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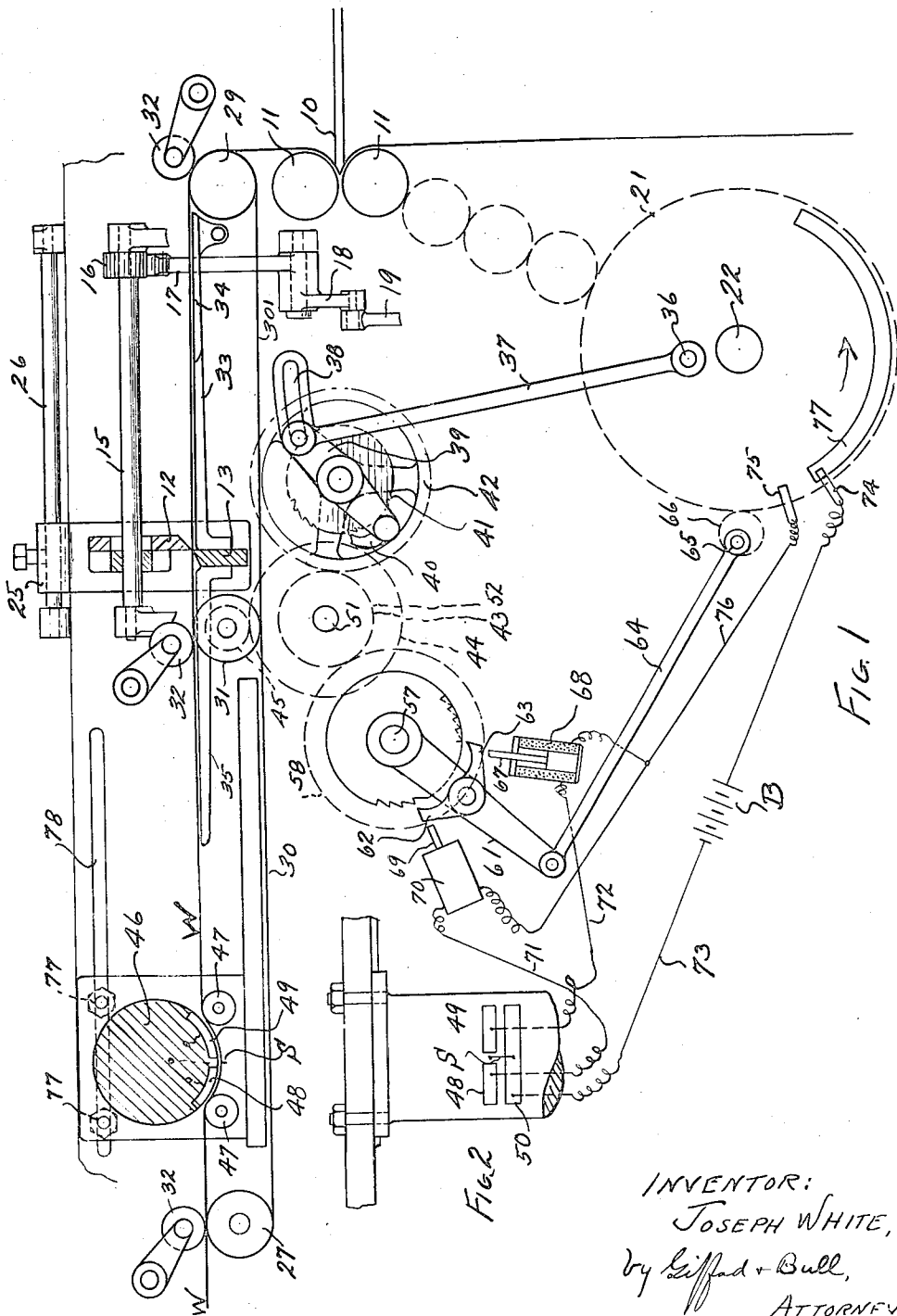
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J. WHITE

