

No. 875,485.

PATENTED DEC. 31, 1907.

J. R. ARMSTRONG.

GAS METER.

APPLICATION FILED FEB. 19, 1907.

2 SHEETS—SHEET 1.

Fig. 1.

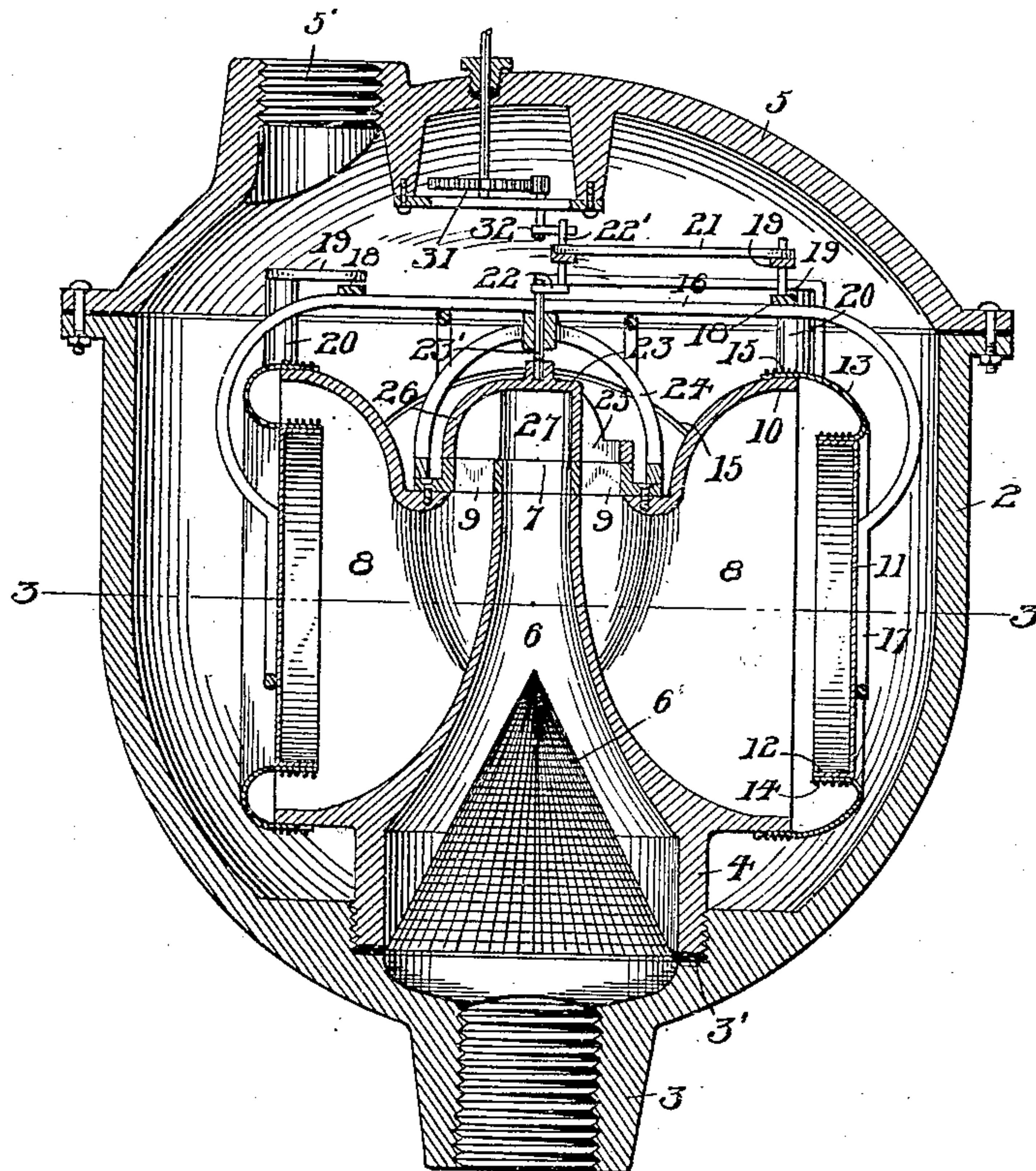
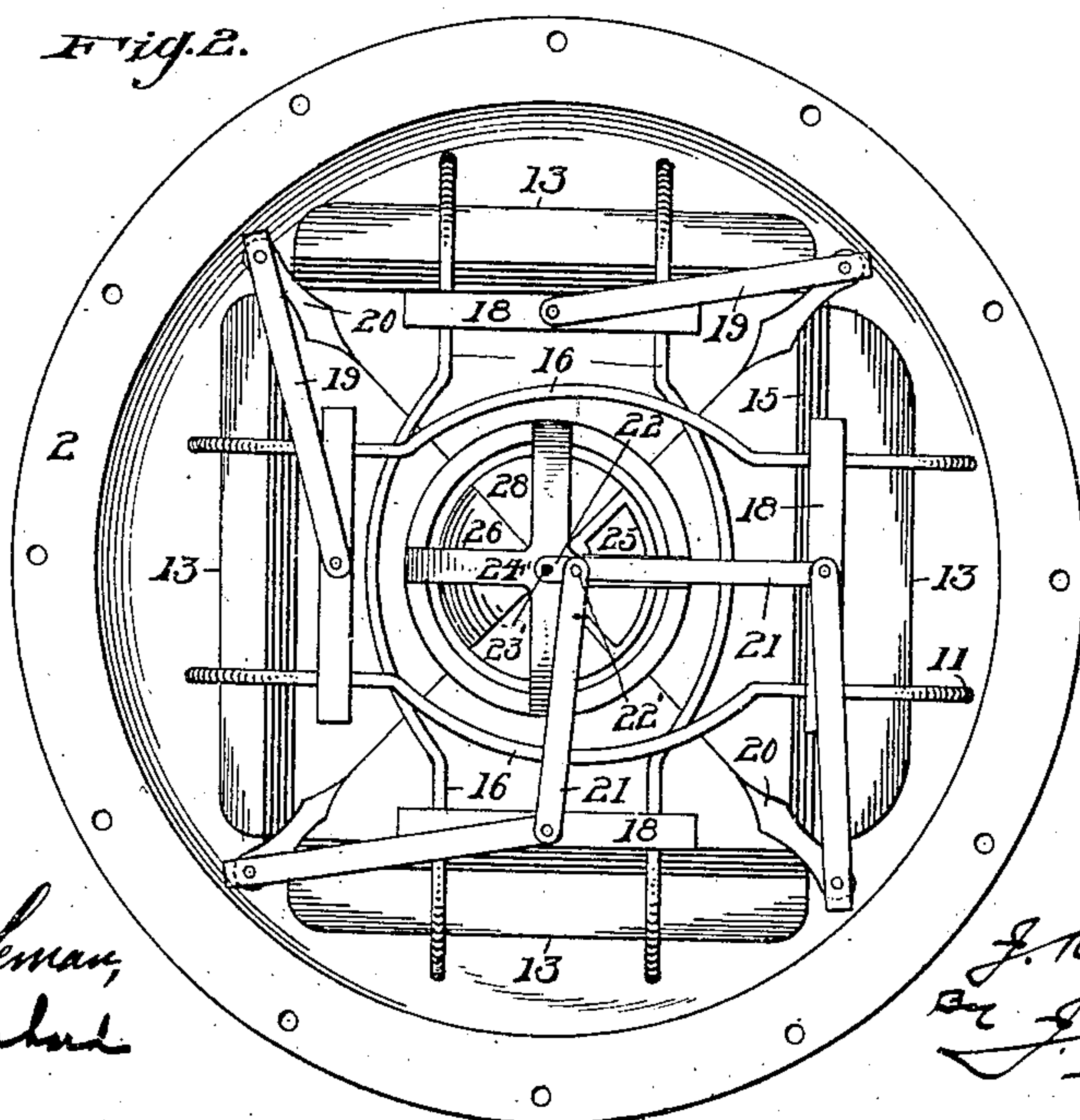


