March 7, 1967 L. J. SAUNDERS ET AL 3,307,441

MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

Filed June 14, 1965 6 Sheets-Sheet 1

FIG. 1

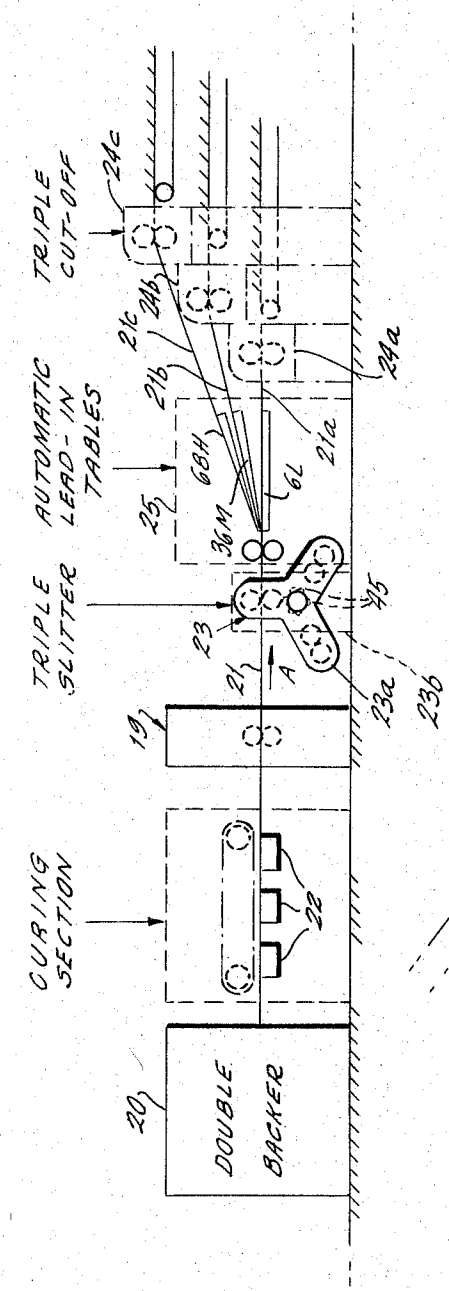
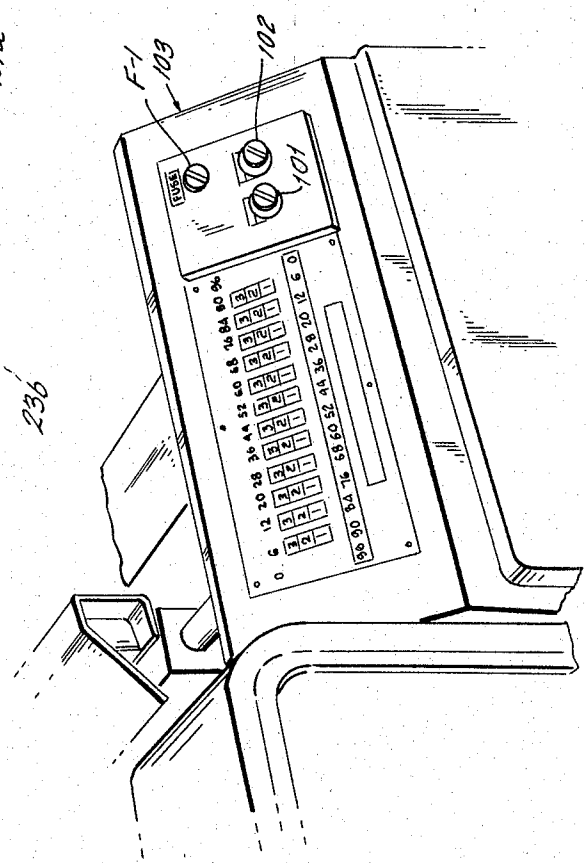


