

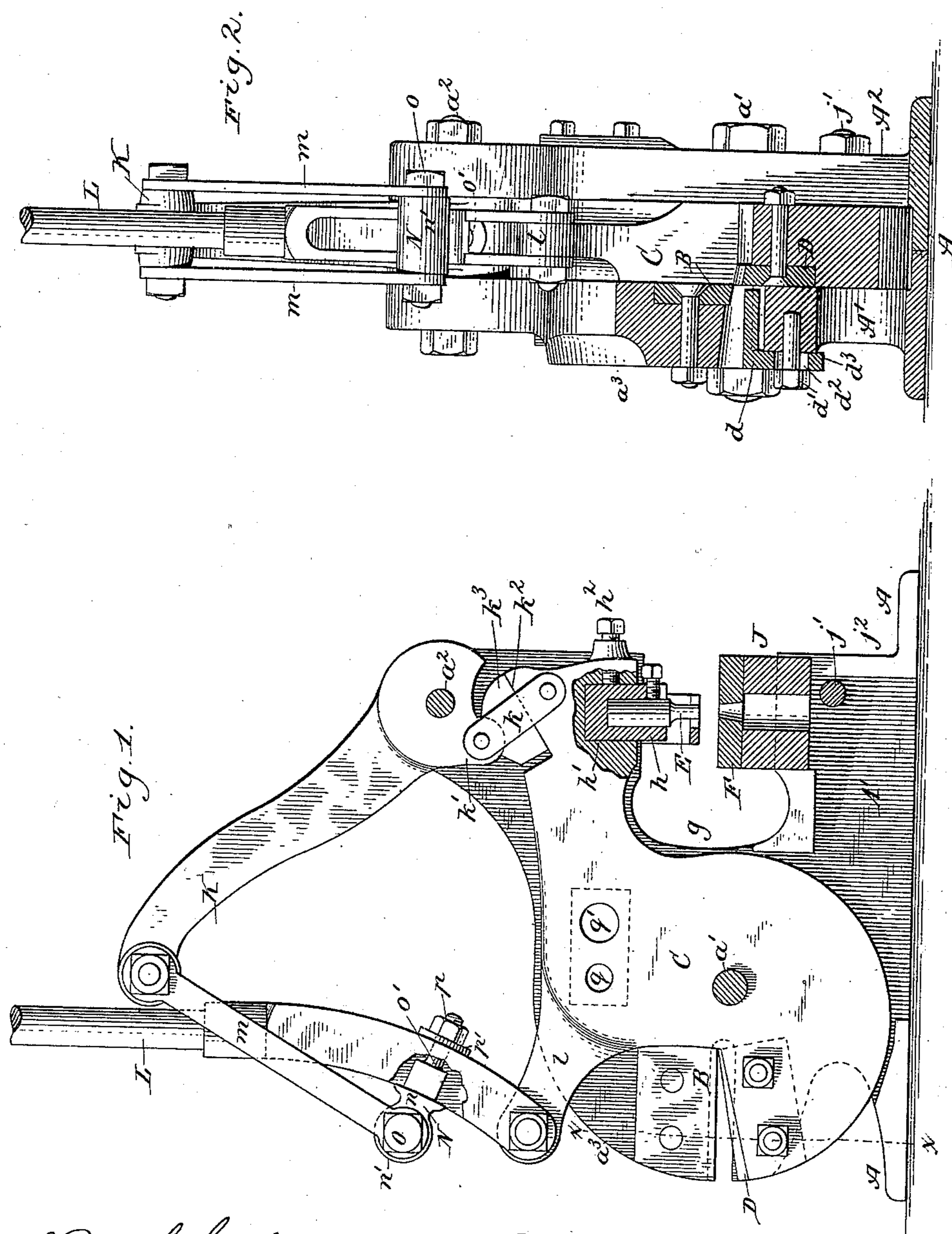
(No Model.)

2 Sheets—Sheet 1.

P. BROADBOOKS.
METAL SHEARS.

No. 405,526.

Patented June 18, 1889.



Chas. Buchheit.
Theo. L. Popp.

Witnesses.

Peter Broadbooks Inventor.

By Wilhelm Popp.

