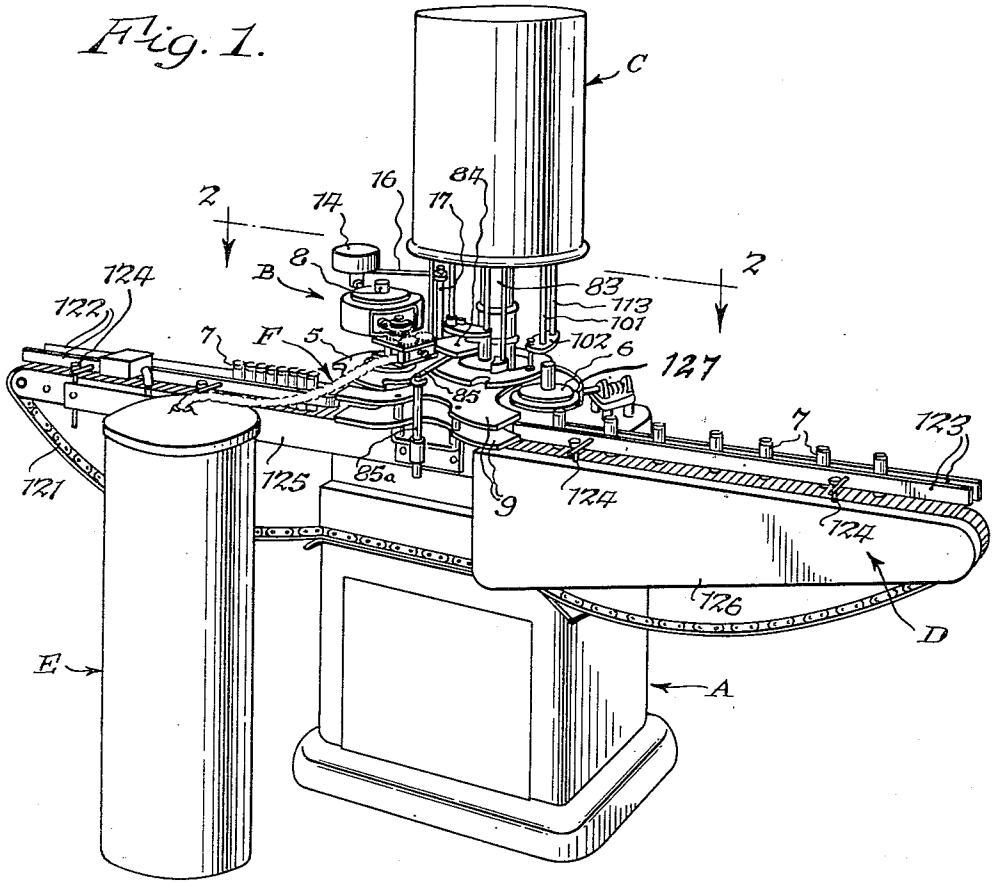
Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954 6 Sheets-Sheet 1

Fig. 1.



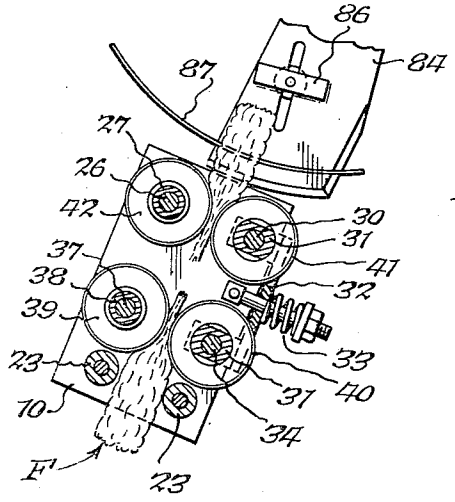


Fig. 9.

INVENTOR.
George H. Dimond
BY
John J. McGlew
Attorney.

Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954

6 Sheets-Sheet 2

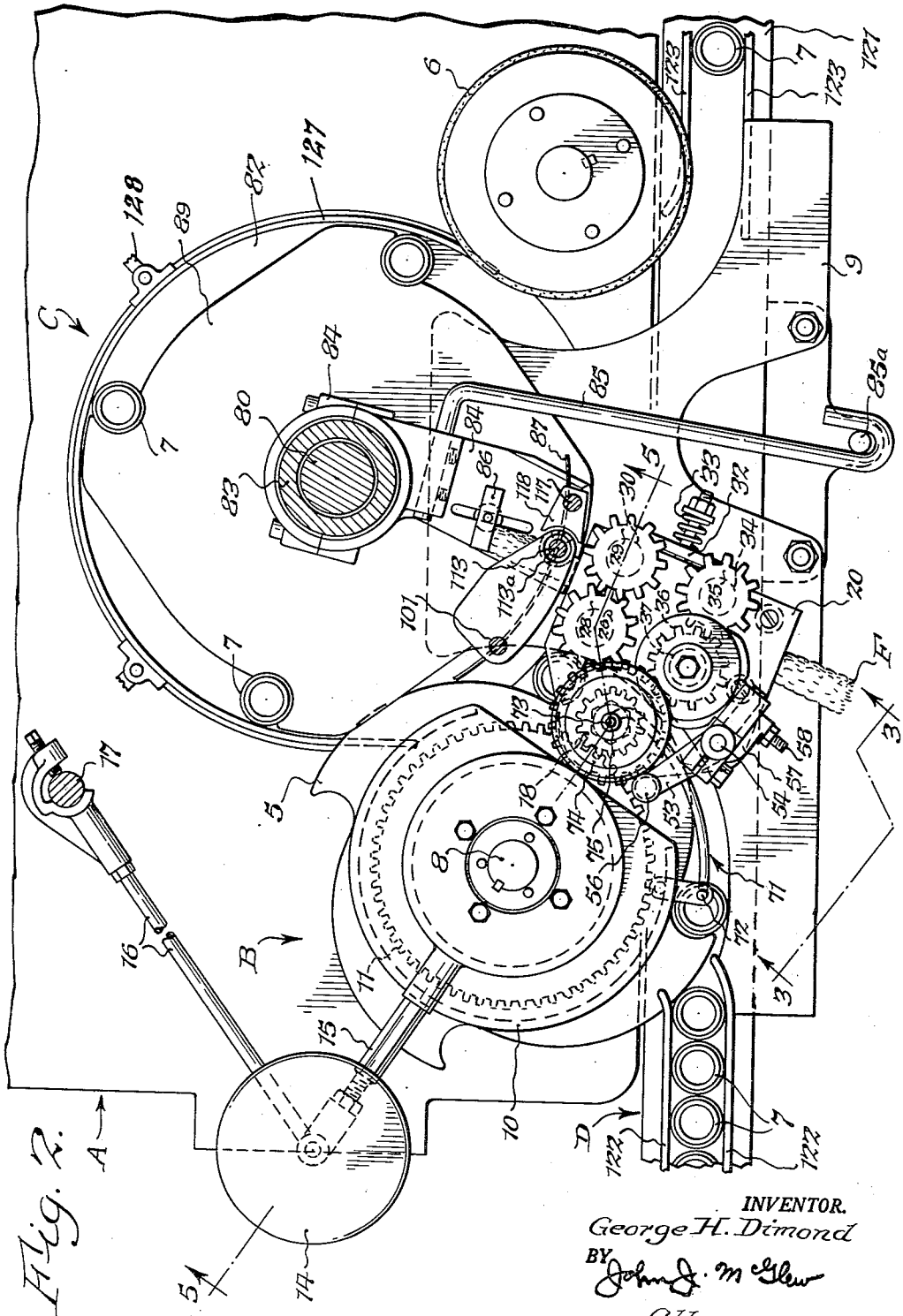


Fig. 2.

