

[54] **TWO STAGE WORKSTOCK LOCATOR FOR PUNCH PRESSES**

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[73] Assignee: Teletype Corporation, Skokie, Ill.

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[51] Int. Cl. B26d 7/16

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83/268, 269, 391-395, 467 A, 468, 419, 421;
226/2, 8, 125

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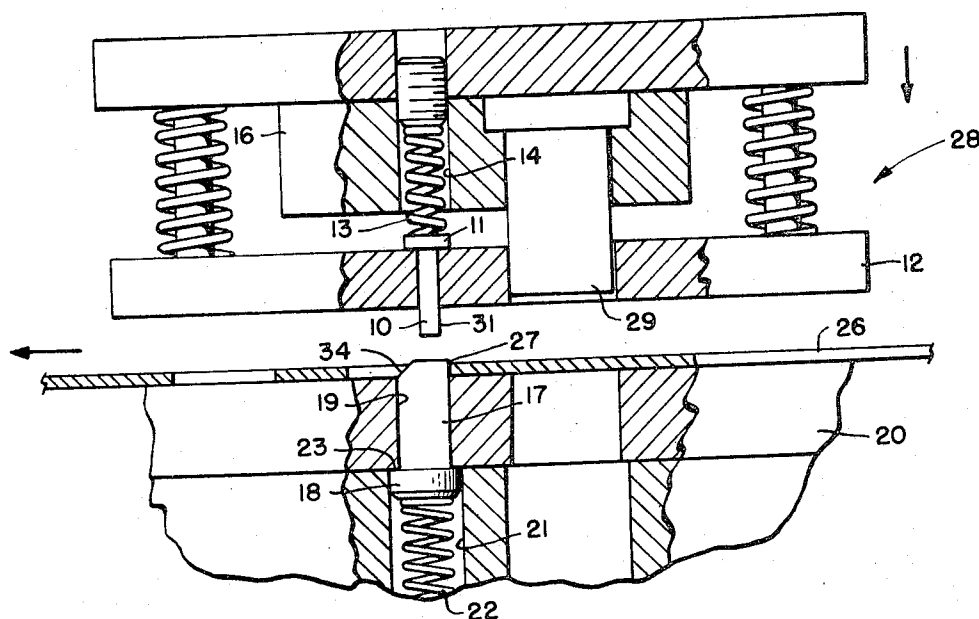
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[57] **ABSTRACT**

Workstock to be operated upon by a punch press is advanced into blocking engagement with a first locating device which is slidably mounted in the die of the punch press and which locates the workstock in a first position. When the punch press is operated a second locating device, positioned in the ram of the punch press, engages the first locating device and forces it beneath the bottom surface of the advancing stock. When the first locating device is depressed beneath the bottom surface of the workstock, the workstock partially advances over the first locating device and into engagement with the second locating device, which accurately locates it in a second and final position to be operated upon by the punch press. The bottom surface of the workstock holds the first locating device out of blocking engagement with the workstock, and after the punching operation the workstock advances over the first locating device until the portion of the workstock which has just been blanked out by the punch is above the first locating device, at which time the first locating device rises to again block the advancing workstock and to initially locate it in the first position for the next punching operation.

