April 17, 1962 W. H. DOUTHIT 3,029,571

APPARATUS FOR DISPENSING WRAPPING MATERIALS

Filed Aug. 16, 1960 2 Sheets-Sheet 1

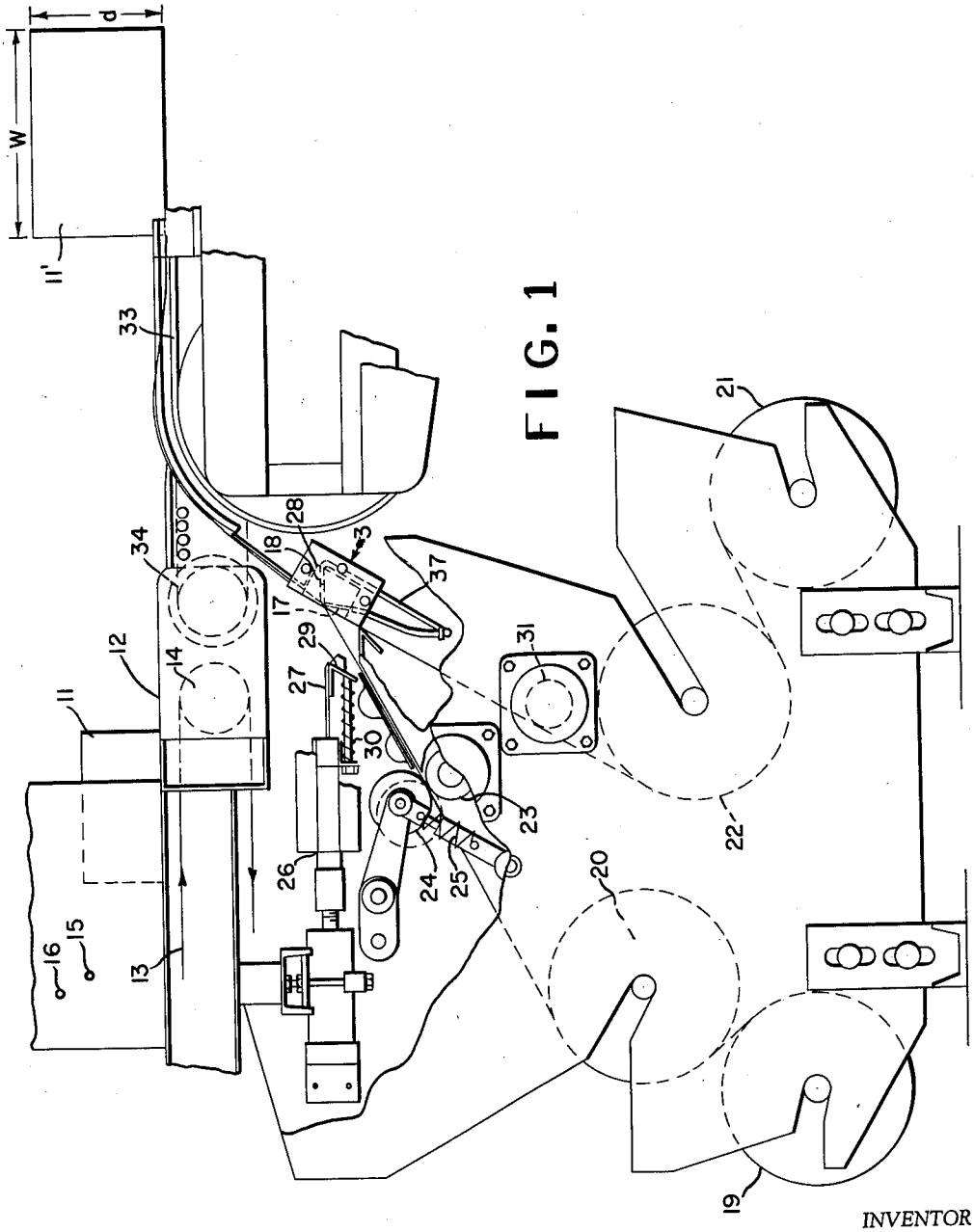


FIG. 1

INVENTOR
WALTER HAROLD DOUTHIT

BY Herbert W. Wolfson
ATTORNEY

April 17, 1962 W. H. DOUTHIT 3,029,571

APPARATUS FOR DISPENSING WRAPPING MATERIALS

Filed Aug. 16, 1960 2 Sheets-Sheet 2

FIG. 2

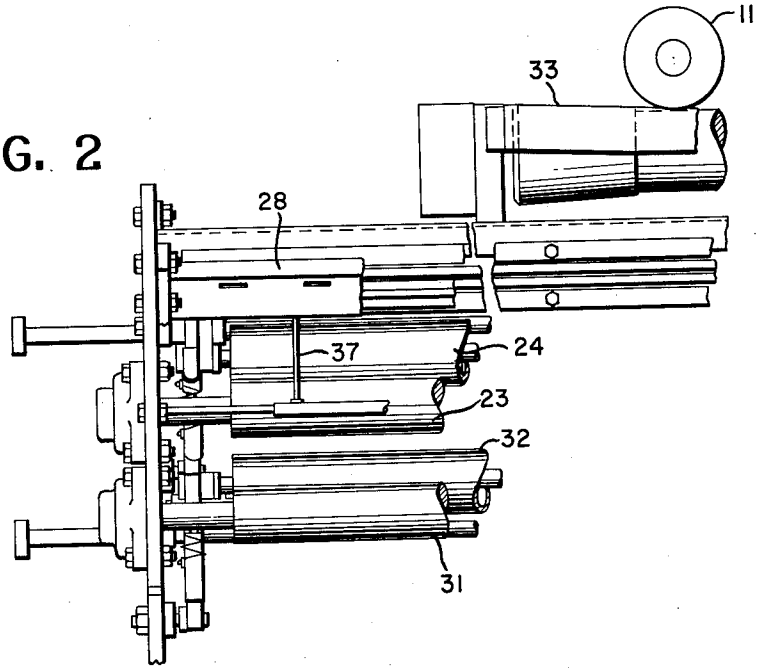
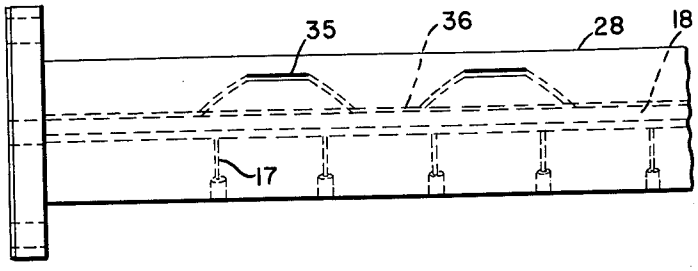


FIG. 3



INVENTOR
WALTER HAROLD DOUTHIT

BY Herbert M. Wolfson
ATTORNEY

United States Patent Office 3,029,571 Patented Apr. 17, 1962

3,029,571
APPARATUS FOR DISPENSING WRAPPING MATERIALS

Walter Harold Douthit, Clinton, Iowa, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware

Filed Aug. 16, 1960, Ser. No. 49,944
6 Claims. (Cl. 53—66)

This invention relates to the wrapping of articles. More particularly, it relates to a machine for dispensing wrapping material for elongated articles, preferably cylindrical articles, the dimensions of which may vary in diameter and width.

The invention will be discussed as it pertains to wrapping rolls of regenerated cellulose film with a moistureproof wrapper. However, it will be evident that the invention is applicable to the wrapping of any object wherein the general shape of the object is constant but the particular dimensions vary from object to object.

In the preparation of regenerated cellulose film, the film is first wound in wide, large diameter mill rolls. These mill rolls are then slit into smaller rolls of various widths and diameters according to customers' specifications. In order to retain the desirable moisture content in the film, the slit rolls are usually wrapped in a moistureproof cellophane film wrapper and overwrapped with heavy waxed