

May 11, 1937.

H. G. ALLEN ET AL

2,079,672

STAPLE EXTRACTOR

Filed Dec. 28, 1934

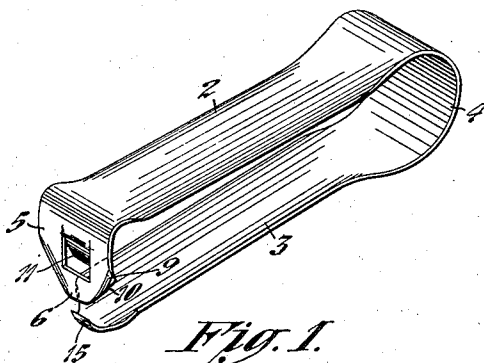


Fig. 1.

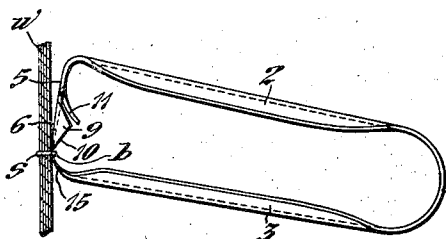


Fig. 2.

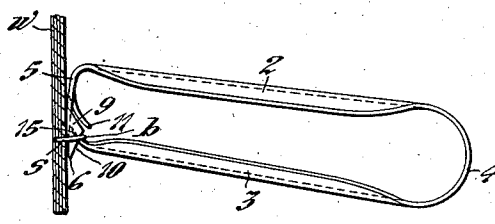


Fig. 3.

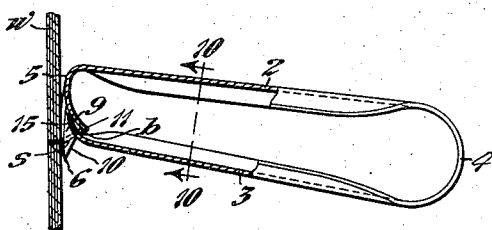


Fig. 4.

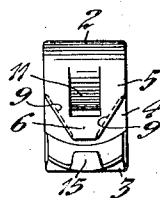


Fig. 5.

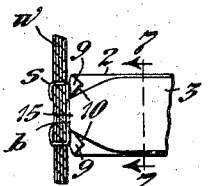


Fig. 6.

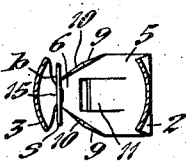


Fig. 7.

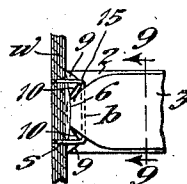


Fig. 8.

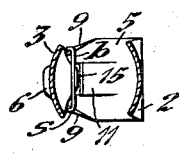


Fig. 9.

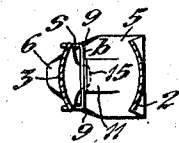


Fig. 10.

Inventors:
Herbert A. Bickford
and Howard G. Allen
By *Frederick J. Allen*
Attorneys.

UNITED STATES PATENT OFFICE

2,079,672

STAPLE-EXTRACTOR

Howard G. Allen, Edgewood, and Herbert A. Bickford, Warwick, R. I., assignors to Boston Wire Stitcher Company, Portland, Maine, a corporation of Maine.

Application December 28, 1934, Serial No. 759,528

7 Claims. (Cl. 254—28)

This invention relates to an implement for extracting or withdrawing staples and similar fasteners from articles held together or fastened thereby and particularly to a staple-extracting device of the same general character as that shown and described in United States Letters Patent No. 1,980,573, dated November 13, 1934.

The present invention consists in improvements in the construction and method of operation of the device which, in its preferred form, is constituted as a bowed spring adapted to be manually operated to extract the staples without mutilating or otherwise damaging the sheets of material or other articles fastened thereby.

One object of the invention is to provide a light-weight, compact device of the type indicated that may be used as a desk implement or carried in the pocket.

Another object of the invention is to provide a device of the type indicated having means for insertion under the head of a staple to press against the work and means having a relative sliding movement that cooperate to withdraw the staple.

Another object of the invention is to provide a device of the type indicated which is operative to withdraw or extract the staple by causing its clinched legs to be straightened whereby to prevent tearing or mutilating the paper or otherwise damaging the work.

Another object of the invention is to provide a device of the type indicated which is operative to extract or withdraw the staple without buckling or bending its head or crossbar so as to prevent tearing the paper or other material through which the staple is clinched.

Another object of the invention is to provide a simple and efficient device of the type indicated that is constructed from a single strip of sheet-metal struck up in a die and bent to the required shape whereby to eliminate assembling operations and reduce the cost of the article to a minimum.

