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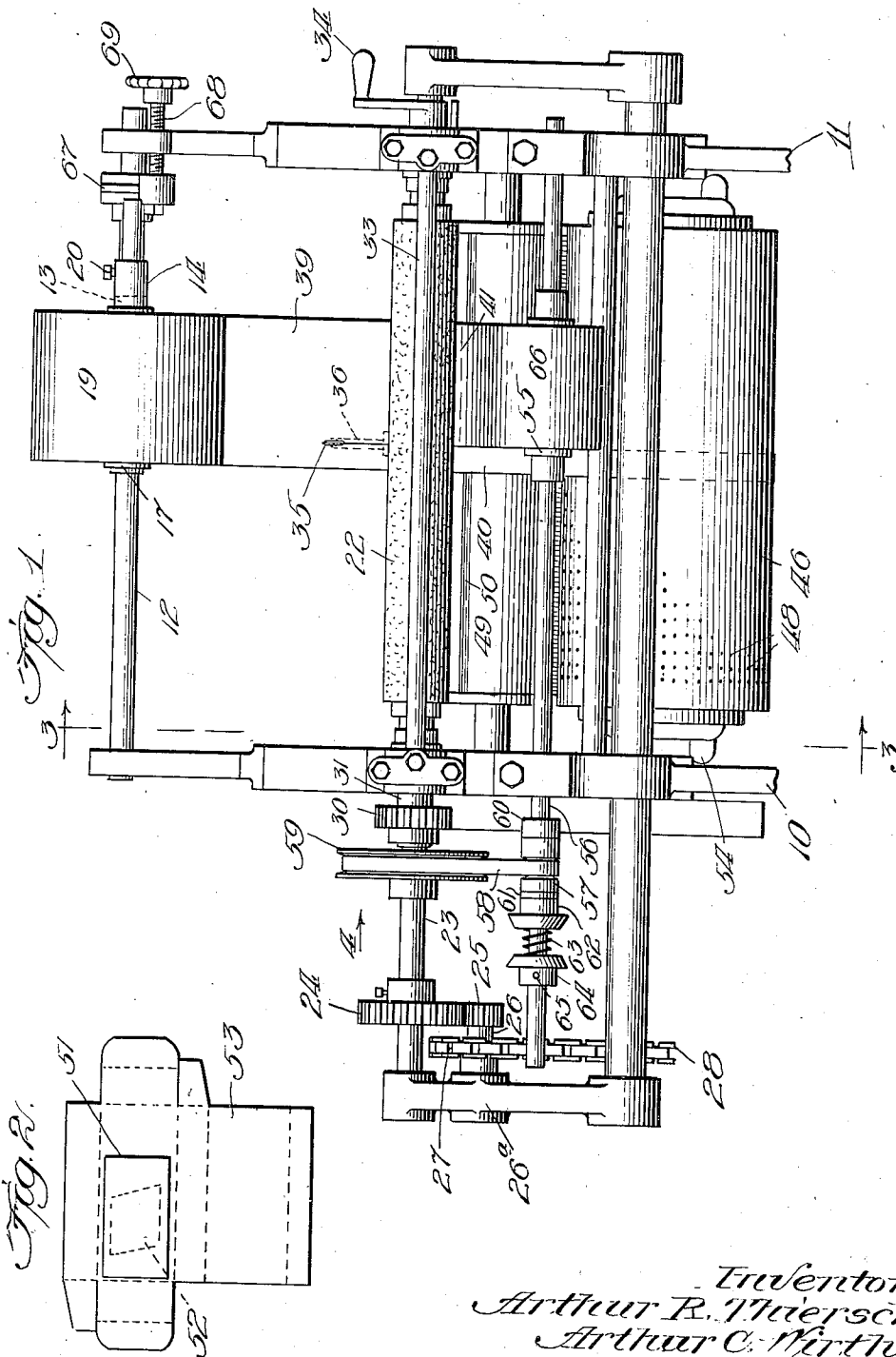
A. R. THIERSCH ET AL

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SLITTING AND REWINDING MECHANISM

Filed April 23, 1941

2 Sheets-Sheet 1



Inventors:
 Arthur R. Thiersch and
 Arthur C. Mirth
 by John D. Darley Atty.

