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AUTOMATIC PUNCHING FORM FOR BOX WRAPPING MACHINES

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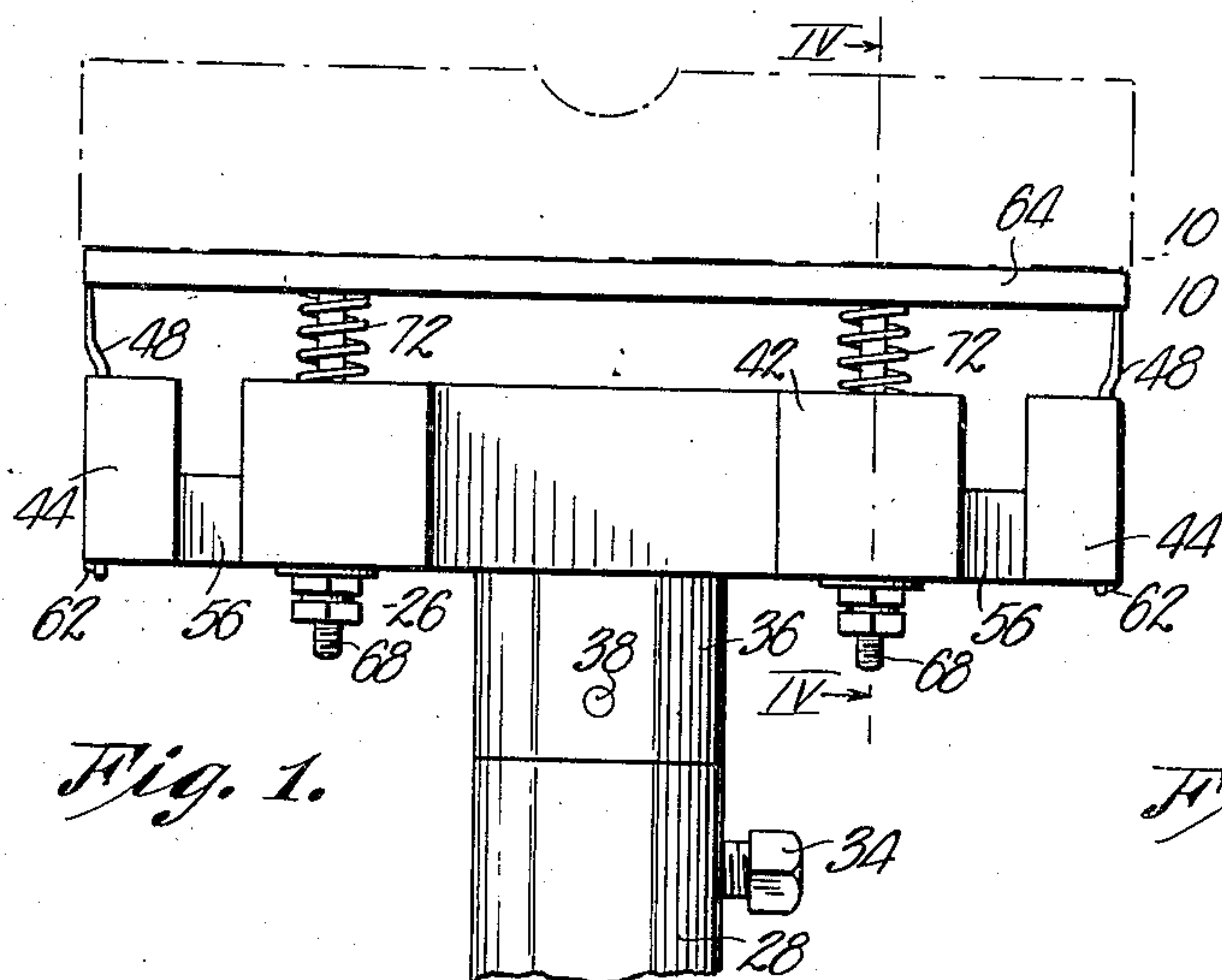


Fig. 1.

