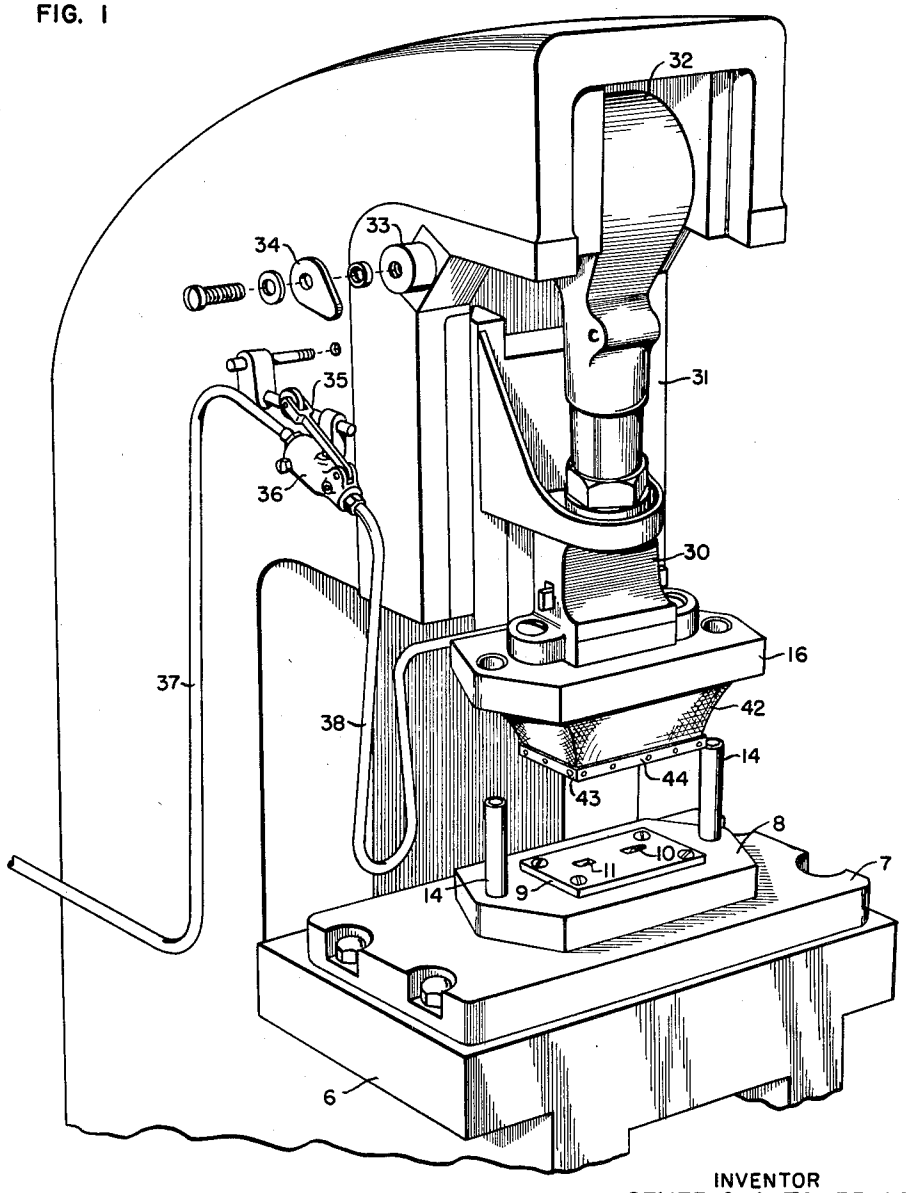
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CHIP REMOVER BELLOWS FOR SHAVING PUNCH

