Feb. 28, 1967 W. H. GILES 3,306,801

WEB SEVERING MEANS FOR WEB SPLICING MACHINES

Filed Sept. 14, 1962 4 Sheets-Sheet 1

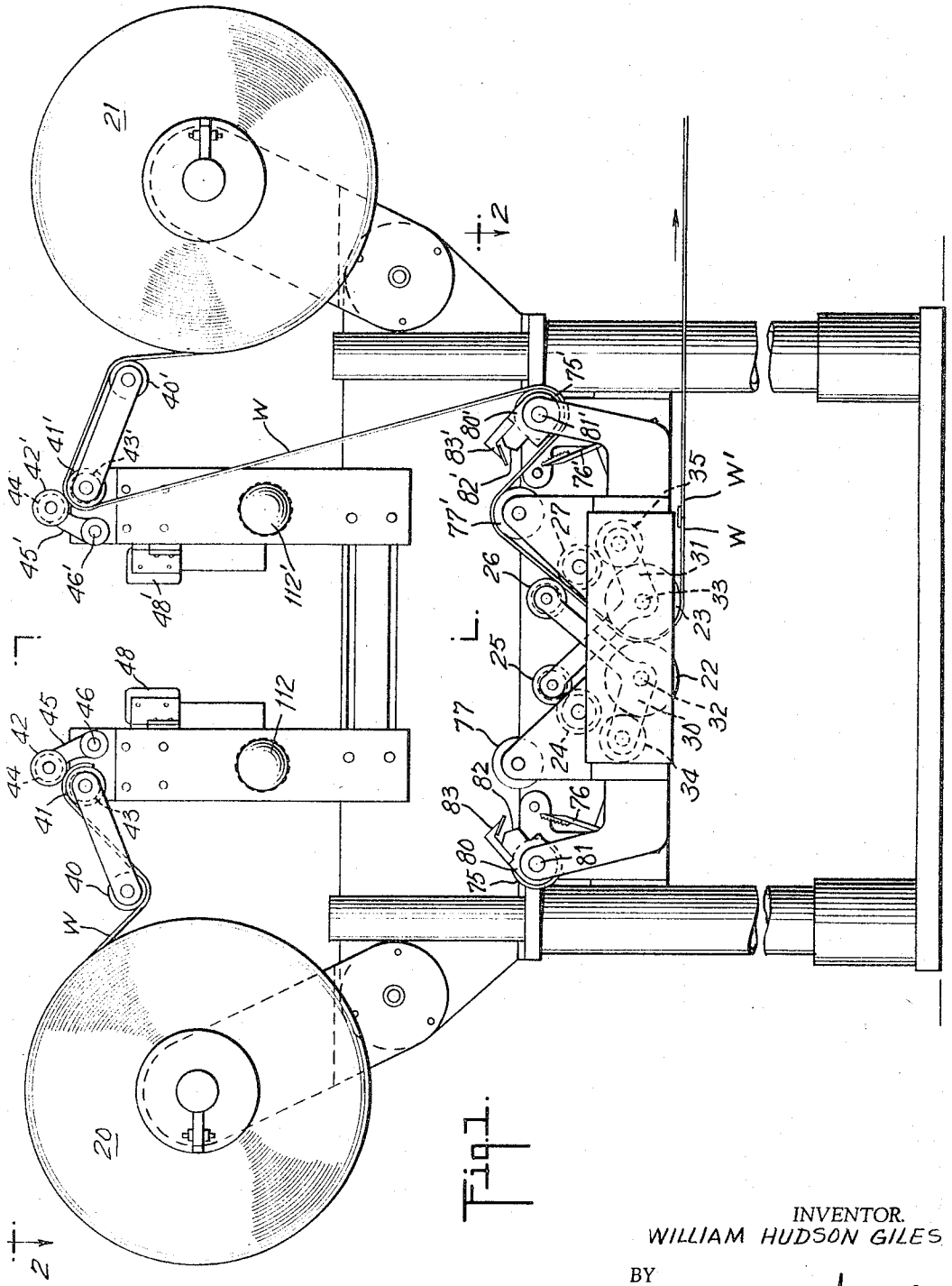


Fig. 1.

