

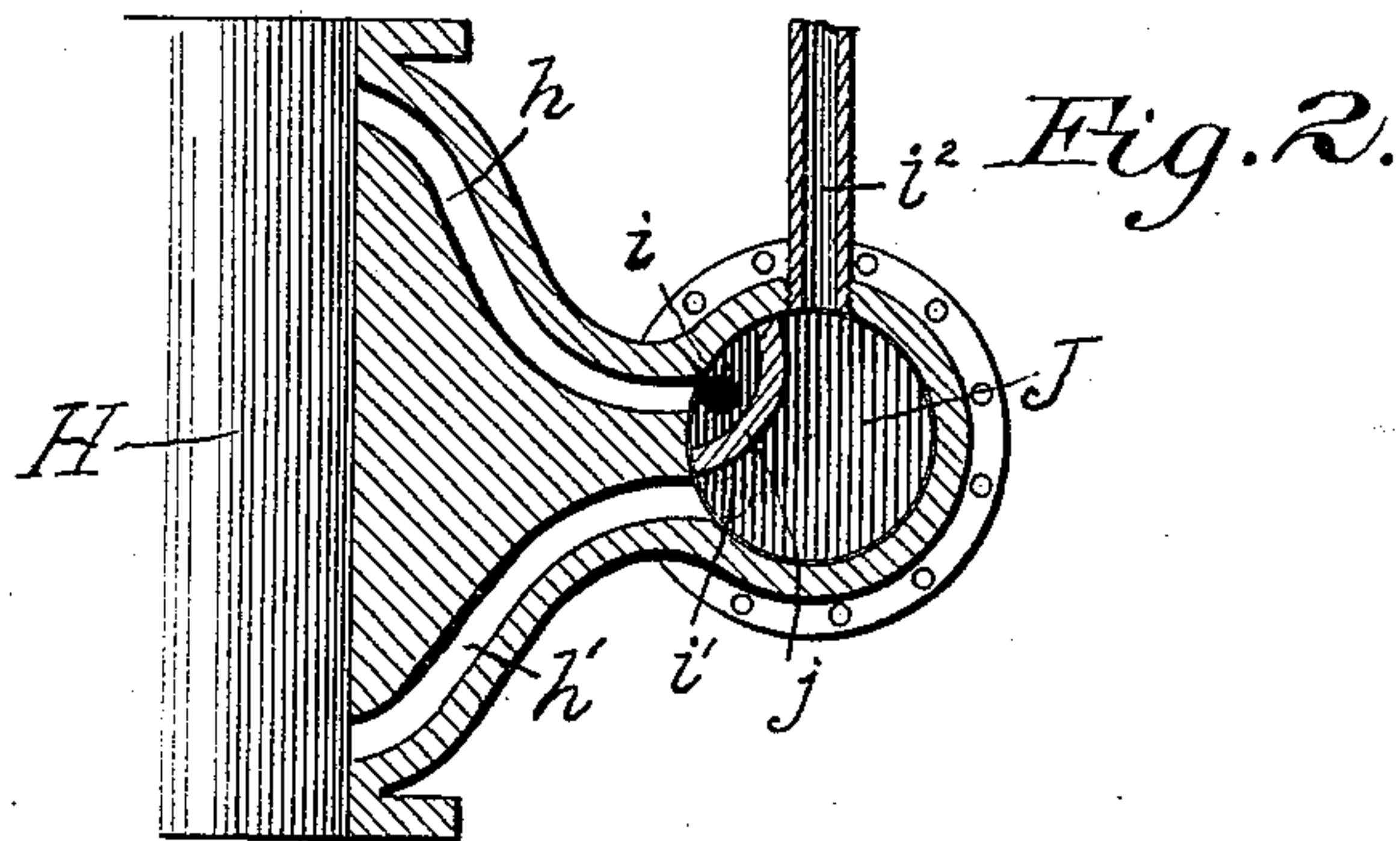
