

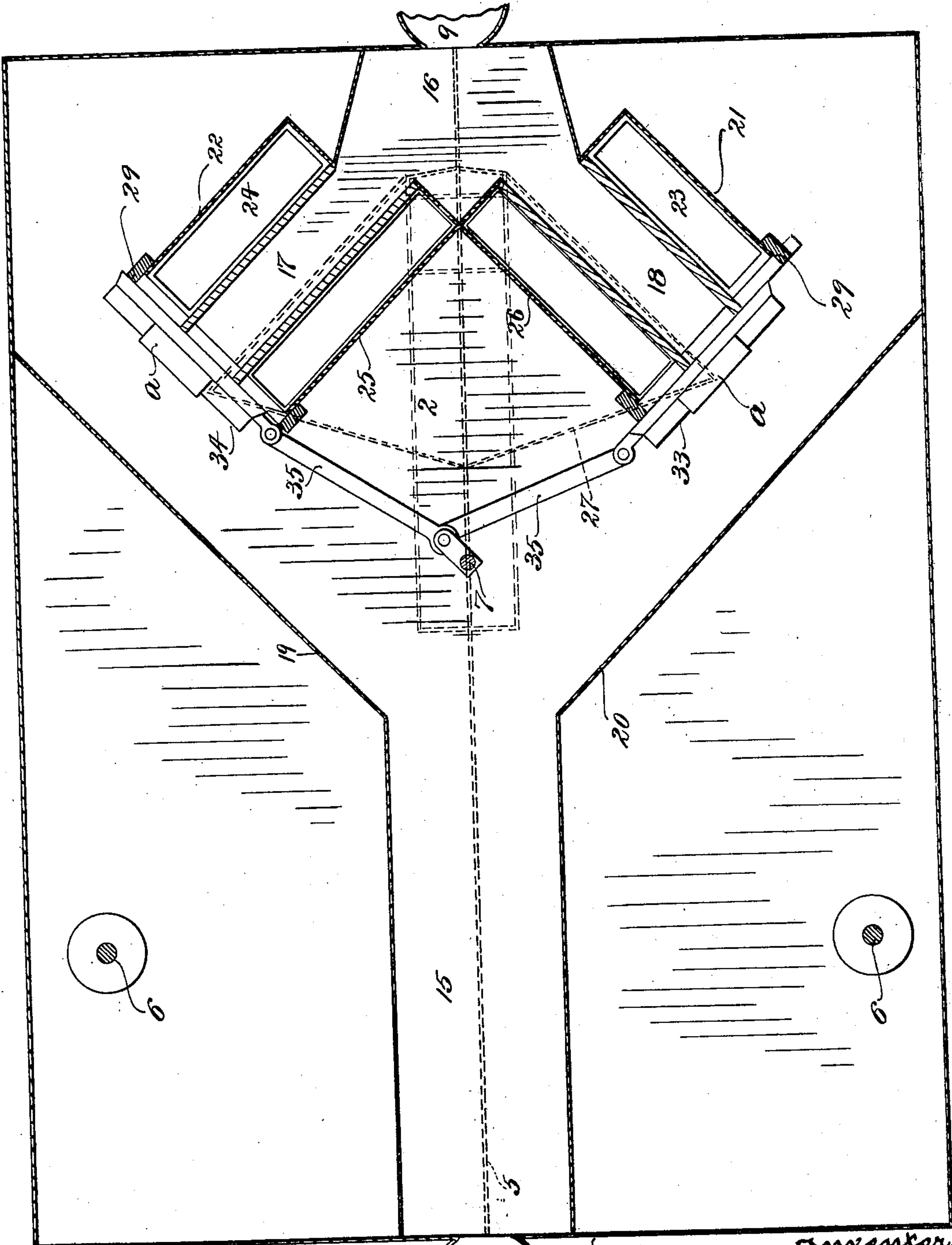
No. 865,442.

PATENTED SEPT. 10, 1907.

B. H. SPANGENBERG.
GAS METER.

APPLICATION FILED MAR. 11, 1905.

