

[54] **BOTTOM STOP MACHINE**

2,885,679 5/1969 Stanwyck..... 227/86

[75] Inventor: **Morris Perlman**, Brooklyn, N.Y.

1,481,867	1/1924	Holbrook.....	227/86
-----------	--------	---------------	--------

3,190,521	6/1965	Perlman.....	227/3
-----------	--------	--------------	-------

[73] Assignee: **Carbide Form Grinding, Inc.,**
Brooklyn, N.Y.

Primary Examiner—Granville Y. Custer, Jr.

Attorney—Michael S. Striker

[22] Filed: Apr. 1, 1970

[21] Appl. No.: 24,551

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 693,592, Dec. 26, 1967, abandoned.

[52] U.S. Cl. 227/88

[51] **Int. Cl.**..... B27f 7/12

[58] **Field of Search** 227/85, 86, 87, 88,
227/89, 90, 91; 29/207.5 R, 207.5 ST

[56] **References Cited**

UNITED STATES PATENTS

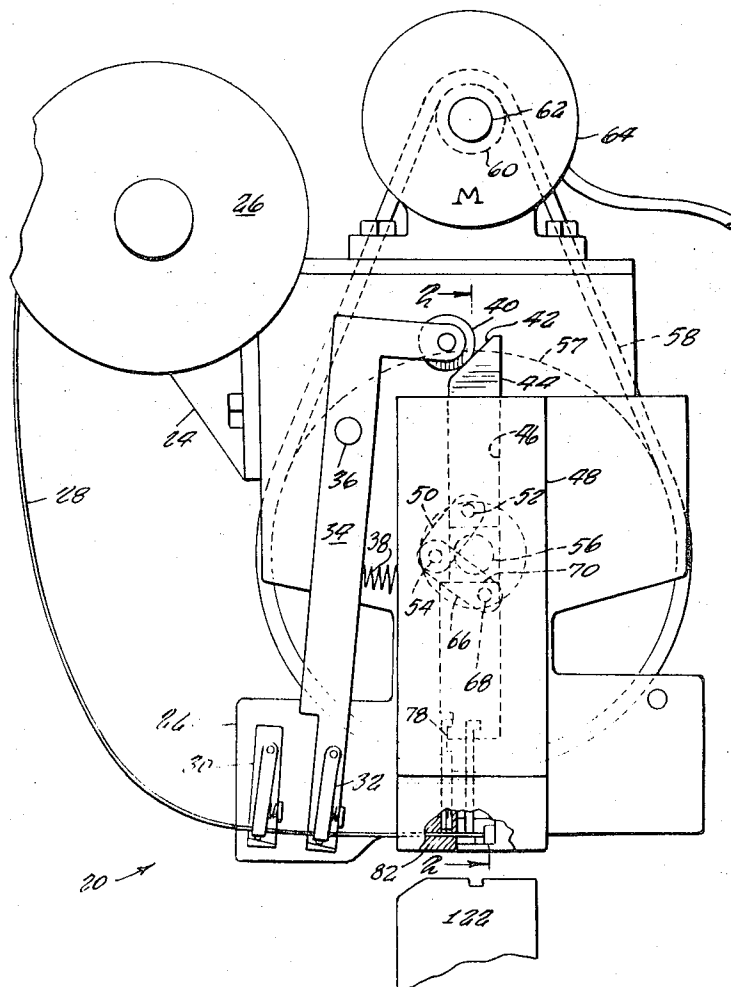
3,233,810	2/1966	Runnels, Jr.	227/7
-----------	--------	-------------------	-------

[57]

ABSTRACT

A machine for automatically manufacturing slide fastener bottom stops from a continuous band of wire, and subsequently securing each bottom stop to a slide fastener chain. The machine includes a mechanism for intermittently feeding a gapped continuous slide fastener chain and the wire band between an anvil and press mechanism that forms the bottom stops and secures them to the slide fastener chain.

