

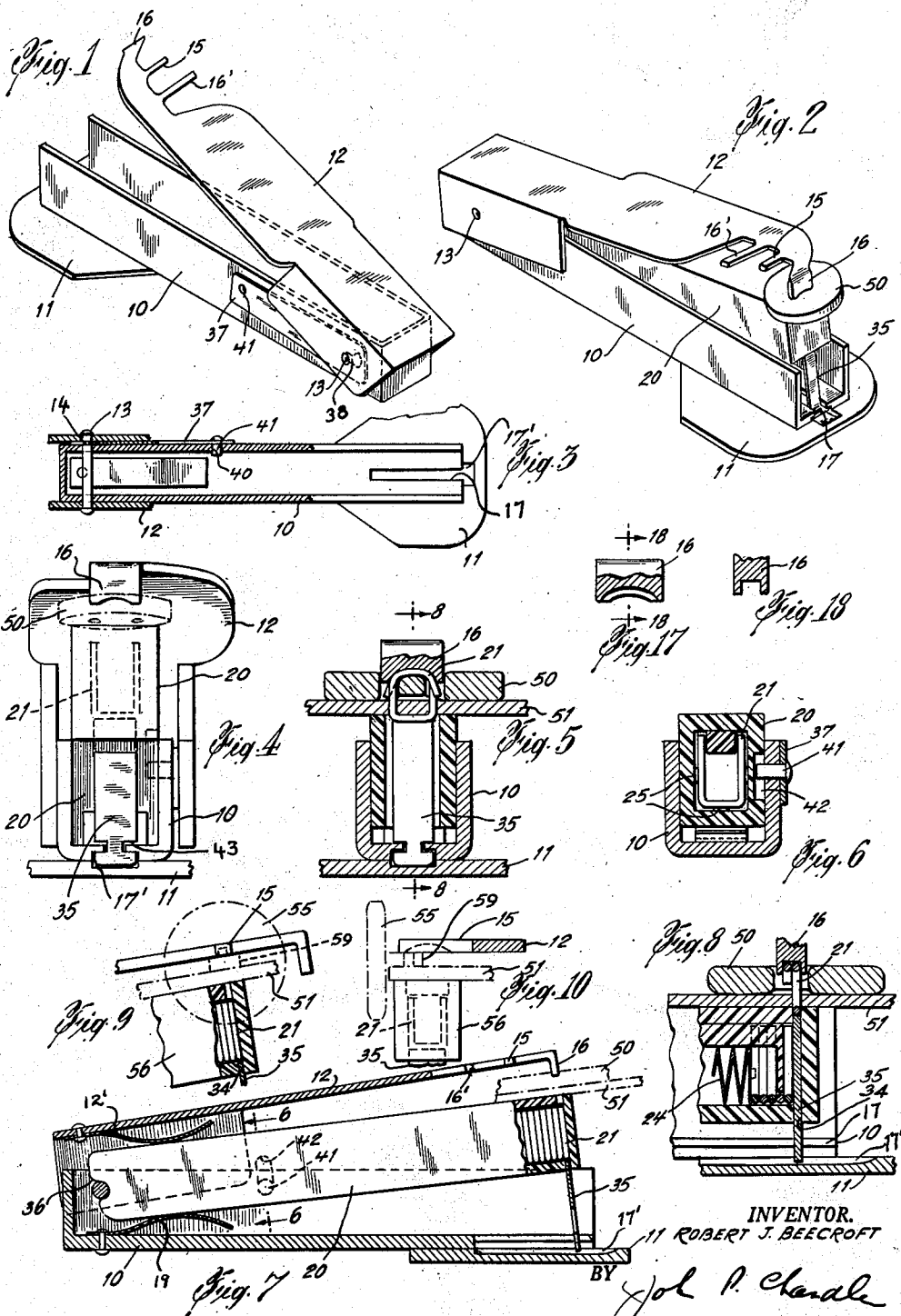
March 31, 1953

R. J. BEECROFT
STAPLING MACHINE

2,632,889

Filed March 22, 1950

2 SHEETS—SHEET 1



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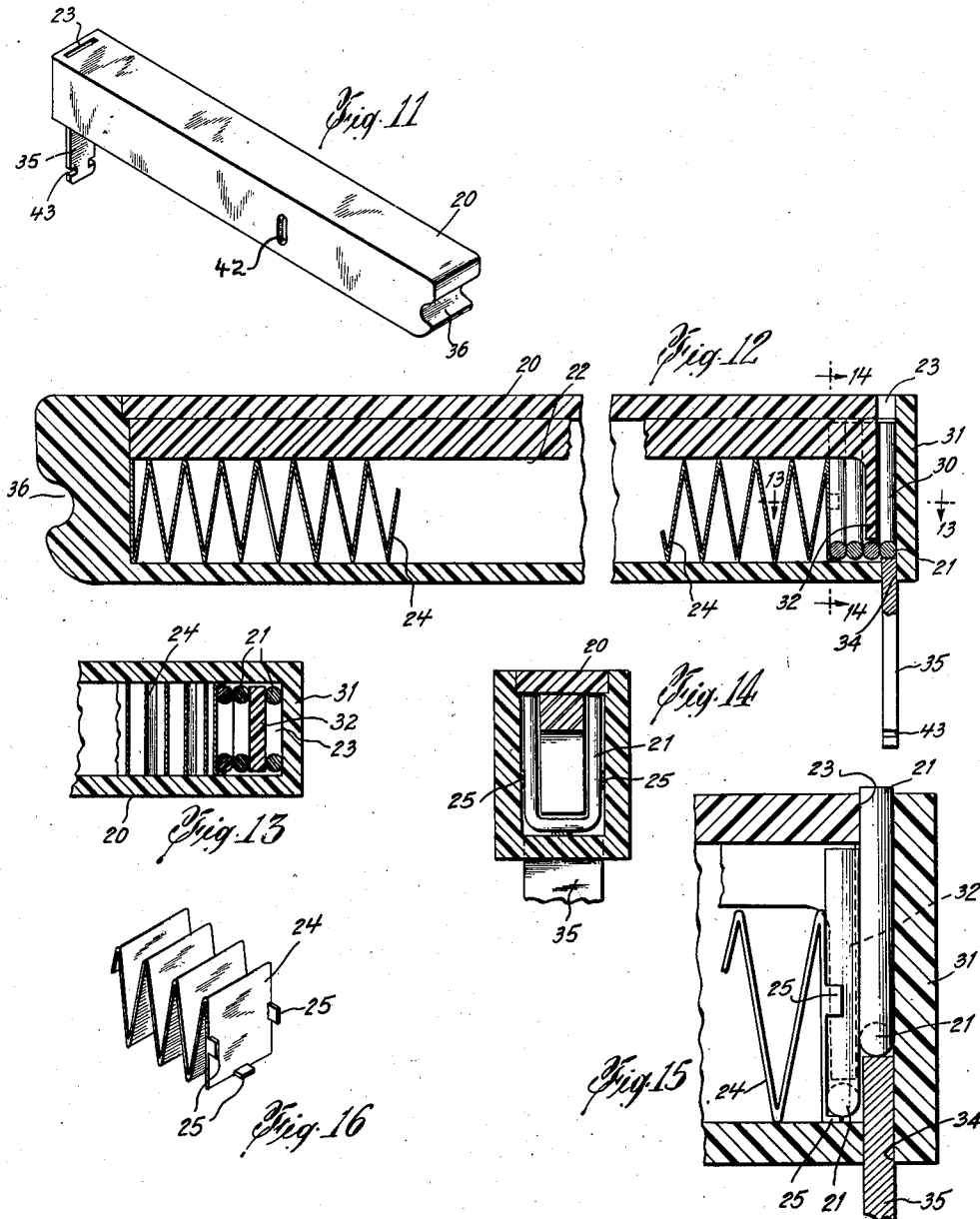
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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STAPLING MACHINE

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3 Claims. (Cl. 1—3)

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This invention relates generally to stapling machines and in particular to a button stapling machine and staple cartridge therefor.

The invention is directed toward the stapling of buttons or the like on cards for the purpose of display and sale thereof. When offered for sale in this manner, the retail price is necessarily low therefore a minimum production cost is primarily important. Other means of attachment are available, however, the cost of the labor involved prohibits the use thereof. It is readily apparent that staples are the most expedient and inexpensive means available, however heretofore, the machines required for the stapling operation were large, bulky and relatively expensive, mass production being the only practical method of keeping production costs at a minimum.

