Jan. 6, 1953 H. GAMBLE 2,624,165

MACHINE FOR WRAPPING RODLIKE ARTICLES IN TUBULAR WRAPPERS

Filed March 7, 1951 7 Sheets-Sheet 1

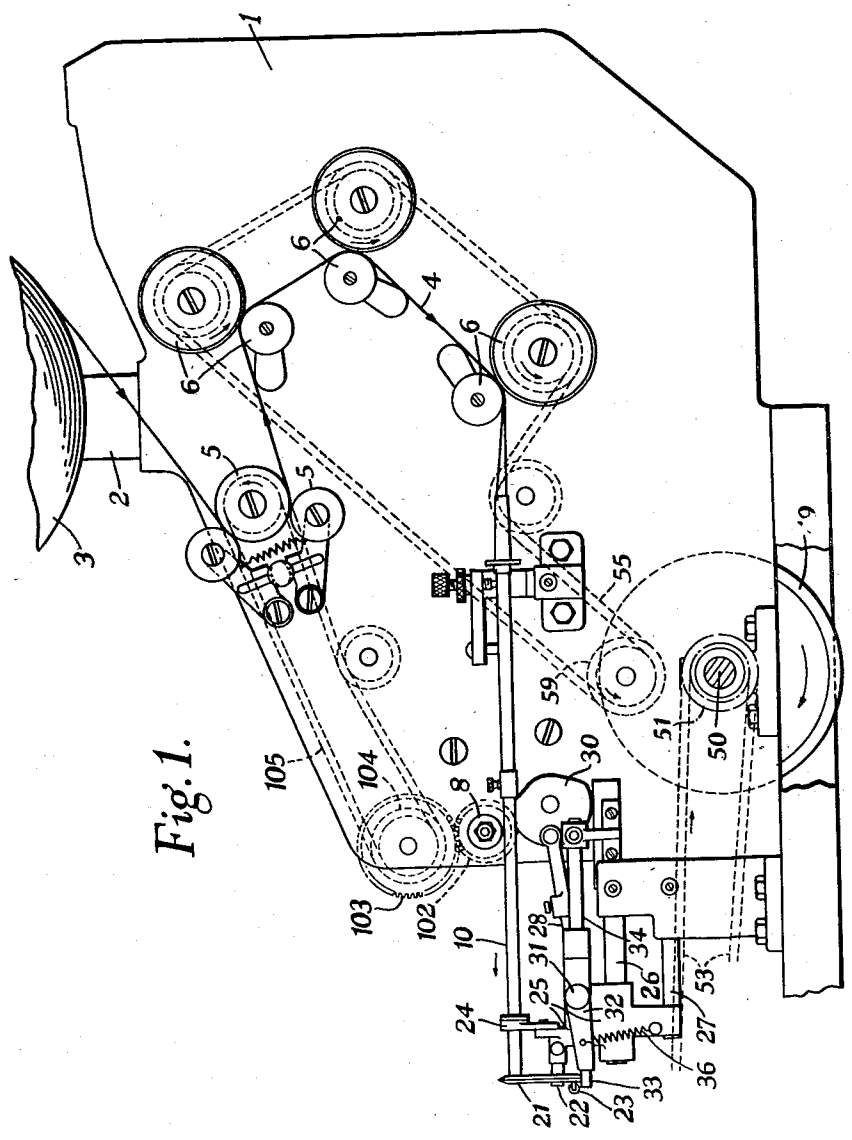

Fig. 1.

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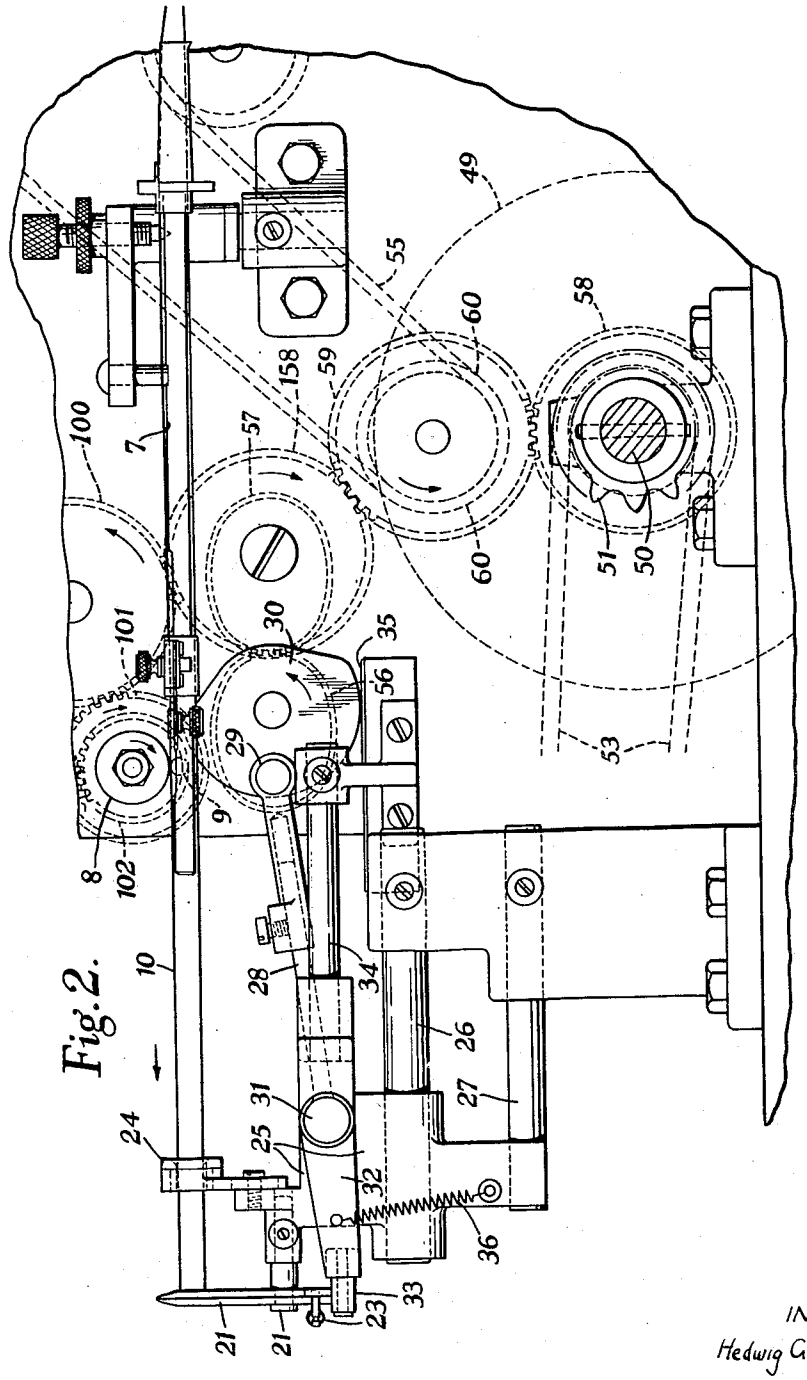

