

No. 792,118.

PATENTED JUNE 13, 1905.

H. CHRISMAN.
DRY GAS METER.

APPLICATION FILED JULY 6, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

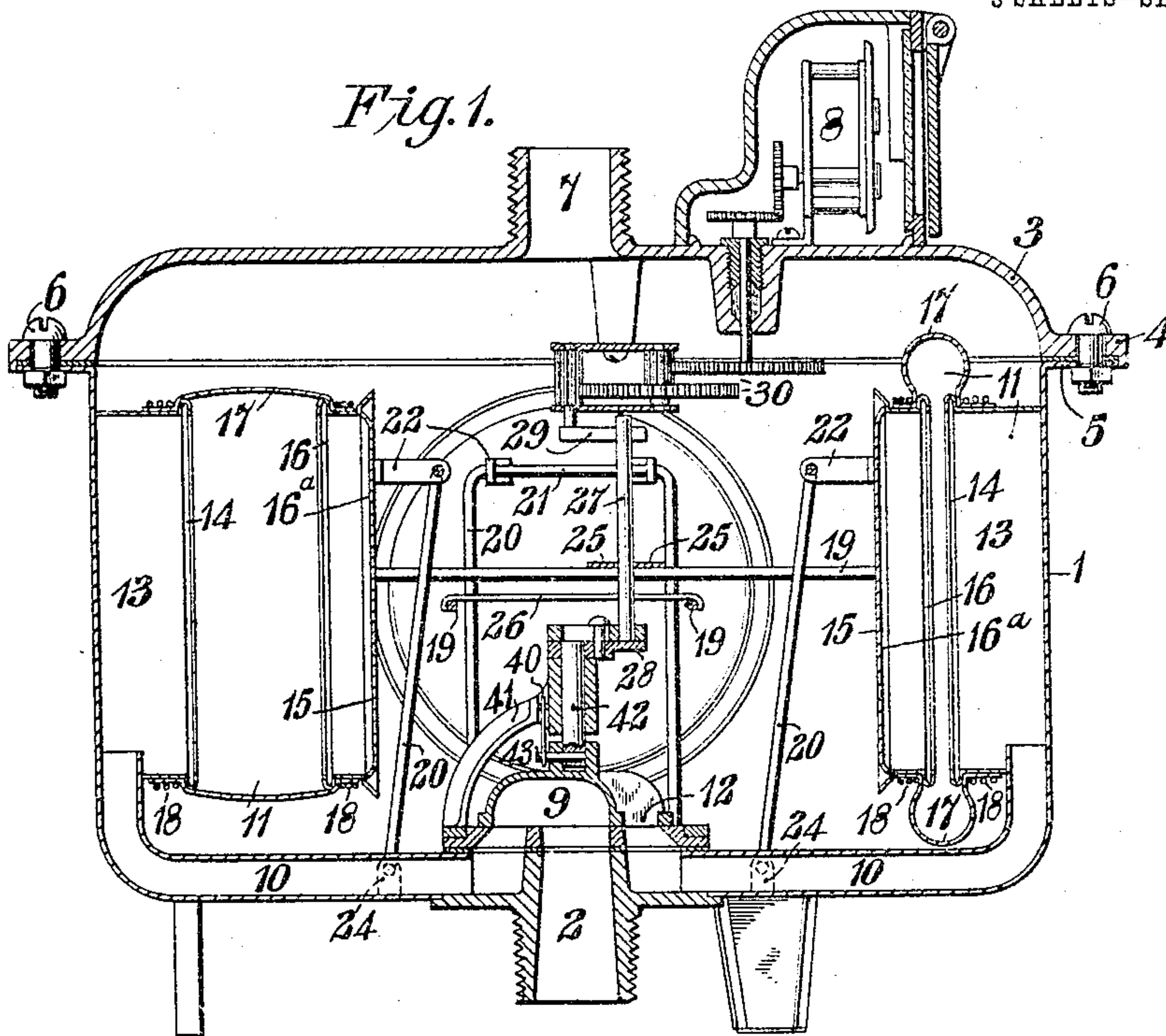
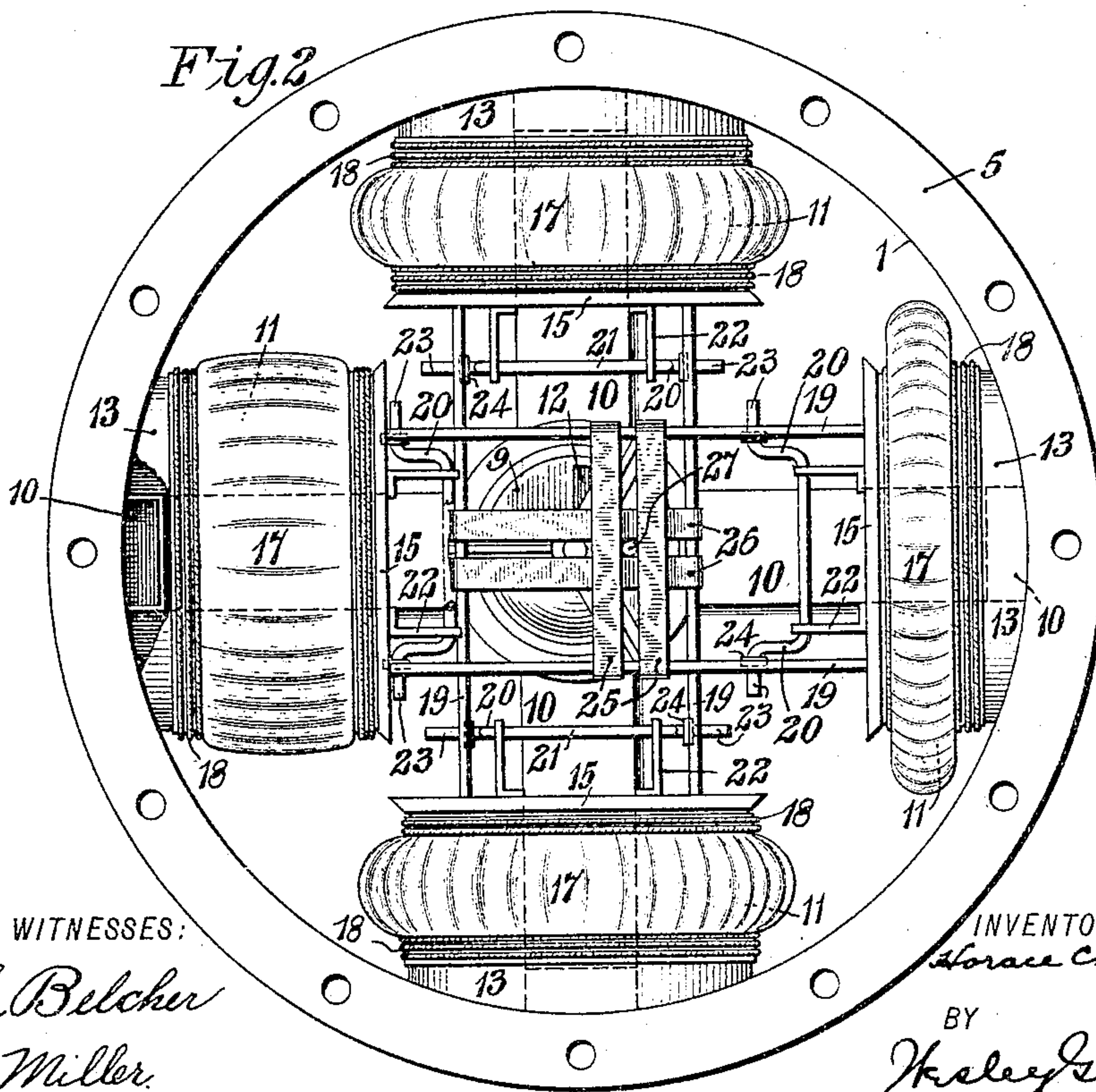


