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METHOD AND APPARATUS FOR PUNCHING AND SLITTING

Filed Feb. 19, 1963

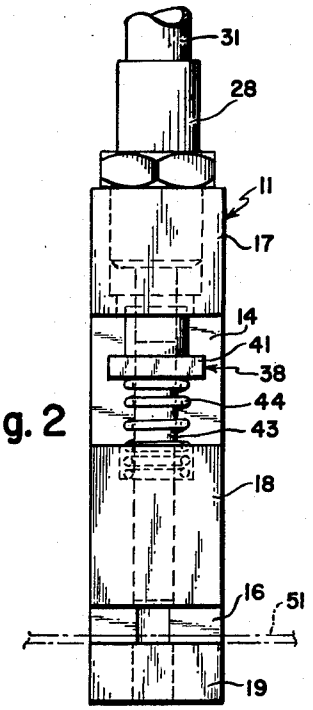


Fig. 2

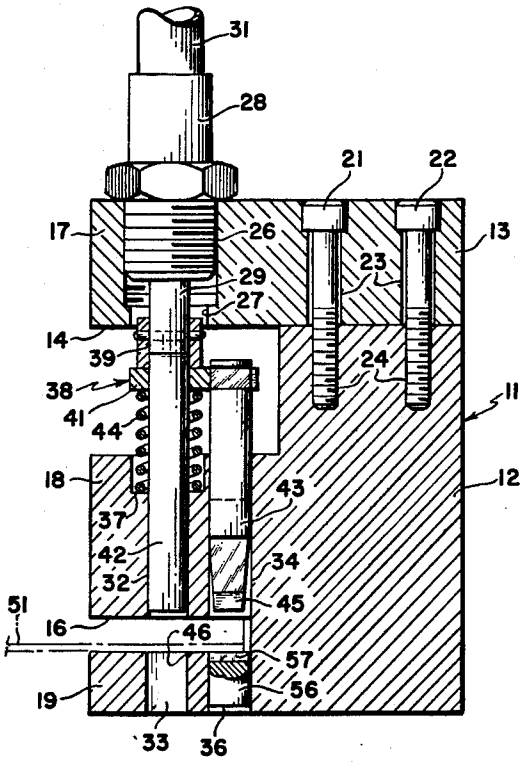


Fig. 1

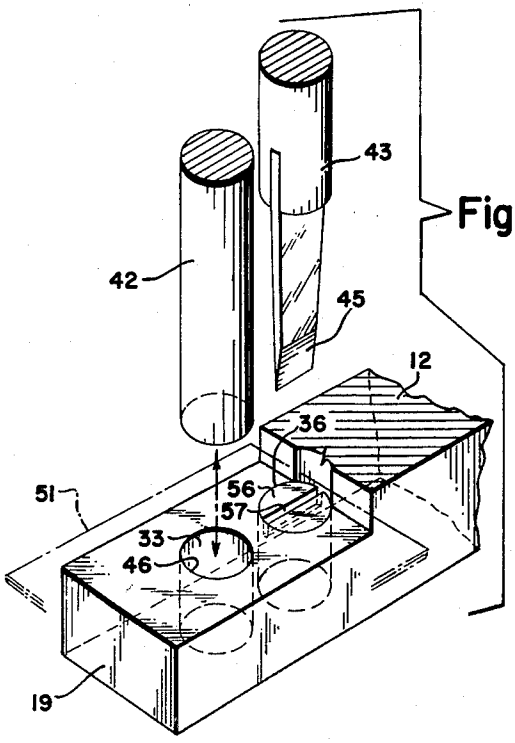


Fig. 4

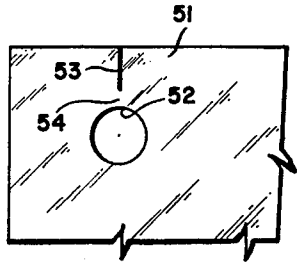


Fig. 3

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METHOD AND APPARATUS FOR PUNCHING AND SLITTING

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This invention relates to an apparatus for providing a hole and adjoining slit in bags of plastic transparent material used in packaging articles.

