

**Dec. 8, 1953**

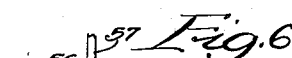
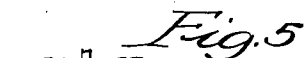
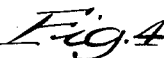
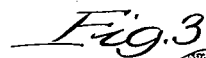
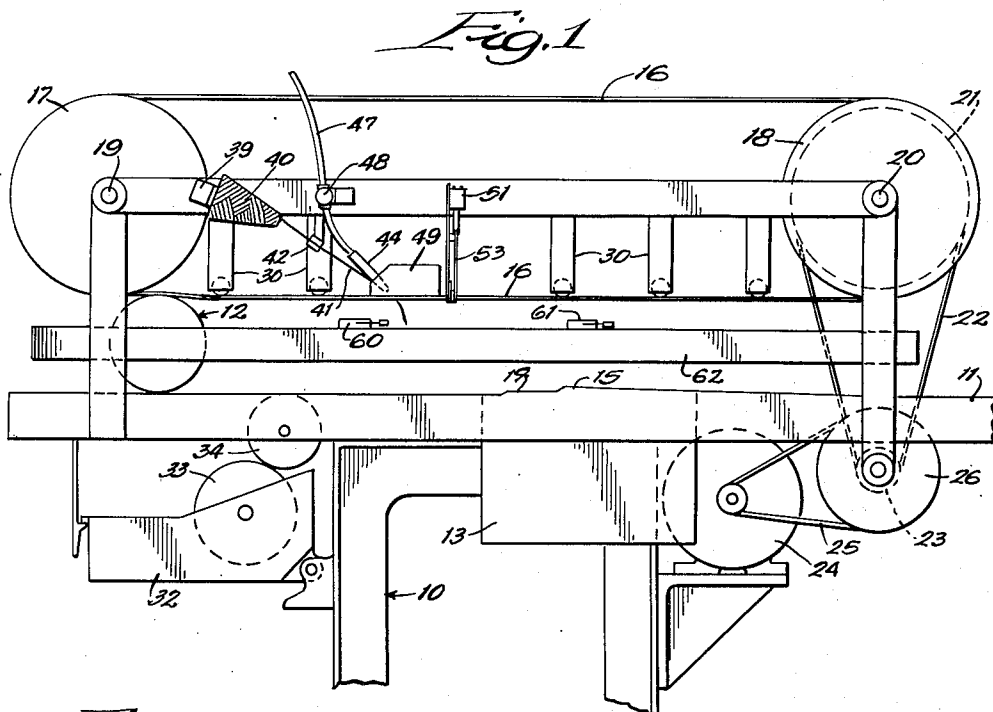
W. F. HANSER

**2,661,582**

# TEAR-CORD APPLYING MACHINE AND METHOD

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2 Sheets-Sheet 1



INVENTOR:  
*William F. Hanser,*  
BY  
*Dawson & Co.,*  
ATTORNEYS.