FIG. 5



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6 Sheets-Sheet 2

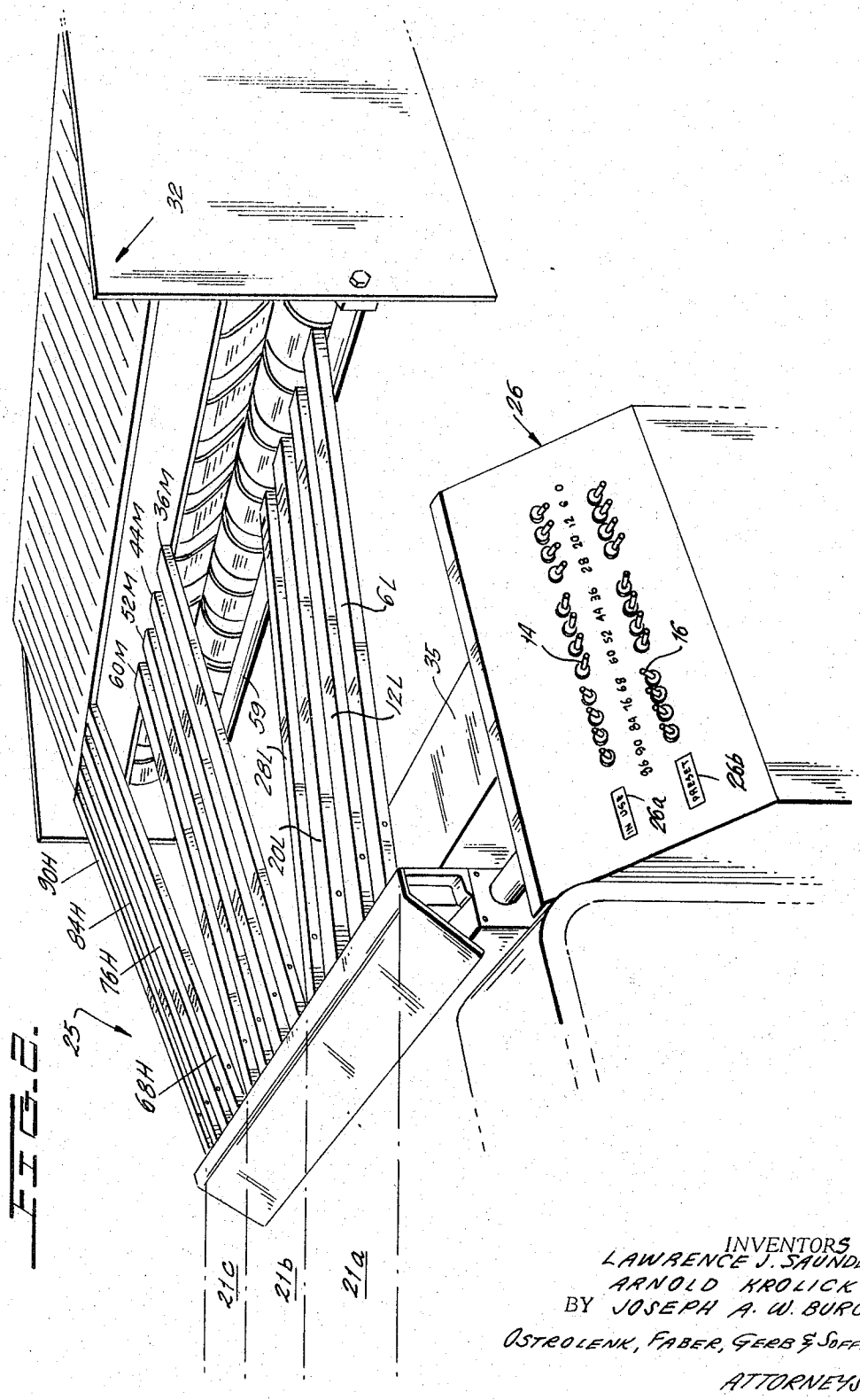

FIG. 2.

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MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

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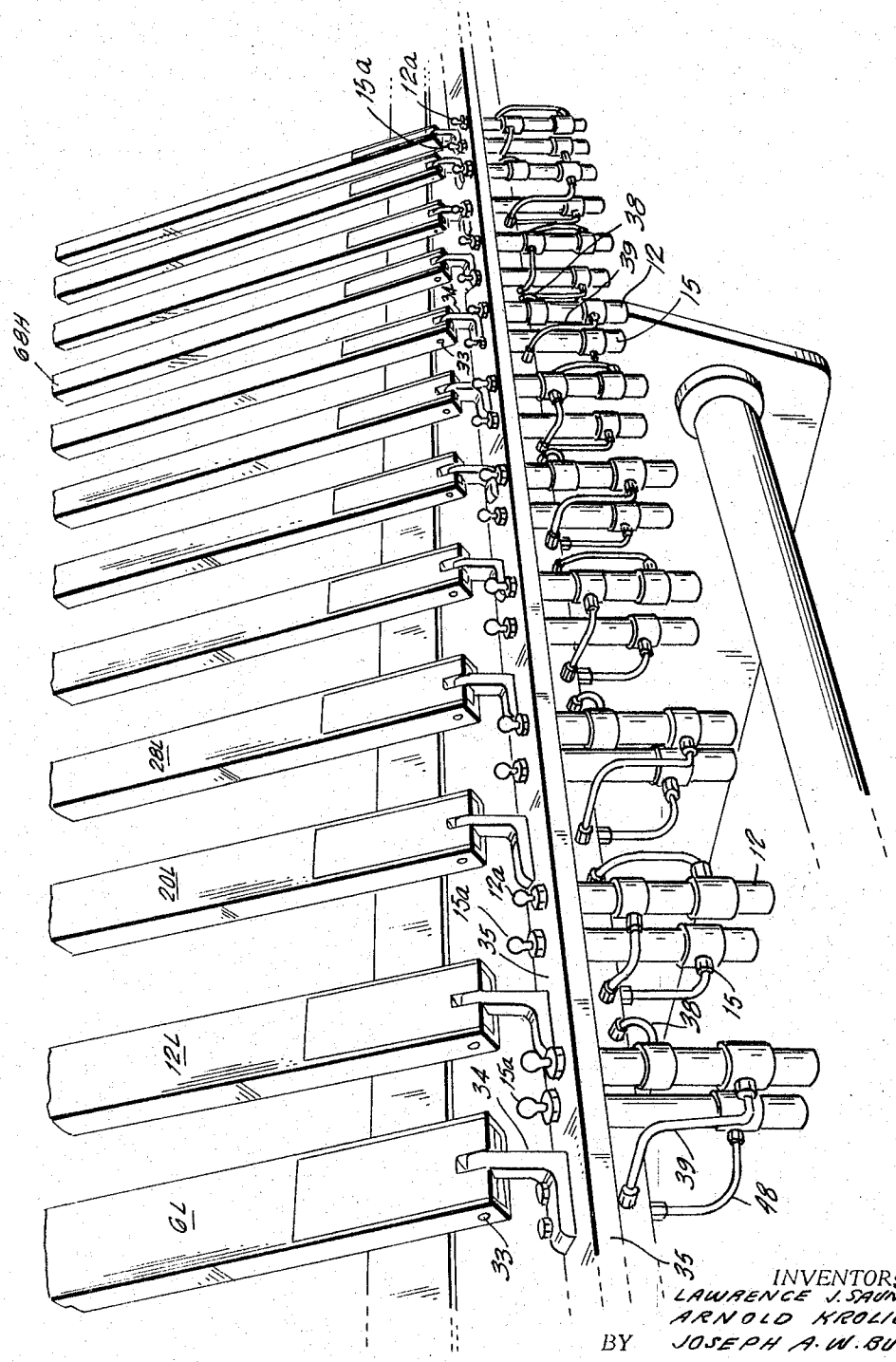
FIG. 7



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MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

