

Sept. 9, 1924.

1,507,916

F. P. GRANAT

MACHINE FOR APPLYING TIPS TO LACINGS

Filed May 20, 1921

2 Sheets-Sheet 1

FIG. 1.

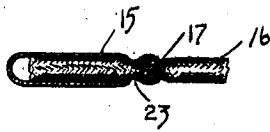


FIG. 2.



FIG. 3.

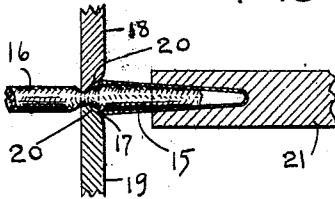


FIG. 4.

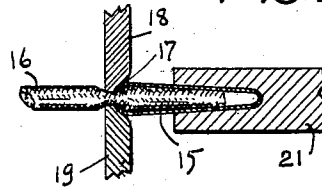


FIG. 5.

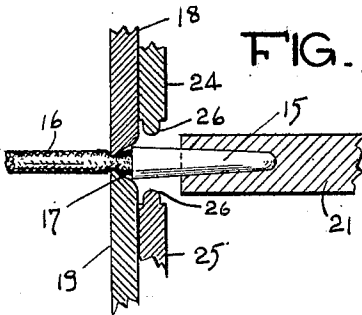


FIG. 6.

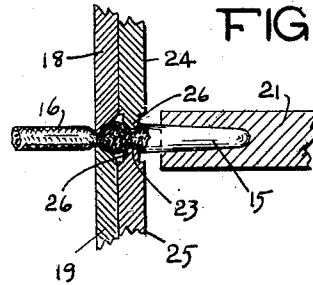


FIG. 7.

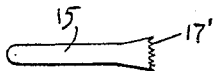
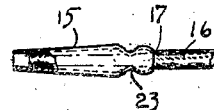


FIG. 8.



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2 Sheets-Sheet 2

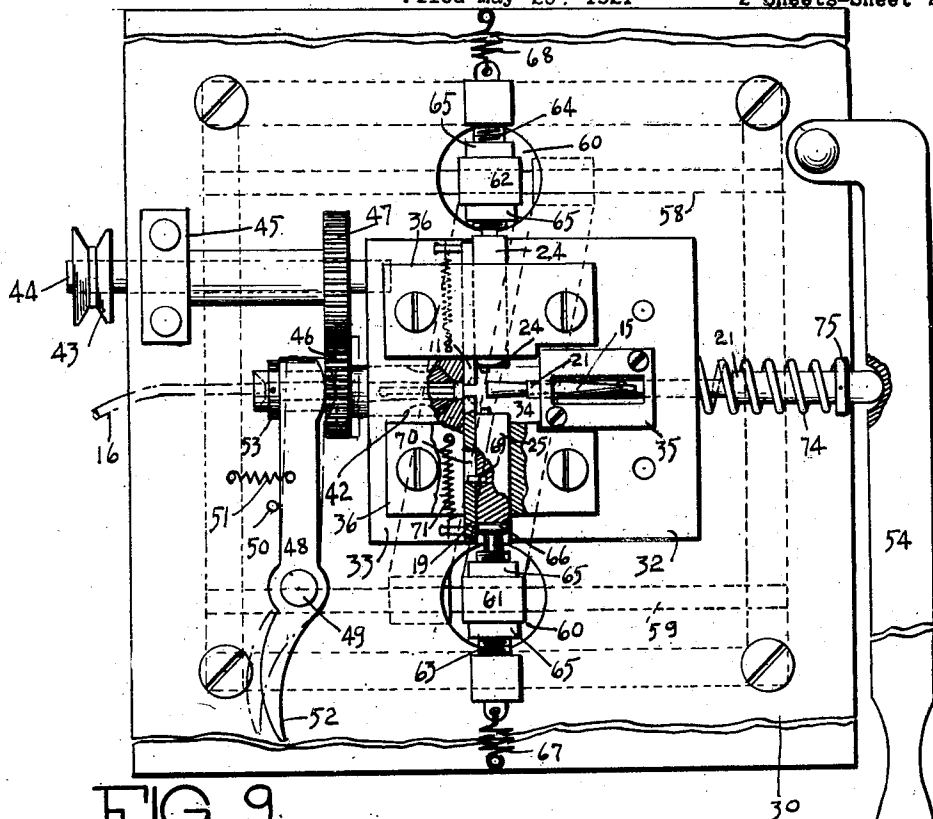


FIG. 9.

