

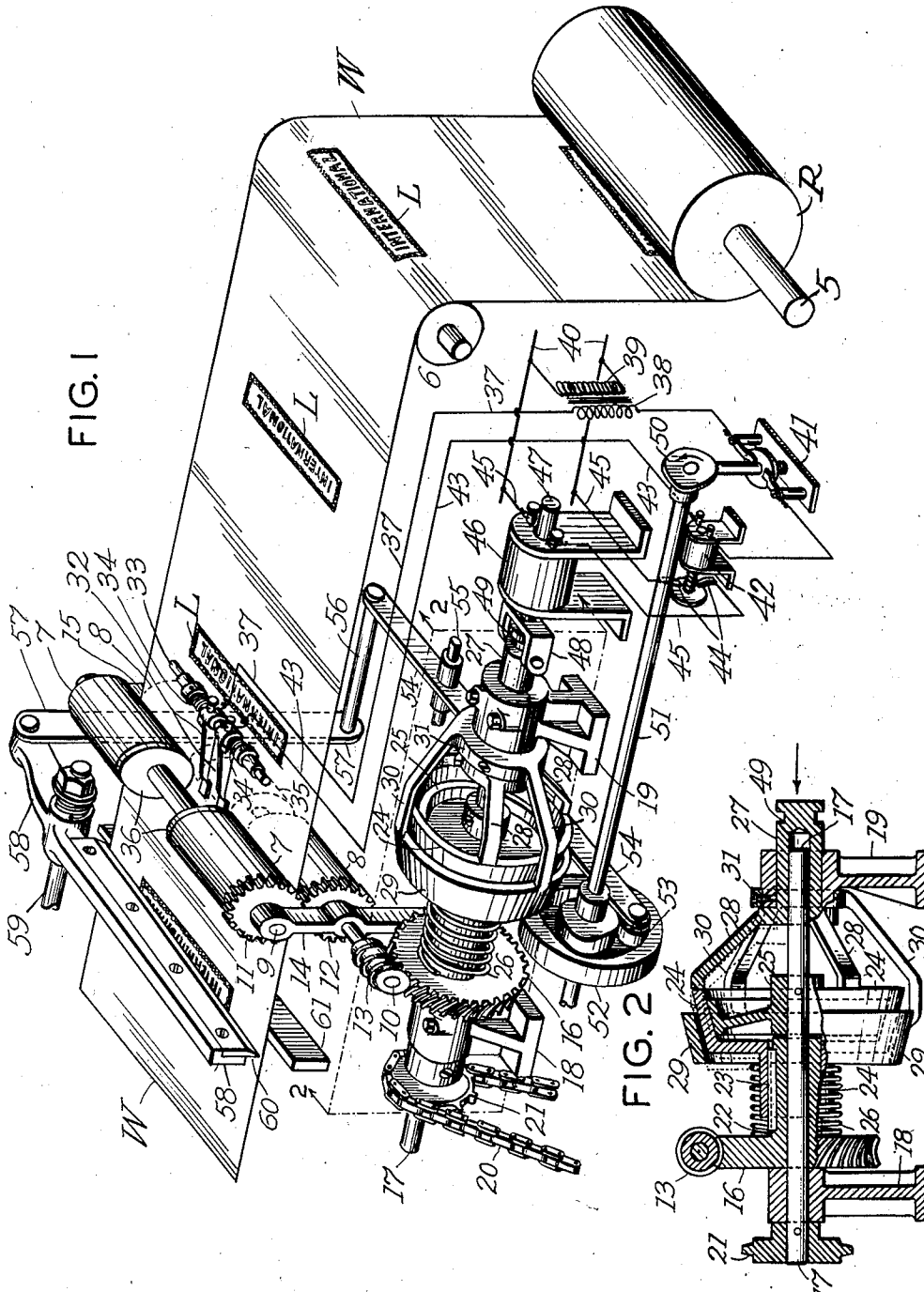
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REGISTERING SHEET FEED

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REGISTERING SHEET FEED

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This invention relates to registering wrapping material feeds for packaging machines and the like using regenerated cellulose or other similar materials, its main object being to feed and cut printed wrapping material from a continuous roll of the material in such a manner that the printed matter on the web will properly register with the severing knife which cuts the materials into wrapper lengths, so that when wrapped about an article the printed design will be properly positioned on the wrapped article.

