Aug. 19, 1924. 1,505,508

L. TRAGER

WATER METER

Filed Dec. 21, 1922 2 Sheets-Sheet 1

Fig. 1.

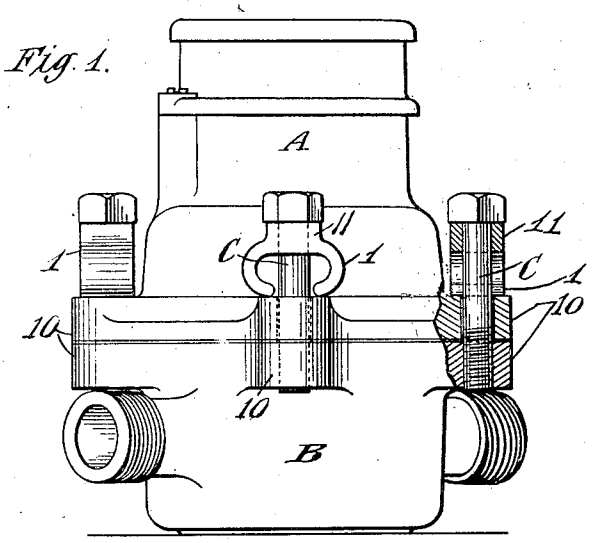


Fig. 2.

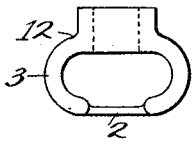


Fig. 3.

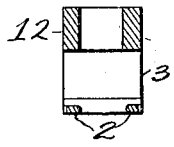


Fig. 4.

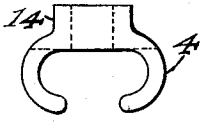


Fig 5.

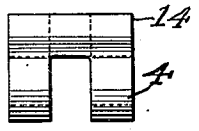


Fig. 7.

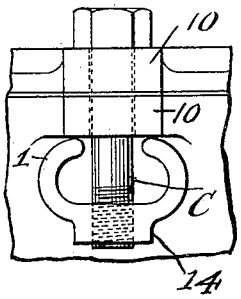
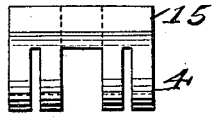


Fig. 6.



Inventor

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L. TRAGER

WATER METER

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Fig. 8.

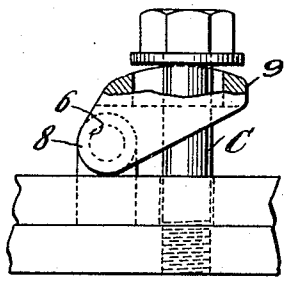


Fig. 9.

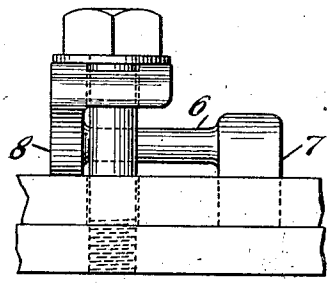


Fig. 10.

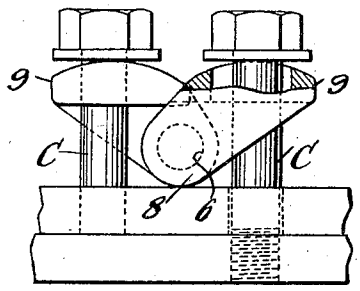
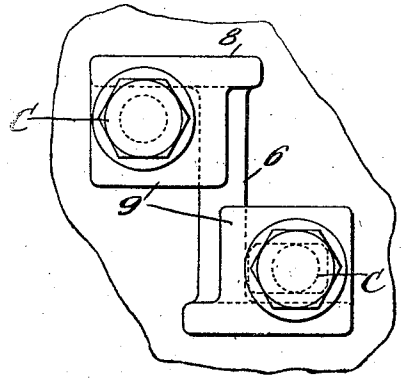


Fig 11.



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Patented Aug. 19, 1924. 1,505,508

UNITED STATES PATENT OFFICE.

LEON TRAGER, OF NEWARK, NEW JERSEY, ASSIGNOR TO WORTHINGTON PUMP AND MACHINERY CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF VIRGINIA.

WATER METER.

Application filed December 21, 1922. Serial No. 608,377.

To all whom it may concern:

Be it known that I, LEON TRAGER, a citizen of the United States, residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Water Meters, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates particularly to water meters in which the casing is made with two parts held together by bolts or other securing means acting through yielding spacers to allow the casing parts to separate on freezing, thus avoiding breakage of the casing or injury to the meter parts, this class of meters being commonly known as frost proof meters.

