

No. 832,178.

PATENTED OCT. 2, 1906.

H. F. WEINLAND.
BLOW-OFF VALVE.

APPLICATION FILED JULY 15, 1904.

Fig. 2.

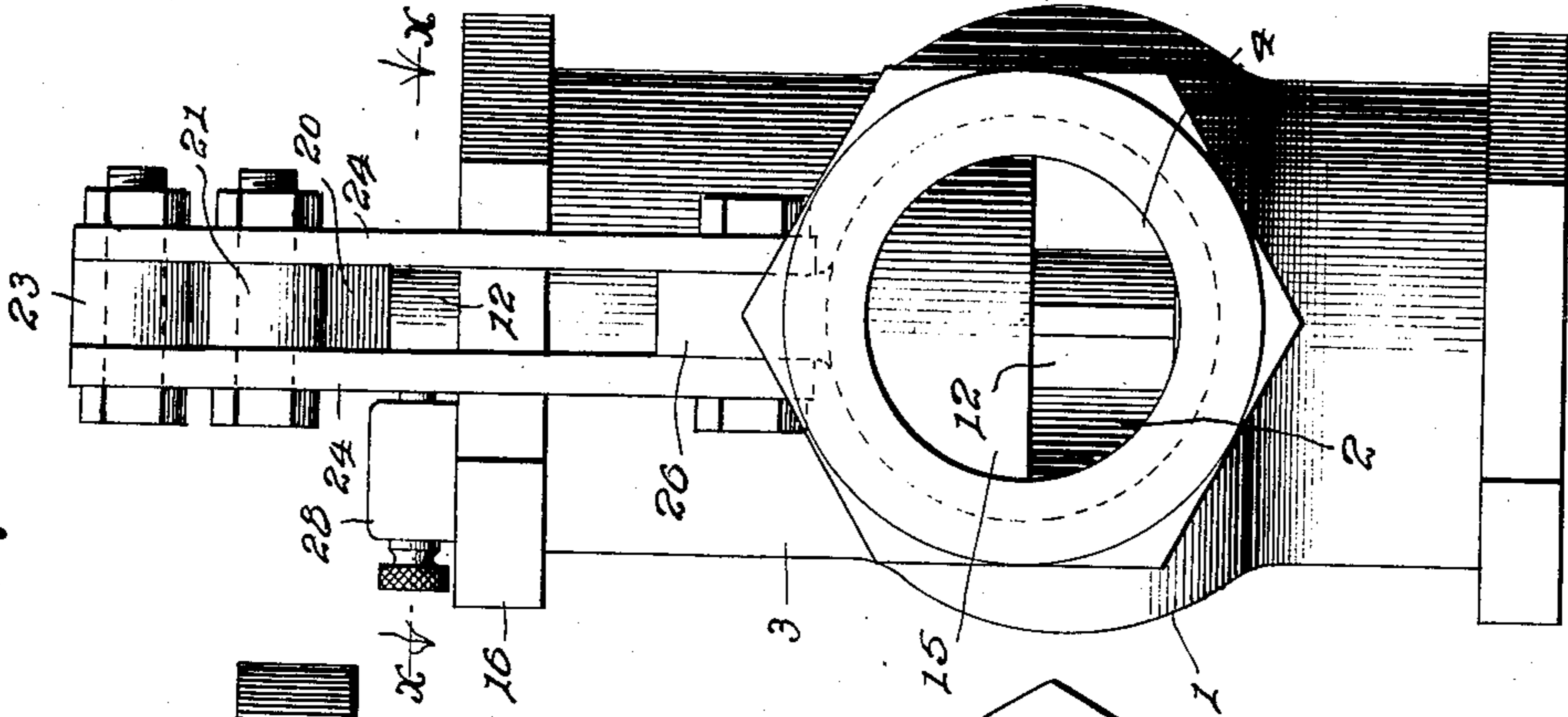


Fig. 3.