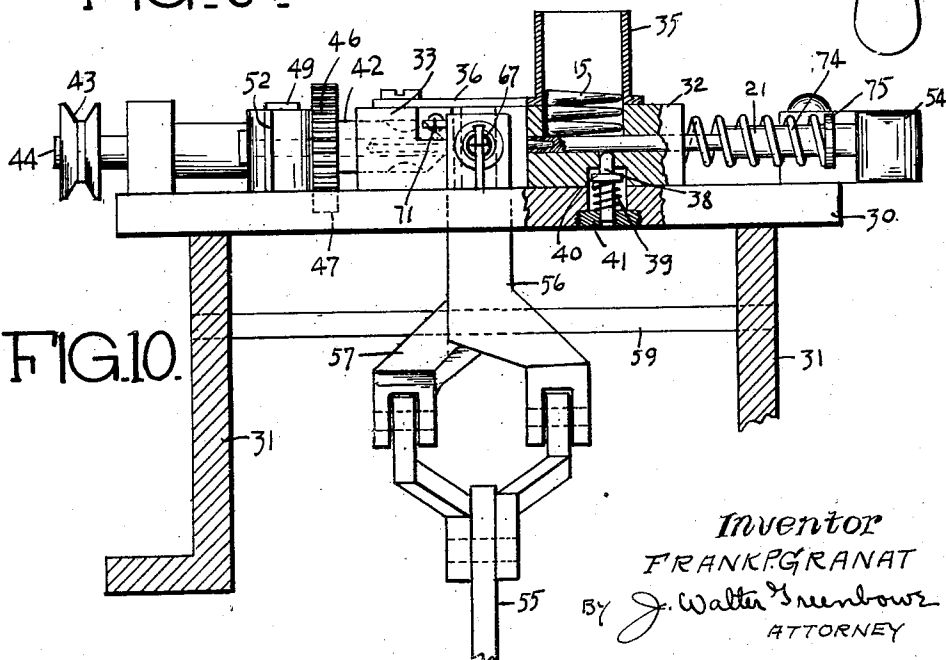


FIG. 10.

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UNITED STATES PATENT OFFICE.

FRANK P. GRANAT, OF NEW YORK, N. Y.

MACHINE FOR APPLYING TIPS TO LACINGS.

Application filed May 20, 1921. Serial No. 471,177.

To whom it may concern:

Be it known that I, FRANK P. GRANAT, a citizen of Czechoslovakia, residing at 346 East 65th St., New York city, county of New York, and State of New York, have invented certain new and useful Improvements in Machines for Applying Tips to Lacings, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to means for securing tips or guards to the ends of lacings or the like.

An object of the invention is to provide co-ordinating machine elements adapted to secure the tip to a lace in an efficient and expeditious manner.

Tips for lacings as commonly used possess certain objectional structural features, such as sharp corners which tend to hamper the passage of the tip through an eyelet and often catch a thread of a fabric, as for instance a stocking, with a ruinous effect.

My improved tip avoids the possibility of the above disadvantages and provides a more durable and economical product.

Other objects and advantages of my invention will manifest themselves upon reference to the following specification and the accompanying drawings in which

Figure 1 is a sectional view of a tip with the lace therein, shown crowded between the crimped edge of the tip and an annular depression;

Fig. 2 is a sectional view of a tip shown secured to a lace by means of its crimped edge;

Fig. 3 is a sectional view of a tip before the crimping operation, the dies being shown in section;

Fig. 4 is a view similar to Fig. 3, but showing the edge of the tip crimped;

Fig. 5 is a side view of a tip in position to be crimped to a lace and showing a pair of forming dies in position to be moved to form an annular groove, the dies being shown in section;

Fig. 6 is a view of a tip partly in section and showing the dies closed and a lace secured to the tip;

Fig. 7 is a side view of a tip before it is applied to a lace the greater portion being cylindrical and having a bowl or funnel shaped end for the entrance of the lace, and

when attached will take the shape of the tip as shown in Fig. 1; teeth are also shown at one end;

Fig. 8 is a side view of a tip open at both ends and partly in section;

Fig. 9 is a plan view of a semi-automatic machine for securing a tip to a lace, parts of the machine being shown in section and

Fig. 10 is an end elevation of Fig. 9, parts being shown in section.

