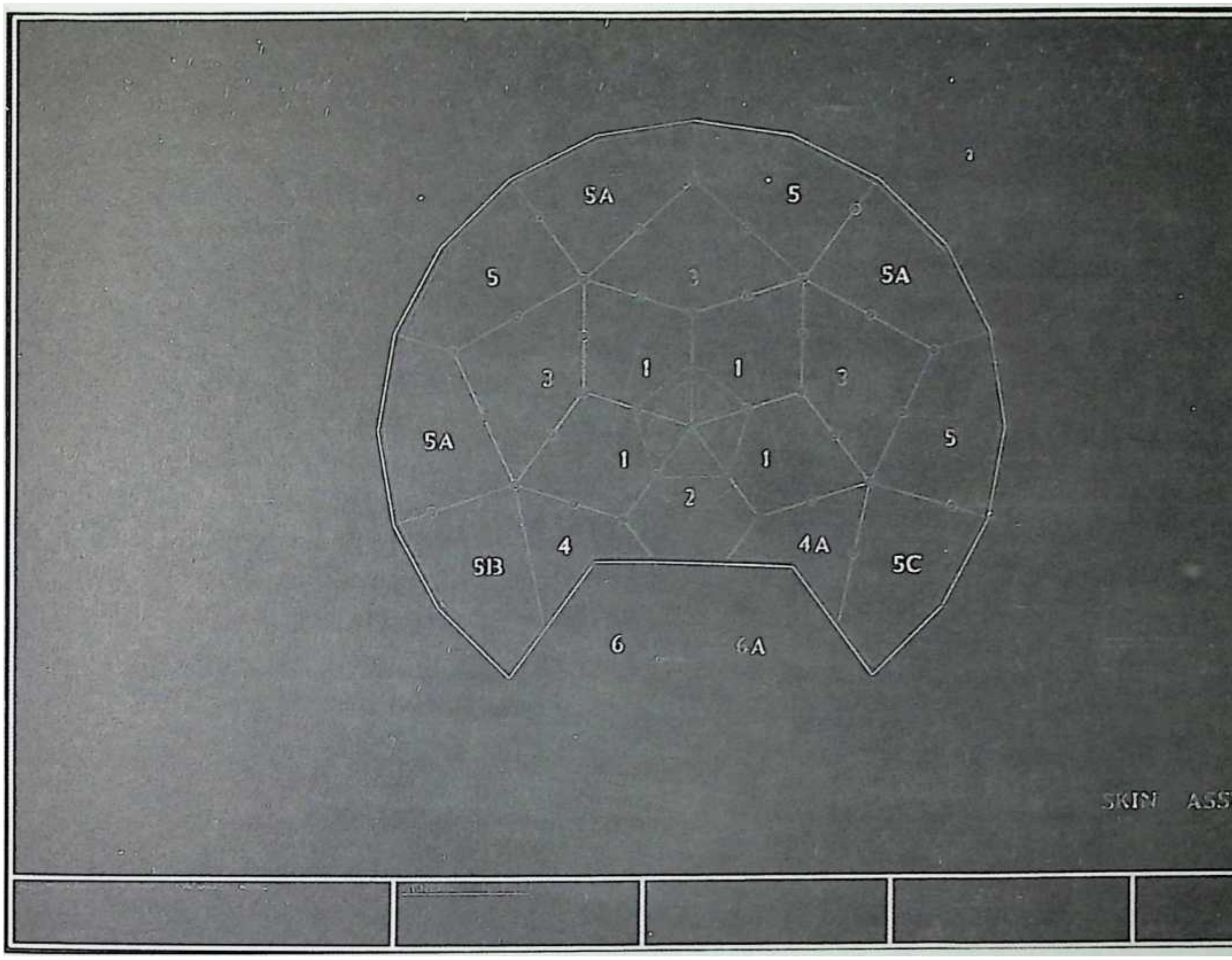
5A
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5A
3
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5A
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1
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2
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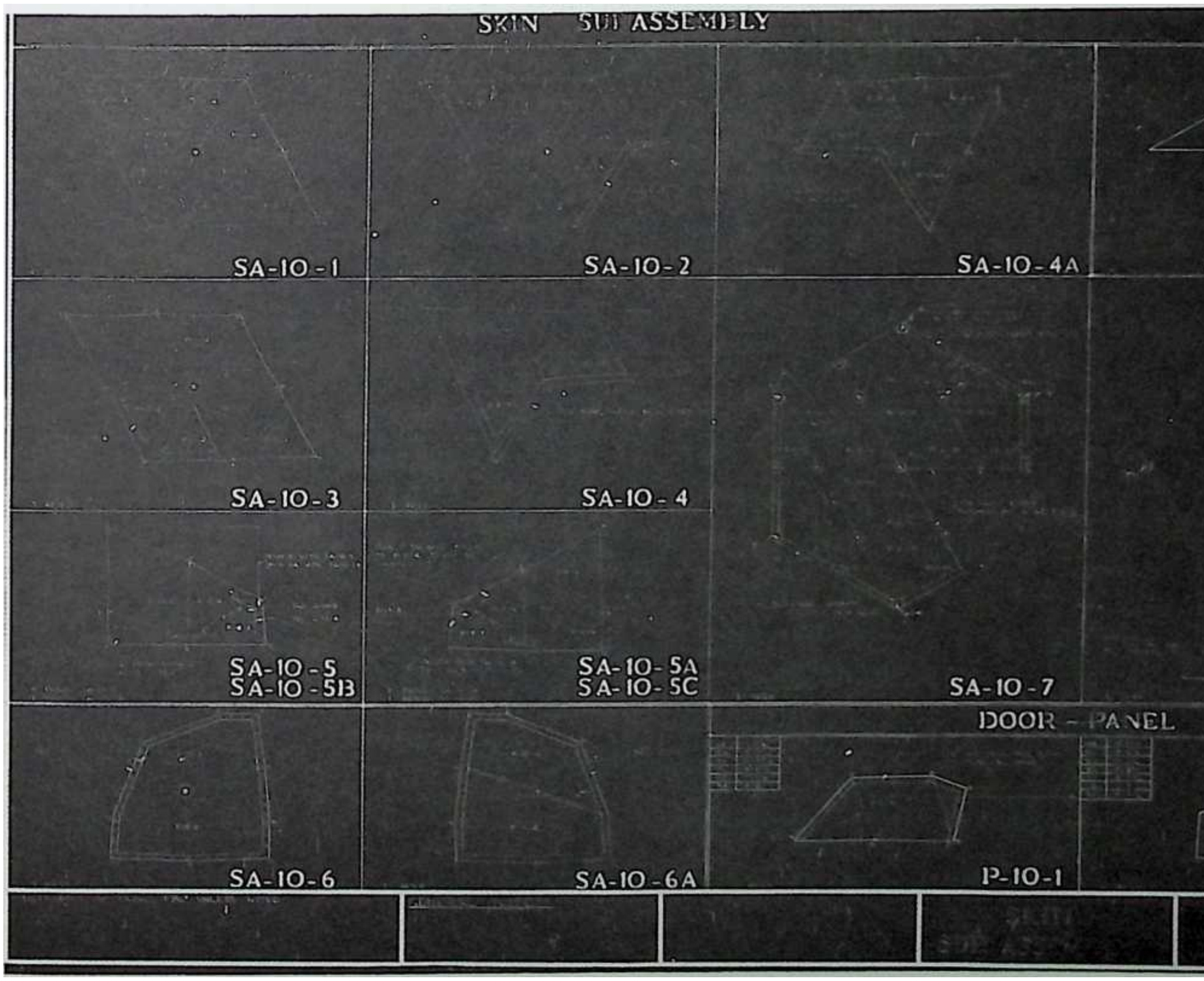
4A
5B
5C
6
6A
SKIN ASS



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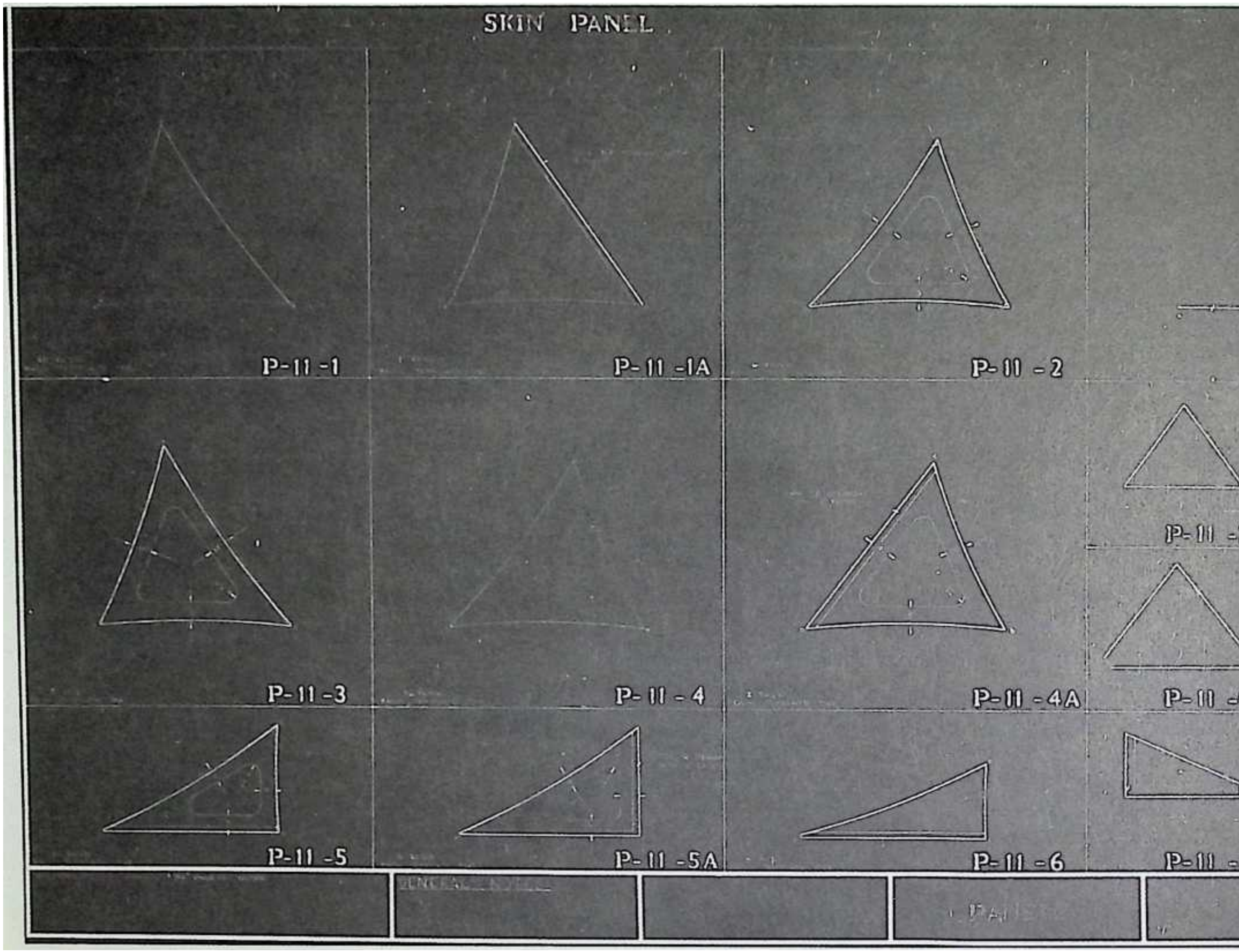
SA-10-2
SA-10-4A
SA-10-3
SA-10-4
SA-10-5
SA-10-5B
SA-10-5A
SA-10-5C
SA-10-7
DOOR - PANEL
SA-10-6
SA-10-6A
P-10-1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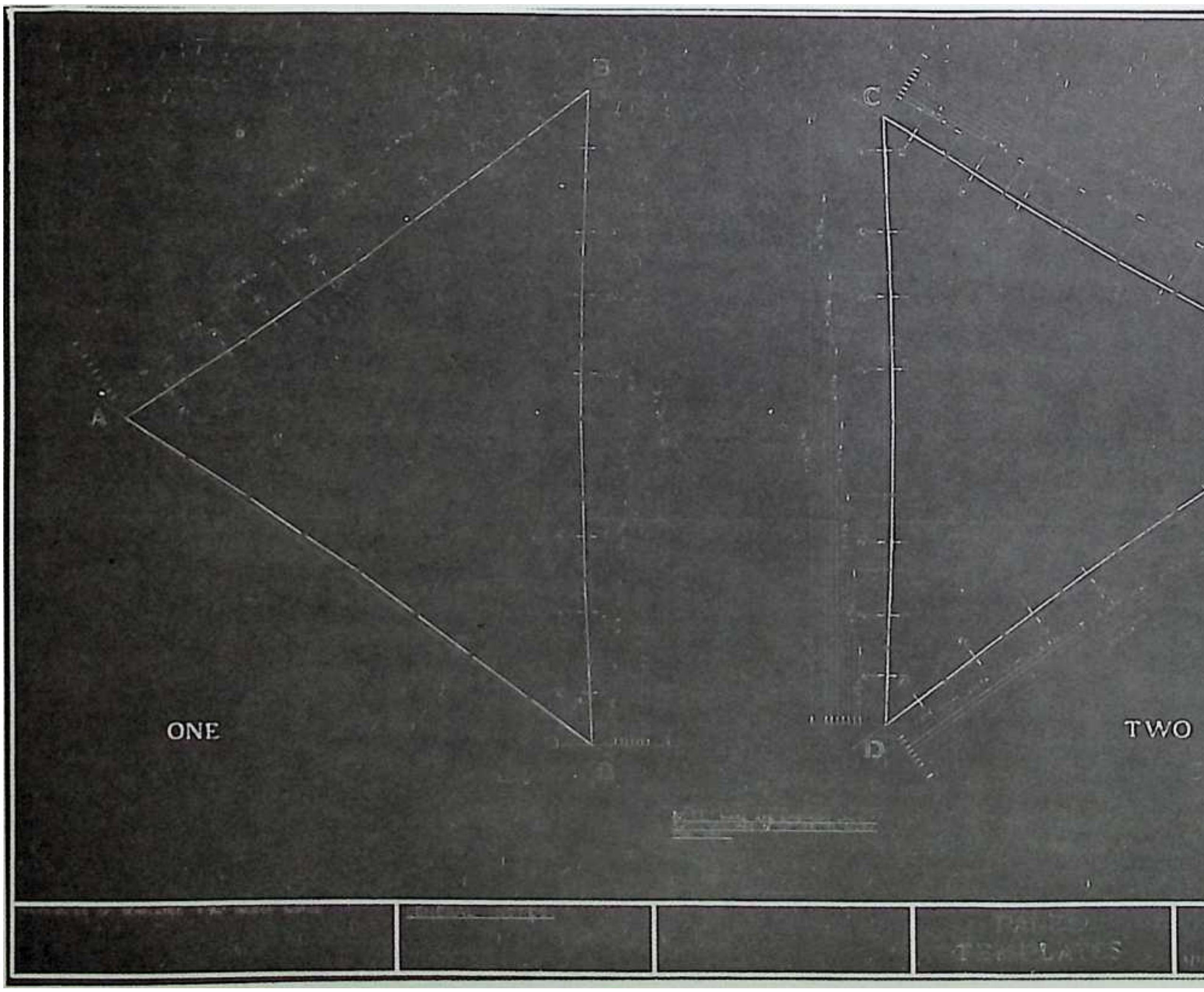
P-11 -1A
P-11 - 2
P-11 -3
P-11 - 4
P-11 -4A
P-11 -5
P-11 -5A
P-11 -6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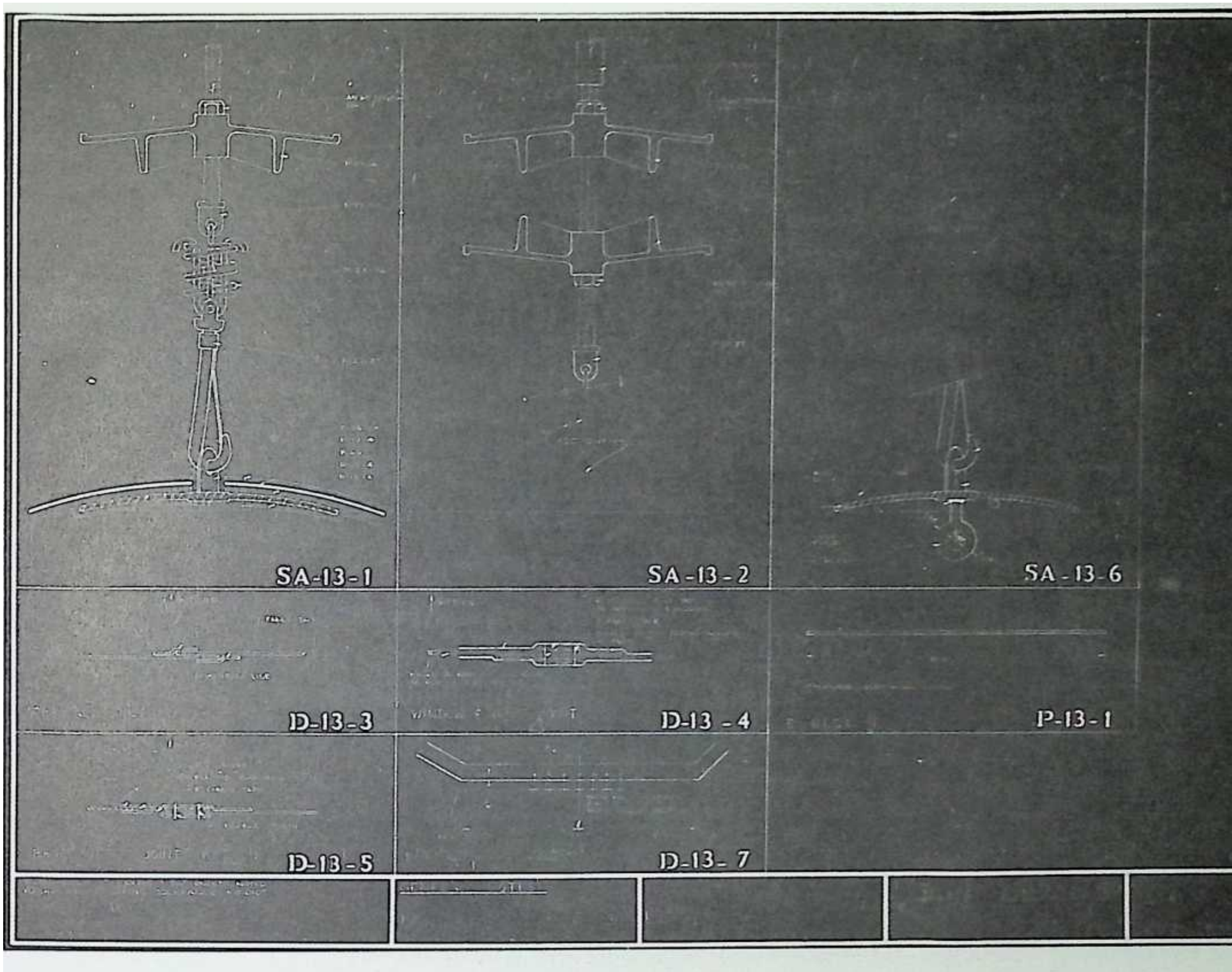
TWO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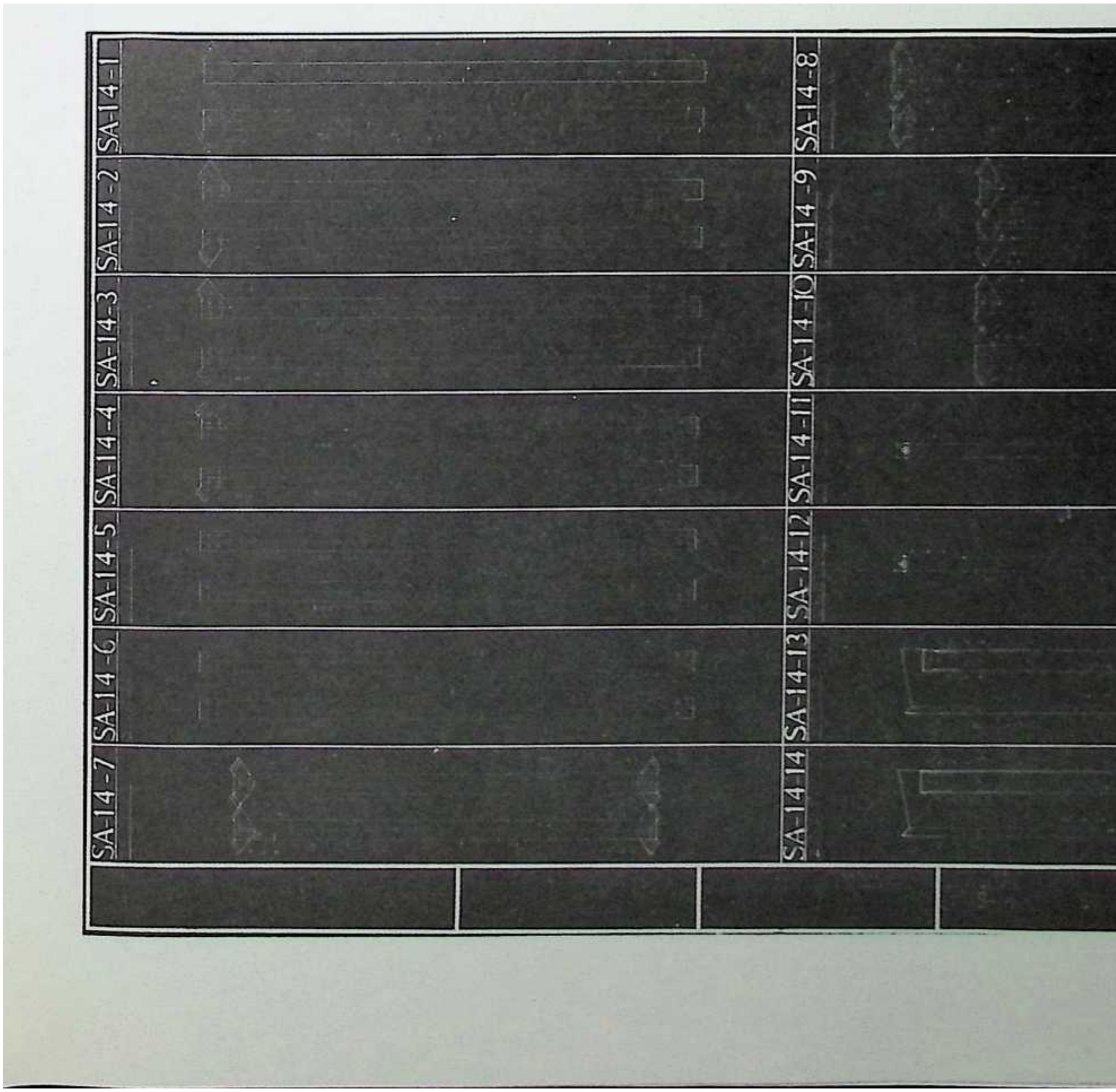
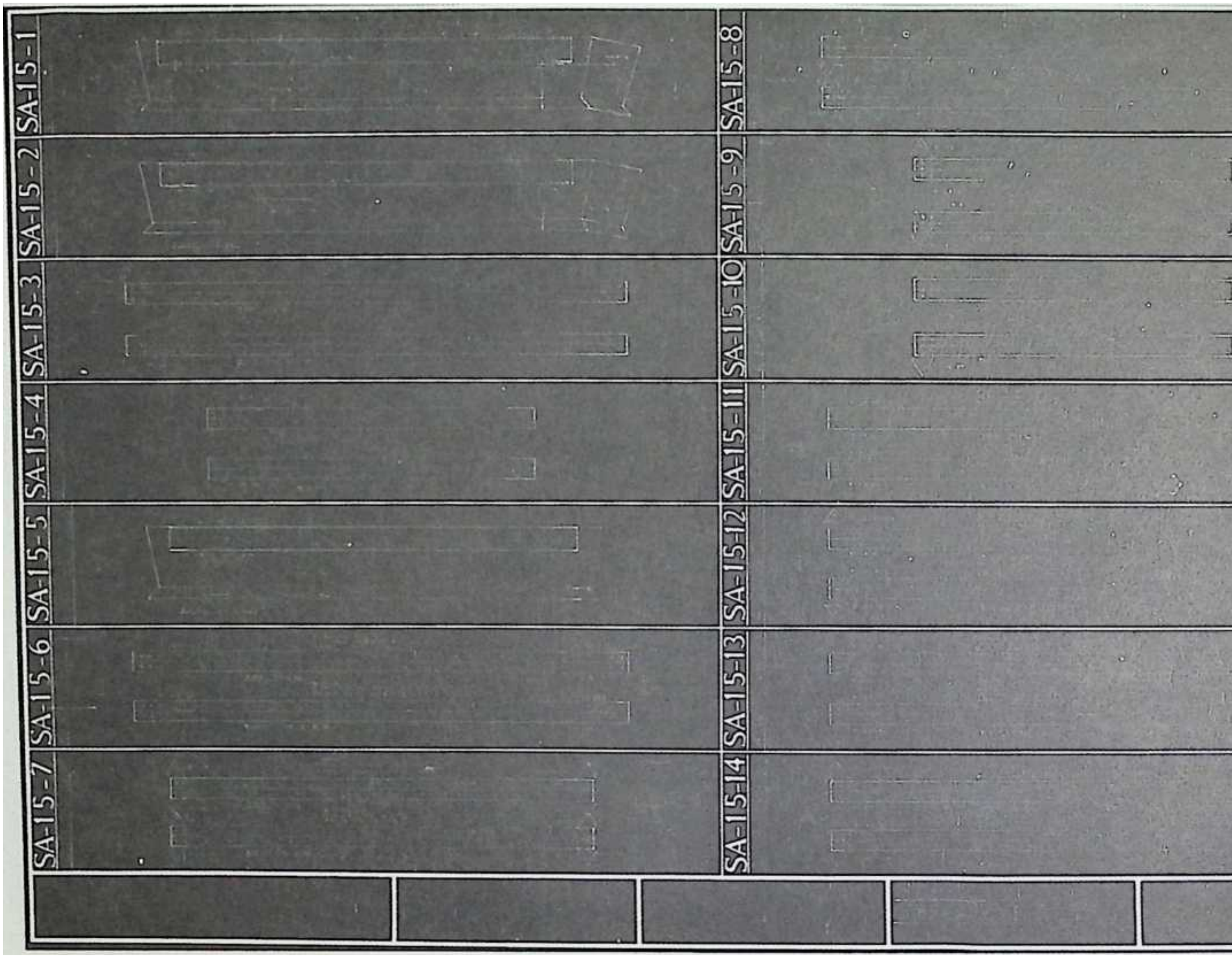
D-13-5
D-13-7



282 THE: GEODESIC REVOLUTION. PART 1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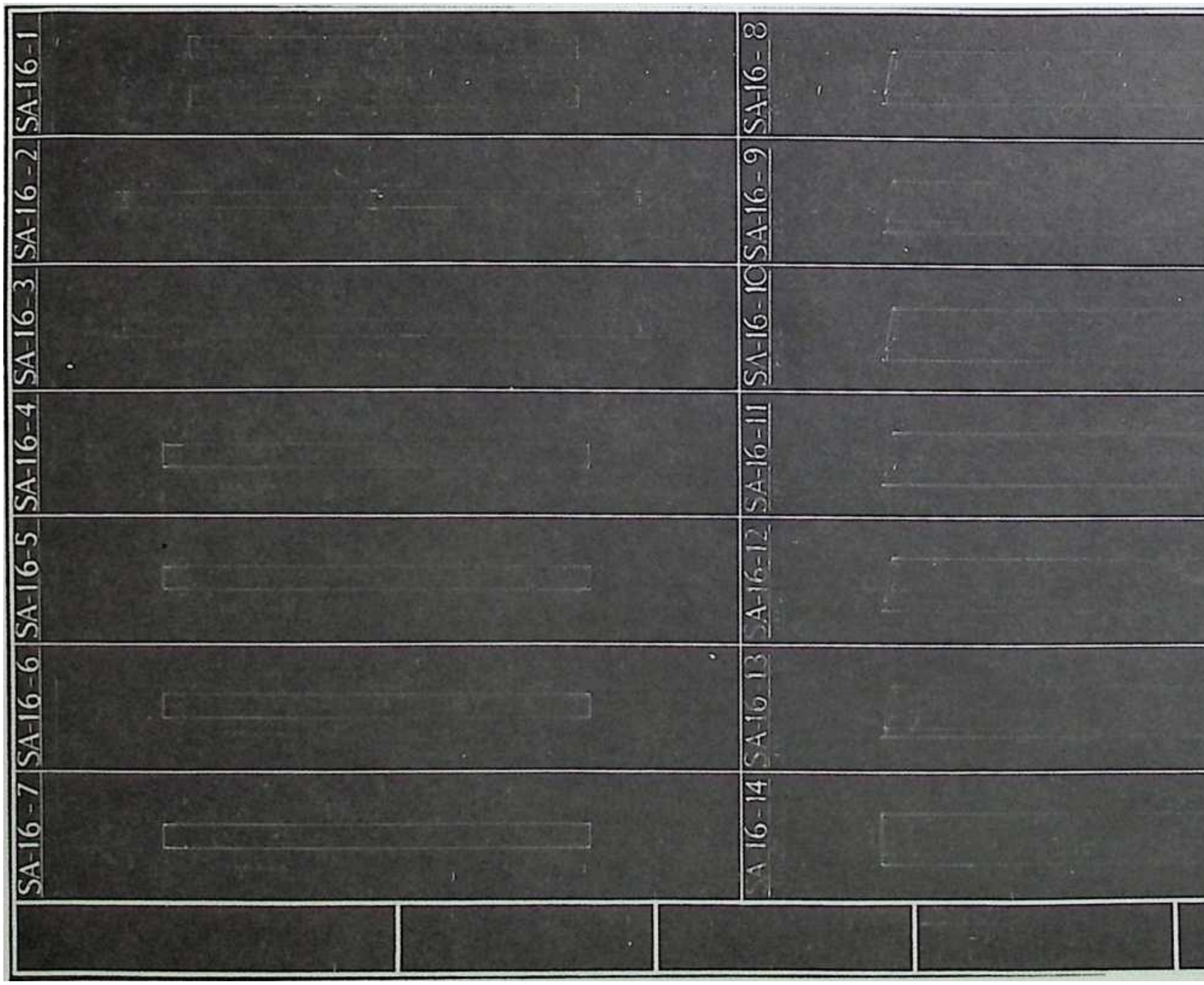
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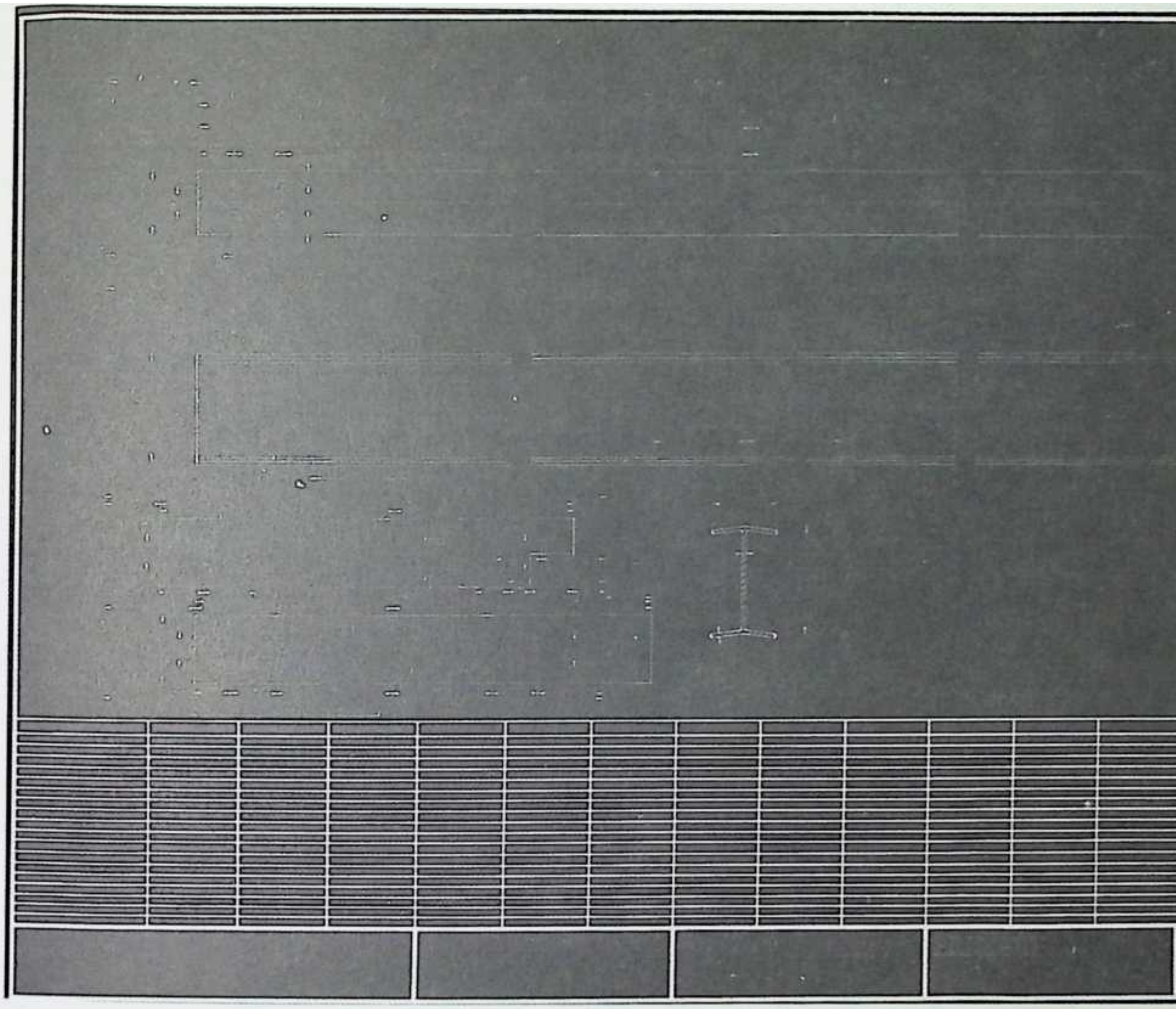

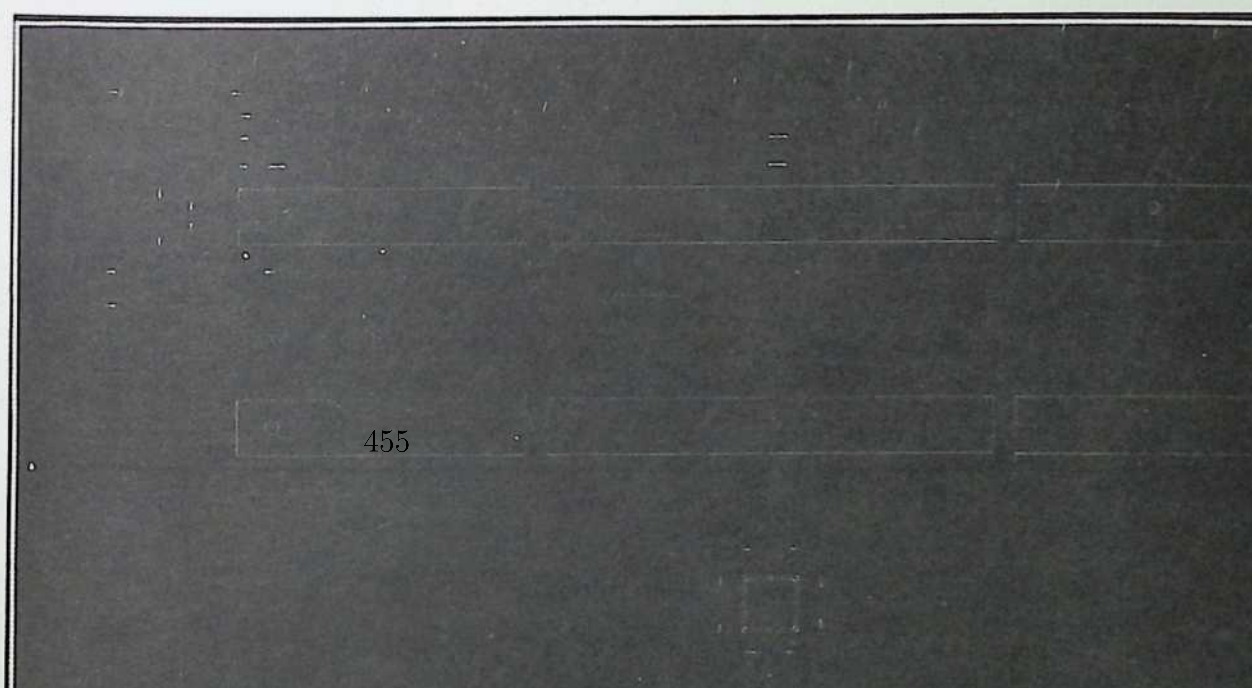

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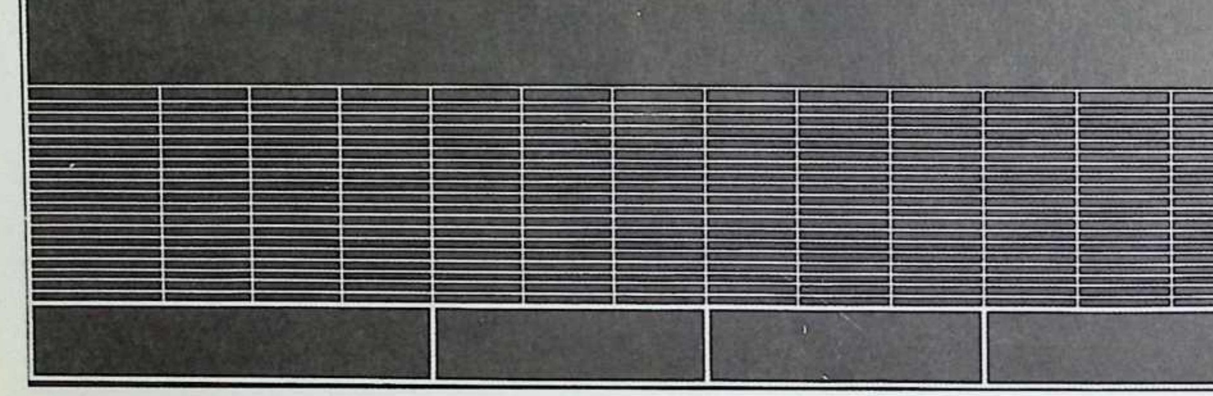

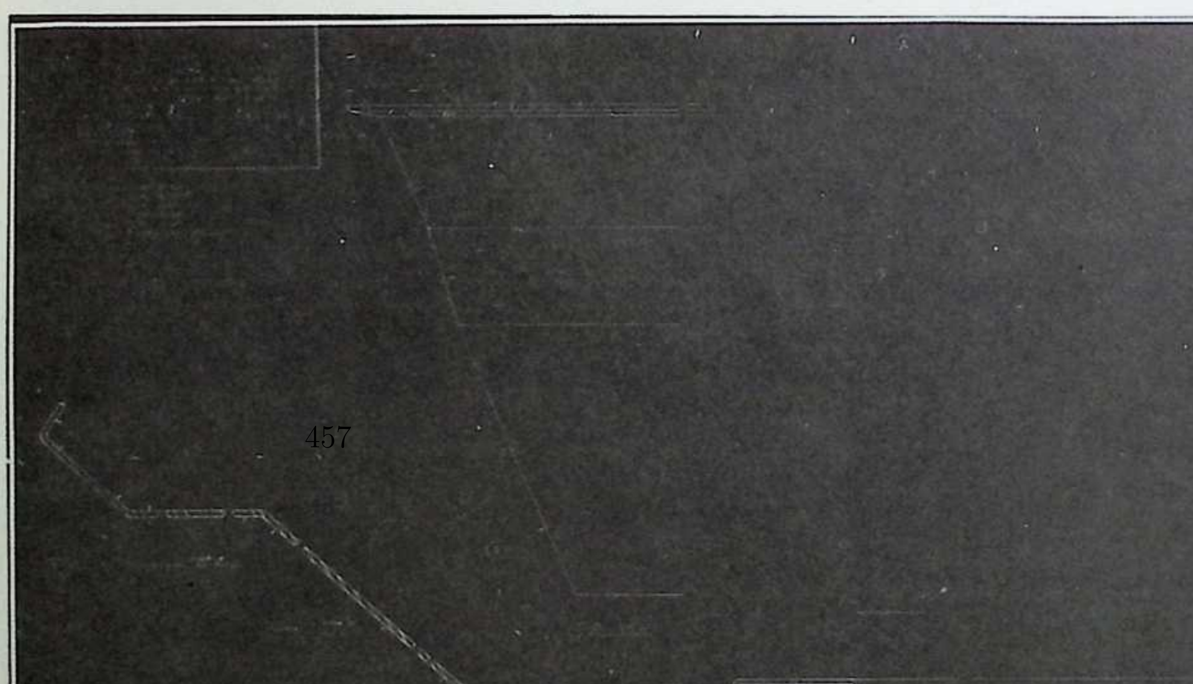

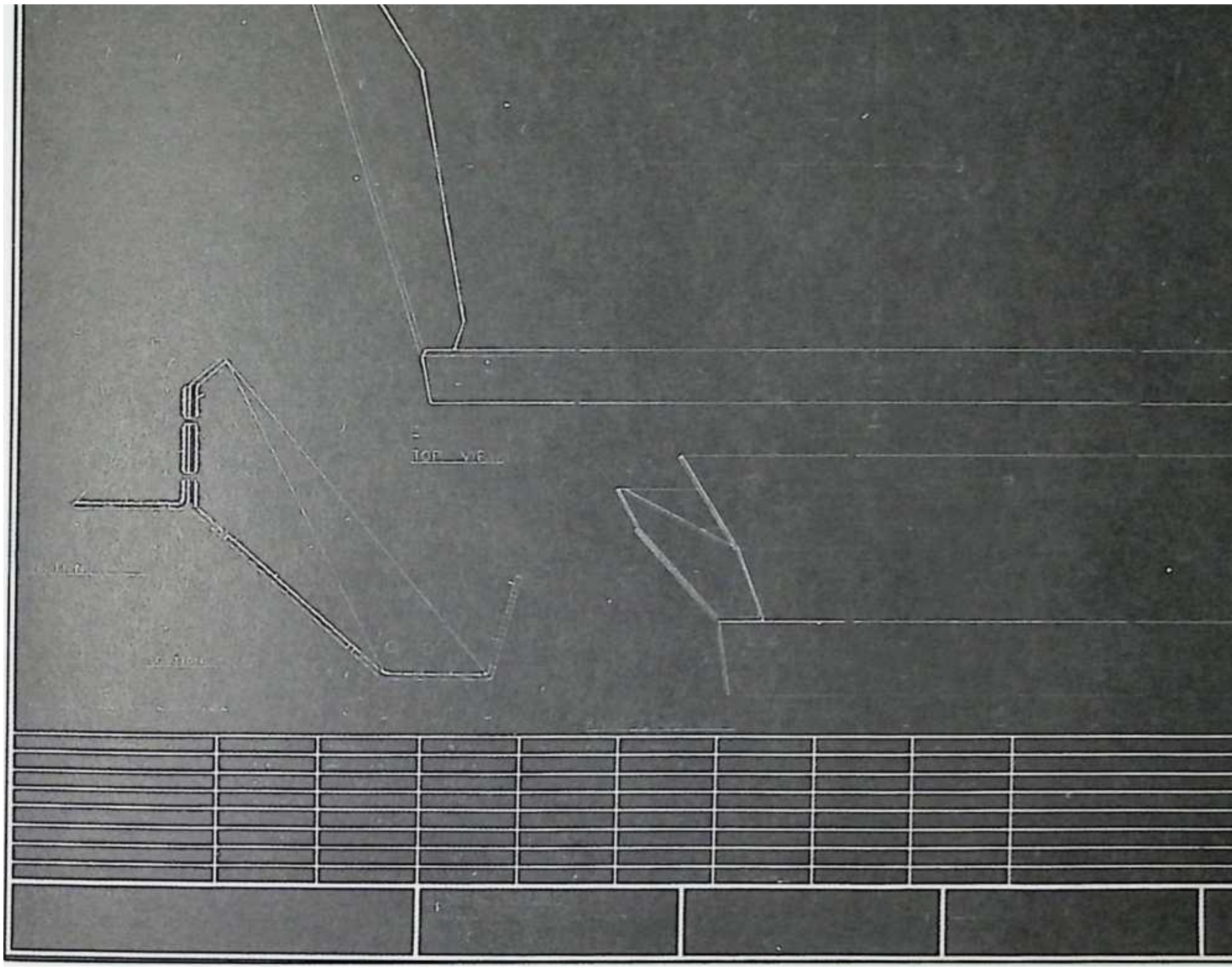

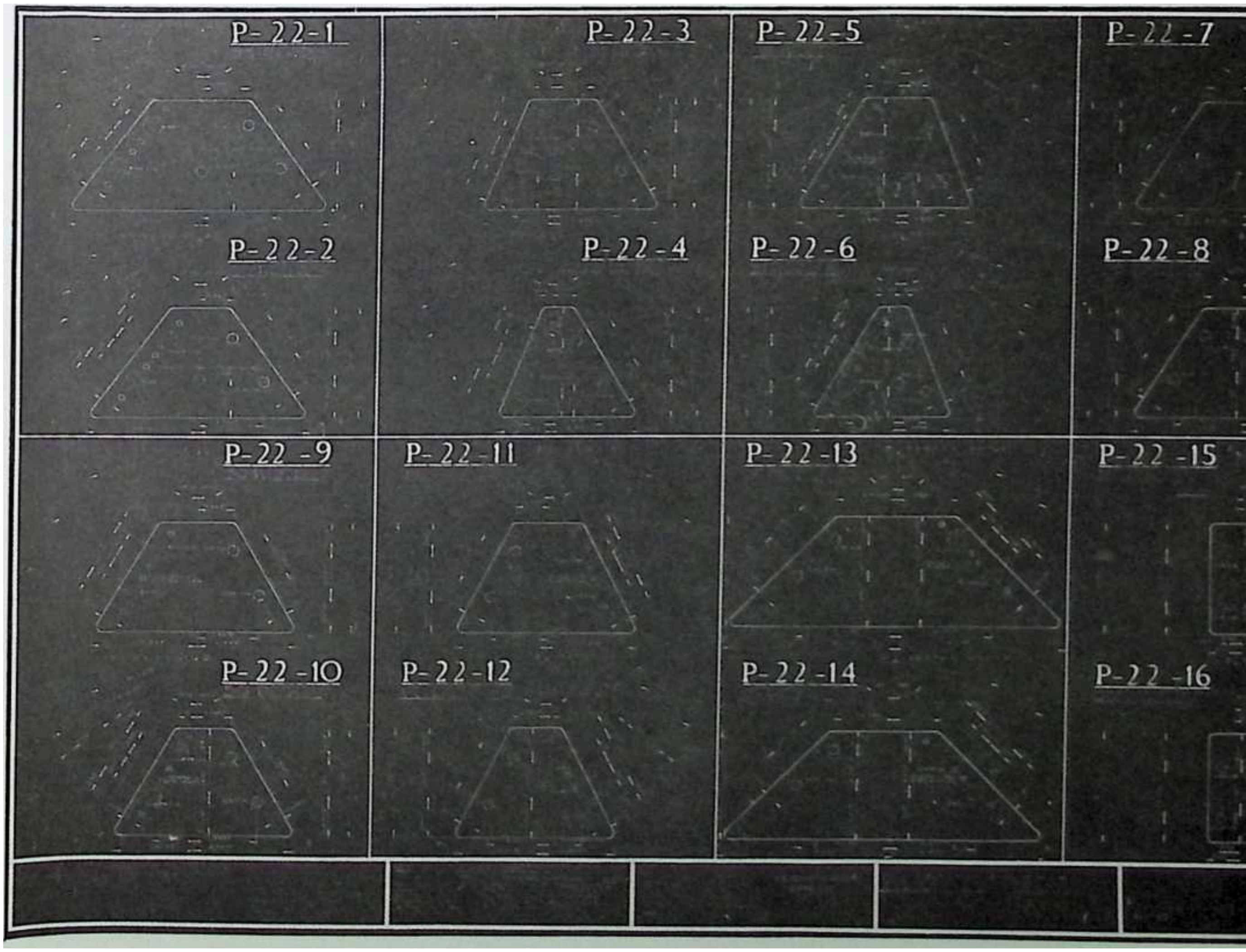
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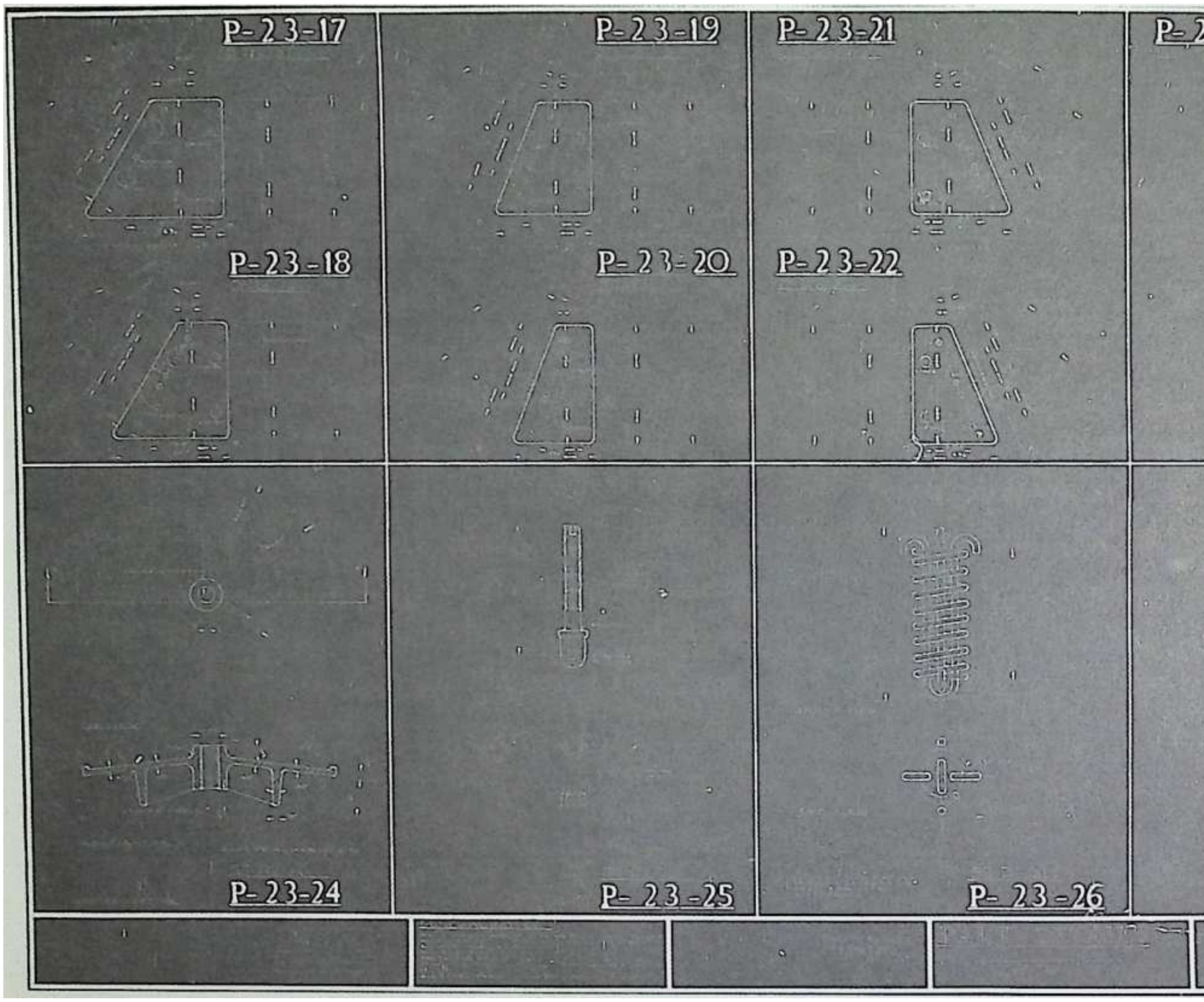
P-22-16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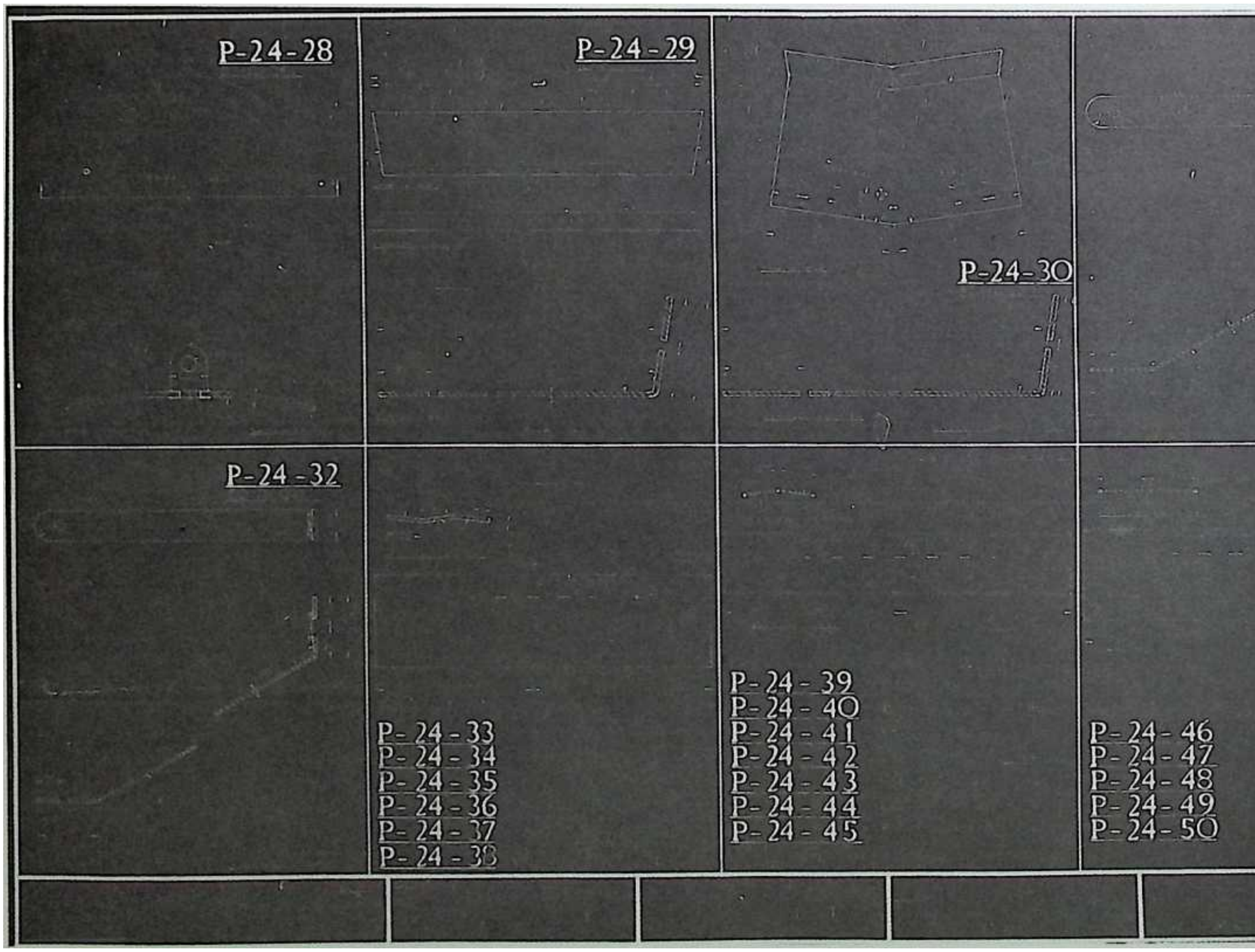
P-23-26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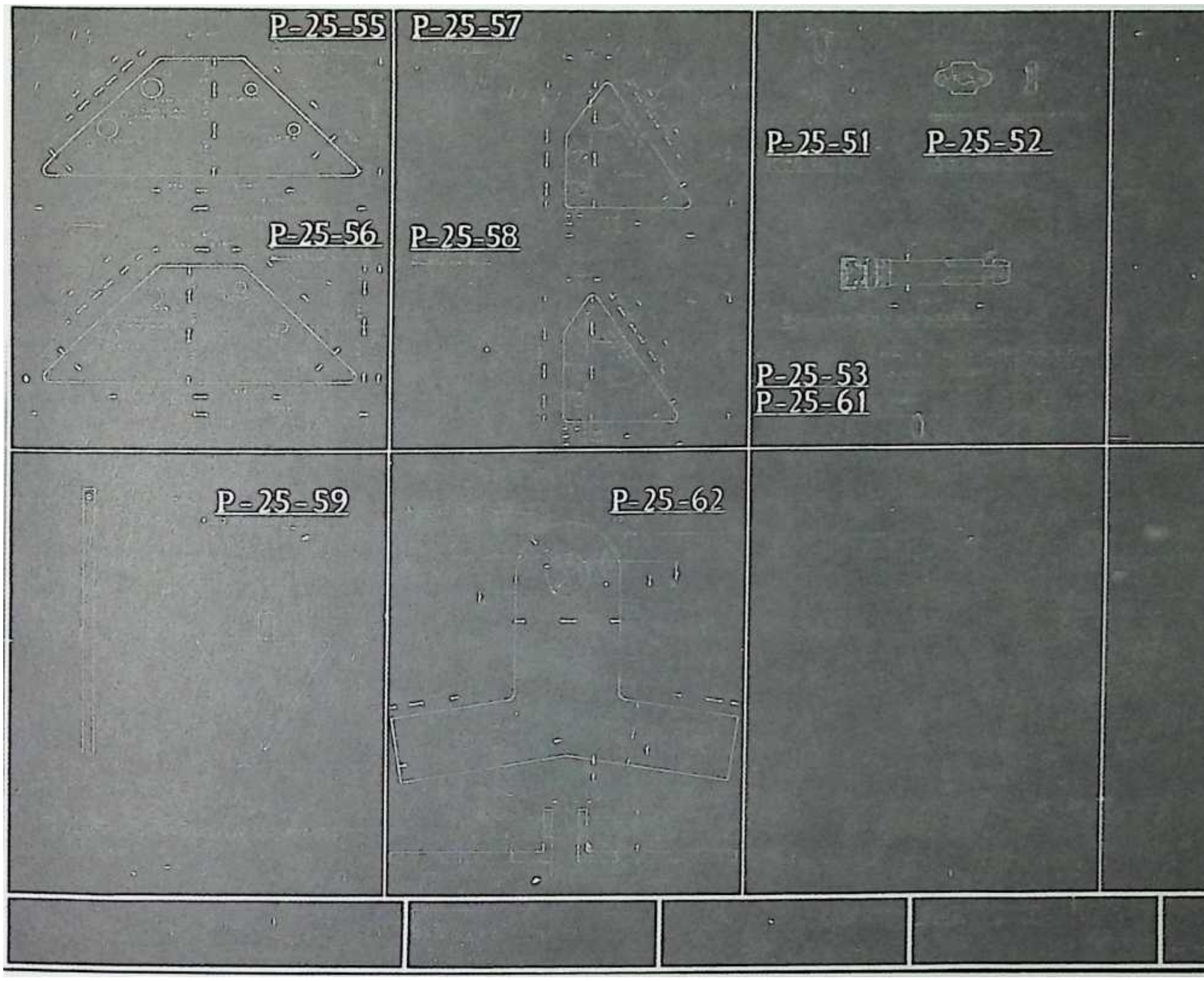
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P-25-52
P-25-56
P-25-58
P-25-53
P-25-61
P-25-59
P-25-62

Fifty-Foot Base Diameter Radome 1955

The radome was redesigned in 1955 to include a circular fiberglass hub. This node afforded the structure greater compressive strength since the acute angles of the diamonds were blunted and focused on a dense, circular target. The pins were made shorter and stronger.

D HUB

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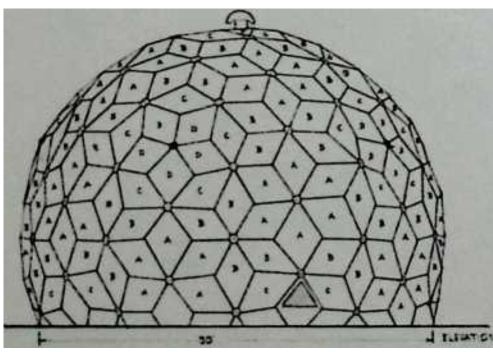

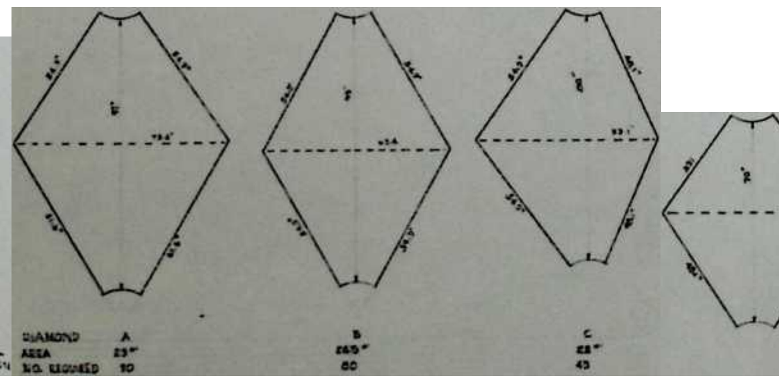

Fastener Pin A

1955

to

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8

ELEVATION

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FASTENER PIN K FULLER 0kPOME *VfLZl^ZZK* BEK!

GEOV&>\|C$ IN6. 2»

4 BKATTLS 4Tf?E8T CAMBE1P6E M AUS4.

TELEPHONE TZ-4-MU

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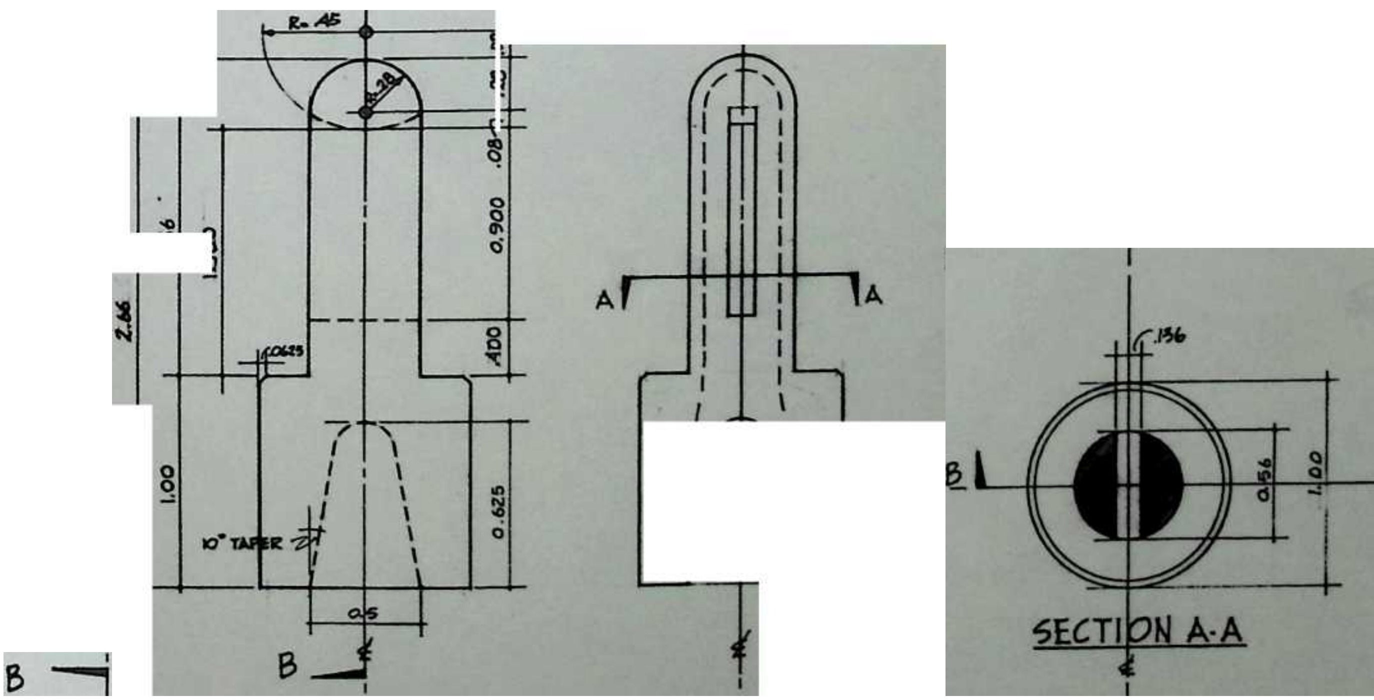
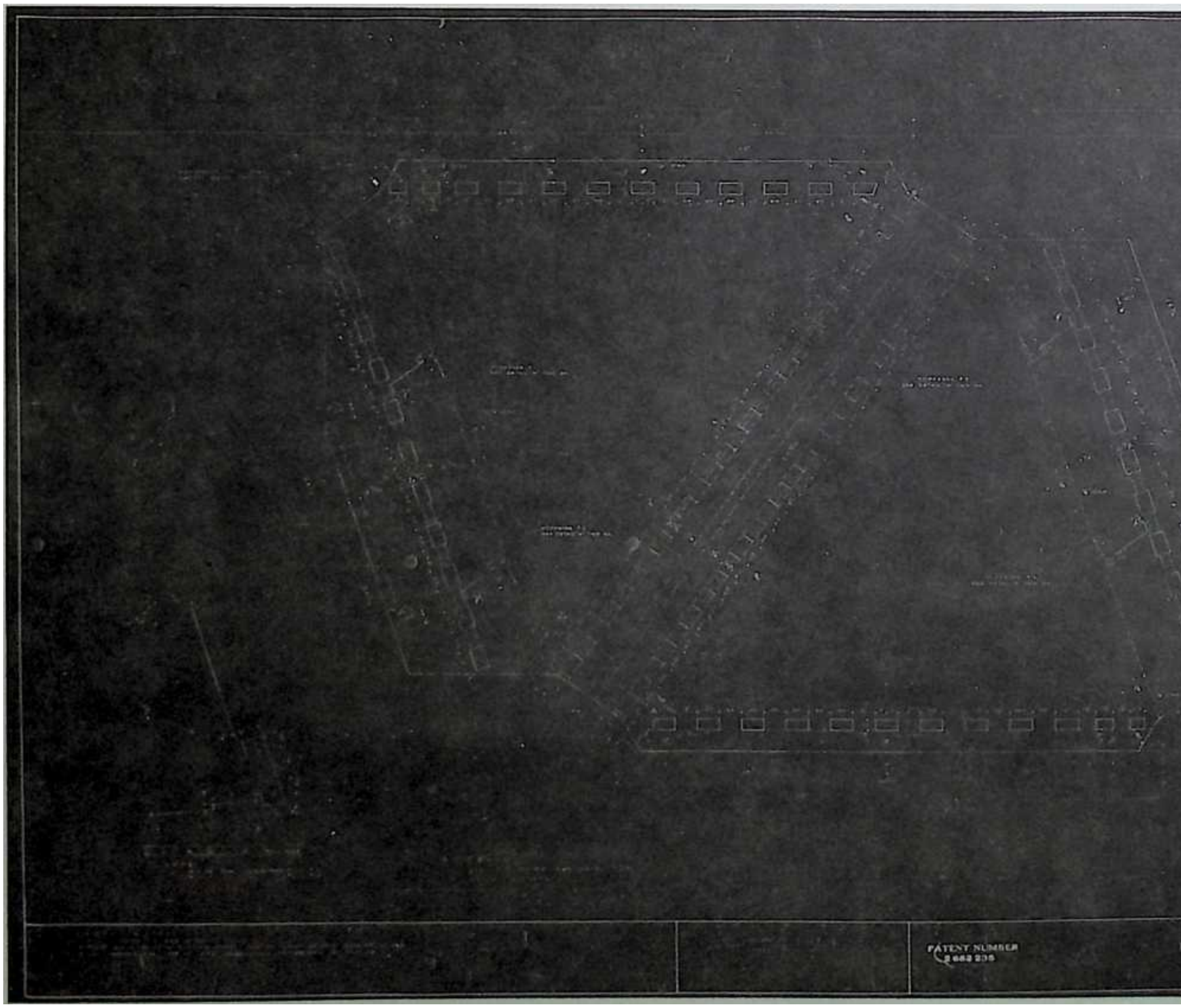


F orty-F oot Paperboard Dome 1955

The forty-foot paperboard dome is significant as a relatively large structure composed entirely of paper. Theoretically, the ratio of tensile strength to weight is great in such a building.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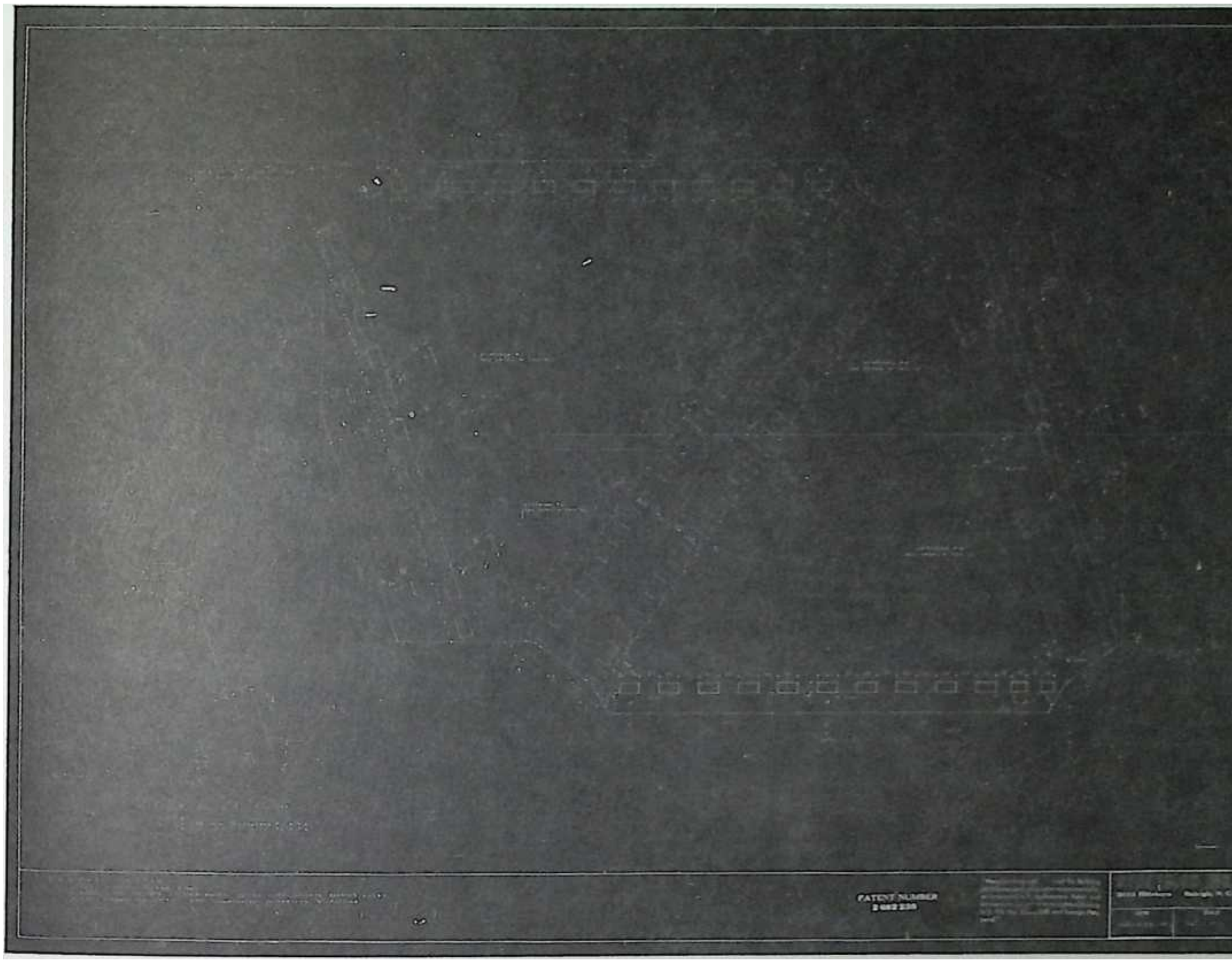
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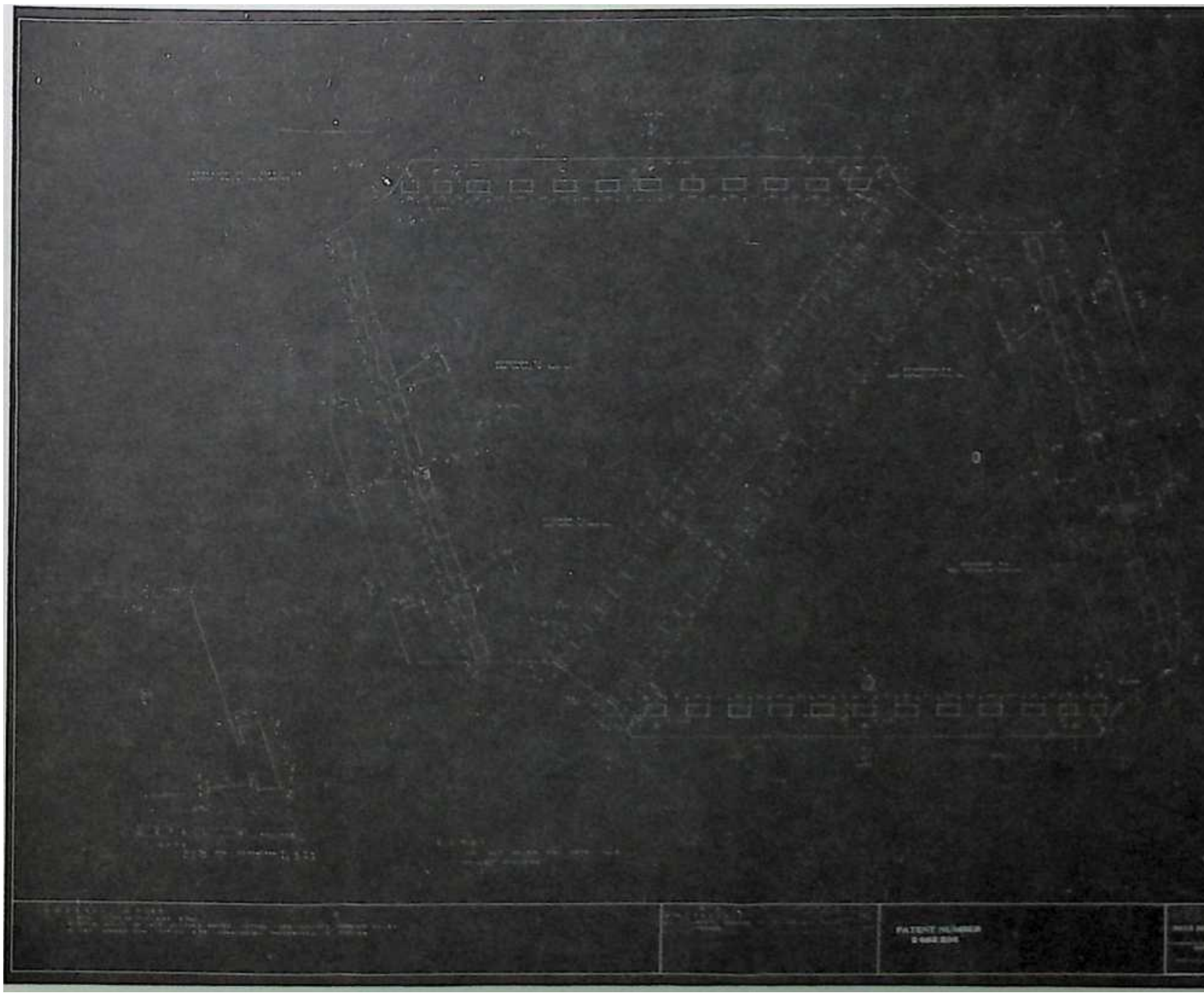
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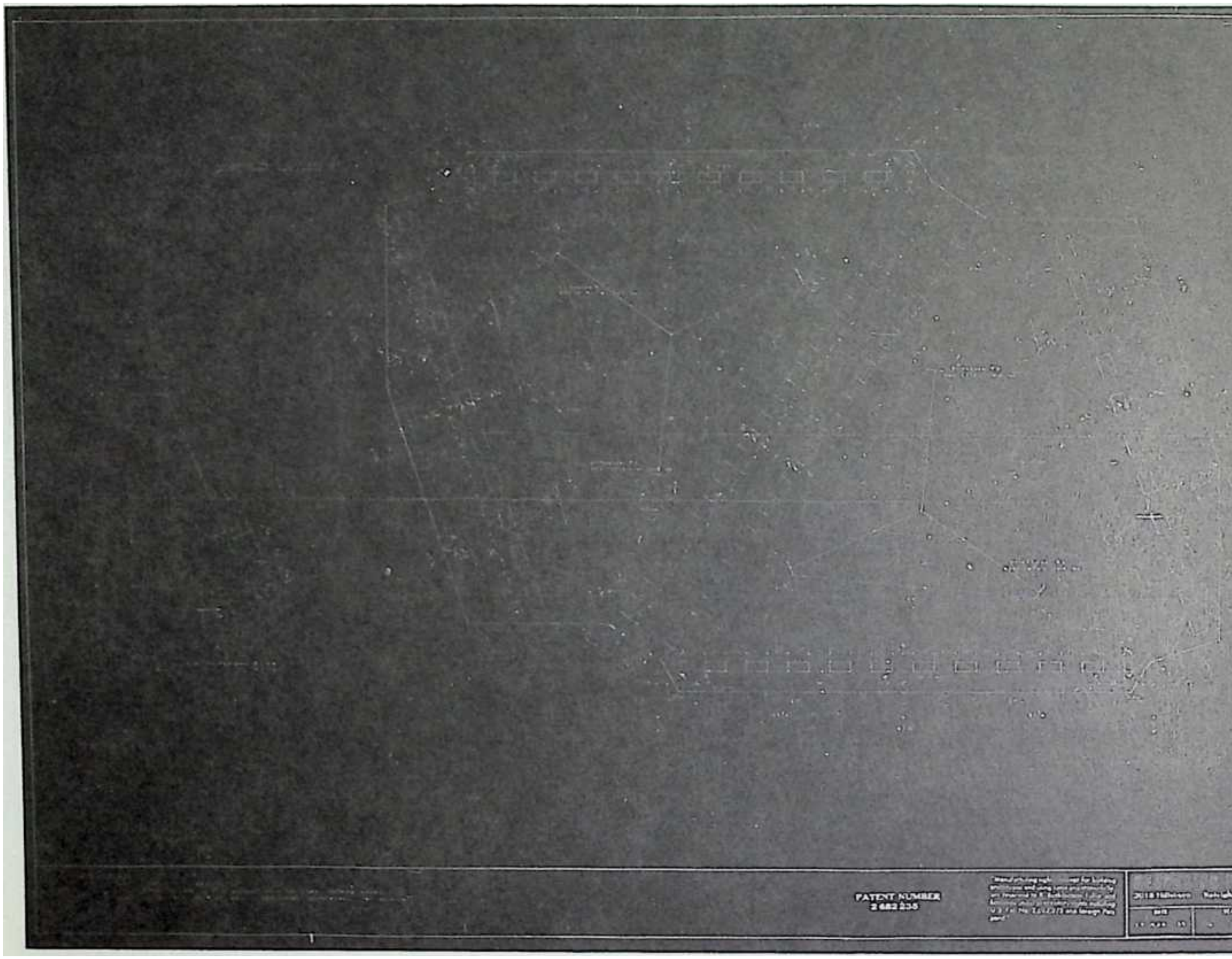
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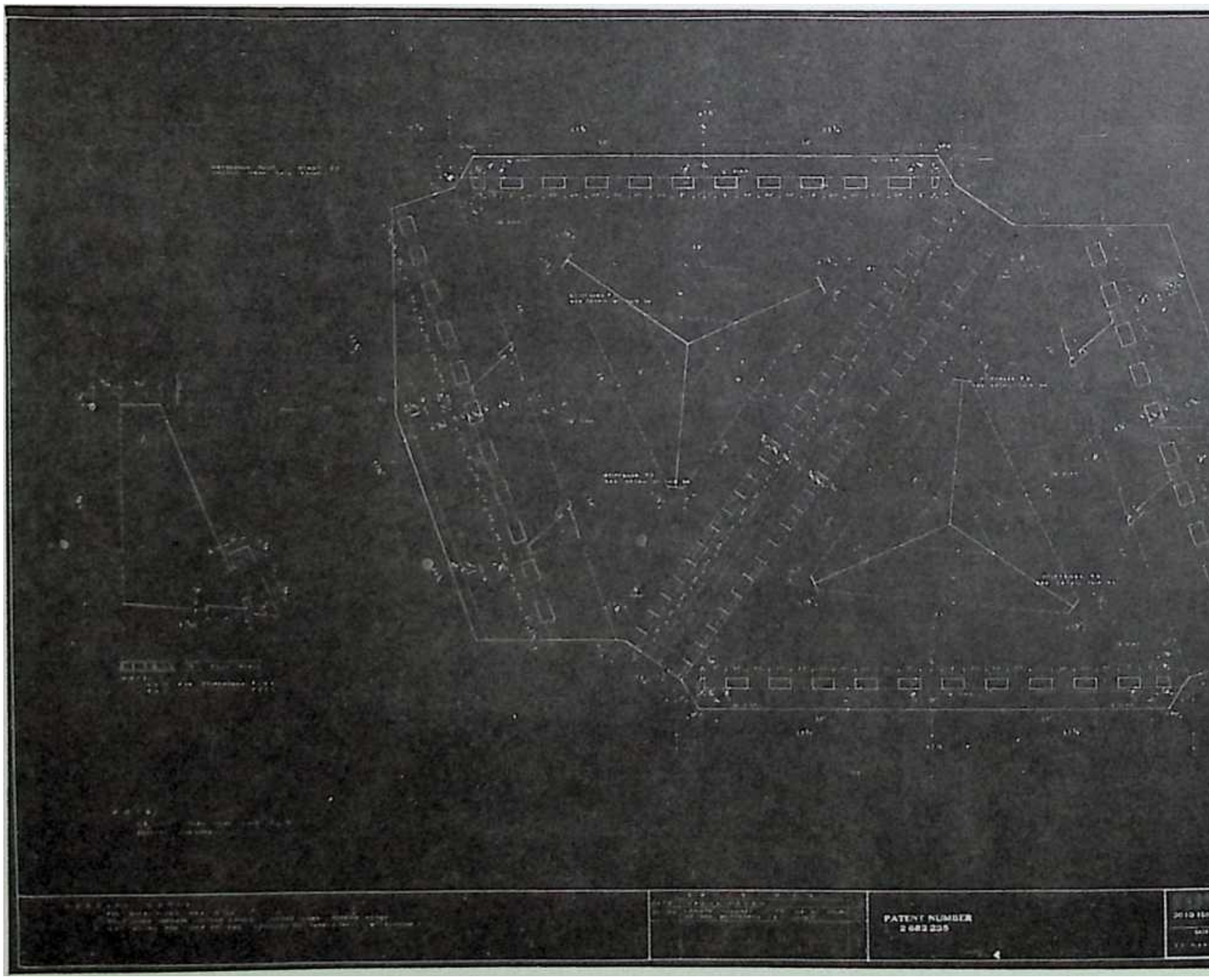
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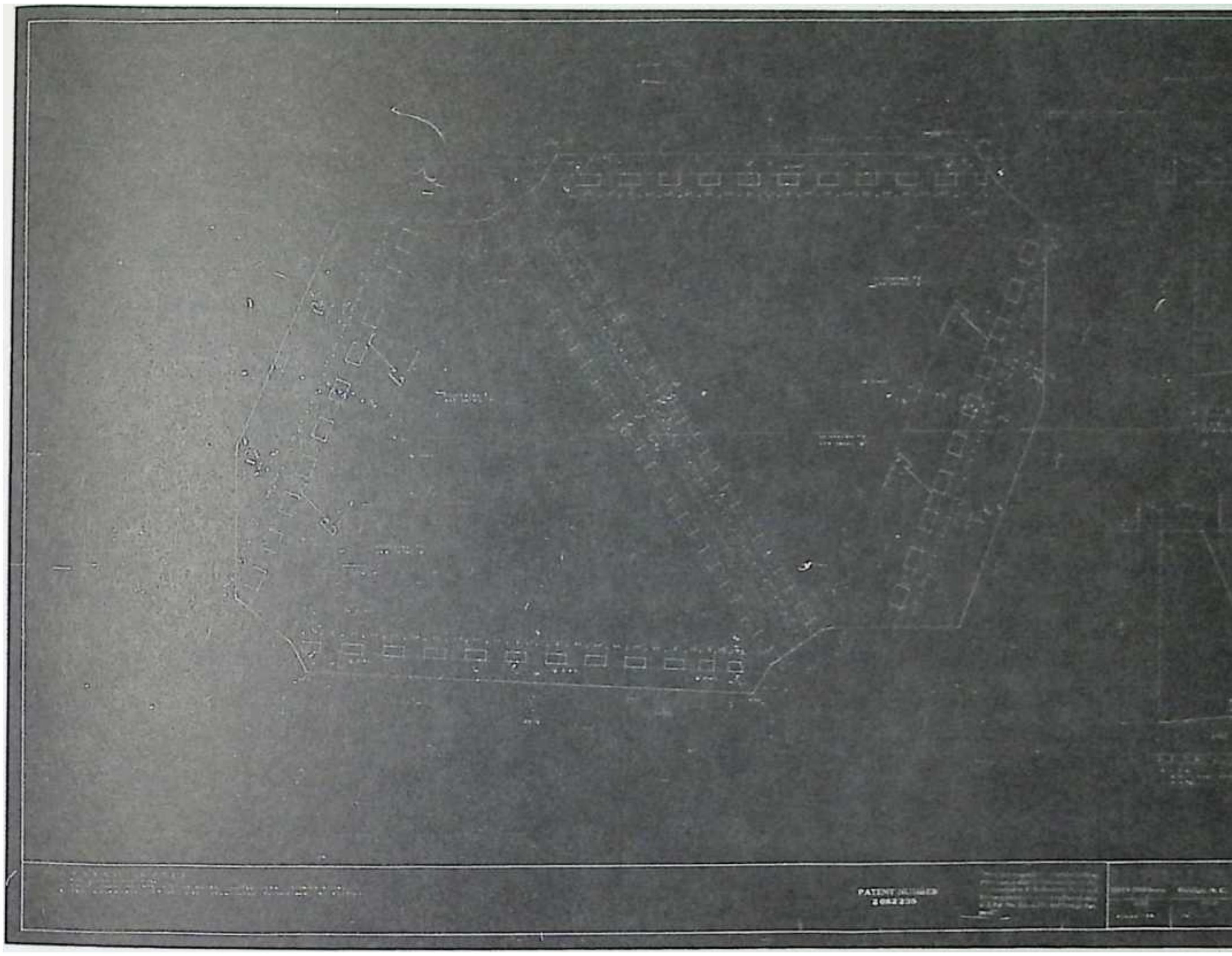
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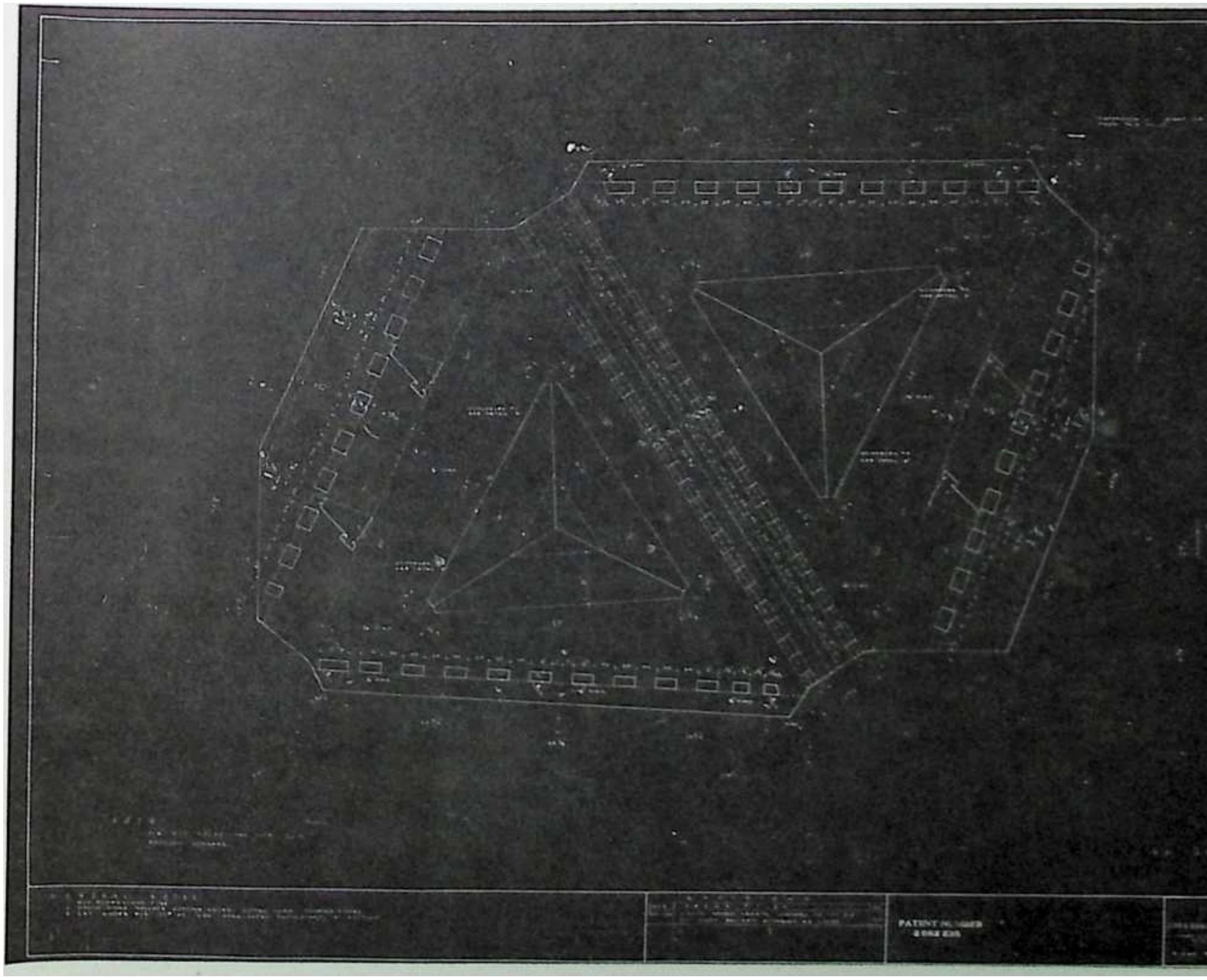
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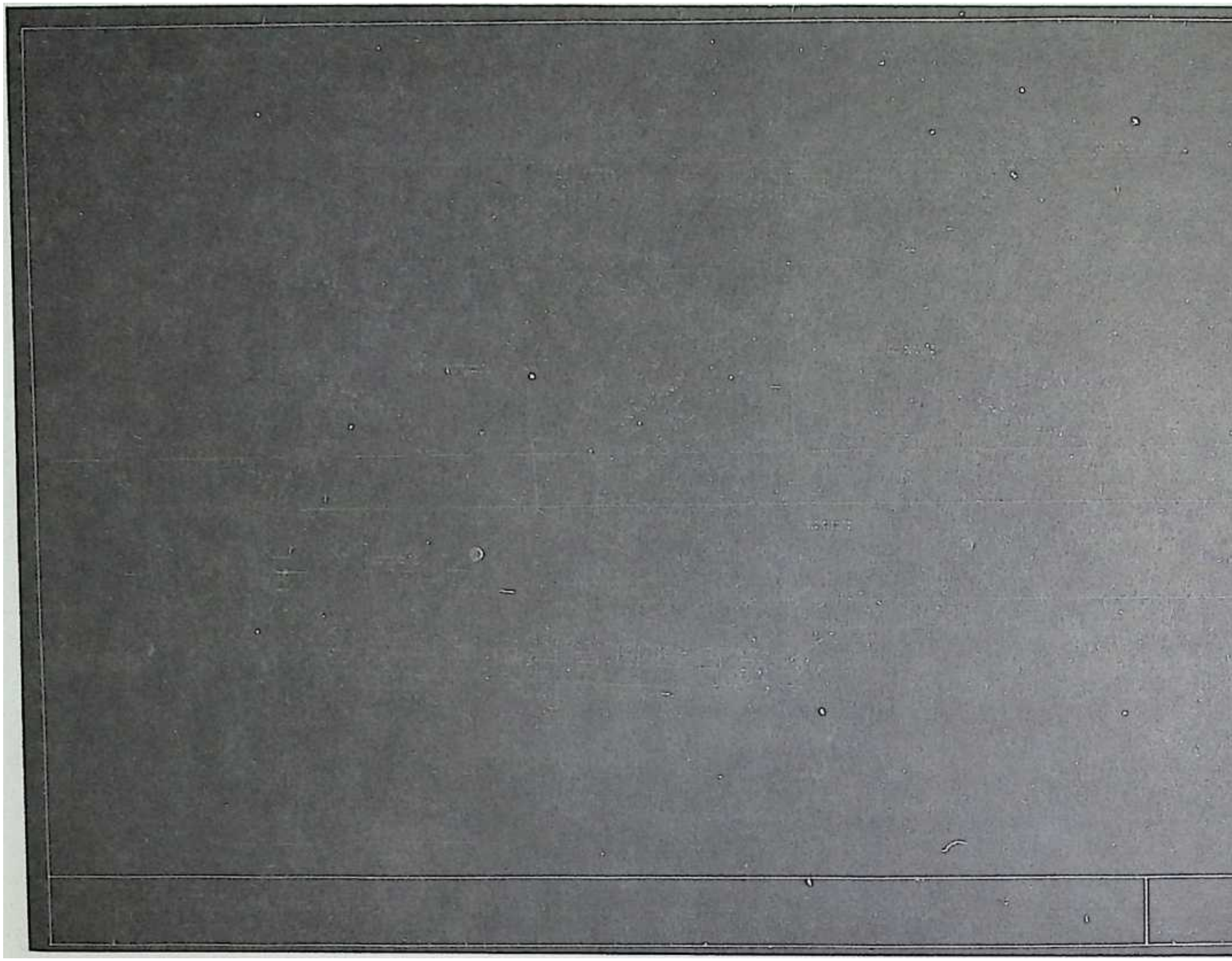

