

2 Sheets—Sheet 1.

No. 598,249.

Patented Feb. 1, 1898.

Fig. 5.

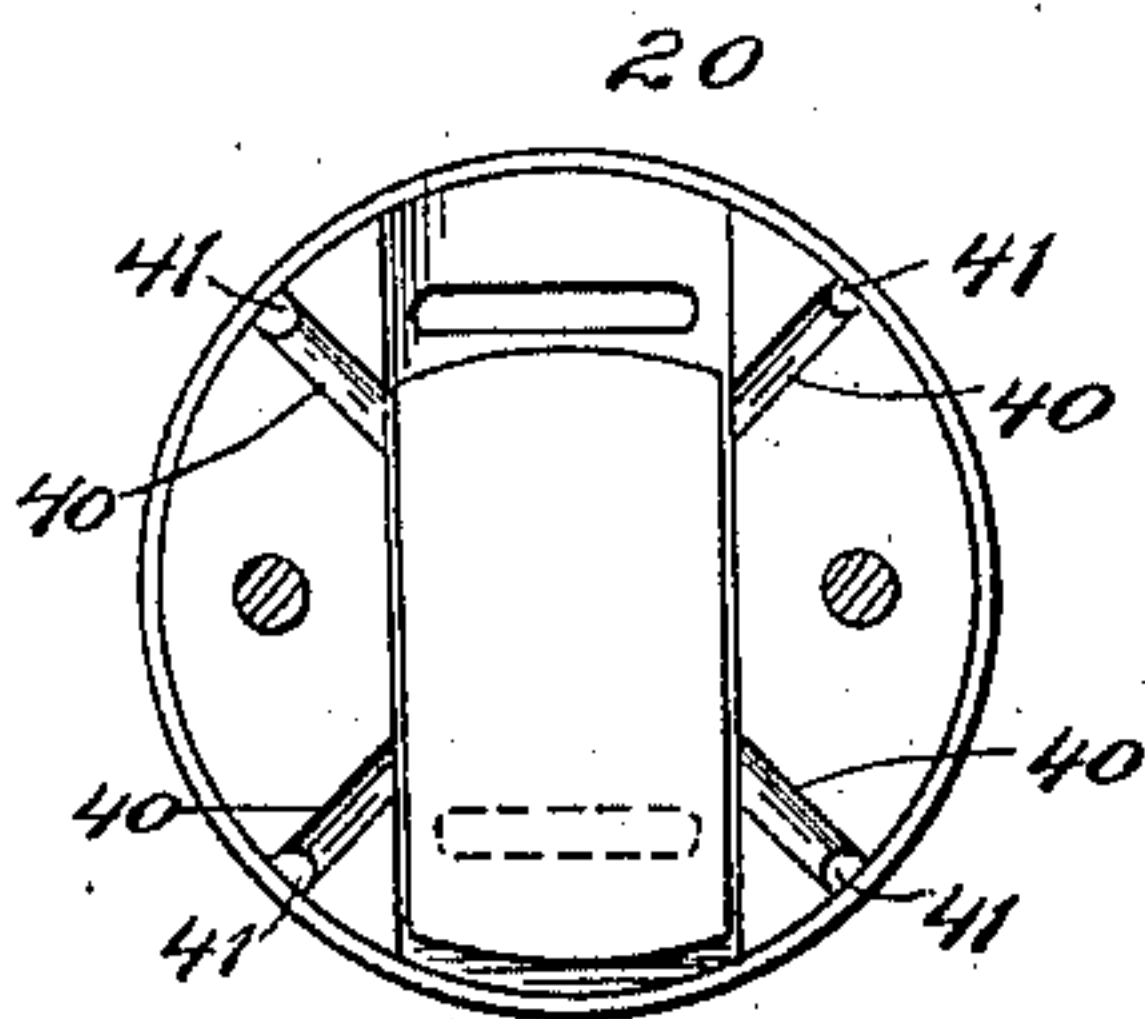


Fig. 1.

