

(No Model.)

W. H. WOOD.  
HYDRAULIC RIVETING MACHINE.

No. 509,782.

Patented Nov. 28, 1893.

Fig. 1.

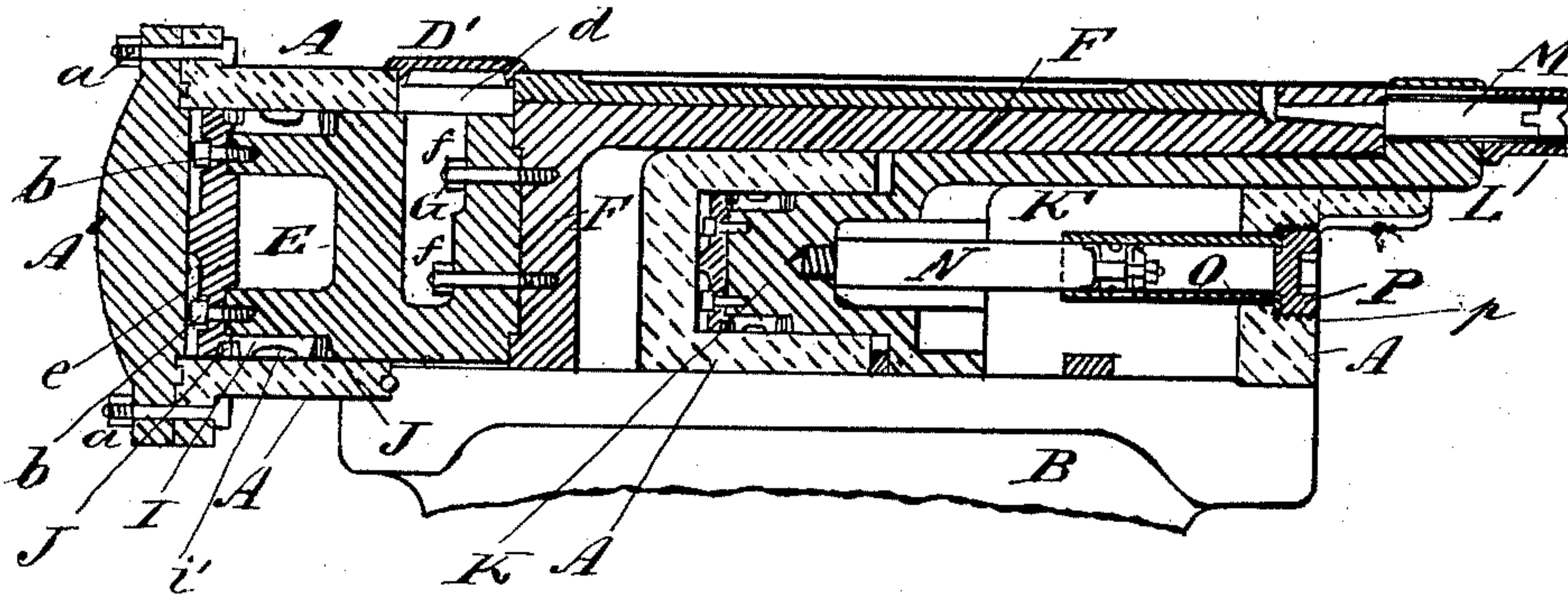


Fig. 2.