Attorneys.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

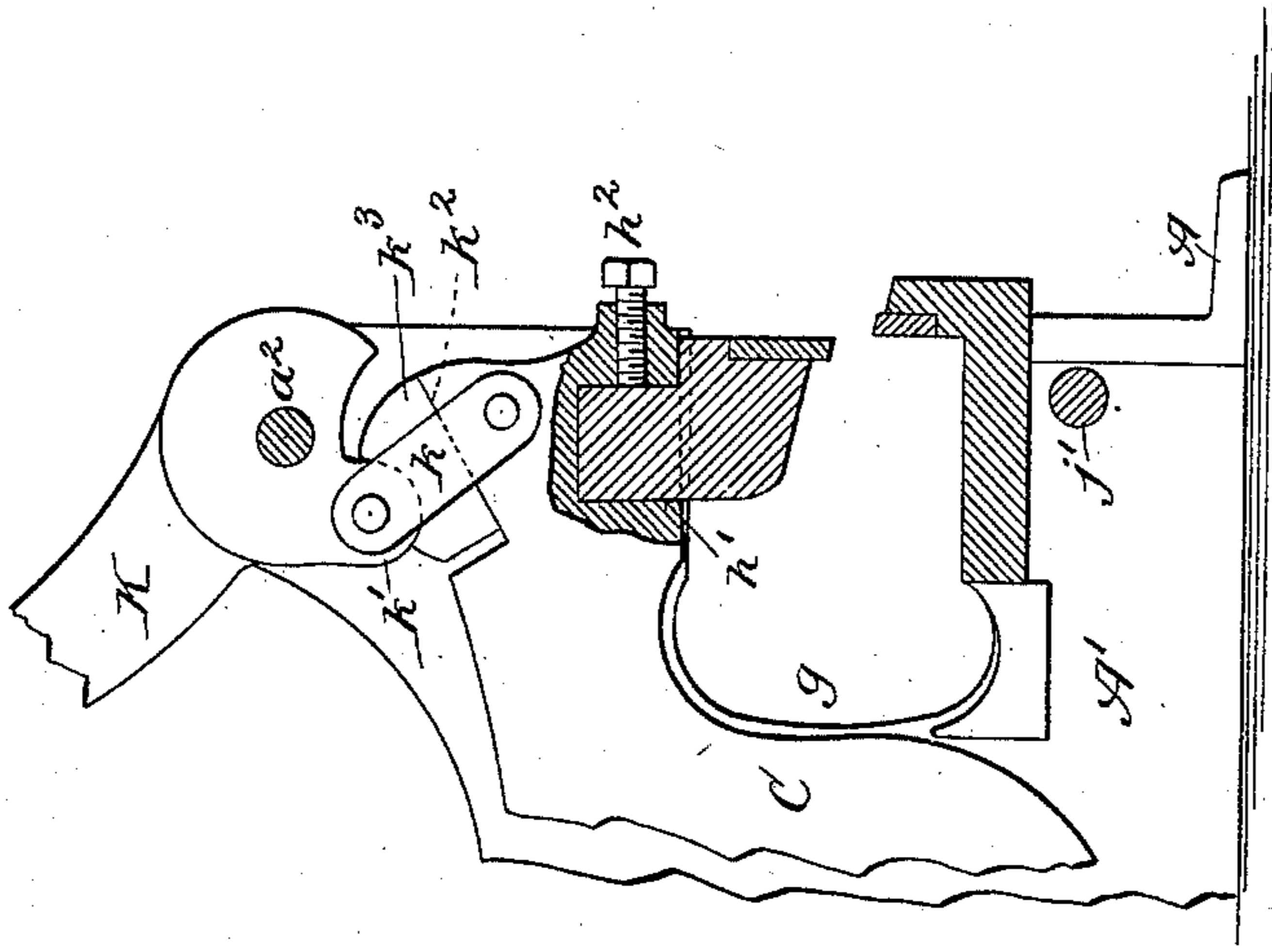


Fig. 4.