INVENTOR.
George H. Dimond
BY John J. McGlew
Attorney.

Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954 6 Sheets-Sheet 3

Fig. 3.

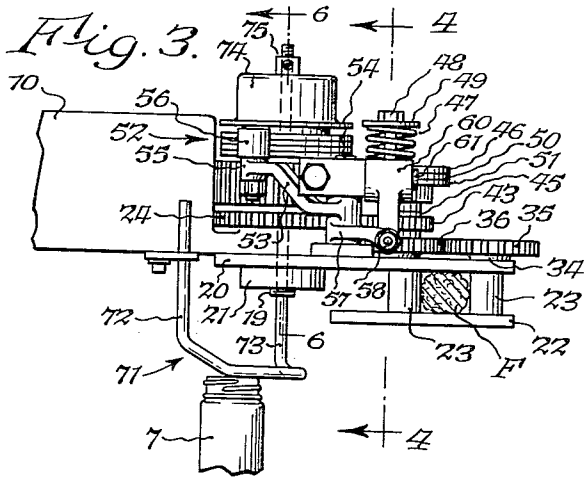


Fig. 4.

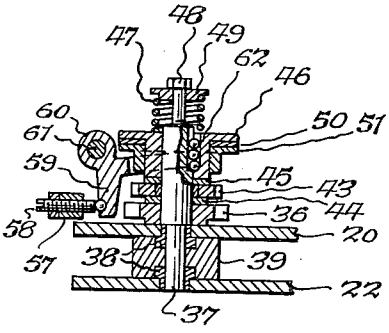


Fig. 5.

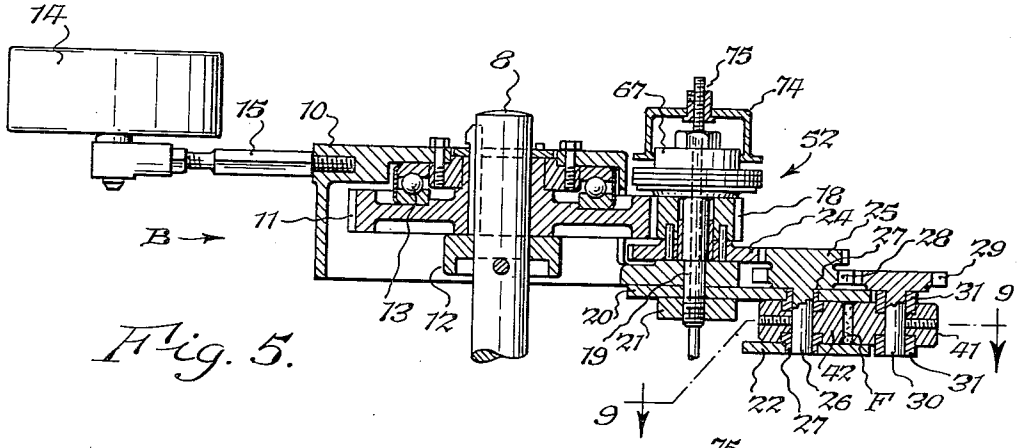


Fig. 7.

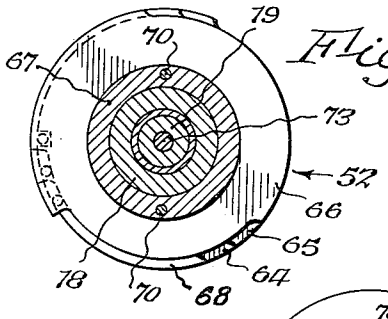


Fig. 6.

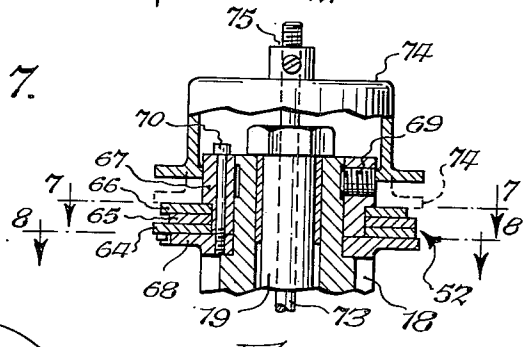
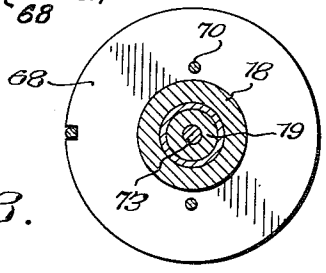


Fig. 8.



INVENTOR.
George H. Dimond
BY
John J. McGlew
Attorney.

Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954 6 Sheets-Sheet 4

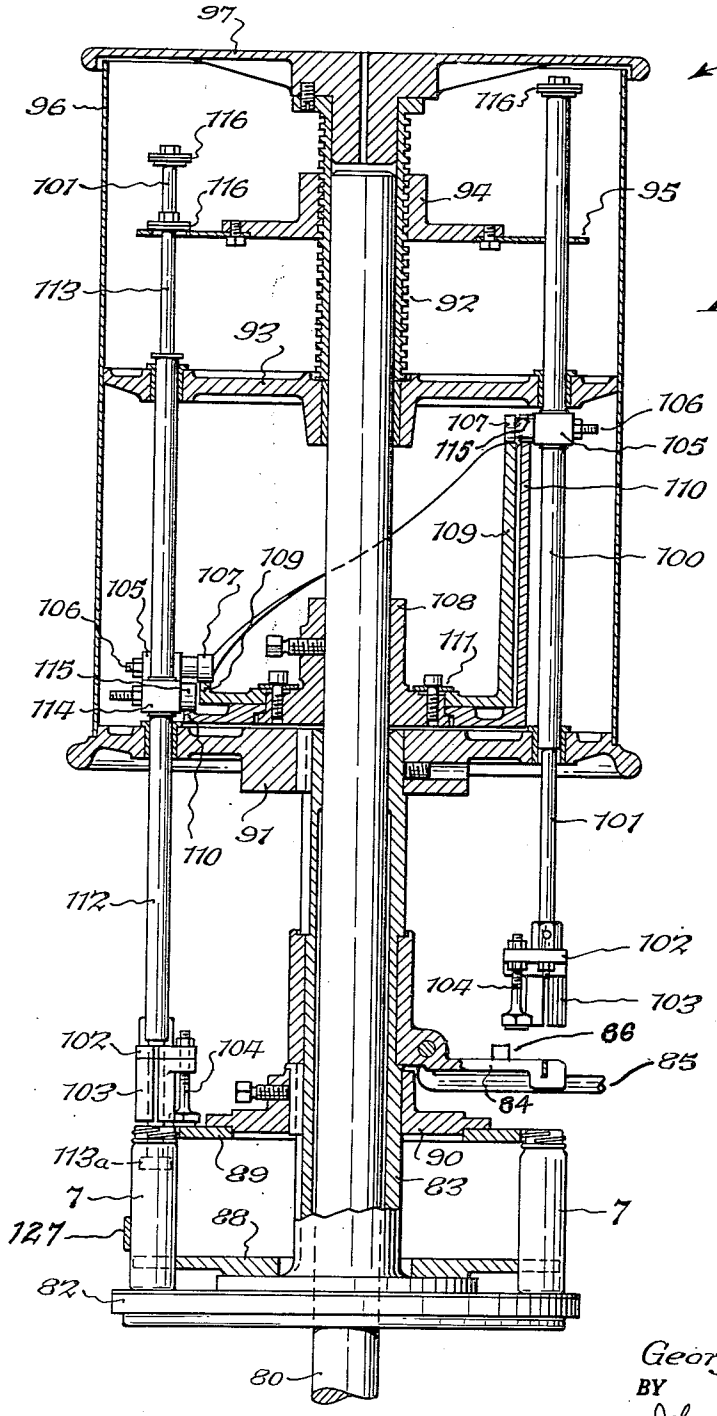


Fig. 10.

