Feb. 20, 1951 G. FREUND, II 2,542,652

APPARATUS FOR PLICATING TUBING

Filed Dec. 6, 1946 2 Sheets-Sheet 1

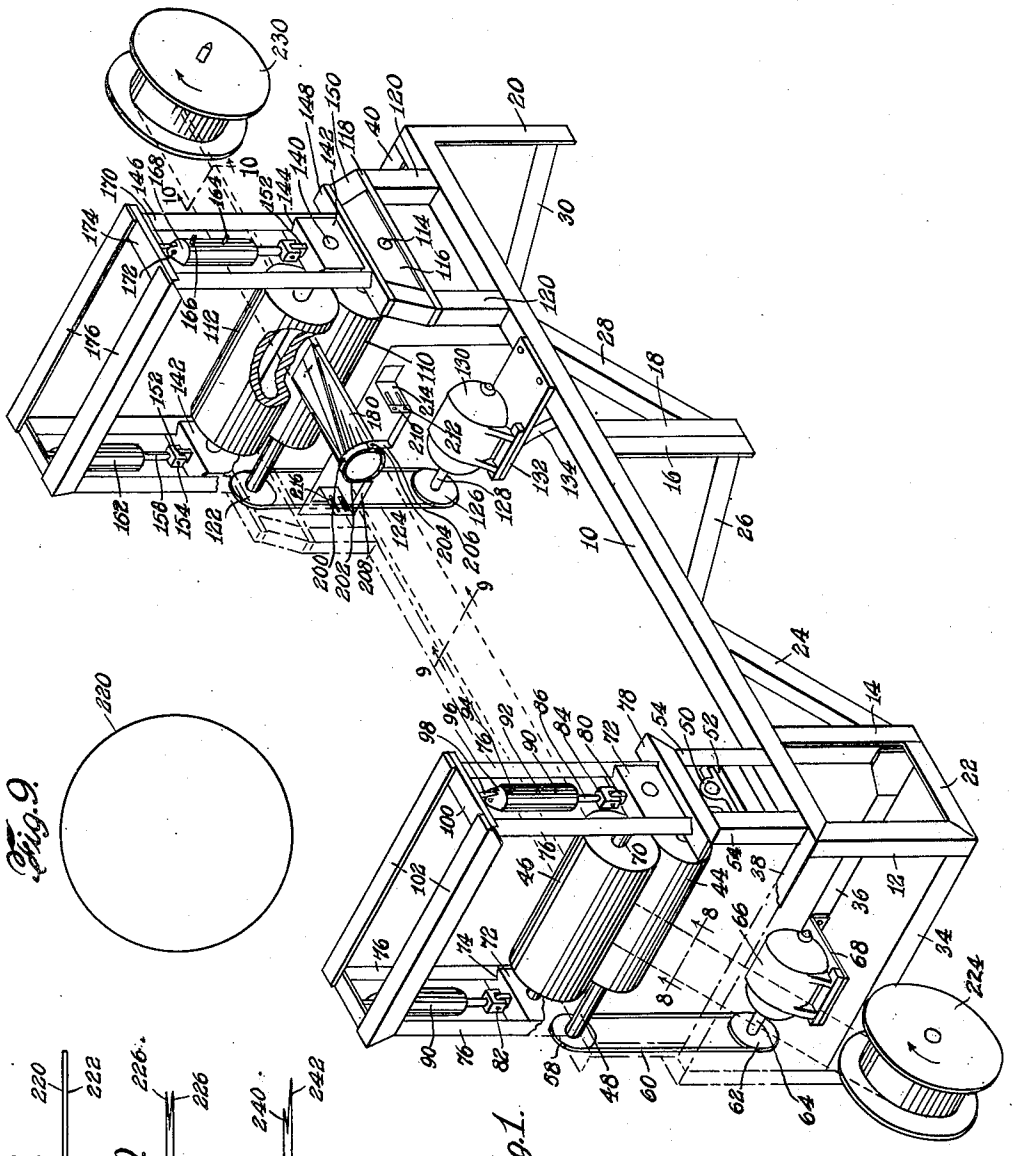


Fig. 1.

Fig. 9.

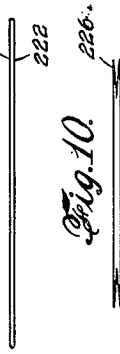


Fig. 8.