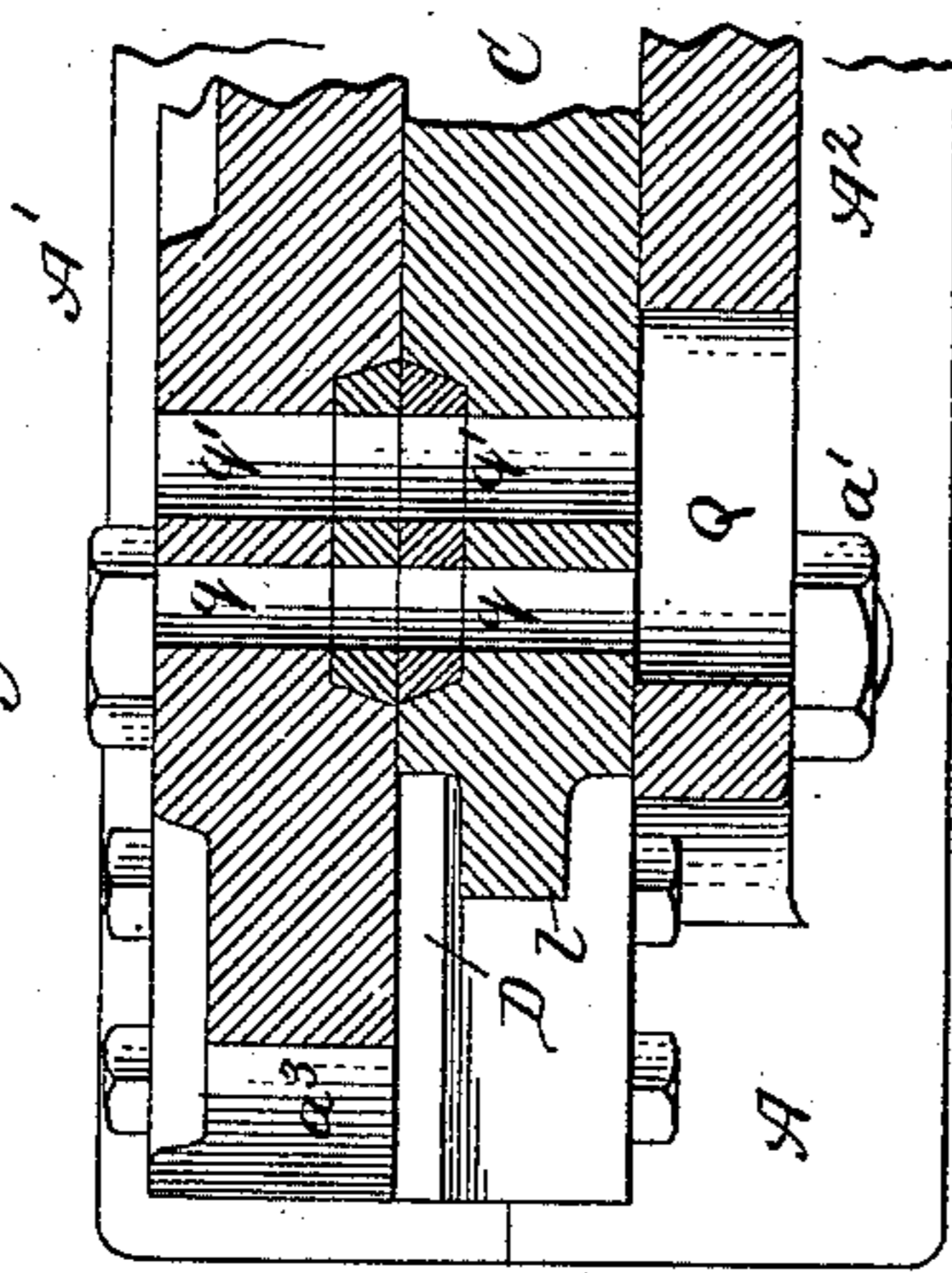


Fig. 6.