While it is possible to register the printing on material fed from a web or roll by perforating the material and feeding or controlling by perforations or by notches cut in the material, this method of registering requires an additional operation in preparing the material and moreover it is unsatisfactory on such materials as regenerated cellulose which by reason of their thinness and lack of stiffness cannot be readily fed or controlled by a perforation or notch. Also such a perforation or notch in regenerated cellulose has a tendency to start tears even though the material when unnotched or perforated is quite resistant to tearing. Also such perforations or notches mar the appearance of the material.

Accordingly the principal object of the present invention is to feed a continuous web or strip of material with the printing properly registering and without use of any of the perforations or notches heretofore commonly found necessary for this purpose. To this end it is an object of the invention to register or correct the feed of the web from the printing by means of differences in the conductivity of the printed and the unprinted portion of the wrapping material and more particularly to utilize a difference in electrical conductivity of the wrapping material proper and the printing thereon for stopping a printed area thereon in exact registering position. Still another object is to provide simple and effective means for stopping the feeding of the wrapping material so that the printing is properly registered and to do so in a simple and direct manner by simply stopping the feed when the print is in correctly registered position whether this involves feeding more or less than was fed to the preceding article. This eliminates rather cumbersome and delicate constructions heretofore used wherein one of a series of feed controlling devices are preset to under or over feed the web to correct for errors which if allowed to accumulate would result in substantial lack of registration of the printed areas with respect to the sides of the wrapped package.

With these and other objects not specifically mentioned in view the invention consists in certain constructions and combinations which will be hereinafter fully described and specifically set forth in the claims hereunto appended.

In the accompanying drawing, which forms a part of this specification and in which like characters of reference indicate the same or like parts, Fig. 1 is a perspective view of a web feed constructed in accordance with the invention; Fig. 2 is a detail view in sectional elevation on the line 2—2 of Fig. 1.

In carrying the invention into effect there is provided a device for feeding a continuous strip of wrapping material having separated areas thereon of a substantially different electrical conductivity from that of the material: the combination with feeding mechanism operating on the strip to feed the same to a wrapping machine or the like, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding operation of the mechanism only when a printed area reaches a predetermined registered position to thereby properly register the same, regardless of slight variations in the distances between areas. In the best constructions said means include an electric detector circuit having spaced brushes in the path of the areas on said strip arranged to make and break the circuit as conducting or nonconducting surfaces of the web pass under the same. The best form of the invention also includes strip severing means operating after the strip stops and mechanism for starting the feed after the strip is severed. The various means referred to may be varied in construction within the scope of the claims for the particular device and the method selected to illustrate the invention is but one of many possible embodiments of the same. The invention therefore is not to be restricted to the precise details as shown and described.

Referring to the drawing, the web W, which has printed conducting areas such as the labels L on it at equal intervals, is fed from the reel R on shaft 5 over roller 6 by the feed rollers 7 and 8 on shafts 9 and 10, respectively, driven by the gears 11 and 12 from the worm 13 on shaft 10, the shafts 9 and 10 being supported in brackets 14 and 15 of the packaging machine. The worm 13 meshes with worm wheel 16 on drive shaft 17 which is supported in bearings 18 and 19 and connected with the drive of the packaging machine by the chain 20 engaging with sprocket 21. The worm wheel 16 is loosely mounted on shaft 55

17 and on its hub 22 is splined, by key 23, the movable member 24 of a friction clutch whose stationary member 25 is fixedly mounted on shaft 17. The two members are held in frictional engagement by the tension of a coil spring 26 placed around the hub of member 24. The clutch is disengaged by the axial movement of a forked sleeve 27, the tines 28 of which bear against the face of member 24. A brake ring 29 held by spider arm 30 of a collar 31, is by the latter stationarily attached to bearing 19.