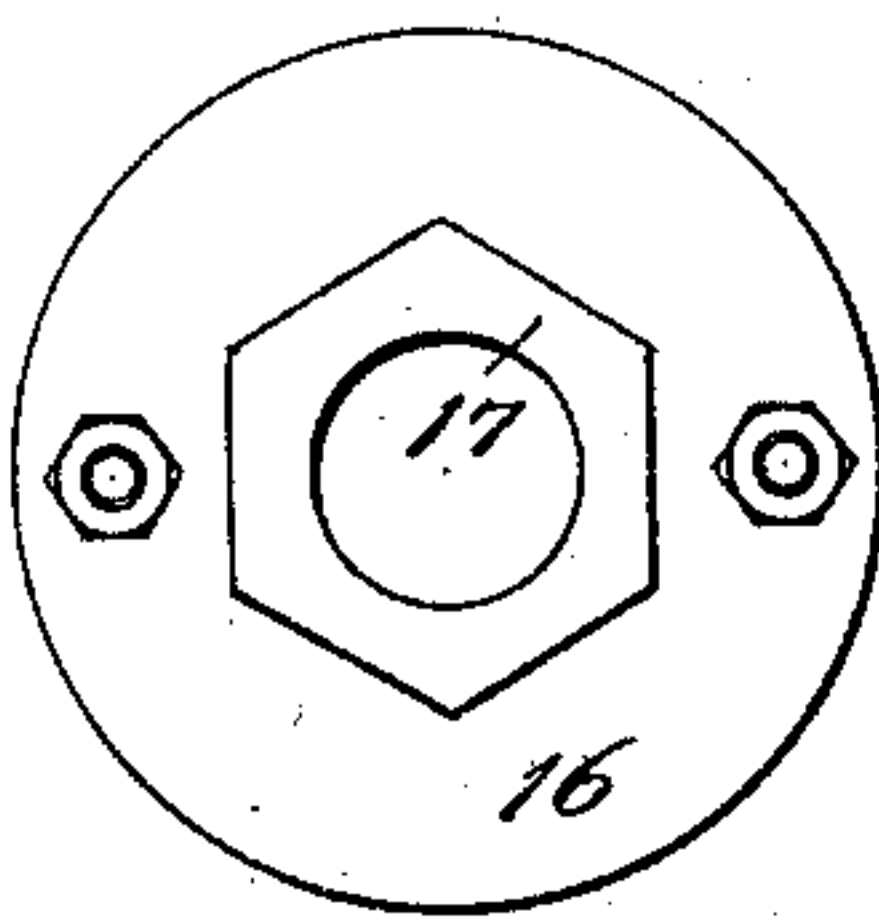


Fig. 6

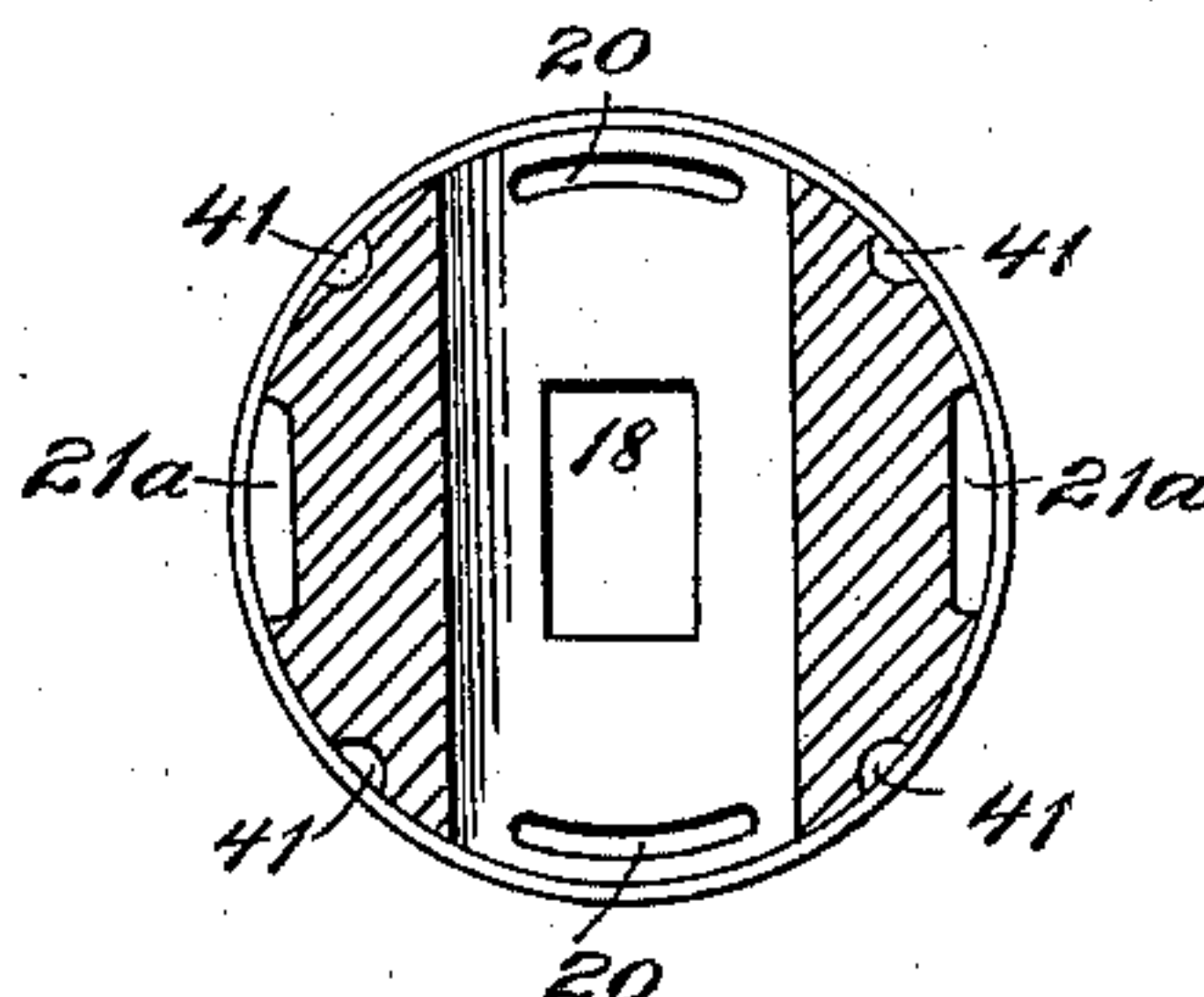