paper prior to shipping. Since the slit rolls vary in width and diameter, the wrapping materials must vary similarly. The industry has standardized on the diameter of the slit rolls, i.e. on the amount of winding that takes place on a slit roll. Thus, the slit rolls are wound to two or three standard diameters. Since it is the width of the wrapping materials that is a function of the diameter of the slit rolls, the width of the wrapping materials can be standardized at two or three standard widths. However, the width of the slit rolls varies anywhere from a few inches to several feet. The width of the slit rolls cannot be standardized because of the divergent demands of customers who wrap a wide variety of commercial items. Hence, it behooves the operator who is wrapping the slit roll to cut each length of wrapping material individually for each slit roll, depending upon the width of the particular slit roll to be wrapped. This job is tedious, time consuming and uneconomical.

It is, therefore, an object of the present invention to provide an apparatus to dispense a wrapper for slit rolls of regenerated cellulose film, the wrapper being the correct width and the correct length. Other objects will appear hereinafter.

In its simplest terms, the apparatus comprises means, including a conveyer, for supporting and conveying a substantially elongated article; automatically operated means for sensing the height of said conveyed article; means for dispensing beneath said conveyed article wrapping material of the proper width based on the sensed height of the article; automatically operated means for sensing the length of said conveyed article; and means for cutting the wrapping material to the proper length based on the sensed length of the article.

