April 19, 1955 O. MOEN 2,706,292

RAISER STRUCTURE FOR STAPLING MACHINES

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Fig. 1.

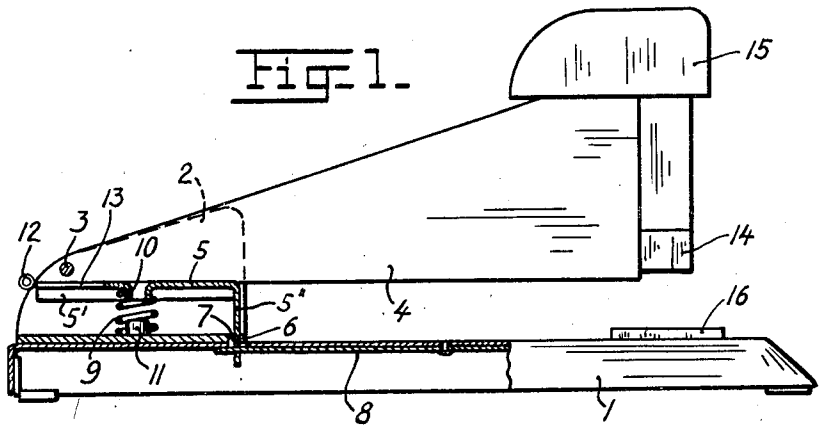


Fig. 2.

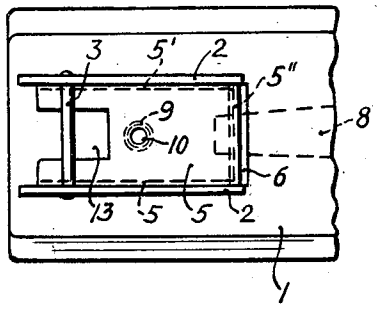
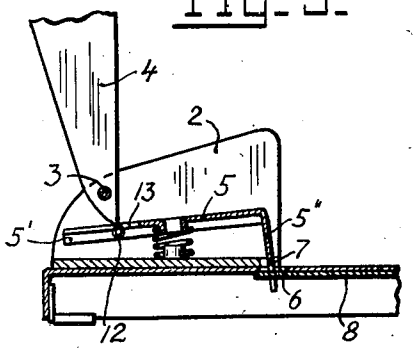


Fig. 3.



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RAISER STRUCTURE FOR STAPLING MACHINES

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8 Claims. (Cl. 1—3)

The present invention relates to stapling machines of the type in which a staple magazine and plunger are pivotally supported on a base. In particular, the invention is directed toward resilient structure for swinging the magazine and plunger upward relative to the base about the interconnecting pivot after a staple setting operation has been completed.

A stapling operation is accomplished in the usual way by applying pressure to a knob at the swinging end of the magazine, the initial effect of which is to swing the staple magazine downward into engagement with the work and thereafter the plunger moves downward relative to the staple magazine to force a staple through the work and clinch its free ends against an anvil. Downward swinging of the staple magazine is resiliently resisted by spring mechanism which serves to return the staple magazine to its upwardly swung position again when pressure on the knob is released following the stapling operation.

The principal object of the present invention is to provide a simpler and more effective type of resilient mechanism for returning the staple magazine to its upper position and arresting such upward movement in the desired position of rest. In the present device the staple magazine not only is arrested in its desired upper position, but is held resiliently in such upper position against movement by the force of gravity if the stapling machine is turned upside down.

A further object is to provide such staple magazine arresting and resilient holding mechanism which will not excessively resist movement of the staple magazine relative to the base either during a stapling operation or when the staple magazine is intentionally swung away from the base for application of staples without clinching them against the base anvil.

In accomplishing the aforementioned objects a spring is positioned to react between the base and a plate element which engages the portion of the staple magazine adjacent to the base for a considerable extent generally parallel to the base. The spring acting substantially at the middle of such plate element exerts a force substantially perpendicular to such plate element and the base and thereby tends to move the plate element through positions parallel to the base and urge it in such attitude against the staple magazine, so that in turn the portion of the staple magazine engaged assumes a position parallel to the base.

A preferred type of mechanism embodying the present invention is illustrated in the accompanying drawings.

Figure 1 is a side elevation view of a stapling machine incorporating the present invention with parts broken away.

Figure 2 is a fragmentary plan view of the staple magazine supporting end portion of the base, the staple magazine being removed.

Figure 3 is a fragmentary longitudinal sectional view through the staple magazine supporting end portion of the base and the adjacent portion of the staple magazine attached thereto, with the staple magazine swung into a position extending transversely of the base.

