Jan. 8, 1952 M. M. BALSAM ET AL 2,582,094

PUNCHING MACHINE

Filed Sept. 22, 1948 2 SHEETS—SHEET 1

Fig-1-

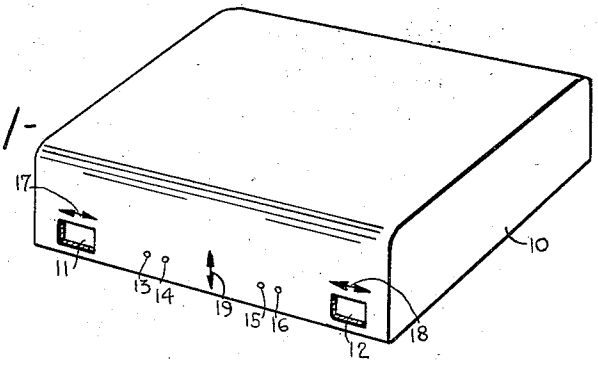
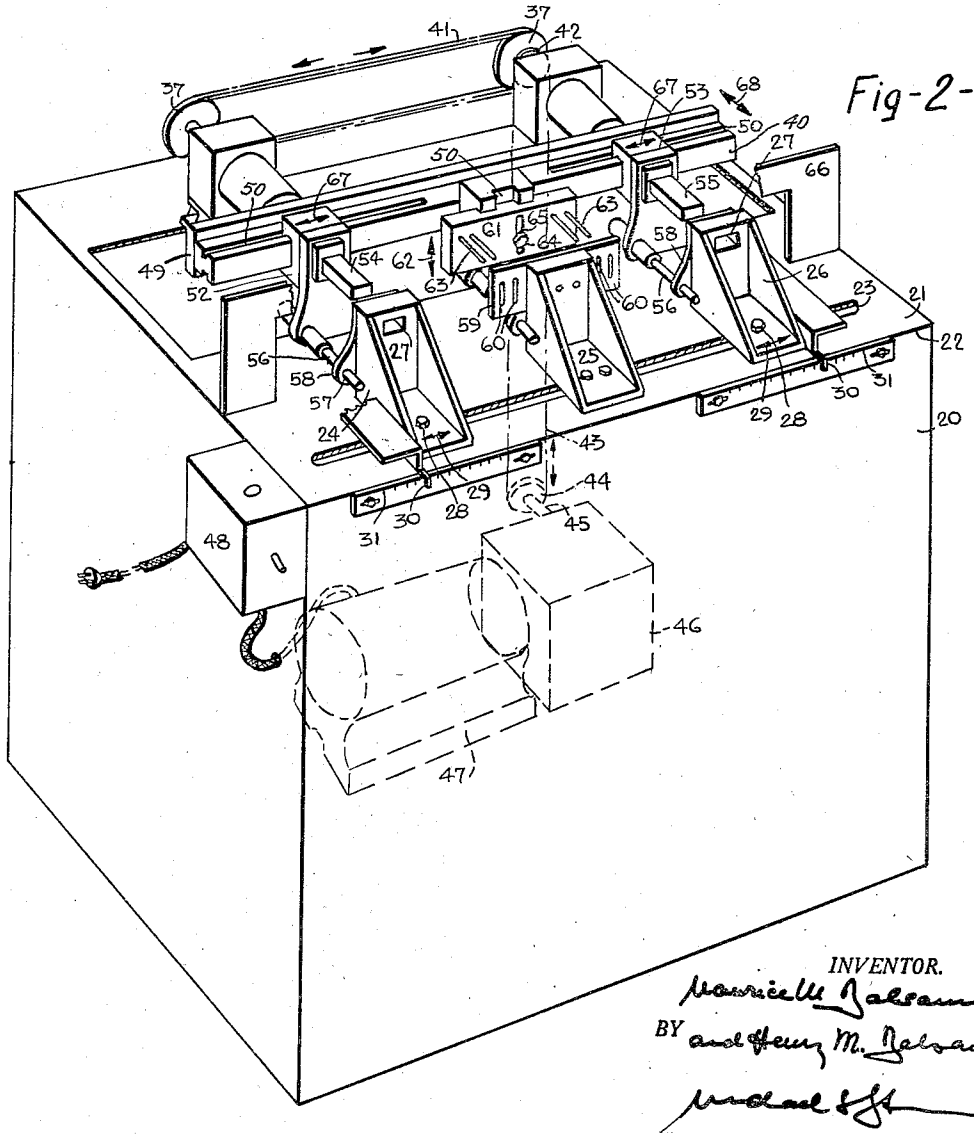


