March 26, 1963 J. B. YURYAN 3,082,808

APPARATUS FOR ADVANCING FLEXIBLE, STRAND-LIKE MATERIAL INTO THE FIELD OF ACTION OF PROCESSING MEANS

Filed Nov. 1, 1960 3 Sheets-Sheet 1

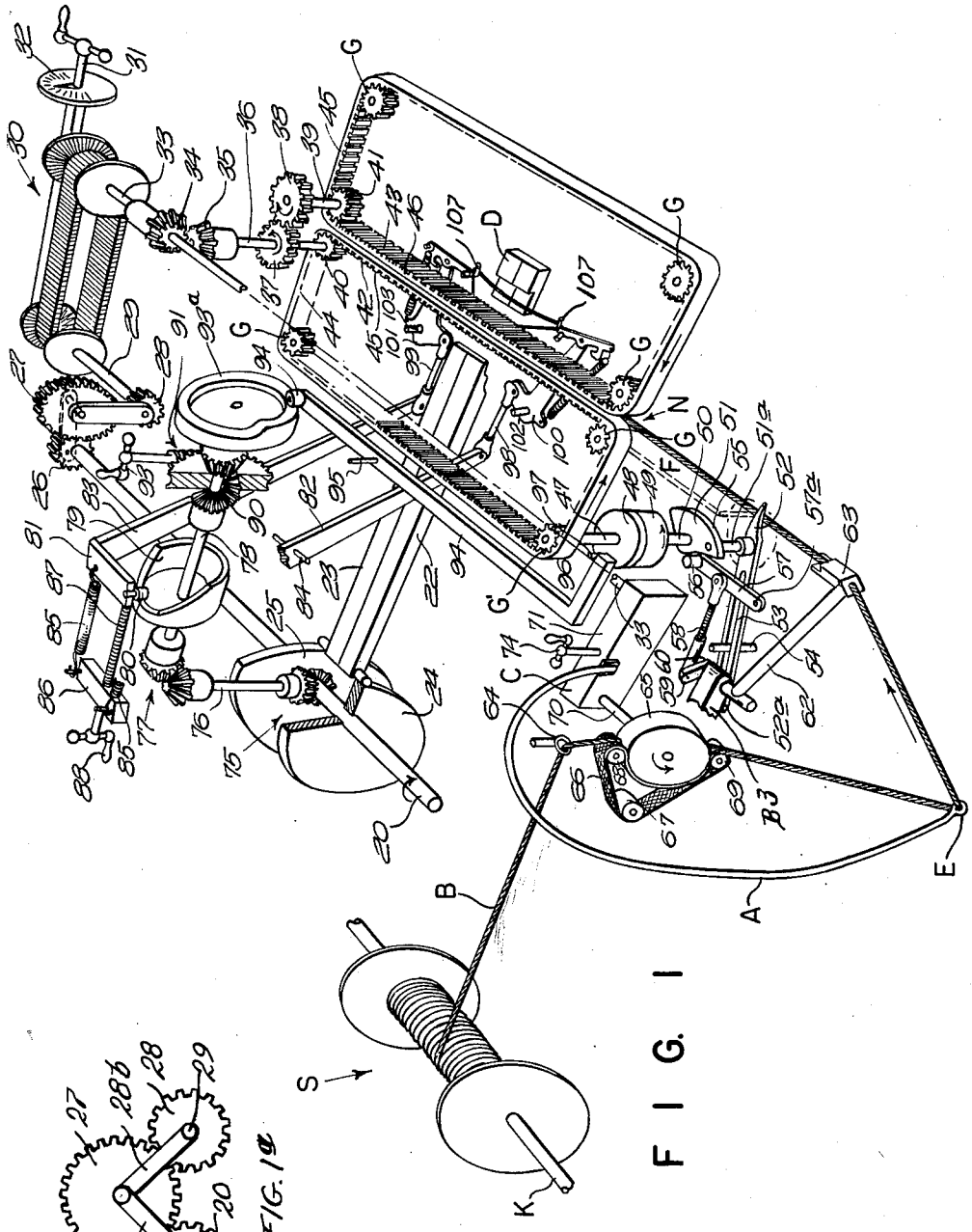


FIG. 1

FIG. 1a

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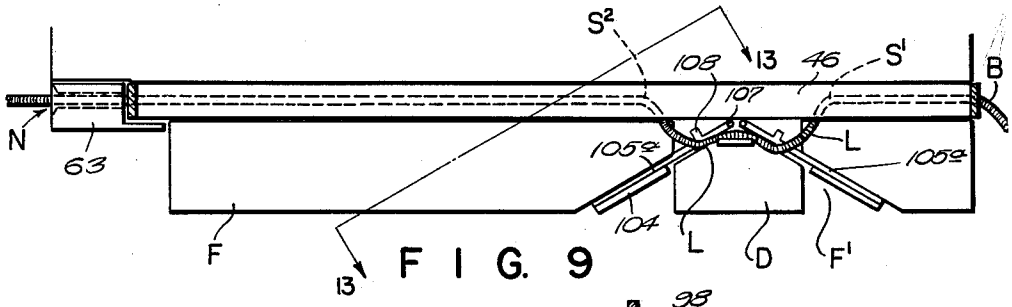


