Oct. 7, 1941. W. S. SAWLE 2,258,070

PUNCH PRESS

Filed Jan. 2, 1940 2 Sheets-Sheet 1

Fig. 1

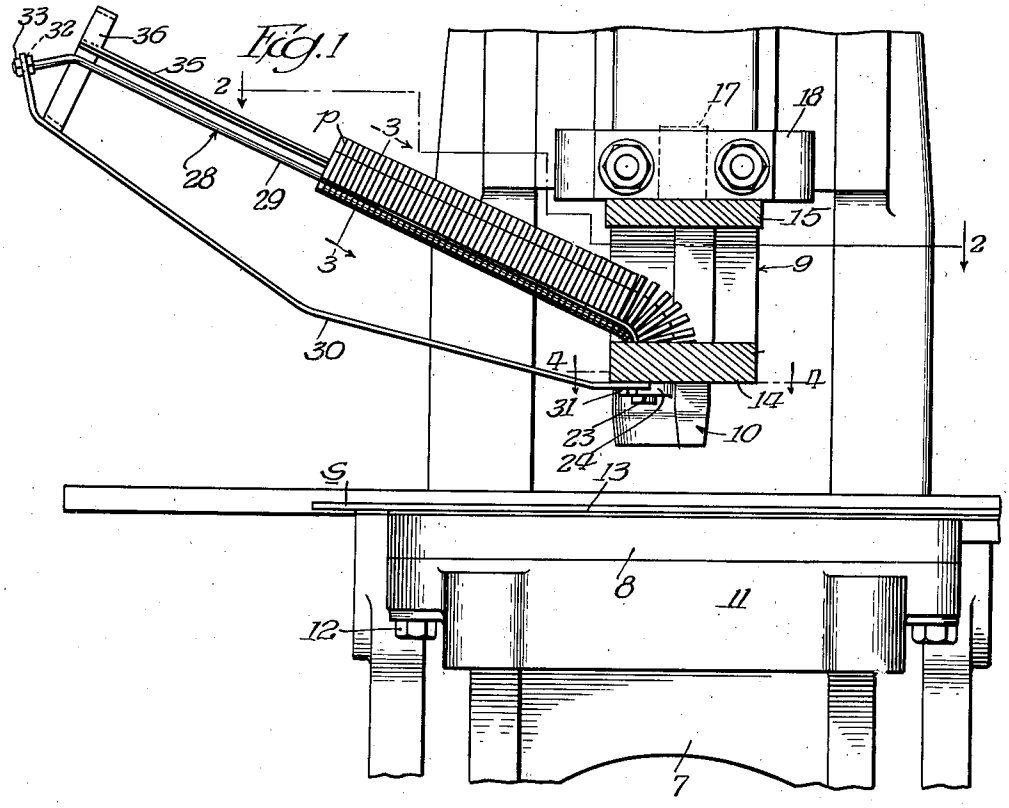
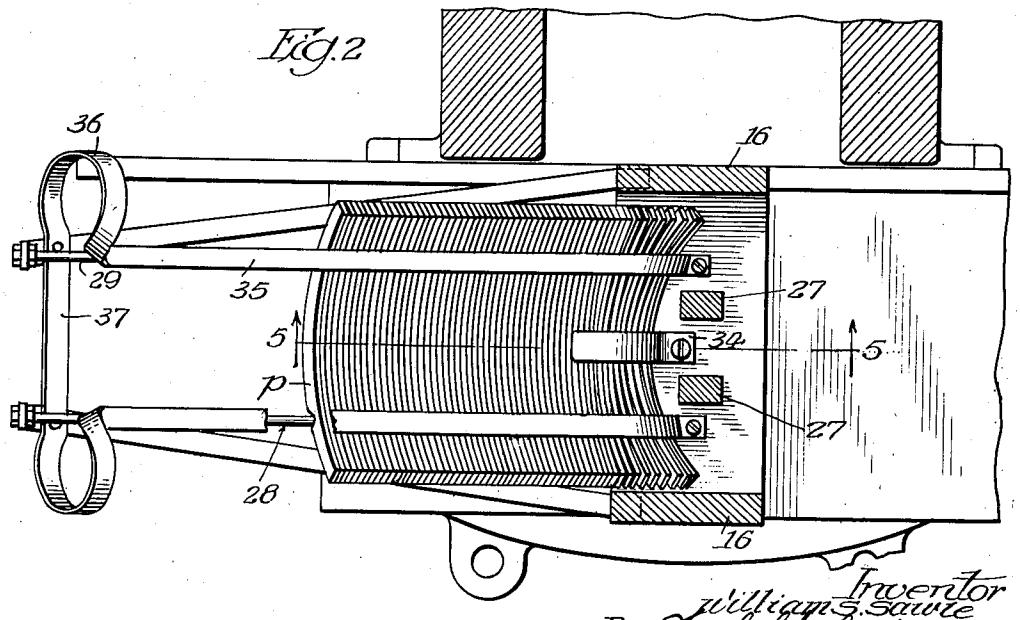


