

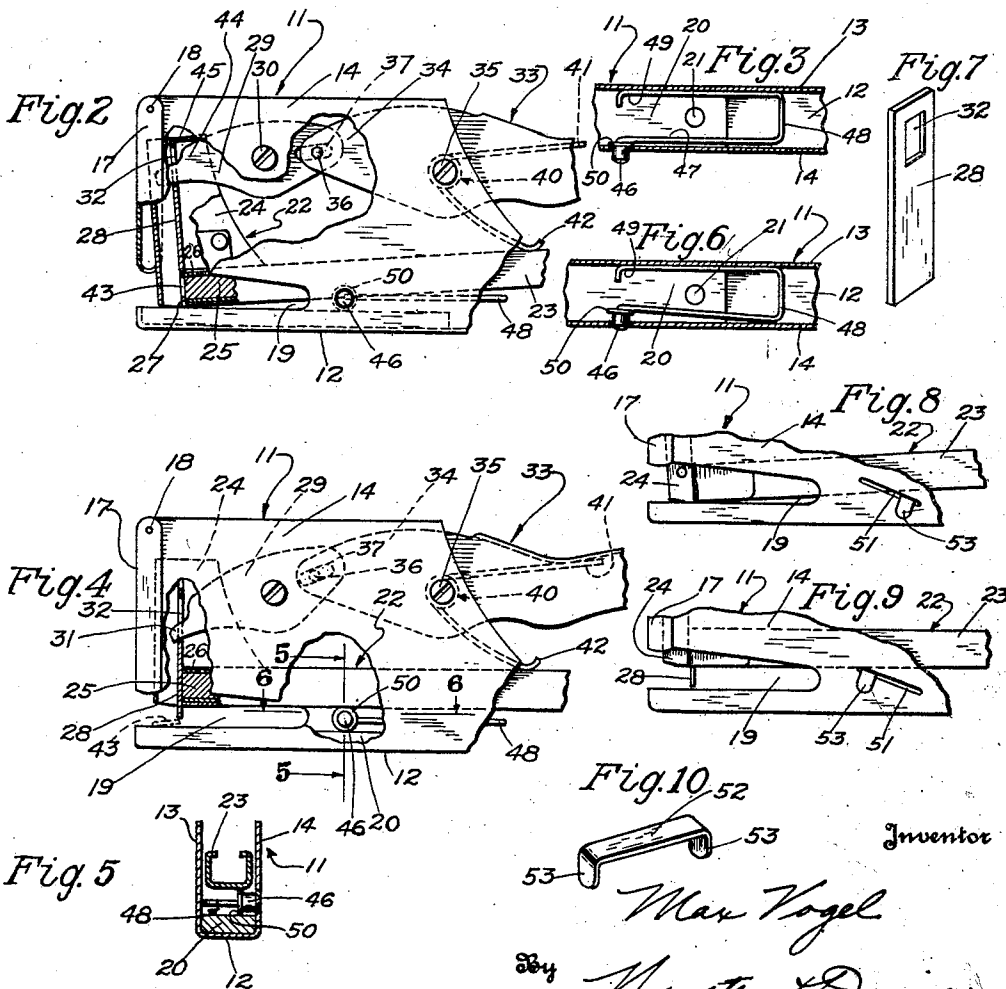
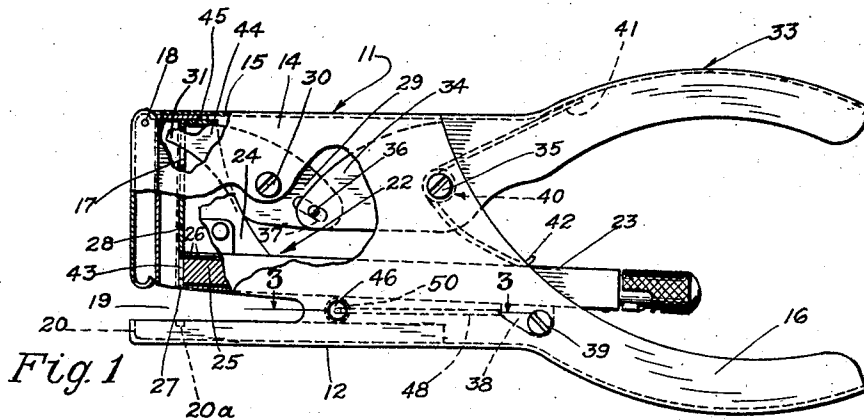
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STAPLING MACHINE

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STAPLING MACHINE

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This invention relates to new and useful improvements in staple driving machines and has particular relation to a plier type stapling machine of the kind used for stapling together the various pages of documents and the like.