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

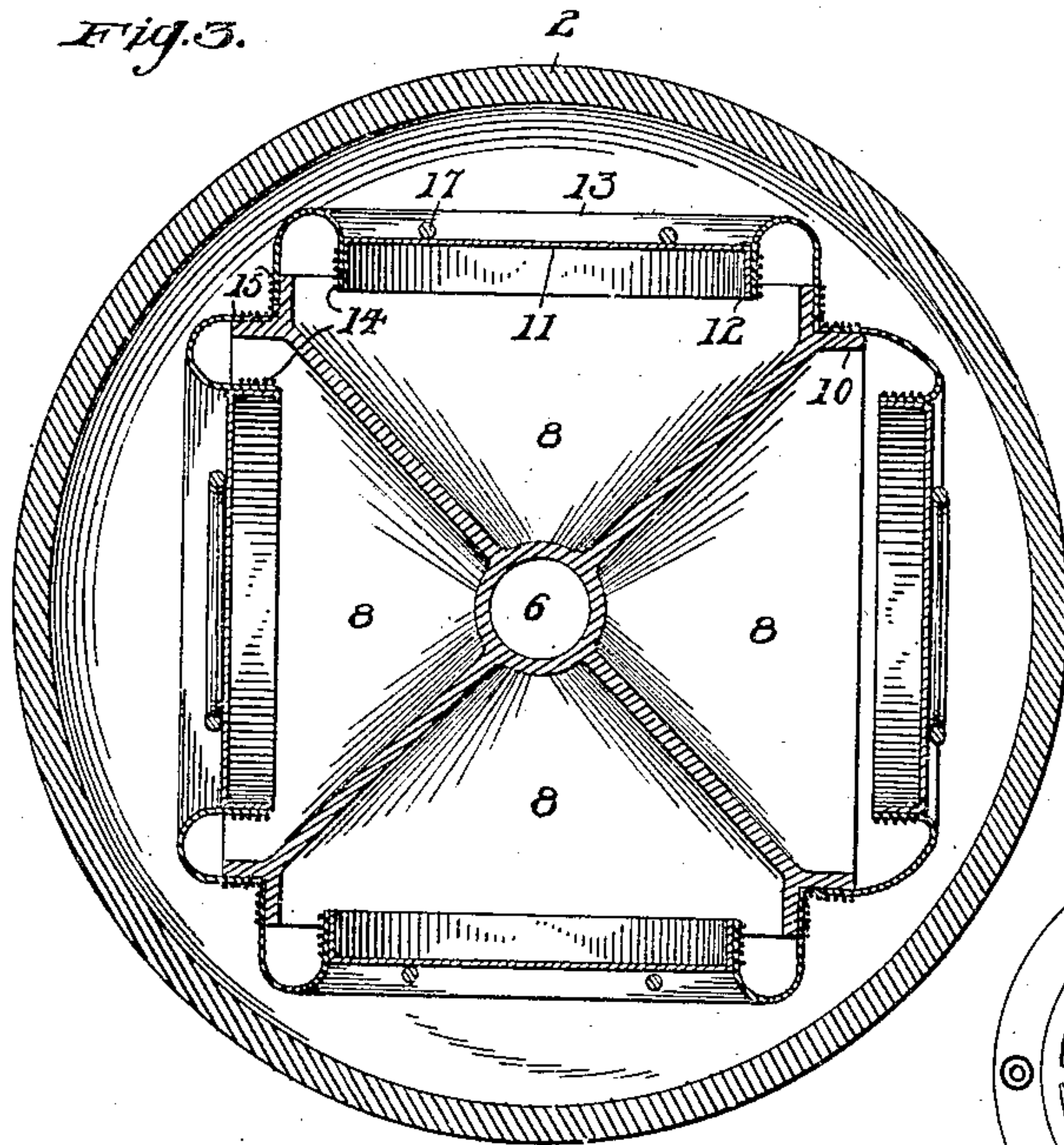


Fig. 5.