Fig. 2



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Fig. 3

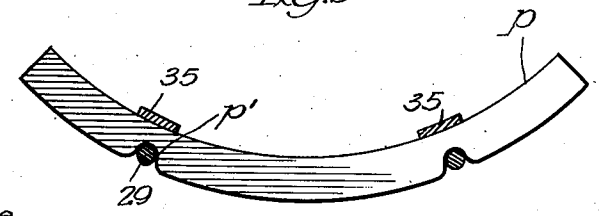


Fig. 4

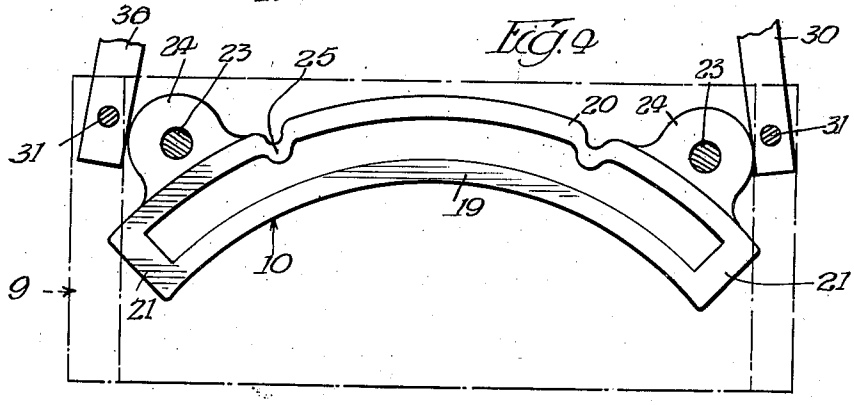


Fig. 6

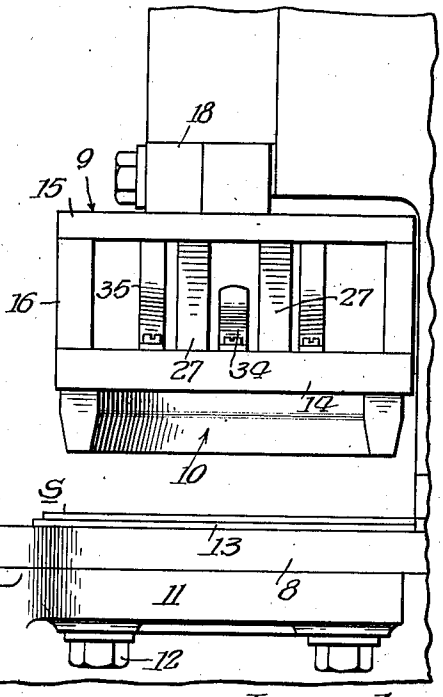
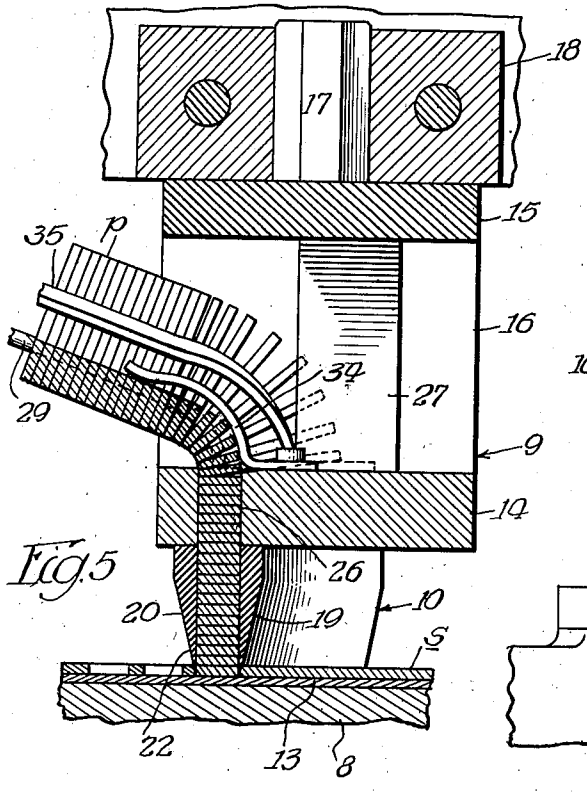