My improved tip is preferably of tubular form initially constituting a blank adapted to be either spun or formed by means of dies, and is capable of having one end bent inwardly by suitable mechanism. Mechanism may also be provided with co-operating parts to facilitate the insertion of the lace into the blank or tip.

The embodiment of my invention for applying a tip to a lace comprises mechanism including a gravity feed magazine from which tips may be fed individually to the path of a plunger adapted to be actuated to move the open end of a tip adjacent to a pair of opposing members which will be hereinafter termed crimping dies.

A guide is provided through which the end of a lace is passed for entrance into the tip, and since a lace is more or less limp a continually rotating guide is found desirable.

When the lace has been inserted into the tip the crimping dies are moved so that a semi-annular groove disposed at the end of each die provides an encircling groove about and contiguous to the teeth or edge of a tip.

The plunger then forces the tip against the crimping dies until the annular edge is forced inwardly and in engagement with the lace to secure it to the tip.

An additional pair of forming dies are then employed to press a circumferential groove about the tip adjacent to the crimped end, thereby crowding a portion of the lace toward the intumed crimped end of the tip thus increasing the grip.

Referring now to the drawing and more particularly to Figs. 1 to 6, it will be readily seen that my improved tip 15 may be either conical or of cylindrical shape and when a lace 16 is inserted into the tip an edge 17 of the tip may be bent inwardly by any suitable means to engage with and grip a lace. In the present embodiment of the in-

vention the means for bending inwardly the edge 17, comprises two opposing members or crimping dies 18 and 19. These dies are provided with a semi-circular recess at their ends about which groove 20 is formed. Thus when a lace has been inserted into a tip the ends of the dies 18 and 19 are moved until their ends contact and the groove 20 encircles the lace as shown in Fig. 3. The edge 17 of the tip is then forced against the dies 18 and 19 by means of a plunger or pusher rod 21 which is provided with a recess to receive and center the tip on a given axial line. The groove 20 is beveled or flared and when the two dies are in position about a lace an annular bowl shaped face is provided and adapted to guide the edge 17 inwardly as it is pressed in contact with the dies as shown in Fig. 4.

After the edge 17 has been crimped, an annular groove 23 may be formed by means of forming dies 24 and 25. Each forming die is provided with a semi-circular bead or raised portion 26 and the said beads when moved in contact with a portion of the tip compress it, as shown in Fig. 6 and form the annular depression 23. It is obvious that a plurality of such depressions may be made at intervals throughout the length of the tip, and that the end of a tip may, if desirable, be provided with a plurality of teeth 17' as shown in Fig. 7, to be crimped inwardly.

A preferred form of apparatus for semi-automatically attaching the lace 16 to the tip 15 is illustrated in Figs. 9 and 10 and such apparatus comprise mechanism supported upon a plate 30 secured to legs 31.

Approximately in the center of the plate 30 and fastened thereto, is positioned two guide blocks 32 and 33 spaced apart to provide a passage way for the dies 18, 19, 24 and 25. Plates 36, disposed above the dies and secured to the guide blocks, prevent their upward movement. The passageway connects with a central aperture 34 at one side of which is disposed a gravity feed magazine 35 adapted to contain a plurality of the tips 15 which drop individually in the path of the plunger 21 provided with the afore-mentioned recess to receive the end of a tip. A suitable bore is provided to guide the plunger during its movement and means for supporting the end of a tip (to align its axis) is provided by a vertical reciprocating pin 38. When a tip is dropped from the hopper the pin 38 supports its smaller end through the action of a spring 39 disposed between a collar 40 and a screw plug 41. The tip is thus maintained with its axial line coincident with that of the plunger 21 and in position to be engaged thereby.

For the purpose of guiding the end of a lace into the tip a rotary guide 42 in the

form of a split-chuck is journaled in the block 33 and disposed with its axis aligned with that of the plunger 21. The guide or chuck 42 is provided with the usual spring members or jaws normally spaced apart and adapted to be closed by their engagement with a tapered surface.

The said guide may derive its rotary movement from any suitable source of power as for instance a motor having a belt connected to a pulley 43 secured to a shaft 44 journaled in a bearing 45. Movement is transmitted to the guide 42 by means of meshing gears 46 and 47 secured to the said guide and the shaft 44 respectively.

The guide is constructed with its inner end tapered, the said tapered end being disposed in movable contact with a tapered end of the aperture in which it is journaled. An in-movement of the guide thus causes its jaws to close and grip a lace when passed through the guide, for purposes to be presently described.

