No. 778,086. PATENTED DEC. 20, 1904.

J. THOMSON.

WATER METER.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

Fig. 1.

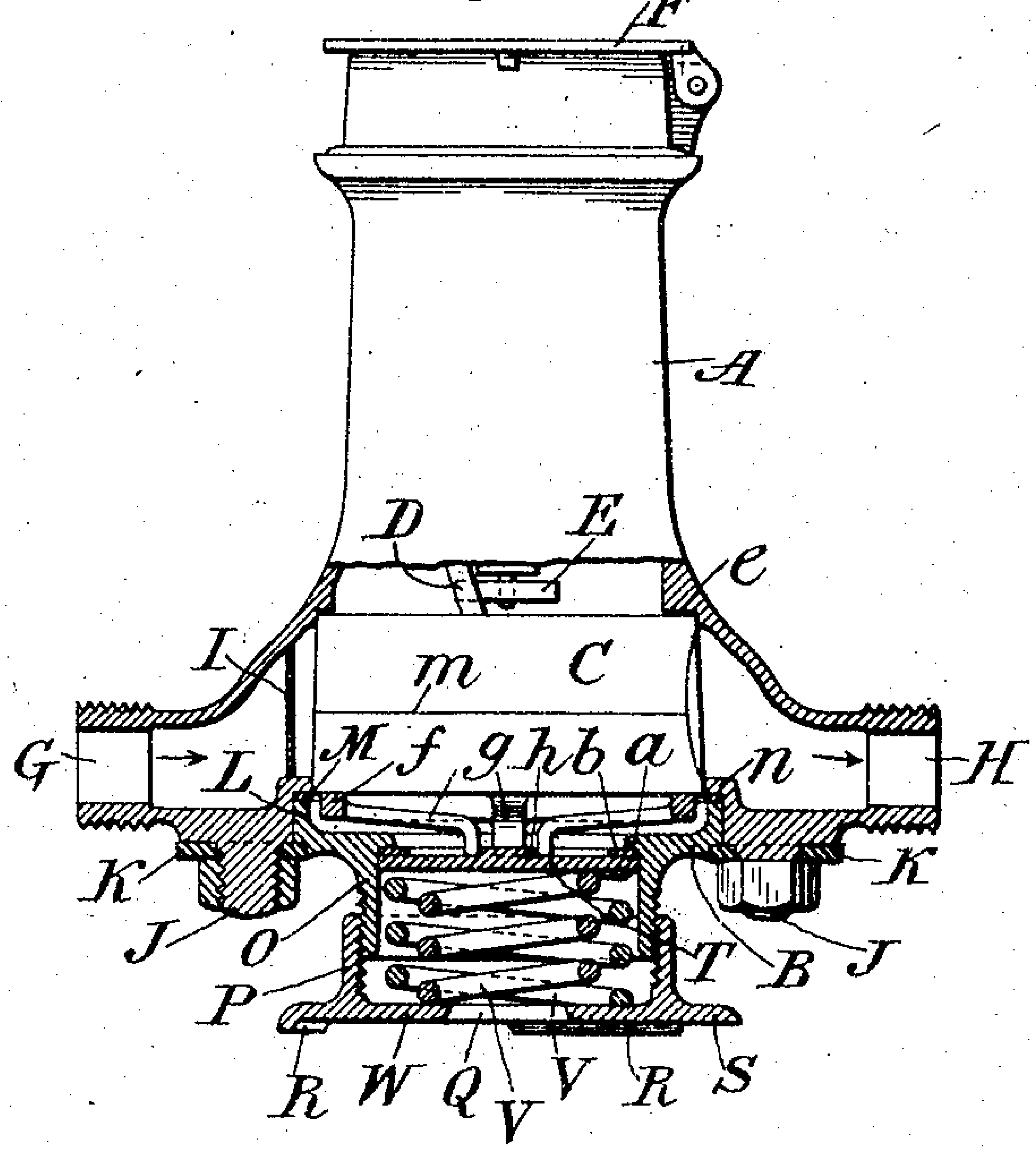


Fig. 2.