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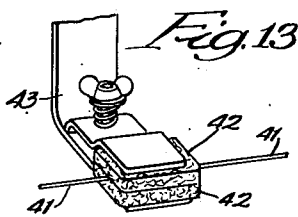
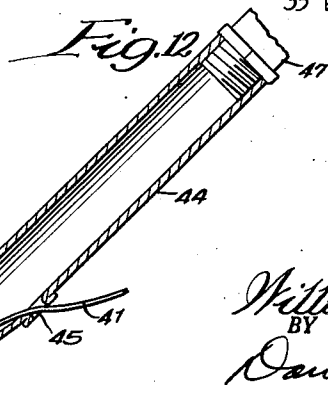
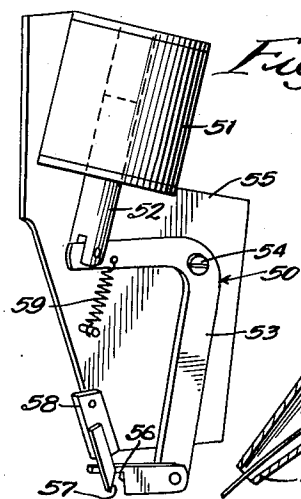
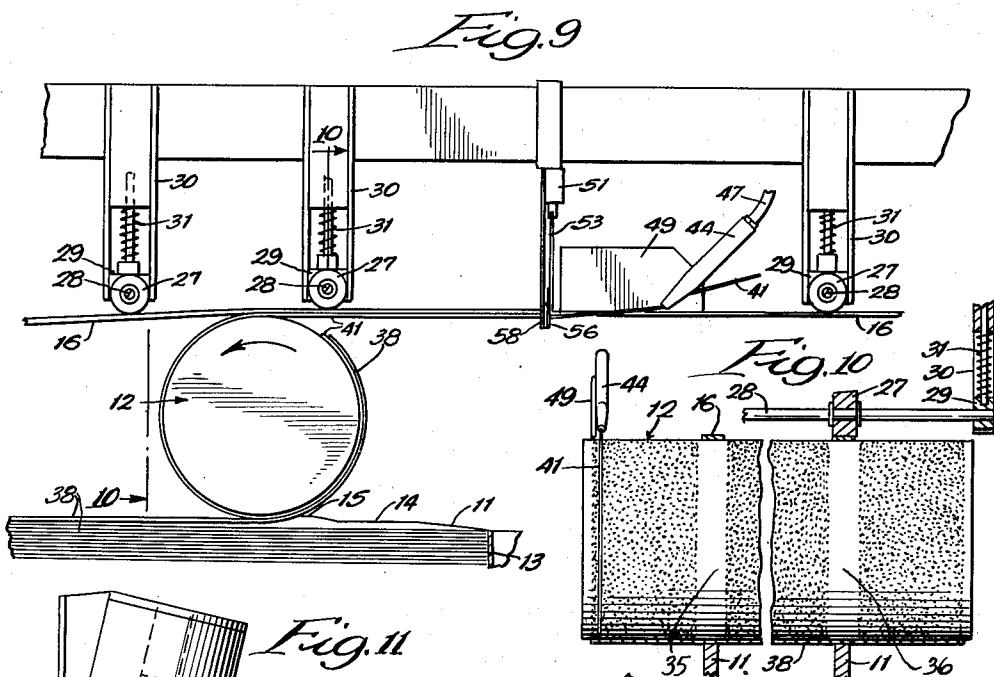
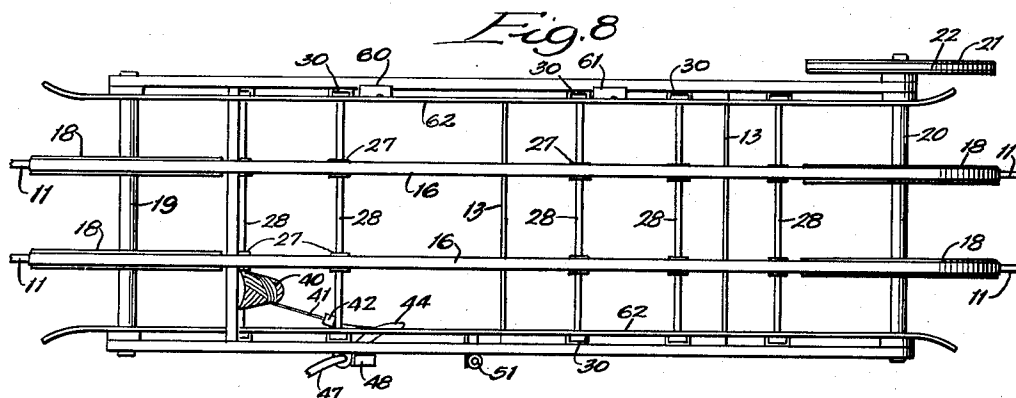
W. F. HANSER

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TEAR-CORD APPLYING MACHINE AND METHOD

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2 Sheets-Sheet 2



INVENTOR:  
*William F. Hanser,*  
 BY  
*Dawson & Co.,*  
 ATTORNEYS.

## UNITED STATES PATENT OFFICE

2,661,582

TEAR-CORD APPLYING MACHINE  
AND METHOD

William F. Hanser, Cedar Rapids, Iowa, assignor  
to National Oats Company, Cedar Rapids, Iowa,  
a corporation of Illinois

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13 Claims. (Cl. 53—5)

1 This invention relates to a tear-cord applying machine and method. The invention is particularly useful in the application of cord or other tear means to a package, whereby upon the drawing of the cord the package may be readily opened.

