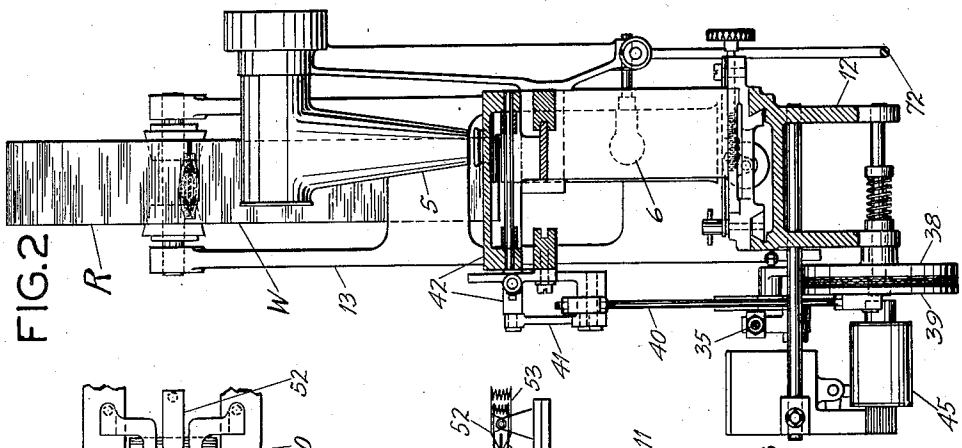
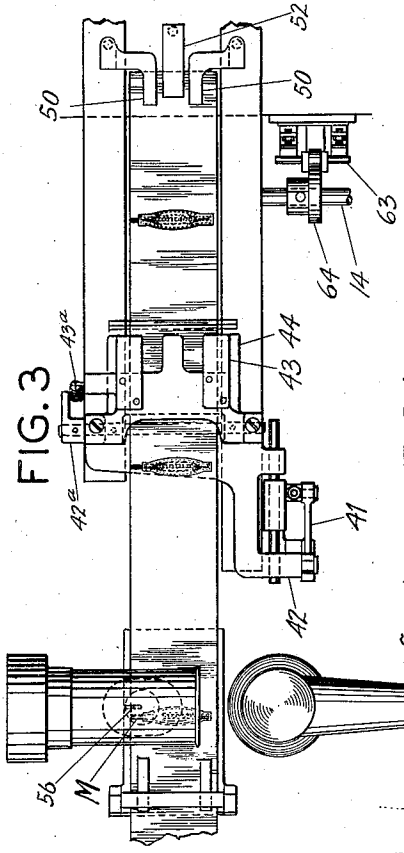
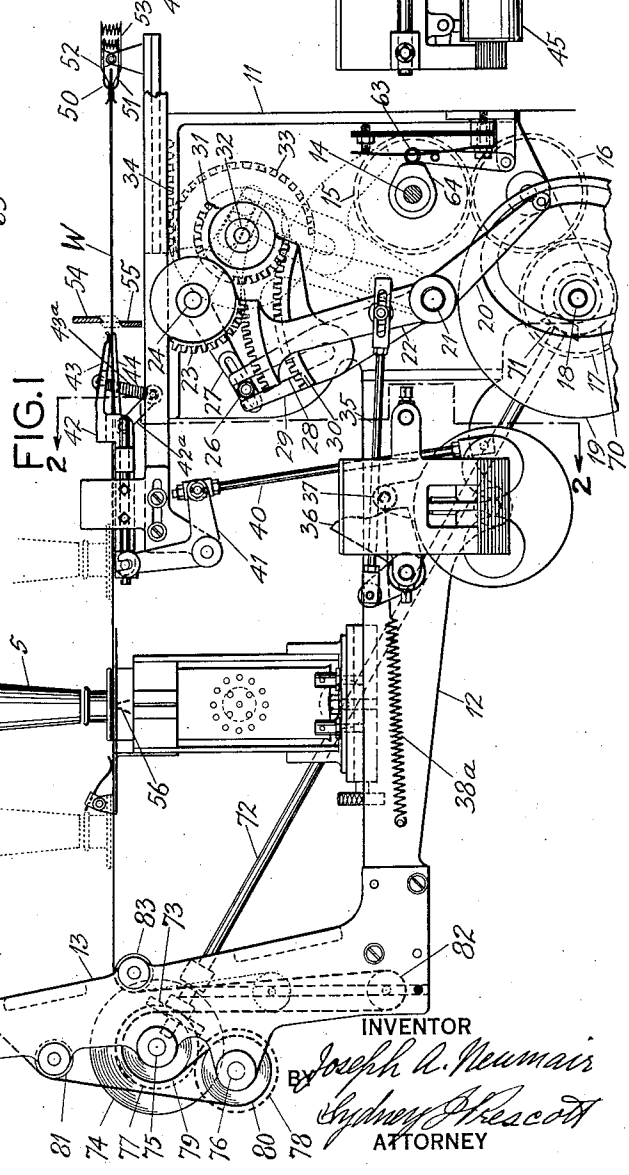
Dec. 18, 1934. J. A. NEUMAIR 1,984,804

