C. & R. W. LAWSON.

GAS METER.

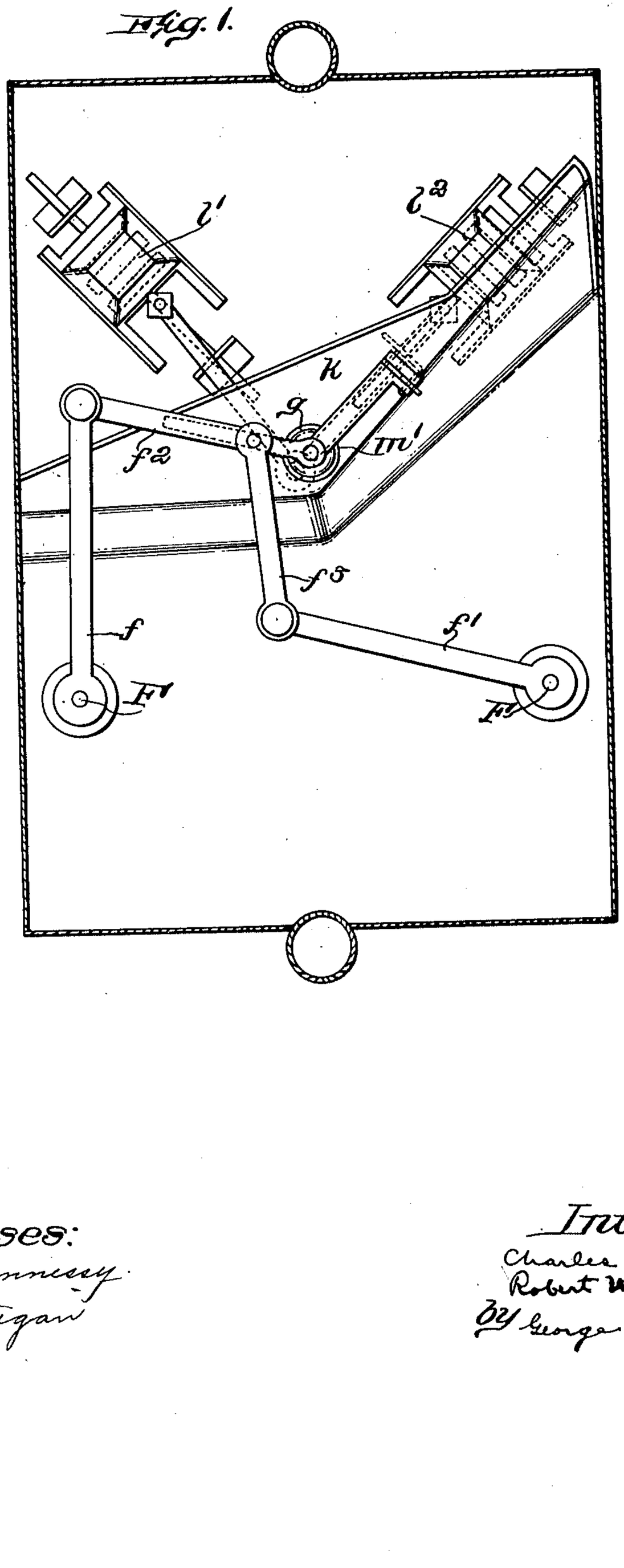
APPLICATION FILED MAR. 15, 1909.

970,627.