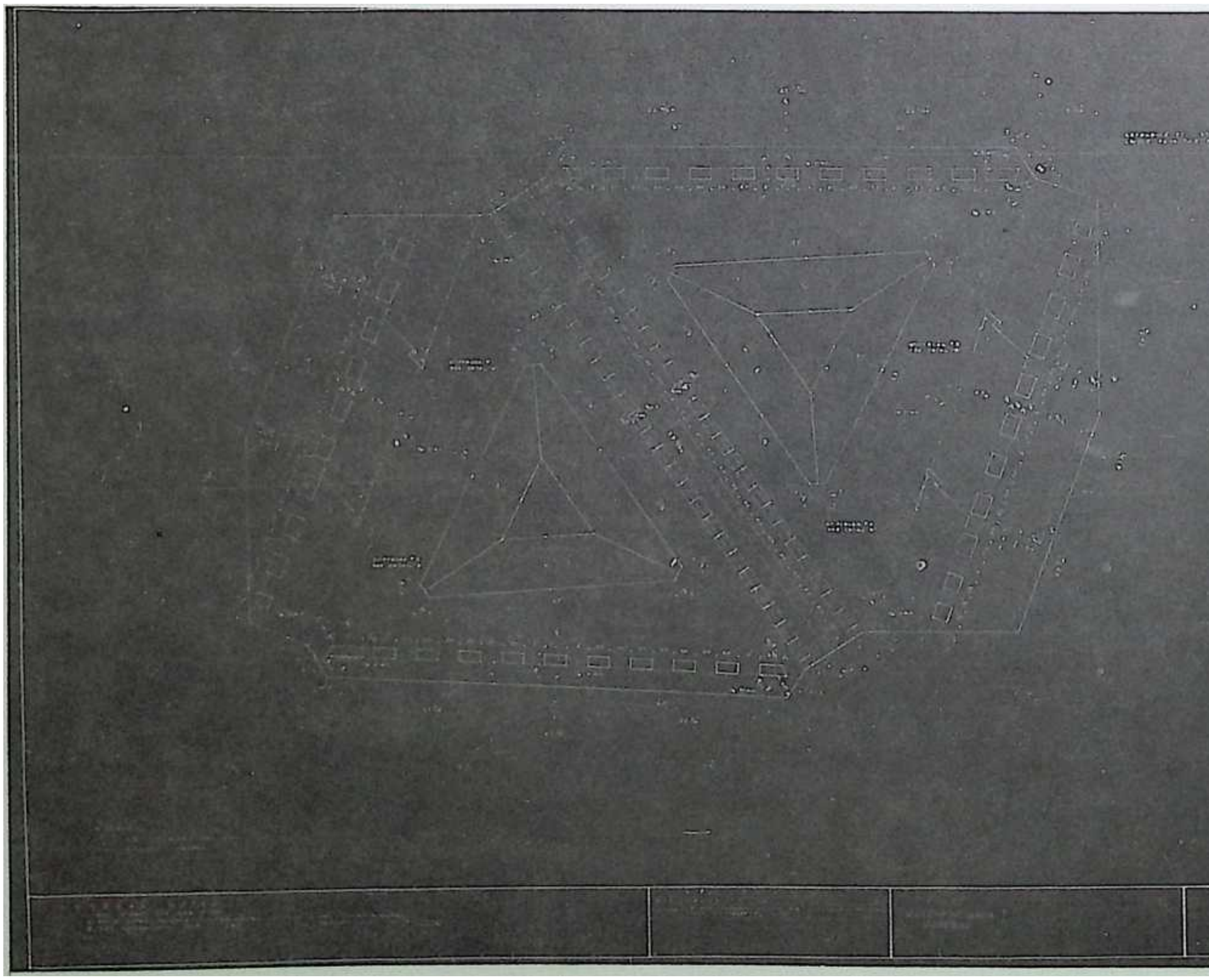

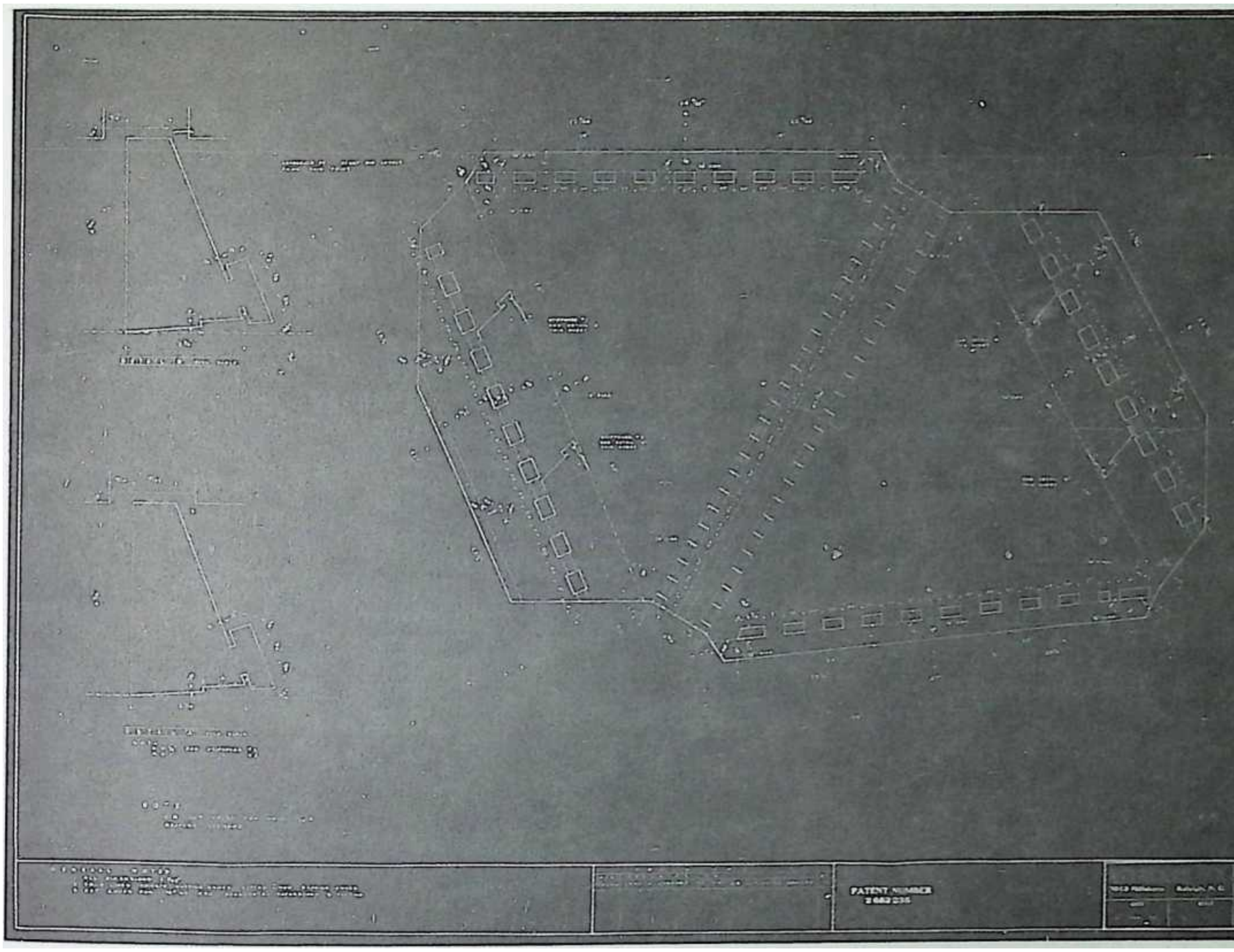
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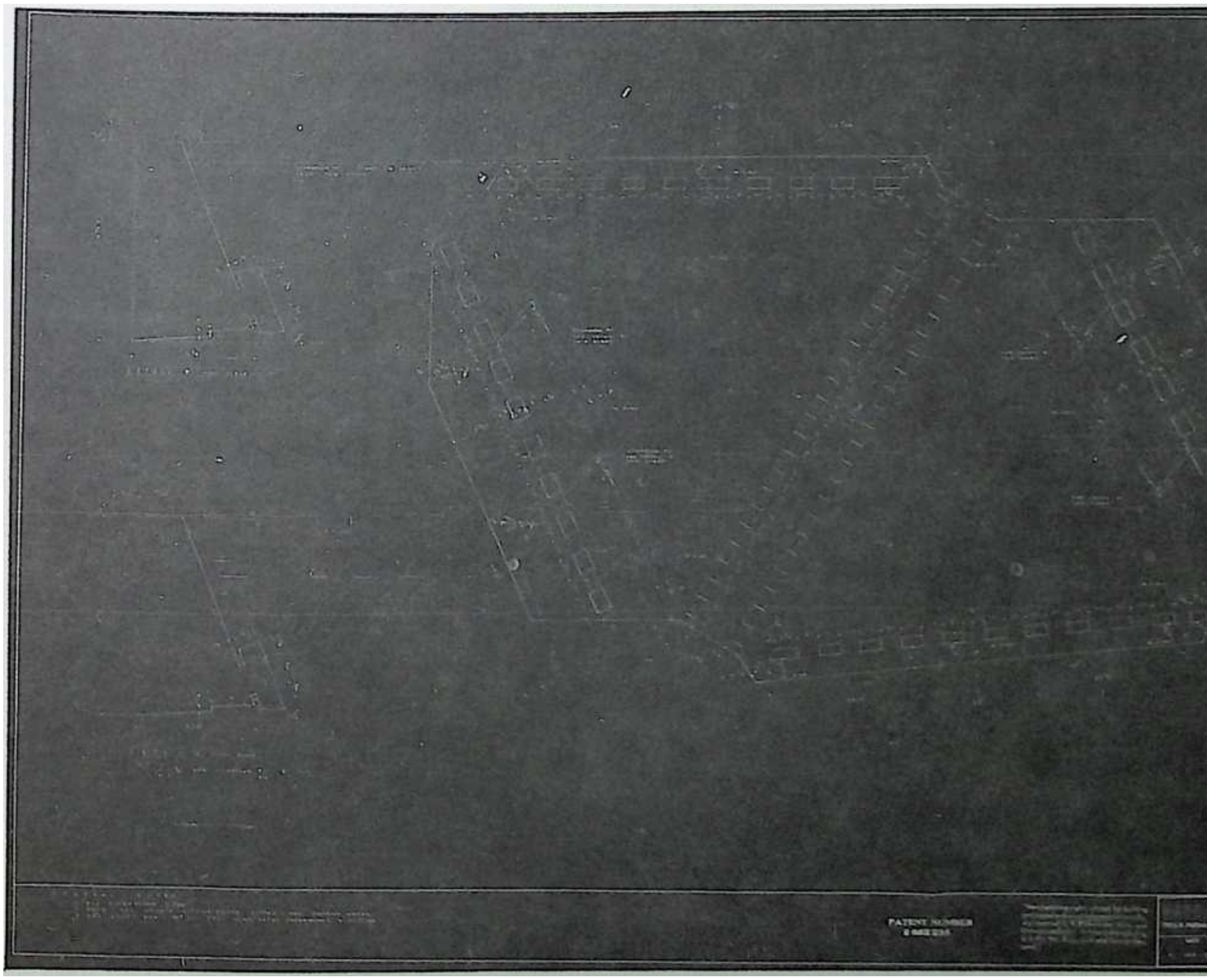
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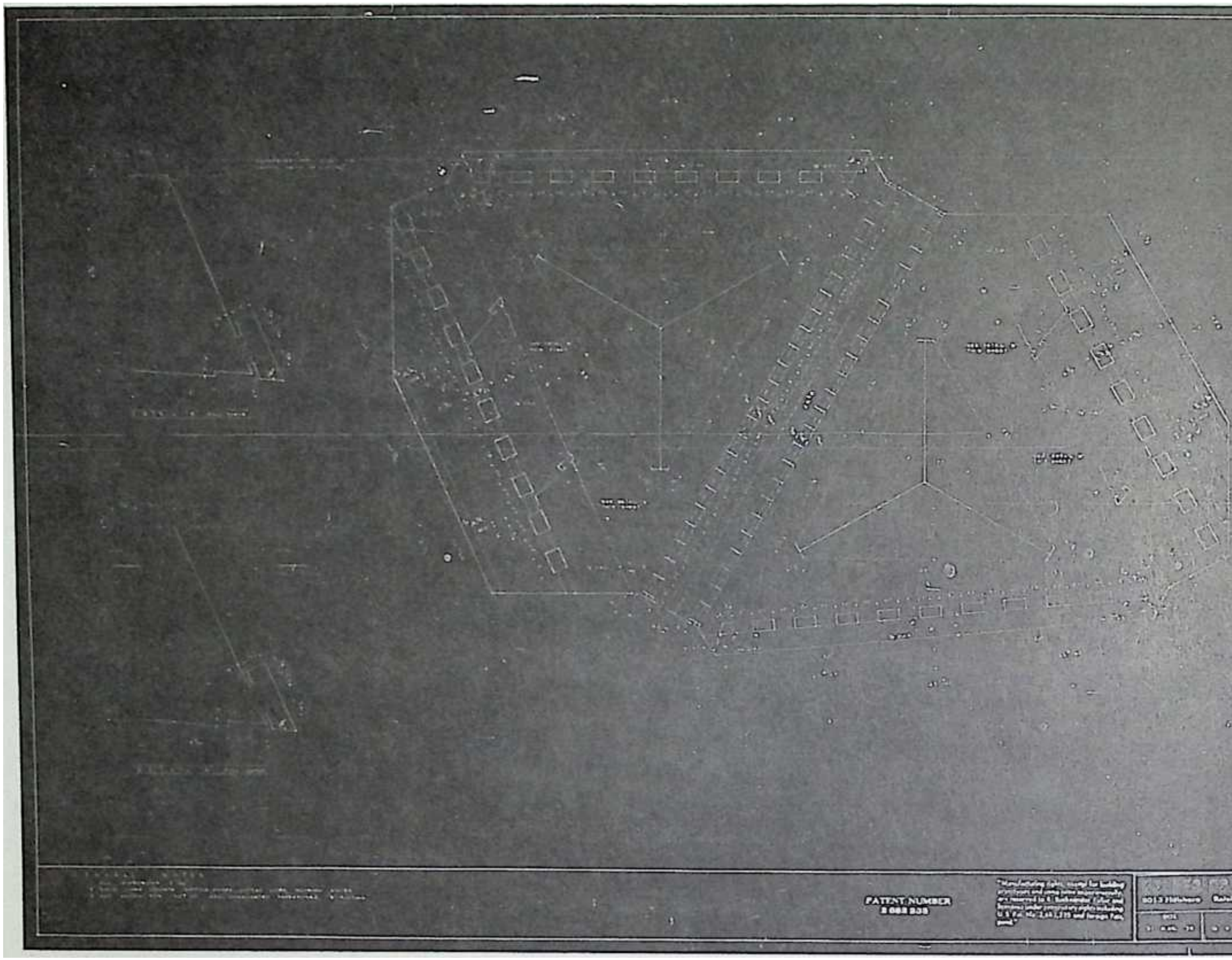
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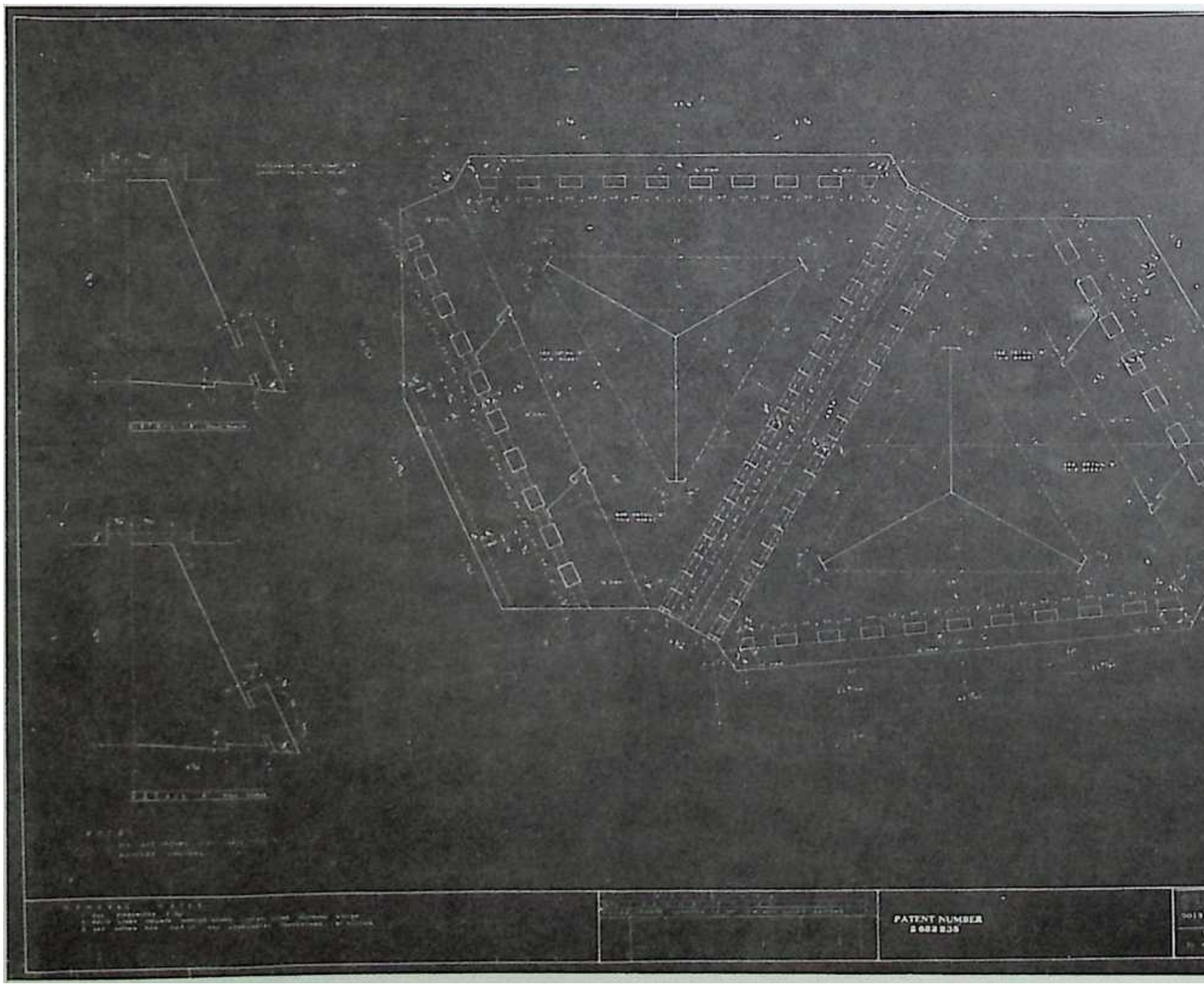
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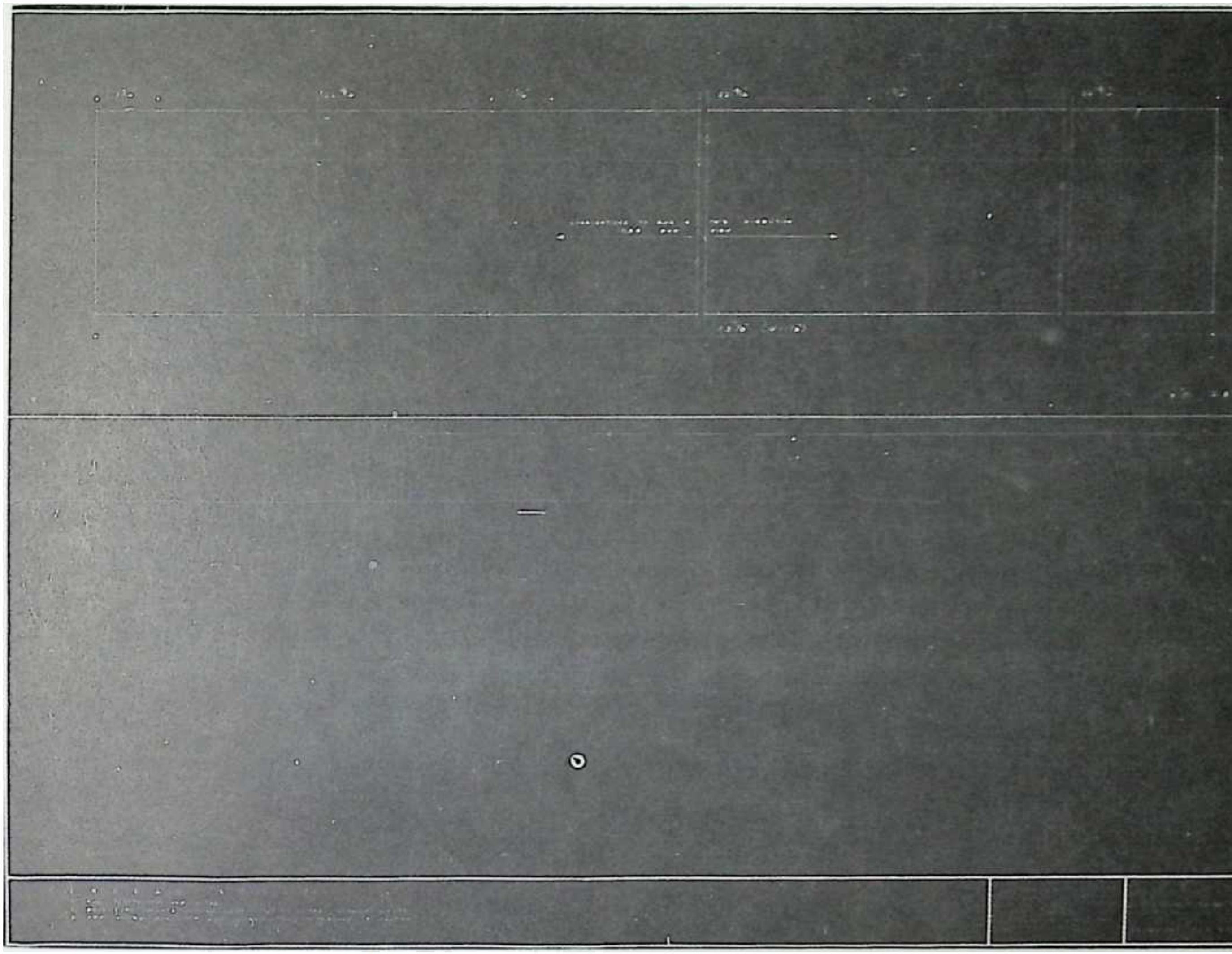
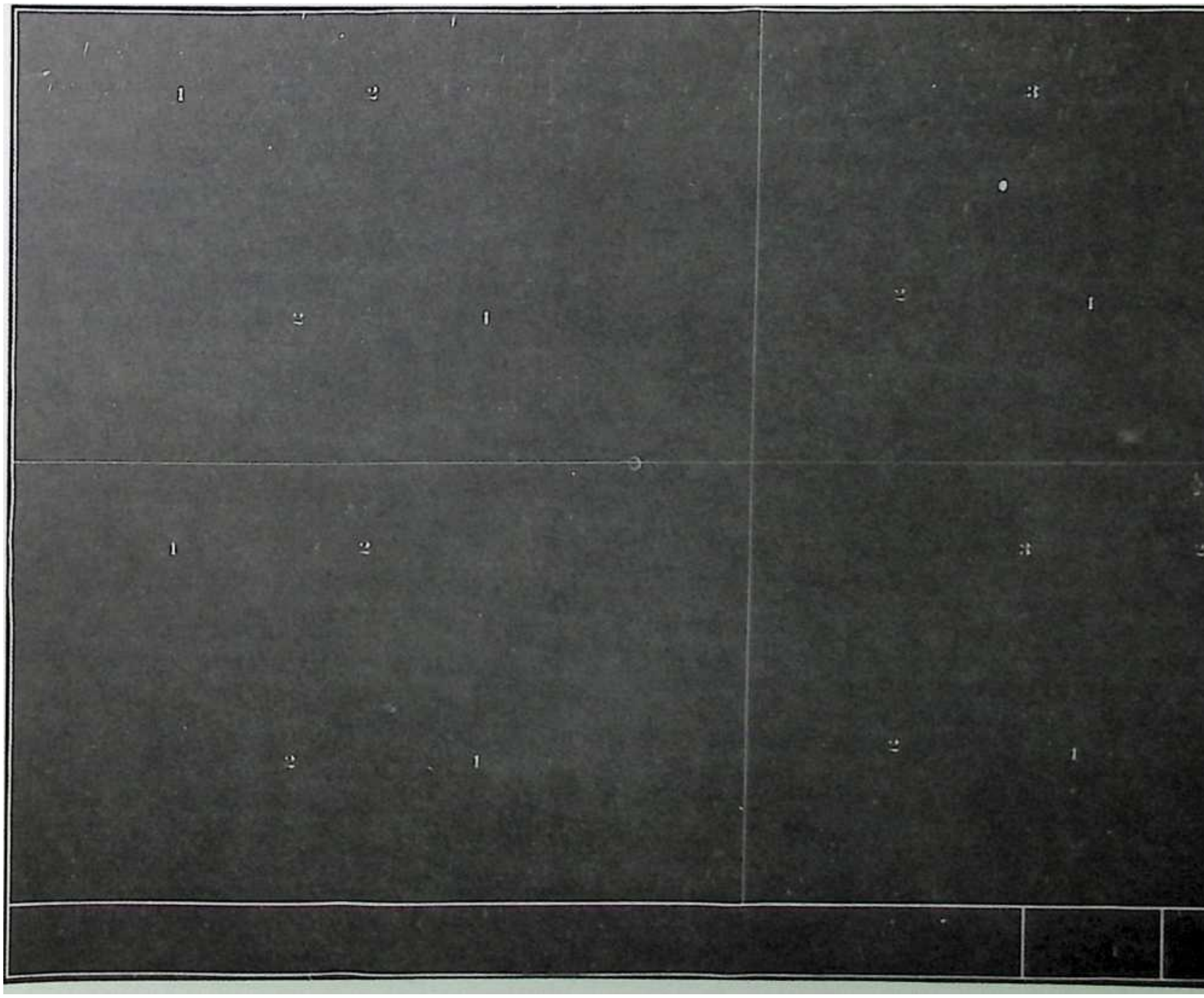
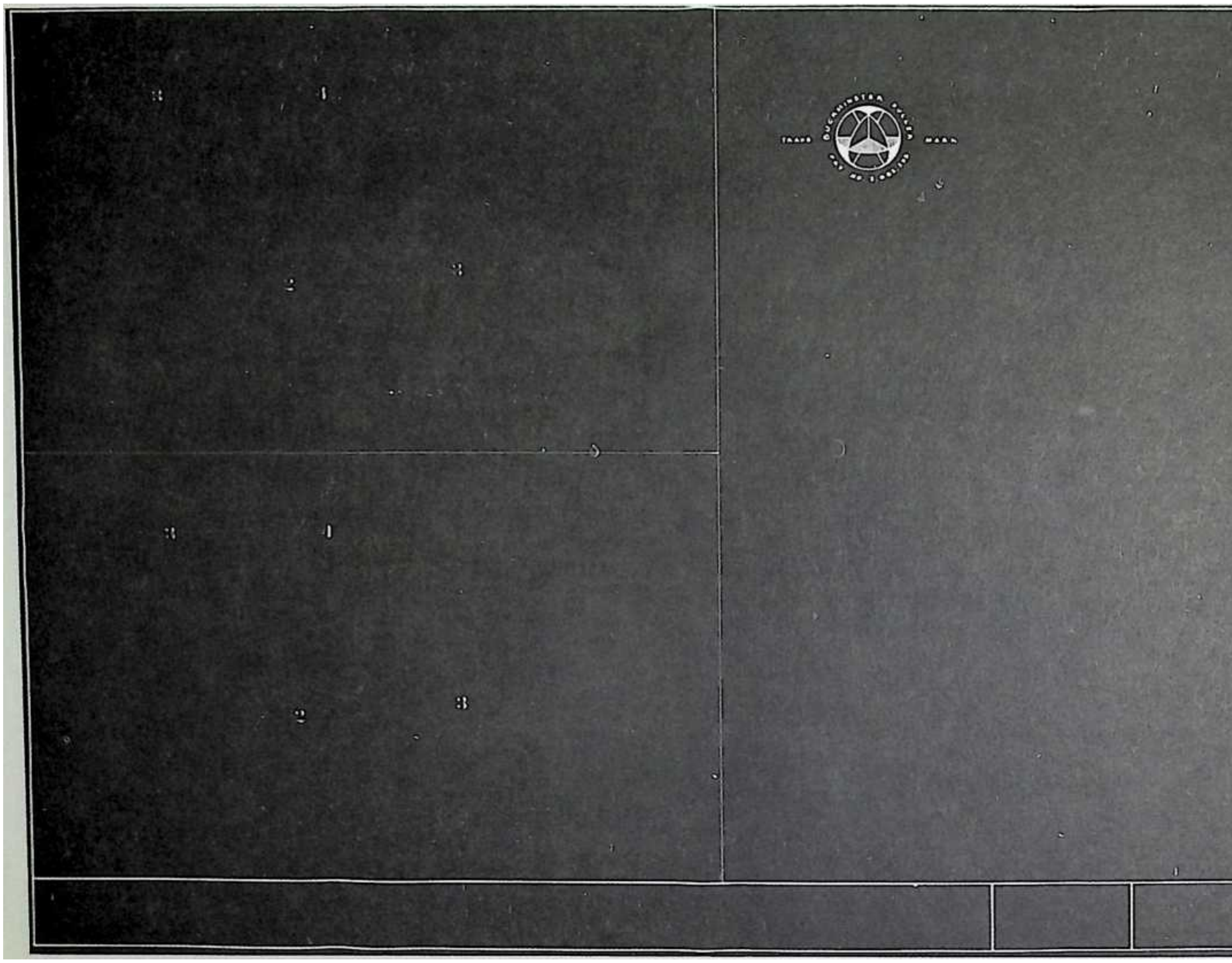


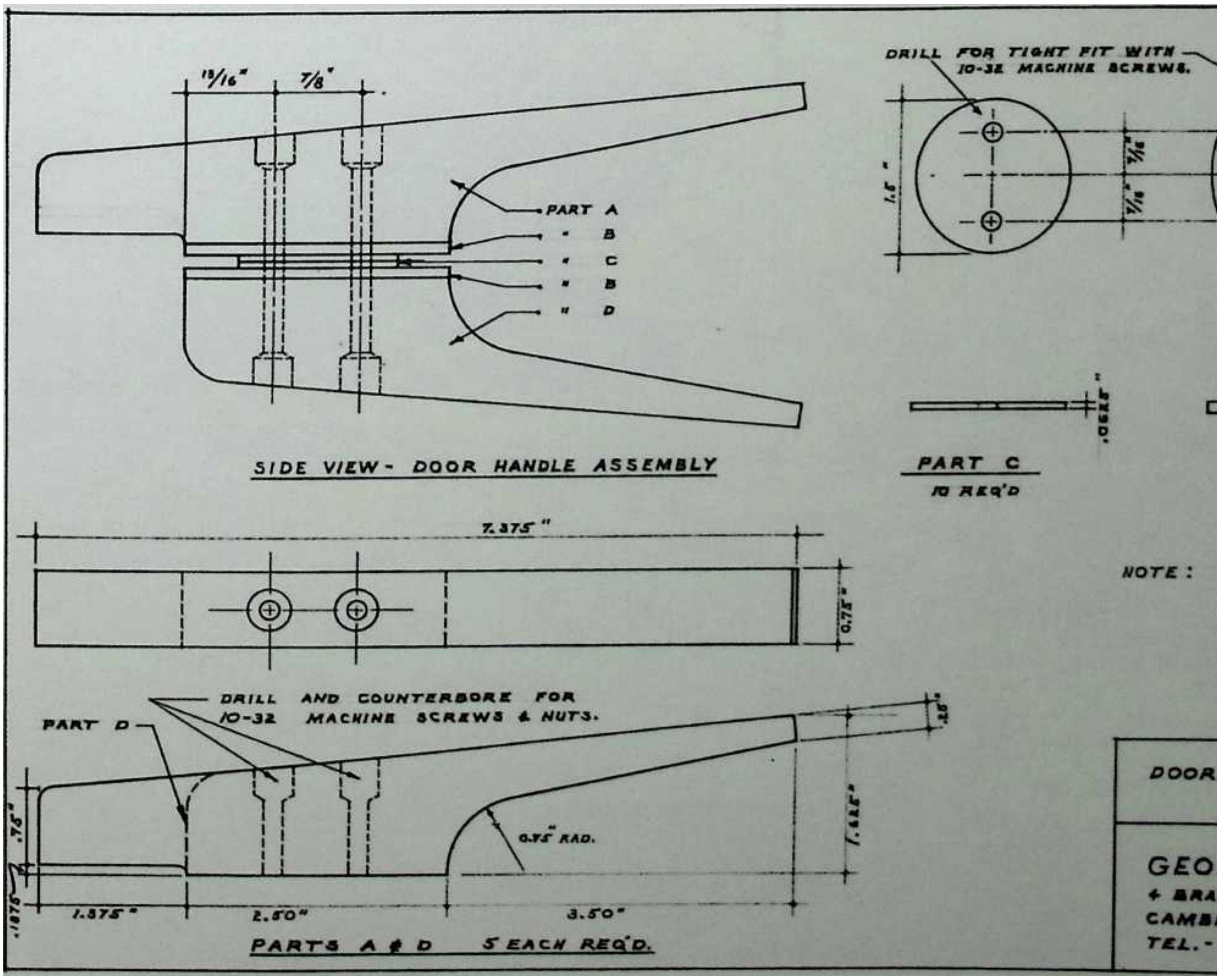




Door Handle Assembly for a Radome

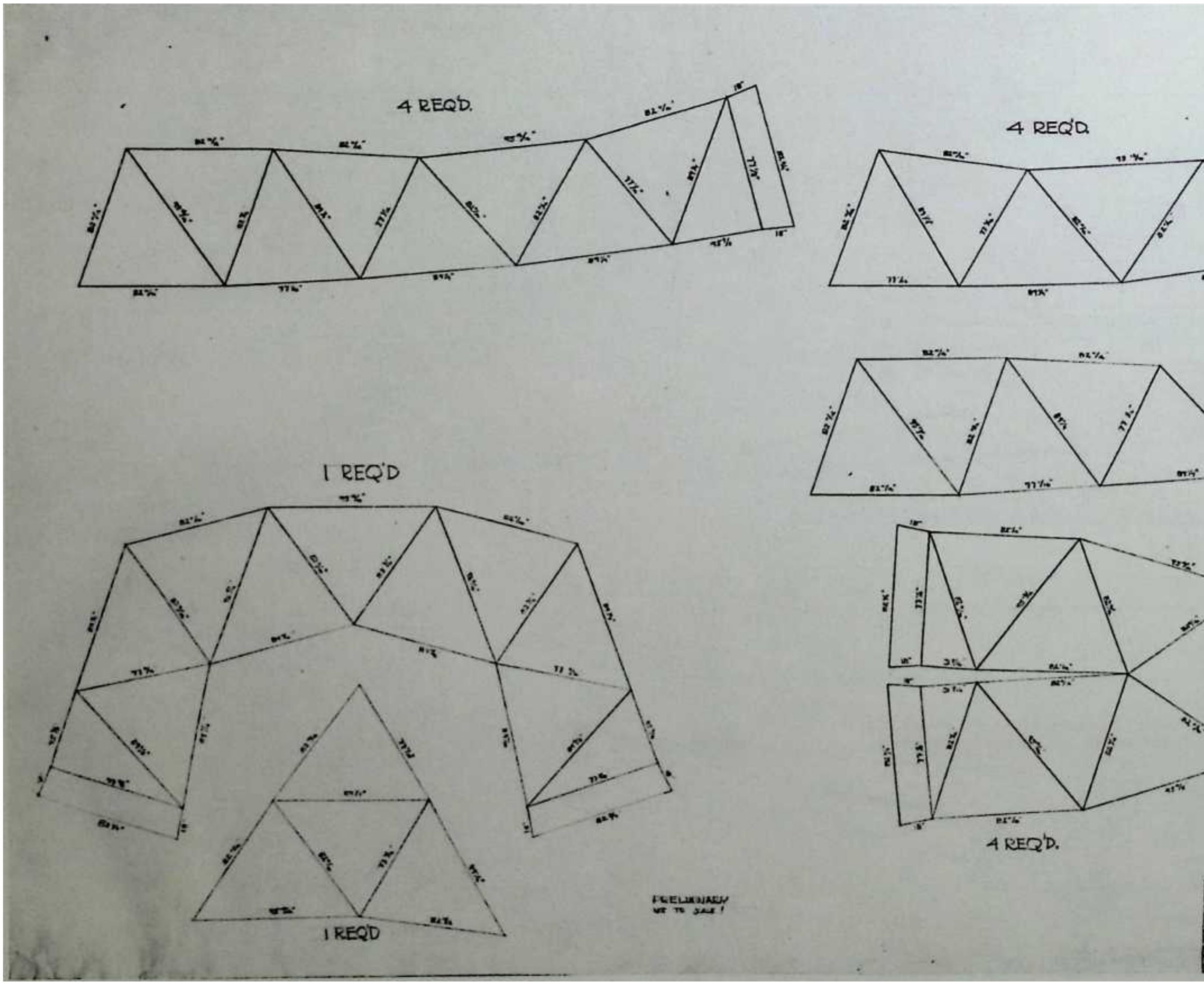
The most elegant version of the door latch for the geodesic dome was devised in 1955. It was manufactured in black industrial laminate.

1955



U.S. Marine Corps— F.F. 42 V2 S. Preliminary 1955

This is a paperboard strip dome of unknown function.

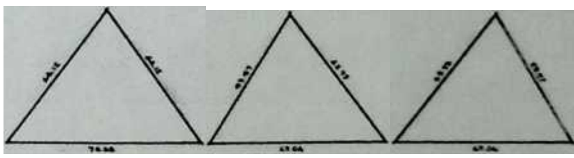


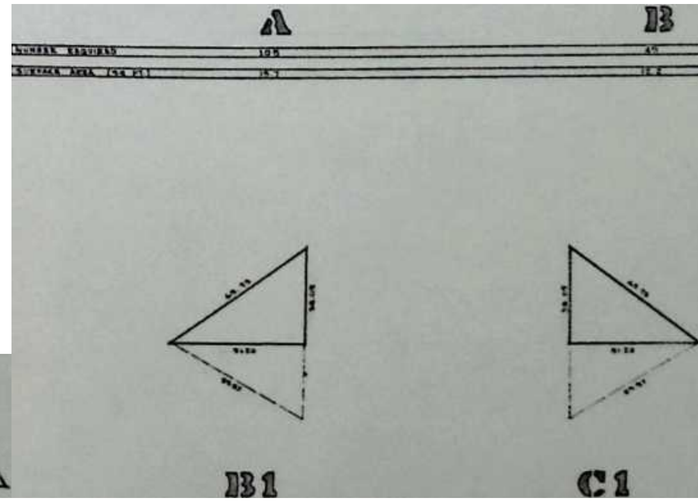
Thirty-two-Foot-Diameter

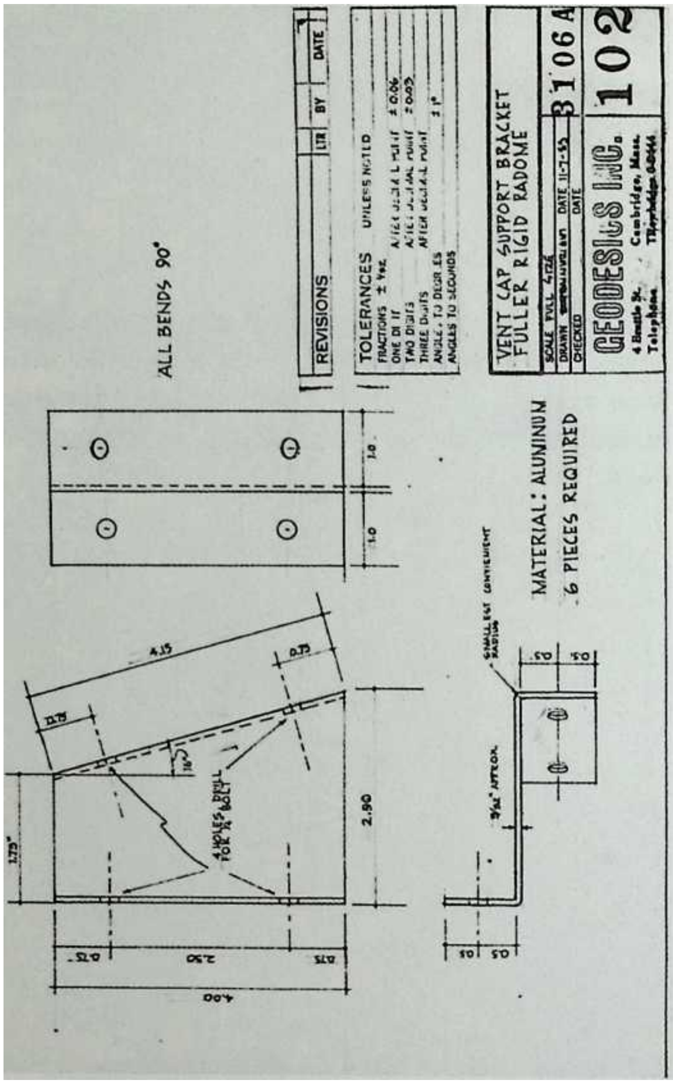
Rigid Radome

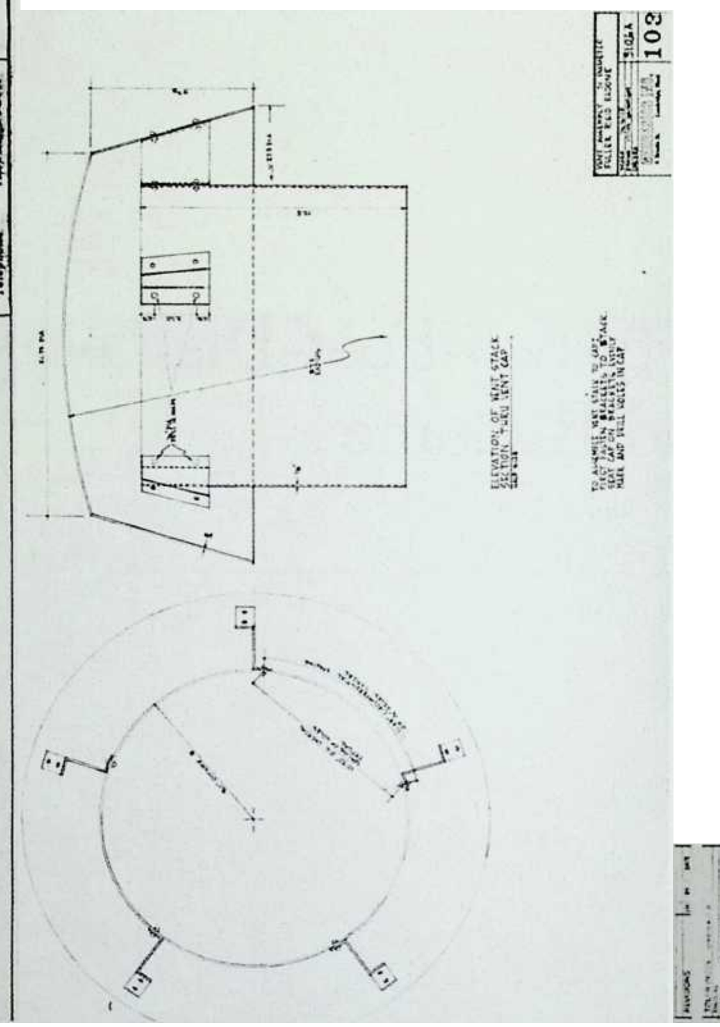
1955

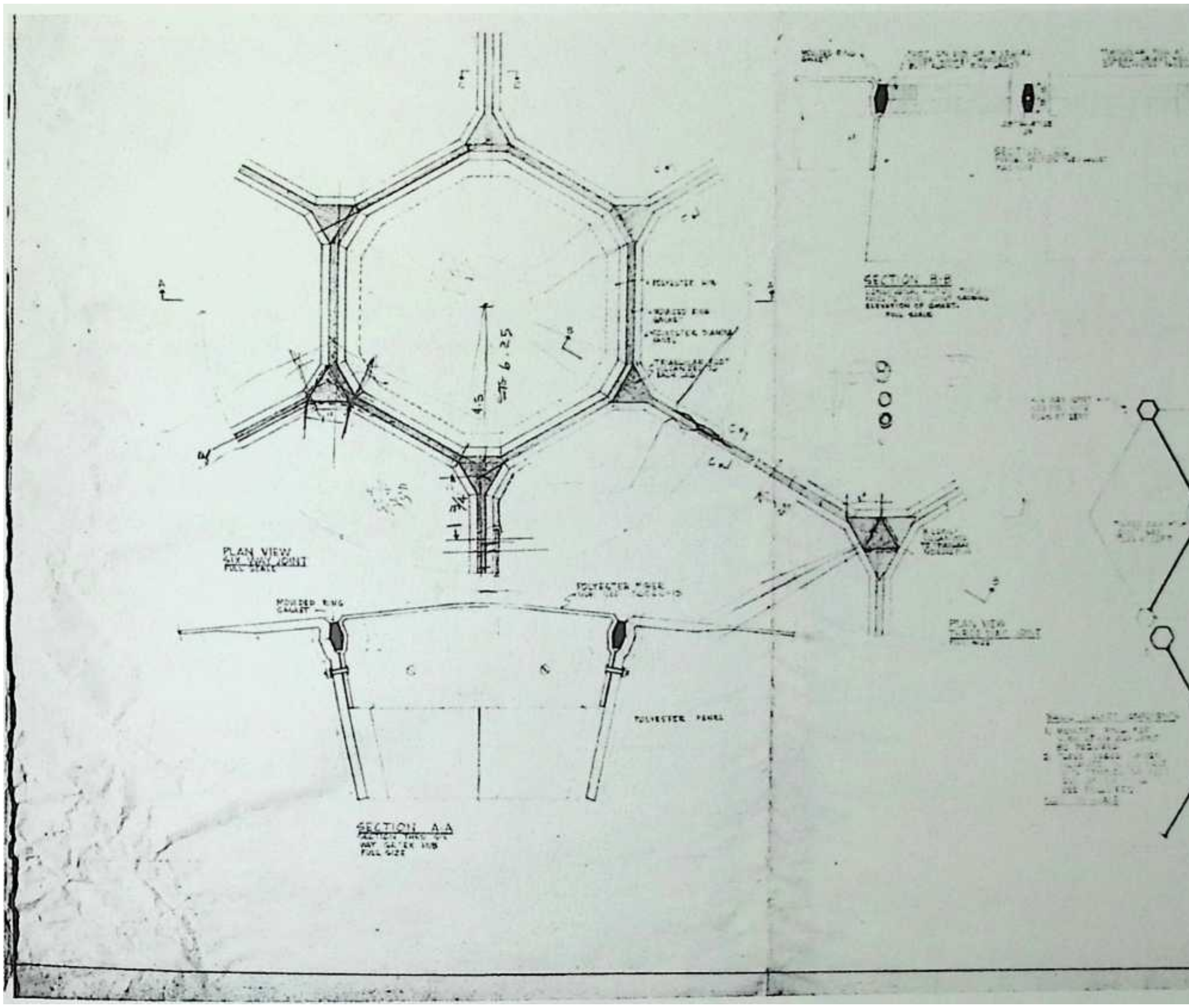
The rigid radome is composed of stiff fiberglass components; the air-inflated radome is a flexible structure. This version of the rigid structure has triangular panels instead of hexagonal, pentagonal, or diamond-shaped ones.

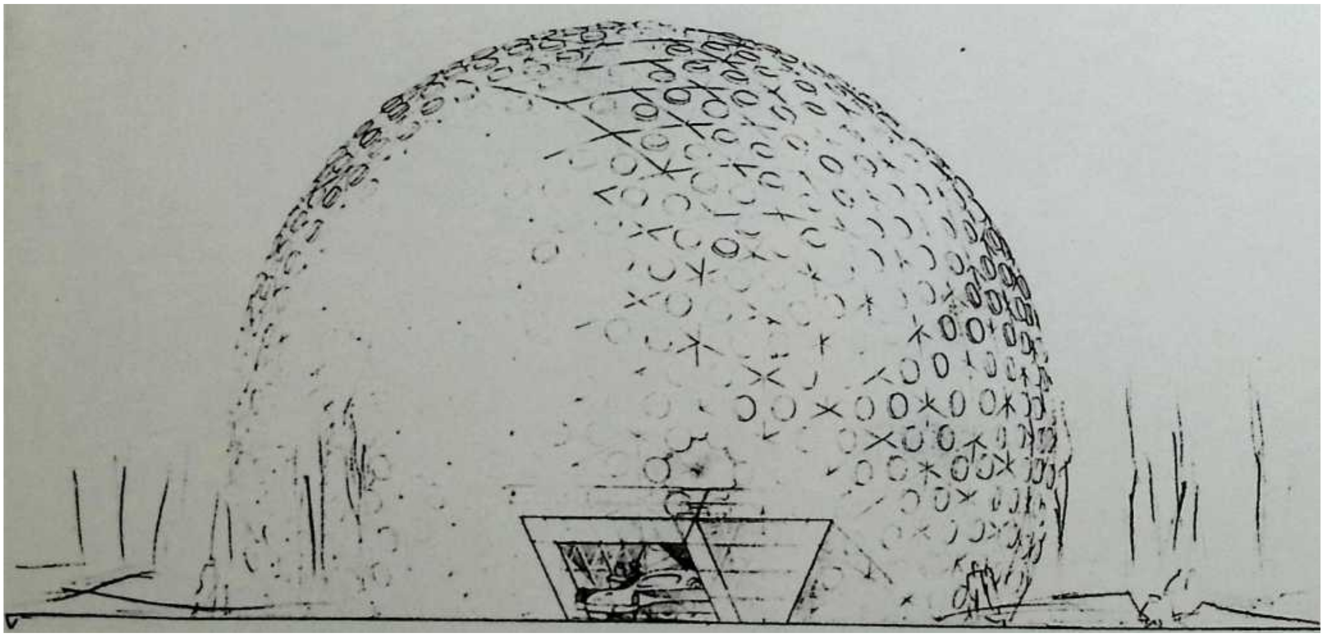



A
B
B1
C1


ALL BENDS 90°
REVISIONS
TOLERANCES
VENT CAP SUPPORT BRACKET
FULLER RIGID RADOME
3106A
GEODESICS INC.
102
MATERIAL: ALUMINUM
6 PIECES REQUIRED




PLAN VIEW
SIX WAY JOINT
FULL SCALE
SECTION A-A
FULL SIZE
SECTION B-B
FULL SCALE
PLAN VIEW
THREE WAY JOINT
MOULDED RING
GASKET
POLYESTER FIBER
POLYESTER PANEL
6.25
4.5



Homestyle Center Foundation, Geodesic Dome House, Grand Rapids, Michigan 1955

The molded polyester fiberglass units of this dome are hexagons modified by corner arcs that form porthole fenestration. Visually, however, the raised molded flanges of each panel suggest that each window is the center of a triangular unit. Like the Skybreak designs, the Homestyle Center Dome House was to be lit abundantly. Interior trusses supported the geometric platforms of living spaces. This is the first fully articulated geodesic dome dwelling and resembles the Dymaxion House of a quarter century earlier in several of its details. None of Fuller's earlier domestic designs matches the spatial luxury of this dome.

U OM ESTYLE DESIGNED BY

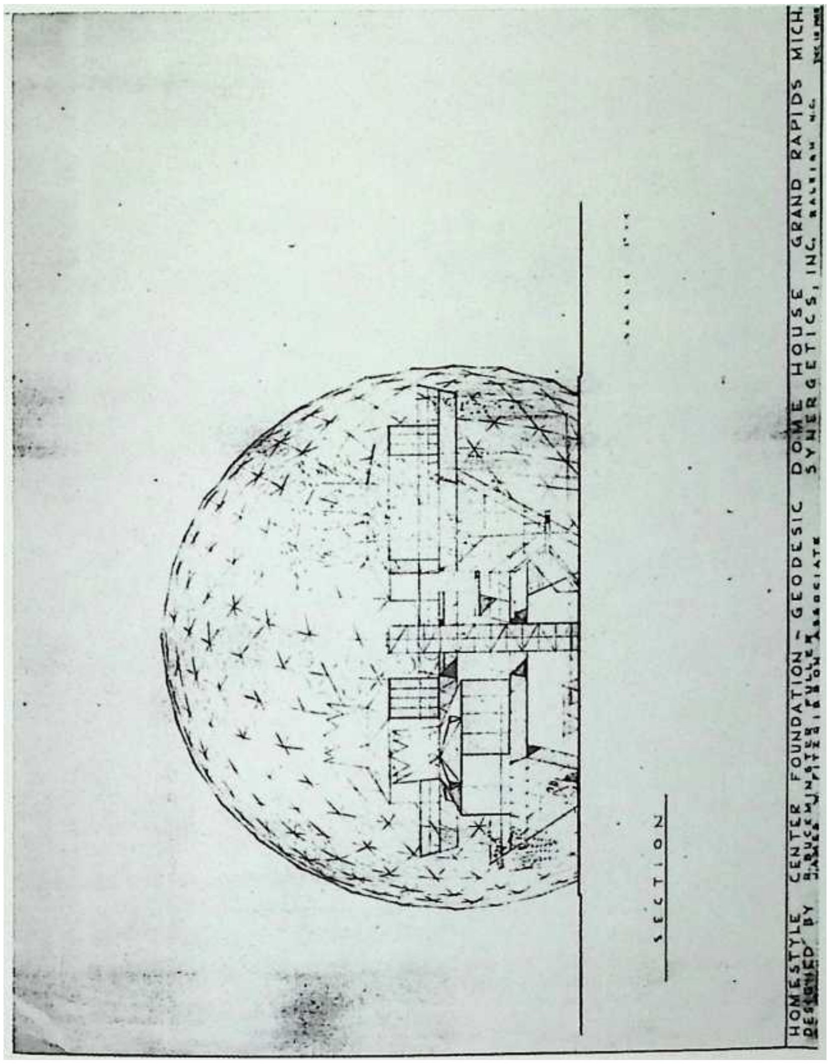
CENTER FOUNDATION - GEODESIC

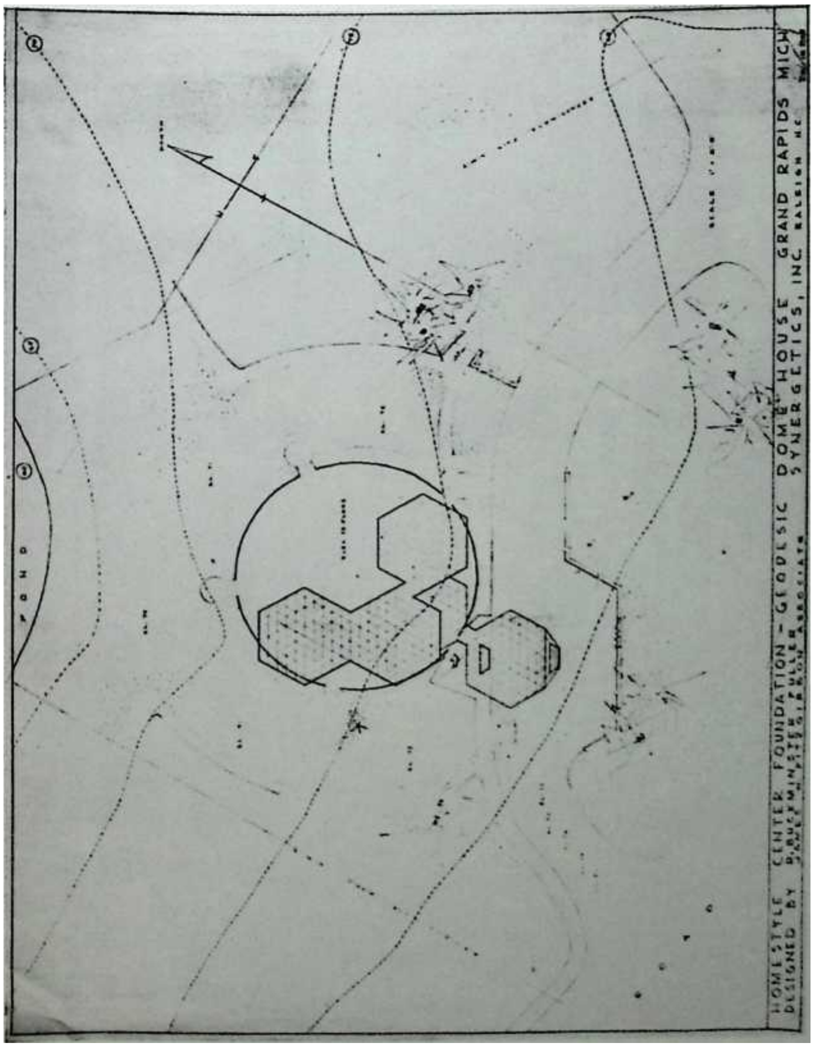
S T E B F U L L E. «

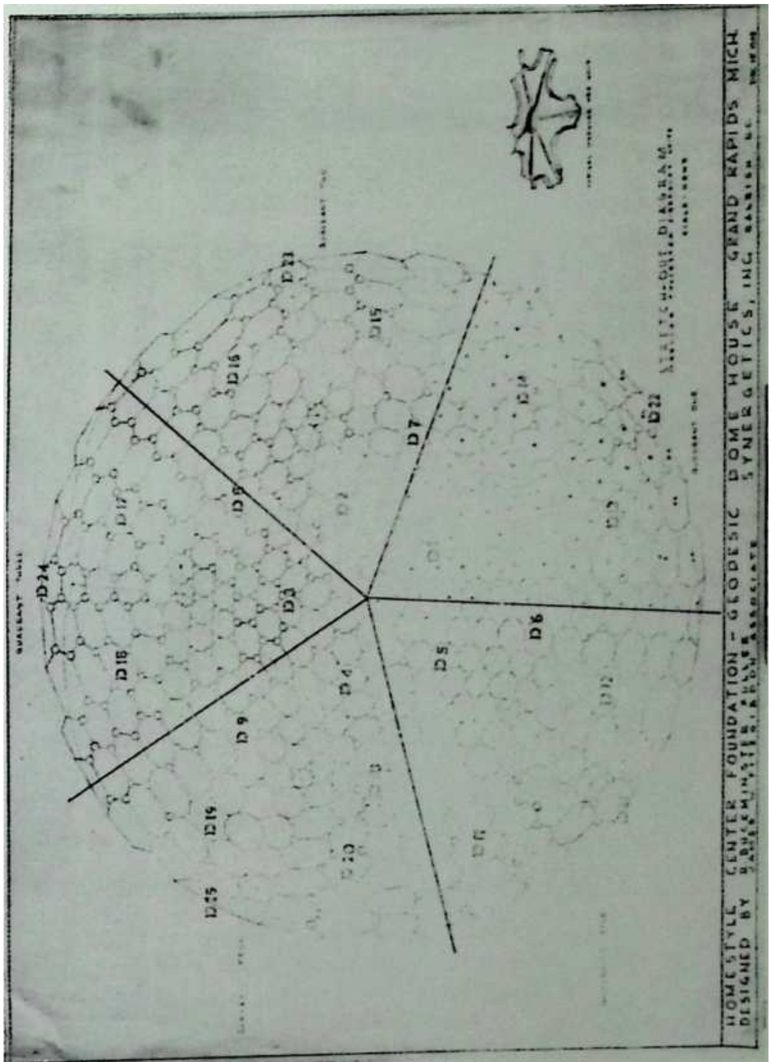
JAMES FITZ G ' *b* It o M ASAOCiA-rn

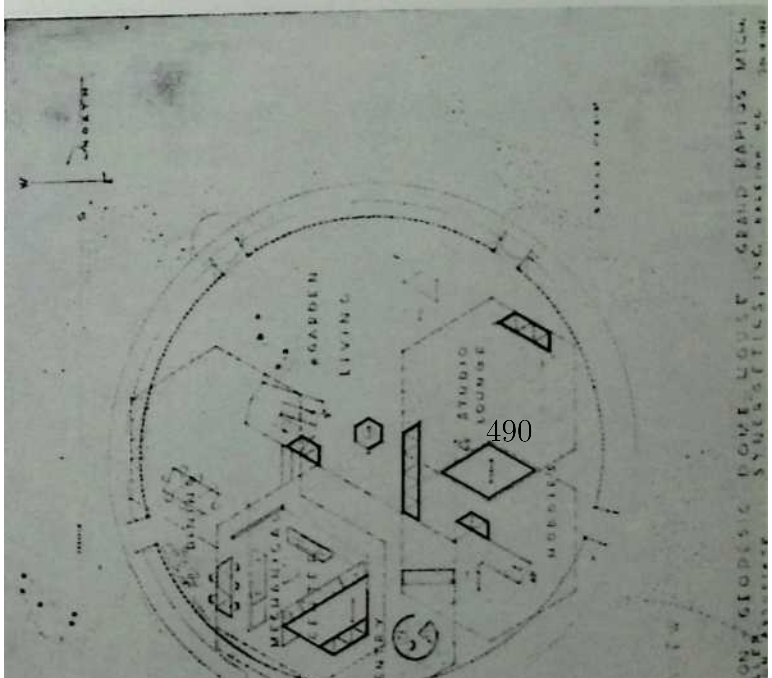
DOME HOU.SE GRAND E API DS MICH.

5YHEBGE.TICS, INC. EAUCIGH M.C. BGT'O „„


HOMESTYLE CENTER FOUNDATION - GEODESIC DOME HOUSE GRAND RAPIDS MICH.
DESIGNED BY
SYNERGETICS, INC.
SECTION

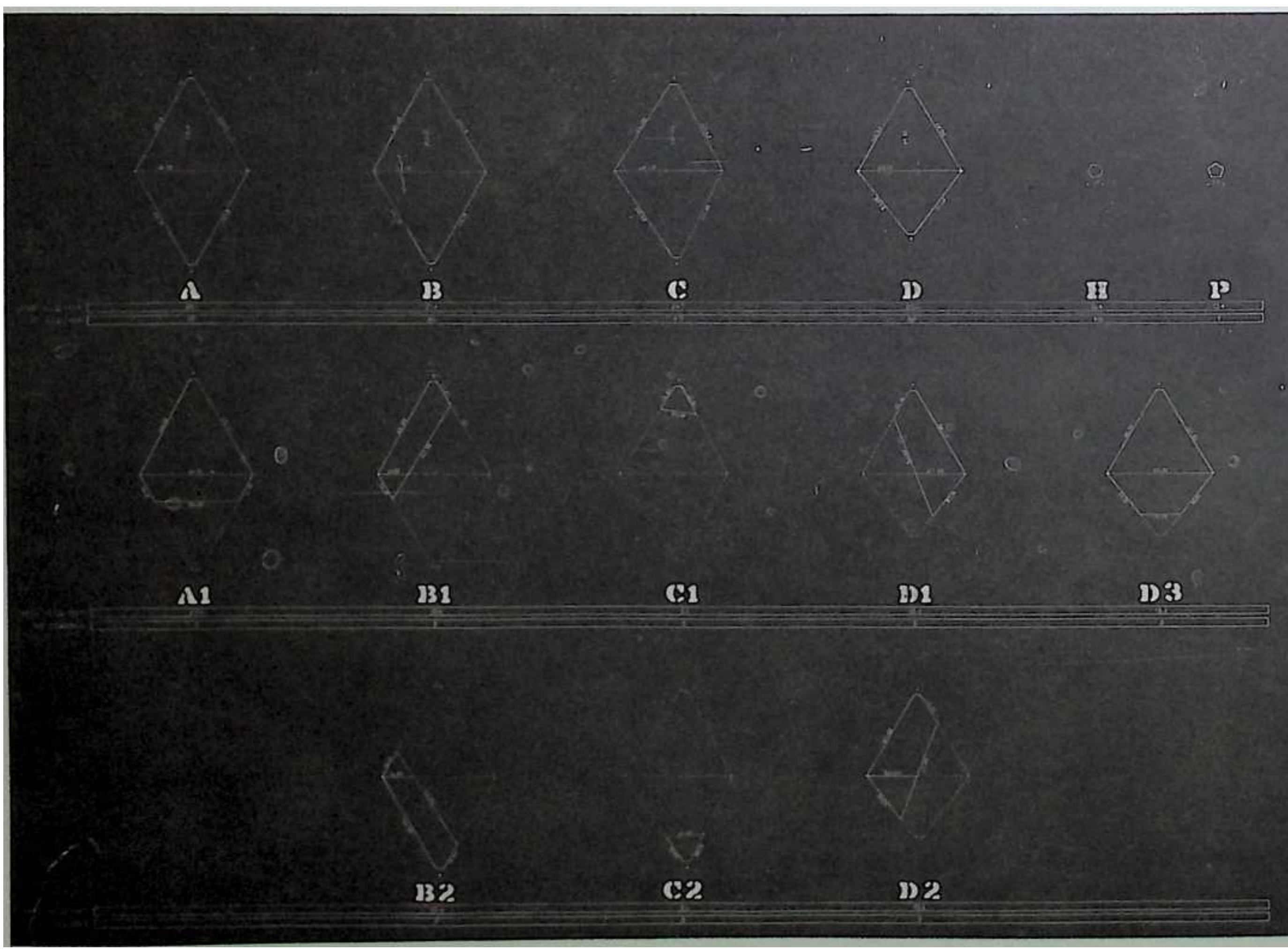

HOMESTYLE CENTER FOUNDATION - GEODESIC DOME HOUSE GRAND RAPIDS MICH
DESIGNED BY
SYNERGETICS, INC
POND

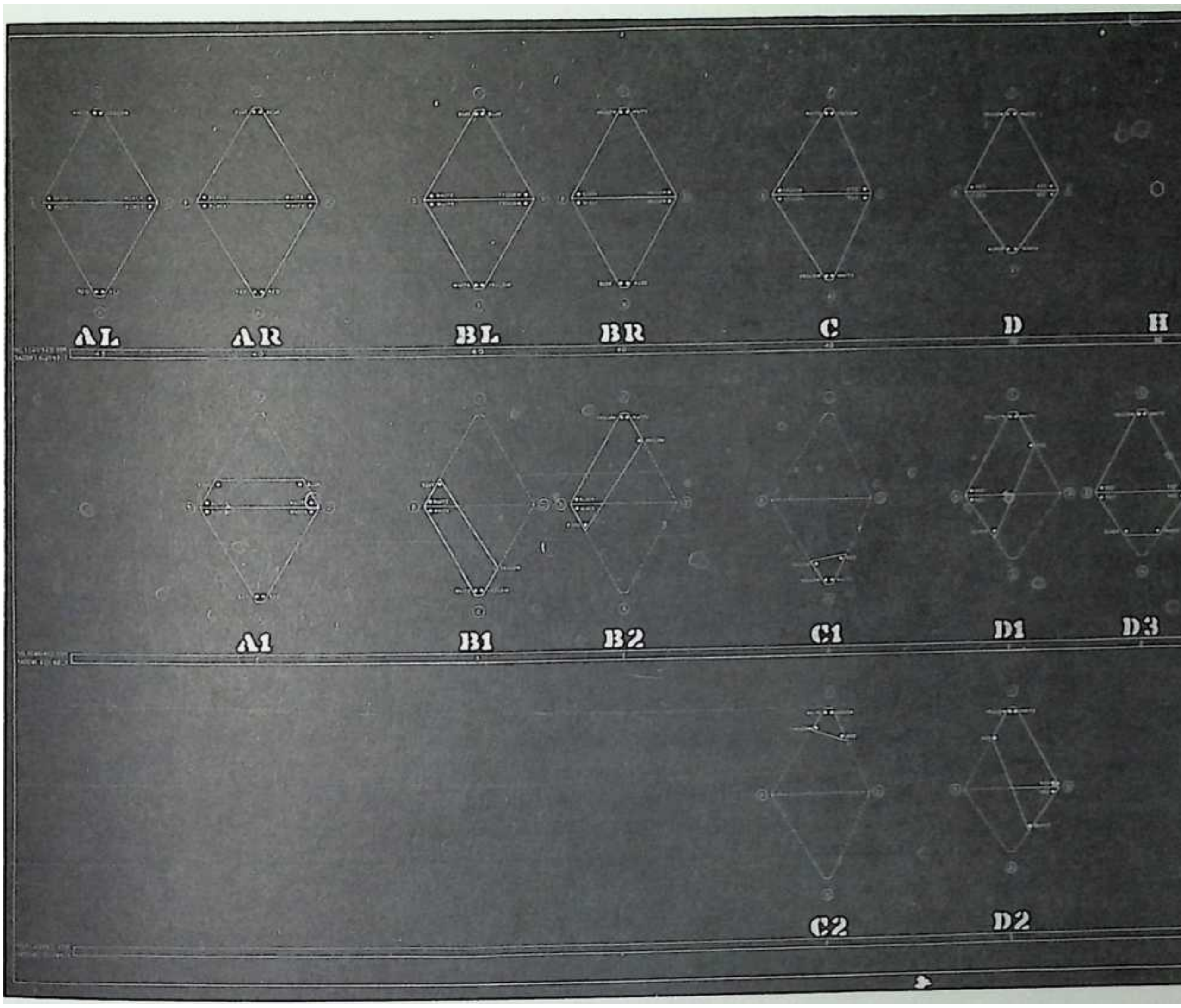

HOMESTYLE CENTER FOUNDATION – GEODESIC DOME HOUSE GRAND RAPIDS MICH.
DESIGNED BY R. BUCKMINSTER FULLER
SYNERGETICS, INC.
D3
D4
D5
D6
D7
D9
D15
D16
D17
D18
D19
D20
D22
D23
D24
D25


GEODESIC DOME HOUSE GRAND RAPIDS MICH.
NORTH
GARDEN
LIVING
STUDIO
LOUNGE
MECHANICAL
DINING

Final Version of the Radome (Fifty-Foot Diameter): Flange and Vertex Details 1955

The final version of the Fuller radome has molded hubs of polyester and a molded ring gasket. The hubs are hexagonal, and the radome's beveled corners form small triangles filled with a rubber plug. The larger fiberglass panels are roughly diamond-shaped. Although this version of the radome was more complex to fabricate, the structural complications ultimately provided greater stability. The many sketches attending this new design are testimony of its greater intricacy.




AL
AR
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D
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A1
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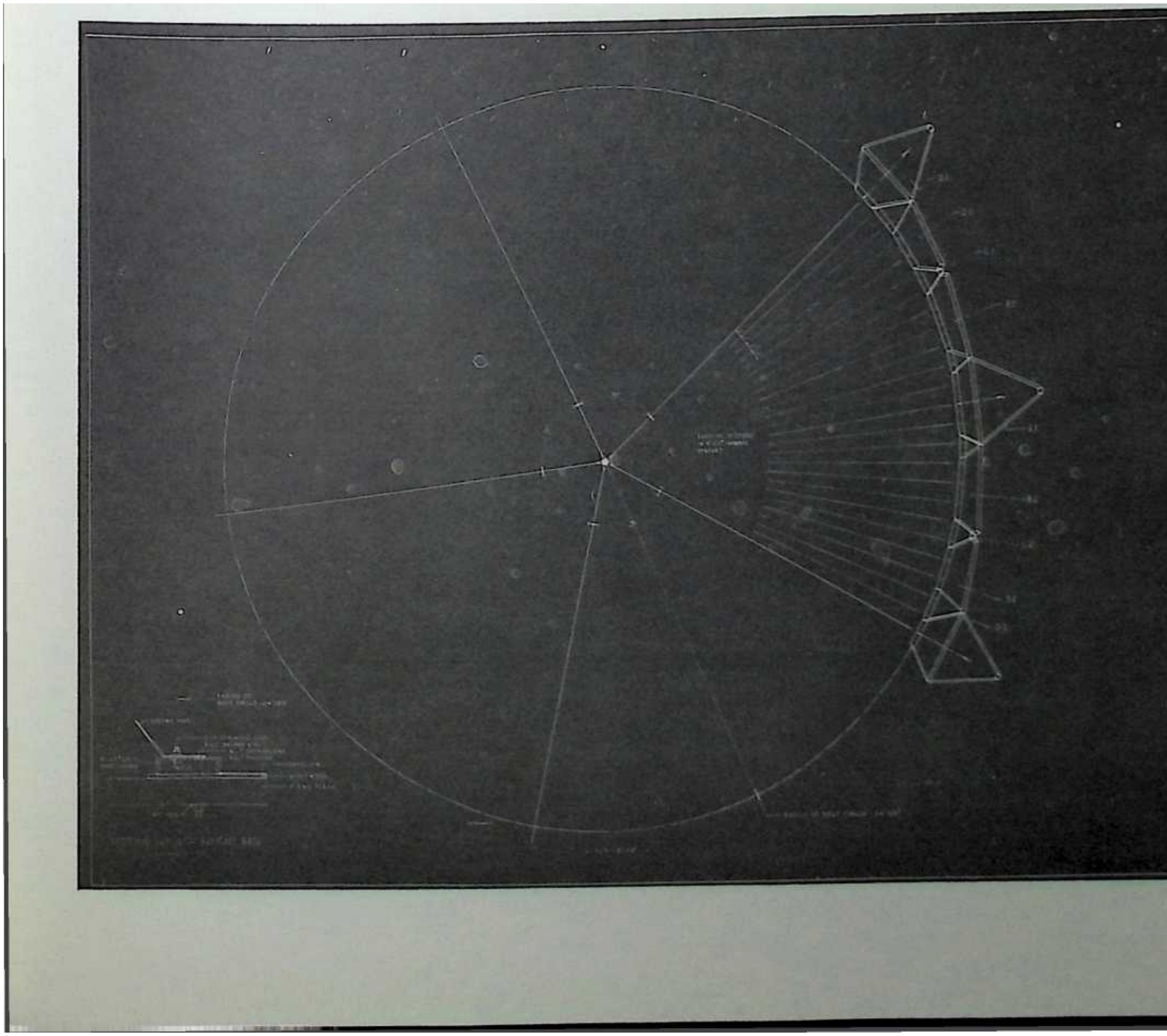
B2
C1
D1
D3
C2
D2




1
2
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3
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1
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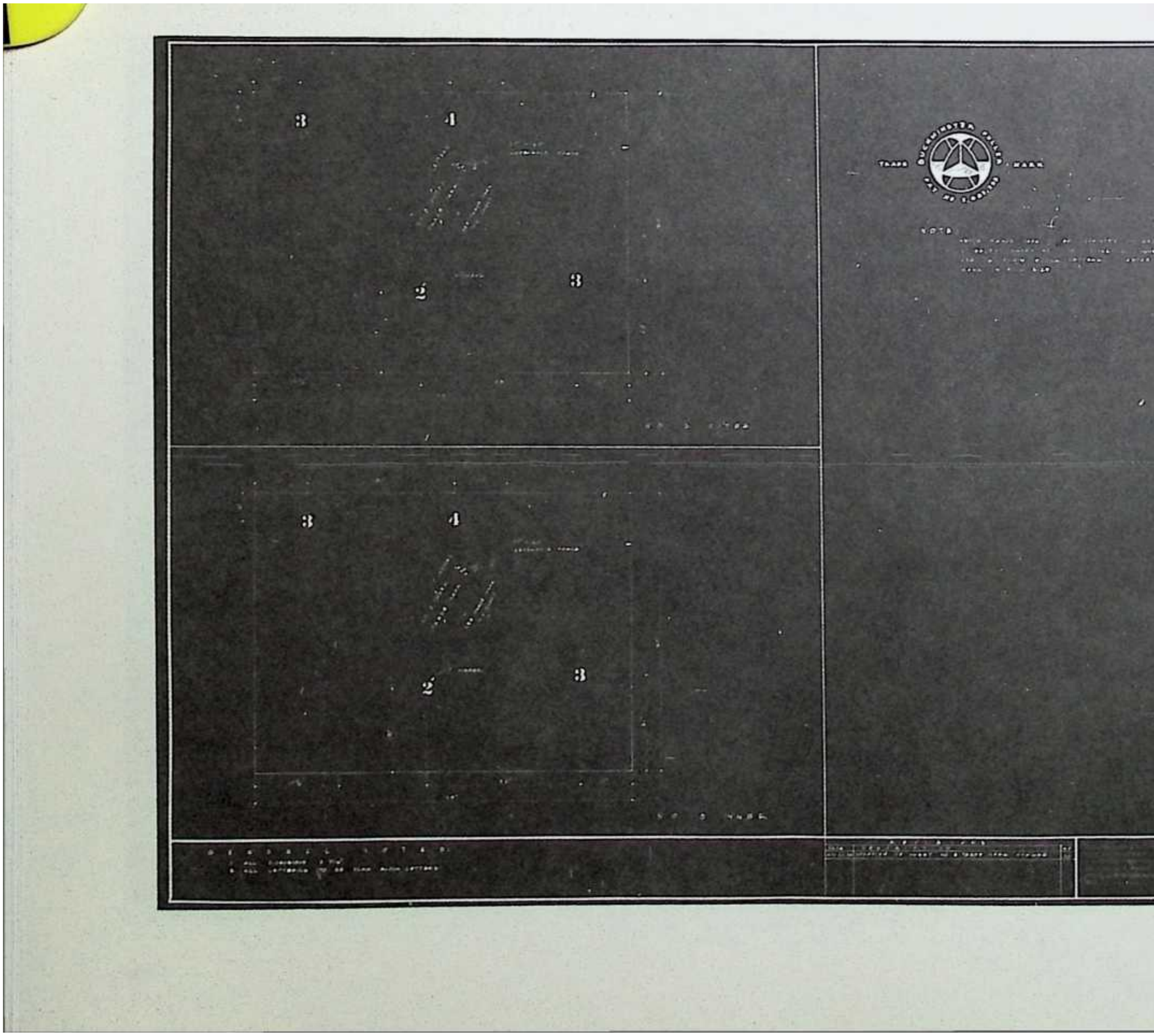
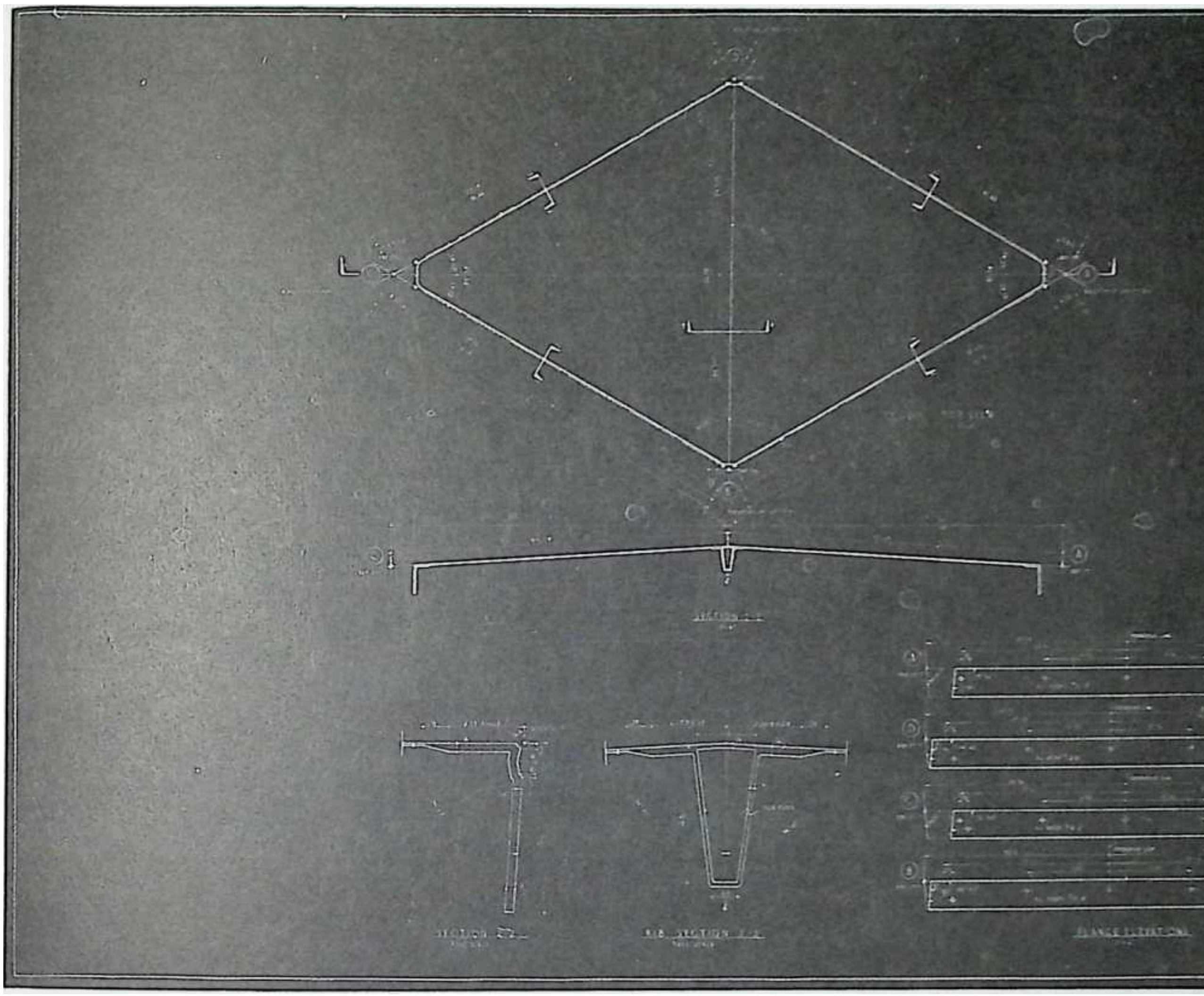
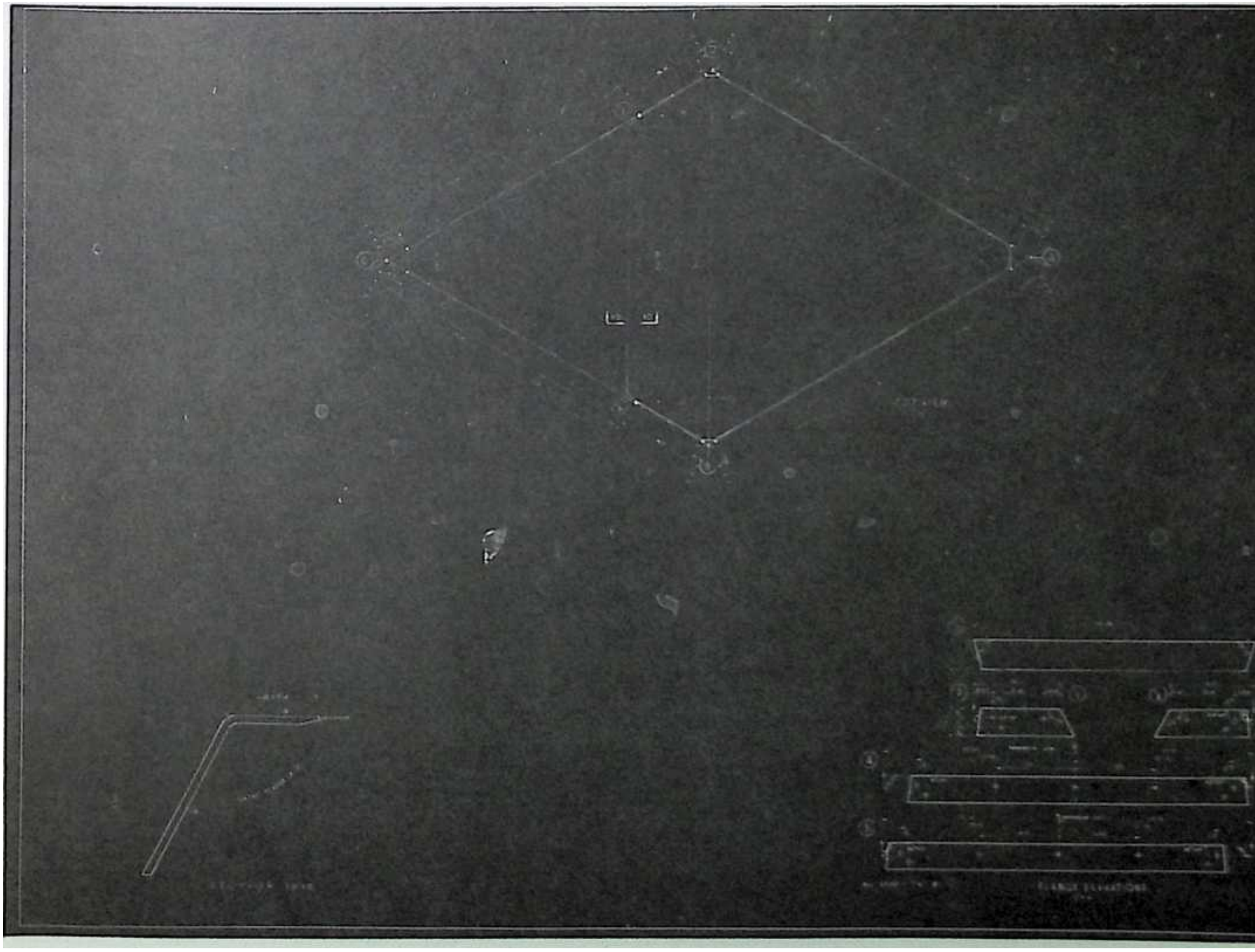
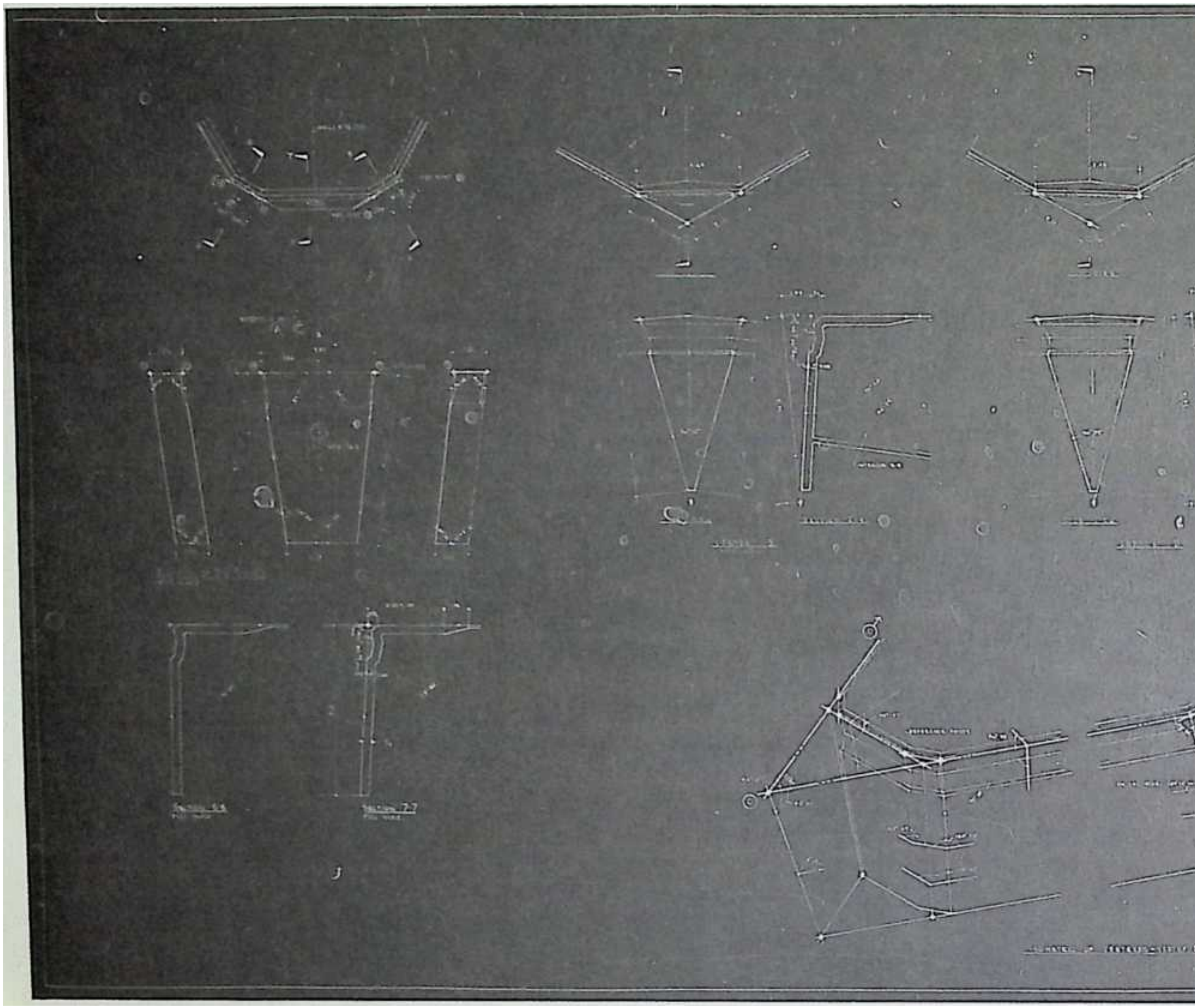
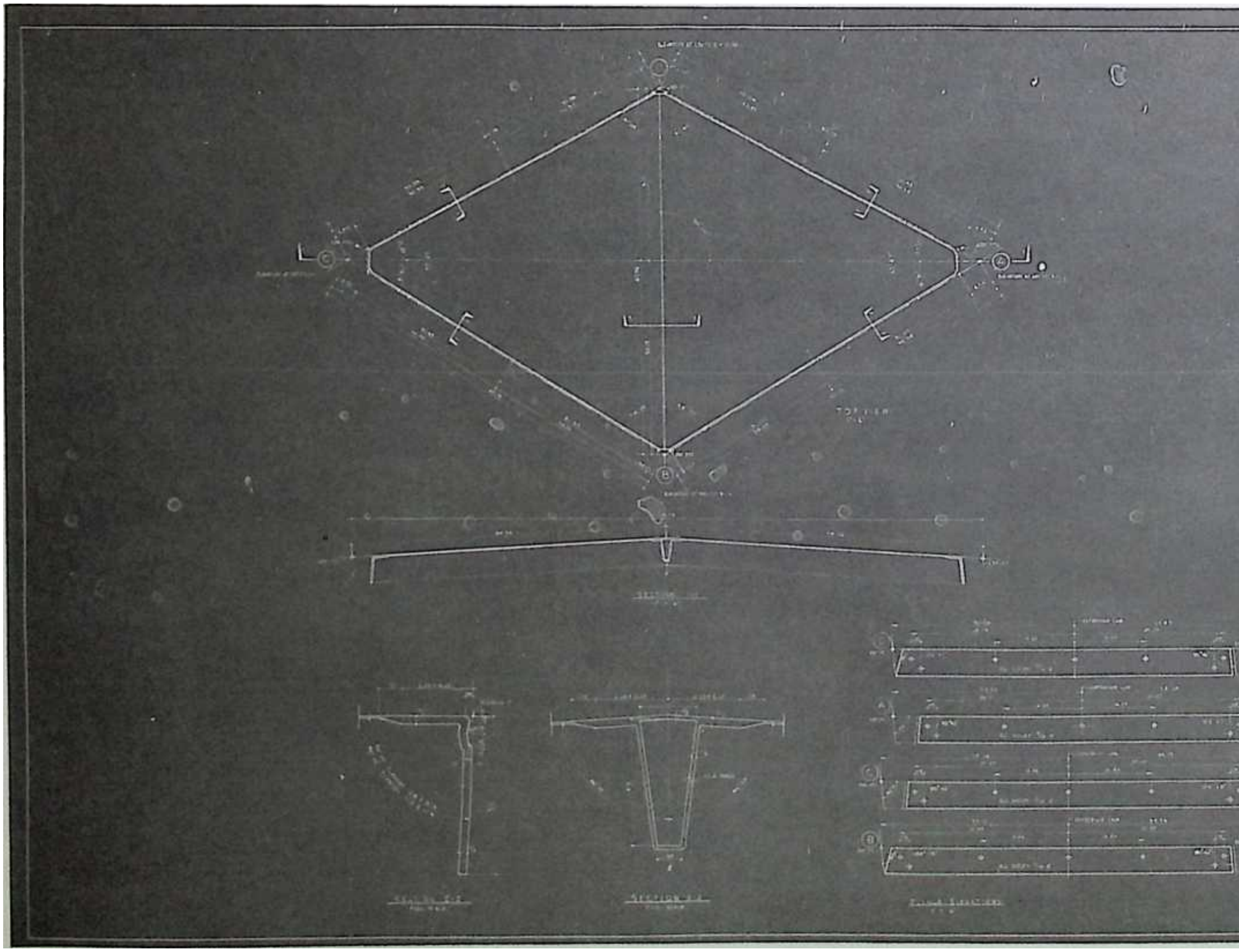
2
1
3
2
1