Fig. 2.

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MACHINE FOR WRAPPING RODLIKE ARTICLES IN TUBULAR WRAPPERS

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Fig. 3.

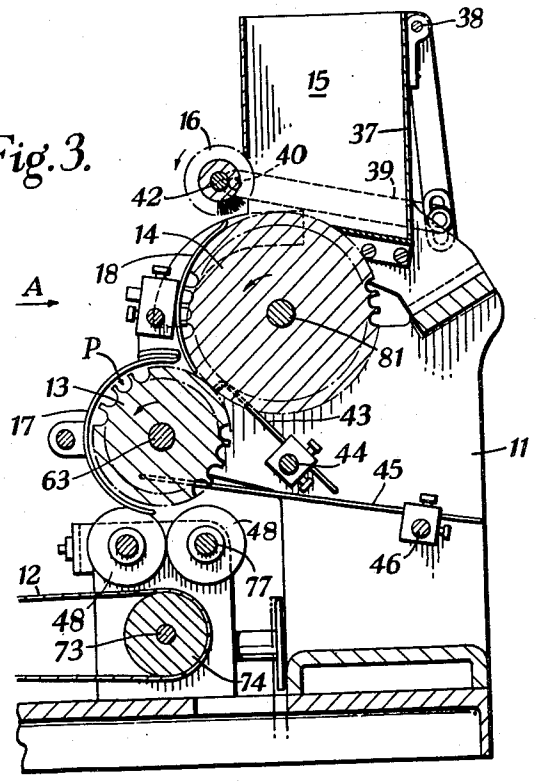
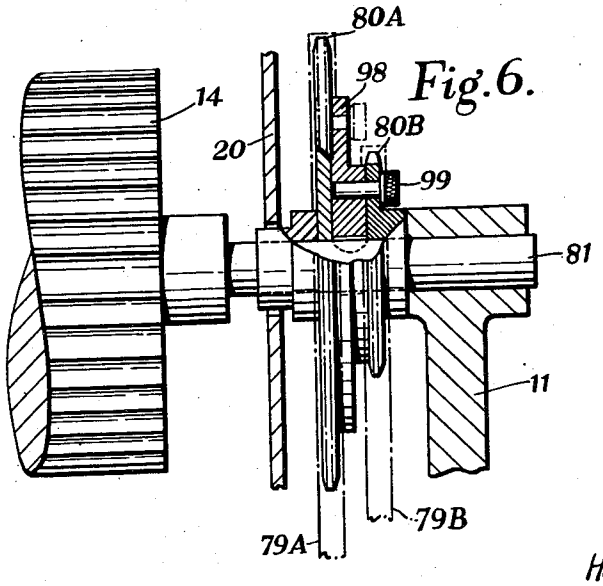


Fig. 6.



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MACHINE FOR WRAPPING RODLIKE ARTICLES IN TUBULAR WRAPPERS

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Fig. 4.

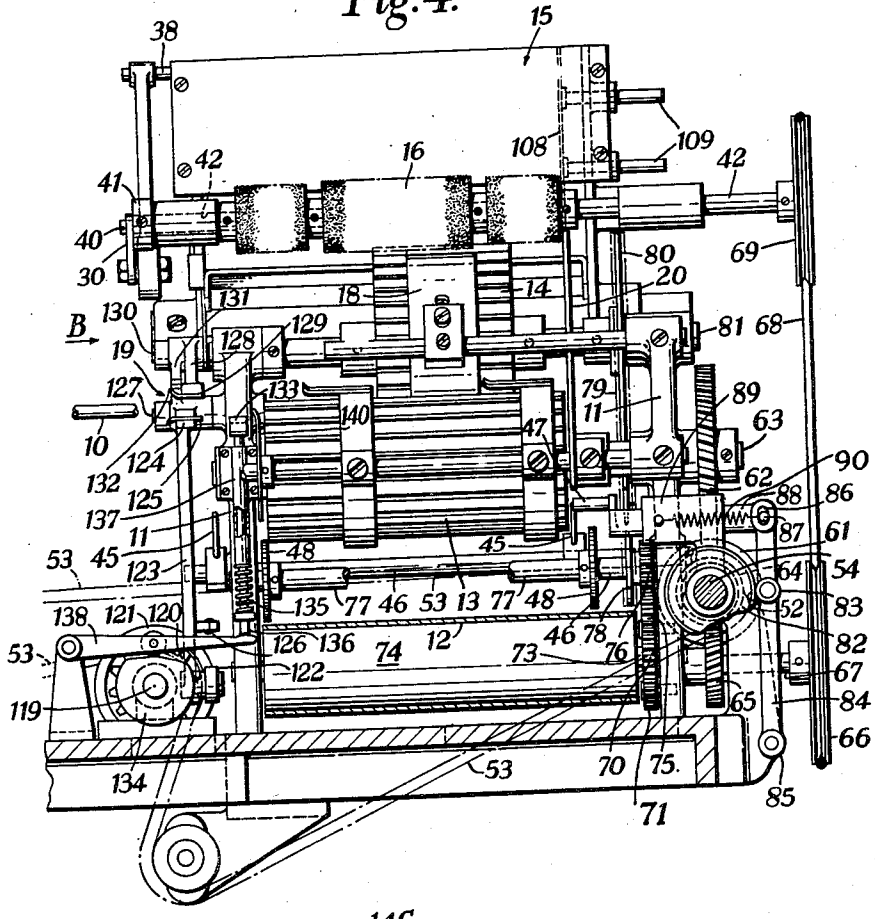
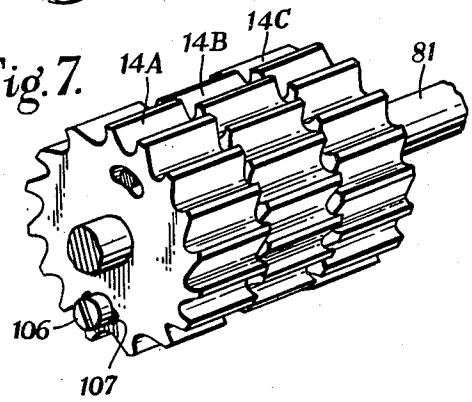


