

[54] **CUTTING AND SPLICING APPARATUS**

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[58] Field of Search 83/397, 398, 508, 471, 477, 83/143, 157

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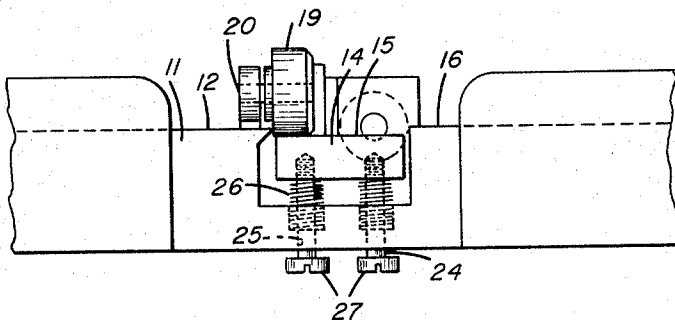
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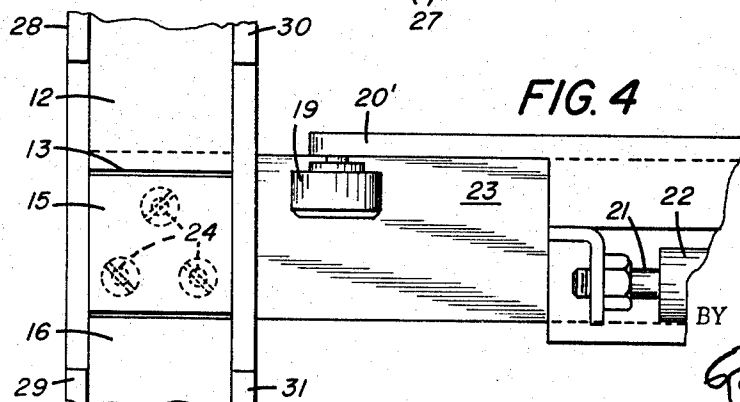
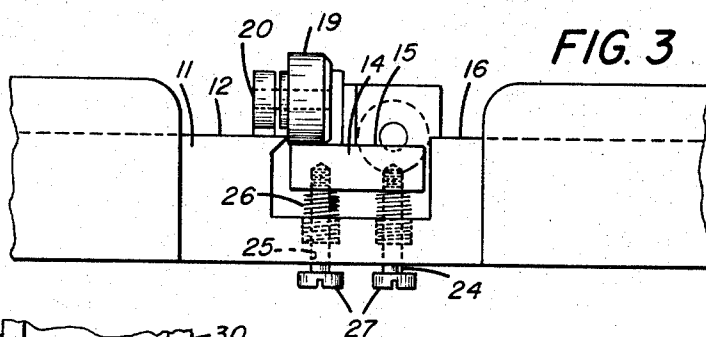
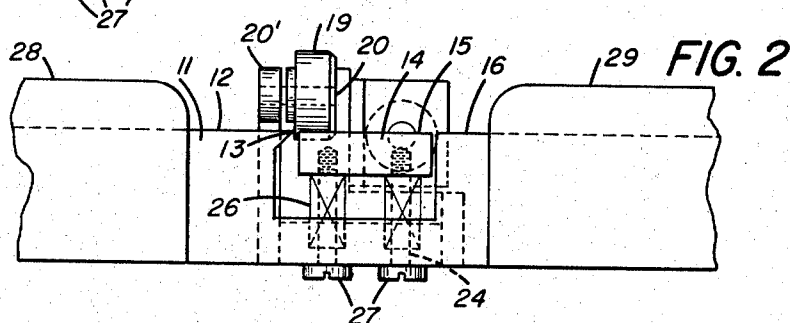
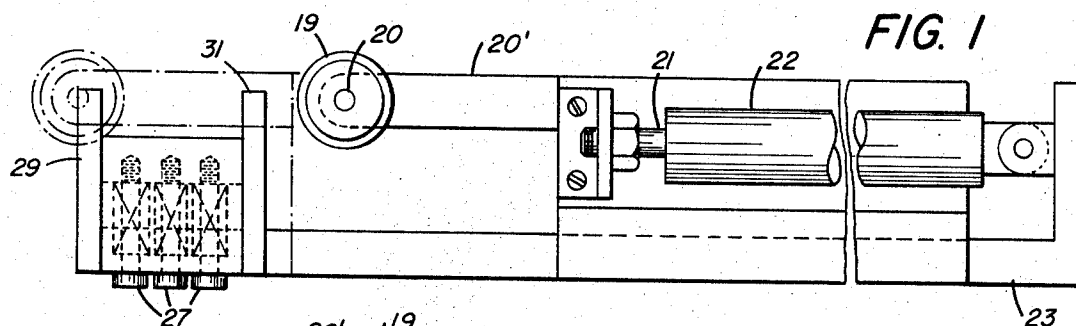
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ABSTRACT