Fig. 5



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UNITED STATES PATENT OFFICE

2,258,070

PUNCH PRESS

William S. Sawle, Kenilworth, Ill.

Application January 2, 1940, Serial No. 311,975

2 Claims. (Cl. 164—19)

The present invention relates generally to presses for punching similarly shaped articles from sheet stock. More particularly the invention relates to that type of punch press which is actuated by power and as its principal or primary parts comprises:

(1) A supporting structure;

(2) A platen which is carried by the supporting structure and is adapted to have the sheet stock from which the articles are to be punched fed intermittently and in a rectilinear course thereover;

(3) A shank equipped holder which is mounted on the supporting structure above the platen to move in a reciprocating manner to and from the platen; and

(4) A hollow die which is fixed to the holder and operates in response to successive movements of the holder toward the platen and in connection with co-ordinated intermittent feed strokes of the stock successively to penetrate the stock and cut the desired articles therefrom.

One object of the invention is to provide a punch press of this type which is generally an improvement upon, and has certain inherent advantages over, previously designed presses of the same general design and character.

Another object of the invention is to provide a punch press of the aforementioned type in which the holder for the die is of hollow box-like design and has in registry and communication with the hollow or interior of the die a slot for permitting the die punched articles to pass into it from the die.

Another object of the invention is to provide a punch press of the last mentioned character in which the hollow box-like holder for the die has associated therewith a track for receiving the articles from the holder interior and in addition simple and novel means for deflecting the articles from the slot onto the track.

A further object of the invention is to provide a punch press of the last mentioned character in which the track serves as an accumulating medium for the punched articles and is so arranged that the deflecting means operates to maintain the punched articles in row form thereon.

A still further object of the invention is to provide a punch press which effectively and efficiently fulfills its intended purpose and is so constructed and designed that it may be manufactured at a low and reasonable cost.

Other objects of the invention and the various advantages and characteristics of the present punch press will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Figure 1 is a side view of a punch press embodying the invention, parts of the box-like die holder being broken away and shown in section in order better to illustrate the design, position and mode of operation of the track for the punched articles;

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1 and illustrating the cross sectional design of the box-like holder and the manner in which the track is attached and supported with respect to the holder;

Figure 3 is an enlarged transverse section taken on the line 3—3 of Figure 1 and disclosing in detail the manner in which the punched articles are carried by the track;

Figure 4 is an enlarged horizontal section taken on the line 4—4 of Figure 1 and illustrating the arrangement, shape and design of the hollow die for punching the articles from the sheet stock in response to movement of the holder toward the platen;

Figure 5 is an enlarged section taken on the line 5—5 of Figure 2 and showing the manner in which the deflecting means on the box-like holder operates to deflect the punched articles from the holder slot onto the track; and

Figure 6 is a fragmentary end view showing the die and holder in their raised position with respect to the platen.

The punch press which is shown in the drawings constitutes the preferred embodiment of the invention. It is primarily designed and adapted to cut similarly shaped arcuate gasket forming pieces *p* from sheet stock *s* of fiber or composition material and comprises a supporting structure 7, a platen 8, a die holder 9 and a die 10.