Fig-2-



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PUNCHING MACHINE

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Fig-3-

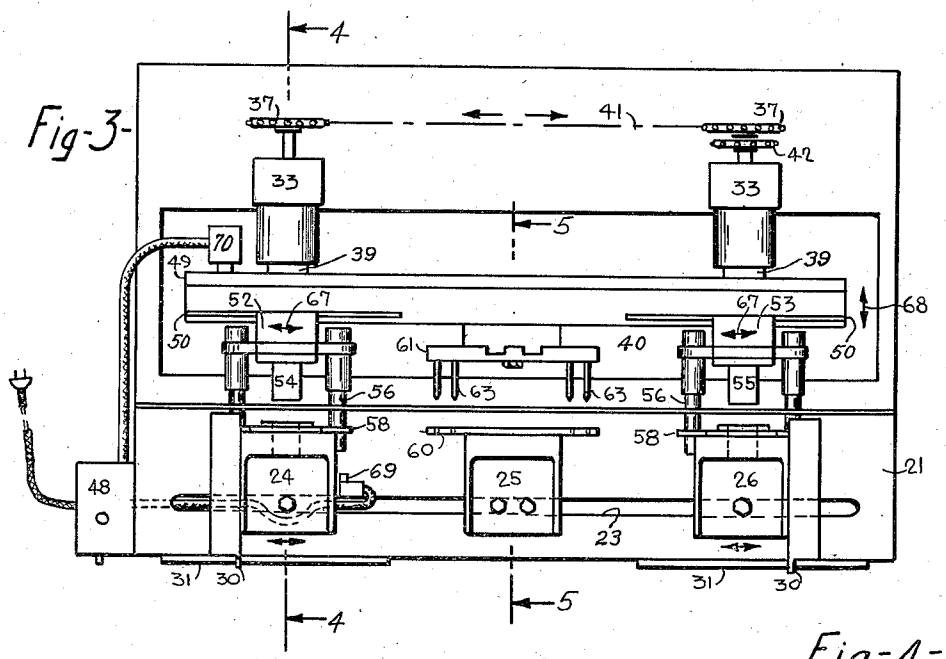


Fig-4-

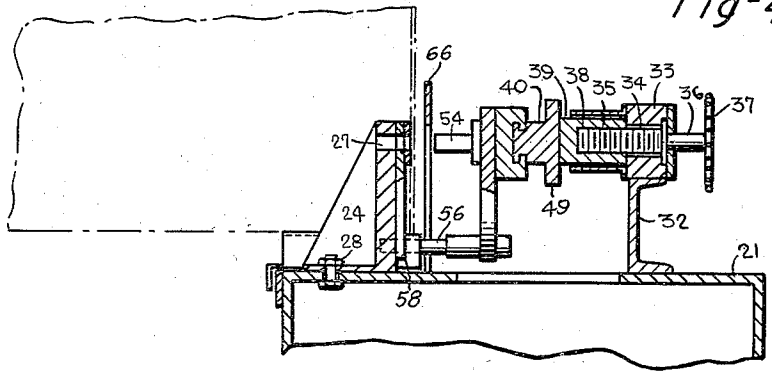
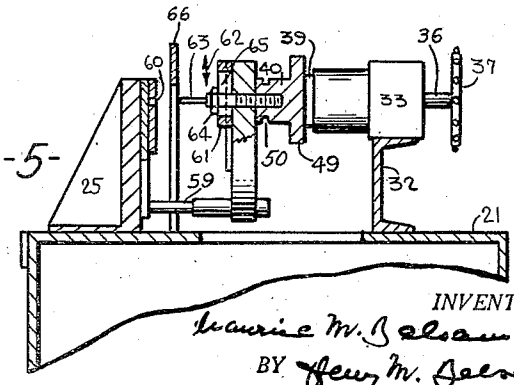


Fig-5-



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PUNCHING MACHINE

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1 Claim. (Cl. 164—90)

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Our present invention relates to punching machines, and more particularly to machines for punching multiple holes into pieces of luggage.

It is an object of the present invention to provide a punching machine adapted to punch simultaneously a plurality of holes, the relative position of which is adjustable.

It is a further object of our present invention to provide a punching machine adapted to punch the holes for the locks and the handle posts in different pieces of luggage.

Still another object of our present invention consists in a punching machine for punching two or more holes, the distance and relative position of which can be varied.

With the above objects in view, our present invention mainly consists of a machine for punching holes in a sheet of material, e. g. the front or end wall of the cover or bottom of a piece of luggage, comprising in combination a base, at least two punching devices, supporting means for each of the punching devices, at least two guiding means arranged on the base extending perpendicular to each other, and each corresponding to one of the supporting means so as to guide the punching devices on the base perpendicular to each other, and at least two fixing means each combined with one of the supporting means adapted to fix the supporting means together with the corresponding punching device in any desired position to the corresponding guiding means and the base.

