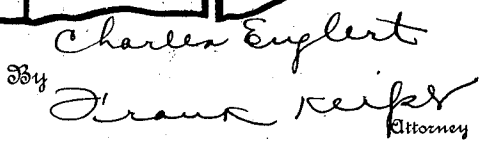


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3 SHEETS--SHEET 1.

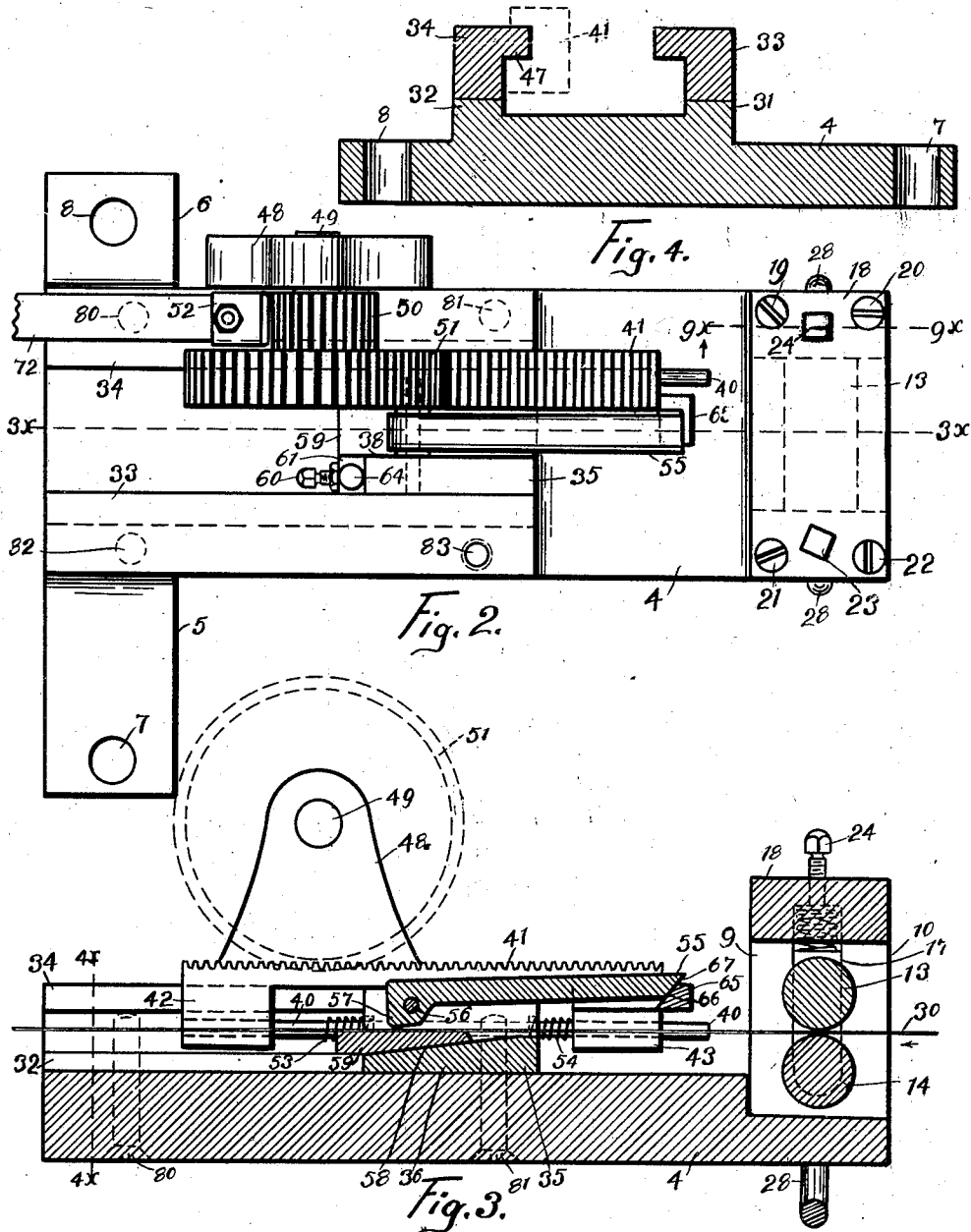


C. ENGLERT.
FEED MECHANISM FOR PUNCH PRESSES.
APPLICATION FILED JULY 25, 1912.

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Patented Feb. 24, 1914.