The supporting structure 7 is of conventional or standard design and is adapted to rest upon the floor of the establishment in which the press is used. It is formed of castings and other structural pieces, as illustrated in Figures 1 and 2, and includes as a part thereof a horizontally extending bed plate 11. This plate extends horizontally and serves as a support for the platen 8. The latter is fixedly or rigidly secured to the top face

of the bed plate 11 by bolts 12 and embodies a flat top face 13 over which the sheet stock *s* is adapted to be fed in an intermittent manner. Preferably the sheet stock is fed manually although if desired automatic feed means operating in synchronism with the die holder and die, may be employed. It is contemplated that the stock be fed over or across the top face 13 of the platen in a rectilinear course.

The die holder 9 is positioned over the platen 8 and carries the die 10, as hereinafter described. It is of box-like design and comprises a bottom wall 14, a top wall 15 and a pair of end walls 16. The end walls extend between, and are suitably connected to, the end portions of the bottom and top walls and serve to hold the last mentioned walls in vertically spaced relation. The sides of the holder 9 are open. The top wall 15 embodies on the central portion thereof an upstanding shank 17 which is clamped within a socket in a head 18 and is polygonal in cross section so as to prevent turning of the holder 9 with respect to the head. The head is slidably mounted with respect to the supporting structure 7 so that it is shiftable by suitable operator-controlled power-actuated mechanism (not shown) to and from the platen 8 on the bed plate 11.

The die 10 is hollow and has an open bottom and an open top. It fits against and extends downwardly from the bottom face of the bottom wall 14 of the box-like die holder 9 and consists of an inner wall 19 an outer wall 20 and a pair of end walls 21. The inner and outer walls are held in laterally spaced relation by the end walls and are of such curvature or shape that the interior of the die corresponds in shape to the gasket pieces to be punched from the sheet stock *s*. The outer lower portions of the inner, outer and end walls of the die are so beveled or angled with respect to the inner lower portions that the bottom of the die is in the form of a knife or cutting edge 22. This edge corresponds in shape to the die interior. The die is held in connected or fixed relation with the box-like holder 9 by way of a pair of bolts 23. The latter extend upwardly through a pair of apertured lugs 24 on the outer wall 20 of the die and project into internally threaded sockets in the bottom wall 14 of the die holder. When the die holder is lowered in connection with downward movement of the head 18 the die is lowered conjointly therewith and the edge 22 penetrates the subjacent portion of the stock *s* and cuts from the stock an arcuate gasket forming piece *p*. The down stroke of the die holder is such that at the end of such stroke the edge 22 of the die is in abutting relation with the top face 13 of the platen 8. The outer wall 20 of the die embodies inwardly of its ends, a pair of inset or instruck portions 25. These portions are so shaped that they form notches p^1 in the convex margins of the gasket forming pieces *p*. The gasket pieces as they are cut by the die from the sheet stock *s*, to move upwards. In order to permit the pieces *p* to travel unrestrictedly through the die the bottom wall 14 of the die holder 9 is provided with an arcuate slot 26. This slot is shaped conformably to, and is in accurate registry with, the interior of the die 10. The gasket forming pieces *p*, after travelling or moving upwardly through the die interior, move through the slot 26 into the interior of the die holder 9, as shown in Figure 5. The portion of the die holder bottom wall 14 which defines the inner curved face of the slot 26 is reinforced against bending or distortion by a pair of struts 27. The latter are positioned in laterally spaced relation and extend between, and are secured to, the bottom and top walls 14 and 15 of the die holder 9. By providing the slot 26 in the bottom wall 14 and having the die holder of box-like design the cut gasket forming pieces *p* are permitted to travel freely through the die and into the die holder interior.