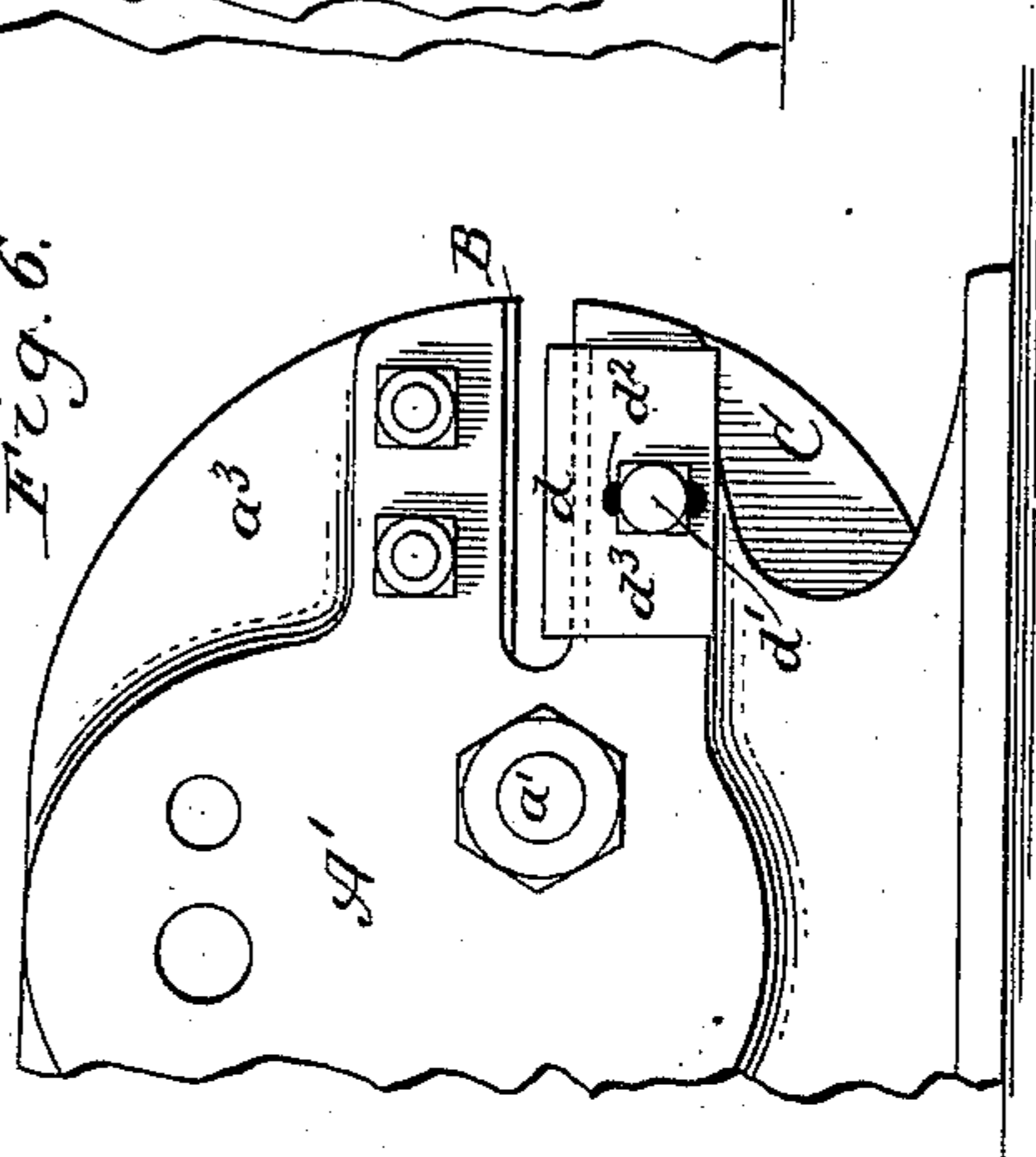


Fig. 3.

