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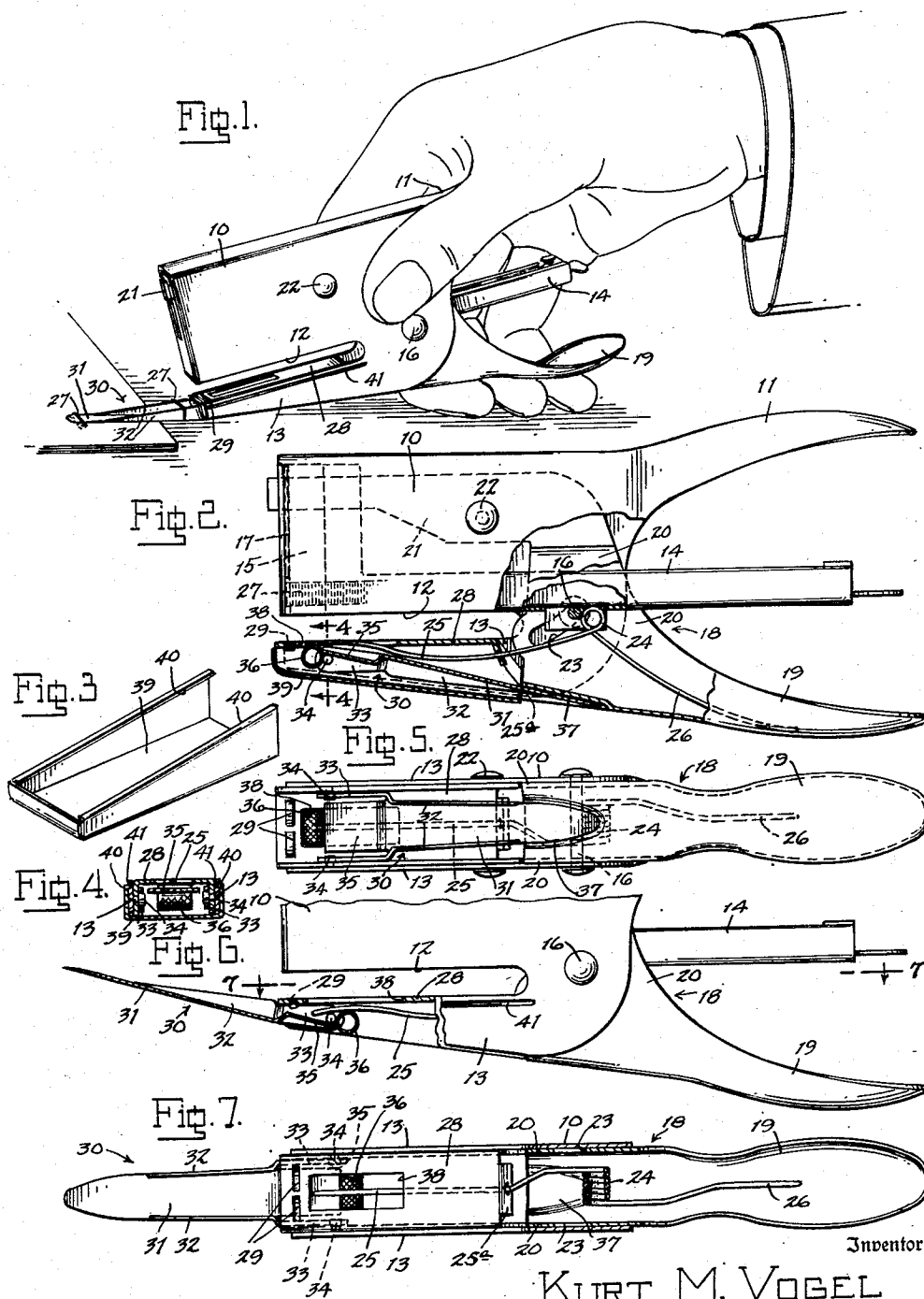
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RETRACTABLE STAPLE EXTRACTOR

