March 20, 1951 G. SCOTT 2,545,560

DIE SET FOR PUNCH PRESSES

Filed March 26, 1949

FIG. 1

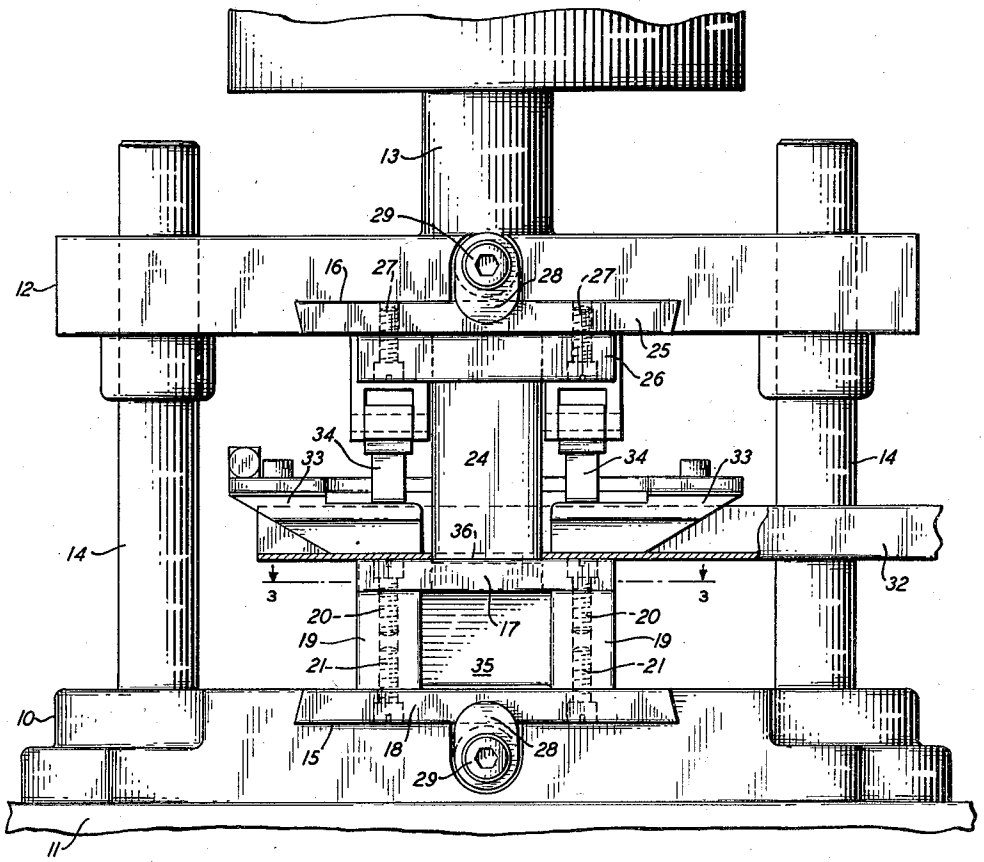


FIG. 2

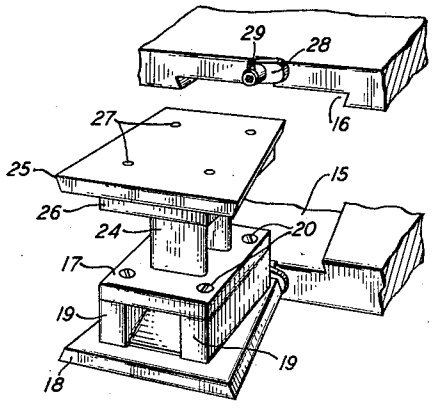
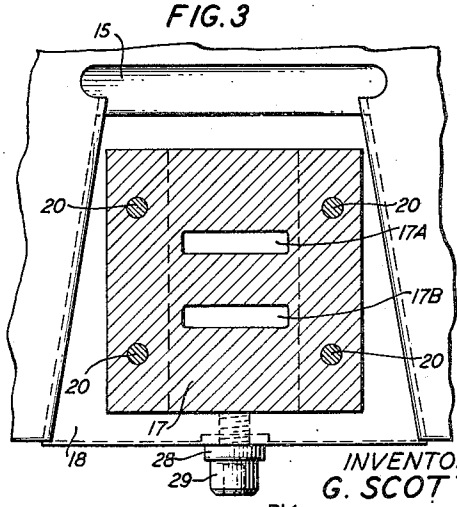


