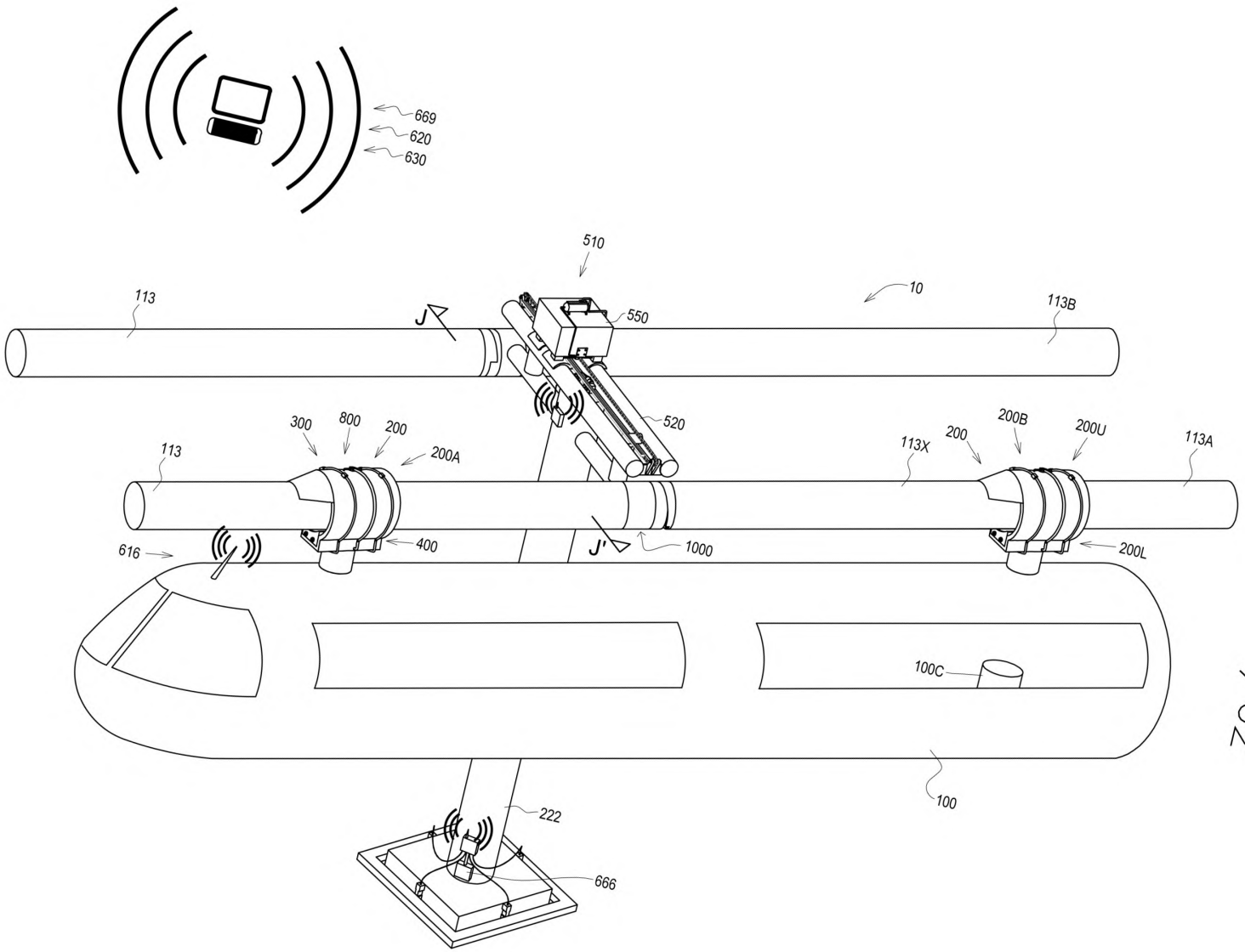

669
620
630
510
10
113
113B
J
550
520
300
800
200
200A
113
113X
200
200B
200U
113A
616
400
J'
1000
200L
100C
100
222
666

Fig. 1

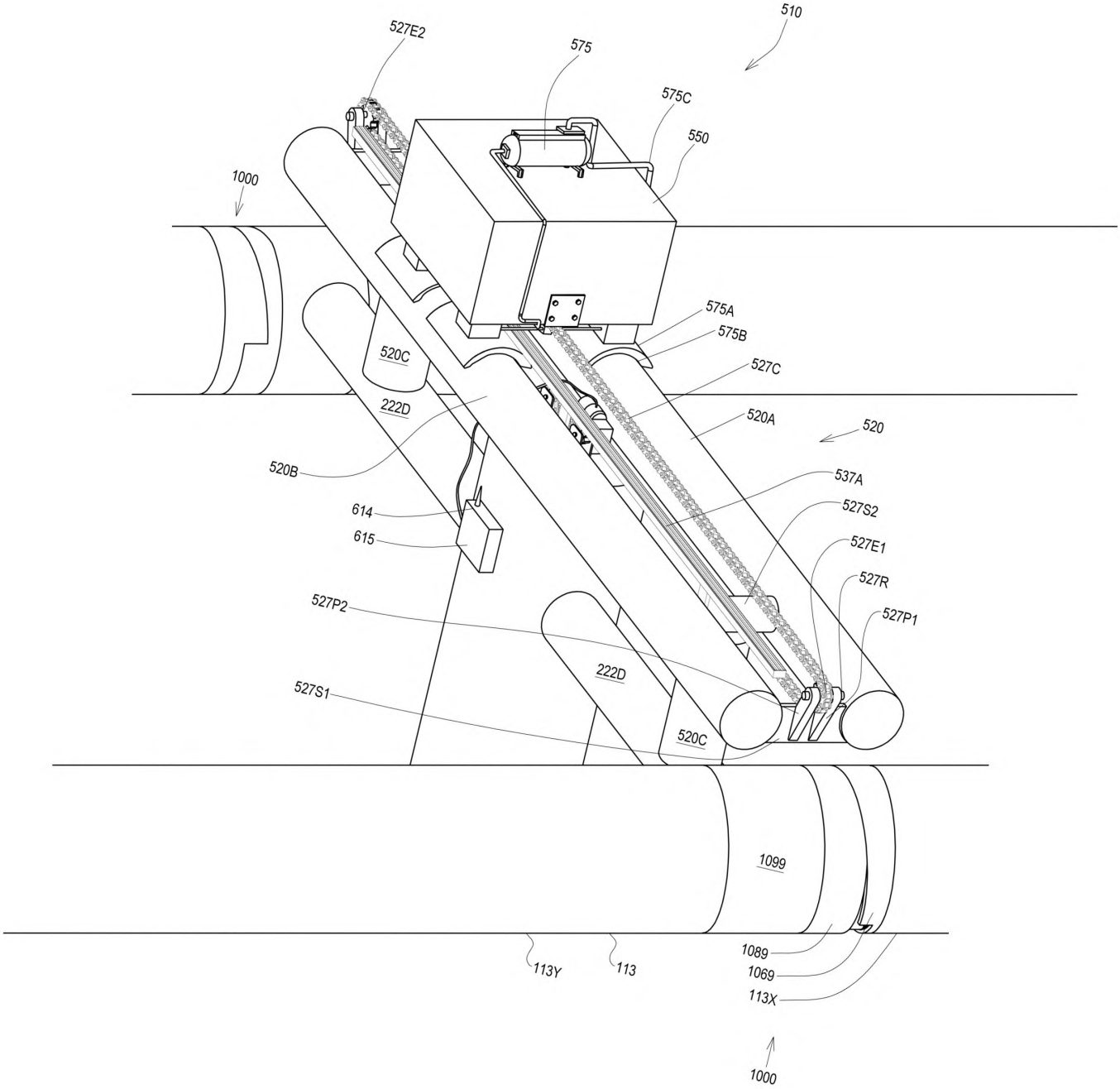

510
527E2
575
575C
550
1000
575A
575B
527C
520C
222D
520A
520
520B
537A
614
527S2
615
527E1
527R
527P2
527P1
222D
527S1
520C
1099
1089
113Y
113
1069
113X
1000

Fig. 2A

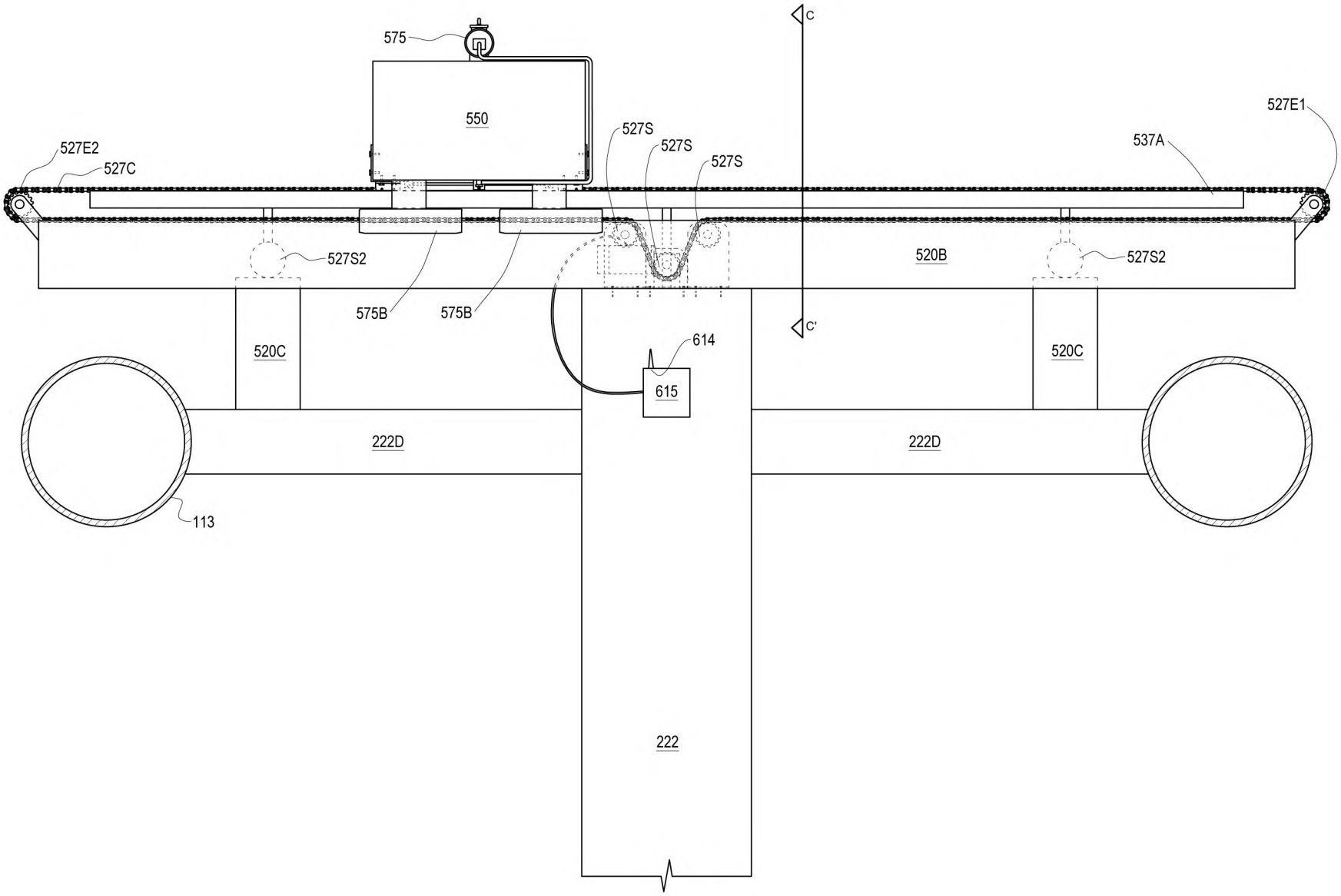

575
550
527S
527S
527S
527E2
527C
537A
527E1
527S2
520B
527S2
575B
575B
C
C'
614
615
520C
520C
222D
222D
113
222

Fig. 2B

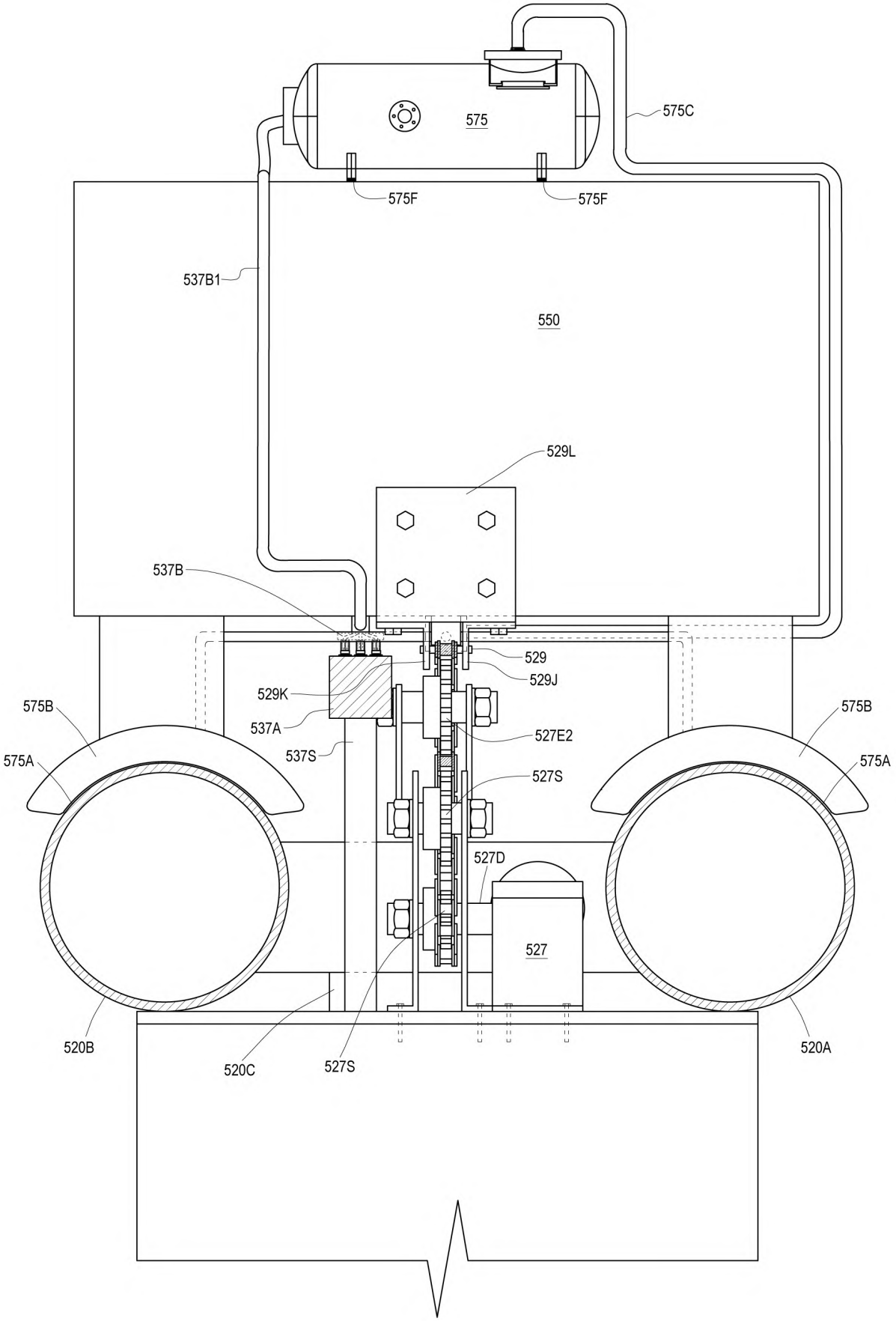

575
575C
575F
575F
537B1
550
529L
537B
529
529J
529K
537A
527E2
537S
527S
575B
575A
575B
575A
527D
527
520B
520C
527S
520A

Fig. 2C

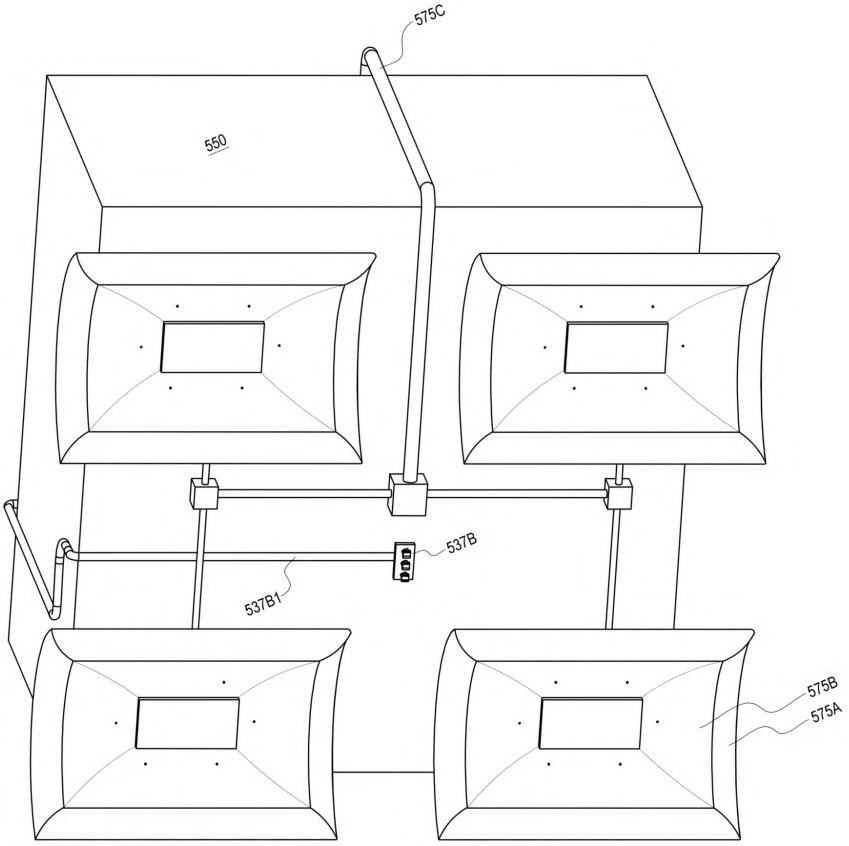


Fig. 2D

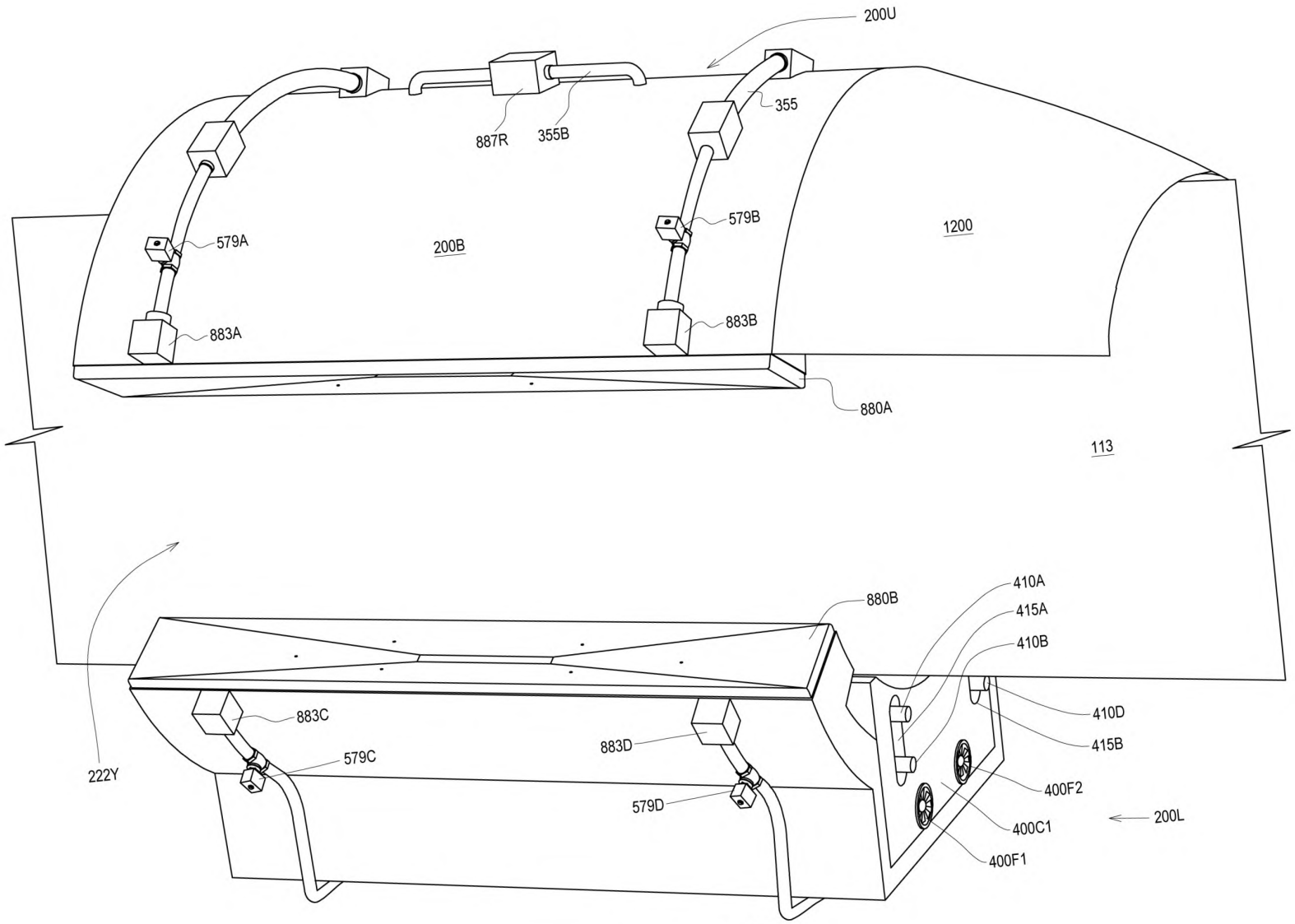

200U
887R
355B
355
579A
200B
579B
1200
883A
883B
880A
113
880B
410A
415A
410B
883C
410D
415B
222Y
579C
883D
400F2
579D
400C1
200L
400F1