Patented Sept. 20, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

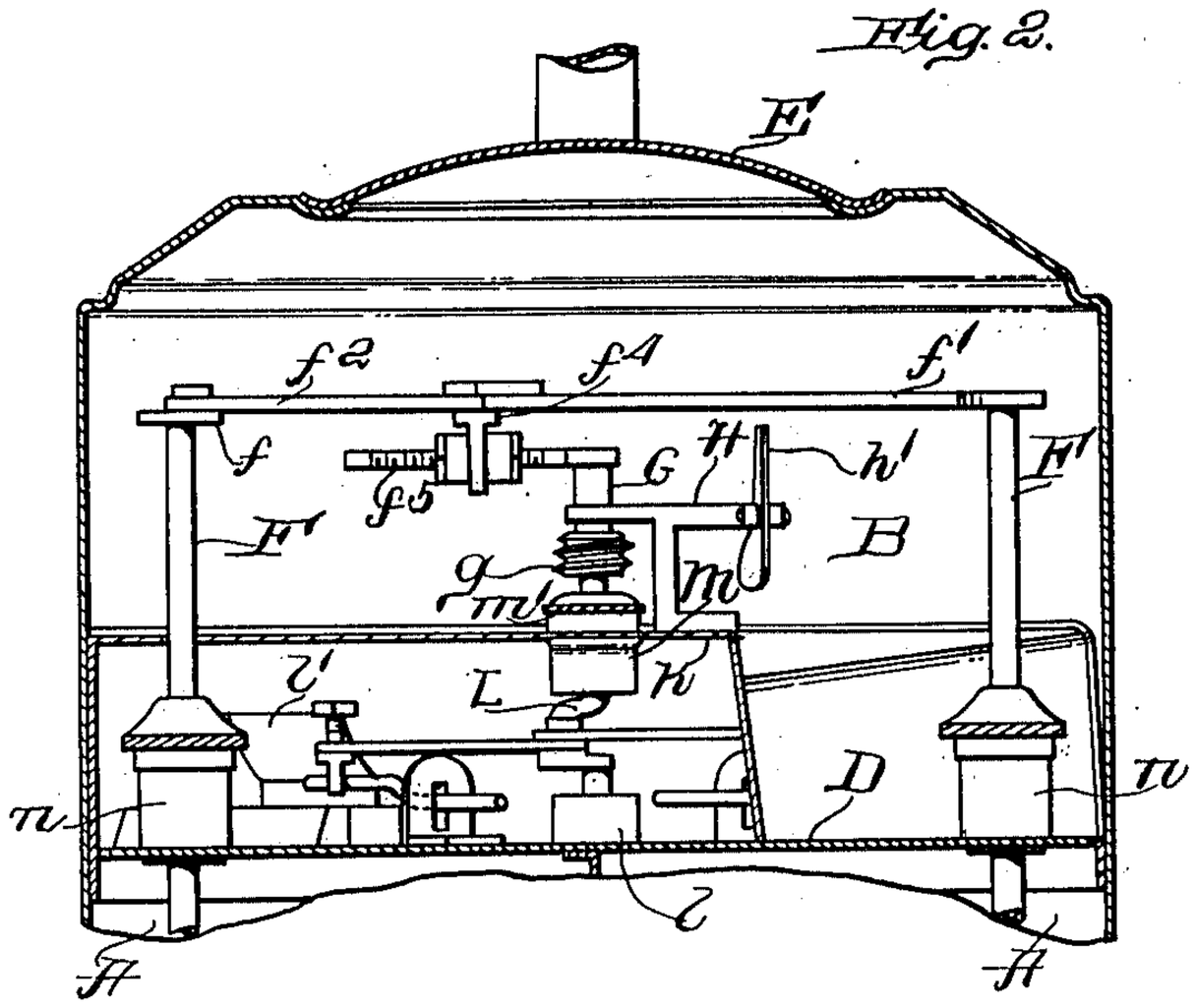

Fig. 3.