FIG. 9

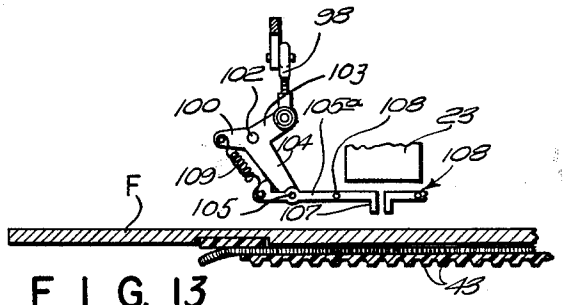


FIG. 13

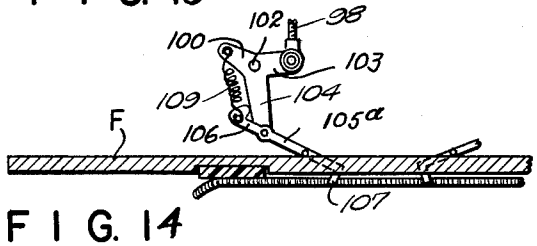


FIG. 14

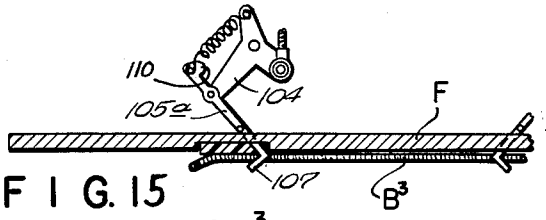


FIG. 15

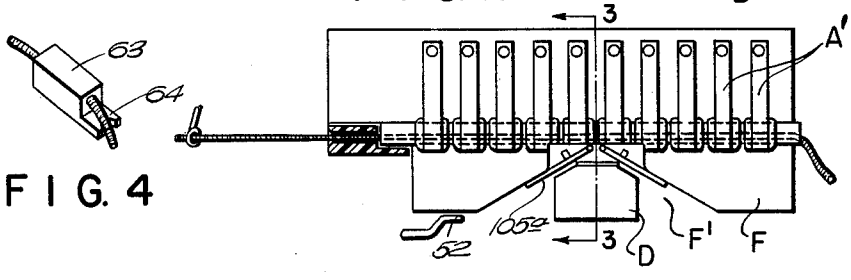


FIG. 4

FIG. 2

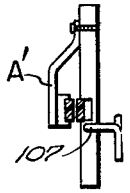


FIG. 3

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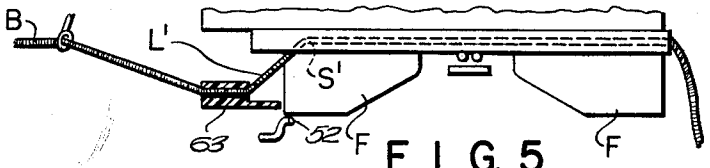


