Oct. 21, 1941. C. E. HARPER 2,260,223

PUNCHING MACHINE

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Fig. 1.

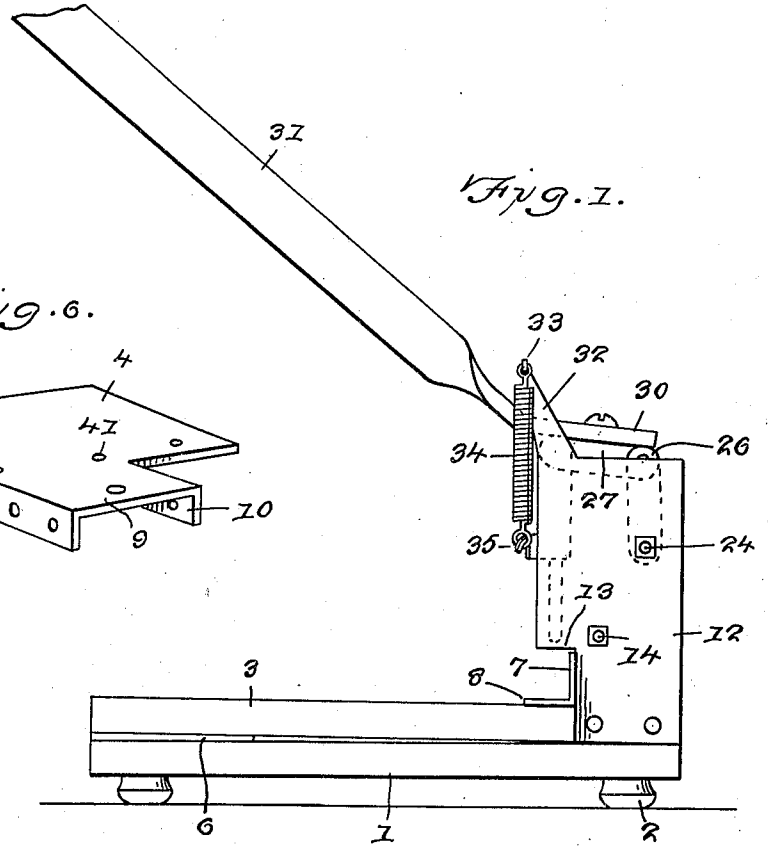
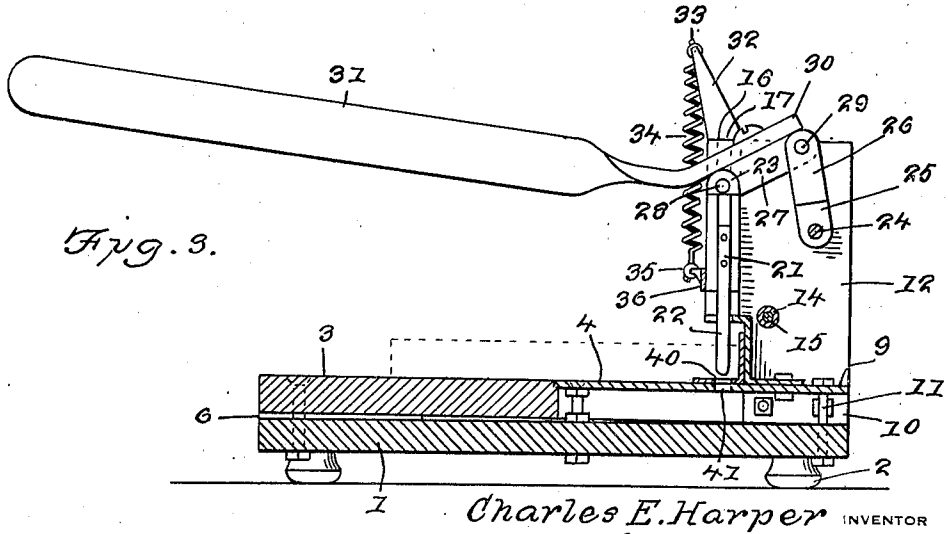


Fig. 6.

Fig. 3.



Charles E. Harper INVENTOR

BY Victor J. Evans & Co.

ATTORNEYS

WITNESS

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Fig. 2.

