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2,300,569

CONTROLLING DEVICES FOR WRAPPING MACHINES

Filed May 9, 1941

2 Sheets-Sheet 1

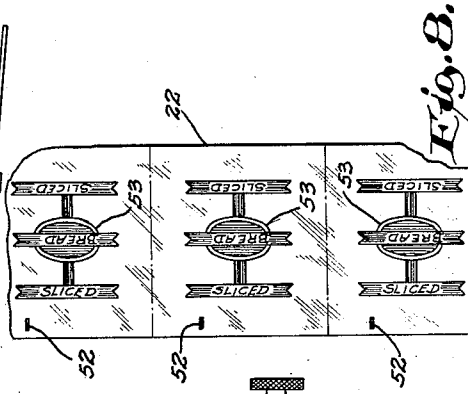
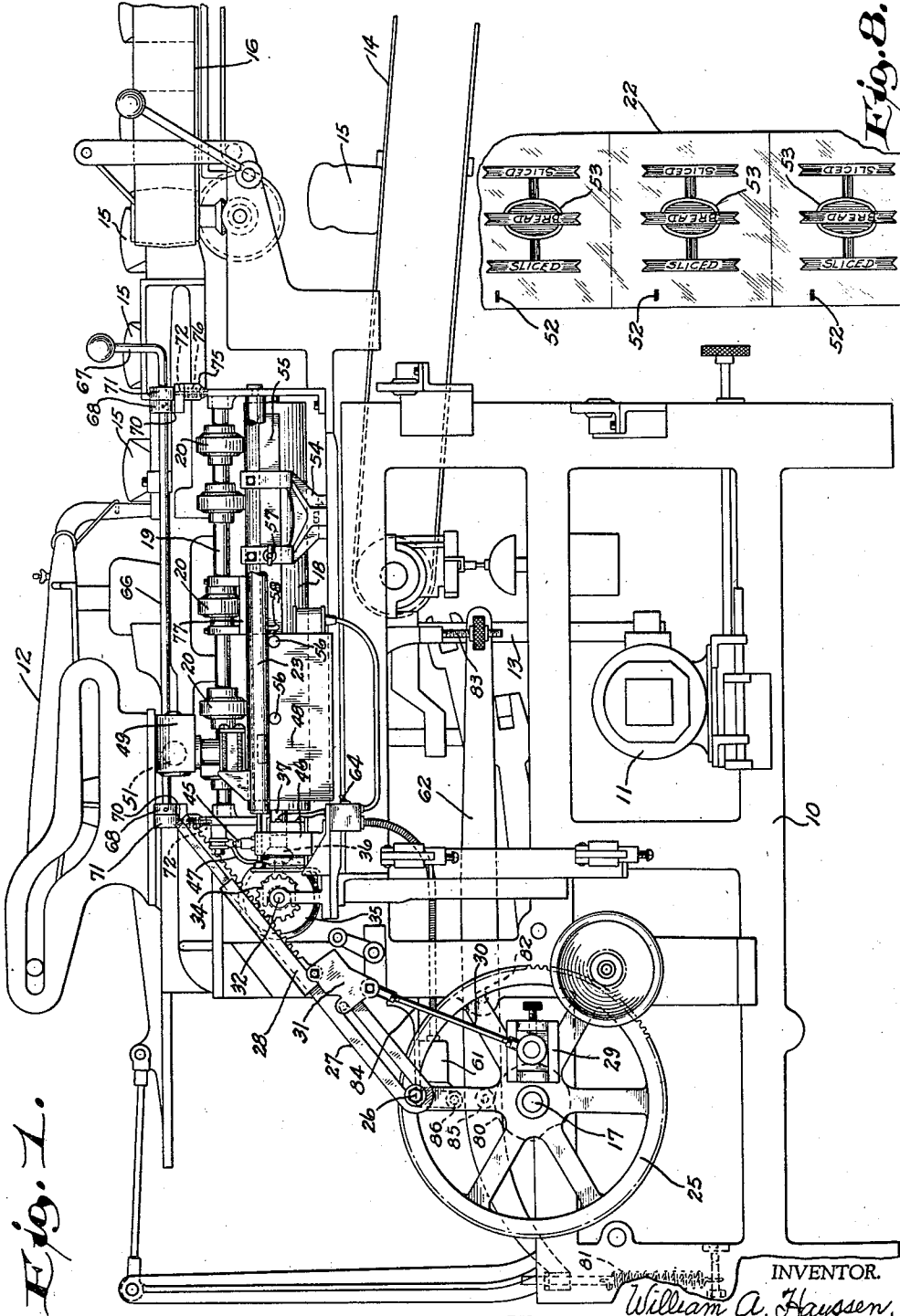