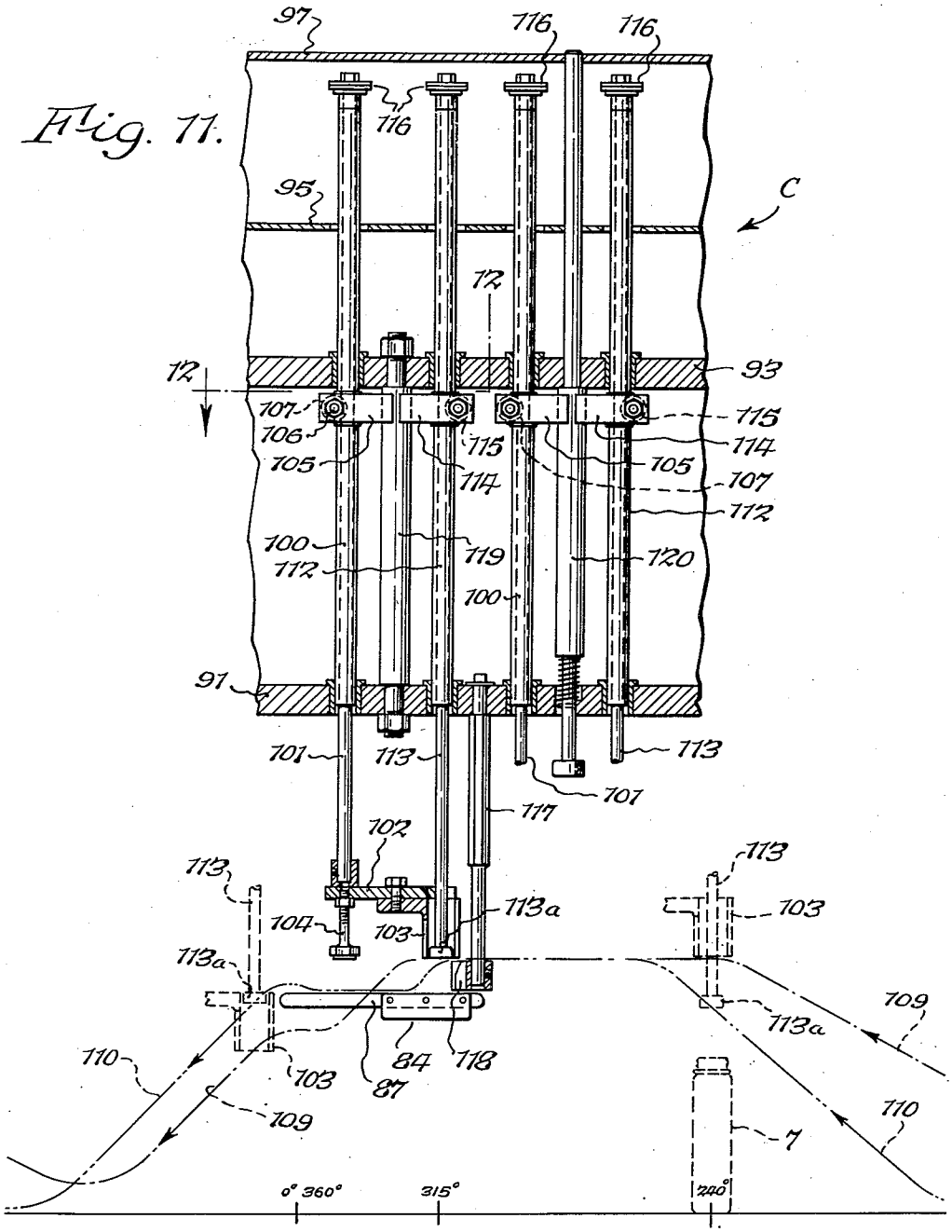
INVENTOR.
George H. Dimond
BY
John J. McGlew
Attorney.

Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954 6 Sheets-Sheet 5

Fig. 11.



INVENTOR.
George H. Dimond
BY
John J. McGlew
Attorney.

Sept. 10, 1957 G. H. DIMOND 2,805,531

MATERIAL INSERTING MACHINE

Filed Dec. 10, 1954 6 Sheets-Sheet 6

Fig. 12.

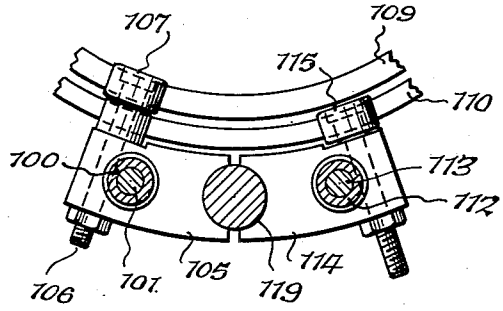


Fig. 13.

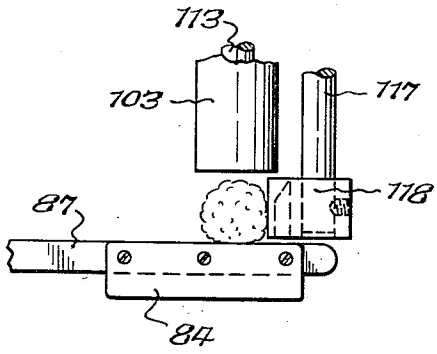


Fig. 14.

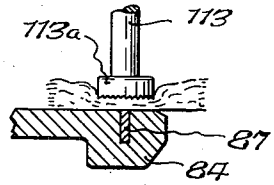


Fig. 15.

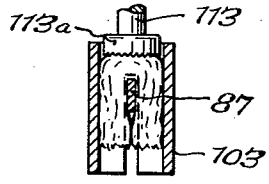
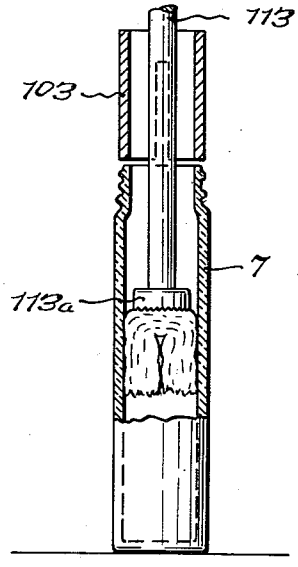


Fig. 16.



INVENTOR.
George H. Dimond
BY
John J. McGlew
Attorney

United States Patent Office 2,805,531 Patented Sept. 10, 1957

2,805,531

MATERIAL INSERTING MACHINE

George H. Dimond, East Aurora, N. Y., assignor to Consolidated Packaging Machinery Corporation, Buffalo, N. Y., a corporation of New York

Application December 10, 1954, Serial No. 474,455

16 Claims. (Cl. 53—63)

This invention relates to new and useful improvements in machines for inserting individual lengths of fibrous material such as cotton into completely empty or partially filled bottles, and particularly seeks to provide a novel machine of this general type which is adapted to break off individual strand lengths from a continuously fed supply strand of fibrous material, to fold the strand lengths into an inverted U-shaped, and to insert them into any predetermined position inside the bottles with the ends of the U-shaped strands positioned below the smooth, intermediate portions thereof.