WEB HANDLING MECHANISM

Filed July 2, 1921

2 Sheets-Sheet 1



INVENTOR:
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by Liffard & Bull,
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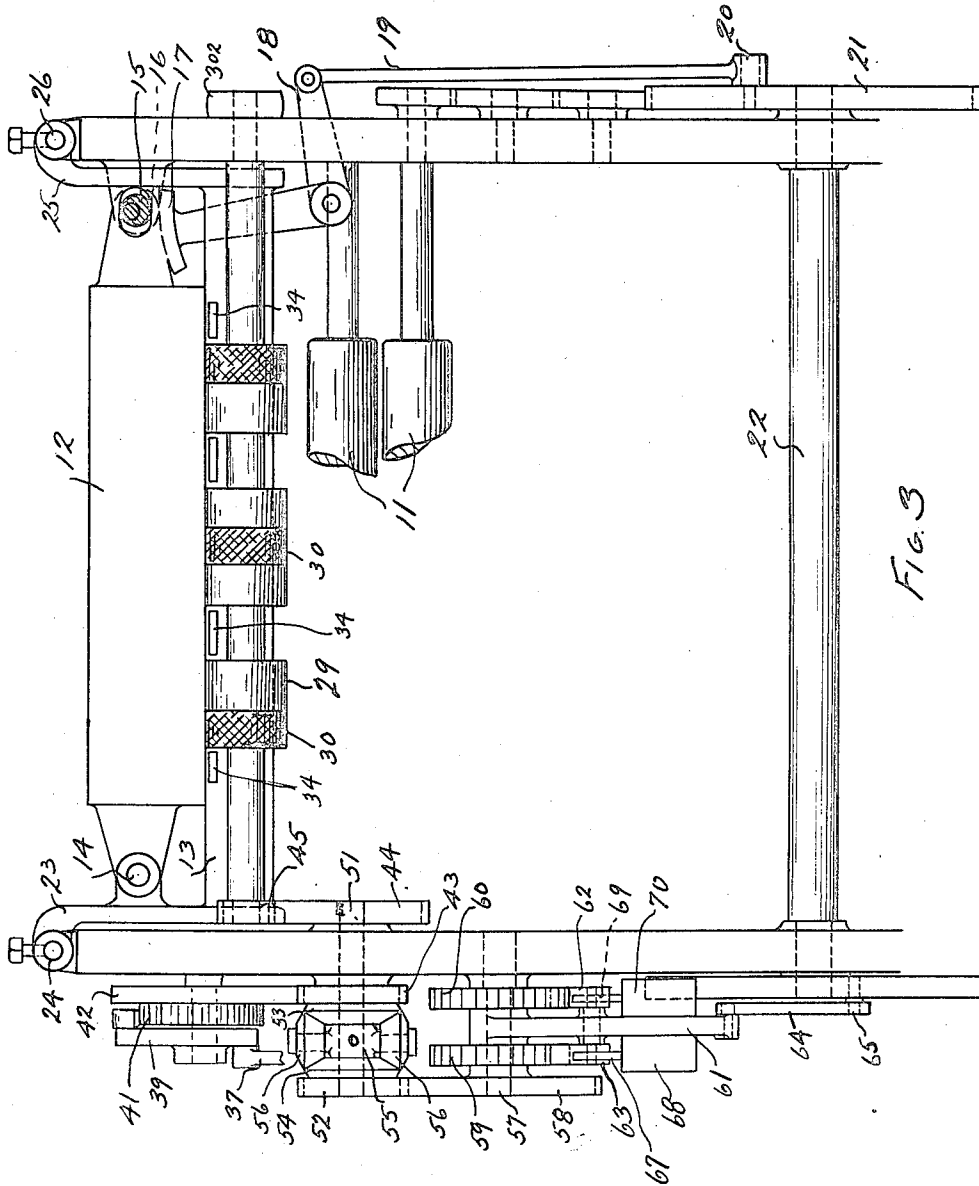


FIG. 3

INVENTOR:
JOSEPH WHITE,
by *Eifford & Bull*,
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH WHITE, OF MIDDLESEX, NEW JERSEY; MINNIE E. WHITE ADMINISTRATRIX OF SAID JOSEPH WHITE, DECEASED, ASSIGNOR TO THE RIEGEL SACK COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WEB-HANDLING MECHANISM.

Application filed July 2, 1921. Serial No. 492,061.

