

No. 661,413.

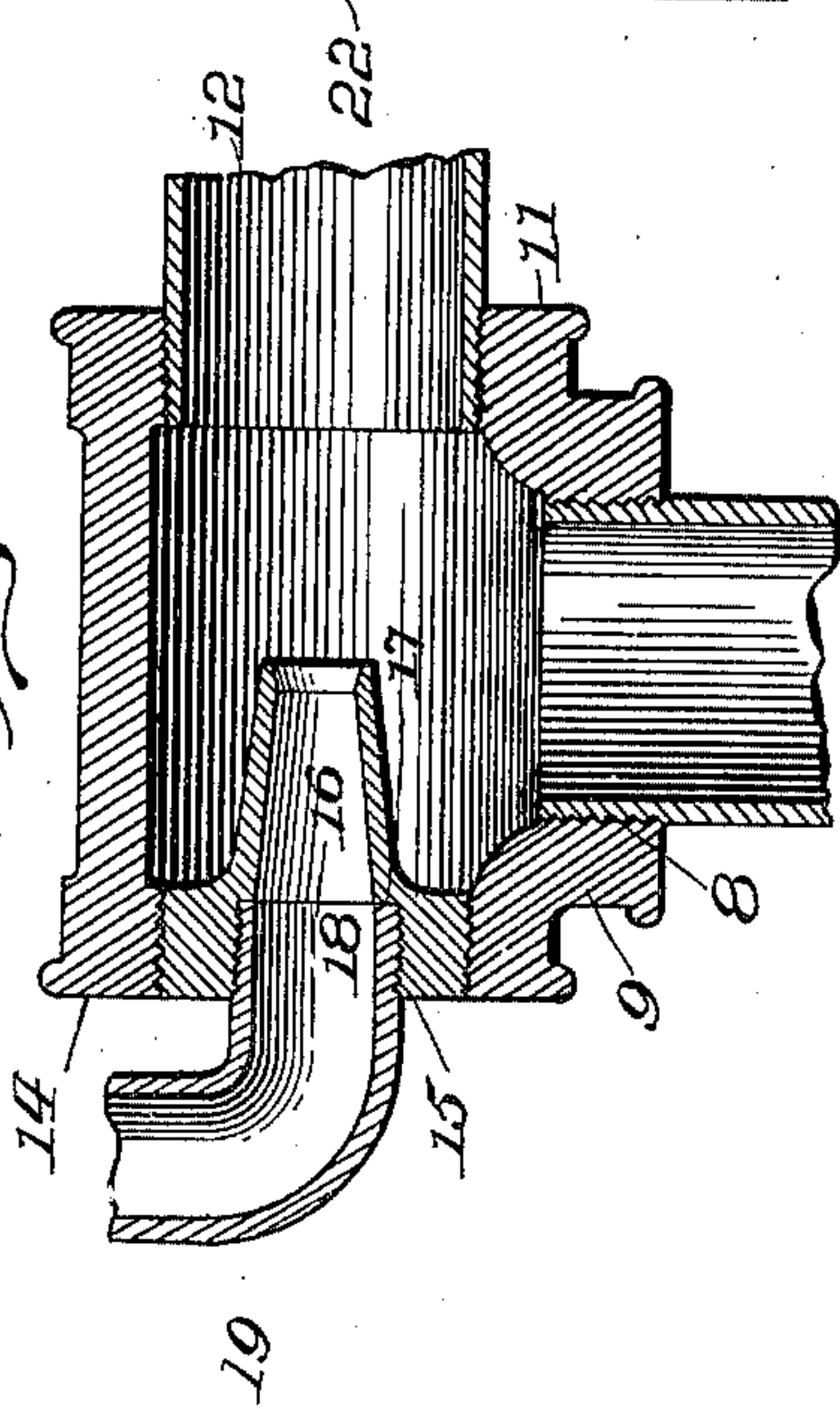
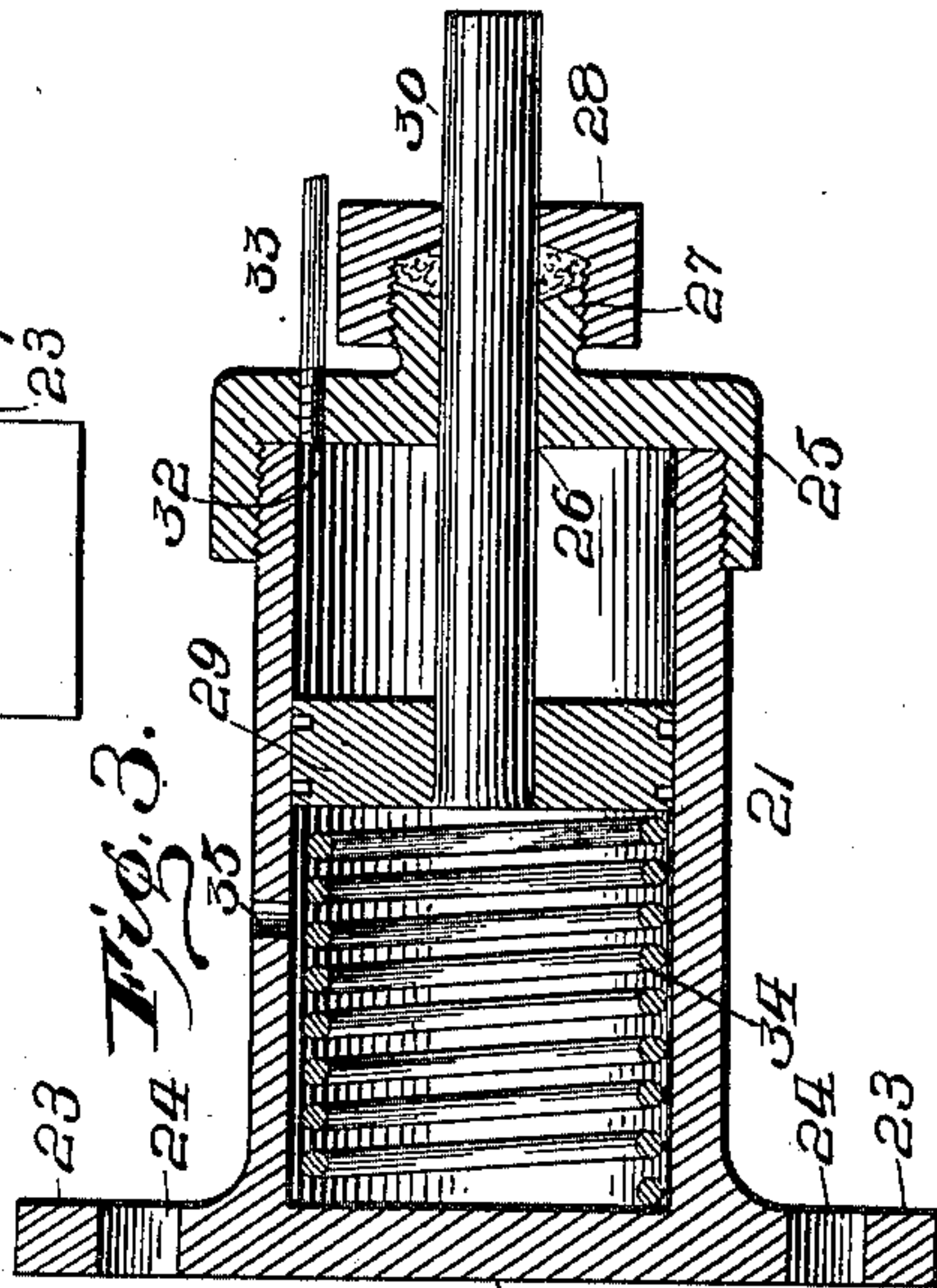