On the web W bear two contact fingers or brushes 32, mounted on a shaft 33 and resiliently held against the web by torsion springs 34, the web at this point being supported by a drum 35 of soft rubber or other insulating material held between feed rollers 8 on shaft 10, the fingers 32 being protected from accidental contact by insulating disks 36 attached to the inside faces of feed rollers 7. One of the fingers 32 is connected by a wire 37 to one terminal of a source of electrical energy, which may be a battery or the secondary 38 of a step-down transformer, the primary 39 of which is connected to an A. C. supply circuit 40. The other terminal of the transformer or other electrical source is connected through a circuit breaker 41 to a relay 42 from which a wire 43 leads to the second contact finger. The relay 42, when energized, closes the contacts 44 of a circuit 45 from the line 40, the circuit energizing an electromagnet or solenoid 46 whose core 47 carries a fork 48 which engages with the annular groove 49 in clutch shifting sleeve 27.

The labels L are printed or otherwise applied with the portion of their forward border between the contact fingers 32 made electrically conductive by means of heavy bronzing or by the application of a small strip of metal foil, so that the primary circuit of the relay 42 closes as soon as the edge of one of the labels L passes under the fingers 32, thereby allowing current from the line 40 to flow through the contacts 44 into the electromagnet 46. The latter, on being thus energized, causes the core 47 to move inward, thereby pushing, by means of the arms 28, the clutch member 24 out of engagement with member 25 and into engagement with the brake ring 29, thus stopping the motion of gear 16 and arresting the web drive.

The circuit breaker 41 is actuated by cam 50 on cam shaft 51, which of course is driven in timed relationship with the shaft 17 by suitable connections not shown the cam 50 being timed in accordance with cam 52, the roller 53 of which, through cam lever 54 fulcrumed on shaft 55 and through connection 56, actuates the connecting rod 57 which, through arm 58 pivoted on shaft 59, operates the knife 60 along the stationary ledger plate 61. On the up stroke of the knife, after having cut the web W, the cam 50 depresses the contact plate of circuit breaker 41, thereby interrupting the registering current and de-energizing the relay 42. In consequence, the contacts 44 are opened and the current in electromagnet 46 is interrupted, thus releasing core 47 and permitting the spring 26 to push the clutch 24 into engagement, thereby restarting the web feed. The circuit breaker 41 at the same time prevents arcing, due to the opening of the registering circuit, which might take place at the contact finger 32 and thereby avoids possible injury to the web.

In case of an electrically conducting web having nonconducting printing the electromagnet 46 is so arranged in relation to the clutch member 24

that an interruption of the current in the former causes the latter to disengage.

The operation of the machine and the method employed therein is as follows:

Two contact fingers 32 engaging with the surface of the web the printed parts of which are of different conductivity from the rest of the web close or open the electric circuit of a relay 42 which in turn operates an electromagnet 46 which operates a clutch 24 whereby the feeding of the web is stopped. The cutoff knife being placed at a distance from the contact fingers equal to the wrapper length required from the edge of the printing, all the web sections cut have the printing the same distance from the edge and the printed design will be located at the same position on every package.

When the web is of an electrically nonconducting material, such as paper or regenerated cellulose, etc., the printing on it is done with a conducting ink which closes the circuit between the contacts, but for printing a web made of electrically conducting material, such as metal foil, non-metallic ink is employed which opens the circuit between the contact fingers. In the former case, the feed stopping electromagnet is normally idle and energized during the registering period only, while in the latter case, it is normally energized, and idle during the registering period. In the preferred construction the feed driving clutch is arranged to be normally held in engagement by a spring coiled around the hub of its movable friction member 24 which is slidably keyed to the drive wheel of the web feed. The electromagnet, when actuated by the registering contact, causes the axial movement of a fork 48, the tines of which bear against the face of the movable friction member 24, pushing the same out of engagement with the clutch member 25 and into frictional engagement with a stationary brake ring 29, thereby stopping the motion of the feed rollers and holding the web in position for cutting.