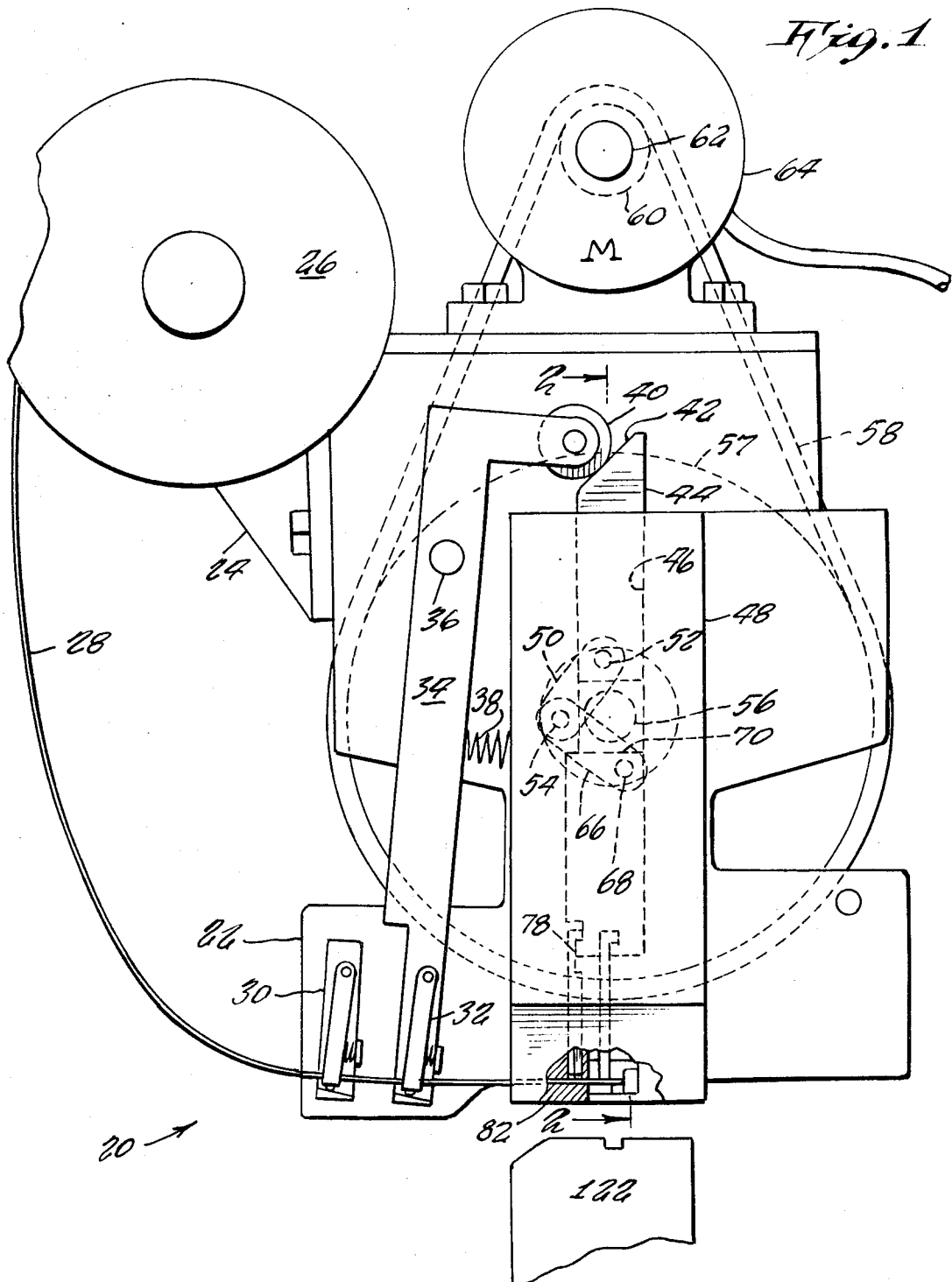
6 Claims, 21 Drawing Figures



Patented July 17, 1973

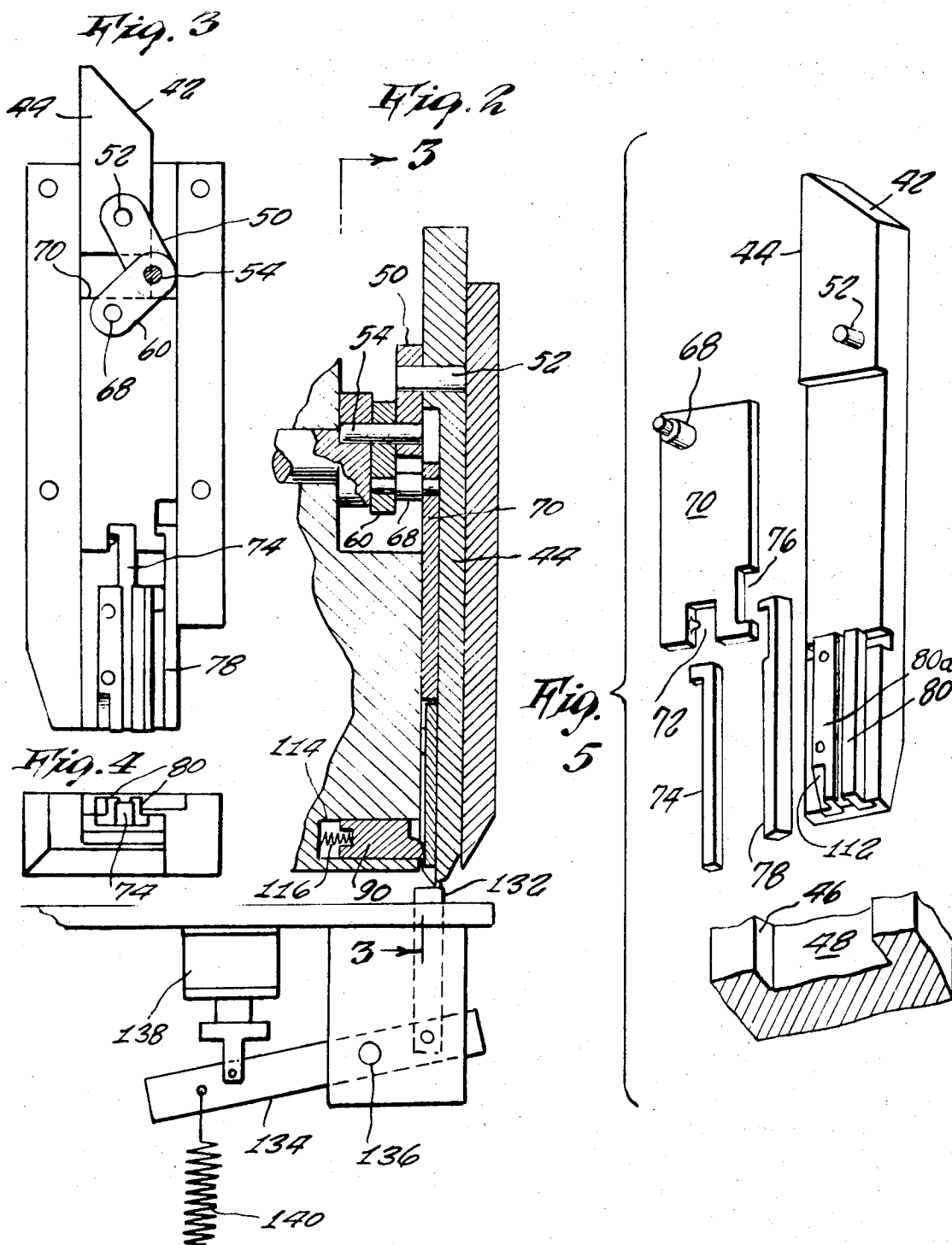
3,746,236

5 Sheets-Sheet 1



INVENTOR