Fig. 2

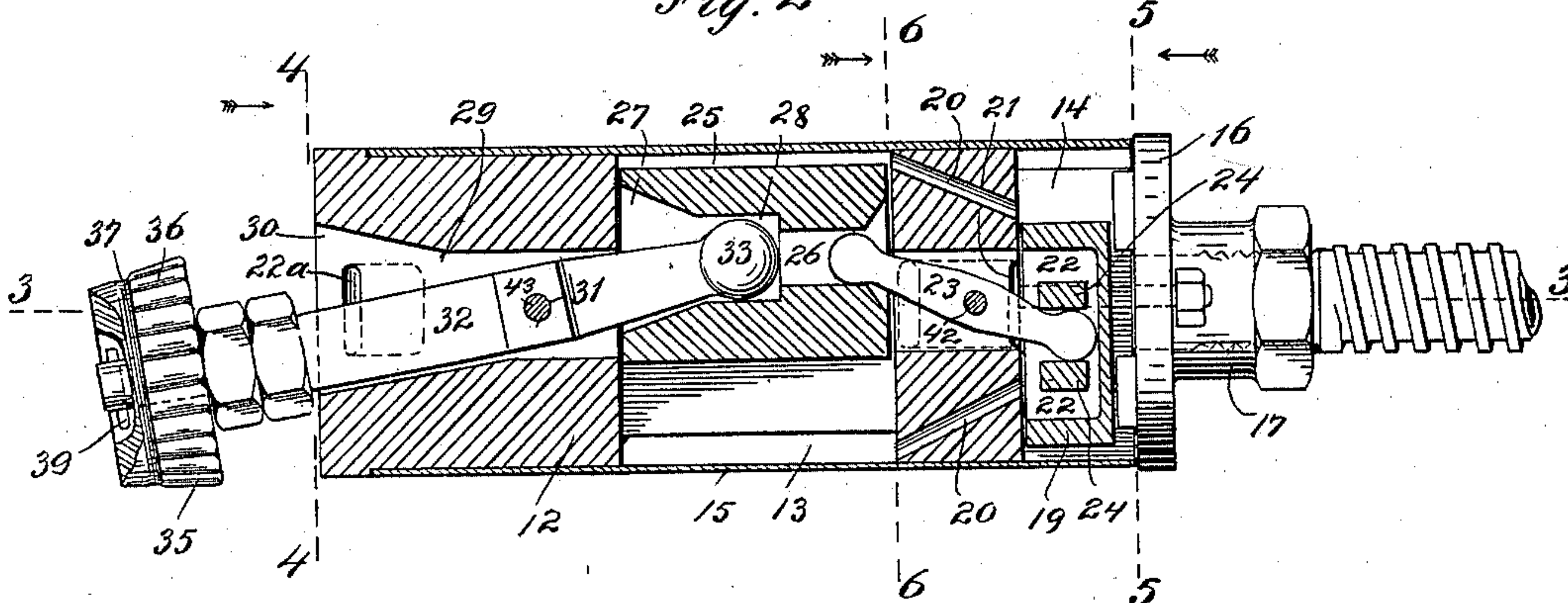


Fig. 3.