Filed May 31, 1951

2 Sheets-Sheet 1



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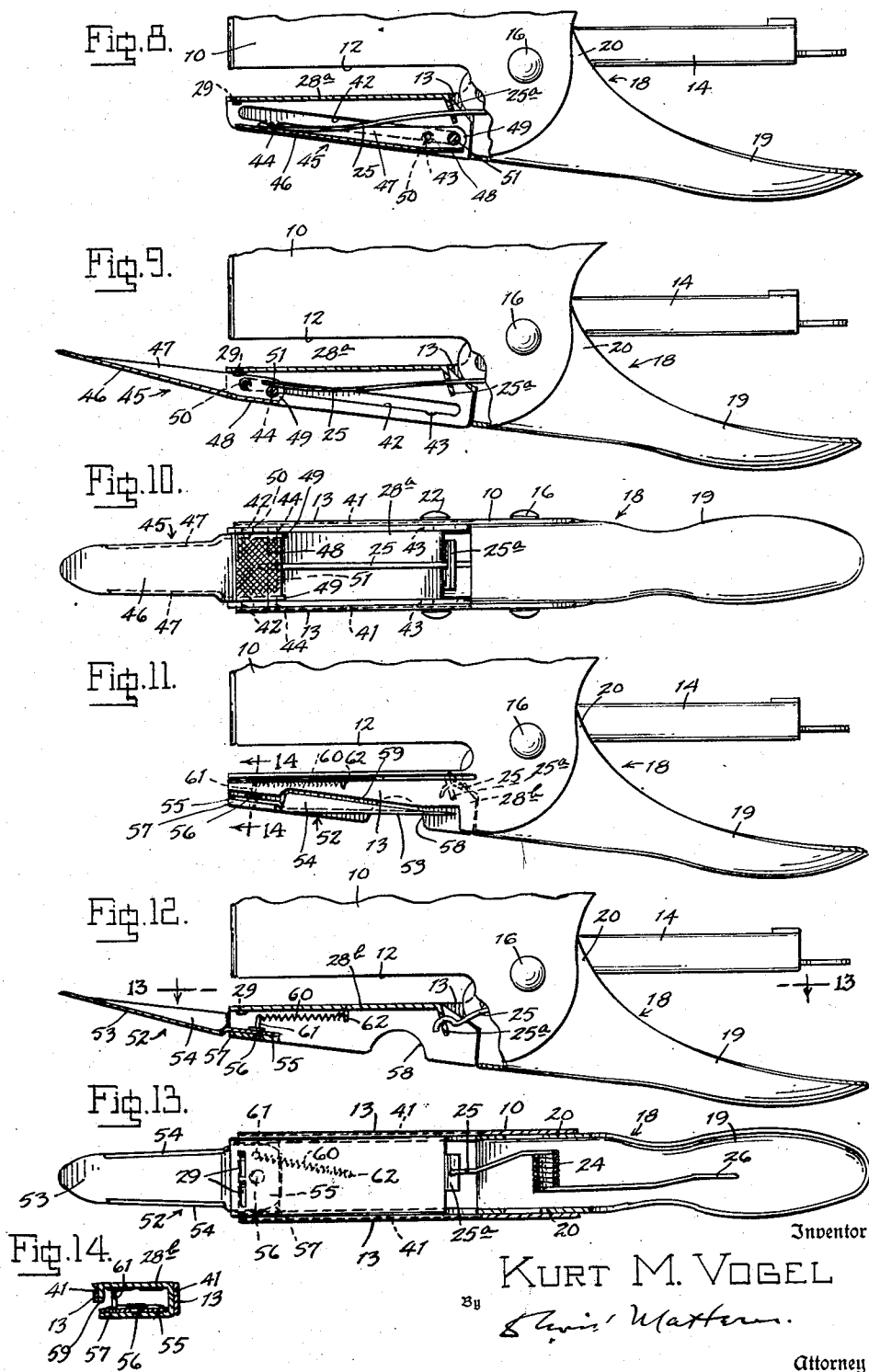
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UNITED STATES PATENT OFFICE

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RETRACTABLE STAPLE EXTRACTOR

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8 Claims. (Cl. 254—28)

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The present invention relates to a combined stapling device and staple extractor, and has for an object to provide a device of this character in which a staple removing element is incorporated in a stapling device in such manner that, when not in use, it will occupy a substantially concealed position within the device, so as not to interfere with the normal stapling operation thereof, and, when in its operative staple extracting position, will be projected forwardly from the stapling device in such relation that the grip handle of the latter forms a manipulating handle therefor.

