April 13, 1954

M. PARKER ET AL
FEEDING OF WRAPPING MATERIALS TO
WRAPPING MACHINES AND THE LIKE

2,675,230

Filed Feb. 4, 1952

4 Sheets-Sheet 1

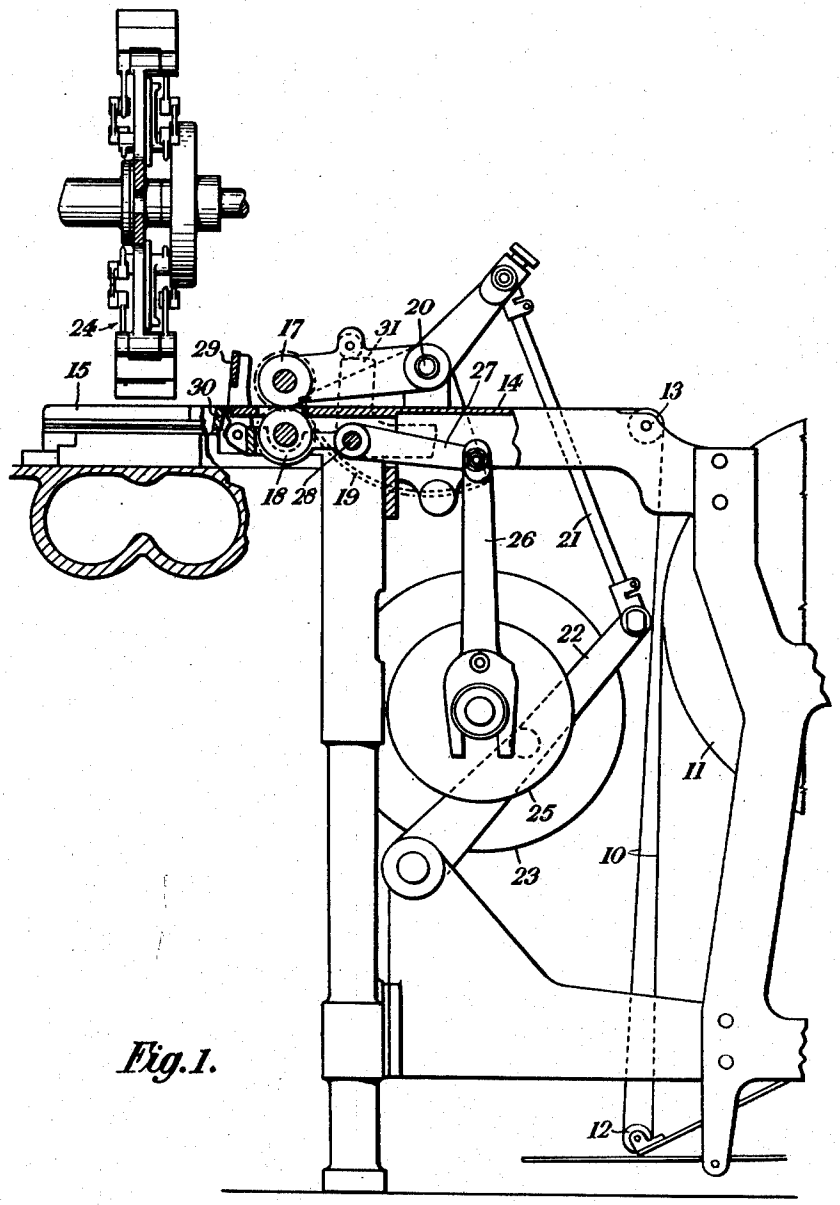


Fig. 1.

