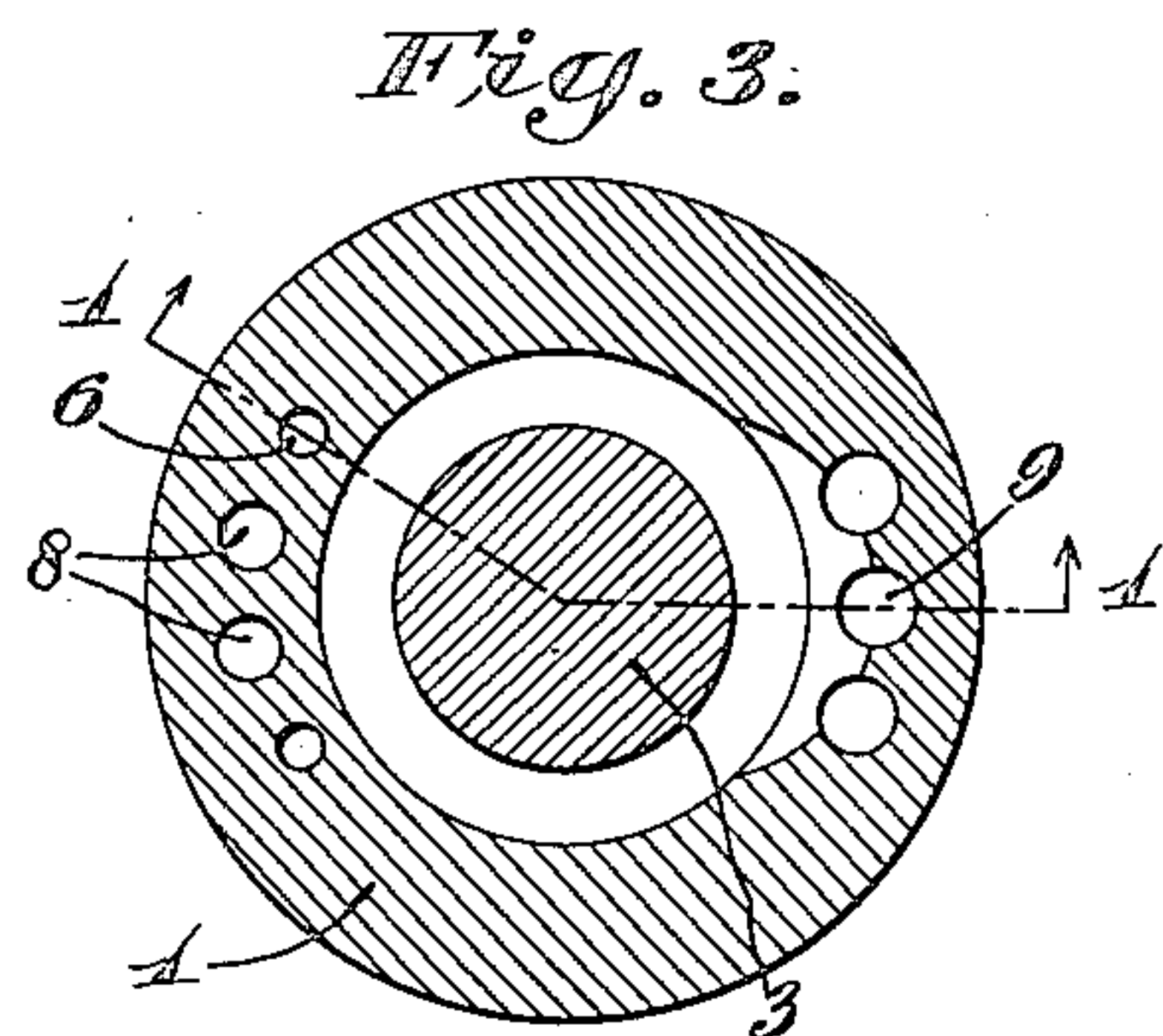