An object of the invention is to provide a staple driving machine including means whereby a staple may be easily ejected should it clog in the raceway of the machine.

Another object is to provide a plier type stapling machine including a main housing having an anvil portion, a housing pivoted in said main housing and including a head having a raceway and a plunger operable in said raceway toward and from the anvil to drive the staples through the raceway, means to operate said plunger to drive a staple, means whereby the initial movement of said operating means serves to rock the pivoted housing on its pivot in a manner to carry its head and the lower end of said raceway toward the anvil and into engagement with the means to be stapled, and means at will, to secure said pivoted housing against said movement to permit of operation of the plunger while the head of the pivoted housing is spaced from the anvil to permit a clogged staple to be ejected from the raceway.

A further object is to provide a means for the purpose stated and which is extremely simple in construction, easy to operate and which does not detract from the appearance of the stapling machine in which it is embodied.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawing wherein satisfactory embodiments of the invention are shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims to which claims reference is to be had for a definition of the invention.

In the drawing:

Fig. 1 is a side elevational view of a complete stapling machine in accordance with the

invention, parts of the housing being broken away, the operating parts being shown in their normal positions;

Fig. 2 is a similar view showing the forward portion of the machine as when driving a staple;

Fig. 3 is a detail sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a side elevational view of the forward portion of the machine, parts of the housing being broken away and the parts being shown as positioned when a clogged staple is being ejected from the raceway;

Fig. 5 is a sectional detail view taken substantially along the line 5—5 of Fig. 4;

Fig. 6 is a detail sectional view somewhat similar to Fig. 3 but taken substantially along the line 6—6 of Fig. 4;

Fig. 7 is a perspective view of the plunger removed and on a slightly enlarged scale;

Fig. 8 is a side elevational view of the lower forward portion of the machine, showing a modified form of locking means for the pivoted housing, the locking means being shown in normal or inoperative position;

Fig. 9 is a view similar to Fig. 8 but with the locking means shown in operative position; and

Fig. 10 is a perspective view of the locking means of Figs. 8 and 9 removed.

Referring in detail to the drawing and at first particularly to Figs. 1 through 7 thereof, at 11 is generally indicated the main or outer housing of the machine which housing preferably includes a bottom wall 12, side walls 13 and 14, and a top wall 15. Formed with this main housing 11 and extending rearwardly therefrom is a handle or hand grip member 16 the complete function of which will later appear. Aside from the handle 16 the housing 11 is open at its rear end and at its forward end is closed by a removable cap or closure member 17 which may be secured in place as by a pin 18.

The side walls 13 and 14 of the housing are cut away to provide a mouth or notch 19 into which papers or the like to be stapled together are inserted. Disposed on the lower or bottom wall 12 of the housing below the notch 19 is an anvil bar 20 secured in place

as by rivets or the like 21 and being shaped toward its forward end to provide anvil recesses 20a which bend or fold the prongs of the staples against the under side of the papers and thus clinch the staples in the usual manner after the staples have been forced through the papers.

Arranged within the main housing 11 is a housing 22 comprising an elongated portion 23 and a head 24 rigid therewith. The elongated portion 23 contains a guide bar 25 for a staple strip 26 to be fed along the guide bar by any suitable follower means. Head 24 of the housing 22 includes a raceway 27 in which is slidably mounted a plunger 28 adapted to be reciprocated in the raceway to drive the staples. It will be understood that the staple strip 26 is fed along the guide bar 25 in the direction of the raceway 27 and that the staples are fed one at a time into the raceway to be driven therethrough by the plunger 28.

An operating member or lever 29 is pivotally mounted within the housing 11 as by means of a pivot 30 supported in the side walls of the housing. It will be noted that the member 29 is pivoted intermediate its ends and toward its forward end this member is reduced to provide a portion 31 arranged in an opening 32 in the plunger. A second handle or hand grip 33 has a portion 34 disposed within the housing 11 and the handle 33 is pivotally mounted as on a pivot 35 supported in the side walls 13 and 14 of the housing. The forward end of the portion 34 overlaps the rear end of the operating member 29 and carries a pin 36 disposed in a slot 37 in said member whereby the handle and member are connected.