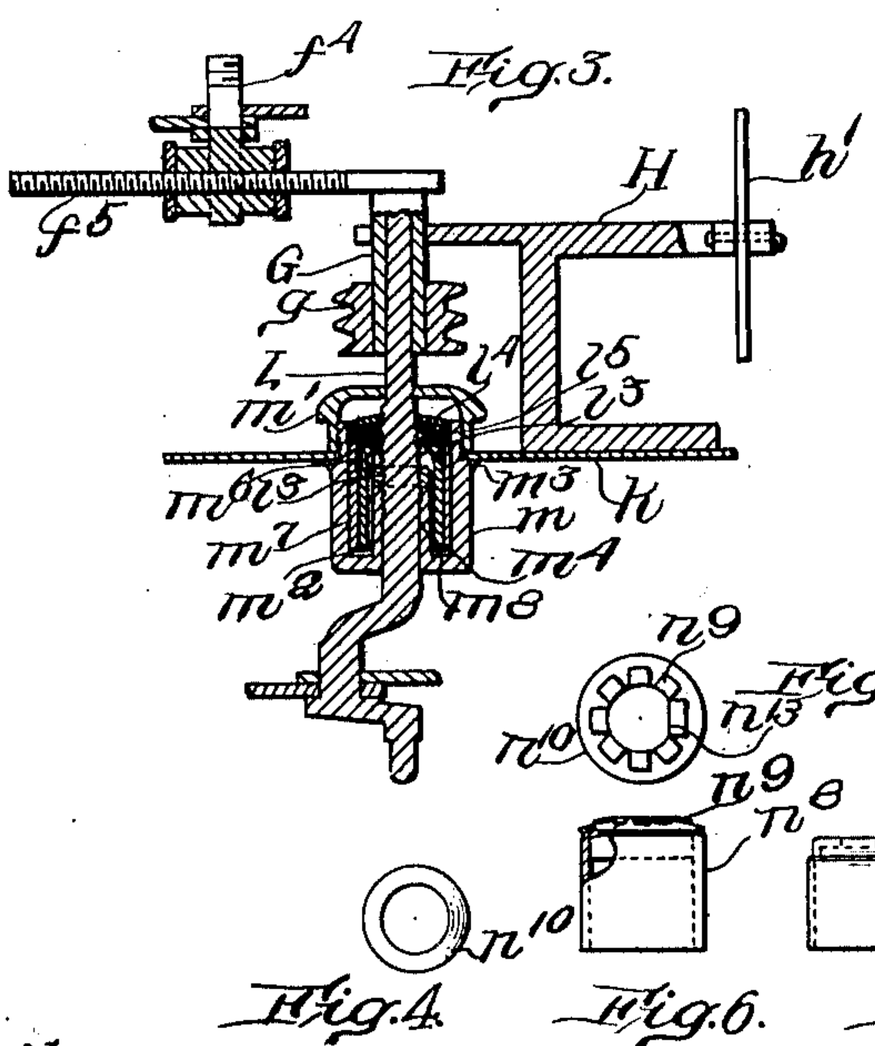

Fig. 5.

Fig. 4.

Fig. 6.

Fig. 7.

Fig. 8.

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3 SHEETS—SHEET 3.