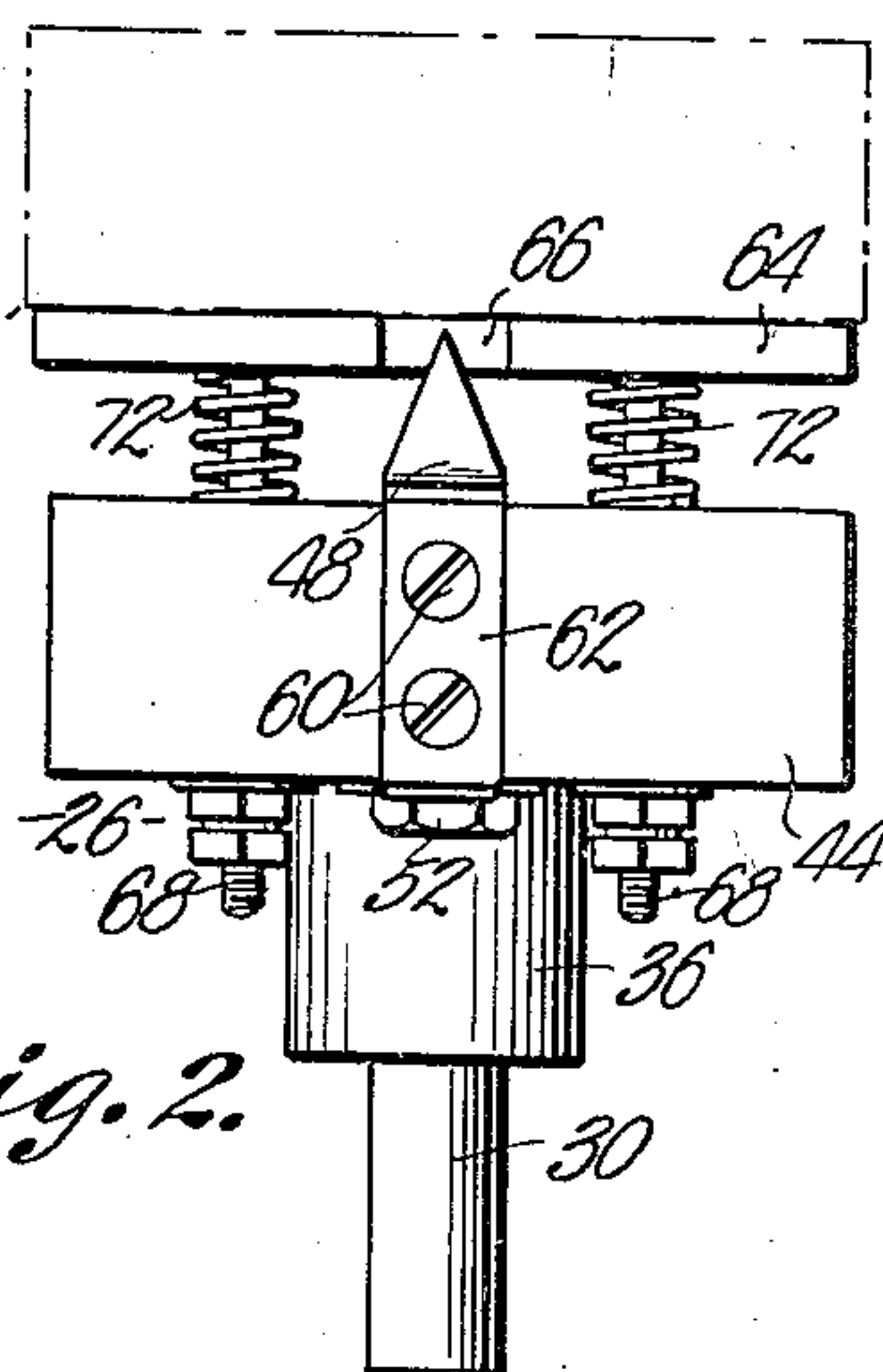


Fig. 2.