Fig. 10.



Fig. 11.

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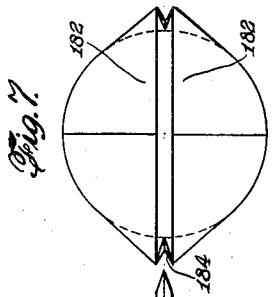


Fig. 1.

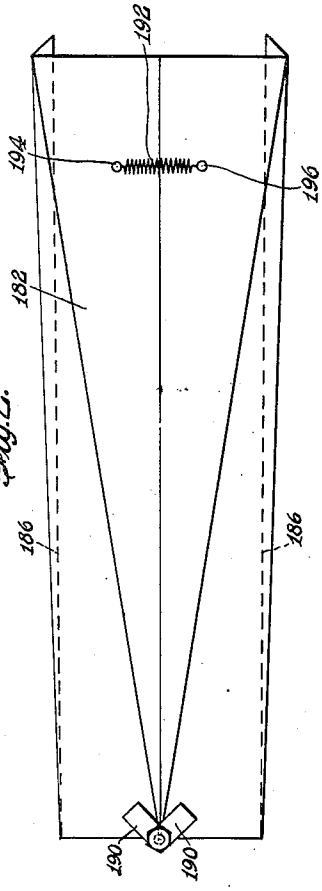


Fig. 2.

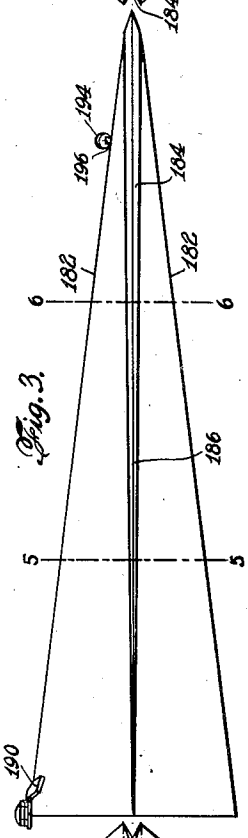


Fig. 3.

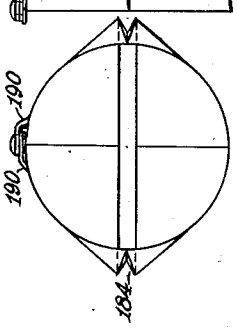


Fig. 4.

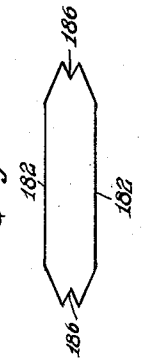


Fig. 6.

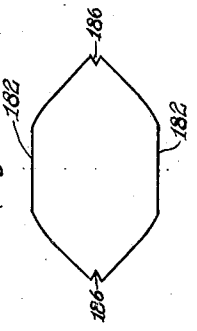


Fig. 5.

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APPARATUS FOR PLICATING TUBING

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Application December 6, 1946, Serial No. 714,451

9 Claims. (Cl. 93—1)

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This invention relates to a new and improved method of and apparatus for plicating tubing. More particularly, it relates to a method of and apparatus for producing continuous lengths of plicated seamless tubing.

Recently, there has been devised a process wherein a plastic is extruded from a melt to form a thin-walled seamless tubing which is collected in flattened condition on a reel. In such flattened tubings, the top and bottom panels have a tendency to stick together and considerable difficulty is encountered in separating the panels so that the tubing can be expanded for use. After considerable research and experimentation, it was found that if the flattened tubing had plicated sides, the flattened tubing could be easily opened. More particularly, it was found that when either leg of a plicated side was pulled away from the other, and this can be very easily done, an opening was provided at the end of the tubing which permitted the insertion of a finger or tool whereby such opening could be enlarged with no difficulty. For economic purposes, it is highly desirable that continuous lengths of tubing be plicated. However, there is no method in the prior art which discloses producing continuous lengths of plicated tubing from a preformed seamless tubing in the flattened state, nor any apparatus therefor.

An object of this invention is to provide a method of and apparatus for producing continuous lengths of plicated tubing.

Another object of this invention is to provide a method of and apparatus for producing continuous lengths of plicated tubing from preformed continuous lengths of flattened seamless tubing.

