(No Model.) 3 Sheets—Sheet 1.

J. THOMSON.

DISK WATER METER.

No. 520,197. Patented May 22, 1894.

Fig. 1.

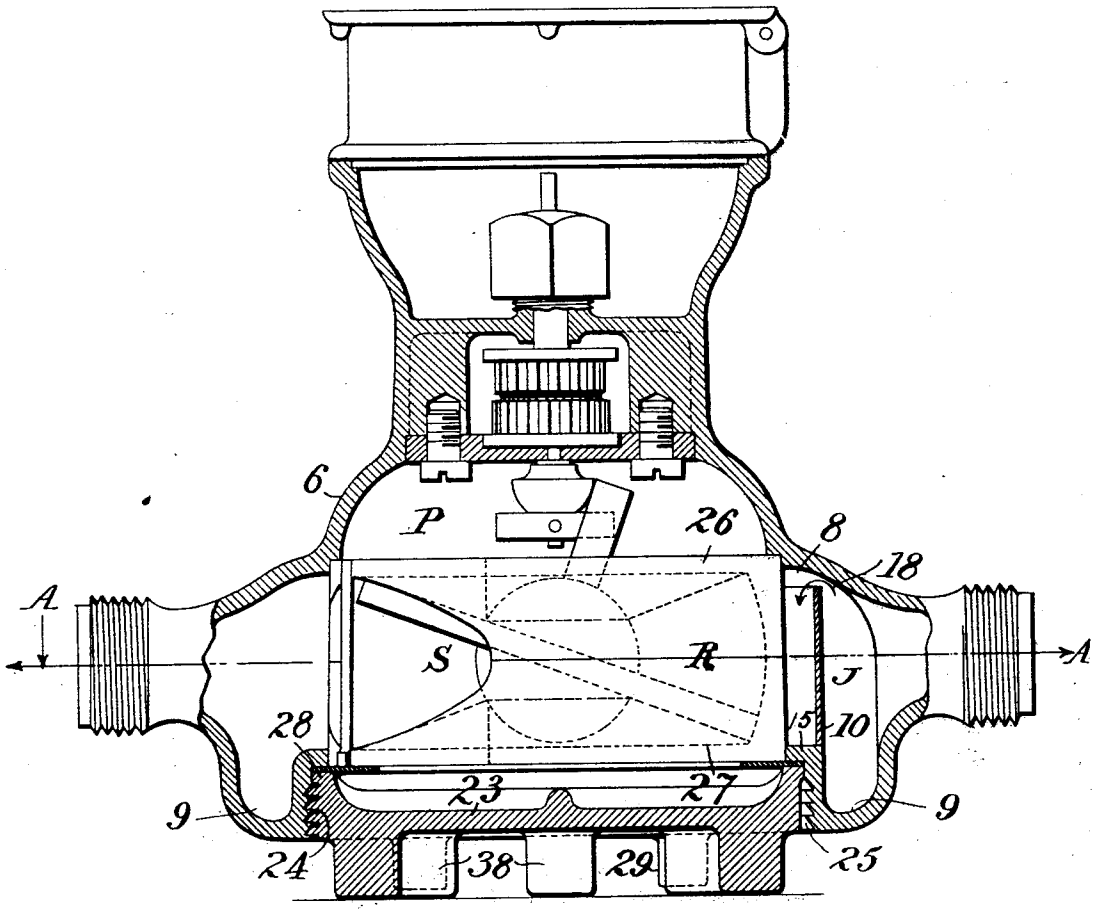

Fig. 6.

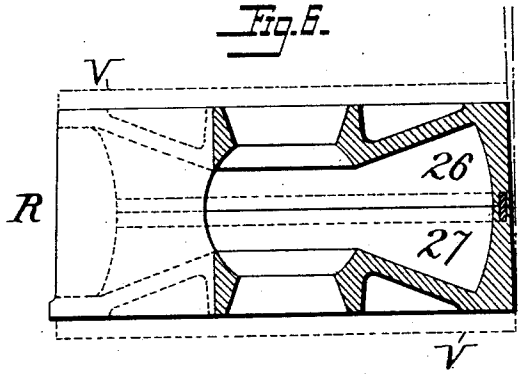

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Fig. 2.