The inner housing 22 is pivotally mounted within the housing 11 and to this end the elongated portion 23 of housing 22 carries a pair of downwardly extending ears 38 pivotally mounted as at 39. Owing to this pivotal mounting the housing 22 is adapted for rocking movement to carry its head 24 toward and from the anvil bar 20. As the handle 33 is pivoted intermediate its ends movement of its outer end portion in the direction of the handle 16 will result in an upward movement of its end portion 34. Owing to the pin and slot connection between the operating member 29 and the pivoted handle the inner end of said member will be moved upwardly and the outer end thereof will be moved downwardly and as the portion 31 thereof is in the opening 32 in the plunger the plunger will be moved downwardly in a manner to drive a staple.

A spring 40 is wrapped about the pivot 35 and has an arm 41 bearing against the inner side of the handle 33 and a second arm 42 bearing against the elongated portion 23 of the pivoted housing 22 forwardly of the pivot 39 thereof. The action of this spring 40 is

such that it tends to move the forward end of the housing 22 downwardly but this movement is normally prevented by the top wall 45 of the housing resting on the top edge of lever 44 which is normally held in its upper position by spring arm 41 pressing against the under side of hand lever 33. However, on initial movement of the handle 33 in the direction of the handle 16 the housing is released and also the spring is compressed, and the housing 22 is rocked on its pivot 39 to throw its head portion 24 downwardly in the direction of the anvil bar 20 and into engagement with said anvil bar or into engagement with any papers or the like inserted in the notch 19.

This initial movement takes place without the plunger 28 being operated, the initial movement being possible owing to the pin and slot connection 36, 37 and owing to the fact that the opening 32 in the plunger is of such length that the reduced end portion 31 of the operating member has a certain amount of play therein. After the lower portion of the head engages the anvil bar or the papers to be stapled together, further movement of the housing 22 about its pivot 39 is of course prevented and a continued push or pressure on the handle 33 in the direction of the handle 16 will result in the plunger 28 being operated downwardly through the raceway 27 in a manner to drive the staple 43 which is the first staple on the strip 26.

After the staple is driven the pressure on handle 33 is released and the spring 40 acts to return the parts to their normal positions. That is, the spring throws the handle 33 upwardly resulting in its inner end 34 being thrown downwardly in a manner to rock the operating member 29 about its pivot 30 throwing its inner end downwardly and its outer end upwardly. This operating member inwardly of its reduced portion 31 includes a shoulder portion or top edge 44 which as above stated engages the inner surface of an upper wall 45 of the head 24 whereby to elevate the pivoted housing to normal position and retain it there.

From the foregoing description it will be understood that initial movement of the handle 33 toward the handle 15 results in the housing 22 being rocked on its pivot to dispose the head 24 and the lower end of the raceway 27 against any papers there may be on the anvil bar, or against this bar should there be no papers in the notch 19. Therefore, should a staple become clogged in the raceway it would be difficult or impossible with the mechanism thus far described to eject said staple. Each operation of the handle would simply bring the plunger against the clogged staple and the clogged staple would be supported or prevented from leaving the raceway by the anvil bar.

According to the present invention means

are provided for movement into and out of a position in the path of the movement of the pivoted housing 22 so as to limit its movement and maintain the housing in a position with the lower end of the raceway 27 spaced from the anvil bar 20 whereby on operation of the handle 33 a staple clogged in the raceway will be engaged and ejected by the plunger 28.

As shown in Figs. 1 through 6 this means includes a button or projection 46 arranged in an opening in the side wall 14 of the main housing 11 and at its inner end connected with an arm 47 of a substantially U-shaped spring 48 arranged in the main housing between the walls 13 and 14 thereof and just above the anvil bar 20. The arm 49 of the spring 48 is disposed against the inner surface of the side wall 13 as clearly shown in Figs. 3 and 6 and this spring 48 therefore serves normally to maintain the button 46 in the position in which it is shown in Figs. 1, 2 and 3.

That is, the spring tends normally to move the button 46 in a direction outwardly of the main housing and this action of the spring is limited by a flange or washer-like portion 50 at the inner end of the button and which normally is held flat against the inner surface of the wall 14 of the main housing while the button is projected through said wall. As this flange 50 lies flat against the wall 14 there will be no interference with movement of the pivoted housing 22 in the normal use of the machine. However, when the machine becomes clogged the button 46 may be pressed inwardly into the position in which it is shown in Figs. 4, 5 and 6 with the flange 50 disposed in the path of movement of the pivoted housing 22.

