Oct. 14, 1952 H. H. HILLMER ET AL 2,613,744

PUNCH FOR PRINTING APPARATUS

Filed Feb. 3, 1949 2 SHEETS—SHEET 1

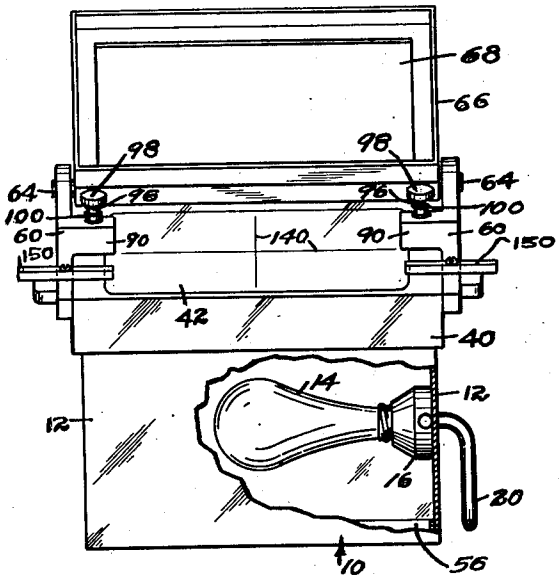


Fig. 1.

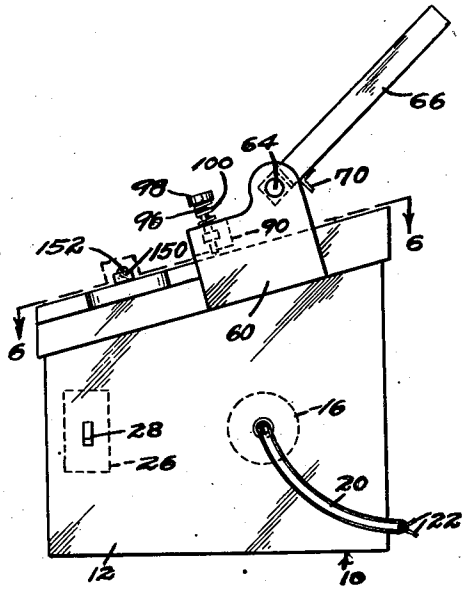


Fig. 2.

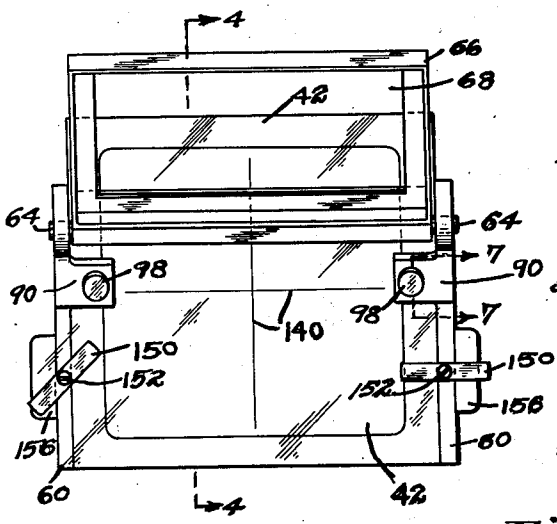


Fig. 3.

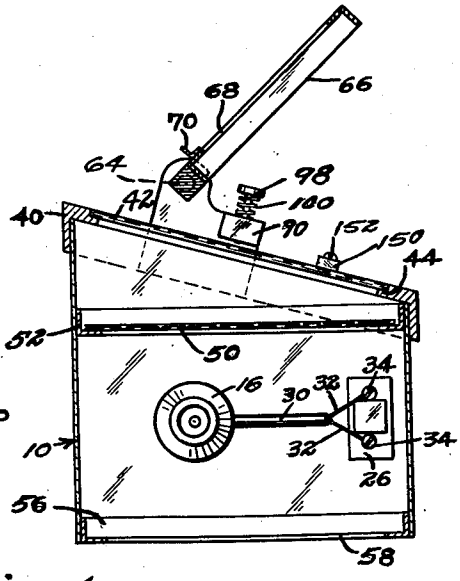


Fig. 4.

