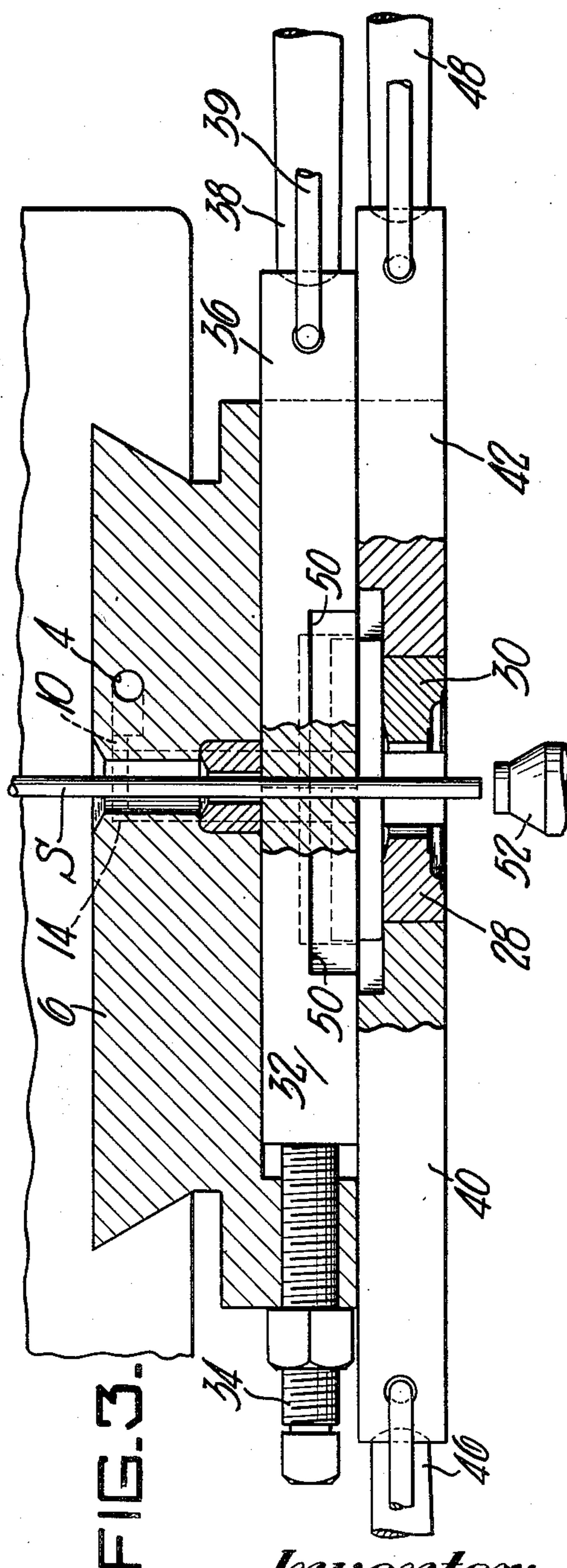
