

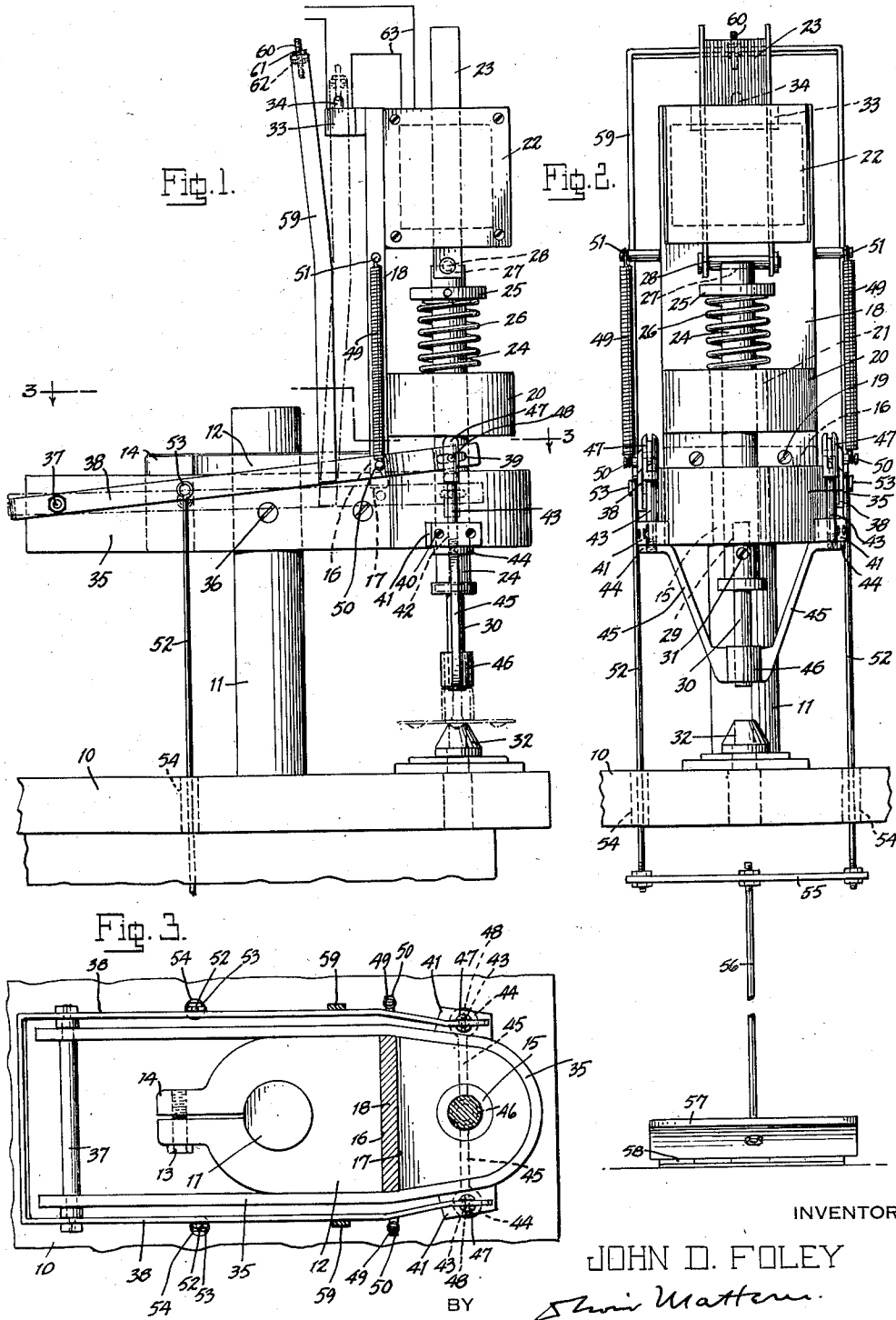
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HOLD-DOWN GUARD MECHANISM FOR TRIMMING PRESSES

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## HOLD-DOWN GUARD MECHANISM FOR TRIMMING PRESSES

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1 Claim. (Cl. 164—86)

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The present invention relates to a hold-down-guard mechanism for trimming presses, and has for an object to provide a mechanism of this character of relatively simple and inexpensive construction, and which will be automatic in operation as to power actuation so that it does not depend upon the volition or judgement of the operator of the press to perform its actuating function.

