Aug. 2, 1949. H. NELSON 2,478,003

MACHINE USEFUL FOR FORMING END LOOPS ON VENETIAN BLIND LADDER TAPES

Filed May 27, 1947

5 Sheets-Sheet 1

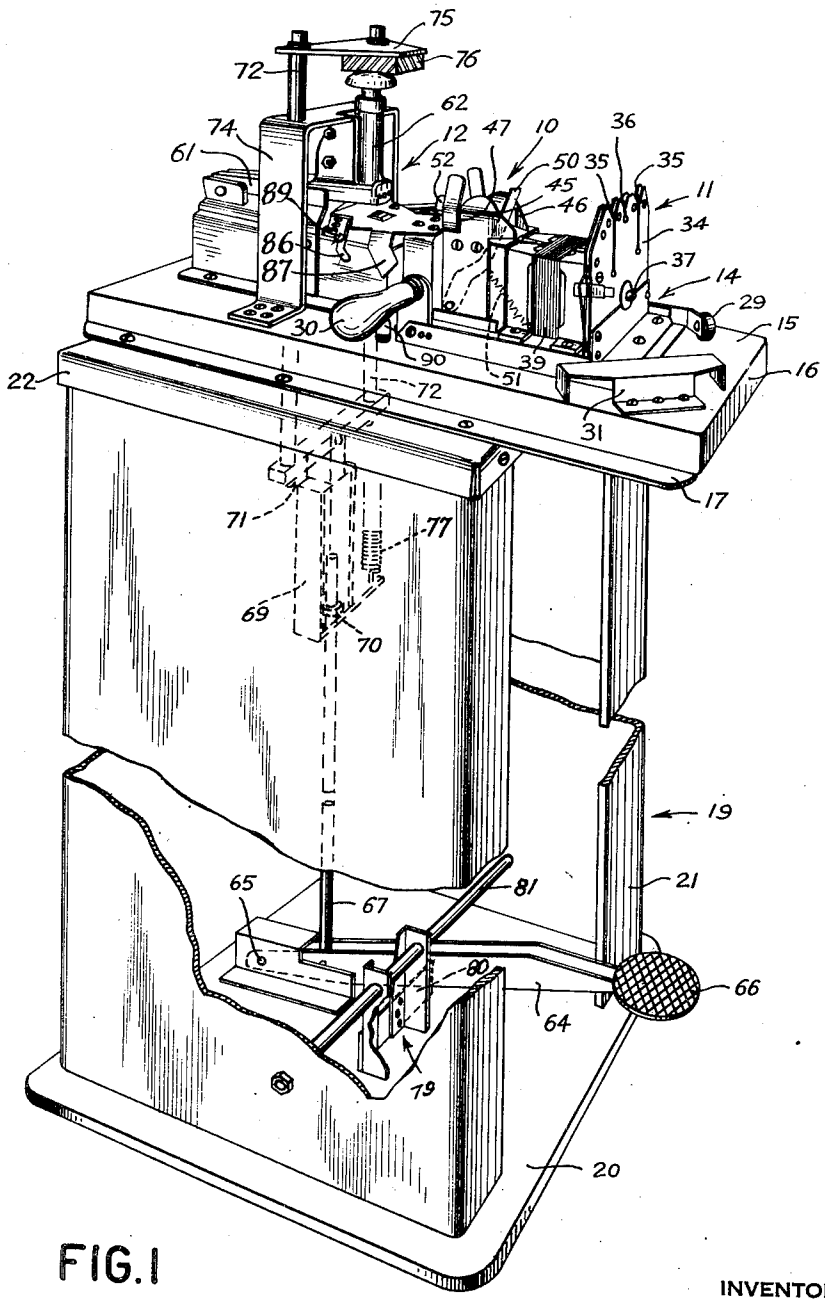


FIG. 1

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5 Sheets-Sheet 2

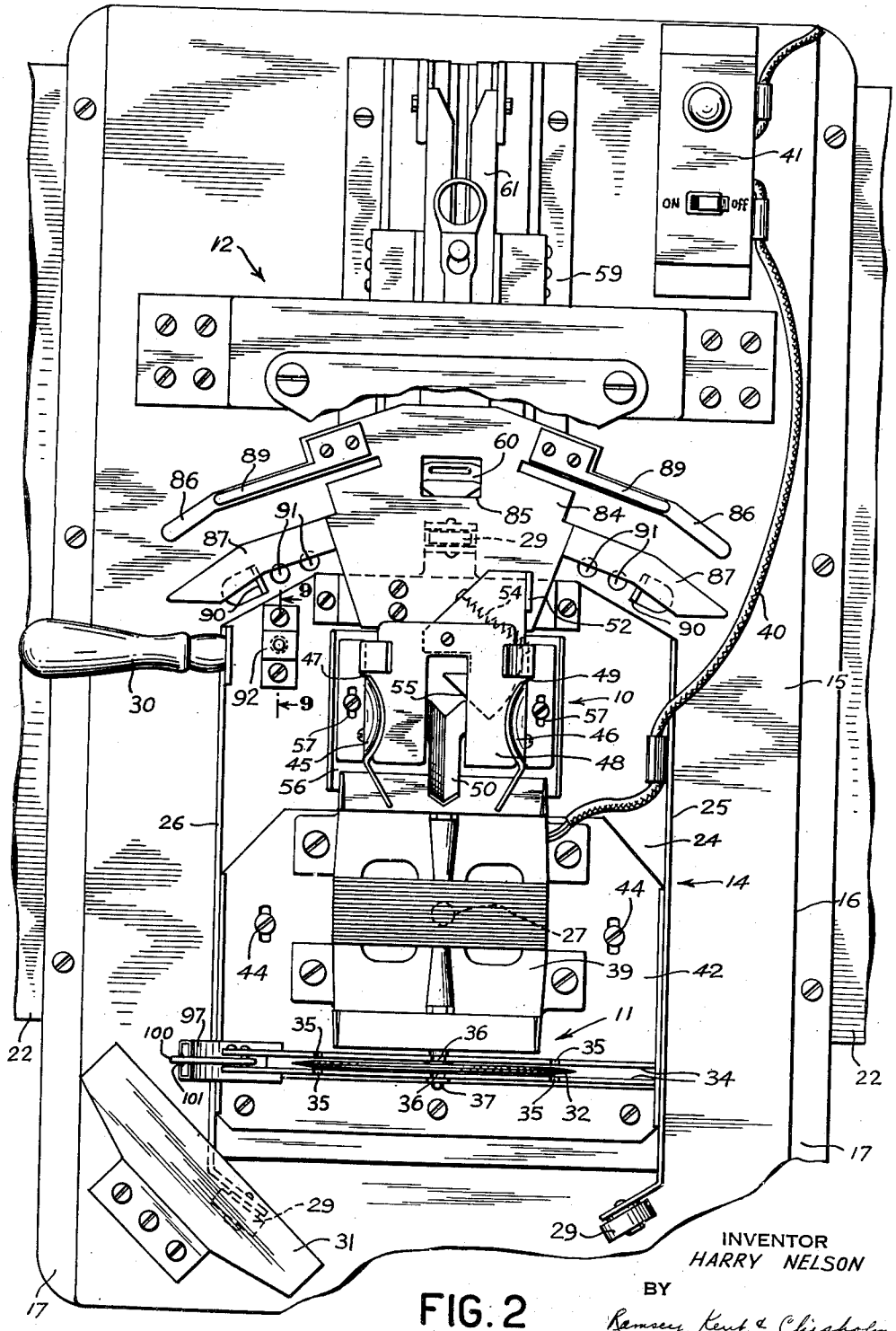


FIG. 2

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5 Sheets-Sheet 3

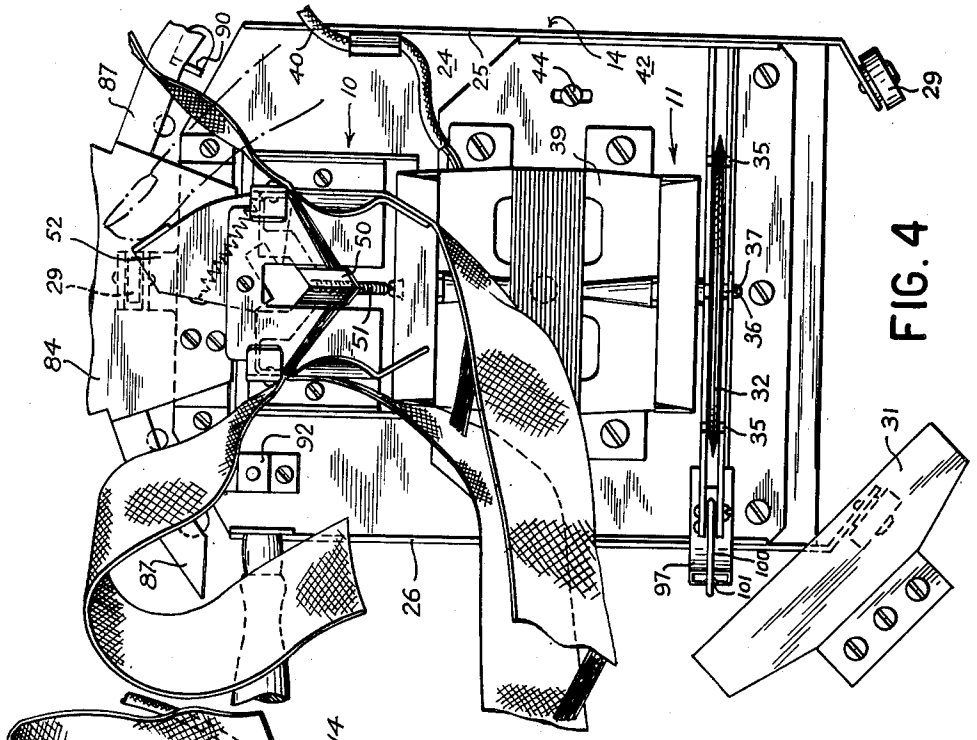


FIG. 4

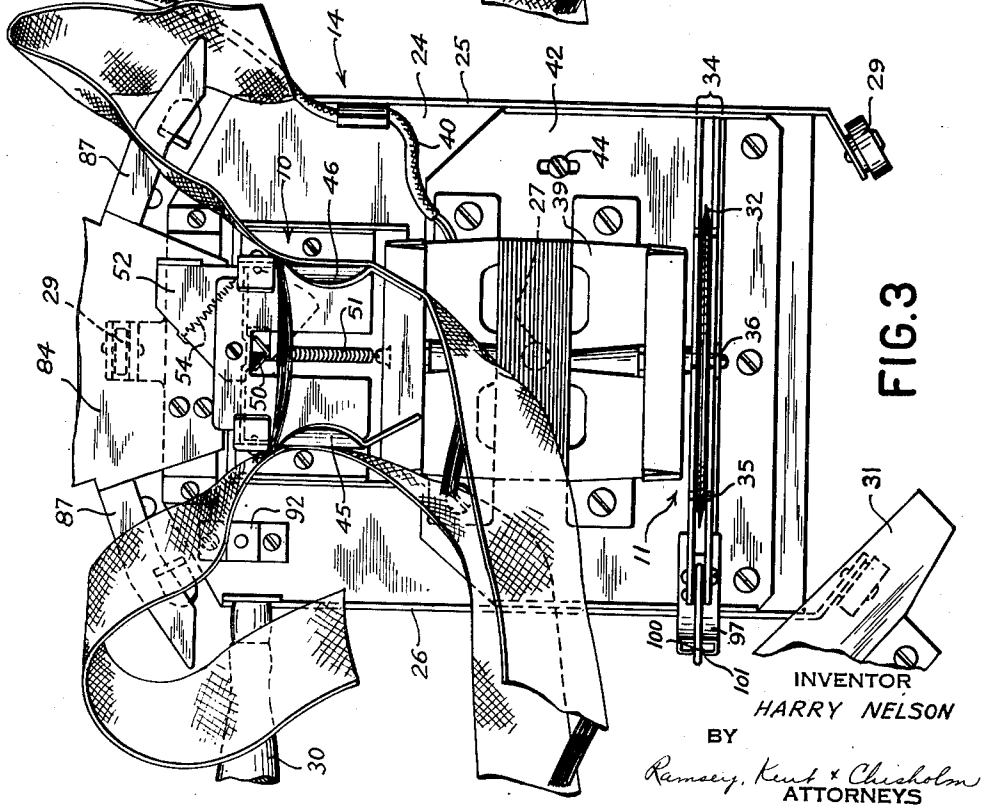


FIG. 3

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5 Sheets-Sheet 4

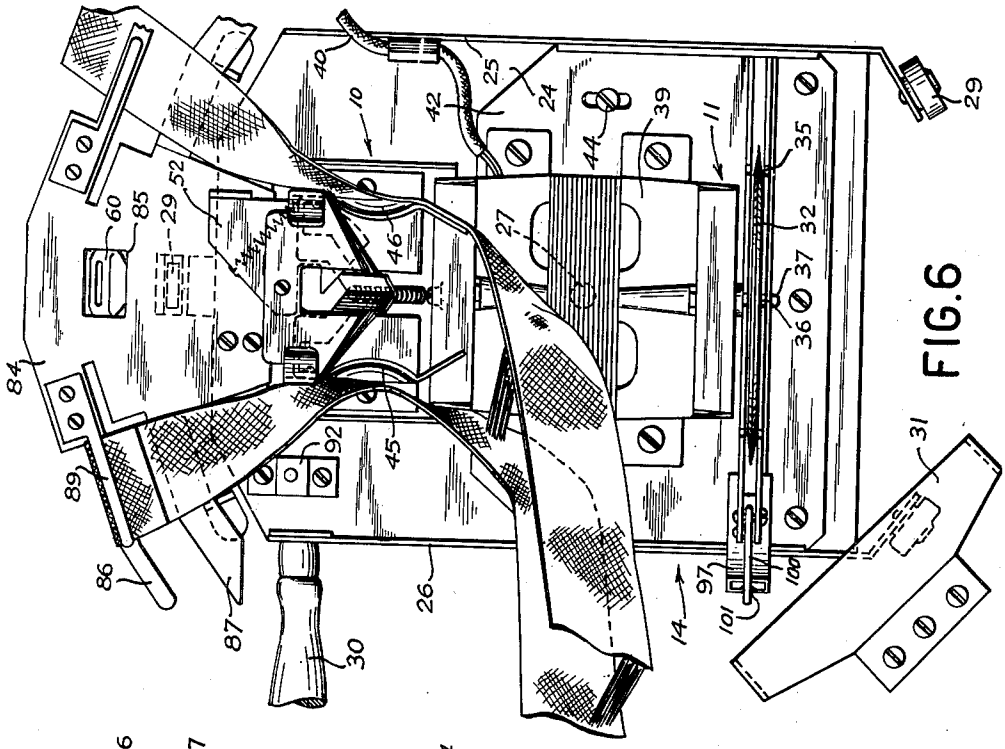


FIG. 6

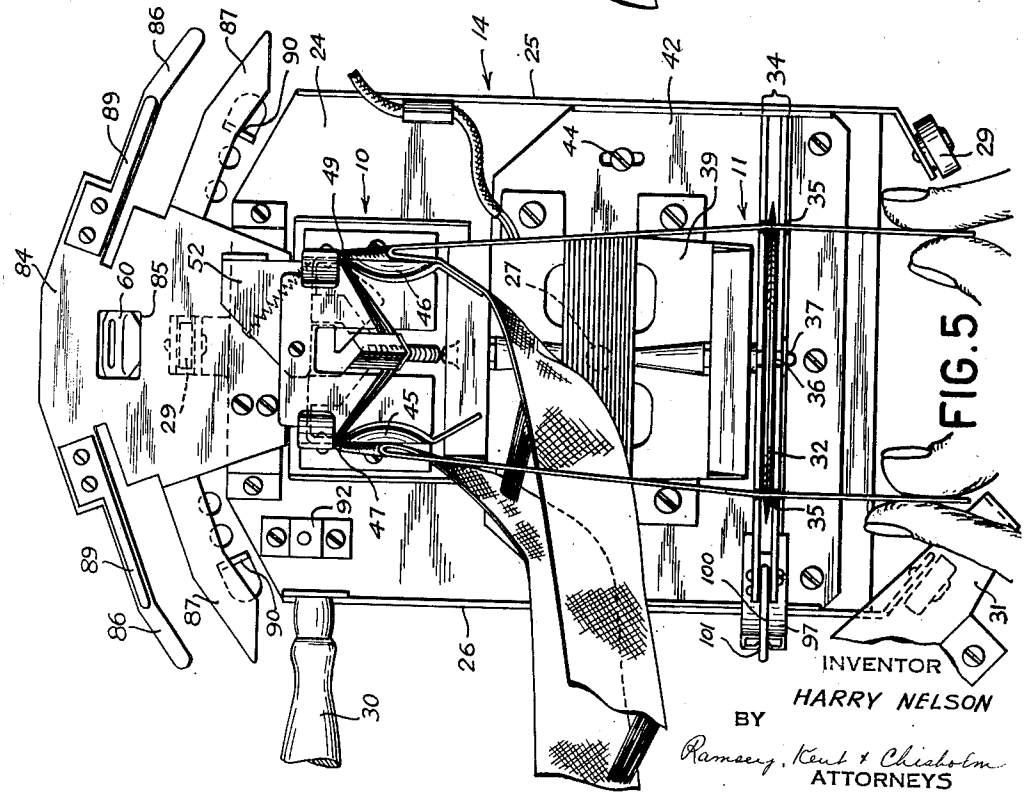


FIG. 5

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5 Sheets-Sheet 5

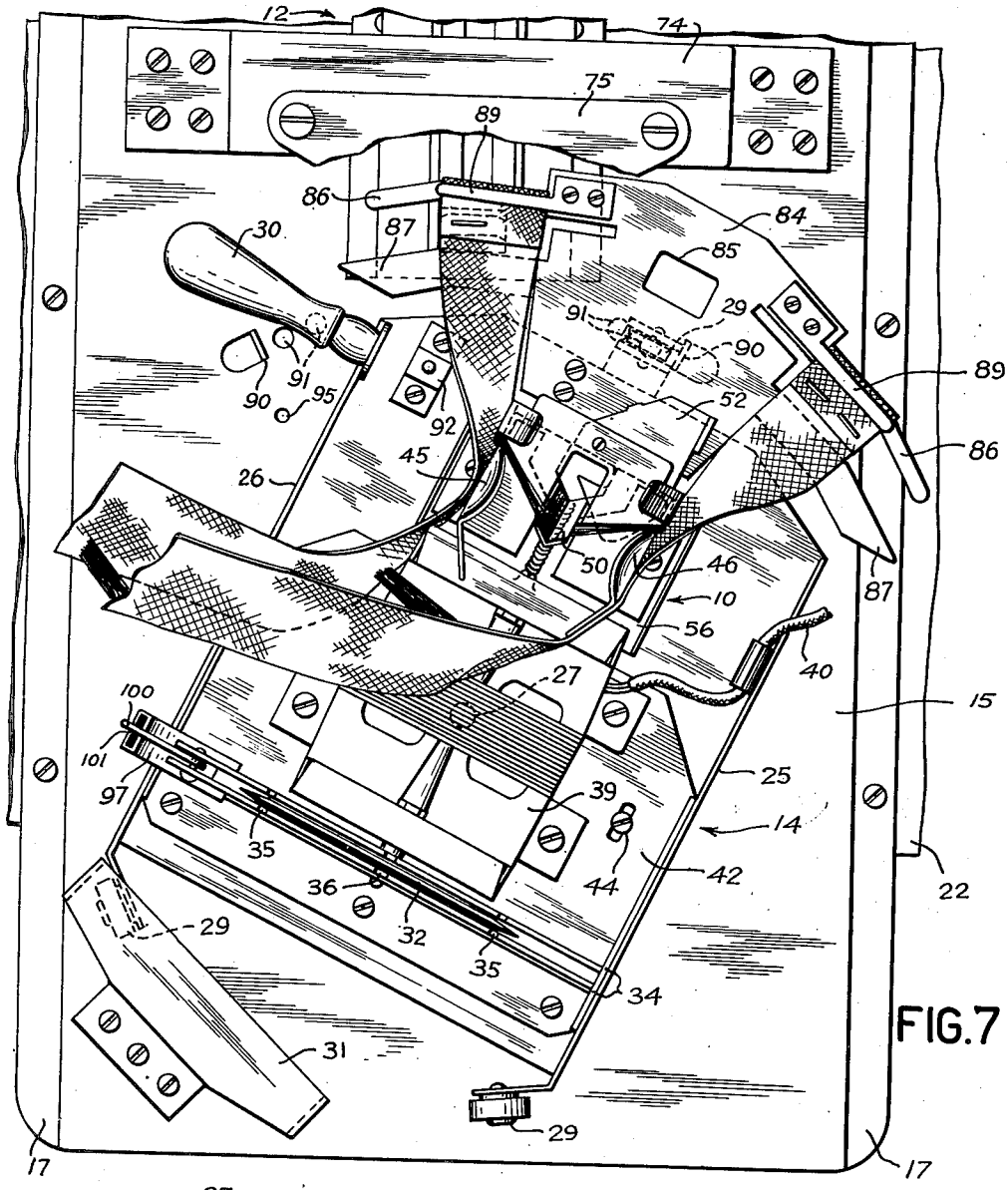


FIG.7

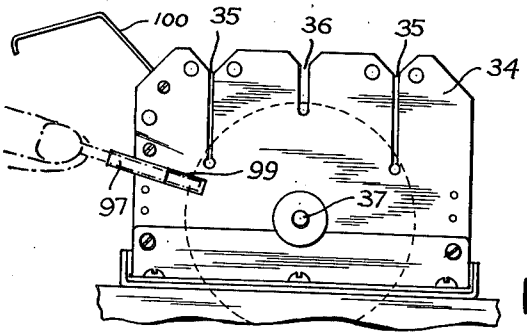


FIG.8

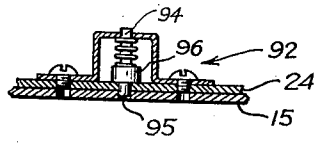


FIG.9

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Patented Aug. 2, 1949