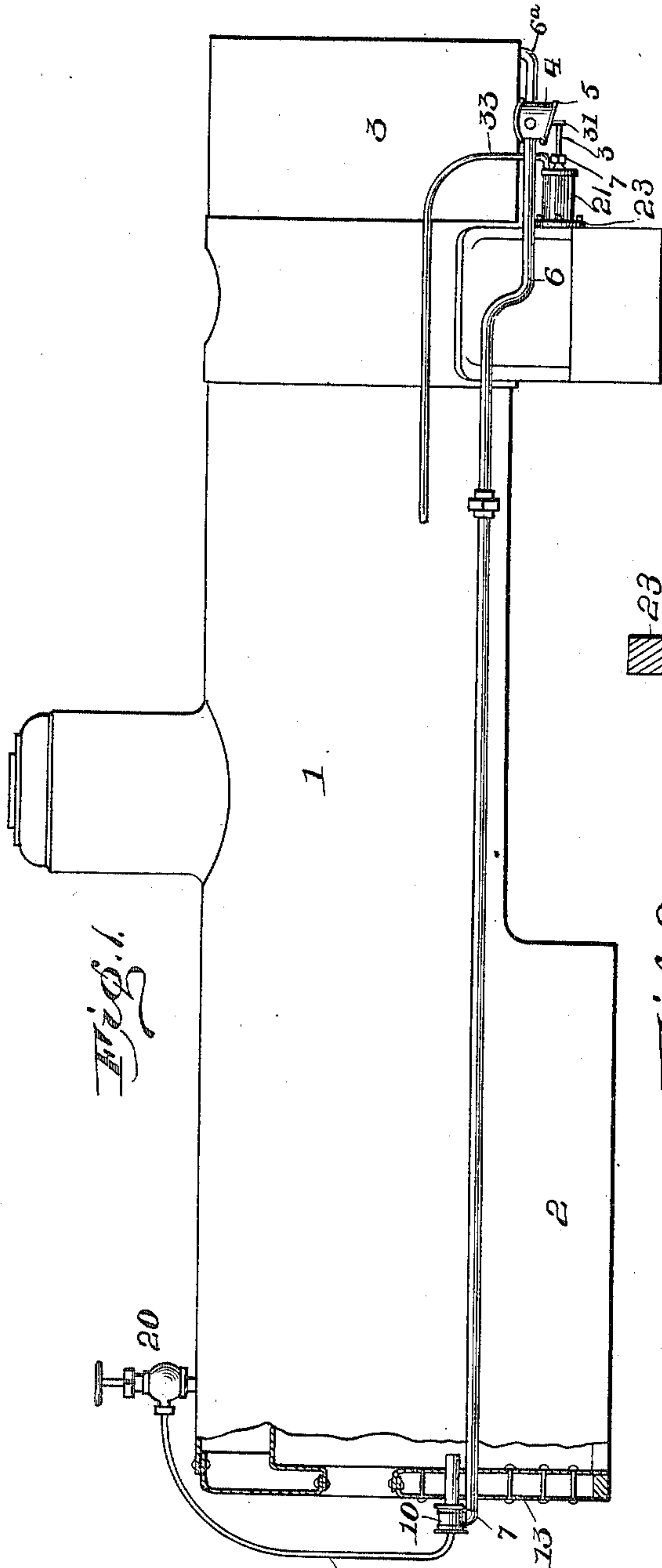
Patented Nov. 6, 1900.

