

E. O'MALLEY.

VALVE.

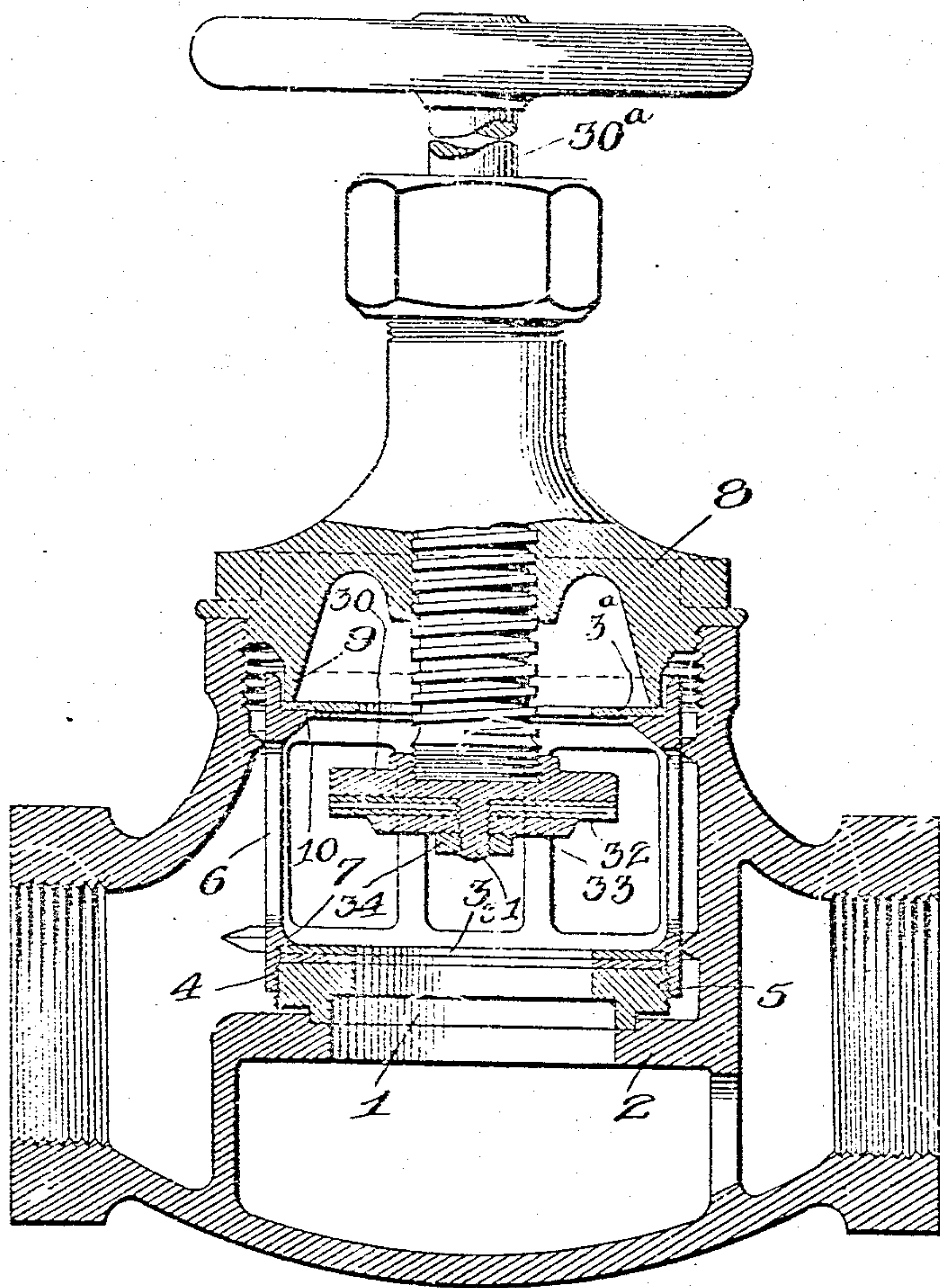
APPLICATION FILED DEC. 6, 1909.

978,929.

