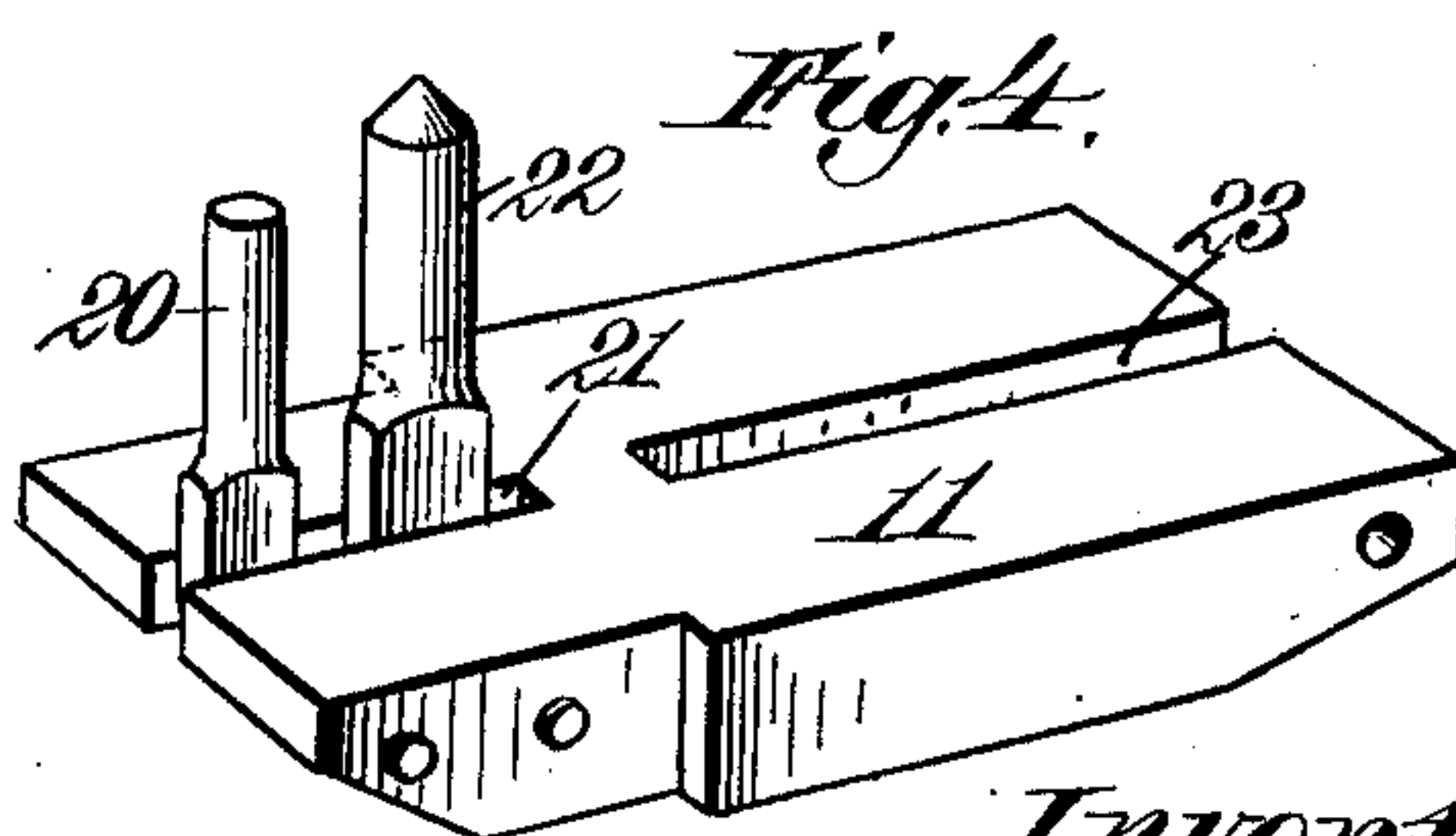
