J. ROTHCHILD.

BLOW-OFF VALVE.

APPLICATION FILED MAY 3, 1907.

917,490. **Patented Apr. 6, 1909.**

3 SHEETS—SHEET 1.

Fig. 1.

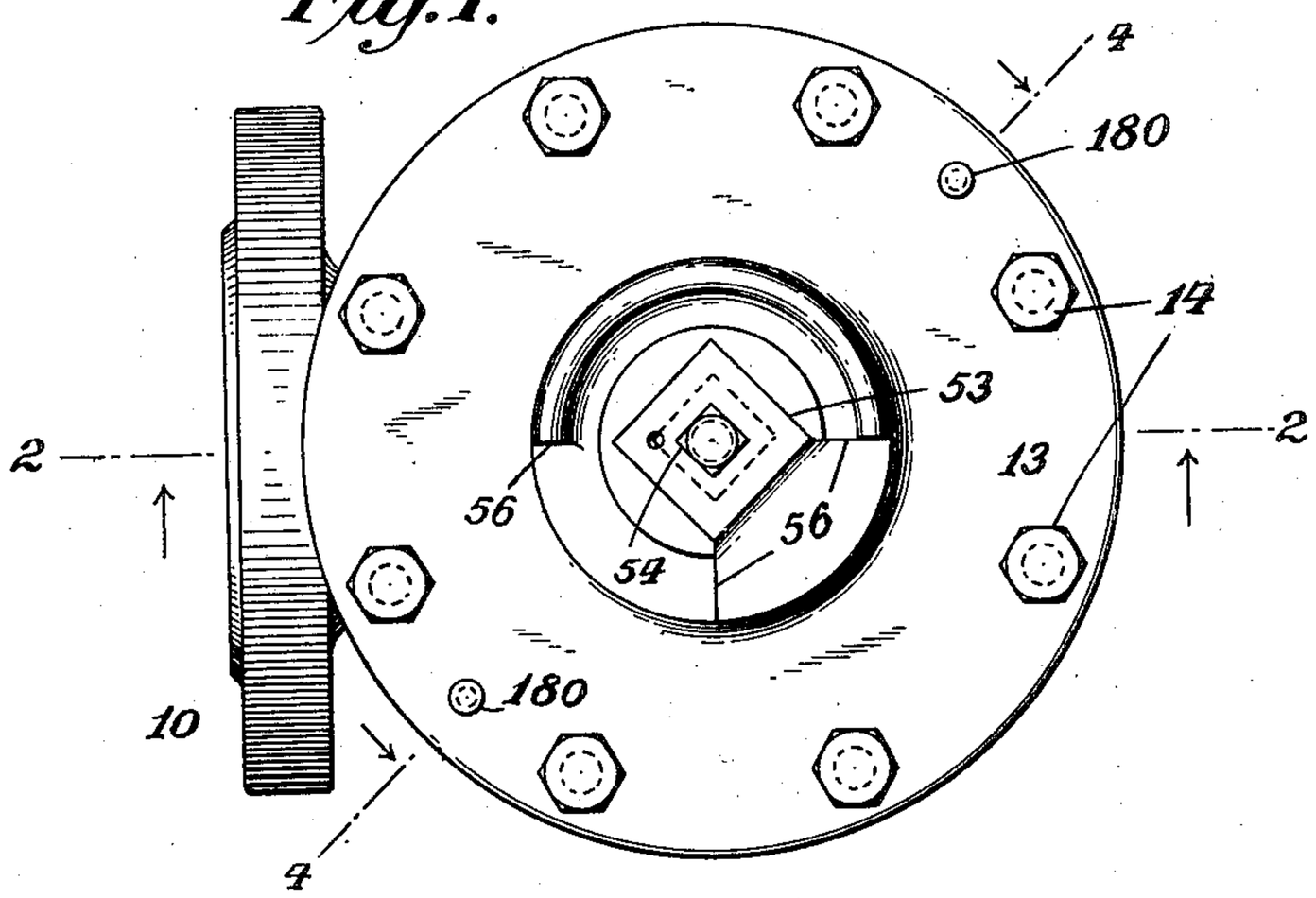
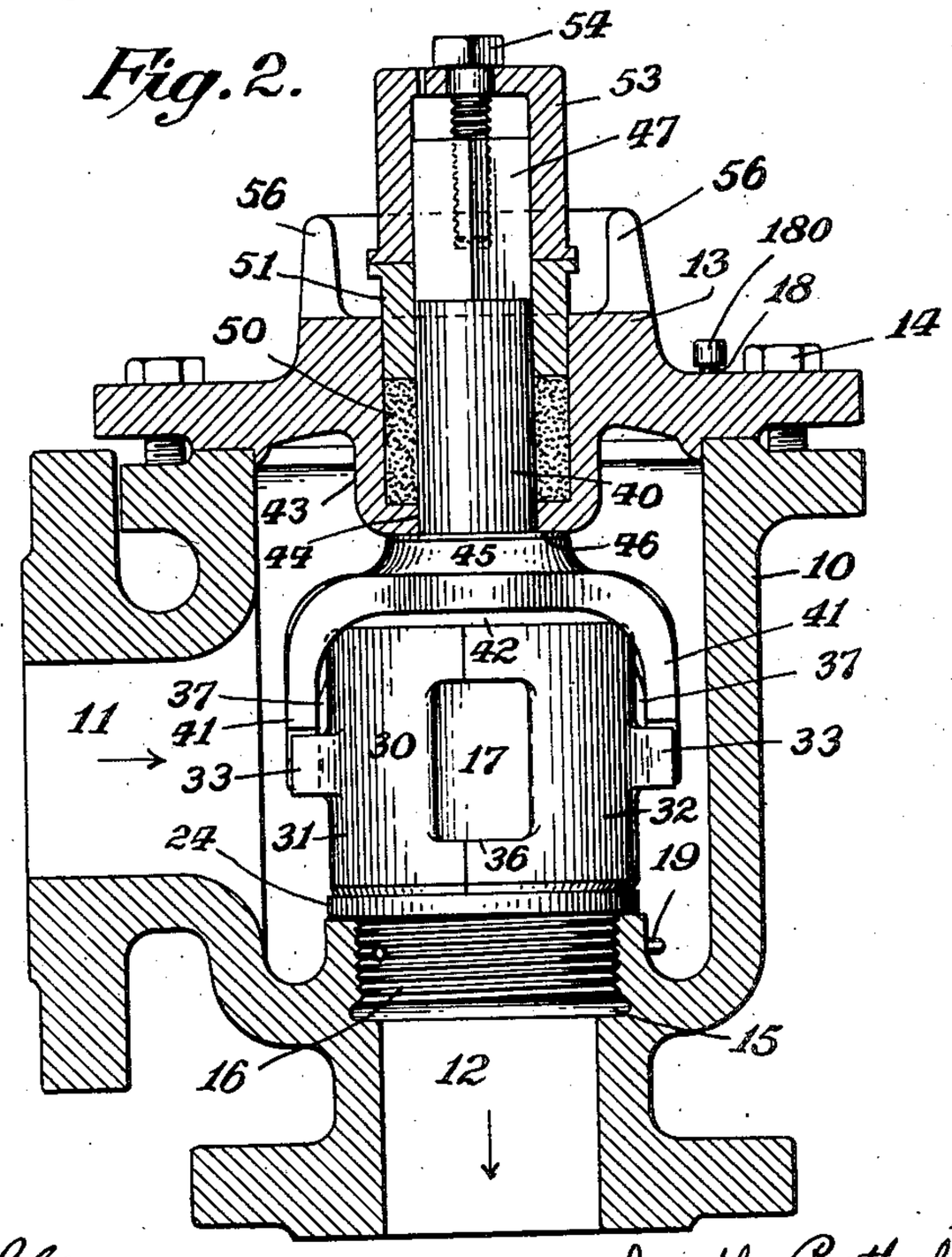


Fig. 2.



Attest:
Edgeworth Greene
Herman Meyer

Inventor:
Joseph Rothchild
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his Atty.

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3 SHEETS—SHEET 2.

Fig. 3.