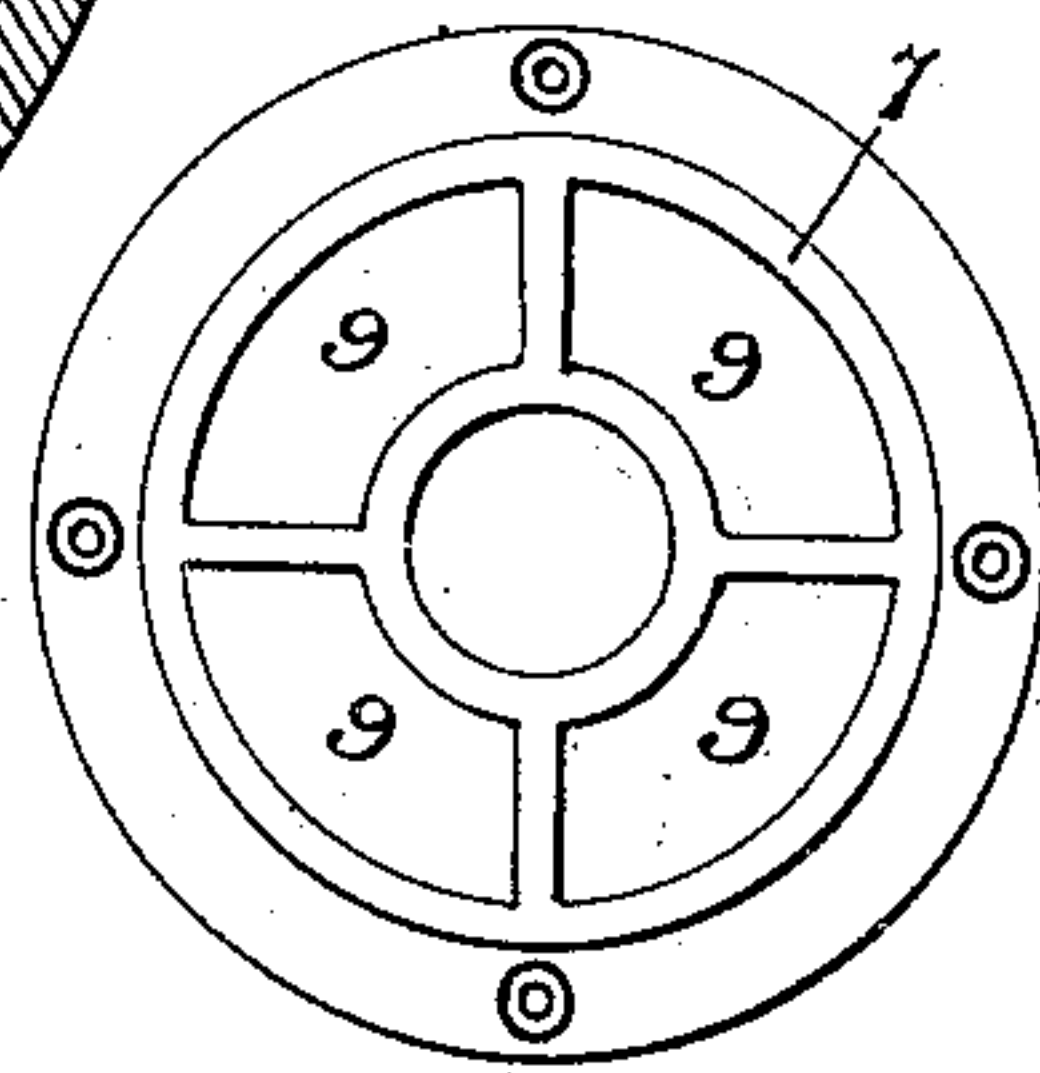


Fig. 4.