Apparatus for cutting a web and for supporting the web during the splicing thereof. The apparatus comprises two generally planar support members, one of which bears a cutting edge formed along a lateral extremity thereof. The other support member is moveable relative to the first and is normally positioned generally coplanar therewith and adjacent said cutting edge whereby the two members together effectively form a single support surface extending on either side of the cutting edge and whereby the operator's exposure to the cutting edge is minimized. A rotatable cutter wheel is suitably mounted for traversal of the cutting edge in cutting relationship therewith. During such traversal, a portion of the cutter wheel extending laterally above the moveable support member engages that member and displaces it from its normal position to a depressed position.

3 Claims, 4 Drawing Figures





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CUTTING AND SPLICING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates in general to the cutting and splicing of webs. In particular, it relates to an apparatus for cutting webs and for supporting the web ends during the splicing thereof.

2. The Prior Art

Devices for cutting webs are well-known in the prior art and range from simple hand-held razor blades and knives to more complex devices. Some known web cutting devices also embody features which facilitate splicing of the cut web ends.

Certain cutting and splicing operations, however, impose added requirements over and above those which the devices disclosed in the prior art are designed to fulfill. One such operation is that of cutting and splicing light-sensitive material. Where such operations are conducted on a production line situated in a darkroom, considerations of operator safety as well as speed and reliability of operation become of increased importance.

Increased speed of operation dictates that apparatus for use in such an operation be largely self-contained so as to obviate the need for hand-held instruments which may be mislaid and which consume valuable operator time in the handling thereof. Furthermore, the device should perform both cutting and splicing functions in such a manner as to reduce unnecessary handling of the materials by the operator. In addition to requirements of production, operator safety is of prime importance. To this end, the apparatus should be so constructed as to minimize the operator's exposure to sharpened edges.

SUMMARY OF THE INVENTION

It is accordingly an object of this invention to provide an improved apparatus for cutting webs and for supporting the web ends during the splicing thereof.

It is a further object of this invention to provide such an apparatus wherein the operator's exposure to sharpened cutting edges is minimized.

These and other objects are attained in accordance with the invention by providing a first member having a generally planar first surface which terminates in a cutting edge. A second member, moveable relative to the first member and bearing a generally planar second surface, is normally positioned adjacent the cutting edge and coplanar with the first member. While in this normal position the second member provides an effective extension of the first member on the opposite side of the cutting edge thereby affording a surface for supporting web ends during splicing and also providing protection of the operator from the cutting edge. A moveable cutter is suitably mounted to traverse the cutting edge in cutting relationship therewith. During this traversal, a laterally extending portion of the moveable cutter engages the second member so as to displace it from its normal position to a depressed position subjacent the first surface.

DESCRIPTION OF THE DRAWING

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawing wherein similar reference numerals indicate corresponding parts in all figures.