2,478,003

UNITED STATES PATENT OFFICE

2,478,003

MACHINE USEFUL FOR FORMING END LOOPS ON VENETIAN BLIND LADDER TAPES

Harry Nelson, New York, N. Y., assignor to Lorentzen Hardware Mf'g. Corp., New York, N. Y., a corporation of New York

Application May 27, 1947, Serial No. 750,861

17 Claims. (Cl. 1—3)

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This invention relates to machines useful in the assembly of Venetian blinds, and more particularly to a machine for properly cutting ladder tapes of a Venetian blind and forming a loop on the end of each branch of the ladder tape.

Venetian blinds are constructed with two or more ladder tapes which support the slats of the blind. These ladder tapes are each formed of two parallel branches of woven fabric tape connected at uniform intervals by somewhat narrower tapes termed rungs which serve to support the individual slats. The lower ends of the branches of the ladder tape are secured to the bottom bar of the blind and the upper end of the branches of each ladder tape are secured to a tilt bar or equivalent construction.

In the enclosed head bar type of blind, such as that shown and described in my copending application Serial No. 601,671, filed June 26, 1945, and issued as U. S. Letters Patent No. 2,455,135 on November 30, 1948, the tilting mechanism is contained inside a channel-shaped head bar. The branches of each ladder tape pass upwardly through slots in the bottom wall of the head bar and connect to a tape rocker which is mounted on a tilt bar or rod. Rotation of the tilt bar serves to adjust the angular position of the slats of the blind. It has been found desirable to form a loop at the upper end of each branch of each ladder tape to facilitate connection of the ladder tapes to the tape rockers. These loops must be formed a predetermined distance from the topmost rungs of the ladder tapes to assure proper operation of the blind.

In the form shown, the present invention is directed to a machine for cutting interfering rungs from the top portions of the ladder tapes, cutting each branch of the ladder tapes a uniform distance from the topmost remaining rung and forming and securing loops at the top of the ladder tapes a uniform distance from the topmost rung.

This machine comprises a machine stand for supporting the operating portions of the machine a convenient distance from the floor. A horizontal frame mounted on top of the stand supports a tape clamp, a rotary cutter assembly, and a stapler. The clamp serves to engage the end portion of a ladder tape and hold it in predetermined position, after which the branches of the ladder tape may be passed against a rotary knife or cutter, this knife being located a definite distance from the clamp so as to uniformly cut each branch of the ladder tape at the desired distance from the clamped portion thereof.