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

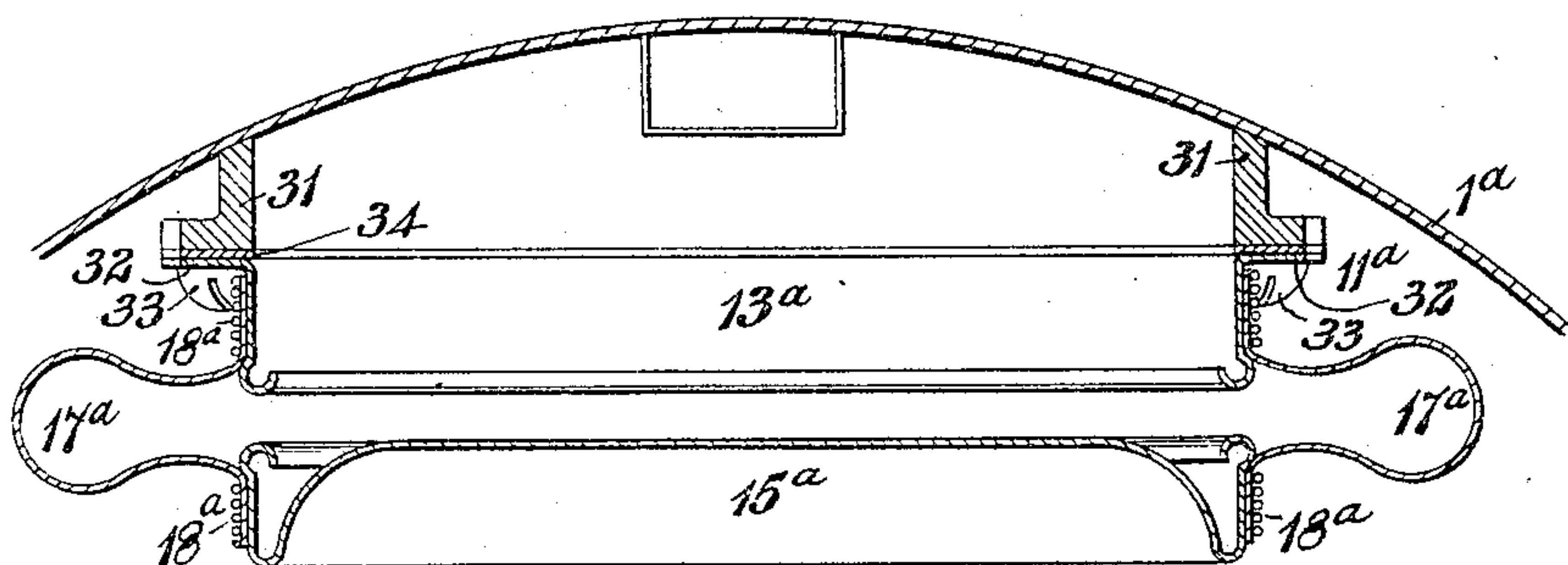
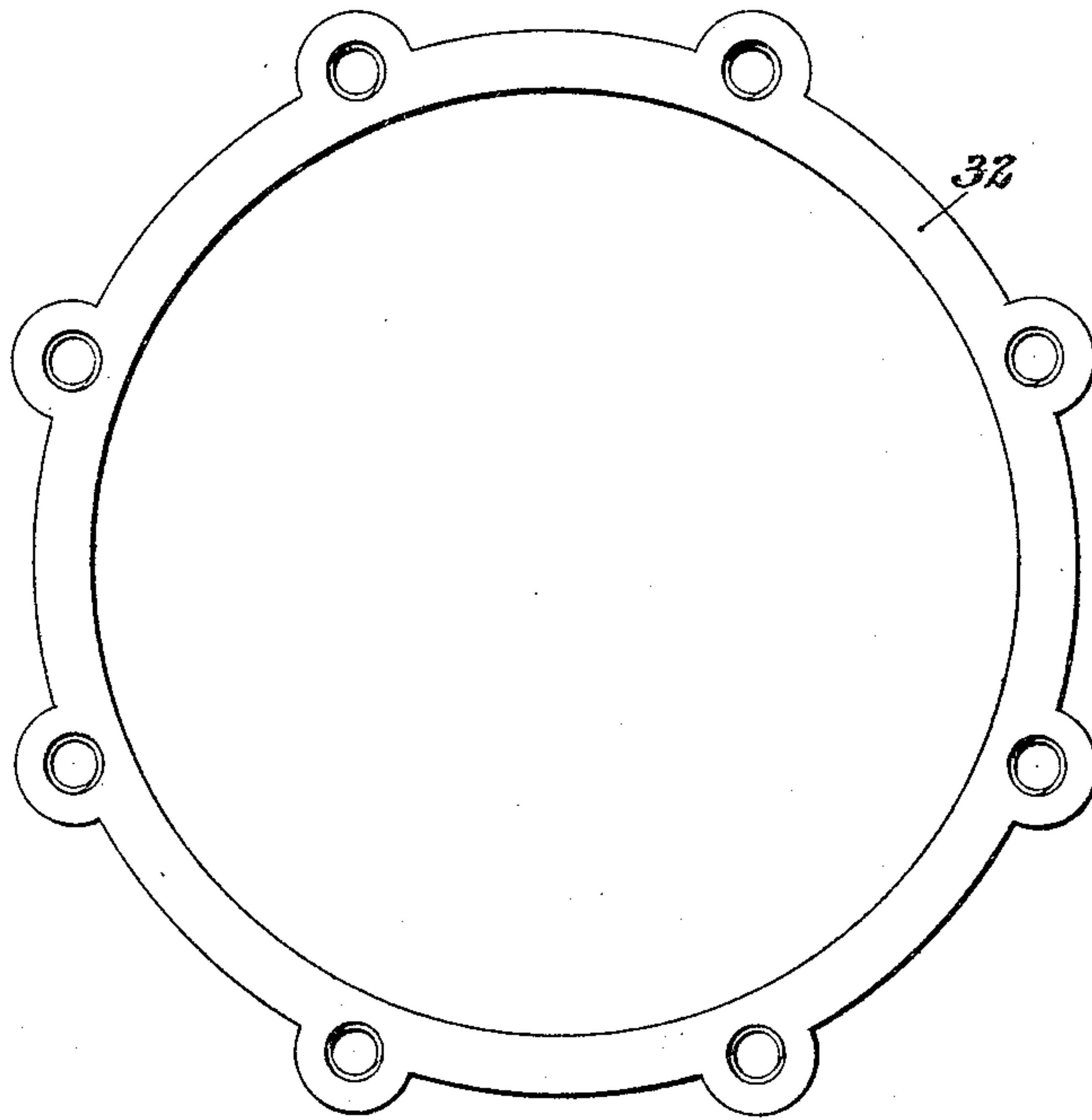