FIG. 5

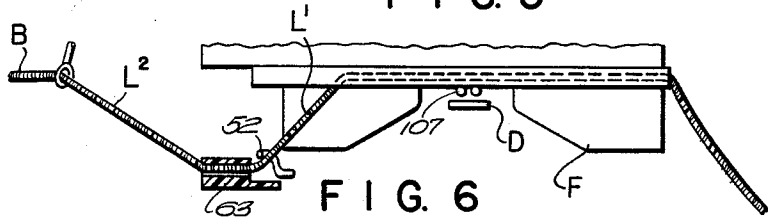


FIG. 6

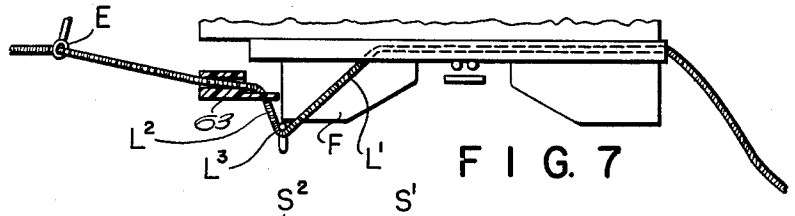


FIG. 7

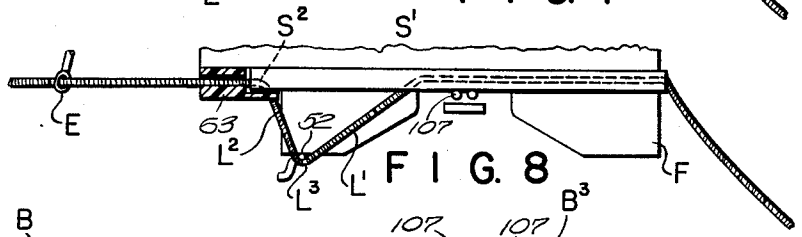


FIG. 8

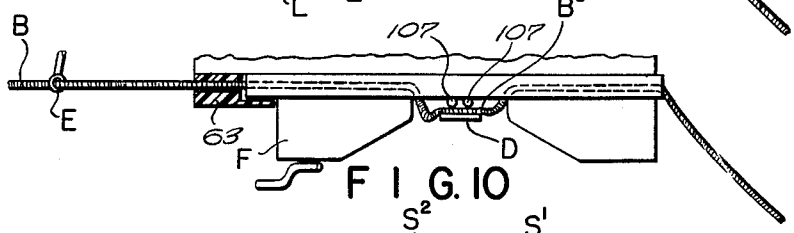


FIG. 10

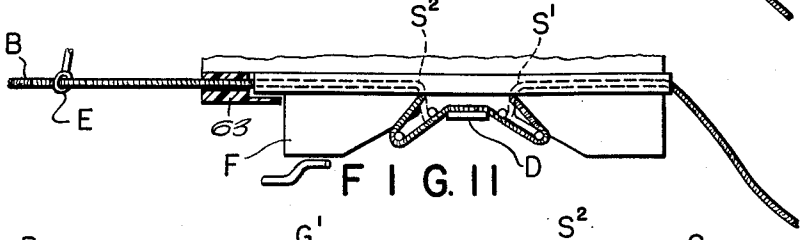


FIG. 11

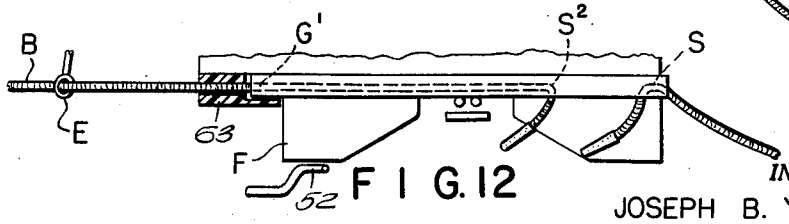


FIG. 12

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3,082,808

APPARATUS FOR ADVANCING FLEXIBLE, STRAND-LIKE MATERIAL INTO THE FIELD OF ACTION OF PROCESSING MEANS

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Filed Nov. 1, 1960, Ser. No. 66,632
22 Claims. (Cl. 153—1.5)

This invention pertains to mechanism for intermittently advancing a length of flexible material, in particular strand-like material, as received from a supply, through the field of action of means for processing said material as, for instance, for cutting it into lengths, applying spaced fasteners thereto, sewing seams in the material, indenting, stamping or printing the material, or the like, but, for more specific example (without limiting intent), for intermittently advancing shoe lace braid through the field of action of means which cuts the braid into shoe lace lengths and applies tips to each length.

Herein, for ease in description and illustration, the present invention is disclosed as embodied in mechanism for supplying lace braid to a tipping machine which, in other respects, may be of conventional type. Among the requirements for such mechanism is that it be capable of advancing the lace braid, step-by-step, and for different selected distances, since shoe laces are of many different lengths. Heretofore mechanism of this type has been complicated in construction and operation because, for example, it has been customary to depend upon spaced braid-clamping jaws or dogs for gripping the lace braid, and upon the employment of cams or other interchangeable parts for determining the distance through which the braid shall be advanced at each cycle of operation, and wherein such jaws, cams or the like, must be pre-set, usually by the aid of tools, according to the predetermined length of lace to be made. In most prior devices of this general type, there are definite limits as respects the number of different lengths which may be made, thus constricting the variety of laces which may be made. Moreover, in most prior machines, such adjustments as are provided for changing from one length to another, require mechanical skill beyond that of the usual machine operator, and, being time-consuming, result in keeping the tipping machine out of operation for a substantial period whenever a change in lace length must be made, thus adding to production cost.

The present invention has for objects the provision of mechanism capable of advancing the lace braid (or such other flexible material as it is designed to handle) so as to supply it to the tipping or other processing machine in any of an infinite number of lengths (within the set limits of the particular machine design) and to provide means easily actuable by the machine operator, and without the assistance of a skilled mechanic, for changing from one length to anotther, and without substantial loss of time. A further object is to provide mechanism of the above type, so designed that when adjusted to a given length of lace it is dependable to produce such length with consistent accuracy.

