

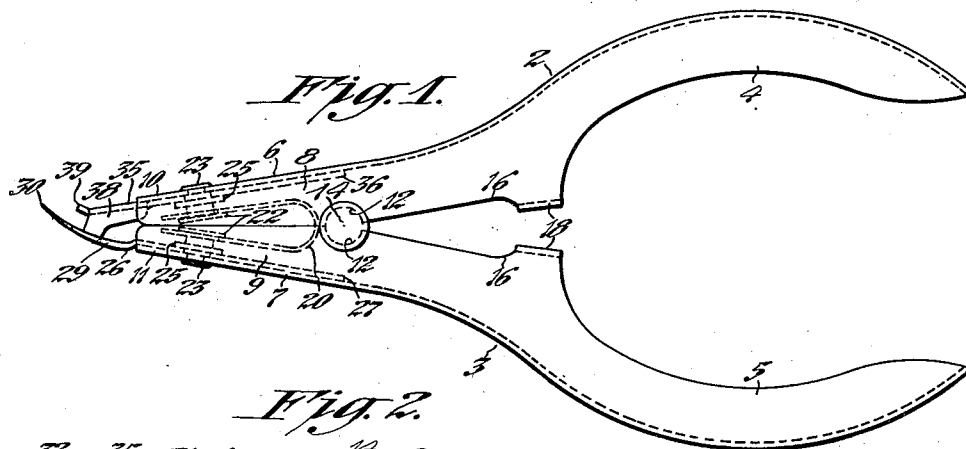
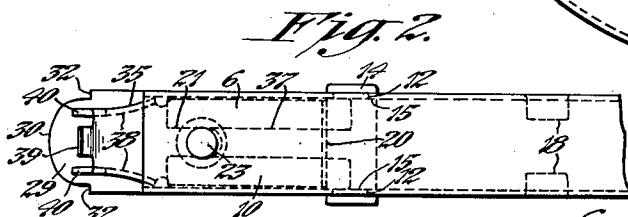
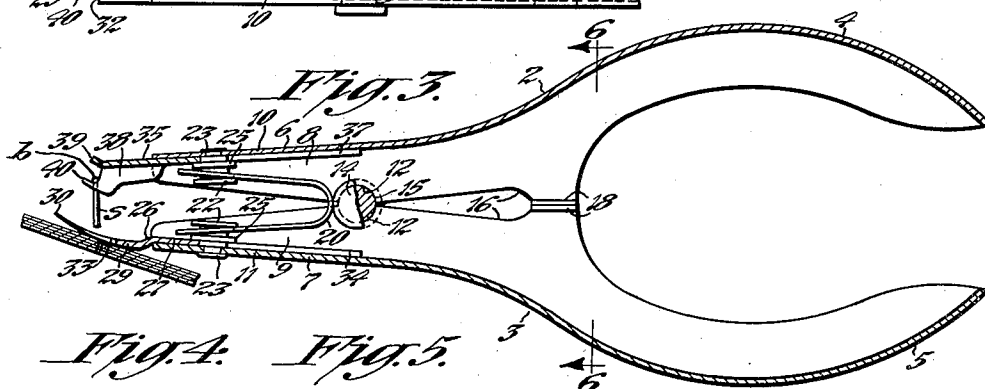
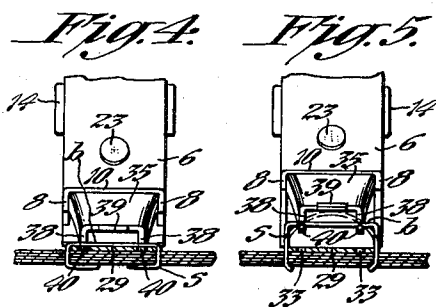
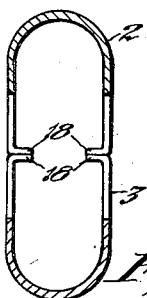
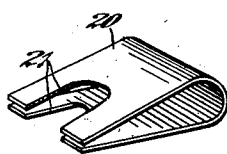
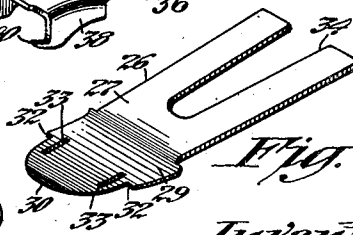
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STAPLE EXTRACTOR