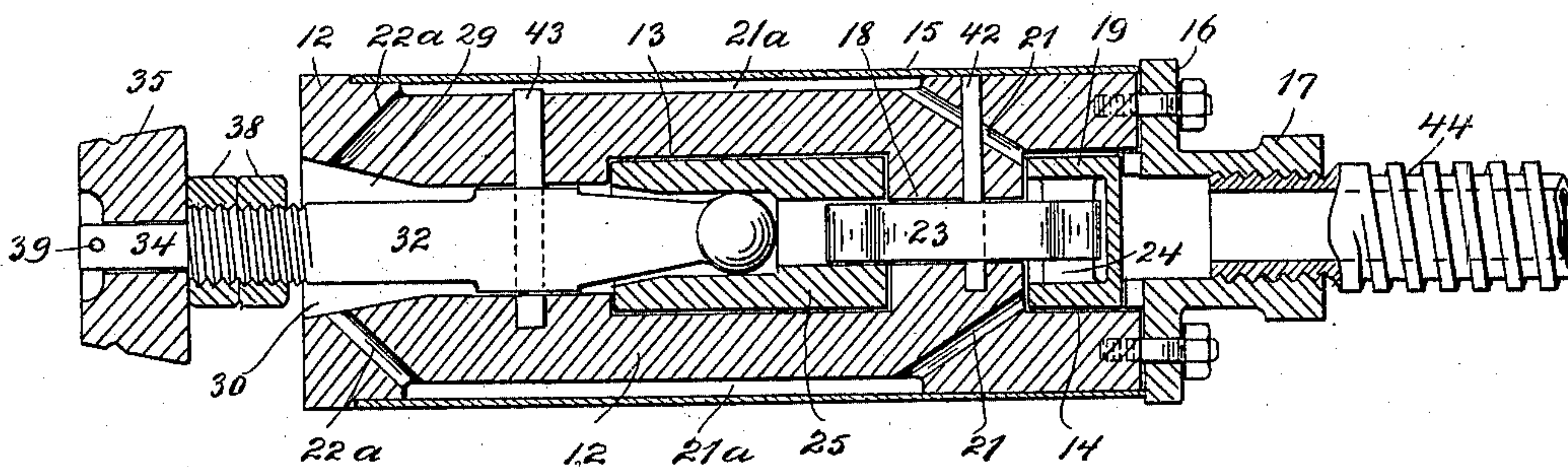
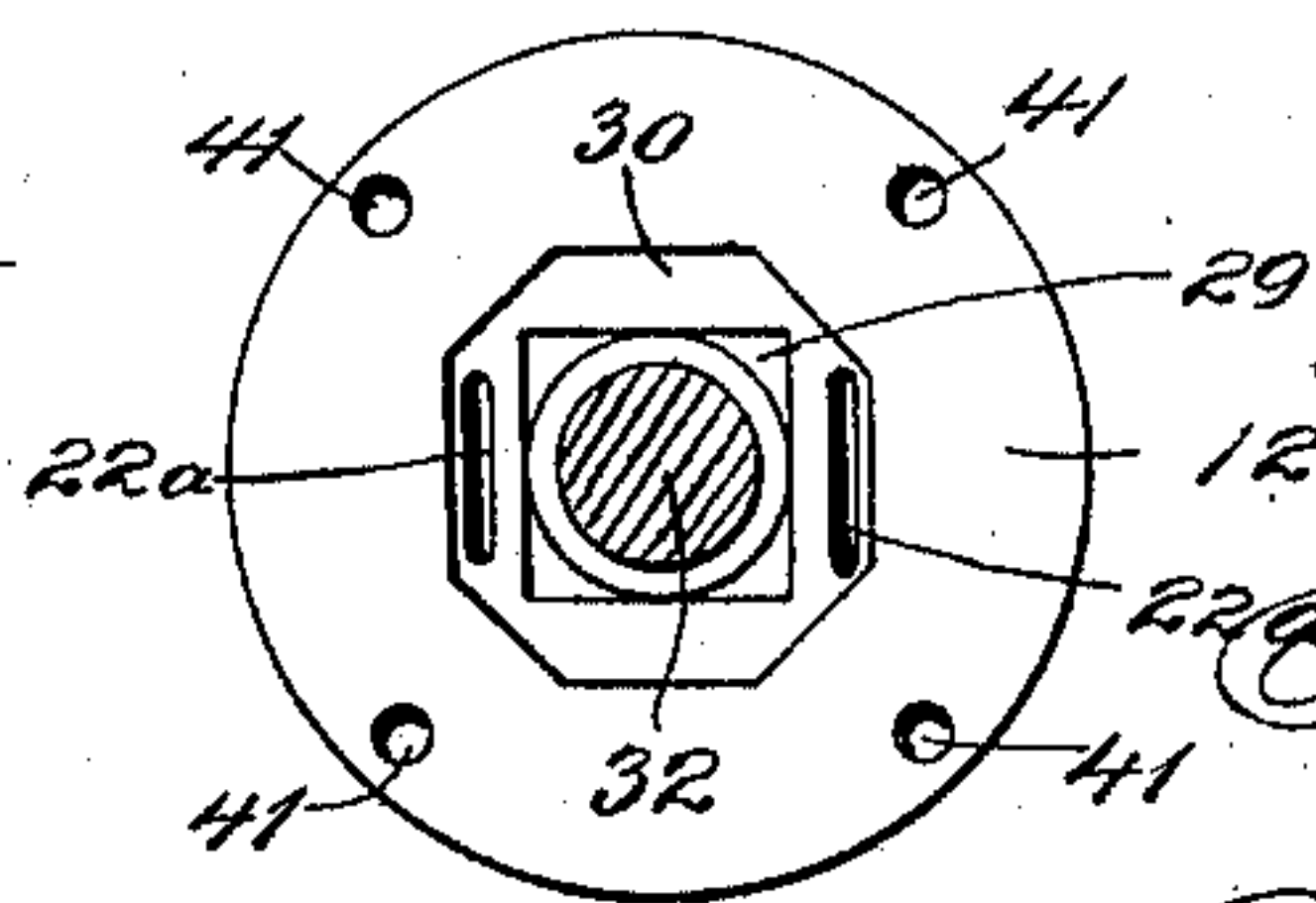