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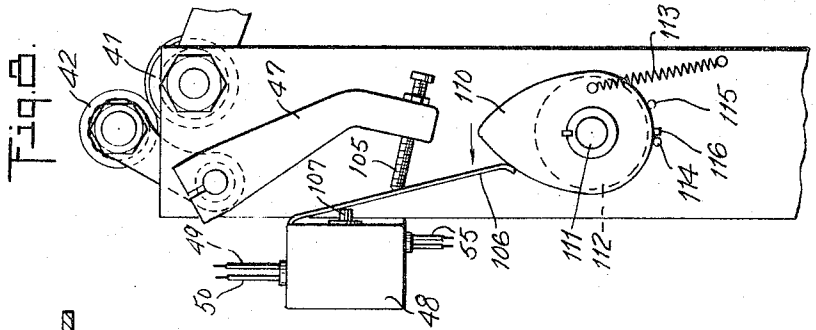
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WEB SEVERING MEANS FOR WEB SPLICING MACHINES

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Fig. 1.



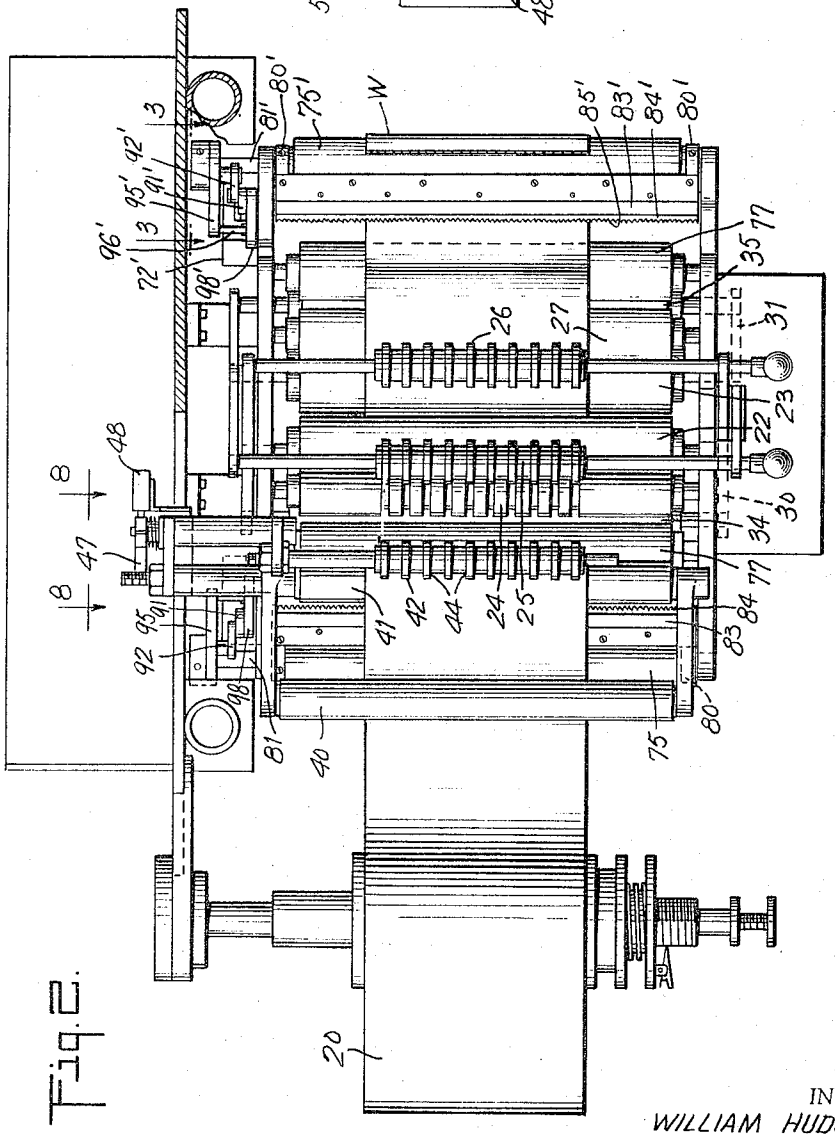


Fig. 2.