Patented Dec. 20, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
*W. H. Rockwell*  
*Caroline Morgan*

Inventor  
*Edward O'Malley*  
by *Langdon Moore*  
Attorneys

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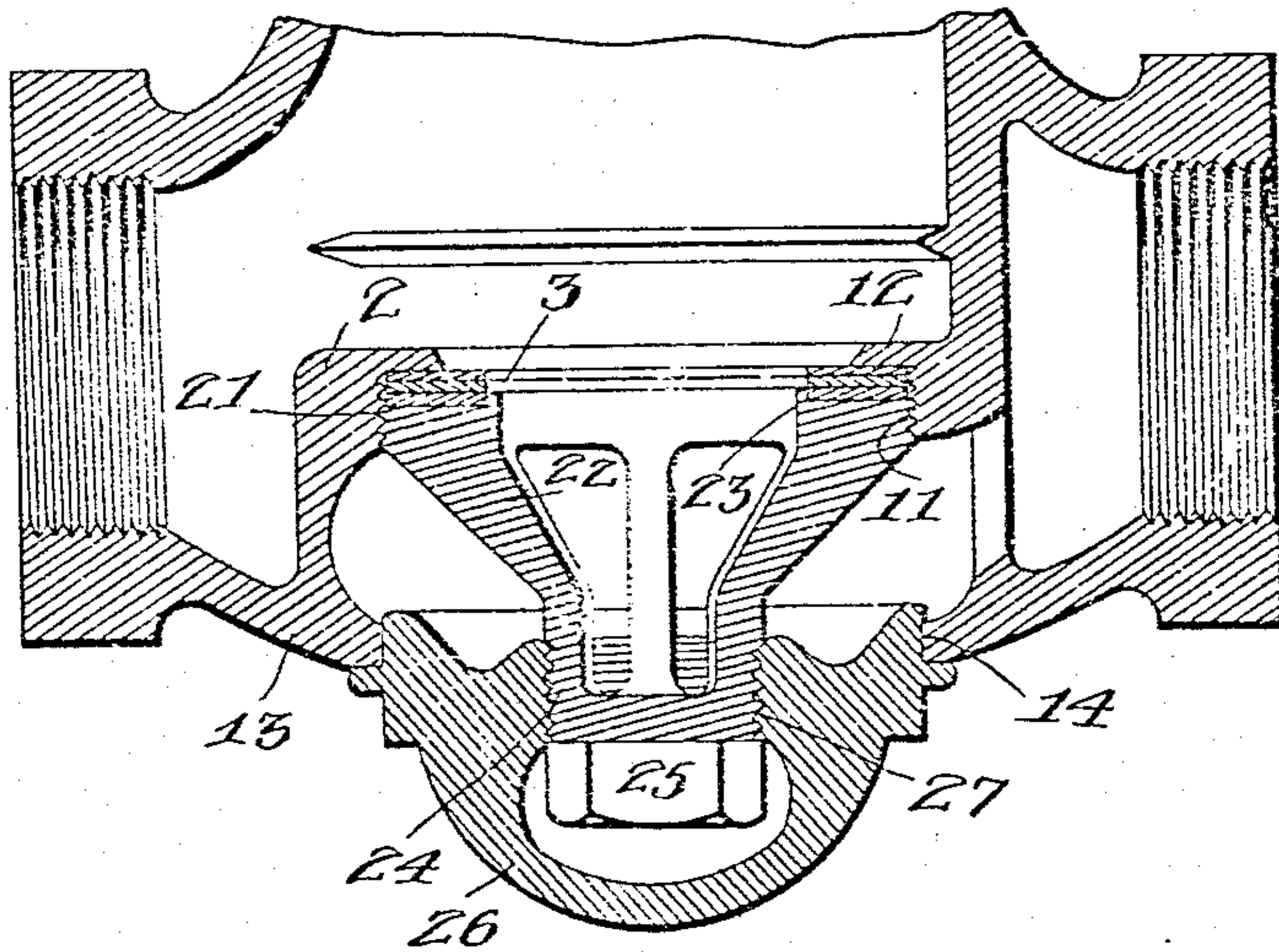
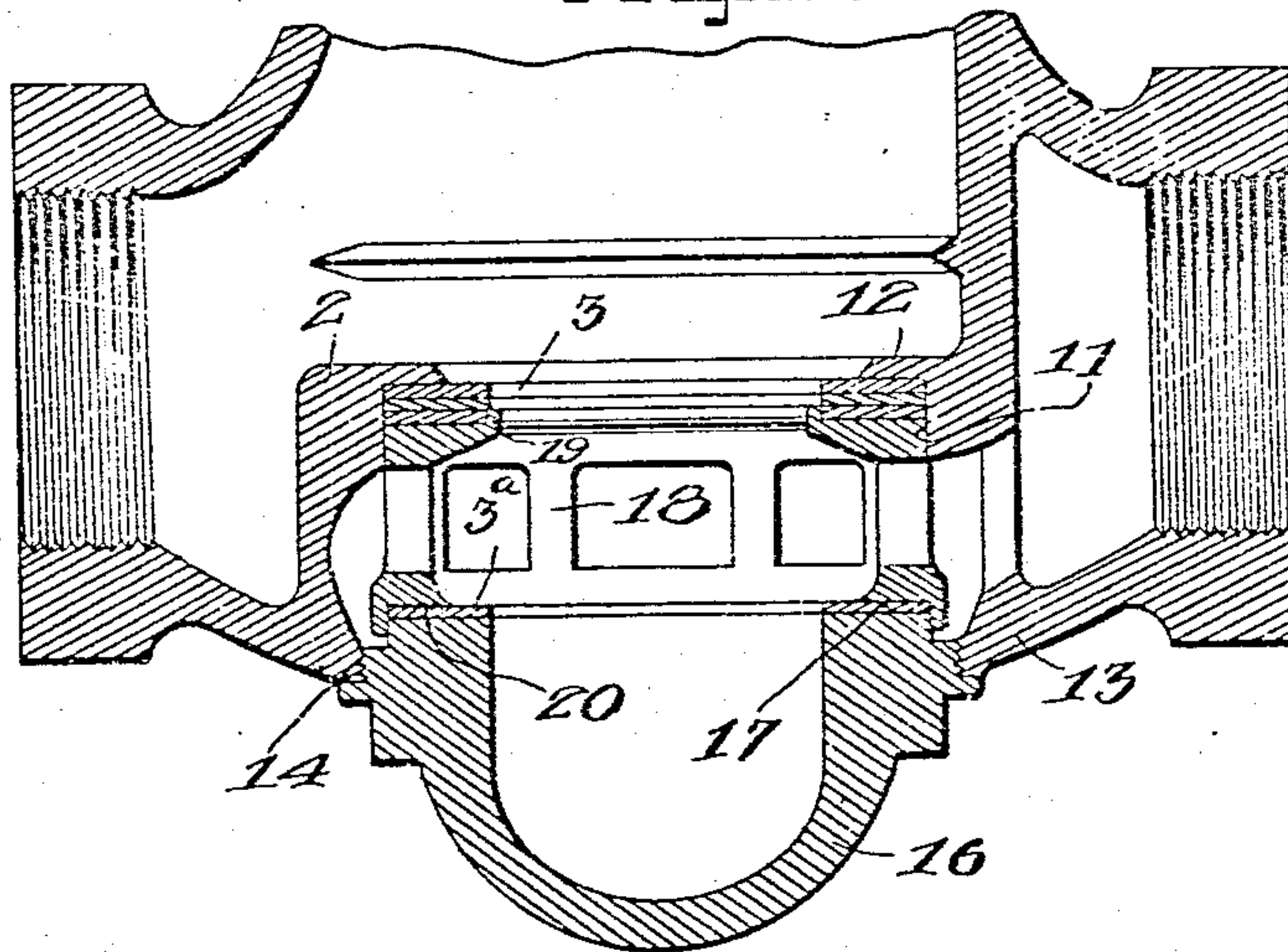


