Oct. 17, 1933. C. A. BERGHOLTZ 1,931,468

PUNCHING MACHINE

Filed Nov. 11, 1929 2 Sheets-Sheet 1

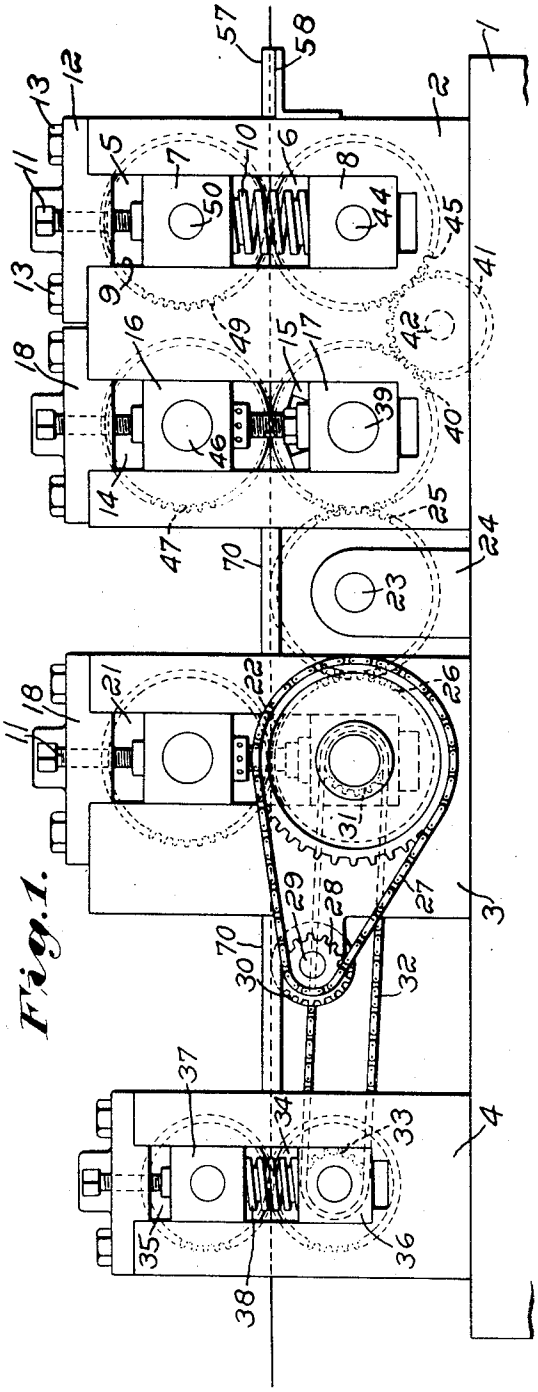


Fig. 1.

