

A. P. VISSER.
 DRY GAS METER.
 APPLICATION FILED MAR. 20, 1916.

1,212,290.

Patented Jan. 16, 1917.
 2 SHEETS—SHEET 1.

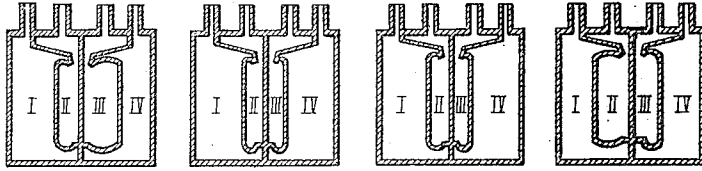


FIG. 1. FIG. 2. FIG. 3. FIG. 4.

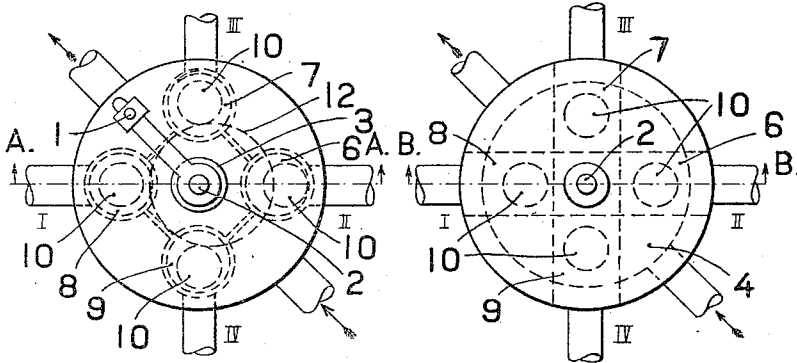


FIG. 5. FIG. 7.

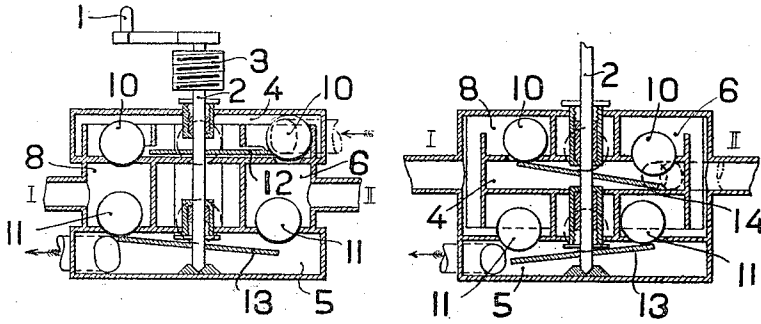


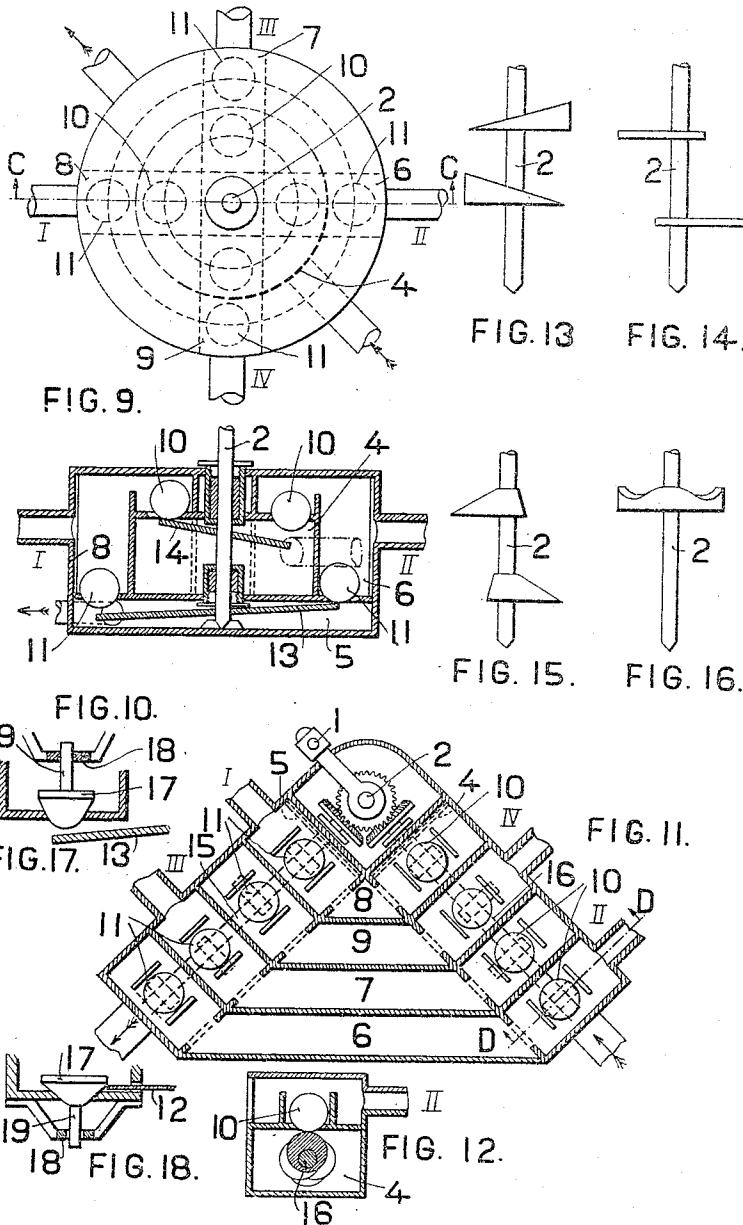
FIG. 6. FIG. 8.