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Fig. 3.

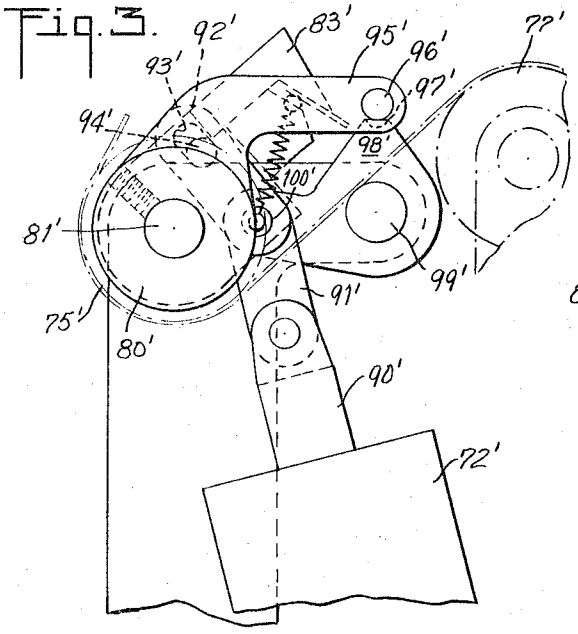


Fig. 4.

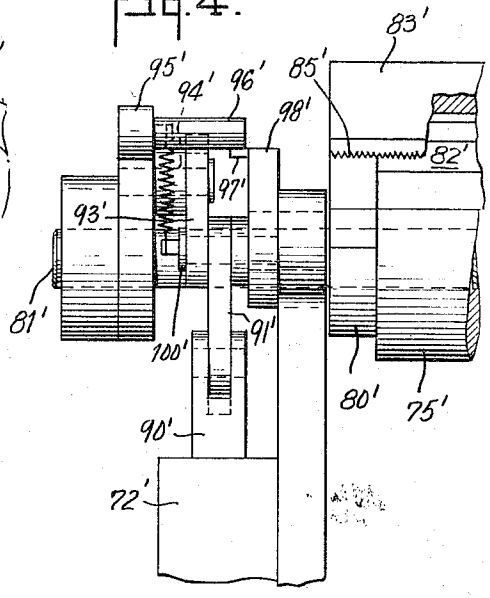
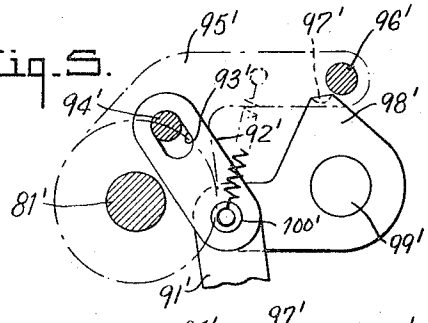


Fig. 5.