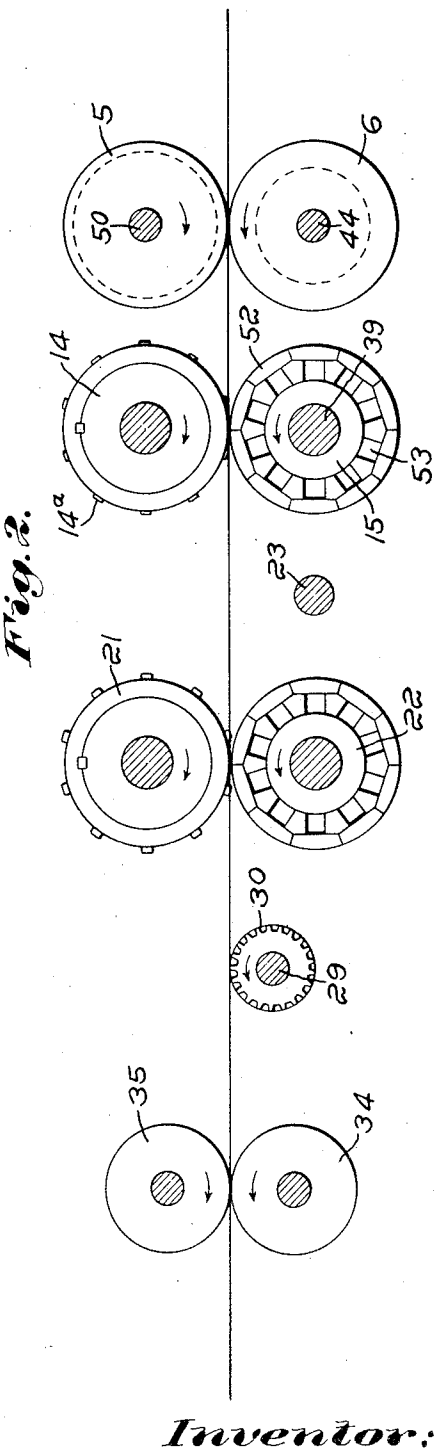


Fig. 2.

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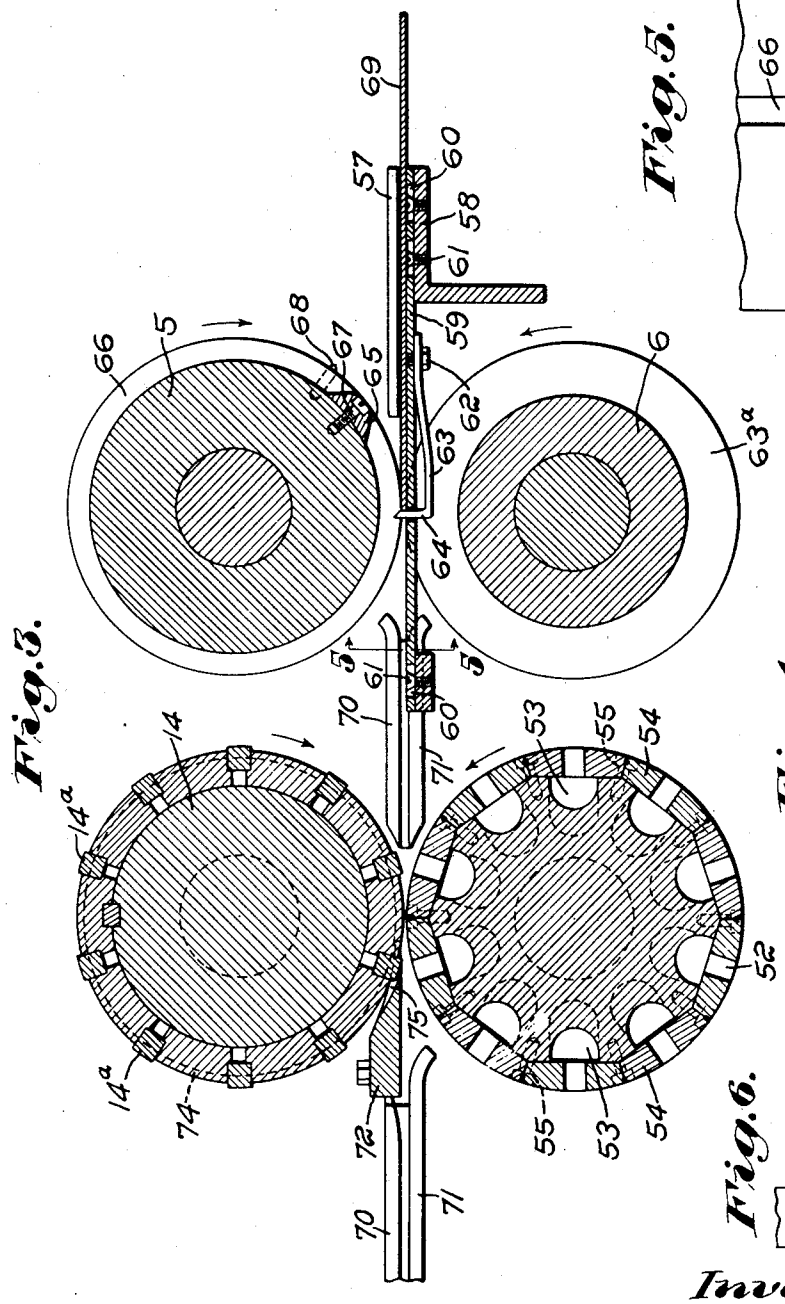


Fig. 3.