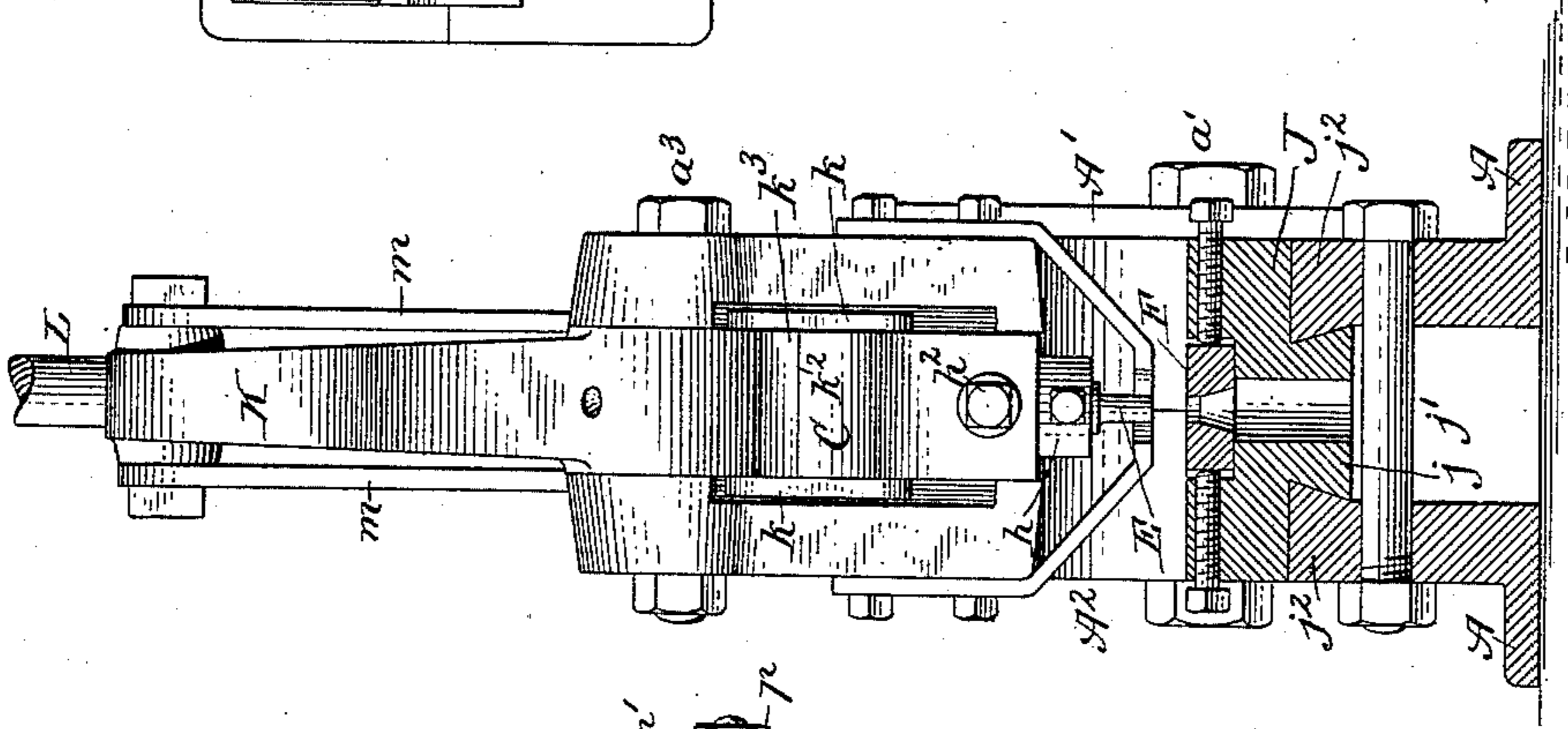
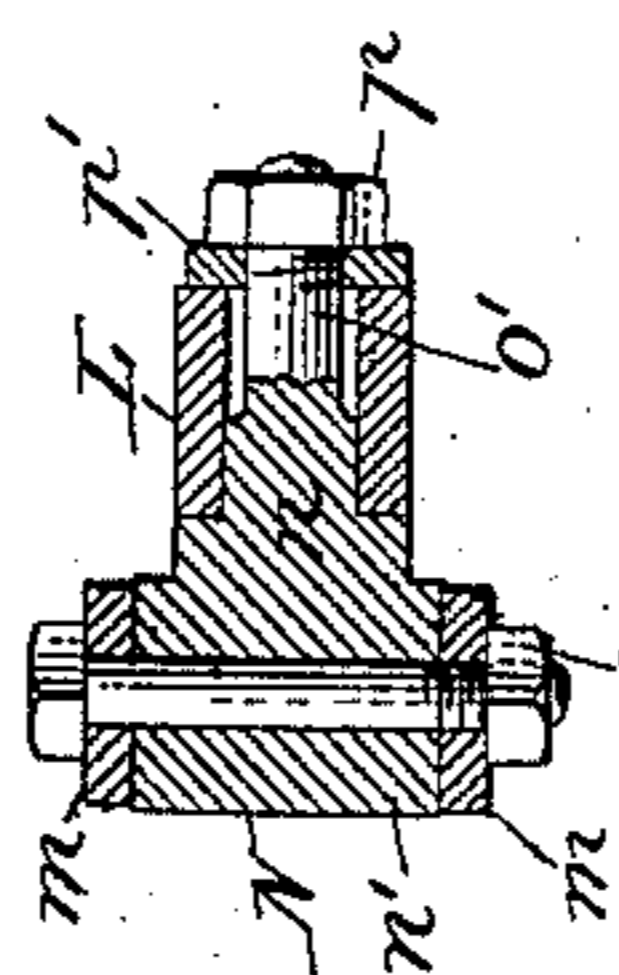


Fig. 5.



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UNITED STATES PATENT OFFICE.

PETER BROADBOOKS, OF BATAVIA, NEW YORK.

METAL-SHEARS.

SPECIFICATION forming part of Letters Patent No. 405,526, dated June 18, 1889.

Application filed January 10, 1889. Serial No. 295,909. (No model.)

To all whom it may concern:

Be it known that I, PETER BROADBOOKS, a citizen of the United States, residing at Batavia, in the county of Genesee, in the State of New York, have invented new and useful Improvements in Metal-Shears, of which the following is a specification.

This invention relates to that class of metal-shears which combine in their organization a shear and punch or two independent shears arranged at opposite portions of the machine, so that the same machine may be employed both for shearing and punching metal, or for cutting bar as well as strip or plate iron.

My invention has the general object to produce a powerful machine of this character which shall contain few parts and which shall be simple and compact in construction.

