March 21, 1967 J. R. BERRY 3,310,288

STAPLE REMOVER

Filed May 21, 1965

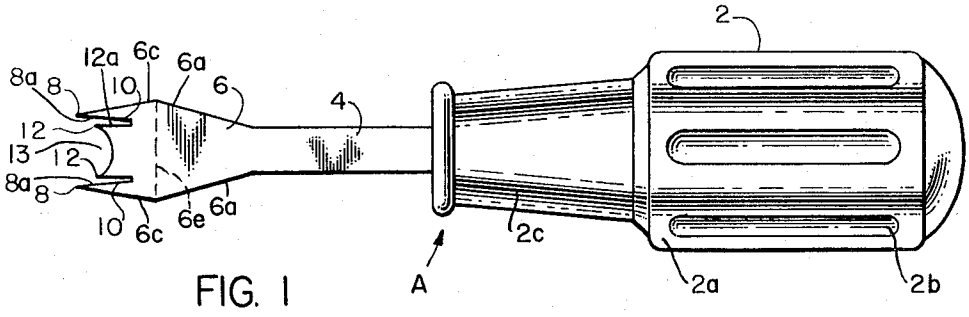


FIG. 1

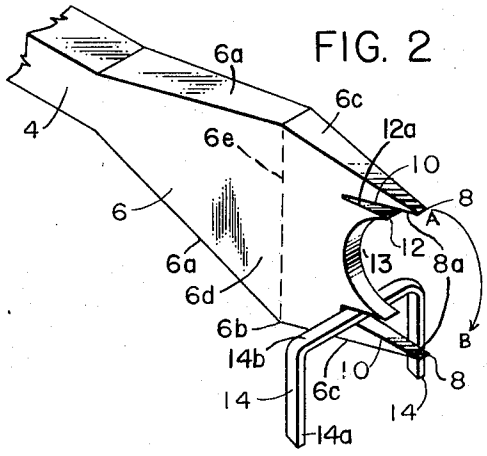


FIG. 2

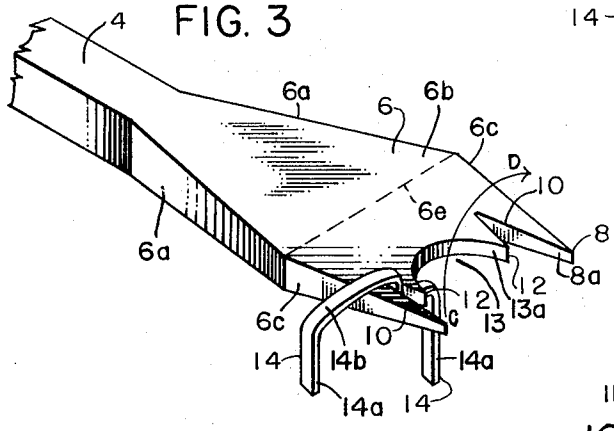


FIG. 3

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STAPLE REMOVER

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This invention relates to portable tools and more particularly relates to a staple remover.

It is an object of this invention to provide a new and improved tool for removing one member from another member.

It is a particularly important object of this invention to provide a new and improved staple remover.

It is a further object of the invention to provide a new and improved tool for removing staples from objects in which they are secured, such as wooden furniture framework, cardboard boxes, and the like.

It is still a further object of the invention to provide a staple remover which is sturdy, durable, and compact while being easily and inexpensively manufactured.

It is another object of the invention to provide a staple remover usable by an unskilled operator.

It is a further object of the invention to provide a staple remover which is manipulatable by one hand of an operator.

It is another object of the invention to provide a staple remover which initially partially pries a staple from a body in which it is secured and then firmly grasps the staple to minimize slippage between the staple and the remover while the staple is firmly lifted free of such body.

It is another object of the invention to provide a staple remover comprising a handle, a shaft, and a fork portion adapted to partially pry a staple from engaging relationship in an object and releasably firmly engage the staple while the staple is being lifted from the object.

It is another object of the invention to provide a staple remover having a fork portion including at least one knife point and at least one crimping point positioned in spaced relation relative to the knife point defining a staple receiving notch or recess therebetween.

It is another object of the invention to provide a staple remover having a head portion including a knife point and a crimping point which preferably is shorter than the knife point.

It is a still further object of the invention to provide a staple remover having a fork portion with the combination of a knife point and a crimping point formed along one lateral edge of the body of the fork portion which is of substantial width to provide a lever arm for lifting the staple from a body into which it is secured.