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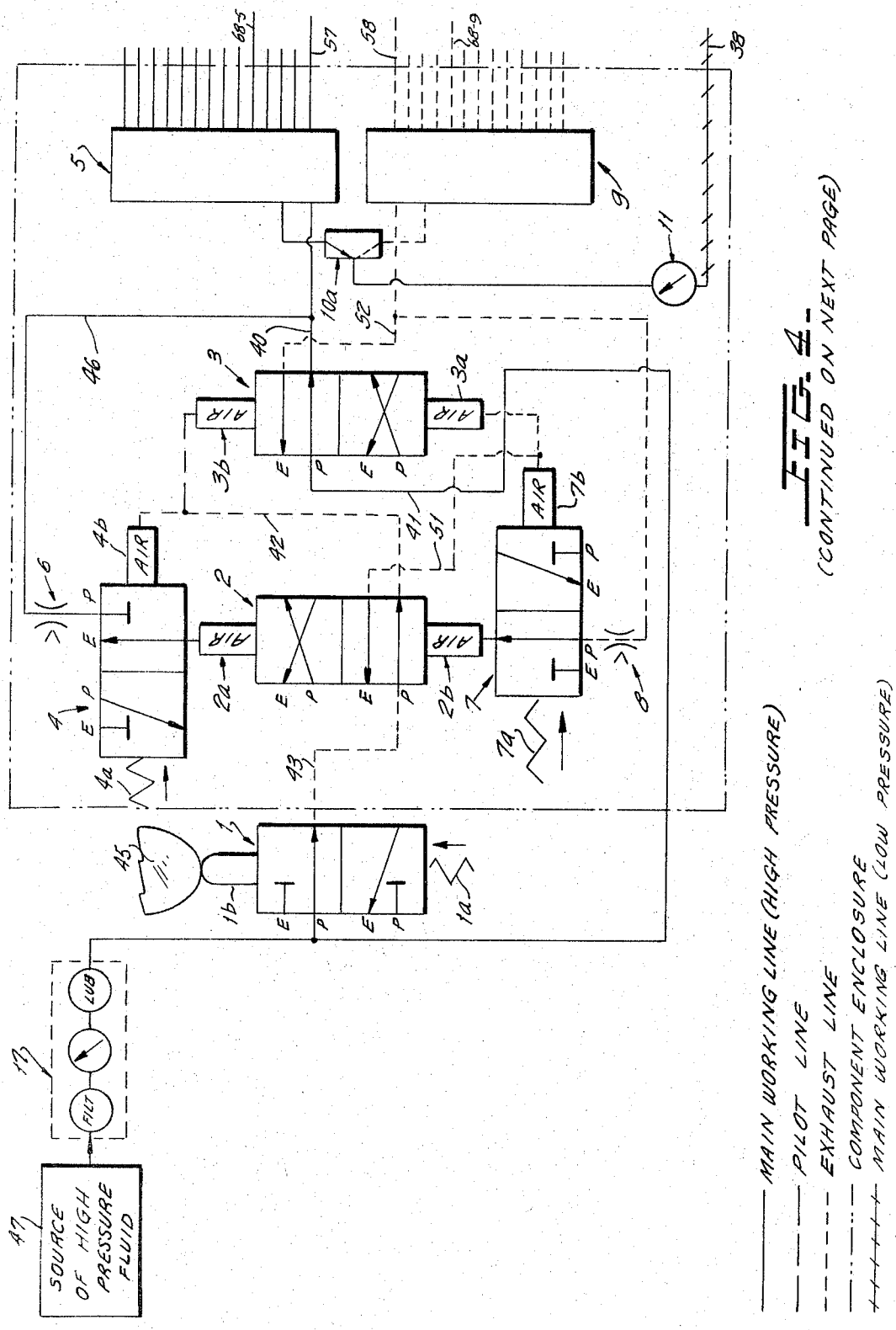

FIG. 4.

(CONTINUED ON NEXT PAGE)

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MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

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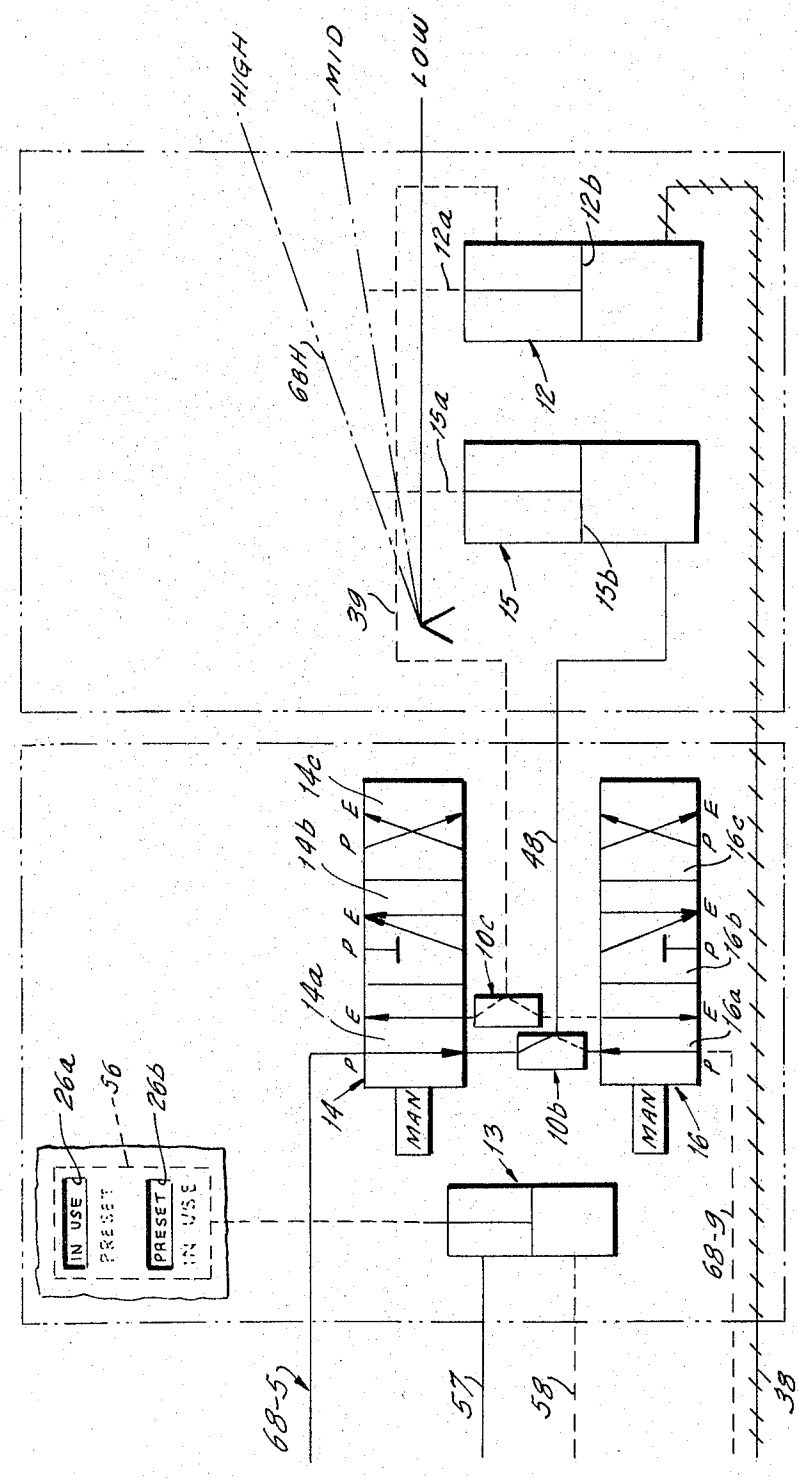

FIG. 4.
(CONTINUED FROM PRECEDING PAGE)

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MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