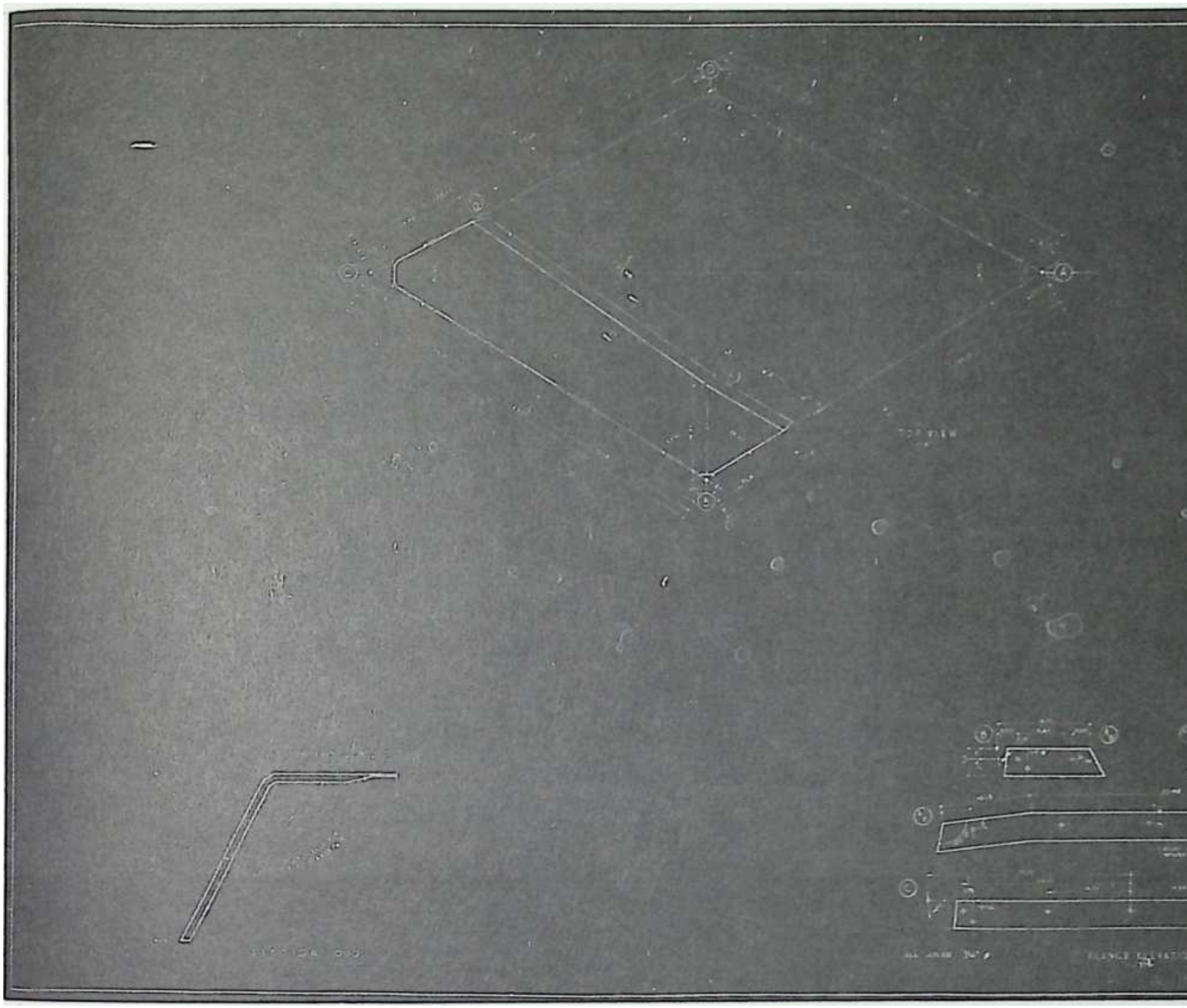

3
4
2
3
3
4
2
3

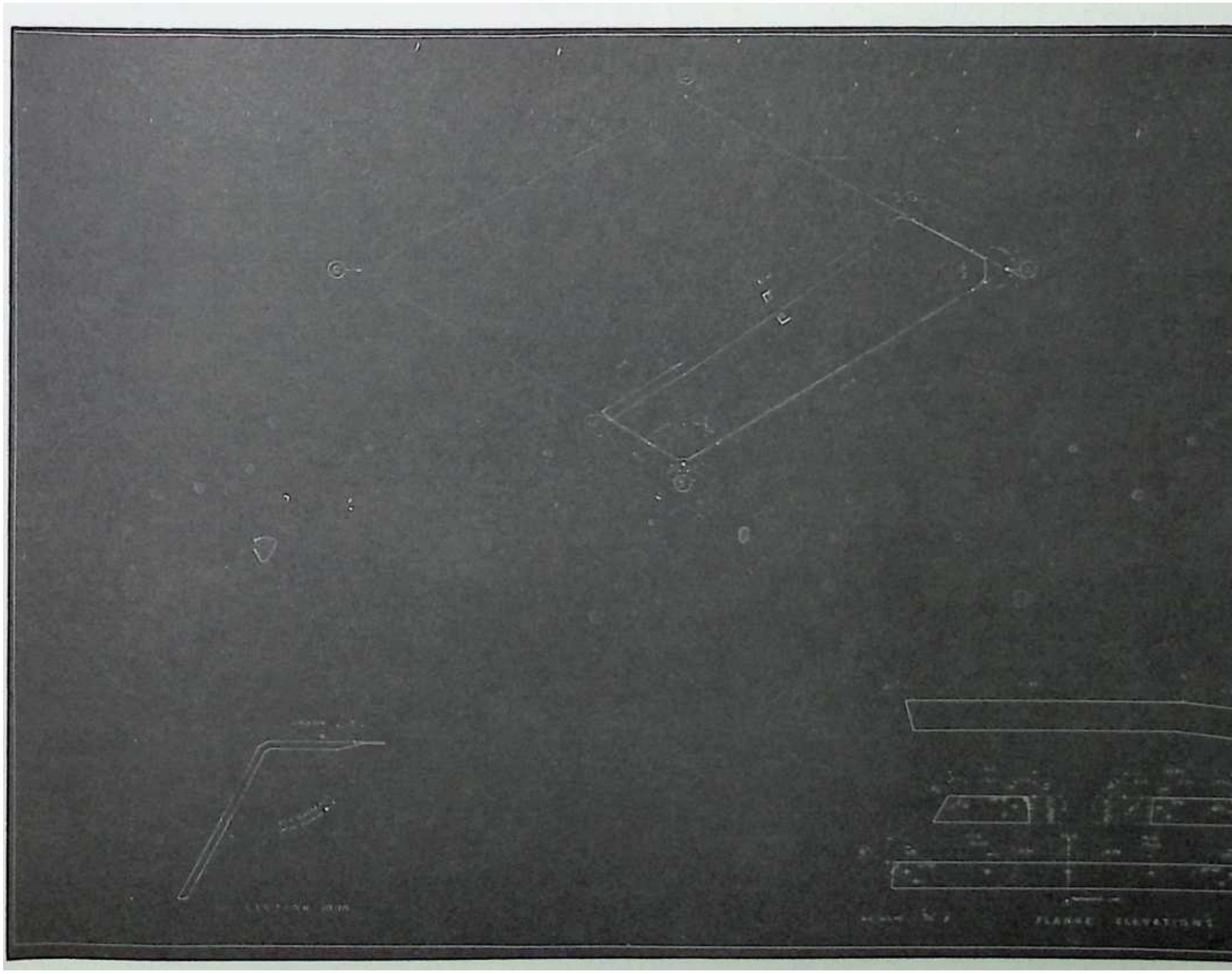


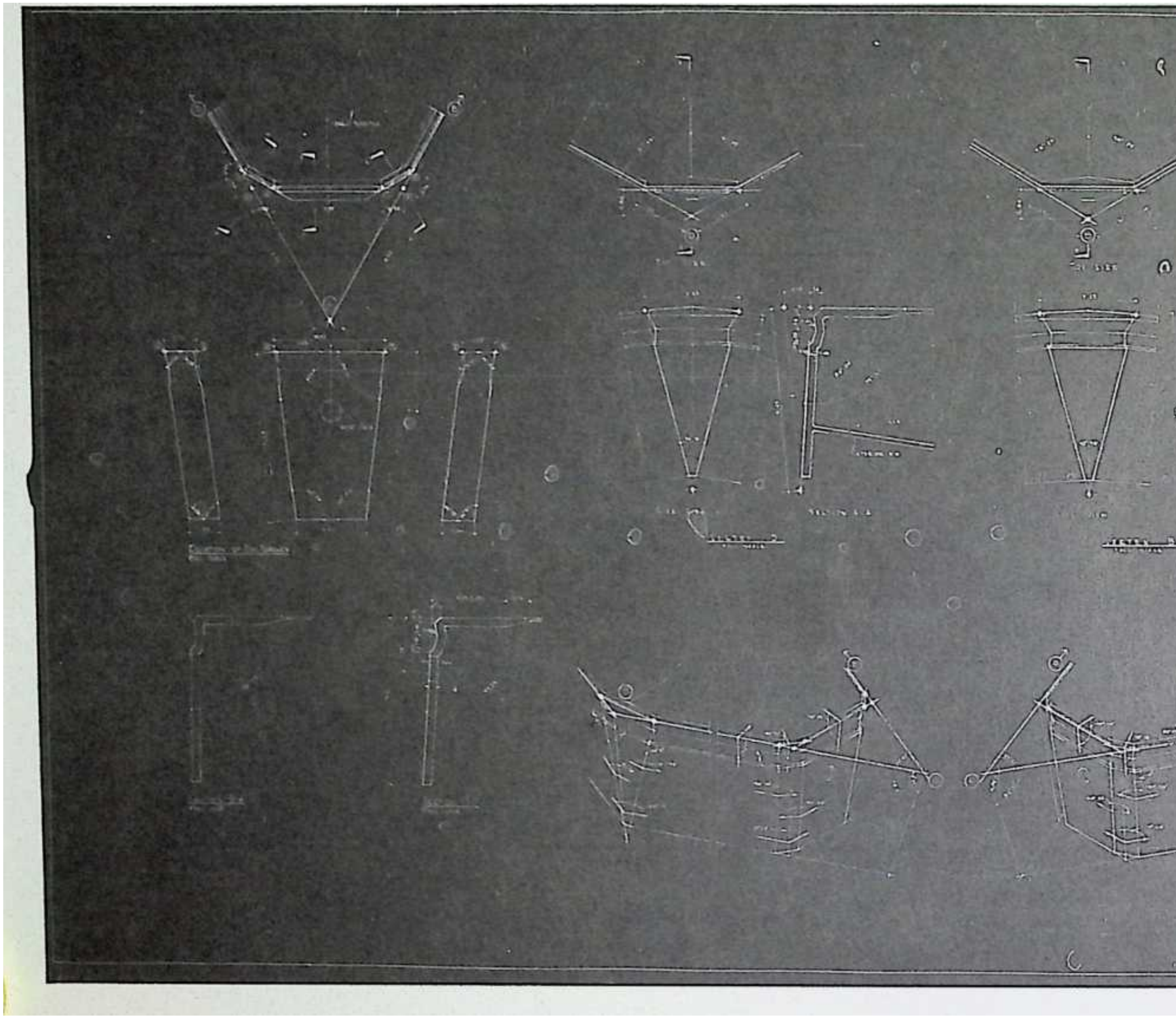


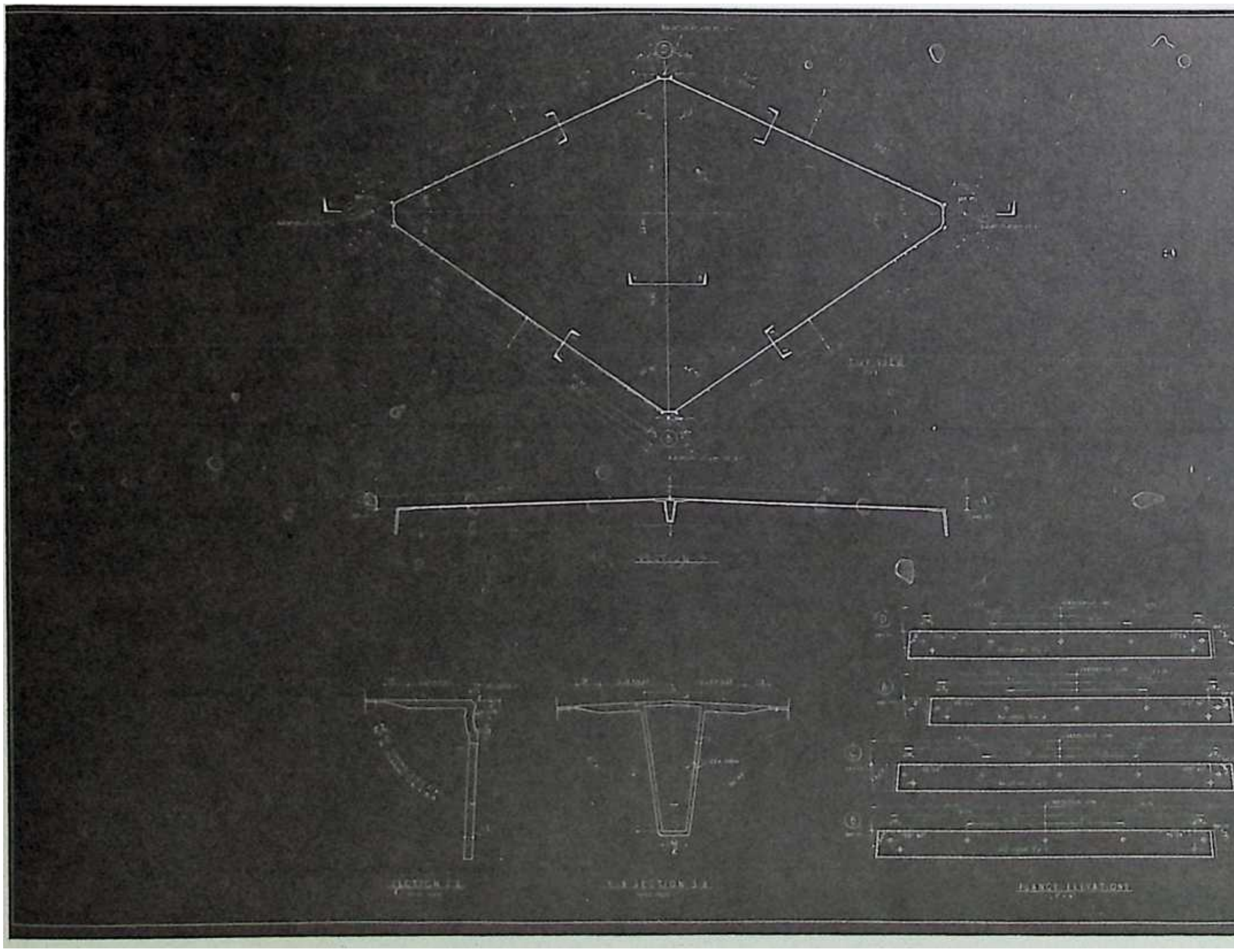


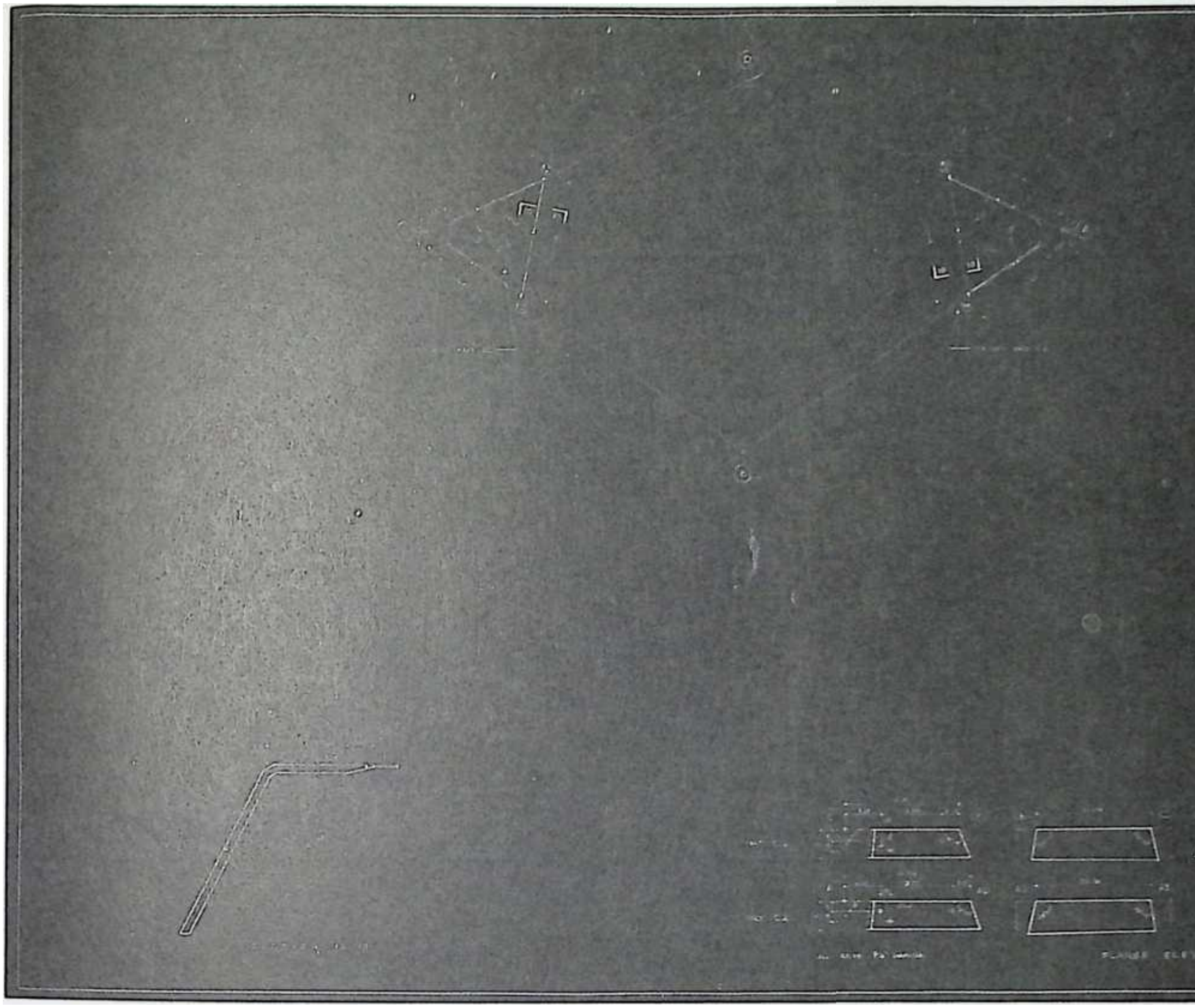


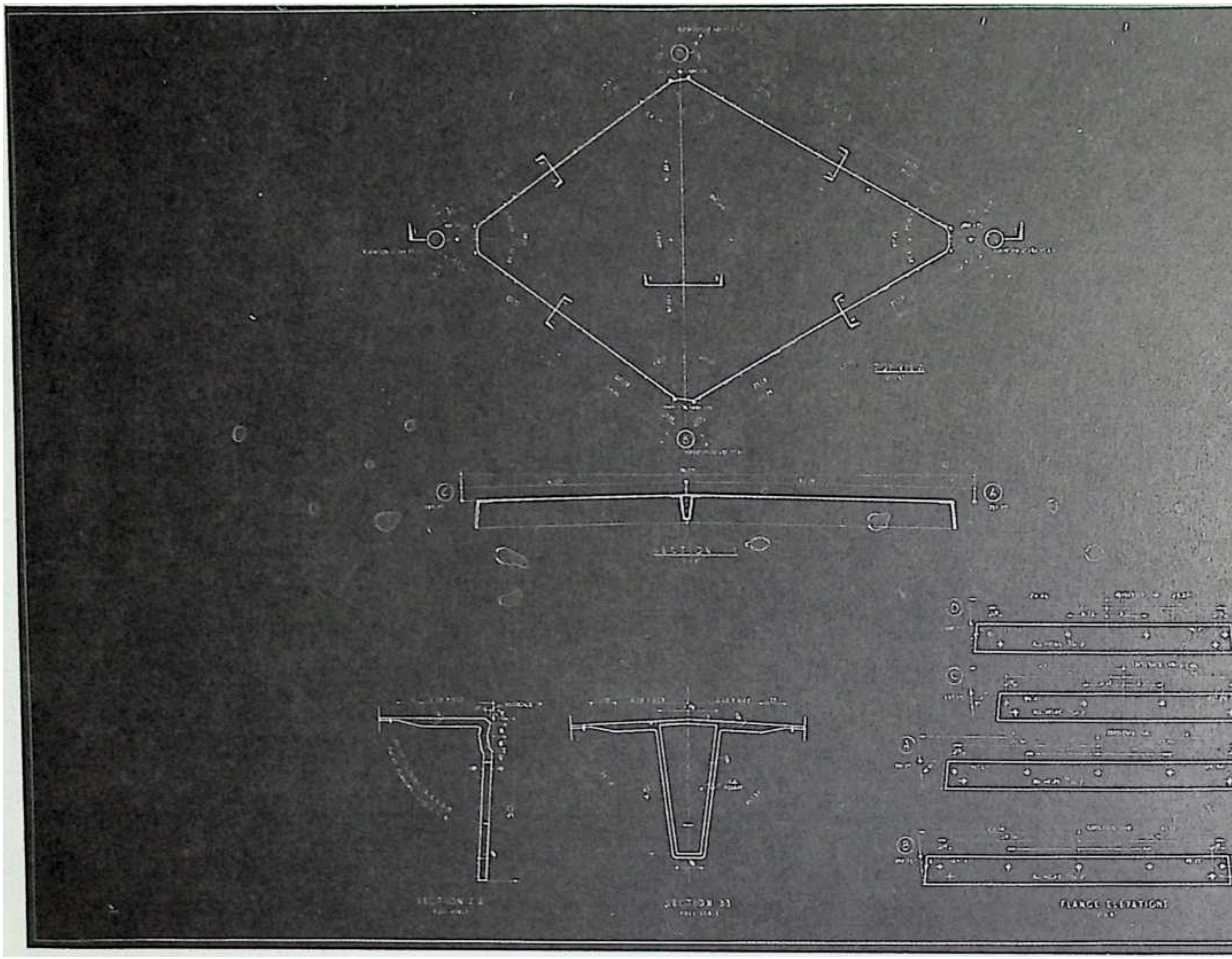

TOP VIEW

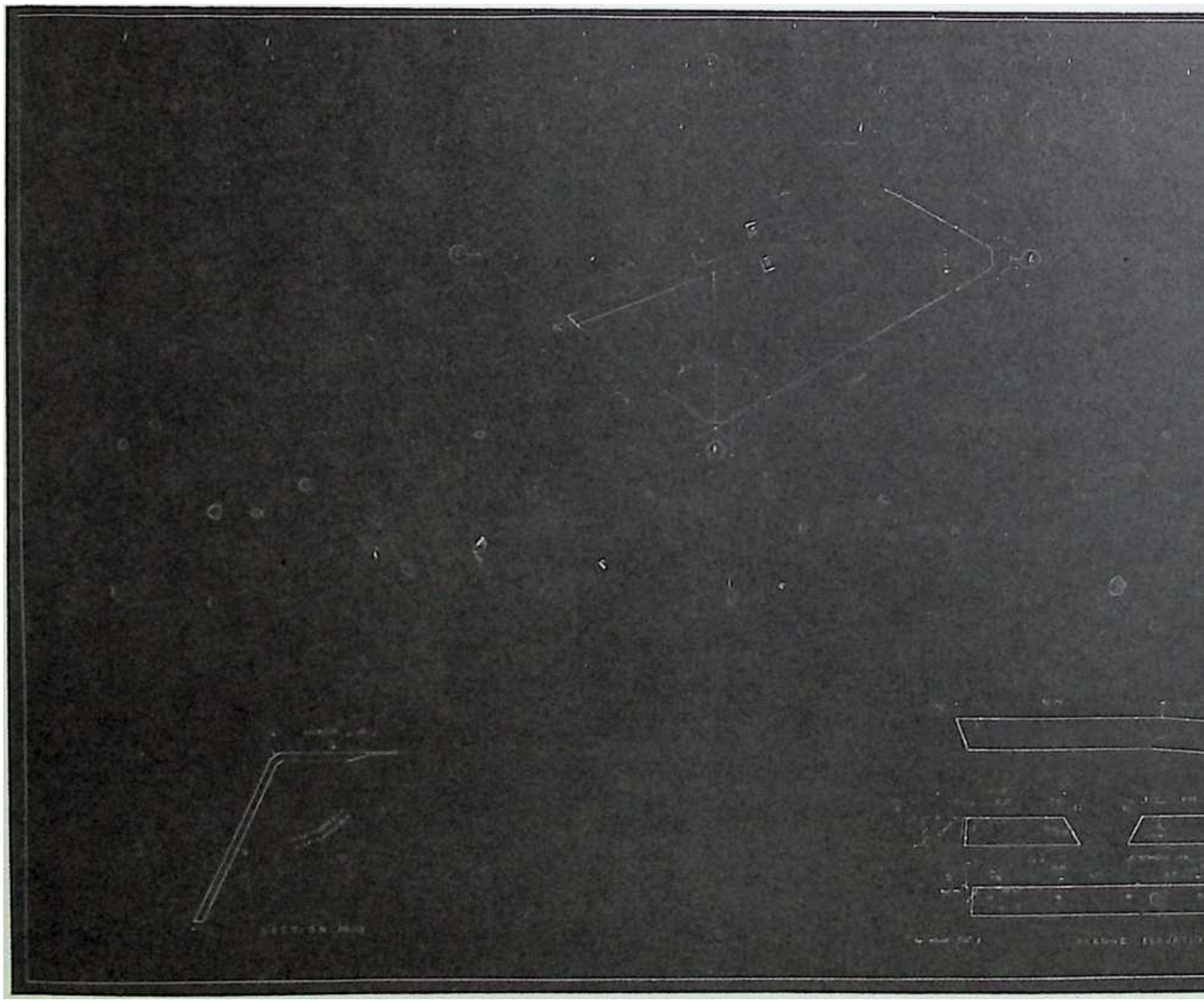

FLANGE ELEVATIONS

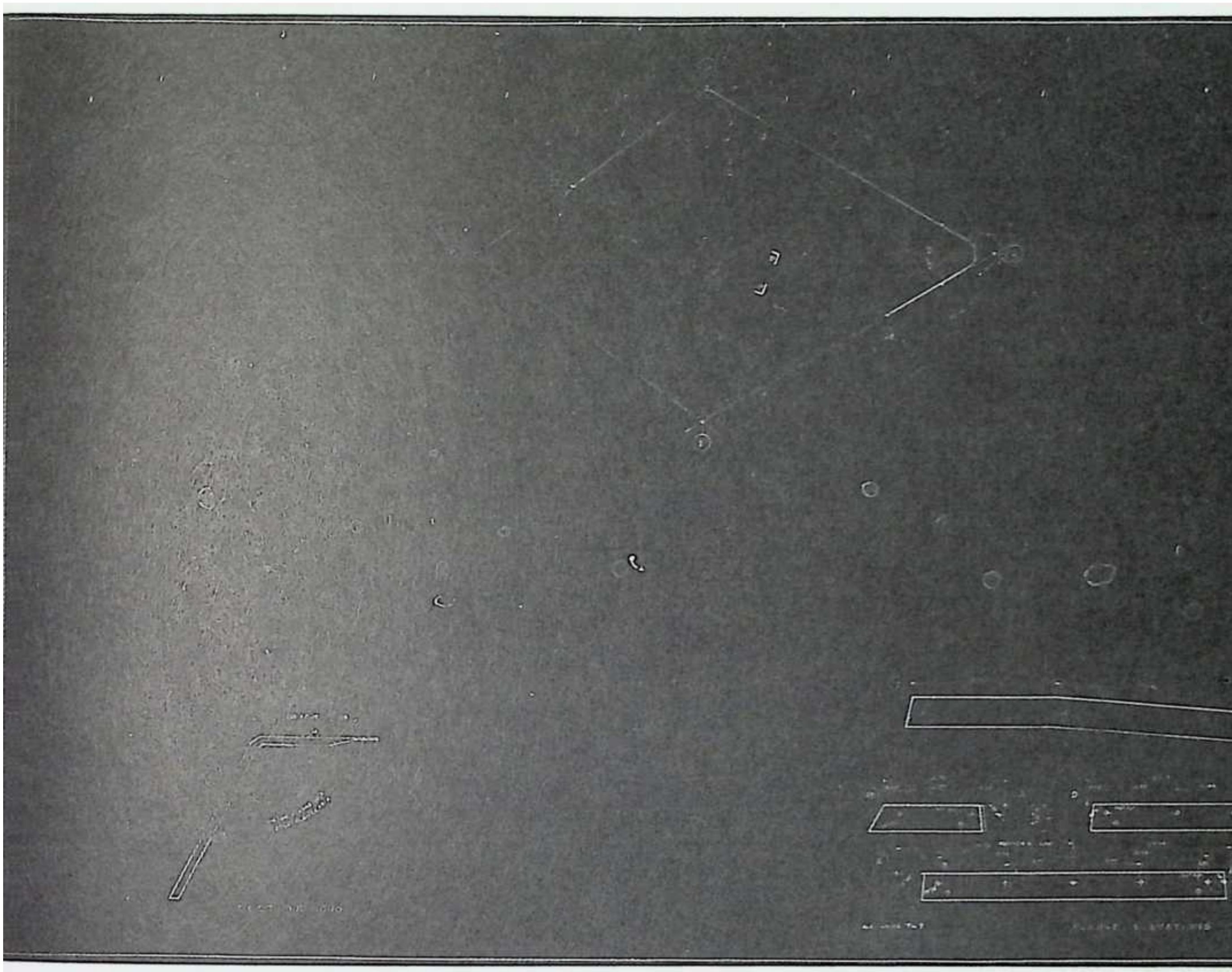


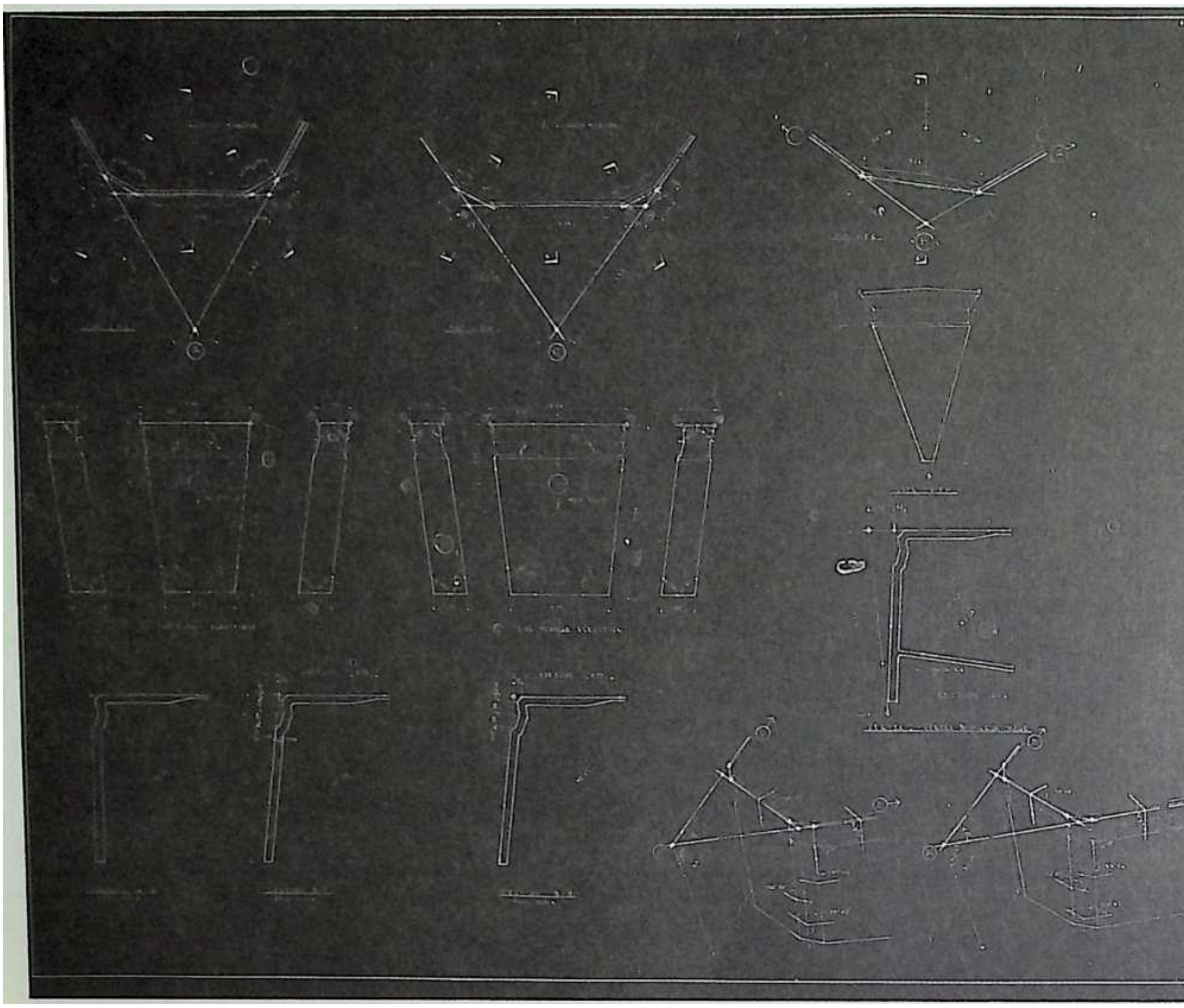


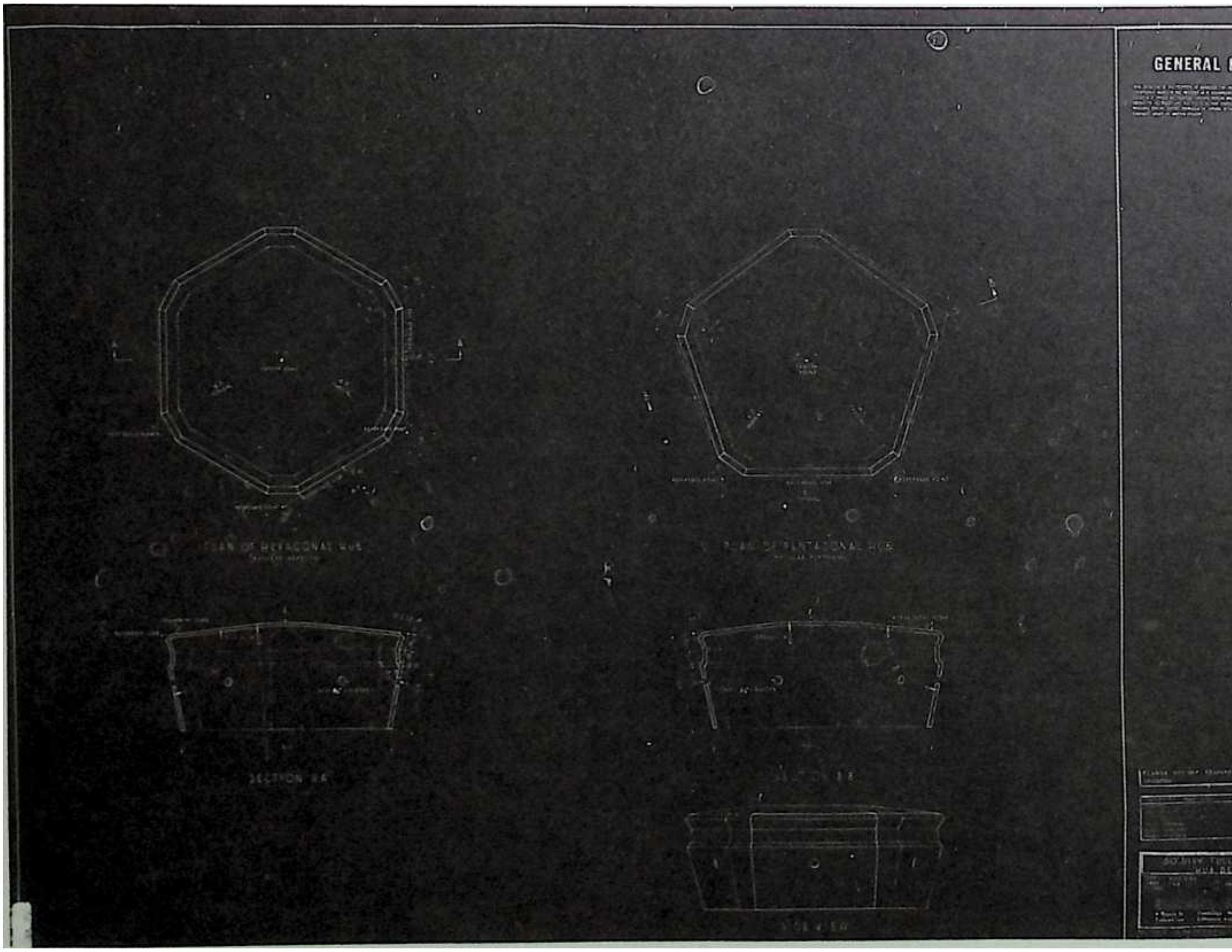


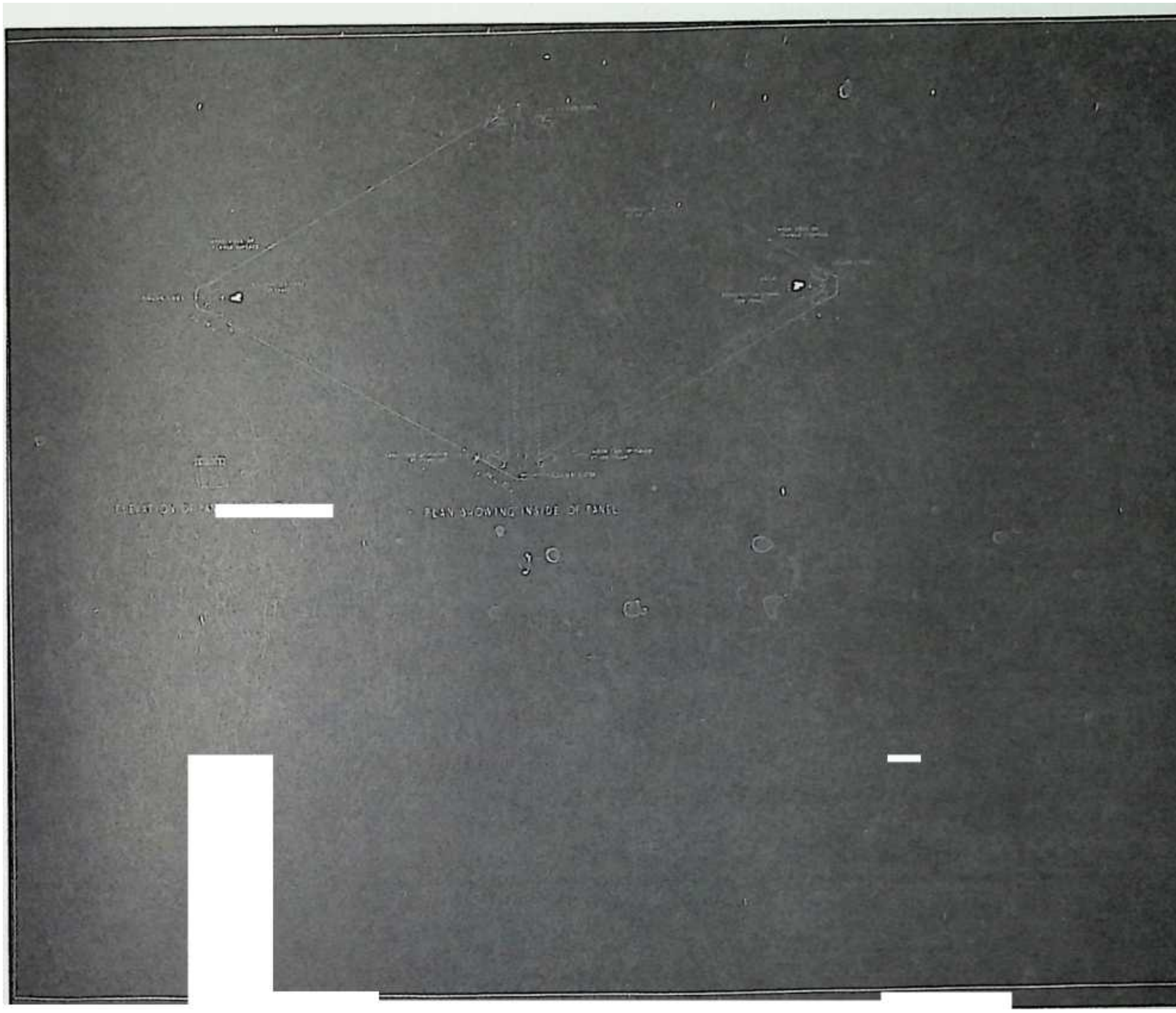

SECTION 33
FLANGE ELEVATIONS

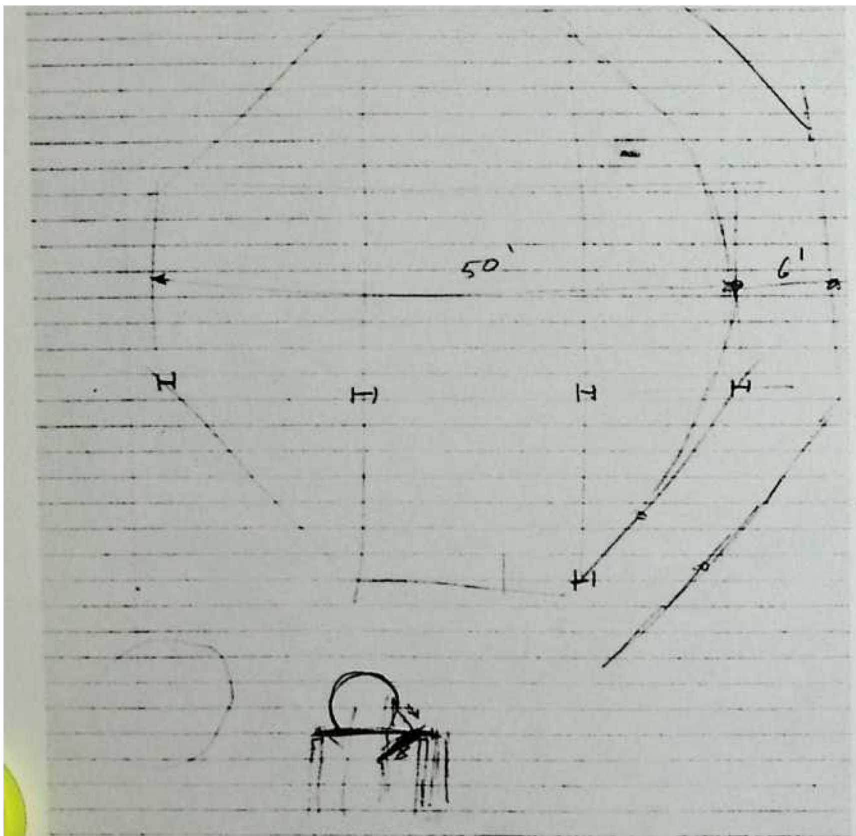


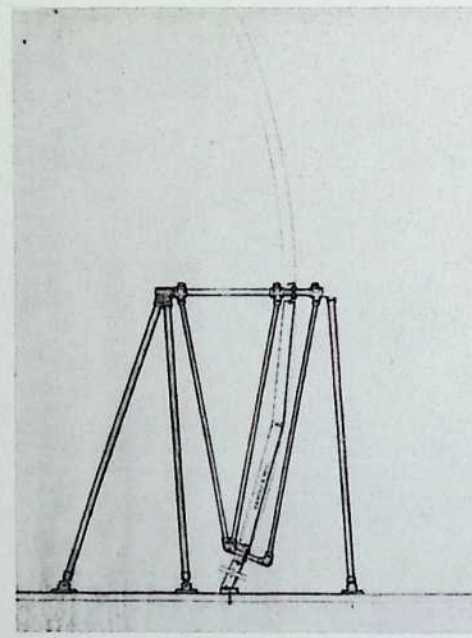


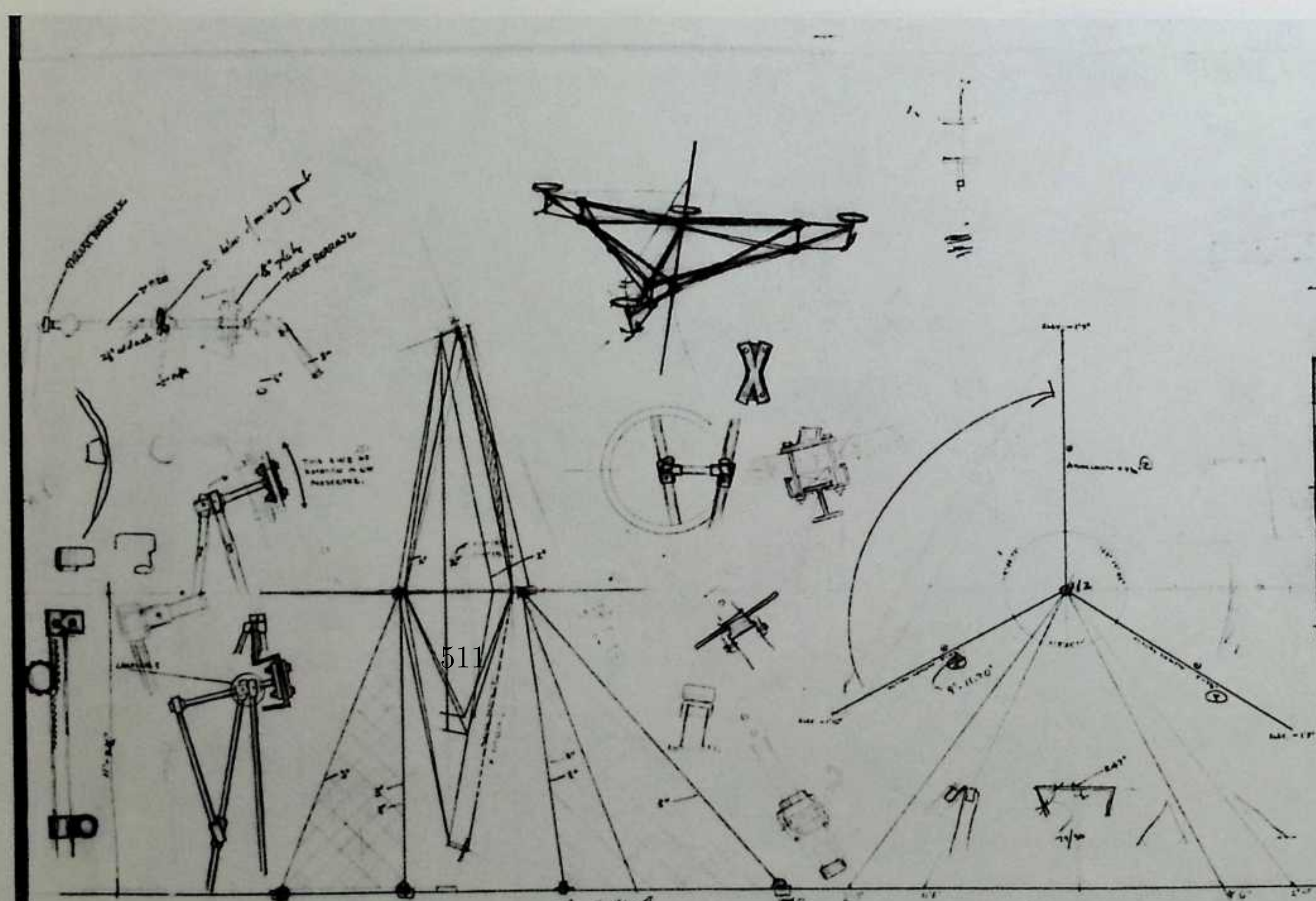


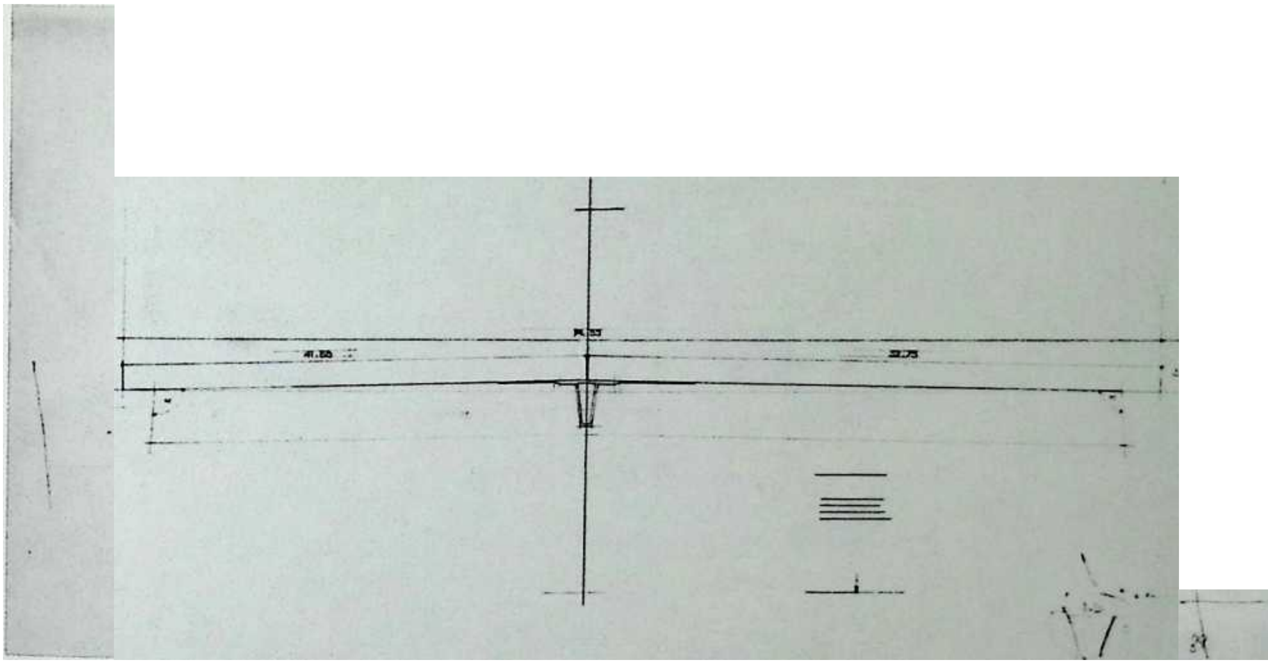

GENERAL
SECTION A-A

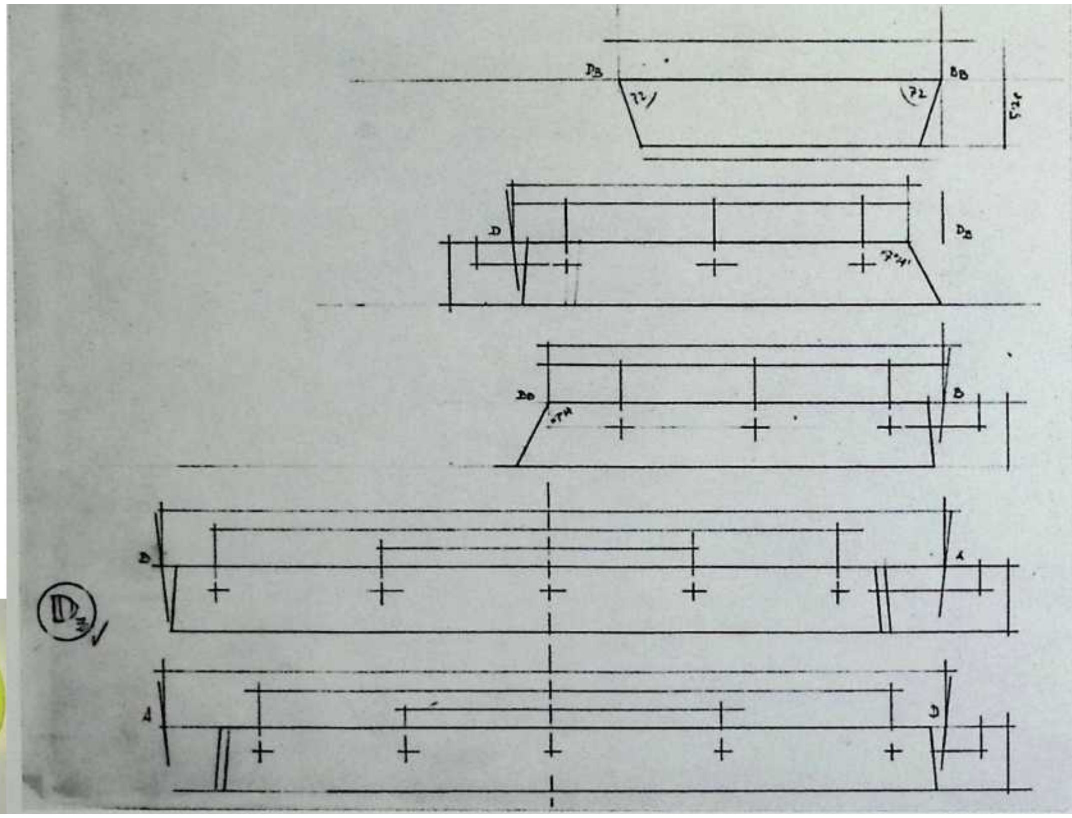

PLAN SHOWING INSIDE OF PANEL

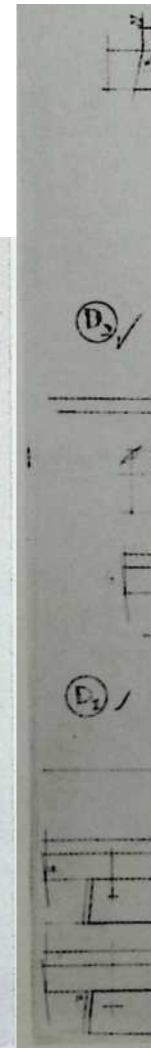

50'
6'

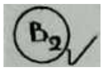


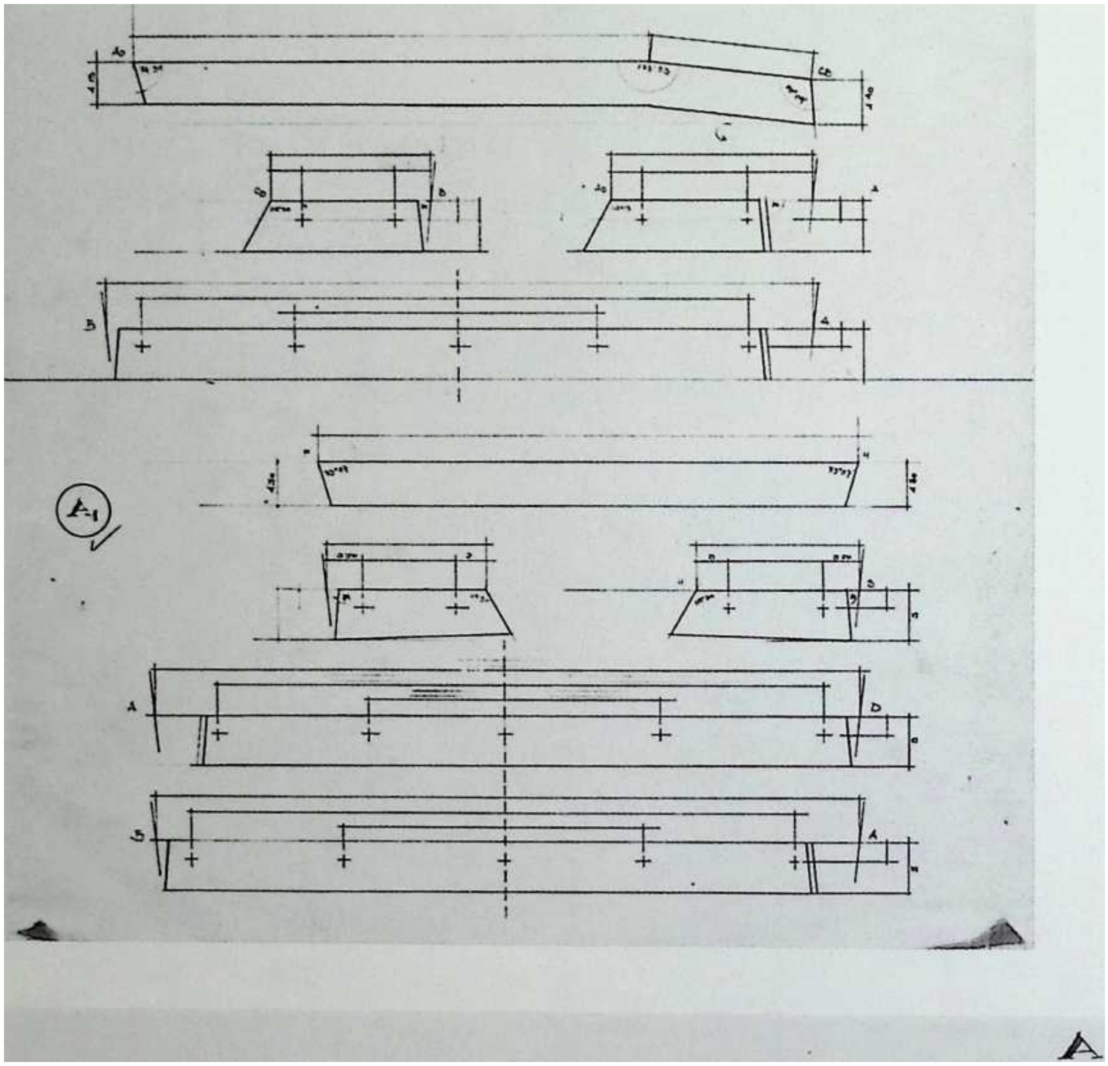


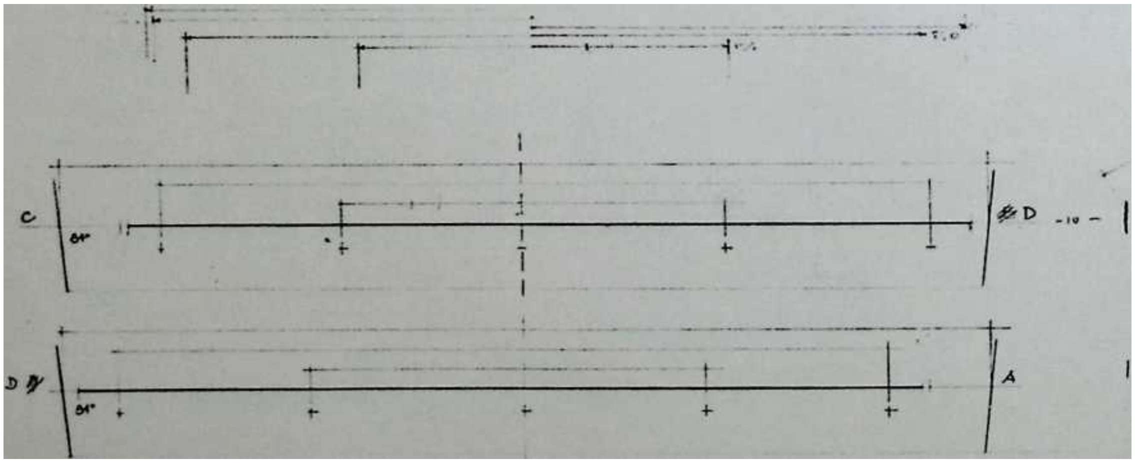



D3

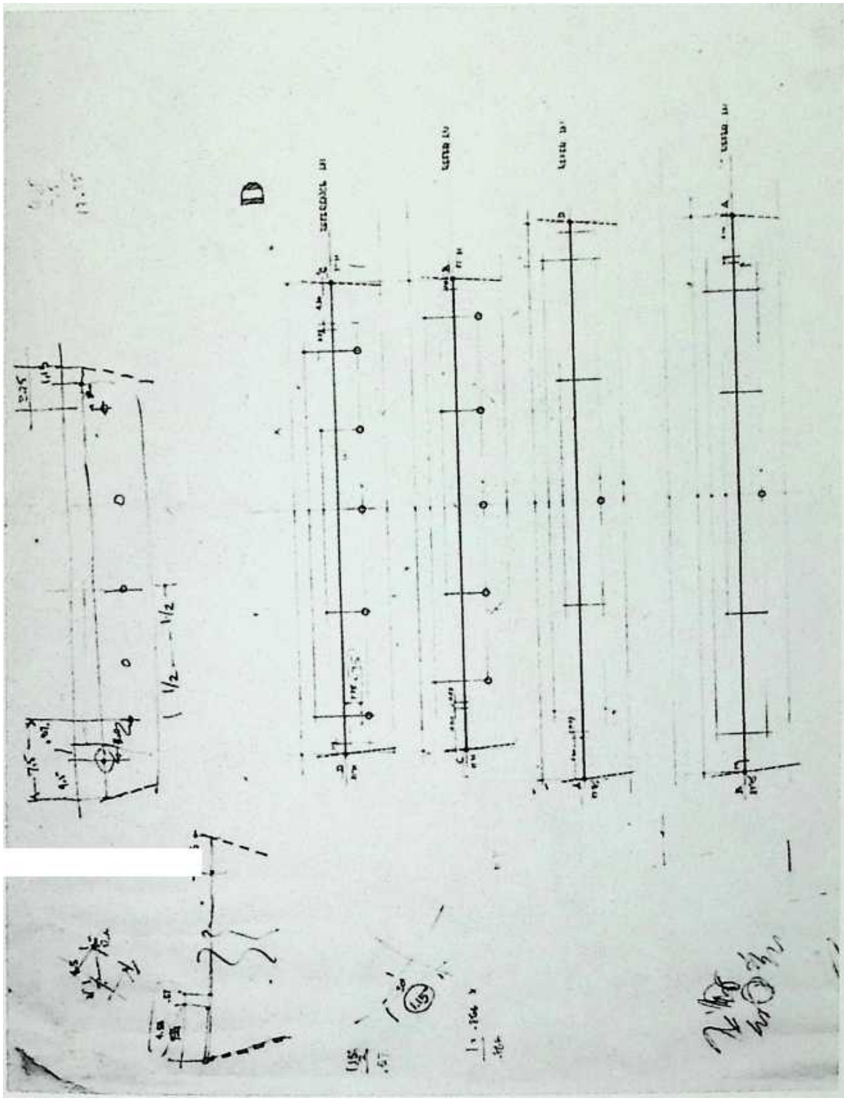

D2
D1

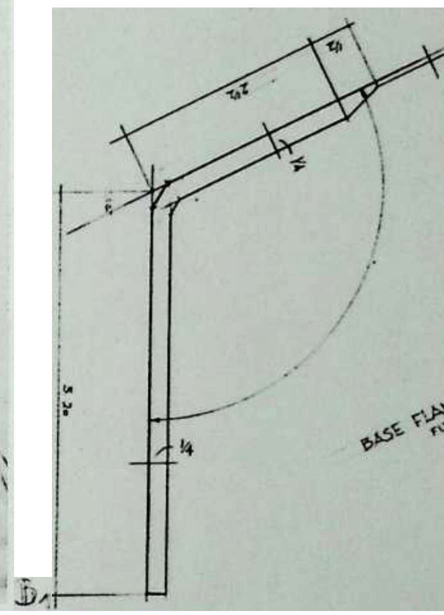

B2

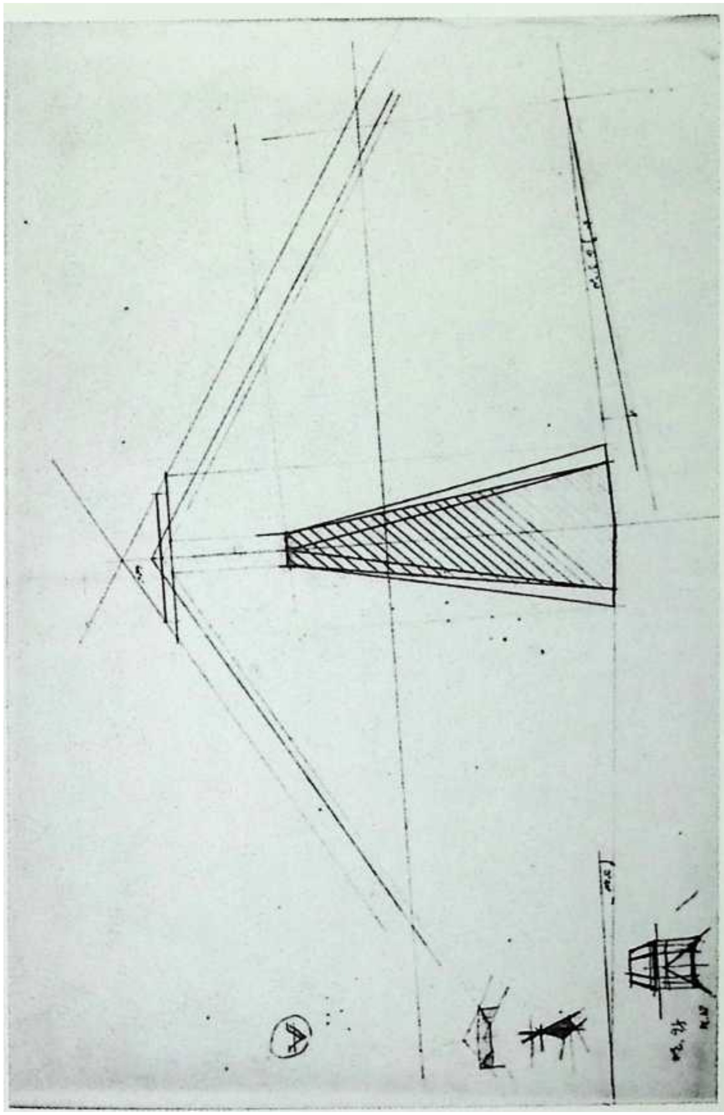


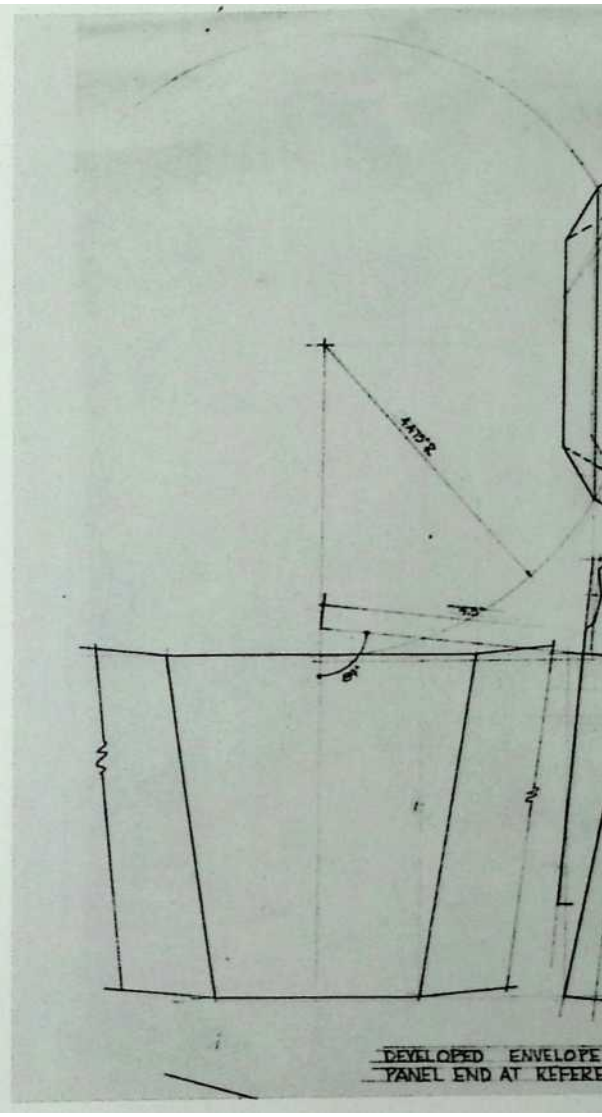


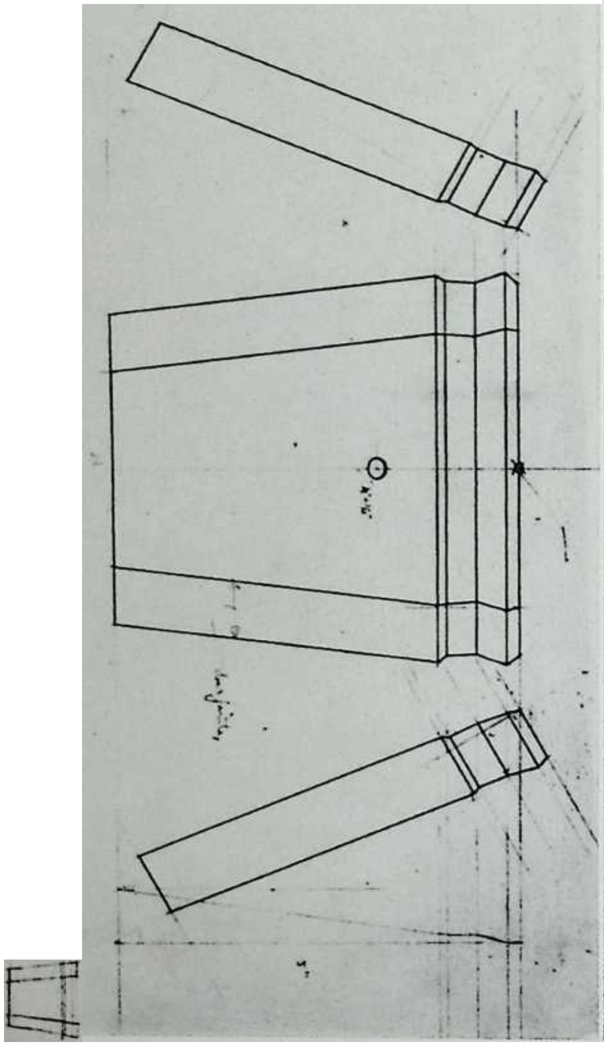
-*f* MS

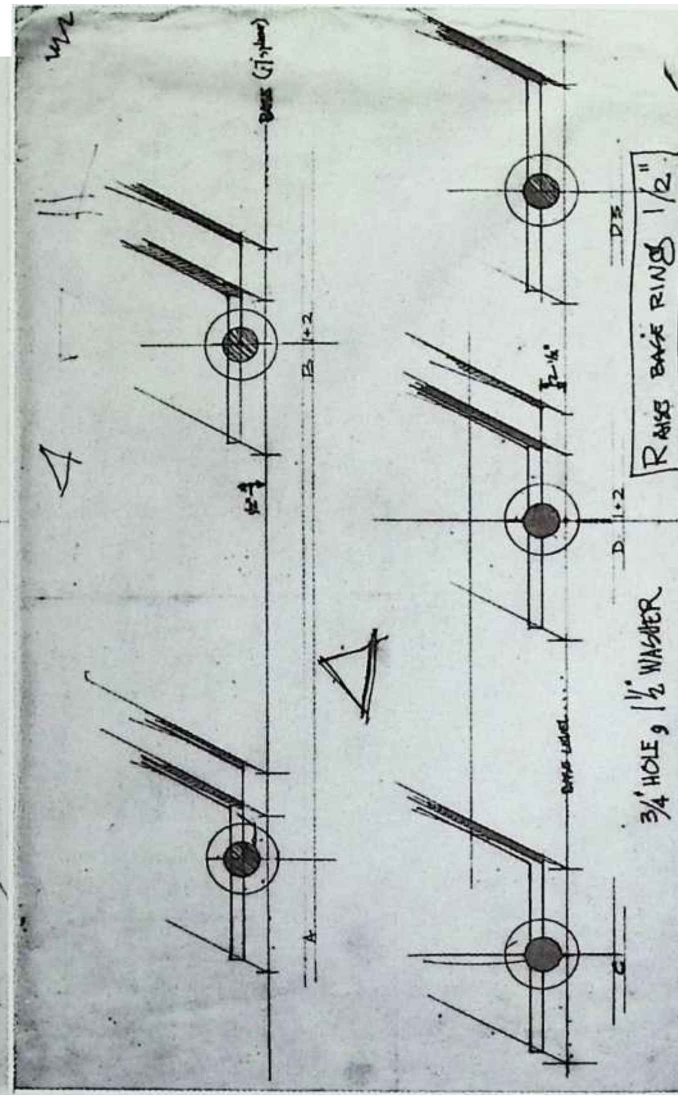


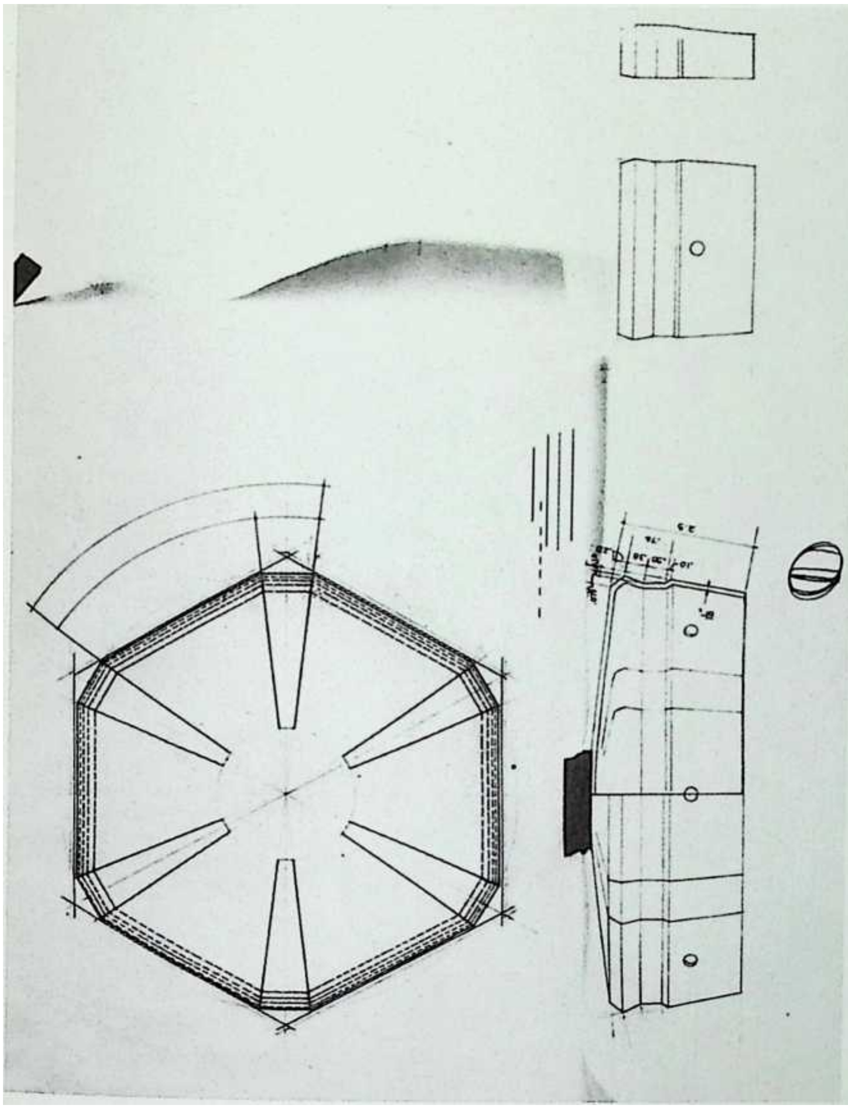


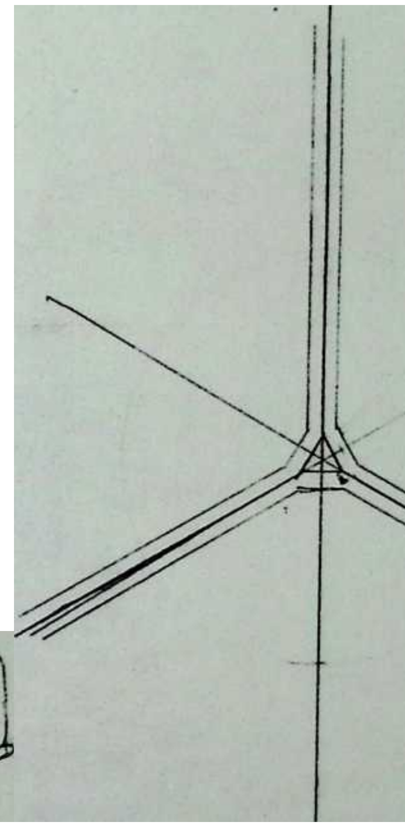


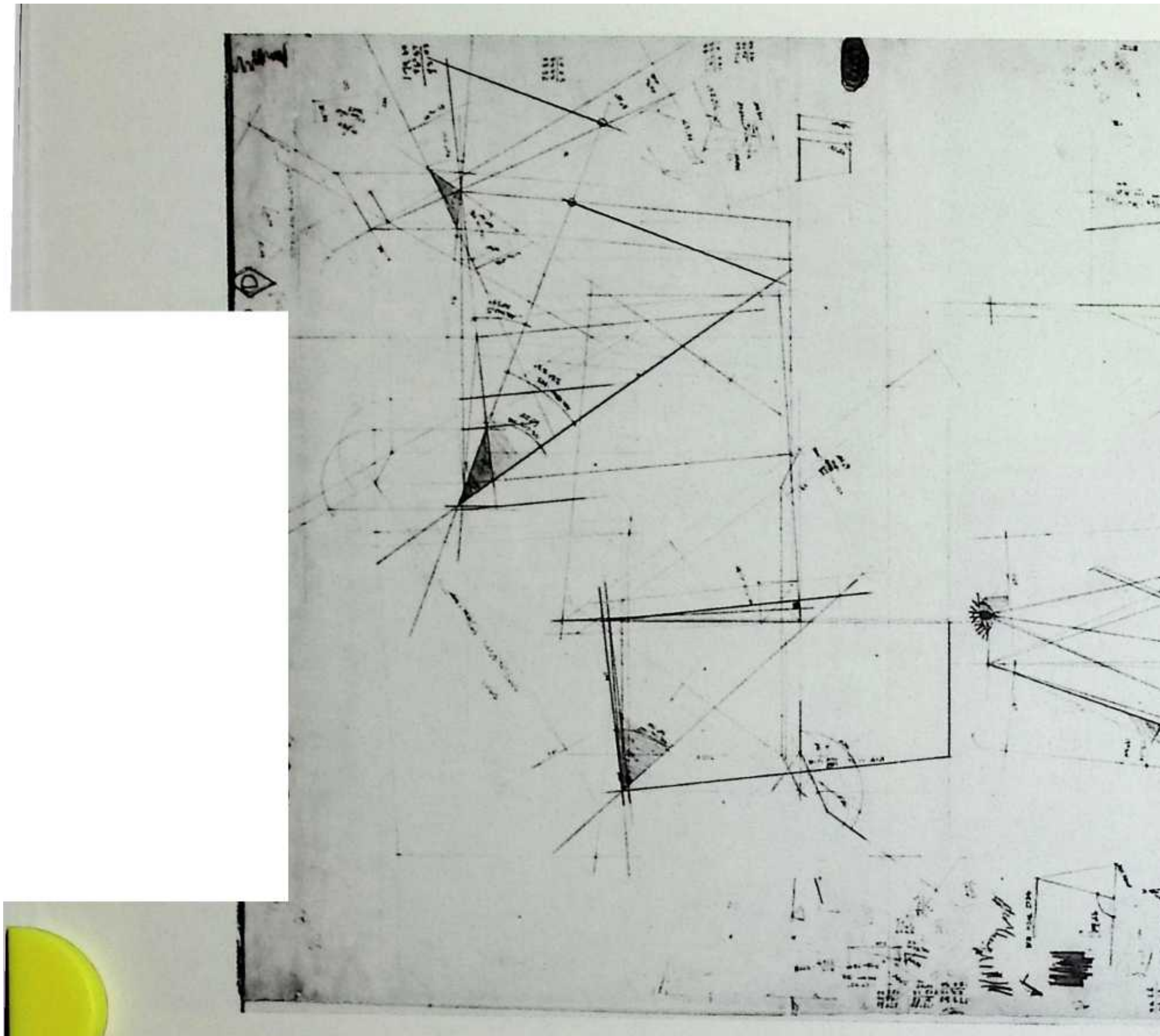

DEVELOPED ENVELOPE
PANEL END AT

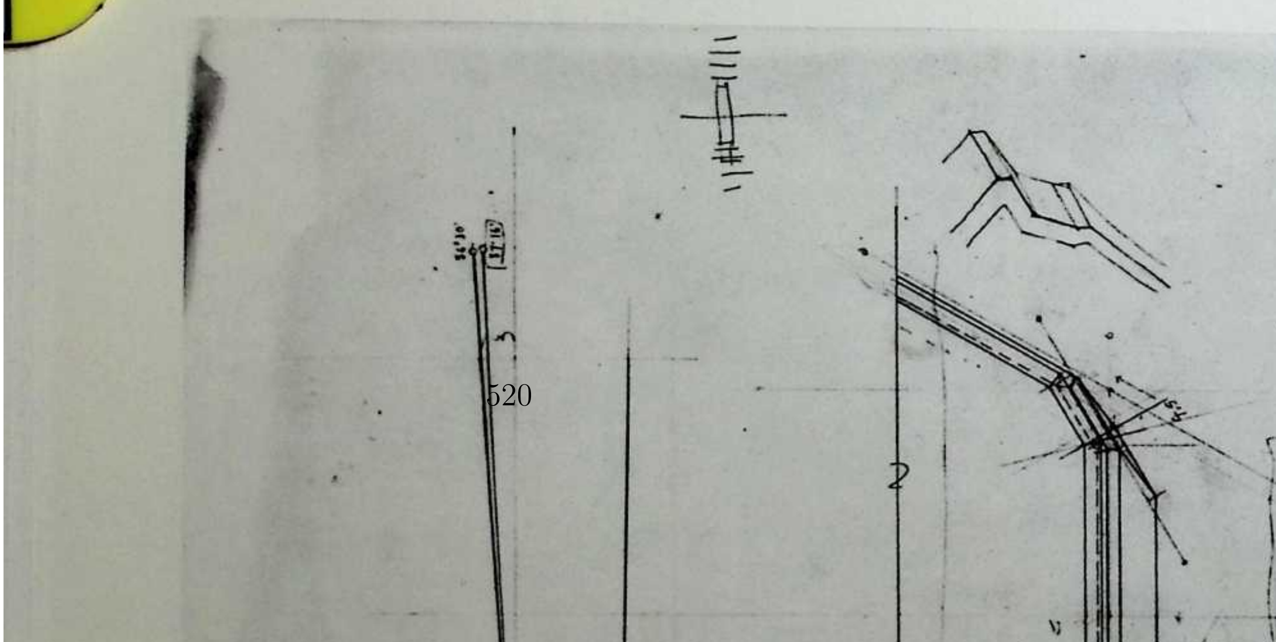



3/4" HOLE, 1 1/2" WASHER
RAISE BASE RING 1 1/2"

