July 7, 1970 H. G. FALTIN ET AL 3,519,181

FEED MECHANISM FOR STRANDULAR MATERIAL

Filed Jan. 18, 1968 2 Sheets-Sheet 1

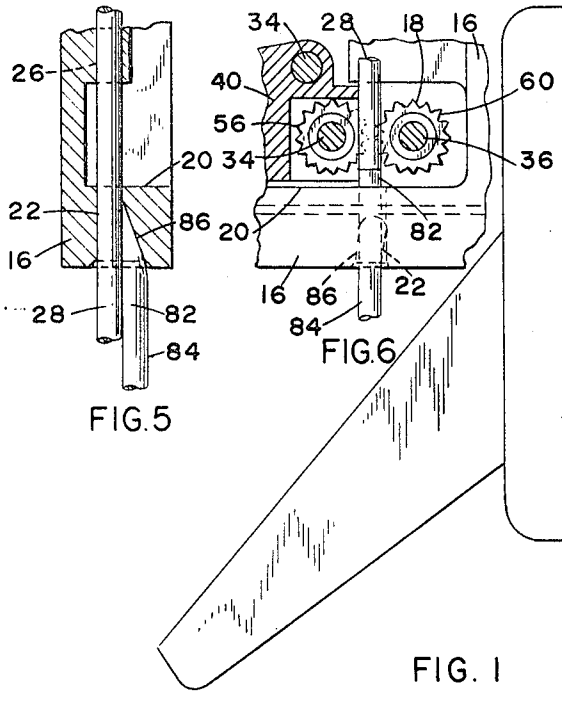


FIG.5

FIG.6

FIG. 1

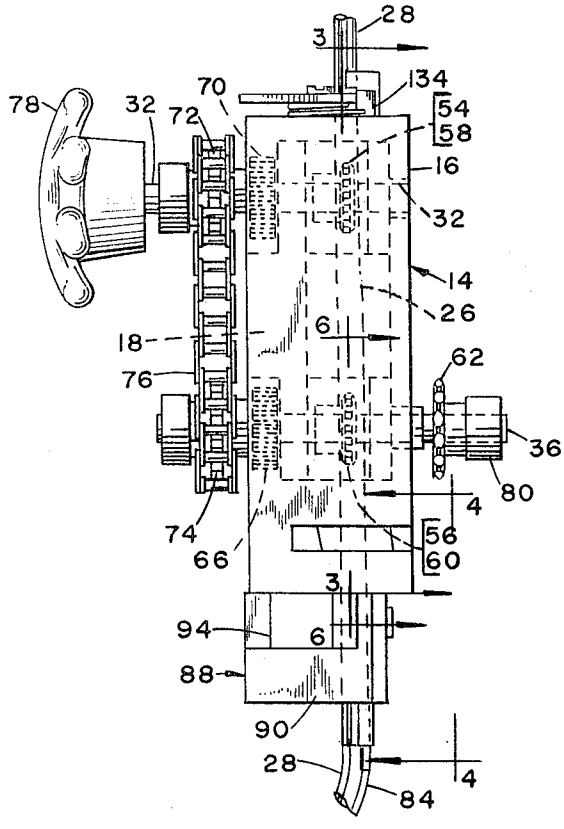


FIG. 2

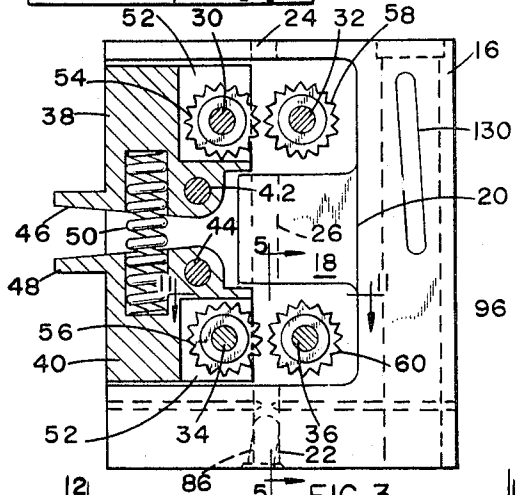


FIG. 3

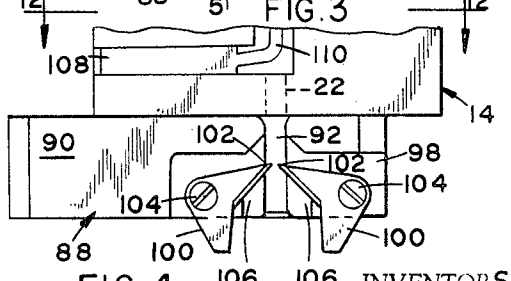


FIG. 4

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FEED MECHANISM FOR STRANDULAR MATERIAL

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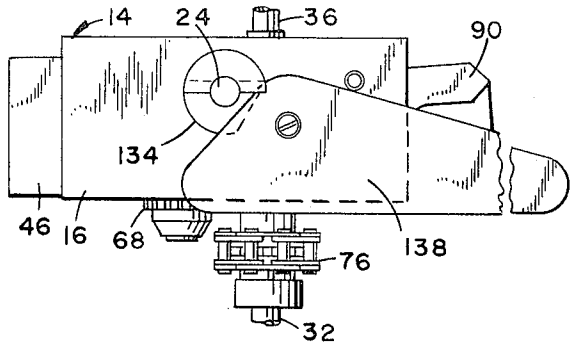


