

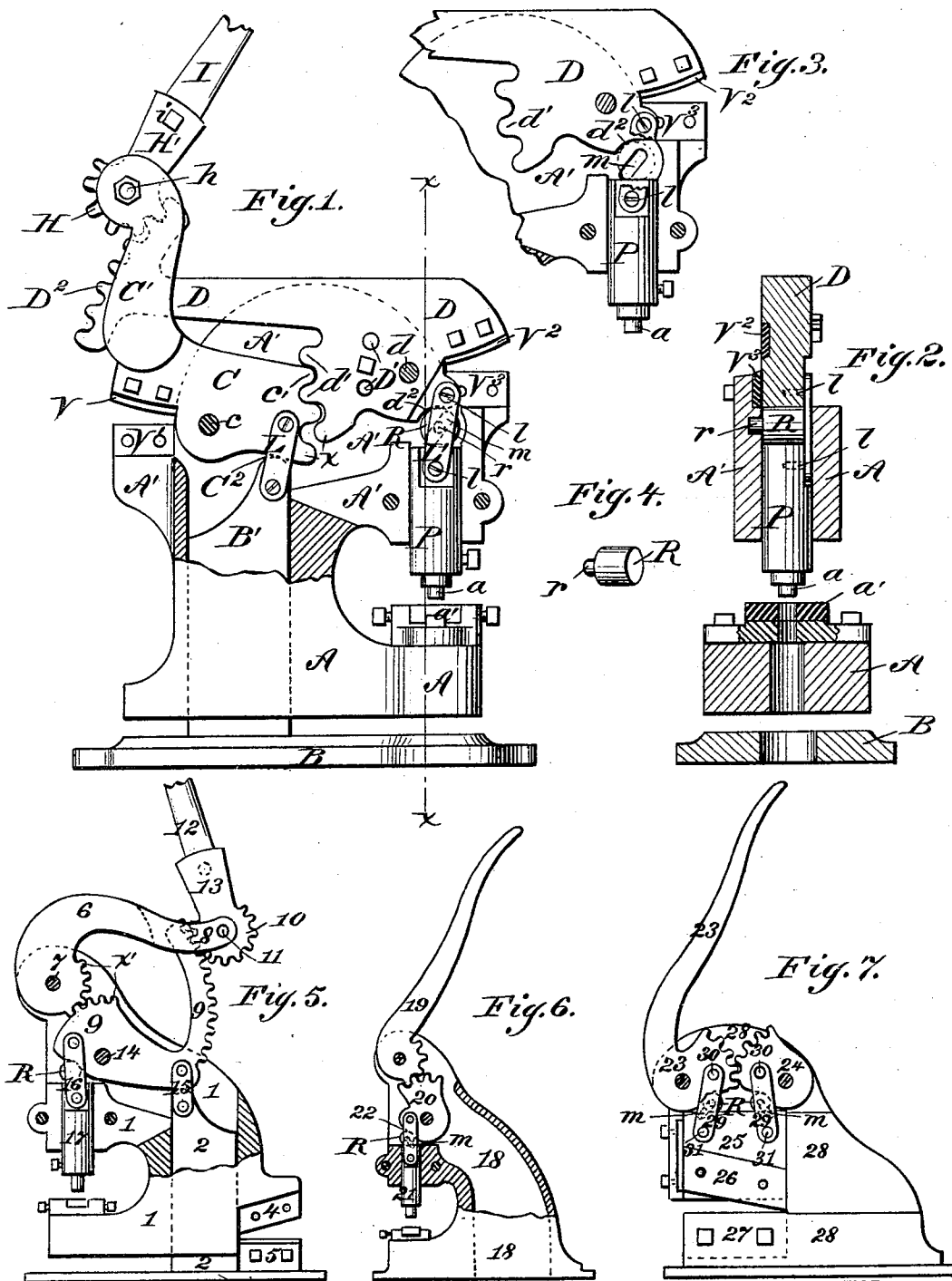
(Model.)

P. BROADBOOKS.

MECHANICAL MOVEMENT.

No. 249,887.

Patented Nov. 22, 1881.



WITNESSES:

Donn S. Twitchell.
C. Sedgwick

INVENTOR:

P. Broadbooks
BY *Munn & Co*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

PETER BROADBOOKS, OF BATAVIA, NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 249,887, dated November 22, 1881.

Application filed April 8, 1881. (Model.)

To all whom it may concern:

Be it known that I, PETER BROADBOOKS, of Batavia, in the county of Genesee and State of New York, have invented new and useful
5 Improvements in Mechanical Movements, of which the following is a specification.

In the accompanying drawings, Figure 1 is a side elevation of a metal punching and shearing machine to which my improvements are
10 applied. Fig. 2 is a cross-section on the line x x of Fig. 1. Fig. 3 is a partial side elevation, link L' being broken away to show the mortise in the frame. Fig. 4 shows the roller R detached. Figs. 5, 6, and 7 show modifications
15 of my improvements.