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PUNCH FOR PRINTING APPARATUS

Filed Feb. 3, 1949 2 SHEETS—SHEET 2

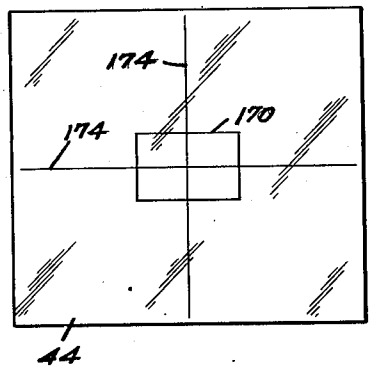


Fig. 5.

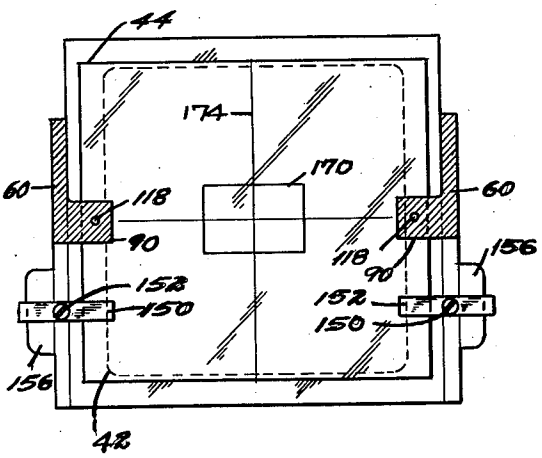


Fig. 6.

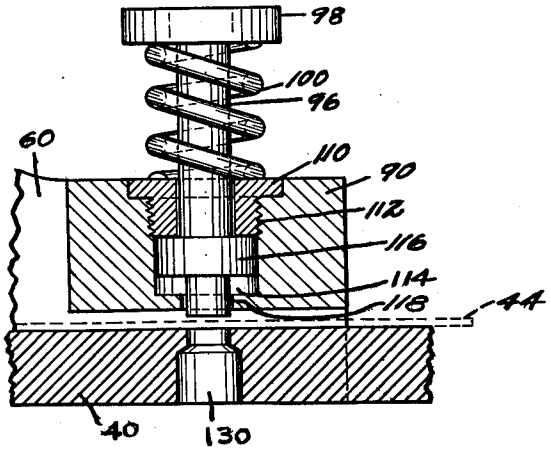


Fig. 7.

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PUNCH FOR PRINTING APPARATUS

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Application February 3, 1949, Serial No. 74,324

1 Claim. (Cl. 164—91)

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This invention relates to the punching of apertures in materials, and more particularly it is an object of the invention to provide a device for accurately punching apertures in predetermined positions in photographic material.

In the use of photographic reproduction machines of the type known to the art as "step-and-repeat" machines, the alignment of photographic material upon the holders thereof is of great importance. This is especially true in the production of multicolored printed matter.

Another object of this invention is to provide a punch box for the accurate punching of apertures on photographic material, and for use in conjunction with step-and-repeat machines of the type described in the applicant's co-pending patent application, Serial No. 765,400, filed August 1, 1947 and titled "Printing Apparatus," now Patent No. 2,288,385 granted March 11, 1952.

A particular object of the invention is to provide a punch, as described, which is adapted to facilitate the accurate punching of apertures without undue eye strain and with a minimum chance for error.

Yet another object of the invention is to provide a device for the purpose described which is sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, assemble and utilize.

Other and still further objects and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof.

In the drawings:

Figure 1 is a frontal elevation of the punch box of the invention, a portion of the forward wall of the lamphousing portion thereof being broken away, the punch lever frame of the device being shown in a raised position preparatory to the insertion of photographic material to be punched.

Figure 2 is a right hand side elevation of the device, as shown in Figure 1.