On the upper side at one end the base plate **1** carries flanges projecting upward from it in spaced parallel relationship which may be formed by the opposite sides of a U-shaped bracket **2** having its web portion suitably secured to the base. Between these flanges extends the pivot pin **3** on which the elongated staple magazine, having one end received between such flanges, is mounted. The end of the staple magazine remote from pivot **3** carries the

staple-applying plunger **14**, reciprocable downward by pressure on the knob **15**.

In the absence of any movement limiting or restraining mechanism, the staple magazine **4** would be swingable relative to the elongated base **1** about pivot **3** through at least 180°. It is desirable for the staple magazine and the base normally to lie in generally parallel relationship alongside each other, spaced apart sufficiently for work to be stapled to be received between the plunger **14** and a clinching anvil **16** on the end of base **1** remote from the bracket **2** and in a position registering with the plunger **14**. The mechanism of the present invention for accomplishing such normal disposition of the staple magazine relative to the base includes the raiser received between the flanges of bracket **2** and including a plate portion **5** preferably of a width approaching the spacing between such flanges. This plate portion may be stiffened lengthwise of the staple magazine and base by downturned flanges **5'** formed on opposite edges of the plate portion and disposed alongside the base flanges, respectively, to locate the raiser relative to such base flanges.

The plate portion **5** of the raiser which bears against the lower portion of the staple magazine **4** extends from the rearward end of such magazine approximately to the front end of bracket **2**, so that the plate portion of the raiser extends to both sides of a plane through the axis of the pivot pin **3** which plane is perpendicular to the base **1**, the major part of the length of such raiser plate portion being positioned forward of such plane, that is, toward the plunger **14** and anvil **16** from the pivot, and the minor part of the length of such raiser plate portion being positioned rearward of such plane, that is, at the side of pivot pin **3** remote from the plunger **14** and anvil **16**. At the front end of the plate portion, namely that adjacent to the anvil **16**, an angle portion **5''** of the raiser extends downwardly from such major plate portion toward the base and its lower end passes through a slot **6** in the base, the length of which extends transversely of the base. The lower end of such raiser angle portion has an aperture **7** receiving the rear end of a leaf spring **8** extending lengthwise of the base and secured beneath its upper surface, as shown in Figures 1 and 3. The front end of such leaf spring may hold the anvil **16** in the desired operating position.

The plate portion **5** of the raiser is pressed into engagement with the lower edge of the staple magazine **4** by a helical spring **9** reacting between the base **1** and approximately the central part of the plate portion **5** of the raiser. In order to hold the spring **9** in position interengaged between the base and raiser a collar **10** is pressed downwardly out of the material of the plate portion **5**, of a size to fit within the end of the spring. To locate the other end of the spring a pin **11** extending within it is mounted on the central portion of the U-shaped bracket **2**.

In the position shown in Figure 1 the plate portion **5** of the raiser pressed against the portion of the staple magazine **4** which is adjacent to the base **1**, normally holds such magazine in a position substantially parallel to the base **1** as illustrated. Upward movement of the rear end of the raiser is limited by pressure of the raiser against the portion of the staple magazine immediately beneath pivot pin **3**. Upward movement of the forward end of the raiser effected by spring **9** is limited by engagement of the lower edge of slot **7** with spring **8**, upward movement of which in turn is limited by engagement of such spring with the under side of the base **1**. The length of the angle portion **5''** between the lower edge of the slot **7** and the surface of the plate portion **5** engaging the staple magazine is such relative to the spacing between the portion of the staple magazine adjacent to the base at the location of pivot pin **3** and the base as to dispose the staple magazine **4** in any desired relation to the base **1**. Preferably such length of the angle portion of the raiser mentioned is equal to the spacing between such portion of the staple magazine and the base also mentioned, so that upward movement of the raiser will be arrested with its plate portion **5** disposed in a plane parallel to the base **1**. If the portion of the staple magazine **4** engaged by this raiser portion is parallel to the remainder of the under surface of the staple magazine, such magazine will

therefore be held in a position of rest in which its under surface is parallel to the base 1.

Because the plate portion 5 of the raiser extends to both sides of a vertical plane through the pivot axis of the staple magazine 4 defined by the pin 3, the raiser serves the further purpose of resisting movement of the staple magazine away from the base when the stapling machine is lifted and transported by the magazine or the knob 15. When the stapling machine is thus held, the force of gravity acting on the base 1 tends to swing its anvil end downward relative to the staple magazine, but such movement would require deflection of the rear end of the base relative to the part of the raiser plate portion 5 and staple magazine rearwardly of the pivot pin and a consequent withdrawal of the forward portion of such raiser from contact with the adjacent edge of the staple magazine. Such movement would compress spring 9 somewhat, so that the spring resists this movement, and preferably it is stiff enough so that the weight of the base 1 would not effect any appreciable movement of this type.