Fig. 1.

Fig. 2.

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2 Sheets-Sheet 2

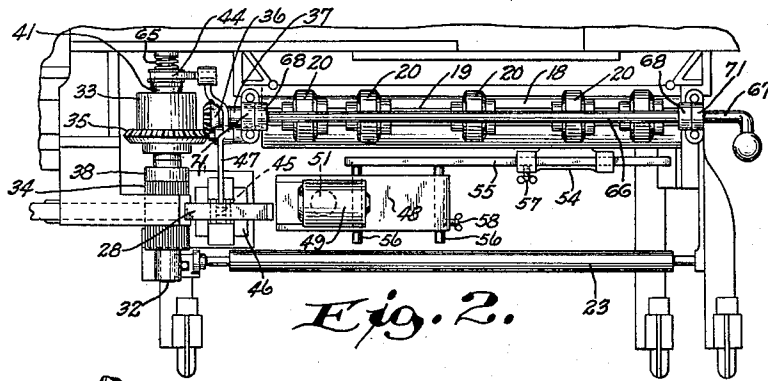


Fig. 2.

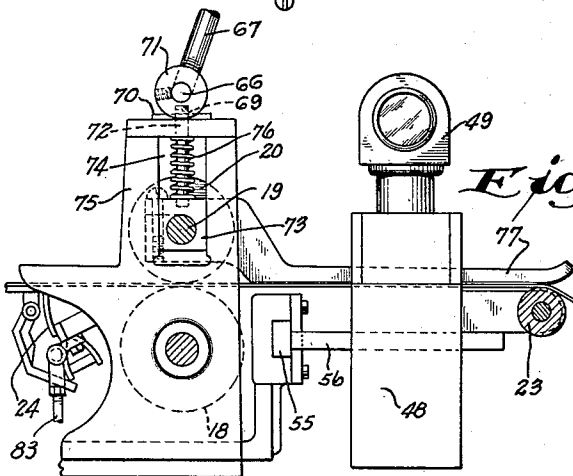


Fig. 3.

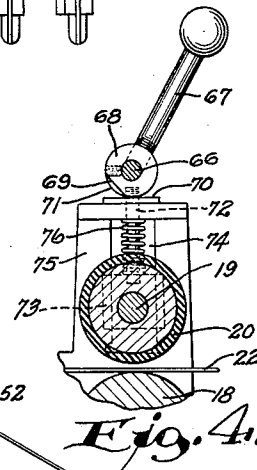


Fig. 4.

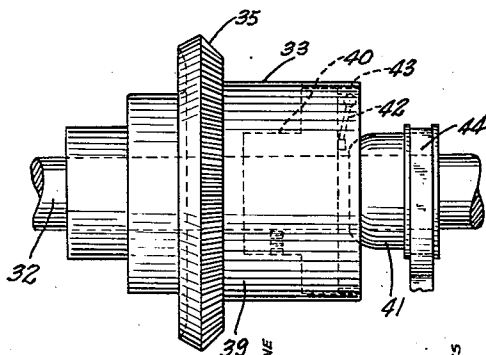


Fig. 5.

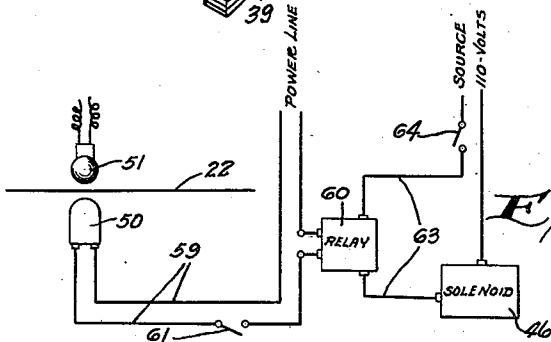


Fig. 6.