It is an additional object of the invention to provide a staple remover having a forked head portion of substantial width including a knife point and crimping point combination formed along each lateral edge of the head portion.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a side view in elevation of a staple remover embodying the invention;

FIGURE 2 is a fragmentary view in perspective of a portion of the shaft of the staple remover of FIGURE 1, and its fork or head after initial engagement of a staple; and

FIGURE 3 is a fragmentary view in perspective similar to FIGURE 2 after approximately 90 degrees' rotation of the staple remover illustrating the crimping of the staple preliminary to its removal.

Referring to the drawings, a staple remover A embodying the invention comprises a handle **2**, a shaft **4**, and a

head or fork **6**. The handle has a gripping portion *2a* which preferably is cylindrical in shape, is of a diameter to conveniently fit the hand of an operator, and has a plurality of longitudinally extending circumferentially spaced recesses *2b* to facilitate a firm grip of the handle by an operator. The handle has a tapered end portion *2c* into which the shaft **4** is fitted and secured by any suitable manner. It will be apparent that the handle may be formed of any suitable substantially rigid material, such as wood, plastic, metal, or hard rubber into which the shaft **4** is firmly secured.

The shaft has a generally square or rectangular cross section as apparent in FIGURES 2 and 3. The shaft and handle are interconnected and aligned relative to each other so that their longitudinal axes are coincident to provide optimum balance and ease of operation.

The fork or head **6** is formed integral with the shaft **4** and has endwardly divergent lateral edge surfaces *6a* adjoining at a location of maximum width *6b* endwardly convergent lateral edge surfaces *6c*. The fork is tapered toward its face end with respect to its thickness providing opposite side faces *6d* which are of substantial width as measured along a line of maximum dimension *6e* to provide a substantial moment arm, as discussed in detail below, for ease of removal of staples once they are engaged by the fork of the staple remover.

The fork **6** includes along its free end portion endwardly extending laterally spaced knife points **8** the outward side edge surface of each of which is defined by one of the edge surfaces *6c*. The fork also includes along its free end portion integrally formed endwardly extending, laterally spaced, crimping points **12**. Each of the crimping points is inwardly laterally spaced from an adjacent knife point **8** to define an endwardly opening notch or recess **10**. Each of the fork edge surfaces *6c* extends at such an angle with the longitudinal axis of the fork and shaft that such edge surface is parallel with the surface of the body into which a staple is secured while the handle is being held at a sufficient height above the body's surface that the hand of the operator is free for manipulating the staple remover. Each of the knife points **8** is defined by an outside edge surface *6c* and an inside edge surface *8a* which converge toward the free end of the knife point forming the pointed free end of each of the knife points. Each notch or recess **10** is defined by spaced endwardly divergent inside edge surfaces *8a* of a knife point and the outside edge surface *12a* of the adjacent crimping point. The central portion of the free end of the fork is provided with a circular recess portion **13** defined by a circular end edge surface portion *13a* extending between the end points of the crimping points **12** and thus defining the inside edge of each of the crimping points.

As discussed hereinafter, there is no basic operational relationship between the two sets of combination knife and crimping points and thus their lateral spaced relationship is determined by the breadth of the faces *6d* of the fork as measured primarily along the line of maximum dimension *6b*. This maximum dimension is sufficient for a staple to be lifted clear of the object from which it is pulled by rotation of the fork of the staple remover, as discussed below. It will be apparent that the spaced relationship of each pair of adjacent edge surfaces *8a* and *12a* defining each of the notches **10** is determined by the thickness of the material, generally wire, of which such staple is formed. The spacing between the adjacent edge surfaces *8a* and *12a* is, therefore, sufficient that each of the notches **10** fully receives the bight portion of the staple as apparent in both FIGURES 2 and 3.

The staple remover A is employed in a continuous integrated procedure for the removal of generally U-shaped staples, such as the staple **14** of FIGURES 2 and 3, from