Other and further objects and advantages of the invention will be pointed out in the following more detailed description and by reference to the accompanying drawings, wherein:

FIG. 1 is a fragmentary, diagrammatic, perspective view, omitting certain parts, and showing the mechanism of the present invention as associated with a conventional lace tipping machine of which only the main shaft, dies and their actuating cams are indicated;

FIG. 1*a* is a rear elevation of the "3-gear" intermittent drive shown in FIG. 1;

FIG. 2 is a fragmentary front elevation, to larger scale, at the region of the tipping dies, showing the spring arms which are designed to press against the front feed belt to urge the latter toward the rear belt, and also showing the stretching fingers in idle position;

FIG. 3 is a fragmentary vertical section on line 3—3 of FIG. 2;

FIG. 4 is a perspective view of the guide for the incoming braid;

FIGS. 5 to 8, inclusive, are fragmentary diagrammatic elevations, omitting the belt pressing arms, illustrating successive steps in the formation of a loop of braid and the advance of said loop toward the field of action of the stretching and positioning fingers;

FIG. 9 is a fragmentary diagrammatic elevation similar to FIG. 5, but to larger scale, showing the loop of braid in readiness to be engaged by the positioning and stretching finger;

FIGS. 10 and 11 are views similar to FIG. 9, but illustrating the action of the stretching and positioning fingers;

FIG. 12 is a view similar to FIG. 9, but showing the tip as having been applied and the braid severed; and

FIGS. 13, 14 and 15 are fregmentary, diagrammatic, vertical sections in the plane of line 13—13 of FIG. 9, illustrating successive steps respectively, in the operation of the stretching and positioning fingers.

In accordance with this invention, the incoming advancing braid B (FIG. 1), is first caused to form a depending loop whose downwardly converging legs are held securely at their upper ends by the grip of the two belt runs 45 and 46, the length of the braid material which constitutes the loop being accurately predetermined and constituting a definite fraction of the length of the desired lace. During the formation of this loop, the braid material is drawn off from the source of supply at a rate substantially faster than that at which the braid material is advanced by the belts, and thus the speed of operation of the mechanism is very stubsantially increased as contrasted with an arrangement in which the braid material is never drawn from the source of supply any faster than the speed at which the braid is moved past the tipping point. At this point it may be noted that while reference is herein made to braid employed in making shoe laces, the term "braid" is to be understood as broadly inclusive of any of the materials used for shoe laces as well as strand material used for other purposes.

The downwardly depending loop formed as above described is bodily advanced by the travelling belts until it is centered symmetrically with reference to the tipping dies. When so positioned the belts dwell and loop-stretching and positioning fingers in the loop engage its opposite legs and pull them apart so as to form a substantially rectilinear tensioned run which the fingers then lay against the stationary dies. While the belts continue to dwell, a length of tipping material is properly positioned with respect to this rectlinear run of the braid material, the movable dies come forward and curl the tipping material about the braid, and a cutter severs the tipping material midway its ends thus forming tips in two independent laces, and the belts resume their definite movement carrying the completed lace to the delivery point.

Referring to the drawings, and particularly to FIG. 1, the numeral 20 designates the main shaft of a lace tipping machine of conventional type and to which are fixed two cams 24 and 25 which actuate the movable dies 22 and 23 of the tipping machine. These movable dies cooperate with the stationary dies D.

On the same shaft 20 there is fixed the drive pinion 26 of a conventional "3-gear" variable speed drive (FIG. 1*a*) which includes the planetary gear 27 and the intermittently turning output gear 28, the latter being fixed to the shaft 29, the bearings for the shaft of gear 27 being supported by the links 28^a and 28^b.

The variable speed drive is designed to provide a near dwell in the rotation of the shaft **29** of the order of 45° of the rotation of the drive shaft **20**, with a smooth deceleration and acceleration before and after the dwell, respectively. Such a length of dwell is just sufficient to permit the operation of the dies and cutters before the shaft **29** picks up substantial speed. Any other type of intermittent or variable speed drive may be substituted for the "3-gear" drive herein above described.

The shaft **29** drives a variable speed mechanism **30** which may be of conventional type, for instance, of the link-belt, positive, infinitely variable speed type, and wherein speed variation is controlled by a manually actuatable crank **31**, desirably having a pointer for cooperation with the dial **32** which is graduated to show various lengths of lace.

