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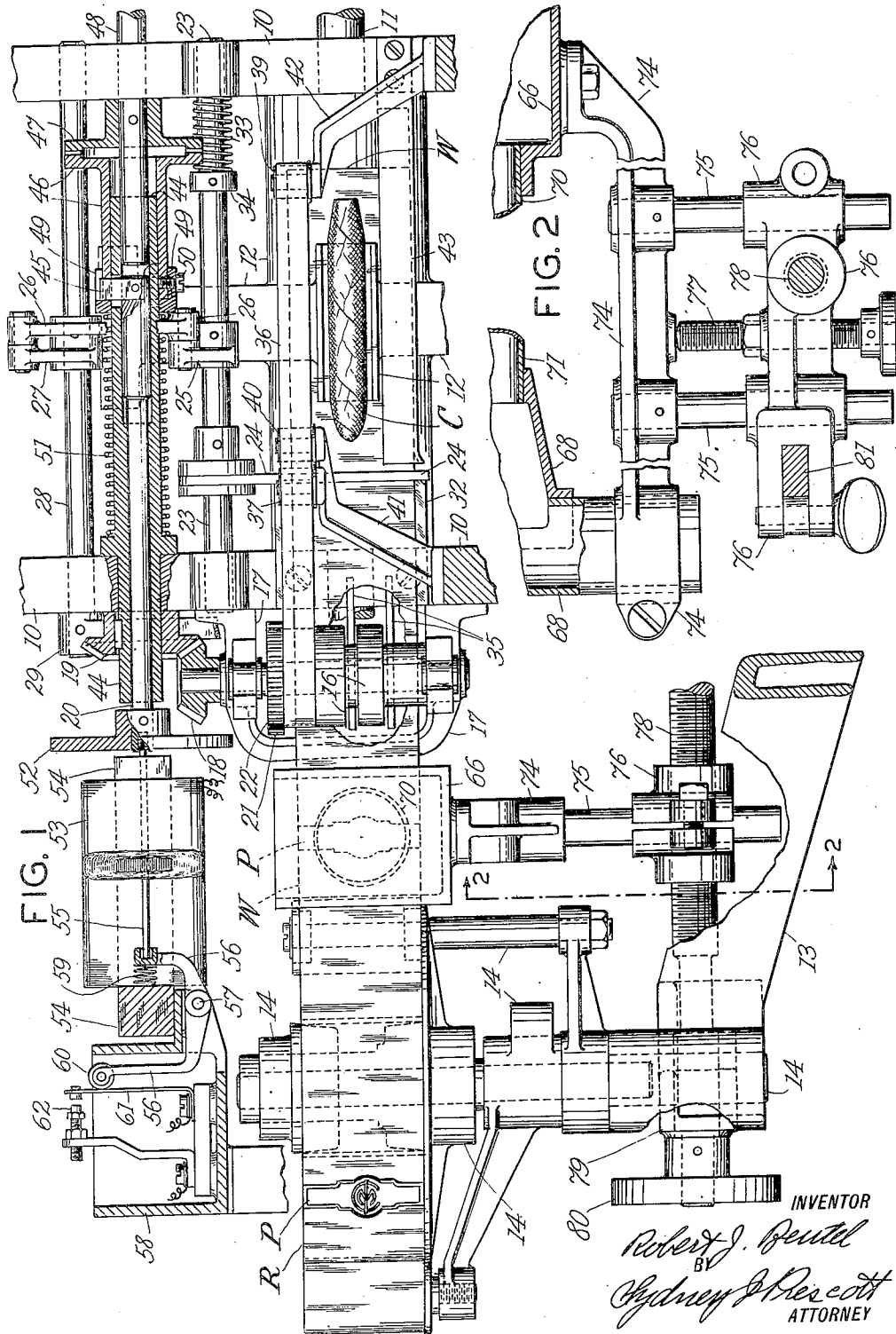
R. J. BEUTEL

