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WRAPPER FEED MECHANISM

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Fig. 2.

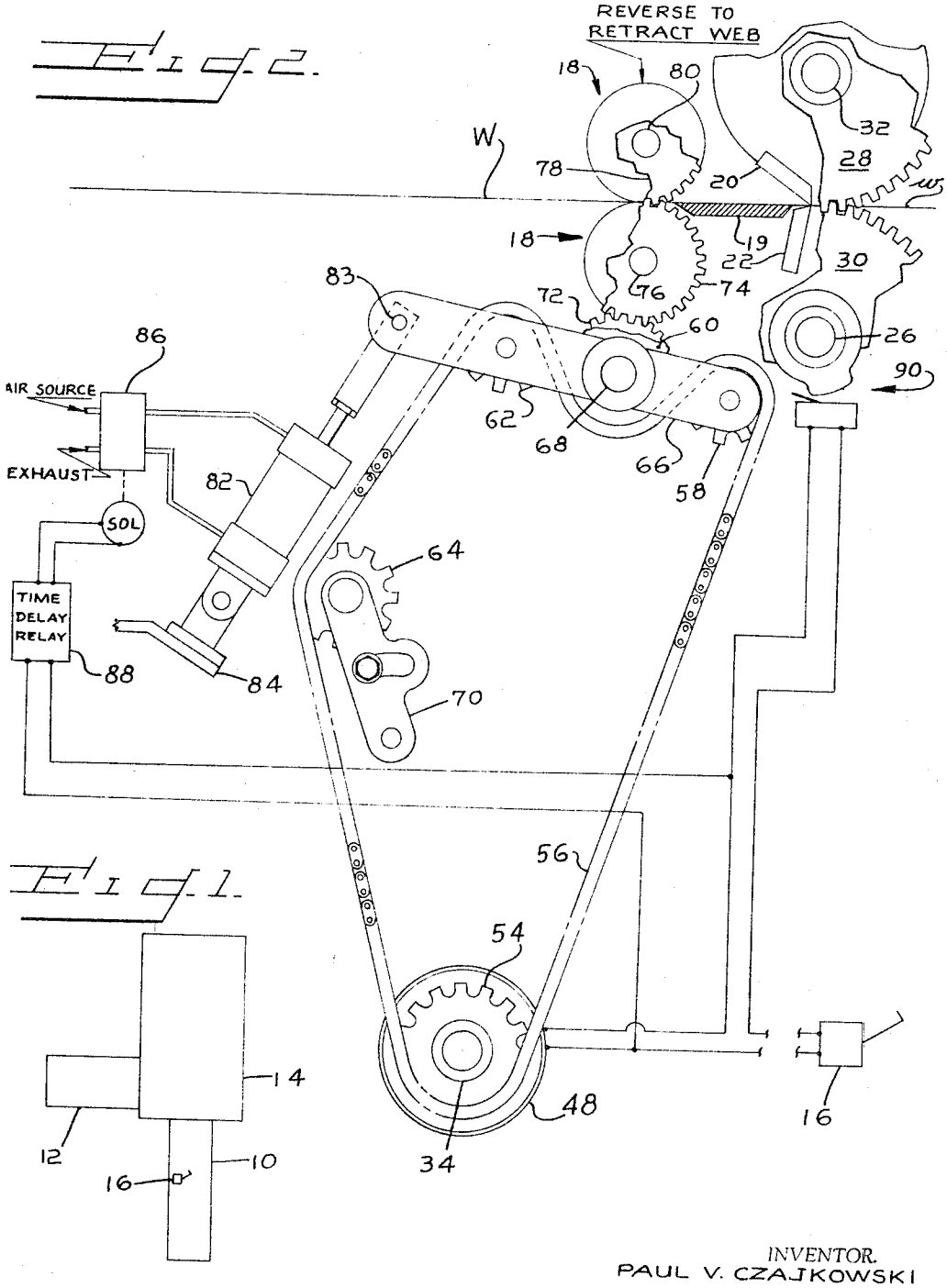


Fig. 1.

