No. 638,518. Patented Dec. 5, 1899.

A. K. MANSFIELD.

OILING AND INDICATOR OPERATING MECHANISM.

(Application filed Nov. 4, 1898.)

(No Model.) 2 Sheets—Sheet 1.

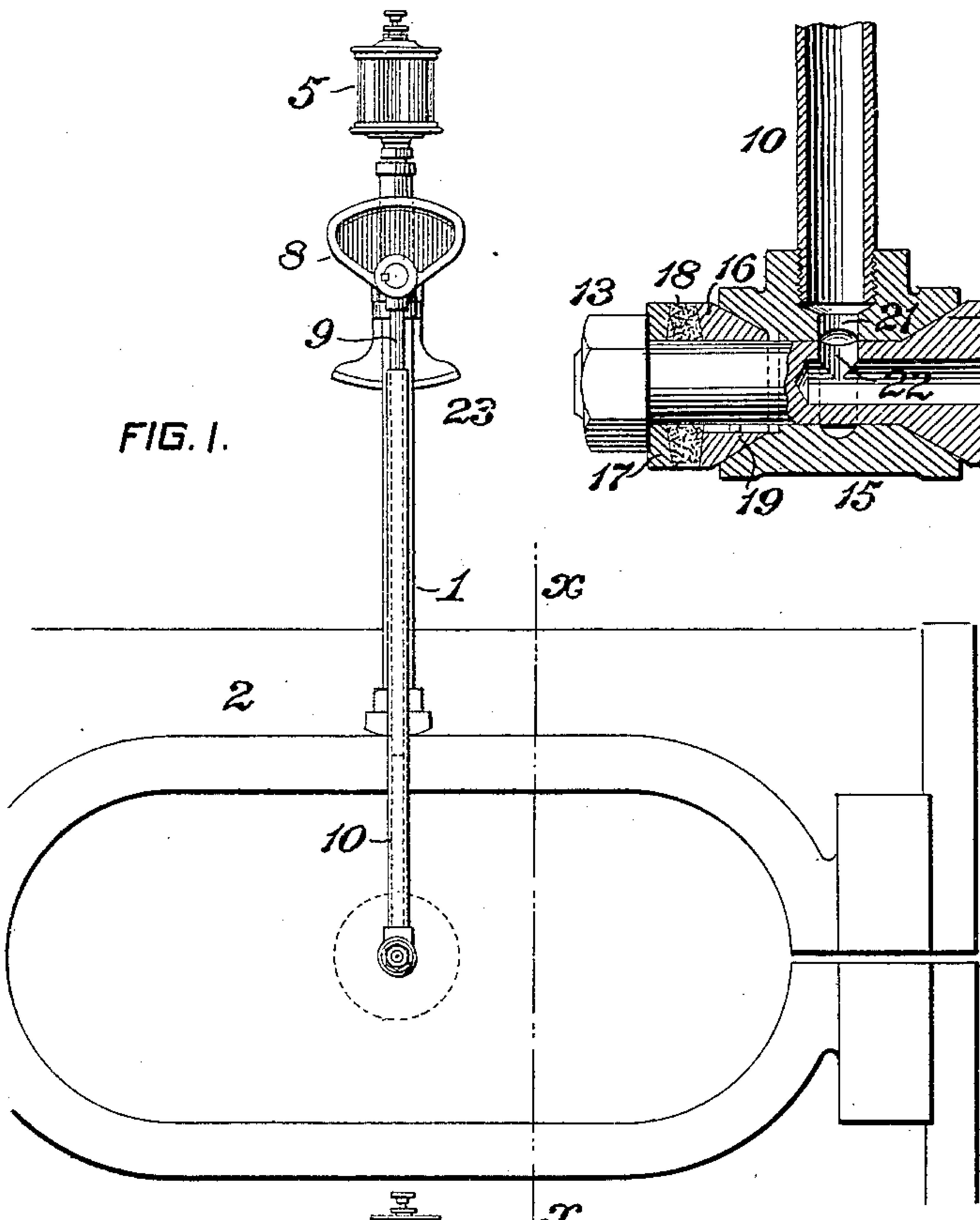
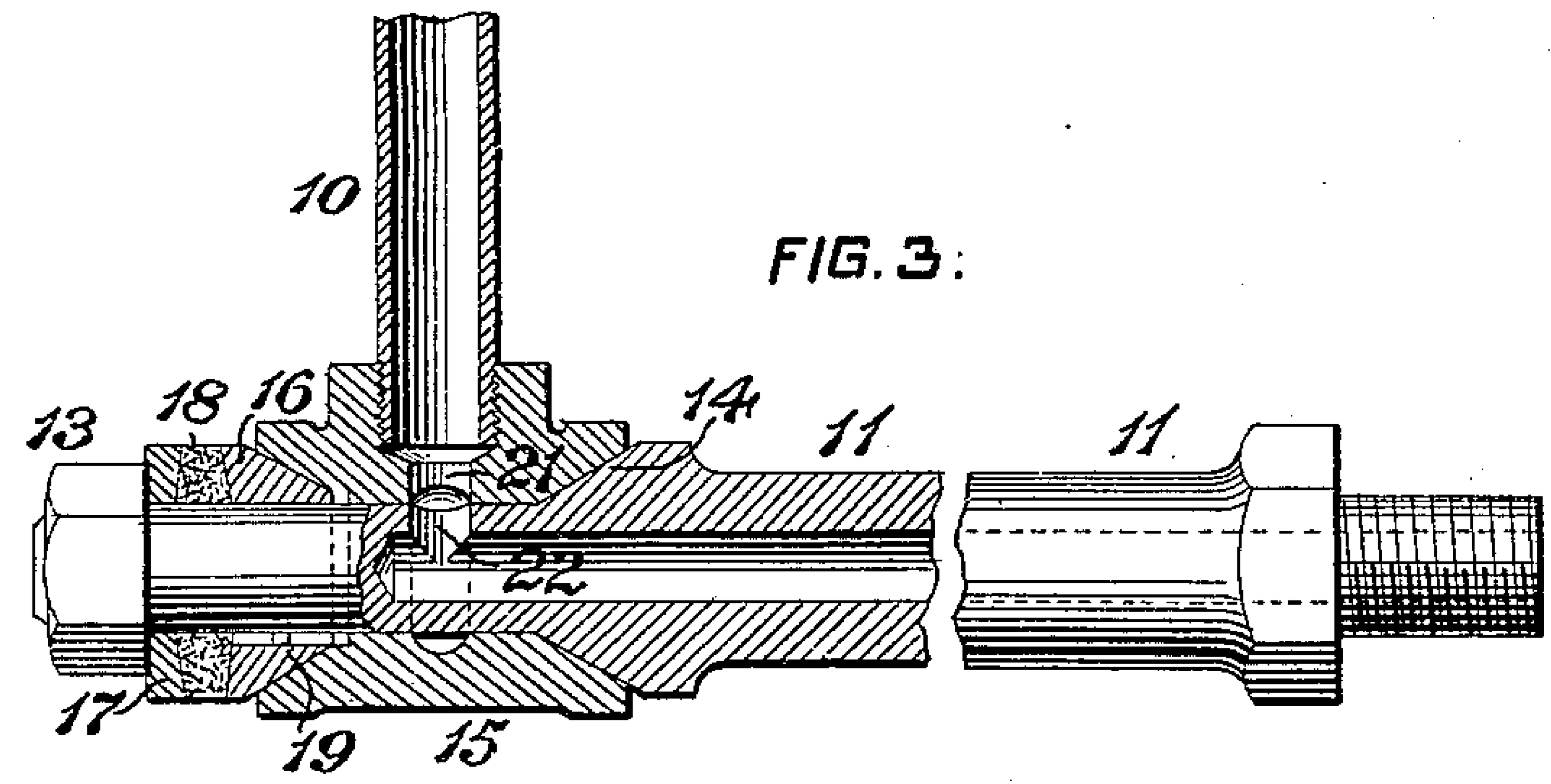


