

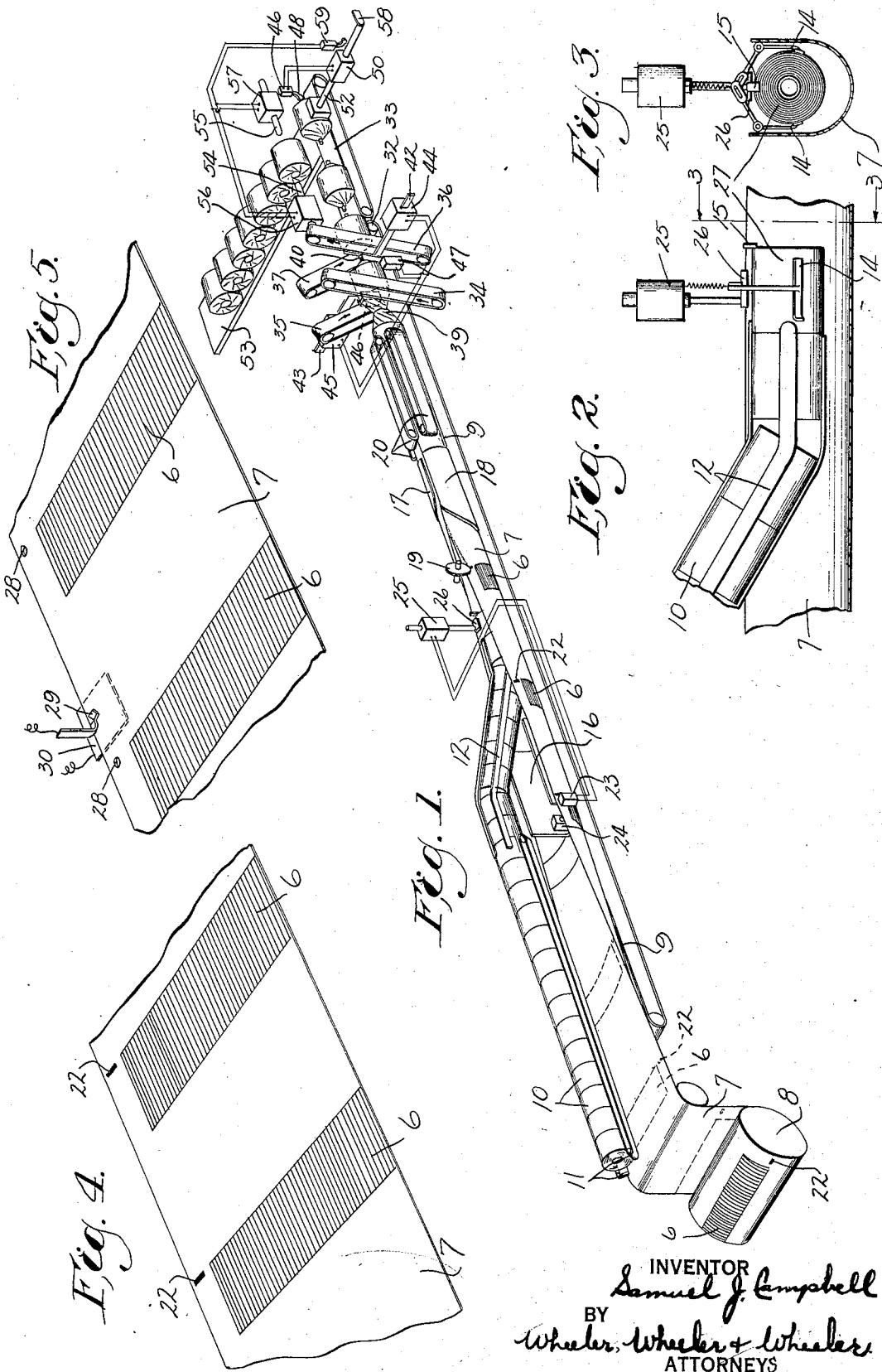
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ART OF WRAPPING TOILET PAPER AND THE LIKE

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ART OF WRAPPING TOILET PAPER AND
THE LIKE

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15 Claims. (Cl. 93—2)

This invention relates to improvements in the art of wrapping toilet paper and the like. The invention pertains to the process and to the equipment for practising the process.

5 It is one of the principal objects of the invention to provide process and equipment for the packaging of rolls of toilet paper or toweling wherein all steps of the packaging process are independently synchronized with reference to the progress of the work, so that the entire operation is conducted in perfect synchronism and with the utmost dispatch without any need for making any step dependent upon any other step of the process.

