Feb. 10, 1970 J. F. FLEMING 3,494,591

STAPLE REMOVER

Filed Nov. 24, 1967

FIG. 1

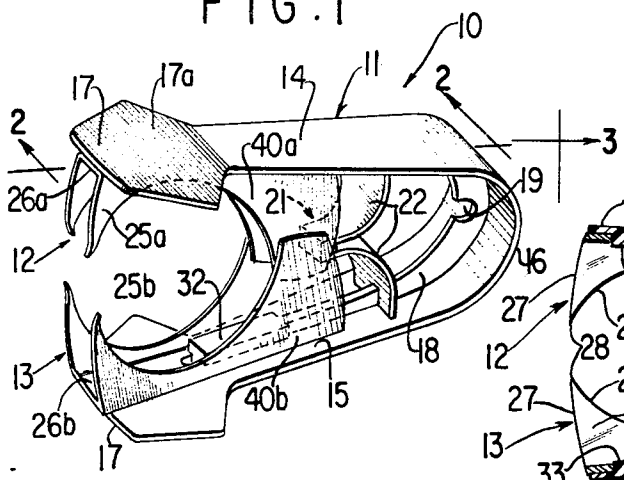


FIG. 2

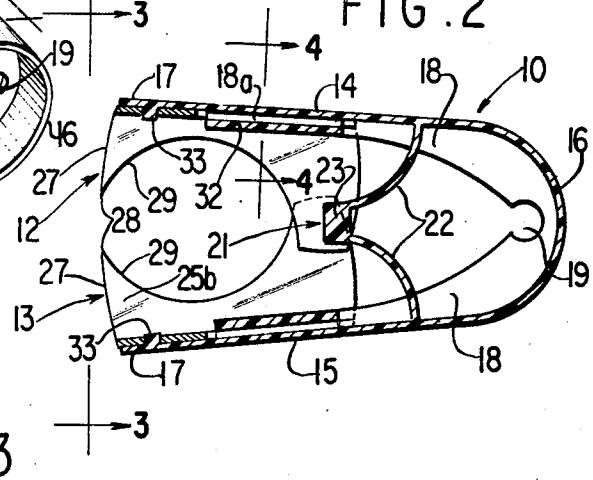
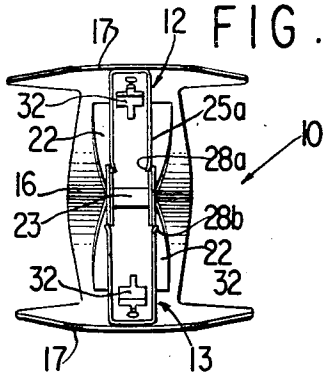


FIG. 3



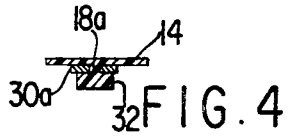


FIG. 4

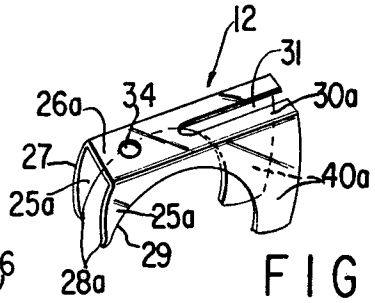


FIG. 5

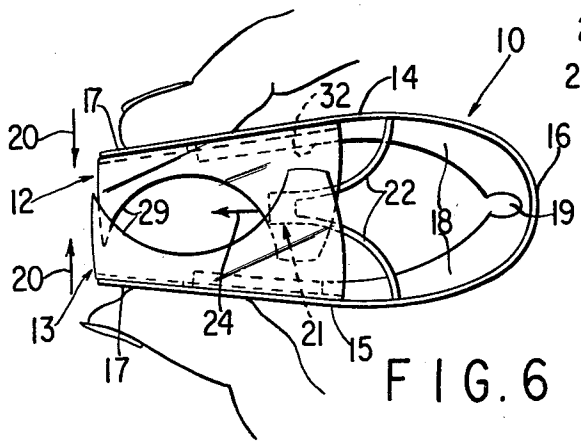


FIG. 6

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STAPLE REMOVER

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U.S. Cl. 254—28 12 Claims

ABSTRACT OF THE DISCLOSURE

A staple remover is constituted by a one-piece molding of elastomeric plastic material comprising a U-shaped body web having metal claws secured inside the ends of its legs, as by being slid into fast engagement with interfitting parts of the molding, and having its legs interconnected by molded web portions which normally hold the claws spaced apart at a desired distance, will flex and guide the claws into telescoped relation under finger pressure applied to the outer sides of the leg ends, and return the leg ends and claws to normal position when such pressure is released.