REGISTERING WEB FEED FOR WRAPPING MACHINES

Filed Oct. 27, 1933 3 Sheets-Sheet 1




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FIG. 6

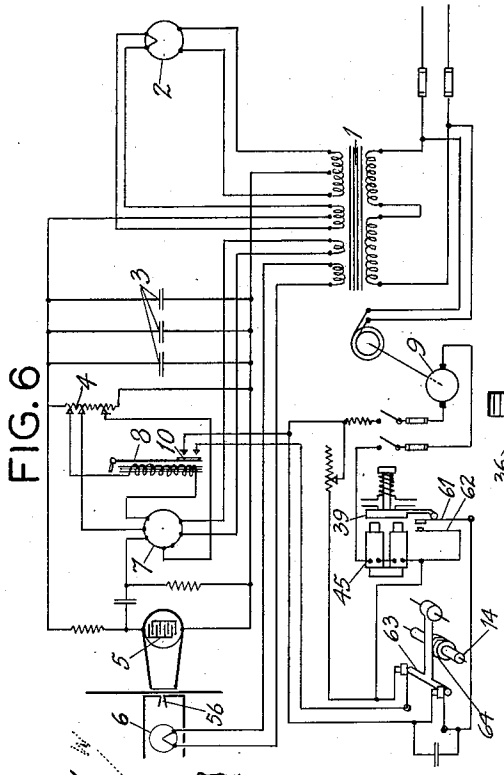


FIG. 5