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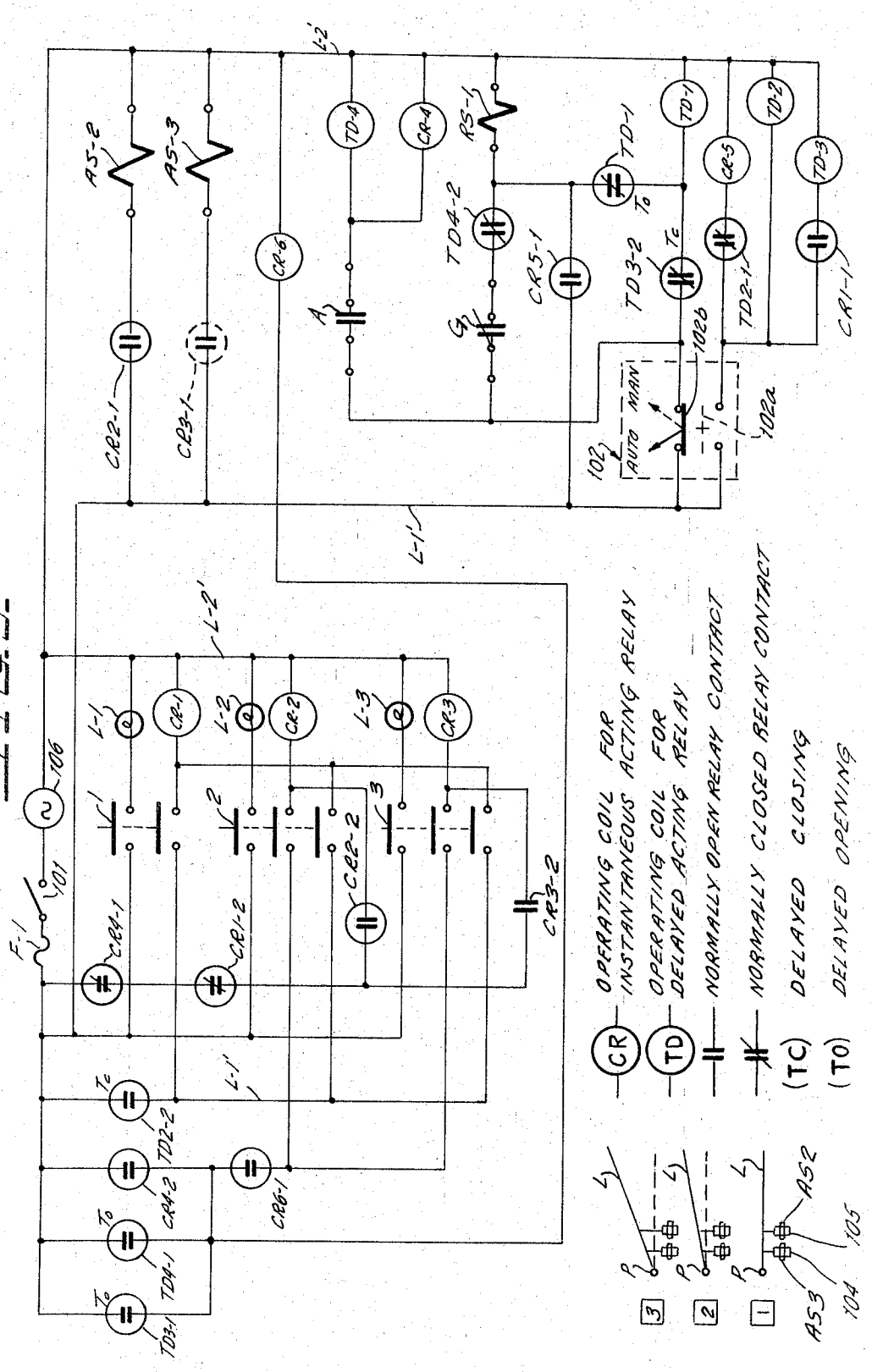
FIG. 5.



United States Patent Office 3,307,441
Patented Mar. 7, 1967

3,307,441

MACHINE FOR SLITTING AND TRANSVERSELY CUTTING CORRUGATED BOARD

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Filed June 14, 1965, Ser. No. 463,628
16 Claims. (Cl. 83—302)

This invention relates to apparatus for the handling of web material and more particularly relates to apparatus of this type for the production of double faced corrugated board.

After double faced corrugated board is formed by a double backer and passes through a curing section the board becomes so stiff that it cannot be stored in roll form. Thus, the web must be cut transversely into sheets by so-called cutoffs (see U.S. Patent No. 3,176,656 issued April 6, 1965).

In order to operate corrugators efficiently a board of substantially full corrugator width must be produced. However, more often than not it happens that the width of the sheets desired is much narrower than the width of the web being produced. Thus, it is necessary to slit the web into a plurality of longitudinal sections. The web sections are fed through one or more cutoffs depending upon the size of blanks required (see the copending U.S. patent application of Albert F. Shields entitled Multiple Cut-off Devices for Web Material, Serial No. 458,724, filed May 25, 1965).

In the case of apparatus having two, three, or more cutoffs it is necessary to direct certain of the web sections above certain of the cutoffs. Guidance of the web sections between the knives of the particular cutoffs is accomplished by means of so called lead-in tables consisting of a plurality of fingers extending parallel to the direction of web travel. These fingers are pivoted at the end thereof closer to the corrugator so that the other ends thereof may be raised or lowered as required in order to guide the web sections between the knives of the appropriate cutoff. Prior to the instant invention adjustment of these fingers has been accomplished manually.

Because of the short time interval during which the cutoffs are reset, resetting of the lead-in table fingers required that the web sections be guided by two or three men while another man adjusted each of the fingers individually. In the case of short runs, that is, where the cutoffs were adjusted frequently for different sheet lengths, adjustment of the lead-in tables was very costly from a labor standpoint.

In order to overcome these difficulties of the prior art the instant invention provides means for automatically positioning the lead-in table fingers at the time changeover is taking place. In the case of apparatus having two cutoffs, means are provided for establishing two discreet positions for each of the lead-in table fingers while in an apparatus having three cutoffs, means are provided for establishing three discreet positions for each of the lead-in fingers. Fluid operated devices are utilized to move and maintain each of the lead-in fingers in its required position.

While the lead-in fingers are in predetermined positions and function to guide the web sections into appropriate cutoffs the next required positions for each of the fingers may be preselected and at an appropriate time all of the lead-in fingers are simultaneously moved to the preselected positions. Typically the appropriate time occurs during the operation of the changeover cycle when a new set of slitter knives is being moved into operative position. The same signal which initiates the operation of the slitter to shift the new set of knives into operative position may be utilized to operate the lead-in table fingers to their preselected positions or the latter function may be accomplished by a switch actuated by the slitter as the new set of knives is moved into operative position.