In former constructions, it has been the custom to use such spacers of cast iron, which would break under ice pressure, but these have proved weak to withstand shocks due to water hammering because of their tendency to break suddenly under such strain and flood the cellar. Attempts have been made to correct this difficulty by making the spacers stronger, whereupon they proved objectionable, as they either did not break on freezing of the meter, or did not break soon enough and the meter parts were damaged before frost proofing action took place. Attempts have been made, also, to use resilient spacers that would yield on freezing and return to normal position on the ice melting, but these have not proven satisfactory.

The especial object of the invention is to meet the requirements by the provision of a simple, cheap and convenient spacer supporting the pressure of securing the parts of the casing together which, while having sufficient resiliency to allow the casing parts to separate slightly under the pressure of water hammer and such sudden light shocks, will be forced beyond the limit of elasticity and take a permanent set under the excessive pressure due to freezing, and by which the casing parts may be closed upon thawing by merely tightening up the nuts. The spacers preferably will be made so as to be capable of use for frost proofing two or more times without renewal.

While the invention relates especially to water meters, it includes an improved deformable safety device or spacer which may be advantageously used with any sectional casing enclosing a pressure or vacuum space, such as steam or gas chambers, liquid chambers liable to freezing, flanged pipe joints, safety valve casings, and the like, and it is the particular aim of the invention to provide a deformable spacing member having the characteristics of sufficient resiliency to absorb light sudden shocks without being deformed beyond the limit of elasticity, but which, when forced beyond the limit of elasticity by excessive pressures, which would ordinarily cause rupture of the casing or the like, will bend or take a permanent set so as to permit separation of the casing or like parts to enable the passage of fluid to or from the casing.

In the accompanying drawings forming a part of this specification, the invention is illustrated as applied in a construction of the preferred form and certain modifications thereof, and these constructions will now be described in detail and the features forming the invention then be specifically pointed out in the claims.

In the drawings—

Figure 1 is a side elevation, partly broken away, of a disc meter made frost proof in accordance with the preferred form of my invention;

Figures 2 and 3 are, respectively, a side view and central section of a modified form of spacer;

Figure 4 is an end view, and Figures 5 and 6, respectively, side views of two other modifications;

Figure 7 is a detailed view showing a modified manner of use of any of the spacers illustrated in Figs. 2 to 6;

Figures 8 and 9 are, respectively, a detail end view and a view looking to the left in Fig. 8, showing another modification, and

Figures 10 and 11 are, respectively, a side and top view of another modification.

Referring now to the drawings, and particularly to Fig. 1, A, B indicate, respectively, the upper and lower casing sections of a common type of disc water meter, such sections being secured together by external lugs 10 receiving bolts C. In meter casing constructions without the frost proof feature these bolts are secured by nuts or passed through one lug and screwed into the other. For a frost-proof construction, however, made in accordance with the present inven-

tion, the improved spacers separate the bolt heads from the casing parts and take the holding pressure of the bolts and, in the form shown in Fig. 1, these spacers consist of a head 11 with bendable legs 1 placed between the bolt heads and the lugs 10, so that on the bending of the legs 1 the two parts of the casing will be allowed to separate on the bolts. As shown in Fig. 1, the ends of the legs 1 rest on the lugs 10 formed on the casing flange of the section A, in which position the bolt C is simply passed through the hole in the head 11 and top lug of the casing and threaded into the lower casing lug so as to draw the casing parts together to form a tight joint with the spacers firmly secured in place between the flange on the upper casing section and the bolt head. The spacers are preferably made of extruded or drop forged brass and the bendable legs 1 are of such resiliency and strength as to yield slightly under water hammer or similar shocks and react to return the parts to position. On freezing, however, the ice pressure is such as to bend the legs beyond the limit of elasticity and they take a permanent set with the casing parts separated. The form of the legs and the extent to which they may be bent, however, is such that, on the melting of the ice, the bolts may be tightened to close the parts of the casing together on the spacers, and the construction used for frost proofing a second time or until the limit of the bending movement of the legs is reached.

In Figs. 2 and 3 there is shown a modified form of spacer, in which the head 12 has legs 3 similar to those of Fig. 1, but are formed with strips 2, connecting their ends on each side of the bolt opening.

In Figs. 4, 5 and 6 there are shown other modified forms of spacers having heads 14 and 15, the spacer shown in Figs. 4 and 5 having a pair of legs 4 on each side of the spacer, and that shown in Fig. 6 having two pairs, or four legs, on each end of the spacer.

It will be obvious from the foregoing that instead of the spacers above described being placed on top of the lugs 10, they may, as shown in Fig. 7, be used under the lower casing lugs 10 by simply threading the hole in the spacer head and screwing the bolt into it.

