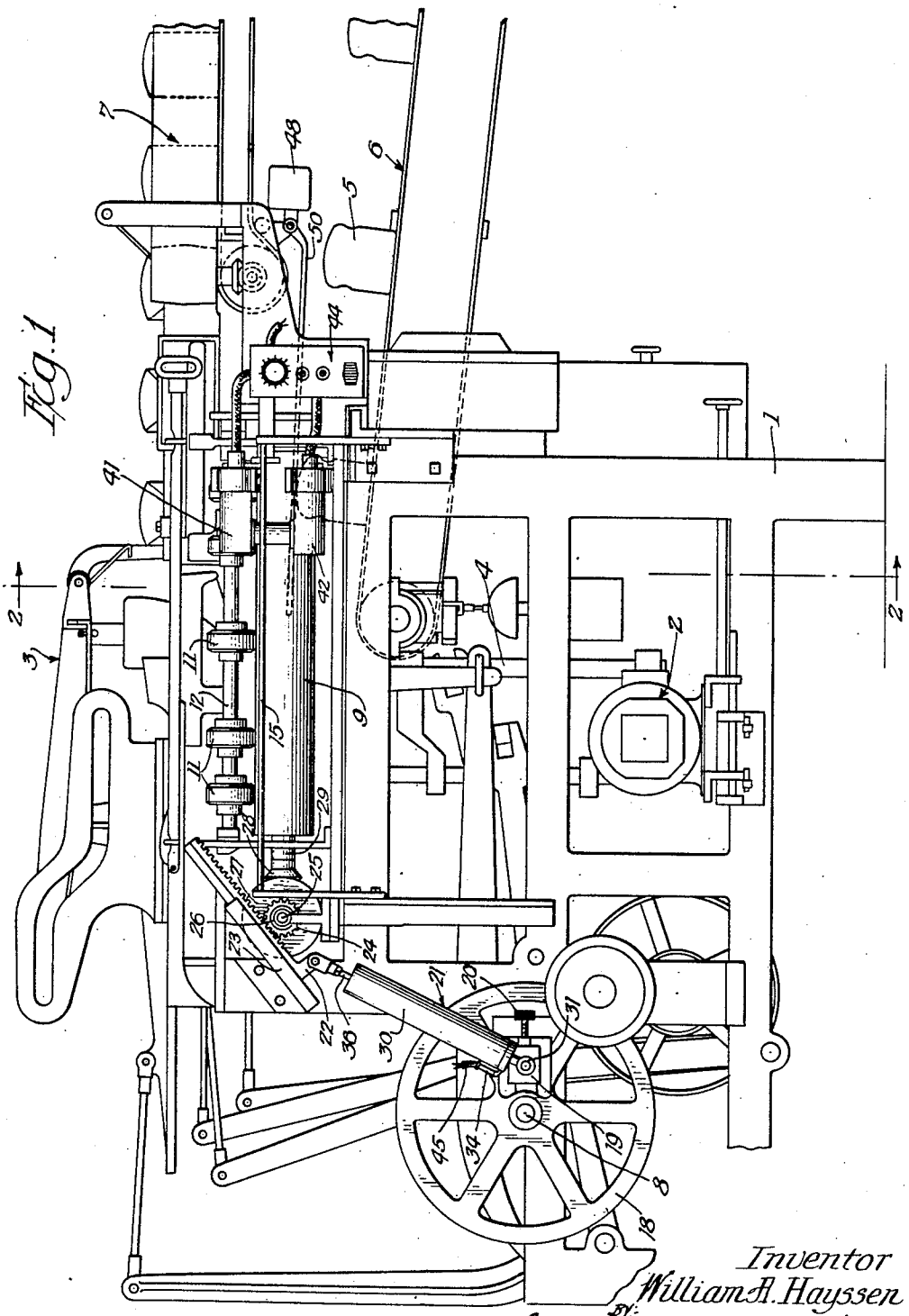
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Aug. 16, 1938. W. A. HAYSSEN 2,127,028

