H. I. DILTS.

FITTING FOR WATER METERS.

APPLICATION FILED DEC. 9, 1907.

910,514.

Patented Jan. 26, 1909.

2 SHEETS—SHEET 1.

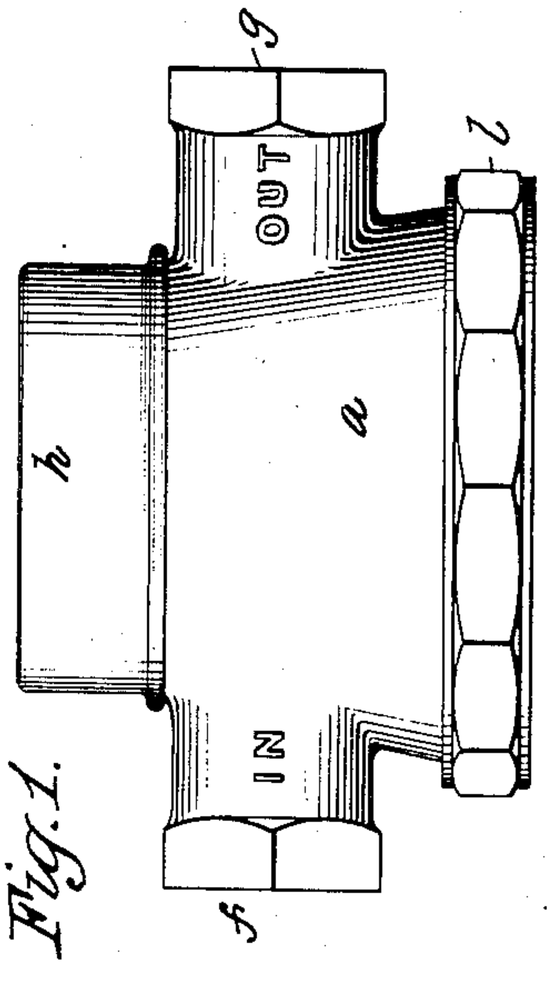

Fig. 1.

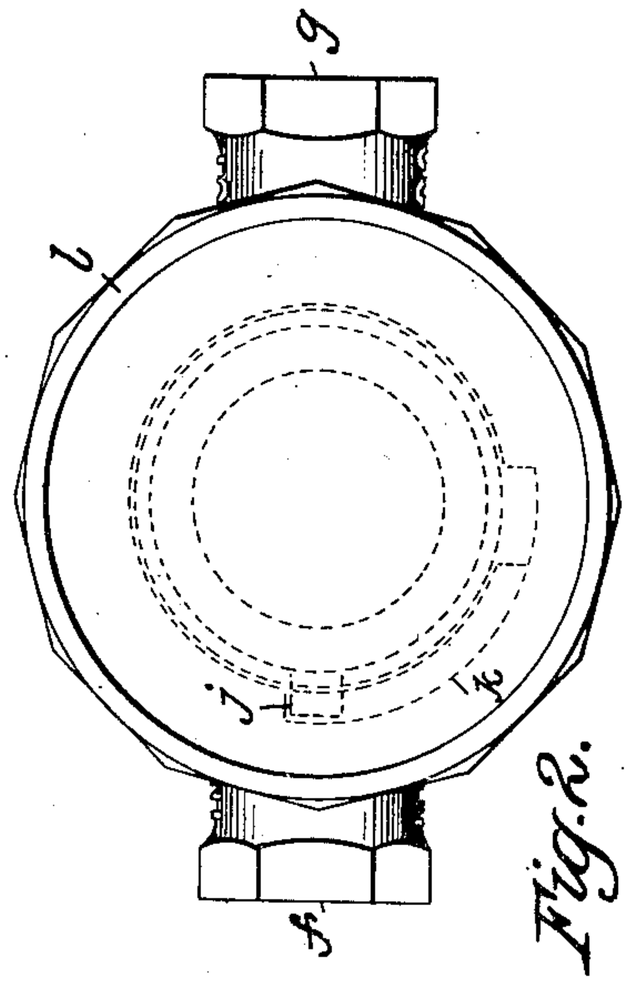

Fig. 2.