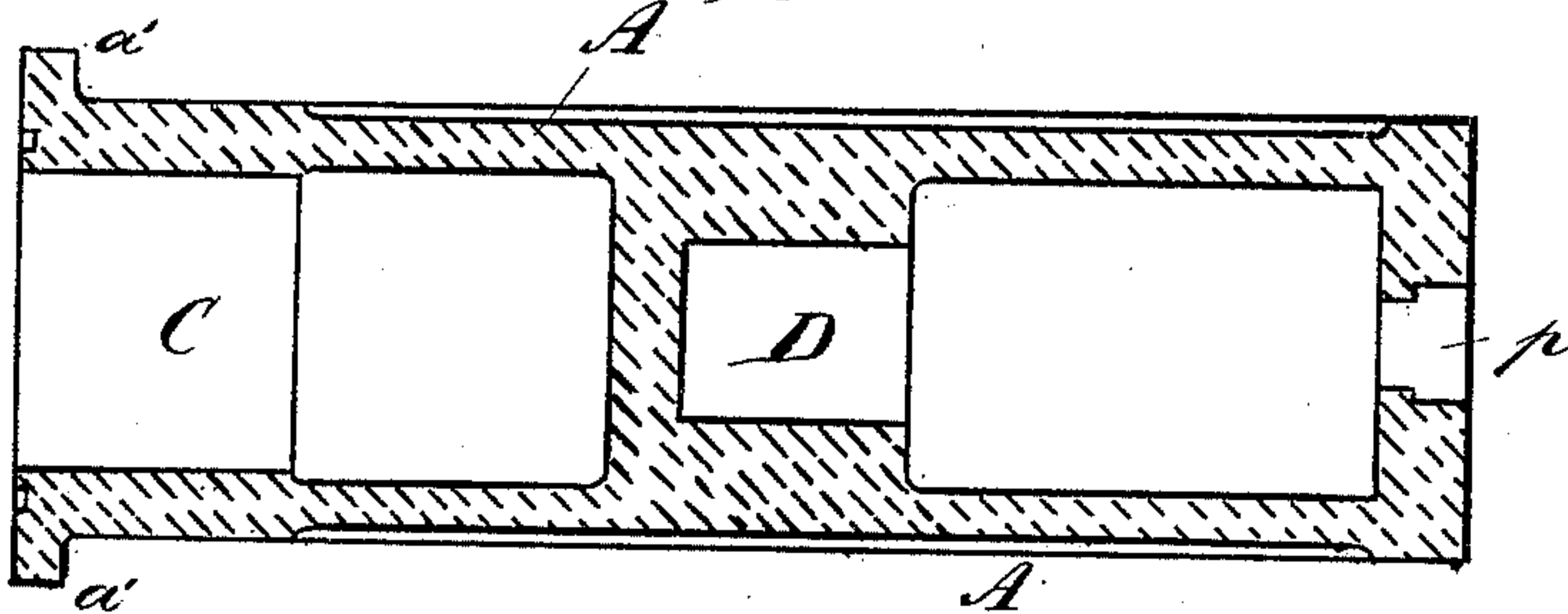


Fig. 3.