To restart the web feed after its interruption by the registering device, a cam operated mechanical circuit breaker 41 is included in the primary registering circuit, the cam being so timed that the circuit is momentarily interrupted on the up stroke of the cutoff knife 60 immediately after a section of the web sufficient for one package has been severed. Upon interruption of the registering current electromagnet 46 is deenergized, thereby permitting a spring, provided for this purpose, to produce a reversal of the feed stopping clutch action and thus to restart the feed which then will keep running until again stopped by the registering device.

What is claimed is:

1. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating to forwardly feed the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the forward feeding of the strip only when a printed area reaches a predetermined registered position, said stopping means including a device acting positively to brake the feed immediately upon cessation of the feeding movement.

2. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the

combination with feeding mechanism operating to forwardly feed the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the forward feeding of the strip only when a printed area reaches a predetermined registered position, said means including an electric circuit having spaced brushes in the path of the areas on said strip arranged to make and break the circuit as conducting or relatively nonconducting surfaces of the web pass under the same, said stopping means including a device acting positively to brake the feed immediately upon cessation of the feeding movement.

3. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding mechanism only when a printed area reaches a predetermined registered position, said means including a solenoid and an operating connection between said feeding means and said solenoid for disabling the feeding means on operation of the solenoid, said stopping means including a device acting positively to brake the feed immediately upon cessation of the feeding movement.

4. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding mechanism only when a printed area reaches a predetermined registered position, strip severing means operating after the strip stops, and mechanism connected to and actuated by said strip severing means for incapacitating said control means and starting the feed after the strip is severed, said stopping means including a device acting positively to brake the feed immediately upon cessation of the feeding movement.

5. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding mechanism only when a printed area reaches a predetermined registered position, and devices for incapacitating said control means to periodically restart the feed, said stopping means including a device acting positively to brake the feed immediately upon cessation of the feeding movement.

6. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of an electric control circuit coacting with the printed areas and operated by said different conductivity for stopping the feeding mechanism only when a printed area reaches a predetermined registered position, said mechanism including devices for rehabilitating the control circuit to restart the feed comprising a

make and break device operating in timed relation to the feeding operation to close the control circuit for a period of time sufficient to carry a printed area past the range of action of said control means.

7. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding mechanism only when a printed area reaches a predetermined registered position, said feed means including a clutch operative to start and stop the feed and said control means including a solenoid having a core engaging one of the members of said clutch for throwing the same out of gear.

8. In a device for feeding a continuous strip of wrapping material having separated printed areas thereon of a substantially different electrical conductivity from that of the material, the combination with feeding mechanism operating on the strip, of electric control means coacting with the printed areas and operated by said different conductivity for stopping the feeding operation of the mechanism only when a printed area reaches a predetermined registered position, said control means including a primary circuit having make and break means coacting with the areas to make and break said primary circuit as a result of differences in conductivity between the material and the print and a secondary circuit controlled by a relay from said primary circuit and a solenoid controlling the feed and operated from said secondary circuit.

9. In a device for feeding in register a strip having thereon a series of separated areas of material coated thereon and having substantially different physical characteristics from the surface of the remainder of the strip, in combination with means for feeding the strip, of a detector sensitive to said different physical characteristics past which said areas travel during feeding, means for stopping said feed, and mechanism connecting said detector and said stopping means to cause feeding to cease when one of said areas comes into the range of action of said detector, said means including a set of clutch members, and said mechanism including an electro-magnetic device for shifting one of said clutch members out of gear comprising an electro-magnet having an armature directly connected to said shiftable clutch member.