FIG. 7

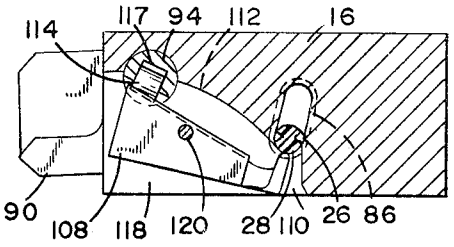


FIG. 12

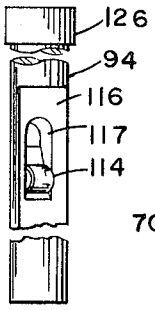


FIG. 14

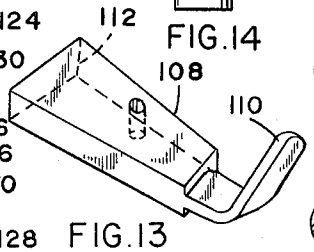


FIG. 13

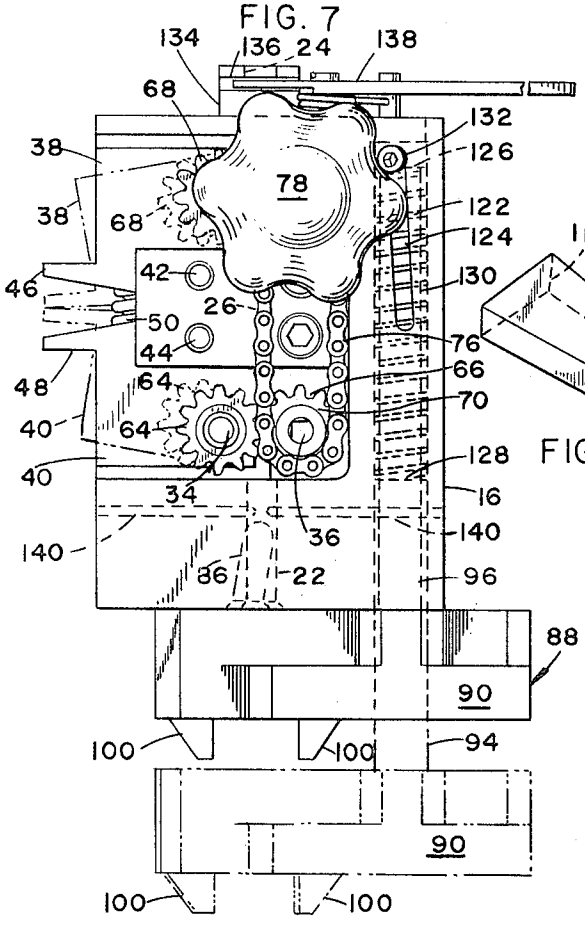


FIG. 8

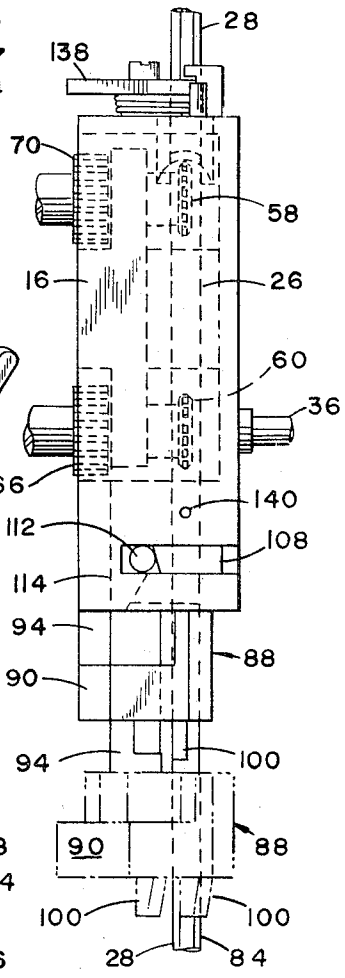


FIG. 10

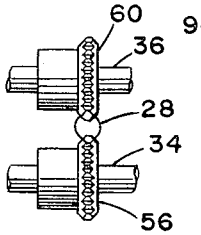


FIG. 11

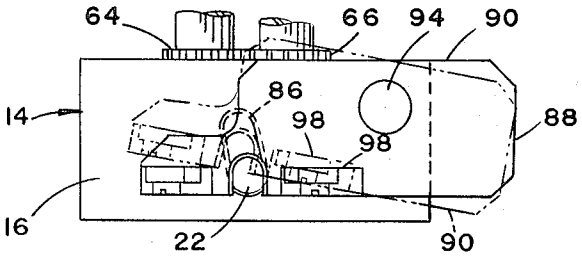


FIG. 9

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3,519,181

FEED MECHANISM FOR STRANDULAR MATERIAL

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Filed Jan. 18, 1968, Ser. No. 698,969
Int. Cl. B65h 25/12
U.S. Cl. 226—11 16 Claims

ABSTRACT OF THE DISCLOSURE

Mechanism for feeding continuous strandular material comprising guide means defining a path therefor, power driven feed means engaging a first strand of material for movement along said path, supporting means engaging and positioning the leading end of a second, standby strand of material for movement to said guide means upon exhaustion of said first strand, and control means responsive to loss of contact with said first strand upon the same becoming exhausted and operable to initiate movement of said supporting means by independent power means to introduce said second standby strand into engagement with said feed means.