Fig. 2.



Witnesses  
*W. H. Rockwell*  
*Caroline Morgan*

by

Inventor  
*Edward O'Malley*  
*Langdon Moore*

Attorneys



# UNITED STATES PATENT OFFICE.

EDWARD O'MALLEY, OF JACKSON, TENNESSEE, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO O'MALLY-BEARE VALVE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

## VALVE.

978,929.

Specification of Letters Patent.

Patented Dec. 20, 1910.

Application filed December 6, 1909. Serial No. 531,599.

*To all whom it may concern:*

Be it known that I, EDWARD O'MALLEY, a citizen of the United States, residing at Jackson, in the county of Madison and State of Tennessee, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to improvements in valves, and more particularly to that type of valve designated as a reciprocating valve.

The object of this invention is to provide a reciprocating valve with a plurality of removable trued seat plates, together with a means for securing the seat plates upon the seat frame and compensating for the removal of a damaged plate.

This invention can be applied to any form of valve, and is so constructed that whenever one of the seat plates becomes damaged it may be removed without the application of any special tool. Furthermore the compensating for the removal of the damaged plate upon the securing means does not alter the relation between any of the parts.

While the preferred form of this invention is illustrated upon the accompanying sheets of drawing, yet it is to be understood that minor detail changes may be made without departing from the scope thereof.

Figure 1 is a view in longitudinal section through a globe valve to which one form of this invention has been applied. Fig. 2 is a view in longitudinal section through a globe valve, with parts broken away, illustrating a modified form of this invention. Fig. 3 is a view in longitudinal section through a globe valve, with parts broken away, to which a modified form of this invention has been applied.