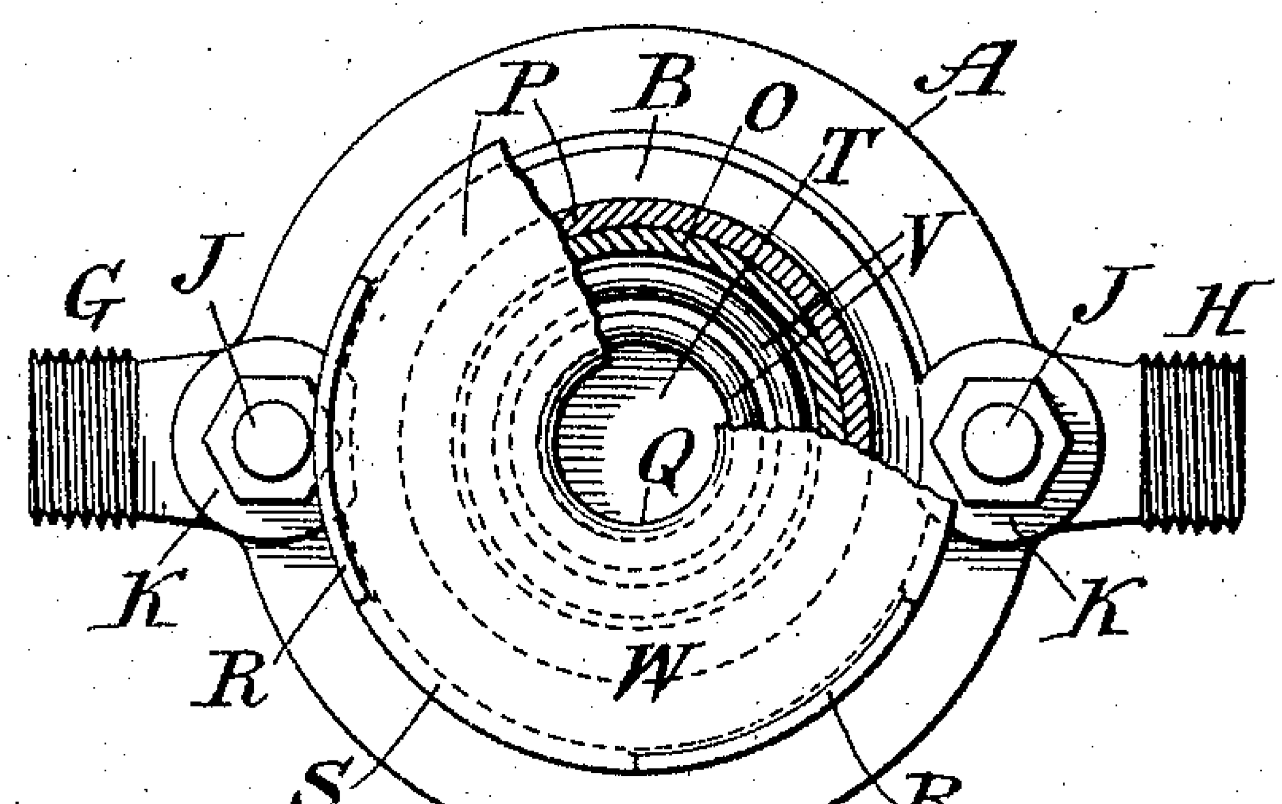
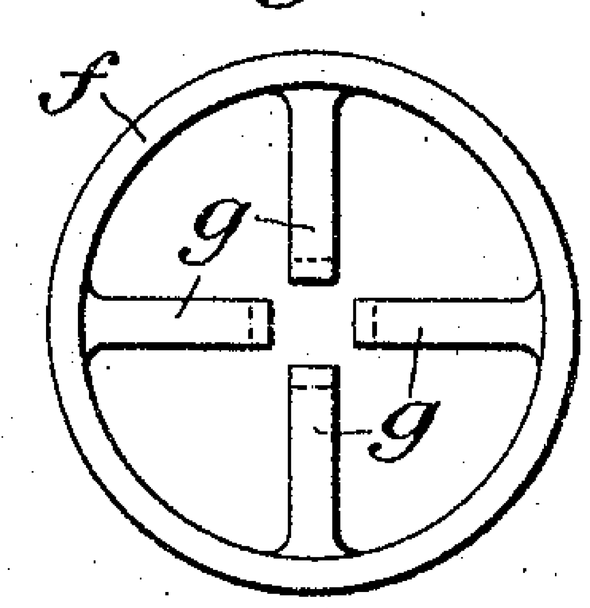


Fig. 3.



Attest:

A. N. Jesbera

Alfred W. Kiddle

Inventor:

John Thomson

by Redding, Kiddle & Greeley

Attys.

No. 778,086. Patented December 20, 1904.

UNITED STATES PATENT OFFICE.

JOHN THOMSON, OF NEW YORK, N. Y., ASSIGNOR TO NEPTUNE METER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

WATER-METER.

SPECIFICATION forming part of Letters Patent No. 778,086, dated December 20, 1904.

Application filed October 19, 1903. Serial No. 177,620.