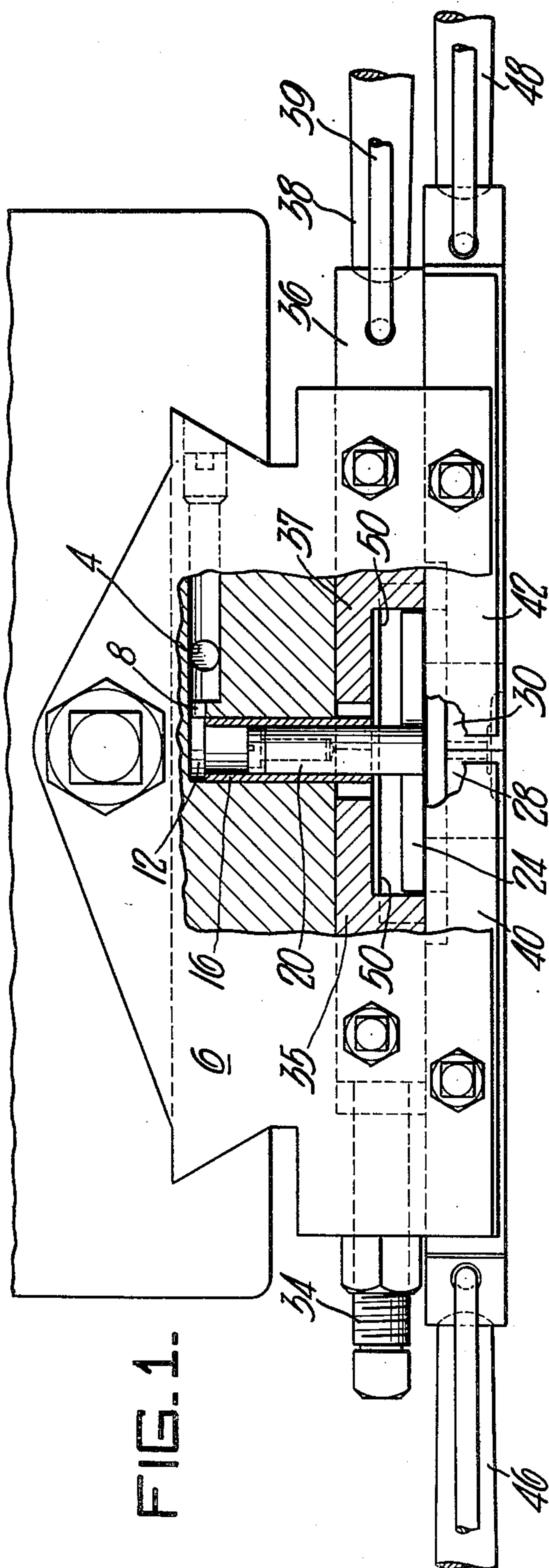