MORRIS PERLMAN
BY *Jacob L. Kollin*

ATTORNEY



INVENTOR
MORRIS PERLMAN
BY *Jacob L. Kollin*
ATTORNEY

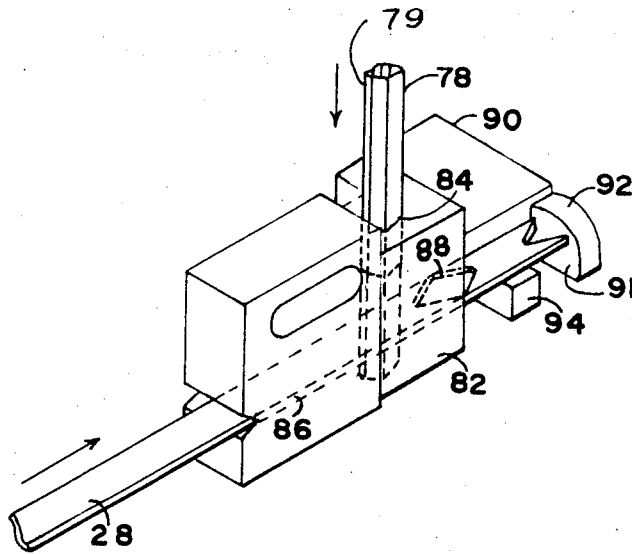


FIG. 6