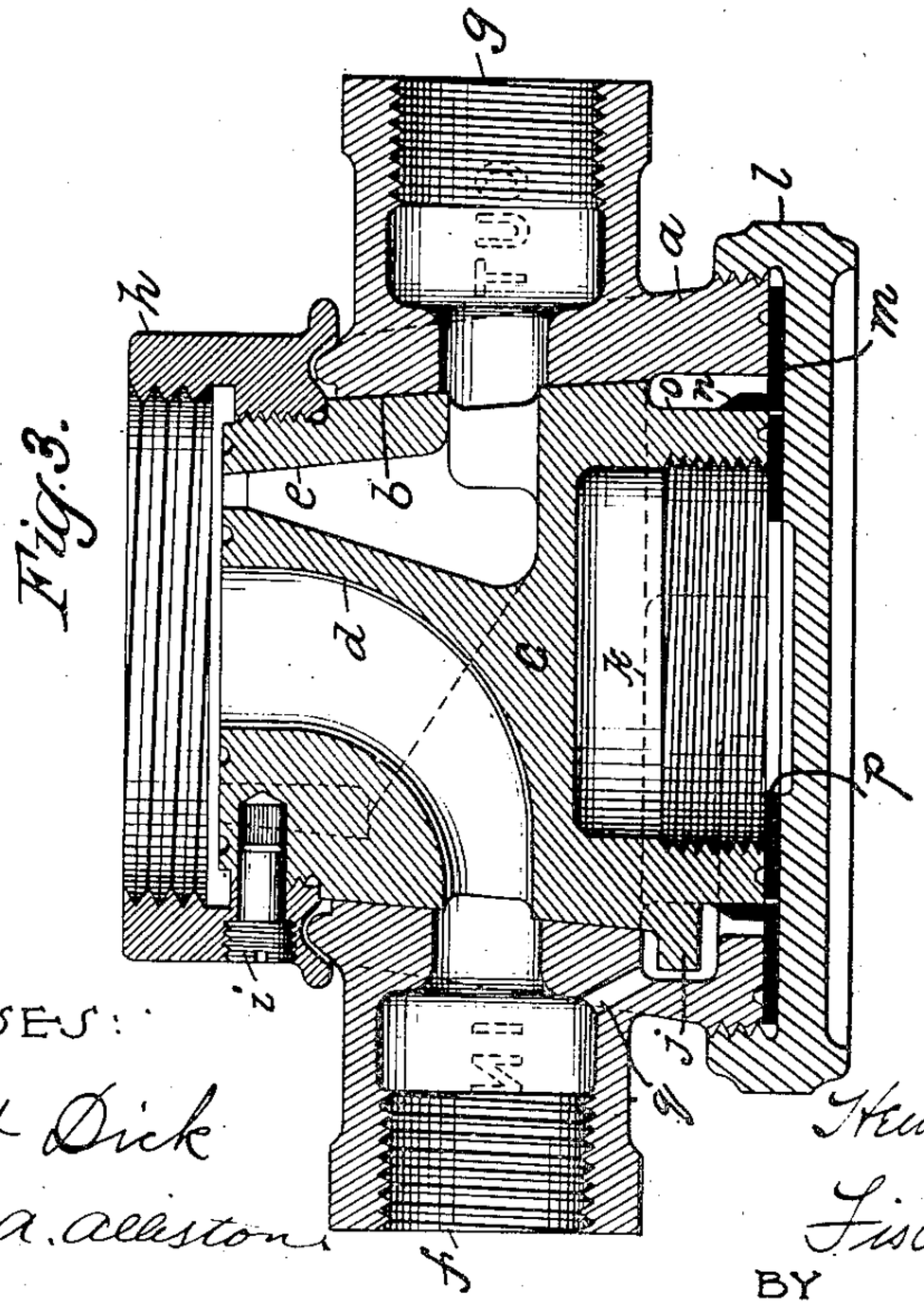

Fig. 3.

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2 SHEETS—SHEET 2.