Fig. 3A

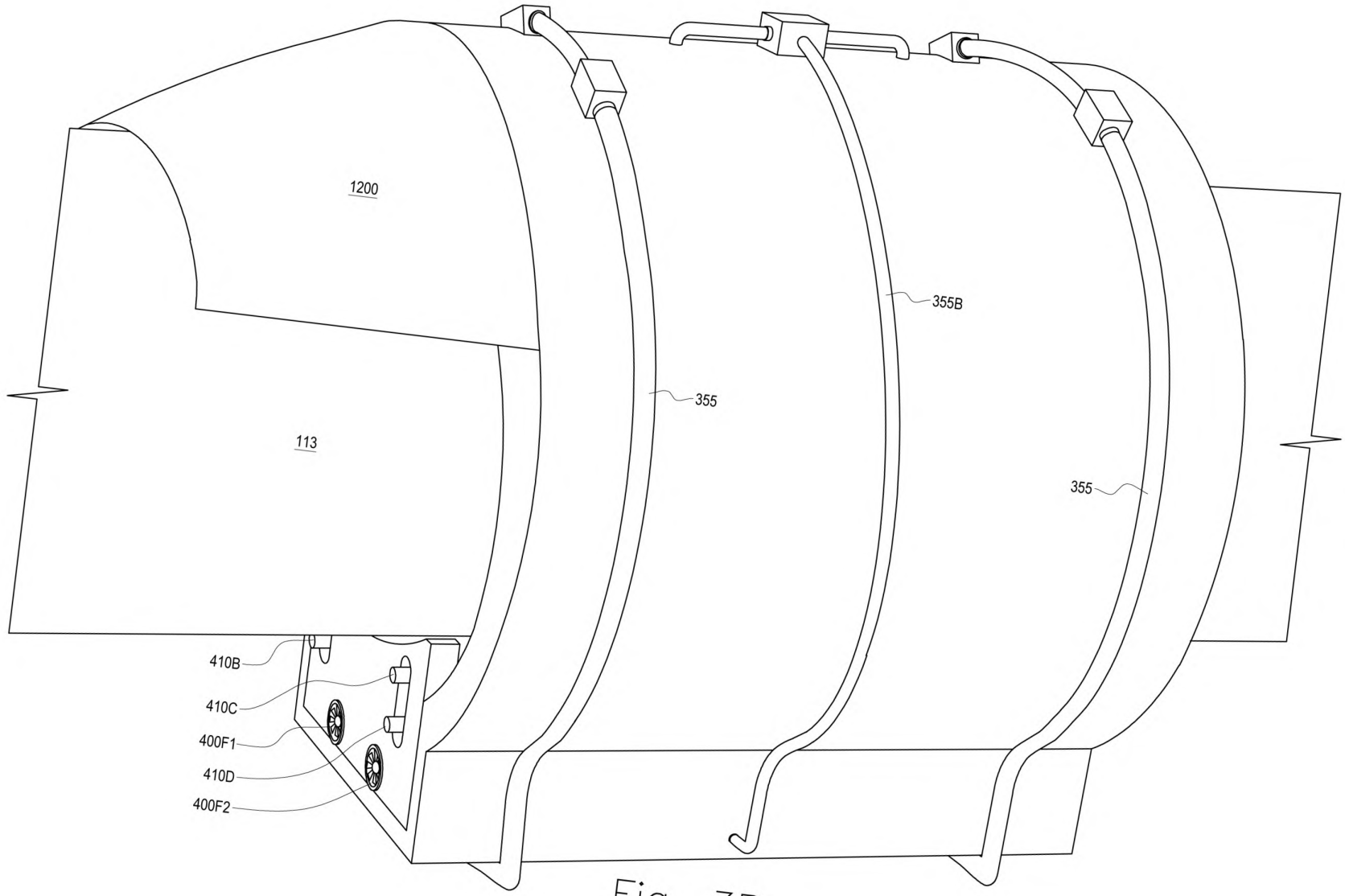


Fig. 3B

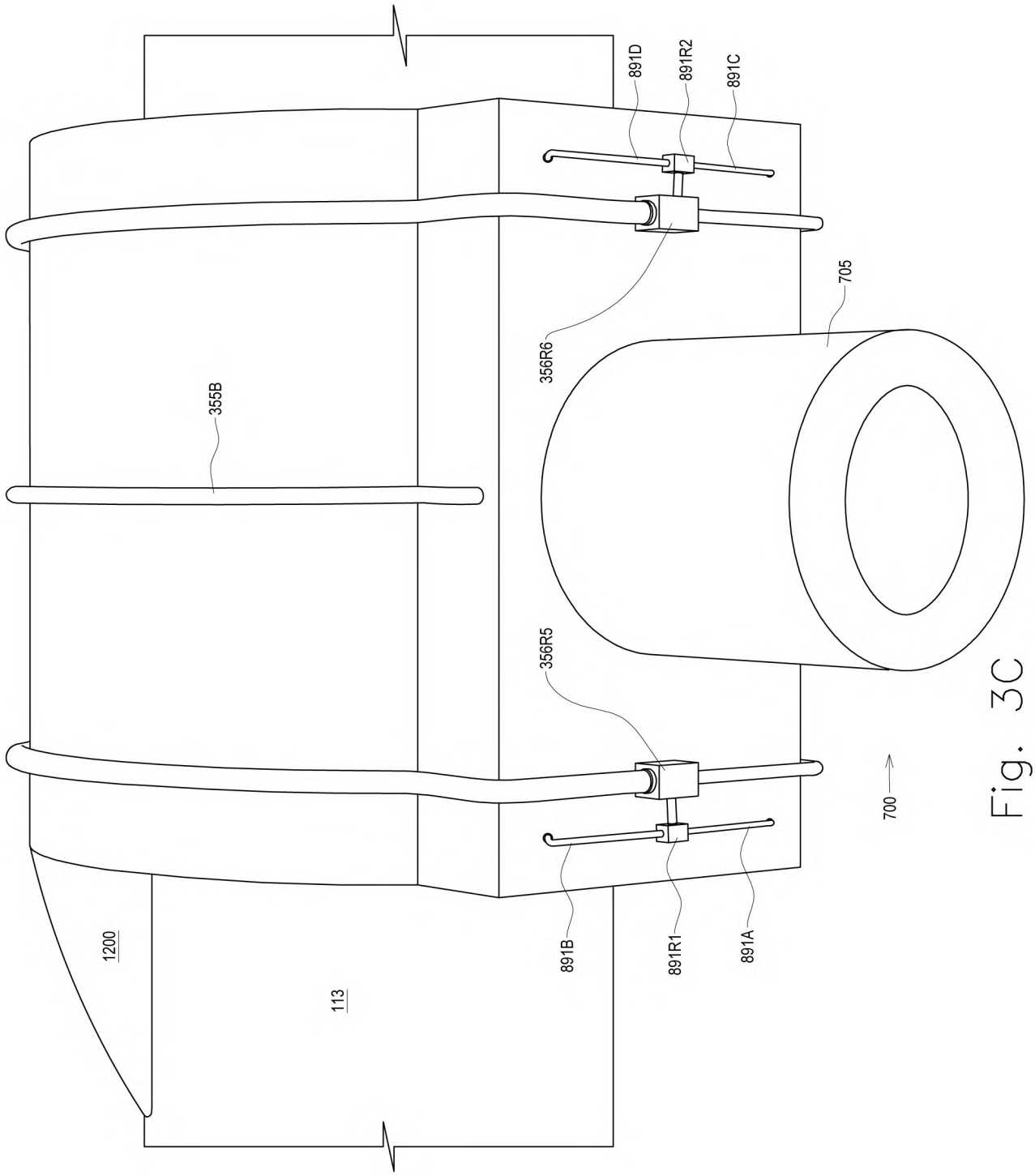

891D
891R2
891C
705
356R6
355B
356R5
700
1200
113
891B
891R1
891A

Fig. 3C

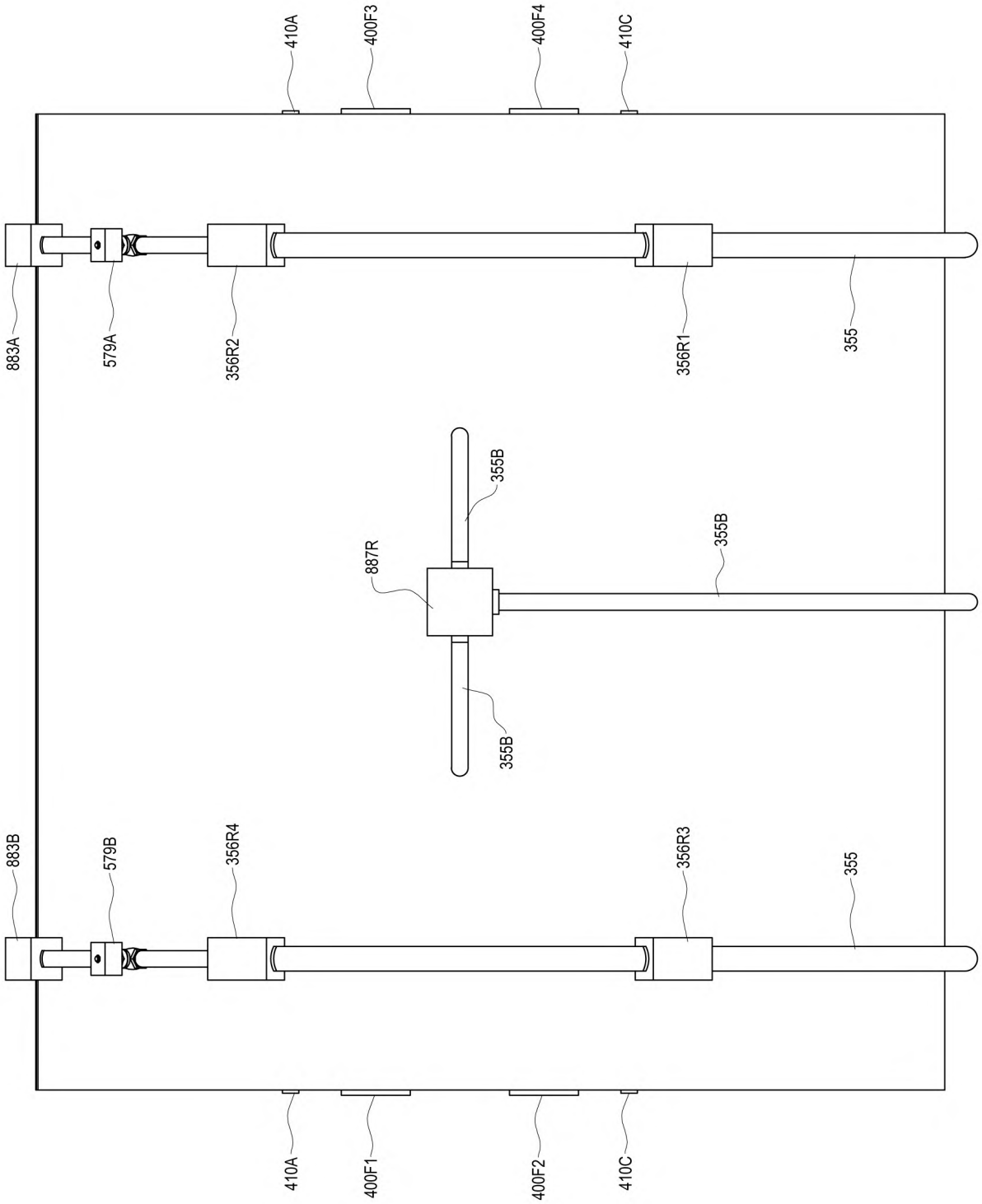

410A
400F3
400F4
410C
883A
579A
356R2
356R1
355
355B
887R
355B
355B
883B
579B
356R4
356R3
355
410A
400F1
400F2
410C

Fig. 3D

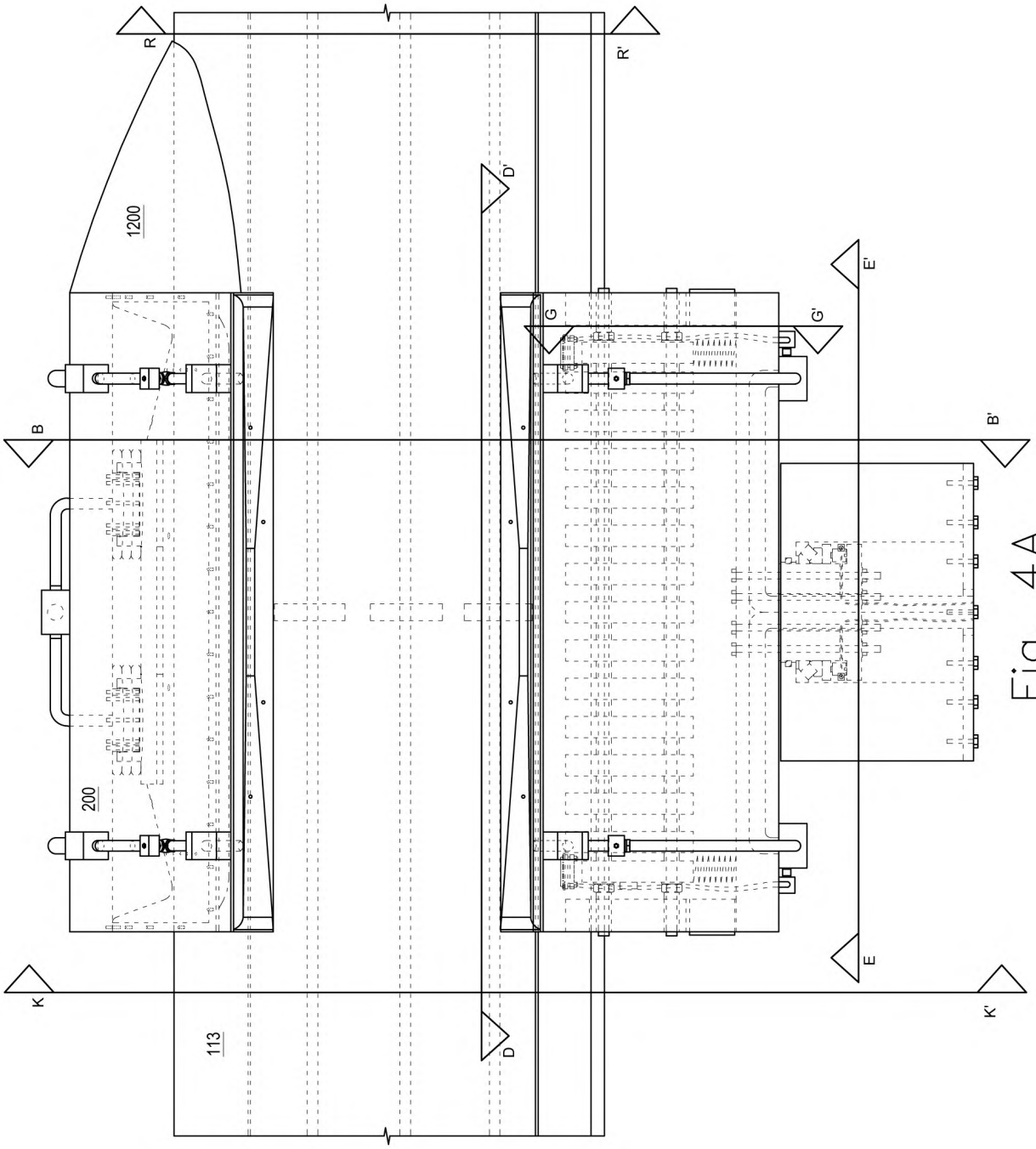


Fig. 4A

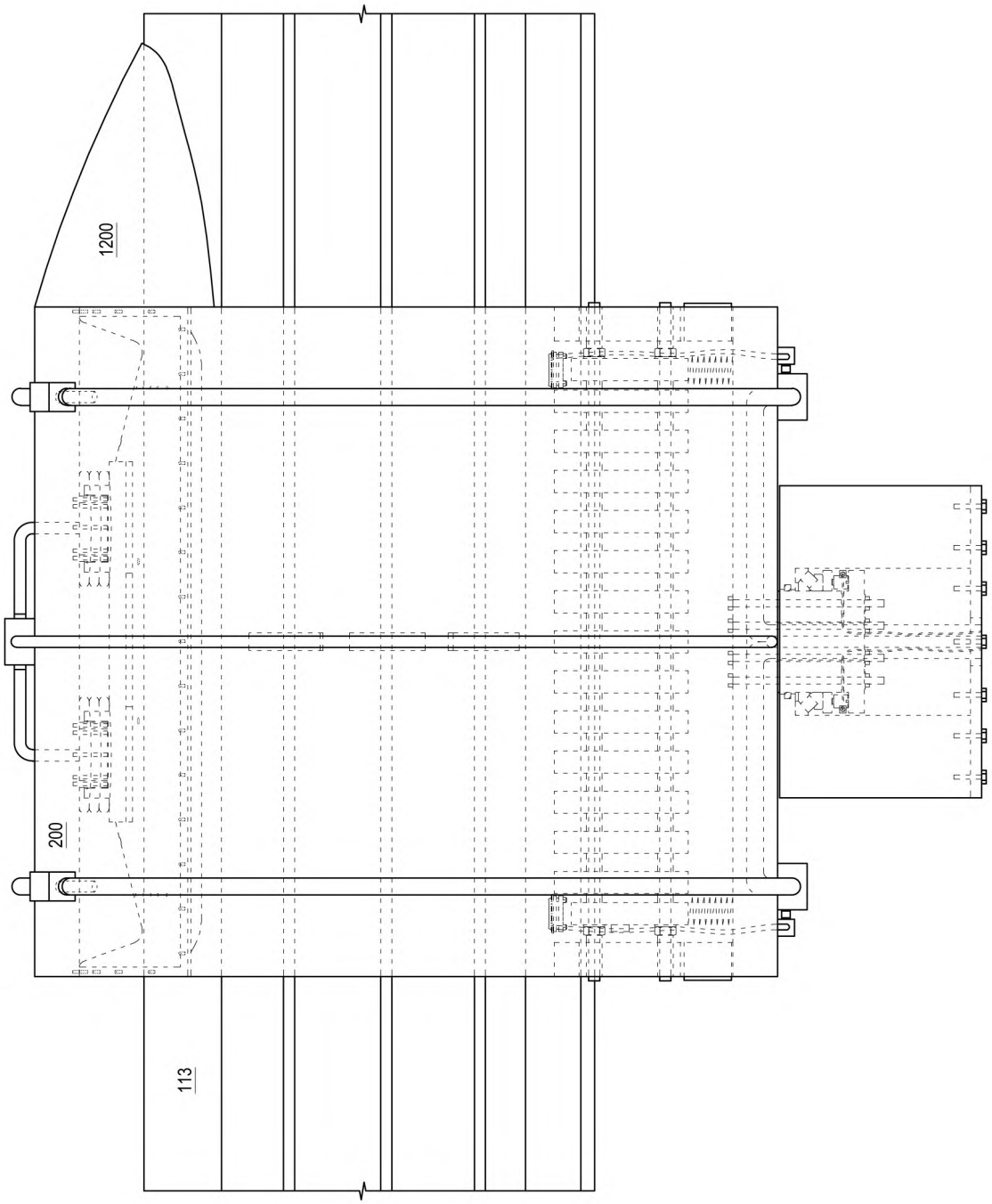


Fig. 4B

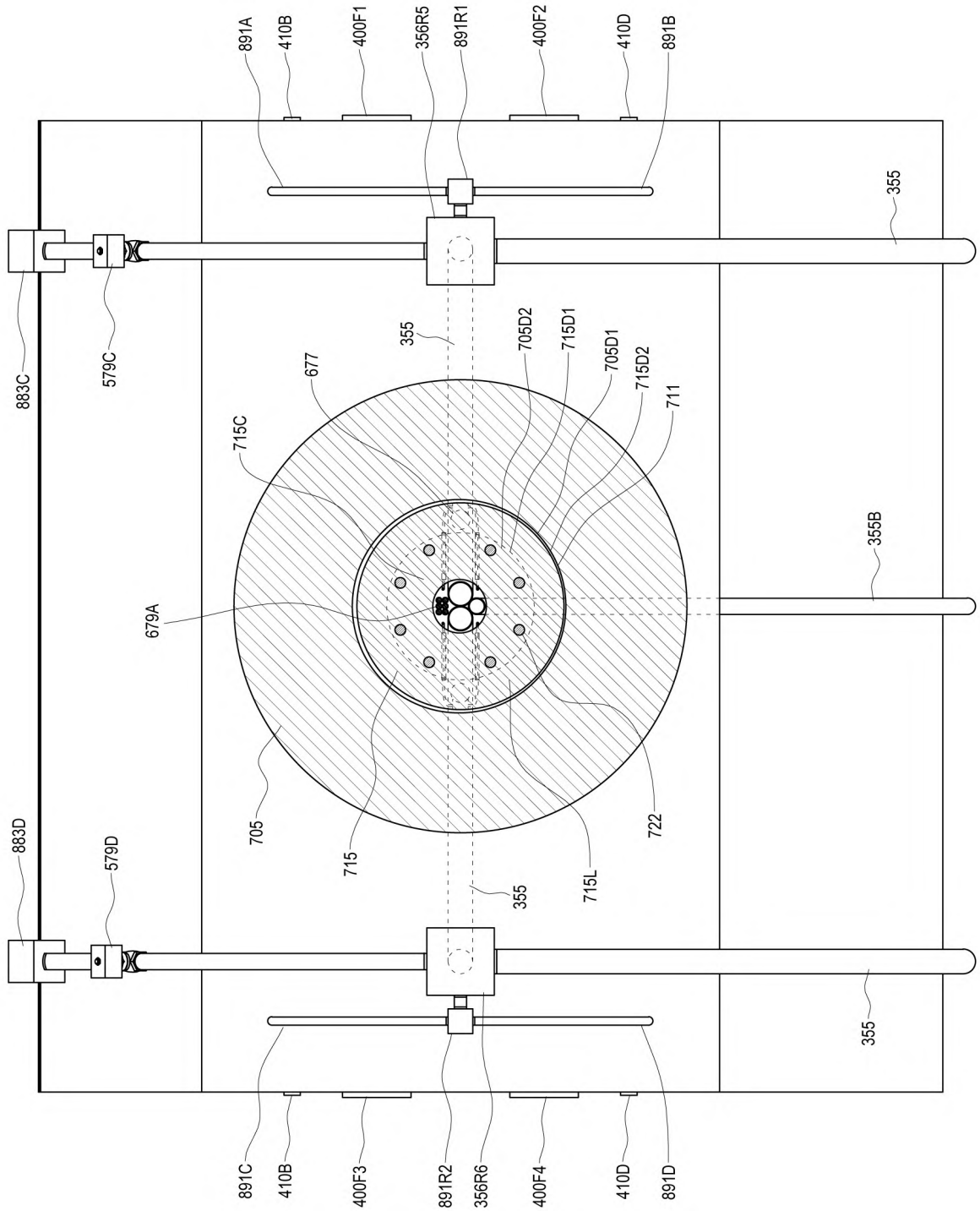

891A
410B
400F1
356R5
891R1
400F2
410D
891B
355
883C
579C
355
705D2
715D1
705D1
715D2
711
677
715C
355B
679A
705
715
722
715L
355
883D
579D
355
891C
410B
400F3
891R2
356R6
400F4
410D
891D