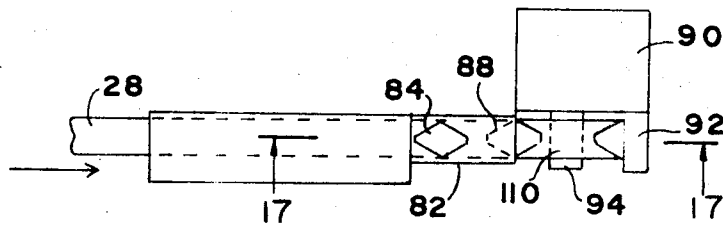


FIG. 15

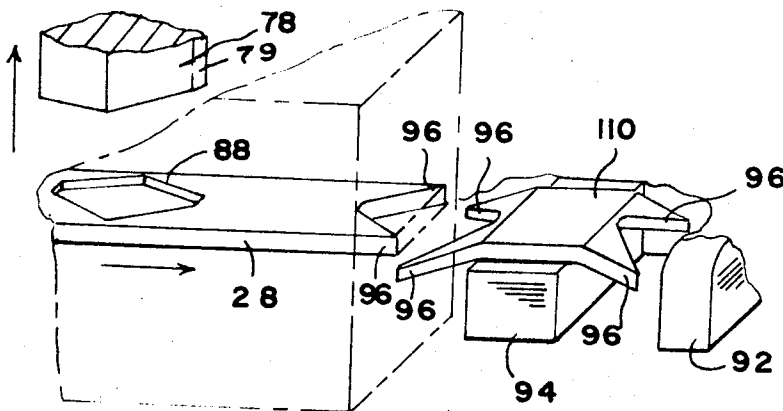


FIG. 16

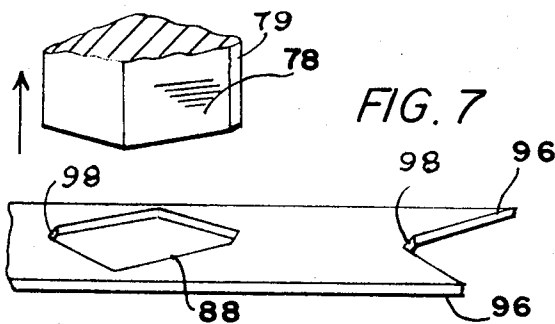
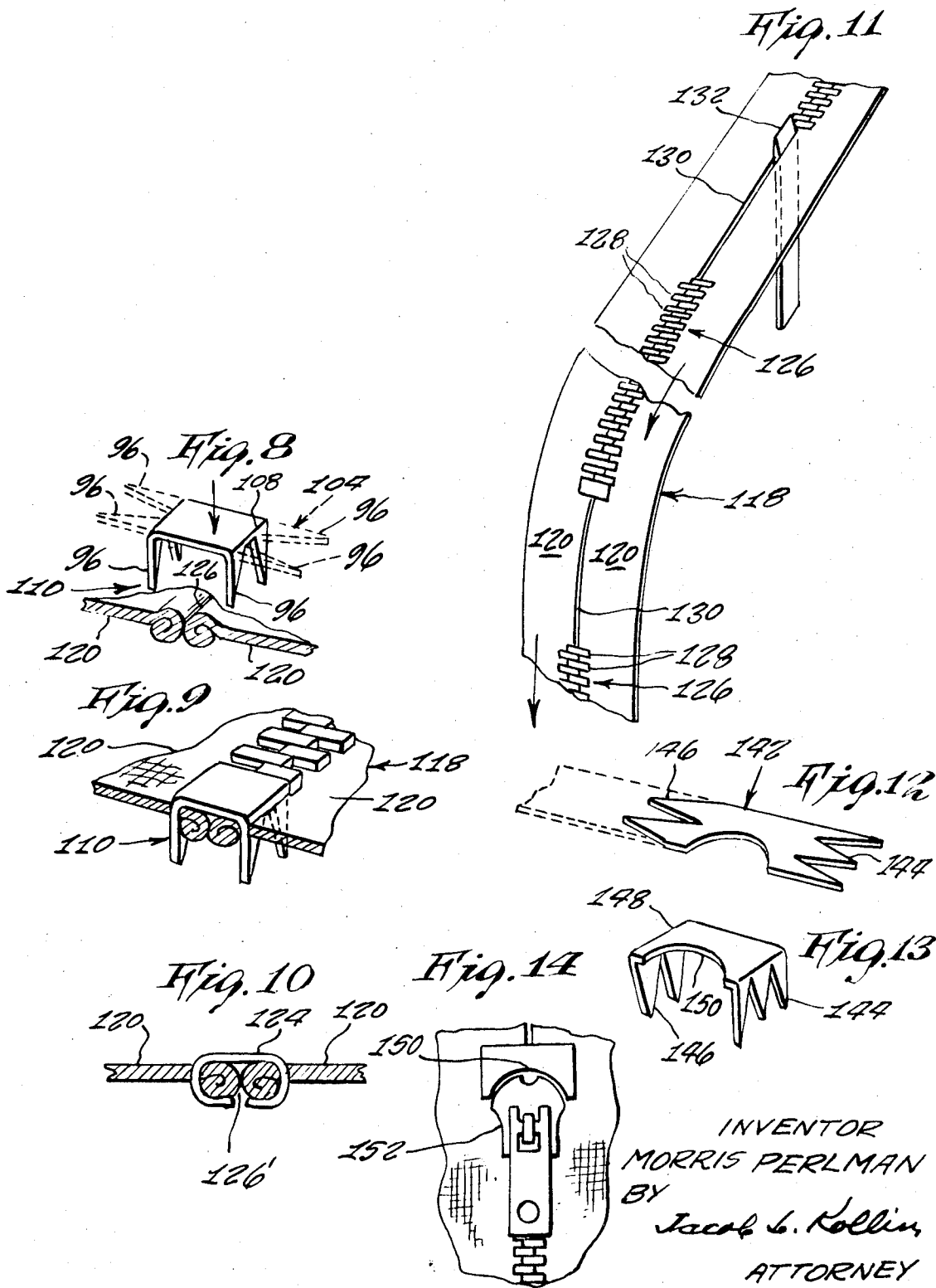