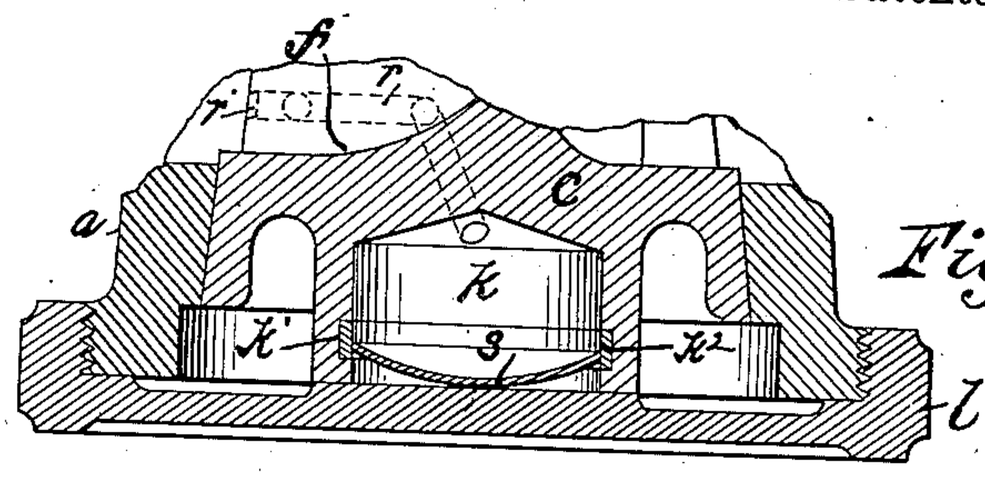

Fig. 4.

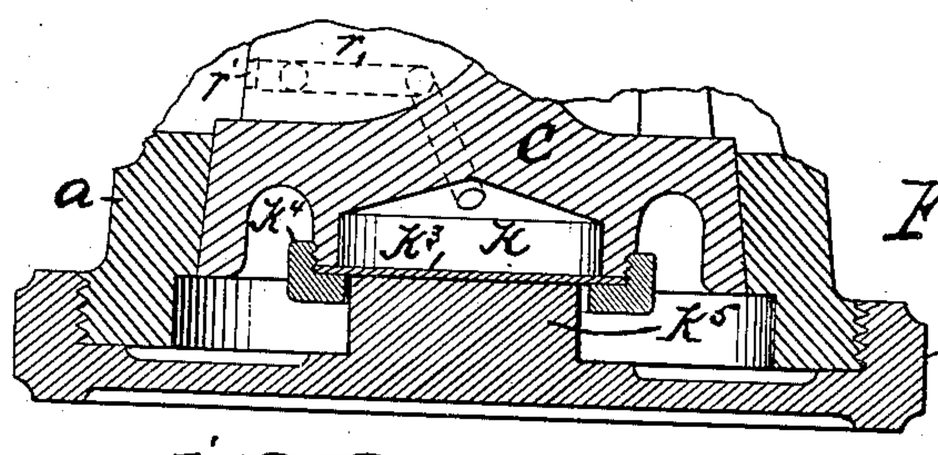

Fig. 5.

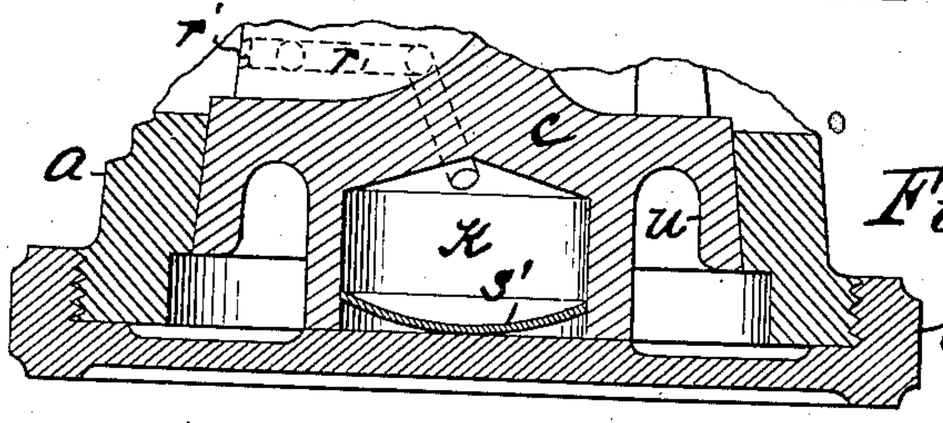

Fig. 6.

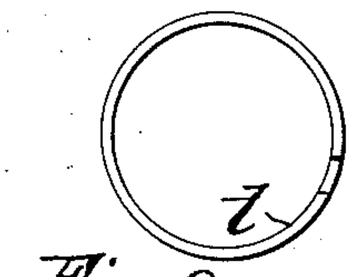

Fig. 8.