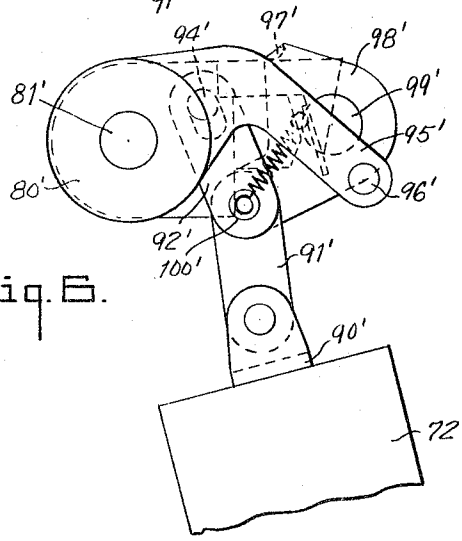
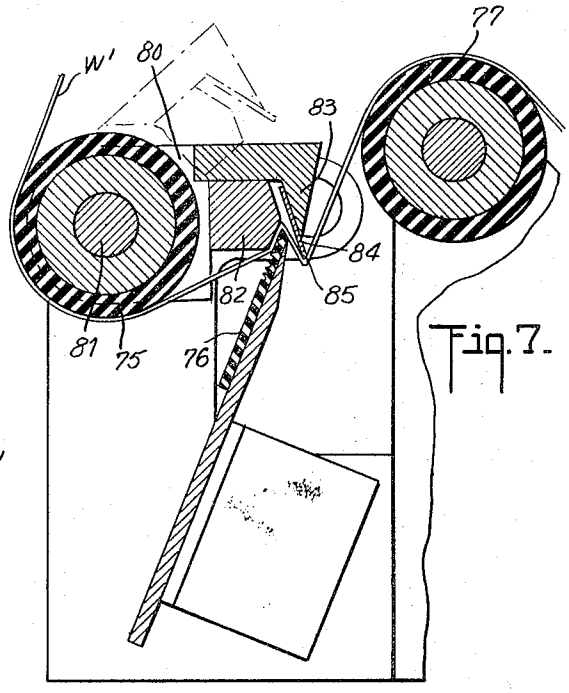


Fig. 6.

Fig. 7.



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WEB SEVERING MEANS FOR WEB SPLICING MACHINES

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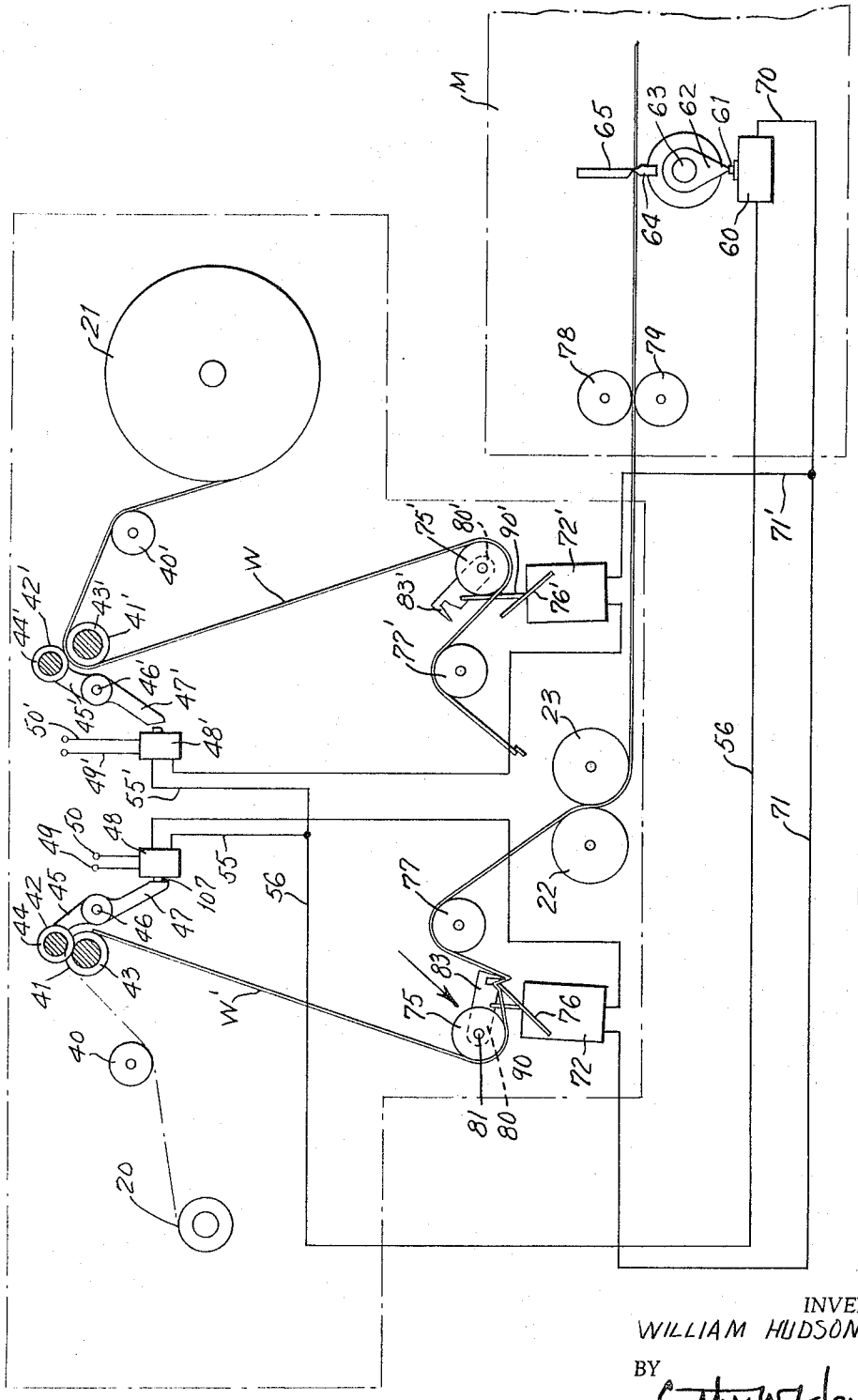