T. J. MARSHALL.

SPARK ARRESTER FOR LOCOMOTIVE BOILERS.

(Application filed Jan. 13, 1900.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS J. MARSHALL, OF RICHMOND, VIRGINIA.

SPARK-ARRESTER FOR LOCOMOTIVE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 661,413, dated November 6, 1900.

Application filed January 13, 1900. Serial No. 1,399. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. MARSHALL, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Spark-Arresters for Locomotive-Boilers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to spark-arresters for locomotive-boilers; and its primary object is to provide improved means for drawing sparks and cinders from the smoke-box of a boiler rearward to the fire-box thereof, where they are consumed.

A further object of the invention is to combine with the pipe or conduit through which the sparks and cinders are drawn improved means for ejecting the sparks and cinders in case the pipe or conduit becomes clogged, said ejecting means acting as a supplemental device to the pipe or conduit and serving to discharge the sparks and cinders at any desired point along the railway.

The construction of my improvements will be fully described hereinafter and defined in the appended claims in connection with the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation, partly in section, of a locomotive-boiler with my improvements applied thereto. Fig. 2 is a vertical section, on an enlarged scale, of the coupling device employed for securing the rear end of the spark pipe or conduit and parts coöperating therewith to the rear wall of the fire-box of the boiler; and Fig. 3 is a horizontal longitudinal section, on an enlarged scale, of mechanism forming a part of the supplemental ejecting means above referred to.

The reference-numeral 1 designates the boiler, provided with the usual fire-box 2 and smoke box or arch 3. Depending from the under side of the smoke-box 3 and in open communication therewith is a hopper 4, beveled at its lower end and provided with a door 5, hinged at its upper end to the hopper to open rearwardly.

6 designates a pipe or conduit, the front

end of which communicates with and is secured to the rear wall of the hopper 4.

6^a designates a short pipe leading from the front wall or side of the hopper to the under side of the smoke-box near the front wall of the latter, said pipe 6^a being in alinement with and constituting an extension of the suction-pipe 6, whereby accumulations in the smoke-pipe may be drawn through the hopper and into and through the pipe 6 for final discharge in the fire-box. The pipe 6 extends rearward either above or below the usual side running-board to the rear end of the boiler, where it is turned up, as shown at 7, and exteriorly screw-threaded, as at 8, for attachment to the depending internally-threaded collar 9 of a T-coupling 10. The front end 11 of the coupling 10 is internally threaded to receive the externally-threaded rear end of a short flue 12, which extends through a suitable opening in the rear wall 13 of the fire-box, the inner or forward end of the flue 12 projecting into the fire-box a short distance beyond the rear wall 13 thereof.