The objects of the invention, the important features of the invention and the advantages of the invention will become more apparent from the following description and the related drawing in which:

FIGURE 1 is a side elevation of the apparatus of the present invention;

FIGURE 2 is a front elevation of the apparatus of the present invention; and

FIGURE 3 is a partial view of the apparatus of the invention showing the female knife bar looking at FIGURE 1 in the direction shown by the arrow 3.

It will be noted that the apparatus shown in the drawing relates to the dispensing of two superimposed sheets as the wrapping material and is limited to wrapping two diameters of slit rolls. However, it will be apparent that the apparatus can easily be adapted by one skilled in the art to dispense one, two, three or more sheets as the wrapping material and to wrap any reasonable number of different diameter slit rolls.

Referring to FIGURES 1 and 2, 11 and 11′ represent slit rolls of regenerated cellulose film in which *w* represents the width of a representative slit roll and *d* represents the diameter of the slit roll. The slit rolls are advanced on a first conveyer 12, the latter being moved by endless belt 13 disposed about roll 14 and a second roll, not shown, both rolls being driven by means not shown. As a slit roll is advanced by conveyer 12, it will interrupt a light beam focused on photocell 16 or light beams focused on both photocells 15 and 16. These photocells first sense the diameter of the advancing slit rolls 11 and 11′. Thus, if the diameter of the slit roll is 9 inches it will only actuate photocell 15. If the diameter of the slit roll is 13 inches, then it will actuate photocell 16. By actuating photocell 16, the first reaction is to deactivate photocell 15 and the electrical circuit involving photocell 15. Hence, when the slit roll passes through the beam focused on photocell 15, the normal reactions associated with photocell 15 do not occur.

Consider slit roll 11, as it advances on the conveyer it first interrupts the light beam focused on photocell 15. This photocell activates an electrical circuit of control relays, time delay relays, solenoids, etc., to provide the following operation. First, a solenoid valve opens momentarily to allow compressed air, supplied by means not shown, to blow through passages or openings 17 in the female knife bar 28 to lift the edges of the wrapping materials out of the female knife bar slot 18. It will be noted that the upper lip of this slot 18 is recessed about 1/16 inch from a straight line extending from the outer edge of the lower lip. This serves to enhance the functioning of the air blast in blowing the leading edges of the wrapping materials from the knife slot 18. 37 represents a tube to provide auxiliary air if needed.

The wrapping materials are wound on rolls 19, 20, 21 and 22. Moistureproof regenerated cellulose film for wrapping 9-inch diameter slit rolls is wound on roll 19 and the waxed paper for wrapping 9-inch diameter slit rolls is wound on roll 20. The moistureproof regenerated cellulose film for wrapping 13-inch diameter slit rolls is wound on roll 21 and the waxed paper for wrapping 13-inch diameter slit rolls is wound on roll 22. A time delay relay is actuated in the electrical circuit containing photocell 15 which serves, in turn, to actuate a motor not shown to rotate drive roll 23 which, in turn, unwinds the wrapping materials on rolls 19 and 20. The drive roll 23 has a rough synthetic rubber covering and forces material through the nip formed by the drive roll 23 with the undriven nip roll 24. The latter roll 24 has a smooth synthetic rubber covering and is pressed against the drive roll by springs 25. Thus, moistureproof regenerated cellulose film superimposed on the waxed paper is fed up and onto a second conveyer 33, the latter being moved by belt 34. The slit roll 11 is advanced over the combined wrapping materials on conveyer 33. The relay is set to provide a sufficient lead of the wrapping materials ahead of the advancing slit roll 11.

When the slit roll 11 has advanced just past the beam focused on photocell 15, the length of the slit roll 11 has been sensed and several other time delay relays in the electrical circuit involving photocell 15 are actuated. One time delay relay serves to shut off the motor which rotates roll 23 after a sufficient length of wrapping material for the advancing slit roll 11 has been provided. Another time delay relay, after allowing sufficient time for

the slit roll lying on the combination of film and paper to pull out any slack in these wrapping materials, energizes a solenoid air valve 26. This valve 26 causes a knife blade 27, preferably serrated, to extend and plunge into the slot 18 of the female knife bar or supporting surface 28 while the wrapping materials are firmly held against this supporting surface 28 by hold-down bar 29 to cut the superimposed wrapping materials simultaneously. The hold-down bar 29 is attached to the knife blade 27 through compressed springs 30. The hold-down bar leads the cutting edge of the knife blade 27 by a fraction of an inch, usually about 3/16 of an inch. By holding the wrapping materials firmly against the female knife bar 28, the hold-down bar 29 allows the knife blade 27 to make a clean cut. Immediately after cutting, the knife blade retracts, thus preparing the machine for the next dispensing operation. The cut lengths of wrapping materials are completely pulled onto the conveyer under the slit roll 11 by the continuous movement of the conveyer. A sufficient amount of these wrapping materials extends beyond the end of the slit roll 11 to cover the end of the slit roll when the wrapping materials are later tucked into the core of the slit roll.