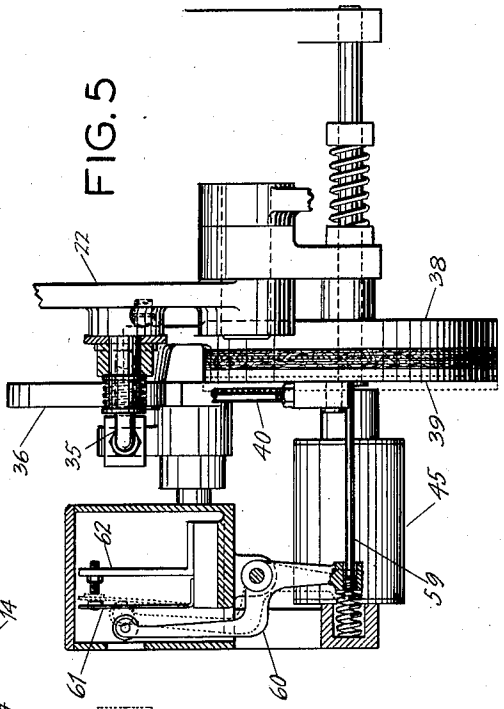
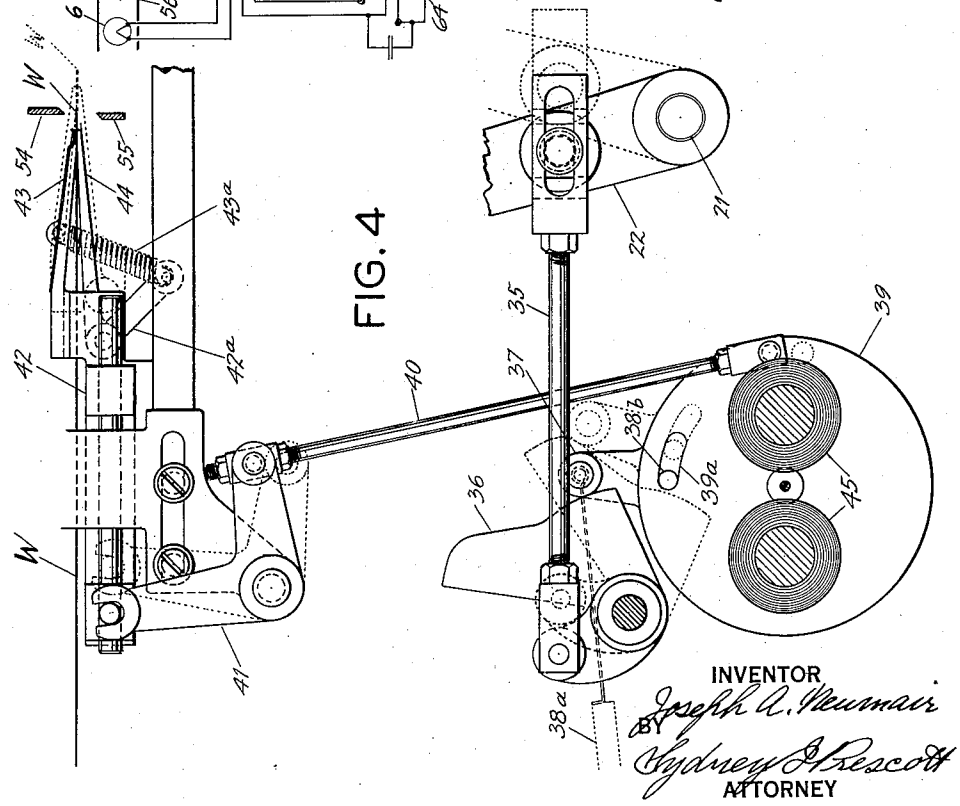


FIG. 4



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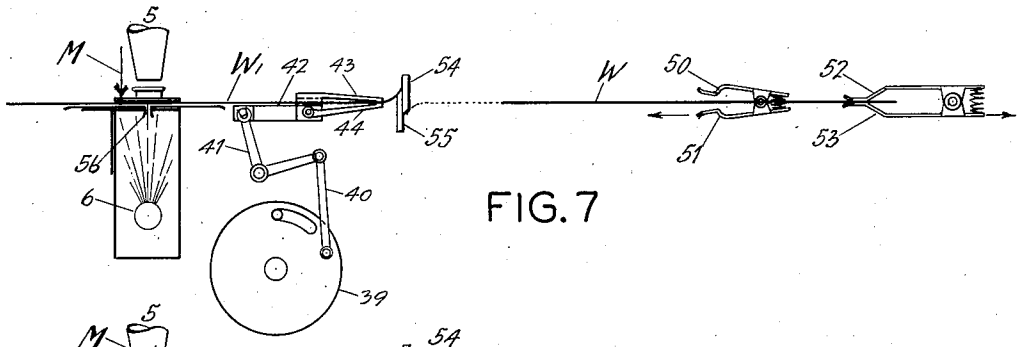