CROSS-REFERENCES TO RELATED APPLICATIONS

The present invention comprises a different mechanism for feeding strandular material from that disclosed and claimed in applicants' co-pending application, Ser. No. 676,127, filed Oct. 18, 1967. Feeding mechanism of this type is also particularly adapted for use in connection with insert and outsert feeding mechanism of the type illustrated in applicants' co-pending application, Ser. No. 638,019, filed May 12, 1967, although it is to be understood that use of the present invention is not to be restricted to mechanisms of the type illustrated in said last mentioned application.

BACKGROUND OF THE INVENTION

The feeding of strandular material, especially strandular adhesive material which is non-tacky, for example at room temperature, is applicable to a substantial number of different manufacturing processes and operations where adhesives are to be applied to certain objects to affix the same together. The adhesive normally is heated to reduce the same to liquid condition and, usually, a thin line or stripe of such liquid adhesive is fed to a certain surface of a specific object or objects to be secured together in various types of manifolding operations. One particular use for adhesive of this type is in regard to manufacturing leather products where certain surfaces thereof are to be connected together, particularly in permanent condition, such as in shoe manufacturing.

Satisfactory types of adhesive of the character referred to above have been developed and are currently available commercially in strandular form, the same usually being sold in coils of substantial length, whereby replacement of an exhausted coil with a new one preferably need occur only several times during a working shift of a given length of time for example. By such an arrangement, a single operator may over-see the functioning of a substantial number of machines.

Especially for purposes of assuring the delivery of a continuous flow of liquid adhesive, for example, as well as any other type of strandular material to which the present invention is adapted without restriction, it is essential that appropriate means be utilized to insure the feeding of a new strand of material to a given machine upon the exhaustion of an immediately preceding strand thereof. Certain types of feeding mechanisms presently are available to retain the leading end of a standby coil of strandular material in readiness to be fed to appropriate feeding mechanism upon the exhaustion of a preceding coil of such material.

One such mechanism is illustrated in Pat. No. 3,128,026 which employs electrical means to effect certain shifting arrangements which are necessary to transfer the driving effect of a feeding mechanism from a first strand of material to a second strand upon the exhaustion of the first. The mechanism shown in this patent appears to be relatively simple but the shifting arrangement illustrated therein appears to be inoperative without applying and utilizing certain additional control means and feed elements over those illustrated at present in the patent. Further, such mechanism does not insure positive and firm engagement, for example, of the leading end of a new, standby strand of material with the trailing end of a preceding strand which has become exhausted. Under such circumstances, it is obvious that a gap can occur in the supplying of the material to the mechanism which is to utilize or consume the same.

The principal object of this invention is to provide a feed mechanism for strandular material which preferably is completely mechanically actuated as distinguished from depending upon electrical energy or any other type of motive power which must be separately supplied to the mechanism. Particularly when the feed mechanism comprises an auxiliary unit attached to a primary machine of some type, such as a machine for feeding inserts or outserts for attachment by adhesive, for example, to a printed web or the like, the feed mechanism may be driven directly from a movable member of such machine and thereby directly coordinate the speed of the feed mechanism with that of said primary machine. If desired, suitable clutch means may be employed in such connecting means. In accordance with the invention, the feed mechanism comprising the invention not only provides means to feed a first strand of material but also includes means to hold the leading end of a second, standby strand of such material in position for automatic advancement of the leading end thereof into abutting contact with the trailing end of a strand about to become exhausted and also into engagement with the feed mechanism as the first strand becomes exhausted, whereby no delay or gap in the delivery of the processed material, such as heated adhesive, for example, will occur.

Another object of the invention is to employ supporting means which holds said leading end of said second standby strand of material in position to be projected into guide means within the feeding mechanism and, upon the first strand becoming substantially exhausted, said supporting means positively moves the leading end of the second strand of material longitudinally into abutting contact with the trailing end of said first strand and also into engagement by the power driven feed means of the feeding mechanism.

A further object of the invention is to provide sear means which initially holds the supporting means for the second, standby strand of material in retracted position, said sear means being co-engageable with a first strand of material while it is moving through the feeding mechanism and, upon the same becoming exhausted, the sear loses contact with the first strand and thereby releases the supporting means for positive longitudinal movement of the leading end of the second, standby strand of material, through use of independent power means also comprising part of the present invention, to insure positive movement of said second strand into engagement with the power driven feed means of the feeding mechanism.

A still further object of the invention is to provide sev-

eral one-way clutch means respectively associated with said sear and said supporting means for the leading end of said second, standby strand of material, whereby resetting of the supporting means may occur after said second standby strand has become exhausted and a new second or standby strand must be mounted within the mechanism for automatic projection into the guideway and feed means of the machine by said supporting means when the preceding strand becomes exhausted.