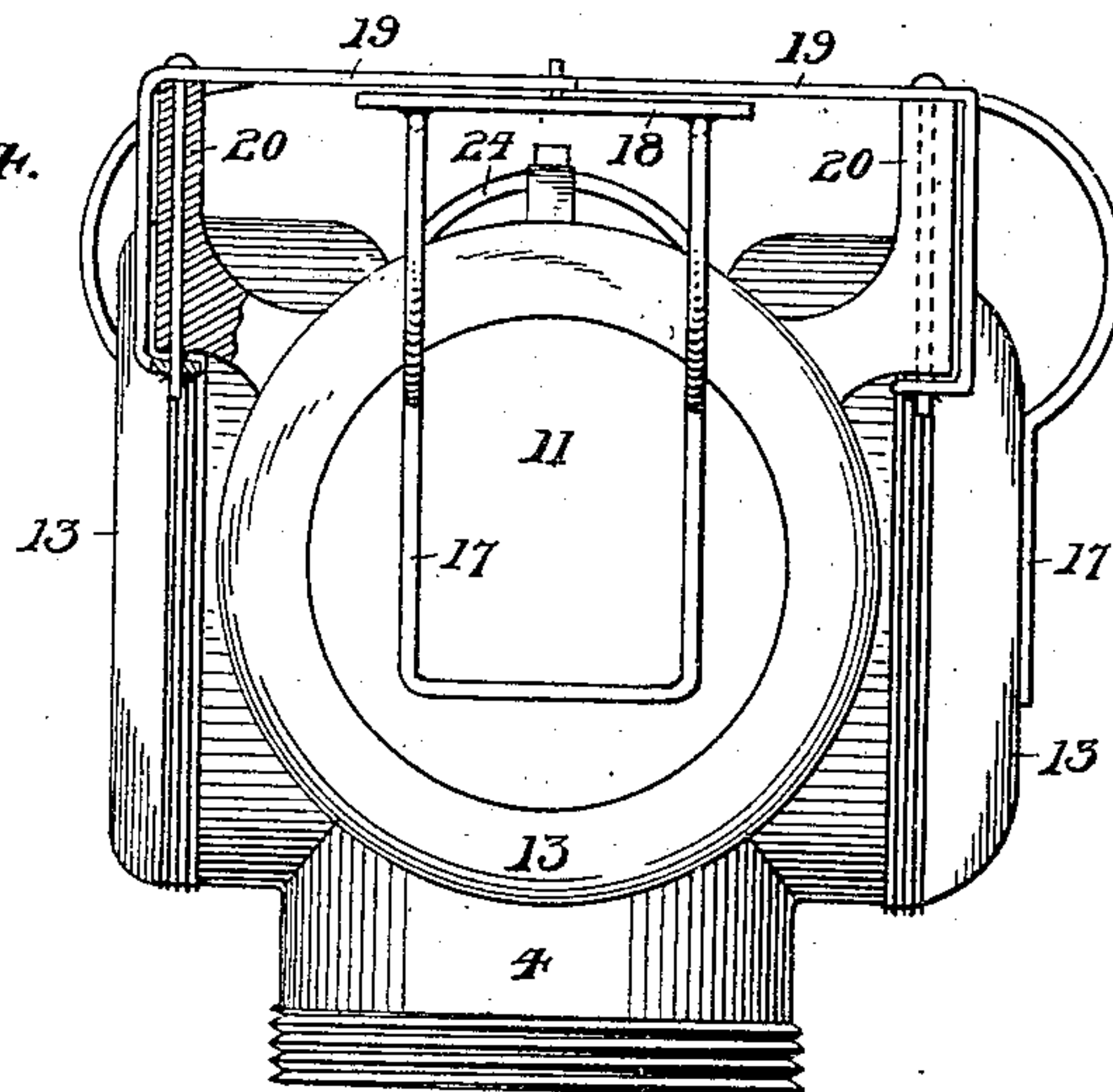


Fig. 6.