As is perhaps well known, in recent years transparent plastic material has been used to package food products, small articles, and clothes returned from a laundry. For display purposes and otherwise, items thus packaged are hung on hooks or the like by passing the bag over the hook with it passing through a hole provided in the bag. When removing the bags from the hook, it is often desirable to pull it at right angles to the main axis of the hook; however, because the plastic material stretches, rather than tears, it is often difficult, if not impossible, to remove them in such a fashion. The present invention includes means for providing a weakened portion in the bag adjacent a hole whereby an article thus packaged may be readily removed so that the weakened portion permits the bag to break readily in a convenient area.

Accordingly, it is an object of this invention to provide a device for simultaneously punching and slitting transparent plastic material adapted to be used in packaging.

It is another object of this invention to provide a device of the type described hereinafter for simultaneously punching and slitting transparent plastic material which comprises a block of solid material having a slot therein adapted to have a plurality of transparent plastic sheets positioned therein and including piston means for slidably moving a hole punch and slit-making element through the sheets forming a hole and a weakened area adjacent the hole.

It is an over-all object of this invention to provide a device of the type described hereinafter which is simple in construction, relatively inexpensive to operate and manufacture, and which is otherwise well adapted to simultaneously cut and slit transparent plastic sheets.

In accordance with these and other objects, which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings illustrating a preferred embodiment thereof.

In the drawings:

FIGURE 1 is a side elevation view, partly in cross section taken along the medial vertical plane of FIGURE 2, illustrating the present invention;

FIGURE 2 is a front elevation view of the instant invention; and

FIGURE 3 is a partial view of a bag which has been provided with a hole and a weakened portion in accordance with the instant invention.

FIGURE 4 is a partial perspective view illustrating a feature of the instant invention described more fully hereinafter.

Referring more particularly to the drawings, wherein like reference characters designate like or corresponding parts throughout the different views, and referring particularly to FIGURE 1, the numeral **11** designates generally an E-shaped block which may be formed of a lower block **12** and an upper block **13**. In the embodiment of the E-shaped block shown, the lower block **12** is provided with a first cut-away portion, indicated by the numeral **14** and a second cut-away portion or slot **16**, said slot being substantially parallel to the portion **14**. The projecting members of the E-shaped block are identified as follows on the drawings: the upper member **17**, the middle member **18**, and the lower member **19**. The upper and lower blocks **12** and **13** are suitably fastened together

as by bolts **21** and **22** threadably positioned in the bores and holes **23** and **24** respectively.

Referring to FIG. 1, the upper member **17** is provided with a threaded vertical bore **26** therethrough communicating with said cut-away portion or upper slot **14**, the interior surface of said bore having a smooth wall adjacent the opening to the portion or slot **14** as at **27**. A cylinder **28** is threadably received in the bore **26**, said cylinder having a pressure chamber therein with an opening in the lower end thereof communicating with a piston **29** adapted to be driven downwardly upon the application of fluid pressure in the cylinder chamber, the pressure being conducted thereto through a hose **31**.

The middle member **18** and the lower member **19** are each provided with a pair of parallel aligned holes **32** and **33**, and **34** and **36**. A shoulder **37** is formed by an enlarged mouth at the upper end of one of the holes in the middle member. A plunger element **38** is disposed in the cut-away portion **14**, said plunger being provided in the top surface thereof with a recess **39** adapted to receive the downwardly-extending end of the piston **29** and being further provided at the downwardly-extending end thereof with a horizontal plate **41**. The piston **29** may be attached to the plunger element **28** by a pin, as shown in FIGURE 1. Extending downwardly from the horizontal plate **41** are a first hole punch element **42** attached to the plate **41** and a second slitting element **43** slidably held by the plate **41**. The upper portion of the slitting element **43**, as seen in FIGURE 1, has at least one transverse groove for connecting it to a vertical slot in the end of the flat horizontal plate **41**. A coil spring **44** is disposed around one of the elements with the upper end thereof being in abutting engagement with said plate and the lower end thereof being received in the hole **32** abutting the shoulder **37**. The element **42** comprises a circularly-shaped hole punch and the element **43** is provided with a knife-shaped end **45** for slitting. The upper edges of the hole **33** have sharp edges forming a die; alternatively, a tubular member (not shown) may be fitted in the hole **33**, said insert having a sharp cutting edge as at **46**; and, in the hole **36**, a cylindrically-shaped insert **56** is fitted, said insert having a diametrical slit **57** therein with the edges of the slit forming a die or edge for cooperation with the slitting element **43**.