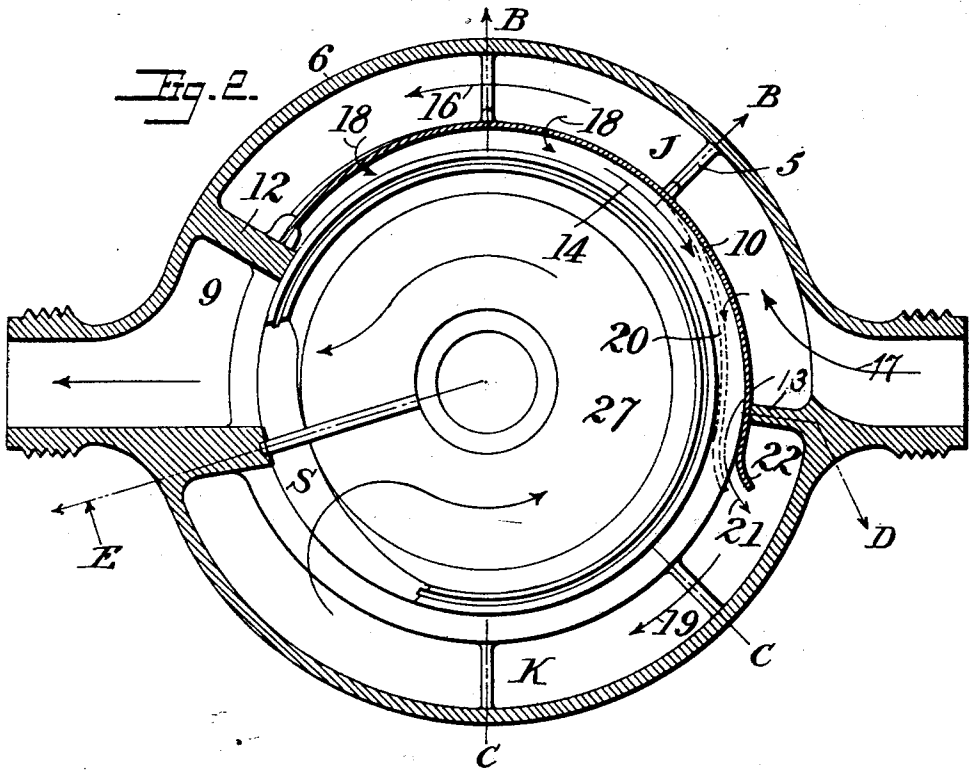

Fig. 3.

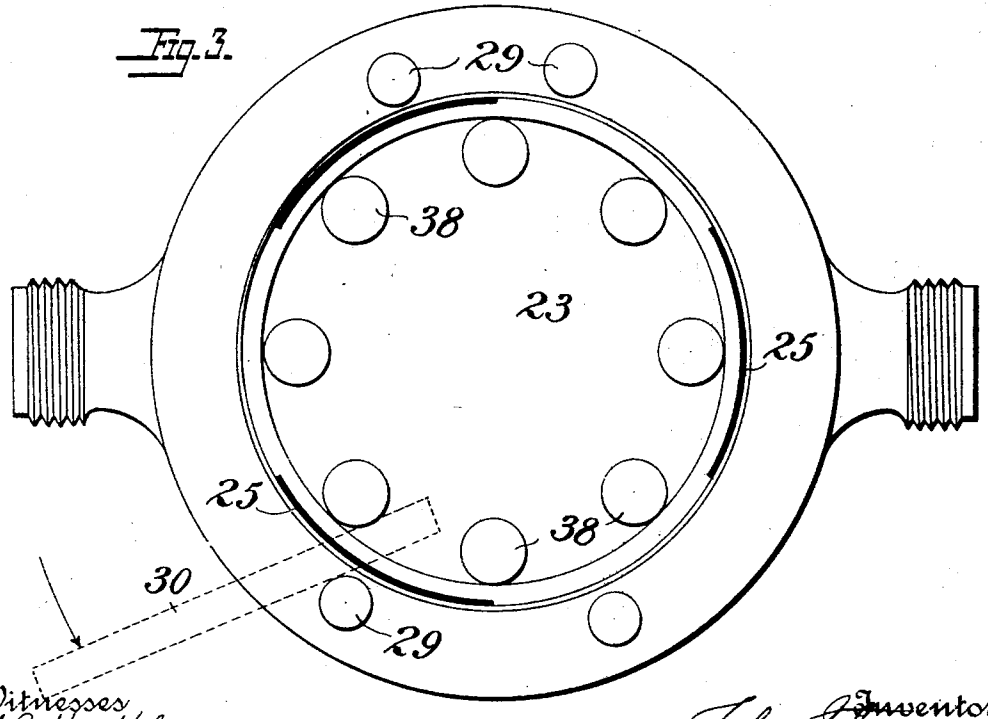

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Fig. 4.