1,998,069

STRIP REGISTERING DEVICE

Filed May 17, 1932

2 Sheets-Sheet 1



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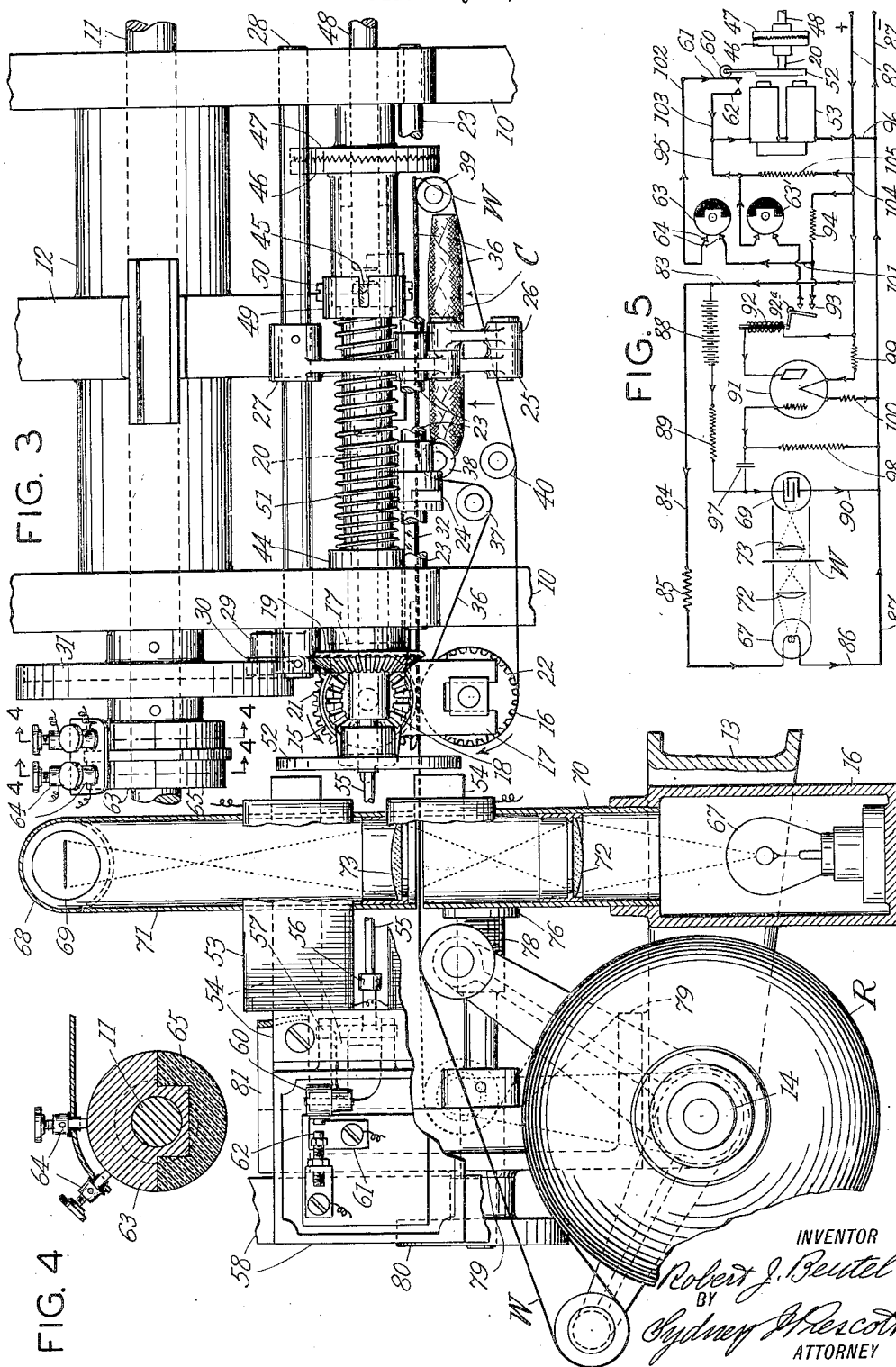
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UNITED STATES PATENT OFFICE

1,998,069

STRIP REGISTERING DEVICE

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Application May 17, 1932, Serial No. 611,909

13 Claims. (Cl. 271—2.6)

This invention relates to an improvement in strip registering devices for wrapping machines, its main object being to provide means for stopping the feeding of a continuous web of wrapping material to bring the recurring printed design thereon into predetermined position, so that the printing will appear in the same relative position on all articles wrapped by said web.