To all whom it may concern:

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

This invention relates primarily to water-meters, and is based upon the well-known fact that water when frozen increases in volume, the expansion due to the transformation being practically irresistible, with the result that the containing vessel will be distorted or disrupted at its weakened portion, causing the destruction of the vessel for further use unless some provision is made to save the operative and essential parts of the vessel under the stress, as by providing some predetermined part designed to yield or break under the excessive strain.

In the accompanying drawings, forming a part hereof, Figure 1 is a view, partly in elevation and partly in vertical section, of a water-meter embodying my invention. Fig. 2 is a bottom or under side view of the meter shown in Fig. 1, and Fig. 3 is a detail view of the bracket or spider for supporting the internal disk-chamber casing.

The meter shown in the accompanying drawings is a disk water-meter, and A is the main or outer casing. B is the lower inclosing head or bottom therefor.

C is the internal casing or disk-chamber, which is made in two parts, containing the nutating disk. (Not shown.)

D is the spindle attached to the ball of the disk.

E is the arm which is connected to the shaft forming a part of the registering mechanism located within the outer inclosing case above the disk-chamber, the registering mechanism not being shown.

F is the hinged cover inclosing the dial and pointers. (Not shown.)

G is the inlet-port, and H the outlet-port, of the meter, and I is the usual screen for excluding from the meter foreign matter.

The bottom B is shown as being circular in shape; but obviously it may be of some other shape, as rectangular, if desired. It is firmly secured to the main casing by the bolts J and washers K and in a water-tight manner by means of the perpendicular upwardly-projecting annular flange L of the bottom B, which flange engages with the gasket M and the overturned inwardly-projecting flange *n* of the main casing, forming the seat for the gasket.

The bottom B is provided with a central orifice which opens into or is continuous with a short tubular section or neck O, provided on its outside surface with a male thread, the neck O being preferably integral with the bottom B, as in the construction shown in the drawings. Over this neck O is secured a cylindrical cap P, provided on its inside surface with a female thread with which the male thread of the neck O engages, thereby forming a box or housing for the resilient device hereinafter referred to. The cap P is provided with a central opening Q for the purpose to be presently explained, and this cap P is also provided with any desired number of feet R, three being shown in the drawings, the meter in its upright position, as shown in Fig. 1, resting thereon, the cap P being also provided with a broad annular flange S, whereby to afford an adequate support for the meter.

The orifice in the bottom B is designed to be closed by the plug T, which plug is normally maintained against the orifice in the bottom B to close the same by means of the coiled springs V V or other resilient or retroactive means, which rests upon the inwardly-projecting flange W of the cap P. The bottom B has an inwardly-projecting lip or flange *a*, which furnishes a seat or bearing for the plug T, between which flange and plug is inserted a gasket *b* in order to render the joint water-tight.

In order to support the disk-chamber casing and hold it to its seat *e* on the inside of the main casing, a bracket or spider is provided, preferably of the construction shown in Figs. 1 and 3. In the construction of this supporting member shown in the drawings *f* is a ring having inwardly-projecting radial arms g, the inner ends of which depend and are designed to rest upon the plug T, the plug T being provided with a central stud h, which is encircled by the prongs g, as shown in Fig. 1, whereby the supporting-bracket is held in central position. The outer diameter of the ring f of the supporting member, as shown, is very nearly of the same diameter as the bottom of the disk-chamber, furnishing thereby a large support for the disk-chamber; but I desire it to be understood that my invention is not limited to the particular construction of supporting member for the disk-chamber shown in the drawings and hereinabove described, nor that the supporting member shall spread across the entire bottom of the disk-chamber, the essential function of the supporting member being that it shall furnish an adequate support for the disk-chamber. The gasket M is not designed to but may project inwardly over the flange L; but if this gasket should project thereover the disk-chamber in that event would rest upon the gasket to a slight extent, as well as upon the supporting member.

When the coiled springs V V have been inserted in the neck O of the bottom B and the cap P screwed over the neck O, forming the housing aforementioned, the coiled springs V V will thereby be compressed, their tension forcing the plug T upward or inward to its seat or bearing in the bottom B and also forcing upward or inward with the plug T the supporting-bracket and the disk-chamber C until all of the parts are securely held together and in a water-tight manner, and the tension of the springs can be increased or reduced, according as the cap P is screwed in or out, as will be readily understood.

In the construction of the various parts of the meter shown in the drawings I prefer to make the outer inclosing case or main casing of composition metal which will possess a high degree of ductility and flexibility, the disk-chamber casing of bronze, the supporting-bracket of more ductile composition, the bottom B and cap P and the plug T of cast-iron or low-grade brass, and the coiled springs V V of steel, and the position and arrangement of the several parts when the meter is in normal operative condition is shown in Fig. 1.