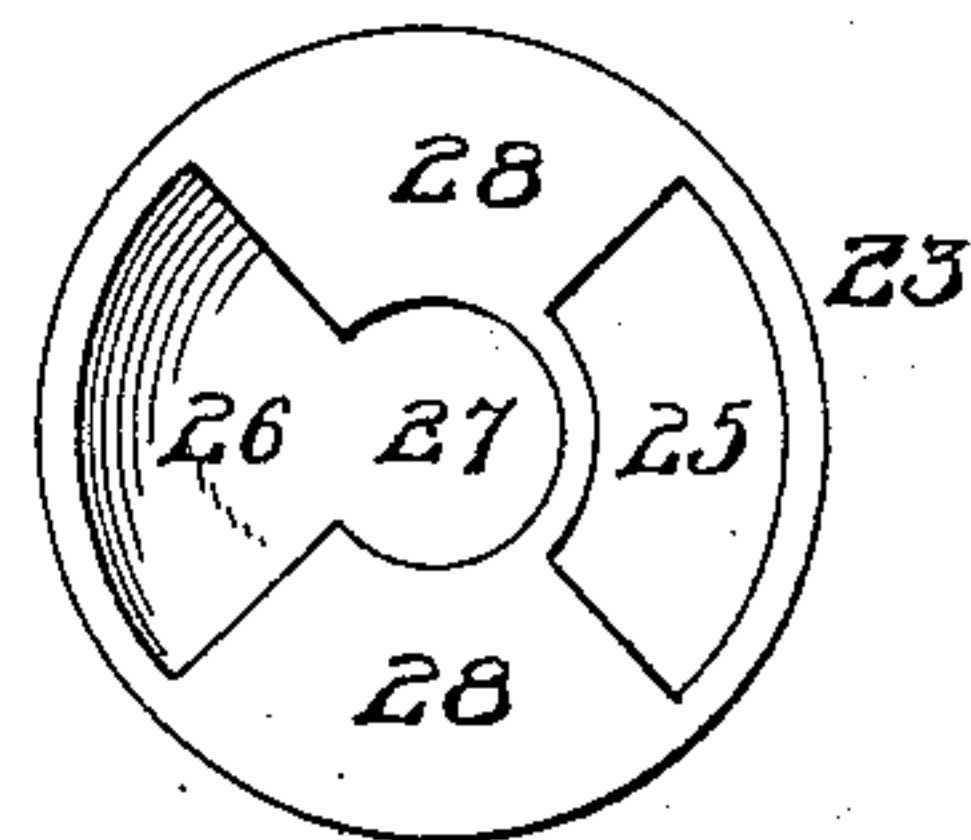
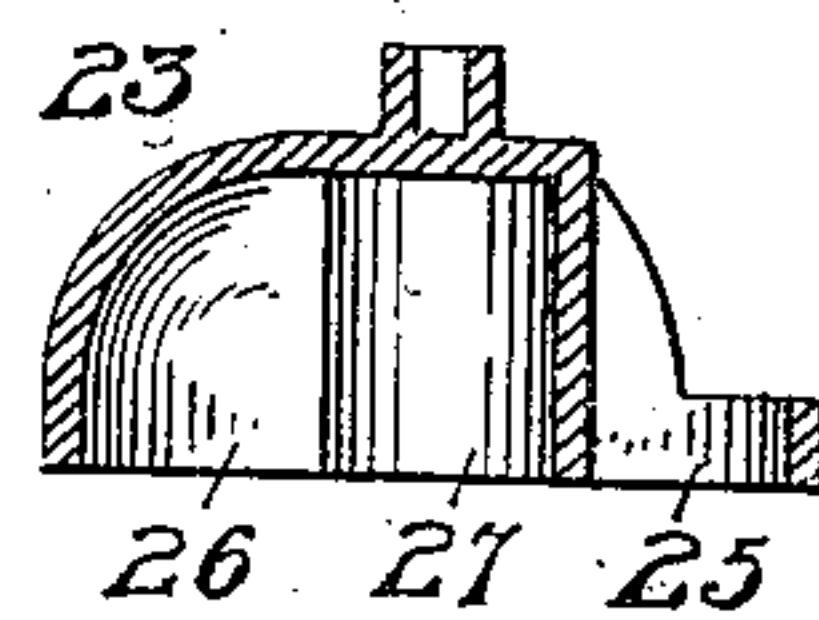


Fig. 7.



witnesses:

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*Atty.*



# UNITED STATES PATENT OFFICE.

JAMES R. ARMSTRONG, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO  
WILLIAM H. IRVIN, OF PITTSBURG, PENNSYLVANIA.

## GAS-METER.

No. 875,485.

Specification of Letters Patent.

Patented Dec. 31, 1907.

Application filed February 19, 1907. Serial No. 358,163.

*To all whom it may concern:*

Be it known that I, JAMES R. ARMSTRONG, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Meters, of which the following is a specification.

One object of the invention is to so assemble the internal parts of a meter that they may be entirely removed from the inclosing casing, whereby all portions thereof are readily accessible for repairing, cleaning, or any other purpose.

A further object is to improve, simplify, and render more efficient the construction and operation of the gas-measuring pockets.

The invention also includes a diaphragm of improved construction.