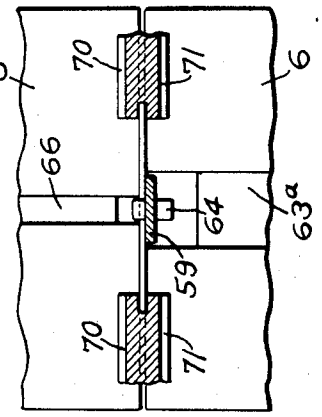


Fig. 5.

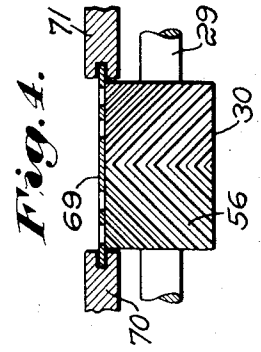


Fig. 4.

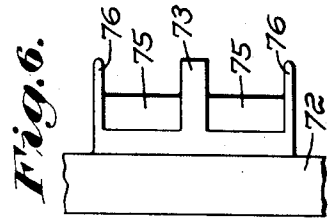


Fig. 6.

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UNITED STATES PATENT OFFICE

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PUNCHING MACHINE

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Application November 11, 1929
Serial No. 406,226

8 Claims. (Cl. 164—99)

This invention relates to punching machines for use upon metal and particularly to rotary machines of that class. Its object is to provide a novel and improved machine having, among others, the improvements and advantages herein pointed out and claimed.

In the drawings of one embodiment of my invention selected for description and illustration,

Fig. 1 is a side elevation partly broken away;

Fig. 2, a diagrammatic view of the several rolls and the stock on which they act;

Fig. 3, a vertical sectional view on an enlarged scale through the bed and the center of the first feeding and the punching rolls;

Fig. 4, a side view in detail of the burr remover;

Fig. 5, a detail section on the line 5—5, Fig. 3; and

Fig. 6, a plan view of the stripper member.

Referring first to Figs. 1, 2, my novel punching machine comprises a bed 1, with roll and gear supporting posts or frames 2, 3, 4 thereon, and similar frames, not shown on the opposite side of the bed.

In frame 2 are mounted two feed rolls 5, 6 of any convenient construction, the journals 7, 8 for which are carried in a vertical channel 9 in the frame 2. These journals are normally retained in proper relation to each other by a spring 10 seated between them and kept under proper degree of compression by a screw 11, in a bridge member 12 secured to the upper frame ends by bolts 13.

The punching roll 14 provided with punches 14^a and cooperating die roll 15 are carried in a similar manner in the same frame by journals 16, 17 and bridge 18 while clearing rolls 21, 22 are carried in the same manner in frame 3.

A main drive shaft 23 is mounted in the frame 24 and this shaft carries a gear 25 meshed with a gear 26 on the shaft of roll 22, which shaft also is suitably connected with a wheel 28 on shaft 29 as by a chain 27, said shaft 29 carrying the burr removing roll 30.

The shaft of the roll 22 also carries a wheel 31 with chain 32 thereon running over wheel 33 on the shaft of the rear feeding roll 34, which with journals 36, 37 spaced by spring 38 and cooperating roll 35 are mounted in the frame 4; and by the means described, the said various rolls and wheels are operated.