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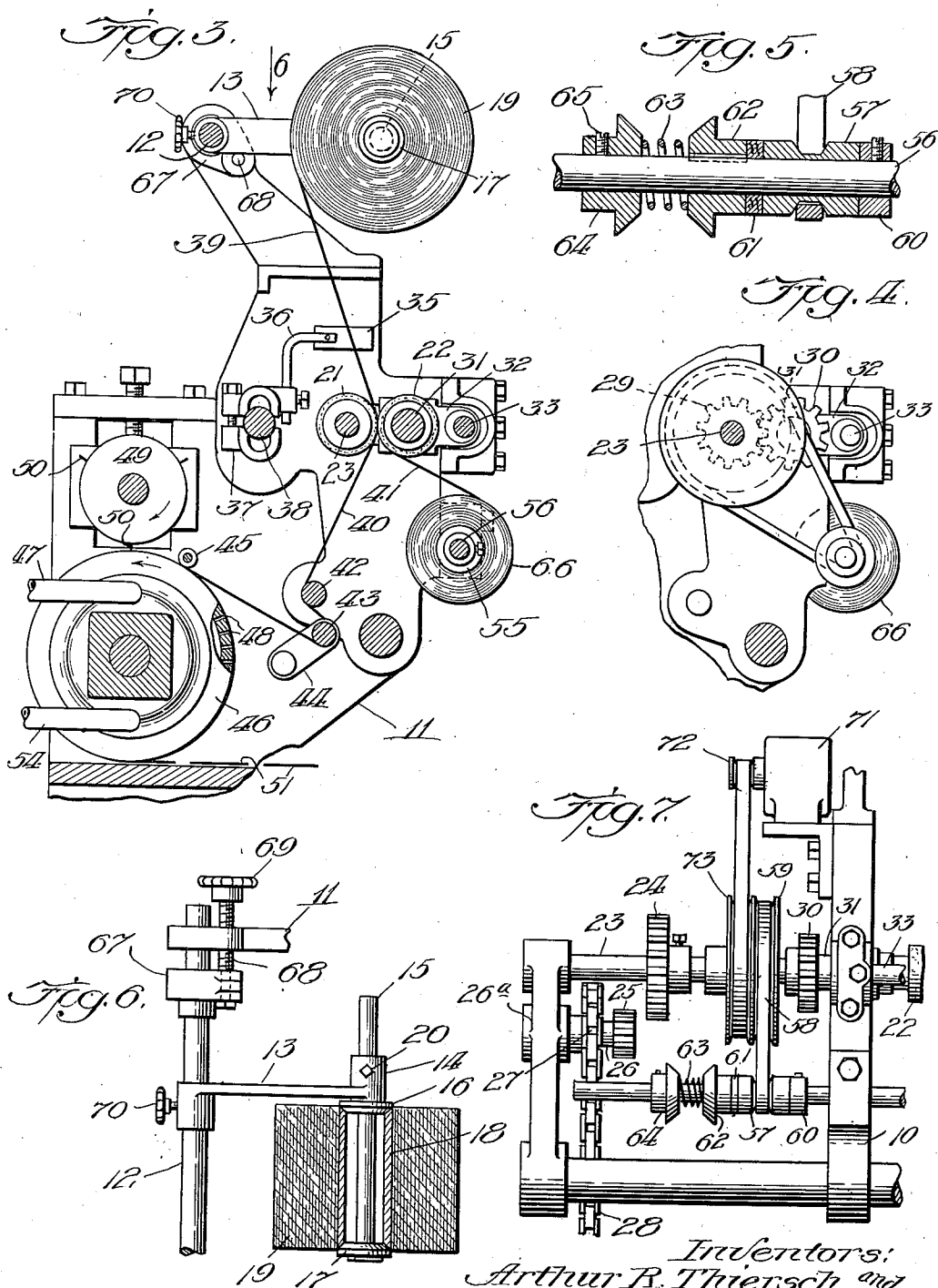
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Inventors:
Arthur R. Thiersch and
Arthur C. North

by John W. Darley

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UNITED STATES PATENT OFFICE

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SLITTING AND REWINDING MECHANISM

Arthur R. Thiersch and Arthur C. Wirth, Chicago, Ill., assignors to Carton Finishers, Inc., Chicago, Ill., a corporation of Illinois

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2 Claims. (Cl. 164—61)

Our invention relates to a slitting and rewinding mechanism for cutting a continuously moving sheet of material into two or more strips, at least one of which has a predetermined width, and thereafter rewinding the cut strips into rolls, or immediately feeding one or more of the strips to another mechanism while rewinding the remainder.

