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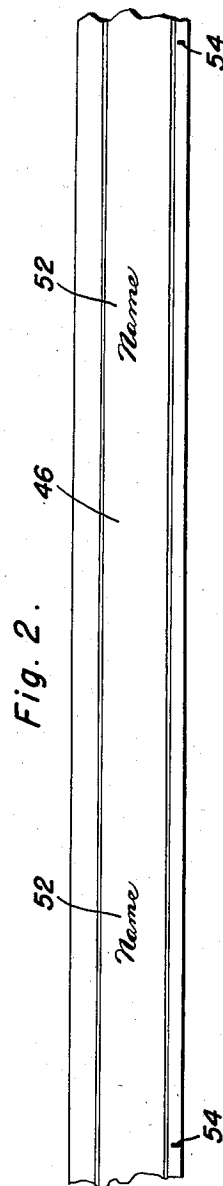
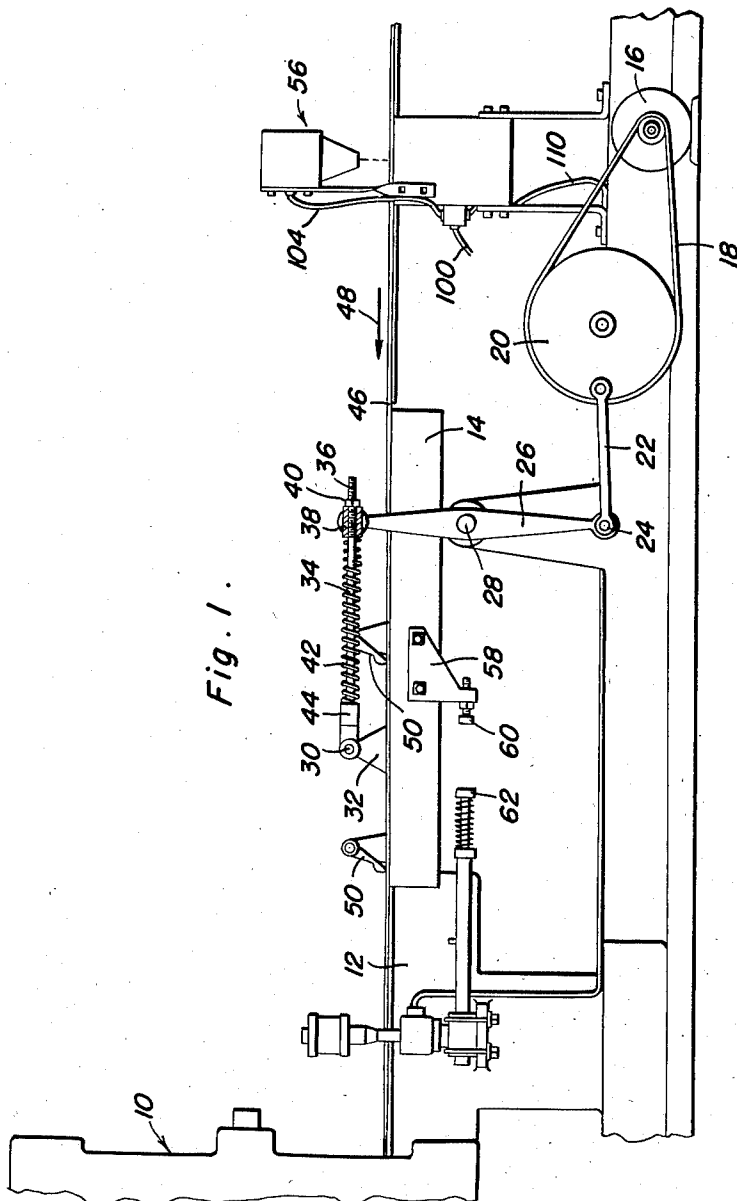
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HYDRAULIC STOP DEVICE FOR WEB FEEDING MACHINES