In Patent No. 2,501,770, granted March 28, 1950, and application Ser. No. 207,363, filed January 23, 1951, now U. S. Patent No. 2,691,473, there are disclosed and claimed machines of this general type in which a strand of fibrous material such as cotton wadding is fed in individual lengths into the necks or tops of successively presented, continuously moved bottles.

A machine constructed in accordance with this invention is an improvement over those disclosed and claimed in the above patent and application, particularly with respect to the provisions for inserting the individual strand lengths of fibrous material into the bottles to any depth desired and to the means for folding the fibrous material strands into an inverted U-shape and subsequently inserting the U-shaped strands into the bottles with the ends thereof positioned below the smooth intermediate portions, and to means for preventing the feeding or parting of individual lengths of fibrous material when no bottle is in position to receive them.

It is, therefore, an object of this invention to provide a machine for the insertion of fibrous materials into partially filled or completely empty bottles in which individual lengths are first separated from a continuously fed strand of the fibrous material, then folded into an inverted U-shape, and inserted into continuously advanced bottles with the ends of the fibrous material strands positioned downward below the intermediate portions thereof.

Another object is to provide a machine of the character stated in which individual strand lengths of fibrous material are continuously fed to a position above a folding blade and advanced thereon by a plunger until a sleeve effects the bending of the strand into an inverted U-shape thereover and the strand is then pushed by the plunger into the bottom of a bottle which has been continuously advanced to a position below the U-shaped strand in synchronization therewith.

A further object of this invention is to provide a machine of the character stated which is capable of continously positioning strands of fibrous material at any predetermined depths within continuously advanced bottles.

A further object is to provide a machine of the character stated which has sensing means to prevent the entrance of fibrous material to the bottle area when no bottles are present below the material-inserting station.

A further object of this invention is to provide a machine of the character stated which is simple in design,

rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

In the drawings:

Fig. 1 is a somewhat schematic perspective view of a material-inserting machine constructed in accordance with this invention;

Fig. 2 is an enlarged horizontal section taken along line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary detailed elevation taken elong line 3—3 of Fig. 2;

Fig. 4 is a vertical section taken along line 4—4 of Fig. 3;

Fig. 5 is a fragmentary, enlarged detail vertical section taken along line 5—5 of Fig. 2;

Fig. 6 is a fragmentary, further enlarged detail partly in section taken along the line 6—6 of Fig. 3;

Fig. 7 is a horizontal section taken along line 7—7 of Fig. 6;

Fig. 8 is a horizontal section taken along line 8—8 of Fig. 7;

Fig. 9 is a horizontal section taken along line 9—9 of Fig. 5;

Fig. 10 is an enlarged fragmentary vertical transverse section through the turret of the machine;

Fig. 11 is an enlarged fragmentary development of a portion of the turret showing one complete set of plunger and sleeve with a development of their motion by cam action;

Fig. 12 is a horizontal section taken along line 12—12 of Fig. 11;

Fig. 13 is a detailed fragmentary elevation showing the cotton as initially positioned over the folding blade;

Fig. 14 is a detailed fragmentary elevation showing the plunger holding the cotton on the folding blade;

Fig. 15 is a detailed fragmentary vertical section showing the sleeve in the process of folding the cotton over the folding blade; and

Fig. 16 is a detailed fragmentary vertical section showing the plunger in the process of positioning the cotton in a bottle.

Referring to the drawings in detail, the invention as illustrated is embodied in a machine for inserting individual lengths of fibrous strand into either partially filled or completely empty bottles and includes a base A, a fibrous material strand-separating and -feeding mechanism generally indicated at B, a turret assembly generally indicated at C for performing the material-inserting operations, an intake and discharge conveyor generally indicated at D, and a container generally indicated at E which holds a supply F of unbroken stranded fibrous material, such as cotton wadding.

The base A carries all of the driving mechanisms of the machine (not shown) including a motor which operates: the turret C, the strand-separating and feeding mechanism B, the intake and discharge conveyor D, a pair of upper and lower intake star wheels 5, 5, and a discharge friction faced wheel 6, all synchronized to effect insertion of the fibrous material F into bottles 7. The driving mechanisms are generally similar to those disclosed in Patent No. 2,691,473, issued October 12, 1954.

The intake star wheels 5, 5 are rigidly affixed to a vertical shaft 8 and are provided with four bottle-receiving pockets so that individual bottles may be moved through an arcuate path from the intake position of the con-

veyor D to operative association with the mechanism of the turret C. The bottles are guided along arcuate paths during intake and discharge from the turret C by guide plates 9, 9 which are affixed to the top of base A in parallelism therewith.

The continuous strand F of cotton wadding is adapted to be withdrawn from its container E by the feeding mechanisms B which are carried by and driven from the shaft 8 which is operatively connected to the driving mechanisms in the base A. The feeding mechanisms include a cover 10 which is provided with an opening through which the upper portion of the star wheel shaft 8 extends. Keyed to the shaft 8 immediately below the cover 10 is a gear 11 supported on the star wheel shaft by means of a bearing collar 12 rigidly affixed thereto. A ball thrust bearing 13 is provided between the cover 10 and the gear 11 to permit rotation of the gear independently of the cover. A counterweight 14 is adjustably positioned in proximity to the feeding mechanism B and connected to the cover 10 by an adjustable arm 15. The counterweight 14 is also secured by a link 16 which is clamped to a stud 17 projecting upwardly from the base A. By shortening or lengthening the effective lengeth of the arm 15 the counterweight is adjustably positioned to balance the feeding mechanism which is supported on the shaft 8.

The gear 11 meshes with a pinion gear 18, the latter being freely rotatable about an upstanding stationary spindle 19 which is affixed to the lower lip of the cover 10 with the lower end of the spindle projecting therebelow. A pentagonal plate 20 (see Figs. 2 to 5 and 9), having a suitable apperture to pass around the spindle 19, is secured beneath the lower lip of the cover 10 and fastened thereto by a nut 21 threadably engaged on the lower end of the spindle 19. A rectangular plate 22 is secured in spaced parallel relation under the plate 20 as by a plurality of spacers 23. The spindle 19 also carries a gear 24 underlying the pinion 18 which is pin-connected to the pinion in order to rotate therewith.

The gear 24 meshes with a gear 25 mounted on the upper part of a flanged vertical shaft 26 journalled between the plates 20 and 22 in bearings 27, 27. Another gear 28 is mounted on the upper part of the shaft 26 below the gear 25 and meshes with a gear 29 of the same diameter mounted on a flanged vertical shaft 30 journalled in bearing blocks 31, 31 slidably carried in slots formed in the outer edges of the plates 20 and 22. A similar set of bearing blocks 31, 31 are carried in slots formed in the outer edges of the plates 20 and 22 in spaced parallel relation to the first set. The blocks 31 are yieldably retained in the slots by a yoke 32 and an adjustable compression spring 33.