Our invention finds particular application in connection with the so-called window Cellophaning machine of the general type disclosed in U. S. Letters Patent No. 1,969,106, and for purpose of description, the invention will be discussed in connection therewith. These machines are employed to cover an opening in a carton or box with a transparent strip such as Cellophane or glassine, so that the contents of the carton are readily visible through the window.

In the ordinary operation of these machines, a Cellophane roll having a width suitable for the particular window to be covered is mounted in the machine and is then continuously unwound and transversely cut at intervals to produce window strips of the required length, which strips are then registered with the openings in the cartons and adhered thereto.

Where a machine operates continuously with cartons having windows of uniform width, no particular problem arises, but in those cases where successive batches of cartons are passed thru the machine, and the windows of one batch have a different width from the windows of other batches, the processor is faced with a choice of two alternatives. Either a large stock of Cellophane rolls of varying widths must be kept on hand or rolls of required width must be ordered as needed. The first alternative may be prohibitive as to investment for the small manufacturer, while in the other case, it has been ascertained that it is not always possible to promptly obtain rolls of the desired width so that there is a considerable stand-by loss of machine and operator time.

It is thereafter the principal object of our invention to devise a mechanism in the form of an attachment for a machine of the foregoing character which enables the use of a Cellophane roll of maximum length for any particular machine and the cutting therefrom of one or more strips having widths appropriate for the windows of cartons being processed, which strips are continuously moved into position to be operated upon by the Cellophaning machine, and the remaining portion of the original roll is rewound.

A further object is to provide a mechanism as

indicated which may be operated as a simple slitting and rewinding device during non-operative periods of the principal machine.

A further object is to devise a method of preparing from a roll of wound flexible sheet material a strip having a width less than that of the original roll while simultaneously rewinding the remainder of the roll for subsequent separation into other strips.

In the drawings:

Fig. 1 is an end elevation of a machine as disclosed in the aforesaid patent showing our improved mechanism applied thereto.

Fig. 2 is a plan view of a typical carton in collapsed condition showing a characteristic strip patch as produced by the machine covering a window opening in one side of the carton.

Fig. 3 is a section along line 3—3 in Fig. 1.

Fig. 4 is a fragmentary side elevation of the machine looking into the direction of the arrow 4 in Fig. 1 and showing the driving connection between the feed rollers and the rewind shaft.

Fig. 5 is a sectional elevation of the rewind shaft showing the friction clutch connection between the shaft and the drive from one of the feed rollers.

Fig. 6 is a fragmentary plan view, partly in section, looking in the direction of arrow 6 in Fig. 3, and showing the adjustable mounting for the roll of flexible material from which the strips are cut.

Fig. 7 is a fragmentary elevation of the left side of the machine as viewed in Fig. 1, showing the machine conditioned for simple slitting and rewinding.

Referring to the drawings the numerals 10 and 11 designate side frames of the machine as disclosed in the above noted patent. Disposed between and shiftable endwise in the frames is a bar 12 which carries an arm 13 that extends forwardly of the machine and is provided at its outer end with a hub 14 through which extends a pin 15. Integrally formed with the hub 14 is a beveled collar 16 and a similar collar 17 is integrally formed with the pin 15. The beveled surfaces of the collars 16 and 17 bear against the inwardly beveled ends of a spool 18 on which is wound a sheet of Cellophane 19. In other words, the spool 18 is journaled on the collars 16, 17 and the pin 15 may be adjusted in the hub 14 so that a slight frictional drag will be exerted by the collars against the spool 18 so that the unwinding of the roll 19 is effected under slight tension. This procedure insures that the sheet will be unwound in a smooth condition and en-

tirely free from wrinkles which is a very important factor in the case of a sheet of Cellophane or glassine. The adjusted position of the pin 15 may be held by a set screw 20 that is threaded in the hub 14.