Fig. 5

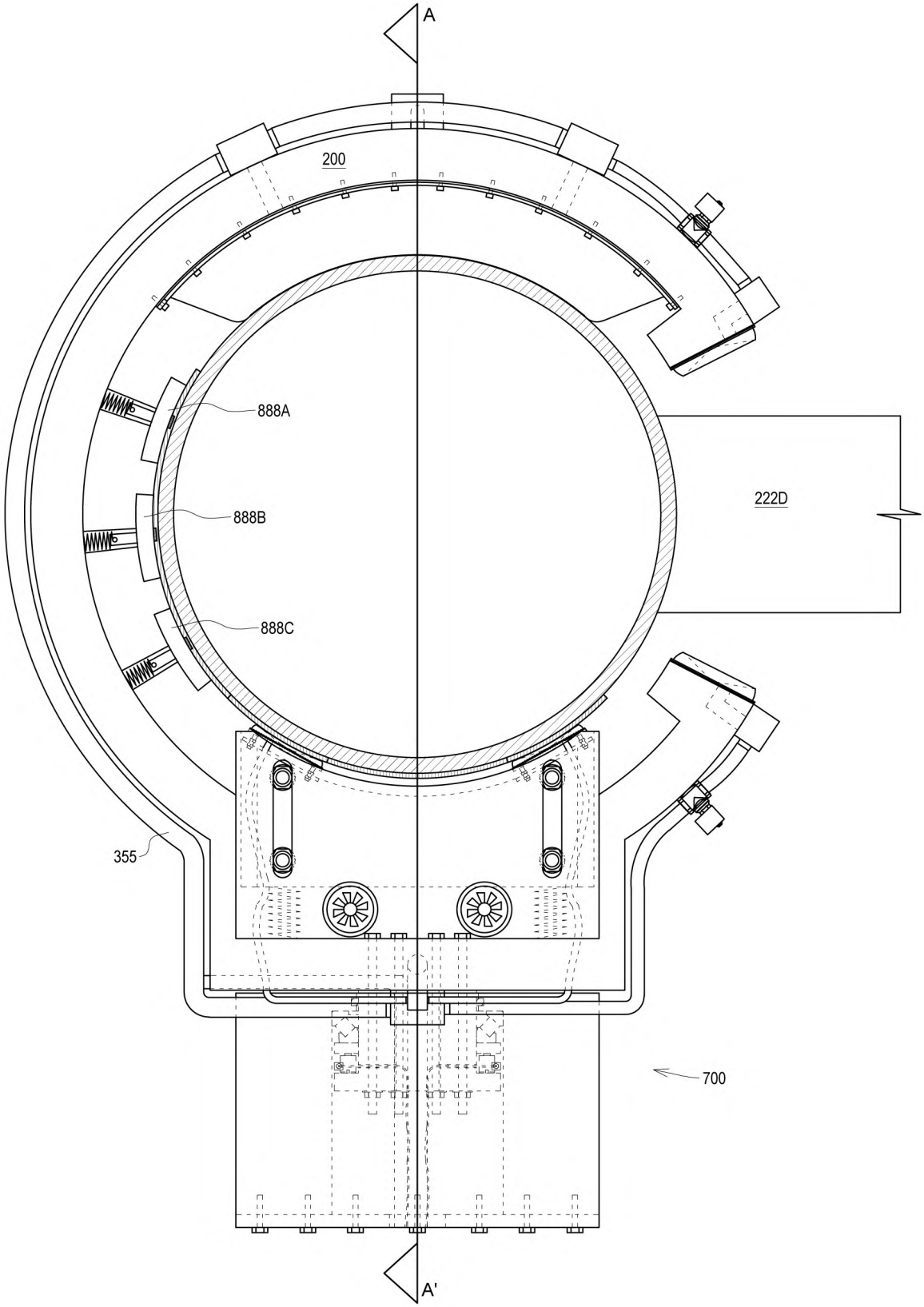


Fig. 6A

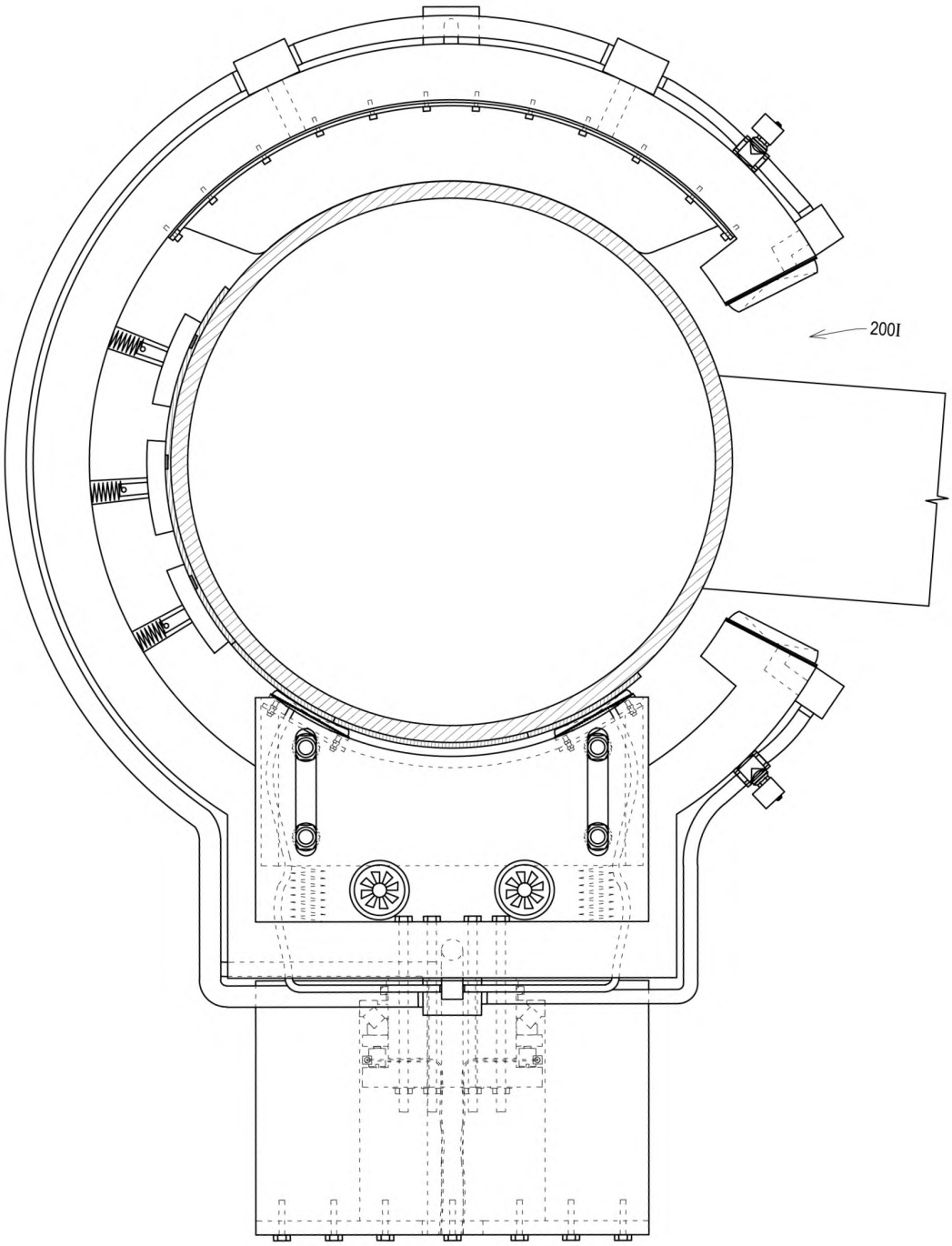


Fig. 6B

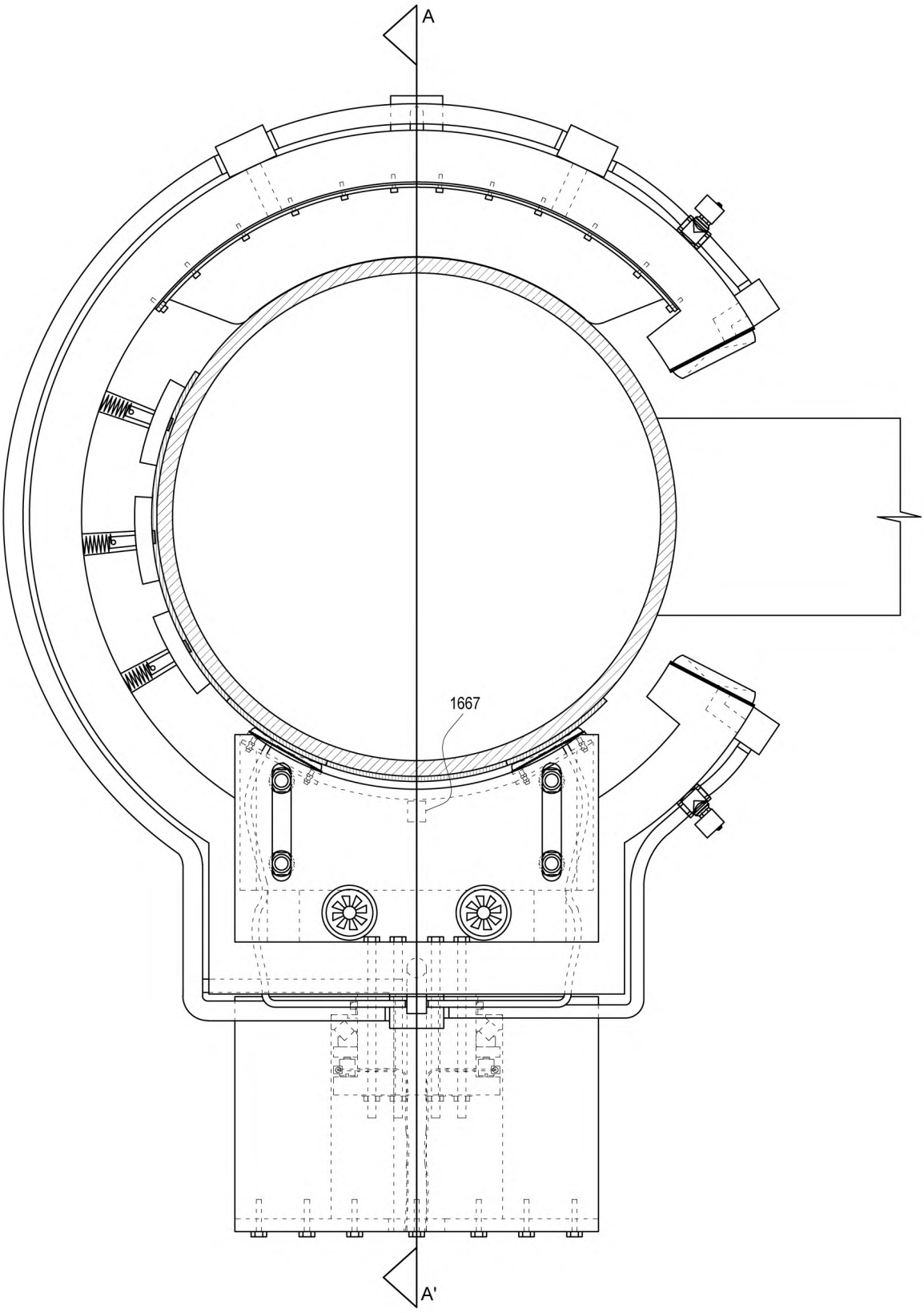


Fig. 6C

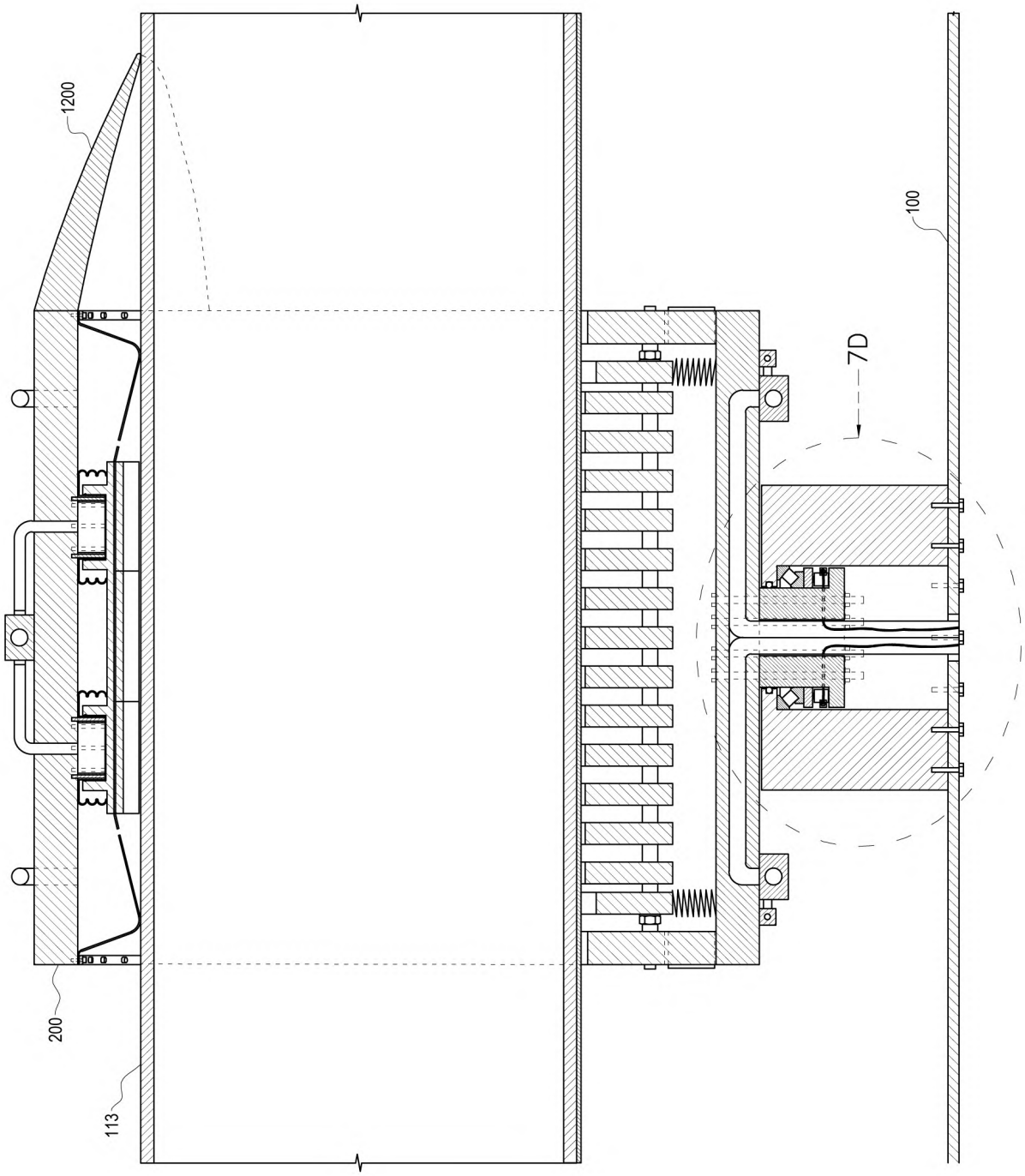


Fig. 7A

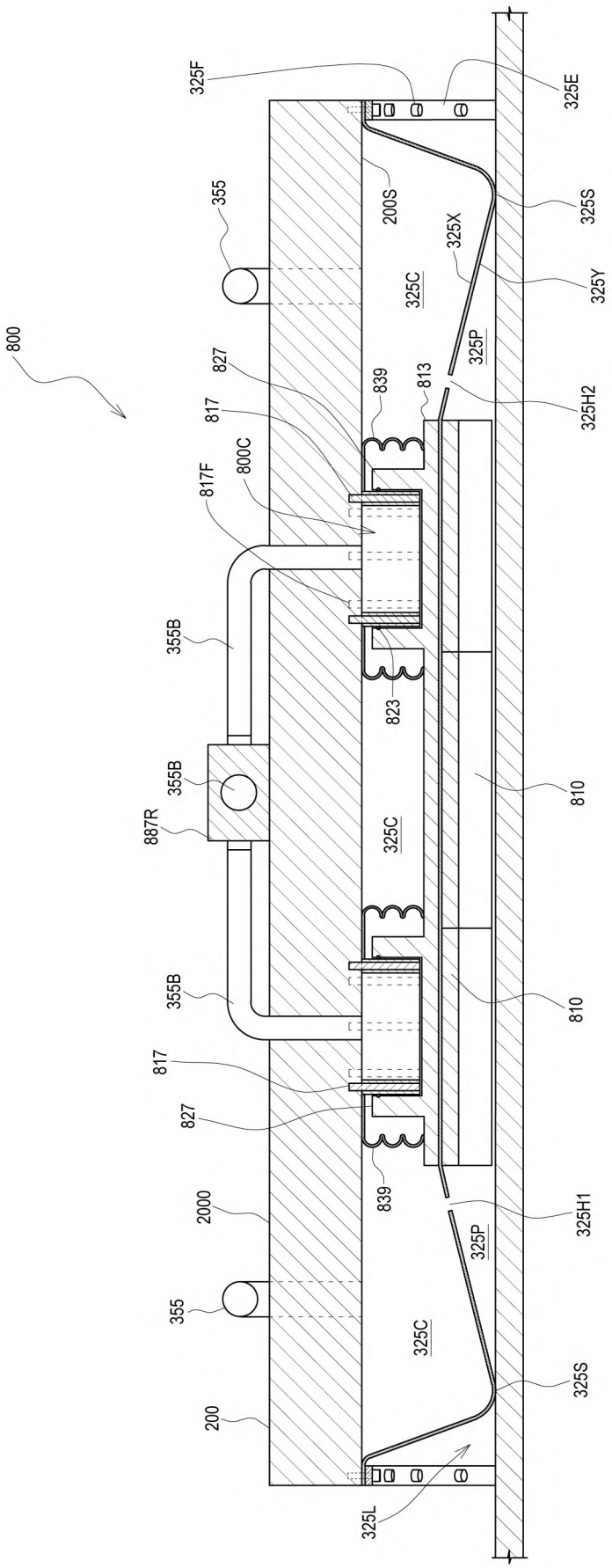

800
325F
325E
355
200S
325S
325X
325Y
325C
325P
827
839
813
325H2
817
800C
817F
355B
823
810
887R
325C
810
355B
817
827
839
2000
325H1
325P
355
325C
325S
200
325L