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UNITED STATES PATENT OFFICE

1,956,166

STAPLE EXTRACTOR

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13 Claims. (Cl. 254—28)

This invention relates to an implement for extracting or withdrawing staples and similar fasteners from articles fastened together or held thereby and particularly to a staple-extracting device of the same general character as that shown and described in my copending application for U. S. Letters Patent, Serial No. 581,818, filed December 18, 1931. 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 plier-like implement 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 small, light-weight, compact device of the type specified which 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 specified having means for insertion under the head of the staple to press against the work and other means movable relatively thereof to withdraw the staple without crinkling or buckling the paper or damaging the work.

Another object of the invention is to provide a device of the type specified which is operative to withdraw or extract the staple by causing its clinched legs to be straightened without tearing or mutilating the paper or other articles held by the staple.

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

Another object of the invention is to provide a device of the type specified in which the staple-extracting elements are detachably mounted on the jaws of the implement to provide for their convenient removal whereby other elements of different dimension may be substituted in their place for operating on staples and fasteners of varying size and shape.

Another object of the invention is to provide a simple and efficient device of the type specified comprised of a minimum number of sheet-metal parts adapted for economical manufacture and readily assembled without the use of tools.

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 by the accompanying drawing. In the drawing:

Fig. 1 is a side elevation of the present improved staple-extracting device showing the parts in normal position;

Fig. 2 is a plan view of the forward part of the implement;

Fig. 3 is a view similar to Fig. 1 illustrating the relationship of the various parts at the completion of the staple-extracting operation;

Fig. 4 is an end view of the device looking toward its jaws and illustrating the parts in position at the first operation of extracting a staple;

Fig. 5 is a similar view showing the parts in position as the staple is being withdrawn from the work;

Fig. 6 is a cross sectional view through the handles of the device, taken on line 6—6 of Fig. 3 and showing the means for limiting the movement of the handles;

Fig. 7 is a perspective view of the staple-extracting element of the device;

Fig. 8 is a perspective view of the work-engaging beak or blade; and

Fig. 9 is a perspective view of the spring-element employed for drawing the jaws of the device together.

As before indicated, my invention is preferably embodied in a device taking the form of a pair of pliers having pivoted jaws which are movable relatively of each other under manual pressure on their handles. One jaw of the implement is provided with a beak-like blade adapted for insertion under the head or crossbar of the staple and the other jaw carries hook-like projections or prongs normally seated in recesses in the blade and adapted to be separated with respect thereto to pry the staple out of the work as the blade is pressed thereagainst.

To render the device light in weight and economical to manufacture its parts are preferably constructed of sheet-metal struck up in dies and shaped to the form as hereinafter described. The main operating members 2 and 3 of the pliers are of conventional shape, being of channel form with curved handles 4 and 5, preferably of semicircular contour in cross section as shown in Fig. 6 of the drawing. The opposed jaws 6 and 7 of the members 2 and 3 of the pliers are also of channel-like construction having opposite parallel side walls 8 and 9 with relatively flat connecting portions 10 and 11 arranged in opposite relationship and carrying the two operating elements of the staple-extracting means to be later described.

The members 2 and 3 are pivotally connected to

adapt their jaws 6 and 7 to be opened or spread apart during the staple-extracting operation. As shown in Figs. 2 and 3 of the drawing, the side walls 8 and 9 of the jaws 6 and 7 are provided with semicircular apertures 12, the edges of which are received in circumferential grooves 15 formed at the ends of a pivot-stud 14. The edges of the apertures closely fit within the grooves 15 in the stud 14 so that the latter, in addition to serving as a pivot for the members 2 and 3, acts to prevent both longitudinal and lateral displacement thereof. Rearwardly of the pivot-stud 14 the side walls 8 and 9 are cut away at 16 to provide clearance so that the handles 4 and 5 may be drawn together in the manner as illustrated in Fig. 3. Referring now to Fig. 6, ears or lugs 18 are bent inwardly from the side walls 8 and 9, being adapted to contact to act as stops for limiting the movement of the handles 4 and 5 at the completion of the staple-retracting operation. Movement of the handles 4 and 5 in the opposite direction is limited by the engagement of the upper and lower edges of the side walls 8 and 9 of the jaws 6 and 7, see Fig. 1.

