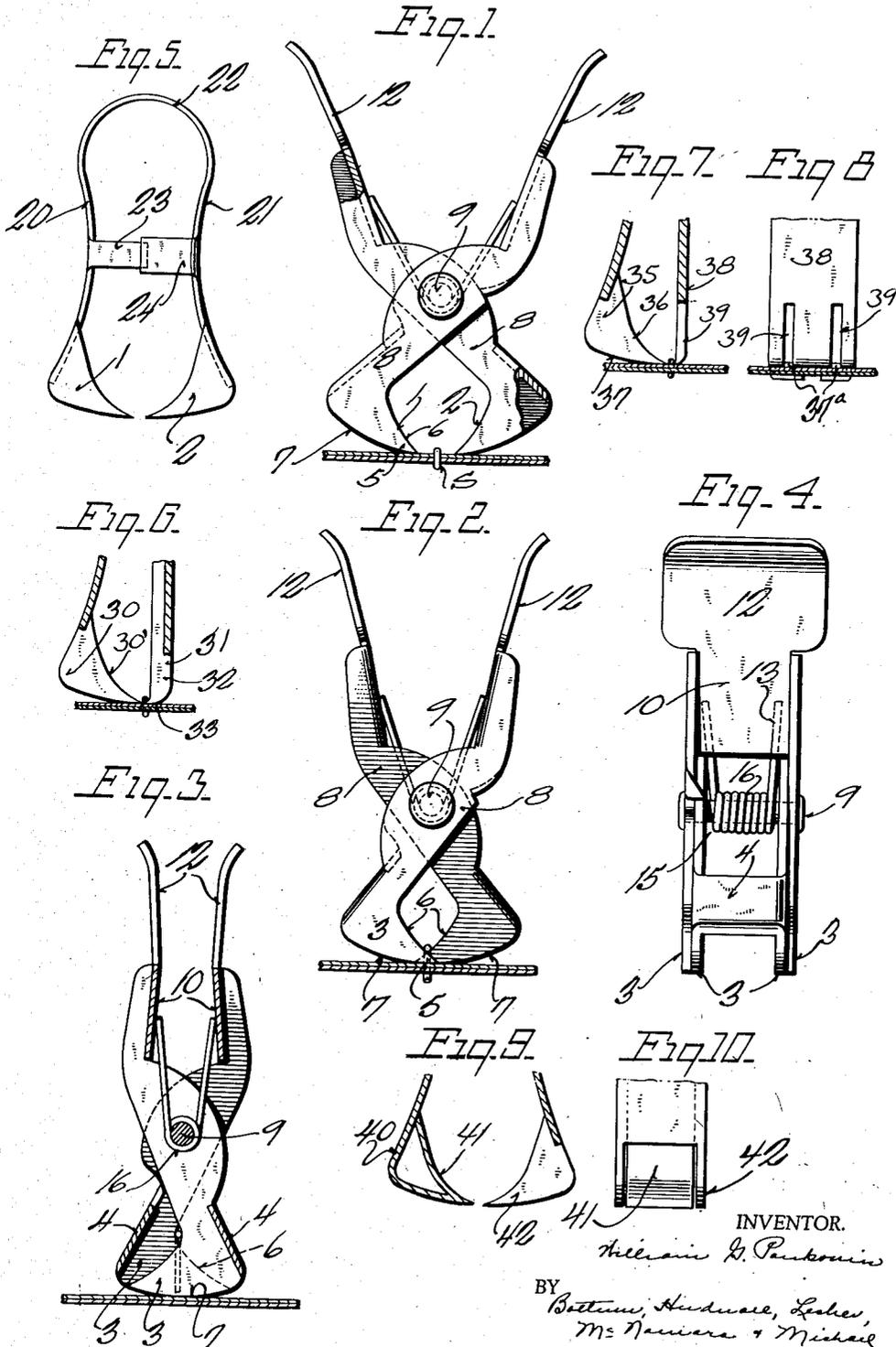


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TOOL FOR REMOVING STAPLES

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TOOL FOR REMOVING STAPLES

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21 Claims. (Cl. 254—28)

This invention relates to a device for removing staples or similar fasteners from paper, drawing boards, and the like.

An object of the invention is to provide a device of this character which may be conveniently utilized to quickly remove staples or similar fasteners from paper without tearing or mutilating the paper, and also from drawing and artist boards and wherever tacking is required.

Another object is to provide a device having these advantages and capacities and which is extremely simple and durable in its construction, readily and easily operated and comparatively inexpensive to manufacture.