A shaft 34 journalled in the rear set of the bearing blocks 31 and is provided at its upper end with a gear 35 which is the same diameter as and meshes with a gear 36 fixed on a shaft 37 journalled in bearings 38. A knurled or fluted feed roll 39 is affixed to the shaft 37 between the plates 20 and 22 and cooperates with a similar feed roll 40 affixed to the shaft 34. The rolls 39 and 40 constitute the rear pair of feed rolls and are intermittently stoppable, as will be hereinafter more fully described. A knurled or fluted feed roll 41 is affixed to shaft 30 between the plates 20 and 22 and cooperates with a similar feed roll 42 affixed to shaft 26. The rolls 41 and 42 together constitute the forward pair of feed rolls and are continuously driven by the gear 25 which meshes with the gear 24. The forward feed rolls are oriented with the rear feed rolls to discharge cotton radially to the star wheel 89, and the rear feed rolls are spaced behind the forward ones at a distance approximately double the minimum length of cotton strand which will be parted and inserted into each bottle.

Means are provided to intermittently stop rotation of the rear pair of feed rolls 39 and 40 while permitting the forward pair of feed rolls 41 and 42 to continue to rotate and thereby to effect the parting or separating of individual lengths of cotton wadding from strand F thereof solely through tension. These means include a freely mounted gear 43 which is rotated by the gear 24 and acts to rotate the shaft 37 and the gear 36 through the medium of friction washers 44 and 45 only when compressed into driving contact therewith by a clutch mechanism.

The clutch mechanism includes a hubbed driving plate 46 which is biased downwardly by a spring 47 secured to the shaft 37 by a bolt 48 and washer 49. The driving plate 46 exerts a downward pressure through a friction washer 45, gear 43 and friction washer 44 to rotate shaft 37 and thereby the gears 35 and 36 during feeding operation. Parting of the cotton into individual lengths will be effected by lifting the driving plate 46 a distance sufficient to relieve driving pressure on the washers and gears therebelow, so as to cause the rear feed rolls to stop and the forward feed rolls to pull the cotton apart. To disengage and stop the driving plate 46 there is provided a friction washer 50 and a hubbed friction disk 51 which are cam-controlled, as will be hereinafter more fully described.

The position of the driving plate 46 is regulated by a cam generally indicated at 52. The cam 52 acts through a mechanism including an arm 53 pivotally connected at its inner end to a stub shaft 54 which is mounted on the upper plate 20. The outer end of the arm 53 is provided with an upstanding boss 55 which carries an upwardly extending roller cam follower 56. Another arm 57 rigidly connected to the arm 53 and extending in a generally opposite direction therefrom is provided at its outer end with a transversely disposed pin or stud 58 threadably engaged therewith and having a flat outer end adapted to exert pressure upon a ball secured to a depending arm 59 of a bell crank 60. The bell crank 60 is pivoted on a shaft 61 held in place on a mounting affixed to the upper end of the shaft 54. The other arm of the bell crank 60 comprises a yoke which spans the hub of the friction disk 51 and engages the underside of the disk portion thereof. The yoke portion of the bell crank 60 spans the hub of the friction disk 51 across a pair of flats on the latter (not shown) so as to prevent rotation thereof during the periods when the rear feed rolls 39 and 40 are stopped.

In the driving position the driving plate 46 is down and the cam follower 56 rides around cam 52 on the low portion thereof. When a high spot is reached the cam follower moves out and through the medium of the arms 53 and 57, the stud 58 and the bell crank 60 and causes the friction disk 51 and the friction washer 50 to bear against the clutch driving-plate 46 to move it upwardly along the shaft 37 and thereby to stop its rotation and the rotation of the gear 36, the latter no longer being held tightly by the washer 44. It will be noted that the driving-plate 46 is drive-connected to the shaft 37 through the medium of a keyway and ball keys indicated at 62 which permit axial movement of the driving-plate along its associated shaft. The gear 43 will then be permitted to rotate freely between the washers 44 and 45 without driving the gears 36 and 35 and the associated feed rolls 39 and 40.

The cam 52 as shown in Figs. 3, 5, 6, 7 and 8 comprises three identical disks 64, 65 and 66, each of which has equal high, medium and low peripheral arcs. Each disk has an equal arc of high cam having a large radius, an equal arc of intermediate cam having an intermediate radius, and an equal arc of low cam having a small radius. The disks are clamped between two supporting sleeves, an upper one 67 and a lower one 68, and are held tightly therebetween as by tightening bolts 70. The upper sleeve is fixed to the spindle 18 by means of a set screw 60. Before insertion between the sleeves the disks may be rotated relative to one another so as to present a desired effective contour or cam travel path over which the follower 56 must travel. The disks are then held in this position

by suitable locking pins which fit into a respective notch on a disk below and on the lower supporting sleeve **68**. The follower is deeper than the thickness of the three disks combined, so that the travel of the follower will be determined by the peripheral profile of the high and medium arcs in combination, the low arcs being blanked off by the lower supporting sleeve **68**. The disks are rotated relative to one another any time it is desired to change the timing at which the rear feed rolls **39** and **40** are stopped or rotated by the action of the cam follower acting through the clutch mechanism described above. The longer the peripheral distance along the high lift portions of the cam **52** the longer will be the stopping period of the rear feed rolls during each cycle. Referring to Fig. 7, it can be seen that changing the position of the top disk **66** will be sufficient to change cam timing.

In accordance with the invention means are provided whereby cotton strand feeding will cease whenever for any reason whatever there is no bottle advancing toward the filling station. These means include a relatively small diameter, vertically reciprocable U-shaped sensing wire **71** having one leg **72** extending upwardly alongside the cover **10** and the other leg **73** extending upwardly through the hollow spindle **19**. Each leg is free to move vertically and the one inside the spindle **19** is provided at its upper end with a blocker cap **74**. The blocker cap is bell-shaped and has a flanged base. It is slidably mounted on a flanged collar threadably secured to the upper edge of the arm **73** as at **75**. The horizontal web portion of the sensing wire **71** is normally positioned above the bottles on the feeding line so that the weight of the wire is supported by each successive bottle as it moves underneath. When there is no bottle feeding below the sensing wire the wire drops by gravity so that the flanged blocker cap falls behind the cam follower **56** as soon as the cam follower hits a high spot on the cam. The flanged portion of the blocker cap having a radius substantially equal to the radius of the high lift portion of the cam **52** then prevents the follower from moving into contact with the low portion of the cam, and in such a position the rear feed rolls **39** and **40** do not rotate. The forward feed rolls **41** and **42** continue to rotate, but after the previously parted strand is fed through there will no longer be any cotton in position for further feeding by the forward rolls owing to the fact that the rear feed rolls are not advancing the cotton to them. When a bottle again comes into position in contact with the sensing wire **71** the blocker cap at the end thereof is raised out of contact with the cam follower **56** to permit the cam **52** to become effective and resume feeding of the strand.

The cotton leaving the forward feed rolls **41** and **42** comes into operative association with mechanism carried by the turret C. The turret assembly C includes a vertically extending main turret spindle **80** which is rigidly carried by the base A. A wheel **82** is rigidly fastened to the lower hub portion of a hubbed sleeve **83** and is rotated about the spindle **80** by mechanism operated by a motor in the base A (not shown). A radially extending table **84** is mounted on the sleeve **83** by means of a collar which permits rotation of the sleeve **83** therein. The table **84** is held against rotation relative to the shaft **80** and the sleeve **83** by a retaining bar **85** rigidly affixed thereto and to a stud **85***a* extending upwardly from the base A.

