

[54] SAFETY PAPER CARTON OPENING BLADE HOLDER

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[58] Field of Search 30/2, 286, 295, 336

[56] References Cited

UNITED STATES PATENTS

2,209,751	7/1940	Wulff	30/2 X
2,730,800	1/1956	Bailey	30/2
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Primary Examiner—Donald G. Kelly

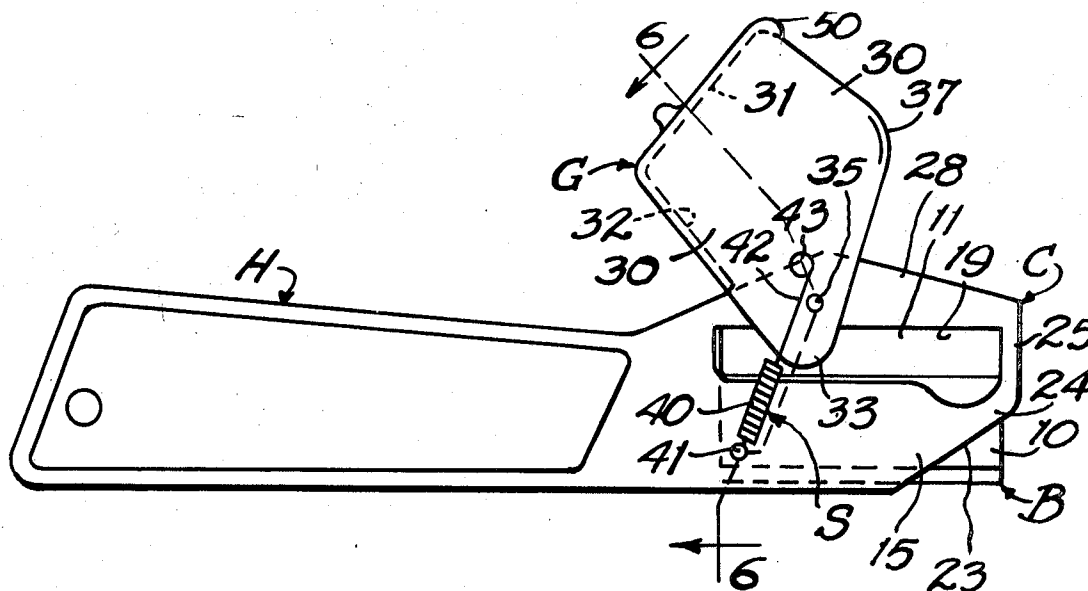
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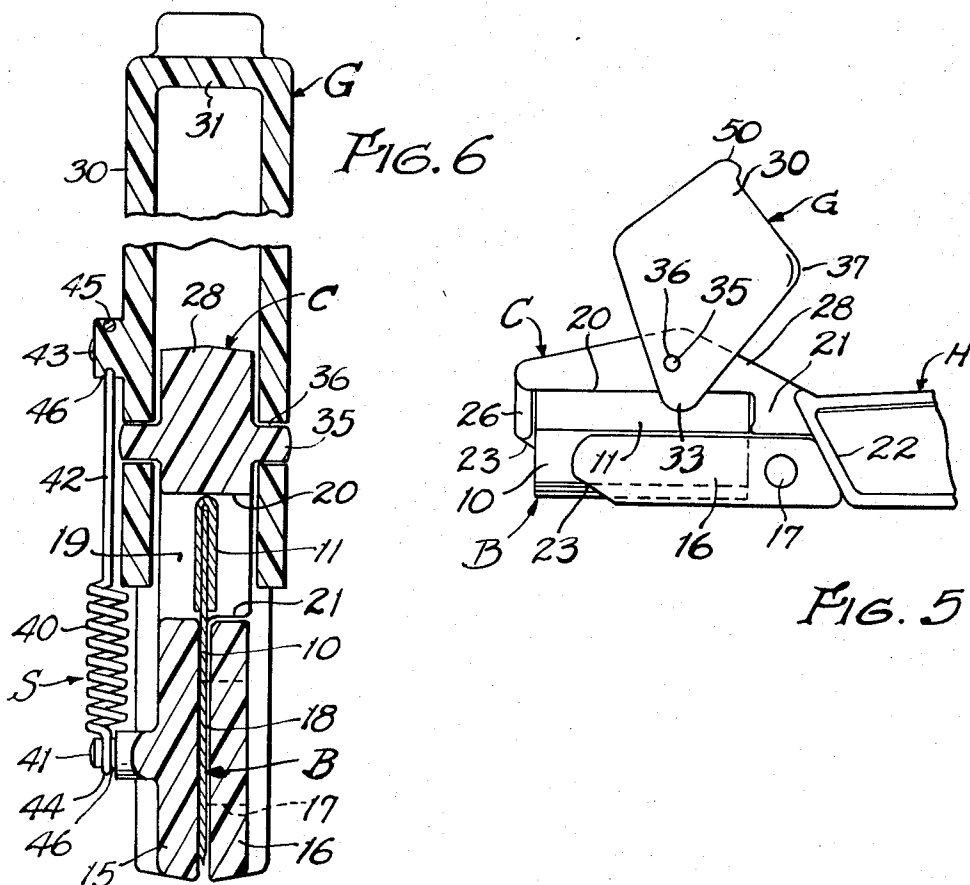
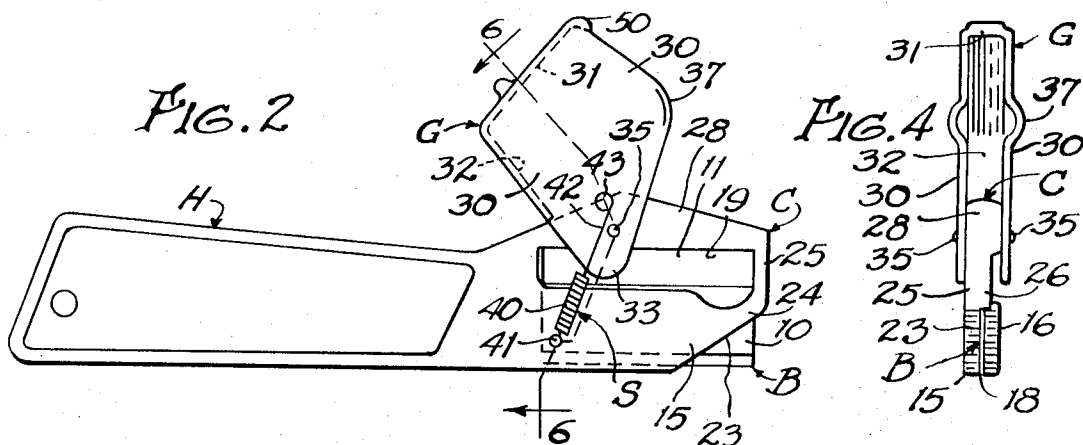
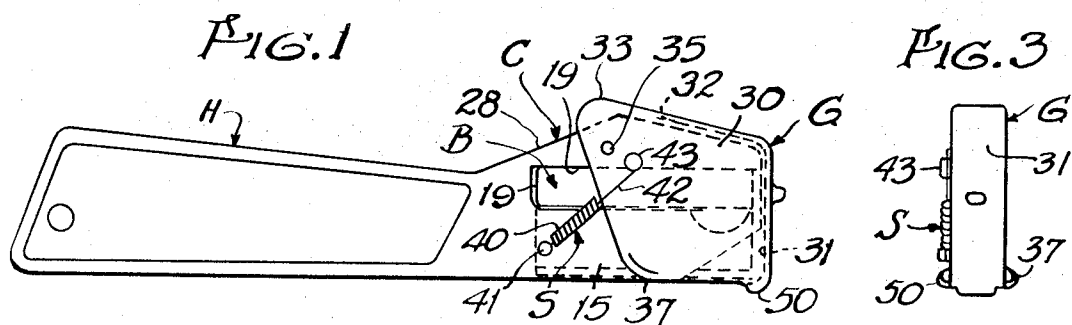
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[57] ABSTRACT

