

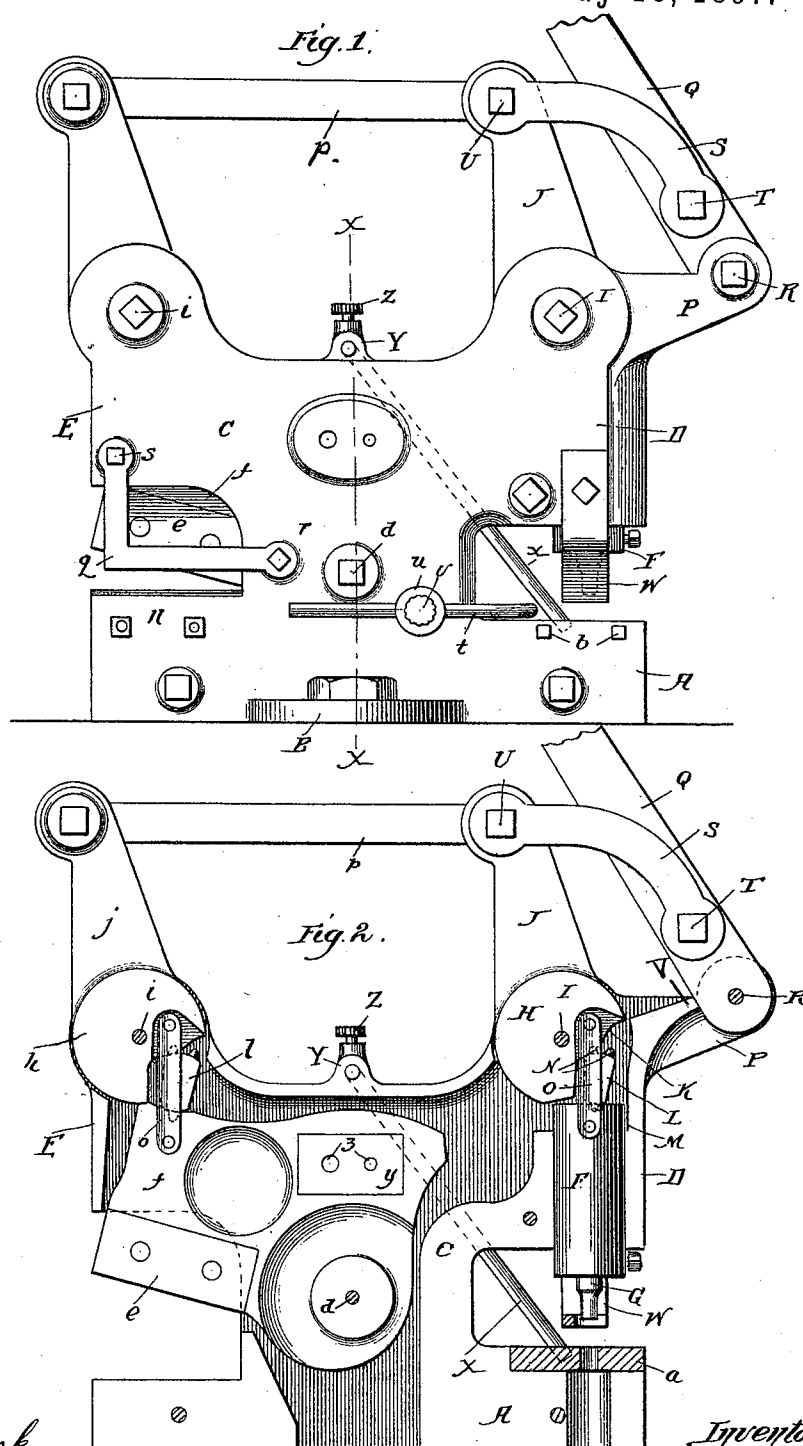
(No Model.)

2 Sheets—Sheet 1.

P. BROADBOOKS.
COMBINED PUNCH, SHEARS, AND CUT-OFF.

No. 582,618.

Patented May 18, 1897.



Witnesses:

H. D. Hallock.

S. Williamson

Inventor:

Peter Broadbooks.

By Geo. H. Holgate
Attorney.