Fig. 7.



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MACHINE FOR WRAPPING RODLIKE ARTICLES IN TUBULAR WRAPPERS

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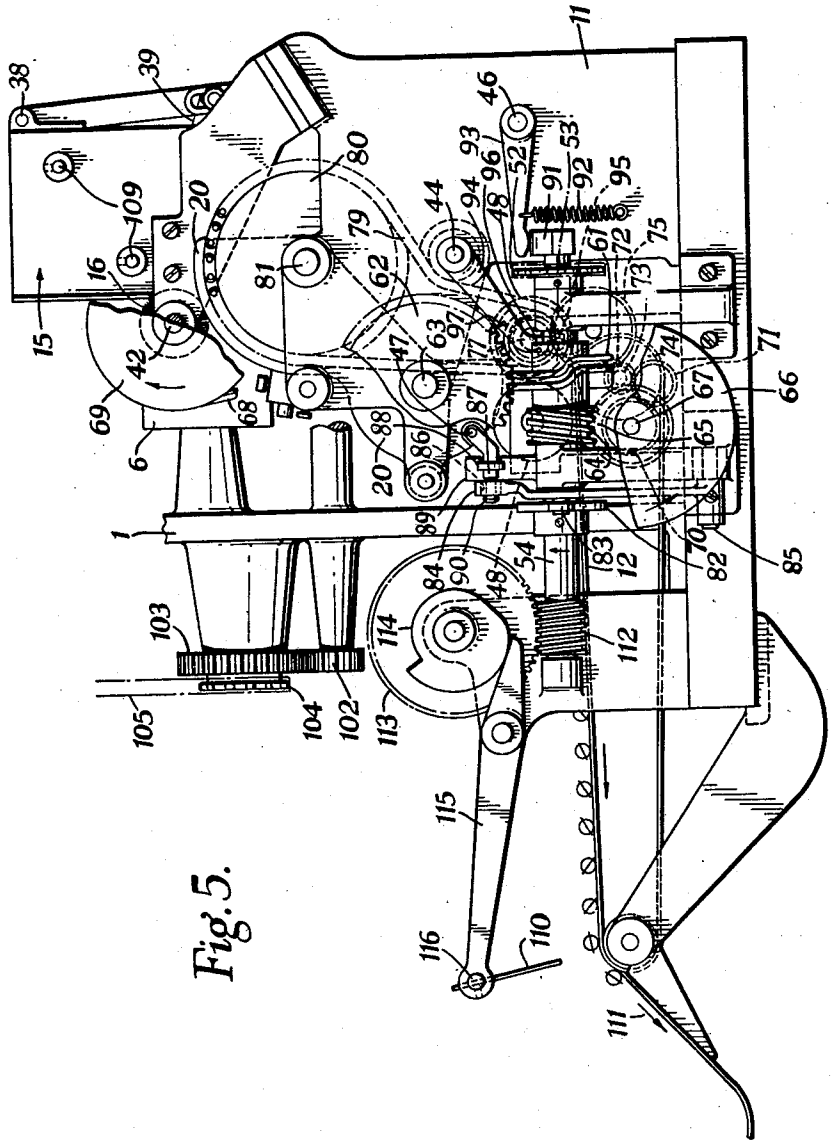

Fig. 5.

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Fig.8.

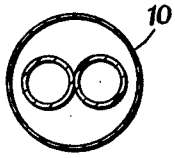

Fig.9.

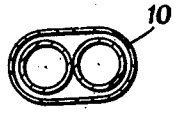

Fig.10.

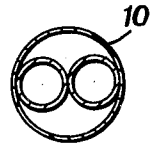

Fig.11.

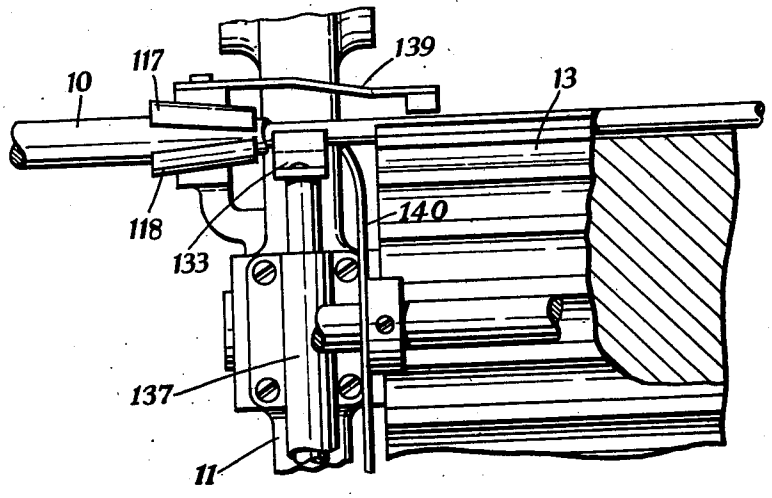

Fig.12.

