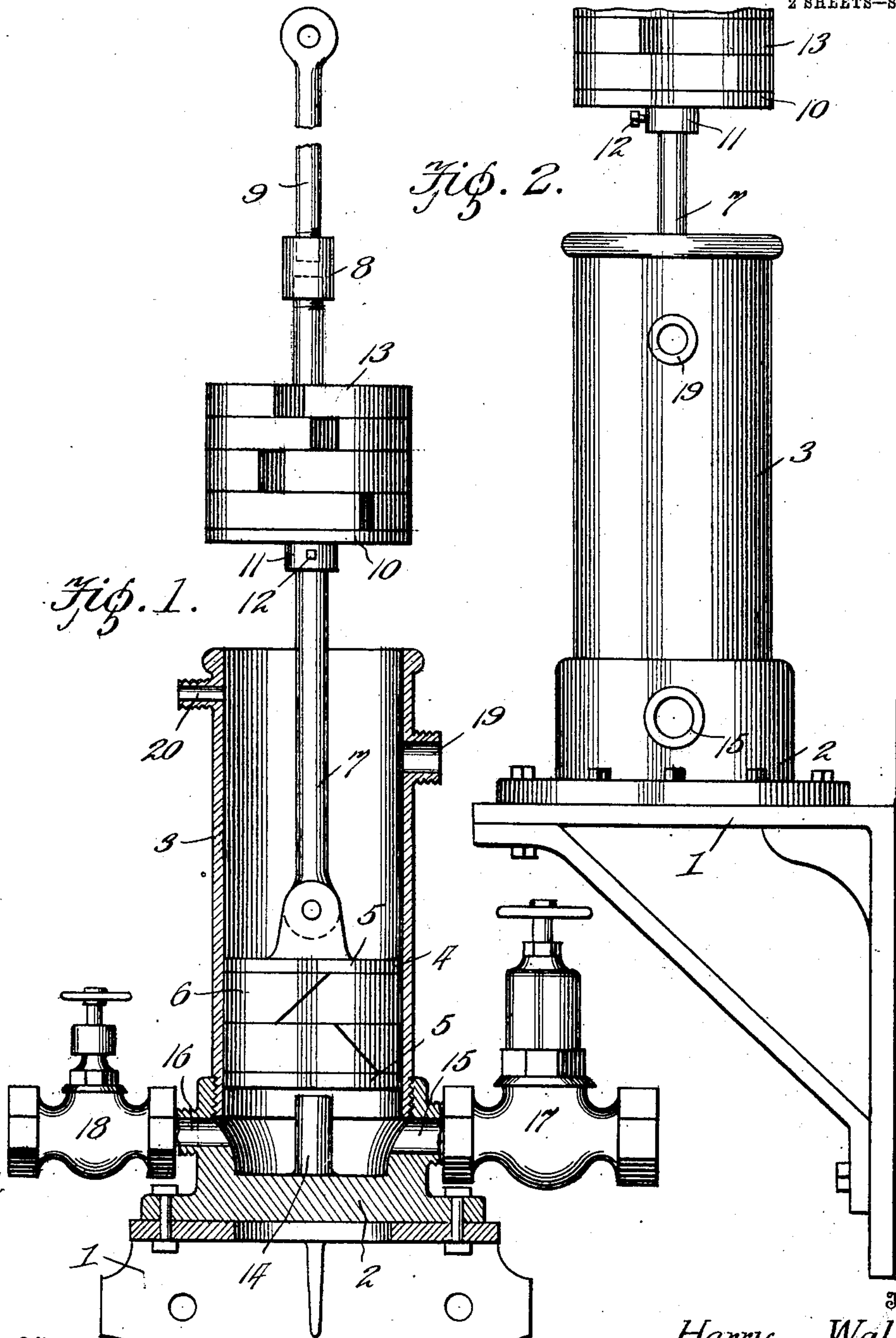


H. WALKER.
DAMPER REGULATOR.
APPLICATION FILED JULY 2, 1907.

912,213.

Patented Feb. 9, 1909.

2 SHEETS—SHEET 1.



Witnesses

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Fig. 3.