Still another object of the invention is to provide compact and manually operable means which readily permit de-activation of frictional drive wheels comprising power driven feed means, whereby release of the strandular material from said feed means may take place, when desired, with a minimum of effort.

A still further object of the invention is to provide mounting means for said supporting means for the leading end of said second, standby strand which will skew said supporting means during feeding movement of said second strand of material to a limited extent about the axis of movement of said mounting means, thereby insuring accurate positioning of the leading end of said second strand within the guide means of the feeding mechanism incident to the same being engaged by the power driven feed means thereof.

Details of the foregoing objects and of the invention, as well as other objects thereof, are set forth in the following specification and illustrated in the accompanying drawings comprising a part thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation of an exemplary insert feeding mechanism comprising an exemplary showing of a typical machine or mechanism with which the feed mechanism comprising the present invention may be utilized, a portion of said figure being broken away to show the preferred position of the mechanism comprising the present invention in relation to said exemplary insert feeding means.

FIG. 2 is an enlarged side elevation of the feed mechanism shown in exemplary manner to FIG. 1, said feed mechanism comprising the present invention.

FIG. 3 is a vertical sectional face view of a portion of the feed mechanism shown in FIG. 2 as seen on the line **3—3** of the latter figure.

FIG. 4 is a fragmentary rear face view of the lower portion of the feed mechanism shown in FIG. 2 as seen on the line **4—4** of said figure.

FIG. 5 is a fragmentary vertical side view of a portion of the mechanism shown in FIG. 3 as seen on the line **5—5** of said figure.

FIG. 6 is a fragmentary vertical face elevation of a portion of the mechanism shown in FIG. 2 as seen on the line **6—6** of said figure.

FIG. 7 is a top plan view of the mechanism shown in FIG. 2.

FIG. 8 is a front elevation of the mechanism shown in FIG. 2.

FIG. 9 is a bottom plan view of the mechanism shown in FIGS. 2, 7 and 8.

FIG. 10 is a side elevation similar to FIG. 2 but showing the supporting means for the second standby strand of material in extended or retracted position and also illustrating the latching mechanism for holding the same in said position.

FIG. 11 is a fragmentary plan view showing details of the mechanism illustrated in FIG. 3 as seen on the line **11—11** of said figure.

FIG. 12 is a transverse sectional plan view of the mechanism shown in FIG. 4 as seen from the line **12—12** of said figure.

FIG. 13 is a perspective view of the sear element utilized to maintain the supporting means for the second standby strand in retracted position.

FIG. 14 is a foreshortened view of a shaft for the supporting means for said standby strand of material.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1, an exemplary machine **10** is illustrated in vertical elevation which is only one of a substantial number of different types of machines which require the feeding of strandular material thereto or therein to simplify and facilitate the illustration of the characteristics and advantages of the feed mechanism for strandular material comprising the present invention, the particular machine **10** selected for specific illustration comprises a machine for feeding a strip of inserts, not illustrated, for attachment, for example, to a printed web by means of a relatively small stripe of liquid adhesive furnished to the machine by exemplary heating means **12** which transforms the solid strandular material from a solid state to a liquid state.

The strandular material is fed to the heating means **12** by feed mechanism **14** which embodies the principles of the present invention. For further details of the machine **10** which has been selected as the principal means for utilizing the capacity of the feed mechanism **14**, attention is directed to said aforementioned co-pending application, Ser. No. 638,019, but it is to be understood that use of the present invention is not to be restricted to that particular type of machine.

It also should be understood that while adhesive material in solid, strandular form has been selected as the material to be fed by the feed mechanism **14** for purposes of illustrating the present invention, said invention is not to be restricted to the feeding of strandular adhesive material in solid form but, rather, may be employed in the feeding of other types of strandular material capable of being accommodated to the various means and elements embodied in the overall feed mechanism **14**, details of which are as follows.

Feed mechanism **14** preferably comprises a plurality of interfitting parts comprising an outer body member **16** and an inner body member **18**. Said body members preferably are formed from suitable material such as metal, steel or aluminum being highly suitable for such purposes. Inner body member **18** is received within an appropriate recess **20** extending inward from one face and one side of the outer body member **16**. The outer body member **16**, as illustrated in exemplary manner in FIG. 1, is mounted in a substantially vertical position but such position is not restrictive however. The lower end thereof has an inlet opening **22** and the upper end has an exit or discharge opening **24**. Extending preferably in a substantially axial direction between the inlet opening **22** and discharge opening **24** is guide means **26** defining a predetermined path of movement for a strand **28** of material of uniform cross-sectional shape throughout its length.

For convenience and ease of operation as well as manufacturing and assembly, the inner body member **18** supports two pairs of cooperating shafts **30**, **32** and **34**, **36**. One shaft **32** and **36** of each pair is directly supported by suitable bearings within the inner body member **18**, while the opposite companion shaft **30** and **34** of each pair respectively are supported by bearings formed in support members **38** and **40** which, particularly as shown in FIG. 3, are in the form of block-like bell cranks which are movable limited distances about supporting pintles **42** and **44** which are fixedly carried by inner body member **18**.