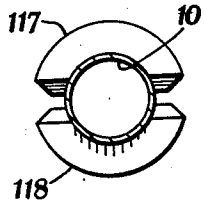

Fig.13.

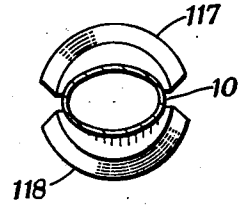

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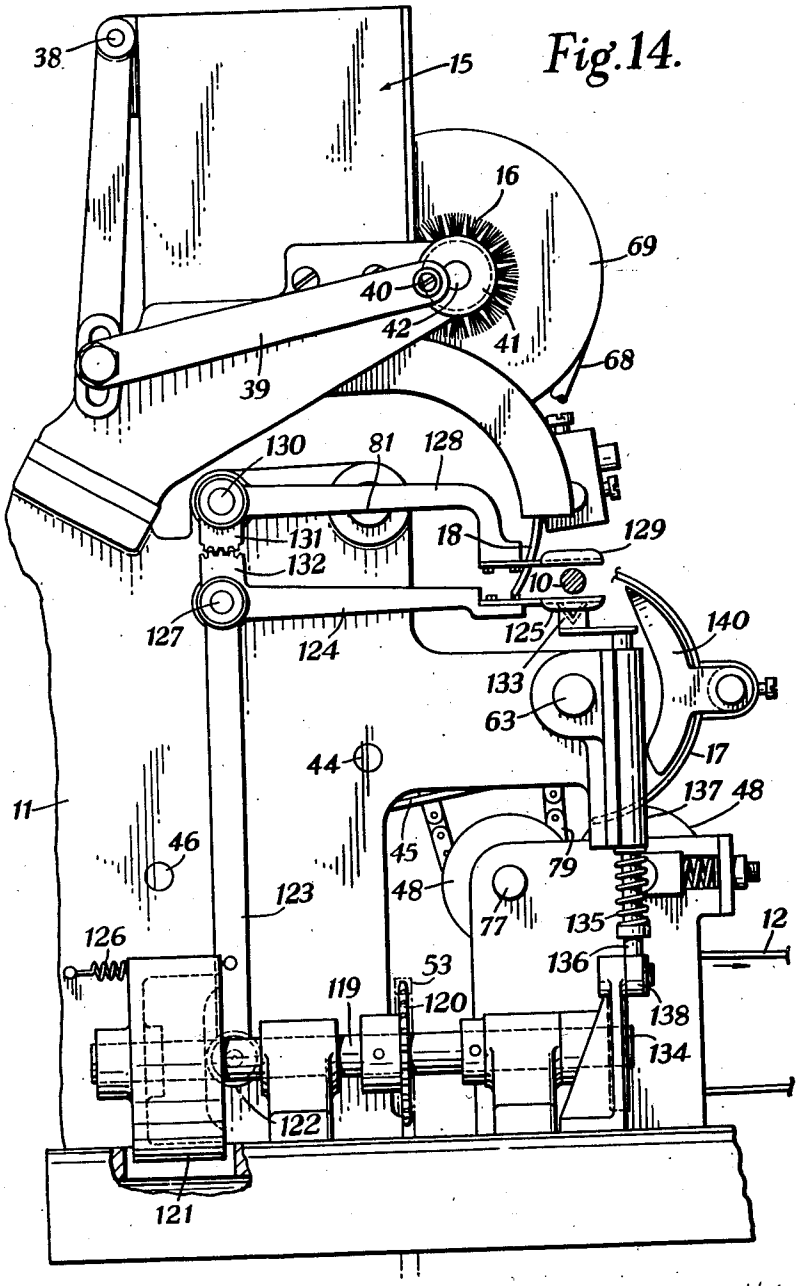
Fig. 14.



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Patented Jan. 6, 1953 2,624,165

UNITED STATES PATENT OFFICE

2,624,165

MACHINE FOR WRAPPING RODLIKE ARTICLES IN TUBULAR WRAPPERS

Hedwig Gamble, Ponders End, England

Application March 7, 1951, Serial No. 214,336
In Great Britain March 15, 1950

11 Claims. (Cl. 53—66)

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This invention relates to machines for wrapping rod-like articles, such for instance as drinking straws, in tubular wrappers.

According to the invention there is provided a machine for wrapping rod-like articles in tubular wrappers comprising a fluted drum for feeding articles from a hopper and means for preventing any flute from removing more than one article at a time from said hopper, a further fluted drum arranged to receive in each of its flutes an article so fed and bring it into alignment with a wrapper tube, means for moving the tube length-wise along the flute containing such article to cause the tube to pass over the article in such flute, said fluted drum for feeding articles from the hopper comprising several narrow drums assembled on a single shaft and means being provided whereby the drums may be secured to the shaft with their flutes staggered so that jointly the narrow drums define a common flute of a suitable size for an article to be fed.

The tube, which may be of circular cross-section, may be formed from a web of paper which is folded and sealed to form a continuous paper tube from which lengths to form wrapper tubes are cut off.

A pusher device may be provided to assist in finally positioning an article in the wrapper tube which is a section cut from the formed tube, as by scissors. The wrapper tube is cut long enough for its ends to overhand the article and after cutting, the tube enclosing the article may pass to sealing devices, such as crimping wheels, to close the tube ends.