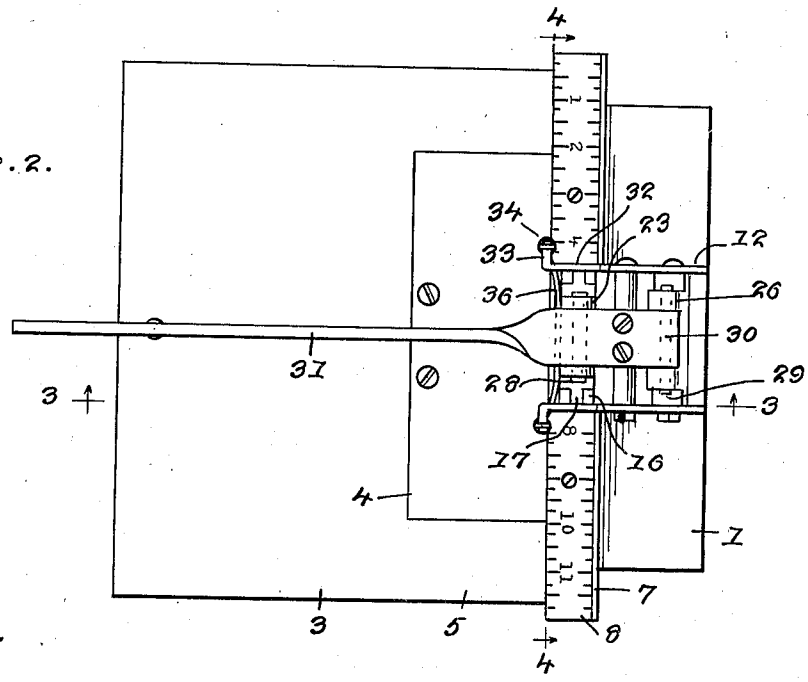


Fig. 5.

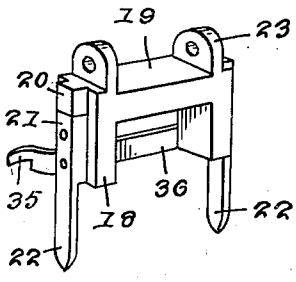


Fig. 7.

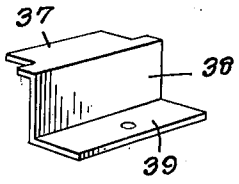
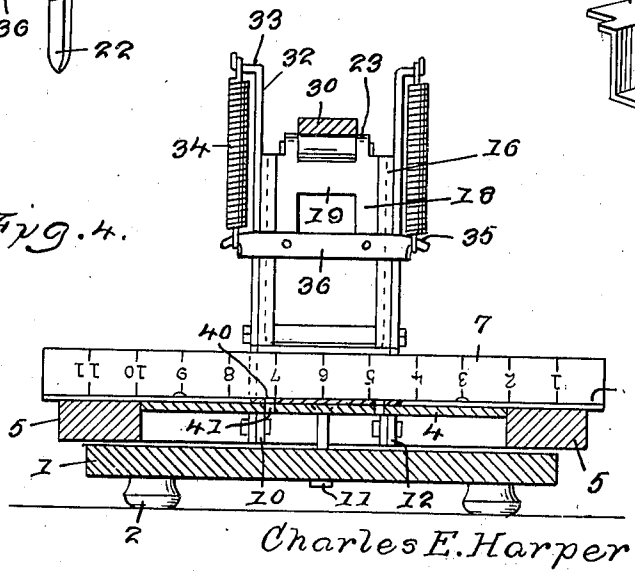


Fig. 4.



Charles E. Harper INVENTOR.

BY Victor J. Evans & Co.

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UNITED STATES PATENT OFFICE

2,260,223

PUNCHING MACHINE

Charles E. Harper, Waycross, Ga.

Application June 6, 1941, Serial No. 396,932

5 Claims. (Cl. 164—91)

This invention relates to punching machines, and its general object is to provide a machine that is primarily designed for punching or perforating a relatively great number of sheets of material, such as for example twelve or more quires of paper, in a single operation, with minimum effort on the part of the operator and without disarranging the sheets relative to each other, so that the edges of all the sheets will remain even and the perforations in perfect registration, to allow easy insertion of suitable fastening means therethrough, for binding the sheets together, therefore it will be seen that my machine is very desirable for use in perforating voluminous records prior to binding the same together.