The invention is especially adapted for incorporation in a stapling device of the plier type having handle means comprising a fixed upper grip handle and a pivoted lower grip handle adapted to be gripped by the hand and compressed to affect the stapling operation, the handle means of such plier type stapling device also providing an operating handle means for the extracting element disposed in the most effective position for engaging and extracting staples. In particular the extracting element projected from the front of the stapling plier is adapted to be engaged beneath the bridge of the staple by a straight forward sliding movement, the continued forward sliding movement unclenching and extracting the staple, and the disposition of the grip handle directly behind the extracting element enabling the device to be gripped in a natural manner and pushed forwardly with a positive straight movement to extract the staples.

The staple extracting operation is best carried out by engaging the extracting element in flat relation against and parallel to the surface of the material containing the staple while such material is supported upon a flat surface or the palm of the hand, and, to enable this operation to be effectually carried out, it is proposed to provide the staple extracting element in such angular relation to the base of the stapling device that sufficient clearance for the fingers gripped about the handle means will be provided between the lower side of the lower handle and the supporting surface, while the extracting element is disposed in flat parallel relation with such surface. The arrangement also prevents damage to the stapled material such as might occur if the extracting element were held at an angle thereto.

With the above and other objects in view, embodiments of the invention are shown in the accompanying drawings, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

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In the drawings:

Fig. 1 is a perspective view of the device according to one illustrated exemplary embodiment of the invention, and showing the same in the operation of extracting a staple.

Fig. 2 is a side elevation, partially in vertical section, showing the extracting element in its retracted position within the stapling plier, a closure slip cover being also shown in place.

Fig. 3 is a perspective view of the closure slip cover for use with the device.

Fig. 4 is a transverse vertical sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a bottom plan view of the device as seen in Fig. 2, the slip cover being removed.

Fig. 6 is a fragmentary side elevation, partially in vertical section, showing the extractor element in its projected operative position.

Fig. 7 is a horizontal sectional top plan view, taken along the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary side elevation, partially in vertical section, of a modified form of the invention, the extractor element being shown in its inoperative retracted position.

Fig. 9 is a similar view showing the extractor element in its operative projected position.

Fig. 10 is a bottom plan view, with the extractor element in the projected position as seen in Fig. 9.

Fig. 11 is a fragmentary side elevation of another modified form of the invention, the extractor element being shown in its retracted position.

Fig. 12 is a fragmentary side elevation, partially in vertical section, showing the extractor element in its projected position.

Fig. 13 is a horizontal sectional top plan view, taken along the line 13—13 of Fig. 12.

Fig. 14 is a transverse vertical sectional view, taken along the line 14—14 of Fig. 11.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, and more particularly to Figs. 1 to 7 thereof, the illustrated exemplary embodiment of the invention shown therein is incorporated in a stapling device of the plier type, although it will be understood that it may be incorporated in stapling devices of the desk or other types if desired. The particular stapling plier illustrated is of the type as disclosed in the patent to Edward C. Johnson for Stapling Plier No. 2,157,987, granted May 9, 1939, and comprises a housing 10 having an upper grip handle 11 formed integrally therewith, the lower portions of the side walls of the housing

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having slots 12—12 constituting the material receiving mouth and the jaw portions 13—13 of the side walls below these slots constituting supports for the staple clinching anvil means of the plier, as will presently more fully appear. The staple carrying guide or magazine 14 carrying the staple driving head 15 at its forward end is pivotally mounted upon a pin 16 supported at its ends in the side walls of the housing, the staple driving head having a staple driver 17 carried therein for vertical staple driving movement.