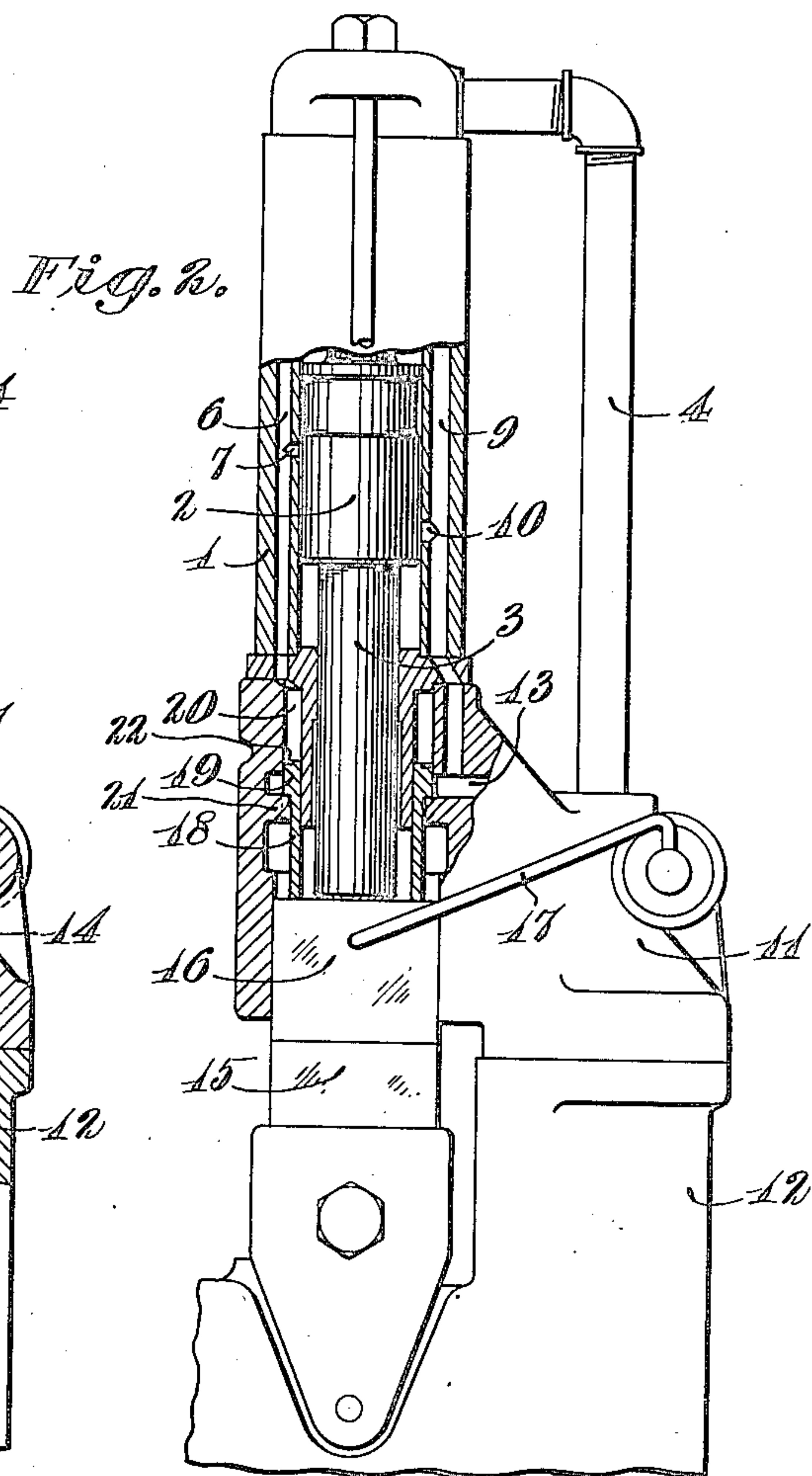