Fig. 4.



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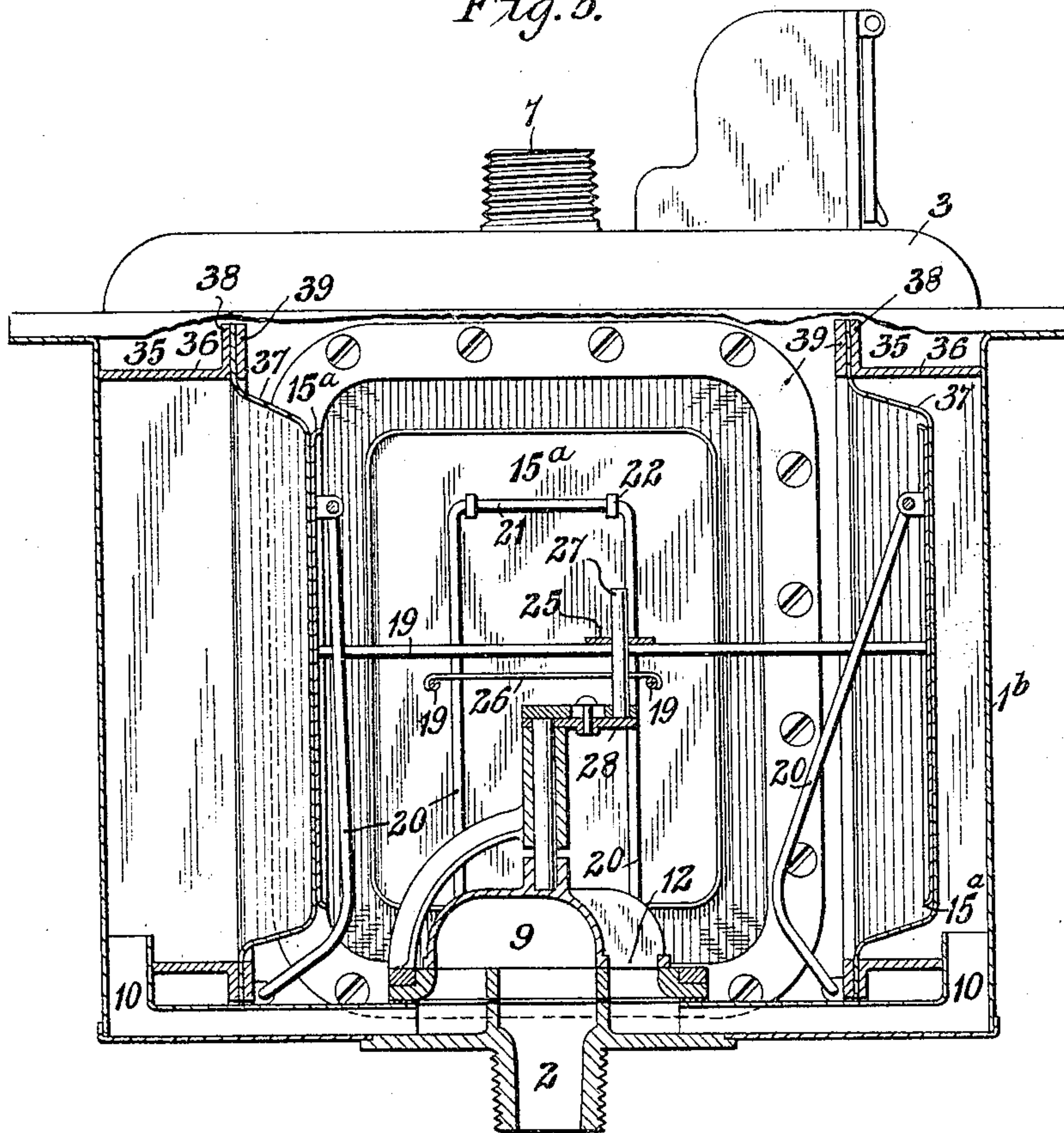
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3 SHEETS—SHEET 3.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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DRY GAS-METER.