a firm embedded relationship in bodies such as furniture, wood, boxes and the like. The initial step in the procedure of removing a staple with the staple remover is illustrated in FIGURE 2 which shows the engagement of the staple remover with the staple and the lifting or partial removal of the staple from the object in which it is secured. The staple remover is grasped firmly by either hand of the operator and positioned at an acute angle with the surface in which the staple is embedded with the side faces 6*d* of the head 6 generally perpendicular to the surface of the body, not shown, in which the staple is embedded. The lateral edge surface 6*c* of the fork along the knife point 8 adjacent to the body is placed on the surface of the body as apparent in FIGURE 2 and the longitudinal axis of the staple remover is aligned perpendicular to the bight portion 14*a* of the staple. With the staple remover oriented as described, it is moved by the hand of the operator toward the central portion of the staple bight with the free end point of the knife point being inserted underneath the bight of the staple between it and the surface of the body is which the staple is embedded. The knife point is advanced beneath the staple with the staple bight being lifted upwardly due to the wedging action of the knife point because of the angular relationship of its inside and outside edge surfaces 8*a* and 6*c*. The staple remover is forced toward the staple until, as shown in FIGURE 2, the bight portion of the staple is fully received within the notch 10 between the knife point and crimping point being employed. It will be apparent from FIGURE 2 that when the staple is fully received within the notch a portion of the staple is lifted from the surface of the body in which it is embedded a distance substantially equivalent to the thickness of the base end of the knife point at the inward end of the notch 10 in which the staple is received. In the case of a very rigid staple the entire staple is generally lifted, as shown in FIGURE 2, while a more flexible staple very firmly embedded in a body may bend along its bight portion with the leg portions 14*b* of the staple being little affected at this stage in the staple removal procedure.

After the partial engagement of the staple, as illustrated in FIGURE 2, the staple is fully, releasably, engaged by the fork 6 of the remover A as shown in FIGURE 3. The operator of the staple remover revolves his hand rotating the staple remover around its longitudinal axis moving the fork in a lateral direction until the upper free edge 6*c* of the fork of the staple remover is revolved downwardly substantially into engagement with the surface of the body in which the staple is embedded, as shown in FIGURE 3. It will be apparent that as the staple remover revolves laterally so that its upper free knife point 8 moves along an arcuate line A–B, FIGURE 2, to the position shown in FIGURE 3 the crimping point 12 engaged with the bight of the staple revolves about the lower knife point 8 engaging the staple with the bight of the staple being severally crimped, as apparent in FIGURE 3. The crimping of the staple bight shortens the effective length of the bight so that as the crimping point moves downwardly on the bight a portion of the bight is forced toward the direction of rotation of the fork of the staple remover partially pulling up the leg 14*a* of the staple away from the direction of movement of the remover fork. As apparent, the staple remover is rotated until its head or fork is substantially flat and the free revolving edge of the fork engages the surface of the body in which the staple is embedded.

At the position of the staple remover in FIGURE 3 the staple is fully crimped, the leg of the staple away from the direction of rotation of the remover is partially pulled from the body holding the staple, and the staple is tightly secured on the fork.

After the staple remover engaged with the staple is moved to the position of FIGURE 3, the last step in the staple removal procedure is effected to pull the staple completely free of the body in which it is secured. The hand of the operator rotates the staple remover from the position of FIGURE 3 about its longitudinal axis with the free edges 6*a* and 6*c* of the fork of the staple remover near their junction at the line 6*c* away from the staple engaging the surface of the body in which the staple is secured providing a pivotal axis for the fork while the edge of the fork at which the staple is secured to the fork is lifted through an arc defined by the line C–D, as apparent in FIGURE 3, until both legs of the staple are pulled completely free of the object.

The crimping of the staple as in FIGURE 3 is an especially important feature in the operation of the staple remover. The crimped relationship of the staple prevents its sliding through the notch 10 so that even though one of the staple legs is pulled free the staple is not spread open to release the remover fork before the other leg of the staple is lifted from its embedded relationship in a body.

The freed or removed staple is then disengaged from its secured, crimped, relationship with the knife and crimping points of the fork by any suitable means. For example, it is manually forced forward the free end of the fork to disengage it, or, if it is too severely crimped or bent around the fork to be manually removed, a suitable tool such as a screw driver is employed to dislodge it from the knife and crimping points.

It will now be seen that a new and improved portable tool has been described and illustrated.

It will be further seen that a new and improved staple remover has been described and illustrated.

It will be seen that the staple remover is useful for pulling staples from bodies in which they are secured, such as wooden furniture frameworks, cardboard boxes, and the like.

It will be further seen that the staple remover is sturdy, durable and compact while easily and inexpensively manufactured.

It will also be seen that the staple remover is operable by an unskilled operator.

It will be seen that the staple remover is manipulated by one hand of an operator.

It will be seen that the staple remover initially partially lifts a staple from a body in which it is secured and subsequently firmly grasps the staple by crimping it so that the staple remains engaged in non-slipping relationship with the remover while being lifted free of the body.