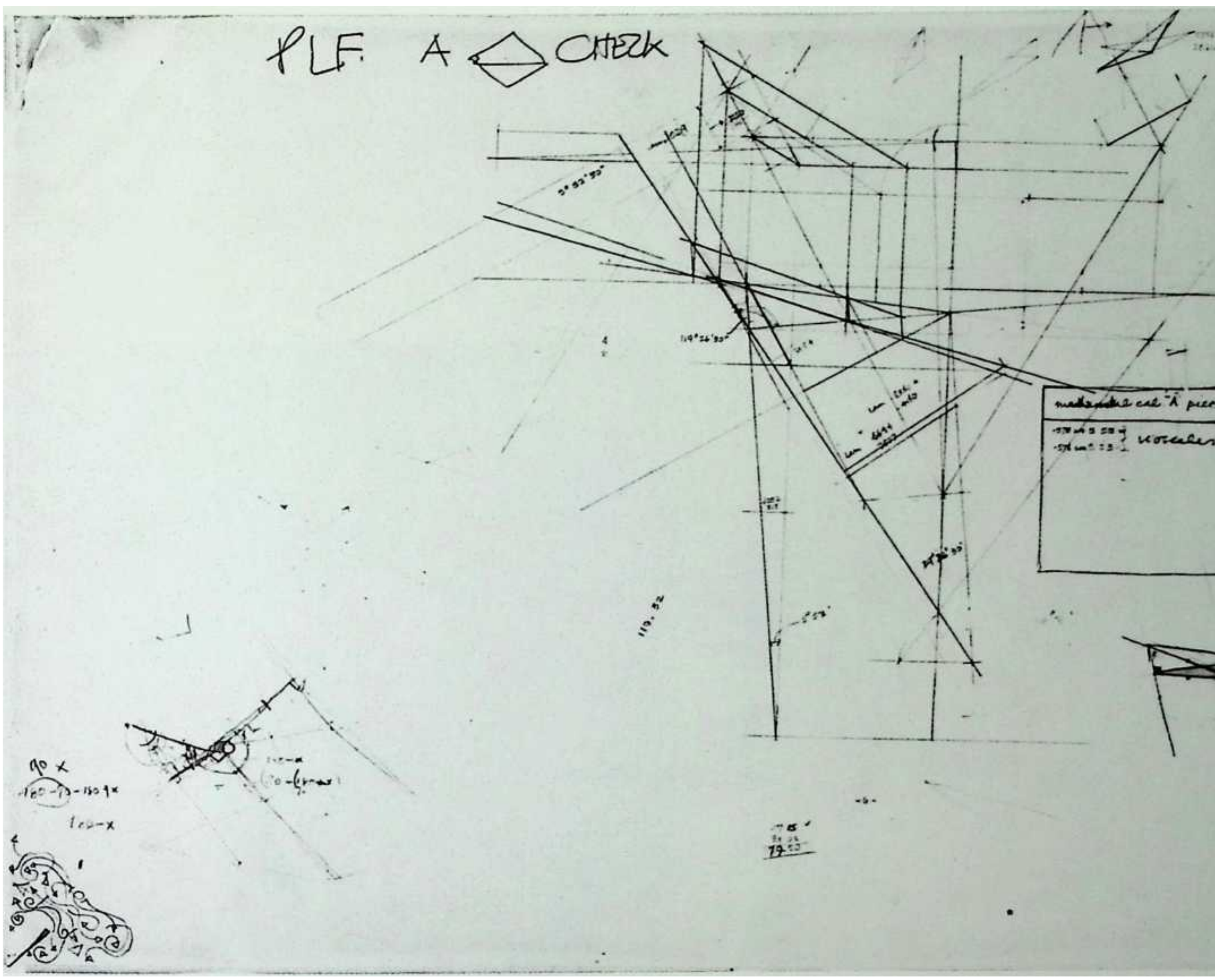


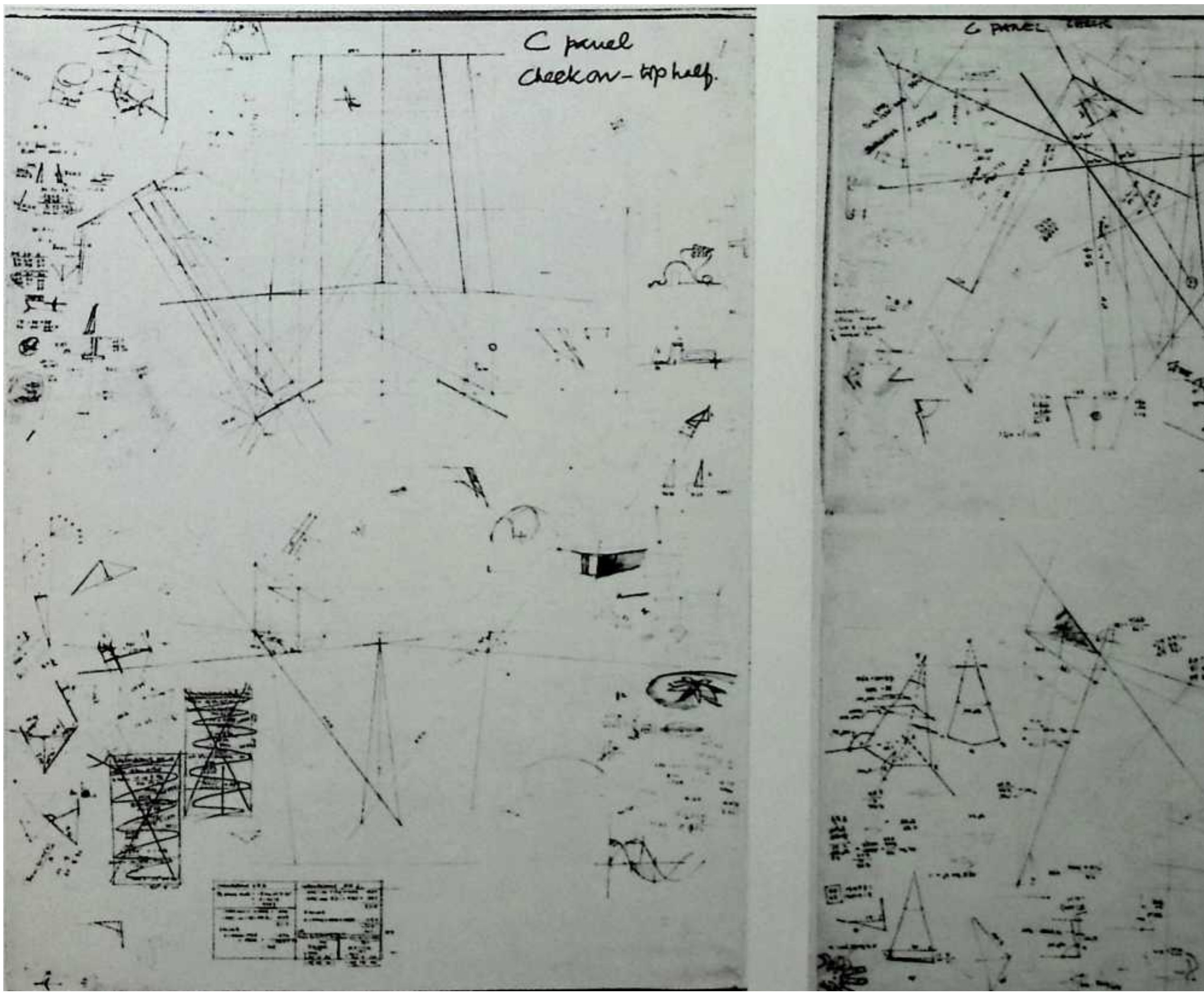


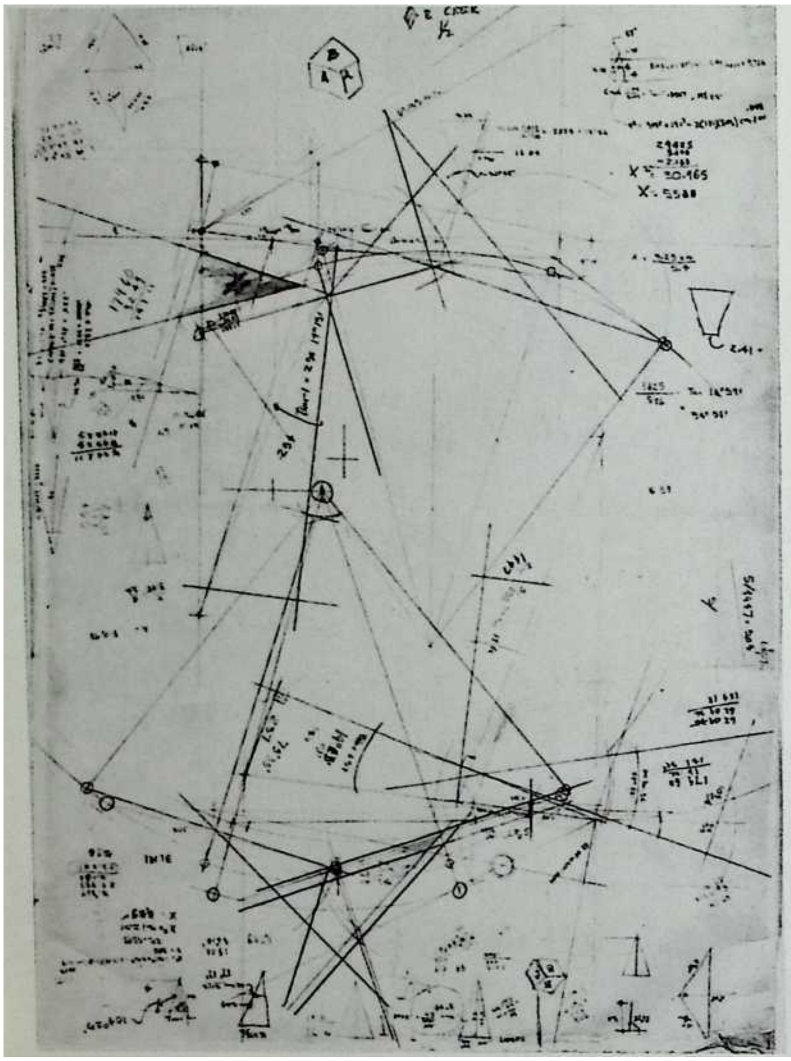


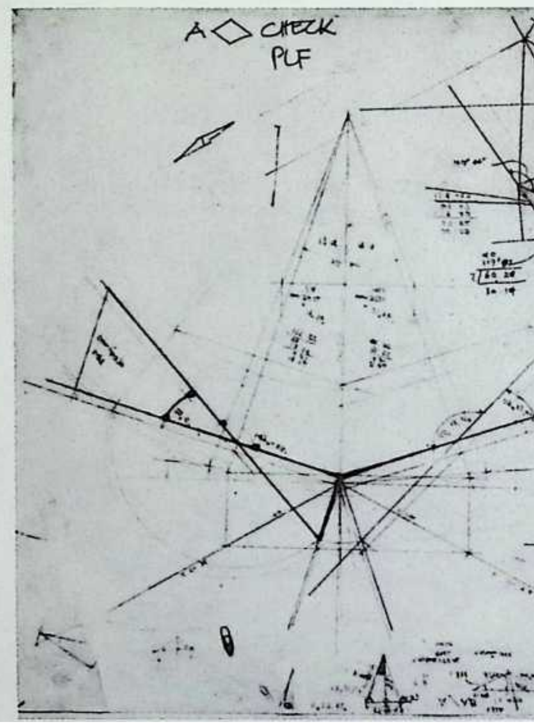


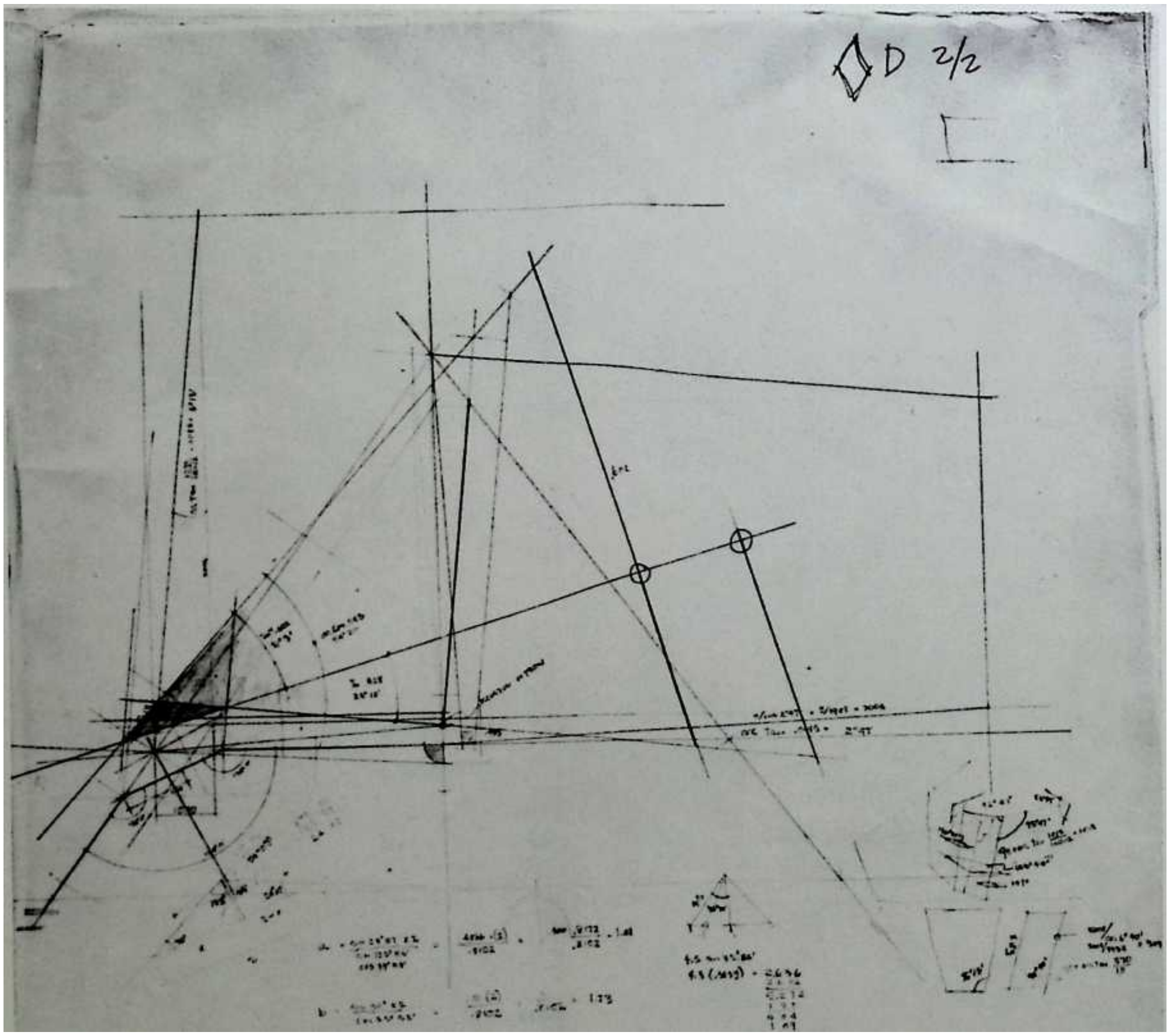
aw *TUJ* XJT5OV



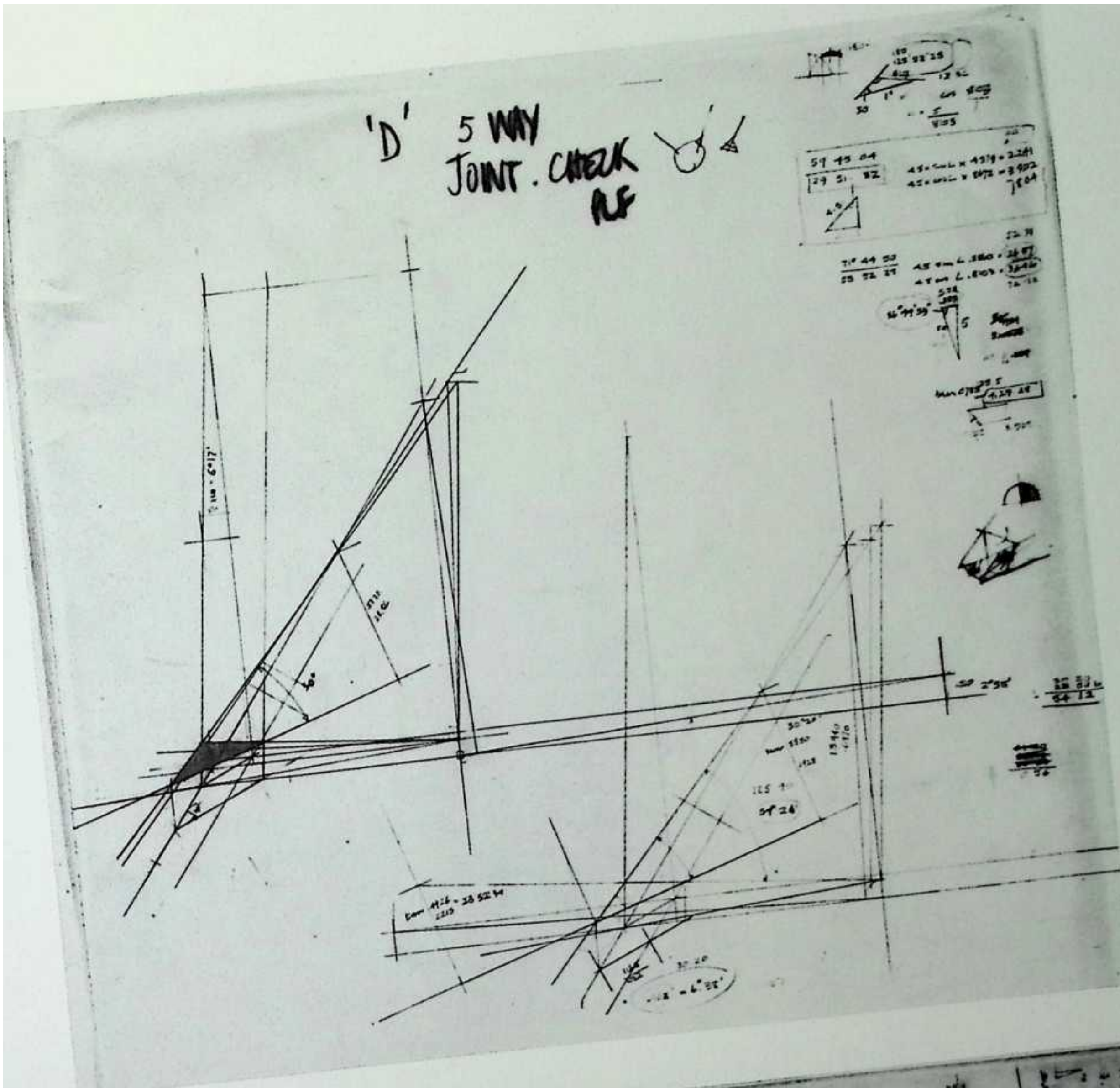

C panel
Cheek on - top half.
C PANEL

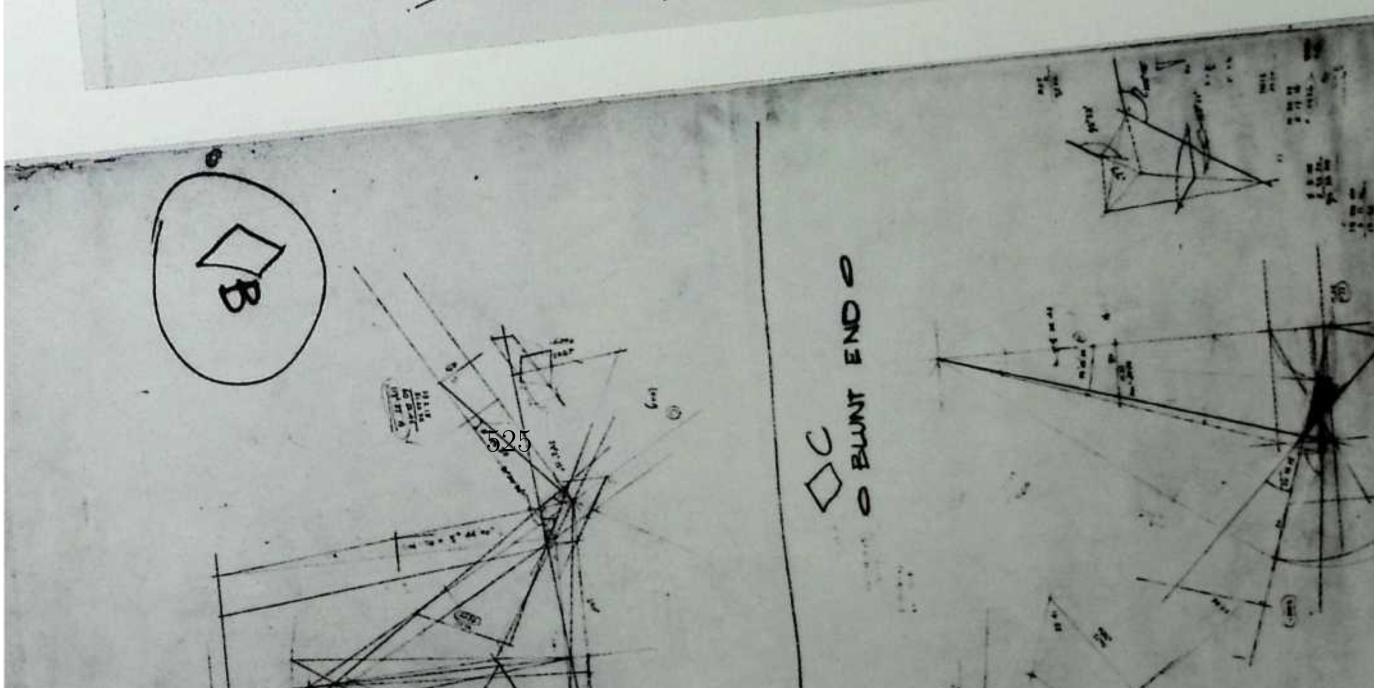


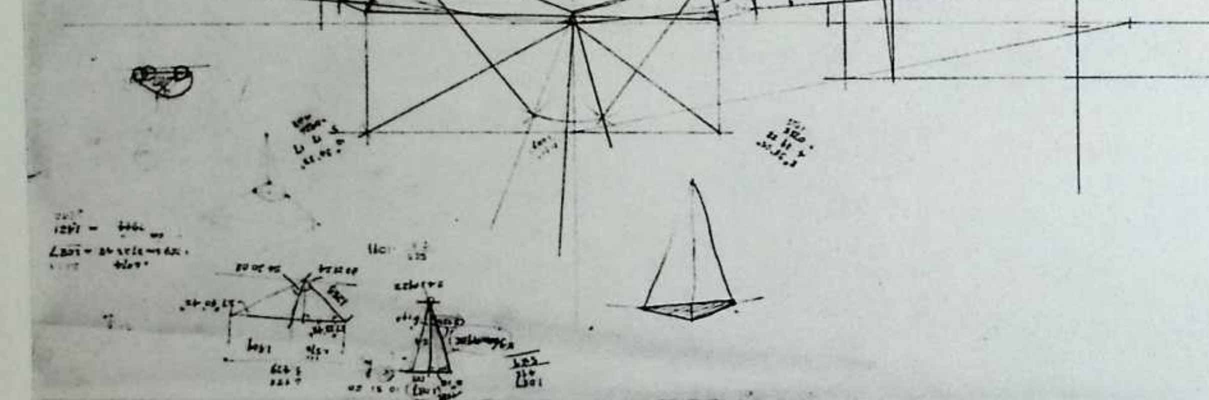

A ◇ CHECK
PLF

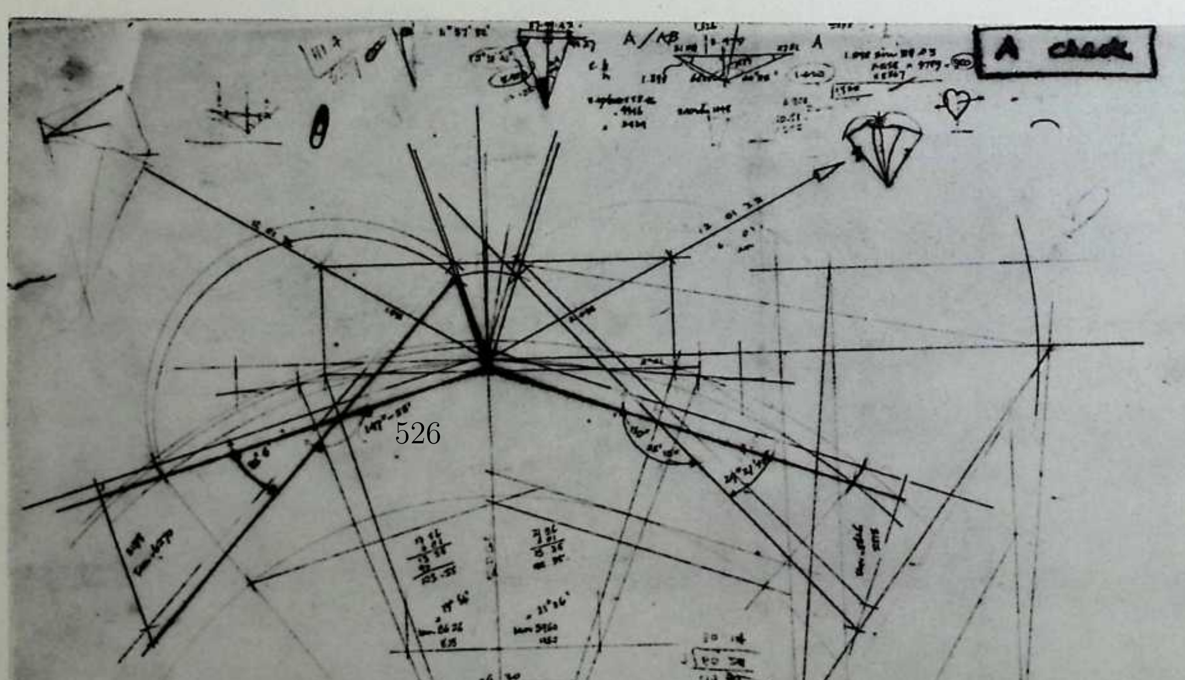


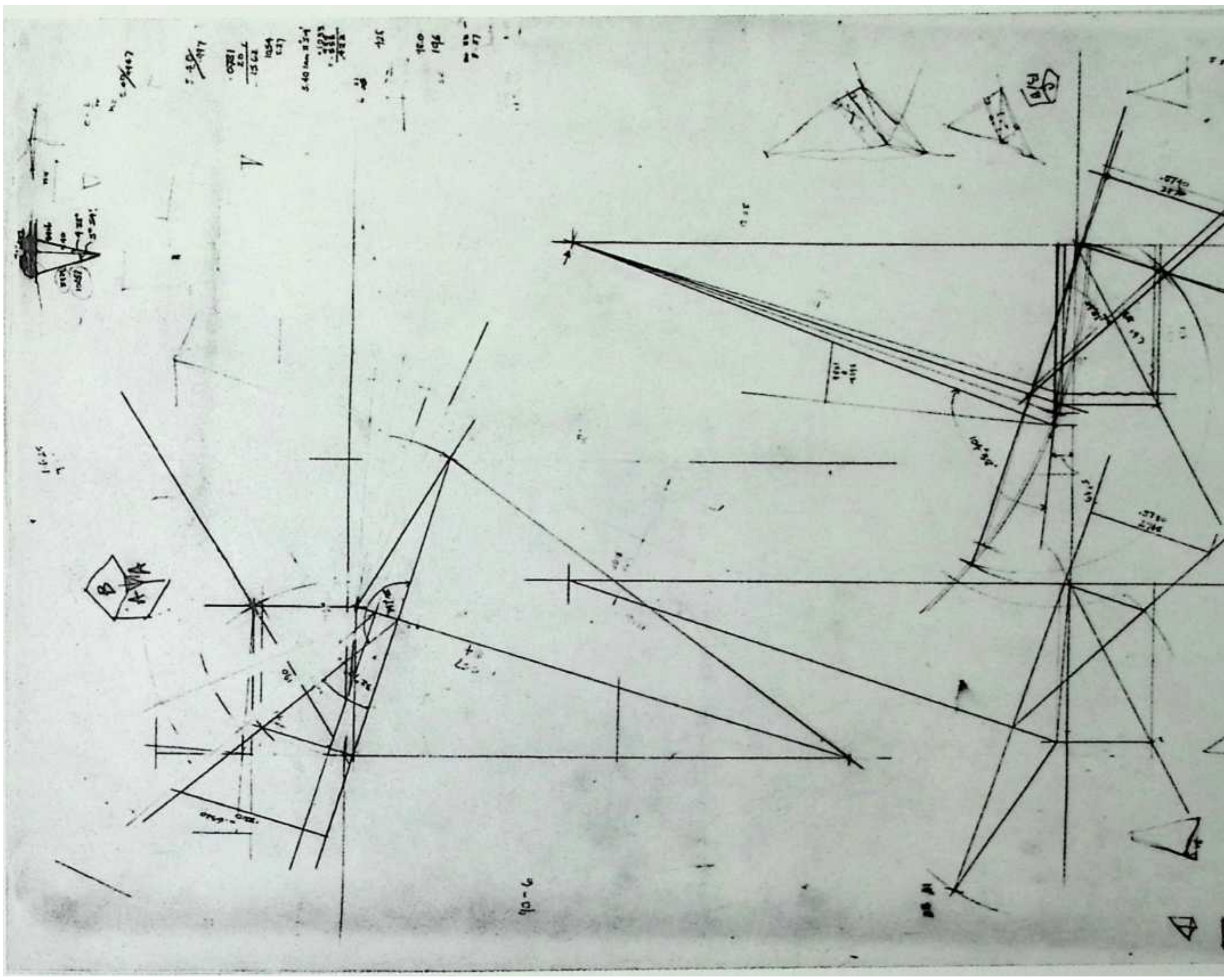
^ceoobs.ckevo^.mk^ 33

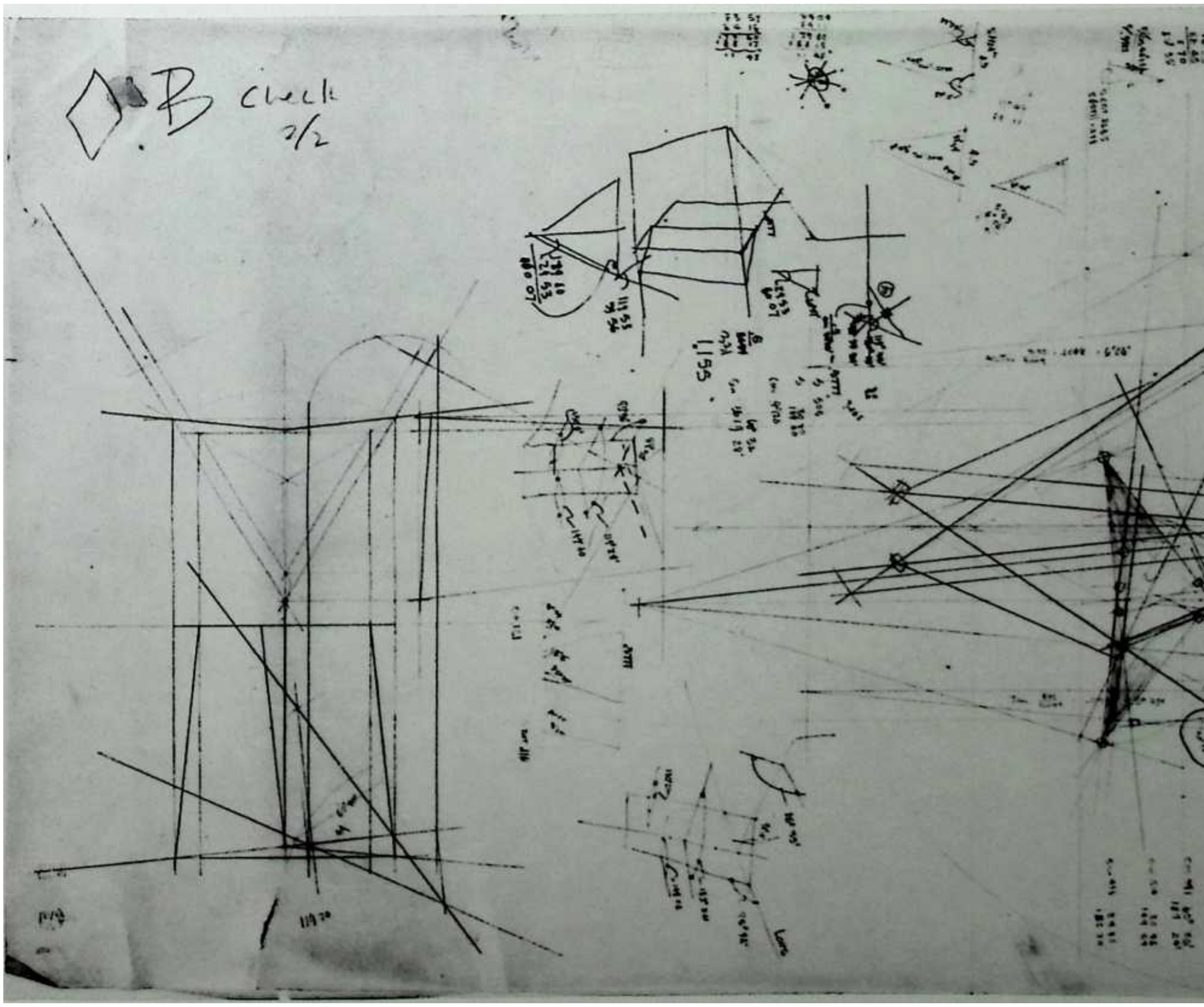

'D' 5 WAY
JOINT. CHECK

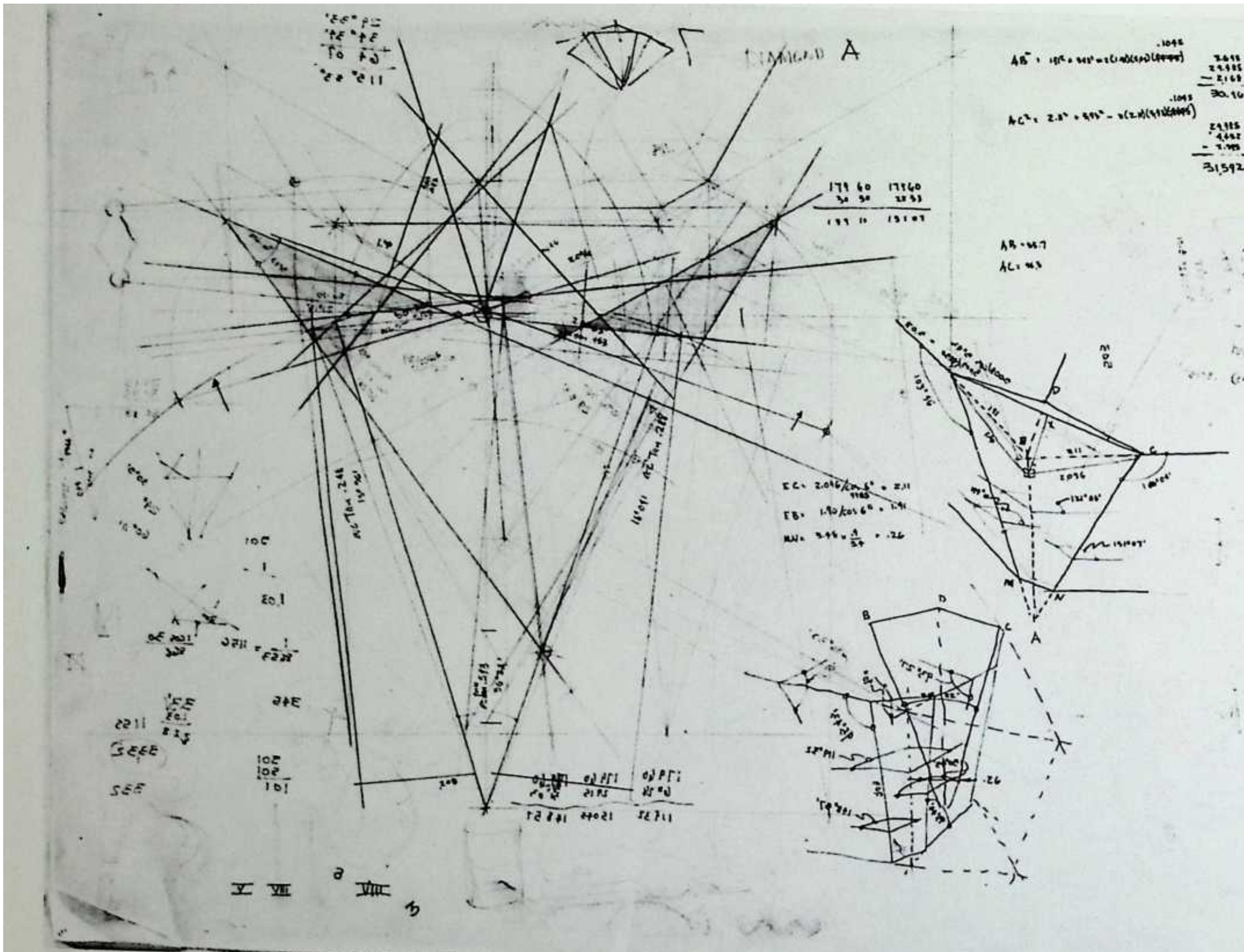

B
C
BLUNT END

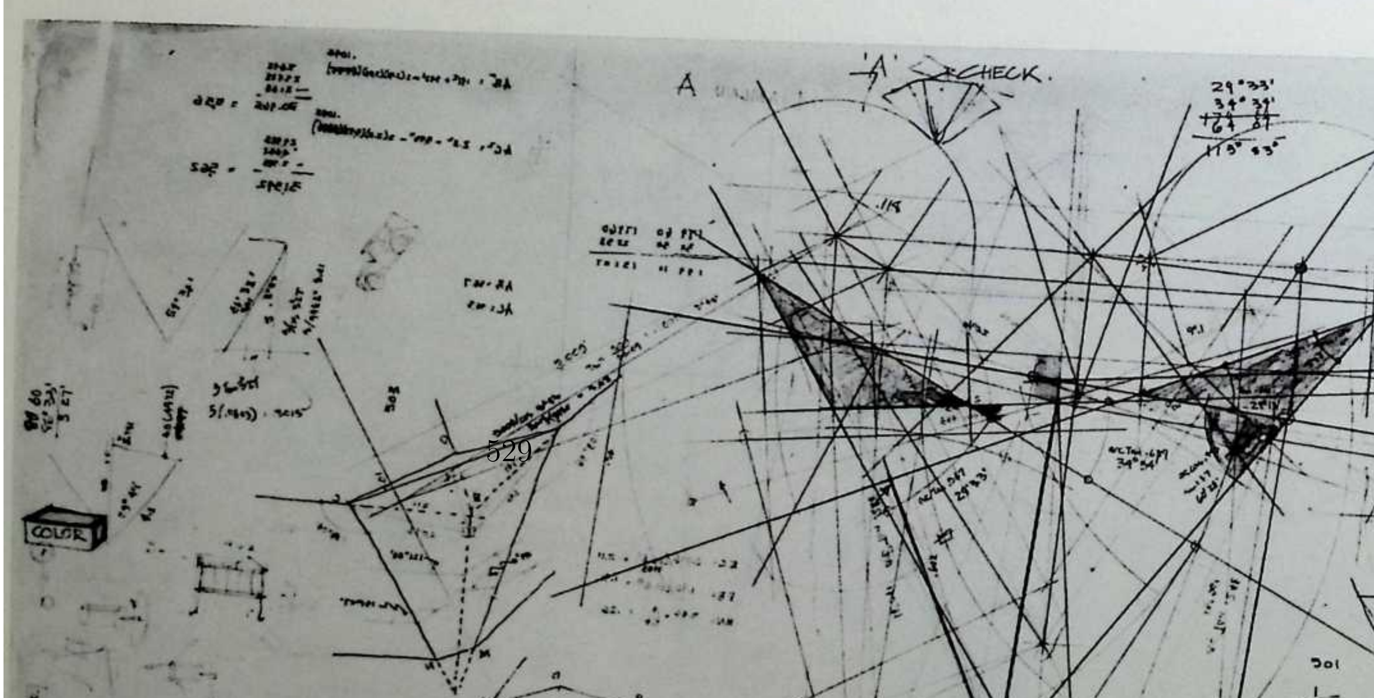

DIAMOND






B Check
2/2


DIAMOND A
AB = 33.7
AC = 43


A
'A' CHECK.
COLOR

Homestyle Center

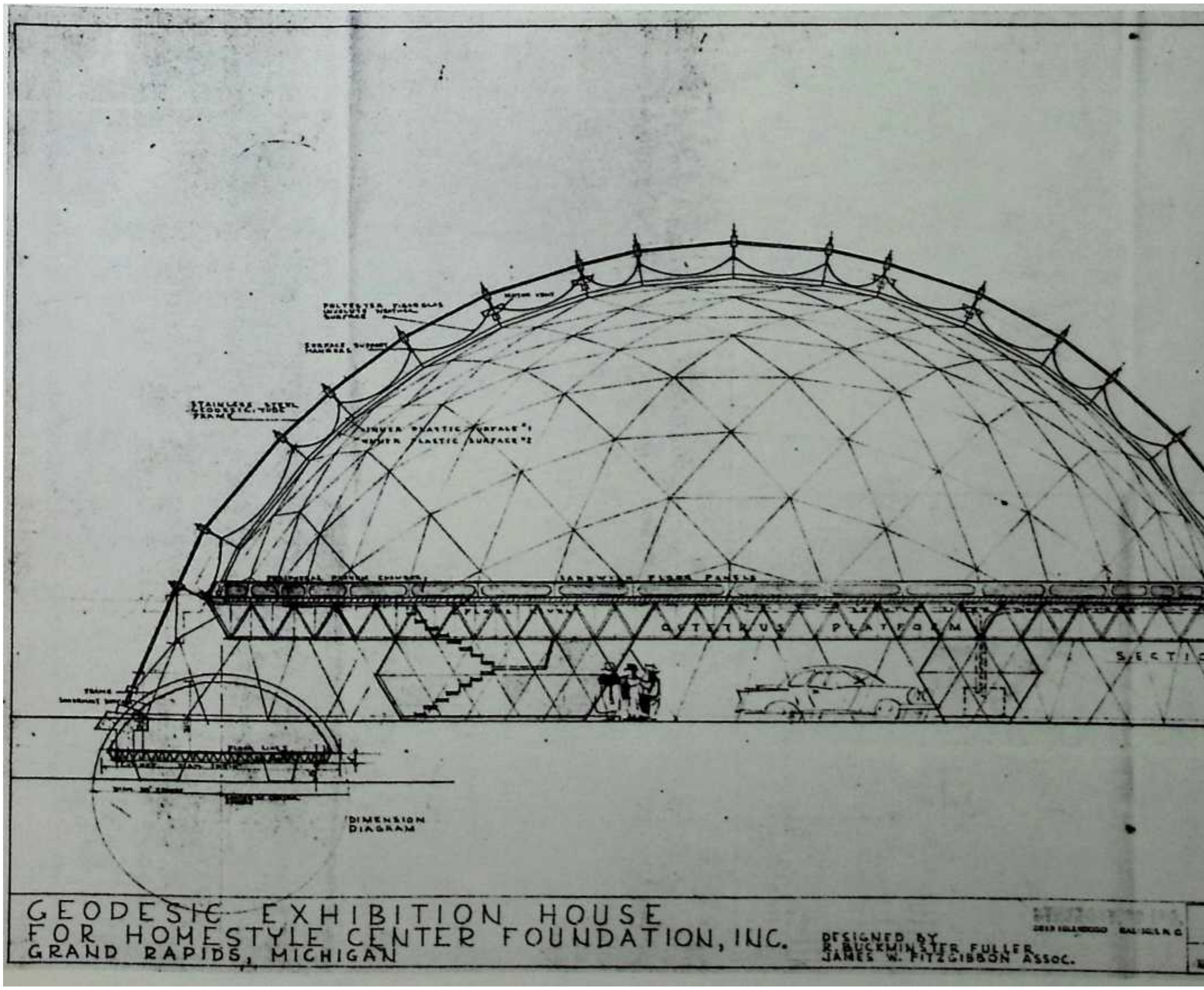
Foundation, Geodesic

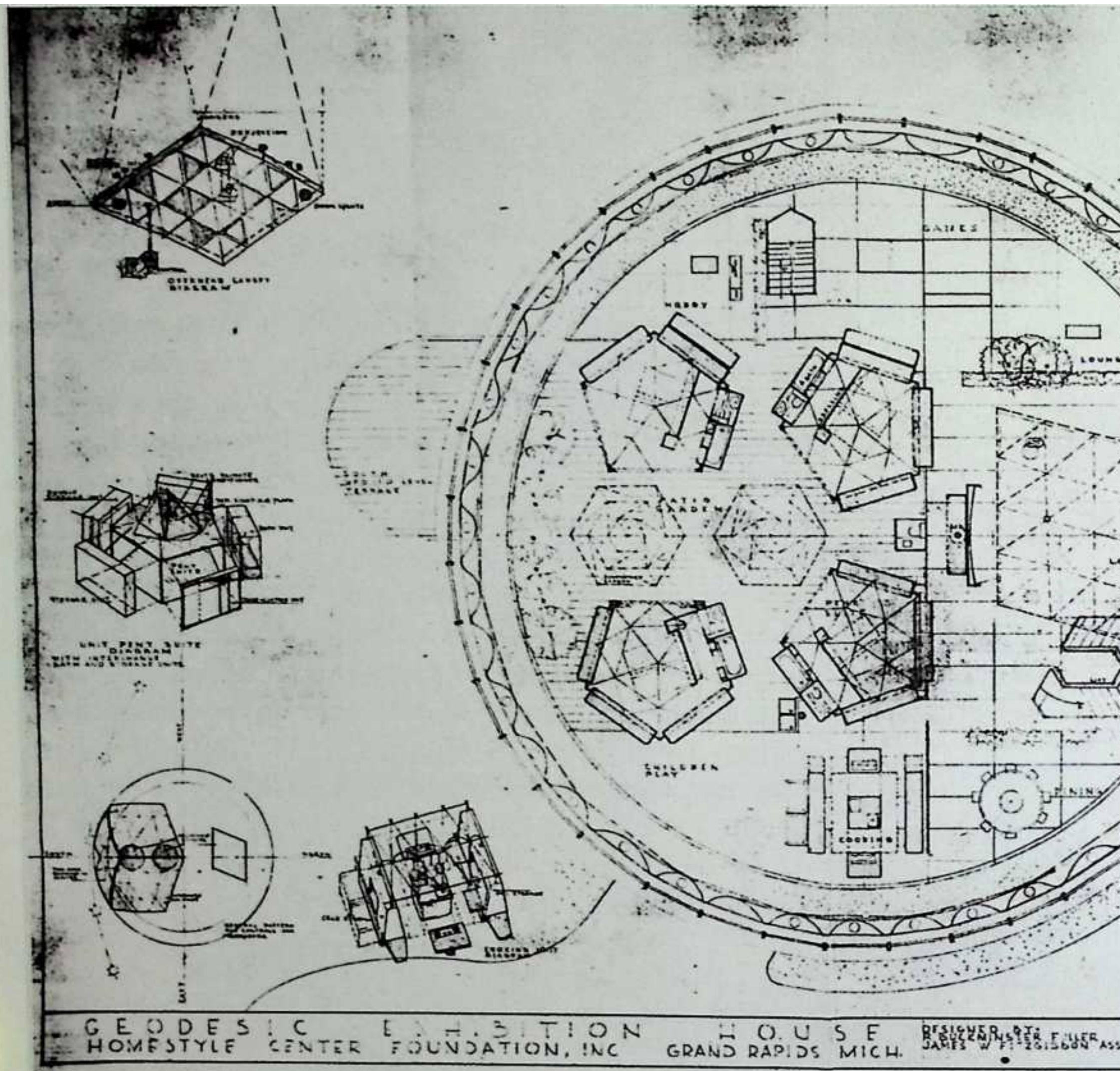
Exhibition House, Grand

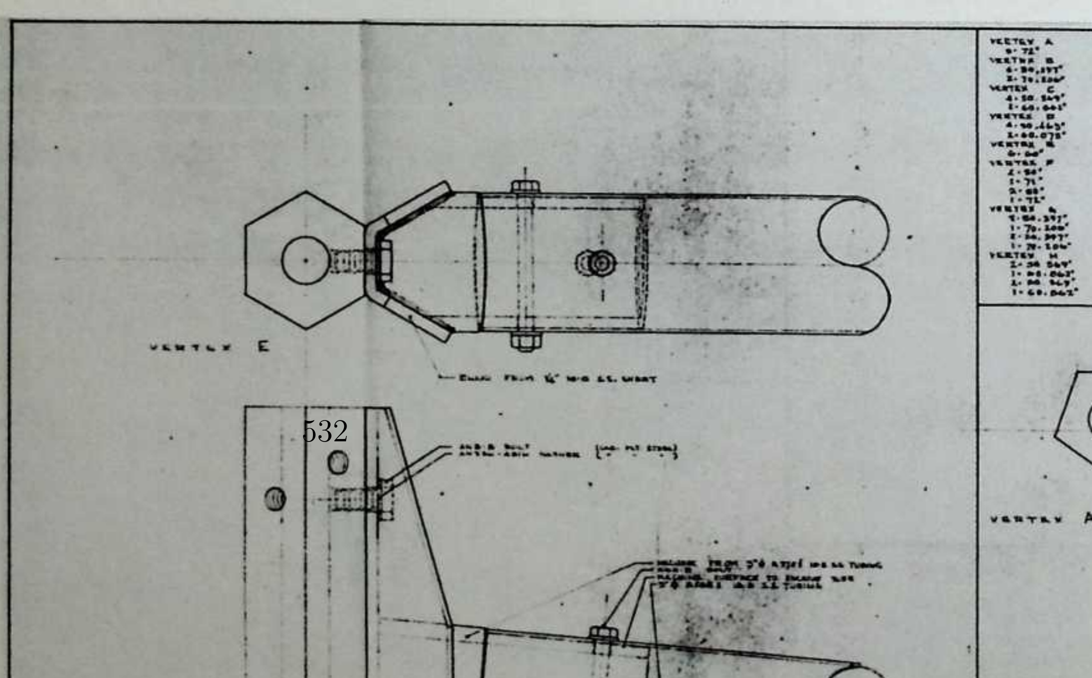
Rapids, Michigan

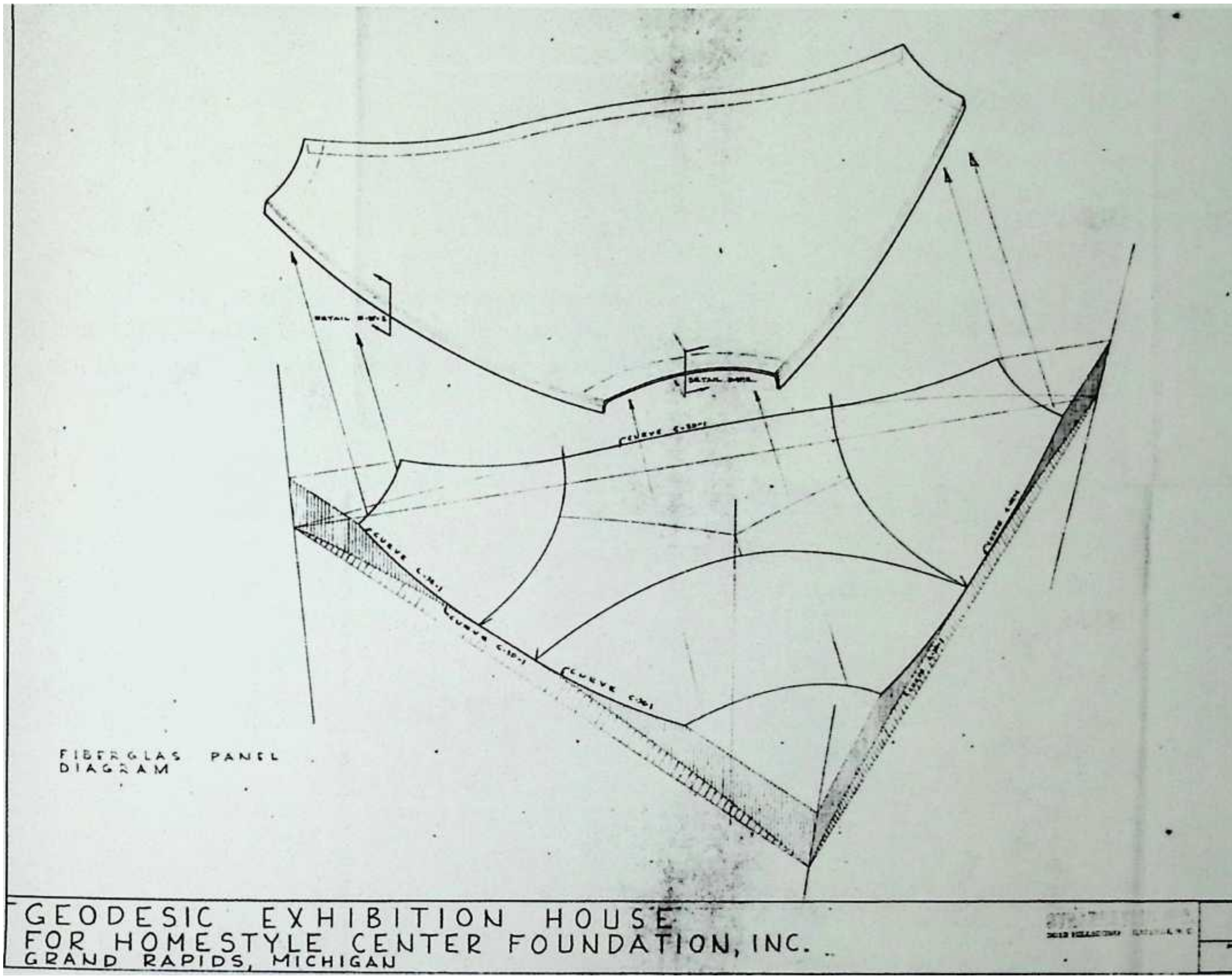
1956

The exhibition house of the Homestyle Center was more advanced than the foundation's main dome house in its fenestration and ecological ventilation. It has a stainless steel frame and a polyester fiberglass involute weather surface. The dome was constructed of translucent fiberglass panels. Octet trusses support the inner spaces. With such a generous illumination, the indoors becomes the outdoors, making the dramatic sun shades suspended from the dome's interior *de rigueur* during summer. One diagram indicates how the house remains cool during the warmer months and warm during the winter. Even the car is afforded protection in the driveway that runs under the first floor beside the swimming pool.

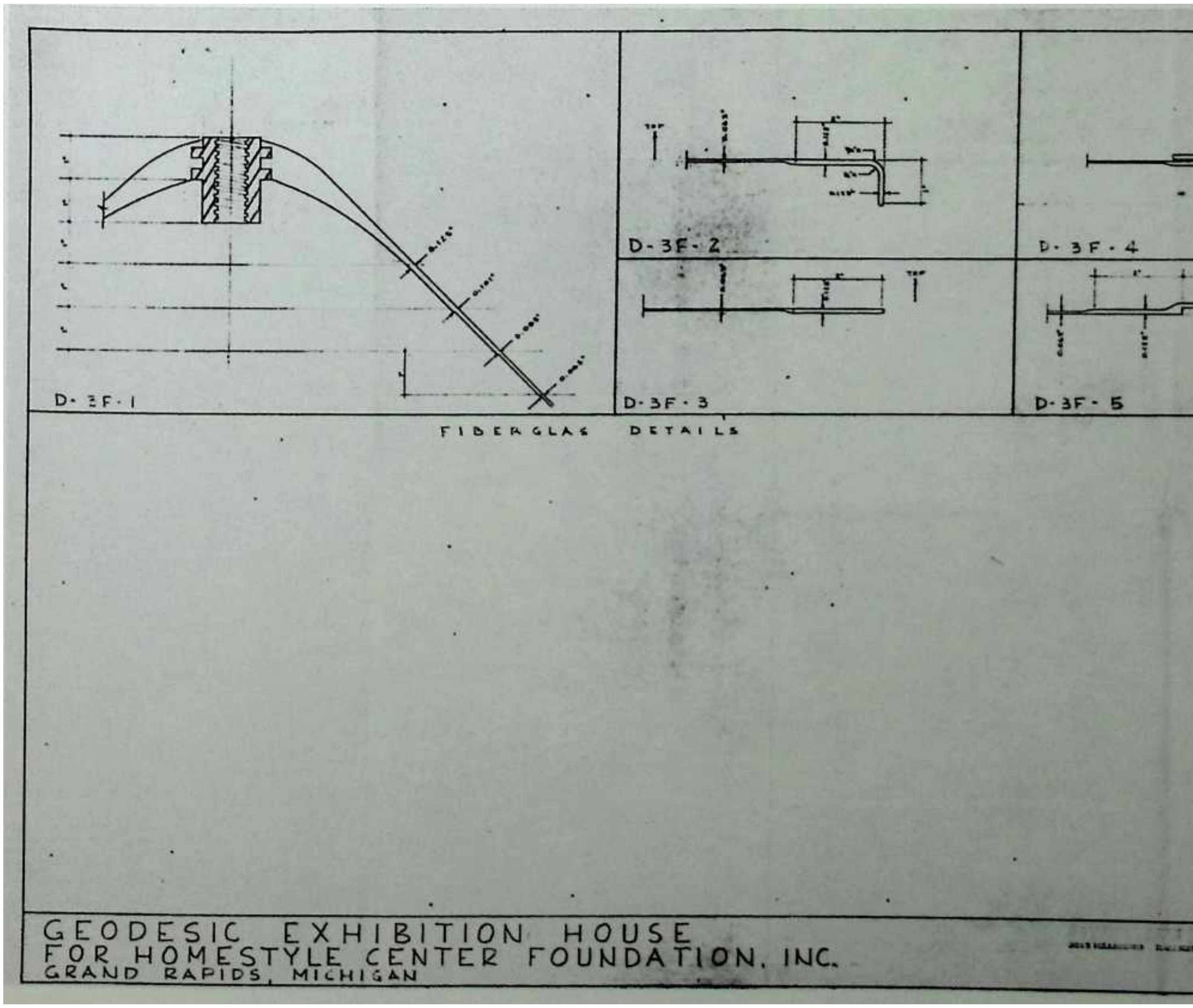

OCTETRUS PLATFORM
DIMENSION DIAGRAM
GEODESIC EXHIBITION HOUSE
FOR HOMESTYLE CENTER FOUNDATION, INC.
GRAND RAPIDS, MICHIGAN
DESIGNED BY
R. BUCKMINSTER FULLER
JAMES W. FITZGIBBON ASSOC.


GEODESIC EXHIBITION HOUSE
HOMESTYLE CENTER FOUNDATION, INC GRAND RAPIDS MICH.


VERTEX E

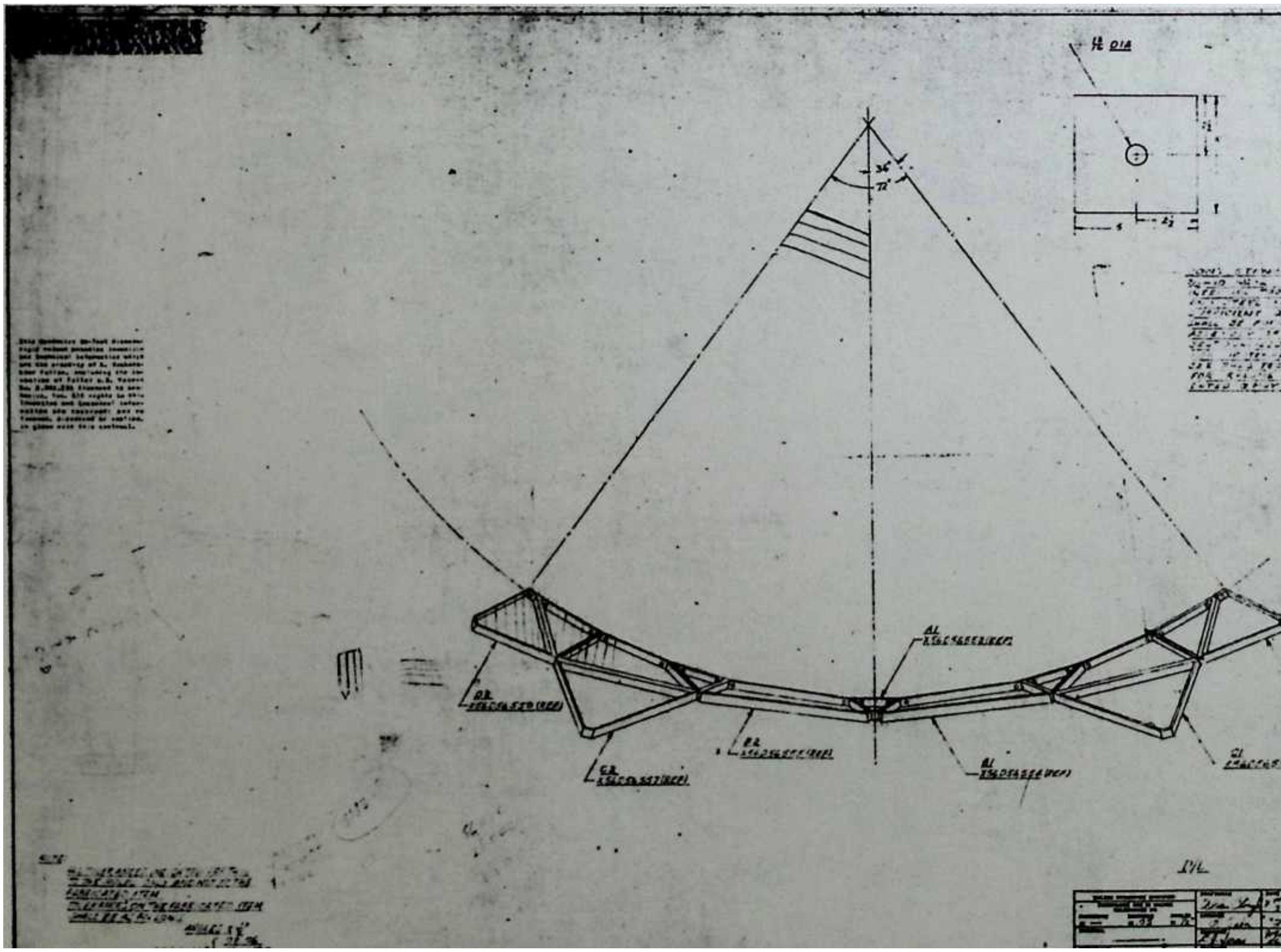

FIBERGLAS PANEL
DIAGRAM
GEODESIC EXHIBITION HOUSE
FOR HOMESTYLE CENTER FOUNDATION, INC.
GRAND RAPIDS, MICHIGAN

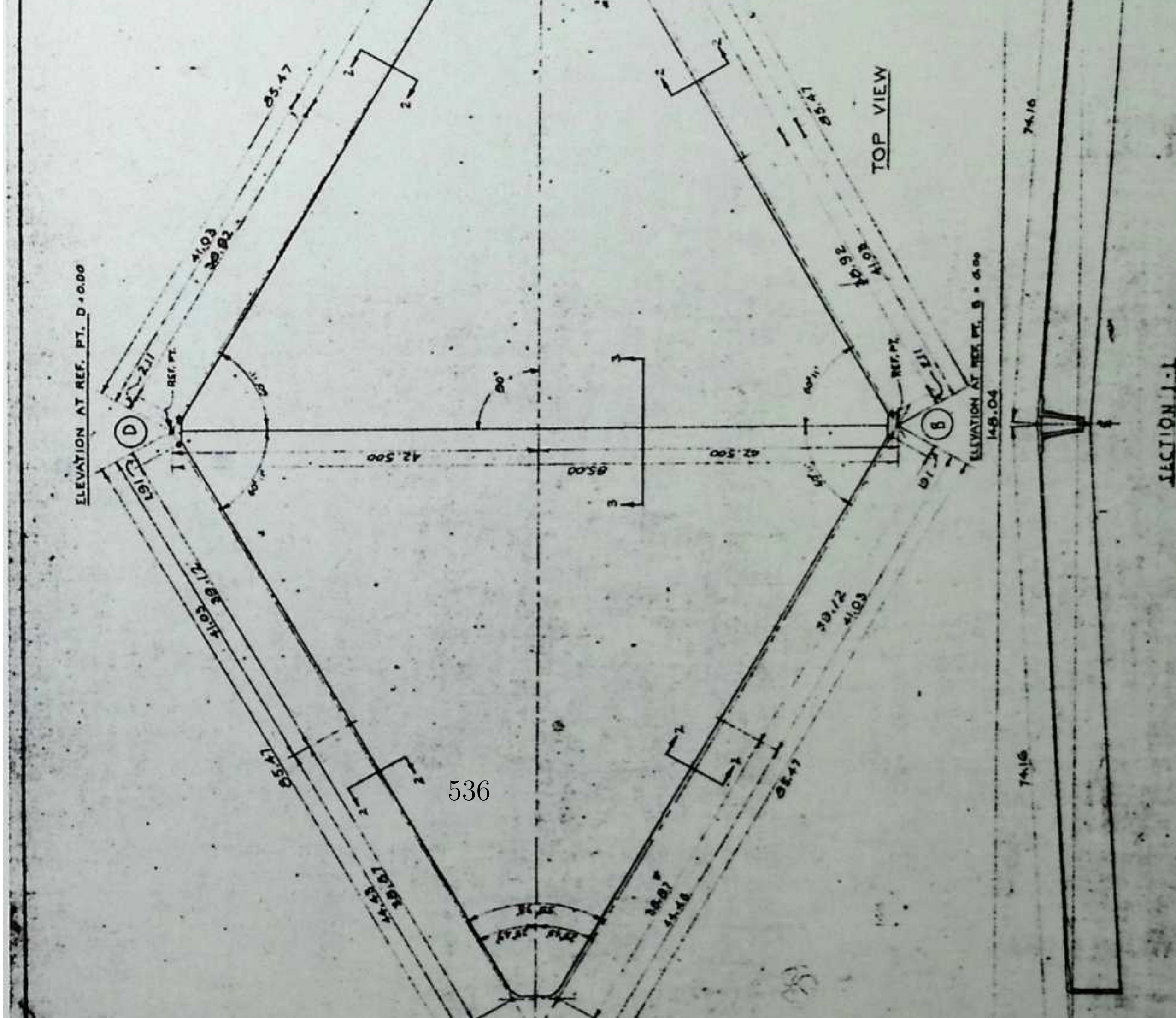
534

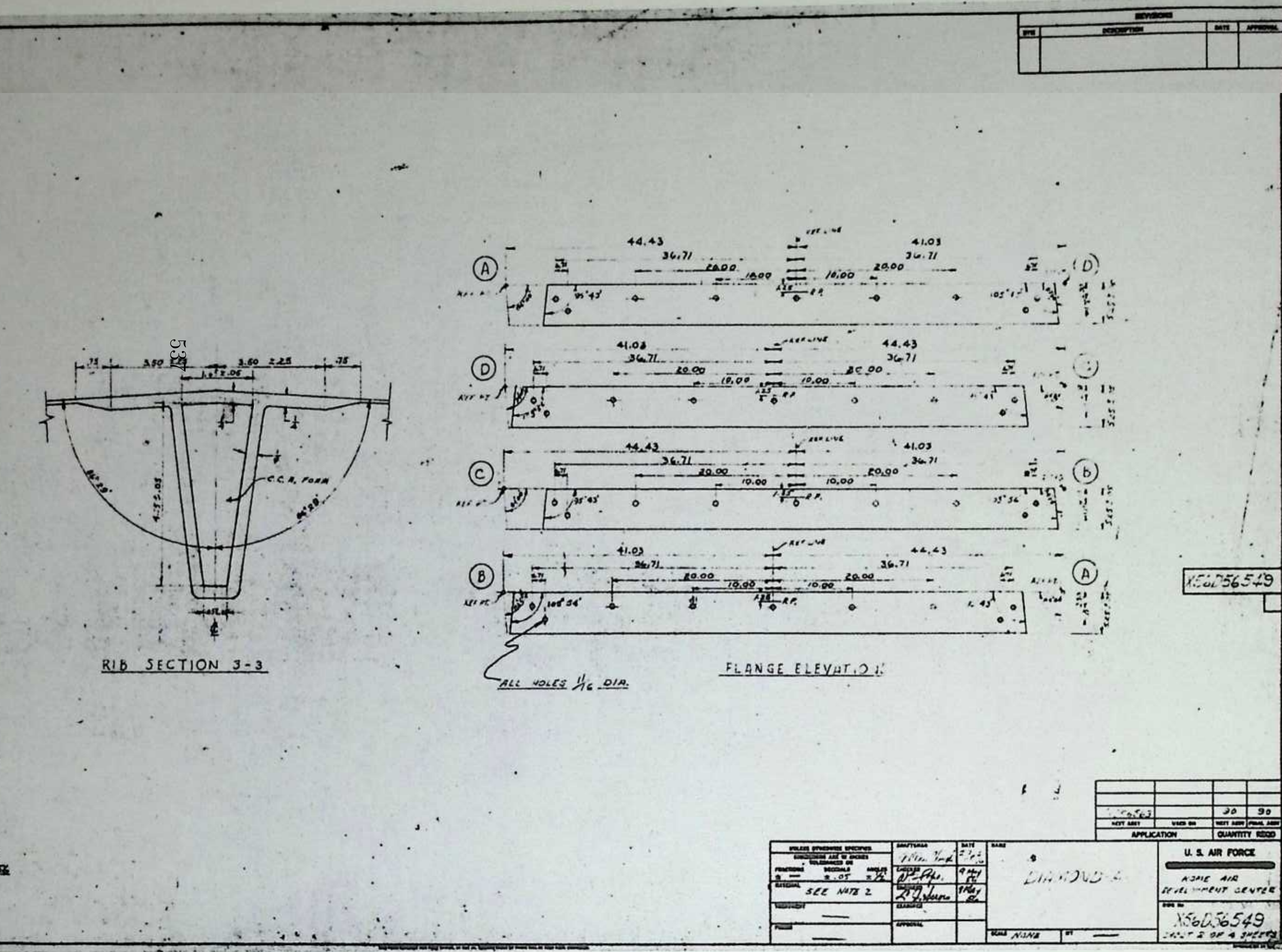


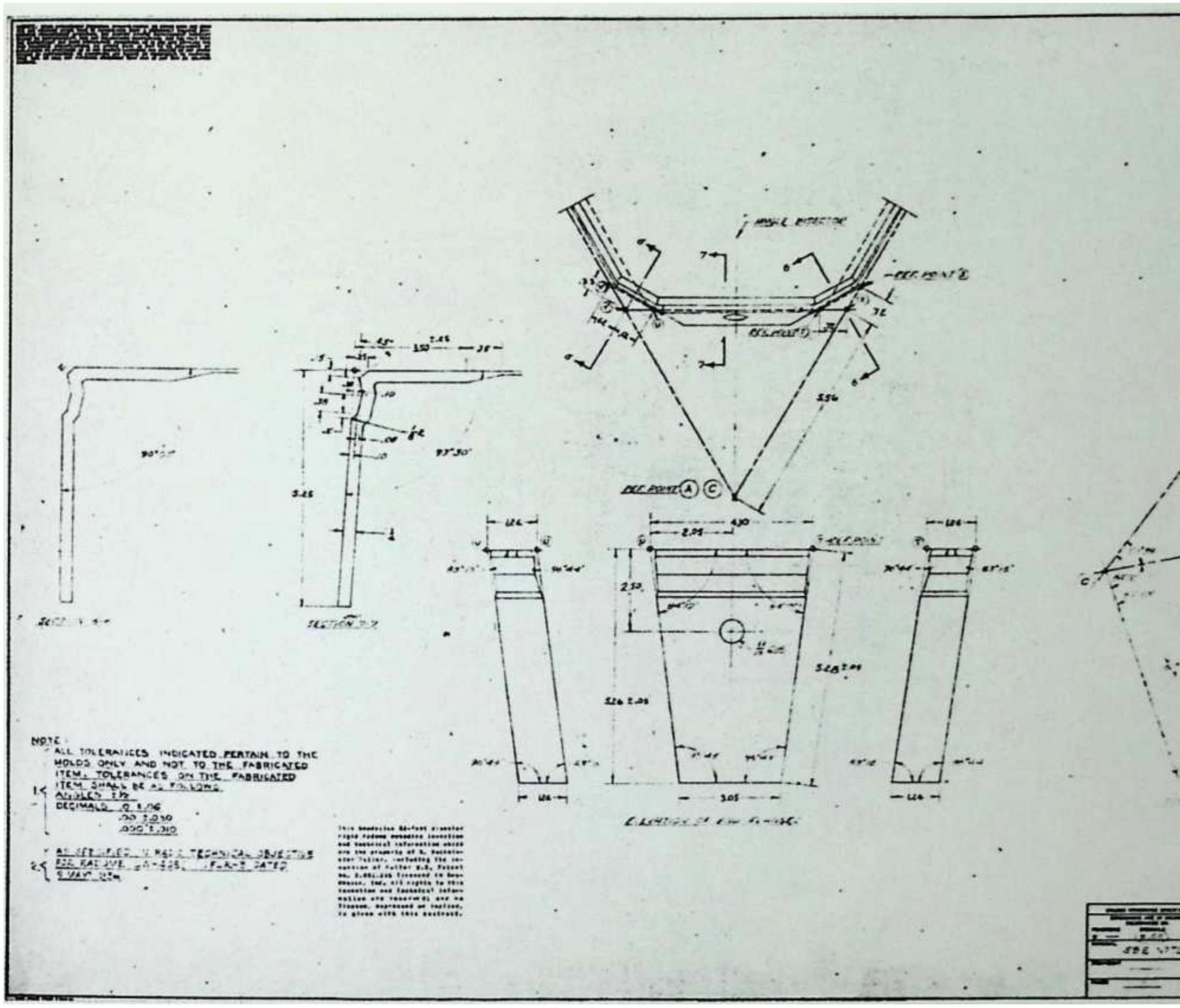
U.S. Air Force, Rome Air Development Center, Rome, New York 1955

The Air Development Center in Rome, New York, is a rigid radome with diamond-shaped panels attached to hexagonal hubs and is set on a metal truss platform.

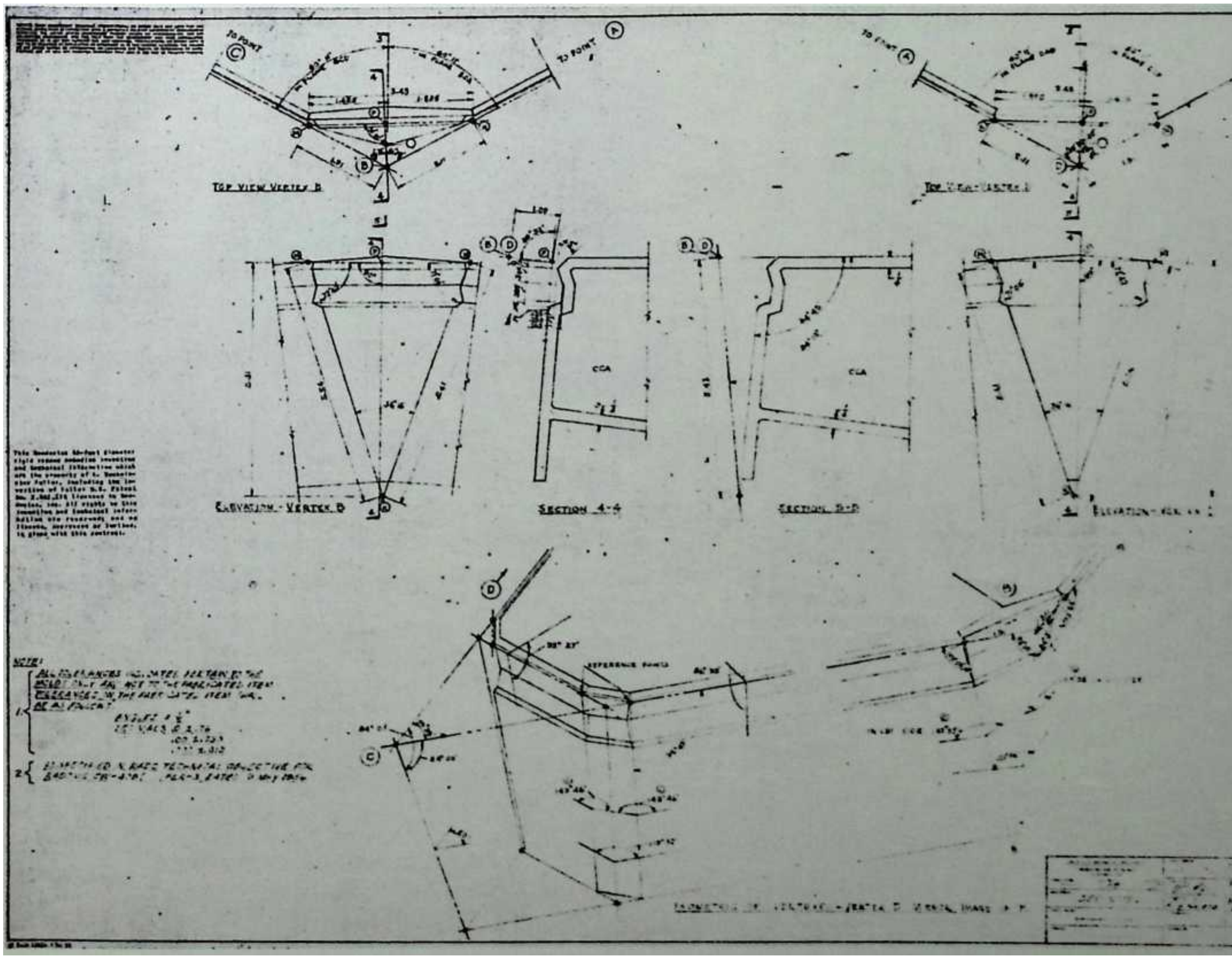


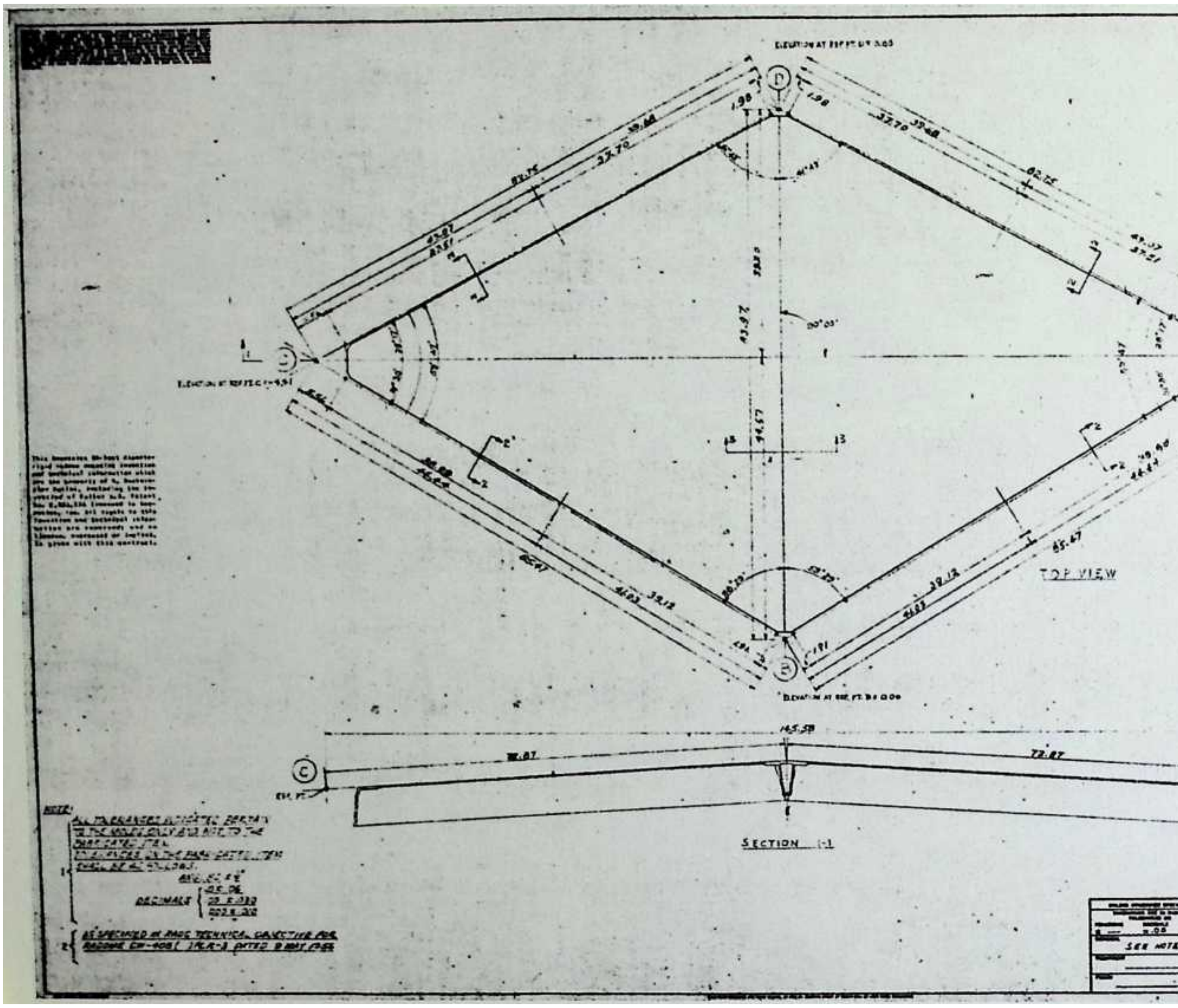

TOP VIEW
ELEVATION AT REF. PT. D = 0.00
REF. PT.

