Feb. 13, 1962 D. A. WEINSTEIN 3,020,630

MACHINE FOR MAKING A STAPLE FASTENING BELT

Filed June 24, 1959 2 Sheets-Sheet 1

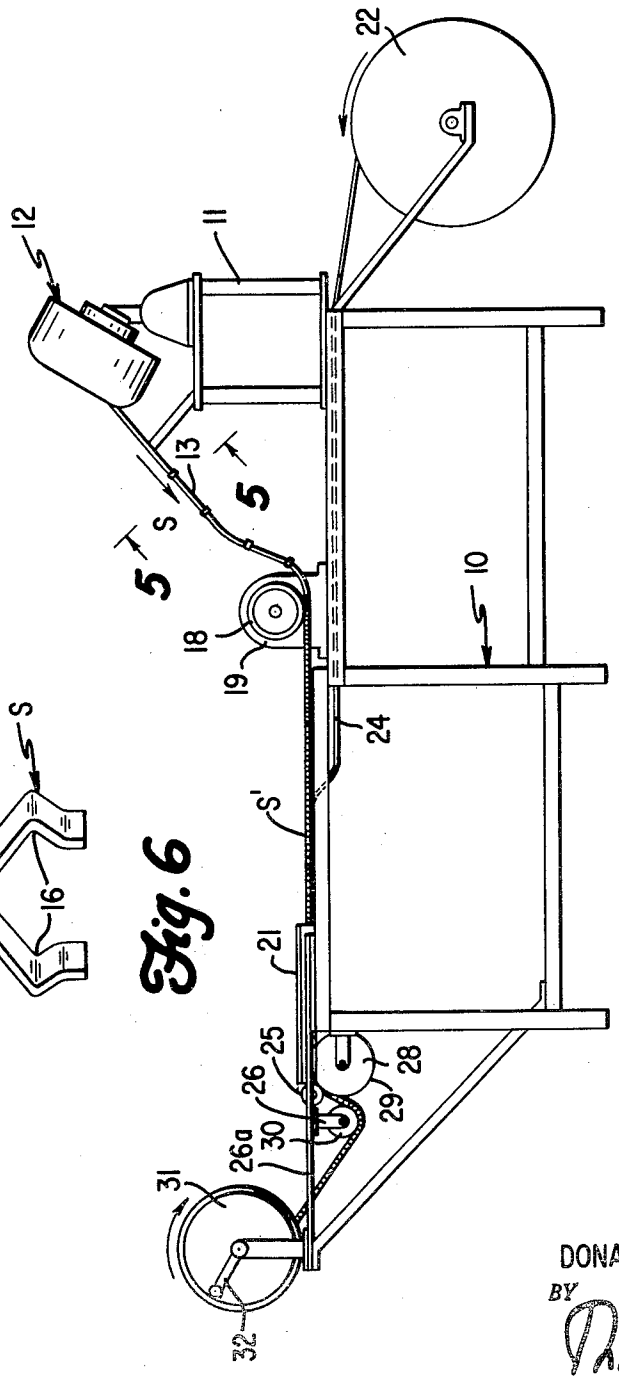


Fig. 6

Fig. 1

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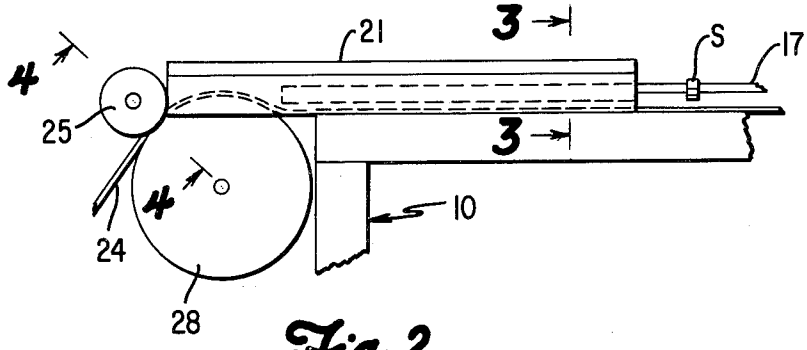