The present invention eliminates the need for the expensive, bulky stapling machines and provides a novel device which can be utilized by even the smallest of button manufacturers. In fact, individuals who have the need for such a machine may utilize the instant invention to fulfill their requirements.

The invention consists of a hand operated stapling machine that is of extremely novel construction and which may be fabricated of inexpensive sheet-metal stampings and provides for the reception therein of a staple magazine in the nature of a cartridge.

The cartridge is sealed except for a relatively small throat opening through which the staples pass, hereinafter disclosed in detail, and therefore dirt and other extraneous matter can not accumulate to produce a staple jam. Also the cartridge has been designed to be inexpensively produced and is therefore expendable, i. e., upon exhaustion of the staples therein, the empty cartridge is thrown away and a full cartridge inserted in the machine. This practice avoids the direct handling of the staples and prevents punctured fingers or cuts which previously resulted from the sharp points thereon.

It is a primary object of the invention to provide a stapling machine which will staple buttons or the like to a card.

Another object resides in the provision of a stapling machine having plural anvils thereon.

Still another object provides for a stapling machine having a magazine in which a staple cartridge may be positioned.

A further object provides for a cartridge having staples sealed therein.

And a still further object provides for a cartridge having internal spring means which transports staples to a throat opening therein.

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Another object provides of a cartridge having staples and a driving hammer therefor.

And another object provides for a cartridge having means thereon for the latching thereof in a stapling machine.

Another object provides for a stapling machine having releasable means for latching a cartridge in operative position.

A further object provides for a stapling machine having means for actuating the cartridge staple driving hammer.

And a further object provides for a stapling machine wherein the staples are driven upwardly.

And another object provides for a stapling machine that will accommodate cartridges of differing lengths.

Other ancillary objects will be apparent from the following detailed description when read in the light of the drawings in which:

Fig. 1 is a perspective view of a stapling machine.

Fig. 2 is a perspective view of the invention illustrating a staple magazine or cartridge therein and a button in stapling position.

Fig. 3 is a plan view of the cartridge and stapling arm therefor.

Fig. 4 is a front elevational view of the stapling machine with a staple illustrated in dotted line, about to be driven into a button.

Fig. 5 is a sectional front elevation of the stapling machine with the staple secured to a button and the cartridge in the lowermost position.

Fig. 6 is a sectional view taken along line 6—6 of Fig. 7.

Fig. 7 is a sectional side elevational view of the invention in open or normal position.

Fig. 8 is a fragmentary sectional view taken along line 8—8 of Fig. 5.

Fig. 9 is a fragmentary side elevational view of a button positioned relative to the staple and anvil.

Fig. 10 is a fragmentary side elevational view of the second type of button having attachment means at the rear thereof, in position to be attached to a foreign member.

Fig. 11 is a perspective view of a staple cartridge.

Fig. 12 is a sectional side elevational view of a cartridge showing the spring staple carrier.

Fig. 13 is a fragmentary sectional view taken along line 13—13 of Fig. 12.

Fig. 14 is a sectional view taken along line 14—14 of Fig. 12.

Fig. 15 is an enlarged fragmentary sectional

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view of a staple cartridge with a staple positioned midway in the throat.

Fig. 16 is a perspective view of the spring staple feeder.

Fig. 17 is a fragmentary sectional view of an anvil.

Fig. 18 is a fragmentary sectional view taken along line 18—18 of Fig. 17.

Referring to Figs. 1 and 2, the stapling machine shown therein consists essentially of a stapling arm 10, a base plate 11 thereon and an anvil carrying arm pivotally secured to the stapling arm 10. The arm 12 is supported on a pin 13 having an annular recess 14 in the periphery thereof; the pin 13 being journaled in appropriate openings in the side walls of the stapling arm 10. Formed on the arm 12 are the anvils 15, 16 and 16', the purpose of which will be hereinafter apparent.

One end of the lower wall of the stapling arm 10 is slotted at 17 and has adjacent thereto a slotted recess 17' formed in base plate 11.