This invention relates to a staple remover, that is, to a device by which wire staples extending through paper or like sheets and having their ends bent backwardly upon the sheets can be conveniently removed without tearing the sheets.

It is an object of the invention to provide a serviceable staple remover constituted by a minimum number of parts which can be inexpensively fabricated and simply and easily assembled together.

According to the present invention, a staple remover is constituted by a one-piece molding of elastomeric plastic material comprising a resilient body web molded to a U-shape and having staple removing claw members secured in confronting coacting relation inside the ends of the legs of the body web, which legs are interconnected by integral elastic web means that hold them and the claws of the claw members in position to engage a staple, guide and yieldingly resist movement of the claws into telescoped relation for removal of a staple under finger pressure applied to the outer sides of the leg ends, and restore the legs and claws to normal open position when such pressure is released.

The said elastic web means are constituted advantageously not only by the base or bight portion of the U-shaped body web but also by integral arcuate web portions of the molding which define a resilient web connection having the form of a cusp bridging the space between the legs of the body web at a location between the curved base and the claw holding end portions thereof. This web connection resists spreading of the legs and claws beyond their normal open position suited for engagement of the claws with a staple to be removed, exerts a desired yielding resistance to convergence of the claws for removal of the staple under finger pressure applied to the leg ends, and returns the legs positively to their normal position when such pressure is released.

According to another feature of the invention, the claw members are each provided with a substantially flat base having an extended arm portion that can be slid into fast engagement with interfitting parts molded on the inner sides of end portions of the legs of the body web, so that the claw members and the molded body of the staple remover can be quickly and easily assembled together and yet will remain securely in the required working relationships under the stresses and strains of use.

According to another feature of the invention, the

claw members are made as metal stampings or the like which not only present mating sets of claws to be moved into telescoped relation for removal of a staple but also have backwardly extended base portions by which they are secured inside the legs of the molded elastomeric body web and from which mating guide elements, such as sets of fins or high flanges fitting slidably one upon another, project inwardly in telescoped relation. These elements guide the claws positively into telescoped relation so that they will not be displaced laterally out of proper working alignment by finger pressures applied incorrectly to the ends of the legs of the body web.

The above and other objects, features and advantages of the invention will be apparent from the following detailed description of an illustrative embodiment thereof which is to be read in connection with the accompanying drawing, wherein:

FIG. 1 is a perspective view of a staple remover in accordance with the invention;

FIG. 2 is a longitudinal sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is an end elevational view of the staple remover as it appears when viewed in the direction of arrows 3—3 of FIG. 2;

FIG. 4 is a transverse sectional view taken along line 4—4 of FIG. 2;

FIG. 5 is a perspective view of one of the claw members; and

FIG. 6 is a side elevational view of the staple remover, illustrating a relative position of its parts in the course of operation for the removal of a staple.

As shown in the drawing, a staple remover **10** in accordance with this invention is constituted by a one-piece molding **11** which is composed of a suitable elastomeric plastic material, for example, a high density polyethylene, and carries metal claw members **12** and **13** in confronting, coating relation.

The main body of the molding **11** is defined by a body web of the elastomeric material molded to a slightly open U-shaped configuration indicated in FIGURES 1, 2 and 3. The body web comprises legs **14** and **15** and an arcuate, nearly semi-cylindrical, base or bight portion **16** interconnecting the legs. The claw members **12** and **13** are assembled in secure engagement with interfitting molded parts on the inner sides of the legs **14** and **15**. The body web is made sufficiently wide and rigid, though elastically bendable in the region of the base **16** by finger pressure applied to the free ends **17** of the two legs, that the leg ends and claws converging under such pressure will be constrained to stay in planes transverse to a plane bisecting the body web. The free ends **17** of the legs are laterally enlarged, as seen in FIGS. 1 and 3, and they may be formed with ridged or knurled outer surfaces **17***a*, to facilitate the grasping of them and application of pressure to them between fingers of the hand of a person using the staple remover, as indicated in FIG. 6.

A central flange **18** molded integrally with the inner side of the body web along the legs **14** and **15** and base **16** imparts longitudinal rigidity to the legs so that they will deliver bending forces produced by convergence of the end portions **17** predominantly to the curved base **16**. This flange **18** has a cut-out area **19** near the middle of the base **16**, to concentrate such bending forces at that location and enable a desired elastic bending or flexing of the molding under finger pressure applied to the leg ends **17**.