The shaft 39 of the die roll 15 also carries a gear 40 in mesh with the gear 25 by which the former is rotated and which also, through the gear 41 on shaft 42 in the frame also drives gear 45 on the shaft 44 with feed roll 6. The shaft 46 of roll 14 carries also a gear 47 in mesh with gear 40 on shaft 39 with roll 15, and by which roll 14 is driven, and roll 5 is similarly driven by a gear 49 on its shaft 50, and meshing with gear 45 on the shaft 44 of roll 6. The roll 14, as stated, Figs. 1, 2, 3, is equipped with punches 14^a which cooperate with dies 52 on roll 15 on shaft 39. The roll 15 is channeled longitudinally as at 53, about its face, Fig. 3, to receive the punched out material, or scrap, and if these channels are inclined towards one end of the roll, they will more readily automatically carry it away. The dies 52, Fig. 3, are formed in plates 54 secured the proper distance apart by screws 55 to the surface of roll 15. By this means after the dies become dull, the plates 54 may be refaced and the dies sharpened and the plates repositioned and adjusted by raising them slightly from their seats by means of shims.

The burr remover 30 is a roll of suitable abrasive material as metal, with diagonal grooves or ribs 56 thereon which, by abrasive action, remove cleanly and without injury to the sheet material, any burr resulting from the punching action.

The frames, Figs. 1, 3, 5, carry guides 57, 58 to ensure the proper feeding of the stock.

Heretofore great difficulty has been experienced when using rotary punches, in controlling the punching action and the feeding of the stock, to ensure accurate and uniform results. To that end I have devised the following construction. To the bottom of the plate 59, which is longitudinally adjustable on the guide 58 by means of the slots 60 and screws 61, Fig. 3, there is secured as by a screw 62 one end of a resilient feed stop bar 63 resting in the channel 63^a in the roll 6 and with an upwardly extended bevelled end 64 projecting through the plate 59. This member 64 is in the path of a lug 65 in the channel 66 in the face of the roll 5, and secured to said roll by screw 67. In the face of the roll also, but not in the channel is a feed pin 68 which engages the stock 69 at each revolution of the roll 5.

The bed also carries at the left of the roll 5 upper and lower guides 70, 71, to assist in proper feeding of the stock to the punches and burr remover.

To effect positive stripping of the stock from the punch, Figs. 3, 6, I have also provided a block 72 with a forwardly extended bevelled finger 73 resting within a channel 74 in the face of the punch roll 14, and above the stock, the member 72 being channeled, however, at 75, to permit passage of the punches 14^a themselves therethrough. The member 73 also may have end fingers 76 to assist in stripping the stock.

In operation the feed, punching and clearer rolls having been relatively adjusted vertically for the stock to be handled, the stock is fed by hand between the guides 57, 58 from the front, Fig. 1, right hand end of the machine, until the front end of the stock engages the stop 64. In this position the feed wheels 5, 6, engage the stock only slightly and slip over its face. The

punches have of course been so located on the roll 14 as to operate at the required points on the stock. The pin 68 is positioned on the roll 5 relative to the lug 65 to engage the stock while the stop 64 is depressed to a level with the top of the stock by the lug 65, and at such time it engages the stock and feeds it forward against the top of the stop 64. As the stock is fed against the stop 64 by the pin 68, the stop is forced down by the stock to a level with the bottom of the stock, permitting the latter to pass over the stop to the punching roll.

The latter roll has been so adjusted on the machine relative to the feed roll 6, that the punches will act upon the stock at the proper distance from the leading end of the stock, and thus produce desired and uniform results. The punches 14^a are intended to pass entirely through the stock, and into the cooperating dies 52, a very short distance, the punched out material dropping into the channels 53 and eventually dropping out at their ends.

Occasionally, however, some of the punches do not cut through the stock sufficiently to free the punched out material, and to take care of such instances I provide the clearer rolls 21, 22, already referred to, and provided with slightly smaller punches but a little longer and in like location, and these act to free any material not freed by the first punch roll.

The material is next acted upon by the burr removing roll 30 which clears effectively the lower face of the stock of all rough edges remaining thereon. The rear feed rolls 34, 35, not only act as such but they also act to position the stock and to regulate the speed at which it is fed under the influence of the roll 30 thereon as the latter operates upon it.

This invention is not restricted to the precise embodiment thereof described and illustrated.