3 SHEETS-SHEET 2.



Inventor

Witnesses

Lea M. Ash,
Eric Ischinger

Charles Englert

By Frank Reifer
Attorney

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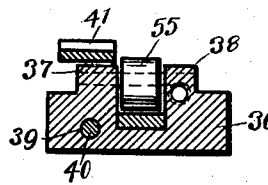
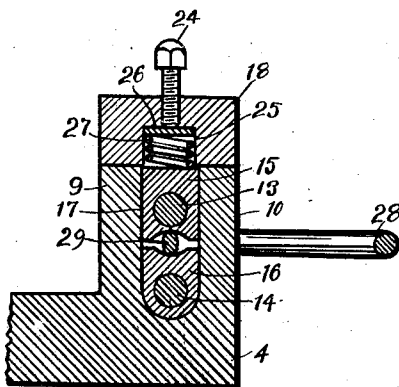
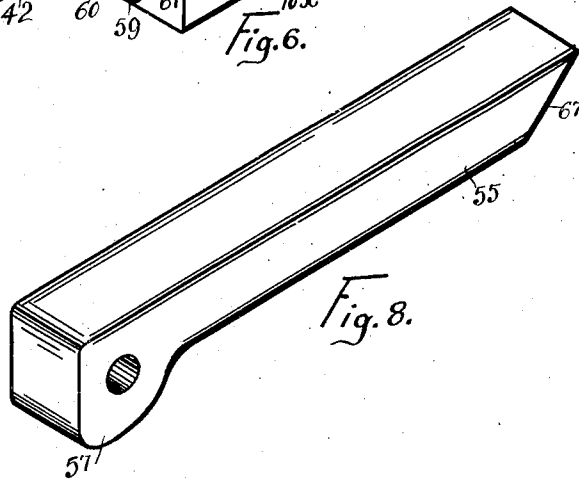
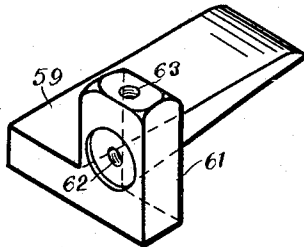
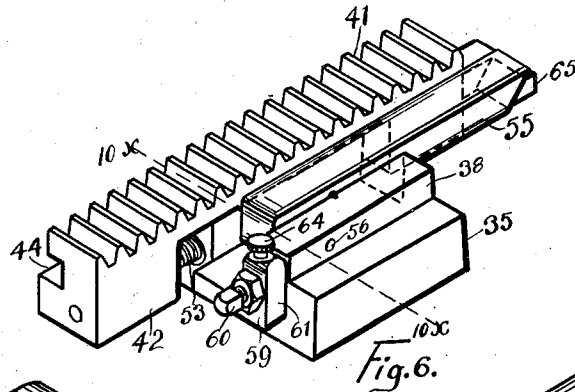


Fig. 9.

Witnesses
Lena M. Ash.
Eric Schinger

Inventor

Charles Englert

By Frank Kuper
Attorney

UNITED STATES PATENT OFFICE.

CHARLES ENGLERT, OF ROCHESTER, NEW YORK.

FEED MECHANISM FOR PUNCH-PRESSES.

1,088,015.

Specification of Letters Patent.

Patented Feb. 24, 1914.

Application filed July 25, 1912. Serial No. 711,587.

To all whom it may concern:

Be it known that I, CHARLES ENGLERT, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Feed Mechanisms for Punch-Presses, of which the following is a specification.

My invention relates to a feed mechanism for punch presses and has for its object to provide a device by which a strip of metal is fed to the machine intermittently, the machine working to cut off equal lengths of the metal and form them into predetermined shapes, according to the tools that are set in the machine.