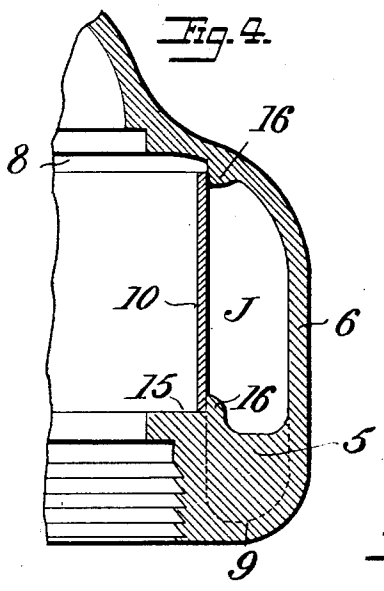


Fig. 5.

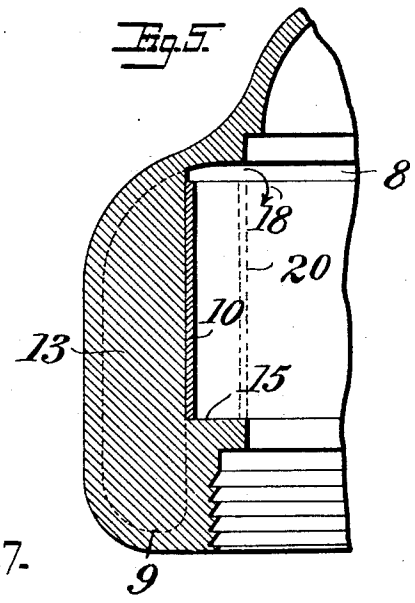


Fig. 7.

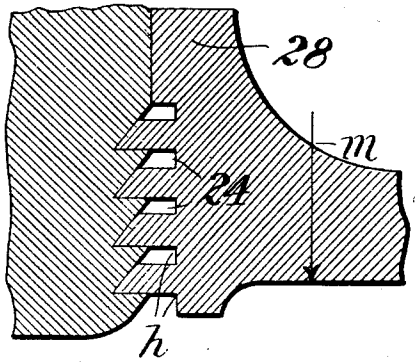
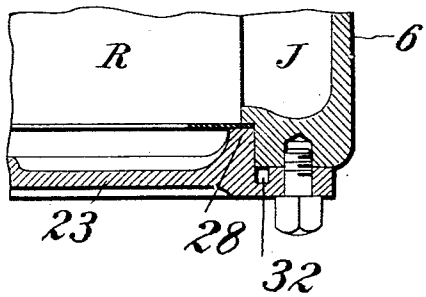


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE NEPTUNE METER COMPANY, OF NEWARK, NEW JERSEY.

DISK WATER-METER.

SPECIFICATION forming part of Letters Patent No. 520,197, dated May 22, 1894.

Application filed November 3, 1893. Serial No. 489,963. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMSON, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Disk Water-Meters, of which the following is a specification.

This invention relates to improvements in water meters.

In the drawings:—Figure 1 is a vertical central section and elevation of my improved meter, of the disk system. Fig. 2 is a horizontal section on the line A, but in which the upper section of the disk casing and the disk are removed. Fig. 3 is a total bottom plan view of the meter. Fig. 4 is a detached cross-section on the line B and representative of the sections on the lines C, C. Fig. 5 is a similar representation on the line D. Fig. 6 is a transverse section of the disk casing, taken on the line of the diaphragm, as E. Fig. 7 is an enlarged sectional detail view of the cap-thread; and Fig. 8 shows a modification in the attachment of the cap.

The first part of this invention consists in providing an annular pocket, or a series of pockets communicating with each other for the reception of gravel, dirt, &c. In general this feature is related to one of my present pending applications, Disk Water Meters, Serial No. 482,769, but the specific improvement here presented is in designing the main casing 6, to provide an inclosed annular space J, K, surrounding the periphery of the disk casing R, which space shall extend downwardly, below the lowermost edge of the disk casing, to form a well defined pocket or recess, as 9, below the level of the ports of the said casing, said pocket being divided transversely by shallow ribs 5 and having no communication with the spaces above and below the disk casing; thus, this annular pocket is sub-divided into a plurality of circumscribed wells or catch basins, so to speak, open at the top and disposed below the level of the inlet port of the disk casing. In this wise, if small stones or gravel are rolled through the inlet pipe they will not in like manner be rolled into the disk chamber, but by descending into the pocket will be entrapped thereby.