Fig. 4



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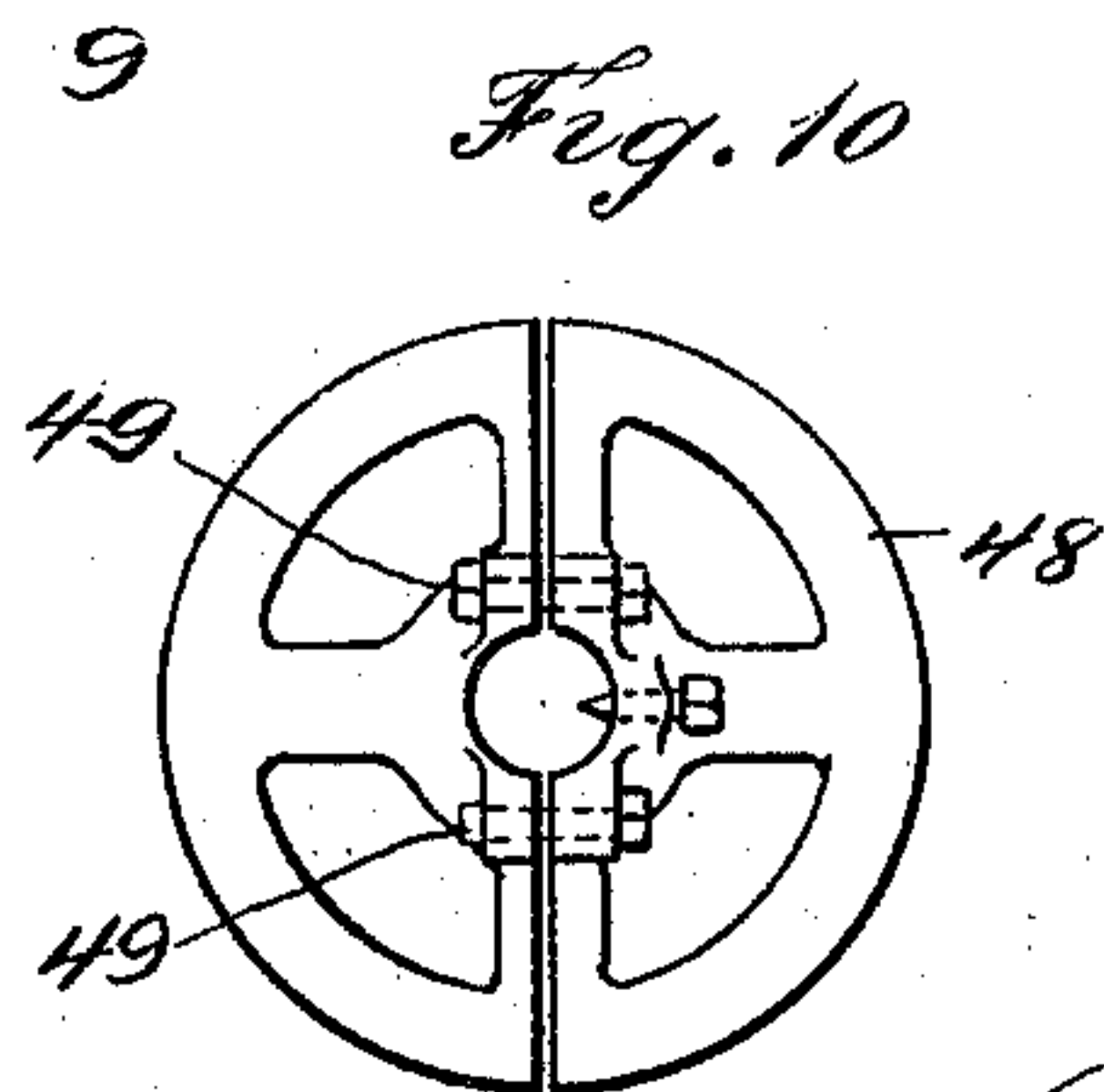