FIG. 7

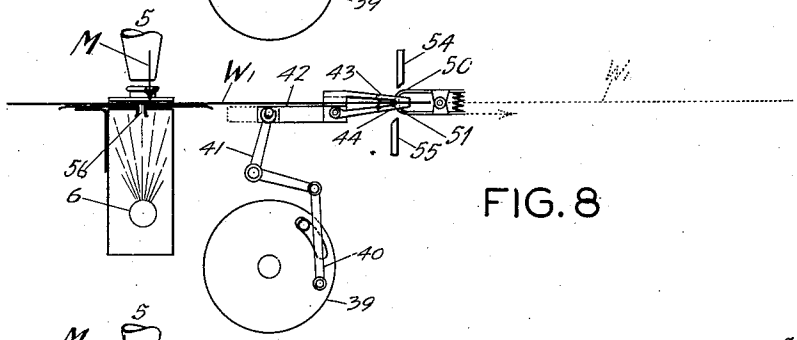



FIG. 8

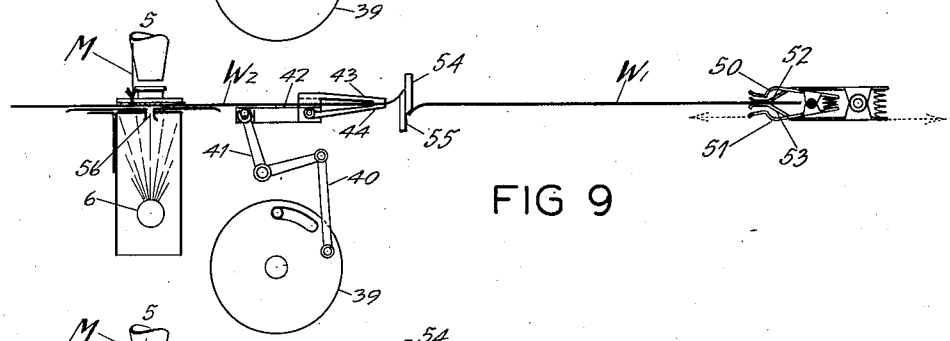



FIG 9

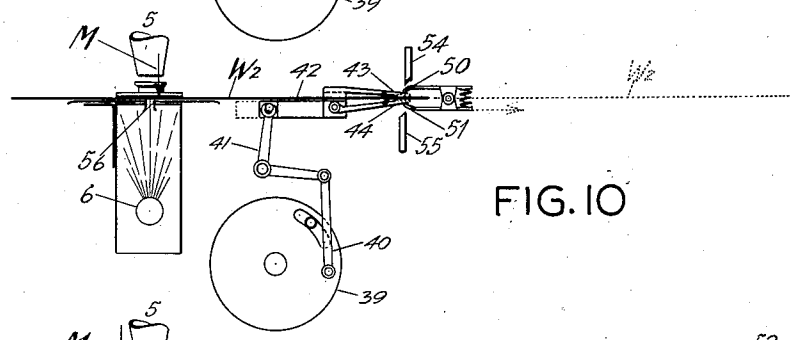



FIG. 10

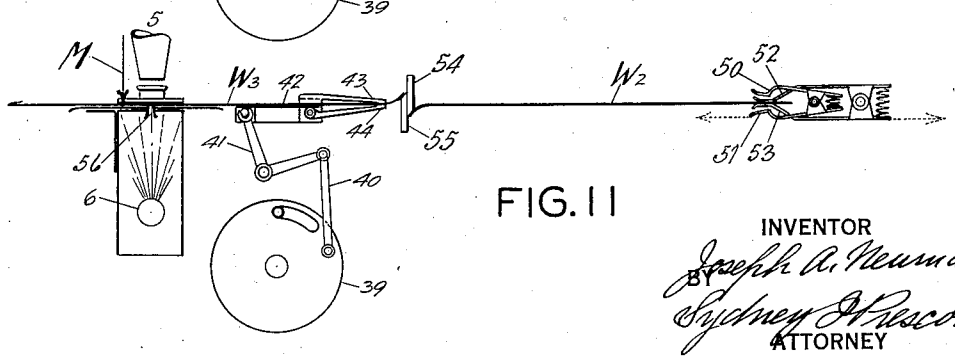



FIG. 11

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# UNITED STATES PATENT OFFICE