In addition to the supporting structure 7, the platen 8, the die holder 9 and the die 10, the press comprises a track 28 for carrying the cut gasket forming pieces *p* away from the die holder 9 and holding or supporting the cut pieces in such manner that they are in stacked relation and hence may be readily inspected to determine whether defects are present. The track 28 consists of a pair of laterally spaced inclined rods 29 which are located at one side of the die holder 9 and are spaced apart a distance corresponding to the distance between the notches p^1 in the gasket forming pieces *p*. The lower ends of the rods are located in opposed relation with the struts 27 and have the extremities thereof bent downwards and secured in fixed relation with the portions of the die holder bottom wall which overlie the instruck portions 25 of the outer wall 20 of the die and encounter the notches p^1 in the gasket forming pieces *p* as the pieces move or travel upwards in the slot 26. The outer ends of the rods 29 are supported and held against downward flexure or bending by a pair of inclined braces 30. These braces underlie the rods 29 constituting the track 28 and have the lower ends thereof secured by bolts 31 to the under or bottom face of the die holder bottom wall 14. The upper ends of the braces have holes 32 therein through which the upper or outer ends of the rods 29 project. Said ends of the rods are externally threaded and carry inner and outer nuts 33 which, as shown in Figures 1 and 2, are arranged in straddled relation with the upper ends of the braces 30 and maintain the rods and braces in fixed or rigid relation. The rods, except for the lower and upper ends thereof, are straight. The cut gasket forming pieces *p* as they emerge from the top portion of the slot 26 in the die holder bottom wall 14 are urged into contact or seated relation with the track forming rods 29 by a deflector 34 and are caused by this deflector to travel around the bent portions of the lower ends of the rods. The pieces, as the result of the action of the deflector 34 in connection with upward feed thereof, due to successive cutting of additional pieces by the die 10, move upwards along the rods and with the latter in seated relation with the notches p^1. The deflector 34, as shown in the drawings, is formed of an elongated strip of metal and has one end thereof bolted or otherwise fixedly secured to the portion of the die holder bottom wall 14 which defines the central inner part of the slot 26. It is positioned between the struts 27 and is arranged so that the central portion and upper end thereof overlie the slot 26. Such portion and end of the deflector 34 are shaped and positioned as shown in Figure 5. The central portion is curved in the direction of, and conformable to, the bent portions of the lower ends of the track forming rods 29 and is positioned and arranged so that it engages the inner central portions of the cut pieces *p* as they emerge from the slot 26 and places such portions under such pressure that

the pieces are caused to travel around and at right angles to the bent lower ends of the rods, as shown in Figure 5. The upper end of the deflector **34** for the most part is straight and is parallel to the adjacent straight portions of the rods **29**. It projects outside of the die holder and serves to maintain the pieces at right angles to the rods directly after they move or travel around the bent lower end portions of the rods. As the result of the action of the deflector **34** the cut gasket forming pieces *p* are first caused to travel and swing around the bent lower end portions of the track forming rods after emerging from the slot **26** and then ride upwards in stacked relation on the straight portions or parts of the rods. When the pieces travel upwards on the track forming rods their ends project upwardly. To maintain the pieces in seated relation with the rods two guide strips **35** are provided. These strips overlie, and are upwardly inclined in conformity to the rods **29**, as shown in Figures 1 and 2. They are adapted to engage the inner end portions of the pieces *p*, as shown in Figure 3, and have the lower ends thereof bolted or otherwise fixedly secured to the top face of the bottom wall **14** of the die holder **9**. The upper ends of the strips **35** are cross connected by way of a pair of U-shaped loops **36** and a cross piece **37**. The cross piece is riveted to, and extends between, the upper ends of the braces **30** and serves to hold the braces as well as the track forming rods **29** against lateral flexure. The loops **36** extend laterally with respect to the guide strips **35** and are connected to, and extend between, the ends of the cross piece **37** and the upper ends of the strips **35**. They are U-shaped in design and permit the cut gasket forming pieces *p* to be removed from the track after they reach the upper end of the rods **29**. The pieces travel upwardly on the tracks in abutting relation and are so held or retained that a predetermined number may be removed from the track by any suitable rack or removing tool and then taped together for shipping purposes.