SPECIFICATION forming part of Letters Patent No. 792,118, dated June 13, 1905.

Application filed July 6, 1903. Serial No. 164,419.

To all whom it may concern:

Be it known that I, HORACE CHRISMAN, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dry Gas-Meters, of which the following is a specification.

My invention relates to dry gas-meters of the single-acting type in which the gas is introduced into and is exclusively measured in expansible and collapsible chambers that are arranged and connected in such manner that the expansion of one chamber causes the opposite chamber to collapse, and thus expel the gas therefrom, the movements of the diaphragms under this expansion and contraction of the chambers being imparted to motion-transmitting mechanism, which in turn operates a registering-train to register the number of cubic feet of gas flowing through the meter.

The object of my invention is to provide a meter of this character which shall be simple, compact, and inexpensive in construction and effective in operation, and which may be easily dismembered for inspection and repair when necessary or desirable.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central section through one form of meter. Fig. 2 is a plan view of the principal parts of the meter shown in Fig. 1, the cap or cover being removed. Fig. 3 is a horizontal section through a portion of a meter of modified construction. Fig. 4 is a detail view of one of the features shown in Fig. 3; and Fig. 5 is a view similar to Fig. 1, but illustrating a modified construction.

Referring now particularly to Figs. 1 and 2, the casing of the meter, which is here shown as of cylindrical contour, but which may be of rectangular or other form in cross-section, if desired, comprises a body portion 1, provided with an inlet-opening 2 in its bottom, and a cap or cover 3, provided with a flange 4, which is fastened to a corresponding flange 5 on the body portion 1 by means of suitable bolts 6. The cap or cover is provided with an outlet-opening 7 and with registering mechanism 8, which may be of usual well-known construction and need not, therefore, be described in detail. The gas, entering the meter at 2, flows through a rotary valve 9 and passages 10 into measuring-chambers 11 and is also exhausted from the measuring-chambers through the passages 10 and the valve 9, the latter being provided with openings 12, which are so located that as the valve rotates the outlet end of each passage 10 is put into communication with the interior of the casing when the corresponding chamber is fully expanded. Each chamber 11 comprises a thin metal cylinder 13, the inner edge of which is preferably bent over, as indicated at 14, and the outer edge of which is soldered to the inner wall of the casing 1, so that the portion of said wall which is inclosed within the cylinder 13 constitutes the outer wall of the chamber. A thin metal head 15, comprising a cylindrical part 16 and a plate 16^a, soldered together, is attached to the cylinder 13 by means of a bellows 17, formed of leather or other suitable flexible material, the bellows being fastened to the parts 13 and 16 by means of cord 18, wound thereon in the usual manner. The form of the parts 13 and 15 might of course be varied considerably from what is here shown, and such references to the form of the said parts as may be herein made are therefore not to be construed as restricting the invention in this particular. Each head 15 is connected to the corresponding head at the opposite side of the casing by means of a pair of rods 19 and is also pivotally supported by means of two arms 20, the upper ends of which are joined by a horizontal portion 21, that is journaled in posts 22, projecting from the diaphragm. The other ends of the rods 20 are bent laterally, and the bent ends 23 are journaled in lugs 24 at the bottom of the casing. Fastened to one pair of arms 19 are two horizontal bars 25, and fastened to the other pair of arms 19 are a pair of corresponding bars 26, the two pairs being at right angles to each other and a shaft 27 being located in the opening between them. The lower end of the shaft 27 is connected to a crank-arm 28 for operating the valve 9, and its upper