The molding **11** is also made with a web section **21**, desirably having the form of a cusp, which interconnects the legs at a location between the curved base and the parts mounting the claw members **12** and **13**. This web section serves as a further means for normally holding the leg ends **17** and claw members spaced apart at a dis-

tance suitable for engagement of the claw members with a staple, but keeping them from spreading farther apart, and also as a further means for guiding their convergent movement under finger pressure, elastically resisting such movement, and restoring them to normal position when such pressure is released.

The web section **21** as shown consists of oppositely disposed arcuate web portions **22** which extend inwardly and forwardly from the inner sides of the legs **14** and **15** to a junction **23** midway between the legs, thus constituting an elastically compressible cusp-shaped connection bridging the space between the legs. Upon convergent movement of the legs by pressure applied to their outer sides, the arcuate web portions **22** are flexed toward one another and the junction **23** is displaced forwardly in the direction toward the free ends **17** of the legs, as indicated by the arrow **24** on FIG. 6.

As shown, the claw members **12** and **13** are mounted in confronting relation at the inner sides of the legs **14** and **15**, with their respective sets of mating claws or teeth **25***a* and **25***b* disposed at the outer edges of the leg ends **17** so that they can be placed and moved together against a stapled sheet surface for engagement of a staple in conventional manner. Each claw member is formed of steel or another suitably hard metal, conveniently as a stamping thereof, and comprises a pair of laterally spaced claws struck up from a flat base portion **26***a* or **26***b* that includes an elongated arm **30***a* or **30***b* extending backwardly away from the claws (FIG. 5). The claws **25***a* of one claw member, say member **12**, are spaced apart by a smaller distance than the claws **25***b* of the other claw member, so as to be telescoped slidingly inside the latter by converging movement of the leg ends **17** under finger pressure. Each of the claws has an arcuate front edge **27** and an arcuate back edge **29**, which merge into a pointed tip engageable under a staple to be removed. The arcuate edges **27** and **29** serve, respectively, to guide the claws beneath the staple and to extract the staple, in well known manner. As indicated on FIG. 3, the tips **28***a* of the inside claws **25***a* are desirably curved slightly inwardly, i.e., toward one another, and the tips **28***b* of the outside claws **25***b* are desirably curved slightly outwardly, to aid in guiding the claws into properly telescoped working relation.

The two claw members, moreover, are formed along backward parts of their base portion **26***a* and **26***b* with integral mating guide elements, such as sets of laterally spaced fins or high flanges **40***a* and **40***b* aligned with the respective claws **25***a* and **25***b*, which project inwardly into constantly telescoped, sliding engagement one with another so as to hold the claws in proper working alignment at all times. These elements by sliding one upon another guide the claws positively into telescoped relation and prevent them from being displaced laterally out of working alignment by finger pressures applied incorrectly to the ends of the legs **14** and **15** of the body web.

The claw members **12** and **13** are mounted securely in place on the respective legs **14** and **15** by means of molded parts on the inside of each leg which interfit with parts of the base portion of the corresponding claw member and enable the staple remover to be assembled by simple sliding movement of the claw members into fast engagement with such molded parts. In the illustrated embodiment as seen in FIG. 5, the backwardly extended base portion **30***a* or **30***b* of each claw member is bifurcated to define therein a central longitudinal slot **31** which is open at the backward end thereof, and the central flange **18** on the body web of the molding **11** is formed near the leg ends **17** with forward extensions **18***a* capped by head strips **32**, so as to provide on the inner side of each leg a molded structure of T-shaped cross-section (FIG. 4) which is slidably straddled by and overlies the forks of base portion **30***a* or **30***b*. The upright part **18***a* of this T-shaped structure fits into the slots **31** of a claw member slid thereupon, to hold the claw member against lateral displacement, and the head strip **32** holds the claw member fast against the inner surface of the leg.

At a suitable location to be occupied by the base of each claw member, the inner side of each end portion **17** of the molding **11** is formed with an integrally molded inward protrusion **33** (FIG. 2) that will fit into a mating aperture **34** (FIG. 5) formed in the base **26***a* or **26***b* of the respective claw member **12** or **13**. Each claw member thus is prevented from undergoing longitudinal displacement relative to the end of the leg **14** or **15** against which it is held by the elongated T-shaped flange means **18***a*, **32**.