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WRAPPER FEED MECHANISM

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The present invention relates to improvements in wrapper cut-off mechanisms as used in wrapping machines.

In many wrapping machines individual wrappers are cut from the leading end of a web of wrapping material and then delivered to instrumentalities which fold the wrapper around an article. If there is an interruption in the feed of articles, which is often only temporary, operation of the wrapping machine could be stopped immediately to prevent unused wrappers from accumulating. This, however, would entail considerable stress on the various machine parts due to the large inertia involved. It has thus been an accepted practice to stop operation of only the wrapper feed when the supply of articles is interrupted. The remaining components of the machine continue operation and only a small number of machine elements are involved as accumulation of unused wrappers is prevented.

However, recent increases in the rates of operation of such wrapping machines have made it necessary to employ a continuously rotating cut-off knife in order to further reduce the inertia, and consequent stresses of the parts which are accelerated and decelerated when the feed of wrappers must be interrupted. Thus, the rolls which feed the web to the knife are stopped as the knife continues to rotate. Unfortunately, the leading edge of the web tends to be drawn into the bite of the rotating knife which cuts small slivers therefrom. This has two harmful effects. First, in a relatively short time the web is drawn through the feed rolls sufficiently so that registration of printed panels will be improper on several articles, once wrapper feed is resumed. Second, the slivers quickly accumulate and become a nuisance, if not a hazard, to operation of the machine.

The object of the invention is to overcome the problems outlined above incident to interrupting the feed of wrappers where a continuous rotating cut-off knife is employed.

These ends are attained in a wrapping machine having a wrapper feed comprising a pair of rolls for feeding a web of wrapping material to a rotating knife which severs a wrapper therefrom. This wrapper is then positioned relative to an article which is to be wrapped. When the supply of articles is interrupted, the feed rolls are stopped as the knife continues rotation. The leading end of the web is then retracted by imparting a reverse rotation to the feed rolls. Advantageously this may be done through the same driving system employed in rotating the feed rolls in a forward or normal direction.

The above and other related objects and features of the invention will be apparent from a reading of the following description of the disclosure found in the accompanying drawing and the novelty thereof pointed out in the appended claims.

In the drawing:

FIG. 1 is a diagrammatic view of a wrapping machine of the type referred to; and

FIG. 2 is an elevation of wrapper feed mechanism embodying the present invention.

FIG. 1 shows by block representation, a wrapping machine comprising an article feeder **10**, wrapper feed mechanism **12** and folding instrumentalities **14**. Articles are fed to the feeder **10** either manually or directly from a preceding machine. The feeder then advances the articles to the folding instrumentalities in timed relation to the delivery of wrappers from the mechanism **12**. These instrumentalities then fold each wrapper about an article.

A detector **16** senses the absence of articles, or a sufficient number of articles, at the feeder **10**. Actuation of the detector **16** causes feeding of wrappers from the mechanism **12** to be stopped in proper timed relation to the last article passing from the feeder to the folding instrumentalities. When the supply of articles is replenished, operation of the wrapper feed mechanism is resumed in proper timed relation to the advance of the articles.

FIG. 2 shows those components of the wrapper feed mechanism **12** required to teach those skilled in the art to practice the present invention. Many known components are omitted or shown in diagrammatic form for the sake of simplicity and clarity.

Normal operation of this mechanism is quite simple. A web W of sheet material is drawn from a supply roll (not shown) and fed by a pair of rolls **18** across a plate **19** to a rotating knife **20**, which shears the web against a bed plate **22**. A wrapper *w* is severed from the leading end of the web with each rotation of the knife **20** and then advanced to the folding instrumentalities by appropriate means (not shown). The parts are so dimensioned that in normal operation the knife **20** and feed rolls **18** simply rotate continuously to deliver wrappers of correct size in proper timed relation to the advance of articles to the folding instrumentalities.