The second feature hereof relates to the circular vertical septum 10, situated in the receiving section of the annular space, one end of this septum, the end farthest from the inlet spud being fixedly secured to the abutment 12, while the other end bears under spring tension, against the face of the abutment 13. The lower edge of the septum makes approximately close contact with the horizontal face 15, of the main casing above the pockets, but the upper edge is to be free of contact except where it may abut against projections both top and bottom as at 16, Fig. 4, to limit its outer position. Thus there is provided a narrow circular opening 8 at the top of the septum so that the inlet from the pipe is forced first into the space J, as arrow 17, between the septum and the wall of the main casing, thence rising and passing through the narrow slit, as arrows 18, whence the flow reversing passes between the septum and the wall of the disk casing, as arrow 14, until reaching the full space K, as arrow 19, it passes at reduced velocity to the inlet port S, and thence through the disk chamber and out to the pipe. But an important operation of the septum is yet to be pointed out, which is that in the event of the space between it and the wall of the main casing becoming filled, its free end will then be forced inwardly, as see dotted lines 20, by which action the flow from the pipe will pass directly between the edge of the abutment 13, and the outer surface of the septum, as see dotted arrow 21, to the full space K, and thence to the disk chamber the septum thus acting as a spring valve. The important advantage derived from the design and disposal just described is that when the septum shall automatically yield permitting the water to flow directly to the full space K nevertheless this deflection of the septum does not cause the accumulated débris in the space J to be blown into the space K and thence to the disk chamber. It will be observed that the free end 22 of the septum is curved outwardly. The object of this is that when the flow is direct as arrow 21, the current will be caused to impinge against the outer wall of the main casing, thus reducing the velocity of particles liable to obstruct the disk and tending to their gravitation into the pockets provided

therefor. Thus, in the device just described ample provision is made to guard the meter against accidental damage under all normal conditions, while the well nigh universal objection to fixed strainers, *i. e.*, the liability to stop the flow even at the saving of the meter, is obviated by means of the automatic relieving action of the septum. Obviously the septum may be perforated to act partially or entirely as a strainer.

While I have shown a yielding or spring valve between the inlet and the main passage K, it will be evident that other forms of valves may be used for closing a port or ports that will be opened automatically to secure a direct flow only in case the normal or indirect passages become closed.

The third feature of the invention is in the construction of the thread of the cap or head 23, and in the manner of supporting the disk casing thereon and in the construction thereof, whereby in event of the meter being frozen the threads of the cap will be stripped, the cap, the disk and disk casing will be blown out but without injury to the thread of the main casing or to the disk and disk casing. To form the male thread of the cap whatever the material, so that it will certainly yield under a definite strain which shall not be sufficient to damage the female thread, I simply cut a narrow groove, as 24, Fig. 7, at the bottom of the thread of the cap. In this manner I but amplify in the thread the condition of a beam supported at one end; so that the depth of this spiral groove, the cross sectional area remaining constant, will accurately determine the shearing strength of the thread, which will thus yield at the root, as *h*, when the thrust is as indicated by arrow *m*. To facilitate the removal of the stripped thread, and to also more certainly insure that the thread shall entirely give way, the cap being thus blown out "clean," the thread may be sectional or mutilated as at 25. In this wise the broken threads will be in sections to be readily removed, and it is preferable that the mutilation of the thread shall be in about three sections approximately as illustrated in Fig. 3, the object of which is that if one segment yields the others are more certain to immediately follow, as the removal of any one point of support will transmit the entire load to the remaining two points of support. I also call to attention that while the foregoing constructions, either or both, may be applied to any form of thread, I regard the ratchet form, when applied in the manner here shown, much the preferable, as in this wise the pressure transmitted to the cap is sustained on the flat surfaces of the threads; hence there is much less frictional adhesion than in a V-thread, an important advantage in removing the cap. Moreover, when the cap is blown out the angular surfaces of the threads permit the threads of the cap to "clear" or roll out of threads in the casing with little or no tendency to jam, all of which may be clearly understood upon inspection of the enlarged cross section of the thread of the cap and main casing, as shown most clearly in Fig. 7. But, that the cap alone shall be capable of being blown out is not sufficient to protect the internal structure of a meter when it is considered that the internal compression, or expansion, as the case may be, if borne by the disk casing springs and distorts it, often rendering it unfit for subsequent use. This difficulty, however, is fully overcome in the present construction wherein the sections 26, 27, of the disk casing are not only held together but are forced to their seat and bearing in the main casing by the flange 28 of the cap. Hence, if the water should first congeal in the space P, above the disk casing, the excessive pressure thereby exerted, due to the expansion of freezing, is transmitted through the disk chamber sections to the flange when the rupture of the thread not only relieves the pressure upon the main casing but forces the disk casing outward with the cap. Again, if the water within the disk chamber has solidified it will be seen that inasmuch as the two sections of the disk chamber are not clamped together, except by the cap, they, too, are free to separate, as shown by dotted lines V, Fig. 6, without distortion, immediately the threads of the cap are ruptured. It will be be evident that the parts of a sectional casing of any desired form may be connected by weakened threads in like manner as body and cap sections. Should there be cases in practice, however, where the flange construction is preferred, this may be readily met by such an arrangement as is shown in Fig. 8, thus, by cutting a groove, as 32, the cap and disk casing may be blown out without damage to any part excepting only the cap itself, as all the details and conditions remain as in the instance of the screw cap.

