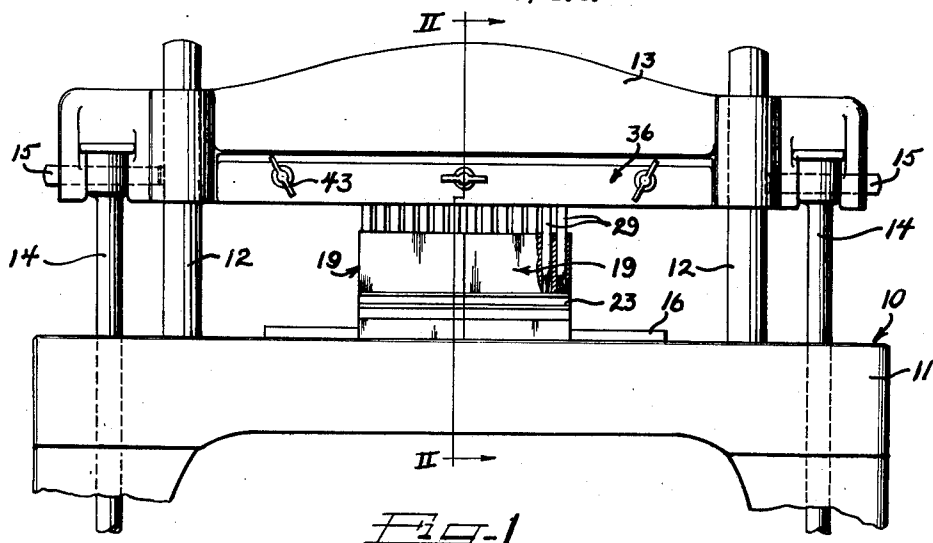
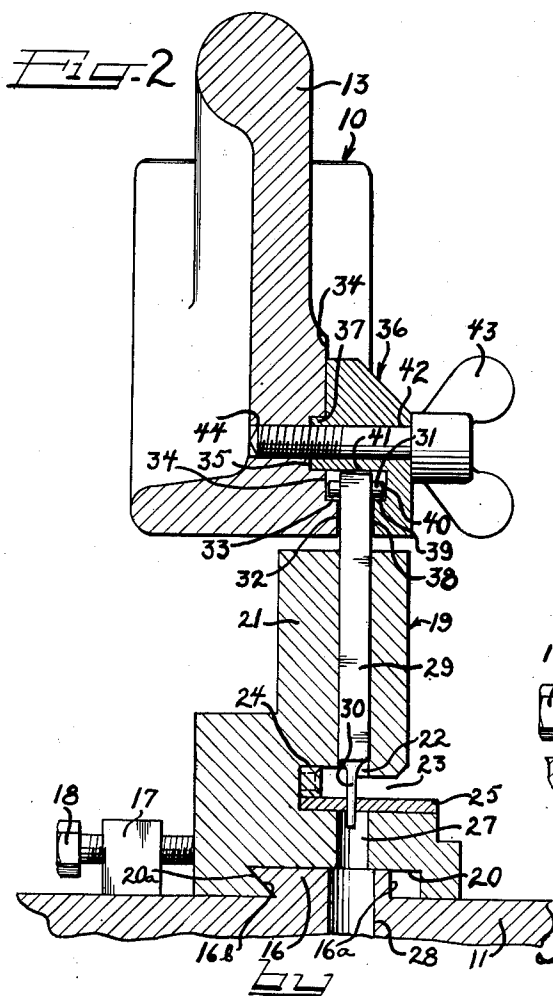
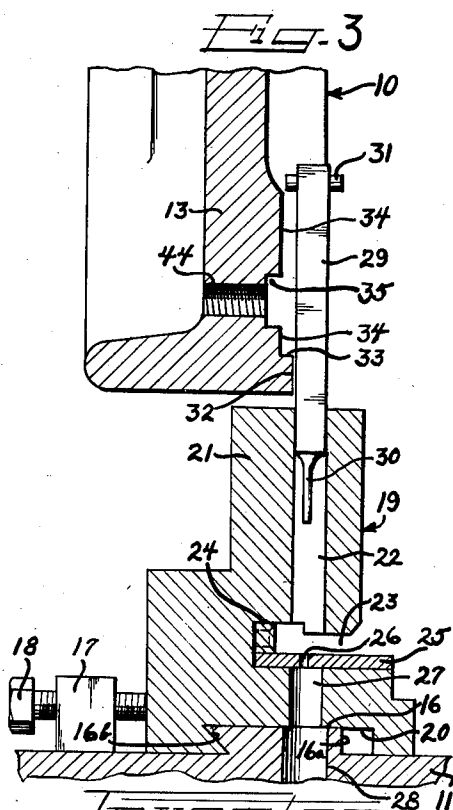