FIG. 1.



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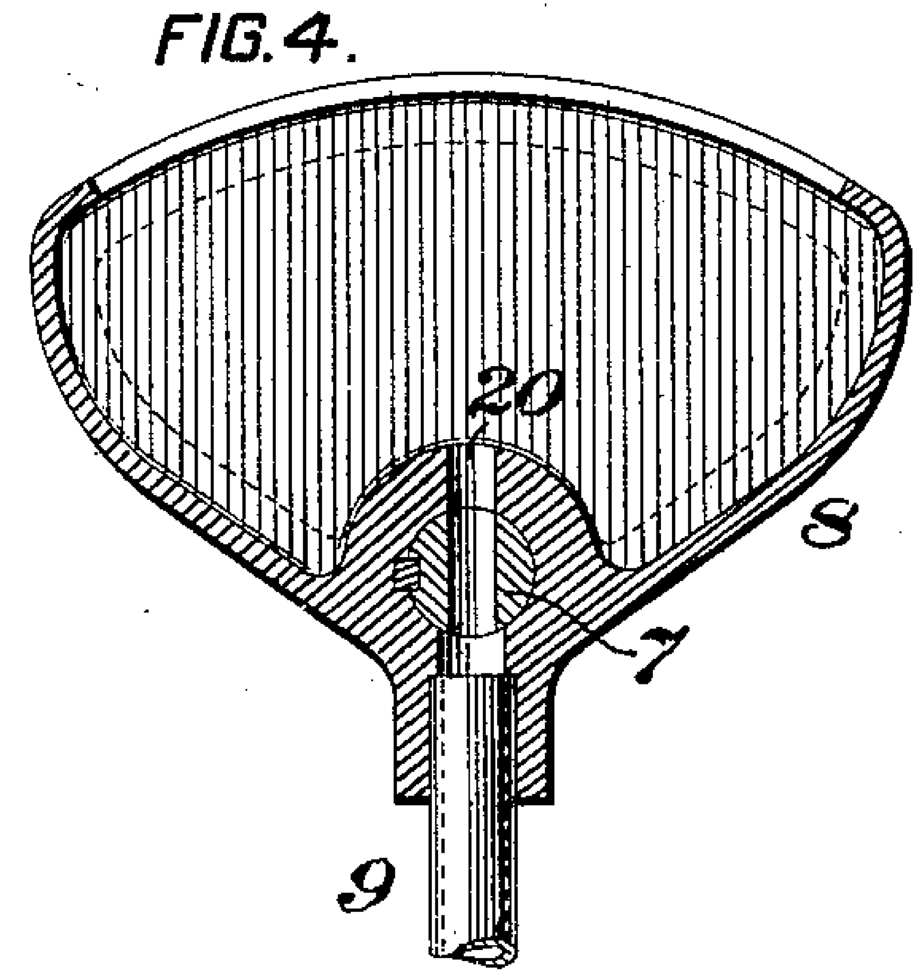