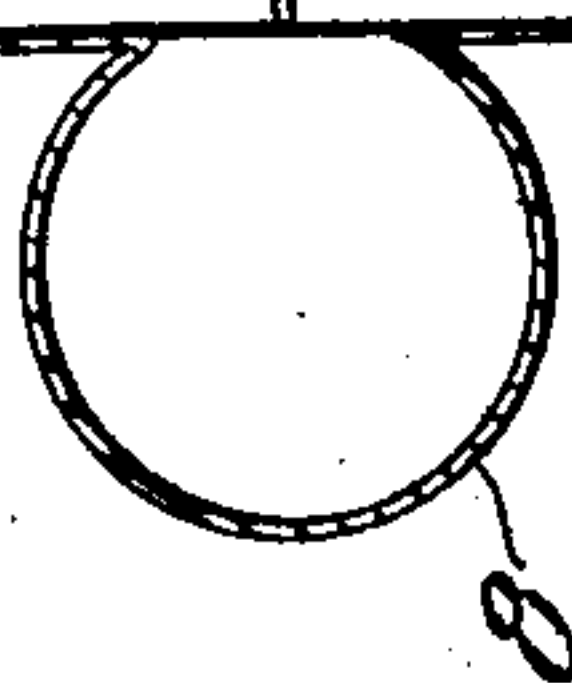
3 SHEETS—SHEET 1.



Witnesses:

Wm. H. Gilligan

Fig. 1



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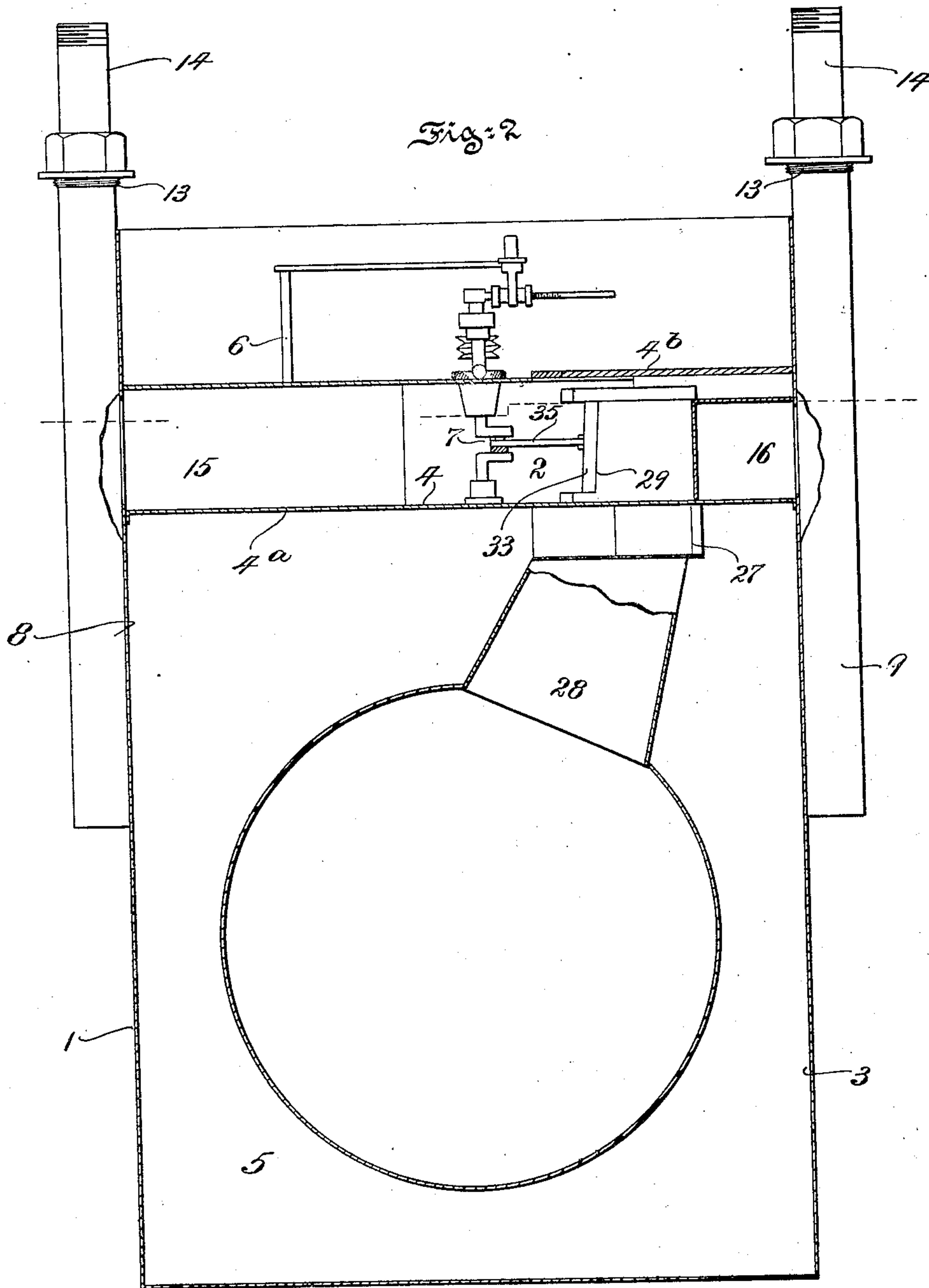
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3 SHEETS—SHEET 2.