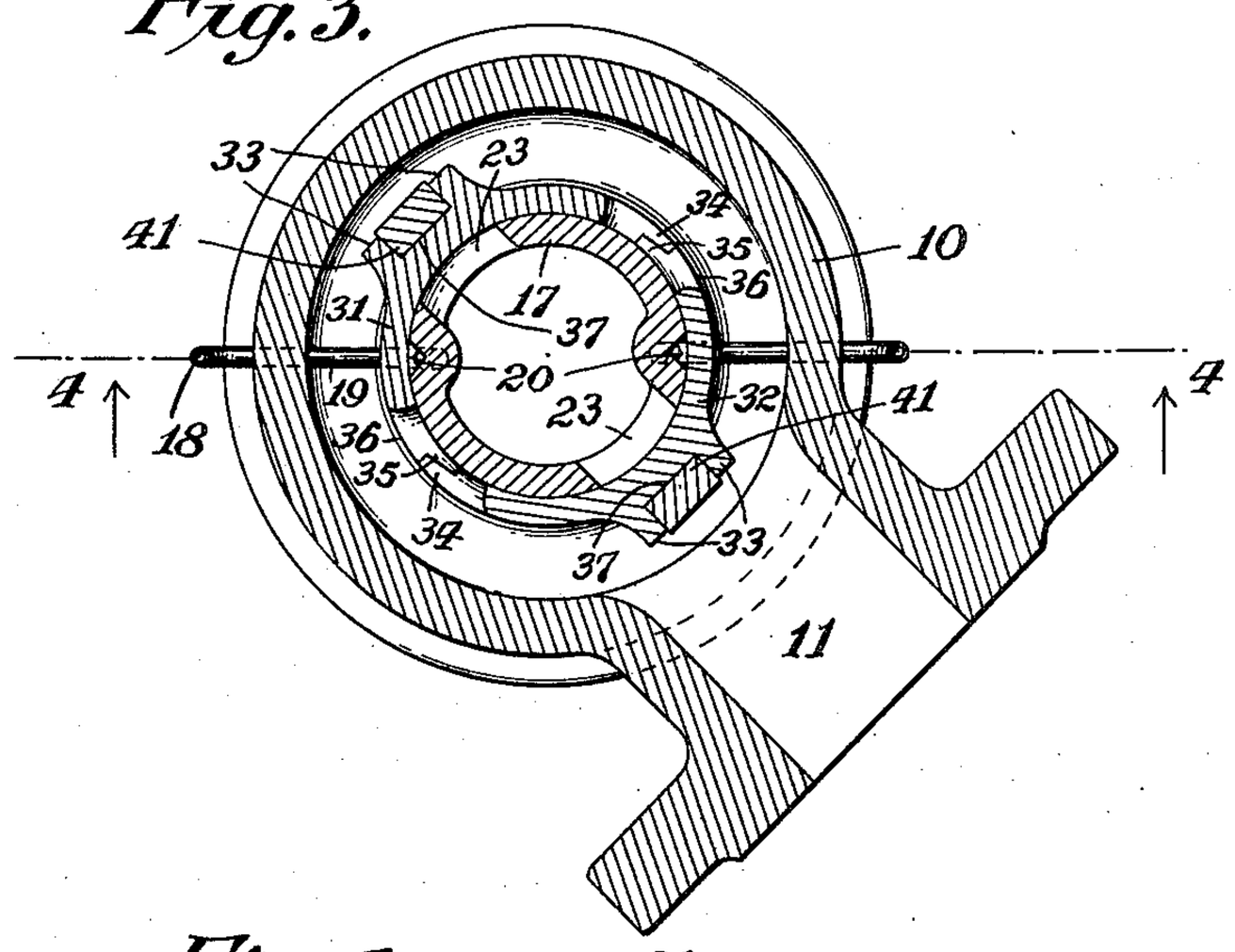

Fig. 4.