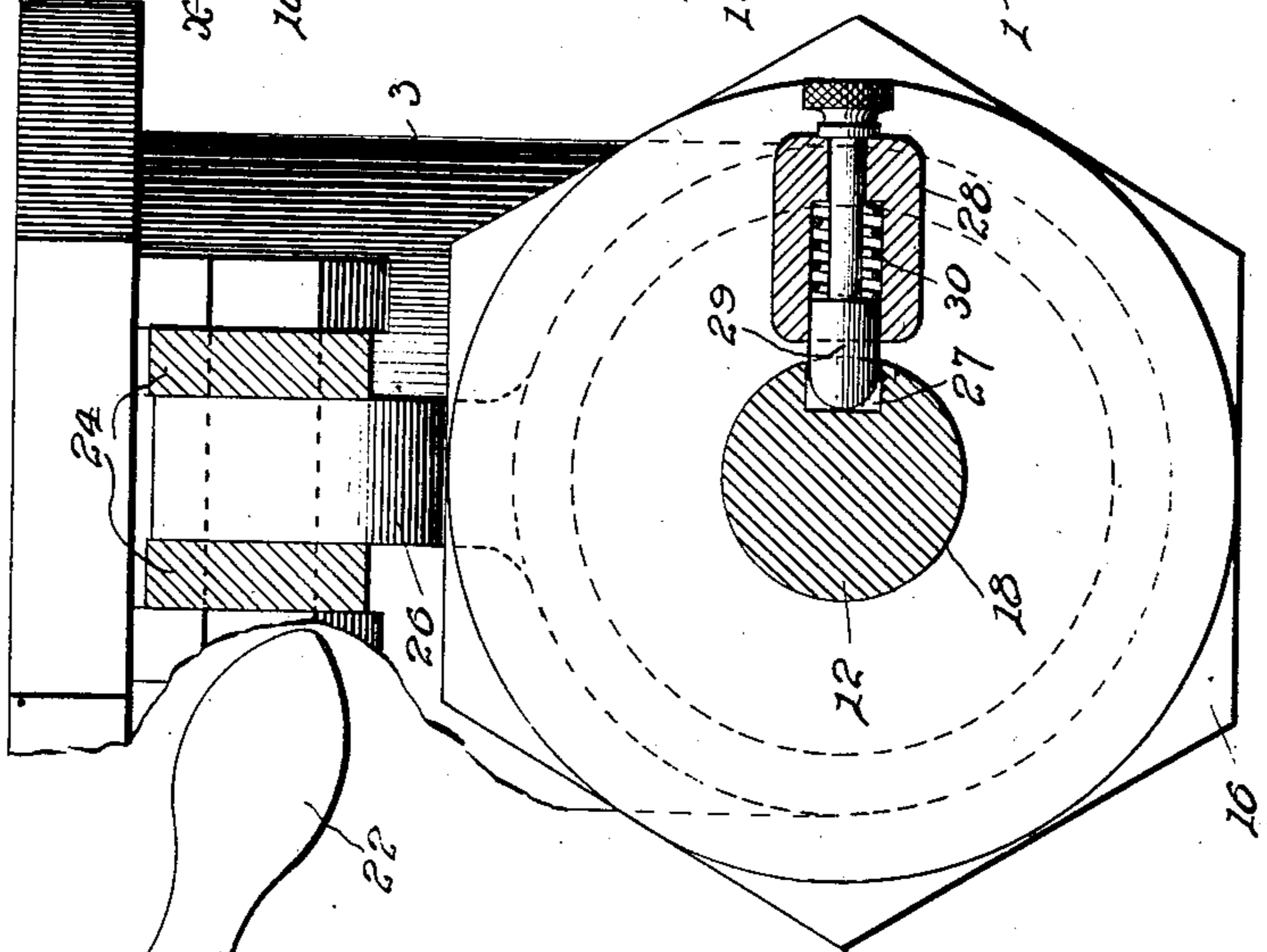
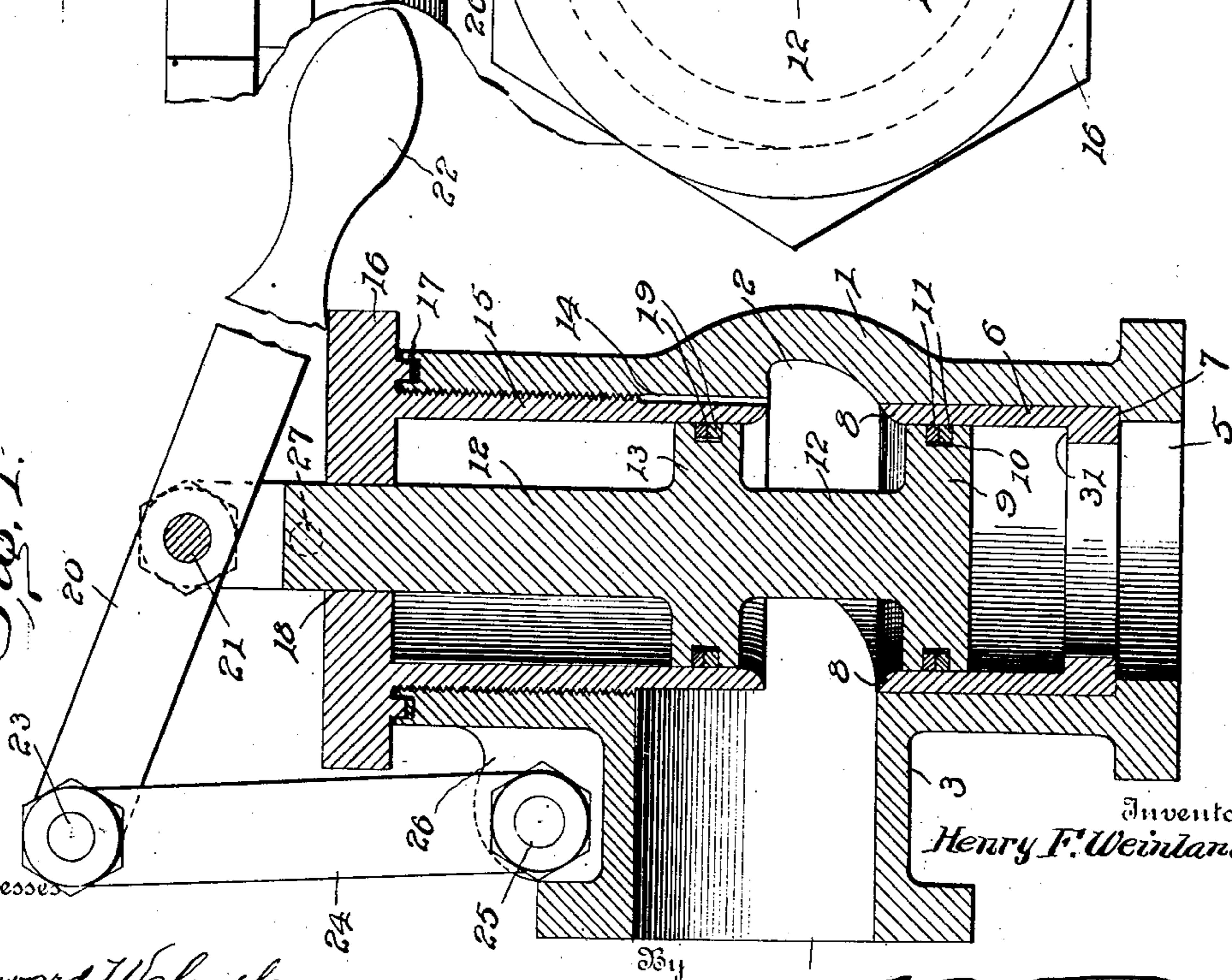