Other and additional objects will become apparent hereinafter.

The objects of the invention are accomplished, in general, by gradually flattening a seamless tubing inflated with a gaseous medium and simultaneously infolding the tubing on opposite sides thereof to produce a flattened tubing wherein the top and bottom panels are flat and the opposite sides plicated. The legs of the plicated sides can be equal, but alternatively, however, they are made of uneven lengths whereby one of such legs projects beyond the other so that it can be manually gripped for initiating the opening of the flattened tubing.

In one form of an apparatus for carrying out the method and which constitutes one part of this invention, tubing is fed between two pairs of squeeze rolls and a bubble of a gaseous medium is entrapped or sealed off in the section of the tubing between the two pairs of rolls, whereby the tubing is inflated. The bubble of gaseous medium is isolated in the tubing between the two pairs of squeeze rolls and, as the continuous tubing is fed from a suitable source of supply between

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these two pairs of rolls, the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, with the result that the successive sections of the tubing passing between said rolls are successively inflated. The two pairs of rolls are preferably driven at the same peripheral speed so that the tubing is not stretched in its passage therebetween. Means are provided to maintain the squeeze rolls of each pair in contact with each other so that the gaseous medium can be entrapped in the tubing between the two pairs of rolls.

Between the two pairs of rolls and in the path of travel of the inflated tubing, there is provided a plicating funnel through which the tubing passes. The plicating funnel is of such a construction, as will hereinafter be more fully described, that an inflated tubing of normally round cross-section passing therethrough is gradually flattened and simultaneously infolded at the opposite sides thereof to produce the plications. The tubing, as it passes from the discharge end of the plicating funnel, is flattened, i. e. the top and bottom panels being straight and parallel but slightly spaced from each other with the sides thereof plicated. The discharge end of the plicating funnel is positioned in as close proximity as possible to the nip of the second pair of rolls so that the tubing, as it issues from the plicating funnel, will pass quickly to and between the nip of the rolls. Upon passing between the second pair of rolls, the tubing is completely flattened, and the flattened plicated tubing is wound up on a reel. The plicating funnel is pivotally mounted at the entrance end thereof, and the discharge end thereof preferably floats. The internal perimeter of the plicating funnel, irrespective of the shape, is of the same magnitude at all cross-sections of the funnel.

The present invention will be more clearly understood by reference to the following detailed description when taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view, partly broken away and in part diagrammatic, of one form of an apparatus embodying the principles of the invention;

Figure 2 is a top view of the plicating funnel;

Figure 3 is a side view of the plicating funnel;

Figure 4 is a view of the entrance end of the plicating funnel;

Figure 5 is a section taken on the line 5—5 of Figure 3;

Figure 6 is a section taken on the line 6—6 of Figure 3;

Figure 7 is a view of the discharge end of the plicating funnel;

Figure 8 is a section taken on the line 8—8 of Figure 1;

Figure 9 is a section taken on the line 9—9 of Figure 1;

Figure 10 is a section taken on the line 10—10 of Figure 1; and

Figure 11 is a section of a plicated tubing with legs of uneven length.

Referring now to the drawings wherein like reference numerals designate like parts, and particularly to Figure 1, the apparatus is mounted on a frame formed of angle irons and wherein each side of the frame comprises a longitudinal member 10 carried on and appropriately secured to vertical members 12, 14, 16, 18, 20. The vertical members 12 and 14 are also secured together at the bottom thereof by the member 22. Braces 24, 26, 28, 30 are also provided to reinforce the frame. The two sides of the frame are secured together by cross-pieces 34, 36, 38, 40.

At the feed end of the apparatus, there is provided a pair of squeeze rolls 44 and 46. The roll 44 is secured onto a shaft 48 which is rotatably mounted in a pair of pillow blocks 50. Each pillow block 50 is mounted on a shelf 52 secured to vertical supports 54 appropriately secured to the longitudinal member 10. For reasons which will become apparent, one end of the shaft 48 is provided with a pulley 58 which is driven by a belt 60 by a pulley 62 carried on the motor shaft 64 of a motor 66. The motor 66 is mounted on a shelf 68 secured to the cross-piece 36.