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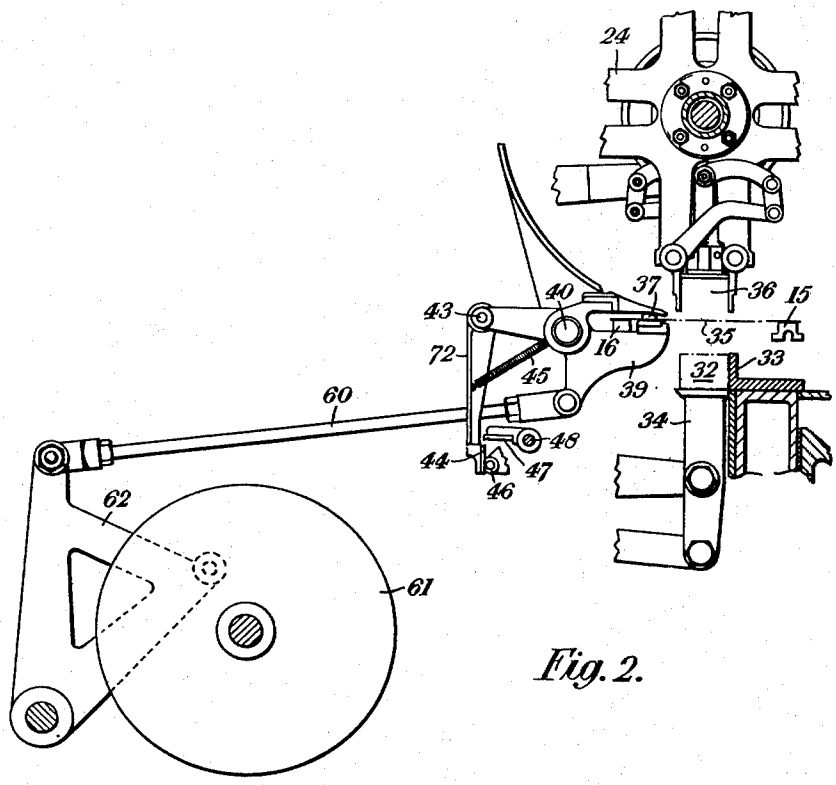


Fig. 2.

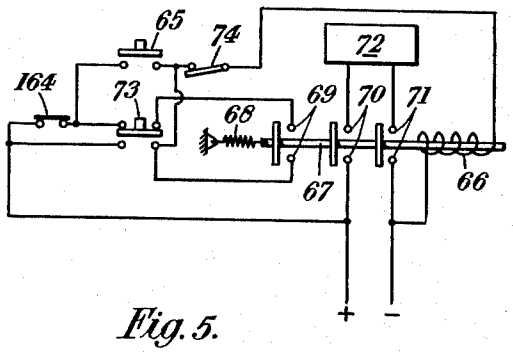


Fig. 5.

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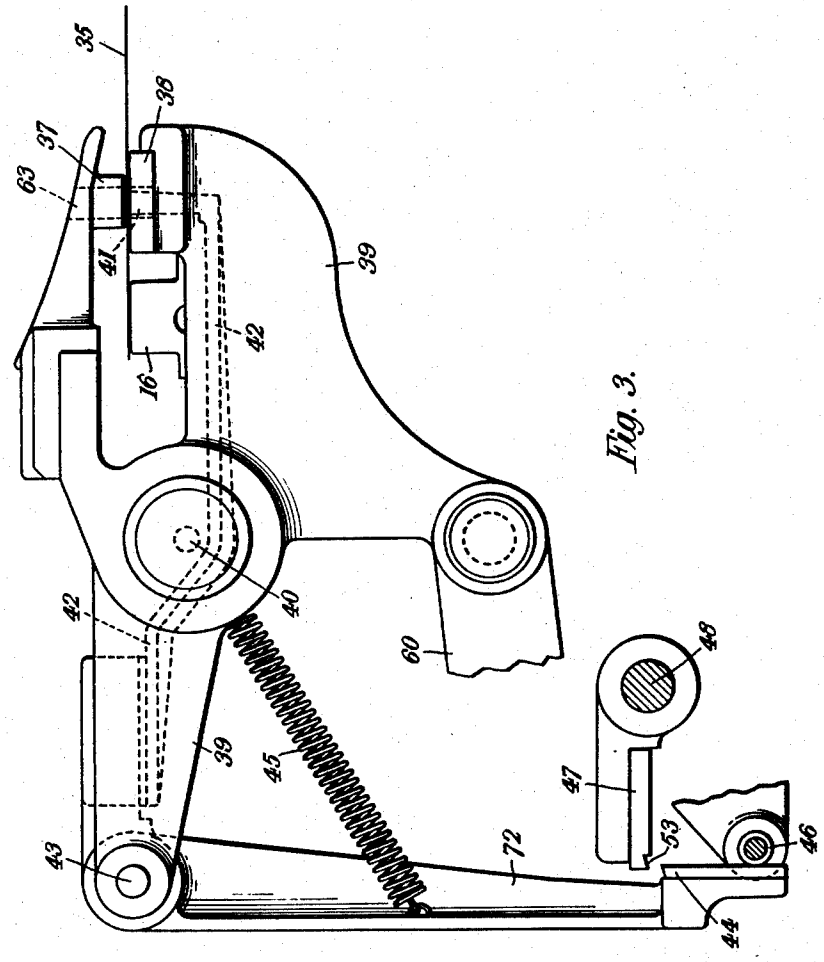