The invention has the further object to provide the machine with a rest or support for the bar or plate to be cut, so as to prevent wrenching of the cutting-jaws by the tipping or rising of one end of the bar placed between the jaws, and also to improve the machine in several other respects.

The invention consists of the improvements, which will be hereinafter fully described, and pointed out in the claims.

In the accompanying drawings, consisting of two sheets, Figure 1 is a sectional side elevation of my improved shear with one of the side plates removed to show the interior construction of the machine. Fig. 2 is a sectional elevation of the end of the machine at which the shear is located, the section being taken in line *xx*, Fig. 1. Fig. 3 is a sectional elevation of the end of the machine at which the punch is arranged. Fig. 4 is a fragmentary horizontal section of the upper portion of the oscillating frame and adjacent side frames of the machine, showing the shear for cutting small metal bars. Fig. 5 is a cross-section of the adjustable clamp whereby the links attached to the cam-lever are connected to the actuating-lever. Fig. 6 is a fragmentary side elevation of the shear end of the machine. Fig. 7 is a sectional side elevation of a modified construction of the machine, showing a pair of transverse cutters or shearing-knives substituted for the punch.

Like letters of reference refer to like parts in the several figures.

A represents the base or bed plate of the machine, which is preferably divided longitudinally at its center, as shown, and $A' A^2$ are two parallel vertical side plates rising from the divided base A, the side plates and the parts of the base being secured together by horizontal bolts $a' a^2$, passing through the side plates. The side plate A' projects forwardly beyond the other side plate A^2 , as shown at a^3 in Fig. 4, and to this projecting portion is secured a stationary cutting jaw or blade B.

C represents an oscillating lever-frame arranged between the side plates $A' A^2$, and pivoted between its ends by the horizontal bolt a' , passing through openings in the oscillating frame and side plates. The front portion of the oscillating frame C is arranged below the projecting portion of the side plate A' , and is provided with a cutting jaw or blade D, which operates in conjunction with the upper stationary jaw B.

d represents a flat horizontal rest or support for the bar to be cut, arranged directly underneath the overhanging portion a^3 of the side plate A' , opposite the movable jaw D, and separated from said overhanging portion by a narrow space, which receives the bar of metal. A bar in being cut tends to tip upwardly at one end, swinging upon the cutting-edge of the upper stationary knife as a fulcrum, and this tipping of the bar is liable to wedge the cutters apart and break the jaws of the machine. The rest d acts as a stop, which holds the bar in a horizontal position and prevents tipping thereof.

By arranging the rest so as to bear against the under side of the bar to be cut a clear space is left above the bar and an unobstructed sight is obtained, which enables the operator to accurately locate the bar between the shearing-jaws before cutting the same. This arrangement also brings the rest in very close proximity to the meeting edges of the cutting-jaws, and affords a support for the bar when but a short length is to be cut from the same, which result it is impossible to accomplish when the rest is so located as to bear against the upper side of the bar, as in this latter case the rest must necessarily be placed at a distance from the jaws, so as not to interfere with the operation thereof.

The rest d may be stationary and formed in one piece with the base A of the machine; but it is preferably made vertically adjustable on the adjacent side plate A', as shown, so that the rest may be raised and lowered to increase or diminish the space between the rest and the overhanging portion a^3 of the side plate A' in accordance with the approximate thickness of the metal to be cut, thereby enabling different-sized bars to be held more snugly than is possible when the rest is stationary and gaged for the average size of bars which may be cut in the machine. The rest d , in connection with the projecting portion a^3 , also serves as a gage, which determines the greatest thickness of metal which the machine is designed to shear, and it thus prevents the introduction between the cutters of a thicker bar than the machine is able to cut without liability of its being broken.

The rest is made adjustable by means of a set-screw d' , arranged in a threaded opening in the side plate A', and passing through a vertical slot d^2 , formed in an angular flange d^3 , with which the rest is provided.

E represents a punch secured to the rear end of the oscillating frame C, and F is a stationary punching-die arranged at the rear end of the machine, underneath the punch E. The rear portion of the machine adjacent to the punch and die is recessed in the usual manner, as shown at g .