A folded spring-element 20 positioned between the jaws 6 and 7 serves as the means for connecting the two members 2 and 3 and acts to yieldingly hold their jaws 6 and 7 in closed relationship with the edges of the side walls 8 and 9 thereof in abutting engagement. The spring-element 20, shown in detail in Fig. 9, consists of a strip of tempered metal folded into U-shape with the sides of the U converging toward its open end to conform to the portions 10 and 11 of the jaws 6 and 7 when the latter are in closed position. The opposed ends of the U-shaped spring 20 are provided with slots 21, the edges of which engage under the heads 22 of a pair of studs 23 projecting inwardly from the portions 10 and 11 of the jaws 6 and 7. The reduced ends of the studs 23 are riveted through holes in the portions 10 and 11 of the jaws 6 and 7 and spaced at a distance from their heads 22 are peripheral flanges 25 employed for a purpose as later explained.

In assembling the parts of the device thus far described the spring 20 is first inserted between the jaws 6 and 7 with its slotted ends engaging the studs 23. The pivot-stud 14 is then placed in position across the side walls 8 and 9 of the members 2 and 3 with the edges of their apertures 12 engaged with the grooves 15 therein. In this relationship the stud 14 engages the folded end of the spring 20 to act as a retainer for preventing displacement of the spring.

A blade-like member 26, shown in detail in Fig. 8, is mounted on one of the jaws of the device to be pressed against the paper or other work in removing a staple or fastener therefrom. The blade member 26 is constituted by a relatively flat sheet-metal strip 27 adapted to fit within the channel-like jaw 7 of the implement to be releasably secured thereto in the manner as later explained. The forward end of the blade 26 is offset downwardly to a slight extent and curved upwardly in arcuate shape to form a beak 29 terminating in a rounded point 30. The under side of the beak 29 is beveled or tapered toward its point in the manner of a knife-blade to provide for its convenient insertion under the head or crossbar of the staple to be extracted. Preferably, the blade 26 is formed on its lateral edges with abutments or shoulders 32 which are adapted to engage the sides or legs of the staple to serve as stops for the beak 29 as it is inserted under the head of the staple. The beak 29 of the blade 26 is provided

with opposite parallel slots or openings 33 which are used for a purpose as later explained.

The rearward end of the blade 26 is provided with a longitudinally-extending slot 34, the edges of which are adapted to engage the sides of the stud 23 in the jaw 7 when the blade is inserted therein. It will be observed by reference to Fig. 8 that the sides of the bifurcated portion of the blade 26, formed by the slot 34, diverge outwardly toward its rearward end to provide that when the blade is slid into the jaw 7 the sides will be compressed by engagement with the side walls 9 of the jaw to frictionally grip thereagainst. The blade 26 engages the stud 23 between its flange 25 and the wall 11 of the jaw 7 to bind it against the latter and the spring action of its bifurcated portion causes it to grip the sides of the jaw to retain it in place.

Removably mounted on the opposite jaw 6 is a member 35 which constitutes the prying means for withdrawing the staple from the work. The member 35, shown in detail in Fig. 7, comprises a bifurcated plate-portion 36 similar in outline to that of the blade 26 and having a longitudinal slot 37 with the sides formed thereby diverging outwardly toward its rearward end. The member 35 is inserted into the jaw 6 with its sides embracing the stud 23 between the flange 25 and the wall 10 and with the bifurcated portion compressed to frictionally engage the sides 8 of the jaw.

The member 35 is narrowed at its forward end and formed with flanges 38 bent downwardly from its sides. The bottom portions of the flanges 38 are extended forwardly to form projecting hook-like prongs 40 of curved outline which normally seat in the openings 33 in the beak 29 of the blade 26. In this position the prongs 40 are adapted to be inserted under the head of the staple as the beak 29 is slid thereunder in the manner as later more fully set forth. The member 36 is formed at its forward end with a projecting ear or lug 39 bent upwardly from the plane of its top portion. The ear 39 serves as a guard for preventing the head or cross-bar of the staple from buckling or bending upwardly excessively during its removal from the work. The method of operation of the device is as next explained.