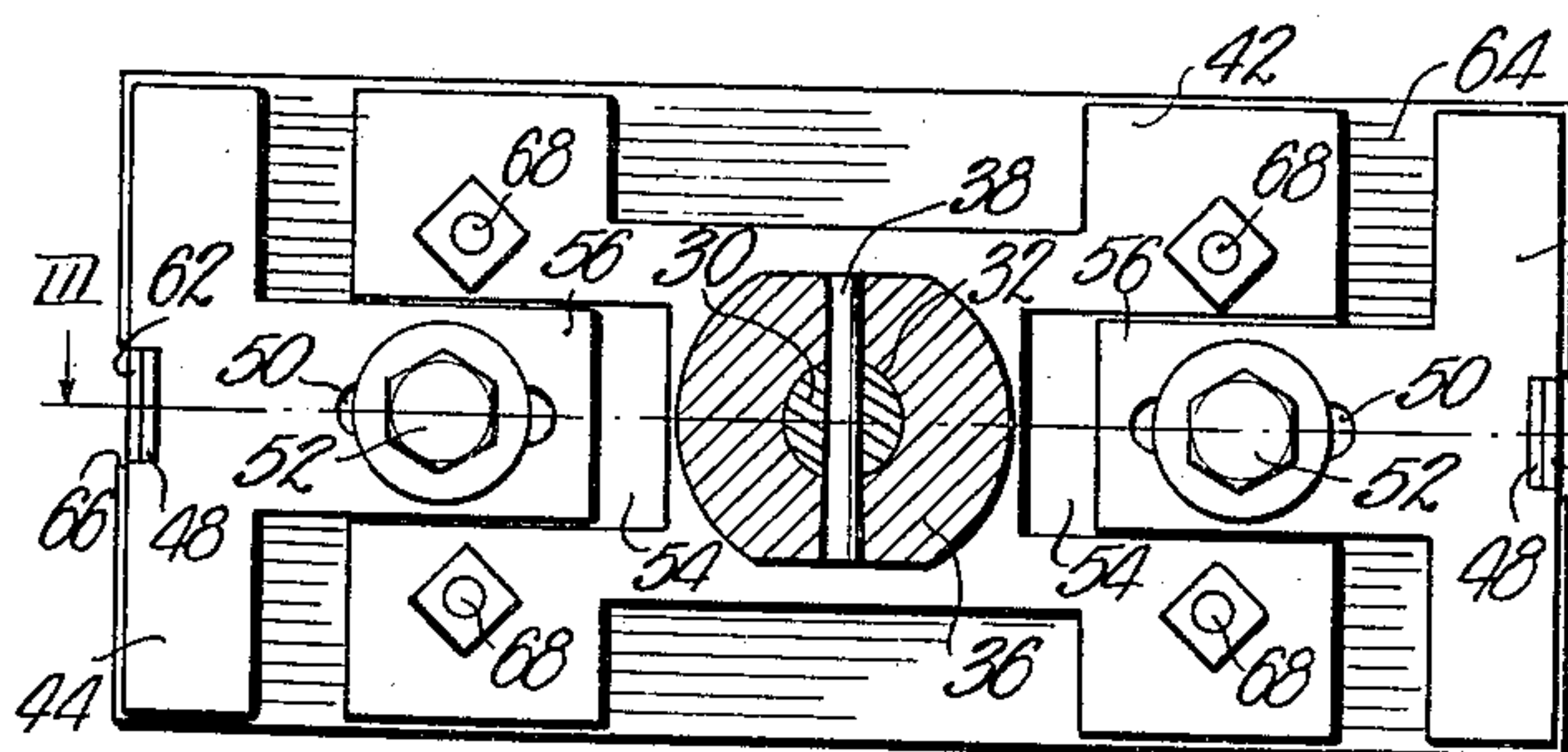


Fig. 3