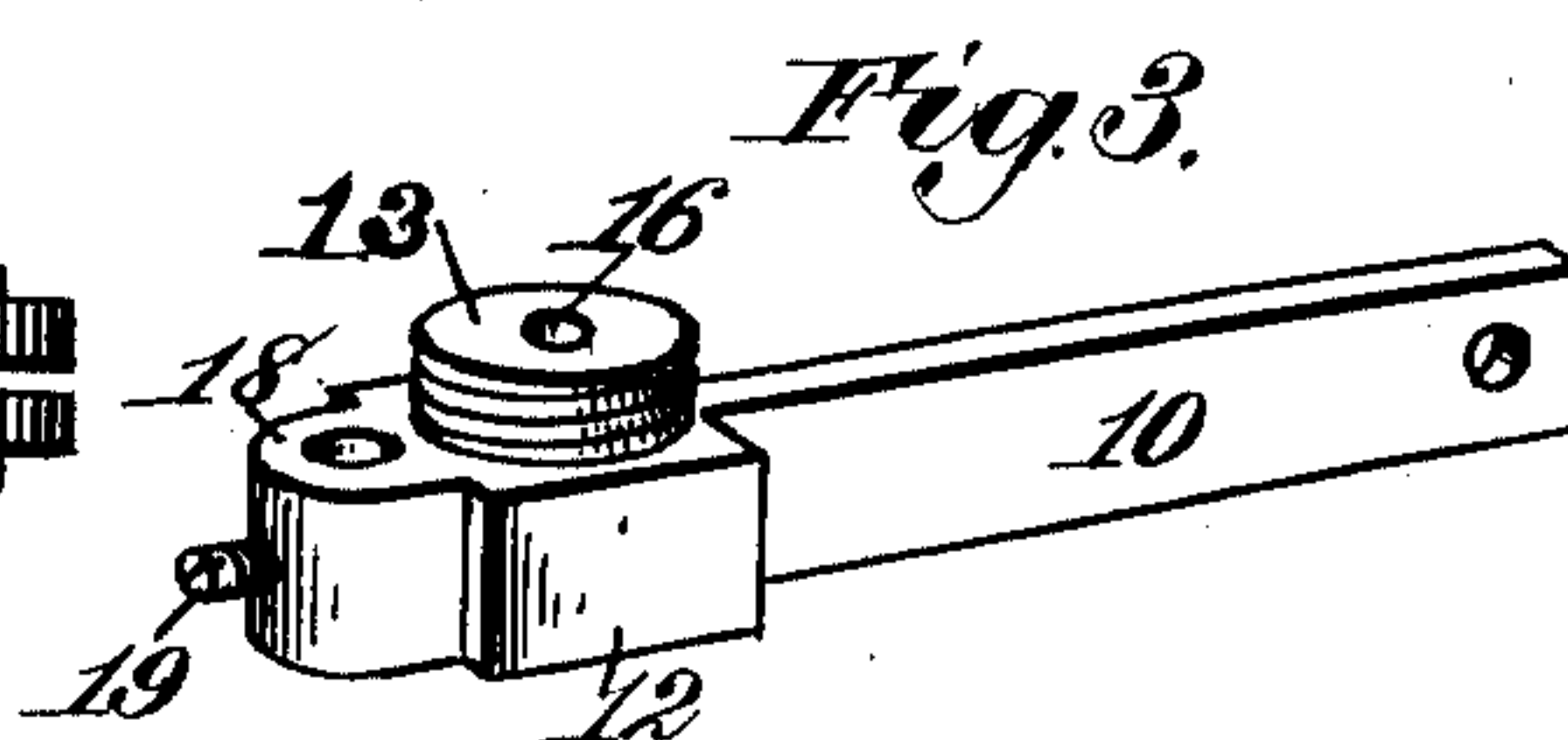