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FIG. 1



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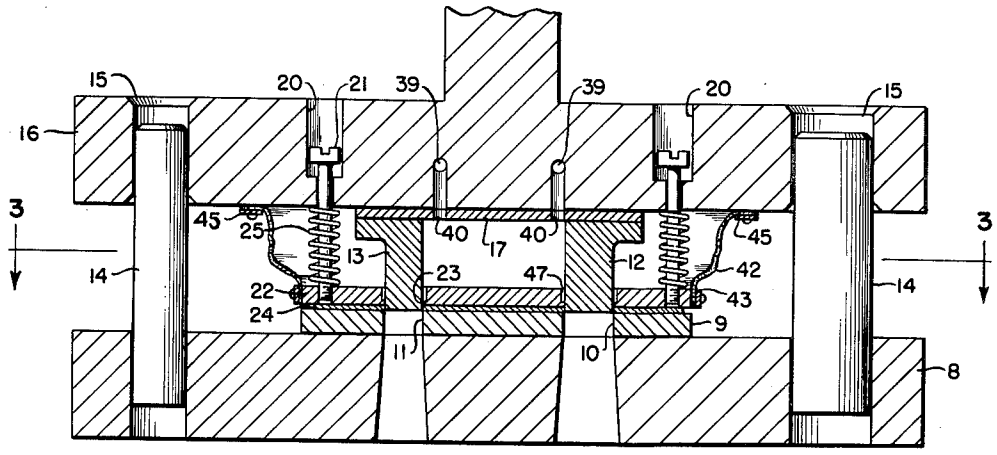


FIG. 2

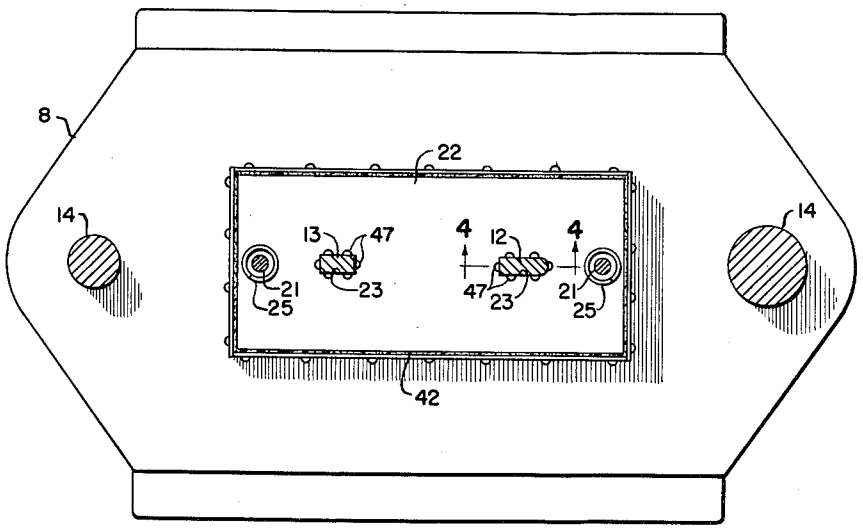


FIG. 3

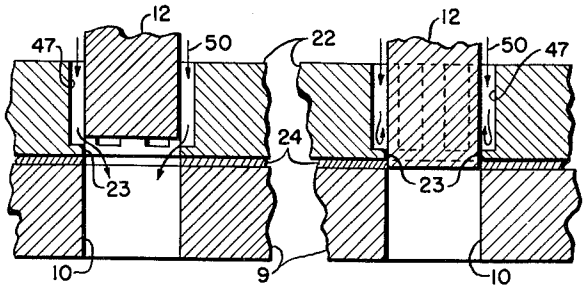


FIG. 4

FIG. 5

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CHIP REMOVER BELLOWS FOR SHAVING PUNCH

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This invention relates to punch press mechanisms and more particularly to a chip remover for blowing chips out of a shaving punch.

In punch presses, considerable difficulty has been experienced in removing chips which may be formed in the press, particularly in shaving punches, and if the chips are not removed, the life of the punch and die are materially reduced and the effectiveness of the shaving operation is impaired.

It is an object of the present invention to provide a chip removing mechanism for a punch press.

A further object of the invention is to provide a shaving punch with a chip removing mechanism which insures that the fine chips formed in the punch will be completely removed from the punch.