As an individual strand length leaves the forward feed rolls **41** and **42** (see Fig. 9) it is projected onto the folding table **84**. The folding table **84** is disposed in alignment with the radially inwardly fed cotton strand and is provided with a cotton strand feed stop **86** adjustably mounted in a slot thereon. A curved or arcuate folding blade **87** has its center of curvature at the center of the shaft **80** and overlies the initial portion of the path of travel of the containers entering the turret C and into which cotton is to be inserted. The folding blade **87** is affixed to the folding table **84** at a position spaced slightly inwardly from the discharge of the forward feed rolls **41** and **42**. The ends of the folding blade **87** extend laterally beyond the edges of the folding table **84**.

The top of the shoulder wheel **82** provides a peripheral ledge for the support of bottles into which wadding is to be inserted. An annular segmented plate-type star wheel **88** having four peripheral pockets is removably affixed to the shoulder portion of the sleeve **83**. The star wheel pockets are shaped to conform to the body configuration of containers or bottles upon which the work functions are to be performed. A similar star wheel **89** having four pockets in registry with the pockets of star wheel **88** is removably affixed to a mounting sleeve **90** which is in turn slidably mounted on the upstanding sleeve **83** and is prevented from rotary movement with respect thereto by suitable slideway and key connections and held from vertical movement with respect thereto by a suitable set screw. A lower spindle **91** is rigidly affixed to the upper end of the sleeve **83**.

The upper end of the spindle **80** is provided with an externally threaded sleeve **92** which rotates in respect thereto and is positioned above an upper spindle plate **93**. The upper spindle plate **93** can rotate freely about the spindle **80**. It is held in spaced relation to the spindle plate **91** by means to be described hereinafter.

A hubbed plate **94** is threaded onto the sleeve **92** and is provided with an abutment annulus **95** which provides a lower stop for the plungers **101** and **113** in a manner to be described more fully hereinafter. A cylindrical casing **96** extends upwardly from the outer edge of the lower spindle plate **91**. It is covered by a plate **97** which has a hub portion which fits into and is locked in place on the sleeve **92** as by a dowel pin. The turret wheel **82**, the star wheels **88** and **89**, the cover plate **97**, the disk **95** and the spindle plates **91** and **93** all rotate as a unit about the spindle **80**.

Mechanisms are carried inside the turret for first effecting an initial holding of the separated strand of cotton as it is fed from the forward feed rolls **41** and **42** onto the folding table. The turret mechanisms then act to advance the strand along the arcuate folding blade **87** outwardly from the folding table **84** in the direction the bottles are advancing in the pockets of star wheels **88** and **89**. Means are provided for folding the cotton over the folding blade and then positioning each folded strand in proximity to the top of an associated bottle and finally for inserting the folded strand well down into the bottle towards the bottom thereof. To this end the turret assembly is provided with four sets of mechanisms (corresponding to the number of pockets of the star wheels **88** and **89**), all of which are identical in structure. Accordingly, for convenience herein a detailed description will be made of only one of these assemblies, and it will be appreciated that the remainder are alike.

A vertically reciprocable carrier sleeve **100**, having an internal carrier spindle **101** slidably fitted therein, is journalled in suitable bearings in the plates **91** and **93**. The carrier spindle **101** is provided at its lower end with a short horizontal plate **102** which is rigidly affixed thereto and extends outwardly at a right angle to the end thereof. Bolted to the outer end of the casting **102** is a vertically extending folding cylinder or sleeve member **103**. The folding sleeve member comprises a vertically extending cylinder **103** which is slit at two opposite sides from the bottom edge upwardly along its height. The slits are cut to conform to the curvature of the folding blade **87** and are arranged so that when the sleeve member **103** is reciprocated the folding blade **87** will extend into the slits thereof as it comes down over the blade. In addition to the folding sleeve member the plate **102** carries an adjustable threaded stud stop **104** which is positioned near the inner edge thereof and extends downwardly towards star wheel **89** with which the stop comes into contact at the lower limit of travel of the carrier spindle **101**.

The central portion of the sleeve carrier **100** is provided with a casting **105** carried thereon and releasably secured as through the use of clamping bolt **106**. The inner face of the casting **105** is provided with a roller cam follower **107**. A flanged-base hub **108** is adjustably secured to the spindle **80** and carries a pair of concentrically arranged inner and outer cylindrical cams, **109** and **110**, respectively, each provided with an internally extending flange portion which are together clamped onto the flanged base of the hub **108** as through clamp ring and bolt connections, indicated at **111**. The roller cam follower **107** is adapted to engage the cam **109** as it rotates around the latter.

The cylinder cam **110** is adapted to cause the reciprocation of a plunger sleeve **112** having an internal plunger spindle **113** slidably fitted therein. The plunger sleeve **112** is mounted for vertical reciprocating motion in suitable bearings in spindle plates **91** and **93** similarly to the carrier sleeve **100**. The plunger spindle **113** has a flanged lower end or plunger **113***a* of a size which permits its insertion into the sleeve member **103**. The central portion of the plunger sleeve **112** is provided with an adjustably positioned casting **114** slidably carried thereon and releasably secured as through the use of a clamping bolt. The casting **114** is provided with an inwardly extending roller cam follower **115** adapted to engage the cylinder cam **110**.

The carrier spindle **101** and the plunger spindle **113** are each provided with washer or flanged stops **116** at the upper extremities thereof. These washer stops **116** are made of a larger diameter than the associated carrier and plunger sleeves **100** and **112** so that the downward travel of the spindles will be limited by the abutment annulus **95**. When desired the hubbed plate **94** can be adjustably rotated so that the lower limit of movement of the spindles can be set as desired. The hubbed plate **94** with its abutment annulus **95** may be adjustably positioned at any height along the sleeve **92**. With this provision and the provisions for adjustably positioning the star wheel **89** along the height of the spindle **80** it is possible to adapt the machine to bottles of different heights or to vary the depth of insertion of individual strands into bottles of the same height.

The stud stop **104** functions similarly to the washer stops **116** by contacting the star wheel **89** to establish a lower limit for the carrier spindle **101** and in addition acts to insure that the bottles **7** will not be chipped or broken by contact with the descending sleeve member **103** The carrier and plunger spindles **101** and **113** normally move with their respective sleeves in accordance with the indicated movement of the cams **109** and **110**. However, each is slidable in its sleeve so that whenever objects, such as the bottle or the cotton strand, which might resist or deter movement, are encountered by devices carried by either, the affected spindle may move upwardly relative to its sleeve as the sleeve continues to move downwardly by gravity under the control of its cam. Since the movement is caused by the downward action of gravity or the upward lift of the cam, it is always gentle and no breakage will occur.

A pusher spindle **117** is affixed to the turret C so as to depend therefrom into close proximity with the folding table **84**. The pusher spindle **117** is positioned close to the carrier sleeve **103** and the plunger **113***a* and is provided with a curved pusher plate **118** at the lower end thereof which trails the carrier sleeve and the plunger during operative rotation of the turret C and acts to push cotton along the folding blade **87** in conjunction with the plunger **113***a*. Vertically disposed cylindrical studs **119** are fastened between the spindle plate **91** and the upper spindle plate **93** and are positioned between each set of carrier and plunger sleeves **100** and **112**. The studs **119** maintain the spacing and rigid alignment of the spindle plates **91** and **93**. The studs **119** are slidably engaged by the opposed ends of the castings **105** and **114** to prevent rotation of the sleeves **100** and **112** and thereby maintain the axes of the cam rollers **107** and **115** in radial relation to the cams **109** and **110**. One of the studs **119** is substituted for by a rod **120** having a smaller portion which extends both upwardly through the upper spindle plate **93** into a hole provided in the cover **97** and downwardly through a hole in the spindle plate **91**. The central wide portion is shorter than the distance between the plates **91** and **93** and is spring-biased upwardly against the upper spindle plate **93**. The rod **120** normally locks the upper cover and its associated parts to the lower portion of the turret for rotation therewith, but it may be manually pulled downwardly to disengage its upper end from the cover **97**. The cover **97** may then be rotated and its rotation will result in relative rotation of the threaded sleeve **92** which will change the position of the abutment annulus **95** as the hubbed plate **94** is threadably moved along the sleeve **92**.