In Figs. 8 and 9 a modified form of spacer is shown, in which a horizontal torsion member 6, formed with a lug 7 at one end thereof, is arranged to be received in a suitable cavity in the flange of the meter casing, and at its other end the member 6 is provided with a head 8 arranged to rest and turn on the flange of the meter casing, such head having an offset bolt-engaging member 9 through which the bolt passes, with the head of the latter arranged to contact with the top of the member 9, a large clearance being provided around the shank of the bolt to prevent it binding on member 9 in the operation of the device hereafter described. The bolt is threaded into the lower casing flange to draw the casing parts together.

In Figs. 10 and 11 the torsion member 6 carries heads 8 and bolt engaging members 9, thus doing away with the lug 7 and its seating cavity.

The spacers shown in Figures 8 to 11 are claimed specifically in another application, Serial No. 608,379, filed December 21, 1922.

In these latter constructions, when the sections of the meter casing are subjected to the pressure of ice formation, they are forced apart, thereby producing a twisting or torsional bending action of the torsion member 6, due to the pressure of the bolt heads on the offset members 9. The action of these modified devices in respect to water hammer and frost proofing is the same as that of the spacers above described, the members 6 yielding within their elastic limit on water hammer, but taking a permanent set under the continued pressure of freezing.

It will be understood that the invention is not limited to the exact form or construction of any of the devices shown, but that these may be modified widely within the invention as defined by the claims, and that the term "spacer" is intended to cover any form of deformable member which coacts with the means for securing the casing parts together, so as to support the pressure holding the parts together and permit them to separate by deforming the spacers.

What is claimed is:

1. A water meter having a sectional casing and means for securing the casing parts together including a yielding spacer supporting the pressure of said securing means and deformable under excessive pressures tending to separate the casing parts, said spacer being of such resiliency as to be deformed beyond its elastic limit and take a permanent set with the casing parts separated when the meter is frozen.

2. A water meter having a sectional casing and means for securing the casing parts together including a resilient spacer supporting the pressure of said securing means and deformable under excessive pressures tending to separate the parts of the casing, said spacer being of such resiliency as to be deformed within its elastic limit under water hammer and similar pressures and return the parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated when the meter is frozen.

3. A water meter having a sectional casing and clamping bolts, and resilient spacers for supporting the pressure of said bolts and deformable under excessive pressures tend-

ing to separate the parts of the casing, said spacers being of such resiliency as to be deformed within their elastic limits under water hammer and similar pressures and return the casing parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated when the meter is frozen.

4. A water meter having a sectional casing and clamping bolts, and resilient spacers for supporting the pressures of said bolts and deformable under excessive pressures tending to separate the parts of the casing, said spacers being of such resiliency as to be deformed within their elastic limits under water hammer and similar pressures and return the casing parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated when the meter is frozen, said spacers being formed to permit further deformation after the casing parts have been tightened by the bolts after freezing and thawing, whereby the spacers may be used a plurality of times for frost-proofing.

5. The combination with a sectional casing and the means for securing the casing parts together, of a yielding spacer supporting the pressure of said securing means and deformable under excessive pressures tending to separate the casing parts, said spacer being of such resiliency as to be deformed beyond its elastic limit and take a permanent set with the casing parts separated on excessive pressure within said casing.

6. The combination with a sectional casing and the means for securing the casing parts together, of a resilient spacer supporting the pressure of said securing means and deformable under excessive pressure tending to separate the parts of the casing, said spacer being of such resiliency as to be deformed within its elastic limit under light sudden shocks and return the parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated on excessive pressures within said casing.

7. The combination with a sectional casing and the bolts for securing the casing parts together, of resilient spacers for supporting the pressures of said bolts and deformable under excessive pressures tending to separate the parts of the casing, said spacers being of such resiliency as to be deformed within their elastic limits under light sudden shocks and return the casing parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated when the pressure within the casing becomes excessive.

8. The combination with a sectional casing and clamping bolts therefor, of resilient spacers for supporting the pressures of said bolts and deformable under excessive pressures tending to separate the parts of the casing, said spacers being of such resiliency as to be deformed within their elastic limits under sudden light shocks and return the casing parts to normal position but to be deformed beyond the elastic limit and take a permanent set with the casing parts separated when the pressure within said casing becomes excessive, said spacers being formed to permit further deformation after the casing parts have been tightened by the bolts after subsidence of such excessive pressure, whereby the spacers may be used a plurality of times.

9. A yielding spacer, comprising a head arranged to engage a clamping device, and a plurality of bendable legs formed on said head arranged to support the clamping pressure of said clamping device, said legs being arranged to take a permanent set when bent under excessive pressure.

10. A yielding spacer, comprising a head arranged to engage a clamping device, and a plurality of resilient legs formed on said head arranged to support the clamping pressure of said clamping device, said legs having sufficient resiliency to bend and react under light sudden shocks and to be deformed beyond their elastic limit and take a permanent set under continued excessive pressure.

In testimony whereof, I have hereunto set my hand.

LEON TRAGER.