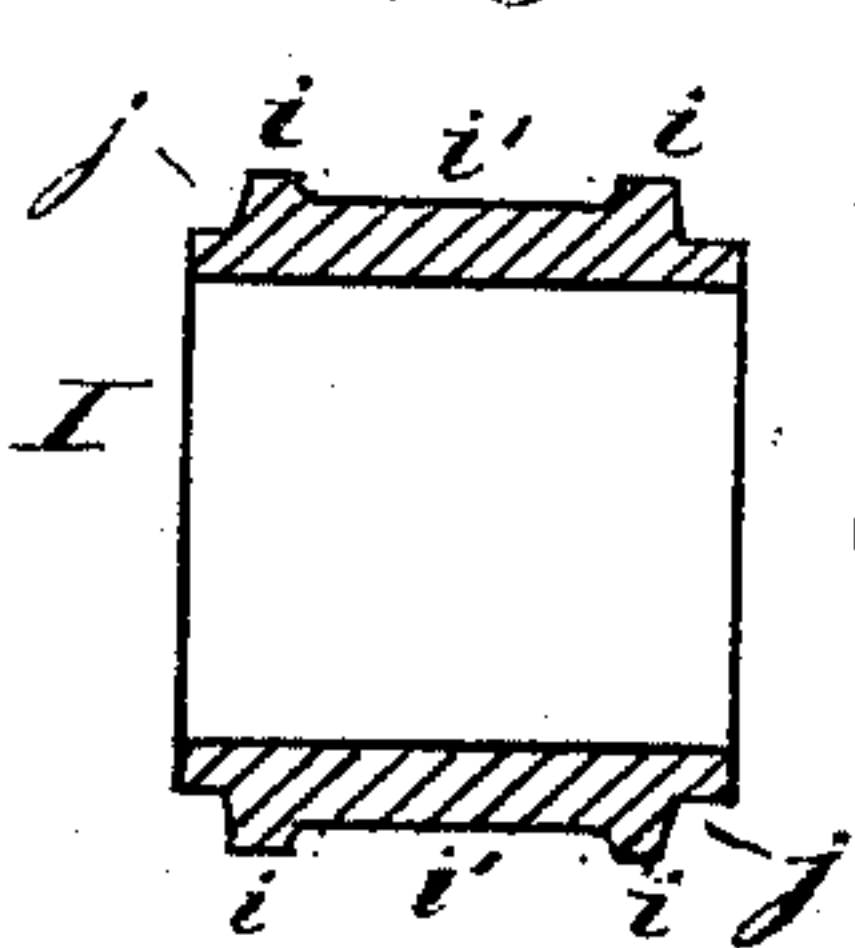


Fig. 4.

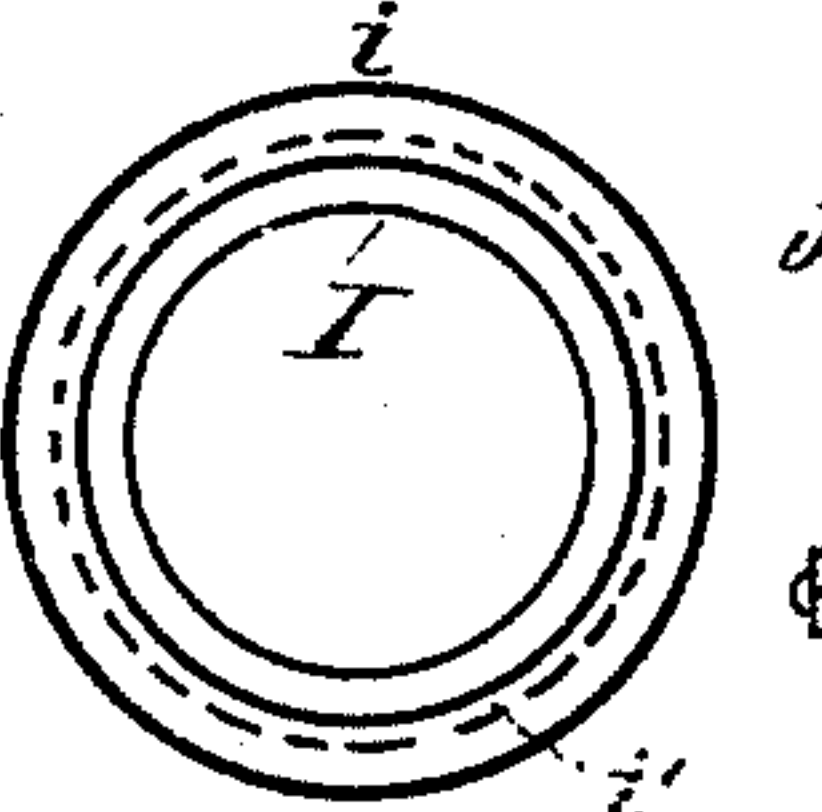


Fig. 5.