Fig. 3.

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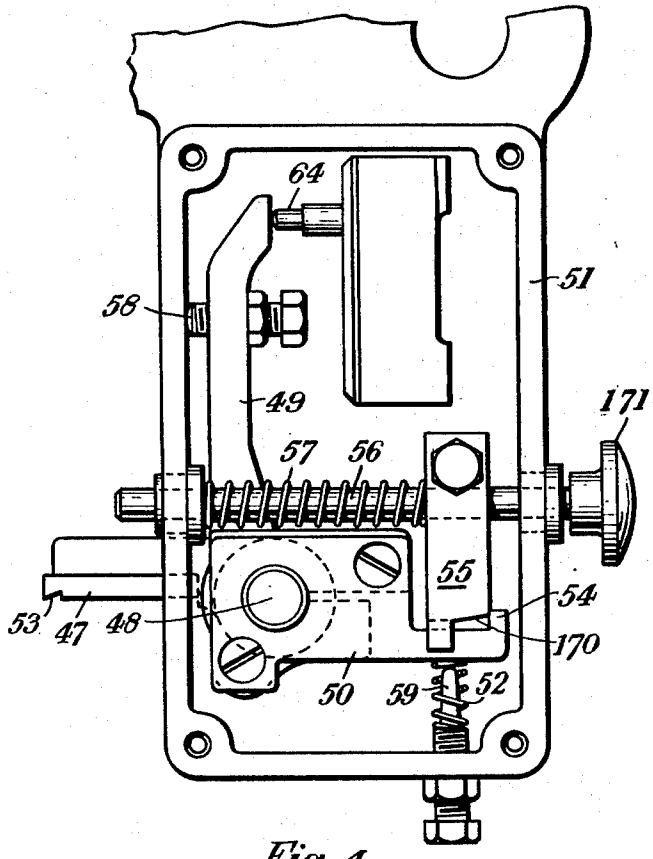


Fig. 4.

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UNITED STATES PATENT OFFICE

2,675,230

FEEDING OF WRAPPING MATERIALS TO WRAPPING MACHINES AND THE LIKE

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Application February 4, 1952, Serial No. 269,867

7 Claims. (Cl. 271—2.6)

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This invention relates to apparatus for feeding to a wrapping machine individual wrappers, fed in succession from a stack, or a continuous web of wrapper, the leading portion of which is cut off at each machine cycle and utilised to wrap an article.

Undesirable results ensue if the wrapper feed is incorrectly coordinated with the movements of the various parts of the wrapping machine proper and these are particularly serious where plastic substances, such as butter or margarine, are to be wrapped, due to the fact that an incompletely covered block of such substance will foul the wrapping mechanism if allowed to proceed through the machine.

Overfeeding of the wrapper very seldom occurs with a properly designed feed mechanism, but underfeeding sometimes occurs, as for example if the wrapper is retarded for some reason or if it has a badly curled corner, and improper wrapping of the article may arise as the result of such accidental underfeeding of the wrapper. Underfeeding of the wrapper may be counteracted by providing a trip mechanism which operates to stop the machine in response to failure of the leading edge of the wrapper to reach a desired point.