Filed Aug. 11, 1948

2 SHEETS—SHEET 1



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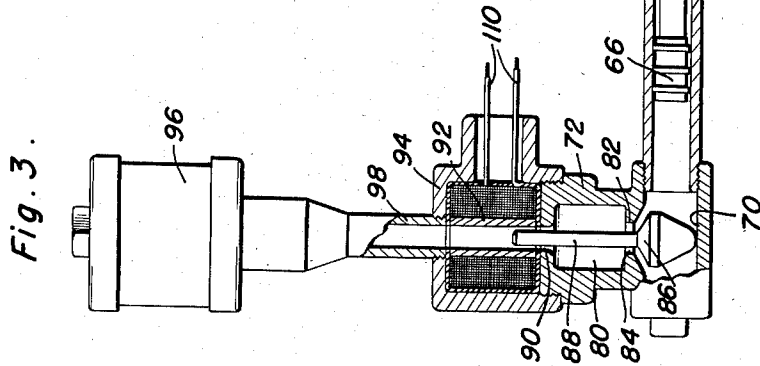
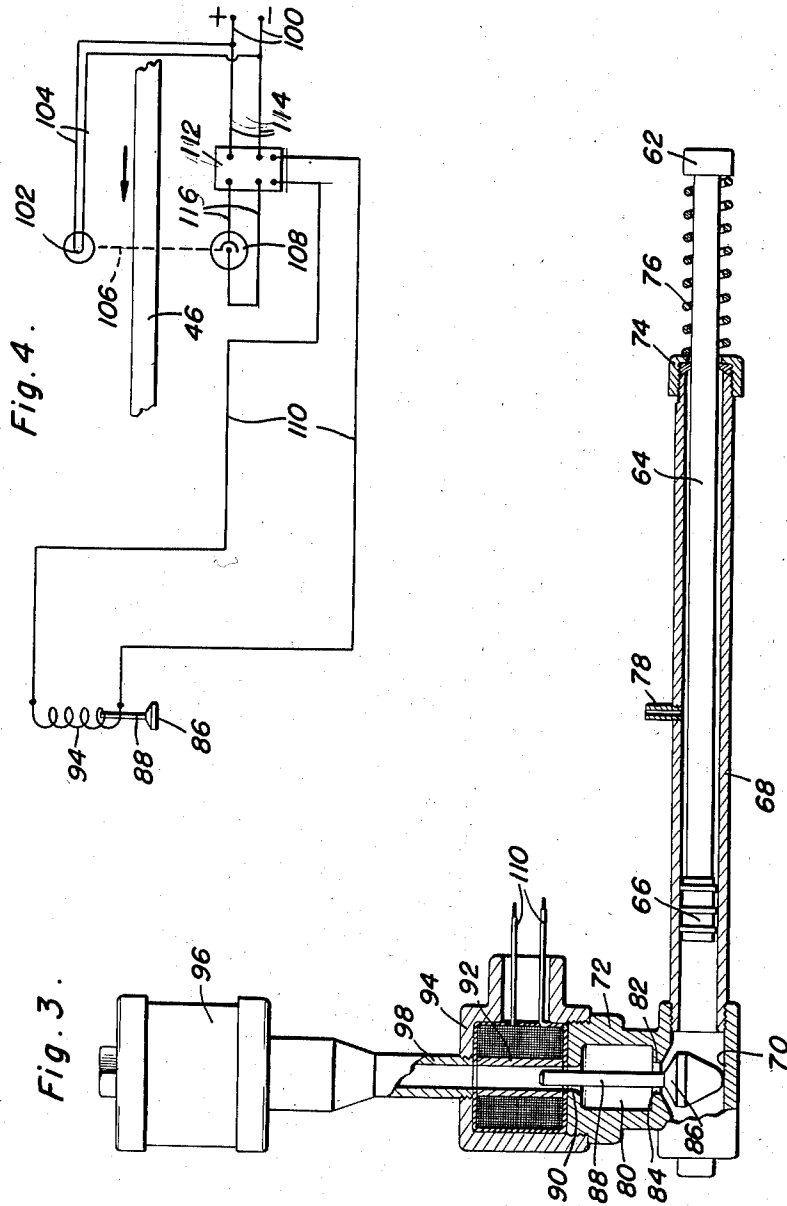
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HYDRAULIC STOP DEVICE FOR WEB FEEDING MACHINES

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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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HYDRAULIC STOP DEVICE FOR WEB FEEDING MACHINES

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4 Claims. (Cl. 271—2.6)

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This invention comprises novel and useful improvements in a hydraulic stop device for web feeding machines and more specifically pertains to a method and an attachment for improving the operation of web feeding machines and particularly of packaging machines, whereby further feeding of the web is positively prevented after predetermined portions thereof have been conveyed to the receiving portion of the machine.

The principal object of this invention is to provide a novel method and apparatus for increasing the efficiency of the operation of a web feeding machine.

An important object is to provide a process wherein predetermined and preformed selected portions of a web are intermittently and successively supplied to a packaging machine and wherein means are provided for preventing any variation in the feeding of the said predetermined portions, wherein the control of the feeding operation is effected by means of an electric eye scanning suitable target indicia carried by the web to be fed and which electric eye controls the stop mechanism of the web feeding means.