Fig. 7B

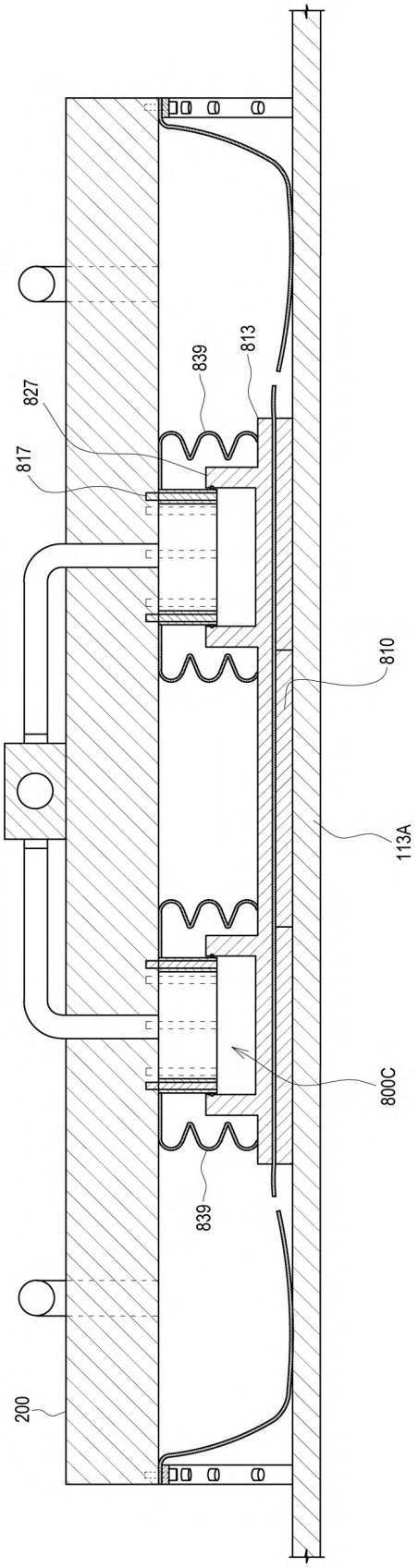


Fig. 7C

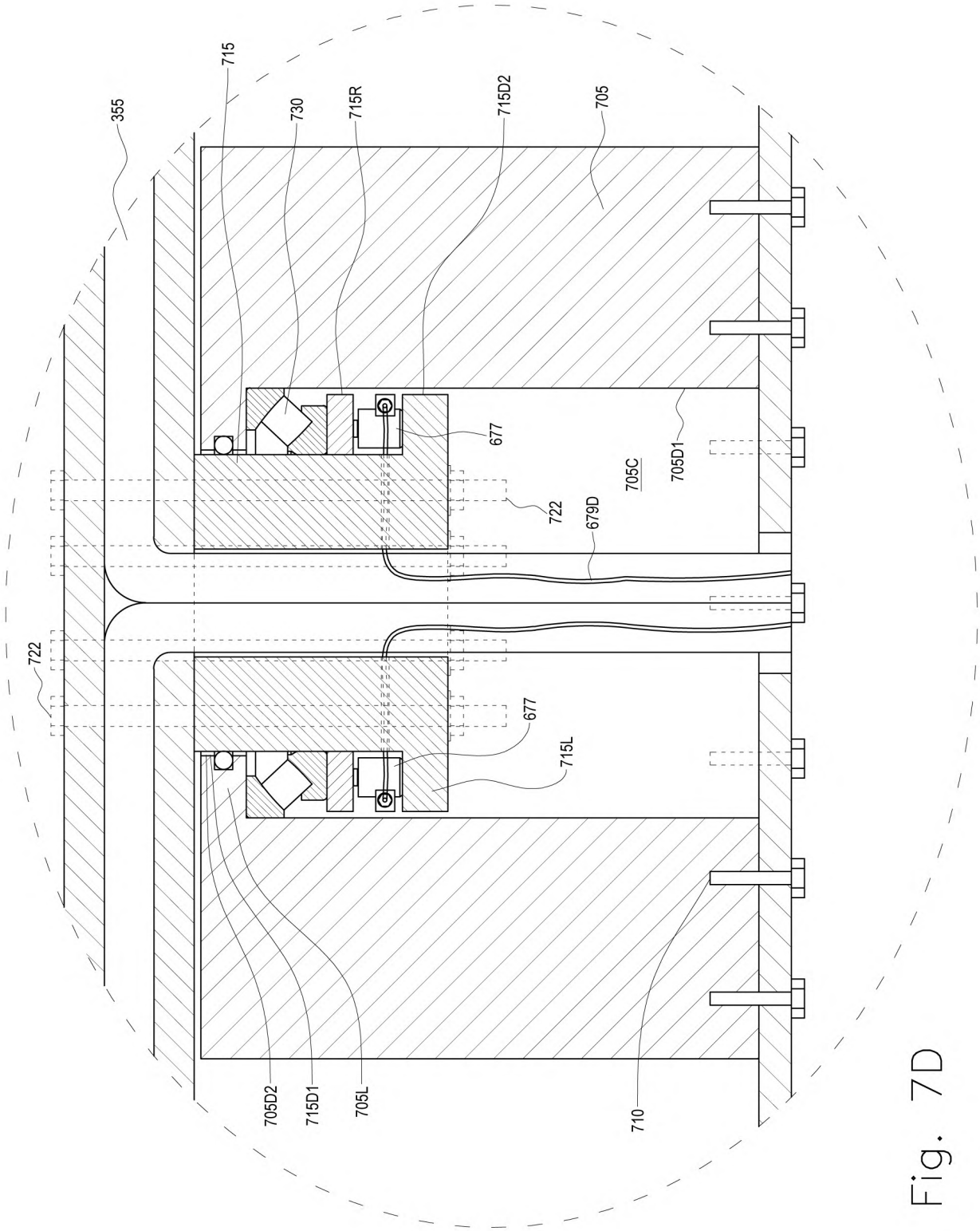

355
715
730
715R
715D2
705
677
705C
705D1
722
679D
722
677
715L
705D2
715D1
705L
710

Fig. 7D

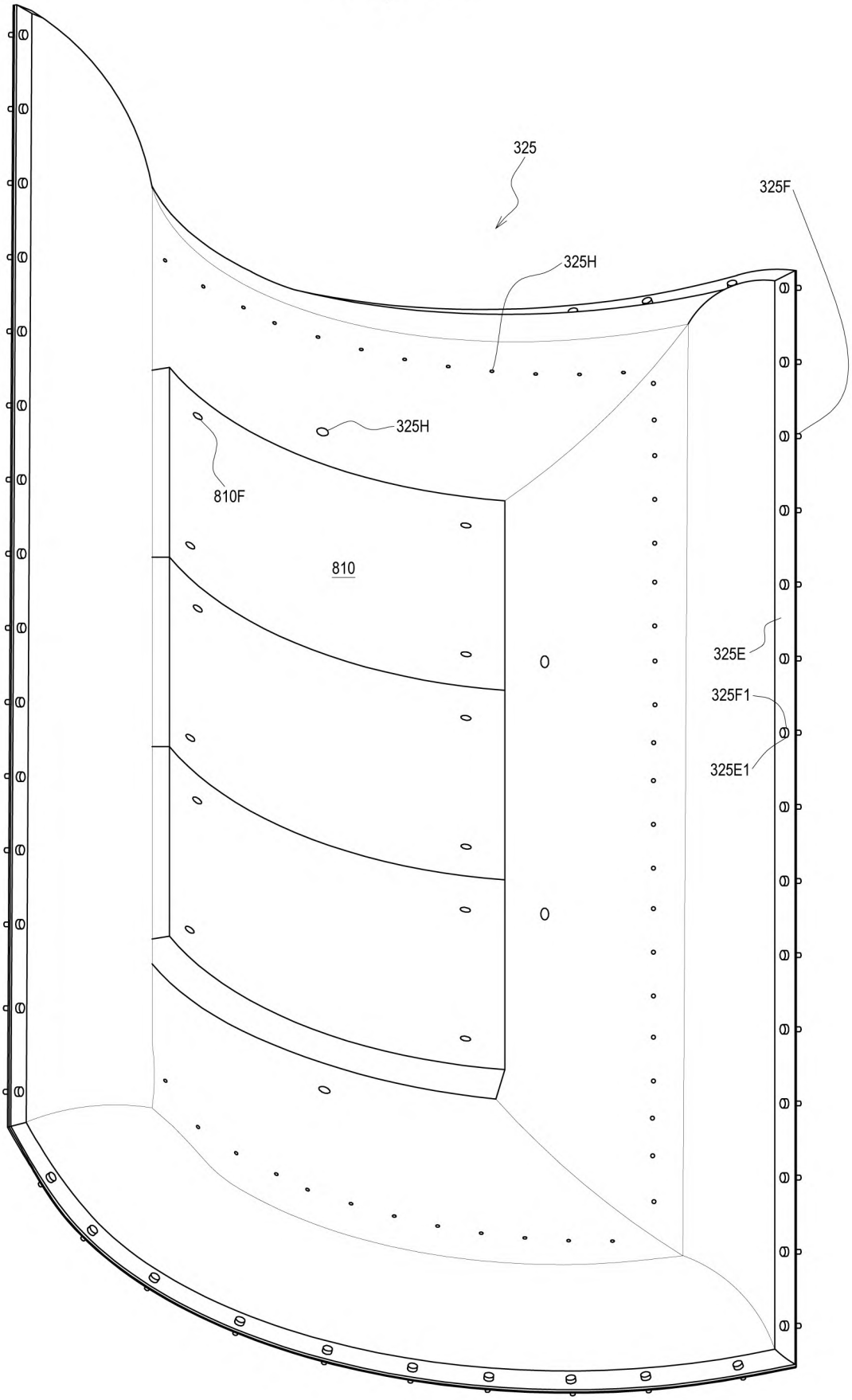


Fig.8A

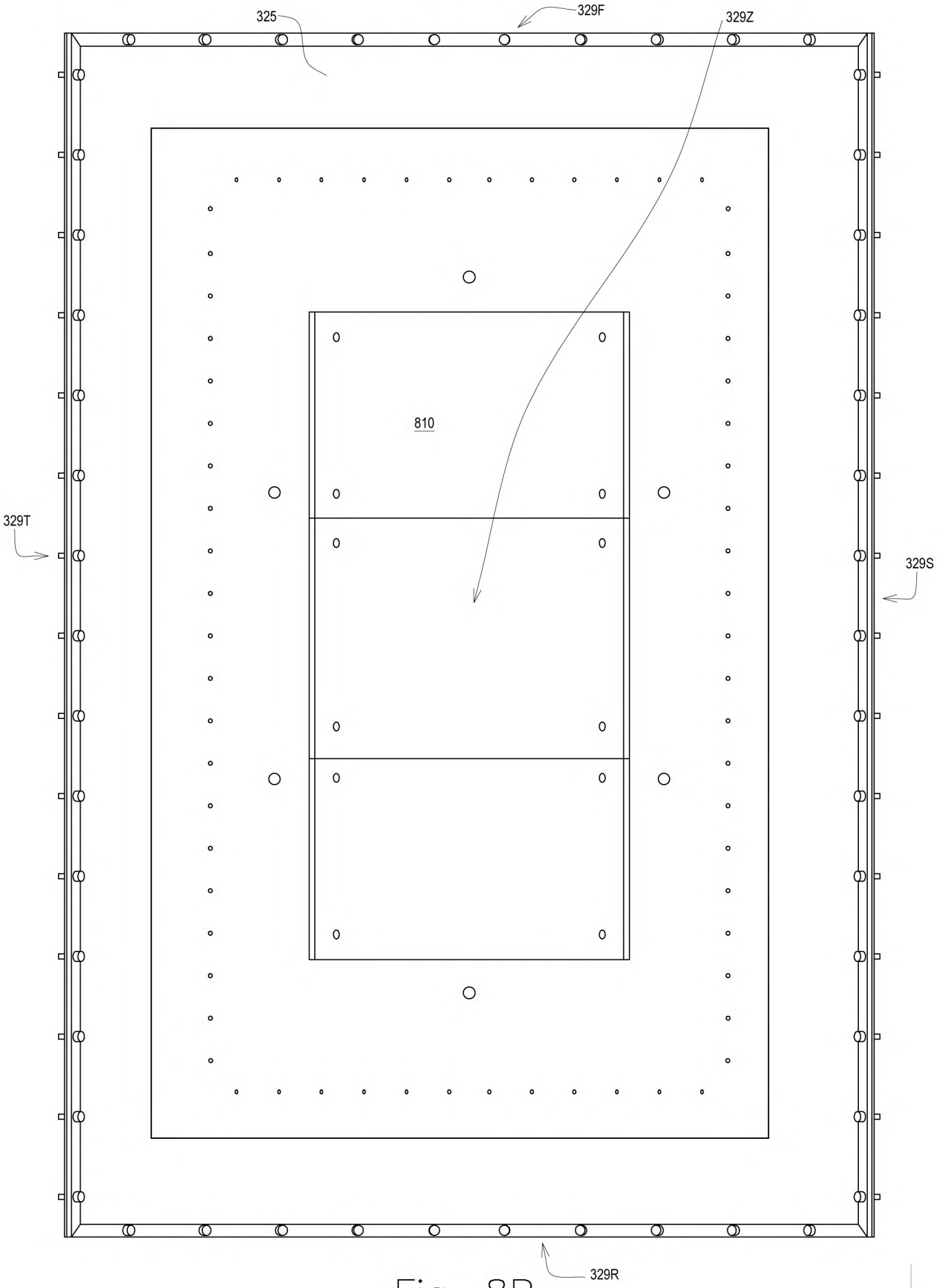


Fig. 8B

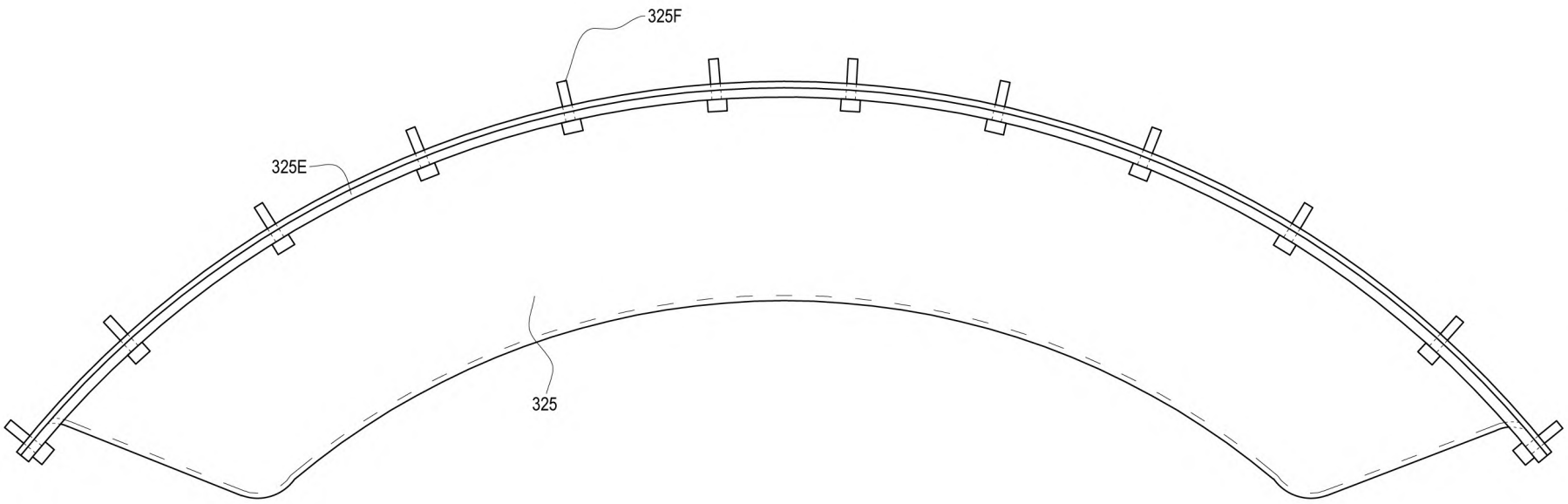


Fig. 8C

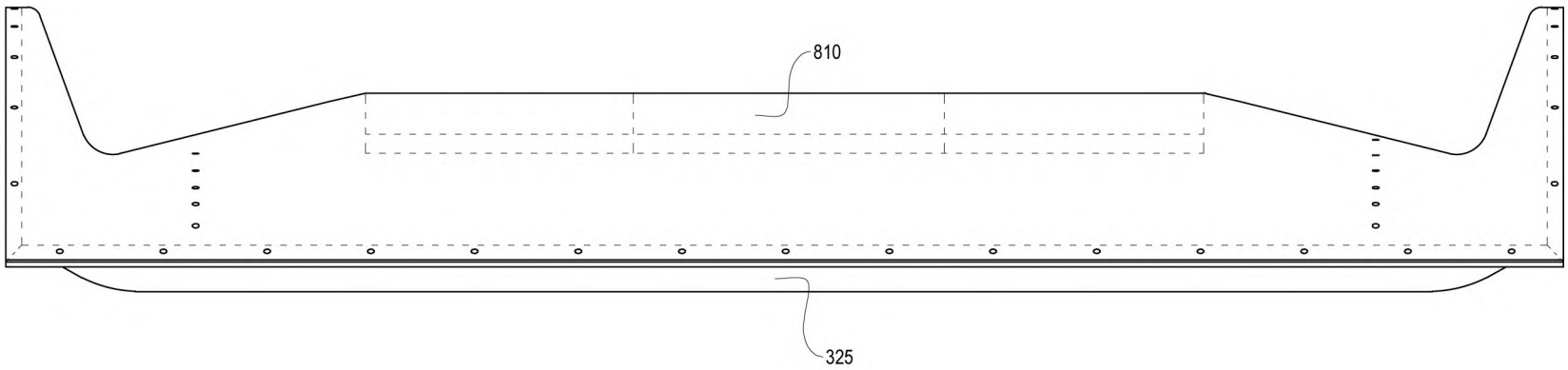


Fig. 8D

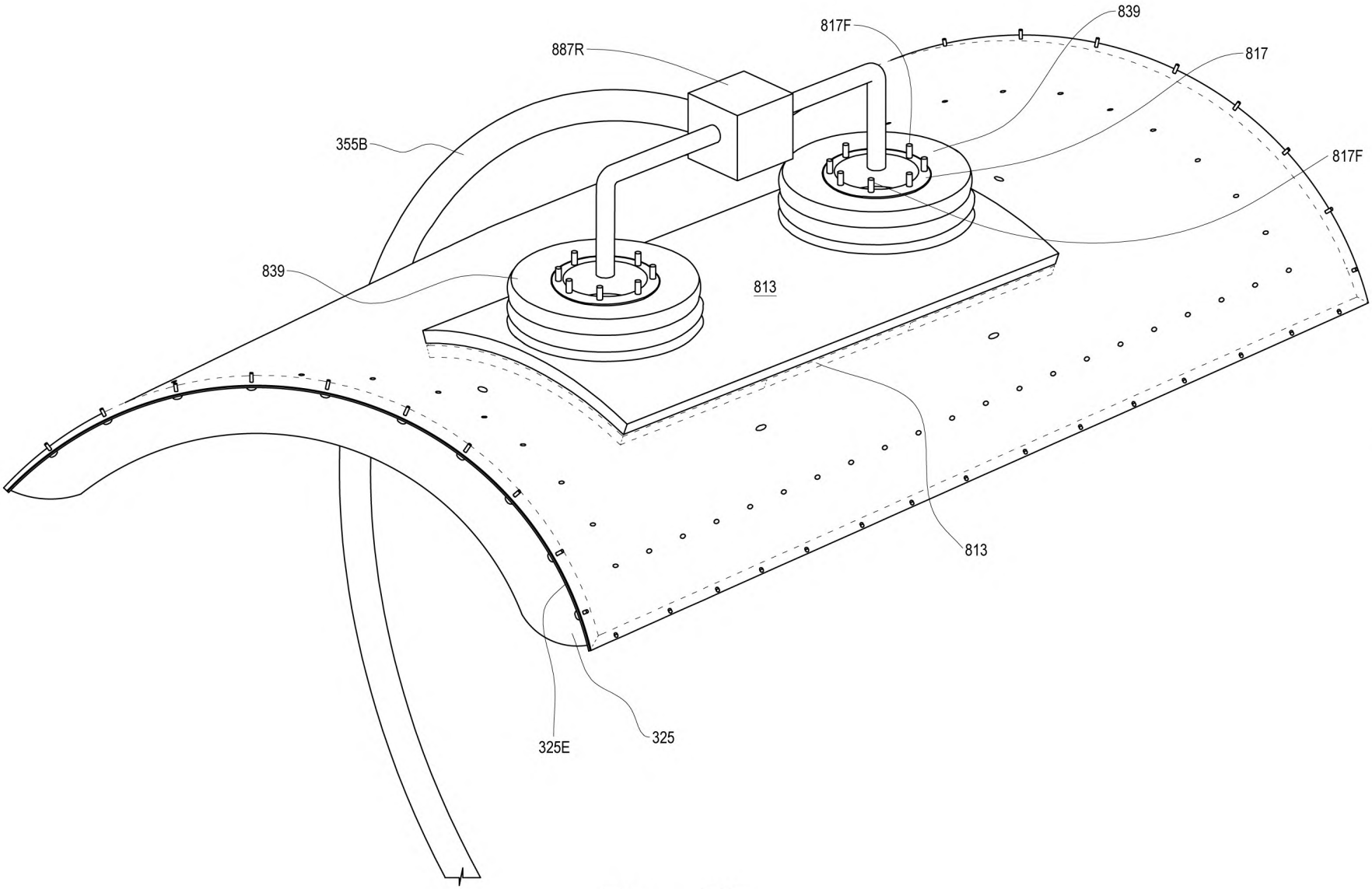


Fig. 8E

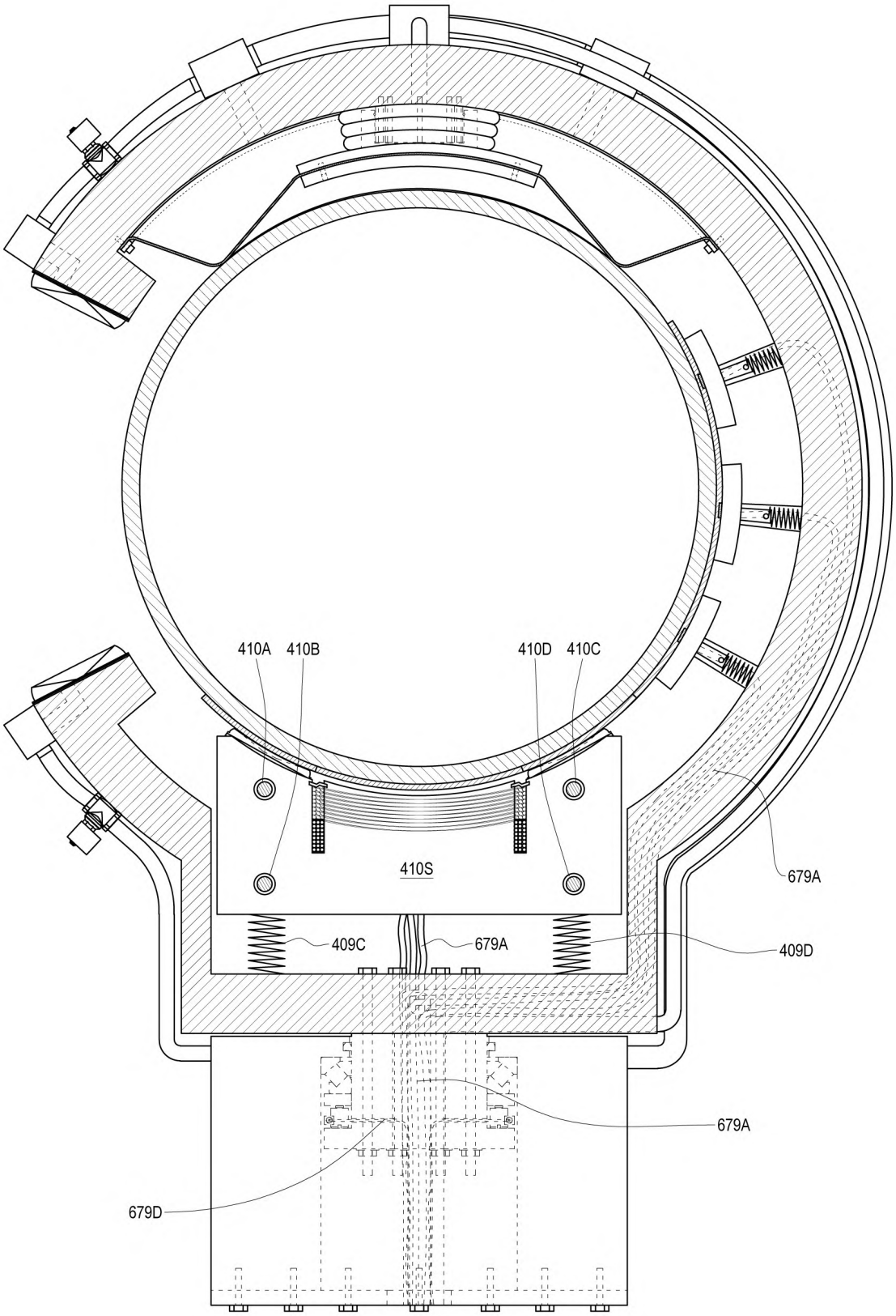


Fig. 9A

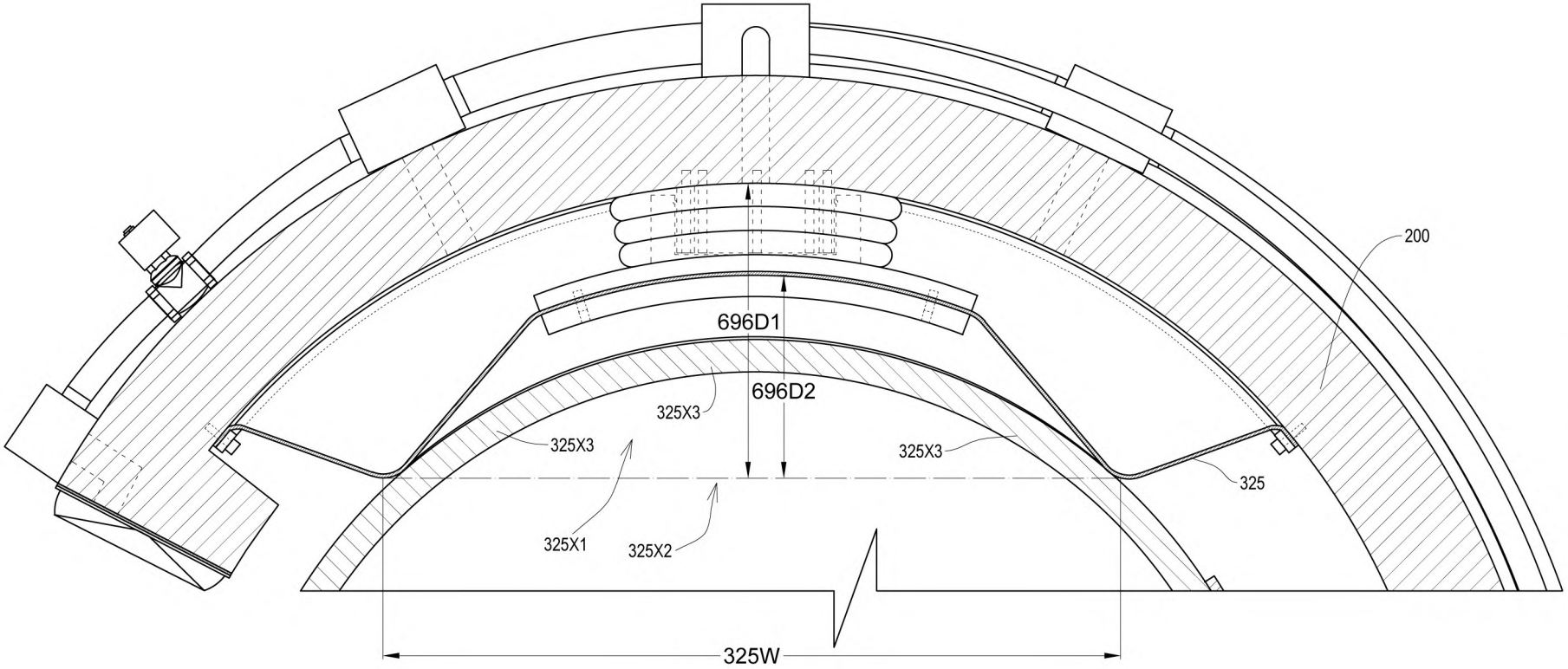


Fig. 9B

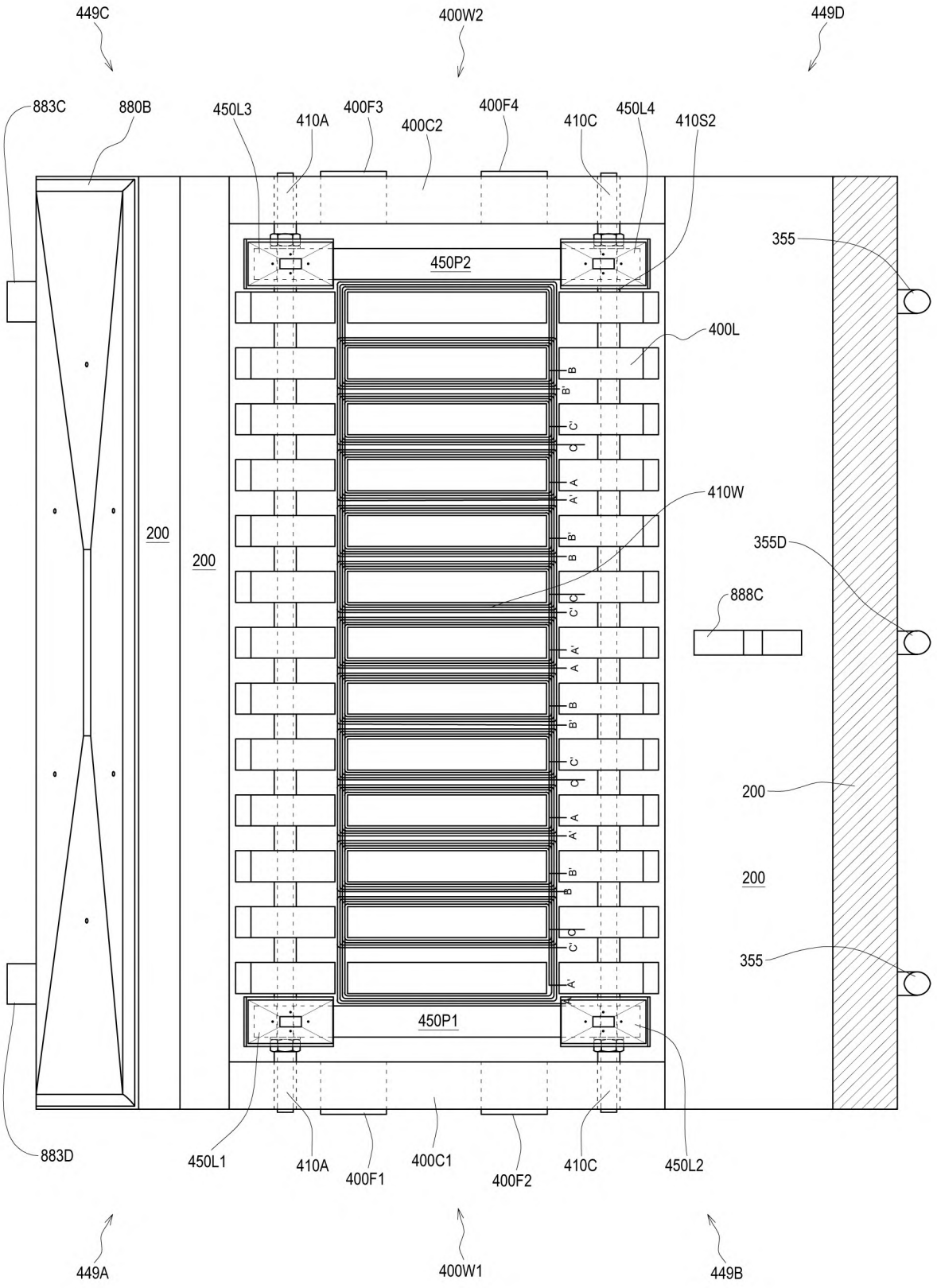

449C
400W2
449D
883C
880B
450L3
410A
400F3
400C2
400F4
410C
450L4
410S2
355
450P2
400L
410W
200
200
355D
888C
200
200
355
450P1
883D
450L1
410A
400F1
400C1
400F2
410C
450L2
449A
400W1
449B

Fig. 10A

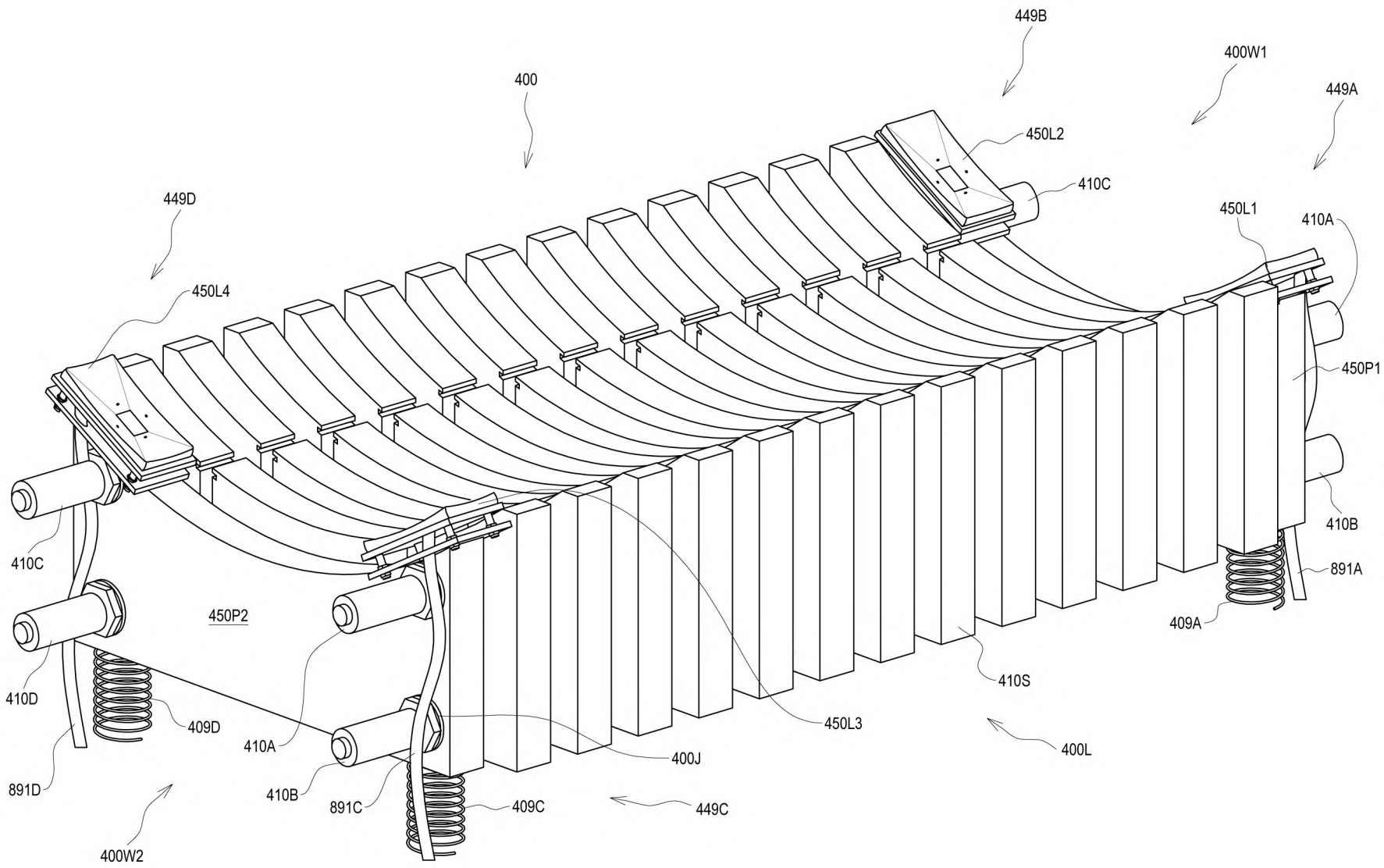

449B
400W1
400
449A
450L2
410C
449D
450L1
410A
450L4
450P1
410C
410B
891A
450P2
409A
410D
410S
409D
450L3
410A
400L
400J
891D
410B
891C
409C
449C
400W2