Within the internally-threaded rear end 14 of the T-coupling is fitted the externally-threaded flange 15 of a nipple or jet-pipe 16, said flange being recessed to form an annular shoulder 17 and having its central opening internally threaded to receive the lower threaded end 18 of a steam-pipe 19. This pipe 19 extends upward and forward to communicate with a globe-valve 20 on the upper side of the boiler, through which dry steam is admitted to the pipe, and thence through the flue 12 into the fire-box.

21 designates a cylinder having its rear wall 22 provided with a flange 23, having bolt-holes 24 to facilitate the securing of the cylinder in a horizontal position to a convenient portion of the boiler. The front end of the cylinder 21 is closed by a cap 25, having a threaded connection with the cylinder, as shown in Fig. 3, and formed with a central passage 26, surrounded on the outer side of the end cap 25 with an externally-threaded collar 27, to which is secured a stuffing-box 28. A suitably-packed piston 29 is arranged with the cylinder secured to a piston-rod 30, extending through the end cap 25 and stuffing-box 28 and having a link connection 31 with the

hinged door 5 of the hopper. The end cap 25 of the cylinder is also formed with an inlet 32 for compressed air, with which communicates the front end of a pipe 33. The pipe 5 33 extends rearward to any suitable compressed-air reservoir under control of the engineer. Between the rear end wall of the cylinder 21 and the piston 29 is interposed a coil-spring 34, and the cylinder is formed with a 10 suitable exhaust-port 35.

The operation of the apparatus constructed as above described is as follows: By means of the valve 20 a jet of dry steam is admitted through the pipe 19, coupling 10, and flue 12 15 into the fire-box, thus causing a partial vacuum and a consequent suction in the pipe 6 to draw rearward through said pipe 6 and the hopper 4 any sparks or cinders contained in the smoke-box 3. In case of clogging of the 20 pipe 6 or at other times when necessary to relieve the hopper of an accumulation of sparks a blast of compressed air is directed through the pipe 33 into the cylinder 21, forcing the piston rearward against the tension of the 25 spring 34 and operating the door 5 through the medium of the piston-rod 30. The door 5 is automatically closed as soon as the piston is relieved of air-pressure by the expansive force of the spring. Thus it will be seen 30 that the pipe 6 and the means for producing a suction therethrough and the air-operated piston cooperate to keep the hopper free from accumulations, and either return the sparks and cinders to the fire-box or deposit the lat- 35 ter upon the roadway, as preferred, thus insuring the effectiveness of the apparatus at all times.

I claim—

1. The combination with a locomotive-boiler, 40 of a hopper secured to the under side of the smoke-box of the boiler, a suction-pipe communicating at its forward end with the hopper and at its rear end with the fire-box, a short pipe leading from the front wall of the 45 hopper and communicating with the smoke-

box near the front wall of the latter, a short flue extending through the wall of the fire-box, a three-way coupling to which said suction-pipe and flue are secured, a jet-pipe secured to said coupling, a steam-pipe secured at its 50 lower end to said jet-pipe, and a valved connection in the upper portion of said steam-pipe leading to the upper portion of the boiler, substantially as shown and described.

2. The combination with a locomotive-boiler, 55 of a suction-pipe connecting with the fire-box and the rear wall of the hopper, a short pipe connecting the front wall of the hopper and the front portion of the smoke-box, means for creating a rearward draft through said 60 suction-pipe, a cylinder secured to the boiler, a piston-rod within the cylinder and connected with the door of the hopper, a pipe for admitting motive fluid to the forward end of said cylinder to move the piston, and a spring for 65 returning said piston to its normal position, all substantially as described and for the purpose set forth.

3. The combination with a locomotive-boiler, 70 of a hopper secured to the smoke-box thereof, of a suction-pipe communicating at its front end with the rear side of the hopper, a short pipe leading from the front wall of the hopper and communicating with the smoke-box, a flue extending through the rear wall of the 75 fire-box, a T-coupling secured at one end to said flue, and also secured to the rear end of the suction-pipe, a nipple or jet-pipe having an externally-threaded flange for securing said pipe to the coupling, and a valved steam- 80 pipe secured at its lower end to the threaded opening of said nipple, and at its upper end with a valved connection leading to the upper portion of the boiler.

In testimony whereof I affix my signature 85 in presence of two witnesses.

THOMAS J. MARSHALL.

Witnesses:

ALEXANDER S. WRIGHT,
JOHN S. WAKEFIELD.