FIG. 7

INVENTOR.
MORRIS PERLMAN
 BY *Jacob L. Rollins*
 ATTORNEY



INVENTOR
MORRIS PERLMAN
BY
Jacob L. Kollin
ATTORNEY

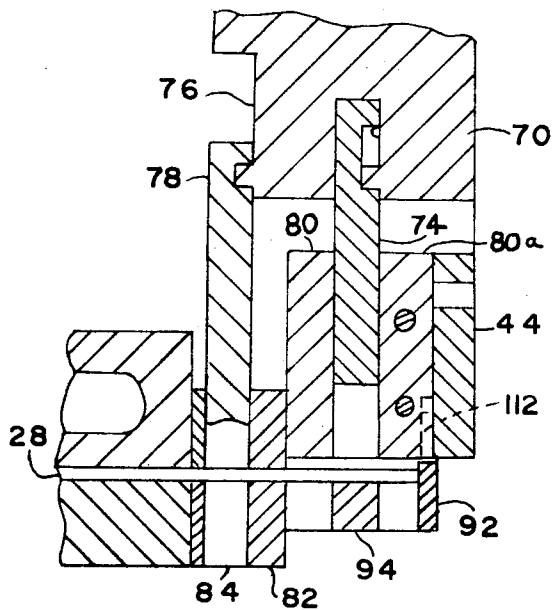


FIG. 17

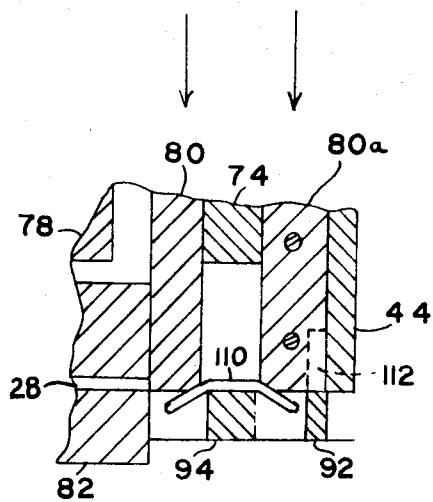


FIG. 18

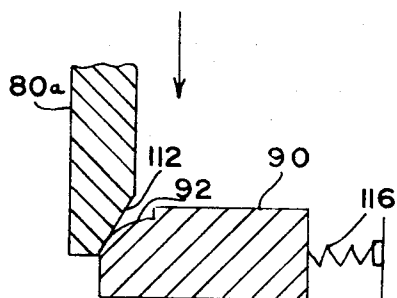


FIG. 19

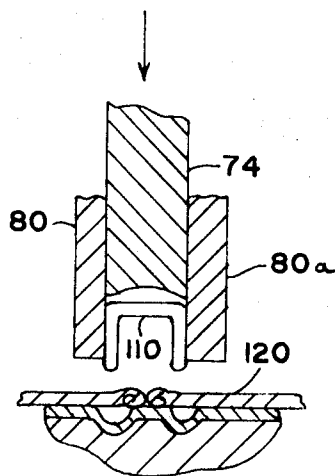


FIG. 20

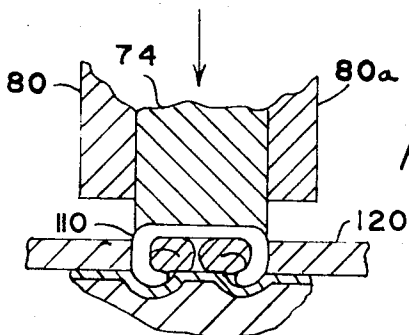


FIG. 21

INVENTOR.
MORRIS PERLMAN
BY *Jacob L. Kollins*
ATTORNEY

BOTTOM STOP MACHINE

The present application is a continuation-in-part of application Ser. No. 693,592, filed on Dec. 26, 1967, now abandoned.