The roll 46 is secured on a shaft 70, the opposite ends of which are rotatably mounted in bearings 72. Each bearing 72 is provided with a groove 74 on each end thereof and is adapted to ride on a pair of spaced vertical rails 76 which are secured to the member 78 appropriately secured to the members 54. For reasons which will become apparent hereinafter, each of the bearings 72 are adapted to be separately and individually raised and lowered. In the form shown in Figure 1, each bearing 72 is provided with a lug 80 which is secured by a pin 82 in a yoke 84 carried at one end of a piston rod 86. The piston rod 86 is provided with a piston (not shown) slidably disposed in an air cylinder 90 having air connections 92 and 94. Each air cylinder 90 is provided at the top thereof with a forked member 96 which is secured to a lug 98 carried by a support 100 secured to the top of the rails 76. Cross-pieces 102 secured to the top of the supports 100 reinforce the structure.

At the discharge end of the apparatus, there is provided a second pair of squeeze rolls 110 and 112. The roll 110 is secured on a shaft 114 which is rotatably mounted in pillow blocks 116. Each pillow block 116 is carried on a shelf 118 which, in turn, is carried at the top of the members 120 appropriately mounted on the longitudinal member 10. On one end of the shaft 114, there is provided a pulley 122 which is driven by a belt 124 from a pulley 126 carried on the motor shaft 128 of a motor 130. The motor 130 is appropriately mounted on a shelf 132 secured to the longitudinal member 10. Braces 134 reinforce the shelf 132.

The roll 112 is secured to a shaft 140, the opposite ends of which are rotatably mounted in bearing blocks 142. Each bearing block 142 is provided with a groove 144 in each end thereof whereby such bearing block 142 is adapted to ride on a pair of spaced rails 146 which are carried on a member 148 supported by the members 150 disposed on the shelf 118. Each bearing 142 is provided with a lug 152 which is secured

by a pin 154 in a yoke 156 carried at one end of a piston rod 158. The other end of the piston rod 158 is secured to a piston (not shown) which is slidably mounted in a cylinder 162 provided with air connections 164 and 166. Each of the cylinders 162 is provided at the top thereof with a bifurcated member 168 in which a lug 170 is secured by means of a pin 172. The lug 170 is carried by a member 174, which is secured at the top of the rails 146. Cross-pieces 176 serve to reinforce the structure.

As is shown in Figure 1, a plicating funnel, generally indicated by the reference numeral 180, is positioned before the second pair of rolls and in the path of travel of the tubing from the first to the second pair of rolls.

The plicating funnel is of a construction such that as an inflated tubing, substantially circular in cross-section, passes therethrough, said tubing will be gradually flattened and the sides thereof simultaneously infolded to produce a plicated tubing. In general, the plicating funnel is circular in cross-section at the entrance end thereof, as shown in Figure 4, and the top and bottom of the plicating funnel are so shaped that at the discharge end, the respective free ends of the top and bottom are in parallel spaced horizontal planes, as shown in Figure 7. As shown in Figure 2, the top and bottom of the plicating funnel are each formed with a flat surface 182 which flares in the direction toward the discharge end and, at the discharge end, the flat surfaces of the top and bottom constitute the top and bottom of the discharge opening. The flat portions 182 of the top and bottom, moreover, converge toward each other in the direction toward the discharge end but terminate in spaced relationship, as above explained.

The plicating funnel is also provided with diametrically opposed re-entrant portions 184 in which each of the legs thereof begin in the circular portion of the funnel and flare inwardly in the direction toward the discharge end of the funnel. The re-entrant portions 184, as shown in Figures 5 and 6, are intermediate the top and bottom flat surfaces 182 and, at the discharge end, connect the flat portions together. The inner edges 186 of the re-entrant portions are preferably rounded. The size of the internal perimeter of the plicating funnel is the same throughout the length of the funnel.

For convenience in manufacture, the plicating funnel is formed of two longitudinal sections which, when positioned with their inner edges in opposed relationship, as hereinafter described, will produce the plicating funnel above described.

The two sections of the funnel are positioned with their inner edges in abutting relationship, and each section of the plicating funnel is respectively secured at the entrance end of the funnel to a strap 190. A spring 192 is secured at one end thereof to a pin 194 carried by one of the sections, and the other end of the spring is secured to a pin 196 carried by the other section. The spring 192 continuously urges the sections toward each other and is preferably disposed in the vicinity of the discharge end of the plicating funnel.