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The two branches of the ladder tape are then passed around bar-like members, the end of each branch being folded back upon itself to form terminal loops a uniform distance from the clamped portion of the tape. A carriage which mounts the clamp, the cutter and the bar-like loop-forming members is bodily movable beneath a fixed stapler for securing the loops, this stapler being operable by pressure upon a foot pedal. After stapling the loops, the ladder tape is unclamped and removed from the machine, this end of the tape now being ready for insertion into an enclosed head bar of the type above mentioned.

An object of the present invention is to provide a machine for rapidly and uniformly cutting the ends of Venetian blind ladder tape to proper length.

Another object of the invention is to quickly and conveniently cut unwanted rungs from Venetian blind ladder tape.

A further object of the invention is to provide a machine for aiding in the forming and securing of loops at the end of Venetian blind ladder tape.

A further object of the invention is to provide a machine for forming and securing loops at the end of Venetian blind ladder tape a uniform distance from a rung of the tape.

A further object of the invention is to provide a composite machine for cutting the branches of Venetian blind ladder tape and forming and securing loops therein a uniform predetermined distance from a rung of the tape.

A still further object of the invention is to provide a machine for forming loops on the ends of the branches of the Venetian blind ladder tape a predetermined distance from a rung thereof and quickly and securely securing said loops.

Further objects and objects relating to details and economies of construction and operation will more definitely appear from the detailed description to follow.

My invention is clearly defined in the appended claims. In the claims, as well as in the description, parts are at times identified by specific names for clarity and convenience, but such nomenclature is to be understood as having the broadest meaning consistent with the context and with the concept of my invention as distinguished from the pertinent prior art. The best form in which I have contemplated applying my invention is illustrated in the accompanying drawings forming part of this specification, in which:

Fig. 1 is a perspective view of the complete machine, a portion of the stand being broken away to show details of construction.

Fig. 2 is a top plan view of the machine, one corner of the frame and portions of the stapler being broken away.

Fig. 3 is a top plan view of a portion of the machine, showing a ladder tape positioned for clamping by the machine.

Fig. 4 is a view similar to Fig. 3, showing the ladder tape in clamped position.

Fig. 5 is a view similar to Fig. 3, showing the cutting of the ladder tape branches to proper length.

Fig. 6 is a view similar to Fig. 3, showing the formation of loops in the ends of the ladder tape branches.

Fig. 7 is a top plan view of a portion of the machine, showing the securing of the loops in the ladder tape branches by stapling, a portion of the stapler being broken away for clarity of illustration.

Fig. 8 is a somewhat diagrammatic front elevation of the cutter and cutter guard, showing the guide sleeve for aiding in sharpening the cutter.

Fig. 9 is a detailed view of the latch for holding the carriage in central position.

Referring now to the drawings and particularly to Figs. 1 and 2, the machine comprises a ladder tape clamp **10**, a rotary cutter assembly **11** and a stapler **12**, the clamp and the cutter assembly being mounted upon an oscillatable carriage **14** which is pivotally mounted on a frame **15**. The stapler **12** is mounted directly on the frame **15**.

The frame **15**, which is preferably of stamped sheet metal having a downwardly-directed marginal flange **16** extending about its edge and terminating in lateral mounting flanges **17**, is supported at a convenient height for operation of the machine by a sheet metal stand **19**. The stand **19** is formed of a rectangular base **20** upon which is mounted a generally channel-shaped vertical member **21**, this member being open at the front as shown in Fig. 1. A horizontal top member **22** secured to the top of the vertical member **21** supports the frame **15**, which is bolted thereto by bolts passing through the flanges **17, 17**.

The carriage **14** comprises a generally rectangular sheet metal plate **24** having upwardly-projecting lateral flanges **25** and **26**. This carriage is oscillatably mounted on the top surface of the frame **15** by a pin **27** journaled in the frame.

The carriage **14** is supported on ball-bearing rollers **29** (see Fig. 2) mounted on horizontal axes, one of these rollers being mounted on forward extensions of each of the carriage flanges **25** and **26**, and the third roller being mounted centrally at the rear of the carriage. The axes of these rollers intersect the pin **27**, the rollers providing for almost frictionless oscillation of the carriage **14** on the frame **15**.

A laterally-projecting handle **30** mounted on the rear of the carriage flange **26** serves as a ready means for oscillating the carriage **14**. A guard **31** secured to the frame **15** and having a flat horizontal portion immediately overlying the path of a roller **29**, serves to prevent upward displacement of the carriage **14** from the frame, as well as prevent accidental contact of the machine operator with the roller.

The cutter assembly **11** is mounted on the front end (end nearest the machine operator)

of the carriage **14**. This assembly comprises a rotary knife **32** which is of circular form with a very sharp peripheral edge. The rotary knife **32** is rotated on its axis within the knife guard **34**, consisting of two flat spaced parallel plates which may be of the general outline shown in Fig. 8.

Vertical slots **35, 35** and **36** are formed in both plates of the knife guard **34**, as best shown in Fig. 8. These slots project downwardly to intersect the path of the rotary knife **32**, terminating slightly below the knife path. The top or entering ends of these slots are somewhat flared to provide for easy entrance of ladder tape to be cut. The central slot **36** is somewhat wider than the side slots **35, 35**.

The rotary knife **32** is rotated in a vertical plane within the knife guard **34** by a shaft **37**, this shaft being driven at substantially constant speed by a fractional horsepower electric motor **39** which is connected to a suitable supply of electric power by a lead **40**. An electrical on-off snap switch **41** mounted on a rear corner of the frame **15** serves to control the motor **39**.

The motor **39** and knife guard **34** are secured on the top surface of a broad channel **42** having upwardly-directed flanges fitting within the lateral flanges **25** and **26** of the carriage **14**. The channel **42** is secured to the plate **24** of the carriage **14** by bolts which pass through slots **44, 44** of the channel, thus providing for adjustment of the cutter assembly **11** from front to rear of the carriage. The flanges **25** and **26** prevent the channel **42** and cutter assembly **11** from becoming out of alignment during adjustment.