BACKGROUND OF THE DISCLOSURE

This invention relates generally to slide fastener production machinery. More specifically it relates to machines for the manufacture and securement of bottom stops upon slide fastener chains during the production of slide fasteners. The present invention comprises an improvement of the machine disclosed in the application filed by the applicant in the U. S. Patent Office on May 17, 1966 Ser. No. 550,737 and issued as U.S. Pat. No. 3,445,912 on May 27, 1969, the present machine including specifically altered components so as to be adaptable for bottom stop manufacture. It is generally well known to those skilled in the art, that staples which form bottom stops are generally manufactured at present by a separate machine from the machine which secures them to the slide fastener chain; the manufactured staples being fed from a hopper on the latter machine, along a track to the place of securement operation. It is also well known, that the staples easily become jammed during the feeding from the hopper, thus causing necessity to occasionally stop the machine to correct the same. To prevent this stoppage of continuous production, the machine must be constantly tended to correct any jammed staples before resulting in faulty production. This is, of course, objectionable.

Accordingly, it is a principal object of the present invention to provide a bottom stop machine which includes means within a single unit to manufacture bottom stop staples and immediately after production of each staple to secure the same to a slide fastener chain, thereby eliminating need of two separate machines wherein the latter includes a hopper having the above described problem.

Another object is to provide a bottom stop machine which accordingly eliminates all mechanisms of the formed staples that become the bottom stops.

Yet, another object is to provide a bottom stop machine which, accordingly, eliminates the need to transfer staples from one machine to another, and which can triple the production speed of bottom stop manufacture over existing methods.

Yet, another object is to provide a bottom stop machine which allows production of an improved staple which lessens the possibility of tearing the slide fastener fabric by eliminating any long cut of the fabric when secured thereto such as is present with conventional bottom stops.

Other objects are to provide a bottom stop machine which is simple in design, inexpensive to manufacture, rugged in construction, easy to use and efficient in operation.

These and other objects will be readily evident upon a study of the following specification and the accompanying drawings wherein:

FIG. 1 is a front elevation view of the machine,

FIG. 2 is a cross-sectional view taken on line 2—2 of FIG. 1,

FIG. 3 is an elevation view of the press mechanism, as viewed on line 3—3 of FIG. 2,

FIG. 4 is bottom view thereof,

FIG. 5 is an exploded perspective view of the component parts thereof,

FIG. 6 is a perspective view of the wire guide, wire stop and wire punching mechanism with wire in relative position thereto,

FIG. 7 is a perspective view of the wire band after punching operation,

FIG. 8 is a perspective view of the staple formed from the wire band,

FIG. 9 is a perspective view thereof inserted into the slide fastener chain,

FIG. 10 is a front edge view thereof showing the staple stop secured upon the slide fastener chain,

FIG. 11 is a perspective view of a section of slide fastener chain and means for intermittent arrest thereof for performing the bottom stop securement thereto,

FIG. 12 is a perspective view of a blank of a modified bottom stop staple,

FIG. 13 is a perspective view thereof formed into a finished staple ready for securement to a slide fastener chain, and

FIG. 14 is a plan view thereof secured upon a slide fastener chain.

FIG. 15 is a top view of FIG. 6,

FIG. 16 is a perspective view of the staple after it has been sheared off,

FIG. 17 is a cross-sectional view taken on line 17—17 of FIG. 15,

FIG. 18 is a cross-sectional view of one of the steps showing the operation of the machine,

FIG. 19 is a cross-sectional view showing another step of the operation,

FIG. 20 is a cross-sectional view showing yet another step and

FIG. 21 is a cross-sectional view showing still another step.

Referring now to the drawings in detail, the reference numeral 20 represents a bottom stop machine, according to the present invention, wherein there is a machine main frame 22 upon which bracket 24 is mounted for supporting rotatably free a reel 26 having a continuous band of flat wire 28 which feeds intermittently therefrom by means of a stationary feed jaw 30 mounted on the mainframe and a movable feed jaw 32 mounted on end of rocker arm 34 pivoted about pin 36 and normally urged toward the stationary feed jaw by compression coil spring 38. The opposite end of the rocker arm carries a rotatable roller 40 engaging a cam face 42 at the upper end of vertically slidable ram 44 slidable within a channel 46 of a cover plate 48. The ram is vertically operated by means of a link 50 pivotally connected at one end to a pin 52 secured on the ram, the other end of the link being pivotally free on a pin 54 eccentrically carried on main shaft 56. The shaft 56 has a pulley 57 secured thereto, around which an endless belt 58 travels, the belt being powered by a pulley 60 on a motor shaft 62 of a motor 64 mounted upon the main frame.

