MECHANISM FOR AND METHOD OF FOLDING AND CREASING PIECES OF RIBBON

Siegfried Godel, Norwalk, Conn., and William Rosenberg, Roslyn Heights, N.Y., assignors to Fashion Development Corporation, New York, N.Y., a corporation of New York

Filed Mar. 25, 1968, Ser. No. 715,748

Int. Cl. A41h 33/00

U.S. Cl. 223—37

11 Claims

ABSTRACT OF THE DISCLOSURE

Pre-cut lengths of ribbon are fed onto a plate formed with a slot. A push blade mounted on a frame moves up and down with the frame. The frame is guided on guides as it moves up and down. On its downward motion the blade pushes the fed ribbon into the slot in the plate to fold the ribbon. At the same time, wedge shaped members on the frame pry apart hinged heated pressure members which are biased together by tension springs. When the blade is raised out of the slot the folded and creased ribbon remains in place, but the wedge shaped portions are withdrawn to permit the heated members to be pressed together by the springs against opposite sides of the folded ribbon to create the fold. On the next cycle when the blade comes down a new piece of ribbon is folded and the heated members are again separated to permit the previously folded and creased piece of ribbon to fall down into a receptacle.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to machines for and methods of folding and creasing equal lengths of ribbon.

Description of the prior art

In the prior art devices are known for cutting equal lengths of webbing from a roll and then folding the cut lengths in half.

SUMMARY OF THE INVENTION

An object of this invention is to provide a machine of the character described in which a plurality of equal lengths of ribbon may be fed to a folding position, means being provided for folding each length of ribbon at said position, and means being further provided for then creasing the folded ribbon by means of heat and pressure to retain the crease.

Another object of this invention is to provide in a machine of the character described means to permit the folded and creased pieces of ribbon to fall down into a receptacle, as a new piece of ribbon is being folded.

Yet another object of this invention is to provide in a machine of the character described means to control the heat of the heated creasing members.

A further object of this invention is to provide a strong, rugged and durable machine of the character described which may be operated at considerable speed, which shall be smooth in operation, relatively inexpensive to manufacture, and yet which shall yet be practical and efficient to a high degree in use.

BRIEF DESCRIPTION OF THE DRAWING

In the accompanying drawing, in which is shown an illustrative embodiment of this invention,

FIG. 1 is a front elevational view of a machine embodying the invention and showing the frame and other parts in cross-section;

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

FIG. 3 is a wiring diagram for the heating elements; and

FIG. 4 is a cross-sectional view taken on line 4—4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now in detail to the drawing, 10 designates a machine embodying the invention. The machine comprises a machine frame 11 provided with opposed, parallel, vertical portions 12 formed with vertical grooves 13. At the lower end of the grooved machine frame portions 12 are inwardly extending portions 14 from which extend downwardly, vertical portions 15. Opposed portions 12 are provided with a pair of aligned, horizontal bearings 17 and 18 supporting a horizontal cross-shaft 19. The shaft 19 passes through said bearings and carries a pulley 20 at one end belted, as by belt 21, to a pulley 22 mounted on the armature shaft 23 of an electric motor 24. Fixed to the shaft 19 and disposed centrally between portions 12 of the machine frame, is an eccentric disc 30. Rotatably mounted on the disc 30 is a member 31. Member 31 has a sleeve 32 at its upper end formed with a central annular groove 33 rotatably and non-slidably receiving the disc 30. Extending downwardly from sleeve 32 is an arm 34 carrying a cross-pin 35 at its lower end. Mounted on the cross-pin 35 is a yoke shaped frame 36. Yoke shaped frame 36 comprises a top horizontal bar 37 disposed in a vertical plane. Fixed to the central portion of the bar 37, as by screws 38, is a bracket 39 straddling the lower portion of the arm 34. The cross-pin 35 is received in suitable openings in the upper ends of member 39. The cross-pin 35 passes through a suitable opening in the lower end of the arm 34. Thus as the motor operates to turn the shaft 19, the eccentric disc 30 will rotate member 31 up and down for raising and lowering or for reciprocating the yoke frame 36. Extending downwardly from the outer ends of bar 37 are vertical portions 40, the outer edges of which are slidably received in the grooves 13.

The machine frame 12 may comprise vertical machine frame portions 45 and 46 screwed or bolted together by screws or bolts 47. Frame portion 45 is formed with a longitudinal groove or notch 48 forming said groove 13.
3,511,422

3

The vertical portions 40 are formed with vertical extensions 40a received in said grooves 13. At the lower ends of the vertical portions 40 are downwardly and inwardly bevelled surfaces 50 forming wedges. At lower ends of the vertical portions 40 are inwardly extending portions 51 which are formed with said surfaces 50.

The member 39 has a central slot 39a in its upper end opposite the pin 35 and into which slot the lower end of arm 34 projects. Said member 39, furthermore, has a central groove 39b at its underside into which the crossbar 37 extends. Said central groove 39b forms front and rear flanges 39c contacting the front and rear surfaces, respectively, of the crossbar 37. The screws 38 pass through suitable openings in the flanges 39c and in the crossbar 37. Said crossbar 37 is formed with a central longitudinal slot 60. Received in said slot and fixed to the crossbar 37 in any suitable manner, is a vertical blade 61 extending downwardly and formed with a lower horizontal edge 62. The blade 61 has vertical side edges 63 spaced from the vertical portions 40. Blade 61 may be replaced by a pusher in the form of a wire.