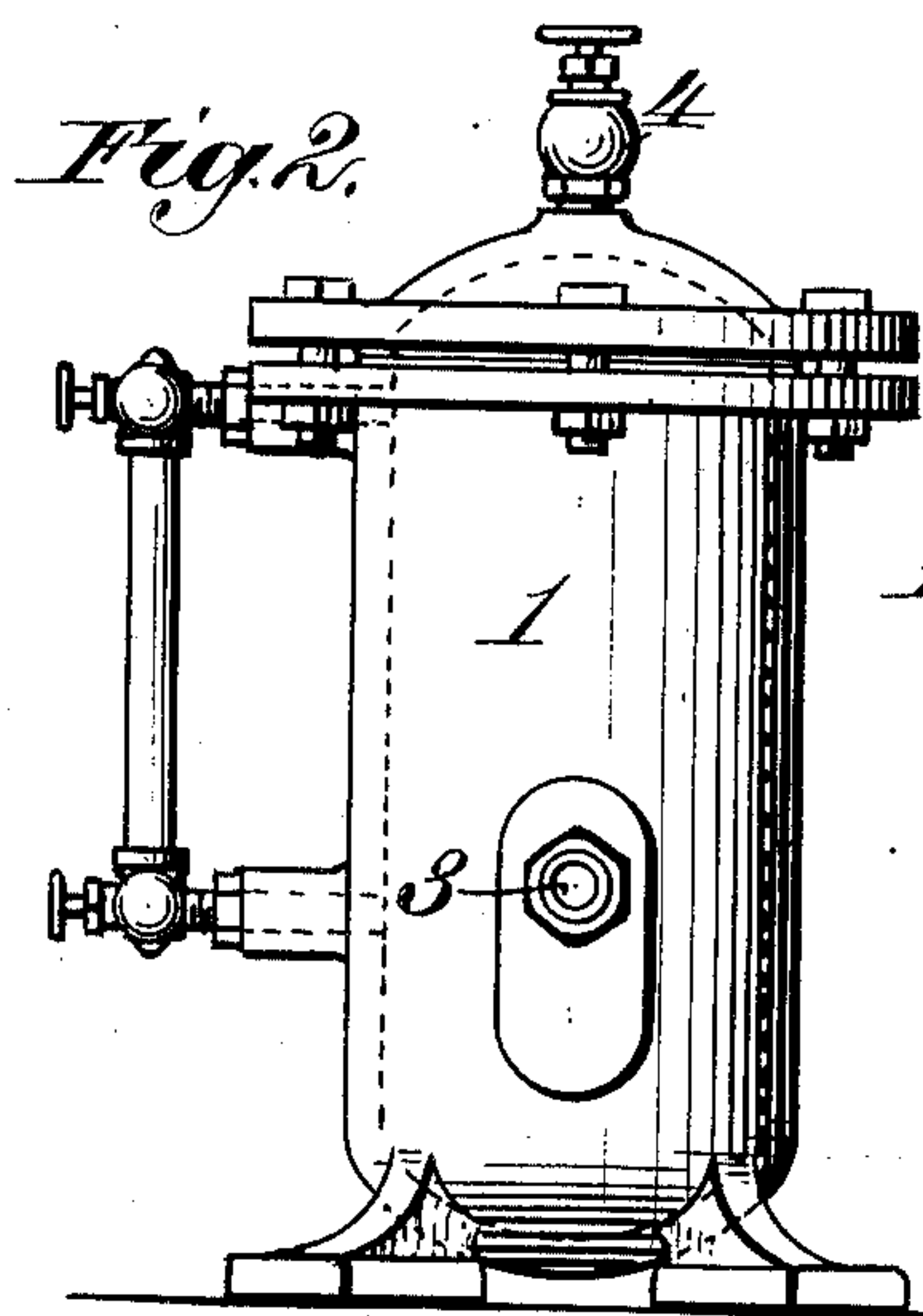