1,984,804

## REGISTERING WEB FEED FOR WRAPPING MACHINES

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Application October 27, 1933, Serial No. 695,527

5 Claims. (Cl. 164—48)

This invention relates to an improvement in wrapping machines, more particularly to the web-feeding mechanism thereof, and its main object is to provide an auxiliary web-feeding device for drawing the wrapping material into proper relation to the cut-off position, in order to overcome mechanical variations of the main feed mechanism and also to compensate for any discrepancies in spacing of the registering marks, which are placed on the web at equidistant intervals thereon, that may have occurred in preparing the web or which may be due to splicing or subsequent shrinkage or stretch of the web material. With this and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

The invention, as disclosed herein, has useful application to the wrapping and banding machine described in my co-pending patent application S. N. 629,959, filed August 22, 1932, and the drawings have therefore been so made as to show it in combination with said machine, reference being made to the disclosure of said application for a complete description of the details of the main feed mechanism.

The device however is not limited in usefulness as an adjunct to any particular wrapping machine and it can also be operated as a separate unit, where it is desired to cut off predetermined lengths of printed web material, such as labels or the like, as it is being unwound from a reel.

In the present invention it is assumed that the wrapping material or web has been prepared with index or registering marks placed at fixed even spaces along the length of the web. These spaces represent the lengths of sections required for wrapping a certain commodity, and as it may be desirable to expose certain advertising matter printed on the wrapping material, it is often important that this be placed uniformly so as to occupy a balanced and attractive position on the wrapped article.

The operation of the auxiliary web-feeding device accomplishes this purpose as it is actuated by the index marks for timing its operation and these marks always occupy a fixed relation to the printed matter. The principal advantage of the auxiliary web-feeding mechanism, which may also be termed a registering or adjusting device, is that while it does not guarantee positive accuracy in lengths of sections, it prevents errors from accumulating so that an error in location of one index mark will be compensated for at the next.

The object of the present invention is achieved by combining the circuit of a light-sensitive "bridge" or photo-electric cell, placed in light-receiving position in respect to registering marks on the web, with an electro-magnetic clutch in such a manner that the drive of the auxiliary web-feeding mechanism is disconnected on receiving a photo-electric impulse. At the instant of release of the clutch the auxiliary feed has advanced the leading end of the web a certain distance beyond the "cut-off" position and, while the main feed is operating, the transfer fingers thereof move up into position to grip the protruding end of the web and proceed to "pull-off" an amount of web as predetermined by the setting of the main feed mechanism. When the feed has reached the end of its stroke, the web is cut to the required length. This length of severed web is equal to the length of stroke of the main feed mechanism plus the amount of advance of the web produced by the auxiliary web-feeding device, beyond the "cut-off" position.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a side elevation showing the web-feed from the reel to the cut-off knives;

Fig. 2 is a sectional end view taken on line 2—2 of Fig. 1;

Fig. 3 is a plan view of Fig. 1;

Fig. 4 is a detail side elevation showing the operating parts of the adjusting device;

Fig. 5 is a sectional end view of Fig. 4;

Fig. 6 is a schematic layout of wiring diagram;

Figs. 7 to 11 are schematic views showing the operation of the registering device during different stages of transfer of web material from reel to wrapping mechanism.

In carrying the invention into effect there is provided a web-severing knife, a main web-feeding mechanism, and an auxiliary web-feeding device for periodically presenting the leading end of the web in properly disposed relation to the knife, whereby cumulative errors in the feed of the web are avoided. In the best constructions contemplated said device includes a reciprocable slide, coacting grippers on the slide for advancing the web, means for reciprocating the slide including an electromagnetically controlled clutch, a photoelectric cell, a source of light arranged to throw a beam of light onto the cell, and an electric circuit connecting said cell and clutch, whereby the obstruction of the beam of light by an opaque index mark on the web will disengage the clutch to stop the web in properly disposed relation to the knife. These various means and parts may be widely varied in construction within the scope of the claims for the particular device selected to illustrate the invention is but one of many possible con-

crete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

Referring to Figs. 1, 2, and 3 of the drawings, bracket 11 is attached to the frame of the combined wrapping and banding machine, and contains the main feed mechanism. To bracket 11 is attached bracket 12 which provides support for the secondary feed, the photoelectric cell unit and, by means of bracket 13, for the reel R and the reel drive.