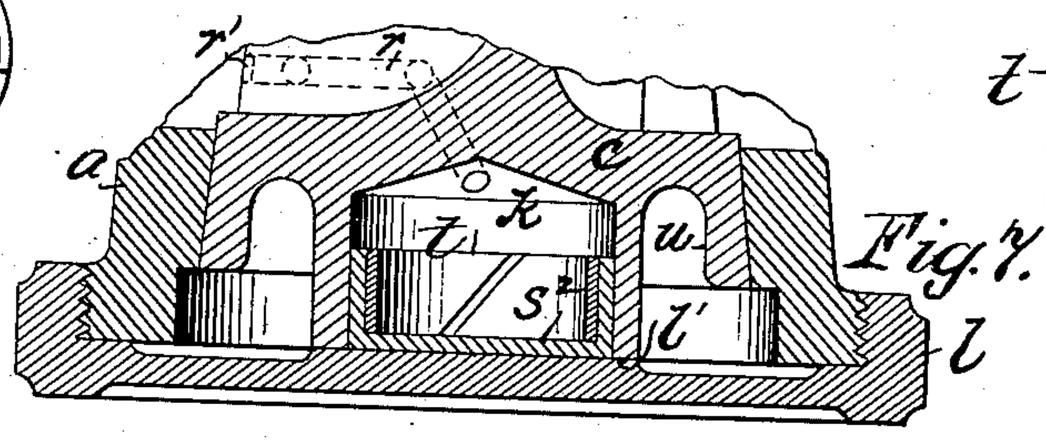

Fig. 7.

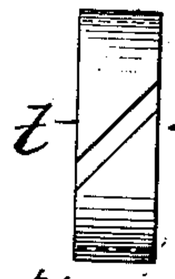

Fig. 9.

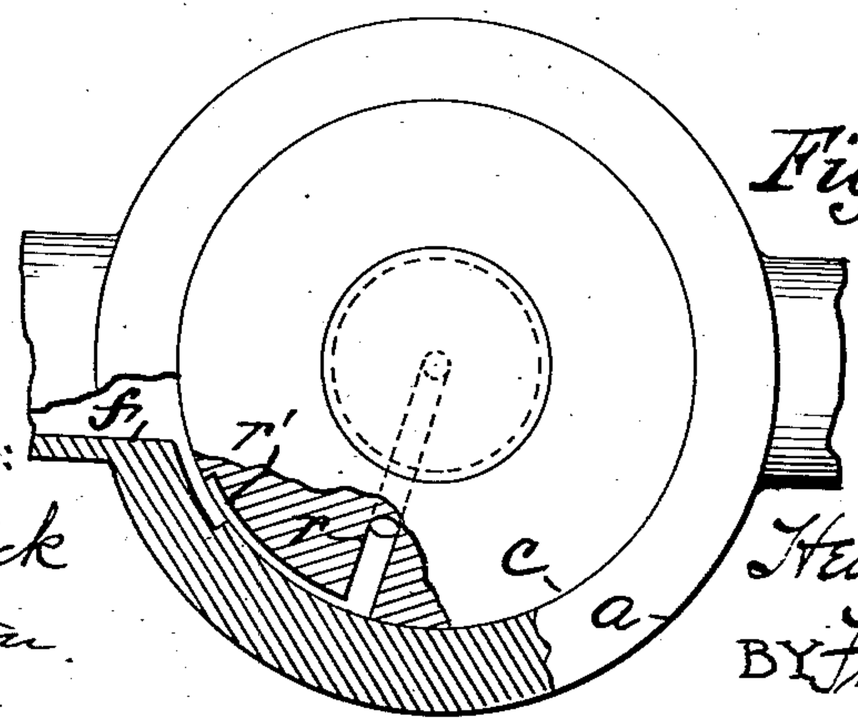

Fig. 10.

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UNITED STATES PATENT OFFICE.

HENRY I. DILTS, OF LONG ISLAND CITY, NEW YORK, ASSIGNOR TO THE NEPTUNE METER COMPANY, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW JERSEY.

FITTING FOR WATER-METERS.

No. 910,514. Specification of Letters Patent. Patented Jan. 26, 1909.

Application filed December 9, 1907. Serial No. 405,692.

To all whom it may concern:

Be it known that I, HENRY I. DILTS, a citizen of the United States, residing at Long Island City, in the county of Queens and State of New York, have invented certain new and useful Improvements in Fittings for Water-Meters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in fittings to be used in connection with water meters or other translating devices.