This object in the present invention is achieved by combining the circuit of a light-sensitive "bridge" or photoelectric cell, placed in light-receiving position with respect to the printed web, through a suitable relay with an electromagnetic clutch in such a manner that the electromagnet not only disconnects the wrapper feed when the printed design on the wrapper web intercepts the light projected onto the photoelectric cell, but also acts as a brake for immediately stopping the feed motion and arresting the same during a predetermined portion of the operating cycle during which the web is cut and the cut blank is carried away by the article to be wrapped. By this means accurate registration of the wrapper is effected. With these 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.

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 an end elevation of a portion of a cigar enveloping machine of usual construction equipped with the photoelectric electromagnetic registering device; Fig. 2 is a detail view on line 2—2 of Fig. 1, showing the manner of supporting the photoelectric unit; Fig. 3 is a top view of the mechanism shown in Fig. 1; Fig. 4 is a sectional side elevation on lines 4—4 of Fig. 3 showing a rotary contact maker for keeping the brake electromagnet in circuit during a portion of the operating cycle; and Fig. 5 is a diagram of the electrical circuits showing the electrical interconnection of the various parts.

In carrying the invention into effect there is provided means for feeding a web of wrapping material having a recurrent design thereon, a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act

as a brake on said web feeding means and hold it immovable for a predetermined interval of time. In the best forms of construction contemplated said web feeding mechanism includes a pair of cooperating feed rollers, intermeshing gears on said rollers, a shaft driven by said clutch mechanism, a bevel gear on said shaft and a bevel gear on one of said feed rollers meshing with the bevel gear on said shaft. In the best forms of construction contemplated, also, said clutch mechanism includes a continuously rotating drive shaft, a driven shaft, clutch members on said shafts, and an electromagnet adapted to be energized when the design on the web intercepts the light projected onto the photoelectric cell to disengage the clutch members, and said electrical circuit includes a spring contact adapted to be closed when said clutch members are disengaged and a rotary contact member for opening said electrical circuit. There is also preferably provided means for severing the web during the interval that it is stopped. These various means and parts may be widely varied in construction within the scope of the claims for the particular machine selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific construction shown and described.

Referring to Figs. 1 and 3, the frame 10 of the cigar enveloping machine carries a shaft 11 on which a turret 12 is mounted to which intermittent motion is imparted by a Geneva gear, not shown. A bracket 13 attached to frame 10 carries a reel 14 supporting a roll R of wrapping material from which the web W is fed to a position adjacent one station of the turret 12 of the enveloping machine by the feed rollers 15 and 16 supported by a bracket 17 fastened to frame 10. The feed roller 15 is driven by bevel gears 18 and 19 from the clutch-controlled driven shaft 20 of the enveloping machine, and drives the feed roller 16 by means of spur gears 21 and 22. Another shaft 23 carried by frame 10 supports a swingable knife 24 for cutting the web W, the knife 24 being actuated at the proper time by a crank arm 25 on shaft 23, a link 26, and a crank 27 on a shaft 28 to which is fastened a cam lever 29 having a cam roller 30 in engagement with a cam 31 on turret shaft 11. The web feed and cutter used on this machine are described in detail in United States Patent 1,796,073 to Robert J. Beutel issued March 10, 1931.