Fig. 1 illustrates the ordinary type of valve having an integral web or bridge supporting the valve seat. A removable seat frame 1 is supported upon the bridge 2 and a plurality of removable trued seat plates 3 are secured thereto. The exterior surface 4 of the seat frame is screw threaded and is adapted to engage the screw threaded interior portion 5 upon the bottom of a cage member 6. An inwardly extending projection or flange 7 is provided upon the inner surface of the cage member above the screw threaded portion which is adapted to engage the upper surface of the uppermost removable trued plate and secure the same in place

upon the seat frame. The cage member extends upward and is adapted to be engaged by the valve cap 8 of usual construction engaging the upper portion of the valve casing. The lower portion of the valve cap is provided with a depending circular flange 9 adapted to be received within the upper portion of the cage member. The upper portion of the cage member, a short distance below the upper end, is provided with an internal projection or flange 10 adapted to be engaged by the depending flange upon the valve cap, and this projection upon the interior of the cage member is of sufficient width to support a removable trued plate 3<sup>a</sup> thereon.

If desired an extra plate may be carried upon the upper portion of the cage member at all times, but this is not necessary to the operation of this device. When one of the trued seat plates upon the seat frame has become damaged it is only necessary to remove the valve cap, so that the cage, seat plate, and seat frame may be withdrawn from the casing. The seat frame is then unscrewed which allows of the removal of all of the trued plates carried thereon. The damaged upper plate is removed and the perfect plates replaced, the seat frame inserted within the cage until the upper seat plate is in engagement with the securing projection upon the cage, and the cage, seat plates, and frame are returned to their original position. By the removal of the uppermost seat plate, the cage member will necessarily descend a greater distance upon the seat frame and the distance between the top of the valve cap and top of the cage member will be increased by the thickness of the plate removed. The damaged plate 3<sup>a</sup> is therefore placed upon the shoulder projecting from the uppermost portion of the cage member, and the valve cap replaced in engagement with the casing. By placing the damaged plate upon the upper portion of the casing, the removal thereof from its original position upon the seat frame will be compensated for and the valve cap may be secured in exactly the same relation to the valve casing, and at the same time secure the seat frame.

Fig. 2 illustrates the application of this invention to a valve in which the seat plates are secured upon the underside of the bridge



2 and in this form the under surface of the web is recessed, as illustrated at 11, and the upper surface forms a flange 12 extending inward and partially covering the uppermost seat plate. A plurality of removable trued seat plates 3 are placed in the recess and held in position in the following manner. The bottom wall of the valve casing 13 is provided with an opening or orifice 14 of the same diameter as the recessed portion 11 of the web. The sides of this opening in the valve casing are screw threaded and adapted to receive the screw threaded portion of a cap or closure 16 therefor. This cap or closure is provided with a circular flange 17 extending upward and within the valve casing. A cage member 18 is placed between the removable seat plates and the projection upon the screw threaded cap. In this form of valve seat it is preferable that the exterior edges of the removable seat plates be attached by a thin film of solder to retain them together, but this is not necessary. The upper portion of the cage member supports and is in engagement with the lowermost plate and is provided with an upstanding shoulder 19 upon the inner circumference adapted to engage the inner circumference of the lowermost seat plate. The lower portion of the cage member is provided with a shoulder 20 adapted to engage the circular projection of the screw threaded cap. This shoulder is of sufficient width to receive and support an additional trued seat plate if desired.

When a seat plate has become damaged the cap closing the opening in the bottom of the valve casing is removed, which allows of the removal of the cage member and seat plates. The uppermost damaged seat plate is then removed and the remaining perfect plates replaced within the recessed portion therefor upon the web. The cage is then placed in engagement with the lowermost seat plate. By the removal of the uppermost seat plate, the cage member will be advanced upward within the recessed portion of the web a short distance equal to the distance of the removed plate. To compensate for this changed relation between the cage member and cap, the damaged seat plate 3<sup>a</sup> is placed upon the shoulder at the bottom of the cage member. The screw threaded cap is then replaced upon the valve casing, and as the removal of the uppermost seat plate has been compensated for by the removed plate being placed upon the shoulder at the bottom of the cage member, the screw threaded cap will engage the bottom of this seat plate, and the cap will assume the same relation to the valve casing as it occupied before the removal of the damaged plate.

Fig. 3 illustrates another form of securing a plurality of removable seat plates upon the underside of the web. In this case the side walls of the recessed portion 11 of the

web 2 are screw threaded and are adapted to receive the upper screw threaded portion 21 of a cage member 22. An aperture or opening 14 of the same diameter as the recessed portion upon the underside of the valve casing 13, but in this case the side walls of this opening in the bottom of the valve casing are not screw threaded. The upper portion of the cage member 22 is provided with an upstanding flange 23 engaging the inner circumference of the lowermost seat plate, and the cage member tapers downwardly and terminates in an integral screw threaded portion 24 of less diameter than the opening in the bottom of the valve casing, and is provided at its lower extremity with a tool engaging surface 25. A cap or closure 26 is provided with a centrally screw threaded opening 27 adapted to receive and engage the screw threaded portion 24 upon the lower part of the cage member.