Fig. 9.

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United States Patent Office 3,306,801 Patented Feb. 28, 1967

3,306,801

WEB SEVERING MEANS FOR WEB SPLICING MACHINES

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Filed Sept. 14, 1962, Ser. No. 223,709
2 Claims. (Cl. 156—353)

This invention relates to a web splicing machine for splicing a new web of paper to an exhausted web, and particularly to control means for coordinating the web severing mechanism on the splicing machine with the web cutting mechanism on the wrapping machine supplied by the splicing machine.

When a paper web is supplied to a wrapping machine from a web splicing machine it is essential that the splicing of a new web to an exhausted web be coordinated with the wrapping machine web cutter so that the printed matter on the severed sheet in the splicing machine be coordinated with the sheet cutting mechanism in the wrapping machine.

This invention has for its salient object to coordinate the severing means on a splicing machine with the web cutter in the wrapping machine supplied by the splicing machine.

A further object of the invention is to provide control means for coordinating the web severing means of a web splicing machine with the web cutting means on the wrapping machine supplied with a web from the splicing machine.

Another object of the invention is to provide web severing a splicing mechanism so constructed and controlled that the splice can be made with the printed pattern on the tail end of the exhausted web alined perfectly with the printed pattern on the leading edge of the new supply roll.

Further objects of the invention will appear from the following specification taken in connection with the drawings which form a part of this application, and in which

FIG. 1 is an elevational view, somewhat diagrammatic, of a web splicing machine having clamping and perforating means for engaging the exhausted web;

FIG. 2 is a top plan view taken substantially on line 2—2 of FIG. 1, looking in the direction of the arrows;

FIG. 3 is an enlarged elevational view taken substantially on line 3—3 of FIG. 2, looking in the direction of the arrows;

FIG. 4 is an elevational view of the structure shown in FIG. 3 taken at right angles to FIG. 3;

FIG. 5 is a detail elevational view of the structure shown in FIG. 3, parts being omitted and being shown in a different position of movement thereof;

FIG. 6 is a view similar to FIG. 3 but showing the clamping and severing mechanism in operative position;

FIG. 7 is a sectional elevational view, on an enlarged scale, of the clamp and severing blade shown in operative position to clamp the end portion of the exhausted web, as indicated by the arrow in FIG. 9;

FIG. 8 is an enlarged elevational view taken substantially on line 8—8 of FIG. 2, looking in the direction of the arrows; and

FIG. 9 is a diagrammatic elevational view showing the controls between the splicing machine and the wrapping machine for coordinating the action of the clamp and tear blade in the splicing machine with the knife or web cutter in the wrapping machine.