In this connection it is to be noted that the button is disposed forwardly of the pivot 39 of the housing 22 and it will be apparent that when the button is pressed inwardly downward movement of the head portion 24 of the pivoted housing will be limited as clearly shown in Fig. 4. Therefore, the lower end of the raceway 27 will be disposed above the anvil bar 20 and the parts will be held in this position.

Further operation of the handle 33 after the housing has engaged the flange 50 of the button will result in the plunger being forced downwardly through the raceway in a manner to eject a clogged staple therefrom as clearly shown in Fig. 4. With movement of the housing limited as suggested it will be apparent that the plunger may be operated to project it beyond the raceway as shown in that figure. When the pressure is removed from the handle 33 the spring 40 acts to return the parts to normal position and the spring 48 will force the button 46 outwardly to normal position and the machine may then be used in the customary manner.

Referring to the form of the invention shown in Figs. 8, 9 and 10, the side walls of the main housing 11 are provided with registering inclined slots 51. These slots are arranged in the lower portions of the walls and inclined upwardly toward the front of the machine. A stop or limiting member 52 has its end portions disposed in the slots 51 and has ears 53 disposed against the outer surfaces of the walls 13 and 14. From this it will be understood that the member 52 is disposed within the housing 11 and extends across the same from one side wall to the other thereof.

Normally, the member 52 (Fig. 8) is disposed rearwardly or toward the lower end portions of the slots 51 in which position it does not interfere with the normal movement of the housing 22 in setting a staple. However, on a staple becoming clogged in the raceway the member 52 may be shifted from the position in which it is shown in Fig. 8 to that in which it is shown in Fig. 9 wherein it is disposed in the forward or upper end portions of the slots 51.

In such position the member 52 is disposed in the normal path of movement of the housing 22 and will limit such movement and prevent the housing being rocked to bring the lower end of the raceway against the anvil and the plunger 28 may be operated to project beyond the raceway as shown in Fig. 9 ejecting the clogged staple during this movement. The ears 53 of the member 52 frictionally engage the outer surfaces of the side walls 13 and 14 whereby the member 52 will remain in adjusted position. For this purpose either the ears themselves or the body of the member may be of resilient or spring material. Further, these ears provide means to be engaged by the thumb and index finger whereby member 52 may be shifted from one position to the other as desired.

From the foregoing description taken in connection with the drawing it will be apparent that the present invention provides a simple and inexpensive means whereby a clogged staple may easily be ejected from the raceway of a machine. It is desirable when driving a staple that the housing 22 rock to dispose the lower end of the raceway against the papers to be stapled together since the staple is then guided and supported while being forced through the papers and being clinched at the underside thereof. However, in order that a clogged staple may be ejected movement of the housing should be limited to maintain the raceway spaced above the anvil when a clogged staple is to be ejected. With the means of the present invention the desired result is easily accomplished without any danger of injury to the parts.

Having thus set forth the nature of my invention, what I claim is:

1. In a stapling machine, a main housing including an anvil portion, a housing pivoted in said main housing and including a head having a raceway therein, a plunger operable in said raceway toward and from the anvil to drive staples through the raceway, means to operate the plunger to drive a staple, means whereby the initial movement of said operating means permits rocking of the pivoted housing in a direction to carry its head and the raceway toward the anvil, and means shiftable to limit movement of said pivoted housing to permit of operation of the plunger to eject a clogged staple from the raceway while the head of the pivoted housing is spaced from the anvil.

2. In a stapling machine including a main housing having an anvil and a movable housing having a raceway and a plunger operable in said raceway to drive staples therethrough, said movable housing shiftable toward and from said anvil during the operation of driving a staple, shiftable locking means carried by said main housing, and said locking means shiftable into a position to limit movement of said movable housing to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the movable housing is spaced from the anvil.

3. In a stapling machine including a main housing having an anvil and a movable housing having a raceway therein and a plunger operable in said raceway to drive staples therethrough, said movable housing mounted in said main housing and shiftable toward and from said anvil during the operation of driving a staple, shiftable locking means carried by said main housing, said locking means comprising a stop member, spring means to return said stop member to normal position when it is moved therefrom, and said stop adapted to be shifted into the path of the movable housing to limit movement of the same to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the movable housing is spaced from the anvil.