Another object of my invention is to provide a feeding device that will feed the metal forward just enough to provide the exact length of metal that is needed to be worked on in the tools.

Another object of my invention is to operate the feeding device from the punch press so that the feed will take place when the tools are otherwise idle, or on the up-stroke of the press.

Another object of my invention is to provide ready adjustments in the feeding mechanism by which the length of the feed may be changed at will.

Another object of my invention is to provide an automatic clamp by which the metal is held in the forward position to which it has been advanced.

Another object of my invention is to provide suitable take up devices by which the wear in the feeding mechanism may be readily compensated for.

These and other objects of my invention will be fully illustrated in the drawings, described in the specification and pointed out in the claims at the end thereof.

In the accompanying drawings, Figure 1 is a side elevation of my feeding mechanism shown together with a portion of the ram and frame of the punch press. Fig. 2 is a top plan view of the feeding mechanism. Fig. 3 is a longitudinal section on the line 3*-3* of Fig. 2. Fig. 4 is a transverse section on the line 4*-4* of Fig. 3. Fig. 5 is a detail view of the vertical rack for driving the feed mechanism. Fig. 6 is a perspective view of the horizontal rack for driving the feed mechanism and the carriage. Figs. 7 and 8 are detail views of the clip

through which the metal is fed. Fig. 9 is a vertical sectional view on the line 9*-9* of Fig. 2, showing the automatic clamp by which the backward movement of the metal is prevented. Fig. 10 is a cross section on the line 10*-10* of Fig. 6.

In the accompanying drawings like reference numerals refer to like parts.

Reference numeral 1 indicates the table or base of the punch press, on which are mounted the guide 2 and the ram 3 of the punch press. Fastened to the table of the punch press is the base 4 of the feeding device, which feeding device has the brackets 5 and 6 thereon, by which the feeding device is connected to the base of the punch press by studs such as are shown at 6^a in Fig. 1, holes 7 and 8 being provided in the brackets for this purpose. The base 4 has the upright standards 9, 10 11 and 12 integral therewith, in which are mounted the gripping rollers 13 and 14, which rollers are mounted in bearings 15 and 16 as shown in cross section in Fig. 9. The bearings in these rollers are contained in slots between the uprights, such as are shown at 17 in Fig. 9. On top of the upright standards 9, 10, 11 and 12 is placed the cap 18, which cap is held in position by the four screws 19, 20, 21 and 22. In this cap at each end thereof are suitably threaded openings in which are placed the adjusting screws 23 and 24, which screws pass through the cap. The cap is suitably recessed at each end under these screws, as indicated at 25. Below each of the screws 23 and 24 is provided a washer 26 and the compression spring 27, which compression spring at its upper end bears upon the washer 26 and at its lower end upon the bearing 15. By the compression spring 27 the bearing blocks and the rollers carried thereby are forced together and the tension by which they are forced together is regulated by the screws 23 and 24. The bearings 15 and 16 are suitably cut away to receive the eccentric ends of the bail 28, which ends are shown in oval cross section in Fig. 9, as indicated at 29. The normal position of this bail 28 is shown in Fig. 1, in which position the bearings 15 and 16 are allowed to approach each other so as to bring the feeding rollers 13 and 14 into contact with each other. When the bail is turned to the position shown in Fig. 9 the bearings are spread, causing the upper

roller to raise from the lower one for a purpose that will presently appear.

Between the rollers 13 and 14 is the strip of metal 30 upon which the feeding device of the punch press is operating. This strip of metal is fed from right to left as shown in Fig. 3, and the mechanism by which it is fed forward I am now about to describe.