Fig. 10B

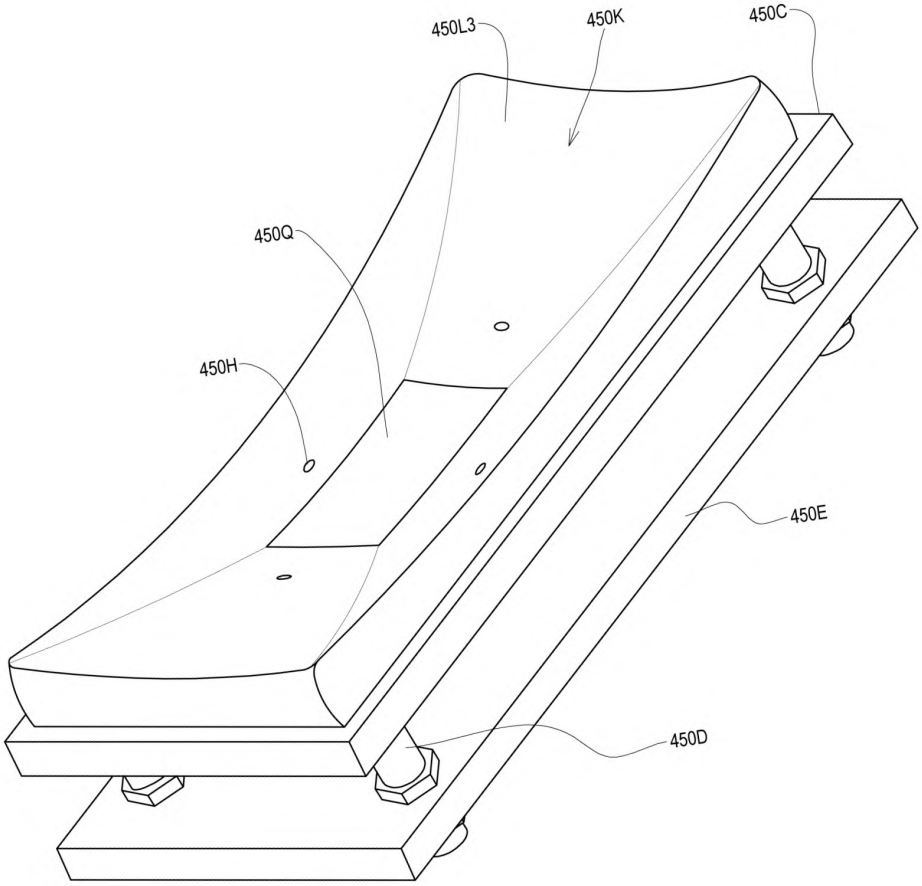


Fig. 10C

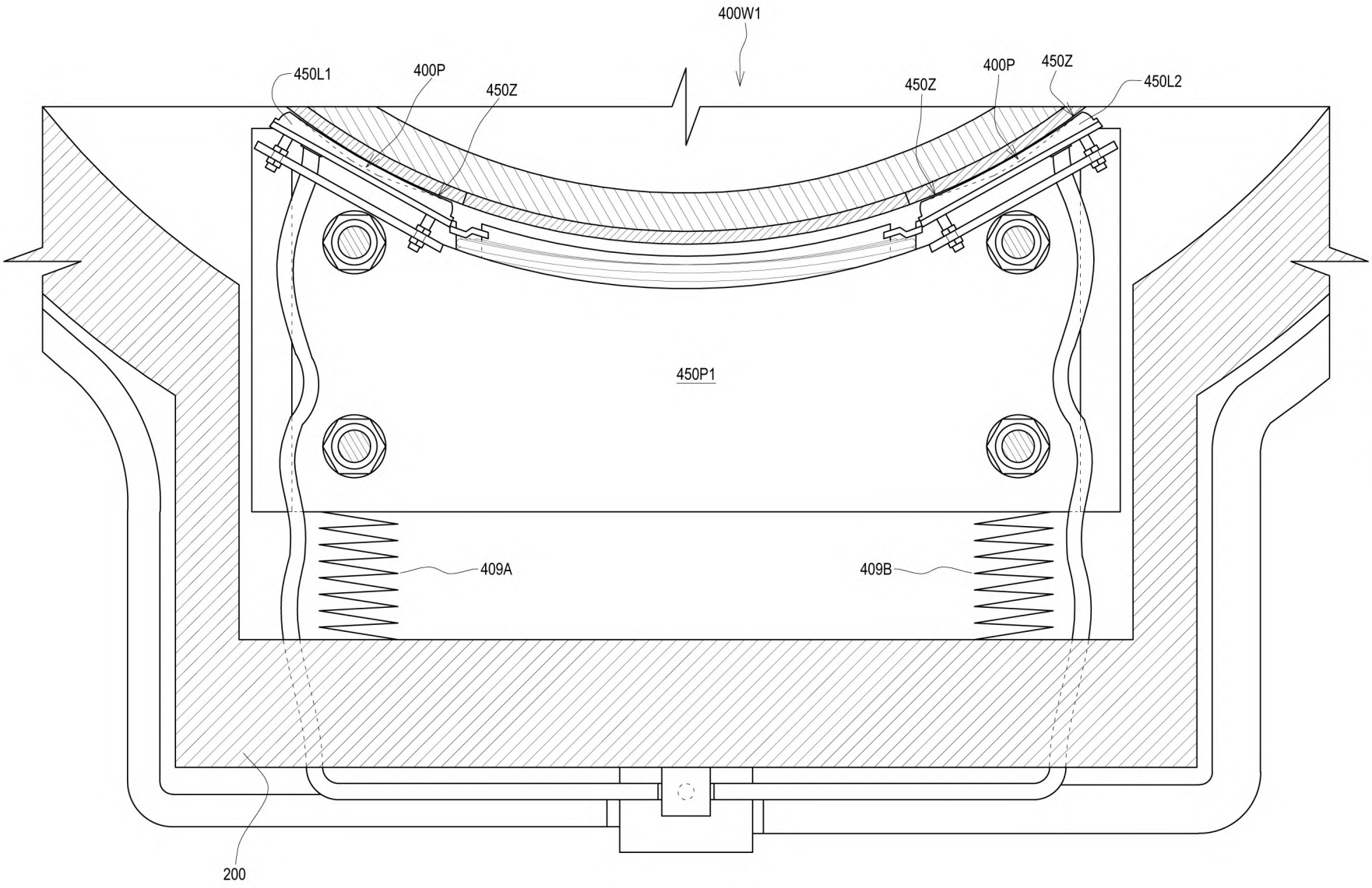

400W1
450L1
400P
450Z
450Z
400P
450Z
450L2
450P1
409A
409B
200

Fig. 10D

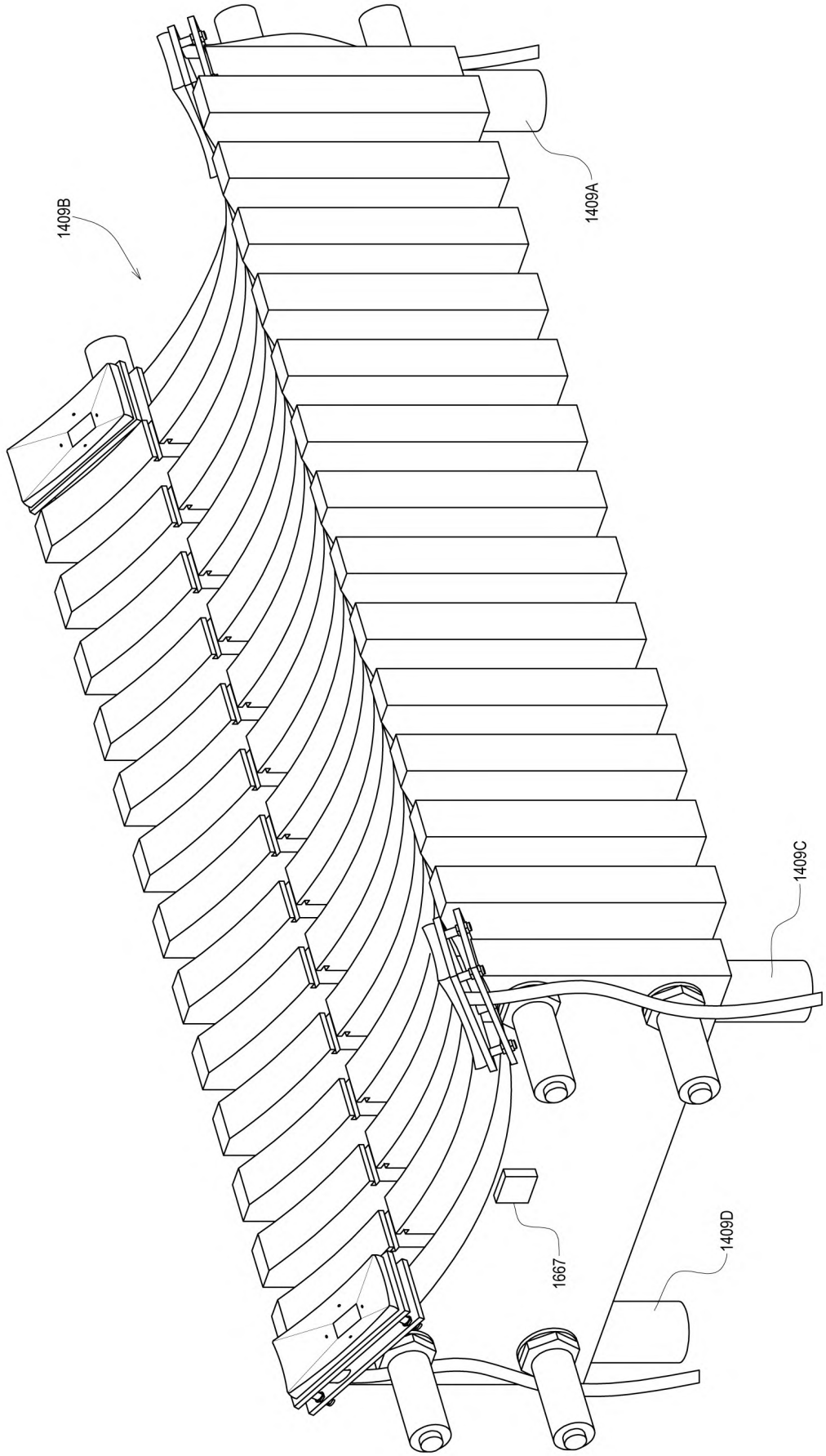
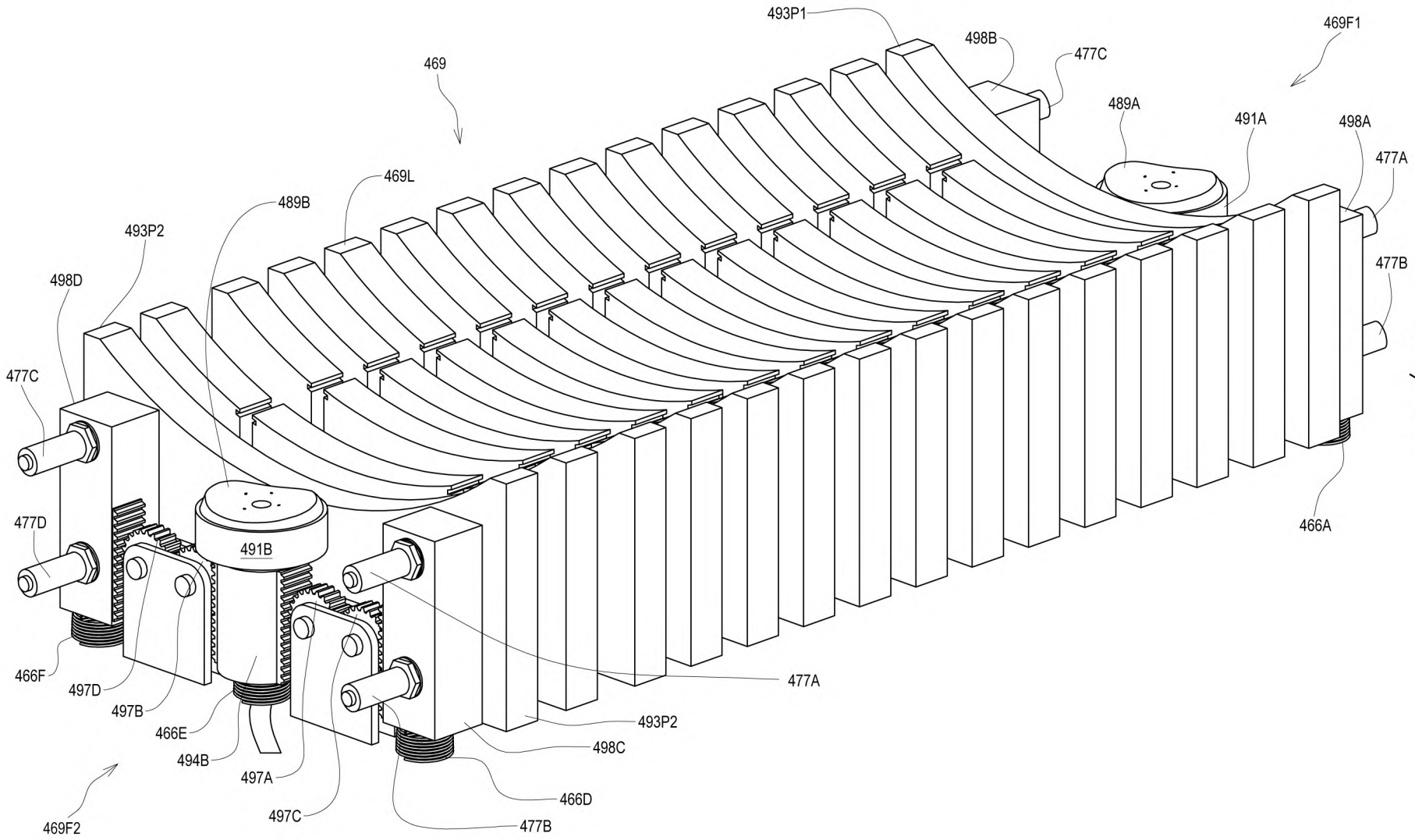


Fig. 10E


469
469F1
493P1
498B
477C
489A
491A
498A
477A
477B
466A
469L
489B
493P2
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477C
477D
491B
466F
497D
497B
466E
494B
497A
497C
469F2
477A
493P2
498C
466D
477B

Fig. 11A

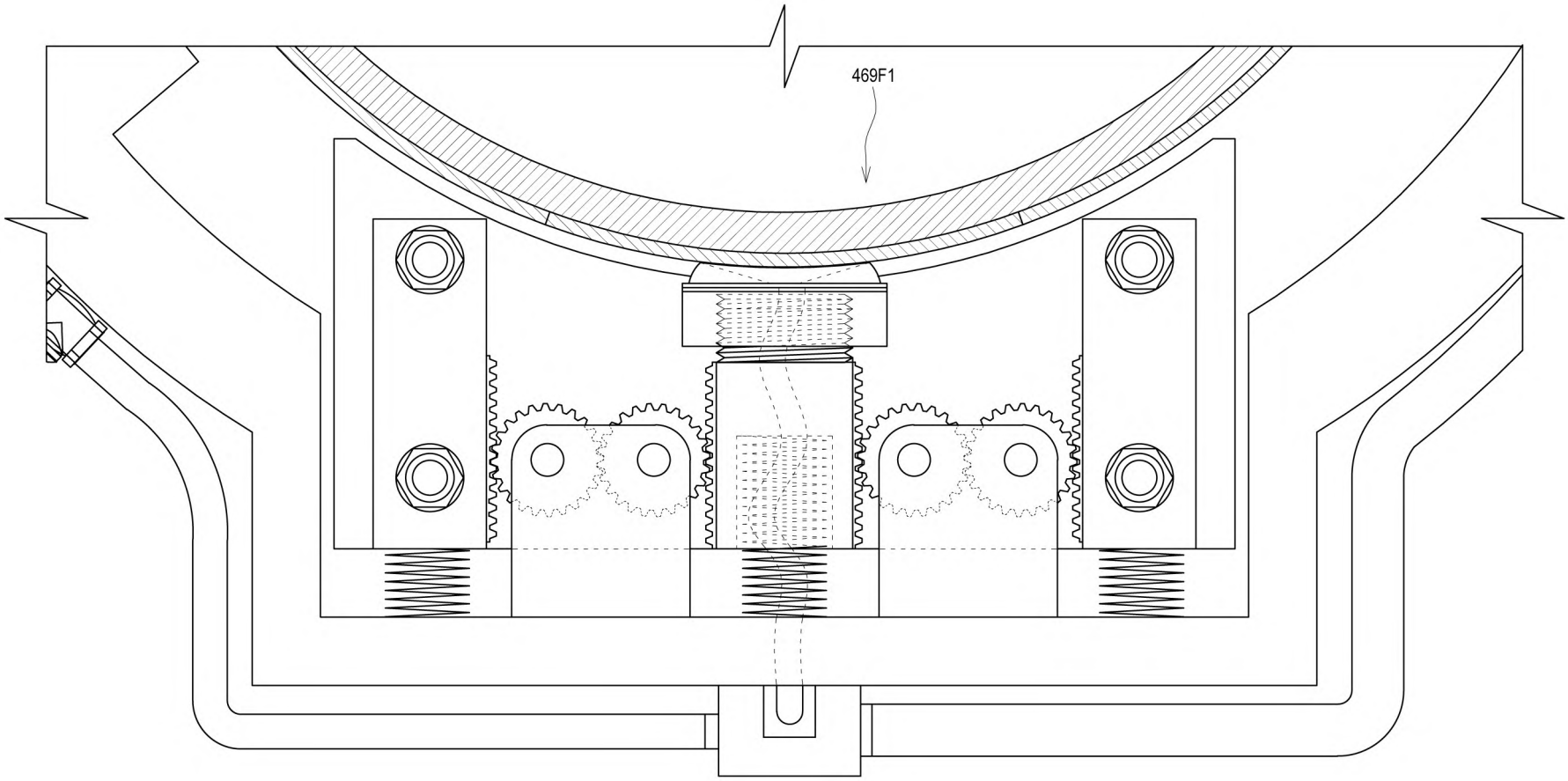


Fig. 11B

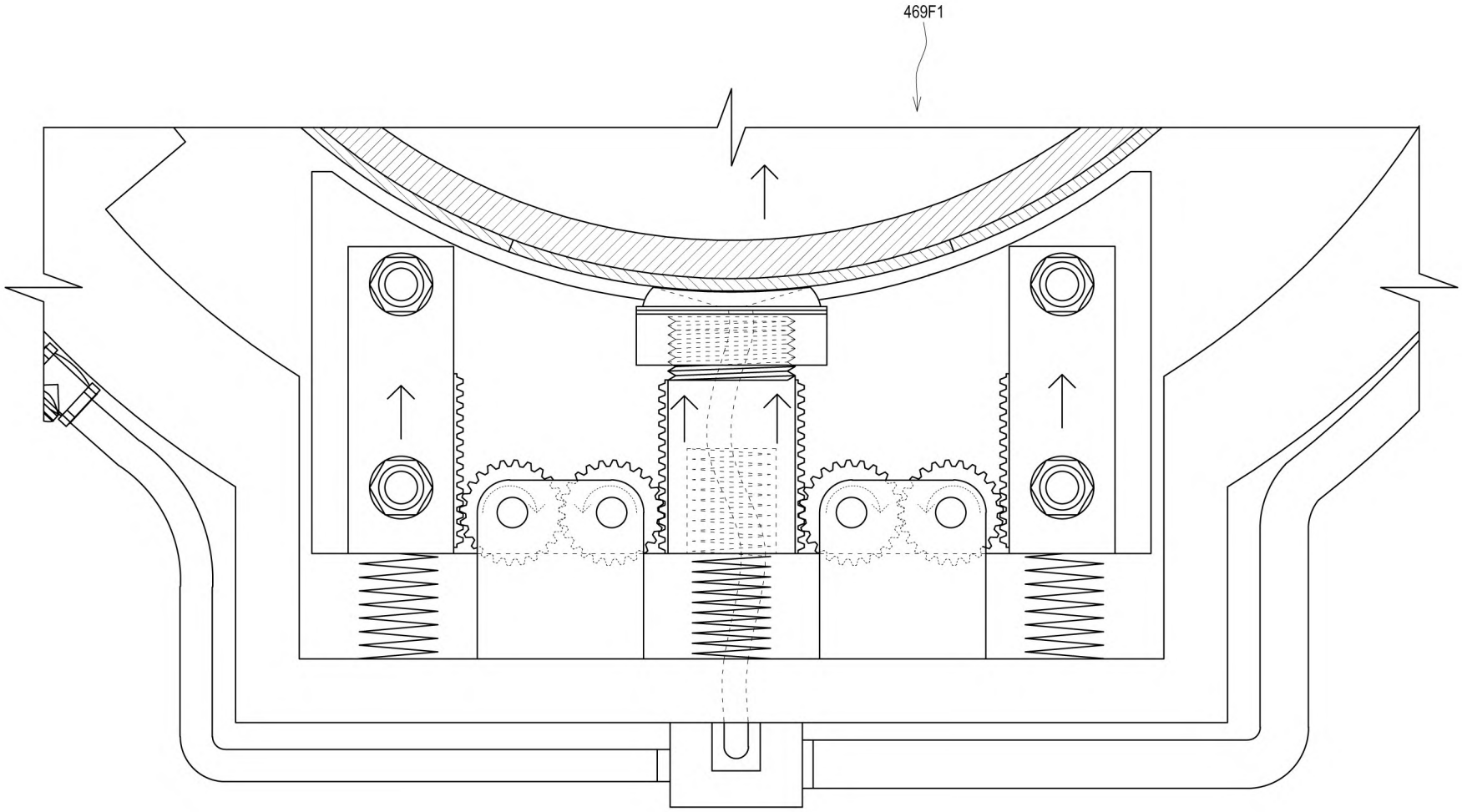


Fig. 11C

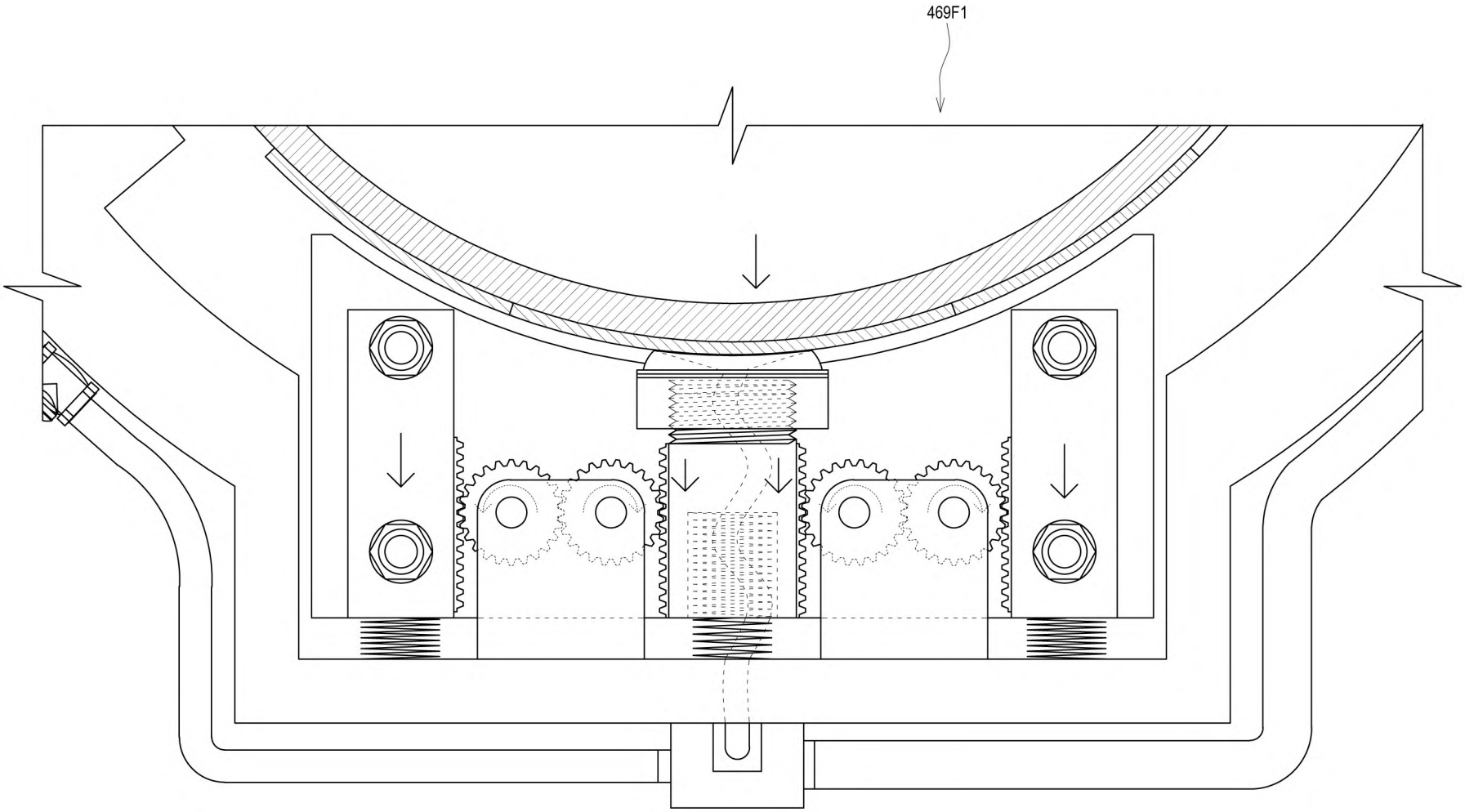
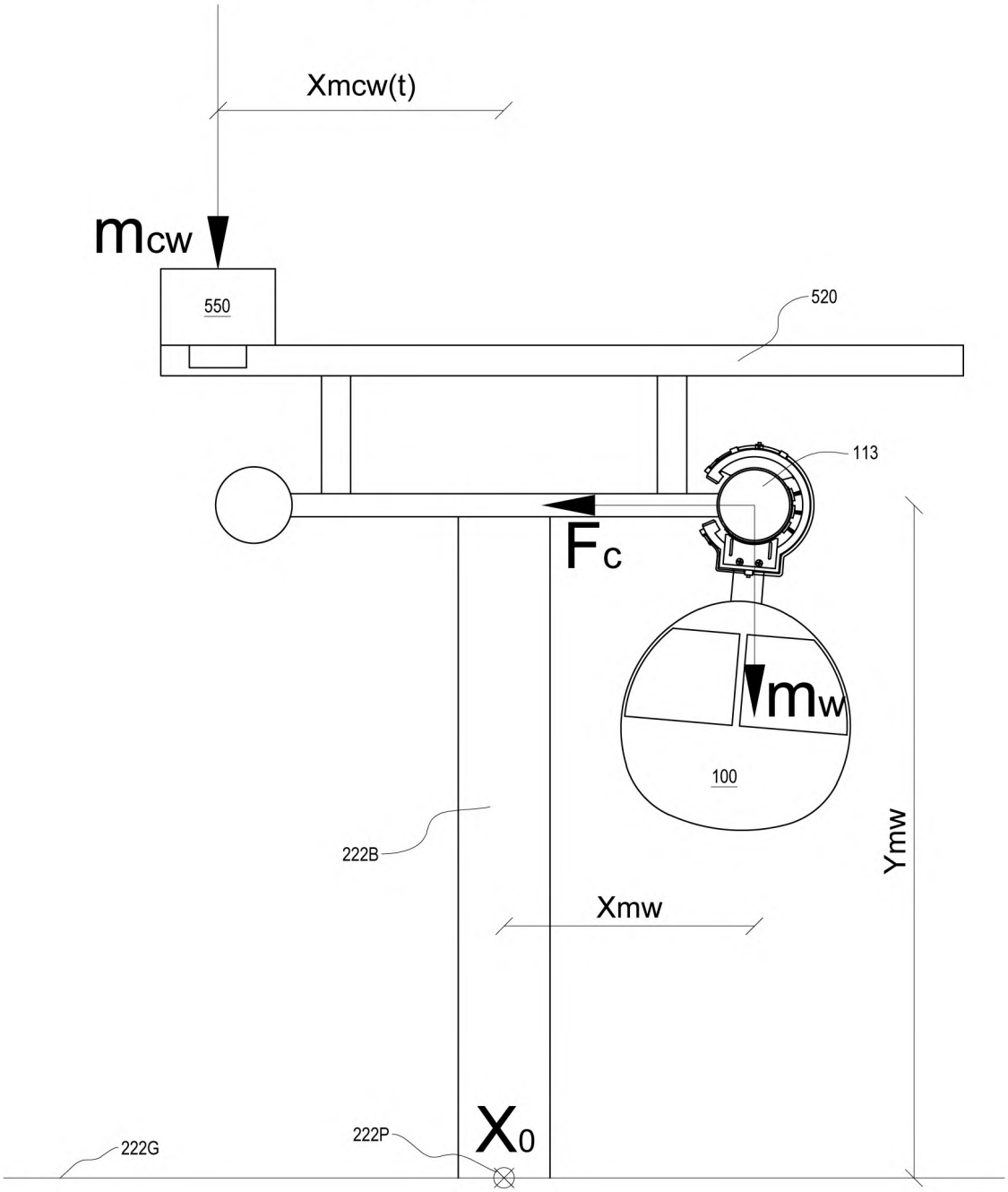
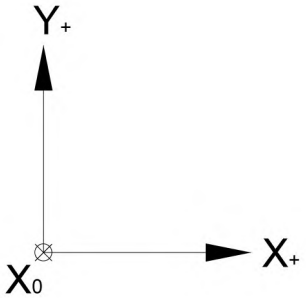


Fig. 11D





- F_c = Fuerza centrífuga del vagón
- m_w = Peso del vagón
- m_{cw} = Peso del peso móvil