In the accompanying drawings, Figure 1 is a vertical sectional view of a meter constructed in accordance with the invention, the valve being in position for admitting gas into one of the pockets and for discharging gas from a previously filled pocket. Fig. 2 is a top plan view, the upper portion of the outer casing being removed. Fig. 3 is a sectional plan view on line 3—3 of Fig. 1. Fig. 4 is a front elevation of the mechanism within the outer casing. Fig. 5 is a detail view of the valve seat, and Figs. 6 and 7 are similar views of the valve.

Referring to the drawings, 2 designates the outer casing having the reduced and open lower end 3 for connecting with a supply line. Above and of larger diameter than the bottom opening the casing is formed with threaded seat 3', in which is removably secured the lower open end 4 of a single frame or casting in which is embodied an inlet chamber and the several gas-measuring pockets, and upon which are mounted the valve and valve operating mechanism. By removing top or upper portion 5 of casing 2, said frame or casting may be unscrewed or disconnected at its lower end and lifted bodily from the casing. Top 5 is constructed with gas-outlet 5'.

The open lower end 4 of the frame or casting constitutes the lower portion of a central upwardly extended inlet or receiving chamber 6, which is open at its upper end through valve seat 7. Within chamber 6 is screen 6' for preventing the passage of impurities into the meter.

Formed around the exterior of this cham-

ber is a series of gas-measuring chambers or pockets 8, each open at its upper end through the valve seat, as indicated at 9. The outer face of each pocket is open and of circular form, the circular opening being defined by the ring-like wall 10. The diaphragm for each of these pockets consists, preferably, of a sheet metal head 11 having the inturned continuous edge flange 12 to which the diaphragm leather 13 is secured by a winding 14, while the opposite portion of the leather overlaps ring 10, to which it is secured by winding 15. It will be noted that leather 13 is extended inwardly over flange 12, with the winding inclosed by the leather within the pocket instead of being on the outer side of the leather. It is also characteristic of the invention that the diaphragm-head is of smaller diameter than ring 10. By thus forming the diaphragm and connecting it with the open face of the pocket, the flexibility of the leather is in no way impaired, and at the same time as the diaphragm-head moves in and out the crease or fold in the leather moves transversely across the exposed portion thereof, so that all parts are subjected to the same amount of wear. With the working or creasing tendency thus distributed, the leather will not crack and break at one point, as is the case in those formations of prior design wherein the working or folding tendency is at one point and does not shift therefrom, such point constituting practically a hinge.

As is customary in this general type of meter, the diaphragms of two opposite pockets are so connected as to operate together, one filling and the other emptying, and vice-versa. The connection here shown consists of the double wire arms 16 having their opposite ends bowed or looped downwardly at 17 to embrace the outer faces of opposite diaphragms 11. The wires extend transversely across the top of the frame or casting, and adjacent their ends are connected by the strips or plates 18, and each of the latter is connected by a pivoted link 19 with a bracket 20 formed on the outer portion of the frame or casting between adjacent pockets. Each of these sets of wires is connected by a link 21 with wrist-pin 22' on the short crank arm 22 secured to stem 23' of valve 23. Stem 23' extends through spider 24 which rises around and extends over valve seat 7. The valve 23 is thus held to its seat and maintained in



proper position thereon at all times. Valve 23, which turns on seat 7, is of well known construction and operation, and no novelty is claimed therefor. It is formed with a vertically open portion 25 which registers with pocket outlets 9 for the purpose of discharging gas from the filled pockets. The valve is also formed with the bridged or closed portion 26 which is open to the central valve-cavity 27, and as the latter is directly above and constantly open to the upper end of inlet chamber 6, the bridged or closed portion directs the gas into the pockets being filled. The blank portions 28 of the valve are of such dimensions as to prevent a pocket which is filling from communicating—through the valve—with a pocket which is emptying.

A portion 31 of the registering mechanism is here shown, the same being located within top portion 5 of the casing and provided with crank-arm 32 which is engaged and rotated by wrist-pin 22'. I have not illustrated the principal portion of the registering mechanism and the dial, as these parts are of old and well-known construction and no novelty is claimed for them.