Despite the action of spring 9 in thus resisting inadvertent angular displacement of the base relative to the staple magazine, such magazine may readily be swung intentionally away from the base in opposition to the force of spring 9, as indicated in Figure 3. During this movement the rearward end of the staple magazine is swung about pivot pin 3 into closer proximity to the base 1, and by such lever action forces toward the base the rearward end of the raiser. As shown in Figure 3, the raiser is tilted about the lower edge of its aperture 7 engaged by the leaf spring 8 and the spring 9 is compressed.

The staple magazine includes a spring for holding the staples within it and urging them toward the plunger 14, and the rearward end of this spring is formed as a loop 12 extending rearwardly beyond the staple magazine. In order to avoid interference between this spring loop and the raiser when the staple magazine is swung away from the base 1, the rearward portion of the raiser is provided with a notch 13 opening at its rearward end as shown in Figures 1, 2 and 3, to receive such spring end loop in the manner illustrated in Figure 3 as it moves toward the base.

I claim:

1. In a stapling machine, an elongated base, an elongated staple magazine disposed substantially parallel to said base and having one end pivotally supported from said base, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base and said plate portion extending to both sides of that plane in which said magazine's pivot axis lies and which plane is perpendicular to said base, and spring means interengaged between said base and said raiser and urging said raiser plate portion toward said staple magazine.

2. In a stapling machine, an elongated base, a pair of flanges projecting from one side of said base in spaced parallel relationship, a pin extending between said flanges, an elongated staple magazine disposed substantially parallel to said base and having one end pivotally mounted on said pin, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base, said plate portion having a minor part of its length extending along such magazine portion which is disposed at one side of that plane in which said magazine's pivot axis lies and which plane is perpendicular to said base, and said plate portion having a major part of its length extending along such magazine portion which is disposed at the other side of such plane, spring means interengaged between said base and said raiser and urging said raiser plate portion toward said staple magazine, and means interconnecting said base and said major part of said raiser's plate portion and operable to limit separating movement of said base and said major part of said raiser's plate portion, but permitting movement of said major part of said raiser's plate portion toward said base.

3. In a stapling machine, an elongated base, a pair of flanges projecting from one side of said base in spaced parallel relationship, a pin extending between said flanges, an elongated staple magazine disposed substantially parallel to said base and having one end pivotally mounted on said pin, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base and said plate portion extending to both sides of that plane in which said magazine's pivot axis lies and which plane is perpendicular to said base, and a helical spring interengaged between said base and the central part of said plate portion of said raiser and urging said raiser plate portion toward said staple magazine.

4. The stapling machine construction defined in claim 3, in which the raiser's plate portion has a member projecting from it into one end of the spring and operable to anchor such spring end relative to the raiser, and the base has a member projecting from it into the other end of the spring and operable to anchor such other spring end relative to the base.

5. In a stapling machine, an elongated base, an elongated staple magazine disposed substantially parallel to said base and having one end pivotally supported from said base, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base, spring means interengaged between said base and said raiser and urging said raiser plate portion towards said staple magazine, and said raiser having an angle portion disposed at an angle to said plate portion and extending therefrom to said base, and means carried by said base, engaging said angle portion of said raiser and limiting movement thereof away from said base but permitting movement thereof toward said base.

6. In the stapling machine defined in claim 5, the base being apertured to receive the end of the raiser's angle portion remote from the raiser's plate portion, the portion of the raiser's angle portion received through such base aperture being apertured, and a securing member extending through such raiser's angle portion aperture and engageable with the base to secure the raiser's angle portion against withdrawal of its end from the base aperture.

7. In a stapling machine, an elongated base, a pair of flanges projecting from one side of said base in spaced parallel relationship, an elongated staple magazine disposed substantially parallel to said base, received between said flanges, and having one end pivotally supported by said flanges, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base, disposed between said flanges, and said raiser having flanges along opposite edges thereof disposed respectively adjacent to the flanges of said pair of base flanges, respectively, and projecting toward said base, and spring means interengaged between said base and said raiser and urging said raiser plate portion toward said staple magazine.

8. In a stapling machine, an elongated base, an elongated staple magazine disposed substantially parallel to said base, having one end pivotally supported by said base, and having a projection beyond such pivoted end, a raiser including a plate portion engaging that portion of said staple magazine which is adjacent to said base and having a notch in the end thereof adjacent to said staple magazine projection, opening at such end, and operable to receive said projection as said staple magazine is swung away from said base, and spring means interengaged between said base and said raiser and urging said raiser plate portion toward said staple magazine.

References Cited in the file of this patent

UNITED STATES PATENTS

2,087,779	Pankonin	July 20, 1937
2,097,865	Stockel	Nov. 2, 1937
2,271,926	Pankonin	Feb. 3, 1942
2,277,347	Pankonin	Mar. 24, 1942