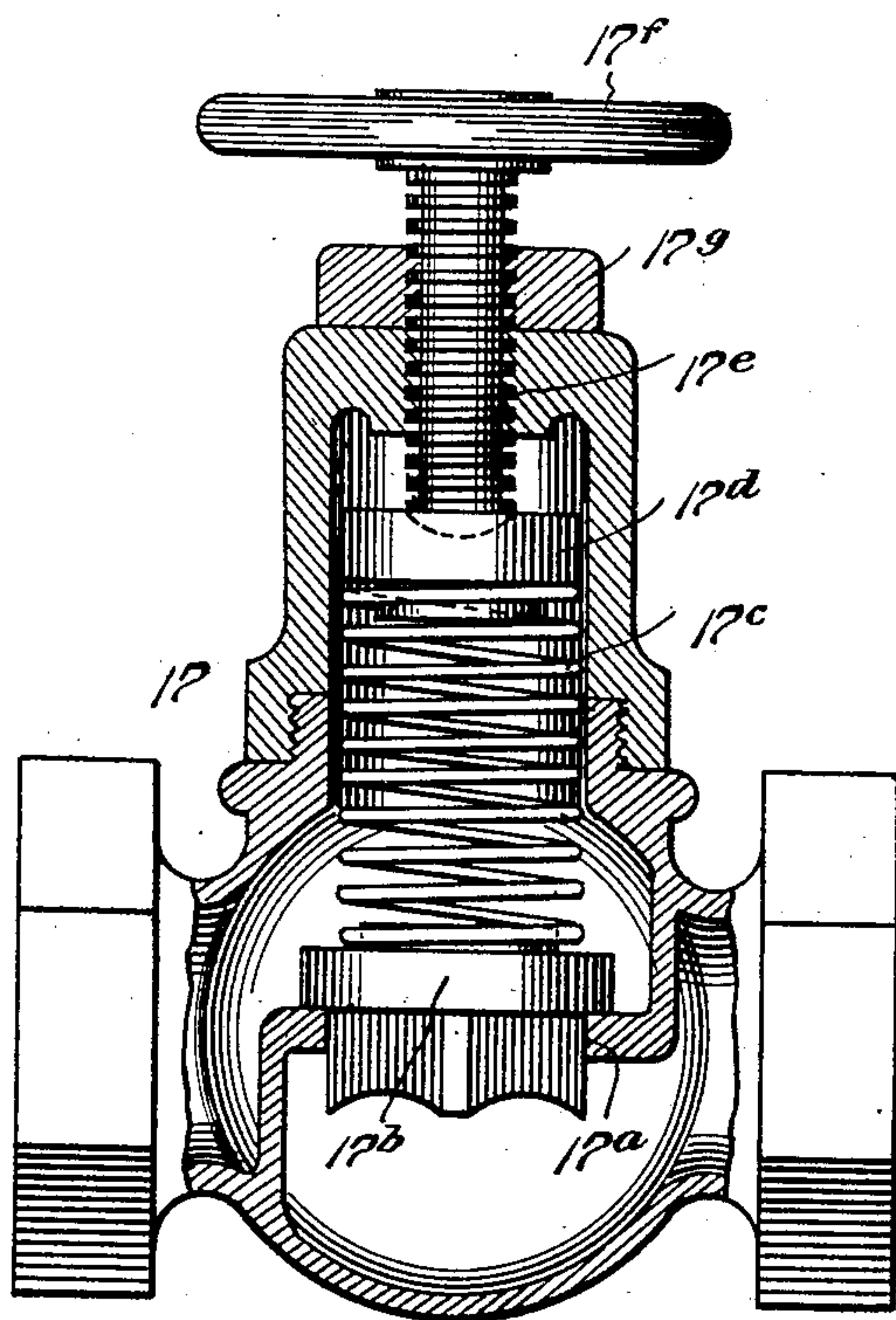
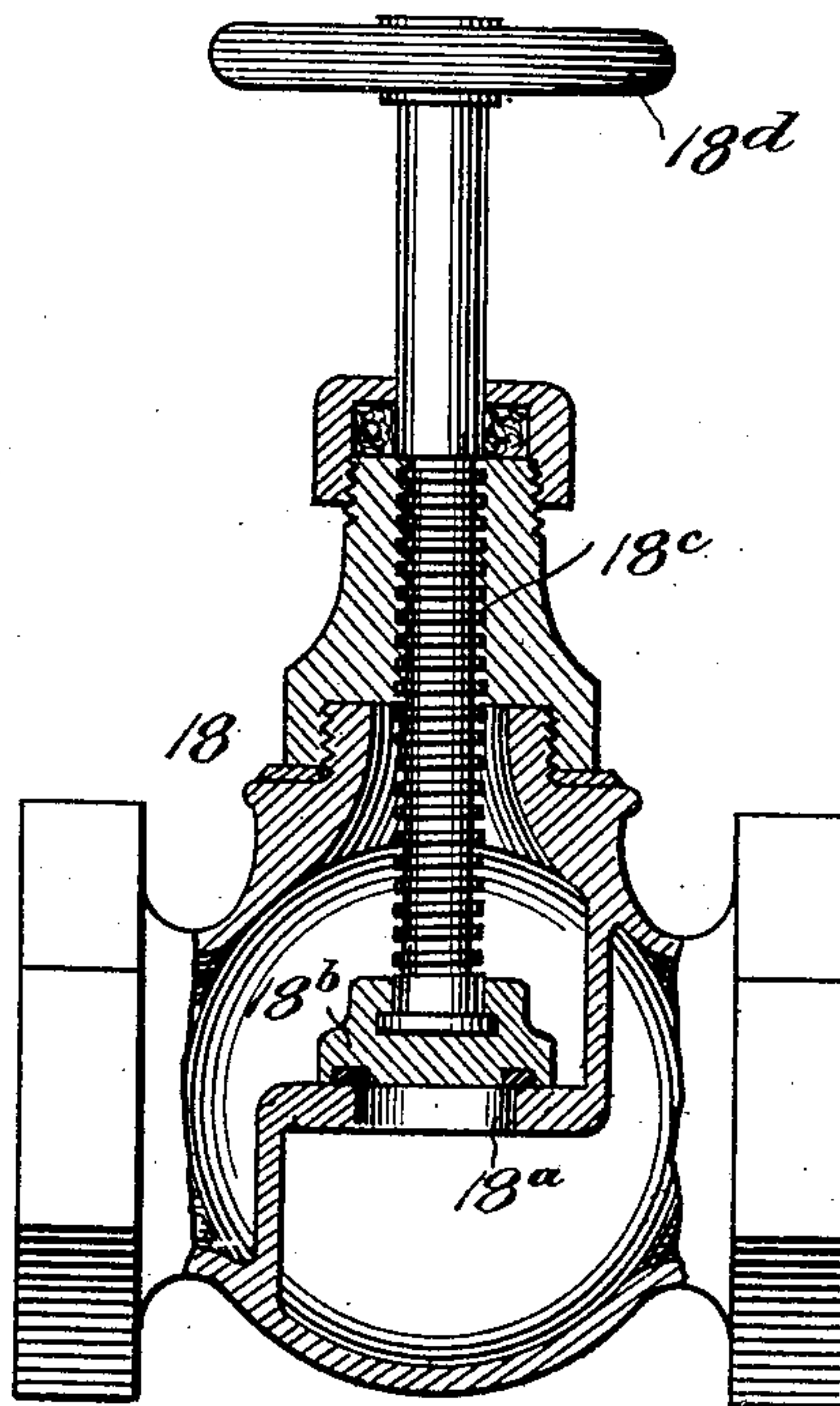


Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY WALKER, OF MODENA, PENNSYLVANIA.

DAMPER-REGULATOR.

No. 912,213.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed July 2, 1907. Serial No. 381,864.

To all whom it may concern:

Be it known that I, HARRY WALKER, a citizen of the United States, residing at Modena, in the county of Chester and State of Pennsylvania, have invented new and useful Improvements in Damper-Regulators, of which the following is a specification.

This invention relates to a damper regulator especially designed for controlling the furnace dampers of steam boilers, the object in view being to provide a regulator of this character operative to partially or wholly close the damper at a point below the pressure at which the safety valve is set to blow, thereby securing safety in the operation of the boiler.

A further object is to provide an apparatus of this character including a cylinder and a weighted piston operating therein, means for supplying steam to the cylinder to raise the piston for a closing movement of the damper when the established steam pressure is reached, means for permitting the escape of steam from the cylinder when the piston is elevated beyond the normal limit of its upward movement, means to permit of the discharge from the cylinder above the piston of surplus oil and water of condensation, and a relief valve to control the escape of steam from the cylinder and the speed of descent of the piston.

The invention consists of the features of construction, combination and arrangement of parts herein after fully described and claimed, reference being had to the accompanying drawing, in which:

Figure 1 is a vertical transverse section, with parts in elevation, of a damper regulator embodying my invention. Fig. 2 is a side view of the same with parts omitted. Fig. 3 is a sectional view of the feed valve. Fig. 4 is a similar view of the exhaust valve.

Referring to the drawing, 1 designates a supporting bracket adapted to be secured to a suitable main support, and upon which rests a base 2, with which is detachably connected the lower end of a cylinder 3 in which operates a piston 4 comprising a cylindrical body having annular end flanges 5 forming an intervening annular groove for the reception of suitable packing rings 6. A rod 7 is connected to the upper end of the piston, extends upwardly from the open upper end of the cylinder, and is connected at its upper end by a coupling

8 with an operating rod 9 adapted to be connected to a crank arm or other means for actuating the furnace damper, not shown. Arranged upon the rod below the coupling 8 is a head 10 having a collar 11 encompassing the rod and adjustably secured thereto by a set screw 12, said head forming a support for a desired number of coupling 8 with an operating rod 9 adapted weights 13 operating to force the piston downward when not subjected to steam pressure to effect a closing of the damper. Extending upwardly from the bottom of the hollow base is a lug or short post 14 forming a bumper or stop to limit the downward movement of the piston.