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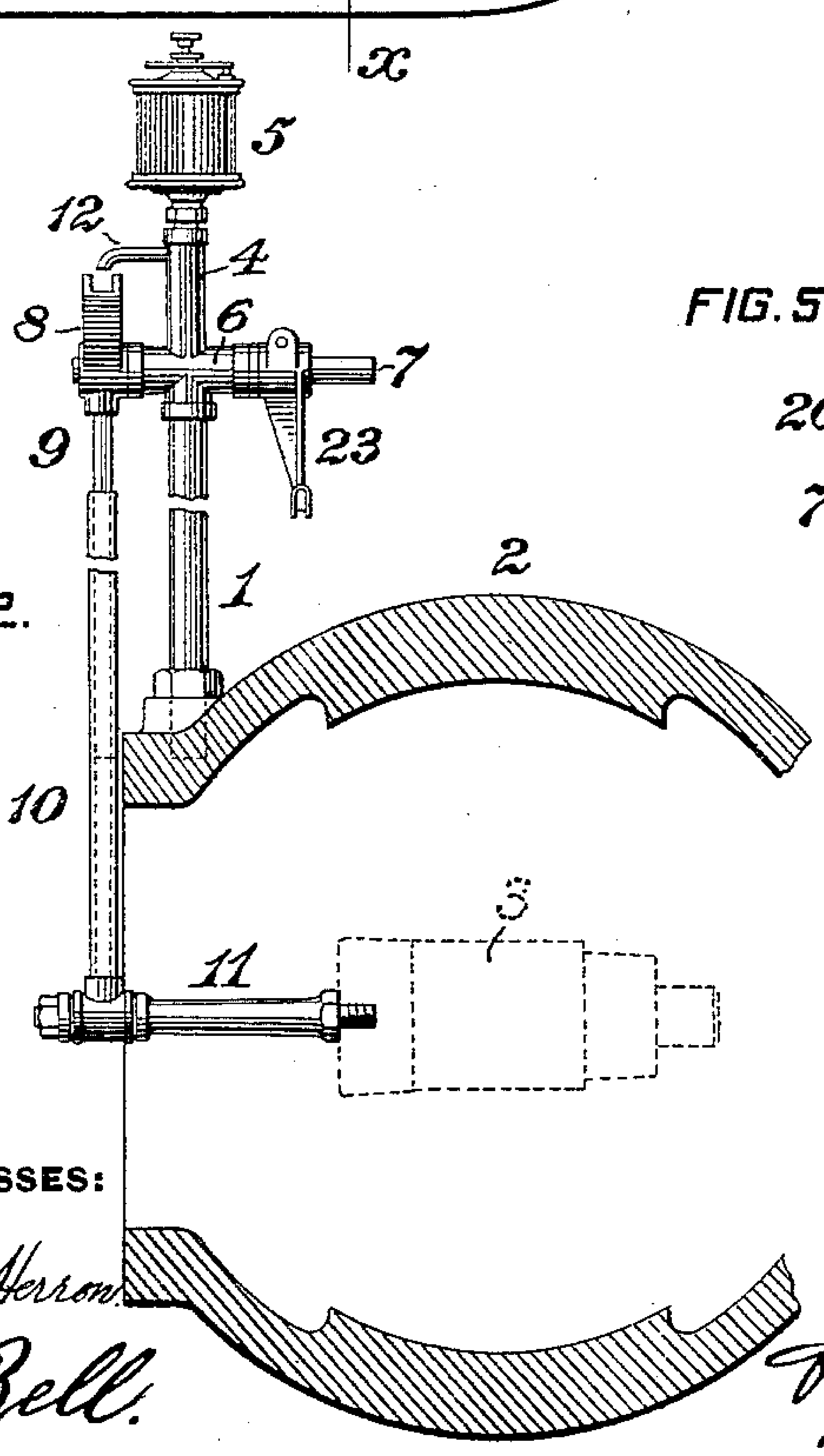

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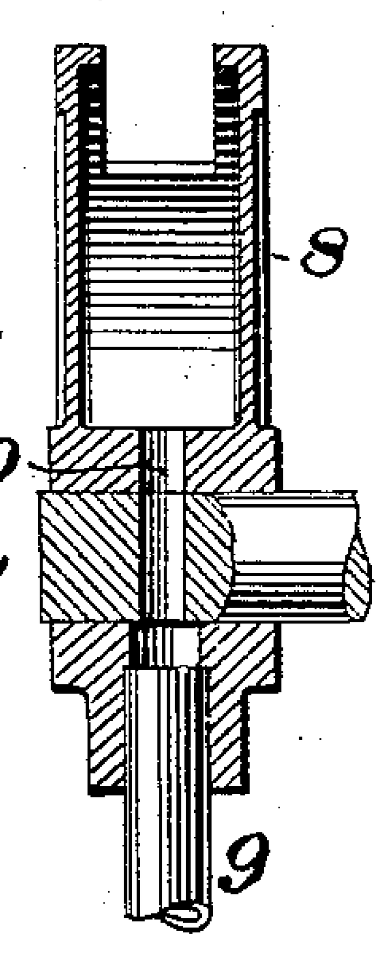