The knife 24, when actuated by cam 31, moves against a ledger plate 32, being held in contact

with the latter by a spring 33 placed on shaft 23 between the frame 10 and a collar 34. The plate 32 is fastened to frame 10 and has extensions 35 reaching in between the feed rollers 15 and 16 and serving as rear supports for the web W which is guided into wrapping position by an endless belt 36 driven by feed roller 15 and running over idlers 37, 38, 39 and 40 supported by brackets 41 and 42 resting on frame 10. The lower edge of web W is supported by a guide 43 fastened to frame 10.

The shaft 20 driving the feed roller 15 is slidable in a sleeve 44 which rotates with it by means of a transverse key 45 passing through a slot of sleeve 44 and being connected to the movable member 46 of a clutch, the stationary member 47 of which is mounted on a continuously rotating drive shaft 48 concentric with shaft 20. The key 45 is fitted into a diametrical slot in the end of shaft 20 and its connection with clutch member 46 is effected by a slotted collar 49 riding on sleeve 44 and fastened to the hub of member 46, which also rides on sleeve 44, by screws 50, the key 45 fitting into a diametrical slot in the end of hub of clutch member 46 in alignment with the slots in shaft 20 and sleeve 44. The gear 19 driving gear 18 is keyed to sleeve 44 and thus rotates as long as the clutch member 46 is held in engagement with clutch member 47 by a coil spring 51 placed between a shoulder on sleeve 44 and collar 49.

On its free end, the shaft 20 carries the armature 52 of an electromagnet 53 which, for quick action, is made with a laminated core 54. The electromagnet 53, on receiving an impulse from the circuit of a photoelectric cell, attracts the armature 52, thereby disconnecting the clutch members 46 and 47 and stopping the feed of web W. To shaft 20 is attached a rod 55 engaging with one arm of a double lever 56 pivoted on a shaft 57 supported by frame 58, the lever 56 being held in engagement with rod 55 by a spring 59 bearing against the core of electromagnet 53. The other arm of lever 56 carries a roller 60 bearing against a contact spring 61. As soon as the armature 52 is attracted to the electromagnet 53 by the action of a photoelectric cell connected to a suitable relay in the circuit of the electromagnet, as hereinafter described, the lever 56 causes the contact spring 61 to move against a contact 62, thereby closing an independent holding circuit through a rotary contact maker 63, Fig. 4, mounted on turret shaft 11, which circuit holds the armature 52 against the core 54 of electromagnet 53 for a definite portion of the operating cycle of the machine, thus keeping the feed of web W arrested while the knife 24 is operated and the cut blank is carried into the turret 12 by the advancing cigar C. The said contact maker consists of two angularly displaced stationary insulated contact brushes 64 bearing against a rotating surface composed of a metallic ring portion 65 and an insulating portion 66, the duration of the contact in each cycle depending upon the relative proportion between the two portions of the surface and upon the amount of displacement of the brushes. A similar contact maker 63' mounted adjacent the contact maker 63 on shaft 11 is also placed in the impulse circuit of the electromagnet 53 to close and open it for the same duration as the contact maker 63 so that the clutch 46, 47, cannot be affected by any impulses of the photoelectric circuit for a definite portion of the operating cycle while the web is being fed. At the expiration of this portion of the cycle the contact makers close their respective circuits to permit

an impulse from the photoelectric cell to energize the electromagnet 53 and thereby stop the web feed.

The photoelectric unit, Figs. 1, 2 and 3, consists of a housing 66, in which is mounted an incandescent lamp 67 and of a housing 68 containing a photoelectric cell or light-sensitive "bridge" 69, these two housings being placed at opposite sides of the web W and having tubes 70 and 71 extending from them towards the web which passes through the narrow slit between the ends of these tubes. In tube 70 is mounted a condensing lens 72 and in tube 71 projecting lens 73, so that the light rays from lamp 67 after passing through web W are concentrated upon the photoelectric cell 69 as indicated by dotted lines in Fig. 3. The housings 66 and 68 are supported by a frame 74, Figs. 1 and 2, which is settable both in the horizontal and vertical direction to adjust for varying conditions in the size of the article to be wrapped by the web W and in the desired appearance of the finished package.

