Jan. 22, 1929. 1,700,005

W. H. WALL

MACHINE FOR WRAPPING CANISTERS WITH LID SEALING TAPE, WRAPPING MATERIAL, AND THE LIKE

Filed Dec. 6, 1927 4 Sheets-Sheet 1

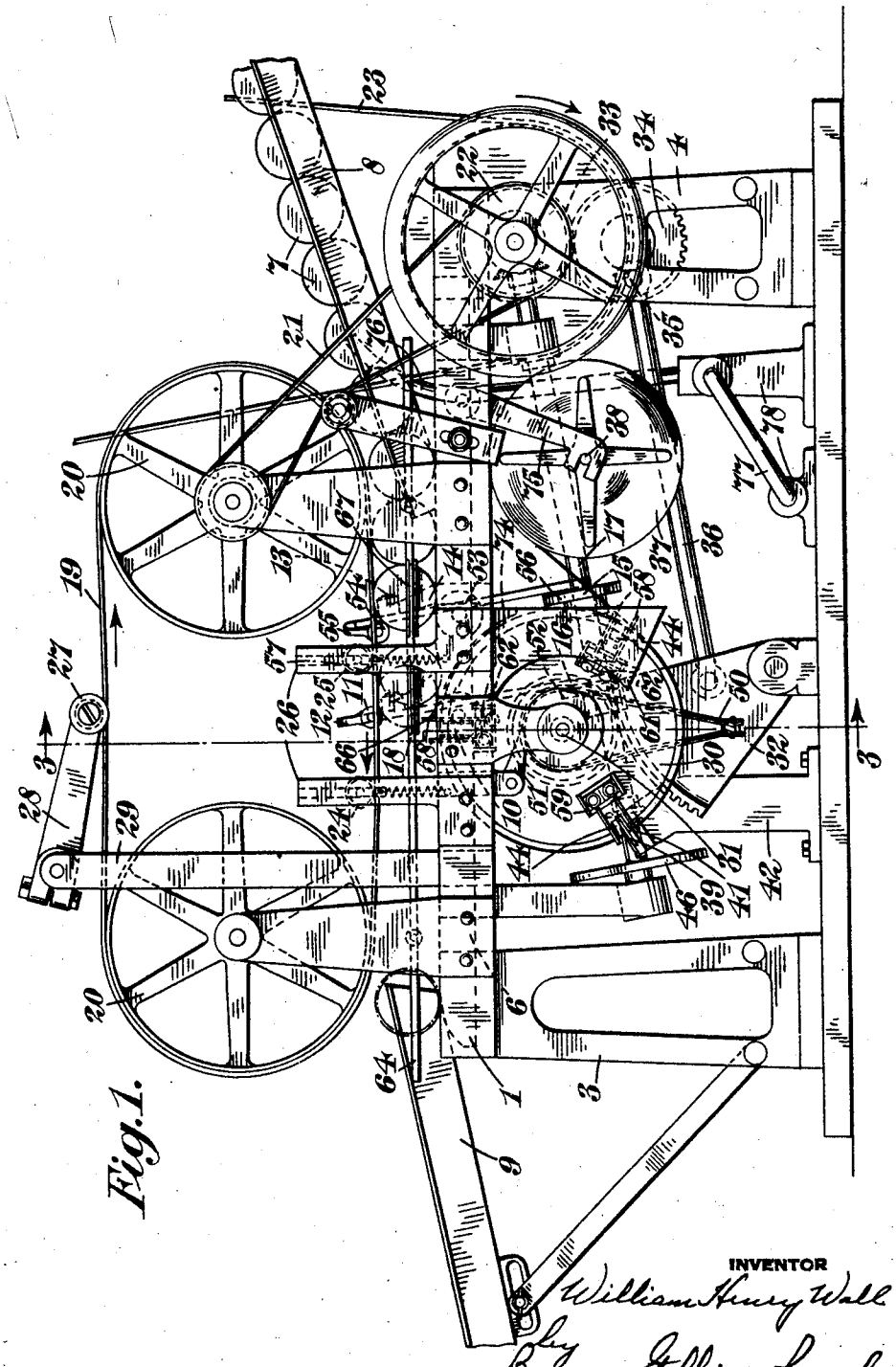


Fig. 1.