In practical use of the meter the upper portion of the main casing above the disk-chamber would contain water, the lower portion of the main casing would contain water, including the space below the bottom of the disk-chamber surrounding the supporting-bracket, and the disk-chamber itself would contain water.

All of the parts of the meter, including the coiled springs V V, would be designed to withstand the ordinary pressures in service—such as the hydrostatic head, water-ram, and the like—the resistance to compression of the coiled springs V V being regulated or adjusted in actual use of the meter by means of the cap P, as before explained.

It is of course not possible to definitely state in advance the exact manner of freezing nor the exact location within the meter where the freezing would first take place under all circumstances in service; but no matter where the freezing occurs whenever the pressure within the meter becomes greater than the meter is designed normally to withstand this excessive pressure will travel in the direction of least resistance—to wit, in the structure shown in the drawings in the direction toward the yielding plug T, which plug T will yield when the coiled springs V V yield, and the coiled springs V V will yield or compress whenever the pressure due to the freezing above it exceeds their resistance to compression. The coiled springs V V will be primarily and normally of such tension and will be so adjusted by the cap P that while, as stated above, they will not yield to the ordinary pressures to which they may be subjected in service, yet they will yield under the excessive pressure due to freezing before any other part of the meter has yielded. Therefore if, for example, the entire body of water within the meter should have frozen with the relief of pressure consequent upon the yielding of the springs V V the disk-chamber will have been forced away from its seat by the pressure of the ice above it, the disk-chamber casing will also have separated into its two component parts at the line of separation m by the pressure of the ice within it, and the supporting-bracket for the disk-chamber and the plug T will also be forced downwardly, all of said parts moving downwardly or outwardly with the movement of the ice, the downward movement of the plug T upon the yielding of the springs V V affording the requisite relief for the pressure and permitting the ice within the meter to move or accommodate itself within the consequent enlarged space. This downward movement of the plug T will separate the plug T from the bottom B, permitting any water that remains unfrozen in the meter to flow through the orifice in the bottom B and through the orifice Q in the cap P, thus affording the requisite relief where the entire contents of the meter are not frozen. When the ice has melted, the springs V V will retroact and automatically restore the plug T, the supporting-bracket, and the disk-chamber to their normal operative positions, as shown in Fig. 1, without the necessity of the reparation or replacement of any of the parts.

I do not limit myself to any particular dimension or size of orifice in the bottom B, for it is obvious that the relative size of this orifice will depend in some measure upon the character of metals of which the several parts of the meter are composed. When the several parts are made of the metals hereinbefore referred to, I have found that the relative area of the orifice shown in the drawings is entirely adequate to afford the requisite relief. Where the diameter of the orifice in the bottom B which is closed by plug T is less than the diameter of the disk-chamber casing or its supporting-bracket, the disk-chamber casing and its supporting-bracket will be prevented from dropping through the opening in the bottom B when the cap P is screwed off the neck O—when, for example, it is desired to inspect the interior of the meter or furnish a new coiled spring or other resilient means or the like.

While I stated before that this invention was devised primarily for use in water-meters, yet I do not limit my invention to its use in connection with water-meters *per se*, for my invention may be applied to other structures, and therefore while in the claims hereinafter following I claim my invention as applied to water-meters, yet I desire it to be understood that I use the term "water-meter" to include not only water-meters *per se*, but all analogous and other structures to which my invention may be applied.

What I claim as my invention is—

1. In a water-meter the combination with a main casing, of an internal casing, an inclosing head for the main casing, an orifice in said inclosing head, adjustable means to close said orifice adapted to yield under excessive interior pressure, the diameter of the orifice in the inclosing head of the main casing being less than the diameter of the internal casing, substantially as and for the purpose set forth.

2. In a water-meter the combination with a main casing, of an internal casing, an inclosing head for the main casing, an orifice in said inclosing head, adjustable means to close said orifice adapted to yield under excessive interior pressure, the area of the orifice in the inclosing head of the main casing being less than the area of the bottom of the internal casing, substantially as and for the purpose set forth.

3. In a water-meter the combination with a main casing, of an internal casing, an inclosing head for the main casing, an orifice in said inclosing head, a plug to close said orifice, a support for the internal casing resting upon said plug, a tubular neck on said inclosing head around the orifice therein, an adjustable cap to unite with said neck, said cap having an opening therein and a coiled spring housed within said neck and cap, said spring being adapted to engage with said plug to normally hold it against the orifice in the inclosing head and said spring being also adapted to yield under excessive interior pressure, substantially as and for the purpose set forth.

This specification signed and witnessed this 5th day of October, A. D. 1903.

JOHN THOMSON.

In presence of—
ALFRED W. KIDDLE,
A. N. JESBERA.