When more than one article is to be enclosed in a single tube, means may be provided for deforming a cylindrical tube to substantially elliptical cross-section so that articles may enter the deformed tube side by side, this method being economical in respect of wrapping material. Deforming may be performed by passing the tube through fixed folders of suitable shape or by squeezing it between pressers. A further presser device may be provided for maintaining the tube in the deformed condition after it emerges from the said folders or pressers.

Means such as a guide trough may be provided for lifting an article in the assembly drum to centralize it with the paper tube, the device being adaptable for lifting two or more straws.

Change speed gearing may be provided for the feeding drum so that it may deliver one or two or more articles to a single flute of the assembly drum.

The invention will be more fully described with

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reference to the accompanying drawings which show an example of a machine for wrapping straws constructed according to the invention.

In the drawings:

Figure 1 is a front elevation of part of the machine showing paper web feeding and tube forming devices.

Figure 2 is an enlarged view of a fragment of Figure 1.

Figure 3 is a sectional elevational of the feeding and assembly devices of the machine.

Figure 4 is a front elevation of Figure 3 looking in the direction of the arrow A, and partly in section.

Figure 5 is a side elevation of the whole machine, partly broken away.

Figure 6 shows a device for altering the speed of a feeding drum.

Figure 7 shows a modified form of feeding drum.

Figures 8, 9 and 10 are diagrams illustrating the wrapping of two straws in a single tube.

Figure 11 shows a fragment of Figure 4 illustrating one kind of tube deforming device.

Figures 12 and 13 are end elevations of the device shown in Figure 11.

Figure 14 is a side elevation of Figure 4 looking in the direction of the arrow B.

In carrying the invention into effect the machine comprises a frame 1, Figure 1, on which is fixed a support 2 for a reel 3 of wrapping material which is drawn as a web 4 by feed rollers 5 and after passing through printing rollers 6 where it is printed in one or more colours, three printing rollers being shown, the web passes through tube forming apparatus of any suitable kind, for example, a device comprising a crimping stick 7. The crimped seam is formed by an outer crimping roller 8 and a small crimping roller 9 held inside the tube. These crimping devices are well known and no further description appears to be necessary. The seam of the tube may be secured either by crimping or adhesive, but generally crimping is preferable and simpler, the crimping of an empty tube being comparatively easy. The leading end of a continuous tube 10 formed in this manner is advanced towards an article wrapping position.

Referring now to Figures 3 and 4 beyond the frame 1 carrying the reel and printing mechanism is an assembly unit between the frames 11 of which, is a conveyor band 12 above which are supported an assembly drum 13 and an article feed drum 14. The conveyor band 12 moves at right angles to the line of movement of the con-

tinuous tube 10, Figure 1, and the drums 13 and 14 are mounted across the conveyor.

The article feeding drum 14 is a fluted drum, see Figure 3, which rotates at the base of a hopper or magazine 15 in which straws are placed so that they lie with their axes substantially parallel with the drum flutes. At the outlet of the hopper, that is where the drum emerges and carries straws out in its flutes, are brushing rollers 16 or the like which brush back surplus straws and prevent more than one from passing out in a single flute. The feed drum moves continuously and deposits the straws in turn into succeeding flutes of the assembly drum 13. The latter moves intermittently and the transfer of a straw is effected just as the drum 13 is stopping, the speeds of the two drums being suitably correlated. Shields 17 and 18 prevent straws from leaving the flutes of the respective drums except where desired.

When a flute of the assembly drum reaches its uppermost position, marked P in Figure 3, the straw in the flute is in alignment with the paper tube 10. A lifting device described later is provided to lift the straw slightly, at least at the end near the paper tube, so as to facilitate its entry into the tube. The continuous tube is fed along the drum flute and it is cut just before its leading edge touches a stop, formed by a flat plate or shield 20, on the remote side of the drum 13 when the tube and straw end are flush and thus the assembly is quickly completed. In this way the cut tube is located in position with respect to the width of the drum but the straw is not yet properly located in the tube lengthwise.

Referring again to Figures 1 and 2, the cutting of the tube 10 is effected by scissors 21 pivoted at 22 and closed to effect cutting by a spring 23. The continuous tube passes through a guide 24 to steady it near the cutting position. The guide travels with the scissors, both members being supported on a bracket 25 which is reciprocated on guide rods 26 and 27 by a connecting rod 28, which is coupled to a crank pin 29 mounted on a cam 30, which also functions as a crank disc. The little end of the connecting rod has pivoted thereto at 31 a double armed lever, one arm 32 of which comprises two pins 33. The other arm 34 of the lever has attached thereto a flat plate 35 which is in rubbing contact with the rim of the cam 30. A spring 36 tends to pull the arm 32 downwards. It will be seen that as the cam rotates, the scissors move to and fro and the plate 35 moves up and down, according to the contour of the cam, under the tension of the spring 36. This movement causes the pins 33 to open the scissors against the tension of the spring 23 and the spring closes the scissors at the proper time to effect cutting. Cutting takes place when the scissors are moving at about the same speed as the tube 10 and the closed scissors thereafter accelerate and push the cut piece of tube along the flute of the drum 13 for about ½" to the stop 20.

A few other features shown in Figure 3 to facilitate the feeding and manipulation of the straws will now be described. The hopper 15 is provided with an oscillating back plate 37 pivoted at 38 and operated by a connecting rod 39 coupled to a crank pin 40 fixed on a crank disc 41 mounted on the end of a spindle 42 on which the brush rollers 16 are mounted. The straws can fall from a flute of the drum 14 when said flute passes the lower end of the shield 18 but should they fail to do so, positive removal is

effected by a pair of pins 43 which are fixed to a rocking spindle 44 operated by a cam as explained later when the driving devices of the machine are described. The pins 43 are not shown in Figure 4 but they are of the same general construction as two other pins 45 now to be described. These pins are pivoted on a rocking spindle 46 and cam operated and are provided to effect positive removal of an enclosed straw from the assembly drum 13 should it fail to fall therefrom at the proper time.