I claim:

1. A rotary sheet material punching machine comprising, in combination, a bed with roll carrying frames, stock feeding rolls thereon, and means on one roll, including a pin, to engage the stock in advance of the bight of the rollers to feed the stock at a predetermined time; also finished hole punching, clearing and burr removing rolls on the bed, and a stock stripper with punch receiving areas thereon all cooperatively connected.

2. A rotary sheet metal punching machine comprising, in combination, a bed, roll frames and rolls with punches radially positioned thereon in the frames, a cooperating die roll for the punching roll, in juxtaposition thereto, stock feeding rolls, stock clearing and burr removing rolls all also on the bed and in operative relation; a stock stripper with punch receiving areas thereon, and means on one roll, including a pin to engage the stock in advance of the bight of the rolls and including a self-positioning stop and roll actuated displacing member therefor, to feed the stock to the rolls at a predetermined time.

3. A rotary sheet material punching machine comprising, in combination, a bed, upper and lower bed guides with a stock stop member thereon, frames also on the bed, a roll with finished hole punches radially positioned thereon, a die roll with channels converging toward the axis at one end of the roll to receive and feed the material scraps therefrom, and cooperating therewith; stock feeding rolls on the frames with a movable stock stripper member at the bight of the feeding rolls; stock clearing and burr removing rolls also on the frames, a stock stripper above the lower guide and means on one roll face to engage the stock stop and the stock and co-ordinate its feeding movement with the stock stop member to feed the stock at a predetermined time, all operatively connected and co-acting.

4. A rotary sheet material punching machine comprising, in combination, a bed, frames thereon containing a punching roll in the frame, grooved stock feeding rolls, a die roll cooperating with the punching roll, stock clearing and burr removing rolls cooperatively mounted in the frames; and a stock stripper between the punching and clearing rolls with paths therein for the punch members on the bed; and means including a stock feed stop yieldably mounted in the bed, a stop displacing member therefor on one of the feeding rolls, and a stock engaging member on one feed roll to feed the stock at a predetermined time to the punching rolls.

5. In a rotary sheet material punching machine having, in combination, a bed, channeled feed rolls, a stock stop member, and stop displacing member therein respectively; punching rolls, clearing rolls and a burr removing member mounted on the bed for progressive step by step action; stock feeding means including an adjustable stock feeding slide on the bed, said stock feeding stop positioned in one roll channel and means on one roll in the channel thereof to displace said stop in the channel of the opposite roll, and means on one feed roll to engage the stock to feed it at a stated time, all cooperatively connected.

6. In a machine for punching sheet material and having, in combination with a bed, punch and die rolls, and clearer rolls and channeled feed rolls thereon, a resilient stock stop member on the bed, in one channel; a stop displacing member on one roll and in an opposite channel and constructed to displace the stop in cooperative action with the roll to permit advance of the stock between the rolls operatively connected.

7. In a machine for punching sheet material and having, in combination, a bed, punch and die rolls and clearer rolls; channeled feed rolls with supports therefor on the frame, a resilient stock stop member in one channel of one roll, a stop displacing member on the bed and in the opposite channel of a second roll, and constructed to displace the stop relative to the roll to permit advance of the stock between the rolls; and a stock feeding pin on one roll acting to feed the stock on the bed after the stop has been displaced by a second roll.

8. In a machine for punching sheet material having, in combination, with a bed, punch and die rolls, and clearer rolls and channeled feed rolls thereon, a resilient stock stop member on the bed and operating in both channels, and a stop displacing member on one roll with a stock feeding member on the roll and adjacent the channel constructed to displace the stop member in cooperative action with the roll to permit advance of the stock between the rolls, said stock stop member being initially actuated by the stop displacing member and thereafter by the stock and means for operating the same.

CARL A. BERGHOLTZ.

CERTIFICATE OF CORRECTION.

Patent No. 1,931,468. October 17, 1933.

CARL A. BERGHOLTZ.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 60, claim 2, after "one" insert the word feeding; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of November, A. D. 1933.

F. M. Hopkins
Acting Commissioner of Patents.

(Seal)