anism 8, which may be of usual well-known construction and need not, therefore, be described in detail. The gas, entering the meter at 2, flows through a rotary valve 9 and passages 10 into measuring-chambers 11 and is also exhausted from the measuring-chambers through the passages 10 and the valve 9, the latter being provided with openings 12, which are so located that as the valve rotates the outlet end of each passage 10 is put into communication with the interior of the casing when the corresponding chamber is fully expanded. Each chamber 11 comprises a thin metal cylinder 13, the inner edge of which is preferably bent over, as indicated at 14, and the outer edge of which is soldered to the inner wall of the casing 1, so that the portion of said wall which is inclosed within the cylinder 13 constitutes the outer wall of the chamber. A thin metal head 15, comprising a cylindrical part 16 and a plate 16^a, soldered together, is attached to the cylinder 13 by means of a bellows 17, formed of leather or other suitable flexible material, the bellows being fastened to the parts 13 and 16 by means of cord 18, wound thereon in the usual manner. The form of the parts 13 and 15 might of course be varied considerably from what is here shown, and such references to the form of the said parts as may be herein made are therefore not to be construed as restricting the invention in this particular. Each head 15 is connected to the corresponding head at the opposite side of the casing by means of a pair of rods 19 and is also pivotally supported by means of two arms 20, the upper ends of which are joined by a horizontal portion 21, that is journaled in posts 22, projecting from the diaphragm. The other ends of the rods 20 are bent laterally, and the bent ends 23 are journaled in lugs 24 at the bottom of the casing. Fastened to one pair of arms 19 are two horizontal bars 25, and fastened to the other pair of arms 19 are a pair of corresponding bars 26, the two pairs being at right angles to each other and a shaft 27 being located in the opening between them. The lower end of the shaft 27 is connected to a crank-arm 28 for operating the valve 9, and its upper

end operates a crank-arm 29, which in turn operates gearing 30, to which the counting or registering train 8 is operatively connected by well-known means that need not be here
5 described.

All of the mechanism hereinbefore described except the registering devices is located within the main casing, and consequently the meter is exceptionally compact
10 in structure and may be operated without danger of leakage.

It will be seen from the foregoing description that as the gas is introduced successively to the chambers 11 it will successively force
15 the heads 15 outward and at the same time will force the opposite diaphragms inward, and thus expel the gas from the corresponding chambers, and this operation will be performed successively, so that the registering-
20 train will be operated in the usual manner.

Since the side walls of the casing are utilized to form the outer walls of the measuring-chambers and the body portion of the casing is formed in one piece, the structure is
25 simple and inexpensive and not liable to disarrangement or destruction in service, and if for any purpose it is desired to inspect or repair any of the interior parts the cap may be readily removed by merely removing the bolts
30 6, and when so removed the entire interior mechanism is readily accessible.