There will hereinafter be illustrated and described a completely fluid operated control system for operating the lead-in table fingers. Another embodiment including an electrical control system for this purpose will also be described. In the case of the electrical control system switching of the lead-in table fingers to their preselected positions may be done on command of the signals programmed on magnetic tape.

Accordingly, a primary object of the instant invention is to provide novel automatic lead-in tables for web handling apparatus.

Another object is to provide automatic lead-in tables including apparatus for preselecting positions of the lead-in tables and thereafter simultaneously shifting all of the lead-in tables to these preselected positions.

Still another object is to provide apparatus of this type in which the control means for the automatic lead-in tables is entirely fluid operated.

A further object is to provide apparatus of this type in which the control means for the automatic lead-in tables is electrically operated.

A still further object is to provide automatic lead-in tables of this type which are operated to preselected positions at the time a new set of slitter knives is moved into operating position.

These as well as other objects of this invention will become readily apparent after reading the following description of the accompanying drawings in which:

FIGURE 1 is a side elevation, in schematic form, of apparatus for producing sheets of corrugated paper board, said apparatus including automatic lead-in tables constructed in accordance with the teachings of the instant invention.

FIGURE 2 is a perspective illustrating the automatic lead-in tables of the instant invention.

FIGURE 3 is a perspective of the lead-in tables of FIGURE 2 lifted to vertical positions to reveal details of the power operating means for the lead-in tables.

FIGURE 4 is a schematic showing the fluid operating means for actuating and controlling the power operating means.

FIGURE 5 is an electrical schematic showing another embodiment of the instant invention for controlling the power operating means.

FIGURE 6 is a perspective of the control panel for the electrical controls of FIGURE 5.

Now referring to the figures and more particularly to FIGURE 1 which illustrates double backer **20** wherein the second liner is joined to single faced corrugated board to produce a web **21** of double face board travelling in the direction indicated by arrow A. After leaving double backer **20**, web **21** passes over steam chest **22** in engagement with the upper surfaces thereof, through shear **19** and thereafter passes through one of the sets of knives of slitter **23**. The knives of slitter **23** may be set to merely trim the edges of web **21** or else longitudinally slit the web **21** into two or more web sections. As illustrated, web **21** is slit into three sections **21***a*, **21***b*, **21***c*.

Automatic lead-in tables **25**, to be hereinafter described in detail, guide and support web sections **21***a*, **21***b*, **21***c* between the knives of cutoff units **24***a*, **24***b* and **24***c*, respectively, which cut the web sections transversely to form sheets. As noted in the aforesaid copending application Serial No. 458,724 cutoff units **24***a*, **24***b*, **24***c* are substantially identical units mounted along the generally horizontal, though partially inclined, feed paths of web sections **21***a*, **21***b*, **21***c* with the knives of unit **24***b* positioned above the knives of unit **24***a* and the knives of unit

24*c* positioned above the knives of unit 24*b*. Thus, it is necessary for web section 21*b* to be guided over cutoff unit 24*a* and it is necessary for web section 21*c* to be guided above cutoff units 24*a* and 24*b*. This is accomplished by automatic lead-in tables 25.

As seen in detail in FIGURE 2 automatic lead-in tables 25 are a series of longitudinally extending fingers 6L, 12L, 20L, 28L supporting web section 21*a*, a series of longitudinally extending fingers 36M, 44M, 52M and 60M supporting web section 21*b* and a series of longitudinally extending fingers 68H, 76H, 84H, and 90H supporting web section 21*c*. The number portion of the reference designation for each of the lead-in fingers corresponds to the transverse position, in inches, occupied by the center of the particular lead-in finger on the feed path for web 21 which, for the machine under consideration, is 96 inches wide. Corresponding members appear on the face of control panel 26 (FIGURE 2) between two rows of switch handles for a reason which will hereinafter become apparent. The letter portion of the reference designation for each of the lead-in fingers indicates the vertical position occupied by the particular lead-in finger in the illustration of FIGURE 2. That is, "L" designates low, "M" designates mid and "H" designates high.

Each of the lead-in fingers is pivoted at the end thereof remote from the feed belt means 32 (FIGURE 2). Since each of the lead-in fingers is pivotally mounted in the same manner and is operated in the same manner to the low, mid and high positions only the mounting of finger 68H and its power operating means will be described.

As seen in detail in FIGURE 3 the horizontal leg of bracket 34 is fixedly secured to the upper surface of transverse frame member 35 while the vertical leg of L-shaped bracket 34 extends between the bifurcated section of finger 68H at the end thereof remote from cutoff conveyor means 32 (FIGURE 2). Pin 33, secured to finger 68H at its bifurcated end, extends through an aperture (not shown) in the vertical leg of bracket 34 to establish a pivot for finger 68H. Pneumatic power cylinders 12 and 15 are mounted to the underside of frame member 35 with the plungers 12*a* and 15*a* of cylinders 12 and 15, respectively, extending through apertures in frame member 35 so as to be engageable with finger 68H and thereby operate finger 68H to its mid and high positions, respectively. Plungers 12*a* and 15*a* are positioned on the side of pivot pin 33 closer to conveyor means 32 so that when plungers 12*a* or 15*a* are extended (moved upwardly) they engage finger 68H pivoting the latter in a counterclockwise direction about pivot 33.

One method of controlling the operation of power cylinders 12 and 15 is illustrated in the schematic of FIGURE 4. This schematic shows an all pneumatic control system for cylinders 12 and 15 with the "Legend" below explaining the structure for each of the valve elements shown in FIGURE 4.

Legend

(1) 3-way valve—normally closed—spring return—cam actuated—shown actuated
(2) (3) 4-way valves—air pilot actuated—shown in an operating position
(4) 3-way valve—normally open—spring return—air pilot actuated—shown actuated
(5) (9) manifolds
(6) (8) flow control valves—manually adjustable
(7) 3-way valve—normally open—spring return—air pilot actuated—shown deactivated
(10*a*) (10*b*) (10*c*) shuttle valves
(11) low pressure regulator
(12) (15) air cylinders—double acting (controlling lead-in fingers)
(13) air cylinder—double acting (controlling "in use," "preset" indicators)

(14) (16) 4-way valves—manually set—3 position—in center position pressure blocked, cylinders 12 and 15 to exhaust

Low pressure air is always present below piston 12*b* of power cylinder 12 being conveyed thereto from pressure regulator 11 through low pressure line 38. This low pressure air always acts to urge plunger 12*a* upwardly to the position illustrated in FIGURE 4 in which lead-in finger 68H, if it were supported by plunger 12*a*, would be in the mid position. Plunger 12*a* is retracted only when high pressure air is introduced through line 39 to power cylinder 12 above piston 12*b*. Such high pressure above piston 12*b* overrides the low pressure below piston 12*b* driving the latter downward. With the valves of FIGURE 4 in the positions illustrated line 39 is connected through shuttle valve 10*c* to exhaust ports of manually operated selector valves 14 and 16. In the schematic of FIGURE 4, the position of selector valve 14 determines the position of lead-in finger 68H.

