July 19, 1938. C. T. BATCHELDER 2,123,875

PERFORATING MACHINE

Filed Aug. 13, 1936 2 Sheets-Sheet 1

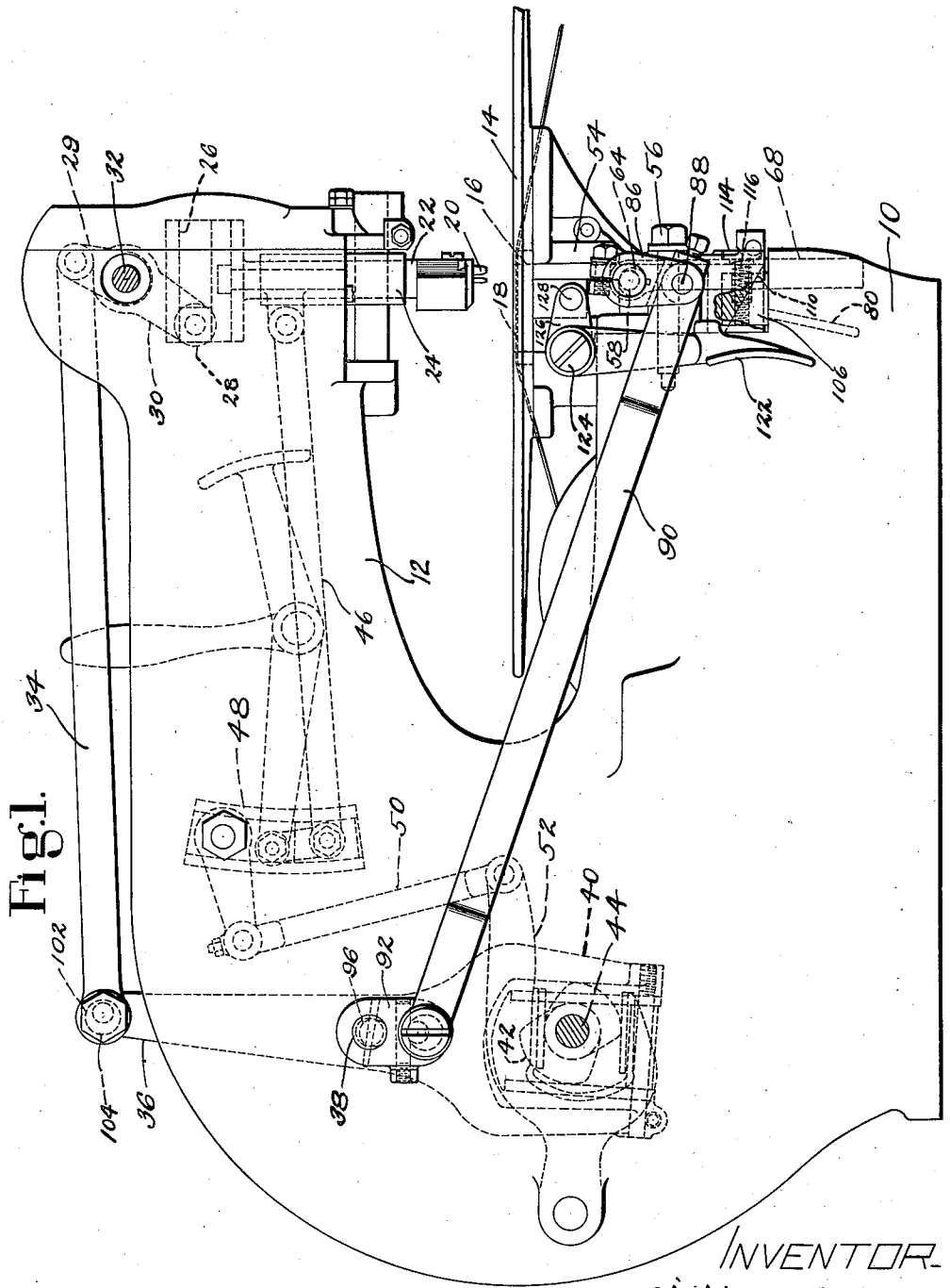

Fig. 1.