The guard mechanism of the invention is especially adapted for cooperative incorporation in a trimming press of the type which trims molded articles from a sheet or strip of molded rubber or the like, and wherein the flexible nature of such material is such that the operator must hold the material relatively close to the die and punch of the press, so as to properly position the article to be trimmed within the die. With this requirement in view it is a further object of the invention to provide a guard mechanism which will effectually prevent positioning of the fingers of the operator in the path of the punch, while at the same time permitting the material to be held in close proximity to the punch and die. It is further proposed to provide a guard mechanism having a guard element adapted to act as a holding means for the material to be trimmed, so as to firmly retain it upon the die preparatory to engagement of the die by the punch.

A further object is to provide a guard mechanism having means for automatically causing the actuation of the power means for driving the punch, and particularly to provide a precision electric switch of the "micro" type, which is adapted to operate within very close limits, so that the punch cannot be operated until the guard is in an exact predetermined position in relation to the die and the work. Another object is to provide a guard mechanism particularly adapted for cooperation with a solenoid operated trimming press, the "micro" switch, forming part of the mechanism, being so connected as to directly open and close the electric circuit of the solenoid, and resulting in a fast operating press without an undue lag between the operation of the guard mechanism and the punch actuating solenoid.

With the above and other objects in view, an embodiment of the invention is shown in the accompanying drawings, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claim.

In the drawings:

Fig. 1 is a side elevation of a trimming press

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embodying the invention, the dot-and-dash lines indicating the position of the guard mechanism in its operative position, as well as the position of the article to be trimmed.

Fig. 2 is a front elevation.

Fig. 3 is a horizontal sectional plan view taken along the line 3—3 of Fig. 1.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, the trimming press, according to the illustrated exemplary embodiment of the invention, comprises a horizontal table or bed 10, upon which there is rigidly secured a vertical cylindrical post 11, having adjustably mounted thereon for vertical adjustment a bearing head 12, secured in its position of adjustment by means of a clamping bolt 13 provided in the rearward split portion 14 of the head.

In the forwardly projecting end of the head there is provided a vertically disposed bearing bushing 15 for supporting the punch driving shaft, as will presently more fully appear. Intermediate post 11 and the bearing bushing 15, the bearing head is provided with a transverse vertical shoulder 16 and a transverse recess 17, a vertically disposed plate 18 being engaged at its lower end in the recess 17 and rigidly secured by screws 19 to the shoulder 16. Upon the forward side of the plate 18 there is secured a bearing block 20 having a bearing bushing 21 therein in axial alignment with the bearing bushing 15, and which in cooperation therewith provides a relatively long bearing support for the punch driving shaft.

In spaced relation above the bearing block 20 there is secured upon the forward face of the plate 18 a solenoid unit 22 having a vertically movable plunger armature 23, the winding of the coil of the solenoid being such as to drive the armature downwardly when it is energized.

A punch driving shaft 24 is engaged for vertical movement in the bearing bushings 15 and 21, and is provided near its upper end with a collar 25, between which and the bearing block 20 there is provided a helical compression spring 26, normally forcing the shaft upwardly. At its upper end the shaft is provided with a transverse semi-cylindrical groove 27, engaged by a cross-shaft 28 provided at the lower end of the plunger 23, so that upon down movement of the plunger the shaft is pressed downwardly, the spring returning the shaft and plunger to their raised positions when the solenoid is de-energized.

Within a vertical socket 29 in the lower end of

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the shaft 24 there is engaged the punch 30 secured in place by a set screw 31, and which is adapted to cooperate with a die 32 secured upon the table 10. The surface of this die surrounding its cutting edge is of truncated cone shape for the purpose of providing clearance space for the operator's fingers, as will hereinafter more fully appear.

An electric switch 33 of the "micro" type is secured at the upper end of the plate 18 upon its rearward side, and is provided with an actuating pin 34 for engagement by the guard mechanism, as will presently more fully appear. This switch is connected in the circuit of the solenoid, so that the solenoid is energized and de-energized in the respective closed and open positions of the switch.