The bottles or containers **7** into which individual lengths of cotton wadding are to be inserted are fed into and discharged from the machine through the conveyor D which is a straight-line conveyor extending across the front of the machine. The conveyor D essentially comprises a conveyor belt or chain **121** carried upon suitable pulleys or sprocket wheels and driven through mechanisms located in base A. Two pairs of spaced guide rails **122**, **122** and **123**, **123**, an intake pair and a discharge pair, respectively, are adjustably supported in a position overlying the conveyor belt **121** as through the medium of a plurality of supporting lugs **124** which are in turn carried by vertically disposed horizontally extending conveyor mounting plates **125** and **126** (see Fig. 1).

The bottles are directed along the conveyor to the intake star wheels **5**. Each successive bottle is picked up in a pocket of the star wheel **5** where it is rotated until picked up by the pockets of the star wheels **88** and **89**. The guide plate **9** aids in directing individual bottles through the proper arcuate paths of travel from one machine portion to the other after they leave the intake of the conveyor. The guide rails **122** are curved near the star wheel in order to direct the bottles into the successively appearing pockets. One edge portion of the guide plate **9** is curved to conform with the radius of the star wheels **5**, and the opposite edge is curved to conform with the radius of curvature of the discharge friction face wheel **6**. The turret assembly C is provided with arcuate guide means, spaced around the star wheels **88** and **89** thereof and comprising a guide rail **127** carried by a pair of horizontally disposed, radially extending supporting studs **128**, **128** (partially shown in Fig. 2).

While the operation of a machine constructed in accordance with this invention should be readily apparent from the foregoing description it is believed that clearer understanding of the invention may be had if one complete cycle of operation is described.

A line of bottles **7** (empty in this instance) into the bottoms of which individual pieces of cotton wadding are to be inserted is supplied to the intake end of the conveyor D. The leading bottle of the line is urged against the curved periphery of star wheels **5** until it is engaged by one of the pockets thereof. As viewed in Fig 2 of the drawings the star wheels **5** are rotated in a counterclockwise direction. As the bottle is being moved under the influence of the star wheels **5** the rear pair of feed rolls **39** and **40** and the front pair of feed rolls **41** and **42** are constantly driven to withdraw the strand F of cotton wadding from its container E.

As the bottle-containing pockets of the star wheels **5** approach registry with the star wheels **88** and **89** the cam **52** is rotated to a position in which the roller cam follower **56** is engaged on a high lift portion thereof and the clutch-driving plate **46** is disengaged to thereby stop the rotation of the rear feed rolls **39** and **40**. The forward feed rolls **41** and **42** continue feed movement and thereby part by tension an individual length of wadding and

project it into alignment over the folding blade **87** mounted on the folding table **84**.

As the bottle is being fed around under the influence of the rotary star wheels **5** the turret is rotating and a position on cam **110** is reached at which the plunger sleeve and spindle begin to descent. Referring to Fig. 11 it is seen that at the 315° position of the turret the cotton is fed over the folding blade **87** onto the folding table **84**, and the plunger sleeve descends until the plunger spindle **113** and the plunger **113***a* come into contact with the cotton strand (see Figs. 13 and 14). As rotation continues the plunger holds the cotton on the folding blade and moves it in the direction of turret rotation off the table **84**. The pusher **118** prevents the cotton from becoming displaced out of vertical alignment with the plunger **113***a*. At this point the sleeve member **103** at the end of the carrier plunger **101** is permitted to descend under the influence of the cam **109** and effect folding of the cotton over the folding blade **87** (see Fig. 15).

The bottle, meanwhile, has come into registry with star wheels **88** and **89** and is gradually moved around the turret base as the carrier sleeve **100** moves downwardly until the sleeve member **103** comes into proximity with the mouth of the bottle and is stopped by the stop **104**. At the 0° or 360° position the plunger sleeve **112** is lifted slightly as shown in the development of the cam in Fig. 11 to permit the cotton to be readily freed from its engagement with the folding blade **87** and then it descends to insert the cotton into the bottom of the bottle. The plunger **113***a* is sufficiently heavy to force the cotton down towards the bottom of the bottle, but when resistance offered by the walls or bottom of the bottle on the cotton becomes greater than the effective gravitational force applied by the plunger, the plunger will stop its downward movement and the sleeve **112** will move downwardly relatively thereto under the control of its cam **110**. As the bottle is advanced around the turret the cam causes the sleeves and spindles to rise out of contact with the bottle and the bottle is discharged at about the 240° position of turret rotation and advanced to the friction faced discharge wheel **6**. The friction faced discharge wheel **6** moves the bottle around the guide plate **9** by revolving it along the periphery thereof by friction contact. (This is possible only with round bottles. With other shapes a star wheel is employed.) The bottle then moves out to the conveyor D at the discharge section thereof between guide rails **123**.

Thus it will be seen that the invention herein disclosed provides a novel machine for the automatic folding of strands of cotton wadding into an inverted U-shape and for the subsequent insertion of the folded strands into either the necks, bottoms or any desired position inside successively presented bottles, while the bottles are moved continuously without interruption through work-performing positions of the machine. The machine provides for the separating of cotton wadding purely by tension from a continuous strand into individual lengths of cotton which are automatically moved into registry with a bottle, folded and positioned therein. In addition, novel means are provided to automatically stop feeding and separating of the cotton strand whenever a bottle is not in proper registry.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

I claim:

1. In a machine for inserting individual lengths of fibrous material into containers, the combination of means for continuously moving a series of bottles, means for supplying a series of individual lengths of fibrous material for insertion into said bottles, means for folding said individual lengths of fibrous material into an inverted U shape, and means for effecting the insertion of an individual folded length of fibrous material into each successively presented bottle.

2. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, means for feeding individual lengths of fibrous material radially to said turret, means for folding said fibrous material into an inverted U shape and for moving the same into registry with the top of an associated container, and means for inserting said folded fibrous material into said container.

3. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a stationary arcuate folding blade positioned over a portion of the path of travel of said containers as they are being advanced by said turret, means for feeding individual lengths of fibrous material transversely onto said folding blade, means for folding said fibrous material over said folding blade, and means for inserting said fibrous material into each of said successively presented containers.

4. In a machine for inserting individual lengths of fibrous material into container, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material-supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said container, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, means for advancing each individual length of fibrous material in the direction of turret rotation along said blade, means for folding said individual lengths of fibrous material over said blade, and means for inserting said individual folded lengths of fibrous material into an associated container.

5. In a machine for inserting individual lengths of fibrous material into containers, the combination of means for continuously moving a series of bottles, normally continuously operable means for feeding a series of individual lengths of fibrous material for insertion into said bottles, means for effecting the insertion of an individual length of fibrous material into each successively presented bottle, means to control the operation of said feeding means, sensing means positioned in the incoming path of travel of said bottles and connected to said control means and effective when bottles are present to cause said control means to operate said feeding means and when no bottles are present to cause said control means to render said feeding means inoperative.