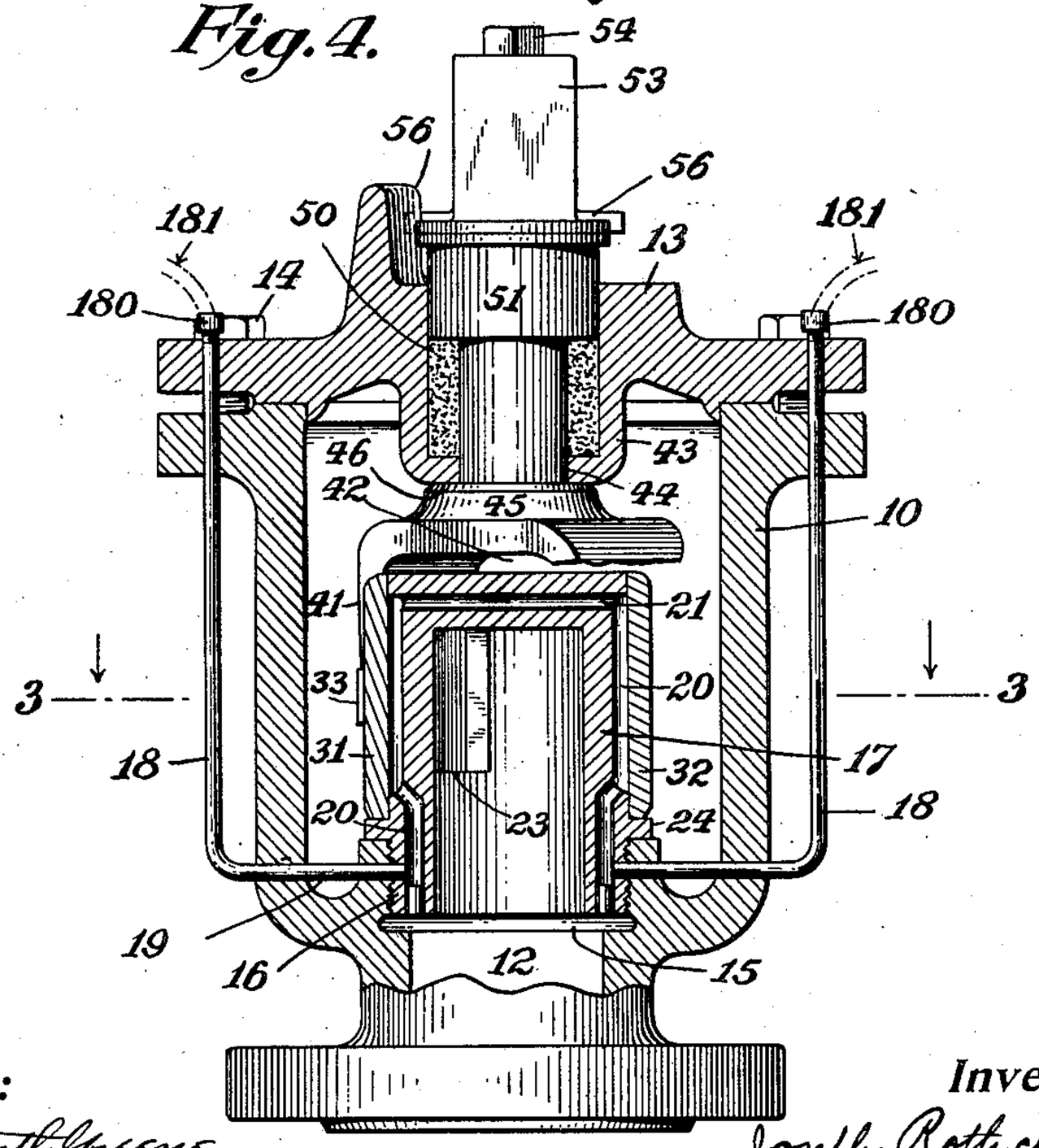

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