The design of a satisfactory trip mechanism presents difficulties. In the first place, since it is only possible to test for a successful feed by determining that the leading edge of the wrapper has arrived at an acceptable position, the trip mechanism can only begin to act at, or near, the end of the wrapper feed period. Secondly, factors concerned with the appropriate distribution of time among the various moving parts of the wrapping mechanism usually combine to favour minimum dwell of the wrapper in its fed position, so that trip action must end as soon as possible.

In addition to restricting detection time, a further condition is usually imposed by applying trip action at so late a stage. This condition is that, when set into motion by wrapper default, the trip must operate immediately on the machine controls, so that stoppage occurs with the least possible overrun; thus preventing the arrival of a partly covered object at a position where it may cause trouble, and so prolong the stoppage.

The problems involved are therefore—

(1) Time restriction, due to the late stage at which trip action is applied to the wrapper and to the almost immediate subsequent departure of the wrapper to its next position.

(2) Necessity for prompt stoppage of the machine due to the late-stage application of trip action, which reduces to a minimum the available time between the moment of tripping and the moment of introduction of the article being wrapped into mechanism which it may foul.

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A further requirement of such a trip mechanism is that, once tripped, it should remain in tripped position, so that the machine cannot be started until the trip mechanism has been reset.

The invention provides, in a wrapping machine, feed mechanism for feeding wrappers in succession to bring their leading edges to a definite datum position, means for testing the wrapper feed at each machine cycle at a position close behind the datum position, a normally cocked trip member which, when uncocked, operates by snap action to actuate a device for stopping the machine and to retain said device in actuated position, and a member, controlled by the testing means, which is ineffective in the case of correct wrapper feed but is operable by the testing means to uncock the trip member in the event of underfeeding of the wrapper.

In the preferred form of the invention, the testing means is constituted by a feeler which, at each machine cycle, tends to move across the path of the wrapper feed. When the leading edge of an individual wrapper, or of a web of wrapping material fed from a reel, is correctly fed up to the datum position the feeler is arrested by the wrapper and prevented from executing the further movement required to actuate the trip mechanism and stop the machine. In the event of underfeeding of the wrapper, however, the feeler can move across the path of the wrapper feed, actuate the trip member and stop the machine. The machine cannot be run normally until the trip member is recocked and frees the machine stopping device, which may conveniently be an electric switch. Recocking may be effected manually, in which case the operator must, after clearing obstacles in the wrapper feed, decide whether the machine is capable of running again before recocking the trip member. Decision on this point is aided by "inching" the machine, in limited steps, by means of a special switch, which is independent of the switch operated by the trip mechanism, or by turning the machine by hand. As an alternative, however, we may provide a device which operates automatically to recock the trip member when paper feed conditions have been restored to normal.

Preferably, the trip member stops the machine by actuating an electric switch, but it will be appreciated that it could, instead, be arranged to

actuate a purely mechanical device, such as a clutch, for stopping the machine.

One specific embodiment of the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which—

Fig. 1 is a side elevation, partly in section, of the wrapper feed mechanism,

Fig. 2 is a view, also partly in section, looking from the left hand side of Fig. 1,

Fig. 3 is an enlarged view of that portion of Fig. 2 which shows the feeler mechanism,

Fig. 4 is a view, taken in the same plane as Figs. 2 and 3, of the trip mechanism, and

Fig. 5 is a circuit diagram.

Like reference numerals indicate like parts throughout the figures.

The machine shown in the drawings is of the general character described in British specifications Nos. 565,144 and 622,593. A web 10 of wrapping material is fed from a reel 11, Fig. 1, over a jockey roller 12, a roller 13, a horizontal feed table 14 and guides 15, 16 (see also Fig. 2) by intermittently rotating feed rollers 17, 18. The rollers 17, 18 are geared together and are periodically given a forward stroke by a toothed quadrant 19, pivoted at 20 and actuated through a link 21 and lever 22 from a cam 23. After the rollers have fed the leading portion of the web forward along the guides 15, 16 and into position beneath a wrapping wheel 24, a cam 25 lifts an arm 26, thereby rocking a lever 27 anticlockwise about its pivot 28 and causing a knife 29 on the left hand end of the lever 27 to descend and, in cooperation with a fixed knife 30, to sever a wrapper from the leading end of the web 10. At the same time a cam 31 is actuated to lift the upper feed roller 17 off the web, and while the roller 17 is so lifted, the quadrant 19 returns to its initial position. The roller 17 is then lowered, and the movable knife 29 raised, prior to the next forward stroke of the quadrant 19, all as described in British specification No. 622,593.