Each of the support members **38** and **40** have laterally projecting legs **46** and **48** respectively provided with opposing recesses which receive the opposite ends of a compression spring **50**. As can be visualized from FIG. 3, the spring **50** urges the legs **46** and **48** away from each other and correspondingly, tend to move the shafts **30** and **34** respectively toward their cooperating shafts **32** and **36**. The portions of the support members **38** and **40** which respectively support the shafts **30** and **34** are the end portions of the block-like bell crank support mem-

bers 38 and 40 which are opposite the projecting legs 46 and 48 thereof.

In view of the fact that the legs 46 and 48 project laterally beyond one side of the assembled outer and inner body members 16 and 18, they readily are engageable manually for manipulation thereof and especially to move the same simultaneously toward each other, against the action of spring 50, for purposes of laterally moving shafts 30 and 34 respectively away from companion shafts 32 and 36.

Upon release of the legs 46 and 48, the spring 50 restores the shafts 30 and 34 to the normal operative positions thereof such as illustrated in FIG. 3. Further, the support members 38 and 40 are each provided with rectangular recesses 52 within which friction wheels 54 and 56 respectively are accommodated, the same being mounted upon and fixed to shafts 30 and 34, respectively, by appropriate means such as set screws or the like. The friction wheels 54 and 56 respectively cooperate with additional, similar friction wheels 58 and 60 which, in turn, respectively are mounted upon and are fixed to shafts 32 and 36 for rotation therewith.

One of the shafts referred to above preferably is connected to drive means otherwise comprising part of the machine 10 and driven by an appropriate prime mover thereof, not shown. For purposes of specific illustration, shaft 36 has been illustrated in FIGS. 2 and 3 as the particular shaft which is connected to such power means of machine 10, such as by providing a driven sprocket gear 62 which is keyed or otherwise suitably fixed to shaft 36 so as to effectively drive the same when driven by the power means of machine 10.

For purposes of transmitting the driving effect imparted to shaft 36 by the sprocket gear 62, it will be seen by reference to FIGS. 8 and 10 that shafts 34 and 36 respectively have meshing spur gears 64 and 66 connected thereto and shafts 30 and 32 respectively have spur gears 68 and 70 connected thereto. Shaft 32 of the upper set and the shaft 36 of the lower set also are drivingly interconnected by sprocket gears 72 and 74, see FIG. 2, which respectively are fixedly connected thereto and a conventional sprocket chain 76 extends around the sprocket gears 72 and 74.

A manually operable knob 78 is fixed, for example, to shaft 32 to effect simultaneous, manual movement of the several pairs of shafts and the corresponding friction wheels 54–60 correspondingly carried thereby. The friction wheels of each transverse pair thereof simultaneously are moved in opposite rotary directions in order respectively to engage opposite surfaces of a stand 28 of material to be fed through guide means 26 of the feed mechanism 14, such as for example when initially threading the leading end of a first strand of material 28 through said guide means 26 to establish the same in operative relationship with respect to the friction wheels.

To permit the foregoing threading to be accomplished, the shaft 36 preferably is connected to the driven sprocket gear 62 by an appropriate one-way clutch 80 shown in exemplary manner in FIG. 2. Also, as best shown in FIG. 3, it will be seen that the opposing pairs of friction wheels 54, 58 and 56, 60, when disposed in operative position with respect to each other as shown in said figure, extend at their peripheries substantially equal distances into the longitudinally extending guide means 26 which preferably is closely complementary in diameter to the diameter of the strandular material 28 so as freely to slidably receive the same but also accurately guide it.

The manner in which the friction wheels engage the strandular material 28 is illustrated in plan view, in exemplary manner, in FIG. 11. It will be seen that the strand 28 has similar grooves along opposed longitudinal sides thereof which respectively receive the serrated peripheries of the friction wheels and thereby effect firm, positive frictional engagement with the strand to insure positive feeding of the strand along its predetermined path defined by the guide means 26. It is to be understood however that other cross-sectional configurations of the strand 28 as well as the complementary surfaces of the friction wheels may be employed, without departing from the spirit of the invention, to insure positive feeding movement of the strand through the feed mechanism 14.

The mechanism described hereinabove provides highly effective longitudinal feeding movement of the more or less endless strandular material 28 which preferably is supplied in coil form upon a reel of substantial capacity, not shown, but which capacity in normal operation preferably is suitable to last for a number of hours of operation of the machine 10, for example, without requiring replenishment of the supply. To insure continuity of feeding a successive or standby strand of material to and through the feed mechanism 14 upon the exhaustion of a preceding strand however, the present invention provides an important but relatively simple and highly effective and efficient mechanism to positively project the leading end 82 of a standby strand 84 of material into the guide means and feed means. In the following description and the claims appended to the specification, such strand is referred to as a second, standby strand in order to distinguish the same from strand 28 which hereinafter and in the appended claims is referred to as a first strand. The initial position of the leading end 82 of such second, standby strand 84 is best shown in FIG. 5.