In the application of a tear filament to a package where the filament is secured by adhesive, great difficulty is encountered in the feeding of such a filament properly within the machine at the precise location needed because of the light or fragile character of the filament and because the use of adhesive often attaches the filament to parts of the machine, etc., causing stoppage and loss of time or a mis-feeding of the filament to the package. Further, difficulties are encountered in attempts to pass packages rapidly through the machine while effecting automatically a severing of the filament at predetermined intervals and without causing misalignment of the unsevered portion of the filament as it approaches the next container. A need has long existed for a rapid and accurate machine and method of the application of tear-cord or filaments to containers.

An object of the present invention is to provide a method and machine for overcoming the difficulties described above and for insuring the rapid and accurate application of the draw elements to the package. Another object is to provide a method and means whereby the draw member is applied at relatively little or no increased expense during the actual wrapping operation which is already necessary in the forming of the completed package. Yet another object is to provide means for applying a tear-cord to a container adjacent the cover of the container, whereby upon the drawing of the cord, a sharp, uniform severance of the wrapper is effected without producing jagged lines therein and without disfiguring the wrapper. A still further object is to provide a process and apparatus whereby a container, after being glued along its body portion, is rotated to draw the tear-cord thereabout while at the same time affixing a wrapper to the package and about the cord while also providing means for severing the cord at a point beyond the wrapper. A still further object is to provide in a wrapping machine for a container, means for feeding a draw-cord accurately to the container and maintaining the cord in a predetermined position for accurate engagement with the container as the same is rotated in the wrapper-engaging and in the wrapping operation. Other specific objects and advantages will appear as the specification proceeds.

2 The invention is shown in an illustrative embodiment by the accompanying drawing, in which—

Figure 1 is a broken side view in elevation of apparatus embodying my invention; Fig. 2, a perspective view illustrating an initial step in the cord-applying operation; Fig. 3, a view similar to Fig. 2 but showing the successive step; Fig. 4, a view similar to Fig. 3 but showing the following step in which the wrapper is being picked up by the glued container and covering the tear-cord already attached to the container; Fig. 5, a diagrammatic perspective view similar to Figs. 1, 2, and 3, but showing the later step in which the cord is brought within the cutting apparatus; Fig. 6, a view similar to Fig. 5, but showing a continuation of the wrapping step and the bringing of the cord within the cutter for a final severance; Fig. 7, a view similar to Fig. 2, but showing the final step in which the container is completely wrapped with the draw-cord thereunder; Fig. 8, a broken top plan view of the apparatus; Fig. 9, an enlarged sectional detail view showing the container in cord and wrapper-engaging position; Fig. 10, a detail sectional view, the section being taken as indicated at line 10—10 of Fig. 9; Fig. 11, an enlarged perspective detail view showing the cutter apparatus employed; Fig. 12, a sectional view of the air tube employed for maintaining the draw-cord in a desired direction for engagement with the container; and Fig. 13, a broken detail perspective view of the cord-retarding means employed.

In the practice of the invention herein described, I employ any suitable type of wrapping machine in which a container is partially coated with a glue and a wrapper applied thereto. In the illustration given, there is shown a wrapper-applying apparatus which is well-known in the art and which need not be described in great detail. As shown more clearly in Figs. 1 and 8, the wrapper apparatus is provided with a base support 10 on which is mounted parallel tracks 11 adapted to receive a container 12 for rotation thereon. Between the tracks 11 is suspended a magazine support 13 in which container wrappers are supported and fed upwardly. To facilitate the picking up of the wrappers, the tracks 11 are stepped upwardly at 14 and 15, and the raising of the tracks also facilitates the bringing of the draw-cord within the cutter elements, as will be later described.

To cause the containers 12 to roll along the tracks 11 through the machine, there are provided a pair of continuous belts 16 mounted on pulleys 17 and 18. The pulleys 17 are mounted

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upon a shaft 19, and the pulleys 18 are mounted upon a shaft 20. The shaft 20 is provided with a drive pulley 21 connected by belt 22 to a driven pulley 23, driven by motor 24 through belt 25 and pulley 26.

