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[56]

References Cited

UNITED STATES PATENTS

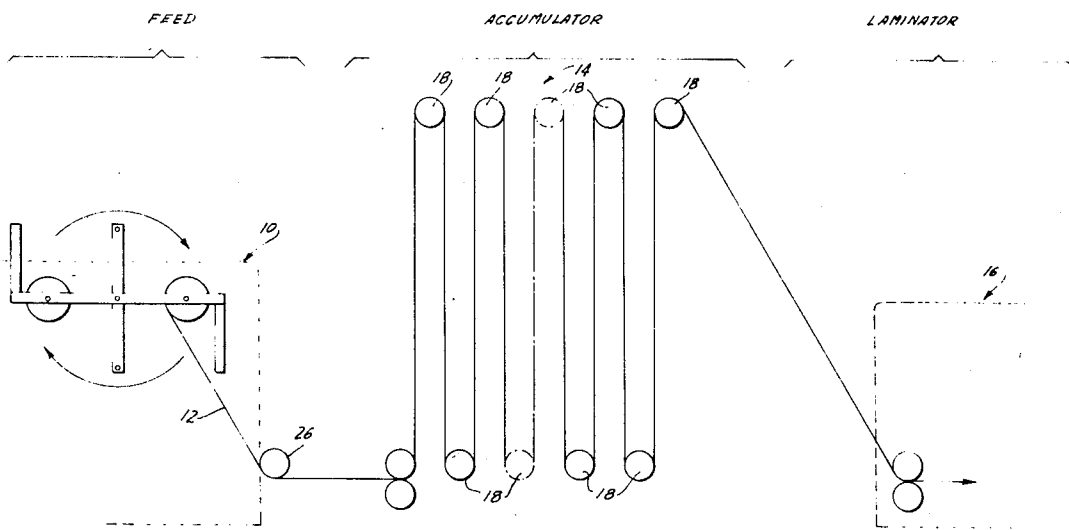
1,716,812	6/1929	Ball	242/58.2
3,172,613	3/1965	Simons et al.....	242/58.2
3,309,036	3/1967	Anderson	242/58.3
3,384,527	5/1968	Fener	156/515 X
3,467,334	9/1969	Chestnut et al.....	242/58.3

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[54] **DEVICE FOR JOINING THERMOPLASTIC WEB MATERIAL**
 4 Claims, 7 Drawing Figs.

[52] U.S. Cl..... 242/58.3,
 156/515, 242/56 A
 [51] Int. Cl..... B65h 19/14
 [50] Field of Search..... 242/56, 56
 A, 58.1, 58.2, 58.3, 58.4, 64; 156/251, 515

ABSTRACT: A device is provided for the continuous feeding of a thermoplastic web material or a rolled foam material without interruption at the exhaustion of a particular web. The device includes a first web support and a second web support mounted to a common turret and means for joining the trailing edge of the web material of one support to the leading edge of the web material of the other support.