The output shaft **33** of the variable speed mechanism **30** has a gear **34** fixed thereto which meshes with a pinion **35** on a vertical shaft turning in bearings (not shown), and to which there is fixed a pinion **37** which meshes with a pinion **38** of the same size and pitch, the latter pinion being fixed to a vertical shaft **39**, turning in bearings (not shown), and to whose lower end there is fixed a pinion **41**. A pinion **40**, similar in pitch to the pinion **41**, is fixed to the lower end of the shaft **36** and these two pinions engage teeth **42** and **43** on two endless belts **44** and **45** respectively. These belts are, for example, of the type commonly employed for power transmission, having gear-like teeth at their inner surfaces and having smooth outer surfaces, for instance, of a rubber composition. These belts **44** and **45** are guided, as here illustrated, by idler pinions G at three points and by a driven pinion G' at the fourth point, so that each belt forms a substantially rectangular loop, with the substantially straight longitudinal runs **45** and **46** of the respective belts so disposed that their smooth surfaces are in substantial contact. As shown in FIGS. 2 and 3, the belt run **46** is resiliently urged rearwardly toward the belt run **45** and the fixed face plate F by a series of spring arms A^1 (FIGS. 2 and 3), preferably provided with nylon blocks for contact with the belt **46**, the face plate F also having nylon blocks for contact with belt run **45**. The opposed surfaces of the belt runs **45** and **46** are thus normally substantially in contact, so that when the braid is introduced between them it is firmly gripped. The pinion G', which is driven by the teeth of the belt **44**, is fixed to the upper end of a vertical shaft **47** turning in bearings (not shown), and to which is fixed the driven element **48** of a one revolution clutch **49**, which is secured to a vertical shaft **50** turning in bearings (not shown). To this shaft **50**, at a point below the clutch **49**, there is fixed a combined crank arm and cam **51**. A crank pin **51a** projects downwardly from the member **51** and is pivotally connected at its lower end to a braid positioning finger **52** having an elongate slot **53** which receives a fixed guide or shaft **54**, the arrangement being such that as the shaft **50** turns, the free end of the finger **52** swings in an elliptical path and in a substantially horizontal plane, the plane of motion of the finger being below the lower edge of the fixed face plate F (shown in broken lines in FIG. 1), whose upper edge is directly below the lower edge of the belt run **45**.

The member **51** has a cam surface **55** which engages a cam follower roll **56** at one end of a horizontally movable lever **57**, which swings about a fixed vertical pivot pin **57a** and to which is pivotally connected the forward end of a link **58** of adjustable length whose rear end is pivotally connected to an upstanding crank arm **59** fixed to one end of a shaft **60** turning in a bearing (B^3). To this shaft **60** there is also fixed a long rocker arm **62** to whose forward end there is fixed an incoming braid guide **63** having a passage therethrough for the braid and which is preferably shaped at its end, to form a fork **64** (FIG. 4) providing a notch for guiding the braid as the latter emerges from the passage in the block.

The braid is supplied from any suitable source, for instance, from a spool S mounted, for example, to turn on the shaft K. The braid B, as it leaves the spool, passes through a guide eye **64** carried by a fixed support and then about a portion of the periphery of the driven delivery drum **65**, mounted on a shaft **70**. As shown in FIG. 1, the braid contacts the roll **65** through an arc of approximately 180°, being held in frictional contact with the drum by an endless belt **66** which embraces suitably positioned idler rolls **67**, **68** and **69**. After leaving the drum **65** the braid passes through an eye E at one end of a long, very flexible spring arm A whose opposite end is here shown as fixed to the casing C of a speed varying mechanism **71** of any desired or conventional type, and which has a crank **74** which may be turned manually for varying the speed of the shaft **70**, above referred to, and which is the output shaft of the speed varying mechanism.

A dial (not shown) may be associated with the crank **74** to assist in adjusting the speed of the shaft **70**. The shaft **33**, above described, is the input shaft of the speed varying mechanism **71**.

By means of a set of beveled gears **75**, the main shaft **20** drives a vertical shaft **76**, turning in suitable bearings (not shown), and which, by means of a set of beveled gears **77**, turns a shaft **78** on which is mounted a cam **79** which is engaged by a cam follower roll **80** turning on a stud fixed to a yoke **81**, which comprises two parallel spaced arms **82** and **83** which are pivoted intermediate their ends to rock about a shaft indicated at **84**.

The cam follower **80** is urged into contact with the cam **79** by coil springs **85** connected at their opposite ends to the yoke **81** and to a fixed block **86**. This block has a screw-threaded opening for the reception of a screw-threaded shaft **87** whose forward end forms a limiting stop for the yoke **81** and whose rear end is provided with a crank **88** by means of which the shaft **87** may be turned and thus the rearward position of the yoke adjusted.

The shaft **78** carries the input pinion **90** of a differential drive mechanism **91** which may be of conventional type and which includes a manually actuable adjusting crank **93**, and whose output shaft carries a cam **93a** which engages a cam follower **94** turning on a stud carried by one end of a lever **94a**, which swings about a vertical pivot **95** and whose opposite end **96** constitutes a latch engageable with a pin **97** projecting upwardly from the clutch member **48** for throwing the clutch out of action at the end of each complete revolution.