The safety mechanism comprises a U-shaped band member 35 engaged about the forward end of the bearing head 12 and secured at its side by means of screws 36, the leg portions of the band projecting rearwardly from the bearing head and being provided in rearwardly spaced relation thereto with a transverse shaft 37, upon the projecting ends of which there is pivotally mounted a U-shaped lever 38. The lever extends forwardly at each side of the bearing head and is provided in the forward end of each of its side legs with a slot 39, for cooperation with the vertically movable guard assembly, as will presently more fully appear.

At each side of the bearing head, in transverse alignment with the axis of the punch actuating shaft, there is secured upon the band member 35 by means of screws 40 a bearing block 41, having a vertical bearing passage 42 therein. In the bearing blocks 41 there are engaged for vertical sliding movement slide rods 43, threaded at their lower ends and screwed into the upper flattened end portions 44 of the side arms 45 provided at each side of the tubular guard member 46. The guard member is axially aligned with the punch 30, and is normally disposed in its raised position between the lower end of the punch and the die 32, being sufficiently spaced above the die to permit placing of the material to be trimmed upon the die. At the upper end of each of the rods 43 there is provided a forked head portion 47, engaged by the forward end of one of the side legs of the lever 38, and provided with a cross pin 48 engaged in the slot 39 of the lever.

The lever 38 is normally maintained in its raised position by means of helical expansion springs 49 connected between studs 50 upon each of the side legs of the lever and studs 51 provided at each side of the plate 18. Downward movement is imparted to the lever by means of pull rods 52, connected to each of the side legs of the lever by means of studs 53, these pull rods extending downwardly through passages 54 in the bed 10 to a cross-head 55, to the central part of which there is secured a pull rod 56, connected at its lower end to an operating pedal 57 connected by a hinge 58 to the floor. The pedal is normally held raised through the action of the springs 49. Upon pressing the pedal downwardly the lever 38 is swung downwardly to bring the guard member downwardly into guarding relation with the die 32 and the work engaged thereon, as shown by the dot-and-dash lines in Fig. 1.

A yoke member 59 is secured at its lower end to the side legs of the lever 38, and upon its upper transverse portion is provided with an adjustably

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mounted contact screw 60 held in its adjusted position by retaining nuts 61 and 62, this contact screw adapted as the lever 38 is swung downwardly to engage and depress the pin 34 of the "micro" switch 33, as shown by the dot-and-dash lines, Fig. 1. The "micro" switch is so positioned with respect to the contact screw that the circuit 63 of the solenoid is closed at the exact predetermined point when the guard member engages the work piece to press it against the die, whereupon the downward operation of the plunger presses the punch downwardly into engagement with the die. It will thus be seen that if a finger of the operator is disposed in the path of the punch, the guard member cannot be brought downwardly to the point where the "micro" switch will be actuated. The tapering of the surface of the die permits the fingers to be placed in very close proximity to the cutting edge of the die without danger of being hit by the punch.

I have illustrated and described a preferred and satisfactory embodiment of the invention, but it will be understood that changes may be made therein, within the spirit and scope thereof, as defined in the appended claim.

What is claimed is:

In a press holddown-guard mechanism, a fixed tool part, a vertically movable tool part, power means for vertically moving said movable tool part downwardly and upwardly respectively into and out of relation to said fixed tool part, a hold-down-guard element comprising a tubular wall surrounding said movable tool part and vertically movable downwardly and upwardly in parallel relation to the movement of said movable tool part respectively into and out of guarding relation to said fixed tool part, said fixed tool part having an opening for engagement by said movable tool part and having an annular downwardly tapered wall surrounding said opening and disposed directly beneath the tubular wall of said holddown-guard element, means normally urging said holddown-guard element into raised position, manually operable actuating means connected to said holddown-guard element to move it downwardly into holding relation with the upper side of the work engaged upon said fixed tool part independently of the movement of said movable tool part and said power means, means for controlling the operation of said power means, and means carried by said manually operable means for operating said last named means at a predetermined point of movement of said holddown-guard element.

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