Integral with the base 4 are the ribs 31 and 32 on which are mounted the guides 33 and 34, in which guides is mounted to reciprocate the carriage 35, which carriage is shown in perspective as a whole in Fig. 6. This carriage consists of a block 36 mounted to travel under and between the guides 33 and 34. On this block are the ribs 37 and 38. Under the rib 37 a hole 39 is pressed longitudinally through the carriage. Through this hole passes the pin 40, the pin being rigid therewith. This pin projects on either side of the carriage, as shown in Fig. 3. On this pin is mounted to slide the rack bar 41, which rack bar appears in side elevation in Fig. 3 and has on each end thereof the depending lugs 42 and 43, which lugs are integral therewith. These lugs are perforated to receive the pin 40, and by the engagement between the pin 40 and the openings in the lugs 42 and 43, the rack is guided in its forward and backward movement. The pins normally support the rack so that it is slightly clear from the rib 37 over which it travels. The lugs 42 and 43 are recessed at the side as shown at 44 in Fig. 6, to receive the flange 47 on the guide 34. The rack bar 41 overhangs the flange 47, as appears from Fig. 4, and is supported by the flange as it travels back and forth.

Mounted on the base 4 and integral therewith is the upright 48 in which is rotatably mounted the shaft 49, to which is keyed the small pinion 50 and the large pinion 51. The small pinion meshes with and is driven by the upright rack 52 which will be presently described, and the large pinion 51 engages with the horizontal rack bar 41, by which the horizontal rack bar is driven back and forth.

As shown in Fig. 3, a considerable lost motion is provided between the rack bar 41 and the carriage 35. Helical springs 53 and 54 are provided on the pin 40, surrounding the pin and acting as buffers between the depending lugs 42 and 43 and the carriage 35. The carriage is recessed around the pins to receive the springs. As the rack bar reciprocates these springs are alternately compressed in the recesses between the carriage and the depending lugs, the springs serving to ease up the jar or shock which the carriage would otherwise receive from the depending lugs on the rack when the lugs drive the carriage, making the mechanism as a whole work more silently and smoothly.

Pivotally mounted on the carriage 35 is the lever 55, the pivot for which is shown at 56. The lever has the eccentric boss 57 around its pivot. Below the pivoted lever the carriage 35 is cut away to an incline 58 and on this incline is adjustably mounted the slide 59, the adjustment of this slide forward and back being secured by the adjusting screw 60 which works in the carriage block 36. This screw 60 is shown in Fig. 6 as having a square and hexagon head, both of which are integral with the screw. The slide 59 has the lug 61 thereon, in which lug is the horizontal perforation 62 through which the screw 60 passes. This opening is not threaded, so that the slide 59 moves freely along the screw 60. The lug 61 has the vertical threaded opening 63 therein through which passes the clamping screw 64 by which the slide 59 is fixed in any position that may be desired. The slide 59 is adjusted to its proper position so that between the slide and the eccentric boss 57 of the lever 55 the metal strip 30 may be suitably pinched and fed forward on the travel of the carriage to the left from the position shown in Fig. 3.

On the right hand end of the rack bar 41 is provided integral therewith, the cam lug 65. This lug has the bevel 66 thereon and the lever 55 is likewise beveled at 67, which parts cooperate to lift the lever so as to pinch the metal strip 30, as will now be described. When the rack bar 41 is at the extreme left, the lever 55 hangs down, giving ample clearance between the eccentric boss 57 and the adjusting plate 59. This will be the position of the parts when the rack bar 41 is at the extreme left from the position shown in Fig. 3. When the rack bar starts to the right, being driven by the pinion 51, the cam lug 65 advances into engagement with the cam 67 on the lever 55 and causes the lever to be lifted at its right hand end to the position shown in Fig. 3. Up to this time the carriage block 36 remains stationary, but as the cam lug 65 advances it causes the lever 55 to raise and pinch the metal and at the same time the depending lug 43 compresses the spring 54 until the carriage block 36 is driven thereby, causing all of the parts of the carriage to be advanced, together with the metal strip 30, until the rack bar 41 and the carriage of which it is a part, reach the end of their movement as determined by the drive of the pinion 51. The rack bar then starts back independent of the carriage block 36, permitting the lever 55 to drop and disengage itself from the strip of metal 30, the carriage block 36 with the lever 55 in the meantime remaining stationary until the depending lug 42 comes into contact with the spring 53 and compresses it and drives the carriage block 36 in the reverse direction.