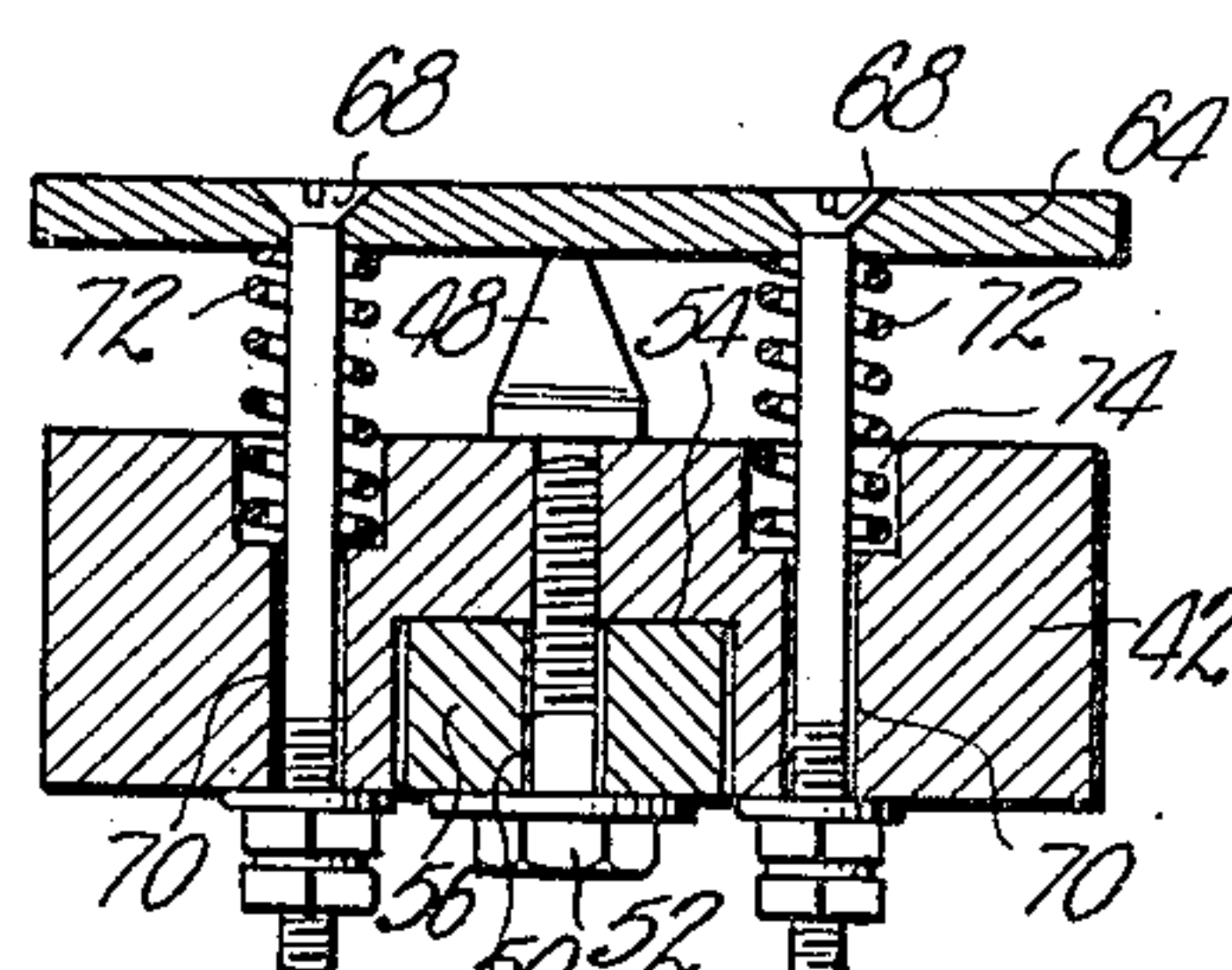


Fig. 4.