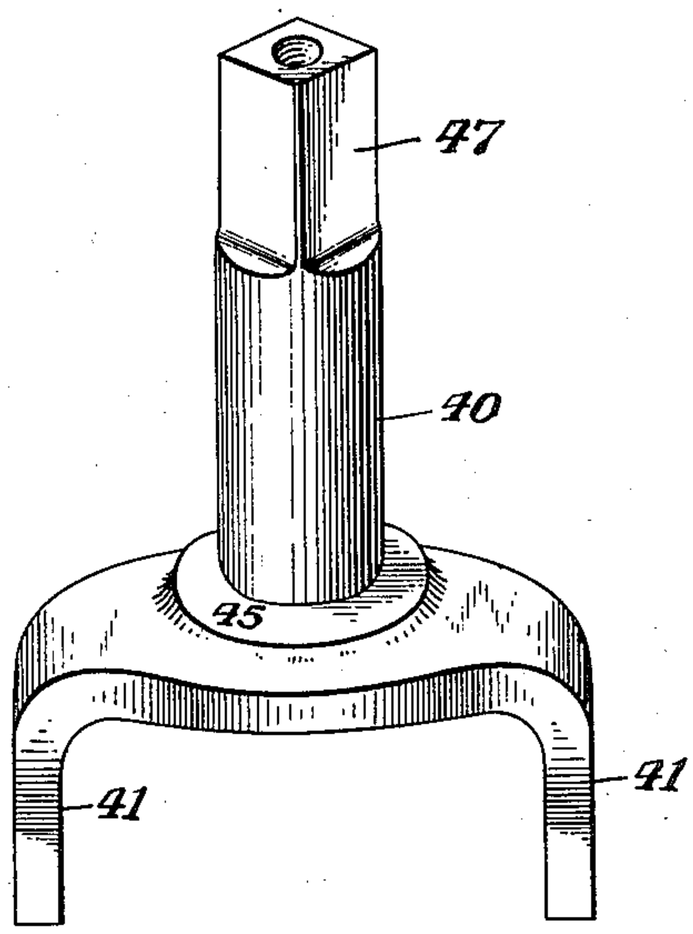
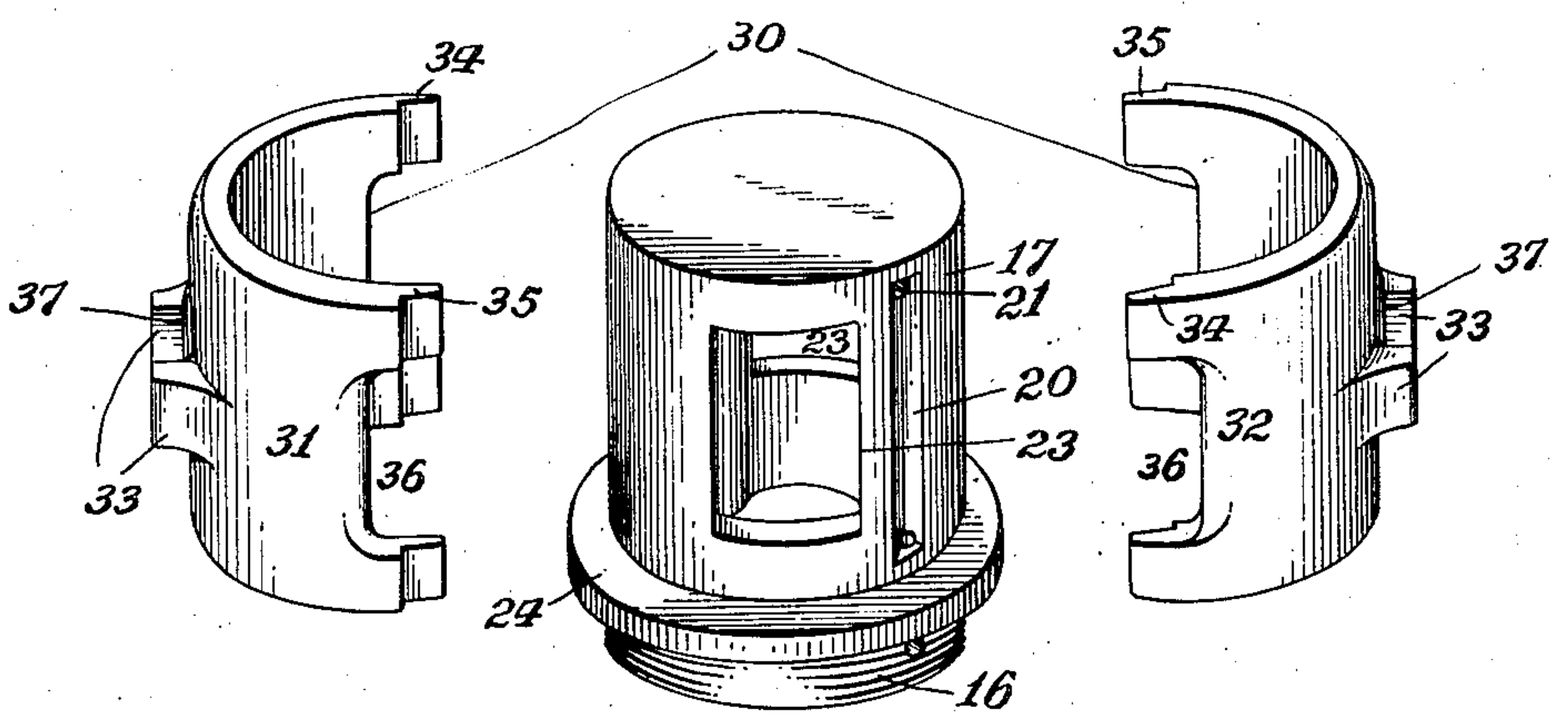
Fig. 5.