Figure 3 is a top plan view of the punch box as shown in Figure 1, one of the photographic material-holding clamps being shown in a partially withdrawn position.

Figure 4 is a view-in-section of the punch box as shown in Figure 3, and as seen along the line 4—4 thereof.

Figure 5 is a top plan view of a piece of film to be placed upon the device and punched.

Figure 6 is a view-in-section of the device taken along the line 6—6 of Figure 2 looking

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downwardly and showing a piece of film in position upon the device preparatory to punching; and

Figure 7 is a detailed view of a punch plunger of the invention and adjacent parts, the view being taken along the line 7—7 of Figure 3.

The punching device of this invention includes a lamp box portion generally indicated at 10 in Figure 1. The lamp box is of a rectangular shape on all sides excepting the ends.

The ends 12 of the box 10 are preferably each provided with an upper edge inclining downwardly from the rearward side thereof to the forward side thereof. Inside the lamp box 10 an electric bulb 14 is mounted in a socket 16, which latter is secured to one of the walls of the box 10.

An electric cord 20 extends outwardly of the box 10 and is provided with two lead wires 22 which latter are connected in operation to a conventional wiring circuit.

A switch 26 is provided extending outwardly of one end of the box 10 and having a switch handle 28.

An electrical cord 30 having wires 32 interconnects the socket 16 and the terminals 34 of the switch 26 in such a manner as to cause the light bulb 14 to go on and off in response to actuation of the switch handle 28.

Around the upper side of the lamp box 10 a frame 40 for a punch box glass 42 is disposed. The frame 40 is provided with a recess 44 in its upper side for receiving the glass 42. The member 42 may be composed of any suitable translucent material and is provided with a flat upper surface for receiving a piece of photographic material such as the film 4 show in Figure 5.

The lamp box 10 also includes a light diffusing member 50 which latter is disposed between the piece of translucent material 42 and the light bulb 14. The diffusing member 50 is mounted upon a suitable bracket 52 which extends around its circumference for securing the diffusing member 50 to the inner sides of the lamp box 10.

The bottom end of the lamp box is open, as best seen in Figure 4, a member 56 of a right-angle in cross section being disposed about the inside of the box 10 at the lower end thereof, the member 56 having an opening 58 therethrough for purposes of ventilation.

The frame 40 extends around all sides of the piece of translucent material 42 and on two opposite ones of the inclined sides of the frame 40 a pair of punch lever frame brackets 60 are

provided, the latter being secured to the frame 40 along the inclined sides thereof and extending upwardly therefrom. The upper ends of the brackets 60 are each provided with apertures, the said apertures being disposed in alignment with each other for receiving the stub axles 64 of a punch lever frame 66.

The punch lever frame 66 is preferably of a rectangular shape and is secured at two corners thereof to the stub axles 64. The frame 66 is preferably provided with an open center 68 for facilitating the viewing of the device during operation.

The upper side of the frame 66 is provided with a transversely disposed right-angle stop or detent 70 which latter is disposed in parallelism wih and spaced apart from the stub axles 64. The detent 70 is disposed on that side of the frame 66 which is disposed upwardly at the conclusion of a punching operation.

The brackets 60 are each provided with a punch block 90 extending inwardly therefrom across the top of the inclined sides of the frame 40. The blocks 90 are each provided with bores extending downwardly therefrom at a right angle to the top of the frame 40 and a right angle to the translucent member 42.

The said bores are for the reception of two punch plungers 96 which latter are disposed therethrough. The punch plungers 96 are each provided with a cap 98 on their upper ends and the latter are disposed for engagement with the under side of the punch lever frame 66 at times when the latter is disposed in a punching position. A pair of coil springs 100 are provided, disposed one each upon the punch plungers 96.

As best shown in Figure 7, the plungers 96 are each disposed through suitable bores which extend downwardly through respective bearing nuts 110. The bearing nuts 110 are each provided with threaded outer sides at their lower ends for engaging threads 112 which latter are disposed in the bores of the punch blocks 90.