An important object is to provide a punching machine that punches elongated perforations or slots for fittingly receiving the flat prongs of paper fasteners or the like now in general use, thus the sheets are held together against any possibility of disarrangement relative to each other, as distinguished by the use of such fasteners in round perforations provided by punching devices now in general use, and which are capable of perforating only a few sheets at a time, thereby said devices are very unsatisfactory for use in the process of binding volume material.

A further object is to provide a punching machine that is primarily designed for use as an office appliance, in that it is readily portable and the machine is simple in construction, inexpensive to manufacture, and extremely efficient in operation, use and service.

This invention also consists in certain other features of construction and in the combination and arrangement of the several parts, to be hereinafter fully described, illustrated in the accompanying drawings and specifically pointed out in the appended claims.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a side elevation of the machine which forms the subject matter of the present invention.

Figure 2 is a top plan view thereof.

Figure 3 is a sectional view taken approximately on line 3—3 of Figure 2, looking in the direction of the arrows.

Figure 4 is a sectional view taken approximately on line 4—4 of Figure 2, looking in the direction of the arrows.

Figure 5 is a perspective view of the blade carrier, with the blades secured thereto.

Figure 6 is a perspective view of the sheet receiving table plate which has formed thereon attaching means for the punching mechanism frame.

Figure 7 is a perspective view of the blade carrier stop to limit the downward movement thereof.

Referring to the drawings in detail, it will be noted that the table of my machine includes a base 1 having secured to and depending therefrom adjacent to the corners thereof knob like supporting feet 2 preferably made from rubber or the like, and secured to the base is a flat top member 3 of a size relative to that of the base to extend laterally beyond the same, as indicated in Figures 2 and 4. However, the front end of the top member and base are flush with each other, while the rear end of the top member is spaced a considerable distance forwardly of the rear end of the base, and the rear portion of the top member is centrally recessed for the major portion of its length to fittingly receive a rectangular metallic plate 4 supported flush with the upper face of the top member for cooperation therewith to provide a flat support for the material to be perforated. From Figure 4 it will be noted that ample space is provided between the base and the plate 4 to receive the blades when at the end of their downstroke.

While the rear portion of the top member or in fact the rear ends of the extensions 5 that are formed by the recess, rests upon the base, the forward portion of the top member is spaced from the base by wedge strips 6 disposed between the base and top member for holding the latter at a slight rearward inclination, as best shown in Figures 1 and 3, to facilitate placing and urging the material to be perforated against the upright or vertical blade like portion 7 of a right angle gauge rule. The upright portion 7 is flush with the rear ends of the extensions 5 and provides a stop for the material, while the lower or horizontal blade like portion 8 rests upon the upper faces of the extensions 5 and the plate 4, as well as is fixed to the latter. Each of the portions 7 and 8 are graduated and numbered, as shown in Figures 2 and 4 to bring about accurate centering of the material relative to the blades, prior to perforating said material, as will be apparent.

Formed on and extending centrally and rearwardly from the plate 4 is an attaching member for the frame of the punching mechanism, the attaching member including a horizontal portion 9 formed with lateral downturned flanges 10 along the entire length of the sides thereof, and

the flanges rest upon the base, as best shown in Figure 3, and are secured accordingly by a bolt and nut connection 11. Fixed to the flanges 10 and rising therefrom are the side walls 12 of the frame, and the front portions of the side walls at the lower ends thereof are recessed as at 13 for receiving the gauge rule, and the rear edge of the plate 4, which bear against the vertical edges of the recesses, while the horizontal edges of the recesses overlie the rule, as best shown in Figure 1. The recesses also provide a space for receiving the edge portions of the material to be perforated. The side walls 12 are connected together adjacent to the recesses 13 by a bolt and nut connection 14, the bolt thereof bridging the side walls and having mounted thereon a spacing sleeve 15.