3 Claims, 3 Drawing Figures



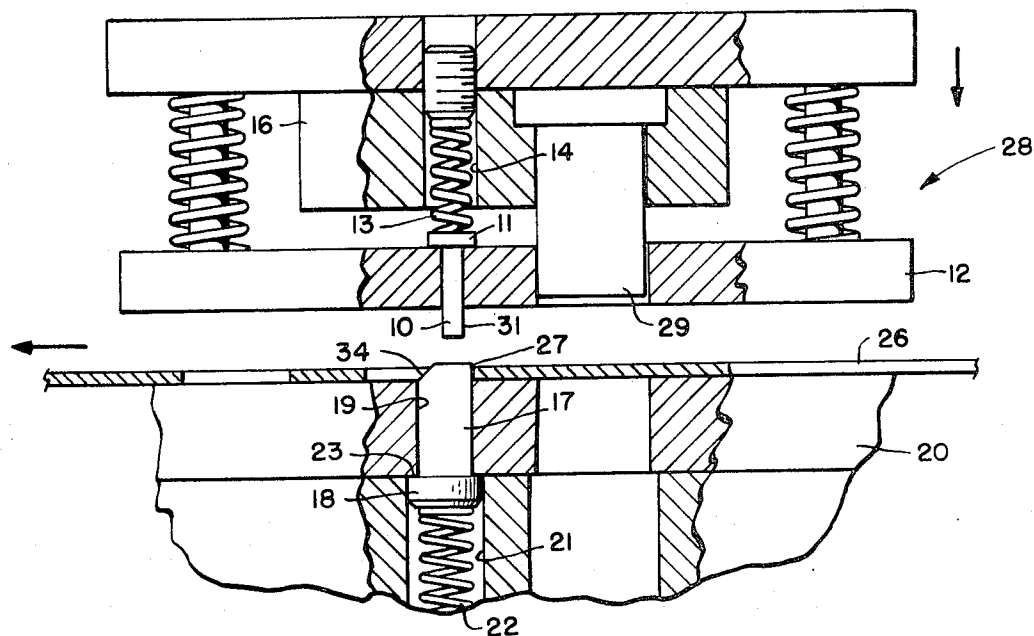


FIG. 1

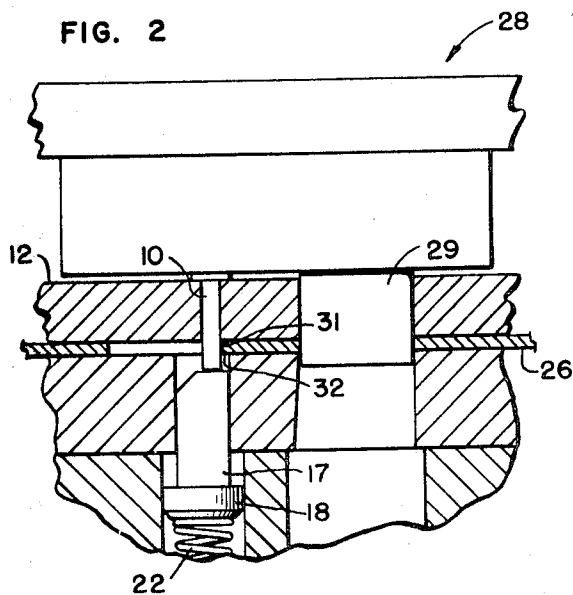


FIG. 2

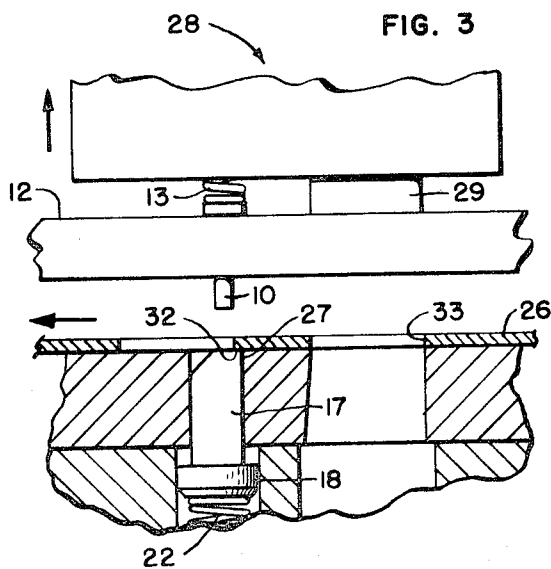


FIG. 3

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TWO STAGE WORKSTOCK LOCATOR FOR PUNCH PRESSES

BACKGROUND OF THE INVENTION

The present invention relates generally to workstops and methods for positioning workstock in punch presses, and in particular to a two stage workstop in which the second, accurate positioning stage, operates to position the workstock over the first stage, so that the first stage does not impede workstock movement after the punching operation.

Generally, in positioning workstock in a punch press, one of two common types of single-stage workstock locating devices is used. The first commonly used type consists of a locating pin slidably mounted in the die of a punch press. The workstock must be lifted over this type of device after it has been operated upon by the punch to bring an edge of the previously blanked area of the workstock into engagement with the pin to position the workstock for a subsequent punching operation. The second type of commonly used single-stage workstop consists of a workstop which is slidably mounted in the die of a punch press and is engaged and moved sideways by the advancing workstock, against an internal bias, into a final fixed position to locate the workstock to be operated upon by the punch. When the workstock is operated upon by the punch, the workstop is depressed downward below the lower surface of the workstock and is urged by its biasing means to return to its original position which is beneath the bottom surface of the workstock. The bottom surface of the workstock then holds the workstop out of blocking engagement with the workstock until the workstock has advanced and the blanked area of the workstock that has just been operated upon by the punch is positioned above the workstop, at which time the workstop moves up and engages an edge of the blanked area to locate the workstock for the next punching operation.

An inherent disadvantage in using the first type of workstop is that the workstock must be lifted, either manually or automatically, to position it with respect to the locating device for the next punching operation. An inherent disadvantage is using the second type of workstop is that, since the workstop must be movable sideways, inaccuracies in locating the workstock often occur as a result of foreign particle accumulation between the workstop and its own locator.