Further objects of the invention are set forth in the following specification which describes a preferred form of construction of the device, by way of example, as illustrated in the accompanying drawing. In the drawing:

Fig. 1 is a perspective view of the present improved staple-extracting device;

Fig. 2 is a side elevation of the device showing the relation of the jaws in the first operation of extracting a staple;

Fig. 3 is a similar side view illustrating the

manner in which the staple is withdrawn from the work;

Fig. 4 is a similar side view, partly in section, showing the relation of the jaws at the completion of the staple-extracting operation;

Fig. 5 is an end view of the device with the jaws in the position shown in Fig. 1;

Fig. 6 is a bottom plan view of the device showing the jaws in the position indicated in Fig. 2;

Fig. 7 is a transverse sectional view through the device taken on line 7—7 of Fig. 6;

Fig. 8 is a bottom plan view of the device showing the jaws in the same position as illustrated in Fig. 3;

Fig. 9 is a transverse sectional view through the device taken on line 9—9 of Fig. 8; and

Fig. 10 is a similar transverse sectional view taken on line 10—10 of Fig. 4 showing the jaws in the position at the completion of the staple-extracting operation.

As before indicated, the invention is preferably embodied in a device constructed in the form of a bowed spring or loop to provide opposed handle members with jaws at their ends adapted for lateral relative movement with respect to each other when manual pressure is applied thereagainst. One jaw of the implement is provided with a beak-like blade adapted for insertion under the head or crossbar of a clinched staple and having inclined cam edges at its sides. The other jaw is constituted as a curved prying member for engaging the crossbar of the staple during the lateral relative movement of the jaws to cause its legs to be bent by the edges of the beak-like blade and pried upwardly from the work by the inclined cam edges.

In the preferred illustrated embodiment of the invention the staple-extracting device is constructed from a single strip of tempered metal struck up in a die and bent to the shape indicated in Fig. 1 of the drawing. As shown in this view, the device comprises opposed arms 2 and 3 which are joined at one end in a semicircular loop 4. The looped end 4 of the device forms, in effect, a pivot for the arms 2 and 3 to adapt them to be manually closed together or spread apart in the manner as later explained. The arms 2 and 3 are formed concavo-convex in cross-section along the greater portion of their length to strengthen the structure and provide smooth outer surfaces adapted to be conveniently grasped by the fingers in forcing the jaws together.

The end of the arm 2 is bent downwardly at a substantially right-angle to form a slightly curved backing plate having a beak or blade 5

at its end adapted to be inserted between the paper or other object and the head of the staple in removing the latter from the work. As shown most clearly in Fig. 4, the lower edge of the blade 5 is beveled to provide a knife-like edge prong 6 for facilitating its insertion between the head of the staple and the work. The corners of the blade 5 are bent or folded inwardly at right-angles to provide ears or projections 9 having edges 10 inclined with respects to the blade 5. The inclined edges 10 form cams or wedges along which the head or crossbar of the staple slides in the manner as later explained to cause it to be withdrawn from the work. Extending rearwardly from the blade 5 is a curved ear 11 which serves as a stop in the manner and for a purpose as later explained. The ear 11 is formed by slitting the blade and bending the metal between the sides of the slit rearwardly.

The arm 3 is narrowed down at its end and curled upwardly to provide a curved prying element 15 adapted to engage the head or crossbar of the staple during the staple-extracting operation. As shown in Figs. 1 and 4, the prying element 15 is adapted for movement past the end of the prong 6 and into sliding engagement with the inner face of the blade 5 between the projections 9. The under side of the element 15 is beveled to form a knife-like edge that engages the inner face of the prong 6 with a close sliding fit and insures engagement with the under side of the staple crossbar. The construction of the implement having now been described in detail its method of operation will next be explained.

Wire staples and similar fasteners are employed very generally for attaching papers and documents; securing tags and labels to articles of commerce, and in sundry other uses too numerous to mention. In some cases the staples are used as a permanent fastening means, but in other instances their use is temporary when it is desired to detach the papers or other articles. Various expedients have been tried for applying the staples to the work in such manner that they may be easily and conveniently removed, but in most cases such methods of clinching the staples result in an insecure fastening of the parts; and where the staples are inclined in the usual manner considerable difficulty has been experienced in removing them without tearing or mutilating the work.

With the present improved implement staples clinched in the usual way may be withdrawn from the work conveniently and expeditiously without danger of tearing the papers or otherwise mutilating the articles fastened thereby.

In operating the present device the arms 2 and 3 are grasped between the fingers and thumb in the usual manner with the jaws held apart due to the inherent resiliency of the bowed loop of the spring 4, as shown in Fig. 1. Holding the work *w* with one hand, the operator inserts the beveled prong 6 of the blade 5 under the crossbar *b* of the staple *s* in the manner illustrated in Fig. 2. When the prong 6 has been inserted beneath the head of the staple *s* in this manner the prying end 15 of the arm 3 will be spaced from the end of the prong 6 and it is only necessary to force the arms 2 and 3 toward each other to withdraw the staple in the manner as next explained.

As pressure is exerted on the arms 2 and 3 their free ends are forced together against the tension of the loop 4. During this action of the arms the beveled forward edge of the prying ele-

ment 15 is first moved into sliding engagement with the inner face of the blade prong 6 and to a position beneath the crossbar of the staple *s* in the manner illustrated in Figs. 2, 6 and 7.