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**2,527,759**



**FIG. 3.**



34

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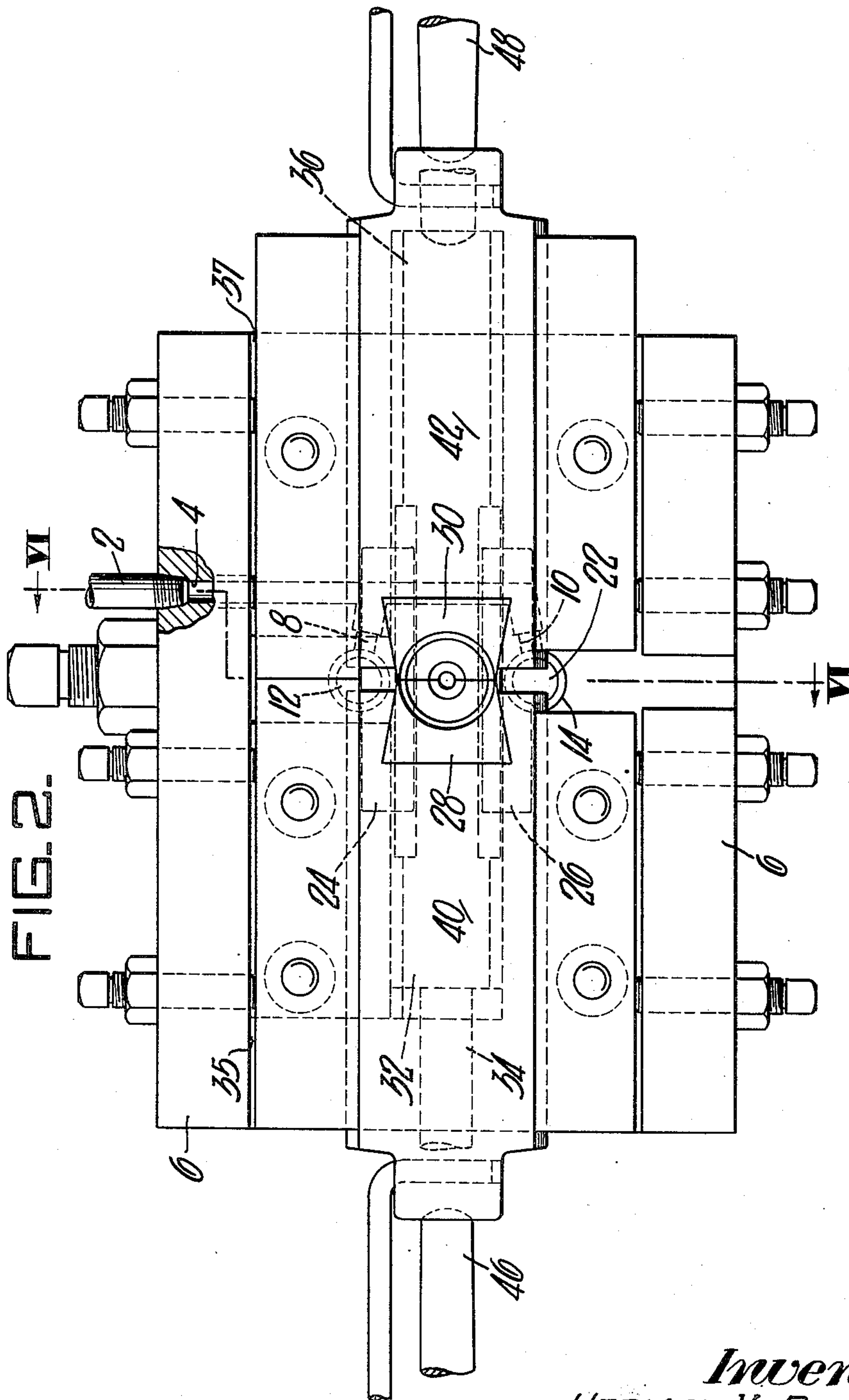
Oct. 31, 1950