The plicating funnel is mounted so that it can pivot about a vertical axis at the entrance end thereof. In the form shown in Figure 1, the straps 190 are pivotally mounted on a pivot 200 carried by a ring 202. The ring 202 is of greater diameter than the diameter of the entrance end of the plicating funnel. The ring 202 is adjust-

ably mounted in the apparatus for reasons which will become apparent hereinafter. In the form shown, the ring **202** is separately secured at two diametrically opposite points by a bolt **204** to the respective leg **206** of a pair of brackets **208**. Each bracket **208** is provided with a second leg **210** which is secured, by means of bolts **212**, to a bracket support **214** appropriately mounted on the frame of the machine. Each bracket support **214** is provided with slots **216** which cooperate with the bolts **212** whereby each of the brackets **208** can be adjusted independently of the other. Lock nuts (not shown) cooperate with the bolts **212** to secure the brackets **208** in adjusted position.

In general, the brackets **208** are adjusted so that the discharge end of the funnel will terminate in as close proximity as possible to the nip of the second pair of squeeze rolls. In practice, when the diameter of the squeeze rolls is 10", the discharge end of the plicating funnel is positioned approximately from ⅛" to $\frac{1}{16}$" before the nip of the second pair of feed rolls, with the result that the plicated tubing, as it issues from the plicating funnel, is immediately passed between the second pair of squeeze rolls and completely flattened thereby. Preferably, the funnel is mounted so that the center of the entrance end thereof is in alignment with the center of the inflated tubing. Due to the fact that the plicating funnel is supported only at the entrance end thereof, the discharge end thereof floats and the funnel, due to its pivotal mounting, will adjust itself into position so that it will be in the path of travel of the tubing passing from the first to the second set of rolls. The diameter of the entrance end of the plicating funnel is approximately the same as the diameter of the inflated tubing entering it.

At the beginning of operation of the apparatus, the rolls **46** and **112** are elevated, and a flattened seamless tubing in which the top and bottom panels **220** and **222** are in intimate relationship (see Figure 8) is unwound from a suitable source of supply, such as an appropriately mounted roll **224**, and manually threaded through the machine, i. e. between the first set of rolls, through the funnel, and thence between the second set of rolls. The roll **46** is elevated by introducing compressed air into the air cylinders **90** through the inlets **92**, whereby the piston rods **86** are moved upwardly with the result that the bearings **72** carrying the rolls are elevated. The roll **112** of the second pair of squeeze rolls is similarly elevated by introducing compressed air in the air cylinders **162** through the connections **164**, whereby the piston rods **158** are moved upwardly with the result that the bearings carrying the rolls **112** are elevated. The roll **46** is then lowered until it is in intimate contact with the roll **44** by reversing the direction of travel of the piston in the air cylinder through the action of compressed air introduced through the inlets **94**. Sufficient air is maintained in the air cylinders to yieldingly mount the roll **46**.

Through the free end of the tubing which extends beyond the second pair of rolls, air is introduced through a nozzle, connected to any suitable source of supply, in an amount sufficient to inflate the tubing which, prior to entrance into the plicating funnel, is circular in cross-section (see Figure 9). Due to the inflation, the tubing within the plicating funnel is caused to engage and conform to the shape of the inner peripheral wall of the funnel. When the tubing has been thus inflated, the roll **112** is lowered quickly

into intimate contact with the roll **110** by introducing compressed air into the air cylinders **162** through the inlets **166** whereby the piston rods **158** descend. The two sets of squeeze rolls seal off or entrap the air in the section of the tubing between the nips of the two pairs of squeeze rolls. The motors **66** and **130** are then actuated, with the result that the rolls **44** and **46** unwind the flattened tubing from the roll **224**, and the rolls **110** and **112**, which are driven at the same peripheral speed as the rolls **44** and **46**, advance the tubing through the apparatus. The tubing, prior to passing between the second set of squeeze rolls **110** and **112**, passes through the plicating funnel **180** where it is gradually flattened and simultaneously infolded to produce a plicated tubing conforming to the shape of the discharge end of the plicating funnel. The tubing, as it passes from the plicating funnel **180**, in introduced substantially immediately between the nip of the rolls **110** and **112**, where it is completely flattened. The plicated tubing, after passing through the rolls **110** and **112**, is of the form shown in Figure 10, wherein the legs **226** of the plications are of equal length. The collapsed plicated tubing is then wound up on a take-up roll **230**, which is driven by any well-known compensating drive, so that the peripheral speed of the wind-up surface will be the same as the linear speed of the tubing passing through the machine. Due to the fact that the two sets of squeeze rolls and the take-up roll are driven at the same peripheral speed throughout the process, the tubing is not stretched.