As further pressure is applied against the arms 2 and 3 the laterally inclined edges or cams 10 on the blade 6 and the curved prying element 15 move inwardly toward each other and slide under the crosshead *b* of the staple *s* in the manner indicated in Figs. 3, 8 and 9. During this movement the crossbar *b* of the staple *s* is cammed or pried away from the work *w* and its legs are bent back and straightened while at the same time the sheets of paper or other articles are held from buckling or bending. Stated another way, the bent ends of the legs of the staple are forced apart through their engagement with the lateral edges of the prong 6 and thus are straightened without tending to tear or mutilate the paper sheets or other articles through which the staple is clinched. It has been demonstrated in practice, that the legs of the staple are so straightened and withdrawn from the work without tearing or greatly enlarging the holes through which the legs extend in their clinched position.

During the extraction of the staple in the manner as above explained its legs straddle the edges of the prying element 15 of the arm 3 so that the head of the staple is prevented from buckling and is pulled evenly as the element 15 moves across the blade 5. When the arms 2 and 3 are compressed to such an extent that the head or crossbar *b* of the staple *s* reaches the peak of the bent ears 9 the legs of the staple will be completely withdrawn from the work *w* as shown in Figs. 4 and 10. It will be seen by reference to these views that when the jaws are further depressed the head of the staple is carried into engagement with the inwardly projecting ear or stop 11 and held thereagainst by the prying end 15 of the arm 3. In this manner the staple may be held suspended and subsequently released therefrom to drop into a wastepaper basket or other receptacle when the jaws are opened out.

It will be observed from the foregoing that the present invention provides a convenient and efficient appliance for extracting clinched staples and similar fasteners when it is desired to detach the articles held together or fastened thereby. It will also be observed that the device is extremely compact, light in weight and simple in construction, being formed entirely from a single strip of sheet-metal struck up in a die and bent to the required shape whereby to eliminate assembling operations and reduce the cost of the article to a minimum. It will further be observed that with the improved construction of the present device the use of screws, pins, rivets, springs or other extraneous parts liable to become loosened and displaced is eliminated and the implement is therefore durable and capable of extended use without adjustment or repair.

While the device is herein shown and described as embodied in a preferred form of construction, it is to be understood that various modifications may be made in the structure thereof without departing from the spirit or scope of the invention. Therefore, without limiting the invention in this respect, we claim:

1. A staple-remover of the type indicated comprising a strip of resilient material folded to form opposed arms, inwardly directed cooperating members at the ends of the arms adapted for lateral movement with respect to each other, one of said members having a tapered backing face and

a cam projecting at an angle to the plane of the backing face, and a prying element on the other of said members, the backing face being adapted for insertion under the crossbar of a clinched staple to a position where the tapered sides engage the legs and the opposite prying member being adapted to move the crossbar on the cam to withdraw the staple by bending the legs about the edges of the backing plate.

2. A staple-remover of the type indicated comprising a strip of resilient material folded to form opposed arms, the end of one of the arms being folded inwardly to form a blade and the material of the blade bent to form a cam-surface projecting at an angle to the plane of the blade, the end of the other arm being formed with a prying member for engaging and moving the crossbar of a clinched staple against the cam-surface on the opposite arm to remove the staple.

3. A staple-remover of the type indicated comprising a rectangular strip of resilient material folded to form opposed arms, the end of one of the arms being bent inwardly and having its corners folded to form inclined cam-surfaces projecting at an angle to the plane of the inwardly bent end, the end of the other arm being cut away and adapted to engage the crossbar of a clinched staple and move between the cam-surfaces on the opposite arm to pry the crossbar against the inclining cam-surfaces to remove the staple.

4. A staple-remover comprising a strip of resilient material folded to form opposing arms, the ends of the arms being inwardly directed with the corners of one end of the strip being bent to form a tapered backing plate and inclined cam-surfaces, the end of the other arm being curved and tapered and adapted for movement between the bent corners on the opposite end for prying the crossbar of a clinched staple against the cam-surfaces.

5. A staple-remover comprising a strip of resilient material folded to form opposed arms, the end of one of the arms being inwardly directed and with the corners of the strip folded at an angle to the plane of the strip, the material at the rear of the folded corners being slit and extended to form a stop, and the material at the end of the other arm being cut away to adapt the end for movement between the folded corners and into engagement with the stop member.

6. A staple-remover of the type indicated comprising a rectangular strip of resilient material folded to form opposed arms, one of said arms being longer than the other with its end portion folded inwardly to form a backing plate underlying the end of the opposite arm, and the inwardly-folded backing plate having inclined cam-surfaces projecting at an angle to the plane of the backing plate, the end of the opposite arm being adapted to move the crossbar of a clinched staple against the inclined cam-surfaces to remove the staple.

7. A staple-remover of the type indicated comprising a rectangular strip of resilient material folded to form opposed arms, one of the arms being longer than the other with its end portion folded inwardly to form a backing plate underlying the end of the opposite arm, the inwardly-folded backing plate having inclined cam-surfaces at its opposite sides projecting at an angle to the plane thereof, the end of the opposite arm being adapted to move the crossbar of a clinched staple against the inclined cam-surfaces to remove the staple, and an abutment in the form of a lug struck up from the backing plate and engaged by the end of the opposite arm to hold the staple after it has been removed.

HOWARD G. ALLEN.

HERBERT A. BICKFORD.