When the leading end of the cut tube under the action of the scissors reaches plate 20 the assembly drum 13 moves on one flute pitch.

In order to permit the ends of the wrapper to be closed, the straw, which is of course shorter than the tube, is pushed further into the tube by a reciprocating pusher 47, Figure 5, so as to position the straw to make it centrally disposed with respect to the tube length. A guide plate 140 prevents this operation from displacing the paper tube, see Figures 4 and 11 where the guide is shown but, for clearness, not in its proper position. It is adjusted to a position further to the left of the assembly drum. At a lower position the enclosed straw is ejected by the pins 45 and drops into two pairs of crimping wheels 48 which crimp the ends of the tube which extend beyond the straw to seal up the tubular wrapper. Later the wrapped straws fall on to the conveyor hand 12. The crimping wheels may, if desired, be engaged under spring pressure, for instance, each wheel of one pair is spring loaded, as shown in Figure 3, and the pressure can be adjusted. This enables the crimping to be fairly loose, that is, just secure enough for packing and transport, but very easily opened. Some users prefer such loose seams as in opening a tightly crimped seam one is liable to tear or spoil the end of the straw.

The machine is driven by a pulley 49 fixed to a main shaft 50, Figure 1. A sprocket wheel 51 on the shaft 50 drives a similar sprocket wheel 52, Figure 5, by a chain 53 and nearly all the parts shown in Figures 3, 4 and 5 are driven from a worm shaft 54 to which the sprocket wheel 52 is fixed. On the shaft 50, Figure 2, is a gear wheel 58 which drives a similar gear wheel 59 on which is mounted a sprocket wheel 60 which drives the printing rollers by a chain 55. The wheel 59 drives a similar gear wheel 158 whereby the scissors are driven through elliptical gear wheels 56 and 57. The wheel 158 also drives a similar gear wheel 100 which drives a smaller gear wheel 101 on the spindle of the upper crimping wheel 8. A small gear wheel 102 is also fixed on the crimping wheel spindle and this gear wheel drives another 103, on which is a sprocket wheel 104 having a chain 105 on it by which the roller 5 is driven.

The worm shaft 54 has a double threaded worm 61 on it which has a portion of its thread of zero lead. This worm gears with a wormwheel 62 fixed on a shaft 63 to which the assembly drum is fixed. Thus as the shaft 54 rotates continuously, the drum 13 is intermittently driven, this type of drive being well known. A further double worm 64 on the shaft 54 drives a wormwheel 65 which has a pulley 66 on its shaft 67. This pulley is connected by a cross belt, part of which is shown at 68, Figures 4 and 5, to a pulley 69 fixed on the spindle 42. A gear wheel 70 on the shaft 67 drives an idler gear wheel 71 which drives another gear wheel 72 on a

shaft 73 to which is attached a roller 74 which drives the conveyor 12.

The gear wheel 72 drives an idler gear wheel 75 which engages a gear wheel 76 on a shaft 77 on which one pair of the crimping wheels 48 is carried. The pairs of crimping wheels are coupled by equal gear wheels (not shown). On the shaft 77 there is also a sprocket wheel 78 on which is mounted a chain 79 which also runs on a large sprocket wheel 80 fixed to a shaft 81 which carries the fluted feed drum 14.

On the worm shaft 54 there is also fixed a disc cam 82 on which runs a roller 83 pivoted on a cam lever 84 pivoted at 85. At the top of the cam lever is a slot 86 in which a pin 87 works, this pin being fixed to a slide 88 which carries the straw pusher 47. The slide runs in a guide 89 and a spring 90 cooperates with the cam to reciprocate the slide 88 and pusher 47 at the proper times.

At the right hand end, Figure 5, of the camshaft 54 is a cam 91 which, in cooperation with a spring 92, oscillates an arm 93 fixed to the spindle 46 and thus moves the pins 45 up and down at the correct times. The spindle 44 is rocked by an arm 94 fixed to it and having a roller 95 at its free end which engages a crown cam 96 fixed on the shaft 54. A spring 97 pulls the roller against the cam and thus the ejector pins 43 are moved up and down as required.

If it is desired to wrap two or more straws in each tube it is only necessary to increase the relative speeds of the drums, the top drum going twice as fast for two straws and so on. Thus two straws are fed into a single assembly drum flute and thereafter wrapped as before.

The removal of the straws from a hopper by a fluted drum can only be done satisfactorily if one straw only is taken out by one flute. If the flutes are made wider so as to take two straws, feeding is not reliable. For instance, one straw may drop askew into the wide flute so that the axis of the straw is not parallel to the flute and this straw will block the flute so that the second straw cannot move in. Therefore it is really essential to feed straws singly from the hopper and, as stated above, this means changing the speed ratio of the feeding and assembly drums. This could be done by changing the sprocket wheel 80 but as this is an inconvenient method, the arrangement shown in Figure 6 is provided. The feed drum shaft 81 has two sprocket wheels 80A and 80B mounted on it so that they are freely rotatable thereon. Between the sprocket wheels is a ring 98 keyed to the shaft 81. A pin 99 can be shifted to couple either sprocket wheel to the ring 98 and this to the shaft 81 so the drum can rotate either at an even ratio speed with the assembly drum, that is, one flute to one flute or at twice this speed, that is, two flutes to one flute. Thus in the second case two straws are delivered to each flute of the assembly drum. The sprocket wheels are driven by two chains marked 79A and 79B and it will be understood that the driving sprocket wheel 78 is a double one in this case. This construction is given merely by way of example and any suitable change-speed device may be incorporated in the feed drum drive.