C. E. EMMER

GANG PUNCHING MACHINE

Filed March 9, 1946



INVENTOR

CHARLES EDWARD EMMER

The Town of Charles Mills

UNITED STATES PATENT OFFICE

2,601,108

GANG PUNCHING MACHINE

Charles Edward Emmer, Chicago, Ill., assignor
to General Binding Corporation, Chicago, Ill.,
a corporation of Illinois

Application March 9, 1946, Serial No. 653,342

3 Claims. (Cl. 164—90)

1

This invention relates to gang punching machines having a punch mounting that facilitates quick replacement, removal and rearrangement of the punches. Specifically, the invention deals with a gang punching machine of the type having a punch head actuating a plurality of punches which are slidably mounted in a die block for co-action with a die wherein the punch head carries a removable punch retaining strip that can be quickly removed from the punch head to permit retraction of punches from the die block without disturbing the die block.

Heretofore gang punching machines have been difficult to change for different punching jobs and much time was lost in changing over the machines to accommodate various types of jobs. According to this invention gang punching machines are equipped with punch heads having quickly removable punch retaining strips enabling quick rearrangement of the punches in the machine to accommodate different types of jobs.

The invention will hereinafter be specifically described as embodied in a gang punching machine for slotting of paper to receive a mechanical book binding. Since such mechanical book bindings vary quite widely with regard to the number of binding slots and the position of the slots, the punches of the machine must be changed or rearranged for each particular job. Such changes are so quickly made by means of this invention that the machine can be quickly changed over to accommodate a whole series of different jobs without material loss of production time.

It is then an object of this invention to provide a gang punching machine with a punch mounting that is readily opened up or removed for replacement or rearrangement of the punches.

A further object of the invention is to provide a gang punching machine wherein a punch head carries a removable punch retaining strip that is quickly separated from the punch head so that punches slidably mounted in a die beneath the head can be replaced and rearranged as desired.

A further object of the invention is to provide a gang punching machine wherein the punches of the machine can be retracted at will from the die block of the machine without removing or loosening the die block.

A specific object of the invention is to provide a new punch head arrangement for gang punching machines which will accommodate selective removal and replacement of punches without disturbing other punches.

Other and further objects of the invention will

2

be apparent to those skilled in the art from the following detailed description of the annexed sheet of drawings which, by way of a preferred example only, illustrates one embodiment of the invention.

On the drawings:

Figure 1 is a fragmentary front elevational view of a gang punching machine according to this invention.

Figure 2 is a vertical cross sectional view, with parts in end elevation, taken along the line II—II of Fig. 1.

Figure 3 is a view similar to Fig. 2 but illustrating the manner in which punches are removed from the machine.

As shown on the drawings:

The gang punching machine 10 of this invention includes a main frame or bed 11 with upstanding guide posts 12 projecting upwardly therefrom and slidably supporting a punch head or ram 13. The head 13 is reciprocated toward and away from the bed 11 by means of operating the rods 14 pivoted to the head 13 on pins 15 and extending through suitable apertures in the bed 11.

The bed 11 has a longitudinally extending raised rib 16 thereon with a vertical front face or wall 16a and an undercut or reentrant rear wall 16b. Lugs such as 17 are provided on the bed 11 in spaced rearward relation from the rib 16. These lugs receive bolts 18 which are threaded therethrough and project forwardly therefrom.