Drive shaft 14 by means of gears 15, 16, and 17 drives shaft 18. Bevel gear 70 on shaft 18 meshes with bevel gear 71 on shaft 72, the upper end of which carries a friction wheel 73. Wheel 73 engages friction disk 74 on shaft 75 which drives shaft 76 through a pair of gears 77 and 78. Shafts 75 and 76 also carry drive rollers 79 and 80.

The web material W is threaded from reel R over a guide roller 81, drive rollers 80 and 79, tension take-up roller 82 and guide roller 83 through the photoelectric cell 5, which forms a part of the auxiliary feed comprising gripper fingers 43 and 44 on slide 42.

The unwinding of web material is continuous except when tension take-up roller 82 reaches the limit of downward motion, thus releasing the tension and friction of the web on drive rollers 79 and 80. As the web material is carried off by the main feed mechanism, the tension roller 82 is raised, thus restoring the friction necessary for drive rollers 79 and 80 to operate.

On shaft 18 is mounted a disk cam 19. Cam lever 20 on shaft 21 engages cam 19 and thus actuates the gear segment of lever 22 which meshes with gear 23 fixed to shaft 24. Lever 27 is also attached to shaft 24. A roller 26 adjustably secured to lever 27 engages slot 28 of lever 29 loosely mounted on shaft 21. A gear sector 30 attached to lever 29 engages gear segment 31 on shaft 32 to which is also attached gear 33. Gear 33 engages a rack fixed to slide 34 on which are mounted the first transfer fingers 50 and 51, which are actuated to grip and release the web by means disclosed in my co-pending application referred to above.

As drive shaft 18 rotates it turns cam 19 which imparts a swinging motion to lever 20 and, through shaft 21, a corresponding motion to lever 22. The gear segment of lever 22 causes oscillation of gear 32 and, through shaft 24, a corresponding swinging motion of lever 27. As lever 27 oscillates, roller 26 which is constrained to travel in slot 28 of lever 29, imparts a swinging motion to lever 29 and gear sector 30, which in turn, oscillates gear 31 and, through shaft 32 produces a corresponding oscillation of gear 33. Oscillation of gear 33, which engages a rack on slide 34, imparts a straight line reciprocating motion to the slide on which are mounted the first transfer fingers, 50 and 51.

A second transfer slide (not shown) carrying gripper fingers 52 and 53, picks up the web, as the slide 34 completes its forward stroke, and, after the web has been cut by knives 54 and 55, draws the severed section over the article to be wrapped. Reference may be had to my co-pending application referred to above for a complete disclosure of mechanism for actuating the fingers 50—51 and 52—53 to grip and release the wrapper. One half turn of cam 19 produces a motion through levers and gears in one direction and the other half turn reverses the direction throughout the mechanism. The straight line motion imparted to first transfer slide 34 brings the first transfer fingers 50 and 51 up into position to grip the protruding end of the web as shown in Fig. 8. During part of the approach of the first transfer slide the auxiliary web-feed, actuated by lever 22, Fig. 4, through connecting rod 35 and cam 36 bearing on roller 37, causes clutch member 38 to rotate and through clutch disc 39 and connecting rod 40, bell crank lever 41 advances slide 42 with the gripper fingers 43 and 44 which hold the end of the web W, thus causing the leading end of the web to be pushed forward beyond the established cut-off position, the slide 42 being reciprocably mounted in a bracket carried by the guides of the slide 34.