The machine is designed to handle various lengths of straws and consequently to feed different lengths of tube and also to wrap various diameters of straws. The drums are shorter than the straws, as longer or shorter straws can always be handled by the same drums, provided that there is sufficient length of flute to support

a straw firmly so that it cannot fall out of the sides of the drum, that is out of the end of the flute. The feeding and cutting of various lengths of tubing can be catered for by change gears or the like on the respective parts of Figure 1. The variation in diameter of the straws to be wrapped would, however, normally mean changing the feed drum as two small straws might fall into a large flute and be fed together. A single assembly drum is generally sufficient for several diameters of straw but the changing of the feed drum is wasteful and not suitable for the average operator who is usually an unskilled girl. To overcome this difficulty three short drums are used side by side on the feed drum shaft as shown in Figure 7. The middle drum marked 14B is fixed to the shaft 81 but the others 14A and 14C respectively are fixed to the middle one by bolts 106 passing through quadrant slots 107. The flutes are large enough to take the largest straw and are preferably constructed so that the teeth between the flutes are rather like ratchet teeth in appearance, as illustrated. When the three drums are assembled with the flutes in alignment the largest straws can be handled but if the side drums 14A and 14C are turned round on the shaft 81 the back surfaces of the flutes of the outer drums co-operate with the front surfaces of the flutes of the middle drum to form smaller effective flutes. Sufficient adjustment is provided to cover all sizes and the adjustment is a perfectly simple operation. Alternatively, the middle drum can be adjustable and the outer ones fixed to the shaft, when it is only necessary to shift the middle one and then lock it in position and the flutes of the outer drums will be in permanent alignment.

The crimping wheels 48 are also adjustable for position and are fixed by set screws along their shafts to engage the tube material extending beyond the ends of the straws. The hopper 15 is also adjustable, having one slidable side 108 carried on rods 109 so as to alter the width of the hopper for various lengths of straws.

A counting device may be fitted on the machine and a suitable construction is shown in Figure 5. The device comprises stops 110 to arrest wrapped straws on the conveyor band 12. These stops consisting of thin wires or bars are lifted and lowered so that when the stops are down, straws accumulate side by side, then the bars lift and the assembled straws pass forthwith into a chute. To operate this counting device a further worm 112 is fixed on the worm-shaft 54 and engages with a wormwheel 113. To the wormwheel is fixed a snail cam 114 which periodically lifts a pivoted lever 115 carrying a bar 116 in which two stops 110 are fixed, one at each side of the band 12. If desired a bell signal device may be added, suitably geared to the wormwheel 113 to indicate when a large number of wrapped straws, say 500, has accumulated in the chute so that the operator can remove them.

It is often desired to wrap two or more straws in a single tube and if this tube is cylindrical it is obvious that the inside diameter of the paper tube must be at least as large as the width of the several straws. If such wrapping is carried out as set forth above it is necessary to make the dimension of the tube somewhat greater than this, see Figure 8, or the sliding of the tube over the straws may cause difficulties. Such increase in the diameter of the tube requires more paper and in the interest of economy it is desirable to keep the width of the paper strip from which the

tube is made as small as possible. To this end means are provided to deform a cylindrical tube so that it will take, for example, two straws side by side.

As previously described the tube is caused to slide over the straws and the deformation of the tube may be effected by pressing it by two fixed or movable pads, described later, between which the cylindrical tube passes. The diameter of the cylindrical tube is so chosen that when pressed in this manner to deform it, the width of the tube, that is the major axis thereof is sufficient to allow two straws, side by side, to enter easily, see Figure 9. After the straws have been inserted, the tube is released and changes to substantially cylindrical shape again, see Figure 10. As the straws will easily move into a tube, once the initial entry has been effected, it is only strictly necessary to press the tube at the place where the straws start to enter, but as the tube is generally moved while the straws are still, it will be understood that the deformation of the tube takes place locally and continuously and as the tube moves, each part passing between the pads is deformed in turn. A modification, where the pressure is maintained is described later.

In one construction of deforming device shown in Figures 11 to 13 the cylindrical paper tube moves as before towards the straws. Between the end of the tube and the near ends of the straws are two pressers 117 and 118, consisting of short concave formers. The cross section of each former at the end near the tube is a circular arc and at the end near the straws an elliptical arc, the section changing progressively from one shape to the other, see Figures 12 and 13. The concavities are directed towards one another and although the formers do not touch, they substantially define a circle at one end and an ellipse at the other.

Thus the section of the tube changes from a cylinder to an ellipse, though it must be understood that these terms are descriptive only, for the tube may be deformed so as to be of a section consisting of two semi-circular arcs joined by straight lines and the term "substantially elliptical" is meant to include such a shape. This shape can be made by formers comprising two flat plates suitably disposed and converging to effect a mere flattening of the tube. Instead of employing fixed formers, suitable formers may be cam-operated to move towards and away from one another. This construction is shown in Figures 4 and 14.

A shaft 119 is mounted in bearings on the base plate of the machine and has on it a sprocket wheel 120 which is driven by the chain 53 previously mentioned. At one end of this shaft is a crown cam 121 which engages a roller 122 at the lower end of an arm 123 of a bell crank lever. The other arm 124 has a presser 125 fixed to it. As the cam 121 rotates, the bell crank is oscillated by the cam and a spring 126 about its pivot 127. Another arm 128 carrying a top presser 129 is pivoted at 130 and geared to the arm 124 by toothed quadrants 131 and 132. Thus the two pressers are moved towards and away from one another at the necessary times. After the tube has been moved over the straws to enclose them it expands to substantially cylindrical shape as in Figure 10 and it is cut and closed as previously described. Where these pressers are used the cut takes place just at the left of the presser 117—118 or 125—129 and finally located by the guide 140 as the drum moves on.