Fig. 1.



Witnesses

G. Howard Walmisley.
Irvine Miller.

Inventor
Henry F. Weinland,

J. H. A. Goulinier
Attorney

UNITED STATES PATENT OFFICE.

HENRY F. WEINLAND, OF SPRINGFIELD, OHIO, ASSIGNOR TO THE
LAGONDA MANUFACTURING COMPANY, OF SPRINGFIELD, OHIO,
A CORPORATION OF OHIO.

BLOW-OFF VALVE.

No. 832,178.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed July 15, 1904. Serial No. 216,702.

To all whom it may concern:

Be it known that I, HENRY F. WEINLAND, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Blow - Off Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to blow-off valves for steam-boilers; and has for its object, among other things, to provide a construction whereby the fit of the valve shall not be materially affected by the wear arising from the
15 attrition due to the outgoing sediment during the operation of blowing off.

Further objects of my invention are to provide a balanced valve, that the valve may be readily opened or closed by hand, and to prevent injury to the valve by the application of
20 excessive force thereto in closing the same.

To these and other ends my invention consists in certain novel features which I will now proceed to describe and will then particularly point out in the claims.
25

In the accompanying drawings, Figure 1 is a vertical sectional view of a structure embodying my invention in one form. Fig. 2 is an elevation of the same, and Fig. 3 is a plan
30 section, on an enlarged scale, taken on the line X X of Fig. 2 and looking in the direction of the arrows.