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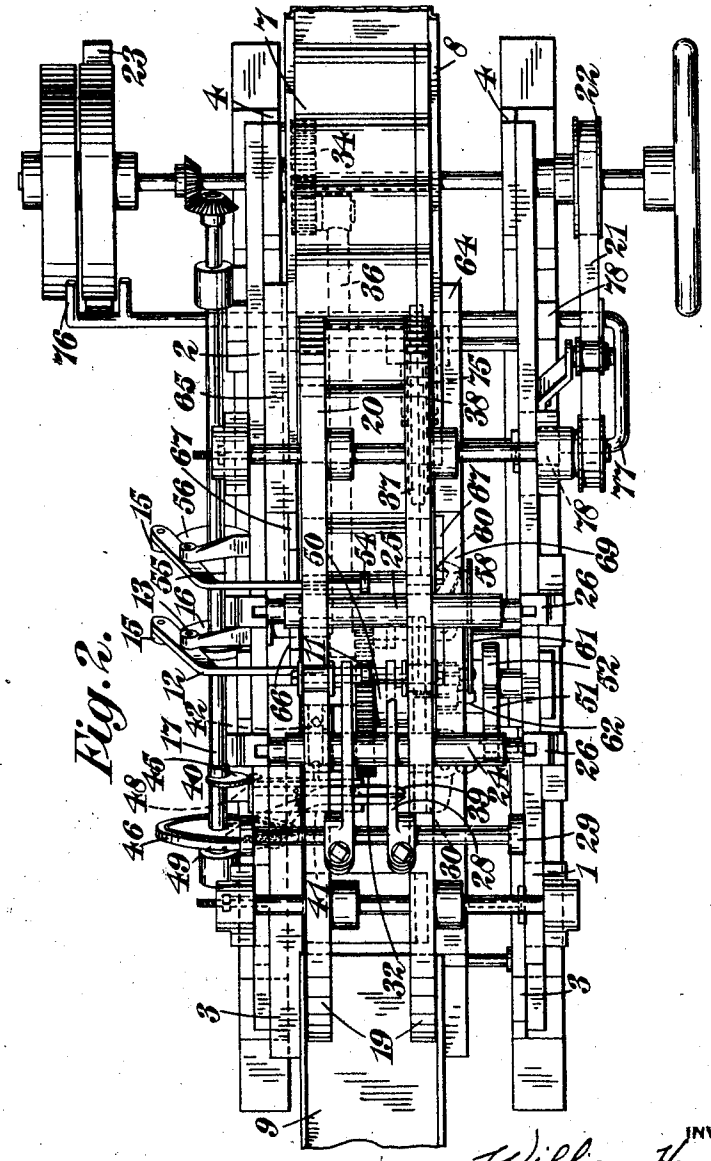


Fig. 2.

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Fig.3.

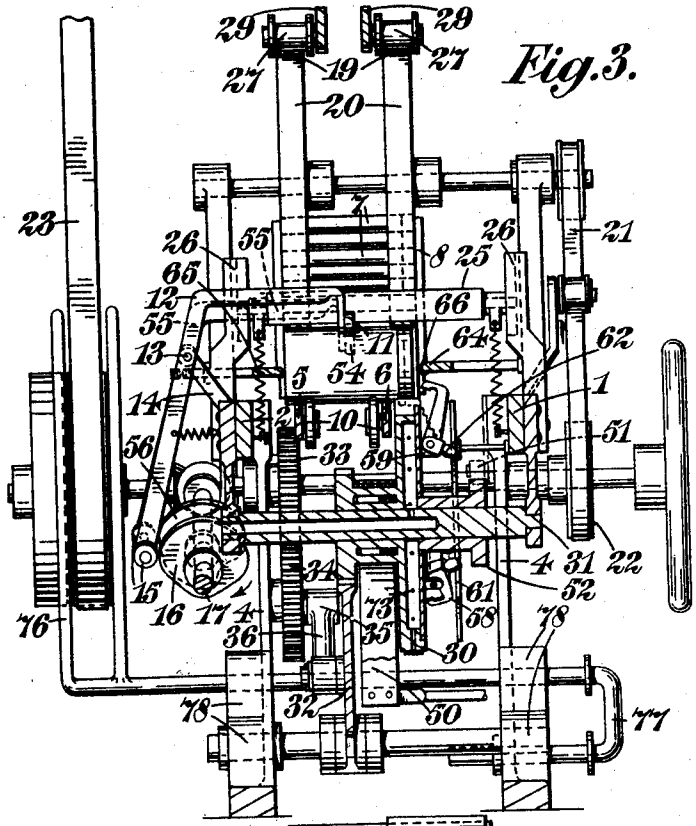
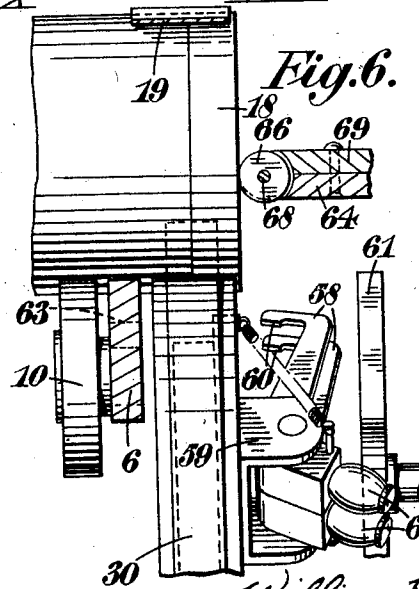