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UNITED STATES PATENT OFFICE.

JOSEPH ROTHCHILD, OF NEW YORK, N. Y., ASSIGNOR TO JOHN SIMMONS CO., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BLOW-OFF VALVE.

No. 917,490. Specification of Letters Patent. Patented April 6, 1909.

Application filed May 3, 1907. Serial No. 371,713.

To all whom it may concern:

Be it known that I, JOSEPH ROTHCHILD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Blow-Off Valves, of which the following is a specification.

My invention relates to blow off valves for steam generators and is designed to be employed in the discharge from such appliances of the solid ingredients deposited from the water used to generate steam therein, using the current of fluid under pressure within the generator for that purpose.

Owing to the rapid accumulation of solid precipitates within a steam generator, the great pressures which exist therein and the increase of temperature which necessarily occurs when the discharge of such materials takes place on account of some of the parts being brought into contact with the hot fluids, the valves employed to close the discharge ports should be as tight as possible, in order to prevent leakage, because if any leakage does occur the path along which the heated fluid moves carrying with it fine grit and precipitated material of great hardness is speedily destroyed under their erosive action. Moreover, the workmen by whom such valves must necessarily be operated are of a low grade of intelligence and it is best to leave them no opportunity for regulating the opening or closing of the valve or to do anything but move its handle or operating stem. Another difficulty met with in valves of this character is that of providing properly for their adequate lubrication. It has been found difficult to introduce lubricants to the contacting parts and still more difficult to maintain at such points a supply of proper lubricating material, because of the heat and pressure.

In the valve which forms the subject matter of this application, I believe I have solved some of the problems and overcome some of the difficulties mentioned. In brief, I have provided a valve which is not only tightly closed when shut but one which is held closed by the pressure of the fluid intended to be discharged upon the parts of the valve, one which, if partly opened, does not have its ultimate efficiency impaired by the erosive action of the materials passing therethrough, one which can be completely and thoroughly lubricated and maintained lubricated and one the adjustment of which the operator cannot control after its parts have been properly assembled.

In the drawings, Figure 1 is a plan of the assembled parts of the valve; Fig. 2 is a central vertical section of the same on the plane of the line 2—2 in Fig. 1; Fig. 3 is a transverse section on the plane of the line 3—3 in Fig. 4; Fig. 4 is a central vertical section on the plane of the line 4—4 in Figs. 1 and 3; Fig. 5 is a perspective view of the discharge cylinder, encircling slide valve and its stem.

In the drawings, 10 is a valve casing provided with a suitable inlet port 11, and a suitable discharge port 12 and with a bonnet 13 secured to the casing by any suitable means, as the screws or bolts 14. The upper end of the discharge port is expanded at 15 and internally threaded to receive the lower threaded end 16 of a discharge cylinder 17.