The device may be made up in the form of a hand tool or implement or, if desired, may be made to constitute an appurtenance of a stapling machine or device. In any event, the preferred construction embodies a pair of opposed jaws, one of which, at least, has camming means engageable with the body of the staple and also an anvil across which the bent legs of the staple are straightened as the body of the staple rides up along said camming means under the influence of the combined action of said jaws.

Other objects and advantages reside in certain novel features of the construction, arrangement and combination of parts which will be hereinafter more fully described and particularly pointed out in the appended claims, reference being had to the accompanying drawing forming a part of this specification, and in which:

Figure 1 is a view in side elevation with parts broken away and shown in section and illustrating a staple removing device embodying the present invention and positioned as at the beginning of a staple removing operation;

Figure 2 is a view in side elevation showing the action of the device during the operation of removing a staple;

Figure 3 is a view in central vertical section illustrating the device as positioned at the completion of a staple removal operation;

Figure 4 is a view in end elevation;

Figure 5 is a view in side elevation showing a modified form of staple removing device;

Figure 6 is a fragmentary view in elevation showing a modified jaw formation which may be employed with any of the various types of tool structures;

Figure 7 is a fragmentary view in side elevation showing still another modified jaw formation;

Figure 8 is a view in end elevation of the modification viewed in Figure 7;

Figure 9 is a fragmentary view in side elevation showing a third form of jaw structure; and Figure 10 is a view in end elevation of the modification viewed in Figure 9.

Referring to the drawing, and more particularly to the form of the invention shown in Figures 1 to 4, it will be seen that the device includes a pair of similar though oppositely disposed jaws designated at 1 and 2. The jaws may be constructed of sheet metal and each consists of a pair of jaw members 3 connected and held in spaced relation at their lower ends by an integral connecting strap 4. Each jaw member has parallel plane vertical sides and upper and lower camming surfaces 6 and 7, respectively, enlarging outwardly and upwardly from the point of intersection 5.

Integral with the jaws are levers designated at 8, the levers associated with the jaw 1 crossing the levers associated with the jaw 2 and being pivotally interconnected therewith by means of a pivot pin 9. The levers of the members of the jaw 1 are cross connected by an integral web or plate 10 and the levers connected with the jaw members 2 are similarly interconnected. The webs 10 are enlarged and shaped at their upper ends to provide handle portions 12.

A light spring designated generally at 15 has a coiled portion 16 mounted on the pivot 9 and has its end portions 13 engaging the webs 10, the spring being tensioned to tend to spread or separate the jaw members.

In lieu of the crossed lever arrangement shown in Figures 1 to 4, the jaw members 1 and 2 may be connected to the lower ends of levers 20 and 21, which are formed from the same piece of metal as the jaw members and are connected at their upper ends by bowed portion 22. Intermediate their ends the levers 20 and 21 may be provided with interengaging guide strips 23 and 24 functioning to maintain the jaws aligned. In this construction the inherent resiliency of the levers 20 and 21 and their connecting portion 22 separates the jaw members but the jaw members may be readily brought together by gripping the levers 20 and 21 and thereby flexing the portion 22.

The operation of the jaws is the same in either embodiment of the invention. As illustrated in Figure 1, when the staple designated at S is to be removed, the tool is placed over the same with one jaw on one side of the staple and the other jaw on the other side. The handles 12 are then grasped and pulled together. This causes

the ends of the jaws to pass in between the body portion of the staple and the paper, the body portion of the staple riding up the cam surfaces 6 of the jaws as the jaws move into overlapping side by side relation. At the same time the surfaces 7 of the jaws are pressed to that portion of the paper lying immediately above the bent legs of the staple and provide an effective anvil action as to these legs whereby as the body portion of the staple is pulled upwardly, the legs ride across the paper supported by the anvil and are straightened out. In this way the staple is quickly, easily and cleanly removed without mutilating or tearing the paper. It is to be understood that the device may be used for pulling staples out of any material and is, of course, not restricted to pulling staples out of paper.

When the tools are employed for pulling staples out of artists' boards, drawing boards or other articles in which the staples are driven without their legs being clinched or bent the camming surfaces coact with the body portions of the staples to draw or pull the staples out of the boards but the necessity of straightening the legs is not present so that the anvil surfaces merely ride across the face of the board.