In accordance with one embodiment of the invention, a punch press having the usual punch holder, stripper plate and punches, is provided with a bellows-like arrangement comprising a sheet of imperforate flexible material attached to the punch holder and to the stripper plate to form a bellows-like compartment into which compressed air may be fed at predetermined times in the cycle of the punch press for directing air to blind channels formed in the stripper plate, along the shank of the punch. The channels in the stripper plate are so arranged that the punch will close off the flow of air through the channels when the punch is in its advanced position but will permit the air to be blown out around the free end of the punch when the punch is retracted.

A more complete understanding of the invention may be had by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

FIG. 1 is a view in perspective of a punch press equipped with the chip removing mechanism comprising the present invention;

FIG. 2 is a transverse vertical sectional view through the punch and die mechanism showing details of construction of the punch press equipped with the chip remover of the present invention;

FIG. 3 is a horizontal sectional view taken substantially along the line 3—3 of FIG. 2, in the direction of the arrows;

FIG. 4 is a detailed sectional view on an enlarged scale, taken substantially along the line 4—4 of FIG. 3 in the direction of the arrows, showing the relationship of the punch and the stripper plate when the punch is in its retracted position, and

FIG. 5 is a view similar to FIG. 4 but showing a punch in its advanced position where it blocks the flow of air across the free end of the punch.

Referring now to the drawings, wherein like reference characters designate the same parts throughout the several views, particular reference being had at this time to FIG. 1 wherein there is shown a punch press including a bed 6 having a bolster plate 7 mounted on it for supporting a die block 8 on which there is mounted a die plate 9 having shearing apertures 10 and 11 for cooperation with punches 12 and 13. Extending upwardly from the die block 8 are a pair of guide or pilot pins 14 designed to enter guide sleeves 15 mounted in a punch holder 16 thereby to guide the punch holder 16 with respect to the die block 8. The punches 12 and 13

are mounted on a punch plate 17 suitably secured to the punch holder 16.

The punch holder 16 has shouldered apertures 20 formed in it for receiving the heads of stripper plate supporting screws 21. These screws 21 are threaded into a stripper plate 22 and have springs 23 encircling their shanks so that the stripper plate 22 is normally urged from the position shown in FIG. 2 to a position where the heads of the screws 21 will seat on the shoulder in the aperture 20 to hold the stripper plate 22 in a predetermined spaced relationship with respect to the punch holder 16 as is usual in punch presses.

The stripper plate 22 has punch conforming apertures 23 formed in it which extend through from the inner surface to the outer surface of the stripper plate and the stripper plate will serve to strip a part 24 off of the punches as the punches are retracted on the up-stroke of the punch press during which up-stroke the springs 23 will hold the stripper plate against the part 24 until the part has been stripped from the punches 12 and 13.

The punch holder 16 is suitably mounted on a reciprocatable ram 30 (FIG. 1), of the press which is guided in suitable ways 31 and which has reciprocation imparted to it through a crank 32 driven by a shaft 33. The shaft 33 has on it a cam 34 (shown in exploded relation in FIG. 1) which cooperates with an actuating lever 35 of a valve 36 to open the valve 36 as the punches 12 and 13 are driven downwardly by the ram 30. The valve 36 is connected to a source of compressed air (not shown) through a hose or piping 37 and when the valve 36 is opened, air under pressure will be directed through a flexible hose 38 to a pair of passages 39 extending horizontally into the punch holder and in communication with vertically extending passages 40 which extend from the passages 39 out through the punch supporting plate 17.

The stripper plate 22 and the punch holder 16 have an imperforate flexible sheet 42 attached to them to form a closed, bellows-like chamber surrounding the shanks of the punches 12 and 13. This imperforate sheet of flexible material 42 is sealed to the sides and the front and back of the stripper plate 22 by hold down plates 43 and 44 and is fixed to the bottom of the punch holder 16 by means of hold down plates 45 to seal the stripper plate 22 to the punch holder 16 throughout the circumference of the hold down plate 22.