The rotation of the pinions 50 and 51 is

determined by the vertical rack 52 which has the lugs 69 and 70 thereon through which passes the pin 71, which pin is rigid with the arm 72 which is fastened to the ram 3 of the press, as shown in Fig. 1. The rack 52 is mounted to travel loosely on the pin 71, being held to a right line motion by the bearing between the rack and the end of the arm 72.

As shown in Figs. 1 and 5, a lost motion is provided between the rack bar 52 and the arm 72, which lost motion is determined as follows: On the upper end of the pin 71 are the two lock nuts 73 and 74, which lock nuts may be clamped in position against each other on the pin 71 up or down, as may be desired, the pin 71 being threaded for this purpose. As the arm 72 rises the rack bar will be driven up by the contact between the arm 72 and the lug 69, and as the arm 72 descends the rack bar 52 will be driven down by the contact between the lock nut 73 and the lug 69 or by the contact between the arm 72 and the lug 70. If the arm 72 makes contact with both the lugs 69 and 70 the greatest lost motion will be allowed between the arm 72 and the rack 52, and the rack will have its shortest travel. The travel of the rack bar will be lengthened by turning the lock nuts 73 and 74 down toward the arm 72. It is obvious that the travel of the rack bar will be shortened from the travel of the arm 72 by the distance between the lock nut 73 and the arm 72 on the pin 71, less the thickness of the lug 69. By varying the position of the nut 73 on the pin 71, the travel of the rack bar may be lengthened or shortened at will and the feed of the carriage and the feed of the metal controlled thereby may be lengthened or shortened as may be desired.

The guide 34 is clamped in place by the screws 80 and 81 shown in dotted lines in Fig. 3. The guide 33 is clamped in place by a similar screw 82 and by an adjusting screw 83. This screw has a shoulder 84 thereon from which extends a threaded stem 85, which stem is surrounded by the helical spring 86 and the washer 87. The stem 85 has a threaded engagement with the guide 33 but not with the base 4 or the rib 31. As the screw 83 is turned it compresses the spring 86 and draws the guide 33 down yielding on the rib 31 at that end. The guide 33 is tapered so that it slopes downward slightly toward the screw 83 and in consequence must be slightly lifted by the carriage as it approaches that end, thus increasing or decreasing the frictional resistance to the movement of the carriage as it travels back and forth. This frictional resistance is thrown on the carriage block when it is in the position shown in Fig. 3, and holds it against movement until it is positively moved by the rack bar and lug

43 from that position. This insures the lifting of the lever 53 and the gripping of the material to be fed before the carriage block 36 starts forward, and when it does start forward it makes it certain that it will carry the metal strip 30 with it, insuring the proper and accurate feed. The upright 38 may be made adjustable along the base 4 and this will permit of changes in the size of the pinion 50 which is supported thereby, without disturbing the position of the rack 52 on the ram. In this way a great variation in the length of stroke of the feeding mechanism can be secured.

Having thus described my invention, what I claim as new and patentable is as follows:

1. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate thereon, a clutch mounted in said carriage, means for closing said clutch on a strip of metal, means for advancing the clutch with the strip of metal, means for opening the clutch at the end of its forward movement, and means for retracting said clutch while it is open said means including a rack bar having a movement both with and independent of the carriage.

2. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate therein, a clutch in said carriage and reciprocating therewith, means operating to close said clutch at one end of its movement and to open said clutch at the other end of its movement said means including a rack bar having a movement both with and independent of the carriage.

3. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate therein, a rack bar for driving said carriage, said rack bar being mounted to reciprocate on said base independent of the carriage for a portion of its movement and with the carriage for the balance of its movement a clutch in said carriage, said clutch being opened by the rack bar at one end of its movement and being closed by the rack bar at the other end of its movement.