To all whom it may concern:

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing at Middlesex, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Web-Handling Mechanism, of which the following is a specification.

My present invention relates to mechanism for positioning a web, particularly for handling a web which has had registering indicators applied thereto, particularly during a printing operation.

In certain manufacturing processes, such as the making of bags from a web or printed material, it is desirable to have the printing mechanism arranged so that, if desired, bags of different lengths may be printed thereon, and it is also sometimes desirable that the printed web, instead of being cut immediately after the printing, shall be rolled up into the machines for operating on sheets cut from the web, at which time the web is cut into sheets.

As is well understood by those skilled in the art, webs of certain materials in particular, and particularly if such materials are allowed to stand under changing atmospheric conditions for a considerable time, will stretch or contract. Consequently, if, for instance, a sequence of designs is printed on a web of bag material, such designs will, ordinarily, be uniformly spaced along the web. If now this web is rolled up and not cut into sheets until after the lapse of a number of days or even hours, the web may change in length and these changes may not be uniform throughout the length of the web. Consequently, if the web were now passed into a cutting machine, for instance, by an arrangement which would feed the same amount of web for each cycle, the shifting of the relative positions of the several designs might be such that, as successive sheets were cut from the web, the line of division would fall in the printed matter, or at least would materially change the margins.

In my present apparatus I have provided a means by which a web, to which registering indicators have been applied during the printing operation, may be cut into sheets with the division line between the sheets in proper relation to each printed design,

irrespective of the changes in length of the web between the time of printing and the time of cutting.

My invention will best be understood from the following description and the mechanism which I have chosen for purposes of illustration.

In the drawings Figure 1 is a side elevation of my illustrative form of mechanism, with some of the parts shown more or less diagrammatically and others in vertical section; Fig. 2 is a bottom view of a portion of Fig. 1, with the circuit wires connected to the circuits shown in Fig. 1; and Fig. 3 is a front elevation of Fig. 1, with some of the parts broken away.

Corresponding reference characters refer to corresponding parts in the several views.

In the illustrative mechanism, it is assumed that the web W has been provided during the printing operation with registering indicators which, in the form chosen for purposes of illustration, are staples S inserted, preferably, in predetermined relation to each printed design, these staples being the usual metallic ones with the exposed portions of the staples extending crosswise of the web.

The mechanism with which the web positioning devices cooperate in the machine illustrated consists of a folder for folding the sheets cut from the web crosswise of the web and a cutter for cutting the sheets from the web. The folder has a folding blade 10, reciprocated by any of the usual mechanisms, to carry the folded sheet between a pair of folding rollers 11, 11. This portion of the mechanism is well understood in the art and further description thereof will be unnecessary.

The cutter illustrated comprises a movable upper knife 12 and a fixed lower knife 13, the upper knife being pivoted at one end at 14 and engaging an eccentric shaft 15 at its other end, the eccentric shaft 15 being provided with a gear 16 meshing with a segment 17 on the end of a lever 18 which, through a connecting rod 19, is reciprocated once for each cycle and means of the crank-pin 20 on the gear 21 attached to the cross shaft 22 and driven from the main drive for the machine.

The center 14 is supported in an adjustable bracket 23, mounted on the fixed rod 24,

the opposite side of the machine being provided with a bracket 25 mounted on a fixed rod 26. The brackets 23 and 25 also support the fixed knife 13. By means of the arrangement just described, the position of the cutter in relation to the folder may be adjusted by shifting the brackets 23 and 25 along the rods 24 and 26, the sliding connection between the movable end of the knife 12 and the eccentric shaft 15 permitting this to be done without disturbing the operative relation between the movable knife and the crank 20. By shifting the cutter in relation to the folder, the folding knife 10 can be made to fall at the middle of each sheet after it has been cut from the web by the cutter.

The web enters the machine from the left of Fig. 1 and is supported between the rollers 27 and 31 by tapes 30, the roller 29 being driven by the belt 301 running on the pulley 302 on the end of the roller 29, and each of the rollers 27, 29 and 31 having one or more rollers 32 in contact therewith to forward the web in the usual manner. Sheet supporting platforms 33, 34 and 35 may be provided adjacent the cutter.