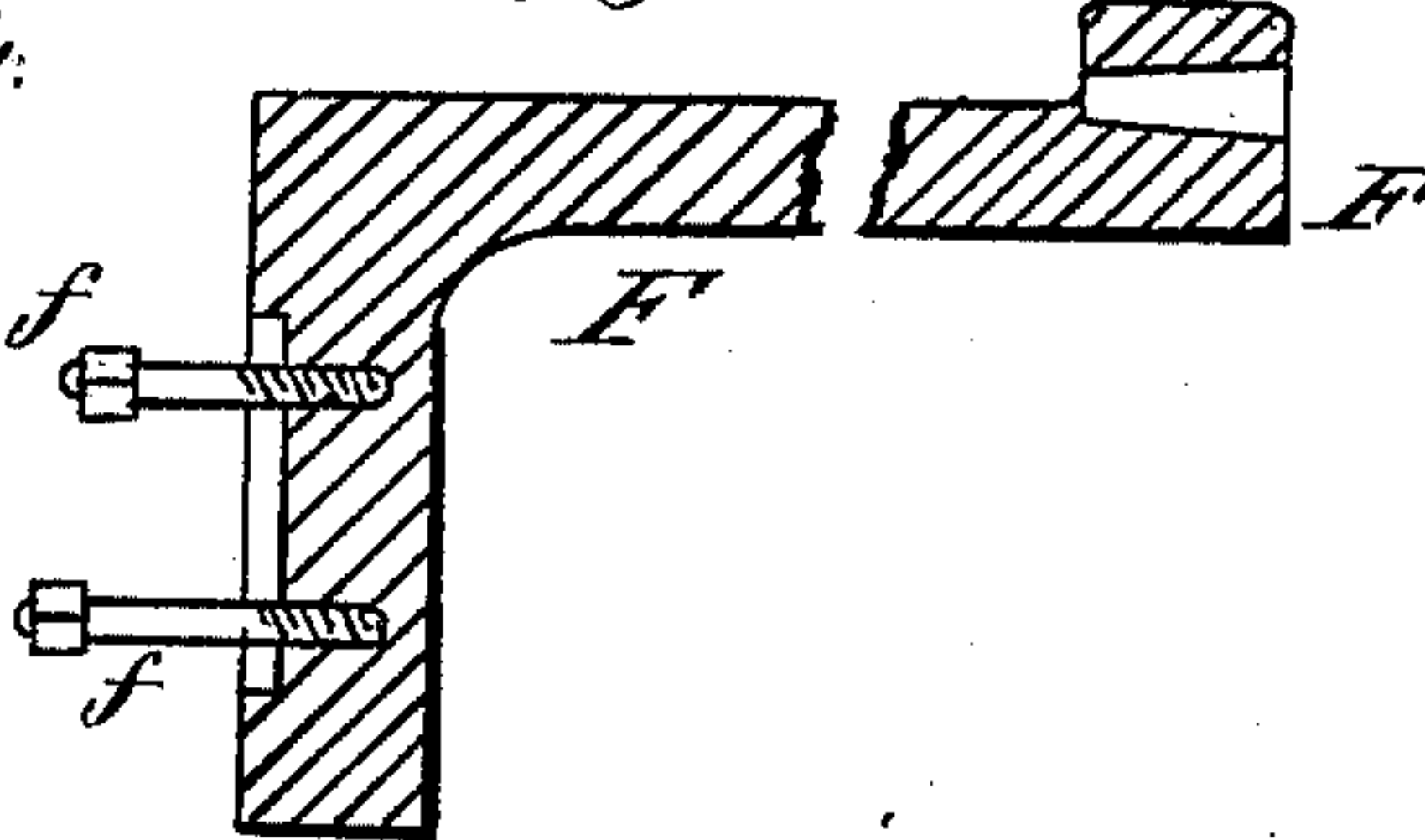


Fig. 6.