The particular formation of the jaws may be widely varied. As illustrated in Figure 6, one jaw designated generally at 30 has the formation previously described and shown as characteristic of both jaws in the embodiment of the invention shown in Figures 1 to 5, whereas the other jaw designated at 31 has each of its members formed with a straight body portion designated at 32 and a small point designated at 33. The jaw 31 is designed to hold down the material and the bent portions of the staple legs while the other jaw 30 has as its predominant function that of a camming jaw since the camming surface 30' of each of its jaw members is applied underneath the body portion of the staple and cams the body portion away from the material and in instances where the legs of the staples are clinched or bent cooperates with the jaw 31 in straightening the legs of the staple sufficiently to provide for its clean removal from the paper or other material.

The jaw formation shown in Figures 7 and 8 includes a camming jaw 35, each jaw member 37^a of which has a camming surface 36 and an anvil surface 37 of the same type as that of the jaws illustrated in Figures 1 to 5 but the cooperating jaw 38 is in the form of a straight plate having vertical slots 39 which receive the jaw members 37^a. The plate-like jaw 38 provides an abutment for one side of the body portion of the staple so as to hold the same in position for proper coaction with the camming jaw 35.

The jaw formation shown in Figures 9 and 10 consists of a camming jaw designated generally at 40 in which the camming surface 41 is formed by bending the metal of the jaw back upon itself. Cooperable with this camming jaw 40 is a slotted camming jaw 42. The jaw 42 is so dimensioned and has a slot of such size that it straddles the camming jaw in the operation of removing the staple.

While I have shown and described constructions in which my invention may be embodied, it is to be understood that these constructions have been selected merely for the purpose of illustration and that various changes in the size, shape and arrangement of the parts may be made without departing from the spirit of the invention or the scope of the subjoined claims.

The invention claimed is:

1. A device of the character described comprising cooperable jaws, at least one of said jaws having an upper camming surface and a lower camming surface functioning as an anvil, and means for bringing said jaws into overlapping side by side relation and with said camming surfaces in between the bridge of the staple and its bent legs to pull the staple out of the material with which it is engaged and to straighten out the legs of the staple during such pulling action.

2. A device of the character described comprising a pair of pivotally interconnected levers, each lever having at one end a pair of jaws, the jaws of one lever being oppositely disposed with respect to the jaws of the other and being positioned so as to be brought into overlapping relation when the levers are appropriately actuated each of said jaws having a point adapted to be inserted between the body portion of the staple and a bent leg thereof, each of said jaws also having beyond said point a camming surface and a surface functioning as an anvil whereby when the jaws are moved into overlapping relation between the staple and its bent legs they will pull the staple out of the material in which it is engaged and straighten out the bent legs of the staple by the reaction of said anvil surfaces during such pulling action.

3. A staple removing device comprising cooperating parts, camming means contained on one part of the device, a backup holding member on the other part of the device, the camming means interfitting and being cooperable with the backup holding member, said means and member being engageable with a staple whereby relative movement thereof causes the staple to ride said camming means and be vertically removed from the material.

4. A staple removing device comprising cooperating staple engaging parts, one of which has camming means insertable under the body portion of the staple and the other of which is engageable with the staple to cause it to ride along said camming means and be removed by the relative movement of said cooperating staple engaging parts.

5. A staple removing device comprising cooperating staple engaging parts, one of which has a pointed jaw member adapted to be inserted under the body portion of the staple and provided with a camming surface engageable with the staple to pull it out of the material which it penetrates and an anvil surface engageable with said material, said other part being engageable with said staple to cause it to slide up said camming surface and be removed by relative movement of said cooperating parts.

6. A staple removing device comprising cooperating staple engaging parts, one of which has a pointed jaw member adapted to be inserted under the body portion of the staple and provided with a camming surface engageable with the staple to pull it out of the material which it penetrates, and an anvil surface engageable with said material, said other part being engageable with said staple to constrain it to coact with said pointed jaw member and being slotted to allow said jaw member to move into overlapping relation therewith during the staple removing operation.

7. A staple removing device comprising a jaw including a pair of pointed jaw members insertable under the body portion of a staple and hav-

ing camming surfaces adapted to pull the staple out of the material which it penetrates and a cooperable staple back-up member having means engageable with the staple to constrain it to respond to the action of said jaw members and having a slot receiving said jaw members as they pull the staple out of the material.

8. A staple removing device comprising a jaw including a pair of pointed jaw members insertable under the body portion of a staple and having camming surfaces adapted to pull the staple out of the material which it penetrates and a cooperable staple back-up member having its lower end formed to engage the staple and constrain it to respond to the action of said jaw members and having spaced vertical slots through which said jaw members pass during the staple removing operation.