In FIG. 5, it will be seen that the inlet opening 22 in the lower portion of the outer body member 16 is provided at one side with an angular recess 86 which flares laterally and downward, the same functioning somewhat as a funnel to guide the leading end 82 of said standby strand 84 into the guide means 26 and especially between the lower pair of friction wheels 56 and 60. To support said leading end 82 of standby strand 84 in said position, the feed mechanism 14 is provided with supporting means 88 adjacent the lower end of the outer body member 16 and comprising a transversely extending block 90 having a channelway 92 extending inward from one side face thereof and in a direction parallel to the axis of the guide means 26.

The block 90 is fixed to the lower end of a rod 94 which extends vertically into a complementary guide opening 96 which projects upwardly nearly to the upper end of body member 16. For convenience, the rod 94 and guide opening 96 are cylindrical, which facilitates the mounting and actuation of the block 90 in a manner that it may be skewed at least a limited amount between the retracted, lowermost position, as shown in phantom in FIGS. 8 and 10, and the uppermost, so-called feeding position thereof shown in full lines in said figures. Such skewed movement also is illustrated by the phantom and full line positions of the member 90 in FIG. 9, the purpose of which skewing is described hereinafter.

The face of the block 90 within which the channelway 92 is formed also is provided with a relatively wide rectangular recess 98, see FIGS. 4 and 9, upon the inner face of which a pair of dogs 100, having opposed pointed tips 102, are pivotally mounted within a plane so positioned relative to the axis of channelway 92 that when the standby strand 84 is operatively disposed within the channelway 92, the pointed tips 102 of dogs 100 will be disposed respectively in the grooves in opposite side walls of the strand 84, which grooves are similar to those shown in FIG. 11 with respect to strand 28. Said arrangement will prevent accidental withdrawal movement of the strand 84 from block 90.

The dogs 100 are pivotally connected for relatively free movement upon the face of rectangular recess 98 by a pair of pivot screws 104. The depending lower ends of the dogs 100 act as weights which tend to swing the pointed tips 102 downwardly so as to insure engagement thereof within the surfaces of the grooves on opposite sides of the strand 84. A pair of stop lugs 106 also project outwardly from the face of recess 98 and serve to prevent

downward movement of the pointed tips **102** beyond the positions thereof shown in FIG. 4. When in such position, said tips are always engageable by the leading end **82** of the standby strand **84** when threading the same upwardly through channelway **92** so as to extend the leading end **82** of strand **84** above block **90** and into angular recess **86** as shown in FIG. 5.

The supporting means **88**, when holding the leading end **82** of a standby strand **84** in position to be automatically projected into guide means **26** after the so-called first strand **28** of material has become exhausted, is positioned with the block **90** thereof in what is termed the retracted position of said block. Such position is illustrated in phantom in FIGS. 8 and 10. Said block is maintained releasably in such retracted position by a sear member **108** which is best shown in operative position in FIGS. 4 and 10, and in detached perspective manner in FIG. 13. Sear **108** has a finger **110** which is positioned to slidably ride upon strand **28** as the same moves along guide means **26**.

The shape of the finger **110** with respect to the main body of sear **108** as well as the angular face **112** thereon, see FIG. 10, is such that when a strand **28** is moving along guide means **26**, the finger **110** slidably rides upon said strand. Under such circumstances, a cylindrical locking roller or member **114**, comprising part of a one-way clutch, is disposed in recess **115** having a sloping inner wall and extending inward from a flat surface **116** of limited length which is formed along one side of the rod **94**, and will be wedged between such sloping inner wall of recess **115**, and the angular surface **112** on sear **108**. The sear is supported within a suitable transverse slot **118** by pivot pin **120** which permits restricted pivotal movement of the portion of surface **112** which is engaged by the locking member **114** and the finger **110** which is movable toward and from the guide means **26** as best shown in FIG. 12.

Independent power means preferably is provided for supporting means **88** to move block **90** as required. Such power means, as illustrated, specifically comprises a coiled spring **122** which surrounds a reduced diameter upper portion **124** of rod **94**, see FIG. 8. One end of the spring abuts a shoulder or collar **126** fixed to the upper end of portion **124** of rod **94** and the lower end of said spring abuts an annular shoulder **128** which is positioned in the guide opening **96** a suitable distance above the lower end thereof.

It can be seen from FIG. 8 and the foregoing description of the power means **122** that the same constantly urges block **90** upwardly but such upward movement normally is restrained by the one-way clutch comprising locking member **114**, the same being controlled by the finger **110** of sear **108** which engages strand **28** while moving along guide means **26**. Such arrangement therefore constitutes control means for the operation of the supporting means **88** of which block **90** is one of the principal components.

When the terminal end of strand **28** moves past the finger **110**, the wedging effect of locking member **114** between the sloping wall of recess **115** within rod **94** and the angular surface **112** of sear **108** is completely released, whereupon the force of the power means comprising spring **122** instantly is free to move block **90** upwardly and thereby carry with it the leading end **82** of the second or standby strand **84**. Said leading end **82** thereby is moved at least into the inlet opening **22** and firmly abuts the trailing end of strand **28** as shown in exemplary manner in FIG. 6.