More particularly, at this time the pressure ports, designated *P*, of valve 14 are connected to manifold 5 which is provided with high pressure air through line 40, valve 3 and line 41. Valve 3 has been operated to the position shown by high pressure air supply through line 42, valve 2, line 43 and valve 1. Valve 2 has been operated to the position shown by the momentary application of high pressure air through valve 7 which is urged toward the position illustrated by spring 7*a*. Valve 4 is maintained in the position shown by virtue of high pressure air in line 42 acting against the force of spring 4*a*.

Valve 1 is momentarily operated to the position shown by cam 45 which acts against spring 1*a*. Cam 45 is mounted to the rotatable carrier of slitter 23 (FIGURE 1) while valve 1 is mounted to the stationary frame 23*b* of slitter 23. Whenever carrier 23*a* is pivoted through one-third of a revolution to shift a new set of knives into operative position, one of the cam sections 45 engages follower 1*b* thereby operating valve 1 to the position shown. When cam 45 no longer engages follower 1*b*, spring 1*a* changes valve position so that line 43 is connected to an exhaust port and pressure is removed from line 43.

The elements of FIGURE 4 are operated to the positions shown in the following manner. After a selection is made by manually operating selector valve 14, when one of the cam sections 45 engages follower 1*b* pressure is introduced through valve 1 to line 43 and through valve 2 to line 42. The latter is connected to the pilot 4*b* of valve 4 as well as the pilot 3*b* of valve 3. Pressure ports of valve 4 are now blocked and pressure from source 47 is introduced through line 41, valve 3 and line 40 to manifold 5 and through output line 68–5 of manifold 5 to the pressure ports of selector valve 14. In the position of valve 14 shown, section 14*a* thereof is active so that pressure is introduced through shuttle valve 10*b* and line 48 to cylinder 15 thereby ejecting plunger 15*a* to operate lead-in finger 68H to its highest position.

When follower 1*b* of valve 1 is released pressure is no longer present at pilot 4*b* permitting spring 4*a* to change the position of valve 4. This introduces pressure at the upper pilot 2*a* causing the position of valve 2 to shift. Now line 51 is connected to a pressure port *P*.

When slitter 23 is again shifted a section of cam 45 engages follower 1*b*. Now high pressure air is introduced through valve 1 to line 43 and valve 2 to line 51. The latter is connected to the pilot 7*b* of valve 7 as well as to the lower pilot 3*a* of valve 3. This shifts valve 7 against the force of spring 7*a* so as to block pressure to the lower pilot 2*b* of valve 2. Valve 3 having been shifted through the introduction of pressure to lower pilot 3*a* conducts pressure from line 41 to line 52 and exhausts line 40.

Line 52 introduces pressure to manifold 9 while manifold 5 is exhausted through line 40 and valve 3. Pressure

in manifold **9** is conveyed from line **68–9** to selector valve **16**. In the position of valve **16** shown, the high portion **16***a* thereof is active so that pressure is introduced through shuttle valve **10***b* and line **48** to power cylinder **15** to operate lead-in finger **68**H to the upper position shown. The upper end of cylinder **12** is exhausted through line **39** and shuttle valve **10***c*.

During the period of time when one of the selector valves **14, 16** is controlling the positions of power cylinders **12** and **15**, the other of the vlaves **14, 16** may be operated to pre-select the positions which cylinders **12** and **15** should occupy when slitter **23** is next shifted. Thus, one of the valves **14, 16** is said to be "in use," that is, controlling the present position of cylinders **12, 15** and the other of the valves **14, 16** is used as a "pre-set" means to select the positions to be assumed by cylinders **12** and **15** when slitter **23** is next shifted.

In order to indicate which of the valves **14, 16** is being used as a pre-set means, indicator flag **56** (FIGURES 2 and 4) is provided. Flag **56** is provided with a double set of "in use"-"pre-set" indicia in reverse sequence. One portion of the indicia from each set is always viewable through windows **26***a*, **26***b* of control panel **26**. Thus, in FIGURE 2 "in use" is viewable through window **26***a* in line with the row containing selector valve **14** and "pre-set" is viewable through windows **26***b* aligned with the row containing selector valve **16**. This is consistent with the schematic of FIGURE 4 in that pressure introduced through line **57** from manifold **5** to the top of cylinder **13** operates flag **56** to the downward position shown. Flag **56** is shifted upward when there is pressure in manifold **9**. At that time the pressure is conveyed through line **58** to the lower portion of cylinder **13** thereby moving flag **56** upward and changes the indicia appearing at the respective windows **26***a*, **26***b*.

While the selector valves for control of only one of the lead-in fingers has been described it should now be apparent that the additional selector valves of control panel **26** control operation of the power cylinders for operating the other lead-in fingers. Naturally, all of the selector valves in the row with selector valve **14** are connected to manifold **5** through the lines parallel to line **68–5** and all of the selector valves in the row containing selector valve **16** are connected to manifold **9** through lines parallel to lines **68–9**. Thus, it is seen that each time pressure is introduced into one of the manifolds **5, 9** and exhausted from the other of these manifolds all of the lead-in fingers will simultaneously move to pre-selected positions.

Up to this point only the high position of lead-in finger **68**H has been considered. In order to operate finger **68**H to its mid position the particular valve **14, 16** which is "in use" must be in its mid position. Considering selector valve **16** to be "in use" and in the position where its central section **16***b* is active, lines **39** and **48** are both exhausted through shuttle valves **10***c* and **10***b*, respectively. Under these conditions power cylinder **15** is deactuated in that no pressure is present below piston **15***b*. At this time no pressure is present above piston **12***b* so that the low pressure present below piston **12***b* forces plunger **12***a* outward to the position shown in FIGURE 4 for support of lead-in finger **68**H in its mid position (a position corresponding to that of lead-in finger **36***m* in FIGURE 2).

When selector valve **16** is "in use" and its third portion **16***c* is active, line **48** is exhausted through shuttle valve **10***b* while pressure is introduced through shuttle valve **10***c* to line **39**. The absence of pressure below piston **15***b* causes plunger **15***a* to be retracted. High pressure above piston **12***b* overcomes low pressure below piston **12***b* causing plunger **12***a* to be retracted. With both plungers **12***a* and **15***a* retracted lead-in finger **68**H occupies the low position corresponding to the position occupied by lead-in finger **6**L in FIGURE 2. This low position is established by virtue of gravity causing the end of lead-in finger **68**H closest to conveyor means **32** to rest upon transverse frame member **59** (FIGURE 2).