4. In a stapling machine including a main housing having a pair of oppositely disposed side walls and an anvil portion between said walls, a movable housing having a raceway therein and a plunger operable in said raceway to drive staples therethrough, said movable housing mounted in said main housing and shiftable toward and from said anvil during the operation of driving a staple, a button mounted in an opening in one side wall of said main housing, a U-shaped spring within said main housing and having one of its arms connected with said button, said spring having its other arm disposed against the side wall opposite the side wall having the opening therein, said spring normally functioning to maintain said button

projecting through the side wall of the main housing, and said button adapted to be manually shifted against the action of said spring whereby the button may be disposed in the path of movement of the movable housing to limit movement thereof and permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the movable housing is spaced from the anvil.

5. In a stapling machine including a main housing carrying an anvil, a second housing having a raceway and a plunger operable in said raceway to drive staples therethrough, said second housing pivotally mounted within said main housing for rocking movement toward and from said anvil during the operation of driving a staple whereby to dispose the lower end of said raceway against the material to be stapled while a staple is being driven through the raceway, a stop carried by one of said housings, and said stop shiftable into a position to limit movement of said pivoted housing to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the lower end of the raceway is spaced from the anvil.

6. In a stapling machine, a main housing carrying an anvil, a second housing having a raceway and a plunger operable in said raceway to drive staples therethrough, said second housing pivotally mounted within said main housing for rocking movement toward and from said anvil during the operation of driving a staple whereby to dispose the lower end of said raceway against the material to be stapled while a staple is being driven through the raceway, means to limit pivotal movement of said second housing to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the lower end of the raceway is spaced from the anvil, said means comprising a slot in a wall of the main housing, and a stop member shiftable in said slot between operative and inoperative positions.

7. In a stapling machine, a main housing carrying an anvil, a second housing having a raceway and a plunger operable in said raceway to drive staples therethrough, said second housing pivotally mounted within said main housing for rocking movement toward and from said anvil during the operation of driving a staple whereby to dispose the lower end of said raceway against the material to be stapled while a staple is being driven through the raceway, means to limit pivotal movement of said second housing to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the lower end of the raceway is spaced from the anvil, said means including an inclined slot in a wall of the

main housing, a shiftable stop member guided by said slot, and said stop member shiftable from an inoperative position at the lower end of said slot to a position at the upper end of said slot in the path of movement of the second housing.

8. In a stapling machine, a main housing including a pair of oppositely arranged side walls, an anvil carried by said housing between the lower portions of said side walls, a second housing having a raceway and a plunger operable in said raceway to drive staples therethrough, said second housing pivotally mounted within said main housing in spaced relation to said anvil and rockable toward and from said anvil during the operation of driving a staple whereby to dispose the lower end of said raceway against the material to be stapled while a staple is being driven through the raceway, means to limit pivotal movement of said second housing to permit of the plunger being operated through the raceway to eject a clogged staple therefrom while the lower end of the raceway is spaced from the anvil, said means including inclined slots formed in said side walls above the anvil, said slots arranged in alignment, a stop member extending between said walls and having portions in said slots whereby movement of the stop member is guided by said slots, said stop member movable in said slots into and out of the path of movement of the second housing, and said stop member including means frictionally engaging the outer surfaces of said side walls to hold the stop member in adjusted position.

9. In a plier type stapling machine, a housing having a handle rigid therewith, a handle pivoted to said housing, a housing pivotally mounted in the first housing, a head on said pivoted housing and having a raceway therein, an anvil on the first housing below said raceway, a plunger slidable in the raceway toward and from the anvil to drive staples through the raceway, a spring engaging the pivoted handle and the pivoted housing, a connection between the pivoted handle and the plunger, said spring adapted on the pivoted handle being moved against the action of the spring to rock the pivoted housing on its pivot to move its head in the direction of the anvil, said handle on further movement adapted through its connection with the plunger to operate the same in a direction to drive a staple, said spring adapted to return the parts to normal position on the pivoted handle being released, and means carried by said first housing and shiftable to and from a position to limit said pivotal movement of the pivoted housing to permit said plunger to be operated through said raceway to eject a clogged staple therefrom while the raceway is spaced from the anvil.

10. In a stapling machine, an anvil, a housing having a raceway, a plunger oper-

able in said raceway toward and from the anvil to drive staples through the raceway, means to operate the plunger to drive a staple, means connecting the housing and the anvil to permit relative movement of the housing and the anvil toward and from each other, and a shiftable stop, said stop being shiftable to a position to limit said first movement to permit operation of the plunger to eject a clogged staple from the raceway while the housing is spaced from the anvil.

In testimony whereof I affix my signature.
MAX VOGEL.

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