The invention, briefly described, consists of means for linking or coordinating the severing means for severing the exhausted strip in a splicing machine with the cutting knife of a wrapping machine supplied from the splicing machine in such a manner that the printed matter on the wrapper formed of the severed sheet in the wrapping

machine will be correctly positioned on the package wrapped. The splicing machine in connection with which the invention is shown is so constructed that when the web from one supply roll is exhausted the feed for said web is automatically discontinued and the feed for the auxiliary web or other supply roll is automatically connected. When these webs reach primary feed rolls they are spliced together. The present invention has to do with the severing of the exhausted web and the control of clamping and severing mechanism in such a manner that the severing of the web is coordinated with the operation of the web cutter in the wrapping machine supplied from the splicing mechanism.

Further details of the invention will appear from the following description.

The splicing mechanism per se forms no part of the present invention and is covered in applicants' copending application Serial No. 29,918, filed May 18, 1960. This mechanism is shown somewhat diagrammatically in FIG. 1, in which are shown two supply rolls **20** and **21**, primary feeding rolls **22** and **23** from which the paper web is delivered to a wrapping machine, and two sets of secondary feed rolls **24**, **25** and **26**, **27**. The secondary feed rolls **25** and **26** are mounted on bell-crank levers **30** and **31** which are pivoted on shafts **32** and **33** of feed rolls **22** and **23**. The other ends of the bell-crank levers **30** and **31** have mounted thereon rolls **34** and **35** which contact and are driven by the primary feed rolls **22** and **23**.

It will be noted from the showing in FIG. 1 that the roll **35** is in engagement with the secondary feed roll **27** and the drive is transmitted from the primary feed roll **23** through the roll **35** to the secondary feed rolls **27** and **26**. Thus, in this figure the web W is being fed through the secondary feed rolls **26** and **27** and the primary feed rolls **22** and **23**. On the other hand, it will be noted in FIG. 1 that roll **34** is spaced from and is not in engagement with the secondary feed roll **24** and, therefore, no drive is transmitted to the secondary feed rolls **24** and **25**.

The positions of the bell-crank levers and the rolls carried thereby are determined by the web, and the secondary feed rolls **24** and **25** and **26** and **27** are constructed as shown in FIG. 2 so that when no web is passing therebetween they can move into intermeshing relation, thus permitting movement of the bell-crank levers. In FIG. 1 the secondary feed rolls **24** and **25** are disposed in intermeshing relation, thus causing the bell-crank levers **31** to swing in an anticlockwise direction and at the same time causing the roller **35** to transmit the drive from the primary feed roll **31** to the secondary feed rolls **26**, **27**. This is more fully illustrated and described in applicants' copending application above referred to.

The present invention has to do with the severing of the exhausted web and with control mechanism coordinating the severing mechanism with the cutter in the wrapping machine supplied by the splicing machine. The exhausted web in FIG. 1 is designated W'.

In the showing in FIG. 9 it will be noted that the supply roll **21** is the full roll and the supply roll **20** is substantially exhausted. The web W' from the supply roll **20** passes beneath an idler roll **40** and between a pair of rolls **41** and **42** which have spaced peripheral portions, as shown at **43** and **44**, the spaces on one roll being disposed opposite ribs on the other roll so that they can move into intermeshing relation, as shown at the left in FIG. 9. Under ordinary conditions and before the web is exhausted, the web passes between the rolls **43** and **44** and holds them in the position shown at the right in FIG. 9 with the intermeshing portions separated. When the web is exhausted, however, these rolls **42** and **43** move into intermeshing relation, swinging a bellcrank lever **45** on which the roll **44** is mounted in an anticlockwise direc-

tion. This lever is pivoted at 46 and the other end thereof, as shown at 47, engages and operates a micro-switch 48. Lead lines 49 and 50 from a power main are connected to the switch 48. The web W from the full supply roll 21 extends over an idler 40' and between rolls 42' and 41', the roll 42' being mounted on a bell-crank lever 45' pivoted at 46' and having its lower end 47' extending to a position to operate a switch 48'. The rolls 41' and 42' are constructed in the same manner as the rolls 41 and 42 and are adapted to move into intermeshing relation when the web W is exhausted. The switch 48' is supplied with power through lead lines 49' and 50'.