The rollers 27 and 31, together with the tapes 30, are moved so as to feed forward a length of web approximately equal to the length of the sheet to be cut off, such movement being had, in the machine illustrated, by a ratchet and pawl device operated by a crank mounted on the shaft 22. The crank 36 has a connecting rod 37 engaging the slot 38 of a pawl lever 39 carrying a pawl 40. This pawl is arranged to engage a ratchet wheel 41, to which is attached a gear wheel 42 meshing with a gear 43, to which is connected an intermediate gear 44 (in the manner to be more fully described hereinafter) engaging with a gear 45 on the end of the roller 31. Each rotation of the crank 36 will cause the web to be fed forward past the cutter during each half turn of the shaft 22 and to remain at rest, so far as the feed through the ratchet 41 is concerned, during the remainder of the cycle.

At the left of the cutter I have illustrated one form of an indicator contacting device by which the final position of the web in relation to the cutter will be controlled by the position which an indicator, such as a staple S, occupies in relation to the indicator device after the web has been moved forward by the main web feeding device just described. The contacting device is arranged to cooperate with an auxiliary web-feeding means by which the web will be moved forward or backward from the position to which it was brought by the main web-feeding means until the indicator adjacent the conducting device is in a predetermined relation to the cutter. This means that correspondingly the printed de-

sign with which the indicator has a fixed relation, is therefore brought into a predetermined position with the cutter, regardless of any changes by shrinkage or stretching in the length of the web after the designs have been printed thereon.

The particular indicator device illustrated controls this auxiliary web-feeding means through electric circuits which are, in turn, controlled by the metallic indicators S.

Extending across the frames of the machine is a circular bar or support 46 around which the web is bent slightly in order to insure a good contact, the web being held against the bar by the rollers 47, 47. The bar is fixed; that is, it is non-rotative. At the center of its lower part is a portion which I have termed the "neutral portion" and at either side of this neutral portion is one of the contacting plates 48, 49. Spaced crosswise of the web from these contacting plates is a single contacting strip 50 which, in the form shown, is a single strip, but which can be cut into two portions at the neutral point. The space between the strips crosswise of the web is such that it can be bridged by the exposed portion of a staple S, the staple being made to slide over these contacting strips when the web is carried past the contacting device.

A shaft 51 extends through the side frame of the machine and has attached to its inner end a gear 44 which meshes with the gear 45 on the roller 31. On the outer end of this shaft is loosely mounted the gear 43 and a gear 52. To the gear 43 is connected a bevelled gear 53, and to the gear 52 is connected a bevelled gear 54. Between the bevelled gears 53 and 54 and connected to the shaft 51 is a frame 55 carrying a pair of bevelled pinions 56, 56 meshing with the bevelled gears 53, 54. To a shaft 57, extending out from the side frame, is connected a gear 58, connected to which is a pair of ratchets 59, 60, the teeth of the ratchets extending in opposite directions. Loosely mounted on the shaft 57 is a pawl lever 61 carrying pawls 62 and 63 arranged respectively to engage the ratchets 60, 59. The lever 61 is reciprocated through a rod 64 by a crank-pin 65 mounted on a gear 66 meshing with a gear on the shaft 22. The ratio between the gear on the shaft 22 and the gear 66 is such that 66 makes a large number of turns for each cycle of the machine.

With the arrangement of gearing just described, it will be seen that when the crank 36 is moving downward in Fig. 1, the gears 42 and 43 will be rotated, which will turn the bevelled gear 53 so as to carry the bevelled pinions 56, 56 around the bevelled gear 54, which at that time is held stationary, so as to rotate the shaft 51 and with it the roller 31. Similarly, when either of

the pawls 62, 63 is in engagement with the corresponding ratchet wheel, the gears 58 and 52 will be turned, and the bevelled pinions 56 will thereby be carried around the bevelled gear 53, which at that time is held stationary, to turn the shaft 51 and through that the roller 31. The turning of the roller 31 will move the tapes 30 to feed the web.