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UNITED STATES PATENT OFFICE.

AART PIETER VISSER, OF THE HAGUE, NETHERLANDS.

DRY GAS-METER.

1,212,290.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, AART PIETER VISSER, engineer, residing at The Hague, the Netherlands, a subject of the Queen of the Netherlands, have invented certain new and useful Improvements in and Relating to Dry Gas-Meters, of which the following is a specification.

This invention relates to the gas distributing means in dry gas-meters. In the well known dry gas-meters the gas distribution is usually controlled by means of a plain slide valve. These valves receive their motion from a pair of bellows or bags the cranks of the two bags being arranged at 90° to one another. Both cranks act upon a common crank on which the eccentric for the two slide valves also mounted at 90° mutually, is fixed so that the crank never attains a dead-center position. The disadvantages of these slide-valves are the comparatively high cost at which an accurate tight-fit can be obtained and the fact, that owing to unequal wear of the face of the valve, leakage is inevitable after some time. On the other hand these valves stick or go heavily if a little tar, naphthalene, etc., has settled between the sliding surfaces, with the result that the loss of pressure in the meter is increased considerably and the supply of the gas to the burners is not uniform. Owing to the great forces to be transmitted the driving members soon wear out, so that also for this reason after some time the light starts jumping.

It has been proposed to replace the slide valves by lift valves but without success, because the device became complicated and expensive. Gas distribution by means of lift valves has the advantage that the work required for the operation remains constant even after many years' use. Tar, which may have settled on same, does not interfere with the movements, on the contrary, it influences the tight fit favorably.

According to the invention the valves are acted upon directly, *i. e.*, without making use of levers, connecting rods and the like but are operated by means of suitable members such as eccentric disks, obliquely set plates, cam plates and the like, preferably mounted on a common shaft. In the latter case the usual vertical crankshaft may be used to carry the cam plate for lifting and dropping the valves at the right moments. In combination with this feature of the invention ball-valves are especially suited. Such

valves when being lifted make a rolling movement, so that the friction is reduced considerably.

The invention is further explained with reference to the accompanying drawings.

Figures 1 to 4 show schematically the movements of the bags in a dry gas-meter. Figs. 5 and 6, 7 and 8, 9 and 10 are a side view and vertical section across the lines A A, B B, C C respectively of three different valve boxes, constructed in accordance with the invention. Fig. 11 is a sectional view of a fourth construction, while Fig. 12 represents part of a vertical section across the line D D in Fig. 11. Figs. 13 to 16 show different forms of operating members. Figs. 17 and 18 represent two modified valve constructions.

The gas-meter contains chambers, indicated by I, II, III and IV. The wall between the chambers II and III is fixed; the chambers I and II and III and IV are mutually separated by means of bags or bellows. In Fig. 1 the chamber III is entirely full of gas which must be discharged; in Fig. 2 the chamber I is filled, while in Fig. 3 the chamber IV and in Fig. 4 the chamber II is full. From these figures the movements of the bags are sufficiently clear. In the Figs. 5 to 12 the pipes opening into the chambers are correspondingly indicated by I, II, III and IV; the main supply and discharge pipes (street and house pipes) are indicated by arrows pointing in the direction of and away from the meter.

The adjustable crankpin 1 (Figs. 5, 6) is connected to the transmitting means of the bags in the usual way by means of rods (not shown), so that the crankshaft 2 is rotated when gas passes the meter and thereby drives the counting-mechanism by means of the worm 3. The valve box is divided into a main supply chamber 4 and a main discharge chamber 5 and in four distributing chambers 6—9, each containing two ball valves, the upper balls 10 of which control the supply and the lower balls 11 the discharge. On the shaft 2 an eccentric disk 12 and an oblique plate 13 are fixed. The vertical walls of the chambers 6—9 form a cylinder of such a diameter that the balls are always bound to fall back on their seatings even if the meter is not placed exactly vertically. To also arrange for this with the balls 10 the walls reach into the main supply chamber 4. In the position of the eccentric

