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STAPLE FEED FOR STAPLING MACHINES

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This invention relates to staple feeds for stapling machines.

It is an object of the invention to provide improved means for the feed of staples which are connected by a common coating and thus do not permit the interpositioning of a feeding device.

According to the present invention there is provided a stapling machine comprising a carrier for a strip of U-shaped staples, means defining a driving channel at one end of the carrier, the driving channel serving to receive the end staple of the strip, a reciprocable driver for ejecting the end staple from said channel, a feed brush arranged for co-operating with the webs of the staples in the strip, and means co-operating with the brush and the driver for feeding the staples towards the channel during operation of the driver.

For a better understanding of the invention and to show how the same may be carried into effect reference will now be made to the accompanying drawing, in which

FIGURE 1 is a sectional view through a stapler having a staple feed mechanism provided in accordance with one embodiment of the invention,

FIGS. 2 and 3 are cross-sectional views on the lines 2—2 and 3—3 of FIG. 1,

FIG. 4 is a sectional view of another staple feed mechanism,

FIG. 5 is a sectional view on the line 5—5 of FIG. 4, and

FIG. 6 is a sectional view of a staple having a different staple feed mechanism provided in accordance with the invention.

The stapling machine in which the feed mechanisms may be incorporated consists in known manner of a base plate 1, a clinching anvil 2 and a housing 3. The housing 3 is pivoted to base plate 1 by pin 25 and can be moved towards or away from the base plate 1. Housing 3 includes a staple driver 4 and a staple carrier 5 which supports a supply of staples 6. In housing 3, a control lever 27 is pivoted on a pin 26. Lever 27 is maintained in position by a spring 28 and supports at its front end 29 an inwardly directed bolt 30 which in an opening 31 accommodates driver 4. A spring (not shown) urges members 1 and 3 to basic relative positions as illustrated and is weaker than spring 28. This enables the stapler to work in conventional manner. With machines of this type it is necessary to insure that, after a staple has been driven and used, the staples 6 are displaced on the carrier 5 by an amount equal to the thickness of one staple thus insuring that the foremost staple is always brought into position under the driver 4. For this purpose, a bar 8 is provided in the housing 3, the bar 8 being guided by transverse pins 9 supported on housing 3 and located in slots 7. The bar 8 is continuously urged towards the driver 4 by means of a spring 10. The bar 8 is situated above the staple carrier 5 and carries, near the end adjacent the driver 4, a brush 11 whose bristles 12 are directed forwards towards the driver 4. The construction is such that the bristles 12 bear with slight pressure against the webs of the staples 6 supported on the carrier 5. Thus the brush 11 with bristles 12 urges the staples to a position wherein the foremost staple bears against the front wall 13 of the housing 3. Nylon and flexible steel bristles, for example,

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have been found satisfactory for this type of operation since they have both sufficient strength and elasticity.

In order to effect the feed movement necessary after each stapling operation, the bar 8 is provided at its front end with an inclined surface 14 with which there is associated an opposing surface 15 on the driver 4. The arrangement of the two surfaces 14 and 15 is such that, when the driver 4 moves down to perform a stapling operation, as soon as it enters the driving channel which is filled by the first staple 6 of the strip, the surface 15 of the driver 4 bears against the surface 14 of the bar 8 and then, with the further descent of the driver 4, pushes the bar 8 back against the action of the spring 10. When the driver 4 returns to its initial position after having completed the stapling operation, the surface 15 releases the bar 8, which is then returned towards the driver 4 by the spring 10. As the bar 8 moves under the action of the spring 10 the bristles 12 of the brush 11 catch on the staples 6 on the staple carrier 5 so that the staples 6 are moved forward until the foremost staple bears against the front wall 13 of the housing 3.

In order to prevent the bristles 12 from moving the staples 6 during rearward movement of the bar 8, the mechanism of FIGURES 1, 2 and 3 provides for the brush 11 to be made of a width such that it only bears against the middle third of the webs of the staples. Fixedly arranged on either side of the brush 11 and forward thereof are two fixed brushes 16 and 17 supported by supports 16a and 18a on the side walls of the housing 3, their bristles 18 also inclined towards the driver 4, and bearing against the webs of the staples 6. Thus the bristles 18 of the brushes 16 and 17 prevent the staples 6 from being moved by the bristles 12 of the feed brush 11, when the bar 8 moves rearwards.

In the mechanism shown in FIGURES 4 and 5, the bristles 12 of the brush 11 contact the staples 6 over the whole width of their webs. In this case, there is provided in the carrier 5 a fixed brush 16' whose bristles 18' are inclined towards the driver 4 and bear against the undersides of the staple webs. The bar 8 can also carry further brushes 11' (FIG. 1).

In the mechanism of FIGURE 6, an endless brush band 12a cooperates with the webs of the staples 6.

The brush band 12a extends over the whole length of the strip of staples 6 and around a front reversal roller 19 which is connected to a ratchet wheel 20 arranged to be advanced by a pre-determined amount by a push member 21 at each return movement of the driver 4.

In other words, band 12a is moved in the direction of arrows A in accordance with the rotation of ratchet wheel 20 which is actuated by the driver 4 operating through push member 21, the remainder of this stapler corresponding to that shown in FIG. 1.

We claim:

1. In a stapler having a housing supporting a staple driver and a carrier for guiding staples towards an ejection channel for being ejected by said driver, a staple feed mechanism comprising: a brush displaceable in the housing for movement in opposite directions towards and away from the ejection channel, resilient means coupled to said brush and urging the same toward the ejection channel, and bristles on said brush directed towards the carrier for engaging the staples and urging the same towards said channel.

2. A stapler comprising means defining an ejection channel and including a guide adapted for supporting staples and guiding the latter towards said channel, a driver adapted to effect a driving stroke and operatively associated with said means to drive said staples through said channel as the staples arrive at the latter, and feeding means operatively disposed with respect to said guide for urging said staples toward said channel; said feeding

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means comprising a brush adjacent said guide and including bristles for engaging said staples, and means coupled to said brush for urging the latter and thereby said staples towards said channel.

3. A stapler as claimed in claim 2, wherein the said means coupled to said brush comprises a spring urging the brush towards said channel, said feeding means further comprising means coupled to said brush for engagement by said driver during a driving stroke thereof to displace said brush away from said channel against the force of said spring whereby said brush is reciprocated back and forth with respect to said channel by the operation of said spring and driver.

4. A stapler as claimed in claim 2, wherein the said means coupled to said brush is a ratchett wheel, said stapler further comprising means on said driver for rotating said ratchet wheel during a driving stroke of said

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driver and an endless belt supporting said brush and being coupled to said ratchet wheel whereby said staples are urged towards said channel by the operation of the driver.

5. A stapler as claimed in claim 2, wherein said bristles are inclined toward said channel so that when said brush is moved toward said channel the staples are urged toward said channel and when the brush is moved away from said channel said bristles pass over said staples without displacing the same.

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