In the drawings which accompany this specification, Figure 1 shows a side elevation of the device. Fig. 2 is a plan view of the same. Fig. 3 shows a side elevation in section taken on line *x*—*x* of Fig. 2. Figs. 4, 5 and 6 illustrate modifications of my invention, the same being partial sections similar to Fig. 3. Fig. 7 illustrates a further modification embodying the preferred form. Figs. 8 and 9 illustrate details of the modification illustrated in Fig. 7, and Fig. 10 illustrates a cross-section of the case and plug, illustrating the position of the by-pass.

Similar letters of reference are employed in all of the above described views to indicate corresponding parts.

In the drawings, *a* represents an ordinary valve casing or fitting adapted to be connected to the service pipe in the usual manner, the valve casing being provided with a ground chamber *b* preferably tapered for the reception of a ground core or plug *c*, said ground core or plug being provided with direct flow port *d* and a reverse flow port *e*, which are designed to engage and register with the inlet *f* and outlet *g* in the valve casing or fitting *a*. The upper end of the ground core or plug *c* is screw-threaded externally to engage with the nut *h* which is internally screw-threaded for the reception of a water meter or other translating device. The nut *h* may be locked to the core or plug *c* in any convenient manner, preferably by means of the set screw *i* as shown.

j is an extension formed on the core or plug *c* in any convenient manner, near its lower extremity, and designed to engage with a recess *k* which is conveniently arranged in the lower extremity of the valve casing or fitting *a* to prevent the core *c* from being turned further than is necessary to shut off the water in the service pipe when it is found necessary or convenient to remove the water meter or other translating device from the nut *h*, which is secured to the upper part of the core *c*.

l is a cap internally screw-threaded and engaging with the lower part of the valve casing or fitting *a*. Interposed between the cap *l* and the under side of the fitting *a* is an annular gasket *m* which has a flange *n* to receive the cylindrical end *o* of the core or plug *c*. As an additional safety guard, and also to provide a yielding pressure to hold the core or plug *c* upon its seat, I also interpose a supplementary annular gasket *p*, between the cap *l* and the lower end of the plug *c* as clearly indicated in Fig. 3.

The normal position of the valve casing, when in use, is as indicated in Figs. 1 and 2, so that the meter or other translating device may be attached to the nut *h*. In this position, it will be noted that the core *c* with the meter or other translating device secured thereto, will have a downward tendency due to the weight of the parts, this tendency being to unseat the core from its conical seat. In order to counteract this downward pressure or tendency, to unseat, I lead a by-pass *q* from the inlet *f* into the lower end of the casing, so that the pressure from the inlet may pass into and completely fill the lower cavity around the lower end of the core or plug *c*. The tendency of the pressure thus introduced, is to overcome the downward pressure upon the core *c*, due to its weight and the weight of the superposed parts. If, however, this pressure were permitted to exert itself over the entire under surface of the plug *c*, the differential pressure would be sufficient to so firmly seat the plug within the casing that it would be practically impossible to turn such plug, but in order to cut such pressure away from the entire under surface of the core or plug *c*, I have as heretofore described, provided the annular gasket *m* with the upwardly extending flange *n* to receive the cylindrical end *o* of the core *c*. In this manner, I effectually cut off the access of the pressure through the port *q* into the lower cavity from the broad surface of the lower end of the plug and only permit a fraction of such pressure to become effective.

In order to provide convenient means for unseating the plug *c* from the casing and removing the same entirely, I provide a large cylindrical screw-threaded cavity in the lower end of the plug into which a wrench may be screwed for the purpose of rotating the same for the purpose of lifting the plug free from the casing, or for regrinding the valve.

In practice, a water meter or other translating device is screwed to the nut *h* in such manner that the direct flow port *d* is in registry with a passage within the meter, and the reverse flow port *e* is in registry with the discharge port of the meter. With the nut locked in position by means of the screw *i* as shown, the act of screwing the meter home into the nut *h* will result in turning the plug *c* so that its ports *d* and *e* will register with the inlet *f* and outlet *g*, and thus permit a free flow of water from the main to the meter. If, now, it is desired to remove the meter from the casing *a*, the unscrewing of the meter from the nut *h* will rotate the plug *c*, so that the ports *d* and *e* will be out of registry with the inlet *f* and outlet *g*, thereby cutting off all flow of water through the casing, as well as through the meter. Further rotation of the meter will result in unscrewing the same completely from the nut *h* and thereby permit the entire removal of the meter. If for any reason, the plug *c* should stick or fail to turn with the meter in the act of unscrewing the same, a pipe wrench may be applied to the nut *h* to turn it to the shut-off position before completely unscrewing the meter. I have not deemed it necessary to illustrate a meter in connection with the fitting, for the reason that such meters are well known in the art, and as well as fittings of the general type illustrated in the drawings.