4. In a feed mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate therein, a rack bar for driving said carriage, said rack bar being mounted to reciprocate on said base, said rack bar causing said carriage to reciprocate therewith in a portion of its movement only a clutch mounted on said carriage, said clutch being opened or closed by the surplus movement of the rack bar.

5. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate therein, a rack bar for driving said carriage being mounted to reciprocate on said base, a clutch mounted in said carriage, means on said rack bar operat-

ing first to close the clutch and then advance the carriage as a whole without moving the carriage.

6. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate therein, a rack bar for driving said carriage being mounted to reciprocate on said base, a clutch mounted in said carriage, means on said rack bar operating first to close the clutch without moving the carriage and then advance the carriage as a whole, said rack bar operating thereafter to open the clutch without moving the carriage and then retract the carriage as a whole.
7. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate thereon, a rack for driving said carriage, said rack having a limited movement on the base independent of the carriage, a lever mounted on said carriage, a cam on the end of said lever, a cam on said rack engaging with the cam on the lever, by which the end of the lever is lifted by the movement of the rack independent of the carriage.
8. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate thereon, a rack for driving said carriage, said rack having a limited movement on the base independent of the carriage, a lever mounted on said carriage, a cam on the end of said lever, a cam on said rack engaging with the cam on the lever, by which the end of the lever is lifted by the movement of the rack independent of the carriage, a lug on said rack engaging with said carriage to move the carriage with the rack.
9. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate thereon, a rack for driving said carriage, said rack having a limited movement on the base independent of the carriage, a lever mounted on said carriage, a cam on the end of said lever, a cam on said rack engaging with the cam on the lever, by which the end of the lever is lifted by the movement of the rack independent of the carriage, said lug engaging with the carriage to move it after the lifting of the lever has been completed.
10. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to reciprocate thereon, a pin fixed in said carriage and projecting from each end thereof, a rack mounted to slide on said pin and drive said carriage.
11. In a feeding mechanism for a punch press, the combination of a base, a carriage mounted to slide thereon, a lever pivotally mounted on said carriage, an eccentric on said lever adapted to press material against

said carriage, a wedge shaped plate in said carriage below said eccentric with which said eccentric coöperates, said plate being movable longitudinally to adjust it toward and away from said eccentric.

12. In a feeding mechanism for a punch press, the combination of a base, guides on said base, one of said guides at one end thereof being yieldingly connected to said base and sloping toward said base, a carriage mounted to move in said guides, said carriage being adapted to lift one of said guides as it approaches the end thereof which is downwardly sloped.

13. In a feeding mechanism for a punch press, the combination of a base, guides on said base, a carriage mounted to reciprocate on said guides, said guides being arranged with respect to said carriage to permit the free movement of the carriage therein at one end thereof and cause said carriage to jam therein at the other end thereof.

14. The combination in a punch press of a table and a frame therefor, a ram mounted to reciprocate in said frame, a rack mounted to reciprocate with said ram, a feeding device attached to said press, said device having a rack and clutch thereon, pinions meshing with the two racks, to cause the reciprocation of the rack and clutch from the rack on the ram.

15. The combination in a punch press of a ram, a rack mounted thereon to move parallel therewith, lost motion being provided between said rack and said ram, means for varying the amount of lost motion between said rack and said ram at will.

16. The combination in a punch press of a ram, a rack mounted thereon to move parallel therewith, lost motion being provided between said rack and said ram, means for varying the amount of lost motion between said rack and said ram at will, a feeding device driven by said rack, said feeding device operating to feed at right angles to the path of movement of the ram.

17. The combination in a punch press of a ram, a rack mounted thereon to move parallel therewith, lost motion being provided between said rack and said ram, means for varying the amount of lost motion between said rack and said ram at will, a feeding device driven by said rack, said feeding device operating to feed at right angles to the path of movement of the ram, said feeding device operating to feed toward the ram on the upstroke of the ram.

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

CHARLES ENGLERT.

Witnesses:

LENA M. ASH,

ALICE M. JOHANNES.