The web W may be of transparent material, such as cellophane, with opaque printings P recurring thereon, or of opaque material such as metal foil or dark paper, with transparent printings, the light from the lamp 67 being momentarily stopped by the printings P in the former case and momentarily transmitted by them in the latter case.

The frame 74 is supported by vertical rods 75 sliding in sockets of a bracket 76 and adjustable by means of a screw 77. The bracket 76 is movable horizontally on a screw 78 supported in a bracket 79 attached to reel bracket 13, the screw 78 being provided with a hand wheel 80 for the adjustment of bracket 76, the horizontal motion of which is guided by a bar 81 attached to bracket 79.

In Fig. 5 the diagram of the electrical connections is given for operating this apparatus from a direct-current source of electricity. The incandescent lamp 67 is fed from the + line 82 by wires 83, 84 through a resistance 85, the current returning by wire 86 to the - line 87. The photoelectric cell 69 receives line current from wire 88 through a battery 89 and a high resistance 89, the current returning through wire 90 to line 87. The current produced in the photoelectric cell 69 by the photoelectric action of the light projected through lenses 72 and 73 to cell 69 is amplified by a vacuum tube 91 and flows through a sensitive relay 92 which attracts the pivoted switch 92A and swings it away from contacts 93. But when the light is intercepted by a printed design on the wrapper the current from the photoelectric cell is diminished sufficiently to permit the switch 92A to swing downwardly under the influence of gravity and close the contacts 93, thereby permitting a current to flow from line 82 through a resistance 94, contacts 93, rotary contact maker 63', wire 95 and electromagnet 53 back to line 87 through connection 96. The amplification circuit includes a condenser 97 and a high shunt resistance 98, the heating element of the tube 91 receiving current from the line through resistances 99 and 100 and the photoelectric cell being connected to the grid of tube 91. The flow of current through electromagnet 53 caused by closing the contacts 93 attracts the armature 52, thereby not only disengaging clutch 46, 47 and stopping the rotation of web feed drive shaft 20, but also, by means of roller 60, closing the contacts 61, 62, so that now a current is established from line 82 through resistance 94, 75

wire 101, rotary contact maker 63, wire 102, contacts 61, 62, wire 103, electromagnet 53 and wire 96 to line 87. The latter current through the electromagnet 53 does not depend upon the relay contacts 93 and flows as long as the brushes 64 of contact maker 63 are in circuit, thus braking the shaft 20 immediately after the clutch 46 has been released by the relay current and holding it immovable during a given portion of the operating cycle of the enveloping machine. A circuit from line 82 through wire 104, high resistance 105 and wire 95, and through wire 96 back to line 87, permanently supplies a small current to electromagnet 53 for the purpose of balancing the initial pressure of spring 51 and of preventing sparking at the contacts 61 and 93.

When operating this improved registering device from an alternating current line, the photoelectric cell 69 is supplied through a full-wave rectifier, and the electromagnet 53 through a motor-generator fed by the A. C. source of electricity.

What is claimed is:

1. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time.

2. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said web feeding means including a stationary guide for the lower edge of the web and an intermittently driven endless belt controlled by said clutch mechanism for feeding the web along said guide.

3. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said web feeding mechanism including a pair of cooperating web feeding rollers, intermeshing gears carried by said rollers, a shaft driven by said clutch mechanism, a bevel gear on said shaft, and a bevel gear on one of said feed rollers meshing with the bevel gear on said shaft.

4. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell

arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said clutch mechanism including a continuously rotating drive shaft, a clutch fixed on said drive shaft, a driven shaft geared to said web feeding means, a slotted sleeve on said driven shaft, a clutch member on said sleeve adapted to engage the clutch member on said drive shaft, a slotted collar fixed on the hub of the clutch member on said sleeve, a key fixed in said driven shaft and extending through the slots in said sleeve and collar, a spring engaging said collar to press the clutch member on said sleeve into engagement with the clutch member on said drive shaft.

5. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said clutch mechanism including a continuously rotating drive shaft, a driven shaft, clutch members on said shafts, means for pressing the clutch members into engagement, and an electrical circuit connected to said photoelectric cell, an electromagnet adapted to disengage said clutch members, and means for amplifying the current delivered from said photoelectric cell and conducting it to said electromagnet.

6. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means when a design on said web intercepts the light projected thereon, an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said clutch mechanism including a continuously rotating drive shaft, a driven shaft, clutch members on said shafts, means for pressing said clutch members into engagement, and an electromagnetic circuit connected to said photoelectric cell and including an electromagnet adapted to disengage said clutch members, a relay adapted to close the electromagnetic circuit when a design on the wrapper web intercepts the light projected into the web, and a rotary contact maker for opening the electromagnetic circuit after a predetermined interval of time.

7. The combination with means for feeding a web of wrapping material having a recurrent design thereon, of a source of light arranged to project light onto said web, a photoelectric cell arranged to be illuminated by the light projected onto said web, electromagnetic clutch mechanism for stopping the web feeding means

- when a design on said web intercepts the light projected thereon, an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on said web feeding means and hold it immovable for a predetermined interval of time, said clutch mechanism including a continuously rotating drive shaft, a driven shaft, clutch members on said shafts, and an electromagnet adapted to disengage said members when energized, and said electrical circuit including a spring contact adapted to be closed when said clutch members are disengaged and a rotary contact member for opening said electrical circuit.
8. In a registering feed for continuous strip material, the combination with devices for feeding the strip including coacting clutch elements through which the strip is driven movable into and out of operative engagement, electro-magnetic means for disengaging said elements, and brake mechanism controlled by said means operating when the clutch elements are disengaged.
9. In a registering feed for continuous strip material, the combination with devices for feeding the strip including coacting clutch elements through which the strip is driven movable into and out of operative engagement, electro-magnetic means for disengaging said elements, brake mechanism controlled by said means operating when the clutch elements are disengaged, said means including a magnet, an armature for said magnet connected to one of said elements, and a braking surface moving with the last mentioned clutch element, and a complementary braking surface positioned to be engaged by said moving braking surface.
10. The combination with a photoelectric cell, of electromagnetic clutch mechanism controlled by said cell including a driven shaft, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on the driven shaft when it is inoperative.
11. The combination with a photoelectric cell, of electromagnetic clutch mechanism controlled by said cell, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on a driven shaft when it is inoperative, said clutch mechanism including a continuously rotating drive shaft, said driven shaft, clutch members on said shafts, means for pressing said clutch members into engagement, and an electromagnetic circuit connected to said photoelectric cell and including an electromagnet adapted to disengage said clutch members, a relay adapted to close the electromagnetic circuit and controlled by said photoelectric cell, and a rotary contact maker for opening the electromagnetic circuit.
12. The combination with a photoelectric cell, of electromagnetic clutch mechanism controlled by said cell, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on a driven shaft when it is inoperative, said clutch mechanism including a continuously rotating drive shaft, said driven shaft, clutch members on said shafts, means for pressing the clutch members into engagement, an electromagnet adapted to disengage the clutch members, a photoelectric circuit connected to said photoelectric cell and electromagnet, and means in said photoelectric circuit for amplifying the current delivered from said photoelectric cell.
13. The combination with a photoelectric cell, of electromagnetic clutch mechanism controlled by said cell, and an electrical circuit adapted to be closed by said clutch mechanism for causing the latter to act as a brake on a driven shaft when it is inoperative, said clutch mechanism including a continuously rotating drive shaft, said driven shaft, clutch members on said shafts, and an electromagnet adapted to disengage said members when energized, and said electrical circuit being connected to said electromagnet and including a spring contact adapted to be closed when said clutch members are disengaged and a rotary contact maker for opening said electrical circuit.

ROBERT J. BEUTEL. 45