The switch 48 is connected by a wire 55 to a wire 56 and the switch 48' is connected to the wire 56 by a wire 55'. The wire 56 is connected to a micro-switch 60 in a wrapping machine M supplied from the splicing machine. When the circuit is closed through the switch 48 to the switch 60, no power is transmitted therethrough, but this switch is controlled in its operation by a plunger 61, which in turn is controlled by a cam 62 mounted on a knife shaft 63 which carries a rotating knife 64, which in turn coacts with a knife blade 65 to cut the web of material received from the splicing machine. The knife shaft and knife mounted thereon are operated continuously in the wrapping machine to cut the web into sheets, but their operation is controlled by suitable electric eye mechanism which insures the cutting of the web at the desired intervals to properly position the printed matter disposed thereon. When the knife shaft is rotated, the cam 62 will depress the plunger 61 and close the circuit through the switch 60.

When the circuit is closed, power is transmitted through the switch to a wire 70 which is connected by a wire 71 to a solenoid 72 and by a wire 71' to a solenoid 72'. These solenoids control the operation of clamping mechanism for clamping the exhausted web and the operation of a tear blade which operates to perforate the web and to permit the feeding means for the exhausted web, such as the primary rollers 22 and 23, to tear the web against the tear blade. For a more detailed illustration of the clamping means, tear blade, solenoid and operating connections therebetween, attention is directed particularly to FIGS. 3 to 7 inclusive. It will be understood that the solenoids and clamping mechanism and tear blades for the two webs are exactly the same and they are therefore designated by like reference characters, the reference characters relating to the exhausted web designating the parts relating thereto and the reference characters for the other web being designated by the same reference characters primed.

Referring particularly to FIG. 7, it will be seen that the web W' is led around a roll 75, over a stationary plate 76, and around a roll 77 to the auxiliary feed rolls 24 and 25. From the auxiliary feed rolls the web passes between the primary feed rolls 22 and 23 and between feed rolls 78 and 79 into the wrapping machine M. The auxiliary feed rolls are omitted from the diagrammatic showing in FIG. 9.

A bracket 80 is pivoted on a spindle 81 on which the roll 75 is mounted, and the bracket 80 has secured thereto a clamping block 82 which is adapted to clamp the web against the back of the plate 76, as shown in FIG. 7. The bracket 80 also has on the end thereof a downwardly extending hook-shaped portion 83, on which is mounted a tear blade 84 having a serrated lower edge 85. After the web has been clamped by the block 82, the continued pull on the web by the primary and secondary feed rolls will cause the web to tear against the blade 84.

As shown in FIGS. 3 to 6 inclusive, which show the linkage at the right in FIG. 9, the bracket 80' and the tear blade and clamping block carried thereby are moved into operative position when the solenoid 72', viewing FIG. 9, is operated. The solenoid has a plunger 90', the upper end of which is connected to a link 91', which

is connected to a link 92' having a slot 93' in the end thereof. A pin 94' is mounted on an arm 95' secured to the shaft 81'. The arm 95' has mounted in the outer end thereof a stud or pin 96' which rests under normal conditions in a depression or groove 97' formed in an arm 98' pivoted on a fixed stud 99'. The arm 98' is also pivoted to a pin 100' which pivotally connects the links 91' and 92'.

It will be noted that the bracket 80' and the arm 95' are both mounted on and secured to the shaft 81'. When the pin 96' on the outer end of the arm 95' rests in the depression 97', the bracket 80' and shaft 81' are held against movement. However, when the solenoid 72' is energized, thus pulling down on the plunger 90', the arm 98' will be moved in an anticlockwise direction, thus freeing the pin 96' from the depression 97'. Further downward movement of the plunger 90' will pull the arm 95' and the bracket 80' to the position shown in FIG. 6, thus moving the clamping block 82' and tear blade 84' into the operative position shown in FIG. 7.

In view of the control of the switch 60 by the knife shaft through the plunger 61, the circuit through the solenoid cannot be established until the cam 62 on the knife blade shaft operates the plunger 61, and this will in turn control the circuit through the plunger and the operation of the clamping block and tear blade.