CONTROL DEVICE FOR WRAPPING MACHINES

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Fig. 1



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Fig. 2

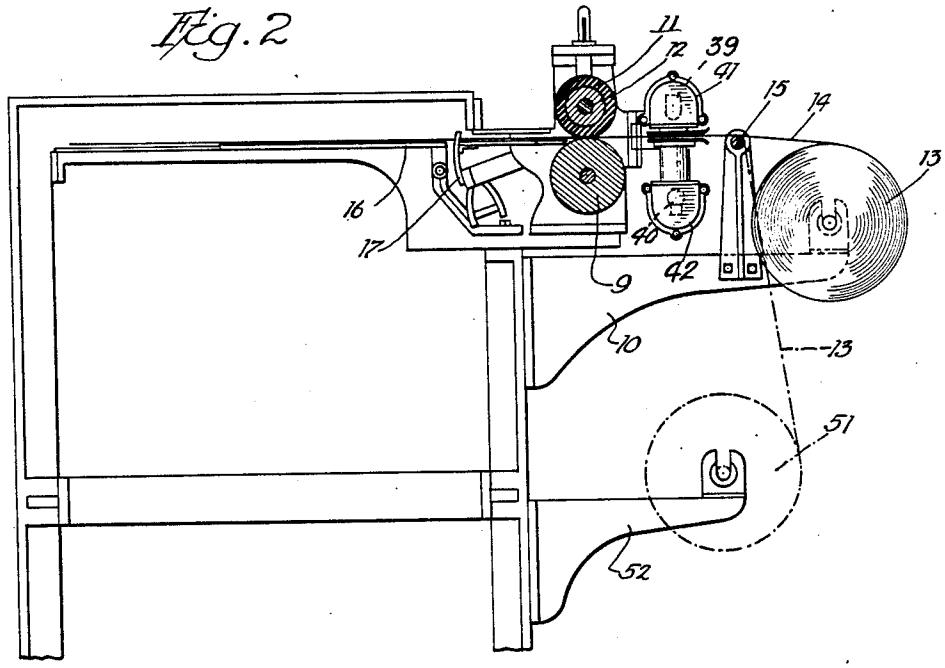
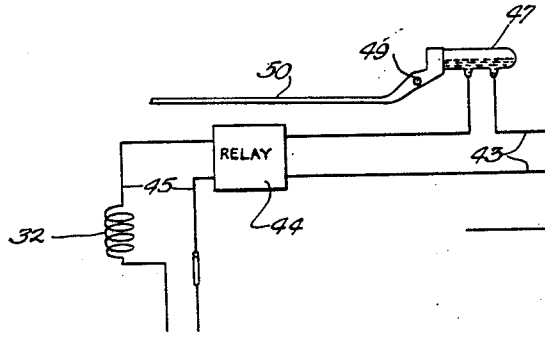


Fig. 3



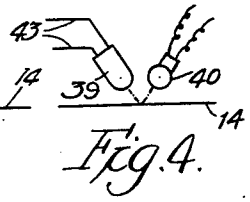
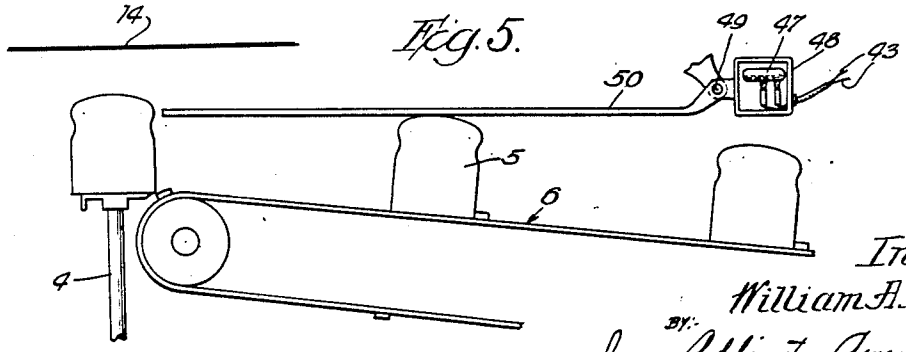


Fig. 4.

Fig. 5.



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Fig. 6.