As best seen in Figure 7, the bores 114 of the punch blocks 90 are each of a size for receiving a shoulder or collar 116 which latter is secured to and spaced apart from the lower end of each plunger 96.

The bore 114 is provided with a portion 118 of lesser diameter at its lower end so that the shoulders 116 are each adapted to reciprocate between a block shoulder thus formed and the under side of the member 110.

As best seen in Figure 7, the frame 40 is provided with two openings 130 extending downwardly therethrough and on opposite sides thereof beneath the plungers 96. The openings 130 are provided with restricted upper ends for snugly receiving the lower end of the plungers 96. The openings 130 are also provided with lower ends of larger diameters for permitting the free passage therethrough of punched out photographic material.

As best seen in Figure 3, the piece of translucent material 42 is preferably provided with suitable indicia such as a set of cross hair lines 140 thereon. The lines 140 preferably extend one in parallelism with, and one at a right angle to, a line drawn between the lower end of the plungers 96.

The punch box further includes a pair of pivoting clamps 150 which latter are elongated members being secured at their centers by means of screws 152 to their respective brackets 60. Members 156 are provided and are secured to the bracket 60 and extend outwardly therefrom. The members 156 provide upper surfaces disposed in parallelism with the upper surfaces of bracket 60 and in parallelism with upper surface of the frame 40 and the translucent member 42 for supporting outer ends of members 152 at times.

In operation, when it is desirable to punch holes in the film 4 shown in Figure 5, the film is placed on the upper side of the translucent member shown in Figure 2.

The film 4 is provided with suitable reference indicia thereon, a representative indicia being illustrated by rectangular lines shown at 170 at the center of the film 4. In addition, or in substitution, the film 4 may be provided with cross-hair indicia 174, as shown in Figure 5.

In order to properly position the film 4, the latter is moved about so that the right angle cross-hairs 174 are disposed in alignment with the cross-hairs 140 on the translucent members 142.

If the cross-hairs 174 are not provided on the film 4, the rectangular lines 170 or their equivalent, are lined up with the cross-hairs 174 for positioning the film 4.

When the film is in proper position the clamps 150 are swung into place for holding the film securely, such holding position of the clamps 150 being best illustrated in Figure 6.

The punch frame 66 is then lowered from the position shown in Figure 2 until the under side thereof is disposed in engagement with the top caps 98 of the punch plungers 96, at which time the plungers are caused to descend, passing through the piece of film as indicated at 4 and in dotted lines in Figure 7. The film is then punched and portions thereof will drop through the openings 130 and fall downwardly into the box 10, and outwardly of the opening 58 in the bottom thereof.

As thus described, the invention has provided a means for accurately punching apertures in photographic material, a punching device which is time-saving and which is adapted to prevent the waste of material.

From the foregoing description it is thought to be obvious that a punch for printing apparatus in accordance with our invention, is particularly well adapted to use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that our invention is susceptible of some change and modification without departing from the principles and spirit thereof, and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice except as claimed.

We claim:

In a photographic printing film punch, the combination which comprises a sheet of translucent material having a horizontally disposed line and a vertically disposed line thereon, said vertically disposed line positioned at a right angle in relation to the horizontally disposed line, a frame having a continuous recess in which the said sheet of translucent material is positioned, a pair of punch mounting brackets positioned at the sides of the frame and having punch carrying blocks extended therefrom and spaced above the upper surface of the said sheet of translucent material, said punch carrying blocks having bores with counterbores therein extended therethrough and positioned perpendicular to the

face of the frame, said bores being centered on the said horizontally disposed line on the translucent sheet, punches having collars thereon slidably mounted in the said bores with the collars positioned in the counterbores, means resiliently urging said punches upwardly away from the frame, a punch actuating frame pivotally mounted in the said brackets and positioned to engage the upper ends of said punches, and elongated clamping members pivotally mounted on the said brackets at points spaced from the said punch carrying blocks whereby film positioned on the frame, aligned with the said horizontal and vertical lines, and secured in position by the elongated clamping members is provided with accurately positioned openings upon operation of the punches.

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