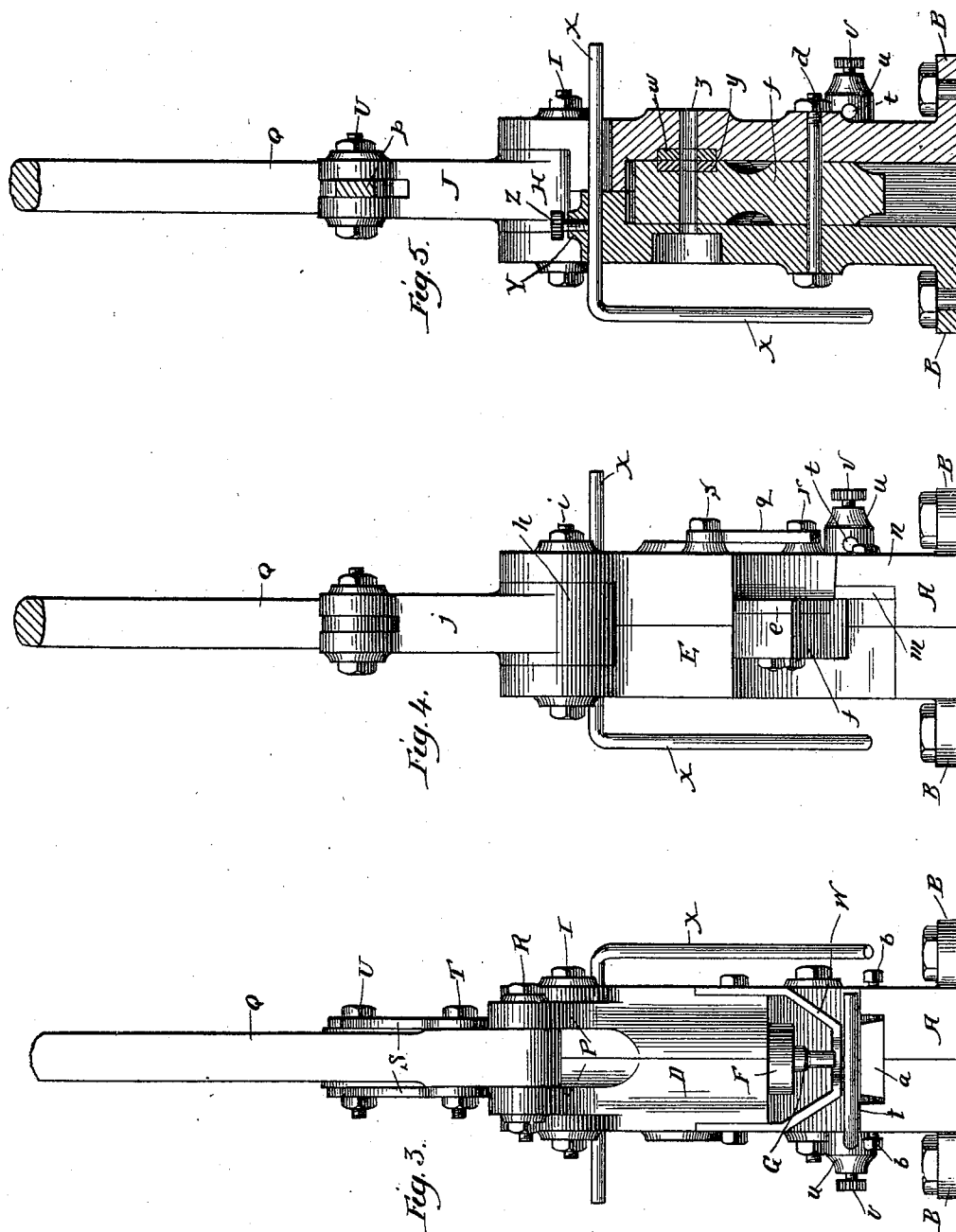
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UNITED STATES PATENT OFFICE.

PETER BROADBOOKS, OF BATAVIA, NEW YORK.

COMBINED PUNCH, SHEARS, AND CUT-OFF.

SPECIFICATION forming part of Letters Patent No. 582,618, dated May 18, 1897.

Application filed August 19, 1896. Serial No. 603,168. (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 and State of New York, have invented a certain new and useful Improvement in a Combined Punch, Shears, and Cut-Off, of which the following is a specification.

My invention relates to a new and useful improvement in a combined punch, shears, and cut-off, and has for its object to so construct a device as to greatly facilitate the application of power to the several operating members of the device, and to so connect the punch and shears as to permit disconnection when it is desired to use the punch only, and a further object is to provide gages and stops for the regulation of the operations to be performed by the device.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of a combined shears and cut-off made in accordance with my improvement; Fig. 2, a central vertical longitudinal section thereof; Fig. 3, an end view looking toward the punch; Fig. 4, a similar view taken from the opposite end of the device, and Fig. 5 a section at the line *x x* of Fig. 1.