A block 32 (Fig. 2) of plastic material to be wrapped is fed, at each cycle of operation of the machine, by a pusher 33 into position on top of a lifting member 34, which is then lifted, as described in British specification No. 565,144, to raise the block 32 into the lowermost pocket 36 of the wrapping wheel 24, which is of the construction described in U. S. application Serial No. 269,884, now U. S. Patent No. 2,643,501. The block 32 carries with it, as it rises into the pocket 36, the wrapper 35 which has been severed, by the knives 29, 30, from the leading edge of the web 10 as already described with reference to Fig. 1.

The feed rollers 17, 18 operate, at each machine cycle, and so long as the machine is working properly, to feed the leading edge of the web 10 to a definite datum position. The wrapper 35 severed by the knives 29, 30 will then be correctly positioned in relation to the block 32. To ensure that the web has been correctly fed by the feed rollers 17, 18, the portion thereof immediately to the rear of its leading edge is fed into a narrow gap, e. g. $\frac{1}{32}$'' in width, between two rails 37, 38 carried by a lever 39 (Fig. 3) mounted on a horizontal pivot pin 40. The lower rail 38 has in it a hole containing a feeling finger 41 which is attached to and projects upwardly from one arm 42 of a bell crank pivoted on the end 43 of the lever 39 remote from the rails. The other arm 72 of the bell crank carries at its lower end a striker 44. A spring 45 tensioned between the arm 72 and the pivot pin 40 retains the striker in contact with a fixed stop 46. In this position, the upper end of the feeling finger 41 is level with the upper surface of the rail 38, as shown in Fig. 3.

Above the striker 44 is disposed a trip lever 47, fixed to a horizontal shaft 48 (see also Fig. 4) carrying a switch actuating lever 49 and a cocking arm 50. The latter parts are enclosed in a box 51 situated in front of the mechanism shown in Figs. 2 and 3 and therefore not seen in those figures. A compression spring 52, bearing against the undersurface of the cocking arm 50, normally holds the switch actuating lever 49 and trip lever 47 in the cocked position shown in Figs. 3 and 4, in which the nose 53 of the trip lever 47 is immediately above the striker 44. In this position, a nose 54 on the cocking arm 50 coacts with a detent 55, which is fixed to a resetting rod 56, urged by a compression spring 57 to the right, thereby holding the detent 55 in the position shown in Fig. 4. An adjusting screw 58 on the switch actuating lever 49 coacts with the side of the box 51 to determine the position of the parts when cocked, and a further adjusting screw 59 below the cocking arm 50 serves to limit the movement of the parts when uncocked.

At the end of each wrapper feed period, the lever 39 is rocked clockwise as seen in Fig. 3 by a link 60 operated (see Fig. 2) from a cam 61 through the agency of a lever 62. The rails 37, 38 are thus lowered, carrying downwardly the leading edge of the wrapper 35. The forward end of the guide 16 is disposed behind the lever 39, so that the leading portion of the wrapper is unsupported at its left hand side as seen in Figs. 2 and 3, so permitting of downward movement of said leading edge. If the wrapper has been correctly fed, it coacts with the feeler finger 41 to prevent it from moving into a hole 63 in the upper rail 37 aligned with the hole in the lower rail 38. The bell crank 42, 72 thus moves as a unit with the lever 39 about the pivot 40, causing the striker 44 to move in an arcuate path about the pivot 40 and so to move clear of the nose 53 of the trip lever 47.

If, however, the wrapper has been underfed and does not obstruct the feeler finger 41, the latter will rise, under the action of the spring 45, into the hole 63 in the upper rail 37, the striker 44 riding upwardly on its stop 46, as the pivot 43 is raised by clockwise movement of the lever 39, and so engaging the nose 53 of the trip lever 47 and rocking the shaft 48 clockwise. This rocks the cocking arm 50 (Fig. 4) against the spring 52 into a position in which its nose 54 is clear of the detent 55 and at the same time causes the switch actuating lever 49 to depress a microswitch 64 and thereby stop the machine.