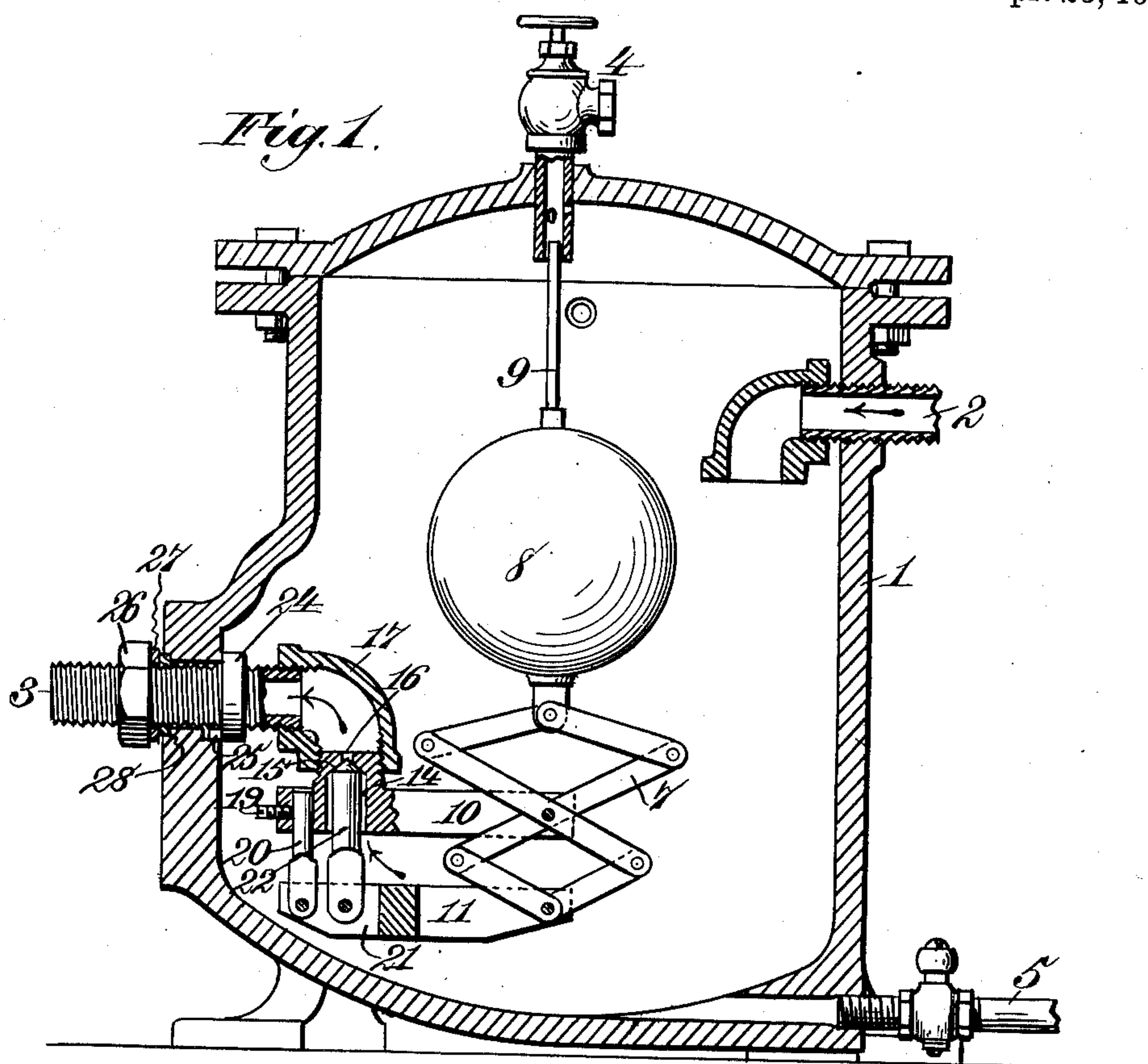