The staple driving lever 18 comprises a lower grip handle 19 and side wall portions 20—20 extending upwardly therefrom between the side walls of the housing 10 and the side walls of the staple magazine 14, these side portions being bent inwardly above the staple magazine and then extended upwardly and forwardly in contacting welded-together relation to form a forwardly projecting lever arm 21 engaged at its forward end with the staple driver 17. The lever arm 21 is pivotally mounted upon a pivot pin 22, supported at its ends in the side walls of the housing 10, and the side wall portions 20 are provided with slots 23—23 arranged concentrically to the axis of the pin 22 and engaged by the pin 16. A spring 24 coiled intermediate its ends has one end 25 extended forwardly and secured in the lower jaw of the housing 10 and its other end 26 engaged with the inner surface of the lower grip handle 19, its coil portion being positioned rearwardly of the pin 16 and pressing upwardly on the undersurface of the stapling magazine 15, this spring thus exerting pressure to press the grip handle 19 to open position and lever arm 21 and the staple driver 17 to raised position. It also exerts upward pressure upon the staple magazine 14 rearwardly of the pivot pin 16 to press the staple driving head 15 downwardly so that it follows the downward movement of the lever arm 21.

In the operation of this type of stapling plier the lower handle 19 is gripped and pressed upwardly toward the upper handle 11, the initial downward movement of the lever arm 21 causing the staple driving head 15 and guide 14 to swing downwardly toward the anvil to grip the material to be stapled. The continued movement of the arm 21 then forces the staple driver 17 downwardly in the staple driving passage within the head and drives the foremost staple of the staple strip 27 disposed in the staple magazine.

Between the lower jaw portions 13—13 of the housing member a channel member 28 of inverted U-shaped cross-section is rigidly secured by welding or other suitable means and provides an anvil support for the material to be stapled, being provided for this purpose near its forward end and in line with the staple driver 17 with staple clinching grooves 29—29. The channel member also provides a pocket at the under side of the lower jaw portion of the housing member 10 within which the staple extractor element of the invention is mounted.

The staple extractor 30 comprises a flat blade portion 31 provided along its side edges with wedging flanges 32—32 of gradually increasing height and starting slightly back from the thin entering tip portion of the blade. The wedging flanges are provided with outwardly offset mounting extensions 33—33 pivotally mounted upon pivot studs 34—34 secured to the side walls of the channel member 28. The blade portion is provided at its rearward end with an upwardly

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offset extension portion 35 extending beyond the pivotal axis of the pivot studs 34 and provided with a curled finger-engaging portion 36, preferably having a knurled surface. In the retracted inoperative position of the staple extractor, as shown in Figs. 2 and 5, the blade portion is disposed within the pocket of the channel member with its tip end resting within a recess 37 formed in the forward end of the lower side of the lower grip handle 19, being yieldably retained in this position by engagement of the forwardly extending end 25 of the spring 24 with the finger-engaging portion 36. This spring extends through an apertured lug 25a formed at the inner end of the channel member 28 into a slot 38 provided in the transverse portion of the channel member, this slot providing a clearance space for movement of the finger-engaging portion 36 as the blade end of the staple extractor is swung to its projected operative position as shown in Figs. 6 and 7. In the projected position the spring end 25 engages the finger-engaging portion at the other side of the pivot axis from its engagement therewith in the retracted position, as shown in Figs. 2 and 5, and thus yieldably retains the staple extractor in projected position. In the operation of projecting the staple extractor the tip end of the blade portion is first disengaged from the recess 37 by pressing upwardly upon the finger-engaging portion 36, whereupon the blade portion may be conveniently pressed to its projected position.

The angle of the blade portion 31 with respect to the lower surface of the housing member is such that when the blade portion is engaged with a flat surface, as shown in Fig. 1, the lower grip handle 19 will be sufficiently spaced from the flat surface to provide clearance for the fingers of the hand gripped about the grip handle. In the operation of extracting the staple the blade may thus be effectually moved forwardly to engage its tip portion beneath the bridge of the staple, continued forward movement causing the wedging flanges 32 to bend the clinched staple legs outwardly into unclined position, at the same time raising the bridge portion upwardly to extract the staple through the perforations in the stapled material, the extracted staple being then disposed upon the high ends of the wedge flanges. Where several staples are successively extracted they will collect upon the wedge flanges from which they may be readily removed when desired.