Such upward movement of block **90** and the standby strand clutched therewith by the dogs **100** is of sufficient extent that the leading end **82** of strand **84** not only is positively pushed into abutting contact with the trailing or terminal end of strand **28** but also into feeding engagement with the lowermost pair of friction wheels **56** and **60** of the power driven feed means, whereby positive feeding movement of the standby strand **84** is assured. It thus will be seen that the positive engagement of the leading end **82** of standby strand **84** by said feed means is automatic and after such feeding engagement of the leading end **82** by such lowermost pair of friction wheels is achieved, further upward movement of block **90** is arrested by engagement thereof with the lower surface of body member **16**, as shown in the full line illustrations of the block **90** in FIGS. 8 and 10.

The leading end **82** of the standby strand **84** normally is laterally displaced with respect to the first strand **28** while the latter is being fed longitudinally through the guide means **26**, such offset amounting substantially to the diameter of the strands **28** and **84**. However, upon the trailing end of strand **28** moving past engagement with the finger **110** of sear **108**, the leading end **82** of standby strand **84** will be projected longitudinally into inlet opening **22** and guide means **26**. When this occurs, it is desired that the channelway **92** on block **90**, which meanwhile has been holding the portion of standby strand **84** adjacent the leading end **82**, shall be brought into substantial axial alignment with the inlet opening **22**. To accomplish this, one wall of body member **16** adjacent guide opening **96** is formed with an elongated slot **130**, see FIGS. 3 and 8.

From FIG. 3 in particular, it will be seen that the longitudinal axis of guide opening **96** is parallel to the guide means **26**. The opposite sides of slot **130** are closely engaged slidably by a lug **132** which is threadably secured to the upper end of the upper portion **124** of rod **94**. The length of slot **130** will be slightly greater than the maximum permitted length of movement of block **90** with respect to the lower end of body member **16**. Accordingly, the slight angularity of slot **130** with respect to the axis of guide opening **96** is sufficient to permit a limited skewing movement about the axis of rod **94** to the extent indicated somewhat diagrammatically respectively by the full line and phantom illustration of block **90** in FIG. 9. The direction of such skewing movement of block **90** is such as to dispose the upper portion of standby strand **84** in axial alignment with the inlet opening **22**.

An incidental refinement of the present invention also includes a shearing boss **134** having an opening therethrough coaxial with the discharge opening **24** and a transverse slot **136** extending partially therethrough for the reception of a pivotally supported shearing blade **138**. Upon rotating the shearing blade **138** clockwise, as viewed in FIG. 7, it will sever any strand of material projecting through the discharge opening **24** and permit movement of the heating means **12** from the operative position thereof shown in FIG. 1 for example to a position in which the machine **10** readily may be loaded with a strip of inserts, for example, not shown, without danger of the attendant being burned by accidentally contacting the heating means **12**. Such an operation obviously will occur when the feed mechanism **14** is idle, such as when the machine **10** is rendered inoperative by stopping the power means thereof for example.

After a standby strand **84** has been advanced into feeding engagement at least by the lower pair of friction wheels **56** and **60** of the feed means of the mechanism, such standby strand then becomes the first or main strand of material being fed by the feed mechanism **14**. Such operation occurs automatically as described above. Following this however, it is essential that another standby strand be mounted in operative position in which the leading end **82** thereof, for example, shall be supported as shown in FIG. 5 with respect to the strand then being fed through the inlet opening **22**.

Such introduction of the leading end of said additional standby strand readily is accomplished simply by moving the leading end thereof upwardly through the channelway **92** of the block **90** of supporting means **88** until the leading end is introduced into the angular recess **86** in the lower end of body member **16**, for example. When this has been accomplished, the block **90** then

is moved downwardly preferably to the full extent permitted by the sear **108** and the clutch mechanism comprising locking member **114**, whereupon the feed mechanism **14** is restored to full operative position in accordance with the invention while one strand is being fed and a standby strand is in position automatically to be introduced into feeding engagement with the power driven feed means of the feeding mechanism upon the exhaustion of said one strand occurring.

While the invention has been described and illustrated in its several preferred embodiments, it should be understood that the invention is not to be limited to the precise details herein illustrated and described since the same may be carried out in other ways falling within the scope of the invention as shown and described.

We claim:

1. Mechanism for feeding continuous standular material comprising guide means defining a path along which a first strand of said material is movable, power driven feed means adapted to engage and move such first strand of material along said path, supporting means mounted for longitudinal movement with respect to said guide means and adapted to engage and position the leading end of a second standby strand of said material for movement to said guide means, and control means responsive to said first strand becoming exhausted and operable to initiate movement of said supporting means to move said leading end of said second standby strand into abutting contact with the trailing end of said first strand and also into active engagement by said feed means.

2. The feeding mechanism according to claim **1** in which said supporting means is positioned to move said second standby strand of material into engagement with said feed means while said first strand is being moved past said feed means when such movement of said standby strand is permitted by operation of said control means.

3. The feeding mechanism according to claim **2** in which said supporting means is mounted for movement from a remote retracted position in feeding direction toward said feed means a sufficient distance to effect engagement of the leading end of said second standby strand with said feed means when the trailing end of said first strand of material has passed therefrom.