Fig.6.



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Fig. 5.

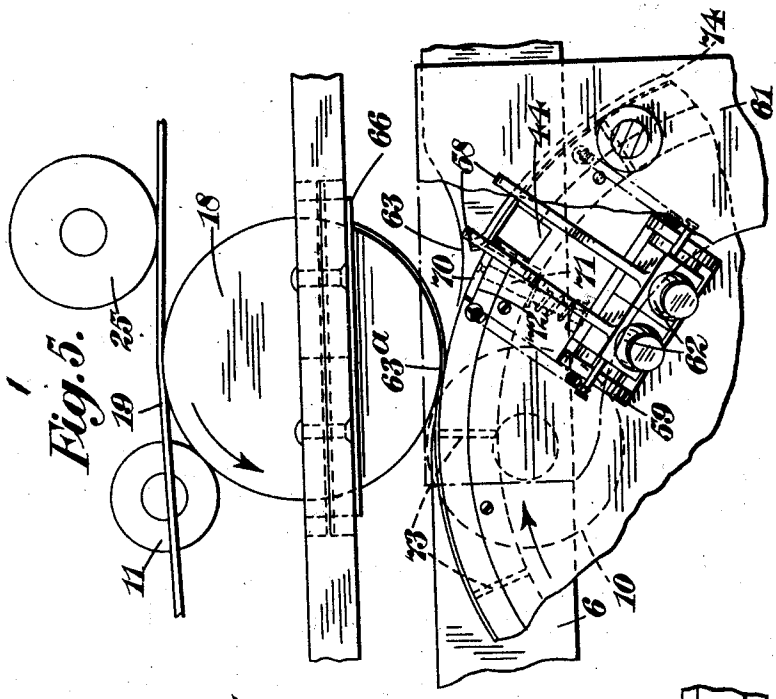
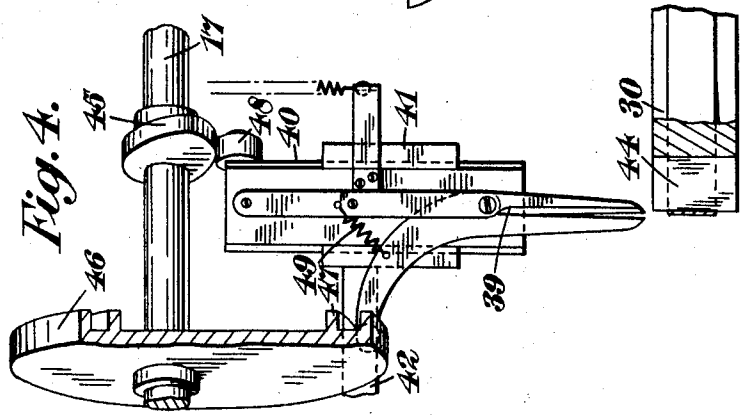


Fig. 4.



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Patented Jan. 22, 1929. 1,700,005

UNITED STATES PATENT OFFICE.

WILLIAM HENRY WALL, OF LONDON, ENGLAND, ASSIGNOR TO A. WANDER LIMITED, OF LONDON, ENGLAND, A BRITISH COMPANY.

MACHINE FOR WRAPPING CANISTERS WITH LID-SEALING TAPE, WRAPPING MATERIAL, AND THE LIKE.

Application filed December 6, 1927, Serial No. 238,207, and in Great Britain December 24, 1926.

This invention is for improvements in or relating to machines for wrapping canisters and like containers with lid-sealing tape, wrapping material and the like to be adhesively attached to the container, and has for its object to provide an improved automatic machine of this nature which will be efficient and of simple and inexpensive construction.