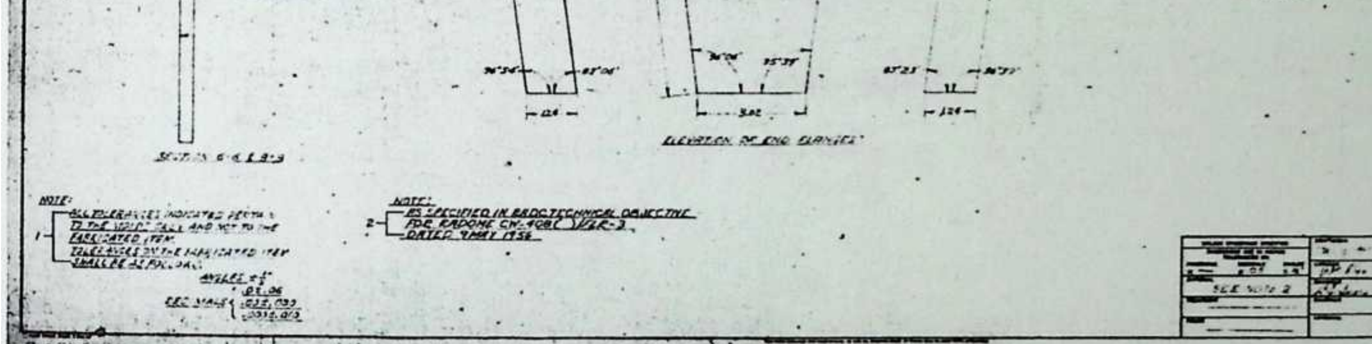

RIB SECTION 3-3
C.C.R. FORM
FLANGE ELEVATION
ALL HOLES 11/16 DIA.
44.43
41.03
36.71
20.00
10.00
R.P.
X56D56549
APPLICATION
QUANTITY REQD
U. S. AIR FORCE
ROME AIR
DEVELOPMENT CENTER
SEE NOTE 2
SCALE NONE
X56D56549
SHEET 2 OF 4 SHEETS

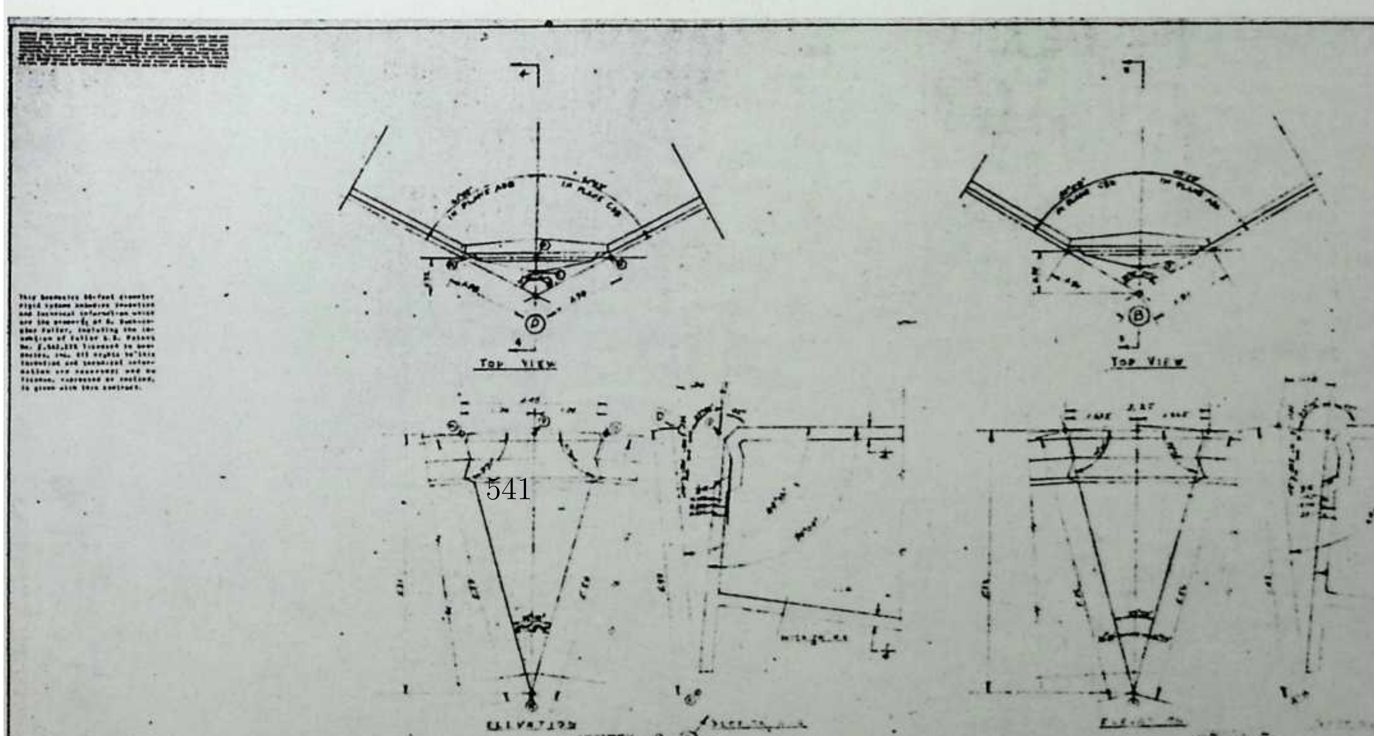


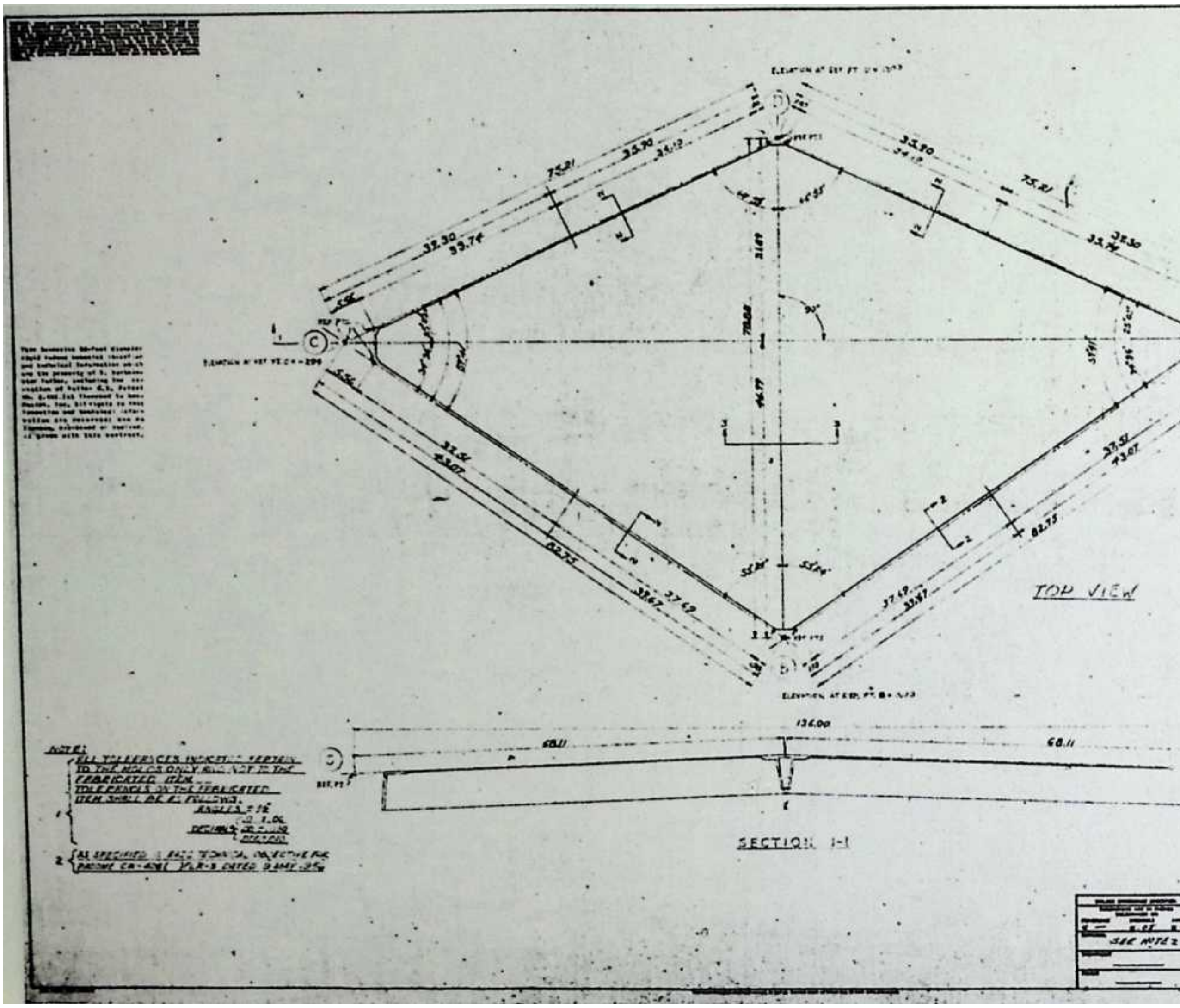
NOTE:
ALL TOLERANCES INDICATED PERTAIN TO THE MOLDS ONLY AND NOT TO THE FABRICATED ITEM. TOLERANCES ON THE FABRICATED ITEM SHALL BE AS FOLLOWS:
DECIMALS
SECTION 7-7
REF POINT A C
5.25
2.05
2.50
3.05

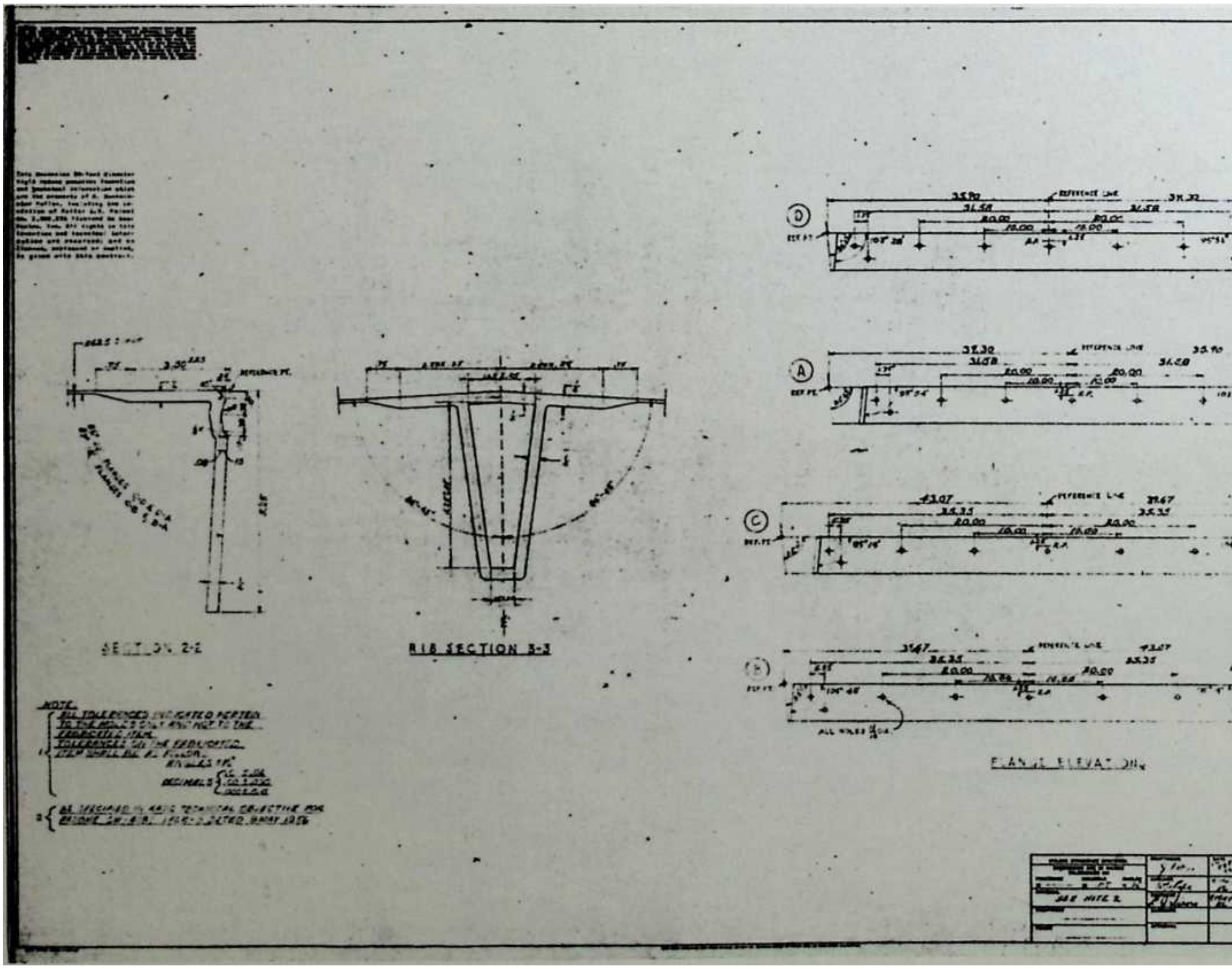

TOP VIEW VERTEX B
ELEVATION - VERTEX B
SECTION 4-4
SECTION D-D
CCA
NOTE:

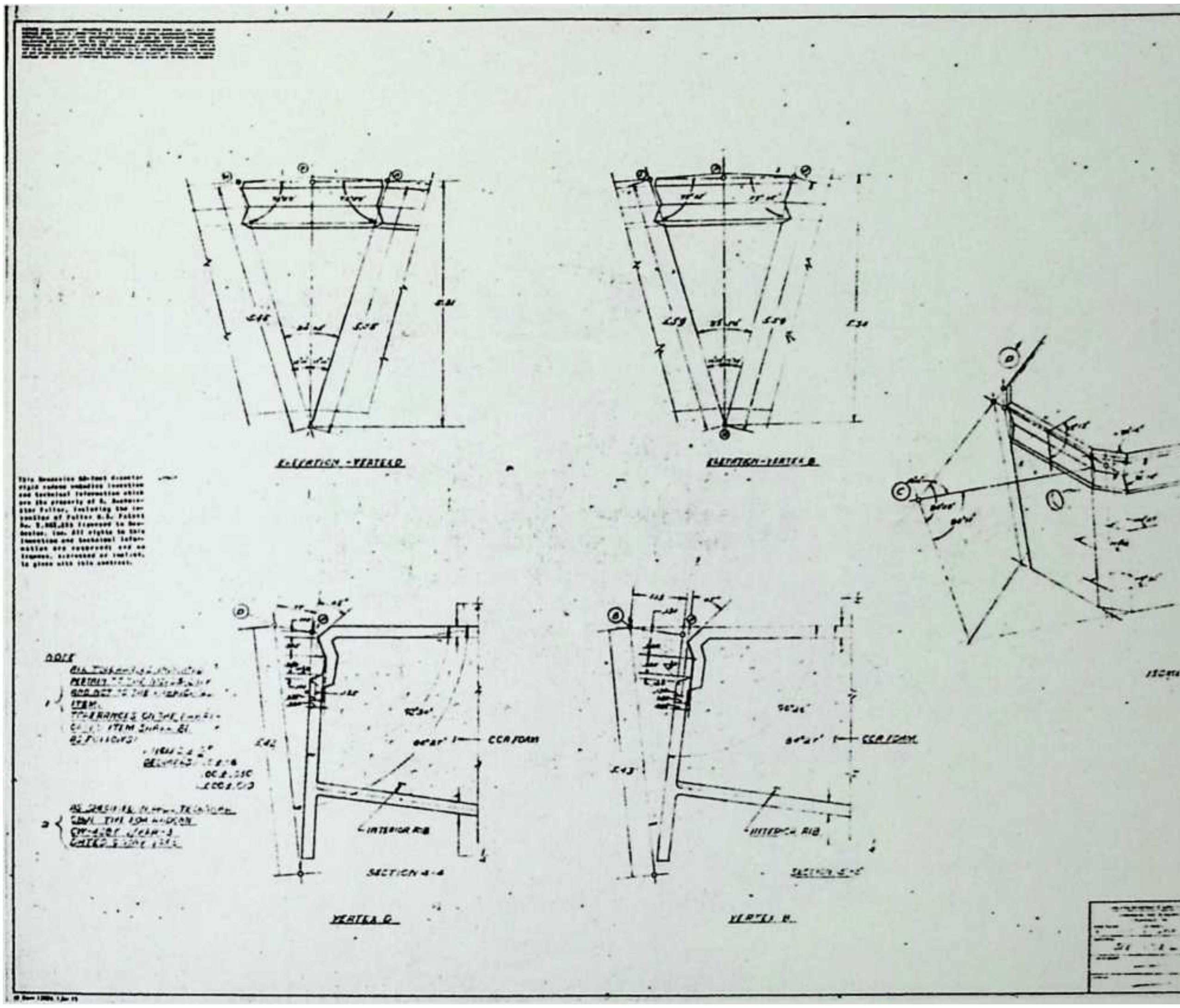

TOP VIEW
SECTION 1-1


SECTION 7-7
ELEVATION OF END FLANGES
NOTE:
NOTE:

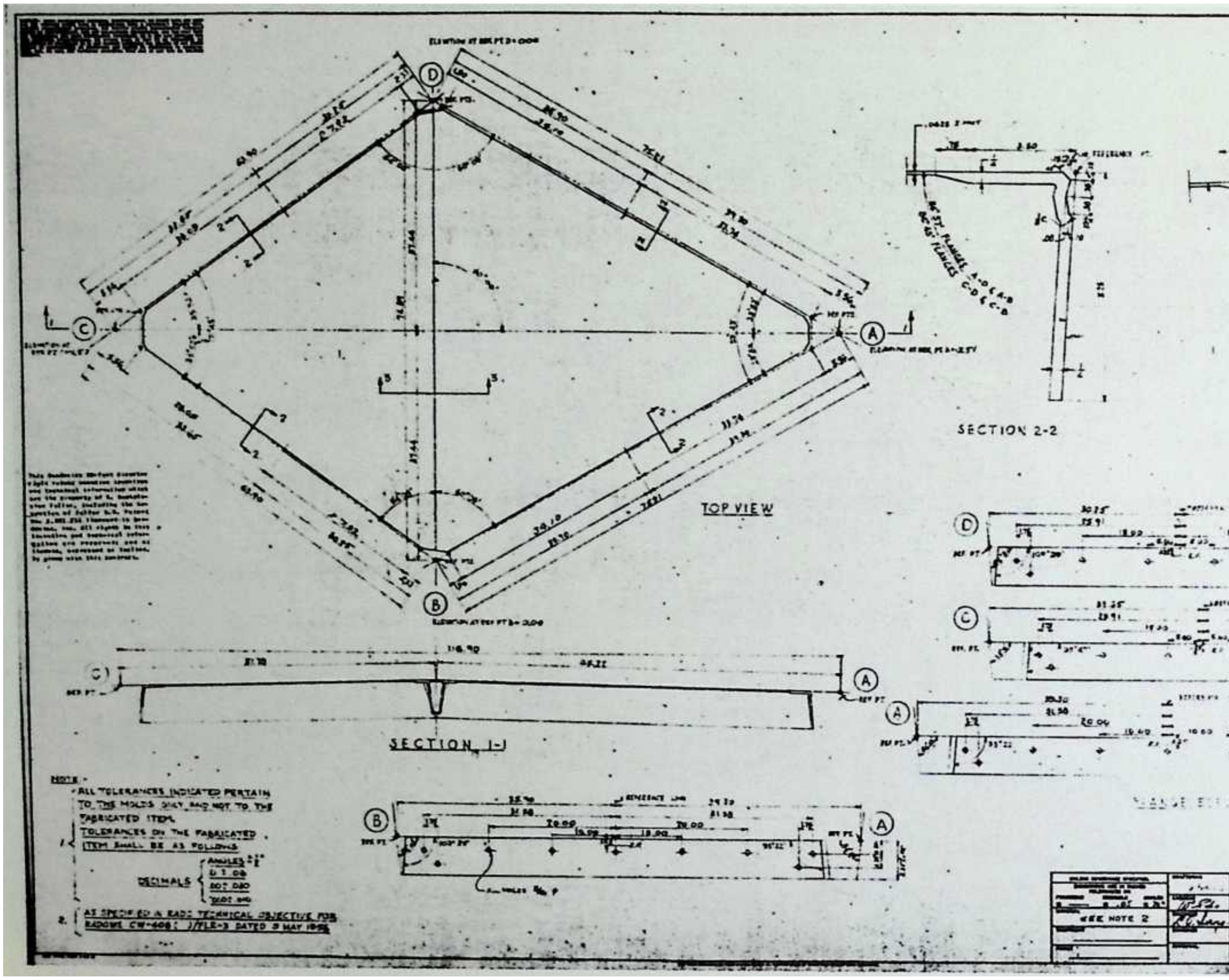

TOP VIEW
TOP VIEW


TOP VIEW
SECTION 1-1
136.00
68.11
68.11
SEE NOTE 2

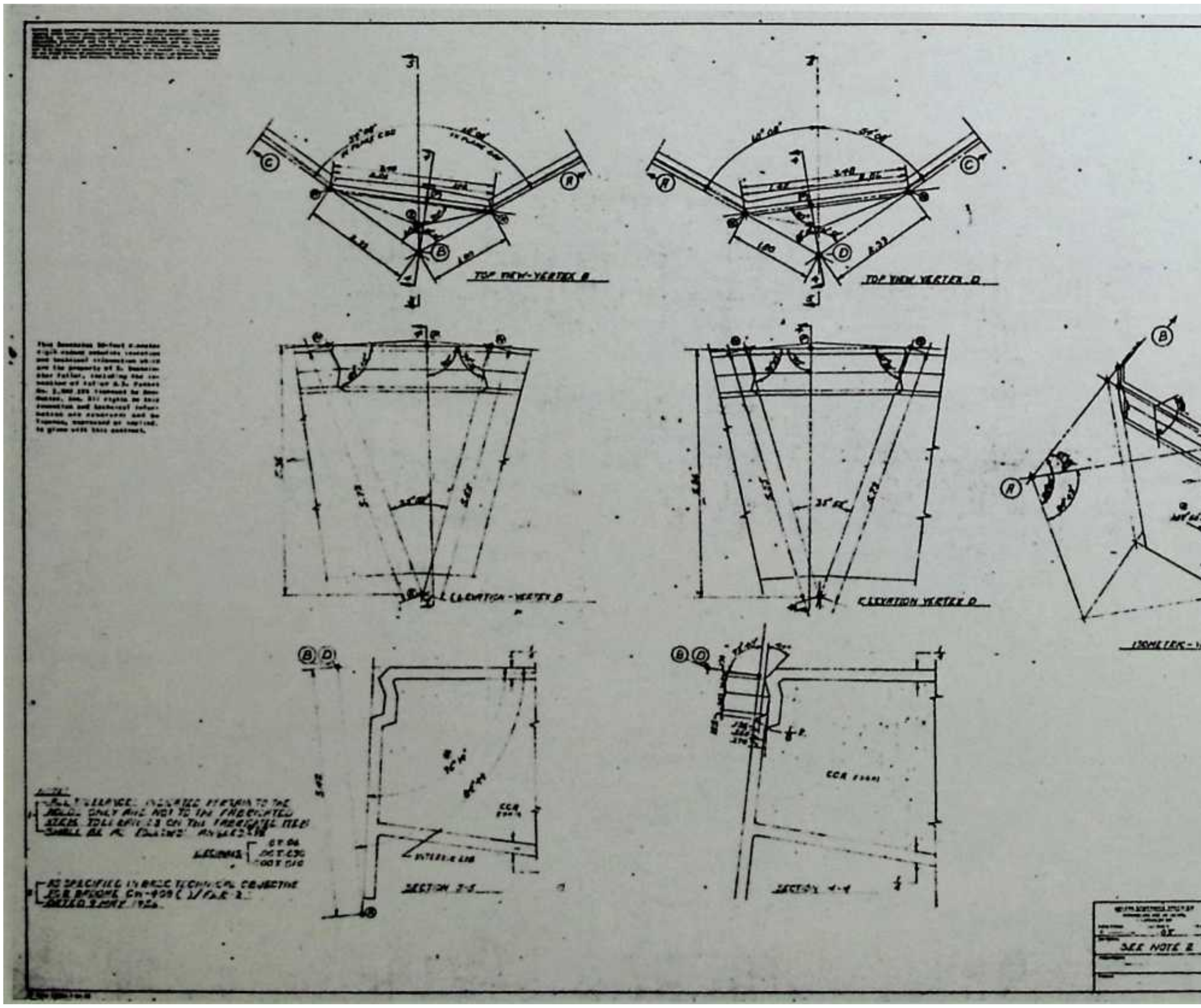

SECTION 2-2
RIB SECTION 3-3
FLANGE ELEVATION
NOTE:
REFERENCE LINE

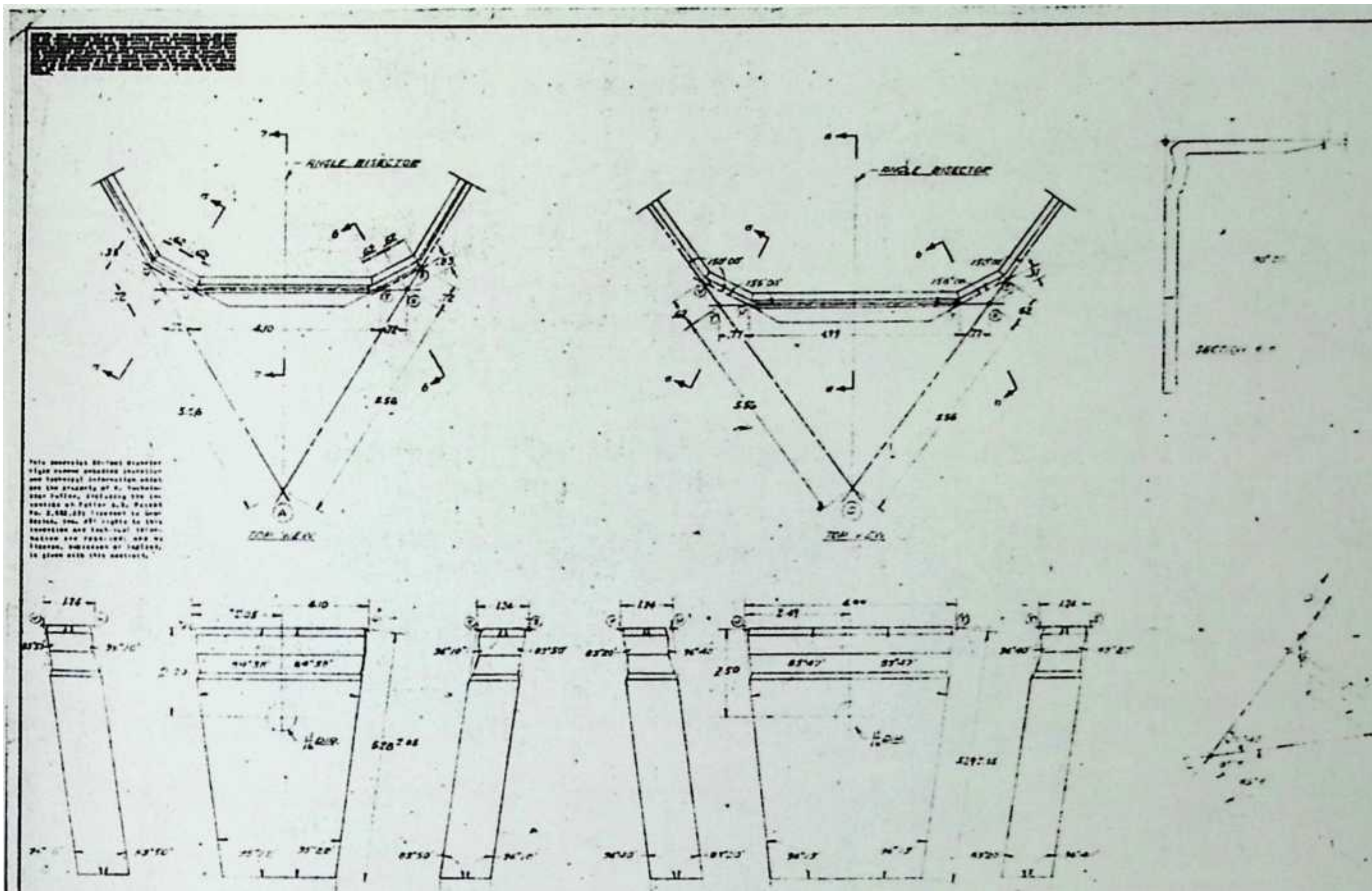


ELEVATION - VERTEX B
SECTION A-A
CCA FORM
INTERIOR RIB
VERTEX B

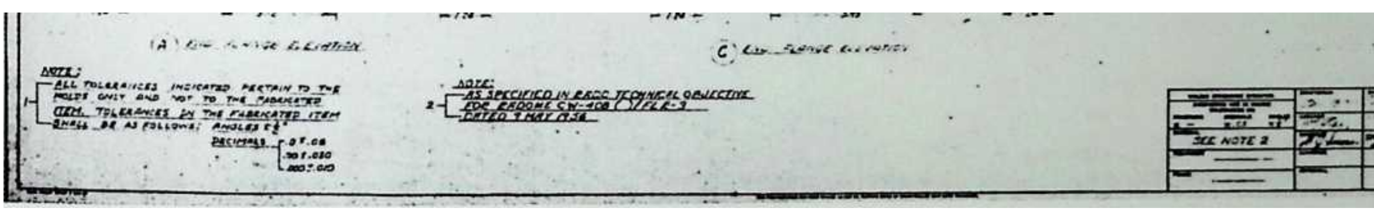


TOP VIEW
SECTION 1-1
SECTION 2-2
NOTE -
SEE NOTE 2

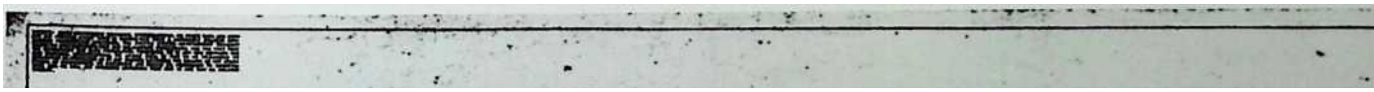

TOP VIEW-VERTEX B
TOP VIEW VERTEX D
ELEVATION-VERTEX B
ELEVATION VERTEX D
SECTION 3-3
SECTION 4-4
SEE NOTE 2

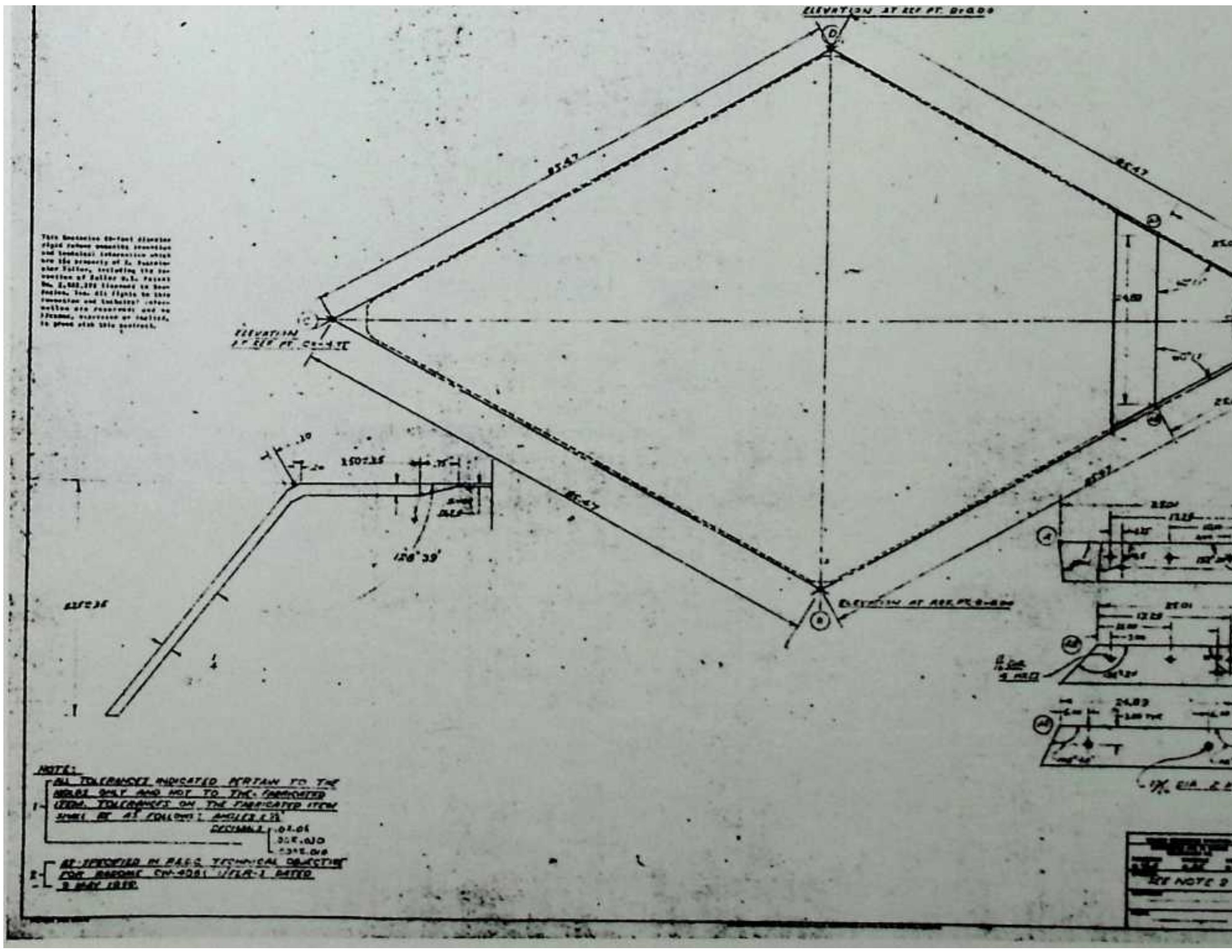


ANGLE BISECTOR
ANGLE BISECTOR



NOTE:
1 ALL TOLERANCES INDICATED PERTAIN TO THE MOLDS ONLY AND NOT TO THE FABRICATED ITEM. TOLERANCES ON THE FABRICATED ITEM SHALL BE AS FOLLOWS; ANGLES ±½°
DECIMALS .0 ±.06
.00 ±.030
.000 ±.010
NOTE:
2 AS SPECIFIED IN RADC TECHNICAL OBJECTIVE FOR RADOME CW-408 ( )/FLR-3 DATED 9 MAY 1956
SEE NOTE 2




126°39'
NOTE:
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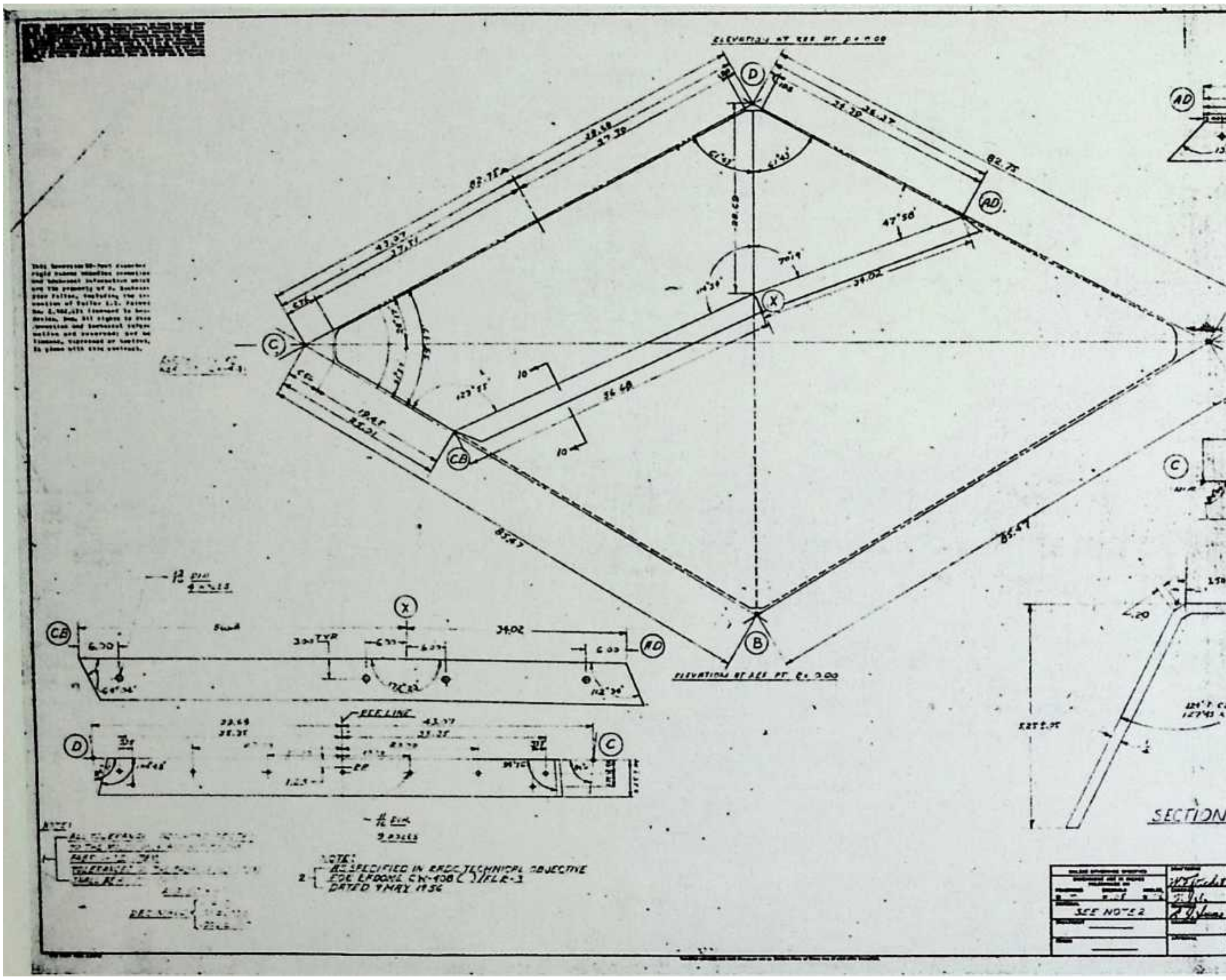
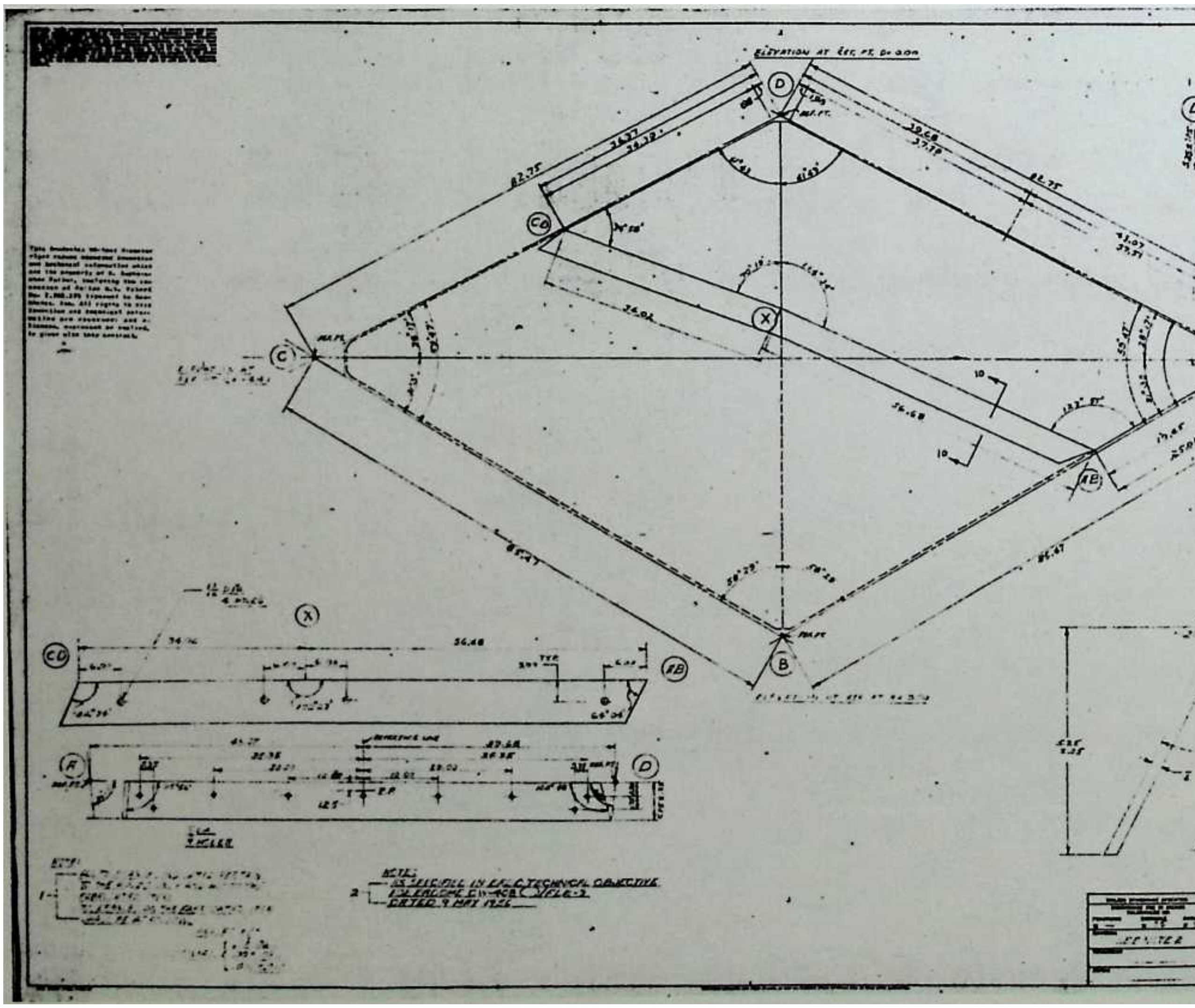
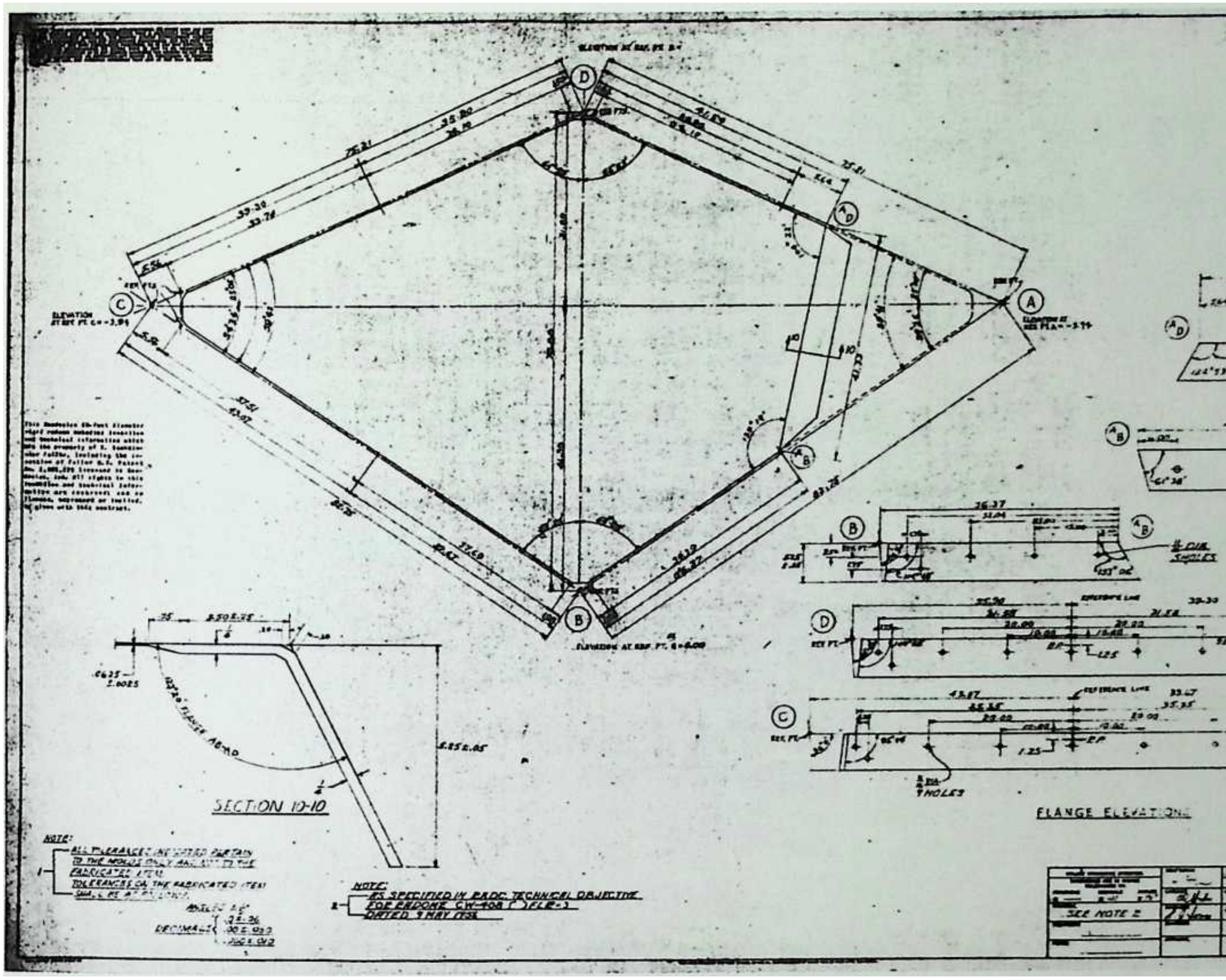
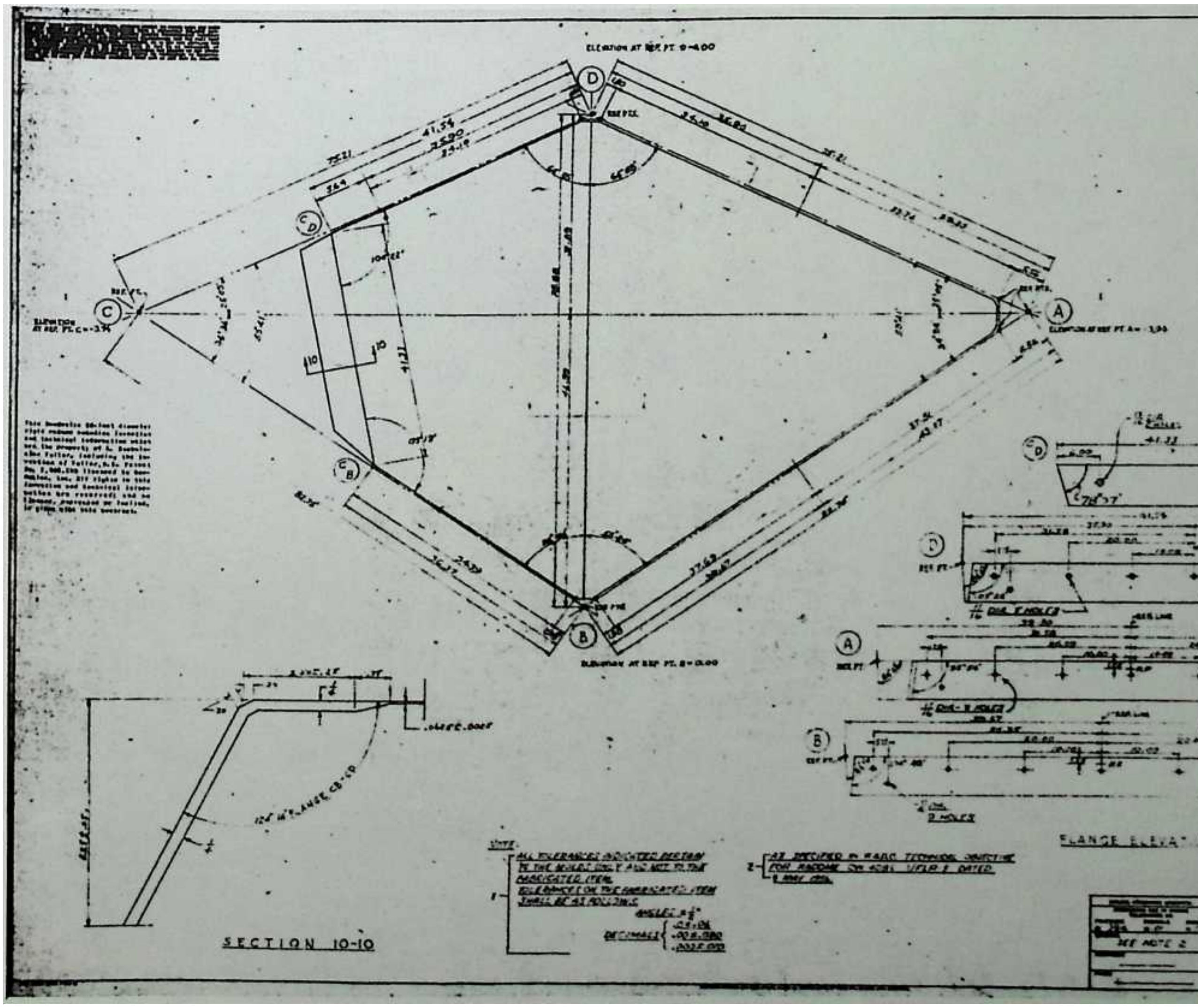
DECIMALS


82.75
85.47
47°50'
34.02
36.68
6.00
SEE NOTE 2
SECTION




SECTION 10-10
FLANGE ELEVATIONS



BA *

SECTION

|X56PX65J3

FLANGE ELEVATIONS

irr NOTE 2

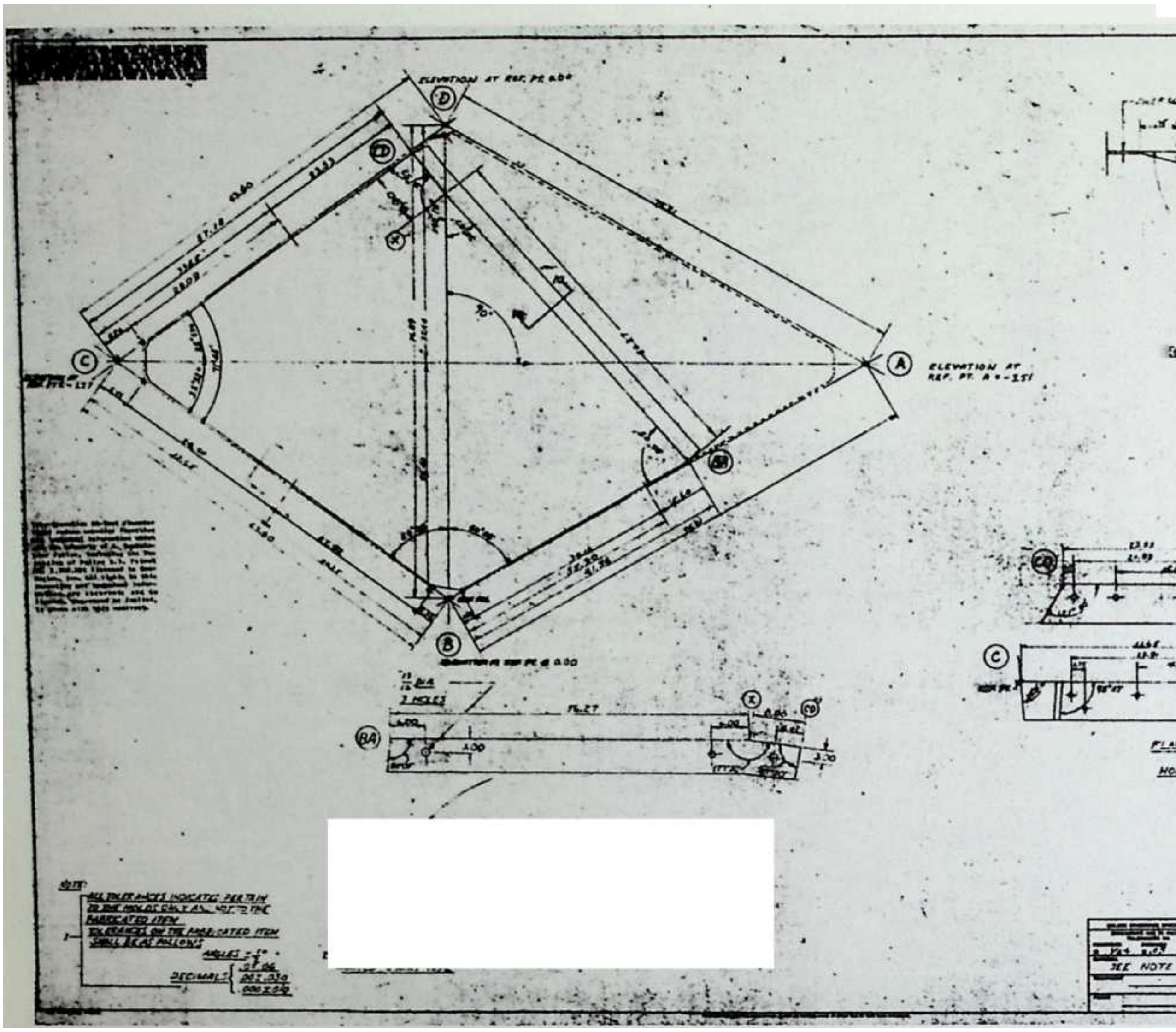
' xstpsessa

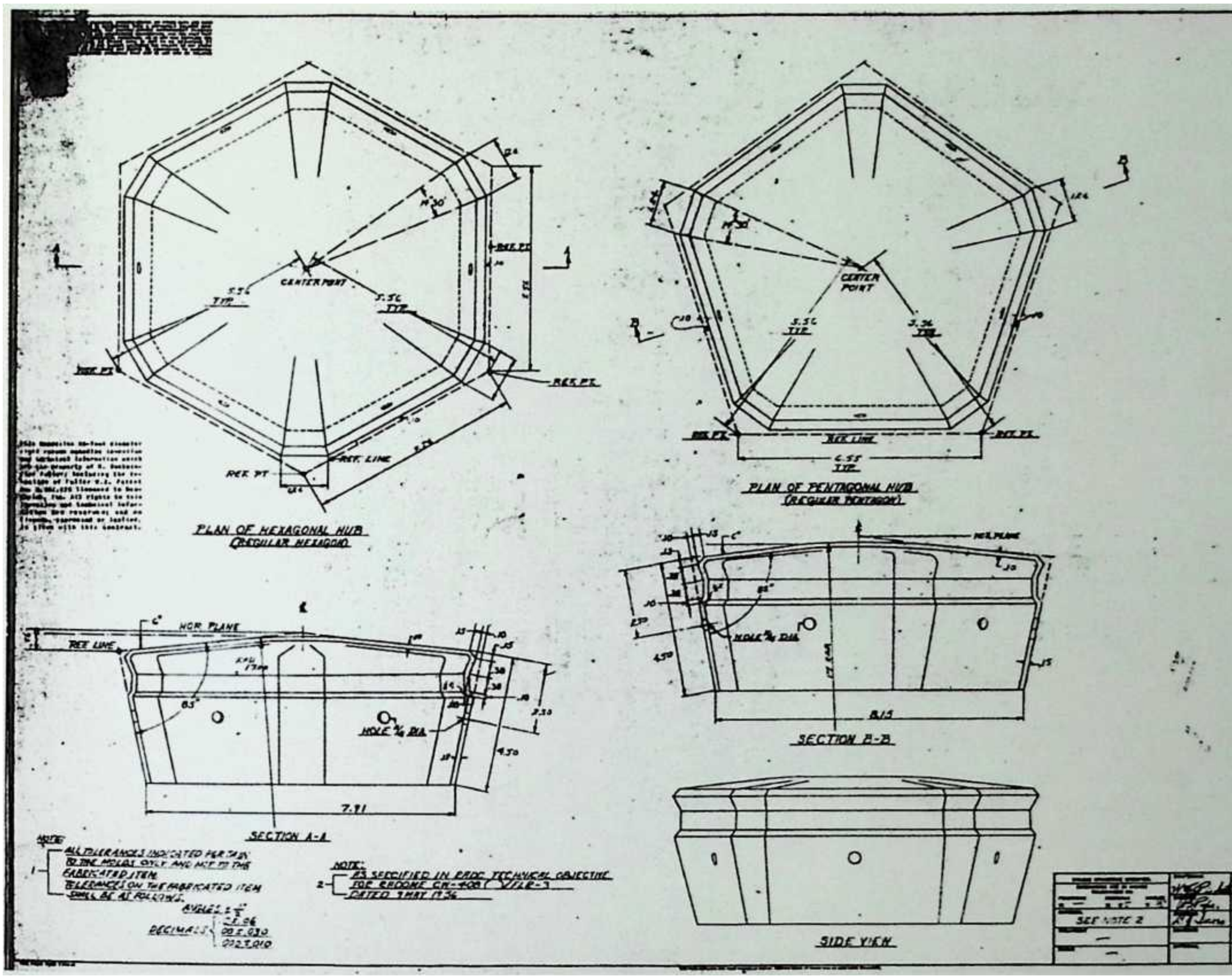
3A5£ D-r

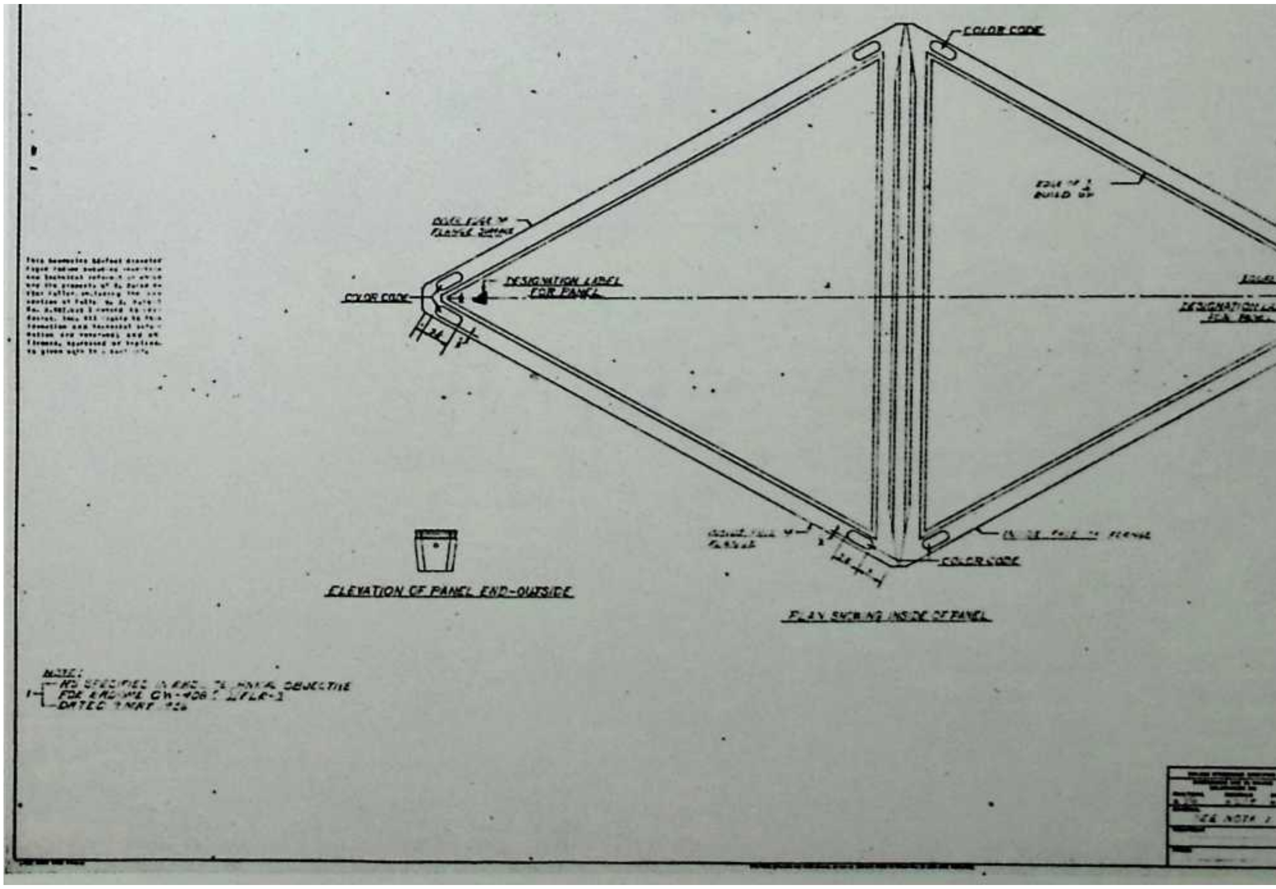
OJMHTTT BSD

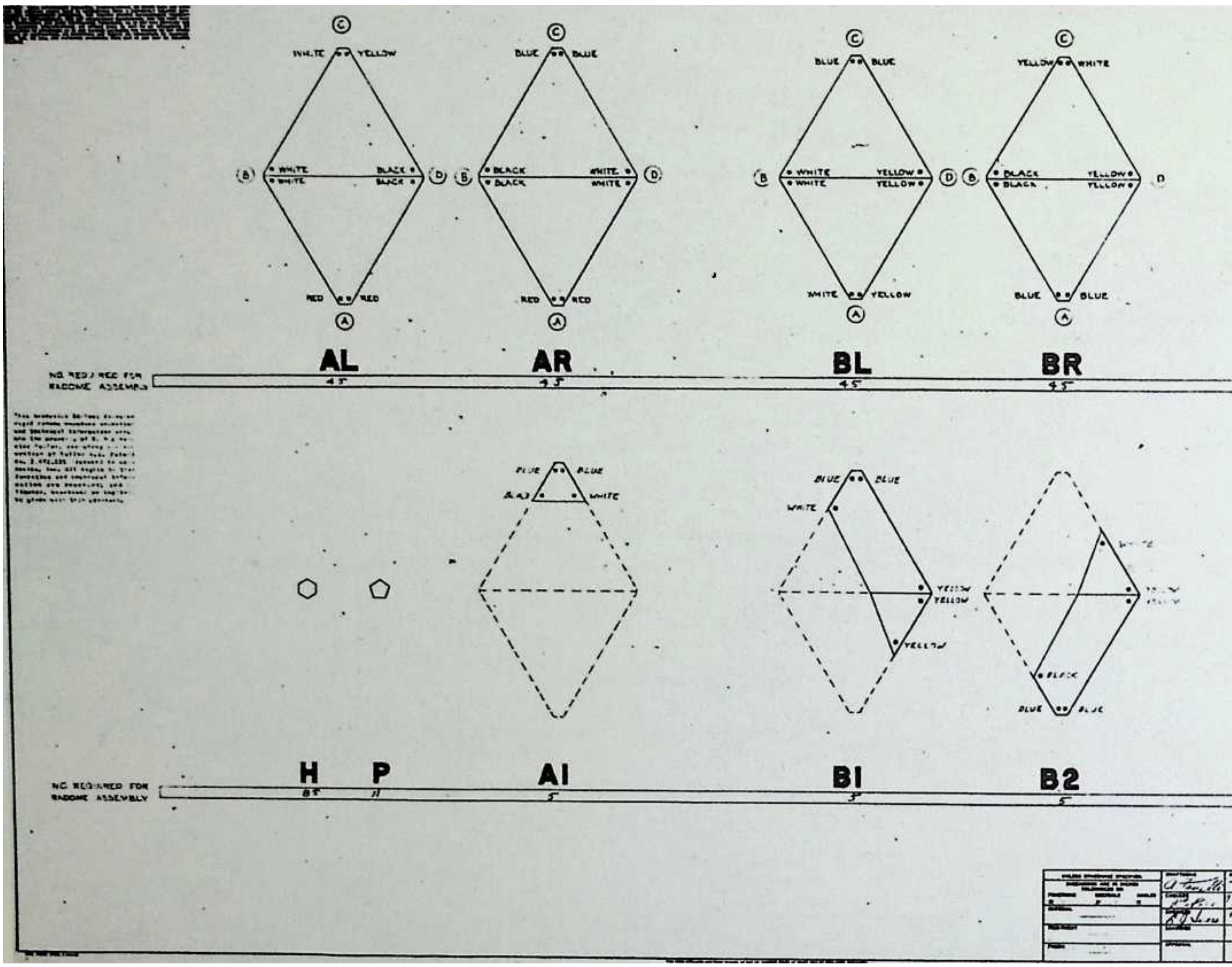
U & Ml FOKX

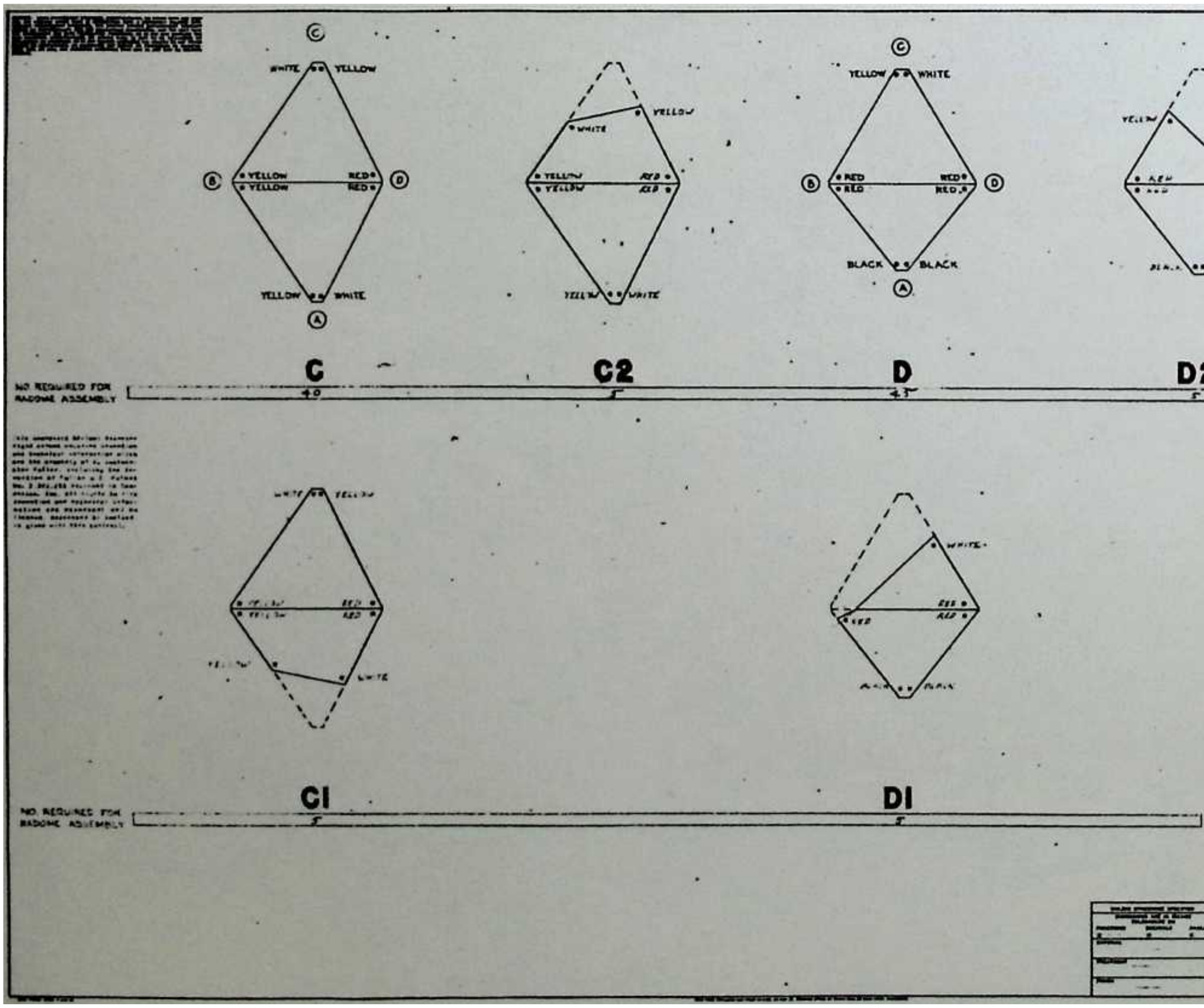
AOA«r Ct)UTA

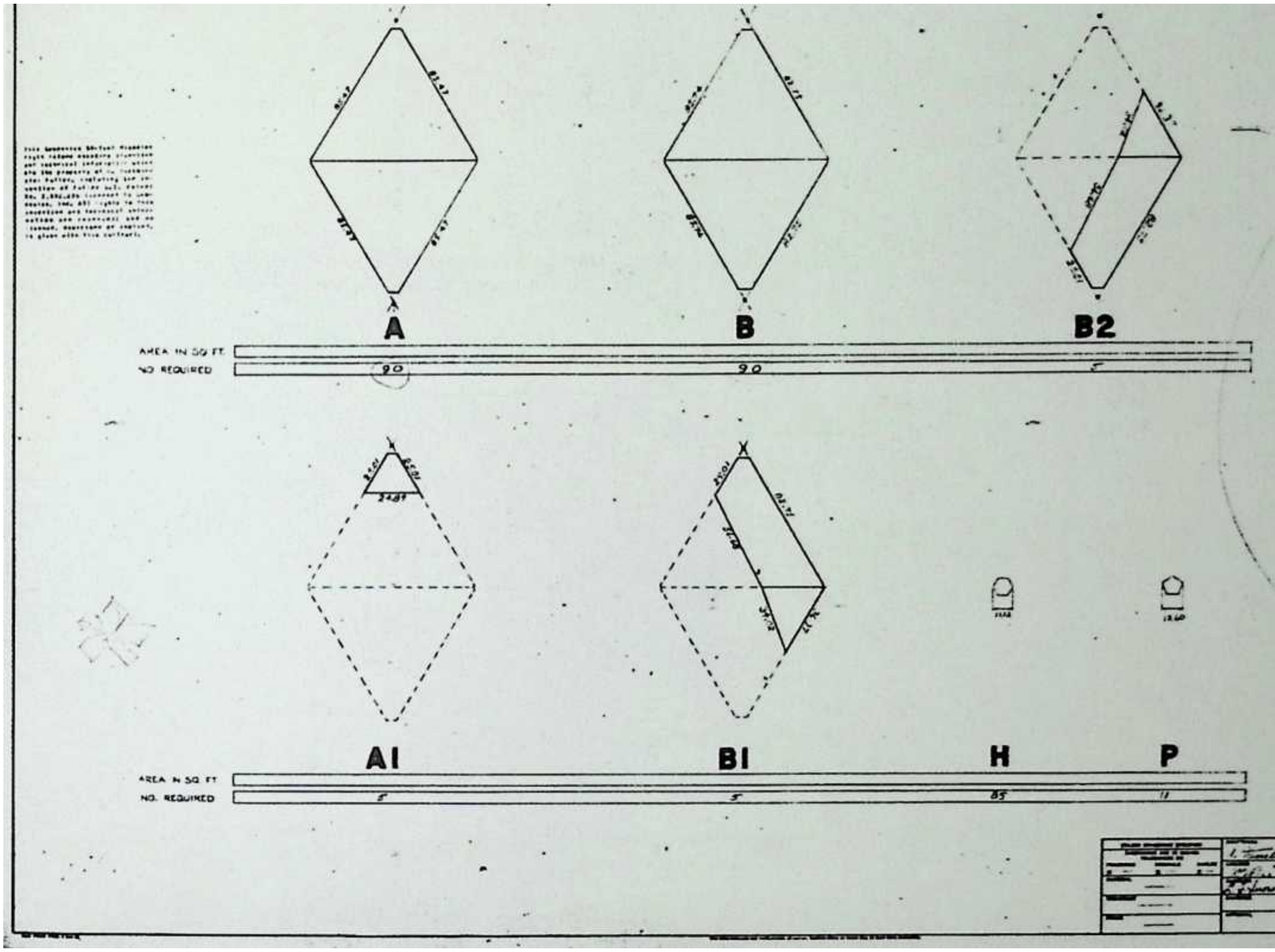



PLAN OF HEXAGONAL HUB
(REGULAR HEXAGON)
PLAN OF PENTAGONAL HUB
(REGULAR PENTAGON)
CENTER POINT
REF. PT
REF. LINE
HOR. PLANE
SECTION A-A
SECTION B-B
SIDE VIEW
7.91
8.15
NOTE:
NOTE:
SEE NOTE 2

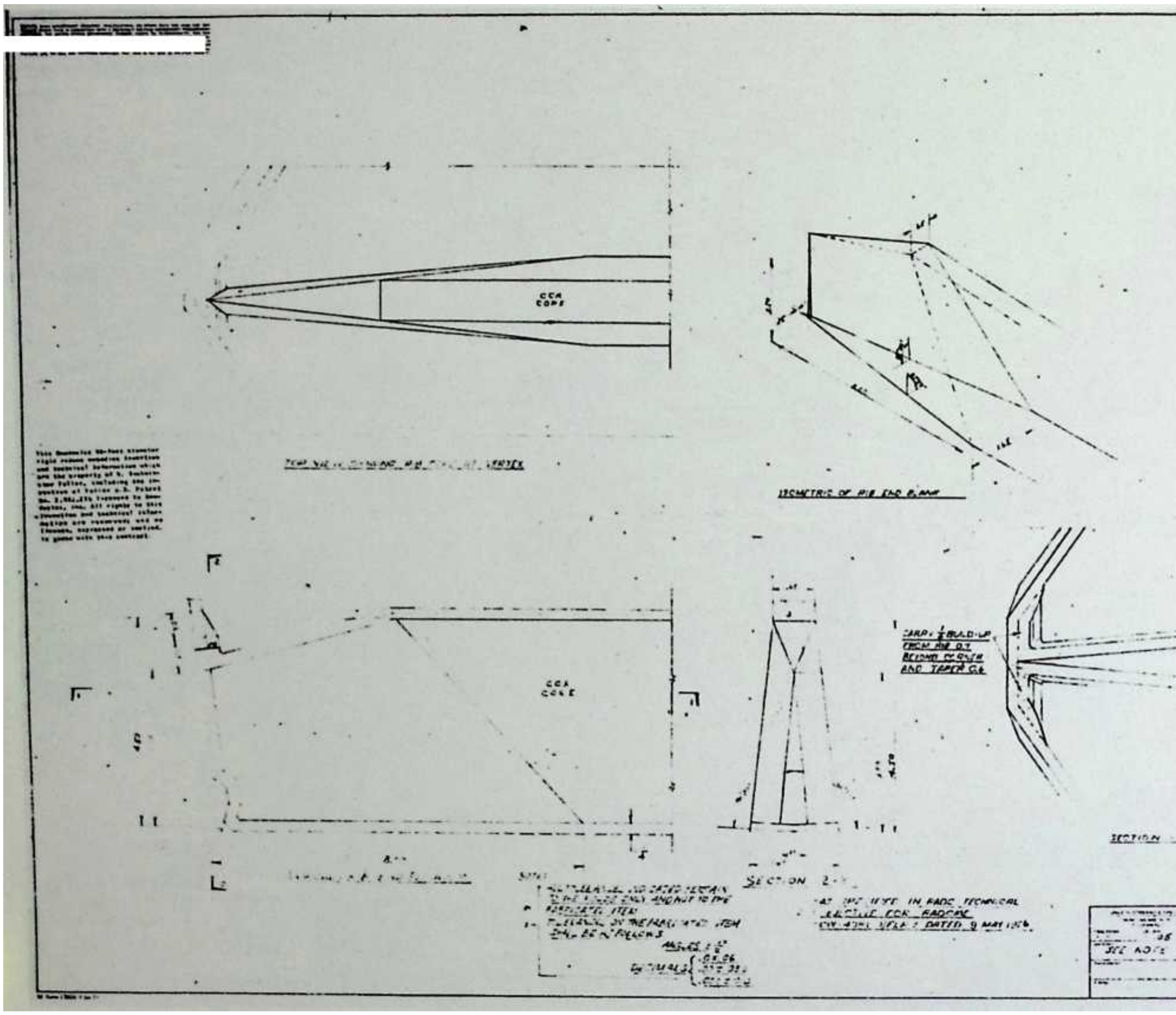

COLOR CODE
DESIGNATION LABEL FOR PANEL
COLOR CODE
COLOR CODE
ELEVATION OF PANEL END-OUTSIDE
PLAN SHOWING INSIDE OF PANEL
NOTE:


AL
AR
BL
BR
H
P
AI
BI
B2
WHITE
YELLOW
BLUE
BLACK
RED
NO. REQUIRED FOR RADOME ASSEMBLY
45


C
C2
D
D2
NO REQUIRED FOR RADOME ASSEMBLY
CI
DI
NO REQUIRED FOR RADOME ASSEMBLY
WHITE
YELLOW
RED
BLACK


A
B
B2
AREA IN SQ. FT.
NO. REQUIRED
90
90
5
A1
B1
H
P
AREA IN SQ. FT.
NO. REQUIRED
5
5
85
11

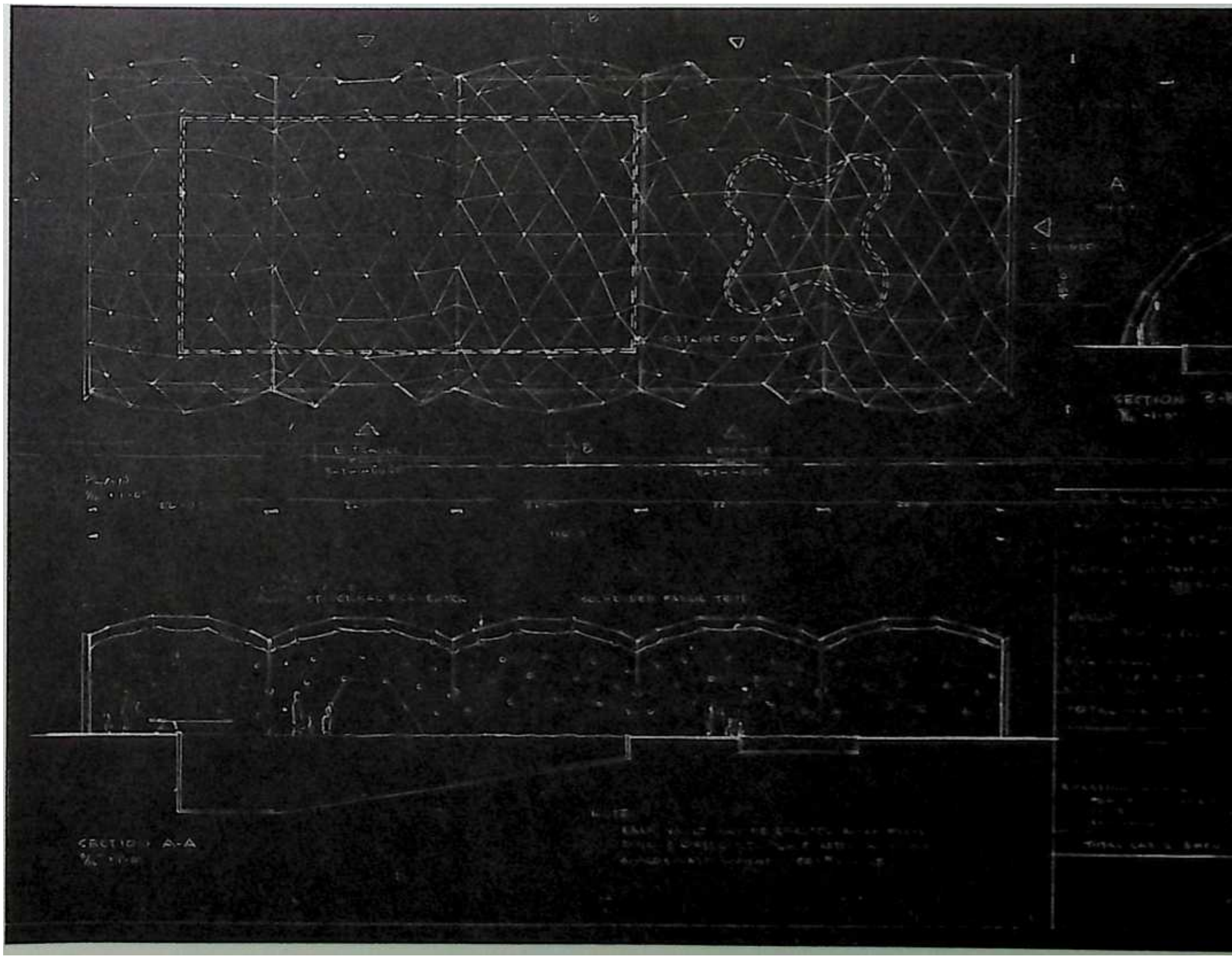
wn



Swimming Pool Designs

1955 & 1956

These five geodesic vaults above a swimming pool (1956) were probably covered by a flexible transparent material and served to protect the pool's occupants from wind and cold weather. The plastic pool prototype was designed according to the geodesic principles of the radome for Lunn Laminates, Inc., in 1955.



TRANSVERSE SECTION
LONCrWPlNAL SECTION

5WIMMIN4 POOL PRELIMINARY FOR LUNN LAMINATED , IN6.

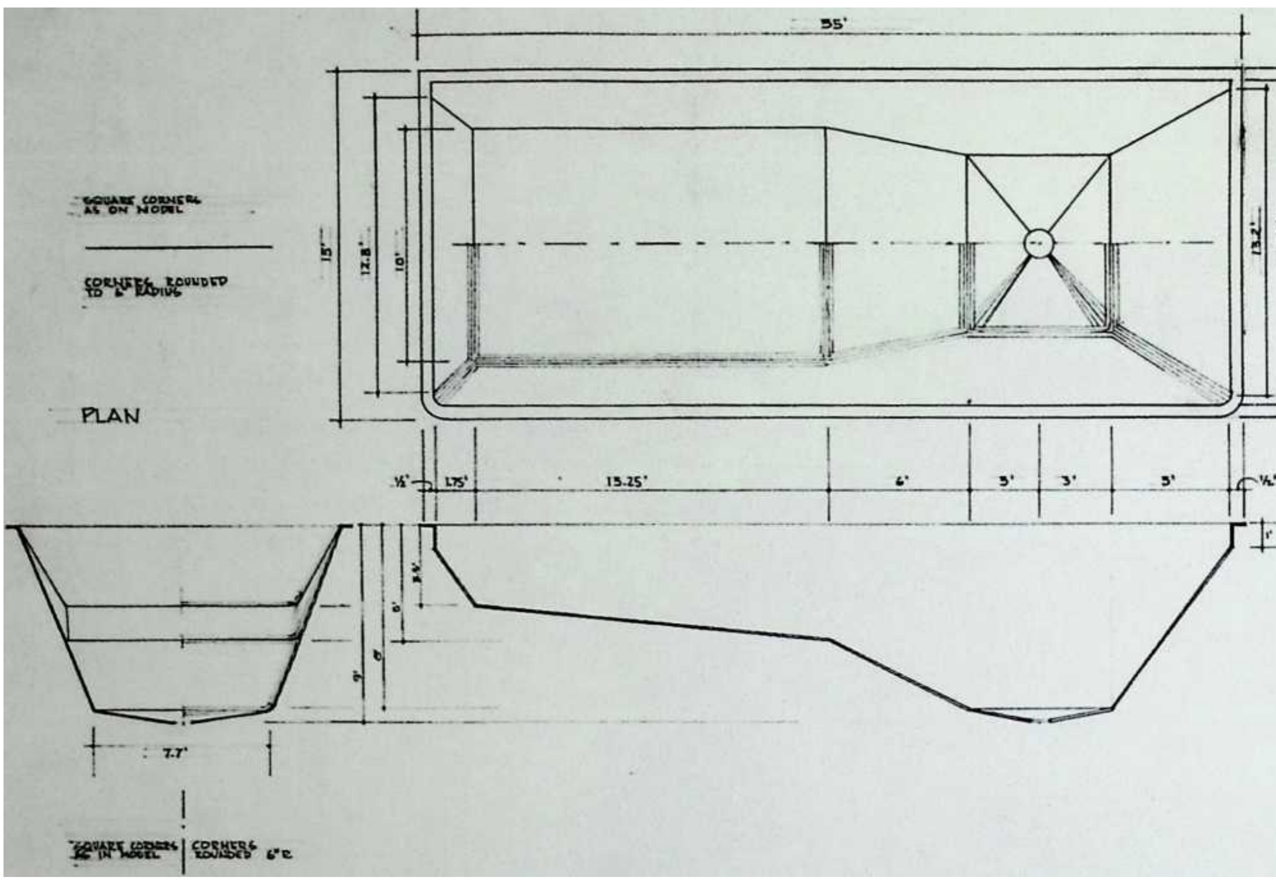
SCALE r.v

DRAWN ~ IMmURUDOT DXTC

CHICKED DAlu

l)K

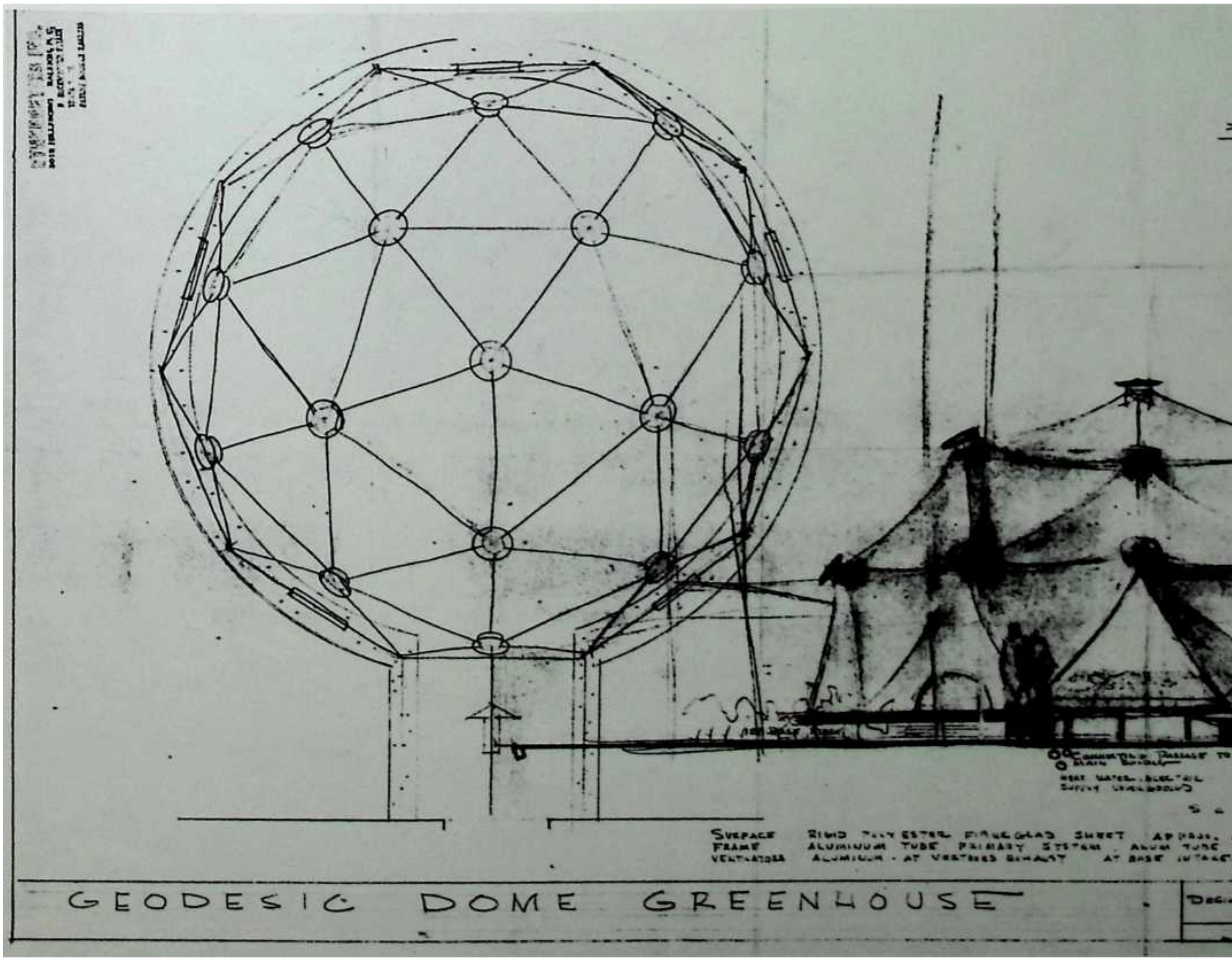
4Br«ttl«S*. Canbrldfa, Mm«.
T«U»U«« Tltnri«U<» W4M

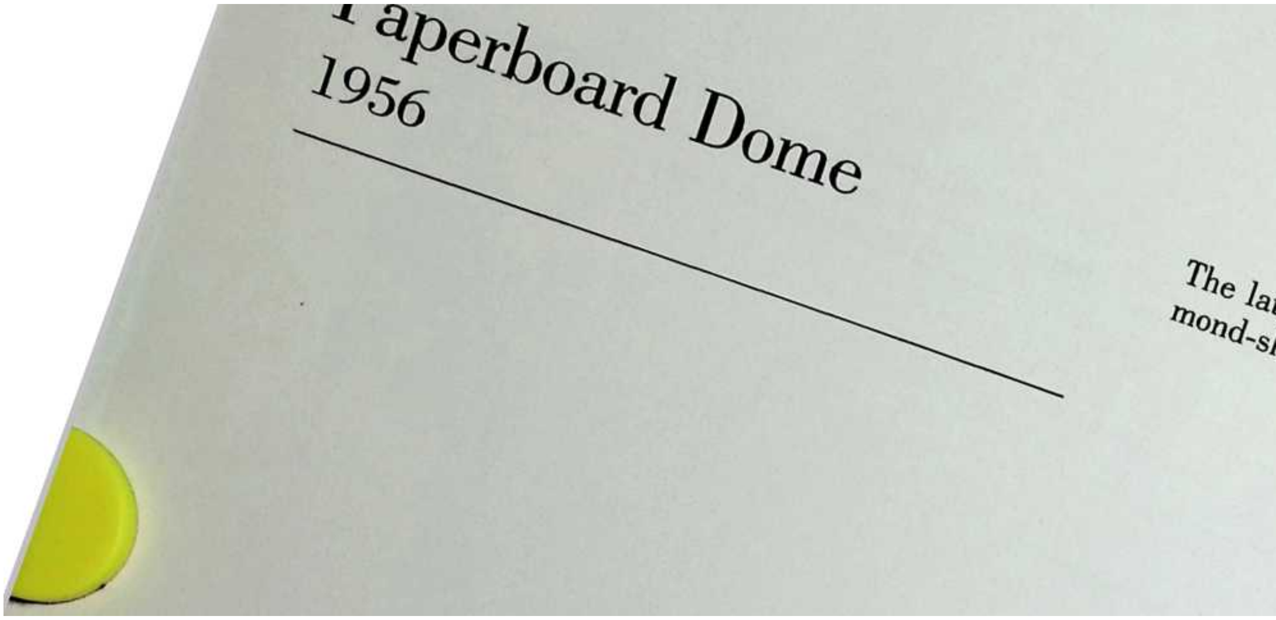


Geodesic Dome

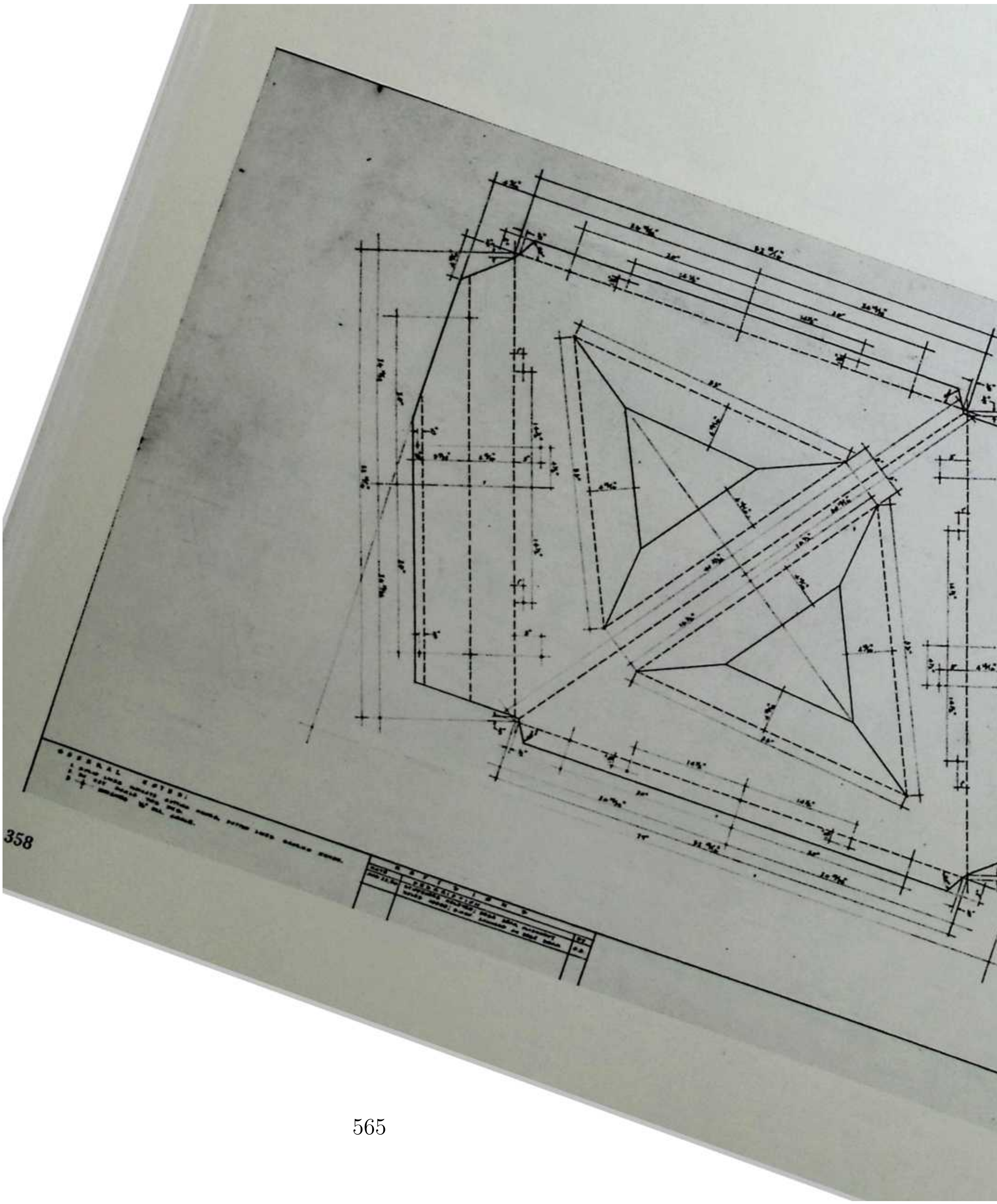
Greenhouse 1956

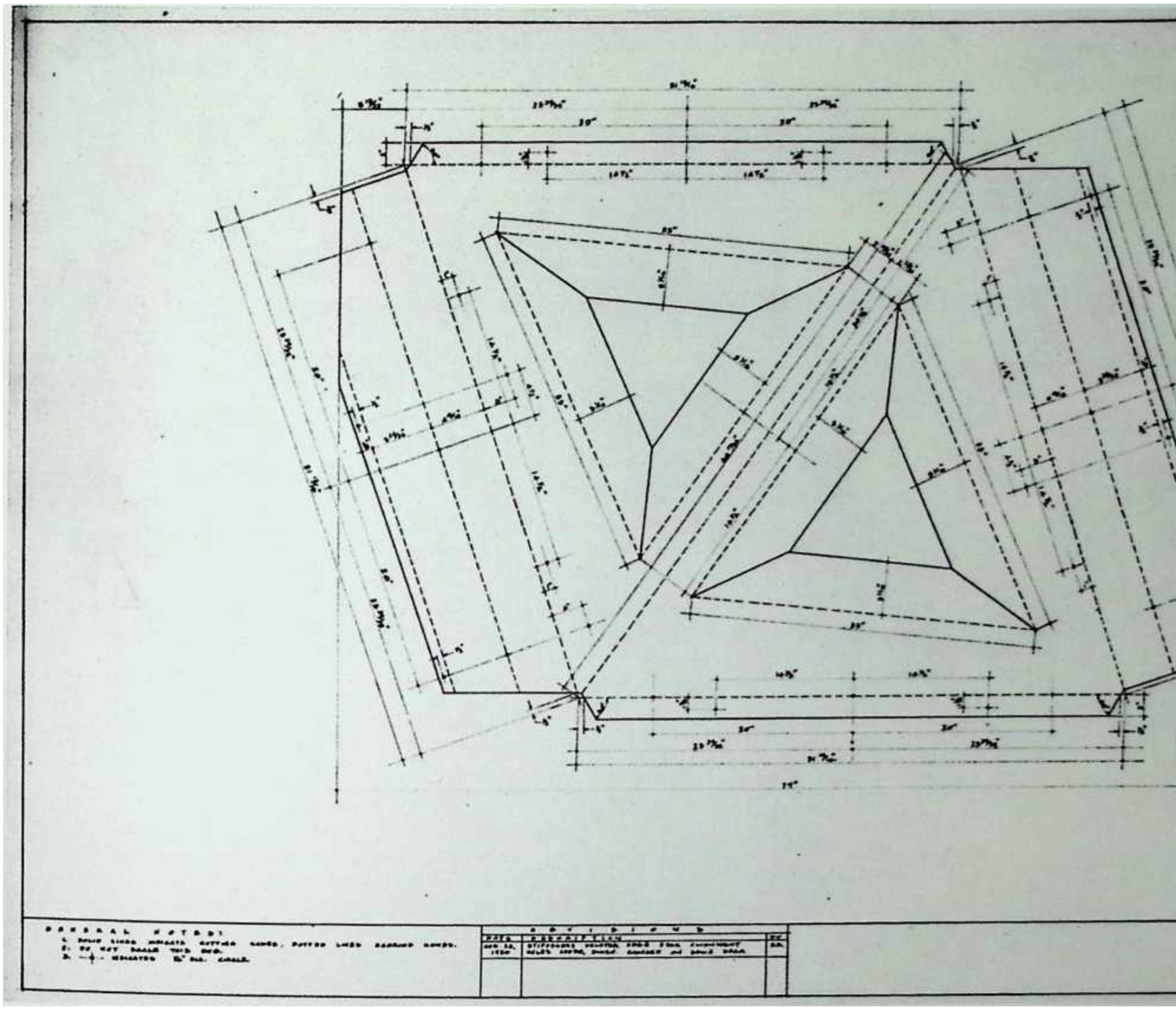
The geodesic dome greenhouse is a system of polyester fiberglass sheets in catenary conformation, suspended from a standard aluminum frame.