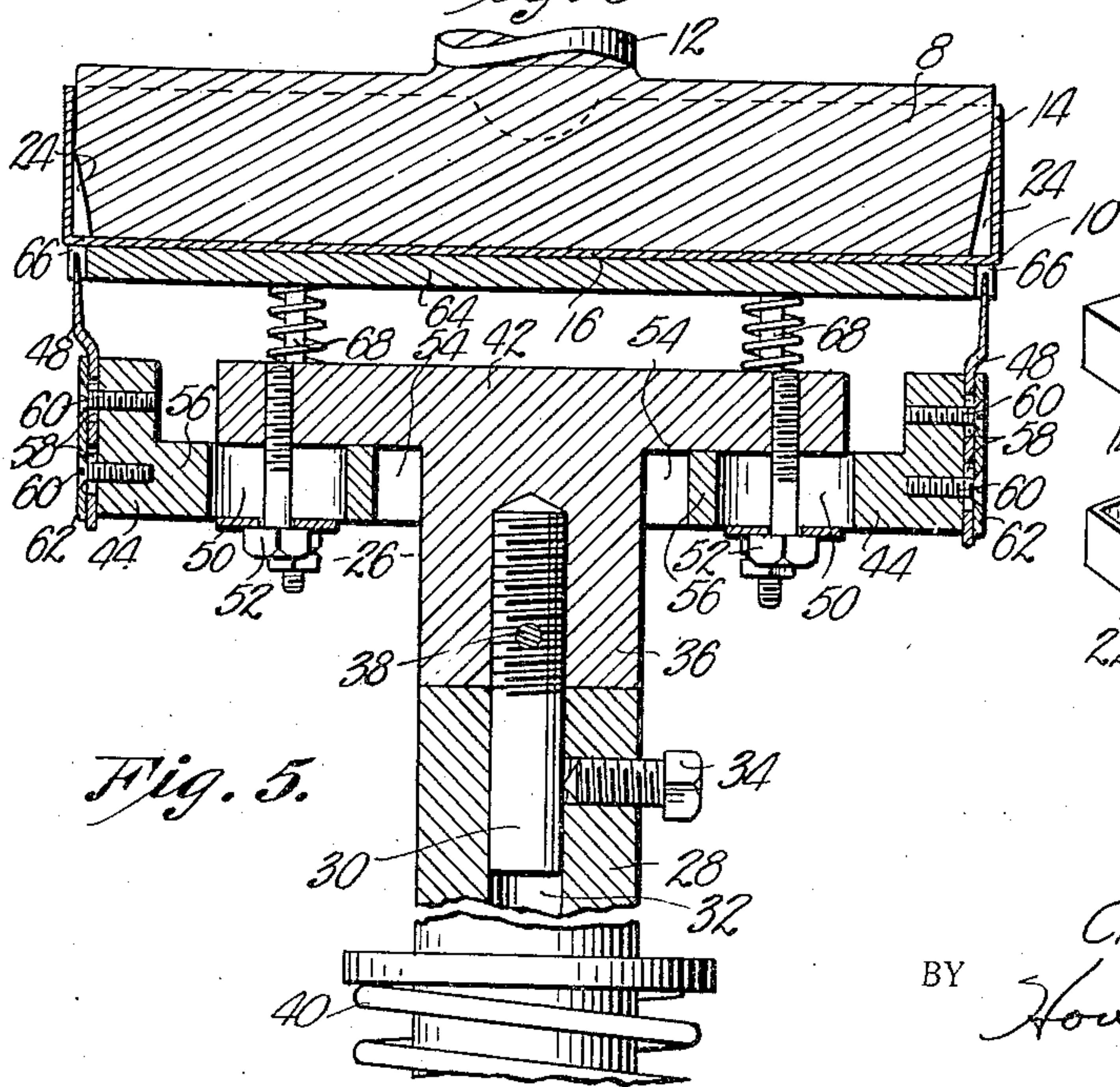


Fig. 5.