On each side of the casing there is provided a pipe or conduit 18 turned inwardly at its bottom 19 and connecting at its lower extremity to an upright channel or passage way 20 formed in each side of the cylinder 17. These channels or passage ways are connected at their upper extremities by a transverse channel 21. The channels 20 are recessed in the walls of the cylinder 17 and are preferably made partly or entirely open on their outer or circumferential side 22 opposite the encircling valve presently to be described in order that when the valve is moved the contacting surfaces may properly be lubricated. The pipes or channels 18 are provided with caps 180 to exclude the dust, or are extended, as shown in dotted outline at 181, by means of a hose or pipe to a source of oil supply under pressure whereby a column of fluid is passed through them and the transverse channel 21. The discharge cylinder 17 is provided with longitudinal ports 23, 23, which are placed preferably diametrically opposite to each other and it is also provided with an annular flange 24 below the level of these ports, but above the threaded end 16, and which flange is adapted to afford a support for an encircling slide valve 30. This valve is arranged around the cylinder 17 and is preferably made in two pieces 31 and 32 identical in size and shape, each provided with a pair of projecting ears 33, 33, each provided with overlapping

flanges 34, 35, at their vertical edges to form a joint and forming when assembled a cylinder with two ports, 36, 36, arranged diametrically opposite each other and adapted to register with the similar ports, 23, 23, of the cylinder 17. The slide valve rests upon the flange 24 and when its parts are assembled and in place snugly encircles the cylinder 17, to its upper edge. It will be understood that by the rotation of the slide valve 30 with respect to the discharge cylinder 17, when the ports register, the discharge is open and when they cease to register the discharge is closed.

In order to rotate the slide valve 30, there is provided a centrally arranged valve stem 40 having downwardly extending forks 41, 41, which are adapted to project between and rest upon the ears, 33, 33. A small boss 37 is formed on the outer surface of the slide valve 30 and a corresponding depression engaging therewith is formed on the inner surface of each fork, 41, 41, facilitating their relative movement. The valve stem 40, when in position, is so arranged that there is preferably a space 42 between it and the upper surfaces of the cylinder 17 and slide valve 30. The stem is adapted to pass through the bonnet 13 and the latter is provided with a hollow neck 43 restricted at 44 closely to embrace the stem 40, a shoulder 45 being turned on the upper side of the fork body and adapted to seat snugly against the lower surface 46 of the neck referred to. The stem 40 is squared at 47 to provided a turning head. Within the neck 43 is a ring 50 of any suitable soft elastic packing and arranged above this is a metallic ring 51. Placed yet above this is a cap sleeve 53 adapted to engage the turning head 47. A set screw 54 is adapted to pass through the cap 53 and into the stem 40, the purpose of the construction being to adjust the intermediate ring 51 against the packing ring 50 to vary the density and make a tight joint and to vary the location of the cap sleeve to adjust it with respect to the fixed part of the stem. This ring 50 may be lubricated in any approved manner. The method which I prefer is to drill a small channel through the cap 53 down to the intermediate ring 51, through which a liquid lubricant may be fed. Suitable stops 56, 56, are provided in the casing whereby over rotation of the valve stem is prevented and accuracy of its operation is insured.

It will be observed that when the parts have been assembled the movement of the valve in one direction is limited by the position of the fork of the stem with respect to the ears on the valve, and its movement in the other direction is limited by the position of the shoulder on the fork with respect to the seat on the casing, so that when once the valve is in position it is apt to stay there. The annular flange on the discharge cylinder serves further to control this matter. The valve does not leak, the greater the pressure against the encircling segments of the valve, the tighter the valve is closed, and the greater the pressure against the forked stem pressing it against the shoulder in the casing the more leakage is prevented at that point. At the same time the lubrication is perfect because oil can be poured into the conduits 18 and the fact that it has filled the parts designed to be lubricated is demonstrated by its discharge from the opposite conduit, showing that the conduits and transverse passage way are full. If the valve is not used in such a position that the conduits are normally vertical or the action of gravity is insufficient to cause a proper circulation of the liquid lubricant, pressure may be applied to one of the conduits to induce a circulation.