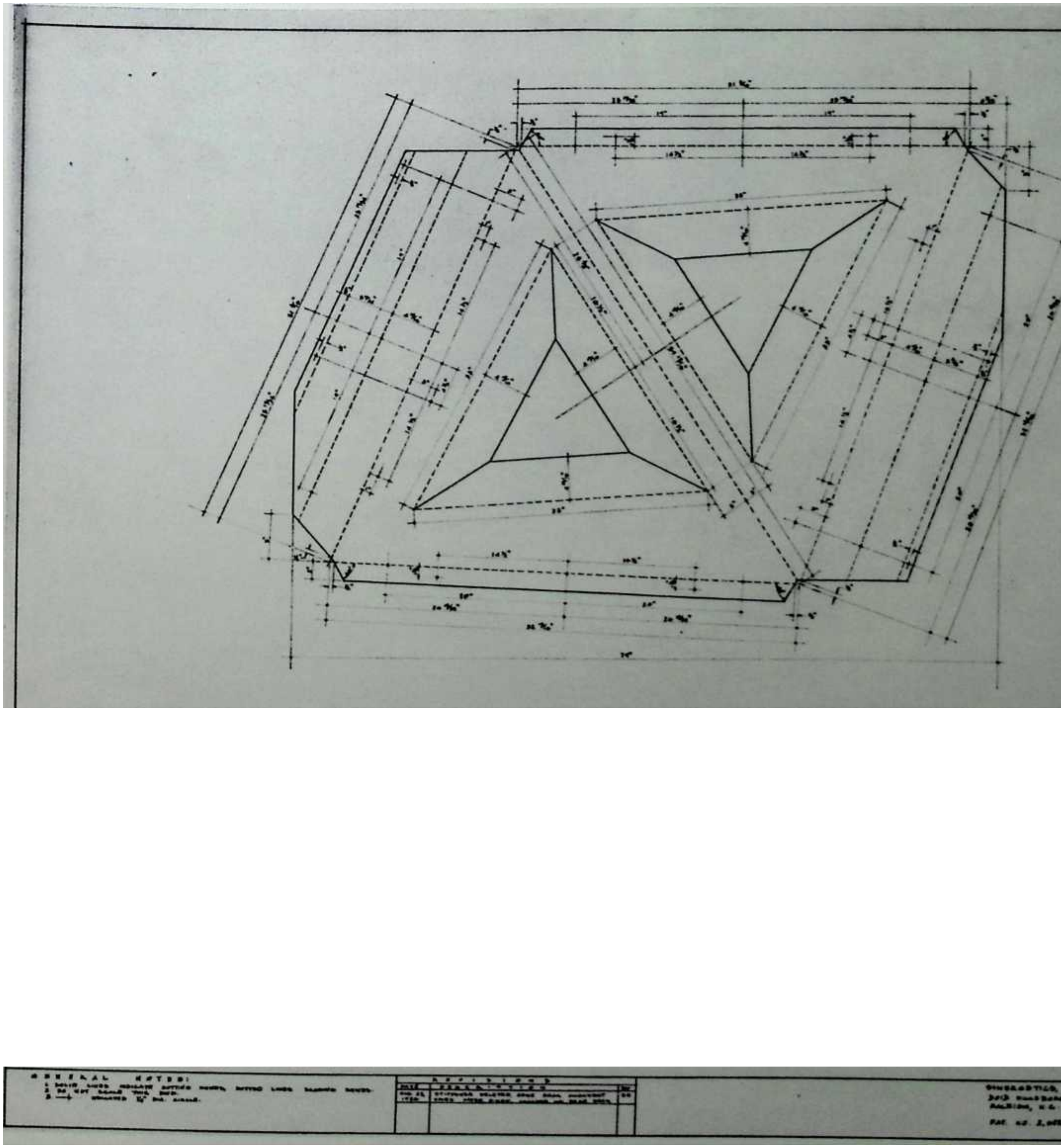

SURFACE
FRAME
ALUMINIUM TUBE
GEODESIC DOME GREENHOUSE

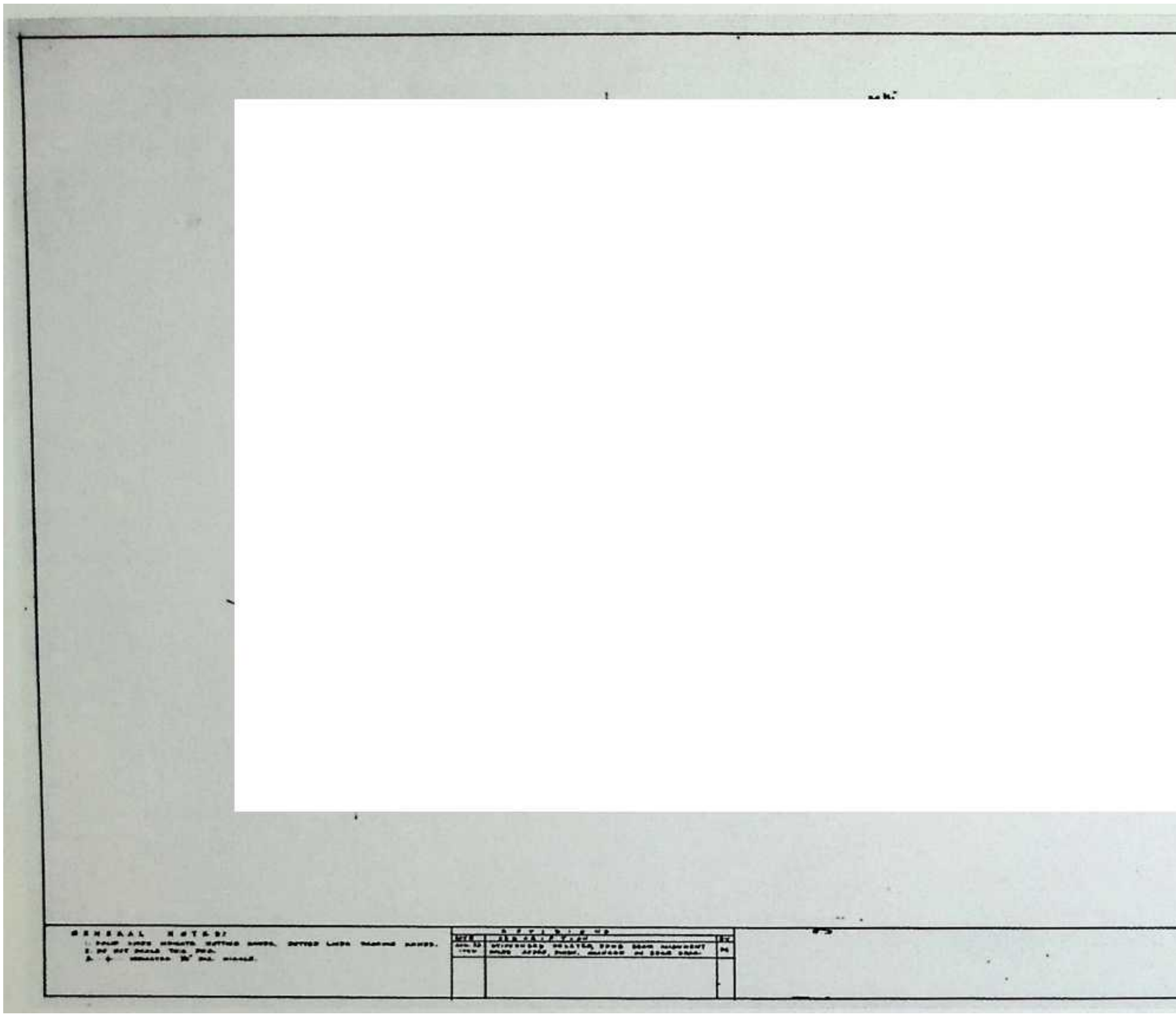

aperboard Dome
1956

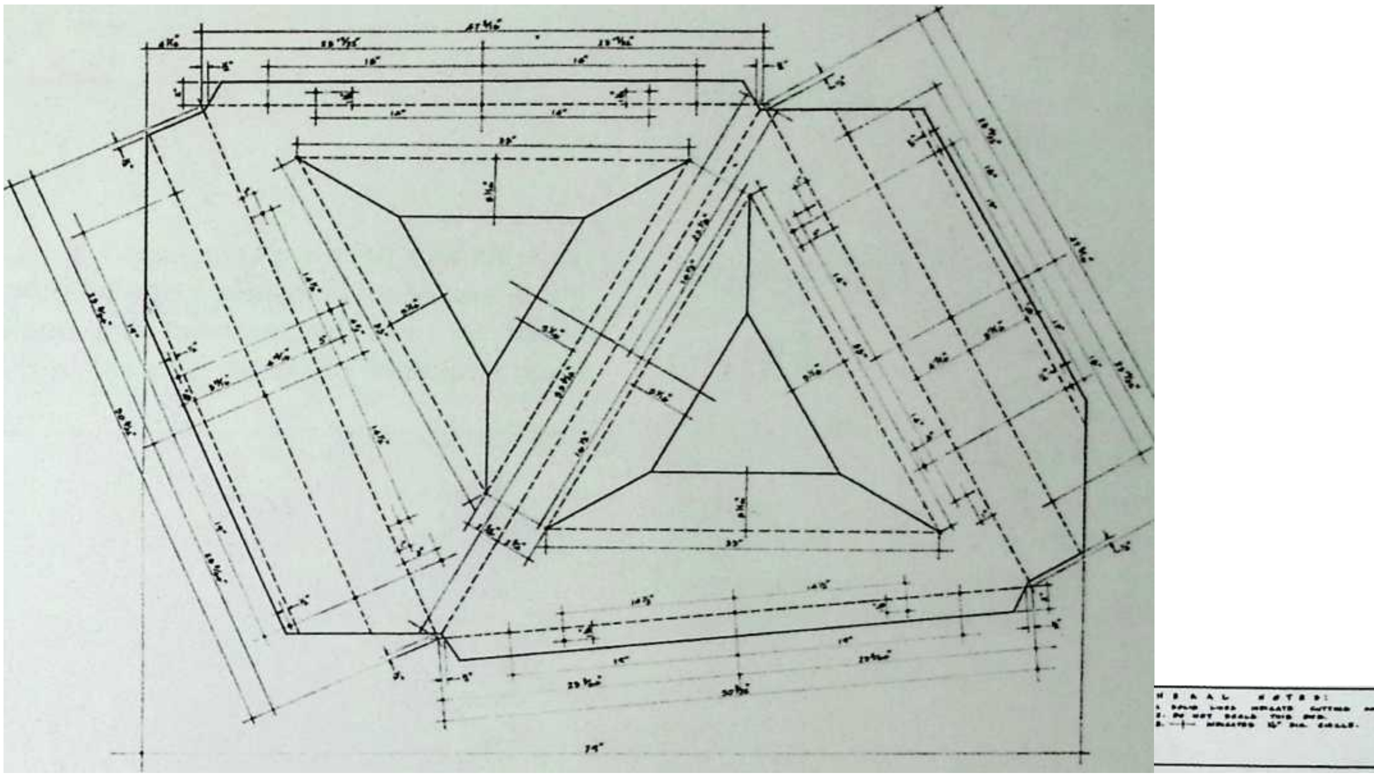
The la
mond-s


358




GENERAL NOTES:
REVISIONS


GENERAL NOTES:

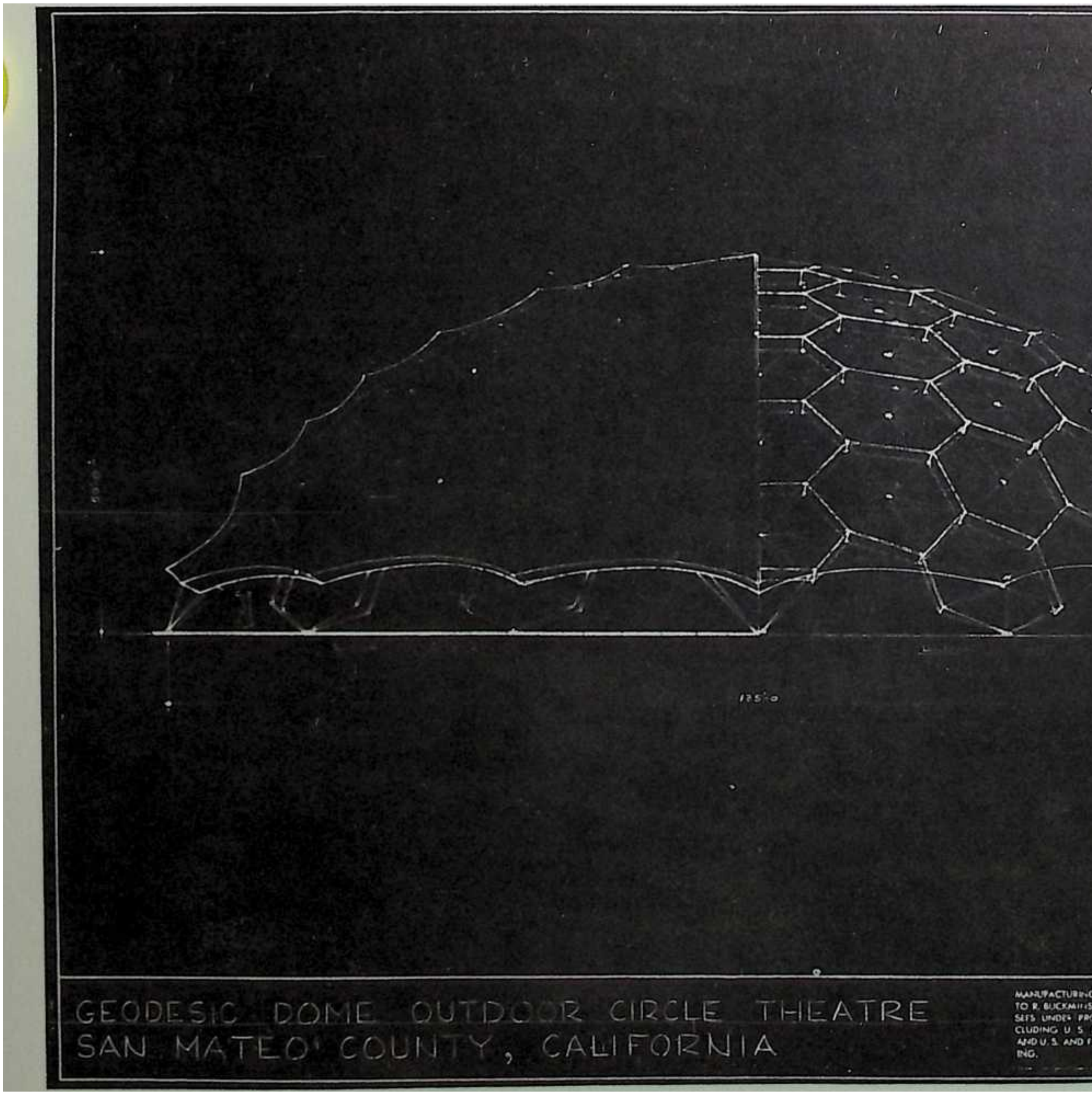


Geodesic Dome: Outdoor

Circle Theater, San Mateo

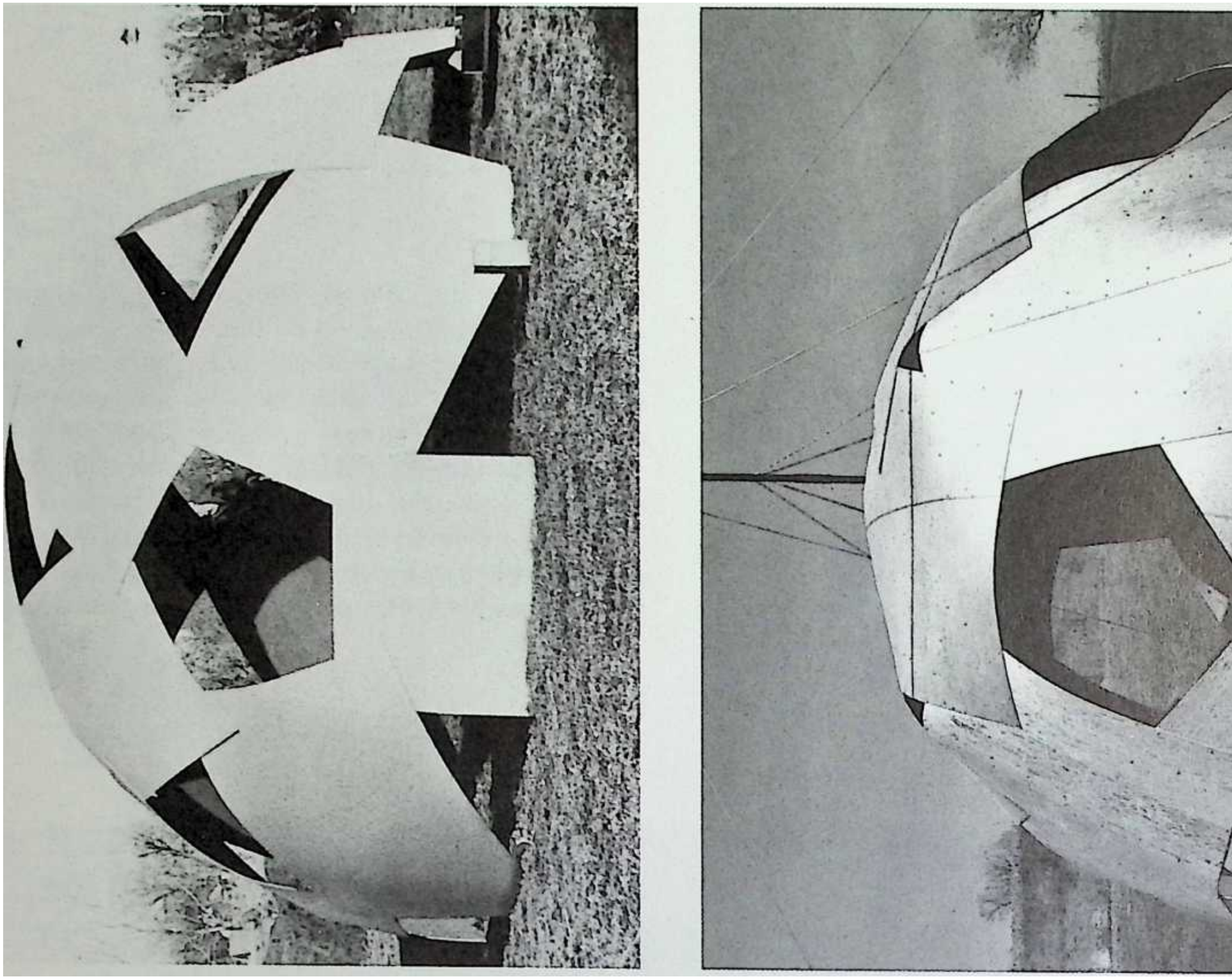
County, California 1956

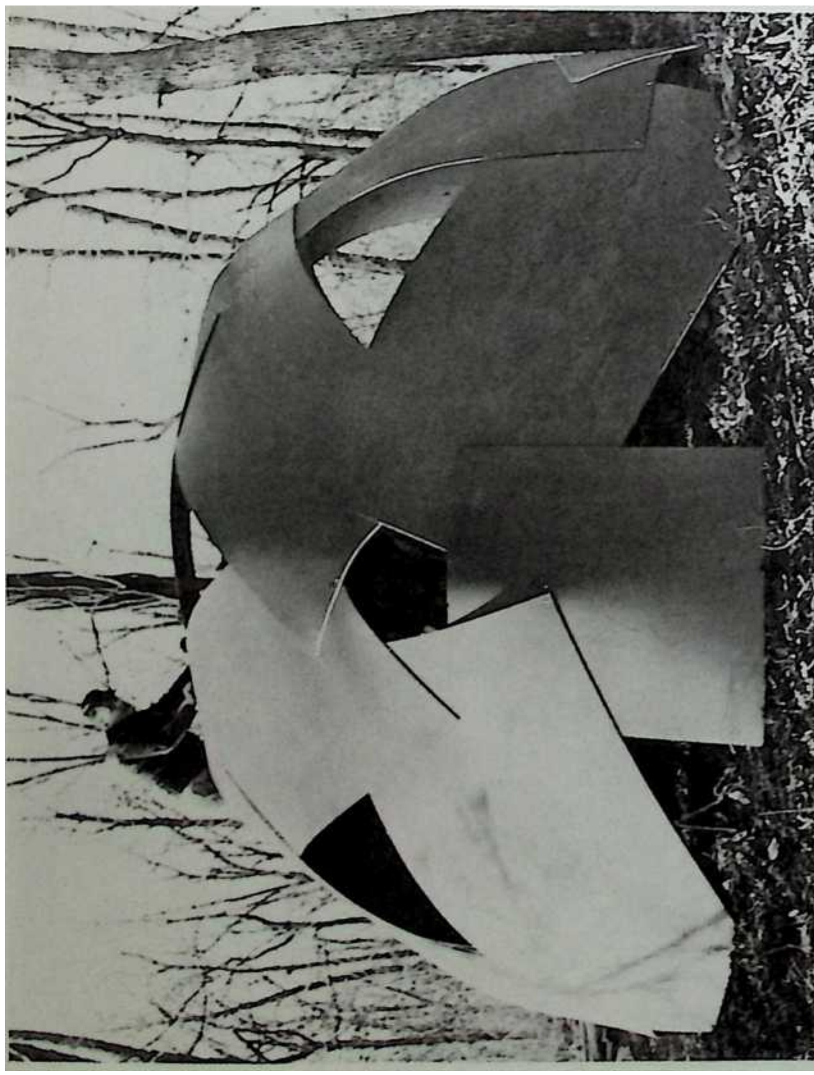
This outdoor theater is composed of paired hexagonal aluminum units held in a tense relationship by the twelve tie lines that intersect in a single node. The same structural principle is found in the bicycle wheel

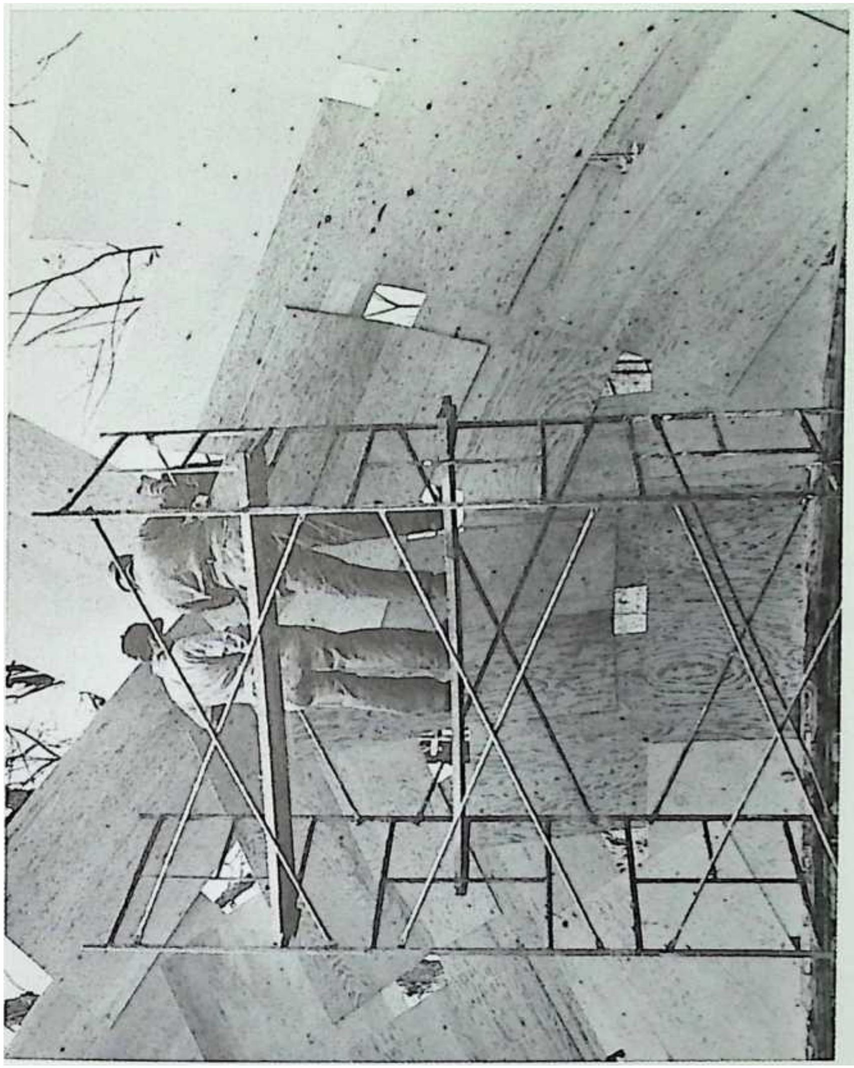


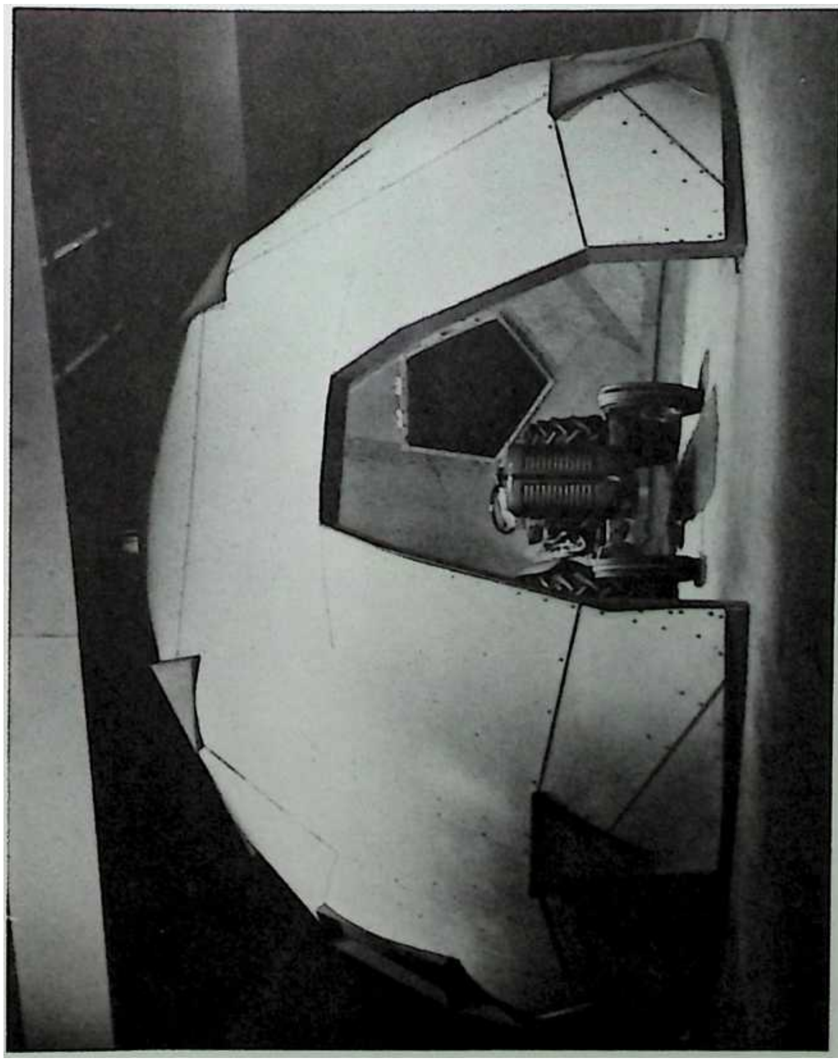
Plydome Studies 1956

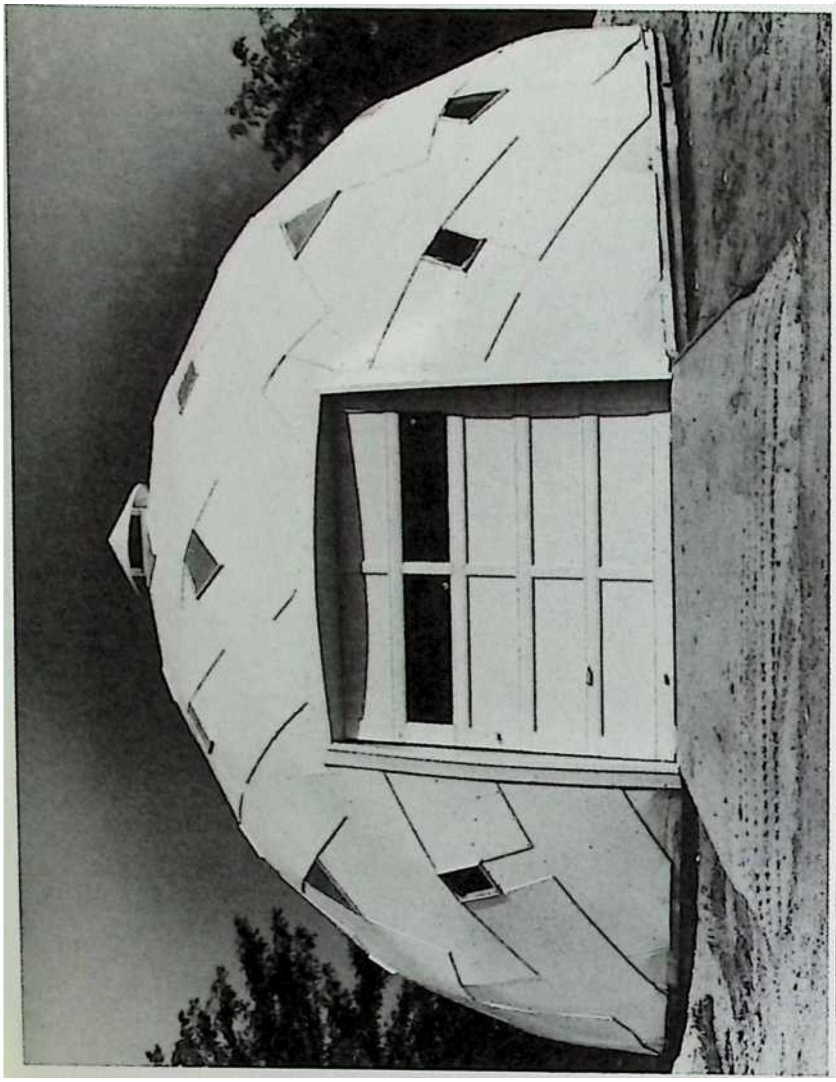
Like those of the radome, the panels of the plydome channel the stress caused by the force of gravity. However, the plydome is made of laminated wood, which is no stronger than polyester fiberglass but is considerably more economical. Moreover, the plywood panels are merely bent into the final domical shape during construction. Thus, the design tolerances involved are relatively less rigorous than those for molded polyester panels. Although less refined than his radomes, Fuller's plydomes are cheaper and more elegant designs.

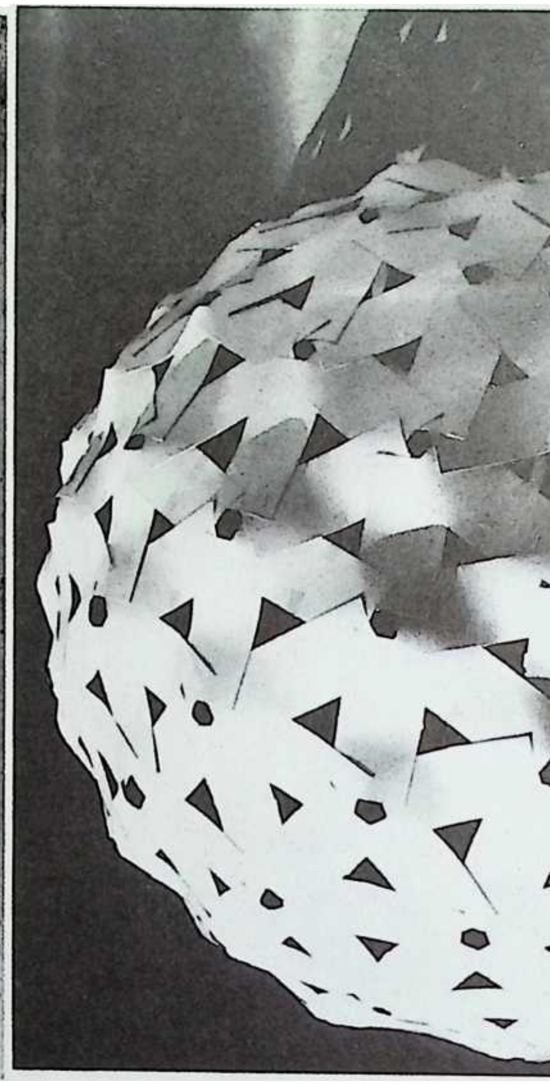


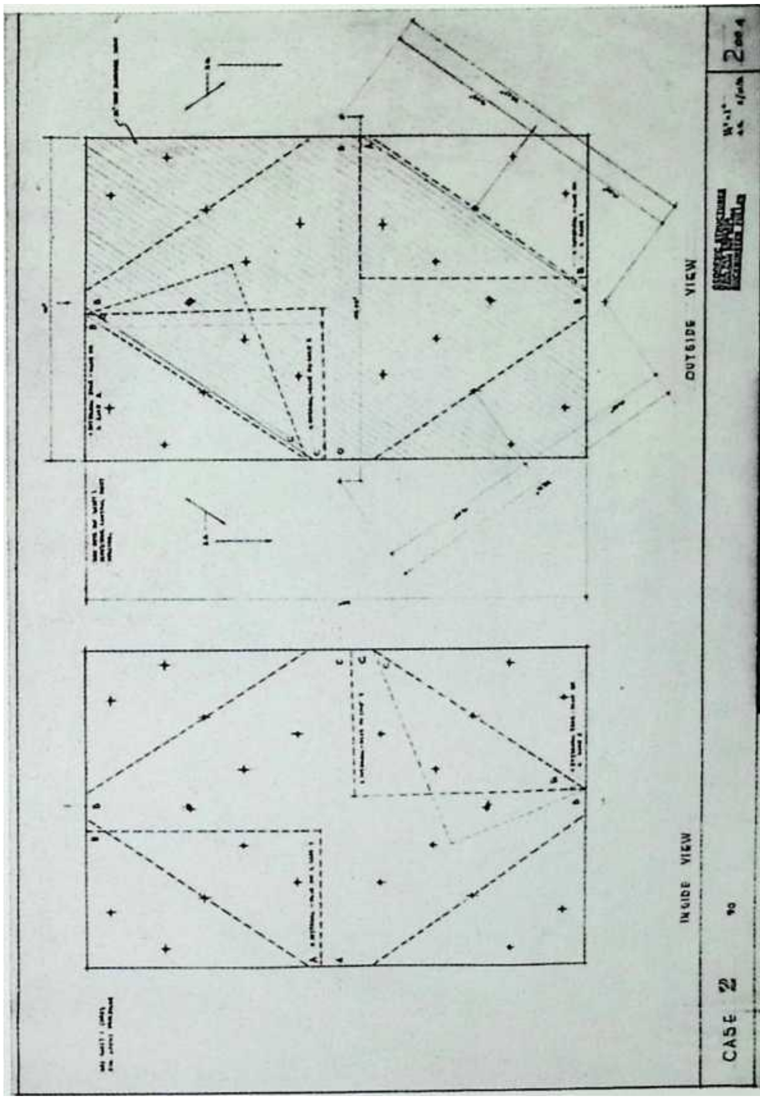




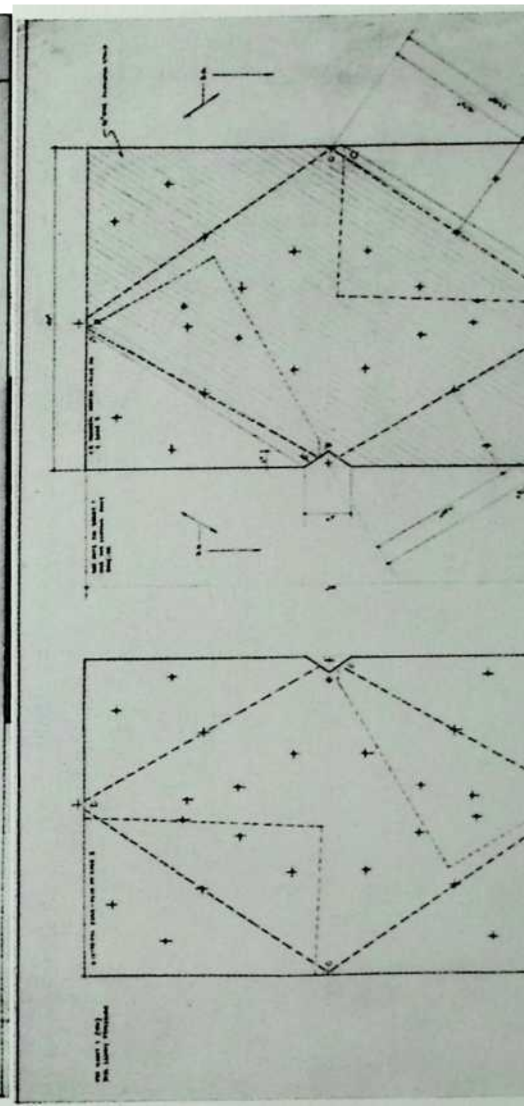


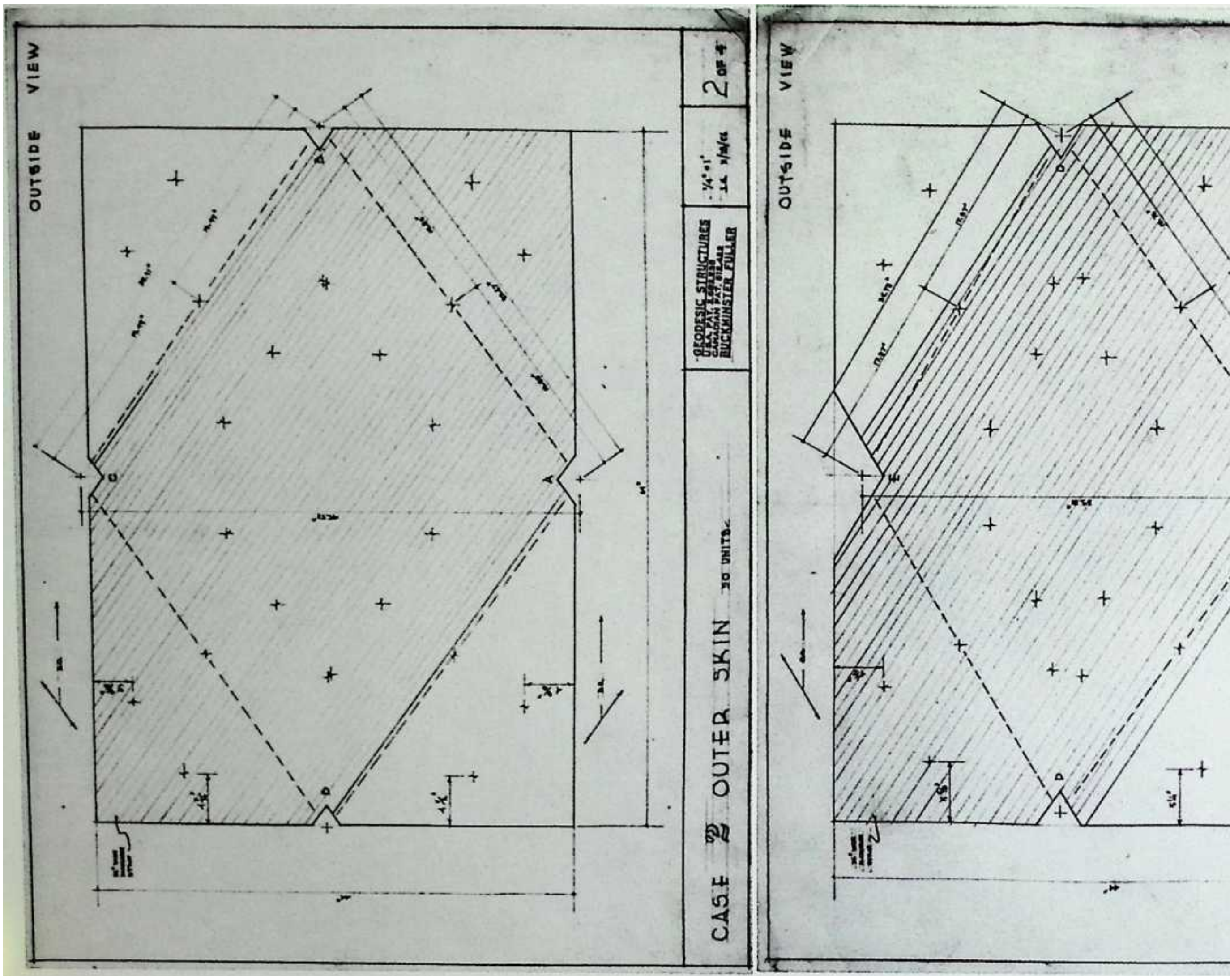


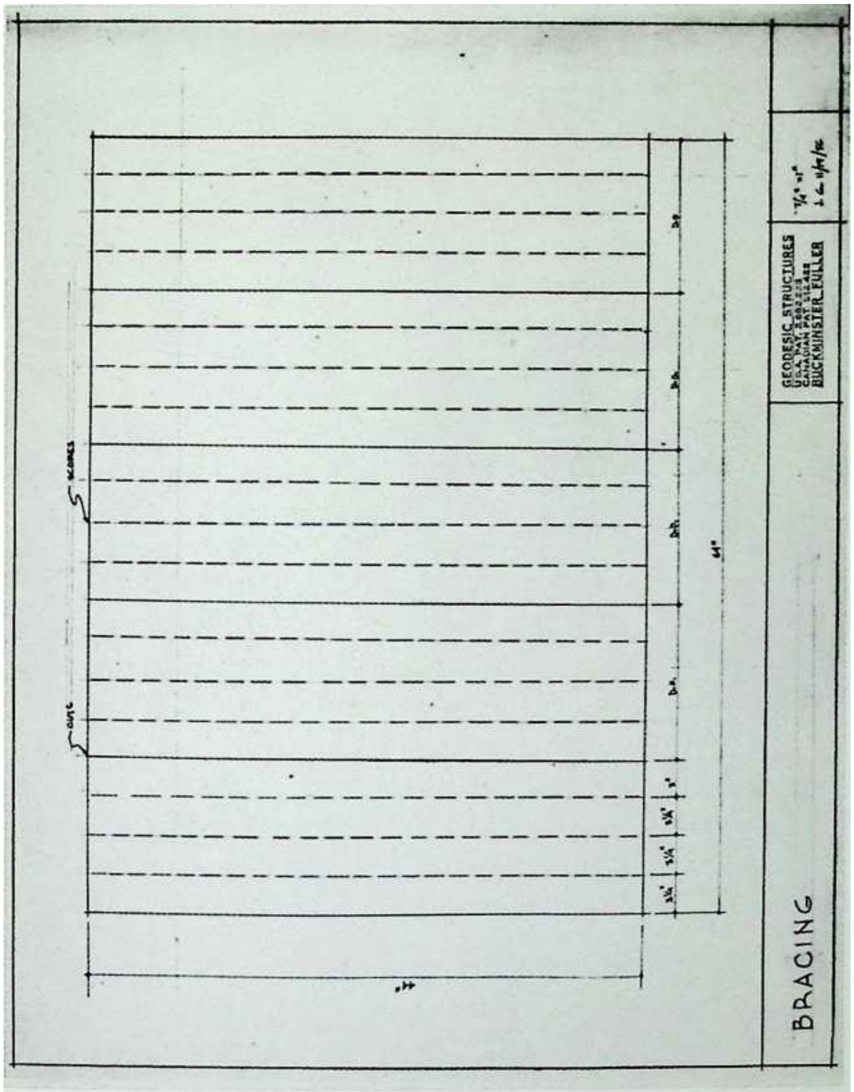


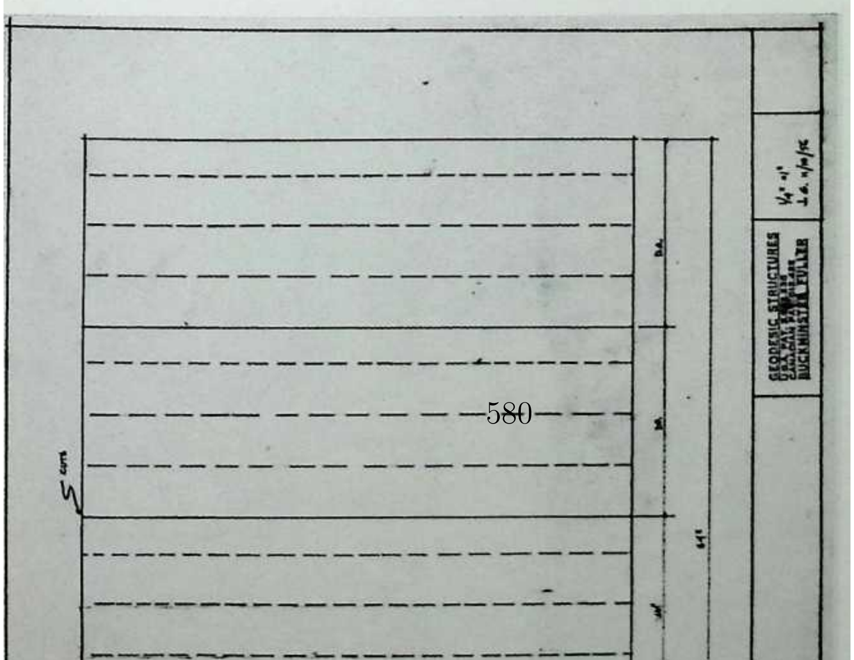


OUTSIDE VIEW
INSIDE VIEW
CASE 2

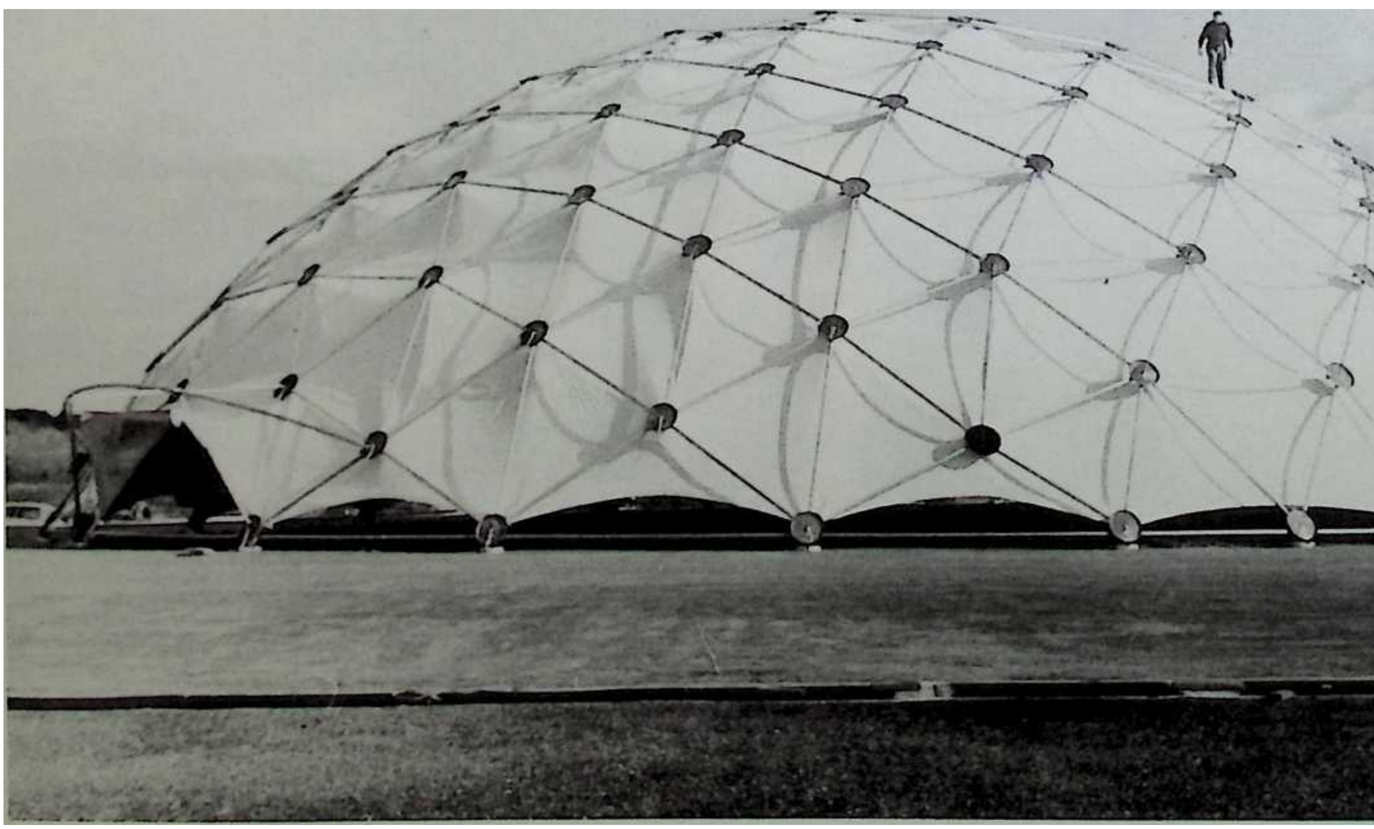


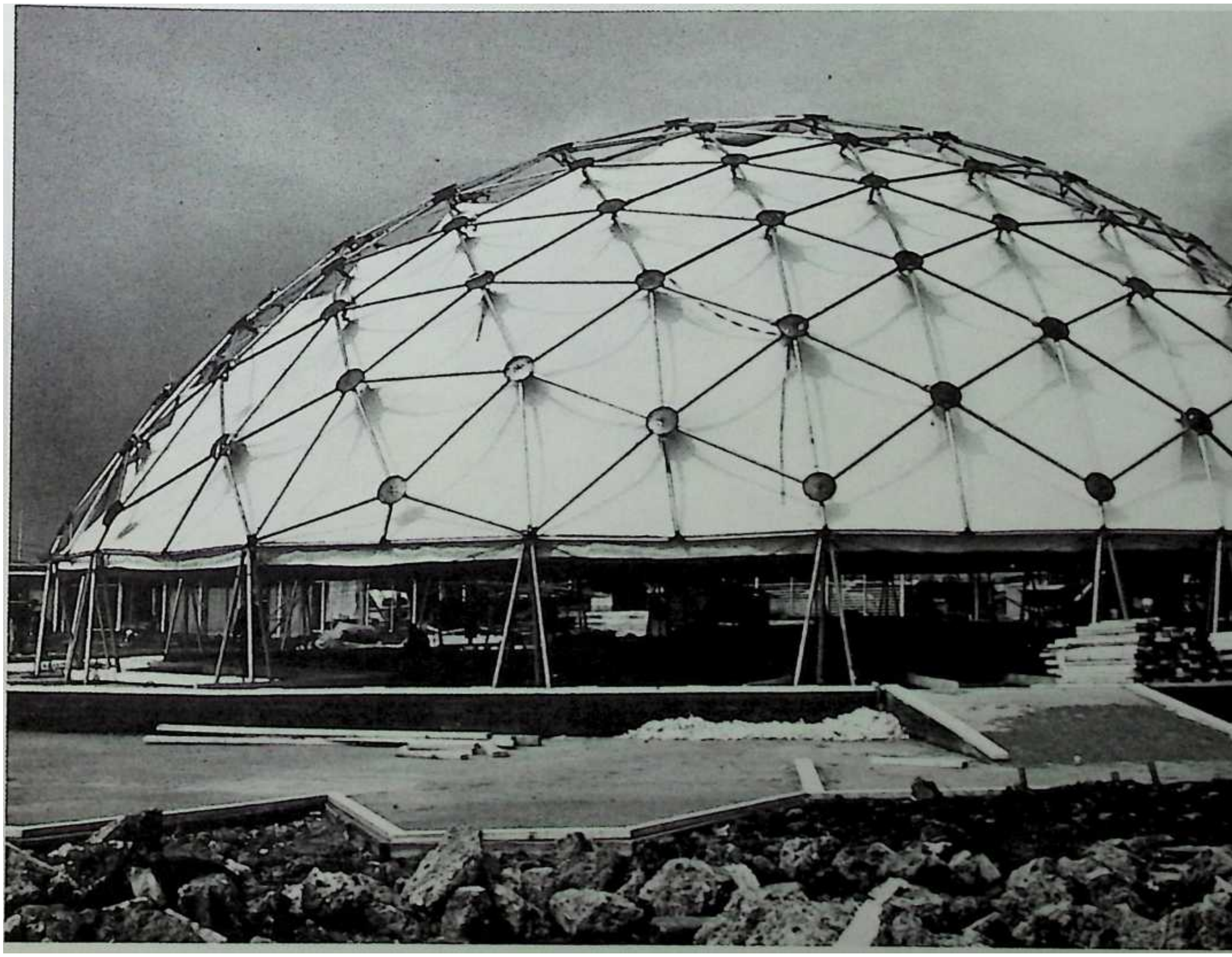

OUTSIDE VIEW
CASE
OUTER SKIN
30 UNITS
GEODESIC STRUCTURES
BUCKMINSTER FULLER
2 OF 4

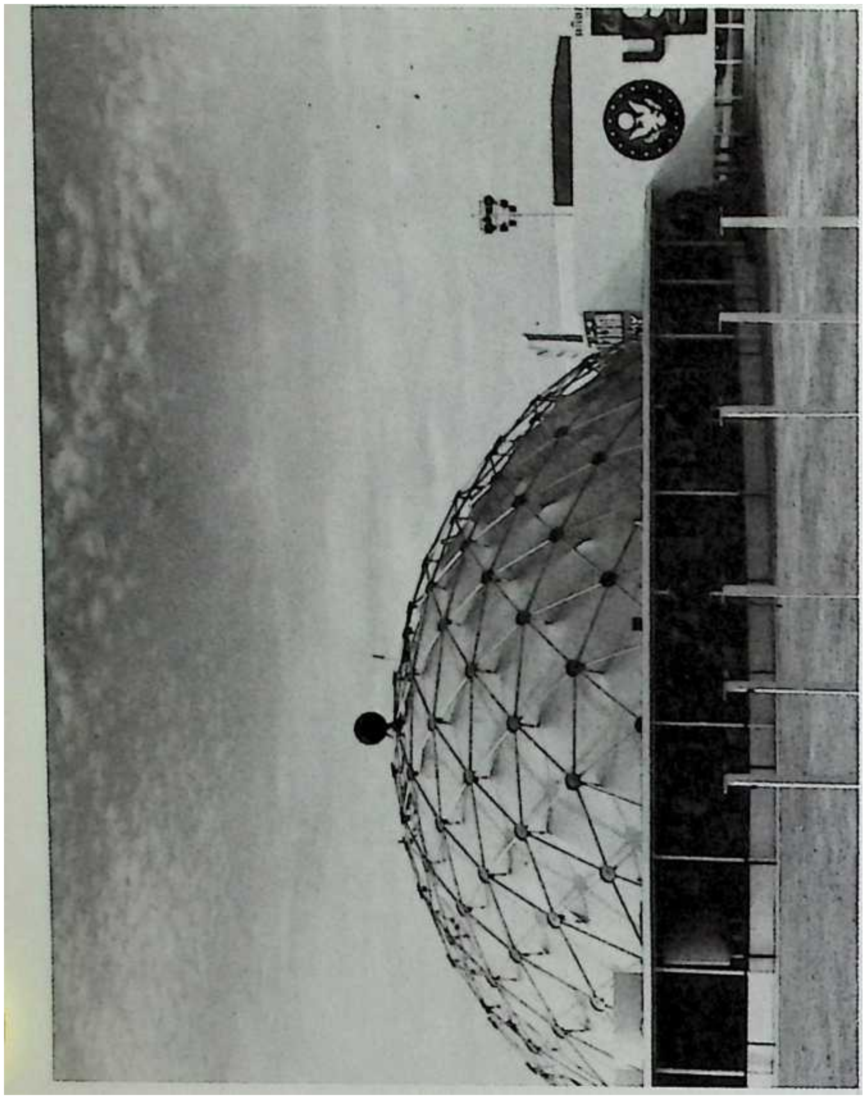

BRACING
GEODESIC STRUCTURES
BUCKMINSTER FULLER

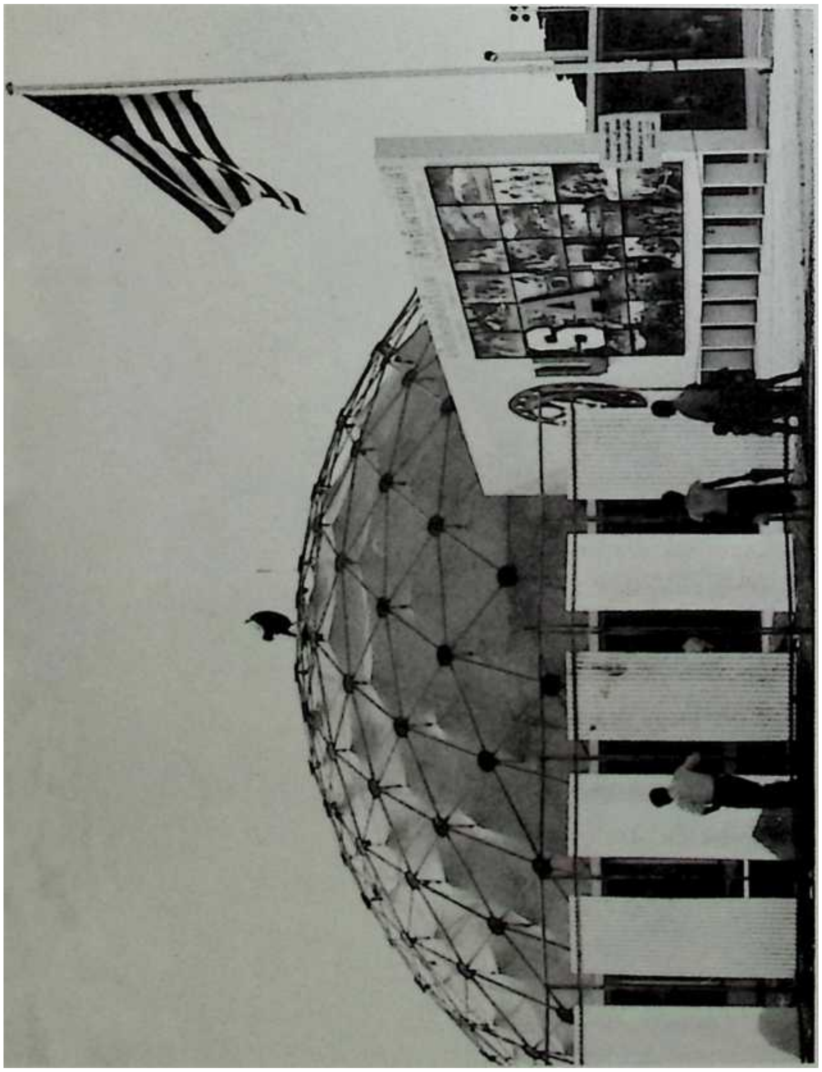

GEODESIC STRUCTURES
BUCKMINSTER FULLER

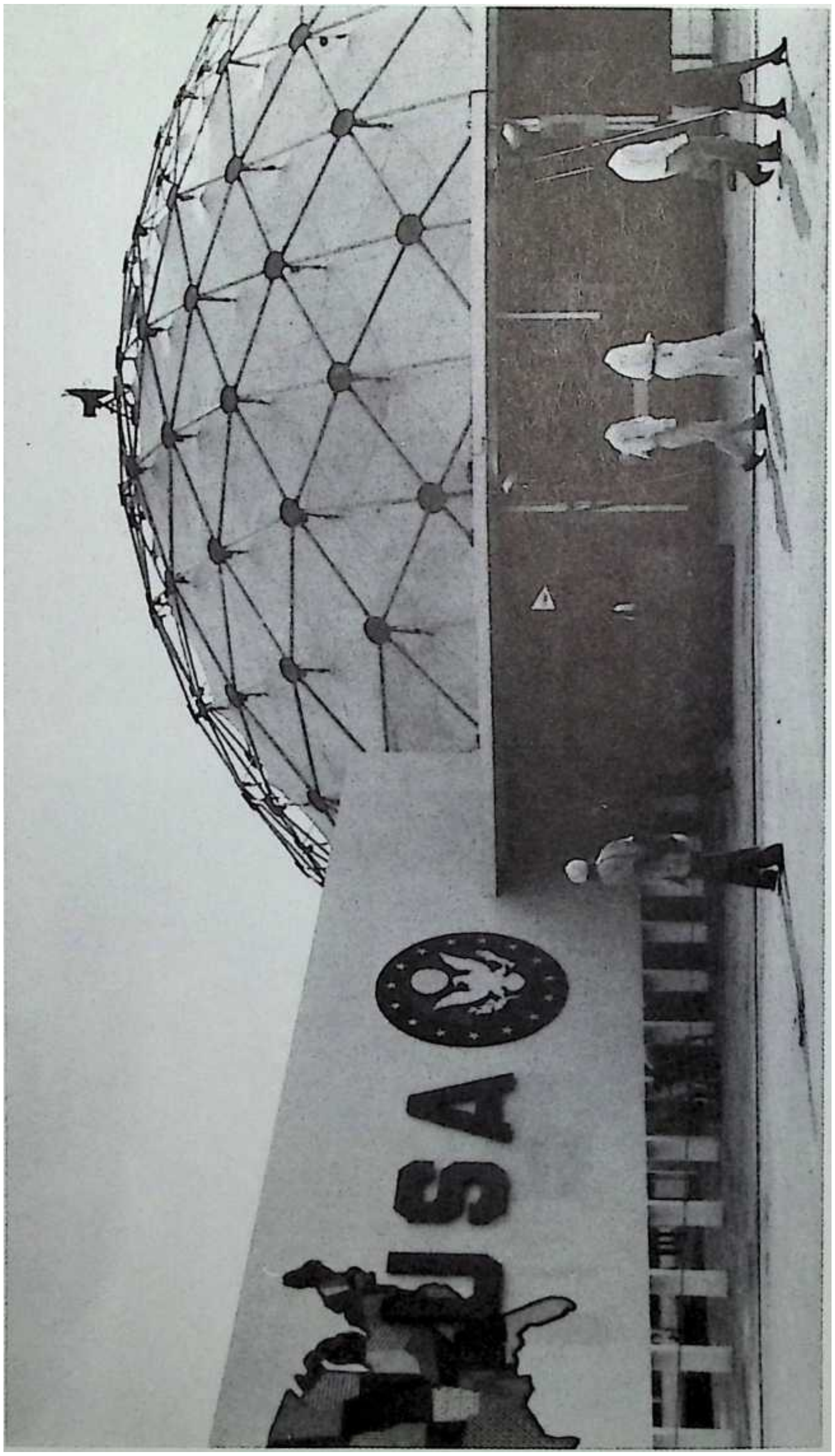
100-Foot Geodesic Trade Fair Dome (Pictures) 1956





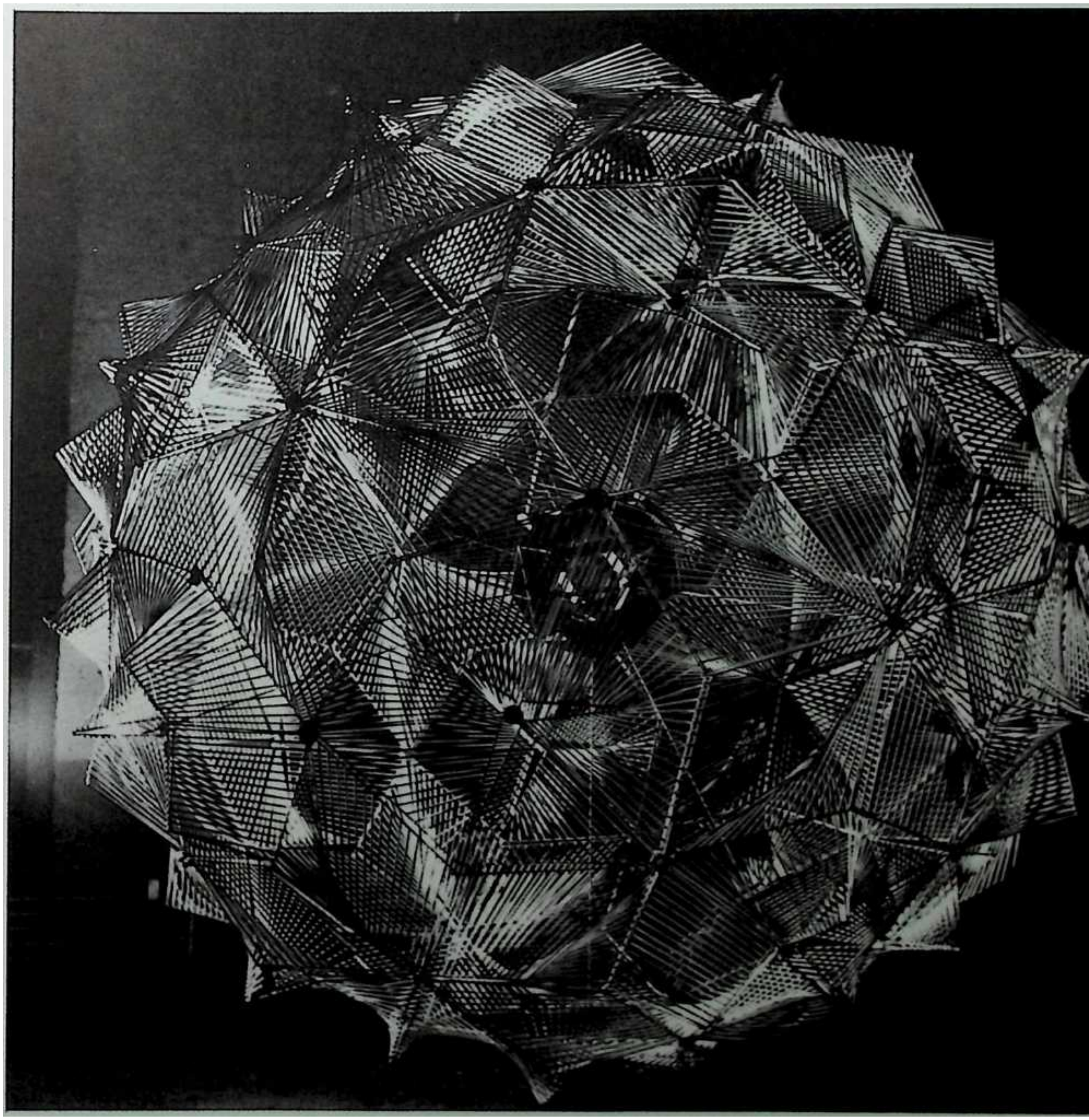




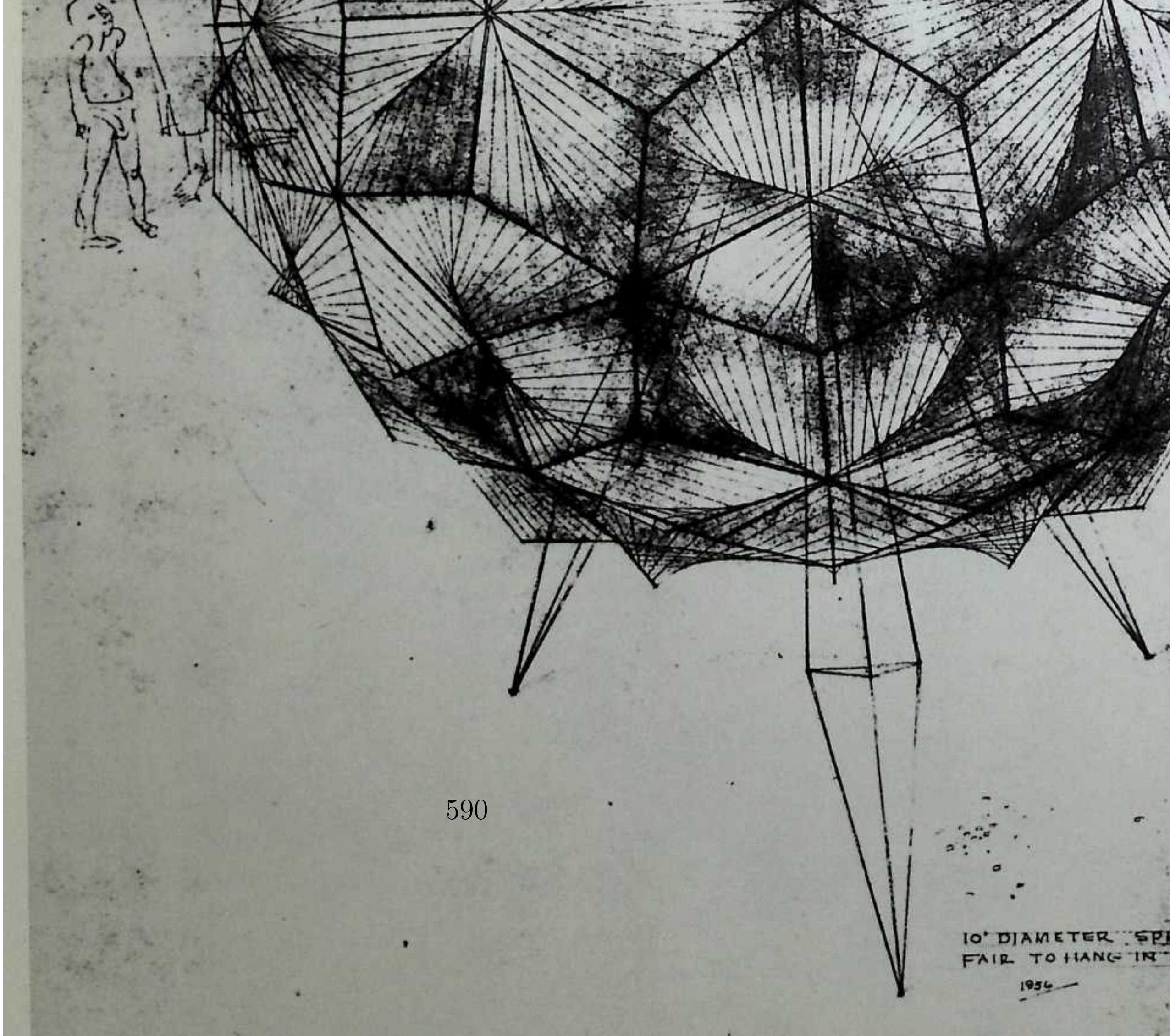

USA

Ten-Foot-Diameter Sphere to Stand in the 100-Foot Geodesic Dome at the Bangkok Trade Fair Designed and Executed by Duncan Stuart, 1956

This sculpture by Duncan Stuart is a modified geodesic globe that stood on the interior of Fuller's exhibition dome like a chattra for a Buddhist stupa. This landmark was the cynosure of the Bangkok fair of 1956. Stuart's sculpture is of polychromed, anodized aluminum.



8®

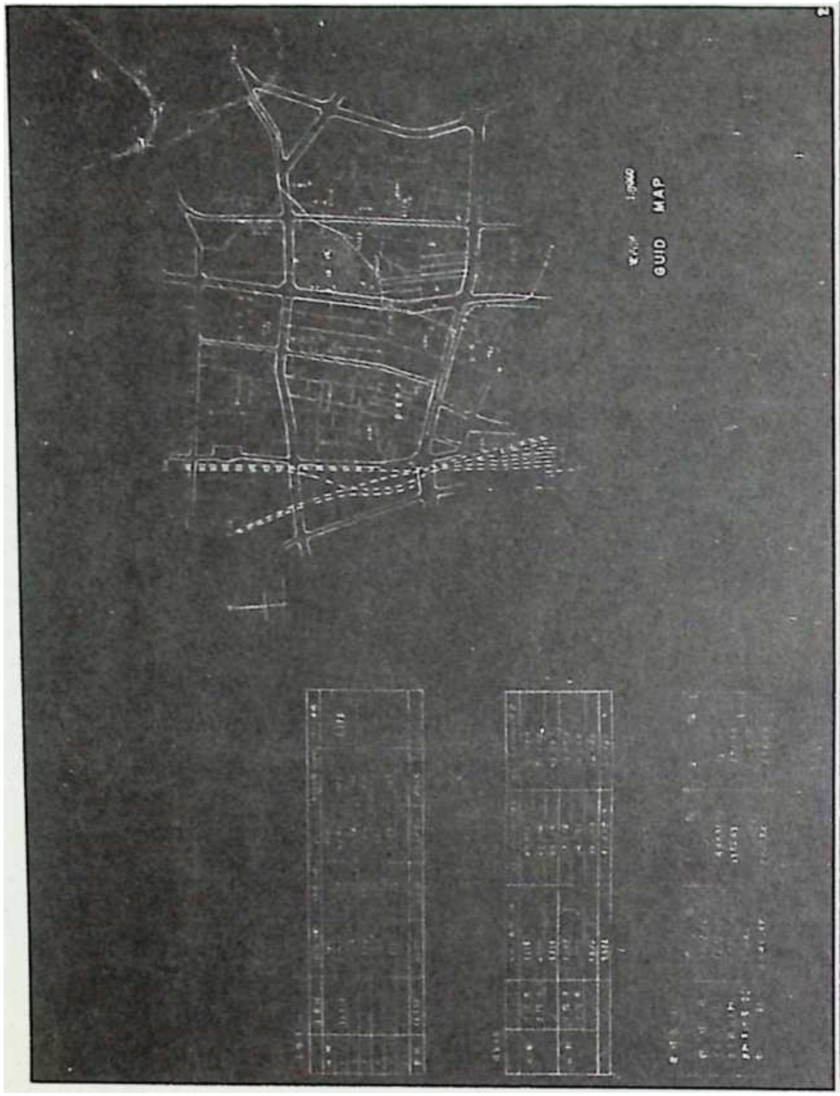

10' DIAMETER
FAIR TO HANG IN
1956

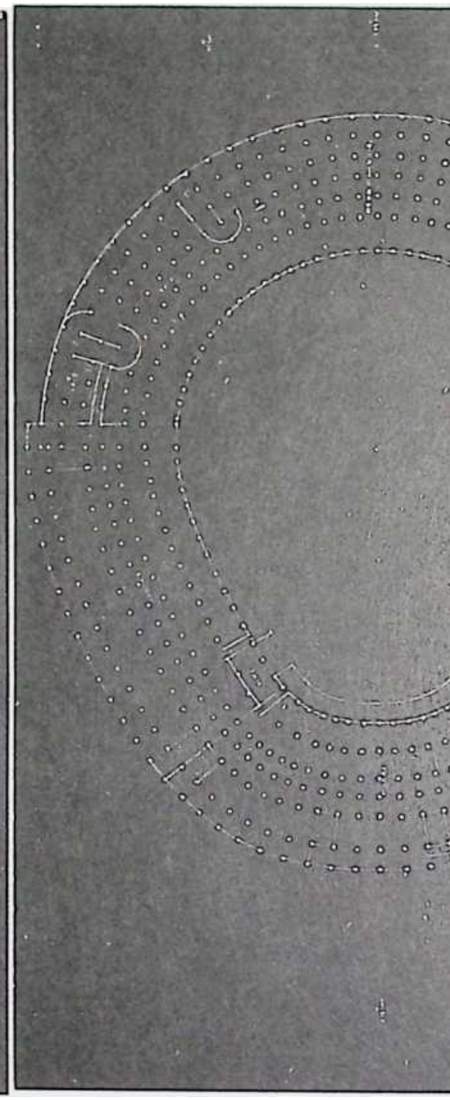
Ball Park Intended for the Yomiuri Giants, Tokyo 1956

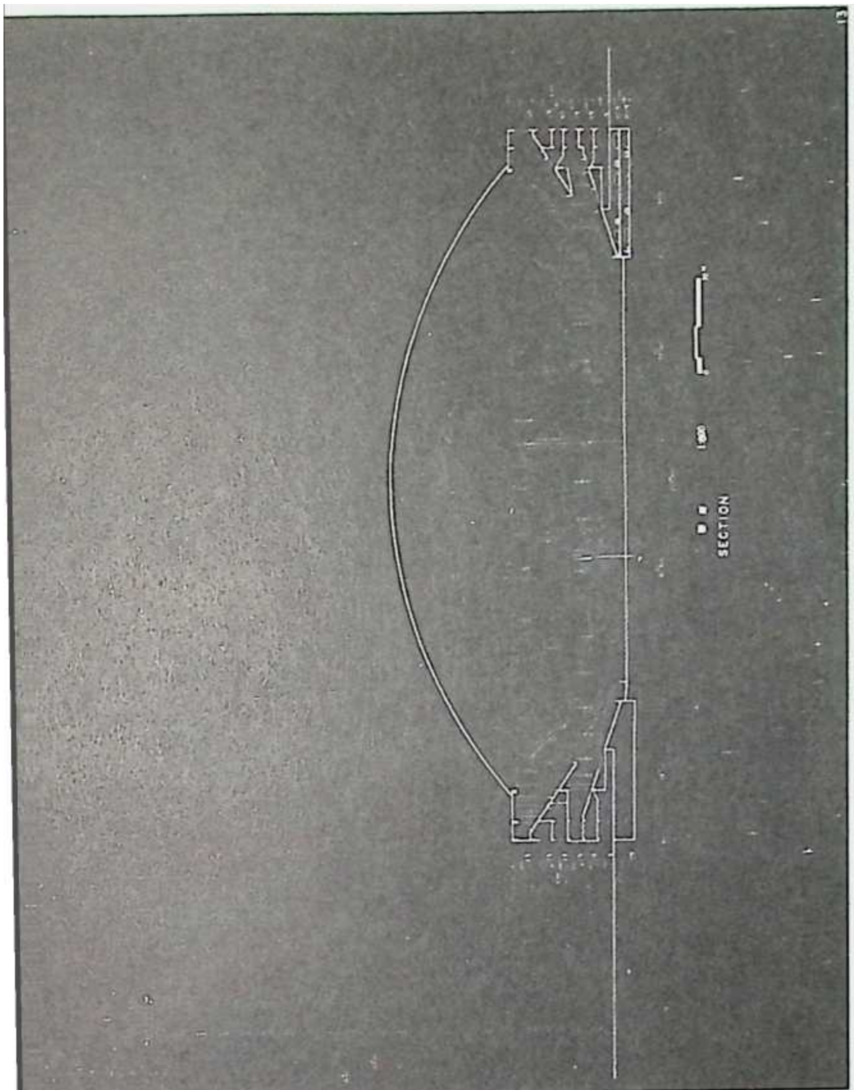
The height of this geodesic saucer dome would have daunted any home run or fugitive fly ball. The code name for the project was Tokyo 750, which refers to the diameter *of* the dome. The sponsor was to be Yomiuri, who gave his name both to a Tokyo-based newspaper and to a baseball team. Fuller's representatives in Japan claimed the stadium could be built for a very- low cost. Yomiuri's consultants eventually advised him against such a speculative real estate investment, and the project did not proceed beyond this handsome group of preliminary renderings. Had the ball park been constructed, it would have contained the largest man-made space. Eventually, Yomiuri built one of Fuller's geodesic domes to house a putting green and club at the Yomiuri Golf Course.