h is the tool-holder carrying the punch E, and it is secured in a vertical socket h' , formed in the rear portion of the oscillating frame C by means of a set-screw h^2 . The punching-die F is secured to a removable holder J, having in its under side a dovetail rib or tenon j , which is clamped between the adjacent rear portions of the side plates A' A² by means of a horizontal bolt j' , passing through said plates below the holder J, the contiguous portions j^2 of the side plates being correspondingly dovetailed or recessed, so as to confine the tenon of the holder between the side plates. This construction permits the die-holder J to be readily removed by loosening the clamping-bolt j' and a stamping-die, shearing-knife, or other tool to be substituted for the same, as shown in the modified construction in Fig. 7, in which a shearing-blade is secured between the side plates A' A². In this case the punch E is removed from the oscillating frame C, and a holder carrying a shearing-blade is secured in the socket h' . When cutters are substituted for the punch, they are preferably arranged at right angles to the cutters of the front shear, as shown, so that the front shear may be used for cutting bars transversely, and the rear shear for cutting plates or strips of metal lengthwise. The holder carrying the lower cutter of the rear or transverse shear is provided with a dovetailed rib similar to the die-holder J, so that the same can be clamped between the side plates A' A².

K represents a cam or eccentric lever,

whereby the lever-frame C is oscillated on its pivot, so as to cause the cutter D to move toward the upper stationary cutter B and the punch E to descend. This cam-lever is pivoted at its inner end between the upper rear portions of the side plates A' A² by the cross-bolt a^2 , and is connected with the adjacent end of the oscillating frame C by links k . The cam-lever is provided with a convex nose k' , and between this nose and an incline k^2 on the oscillating frame is arranged a sliding block k^3 , the latter being provided in its upper side with a concave recess in which the nose k' is seated. Upon depressing the cam-lever K the nose k' moves the block k^3 rearwardly on the oscillating frame C, and causes the block to depress the adjacent end of the oscillating frame, thereby lowering the punch E and swinging the lower movable jaw D upwardly toward the stationary jaw B. Upon raising the cam-lever the links k elevate the rear end of the oscillating frame, opening the cutting-jaws B D, and elevating the punch E. In depressing the cam-lever K the sliding block receives nearly all the strain, thereby relieving the pivot-pins of the links k , which latter serve only to swing the oscillating frame on its pivot in opening the cutting-jaws and elevating the punch, and do not receive any of the strain during the shearing or punching operations. The openings through which the pivot-pins of the links k pass are made sufficiently large to allow of the necessary play of the pins in depressing the cam-lever K.

L represents the main actuating-lever of the machine, which is preferably pivoted at its bifurcated inner end to a lug l , formed on the oscillating frame C, so as to obtain increased leverage and assist in swinging the oscillating frame on its pivot; but, if desired, it may be pivoted to the stationary frame of the machine. The actuating-lever L is connected with the cam-lever K by links m , attached at their upper ends to the upper ends of the cam-lever and at their lower ends to a clamp N, which is adjustably secured to the bifurcated portion of the actuating-lever, so that the lower ends of the links m may be arranged at a greater or less distance from the fulcrum of the actuating-lever to increase or reduce the stroke of the lever and the range of movement of the cutting-jaw D. The clamp N consists of a block n , bearing against the under side of the lever and provided with a transverse bearing n' , through which passes a pivot-bolt o , connecting the links m , and a shank o' , passing between the branches of the bifurcated portion of the lever and having a clamping-nut p and washer p' bearing against the upper side of said branches. Upon loosening the nut p the clamp N can be moved toward and from the fulcrum of the lever L, and when properly adjusted it is again secured in place by tightening said nut.

The side plate A' and oscillating frame C are provided with horizontal circular open-

ings $q q'$, which coincide with each other when the parts of the machine are at rest, but which pass and partly cover each other when the oscillating frame swings on its pivot.

5 The contiguous parts of the openings in the side plates and oscillating frame are provided with circular shearing knives or cutters, which are adapted to shear round bars placed in said openings.

10 The side plate A^2 is provided opposite the openings $q q'$ with an elongated opening Q , through which the bars or rods to be cut are passed to the openings $q q'$, as shown in Fig. 4.

I claim as my invention—

15 1. In metal - shears, the combination, with the stationary frame provided at one end with an upper stationary cutter or jaw, of an oscillating lever-frame pivoted between its ends to the stationary frame, and carrying at
20 one end a lower movable cutter or jaw co-operating with the stationary jaw of the frame and at its opposite end a punch or other cutting-tool, a cam-lever pivoted to the stationary frame, whereby said oscillating frame is
25 swung on its pivot, and an actuating-lever connected with said cam-lever, substantially as set forth.

2. In metal - shears, the combination, with the stationary frame composed of upright
30 parallel side plates and having a punching-die at one end and an upper stationary shearing-jaw at its opposite end, of an oscillating frame pivoted between the stationary side plates of the main frame and carrying at one
35 end a lower movable cutting-jaw arranged opposite said stationary jaw, and at its opposite end a punch arranged above said punching-die, a cam-lever arranged above one end of said oscillating frame for swinging the lat-
40 ter on its pivot, and an actuating-lever connected with said cam-lever, substantially as set forth.