P. J. HEFFERNAN.  
STEAM TRAP.  
APPLICATION FILED JAN. 7, 1911.

990,735.

Patented Apr. 25, 1911.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

PATRICK J. HEFFERNAN, OF BAYONNE, NEW JERSEY.

## STEAM-TRAP.

990,735.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed January 7, 1911. Serial No. 601,324.

### To all whom it may concern:

Be it known that I, PATRICK J. HEFFERNAN, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented new and useful Improvements in Steam-Traps, of which the following is a specification.

This invention relates to improvements in steam traps, more particularly of the type shown in my prior U. S. Patent No. 803,483, of October 31, 1905.

The present invention contemplates especially the improvement, in respects to be particularly enumerated, of certain of the elements which enter into the general combination of my prior structure, and the objects of the improvements to be herein set forth are to increase the sensitiveness of action, thus adapting the trap for more general application; to provide for more ready accessibility to the parts for the purpose of cleaning, repairing or renewing; and to render the construction of generally simpler and less expensive nature.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a vertical longitudinal section of the improved trap; Fig. 2 is an end elevation thereof; Fig. 3 is a perspective view of an improved element of the valve construction; and Fig. 4 is a perspective view of an improved element of the valve operating mechanism.

Similar characters of reference designate corresponding parts throughout the several views.

Inasmuch as the general construction of trap herein shown is described with particularity in my prior patent referred to, only a brief reference will be made to the essential parts. These are the casing 1 having the inlet connection 2, the outlet connection 3, the pet-cock 4 fitted in the dome, the pipe 5 communicating with the lower end of the casing and through which collected impurities are discharged or blown off, the valve construction, and the valve operating mechanism, comprising a system of lazy tong levers 7, a float 8 connected to the lever system at its upper end, the said float having an axially extended guide rod 9 which projects into the sleeve of the pet-cock, the member 10 which constitutes, *inter alia*, a suspension means for the system of lazy tong levers and is connected thereto at an inter-

mediate fixed point, and the lever 11 which is suspended from the member 10 and constitutes, *inter alia*, a carrier for the discharge valve and is connected with the system of levers at the lower end thereof.

The foregoing elements in their broad or general aspect are fully described in my prior patent. The present improvements reside more particularly in the valve construction, in the construction of the suspension member 10, and in the construction of the lever 11. According to the present invention the valve casing is formed as a part of the member 10. The latter comprises a relatively thin shank, having near its inner end an enlargement 12 provided on its upper face with a threaded boss 13. The enlargement 12 is formed with an inclosed discharge duct 14, which terminates in a valve seat 15 and a reduced opening 16 leading coaxially from the valve seat to the upper face of the boss 13. The member 10 is held rigid in the casing by means of an elbow coupling 17, one end of which is threaded upon the inner end of the connection 3 and the other end of which has threaded engagement with the boss 13. The member 10 serves in turn, as above stated, as a means for suspending the lever system 7 and as a means for suspending the lever 11. With regard to the latter office the member 10 is provided at its inner end with an apertured lug 18 through which is threaded a set screw 19 and in the opening of which is fitted a shank 20 which is held rigidly in position by said set screw. The shank 20 is thus in effect a rigid angular extension of the member 10 and is directly pivoted to the lever 11 near the inner end of the latter, the said lever having a slot 21 which extends longitudinally from its inner edge and in which the lower flattened portion of the shank 20 is fitted. The valve which coöperates with the seat 15 is shown at 22 and is in the nature of a plug which works axially in the passage 14, said valve being of needle-point form at its working end and having its lower end flattened and pivotally fitted in the slot 21 aforesaid. The lever 11 is also formed with a slot 23 which is in line with the slot 21 and extends from the opposite end of said lever, serving to receive the end portions of the lower levers of the system 7.

In the improved construction and in accordance with the invention, the office of



the lever 11 is two-fold. In the first place, it performs the ordinary function of a lever and in the second place it performs the function of a counterbalance for the float 8, being in this respect in the nature of a casting of proper weight. By thus combining a counter-balance with the float 8 in the manner shown and explained, the action of the valve operating mechanism is rendered more sensitive and at the same time it is permitted to employ connections of larger diameter, thus increasing the capacity of the trap, for automatically delivering liquid of condensation.

The formation of the valve casing as a part of the member 10 is of advantage not only in respect of simplifying the construction and rendering it less expensive but also in respect of providing for more ready accessibility for the purpose of assemblage, disassemblage, cleaning, or repairs. Furthermore, this construction provides for a vertical disposition of the discharge passage and for the working of the valve coaxially in this passage, for which reason the tendency to pass extraneous matter is greatly reduced.