The pawls 62 and 63 are provided with the usual devices to hold them normally out of engagement with their respective ratchets. In order to move them into operative position, I have provided for the ratchet 63 a contacting pin 67 arranged to be moved longitudinally by a solenoid 68, and similarly for the ratchet 62 a pin 69 controlled by a solenoid 70. If either of the pins 67 or 69 is moved downward when the corresponding solenoid is excited, the pin will hold the corresponding pawl in mesh with the corresponding ratchet, so that as the rod 64 is reciprocated that ratchet will be turned step by step.

The solenoid 70 is connected to the contacting strip 48 by a wire 71 and, similarly, the solenoid 68 is connected to the strip 49 by a wire 72. A wire 73 is connected to the strip 50 through a source of power, as the battery B, the opposite end of the wire 73 being connected by a brush 74 arranged to contact with a strip 77 rotatably mounted on the shaft 22. Adjacent the brush 74 is a second brush 75 to which is connected a branched wire 76, a branch of this wire being connected to each of the solenoids 68, 70.

The folding rollers are connected through the gearing illustrated to the driving shaft of the machine. The contacting device 46 is slidably mounted on the side frames of the machine and is held in position by bolts 79 passing through slots 78. By this last arrangement the position of the contacting device 46 in relation to the cutter may be changed when the length of the sheet to be cut off is varied, the amount of adjustment provided for the device 46 being such that it not only can be moved the same distance that the cutter is moved toward the folder, but may also be moved nearer to the cutter itself.

The operation of the illustrative form of my invention is as follows: Assuming that the cutter has just severed a sheet from the end of the web and that the shaft 22 turns counterclockwise, then the folding knife 10 will tuck the middle of the sheet just cut off between the folding rollers 11, 11 which are moved at sufficiently high speed to carry the end of the sheet away from the end of the sheet just cut off. As the crank-pin 36 moves downward in Fig. 1, the tapes 30 will be advanced to feed the leading end of the web past the cutter a distance equal to the average length of the sheet to be cut off, this distance being determined by the position

of the upper connecting pin of the rod 37 in the slot 38. As the pin 36 reaches the lower part of its travel, the tapes 30 will be brought to rest and with them the web W. The contacting device 46 is located so that at this time the register indicator will fall within the range of the contacting portions of the device, and if the staple S constitutes the registering indicator, it will slide over and bridge the space between the contacting pieces 48 and 50 or 49 and 50, or the web may be brought to rest with the staple in the neutral position with one end in contact with the strip 50 and the other end between the strips 48 and 49, as shown in Fig. 2. By reason of the position and length of the strip 77 during the time when the web is being moved by the crank-pin 36, the circuit through the solenoids cannot be closed by the staple S, this strip 77 at that time being away from the brushes 74 and 75. As the web is brought to rest, however, the strip 77 passes beneath the brushes 74 and 75 and, if the staple S is located so as to contact with the strip 48, then the circuit through the solenoid 70 is closed, the current passing from the battery B through the wire 73, the strip 50, the staple S, the strip 48, the wire 71, solenoid 70, the wire 76, the brush 75 and the strip 77. This will cause the pin 69 to be projected outward and to throw the pawl 62 into engagement with the ratchet 60. By reason of the rapid vibration of the rod 64, the ratchet 60 will be moved a number of steps in rapid succession clockwise, and this will rotate the gears 58 and 52 to turn the roller 31 to feed the web forward, this motion continuing until the staple S is moved to the neutral position, when the circuit through the solenoid 70 will be broken by reason of the end of the staple moving out of contact with the strip 48. The printed design on the leading end of the web is now in proper relation to the cutter and the latter is moved to cut off the sheet.

Similarly, if when the web is brought to rest after the main web-feeding means has operated so that the staple S bridges the space between the strip 49 and the strip 50, the circuit through the solenoid 68 will be similarly closed to throw into action the pawl 63. This, however, will rotate the roller 31 and the tapes 30 backward so as to carry the leading end of the web backward until the staple S is opposite the neutral space, when the web again comes to rest as before.

Obviously, if when the web is advanced the staple S is in the neutral position, then neither solenoid is excited and the auxiliary mechanism remains inoperative.