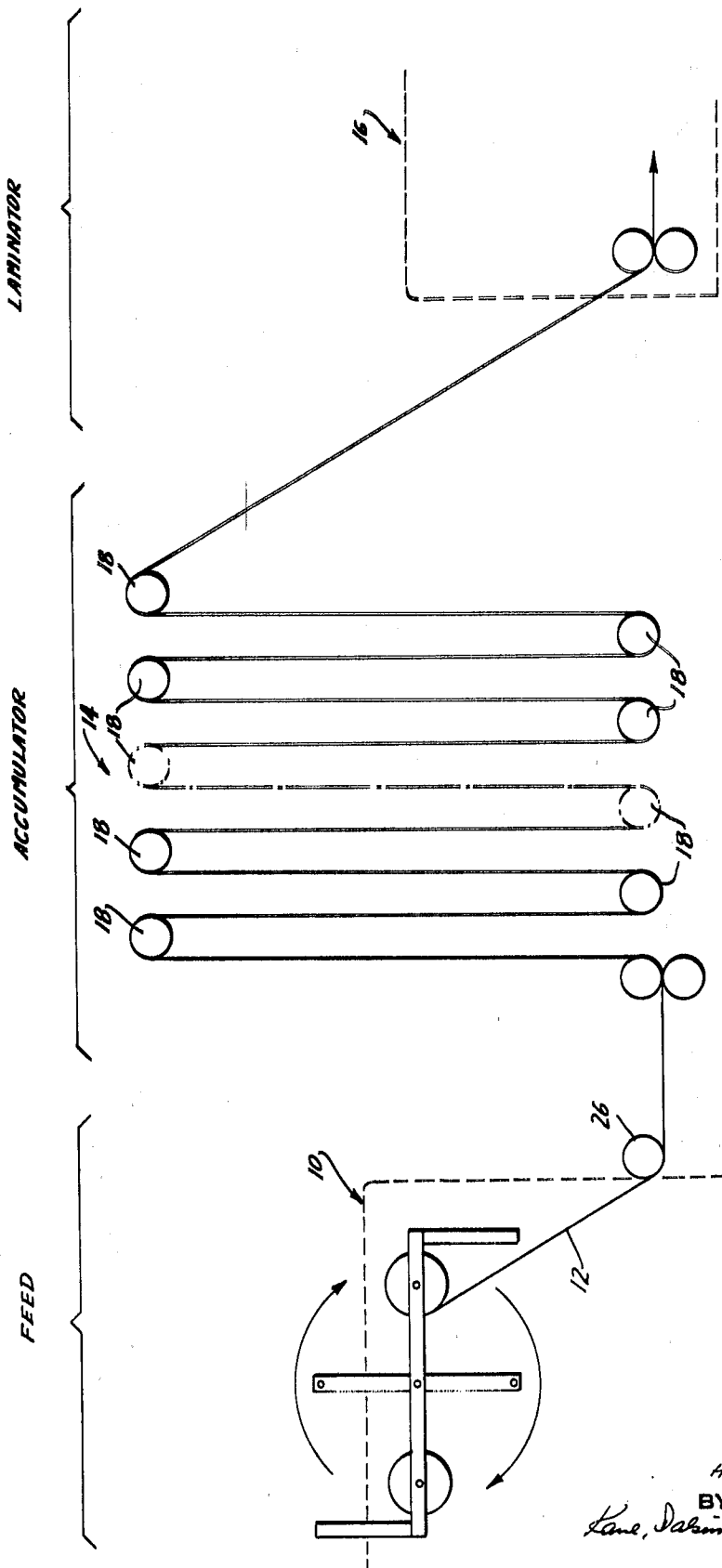


FIG. 1