10 More particularly stated, I propose to feed in a continuous web the label stock required to wrap the rollers, and I propose to deliver each roll accurately to its proper place with reference to the label printed on that portion of the wrapper which is to be placed about the roll. It is my purpose, moreover, to maintain the wrapper in a single continuous web until after it has been glued about the rolls spaced therein, and twisted therebetween, the severing of the wrapper being dependent automatically upon the desired degree of twisting of the wrapper.

In the drawing:

Figure 1 is a diagrammatic view in perspective showing the sequence of operations and representative mechanism embodying the invention.

Figure 2 is a fragmentary view in longitudinal section on an enlarged scale showing a mechanism for delivering successive rolls to the continuously moving web of wrapping material.

Figure 3 is a detail view in transverse section on the line 3—3 of Figure 2.

Figure 4 is a detail view on an enlarged scale showing in perspective a fragmentary portion of the wrapping material which may be employed in connection with this invention.

Figure 5 is a fragmentary view in perspective on an enlarged scale showing a modified form of wrapping material and associated control.

Like parts are identified by the same reference characters throughout the several views.

The invention will be described with particular reference to the process, and from this description the parts of the mechanism will sufficiently appear.

50 I first print the desired labels 6 upon a continuous web 7 of wrapper stock which is then supplied in a parent roll 8 and continuously delivered upon a feed belt 9. It is one of the important features of the present machine that aside from the delivery step there is no intermittent actuation of the work. The wrapper is in continuous forward movement from the time the wrapping stock enters the machine until the wrapped roll is ready for delivery and lacking

only the final operation of tucking in the twisted ends of wrapping stock.

The cored rolls 10 are supported on converging belts 11 which urge them forward into a trough or chute 12. At the lower end of the trough the most advanced roll passes from the support of the trough into the grasp of a pair of spring fingers 14 and against a stop 15 which holds the roll momentarily against further advance.

10 In the meantime the advancing web of wrapper stock 7 has been drawn over a guide 16 into the form of a channel into which the chute 12 extends. In the continued advance of the wrapping stock the folding wings 17 and 18 bring the margins of the web together and overlap them above the enclosed rolls in a well understood manner. The adhesive roll 19 applies a suitable adhesive to the undermost of the overlapping margins of the web, and as the web and enfolded rolls advance, the web is engaged by a series of belts 20 which hold the web firmly in place for a sufficient time to permit the adhesive to act.

25 The deposit of each successive terminal roll from the trough 12 into the channeled web 7 at the proper point with reference to the label printed on the web, is accomplished automatically by any one of several mechanical devices which operate in synchronism with the advance of the web. In my preferred device I print upon the web 7 in a predetermined relation to the labels 6 thereon a black mark 22 which may be located along the margin of the web of wrapping material and which is sufficiently opaque to operate a photoelectric cell. The photoelectric cell is indicated diagrammatically at 24, and the source of light is shown at 23. The light will ordinarily shine through the translucent material of the web to maintain the cell energized, but when one of the black marginal marks 22 passes between the source of light and the cell it deenergizes the cell and, through a suitable relay (not shown), it causes the energization of the solenoid 25, thereby projecting downwardly the presser foot 26 which ejects the terminal roll 27 from between the spring fingers 14, dropping it at a predetermined point with reference to the label printed on a continuous web of wrapping material.

50 In Fig. 5 I have shown an alternative arrangement in which the wrapping material 7 is provided with a hole at 28 through which the contact 29 of a special switch can engage the energized plate 30 on the opposite side of the web to close an electrical circuit for the energization of the solenoid. The same type of hole may be used to control pneumatic mechanism such as that used in player pianos. Since the ejector 26 operates intermittently and the web moves continuously, it will be apparent that the rolls to be wrapped are spaced at suitable intervals with-

in the sealed tubular wrapper produced by the adhesive reel 19, the folding plates 17 and 18, and the pressure belts 20.

The conveyor belt 9 upon which the wrapping web is carried terminates at a pulley 32 in alignment with a similar belt 33 operated at a somewhat higher rate of speed. Between the pressure belts 20 and pulley 32 I provide means for rotating the wrapped rolls upon the supporting belt 9 without interfering with their continuous advance thereon. In order to accomplish this purpose, I have provided at least two sets of twisting belts 34, 35, 36, and 37, the belts of each set being located at opposite sides of the path of roll advance in positions for lateral engagement with each wrapped roll as it passes between the twisting belts. The supporting conveyor 9 is sufficiently narrow so that the sides of the wrapped rolls are exposed.