Fig. 2

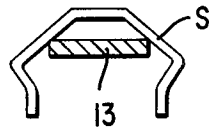


Fig. 5

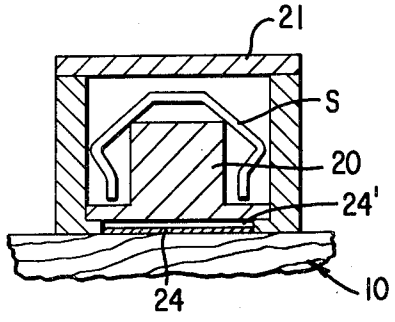


Fig. 3

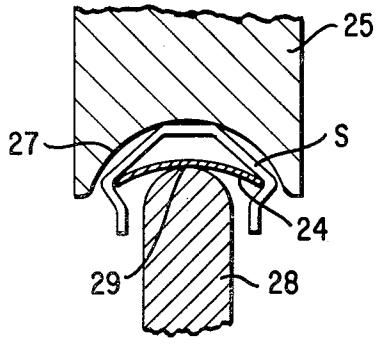


Fig. 4

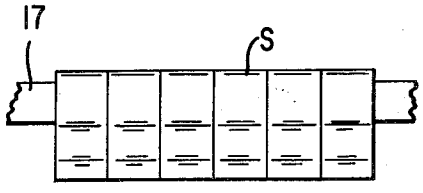


Fig. 7

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MACHINE FOR MAKING A STAPLE FASTENING BELT

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3 Claims. (Cl. 29—211)

This invention relates to a machine for producing a staple element belt or strip adapted to be closely wound on itself into a coil to define a cartridge or refill adapted to be readily loaded into a stapling machine and an object is to produce such machine which is simple and inexpensive to build, operate and maintain, and can quickly and economically mount staple elements on a continuous strip of flexible resilient sheet material.

Other objects and advantages of the invention will hereinafter appear and, for purposes of illustration but not of limitation, an embodiment of the invention is shown on the accompanying drawings in which—

FIGURE 1 is a side elevation of a machine forming a coil of a strip of sheet material containing staple elements providing a cartridge for use in a suitable stapling machine;

FIGURE 2 is an enlarged fragmentary view of one end portion of the machine, showing particularly the means by which the staples are fed to the elongate strip of flexible sheet material;

FIGURE 3 is a transverse sectional view on an enlarged scale taken substantially on the line 3—3 of FIGURE 2;

FIGURE 4 is an enlarged fragmentary sectional view substantially on the line 4—4 of FIGURE 2;

FIGURE 5 is an enlarged transverse sectional view substantially on the line 5—5 of FIGURE 1;

FIGURE 6 is an enlarged perspective view of one of the staple elements; and

FIGURE 7 is an enlarged fragmentary view showing a number of the staple elements advanced on the guide strip to position same in close juxtaposed relation.

The illustrated embodiment of the invention comprises an upright standard or table **10** on one end of which is a vertically disposed supporting frame **11** on which is suitably mounted a motor driven hopper **12** of a type well known in the art and into which is poured a quantity of the staple elements, the actuating part of the hopper rotating and causing the staple elements to travel downwardly by gravity along a downwardly and forwardly inclined track or guide **13** which is in the form of a relatively narrow strip of sheet metal, substantially as shown in FIGURE 5. Each staple element S, particularly as shown in FIGURE 6, comprises a one piece body of sheet metal having a flat end wall **14** from which extend in generally parallel relationship legs **15** forming a generally inverted U. Each of the legs is bent outwardly intermediate its ends to provide diametrically opposed notches **16**, the free ends of the legs being straight and parallel with each other.

As above pointed out the staple elements S slide down the inclined guide or track **13** to a substantially horizontal extension **17** thereof and substantially at the right hand end of the horizontal extension **17** is a rubber rimmed drive wheel **18** which engages the upper flat ends **14** of the staples and propels them quickly and forcefully to provide a horizontally disposed row of staple elements S' with the adjacent elements in engagement with each other. The drive wheel **18** is driven in any suitable manner as by an electric motor **19**. The row staple elements S' encounter an inverted T-shaped track **20** (FIGURE 3) disposed within a closed passageway at **21** which forms the forward end portion of the travel of the horizontal row of staple elements. The passageway **21** confines the top

and sides of each staple element S for militating against canting of misarrangement thereof during advancing movement.