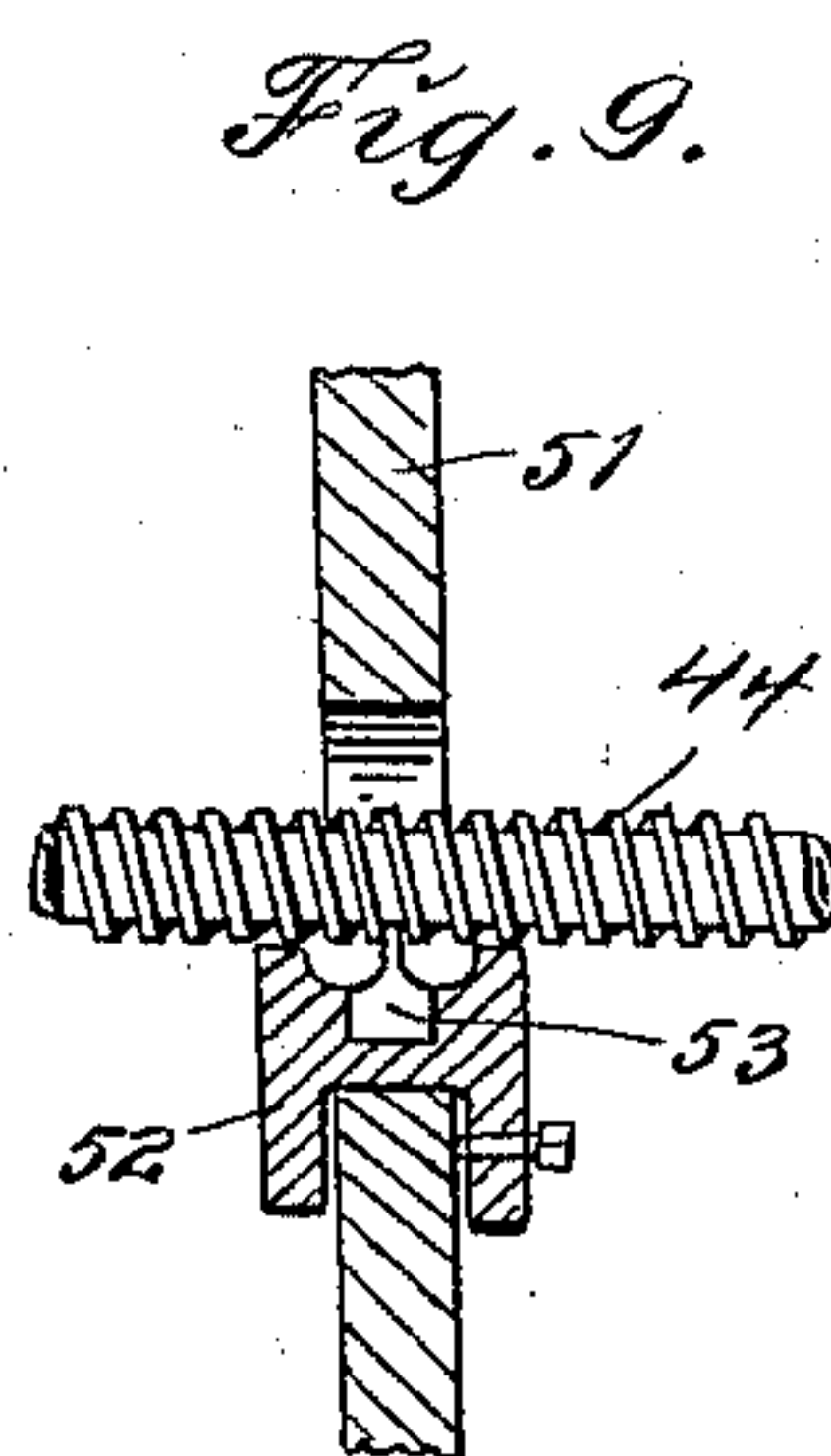
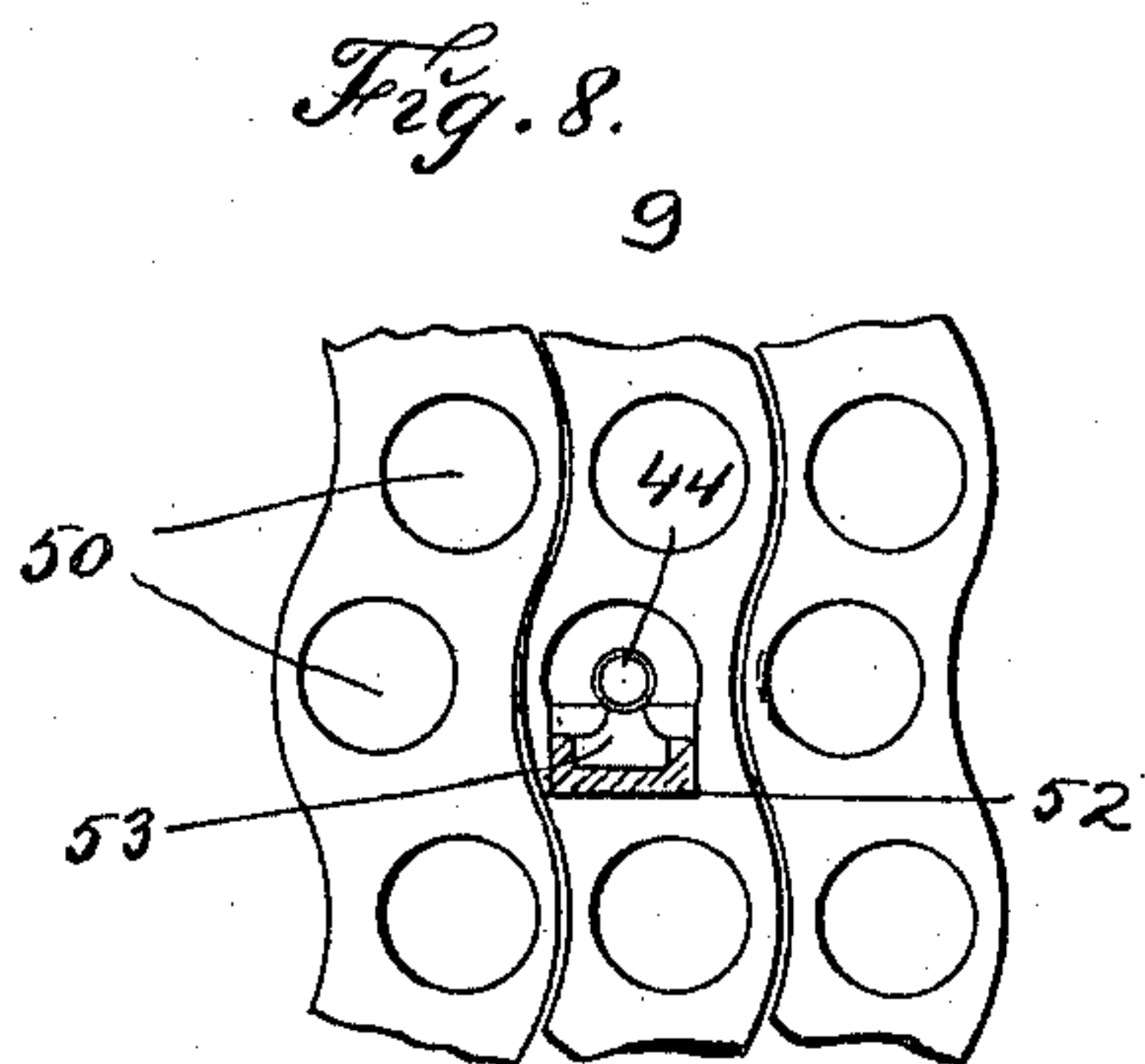
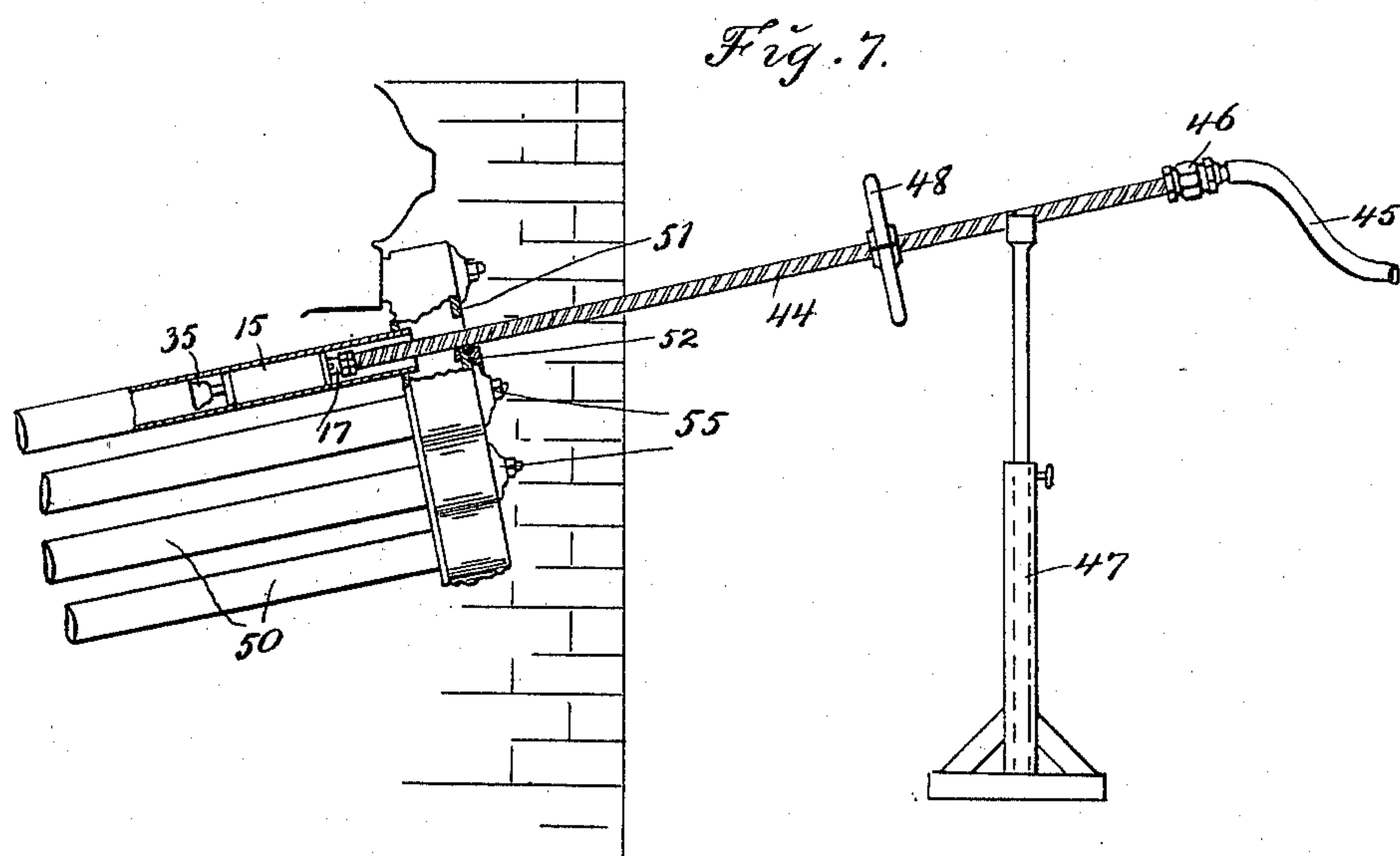
(No Model.)