It will be understood that any of the usual looping devices may be provided by which the leading end of the web may be given an intermediate motion without stopping the

continuous run of the main portion of the web. It will also be understood that the several devices may be varied widely in construction and that they may be used separately as well as in combination. While I have shown an electrically operated device controlled by metallic conducting indicators on the web, it will be obvious that such devices may be mechanical, if desired, and similarly controlled by the presence of the indicator. If the indicator, instead of being a piece affixed to the web should be a perforation therein, then instead of having the terminals of the circuits on the same side of the web to be bridged by the staple, such terminals may be located respectively on opposite sides of the web so that the current may pass through the indicator opening. While I have shown my web locating means in connection with a cutter and folder, it will be obvious that it can also be used in connection with any other mechanism for performing operations on the web.

While I have shown the main web forwarding gearing and the auxiliary web forwarding gearing connected through the planetary gearing 53, 54, 56, such connection may be a direct one in the machine illustrated, because at the time the planetary gearing is in operation, the pawl 40 will be moving backward over its ratchet teeth, and correspondingly, when the pawl 40 is in operation, the pawls 62, 63 will be out of engagement with their corresponding ratchet teeth.

I claim:—

1. In a mechanism for locating a web according to the position of spaced indicators on the web, a web-moving means adapted to move the web in each cycle a distance approximately that of the normal spacing of the indicators and then bring it to rest, and auxiliary web-moving means to move the web additionally in each cycle either forward or backward until an indicator is in a predetermined position.

2. In a mechanism for locating a web according to the position of spaced indicators on the web, a web cutter, a web-moving means adapted to move the web, after its leading end has been cut off, a distance approximately that of the length of the sheets to be cut off and then bring it to rest, and auxiliary web-moving means to move the web additionally either forward or backward until an indicator is in a predetermined position in relation to the cutter.

3. In a mechanism for locating a web according to the position of spaced tactile indicators on the web, a web-moving means adapted to move the web in each cycle a distance approximately that of the normal spacing of the indicators and then bring it to rest, and auxiliary web-moving means controlled by said indicators to move the

web additionally in each cycle either forward or backward until an indicator is in a predetermined position.

4. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, a web-moving means adapted to move the web, after its leading end has been cut off, a distance approximately that of the length of the sheet to be cut off, and auxiliary web-moving means controlled by the indicators to move the web either forward or backward until an indicator is in a predetermined position in relation to the cutter.

5. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, a web-moving means adapted to move the web, after its leading end has been cut off, a distance approximately that of the length of the sheet to be cut off and then stopping the web, and auxiliary web-moving means controlled by the indicators to move the web either forward or backward after the web has stopped until an indicator is in a predetermined position in relation to the cutter.

6. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, an indicator contacting device, a web-moving means adapted to move the web past the cutter a distance approximately that of the length of the sheet to be cut off, said contacting device being adapted and located so as to be contacted by an indicator after the web has been moved, and auxiliary web-moving means controlled by the position of the indicator in contact with said contacting means, to move the web additionally until the indicator is in predetermined relation to the cutter.

7. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, an indicator contacting device, a web-moving means adapted to move the web past the cutter a distance approximately that of the length of the sheet to be cut off, said contacting device having a neutral space and a contacting portion on either side thereof, and an auxiliary web-moving means controlled by the indicator in contact with said device and adapted to move the web, after it has been moved by the web-moving means, either forward or backward, according to whichever contacting portion is contacted by the indicator, until the indicator is in the neutral space.

8. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, an indicator contacting device, a web-moving means adapted to move the web past the cutter a distance approxi-

mately that of the length of the sheet to be cut off, said contacting device having a neutral space and a contacting portion on either side thereof, and an auxiliary web-moving means controlled by the indicator in contact with said device and adapted to move the web, after it has been moved by the web-moving means, either forward or backward, according to whichever contacting portion is contacted by the indicator, until the indicator is in the neutral space, the distance between the cutter and the contacting device being adjustable and the web-moving means being also adjustable, whereby the normal length of the sheets to be cut off may be varied.

9. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, a web-moving means adapted to move the web, after its leading end has been cut off, a distance approximately that of the length of the sheet to be cut off, and auxiliary web-moving means controlled by the indicators to move the web either forward or backward until an indicator is in a predetermined position in relation to the cutter, said auxiliary means including a reciprocating member and means to reciprocate it rapidly a plurality of times for each operation of the cutter.