It will be seen that the staple remover comprises a handle, a shaft, and a fork or head portion adapted to initially partially pry a staple from embedded relationship in a body and to releasably firmly engage the staple while lifting it free of the body.

It will be further seen that the fork portion of the staple remover includes at least one knife point and at least one laterally spaced crimping point defining a staple receiving notch or recess between the knife and crimping points.

It will also be seen that a preferred form of the staple remover includes a crimping point which is shorter than the adjacent knife point.

It will be seen that a knife and crimping point combination is formed along a lateral edge of the body portion of the fork providing a substantial lever arm for lifting a staple from a body in which it is secured by rotation of the fork about a line along a lateral free edge of the fork opposite the edge supporting the knife and crimping points engaging the staple.

It will also be seen that one preferred form of the staple remover includes a fork substantially wide having a pair of spaced knife and crimping point combinations, each combination being located along a lateral edge of the fork.

It will be apparent that several alternate forms of various features of the staple remover may be employed. For example, the longitudinal recesses 2*b* and the gripping portion of the handle 2 may, if desired, be eliminated to provide a smooth cylindrical outer surface to such gripping portion. While a pair of the knife and crimping

point combinations is described and illustrated it will be apparent that the staple remover is operable with only a single knife and crimping point combination formed on a member having sufficient width to provide a moment arm for lifting the staple free of the body in which it is secured. The employment of a pair of laterally spaced knife and crimping point combinations is preferred to provide a spare in the event that one of the combinations is damaged in use.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

I claim as my invention:

1. A tool comprising: wedge means for engaging and partially lifting a staple from a body in which it is embedded; means supported in spaced relation with said wedge means defining a staple receiving recess with said wedge means and cooperating with said wedge means for crimping said staple upon rotation of said tool for releasably engaging said tool with said staple; body means supporting said wedge means and said crimping means and providing structure for a moment arm for said wedge and crimping means whereby an edge of said body means opposite said wedge and crimping means is engageable with said body in which said staple is embedded for lifting said staple free of said body; and means connected with said body means for holding and manipulating said tool.

2. A staple remover as defined in claim 1 wherein said staple engaging means comprises a wedge shaped knife point and said crimping means comprises a substantially wedge shaped crimping point.

3. A staple remover comprising: handle means; shaft means secured at one end to said handle means; head means at the other end of said shaft means; knife point means formed on said head means extending in an opposite direction to said handle means; crimping point means formed on said head means extending in substantially the same direction as and spaced from said knife point means; said knife point means and said crimping point means defining a staple receiving recess therebetween; said knife point means being adapted to engage and partially lift a staple from embedded relationship in a body; and said crimping point means being adapted to coact with said knife point means for crimping said staple upon rotation of said staple remover about a longitudinal axis thereof for releasably engaging said staple and lifting said staple free from said embedded relationship.

4. A staple remover as defined in claim 3, wherein said knife point means comprises a wedge shaped portion of said head member defined by a lateral edge convergent toward a free pointed end and said head member is of substantial width relative to the thickness of said member whereby a staple is lifted from a body in which it is embedded upon rotation of said tool about a longitudinal axis along a free lateral edge of said head member engaging the surface of said body in which said staple is embedded.

5. A staple remover as defined in claim 4 wherein said knife point is longer than said crimping point.

6. A staple remover comprising: a handle; a shaft secured along one end portion to said handle; a fork member secured at one end thereof with the other end of said shaft, said fork member, said shaft, and said handle being substantially aligned along a common longitudinal axis; said fork member having one dimension perpendicular to said longitudinal axis substantially greater than another dimension perpendicular to said first dimension and said longitudinal axis whereby said fork member is substantially wider than its thickness thereof; said fork member having formed along a lateral edge a wedge shaped knife point for engagement of a staple and partial removal of said staple from a body in which said staple is embedded, said knife point extending in alignment with said longitudinal axis to a pointed free end in a direction opposite the direction of said shaft; and a crimping point formed on said fork member having a pointed free end extending in substantially the same direction as said knife point and laterally spaced inwardly therefrom to provide a notch between said crimping point and said knife point.

7. A staple remover as defined in claim 6 having a knife and crimping point combination along each lateral edge of said fork member and wherein the lateral edge surfaces of said knife points are convergent toward each other toward the free ends of said knife points.

8. A staple remover as defined in claim 7 wherein each of said crimping points is shorter than each of said knife points.

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