The pin 54 eccentrically carried by the main shaft 56 has also one end of a second link 66 carried pivotally free thereupon, the opposite end of link 66 being connected pivotally free on a pin 68 secured to a driver plate 70.

The driver plate is slidable vertically within channel 46 of the cover plate 48. A notch 72 on the lower end of the driver plate carries a driver 74, and another notch 76 carries a punch 78. The driver 74 is slidable

between side punches 80 and 80a fixed, spaced and substantially parallel to each other, to the ram 44.

It is to be noted that the construction and operation of the wire feed jaws, above described, is identical to that as shown and described in applicant's above mentioned earlier patent application. Likewise the construction and vertical operation of the ram and driver plate are identical as described in applicant's previous application and the reader is referred thereto for a fully detailed description of a cycle of operation thereof. In the present construction, however, the wire 28 is fed through a die block 82, having a diamond configured vertical opening 84 therethrough which intercepts a feed slot 86 through which the wire is fed. The punch 78 is of correspondingly diamond cross-sectional configuration formed with flats 79 so as to punch a diamond shaped opening 88 through the wire, as shown in FIG. 7, said diamond-shaped opening having corresponding flats.

The present invention includes a horizontally sliding arbor 90, having an arcuate cam 92 and a forming anvil 94. As shown in FIG. 6, the end of the wire comes into abutment with one side face 91 of cam 92, the wire being positioned over the anvil 94, on which the wire rests. The punch 80 moves vertically down to cut and bend the staple into U-shape over the anvil 94. In operative use the wire feed jaw 32 advances the wire until the end thereof abuts the side face 91 of the cam 92. It will be noted that the terminal end of the wire includes one half of a diamond-shaped opening 88; the wire having been pierced in a preceding operation by punch 78. It will be noted that the opening 88 extends nearly fully across the full width of the wire, thereby causing two relatively sharp pointed legs being formed when the wire is sheared across the opening. It will be further noted as shown in FIG. 7, that the opening 88 has straight sides 98 in the crotch between the legs 96, for a reason which will be explained herebelow.

The operation of the machine is as follows:

The band of wire 28 is fed through slot 86 in the die block 82, passes over anvil 94 and comes to a stop against the side wall 91 of cam 92, as shown in FIG. 6.

Ram 44 moves downward to clamp the wire against anvil 94. It continues its downward movement, shearing off half of the diamond-shaped hole 88 in the wire band 28, as shown in FIGS. 16 and 18.

As the ram 44 continues its downward movement, the punches 80 and 80a bend the staple 110 over the anvil 94, forming a staple bent in a U-shape. Now the anvil 94, having served its purpose, is pushed out of the way by the diagonally inclined cam face 112, (shown in FIG. 5 and FIG. 19) which pushes against cam 92, as shown in FIGS. 19 and 2, in order to allow the driver 74 to push the formed staple 110 into the fabric 120.

The ram 44 has now moved as far as it can in the downward motion and the punches 80 and 80a are holding the U-shaped staple 110 as shown in FIG. 20.

The driver plate 70, as shown in FIGS. 5 and 17, now starts its downward motion, which pushes the punch 78 and the driver 74 down. The driver 74 moves down between punches 80, 80a, pushing the U-shaped staple down still further into the fabric 120, piercing the fabric and stopping at the clincher plate 156, as shown in FIG. 21.

The upper transverse portion of the staple is pushed further downward toward a slide fastener chain 118 comprised of a pair of stringers 120 located edge to

edge. The legs penetrate their full length through the chain stringers and are inwardly turned as shown in FIG. 10 by means of a correspondingly contoured die on a lower anvil or clincher plate 122. The staple, thus, forms a bottom stop 124 that straddles the edges 126' of the stringers. The ram and driver plate with associate parts are then returned to their upper original position while the sliding arbor again advances forwardly as described in detail in the former application. While the driver 74 has been moving down, the punch 78, has in the meantime been moving down, also, into the diamond-shaped hole 84 and has punched a diamond-shaped hole 88 in the wire band 28. The wire band is next advanced again over anvil 94 and comes again to a stop against the side wall 91 of cam 92. The above described operation is repeated serially.

It should be noted that the punch 78 is always maintained in the hole 84 to prevent its misalignment relative to that hole 84.