An object of the invention is to provide a workstock locating device which can consistently position an advancing workstock with a high degree of accuracy.

Another object of the invention is to provide a workstop which can be used to successively position a workstock under a punch to be operated upon by the punch.

A further object of the invention is to provide a workstop which may be easily installed in the die and ram of a punch press, and which is maintenance free.

SUMMARY OF THE INVENTION

The foregoing and other objects of the invention are accomplished by providing a two stage workstop for locating a workstock between the die and the ram of a punch press. A first locating device is positioned in the die of the punch press and locates the workstock in a first position. A second locating device is positioned in the ram of the punch press, and is responsive to the operation of the ram to locate the workstock in a second and final position so that it may be operated upon by the punch.

Preferably, the workstop comprises a first locating device slidably mounted in the die for movement above and below the workstock engaging surface of the die, and normally urged by a spring above the workstock engaging surface of the die to engage and to locate the advancing workstock in a first position. A second locating device is fastened to the ram of the punch press for movement therewith, and is positioned for engagement with the first locating device prior to operation of the punch upon the workstock to depress the first locating device below the surface of, and out of blocking engagement with, the advancing workstock. The second locating device is

positioned to engage the first locating device with its workstock engaging surface offset, in the normal direction of advance of the workstock, with respect to the workstock engaging surface of the first locating device, so that when the first locating device is depressed below the surface of the workstock by the second locating device, the workstock will advance over the top surface of the first locating device and into engagement with the second locating device. This operates to position the workstock in its final accurate position prior to being operated upon by the punch. A chamfer is provided on the surface of the first locating device opposite the surface which normally engages the advancing workstock, so that if the workstock is moved in a direction which is opposite the direction that it normally advances; that is, if the workstock is pulled back out of the punch press in a direction reverse to that from which it normally enters, the first locating device will be cammed by the workstock out of blocking engagement with the workstock to allow the workstock to be readily removed from the punch press.

Other objects, advantages and features of the invention will be apparent from the following detailed description of a specific embodiment thereof, when taken in conjunction with the appended drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 of the drawings is a longitudinal view, partly in section, illustrating the workstock locator, mounted in the ram and die of a punch press, as it positions the workstock in a first location prior to initiation of a punching operation.

FIG. 2 of the drawings is a longitudinal view, partly in section, illustrating the relationship of the workstock locator with respect to the workstock after it has positioned the workstock in a second location and immediately after the workstock has been operated upon by the punch.

FIG. 3 of the drawings is a longitudinal view, partly in section, illustrating the position of the workstock locator with respect to the workstock immediately after the ram is withdrawn from the workstock following a punching operation.

DETAILED DESCRIPTION

The specific embodiment of the workstock locating device shown in the drawings includes a cylindrical pin 10 having an enlarged cylindrical end 11. The pin 10 is slidably mounted in a pressure plate 12 of a ram 28 such that the pin 10 extends downwardly from the bottom of the pressure plate 12, and such that the enlarged cylindrical end 11 engages the upper surface of the pressure plate 12, as viewed in the drawings. A spring 13, restrained within a cylindrical chamber 14 that opens externally of a punch holder 16, operates to urge the enlarged cylindrical end 11 of the pin 10 downward and into engagement with the top surface of the pressure plate 12. The cylindrical chamber 14 is of sufficient diameter to accept the enlarged cylindrical end 11 of the pin 10.

The workstock locating device also includes a cylindrical blocking member 17 having an enlarged cylindrical end 18. The blocking member 17 is slidably mounted within a cylindrical chamber 19 that opens externally of a die 20 such that the blocking member 17 may extend above the top surface of the die 20 as viewed in the drawings. The enlarged cylindrical end 18 is slidably mounted within a cylindrical chamber 21 which is coaxial with and of a larger diameter than the chamber 19, and which also contains a spring 22 for urging the enlarged cylindrical end 18 of the blocking member 17 upwardly and into engagement with a shoulder 23 which is formed by the juncture between the cylindrical chamber 21 and the smaller diameter cylindrical chamber 19. Therefore, the spring 22 normally urges the blocking member 17 upwardly above the top of the workstock engaging surface of the die 20.