In operation, it will be understood that with the valve so turned as to place chamber 6 in communication with one of the pockets the inflowing gas will press outwardly on the diaphragm of that pocket and move the same outward, at the same time drawing the diaphragm of the opposite and cooperating pocket inward, the position of the valve at that time being such as to discharge the gas from the last mentioned pocket into the upper portion of the casing. This motion of the diaphragms is transmitted through connecting links and crank 22 to the valve, thus moving the latter as required for filling and emptying the pockets. This operation of meters of this type, as well as the action of the registering mechanism, is so generally understood that further description is deemed unnecessary.

By forming the pockets, the inlet chamber, and the valve mounting in a single frame or casting, I obtain a most efficient and compact structure, and one which is removable bodily or in its entirety from the outer casing, and when removed all parts thereof are readily accessible.

I claim:—

1. In a meter, the combination of a series of pockets arranged radially, diaphragms forming the outer walls of the pockets and adapted to move outwardly when the pockets are filling, and valve mechanism operatively connected to the diaphragms.

2. In a meter, the combination of a series of radially arranged pockets, diaphragms for the pockets adapted to move outwardly when the pockets are filling, connections between opposite diaphragms whereby as one

moves outwardly under pressure of inflowing gas the opposite diaphragm moves inwardly for expelling the gas contained in its pocket, and valve mechanism operatively connected to the diaphragms.

3. In a meter, the combination of a central gas inlet chamber, pocket side-walls extending from the outer face of the chamber, diaphragms forming outer walls of the pockets and adapted to move outwardly when the pockets are filling, connections between opposite diaphragms whereby they are caused to move simultaneously in the same direction, the central inlet chamber being provided with a valve seat which communicates with all the pockets, and a valve on the seat and operatively connected to the diaphragms for admitting and discharging gas from the pockets.

4. In a meter, the combination of a single structure consisting of a central upright gas inlet chamber open at its lower end for gas to enter and at its upper end provided with a valve seat, pocket side-walls extending from the outer face of the chamber, diaphragms forming the outer walls of the pockets, connections between opposite diaphragms, a valve on the seat for controlling the passage of gas to and from the pockets, and an operative connection between the valve and diaphragms.

5. The combination of an outer casing having a central gas inlet at its lower end and a gas outlet, a single structure within and removable from the casing and consisting of a central gas inlet chamber adapted at its lower end to connect with the casing inlet and at its upper end provided with a valve seat, pocket side-walls extending from the outer face of the chamber, said valve seat communicating with all the pockets, diaphragms forming the outer walls of the pockets, connections between opposite diaphragms, a valve on the seat for controlling the passage of gas to and from the pockets, and an operative connection between the valve and diaphragms.

6. In a meter, the combination of a casing having a gas inlet opening in the bottom thereof, a single casting constructed with a central inlet chamber adapted at its lower end to detachably connect with the interior of the casing around the inlet opening thereof, said single casting being formed with a series of pockets around the exterior of the inlet chamber, a valve for controlling the admission and discharge of gas from the pockets, diaphragms for the pockets, and an operative connection between the diaphragms and the valve.

7. In a meter, the combination of a central gas inlet chamber, pockets arranged around the chamber and open at their outer faces, the pockets being adapted to communicate with said chamber and with a gas out-

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let, a valve for controlling said communications, diaphragms for the open faces of the pockets adapted to move outward when filling and inward when emptying, and operative connections between the diaphragms and valve for actuating the latter.

8. In a meter, the combination of a central gas receiving chamber, a series of pockets arranged around the chamber with the latter forming the inner walls of the pockets, the outer faces of the pockets being open, diaphragms for the open faces of the pockets adapted to move outward when filling and inward when emptying, the pockets being adapted to communicate with said chamber and with the gas outlet, a valve for controlling the said communications, and operative connections between the diaphragms and the valve for actuating the latter.

9. In a meter, the combination of an outer casing having a central gas inlet at its bot-

tom and a gas outlet, a frame removably fitting within the casing and formed with a central gas inlet chamber adapted to connect with the casing inlet, the frame having a series of pockets arranged around the exterior of the central chamber and adapted to communicate therewith and with the casing, the pockets having open outer faces, diaphragms for the pockets, a valve for controlling communication between the pockets and said chamber and the pockets and the interior of the casing, and an operative connection between the diaphragms and the valve for actuating the latter.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES R. ARMSTRONG.

Witnesses:

MARGARET E. ROGAN,  
ALLEN DODD.