The provision of the shank 20 is of advantage in that it affords a ready means for adjusting the valve 22 with relation to its seat and for thus compensating for wear.

The construction above described is self-contained and may be removed or replaced as a unit, and for such removal or replacement it is only necessary to remove the upper head of the casing 1, no further manipulation of said casing being required. To facilitate the removal and replacement of the self-contained organization, the connection 3 is provided near its inner end with a rigidly fitted collar 24 having at one side thereof a lug 25 which engages in a recess in the adjacent face of the casing and thus holds the connection 3 against turning when the securing nut 26, arranged on the outside of the casing, is applied. Interposed between this securing nut and the casing is a collar 27 which serves to retain a packing ring 28 that is fitted in a recess in the adjacent face of the casing. When it is desired to remove the self-contained organization from the casing the upper head of the latter is first removed and the nut 26 is taken from the connection 3. Thereupon the structure may be removed from the casing, first by a lateral and then by an axial movement, as is obvious.

While the improvement has been described as a steam trap it will be understood that it can with equal and advantageous facility be used for other analogous purposes, *e. g.*, as an oil trap, which use may be specifically exemplified in the separation of gasoline from gas. In using the arrangement as an oil trap it will, of course, be un-

derstood that no departure from any of the essential features of construction above described is necessary, the only changes in fact concerning the buoyancy of the float and the mass of the weight in accordance with differences in the specific gravity of the fluids to be separated.

Having fully described my invention, I claim:

1. In a steam trap, in combination, a casing having an inlet and outlet connection, a member coupled to the outlet connection and comprising a horizontally disposed shank having an enlargement at its inner end, the enlargement being formed with a vertical discharge passage terminating in a valve seat and with a duct leading from the valve seat to the upper face of the member, a valve working coaxially in the discharge passage, a lever system connected to the other end of the shank and being suspended from the latter, a float connected to the upper end of the lever system, and a lever carrying the valve and connected to the lower end of the lever system.

2. In a steam trap, in combination, a casing having an inlet and an outlet connection, an elbow coupling joined to the latter, a member threaded into the elbow coupling and formed with a vertical discharge passage terminating in a valve seat and with a duct leading to the upper face of the member from the valve seat, a valve working coaxially in the discharge passage, and valve operating means having its operation automatically consequent to changes in the level of the liquid in the casing.

3. In a steam trap, in combination, a casing having an inlet and an outlet connection, a member coupled to the outlet connection and having at its inner end a vertical discharge passage terminating in a valve seat and a duct leading to the upper face of the member from the valve seat, a lever system suspended by the member, a float operatively connected to the upper end of the lever system, a lever operatively connected to the lower end of the lever system, the lever carrying the valve, and a vertical shank adjustably connected to the member and forming in effect a rigid angular extension thereof, the lever aforesaid being pivoted to and suspended by the shank.

4. In a steam trap, in combination, a casing having an inlet and an outlet connection, a valve chamber coupled to the latter, a vertically disposed valve which has its seating in said chamber, a lever of substantial weight and provided with slots extending from its end faces, the lower end of the valve being pivotally fitted in one of the slots, a fixed part by which the lever is suspended and which has its end pivotally fitted in one of the slots, a lever system having an end pivotally fitted in one of the slots, and a float



connected to the upper end of the lever system, the lever constituting a counterbalance for the float.

5 In a steam trap, in combination, a casing having an inlet and an outlet connection, the latter comprising a threaded pipe section which is fitted in a wall of the casing and is provided with a fixed collar having a projecting lug, the said wall having a  
10 recess in its inner face in which the lug engages, a retaining nut fitted on the connection adjacent the outer face of said wall, a valve chamber within the casing and coupled to the outlet connection, a valve having

a seating in said chamber, and valve operating means having its operation automatically consequent to changes in the level of the liquid in the casing, the valve chamber, valve and valve operating mechanism having conjointly a self-contained organization. 15 20

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PATRICK J. HEFFERNAN.

Witnesses:

DANIEL MURRAY,  
JAMES B. FAGNELL.