Formed on or otherwise secured to the confronting faces of the front portions of the side walls 12 and along the height thereof from the recesses 13 to the upper ends of the side walls, are pairs of spaced bars 16 that provide vertical guide grooves 17 for the blade carrier, the latter being of inverted substantially U-shape configuration to provide depending arms 18 and a horizontal upper bight portion 19. Formed on the outer sides of the arms at the upper ends thereof are lugs 20 that provide abutments for the upper ends of the elongated shanks 21 of a pair of blade members, the shanks bearing against the lugs and the blades 22 thereof are formed on the shanks for disposal in depending relation therefrom and of course the blades extend a considerable distance below the lower ends of the arms 18. The shanks together with the lugs 20 and the blades are mounted for slidable movement or travel in the guide grooves 17.

The shanks of the blades are fixed to the arms 18 by suitable means as shown, and are preferably readily detachable from the arms to not only facilitate sharpening the lower beveled penetrating ends of the blades, but for removing the same, in the event of damage thereto. The blades from the beveled and reduced penetrating lower ends thereof are of narrow rectangular cross sectional shape in the form shown, but the side edges of the blades may be beveled to a cutting edge. In any event, due to the cross sectional shape of the blades, they will provide a narrow or slot like perforation in the material, for the purpose as clearly set forth in the objects, that is to fittingly receive flat prongs of paper fasteners or the like.

Formed on and rising from the bight portion 19 of the blade carrier is a pair of spaced parallel ears 23 and disposed between the rear portion of the side walls 12 for swinging movement, as well as mounted on a pivot bolt 24 for that purpose, is the lower portion of a fulcrum member 25 that is formed to provide a pair of upright arms 26 which like the ears have apertures in the upper ends thereof. A flat block like member 27 is provided for connecting the fulcrum member to the blade carrier, the block member having rounded ends and being formed with pairs of trunnions 28 and 29 extending from the sides adjacent the ends thereof. The trunnions 28 are mounted in the apertures of the ears 23, while the trunnions 29 are mounted in the apertures of the arms 26, to allow for free pivotal movement of the block member relative to the fulcrum member and the blade carrier.

Resting on and detachably fixed to the upper face of the connecting block member 27 is an end portion 30 of a lever that is twisted adjacent its connection with the block member to provide a handle portion 31 disposed at right angles to the portion 30, and the outer end portion of the lever may be reduced to provide convenient gripping means.

Formed on or otherwise secured to the forward ends of the side walls 12 is a pair of upright forwardly inclined limbs 32 reduced in tapered formation toward their upper ends that terminate in laterally directed hooks 33 having connected thereto the upper ends of coil springs 34 which have their lower ends connected to hooks 35 formed on the ends of a cross strip 36. The cross strip is secured to and bridges the arms 18 of the blade carrier, and by that construction, it will be obvious that the blade carrier is urged and normally held in its upper position of Figure 4.

Disposed in the path of the arms 18 to limit the downward movement of the blade carrier, is the horizontal upper forward portion 37 of an abutment member that includes a vertical portion 38 bearing against the gauge rule and a horizontal lower rear portion 39 that is fixed to the horizontal portion 9 of the attaching member, as best shown in Figure 3. The horizontal upper forward portion 37 is reduced to fit between the bars 16 and is disposed flush with the upper edges of the recesses 13, as clearly shown in Figure 3.

The lower or horizontal blade like portion 8 of the gauge rule is provided with slots 40 that register with like slots 41 in the plate 4, for passage of the perforating blades therethrough, when they have completed their punching or perforated action or in other words are at the end of the downstroke thereof.

From the above description and disclosure in the drawings, it is believed that the use of my machine will be obvious, but it might be mentioned that any number of sheets of material, including a package of approximately five hundred can be perforated by my machine, and they are placed upon the top member of the table with their edge portions to be perforated, disposed within the recesses 13. The hand lever is then lowered for forcing the blades 22 through the sheets, and it might be reiterated that due to the shape of the blades, the perforations provided thereby are elongated or of slot like formation. That shape of perforations is very desirable, in that they fittingly receive flat prong paper fasteners or the like, as and for the purpose previously set forth. The construction of the machine together with the length of the lever brings about easy and expeditious operation thereof, regardless of the number of sheets being punched, and the coil springs facilitate removing the blades from the sheets.