For the purpose of enclosing the pocket containing the retracted staple extractor, a slip cover 39, as shown in Fig. 3, may be engaged over the same, being provided with inwardly turned guide flanges 40—40 which slideably engage grooves 41—41 provided in the lower jaw portions 13 of the housing member 10 in spaced parallel relation below the slots 12. This slip cover is of wedge shape to fit the shape of the lower jaw of the plier and will be frictionally wedged in place as it is forced inwardly into its enclosing position. It is disengaged simply by pressing forwardly.

In Figs. 8 to 10 I have illustrated a modified form of the invention in which the staple extractor is mounted for sliding movement between its retracted and projected positions. For this purpose the side walls of the channel member 28a are provided with longitudinal slots 42—42 disposed parallel to the lower edges of said side walls, each slot having a rearward detent notch 43 forwardly spaced from its rearward end and a forward detent notch 44 rearwardly spaced

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from its forward end. The staple extractor 45 comprises a flat blade portion 46 and wedging side wall portions 47—47, substantially similar to the staple extractor 30 of the embodiment of the invention shown in Figs. 1 to 7, the blade portion having a rearward extension portion 48 disposed at an angle thereto. This angle is such that in the projected position, as shown in Fig. 9, the portion 48 is parallel to the underside of the lower jaw of the stapling plier and the blade portion is at an upwardly inclined angle thereto. The wedging side portions 47 are provided with rearwardly extending mounting portions 49—49 having outwardly projecting pivot studs 50—50 slideably engaged in the slots 42, and also having in rearwardly spaced relation to the studs a transverse pin 51 extending between the side walls and having its ends projecting as pivot studs into sliding engagement with the slots 42. The undersurface of the portion 48 is preferably knurled, as shown in Fig. 10, for the purpose of facilitating the projection and retraction of the staple extractor by engagement of a finger therewith.

In the retracted position, as shown in Fig. 8, the stud ends of the pin 51 are in engagement with the rearward ends of the slots 42 and the pivot studs 50 are engaged with the detent notches 43, the spring end 25 pressing against the blade portion 46 to yieldably retain the studs in engagement with the notches. In order to project the staple extractor a finger is engaged with the knurled surface of the portion 48 and pressed inwardly to disengage the studs 50 from the detent notches 43, whereupon the projector may be pushed forwardly to its projected position. In this position the studs 50 engage the forward ends of the slots 42, the spring end 25 at the same time engaging the upper side of the pin 51 and pressing its projecting end portions into the detent notches 44. The blade portion is thus tilted upwardly at an angle to the underside of the stapling plier and locked in place against rearward pressure exerted thereon. In order to retract the staple extractor the portion 48 is pressed inwardly to disengage the ends of the pin 51 from the detent notches 44, the staple extractor being thereupon pushed to its retracted position, as shown in Fig. 8. When in retracted position the extractor may be enclosed if desired, by a slip cover 39, the lower jaw portions 13 being provided with grooves 41—41 for this purpose.

In Figs. 11 to 14 I have illustrated another modified form of the invention in which the staple extractor is pivotally mounted for movement about a substantially vertical pivot axis between its retracted and projected positions. The staple extractor 52 comprises a blade portion 53 and wedging side walls 54, the blade portion being provided with an upwardly offset extension 55 disposed at an angle to the blade portion corresponding to the angular relation of the blade portion to the underside of the staple plier in the projected position as shown in Fig. 12. The extension portion 55 is pivotally mounted by means of a pivot stud 56 upon a supporting platform portion 57 extending from one side wall of the channel member 28b, this side wall and the adjacent side of the lower jaw portion 13 also being provided with a finger-engaging notch 58 for facilitating the movement of the staple extractor from its retracted position. The other side wall and the adjacent side of the lower jaw portion 13 is provided with a clearance cut-out 59 through