As shown in Fig. 5, depression of a start button 65 completes a circuit to energize a contactor holding coil 66, thereby moving a contactor 67 to the right, against the action of a spring 68, to close contacts 69, 70, 71. Closure of the contacts 69 completes a holding circuit for the coil 66, while closure of the contacts 70, 71 completes a circuit to the electric motor 72 driving the machine. Immediately, however, the microswitch 64 (Fig. 4) is depressed by the lever 49, a contact 164 is opened to break the holding circuit for the coil 66. The spring 68 then moves the contactor 67 to the left, opening the contacts 70, 71 and so stopping the motor 72. Opening of the contacts 164 renders the start button 65 inoperative.

Immediately the nose 54 of the cocking arm 50 has moved clear of the detent 55, the latter is freed to the action of its spring 57 and is moved to the right (Fig. 4) by the spring. A sloping surface 170 on the detent 55 then engages the nose 54 on the cocking arm to give the latter a rapid further clockwise movement. The detent 55 moreover, under the action of its spring 57, holds the cocking arm 50 depressed and the switch 64 operated. This is important, because the limited time, referred to above, available for the movement of the lever 39, means that the amount of movement of the trip lever 47 by the striker 44 is extremely restricted, and not sufficient to ensure safe operation of the switch 64 unless the switch actuating lever 49 or the trip lever 47 are made of an inconvenient size. In addition to promoting a compact assembly, the action of the detent 55, in not only retaining the switch 64 depressed but also in furthering such depression, ensures that the trip lever 47 is moved beyond the range of movement of the striker 44. In this way, the switch 64 is protected from innumerable "jogs" during correction of wrapper feed faults, or, as may happen, during running of the machine without wrappers.

A recocking knob 171 is provided on the end of the resetting rod 56. Hand pressure on this knob 171 returns the detent 55 to the left, against its spring 57, into a position in which the cocking arm 50 may be returned, by its spring 52, into its initial cocked position (shown in Fig. 4) in which it once more holds the detent depressed. The switch actuating lever 49 is thus moved away from the switch 64 which is returned by a spring inside it into its initial position, in which the contact 164 (Fig. 5) closes again, thereby bringing the start button 65 into circuit again to permit of operation thereof to start the motor 72. Depression of an inching button 73 completes a circuit to the coil 66, whether the contact 164 is open or not. Momentary breaking of the circuit to the coil 66 during the return of the inching button 73 allows the contacts 69 to open, so that the circuit to the coil 66 remains broken when the inching button is fully returned to the position shown in Fig. 5. The buttons 65, 73 are spring loaded so as normally to occupy the positions shown in Fig. 5. A stop switch 74, operation of which cuts out all the other switches, is used for normal stopping of the motor.

The lever 39 is returned to its initial position immediately after the feeling finger 41 has tested the wrapper feed, so freeing the wrapper, if present, from the pressure of the feeling finger and allowing its rapid transference into the wrapping wheel 24 by the lifting member 34 (Fig. 2).

It is not essential that the rails 37, 38 should move as well as the feeling finger 41 to permit of movement of the latter into the hole 63 in the upper rail 37. As an alternative, the rails 37, 38 may remain stationary and trip action be secured by imparting movement only to the lever 42 carrying the feeling finger.

What we claim as our invention and desire to secure by Letters Patent is:

1. In a wrapping machine, the combination, with intermittently operating feed mechanism for feeding wrappers in succession to bring their leading edges to a datum position, of a feeler, means operative in timed relationship with said feed mechanism to move said feeler across the path of wrapper feed at a point immediately in rear of its leading edge, a striker linked to said feeler, means guiding said striker to move in a first path when movement of said feeler is arrested by a wrapper and otherwise in a second path, a trip member positioned out of the first path of movement of said striker but actuable by said striker when it moves in its second path of movement, a normally ineffective device for stopping said machine and means connected to said trip member for actuating said stopping device on actuation of said trip member by said striker.