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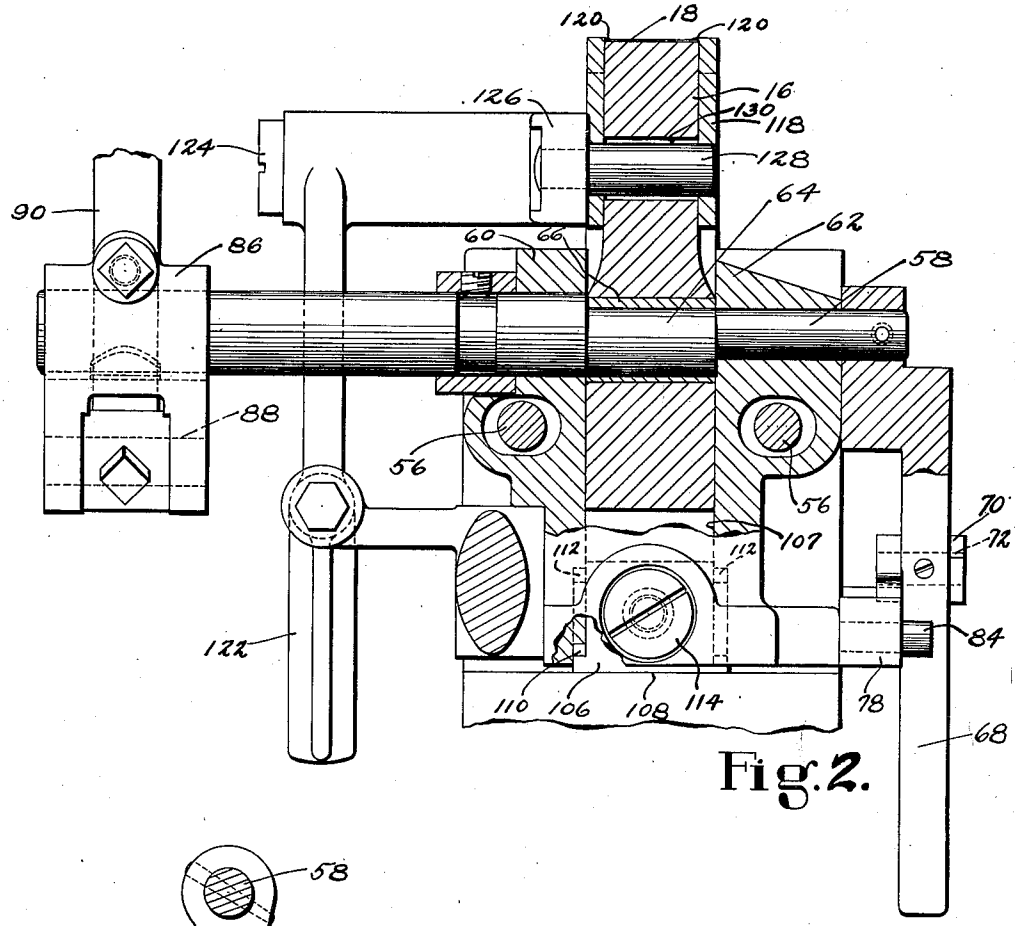

Fig. 2.

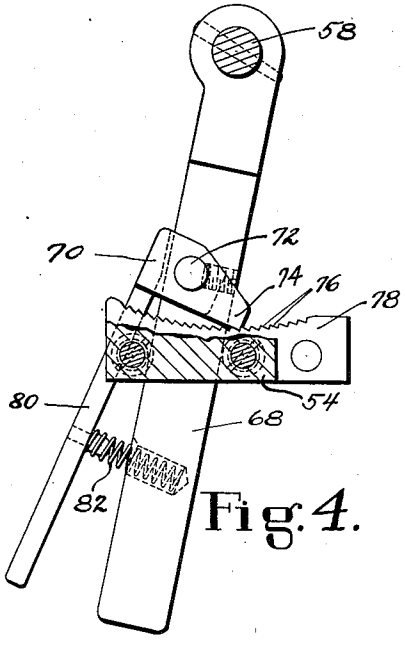

Fig. 4.