As previously described the flutes of the assembly drum serve also as a lead for the endless tube of paper which moves along and outside the straws and wraps them. If then there is much difference in the diameter of the tube for different wrappings it is obvious that without further provision the assembly drum would have to be changed for single or double wraps. If a drum with flutes wide enough to permit two straws to lie that is, one or two straws per tube, when the flute is used for single straws, they are not sufficiently kept in position so that the paper tube can slide over a straw. The correct position of the straws is roughly in line with the axis of the tube and even with single straws it is desirable to ensure this alignment. The changing of the drum for another, when a different number of straws is to be put into a single tube is a long job requiring some dismantling of the apparatus concerned. To avoid this difficulty there is provided a tapering guide trough, for example a V guide 133 as shown in Figures 4, 11 and 14 adapted to engage an end of one or more straws contained in a flute of the assembly drum 13 and guide them so that they are centralised with respect to the bore of the wrapper tube.

As previously mentioned, the straws are always longer than the assembly drum. The end of the straw outside the drum on the side of the oncoming paper tube is guided into the paper tube by the guide or trough 133 and as soon as the drum is in the stopping position, to permit the tube to slide in, the guide is lifted by a cam 134 on the shaft 119 against the action of a spring 135. The guide which is shaped in V form is wide on the straw side and narrow on the side where the tube moves on. This tapering construction of the guide trough forces the straw into a certain position corresponding or parallel to the axis of the tube. It is then of no importance at all where the straw lies in the flute; the guide brings the straw into the exact position and the tube can slide over the straw. The guide 133 is supported on a slidable rod 136 working in a guide 137. One end of a lever 138 engages the rod and is raised by the cam 134 at the necessary times. If desired, the guide 133 can be attached to the lower presser 125 where such is used thus saving separate operating mechanism. The tube deforming devices previously described facilitate the entry of two or more straws but there is a tendency for the deformed-tube to return to its shape immediately it has passed through the jaws of the device. On the whole it is best to maintain the oval form of the tube for a while and this may be done by attaching to the upper presser 117 a flat spring or a thin bar 139, Figure 11, which has on its further end a pad which rests on the upper side of the tube. A similar thin bar may be fitted on the presser 129 to operate when it is in its lower position, slightly bending the top side of the tube and so maintaining approximately its oval shape until a certain amount of the straw is inside the tube. The bar 139 is only shown in Figure 11 but its attachment to the presser 129 is obvious.

I claim:

1. A machine for wrapping elongate articles in tubular wrappers, comprising a hopper having an article outlet, a fluted drum rotatably supported in position to receive articles singly from said outlet, a fluted assembly drum unit rotatably positioned to receive successively in each of its flutes an article from the first drum, means for intermittently turning the assembly drum unit to successively bring each flute to a predetermined station, a wrapping tube forming means,

means for moving the tube lengthwise into and along an article carrying flute of the assembly drum unit when such flute comes to rest at said station to cause the tube to pass over the article, said drum unit comprising a plurality of drum sections assembled on a common shaft, and means by which the drum sections may be secured against relative turning movement with the flutes thereof staggered whereby the drum sections jointly define a common flute of a size to receive an article of predetermined size.

2. A machine of the character stated in claim 1, with means for deforming the cross section of the leading end of the cylindrical wrapping tube to substantially elliptical form while the tube is passing over an article whereby two or more articles may enter the tube side by side.

3. A machine of the character stated in claim 2, with a presser adapted to engage the tube and maintain the deformed shape of the tube beyond said deforming means.

4. A machine of the character stated in claim 1, with a change speed gear mechanism coupling the fluted drum and the assembly drum unit for facilitating the rotation of the first drum at different speeds relative to the intermittent rotation of the assembly drum unit for effecting the transfer of articles from one, two or more flutes of the first drum into a single flute of the assembly drum unit.

5. A machine of the character stated in claim 1, with a guide positioned to engage the article in the flute of the assembly drum unit when such flute reaches said station for positioning the article substantially in alignment with the wrapping tube.

6. A machine of the character stated in claim 2, with a guide positioned to engage the article in the flute of the assembly drum unit when such flute reaches said station for positioning the article substantially in alignment with the wrapping tube.

7. A machine for wrapping elongate articles in tubular wrappers, comprising a hopper having an article outlet, a fluted drum rotatably supported in position to receive articles singly from said outlet, a fluted assembly drum unit rotatably positioned to receive successively in each of its flutes an article from the first drum, means for intermittently turning the assembly drum unit to successively bring each flute to a predetermined station, a wrapping tube forming means, means for moving the tube lengthwise into and along an article carrying flute of the assembly drum unit when such flute comes to rest at said station to cause the tube to pass over the article, means for severing the tube after a predetermined length thereof has passed over the article, said drum unit

comprising a plurality of drum sections, a rotatable shaft common to and having the drum sections mounted thereon, one of said drum sections being fixed to the shaft and the other drum sections being free for turning movement on the shaft, and means coupling the free turning drum sections with the fixed drum section whereby all of the sections may be secured against relative turning movement with the flutes thereof staggered whereby the drum sections jointly define a common flute of a size to receive an article of predetermined size.

8. A machine of the character stated in claim 7, with means for deforming the cross section of the leading end of the cylindrical wrapping tube to substantially elliptical form while the tube is passing over an article, said last means comprising a guide through which the tube passes, having a substantially circular contour at the end in which the tube enters and a substantially elliptical contour at the end from which the tube emerges.

9. A machine of the character stated in claim 7, with means for deforming the cross section of the leading end of the cylindrical wrapping tube to substantially elliptical form while the tube is passing over an article, said last means comprising two spaced presser members between which the tube passes, means supporting said members for movement toward and away from one another for applying compression to the tube passing between them, and mechanism for effecting the movement of said members toward one another to apply the desired compression to the tube.

10. A machine of the character stated in claim 9, with a guide positioned at the end of the assembly drum unit toward which the tube advances, for engaging an article carried in the assembly drum unit flute upon reaching said station and guiding said article to a position substantially in alignment with the advancing wrapping tube.

11. A machine of the character stated in claim 7, with a tube pressing means adapted to engage the tube and maintain the deformed shape thereof after the tube passes the said deforming means.

HEDWIG GAMBLE.

REFERENCES CITED

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

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