10. In a device for feeding in register a strip having thereon a series of separated areas having substantially different physical characteristics from the surfaces of the remainder of the strip, the combination with means for feeding the strip, of a detector sensitive to said different physical characteristics past which said areas travel during feeding, means for stopping said feed, mechanism connecting said detector and said stopping means to cause feeding to cease when one of said areas comes into the range of action of said detector, said stopping means including a clutch through which said feed is driven, and electro-magnetic means controlled by said detector for throwing the clutch out of gear, and a brake associated with said clutch and said feed, and acting to brake the feed immediately upon operation of the clutch to cease driving the feed.

11. In a device for feeding in register a strip having thereon a series of separated areas having substantially different physical characteristics from the surfaces of the remainder of the strip, the combination with means for feeding the strip, of a detector sensitive to said different physical characteristics past which said areas travel during feeding, means for stopping feeding operation of said feed, mechanism connecting said detector and said stopping means to cause feeding to cease when one of said areas comes into the range of action of said detector, said stopping means including a clutch through which the feed is driven, and means controlled by said detector for operating the clutch and a brake associated with said clutch and said feed, and acting to brake the feed immediately upon operation of the clutch to cease driving the feed.

12. Mechanism for feeding a printed strip in register comprising a strip feeder, means for rendering said feeder inoperative to feed the strip, an electromagnetic device for actuating said means, and electric current controlling means operated by contact with the printed portions of the strip and connected to said device to stop the feeder when the print is in register, and a brake associated with said electromagnetic device and said feed, and acting to brake the feed immediately upon operation of said device to stop the feed.

13. Mechanism for feeding in register a printed strip having conducting and nonconducting portions comprising a strip feeder, means for rendering said feeder inoperative to feed the strip, an electromagnetic device for actuating said means, a detector circuit connected to said device and passing through the conducting portions of the strip arranged to stop the feeder with the printing in predetermined registered position, and mechanism thereafter acting on said device for a period of time less than the interval of time between stops to start the feed and maintain it in operation until the conducting or nonconducting portion of the web which caused the last stop has passed from the range of action of the detector circuit, and a brake associated with said device and acting immediately upon operation of said device to stop the feed, said brake being rendered inactive upon operation of said mechanism to start the feed after each such stoppage thereof.

14. The combination with mechanism normally operating to feed forwardly a web of material having separated printed areas thereon of a

substantially different conductivity from that of the web, of a periodically moving knife arranged to sever said web, and electric control means engaging said web and actuated by the different conductivity of said printed areas, upon contact therewith, for stopping the forward feeding of the web when a printed area thereon reaches a predetermined position relative to said knife, and a brake associated with said feed and with said knife, and co-ordinated therewith to brake the feed prior to said periodic actuations of said knife respectively, and to release said feed prior to resumption of said forward feeding after each periodic actuation of the knife.

15. The combination with mechanism normally operating to feed forwardly a web of material having separated printed areas thereon of a substantially different conductivity from that of the web, of an intermittently moving knife arranged to sever said web, electric control means constantly engaging said web and actuated by the different conductivity of said printed areas, upon contact therewith successively, for stopping the forward feeding of the web, and a device for incapacitating said means to restart the forward feeding of the web after the severing thereof by said knife, and a brake associated with said feed and with said knife, and co-ordinated therewith to brake the feed prior to said periodic actuations of said knife respectively, and to release said feed prior to resumption of said forward feeding after each periodic actuation of the knife.

16. The combination with mechanism normally operating to feed forwardly a web of material having separated printed areas thereon having substantially different physical characteristics from the remainder of the web, of a periodically moving knife arranged to sever said web, a detector sensitive to the different physical characteristics of said printed areas, means for disabling said mechanism to stop the forward feeding of the web, and instrumentalities connecting said detector and means to cause the forward feeding of the web to cease when one of said areas comes into the range of action of said detector, said mechanism including a set of rolls coacting to forwardly feed the web, and a brake associated with said feed and with said knife, and co-ordinated therewith to brake the feed prior to said periodic actuations of said knife respectively, and to release said feed prior to resumption of said forward feeding after each periodic actuation of the knife.

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