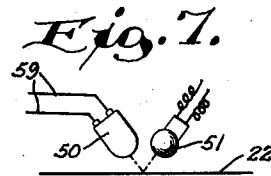


Fig. 7.

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UNITED STATES PATENT OFFICE

2,300,569

CONTROLLING DEVICE FOR WRAPPING
MACHINES

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Application May 9, 1941, Serial No. 392,652

4 Claims. (Cl. 164—49)

This invention relates to improvements in controlling devices for machines including wrapping machines wherein a web is severed, and more particularly to a controlling device in the nature of an electric eye or light sensitive means for automatically controlling the paper feeding means in machines including wrapping machines.

Heretofore, it was standard practice in wrapping machines for loaves of bread, for instance, to feed the wrapping paper in a continuous web from a roll, with the web traveling longitudinally of the machine and transversely of the length of the loaf. At a proper station the paper was periodically cut off in lengths so that a length could be wrapped around a loaf and folded over the ends thereof. In the standard prior machines of the type mentioned, it was impossible to accurately control the web feeding mechanism relative to the location of printing matter, designs, or other indicia on the paper in its relation to a wrapped loaf. Because of this difficulty it became common practice to print an entire roll of paper with continuous repeated patterns with the result that no attempt was made during wrapping operations, to accurately register any particular portions of the wrapper indicia with the loaf being wrapped.

It will thus be seen that prior wrappers were rather completely covered with continuous designs or other indicia and a baker could not avail himself of a wrapper which carried only segregated areas of printing which needed correct spacing and locating on a wrapped loaf.

According to the present invention the aforementioned objections and limitations are overcome and a web of paper for continuous wrapping may have segregated and spaced indicia thereon because the present improvements so accurately control the paper web feed as to insure positioning of the indicia on a section of wrapper on desired sides of a loaf. Also, according to the present invention it is unnecessary to print that portion of the paper which is folded under the bottom of the loaf.

A further object of the invention is to provide an electric eye control for wrapping machine web feeds which functions with either opaque or light permeable paper.

A further object of the invention is to provide a control of the character described whereby spaced markings or areas on the wrapping paper itself serve to accurately stop the web feed so that the cutting operation is always performed in the same position relative to the indicia groups on the wrappers.

In general the present invention, in its application of the principle of electric eye control for wrapping mechanism is somewhat analogous to the Hayssen Patent No. 2,127,028, but the present invention is an improvement thereover in the accessibility for repairs, replacements and adjustments of the electric eye unit, and also in regard to the particular portion of the web feeding mechanism which is controlled by the electric eye.

A more specific object of the present invention is to provide a control of the character described wherein an electric eye mechanism automatically operates a clutch interposed between the drive of the machine and the wrapper feeding rolls.

Another specific object of the invention is to provide an electric eye control for wrapping machines which is extremely simple and is susceptible of very accurate register control.

A further object of the invention is to provide an electric eye control for wrapping machines which is very simple in construction and operation, which is strong and durable, which is automatic and efficient in operation, and which is well adapted for the purposes set forth.

With the above and other objects in view the invention consists of the improved electric eye control for wrapping machines, and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a side view of a bread wrapping machine equipped with the improved electric eye control for the paper feeding mechanism;

Fig. 2 is a fragmentary plan view of that portion of the wrapping machine with which the improved control mechanism is associated;

Fig. 3 is an enlarged fragmentary vertical sectional view through a portion of the wrapping machine showing the paper feeding roll and co-operating rollers;

Fig. 4 is a fragmentary vertical sectional view showing the position of the cooperating paper feeding rollers when elevated to inoperative position;

Fig. 5 is a fragmentary detail view of the clutch for controlling the wrapper feeding roll shaft;

Fig. 6 is a schematic and wiring diagram of the electrical connections for the control system and illustrates the arrangement of a light sensitive cell and light source relative to the wrapper web when light permeable wrapping material is used;

Fig. 7 is a schematic view showing the relative position of the light cell and light source when arranged for use with opaque or semi-opaque wrapping material; and

Fig. 8 is a plan view of a fragment of a paper web such as may be fed into the machine for the wrapping of bread loaves.