Each of the twisting belts operates in a path which is more nearly upright than horizontal but is inclined in the direction of roll travel upon the conveyor line. Thus the inner flight of belt 34 and the inner flight of belt 36 operate in an upward direction across conveyor 9 and each is inclined toward the delivery end of the machine. The opposing belts 35 and 37 have their inner flights operating in a downward direction across conveyor 9, and each is inclined so that in the course of its downward movement it also moves toward the delivery end of the machine. Each subsequent pair of belts, such as the pair 36-37, operates at a higher speed than the belts preceding it.

It will be apparent that as each roll is engaged by the belts 34 and 35, the preceding roll being held against torsional displacement by the pressure belts 20, the advanced roll will be rotated and will twist that portion of the wrapping web 39 which lies between the successive rolls. As the roll is being held between the twisting belts 34 and 35 and turned at a speed related to the speed of operation of such belts, the next advanced roll of the series is being engaged by belts 36 and 37 and rotated at a higher speed, thereby further twisting the intervening portion of the wrapping web as shown at 40.

When the portion 40 of the intervening web of wrapping material is twisted sufficiently tightly, it is cut off by means of the coacting shear knives 42 and 43. These may conveniently be actuated by solenoids 44 and 45 respectively, and they may conveniently be controlled by another photoelectric cell 47 and co-operating light source 46, the arrangement being such that when the light is intercepted by the advance of the next successive wrapped roll the cut-off knife will be operated to sever the connection between the wrappers of the respective rolls.

Immediately thereafter the wrapped roll which has been freed by the severing operation, passes from the conveyor 9 on to the conveyor 33, and its acceleration separates it from the succeeding wrapped roll for a sufficient distance to enable the operation of the severing mechanism now to be described.

As each roll reaches an advanced position on the conveyor 33, it engages the lever 48 of the switch 49 which controls a solenoid 50. The armature of the solenoid is a positioning plunger 52 which strikes the side of the wrapped roll and moves it off of conveyor 33 on to a table 53 where it is brought to rest directly between the tucking armatures 54 and 55 of solenoids 56 and 57 respectively. These solenoids are controlled

by the engagement of a member 58 on the positioning plunger 52 with the control lever of a switch 59, so that as the positioning plunger reaches the limit of its stroke the circuit which energizes solenoids 56 and 57 is closed and the tuckers 54 and 55 advance and push into the core of the aligned roll the projecting twisted ends of its wrapper, thus completing the wrapping operation.

The wrapped roll will be advanced on table 53 when it is thrust ahead by the operation of the positioning plunger 52 in setting the next wrapped roll between the tuckers 54 and 55.

I have not illustrated the driving connections for the various conveyors and belts for the reason that they are obvious and require no particular arrangement or control because of the fact that each operation on the work is separately synchronized directly and automatically with reference to the progress of the work. Thus the release of each successive roll into the channeled wrapping web is automatically controlled with reference to means provided on the web itself and consisting either of an opaque mark or an aperture. The adhesive reel 19 is operated by frictional contact of the web itself. The folding plates 17 and 18 are stationary and operate by reason of the movement of the web with respect thereto. The pressure belts 20 require no special synchronization but act effectively with respect to any portions of the work which are directed to them.

Similarly, the twisting belts 34 and 35 are acting continuously and become effective whenever any work enters between them. It is only necessary that the relative speeds of successive sets of belts shall be progressively increased until an intervening twist of the desired tightness is produced. The cutting of the twist is then controlled entirely automatically with reference to the progress of the work.

Similarly, the action of the positioning plunger is entirely controlled by the advance of the work, and the final tucking of the twist into the ends of the core, while controlled by the positioning plunger, is nevertheless thereby directly synchronized with the position of the work.

While I have described the invention with particular reference to the wrapping of cored rolls of toilet paper and the like, it will be apparent that many other articles, particularly articles of cylindrical form, may be wrapped by the method and apparatus herein disclosed, and some features of the present invention are of general application to wrapping machines.

I claim:

1. A method of wrapping which includes the advance of a continuous web of wrapping material, the deposit thereon of articles to be wrapped, and the control of such deposit directly with reference to the advance of the wrapping material, whereby such deposit is dependent upon the presence of wrapping material and does not require any common actuating connections for such advance and such deposit.

2. Those steps in the method of wrapping which comprise the printing of labels on a continuous web of wrapping material, the placing on said web of a control means in stated relation to each label, and the deposit on the web of an article to be wrapped in synchronized relation to the passage of said control means in the movement of the web.

