

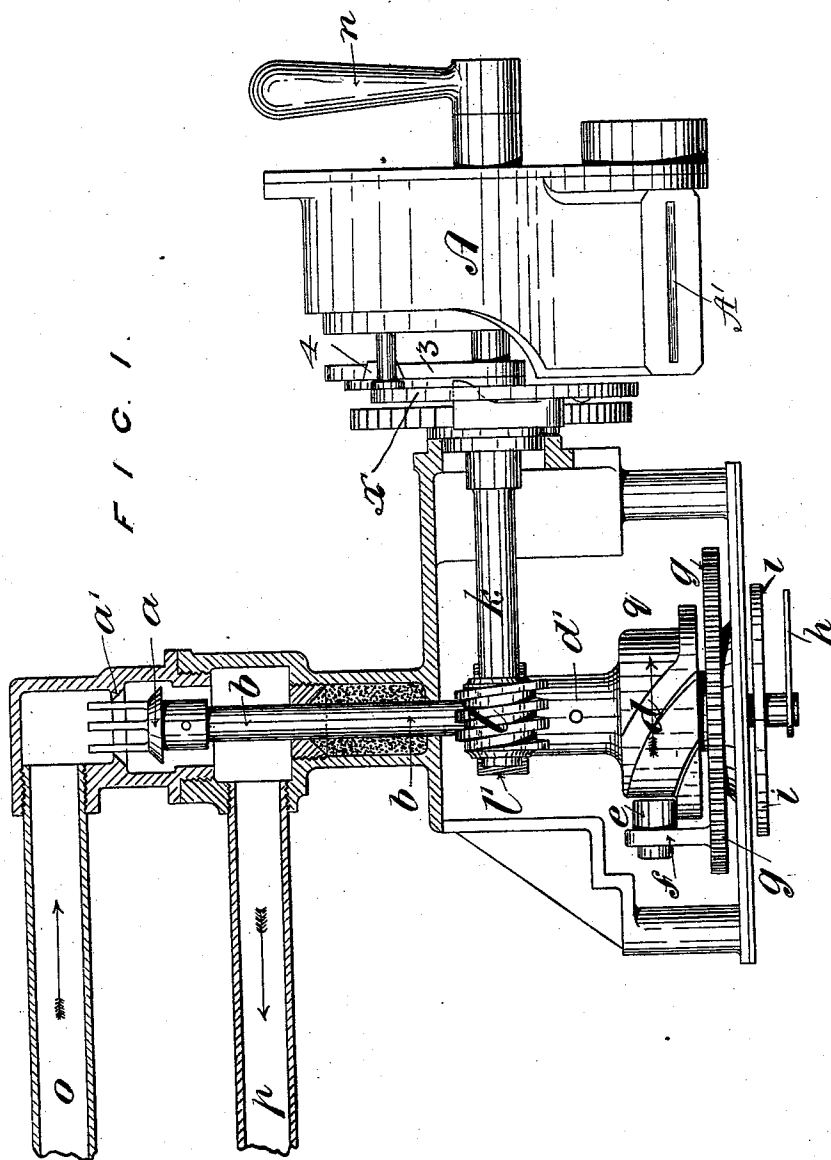
(No Model.)

2 Sheets—Sheet 1.

D. ORME.
PREPAYMENT GAS METER.

No. 537,167.

Patented Apr. 9, 1895.



Witnesses.
E. K. Stewart.
A. D. Basing.

INVENTOR.

Daniel Orme
By his atty. Reinhardt & Co.

(No Model.)

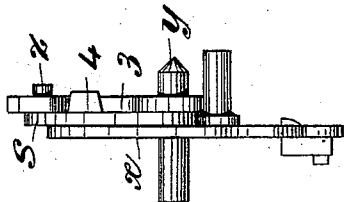
2 Sheets—Sheet 2.

D. ORME.
PREPAYMENT GAS METER.

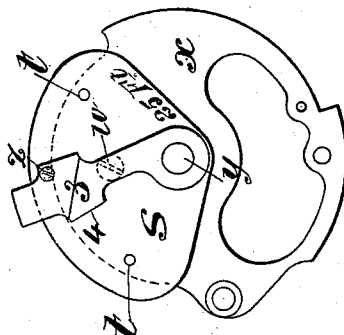
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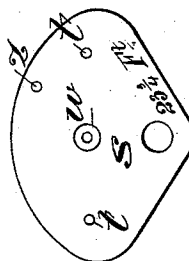
F I C. 4.