In use, a length of workstock 26 to be operated upon by the punch press is advanced leftwardly across the top surface of the die 20 into the punch press and into engagement with a

workstock engaging surface 27 of the blocking member 17, which operates to locate the workstock in a first position as illustrated in FIG. 1. As the ram 28 descends (FIG. 2), the pin 10, under the urging of the spring 13, engages the blocking member 17 and pushes it downward beneath the bottom surface of the workstock 26 against the bias of the spring 22. The upper spring 13, for the pin 10, is selected to be substantially stronger than the lower spring 22, for the blocking member 17, so that this action readily occurs. After the blocking member 17 has been pushed downward beneath the bottom surface of the workstock 26 by the pin 10, the workstock 26 again advances leftward, prior to the operation of a punch 29 upon the workstock 26, partially over the top surface of the blocking member 17 and into engagement with a workstock engaging surface 31 of the pin 10, as is shown in FIG. 2 of the drawings. The workstock engaging surface 31 of the pin 10 is located to the left of the workstock engaging surface 27 of the blocking member 17, and serves to locate the workstock 26 in a second, accurate and final position immediately prior to the operation of the punch 29 upon the workstock 26.

As the ram 28 ascends after the punch 29 has operated upon the workstock 26 (FIG. 3), and the pin 10 is withdrawn from its engagement with the blocking member 17, the blocking member 17 moves upwardly under the influence of the spring 22 and into engagement with a bottom surface 32 of the workstock 26, which maintains the blocking member 17 in a depressed condition and out of blocking engagement with the workstock 26.

When the ram 28 has sufficiently ascended out of engagement with the workstock 26 so that the leftward movement of the workstock 26 is not impeded, as shown in FIG. 3 of the drawings, the workstock 26 is again advanced leftwardly over the top surface of the depressed blocking member 17 until a hole 33 in the workstock 26, which has just been blanked out of the workstock 26 by the punch 29, clears the top surface of the blocking member 17, at which time the blocking member 17 is projected upwardly above the bottom surface of the workstock 26 and into the hole 33 by the spring 22 in preparation for a subsequent engagement of the workstock 26 with the workstock engaging surface 27 to locate the material in the first position for the next punching operation. This completes the cycle which is repeated each time that a punching operation is performed.

A chamfered surface 34, which is not relevant in the normal operation of the locating device, is provided on the blocking member 17 opposite the workstock engaging surface 27 to facilitate removal of the workstock 26 from the punch press in the direction from which it was inserted. If it is necessary to remove the workstock 26 from the punch press in the rightward direction, perhaps because a jam has occurred, engagement of the workstock 26 with the chamfered surface 34 of the blocking member 17 will cam the blocking member 17 downward and out of engagement with the workstock 26, thereby allowing the workstock 26 to be withdrawn over the top of the blocking member 17 and out of the punch press.

While one specific embodiment of the invention has been described in detail, it will be obvious that various modifications may be made from the specific details described without departing from the spirit and scope of the invention.

What is claimed is:

1. A workstop for use with a punch press having a ram and a die to position advancing workstock inserted therein to be

operated upon by a punch, which comprises:

a first workstock locating device slidably mounted in the die for movement above and below the workstock engaging surface of the die;

a spring for normally urging the first locating device to an aspect above the workstock engaging surface of the die to engage and to locate the advancing workstock in a first position;

a second workstock locating device mounted to the ram for movement therewith, and arranged for engagement with the first locating device, prior to operation of the punch upon the workstock, to depress the first locating device below the surface of the advancing workstock and out of engagement with the advancing workstock, and to set the workstock in a second position prior to operation of the punch upon the workstock, said second workstock locating device having a workstock engaging surface offset, in the normal direction of advance of the workstock, with respect to the workstock engaging surface of the first locating device such that, when the first locating device is depressed below the surface of the workstock by the second locating device, the workstock will advance over the top surface of the first locating device and into engagement with the second locating device; and

a chamfered surface on said first locating device opposite its surface which normally engages the advancing workstock, with a slope so that if the workstock is moved in a direction which is opposite the direction that it normally advances, the first workstock locating device will be cammed out of blocking engagement with the workstock, said spring proportioned for yielding to a force moving said workstock in said opposite direction.

2. A workstock for use with a punch press having a ram and a die and adapted for positioning an advancing workstock inserted therein to be operated upon by a punch, the workstock comprising:

a first locating device mounted for movement in said die between positions above and below the workstock engaging surface of said die;

a first spring arranged relative to the die for urging the first locating device above the workstock engaging surface of the die to engage and to locate an advancing workstock in a first position;

a second locating device mounted for movement relative to the ram and in alignment with said first locating device, movement of said second locating device being responsive to operation of the punch to locate an advancing workstock in a second position; and

a second spring arranged for movement with the ram and urging said second locating device into the path of the advancing workstock, said springs proportioned such that said first spring yields to permit said first locating device to move out of the path of movement of the workstock as said second locating device moves toward its locating position.

3. A workstock according to claim 2 wherein said ram comprises a punch holder and a yieldable pressure plate biased into spaced relationship with said punch holder, and said second locating device is reciprocative through said plate, the workstock further characterized in that a boss engaging said pressure plate limits movement of said second locating means under urging of said second spring.

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