H. V. PIERSON  
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BLOW DUPLEX NAIL MACHINES

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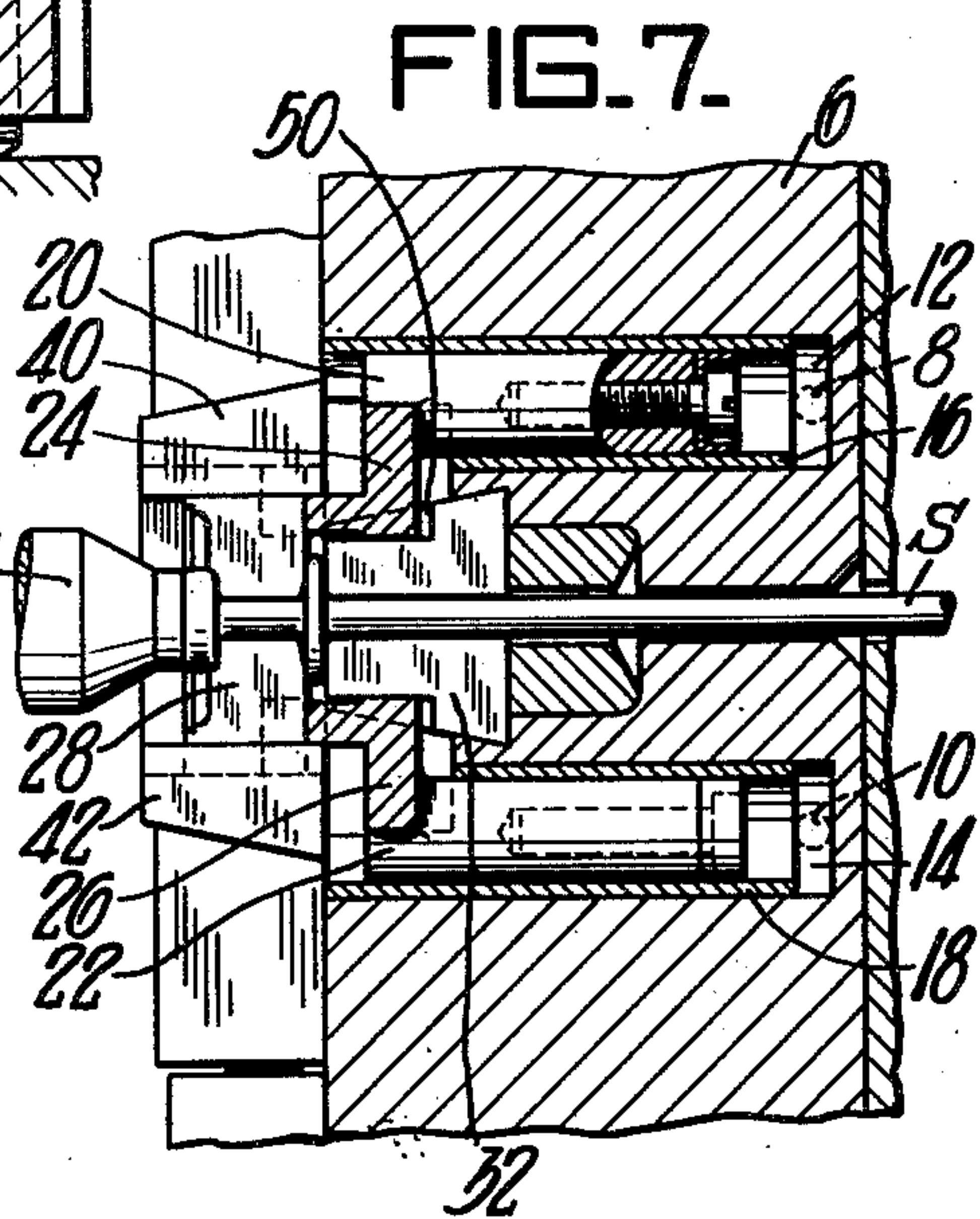
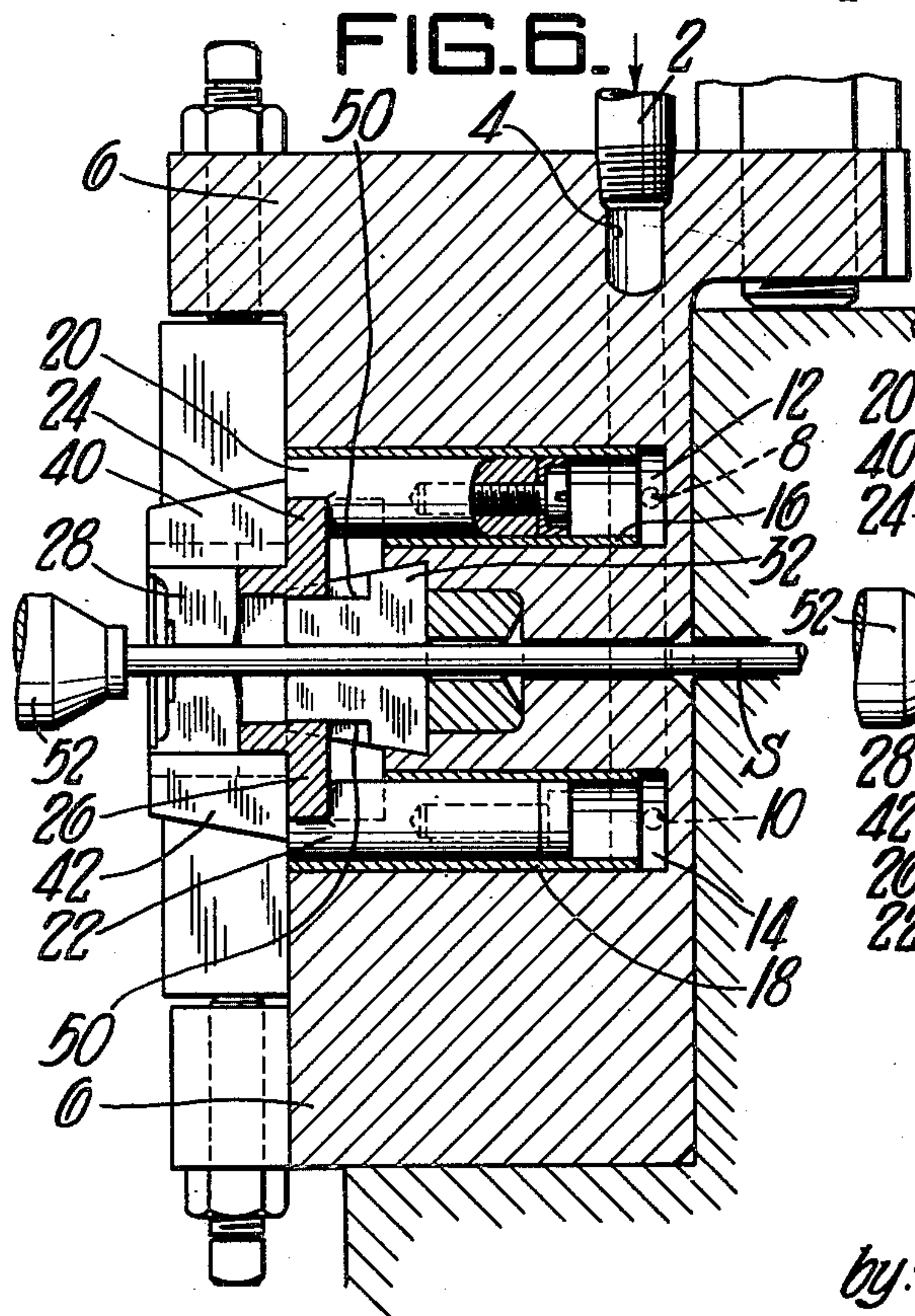
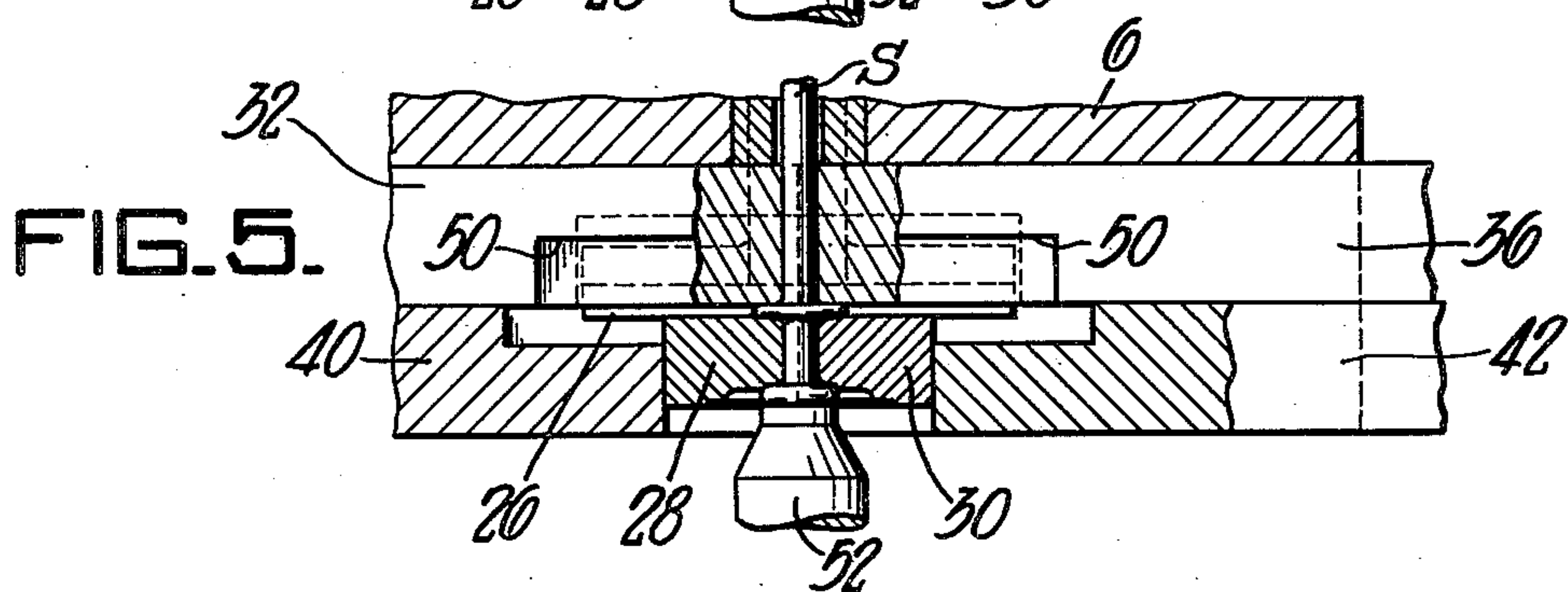