The swinging motion of lever 22, Figs. 4 and 5, through connecting rod 35 and cam 36, which contacts on roller 37 on the clutch member 38 oscillates the latter. Tension spring 38*a* urges the roller 37 against the cam 36 and normally maintains the pin 38*b* on clutch member 38 against one end of the slot 39*a* in clutch disk 39. Clutch disk 39 is yieldingly pressed into engagement with clutch member 38 and thereby, through connecting rod 40 and bell crank lever 41, transmits a horizontal sliding motion to slide 42. Fingers 43 and 44 on slide 42, Fig. 7, having gripped the web W just before the last cut was made, advance the end of web W between the open knives 54 and 55, Fig. 8, a distance equal to the space between index mark M on the web and slot 56 in the photoelectric cell unit. On the return swing of lever 22, the magnet 45 having released clutch disk 39, as will be hereinafter described, the slide 42 returns as cam 36 retreats and allows clutch member 38 to follow the movement of the cam under the action of spring 38*a*, thereby also turning the clutch disk 39 through action of pin 38*b* in slot 39*a*.

When the index mark M on web W passes over the narrow slot 56, Figs. 1 and 3, which is the only space through which light from the incandescent lamp 6 can reach the photoelectric cell 5, the light source is cut off from the light sensitive bridge. This results in a momentary impulse in the circuit of electo-magnet 45, energizing it and causing it to attract the armature or clutch disk 39, releasing it from clutch member 38 and thus arresting the movement of the auxiliary web-feed.

As clutch disc 39 is attracted by magnet 45, push rod 59, Fig. 5, which is spring-pressed into engagement with the clutch disc 39, through lever 60 establishes contact between contact spring 61 and post 62, thereby closing an independent circuit through contact maker 63, which is controlled by cam 64 on drive shaft 14. Contact maker 63 thus establishes a second circuit through electro-magnet 45, which insures that the magnetization of armature 39 will be unaffected by any impulses of the photo-electric circuit during the rest period of the web. In order to take care of wrapping material of lengths and widths varying for different size articles, the photoelectric cell unit is slidably mounted on bracket 12 and provided with screw adjustments, in two directions, for close setting.

From the above described action of the photoelectric cell, it will be seen that the amount of movement of web W, due to the action of the auxiliary feed, is dependent on the distance of index mark M from slot 56 at the time in the last cut was made.

Figs. 7 to 11 inclusive show progressive stages in the operation of the photoelectric cell and the main and auxiliary web-feeding mechanism.

Fig. 7 shows the gripper fingers 52 and 53 after they have gripped the cut-off section W of the web pulling it away while the transfer fingers 50 and 51 in separated position, are returning to grip the end of the next section W1 which, in the meantime, is being advanced into position between the knives 54 and 55 by the auxiliary feed. Fig. 8 shows transfer fingers 50 and 51 after they have gripped the protruding end of the web W1 ready to pull away as fingers 43 and 44 of slide 42 release their grip. The finger 44 is pivoted on slide 42 and carries a lever 44*a* which is connected by a tension spring 43*a* to the finger 43, whereby the web is gripped between the fingers 43 and 44 and the engagement of the lever 44*a* with a stationary abutment, not shown, will cause the fingers to release the web. Fig. 9 shows this section of web W1 pulled out and cut off as the gripper fingers 52 and 53 have gripped the cut-off section W1 ready to proceed to transfer it into position above the article to be wrapped, the transfer fingers 50 and 51 have released their grip ready to return and grip the end of the next section W2 which will be advanced similarly as shown in Figs. 8 and 10. In Fig. 8 the end of W1 is shown protruding further beyond the cut-off position than is the case of web W2 in Fig. 10. This condition results from index mark M in Fig. 7 being a greater distance away from the photo-electric cell, at the instant the web was cut, than is the case in Fig. 9.