The invention may be regarded as relating to a machine for this purpose of the type which comprises a canister-support upon which a canister may be made to rotate about a stationary axis, means for rotating the canister in position upon the support, means for drawing wrapping material from a supply reel and feeding it in lengths appropriate to the diameter of the canister to the periphery of the canister in position upon the support, the arrangement being such that as the canister rotates it wraps itself with the wrapping material, and automatic means for severing the wrapping material after it has been withdrawn from the supply reel into cut lengths appropriate to the diameter of the canister.

According to the principal feature of the present invention, a machine of the aforesaid type is characterized in that the wrapping-material feeding means comprises a movable carrier for the material (e. g. a rotatable drum) arranged by its movement to draw the material from the supply reel, wrapping it upon its periphery, and to deliver the material to the periphery of the canister in position upon the canister support, the arrangement being such that at all times during the operation of the machine there is so wrapped upon the canister periphery a sufficient length of wrapping material completely to wrap one canister and in addition at least a fraction of such length, and also such that the canister, as it rotates and as the carrier moves, licks off the wrapping material from the periphery of the canister and wraps it upon its own periphery, automatic means are provided for holding against the periphery of the carrier the aforesaid sufficient length of wrapping material wrapped upon it, and the wrapping-material severing means is arranged to operate upon the material after the aforesaid sufficient length thereof has been wrapped upon the periphery of the carrier.

The invention is primarily concerned with a machine adapted to operate with pre-adhesivized wrapping material such, for example (in the case of a lid-sealing machine) as the material known as adhesive tape. The pull of the feed carrier as the latter rotates unwinds the supply reel and this overcomes the mutual adhesion of its convolutions. The canister rotating means is further relieved of the duty of unwinding the supply reel and, in consequence, said means may efficiently take the form of frictional driving means, frictionally engaging, say, the periphery of the canister.

According to a further feature of the invention the machine may comprise a runway upon which may be delivered in succession to the canister-support a stream of canisters to be wrapped, automatic canister-arresting means at the canister-support arranged to arrest the first canister in the aforesaid stream and retain it at the support during the wrapping operation and then to release that canister and arrest in the same way the next in the stream, and automatic means to move forward the stream of canisters on the runway to the canister-support and to eject from the support the canisters as they become wrapped and released by the arresting means.

According to a further feature of the invention, the canister-rotating means and said automatic means to move forward the stream of canisters upon the runway and to rotate and eject the wrapped canister from the canister-support may comprise an endless band arranged to travel parallel with the runway and frictionally to engage the periphery of the canister upon the support and of the canisters on the runway.

Conveniently, the canister-support may be constituted by rollers against which the canister is made to roll by the action of the aforesaid moving band, and one of these rollers is arranged to be momentarily withdrawn by automatic means out of the path of the canisters on the runway so as to allow the fully-wrapped canister to be ejected by the action of the band and another to take its place at the support.

As will be appreciated, of course, the advance of the stream of canisters on the runway is arrested during each wrapping operation, and according to a further feature of the invention automatic means may be provided for so arresting the advance of the

canisters on the runway and for spacing the stream of canisters behind the canister-support from the canister in position upon the support, so that the last-mentioned canister, being isolated from the others, may rotate the more freely at the support.

Conveniently, the canister-arresting means referred to in the preceding paragraph may take the form, as in the case of the first-mentioned canister-arresting means, of rollers against which the canister is made to roll by the action of the moving band, one of these rollers being arranged to be momentarily withdrawn by automatic means out of the path of the canisters on the runway so as to allow one canister to pass to the canister-support and the next canister in the stream to take its place.

According to another feature of the invention, the means for holding the wrapping material in position upon the periphery of the carrier may comprise suction-holes in the carrier periphery so positioned as to underlie the wrapping material thereon and means to produce suction at said suction-holes.

In addition, or as an alternative to the aforesaid suction-operating retaining means, the means to retain the wrapping material upon the carrier periphery may comprise finger-like elements which bear at their points upon the outer face of the wrapping material upon the carrier periphery and thereby hold, or assist in holding, said material, in association with means whereby said finger-like elements are made automatically to release their hold in succession as the material reaches the canister-support.

Other features of novelty will appear from the following description of one embodiment of the invention and will be separately claimed in the accompanying statement of claim.

The said embodiment of the invention, which will be described purely by way of example, is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of the machine.

Figure 2 is a corresponding plan.