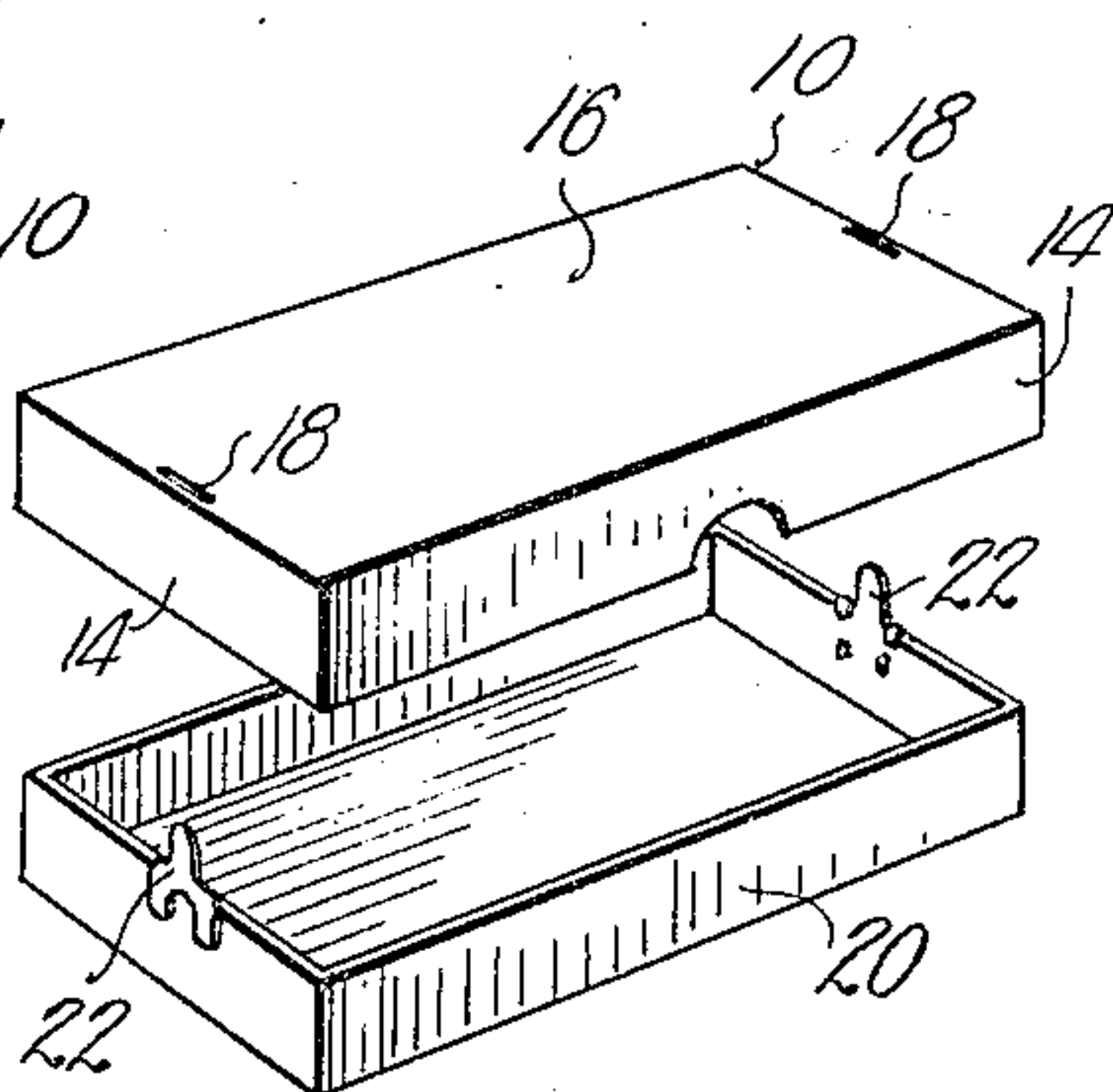


Fig. 6.

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AUTOMATIC PUNCHING FORM FOR BOX WRAPPING MACHINES

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10 Claims. (Cl. 93—59)

This invention relates to box making machinery and particularly, equipment used in wrapping boxes and the parts thereof.

The primary object of this invention is to provide specially built forms for box wrapping equipment which will perforate the boxes at desired points as the wrapping takes place.

One of the important aims of this invention is to provide an automatic punching form for box wrapping machines wherein is included adjustable punches, means for holding the box out of engagement with the punches during predetermined portions of the path of travel of the box and cooperating top and bottom forms which may be used with the conventional box wrapping machines, now commercially employed. Boxes known to the trade as mail order containers are of the telescoping type and have metal clips secured to one part thereof which extend through perforations provided in the other part, or lid. These last mentioned perforations are usually formed by a separate operation which is not only expensive, but presents an undesirable ragged edge at the perforation, because the piercing is done after the cover is wrapped, requiring that the punches move through the cover from the inside toward the outside, thus creating a bur or torn edge which is always in sight.

This invention provides top and bottom forms for box wrapping machines which cooperate to automatically form the aforesaid perforations as the cover of the box is being wrapped, and the preferred embodiment is illustrated in the accompanying drawing wherein:

Figure 1 is a side elevation of the bottom form of a box wrapping machine made to embody the present invention.

Fig. 2 is an end view of the same.

Fig. 3 is an inverted plan view of the bottom form illustrating the extensible heads thereon.

Fig. 4 is a cross sectional view through the bottom form taken on line IV—IV of Fig. 1.

Fig. 5 is a vertical longitudinal sectional view through the top and bottom forms showing a box in place; and,

Fig. 6 is a perspective view of a two-part mailing box having perforations formed therein through the use of the forms illustrated in Fig. 5.

The forms constructed to embody the present invention may be used with the conventional type box wrapping machines, well known to the trade and in the art.

The top form 8 is of a size to fit snugly into the portion of box 10 which is to be wrapped and perforated, and this top form is reciprocally

mounted upon a ram 12 forming a part of the box wrapping machine not here illustrated.