2. In a wrapping machine, the combination, with intermittently operating feed mechanism for feeding wrappers in succession to bring their leading edges to a datum position, of means for testing the wrapper feed at each machine cycle at a position close behind said datum position, a normally inoperative device for stopping said machine, a pivotally mounted trip member, a lever for actuating said stopping device fixed to said trip member, a cocking arm also fixed to said trip member, a spring urging said trip member for movement about its pivot in a direction to move said lever away from said stopping device, a member coupled to said testing means and operable thereby on failure of the wrapper feed to displace said trip member and said lever and thereby to effect operation of said stopping device, and a detent coacting with said cocking arm to retain said lever in its displaced position.

3. In a wrapping machine, a combination as claimed in claim 2 comprising a loading spring urging said detent into engagement with said cocking arm, a cam surface on said detent and a nose on said cocking arm, said loading spring serving, on displacement of the trip member, to impart to said cocking arm and said lever, through coaction of said cam surface with said nose, further movement in the direction to actuate said stopping device.

4. In a wrapping machine, a combination as claimed in claim 2 comprising a slidable resetting rod, said detent being mounted on said resetting rod, a loading spring urging said detent into engagement with said cocking arm, a cam surface on said detent and a nose on said cocking arm, said loading spring serving, on displacement of the trip member, to impart to said cocking arm and said lever, through coaction of said cam surface with said nose, further movement in the direction to actuate said stopping device, and said resetting rod being manually operable to reset said detent, against the action of said loading spring, into position to engage said cocking arm to recock said trip member.

5. In a wrapping machine, the combination of a pivoted lever, a pair of rails carried by said lever and defining between them a narrow gap, intermittently operating feed mechanism for feeding wrappers in succession into said gap with the leading edge of the wrapper slightly in advance of aligned holes in said rails, a device for stopping said machine, a normally cocked trip member, means actuable by said trip member, when freed, to operate said stopping device, a bell crank pivoted to said lever, a feeler mounted on one arm of said bell crank, said feeler normally being housed in a hole in one of the rails, a spring urging the bell crank in the direction to move the feeler across the path of the wrapper feed and into the hole in the other rail, a stop coacting with the other arm of the bell crank so as normally to prevent such movement, a striker on said other arm of said bell crank, which is normally opposite said trip member, and cam-

operated mechanism for periodically oscillating said lever to cause the rail in which the feeler is housed to move across the path of the wrapper feed, said striker moving, in response to oscillation of said lever, in an arcuate path to clear the trip member so long as the wrapper impedes movement of the feeler into a hole in the other rail but being constrained by said spring to move along the stop and so to actuate the trip member, when, due to underfeeding of the wrapper, movement of the feeler into the hole in said other rail is not impeded by the wrapper.

6. In a wrapping machine, the combination, with an electric motor for driving said machine, of intermittently operating feed mechanism for feeding wrappers in succession to bring their leading edges to a datum position, a feeler, means operative in timed relationship with said feed mechanism to move said feeler across the path of wrapper feed at a point immediately in rear of its leading edge, a striker linked to said feeler, means guiding said striker to move in a first path when movement of said feeler is arrested by a wrapper and otherwise in a second path, a trip member positioned out of the first path of movement of said striker but actuable by said striker when it moves in its second path of movement, a normally inoperative switch for stopping said motor, and means connected to said trip member

for actuating said switch on actuation of said trip member by said striker.

7. In a wrapping machine, the combination, with an electric motor for driving said machine, of intermittently operating feed mechanism for feeding wrappers in succession to bring their leading edges to a datum position, means for testing the wrapper feed at each machine cycle at a position close behind said datum position, a normally inoperative switch for stopping said motor, a trip member, a lever connected thereto for actuating said switch, a spring urging said trip member and lever in the direction to maintain said lever away from said switch, a cocking arm also connected to the trip member, and a member connected to and movable with said testing means, said member coacting with said trip member on failure of the wrapper feed to effect actuation of said switch, and a detent coacting with said cocking arm to retain said lever in its switch actuating position.

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