In blow-off valves as ordinarily constructed the valve proper, when closed, rests
35 against a seat which extends into the path of the closing movement of the valve, being moved to bear against said seat by power applied thereto, usually by hand, through the medium of a threaded stem. Said valve
40 is also usually exposed to the full unbalanced boiler-pressure, which tends to move it toward its seat and resists its movement in the opposite direction. It results from this construction that the valve is difficult to
45 open against the boiler-pressure. It also results that when the valve leaves its seat the violent outrush of the sediment abrades the valve and seat at their meeting faces, thus spoiling their fit and rendering a tight joint
50 impossible. Where, as is sometimes the case, a cylindrical guiding bore or passage is employed, extending inward from the valve-seat and serving to guide the valve, which fits

therein, the abrasion or erosion occurs on the valve when said valve clears said passage 55 during its opening movement, and in this case also the fit of the valve on its seat is impaired, and a leak results. Furthermore, where the construction is such that the valve proper closes against a seat toward and from 60 which it is movable it frequently occurs that grit or sediment becomes lodged between the valve and seat, preventing full closure of the valve and causing leakage. When this occurs, the attendant frequently attempts to 65 close the valve completely by the application of excessive force, which often results in breakage of the parts. To overcome these objectionable features, I employ a structure comprising a piston-valve fitting with a 70 steam-tight fit in the discharge or outlet passage of the valve casing or body, which latter has no seat against which the valve fits, being of the same diameter throughout that portion of its length traversed by the 75 valve in its normal range of movement. Thus the fit between the valve and passage is entirely between the annular or peripheral portion of the valve-piston and the wall of the passage, there is no seat to erode, and 80 such erosion as takes place occurs at the lower edge of the valve and upper edge of the passage and does not mar the fit of the parts when the valve is fully introduced into the passage. There is no seat against which the 85 valve can be forced, so that breakage in that way by misuse on the part of the attendant is avoided. The valve is preferably a double-piston valve, the space between the pistons being always exposed to the boiler-pressure 90 and the exposed areas of the two pistons being equal, so that the valve is always balanced. Provision is made for locking the valve in its closed position and for packing the pistons to insure tight joints. 95

In the embodiment of my invention shown in the accompanying drawings, 1 indicates the body or casing of the valve, having a chamber 2 and a branch 3, usually horizontal, provided with a passage 4, which communicates with the boiler and chamber 2 and forms the inlet-passage of the valve. 100

5 indicates the outlet-passage of the valve, communicating with the chamber 2 at its inner end and being usually vertical. This 105 outlet-passage is preferably the lower portion

of a passage extending entirely through the body 1 from top to bottom, and is preferably provided with a bushing 6, fitting therein and resting at its lower end on a seat or shoulder

7. This bushing is cylindrical internally, without seat or shoulder throughout that portion thereof in which the valve travels in its normal operation, being, however, preferably flaring or rounded off at its upper end adjacent to the chamber 2, as indicated at 8.

9 indicates the valve proper, which is in the form of a disk or piston, the periphery whereof fits the outlet-passage in which it moves, formed in this instance in the bushing 6, so as to effectually close the said passage. To insure a better fit and take up wear, the valve-piston 9 may be provided with a peripheral groove 10, in which packing-rings 11 may be located, said rings being preferably expansive.

The chamber 2 is of greater diameter than the valve 9, so that when said valve is moved out of the outlet-passage into said chamber there is a free passage from the boiler through the passage 4, chamber 2, and outlet-passage 5. The greatest erosion occurs when this passage is first opened, which is when the lower edge of the valve 9 clears the bushing 6, and it will be seen that the parts then exposed to the first rush of outgoing material—to wit, the lower edge of the valve and the upper edge of the bushing—are not essential to the proper closing of the passage and may become worn without materially affecting the fit of the valve when in the closed position shown in the drawings. In fact, the outgoing sediment never passes directly between the surfaces which effect the closure of the outlet-passage, and these surfaces are not unduly worn, as they are when the sediment is blown forcibly through the restricted space between the ordinary valve and its seat formed at the initial opening movement of said valve. The erosion of the upper end of the bushing 6 is materially decreased by the flaring of said upper end, and the inclined surface thus formed also prevents the packing-rings 11 from catching on the upper end of the bushing when the valve returns to its closed position, which catching might occur when expansive rings are employed, and said rings expand in the chamber 2 to a diameter greater than the internal diameter of the main body of the bushing.