Figure 3 is a vertical section through the machine along the section line 3—3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a plan in detail of the means which severs the wrapping material into lengths appropriate to the diameter of the canister to be wrapped, and

Figures 5 and 6 are other detail views, Figure 5 being a side elevation and Figure 6 an end elevation.

Like reference numerals indicate like parts in the various figures.

The framework of the machine comprises two side members 1, 2 and end supports 3, 4. The side members and end supports are suitably braced together by cross members.

Carried by the side members and situated between them is a run-way comprising two runners 5, 6 extending parallel with the side members as shown. A stream of canisters 7 is delivered on to this run-way from an inclined chute 8, and the canisters, after they have been wrapped, leave the runners by way of a discharge chute 9.

What has been referred to herein as the canister support comprises a pair of rollers 10 rotatably mounted upon the sides of the runners 5, 6, and a single roller 11 upon the extremity of one arm of a bell-crank lever 12. The lever 12 is pivoted at 13 to a bracket 14 carried upon the side face of the frame member 2. The extremity of the other limb of the bell-crank lever carries a cam-roll 15 which rolls upon the edge of a cam 16 mounted upon an inclined cam shaft 17 extending along the machine at the rear thereof.

The means which rotates a canister 18 in position upon the canister support comprises an endless moving band 19 carried upon band wheels 20, one of which is driven through a belt 21 by a belt wheel 22 positively driven by means, not shown, through a transmission belt 23. The band 19 frictionally engages the periphery of the canister 18 and rotates the latter against the rollers 10, 11. In order to adjust the frictional engagement of the band with the canister, two pressure rollers 24, 25 are provided, spring-drawn downwardly in guides 26, and in addition to these rollers a third pressure roller 27, mounted upon the extremity of an arm 28 which can be set rigidly in any desired position of adjustment upon its support 29. By adjusting the arm 28 the tension of the band 19 and, correspondingly, the frictional engagement of the band with the canister periphery, may be adjusted as desired.

The aforesaid device which feeds wrapping material to the periphery of the canister 18, comprises a drum 30 rotatably mounted upon a shaft 31. This drum is arranged to rotate intermittently through one-third of a revolution at a time, and it is driven in this manner by an oscillating quadrant 32 which engages the drum through a one-way free-wheel clutch. The quadrant 32 is itself driven through gearing 33, 34, a crank 35 and connecting rod 36, the gearing 33, 34 being driven through the medium of the aforesaid transmission belt 23.

At each intermittent movement of the drum, the latter feeds on to the periphery of the canister 18 a length of pre-adhesivized tape sufficient to wrap completely around the periphery of the canister with an overlap of a fraction of an inch. At the same time it withdraws wrapping material from a supply reel 37. The reel 37 is freely rotatable upon a spindle 38.

During the dwell periods between the intermittent movements of the drum 30, the wrapping material drawn on to the drum is

severed by an automatic severing device which will now be described in detail. As shown in detail in Figure 4, it comprises a pair of knives 39 mounted upon a sliding block 40 in a stationary guide 41. The guide 41 is carried upon a pedestal mounting 42. The knives during the rotational movement of the drum 30 are withdrawn clear of the periphery of the drum, as shown in Figure 4, and at each dwell period the knives are momentarily advanced into notches 44 provided to receive them in the periphery of the drum and are caused to operate upon the tape extending past the notch around the periphery. Thus, the knives upon their carrier block 40 are advanced into the aforesaid notches by the action of a cam 45 mounted upon the aforesaid shaft 17 and are closed upon the tape so as to cut it, by the action of a second cam 46 also mounted upon said shaft 17, the two cams 45 and 46 engaging the knives through the medium of cam rollers thereon 48, 47. The two blades of the knives are kept open by a tension spring 49. The relative disposition of the cams 45, 46 is such as to effect first the advancing of the knives into the notches in the periphery of the drum and then the closing of the knives together, and the position of the cams is such that these operations are timed in synchronism with the general operation of the machine so that a cutting operation takes place during the dwell period of the drum's movement. The drum 30 is provided with a permanent brake 50 which brakes its movement and associated with this brake a pawl-and-ratchet 51, 52. By these means the movement of the drum is so controlled that the exact one-third revolution is accomplished and the tape end is correctly positioned relatively to the canister support.

With the parts in the positions shown in Figure 1, which are the positions corresponding to the aforesaid dwell period, the tape extends uncut from the periphery of the supply reel 37 to the centre of the left-hand (Figure 1) notch 44 and a cut length extends around the periphery of the drum from the centre of said notch to the centre of the next (top) notch.