Assuming that the die holder and die are being moved continuously to and from the platen **8** and the sheet stock *s* is being intermittently fed over or across the platen the operation of the press is as follows:

On each down stroke of the holder and die the cutting edge **22** of the die penetrates the stock and punches out a gasket forming piece *p*. During successive down strokes of the die the cut pieces *p* move upwards through the interior of the die and then travel through the slot **26** in the bottom wall **14** of the box-like die holder **9**. As the pieces emerge from the top of the slot the center portions thereof encounter the curved intermediate portion of the deflector **34**. Such portion of the deflector, as hereinbefore pointed out, urges the pieces into seated relation with the curved lower ends of the track forming rods **29** and exerts such pressure that the pieces are caused to travel or move around and at right angles to such ends of the rods. After leaving the bent lower portions of the rods the pieces *p* travel in abutting relation toward the upper end of the track **28** and are maintained in seated relation with the rods by the guide strips **35**. When the pieces reach the upper end of the track they may be removed either one at a time or in group form. By reason of the fact that the notches p^1 of the cut gasket forming pieces are in seated relation with the track forming rods **29** during travel of the pieces on the rods the pieces are effectively and efficiently held against sidewise or lateral displacement.

The herein described punch press is efficient in operation and may be manufactured at a comparatively low cost due to the simplicity of the design. By reason of the fact that the press includes the track **28** and the deflector **34** it has provision for ready and continuous discharge of the cut pieces *p*. Due to the construction and design of the track the cut pieces may be readily inspected while traversing the track and in addition may be removed in group form.

Whereas the punch press has been described as being designed and adapted primarily to cut arcuate gasket forming pieces *p* from fiber sheet stock it is to be understood that it may be used to cut other arcuate articles from stock other than fiber or gasket forming material.

It is also to be understood that the invention is not to be restricted to the details set forth since these may be modified within the scope of the appended claims without departing from the spirit and scope of the invention.

Having thus described the invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a punch press comprising a platen adapted to have sheet stock fed intermittently thereacross, a box-like die holder mounted over, and to move to and from, the platen and having a bottom wall and an open side, and an arcuate hollow die on the under side of said bottom wall of the holder adapted and shaped to cut from the stock arcuate articles with pairs of notches in the outer margins thereof in response to successive movements of the holder toward the platen and intermittent feed of the stock and having the interior thereof in communication with the holder interior by way of a correspondingly shaped arcuate slot in said bottom wall so that the cut articles may pass from the die interior into the holder interior, of a pair of inclined parallel laterally spaced track-forming rods disposed adjacent, and extending through, said open side of the holder, having the lower ends thereof bent downwards and secured to the portion of the holder bottom wall that defines the outer curved portion of the slot, and adapted to have the articles emerging from said slot travel therealong with the notches in seated relation therewith, and a strip type deflector disposed in the holder between the lower ends of the rods but on the other or inner side of the slot. curved in the direction of the lower ends of the rods, and shaped and arranged so that it engages the central portions of the inner margins of the cut articles emerging from the slot, and operates to cause such articles first to travel around and at right angles to the bent lower ends of the rods and then along the rods at right angles thereto.

2. The combination with a punch press comprising a platen adapted to have sheet stock fed intermittently thereacross, a box-like die holder mounted over, and to move to and from, the platen and having a bottom wall and an open side, and an arcuate hollow die on the under side of said bottom wall of the holder adapted and shaped to cut from the stock

arcuate articles with pairs of notches in the outer margins thereof in response to successive movements of the holder toward the platen and intermittent feed of the stock and having the interior thereof in communication with the holder interior by way of a correspondingly shaped arcuate slot in said bottom wall so that the cut articles may pass from the die interior into the holder interior, of a pair of inclined parallel laterally spaced track-forming rods disposed adjacent, and extending through, said open side of the holder, having the lower end thereof bent downwards and secured to the portion of the holder bottom wall that defines the outer curved portion of the slot, and adapted to have the articles emerging from said slot travel therealong with the notches in seated relation therewith, a strip type deflector disposed in the holder between the lower ends of the rods but on the other or inner side of the slot, curved in the direction of the lower ends of the rods, and shaped and arranged so that it engages the central portions of the inner margins of the cut articles emerging from the slot, and operates to cause such articles first to travel around and at right angles to the bent lower ends of the rods and then along the rods at right angles thereto, and a pair of inclined parallel laterally spaced guide strips overhanging, and connected to move with, the rods, having the lower ends thereof connected to the holder and their upper ends connected by opposed laterally extending loop-like elements to the upper ends of the rods, and serving to hold on said rods the articles deflected by the deflector.

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