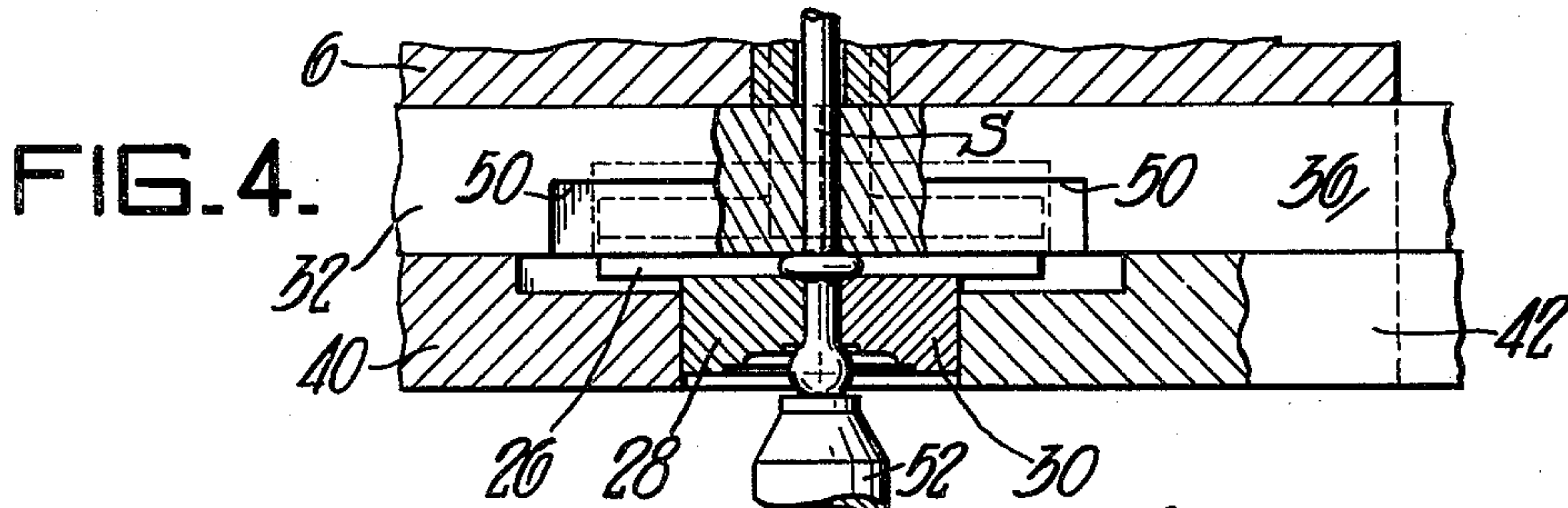
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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,527,759