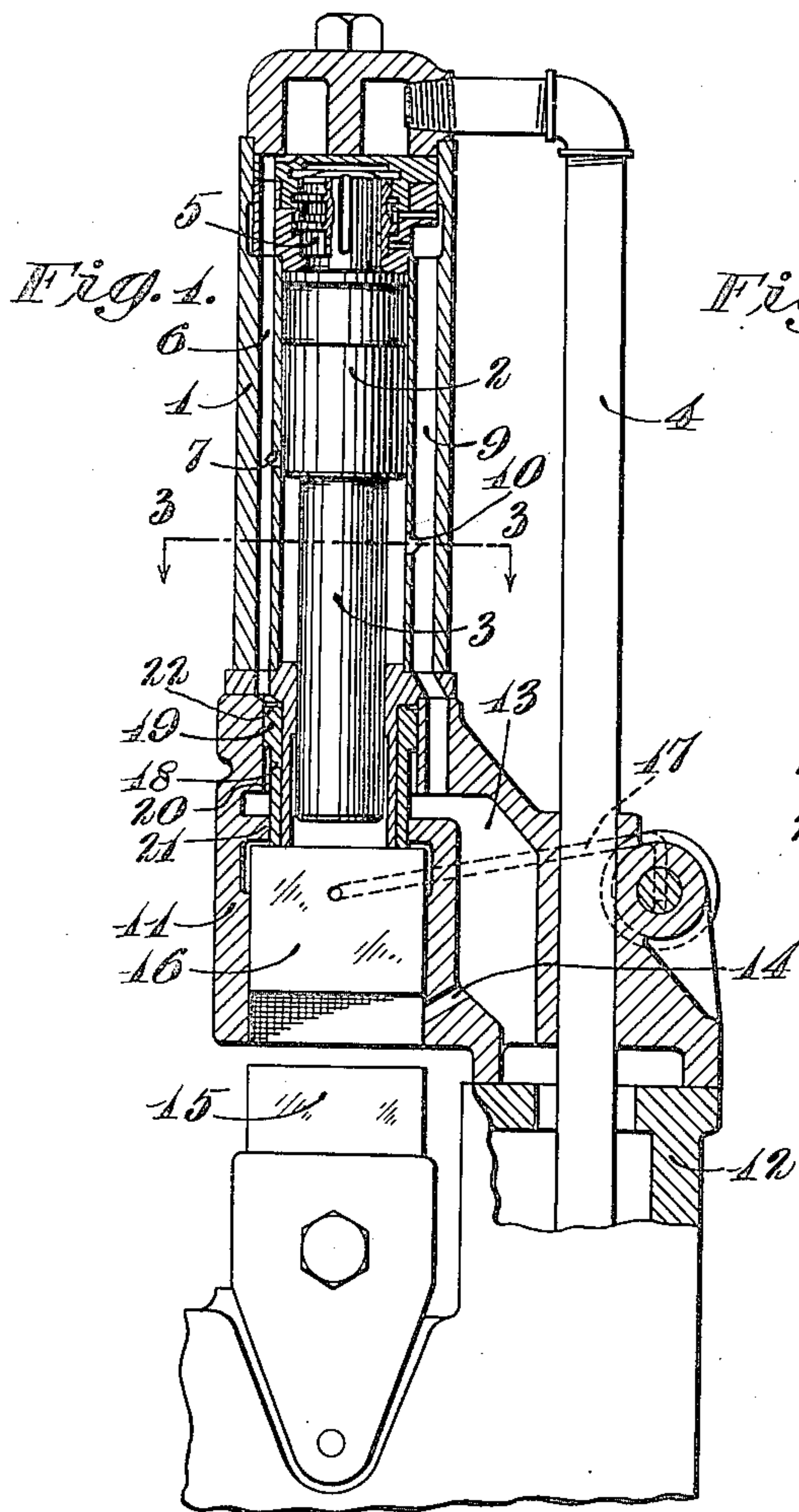