In Fig. 4, I have illustrated a modification, wherein the fluid pressure instead of being introduced through the by-pass *q* in the casing, as heretofore described in connection with Fig. 3, is introduced through a by-pass *r* leading through the face of the core *c*, and into the chamber *k*. This chamber *k* in the present modification is cylindrical as usual, and has an annular recess *k'* near its lower end, which recess is provided with an annular gasket k^2. In the lower end of the chamber *k* and resting upon the cap *l*, is a disk-shaped piston *s* fitted closely into the chamber *k*, and rendered water-tight by means of the gasket k^2.

The port *r* is so located in the face of the plug *c* that when said plug is turned to close the inlet *f* and outlet *g*, such port *r* will still be in communication with the inlet *f* and the chamber *k*, and in order to accomplish this, I provide a partially circumferential channel *r'*, in the face of the plug, so that some portion of said channel will always be in registry with the inlet *f*. Were not this precaution taken to permit pressure at all times to enter the chamber *k*, if the plug *c* were turned to shut-off position, the pressure in the chamber *k* would gradually dissipate and thereby permit the plug *c* to drop away of its own weight from its conical seat in the casing, and thus permit a leak.

In Fig. 5, the plug is substantially the same as described in Fig. 4, with the exception that the chamber *k* is somewhat shallower, and has its lower end covered with a flexible diaphragm k^3 of metal or other suitable material, said diaphragm being held to the lower end of the plug by means of a screw-thimble k^4. I also provide a boss k^5 upon the center of the cap *l*, upon which the diaphragm k^3 reacts in order to permit the pressure in the chamber *k* to elevate the plug *c*.

In Fig. 6, the chamber *k* and the port *r* are substantially the same as heretofore described, in connection with Figs. 4 and 5. In this modification, I provide a diaphragm *s'*, such diaphragm taking into and fitting closely to the chamber *k*. In this manner, pressure introduced through the port *r* will cause a suitable elevation of the plug *c*.

In Fig. 7, I illustrate my preferred form, in which the plug *c* is provided with the bottom chamber *k*, having the port or by-pass *r* leading from the exterior of the plug to said chamber. The cap *l* is screw-threaded to the lower end of the casing *a*, and has upon its center an elevated boss *l'*, which forms a seat for the lower end of the plug *c*. Within the chamber *k*, I locate the cup-shaped piston s^2, such piston being made of leather, rubber, or any material suitable for the purpose. Within the hollow portion of said cup-shaped piston s^2, I locate the split expansion ring *t*, its purpose being to maintain a close contact between the upwardly extending flange of the piston s^2 and the wall of the chamber, so that there shall be no leakage between the chamber *k* and the space surrounding the exterior of the core bottom. The admission of the pressure through the port *r* through the chamber *k* against the inside of the piston s^2, and the expansion ring *t*, will result in creating an upward tendency of the core *c*, and thus maintain it upon its conical seat.

In each of the modifications illustrated in Figs. 4, 5, 6 and 7, the core *c* is provided with a substantially annular groove *u*, about its head, the purpose being to remove the superfluous metal and to lighten the core to as great an extent as possible.

In the form of my invention as illustrated in Fig. 3, it will be noted that the pressure which sustains the valve plug *c* upon its seat, passes directly from the inlet *f* to the lower portion of the casing, through the small by-pass *q*, in which case, such pressure is exerted throughout all parts of the chamber formed by the lower end of the casing *a*, the plug *c* and the cap *l*. I find this form of fitting of

advantage where comparatively low pressures exist, inasmuch as the gasket *m*, with its flange *n*, has sufficient strength to withstand such pressures. However, where the pressure is very high, the following disadvantage is found. The pressure within the chamber just referred to, is confined to the bottom of the casing as illustrated in Fig. 3, and results in an expansion of that portion of the casing which forms such chamber, while at the same time, it results in a compression of the lower end of the plug and thereby produces a leak between the lower portion of the plug *c* and the contiguous portion of the conical seat in the fitting *a*. It might be presumed that this pressure would result in forcing the plug *c* further up into the fitting, so as to form a perfect fit, but it will be understood that the upper portion of the plug has already formed a fit upon its seat, and therefore, can be forced no further. This disadvantage, however, is of small importance where lower pressures exist, while the compensating advantage of cheapness of construction makes this form a desirable one.