The slide fastener chain 118 fed into the bottom stop machine 20 is illustrated in FIG. 11, and is shown to include stringers 120 joined by intermittent sections 126 of engaging teeth 128; the sections 126 being spaced by gaps 130. In order that the bottom stop be applied at the correct position upon the slide fastener chain, it is necessary that the chain be intermittently advanced and stopped with the proper portion thereof being below the staple. This is accomplished by a knife edged stop 132 that normally travels with the gap 130. When the stop 132 engages the end of the gap as the chain is advanced, it causes the advancing mechanism to stop and hold the chain stationary, during which time the above stapling operation is performed, and the bottom stop is inserted in the end of the gap. It will be noted that the downwardly descending staple will push the stop 132 downward out of the gap, the stop 132 being on one end of a pivotable lever 134 pivoted centrally on a pin 136, the opposite end of the lever actuating a solenoid operated switch 138 in circuit with the drive motor M to start a subsequent cycle of operation. A tension spring 140 returns the stop 132 upward again, to travel in the next gap 130 for repeating the operation.

The bottom stop as above constructed, will not cause the slide fastener chain fabric to tear under sideward force as can happen with conventional bottom stops, because only the legs have punctured the fabric while the edge 98 has not damaged the same. Thus there is no line cut to cause a tearing action to develop under sideward stress.

In FIG. 12, a modified design of staple blank 142 is shown wherein teeth are punched out at each end without any waste of material. A singular zig-zagged punch replaces punch 78 and die edge, forms three teeth 144 on one end of one staple while at same time forming two teeth 146 of the adjacent staple. The staple 148 thus formed may include a side relief notch 150 for the purpose of receiving the end of a slide 152 of a slide fastener. The notch may be of any desired configuration such as semi-circular, semi-hexagonal or trapezoidal.

While various changes may be made in the detail construction, it is to be noted that such changes will be within the spirit and scope of the present invention as is defined by the appended claims.

I claim:

1. In a machine for forming and attaching bottom stops to a slide fastener chain, a combination comprising support means; die and punch means mounted on said support means for punching a diamond-shaped aperture in a flat wire; means for feeding the flat wire stepwise in longitudinal direction to and beyond said first die and punch means; combined cutting, bending and driving means mounted on said support means and located in said feeding direction downstream of said die and punch means for cutting the prepunched flat wire transversely along a plane extending through the diamond-shaped aperture midway between the ends thereof, for bending the thus cut off wire portion into a staple, for driving the staple through tapes of a slide fastener chain, and for clinching the staples on the tapes; and means for operating said die and punch means, said feeding means and said combined cutting, bending and driving means in proper sequence.

2. A combination as defined in claim 1, wherein said die and punch means comprise a die stationarily mounted on said support means, said die having a pair of opposite end faces and being provided with a first passage extending in said feeding direction between said end faces and forming with one of said end faces a cutting edge, and with a second passage of substantially diamond-shaped cross section intersecting said first passage between the ends thereof; and a punch of diamond-shaped cross section guided in said second passage for reciprocating movement.

3. A combination as defined in claim 2, wherein said combined cutting, bending and driving means comprise an anvil located spaced in said feeding direction from said one end face of said die, movable between an active position supporting a wire portion downstream of said die and an inactive withdrawn position; a pair of punches arranged spaced and substantially parallel to each other for reciprocating movement on opposite sides of said anvil, one of said punches cooperating with said cutting edge for cutting the wire in said plane, and said pair of punches cooperating with said anvil for

bending the cut off wire portion into a staple; a stationary clinching plate on said support means below said movable anvil; and a driver guided in the space between said pair of punches for driving the thus formed staple through and clinching it against said tapes, said operating means comprising a ram mounted on said support means for reciprocating movement and carrying in the region of one end thereof said pair of punches, and a driver plate movable relative to said ram and carrying said driver and said punch of diamond-shaped cross section.

4. A combination as defined in claim 3, and including stop means connected to said anvil for movement therewith and located in the path of movement of the wire spaced from and in the feeding direction downstream of said anvil, and cooperating cam faces on said stop means and on the other of said pair of punches for moving said anvil from its active to its inactive position, and biasing means biasing said anvil to its active position.

5. A combination as defined in claim 3, wherein said operating means further include a drive shaft, a first pin eccentrically projecting from one end of the drive shaft, a second pin projecting from said ram toward said one end of said drive shaft, a third pin projecting from said driver plate toward said one end of said drive shaft, a first link pivotally connected at opposite ends to said first and said second pin, and a second link pivotally connected at opposite ends to said first and said third pin.

6. A combination as defined in claim 3, wherein said ram is provided at the end thereof which is opposite said one end with a cam face, said wire feeding means comprising a follower engaging said cam face and a lever pivoted intermediate the ends thereof on said support means and carrying at one end thereof said follower and at the other end a feed jaw, and biasing means cooperating with said lever for maintaining said follower in engagement with said cam face on said ram.

* * * * *

45

50

55

60

65