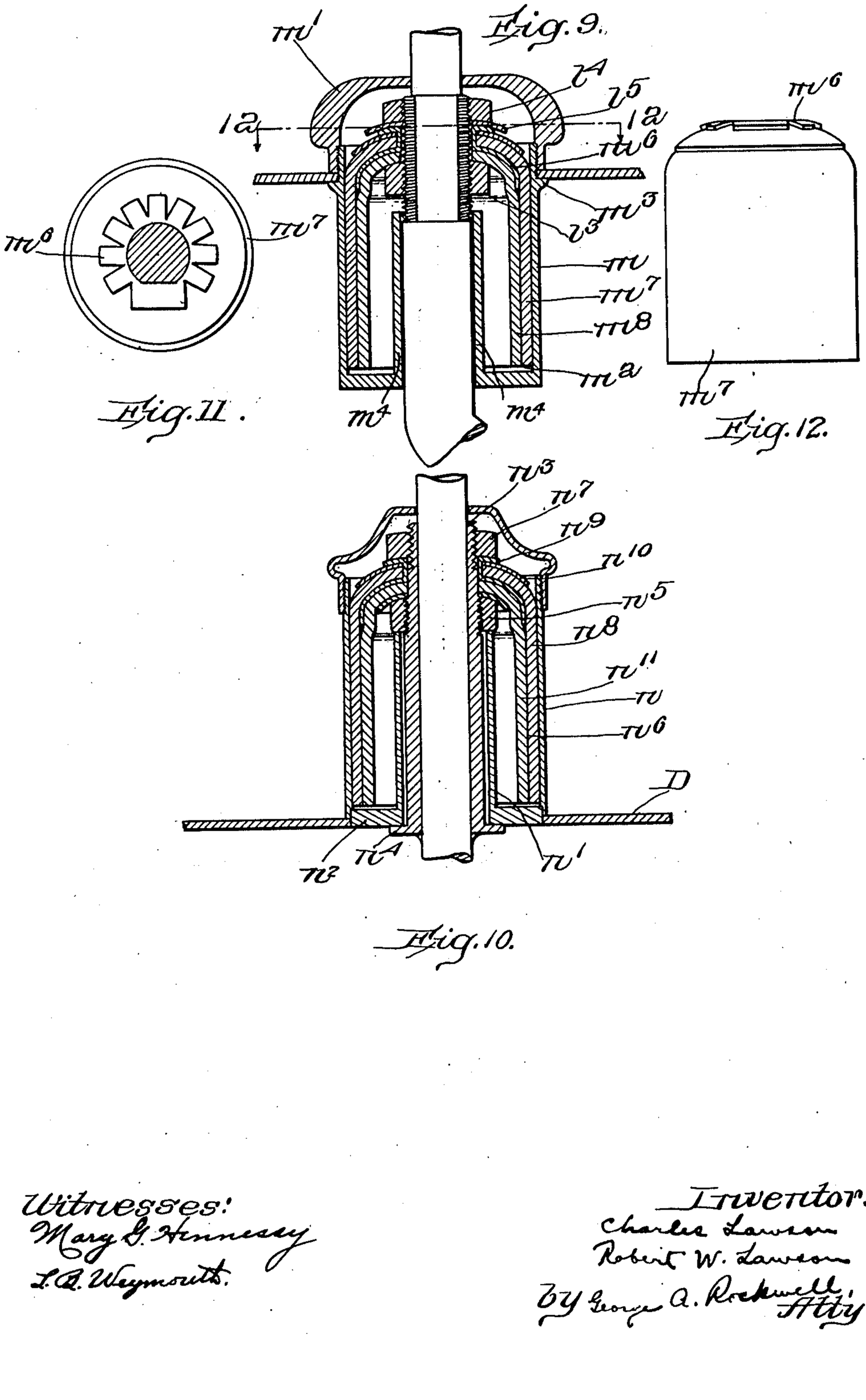

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

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UNITED STATES PATENT OFFICE.

CHARLES LAWSON AND ROBERT W. LAWSON, OF BOSTON, MASSACHUSETTS.

GAS-METER.

970,627. Specification of Letters Patent. **Patented Sept. 20, 1910.**

Application filed March 15, 1909. Serial No. 483,373.

To all whom it may concern:

Be it known that we, CHARLES LAWSON and ROBERT W. LAWSON, both of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Gas-Meters, of which the following is a specification.

The object of our invention is to improve the construction and increase the efficiency of operation of gas meters so that leakage of gas will be prevented and accuracy of measurement will be acquired.

Our invention consists mainly in constructing the motor mechanism with a removable worm.

A feature of our invention is the construction of the bushings.

Other features will be pointed out below.

In the drawings Figure 1 is a plan of a meter embodying our invention, the cover being removed; Fig. 2 is a vertical sectional view of the distributing chamber; Fig. 3 is a sectional detail of the crank shaft and connected mechanism; Figs. 4 to 8 are details hereinafter described. Fig. 9 is an enlarged sectional view of the bushing shown in Fig. 3; Fig. 10 is an enlarged view in sectional detail of one of the bushings; Fig. 11 is a plan of the packing member on an enlarged scale, showing the crank shaft in section; and Fig. 12 is an elevation of the packing member on an enlarged scale.

We have not shown the motor chamber and the motor mechanism in full as any of the well-known motor mechanisms may be used. The upper part however of the motor chamber appears at A in Fig. 2. This chamber is separated from distributing chamber B by partition D, the cover E of the distributing chamber being removable as usual.

Shafts F F lead from chamber A to chamber B through bushings hereinafter fully described. To the upper ends of these shafts are rigidly attached cranks f f', the latter being connected by links f^2 f^3 with the wrist pin f^4 which is adjustably mounted on crank-arm f^5, the latter being permanently connected with sleeve G. To this sleeve is rigidly attached worm g the sleeve being journaled in bracket H soldered to valve box K. This bracket carries the usual latch-detent h' to prevent rotation of arm f^5 in the wrong direction. Worm g is to be connected with ordinary dial mechanism.

The end of the crank shaft L is soldered to arm f^5 and the shaft extends through sleeve G, valve box K and bushing M to its bearing l, and is connected with, and operates, valves l' l^2 in the usual manner. Bushing M comprises lower tubular member m, upper cap member m' screwed to member m, expansible member m^2 and suitable washers. Member m has lip m^3 bearing against the under side of valve box K and has an exteriorly-threaded portion extending through said valve box. This member comprises an outer wall and an inner annular wall m^4 and between these two walls a chamber or cell to receive the lower end of the expansible member hereinafter described and to receive also the lubricant. Member m has its base portion perforated at the center to provide for the shaft L which rotates within said inner annular wall. Cap member m' is interiorly-threaded to engage the thread of member m and its lower surface engages valve box K and in this way the bushing is kept in place.

It may be desirable to allow a slight vertical movement for crank-shaft L and this movement is limited in one direction by collar l^3 on the crank shaft engaging the top of wall m^4 and in the other direction by the bend in the crank shaft engaging the bottom of member m. Shaft L is threaded to receive nut l^4 to hold the washer l^5 in place, and is flattened at one side to engage the flattened inner portion of expansible member m^2, the latter being held in place by collar l^3, washer l^5 and nut l^4. This expansible member comprises an eyelet m^6 gripping a tubular piece of leather m^7 and preferably we insert a smaller tubular piece of leather m^8, the latter fitting within the former but being held in place by friction. We speak of leather because that seems to us the most desirable material, but any similar expansible material could be used. The inner edge of the eyelet is flattened as above explained, and the eyelet bears against collar l^3 while the leather extends down into annular cell between wall m^4 and the outer wall of member m.