Referring now to Figs. 3 and 4, I have here shown a casing 1^a, which is of cylindrical contour, but which, as above stated in connection with the preceding figures, may be of
35 rectangular or other form, if desired. I have here shown only one measuring-chamber 11^a; but it will be understood that a plurality of such chambers, preferably four, as indicated
40 in Figs. 1 and 2, may be employed. As in the preceding figures, the casing-wall constitutes the outer wall of the chamber 11^a, and surrounding the space which is to constitute the chamber is a wall or flange 31, which is
45 here indicated as of annular form, though it may be of any other form desired. This wall or flange may be either formed integral with the casing 1^a, or it may and generally will be formed separately and soldered to the casing,
50 as the casing is preferably formed of sheet metal. The members 13^a and 15^a, the bellows 17^a, and the fastening means 18^a may be the same as the corresponding parts shown in Figs. 1 and 2 and already described. Instead of soldering the member 13^a directly to the casing, however, I clamp it removably to the wall 31 by any suitable means. As here shown, the said member is provided with a flange 32, that is fastened to the part 31 by
60 means of screws 33, a gasket 34 of yielding material being interposed between the wall 31 and the flange 32 in order to make a gas-tight joint. The form of each of these parts is of course susceptible of considerable variation within the scope of my invention. The

construction here shown has all the advantages incident to the construction shown in Figs. 1 and 2 and the additional advantage that the bellows and the metal parts connected thereby may be readily removed and replaced
70 when desired without the employment of any tools except a screw-driver.

In Fig. 5 I have shown a construction in which each measuring-chamber 35 is formed by the main casing 1^b, sheet-metal side walls
75 36, of cylindrical or other form and soldered to the main casing, and a flexible bellows or diaphragm 37, the edge or edges of which are clamped between a flange 38 on the edge of the wall 36 and an annular plate 39. The
80 valve and register-operating mechanisms are substantially the same as those shown in Figs. 1 and 2 and need not be again described. The plates 15^b, which are supported upon the outer ends of the rods 19 and the horizontal
85 connections 21 between the rods 20, are moved by the pressure of the gas against the flexible diaphragms 37, but are not attached thereto, though they of course might be, if desired.

In order to prevent backward operation of
90 the meter, I suspend a pawl 40 from the bracket 41, which supports the valve-shaft 42 in such manner that it is free to swing in a forward direction only. A pin 43, that fastens the valve and its shaft together, projects a sufficient
95 distance to engage the pawl 40, all as indicated in Fig. 1.

The form, composition, and relative location and arrangement of the several parts may of course be varied from what is shown and
100 described without departing from my invention.

I claim as my invention—

1. A single-acting dry gas-meter comprising a two-part casing forming a single main
105 chamber, a set of cylindrical, collapsible chambers, each having an outer side formed by a portion of the casing-wall of the main chamber and an inner side of substantially the same dimensions which is moved by the gas to effect
110 registration, and valve mechanism and motion-transmitting gearing located in the main chamber.

2. In a gas-meter, a casing consisting of a body portion and a cap or cover forming a single main chamber, a plurality of cylindrical collapsible chambers each of which comprises two metal parts of approximately the same lateral dimensions and a flexible bellows,
115 valve mechanism and register-operating mechanism located in the main chamber and connected to the front plates of the collapsible chambers.

3. In a gas-meter, a casing having a plurality of inwardly-projecting ribs or flanges, a
125 metal frame removably fastened to each rib or flange, a metal plate, and a flexible bellows having its edges fastened respectively to said frame and said plate.

4. In a single-acting gas-meter, a two-part
130

cylindrical casing forming a single main chamber having a plurality of annular blocks fastened to its inner wall, a corresponding number of expansible chambers one of the members of each of which is detachably fastened to said annular block, and valve and register-operating mechanisms located in the main chamber and connected to the front members of the collapsible chambers.

5 5. In a gas-meter, a two-part casing, a plurality of expansible chambers, a plurality of blocks or flanges projecting inwardly from the casing and conforming in outline to said chambers, means for detachably fastening one member of each chamber to the corresponding block or flange and a gasket interposed between said parts.

6. A single-acting gas-meter comprising a casing forming a single main chamber, a plurality of collapsible measuring-chambers of 20 curved peripheral contour and of substantially uniform diameter when expanded, the outer walls of which are parts of the main casing-wall, a valve, valve mechanism and register-operating mechanism located within 25 the main chamber and connected to the inner walls of the measuring-chambers.

In testimony whereof I have hereunto subscribed my name this 27th day of June, 1903.

HORACE CHRISMAN.

Witnesses:

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BIRNEY HINES.