Referring to the drawings, A represents the base of the device, adapted to be bolted to a bench or bed by means of the ears B, and formed with this base is the frame C, which in practice I prefer to make in two halves, as well as the base, so cast as to provide recesses and projecting parts for the reception and retention of the several operating parts thereof, and these halves are preferably secured together by bolts and nuts.

In the formation of the frame overhanging heads D and E are provided, and in the former is fitted to slide vertically a punch-plunger F, to the lower end of which is secured the

desired form of punch G by any suitable arrangement, which in practice is usually attached by forming the shank of such punch upon the taper and forcing it within a correspondingly taper hole in the plunger or follower.

Within the upper portion of the head D is pivoted the cam H by means of the bolt I, and this cam has formed therewith an arm J for its operation. In order that considerable strain or pressure may be imparted to the plunger F from the cam H without undue friction between said plunger and cam, the latter is cut away at K, thereby producing an eccentric surface. Between it and the upper end of the plunger is interposed a toggle-block L. This block is held in place by a pin M, projecting therefrom into a suitable hole in the top of the plunger, and the pins N, also projecting therefrom and adapted to enter holes in the eccentric surface. Thus when this cam is turned upon its axis the toggle-block will act as a gear in connection with the eccentric surface, and the force transmitted from said surface to the plunger will be directly through the block, thereby bringing little or no sidewise strain upon either the cam-block or plunger. Another advantage of this arrangement in the transmissions of power from the cam to the plunger is that the toggle-block gradually approaches the line connecting the fulcrum of the cam and the point at which said block bears upon the plunger, thereby increasing the leverage between said cam and plunger, whereby a greater amount of force will be brought to bear upon said plunger, and the advantages of this arrangement will be obvious.

In order that the plunger may be drawn upward when the cam is revolved in the opposite direction, a link O connects said cam and plunger by having its ends pivoted thereto, as clearly shown in Fig. 2.

P represents two projecting lugs between which the operating lever or handle Q is pivoted at R, so as to have a swinging movement, and curved links S are pivoted at T to this handle and at U and the arm J, from which it will be seen that the punch-plunger may be forced downward or elevated by the operations of the handle.

The reason for curving the links S is that

the handle may be swung downward to such an extent as to cause the point T to pass around and to the opposite side of the point R to such an extent as to bring the points T R U in almost a straight line, with the obvious result of increasing the amount of force transmitted to the arm J from the handle as said handle is forced downward, as is well understood in connection with the toggle-joints.

The upward movement of the handle may be limited by coming in contact with the rib V.

The stripper W depends from the overhanging head D, and is so arranged relative to the punch G as to serve the purpose of preventing the upward movement of the metal which has been punched when the punch is elevated, as is well understood, and a gage-finger X is adjustably secured in the lug Y by means of the set-screw Z, so that it may be placed in any position for the desired regulation of the position at which the punch will operate upon the work. I have here shown the die-block *a* held in a recess in the base by means of the set-bolts *b*.

The opposite end of the device is utilized for the construction of the shears, and in the overhanging head E is pivoted the cam *h*, similar in all respects to a cam H, by means of the bolt *i*, and this cam is connected to the movable shear-blade *f* by means of the link *o*, and is caused to force this shear-blade downward through the medium of the toggle-block *l*, which is constructed and operates as described in connection with the toggle-block L. The movable shear-blade is pivoted at *d* and has secured thereto by means of suitable bolts the cutter *e*. The stationary cutter *m* is bolted to the stationary jaw *n*, so that when these cutters become dulled or useless from any other cause others may be substituted therefor, or they be sharpened and replaced. The movable shear-blade is given its operations by means of the cam *h*, upon which is formed an arm *j*, connected by means of the pitman *p* to the arm J, from which it will be seen that when the last-named arm is swung to and fro by the operations of the handle, as before described, the arm *j* will move in unison therewith, thus causing both the shears and punch to operate in unison and with an equal amount of force, so that when certain classes of work are being performed which require at one time the use of the punch and at another the use of the shears the operator is not compelled to change any part of the machine or his position, as he has only to operate the single hand to effect operations of both punch and shears, yet should at any time the punch alone be needed for considerable use the shears may be disconnected therefrom by the removal of the pitman *p*, which will cause said shears to remain inactive during the operations of the punch.