A preferred embodiment of our present invention comprises in combination a base, at least two punching arrangements each including a punching die and a corresponding punching guide arranged on the base, a common horizontally elongated supporting member, at least two attaching means each movably attaching one of the punching dies to the common supporting member, holding means for the common supporting member holding the same reciprocably towards and away from the punching guide, means for maintaining the punching dies aligned with the punching guides, and operating means for horizontally moving the common supporting member transversely of its length together with the punching dies towards and away from the punching guides.

A punching machine particularly adapted for the purposes of our present invention includes a base, a stationary punching guide firmly secured to the base, a slidable punching guide secured to the base slidably in horizontal direction, a common elongated supporting member mounted

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on the base reciprocably in horizontal direction towards and away from the punching guides, a first punching die mounted on the common supporting member slidably in horizontal direction in alignment with the slidable punching guide, connecting means connecting the first punching die with the slideable punching guide so as to compel the same to slide uniformly in alignment with each other in horizontal direction, a second punching die mounted on the common supporting member slidably in vertical direction in alignment with said stationary punching guide, and operating means for moving the common elongated supporting member transversely of its length together with the punching dies towards and away from the punching guides.

The novel features which we consider as characteristic for our invention are set forth in particular in the appended claim. The invention itself however, both as to its construction and its methods of operation, will be best understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a suitcase body showing the punched out holes for the locks and the handle posts;

Fig. 2 is a perspective view of a punching machine according to our present invention;

Fig. 3 is a top view of the machine shown in Fig. 2;

Fig. 4 is a partial cross section through the machine shown in Figures 2 and 3, along line 4—4 of Figure 3;

Fig. 5 is another cross section through the machine shown in Figures 2 and 3, along line 5—5 of Figure 3.

The machine according to our present invention serves mainly for punching holes into pieces of luggage, e. g. into a suitcase body 10 of the type shown in Figure 1.

Usually, in such a suitcase body two rectangular holes 11 and 12 are needed for the locks, and a plurality of small holes 13, 14, 15 and 16 are needed for the handle posts.

Depending upon type and size of the suitcase body it is necessary to adjust the position of the lock holes 11 and 12 in horiontal direction as indicated by arrows 17 and 18 and the position of the handle posts 13—16 in vertical direction as indicated by arrow 19. The relative position, i. e. the distance between the post holes 13 to 16 remains always the same.

In order to enable such adjustment, our new

machine shown in Figures 2 to 5 includes adjusting means of an entirely new type:

The base 20 of the machine has a flat top face 21 provided near its front edge 22 with a guiding slot 23. Also near the front edge 22 of the top face 21 are arranged three punching guides 24, 25 and 26.

The punching guides 24 and 26 are each provided with a rectangular guide hole 27 having the size of the lock holes 11 and 12. Furthermore, these punching guides are mounted by means of screws 28 slidably in the guiding slot 23 in direction of arrow 29, so as to be adapted to slide parallel to the front edge 22 of the top face 21 of the base 20.

An indicating pointer 30 is secured to the front edge of each of the punching guides 24 and 26, cooperating with an indicating scale 31, indicating the position of the respective punching guide. With the aid of these indicating means it is possible to place the two punching guides 24 and 26 at preferably equal distances from the punching guide 25.

As clearly shown in Figures 4 and 5, we arrange on the top face 21 of the machine base 20, near the rear edge thereof, brackets 32 holding the blocks 33. Each of these blocks is provided with a hole 34 in which the screw 35 is held freely rotatably, but not slidably in axial direction. Screw 35 is provided at its rear end with a shaft 36 upon which the chain wheel 37 is mounted. The front end of screw 35 projects into the screw threaded hole 38 of the driving member 39. This driving member 39 in turn is secured at its front end firmly to the common supporting member 40.

It should be noted that—as clearly shown in Figure 2—two such driving arrangements are provided so that the common supporting member 49 is held at both ends thereof.

The two chain wheels 37 are connected by the endless chain 41. Furthermore, an additional chain wheel 42 is provided on one of the shafts 36 and is driven by means of the endless chain 43, the chain wheel 44, the shaft 45, the reversing arrangement 46, and the electric motor 47. This electric motor 47 is operated by the switch 48, whenever desired.

In accordance with our present invention, we provide on the common supporting member 49, near both ends thereof, horizontal guiding grooves 50, 50, and in the middle thereof, vertical guiding grooves 50.

The horizontally extending guiding grooves 50 support slidably in horizontal direction the supporting blocks 52 and 53, which in turn carry the punches 54 and 55 respectively; these punches 54 and 55 correspond in shape to and cooperate with the punching holes 27 in matrix dies 58 and in the punching guides 24 and 26 respectively.