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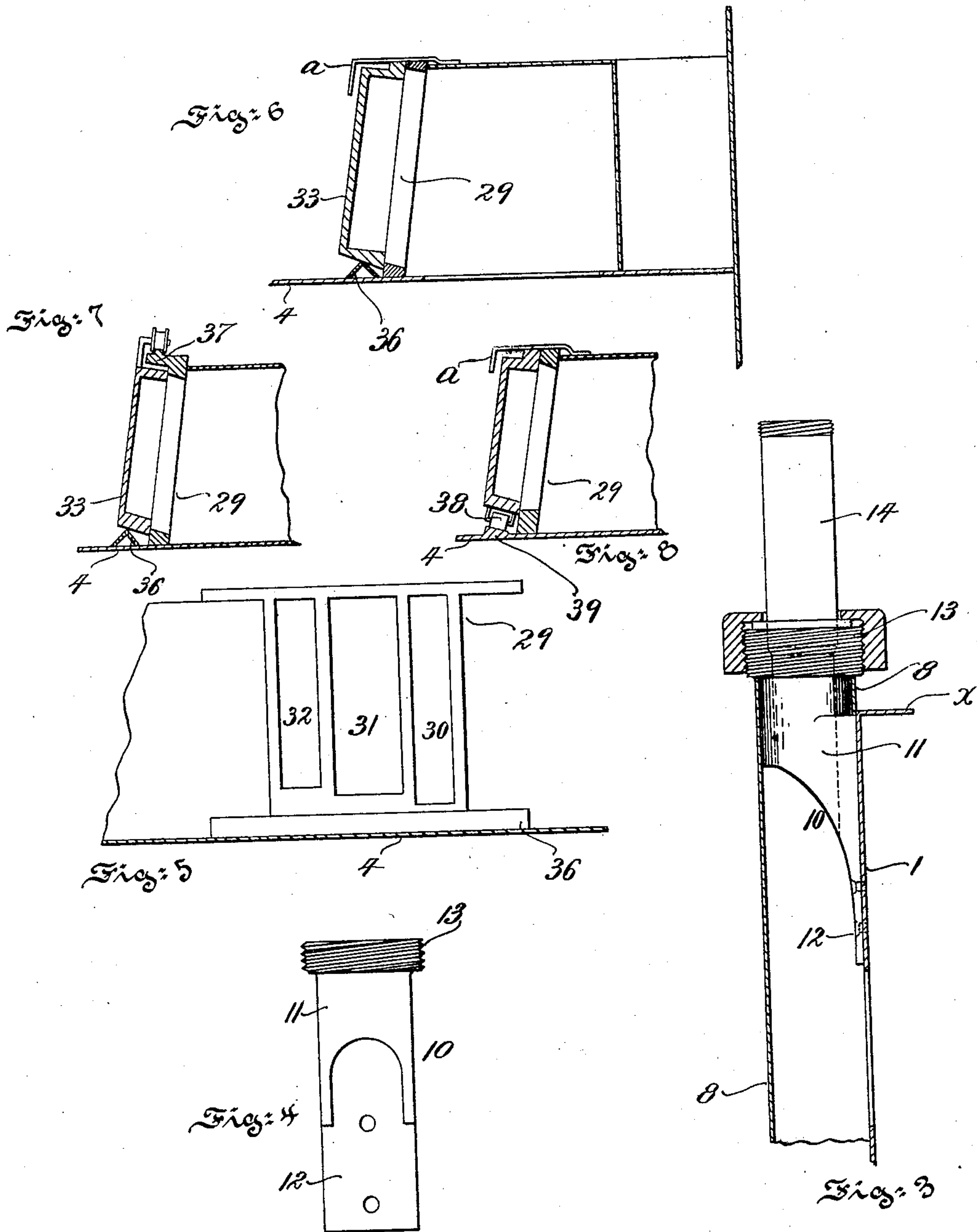
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