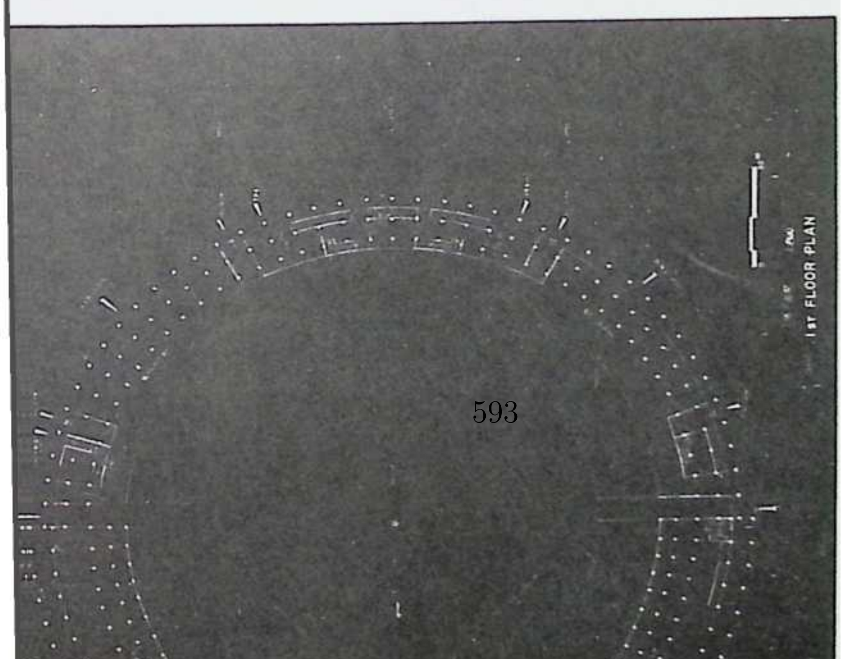
ROM: &HOJI aAIXC>

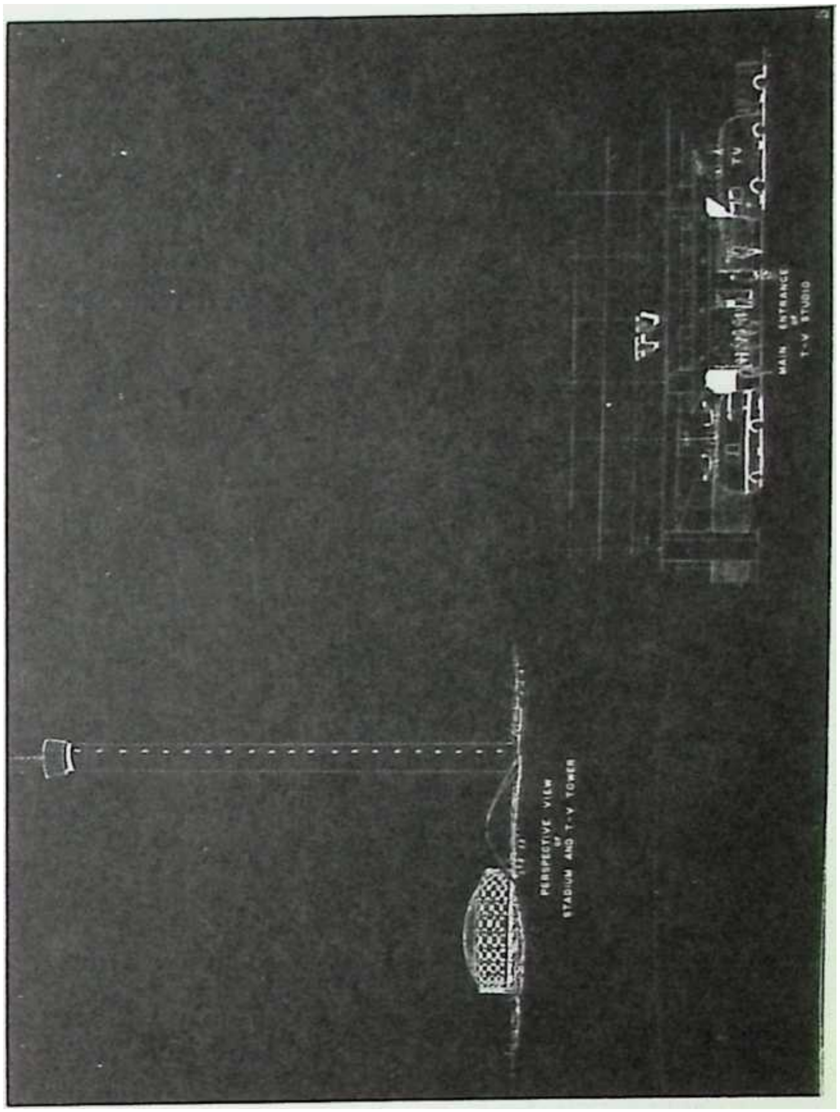
2, z-cmomv, «UCM> CJiiyoCA-Atf, I*'**'

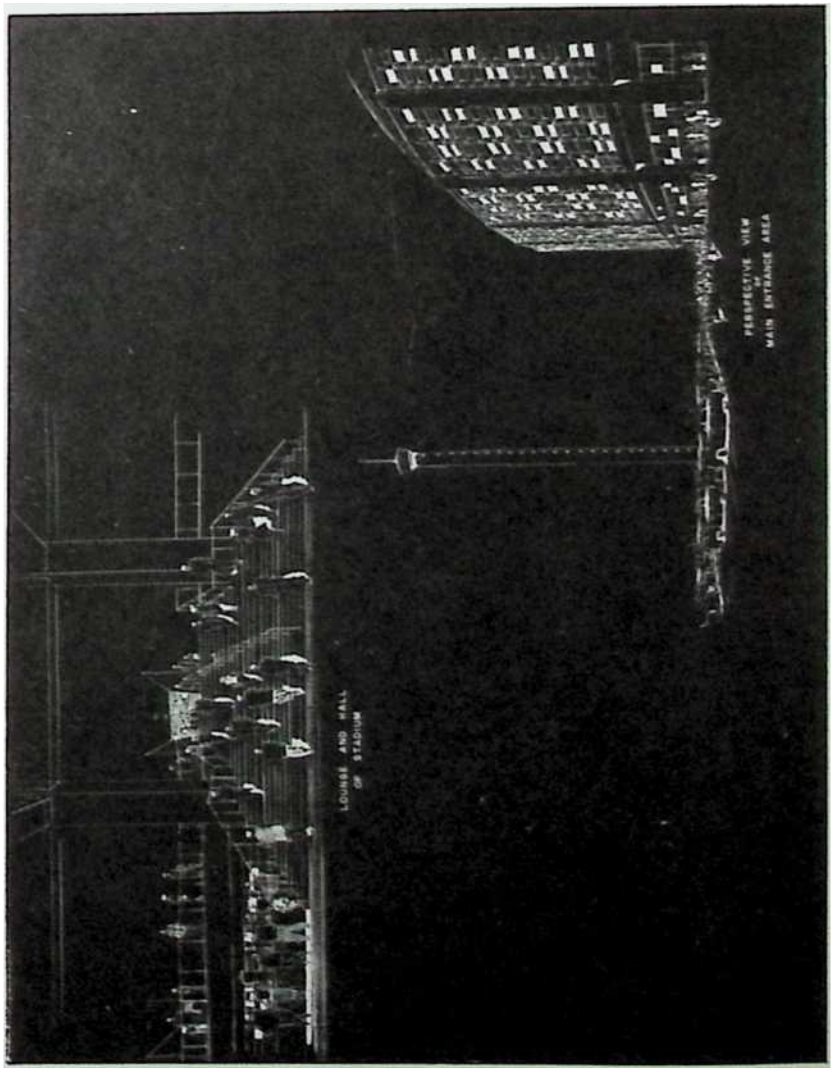

GUID MAP

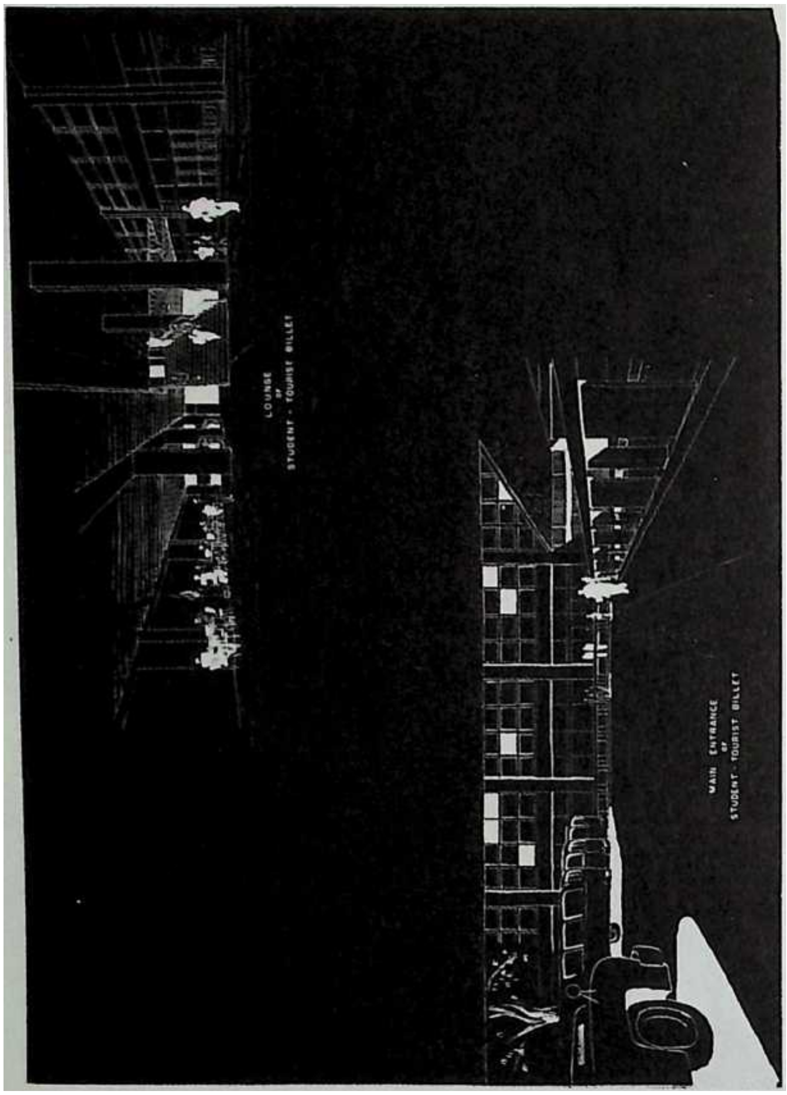



SECTION


1ST FLOOR PLAN

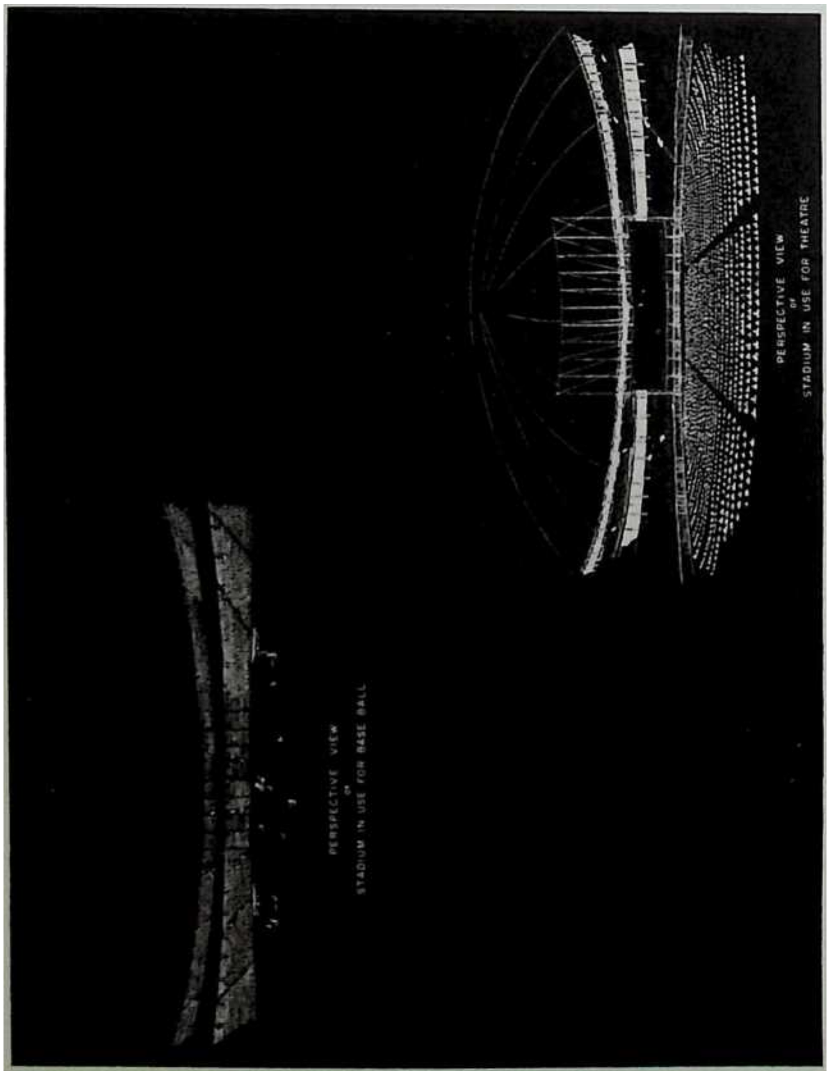

PERSPECTIVE VIEW
OF
STADIUM AND T-V TOWER
MAIN ENTRANCE
OF
T-V STUDIO

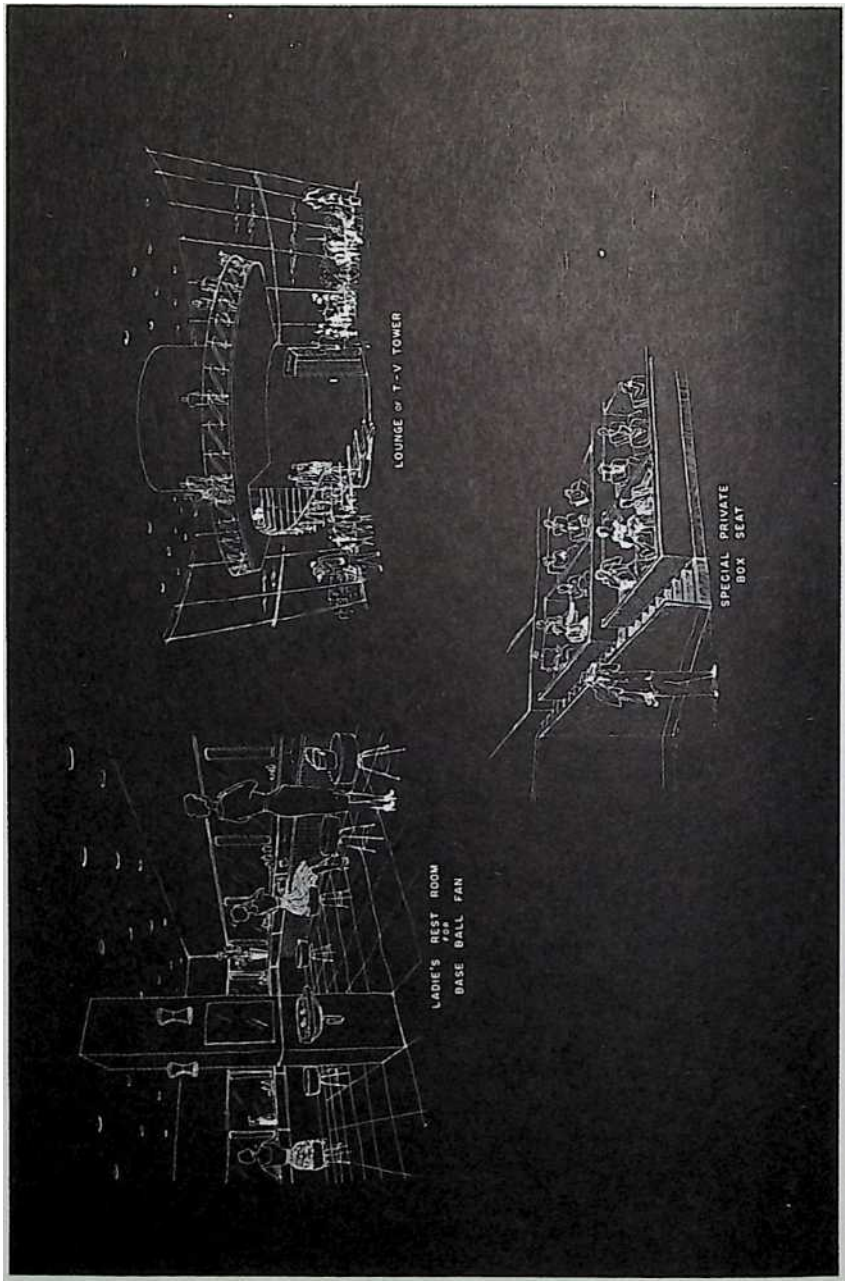

LOUNGE AND HALL
OF STADIUM
PERSPECTIVE VIEW
OF
MAIN ENTRANCE AREA



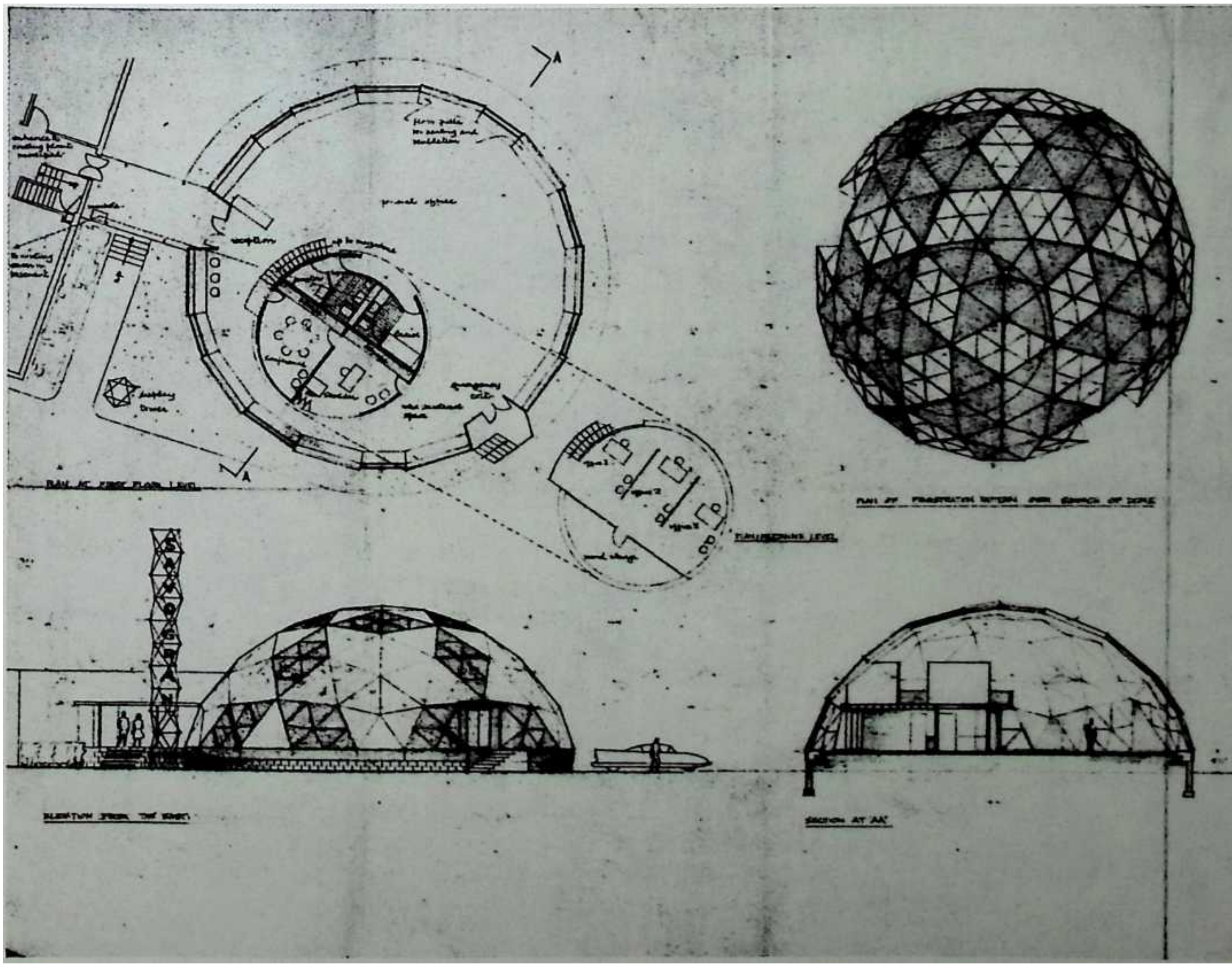
LOUNGE OF STUDENT - TOURIST BILLET

MAIN ENTRANCE OF STUDENT - TOURIST BILLET


PERSPECTIVE VIEW
OF
STADIUM IN USE FOR BASE BALL
PERSPECTIVE VIEW
OF
STADIUM IN USE FOR THEATRE



Geodesic Office Building for the Savogran Company, Norwood, Massachusetts 1957

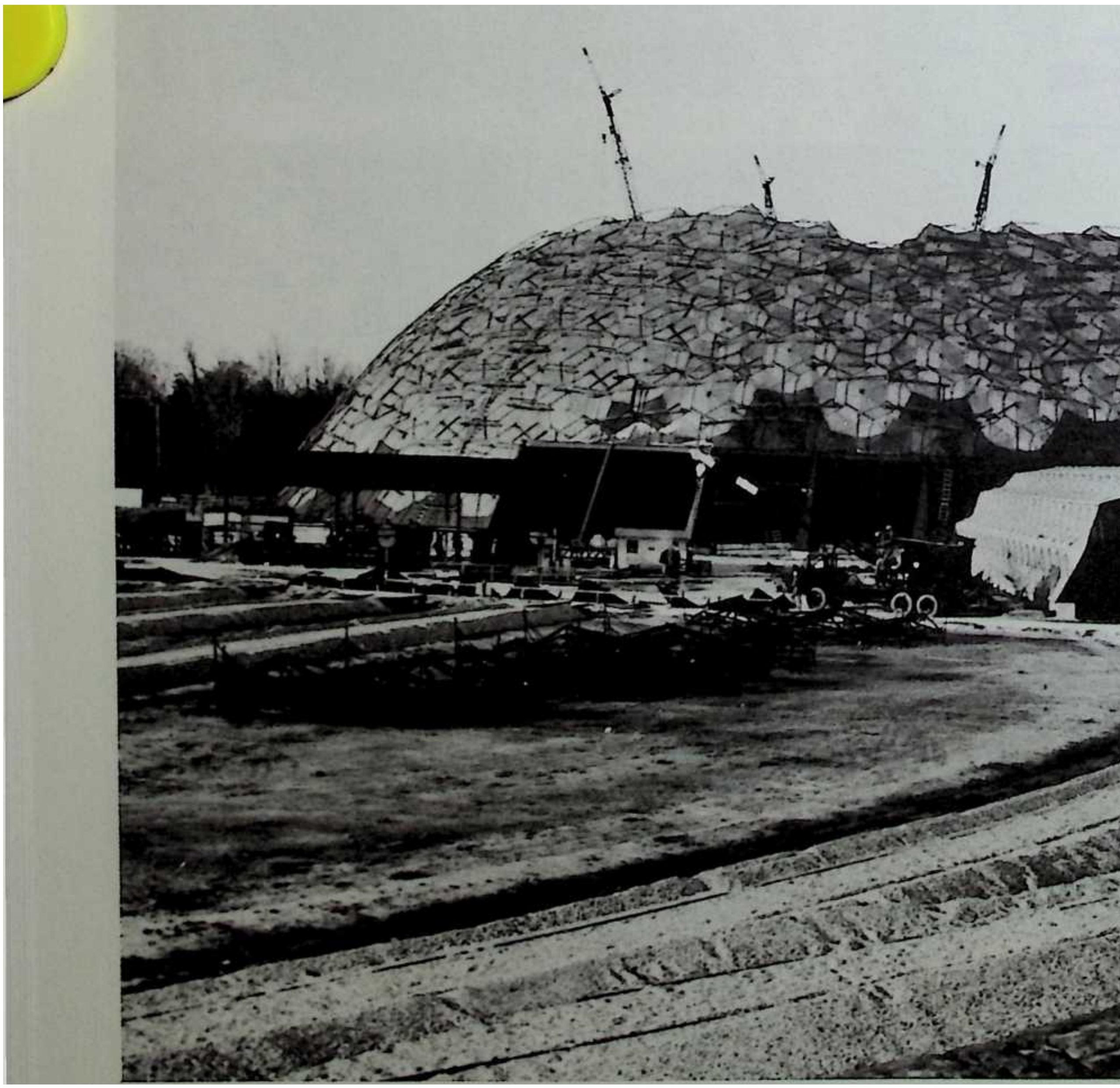


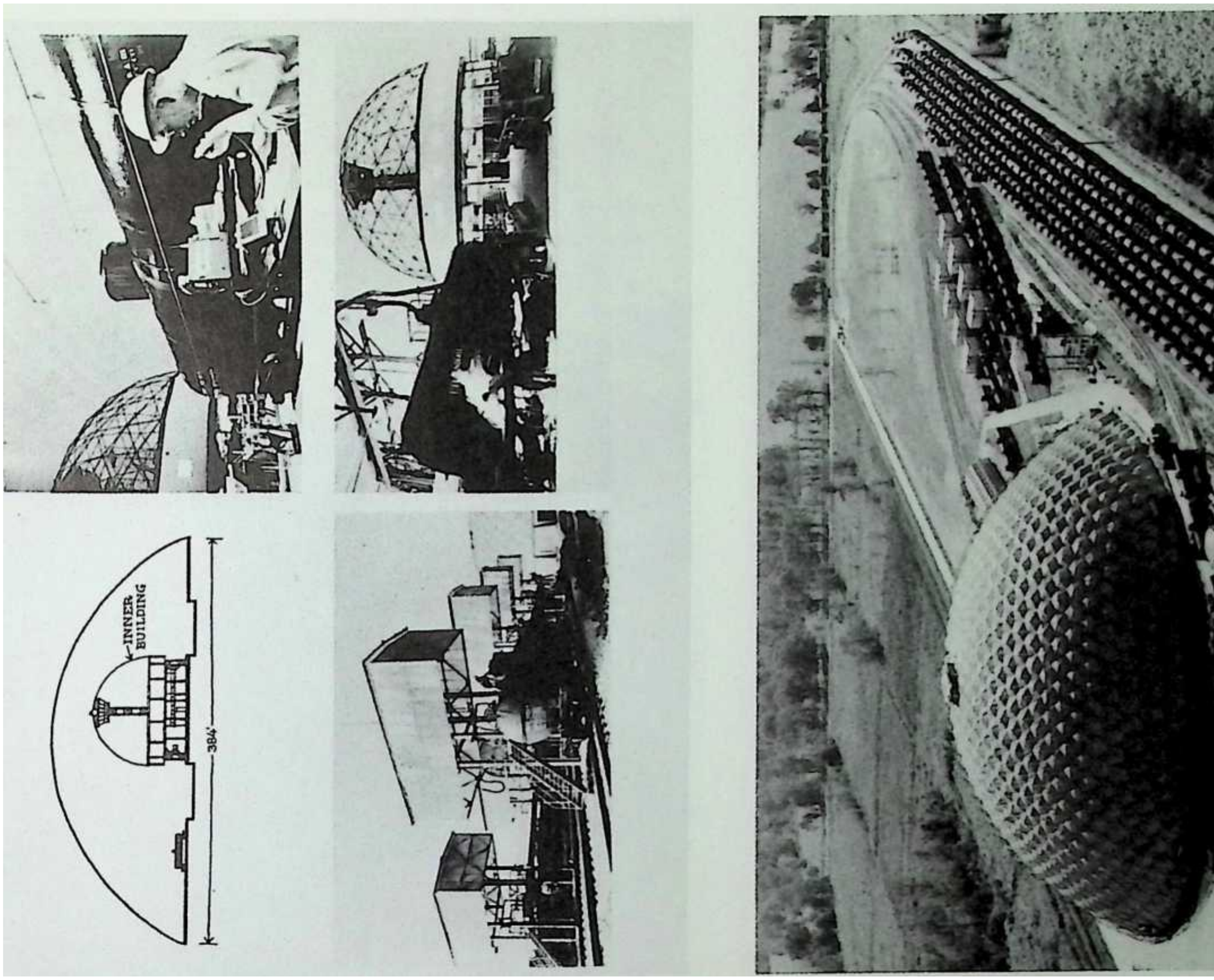
Savogran Company was extremely precocious in adopting the geodesic dome for its office building. The firm was apparently more interested in the possibilities of an innovative building design than in economic considerations.

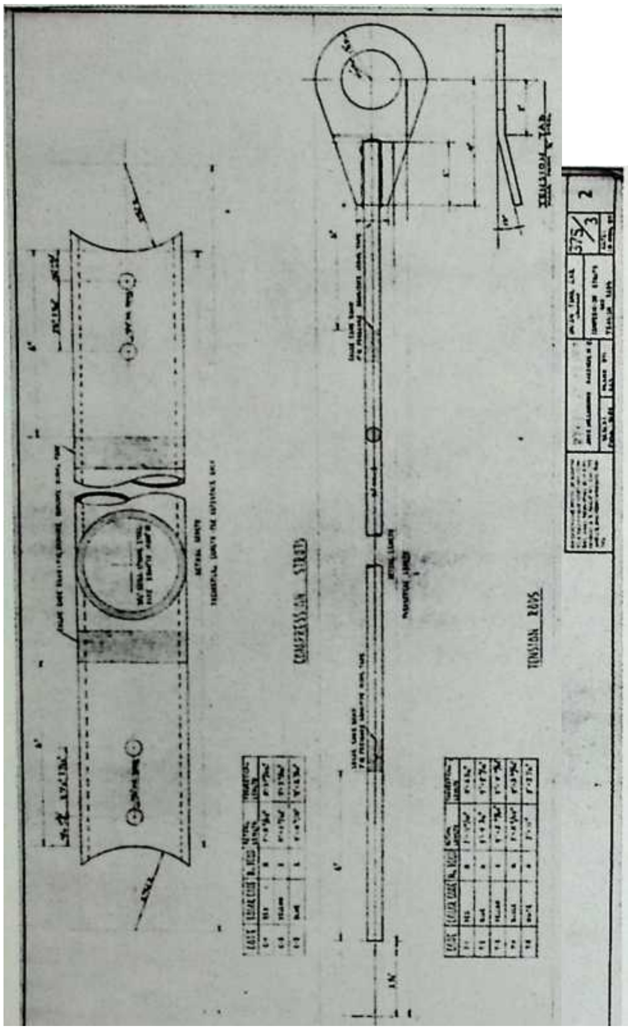
Union Tank Car

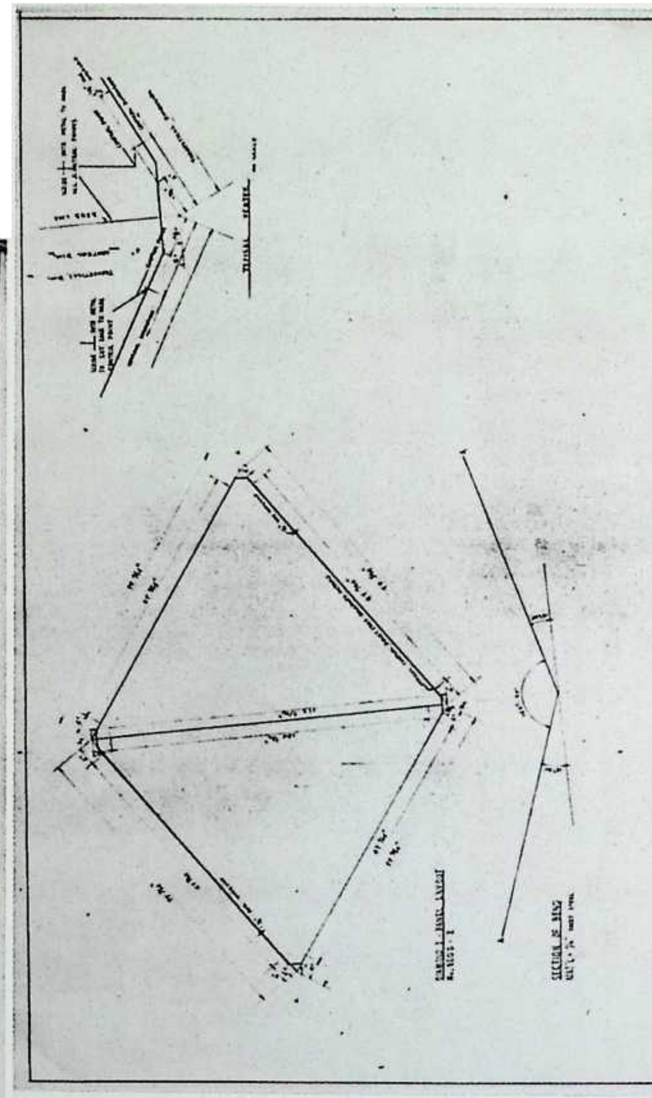
Company, Baton Rouge, Louisiana, Dome and Exedra 1957

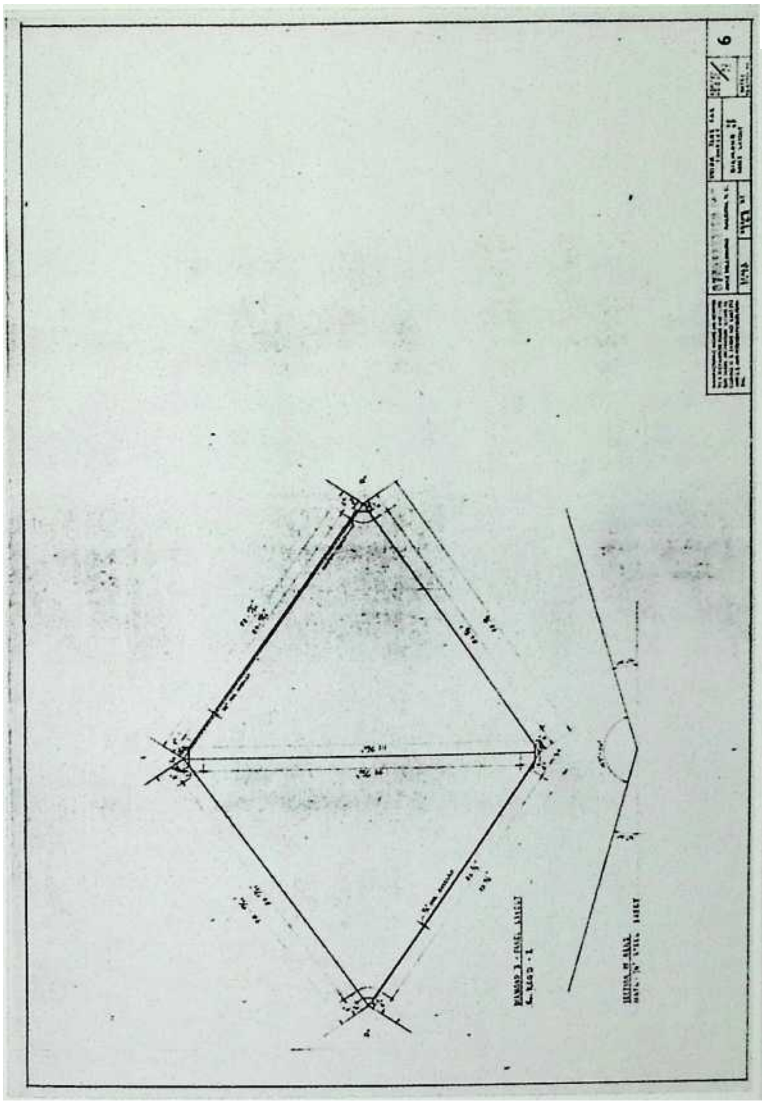
Fuller designed this 384-foot geodesic dome for a site in Baton Rouge, Louisiana. It is the largest permanent dome since the Ford commission of 1952 and is one of the first designs to incorporate geodesic structures other than the dome. The long entrance pavilion and the triangular hub are novelties in this design.

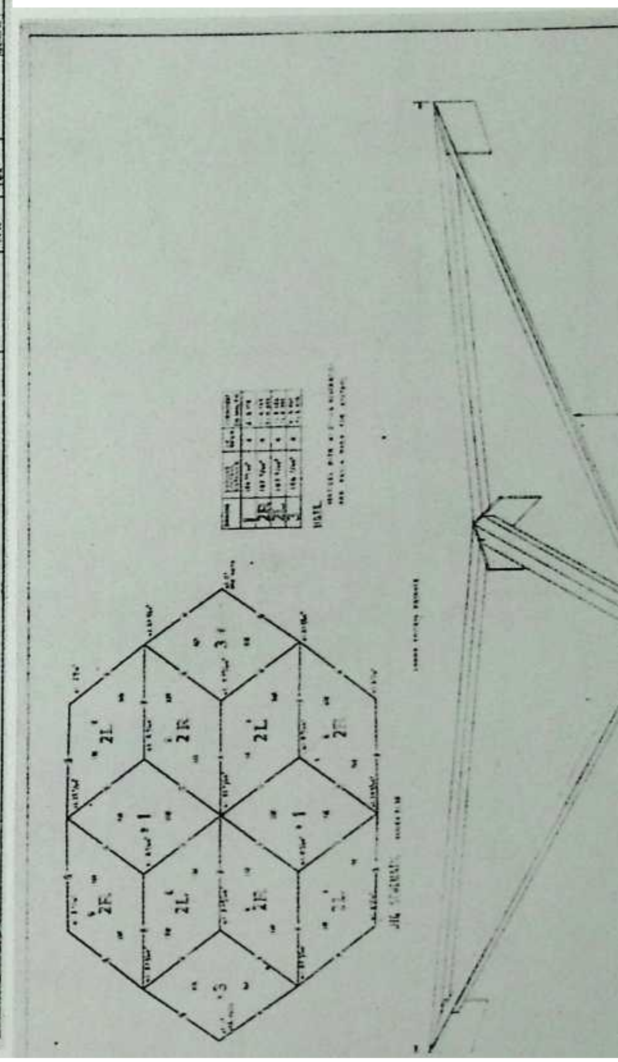


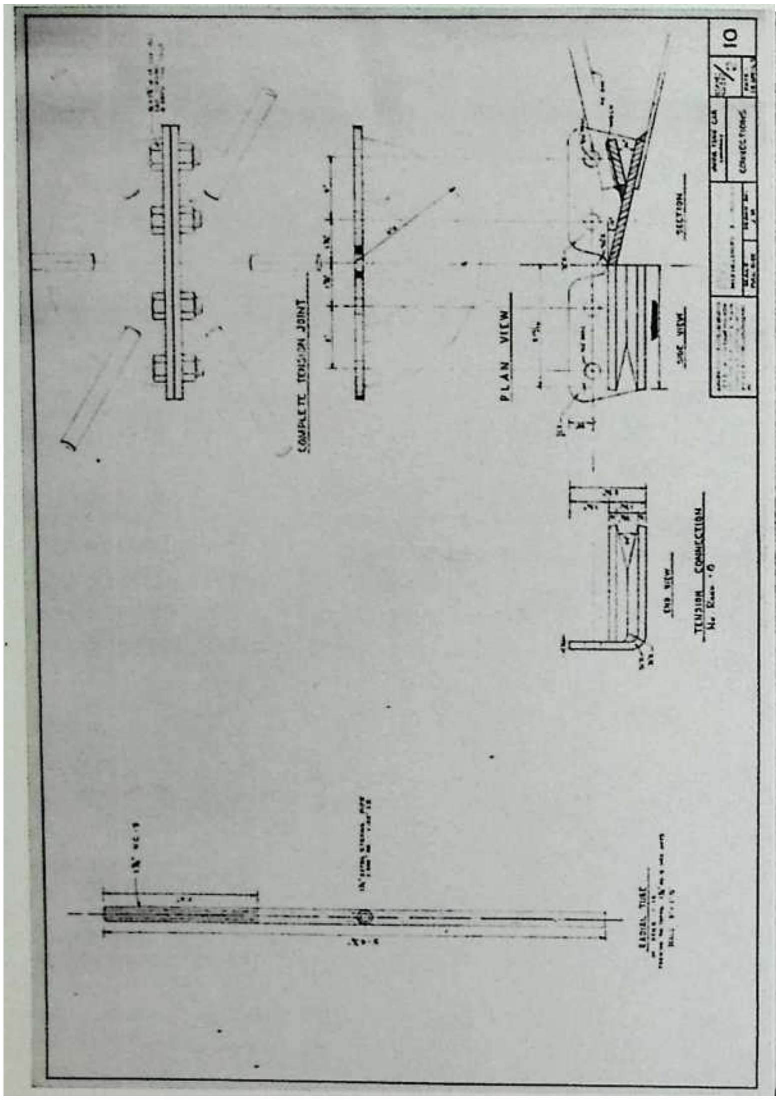

INNER BUILDING
384'

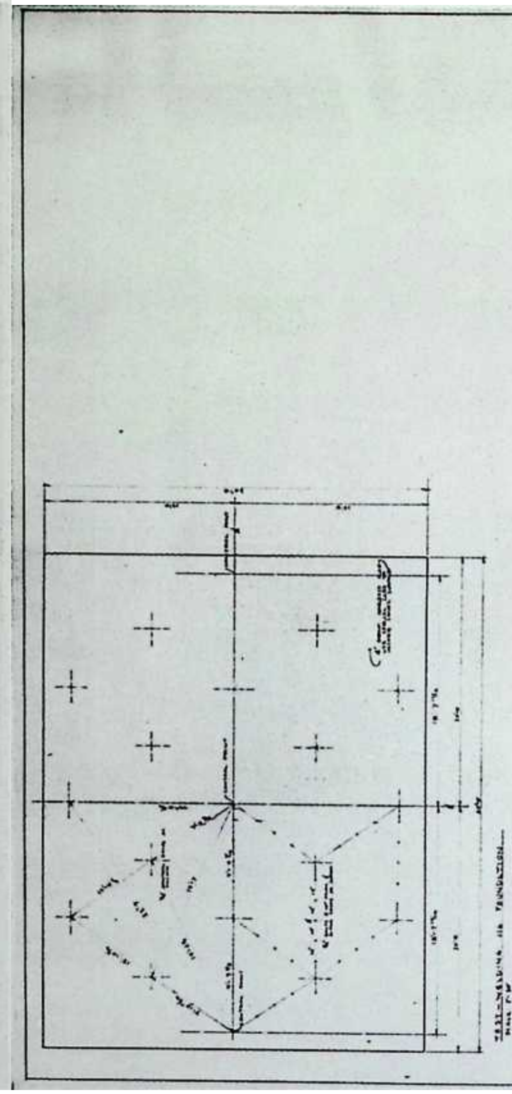


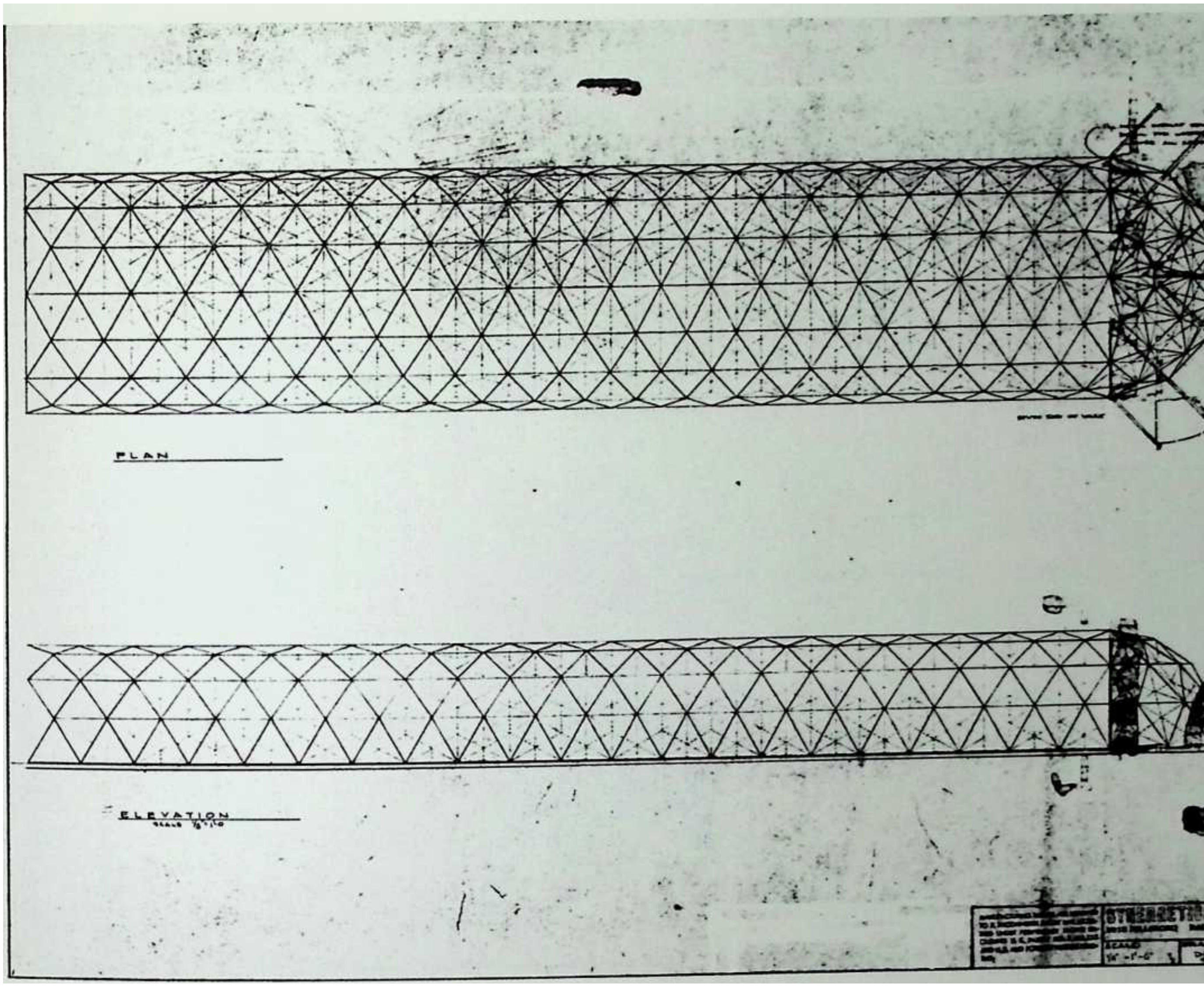






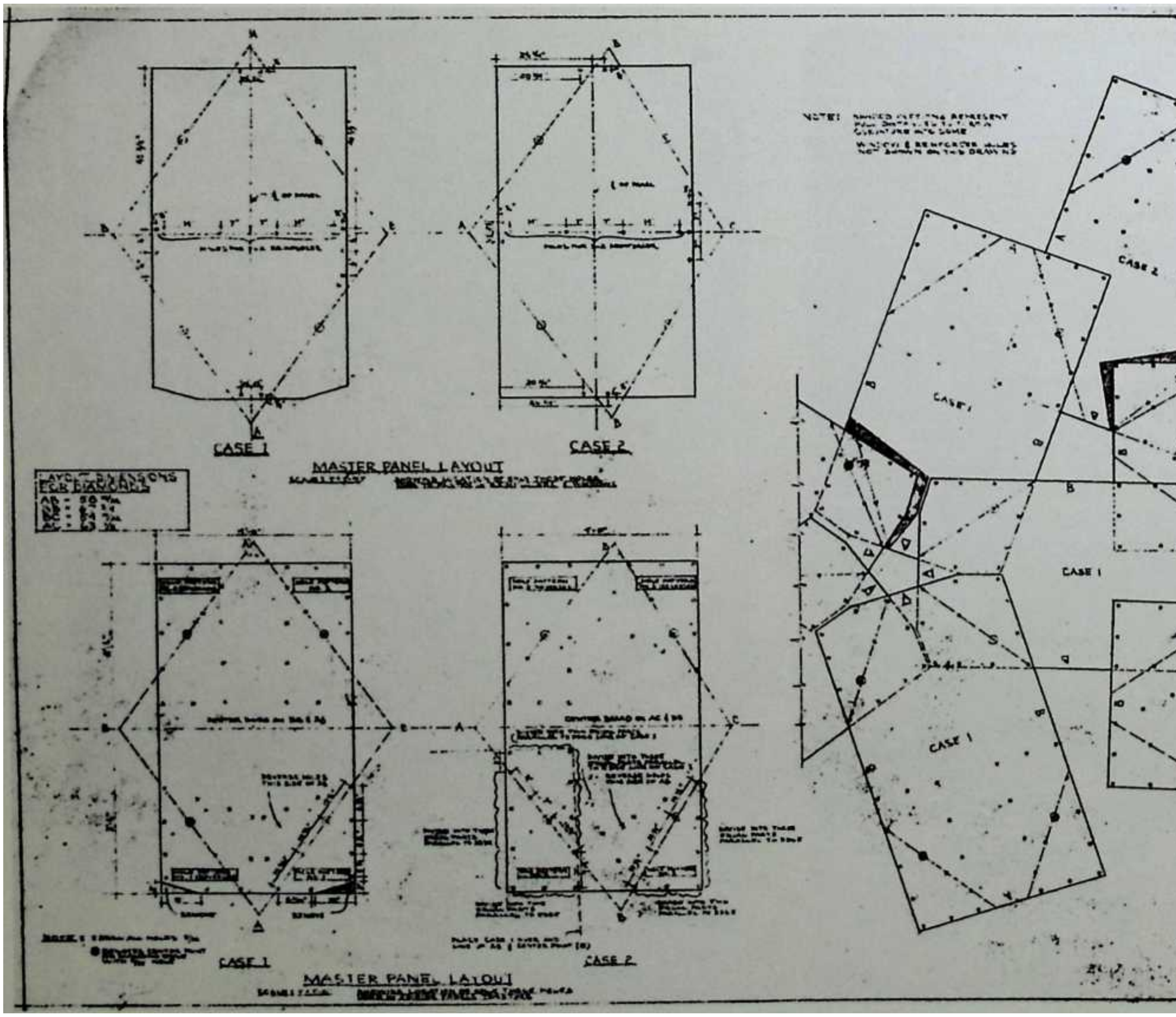


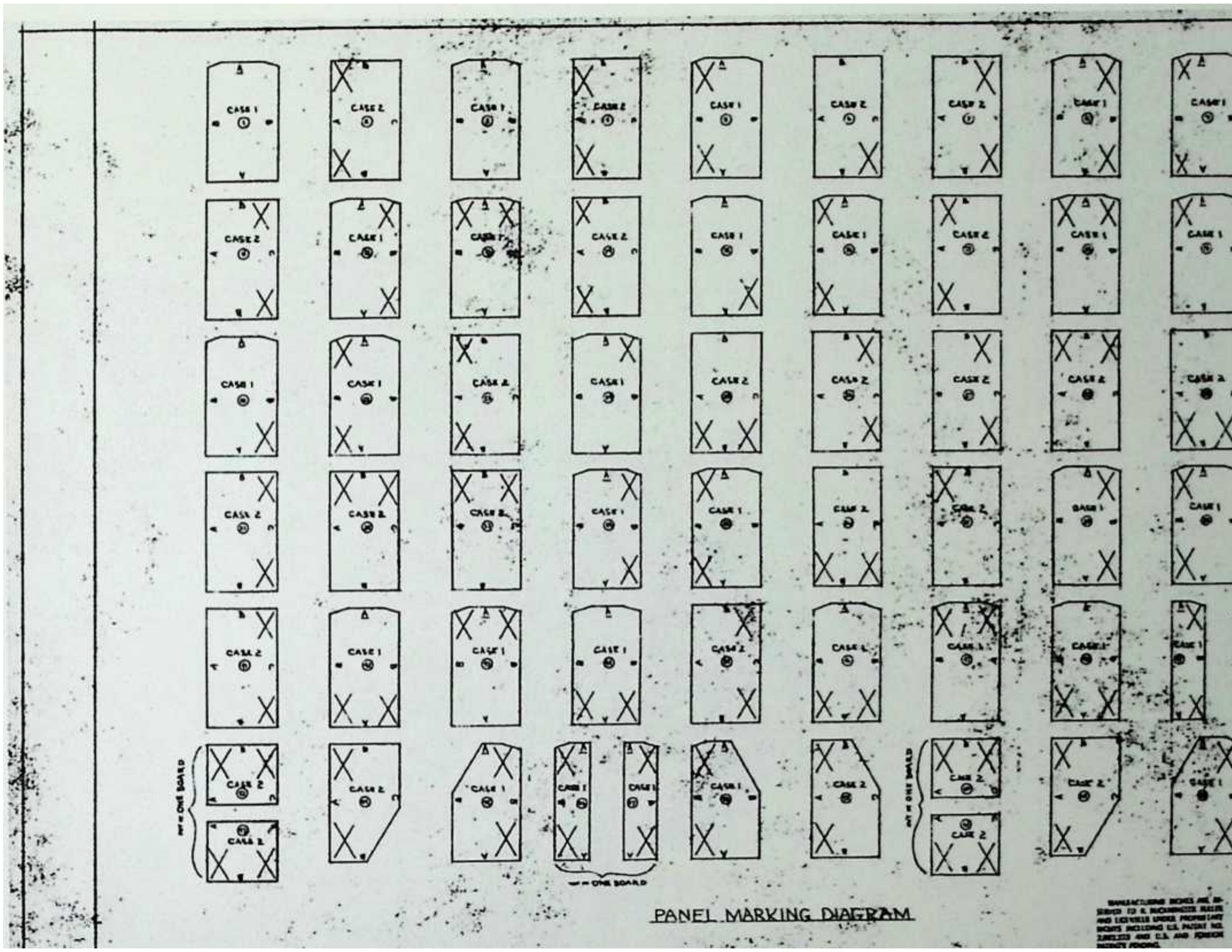


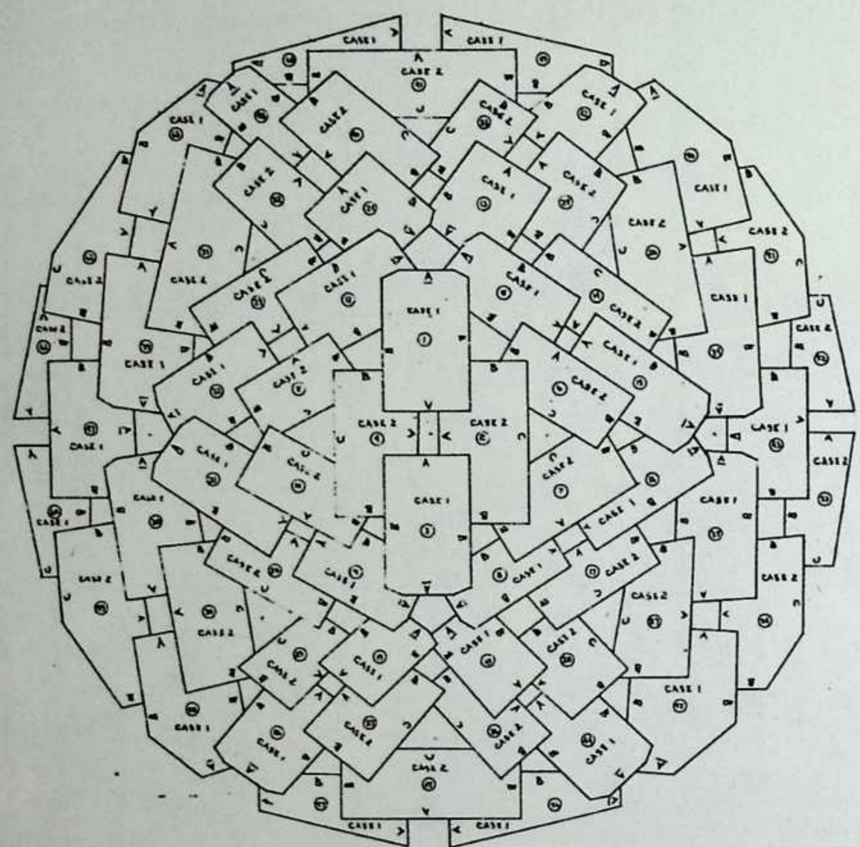


Twenty-nine-F oot- Diameter Plydome 1957

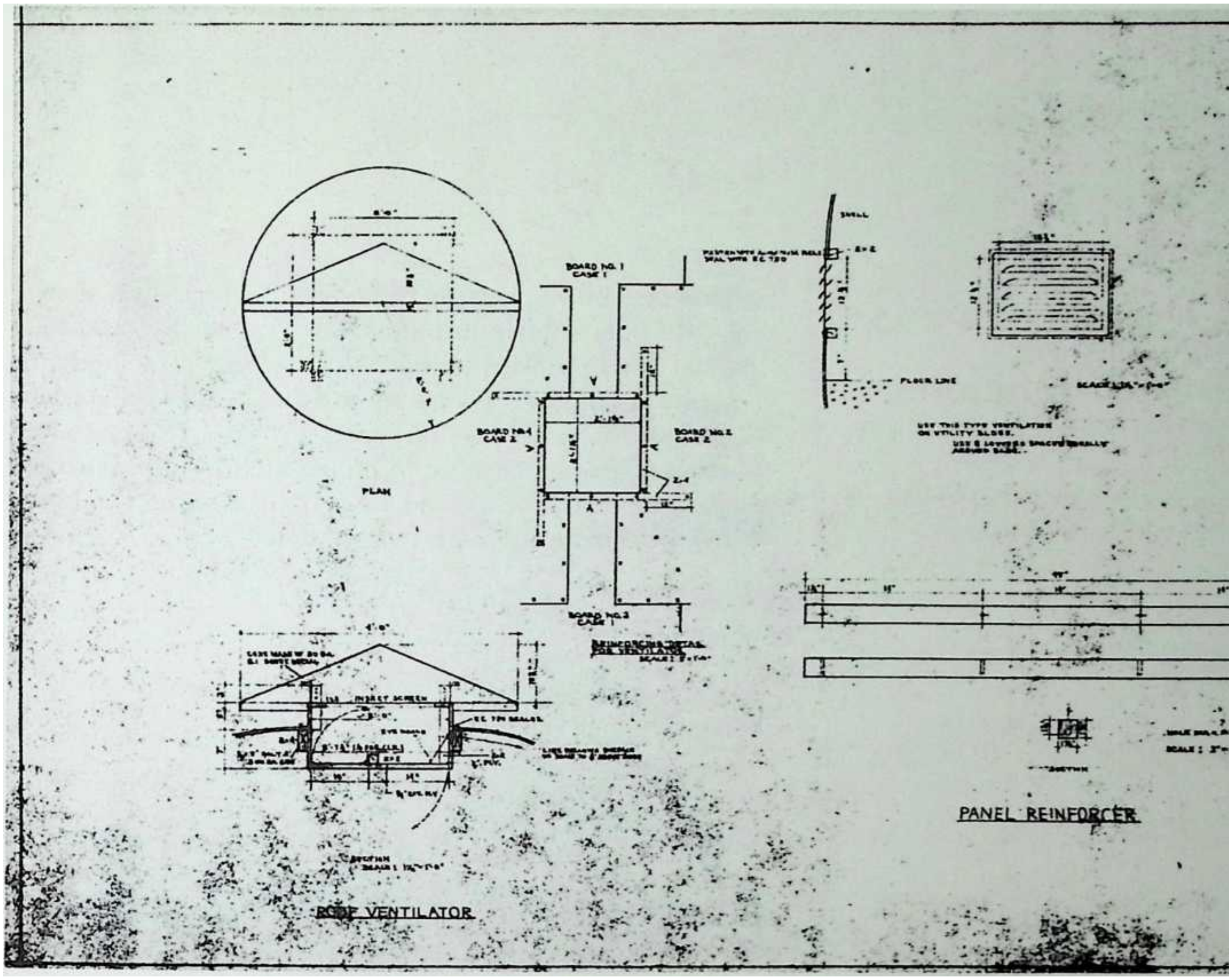
Five plywood panels form the vertexes of this dome. Each is secured to the other with bolts along the intersecting edges. There is a total of sixty-four panels of various sizes.

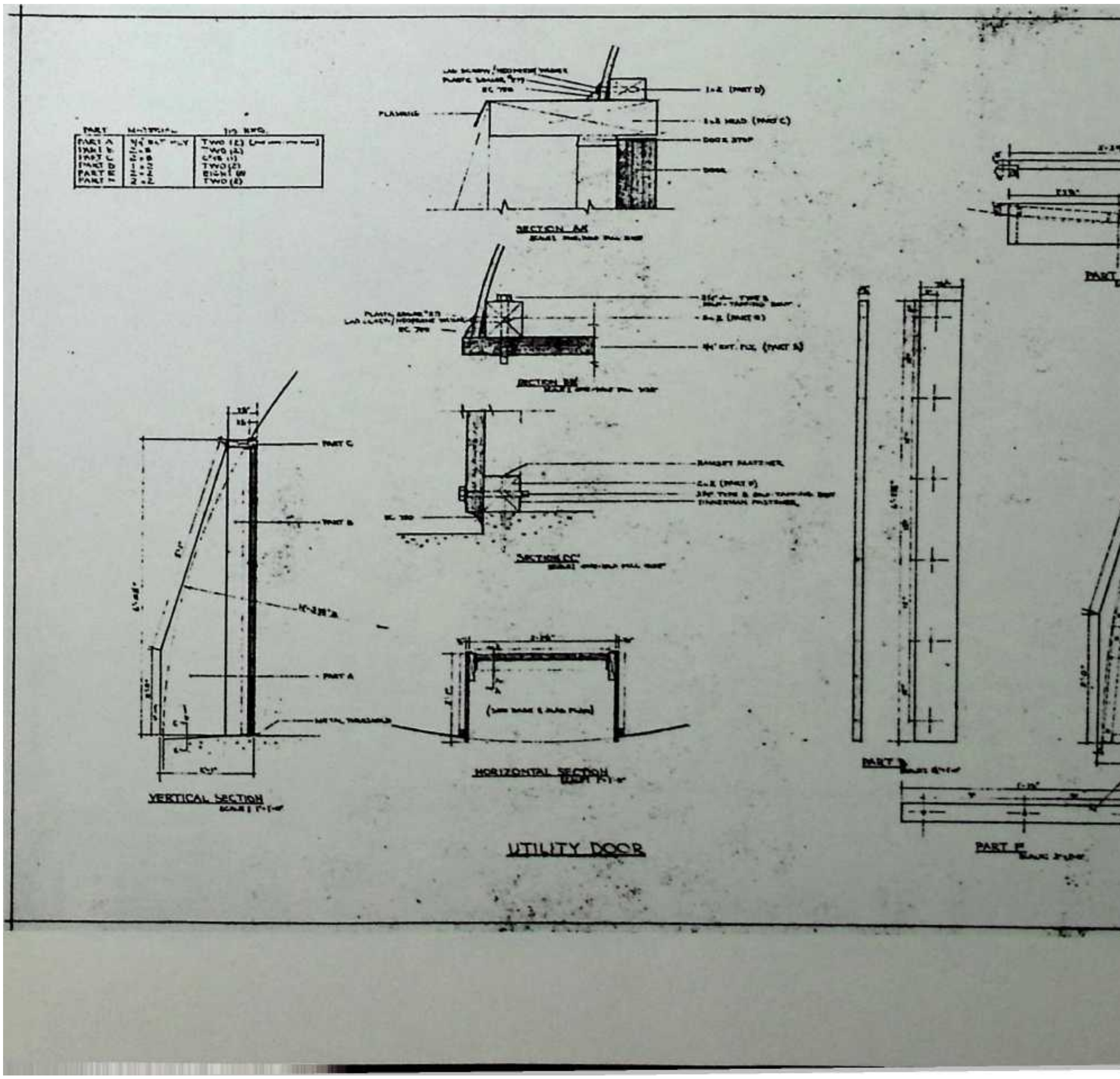

CASE 1
CASE 2
MASTER PANEL LAYOUT
CASE 1
CASE 2
MASTER PANEL LAYOUT
CASE 1
CASE 2
CASE 1
CASE 1


PANEL MARKING DIAGRAM



SPREAD-O

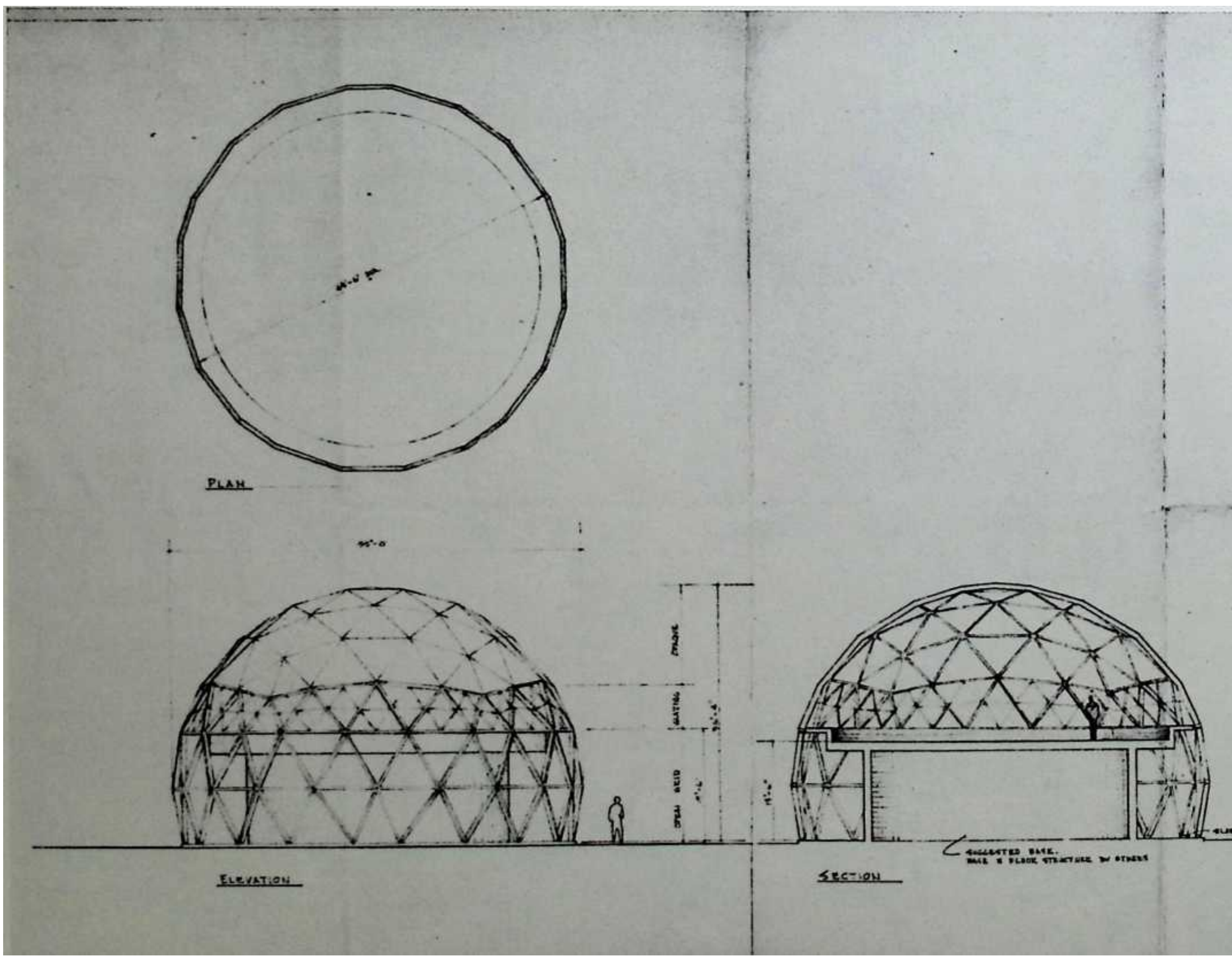

BOARD NO. 1
CASE 1
PLAN
SHELL
FLOOR LINE
PANEL REINFORCER
ROOF VENTILATOR

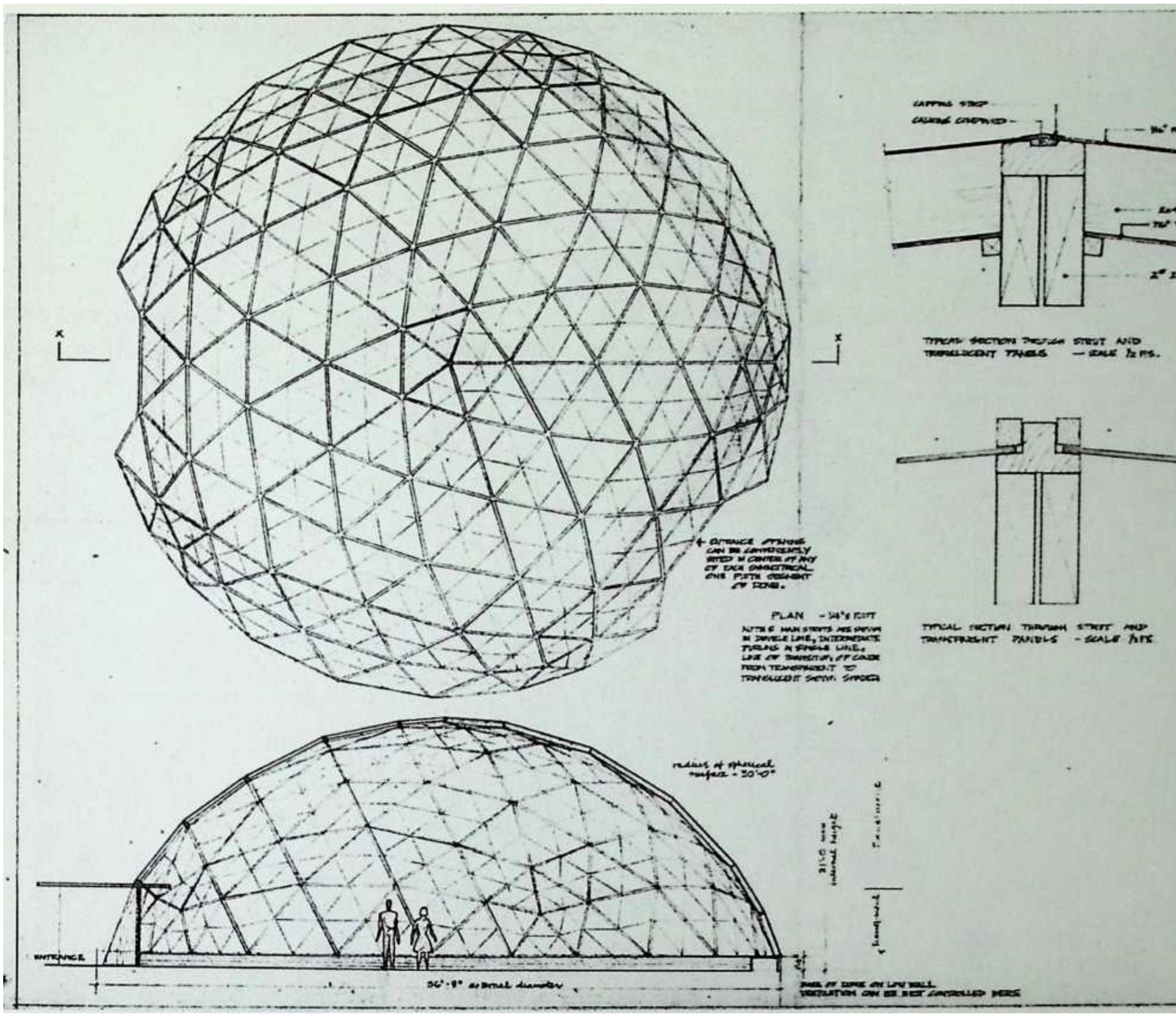


Ski Lodge Design No. 2

Wurster-Bernardi & Emmons, Architects, 1957

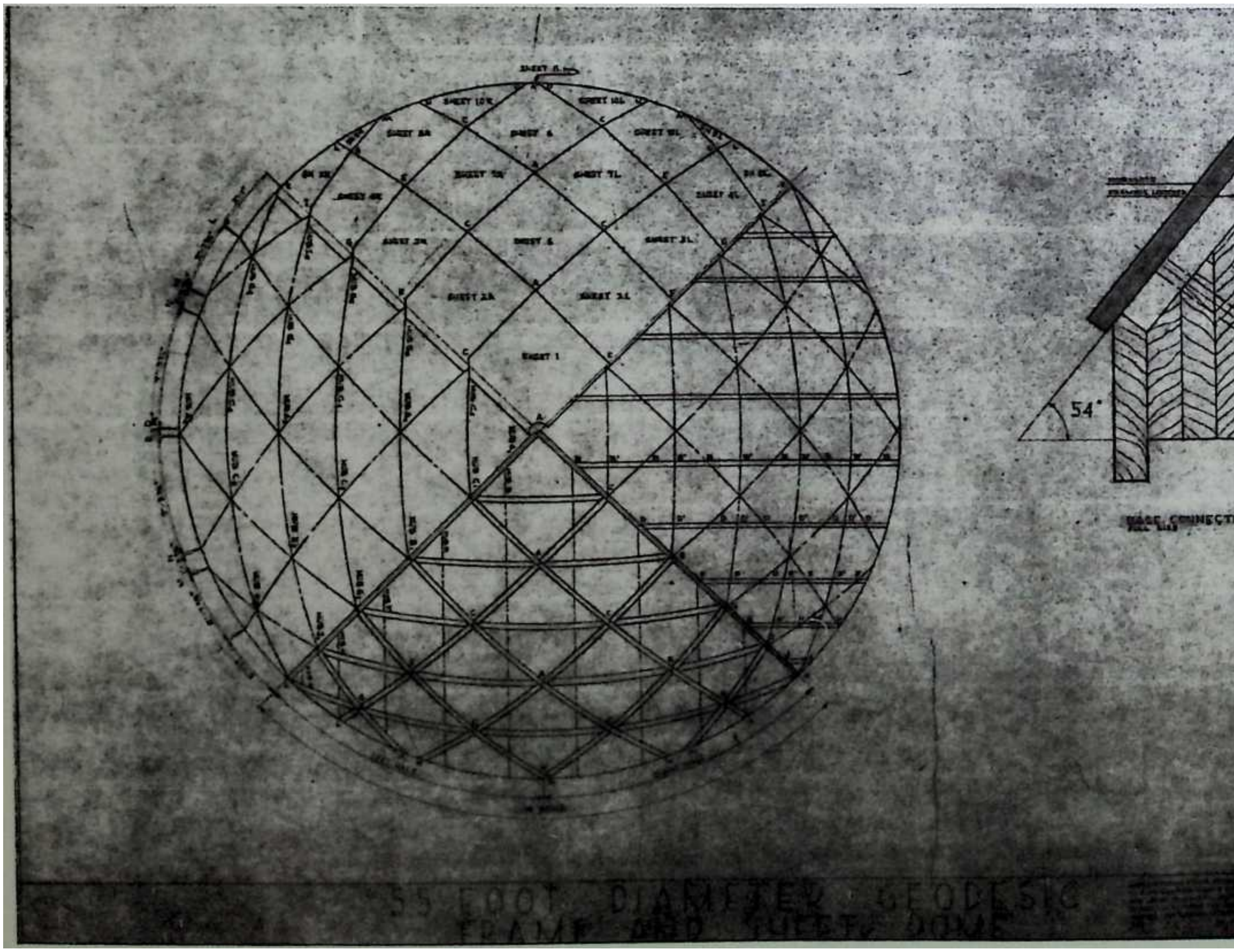
This is another example of an architectural firm that used Fuller's dome in a design with a private and luxurious function. The strength of the dome protected against strong winds and snow drifts, and its materials allowed the sun's rays to penetrate. The entrance and stairs of this lodge were to be decided by the patrons or the architect. The second story is marked on the exterior by a more intricate fenestration.

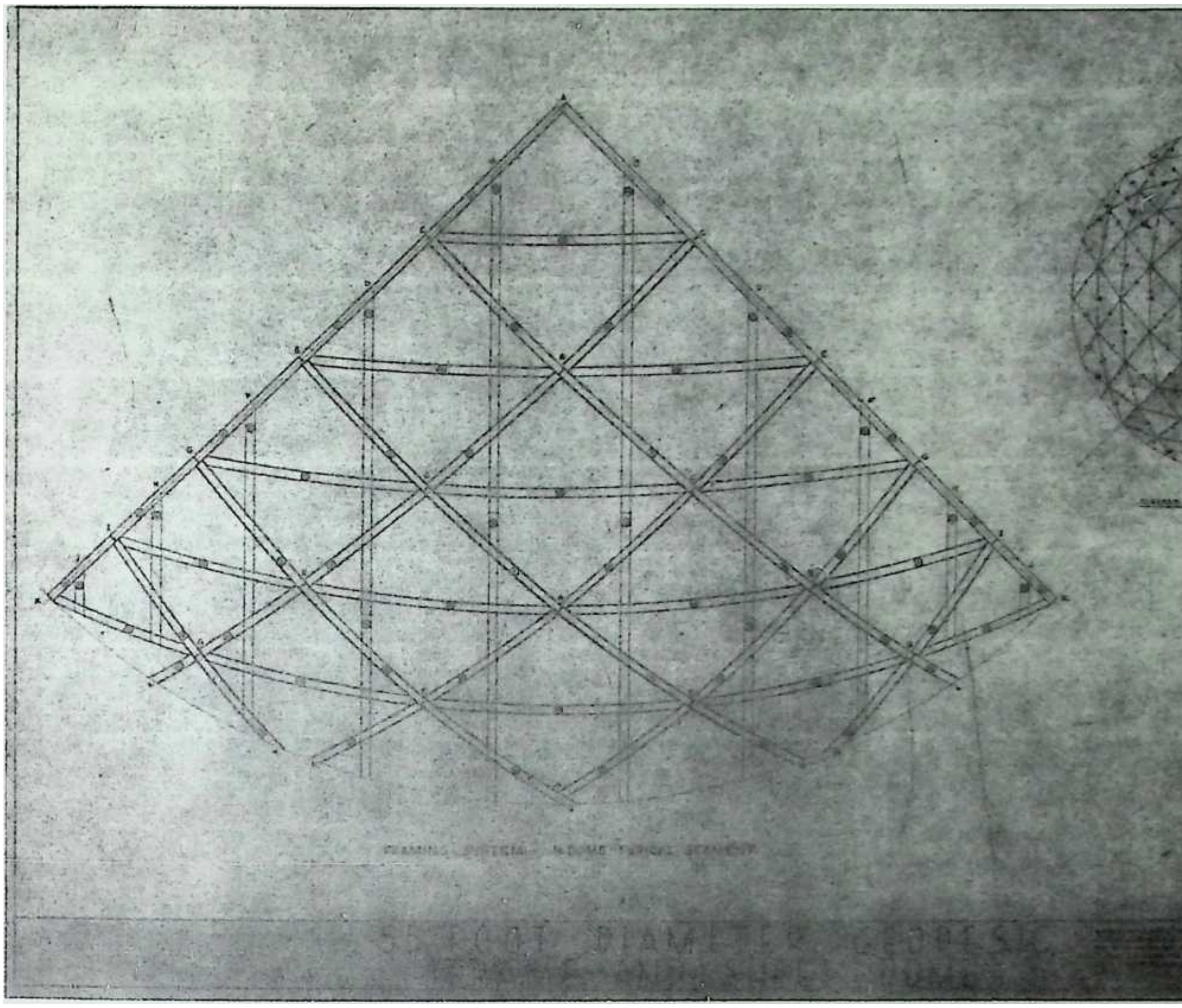


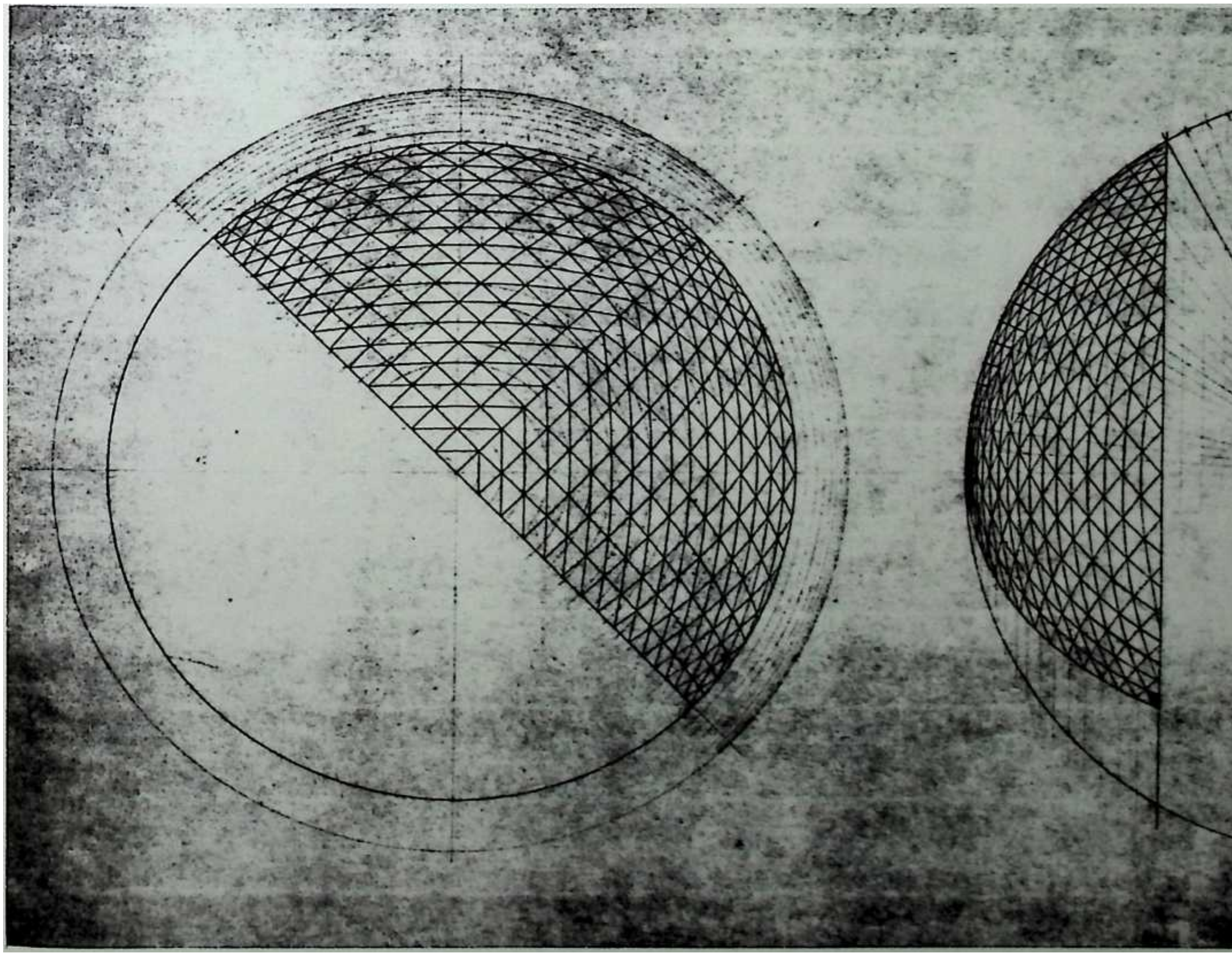


Fifty-five-Foot and Thirty-six-Foot Diameter Geodesic Frame and Sheet Domes 1957

This dome of wood slats is notable for the cruciform armature that necessitates hubs of several types. It was to be clad in inexpensive panels of homasote secured with tacks.

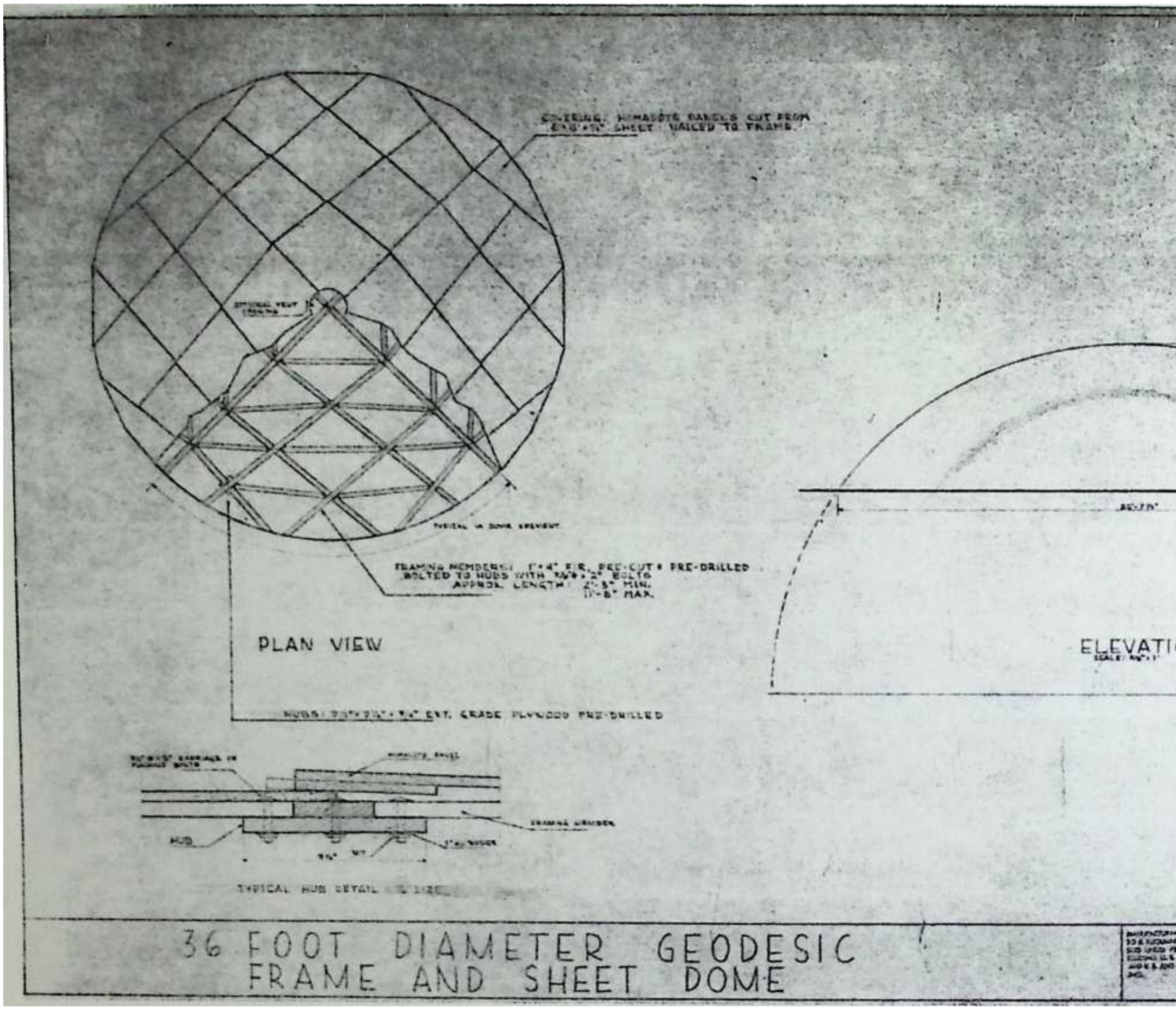

54°
55 FOOT DIAMETER GEODESIC





36	DI-	ED GEODESIC	EAU«MK$_C$	ttSXXICM
FOOT	AMET			
FRAME	D	' DOME	£-'—	-
AN	3U££1		K"'"*•" *•	•
			Li' "»> <•>' u	
			AsrVD 1^1 ~T-	

BASE IZIMG DETAIL SAME AS AS* OOMC.