In order to urge the belt 16 against each container 12 as it passes through the machine, rolling on tracks 11, I provide a series of rollers 27 mounted on shafts 28, the shafts being carried by slide blocks 29 within the frame guides 30, each block being urged downwardly by a spring 31, as shown more clearly in Fig. 10. Since such structure is well-known, a detailed description herein is believed unnecessary.

Suitable means for applying the glue to the container is provided in the apparatus. This consists of a glue pot 32, in which is mounted a roller 33 and a transfer roller 34 is provided for rotating in a direction opposite to the rotation of the container 12 for applying glue thereto. In operation, the roller 34 rotates at a high speed for applying glue to the surface of the container with spaced gaps in the glue applying surfaces, whereby the container has intermediate portions 35 and 36 which are free of glue and which contact with the drive belts 16, as shown best in Fig. 10.

The container 12 may be of any suitable type or construction. In the illustration given, a cylindrical container is provided having a cap or closure lid 37 at one end and the glue coating extending over the inner portion of the cap so as to cause the wrapper 38, when secured to the container, to thus unite the cap to the body of the container, as shown more clearly in Fig. 7.

In conjunction with the foregoing illustrative apparatus, in which a container is coated with adhesive and provided with a wrapper as it is advanced through the machine, I provide means for supporting a tear-cord, means for retarding the movement of the tear-cord, means for supporting the tear-cord in accurate alignment with the container which is being rolled upon the tracks to cause the cord to be picked up by the glue of the container, and means finally for severing the cord after it has been extended about the container and the cover has been applied. I will now describe such means.

Upon a bracket 39 carried by the frame of the machine, is mounted a spindle carrying a twine cone 40 from which the tear-cord or filament 41 is drawn forwardly as it is needed. The cord 41 passes through the felt strips 42 supported by the clamp bracket 43, and from thence the cord passes through the lower portion of an air tube 44, as shown more clearly in Fig. 12. The tear-cord extends through an opening 45 in the lower portion of the tube 44, and past the inwardly-turned lip 46. An air pipe 47 communicates with tube 44 and leads from a source of compressed air (not shown).

A solenoid-operated valve 48 controls the opening and closing of the conduit 47. A shield 49 of sheet metal or other suitable material is supported alongside the tube 44 and spaces the tube from the adjacent drive belt 16, as shown best in Fig. 10.

Beyond the shield 49 is a cutter device 50 which may be of any suitable type. In the illustration given, I provide a solenoid 51 for operating a plunger 52 secured to the upper end of a bell crank 53 mounted upon a pivot 54 carried by the frame member 55. A cutter 56 is secured to the lower end of the bell crank arm 53, and is adapted to be moved forward past a cutting edge 57 sup-

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ported by the member 58. A spring 59 normally urges the cutter members 56 and 57 in spaced-apart relation, as illustrated in Fig. 11.

In order to control the solenoid valve 48, I provide a contact member 60 which, when engaged by a container, causes the valve 48 to close the conduit 47.

Spaced forwardly of the contact 60 is a second contact switch member 61 which, when engaged by a container, closes the circuit of the solenoid 51, causing the cutter member 56 to advance and sever the cord 41.

It will be understood that the switches 60 and 61 may be located at any desired point and, if desired, located on the same side of the machine with the cutter and the cord-feeding parts. For example, the cord support, tube, shield, cutter, and switches 60 and 61 may all be mounted in a compact manner upon a bracket structure supported at one side of the machine. I prefer to employ along with the tracks 11, side frame members 62 which abut the ends of the containers 12 and keep them rolling in a plane transversely of their axes across the machine.