In order that the canisters shall be free to rotate without hindrance during the wrapping operation, means are provided for momentarily arresting the forward movement of the stream of canisters behind the canister at the support and for spacing the first canister of this stream clear of the canister 18 at the support. This means comprises a second pair of rollers 53 on the runners 5, 6 exactly similar to the rollers 10, and a second roller 54 exactly similar to the roller 11. The roller 54 is mounted upon the extremity of one limb of a bell-crank lever 55 similar in every respect to the lever 12. This lever 55 is pivoted to a bracket carried upon the frame member 2 and the extremity of its other limb carries a cam roll which rolls round the edge of a cam 56 on the shaft 17. This cam is so timed relatively to the cam 16 that the lever 55 is raised a trifle later than the roller 11. The roller 11 is raised first so as to allow a fully wrapped canister to be ejected by the band 19 from the canister support, the roller 11 immediately returns to its operative position, and practically simultaneously with this last movement of the roller 11 the roller 54 is raised to allow another canister to be advanced by the band 19 to the canister support, the roller 54 immediately dropping again so as to arrest the further movement of the stream of canisters 7. These operations of the rollers 11 and 54 occur during the aforesaid dwell period.

The band 19 is arranged lightly to engage the first of the canisters behind the roller 54, rotating it against the rollers 53 and 54, and, when the roller 54 lifts, to propel the said canister to the support.

At the moment when the parts of the machine are in the positions shown in Figure 1, a fully wrapped canister has just been ejected from the canister support and another is passing from beneath the roller 54. The further movements of the drum 30 and the canister passing to the support are as follows:—

As soon as the knives have operated the drum commences to rotate through one-third of a revolution and after it has proceeded through a small fraction of its travel the forward end of the adhesive tape lying round the periphery of the drum meets the periphery of the canister, which at this moment is approximately in the position shown in chain-line at 57. The adhesive tape at this moment attaches itself to the periphery of the canister, which all the while is being rolled on the runway towards the canister support under the influence of the moving belt 19. The result is that when the canister has reached the canister support it has wrapped upon a section of its periphery the advancing end of the adhesive tape, having lifted off the tape, of course, from the periphery of the drum. The wrapping operation is then completed at the support, i. e. while the canister is made to rotate under the influence of the band 19 against the rolls 10 and 11. The approximate relative positions of the canister and drum in the neighborhood of the canister support at the moment when the canister reaches the rollers 10, 11 is shown in Figure 5.

In order to maintain the adhesive tape in proper position and alignment upon the periphery of the drum 30, especially the cut length, the drum periphery is provided with suction-holes where the tape overlies it, and the drum and the shaft 31 are hollow as shown clearly in Figure 3 and communicate with suction-producing means. In addition the drum carries three pairs of pivoted fin-

gers 58 (Figures 5 and 6) arranged to bear at their extremities 60, under the influence of tension springs, upon the abutting ends of the length of cut tape on the periphery of the drum and thereby prevent said ends from becoming displaced. The fingers 58 take the form of bell-crank levers and are pivoted to carrier-brackets 59 mounted upon the face of the drum. When the left-hand notch (Figure 1) arrives at the upper position, the fingers are arranged to be lifted so as to release the extremity of the tape for attachment to the canister periphery. To accomplish this lifting movement of the fingers a stationary cam-plate 61, provided on the framework of the machine, co-operates with cam-rolls 62 on the fingers 58. The cam-plate 61 is of such extent at its operative face as to maintain the fingers 58 in their lifted position until they can close again upon the aforesaid uncut length of tape extending from the left-hand (Figure 1) notch 44 to the periphery of the supply reel 37.

Referring again to Figure 5, it will be seen that the upper edge of the runners 5, 6 is valleyed at 63 and that the contour of the valley is for a short distance, at 63^a, approximately coincident with the periphery of the drum 30. The coincidence of the contour of the runners with the drum periphery provides virtually for a bodily rolling of the canister around the drum and thereby a longer period of contact for effective initial attachment of the tape to the canister than would be provided were the runners straight at their point of tangency with the drum periphery.

It will also be seen that the position of the rollers 10 is such that the canister at the wrapping position rolls on the peripheries of the rollers 10, 11 and therefore free of frictional contact with the runners. This arrangement minimizes friction.