The form of bushing shown in detail in Fig. 11 is the one we prefer to use for the

rock shafts F F. It comprises tubular member n with annular wall n' and with a projecting portion n^2 which enters a hole in partition D, and which is soldered thereto. Member n^3 is soldered at the top and bottom to shaft F, and is in tubular form with one end n^4 flanged to engage the under side of partition D and with the other end threaded for engagement with a nut n^5 on member n^3 which nut bears against the top of wall n' to limit the downward movement of the shaft F. Member n^3 is flattened at n^{12} to engage the flattened portion n^{13} of member n^6. Expansible packing member n^6 is similar to the one already described and its lower portion extends within the cell formed by wall n' and the outer wall of member n. Nut n^7 and nut n^5 keep the expansible member in place.

We prefer to make the expansible member n^6 by placing the tubular leather member n^8 over eyelet n^9, then placing collar n^{10} over the leather, and then bending down the top of the eyelet. The inner petticoat n^{11} of leather is then inserted.

We prefer to use leather as the expansible material, but any other material which would accomplish our purpose may be used.

In using our meter the shafts F F are rocked as usual by the vibrations caused by the flow of gas and in this rocking will tend to oscillate tubular members n^3 as they are soldered to those members. Such oscillation will carry with it members n^6 by reason of the flattened portions above described. The only place where the gas may tend to leak through is between the annular wall m^4 above described and the crank shaft or between the wall n' and member n^3 as the case may be. But if gas does leak through it will be deflected by collar l^3 or by nut n^5 and also by the upper part of the expansible member. No gas can leak through because the lock nuts l^4 and n^7 make a complete gas-tight joint. It will then come in contact with the expansible member of the bushing. This member forms a gas-tight joint with its shaft and the gas must therefore pass downward into the chamber or cell between the inner and outer walls of the member m or member n. It is to be noted that the expansible members rotate with their shafts and this is important in that it increases the efficiency of the bushing by preserving the gas-tight joint between the expansible members and their shafts. In case the expansible member becomes worn by its friction against the outer wall there is no danger of leakage because the pressure will force the leather against the outer wall even after such wearing. As it is deflected the gas spreads out the leather of member m^2 or n^6 and forces the latter against the outer wall of the bushing with the result that the more gas and the greater pressure there is the more effective will be the obstruction caused by member m^2 or n^6. When it is desired to make examination of the bushing M or repair it, it is only necessary to unsolder crank-arm f^5 from crank-shaft L and unsolder bracket H from valve box K when worm g and consequently sleeve G may be slid off from the crank shaft doing away with the necessity of unsoldering the worm from the crank-shaft which has heretofore been necessary.

Among the many advantages of our invention we may note that we have no leakage or waste of gas; that we make repairs much easier and more cheaply; that the cost of maintenance is small; that there is much less friction than heretofore and therefore the meter is more accurate; and that the meter is in fact an automatic governor because if the pressure is great there is generally more likelihood of leakage and inaccurate registering but with our meter the greater the pressure the more friction there is, and the less the pressure the less friction there is, so that the pressure of the gas regulates the friction.

What we claim is:

1. A bushing for gas meters comprising a chamber; a shaft mounted to oscillate in said chamber; and a packing member mounted to oscillate with said shaft and having an expansible portion extending into said chamber and adapted to expand against the wall of said chamber.

2. A bushing for gas meters comprising a member having an outer wall, an inner cylindrical wall and a chamber between the walls; a shaft mounted to oscillate within the inner wall; and a packing member mounted to oscillate with said shaft having an expansible portion extending into said chamber and adapted to expand against said outer wall.

3. A bushing for gas meters comprising a member having an outer wall, an inner cylindrical wall and a chamber between the wall; a shaft mounted to oscillate within the inner wall; and a packing member mounted on said shaft and having an expansible portion extending into said chamber and adapted to expand against said outer wall.

4. A bushing for gas meters comprising a chamber; a shaft mounted to oscillate in said chamber; and a packing member mounted to oscillate with said shaft and having a leather portion extending into said chamber and adapted to expand against the wall of said chamber.

5. A bushing for gas meters comprising a chamber; a shaft mounted to oscillate in said chamber; and a packing member mounted on said shaft and having a supporting ring to engage the shaft and a leather portion supported by said ring and extending

into said chamber and adapted to expand against the wall of said chamber.

6. A bushing for gas meters comprising a tubular member; a second tubular member within the first and having a flattened side; and an expansible member which has a flattened portion to coöperate with the flattened portion of said second tubular member, substantially as, and for the purposes, described.

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