In use, a bag of transparent plastic material **51**, such as is illustrated in FIG. 3, is inserted into the cut-away portion or slot **16**. Fluid pressure is applied in the cylinder **28** to the piston **29** whereupon it is driven downwardly storing energy in the spring **44** and moving the plate **41** and elements **42** and **43** carried thereby downwardly with the result that the elements **42** and **43** simultaneously punch a hole **52** and make a slit **53** forming a hole and weakened area **54** in the bag.

While not shown, it will be apparent to those skilled in the art that a two-way valve may be used so that the piston will reciprocate without the requirement of the spring means **44**.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is, therefore, not to be limited to the details disclosed herein, but is to be accorded the full scope of the claims so as to embrace any and all equivalent apparatus and articles.

What is claimed is:

1. For use in punching and slitting transparent plastic material, a device comprising; a block of solid material; said block having a slot therein adapted to receive a plurality of transparent plastic sheets to be provided with a hole and an adjacent weakened area, and a pair of

substantially parallel openings lying normal to said slot; a piston slidably housed in said block and having carried thereby and fastened thereto a hole punch element and a slit-making element slidably housed in said openings, said slit making element being connected for vertical movement with the hole punch and being slidable in a horizontal plane for alignment relative to the hole punch on vertical movement, said elements being adapted to be moved upon application of force to said piston into and out of said slot portion for punching and slitting sheets of transparent plastic material received positioned therein; and means connected to said block for reciprocally driving said piston.

2. For use in punching and slitting transparent plastic material; a block of rigid material forming a housing having a first cut-away portion and a second cut-away portion parallel to said first cut-away portion with said portions forming a generally E-shaped housing having a top member, a middle member, and a lower member, said members projecting outwardly from the main body of said block; said top member having a bore therethrough communicating with said first cut-away portion, the sides of said bore being tapped at least part way therealong and being smooth adjacent the first cut-away portion; said middle member having a first pair of parallel spaced-apart bores therethrough communicating with said first and second cut-away portions, one of said bores being enlarged at one end thereof adjacent the first cut-away portion forming a shoulder therein; said lower member having a second pair of parallel spaced-apart bores therethrough, said second pair of bores being aligned with said first pair of bores; a plunger slidably disposed in said first cut-away portion and having a first end received in the smooth sided portion of the top member and a second end; a pair of elements disposed respectively in the bores of said middle member, said elements being fastened at one end thereof to the second end of said plunger and at the other end and being provided respectively with a hole cutting punch element and a slitting element, said elements co-operating with the edges of said second pair of bores at the surface of the second cut-away portion defining a cutting edge; a spring seated in the bore of said middle member against said shoulder at one end thereof with the other end thereof being in abutting engagement with the second end of said plunger; a

cylinder having a pressure chamber therein with an intake port at one end thereof and an opening at the other end thereof for said piston, said cylinder being threadably received in the bore of said top member; and means for providing fluid pressure to said cylinder whereby said piston and plunger may be forcibly driven so that said elements are adapted to be driven into said second cut-away portion making a hole and adjacent weakened areas in a plurality of transparent plastic sheets positioned therein.

3. In a structure including a housing with a slot therein, a slidable piston connected to said housing and adapted to have fluid pressure applied thereto, a pair of elements connected to said piston for slidable movement therewith into and out of a slot, one of said elements comprising a hole punch and the other of said elements comprising a slit-making member with a knife edge, a means to connect said elements to said piston for relative adjustment of said elements to one another on slidable movement, said members being adapted to simultaneously punch a hole and provide a slit adjacent the edge of a transparent plastic sheet.

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