In order to keep the punching dies 54 and 55 in proper alignment with the corresponding punching holes in the punching guides, we provide on each of the supporting blocks 52 and 53, a guiding pin 56 which permanently passes freely slidably through a hole 57 provided in an extension 58 of the corresponding punching guide.

The central punching guide 25 is provided in the embodiment shown in Figures 2 to 5 with a punching guide plate 59 provided with vertically elongated punching holes 60, arranged at the same distance from each other as the holes 13, 14, 15 and 16 in the luggage cover 10, shown in Figure 1.

The guiding slots 50 described above are adapted to guide the die block 61 in vertical directions indicated by arrow 62. This die block 61 is provided with a plurality of punch pins 63 arranged in alignment with the punching holes 60 in the guide plate 59. Screw 64 screwed into a corresponding screw hole in the main body of the common supporting member enables, together with slot 65 in die block 61 holding of the die block 61 in any desired vertical position.

The guard member 66 serves for properly supporting the piece of luggage during the punching operation.

The above described machine operates as follows:

First, the screws 28 are loosened so as to enable sliding of the punching guides 24 and 26 in directions of arrows 29. The guides are moved in such direction until the indicating means described above show that they are at the proper desired distance from each other and the central guide 25. It is evident that such sliding of the guides 24 and 26 will result in simultaneous sliding of the punches 54 and 55 in direction of arrows 67 so as to maintain proper alignment between the guide and the corresponding punch. Thereafter, the screws 28 are tightened.

Then screw 64 is loosened and the die block 61, together with the punch pins 63 is moved in vertical directions indicated by arrow 62 into proper position. Then screw 64 is tightened.

Now the machine is ready for operation, and a luggage body is inserted between the guides and guard 66. Then switch 48 is operated. This results in operation of motor 47 and rotation of the screws 35 in such direction that they move the common supporting member 49 forward against the guides in direction of arrow 68.

This will result in punching of the desired hole: The moment the holes are punched a limit switch 69, shown in Fig. 3 of the drawings, will automatically reverse the direction of turning of shaft 45, and thereby cause retraction of the common supporting member 49 into its retracted initial position. The moment the supporting member 49 again reaches its initial position, another limit switch 70 (Fig. 3), causes switch 48 to turn back into its initial position. It should be noted that instead of limit switches, it is possible to use mechanical reversing and switch operating means of well known type.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of punching machines differing from the types described above.

While we have illustrated and described the invention as embodied in a punching machine for luggage, we do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of our invention.

Without further analysis, the foregoing will so fully reveal the gist of our invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention, and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claim.

It should be stressed that our new machine can be operated not only by electric means, but also by air pressure, hydraulic pressure, and might include, if necessary, fly wheel and/or cam

arrangements for operating the punching dies.

What we claim as new, and desire to secure by Letters Patent is:

In a machine for simultaneously punching a plurality of holes in a sheet member, the combination, with a base of three guide members mounted on the latter, the base having a longitudinal slot allowing horizontal adjustment of the two outer guide members on both sides of the intermediate guide member toward and away from the latter along said slot in said base; means engaging in said slot for fixing the two outer guide members in attained positions of adjustment; a pair of hollow blocks rigidly supported on said base in spaced apart relation, the intermediate guide member having a die matrix with at least one vertically elongated aperture therein; further die matrices on the outer guide members having punching apertures therein; substantially horizontal threaded drive shafts rotatably mounted in said hollow blocks and each shaft carrying a first operating wheel; an additional operating wheel on one of said drive shafts; drive means for driving the additional operating wheel; operative means interconnecting the first operating wheels for providing simultaneous rotation thereof; threaded drive members mounted on and meshing with the threads on said drive shafts to be moved horizontally thereby upon rotation of said drive shafts; an elongated horizontal supporting member fixed on said threaded drive members; three punching devices adapted to cooperate with three guide members; three supports mounted on said movable supporting member and individually supporting said punching devices, the intermediate support having vertical guide means exclusively allowing vertical adjustment of the intermediate punching device in order to cooperate with the vertically elongated aperture in the die on said intermediate guide member; horizontal guide means on said movable supporting member for slidably guiding the other two supports along the latter member, the two punching devices on said other two supports cooperating with the punching apertures in the further dies; mutually engaging means on said supports and said guide members for maintaining the punching devices and the apertures in said dies in operative alignment in all positions of horizontal adjustment on said other guide members and vertical adjustment of the intermediate punching device; means for securing the latter and said other guide members in attained positions of adjustment; and means for initiating and controlling operation of said drive means.

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