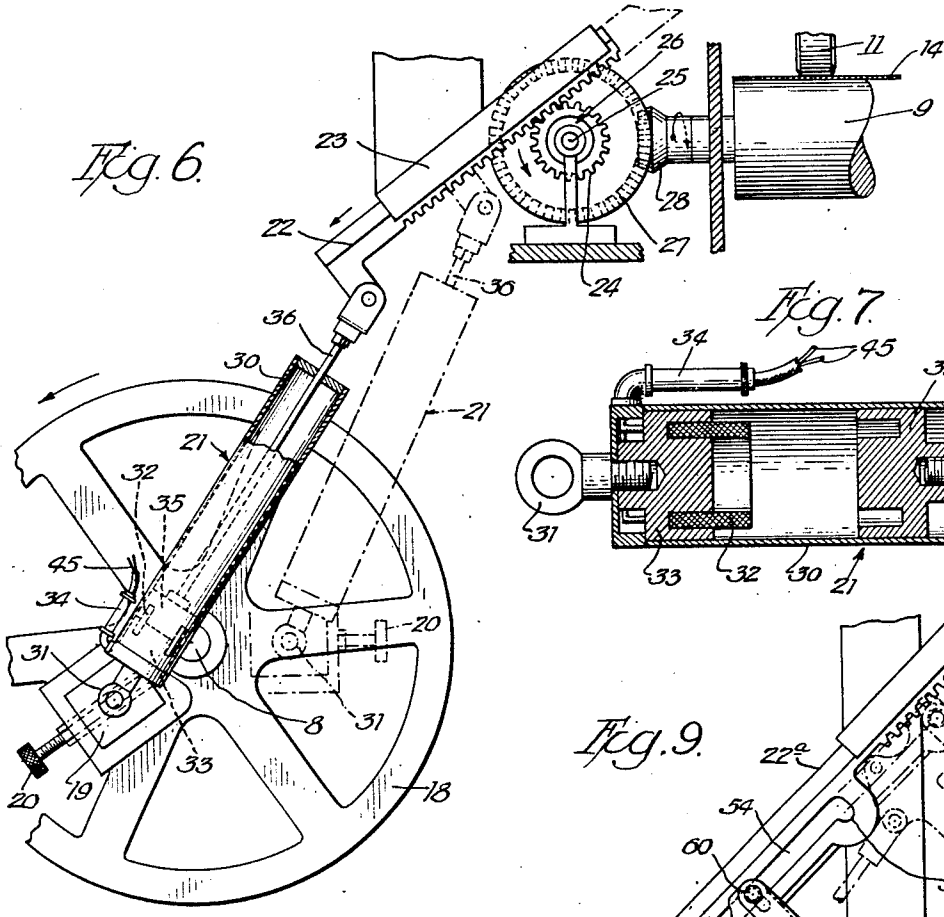
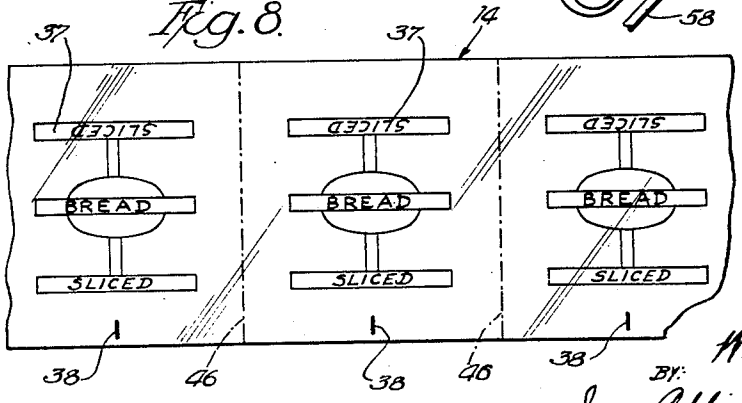


Fig. 7.

Fig. 9.

Fig. 8.



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UNITED STATES PATENT OFFICE

2,127,028

CONTROL DEVICE FOR WRAPPING MACHINES

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Application September 28, 1936, Serial No. 102,905

11 Claims. (Cl. 93—2)

This invention relates to wrapping machines, and more particularly to a web or paper feed mechanism and control therefor whereby any printed matter or legends on the web may be accurately registered with relation to predetermined surfaces on the article to be wrapped, so that after the article is wrapped the printed matter or legends will all be in the same relative position on all of the articles.

The invention is suitable for use in connection with various types of wrapping machines. However, it is particularly adapted for use with bread-wrapping machines in which it is desirable to display printed matter on the top and sides of the loaf in accurate registration and so that the printed material need not be inverted on either side of the loaf.