In considering the elements shown in FIGURE 4 the selector valve which is "in use" is deemed to be a switch means while the selector valve being used for "pre set" is deemed to be a pre-selection means. Valve **1** is deemed to be a command means in that operation thereof is effective to shift the relative positions of the banks of selector valves (rows on the control panel **26** in FIGURE 2) between "pre-set" and "in use" conditions.

It should now be apparent to those skilled in the art that by modifying selector valves **14** and **16** power cylinder **12** may be operated solely by virtue of high pressure and pressure regulator **11** and line **38** may be eliminated. More particularly, selector valve sections **14***b* and **14***c* are reversed and line **39** is connected to cylinder **12** below piston **12***b*. Now selector valve section **14***c* is at the center position between sections **14***a* and **14***b*. Thus, for the mid position pressure will be present below piston **12***b* and for the other two positions of selector **14** the region of cylinder **12** below piston **12***b* will be exhausted. Similarly, valve sections **16***b* and **16***c* would be reversed.

In the embodiment of FIGURES 5 and 6, the pneumatic controls for the lead-in fingers are replaced by electrical controls which select whether or not either of the power cylinders for lifting the particular lead-in fingers is energized. Control panel **103** of FIGURE 6 is provided with a vertical row of three push buttons **1, 2, 3** for each of the lead-in fingers together with fuse **F–1**, power switch **101** and mode switch **102**. As seen in schematic form at the lower left of FIGURE 5, the circuitry controlled by push button **1** is effective to operate both power air cylinders **104, 105** so that the plungers thereof are retracted and lead-in finger L is in its lowermost or horizontal position; push button **2** is effective to cause the plunger of power cylinder **105** to be extended thereby pivoting lead-in finger L counter-clockwise about its pivot P to the mid position; and operation of push button **3** is effective to cause the plunger of power cylinder **104** to be extended thereby operating lead-in finger L to its uppermost position.

FIGURE 5 illustrates the instantaneous and preset controls for a single lead-in finger L. It is to be understood that substantially identical instantaneous and preset controls are also provided for each of the other lead-in fingers.

As seen in FIGURE 5, fuse **F–1** and switch **101** are connected in series between one terminal of power source **106** and power line **L–1′** while the other terminal of power source **106** is connected directly to power line **L–2′**. When switch **102** is in the manual position, bridging contact **102**A thereof connects the time delay relay operating coil **TD–2** across power lines **L–1′, L–2′** thereby opening contacts **TD2–1** and closing contacts **TD2–2** both after a delay typically adjusted for two seconds duration. The opening of contact **TD2–1** interrupts the enerigzing circuit for the relay coil **CR–5** which became energized the moment that switch **102** was operated to the manual position.

With relay **CR–5** energized contacts **CR5–1** close thereby connecting reset solenoid **RS–1** across power lines **L–1′, L–2′**. Reset solenoid **RS–1**, when energized, releases mechanical latches which act to hold push buttons **1** or **2** or **3** in their depressed position. It is noted that by depressing any of the push buttons **1–3**, mechanical latches which may be holding either of the other push buttons in depressed position are automatically released and the other push buttons are prevented from being operated so long as the first push button is being held in position by being depressed. After a particular push button is depressed it is mechanically latched in depressed position.

Now consider a situation where mode switch **102** is in the manual (MAN) position and the particular lead-in finger controlled by the circuitry illustrated in FIGURE

5 is in position 2, or the mid position, and thereafter push button 3 is depressed. Lead-in finger L is held in position 2 through the energization of air solenoid AS–2 which controls the introduction of high pressure fluid to power cylinder 105. In order to energize air solenoid AS–2 contacts CR2–1 must be closed. This is accomplished by maintaining control relay coil CR–2 energized through the closing of holding contacts CR2–2, normally closed contacts CR1–2 and normally closed contacts CR4–1.

Push button 3 is a three-section switch which when depressed is latched in the depressed position thereby energizing lamp L–3 indicating that push button 3 is depressed. Control relay coil CR–2 is connected through a section of push button switch 3 and the closed contact TD2–2 across power lines L–1', L–2'. This causes CR1–2 to open thereby deenergizing coil CR2 to interrupt the energizing circuit for air solenoid AS–2. At this same time contacts CR1–1 close thereby completing the energizing circuit for time delay relay coil TD–3 which instantaneously closes contacts TD3–1. Now the coil of control relay CR–6 is energized to instantaneously close contacts CR6–1. This completes an energizing circuit for the coil of control relay CR–3 through a stage of push switch 3, contacts CR6–1 and contacts TD3–1. With control relay coil CR–3 energized, contacts CR3–1 in series with air solenoid AS–3 are closed thereby completing the energizing circuit for air solenoid AS3 to energize power cylinder 104 which operates lead-in finger L to its uppermost position. At the same time holding contatcs CR3–2 close thereby completing the holding circuit for relay coil CR–3 with this holding circuit consisting of contacts CR3–2, CR1–2 and CR4–1.

If mode switch 102 is then operated to the automatic (AUTO) position shown in FIGURE 5 and thereafter push button 2 is depressed, the latch holding push button 3 depressed is mechanically released. Under these circumstances the energizing circuit for the coil of control relay CR–1 is deenergized and control relay coil CR–3 remains energized through its holding circuit of contacts CR3–2, CR1–2 and CR4–1. Lamp L–2 is energized indicating that push button 2 is depressed and that during the next changeover lead-in finger L will move to its mid position.

During the automatic changeover cycle the programming device for controlling changeover, typically a time operated camming device or means responsive to switching signals which are stored on a magnetic or punched tape, causes contact A to close. This energizes the coils of relays TD–4 and CR–4 thereby opening TD4–2 and CR4–1 and closing TD4–1 and CR4–2. The closing of CR4–2 or TD4–1 energizes the coil of control relay CR–6 thereby closing contacts CR6–1. This completes an energizing circuit for the coil of control relay CR–2 through contacts CR6–1 and CR4–2 thereby closing CR2–1 and energizing air solenoid AS2. At the same time holding contacts CR2–2 are closed thereby completing a holding circuit through CR1–2 and CR4–1. Shortly thereafter the automatic changeover programmer opens switch A and closes switch G.

The opening of switch A deenergizes control relay CR–4 instantaneously opening contacts CR4–2 and instantaneously closing contacts CR4–1. However, the delayed opening of contacts TD4–1 maintains control relay CR–6 energized so that contacts CR6–1, in series with contacts TD4–1 and a section of push button switch 2, provide an energizing circuit for control relay CR–2.