It will be further obvious that my machine is not only capable of perforating sheets of paper but also other sheet material such as soft metals, leather, cardboard and the like.

It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent.

It is to be understood that changes may be made in the construction and in the combination and arrangement of the several parts, provided that such changes fall within the scope of the appended claims.

What I claim is:

1. A punching machine comprising a table for receiving material to be perforated, a frame fixed to and rising from the rear portion of the table and including spaced parallel upright walls, bars secured to the walls and providing guide grooves

along the height thereof, an inverted substantially U-shaped blade carrier providing a bight portion and arms depending therefrom, blades including shanks secured to the arms and together with the shanks being mounted for slidable movement in the grooves, abutment means having the shanks bearing against the same and being fixed to the arms, said blades having penetrating lower ends, means connected to the frame and the carrier for urging and holding the blades to and in a normal elevated position, and handled means connected to the bight portion of the carrier for lowering the blades to penetrating position.

2. A punching machine comprising a table for receiving material to be perforated, a frame fixed to and rising from the rear portion of the table and including spaced parallel upright walls, bars secured to the walls and providing guide grooves along the height thereof, an inverted substantially U-shaped blade carrier providing a bight portion and arms depending therefrom, blades including shanks secured to the arms and together with the shanks being mounted for slidable movement in the grooves, said blades being substantially flat in cross section and having beveled lower ends, limbs secured to and rising from said upright walls at a forward inclination, a cross member secured to and bridging the arms, said limbs and arms terminating at their outer ends into hooks, coil springs having their ends connected to the hooks of the limbs and cross member respectively for urging and holding the blades in normal elevated position, and handled means connected to said carrier for lowering the blades to penetrating position.

3. A punching machine comprising a table for receiving material to be perforated, a frame fixed to and rising from the table, a blade carrier guided for vertical slidable movement in the frame and including depending arms, blades including shanks secured to the arms, said blades depending from the shanks and being substantially flat in cross section and having beveled lower penetrating ends to provide slot like perforations, springs connected to the frame and the carrier for urging and holding the blades to and in a normal elevated position, fulcrum means mounted for swinging movement in the frame and including upright arms, means connecting the upright arms to the carrier and being pivoted thereto, and a hand lever fixed to the connecting means for lowering the blades to penetrating position.

4. A punching machine comprising a table including a base, a top member secured to the base and having a recessed rear portion, a plate having blade receiving openings therein and fittingly arranged within the recess for disposal flush with the top member, said plate being supported above the base to provide a space between the same, a frame including spaced parallel upright walls, means formed on the rear end of the plate and having downturned flanges resting upon the base, said means being fixed to the base and having the walls fixed to the flanges thereof, said walls being recessed in the lower forward portions thereof with the upper edges of the recesses overlying the plate, a right angled graduated gauge rule secured to the plate and mounted in the recesses of said walls for receiving material to be perforated, said rule having openings therein registering with the openings of the plate, bladed means guided for slidable movement between said walls and including depending blades for passage through the openings, means for urging and holding the bladed means to and in a normal elevated position, and means for lowering the bladed means to penetrating position.

5. A punching machine comprising a table including a base, supporting feet secured to the base, a top member secured to the base and having a centrally recessed rear portion, a plate having blade receiving slots therein and fittingly arranged within the recess for disposal flush with the top member, said plate being supported above the base to provide a space between the same, means for holding the top member and plate in a rearward tilted position relative to the base, a frame including spaced parallel upright walls, means formed on the rear end of the plate and having downturned flanges resting upon the base, said means being fixed to the base and having said walls fixed to the flanges thereof, said walls having recesses in the lower forward portions thereof with the upper edges of the recesses overlying the plate, a right angle graduated gauge rule secured to the plate and mounted in the recesses of said walls for receiving material to be perforated, said rule having slots therein registering with the slots of the plate, a blade carrier guided for slidable movement between said walls, blades secured to and depending from the carrier for disposal through said slots, means for holding the carrier in a normal elevated position, means for lowering the carrier for disposing the blades to a penetrating position, and means between said walls for disposal in the path of the carrier to limit the downward movement thereof.

CHARLES E. HARPER.