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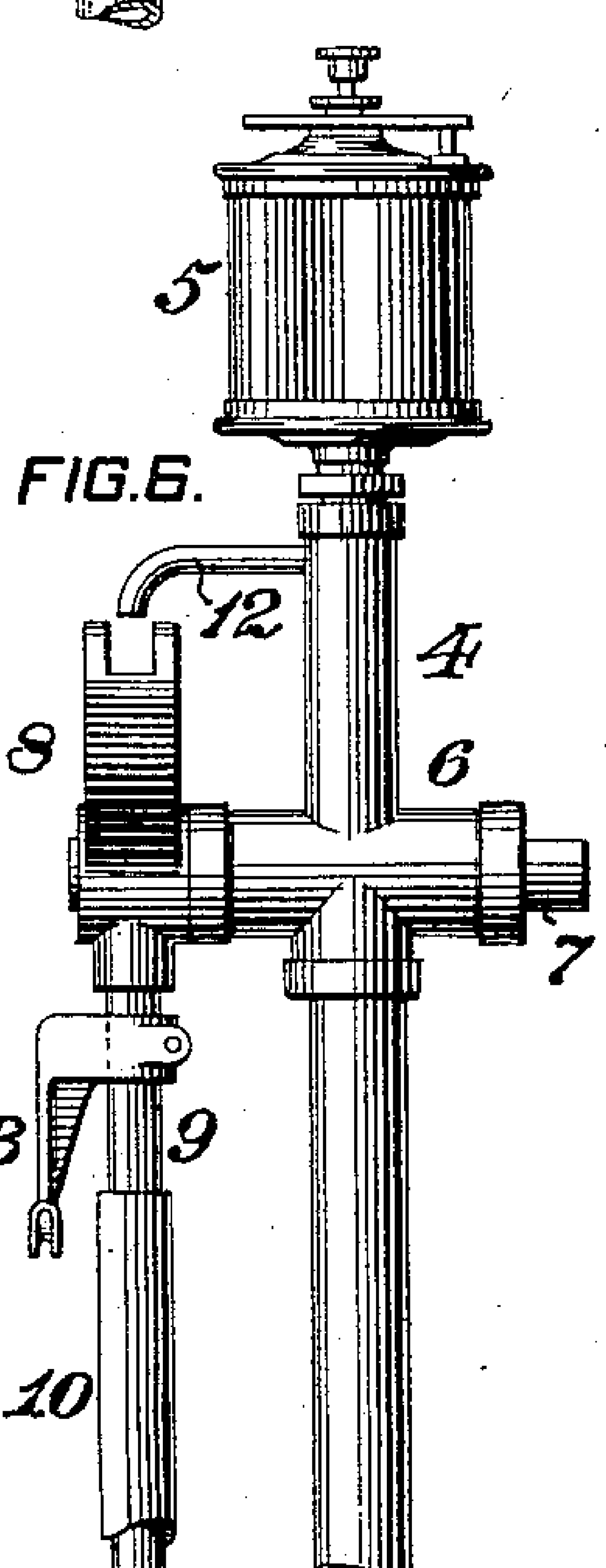

FIG. 6.

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FIG. 7.