FIG. 1 is a side view of the apparatus depicting the cutter wheel in its retracted position and further showing a dot and dash representation of the cutter wheel at the end of its forward travel along the cutting edge.

FIG. 2 is a fragmentary front view of the apparatus shown in FIG. 1 showing the moveable second member in its normal position and the cutter wheel in its retracted position.

FIG. 3 is a fragmentary front view of the apparatus depicting the second member in its depressed position during traversal of the cutting edge by the cutter wheel.

FIG. 4 is a fragmentary top view of the apparatus depicting the cutter wheel in its retracted position.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to FIG. 2, the apparatus is comprised of a stationary first member 11 having a generally planar first surface 12 adapted to support a web during the cutting and splicing thereof. Disposed along one edge of the first surface 12 is a cutting edge 13 of suitable length to accommodate the web to be cut. Adjacent the cutting edge 13 is a moveable second member 14 having a generally planar second surface 15 similarly adapted to support a web and normally positioned generally coplanar with the first surface 12. An additional support surface 16 may be provided as a stationary effective continuation of the first surface 12 separated therefrom by the second member 14. Web alignment with respect to the cutting edge 13 is facilitated by parallel guide members 28, 29, 30 and 31 positioned on opposite sides of surfaces 12, 16 (as shown in FIG. 4) and spaced one from another a distance generally equal to the width of the web, whereby the web may be maintained therebetween during cutting and splicing.

Positioned proximate the first member 11 and aligned with the cutting edge 13 is a cutter member adapted to move relative to the cutting edge in cutting relationship therewith. In the embodiment herein described the cutter member advantageously comprises a rotatable cutter wheel 19 as shown in FIG. 1. The cutter wheel 19 is attached by means of an axle 20 to a traversing mechanism. The traversing mechanism is comprised of a supporting and guiding member 20' slidably mounted on support structure 23 and connected, in a manner known in the art, to the piston rod 21 of a hydraulic or pneumatic cylinder 22 attached to support structure 23. Energization of the cylinder 22 causes the cutter wheel 19 to be driven forward from its retracted position (shown in solid lines in FIG. 1) so that it traverses the cutting edge 13 in cutting relationship therewith. At the conclusion of such traversal, the piston rod 21 is retracted thereby causing the cutter wheel 19 to be returned from its extended position (shown by the dot-and-dash representation of FIG. 1) to its retracted position.

The moveable second member 14 is affixed to mounting apparatus designed to maintain the second surface 15 normally in a position generally coplanar with the first surface 12 and adjacent the cutting edge 13 so that the second surface forms an effective extension of the first surface on the opposite side of the cutting edge as shown in FIG. 2. The mounting apparatus is further designed to allow displacement of the second member 14 from its normally coplanar position during traversal of the cutting edge 13 by the cutter wheel 19 so that the second member assumes, during such traversal, a depressed position subjacent the first surface 12 as shown in FIG. 3.

Various mechanisms for maintaining the second member 14 in its normal position and for allowing or causing its displacement in response to traversal of the cutting edge 13 will be apparent to those skilled in the art. In the embodiment herein described, and best shown in FIGS. 2 and 3, the mounting mechanism comprises guide posts 24 affixed to the second member 14 and extending downward therefrom through suitable holes 25 formed in a portion of the first member 11 spaced therebeneath. Each guide post is inserted within a respective compression spring 26 extending between the first and second members such that the second member is biased upward into its normal coplanar position. Upward movement of the second member 14 is controlled by the expanded heads 27 of guide posts 24 which, as they are carried upward by the second member, contact the bottom surface of the first member 11 to prevent upward travel of the second member beyond its normal position.

As the cutter wheel 19 moves into cutting relationship with the cutting edge 13, a portion of the cutter wheel extending laterally above the second member 14 engages that member and causes it to be displaced downward against the action of compression springs 26 into a depressed position subjacent the first surface 12, as shown in FIG. 3. After traversal of the cutting edge, and upon retraction of the cutter wheel out of cutting relationship, the second member is again biased upward into its normal coplanar position.