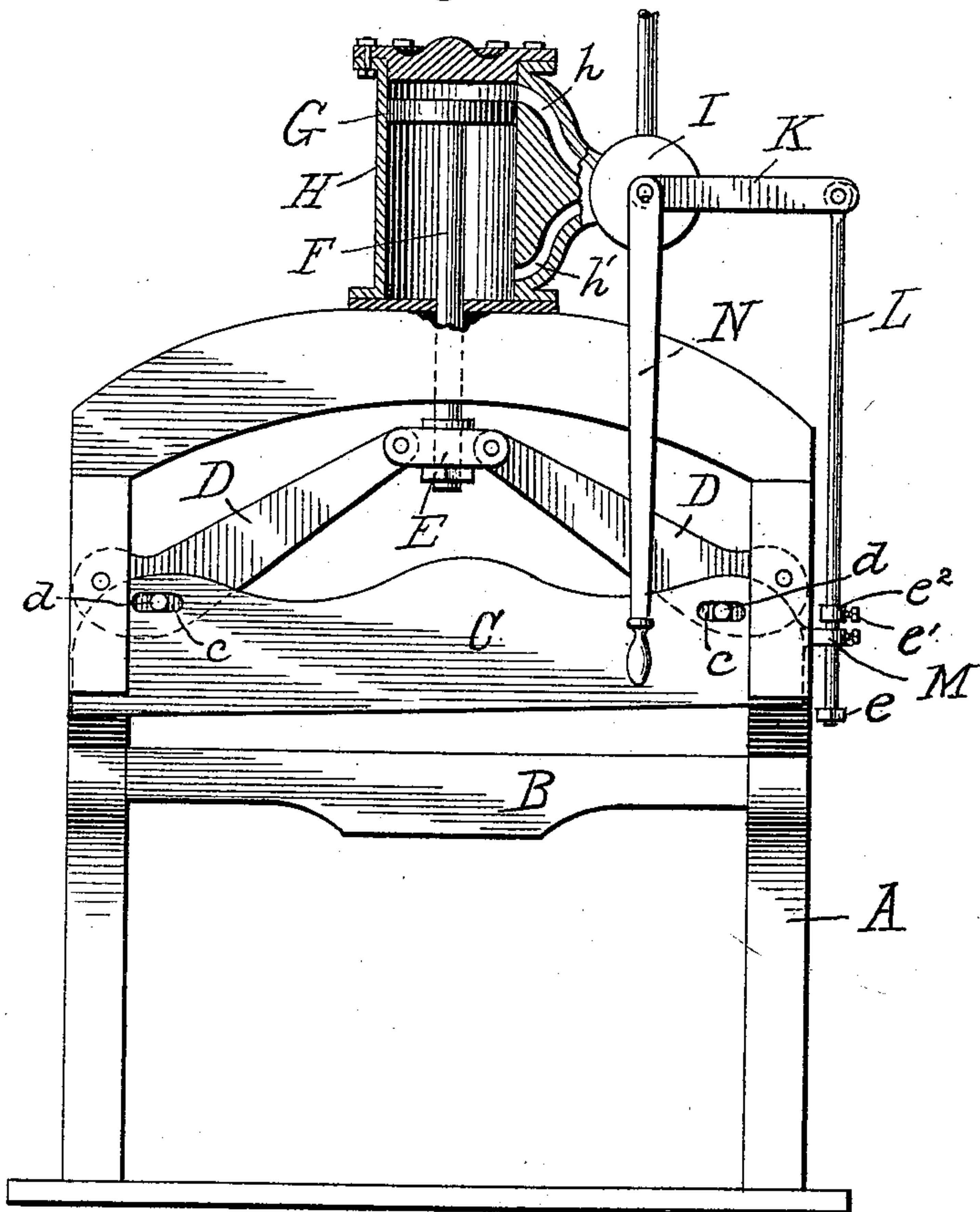
(No Model.)