At the right hand end of the machine carried by a suitable bracket is a reel having a roll **22** of relatively stiff flexible sheet material, such as paper. From the roll **22** the paper strip passes forwardly beneath the row S' of staple elements. The width of the paper strip **24** is slightly greater than the distance between the notches **16** of the staple elements S, and as shown, it passes through a guideway **24'** formed directly beneath the inverted T-shaped track **20** and thus is disposed directly beneath the row of staple elements S'.

At the left hand portion of the frame **10** is a roller **25**, the peripheral surface **27** of which is grooved to accommodate the staple elements S, substantially as shown in FIGURE 4. Beneath the grooved roller **25** is a roller **28** which engages the underside of the paper strip and is of substantially larger diameter than the roll **25**. The thickness of the roller **28** is considerably less than the roller **25** in order to fit between the depending legs **15** of the staple element S. The periphery **29** of the roll **28** is rounded as indicated on FIGURE 4 and engages the underside of the elongate sheet metal strip **24** and forces it in upwardly arched form into the successive staple elements S so that the edges of the strip **24** are forced into engagement with the recesses or notches **16** of the fastener S.

The strip **24** then advances under an idler roll **30** suspended from a frame extension **26***a* by a bracket **26** and thence passes to a recoil reel **31** about which the elongate strip **24** with the fasteners thereon in juxtaposed or abutting relation are coiled so that a sufficient number are wound into a cartridge form with the free end suitably secured. The recoil reel **31** in this instance is hand driven by a hand crank **32**. The idler roll **30** serves an important function in equalizing the distance between adjacent staple elements, a spacing of about 1/32" being desirable. If the strip **24** is pulled out faster than the staples are fed, then the idler roll **30** operates to cause the staple elements to become more equally spaced from each other. The same obtains when the strip is pulled more slowly than the staple elements are fed to it.

It will be apparent that the motor driven wheel **18** rapidly propels the staple elements to form a continuous row which is advanced also by the wheel **18** through the covered passageway **21** which ensures that the staple elements are maintained in the proper position for engagement with the paper strip **24**. The latter in this instance is manually advanced by operation of the crank **32**. The strip is sufficiently stiff and resilient so that when pressed into the staple element by the roller **28**, the edges will snap into engagement with the notches **16** and exert adequate friction to retain the staple elements on the strip against accidental shifting or sliding movement. Neither of the rollers **25** and **28** is independently driven but they rotate pursuant to the advancing movements of the row of staple elements and the paper strip **24**. After a predetermined length of the staple element-carrying strip has been coiled by the reel **31**, it provides a cartridge which is removed and a new coil is started.

Numerous changes in details of construction, arrangement and operation may be effected without departing from the spirit of the invention especially as defined by the appended claims.

What I claim is:

1. In a machine for forming a staple element belt, each staple element being of general U-form with each leg outwardly angled to provide oppositely arranged notches, horizontal staple element guide means, power means for feeding staple elements to said guide means for providing and advancing a row of juxtaposed staple elements in

such manner that the staple elements are in inverted U position, a supply of flexible sheet material in elongate strip form, an inverted T-shaped track means disposed in a closed passageway adapted to confine the top and sides of each of said staple elements, a guideway of a width slightly greater than the distance between the notches of said staple elements disposed under said T-shaped track adapted to guide the strip of material to the staple element row in such manner that the strip is at approximately right angles to the legs of the U staple elements, a peripherally grooved roller arranged to engage the upper part of successive staple elements discharged from said guide means, a roller adjacent the end of said passageway of a width to extend between the legs of the U staple and arranged adjacent said grooved roller and beneath the strip material to press the sheet material strip into the staple element engaged by the grooved roller so that the edges of the strip are forced into the notches of

such staple element, said last roller having a curved peripheral surface, and means to impart advancing movement to the strip.

2. The invention defined in claim 1 wherein said means to impart advancing movement to the strip includes reel means adapted to reel the strip carrying said staple elements.

3. The invention defined in claim 1 including an idler roller in advance of said rollers adapted to equalize the spacing between adjacent ones of said staple elements.

References Cited in the file of this patent

UNITED STATES PATENTS

2,355,833	Bertalan	Aug. 15, 1944
2,426,623	Larsen	Sept. 2, 1947
2,515,487	Bertalan	July 18, 1950
2,579,486	Frankwich	Dec. 25, 1951