Operation

In operation, the web to be cut is laid upon the planar support surfaces such that the location on the web where the cut is to be made overlies cutting edge 13. After the web is so positioned, the cylinder 22 is energized thus causing the cutter wheel 19 to traverse the cutting edge 13 as hereinbefore described and producing the desired cut. After completion of the cut, the cylinder 22 is de-energized and the cutter wheel is returned to its retracted position. While the cutter wheel 19 is in its retracted position the second member 14 is maintained in its normal position generally co-planar with the first member 11 and adjacent the cutting edge 13, thereby protecting the operator from the cutting edge.

Protection is also afforded the operator by the particular configuration of the cutter wheel 19. As shown in FIG. 3, the cutter wheel is of extended thickness as measured along its axis of rotation whereby it is adapted to engage and depress the second member 14 during traversal of the cutting edge 13. Obviously, this function could be performed by a cutter member of sufficient thickness but having a configuration other than circular such as, for example, an elongated blade-like member adapted to coact with cutting edge 13 in a manner resembling that of a scissors or a guillotine. However, the thickened cutter wheel 19 is preferred since it provides increased operator safety in that its circular shape renders less likely the accidental engagement of the operator's hands between the coacting cutting surfaces. Furthermore, because of the essentially blunt configuration of the thickened cutter wheel, there is less likelihood of injury from that member itself, as opposed to that which would exist with a guillotine or thinner disk-like cutter member.

The apparatus also facilitates the splicing of webs cut thereby. In this respect, a first web may be placed upon the apparatus and cut in the manner previously described. This web is then held in alignment with the cutting edge 13 by the operator while its severed end is discarded and while a second web is placed on the apparatus with its free, or discard, end overlaying the first web. The second web is then cut in like manner to the first and its free end discarded with the result that the respective ends of the two webs lie in closely spaced opposing relationship along the cutting edge. The webs may then be joined together by applying a strip of splicing tape across their ends.

The second member facilitates splicing in that it is maintained by its support mechanism in its normal position during splicing. While in this position, the first and second members together form a stable support for the web ends so that the splicing tape may be firmly applied thereto, thus assuring a

secure splice.

The invention has been described in detail with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

I claim:

1. Apparatus for cutting a web, said apparatus comprising:
 - a first member having a generally planar first surface terminating in a cutting edge;
 - a cutter member comprising a rotatable cutter wheel adapted to traverse said cutting edge in cutting relationship therewith;
 - a second member moveable relative to said first member and having a generally planar second surface normally positioned generally coplanar with said first surface and adjacent said cutting edge, whereby said second surface forms an effective extension of said first surface; and
 - means responsive to the movement of said cutter member in cutting relationship with said cutting edge for displacing said second member from its normal position to a depressed position wherein said second member is disposed subjacent said first surface.
2. The apparatus of claim 1 wherein said means for displacing said second member from its normal position comprises a portion of said cutter member extending laterally above said second member and adapted to engage and depress said second member during movement of said cutter member in cutting relationship with said cutting edge.
3. Apparatus for cutting a web, said apparatus comprising:
 - a first member having a generally planar first surface terminating in a cutting edge;
 - a second member movable relative to said first member and having a generally planar second surface normally positioned generally coplanar with said first surface and adjacent said cutting edge, whereby said second surface forms an effective extension of said first surface on the opposite side of said cutting edge; and
 - a rotatable cutter wheel having operable means connected thereto for causing said cutter wheel to traverse said cutting edge in cutting relationship therewith;
 - said cutter wheel having a portion thereof extending laterally above said second member and adapted to engage and depress said second member during said traversal of said cutter wheel in cutting relationship with said cutting edge, whereby said second member is displaced from its normal position to a depressed position subjacent said first surface.

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