FIG. 3



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Patented Mar. 20, 1951 2,545,560

UNITED STATES PATENT OFFICE

2,545,560

DIE SET FOR PUNCH PRESSES

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Application March 26, 1949, Serial No. 83,647

3 Claims. (Cl. 164—118)

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This invention relates to punch presses and more particularly to die sets for such presses.

In die punching operations, it is often necessary to punch the material, such as a mounting plate for radio or telephone circuit components, several times using different type or size punches. On a production basis such punching is done by several different presses, each press having a different punch and die. However, in a small shop not having sufficient presses or when only a limited number of pieces are desired, thus not warranting the use of several presses, it is the practice to use just one press for the operation, changing the die sets after each type of hole is punched. With the heavy die sets at present being used, considerable time is lost in this change and in setting the die and punch accurately in position so that they will properly mate. Otherwise if they are not accurately aligned not only is the material not properly punched upon the descent of the ram but the die itself may be damaged or destroyed. Further the die sets are quite heavy and bulky and consequently difficult to handle and align properly.

It is an object of this invention to enable rapid interchange of dies and punches in the press.

It is a further object of this invention to expedite the rapid and accurate alignment of such dies and punches in the press.

It is a further object of this invention to decrease the cost of punched articles by simplifying the punching procedure.

In accordance with one feature of this invention, both the die and punch are mounted on holder plates which are accurately machined to fit into depressions in the punch press so that when they are secured in place the punch and die are properly aligned and no further adjustments need be made.

In accordance with another feature of this invention, the holder plates and the depressions are made trapezoidal in shape and the sides dovetailed so that the plates need be only slid into the depressions to be held accurately in place.

In accordance with another feature of this invention, the various dies and punches are mounted on holder plates of the same size and shape so that they may be rapidly and accurately interchanged in the depressions.

In accordance with a further feature of this invention, the die set plates are first set in the punch press and then the various holder plates need be aligned only once to be capable of removal and reinsertion rapidly and without destroying the alignment of the punch and die.

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A complete understanding of these and other features of the invention may be gained from consideration of the following detailed description and the accompanying drawing in which:

Fig. 1 is a front view of a portion of a punch press showing die and punch holder plates illustrative of one embodiment of this invention;

Fig. 2 is a perspective view of the die and punch holder plates and the depressions in the die sets; and

Fig. 3 is a section view along line 3—3 of Fig. 1.

Referring now to the drawing, the lower die set plate 10 is positioned on the bolster plate or bed 11 of the punch press. The upper die set plate 12 is attached to the ram 13 and held in position by the master guide pins 14. The lower die set plate 10 has a depression 15 in its face, the depression being trapezoidal in shape and having its sides dovetailed or provided with keyways. A similar depression 16 is provided in the face of the upper die set plate 12 and is in exact alignment with the depression 15 in the lower die set plate 10.

A die 17 having blanking apertures 17A and 17B therein is mounted on a die holder or base plate 18 and separated therefrom by blocks 19. The die is secured to the blocks by a plurality of screws 20 and the blocks to the die holder plate by a plurality of screws 21.

The punch 24, which is shown with two punch members, is mounted on a punch holder or base plate 25 by a mounting plate 26, the mounting plate being secured to the holder plate by a plurality of screws 27 and dowel pins, not shown, and the punch members to the mounting plate 26 by screws, not shown.