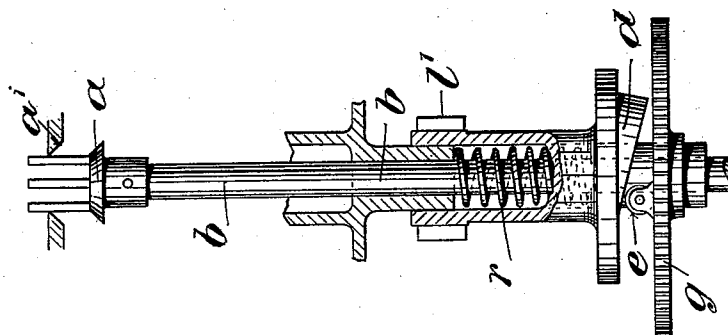
F I C. 3.



F I C. 5.



F I C. 2.



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UNITED STATES PATENT OFFICE.

DANIEL ORME, OF OLDHAM, ENGLAND.

PREPAYMENT GAS-METER.

SPECIFICATION forming part of Letters Patent No. 537,167, dated April 9, 1895.

Application filed July 20, 1894. Serial No. 518,081. (No model.) Patented in England August 19, 1893, No. 15,740.

To all whom it may concern:

Be it known that I, DANIEL ORME, a subject of the Queen of Great Britain, residing at Oldham, Lancaster county, England, have
5 invented certain new and useful Improvements in Gas-Meters, of which the following is a specification, reference being had to the accompanying drawings.

This invention was patented in Great Britain August 19, 1893 No. 15,740.

My invention has reference to prepayment wet and dry gas meters arranged to supply a pre-determined quantity of gas to the consumer upon the insertion of a coin or coins
15 as is the case for example in a former invention for which I have obtained a patent in the United States, No. 497,682. In the said former invention the supply of gas was interrupted by arresting the motion of the bellows or drum. In the present case I cause the supply to be shut off by the closing of a valve, which is acted upon by parts receiving motion through suitable gearing from the drum or bellows. I prefer to make the valve
25 or its seating of soft metal or material such for example as lead, the seating or the valve as the case may be being made of hard metal or material, the intention being that the part formed of soft material shall be capable of accommodating itself to the part of hard material whereby a more perfect or reliable closure of the valve can be obtained. To set the cam or part which is rotated in advance, I use a revoluble coin cylinder as in my said former
35 invention and I also vary the construction of the adjustable varying stops or parts upon which the coin operates when the coin cylinder is revolved. I use a series of changeable plates or stops capable of attachment to the
40 disk. When using such plates each plate would have a screw hole differing in position from the screw holes of the other plates so that a movable stop centered on the axis of the disk and connected with the disk by means
45 of the screw hole, would assume a different position on each plate, the edge of the inserted coin striking earlier or later against the stop and so moving the spindle which actuates the cam or cam-disk more or less according to the varying price of gas. The
50 changeable plates or stops are stamped, numbered and recorded so as to serve as checks upon the persons employed to make the change

of plates or stops and insure that they had performed their duties.

For the purpose of rendering my invention clearly understood I have attached to my present specification two sheets of explanatory drawings which I will now describe.

On Sheet 1, Figure 1 is a plan view partly
60 in section of a practicable arrangement for closing the valve which shuts off the supply of gas when the quantity paid for has been consumed. Fig. 2 is a modified form of the arrangement shown in Fig. 1, Sheet 1. Figs. 65
3, 4 and 5 show the plates for varying the delivery of gas in accordance with the price.

Referring to Sheet 1, the valve is marked
70 *a* and when closed it rests upon the valve seating *a'* and thus stops the gas from passing through the meter. The valve *a* is mounted loosely on the end of a spindle *b* and this spindle is capable of being slid to and fro by means of a cam *d* also carried by the spindle. The cam *d* is formed with a cam groove as
75 clearly shown in the drawings, and the said cam groove is adapted to confine an anti-friction bowl or pin *e* which is carried by a projection *f* from the spur wheel *g*. The spur wheel *g* is part of the ordinary and already
80 described mechanism of my pre-payment meter and is connected to a train of gearing from the bellows or other measuring parts of the meter, so as to rotate and move the index finger *h* which revolves in front of the dial *i*.
85 The portion of the mechanism marked "A" is the money box mechanism but this need not be described as it is practically identical with the coin receiving or money box mechanism described and illustrated in the specification of my said former United States Patent
90 to which I refer the reader. It will be seen that as in the aforesaid former specification the spindle *b* is geared to the central spindle *k* of the coin receiver A by a worm *l* and worm
95 wheel *l'* so that when the coin receiver is operated by the handle *n* upon the insertion of a coin the spindle *b* is rotated to a certain extent and as the worm wheel *l'* is a fixture on the sleeve *d'* of the cam *d* the cam is turned
100 in the direction of the arrow. When the cam is so turned as to be in advance of the bowl *e* as shown in the drawings for example, the valve *a* is away from its seat allowing gas to pass into the meter from the supply pipe *o*
105 through the pipe *p* which conducts the gas to

