Jan. 21, 1941. C. BARBIERI 2,229,488

COMBINATION BOLSTER AND PUNCH PRESS

Filed Nov. 27, 1939 2 Sheets-Sheet 1

Fig-1

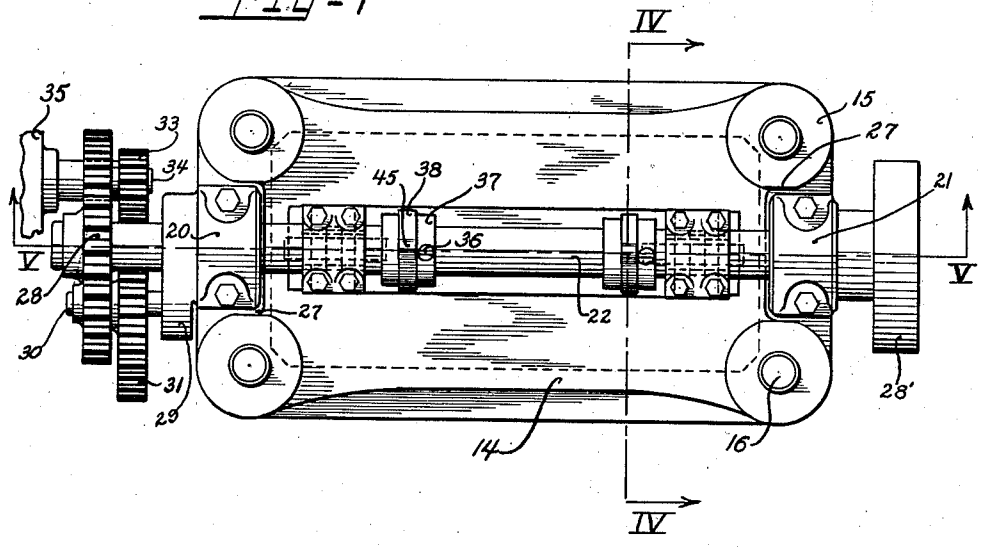

Fig-2

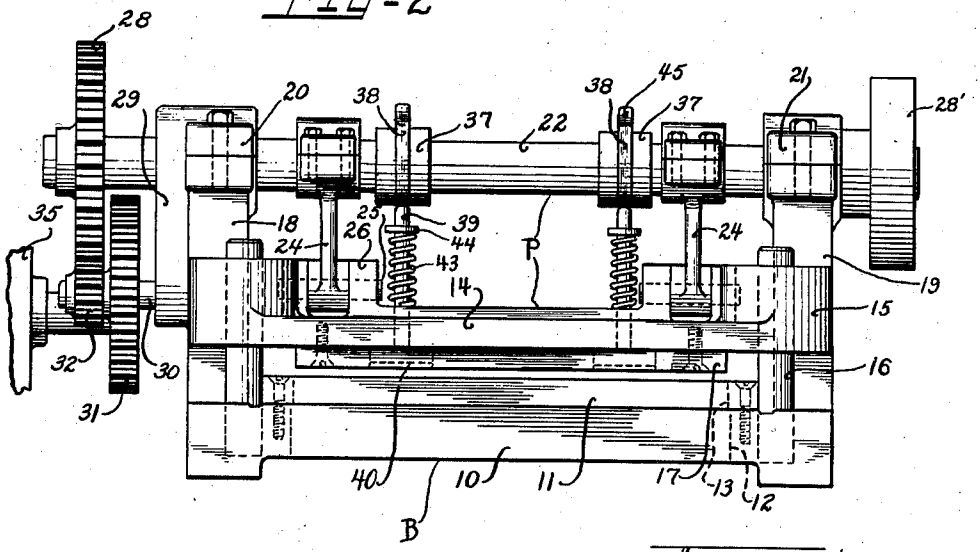

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Fig-3

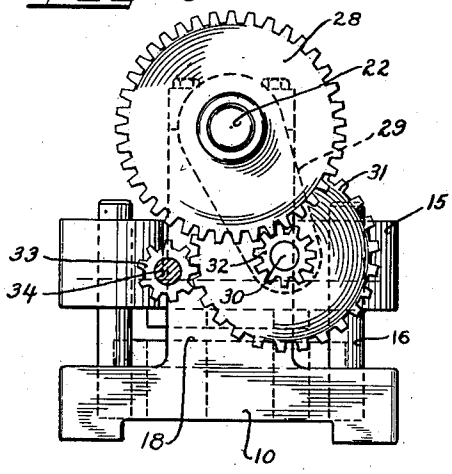


Fig-4

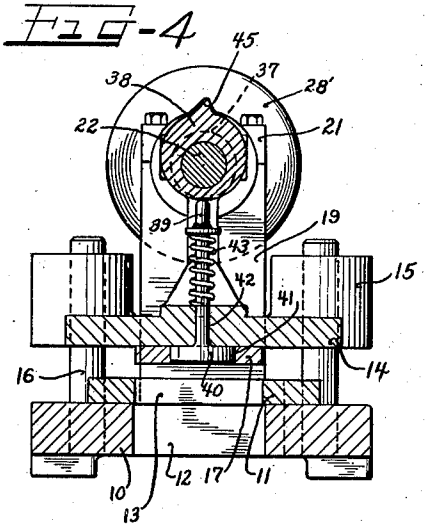
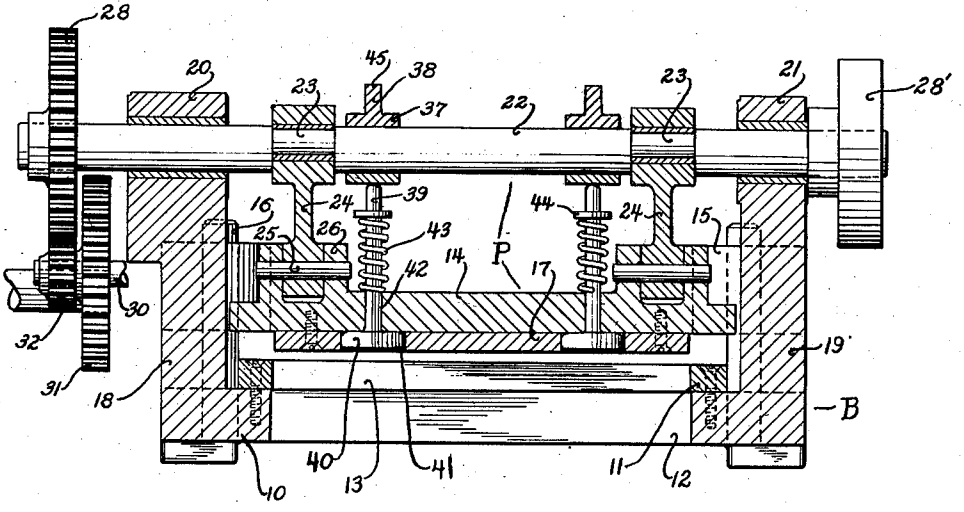


Fig-5



Inventor

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Patented Jan. 21, 1941

2,229,488

UNITED STATES PATENT OFFICE

2,229,488

COMBINATION BOLSTER AND PUNCH PRESS

Cesare Barbieri, New York, N. Y., assignor to Dixie-Vortex Company, Chicago, Ill., a corporation of Delaware

Application November 27, 1939, Serial No. 306,311

3 Claims. (Cl. 164—86)

This invention relates to a combination bolster and punch press for economically blanking comparatively thin material and adapted particularly for punching large size blanks of flexible material.