One of the advantages of the construction here shown is that the force applied to both

the punch and shears is in nearly a direct downward line, and therefore little or no tendency is had for either said shears or punch to spring sidewise, thereby avoiding the "drawing in" which would otherwise take place were there lateral movement during the operations of either the punch or the shears.

It is to be noted in connection with the shears that as the movable blade continues to operate upon the work, thereby losing leverage as the cutting operation recedes from the pivoted point of the movable blade, the force exerted upon said blade is increased by the actions of the cam and toggle-block, so that the shearing of a piece of metal, however wide, within the limits of the shears will require no more force to be applied to the handle at the finishing of the operations than at the beginning thereof. This is of considerable importance, since, as is well recognized, any metal working the decrease of the leverage of a shear-blade relative to the work will cause said blade to finish its work with a snap, often injuring the blade and at all times leaving an undesirable bur upon said work.

q represents a holder secured to the frame and head by the bolts *r* and *s* and is for the purpose of keeping the metal to be sheared from springing upward when operated upon, thereby preventing the reaction upon the movable blade which would take place were the metal permitted to rise, and this reaction invariably tends to force the movable blade away from the stationary blade, with the consequent result of bending the movable blade out of position.

If desired, a gage to the shear, consisting of a right-angle rod *t*, may be adjustably held in the lug *u* by means of the set-screw *v*, so that when properly adjusted the distance from the edge of the metal at which the punch operates thereon may be determined. It is also obvious that the finger X may be utilized so as to serve as a gage for determining the lengths of sheet metal cut by the shears or the distance apart of holes punched in a strip by adjusting it in the lug Y until it crosses the path of the work at the desired point.

The cutting off of round metal, such as rods or wire, is provided for by the securing of the die-plate *w* within the frame adjacent the enlargement of the movable shear-blade, which is designed for this purpose, and the securing of a like die-plate *y* within this enlargement and the formation of holes through said plates, enlargement, and frame, as indicated at *z*. The operations of this part of the device are as follows: The die-plates moving in contact with each other when in alignment will permit the passage of the rod to be cut through one of the holes *c*, after which, by the swinging of the shear-blade through the operation of the handle, the die-plate *y* will be so moved as to cause the edges of the holes to serve as cutting edges, which

will sever the rod after the manner of a shear-die. The lengths in which the rod is severed may be determined by the gage-finger X, since said gage-finger may be adjusted in alinement with the rod when passed through either of the holes z.

I am aware that a number of slight modifications may be made in the construction here shown and described without departing from the spirit of my invention, and I therefore do not wish to be understood as limiting myself to these exact details of design.

Having thus fully described my invention, what I claim as new and useful is—

1. The herein-described combination of a base, a frame formed in two halves and secured together by means of bolts, a punch-plunger fitted in one end of the frame, a cam pivoted in said end, a toggle-block L interposed between the cam and plunger, a link O connecting said plunger and cam, an arm J formed with the cam, an operating-lever Q also pivoted to the frame, a curved link S connecting said lever with the arm J, a shear-blade *f* pivoted within the frame, a cam *h* also pivoted within the frame, a toggle-block *e* interposed between said cam and blade, a link *o* for connecting said blade and cam, an arm J formed with said cam, a pitman *p* for connecting the arms J and *j*, die-plates *y* and *w* having holes formed therethrough arranged to come in alinement, and a series of gages

for determining the operations of the device, substantially as and for the purposes set forth.

2. In a device of the character described, a frame, a punch-plunger slidable therein, a cam journaled in the frame adapted to operate the plunger, an arm projecting from the cam, an operating-lever pivoted to the frame, a link connecting the arm to the lever, a cutter-blade pivoted in the frame, a second cam adapted to operate the cutter-blade having a projecting arm and a pitman connecting the two arms, as and for the purpose described.

3. In a device of the character described, a frame, a punch-plunger slidable therein, a cam journaled in the frame, a toggle-block having teeth to fit apertures in the cam and plunger, a link connecting the plunger and cam, an operating-lever pivoted to the frame, a curved link connecting the lever to an arm of the cam, a shear-blade pivoted in the frame, a cam and toggle similar to the others adapted to operate the blade and a pitman connecting arms of the cams, as and for the purpose described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

PETER BROADBOOKS.

Witnesses:

S. S. WILLIAMSON,
W. E. WEBSTER.