4. The feeding mechanism according to claim **3** further including power means interengageable with said supporting means and operable to effect feeding movement thereof when such movement is permitted by operation of said control means following the passing of said first strand of material from said feed means of said feeding mechanism.

5. The feeding mechanism according to claim **4** in which said supporting means is connected to a member movable longitudinally substantially parallel to said path defined by said guide means and said power means therefor comprising a spring which is in energized condition when said supporting means is in said retracted position thereof, whereby the energy of said spring is operable to move said supporting means in feeding direction to move said second strand of material supported thereby to said feed means.

6. The feeding mechanism according to claim **5** further including a sear latch engageable with said longitudinally movable member and operable to retain the same releasably in said retracted position thereof, said sear latch having a portion slidably engageable by said first strand of material while moving along the path therefor in said guide means, and said sear being movable to a position to release said longitudinally movable member from said retracted position when engagement of said sear with said first moving strand is lost by passage of the trailing end thereof past said portion of said sear which normally engages the same.

7. The feeding mechanism according to claim **1** further including power means adapted to be energized when said supporting means is moved away from said feed means to support the leading end of said second standby strand of material in position to be moved to said guide means, and said power means being adapted to move said supporting means in feeding direction when said control means responds to said first strand of material becoming exhausted, said supporting means being operable by said power means to abut the leading end of said second standby strand of material against the trailing end of said first strand of material and thereby prevent a gap in the supply of material being fed by said feeding mechanism.

8. The feeding mechanism according to claim **7** further including a rod movable longitudinally in a guide opening substantially parallel to the path of movement for said first strand of material, and means to skew said rod a limited amount about the axis thereof when said supporting means is moved from its normal supporting position for the leading end of said second standby strand of material in feeding direction toward said power driven feed means, thereby aligning the leading end of said second standby strand of material with the inlet for said path for the material in said guide means.

9. The feeding mechanism according to claim **8** further including a one-way clutch engageable with said rod and operable to hold the same in the normal supporting position thereof in which the feeding end of said second standby strand of material is in position to be moved toward said power driven feed means when permitted by the operation of said control means.

10. The feeding mechanism according to claim **9** further including a sear having a portion comprising part of said one-way clutch and another portion engageable with the first strand of material while moving along the path therefor in said mechanism, whereby upon said latter portion of said sear losing engagement with said first strand of material when the trailing end thereof moves past said portion of said sear said clutch will be released from said rod and the power means for said rod then being operable to move the same in feeding direction for said second standby strand of material engaged by the supporting means on said rod.

11. The feeding mechanism according to claim **7** in which said supporting means is provided with a one-way clutch comprising at least one pivoted and weighted dog engageable with said second standby strand of material to hold the same against movement in one direction and permit release of said supporting means from said strand when the leading end thereof has been moved into said guide means and is engaged by said power driven feed means for movement thereof in the opposite direction relative to said dog, whereby the leading end of a new second standby strand of material may be placed in operative position relative to said supporting means for delivery to the guide means and power driven feed means thereof upon the exhaustion of said previous second standby strand of material.

12. The feeding mechanism according to claim **1** in which said feed means comprises a pair of opposing friction wheels and a pair of meshing gears respectively being connected to said friction wheels to insure positive simultaneous driving movement thereof, said friction wheels respectively engaging opposed surfaces of the strandular material and the peripheral portions of said friction wheels engaging said opposing portions being movable simultaneously in the same direction at the same surface speed and thereby insure positive feeding of said strandular material.

13. The feeding mechanism according to claim **12** further including means to rotatably support one of said friction wheels and said supporting means being manually movable a limited distance in a direction to move the friction wheel supported thereby laterally away from the opposing friction wheel and thereby permit free move-

ment of said strandular material within the guide means therefor.

14. The feeding mechanism according to claim **12** in which said feed means comprises two pairs of opposing friction wheels respectively spaced longitudinally along the path for said strandular material within said mechanism, and drive means extending between and being interconnected to one friction wheel of each of said two pairs thereof, each pair of said friction wheels also having meshing gears respectively connected thereto to insure positive and simultaneous movement of both friction wheels of each pair and said interconnecting drive means being operable simultaneously to positively drive the friction wheels of each pair at the same speed.

15. The feeding mechanism according to claim **14** further including support means respectively for one friction wheel and connected gear of each of said pairs thereof, said support means being manually movable in directions simultaneously to move the friction wheel and gear supported thereby laterally away from the opposing friction wheel and gear of each pair thereof, thereby to free strandular material from engagement by said friction wheels sufficiently to permit longitudinal movement of strandular material within said guide means without interference from said friction wheels.

16. The feeding mechanism according to claim **15** in which said support means comprise bell cranks and one leg of each bell crank extending in similar directions from said mechanism and substantially parallel to each other for manual engagement to effect simultaneous pivotal movement of said bell cranks about the supporting axes thereof to move said aforementioned one friction wheel of each pair away from the opposing friction wheel therefor, said supporting means also including a compressible spring extending between said one leg of each bell crank and operable to urge the same apart and correspondingly move the friction wheel supported by each of said bell cranks toward the opposing friction wheel of each pair thereof.

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