Although the invention is illustrated and described as being applied to a bread wrapping machine it should be understood that the invention is generally applicable to various types of mechanisms for feeding and severing a web. All such changes, modifications and adaptations are contemplated as may come within the scope of the appended claims.

Referring now more particularly to the drawings it will appear that the depicted bread wrapping machine includes a frame 10 on which the various mechanisms are supported in the usual manner. Said mechanisms will not be described in detail as they are similar to those used in conventional machines of this type. There is, however, a motor 11 which is connected by suitable transmissions to operate a paper folding mechanism designated generally by the numeral 12; and an intermittently operable elevator 13 for wrapping each loaf as it is delivered thereto, into proximity of the folding mechanism 12. The latter functions to wrap paper about each loaf.

An incoming conveyor is designated by the numeral 4. Said conveyor is suitably driven (either continuously or intermittently) and loaves 15 are spaced thereon so that individual loaves successively are moved onto the elevator 13 which lifts each loaf to a wrapping position and then drops to receive the next loaf. An outgoing conveyor 16 is provided above the incoming conveyor 14 to take the wrapped loaves to a suitable collection station remote from the machine.

The present invention is concerned particularly with the feeding mechanism for the wrapping paper web. Rotatably supported in the frame 10 is a transverse shaft 17 driven from the motor 11 by suitable power connections. An elongated lower feed roller 18 is mounted on one side of the machine and extends longitudinally thereof with its end portions being journaled in suitable bearings. Above said feed roller 18 there is a shaft 19 which carries spaced apart cooperating pressure rollers 20, preferably formed of rubber. The end portions of the shaft 19 are mounted in vertically shiftable bearing brackets, as will appear from Figs. 3 and 4.

A roll of wrapping paper 21, having its printed surface upward, is rotatably and replaceably supported on brackets at the front side of the machine, as illustrated in the Mayssen Patent No. 2,127,028. The web 22 from the roll 21 passes over a small diameter guide roll 23 and from thence between the roll and rollers 18 and 20. The web further extends adjacent the folding mechanism 12. An oscillatable cut-off knife 24 of the usual type may be intermittently operated by the suitable transmission from the motor 11 so that paper which is intermittently fed to the wrapping position will be cut off in suitable lengths.

The feed roll 18 is intermittently driven from the constantly revolving shaft 17 by means of a transmission mechanism shown at the left in Fig. 1. A fly wheel 25 is fast on the shaft 17 and a peripheral portion of said fly wheel has a pivotal connection 26 with a reciprocating connecting rod 27. A rack 28 is adjustably secured to

the outer end portion of the connecting rod and may be moved longitudinally thereon to vary the length of stroke of the connecting rod and rack. Such adjustments are facilitated by a crank pin block 29 in which an end of a connection 30 is adjustably secured. The other end of said connection is fast to an extension plate 31 on the adjustable rack 28.

Suitably mounted in bearing brackets on the upper portion of the frame 10 immediately below the rack 28 is a transverse shaft 32. Said shaft carries a clutch 33 which will be referred to in detail hereinafter. On the shaft 32, and integral with an overrunning clutch 38, is a pinion 34 which is in mesh with the rack 28. A miter gear 35 is integral with a portion of the master clutch 33 and is driven only when said clutch is engaged. Said miter gear engages a pinion 36 fast on the end of a shaft 37 on which the paper feed roll 18 is mounted.

In addition to the clutch 33 there is also on the shaft 32 the previously mentioned overrunning clutch 38 of a conventional type. Said overrunning clutch is so constructed and arranged that when the rack 28 is moved in a downward direction it, through the integral pinion 34, will rotate the shaft 32 for driving purposes, and when said rack travels in an upward direction, because of the overrunning clutch, the shaft 32 will be idle and the connections to the feed roll 18 will be inoperative.