A further important object of the invention is to provide a hydraulic stop attachment which may be readily applied to various types of existing web feeding machines for controlling the feeding stroke thereof in response to control targets on the web itself, together with an electric eye for controlling the operation of a hydraulic stop mechanism in response to the passage of successive markers beneath the electric eye.

An important feature of the invention resides in the provision of a web feeding conveyor which is reciprocable relative to a web receiving member, a driving means and a yieldable connection between the driving means and the conveyor, together with an adjustable stop mounted on the conveyor and a yieldable abutment or stop mounted on the web receiving member positioned in the path of travel of the fixed stop, which yieldable stop additionally resists further movement of the conveyor at a predetermined position in its travel and is controllable to selectively and positively oppose further movement of the conveyor at a predetermined position in the travel of the web.

A still further feature of the invention resides in the provision of an attachment as set forth in the preceding feature, wherein the positive stop means includes a hydraulic cylinder having a piston movable therein and connected with the yielding abutment or stop, together with the hydraulic reservoir communicating with the cylin-

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der and a control valve for regulating the flow of fluid from said cylinder to said reservoir.

A still further feature of the invention resides in the provision of an attachment as set forth in the foregoing features wherein an electric circuit is provided for operating a solenoid controlling the valve to selectively bias the same to its closing position in response to the passage of a predetermined portion of the web beneath a web detecting station.

Yet another feature of the invention resides in the provision of an attachment in conformity with the foregoing features wherein the detecting station includes an electric eye connected in the circuit and controlling the circuit for energizing the valve.

Yet another feature of the invention resides in the provision of an attachment as set forth in the above mentioned features wherein the driving means is actuated through a distance capable of imparting a greater movement to the conveyor means than is necessary to feed the desired portion of the web, wherein the conveying means first encounters a yielding resistance in advance of the termination of the distance necessary to feed a desired portion of the web, and wherein the yielding abutment is then selectively locked against further movement when the desired portion of the web has been fed by the conveyor, whereby the locking abutment will positively prevent further movement of the conveyor and feeding of the conveyor, and simultaneously effect yielding in the yielding connection of the driving mechanism throughout the remainder of the stroke of the latter.

These, together with various ancillary objects and features of the invention which will later become apparent as the following description proceeds, are attained by this device and by this process, one suitable embodiment of which has been illustrated in the accompanying drawings and set forth herein, reference being now made to the drawings, wherein:

Figure 1 is a diagrammatic side elevational view, parts being shown in section, of the pertinent parts of the web feeding mechanism associated with a web receiving mechanism such as a packaging machine, to which the principles of this invention have been applied;

Figure 2 is a fragmentary plan view of a portion of a suitable type of web which may be dispensed in accordance with this invention;

Figure 3 is a vertical longitudinal sectional view through a portion of the hydraulic stop

mechanism of the device, parts being shown in elevation; and,

Figure 4 is a wiring diagram illustrating a suitable electric circuit employed in the invention.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, attention is directed first to Figure 1 wherein the numeral 10 designates generally a portion of the framework of any suitable machine, such as a packaging machine, with which the attachment of this invention may be associated, this machine including a stationary web receiving member 12, a movable carriage or conveyor in the form of a table or plate 14 which is mounted in any suitable manner not shown, for reciprocatory motion towards and from the stationary receiving member 12, together with a driving and connecting means for causing reciprocation of the conveying means.

This driving mechanism includes any suitable power source such as an electric motor 16 which is drivingly connected as by means of a belt 18 and pulley 20 with a connecting rod 22 whose outer ends pivoted as at 24 to an oscillating or rocker lever 26 journaled or fulcrumed as at 23 to any suitable portion of the supporting frame of the machine.

Pivotally secured as by a pivot pin 30 and upstanding lug 32 on the conveyor member 14, is an operating rod 34 whose screw threaded outer extremity 36 is slidably received in the transversely extending bore of a boss 38 carried by the outer end of the oscillating lever 26. A lock nut 40 serves to maintain the rod 34 in properly adjusted position in the rocker 26, whereby the relative position of the conveyor member 14 with respect to its operating rocker 26 may be regulated. A compression spring 42 surrounds the rod 34 between the tubular boss 38 and a sleeve or collar 44 loosely surrounds the rod 34 at the pivot end thereof.