the measuring mechanism. The passage of the gas through the meter drives the gearing which operates the spur wheel, the said spur wheel carrying round with it the bowl *e*. So long as the bowl *e* is in that part of the cam groove which is parallel to the face of the wheel *g* the position of the spindle *b* is not altered and the valve *a* remains open; but when the bowl *e* comes up with and enters the inclined part of the groove which appears in Fig. 1 the cam and the spindle *b* are slid longitudinally and the valve *a* is shut down upon its seat *a'* thus stopping the supply of gas. The gradual closing of the valve lowers the light and warns the consumer that his supply is about to be cut off, so that he may if he chooses, purchase a continued supply by inserting another coin, and operating the coin receiving mechanism, so as to advance the cam *d* again. It will be seen that by the use of a cam of the indicated nature, I obtain a positive to and fro movement of the valve which never varies. I might however use a spring in conjunction with an inclined or cam face to open and close the valve *a* but in all cases I would use the spring to open the valve and never to close it. This use of the spring to open but not to close the valve is for the purpose of avoiding certain disadvantages which will be hereinafter made apparent. If preferred the valve *a* may be placed at the outlet from the meter instead of at the inlet as set forth.

Fig. 2 (Sheet 2) illustrates the combination of the valve closing cam-face with the valve opening spring. The inclined or cam-face *d* projects from the head of a sleeve *q* which is secured to the sliding spindle *b* carrying the valve *a* as in the former example. A bowl *e* is carried by the spur wheel *g* and is arranged opposite to the said inclined or cam face *d*. The sleeve *q* has formed on it the worm wheel *l'* and this gears with the worm *l* on the money box spindle, so that the sleeve *q* with its inclined or cam face, is advanced by the operation of the coin receiving mechanism in the same manner in which the cam *d* Fig. 1 is advanced. When the bowl on the spur wheel *g* overtakes the incline *d*, the sleeve and shaft *b* are slid against the pressure of the contained spring *r* so as to close the valve *a*. When the sleeve with its cam face is again advanced, the spring *r* slides back the sleeve and shaft so as to open the valve. I prefer to make the valve *a* or its seating *a'* of soft metal such as lead, or a soft alloy or of any other soft material suitable for the purpose. My reason for this is that generally when the seat or the valve is of such soft metal or material, the one accommodates itself to the other and inequalities or grit or dirt deposited on the seating or valve face do not prevent gas tight contact between valve and seating. The inequality is leveled up by the softness of the metal or substance of the valve or seating, and hard grit or deposit is sunk into the soft metal or substance so that in any case fluid

tight contact between the valve and the seat is insured. The reason of my preference for a cam closing and spring opening arrangement for the valve, as described with reference to Fig. 2 is more apparent when a valve or seating of soft substance is used. When the cam is used to close the valve, the gas is cut off and the mechanism stopped as soon as the valve and seat are in close contact, and no further injurious pressure upon the valve or seating takes place; but when a spring is used, the pressure is always constant and maximum whether required or not. This subjects the valve and seating to unnecessary strain and destructive wear. Therefore I consider the use of a spring to close the soft metal valve is disadvantageous, whereas there is nothing against its use as a means for opening the valve. I do not however restrict myself to using a cam closing and spring opening arrangement, in those cases only where a valve or seating of soft material is used. Even where a valve and seating of hard metal or material is used I find that the use of the said cam closing and valve spring opening arrangement is advantageous. The reason is this: Suppose that both valve and seating are of hard material if a spring is used to close the valve, the spring can attain only a certain force of pressure and if any grit or dirt should come between the valve and face the spring is not sufficiently powerful to crush the obstruction and close the valve; but if the closing is effected by the cam then the power of the cam is so great that it can crush the interposing grit and close the valve, the closing motion of the valve continuing so long as the gas continues to pass the valve and thus actuate the mechanism which operates the valve.

The described arrangements for operating the valve might be varied by causing the cam to rotate as the gas passes through the meter the cam in such a case acting upon a part connected with the coin receiving mechanism.

In all cases the cam or part operated from the coin receiving mechanism is prevented by a stop from being revolved beyond a determined extent, by the insertion of a succession of coins.

The remaining figures refer to improved means for altering the stop on the disk of the coin receiving mechanism so as to vary the quantity of gas delivered for a given coin, in accordance with the varying local or market price of gas all as clearly set forth in the specification of my said prior United States patent.