Heretofore in the blanking of comparatively light material such as sheet metal, paper or the like, die sets, comprising bolster and punch holder elements, have been employed and these die sets were mounted and secured on the beds of standard punch presses and with the punch holder adapted for securing to the reciprocating punch head for operation of the die set. Such procedure involves the expense of costly standard punch presses and the operation thereof, particularly where the material to be blanked is comparatively thin and requires very little power for cutting or punching thereof.

An important object of my invention is to eliminate the necessity for the use of a standard expensive type of punch press in the blanking of material when comparatively little power is required for the punching operation, and thereby materially reduce the cost of equipment and operation.

In accordance with my invention, I have produced a combination or unitary structure comprising a bolster element for supporting a die shoe or plate, and a punch holder element guided relative to the bolster element and operated or reciprocated by driving means mounted on and supported by the bolster structure. In other words, my improved structure may be considered as a die supporting bolster structure with a punch press mounted thereon to form a unitary assembly or structure therewith. Such unitary structure may be readily driven as by an electric motor of a capacity commensurate with the power necessary for the punching or blanking operation by the unitary structure.

My improved structure is fully disclosed on the accompanying drawings in which:

Figure 1 is a plan view;

Figure 2 is a side elevation;

Figure 3 is an end elevation;

Figure 4 is a section on plane IV—IV Figure 1; and

Figure 5 is a section on plane V—V Figure 1.

The structure disclosed comprises the bolster element B and the punch press element P. The bolster element comprises the base plate 10 on which may be detachably secured a die shoe or plate 11 to span the blank discharge passageway 12 through the bolster base, the die plate being cut out to the size and shaped corresponding with the blank to be punched, the cutout 13 of the die plate shown being rectangular.

The punch press element comprises the punch holder 14, shown in the form of a rectangular plate having upstanding bosses 15 at its corners which are bored to receive the leader or guide pins 16 secured to and extending upwardly from the bolster element base 10. The punch holder supports the punch or die member 17 which is detachably secured against its under face, the punch being shown in the form of a rectangular plate for entering the rectangular cutout 13 for cutting correspondingly shaped blanks from the material fed between the die plate and punch as the punch holder is vertically reciprocated on the leader pins.

Preferably integral with the bolster base 10 and at the ends thereof are bearing pedestals 18 and 19 terminating in journal boxes 20 and 21 for journaling a shaft 22. This shaft has eccentric or crank portions 23 for receiving crank rods 24 which at their lower ends receive pins 25 supported in ears 26 extending upwardly from the punch holder plate 14. Two crank rods are shown engaging with the opposite ends of the punch holder, and upon rotation of the shaft 22 the punch holder will be reciprocated on the leader or guide pins 16 for repeatedly engaging the punch 17 in the die plate cutout 13 for blanking the material fed through the structure. The punch holder plate 14 has the recesses 27 at its ends for receiving and clearing the bearing pedestals for the shaft 22.

In the driving arrangement shown for the shaft 22, a gear 28 is mounted on one end of the shaft and a flywheel 28' is preferably mounted on the other end so as to balance the weight of the gear and hold the shaft 22 balanced in its bearings. An offset boss 29 on the outer side of the bearing pedestals 18 supports a stud shaft 30 for a transmission gear 31 and pinion 32 assembly, the pinion meshing with the gear 28 on the shaft 22 and the gear 31 being meshed by the drive pinion 33 on the armature shaft 34 of a driving source such as an electric motor 35. The gearing train suitably reduces the motor speed for the desired speed of the punch operating shaft 22.

Adjustably mounted on the shaft 22, as by means of setscrews 36, are the hubs 37 of stripper cams 38. Two such cam structures are shown arranged adjacent to and inwardly of the crank rods 24. These cams cooperate with the stems 39 of stripper heads 40, these heads being circular and normally engaging in circular passageways 41 through the punch 17, the stems extending

through the guide passageways 42 in the punch holder plate 14. Springs 43 encircle the stems between the punch holder plate and collars 44 on the stems and tend to hold the ends of the stems against the cam surfaces of the cams 38. The cam peripheries are shown as being circular but eccentric relative to the shaft 22, and at the point fartherest distant from the shaft axis each cam has an abrupt extension or tooth 45.