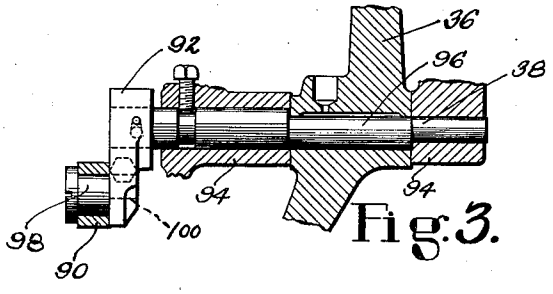

Fig. 3.

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UNITED STATES PATENT OFFICE

2,123,875

PERFORATING MACHINE

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Application August 13, 1936, Serial No. 95,876

6 Claims. (Cl. 164—88)

This invention relates to punching machines and is herein illustrated as embodied in a machine for perforating shoe parts.

In perforating blanks such as shoe uppers formed from sheet material, it has heretofore been common practice to make use of a machine comprising a reciprocating punch and an anvil across which the work is advanced by the punch. It is an object of the present invention to provide an improved machine of the type referred to having mechanism operable to effect relative adjustment of the punch and anvil for the purpose of controlling the pressure exerted by the punch during the punching operation and for controlling the position of the punch during work feeding movements thereof.

To this end, and as illustrated, the invention provides a perforating machine in which a punch is mounted for heightwise reciprocation and for work feeding movements relatively to an anvil, and mechanism for adjusting the position of the anvil heightwise of the punch, together with mechanism operable in response to operation of the anvil adjusting mechanism for varying the heightwise position of the punch during its work feeding operation.

Preferably, and as shown, the anvil carries a metal backing strip which acts as a cutting surface for the punch. Thus, when it becomes necessary to raise the anvil as when it is desired to have the punch penetrate more deeply into the backing strip, particularly when the punch has become dulled, the punch is automatically moved a corresponding distance in a heightwise direction to provide for its release from the strip after a punching operation and prior to a feeding operation of the work. The construction above set forth is particularly advantageous in that the anvil can be adjusted heightwise without resulting in the gouging of the backing strip during feed movements of the punch.

These and other features of the invention are disclosed in the accompanying drawings and following detailed specification, and will be pointed out in the claims.

In the drawings,

Fig. 1 is a view in side elevation of a perforating machine illustrating one embodiment of the invention;

Fig. 2 is a view partly in cross section of the anvil and mechanism for adjusting its heightwise position;

Fig. 3 is a view partly in section of means for varying the position of the punch operating lever; and

Fig. 4 is a side view showing the details of a handle for controlling the anvil adjustment.

As shown in Fig. 1, the machine comprises a frame 10 having a hollow arm 12 overhanging a circular work table 14 at the central portion of which is positioned an anvil 16 which supports a backing strip 18, preferably of brass, adapted to receive the thrust of a punch 20 mounted for reciprocation heightwise of the anvil, the punch being adapted to feed work such as a shoe upper rearwardly over the table away from the operator and in alinement with said overhanging arm. The punch 20 is carried by a plunger 22 slidably mounted in a feed sleeve 24 mounted for front to rear reciprocation in the arm 12. The punch supporting plunger 22 has at its uper end a guide channel 26. The plunger 22 is reciprocated vertically by mechanism comprising a block 28 slidable within the guide channel 26 and pivoted to the lower end of an arm of a lever 30 mounted on a pivot 32 on the frame. Connected to the upper end 29 of the lever 30 is an actuating link 34 which is pivotally connected to the upper end of a cam lever 36 mounted upon a pivot 38 carried by the frame. A forked end portion 40 at the lower end of the lever 36 makes engagement with a three-way cam 42 on a cam shaft 44. The cam 42 is formed in such manner as to cause a punching movement followed by a dwell, a feed movement of the punch being effected during the dwell by other mechanism hereinafter described. The lower end portion of the cam lever 36 is swung by the cam 42 during rotation thereof in such manner that the lever 30 is moved about its pivot to produce a downward motion of the plunger 22 in effecting an operation of the punch upon work positioned upon the table and then is swung slightly past dead center, thereby to raise the punch from engagement with the backing strip. The purpose of this is to prevent gouging of the strip when the punch is moved in its work feeding operation.