When a seat plate becomes damaged, the cap closing the opening in the bottom of the valve casing, is removed, the cage member is then removed by applying a wrench or other tool to the tool engaging surface thereof, which will allow of the removal of the plurality of trued seat plates. The damaged plate is removed from the others and the remaining perfect plates are replaced. The cage member is then inserted until the top thereof engages the lowermost seat plate. The cap closing the opening in the bottom of the casing is then replaced upon the screw threaded portion of the cage member. As illustrated in Fig. 3, the cap engaging the screw threaded portion of the cage member is recessed to receive the faced tool engaging portion of the cage member, the cage member is screw threaded a sufficient distance and the recess in the cap is of sufficient size to allow the cap to be advanced upon the cage member a sufficient distance to compensate for the removal of one or more of the plurality of trued seat plates. By this construction, the removal of a damaged seat plate does not change the relation between the removable cap and the valve casing, yet in each case the removable cap carried upon the valve casing secures the cage member in place and thereby at the same time retains the uppermost trued seat plate in its proper position.

It is to be understood that any form of valve plunger or valve head may be used in connection with the particular forms of removable valve seats disclosed herein, however, it is preferred to employ the valve head illustrated upon Fig. 1.

The head proper 30 is secured to the lower end of the spindle 30<sup>a</sup> passing through the valve cap 8 and is provided upon the underside with a centrally depending screw threaded projection 31. A plurality of



trued head plates 32 corresponding in diameter with the diameter of the valve head and provided with central apertures to receive the screw threaded projection 31 upon the under side of the head are placed thereover and are secured in place by a washer 33 of a diameter somewhat less than the inner diameter of the valve seat. The removable head plates 32 and washer 33 are secured upon the head 30 by the nut 34 on the exterior of the screw threaded projection 31.

Whenever one of the head plates becomes damaged it may be readily removed and a new plate substituted therefor by removing the valve cap, locking nut and washer. When it is not convenient to replace the damaged plate by a new plate and it is still desired to retain the same relation between the valve head and valve seat, all of the trued head plates may be removed at the same time and the damaged plate replaced upon the head at the back of the perfect head plates.

A scored or damaged valve head is just as objectionable as a scored or damaged valve seat, as either will equally prevent the perfect operation of the valve. This invention not only provides for the repairing of a damaged valve seat but also provides for the repairing of a damaged valve head and either or both may be quickly placed in perfect operative condition without the use of special tools and at the same time the relation between the operating parts is not changed in the least.

What I claim is:—

1. In a valve, a valve casing, a plurality of removable trued seat plates, an opening provided in the valve casing for the insertion and removal of the seat plates, a cap closing said opening, a circular projecting member upon the cap extending within the casing, a cage member engaging the seat plates at one end, a portion of the opposite end recessed to receive and support a damaged seat plate, and also receive the project-

ing member upon the cap in engagement with the damaged seat plate.

2. In a valve, a valve casing, a plurality of removable trued seat plates, an opening provided in the valve casing for the insertion and removal of the seat plates, a cap closing said opening, a cage interposed between the seat plates and cap provided with means to receive and hold seat plates at each end thereof, said cap provided with a member cooperating with the said means upon the adjacent end of the cage to retain one or more seat plates therebetween to compensate for the removal of a seat plate from the opposite end of the cage.

3. In a valve, a valve casing, a plurality of removable trued seat plates, an opening provided in the valve casing for the insertion and removal of the seat plates, a cap closing said opening, a cage provided with a seat plate engaging shoulder at each end thereof, said cap provided with an inwardly projecting member cooperating with the shoulder on the adjacent end of the cage to retain a seat plate therebetween to compensate for the removal of a seat plate from the other end of the cage.

4. In a valve, a valve casing a plurality of removable trued seat plates, an opening provided in the valve casing for the insertion and removal of the seat plates, a cap closing said opening, a cage provided with a seat plate engaging shoulder at each end thereof, said cap provided with an inturned projecting member cooperating with the shoulder on the adjacent end of the cage to retain the cage in position and adapted to receive and retain a seat plate between the cap member and the cage shoulder to compensate for the removal of a seat plate from the other end of the cage.

EDWARD J. MALLEY.

Witnesses:

F. B. FISCHER,  
L. O. SWEATMAN.