10. In a mechanism for cutting sheets from a web with lengths determined by the distance between tactile indicators on the web, a cutter, a folding mechanism adapted to fold crosswise sheets cut from the web, an indicator contacting device, the cutter being located above the web between said device and the folding mechanism, a web-moving means to move the web a distance approximately the length of the sheet to be cut off, and auxiliary web-moving means, controlled by the position of an indicator in relation to said contacting device, to move the web additionally to bring an indicator in predetermined relation to the cutter, said folding mechanism, cutter and indicating device being relatively adjustable along the web to vary the length of the sheets.

11. In a mechanism for locating a web having spaced tactile indicators thereon, a fixed indicator contacting device, web-moving means to move the web past said device a distance approximately that of the space between a pair of indicators and bring it to rest with an indicator in contact with said contacting device, said device having a neutral portion, and auxiliary web-moving means, controlled by the relation of the indicator to said neutral space, to move the web additionally forward or backward until the indicator is opposite said neutral portion.

12. In a mechanism for locating a web having spaced tactile indicators thereon, a

fixed indicator contacting device having a neutral portion and contacting portions on either side thereof, and an auxiliary web-moving means controlled by said device and arranged to move the web forward or backward, according to the portion contacted by an indicator until the indicator is opposite said neutral portion.

13. In a mechanism for locating a web having spaced conducting indicators thereon, an indicator contacting device having a neutral portion and contacting portions on either side thereof, an auxiliary web-moving means, electric circuits having a source of power and including said contacting portions, means controlled by said circuits to render said web-moving means operative when said circuits are energized, said circuits and said means being constructed and arranged to cause the web-moving means to move the web forward or backward, according to the contacting portion in contact with an indicator until the indicator is opposite the neutral portion.

14. In a mechanism for locating a web having spaced conducting indicators thereon, an indicator contacting device having a neutral portion and contacting portions on either side thereof, an auxiliary web-moving means comprising a pair of pawls and ratchets, said pawls being normally out of contact with their respective ratchets, means to reciprocate the pawls rapidly a plurality of times in each cycle, and a pair of electric circuits, each including one of said contacting portions and a pawl controlling device adapted to render one of said pawls operative, said indicator being adapted to close the circuit of the contacting portion with which it contacts, whereby the pawl in that circuit is rendered operative to move the web until the indicator is opposite the neutral portion.

15. In a mechanism for locating a web having spaced conducting indicators thereon, an indicator contacting device having a neutral portion and a pair of contacting portions on either side thereof, said pairs being spaced apart crosswise of the web and such space being adapted to be bridged by an indicator, a web-moving means and an electric circuit connected to each pair of contacting portions and having means therein to control the operation of said web-moving means; and arranged to be closed when an indicator bridges the space between said pair, whereby the web-moving means is rendered operative.

16. In a mechanism for locating a web having spaced conducting indicators thereon, an indicator contacting device having a pair of contacting portions spaced apart crosswise of the web, said space being adapted to be bridged by an indicator, a web-moving means including an electric circuit

having its terminals connected to said portions and arranged to be closed when an indicator bridges said space.

17. In a mechanism for locating a web 5 having spaced conducting indicators thereon, an indicator contacting device, a web-moving means, means for operating said web-moving means including an electric circuit with its terminals connected to said device, said circuit being adapted to be closed 10 through an indicator adjacent said device, said indicator forming a part of said closed circuit.

18. In a mechanism for cutting sheets 15 from a web having spaced conducting indicators thereon, a cutter, an indicator contacting device having a neutral portion and

a contacting portion on either side thereof, a web-moving means adapted to move the web past the cutter a distance approximately 20 the length of the sheet to be cut, an auxiliary web-moving means including a pair of electric circuits each having its terminals connected to one of said contacting portions, and adapted to be closed through an indi- 25 cator in contact with said contacting portion, said auxiliary means being adapted to move the web when a circuit is closed, until the indicator is opposite said neutral portion, a switch for each circuit, and means to open the switch after the auxiliary web-moving means has been actuated.

JOSEPH WHITE.