#### Operation

In the operation of the apparatus and method, a container 12 is fed forwardly upon the tracks 11 and the lower portion of the belt 16 carries the container forwardly along the tracks. When the container reaches the glue-applying roller 34, the rapid rotation of the roller 34 in the opposite direction temporarily halts the advance of the container 12 while causing the container to be coated with glue at all points except at the annular spaces 35 and 36 near its ends. After this brief pause, the container is carried forward by the belt 16 and meets the cord 41 which is held at the desired angle for engagement with the adhesive-coated container, as illustrated in Fig. 2. At the point when the cord is making contact with the container, one end of the container engages the contact 60 and the valve 48 cuts off the flow of compressed air through tube 44. The cord, thus released, engages the glue-coated side of the container and is firmly gripped thereby in a line parallel with the end of the container. As the container is rolled forwardly, the tear-cord 41 is drawn through the retarder felts 42 and is extended about the end of the container adjacent the edge of the cap or closure lid 37. Simultaneously, the glue wall of the container 12 picks up a wrapper 38 from the magazine 13 and the wrapper extends about the container as the container rotates, as illustrated more clearly in Figs. 2 to 7, inclusive. As the container advances further, it engages the switch 61 and the cutter 50 operates to sever the cord 41. Since the container has passed behind the contact switch 60, the solenoid valve 48 is urged open by its spring so that compressed air again flows through the tube 44 and holds the unsevered end portion of the cord 41 again in a true line for accurate engagement with the next container.

If the wrapper ends meet, no further operation is necessary in the sealing of the wrapper about the container. I prefer, however, to have the wrapper ends overlapping, and since the overlapped portion does not contact glue, it is necessary that glue be applied to attach the overlapped portion of the wrapper to the attached inner portion of the wrapper. This may be accomplished manually or by a machine operation. It is common to employ a transversely operating continuous glue belt for applying paste or other

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adhesive to the overlapped portion for securing the overlapped edge. Since such structure, however, is old and well-known in the art and is not essential to the practice of the present invention, a detailed description of such structure is herein believed unnecessary.

It will be understood that in actual operation, a series of containers 12 are fed in rapid succession through the machine, each quickly picking up a cord portion and wrapping a label wrapper thereabout, and, after a severing of the cord, being advanced and discharged from the machine. Further, it will be observed that the raised portions 14 and 15 of the track cooperate with the cord cutter in elevating the cord-carrying portion of the container to bring the cord within the cutter elements just prior to the actuation of the switch 61 by contact with the container 12.

The shield 49 is effective in keeping the string after severance from drifting into contact with machine portions, and the compressed air stream from tube 44 snaps the cord after severance quickly into a true, straight line for accurate engagement with the next container.

While the process herein has been described in connection with the physical apparatus illustrated, it will be understood that entirely different apparatus may be used and, in fact, the steps may be to a large extent accomplished manually and by the use of a manually-directed air stream, etc.

While I prefer to operate the solenoid valve 48 to close the compressed air line 47 just prior to the engagement of the filament with the container, the valve may, if desired, be omitted and the compressed air line used continuously for maintaining the filament accurately in the line required. I have found, however, that when the valve 48 is closed just about the time that the container is engaging the filament or cord, there is a quick pick-up of the cord by the container without loss of accurate alignment of the cord and the operation is thus improved.

While, in the foregoing specification, I have set out specific apparatus and specific method steps in considerable detail for the purpose of illustrating embodiments of the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In wrapping and filament-attaching apparatus, a frame, a track carried thereby for supporting a cylindrical container, means for applying adhesive to the container, means for supporting a wrapper adjacent said track for engagement with said container, a tube communicating with a source of compressed air and having an open end directed for discharging an air stream in front of the container, a filament supported adjacent said tube and having a free end portion engaged by said air stream, and means for rotating said container into engagement with said filament and said wrapper to wrap the filament about the container and the wrapper about the filament and container.

2. In apparatus of the character set forth, in which a cylindrical lid-equipped container is rotated upon a track and in which adhesive is applied to the container, a tube communicating with a source of fluid pressure and having an open end directed to discharge a stream of pressure fluid in front of said container, means for supporting a filament with a free end portion engaged and sup-

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ported by said stream, and a wrapper supported for engagement with said adhesive-equipped container after said filament has been attached to said container to enclose said filament.

3. The structure of claim 2, in which means are provided for cutting off said stream of pressure fluid when said container approaches said filament.

4. The structure of claim 2, in which said tube is provided near its open end with an opening through which said filament is extended into the fluid stream.