The operation of the apparatus for a 13-inch diameter slit roll, such as slit roll 11', is similar to that described above. Interrupting the photocell 16 automatically deactivates the electrical circuit that involves the wrapping material for the 9-inch diameter slit roll. The compressed air is then blown through jets 17. A time delay relay is activated which serves to start a motor, not shown, to rotate drive roll 31 which unwinds the wrapping materials from rolls 21 and 22. The wrapping materials are then conveyed through the nip of drive roll 31 and the nip roll 32 over the supporting surface 28 and finally onto the conveyer 33. After the slit roll 11' has been led from conveyer 12 onto the wrapping material on conveyer 33, the operation of the apparatus follows that described previously for the wrapping of the 9-inch diameter slit roll.

One of the important features of the present invention is brought out vividly in FIGURE 3. In the operation of the apparatus there is a tendency for material to collect in the slot 18 of the female knife bar 28. For example, wax from the waxed paper being cut by blade 27 tends to be removed by this blade and is pushed into the slot 18. To prevent undue accumulation of such material in slot 18, several clean-out slots 35 are machined in the rear of the bar 28. These slots 35 communicate with the atmosphere and, through channels 36, with the slot 18.

The apparatus of the present invention makes it possible to dispense a wrapper of the proper dimensions, at the proper time and in the proper position for wrapping elongated objects. The apparatus selects the correct width of wrapping material, cuts off the correct length of wrapping material and positions the material under the slit roll as the roll moves along a conveyer, all automatically. The apparatus is both a time-saver and a labor-saver and can be used to provide such economies in a variety of commercial applications.

Having fully disclosed the invention, what is claimed is:

1. Apparatus comprising means, including a conveyor, for supporting and conveying a substantially elongated article; means for sensing the height and length of said conveyed article, said means disposed out of contact with said article; a plurality of storage means, each adapted to store a different width of wrapping material; means for dispensing beneath said conveyed article wrapping material of the proper width based on the sensed height of said conveyed article; and means for cutting the wrapping material to the proper length based on the sensed length of the article.

2. Apparatus as in claim 1 wherein the means for cutting the wrapping material comprises a substantially vertically disposed supporting surface adapted to support the wrapping material; a substantially horizontal slot in said supporting surface disposed across the width of said surface; a knife blade adapted to move into said horizontal slot; a bar extending across the width of said knife blade, spring loaded to said blade, disposed below said blade and adapted to lead the blade when the blade is moved into the slot whereby the wrapping material is held taut against the supporting surface during cutting.

3. Apparatus as in claim 1 wherein the means for cutting the wrapping material comprises a substantially vertically disposed supporting surface adapted to support the wrapping material; a substantially horizontal slot in said supporting surface disposed across the width of said surface, said slot defined by an upper lip and a lower lip, the upper lip being recessed from a straight line extension of the outer edge of said lower lip; means for supplying compressed air; passages in the supporting surface, disposed below said lower lip and communicating with the slot, adapted to convey compressed air into the area above the outer edge of said lower lip whereby the leading edge of the wrapping material is forced out of the slot.

4. Apparatus comprising means, including a conveyer, for supporting and conveying a substantially cylindrical article; means for sensing the diameter and width of said conveyed article, said means disposed out of contact with said article; a plurality of storage means, each adapted to store a different width of wrapping material; means for dispensing beneath said conveyed article wrapping material of the proper width based on the sensed diameter of said article; and means for cutting the wrapping material to the proper length based on the sensed width of the article.

5. Apparatus comprising means, including a conveyer, for supporting and conveying a substantially elongated article; photocell means for sensing the height and length of said conveyed article; a plurality of storage means, each adapted to store a different width of wrapping material; means for dispensing beneath said conveyed article wrapping material of the proper width based on the sensed height of said conveyed article; and means for cutting the wrapping material to the proper length based on the sensed length of the article.

6. Apparatus comprising means, including a conveyer, for supporting and conveying a substantially cylindrical article; photocell means for sensing the diameter and width of said conveyed article; a plurality of storage means, each adapted to store a different width of wrapping material; means for dispensing beneath said conveyed article wrapping material of the proper width based on the sensed diameter of said article; and means for cutting the wrapping material to the proper length based on the sensed width of the article.

References Cited in the file of this patent

UNITED STATES PATENTS

2,148,248	Swangren	Feb. 21, 1939
2,219,682	Doble	Oct. 29, 1940
2,408,330	Miller	Sept. 24, 1946
2,860,462	Sykes	Nov. 18, 1958
2,880,560	Gibson	Apr. 7, 1959
2,919,527	Smith et al.	Jan. 5, 1960

FOREIGN PATENTS

107,238	Great Britain	June 20, 1917