To effect feeding of the work the punch sleeve 24 is moved rearwardly by means of a link 46, sector 48 and links 50 and 52 which are operatively connected to the cam shaft 44. This arrangement is such that the punch 20 is brought down upon the strip 18 to perforate the work, is relieved, that is, raised slightly above the strip 18 sufficiently to disengage the punch from the strip although remaining in engagement with the work. The punch is then moved rearwardly to feed the work, and is then raised and moved forwardly to its original position. For a more detailed description of the construction and opera-

tion of the machine thus far described reference may be had to United States Letters Patent No. 1,580,132, granted April 13, 1926, upon an application filed in the name of Perley R. Glass.

The anvil 16 is mounted for heightwise movement in a bracket 54 secured to the forward part of the frame 10 by bolts 56 (Fig. 2). The anvil is carried by a shaft 58 mounted in bearings 60 and 62 in the bracket. In order to provide for heightwise adjustment of the anvil the shaft 58 is provided with an eccentric portion 64 which engages a bushing 66 carried by the anvil. Rotation of the shaft consequently effects a variation in the height of the anvil. For convenience in making this adjustment there is provided an arm 68 which is pinned to an end of the shaft 58 and which constitutes a handle whereby the shaft can be rotated. To secure the anvil in predetermined position the handle is provided with a latch 70 (Figs. 2 and 4) mounted upon a pivot 72 on the handle and having a nose portion 74 adapted to engage one or another of a series of teeth 76 on a plate 78 carried by the bracket 54. The latch 70 has an arm 80 extending along one side of the handle 68 and normally forced by a spring 82 into tooth engaging position. The latch is readily released by depressing the arm 80. The movement of the handle is limited by a stop pin 84 carried by the bracket 54.

When the anvil is adjusted heightwise to compensate for wear of the punch or to insure greater pressure during the punching operation which is necessary when the punches become worn or when several punches are used, it is desirable to provide a greater relief movement of the punch beyond its dead center position prior to its work feeding stroke in order to prevent the punch from gouging out the brass strip. Accordingly, I have provided connections between the anvil adjusting mechanism and the punch lever 30 whereby adjustment of the anvil in a heightwise direction will vary the amount of relief movement of the punch. These connections are arranged so as to provide simultaneous operation for both adjustments. To this end, I have provided a forked lever 86 which is secured to one end of the shaft 58 and is pivotally connected at 88 to one end of a lever 90, the other end of which is operatively connected to the cam lever pivot 38 by means of a link 92. The pivot 38 which is mounted in frame bearings 94 (Fig. 3) has an eccentric portion 96 upon which the cam lever 36 is mounted, the arrangement being such that rotation of the lever 86 effects a variation of the position of the pivot point of the cam lever 36, thereby to effect a variation in the location of associated levers 34 and 36, the lengths of the connections 86, 90 and 92 being such that when the anvil 16 is raised or lowered the relief movement of the punch is varied through the lever 30 by a corresponding heightwise distance. Thus, the position of the anvil can be varied without likelihood of the punch gouging the backing strip during its feed movement.

To provide for preliminary adjustment of the various levers in setting up the machine the pivotal connection between the lever 90 and the link 92 comprises a stud 98 (Fig. 3), and an eccentric pin 100 which engages the link 92. Rotation of the stud 98 will vary the position of the pin 100 by a slight amount so that the effective length of the lever 90 between pivot points 100 and 88 can be adjusted. The lever 34 is provided with a similar stud 102 having a pin 104 which engages the upper end of the cam lever 36 by which the effective length of the lever 34 can be adjusted.