2 Sheets—Sheet 2.

M. J. HOWLETT.
CLEANING DEVICE FOR TUBULAR BOILERS.

No. 598,249.

Patented Feb. 1, 1898.



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CLEANING DEVICE FOR TUBULAR BOILERS.

SPECIFICATION forming part of Letters Patent No. 598,249, dated February 1, 1898.

Application filed April 21, 1897. Serial No. 633,095. (No model.)

To all whom it may concern:

Be it known that I, MICHAEL J. HOWLETT, a citizen of the United States, residing at Bayonne, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Cleaning Devices for Tubular Boilers, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to devices for cleaning boilers, and particularly what are known as "tubular" boilers; and the object thereof is to provide an improved device of this class by means of which the scale and other sedimentary substances may be quickly and easily removed from the tubes of the boiler.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of my improvement are designated by the same numerals of reference in each of the views, and in which—

Figure 1 is an end view of the device which I employ; Fig. 2, a longitudinal section thereof; Fig. 3, a section similar to Fig. 2 at right angles thereto; Fig. 4, a section on the line 4 4 of Fig. 2; Fig. 5, a section on the line 5 5 of Fig. 2; Fig. 6, a section on the line 6 6 of Fig. 2; Fig. 7, a side view of the end of a portion of a boiler, showing the operation of my improvement, part of the construction being shown in section; Fig. 8, an end view of a number of said boiler-tubes, showing a device which I employ in the operation of my improvement, said device being connected with the end of one of the tubes of the boiler and being also shown in section; Fig. 9, a partial section on the line 9 9 of Fig. 8, and Fig. 10 a plan view of a wheel which forms a part of my improvement.

In the practice of my invention I provide a device for the purpose herein specified, which consists of a cylindrical block 12, which is provided centrally with a transverse rectangular opening 13 and at one end thereof with a central transverse steam-chamber 14, and secured around the cylindrical block 12 is a casing 15, and secured to that end of the block 12 in which the transverse steam-chamber 14 is formed is a cap-plate 16, which is provided centrally with an outwardly-directed

tubular extension 17, which communicates with the steam-chamber 14.

Formed centrally in the block 12, between the steam-chamber 14 and the central transverse chamber 13, is a passage 18, and mounted in the steam-chamber 14 is a steam-valve 19, and communicating with the steam-chamber 14 and the opposite sides of the central transverse chamber 13 are inclined steam ports or passages 20, and formed at right angles to the inclined steam ports or passages 20 are exhaust ports or passages 21, which communicate with longitudinal supplemental exhaust ports or passages 21^a in the opposite sides of the block 12.

The steam-valve 19 is provided with a transverse opening 22, with which the exhaust ports or passages 21 communicate, and pivoted in the central passage 18, between the steam-chamber 14 and the central transverse chamber 13, is a lever 23, one end of which projects into the steam-valve 19 and operates between suitable bearings 24, formed or secured therein, and the other end of said lever projects into the transverse opening 13, and mounted in said transverse opening 13 is a transversely-movable piston 25, into which the inner end of the lever 23 projects, said piston being provided with a central vertical passage 26, and the end of the piston 25, opposite the head of the block 12, with which the cap-plate 16 is connected, is provided with an enlarged opening 27 and centrally thereof with a circular extension 28, and the outer end of said block 12 is provided centrally with a passage or opening 29, which opens outwardly and the outer end of which is enlarged, as shown at 30, and pivoted in said opening or passage at 31 is a lever 32, the inner end of which is provided with a cap or head 33, which operates in the cylindrical opening 28 in the piston 25, and the outer end of the lever 32 projects beyond the end of the block 12 and is provided with a reduced extension 34, on which is mounted a circular head 35, which is larger at the inner end than at the outer end, and the larger portion of which is corrugated longitudinally, as shown at 36, and said head is also preferably provided with an annular groove 37, and said head is held in position on the outer end of the lever 32 by nuts or burs 38, mounted on said lever

between said head and the end of the block 12 and by a key-pin 39, passed through the end of the extension 34, or said head may be held on said lever in any desired manner.

5 The supplemental exhaust ports or passages 21 communicate at their outer ends with inwardly-directed auxiliary ports or passages 22^a, which communicate with the enlarged outer portion of the opening 29 in the outer
10 end of the block 12, and the inner end of the block 12 is provided with radial grooves 40, which communicate with longitudinal ports or passages 41, formed in the block 12 or in the sides thereof, and these ports or passages
15 extend inwardly through or along said block 12 and open at the outer end thereof, as shown in Fig. 4.