It is common practice in bread-wrapping machines to feed the paper longitudinally of the wrapping machine and transversely of the length of the loaf, and the paper is automatically cut off in pieces of sufficient length to wrap around the loaf and fold over the ends. In other words, prior bread wrapping machines feed the paper from the end of the machine and the web runs crosswise over the loaf. However, in such machines the feeding mechanism is not accurately controlled relative to the design or indicia on the paper; therefore the printed material cannot be accurately positioned on the loaf.

Because of the inaccuracy of such machines, it has become common practice to print the entire roll of paper with continuous repeated patterns, and no attempt is made to accurately register any part of the patterns with the loaf to be wrapped. In practicing the present invention it is unnecessary to print that portion of the paper which is folded under the bottom of the loaf and, therefore, the paper may be printed with spaced designs of any desired character, and these designs may be accurately registered with each loaf whereby the various parts of the design will always appear in the same relative position on each loaf.

It is an object of the present invention to provide a web-feeding mechanism and control therefore whereby the paper itself accurately controls the stopping of the paper feed and the cut-off operation may always be performed in the same relative position with respect to the design or indicia on the paper.

A further object is to provide means co-operating with the feeding means whereby the paper will be fed only when a loaf is to be delivered to a position to be wrapped, thereby preventing a considerable waste of paper.

Another object is the provision of an electrical control device, wherein a light-sensitive means co-operates with the paper being fed to control the mechanism accurately.

It is also an object to provide a wrapping machine feed control wherein a light sensitive means may be arranged to co-operate with substantially any type of paper or web so that the cut off pieces and any design or indicia thereon may register accurately with the article to be wrapped. The invention contemplates the use of either opaque or light-permeable web in the same machine by the use of either reflected light or a light beam transmitted through the web.

Another object is the provision of a feeding mechanism and control of the character described, which is of few parts, cheap to manufacture, convenient in operation, and which will not easily get out of order.

Further objects will be apparent from the specification and the appended claims.

In the drawings:

Figure 1 is a side elevation of a bread-wrapping machine and illustrates one embodiment of the invention;

Fig. 2 is a transverse sectional view through the paper-feeding and cut-off mechanism, and is taken on a line substantially corresponding to line 2—2 of Fig. 1;

Fig. 3 is a wiring diagram of the electrical connections for the control system, and illustrates the arrangement of light-sensitive cell and light source relative to the web when light permeable wrapping material is used;

Fig. 4 illustrates the relative position of the light cell and light source when arranged for use with opaque or semi-opaque wrapping material;

Fig. 5 is a fragmentary detail view of the bread-feeding conveyor and automatic switching arrangement associated therewith for preventing operation of the paper-feeding mechanism when a loaf is not being fed to the machine;

Fig. 6 is a fragmentary view of the transmission for intermittently operating the web-feeding rolls;

Fig. 7 is a longitudinal sectional view through the solenoid portion of the connecting rod illustrated in Fig. 6;

Fig. 8 is a plan view of a portion of one of the paper webs used for wrapping bread; and

Fig. 9 is a slightly modified form of connect-

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ing rod which may be substituted for that disclosed in Figs. 6 and 7.

As previously stated, in the usual bread-wrapping machines, the paper is fed longitudinally of the machine and, therefore, transversely of the load to be wrapped. The loaf may be fed upwardly underneath the wrapper, which is folded thereon, and the wrapped bread is then moved out of the machine on a suitable conveyor moving in the same direction in which the paper is being fed.

In the present invention, it has been found preferable to feed the paper transversely of the machine and conveyor and longitudinally of the loaf, although, of course, the paper or web may be fed in any desired relationship relative to the article to be wrapped and any desired relationship to the machine. The embodiment illustrated may comprise the usual bread-wrapping machine having a frame 1 on which the various mechanisms are supported in the usual manner. It is believed unnecessary to describe all of the various mechanisms in detail, as they may be similar to those used in common practice and may comprise a motor 2 which is connected by suitable transmissions to operate a folding mechanism designated generally by the reference character 3, and an intermittently operable plunger or elevator 4 (Figs. 1 and 4) for raising each loaf as it is delivered thereto to a position adjacent the folding mechanism, which then operates to wrap the loaf.

In the present embodiment, loaves of bread or other articles 5 are fed to the elevator by means of a suitable conveyor 6. This conveyor may be continuously or intermittently driven, and the loaves are spaced thereon so that consecutive loaves are moved onto the elevator 4 which raises each loaf to wrapping position and then lowers to receive another loaf. A second conveyor 7 is provided for moving the wrapped loaves from the machine after they are wrapped.