The knife member is rotated from a powered shaft **26** by gears **28** and **30**. Gear **30** is secured to shaft **26** while gear **28** is secured to a journaled shaft **32** on which the knife **20** is mounted. The bed plate **22** is held in fixed relation to the knife **20** and both may be angled slightly from a true transverse line for effective shearing of the web W. The shaft **26** rotates continuously to drive the knife whenever the wrapping machine is in use.

The feed rolls **18** are driven from a second powered shaft **34** which is mounted on fixed journals and also rotates continuously whenever the machine is in use. An electrically operated clutch-brake unit **48** is mounted on the shaft **34** and controls rotation of a sprocket **54**. The clutch brake unit **48** is connected to and actuated by the detector **16** as further controlled by timing means later described. A chain **56** is trained around the sprocket **54** and sprockets **58**, **60**, **62** and **64**. Sprocket **60** is secured to a shaft **68** and is mounted on fixed journals. Sprockets **58**, **62** are rotatably mounted on an arm **66** which is pivotal relative to shaft **68**. Sprocket **64** is rotatably mounted on an arm **70** which is held in adjusted position to properly tension the chain **56**.

A gear **72** is secured to the shaft **68** and meshes with a gear **74** secured to the lower feed roll shaft **76**. The gear **74** meshes with a gear **78** secured to the upper feed roll shaft **80**. The feed rolls **18** are thus rotated continuously from the shaft **34** in normal operation of the machine.

When the detector **16** is actuated by an interrruption in the supply of articles to feeder, the clutch-brake unit **48** is actuated to lock sprocket **54** and chain **56**. Next, the arm **66** is rotated in a clockwise direction. With the chain **56** locked against movement, this rotation of the arm **66** causes the sprocket **60** to rotate in a clockwise direction and the rolls **18** to rotate in a counterclockwise direction.

This limited counterclockwise or reverse rotation of the feed rolls **18** causes the leading end of the web W to be retracted from the knife **20** which continues to rotate. Thus, when the wrapper feed is stopped, the leading end of the web is positively displaced from the rotat-

ing knife **20**, so that it cannot be drawn into the bite therebetween it and the bed plate **22**.

The means for pivoting the arm **66** comprise a double acting air motor **82** pivotally connected thereto at **83** and having its opposite end pivotally connected to a fixed bracket **84**. Operation of the motor **82** is controlled by a solenoid valve **86** which is connected to the detector **16**. In normal operation of the machine the air motor is maintained by air pressure in its illustrated, retracted position. When the detector is actuated by an interruption in the supply of articles at the feeder, the valve **86** is shifted to cause the motor **82** to move to its extended position and rotate the arm **66** in a clockwise direction as previously described.

As can be seen, the detector **16** is connected to the solenoid valve **86** through a time delay relay **88**. This is preferable to insure that the sprocket **54** will be locked in a fixed position before the arm **66** is pivoted to rotate the feed rolls **18** in their reverse direction and retract the leading edge of the web W. It will further be noted that actuation of the clutch-brake unit and solenoid is also controlled by cam and switch means **90** at the powered drive shaft **26** for the knife **20**. These cam and switch means time operation of the unit **48** and valve **86** so that the feed rolls stop feeding the web W immediately after a wrapper *w* has been severed therefrom. This insures that the wrappers *w* cut immediately before and after the web has been stopped and will be full length.

When the supply of articles is replenished and the detector **16** deactuated, the clutch-brake unit **48** is actuated to again drive the sprocket **54** and the feed rolls **18**. At the same time the solenoid valve **86** is actuated to cause the air motor **82** to return to its retracted position. The various components thus assume the positions previously described for normal operation of the wrapper supply mechanism. Actuation of the unit **48** and valve **86** is again timed by the cam and switch means **90** so that a full length wrapper will be cut when feed is resumed.