$$\sum(M_{X_0}) = (m_w * x_{mw} + F_c * y_{mw} + m_{cw} * x_{mcw(t)})$$

Fig. 12A

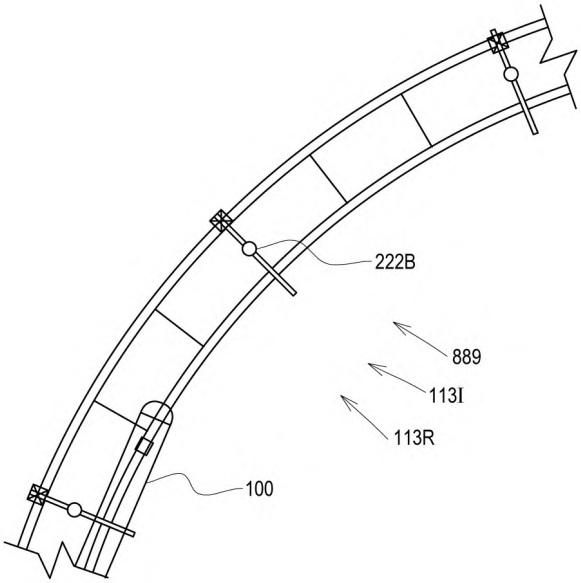


Fig. 12B

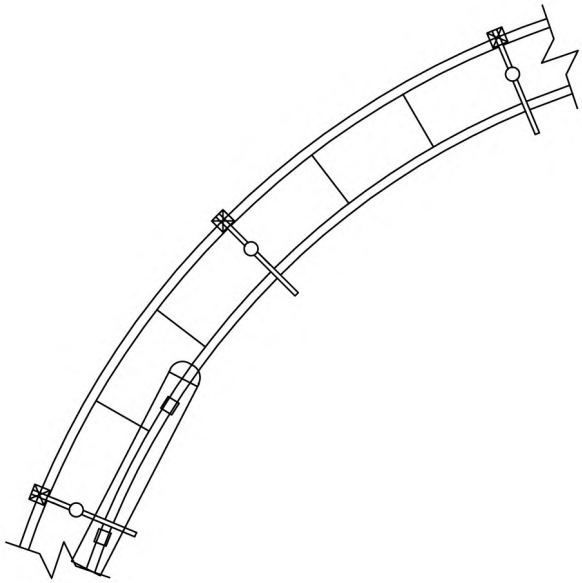


Fig. 12C

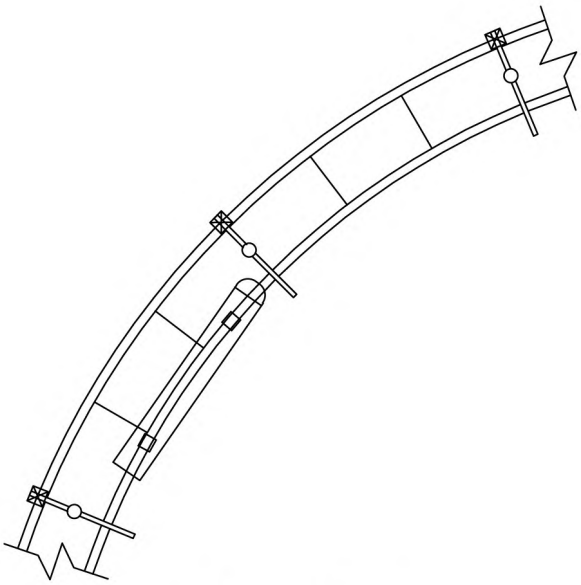


Fig. 12D

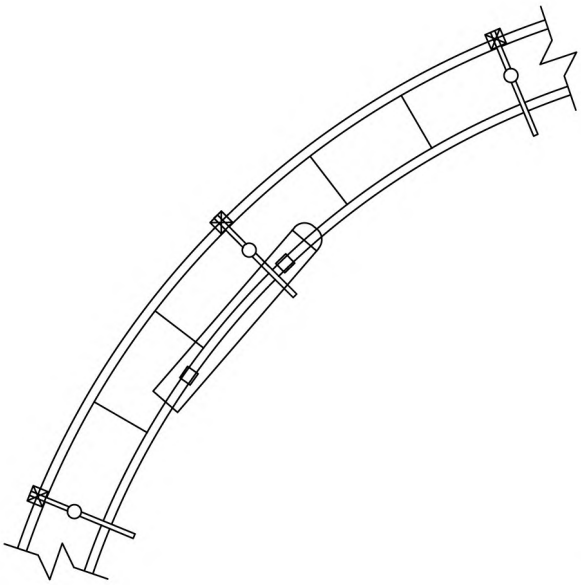


Fig. 12E

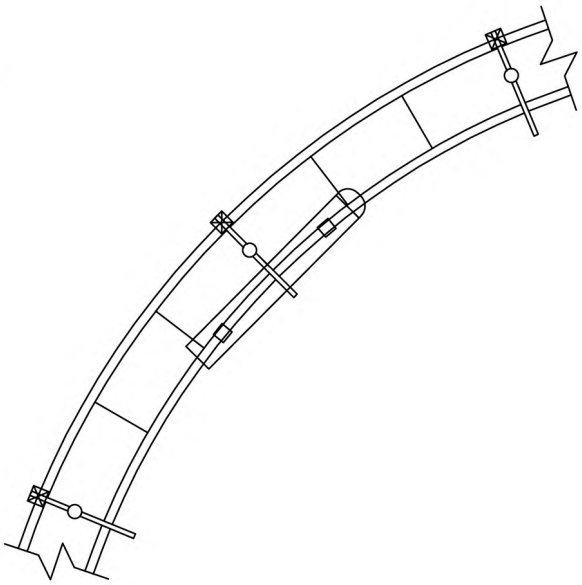


Fig. 12F

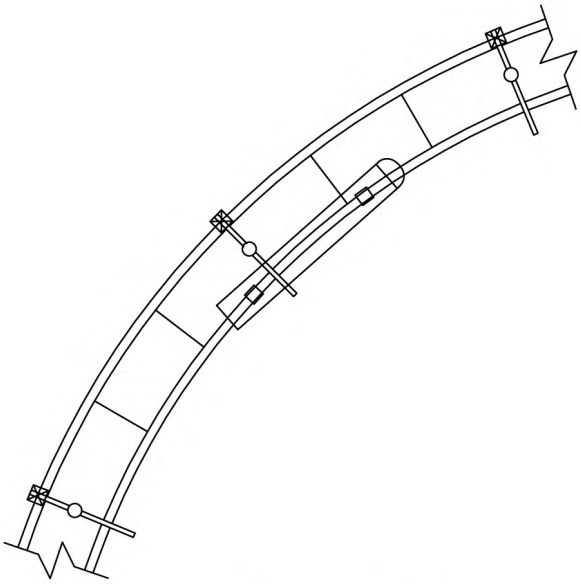


Fig. 12G

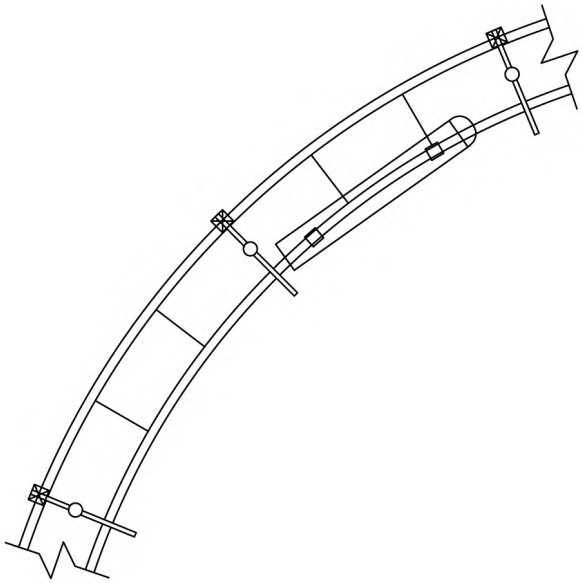


Fig. 12H

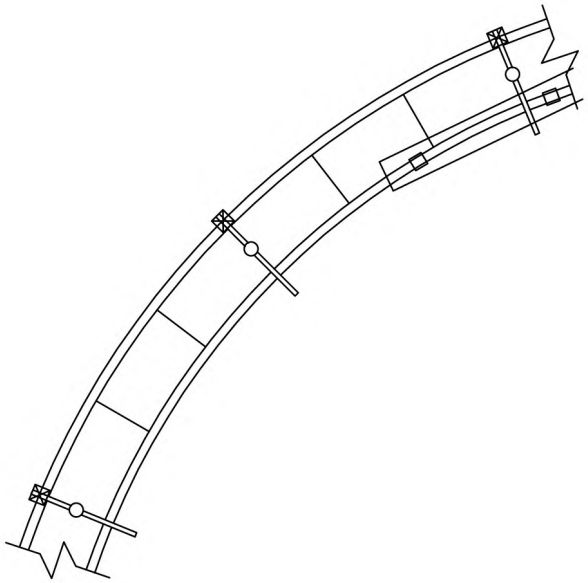


Fig. 12I

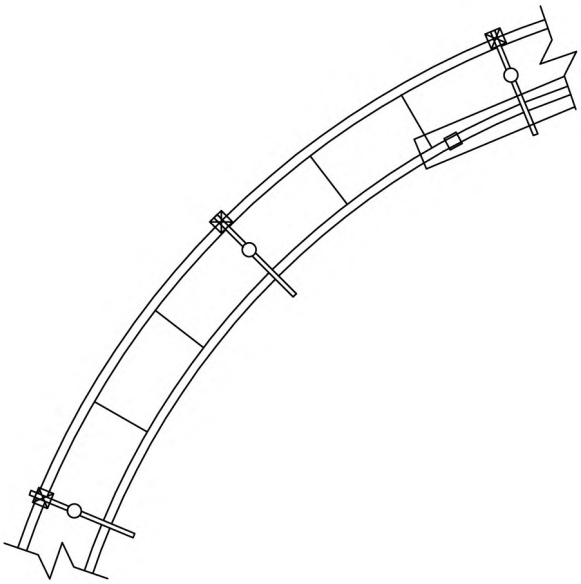
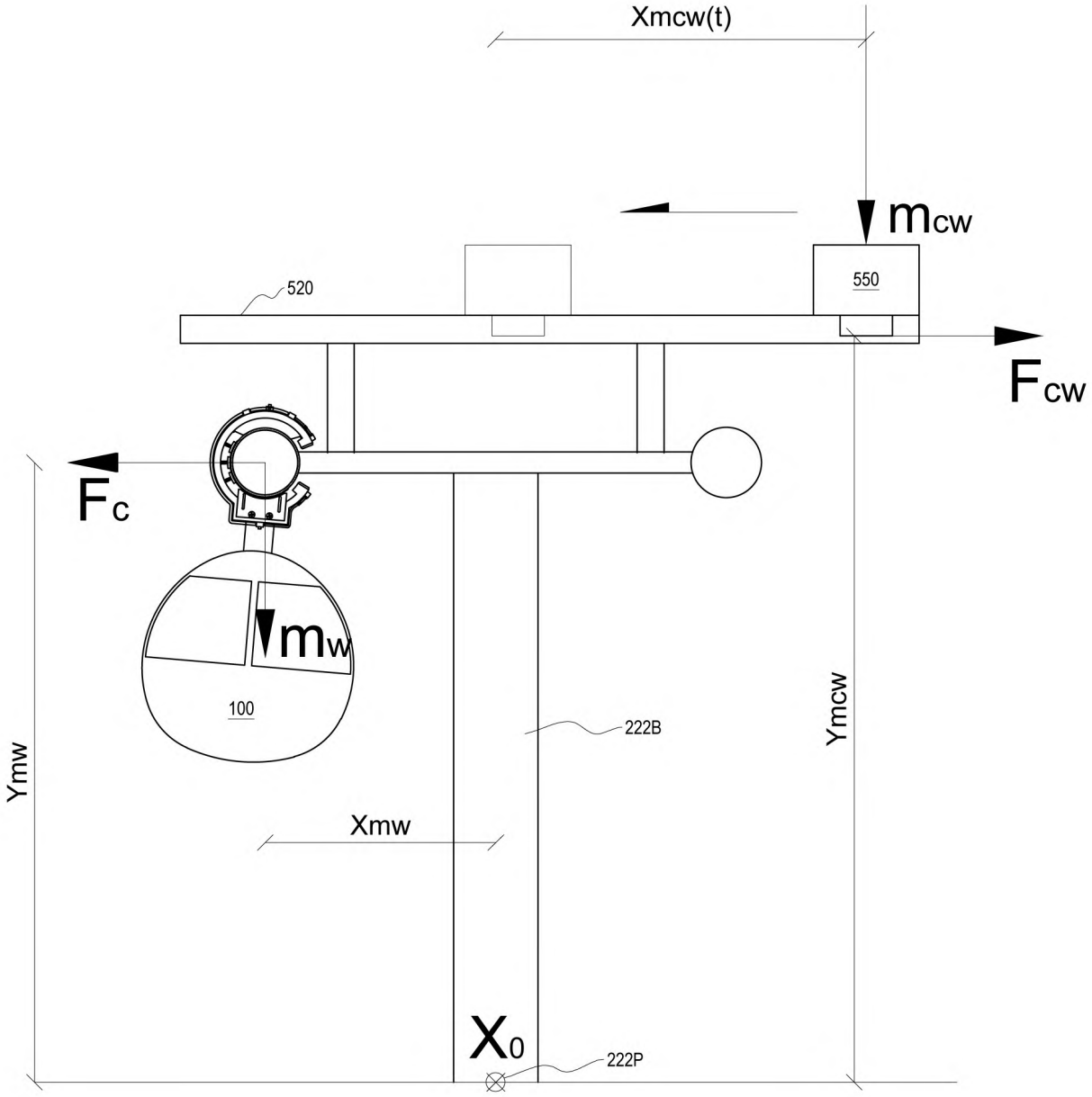


Fig. 12J

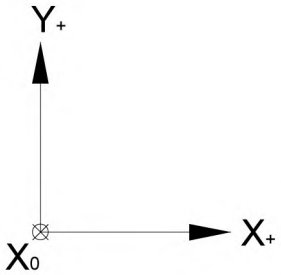
DATOS PARA LA COLUMNA 2										
Posición en Figs. 12B, 12C & 12D.	Xmcw(t) . [m]	Tiempo [s]	ángulo inclinación [°]	% Fc % Mw	mw*Xmw . [kN*m]	Fc*Ymw . [kN*m]	mcw*Xmcw(t) . [kN*m]	$\sum(M_{x0})$ sin c.w. [kN*m]	$\sum(M_{x0})$ con c.w. [kN*m]	Red. $\sum(M_{x0})$ [%]
0	−4.44	0.00	4.8	0.00	0.0	0.0	+348.4	0.0	+348.4	N/A
1	−4.44	0.50	4.8	0.25	−239.1	+64.7	+348.4	−174.4	+174.0	0.2
2	−4.44	1.00	4.8	0.50	−478.2	+129.4	+348.4	−348.8	+0.3	99.9
3	−4.44	1.50	4.8	0.75	−717.3	+194.1	+348.4	−523.2	−174.7	66.6
4	−4.44	2.00	4.8	1.00	−956.4	+258.8	+348.4	−697.6	−349.2	49.9
5	−4.44	2.50	4.8	0.75	−717.3	+194.1	+348.4	−523.2	−174.7	66.6
6	−4.44	3.00	4.8	0.50	−478.2	+129.4	+348.4	−348.8	+0.3	99.9
7	−4.44	3.50	4.8	0.25	−239.1	+64.7	+348.4	−174.4	+174.0	0.2
8	−4.44	5.70	4.8	0.00	0.0	0.0	+348.4	0.0	+348.4	N/A

- w = Vagón/monoriel
- c.w. = Contrapeso/peso móvil
- Xmcw(t) = Posición del contrapeso en el tiempo
- Fc = Fuerza centrífuga del vagón basada en % de Fc
- %Fc = Porcentaje de Fc sobre la columna 2
- Mw = Peso del vagón basado en el % de Mw
- %Mw = Porcentaje de Mw basado en la columna 2
- Red ∑(MX0) = Reducción de la suma de los momentos en la columna
- mw*Xmw = Momento causado por el peso del vagón
- Fc*Ymw = Momento causado por la fuerza centrífuga del vagón
- mcw*Xmcw(t) = Momento causado por el peso del contrapeso en el tiempo

Fig. 12K



- F_{cw} = Fuerza ejercida por la masa móvil
- F_c = Fuerza centrífuga del vagón
- m_w = Peso del vagón
- m_{cw} = Peso del peso móvil



$$\sum(M_{X_0})\_with\_c.w. = (m_w * x_{mw} + F_c * y_{mw} + m_{cw} * x_{mcw(t)} + F_{cw} * y_{mcw})$$

$$\sum(M_{X_0})\_without\_c.w. = (m_w * x_{mw} + F_c * y_{mw})$$

Fig. 12L

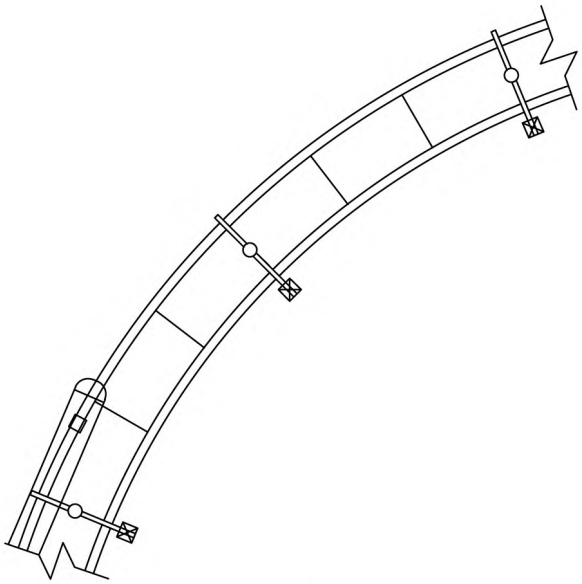


Fig. 12M

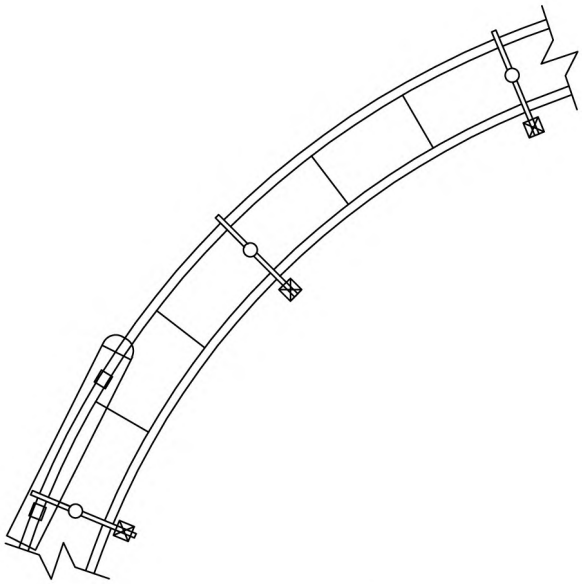


Fig. 12N

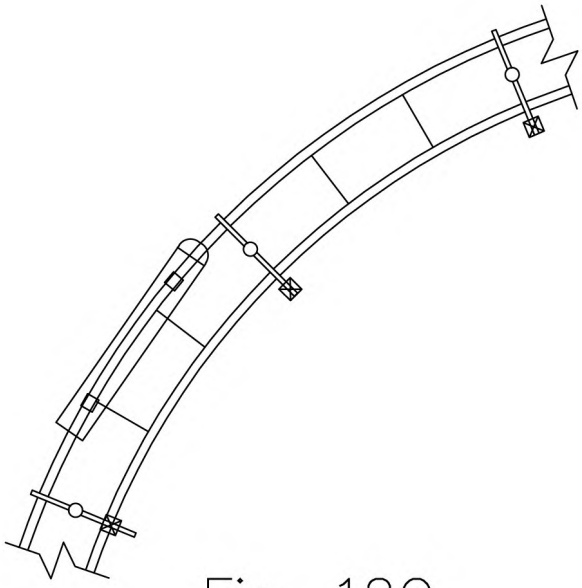


Fig. 12O

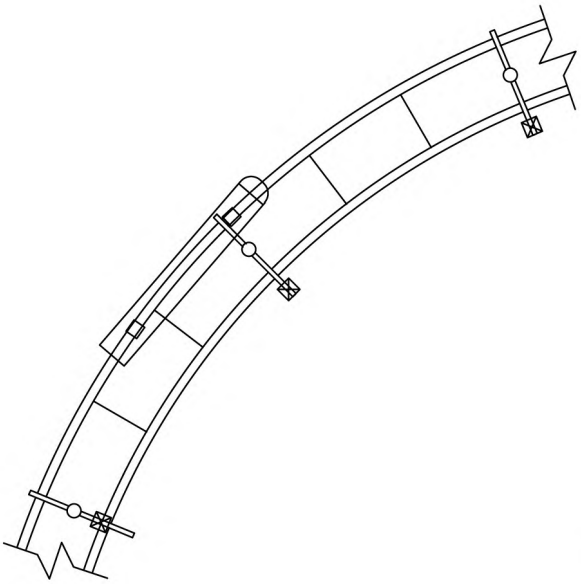


Fig. 12P

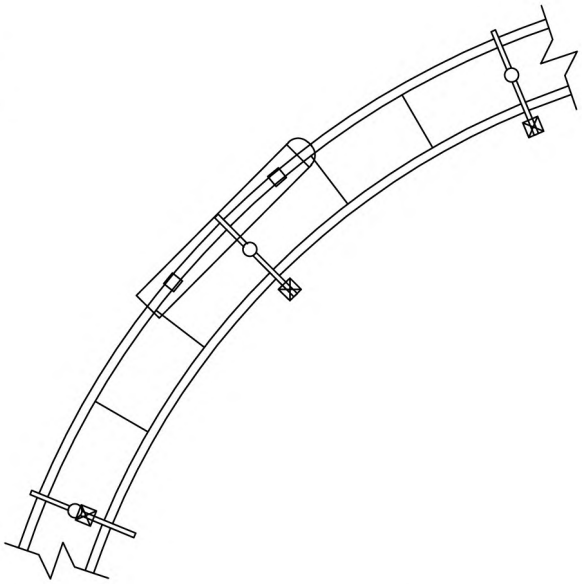


Fig. 12Q

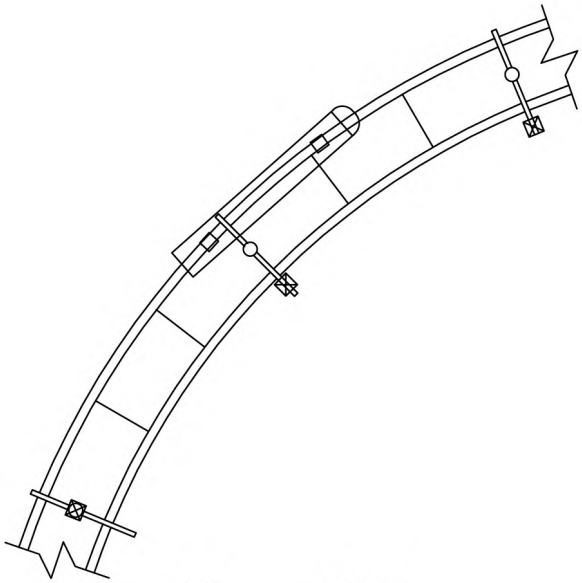


Fig. 12R

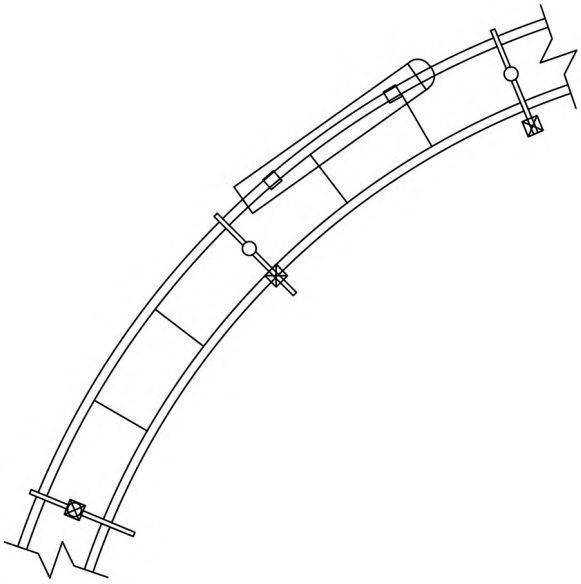


Fig. 12S

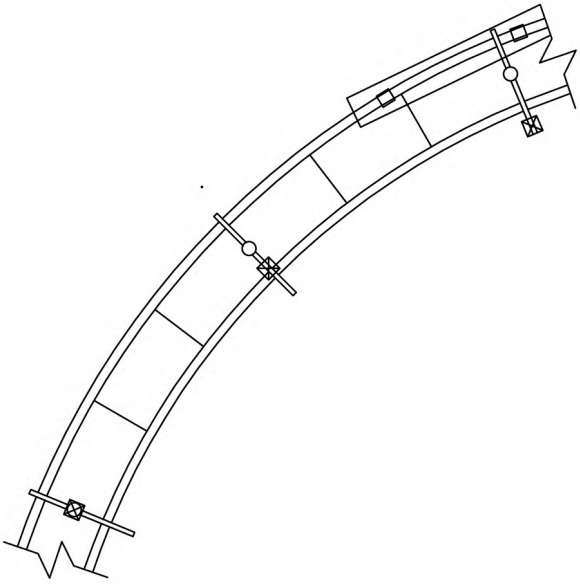


Fig. 12T

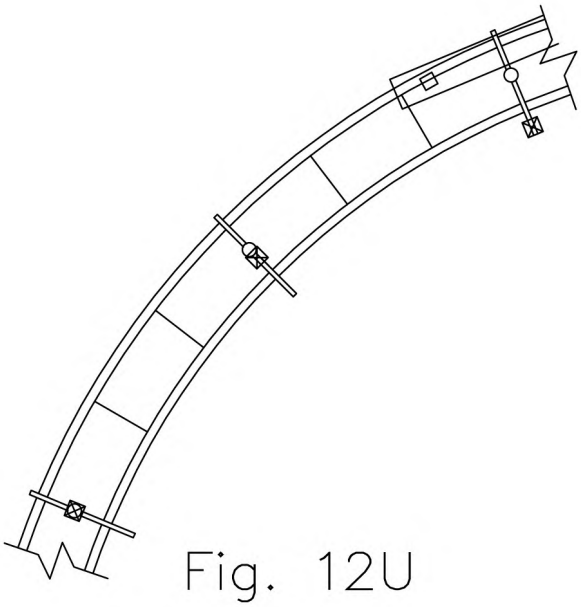


Fig. 12U

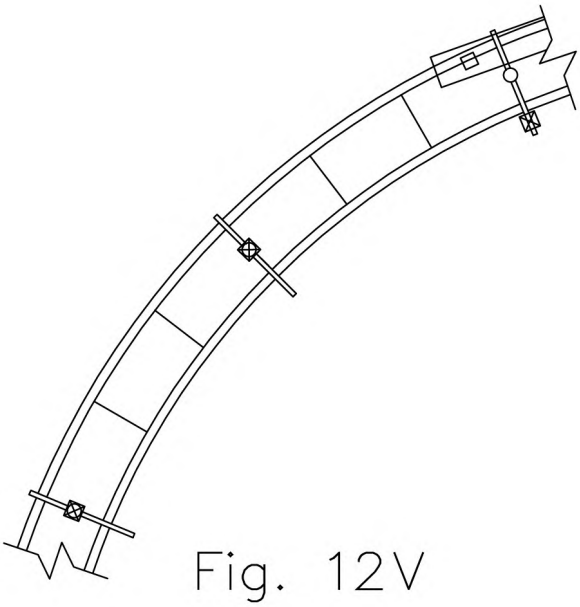


Fig. 12V

DATOS PARA LA COLUMNA 2													
Posición en las Figs. 12B, 12C, & 12D.	Xmcw(t) . [m]	Tiempo [s]	c.w. Velocidad [m/s]	c.w. Aceleración [m/s2]	ángulo inclinación [°]	% Fc % Mw	mw*Xmw . [kN*m]	Fc*Ymw . [kN*m]	Fcw*Ymcw . [kN*m]	mcw*Xmcw(t) . [kN*m]	∑(Mx0) sin c.w. [kN*m]	∑(Mx0) with c.w. [kN*m]	Red. ∑(Mx0) [%]
0	+6.00	0.00	0.00	0.00	4.8	0.00	0.0	0.0	0.0	−470.8	0.0	−470.8	N/A
1	+6.00	0.50	0.00	0.00	4.8	0.25	+239.1	+64.7	0.0	−470.8	+303.8	−167.0	45.0
2	+6.00	1.00	0.00	0.00	4.8	0.50	+478.2	+129.4	0.0	−470.8	+607.6	+136.7	77.5
3	+6.00	1.50	0.00	0.00	4.8	0.75	+717.3	+194.1	0.0	−470.8	+911.4	+440.6	51.7
4	+6.00	2.00	0.00	+6.00	4.8	1.00	+956.4	+258.8	−576.0	−470.8	+1215.3	+168.4	86.1
5	+5.42	2.50	+2.00	+2.00	4.8	0.75	+717.3	+194.1	−192.0	−425.3	+911.4	+294.1	67.7
6	+4.25	3.00	+2.50	0.00	4.8	0.50	+478.2	+129.4	0.0	−333.5	+607.6	+274.1	54.9
7	+3.03	3.50	+2.30	−0.80	4.8	0.25	+239.1	+64.7	+76.8	−237.8	+303.8	+142.8	53.0
8	+0.31	5.70	0.00	−1.29	4.8	0.00	0.0	0.0	+123.9	−24.3	0.0	+99.6	N/A
9	0.00	+5.70	0.00	0.00	4.8	0.00	0.0	0.0	0.0	0.0	0.0	0.0	N/A

- w = Vagón/monoriel
- c.w. = Contrapeso/peso móvil
- Xmcw(t) = Posición del contrapeso en el tiempo
- Fc = Fuerza centrífuga del vagón basada en % de Fc
- %Fc = Porcentaje de Fc en la columna 2
- Mw = Peso del vagón basado en el % de Mw
- %Mw = Porcentaje de Mw basado en la columna 2
- Fcw = Fuerza ejercida por el contrapeso
- Red ∑(MX0) = Reducción de la suma de momentos en la columna 2
- mw*Xmw = Momento del peso del vagón
- Fc*Ymw = Momento de la fuerza centrífuga del vagón
- Fcw*Ymcw = Momento de la acción del contrapeso
- mcw*Xmcw(t) = Momento del peso del contrapeso en el tiempo