A transverse shaft 8 is rotatably supported on the frame 1, and this shaft may be continuously driven from the motor 2 or any suitable power source, and is ordinarily used to operate a paper-feed mechanism of the usual type. In the present embodiment, however, this same shaft 8 may be used to drive suitable paper-feed rolls which may be positioned at the side of the machine and longitudinally thereof as illustrated in Figs. 1 and 2. It will be apparent that they may be positioned transversely of the machine if desired and in any suitable relationship to the wrapping mechanism. The feed rolls preferably comprise a steel roller 9 mounted in suitable bearings on brackets 10 and co-operating pressure rollers 11, which latter are preferably of rubber and are secured to a shaft 12, which shaft is also rotatably mounted in suitable bearings on the brackets 10. A roll of paper 13, having its printed surface upward, is rotatably supported on the brackets as shown, and the web 14 passes over a small guide roll 15 and between the feed rolls as illustrated, then over a suitable skeleton support 16 adjacent the folding mechanism and above the bread elevator. An oscillatable cut-off knife 17 of the usual type may be intermittently operated by a suitable transmission from the motor 2 so that the paper which is intermittently fed to the wrapping position will be cut off in suitable lengths.

The feed roll 9 is intermittently driven from the continuously operated shaft 8 by means of a transmission mechanism illustrated in Figs. 1, 6, and 7. The transmission comprises a flywheel or gear or other suitable driving member 18 capable of reciprocating a connecting rod, and may be secured to the shaft 8 and provided with a crank pin block 19 slidably mounted thereon. This block 19 may be laterally adjusted by means of a screw 20, whereby the crank pin may be positioned at any desired radial distance from the axis of the shaft 8. A connecting rod 21 is pivotally connected to the crank pin block 19 and to a rack 22, the latter being slidably mounted in an angularly positioned guide 23. The rack 22 is in mesh with a pinion 24, which latter is rotatably mounted on a shaft 25 and forms the driving member of a so-called over-running clutch 26. A miter gear 27 is secured to the driven member of the over-running clutch and is in mesh with a pinion 28 secured to the outwardly extending shaft 29 of the paper-feed roll 9. The over-running clutch may be of any suitable type and is so constructed and arranged that when the rack moves in a downward direction the feed roll 9 will be driven to feed the paper, and when the rack moves upwardly the feed roll will be stationary and no paper will be fed.

The connecting rod 21 comprises a cylindrical member 30 of non-magnetic material having a bearing portion 31 mounted on the crank pin of the adjustable block 19. An electromagnet or solenoid is secured in the lower end of the cylinder 30 and comprises a coil 32 supported by a suitable iron core 33, as illustrated. The core 33 is rigidly secured in the end of the cylinder, and the coil is provided with suitable conductors which extend through a conduit 34. The electrical connections and control of this solenoid will be described later. A co-operating solenoid core 35 is slidably mounted in the cylinder 30 and connected to the rack 22 by means of a piston rod 36. It will be apparent that if the magnet coil 32 is energized and the cylinder is moved until the core 33 engages the piston core 35, the two core sections form a closed magnetic field which will be rigidly held together, and the connecting rod 21 will then operate as a single rigid driving member as long as the coil remains energized. The energizing and de-energizing of the solenoid 32 is controlled by the web 14 in a manner which will be described later.

The solenoid is so constructed relative to the power required to operate the feeding rolls that when the core sections 33 and 35 are only slightly separated the magnetic power is not sufficient to operate the rolls. It will therefore be apparent that if at any time during the downward movement of the rack 22 the solenoid circuit be momentarily broken, the feed rolls will instantly stop, and even though the coil be again immediately energized, the driving member 18 can continue its movement to complete the downward stroke of the cylinder 30 and to further separate the core members without again moving the feed rolls until the crank pin again reaches the top of its stroke and starts downwardly.

Therefore, in order to accurately limit the length of the feed, it is only necessary to momentarily de-energize the coil 32 at any desired point during the downward stroke of the crank pin, which will permit the separation of the parts of the connecting rod sufficiently to allow the downward stroke to be continued without further movement of the feed rolls. The core members will again be engaged during the upward stroke of the crank pin, and the rack 22 will be raised. Also, as at this time the coil is energized, the

rack 22 will again be moved downwardly to operate the feed rolls until another momentary de-energizing of the solenoid coil.