12 and of the oblique plate 13 shown, the ball 10 on the right has been raised off its seat by the engagement of the eccentric 12 with its underside and the supply opening to the distributing chambers 6, and thence to the meter-chamber II is fully open, while in this position the discharge valve of the chamber 6 is closed. The supply valve of the chamber 8 on the other hand is closed and the discharge valve 11 of this chamber fully opened. At this position of the crank the four remaining balls just touch the eccentric 12, and the plate 13 respectively, so that at the moment one of the supply valves or of the discharge valves is falling back on its seating; the ball situated diametrically opposite to same is always lifted. By this arrangement of the controlling means reversion of the movements of the bag as soon as the chamber at one side of this bag is full, is rendered possible. When the eccentric disk 12 moves along a ball or when the oblique plate 13 is rotated underneath a ball and lifts same; these balls are made to roll constantly, so that as stated above the losses due to friction and herewith the losses in pressure in the meter are reduced to a minimum.

It will easily be understood that the respective successive movements of the balls 10 and 11 as a result of the rotation of the shaft 2 are such that the meter-bags work in the usual way and warrant a constant flow of gas passing through the main supply- and discharge pipes of the valve box.

The distributing arrangement shown in Figs. 7 and 8 works in much the same way as the arrangement described above. The supply chamber 4 is in this case arranged inside the valve box and the distributing chambers 6—9 are situated in the shape of a cross. The balls controlling the supply are operated by means of an oblique plate 14.

The construction according to Figs. 9 and 10 corresponds in principle with the arrangements according to Figs. 7 and 8. The balls, however, are more accessible on the cover of the valve box being detached.

The valve box of Figs. 11 and 12 shows operating means for the balls consisting of eccentrics 20, fixed to shafts 15 and 16, by which the discharge and supply valves are controlled respectively. These shafts are driven by means of a suitable gearing.

The Figs. 13—16 show members of different shapes adapted to be fixed to the shaft 2 and to lift or drop the balls in valve boxes of the shape according to Figs. 5—10 in such a way that two balls situated diametrically opposite one another can only be resting on their seatings simultaneously during an instant. Figs. 13 and 15 show wedge members of different shape the upper one in each case being adapted to operate the upper balls and the lower one the lower balls. Fig.

14 shows a form in which eccentric disks, similar to 12 (Fig. 6) are employed to operate both the upper and the lower valves. Fig. 16 shows a crown wheel having corrugations thereon for operating the valves.

In Figs. 17 and 18 two valve constructions are shown especially suited for being controlled by means of an eccentric disk such as 12 or an oblique plate such as 13. The valve body 17 is guided in a fixed eye 18 by a central pin 19. Valves of this shape always fall back upon their seatings independently of the manner in which they are lifted. It will also be understood that during the time they are lifted they are rotated on their axes by frictional contact with the revolving members 12 or 13.

In practice it will of course never be attained that a valve of one of the chambers is closed at the very moment the corresponding valve in the other chamber is opened. A slight inaccuracy in the adjustment of the mechanism or resulting from wear however, does not result in a jumping light, because in relation to a bag, both valves of which should rest on their seatings simultaneously, the crank pin is just in a dead center position. The crank is pulled through this dead center position with a maximum force by the other bag, so that the pressure of the gas does not alter appreciably, if the inaccuracy in the operating mechanism is kept within technically allowable limits.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a dry gas meter the combination of valves for controlling the gas distribution such valves being of the type which rise and fall from and to their seats, and means for operating said valves consisting of rotating oblique disks adapted to periodically engage and lift each of said valves from its seat.

2. In a dry gas meter the combination of valves for controlling the gas distribution such valves being of the type which rise and fall from and to their seats and each having a downwardly facing rounded portion, and means for operating said valves consisting of rotating members adapted to periodically engage said rounded portions and lift said valves from their seats and at the same time to cause rotation of the same by rubbing engagement.

3. In a dry gas meter the combination of valves for controlling the gas distribution such valves being of the type which rise and fall from and to their seats, and means for operating said valves consisting of rotating members adapted to periodically engage and lift each of said valves from its seat, said valves being freely rotatable and being engaged by said rotatable members to cause their rotation by frictional engagement.

4. In a dry gas meter the combination of ball valves for controlling the gas distribution and means for operating said valves consisting of rotating oblique disks adapted to periodically engage the underside of said valves and lift them from their seats.

5. In a dry gas meter the combination of valves for controlling the gas distribution such valves being of the type which rise and fall from and to their seats, and means for operating said valves consisting of rotating members mounted on a common shaft adapted to periodically engage and lift each of said valves from its seat and at the same time to rotate it by rubbing engagement.

6. In a dry gas meter the combination of valves for controlling the gas distribution such valves being of the freely movable ball type, and means for operating said valves consisting of rotating members mounted on a common shaft and adapted to periodically engage the underside of said valves to lift them from their seats and, by rubbing engagement, to rotate them at the same time.

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

AART PIETER VISSER.

Witnesses:

D. J. KORY,
A. C. NELSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."