The lower ends of the arms **82** and **83** of the yoke **81** are pivotally connected to the rear ends of links **98** and **99**, respectively, desirably of adjustable length, whose forward ends are pivotally connected to levers **100** and **101** which turn about pivot members **102** and **103** respectively.

The measuring of the braid material to form the loop is illustrated diagrammatically in FIGS. 5 to 8. Referring first to FIG. 12, which shows the situation immediately after the tipping material has been applied and the braid has been cut, the incoming guide **63** is shown in what may be termed its normal position, where the axis of its braid guiding passage is aligned with the space between the belt runs **45** and **46** and in that horizontal plane in which the braid lies as it is advanced by the belts. The retaining finger **52** is likewise in normal position, that is to say, in a plane below the lower edge of the face plate F and slightly to the rear of the face plate and points toward the right as seen in FIG. 12.

Turning now to FIG. 5, and assuming that the braid B is gripped at the nip point S^1, where it enters between runs **45** and **46**, the incoming guide **63** now starts (FIG. 6) to move downwardly (the belts now advancing), and the guide deflects the braid B downwardly and away from the nip of the belts, as shown at L^1 (FIG. 6). The braid now forms two downwardly converging lengths L^1 and L^2 (FIG. 6) constituting the legs of the depending loop L. At this time, the retaining finger **52** enters the loop and holds the bight L^3 (FIG. 7) of the loop down at the level of the retaining finger, while the guide **63** is returned to

its normal position as shown in FIG. 8. The finger **52** now swings back toward its normal position and as it passes beneath the lower edge of the face plate F it releases the braid which is now bodily advanced as a depending loop L (FIG. 9), with the upper ends of the legs L^1 and L^2 gripped at the points S^1 and S^2 between the belts, and this loop, consisting of a slack untensioned length of braid, is carried along bodily by the belts until it is centered with respect to the dies.

While in this position the belts dwell and loop-positioning and stretching fingers, that is to say, the hooked levers **105a**, now to be described, come into action.

The axes of the pivots **102** and **103** (FIG. 1) on which levers **100** and **101** turn, are so inclined that the levers swing in upwardly converging planes inclined approximately 30° to the horizontal. As indicated in FIG. 13 (where only the lever **100** is illustrated), by way of example, each of the levers **100** and **101** is of bell crank type comprising a short arm **103** to which the ends of the actuating links **98** and **99** (FIG. 1), respectively, are connected. To the long arm **104** of bell crank lever **100**, a lever in pivotally connected at **105**, the latter lever having a long arm **105a** and a short arm **106**. The long arm **105a** terminates in a hook **107** and has an upstanding stud **108** intermediate its ends. A tension spring **109**, connected with the short arm **106** of the hooked lever, tends to swing the latter lever in a clockwise direction, as seen in FIG. 15, but such motion is limited by contact of an abutment **110**, carried by its short arm **106**, with the long arm **104** of the bell crank lever.

The face plate F is a length of rigid metal having parallel, vertical, front and rear faces extending parallel to the belt runs **45** and **46**, with its forward vertical face substantially in the plane of the forward smooth face of belt run **45**.

The face plate is notched (FIG. 9) at the location of the dies, to provide an upwardly tapering triangular recess F^1, whose right and left-hand edges converge upwardly at an angle of 30° to the horizontal, and the axes about which the levers **100** and **101** rock are so located that, at times, in the operation of said levers, as later described, the studs **108** contact the rear surfaces of the face plate F, and slip downwardly thereagainst along the respective edges of the recess F^1.

When the bell crank lever **100**, for example, is rocked by the forward motion of its actuating link **98**, it carries the pivotal axis **105** of the hooked lever or positioning finger bodily in an arcuate path while the spring **109** holds the abutment **110** against the arm **104** and the hook **107** thus moves forwardly through the recess F^1 (FIG. 9) and enters the depending loop L of the braid which, at this time, is hanging loosely down between the points at which it is gripped by the now stationary belts. As the levers **100** and **101** continue to turn in the same direction, their hooks **107** engage the depending legs respectively, of the loop, and, moving in opposite directions, tend to stretch the loop laterally while also drawing it downwardly by reason of the inclination of the levers. As the bell crank levers continue their movement the resistance imposed by the loop causes the hooked levers to be retarded and when the studs **108** come into contact with the rear surface of the face plate F, further forward motion of the hooks is prevented while the springs **109** hold the braid under tension (FIG. 15), and in contact with the stationary dies. If the braid be elastic, the braid forming the loop will be stretched (FIG. 11) and a rectilinear run B^3 of the looped material will be drawn across the fixed dies D and brought into contact with the upstanding shoulder of said dies. The amount of stretch is set by adjusting the stop screw **87** to limit motion of yoke **81**. This adjustment provides for stretch of from 0% to nearly 100%.