The valve 9 is preferably operated through the medium of a stem 12, projecting beyond the body 1, and I prefer to balance the valve by means of a second piston 13, mounted on said stem 12 and fitting in the upper portion 14 of the passage through the body 1 hereinbefore referred to, of which the passage 5 is the lower portion. To this end I prefer to provide for this upper portion a bushing 15, threaded into said passage and provided with a cap 16, which closes the upper end of the

body, a packing 17 being preferably interposed between said cap and upper end of the body. The cap has an aperture 18 for the passage of the valve-stem 12, and the piston 13, which fits within the bushing 15, is preferably provided with peripheral packing-rings 19, which take up wear, insure a proper fit, and do away with the necessity of a stuffing-box or packing where the valve-stem passes through the cap. The pistons 13 and 9 are of the same area as to their adjacent faces, which are always exposed to the same pressure, so that the valve 9 is balanced and moves readily, even when closed.

The valve may be operated by any suitable means; but since, as just stated, it is balanced and requires little power to move it I prefer to employ, instead of the usual slow-acting screw, a quick-acting device, such, for instance, as that shown. This consists of a hand-lever 20, pivoted between its ends at 21 to the upper end of the valve-stem, one end of said lever having a handle 22, the other end being pivoted at 23 between the upper ends of links 24, the lower ends of which are pivoted at 25 on opposite sides of a lug 26 on the branch 3. By this means the valve may be readily and quickly moved from its closed to its open position, and conversely.

In order to prevent accidental opening of the valve, I provide a locking device therefor, preferably engaging the valve-stem. To this end said stem is provided with a groove or recess 27, and there is mounted on the cap 16 a housing 28, in which slides a locking bolt or pin 29, adapted to engage the recess 27 when the valve is fully closed, and preferably backed by a spring 30, which tends to move it into and hold it in such engagement. This device also insures a full closing movement of the valve into a position such that it will completely close the outlet-passage, since the lock will not operate until the valve is in proper closing position.

It will be observed that since there is no seat against which the valve can be forced by the attendant damage by excessive pressing of the valve against its seat is avoided. The passage 5 is provided with a seat or shoulder 31, located beyond the normal range of movement of the valve in a closing direction, but this is not a valve-seat which has any function whatever in the normal operation of the valve. Its purpose is to prevent the valve from being blown entirely out of the casing in case of breakage of the valve-stem or its connections. In such a case the outward movement of the valve will be arrested by said shoulder 31, thus preventing the valve from moving entirely out of the casing, said shoulder holding the valve in a closing position and preventing the escape of the contents of the boiler.

I do not wish to be understood as limiting myself to the precise details of construction

hereinbefore described and shown in the accompanying drawings, as it is obvious that modifications may be made therein without departing from the principle of my invention.

5 In the claims hereto appended I have used the term "piston-valve" to define a valve closing the passage which it controls solely by peripheral contact with the wall of said passage, the passage being without a transverse seat for the valve and the contact-surface of the valve moving parallel with the cooperating contact-surface of the passage.

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

1. A blow-off valve for steam-boilers, comprising a casing having an inlet-passage and a seatless outlet-passage, and a piston-valve fitting the outlet-passage, adapted to close 20 the same by peripheral contacts with its wall, and movable into and out of said outlet-passage at its inner end, the said inner end of the outlet-passage being flaring, whereby erosion of the edges of the valve and passage 25 when the valve clears the passage is avoided, substantially as described.

2. A blow-off valve for steam-boilers, comprising a casing having an inlet-passage and a seatless outlet-passage, and a piston-valve

fitting the outlet-passage, adapted to close 30 the same by peripheral contact with its wall, and movable into and out of said outlet-passage at its inner end, said inner end of the outlet-passage being flaring, whereby erosion of the edges of the valve and passage when 35 the valve clears the passage is avoided, and said piston-valve being provided with an expansive annular packing, substantially as described.

3. A blow-off valve for steam-boilers, comprising a casing having an inlet-passage and a seatless passage extending through said casing transversely to the inlet-passage, a bushing removably fitting the upper portion of said transverse passage and provided with 40 a cap to close said passage at its upper end, and a valve working in said transverse passage and comprising a piston-valve proper which closes the same by peripheral contact only, and a balancing-piston fitting said bushing, 50 substantially as described.

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

HENRY F. WEINLAND.

Witnesses:

E. O. HAGAN,
IRVINE MILLER.