PQOCEDUGE1

BASE RING

TYPICAL SEGMENT

STEFA

£.RfctT|pN

AP?llCATiOH.a:~MG7AgOTE PANELS

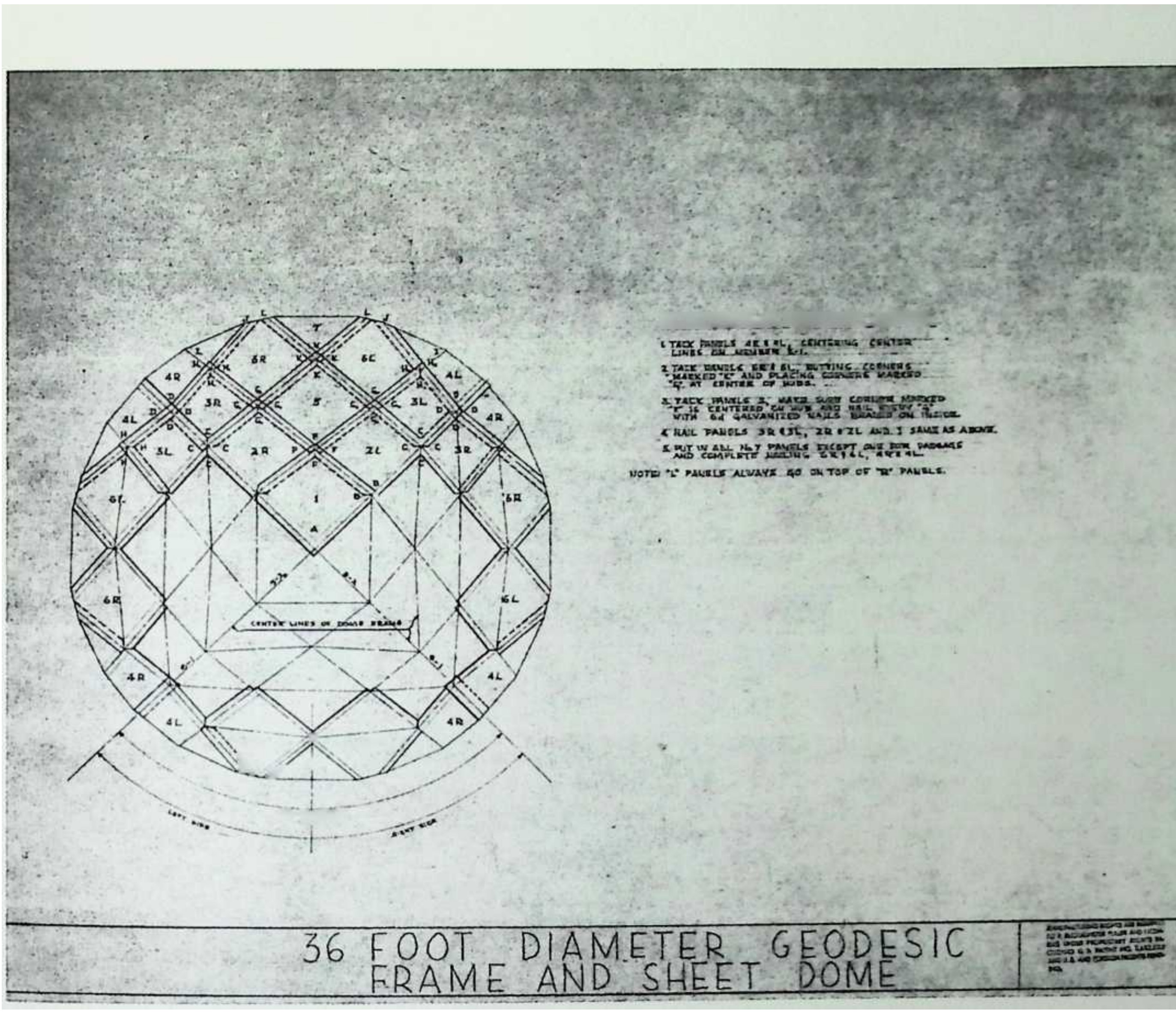
rar

61

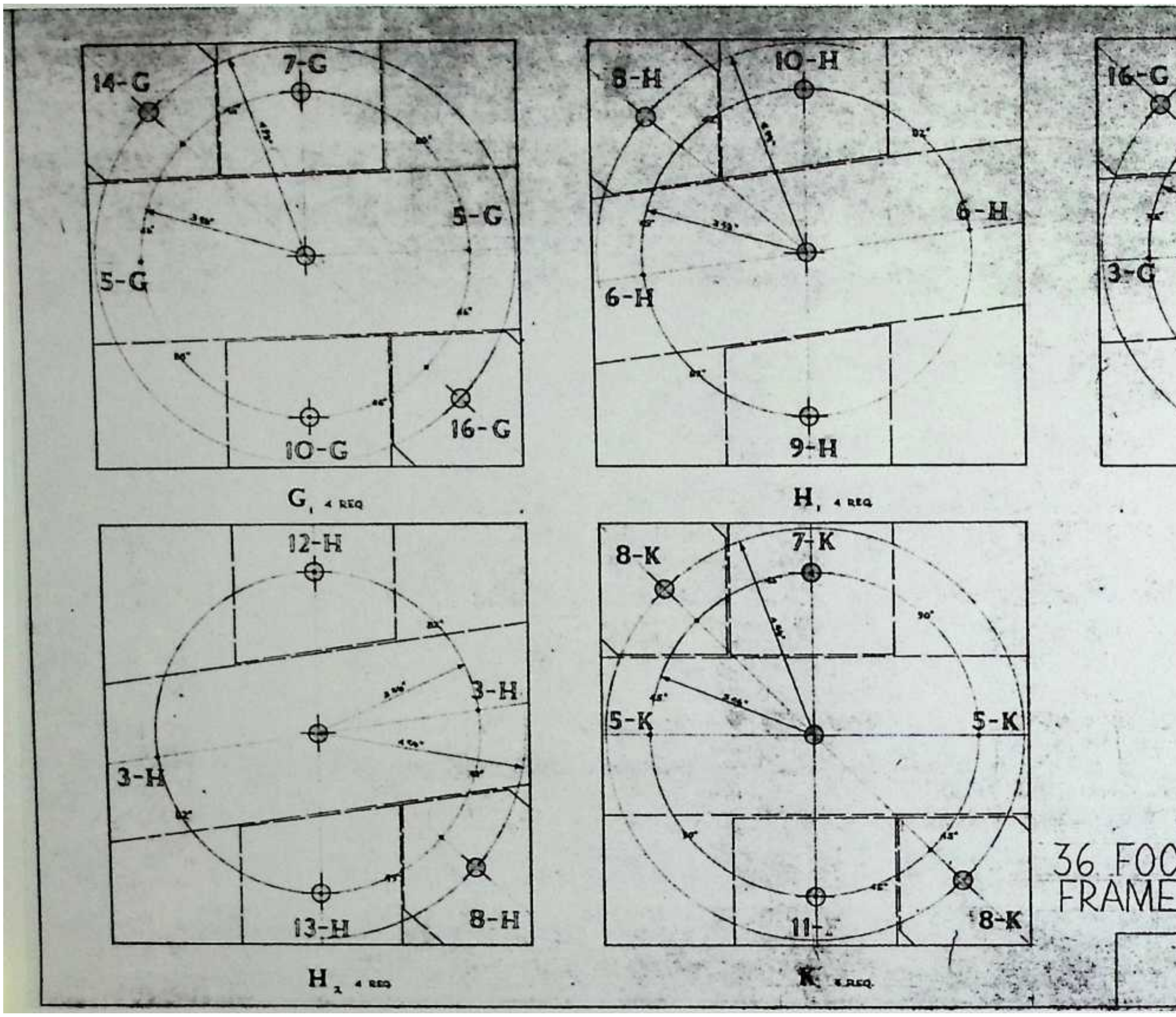
' 6R

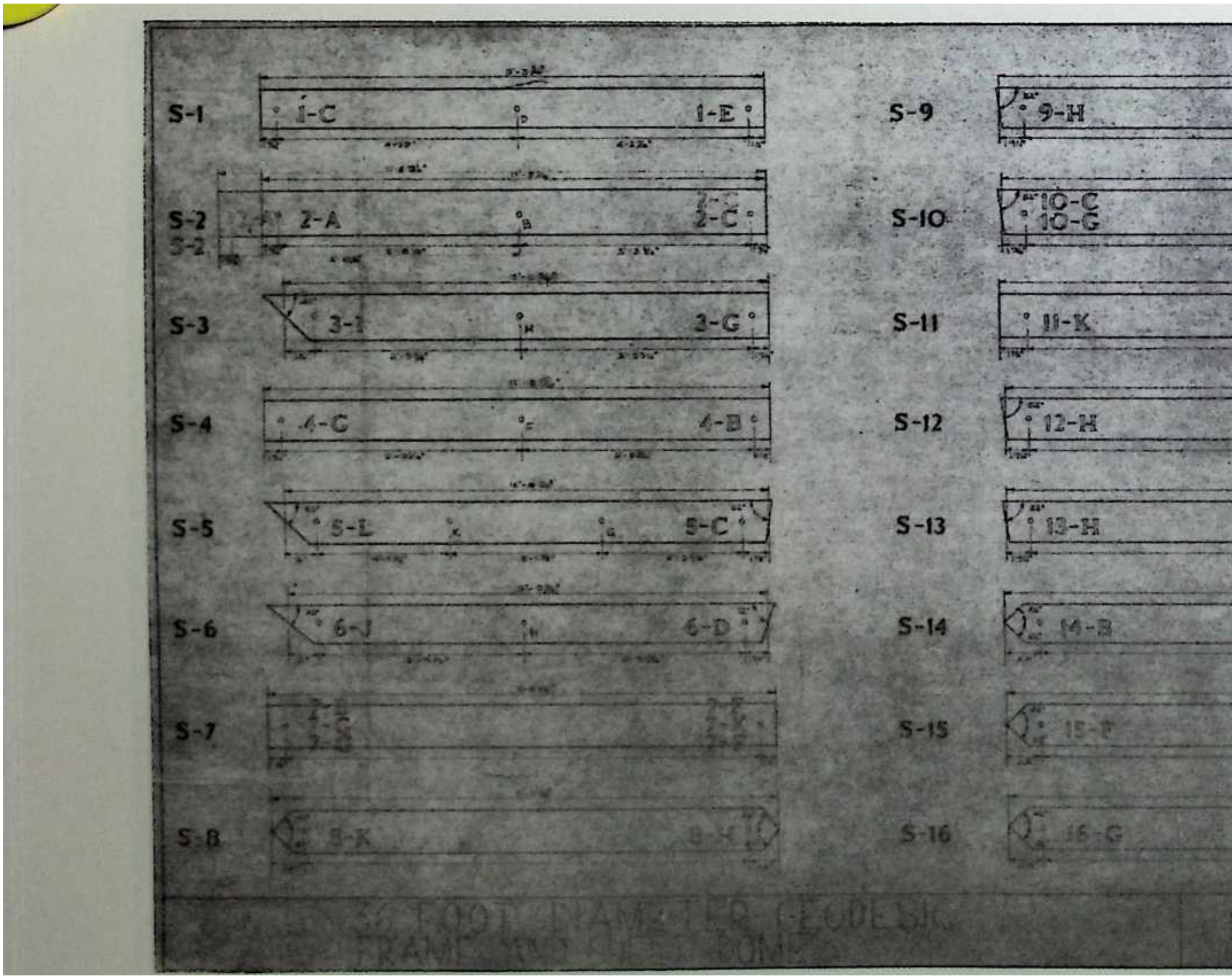
\ 'Z 1

» DOME

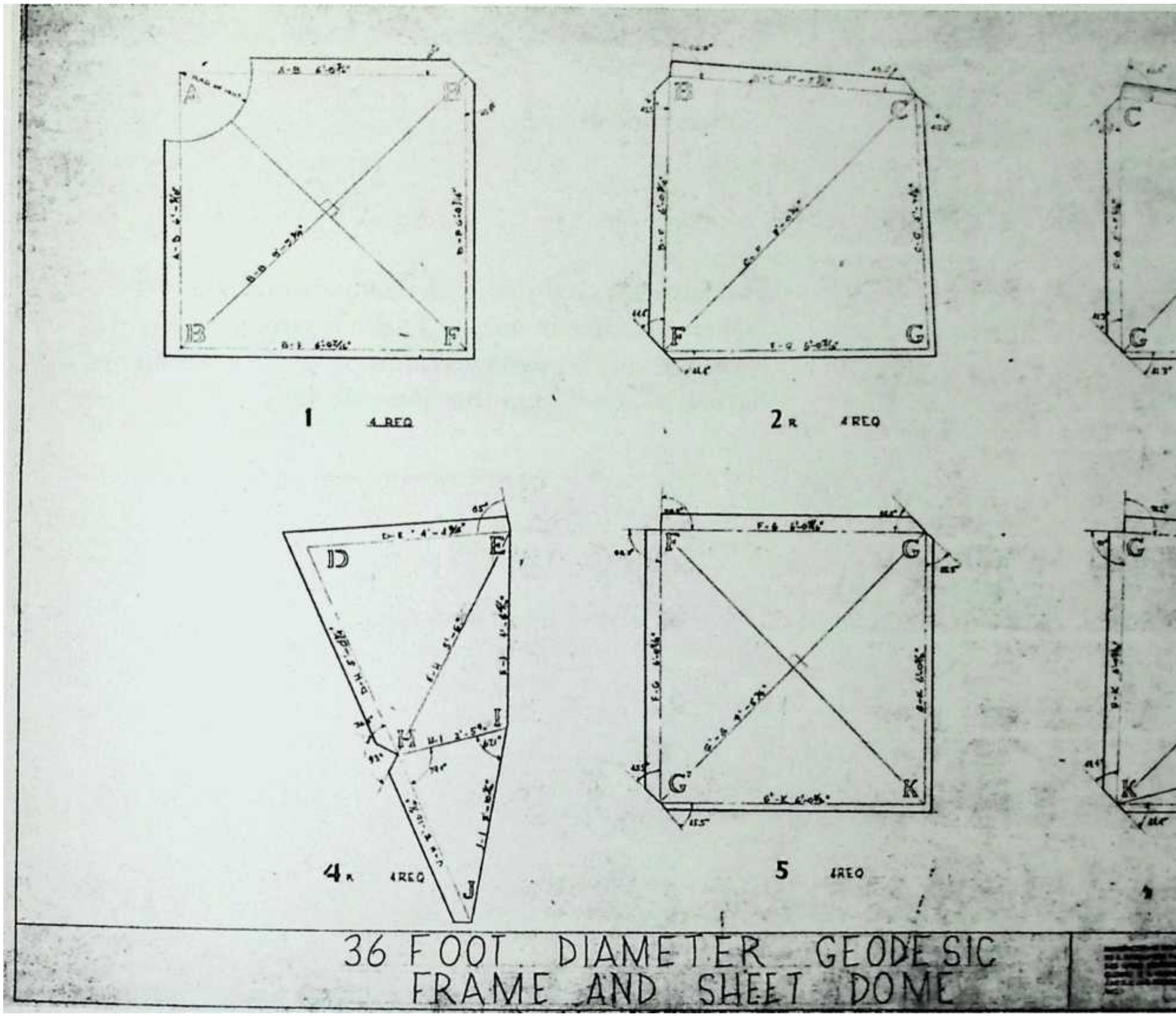


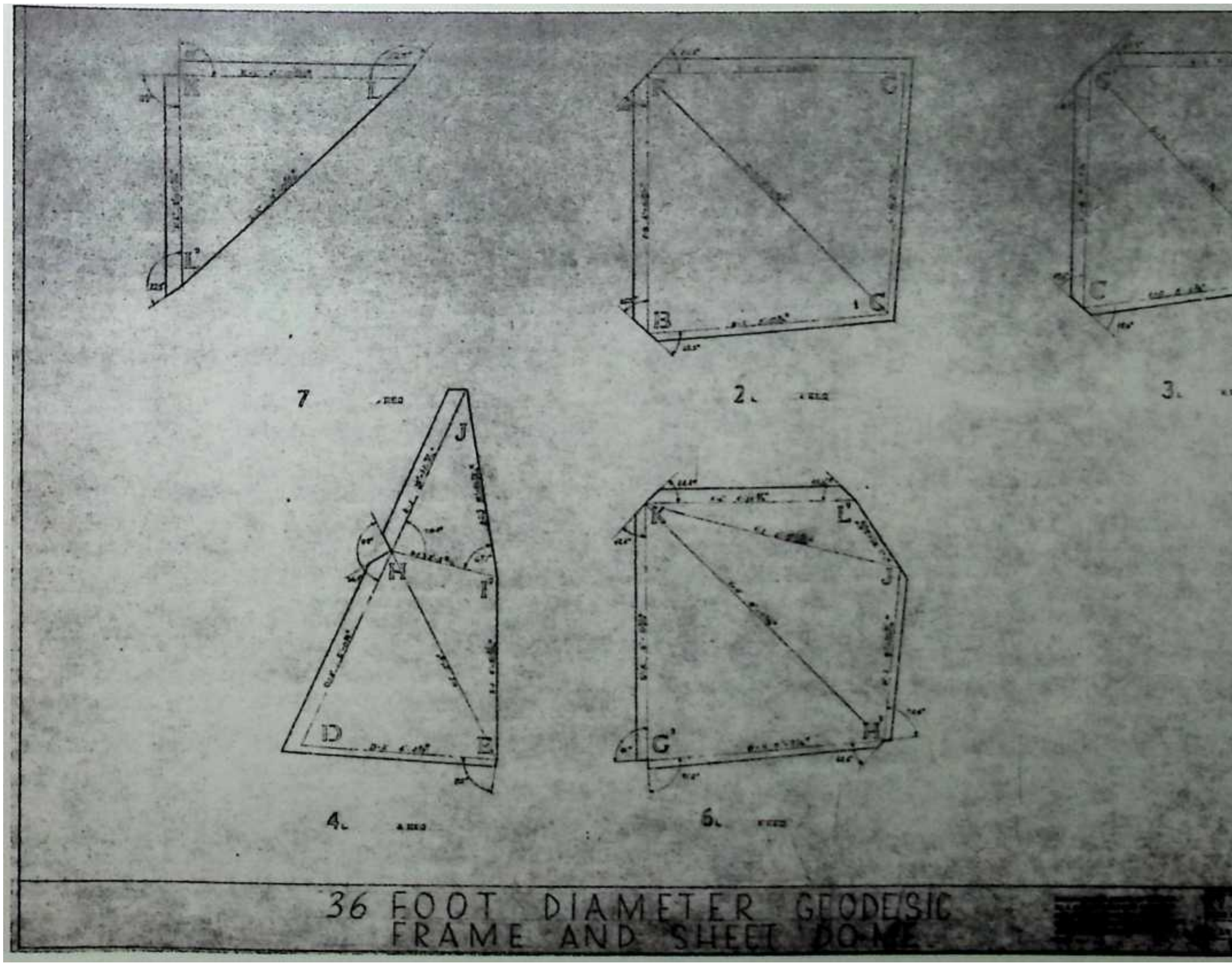
4. NAIL PANELS 3R & 3L, 2R & 2L AND 1 SAME AS ABOVE.
NOTE: "L" PANELS ALWAYS GO ON TOP OF "R" PANELS.
36 FOOT DIAMETER GEODESIC
FRAME AND SHEET DOME

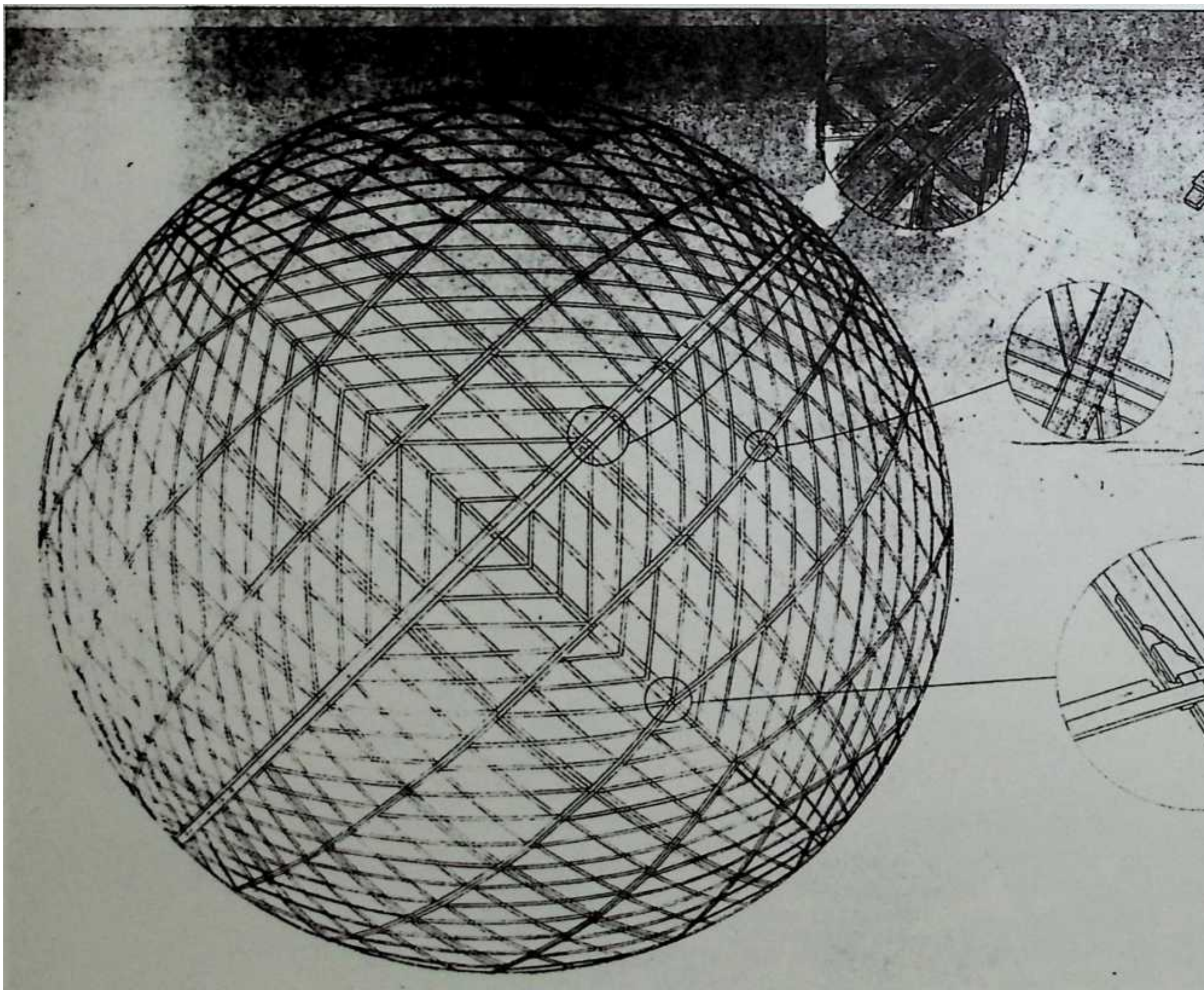

14-G
7-G
5-G
5-G
10-G
16-G
G1 4 REQ
8-H
10-H
6-H
6-H
9-H
H1 4 REQ
16-G
3-G
12-H
3-H
3-H
13-H
8-H
H2 4 REQ
8-K
7-K
5-K
5-K
8-K
K 4 REQ
36 FOO
FRAME



S-1
1-C
1-E
S-2
2-A
2-C
S-3
3-G
S-4
4-C
4-B
S-5
5-C
S-6
6-J
6-D
S-7
S-8
S-9
9-H
S-10
10-C
10-G
S-11
11-K
S-12
12-H
S-13
13-H
S-14
14-B
S-15
S-16
16-G
36 FOOT DIAMETER GEODESIC


1 4 REQ
2R 4 REQ
4R 4 REQ
5 4 REQ
36 FOOT DIAMETER GEODESIC
FRAME AND SHEET DOME


7
2.
3.
4.
6.
36 FOOT DIAMETER GEODESIC
FRAME AND SHEET DOME



Typical Raft System for Thirty-six-Foot Homasote 1958

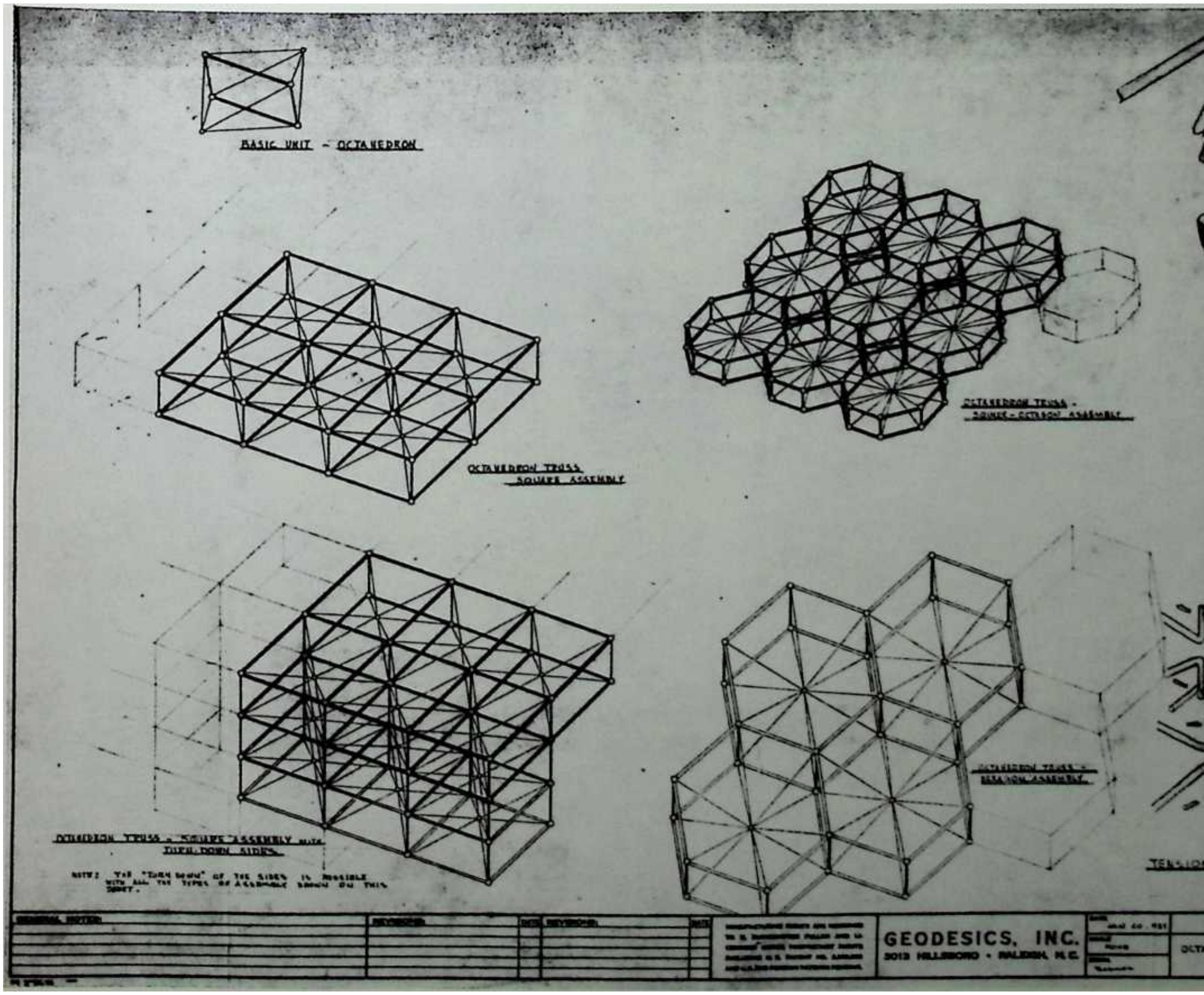
*rmcAc farr fa >**

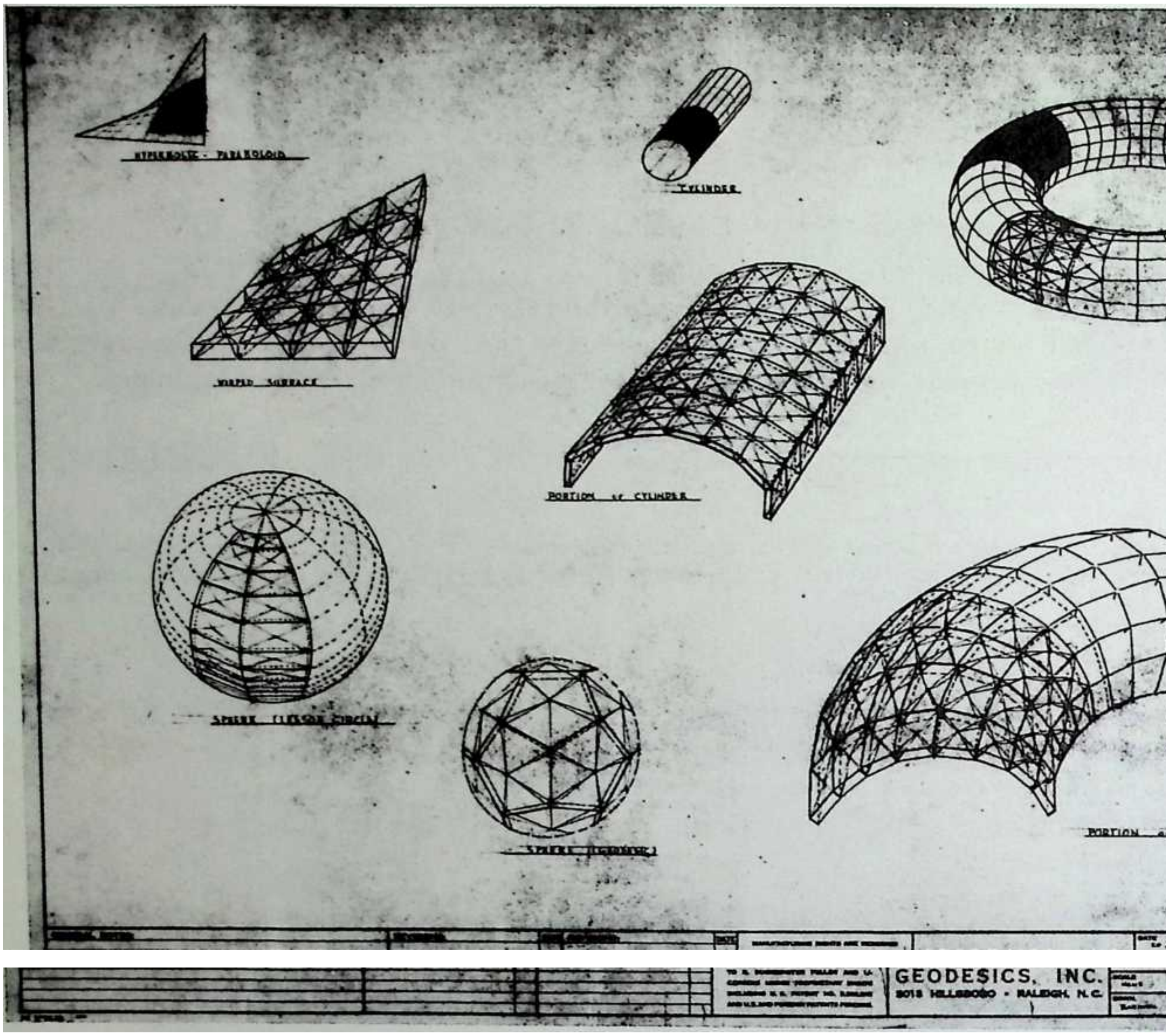
Mr)ASOT£ K'

This complicated dome of narrow wood slats that are tacked together is one of Fuller's strongest wood designs due to the dense overlapping of components. A narrow channel cuts the dome in half.

Octahedron Truss 1959

The octahedron truss, devised as early as 1952, was capable of being shaped into the following geometric volumes: the sphere, the torus, and the cylinder.

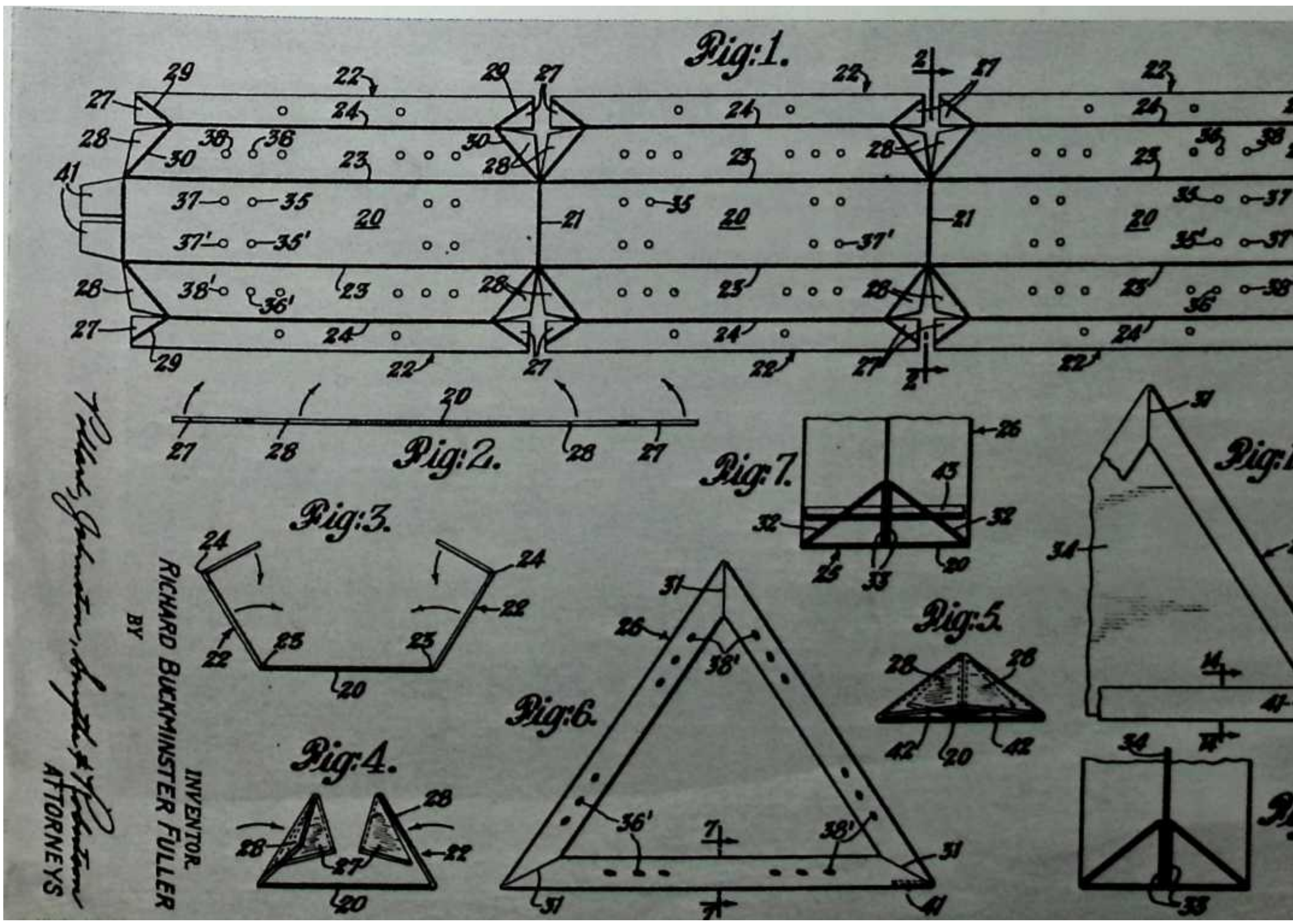

BASIC UNIT - OCTAHEDRON
OCTAHEDRON TRUSS
SQUARE ASSEMBLY
GEODESICS, INC.
3013 HILLSBORO • RALEIGH, N.C.



The paperboard dome affords further proof that economy is the first priority in Fuller's designs. Although less attractive, strong, and durable than aluminum, wood, or steel, paperboard is, nevertheless, far cheaper. Furthermore, paperboard is manufactured all over the world, a fact which should have made Fuller's new dome as ubiquitous as the standard packing crate. If coated with a thin layer of vinyl, it becomes not only much stronger, but also completely weather resistant. It would thus be viable shelter for both the torrid and frigid zones.

Paperboard Dome Patent 4/14/59

The design comprises a grouping of triangular, volumetric frames that are locked together by plastic dowels. Each unit is assembled from a rectangular sheet of corrugated fiberboard, the two smooth outer sheets of which weigh only thirty-eight pounds per 1,000 square feet. The corrugated interior has fifty-five flutes per foot, but the whole is only one-tenth inch thick. The triangular frames have open channels on the interior, into which is inserted a triangular flat panel of paperboard. These domes also have been used as centering to support an outer shell of concrete.



402 THE GEODESIC REVOLUTION, PART 1

April 14, 1959 R. B. FULLER 2,881,717

BUILDINC CONSTRUCTION

April 14, 1959

2,881,717

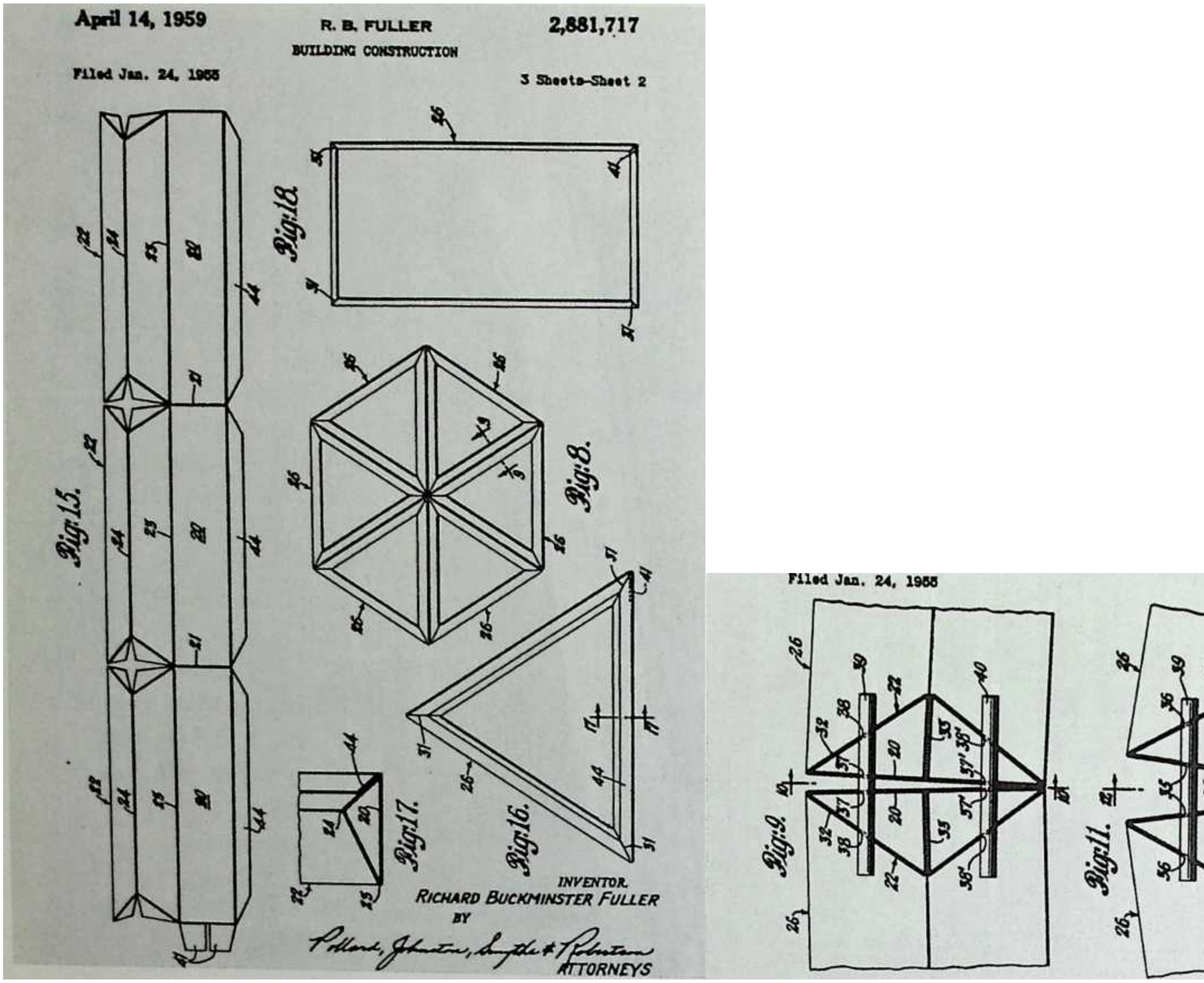
Fll»4 Ju. 24, 1988

3 Sbsats-Shaat 3

OHNFYS

R. B. FULLER

BUILDING CONSTRUCTION



Plydome Patent 9/22/59

Plywood of any thickness is much stronger than paperboard. Moreover, plywood need not be weatherproofed to survive. Perhaps for these reasons, Fuller developed the plydome. Clearly more expensive than paperboard, plywood, nevertheless, can be constructed into a dome of greater design elegance. With the help of trigonometry, one can locate holes along the edges *of* rectangular plywood panels that are easily bent and bolted into a dome.

Sept. 22, 1959 r. q. fuller 2,905,113

SELF-STRUTTED GEODESIC PLYDOME

Filed April 22, 1957 3 Sheets-Sheet 1

INVENTOR.

Ihnngs, ncHAAD Buckminster fuller

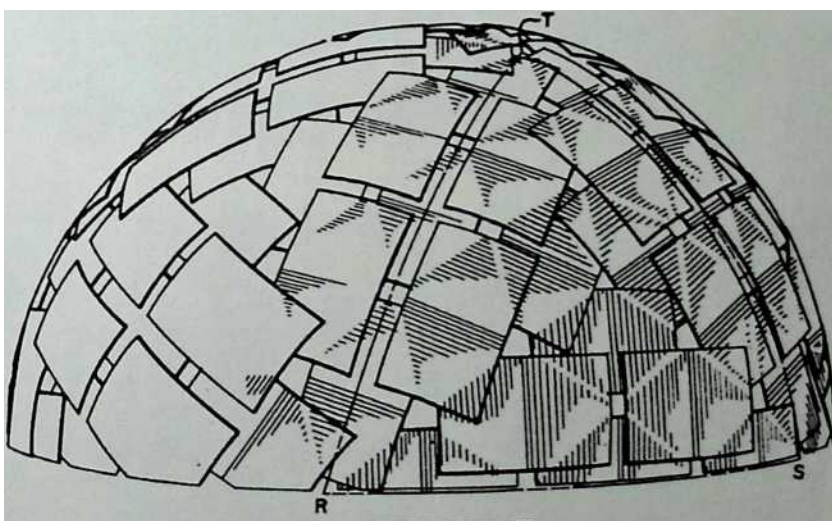
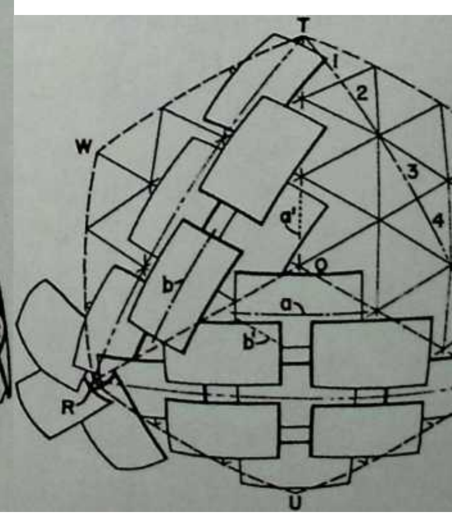
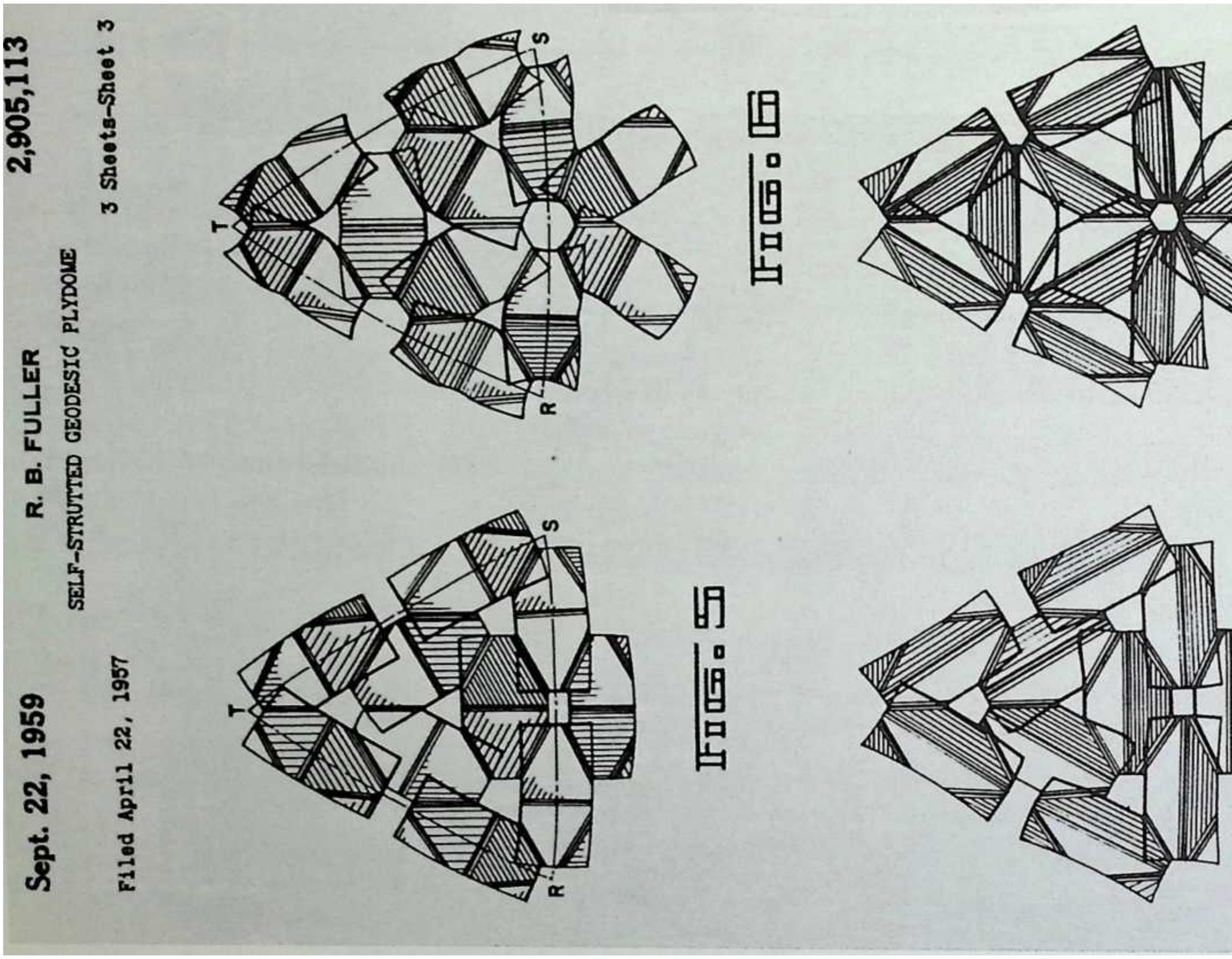


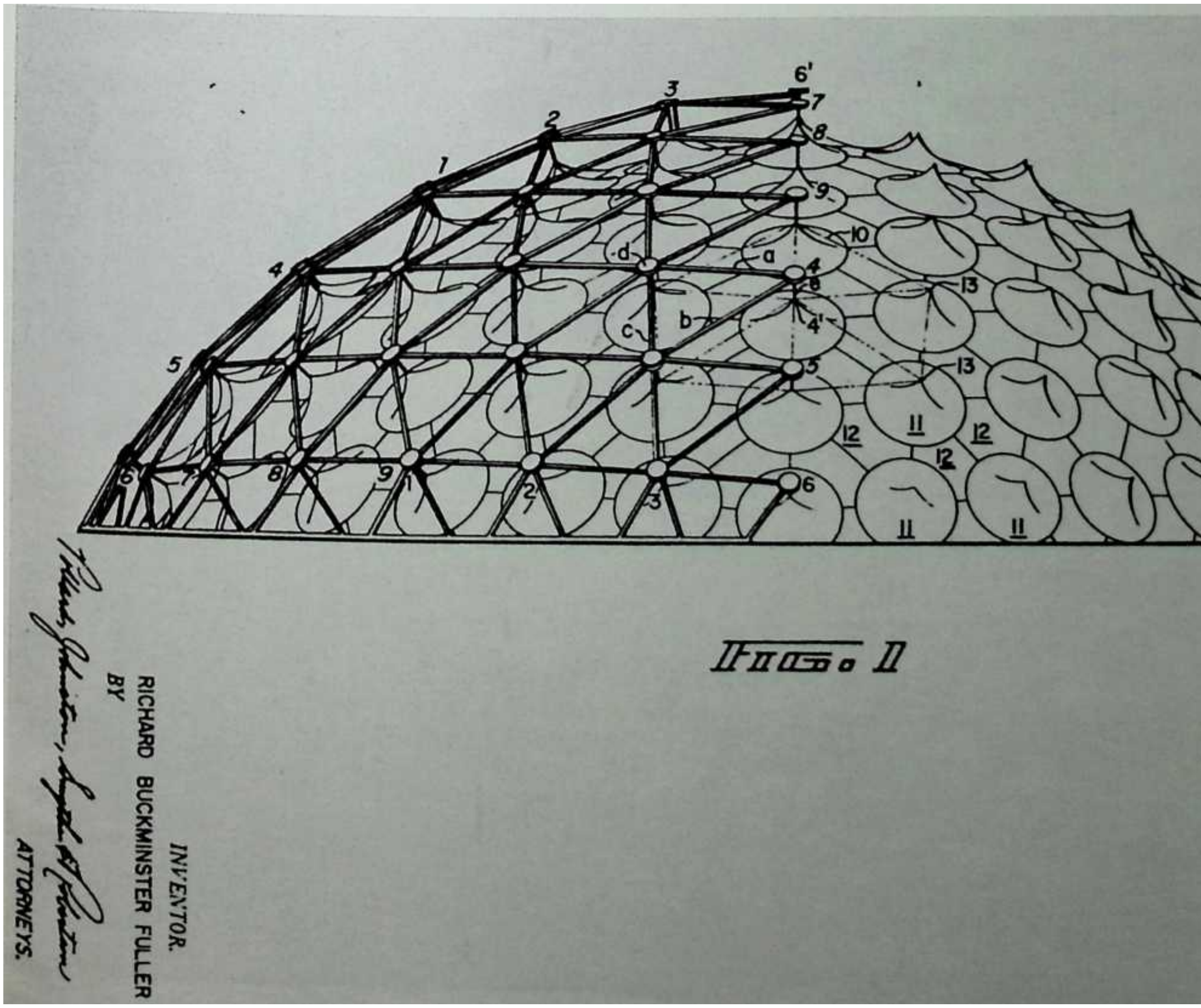
FIG. 1





Catenary Geodesic Tent Patent 11/24/59

This aptly named invention hangs on small chains from the vertices of a standard, aluminum geodesic dome. These chains are pulled through openings in the hubs of the aluminum frame until the tent is taut. The tent itself is tailored to produce hyperbolic paraboloids, the vertices of which are contiguous with those of the frame. The benefit of this design is the complete stability of the hanging tent—whether it is made of canvas or molded fiberglass—under the stresses of ambient winds. (See Homestyle Center Foundation, Geodesic Exhibition House.)



NOT. 24, 1959

ni«d March 1, 1967

R. B. FULLER

GEODESIC TENT

2,914,074

4 Sh»at»-Sh««t 2

It n as a 3

Nov. 24, 1959 r. b. fuller 2,914,074

GEODESIC TENT

FlUd March 1, 1957 4 ShMta-Sbuat 3

Nov. 24, 1959

R. B. FULLER

GEODESIC TENT

2,914,074

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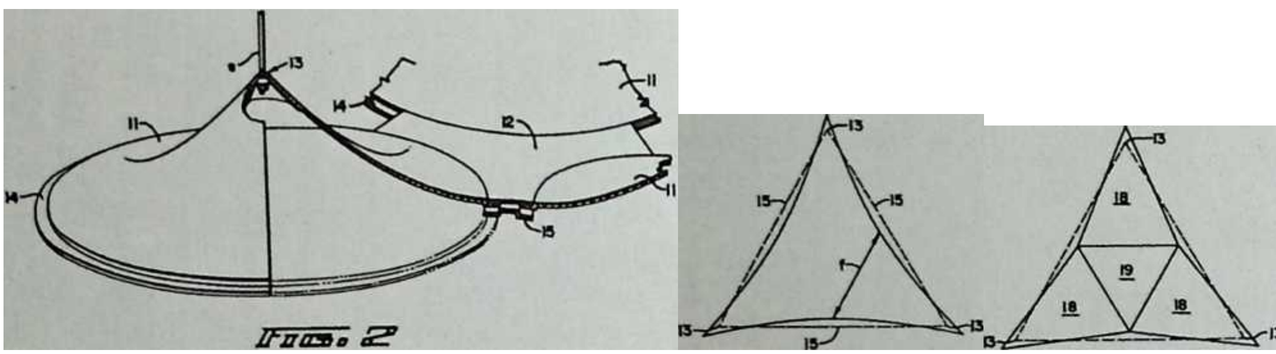
INVENTOR.

RICHARD BUCKMINSTER FULLER

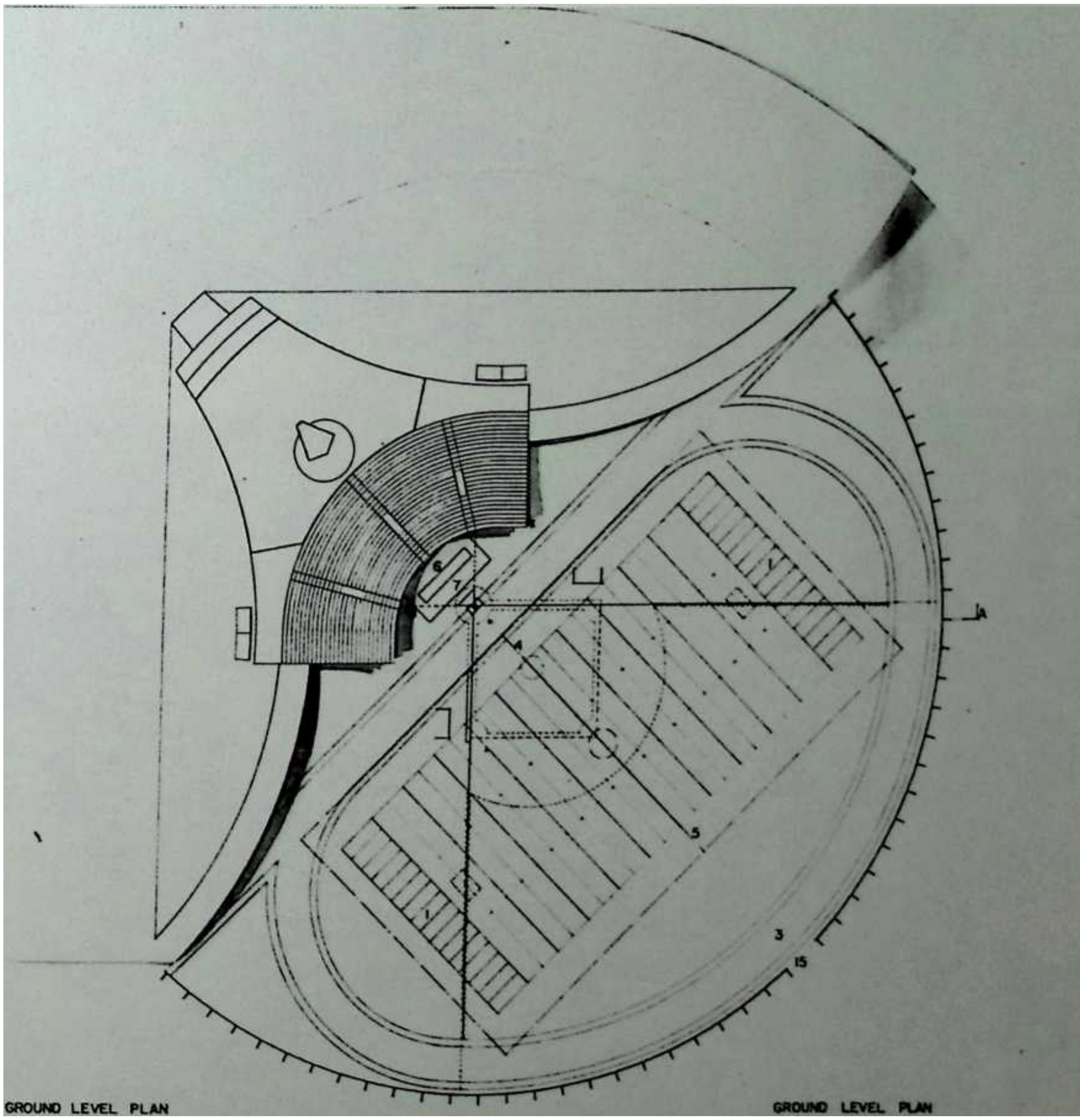


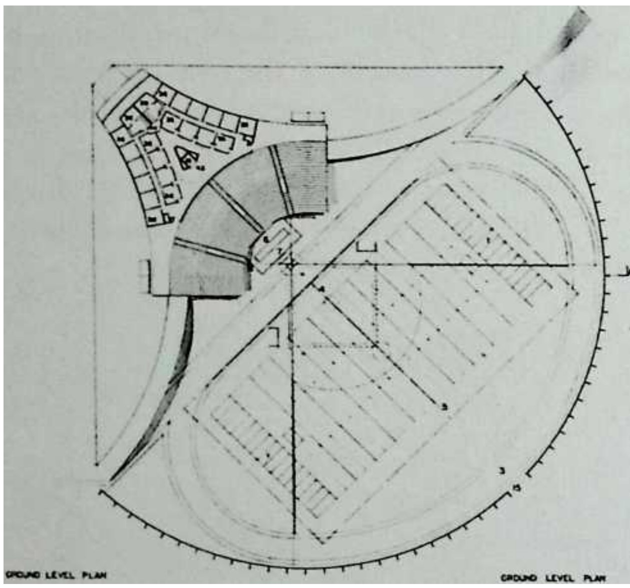
U.S. Air Force Academy Field House

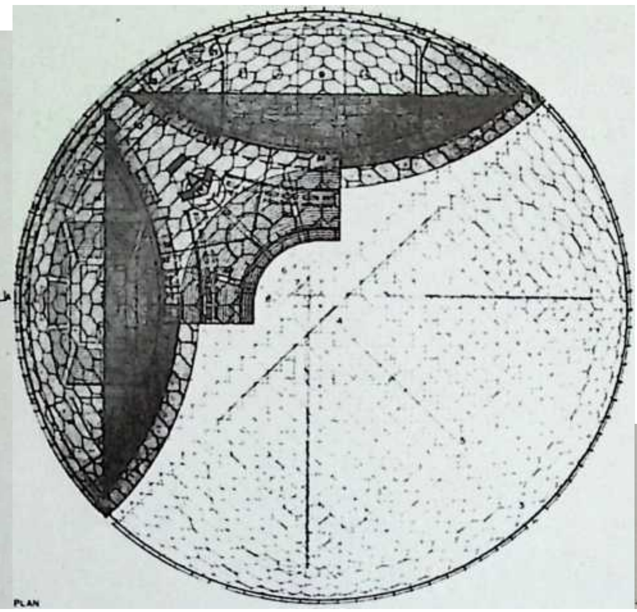
1959

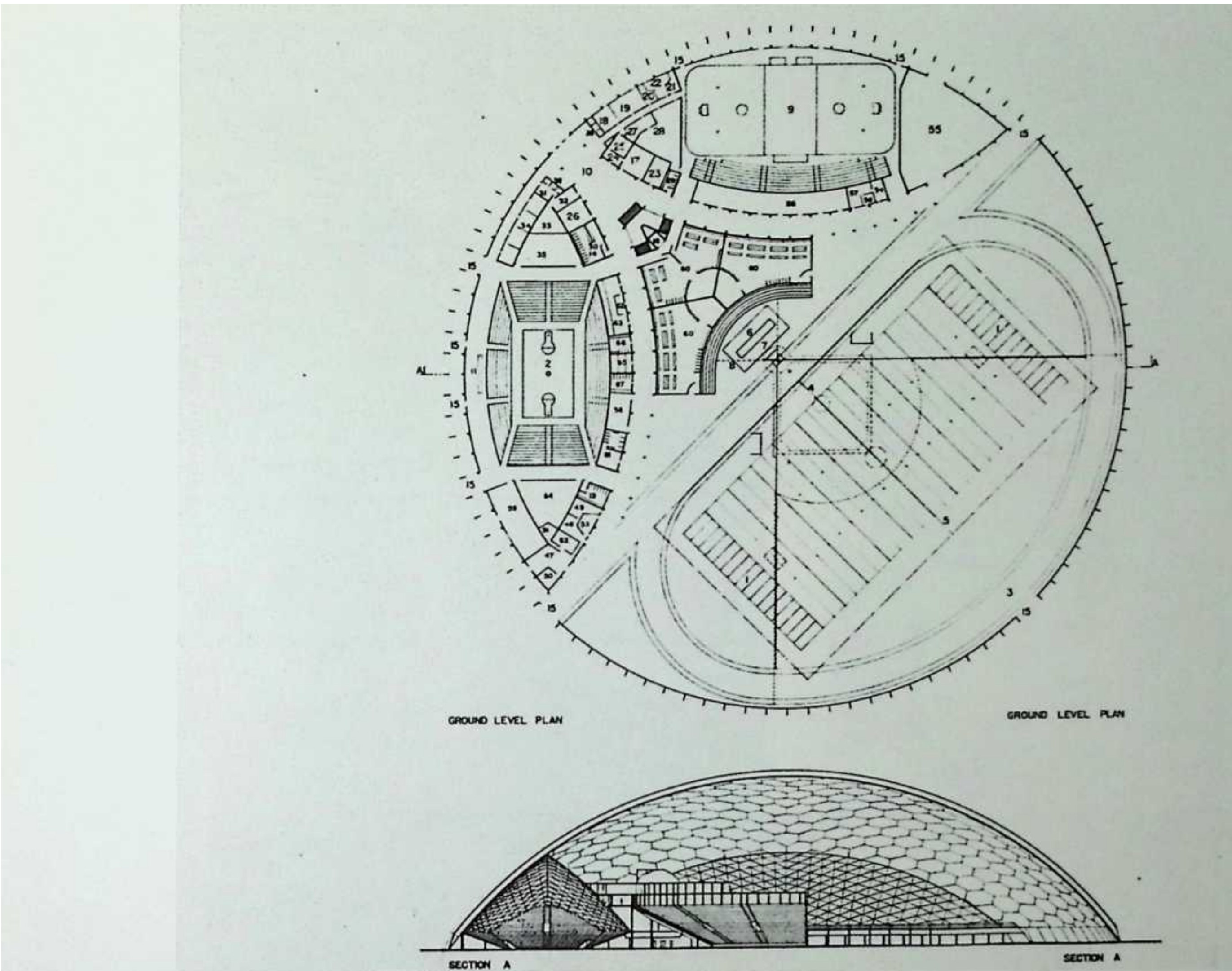
The field house would have been large enough to accommodate a football field surrounded by a running track, a basketball stadium, a hockey rink, portable fencing and wrestling floors, portable viewing stands, and a permanent triangular core housing offices and lockers. The diameter of the dome would have been 400 feet.

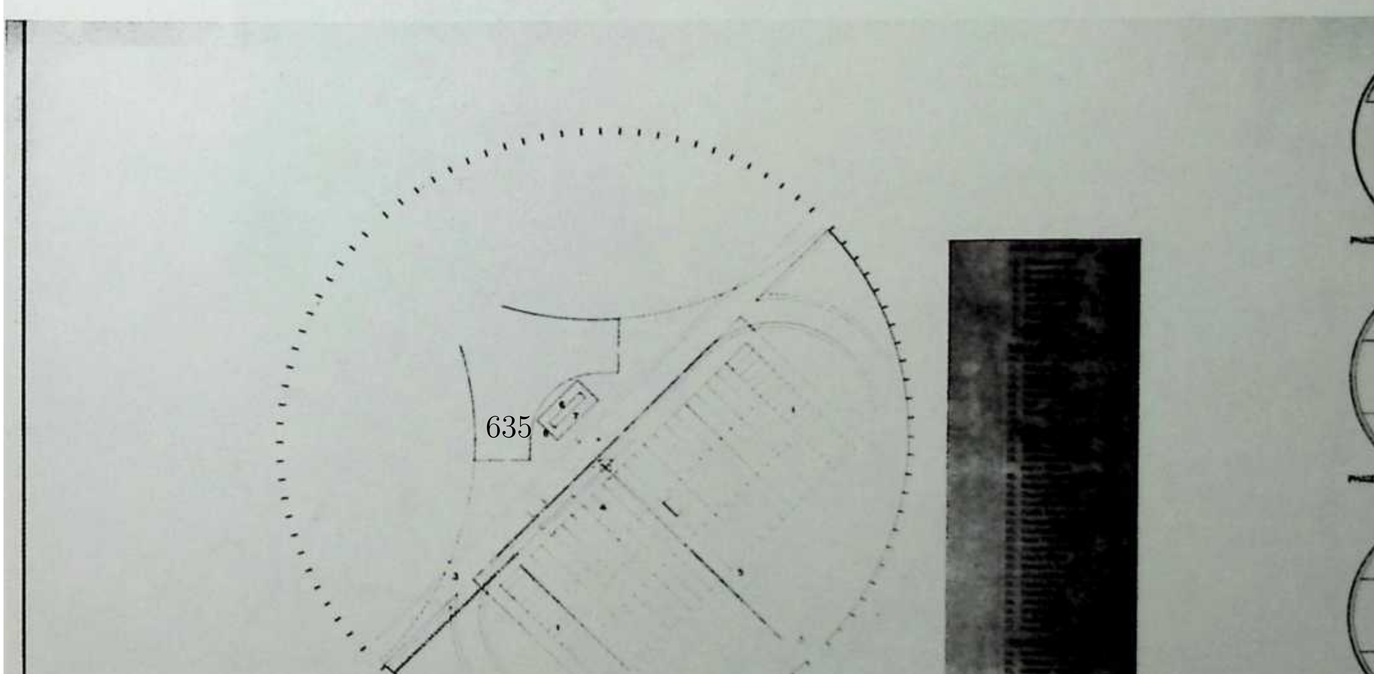
SECTION A SECDON A


GROUND LEVEL PLAN
GROUND LEVEL PLAN


GROUND LEVEL PLAN
GROUND LEVEL PLAN


PLAN


GROUND LEVEL PLAN
GROUND LEVEL PLAN
SECTION A
SECTION A



Museum of Modern Art

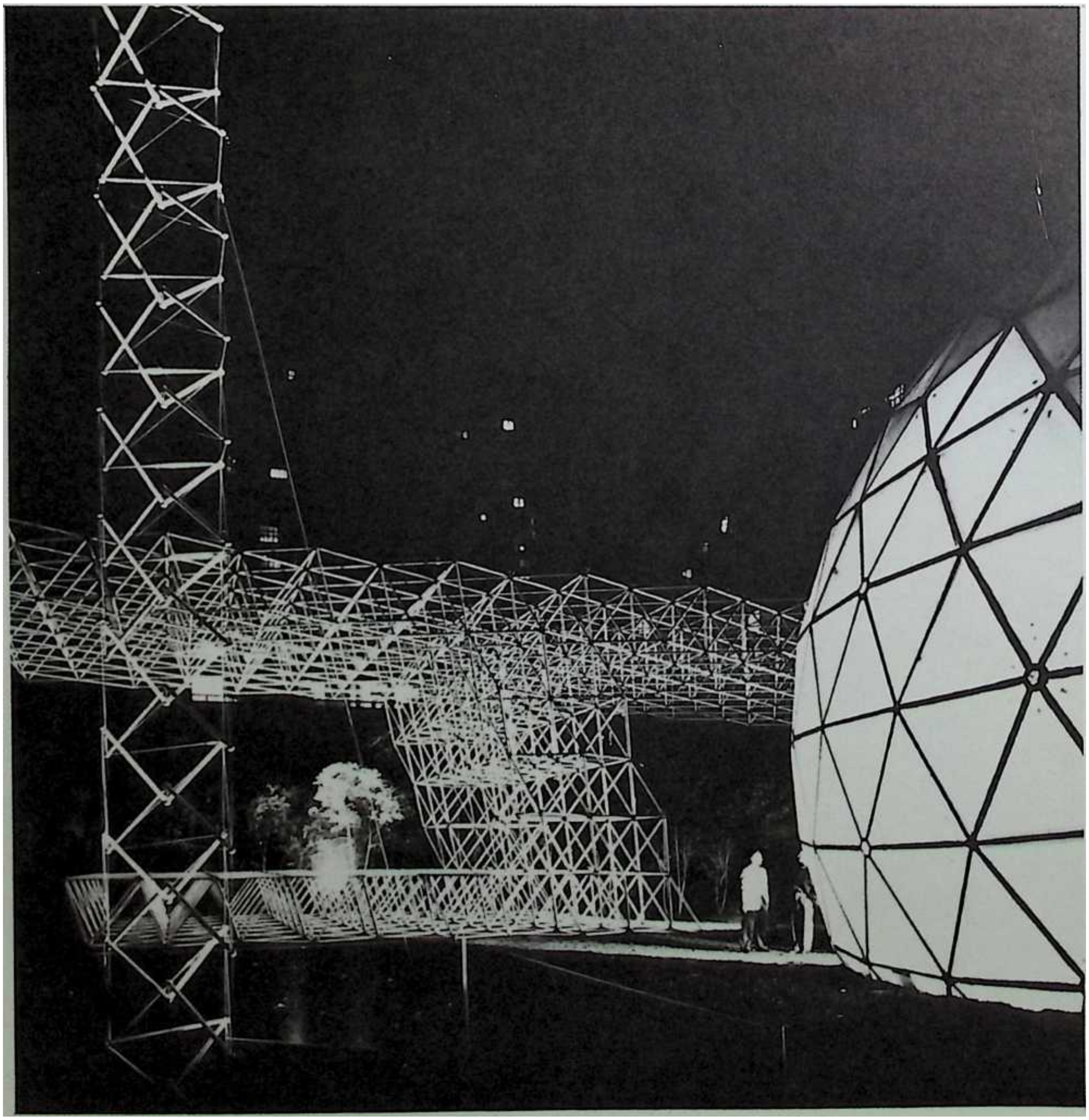
Octahedron-Tetrahedron

Truss and Tensegrity Mast

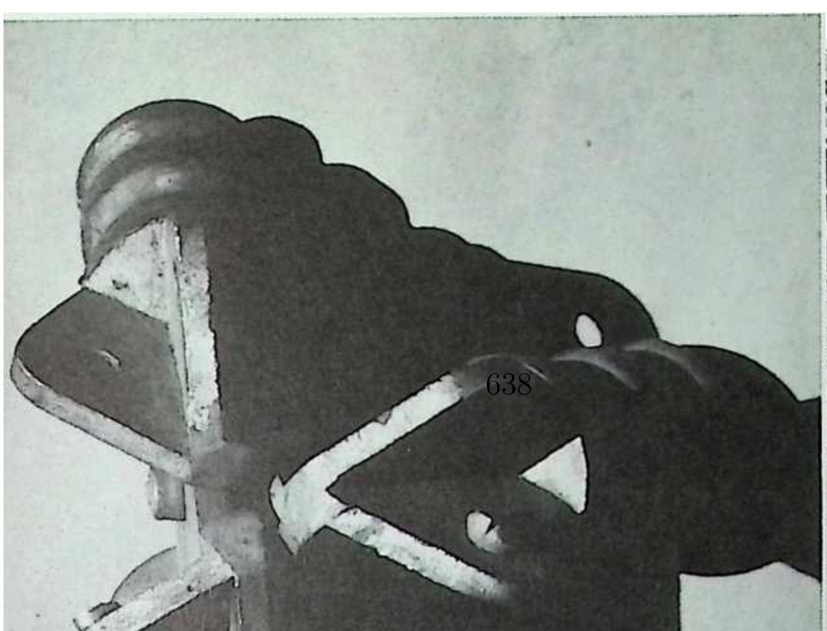
1959

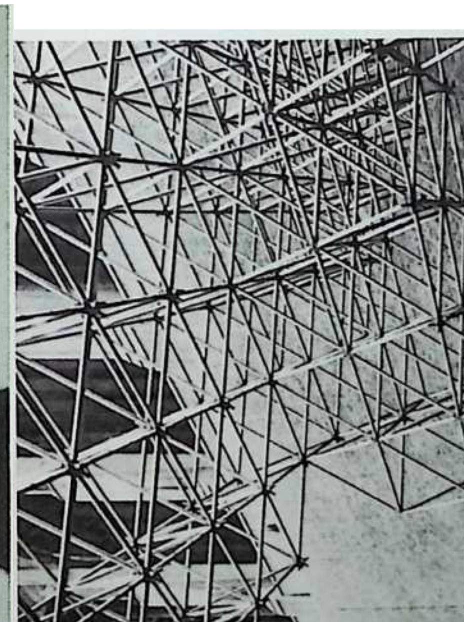
The strength and lightness of the octahedron-tetrahedron truss was demonstrated most effectively by the one Fuller installed at the Museum of Modern Art (MOMA) in New York in 1959. Practically filling the width of the garden designed by Philip Johnson, the h- shaped truss impressed the viewer with the fifty-foot span of its lintel that was cantilevered twenty feet above the marble pavement.

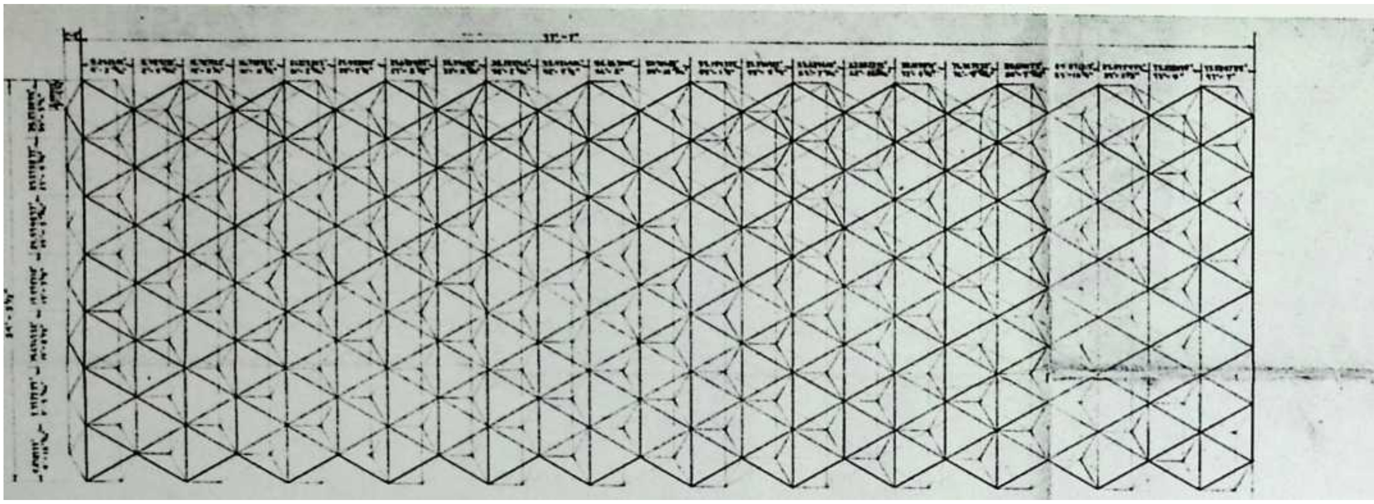
The tensegrity mast was another work exhibited by Fuller in the MOMA exhibition. Although quite impressive when installed in the museum's garden, it provided an even greater spectacle when carried by Fuller's assistants through the streets of Manhattan.



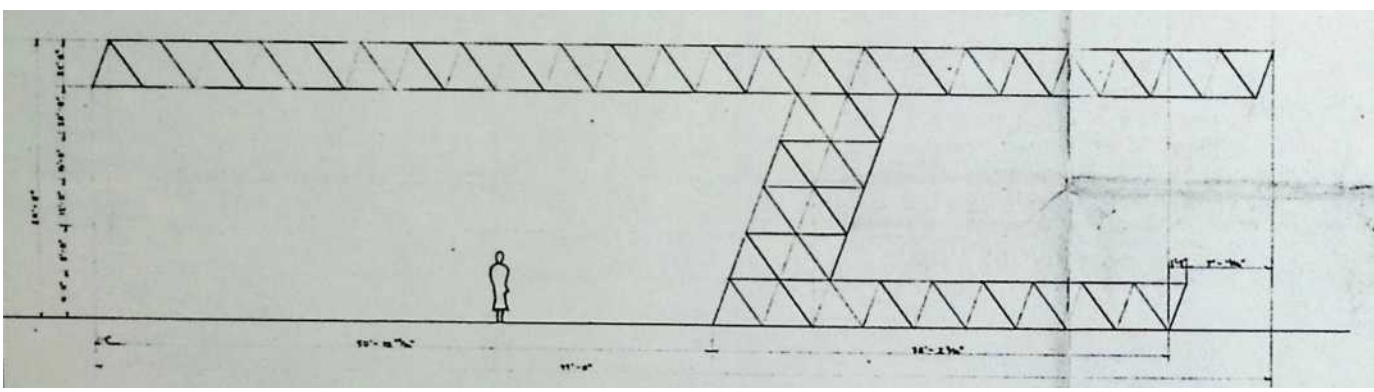
THE GEODESIC REVOLUTION, PART 1 411



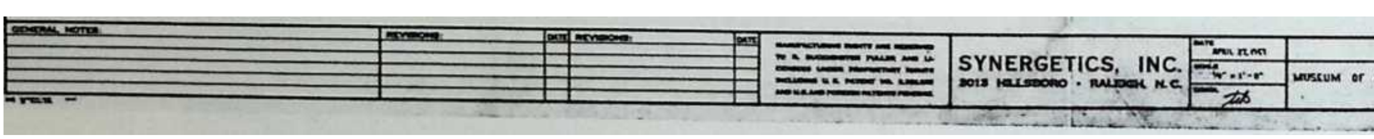


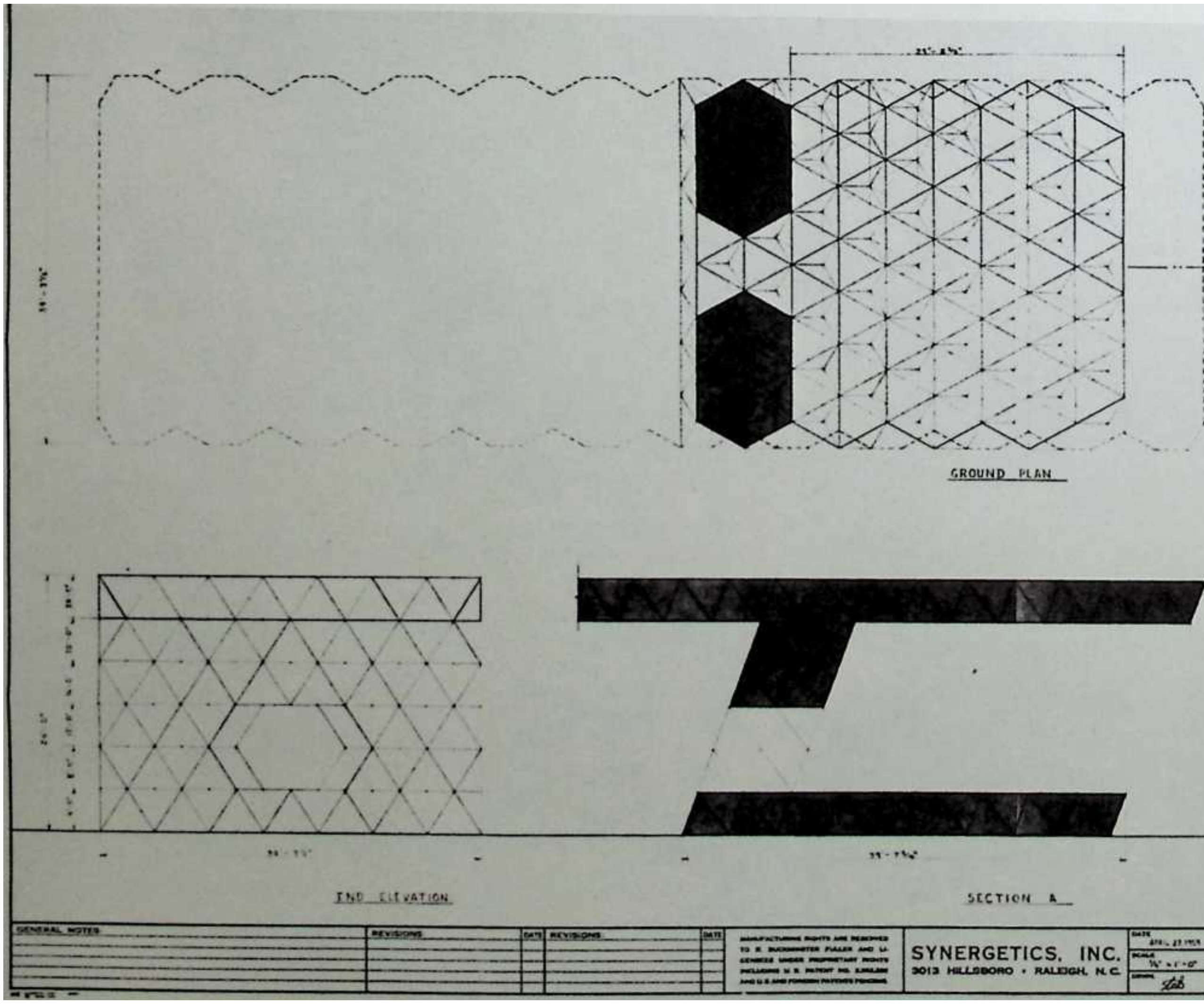


PLAN Itof view)



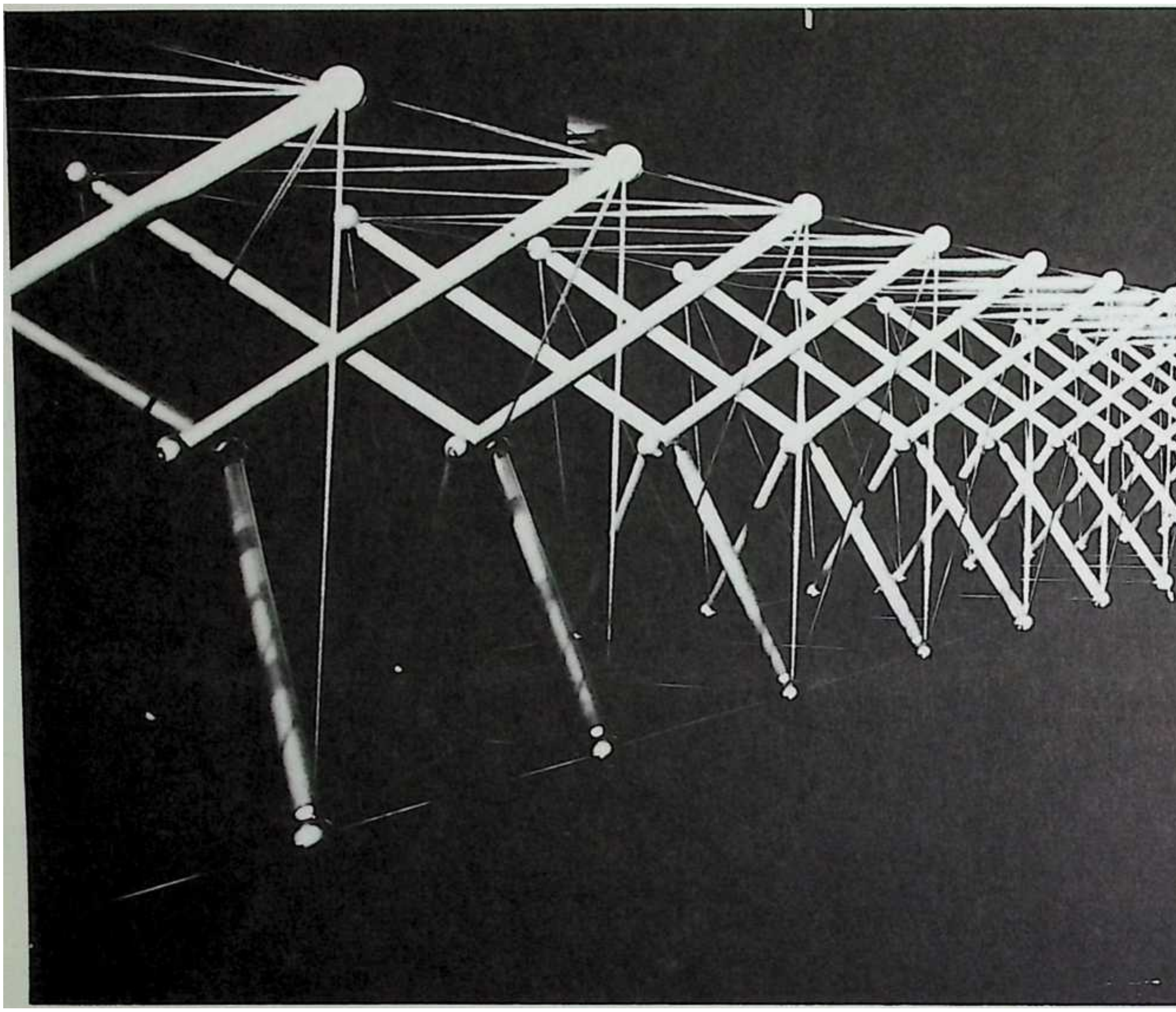
ELEVATION

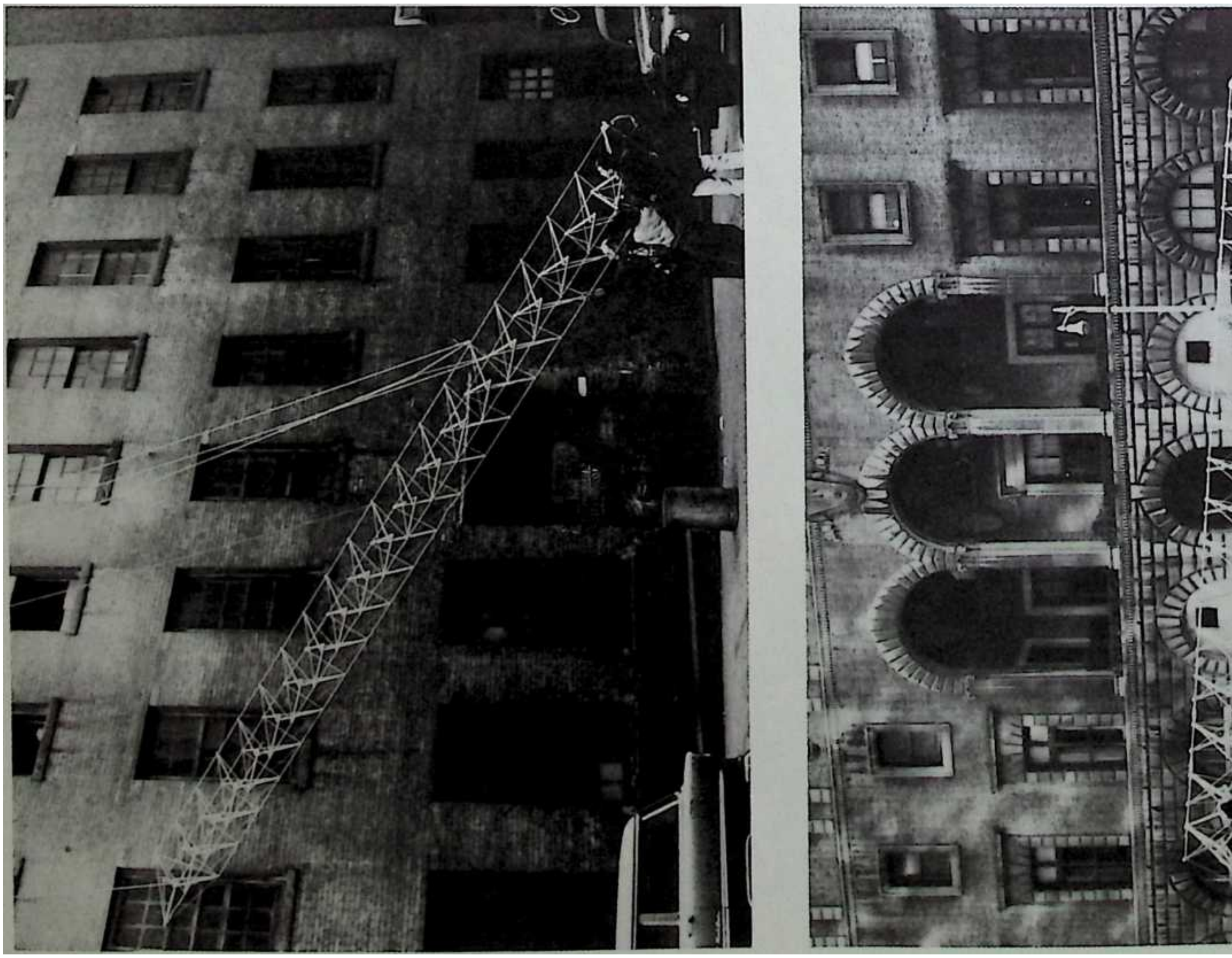




Tensegrity Mast

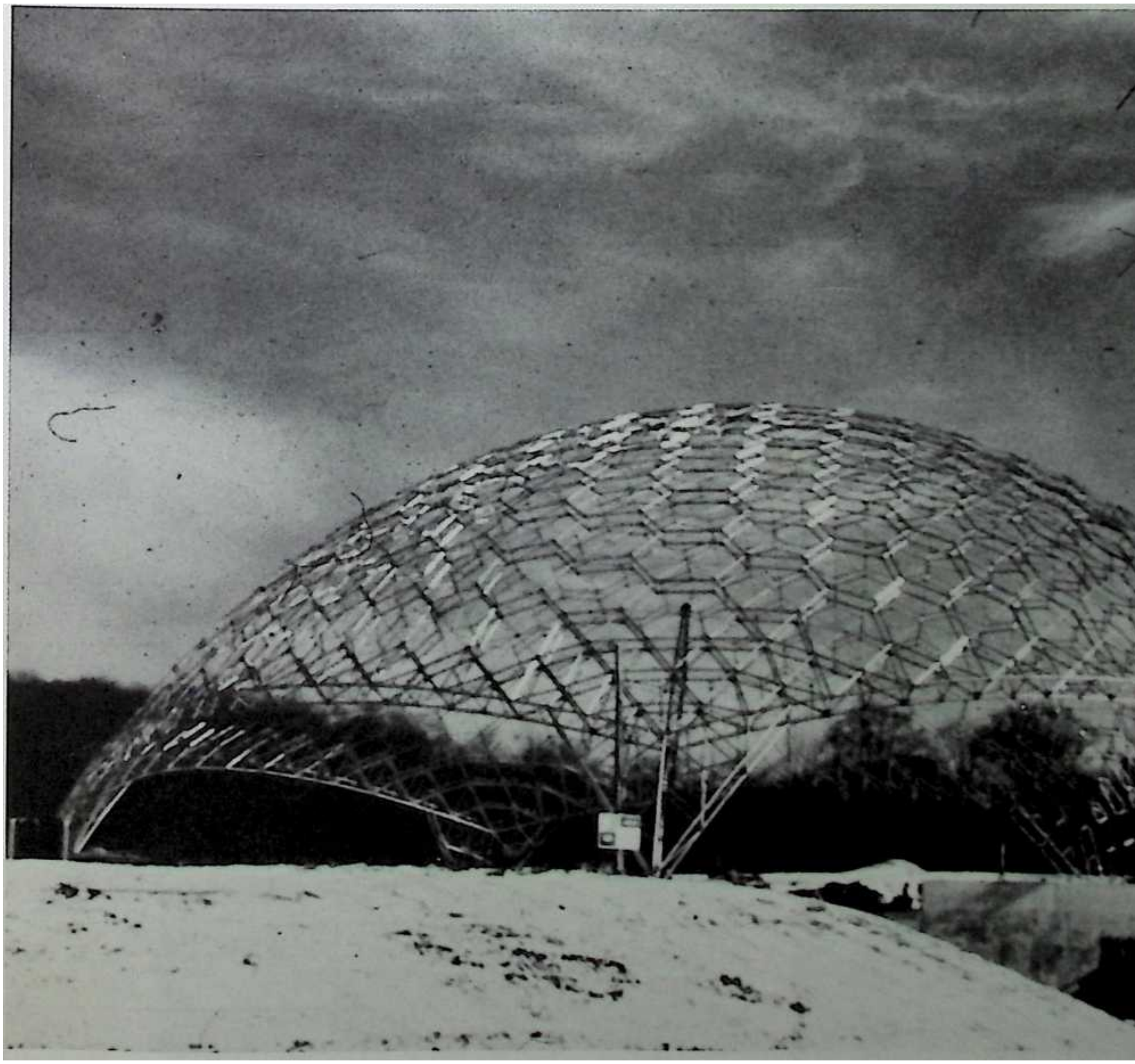
Installation at MOMA 1959





Dome by Synergetics for the North American Aviation Company Erected over the Buildings and Grounds of the National Headquarters of the American Society for Metals, Cleveland, Ohio, 1959

Synergetics, a Raleigh, North Carolina company, produced the design for this umbrellalike geodesic dome supported on five triangular trusses. The dome's edges curve gently upward from these supports, showing Fuller's attempt in later domes to achieve architectural effects. The dome straddles the headquarters of the American Society for Metals.



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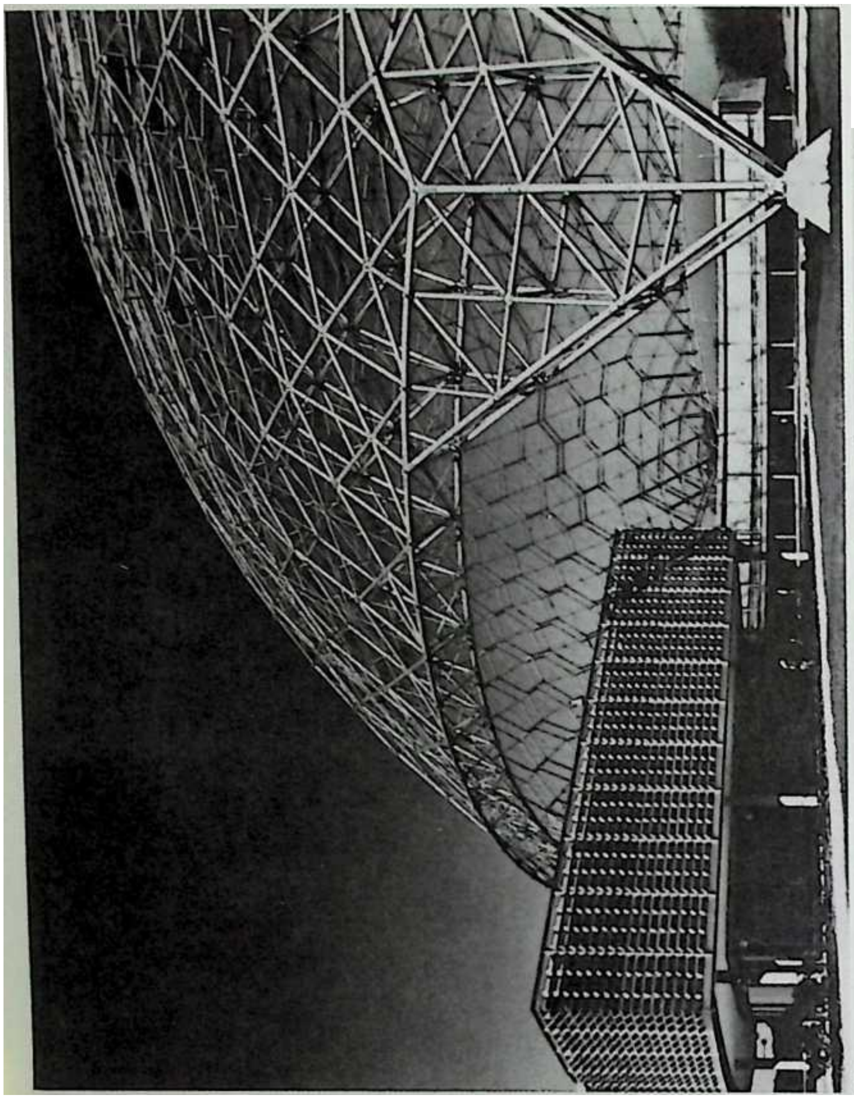

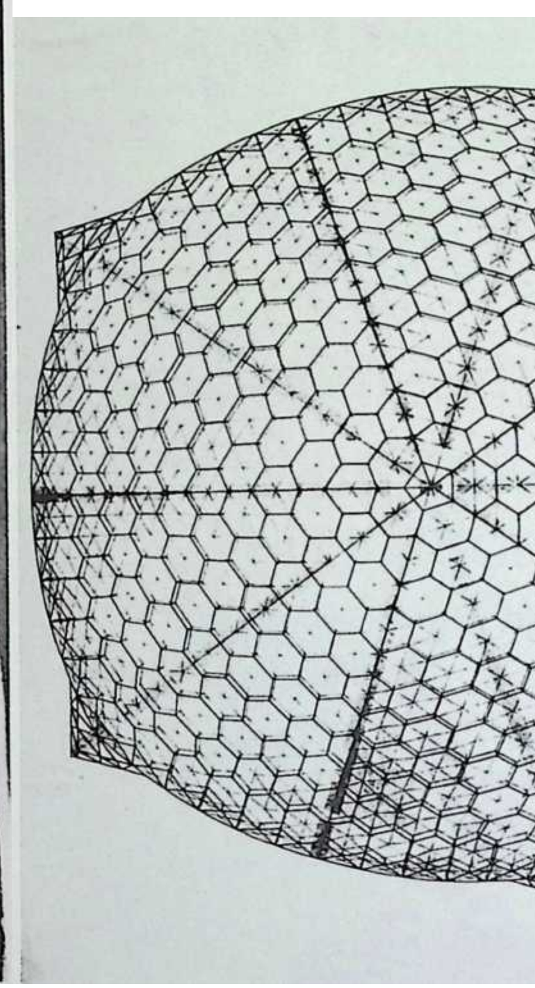

List of Figures

List of Tables

Todo list