In order to maintain the stream of canisters in alignment with one another whilst they are on the runway and to ensure that the canisters will be properly positioned at the canister support in relation to the adhesive tape fed to them, two lateral guides 64, 65 are provided. To reduce friction between the guides 64, 65, on the one hand, and the canister 18 at the canister support and the first canister of the remainder of the canisters behind the rollers 53, 54, on the other, the guides have mounted upon them two pairs of rollers 66, 67. These rollers are mounted to rotate freely upon spindles 68 in bearing plates 69 riveted to the lateral guides 64, 65. Each roller of each pair is free to rotate independently of the other so that as the canister rotates one roller will revolve on the spindle in one direction and the other will revolve in the opposite direction.

In order to ensure that the leading end of the tape on the carrier drum shall make effective contact with the canister periphery, a small section of the periphery of the drum, where the latter underlies said leading end of the tape, is made yieldingly movable in a direction radially outwards with respect to the axis of the drum. Thus a portion 70 of the drum periphery immediately adjacent the following side of each notch 44 is movable radially of the drum, and for this purpose is mounted upon the outer end by a spring-pressed plunger 71 carried in the drum casing. The spring control of the plunger 71 is so proportioned relatively to the spring control of the fingers 58 that the latter by their closing movement overcome the compression of the plunger control springs, so that the portion 70 of the drum periphery is held down on to its seating 72 until the notch reaches in the rotation of the drum the aforesaid upper position and the fingers 58 are cam-lifted off the tape, whereupon the portion 70 of the drum periphery moves radially outward and presses the loose end of the adhesive tape into proper contact with the canister periphery.

As previously stated, the periphery of the drum 30 is provided with suction holes 73 where the tape overlies it, for the purpose of maintaining the tape in proper position upon the drum. In order to preserve partial vacuum within the interior of the drum a mask 74 is provided round that portion of the drum periphery which lies between the upper notch position and the right-hand lower notch position. Between these two positions there is no tape to overlie the suction holes and the mask acts to close the orifices of the holes and thereby prevent such ingress of air as would destroy the partial vaccum within the drum. This mask may take the form of a curved strip of metal with a rubber, leather or felt, facing to it, or it may take any other convenient form.

In order to facilitate the operation of changing the supply reel, the latter may be simply threaded upon the spindle 38 and be held in position thereon by a hinged arm 75 formed with a U-shaped free extremity as shown and mounted friction-tight upon the side frame 1 of the machine. When it is required to renew the supply reel all that is required is to move the arm 75 to one side, draw off the empty hub of the exhausted reel, place upon the spindle a new reel and replace the arm 75 to the position shown in Figure 1.

The transmission belt 23 is arranged to be moved from the fast pulley to the loose pulley or vice versa by means of a belt-shifting fork 76 operated by a handle 77 slidingly mounted in bearings 78 to receive it.

In order to ensure an efficient wrap of the tape upon the periphery of the canister the proportions of the various moving parts may be such that the linear speed of the band 19 slightly exceeds the peripheral speed of the

drum 30. By this means a certain degree of tension is always maintained on the cut length of tape being fed from the drum to the canister.

Obviously, the aforesaid example does not limit the invention in any way as to the general form it may take, and, moreover, in the particular example described various modifications may be made in respect of detail parts without in any way departing from the spirit of the invention.

I claim:

1. An automatic machine for adhesively wrapping canisters and the like with wrapping material, comprising in combination a canister support to which is fed in succession a stream of canisters to be wrapped and upon which each canister performs rotation to become wrapped, means to rotate the canister at the support, means to support rotatably a supply roll of wrapping material, a movable feed-member adapted, during the rotation of the canister at the support, to draw wrapping material from a supply roll thereof applied to the support for the same, on to its periphery and to deliver the drawn-off wrapping material directly from the periphery of the feed member to the periphery of a canister rotating at the support, an automatic severing device operable periodically in phase with the movements of the canister at the support and of the feed member, to sever from the drawn-off wrapping material on the feed-member a length of said material sufficient to wrap the canister at the support, and automatic retaining means for holding against the feed-member periphery during the movements of the feed-member, the free end of the unsevered wrapping material leading from the feed-roll.

2. A machine according to claim 1 and having a runway along which the canisters are advanced in succession to the support, said means to rotate the canister at the support comprising an endless band arranged to travel parallel with the runway and by frictionally engaging the peripheries of the canisters advance the latter along the runway to the support, automatic canister-arresting means arranged to arrest each canister in succession and retain it at the support until it has become wrapped, and thereafter to release it, said endless band being arranged to eject the released wrapped canister from the support by frictional engagement with its periphery.