Jan. 2, 1923.

1,440,807

W. H. WINEMAN.  
FORGING MACHINE.  
FILED MAY 6, 1919.



Inventor:  
Wade H. Wineman  
by  
Wm. L. [Signature]  
Atty.



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# UNITED STATES PATENT OFFICE.

WADE H. WINEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO SULLIVAN MACHINERY COMPANY, A CORPORATION OF MASSACHUSETTS.

## FORGING MACHINE.

Application filed May 6, 1919. Serial No. 295,062.

*To all whom it may concern:*

Be it known that I, WADE H. WINEMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Forging Machines, of which the following is a full, clear, and exact specification.

This invention relates to forging machines.

One object of the present invention is to provide an improved forging machine. Another object of the present invention is to provide an improved means for operating a die block on material to be forged in such manner that the die block is held against the work during the operation of a hammer on the block, and that the die block is held in a retracted position free from the work when the forging machine is inoperative. These and other objects and advantages of my improved construction will, however, hereinafter more fully appear.

In the accompanying drawings, I have shown for purposes of illustration one embodiment which my invention may assume in practice.

In these drawings,—

Fig. 1 is a longitudinal sectional elevation substantially on the line 1—1 of Fig. 3 of a swaging mechanism of a forging machine.

Fig. 2 is a similar longitudinal sectional view with certain parts shown in elevation and other parts shown in different positions than in Fig. 1.

Fig. 3 is a transverse sectional view substantially on the line 3—3 of Fig. 1.

In this illustrated construction, I have shown my invention applied to a forging machine having a swaging hammer of the piston hammer type, such as is shown in Patent 1,250,932, issued Dec. 18, 1917, the same comprising a cylinder 1 having a piston 2 reciprocable therein and adapted to deliver its blow through a striking bar 3. As is clearly shown in the patent above referred to, the pressure fluid is admitted to one end of this cylinder, herein through an inlet pipe 4, and the flow from this end to the opposite ends of the cylinder to actuate the piston is controlled by a valve 5, a constant pressure port 6 always in communication with the inlet pipe 4 and having communication with the cylinder through a port 7, return ports 8 for admitting pressure

fluid to the lower end of the cylinder, the same being shown herein only in the transverse sectional view, and exhaust passages 9 communicable with the upper end of the cylinder through passages controlled by the valve and with the lower end of the cylinder by a port 10. The pressure fluid motor and its operation are not described herein in detail since the construction and operation form no part of the present invention, the same being shown merely to illustrate one kind of motor with which my improvement may be embodied.

The motor is preferably mounted upon a supporting arm 11, in turn mounted on the hollow base 12 of the forging machine with the hollow interior of which the exhaust passages 10 communicate through suitable passageways 13 formed in the arm 11, the exhaust passage 13 preferably communicating also with a port 14 through which a part of the exhaust fluid flows to the work to blow the scale and dirt therefrom. As is clearly shown in Fig. 1, all external piping has been eliminated in so far as possible by passing the inlet pipe 4 through the supporting arm 11 and into the base 12 to a controlling valve which may be operated by a controlling handle, not shown, or any other suitable means.

Mounted on the base 12 is a fixed die block 15 which cooperates with a reciprocable die block 16 which reciprocates in and is guided by the supporting arm 11, the block 16 being disconnected from the striking pin 3 and normally held in an elevated position by a pair of springs 17 which normally hold the die block in a retracted or elevated position free from the lower die block 15 or the work. I preferably provide means for holding the upper die block against the work during the operation of the forging machine, so that the block will not reciprocate with the piston, and in the form of my improvement shown herein, I provide for this purpose, a sleeve 18 having a head 19 reciprocable in a small cylinder 20, the sleeve being guided by an annular collar 21 herein shown as formed on the supporting arm 11. Any suitable means may be provided for moving this sleeve downward against the die block 16 to depress the latter, but in the form of my improvement shown herein, I have extended the constant pressure passage 6, which is



always in free communication with the inlet pipe 4, to the upper end of the cylinder 20 where it communicates with an annular groove 22 which may be formed in the rear head of the cylinder 20 or in the head 19 of the sleeve 18. When the valve in the base 12 of the forging machine is opened to admit a flow to the pneumatic tool, the pressure fluid will also flow through the constant pressure passageway 6 to the annular recess 22 and will act on the upper head of the piston 19, forcing the latter together with the upper die block 16 toward the work, the pressure exerted by the compressed air or other fluid on the piston head 19 being sufficient to overcome the pressure of the spring 17. As soon as the supply of pressure fluid to the pneumatic tool is cut off, the pressure in the constant pressure passageway 6 will drop, and the spring 17 will raise the upper die block, sleeve 18, and piston 2 and free the work so that it may be withdrawn from between the die blocks.

By this improved construction, it is possible to use a lighter, more rapidly reciprocating piston which will deliver a large number of blows to the work with the result that the metal being worked on will not become granular or brittle as occurs when a small number of very heavy blows are struck. It will further be noted that, as the upper die block is held against the work during the operation of the hammer piston, more careful work will be done for the position of the block on the work is not changed. It will also be noted that the upper die block may be easily removed without having to disconnect the same from the piston.