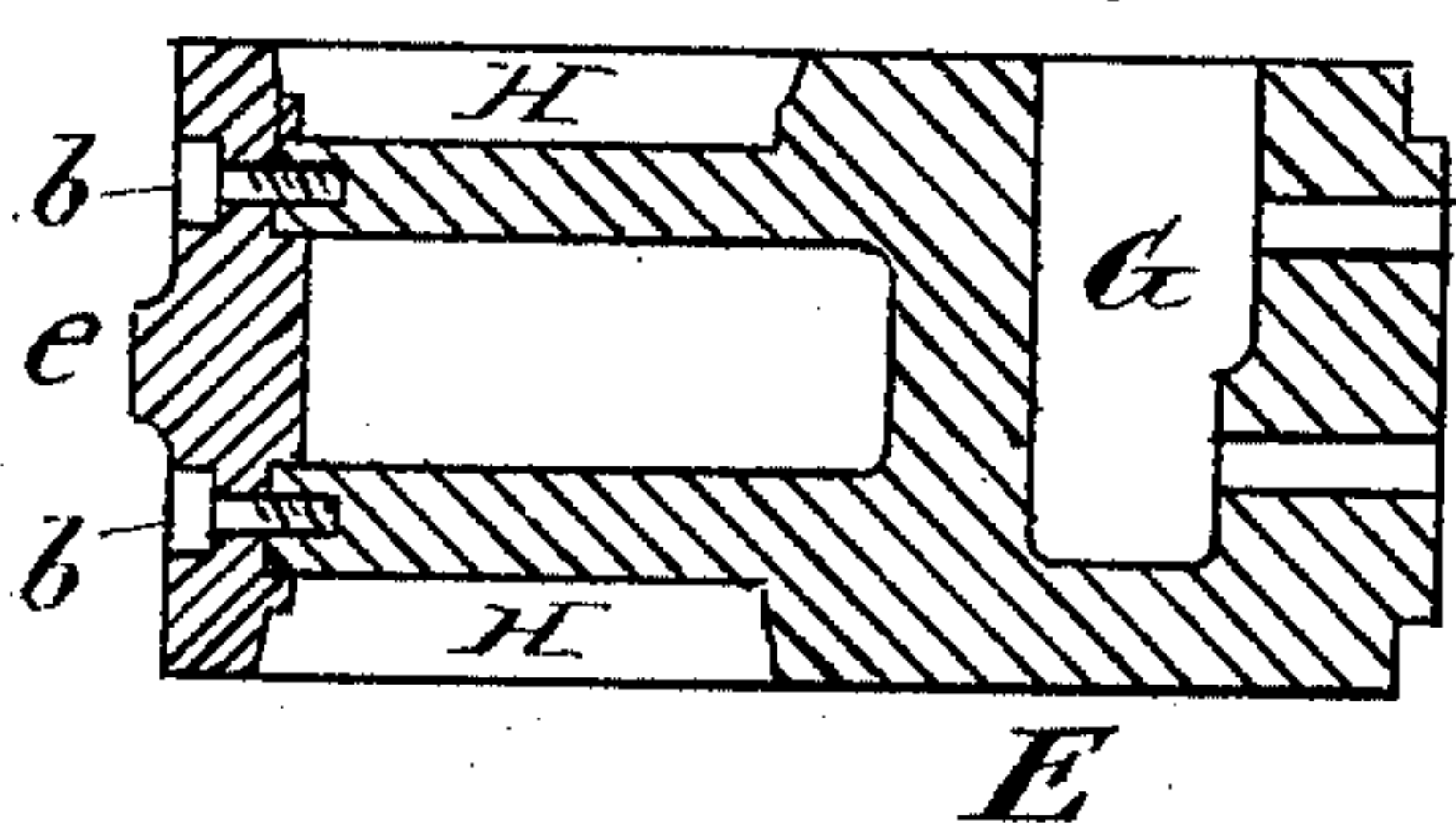
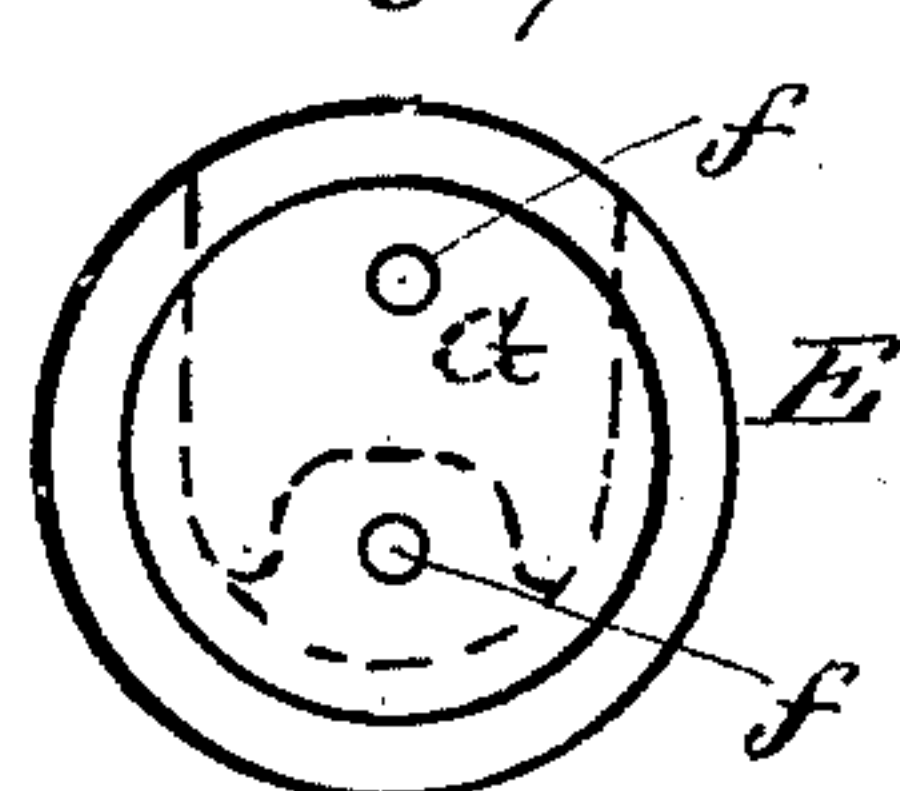