The movable dies **22** and **23** advance and curl a length of tip-forming material (supplied in usual manner) about the length B^3 of the braid, the cutter severs the tip-forming material and braid of the dies retract and the belts resume their advance, bringing the parts back to the position of FIG. 12.

I claim:

1. Mechanism for presenting a selected portion of a flexible strand to a device operative to process said selected portion of the strand, said apparatus comprising a pair of endless bands, guide means for said bands operative to define parallel runs of the bands, the distance between the opposite surfaces of said parallel runs being normally less than the transverse thickness of the strand; means operative resiliently to urge said runs toward each other, means operative intermittently to move said parallel runs in the same direction and at the same linear velocity; a movable guide normally operative to deliver strand material into the nip defined by the moving bands as they approach each other to form said parallel runs; means operative so to actuate said guide that, at intervals, it diverts the moving strand from the nip of the moving bands and then returns it to said nip, thereby forming a slack loop of the strand which depends from the belt runs; and means for so intermittently driving said belts as to stop them when that portion of the strand, which constitutes the loop, is within the field of action of the processing device.

2. Mechanism according to claim 1, comprising means for transversely spreading the loop of strand material while it is within the field of action of the processing device, and means for varying the degree to which the loop shall be spread.

3. Mechanism according to claim 2, wherein the means for transversely spreading the loop of strand material is so devised and arranged that the central portion of the loop is disposed as a substantially rectilinear run of the loop material.

4. Mechanism according to claim 1, comprising a measuring finger cooperable with the movable strand guide to form a loop of predetermined dimensions.

5. Mechanism according to claim 4, comprising, as means for synchronizing the motion of the endless belts with those of the movable guide and associated loop measuring finger, a one revolution clutch and means for varying the time, within the machine cycle, at which said clutch shall become operative.

6. Mechanism according to claim 2, wherein the means for spreading the loop comprises a pair of relatively movable fingers, and means operative to engage said fingers with the respective legs of the loop and then to move them apart, thereby to stretch the loop transversely.

7. Mechanism according to claim 6 comprising means for so actuating said fingers as first to advance them into the plane of the loop and then to move them laterally and downwardly while stretching the loop.

8. Apparatus for feeding shoe-lace braid to a lace-tipper of the kind which comprises a main drive shaft, tip-applying dies, means for delivering tip-forming material to the dies, and means for cutting the applied tip material to form two independent tips, said braid-feeding means being operative to advance shoe lace braid from a source of supply into the field of action of the dies and comprising two endless belts having parallel, substantially horizontal rectilinear runs, means for moving said runs intermittently in the same direction and at the same linear velocity, means operative resiliently to urge said runs toward each other, whereby, if a portion of the braid be entered between them, it will be gripped by the belts and carried along with them, and means operative to introduce spaced portions of the braid between the belts, leaving the intervening portion of the braid depending below the belts.

9. The combination according to claim 8, wherein the belts have smooth inner surfaces for contact with the braid, and gear teeth on their outer surfaces, drive pinions engageable with the teeth of the belts, and means for transmitting motion from the main drive shaft of the machine to said belt-driving pinions.

10. The combination according to claim 8, further characterized in having a braid guide movable from an operative position, at which it enters a portion of the braid between said belt runs, so that said portion of the braid is gripped between said belt runs, to an inoperative position at which it no longer enters the braid between said belt runs, means for actuating said guide comprising a one revolution clutch, and clutch-controlling means adjustable to vary the time, within the cycle of operation of the machine, at which said guide shall move from inoperative to operative position.

11. The combination according to claim 9, further characterized in having a variable speed drive interposed between the main drive shaft of the machine and said belt driving pinions, whereby the linear traverse of the belts, per revolution of the main shaft, may be varied.

12. The combination according to claim 7, wherein the means for distending the loop of braid while dwelling within the field of action of the processing device comprises a pair of hooked fingers, mechanism operative first to enter said fingers within the loop and then to move said fingers away from each other, and means for transmitting motion from the main drive shaft of the machine to said loop-distending fingers.

13. The combination according to claim 8, further characterized in having means operative to stretch the loop of braid, if the latter be of elastically stretchable material, while it dwells within the field of action of the dies, thereby to provide a substantially rectilinear attenuated portion of the braid to which the dies may apply the tip-forming material.

14. The combination according to claim 8, wherein the means for varying the amount of movement of the loop-distending fingers comprises a rockable yoke, spring means tending to move said yoke in a direction such as to increase the amount of motion of said loop-distending fingers, adjustable means for varying the amount of motion of said yoke by the spring means, and a cam actuated by the main drive shaft of the machine for moving the yoke in the opposite direction.