An inward or longitudinal movement of the guide is effected by means of a hand lever 48 fulcrumed on a pin 49 and having one end normally, lightly in contact with the gear 46 and retained against a stop pin 50 by means of spring 51. A movement of the end 52 of the lever will cause the guide to move and close its jaws. A release of the lever permits the spring 51 to instantly return the guide to its normal position, the operating end of the lever being disposed between the gear 46 and a collar 53. Only a very slight movement of the lever is necessary to cause the jaws to grip a lace, the position of the lever and gear shown in dotted lines in Fig. 9 being exaggerated for the purpose of illustration.

As the end of a lace is led into the guide the plunger 21 is operated by means of lever 54 to move a tip toward and between the dies which are in their normal or open positions. The forming dies 24 and 25 are actuated by means of a treadle 55 which has a toggle connection to cranks 56 and 57 pivoted in shafts 58 and 59 respectively. The said cranks extend through apertures 60 in the plate 30 and are provided with hubs 61 and 62 through which threaded members 63 and 64 are screwed. Lock nuts 65 provide a means of securing the said members in a given position. A flexible connection between the threaded members 63, 64, and the dies 24 and 25 is furnished by a transverse cylindrical portion 66 integral with the screw members 63 and 64 and disposed movably in recesses in the ends of the dies 24 and 25 thus permitting the free movement of the cranks 56 and 57 to actuate the said dies. Springs 67 and 68 connected to the plate 30 and one end of the threaded members serve to retain the dies 24 and 25 in normal open positions.

The crimping dies 18 and 19 are held open by means of their connection with the forming dies 24 and 25, which connection consists of pins 69 fastened to the forming dies and disposed in slots 70 of the crimping dies. Springs 71 secured to the guide block 33 and the crimping dies act to close the dies. The slot 70 however, is so positioned that when the dies 24 and 25 are open the pins 69 contact with the ends of the slots and the crimping dies are prevented from closing. When the treadle 55 is depressed, a small amount of its movement, the cranks 56 and 57 are actuated to move the threaded members 63 and 64 and consequently the forming dies 24 and 25, which movement permits the springs 71 to bring the ends of the crimping dies together prior to the complete movement of the forming dies.

When the crimping dies 18 and 19 have been closed the lever 54 is moved to operate the plunger 21 to position the end of a tip contiguous with the circular groove provided by the two contacting crimping dies. An end of the lace 16 is then passed through the guide 42 and into the tip.

Sufficient force is then applied to the lever 54 to cause the circular edge of the tip to curl inwardly or crimp which results in the formation of an interiorly extending flange in intimate engagement with the lace. A continued depression of the treadle then moves the forming dies 24 and 25 to shape an annular groove about the tip thus increasing the union between the tip and the lace.

In order to insure the depression of a groove, having an entirely smooth surface, the forming dies may be actuated to exert an initial pressure upon the tip and then be opened, at which time the lever 52 is actuated and the guide 42 is caused to grip the lace and rotate it any desired arc of a circle depending upon a manipulation of the lever, which is then released and the forming dies are again actuated to press upon the tip. A repetition of the foregoing operation produces what may be termed a swaging of the metal and results in a smooth surface within the groove.

The longitudinal movement of the chuck or guide 42 has a still further advantage inasmuch as it may be used to give a final thrust to the lace end when the said end has been inserted into a tip; namely the lever 52 may be moved to grip a lace prior to the closing of the dies, but after the lace is within the tip, and this movement of the lever and guide causes a slight movement of the lace and produces a slight buckle of the portion of the lace within the tip. This buckling of the lace results in an abundance of material which may be more readily prevented from passing the inturned edge of the tip.

When a tip has been secured to a lace the

treadle is entirely released and the dies returned to their open positions and the plunger is also returned to its normal position through the agency of a spring 74 disposed between a collar 75, fastened to the plunger, and the guide block 32. When the plunger has been returned to its outer position it clears the hopper 35 and permits the succeeding tip to drop therefrom and in position to be attached to a lace by the inward movement of the plunger.

To remove a tipped lace from the machine an operator lifts the tip from between the open dies and draws the lace through the guide 42.

It is obvious that other structural changes and arrangement of parts may be made to effect the result as contemplated by my invention and it is understood that such modifications come within the scope of the appended claims.

What is claimed is:

1. In a machine for attaching a tip to a lacing, the combination of a magazine for tips, a pusher-rod for positioning a tip, means for guiding the end of a lace into said tip and means for forcing portions of said tip in intimate contact with said lace.