A pair of coating feed rollers 21 and 22 also extend between the side frames and may be located at a lower elevation than the roll 19. The feed roller 21 is mounted on a shaft 23 that is journaled in the side frames with its left end extending through and beyond the frame 10 and having secured thereto a gear 24 which meshes with a pinion 25 fast on a stub shaft 26 that is journaled in a bracket 26a supported by the side frame 10. A sprocket 27 is secured to the stub shaft 26 and engaging therewith is a chain 28 which may be appropriately driven by any source of power as more particularly described in the above patent.

The shaft 23 has also secured thereto a pinion 29 that meshes with a gear 30 of equal diameter fast on a shaft 31 which carries the roller 22. Accordingly, the feed rollers 21 and 22 rotate at constant speed. Provision may be made for varying the clearance between the rollers and one such arrangement is generally indicated by the numeral 32 which designates a block in which each end of the shaft 31 is journaled and which may be moved towards and away from the roller 21 by means of an eccentric construction generally indicated by the numeral 33. The adjustment of the feed rollers forms no part of our invention and for a more detailed explanation reference may be had to the above noted patent. Rotation of the eccentric may be effected by means of a handle 34 located at one side of the machine.

In order to slit the unwinding sheet from the roll 19, a knife 35 is employed which is located between the roll 19 and the feeding rollers. This knife is supported by an arm 36 carried in a bracket 37 which is adjustable along a bar 38 so that the knife may cut strips of varying width from the sheet.

From the foregoing, it will be understood that after the sheet 39 is drawn between the feeding rollers 21 and 22, the rotation of these rollers will thereafter continuously unwind the sheet from the roll 19, this unwinding being effected against the frictional drag exerted on the spool 18. During the travel of the sheet 39 from the roll 19 to the feeding rollers the knife 35 slits the sheet into a strip 40 having the desired width and also into a strip 41. The strip 40 is then carried between and partially around a pair of tension rollers 42 and 43, the latter of which may be carried by a rock arm 44 that may be held in any desired angular position in order to vary the tension on the strip.

After passing the tension roller 43, the strip 40 is gripped between a pressure roller 45 and a suction roll 46 in order to draw the strip under tension as it issues from between the feeding rollers 21 and 22. As indicated in the above patent, provision is made through the medium of a suction pipe 47 and apertures 48 in the surface of the suction roll to snugly hold the strip 40 on the surface of the roll 46 after passing the pressure roller 45 and before passing between the suction roll 46 and a cutting roll 49 which is provided with a plurality of radially extending and circumferentially spaced knives 50.

As the cutting roll 49 rotates, the knives 50 periodically sever the advancing strip 40 into a succession of strip patches 51 (see Fig. 2), the distance between successive severings determin-

ing the length of the patch which will vary with the length of the window opening 52 in a carton 53. Thereafter, and as more particularly described in the aforesaid patent, the strip patches 51 are discharged from the surface of the suction roll 46 by relieving the suction through a pipe 54 and the patches are then registered in succession with the window openings of a succession of cartons 53 which are regularly advanced by another portion of the patented machine.

The other slitted strip 41 is simultaneously wound on a spool 55 which is similar to the spool 18, because it is contemplated that the rewound spool will be subsequently mounted again on the pin 15 and thereafter slit into other strips of the same or different widths. The spool 55 is clamped on a rewind shaft 56 (see Figs. 1 and 5) and this shaft is journaled in the side frames 10 and 11 with the left end of the shaft extending to the left of the frame 10. Freely journaled on that portion of the shaft 56 which lies to the left of the frame 10 is a pulley 57 that is driven by a belt 58 operating around a driving pulley 59 that is fast on the shaft 23. Axial movement of the pulley 57 towards the right, as viewed in Figs. 1 and 5, is prevented by a collar 60 and abutting against the opposite end of the pulley is a friction disk 61.