It will thus be seen that as the rocker 26 is oscillated, the tubular boss 38 slides freely on the rod 34, whereby on its forward movement the boss compresses the spring 42 and through the compressed spring, pivot pin 30 and abutment 32, yieldingly reciprocate or drive the conveyor 14 towards the receiving member 12; while on the reverse movement of the rocker 26, the tubular boss 38 abuts the lock nut 40 and positively retracts the conveyor member 14 to its original position. It will also be readily understood that when a resistance to further movement of the conveyor member 14 is encountered, continued movement of the rocker 26 is permitted by yielding of the spring 42, to thereby prevent damage to the parts and to enable a positive stopping or further movement of the conveyor as set forth hereinafter.

A web or strip 46 of any suitable material such as a paper strip for wrapping packages or the like is fed from any suitable source, being moved in the direction of the arrow 48, across the surface of the conveyor member 14 and from the end thereof to the stationary web receiving member 12, this step being advanced in an intermittent step by step motion in a manner and by a means to be now set forth.

Pivoted to the upper surface of the conveyor 14 are suitable web retaining dogs 50 which firmly grip the web when the conveyor moves toward the left in Figure 1, to thereby advance the web with the conveyor; but which release the web

upon movement of the conveyor means to the right, it being understood that the web itself will be retained by suitable non-return means, not shown, and carried by the machine 10.

In order to better understand the application of the process and apparatus for carrying out this invention, attention is directed to Figure 2 wherein it will be seen that the web 46 is provided with a suitable spaced indicia 52 thereon which indicia constitutes labels or other matter to be placed upon the article to be packaged or wrapped by the machine 10. When wrapping such an article as for example a box, it is desired and necessary that not only the proper length of the strip or web 46 be supplied in order to completely enclose and wrap the article, but it is also necessary that the indicia 52 shall appear at the same selected place on each sheet, in order to be properly positioned on the packaged article. For this reason, it is not sufficient to provide a means for dispensing the same predetermined quantity of web at a step by step movement of the conveyor means, since owing to irregularities of operation in the packaging machine itself as well as other causes, it frequently occurs that the indicia 52 of a piece of web supplied to the packaging machine will be improperly placed, the web may slip in the conveying means, and for various other reasons the indicia may become improperly placed if the dispensing of the web is regulated solely by the distance of travel of the conveyor means 14.

In order to overcome these defects, it is necessary to have a detection station for inspecting targets or reference points such as those indicated at 54 on the web, in order to determine the extent of the portion of the web which should be fed or dispensed at each operation of the conveyor. For this purpose, suitable targets 54 are placed on the side of the strip 46, and an electric eye indicated generally by the reference numeral 56, and of any known and desired construction is mounted upon the frame of the machine in a position to be energized and actuated by passage of one of the targets 54 therebeneath. This electric eye constitutes a switch controlling electric circuit, which electric circuit is employed to energize a stop mechanism for controlling the amount of the web dispensed by the conveyor means 14.

This adjustable stop means includes an adjustable fixed stop comprising a bracket 58 of any suitable construction mounted upon or carried by the conveyor means 14 to be reciprocable therewith, this bracket having a forwardly extending screw threaded member 60 which is adjustably carried by the bracket 58. Slidably and movably carried by the stationary member 12 is the headed member 62 of a yieldable abutment, this headed member being disposed in the path of travel of the member 60 for engagement thereby at the end of a predetermined portion of travel of the conveyor means 14, but prior to the termination of sufficient travel to feed the desired portion of the strip 46.

As will be best seen by reference to Figure 3, the headed member 62 is carried by the end of a rod 64 whose other extremity is provided with a piston 66 slidably received in a cylindrical member 68, the interior of the cylindrical member communicating with the chamber 70 formed in a body member 72. The outer end of the member 68 is provided with suitable packing means indicated at 74, and a compression spring 76 sur-

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rounds the rod 64 and is interposed between the packing means 74 and the headed end 62, to yieldingly urge the rod outwardly of the member 68, and the headed member 62 toward the member 60 of the conveyor means 14.

A suitable atmospheric vent 78 is provided for establishing a communication between the interior of the member 68 at the outer side of the piston 66 and the atmosphere to thereby prevent any dash pot effect of the piston in the cylinder member 68.

The body member 72 contains a chamber constituting a hydraulic fluid reservoir 80 which is disposed above the chamber 70 and separated therefrom as by a partition 82, provided with a port 84 establishing communication between the chamber and the reservoir. A valve member 86 of any suitable construction is provided in the chamber 70 and is urged by gravity to its open position, but when elevated by means to be subsequently set forth, is effected to close the port 84 and thereby stop further communication between the chamber 70 and the reservoir 80. The valve 86 is provided with an upwardly extending valve stem 88 which extends through a bore 90 in the upper wall of the chamber 80 and into the tubular core 92 of a solenoid indicated at 94. This tubular core 92 has continuous communication with the chamber 80 and with the fluid storage tank 96, by means of a further conduit 98.