The switch 48 and the operation thereof by the arm 47 is illustrated more fully in FIG. 8. From this figure it will be seen that the arm 47 is provided with an adjustable set screw 105 which engages a blade 106, which in turn engages a button or plunger 107 which closes the switch 48. In order to permit manual operation of the switch 48 independent of the actuation of the bell-crank lever 47 in the manner described, a cam 110 is mounted on a stud shaft 111 and can be rotated in an anticlockwise direction, viewing FIG. 8, by a handle 112. The cam is held in retracted position by a spring 113 and is movable between limit stops 114 and 115 which are engageable by a lug 116 on the cam. Cam 110, as shown in FIG. 8, engages the blade 106 and presses this blade against the button or plunger 107 on the switch 48.

From the foregoing specification it will be seen that clamping and tearing mechanism is provided for clamping the trailing end of the exhausted web so that the feeding movement of the web will tear the web against the tear blade. When the tear blade is moved into the position shown in FIG. 7, the serrated edge thereof will form a series of perforations therein, facilitating the tearing of the web.

As hereinbefore explained, the movement of the clamp and tear blade to operative position is controlled by the micro-switch 60, which in turn is controlled by a cam on the knife shaft of the wrapping machine, and thus the operation of the clamp and the tear blade are coordinated with the operation of the cutter knife in the wrapping machine so that the trailing end of the exhausted web will be torn at the right place and the printed matter on the web and on the sheet cut in the wrapping machine will be properly disposed. As explained above, the movement of the tear blade and clamp can also be controlled manually, if desired, by means of the operation of the cam 110.

In order to make the splice at such a point that the printed pattern on the tail end of the exhausted web will be alined perfectly with the printed pattern on the leading edge of the new supply roll, the following factors are involved:

(a) There must be a fixed distance between the wrapping machine cut-off knife and the tear off blade in the web splicer.

(b) The cam located on the wrapping machine knife shaft can be adjusted so that the web splicer tear blade will cut off at any desired location on the printed pattern at the tail end of an exhausted roll.

(c) Once the position of the tail end cut-off is deter-

mined, and for example by placing the leading pre-taped edge of a new supply roll at a permanent marked position in the web splicer and a trial splice is made which shows approximately a two inch overlap on the splice, then the leading edge of all new rolls placed into the web splicer will be pre-cut to a point on the printed pattern exactly two inches away from the automatic tail end off point and placed into the web splicer to the same permanent marker. Then, when the splice is automatically made, the printing on the tail end sheet will be alined with the printing on the leading sheet of the new roll.

Although one specific embodiment of the invention has been particularly shown and described, it will be understood that the invention is capable of modification and that changes in the construction and in the arrangement of the various cooperating parts may be made without departing from the spirit or scope of the invention, as expressed in the following claims.

What I claim is:

1. In combination, a web splicing machine, means in the splicing machine for splicing a new web supply to the trailing end of an exhausted web supply, a wrapping machine, means for feeding the web from the splicing machine to the wrapping machine, a cutter in the wrapping machine for cutting the web into sheets, means in the splicing machine for clamping the trailing end of the exhausted web, a tear blade in the splicing machine against which the web can be torn, detector means in the splicing machine for controlling the operation of the clamp and tear blade, and means including electric circuits controlled by the operation of the knife in the wrapping machine operatively coupled to the operation of the detector means for coordinating the operation of the clamp and tear blade to the operation of the wrapping machine knife.

2. In combination, a web splicing machine, means in the splicing machine for splicing a new web supply to the trailing end of an exhausted web supply, a wrapping machine, means for feeding the web from the splicing machine to the wrapping machine, a cutter in the wrapping machine for cutting the web into sheets, means in the splicing machine for clamping the trailing end of the exhausted web, a tear blade in the splicing machine against which the web can be torn, detector means in the splicing machine for controlling the operation of the clamp and tear blade, and means including electric circuits and a solenoid controlled by the operation of the knife in the wrapping machine operatively coupled to the operation of the detector means for coordinating the operation of the clamp and tear blade to the operation of the wrapping machine knife.

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