A pair of die blocks 19, 19 are mounted on the bed 11 of the machine and are retained thereon by the rib 16 and bolts 18. Thus each die block 19 has a recess 20 in its bottom face for receiving the rib 16. The recess 20 has a reentrant or sloping back wall 20a opposed to the wall 16b of the rib 16 and the bolts such as 18 are tightened against the block 19 to hold the wall 20a against the wall 16b thereby locking the block on the rib and affixing it to the bed. The recess 20 is sufficiently wide so that the block can be disposed over the rib and then moved into locking engagement with the wall 16b of the rib by means of the locking bolts 18.

The die block 19 has an upstanding guide portion 21 with a plurality of vertical holes 22 therethrough at spaced intervals along the length of the block. These holes 22 are open ended and open through their bottoms into a slot or gap 23 extending inwardly from the front face of the die block 19 to receive the work to be punched. The slot 23 opens into the front face of the block 19 and has a back wall provided by a backing strip

3

24 which can be positioned as desired in the slot to vary the depth of the slot. The bottom wall of the slot is covered by a die plate 25 which has die holes or apertures 26 therethrough aligned with the guide holes 22 of the block. The portion of the block beneath the apertures 26 of the die plate 25 is cut away to provide a discharge passage 27 for punchings. This passage 27 communicates with a passage 28 in the bed 11.

Punches 29 are slidably mounted in the guide holes 22 of the block 19 and have reduced leading end portions 30 adapted to fit in the die apertures 26. The punches 29 are preferably of non-circular cross section and are usually square. The holes 22 are of the same cross section as the punches so that the punches cannot rotate relative to the die block 19.

The upper ends of the punches 29 each have a cross pin 31 therethrough and projecting therefrom on opposite sides thereof. This pin defines an enlarged head portion which is received in the T-shaped slot formed by the head 13 and the strip 36.

The punch head or ram 13 has a vertical front face 32 lying in a plane to the rear of the holes 22 in the die block 19 so that the punches 29 can clear this face without being cocked. The face 32 extends upwardly to a horizontal shoulder 33 which shoulder extends horizontally inward to a vertical face 34 which is thus offset from the face 32 by the width of the shoulder. The face 34 extends upwardly on the front of the head 13 for a considerable distance and has a recess or groove 35 therein.

A retaining strip 36 has a tongue 37 projecting from the rear face thereof adapted to snugly seat in said groove 35. The strip 36 includes a vertical bottom wall or inner face 38 in spaced parallel relation from the face 32 of the head when the strip is mounted in position on the head so that the punches 29 can fit between the faces 32 and 38. The face 38 of the strip 36 extends upwardly to a horizontal shoulder 39 which is aligned with the shoulder 33 of the head 13 when the strip is affixed to the head. The strip has a wall 40 extending upwardly from the outer edge of the shoulder 39. This wall 40 is spaced from the wall 34 of the head 13 a sufficient distance to receive the suspension pins 31 of the punches therebetween.

The strip 36 has a horizontal wall 41 overlying the shoulder 39 thereof and extending to the end of the tongue 37.

The shoulders 33 and 39 suspend and pull the punches 29 while the wall 41 pushes the punches.

Several bolt holes 42 are provided at spaced intervals along the length of the strip for receiving the shanks of wing bolts 43. The wing bolts 43 are threaded into threaded holes 44 in the head 13 which holes 44 are aligned with the groove 35.

If desired the shoulder 33 on the head 13 can be eliminated and the strip 36 can have its shoulder 39 extend to the head face 34 to cooperate with the wall 41 for forming a deeper slot in the strip. The bottom of this slot is then apertured at intervals to receive the punches 29 with the pins 31 or punch shoulders suspended on the bottom wall or shoulder 39 on opposite sides of the apertures.

As shown in Fig. 3 when the strip 36 is removed from the head 13 the punches can be retracted from the holes 22 of the die block 19 by pulling them straight up from the top of the

4

die block. The front faces of the punch head 13 will not interfere with free upward movement of these punches. However, when the strip 36 is attached to the punch head 13, the tops of the punches 29 are engaged by the wall 41 of the strip and the opposed shoulders 33 and 39 of the head and strip support the projecting portions of the pins 31 of the punches. The punches are thereby held for co-movement with the head or ram 13 in a T-slot or groove defined by the head and strip.