A friction drive between the disk 61 and the pulley 57 is effected by means of a pressure member 62 that is keyed to the shaft 56 so as to partake of the rotary movement of this shaft, while being conditioned for axial movement relative thereto. The member 62 is held against the disk 61 by a loading spring 63 which encircles the shaft 56 and abuts against a collar 64 that may be held relative to the shaft in any desired manner, as by a set screw 65 so that as the disk 61 wears the spring 63 may be reloaded by shifting the collar 65 towards the right.

The friction drive connection between the shaft 56 and pulley 57 is provided as a compensating factor because as the roll 19 decreases in diameter during unwinding, the roll 66 formed by winding the strip 41 on the sleeve 55 increases in diameter. In other words, while the linear speed of the sheet 39 between the feed rollers and the roll 19 always remains constant, the angular speed of the roll 19 varies from time to time relative to the angular speed of the rewinding roll 66.

As stated above, the knife 35 may be adjusted along the bar 38 and a further relative adjustment of the roll 19 may be made with respect to the knife. A supporting arm 13 for this roll is carried by the bar 12 see Fig. 6, and a collar 67 is fixed to the bar. Rotatably mounted in this collar and held against endwise movement relative thereto is one end of an adjusting screw 68 that is threaded through the side frame 11 and carries at its outer extremity a handwheel 69. By turning the screw 68, the roll 19 may be shifted for fine adjustment between the side frames of the machine. Major position adjustment of the roll is accomplished by loosening the set screw 70 and shifting the arm 13 along the bar 12.

From the foregoing, it will be readily understood that our improved mechanism provides an attachment that may be readily mounted on the foregoing patented machine to thereby enable the use of a roll having a standard length and from which strips of any desired width may be cut for subsequent processing by the machine. Our invention is not restricted to use in connection

with a window Cellophaning machine since it will operate just as readily in connection with sheets of any type of material that are capable of being wound into rolls.

During periods when the machine proper is not operating to apply strip patches to the window openings of cartons, the improved mechanism may be employed simply as a slitting and rewinding mechanism. Under these conditions, the knife 35 would be located to cut a strip of the desired width and thereafter the two slitted strips would be rewound simultaneously on a spool mounted on the rewinding shaft 56.

The scope of our invention also comprehends the utilization of more than one knife 35 whereby a plurality of strips of predetermined width can be simultaneously slit and rewound, or one or more of the strips can be delivered to another portion of the machine for severing, as indicated in Fig. 3, or for other purposes.

In Fig. 7 is illustrated a modification showing our mechanism employed simply for the purpose of slitting and rewinding a sheet, but without requiring the operation of the main driving parts of the principal machine. Under these conditions, it is contemplated that the gear 24 may be shifted out of mesh with the pinion 25 and a separate drive to the shaft 23 provided by means of a motor 71 carried by the side frame 10 and on the shaft of which is mounted a pulley 72 that belt drives a pulley 73 secured to the shaft 23.

We claim:

1. In a mechanism of the character described, a rod for rotatably supporting a roll of thin,

flexible, sheet material, means for applying a frictional drag to the roll during unwinding, a pair of feed rollers between which the sheet is drawn under tension to unwind the roll, means for slitting the sheet lengthwise into a pair of strips before reaching the feeding rollers, a rewind shaft on which one of the strips is rewound driven by a power source common to the rollers and shaft, knife means for transversely severing the other strip into a succession of strip pieces, and means for drawing said other strip under tension into proximity to the knife means.

2. In a mechanism of the character described, a rod for rotatably supporting a roll of thin, flexible, sheet material, means for applying a frictional drag to the roll during unwinding, a pair of feed rollers between which the sheet is drawn under tension to unwind the roll, means for slitting the sheet lengthwise into a pair of strips before reaching the feeding rollers, a rewind shaft on which one of the strips is rewound driven by a power source common to the rollers and shaft, friction clutch means interposed between the source and shaft for automatically varying the rotation speed of the shaft and maintaining a constant tension on the strip being rewound as the rewound roll increases in diameter during the rewinding, knife means for transversely severing the other strip into a succession of strip pieces, and means for drawing said other strip under tension into proximity to the knife means.

ARTHUR R. THIERSCH.
ARTHUR C. WIRTH.