Fig. 12W

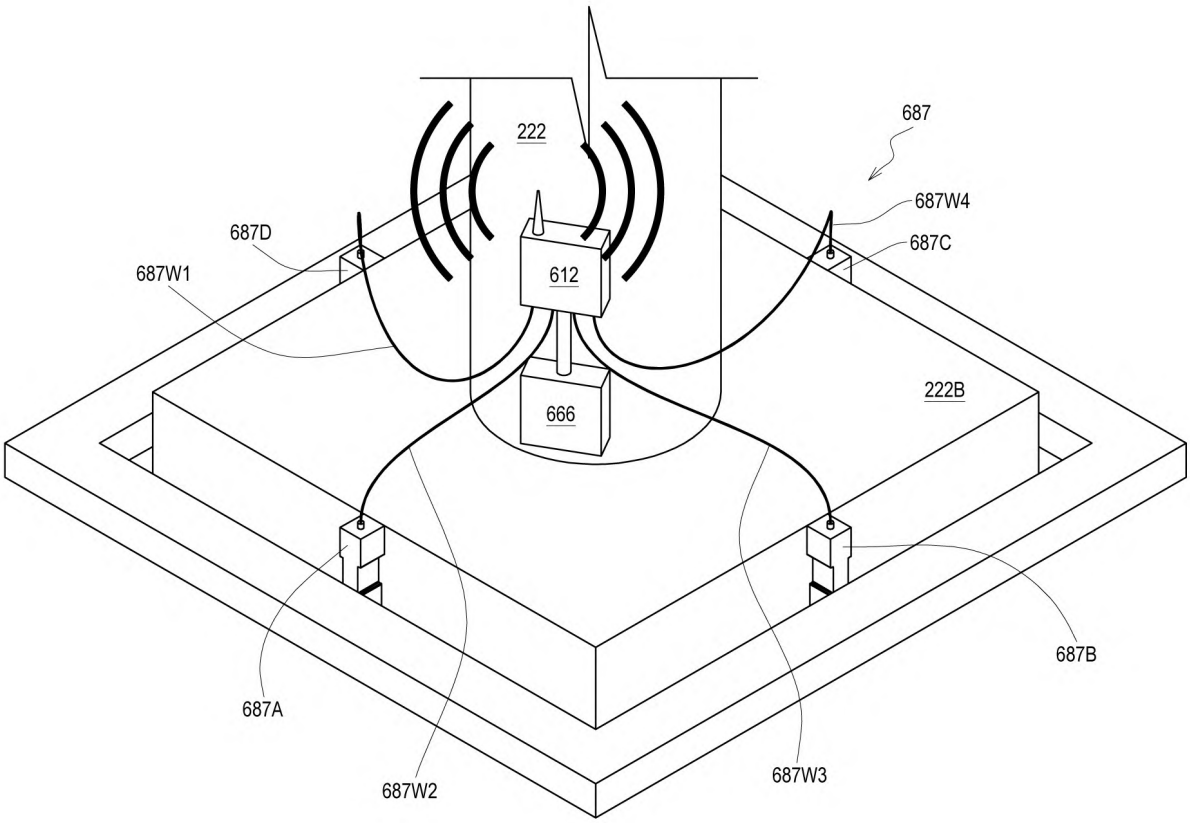

687
222
687W4
687D
687C
687W1
612
666
222B
687B
687A
687W2
687W3

Fig. 13

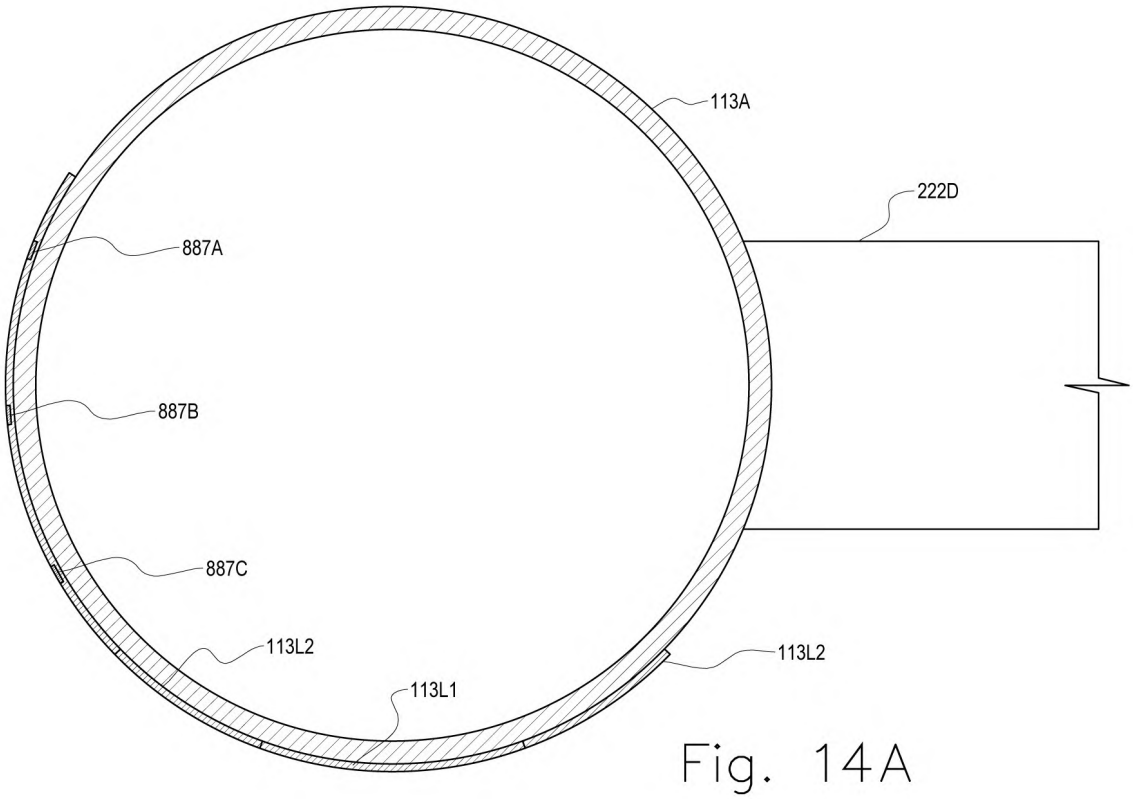


Fig. 14A

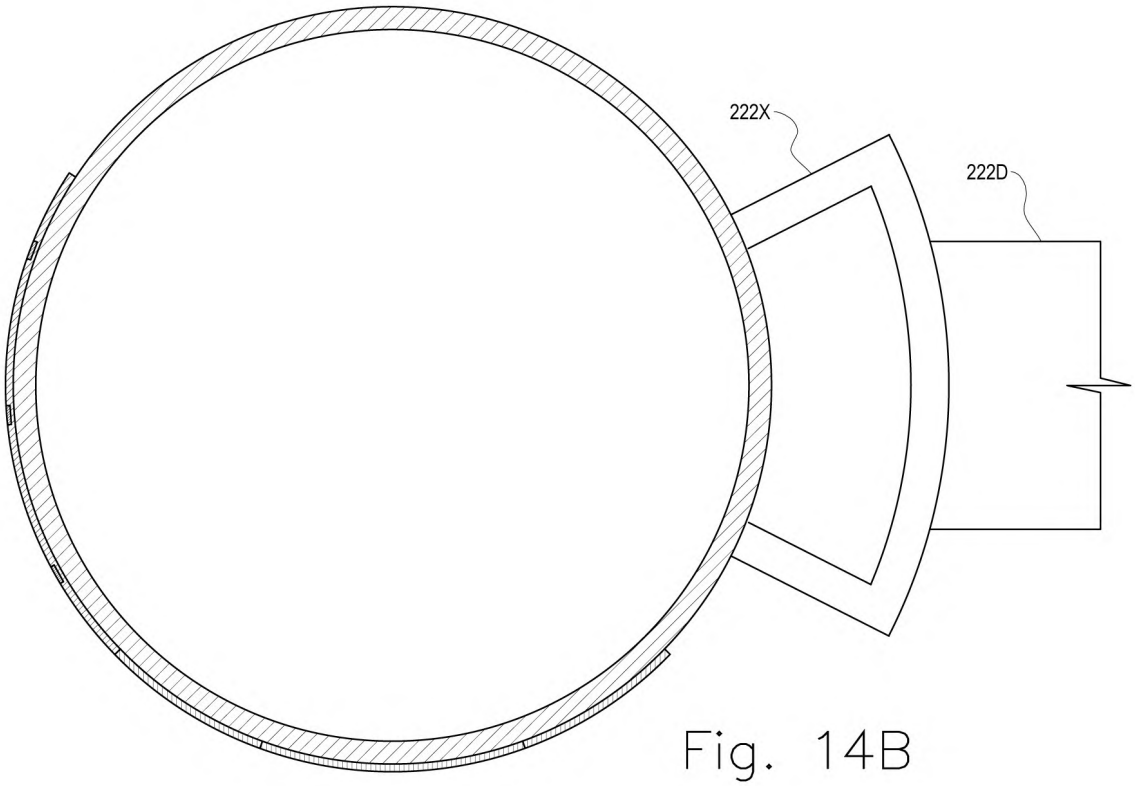


Fig. 14B

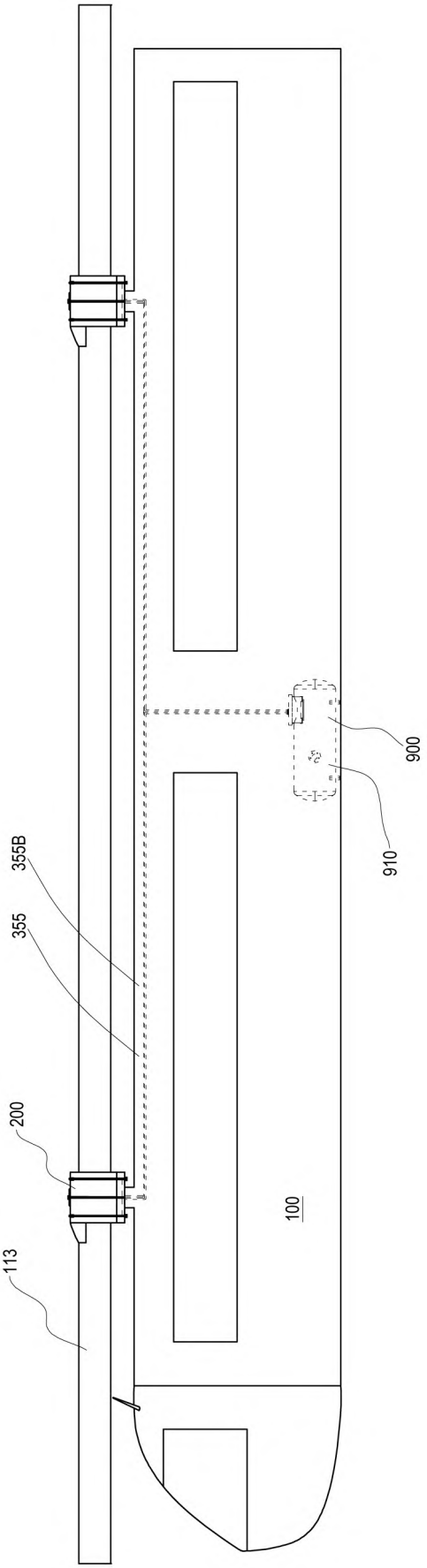


Fig. 15

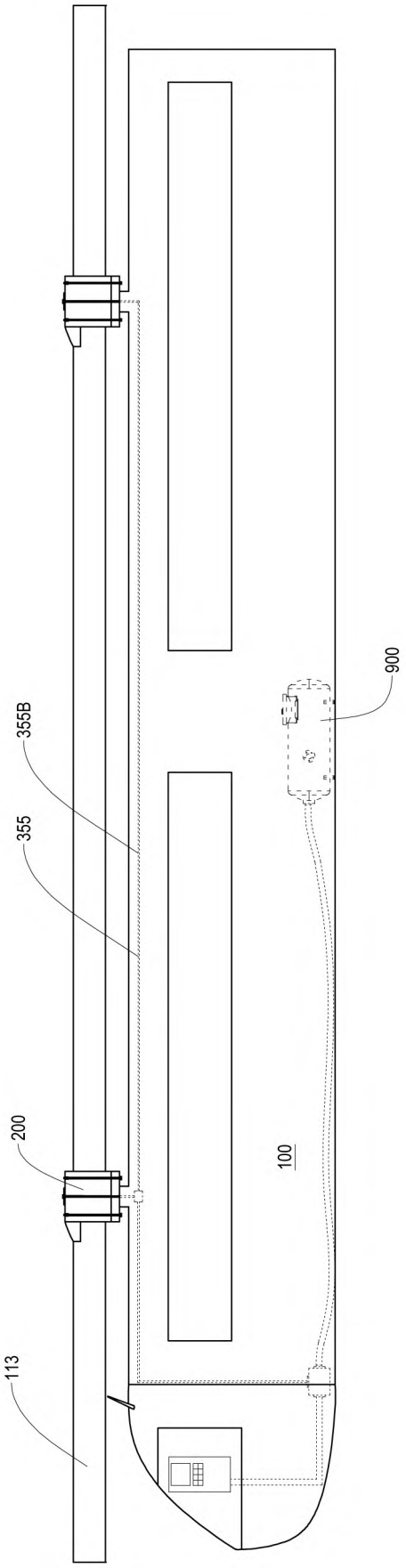


Fig. 16

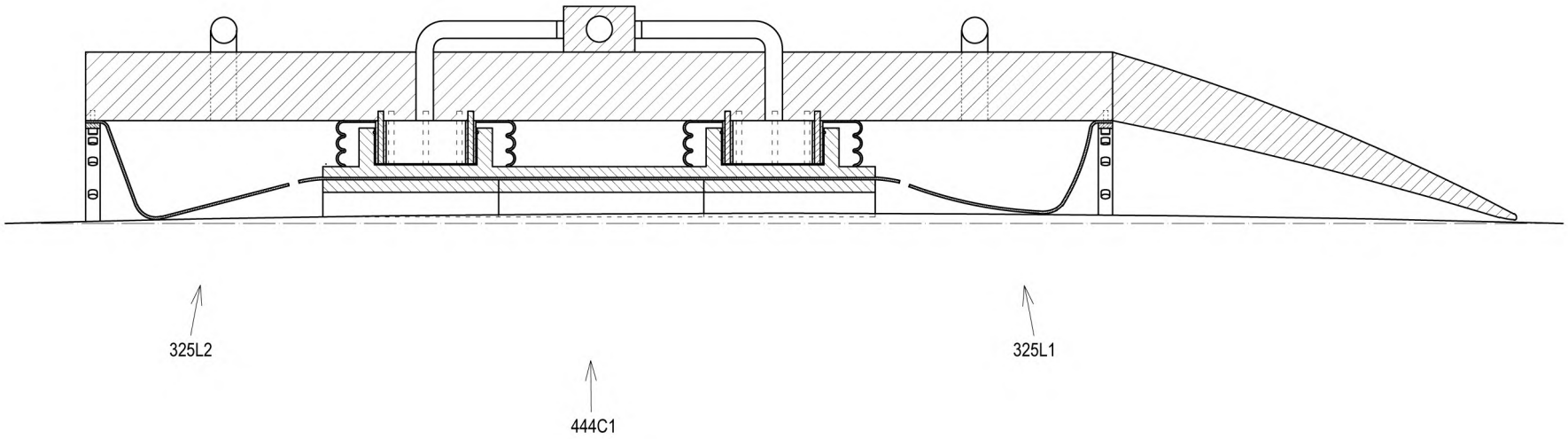


Fig. 17

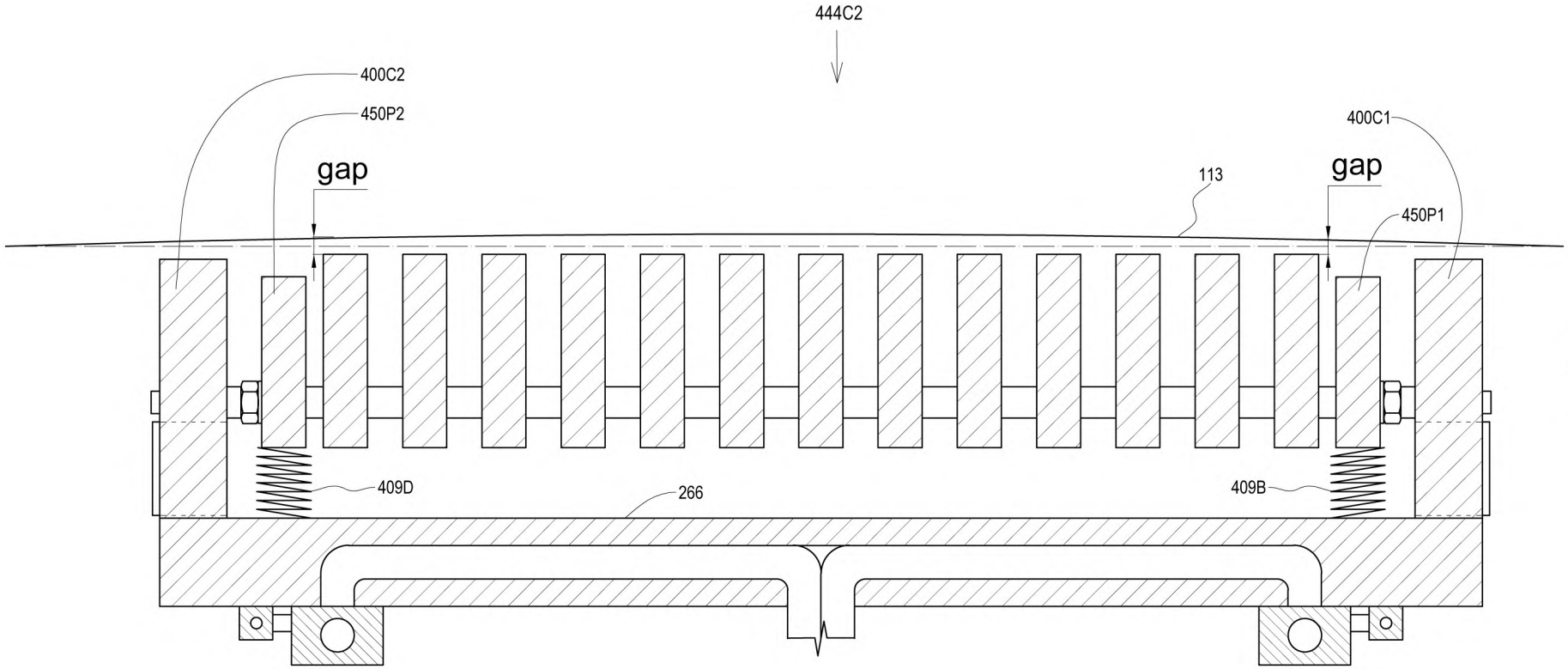


Fig. 18

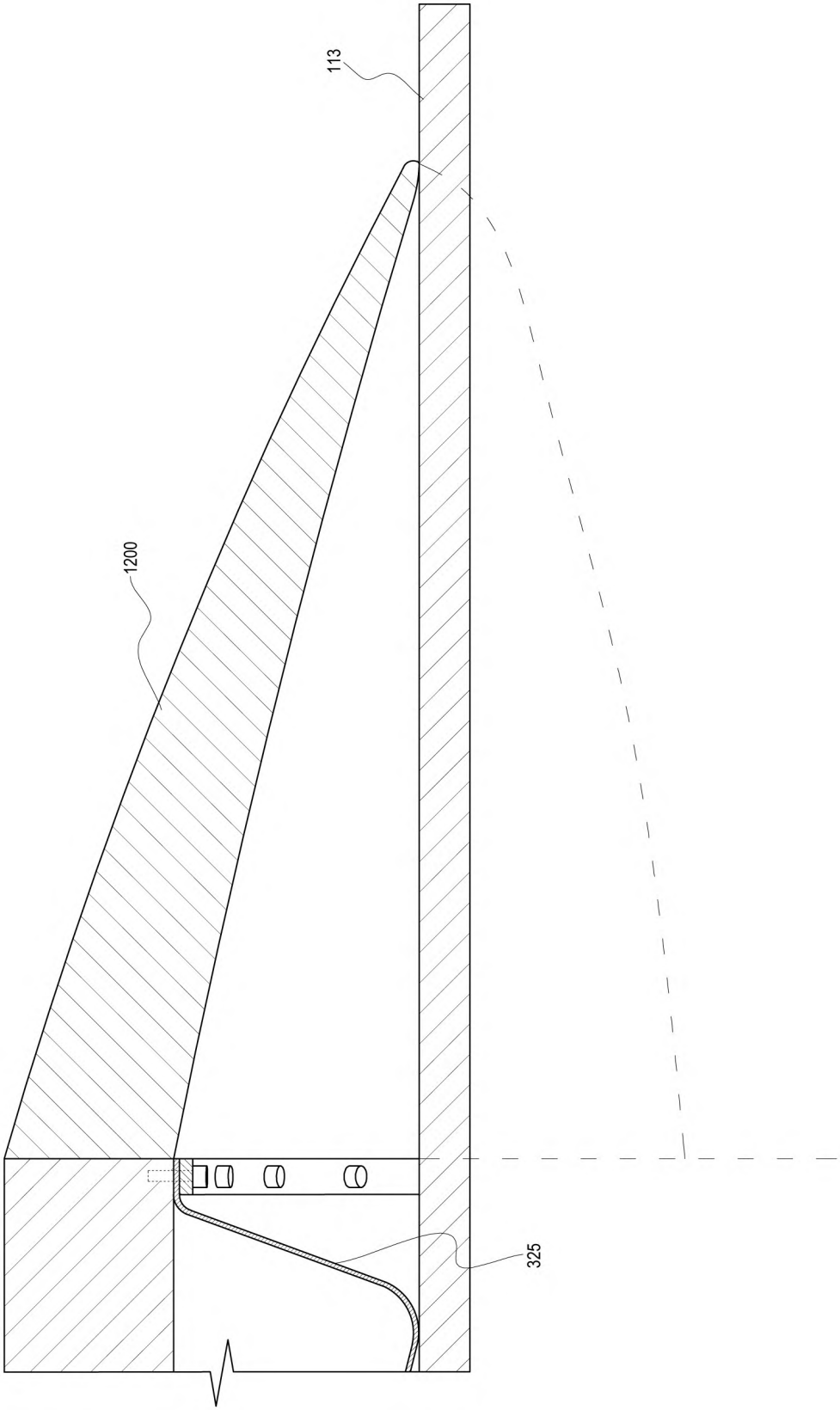
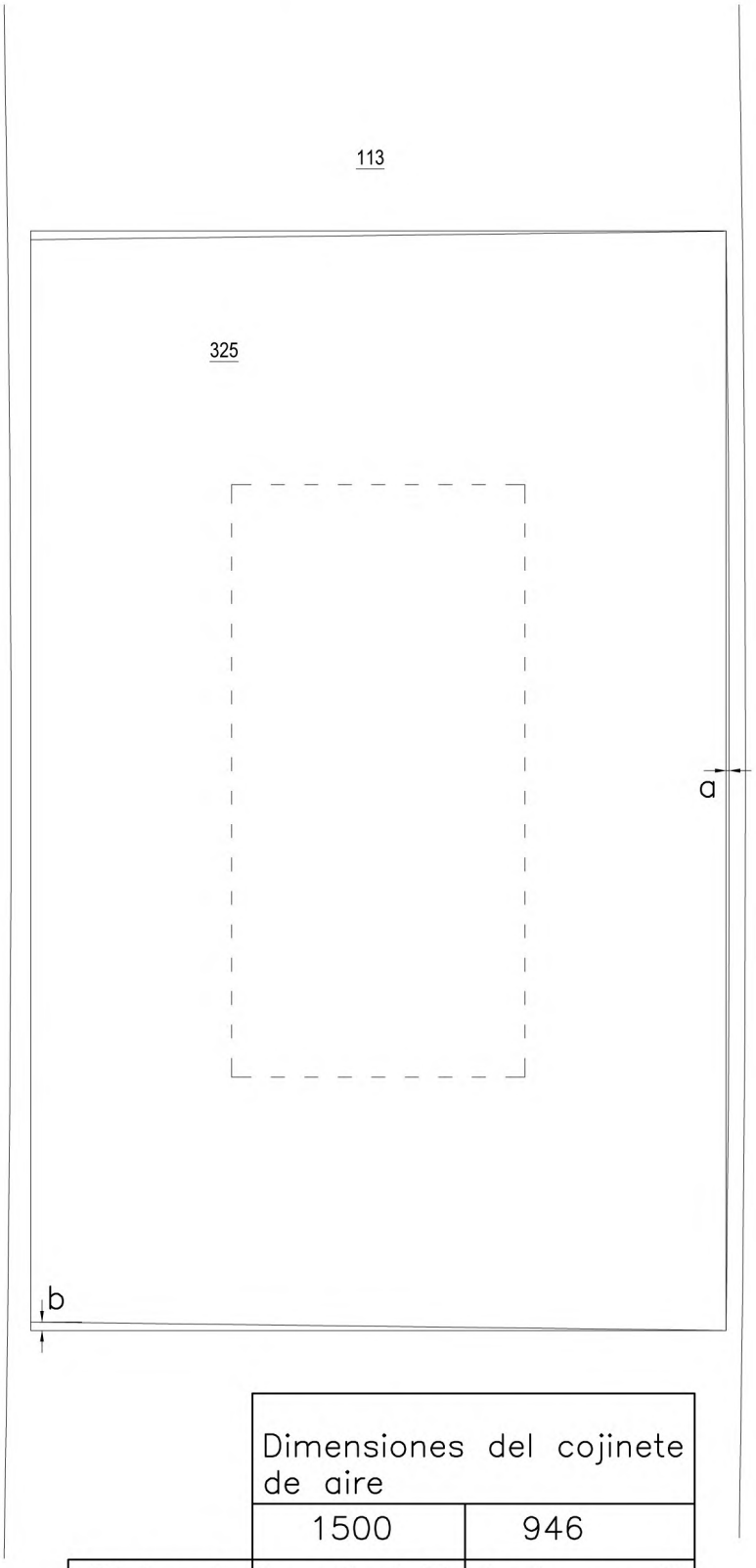
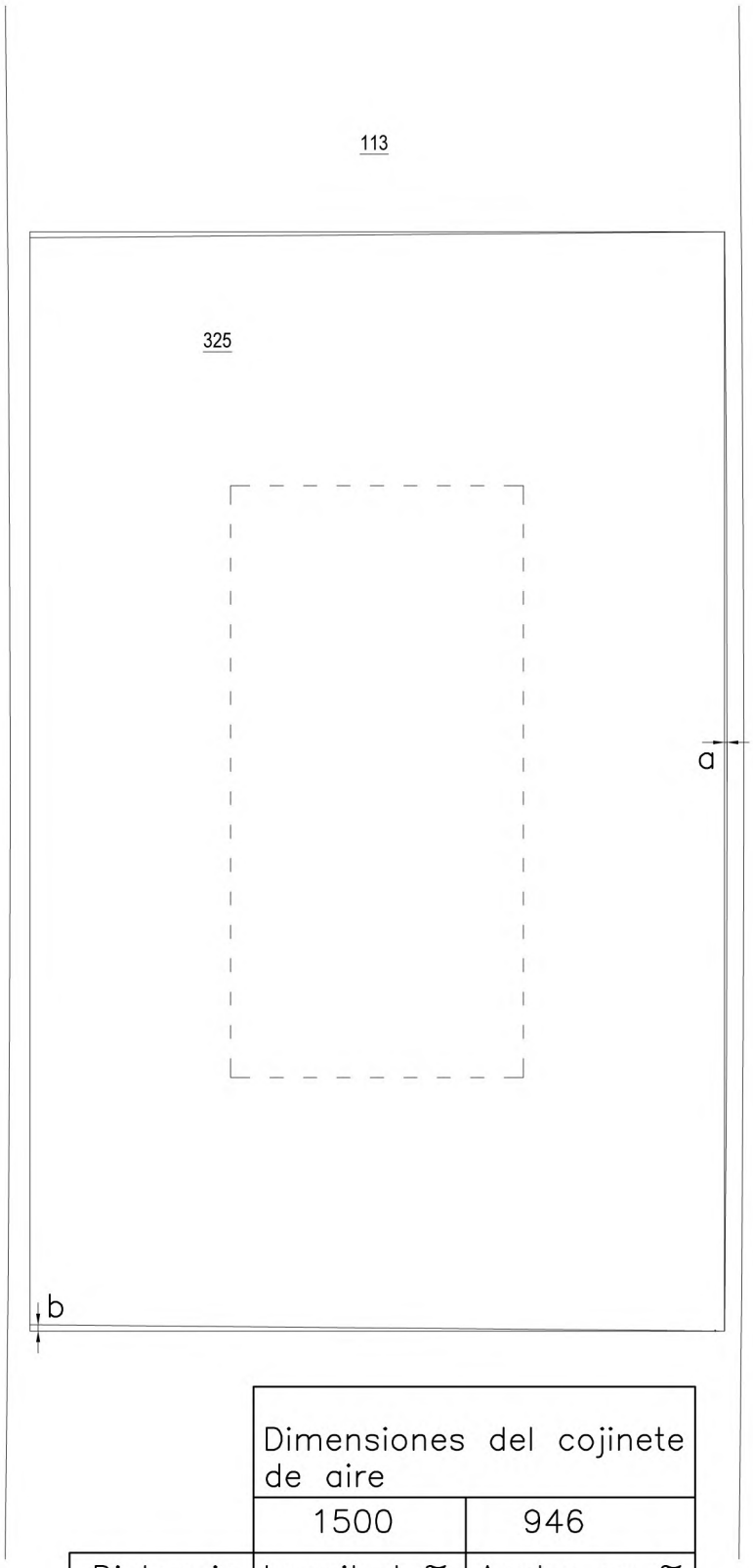


Fig. 19



		Dimensiones del cojinete de aire	
		1500	946
	Distancia	Longitud %	Ancho en %
a	4,61	0,30	0,48
b	11,64	0,77	1,23

Fig. 20A



		Dimensiones del cojinete de aire	
		1500	946
	Distancia	Longitud %	Ancho en %
a	3,92	0,26	0,41
b	8,3	0,55	0,87