5. In a wrapping and filament-attaching apparatus, a track having raised portions at an intermediate point, means for rolling a container upon said track, whereby when said container reaches said raised portions it is elevated, a filament-supporting member, means for supporting a free end portion of said filament in front of a container, means for applying adhesive to said container, whereby when said container is rotated, said filament is engaged by said container and drawn forwardly, filament-cutting means supported in an elevated position and engageable with said filament when said container is raised by said track, and means for actuating said severing means for severing the filament when the container is elevated.

6. In apparatus for wrapping a container and attaching a filament about the container, means for applying adhesive to a container, a tube member communicating with a source of compressed air and supported for discharging a stream of air in front of said container a filament supported adjacent the discharge of said tube and adapted to be blown by said air against said adhesive-coated container, means for rotating said container in contact with said filament, and means for applying a wrapper to said container, whereby upon the rotation of said container said wrapper is drawn to enclose said filament and a portion of said container.

7. In apparatus of the character set forth, a track, means for rolling a cylindrical container upon said track, means for applying adhesive to said container, means for supporting a wrapper for engagement with said container to cause said wrapper to be drawn about said adhesive-coated container, means for discharging a restricted stream of air in front of said container at a point prior to the wrapping of the container, and a filament support supporting a filament with a free end portion in said stream whereby said filament end portion is supported in front of said adhesive-coated container for adherence thereto when said container is rotated.

8. In apparatus of the character set forth, a track, means for rolling a cylindrical container upon said track, means for applying adhesive to said container, means for supporting a wrapper for engagement with said adhesive-coated container to cause said wrapper to adhere thereto and to be drawn about said container, means for discharging a restricted stream of air in front of said container at a point prior to the wrapping of the container, a filament support supporting a filament with a free end portion in said stream, whereby said filament end portion is supported in front of said adhesive-coated container for adherence thereto when said container is rotated, an electrically-controlled valve for stopping the flow of said stream of air, and a switch engageable by said container for controlling the actuation of said valve.

9. In apparatus of the character set forth, a

track along which a cylindrical container is to be rolled, means for rolling said container along said track, means for applying adhesive to said container, means for attaching a wrapper to said adhesive-coated container, a cord support, a friction device through which said cord extends, and a tube communicating with a source of compressed air and supported for discharging a stream of air in front of said adhesive-coated container, said tube being provided near its open end with an opening through which said cord is extended.

10. In apparatus of the character set forth in which a container is supported for rolling upon a track and coated with adhesive and a wrapper is attached to the adhesive, means for applying adhesive to the container, a tube communicating with a source of pressure and having its open end directed for delivering an air stream in front of said container, endless belts engaging the outer edges of said container for rolling the same, means for supporting a filament in said air stream for contact with said adhesive-coated container, whereby the rolling of the container causes the filament to adhere to the container, and a shield interposed between said filament and the adjacent belt.

11. In a process for wrapping a cylindrical container with a tear-filament thereon, in which a container is coated with adhesive and rotated, the steps of directing air in a restricted stream in front of the container, supporting a filament adjacent said stream, whereby said filament is held by said stream in front of the adhesive-coated container advancing said container into contact with said filament, rotating said container to cause the adhesive thereof to pick up said filament and wrap the same about the container, attaching a wrapper to said container, and continuing the rotation of the adhesive-coated con-

tainer to wrap the wrapper about the filament and container.

12. In a method for wrapping a container and attaching a filament about the container below the wrapper, the steps of supporting a filament by means of a restricted air stream in front of a cylindrical container, coating said container with adhesive, advancing the container into engagement with said filament and to engagement with a wrapper, and rolling the adhesive-coated container into contact successively with the filament and wrapper to draw the same about the container.

13. In apparatus of the character set forth, a track, means for rolling a cylindrical container along said track, means for applying adhesive to the container, an electric valve-controlled tube leading from a source of compressed air and supported for directing a stream of air in front of the adhesive-coated container, means for supporting a filament adjacent said tube whereby a free end portion of the filament is carried by said stream, means for supporting a wrapper for engagement with said container whereby said wrapper is attached to said container and to said filament as the container is rolled, electrically-operated means for severing said filament, and spaced switches engageable by said container as it rolls upon said track for closing said air valve and for actuating said severing means.

WILLIAM F. HANSER.

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