Fig. 7.



WITNESSES:

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*William H. Wood*  
*by Lewis Baggett & Co.*  
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# UNITED STATES PATENT OFFICE.

WILLIAM H. WOOD, OF MEDIA, PENNSYLVANIA.

## HYDRAULIC RIVETING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 509,782, dated November 28, 1893.

Application filed January 10, 1893. Serial No. 457,932. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. WOOD, a subject of the Queen of Great Britain, and a resident of Media, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Hydraulic Riveting-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a view, in longitudinal section, of my improved riveting machine. Fig. 2 is a sectional view in plan, or at right angles to the view shown in Fig. 1, of the steel frame of casing of the machine, within which the plungers work. Fig. 3 is a sectional view of the packing sleeve on a plane through the axis of the same. Fig. 4 is an end view of the packing sleeve. Fig. 5 is a view, in longitudinal section, of the rear end of the driving-head of the main plunger. Fig. 6 is a longitudinal sectional view of the main plunger; and Fig. 7 is an end elevation of the same.

Like letters of reference denote corresponding parts in all the figures.

The invention has relation to direct-acting hydraulic machines for riveting and such like operations, and it consists in the improved construction and combination of parts, as hereinafter more fully described and claimed, of the exterior steel casing and the plungers which work within the same and operate the riveting or other tool, as for example, a plate-closer, punching-die, or such other implement as the machine may be designed to operate.