2. In a machine for attaching a tubular tip to a lace, the combination of a pusher-rod, means for feeding tips in the path of said rod, forming dies, means for actuating said rod to position a tip in operative relation to said dies, means for guiding the end of a lace into said tip and means for operating said dies for compressing said tip to force portions thereof into engagement with said lace.

3. In a machine for attaching a tubular tip to a lace, said tip being provided with a flared end, gravity means for feeding a tip to position for the insertion of a lace, means for supporting said tip, means for guiding a lace therein, and means for bending the edge of said flared end inwardly.

4. In a machine for attaching a cap to a lace end, means for supporting said cap, means rotatable about the longitudinal axis of a lace for guiding a lace into said cap, and means for turning a portion of the cap inwardly.

5. In a machine for attaching a guard to a lace, said guard comprising a tubular member, means for automatically positioning a guard for the insertion of a lace, means for holding said guard, means for guiding a lace end therein, oppositely disposed dies adapted to press a portion of the said guard toward the axial line thereof.

6. In a machine for attaching a tubular tip to a lace, the combination of means for holding said tip, a guide rotatable about the longitudinal axis of a portion of a lace for directing a lace end into said tip, and means for crimping one end of said tip.

7. A machine for attaching a tubular blank having an enlarged end to a lace end, means for holding said tip, means rotatable about the lace end to facilitate the entrance of said end into said blank, and means for forming an annular depression in said blank to secure the same to the lace and provide a tip therefor.

8. A machine for attaching a tubular blank to a lace end, a hopper for holding a plurality of blanks, means for automatically feeding blanks individually to position to receive a lace end, and means for depressing the blank to secure the same to the lace to provide a tip therefor.

9. A machine for attaching a tubular tip to a lace comprising a hopper for holding a plurality of tubular blanks, means for feeding said blanks individually from said hopper to position for the insertion of an end of a lace, a guide rotatable about the longitudinal axis of said lace, means for crimping the blank to engage the lace to secure the blank thereto and provide a tip.

10. A machine for attaching a tubular tip to a lace comprising a hopper for holding a plurality of tubular blanks, means for feeding said blanks individually to position for the insertion of an end of a lace, a guide rotatable about the longitudinal axis of the said end portion of said lace, and means for crimping a positioned blank about an inserted lace end to provide a tip therefor.

11. In a machine for attaching a tubular tip to a lace, the combination of means for automatically feeding tips to a given position, oppositely disposed dies, means for moving said dies contiguous with the end of said tip, means for guiding a lace end into said tip and means for moving said tip toward said dies to crimp said end.

12. In a machine for attaching a tubular tip to a lace, the combination of means for automatically feeding tips to a given position, oppositely disposed dies, means for moving said dies adjacent to the one end of said tip, a rotary guide for directing a lace end into said tip, means for moving said tip to crimp an end thereof against

said dies, and means for forming an annular depression about said tip.

13. In a machine for attaching a tubular tip to a lace, the combination of a gravity feed hopper for said tips, a plunger disposed below said hopper and in the path of a descending tip, means for moving said plunger to move a tip to a given position, two laterally disposed dies, means for guiding a lace end into said tip, means for continuing the movement of said plunger to impel the said end in contact with said dies to force a portion of the tip inwardly in intimate engagement with the inserted lace.

14. A machine for attaching a tip to a lace comprising means for positioning a tubular blank, means for guiding a lace end into said blank, and means for effecting a rotation of the inserted lace end.

15. A machine for attaching a tip to a lace comprising means for positioning a tubular blank for the insertion of the end of a lace, a rotary guide for said lace end and means for effecting a rotation of said end when inserted in said blank.

16. A machine for attaching a tip to a lace comprising means for positioning a tubular blank for the insertion of an end of a lace, a rotary guide to facilitate the entrance of said end into said blank, means incorporated in said guide to grip said lace adjacent the portion inserted in said blank, and means for moving the gripped portion endwise to engage with the outer wall of a blank.

17. A machine for attaching a tip to a lace comprising a hopper to hold a plurality of tubular blanks, means for removing said blanks from the hopper into position for the insertion of a lace end, a rotary guide to direct a lace end into a blank, means associated with said guide to momentarily secure the lace to twist the same when in positional engagement with the blank and means for pressing a portion of the blank to secure the lace end thereto.

In testimony whereof I have hereunto set my hand.

FRANK P. GRANAT.