3. Those steps in the art of packaging which include the continuous advance of a wrapper hav-

ing label portions at stated intervals, the deposit on the advancing wrapper of articles to be wrapped, the control of such deposit in accordance with the position of the label portions of the wrapping material, whereby such deposit cannot continue indefinitely following the termination of said wrapper and the envelopment of each article in the wrapping material in the course of its advance.

4. Those steps in the packaging art which include the advance of a continuous web of wrapping material having spaced label portions, the deposit on successive label portions of articles to be wrapped, the control of such deposit directly with reference to the advance of said web, the envelopment of such articles in the web in the course of web advance, the rotation of each article in the course of web advance with respect to the next succeeding article, whereby to twist intervening portions of the web, the severing of the twisted intervening web, and the control of such severing in accordance with web advance, and the tucking of the twisted portions of the web toward the article.

5. Those steps in the art of packaging which include the advance of a web of wrapping material having spaced label portions, the deposit of articles upon said portions in the course of web advance, the enveloping of the spaced articles in the web, the twisting of the web between such articles, and the severing of the twisted web intermediate said articles; and controlling the deposit of such articles and the severing of the twisted web independently of each other with direct reference to web advance.

6. In an apparatus of the character described, the combination with web feeding means, of folding mechanism in the path of the web for channeling the web in the course of its feeding movement, means for depositing in the channel of the web a succession of articles to be wrapped therein, mechanism controlling such deposit, and means borne by the web for actuating said mechanism.

7. The combination with a web feeding means, and means for depositing on the web in spaced relation articles to be enwrapped therein, of mechanism controlling the deposit of each such article, and means directly carried by the web for actuating said mechanism, whereby the articles are deposited in direct relation to web advance.

8. In an apparatus of the character described, the combination with means for feeding a continuous web bearing control means, of a conveyor leading to said web and adapted to deliver thereto articles to be wrapped therein, delivery mechanism for the timed positioning of such articles upon such web, mechanism positioned adjacent the path of the web and controlled by the means carried thereon for regulating the deposit of such articles upon the web with direct reference to the advance of the web itself, means for holding said web about said articles, and means for subsequently severing the web between the articles wrapped therein.

9. In a device of the character described, the combination with a support and means for advancing on said support a wrapper and spaced articles wrapped therein, of twisting belts on opposite sides of said support engageable with the wrapped articles thereon, the belt portion at one side of said support and the belt portion at the other side thereof being movable in opposite directions, and each of said belt portions being in-

clined to advance along said support in the direction of article travel thereon.

10. In a device of the character described, the combination with means for feeding a continuous web, of a folding means in the path of web advance, a gluing means associated therewith, means for depositing articles in spaced relation upon the web to be folded therein, pressure means for holding adhesively treated portions of the web pending web advance, and twisting belts operable upon the web and the articles therein contained in the course of web advance, and successively positioned to twist each article with respect to a succeeding article wrapped in said web.

11. In a device of the character described, the combination with means for feeding a continuous web, of a folding means in the path of web advance, a gluing means associated therewith, means for depositing articles in spaced relation upon the web to be folded therein, pressure means for holding adhesively treated portions of the web pending web advance, and twisting belts operable upon the web and the articles therein contained in the course of web advance, and successively positioned to twist each article with respect to a succeeding article wrapped in said web, together with means for severing the web intermediate such articles, and means for pushing the twisted portions of the web against the article wrapped therein.

12. Those steps in the art of wrapping which comprise the deposit of articles to be wrapped upon spaced predetermined areas of wrapping material, placing in predetermined relation to each such area a control means, and controlling such deposit by said control means in accordance with the relative position of the control means respecting the article to be wrapped.

13. Those steps in the method of wrapping which comprise the marking of wrapping material with reference to predetermined work-engaging areas thereof, producing relative movement between the areas so marked and the articles to be wrapped therein, depositing such articles upon said predetermined areas under control of the marking aforesaid, and engaging a wrapping material about the articles deposited thereon.

14. Those steps in the packaging art which include the continuous advance of wrapping material having predetermined work-engaging areas, the deposit on successive areas of successive articles to be wrapped, the control of such deposit directly with reference to the relative position of said areas and said articles, the envelopment of each article in the wrapping material in the course of the advance thereof, and the closing of said wrapping material at the ends of the enveloped articles under direct control of the work in accordance with its progress.

15. In apparatus of the character described, the combination with means for advancing with respect to articles to be wrapped, a succession of predetermined areas of wrapping material, mechanism for depositing upon each such area an article to be wrapped therein, and means operatively connected to control said deposit in accordance with the relative position of successive areas respecting the articles to be wrapped therein, and actuating connections for driving said material advancing means independently of said article depositing mechanism, whereby the functioning of the latter is dependent solely upon said control means.

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