As the advance of web, due to the auxiliary feed, is equal to this distance, plus a constant amount of overtravel, there will be a difference in the amount of advance of webs W1 and W2 in the two cases and, as the transfer stroke is constant, the fingers 50 and 51 of the first transfer will grip the web a greater distance in from the end in the case shown in Fig. 8 than they will in the case shown in Fig. 10 and the result will be, as shown in Fig. 9, a longer cut-off section W1 than section W2 as shown in Fig. 11.

As before mentioned this variation in lengths, which would ordinarily be very small, would only result in a slight difference in lengths of web material extending beyond the ends of the article to be wrapped, as the location of the label, or other printed matter would always occupy a fixed relation with reference to the index mark M and the action of the auxiliary web feed is controlled by the location of this mark.

A wiring diagram, showing the photo-cell and clutch control circuits, is indicated in Fig. 6.

The photoelectric cell circuit consists of a step-down transformer having its primary connected to a source of alternating current; a rectifier tube 2 connected to the secondary of the transformer and also connected to the plate circuit of the amplifier tube 7; a filter system consisting of condensers 3 connected across the plate circuit to flatten out the intermittent pulsating current delivered thereto by the rectifier; voltage divider (4); photo-cell (5); light source (6) containing a suitable optical system; amplifier tube (7); and relay (8) connected in the plate circuit of the tube 7. It will be noted that the filament of the tube 7 and the light source 6 are connected to secondary windings of the transformer.

The clutch control circuit consists of a D. C. current supply (9); contacts (10) on relay (8); timer (63); clutch magnet (45); and armature (39) for operating the clutch and holding in contacts 61 and 62.

As the opaque index mark M on the cellophane wrapping material W passes over slot 56 and obstructs the light beam from the light source 6 to the photo-cell 5, which is connected to the grid circuit of the tube 7, a current is permitted to flow through the cell, thereby amplifying the current flowing in the plate circuit through relay coils 8 and closing the contacts 10.

The timer 63, being so adjusted that its contacts have been closed just prior to index mark M on web W reaching the slot 56, completes the circuit through clutch magnet 45, disengaging the clutch of the auxiliary feed by pulling the armature 39 against the poles of the magnet, thus preventing any further advance of the web. This movement also closes contacts 61 and 62 thereby holding the clutch in a disengaged position until it is released as the current is broken by the opening of timer contacts 63.

What is claimed is:

1. In a wrapping machine, the combination with a main web-feeding mechanism, of a photoelectrically controlled auxiliary web-feeding device for periodically presenting the leading end of the web of wrapping material to said mechanism, whereby cumulative errors in the feed of the web are avoided.

2. In a wrapping machine, the combination with a web-severing knife, of a main web-feeding mechanism, and a photoelectrically controlled auxiliary web-feeding device for periodically presenting the leading end of the web of wrapping material to said mechanism in properly disposed relation to the knife, whereby cumulative errors in the feed of the web are avoided.

3. In a wrapping machine the combination with a web-severing knife, of a main web-feeding mechanism, and a photoelectrically controlled auxiliary web-feeding device for periodically presenting the leading end of the web of wrapping material to said mechanism in properly disposed relation to the knife, whereby cumulative errors in the feed of the web are avoided, said device including a reciprocable slide, coacting grippers on said slide, means for reciprocating said slide including an electromagnetically controlled clutch, a photoelectric cell, a source of light arranged to throw a beam of light onto said cell, and an electric circuit connecting said cell and clutch, whereby the obstruction of the beam of light by an opaque index mark on the web of wrapping material will disengage said clutch to stop the web in properly disposed relation to the knife.

4. The combination with a main web-feeding mechanism, of an auxiliary web-feeding device for periodically presenting the leading end of the web to said mechanism, whereby cumulative errors in the feed of the web are avoided.

5. A web-feeding device comprising a reciprocable slide, coacting grippers on said slide for advancing the web, means for reciprocating said slide including an electromagnetically controlled clutch, a photoelectric cell, a source of light arranged to throw a beam of light on said cell, and an electric circuit connecting said cell and clutch, whereby the obstruction of the beam of light by an opaque index mark on the web will disengage said clutch and stop the web feed.

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