3. In metal - shears, the combination, with the stationary frame composed of upright
45 parallel side plates and having a punching-die at one end and an upper stationary shearing-jaw at its opposite end, of an oscillating frame pivoted between the stationary side plates of the main frame and carrying at one
50 end a lower movable cutting-jaw arranged opposite said stationary jaw, and at its opposite end a punch arranged above said punching-die, a cam-lever pivoted to the stationary frame and connected with one end of said
55 oscillating frame, and an actuating-lever pivoted to the opposite portion of the oscillating frame and connected with said cam-lever, substantially as set forth.

4. In metal - shears, the combination, with
60 the stationary frame composed of upright parallel side plates and having a punching-die at one end and an upper stationary shearing-jaw at its opposite end, of an oscillating frame pivoted between the stationary side
65 plates of the main frame and carrying at one end a lower movable cutting-jaw arranged opposite said stationary jaw, and at its opposite

end a punch arranged above said punching-die, a cam-lever pivoted to the stationary frame and engaging against one end of said
70 oscillating frame, an actuating-lever, and a connecting link or links attached at one end to said cam-lever and adjustably connected at their opposite ends to the actuating-lever, substantially as set forth.

5. In metal - shears, the combination, with the stationary frame composed of upright parallel side plates and having a punching-die at one end and an upper stationary shearing-jaw at its opposite end, of an oscillating
80 frame pivoted between the stationary side plates of the main frame and carrying at one end a lower movable cutting-jaw arranged opposite said stationary jaw, and at its opposite end a punch arranged above said punch-
85 ing-die, a cam-lever pivoted to the stationary frame and engaging against one end of said oscillating frame, a bifurcated actuating-lever L , links m , attached at one end to said cam-lever, and a clamp N , connecting the op-
90 posite ends of said links with the actuating-lever, and consisting of a block n , having a bearing for receiving the connecting-bolt of said links, and a screw-shank o , provided with a clamping-nut p , bearing against said
95 actuating-lever, substantially as set forth.

6. In metal - shears, the combination, with the stationary frame composed of side plates $A' A^2$, and having at one end a stationary cutting-jaw B and at its opposite end a punch-
100 ing-die F , of the oscillating frame C , pivoted between said side plates and carrying at one end a jaw D and at its opposite end a punch E , the cam-lever K , a link or links k , connecting said cam-lever with the oscillating frame,
105 the actuating-lever L , and the link or links m , connecting said actuating-lever with the cam-lever K , substantially as set forth.

7. In metal - shears, the combination, with the stationary frame composed of side plates
110 $A' A^2$, and having at one end a stationary cutting-jaw B and at its opposite end a punching-die F , of the oscillating frame C , pivoted between said side plates and carrying at one end a jaw D and at its opposite end a punch E ,
115 the cam-lever K , the sliding block J , interposed between said cam-lever and the oscillating frame, links k , connecting the cam-lever and oscillating frame, and the actuating-lever L , connected with said cam-lever, sub-
120 stantially as set forth.

8. In metal - shears, the combination, with the stationary frame having an upper stationary cutting-jaw, of a lower movable jaw and a rest or support arranged underneath the
125 upper stationary jaw and opposite the lower movable jaw, substantially as set forth.

9. In metal - shears, the combination, with the stationary frame having an upper station-
130 ary cutting-jaw, of a lower movable jaw and a vertically - adjustable rest or support arranged underneath the upper stationary jaw and opposite the lower movable jaw, substantially as set forth.

10. In metal-shears, the combination, with
the stationary frame composed of side plates
A' A², the plate A' being provided at one end
with an overhanging portion a³, carrying an
5 upper stationary jaw B, of the oscillating
frame C, carrying a lower movable jaw D,
and a rest or support d, arranged underneath
said overhanging portion of said side plate
and opposite the movable jaw, substantially
10 as set forth.

11. In metal shears and punch, the combi-
nation, with the base A, divided longitudi-
nally and provided with side plates A' A²,

having a dovetailed recess between them, of
the die-holder J, provided with a dovetail rib 15
or tenon arranged in said dovetail recess,
and a clamping-bolt, whereby said side plates
are secured together and the die-holder is
clamped between the plates, substantially as
set forth. 20

Witness my hand this 15th day of Decem-
ber, 1888.

PETER BROADBOOKS.

Witnesses:

GEO. H. HOLDEN,
CARLOS A. HULL.