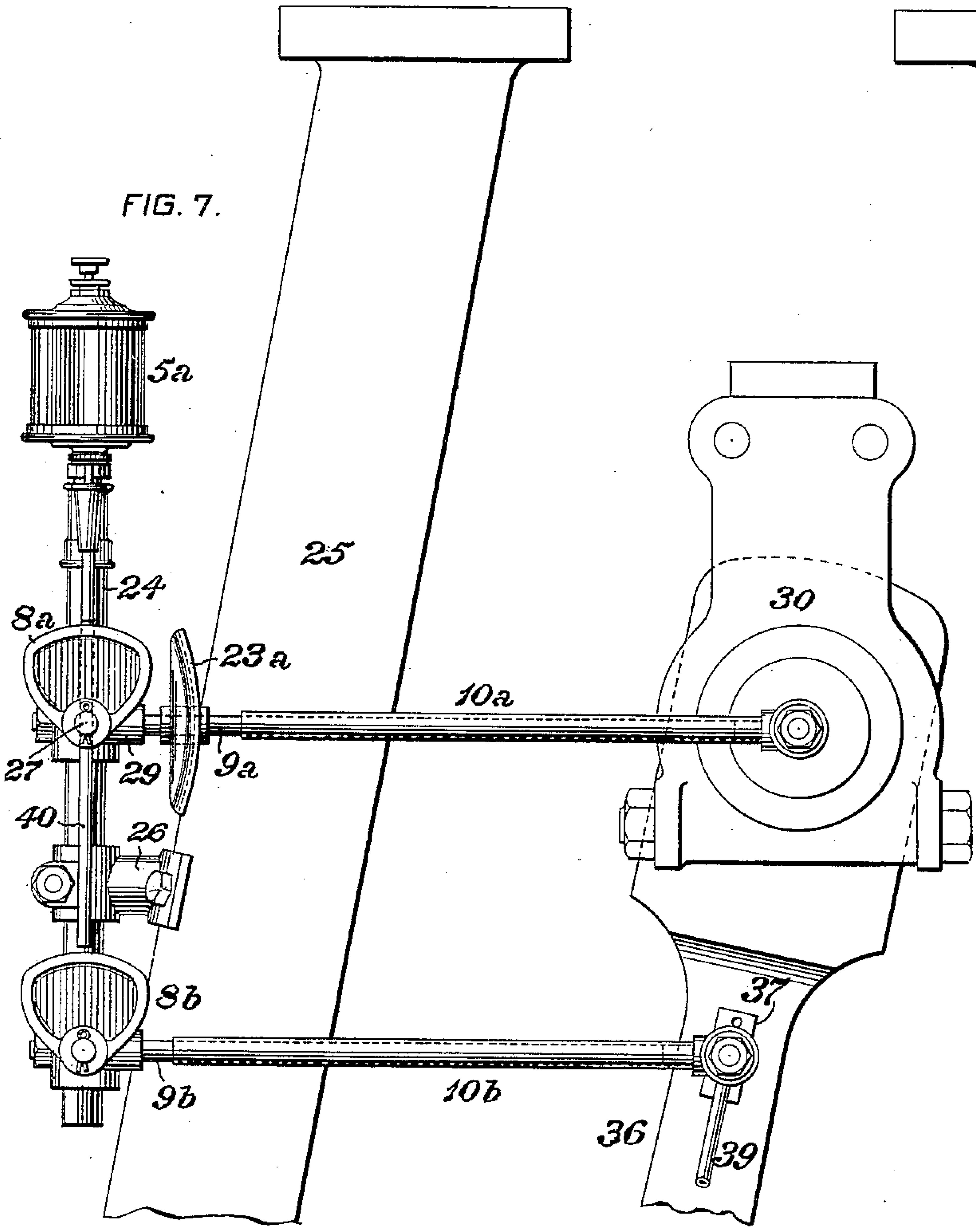


FIG. 8.

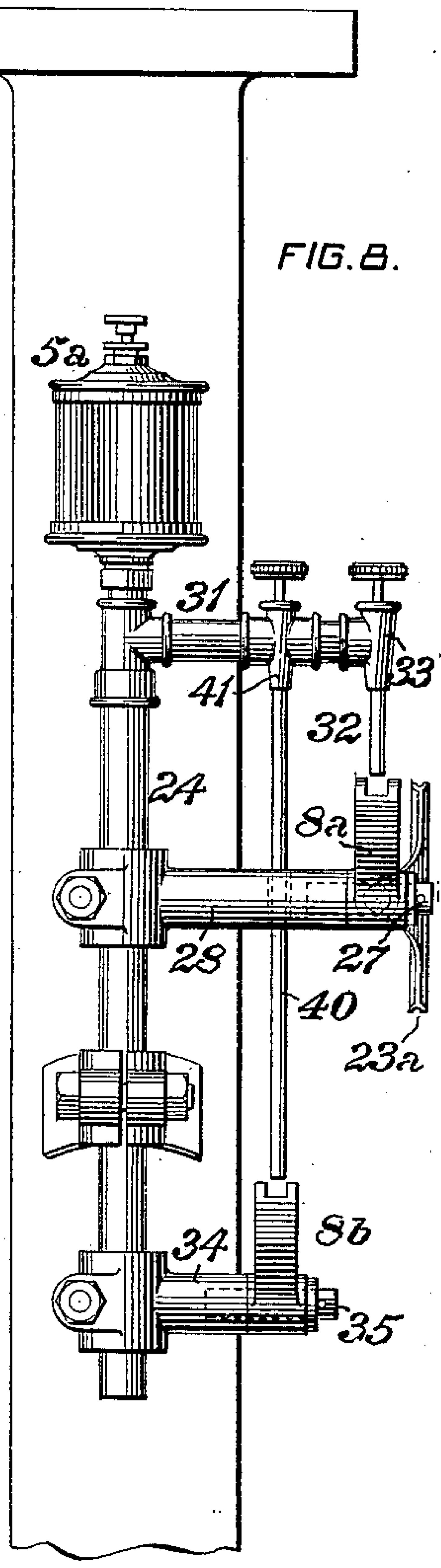


FIG. 9.