A blade holder comprising a grip and a handle molded integrally therewith, of hard plastic material, is provided with a guard pivotally attached thereto for retracting movement to uncover the corner of a blade held in the grip, the pivotal attachment being provided by trunnions integral with respective sides of the grip and received in apertures in respective side walls of the guard, which are of sufficient resiliency to be sprung over the trunnions during assembly of the guard to the grip. A tension spring is connected to integral posts on a side of the grip and on a corresponding side wall of the guard, positioned so that the spring will move over center with respect to the pivot axis in shifting from a closed to an open position, and the guard will be held in each of such positions by the spring.

8 Claims, 6 Drawing Figures





SAFETY PAPER CARTON OPENING BLADE HOLDER

BACKGROUND OF THE INVENTION

A carton opening knife embodying a grip in which a razor blade may be mounted, with one corner of the blade projecting for piercing the wall of a carton, and with a guard that is pivoted to the grip and spring-loaded for movement to a blade-covering position, is disclosed in Bailey U.S. Pat. No. 2,730,800. Knives embodying the construction covered by that patent have been widely distributed and used over a period of about 15 years, but none of them have embodied any means for holding the guard in open position, and all of them have embodied a construction fabricated of parts including a separate pivot pin secured to the grip but not integral therewith.

SUMMARY OF THE INVENTION

The general object of the present invention is provide a carton cutter of the type referred to, in which the guard is spring-loaded both to closed and to open positions, in a construction of maximum simplicity and minimum cost. To this end, all parts are of molded plastic construction with the exception of a coil spring providing the spring loading for (1) normally holding the guard in a position fully covering the projecting cutting corner of the blade, (2) yielding under pressure of the guard against a carton wall being severed, so as to allow the blade corner to project just enough to pierce the wall, (3) automatically returning the guard to the fully covering position when the blade is withdrawn from the carton wall, and (4) holding the guard in a retracted, fully open position for blade-changing when the guard is moved to such fully open position.

These and other objects will become apparent in the ensuing description and appended drawings, in which:

FIG. 1 is a right side view of a carton knife embodying the invention, the guard being shown in the closed position;

FIG. 2 is a right side view of the same, the guard being shown in the fully open position;

FIG. 3 is a front end view of the same, with the guard open;

FIG. 4 is a front end view of the same, with the guard closed;

FIG. 5 is a left side view of the grip portion and guard, with the latter in open position; and

FIG. 6 is a cross-sectional view on an enlarged scale, taken on line 6--6 of FIG. 2.

DESCRIPTION

Referring now to the drawing in detail, I have shown therein, as an example of one form in which the invention may be embodied, a carton opening knife comprising, in general, a cutter blade B, a holder grip C having a handle H, a guard G for normally covering the blade and grip, and a spring S for yieldingly urging the guard C normally to the closed position shown in FIG. 1.

Blade B is of a type having a hardened blade body 10 and a reinforcing back 11. Grip C is in the form of an integral claw on the forward end of handle, H, and comprises spaced laterally opposed fingers 15 and 16, the latter being fabricated of a separate flat strip bonded to a rivet 17 formed as an integral projection from finger 15 and received in a mating opening in finger 16. A narrow slot 18 in which blade body 10 is

snugly received, is provided by spacing of the fingers 15, 16 laterally. Finger 15 has an open longitudinal groove 19 to receive one side of blade back 11, and finger 16 has a width approximately the same as that of blade body 10, its upper margin being spaced from an overhanging shoulder 20 (a lateral extension of the upper margin of groove 19) so as to receive the other side of back 11. A foot 21, formed as an integral downward projection from shoulder 20, bears against the rear end of finger 16, for support which is reinforced by a shoulder 22 on the forward end of handle H, bearing against the rear end of finger 16 which is inclined so as to extend diagonally beneath shoulder 22. Shoulder 20, and the upper margin of groove 19, are defined by the underside of a head 28 which carries the trunnions on which guard G is pivoted.

Fingers 15 and 16 have forward ends undercut on a diagonal such that a substantial corner portion of blade B will project beyond the grip C for penetration of a box wall, the angle of undercut being such as to provide a bearing land 23 on which the holder can slide against the surface of a box wall, thus functioning as a depth gage to limit the penetration of blade B into the box wall. Finger 15 at its forward end (FIG. 2) has a narrow web portion 24 extending downwardly and rearwardly from a vertical web 25 which defines the closed forward end of groove 19, the latter being enlarged in width at its forward end on its lower side, whereby the forward end of the finger can be flexed outwardly enough to clear the forward lower corner of blade back 11, for removal and replacement of the blade. Web 25 is extended laterally to provide a lip 26 (FIG. 4) which reinforces it in providing a support against which the forward end of the blade will bear during a cutting operation in which the blade is dragged rearwardly in the box wall being cut.

Guard C comprises a pair of laterally spaced opposed skirts 30 joined by a bridging web including a front portion 31 and a back portion 32, the latter resting on the top of grip C to limit the closing movement of the guard, and terminating short of the rear extremities of skirts 30, which project in the form of ears 33 for mounting the guard on pivot trunnions 35. Trunnions 35 are formed as integral projections from the sides of grip C above slot 19 and shoulder 20, and are received in cylindrical apertures 36 in guard skirts 30 (FIG. 6). In order to assemble the guard to the grip C, it is provided with diverging lips 37 on skirts 30 at an open side of the guard, remote from bridging web 31, 32 adapted to be wedged over the ends of trunnions 35 so as to spread the walls 30 and permit the trunnions 35 to enter the guard and pass between ears 33 with a spreading action until they reach the apertures 36 therein, whereupon they will enter the apertures and the elasticity of the ears 33 will cause them to close upon the trunnions, assuming the assembled relation shown in FIG. 6.

Loading spring S comprises a coil spring body 40 attached at one end to an integral post 41 on grip finger 15 and having at its other end an extended tail 42 which is attached to an integral post 43 on a side wall 30 of guard G. Attachment to posts, 41, 43 is by means of open loops or hooks 44, 45 at the respective ends of the spring unit S, the posts 41, 43 being provided with annular retainer grooves 46 receiving these loops.