AIR OPERATED HEADING DIES FOR SINGLE  
BLOW DUPLEX NAIL MACHINES

Herman V. Pierson, Joliet, Ill.

Application March 31, 1948, Serial No. 18,256

2 Claims. (Cl. 10—49)

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This invention relates to improvements in a single blow duplex head nail machine and more particularly to such a machine as disclosed by Little et al. Patent No. 2,381,171.

In this machine, each half of the secondary pinch or head forming die is actuated independently by a coil spring operated lever arm. The lever arms and the coil springs to which they are attached are indicated at 170 and 178 respectively in Figures 10, 11, and 12 of the drawings in the Little et al. patent. As shown in the aforementioned drawings, when the hammer approaches the severed end of the nail stock to strike its upsetting blow, the two halves of the secondary pinch die are advanced toward each other to grip the nail stock. When the hammer strikes its blow the secondary pinch die is driven inwardly to upset the lower nail head on the nail stock between the secondary pinch die and the adjacent primary pinch die. The secondary pinch die thus driven inwardly forces the ends of the pivotally mounted lever arms 170 to move in the same direction, which movement extends the coil spring to which each lever arm is attached. When the hammer is withdrawn after the blow has been struck, the tension in coil springs 178 actuates the two lever arms, each of which bears on one-half of the secondary pinch die, so that each half of the secondary pinch die is returned to its initial starting position.

During the operation of this type of nail machine, the secondary pinch die very frequently fails to function properly due to breakage of one or both of the coil springs. It has also been found that dirt and steel particles tend to clog around the lever arms and prevent one or both of them from functioning. Another disadvantage noted is the tendency of the lever arms to break frequently under the impact of the hammer blow. Ordinarily only one of the coil springs or lever arms is effected so that the uneffected half of the secondary pinch die functions alone and as a result, scrap nails are produced until the defect is discovered by the machine operator. In addition, this often results in jamming of the wire in the die causing breakage of the die itself or of the ends of the die holding means. The down time of the machines, due to repairs and replacement of parts, is excessive and results in high maintenance cost in addition to causing a substantial loss of production.

It is an object of my invention to provide an improved die block for a duplex head nail machine wherein the spring actuated lever means for shifting the position of the secondary pinch die are eliminated.

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Another object of my invention is to provide an improved die block for a duplex head nail machine wherein the component parts of the secondary pinch die are actuated simultaneously.

A further object of my invention is to provide an improved die block for a duplex head nail machine wherein are contained fluid means of actuating the component parts of the secondary pinch die simultaneously.

Still another object of my invention is to provide such an improved die block with a port, fluid passages, cylinders and pistons so as to create a cushion for the secondary pinch die contained therein.

These and other objects will become more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a plan view of my invention, partly in section;

Figure 2 is a front view of Figure 1;

Figure 3 is a section through the primary and secondary pinch dies of my invention showing the positions of the primary and secondary pinch dies as the hammer approaches to strike the upsetting blow;

Figure 4 is a view similar to Figure 3 showing the changed position of the secondary pinch dies as the hammer strikes the severed end of the nail stock;

Figure 5 is a view similar to Figures 3 and 4 but showing the position of the secondary dies upon completion of the upsetting blow by the hammer;

Figure 6 is a cross-sectional view taken on the lines VI—VI of Figure 2 showing the position of the pinch dies and the pusher members as the hammer makes contact with the severed end of the nail stock; and

Figure 7 is a view similar to Figure 6 but showing the position of the pinch dies and the pusher members after the hammer has upset the nail stock to form the duplex heads.

Referring more particularly to the drawings, reference numeral 2 indicates a fluid supply line threaded into a port 4 which is located in the top of a die block 6. Port 4 communicates with passages 8 and 10 which in turn are connected to cylinders 12 and 14. The cylinders 12 and 14 are lined with piston or pusher bushings 16 and 18 in which are slidably positioned pusher members 20 and 22. The forward ends of the pusher members carry offset elongated shoe elements 24 and 26 which respectively bear against the upper and lower rearward portions of both halves 28 and 30 of the secondary pinch or head forming die. Half 32 of the primary pinch die is normally



stationary, but is adjustable by means of a screw 34. The other half 36 of the primary pinch die is moved toward the half 32 by means of a push rod 38 and pulled away therefrom by rod 39. The two halves 32 and 36 are held down by clamping blocks 35 and 37. The two halves 28 and 30 of the secondary pinch die are slidably mounted in holder members 40 and 42 so as to be movable parallel to the axis of the nail stock S. Holders 40 and 42 are slidably mounted in die block 6 and are reciprocated by means of push rods 46 and 48. The halves 32 and 36 of the primary pinch die are recessed as indicated at 50 to accommodate the forward and rearward movement of the elongated shoe elements 24 and 26. Hammer 52 is provided for striking the severed end of nail stock S.