Normally the punch holder is in its upper position as shown on the drawings. When the shaft 22 is turned, the crank rod connection will cause the punch holder to be shifted downwardly on the pins 16 to force the punch 17 through the stock to be blanked, and a distance into the cutout 13 of the die plate. The setting of the stripper cams relative to the crank shaft parts 23 is such that as the punch holder moves downwardly the cams will shift the stems 39 and stripper heads 40 downwardly in the passageways 41 in the punch so that the stripper heads will hold the stock during blanking thereof, and during the final movement of the cams, their teeth 45 will effect quick final downward shift of the stripper heads to force through the die plate cutout 13 and into the discharge passage 12 the blank which has been punched from the stock. During the second half rotation of the shaft 22, the strippers will be returned to the normal position by the springs 43 as the punch holder is raised back to normal position. Thus as the structure operates, the reciprocating punch holder punches the blanks from the stock and the strippers discharge the blanks into the discharge passageway 12, and the blanks may be received on suitable conveyor means (not shown).

Thus by combining a die supporting bolster structure and punch press structure into a unitary assembly, blanking, particularly of comparatively light stock, can be more economically and efficiently accomplished and the necessity for the use of standard expensive type punch presses is eliminated. In my improved combination structure, the die and punch elements are detachably applied and the die and punch elements for any desired shape of blanks can be quickly and readily mounted in position.

I have shown a practical and efficient embodiment of my invention but I do not desire to be limited to the exact construction and arrangement shown and described as changes and modifications may be made without departing from the scope of the invention.

I claim as follows:

1. A punching assembly for punching lightweight material such as paper and the like, said assembly comprising a rectangular base plate provided with an upstanding stub pin at each of its four corners, a die plate seated on said base plate, a rectangular punch holder plate provided with upstanding and outstanding bosses on each of its four corners, said stub pins being entered in said bosses for guided sliding movement of said holder plate on said pins, a die on said holder plate, a pair of upstanding bearing pedestals on said base plate, one at each of opposite ends of said base plate and with each disposed between a pair of bosses and in spaced relation to said holder plate, a revolvable shaft journaled in said bearing pedestals and disposed above said holder plate, link means depending from said shaft and pivotally connected to said shaft and to said holder plate, and stripper means operably connected with said shaft and movable in said die holder plate.

2. A punching assembly for punching lightweight material such as paper and the like, said assembly comprising a rectangular base plate provided with an upstanding stub pin at each of its four corners, a die plate seated on said base plate, a rectangular punch holder plate provided with upstanding and outstanding bosses on each of its four corners, said stub pins being entered in said bosses for guided sliding movement of said holder plate on said pins, a die on said holder plate, a pair of upstanding bearing pedestals on said base plate, one at each of opposite ends of said base plate and with each disposed between a pair of bosses and in spaced relation to said holder plate, a revolvable shaft journaled in said bearing pedestals and disposed above said holder plate, link means depending from said shaft and pivotally connected to said shaft and to said holder plate, a stripper rod resiliently supported on said holder plate for movement therein, and a cam on said shaft operably connected with said stripper rod to intermittently depress said rod.

3. A punching assembly for punching lightweight material such as paper and the like, said assembly comprising a base plate provided with upstanding stub pin means, a die plate seated on said base plate, a punch holder plate provided with vertically extending bosses, said stub pin means being entered in said bosses for guided sliding movement of said holder plate on said pin means, a die on said holder plate, upstanding bearing pedestal means on said base plate disposed between spaced bosses and in spaced relation to said holder plate, a revolvable shaft journaled in said bearing pedestal means and disposed above said holder plate, and means depending from said shaft and connected to said shaft and to said holder plate for moving said holder plate up and down in its punching stroke.

CESARE BARBIERI.