As previously stated, the paper web (Fig. 8) may be provided with spaced designs or legends 37 which may be printed thereon and which are intended to be accurately registered with certain predetermined portions of the loaf or other article to be wrapped. In order to obtain this accurate registration, the web 14, which may be a strip of transparent or translucent paper or other material capable of permitting light rays to pass therethrough, or may be more or less opaque with a light-reflecting surface, is provided with spaced opaque spots or lines 38 which are in a predetermined relation to the designs or patterns 37. In fact, these lines may be a part of the pattern and should present a non-reflective surface when used on opaque paper.

When a transparent or sufficiently light-permeable web is used, a light-sensitive cell, such as a photo-electric cell 39, may be positioned on one side of the paper, and a lamp 40 positioned on the opposite side, as shown in Figs. 2 and 3, whereby the cell may be controlled by a light beam transmitted through the web. This method of control has been found suitable when the paper is not substantially more than eight per cent opaque.

When using a wrapping material which is more than eight per cent opaque, it has been found desirable to position both the light cell and the light source on one side of the web as illustrated in Fig. 4, whereby the cell may be controlled by a reflected light beam as shown. It will be understood, of course, that the cell and light source are enclosed in suitable light-proof casings whereby the cell is not affected by light other than the beam transmitted or reflected thereto.

In Figs. 1, 2, and 3 the photo-electric cell 39 is mounted in a casing 41 secured to the frame of the machine above the web, and the light source 40 is similarly mounted in a casing 42 positioned below the web. The photo-electric cell is in alignment with the row of opaque lines 28 on the web, whereby when one of these opaque lines passes between the cell and the light source, a primary circuit 43, which is controlled by the photo-electric cell and which, in turn, controls a switching relay 44 in series therewith, is momentarily de-energized.

When an opaque or semi-opaque web is used and the cell and light source are positioned on one side of the paper as illustrated in Fig. 4, the light beam is constantly reflected to the cell except when the non-reflective indicia 38 intercepts the beam and interrupts the light to the cell.

The switching relay 44 is in series with the conductors 45 of the solenoid coil 32, and the conductors 45 may be connected to any suitable power source. It will therefore be apparent that whenever one of the opaque lines 38 intercepts the light beam, the solenoid coil 32 will be momentarily de-energized and the feeding mechanism will immediately stop with the pattern or design 37 in accurate registration with the article to be wrapped. The cut-off mechanism is arranged to cut off the web between the designs, as indicated by the dotted lines 46, or on any other predetermined lines relative to the opaque lines 38.

It will be understood that the mechanism is so constructed and arranged and the relay 44 is of such type that the lines 38 do not stop under the photo-electric cell 39 in a position to block the light from the light source to the cell. Instead, these lines pass slightly beyond the focal axis of the cell, so that the solenoid coil 32 is only momentarily de-energized. However, this de-energized period is of sufficient duration so that the core members 33 and 35 separate sufficiently to prevent any further operation of the feeding rolls by further downward movement of the core member 33 during completion of the downward stroke of the crank pin. It will also be understood that the feed may be accurately adjusted relative to a predetermined web by means of the adjusting screw 20 arranged for radial adjustment of the crank pin.

As previously stated, the loaves of bread 5 or other articles to be wrapped are fed to the elevator 4 by means of a conveyor 6, and in order that paper will not be fed to the wrapping position unless a loaf is delivered to the elevator, means is provided for breaking the photo-electric cell circuit 43 when a loaf is not on the conveyor in a position to be fed to the elevator. This is illustrated in Fig. 1 and in detail in Fig. 5. The embodiment illustrated comprises a mercury switch 47 which is mounted in a suitable casing 48 and connected in series with the photo-electric cell 39 and relay 44. It will be apparent that this switch may be of any suitable type and may be connected in series with the solenoid coil 32 if it is desired to break the secondary circuit instead of the primary circuit. The switch casing 48 is pivoted at 49 on any suitable part of the frame and is provided with an elongated arm 50 which is normally maintained in the raised position illustrated by the loaves of bread 5 passing thereunder. If the loaves are not continuously moved under the arm 50 to maintain it in a raised position, the arm will drop sufficiently to cause the switch 47 to break the circuit 43 and the solenoid 32 will remain de-energized and no paper will be fed until the arm is again raised by a loaf.