The master clutch 33 has not been shown in detail as any type of clutch or controllable coupling may be utilized. However, referring to Fig. 5, it may be assumed that a clutch of the expanding ring type is desirable. The miter gear 35 is fast with a shell 39 which is normally loose relative to the shaft 32. A portion of said shell encloses a complementary unit 40 which is fast to the shaft 32. A longitudinally movable tapered member 41, slidably mounted on the shaft 32 can be moved to the left, relative to Fig. 5, to operate an arm 42 to expand a band of brake material 43 to thereby effect a frictional engagement between the clutch sections 39 and 40, whereby when the shaft 32 is driven, the integral miter gear 35 will turn. Thus, the shaft 32 which is intermittently driven, as previously described, operates the feed roller 18 through the miter gear 35 and pinion 36 if there is a driving connection between the complementary clutch elements 39 and 40. The bifurcated or forked end of an operating arm 44 straddles a recessed portion of the tapered member 41. The opposite end of the operating arm 44 is connected with the plunger 45 of a solenoid 46, through the means of a centrally mounted rock lever 47.

Operation of the solenoid 46 and consequent control of the master clutch 33 for idling or driving of the paper feed roll 18 is controlled through the action of a light sensitive means in the form of an electric eye mechanism. Said electric eye mechanism includes a lower control device 48 and an upper light source 49. Within the control device there is a photoelectric cell 50 and in the member 49 there is an incandescent bulb 51.

The paper web 22 (see Fig. 8) may be printed with spaced areas of designs or other groups of indicia thereon. Indicia on a section of the web are intended to be accurately positioned relative to certain selected portions of the loaf to be wrapped. In order to obtain accurate registration, the web 22, which may be paper of either an opaque or light permeable material, is provided adjacent a side margin with spaced opaque

spots, lines or areas 52. These spots or the like 52 are positioned in a predetermined relation relative to the design or indicia areas 53 on the web sections. When used on opaque paper the spots 52 should provide non-reflective surfaces.

When a transparent or light permeable web 22 is used, the arrangement of the light source 51 to the photoelectric cell 50 is as shown in Figs. 1 and 6, with the light source and cell being on opposite sides of the paper web whereby the cell is controlled by a light beam passed through the web. If the paper web 22 is opaque it should have a light reflecting surface. In this event it is desirable to position both the light source and the photoelectric cell on the same side of the paper, as shown in Fig. 7. With this arrangement the cell will be controlled by a reflected light beam. The cell and light source are enclosed in suitable light-proof casings whereby the cell is not affected other than the beam transmitted or reflected thereto.

From Figs. 1 and 2 of the drawings it will appear that the units 48 and 49 are connected together and are mounted on the arms of a supporting bracket 54 by means of a longitudinal bar 55 and transverse rods 56. The combination control unit 48-49 may be moved in either direction relative to the shear assembly 24 by moving the bar 55 on its mounting, the bar being secured in adjusted position by means of a clamping bolt 57, and the unit being secured on the rods 56 by clamping bolts 58. The unit 48-49 should be adjusted so that the cell 50 is in alinement with a row of opaque markings 52 on the paper web. Hence, when one of the markings 52 passes between the cell and the light source, a primary circuit 59, which is controlled by the photoelectric cell and which, in turn, controls a switching element 60 in series therewith, is momentarily de-energized. With the use of an opaque paper web and the arrangement of the cell and light source in the manner shown in Fig. 7, the light beam is constantly reflected to the cell except when the non-reflective areas 52 intercept the beams and interrupt the light to the cell.

While the relay 60 is actually incorporated within the unit 48, its relationship to the primary circuit 59 and other electrical instrumentalities is best shown schematically in Fig. 6. The primary circuit 59 includes a normally open switch 61 which is in the form of a limit switch actually controlled by operation of the knife lever 62. When said knife lever moves to operate the knife 24 for a cutting operation it closes said switch 61.