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which the staple extractor swings in moving between its retracted and projected positions. The staple extractor is retained in its retracted and projected positions by means of a toggle spring 60 connected between a pin 61 provided at one side of the pivot stud 56 and a pin 62 secured to the underside of the transverse portion of the channel member 28b. In the retracted position the spring draws one side of the portion 55 against the side wall of the channel member to yieldably retain the staple extractor in retracted position. As the retracted staple extractor is moved from its retracted to its projected position the spring moves over the center of the pivot stud 56 and thereupon exerts pressure to draw the other side of the portion 55 against the side wall of the channel member. When in retracted position the extractor member may be enclosed, if desired, by a slip cover 39, the lower jaw portions 13 being provided with grooves 41—41 for this purpose.

While the staple extractor is shown in the several embodiments as provided in the lower side of the stapling plier, it will be understood that it may, if desired, be provided at the upper side of the housing portion 10, in which case suitable pocket means will be provided in the housing for this purpose.

I have illustrated and described preferred and satisfactory embodiments of the invention, but it will be understood that changes may be made therein within the spirit and scope thereof, as defined in the appended claims.

What is claimed is:

1. A staple extractor for removing from stapled material clinched staples having a bridge and clinched legs, comprising a body member having a lower side, a front end and a hand grip extending upwardly from said lower side and rearwardly from said front end for manually propelling said front end forwardly with said lower side transversely parallel with the upper side of stapled material from which a staple is to be removed, said lower side having a longitudinally extending pocket, an elongated blade member, means movably mounting said blade member within said pocket entirely above said lower side for movement between a retracted position rearwardly of said front end and a longitudinally projected position forwardly of said front end, the lower surface presented by said blade when in said projected position being in a flat plane and free of any downward projections and the lower surface of said lower side of said body member being free of any downward projections relative to the plane of said lower surface of said blade when the latter is in said projected position, said blade member having a thin entering tip for entering engagement beneath the staple bridge as said blade is longitudinally propelled forwardly, a lower longitudinally extending flat side for engagement with the stapled material in transversely and longitudinally parallel relation therewith, and an upper longitudinally extending wedging side having wedging surfaces along its longitudinal edges diverging rearwardly from said entering tip with respect to the longitudinal edges of said lower side whereby the clinched staple legs are bent outwardly into unclined position and withdrawn from the material as said blade is further longitudinally propelled forwardly.

2. The invention as defined in claim 1 further characterized by spring means yieldably retaining said blade member in its respective retracted and projected positions.

3. The invention as defined in claim 1 further

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characterized in that said body member has a longitudinally straight lower side adjacent its forward end, and said blade member in its projected position has its lower longitudinally extending side disposed with its rearward end adjacent to and substantially flush with the forward end of said straight lower side of said body member, and wherein said blade member is disposed at an upward inclination to the plane of said straight lower side of said body member, whereby when said flat lower side of said blade is engaged in parallel relation with stapled material said lower side of said body member is in upwardly spaced relation to said material.

4. The invention as defined in claim 1 further characterized by horizontal pivot means movably mounting said blade member on said body member for movement about a horizontal axis between projected and retracted positions.

5. The invention as defined in claim 1 further characterized by means slidably mounting said blade member on said body member for longitudinal movement between retracted and projected positions.

6. The invention as defined in claim 1 further characterized by longitudinal slot means in said body member slidably mounting said blade member for longitudinal movement between retracted and projected positions, said blade member having stud means engaged in said slot means, and said slot means having detent notch means engageable by said stud means in said projected

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position to tilt said staple extractor upwardly.

7. The invention as defined in claim 1 further characterized by longitudinal slot means in said body member slidably mounting said blade member for longitudinal movement between retracted and projected positions, said blade member having a pair of longitudinal spaced stud means engaged in said slot means, and said slot means having a pair of detent notch means engageable by said respective stud means in said retracted and projected positions to respectively tilt staple extractor downwardly and upwardly.

8. The invention as defined in claim 1 further characterized by substantially vertical pivot means movably mounting said blade member on said body member for movement about a substantially vertical axis between retracted and projected positions.

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