OPERATION

Guard G has a smooth, rounded bearing nose 50 at the end of web 31, which is disposed at a point remote from pivot trunnions 35. In using the knife, the nose 50 is pressed against a carton wall to be slit, the pressure causing the guard G to yield while the point of blade B enters the carton wall. In normal useage, the knife point will pierce the carton wall until bearing lands 23 engage the carton wall to function as depth-gage guides and runners to slide along the carton wall during the slitting operation. When a cut is completed, the knife is simply withdrawn, the spring S drawing the guard G back to its closed position as the blade B leaves the carton wall. When a new blade is to be installed, the guard is swung back to the fully open position of FIGS. 2 and 5 to expose the blade B for manipulation, and the blade is grasped in one hand and tilted laterally, functioning as a lever to spring the grip finger 23 outwardly in one direction while the finger 16 is engaged by the other hand (e.g.) by pressing a thumbnail against lip 26, (FIG. 5) and flexed in the opposite direction until the outer end of knife back 11 can be lifted clear of lip 26 and slid endwise out of slot 19. Such flexing is facilitated by the thin web portion 24 of finger 15.

Holder unit C, H and guard G are molded of a highly elastic, flexible hard plastic (synthetic resin) material only slightly plasticized, having high strength and not brittle.

I claim:

1. In a carton-slitting knife, in combination:

a holder embodying a handle and a blade grip on one end thereof, said handle and grip being integrally molded of an elastic, moderately flexible hard plastic material;

said grip comprising a pair of laterally opposed grip fingers spaced to define a thin flat slot in which the body of a cutting blade is receivable;

one of said fingers having a longitudinal groove in which a reinforcing back of said blade is receivable, and having a front end part closing the forward end of said groove to provide an abutment for engagement with the forward end of said blade back to retain the blade in the grip when being dragged rearwardly through a carton wall, said one finger having a head providing a longitudinal shoulder along the top of said groove for supporting said blade back against the reactive load of cutting action;

the forward end of said one finger being undercut below said abutment with a downward and rearward inclination to provide a carton wall engaging bearing land disposed in a plane diagonally traversing a cutting corner of a blade mounted in the grip, with said corner projecting beyond said grip for penetrating a carton wall;

said head having integral pivot trunnions projecting from opposite sides thereof;

a one-piece molded plastic guard comprising laterally spaced opposed side walls having respective apertures receiving said trunnions and pivotally mount-

ing said guard on said grip with said side walls closely embracing said grip, and a peripheral web bridging between and connecting said side walls in spaced relation, said walls having limited flexibility permitting them to be spread apart for reception of said trunnions between them and insertion thereof into said apertures;

a coil spring;

and integral anchor posts on said grip and guard respectively, to which the ends of said spring are anchored with the spring under tension, the point of anchorage to said guard being close to its pivot axis and movable over center across the axis extending between said pivot axis and said guard anchorage point, whereby said spring is effective to yieldingly hold said guard in either of two positions, one closed over said blade and the other in which said grip is substantially fully exposed to provide convenient access to said blade for removal and replacement.

2. A knife as defined in claim 1, said bridging web and the adjoining periphery of said guard being of angular contour along said periphery so as to brace said side walls against spreading during normal use of the knife.

3. A knife as defined in claim 2, said guard being diamond-shaped in peripheral contour, said bridging web and adjoining periphery defining an obtuse upper corner of the guard, and said side walls having free, spreadable corner extremities at a lower side of the guard opposite said corner.

4. A knife as defined in claim 3, wherein said spreadable extremities are bent laterally to provide diverging lips for wedging entry of said trunnions between said side walls.

5. A knife as defined in claim 4, wherein said corner and corner extremities are of obtuse-angular contour, and wherein said side walls have pivot ears constituted by acute-angular tail extremities beyond the rear end of said bridging web, said ears overlapping said grip and pivoted on said trunnions, said web rear end being engageable against said grip head to determine a limit open position of said guard.

6. A knife as defined in claim 5, wherein said guard has an angular end opposite said ears, with a rounded nose for bearing engagement against a carton wall to be slit.

7. A knife as defined in claim 1, in which said spring including a coiled body extending from its point of anchorage to said grip to a point short of the periphery of said guard, and an extended tail reaching from said coiled body to the anchor post on said guard, said coiled body projecting laterally beneath the adjacent margin of said guard.

8. A knife as defined in claim 7, the under side of said bridging web abutting said head in said closed position, and the rear end of said web abutting said head in said open position of the guard, whereby to limit the movements of the guard toward said closed and open positions respectively.

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