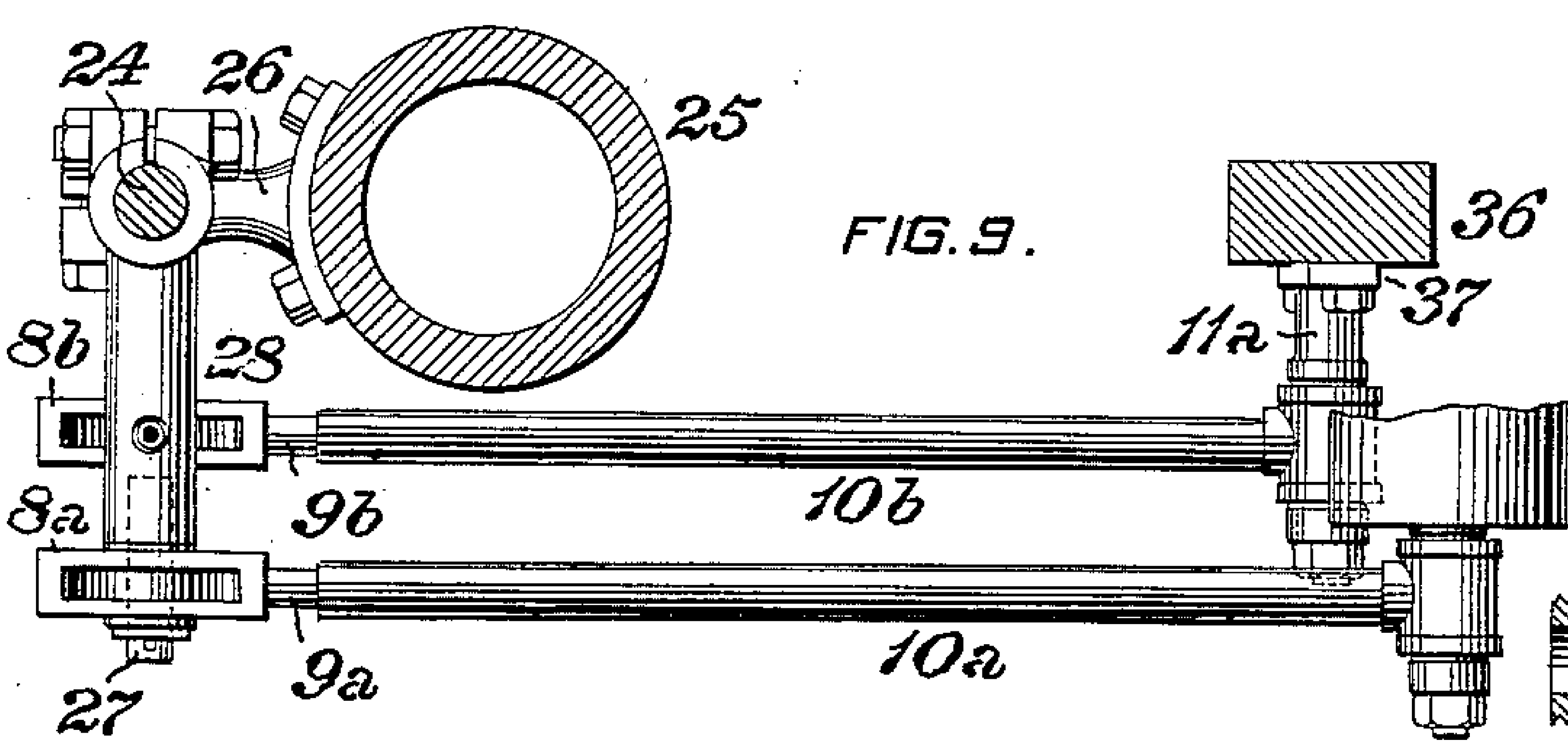


FIG. 10.

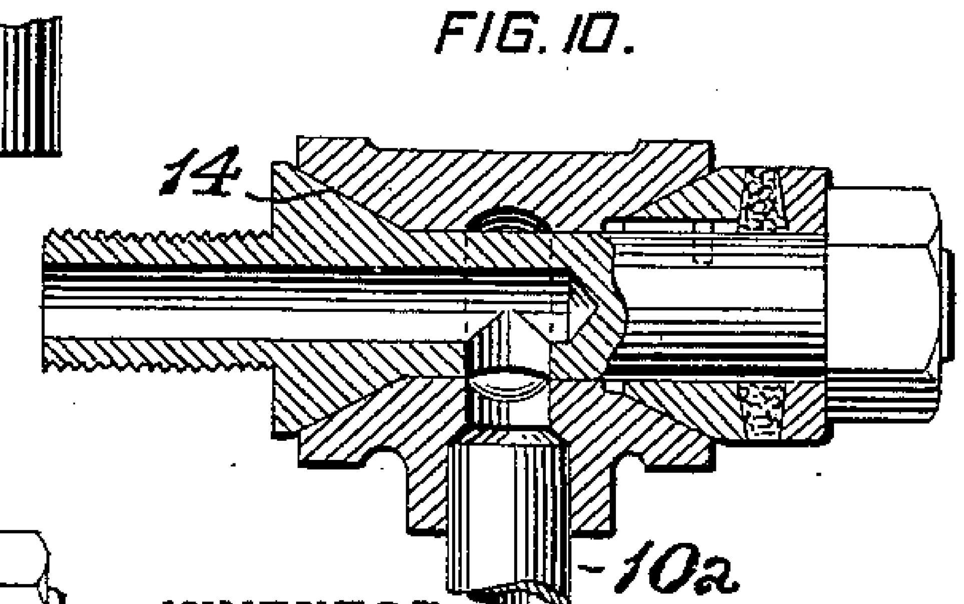
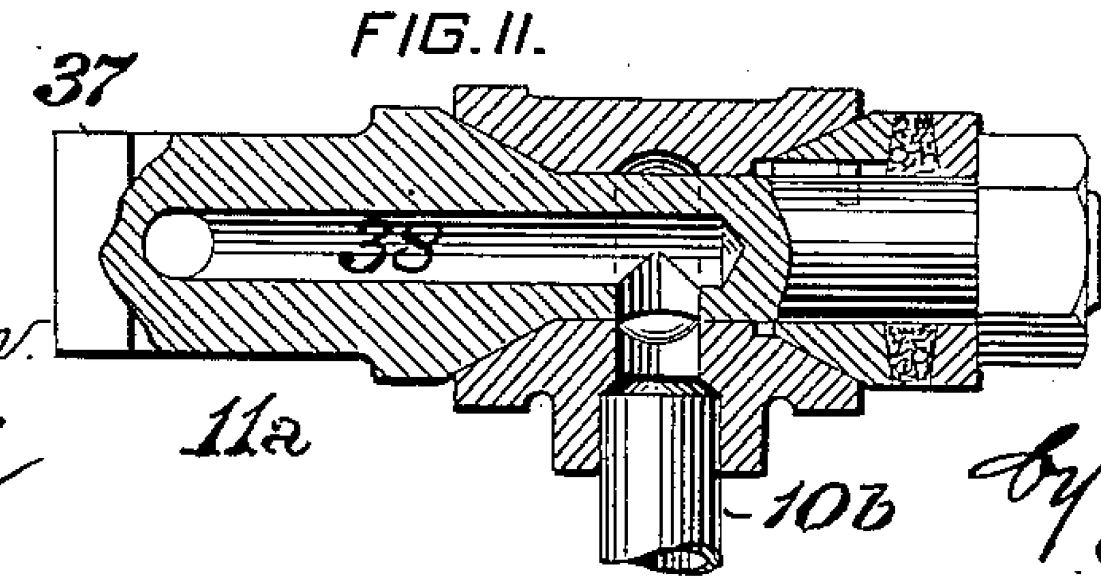


FIG. 11.