9. A staple removing device comprising oppositely disposed cooperable jaws both having upper and lower camming surfaces adapted to be inserted between the body portion of the staple and the material which the staple penetrates and to simultaneously press upwardly on said body portion and downwardly on said material as the jaws are brought together whereby to pull the staples out of said material and to straighten the legs of the staple if necessary to the staple removing operation.

10. A staple removing device comprising cooperable staple engaging parts, one of which is formed of sheet metal bent back upon itself to provide a pointed jaw member having a camming surface adapted to be inserted beneath the body portion of a staple and to pull the staple from the material which it penetrates and the other of which staple engaging parts has means engageable with the staple to force it to move up said camming surface whereby the combined relative movement of said parts removes the staple.

11. In a staple removing device, a jaw having plane parallel vertical sides and upper and lower camming surfaces and adapted to be inserted beneath the bridge of a staple, means cooperable with said jaw and with the said bridge to cause one of said camming surfaces to exert a continuing lifting force on said bridge immediately adjacent the legs thereof.

12. In a staple removing device, a jaw having plane parallel vertical sides and upper and lower camming surfaces and adapted to be inserted beneath the bridge of a staple, means cooperable with said jaw and with the said bridge to cause one of said camming surfaces to exert a continuing lifting force on said bridge immediately adjacent the legs thereof and the other of said camming surfaces to exert a force effective to straighten the bent legs of sheet binding staples.

13. A staple removing tool comprising a pair of cooperable jaws, camming surfaces on said jaws, the camming surfaces of one jaw being oppositely and symmetrically related to the camming surfaces of the other jaw, said surfaces adapted to be placed between the bridge of a staple and the material to which the said staple has been stapled whereby relative movement of said jaws will remove said staple.

14. In a staple removing tool, a pair of cooperable jaws, one of said jaws having a pair of spaced apart pointed wedge-shaped teeth, said points being insertable underneath the body portion of a staple and adjacent the leg portions

thereof, the other of said jaws cooperating when said jaws are brought together to force said first-mentioned jaw forward under said body portion thereby causing a vertical lifting action on said staple completely removing it from the material.

15. A staple removing tool comprising a jaw member having a wedge-shape tooth insertable between the body portion of a staple and material to which said staple has been stapled and a second member having slotted means adapted to receive said tooth and said slotted means cooperating with said tooth as said members are brought together to remove said staple from said material.

16. A staple removing device comprising a movable jaw member having spaced teeth insertable between the bridge portion of a staple whose legs have been clinched or straightly driven into material and a slotted member adapted to receive said teeth and cooperating with said spaced teeth as said members are brought together to extract said staple from said material.

17. A device of the character described comprising upwardly sloping camming means engageable with the body of a staple, means engageable with said body portion to cause said portion to ride over said camming means, and an anvil exerting a downward pressure against the bent legs of the staple to straighten said bent legs as the body portion of the staple rides along said camming means.

18. A staple removing tool formed from a single piece of metal, said piece having projecting ears on one end thereof, said ears being folded inwardly and the edges thereof forming upwardly inclining camming surfaces, said strip being bowed at its central portion to bring said other end in opposite relation to said camming surfaces, said other end and said camming surfaces being adapted to engage a staple between themselves and remove the same upon being moved together.

19. In a staple removing device, cooperable members, one of said members having an anvil surface and upwardly inclining camming surfaces another of said members movable toward said first member and in between said camming surfaces, said members adapted to engage the body portion of a clinched staple and remove said staple upon being moved together.

20. In a staple removing device, cooperable members, one of said members having means adapted to press downwardly against material immediately adjacent the points at which the legs of a driven staple penetrate said material and a plurality of upwardly inclining camming surfaces, another of said members movable toward said first member and in between said camming surfaces, said members adapted to engage the body portion of said driven staple and remove said staple upon being moved together.

21. In a staple removing device, cooperable jaws, one of said jaws having spaced vertically extending members, the upper surfaces of which are inclined to provide a pair of spaced cams engageable with the underside of the bridge of a driven staple, the other jaw being swingable in between said members and being engageable with the bridge of the staple and thereby cooperable with said cams to pull upwardly on said staple as the jaws are swung toward each other.

WILLIAM G. PANKONIN.

CERTIFICATE OF CORRECTION.

Patent No. 2,033,050.

March 3, 1936.

WILLIAM G. PANKONIN.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, lines 39 and 40, claim 10, strike out the words "whereby the combined relative movement of said parts removes the staple" and insert instead and be removed by relative movement of said cooperable parts; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of April, A. D. 1936.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.