Similar letters of reference indicate corresponding parts.

The object of my invention is to provide mechanical movements which in their operation
20 shall exert great force of compression in the performance of any kind of work. I have herein shown and described my improvements as applied to iron punching and shearing machinery.

25 My invention consists, first, in supporting a roller provided with a pin or axle on one end between a reciprocating plunger and a cam-lever, so that said pin shall be caused to move in an inclined or curved mortise in the frame of
30 the machine, and gradually nearer to a right line with the fulcrum of the lever, and the point of contact of the roller with the reciprocating head or tool-holder, to increase the compression as the operating-tools are doing their work,
35 and, second, in so combining the frame of a machine which supports its operative parts with an upright post or standard that the compressive force exerted by the said operating parts shall be increased by the addition of the
40 entire weight of said frame and operating parts.

I more particularly describe my invention as follows:

The frame A , which carries most of the operating parts of the machine, is fitted to slide
45 upon the standard B' , which projects from the bed-plate of the machine. (Shown in Figs. 1 to 4, inclusive, of the drawings.)

The lever C is pivoted at c in the frame A , its outer end carrying the upper shearing-jaw,
50 V , which acts with the lower jaw, V' , secured in the frame A , as a metal-shears. This lever C

also carries two projecting arms, C' , between which the outer end of the cam-lever D is guided, and between which the pinion H is also supported on the shaft h . Said pinion H has
55 a projecting socket, H' , in which the operating hand-lever I is fastened by the set-screw i .

The link L has pivotal connection with the lever C and standard B' , as shown. The inner lower end of said lever C has a series of teeth,
60 c' , formed on it, which engage with a series of teeth, d' , formed on the inner end of the cam-lever D , which is fulcrumed at d in the frame A . The outer end of cam-lever D carries a
65 jaw, V^2 , which acts with the lower jaw, V^3 , secured to the frame A , as a metal-shears.

Cutting-dies are inserted in the lever D and frame A , as at D' , which act to cut off bar
metals. Said lever D is extended backward to permit its teeth D^2 to engage with the pin-
70 ion H .

A plunger, P , is guided in suitable bearings in the frame A , and may be provided with punches of any pattern, as at a , which fit
75 corresponding dies secured to the frame A , as at a' . The link L' has pivotal connection with the lever D and the head of the plunger, as at l , and acts jointly with the farther side, A' , of the frame A and the inclined mortise m to retain the roller R in place. Said roller R (shown
80 detached in Fig. 4) has formed upon its body the rigid pin r , which is caused to move in the inclined mortise m , which is cut in the frame A , and compels the roller R , on the descent of the lever D , to move gradually nearer to a right
85 line with the said fulcrum d and the head of the plunger or tool-holder P , thus gradually increasing the compression as the lever descends. The face of the roller R being smooth, it will turn between the lever D and plunger
90 P with little friction. The roller R being also held in the mortise m by its pin r , and at its outer end by the link L' , it cannot fly out of place, and no compressive strain can be brought
95 upon its pin r , insuring always the proper action and durability of the parts. The lever D is so recessed or formed at d^2 that a close contact of two opposite points of the circumference of the roller R with said recess d^2 and the head of the plunger P is secured during the
100 reciprocation of said plunger, during which movements the link L also holds the foot of the

lever C in contact with the head of the standard B at C². Upon raising the lever I the levers C and D will act together to raise the plunger P, open the cutting-dies D' and shearing-jaws V V' V² V³, and also raise the entire frame A A' and connected operating parts upon the head of the standard B' at C², where their entire weight is supported, as in Fig. 1, and upon the descent of the lever I the compressive force exerted at the punching and cutting dies and shearing-jaws by the joint action of the levers C and D is made more effective by the addition of the weight of the entire frame and connected operating parts, in addition to the weight of the operator.

My improvements may be applied to various modifications of punching and shearing machinery, a few of which I show in the drawings and describe as follows:

Fig. 5 shows a punching and shearing machine having a pair of cam-levers fulcrumed in the frame, having also my improved roller and double-link attachments. The frame 1 is adapted to slide on the standard 2. An upper shearing-jaw, 4, is fixed in the frame 1, and acts with the lower shearing-jaw, 5, which is fixed to the bed-plate 3, on the descent of the frame 1 on the standard 2. The upper toothed lever, 6, is fulcrumed at 7, and engages the toothed lever 9. Said lever 6 also carries arms 8, which guide the outer curved toothed end of the lower cam-lever, 9. Between the arms 8 the segment-pinion 10 is supported on the shaft 11. The operating-lever 12 is fixed in the socket 13 upon the pinion 10. The lower cam-lever, 9, is fulcrumed at 14, and has pivotal connection through the link 15 with the standard 2. The link 16 is pivoted to both lever 9 and plunger 17, and confines the roller R, having pin *r* sliding in an inclined mortise in the frame 1, in like manner and for similar purpose as the roller R in Figs. 1 and 2. Upon raising the lever 12, as shown in the drawings, the frame 1 will be raised on the standard 2 and the punch raised and the shears opened, and upon lowering said lever 12 the compressive force will be gradually increased, and the weight of the frame 1 and operating parts be also made available to increase such compressive force, as with the machine last above described. The arrangement of the levers of the machine shown in Figs. 1, 2, and 3 is such that when the operating-lever I is brought down the lower points, X, of the gearing c' d' will approach each other, while in the machine shown in Fig. 5 the upper points, X', of the levers 6 and 9 will approach each other when the operating-lever 12 is lowered. The links 15 and 16 in Fig. 5 act as do the links L L' in Fig. 1.

Fig. 6 shows a punching-machine intended for light work, in which my improved roller R has the pin *r* traveling in an inclined mortise, *m*, in a stationary frame, 18. The operating-lever 19 is fulcrumed in the frame 18, and is provided with teeth, which engage corresponding teeth on the lower cam-lever, 20, be-

tween which and the plunger 21 the retaining-roller R is guided by its end pin, *r*, moving in the mortise *m*. The link 22 holds the roller in place, as does the link L in the machine shown in Fig. 1. This machine, Fig. 6, has the advantage, above set forth, of an increasing compressive force as the lever 19 descends.

Fig. 7 shows a shearing-machine having an operating cam-lever, 23, toothed to engage with a cam-lever, 24, both levers being fulcrumed in the frame 28, and connected with the reciprocating tool-holding head 25, which carries the jaw 26, which coacts with the lower jaw, 27, fastened in the frame 28, to shear bar or plate metals. Both of these levers 23 and 24 are connected with the head 25 by the links 29, pivoted at 30 and 31. Friction-rollers R, having pins *r* moving in inclined mortises *m* in the frame, are held in place between the levers 23 and 24 and the sliding head 25 by the links 29 and the back of the frame 28. In this machine the compressive force is increased as the cam-levers descend, and the links 29 act in like manner as the link L in Fig. 1.

My improved roller R, having a pin, *r*, moving in an inclined mortise in the frame of a machine, and acting between a cam lever or levers and a reciprocating tool-holding head to increase the compressive force as the said levers descend, may be used in any class of machines where great force of compression is required.

In my Patent No. 166,844 is shown a loose pinion between a cam-headed lever and a tool-holding head, but no provision is made for preventing the disconnection of the geared pinion from the said lever and tool-head, the roller also requiring to be often adjusted in position according to the power; and in my Patent No. 203,111 is shown a roller composed of two pinions and an intermediate plain surface, engaging with corresponding teeth and plain surfaces on a cam-lever and a fulcrumed tool-holding head, said roller being held in position by pivoted and jointed links at either side. In contradistinction to these the construction and application of roller R is such that it cannot be displaced, and both it and its engaging tool-holding head are much simplified, the teeth or gears being dispensed with, and but a single link employed to hold the roller in position in the frame of the machine.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In combination with a reciprocating tool-holding head and a cam lever or levers, the roller or rollers R, carrying the pins *r*, which move in a mortise or mortises in the frame of a machine, to cause said rollers R to move more nearly in line with the point of pressure on said tool-holding head and the fulcrums of the said cam-levers, to gradually increase the compressive useful effect of the operating-tools in said head as the cam-levers descend, substantially as herein specified.

2. The friction-roller provided with the pin *r*, adapted to move in a mortise in the frame of a machine, substantially as described.

3. In combination with the roller *R*, provided with pin *r*, moving in a mortise in the frame of a machine, the link *L'*, pivoted to the reciprocating tool-head, and the cam-lever to hold said roller *R* in place, substantially as herein set forth.

4. The combination of the toothed levers *C* and *D*, pinion *H*, and hand-lever *I* with the link *L'*, roller *R*, having pin *r* traveling in a mortise in the frame *A*, and plunger *P*, substantially as and for the purposes herein specified.

5. The combination of the toothed levers *C*

and *D*, carrying the shearing-jaws *V V'*, with the frame carrying the shearing-jaws *V' V'*, substantially as and for the purpose described.

6. In combination with a frame, *A*, carrying the operating parts of a machine, the standard *B'*, projecting from the bed-plate *B* and linked to the acting levers in such manner as shall cause the said frame and operating parts to slide upon the said standard, to increase the useful effect of the operating tools or cutters secured in the frame and bed-plate, substantially as herein set forth.

PETER BROADBOOKS.

Witnesses:

G. H. HOLDEN,
CARLOS A. HULL.