What I claim as new is:—

1. A blow off valve comprising a discharge cylinder provided with suitable ports, a slide valve provided with ports and adapted to encircle the cylinder and means for introducing a constant supply of lubricant to the contacting surfaces between the cylinder and the valve, consisting of two channels one on each side of the cylinder, each leading to the contacting surfaces and provided with a transverse connecting channel and connected to a suitable source of supply.

2. A blow off valve comprising a discharge cylinder provided with suitable ports, an encircling valve adapted to be moved with relation thereto, automatic means for feeding a constant supply of liquid lubricant to the surface between the cylinder and valve consisting of a suitable channel located within the wall of the cylinder and having openings leading to said surface and means for supplying oil to the channel whereby the movement of the valve will spread the oil over the contacting surfaces.

3. A blow off valve comprising a discharge cylinder provided with suitable ports, an encircling valve adapted to be moved with relation thereto, automatic means for feeding a constant supply of liquid lubricant to the surface between the cylinder and valve consisting of a suitable channel located within the walls of the cylinder and having openings leading to said surface and communications through the exterior of the cylinder to a source of oil supply, whereby a continuous column of lubricant is caused to remain in or flow through the channel.

4. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports, and a stem projecting through the casing, and adapted loosely to engage the slide and which stem is provided with a shoulder seating

against a portion of the casing, whereby fluid pressure within the casing will press the shoulder against the seat.

5. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports and which slide valve is made of independent parts with overlapping flanges, and a stem projecting through the casing and adapted loosely to engage the parts of the slide to rotate them in unison.

6. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports and which slide valve is made of independent parts with overlapping flanges, and a stem projecting through the casing and adapted loosely to engage the parts of the slide to rotate them in unison, and which stem is provided with a shoulder seating against a portion of the casing whereby fluid pressure within the casing will press the stem against the casing and the slide against the cylinder to prevent leakage.

7. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports and which slide valve is made of independent segments, adapted to be held in contact with the cylinder by the pressure of the passing fluid.

8. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports and which slide valve is made of independent segments provided with overlapping edges, adapted to be held in contact with the cylinder by the pressure of the passing fluid.

9. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, a slide valve encircling the cylinder and provided with ports adapted when open to register with the ports of the discharge cylinder, ears on the side of the valve and an independent forked stem adapted to engage said ears to rotate the valve without producing any longitudinal movement thereof.

10. A blow off valve comprising a casing, a discharge cylinder provided with suitable ports, an encircling slide valve adapted when rotated to close and open said ports, means on the cylinder adapted to support the valve and limit its movement in one direction, and means for rotating the valve which also limits its movement in the opposite direction.

11. A blow off valve comprising a casing within which is located a valve, a stem on said valve passing through the casing and provided with a turning head, a packing ring around the stem, a cap sleeve fitted over said turning head, and means for adjusting it with relation to the stem and at the same time controlling the density of the packing ring.

12. A blow off valve comprising a casing within which is located a valve, a stem on said valve passing through the casing and provided with a turning head, a packing ring around the stem, a cap sleeve fitted over said turning head and outwardly shaped to serve also as a turning head, and a screw passing through the end of the cap sleeve into the head of the stem and adapted to adjust it with relation to the stem.

13. A blow off valve comprising a casing within which is located a valve, a stem on said valve passing through the casing and provided with a turning head, a packing ring around the stem, a cap sleeve fitted over said turning head and outwardly shaped to serve also as a turning head, and a screw passing through the end of the cap sleeve into the head of the stem and adapted to adjust it with relation to the stem and to control the density of the packing ring.

14. A valve casing, a valve stem fitted therein, a packing ring surrounding the latter, a sleeve surrounding the stem and in contact with the packing ring, a cap sleeve fitted over the turning head of the stem and in contact with the sleeve and means for adjusting the cap sleeve with relation to the stem and thereby controlling the pressure of the sleeve against the packing ring.

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

JOSEPH ROTHCHILD.

Witnesses:

WILLIAM R. BAIRD,

ALAN MCDONNELL.