Fig. 20B

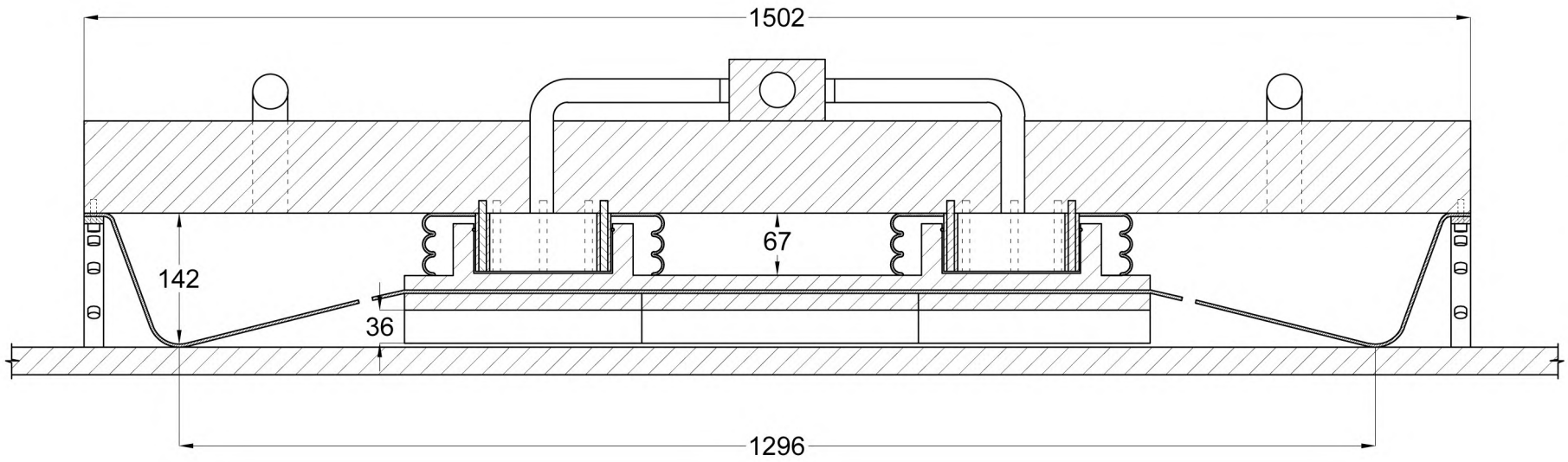


Fig. 21A

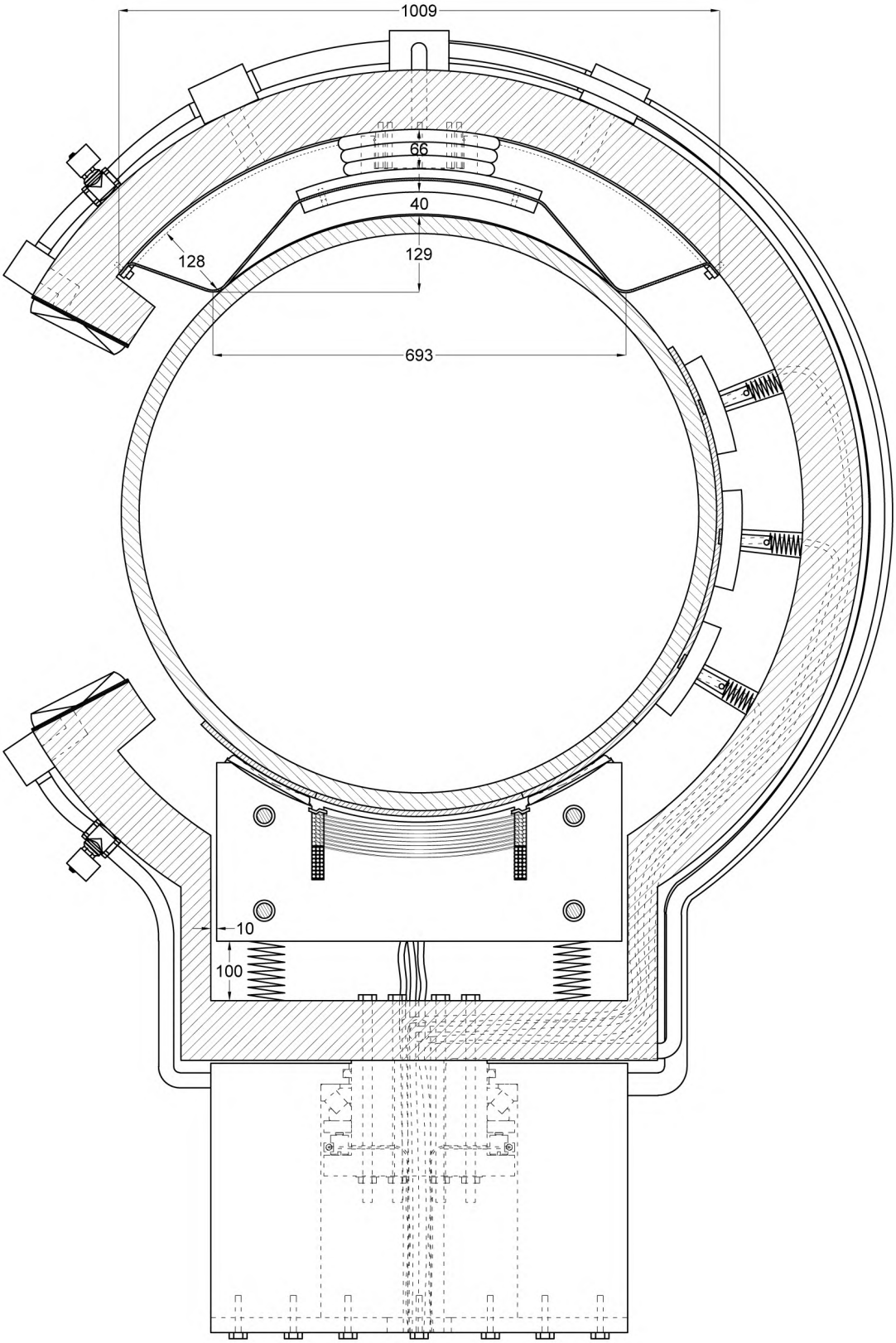


Fig. 21B

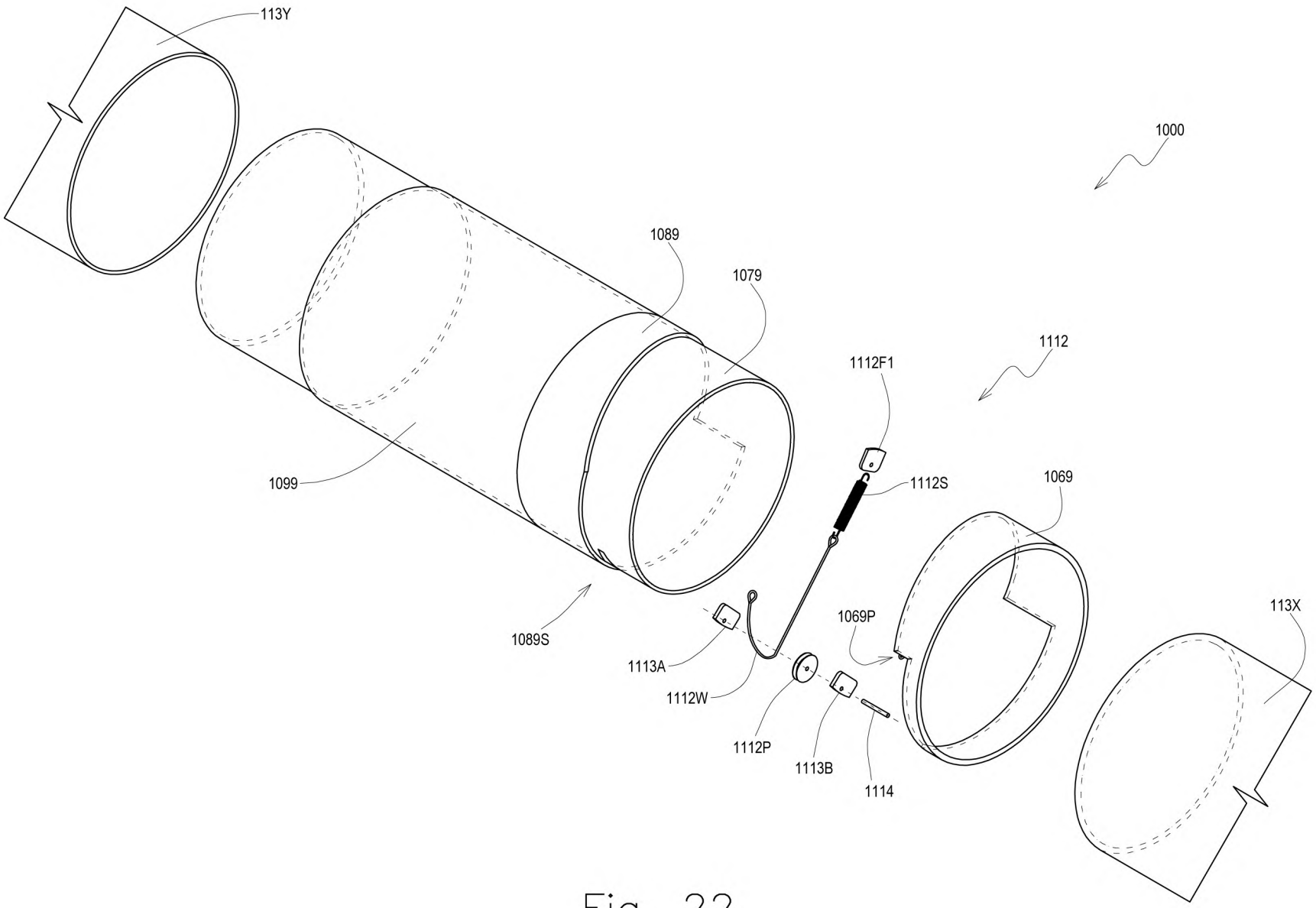

113Y
1000
1089
1079
1112
1112F1
1112S
1069
1099
1069P
113X
1089S
1113A
1112W
1112P
1113B
1114

Fig. 22

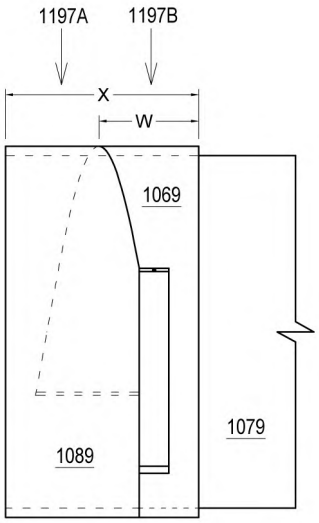


Fig. 24A

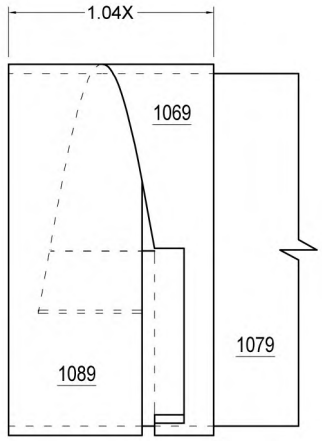


Fig. 24B

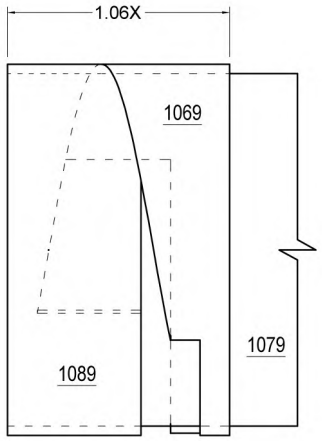


Fig. 24C

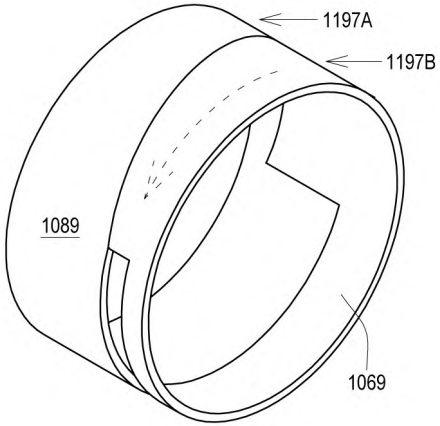


Fig. 23A

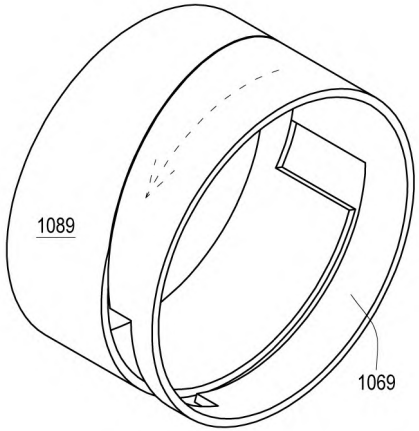


Fig. 23B

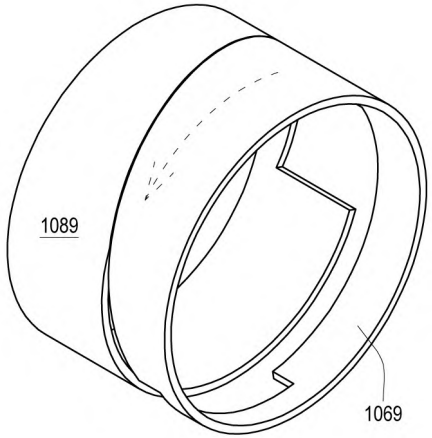


Fig. 23C

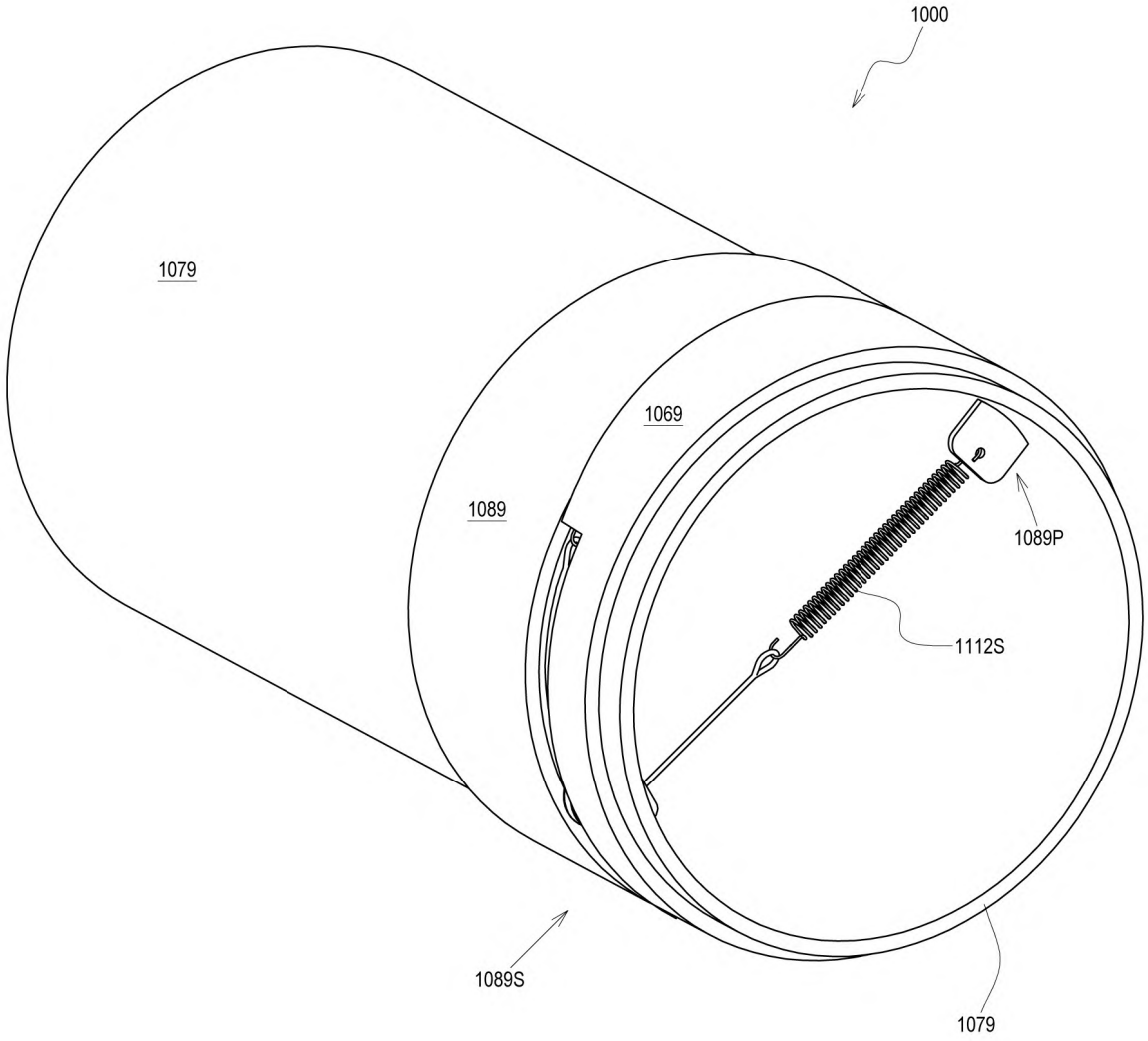


Fig. 25A

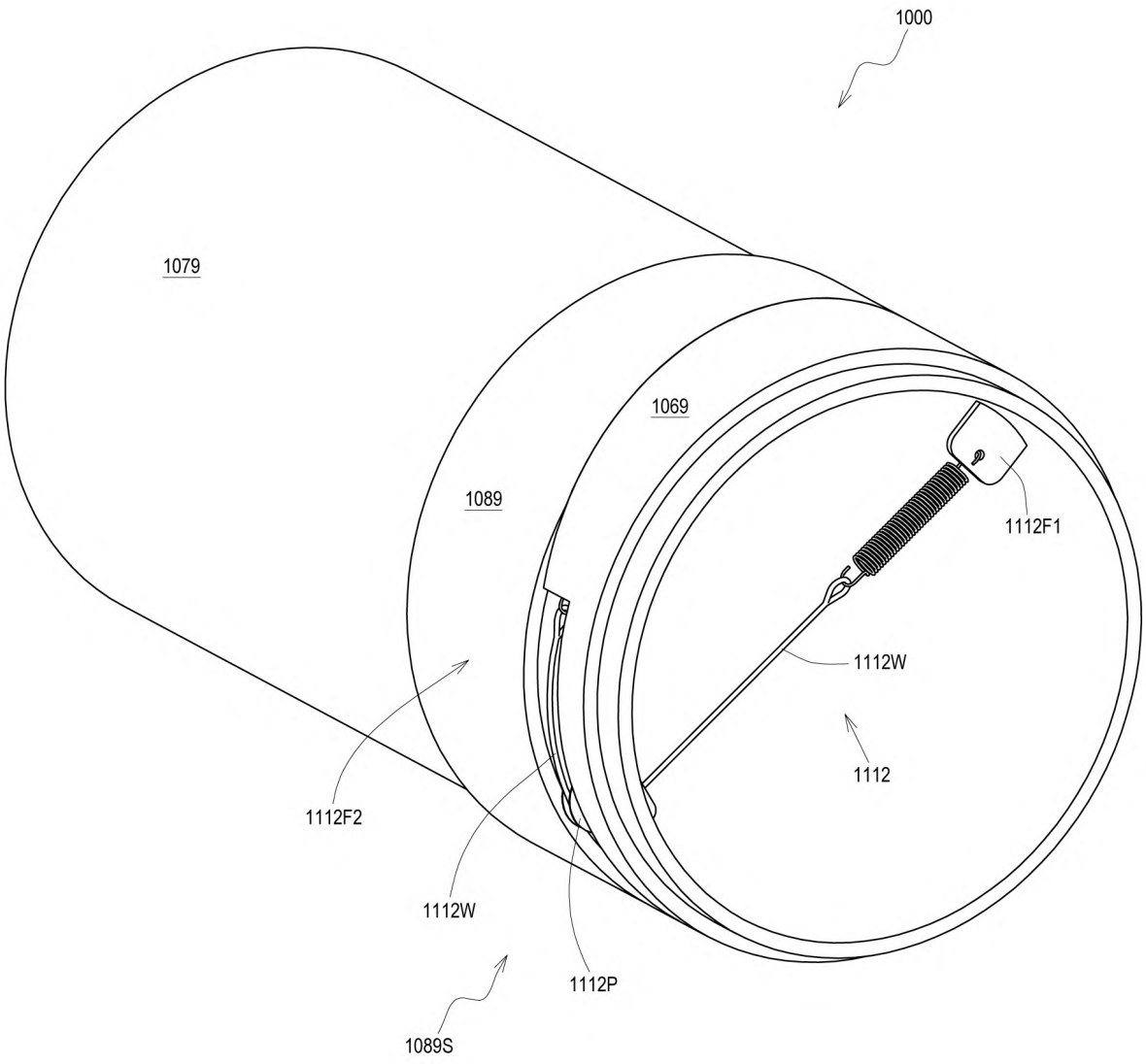

1000
1079
1069
1089
1112F1
1112W
1112
1112F2
1112W
1112P
1089S

Fig. 25B

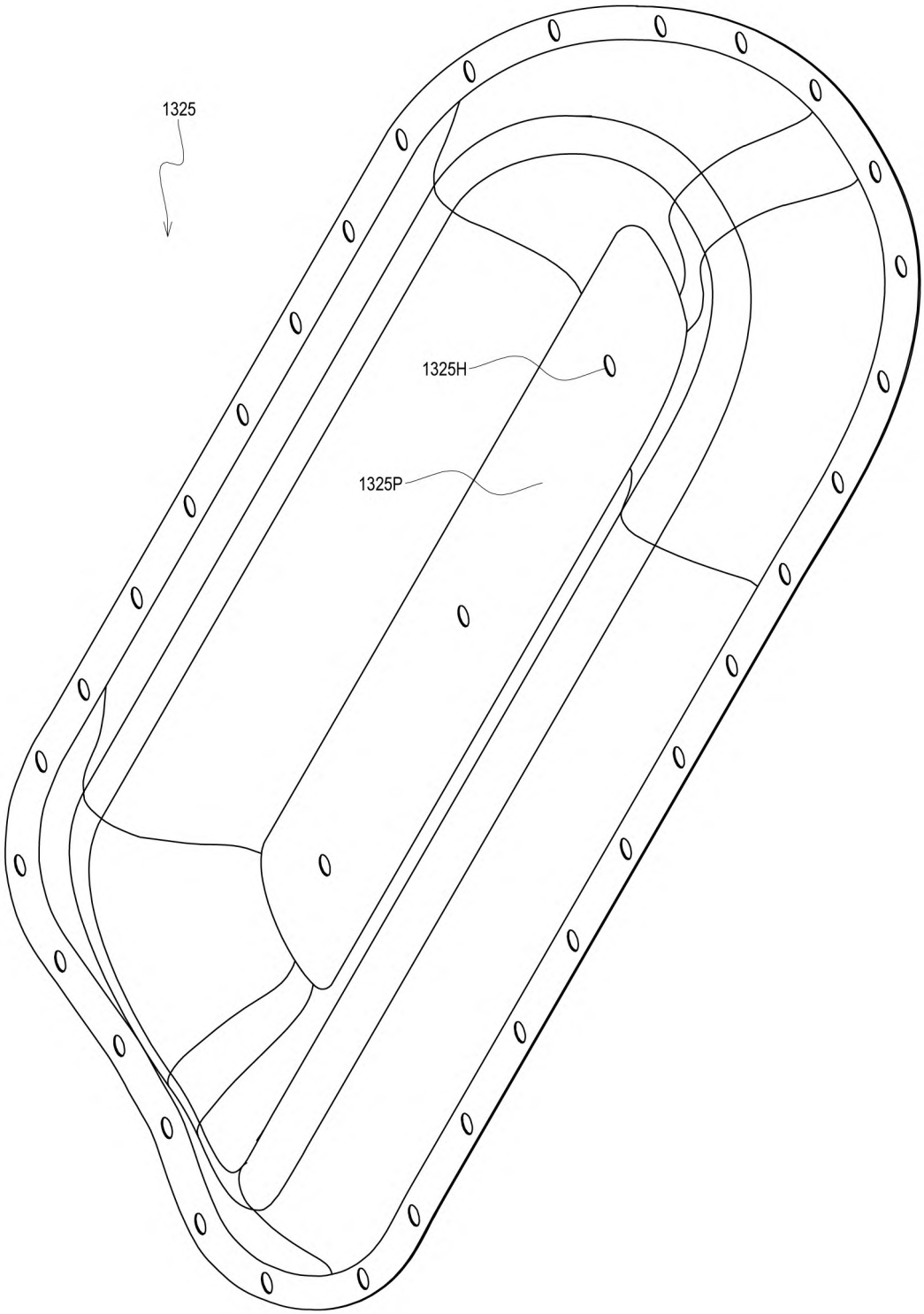


Fig. 26A

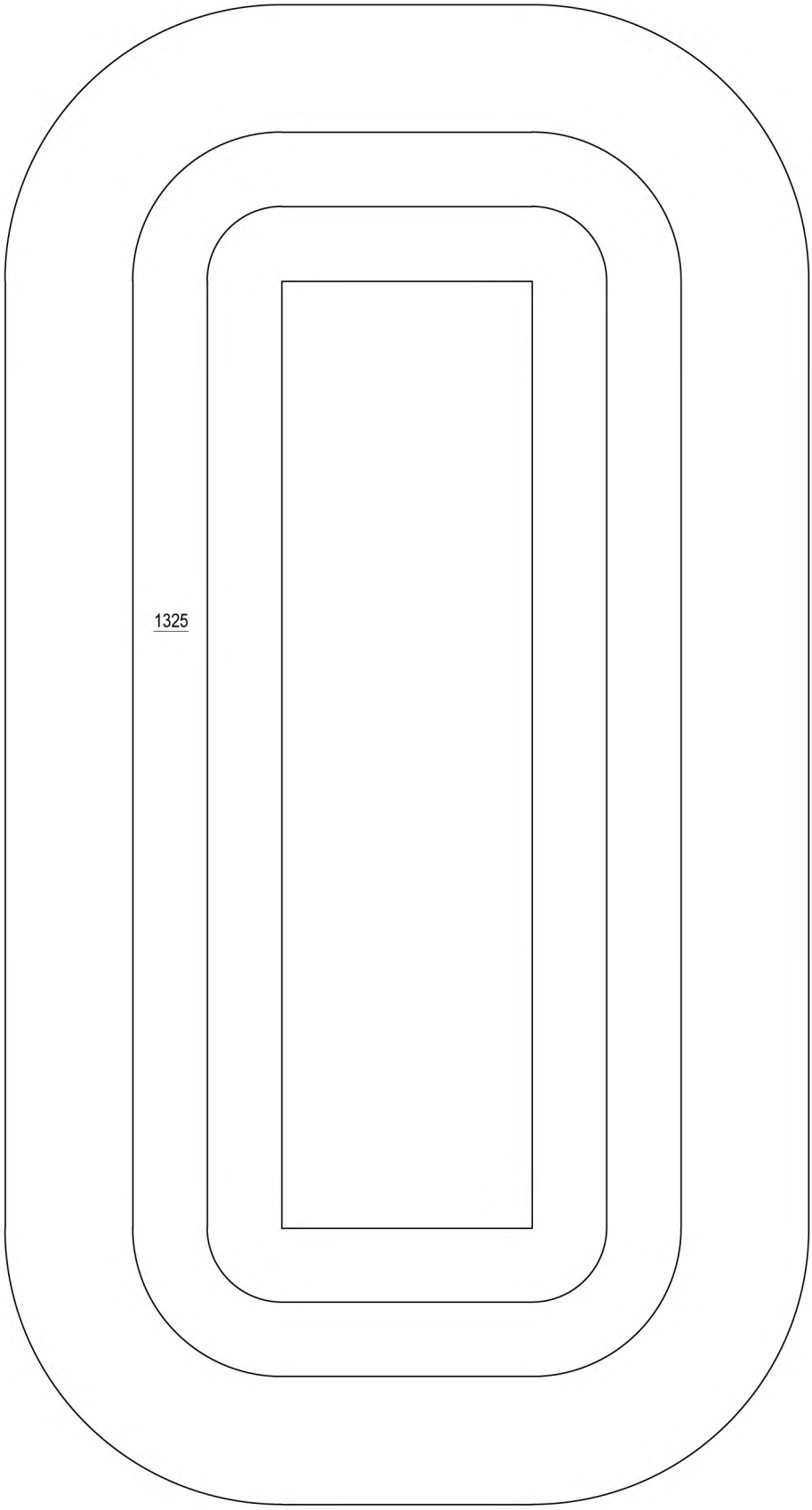


Fig. 26B