BREWSTER H. SPANGENBERG, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE UNITED GAS IMPROVEMENT COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

GAS-METER.

No. 865,442.

Specification of Letters Patent.

Patented Sept. 10, 1907.

Application filed March 11, 1905. Serial No. 249,549.

To all whom it may concern:

Be it known that I, BREWSTER H. SPANGENBERG, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Gas-Meters, of which the following is a specification.

Objects of the present invention are to increase the efficiency of gas meters; to provide a comparatively small meter which will pass a relatively large volume of gas; to make the meter internally self-draining; to facilitate the operation of the valves of the meter; to provide firm attachment for the gas connections of the meter; and to so construct and arrange the various parts of the meter as that the conduits for the passage of gas shall be comparatively large and straight and the ports shall be large and free from tortuous passages.

To these and other ends hereinafter set forth the invention comprises the improvements to be presently described and finally claimed.

The nature, characteristic features and scope of the invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part hereof and in which

Figure 1, is a top or plan view principally in section of a meter embodying features of the invention. Fig. 2, is a side view principally in section of the same. Fig. 3, is a sectional view illustrating one of the gas connections for the meter. Fig. 4, is a front view of one of the parts shown in Fig. 3. Fig. 5, is a front view of the valve ports. Fig. 6, is a sectional view of one of the valves, and Figs. 7 and 8 are sectional views illustrating modifications.

The housing 1 of the meter is as is customary provided with a valve chamber or upper gas compartment or case 2, of which the floor or base 4, constitutes between it and the lower gas compartment or case 3, a partition. The lower case 3, is sub-divided by means of a vertical wall 5, to which the bellows are secured and the bellows are operatively connected with flag-arms 6, which serve to turn the valve shaft 7, and operate the recording apparatus. The division wall 4^a, serves to prevent gas from passing from one side of partition 5, to the other side thereof and it may be arranged at various levels with respect to the part 4, although it is shown as flush with it.

4^b, is a back plate for covering the valve chamber 2.

The foregoing are types of the usual provisions of a meter, although they are and may be variously arranged and they are recited so that the present invention may be intelligently explained, but the present invention is not thereby limited to any peculiar construction, number or arrangement of these parts.

8 and 9, are duplicate gas connections, the one 8, being the inlet and the one 9, the outlet. They are

shown as of tubular form and they may extend beneath the level of the partition 4, although this is not essential. At their lower ends they are closed and they are attached to the housing or case of the meter usually by means of solder, as this insures a satisfactory joint. 10, (Figs. 3 and 4) is a hanger which consists of a short tubular portion 11 provided with a flat shank 12 substantially alined with the exterior of the tubular portion. At the top this hanger is threaded as at 13 for connection with the gas pipe 14 or coupling thereon. The flat portion or shank 12 of the hanger is fitted to the wall of the housing 1, and the part 8 which is usually of tin is fitted around it with the exception of the portion which abuts upon the part 1. In this way the parts 8, 10 and 1 can be satisfactorily soldered or otherwise secured together, and there is practically no opportunity for a leak to be caused by the application of the soldering iron when the cover is being soldered to place on top of the flange *x*. Since the tubular portion is short the internal cross-sectional area of the part 8, is comparatively large and therefore accommodates a comparatively large flow of gas. If desired the shank 12 may be perforated to facilitate sweating or soldering the part 12 to part 1.