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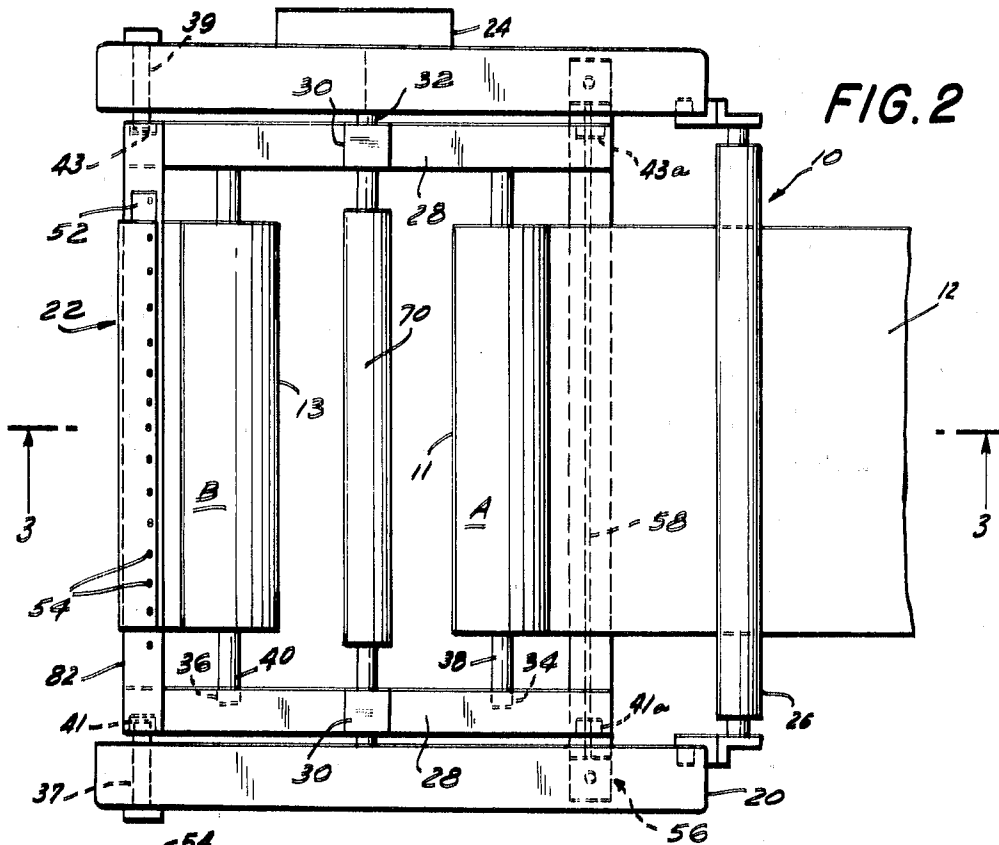