These disadvantages, however, are overcome in the forms illustrated in Figs. 4, 5, 6 and 7, where the pressure necessary to maintain the plug *c* upon its seat, is confined entirely within the head of the plug and against the cap, and should such pressure be sufficient to expand the head of the plug, it would result only in forcing a closer fit between the conical portion of the head of the plug and the contiguous part of the fitting. At this point, it is well to call attention to the fact that the omission of the metal from the annular groove *u*, heretofore referred to, will, in a measure, compensate for any undue expansion of the head of the plug, and thereby obviate any tendency which might exist to so expand the head as to make the plug stick in the casing *a*, and this, by reason of the fact, that the omission of the metal, so as to form the annular groove *u*, breaks direct communication between the walls of the chamber *k* and that portion of the head of the plug which comes in direct contact with the seat in the casing.

I claim.

1. In a fitting for water meters, the combination of a casing, and a rotatable plug fitted therein, and automatic means within the plug for transmitting pressure from the water main to the head of said plug for maintaining said plug upon its seat in said casing.

2. In a water meter fitting, the combination of a casing having inlet and outlet passages, an intermediate upwardly tapering plug fitted to rotate in said chamber, said plug having passages therein for registry with said inlet and outlet passages, a chamber in the lower end of said plug, said plug also having a passage leading from its outer face into its chamber, automatic means fitted into the lower end of said plug chamber for transmitting pressure to a fixed element of said casing, whereby, the exertion of such pressure upon said means will result in maintaining said plug upon its seat in said casing.

3. In a water meter fitting, the combination of a casing, and a rotatable plug fitted therein, registering passages in said plug and casing respectively, a cap screw-threaded to said casing to inclose said plug therein, a chamber in the lower end of said plug having a communicating passage through the wall of said plug to its external face for communication with one of the passages in said casing, and means within said chamber for transmitting pressure introduced into said chamber through said passages for maintaining said plug upon its seat in said fitting.

4. In a fitting for water meters, the combination of a casing, a rotatable plug fitted therein, registering passages in said plug and casing respectively, a chamber in the head of said plug, having constant communication with one of said passages, and automatic means within said chamber for transmitting pressure therein to a fixed element of the casing, whereby, said plug is maintained upon its seat.

5. In a fitting for water meters, the combination of a casing, a rotatable plug fitted therein, registering passages in said plug and casing respectively, means for securing a water meter or other translating device to the upper end of said plug, a chamber in the lower end of said plug, said chamber having a passage leading therefrom to the exterior face of said plug, for communication with the inlet passage of said fitting, and automatic means inclosed within said chamber for transmitting pressure to a fixed element of said casing, whereby, said plug is maintained upon its seat.

6. In a water meter fitting, the combination of a casing, and a rotatable plug fitted therein, registering passages in said plug and casing, the passages in said plug designed for communication with a water meter fitted thereto, a cap screw-threaded to said casing to inclose said plug therein, a chamber in the head of said plug, said chamber having a communicating passage leading from said chamber to the exterior face of said plug and in constant registry with the inlet passage of said casing, a movable diaphragm fitted into said chamber and resting upon said cap, whereby, pressure introduced through said passage into said chamber will result in elevating said plug, and maintaining the same upon its seat in said casing.

7. In a fitting for water meters, the combination of a casing, and a rotatable plug fitted therein, registering passages in said plug and casing respectively, a cap screw-threaded to said casing to inclose said plug therein, and means inclosed between said

cap and plug to prevent excessive differential pressure upon the end of said plug.

8. In a fitting for water meters, the combination of a casing, and a rotatable tapering plug provided with a cylindrical end fitted therein, registering passages in said plug and casing, a cap secured to said casing, to inclose said plug therein, and automatic means secured between said cap and plug to prevent excessive differential pressure upon the cylindrical end of said plug.

This specification signed and witnessed this fourth day of November, 1907.

HENRY I. DILTS.

Witnesses:
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JOHNSON SHIPMAN.