The lever 23 is mounted on a pin or bolt 42, and the lever 32 is mounted on a pin or bolt
20 43, and I also provide a tube 44, which is in practice connected with the screw-threaded extension 17 of the cap 16, as shown in Figs. 2 and 3, and said tube 44 is provided on the outer surface thereof with a screw-thread of
25 great pitch, and I also provide a flexible steam-supply tube 45, which is connected with the outer end of the tube 44 by a universal joint at 46, this construction being best shown in Fig. 7, and in practice I provide an adjust-
30 able stand or other support 47 by which the outer end of said tube may be supported, and I also provide a hand-wheel 48, which is adapted to be connected with the tube 44, and said hand-wheel 48 is composed of two
35 parts, as shown in Fig. 10, which are adapted to be bolted together, as shown at 49, the object of forming this wheel in two parts being to provide means whereby it may be connected with the tube 44, whenever desired,
40 and without disconnecting said tube from the flexible steam-supply pipe 45 and the cleaner which is connected with one end thereof.

In Fig. 7 I have shown at 50 a number of tubes of a tubular boiler, and in Fig. 8 I have
45 shown the ends of these tubes, and in Fig. 9 I have shown at 51 a section of one of the end plates of a boiler with which said boiler-tubes are connected, and I also provide an attachment 52, which is adapted to be connected
50 with the lower side of the openings in said plate and which is provided with an upwardly-directed projection 53, which operates in connection with the thread formed on the tube 55, and in Fig. 7 I have shown the
55 method of operating my improved cleaner in connection with the tubes of the boiler.

The cleaner proper or the casing thereof is indicated in Fig. 7 by the reference-numeral 15, and the operation will be readily understood from the foregoing description when
60 taken in connection with the accompanying drawings, and the following statement thereof.

In practice the support 47 is placed adjacent to the end of the boiler or the tubes
65 thereof and the attachment 52 is connected with the end plate 51 of the boiler-head, and in this operation the cap-plates 55 are re-

moved and the cleaner is then passed through the head of the boiler and into one of the tubes. The steam is then turned on through
70 the pipe 45 and the tube 44 is revolved by the hand-wheel 48. The steam passes alternately through the ports or passages 20 into the steam-chamber 13 and rapidly moves the
75 piston 25 from one side of said chamber to the other, and the lever 23 operates the steam-valve 19 and causes said valve to move from one side of the steam or valve chamber to the other, and this operation of the piston 25
80 also operates the lever 32, and by means of the lever 32 the head 35, which is secured to the outer end thereof, is caused to rapidly strike the inner walls of the boiler-tube 50, in which the cleaner is inserted. It will be
85 understood that in this operation the tube 44 is continually revolved by the hand-wheel 48 and the cleaner passes longitudinally through the tubes of the boiler in which it is placed. The steam in operating the piston and the
90 steam-valve 19 passes alternately through the ports or passages 20 into the central transverse chamber 13 on the opposite sides of the piston 25, and the exhaust-steam passes back alternately through the ports or passages 20
95 into the transverse passages 22 in the steam-valve, and thence through the exhaust ports or passages 21 into the supplemental side ports or passages 21^a and through the ports or passages 22^a out through the end of the
100 block 12 into the boiler-tube, and this exhaust-steam blows the particles of scale or other substances broken loose from the boiler-tube through said tube, and the steam also passes through the radial grooves 40 in the
105 inner end of the block 12 and through the longitudinal ports or passages 41 into the boiler-tube, and this steam also assists in blowing out and cleaning the boiler-tube.

It will be understood that the lever 32 is rapidly operated and the device is continually
110 revolved, and as it passes through the boiler-tube the inner side walls thereof are continually hammered by the head 35 of said lever and all the scale and other particles are broken loose therefrom and said scale or particles
115 are blown out by the steam, as above described.

This device is simple in construction and operation and is well adapted to accomplish the
120 result for which it is intended, and it will be apparent that changes in and modifications of the construction herein described may be made without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, I
125 claim as new and desire to secure by Letters Patent—

1. In a cleaning device for tubular boilers, a cylindrical head, a piston adapted to move transversely of said head, a knocker connected
130 with said piston, said knocker consisting of a circular head which is larger at the inner end than at the outer, and the larger portion being corrugated longitudinally, passages con-

necting the steam-supply pipe with the chamber 13, exhaust ports or passages whereby the steam is exhausted through the tubes of the boiler and passages through said head whereby the steam is permitted to pass through said head and into the tube of the boiler, substantially as and for the purpose set forth.

2. In a cleaning device for tubular boilers, a cylindrical head, a piston adapted to move transversely of said head, a knocker connected with said piston, said knocker consisting of a circular head which is larger at the inner end than at the outer, and the larger portion being corrugated longitudinally, passages connecting the steam-supply pipe with the chamber 13, exhaust ports or passages whereby the steam is exhausted through the tubes of the boiler and passages through said head whereby the steam is permitted to pass through said head into the tube of the boiler, and means for revolving said head and for moving the same longitudinally, substantially as and for the purpose set forth.

3. In a cleaning device for tubular boilers, a cylindrical head, a piston adapted to move transversely of said head, a knocker connected with said piston, said knocker consisting of a

circular head which is larger at the inner end than at the outer, and the larger portion being corrugated longitudinally, passages connecting the steam-supply pipe with the chamber 13, exhaust ports or passages whereby the steam is exhausted through the tubes of the boiler and passages through said head whereby the steam is permitted to pass through said head into the tube of the boiler, and means for revolving said head and for moving the same longitudinally, consisting of a rigid steam-pipe connected therewith, a flexible steam-pipe connected with said rigid pipe, a screw-thread upon said rigid pipe, and a wheel mounted upon said rigid pipe; and an attachment secured to the end plate of said boiler and adapted to engage the screw-thread on said rigid pipe, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 19th day of April, 1897.

MICHAEL J. HOWLETT.

Witnesses:

C. GERST,

L. R. MAHONY.