While I have in this application specifically described one embodiment which my invention may assume in practice, it is to be understood that this form is used for illustrative purposes only and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a forging machine, an anvil die, a movable swaging die, a hammer cooperating with said movable die, stationary hammer guiding means, and means for holding said movable die in engagement with a work piece, said means being movable relative to said hammer guiding means.

2. In a forging machine, a movable swaging die, a hammer reciprocable relative thereto and adapted to cooperate therewith, an anvil die, fixed hammer guiding means, and means for holding said movable die in engagement with a work piece, said means being movable in a path coaxial with the path of reciprocating movement of said hammer.

3. In a forging machine, a movable swaging die, a hammer adapted to cooperate therewith, means for causing said hammer to strike said die a series of blows, and means movable relative to said first mentioned means for causing said die to engage a work piece during said series of blows.

4. In a forging machine, a fixed swaging block, a movable swaging block, means for hammering upon said movable block during the swaging operation, and independently movable means for holding said movable swaging block against the work.

5. In a forging machine, a forming die block, a motor for operating the die block on the work, and separate means automatically operative upon operation of said motor for holding the block on the work.

6. In a forging machine, a forming die block, a tool for operating the die block, and independent means for moving said block in opposite directions.

7. In a forging machine, a forming die block, a stationary pneumatic tool for operating the die block, pneumatic means movable relative to said tool for holding the block against the work, and means for admitting pressure fluid simultaneously to said tool and means.

8. In a forging machine, a die block, a motor including a hammer piston for operating the die block, means for holding the block against the work, and means for normally holding said block, piston, and holding means in retracted positions.

9. In a forging machine, a die block, resilient means for normally holding said block in a retracted position, a sleeve having a piston head actuated by fluid pressure for forcing the block against the work, and a die block striking tool comprising a striking pin operating through said sleeve on said die block.

10. In a forging machine, a die block, resilient means for normally holding said block in a retracted position, a pneumatic tool comprising a cylinder, a piston, and a striking pin, a cylinder adjacent the forward end of said tool, a constant pressure passage communicating with said last named cylinder and the inlet of said first named cylinder, and a piston in said last named cylinder for forcing the block against the work.

11. In a forging machine, a die block, resilient means for normally holding said block in a retracted position, a pneumatic tool comprising a cylinder, a piston, and a striking pin, a cylinder adjacent the forward end of said tool, a constant pressure passage communicating with said last named cylinder and the inlet of said first named cylinder, and a hollow piston surrounding said striking pin and having a piston head in said last named cylinder, said piston being



operated simultaneously with the operation of said pneumatic tool to hold the block against the work.

12. In a forging machine, a swaging die, 5 hammering means cooperating therewith, means for normally holding said die out of engagement with the work, and structurally independent means automatically operative on initiation of the operation of said 10 hammering means to move said die into engagement with the work and to maintain it in that relation during the hammering operation.

13. In a forging machine, a swaging die, 15 and separate coaxially arranged mechanisms for holding said swaging die in contact with the work and for hammering thereon.

14. In a forging machine, a stationary anvil die, a swaging die, hammering means 20 cooperating with said swaging die and including a power actuated hammer traversing a substantially fixed orbit and stationary means determining said orbit, power actuated means for holding said swaging die in 25 engagement with the work, and means for simultaneously supplying power medium to actuate said hammer and to said die holding means.

15. In a forging machine, a swaging die, 30 a power actuated hammer traversing a substantially fixed orbit, power actuated means

movable relative to said hammer for holding said die in engagement with the work, and means for simultaneously supplying power medium to said hammer and to said die holding means. 35

16. In a forging machine, a swaging die, hammering means, independent means for holding said die in engagement with the work during hammering, and means automatically operative to move said die out of 40 engagement with the work upon cessation of hammering.

17. In a forging machine, a swaging die, a power hammer, power actuated means operative upon supply of power medium thereto to move relative to said hammer and to bring the die into engagement with the work and to maintain it in such position, and common power supply means for said hammer and said holding means. 50

18. In a forging machine, a swaging die, a power hammer, power actuated means operative upon supply of power medium thereto to move the die relative to said hammer 55 into engagement with the work and to maintain it in such position, power supply means for said hammer and said holding means, and common controlling means therefor.

In testimony whereof I affix my signature. 60

WADE H. WINEMAN.