Wire staples and similar fasteners are employed very generally for attaching papers and documents and also for many other purposes such as attaching tags and labels to articles of commerce, tacking sheets of paper to drawing-boards, fastening curtains to rollers, matting and the like to floors 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 clinched in the usual manner it has been well nigh impossible to remove them from the work without tearing or mutilating it.

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 device the handles 4 and 5 of the pliers

are grasped in the hand in the usual manner with the jaws held normally in closed relationship by the spring 20 as shown in Fig. 1. With the jaws closed the prongs 40 are depressed within the slots or openings 33 of the beak 29. Holding the work with one hand, the operator simply inserts the curved sharpened beak 29 of the blade 26 under the crossbar *b* of the staple *s*, see Fig. 4, and slides it forwardly with a rocking action until the lateral shoulders 32 on the blade bring up against the legs of the staple. With the parts of the device in this position the hook-like prongs 40 will be located beneath the crossbar *b* of the staple *s* at points adjacent the legs thereof and it is then only necessary to force the handles 4 and 5 toward each other to withdraw the staple in the manner as next explained.

As pressure is exerted on the handles 4 and 5 of the pliers its opposed jaws 6 and 7 will be forced apart against the tension of the spring 20. During this operation the blade 26 is pressed against the top of the work and the prongs 40 will be drawn away therefrom to pry the staple out of the work in the manner indicated in Fig. 5. The ear 39 on the forward end of the member 35 acts as a guard for engaging the head of the staple to prevent excessive buckling thereof, whereby the prongs 40 will retain their grip to pull both legs out at the same time; this action being illustrated by dash lines in Fig. 5. As the staple is withdrawn in this manner the clinched ends of its legs are bent back and straightened, due to the pressure of the blade 26 against the work, and 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 blade 29 and thus they are straightened without tending to tear or mutilate the paper sheets or other articles through which the staple is withdrawn. As has been demonstrated in practice, the legs of the staple will be straightened and withdrawn through the work without tearing or greatly enlarging the holes through which the legs have been clinched. The device thus provides a most convenient and efficient appliance for extracting staples and similar fasteners where it is required to detach the articles held together or fastened thereby.

It is to be observed that the present device is extremely simple in construction and inexpensive to manufacture, besides being light in weight and of small compass to render it adaptable for carrying in the pocket. Moreover, the appliance is practically proof against derangement or getting out of order and is durable in use over long periods of time. Furthermore, the extracting elements of the device are detachable to provide that they may be easily removed from the jaws of the pliers for repair or replacement should they become worn or broken or when it is desired to substitute other elements of different dimension capable of extracting staples or similar fasteners of varying proportions.

While the invention 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 and arrangement of the parts of the device without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. In a device of the type specified, the combination of a pair of pivotally-connected plier

members having handles at one end and opposed jaws at their opposite end, flanged studs projecting from the jaws, and a pair of bifurcated members adapted to be slid into position to engage the studs on the jaws, one of said members being adapted to press against the work and the other member being provided with means for insertion under the head of a staple to pry it out of the work.

2. In a device of the type specified, the combination of a pair of pivotally-connected plier members having handles at one end and opposed jaws at the opposite end formed of channel shape, studs projecting into the channels of the jaws, and bifurcated members formed with longitudinal slots to adapt them to be slid into engagement with the studs to maintain said members against the walls of the jaws, one of said members formed with means for bearing against the work and the other member provided with means for insertion under the head of a staple to pry it out of the work.

3. In a device of the type specified, the combination of a pair of pivotally-connected plier members having handles at one end and hollow jaws at the opposite end, studs projecting into the hollow portions of the jaws and formed with circumferential flanges spaced from the walls thereof, and a pair of slotted members adapted to be slid into engagement with the studs between their flanges and the walls of the jaws to secure them fixedly thereto while providing for their convenient removal therefrom, one of said members being adapted to bear against the work and the other of said members having means for insertion under the head of a staple to pry it out of the work.