Box 10 when fitted onto top form 8, usually has continuous sides 14 which extend laterally from wall 16 through which perforations 18 are to be formed. This portion of the box 10 is normally the lid which fits over the tray-like bottom portion 20 of the box upon which is secured the clips or fastening elements 22, that pass through perforations 18 prior to the bending operation which insures that clips 22 will securely hold lid portion 10 of the box against accidental displacement. These perforations 18 must be formed extremely close to sides 14 and through the wall thereof at the score line, or line of juncture between sides 14 and walls 16. In some instances these perforations 18 are formed in the blank before sides 14 are moved to the position shown in Fig. 3. With a top and bottom form of the nature contemplated by this invention, box portion 10 is completely created before perforations 18 are punched.

Top form 8 should be ground away to provide notches 24 directly over the points where perforations 18 are to be formed. These notches have inclined walls which decrease the depth of the notches as the upper portion of top form 8 is approached so that the hereinafter described punches will have clearance between walls 14 and top form 8.

Bottom form 26 is mounted upon support 28 of the wrapping machine through the medium of pin 30 that extends into socket 32 formed in support 28. A set screw 34 secures pin 30 in place and this last mentioned pin is screw-threaded into boss 36 forming an integral part of bottom form 26. A tapered cross pin 38 passes through pin 30 and boss 36 to preclude relative turning.

Support 28 is yieldably maintained at one end of a path of travel by a relatively heavy spring 40, which forms a part of the conventional wrapping machine. This spring 40 therefore maintains support 28 and bottom form 26 at the upper end of a vertical path of travel until sufficient downward force by top form 8 is exerted to compress spring 40.

More specifically, bottom form 26 is provided with a base 42 integral with boss 36 and upon which is slidably mounted heads 44 which serve to increase or decrease the length of bottom form 26, and since heads 44 carry punches 48, the distance between these punches may be varied by adjusting heads 44. Slots 50 in heads 44 receive machine bolts 52 which are in screw-threaded engagement with base 42 and when these

bolts 52 are tightened, heads 44 will be secured against displacement.

Base 42 is specially cast so as to present cavities 54 into which extend the stems of heads 44, as illustrated in Fig. 3. These stems 56 cooperate with bolts 52 in imparting rigidity to the heads for constant pressure is exerted thereon as the punches 48 perform their work.

Manifestly, there is a punch 48 mounted upon each head 44 and the manner of mounting is the same for each punch. These punches 48 are pointed as seen in Fig. 2, so as to facilitate the piercing operation, and constant sharpening is necessary. Obviously, punches 48 are shortened as time goes on, and since the points of punches 48 must be accurately located with respect to box 10, adjustable means for securing the punches to head 44 is afforded. Each punch 48 is provided with slots 58 through which pass set screws 60 that are in screw threaded engagement with head 44. Plate 62 overlies the slotted portion of punch 48 and the heads of screws 60 are countersunk into plate 62 to present a smooth surface.

Plate 64 provided with punch receiving notches 66 at the ends thereof, is carried by base 42 of bottom form 26. This plate should be substantially the same area as wall 16 of the box being wrapped, and its notches should be in alignment with notches 24 of top form 8.

Plate 64 is yieldably held in a position spaced from the upper surface of base 42 by a plurality of pins 68, each of which extends loosely through openings 70 formed in base 42. Springs 72 interposed between plate 64 and base 42 circumscribe each pin 68 respectively, and the lower ends of these springs 72 are received in sockets 74 that are enlargements of openings 70 provided in base 42. Thus, when plate 64 is moved toward base 42, springs 72 compress and enter sockets 74 to insure freedom of action and an unrestricted path of travel for plate 64. These springs 72 have a direct relation with relatively heavy spring 40 of the wrapping machine, which relation will be more distinctly pointed out during the explanation of the operation.

Operation

When a conventional wrapping machine is equipped with top and bottom forms made as above described, perforations 18 in box 10 will be automatically created while the wrapping action takes place. The operator, after placing the wrapper against the outer face of wall 16, moves box 10 on to top form 8 and allows ram 12 to move form 8 toward bottom form 26. When top form 8 and box 10 engages plate 64, springs 72 will be compressed and plate 64 will move toward base 42 of bottom form 26. As this movement takes place, punches 48 will pierce box 10 and extend into notches 24 created in top form 8. The downward movement of ram 12 will continue, however, while the wrapper (not here shown) is moved upwardly along the outer surfaces of sides 14 by the rollers of the machine.