Adapted to reside within the stapling arm 10 is a cartridge 20, Figs. 11, 12, 13, 14 and 15, in which plural staples 21 are supported. The staple carrying member 20 which is referred to herein as a cartridge, which after it is empty is thrown away, rather than as a magazine which normally stays with the device, is preferably constructed of inexpensive and suitable plastic material, has a chamber 22 therein which is sealed against dirt and extraneous matter except for a throat opening 23 at one end thereof. The staples 21, aligned one to the other, are urged toward the throat opening 23 by means of a staple feeder which may comprise a ribbon spring 24, the end of which contacts the rearmost staple 21. Formed from the spring 24, Fig. 16, are plural ears 25 which are arranged to engage and position the rearmost staple 21 relative thereto. The ears 25 extend forwardly of the staple 21 approximately a distance equal to the radius of the staple wire and therefore permits the utilization of the last remaining staple in the cartridge.

The throat 30 through which the staples 21, Fig. 12, are driven is formed by the end wall 31 of the cartridge 20, and a guide member 32 secured within the cartridge. The inner wall of the throat 30 and the wall 31 are positioned to provide sufficient clearance for the passage of a single staple therethrough and the inner wall 32 is formed to provide clearance on three sides thereof for the passage of the staples 21 therepast. The lowermost side of the guide member 32 retains the succeeding staple 21 in feeding position during the passage of a staple through the throat 30 and throat opening 23.

Mounted for sliding movement in an aperture 34 in the base of throat 30 is a driver 35 which engages the staple 21 positioned in the throat 30 and in the stapling operation, hereinafter described, urges the said staple upwardly. The succeeding staple is restrained from entering the throat 30 by the presence of the driver 35 and only when the said driver has returned to the position shown in Fig. 12 will the succeeding staple be urged into effective driving position.

The cartridge 20 has at one end thereof, a recess 36 in which the pin 13 resides when the said cartridge, Fig. 7, is positioned in the stapling arm 10. Intermediate the arm 12 and a side wall of stapling arm 10, is a spring latch 37 having an aperture 38 therein which is arranged to reside in a portion of the annular recess 14, thus locking the pin 13 against lateral movement. Secured to

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the other end of spring latch 37 is a pin 41 which passes through an aperture 40 formed in the related side wall of the stapling arm 10. The spring latch 37 is slightly longer than the area between the aperture 40 and the pin 13, therefore the presence of the pin 41 in the aperture 40 urges a portion of the periphery of aperture 38 into the annular recess 14 in the pin 13.

The pin 41 extending into the stapling arm 10 engages a slotted recess 42 formed in the side of cartridge 20 and the said cartridge pivoting on pin 13 is limited by the pin 41 contacting the ends of the slotted recess 42. Urging the cartridge 20 upwardly, is a spring 19 secured at one end to the lower wall of the stapling arm 10.

During the insertion of a cartridge 20 in the stapling arm 10, the recesses 43 in the hammer 35 are positioned to permit the sides of slot 17 to slide therein.

Thus, the driver 35 is latched to the stapling arm 10. It will be noted therefrom, that in action, the driver 35 is stationary while the cartridge reciprocates relative thereto. As shown in Figs. 2, 4, 5, 7, 8, 17 and 18, the arm 12 having the anvils 15, 16 and 16' thereon, traveling downwardly by manual pressure compresses the spring 12' and moves the cartridge 20 therewith, to commence upward movement of a staple 21. The button 50 is positioned between the said arm and the cartridge 20. Further downwardly movement of arm 12 urges the staple 21 in the throat 30 against driver 35. The driver is immobile therefore the staple 21 moves upwardly through the throat opening 23 engaging the card 51, passing therethrough and also the openings in the button 50 until engaged by the respective anvil. Continued pressure thereon bends the arms of the staple 21 inwardly thus securing the said button to the card. Subsequent removal of the manual pressure permits the spring 12' to return the arm 12 upwardly, allowing the card and button to be removed from the stapling machine and the succeeding staple to be positioned for the next stapling operation.