4. In a device of the type specified, the combination of a pair of pivotally-connected plier members having channel-shaped jaws, studs projecting into the channels of the jaw and formed with heads at their ends and annular flanges intermediate their heads and the walls of the jaws, slotted members slidable into the jaws to engage around the studs between their flanges and the walls of the jaws, one of said members adapted to bear against the work and the other said member having means for insertion under the head of a staple to pry it out of the work, and a U-shaped spring having slotted ends engaging under the heads of the studs on the jaws of the members to normally hold the latter in closed relationship.

5. In a device of the type specified, the combination of a pair of channel-shaped plier members having opposite side walls connected by intervening portions, said side walls formed with arcuate openings in their edges, a pivot-pin arranged across the walls of the members and provided with peripheral grooves engaging the edges of the arcuate openings thereof, studs projecting into the channel of the jaws of said members, a U-shaped spring having slotted ends engaging around the studs in the jaws to normally maintain the latter in closed relationship, means on one of the jaws for pressing against the work, and means on the opposite jaw adapted for insertion under the head of a staple to pry the latter out of the work when said jaws are carried into open relationship.

6. In a device of the type specified, the combination of a pair of channel-shaped plier members having handles at one end and jaws at their opposite end, said jaws having opposite side walls connected by intervening portions and said side

walls formed with semicircular openings, a pivot-pin extending between the jaws and formed with peripheral grooves engaging the edges of the openings in the side walls thereof, headed studs projecting into the channel of the jaws, a U-shaped spring having its rearward folded portion engaging against the side of the pivot-pin and formed with slots at its free ends engaging around the studs under their heads, means on one of the jaws adapted to bear against the work, and means on the opposite jaw for insertion under the head of a staple to pry it out of the work.

7. In a device of the type specified, the combination of a pair of pivotally-connected plier members having handles at one end and jaws at their opposite end, a member slidably engaged with one of the jaws and formed with a projecting tapered beak adapted to be inserted under the head of a staple to bear against the work, and a member slidably engaged with the opposite jaw and projecting therefrom with flanges folded downwardly from its sides and extended forwardly in hooked prongs adapted for insertion under the head of a staple to pry it out of the work.

8. In a device of the type specified, the combination of a pair of pivotally-connected plier members having handles at one end and hollow jaws at the opposite end, studs in the hollow portions of the jaws, and blade members having bifurcated portions with converging sides adapted to be slid into the hollow jaws to engage the studs as their sides frictionally engage against the side walls of the jaw, one of said blades formed with a projecting beak adapted to bear against the work and the other blade having prongs for insertion under the head of a staple to pry it out of the work.

9. In a plier construction, the combination of a pair of members having handles at one end and jaws at the opposite end with semicircular

sockets on their opposed sides, a pivot-pin received in the sockets of both members, studs in the jaws of said members, and a spring secured to the studs and acting between said members to hold them permanently engaged with the pivot-pin while tending to maintain their jaws in closed relationship.

10. In a plier construction, the combination of a pair of members having handles at one end and jaws at the opposite end and portions of substantially channel shape with semicircular sockets in their sides, a pivot-pin engaged with the sockets in the sides of said members and formed with peripheral grooves for receiving the edges thereof, and a substantially U-shaped spring member having its free ends secured to the members to hold them in engagement with the pivot-pin and normally tending to maintain the jaws in closed relationship.

11. In an implement for the purposes specified, the combination of a pair of relatively movable members having opposite socketed jaws, and staple-extracting members having oppositely-disposed divergent legs slidably within said jaws to frictionally engage the sides thereof to detachably retain them in place.

12. In an implement for the purposes specified, the combination of a pair of plier members having opposite socketed jaws, and staple-extracting members adapted to be inserted into said jaws and slotted to provide resilient portions for binding thereagainst to detachably secure them in place on the jaws.

13. In an implement for the purposes specified, the combination of a pair of plier members having opposite channel-shaped jaws, and staple-extracting elements of slotted bifurcated form having opposite divergent legs adapted to be slid into the jaws with their legs binding against the sides thereof to retain them in place.

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