When assembling a claw member to a leg of the U-shaped body web, the claw member is moved rearwardly over the inside of the free end portion **17** of the leg so as to slide the slot **31** of forked extension **30***a* or **30***b* upon and along the flange **18***a*, with the fork straddling this flange and being held securely against the inner surface of the molding by means of the head strip **32**. During such sliding movement of the claw member, the free end portion **17** of the leg **14** or **15** can flex outwardly sufficiently to enable the base portion of the claw member to be slid over the protrusion **33**. However, when the closed end of slot **31** comes into engagement with the end of flange **18***a* to limit rearward displacement of the claw member, the protrusion **33** comes into register with aperture **34** and is forced into the aperture by the flexed end portion of the leg **14** or **15**.

The staple remover according to this invention can be manufactured economically, being constituted only by a one-piece plastic molding and two metal claw members which can be rapidly assembled in working relation on the molding. Further, although the molding **11** can be composed of a relatively inexpensive elastomeric plastic material, the staple remover will operate reliably and will withstand rough usage without suffering impairment of its serviceability.

It is to be understood that the invention is not limited to details of the illustrated embodiment and that various modifications may be effected therein by one skilled in the art without departing from the fair scope of the invention, which is intended to be defined by the appended claims.

What is claimed is:

1. A staple remover consisting essentially of a one-piece molding of elastomeric plastic material comprising a resilient body web molded to a U-shape and staple removing claw members mounted in confronting, coacting relation on end portions of the legs of said body web, each of said end portions having on the inner side thereof integrally molded parts interfitting with parts of a base portion of one of said claw members for securing the claw member thereto, said molding including elastically bendable web means interconnecting said legs for normally holding them in position for the claws of said members to engage a staple, for guiding and resisting convergence of said legs by bending elastically under finger pressure applied to the outer sides of said end portions, whereby said claws will be telescoped so as to remove a staple, and for returning said legs to normal position upon release of such pressure.

2. A staple remover according to claim **1**, said web means comprising resilient web portions molded to the form of a cusp bridging the space between said legs at a location between said end portions and the base of said U-shaped body web.

3. A staple remover according to claim **1**, said web means comprising oppositely disposed arcuate web portions extending forwardly from respective junctions thereof with said legs, and joined together midway therebetween, at a location between said end portions and the base of said U-shaped body web.

4. A staple remover according to claim **1**, said body web having an inwardly directed medial flange extending along the legs and the base thereof to stiffen said legs so

that they will deliver bending forces produced by such finger pressure predominantly to said base.

5. A staple remover according to claim 4, said flange having a cut-out area therein at the middle of said base to concentrate such bending forces thereat.

6. A staple remover according to claim 1, each of said claw members having a substantially flat rigid base portion having an aperture therein and including an arm extended away from the claws thereof, said molded parts on each said end portion including flange means for slidably receiving said arm so as to hold the claw member tight against said end portion, and including a protrusion fitting into said aperture to prevent displacement of the claw member longitudinally relative to said end portion.

7. A staple remover according to claim 6, said arm being bifurcated and said flange means comprising a molded structure of T-shaped cross-section slidably straddled by and overlying the forks of said arm.

8. A staple remover comprising a body member formed by a web of molded elastomeric material and a staple removing claw member mounted on an end portion of said web, said claw member having a substantially flat base portion having an aperture therein and including an arm extended away from the claws thereof, said end portion having integrally molded parts on a side thereof for holding said claw member fast thereagainst, said parts including elongated flange means for slidably receiving and preventing transverse displacement of said arm and including a protrusion fitting into said aperture to prevent longitudinal displacement of the claw member.

9. A staple remover according to claim 8, said arm being bifurcated and said flange means comprising a molded structure of T-shaped cross-section slidably straddled by and overlying the forks of said arm.

10. A staple remover according to claim 1, each of said claw members having a base portion extended backwardly from the claws thereof and having integral guide means projecting inwardly from said base portion in mating, slidable engagement with such guide means of the other claw member to prevent displacement of the claws of said members out of working alignment.

11. A staple remover according to claim 10, said guide means comprising mating sets of laterally spaced fins aligned longitudinally with the claws of the respective claw members and constantly fitting slidably one upon another in telescoped relation.

12. A staple remover according to claim 1, said claws being formed in pairs to be moved one inside the other by convergence of said legs, the tips of the inside pair of claws being bent slightly inward and the tips of the outside pair of claws being bent slightly outward to aid in guiding the claws into telescoped relation.

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