The ladder tape clamp **10** comprises two corresponding generally vertical sheet metal members **45** and **46** which are joined by a base **48** and are spaced apart a little less than the length of the rungs or connecting tapes of the ladder tape to be cut. Members **45** and **46** are provided with vertical slots **47** and **49**, respectively, for receiving a rung of the ladder tape. The portions of the members **45** and **46** to the rear of the slots **47** and **49** (away from the machine operator) are disposed outwardly slightly to better hold the ladder tape, as will be explained in connection with the operation of the machine. These members are somewhat converged at their top and front portions to assist in engaging the ladder tape in the clamp.

A clamping arm **50** is rotatably mounted at its lower end on the base **48** of the clamp **10** and is urged forwardly between the members **45** and **46** by a tension spring **51**. A trigger **52** which is pivotally mounted on the base **48** serves to hold the arm **50** in rearward position where it does not engage with ladder tape positioned within the clamp **10**. A trigger spring **54** normally retains the trigger **52** in arm-engaging position.

The trigger is oscillatable by the machine operator against the resistance of the spring **54** so as to release the arm **50**, permitting the arm to be oscillated forwardly by the spring **51**. The clamping arm **50** may be returned to trigger-engaged position by pressing rearwardly on the upper end thereof, the arm striking a cam portion **55** of the trigger **52** and oscillating the trigger so as to permit rearward movement of the arm.

The base **48** of the clamp **10** fits within upstanding flanges of a channel **56** fixed to the top surface of the frame **15**, bolts securing the base to the frame and passing through slots **57, 57** in the base to provide for front and rear ad-

justment of the clamp 10, the channel flanges maintaining the clamp 10 in alignment.

The stapler 12 comprises a stapling machine 59 and associated parts for operating the machine. This machine is of conventional type, having a fixed anvil 60 and a pivoted arm 61 for holding a supply of staples and supporting the staple-driving mechanism 62.

The stapler is operated by a foot pedal 64 pivotally connected to the base 20 by a pin 65. The pedal 64 has a foot-engaged portion 66 at the front end of the pedal and an upwardly-extending rod 67 pivotally connected to the pedal a short distance in front of the pin 65. The upper end of the rod 67 passes through a rectangular link 69, this rod having a collar 70 for engaging the link and pulling it downwardly.

The link 69 is pivotally connected at its upper end to a bridge 71 which is secured to the lower end of a pair of rods 72, 72. The rods 72, 72 extend upwardly through holes in the top member 22 of the stand 19, the frame 15, and a U-shaped guide 74, these rods being vertically reciprocable. The rod guide 74 is secured to the top surface of the frame 15.

A plate 75 is fixed to the upper ends of the rods 72, 72 and extends forwardly over the driving mechanism 62 of the stapling machine 59. Operation of the pedal 64 reciprocates the previously-described linkage downwardly so as to operate the stapling machine 59 in the usual manner. An elastic rubber pad 76 may be interposed between the plate 75 and the staple driving mechanism 62 to cushion the operation of the machine. After each stapling operation, a tension spring 77 connected between an extended portion of the link 69 and the lower side of the stand top member 22 serves to return the pedal and linkage to normal position.

A pedal stop 79 (see Fig. 1) is provided to prevent accidental operation of the pedal 64 during periods when the machine is not in use. This stop comprises a metal frame having a laterally-projecting portion 80 displaceable, when in pedal-locking position, immediately under the pedal 64 so as to prevent downward oscillation of the pedal. The stop 79 is slidably journaled on a horizontal rod 81 mounted in the vertical member 21 of the stand 19 immediately above the pedal 64 so as not to interfere with its movement. The stop 79 may be moved along the rod 81 to either inoperative position or to pedal-engaging position.

A horizontal segmental plate 84 is secured to the rear end of the carriage 14 and projects rearwardly to cooperate with the stapling machine 59. This plate has a rectangular central aperture 85 which receives the anvil 60 of the stapling machine when the carriage 14 is in central position.

The plate 84 has two pairs of laterally-extending arms 86, 86 and 87, 87, these arms extending at equal angles, as shown in Fig. 2, such that when the carriage 14 is oscillated to extreme side positions, the arms 86, 86 and 87, 87 lie substantially laterally of the machine. Spring fingers 89, 89 are secured to the plate 84 at the base of the arms 86, 86 and overlie these arms as best shown in Fig. 2.

Tabs 90, 90 are struck up from the frame 15 in the path of the rearmost carriage roller 29 to serve as stops for limiting the oscillatory movement of the carriage 14. Holes 91 are formed in the plate 15 in the path of the rearmost roller 29 a short distance inside of the tabs 90, 90. These holes receive the roller 29 so as to index the carriage 14 relative to the stapling machine

59. When the roller 29 is positioned in the hole 91 adjacent each of the tabs 90, 90, the carriage is positioned at the limits of its oscillatory travel, and when the roller 29 is positioned in either of the other two holes 91 the carriage is a little short of its limits of travel.

A latch 92 is provided at the rear end of the plate 24 of the carriage 14 for locking the carriage in central position. This latch, which is best shown in Fig. 9, consists essentially of a spring-pressed bolt 94 which is received in a hole or detent 95 in the frame 15 when the carriage is in central position. A collar 96 on the bolt 94 limits its downward movement. The carriage 14 is unlatched for oscillatory movement by lifting slightly on the handle 30.

The knife 32 is maintained very sharp by stroking its peripheral cutting edge with an abrasive stone while it is rotating. This sharpening is facilitated by the provision of a metal sleeve 97 of rectangular cross section which is swiveled intermediate its ends in a slot 99 formed in the knife guard 34 and projecting towards the axis 37 of the knife. A stone of cross section fitting within the sleeve 97 may be inserted therein and stroked against both sides of the knife 32, as indicated in dot-dash lines in Fig. 8, the sleeve maintaining the stone at the proper angle for sharpening the knife. A sleeve retainer 100, comprised of a stiff wire shaped as indicated in Fig. 8 and pivoted to the knife guard 34 above the sleeve 97, may be oscillated into retaining position within a narrow slot 101 formed in an end of the sleeve when it is not being used in order to hold the sleeve against movement.

To operate this machine, the switch 41 is moved to the "on" position, thus starting the electric motor 39 and driving the rotary knife 32. The motor and knife constantly rotate while the machine is being used.

A measured length of ladder tape is cut from a supply roll of tape, the length of tape being determined by the height of the blind for which it is intended. The ladder tape may be cut quickly and conveniently by moving the tape against the knife 32, the tape being entered into the wider slot 36 in the knife guard 34 and moved downwardly against the knife to sever the tape.