In some cases it is desirable to provide an inner wrapper for the bread, and this wrapper may be provided from a paper roll 51 rotatably mounted on a bracket 52 (Fig. 2). The web 53 of this inner wrapper may be fed through the machine simultaneously with the web 14, and as this inner web may be transparent or translucent or may be narrower than the outer web, it does not interfere with the proper functioning of the photo-electric cell.

Fig. 9 illustrates a slightly modified form of connecting mechanism for operating the rack. In this embodiment the rack 22a may be provided with an elongated slot 54 having a notch 55 at its upper end. A solenoid 56 is mounted on a bracket 57, which latter is slidably mounted in a slot 54. The bracket 57 is connected to the crank pin member 19 by means of a solid connecting rod 58. The solenoid 56 is provided with a plunger armature 59 having a roller 60 thereon which is engaged in the slot 54.

With the parts as illustrated in Fig. 9, the connecting rod and bracket thereon may be substantially at the bottom of their stroke, and the solenoid 56 has been de-energized, to break the connection between the bracket and the rack, and again energized. However, the rack 22a will not be moved, for the reason that the bracket and roller 60 freely slide thereon. When the bracket 57 moves upwardly, the energized solenoid will cause the roller 60 to be engaged in the notch 55, and when the crank pin starts its downward movement the rack 22a will be moved

downwardly to operate the feed rolls for another cycle.

It will be apparent that if desired the entire web or a narrow strip thereof may be opaque, except for translucent indicia or perforations corresponding to the lines 38, and for such purposes the characteristics of the light-sensitive cell and the relay are such that the solenoid circuit remains closed except when light passes through the web.

It will be understood that the present invention is adaptable to various types of wrapping machines; for instance, some bread-wrapping machines may be provided with a so-called rotary cut-off shear operable by a suitable mechanism whereby when the paper is fed and the spot intercepts the light ray, the mechanism is actuated to rotate the shear.

Modifications may be made without departing from the spirit of the invention, and it is desired therefore that the invention be limited only by the prior art and the scope of the appended claims.

Having thus described this invention, what is claimed and desired to be secured by Letters Patent is:

1. A wrapping machine for wrapping articles which comprises the combination of means for advancing the articles to wrapping position, means for supplying a continuous web of wrapping material having indicia at predetermined places thereon, a beam of light rays directed on said wrapping material, and a light-sensitive device illuminated thereby and so positioned that the indicia intermittently intercepts the said beam, an electrical circuit, means controlled by the articles to be wrapped for establishing and disconnecting said circuit, a transmission for moving the web, and means for severing the web, said transmission comprising a rotating member and a connecting rod consisting of two parts capable of cohering under the influence of magnetic flux, a solenoid in said electrical circuit whereby when current is flowing the magnetic flux exerts its effect to cause said parts to cohere, the indicia of the web when intercepting the beam of light thereby extinguishing the magnetic flux so that the connecting rod separates into two parts, thus stopping the movement of the web.

2. In a wrapping machine of the type described, means for controlling the feed of the wrapping material which comprise a constantly rotating driving wheel, a feed roll, a reciprocating rack, a transmission between said rack and said roll including an overrunning clutch, said connecting rod comprising two separable members adhering to each other under the influence of electromagnetic flux, a solenoid in said rod for causing said flux when energized, and means for interrupting the current to said solenoid to effect separation of the connecting rod into a moving and a substantially stationary portion.

3. In a wrapping machine of the type described the subcombination of a transmission for feeding the wrapping material which comprises a driving wheel, a pinion and a rack cooperating therewith, said rack being connected with the wheel by means of a connecting rod which latter comprises a magnetizable head, a cylinder and a magnetizable piston capable of reciprocatory motion therein, a solenoid positioned in said head and capable of extending into the piston, whereby when said solenoid is generating magnetic flux under the influence of electric current flowing therethrough the head and piston are held immovably together but will separate on stoppage of the current.