15, is a gas inlet conduit or passage and 16 is a gas outlet passage or conduit and both of these passages or conduits are arranged above the level of the floor 4, of the valve chamber 2 for a purpose which will be presently described and which is productive of marked advantages. The gas outlet passage 16 is provided with branches 17 and 18 and the gas inlet passage 15 is widened as at 19 and 20 so that its walls extend to the sides of the housing. The intake openings of the passages 17 and 18 are arranged perpendicularly or at an inclination to the partition 4. In this way certain advantages are attained which will be presently described.

There are housings 21 and 22 arranged above the level of the partition 4 and they cover openings 23 and 24 in the horizontal partition 4. These openings communicate with the respective divisions of the lower case or gas compartment and lead to the outside of the bellows contained therein. 25 and 26 are housings arranged above the level of the partition 4, and they communicate with a structure 27 (shown as but not necessarily of diamond shape), arranged beneath the partition 4, but divided by the partition 5 into two chambers and each of these chambers communicates by means of a generally rectangular passage or conduit 28 with the interior of the bellows. The openings for ingress and egress to the housings 21, 22, 25, and 26 are all arranged not parallel with, but perpendicular or at an inclination to the plane of the floor 4 of the valve chamber 2, and are shown as in the same plane as the openings of the passages 17 and 18.

The valve seats 29, are duplicates of each other and

one of them is arranged at the entrances and exits of the passages formed within the housings 21, 18 and 26, and the other of them at the exits and entrances of the housings 22, 17 and 25. As shown the valve seats are arranged at a slight inclination from the perpendicular in respect to the plane of the partition 4. If water or liquid of condensation should accumulate in either the inlet or outlet connections 8 or 9, these will not be trapped, but the water or liquid will by reason of the fact that the passages 15, 16, 17, and 18 are above the level of the plane of the floor of the valve chamber 2, be drained into the lower case 3, where it will do no harm even though it should accumulate in comparatively large quantity and from which it can be readily drained at comparatively long intervals by perforating the housing and then soldering up the perforation or in any other appropriate manner. Liquid from the inlet connection 8, traverses the passage 15, and flows through the housing 21 or 22 and escapes into the lower case by way of the corresponding opening in the partition 4. Liquid entering at the outlet connection 9, traverses the housing 17 or 18, and reaches the housing 21 or 22, and thus escapes into the lower case. This described drainage feature is of great importance because it permits the meter to continue in satisfactory operation although it may contain a very large amount of liquid, whereas if it were not for this drainage feature a comparatively little liquid such as might be contained in the lower portions of the inlet and outlet connections 8 and 9, would be sufficient to seal these connections and thus interrupt the supply of gas. The fact that the passages 15, 17, 18 and 16 are without bends extending below the level of the floor 4 of the valve chamber 2 and which bends would, if present, hold the liquid and constitute seals, is an important factor in the described drainage of the meter.

If desired, and in order to insure drainage through the housing 21, the ports in the valve seats 29, may be constructed as shown in Fig. 5, in which the port 30, extends nearer to the level of the partition 4, than do the ports 31 and 32. In fact the bottom walls of the ports are at different elevations, the ports 30, being the lowest, 32 the highest, and 31, intermediate of these. The port 30, corresponds with the opening in the housing 23, the port 31, with the opening in the housing 18, and the port 32 with the opening in the housing 26, and on the other side of the meter the arrangement is the same. Should liquid flow or collect upon the floor 4, of the valve chamber 2, from either the inlet or outlet connection, it will obviously drain through the port 30, and liquid entering from the outlet connections by the port 31, may not flow into the port 32, but will escape by the port 30.

The valves may be of any appropriate variety and furnished with proper seats, but for the sake of description the valves 33 and 34, are shown as of the ordinary D-slide variety and they are arranged for coöperation with the described valve seats and are suitably connected as by links 35, with the valve shaft 7. The valves are arranged perpendicular to the partition 4, or at an inclination to the perpendicular, thus they may be permitted to slide upon one of their lower edges as upon the guide 36, (Fig. 6.) When so arranged their friction is comparatively slight since the rubbing surfaces which carry their weight are relatively small.