3. A machine according to claim 1 and having a runway upon which the canisters are advanced in succession to the support, said means to rotate the canister at the support comprising an endless band arranged to travel parallel with the runway and, by frictionally engaging their peripheries, rotate the canister at the support and advance the following canisters along the runway to the support, and a rolling abutment against which the canisters, during their rotation at the support, may roll, said abutment being movable periodically into and out from the path of advance of the canisters so as to arrest each canister as it reaches the support until it has become wrapped and thereupon to release the canister and allow it to be ejected from the support by the endless band.

4. A machine according to claim 1, having a runway along which the canisters are advanced in succession to the support, automatic means to advance the canisters along the runway to the support, automatic canister-arresting means arranged to arrest each canister in succession and retain it at the support until it has become wrapped, and thereupon to release it, automatic arresting means arranged to arrest that canister in the succession which immediately follows the canister undergoing wrapping at the support at a position along the runway such that it is spaced from the canister at the support, said automatic means to advance the canister along the runway to the support being adapted to eject from the support the canisters as they become wrapped.

5. A machine according to claim 1 and having a runway along which the canisters are advanced in succession to the support, said means to rotate the canister at the support comprising an endless band arranged to travel parallel with the runway and by frictionally engaging their peripheries rotate the canister at the support and advance the following canisters along the runway to the support, a rolling abutment against which the canisters during their rotation at the support may roll, said abutment being movable periodically into and out from the path of advance of the canisters so as to arrest each canister as it reaches the support until it has become wrapped and thereupon to release the canister and allow it to be ejected from the support by the endless band, and a second rolling abutment similar in action to the first, but operable to arrest that canister in succession which immediately follows the canister at the support at a position along the runway such that the arrested canister is spaced from the canister at the support.

6. A machine according to claim 1 wherein the means for holding the wrapping material upon the periphery of the feed-member comprises suction holes in said periphery so positioned as to underlie the wrapping material thereon, in combination with means to produce suction at said suction holes.

7. A machine according to claim 1 wherein the means for holding the wrapping-material upon the periphery of the feed-member comprises movable finger-like elements on the feed-member, which bear at their points upon the outer face of the wrapping material, and means whereby said elements are made

automatically to release their hold in succession as the material reaches the canister-support.

8. A machine according to claim 1, wherein the feed-member is a rotatable circular drum.

9. A machine according to claim 1, wherein the feed-member is a rotatable circular drum, the periphery of which is approximately tangential to that of the canister at the support, a portion of the periphery of the drum is yieldingly movable in a radial direction, and the disposition of parts is such that the yieldingly movable portion of the drum periphery is moved radially inward by pressure of contact with the canister on meeting the periphery of the latter, substantially as and for the purpose set forth.

10. A machine according to claim 1, wherein the feed-member is a circular rotatable drum arranged to rotate in a step-by-step fashion, each step of its rotation occasioning a paying-off of a sufficient length of wrapping-material from its periphery to the periphery of the canister at the support completely to wrap said canister, and the automatic severing device being arranged to operate during the dwell periods in the step-by-step movement of the feed-member.

11. A machine according to claim 1, wherein the feed-member is a circular drum rotatable in step-by-step fashion, and wherein the elements of the machine include a runway along which the canisters are advanced in succession to the support, said means to rotate the canister at the support comprising an endless band arranged to travel parallel with the runway and by frictionally engaging their peripheries rotate the canister at the support and advance the following canisters along the runway to the support, a rolling abutment against which the canisters during their rotation at the support may roll, said abutment being movable periodically into and out from the path of advance of the canisters so as to arrest each canister as it reaches the support until it has become wrapped and thereupon to release the canister and allow it to be ejected from the support by the endless band, and a second rolling abutment similar in action to the first but operable to arrest that canister in the succession which immediately follows the canister at the support at a position along the runway such that the arrested canister is spaced from the canister at the support, the movements of the various moving parts of the machine being so co-ordinated in relation to one another and to the rotation of the canister at the support that during each step movement of the feed-member the latter draws on to its periphery from the feed-roll and at the same time pays off to the rotating canister at the support, a length of wrapping material sufficient to wrap said canister, and the severing device comes into operation during the dwell periods in the stepwise movement of the feed-member, substantially as herein set forth.

In testimony whereof I affix my signature.

WILLIAM HENRY WALL.