The guide apertures 23 in the stripper plate, in which the punches 12 and 13 are slidable, have blind channels 47 formed in them which extend from the upper surface of the stripper plate 22 down to a point near the lower surface of the stripper plate. There are six of these channels 47 formed in the wall of each of the apertures 23 and the channels extend downwardly to a point where, when the punches 12 and 13 are retracted to their uppermost positions, there will be a gate opened so that air under pressure in the bellows-like compartment formed by the flexible material 42 will be directed out across the face of the shaving punches 12 and 13 thus to remove any chips which might tend to cling to the punch and be dragged up into the stripper plate in such manner that they could score or scratch the cutting edge or side of the punch when the punch is moved with respect to the stripper plate.

As shown in FIG. 4, the punch is in its retracted position and at this position of the punch, air under pressure will be directed in the direction indicated by the lines 50 with the arrows on them in the direction of the arrows to clean out the aperture 23 and remove any chips which might tend to adhere to the punch. The cam 34 is so arranged on the shaft 33 of the press that air will be admitted under pressure to the chamber formed by the flexible material 42 as soon as the punch 22 starts its

downward movement and the valve 36 will be held open until the punch has been retracted to approximately the same position and as the punch moves into its neutral or inactive upper position, the valve 36 will be closed. As the punches 12 and 13 move downwardly and the valve 36 is opened, a blast of air will be fed down through blind channels 47 and out across the face of the punch. As the punch passes the bottom end of these blind channels 47, the punch will seal the gates or openings at the lower ends of the blind channels 47 and the air will not escape from the chamber formed by the flexible material 42 until the punch is again retracted to a position where the blind channels 47 are in communication with the punch guiding aperture 23. Thus, it is apparent that during the punching operation the air pressure will build up to a maximum within the sealed air-tight chamber formed by the flexible material 42 and thus present the maximum amount of air at the highest pressure available across the face of the punch as the punch is being retracted.

While the invention has been described with respect to a particular application thereof, it will be understood that modifications and variations may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A chip removing attachment for a shaving punch press having a punch holder for advancing and retracting a punch, a punch mounted on said holder and a stripper plate surrounding the shank of said punch and connected to said punch holder and spring-held in a predetermined spaced relationship to the punch holder, an extensible imperforate sheet of flexible material attached and sealed to said stripper plate and punch holder to form a closed bellows-like chamber surrounding the shank of said punch, channels formed in said stripper plate which extend from the inner surface of the stripper plate to within a short distance of its outer surface at the point where the punch goes through the stripper plate, said stripper plate being movable for stripping material from the punch, to a position where the ends of the channels therein adjacent to the outer surface thereof are beyond the free end of said punch and means for directing a blast of fluid under pressure through said chamber and channels and past the end of said punch when the punch is in a relatively retracted position.

2. A chip removing attachment for a shaving punch press having a punch holder for advancing and retracting a punch, a punch mounted on said holder and a stripper plate surrounding the shank of said punch and connected to said punch holder and spring-held in a predetermined spaced relationship to the punch holder, comprising an extensible imperforate sheet of flexible material attached and sealed to said stripper plate and punch holder to form a closed bellows-like chamber surrounding the shank of said punch, air channels formed in said stripper plate which extend from the inner surface of the stripper plate to within a short distance of its outer surface at the point where the punch goes through the stripper plate, and a valve controlled by the punch press for supplying air under pressure to said chamber for passage through said channels and past the free end of said punch when the punch is retracted.

3. A punch press including a punch, a die, a shaft for imparting relative reciprocation to said punch and die, a punch holder for supporting said punch, a stripper plate movable with respect to said punch and having a punch guiding aperture in it, said punch upon having reciprocation imparted to it being retractable into said punch guiding aperture to a limited extent, an extensible imperforate sheet of flexible material attached and sealed to said punch holder and said stripper plate to form a bellows-like compartment surrounding a major portion of said punch, means for directing air under pressure to said compartment in timed relation to the reciprocation of said punch relative to said die, and blind channels formed in the wall of said punch guiding aperture in the stripper plate and extending to a point below the end of said punch when the stripper plate has been moved to said limited extent with respect to the punch, for directing the air under pressure from the compartment across the face of the punch, said punch serving to seal said blind channels and prevent air from being fed through them when the punch is below the bottoms of said blind channels.

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