Guards *a*, may be provided for preventing accidental displacement of the valves while the meter is being carried about or connected. Furthermore the valves may be hung from a guide 37, arranged above and they may be fitted with wheels or rollers which run upon this guide, as shown for example in Fig. 7. In Fig. 8, the valves are shown as provided at their lower edges with wheels or rollers 38, that run upon a guide 39. These constructions are types of many which are well understood in the art and of which the use is made possible by the reason of the generally upright position of the valves. By slidably guiding the valves at one of their edges, guiding devices such as wires projecting from the ends of the valves and working in eyes may be dispensed with, so that considerable room is provided which may be utilized by making the ports as well as the various passages comparatively large.

The presence of large ports and passages permits of the passage of a relatively large volume of gas, and since the described gas passages are comparatively straight and free from tortuous bends, offsets and the like, they afford comparatively little resistance to the passage of gas. By the described arrangement there is therefore provided within a comparatively small housing a meter capable of passing a very large quantity of gas, and since the meter is self-draining, as has been described, its operation is not subject to interruption.

It will be obvious to those skilled in the art to which the said invention relates that modifications may be made in details without departing from the spirit thereof, hence the invention is not limited further than the prior state of the art may require, but

Having thus described the nature and objects of my invention what I claim as new and desire to secure by Letters Patent is

1. A gas meter having its valve chamber superposed upon its bellows chamber and having a gas opening through which drainage may occur from the valve chamber to the bellows chamber, and gas inlet and outlet passages or conduits having their top portions throughout their lengths above the effective level of said gas opening, whereby they may drain into the valve chamber and thence into the bellows chamber, substantially as described.

2. A gas meter having its valve chamber superposed upon its bellows chamber and having a gas opening through which drainage may occur and from the valve chamber to the bellows chamber, and a gas inlet passage or conduit having its top portion throughout its length above the effective level of said gas opening whereby it may drain into the valve chamber and thence into the bellows chamber, substantially as described.

3. A gas meter having its valve chamber superposed upon its bellows chamber and having a gas opening through which drainage may occur from the valve chamber to the bellows chamber, and a gas outlet passage or conduit having its top portion throughout its length above the effective level of said gas opening whereby it may drain into the valve chamber and thence into the bellows chamber, substantially as described.

4. A gas meter having its valve chamber superposed upon its bellows chamber and having a gas opening through which drainage may occur from the valve chamber to the bellows chamber, an upright valve and its seat and housing for controlling said gas opening, and a gas outlet passage or conduit having its top portion throughout its length above the effective level of said gas opening, substantially as described.

5. In a gas meter the combination with the lower bellows chamber and outlet connections and horizontal partition having openings to the bellows chamber of, an open ended housing of which the top portion throughout its length is arranged above the effective level of the openings

and which is internally provided with passages connecting said openings with the outlet connections, substantially as described.

5 6. The combination with the housing and valve chamber of a gas meter, of a gas inlet passage arranged above the floor level of said chamber and widened so that its side walls extend to the side walls of the housing, branch outlet passages or conduits arranged above the floor level of said chamber and between the walls of the widened part of
10 said passage, housings arranged opposite said branches and constituting bellows' passages, and upright valves for controlling the outlet of the bellows' passages, substantially as described.

15 7. The combination in a gas meter of a horizontal partition constituting a valve chamber floor and provided with an opening, a bellows and outlet connections, a housing arranged above the partition and having three passages

of which one communicates with said opening and the others with the outlet and interior of the bellows, and ports in said housing having the bottom portions of the port
20 openings at different heights and communicating with the respective passages, substantially as described.

8. A gas meter provided with a housing, a hanger consisting of a tubular portion provided with a flat shank aligned with the exterior of the tubular portion, said flat
25 shank being applied to the wall of the meter, and a metallic sheet encircling the hanger and soldered to the housing, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of witnesses.

BREWSTER H. SPANGENBERG.

Witnesses:

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