Figs. 9 and 10 illustrate the stapling of a second type of button 55 wherein a ring 59 extends at right angles to the rear of the button and the ring is attached to the card by driving the staple through the ring and the card. In this instance the anvil 15 is employed to clinch the staple after it has passed through the attaching aperture. To position the cartridge throat opening 23 in alignment with the anvil 15, the relative long cartridge 20 is removed and a shorter cartridge 56 is inserted in the stapling arm 10. The cartridges 20 and 56 are identical in every respect except in length.

The anvil 16' is provided for stapling a relatively large button, not shown, in a manner similar to that already disclosed. In this case however, the cartridge would be of a still shorter length and the staples therein may be larger, i. e., the crown of the staple would be proportionate to the positioning of the holes in the larger button. One of the special purposes for which the present staple is provided, i. e., attaching buttons to cards, requires that the user see the full operation. This accounts for the narrowness of anvils 15 and 16'. Such visibility is not necessary when driving a staple through pieces of paper.

It will be clear from the foregoing that when a staple magazine of intermediate size is being used, and which employs anvil 15 to clinch the staple the only change will be that staple driv-

ing blade 35 will be positioned further inwardly in slot 17 than is shown in Figs. 7 and 8. Similarly when the shortest magazine is employed, in conjunction with anvil 16', the blade 35 will be positioned still further inwardly and slot 17 is of sufficient length to permit the inward positioning.

The cartridges are intended to be constructed of a relatively inexpensive material to permit the disposing thereof when exhausted of staples so that a new cartridge may be readily inserted in the stapling machine. This desirable feature prevents possible injury to the handler thereof and allows for rapid reloading of the machine.

While the preferred embodiment of the invention is disclosed as applied to the stapling of buttons, it is understood that the instant invention may be readily adapted to staple other types of objects.

While a form or embodiment of the invention has been shown and described herein for illustrative purposes, and the construction and arrangement incidental to a specific application thereof have been disclosed and discussed in detail, it is to be understood that the invention is limited neither to the mere details or relative arrangement of parts, nor to its specific embodiment shown herein, but that extensive deviations from the illustrated form or embodiment of the invention may be made without departing from the principles thereof.

In which I claim:

1. A stapling machine comprising a stapling arm and an anvil arm joined together at one end thereof by a pivot pin, the other end of the stapling arm having a slot therein, a disposable cartridge for the staples which is arranged to be mounted at one end thereof on the pivot pin and having a staple throat at its opposite end, a staple driver slidably mounted in the throat and having a portion at its non-driving end received in the slot in the stapling arm so as to move the driver to drive a staple when the cartridge is moved toward such arm, springs for normally centering the cartridge between the arms, and pin-and-slot means for limiting movement between the stapling arm and the cartridge.

2. A stapling machine comprising a stapling

arm and an anvil arm joined together at one end thereof by a pivot pin, the other end of the stapling arm having a slot therein, a disposable cartridge for the staples which is arranged to be mounted at one end thereof on the pivot pin and having a staple throat at its opposite end, a driver slidably mounted in the throat and having a portion at its non-driving end received in the slot in the stapling arm in locked relation so as to move the driver to drive a staple when the cartridge is moved toward such arm, springs for normally centering the cartridge between the arms, the cartridge having a slot in the side wall thereof and a pin mounted in the stapling arm extending into such slot for limiting movement between the stapling arm and the cartridge.

3. A stapling machine comprising a stapling arm, an anvil arm and a pivot pin for joining the arms together at one end thereof, the other end of the stapling arm having a longitudinal slot therein, a disposable cartridge for the staples which is mounted at one end thereof on the pivot pin and having a staple throat at its opposite end, a driver slidably mounted in the throat and having a generally T-shaped portion which is received in the slot in the stapling arm to lock the driver to the stapling arm so as to move the driver to drive a staple when the cartridge is moved relative to such arm, springs for normally centering the cartridge between the arms, and pin-and-slot means for limiting movement between the stapling arm and the cartridge.

ROBERT J. BEECROFT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
541,088	Heird	June 18, 1895
580,556	Reinhold	Apr. 13, 1897
836,662	Briggs	Nov. 20, 1906
2,227,314	Maynard	Dec. 31, 1940
2,237,589	Dole	Apr. 8, 1941
2,251,917	Crosby	Aug. 12, 1941
2,309,763	Goodstein	Feb. 2, 1943