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UNITED STATES PATENT OFFICE.

ALBERT K. MANSFIELD, OF SALEM, OHIO.

OILING AND INDICATOR-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 638,518, dated December 5, 1899.

Application filed November 4, 1898. Serial No. 695,484. (No model.)

To all whom it may concern:

Be it known that I, ALBERT K. MANSFIELD, of Salem, in the county of Columbiana and State of Ohio, have invented a certain new and useful Improvement in Steam-Engine Oiling and Indicator-Operating Mechanism, of which improvement the following is a specification.

The object of my invention is to provide a simple, effective, and readily-applicable mechanism whereby a continuous supply of oil may be effected to rapidly-moving members of steam and other engines and which shall have the further capacity of actuating an indicator, as may from time to time be desired.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, which illustrate applications of my invention, Figure 1 is a side elevation of a portion of a horizontal-engine frame with my improvement applied thereto; Fig. 2, a section through the engine-frame on the line $x\ x$ of Fig. 1, showing the improved oiling and indicator-operating mechanism in elevation on a plane at right angles to that shown in Fig. 1; Fig. 3, a section through the joint connecting the outer telescoping pipe shown in Figs. 1 and 2 with the horizontal pipe leading to the cross-head; Fig. 4, a vertical section through the oscillating oil-cup; Fig. 5, a section through the same cup at right angles to that shown in Fig. 4; Fig. 6, an elevation of a portion of the oiling mechanism shown in Figs. 1 and 2, but on a somewhat-larger scale and showing the indicator-operating device secured to one of the telescopic tubes. Figs. 7 and 8 are elevations on planes at right angles to each other, showing my improvement applied to a vertical engine; Fig. 9, a horizontal section and plan view of the oiling device shown in Figs. 7 and 8 with the indicator-operating device omitted; Fig. 10, a section through the flexible joint by which one of the telescopic pipes is connected with the cross-head pin; and Fig. 11, a similar section through the flexible joint by which one of the telescopic pipes of the lower oiling device is connected to the connecting-rod.

My improvement provides an efficient oiling device which utilizes every drop of oil delivered to it and is not dependent merely on the action of gravity to secure the desired flow of the oil, but which utilizes the action of centrifugal force for that purpose; and my invention also provides a simple, convenient, and inexpensive metallic indicator-motion rig, by which the movement of the oiling mechanism is utilized for the purpose of operating the indicator, and the provision of special independent means for that purpose is obviated.

Figs. 1 to 6, inclusive, show my improvement as applied to a horizontal steam-engine. In Figs. 1 and 2 a post or standard 1 is mounted on the frame 2 of the engine, which incloses the cross-head 3, (shown in dotted lines,) and on top of the standard 1 is secured a support 4 for a stationary oil-cup 5. The lower portion of the support 4 is provided with a transverse bearing 6 for a horizontal rock-shaft 7, on which is mounted an oscillatory oil-cup 8. The oil-cup 8 is rigidly fixed on the shaft 7 and is provided with a downwardly-extending pipe 9, which telescopes with or is fitted to slide in a pipe 10, connected by another pipe 11 with the cross-head 3. An oil-passage leads from the stationary cup 5 to a short pipe 12, through which oil may drop into the cup 8, the opening in the upper part of the cup 8 being wide enough to catch the oil in whatever position the cup 8 may be as it oscillates.

The pipe 11, through which oil passes to the cross-head, is rigidly connected to the cross-head and moves laterally back and forth in a horizontal plane when the engine is in motion. The pipe 10 is flexibly connected to the pipe 11 by the joint shown in Fig. 3 of the drawings. The pipe 11 is a hollow stud, with a beveled or tapered shoulder 14 formed thereon and with a solid end screw-threaded to receive a nut 13. A connecting-piece 15, having an interior bevel or taper formed on each of its ends, fits over the end portion of the pipe 11 and against the beveled portion 14 and is held in place by a special packing device between the nut 13 and the outer end of the part 15. This packing device comprises a beveled washer 16, which fits into the beveled end of the part 15, and a compressible packing ring or gasket 18, of felt or other similar material, between the beveled washer 16 and a washer 17, against which the nut 13 bears. The pipe 10 is screw-threaded into the part 15, and when the engine is in motion the part 15 oscillates on the pipe 11. The part 16 is prevented from turning by means of a feather or pin 19, and the joints made by the tapered surfaces of the part 15 with the tapered washer 16 and the tapered shoulder 14 prevent any considerable leakage of oil or only enough to lubricate the surfaces which move on one another. The comparatively soft compressible gasket 18 is tightly clamped between the oppositely-inclined surfaces of the parts 16 and 17 and is pressed against the solid end portion of the pipe 11 and against the washer 16, so as to prevent any leakage. The washer 16 being prevented from turning by means of the pin 19, there will be no turning of the gasket 18 and no rubbing of the gasket by the part 16, but a fixed permanent oil-tight joint will be secured.

The oil supplied to the cup 8 flows through the passage 20, through the pipes 9 and 10, and through the passages 21 and 22 in the flexible joint to the pipe 11, and since the pipes 9 and 10 are moved with considerable speed through an angle corresponding with the length of the stroke of the engine the oil will be acted on by centrifugal force, as well as by gravity, and the pressure thus generated will tend to force it through the pipe 11 to the parts to be lubricated.