Continued downward movement of ram 12 will force form 8, box 10, plate 64, and in fact, the entire bottom form assembly, down to compress springs 40. When the end of the downward stroke is reached, the wrapper will be in position and perforations 18 formed.

The return stroke of ram 12 first permits spring 40 to move all of the bottom form 26 back to the point of beginning, while plate 64 is against base 42. Thereafter springs 72 will move plate 64 to the position shown in Fig. 5 to insure that punches

48 are withdrawn from box 10, and the points thereof are disposed below the upper surface of plate 64 so that box 10 might be automatically forced into the discharge chute of the machine. This ejecting of the box, however, does not take place until after top form 8 has been withdrawn from within box 10. After box 10 has been removed from top form 8, the operation may be repeated.

From the foregoing, it will be obvious to one skilled in the art that the wrapping operation is accompanied by a piercing of perforations 18. Any burs or frayed edges that might be presented, are inside the box and not visible to the user when the box is in the normal position.

Forms for box wrapping machines which embody this invention, might be made to present different physical characteristics than those shown in the accompanying drawing and it is desired to be limited only by the spirit of the invention and scope of the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel during the wrapping operation; and means on the bottom form for piercing the box as it is moved through said portion of the path of travel of the top form.

2. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation; punches on the bottom form for piercing the box as it is moved through said portion of the path of travel of the top form; and means for withdrawing the punches from the box as the top form is moved through a portion of its path of travel in the opposite direction.

3. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation; punches on the bottom form for piercing the box as it is moved through said portion of the path of travel of the top form; and means for withdrawing the punches from the box as the top form is moved through a portion of its path of travel in the opposite direction, said withdrawing means being a portion of the bottom form movable with respect to the remaining portion thereof.

4. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation; punches on the bottom form for piercing the box as it is moved through said portion of the path of travel of the top form; and means for withdrawing the punches from the box as the top form is moved through a portion of its path of travel in the opposite direction, said withdrawing means being a portion of the bottom form and provided with elements for yieldably holding the same in a position to maintain the box being wrapped out of engagement with said punches.

5. In a box wrapping machine, a reciprocating

top form for supporting the box being wrapped; a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel during the wrapping operation; and means on the bottom form for piercing the box as it is moved through said portion of the path of travel of the top form, said top form being provided with openings for receiving the piercing means as they pass through said box.

6. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; and a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation, comprising a base, punches on the base for piercing the box as it is moved through said portion of the path of travel of the form, a plate carried by the base for holding the box being wrapped out of engagement with the punches, and springs yieldably maintaining the plate in the operative position.

7. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; and a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation comprising a base, punches on the base for piercing the box as it is moved through said portion of the path of travel of the form, a plate carried by the base for holding the box being wrapped out of engagement with the punches, and springs yieldably maintaining the plate in the operative position, said punches being adjustably mounted on the base whereby the desired portions thereof are projected from the base to enter the box.

8. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; and a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction

during the wrapping operation comprising a base, adjustable heads on the base for increasing or decreasing the length thereof, punches on the heads for piercing the box as it is moved through said portion of the path of travel of the form, a plate carried by the base for holding the box being wrapped, out of engagement with the punches, and springs yieldably maintaining the plate in the operative position.

9. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; and a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation comprising a base, adjustable heads on the base for increasing or decreasing the length thereof, punches on the heads for piercing the box as it is moved through said portion of the path of travel of the form, a plate carried by the base for holding the box being wrapped, out of engagement with the punches, and springs yieldably maintaining the plate in the operative position, said plate having notches formed therein for the reception of the punches.

10. In a box wrapping machine, a reciprocating top form for supporting the box being wrapped; and a bottom form for engaging the box being wrapped as it moves with the top form through a portion of its path of travel in one direction during the wrapping operation comprising a base, adjustable heads on the base for increasing or decreasing the length thereof, punches on the heads for piercing the box as it is moved through said portion of the path of travel of the form, a plate carried by the base for holding the box being wrapped, out of engagement with the punches, and springs yieldably maintaining the plate in the operative position, said top form and plate having aligned notches formed therein for the reception of the punches.

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