In connection with the above it should be observed that the knife lever 62 is controlled by a cam 80 which is fast on the transverse shaft 17. A suitably mounted coiled spring 81 is connected between a portion of the machine frame and an outer end of the knife arm 62. Said spring is effective to pull downwardly on the outer end of the knife arm and thus lift the forward or inner end of said knife arm, the latter being pivotally mounted, intermediate its ends, on a portion of the machine frame, as at 82. The inner end of the knife arm 62 is connected, through suitable linkage 83, with the knife 24, and the aforementioned lifting of the inner end of the knife arm raises the knife 24 to cut the paper web.

Actually, the switch 61 is carried by a frame bracket 84 adjacent the knife lever 62. When the knife lever is in the position illustrated said switch 61 is open. The cam 80 has an edge recess, and when a cam roller 85 carried by the

knife lever 62 lodges in said recess the knife lever, due to the spring 81, drops. The switch 61 carries a roller 86 for engagement with the knife lever 62 and the dropping of the knife lever causes movement of said roller 86 and its connections to operate internal contact members in the switch 61.

The primary circuit 59 actually controls the relay 60 and said relay is also included in a secondary circuit 63. When the light beam from the source 51 to the cell 50 is uninterrupted and the knife lever shuts the limit switch 61 the main circuit is closed and the relay 60 is energized. The energization of said relay serves to open a switch element in the circuit 63. However, when an opaque or non-reflecting area on the paper web reaches a proper position relative to the unit 48-49 the light beam will be broken, the circuit 59 will be opened, and the relay 60 will be de-energized. Such de-energization of said relay causes a closing of the secondary circuit 63, provided a main control switch 64 therein is in closed position.

The solenoid 46 is included in the secondary circuit 63. This solenoid is of conventional structure and as before mentioned it includes a vertically reciprocable plunger 45 which moves upon energization and de-energization of the magnets within the solenoid body. When the secondary circuit is closed by means of the primary circuit 59 being temporarily opened, as previously described, the coils of the solenoid will be energized and the same will pull the metal core or plunger 45 downwardly. As the upper end portion of said plunger is pivotally attached to a forward end of the rock lever 47, such movement of the solenoid plunger, through said rock lever and the bifurcated arm 44, will move the tapered clutch operating member 41 in a direction on the shaft 32 against the tension of a coiled spring 65 to cause disengagement of the clutch operating member 41 relative to the arm 42 in the clutch which applies the braking or clutch band 43. This therefore causes a disconnection in the driving association as between the clutch elements 39 and 40 whereby the integral bevel gear 35 will not turn for driving purposes. Consequently, during this period of disconnection of the clutch there will be no drive to the paper feed roll 18.

The above description is applicable when a paper web 22 is being automatically fed through the machine and the operation of the clutch 33 by means of the solenoid 46 is automatic, being accomplished by the electric eye mechanism. Provision is also made for manual control of the paper web feed. It will be observed that on the upper portion of the machine is a longitudinally extending rod 66 whose end portions are suitably journaled in bearing brackets. One end portion of said rod terminates in an angularly bent operating handle portion 67. Fast on opposite end portions of the rod 66 are cam disks 68 having flattened surfaces 69 thereon. The flat portions of said disks normally rest on slightly elevated plates 70. On the rod 66, adjacent the cam disks 68, are disks 71 which are free on the rod 66. The latter disks have threaded thereinto the upper end portions of vertical bearing adjusting rods 72. The lower ends of the rods 72 carry bearing blocks 73 which are vertically adjustable within slots 74 in frame elements 75. Confined coiled springs 76 surround the rods 72 so as to exert a downward force on the bearing blocks 73. The end portions of the shaft 19 carrying the co-

operating pressure rollers 20 are journaled in said bearing blocks. The normal position of the arrangement is depicted in Fig. 3 wherein the shaft 19 is in its lower position with the pressure rollers 20 in driving cooperation with the feed roll 18. To manually raise the pressure rollers 20 to prevent the same from driving the web 22, the handle 67 is moved in a slight clockwise direction (referring to Figs. 3 and 4). The cam disks 68 which are pinned to the rod 66 then turn so as to bring onto the plates 70 raised portions of said disks 68 whereby, through the rods 72, the pressure roller shaft 19 will be elevated to remove the pressure rollers 20 from the web and from the roll 18.