The operation of the hydraulically actuated stop means is as follows: With the parts in the position shown in Figure 3, except that the piston 66 and rod 64 are in the extreme right end of their travel, the yielding abutment is ready for operation. As the driving means operates, and the conveyor means 14 is moved toward the yielding abutment, and the web 46 is fed thereby, the fixed abutment 60 finally contacts the head 62 of the yielding abutment, preferably at some predetermined time before the intended bend of the operating stroke of the web feeding means. Upon continued movement of the web feeding means, including the driving means and the carriage or conveyor, the abutment 60 compresses the yielding abutment 64 against the resistance of the spring 76, and the resulting inward movement of the piston 66 serves to displace the hydraulic fluid from the chamber 70, through the port 84 and chamber 80, through conduits 92 and 98 and into the storage tank 96. However, when the web 46 has been moved a desired distance and the parts have been properly positioned, the next target 54 passing beneath the electric eye 56 energizes the latter and causes actuation of the electric circuit whereby the solenoid 94 is energized, and the valve stem 88 constituting the solenoid core is now elevated thereby closing the valve 86 to shut off flow through the port 84. With the valve thus closed, the fluid in the hydraulic chamber 70 can no longer escape intermittently, since hydraulic fluid is substantially incompressible, further inward movement of the piston 66 is halted and the yielding abutment can no longer yield. It should be noted that at this time the pressure in the hydraulic chamber 70 further assists in holding the valve 86 to its seat. It should be particularly noted that when the web has been properly positioned as a result of feeding the proper amount of material, that the yielding abutment is caused to lock and thereby positively prevent by engagement of members 62 and 60, any further movement of the conveyor means 14, whereby no more of the web is now fed. However, the driving means 26 has not yet completed its

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stroke, and the latter is now completed by the tubular boss 38 sliding over the rod 42 against the resistance of the yielding spring 34. It should be noted that this lost motion connection is necessary in order that at all times there may be sufficient movement imparted to the conveyor means 14 for feeding the requisite quantity of web 46, as when a new web is fed into the machine, a web has become displaced therein or the like.

The electric circuit for actuating the hydraulic stop means by means of the electric eye is indicated in Figure 4, wherein it will be seen that electric current is supplied from any suitable source as by the conductors 100, this current then passing through the member 102 of the electric cell by means of a conducting circuit 104. The light ray emitted from the member 102 then passes as indicated by the dotted line 106 through the web 46 and impinges on the light responsive cell 108 and the impulse thus generated is amplified by the amplifier 112 which is connected to the source of power by conductors 114, to the photocell by conductors 116, and to the solenoid 94 by the conductors 110.

This detector or switch now establishes communication by means of the conductors 110 with the above mentioned solenoid 94 to thereby energize the valve 86. As soon as the target 54 has passed from out of register with the line of sight 106 between the light and the target of the electric eye 56, the solenoid is no longer energized, the valve is released and drops by gravity to its original position as shown in Figure 3, whereupon when the conveyor means 14 is withdrawn by the rocker 26, and the abutment members 60 and 62 are released, the spring 76 is now effected to restore the movable abutment to its original position, whereupon the cycle is repeated upon the next feeding operation of the mechanism.

From the foregoing, the process of operation, and the operation of the attachment itself will be readily understood and further explanation is believed to be unnecessary.

However, since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not desired to limit the process and apparatus to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A hydraulic stop device for a web feeding machine having a stationary member, a reciprocable member movable towards and from said stationary member for feeding a web, a driving member and a yieldable connection between said driving and reciprocable members comprising; an adjustable stop carried by said reciprocable member, a yieldable abutment including a hydraulic cylinder carried by said stationary member and a piston movable in said cylinder and disposed in the path of movement of said adjustable stop, a hydraulic reservoir communicating with said cylinder, a normally open valve controlling the escape of fluid from said cylinder to said reservoir and means responsive to predetermined movement of a web for closing said valve thereby rendering the yieldable abutment rigid.

2. The combination of claim 1 including a resilient means biasing said yieldable abutment in a direction to oppose movement of said re-

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reciprocable member toward said abutment.

3. The combination of claim 1 including a solenoid for closing said valve, said last means including an electric circuit for energizing said solenoid.

4. The combination of claim 3 wherein said last means includes an electric cell for detecting markers on the web, said electric cell forming a part of said electric circuit.

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