It will be apparent that the present mechanism can advantageously be employed in combination with known devices for obtaining proper registration of printed panels on the web. This and other modifications of the present disclosure will come within the scope of the following claims.

Having thus described the invention, what is claimed as novel and desired to be secured by Letters Patent of the United States is:

1. In combination with a wrapping machine having an article feeder, and means for detecting an interruption in the supply of articles at the feeder, wrapper supply mechanism comprising a continuously operating rotary knife for severing individual wrappers from the leading end of a web of wrapping material, a pair of feed rolls for advancing the web to the knife, means operative in response to actuation of said detecting means for stopping said feed rolls and imparting a limited reverse rotation thereto to retract the leading edge of the web from the rotary knife and prevent it from being drawn into the knife and thereby to prevent small slivers from being severed therefrom.

2. In combination with a wrapping machine having an article feeder, and means for detecting an interruption in the supply of articles at the feeder, wrapper supply mechanism comprising a continuously operating rotary knife for severing individual wrappers from the leading end of a web of wrapping material, a pair of feed rolls for advancing the web to the knife, means operative in response to actuation of said detecting means for stopping said feed rolls immediately after a wrapper has been severed from said web and then imparting a limited reverse rotation to the feed rolls to retract the leading edge of the web from the rotary knife and prevent it from being drawn into the knife and thereby to prevent small slivers from being severed therefrom.

3. In combination with a wrapping machine having an article feeder and means for detecting an interruption in the supply of articles at the feeder, wrapper supply mechanism comprising a continuously operating rotary knife for severing individual wrappers from the leading end of a web of wrapping material, a pair of feed rolls for advancing the web to the knife, means for driving said feed rolls comprising an endless chain, means operative in response to actuation of said detecting means for stopping operation of said feed rolls and operative through said endless chain to impart a limited reverse rotation to the feed rolls, retracting the leading edge of the web from the rotary knife and preventing it from being drawn into the knife and likewise preventing small slivers from being severed therefrom.

4. In combination with a wrapping machine having an article feeder and means for detecting an interruption in the supply of articles at the feeder, wrapper supply mechanism comprising a continuously operating rotary knife for severing individual wrappers from the leading end of a web of wrapping material, a pair of feed rolls for advancing the web to the knife, drive means for said feed rolls comprising an endless chain, a driving sprocket therefor and idler roll means around which said chain is trained and means operative in response to actuation of said detecting means for stopping said driving sprocket and locking it in a fixed position immediately after a wrapper has been severed from the web, and for thereafter displacing said idler rolls to impart a limited reverse rotation to said feed rolls thus retracting the leading edge of the web from the rotary knife and preventing it from being drawn into the knife and likewise preventing small slivers from being severed therefrom.

5. In combination with a wrapping machine having an article feeder, and means for detecting an interruption in the supply of articles at the feeder, wrapper supply mechanism comprising a continuously operating rotary knife for severing individual wrappers from the leading end of a web of wrapping material, a pair of feed rolls for advancing the web to the knife, driving means for said feed rolls comprising a pair of meshing gears connected to said feed rolls, a third gear meshing with one of said pair of gears, a sprocket connected to said third gear, a driving sprocket, a pair of idler sprockets disposed on opposite sides of said first sprocket, an arm pivotally mounted about the axis of said first sprocket on which said idler sprockets are mounted, a chain trained around all of said sprocket for driving said third gear in a direction causing the feed rolls to advance the web to said rotary knife, means operative in response to actuation of said detector for stopping said driving sprocket and locking it in a fixed position immediately after a wrapper has been severed from said web and for rotating said arm in a direction causing the third gear to impart a limited reverse rotation to said feed rolls after said driving sprocket has been locked in fixed position to thereby prevent the leading edge of the web from being drawn into the knife and small slivers from being severed therefrom.

No references cited.

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