Inlet and discharge connections 15 and 16 are provided at opposite sides of the base for the admission and exhaust of steam. Attached to the inlet connection 15 is a valve 17, which may be termed a steam pressure feed valve. This valve is connected in practice by suitable piping with the boiler or steam main leading therefrom and comprises a casing having a port 17^a controlled by a winged puppet valve 17^b. This valve is adapted to be held to its seat by a coiled expansion spring 17^c connected at its lower end therewith and adapted to be placed under tension by a follower 17^d. The follower is arranged to bear against the upper end of the spring and is adapted to be adjusted to regulate the pressure of the spring by a screw stem 17^e mounted in a threaded opening in the top of the casing and provided with a hand wheel or equivalent adjusting device 17^f. A lock nut 17^g is provided to engage the screw and lock the same in adjusted position. It will thus be seen that the valve 17^b may be set to open at varying degrees of pressure through the action of the follower on the pressure spring 17^c. In practice, the valve is preferably set to open or blow at a pressure slightly below, say three pounds, the pressure at which the main safety valve of the boiler is set to blow, so that before the pressure of steam in the boiler is raised to the maximum degree at which the safety valve blows the valve 17 will open to admit steam to the base 2, whereby the steam pressure thus supplied to the cylinder will elevate the piston against the resistance of the weight 13 and thus transmit an upward movement to the rods 7 and 9 to partially or wholly close the damper and thus control

the draft to prevent a further augmentation of steam pressure within the boiler. When the pressure decreases, the piston 5 descends under the action of the weights 13 and opens the damper to a greater or less extent, as will be readily understood, whereby the furnace is efficiently controlled.

Attached to the exhaust connection 16 of the base is a valve 18, comprising a casing 10 having a port 18^a controlled by a vertical movable valve 18^b, said valve being swiveled at the lower end of a screw threaded adjusting stem 18^c provided at its upper end with a hand wheel or other equivalent adjusting device 18^d, said valve being adapted when 15 opened to allow the escape of the exhaust steam and water of condensation from the cylinder and base. The valve may be adjusted through the medium of its stem to 20 open it to a greater or less extent for the slow or rapid discharge of the steam, whereby the descent of the piston may be regulated, so that when, through the cut-off of the steam supply through the valve 17, there 25 is a reduction of the steam pressure below the piston from condensation, the steam may be allowed to escape under the descent of the piston and weights 13 as slowly or as rapidly as desired to control the descent of the piston 30 to a nicety.

An outlet 19 is provided at the upper portion of the cylinder to permit of the exhaust of the steam therefrom when said outlet is uncovered by an abnormal upward move- 35 ment of the piston, thus preventing the piston from being moved too high. Another outlet 20 is also provided upon the upper portion of the cylinder above the outlet 19 to permit the oil and water of condensation 40 in the cylinder above the piston to discharge when the piston reaches the limit of its upward movement.

From the foregoing description, taken in connection with the drawing, the construction and mode of operation of the device 45 will be readily understood, and it will be seen that the invention provides a regulator which is so controlled as to close the damper before the pressure in the steam boiler 50 reaches the maximum, thus obviating all

liability of an explosion and preventing waste of steam.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:—

1. A damper regulator comprising a base formed with an outwardly extending attaching flange and having a chamber provided at opposite sides with inlet and exhaust ports and communicating exteriorly threaded nipples, and internally screw-threaded above said ports, a cylinder open at its upper and lower ends, said cylinder being externally screw-threaded at its lower end for engagement with the threaded portion of the base, a feed valve connected with the threaded outlet nipple of the base and controlling the inlet port, said valve being provided with a closing spring and means for tensioning said spring and regulating the valve to open under varying pressures, an exhaust valve connected with the threaded outlet nipple of the base and controlling the outlet port, said valve being manually adjustable to regulate the rapidity of escapement of the fluid pressure confined within said chamber, a piston operating in the open-ended cylinder, and a weighted rod extending upwardly therefrom and adapted for connection with a damper. 55 60 65 70 75 80

2. A damper regulator comprising a cylinder, a weighted piston operating therein, and supply and discharge connections at the base of the cylinder, the cylinder being provided at its upper end with an always-open outlet for the discharge of liquids above the piston when the latter is elevated and below said outlet with an always-open steam outlet arranged above the limit of the normal upward movement of the piston and adapted to be uncovered by the piston when the latter passes beyond the limit of its normal upward movement. 85 90

In testimony whereof, I affix my signature in presence of two witnesses.

HARRY WALKER.

Witnesses:

WILLIAM S. G. COOK,
WILLIAM T. NICHOLS, Jr.