The concluding feature of this invention is in providing the cap with a concentric series of pins 38, and in also providing the main casing with a series of pins 29, so disposed and arranged that the cap may be screwed home or removed by the most simple appliances. Thus, say a screw driver, a file or a rod may be utilized as a lever of great effectiveness as indicated by dotted lines 30, Fig. 3. The pins of the cap which also serve as standards for the meter, are preferably spaced equi-distant, but the pins in the casing are spaced unequally, by which arrangement a favorable "bite" is afforded at whatever position rotatively the cap may be set.

While I have referred to the septum as springing throughout its length, except at the extreme fixed end, it will be evident that it may be fixed throughout the greater part of its length with a hinged section, where the end constitutes a valve closing the direct port. Further while I have referred to the sectional casing having one section weakened at its

connection with the other as constructed for a water meter it will be evident that such casings may be used for water traps and other articles liable to injury from freezing.

Without limiting myself to the precise construction and arrangement of parts shown and described, I claim—

1. A main casing, an internal disk casing provided with ports, an inlet to the main casing communicating with the closed circumferential chamber surrounding the periphery of the disk casing, the said chamber provided with transverse ribs forming pockets situated below the level of the said port, all arranged in the meter substantially as and for the purpose set forth.

2. The combination with a disk casing, of the main casing having a plurality of circumscribed pockets open at the top, arranged exterior to the periphery of the disk casing and disposed below the level of the ports in said casing, substantially as set forth.

3. A meter, comprising an external main casing having inlet and discharge passages, an internal disk casing having inlet and discharge ports, the space between the main casing and disk casing being sub-divided into two circular channels, one of which communicates with the inlet passage of the main casing and the other with the inlet port of the disk casing, substantially as set forth.

4. The combination with the disk casing and the main casing, having an inclosed annular receiving space around the periphery of the disk casing, of an intervening septum dividing the said receiving space into circumferential passages communicating with each other, substantially as set forth.

5. The combination with the disk casing and main casing of a septum between the two, a narrow passage above the top of the septum, and a space or chamber outside of the septum extending below ports in the disk casing, substantially as set forth.

6. The combination with the disk casing and main casing, of an intervening septum having one end in movable contact with a bearing within the main casing and constituting a valve closing direct the inlet passage against normal pressure, substantially as set forth.

7. The combination with the main and disk casings, a septum dividing the space between the two into two chambers, the outer chamber communicating with the main inlet port, and an abutment against which one end of the septum bears, said septum arranged to move to and from said abutment, substantially as set forth.

8. The combination with the main casing and the disk casing of the closing cap having its engaging threads mutilated, as 25, and also cut away to form grooves, as 24, substantially as and for the purpose set forth.

9. The combination in a casing, of two sections having engaging threads, the engaging threads of one section being ratchet form and cut-away to form grooves 24, substantially as and for the purpose set forth.

10. The combination in a meter of an outer casing consisting of two sections 6, 23, with engaging weakened threads and an inner disk casing in two sections resting upon the section 23 of the outer casing, substantially as set forth.

11. The combination with the main outer casing and the cap, of the detachable disk casing comprising a plurality of free sections adapted to fit a bearing within the main casing, the construction and arrangement being such that the attachment of the cap to the main casing secures the sections of the disk casing together and holds the disk casing to its bearing, substantially as and for the purpose set forth.

12. The combination with the main and cap sections of a casing one threaded to fit the other, of projections upon each section as 38, 29, arranged substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN THOMSON.

Witnesses:
MEYER KRASNER,
JOHN MCKINNON.