Fixed to the guide frames 12 is a horizontal plate 65. Plate 65 has a central longitudinal slot 66 of such length that the blade 61 may pass downwardly therethrough. Pins 68 extending from the ends of the plate 65 are received in the guide frame members 45, 46 for supporting said plate in a central, horizontal position.

Supported in any suitable manner on the guide frame 12 and adjacent the leading end of the plate 65 are roller shafts 70 supporting rollers 71 which rotate in opposite directions to feed pieces of ribbon 72 onto the top of the plate. The leading edge of the plate 65 may be curved at 65a to accommodate a portion of the bottom roller 71.

By properly feeding pieces of ribbons to the rollers, the ribbons will be fed by said rollers onto the top of the plate and across the slot 66. They are fed in any suitable manner so as to stop the ribbons when the central portions of the ribbons are directly over the slot 66. A plurality of ribbons may be fed at one time. Fixed to the portions 15 of the machine frame are aligned pairs of horizontal axles 75. The axles 75 are similar and symmetrical disposed into slot 72. They may have an outer screw threaded portion 75a screwed into the frame, a smooth shank 75b extending from the screw threaded portion 75 and an inner head 75c.

Mounted on said axles 75 are a pair of similar, symmetrical disposed heated pressure members 80. Each member 80 comprises a pair of parallel side portions 81 extending upwardly from the axles. The lower ends of said side portions are formed with suitable openings for rotatably mounting member 80 on the smooth portion 75b of the axles 75. The members 81 are interconnected by thickened portions 82. Each of the members 80 carries at opposite ends thereof, a pin 83. The pins 83 of members 80, at each side, are interconnected by a coil tension spring 84 which biases said members 80 toward each other. Each of the thickened portions 82 is formed with through bore 85 in which is mounted an electric heating element 86 for the purpose hereinafter appearing. Also mounted on the ends of the thickened portions 82 are outwardly extending headed pins 90 rotatably mounting rollers 91. The rollers 91 are so positioned that as the blade 61 is forced into said slot 66 the wedging surfaces 50 engage between the two sets of rollers to spread the members 80 apart against the tension of the springs 84.

Mounted on one of the members 80 is a thermostatic switch 95. The electrical hook up for the heating element's 86 and the thermostatic switch 95 is shown in FIG. 3. One terminal of the thermostatic switch 95 is connected by wire 96 to one lead of the power supply. The other terminal of the thermostatic switch 95 is connected by wires 97 and 98 to one terminal of each of the heating elements 86. The other terminals of the heating elements are connected by wires 99 to the other lead of the power supply. Thus, the thermostatic switch 95 controls the supply of electric power to the heating element.

DESCRIPTION OF OPERATION

The feed rollers or rollers 71 feed pre-cut lengths of ribbon into folding position on the plate 65. The push blade 61 mounted on member 36 moves up and down therewith. As the motor operates, the blade 61 pushes the pieces of ribbon 72 down through the slot 66 folding them in half. At the same time the heated members 80 are spread apart to allow a previously folded and pressed ribbons to fall down. As the blade rises the members 80 are brought together and due to pressure and heat, the ribbon is creased permanently.

The slot 66 is preferably about 2 to 6 times as wide as the blade 61. The folded ribbon pieces stay in place by friction as the blade is lifted up out of the slot, until the pressure heat members so press against opposite sides of the ribbon pieces to crease the fold in the ribbon pieces. Then as the pressure heat members 80 spread apart, the creased ribbon pieces fall down into any suitable receptacle disposed below the machine frame.

It will thus be seen that there is provided an apparatus and method in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings, is to be interpreted as illustrative and not in a limiting sense.

We claim:

1. In combination, means to fold a piece of ribbon, heat means, and means to pressingly engage said heat means with said folded ribbon, a plate formed with a slot, means to feed said piece of ribbon onto said plate and over said slot, said fold means comprising a pusher movable into and out of said slot, means to reciprocate said pusher for moving said pusher into said slot to fold said ribbon and to move said folded ribbon into said slot, and for moving said pusher out of said slot, leaving said folded ribbon in said slot.

2. The combination of claim 1, and means to guide said pusher in its reciprocatory movement.

3. The combination of claim 1, said heat means comprising a pair of members disposed on opposite sides of the folded ribbon, and means controlled by movement of said pusher to move said members against opposite sides of the folded ribbon to press the fold in the ribbon.

4. The combination of claim 3, and means to move said members away from opposite sides of said folded and pressed ribbon to allow said folded and pressed ribbon to drop by gravity.

5. The combination of claim 4, and means whereby said means to move said members against opposite sides of said folded ribbon is operable upon said pusher being moved out of said slot, and said means to move said members away from opposite sides of said ribbon is operable upon said pusher being moved into said slot.

6. The combination of claim 3, and means to mount said members for pivotal movement toward and away from each other.

7. The combination of claim 3, said means to move said members against opposite sides of said folded ribbon comprising spring means interconnecting said members.

8. The combination of claim 3, said heat means comprising electric heating elements mounted on said members, and thermostatic switch means to control said elements.
9. The combination of claim 4, said means to move said members away from opposite sides of said folded ribbon comprising, rollers on said members and wedge means moveable with said blade and between said rollers.

10. The combination of claim 1, said reciprocating means comprising a shaft, means to rotate said shaft, an eccentric disc on said shaft, a sleeve on said disc and means to connect said sleeve to said pusher.

11. The combination of claim 1, the width of said slot being 2 to 6 times the thickness of the pusher.