In Fig. 1 of the present drawings it will be seen that the coin slot *A'* is formed in a cylindrical coin carrier *A* which after the coin is inserted is turned by the handle *n* so that the coin is carried around with one edge in the path of a stop 3 which it strikes. This stop is carried by a disk 4 connected with the spindle *K* so that the movement of the disk imparted thereto by the movement of the coin cylinder through the coin contacting with the stop will move the cam *d* to set it to the re-

quired point. This stop 3 may be changed so that more or less movement of the coin cylinder with its coin will be lost or ineffective before the stop is struck and moved with the spindle and cam and this stop is regulated to suit the price of the gas.

In my former patent as shown in Fig. 3 Sheet 2 of the drawings I alter the position of the stop (which is there marked 3) by shifting the screw 3^a from one of the holes 4 to another. In my present arrangement I dispense with the said ring of holes 4 and use interchangeable plates *s*. (See Figs. 3, 4 and 5 of the drawings.) Upon the disk *x* (which corresponds to the disk *x* in the said former specification) there are two steadying pins *tt* and a screw hole to receive a screw *w*. The plates *s* are all made to templet and each plate is bored to receive the steadying pins *tt* and the screw *w*. The plates are also bored to slip on the center stud *y* of the disk. Thus every plate of the series occupies exactly the same relative position on the disk *x*. The only difference between the several plates lies in the position of a screw hole *z* whereby the position of the stop 3 is governed. It will be noted that, as fully set forth in my said former specification, the stop 3 is in the path of the projecting edge of the coin, as it is carried round by the coin cylinder. The farther the stop 3 is set away from the coin the less distance will the coin move it, the less will the cam *d* be advanced, and the less gas be delivered in exchange for the coin. On the contrary the nearer the stop is set to the coin the more gas will be delivered. Therefore each of the series of plates *s* has its screw hole *z* in a position which will set the stop 3 closer to or farther from the coin, than is the case with any of the other plates. Thus by providing the requisite series of plates the stop can be set to deliver for a fixed coin a suitable proportion of gas calculated according to the local or market price of gas.

In Fig. 3 the plate on the disk is marked as delivering twenty-five feet of gas for two cents. In the plate shown at Fig. 5 the screw hole *z* is set so as to deliver only twenty-three and three-fourths feet for two cents and similarly the delivered quantity of gas may be varied by simply changing the plate. As a modification of this system I might instead of using the plates *s* provide a number of stops 3 the stops varying in shape but being always secured at a fixed point to the disk. For example the part marked 4 is the face on the stop 3 which the edge of the coin comes against. It will be clear that by making a series of stops with faces 4 projecting more or less the requisite varying delivery could be obtained. The changeable plates or stops might be stamped, numbered and recorded so as to serve as checks upon the persons employed to change the plates or stops and to insure that they had performed their duties.

The aforesaid system of interchangeable plates and stops might be used in conjunction with the hereinbefore described or any other arrangement of prepayment meter to which the plan is applicable.

I claim as my invention—

1. In combination in a coin freed gas meter, the valve, the spindle *b* carrying the same and movable lengthwise the cam carried by the said rod, means for turning the cam to set it in proper position and the bowl engaging the cam and means for operating the bowl controlled in its movement by the passage of gas substantially as described.

2. In combination, in a coin freed gas meter, the valve, the spindle *b* carrying the same and movable lengthwise to seat and open the valve, the spring for moving the rod to open the valve, the cam connected to the spindle, means for setting the cam and the bowl for engaging the cam to force the valve to its seat said bowl being operated through mechanism controlled by the passage of the gas past the valve substantially as described.

3. In combination, the valve, the cam and bowl for operating the same in one direction, the spring for moving the valve in the other direction means for adjusting the relation between the bowl and cam and means operated by the passage of the gas for controlling the operation of the said parts substantially as described.

4. In combination, in a coin freed apparatus, the motor mechanism, means for setting the same controlled by the coin and comprising a coin cylinder the plate *x* and a series of removable check pieces or stops all adapted to be fixed in one position on the plate *x* the said check pieces differing from each other to act as stops for the coin and to operate the setting mechanism to different degrees.

5. In combination, in a coin freed apparatus, the motor mechanism, the setting mechanism, the plate *x* connected to the setting mechanism and adapted to receive a series of check plates in the same position each of said check plates having a stop in a different position relative to the stops of the other plates whereby the adjustment for different degrees of movement of the setting mechanism may be regulated by changing the plates.

6. In combination in a coin freed apparatus, the motor mechanism and the stop mechanism controlled by the coin and comprising a plate *x* adapted to rotate and a series of check pieces adapted to be secured in a similar manner and position to the said plate, said check pieces having differently located stopping shoulders relatively to each other substantially as described.

In witness whereof I hereunto set my hand in presence of two witnesses.

DANIEL ORME.

Witnesses:

DAVID FULTON,
JOSHUA ENTWISLE.