Referring particularly to Fig. 2 it will be observed that the inner end of a paper gripping plate 77 is pivotally mounted on the pressure roller shaft 19. This plate extends forwardly horizontally and rests on the paper web 22 as it passes over the guide roll 23. Said paper gripping plate 77 functions, by its weight, to keep the paper web in position while the pressure feed rollers 20 are elevated.

As will be clear from the description heretofore given, when a marking 52 on the paper web 22 registers with the light source 51 and photoelectric cell 50, the solenoid 46 will be energized. Through the mechanism described, the portion of the master clutch 33 which carries the driving bevel gear 35 will be idle, resulting in cessation of the drive of the paper feeding roll 18. During this interval the knife 24 reciprocates in the usual manner to cut the web and a severed section of paper web is then ready to be wrapped about the loaf. Through the improved mechanism the indicia areas on the wrapping paper section are extremely accurately registered with the desired portions of the loaf.

As has been mentioned heretofore, movement of the knife lever 62, when the knife 24 reciprocates to cut the paper, engages and closes the normally open limit switch 61. This action serves to re-set or close the relay 60 of the control unit with the result that the solenoid 46 will be immediately de-energized. Such de-energization of the solenoid allows the solenoid plunger 45 to raise and the spring 65 on the shaft 32 forces a tapered clutch operating member 41 into the clutch to cause expansion of the band 43 therein and a driving engagement of the clutch elements. Hence, through the bevel gear 35 which is then driven, the drive to the paper feed roll 18 will be re-established for paper advancing purposes.

From the foregoing description it will be seen that the improved controlling device for web feeding and severing machines functions automatically and provides for extremely accurate wrapping web registration. The device is furthermore readily adaptable to standard wrapping machines of various types, is of simple construction, is susceptible of adjustments and ready replacements, and is well adapted for the purposes described.

What is claimed as the invention is:

1. In combination, an intermittently revoluble web feeding roll, there being a web engaged by said roll for advancement thereby, driving means for said roll, a clutch for connecting and disconnecting said driving means relative to said roll, light sensitive means automatically controlled in accordance with the position of said web for disengaging said clutch, means, including a movable actuator, for severing a section of the web, said severing means operating upon a movement of the actuator in one direction, and means controlled by a movement of the actuator for said web severing means in a reverse direction for thereafter automatically re-engaging the drive to said roll.

2. In combination, a revoluble web feeding roll, a cooperating pressure roller movably mounted thereadjacent, there being a web between the roll and roller for advancement when the roll is revolved and when the roller forcefully contacts the web, driving means for said roll, a clutch for connecting and disconnecting said driving means relative to said roll, light sensitive means automatically controlled in accordance with the position of said web for disengaging said clutch, means, including an actuator movable in one direction, for severing a section of the web, means controlled by the movement of the actuator for the web severing means in a reverse direction for thereafter automatically engaging said clutch, and manually actuated means for removing the roller from the web.

3. In combination, a revoluble web feeding roll, there being a web engaged by said roll for advancement thereby, driving means for said roll, a clutch between said driving means and said roll, solenoid operated mechanism for operating said clutch, light sensitive electrical means controlled in accordance with the position of said web for energizing and de-energizing said solenoid, means actuated by a pivotal lever for severing a section of the web when the lever is moved in one direction, a switch operated by movements of said lever in a reverse direction, and an electrical circuit including the solenoid, the switch, and the light sensitive means.

4. In a web feeding mechanism, the combination of a revoluble web feeding roll, driving means therefor, a clutch in said driving means to engage and disengage the same, a cooperating pressure roller, a solenoid, a plunger reciprocated by said solenoid, mechanical connections between the plunger and the clutch for operating the latter, means for periodically momentarily energizing said solenoid to reciprocate the plunger, said last mentioned means being responsive to indicia on wrapping material fed between the pressure roller and feed roll to stop said roll driving means, means, including an actuator movable in one direction, for severing a section of wrapping material, and means controlled by a reverse movement of the actuator for said severing means for thereafter automatically continuing the movement of said roll driving means.

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