4. In a wrapping machine of the type described, the subcombination of a transmission for feeding the wrapping material which comprises a driving wheel, a pinion and a rack cooperating therewith, said rack being connected with the wheel by means of a connecting rod which latter comprises a magnetizable head, a cylinder and a magnetizable piston capable of reciprocatory motion therein, a solenoid positioned in said head and capable of extending into the piston, whereby when said solenoid is generating magnetic flux under the influence of electric current flowing therethrough the head and piston are held immovably together but will separate on stoppage of the current, and means for interrupting the current comprising a light-sensitive relay controlled by light-intercepting indicia on the wrapping material.

5. In a wrapper-feeding mechanism, the combination of a motion-transmitting member including separable magnetizable coupling portions, means for intermittently moving at least one of said portions out of and into effective magnetic range of the other portion, energizing means for producing in said coupling portions a magnetic flux to seal said portions together magnetically for movement as a unit when within said effective range, and means controlled in accordance with the position of a wrapper for deenergizing said energizing means to release said magnetic seal whereby one of said coupling portions is released for continued movement while the other coupling portion is inactive.

6. In a wrapper-feeding mechanism, the combination of a reciprocal motion-transmitting member including separable magnetizable coupling portions, energizing means for producing in said coupling portions a magnetic flux to seal said portions together magnetically for reciprocation as a unit, and means controlled in accordance with the position of a wrapper for deenergizing said energizing means to release said magnetic seal whereby one of said portions is released for independent reciprocation while the other portion is inactive.

7. In a wrapping machine comprising means for advancing articles to be wrapped into wrapping position and means for supplying a wrapping medium thereto, the improvement which comprises the combination of a motion-imparting member for effecting the supply of wrapping medium, said member including separable magnetizable coupling portions, means for intermittently moving at least one of said portions out of and into effective magnetic range of the other portion, energizing means for magnetically sealing said portions together for movement as a unit when within said effective range, and means controlled by indicia on said medium for releasing said magnetic seal to render said motion-imparting member inactive when the article and the wrapping medium are in predetermined relation with each other.

8. In a wrapper-feeding mechanism, the combination of a motion-transmitting member including separable magnetizable coupling portions having abuttingly engaging pole faces, energizing means for producing in said coupling portions a magnetic flux to seal said portions together when said pole faces are in engaging relation, said magnetic flux being incapable of attracting said pole faces into engaging relation after separation thereof, and means for momen-

tarily deenergizing said energizing means during movement of said coupling portions as a unit for effecting separation of said portions whereby one of said portions continues to move and the other portion remains inactive.

9. In an automatic wrapping machine, the combination of means for supplying wrapping medium including a motion-transmitting member having separable driving and driven portions formed of magnetizable material, said driving and driven portions having engaging pole faces, means for producing a magnetic flux in said portions magnetically to seal said portions together for operation as a unit, said driven member when operated effecting the supply of wrapping medium, said magnetic flux being incapable of attracting said portions into engaging relation after separation thereof, and means for momentarily deenergizing said flux producing means to permit said driving portion to separate from said driven portion whereby the supply of wrapping medium is stopped, said last mentioned means being responsive to indicia on said wrapping medium.

10. In a wrapper-feeding mechanism, the combination of a motion transmitting member including separable coupling portions, magnetic means for preventing separation of said coupling portions during movement of said member, said magnetic means being ineffective to cause reengagement of said coupling portions after separation thereof, and means for momentarily deenergizing said magnetic means to effect separation of said coupling portions whereby one of said portions remains inactive while the other portion continues to move, said magnetic means being immediately reenergized so as again to prevent separation of said coupling portions upon reenegagement thereof by said continued movement of said other portion.

11. In a wrapper-feeding mechanism, the combination of a reciprocal motion-transmitting member including separable coupling portions, a feed roll, means for transmitting the motion of said reciprocal member to said feed roll including a rack and pinion and an overrunning clutch, said overrunning clutch being arranged to drive said feed roll only when said reciprocal member is moved in a direction tending to separate said coupling portions, magnetic coupling means for preventing separation of said portions whereby said feed roll is intermittently driven, said magnetic means being ineffective to cause reengagement of said coupling portions after separation thereof, and means responsive to the position of a wrapper fed from said feed roll for momentarily deenergizing said magnetic means during movement of said coupling portions in said direction whereby said portions are separated to stop said feed roll and one of said coupling portions reciprocates independently of the other until said one coupling portion again engages said other coupling portion, said magnetic means thereupon again preventing separation of said portions.

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