Referring to the accompanying drawings, the reference letter A designates the cylindrical casing of the machine, which is made of cast steel, very strong and solid, and securely mounted upon a base, B, as usual. This casing contains two cylinders, C and D, of different diameters, the rearmost cylinder C being the larger of the two, as clearly shown on Fig. 2; and the top part of casing A, above this cylinder C, is cut away to form an aperture, *d*, which is closed by cover D', to prevent any dirt entering the machine. By removing this cover, access may easily be had

to the interior of the machine when it is desired to detach the driving-head from the plunger.

Fitting within cylinder C is the large or main plunger or follower E, to the rear end of which is bolted its follower head *e*, while its forward end is drilled through for the insertion of bolts *ff*, by means of which the driving-head F is fastened detachably to the forward end of the plunger. In order that access may be had to the bolts *ff*, so as to loosen or unscrew their nuts when cover D' has been opened, for the purpose of removing plunger E or adjusting it relative to its driving-head F, the plunger is made with a top recess G, registering or coinciding with the aperture *d* in casing A when the plunger is at the end of its back stroke, as illustrated in Fig. 1. Plunger E has also, back of this top recess G, an annular recess H, which is ground to fit an annular packing-sleeve or collar I, shown in detail in Figs. 3 and 4. This sleeve has two end flanges, *ii*, forming a central annular recess *i'* and annular end recesses *jj*, in which latter the packing J is placed. By tightening up the bolts *bb*, by means of which the follower head *e* is fastened to the rear end of the plunger this packing J between the sleeve and the follower and between the sleeve and the plunger may be squeezed or compressed laterally so as to make a tight fit, preventing the water from passing into the front part of the machine.

In this type of riveters as heretofore constructed, it has been customary to cast the head or end of the stationary casing A integral with, or in a solid piece with, the body of the cylinder, so that the plungers and other movable operating parts of the machine could only be withdrawn for inspection or needed repairs, through the top of the casing by removing the cover, pushing back the plungers, and, where a "plate-closing" plunger was used, this also would have to be removed in order to gain access to the interior of the machine. This has, as will readily be understood, been a serious drawback, to obviate which I construct my casing A with a removable head A', which is fastened securely to the open rear end of the casing by strong steel bolts *a*, inserted through an annular rim or flange, *a'*, encircling the open rear end of



casing A. Thus, by simply withdrawing the bolts *a a*, the cylinder head A' may be removed, permitting the plunger E to be withdrawn through the rear end of the machine (by first detaching it from its driving-head F by removing the nuts of bolts *ff*).

Another important advantage of this construction is, that it permits of a complete and easy inspection and examination of the interior of the cylinder, after the plunger has been removed, by placing a light within the hollow casing so as to ascertain if the smooth cylindrical interior has been scratched or abraded by grit or sand contained in the water, so that, if any such injury is found to exist, the damage may be repaired by scraping and "truing" the inside of the cylinder. This is of very great importance, because any scratches on the wall of the cylinder are apt to form minute ducts or channels, which would permit the water under heavy pressure to pass ahead of the plunger and thus cause leakage which may seriously interfere with the successful operation of the machine at its full working pressure.

Inside of the smaller cylinder D, within the casing A, is located the smaller or supplemental plunger K, which is simply a duplication of the main plunger and driving-head E F on a reduced scale. Unlike this, however, this supplemental plunger is (preferably) made in one piece with its driving-head K', the projecting forward end of which forms a removable cylindrical cap L, encircling the die-holder M at the projecting outer end of the large driving-head F. Generally, the large plunger with its driving-head and die-holder will be the one in use; but for certain kinds of work requiring a less degree of pressure, the smaller plunger will be found to answer the purpose, in which case the die-holder or tool-holder M is removed while tool-holder L is attached to the projecting end of the driving-head K' appertaining to the smaller plunger and the proper tool adjusted therein. It is optional which one of the two plungers is to be used for the time being, only one being used at a time, however, and the choice of the one depending upon the character of the work to be performed by the machine. The small plunger K has a removable follower-head and is also provided with an annular flanged and recessed packing-ring and packing, which, as will be seen from Fig. 1, is constructed and arranged with reference to cylinder D precisely as the corresponding parts in the large plunger with reference to its cylinder C. Within the smaller or supplemental plunger K K' is located the so-called "push-back" plunger N, which works in a small cylinder O, inserted into the small plunger from the front end of the casing and held in position by a packed nut P, screwed into a circular threaded opening *p* in the front end of casing A, so that by removing this nut, cylinder O with its plunger N may be removed for repacking or repairs, when nec-