It is necessary to remove several rungs from the top end of the ladder tape to permit the branches of the ladder tape to pass freely upward through slots in the bottom of the enclosed head bar and attach to the blind tilting means, as well as to space the top blind slat, which is carried on the topmost remaining rung, a proper distance from the bottom of the head bar. This may conveniently be done by folding the branches of the ladder tape outwardly back upon themselves, seizing the middle of the topmost rung and extending it outward so as to collapse the branches of the ladder tape, thus bringing the junctions of the rung and the ladder tape branches together. The double rung is then entered within the slot 36, and moved downwardly against the knife 32 to sever the rung at its junctions with the ladder tape branches. Since the ladder tape branches are doubled back upon themselves and not introduced within the slot 36, the rung is removed without otherwise cutting the tape. This process is repeated until, preferably, the three topmost rungs have been removed from the tape.

The ladder tape is then placed in the clamp 10 with the free ends of the ladder tape branches extending rearwardly towards the stapler 12. The ladder tape branches are placed outside of the clamp members 45 and 46, the topmost remain-

ing rung of the ladder tape being entered within the slots 47 and 49 within the members 45 and 46, respectively. When placing the ladder tape within the clamp 10, it is preferably inserted with the topmost rung at the bottom side of the ladder tape branches. Fig. 3 illustrates the ladder tape in inserted position within the clamp 10. The tape is permitted to hang across the top of the carriage 15 and down beside the machine. At this time the carriage 14 is preferably in its central position on the base 15, it being held in that position by the carriage latch 92. This insertion of the ladder tape into clamp 10 so positions the ladder tape as to orient a rung of the tape, placing the rung a predetermined distance from the knife 32 and arms 86, 86 and thereby determining the distance from this rung at which the ladder tape branch ends are cut and terminal loops formed thereon.

After insertion of the ladder tape in the clamp 10, the trigger 52 is oscillated, as shown in Fig. 4, to release the clamping arm 50 which moves forwardly, pressing the central portion of the clamp-engaged rung forwardly so as to draw the portions of the ladder tape branches adjacent the base of the rung tightly against the outside surfaces of the clamp members 45 and 46. The ladder tape is now firmly engaged by the clamp 10 and thus definitely positioned with relation to the knife 32 and the loop-forming arms 86, 86.

The branches of the ladder tape are folded backwardly upon themselves, and entered into the slots 35, 35, as shown in Fig. 5. The tape branch ends are pulled forward so as to remove any slack between the clamp 10 and the knife 32, and the tape branches then moved downwardly against the knife to sever them at a predetermined distance from the clamp. While Fig. 5 shows both branches of the ladder tape being passed simultaneously against the knife 32, cutting of the two branches may be performed successively if desired. After severing the ladder tape branches as above described, the two branches extend equally from the topmost remaining rung and are of the proper length for the loop-forming portion.

Each branch is now extended rearwardly from the clamp 10, passed over its respective arm 87, and under arm 86, as shown in Fig. 6. The tape branch at the right of Fig. 6 has been so positioned, being somewhat spaced from the segmental plate 84. After being so positioned, the end of each ladder tape branch is folded forwardly about the arm 86, and the loop slid inwardly against the adjacent edge of the segmental plate while at the same time entering the end of the ladder tape branch between the arm 86 and the spring finger 89, as shown in the left ladder tape branch of Fig. 6. While described and shown in Fig. 6 in two individual steps, the passing of the ladder tape branches about the arms 86, 86 and beneath the spring fingers 89, 89 is performed in a single motion by the machine operator and may be performed very rapidly. Loops have now been formed in the ladder tape branches a predetermined distance from the topmost rung of the tape.

The loops are secured in the ladder tape branches by means of the stapler 12. To perform this operation, the carriage handle 30 is raised slightly to unlatch the carriage, after which the carriage is oscillated to the limit of its travel in either direction, the rearmost roller 29 resting against one of the stops 90, 90 and in the detent 91 adjacent the stop. This indexes the loop of a ladder tape branch directly over the anvil 60 of the stapling machine 59. The pedal 64 is then depressed to insert a staple for securing the tape branch loop.

The carriage is then oscillated slightly, placing the rearmost carriage roller 29 in the next detent 91, after which the operation is repeated to insert a second staple in the looped portion of the tape branch, this staple being beside and slightly spaced from the first. The carriage 14 is then oscillated to the opposite end of its travel and the operations repeated so as to staple the other ladder tape branch in a similar manner. During the stapling operation the arms 87, 87 support the ladder tape branches and prevent them from accidentally becoming engaged with the forward portion of the stapling machine 59 during oscillation of the carriage 14.

By spacing the portions of clamp members 45 and 46 rearward of slots 47 and 49, respectively, wider than the forward portions of these members, the tape is held better during the loop-forming and stapling operations due to the extra frictional contact of the tape with the members.

The stapling operation having been completed, the clamping arm 50 is pushed rearwardly to its initial position where it is reengaged and held by the trigger 52. The loops of the ladder tape branches are slipped outwardly from engagement with the arms 86, 86 and the ladder tape withdrawn upwardly from engagement with the clamp 10, the upper end of the tape now being ready for incorporation into a blind of the type herein described.

While this machine has been described as incorporating a stapler for securing the loops in the ladder tape branches, it is within the purview of this invention to secure the tape branches by other well-known means and to use other than a rotary knife for cutting the tape.

I claim:

1. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches, said machine comprising means for clamping ladder tape, said clamping means having a ladder tape rung-receiving portion, tape-cutting means located a predetermined distance from said clamping means for cutting the ladder tape branches a predetermined distance from the rung-receiving portion of said clamping means, a member located a predetermined distance from said clamping means and about which the cut end of a ladder tape branch may be folded upon itself to form a loop, and means for securing the loop so formed.

2. A machine for cutting the branches of Venetian blind ladder tape a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches, said machine comprising means for holding ladder tape and orienting a rung thereof, tape-cutting means located a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the rung-orienting portion of said tape-holding means, a member located a predetermined distance from said tape-holding means and about which the cut end of a ladder tape branch may be folded upon itself to form a loop, and means for securing the loop so formed.

3. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches, said machine

comprising means for holding ladder tape, said tape-holding means having a slot for receiving a rung of the ladder tape, tape-cutting means located a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the rung-receiving slot of said tape-holding means, a member located a predetermined distance from said tape-holding means and about which the cut end of a ladder tape branch may be folded upon itself to form a loop, and means for securing the loop so formed.

4. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding ladder tape, said tape-holding means having a slot for receiving a rung of the ladder tape, and tape-cutting means mounted a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the slot thereof.

5. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding ladder tape, said tape-holding means having a slot for receiving a rung of the ladder tape, and a circular power-driven tape-cutter located a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the slot of the tape-holding means.

6. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding ladder tape, said tape-holding means having a ladder tape rung-receiving position, and tape-cutting means mounted a predetermined distance from said tape-holding means for cutting the branches of the ladder tape at a predetermined distance from the rung-receiving portion thereof.

7. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding ladder tape, and orienting a rung thereof, and tape-cutting means mounted a predetermined distance from said tape-holding means for cutting the ladder tape branches at a predetermined distance from said rung of the ladder tape.

8. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding a ladder tape and orienting a rung thereof, and tape-cutting means located a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from said rung of the ladder tape, said tape-cutting means comprising a movable cutter contained within a cutter guard, the cutter guard having slots adapted to receive the ladder tape branches for cutting.

9. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising means for holding a ladder tape, said tape-holding means having a slot for receiving a rung of the ladder tape, and tape-cutting means located a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the held portion thereof, said tape-cutting means comprising a power-driven circular cutter contained within a cutter guard, the cutter guard having a slot providing a channel extending into the path of the cutter and adapted to receive a ladder tape branch for cutting.

10. A machine for forming and securing loops on the ends of Venetian blind ladder tape branches, said machine comprising means for clamping ladder tape, said clamping means orienting a rung of the ladder tape, oppositely-projecting armlike members a predetermined distance from said clamping means and about which tape branches may be folded back upon themselves to form terminal loops, and means for attaching folded-back portions of the tape branches to the other portions thereof to secure said loops.

11. A machine for forming and securing loops on the ends of Venetian blind ladder tape branches, said machine comprising means for holding ladder tape, said tape-holding means orienting a rung of the ladder tape, oppositely-projecting armlike members a predetermined distance from said tape-holding means and about which tape branches may be folded back upon themselves to form terminal loops, and means for stapling folded-back portions of the tape branches to the other portions thereof to secure said loops.

12. A machine for forming and securing loops on the ends of Venetian blind ladder tape branches, said machine comprising means for holding ladder tape, said tape-holding means having a vertical slot for receiving a rung of the ladder tape, oppositely-projecting horizontal armlike members located a predetermined distance from said tape-holding means and about which the tape branches may be folded back upon themselves to form terminal loops, and means mounted in coordinated relationship to said armlike members for attaching the folded-back portions of the tape branches to the other portions thereof to secure said loops.

13. A machine for cutting the branches of Venetian blind ladder tape a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches, said machine comprising: a machine frame, a carriage movable on said frame, means mounted on said carriage for engaging ladder tape, said tape-engaging means having a ladder tape rung-receiving portion, tape-cutting means secured to said carriage and located a predetermined distance from said tape-engaging means for cutting the branches of the ladder tape a predetermined distance from the rung-receiving portion of said tape-engaging means, a member located on said carriage at a predetermined distance from said tape-engaging means and about which the cut ends of ladder tape branches may be folded upon themselves to form loops, and means attached to said machine frame for securing said loops, said carriage being movable relative to said securing means to position the tape branch loops for the securing operation.

14. A machine for cutting the branches of Venetian blind ladder tape a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches, said machine comprising: a machine frame, a carriage movable on said frame, means mounted on said carriage for holding the ladder tape, said tape-holding means having a ladder tape rung-receiving portion, tape-cutting means secured to said carriage and located a predetermined distance from said tape-holding means for cutting the branches of the ladder tape a predetermined distance from the rung-receiving portion of said

tape-holding means, a member located on said carriage at a predetermined distance from said tape-holding means and about which the cut ends of ladder tape branches may be folded upon themselves to form loops, and a wire staple-applying machine fixed to said machine frame for securing said loops, said carriage being oscillatable on said machine frame to position the tape branch loops for the stapling operation.

15. A machine for cutting the branches of Venetian blind ladder tape a fixed distance from a rung of the tape and forming and securing loops on the cut ends of said branches said machine comprising: a machine frame, a carriage movable on said frame, means mounted on said carriage for clamping the ladder tape, said clamping means having a ladder tape rung-receiving portion, tape-cutting means secured to said carriage and located at a predetermined distance from said clamping means for cutting the ladder tape branches a predetermined distance from the rung-receiving portion of said clamping means, a member located on said carriage at a predetermined distance from said clamping means and about which the cut ends of the ladder tape branches may be folded upon themselves to form loops, and means attached to said machine frame for stapling said loops, said carriage being movable relative to said securing means to position the tape branch loops for the securing operation.

16. Apparatus for performing operations on the ends of Venetian blind ladder tape, comprising: a pair of spaced parallel members adapted to fit between the branches of the ladder tape and maintain the tape laterally extended, said members being provided with slots for reception of a rung of the ladder tape, and a cooperating element movable between said parallel members for engaging and displacing the ladder tape rung to tension the rung and draw the ladder tape branches tightly against the members.

17. A machine for cutting the branches of Venetian blind ladder tape at a fixed distance from a rung of the tape, said machine comprising: means for holding ladder tape, said tape-holding means including two spaced members slotted to receive a rung of the ladder tape, and an element movable between said members for engaging and displacing the ladder tape rung to tension the rung and draw the ladder tape tightly against the members, and tape-cutting means mounted a predetermined distance from said tape-holding means for cutting the ladder tape branches a predetermined distance from the slots thereof.

HARRY NELSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,993,799	Phillips	Mar. 12, 1935
2,288,881	Bauwens	July 7, 1942

Certificate of Correction

Patent No. 2,478,003 August 2, 1949

HARRY NELSON

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 9, line 36, for the word "position" read *portion*; column 8, lines 46 and 61, column 9, lines 1, 15, 24, 34, 44, 53, and 65, column 10, lines 5, 17, and 29, after the word "comprising" in each instance, insert a colon;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of December, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.