It will be seen that the time of oscillation of the shaft 7 and of the pipe 9 is exactly the same as that of the cross-head 3 and of the piston of the engine. In order to utilize this movement for the purpose of operating the indicator, by which the pressure of the steam or other fluid may be indicated at different points of the stroke of the piston, I provide an arm or sector 23, which is mounted on the shaft 7 or other portion of the oiling mechanism, as found most convenient. It is not, however, essential that a separate arm or sector should be employed, as the means for obtaining the desired motion may be of some other form or may be integral with a moving part of the mechanism.

The sector 23 is provided on its circular edge with a groove for receiving and guiding the cord which is connected to and rotates the drum of the indicator, and, as shown in Figs. 1 and 2, the sector is clamped on the shaft 7, so as to oscillate with it and to give to the cord a reciprocating motion corresponding to that of the piston and cross-head of the engine. The sector may be secured to either end of the shaft 7, according to the position of the indicator on the engine-cylinder, or it may be secured to the pipe 9, as shown in Fig. 6 of the drawings, the only essential requirement being that it shall be so located on the oiling mechanism that it may give the desired motion to the drum of the indicator when it is connected therewith and the engine is in motion.

In Figs. 7 to 11 my improvement is shown applied to a vertical engine. The stationary oil-cup 5^a is mounted on the upper end of a rod 24, which is secured to a part of the engine-frame 25 by means of a bracket 26, clamped on the rod and bolted to the frame. The oil-cup 8^a is fitted to oscillate on a pin 27, which is driven into a hole in the end of an arm 28, which is secured to the rod 24, and a pipe 9^a, screw-threaded into a nozzle 29 on the lower part of the cup 8^a, is fitted to slide in a pipe 10^a, which is connected with the cross-head 30 by a flexible joint, such as that shown in Fig. 10. A sector or arm 23^a is secured to the pipe 9^a and oscillates with it as the cross-head 30 moves up and down, the location of the sector being such that it may give the desired motion to the drum of an indicator when connected therewith by means of a cord. Oil from the stationary oil-cup 5^a is supplied to the cup 8^a through the pipes 31 and 32, the flow being controlled by a valve 33. The joint shown in Fig. 10, by which the pipe 10^a is connected with the cross-head, is in all respects the same as that shown in Fig. 3; but as the pipe 10^a is very near the cross-head the part on which the beveled shoulder 14 is formed is screwed directly to the cross-head pin and the intervening length of pipe 11 shown in Fig. 3 is omitted. An arm 34 is secured to the rod 24 near its lower end, and a pin 35 on the end of the arm forms a bearing for an oscillatory oil-cup 8^b. This cup is connected with a pipe 9^b, which is fitted in a pipe 10^b, one end of which is flexibly connected with the connecting-rod 36 by the flexible joint shown in Fig. 11. The central part 11^a of this flexible joint is provided with a flanged end portion 37, which is adapted to be bolted to the connecting-rod, and the passage 38 therein forms a communication between the pipe 10^b and a pipe 39 for delivering oil to the crank-pin of the engine. Oil is supplied to the cup 8^b through the pipe 31 and through a pipe 40, which passes through a hole in the arm 28. The flow of oil is controlled by a needle-valve in the casing 41.

In the construction shown in Figs. 7 to 11 the telescoping pipes 9^a and 10^a and 9^b and 10^b are in a horizontal position when the cross-head is at the middle of its stroke, so that they swing up and down from this position with a minimum movement of the relatively-sliding parts. In this construction the effect of centrifugal force on the oil flowing through the telescoping pipes will be considerable in high-speed engines and will be of importance in securing the desired flow, particularly in the upward half of the stroke, when the flow will not be assisted by the action of gravity. This centrifugal effect will of course be greatest when the engine is running at its highest speed. Where the pipes move the same distance above and below a horizontal position, any assistance or advantage from the action of gravity on the oil may be said to be completely neutralized, since gravity tends to cause a return flow away from the part to be lubricated when the pipes are above the horizontal position, and it will be obvious that under most conditions the flow of the lubricant in the proper direction may be due to centrifugal force only and that it will be greatest when most needed.

I claim as my invention and desire to secure by Letters Patent—

1. An oiling device adapted to be actuated by a moving part of an engine and having indicator-operating means attached thereto and actuated thereby.

2. An oiling mechanism adapted to be actuated by the cross-head of an engine and having an indicator-operating arm or sector connected to and actuated by an oscillating part of the oiling mechanism.

3. In an oiling mechanism, an oscillatory oil-cup, and a pipe connecting said cup to a moving part of an engine by means of a flexible pipe-joint comprising a collar or section of pipe having tapered or conical sockets at its ends, an inner pipe passing therethrough and provided with a tapered or conical shoulder fitting into one of the sockets, a tapered or conical washer on the inner pipe which is fitted into the other socket, means for preventing the washer from turning on the inner pipe, and a compressible packing held against the outer end of the washer.

4. In an oiling mechanism, an oscillatory oil-cup, and a pipe connecting said cup to a moving part of an engine by means of a flexible pipe-joint comprising a pipe having a solid or closed end, a shoulder on the pipe, a collar or short section of pipe fitted thereon and bearing against the shoulder, a tapered or conical washer fitting a tapered or conical socket in the collar or short section of pipe, means for preventing the washer from turning on the inner pipe, a packing held against the washer, and communicating passages in both sections of pipe.

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