Preliminary adjustment of the anvil is obtained by means of a wedge 106 positioned in the recess 107 in the bracket 54 and which rests upon a flat portion 108 of the frame beneath the bracket. The wedge has inclined surfaces 110 arranged to engage corresponding surfaces 112 on depending portions of the bracket. The wedge 106 is moved by a screw 114 extending through the face of the bracket, a spring 116 being provided normally to force the wedge inwardly. The wedge is adjusted to raise the bracket 54 and anvil 16 to normal operating position after which the bolts 56 are tightened thereby to hold the adjustment.

The backing strip 18 is clamped upon the anvil 16 by a sleeve 118 (Fig. 2), which has flanges 120 overlapping the margins of the strip. The sleeve 118 is slidably positioned upon the anvil so that it can be released when it is desired to advance the backing strip. This is accomplished by means of a lever 122 pivoted at 124 on the frame and having an arm 126 carrying a pin 128 which engages the sleeve. The anvil is cut away at 130 providing clearance around the pin 128 to permit of heightwise movement of the anvil.

In the operation of the machine, when it is desired to adjust the heightwise position of the anvil 16, for example to raise it, the lever 80 is depressed to release the latch 70 from the rack 78 and the handle 68 is moved forwardly to rotate the pin 58 which, through its eccentric portion 64, raises the anvil. As the pin 58 is rotated, the eccentric portion 96 of pin 38 is moved angularly through the connections 86, 90 and 92 with the result that the axis of the cam lever 36 is shifted to the right in Fig. 1 and through the link 34 and lever 30 the block 28 is shifted slightly to the right. As a result of this when the cam 42 causes an operation of the punch the block 28 will be raised somewhat higher than formerly when at the end of its movement to the right so that the punch 20 will be spaced from the backing strip just prior to its work feeding movement regardless of the fact that the anvil has been raised.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a perforating machine, a work support, a punch mounted for reciprocation toward and away from the work support and for transverse movement in feeding work positioned upon the support, means for adjusting the heightwise position of the work support, and means operative upon operation of the work support adjusting means to adjust the work feeding position of the punch heightwise in accordance with the heightwise position of the work support.

2. In a perforating machine, a frame, an anvil mounted for movement heightwise of the frame, a punch mounted for reciprocation toward and away from the anvil, means for reciprocating the punch including a lever, means manually operable for moving the anvil heightwise of the frame, and operative connections between the manually operable means and the lever for controlling the position of the punch relatively to the anvil.

3. In a perforating machine, a frame, an anvil slidably mounted in the frame, a punch carried by the frame, means for reciprocating the punch heightwise of the anvil and for moving the punch transversely of the anvil to feed the work, and

means for simultaneously moving the anvil heightwise of the frame and for determining the position of the punch heightwise of the anvil during work feeding movement of the punch.

4. In a perforating machine, a frame, an anvil slidably mounted in the frame, means for moving the anvil heightwise of the frame, a punch mounted for reciprocation in the frame heightwise of the anvil and for work feeding movements transversely of the anvil, means for reciprocating the punch including a power operated lever, a pivot on the frame upon which the lever is mounted, and means operable in response to heightwise movement of the anvil to vary the position of the pivot thereby to determine the position of the punch during work feeding movements thereof.

5. In a perforating machine, a frame, an anvil slidably mounted in the frame, manually operable means for moving the anvil heightwise of the frame, a punch mounted for reciprocation relatively to the anvil, a punch carrier having a groove therein, a lever pivoted upon the frame, a block carried by the lever and slidably positioned in the groove, means for oscillating the lever to effect reciprocations of the punch, and means operatively connecting the manually operable means and the lever oscillating means for varying the initial position of the block in the groove.

6. In a perforating machine of the type having a reciprocating punch, an anvil, and a backing strip extending across a face of the anvil, means for adjusting the position of the anvil in a heightwise direction, means for moving the punch in transverse direction to feed the work, and means for maintaining the distance between the punch and backing strip substantially constant during feeding movements of the punch irrespective of the heightwise position of the anvil.

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