The deenergization of time delay relay TD–4 causes delayed closing of contacts TD4–2. When the latter contacts are closed together with switch G and bridging contact 102B, an energizing circuit for reset solenoid RS–1 is completed thereby releasing the latch holding push button 2 in depressed position. By unlatching push button 2 lamp L–2 is extinguished.

The energizing circuit for control relay CR–2 through CR6–1 and CR4–2 is interrupted and the energizing circuit for control relay CR–1 is also interrupted, with interruption of the latter being effective to close contacts CR1–2. Now the holding circuit through contacts CR2–2, CR1–2 and CR4–1 for control relay CR–2 is completed and air solenoid AS2 remains energized.

It is noted that when mode switch 102 is initially operated to the automatic position information stored in push buttons 1, 2 and 3 is cancelled since reset solenoid RS–1 is energized through contacts TD1–1 and TD3–2. However, reset solenoid RS–1 remains energized for only a short interval of time since operation of mode switch 102 to the automatic position energizes the operating coil for time delay relay TD–1. Thus, after a short time delay contacts TD1–1 will open to interrupt the energizing circuit for reset solenoid RS–1 through mode switch 102.

With respect to the electrical controls of FIGURE 5, it is noted that with mode switch 102 in the manual position, as soon as a selector 1, 2, 3 is depressed the lead-in finger controlled thereby will instantaneously move to the position dictated by the new actuated selector. With mode switch 102 in the automatic position, operation of a selector 1, 2, 3 merely acts to store information. This stored, or pre-selected information, is not effective to operate a lead-in finger until the changeover programmer generates a command signal closing switch A.

Thus, it is seen that the instant invention provides apparatus for automatically operating lead-in tables to desired positions. This apparatus is so constructed that it can be preset with information that will be effective to simultaneously operate all lead-in fingers to their next required positions during a predetermined time period.

Although there has been described a preferred embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

The embodiments of the invention in which an exclusive privilege or property is claimed are defined as follows:

1. Apparatus including means for supporting and guiding a plurality of parallel elongated webs moving along a path parallel to the axes of these webs; said means comprising a plurality of transversely spaced fingers extending parallel to this path, power operating means for moving discreet ones of said fingers to predetermined vertical positions, switch means connected to said power operating means for controlling operation thereof, command means connected to said switch means for initiating operation of said power operating means, preselection means connected to said switch means for choosing the next positions for said fingers without disturbing present positions of said fingers regardless of said present position until subsequent operation of said command means; said switch means actuating said power operating means responsive to actuation of said command means to simultaneously move said fingers to said next positions.

2. Apparatus as set forth in claim 1 in which said power operating means and said switch means are fluid devices.

3. Apparatus as set forth in claim 1 in which the power operating means includes a plurality of power units; each of said power units when actuated operating an individual one of said fingers from a normal low position to another position thereabove.

4. Apparatus as set forth in claim 3 in which the power operating means includes a plurality of additional power units; each of said additional power units when actuated operating an individual one of said fingers from said low position to a mid position between said low and said another positions.

5. Apparatus as set forth in claim 1 also including a section through which the webs pass prior to reaching said fingers; said section being adjustable; and additional means coordinating actuation of said command means to adjustment of said section.

6. Apparatus as set forth in claim 3 in which said apparatus also includes a portion having a plurality of slitting sections and adjusting means for shifting a selected one of said slitting sections into position for producing said webs; and additional means coordinating actuation of said command means to shifting of said slitting sections.

7. Apparatus as set forth in claim 6 in which said additional means includes a switch element actuated by said portion during shifting of said sections.

8. Apparatus including first means providing a web moving longitudinally along a generally horizontal feed path; second means for slitting said web longitudinally into a plurality of parallel moving web sections; third means disposed along said feed path in position to receive said web sections and operate thereon, said third means including entrance conveyors positioned at different heights; fourth means for supporting and guiding said web sections into said entrance conveyors; said fourth means including a plurality of elements spaced across said feed path; power operating means for moving discrete ones of said elements from present to selected subsequent positions with respect to said feed path; switch means connected to said power operating means for controlling operation thereof; command means connected to said switch means for initiating operation of said power operating means; preselection means connected to said switch means for choosing a subsequent position for each of said elements without disturbing its present position until subsequent operation of said command means; said switch means actuating said power operating means responsive to actuation of said command means to simultaneously move said elements to their said subsequent positions chosen by said preselecting means.

9. Apparatus as set forth in claim 8 in which each of said elements is elongated and extends in the general direction of said feed path; pivot means for said elements positioned at the ends thereof remote from said third means; said power operating means moving said elements about said pivot means.

10. Apparatus as set forth in claim 9 in which each of said elements are biased toward positioning the other end of said element to a normal position; said power operating means when actuated raising said other end to another position above said normal position.

11. Apparatus as set forth in claim 10 in which said power operating means engages said elements from below.

12. Apparatus as set forth in claim 10 also including additional power operating means for moving the other ends of said elements to a mid position between said normal and said another positions.

13. Apparatus as set forth in claim 8 in which said switch means and said preselection means are fluid devices including a first and a second bank of selector valves for controlling positions of said elements; means alternately connecting said banks in a preselection and an instantaneous operational mode with each of said banks being in a different operational mode than the other of said banks; with one of said banks in said operational mode the valves thereof controlling present positions of said element; with one of said banks in said preselection mode the valves thereof controlling subsequent positions of said elements.

14. Apparatus as set forth in claim 8 in which said switch means and said preselection means are electrical devices including selector switches and a mode switch for selectively connecting said selector switches in circuit in a preselection and an instantaneous operational mode; with said selector switches in said instantaneous operational mode, operation of each of said selector switches instantaneously operating a predetermined one of said elements; with said selector switches in said preselection mode, operation of said selector switches failing to operate said elements until said command means is actuated.

15. Apparatus including means for supporting and guiding a plurality of parallel elongated webs moving along a path parallel to the axes of these webs; said means comprising a plurality of transversely spaced fingers extending parallel to this path, power operating means for moving discreet ones of said fingers to predetermined vertical positions, switch means connected to said power operating means for controlling operation thereof, preselection means connected to said switch means for choosing the next positions for said fingers, command means; said switch means actuating said power operating means responsive to said command means to move said fingers to said next positions; said apparatus also including a portion having a plurality of slitting sections and adjusting means for shifting a selected one of said slitting sections into position for producing said webs; and additional means coordinating actuation of said command means to shifting of said slitting sections.

16. Apparatus as set forth in claim 15 in which said additional means includes a switch element actuated by said portion during shifting of said sections.

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