E. T. HORNER.
METAL SHEARS.

No. 494,566.

Patented Apr. 4, 1893.

Fig. 1.



Witnesses
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UNITED STATES PATENT OFFICE.

ELWOOD T. HORNER, OF CAMBRIDGE CITY, INDIANA, ASSIGNOR TO THE
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METAL-SHEARS.

SPECIFICATION forming part of Letters Patent No. 494,566, dated April 4, 1893.

Application filed July 16, 1892. Serial No. 440,196. (No model.)

To all whom it may concern:

Be it known that I, ELWOOD T. HORNER, a citizen of the United States, residing at Cambridge City, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Metal-Shears; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in shearing machines and has for its object to provide mechanism whereby such machines may be automatically operated by steam, or other fluid pressure.

To this end my invention consists in the novel construction, arrangement and combination of parts hereinafter fully described and afterward pointed out in the claims, due reference being had to the accompanying drawings forming a part of this specification, wherein—

Figure 1 is a front elevation of my improved machine, and Fig. 2 is a sectional detail illustrating the interior construction of the valve.

Referring to the drawings, A indicates the upright frame of the machine to which is rigidly secured the fixed bed plate B. In suitable guide ways formed in said frame is mounted a vertically reciprocating shearing knife C provided with an inclined or beveled cutting edge to produce a shearing cut as usual. To each side of the frame A is pivoted one end of a lever D, the lower pivoted end of said levers being curved as shown and provided with pins or projections *d*, *d*, which rest in elongated slots *c*, *c*, formed in the opposite ends of the shearing knife C. The upper ends of the levers D, D, are pivoted to a connecting link E which is securely fastened by nuts or other suitable means to one end of a piston rod F, carried by a piston G. The piston G is fitted in a cylinder H mounted upon the top of the frame A and said cylinder is provided with two ports *h*, *h'*, communicating with each end of the cylinder and also communicating with a valve chest I. The valve chest I is circular in cross-section, as

shown in Fig. 2 of the drawings, and is provided with two exhaust ports *i*, *i'* and a supply port *i*². Within said valve chest is fitted a correspondingly-shaped rotary valve J provided with a semi-circular partition *j*, extending from end to end thereof and one of the heads of the valve is provided with a port not shown which is adapted to alternately register with the exhaust ports *h*, *h'*. Secured to the valve spindle is an arm K which at its outer end is pivotally connected to one end of a rod L, the other end of said rod passing through a lug M formed upon one end of the shearing knife C. To the lower end of the rod is secured a nut *l*, and to the rod at a point above the lug M is secured by means of a set screw *l'* a collar *l*². By means of the set screw *l'* said collar may be properly adjusted upon the rod L, for the purpose hereinafter made apparent. To the valve spindle is also secured a hand lever N by means of which the valve may be operated by hand to start and stop the machine as hereinafter described.

The material to be cut is fed to the machine by hand or by suitable feed mechanism and the operator, by means of the hand lever N turns the valve so as to admit steam, or other suitable fluid pressure employed for the purpose to the cylinder H, as for example, as shown in Fig. 2, the valve J, when in position, permitting the entrance of steam from the supply port *i*² to the lower end of the cylinder through the port *h'* and connecting the upper end of the cylinder with the exhaust port *i'* through the port *h*. The cylinder is thus raised carrying with it the levers D, D, and the shearing knife C. When the knife has been raised a certain distance the lug M strikes the collar *l*² on the rod L and raises said rod which, in turn raises the arm K and rotates the valve to reverse the piston G, which then descends and force down the arms D, D which exert a powerful leverage upon the shearing knife C and force it through the material to be cut with a drawing or shear cut. When the knife has nearly reached the limit of its descent the lug M engages the nut *l* on the end of the rod L and the valve is again reversed to permit the ascent of the piston, the knife being thus automatically reciprocated up and down without attention upon the part of the operator.

When it is desired to stop the operation of the knife the valve is turned, by means of the hand lever N, the proper distance to cut off both the ports h , h' , thus stopping the movement of the cylinder and bringing the machine to a rest.

The machine as above constructed is extremely simple and durable and can be operated with any source of fluid pressure at a minimum cost.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a shearing machine, the combination with a reciprocating shearing knife, of a piston and cylinder, connections connecting said piston and knife, a rotary reversing valve controlling both the inlet and outlet ports of the cylinder and a connection between said valve and knife for automatically reversing the valve at the end of the upward and downward movement of said knife, substantially as described.

2. In a shearing machine the combination with the reciprocating knife of a piston and cylinder, levers connecting said knife and piston, a rotary reversing valve controlling both the inlet and outlet ports of the cylinder, a rod provided with projections and suitably connected with said valve, and a lug on said knife adapted to engage said projections to raise and lower the rod to reverse the valve

at the end of each movement of the knife, substantially as described.

3. In a shearing machine, the combination with the frame A and reciprocating shearing knife C, of the cylinder H and piston G, the levers D connecting the said piston and knife, the reversing valve J controlling the inlet and exhaust ports of the cylinder, the arm K carried by said valve, the rod L pivoted to said arm, the nut l and collar l^2 carried by said rod, the lug M on the knife C adapted to engage said nut and collar to raise and lower said rod, and a hand lever N for operating the reversing valve by hand, substantially as described.

4. In a shearing machine, the combination with the frame A and reciprocating knife C mounted in guideways formed therein, and provided at opposite ends with elongated slots c , of the levers D curved at their lower ends and pivoted to the frame A and provided with pins d engaging the slotted ends of the knife, and a cylinder H and piston G, the piston rod being connected to the upper ends of the levers D, substantially as described and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

ELWOOD T. HORNER.

Witnesses:

B. F. DRISCHEL,
M. L. YOUNG.