essary. The object of plunger N is, as its name indicates, to effect the rearward motion or back-stroke of both the main (large) and supplemental (small) plungers, and to this end the cylinder O is always in communication with the pressure reservoir or accumulator, so that the pressure on its plunger can push back the main plunger E F and the supplemental plunger K K' when these are relieved from hydraulic pressure. When the main plunger is used, it carries with it the supplemental plunger, but the exhaust valve of cylinder D being open, it does not operate. On the other hand, when it is the supplemental plunger that is being operated, the main plunger will remain stationary within its cylinder C, the discharge or exhaust valve of which is then open.

From the forgoing description, taken in connection with the drawing, the operation of the machine will readily be understood without further explanation.

It will be seen that the packing J (preferably in the nature of leather washers placed upon the sleeve I at opposite ends, so as to impinge upon the retaining-flanges *i i*) and the follower and plunger respectively can easily be adjusted or removed simply by removing the head A' and disconnecting and withdrawing plunger E, which carries the packing-sleeve with it, and if it is not desired to renew said packing, but simply to compress it laterally so as to make a tight fit within cylinder C, all that is necessary is to screw down the bolts *b*, which forces the movable follower-head *e* up against the adjacent packing, so as to compress it against the retaining flange *i* at the end of the sleeve—an operation which does not require the removal of plunger E from the casing or its disconnection from the driving-head; the temporary unfastening and removal of the casing head A' being all that is necessary. Should any grit contained in the water slip past the packing, it will collect in the annular recess *i'*, where it can do no harm and from which it can be removed by the withdrawal of the plunger and sleeve as occasion may require. I therefore look upon this packing-sleeve, and its combination with the plunger, as an important feature of my improvement.

The hydraulic connections for the admission to the cylinders of water under pressure, and for effecting the discharge from the cylinders prior to the back-stroke, do not differ from those of other direct-acting double-cylinder riveters of the same type, although I prefer to use, in this connection, a pressure-reducing valve invented by me, which forms the subject-matter of a separate application of even date herewith.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination, in a stationary riveting machine, of the casing or top having an aperture closed by a cover, the plunger hav-



ing a recess registering with said aperture, the driving-head, and the bolts connecting the plunger and driving-head, substantially as set forth.

5 2. In a stationary machine for riveting and analogous operations, the improved steel casing herein shown and described, open at its rear end and containing the large cylinder C and a smaller cylinder D, and having a top  
10 opening *d* provided with a cover D' and the large and small plungers, in combination with the head A' and bolts for fastening said head removably to the open rear end of the casing.

15 3. The combination in a riveting machine of the following elements; A stationary casing A open at its rear end, having an aperture *d* near its front end and an aperture *p* in its closed end, and a removable cover A' at its open end, the cover D' for closing aperture *d*, the packed nut P seated in aper-

ture *p*, the large plunger E, having recesses G and H, and provided with the removable and adjustable follower head *e*; the annular flanged packing sleeve I carried by said  
25 plunger; double packings J, J, one at each end of said sleeve on opposite sides of its annular recess; driving head F, having die holder M; bolts *f*, *f*, connecting said driving head and plunger together; supplemental  
30 small plunger K, having driving head K' integral therewith and provided with a cap or tool holder L, and the cylinder O, having the push back plunger N, substantially as described.

35 In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

WILLIAM H. WOOD.

Witnesses:

AUGUST PETERSON,  
BENNETT S. JONES.