It is to be noted that when the tubing is continuously fed between the two pairs of squeeze rolls, the entrapped gaseous medium advances bodily therethrough while remaining substantially constant in quantity. When for some reason or other the quantity of the gaseous medium decreases, as by loss through leakage, additional gaseous medium may be introduced to compensate therefor.

The apparatus can be operated at various speeds. Satisfactory results have been obtained when the tubing is fed through the apparatus at a speed as high as 60 feet per minute and as low as 5 feet per minute.

The distance between the two sets of squeeze rolls can vary within wide limits and is not critical. The two sets of squeeze rolls can be spaced 2 feet apart or any greater distance desired.

In the preferred embodiment of the invention, the upper idler rolls **46** and **112** are preferably formed with a rubber surface, and the lower driven rolls **44** and **110** are formed of any suitable material, such as polished steel.

The plicating funnel is preferably formed of highly polished sheet metal. Due to the fact that the magnitude of the inner perimeter of the plicating funnel is the same at all cross-sections, there is no excess of material and a product free of wrinkles is obtained.

Though in the preceding embodiment the plicated tubing (see Figure 10) has legs of equal length, the invention is not restricted thereto. By making the legs of the re-entrant portions of the plicating funnel of unequal lengths, the legs of the flattened plicated tubing can be made of unequal lengths. In Figure 11 wherein such an embodiment is shown, the legs **240** are of greater length than the legs **242**.

In general, the apparatus and the method can be utilized for the production of plicated seamless tubing formed of any material which is sub-

stantially impervious to the gaseous medium employed for the inflation. Seamless tubing formed of regenerated cellulose or of plastics, such as cellulose acetate, cellulose acetobutyrate, ethyl cellulose, methyl methacrylate polymer, extrusion or molding grade of nylon, polystyrene, polyvinyl formal-acetatebutyral, copolymer of vinyl chloride and vinyl acetate, polyvinyl chloride, and copolymer of vinyl chloride and vinylidene chloride are illustrative examples of tubing which can be plicated by this invention.

Though air is the preferred gaseous inflating medium, it is to be understood that any other gaseous medium which is inert with respect to the material constituting the tubing can be used.

The invention is not restricted to pneumatic means for actuating the roll-raising mechanism. If desired, hydraulic actuating means can be used. Likewise, the upper rolls of each set of squeeze rolls can be yieldingly mounted in any other suitable manner, as, for example, through the use of springs.

In the embodiment hereinbefore described, the tubing was plicated as it travelled in a horizontal path. The invention is equally applicable to tubing travelling in a vertical or inclined path. Likewise, the rolls **44** and **110** can be driven from a common drive.

Though the invention has been described in connection with the production of plicated seamless tubing from preformed flattened seamless tubing, the invention is not restricted thereto. The apparatus constituting one phase of this invention can be used in combination with a tube-producing machine whereby the tubing will be plicated in an operation combined with the method of producing the tubing. The invention provides a method of and apparatus for producing continuous lengths of plicated tubing, something which has been long sought in the art. The plicated tubing can be used as such or transversely cut into predetermined lengths and one end thereof sealed to provide a bag.

Since it is obvious that various changes and modifications can be made in the above description without departing from the nature or spirit thereof, this invention is not restricted thereto except as set forth in the appended claims.

I claim:

1. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel positioned in the path of travel of the tubing between said squeeze rolls and having its discharge end disposed in close proximity to the nip of the second pair of squeeze rolls, said plicating funnel having means to gradually flatten and simultaneously infold tubing at opposite sides thereof and means pivotally mounting said funnel adjacent its entrance end only.

2. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel to gradually flatten and simultaneously infold the inflated tubing as it passes therethrough, means mounting said funnel adjacent its entrance end only and adjustable means to dispose said plicating funnel in the path of travel of the tubing between said squeeze rolls with the discharge end thereof in close proximity to the nip of the second pair of squeeze rolls.

3. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel to gradually flatten and simultaneously infold the tubing, means to pivotally mount said plicating funnel only adjacent the entrance end thereof whereby the discharge end floats, and means to adjust said plicating funnel relative to the second pair of squeeze rolls.

4. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel to gradually flatten and simultaneously infold the tubing, a support adjacent the entrance end of said plicating funnel, means to pivotally mount said funnel on said support whereby the discharge end of said funnel floats, and means to adjustably mount said support.

5. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel to gradually flatten and simultaneously infold the tubing, a ring support in which the entrance end of said plicat-

ing funnel is positioned, means pivotally mounting said funnel to said ring support, a pair of brackets secured to opposite sides of said ring support, a pair of bracket supports, and means to adjustably position each bracket in its respective support.

6. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remain substantially constant in quantity, a plicating funnel, means to dispose said funnel in the path of travel of the tubing between said squeeze rolls with its discharge end in close proximity to the nip of the second pair of squeeze rolls, and means to pivotally mount said plicating funnel at its entrance end only whereby the discharge end floats, said plicating funnel having its top and bottom each formed with a flat surface which flares in the direction of travel of the tubing therethrough, said flat surfaces also converging in the direction of travel of the tubing through said funnel but terminating in spaced relationship, and said plicating funnel having a pair of diametrically opposed re-entrant portions, the legs of which flare inwardly in the direction of travel of the tubing through said funnel.

7. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel formed of two longitudinal sections, a support adjacent the entrance end of said funnel, means to pivotally mount the entrance end of said sections on said support, means urging said sections toward each other, and means to adjustably mount said support whereby said funnel can be adjusted to desired position, said plicating funnel having its top and bottom each formed with a flat surface which flares in the direction of travel of the tubing therethrough, said flat surfaces also converging in the direction of travel of the tubing through said funnel but terminating in spaced relationship, said plicating funnel having a pair of diametrically opposed re-entract portions, the legs of which flare inwardly in the direction of travel of the tubing through said funnel.

8. An apparatus for producing continuous lengths of plicated tubing which comprises a first pair of squeeze rolls, a second pair of squeeze rolls disposed in spaced relationship to said first pair, both pairs of squeeze rolls being adapted to seal off a gaseous medium introduced in a section of a tubing extending from the first set of squeeze rolls to the second set of squeeze rolls, means to continuously rotate each pair of squeeze rolls whereby the tubing is continuously passed from the first set to the second set of squeeze rolls and the gaseous medium advances bodily therethrough while remaining substantially constant in quantity, a plicating funnel formed of two longitudinal sections, a support adjacent the entrance end of said funnel, means to pivotally mount said sections on said support, yieldable means adjacent the discharge end of said funnel continuously urging said sections toward each other, and means to adjustably position said support, said plicating funnel having its top and bottom each formed with a flat surface which flares in the direction of travel of the tubing therethrough, said flat surfaces also converging in the direction of travel of the tubing through said funnel but terminating in spaced relationship, and said plicating funnel having a pair of diametrically opposed re-entrant portions, the legs of which flare inwardly in the direction of travel of the tubing through said funnel.

9. An apparatus for producing continuous lengths of plicated tubing comprising means to seal off a gaseous medium in a section of seamless tubing whereby said gaseous medium is isolated therein and said section contains only and is inflated solely by said gaseous medium, said means including a pair of rotating squeeze rolls at the forward end of the isolated gaseous medium for advancing said tubing and retaining said gaseous medium in said tubing whereby the gaseous medium advances bodily through the said advancing tubing while remaining substantially constant in quantity, means providing a forwardly tapering passage through which the successively inflated sections are passed and whereby said sections are gradually flattened, the discharge end of said forwardly tapering passage being in close proximity to the nip of said pair of rotating squeeze rolls, and means infolding the tubing at opposite sides as it passes through said passage, the flattening and infolding means being disposed in the path of travel of the tubing to said squeeze rolls.

GUSTAV FREUND, II.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
331,721	Lorenz et al.	Dec. 1, 1885
465,211	Schenck	Dec. 15, 1891
2,346,187	Reichel	Apr. 11, 1944

FOREIGN PATENTS

Number	Country	Date
686,952	Germany	Jan. 19, 1940