Both holder plates 18 and 25 are trapezoidal in shape with their sides dovetailed or keyed to fit accurately and closely into the depressions 15 and 16, respectively. These depressions and holder plates are the same size and the die and punch so positioned on the holder plates that when they are inserted into the depressions the die and punch will be properly aligned to mate accurately upon descent of the ram 13. Because of the trapezoidal shape of the holder or base plates and depressions, the holder plates need only be slid into the depressions to be held in proper alignment. Locks 28, held in place by screws 29, prevent the holder plates from sliding back out of the depressions, while their geometric form prevents further forward motion.

In the operation of the punch press shown in Fig. 1, a channel shaped piece 32 is being punched, the slug 36 punched out being shown

just below the punch 24. The channel is held by guides 33 and stripper members 34 which are attached to the rear of the punch press, not shown. The slugs 36 punched out drop into the recess 35 formed by the blocks 19 from which they are removed by any known slide or conveying method. The recess 35 and the blocks 19 need not be provided if the holder plate 18, die set 10 and bed 11 are apertured to allow passage of the slugs through them.

When a particular job has been determined upon and the appropriate dies and punches obtained, the following is an advantageous procedure to follow, although other procedures may be followed without departing from the scope of the invention as explained herein. The die set plates 10 and 12 are first positioned in the punch press and aligned by their aligning pins, in accordance with standard practice. Each die and punch combination is then individually placed in the die set plates by sliding the holder plates into the depressions as explained above. The die is first aligned by a jig and the punch is then aligned upon the die and when once properly aligned is secured to the holder plate by screws and dowel pins, not shown. This alignment of die and punch is individually done for each pair to be used in the punching operation.

In a typical punching operation the part to be punched, such as the channel member 32, which is a mounting plate for telephone circuit components such as are found in the various bays in telephone central offices, may have different holes punched in it in certain specified positions; thus in the channel member shown the holes would depend on whether a relay, condenser or resistor, etc., is to be mounted at that point. The die and punch for one such aperture are slid into the depressions in the die set and then held in place by the locks 28 and the screws 29. As the die and punch have been previously aligned, as explained above, they mate properly without any further adjustment by the operator. Upon completion of the punching of these particular apertures, the screws 29 are loosened and locks turned to allow the holder plates, with the dies and punch, to be slid out of the depressions. A different punch and die are then quickly inserted into the depressions in the die set, and the lock washers tightened again. As these new holder plates are accurately machined to be precisely the same size as the prior ones and as the punch and die on them were previously aligned, the operator need make no additional adjustments before punching the channel member in the preassigned places for these different type apertures.

It is to be understood that the above-described

arrangements are illustrative of the application of the principles of the invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and the scope of the invention.

What is claimed is:

1. A die set for punch presses and the like comprising a pair of die set plates, each of said plates having trapezoidal depressions in one face thereof, keyways in said depressions, a pair of base plates fitting into said depressions and into said keyways, one of said base plates mounting a die and the other of said base plates mounting a punch, said punch being adapted to engage with said die when said die set plates are brought together, and means for securing said base plates in said depressions.

2. In a punch press and the like having a bed member and a plunger member, a first plate attached to said plunger member, a second plate attached to said bed member, each of said plates having depressions therein, said depressions being trapezoidal in shape and having sloping sides, a first base member, a punch mounted on said first base member, a second base member, a die mounted on said second base member, both said base members being trapezoidal in shape and having sloping sides adapted to closely engage said depressions, and means for securing said plates in said depressions.

3. A die set for punch presses and the like comprising a pair of die set plates, each of said plates having trapezoidal depressions in one face thereof, said depressions having the base of the trapezoid along one edge of said plates and having sloping sides, said sides being wider at the bottom than at the top of said depressions, a pair of base plates, one of said base plates mounting a punch and the other of said base plates mounting a die, said plates being trapezoidal in shape and having sloping sides adapted to slide into and closely engage said sloping sides of said depressions in a predetermined setting the position of which will not be changed by the removal and reinsertion of said base plates, and means for the locking said base plates in said depressions.

GEORGE SCOTT.

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