15. Feed mechanism for presenting a portion of shoe lace braid to a tip-applying machine of the kind which includes, a drive shaft, tip-applying dies, means for delivering tip-forming material to the dies, and means for severing the braid and the applied tip-forming material to form two independent tips, said feed mechanism comprising a pair of elongate, substantially horizontal parallel, rectilinear carriers having closely adjacent, substantially vertical faces, and drive means for intermittently moving said carriers in the same direction and at the same linear velocity, means resiliently urging said carriers toward each other, said carriers being operative to grip and hold any portion of the braid which may be interposed between them, and means operative automatically to introduce spaced portions of the braid between the moving carriers while leaving an intervening portion of the braid depending from between said carriers in the form of a loop.

16. Apparatus according to claim 15, wherein the means for interposing portions of the braid between the carriers comprises a movable braid-guide and means for so actuating said guide as first to introduce a portion of the braid between the moving carriers, then to divert the braid from said carriers, and then again to introduce another portion of the braid, spaced from said first named portion, between the moving carriers, and means operative, by engagement with that part of the braid which intervenes between those portions which are gripped by the carriers, to insure the formation of a loop of predetermined length.

17. Mechanism according to claim 15, wherein the carriers are so guided and driven as to transport said loop into the field of action of the dies and then to dwell, and means operative to spread said loop and place its central portion in operative contact with the stationary die while the carriers dwell.

18. Mechanism according to claim 17, wherein the means for spreading the loop comprises a pair of bell crank levers, means operative, while the carriers dwell, to transmit motion from the main shaft for rocking said bell crank levers in opposite directions, a hooked loop-stretching finger pivotally mounted on each bell crank lever, and means operative, as the bell crank levers are swung, for so actuating said loop-stretching fingers that their hooked ends enter the loop and engage the opposite legs thereof respectively, and then move apart and downwardly, thereby to form and place a substantially rectilinear run of the loop in operative relation to the stationary dies.

19. Apparatus for advancing strand-like material into the field of action of strand-processing means, said strand-advancing apparatus comprising devices operative to form a measured length of the material into a slack, depending loop having downwardly converging legs supported at their upper ends only, means operative to move said loop bodily into the field of action of the processing means and then to cause it to dwell while being processed, and means operative to distend the loop laterally thereby to form a substantially rectilinear run of the braid material for cooperation with the processing means.

20. Apparatus for feeding shoe-lace braid received from a supply to a lace-tipping machine of the kind which includes relatively movable tip-forming dies between which a length of braid is placed preparatory to the closure of the dies to form a tip thereon and means for actuating the dies, said feeding means comprising devices operative temporarily to constrain a part of the braid to be positively advanced by the feeding means, means operative to measure off a predetermined length of the braid from that portion of the braid which extends back from the part which is being advanced by the feeding means to the supply and to form said length into a slack loop having downwardly converging legs whose upper ends are spaced apart a distance less than said measured length, and means operative to move said loop bodily toward the field of action of the tip-forming dies and to cause it to dwell with its central portion interposed between the dies.

21. Apparatus for feeding shoe-lace braid received from a supply to a lace-tipping machine of the kind which includes relatively movable tip-forming dies between which a length of braid is placed preparatory to the closure of the dies to form a tip upon the braid and means for actuating the dies, in combination, feeding means for disposing a length of braid between the dies in readiness for the application of a tip, said feeding means comprising a pair of endless belts, means for so guiding the belts as to form parallel, substantially horizontal runs above and which extend transversely of the tip-forming dies, said runs normally contacting each other with resilient pressure, means for driving the belts intermittently in the same direction and at the same speed, means operative while the belts are moving, to measure off a predetermined length of braid from the supply and to form said length into a loop comprising downwardly converging legs whose upper ends are gripped at spaced points respectively, between the parallel runs of the belt and with the intermediate portion of said measured length depending freely below the belt runs, the drive means for the belts being operative to cause them to dwell when the central portion of said loop is positioned within the field of action of the tip-forming dies.

22. Mechanism for intermittently advancing a length of strand-like material, reecived from a supply, through the field of action of means for processing said material, said feed means comprising a pair of endless flat belts, means so guiding said belts as to provide parallel, substantially horizontal runs wherein the opposed flat

faces of the two belts are in vertical planes and normally spaced apart a distance less than the transverse thickness of the strand material, means for driving said belts intermittently in the same direction and at the same velocity, and means operative, while the belts are moving, to measure off a predetermined length of the strand-like material from the supply and to form it into a loop comprising downwardly converging legs whose upper ends are gripped between said flat faces of the belt runs at points spaced apart a distance less than said measured length and wherein the central portion of said loop depends freely below said runs while it is being advanced bodily by the belt, the drive means for the belts being so devised as to cause the belts to dwell for a

predetermined interval of time with said depending loop within the field of action of the processing means, and means operative so to deform each successive loop, as it enters the field of action of the processing means, as to present a substantially rectilinear run of the braid material to the processing means.

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