When it is desired to remove punches from the die block 19 as for example when the job calls for punching spaced groups of holes or slots with unpunched spaces therebetween, the strip 36 is quickly dismounted from the head 13 by removing the wing bolts 43 and the undesired punches are then merely picked out of one or both of the die blocks 19. Remounting of the strip 36 on the head 13 then places the machine in condition for immediate operation. The change over is rapid and very little production time is lost.

From the above description it will be understood that the invention provides a gang punching machine wherein the punches can be quickly replaced, withdrawn or inserted without disturbing the die block of the machine and without appreciable loss of production time of the machine.

While I have shown and described certain embodiments of my improvement for the purpose of illustration, I do not desire to be limited thereto, as changes may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim as my invention:

1. In a gang punching machine having a die block with punch guide apertures, a plurality of punches having main body portions slidably disposed in said apertures and having means projecting from said main body portions defining shoulders adjacent operating ends thereof and facing the other ends thereof, a ram mounted out of alignment with said main body portions of said punches and movable parallel to said punches toward and away from said die block, and a strip removably secured to said ram and having a recess therein defining a shoulder, said shoulders of said punches being in the path of movement of said shoulder on said strip and engaging therewith during movement of said ram away from said die block, and said strip having a wall portion facing said operating ends of said punches and operatively engaging therewith during movement of said ram toward said die block, the removal of said strip thereby permitting ready access to said punches for removal and replacement of the same.

2. In a gang punching machine having a die block with punch guide apertures, a plurality of punches having main body portions slidably disposed in said apertures and having means projecting from said main body portions defining shoulders adjacent operating ends thereof and facing the other ends thereof, a ram mounted out of alignment with said main body portions of said punches and movable parallel to said punches toward and away from said die block, and a strip removably secured to said ram and having a surface aligned with said operating ends of said punches and engaging therewith on movement of said ram toward said die block and having a portion extending toward said die block and provided with an elongated projection facing

5

a portion of said ram and defining a shoulder aligned with said shoulders on said punches and engaging therewith upon movement of said ram away from said die block, said elongated projection on said strip and said portion of said ram being spaced a distance greater than the thickness of said punches to prevent binding between said ram and said punches.

3. In a gang punching machine having a die block with punch guide apertures, a plurality of punches having main body portions slidably disposed in said apertures and having means projecting from said main body portions defining shoulders adjacent operating ends thereof and facing the other ends thereof, a ram mounted out of alignment with said main body portions of said punches and movable parallel to said punches toward and away from said die block, said ram having an elongated projection defining a first shoulder in facing relationship to the shoulders on one side of said punches, said ram having an elongated groove therein adjacent and generally parallel to said elongated projection, a strip having an elongated tongue portion snugly engaging in said groove, said strip having a surface portion in facing relation to the operating ends of said punches and engaging said operating ends on movement of said ram toward said die block, said strip having a portion extending toward said die block provided with an elongated projection thereon extending toward and in facing relationship to said elongated projection

6

tion on said ram and defining a shoulder in facing relationship to the shoulders on the other sides of said punches, and said facing elongated projections on said ram and said strip being spaced a distance greater than the thickness of said punches to prevent binding between said ram and said punches, and a plurality of threaded members normally securing said strip to said ram and removable to permit removal of said punches from said die block

CHARLES EDWARD EMMER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
Re. 17,995	Wright	Dec. 16, 1930
160,474	Sexton	Mar. 2, 1875
223,176	See	Dec. 30, 1879
343,180	Leavitt et al.	June 8, 1886
345,190	Stimpson et al.	July 6, 1886
370,100	Stimpson, Jr.	Sept. 20, 1887
370,985	Stimpson, Jr.	Oct. 4, 1887
435,003	White et al.	Aug. 26, 1890
456,579	Long	July 28, 1891
665,702	Stimpson	Jan. 8, 1901
1,052,527	Stimpson	Feb. 11, 1913
2,216,208	Michon	Oct. 1, 1940
2,265,726	Greenberg	Dec. 9, 1941