6. In a machine for inserting individual lengths of fibrous material into containers, the combination of means for continuously moving a series of bottles, normally continuously operable means for feeding a series of individual lengths of fibrous material for insertion into said bottles, means for folding said individual lengths of fibrous material, means for effecting the insertion of an individual folded length of fibrous material into each successively presented bottle, means to control the operation of said feeding means, sensing means positioned in the incoming path of travel of said bottles and connected to said control means and effective with bottles are present to cause said control means to operate said feeding means and when no bottles are present to cause said control means to render said feeding means inoperative.

7. In a machine for inserting individual lengths of fibrous material into containers, the combination of a main frame, means for continuously moving a series of bottles, a rear pair of feed rolls mounted on said main

frame for withdrawing a continuous strand of fibrous material from a supply thereof, a front pair of feed rolls mounted on said main frame in spaced relation to said rear feed rolls, means to drive both pairs of feed rolls, cam controlled means for periodically stopping said rear pair of feed rolls whereby to part individual lengths of fibrous material from a continuous strand thereof, sensing means positioned in the incoming path of travel of said bottles and connected to said cam-controlled means and effective to stop said rear feed rolls when no bottles are present, and means for effecting insertion of an individual length of fibrous material into each successively presented bottle.

8. In a machine for inserting individual lengths of fibrous material into the bottom portions of containers, means for withdrawing a continuous strand of fibrous material from a supply thereof, means for continuously moving a series of bottles, means for parting individual lengths of fibrous material from the continuous strand thereof, and means for first folding each individual length of fibrous material into an inverted U shape and for thereafter effecting the insertion of each such folded length into the bottom portion of each successively presented bottle.

9. In a machine for inserting individual lengths of fibrous material into containers, the combination of a rear pair of feed rolls for withdrawing a continuous strand of fibrous material from a supply thereof, a front pair of feed rolls for further feeding said strand, means to drive both pairs of feed rolls, means for periodically stopping said rear pair of feed rolls whereby to cause said front pair of feed rolls to part purely by tension successive individual lengths of material from said continuous strand, means for continuously moving a series of bottles, and means for folding the individual lengths of material into inverted U shape and for effecting the insertion of each such folded individual length into each successively presented bottle.

10. In a machine for inserting individual lengths of fibrous material into containers, the combination of a main frame, a rear pair of feed rolls mounted on said main frame for withdrawing a continuous strand of material from a supply thereof, a front pair of feed rolls mounted on said main frame in spaced relation to said rear feed rolls, means to drive both pairs of feed rolls, means for periodically stopping said rear pair of feed rolls to part purely by tension successive individual lengths of material from said continuous strand due to the continued operation of said front feed rolls and to project each of said individual lengths into position for folding and insertion into successively presented bottles, a continuously rotating turret supported on said main frame and located adjacent said feed rolls in such position that material-folding and inserting devices carried thereby will pass through a position in registry with successively projecting strand lengths, means for successively moving individual bottles through a position in registry with each of said projecting strand lengths, material-folding and inserting devices operatively associated with said turret and effective to fold each said individual strand length into an inverted U-shape and to move it from its initially projected position and to insert it into an associated bottle, and means for withdrawing successively packed bottles from said turret.

11. In a machine for inserting individual lengths of fibrous material into the bottom portion of bottles, a main frame, a rear pair of feed rolls mounted on said main frame for withdrawing a continuous strand of fibrous material from a supply thereof, a front pair of feed rolls mounted on said main frame in spaced relation to said rear feed rolls, means to frictionally drive said rear feed rolls, means to positively drive said front pair of feed rolls, cam-controlled means for periodically stopping said rear feed rolls whereby to part by tension individual lengths of fibrous material from the continuous strand thereof, means for continuously moving a plurality of bottles, sensing means positioned in the incoming path of travel of said bottles and connected to said cam-controlled means and effective when no bottles are present to cause said cam-controlled means to stop said rear feed rolls, and means for folding each individual length of fibrous material and inserting the same into the bottom of each successively presented bottle.

12. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material-supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said containers, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, a vertically reciprocable cam-actuated plunger in said turret effective during a portion of rotation of said turret to hold said individual length of fibrous material on said folding blade while the movement of said plunger moves said individual length of fibrous material along said blade in the direction of turret rotation, and means for folding said individual length of fibrous material over said blade, said plunger being effective after said individual length of fibrous material has been folded and during further rotation of said turret to insert said folded lengths of fibrous material into an associated container and thereafter to withdraw upwardly from said container.

13. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material-supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said container, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, means for advancing each individual length of fibrous material in the direction of turret rotation along said blade, a vertically reciprocable sleeve member carried by said turret and having opposed slots extending upwardly from the bottom thereof and being effective during a portion of rotation of said turret to descend over said folding blade whereby to fold said individual length of fibrous material thereover, and means thereafter effective for inserting said individual folded lengths of fibrous material into an associated container.

14. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said container, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, a vertically reciprocable cam-actuated plunger in said turret effective during a portion of rotation of said turret to hold said individual length of fibrous material on said folding blade while the movement of the turret causes said individual lengths of fibrous material to be advanced under pressure of said plunger along said folding blade in the direction of turret rotation, a vertically reciprocable sleeve member carried by said turret and having opposed slots extending upwardly from the bottom thereof and being effective during a portion of rotation of said turret to descend

over said folding blade whereby to fold said individual length of fibrous material thereover, said plunger being effective after said individual length of fibrous material has been folded and during further rotation of said turret to remove the folded material from said sleeve member and to insert the same into an associated container and thereafter to withdraw upwardly from said container.

15. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said container, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, a vertically reciprocable cam-actuated plunger in said turret effective during a portion of rotation of said turret to hold said individual length of fibrous material on said folding blade while the movement of the turret causes said individual lengths of fibrous material to be advanced under pressure of said plunger along said folding blade in the direction of turret rotation, means for preventing said individual lengths of fibrous material from being displaced from beneath said plunger as it is advanced along said folding blade, a vertically reciprocable sleeve member carried by said turret and having opposed slots extending upwardly from the bottom thereof and being effective during a portion of rotation of said turret to descend

over said folding blade whereby to fold said individual length of fibrous material thereover, said plunger being effective after said individual length of fibrous material has been folded and during further rotation of said turret to remove the folded material from said sleeve member and to insert the same into an associated container and thereafter to withdraw upwardly from said container.

16. In a machine for inserting individual lengths of fibrous material into containers, the combination of a continuously rotating turret, means for successively presenting a series of containers to said turret in properly timed relation, a fixed material-supporting table positioned over a portion of the path of travel of said containers, an arcuate folding blade affixed to said table and extending therebeyond in the direction of rotation of said turret and coincident with the path of travel of the center line of said container, means for feeding individual lengths of fibrous material to a position on said table transversely of said folding blade, means for advancing each individual length of fibrous material in the direction of turret rotation along said blade and for folding said individual lengths of fibrous material over said blade and for thereafter inserting said individual folded lengths of fibrous material into an associated container.

References Cited in the file of this patent

UNITED STATES PATENTS

2,171,572	Kelly	Sept. 5, 1939
2,304,932	Lakso	Dec. 15, 1942
2,691,473	Gantzer	Oct. 12, 1954