In operation, fluid under pressure is introduced into port 4 continuously and travels through passages 8 and 10 into the cylinders 12 and 14, thus providing a cushion against the rear ends of pusher members 20 and 22. In this manner, the elongated shoe elements 24 and 26 on the ends of the pusher members are kept in continuous contact with the rearward portions of both halves of the secondary head forming die. The pressure of the cushion is not sufficient to retard the effect of the hammer blow against the severed end of the nail stock in upsetting the duplex heads, but is sufficient to reposition the secondary die after the heads are formed and the hammer is withdrawn. Recess 50 on the surface of the halves 32 and 36 of the primary die permits the elongated shoe elements 24 and 26 to slide rearwardly when the hammer blow is struck. Figure 3 shows the halves 28 and 30 of the secondary head forming die in retracted position. As the hammer 52 approaches the severed end of the nail stock S, the die halves 28 and 30 move inwardly so as to grip the nail stock S just prior to the time that the hammer 52 strikes the end thereof. Figure 4 shows the halves 32 and 36 of the primary die and the halves 28 and 30 of the secondary die gripping the nail stock S and the hammer 52 striking the end thereof. The first head of the nail is shown partly upset between the primary and secondary dies and the second head is shown beginning to form between the secondary die and the hammer.

Figures 5 and 7 show the position of the halves 28 and 30 of the secondary die upon completion of the upsetting action and before the hammer 52 is withdrawn. When the hammer 52 is withdrawn the cushion in the cylinders 12 and 14 will force out the pusher members 20 and 22 and cause the shoes 24 and 26 to return the secondary die to its initial position shown in Figures 3 and 6.

It is to be noted that each of the shoe elements 24 and 26 bears against both halves 28 and 30 of the secondary pinch die. This arrangement of parts makes it impossible to have either half of the secondary pinch die function independently of the other. If for some reason one of the shoe elements 24 and 26 fails to function, the remaining shoe element will continue to successfully actuate the two halves of the secondary pinch die. Even if both shoe elements cease functioning it is impossible for the wire to jam, so that the machine will continue to operate without damaging the dies. Under this condition

scrap nails are not produced as in the case of duplex head nail machines having the conventional type of die block and spring actuated secondary pinch dies, but instead, good single headed nails are produced.

While one embodiment of my invention has been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. In a single blow nail machine for forming duplex headed nails from nail stock, a die block having a port therein, primary pinch dies mounted in said die block having recessed portions in the outer surfaces thereof, secondary pinch die-holders slidably supported in the die block adjacent said primary pinch dies, secondary pinch dies slidably mounted in said holders for movement parallel to the path of travel of the nail stock, the movement of said secondary dies being in a direction at right angles to the longitudinal axis of said secondary die holders, and fluid actuated means within said die block communicating with said port for shifting said secondary dies to predetermined starting positions, said means comprising at least one fluid passage in said die block connected to said port, at least one cylinder within said die block connected with said fluid passages, a pusher member slidably fitted in each of said cylinders, and an offset extending shoe element mounted on the outer end of each of said pusher members, said shoe elements being slidably mounted in the recessed portion of the surface of said primary pinch dies and bearing against the rear ends of said secondary pinch dies.

2. In a single blow nail machine for forming duplex headed nails from nail stock, a die block having a port therein, primary pinch dies mounted in said die block, secondary pinch die-holders slidably supported in the die block adjacent said primary pinch dies, secondary pinch dies slidably mounted in said holders for movement parallel to the path of travel of the nail stock, the movement of said secondary dies being in a direction at right angles to the longitudinal axis of said secondary die holders, and fluid actuated means within said die block communicating with said port for shifting said secondary dies to predetermined starting positions, said fluid actuated means comprising at least one fluid passage in said die block connected to said port, at least one cylinder within said die block connected with said fluid passages, and a pusher member slidably fitted in each of said cylinders adapted to bear against the rear ends of said secondary pinch dies.

HERMAN V. PIERSON.

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