FIG. 2

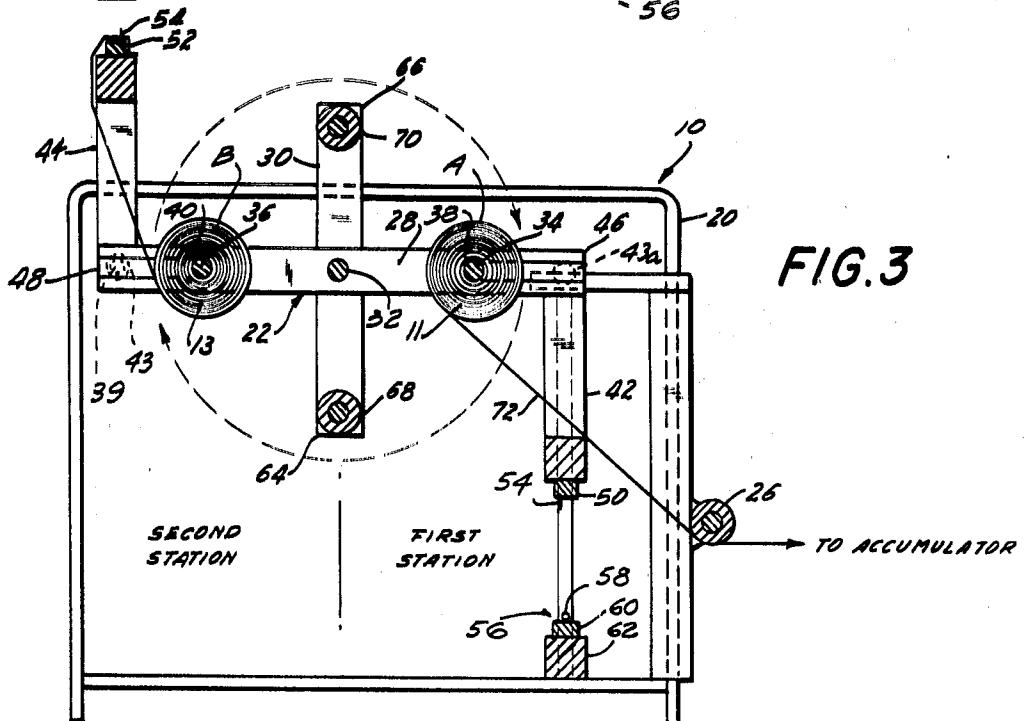


FIG. 3

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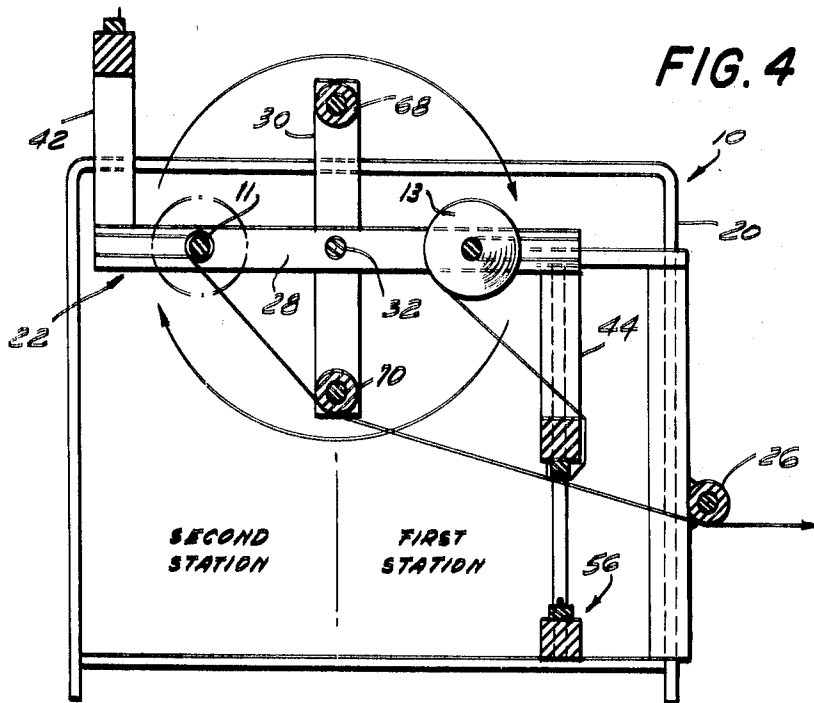


FIG. 4

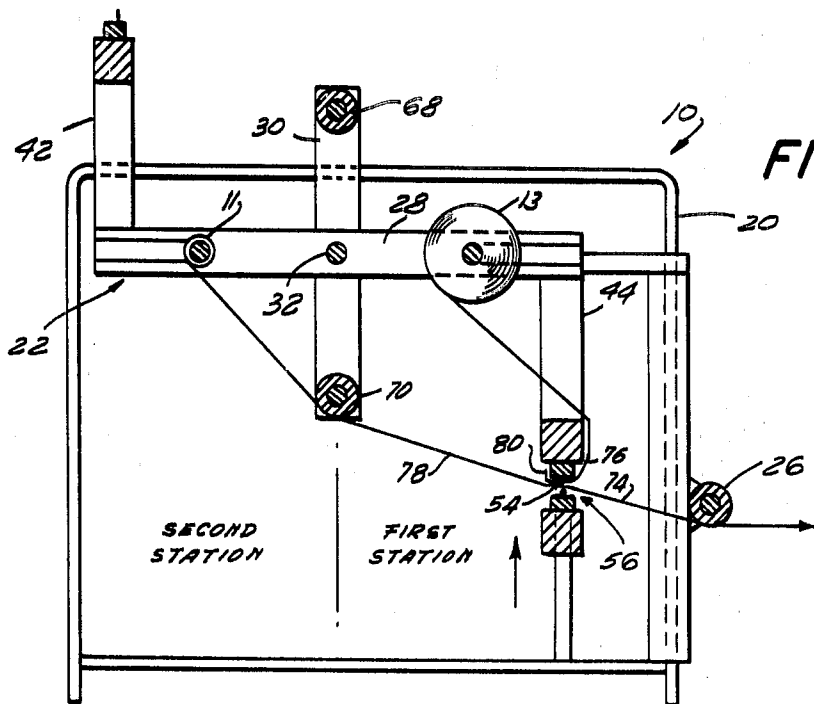
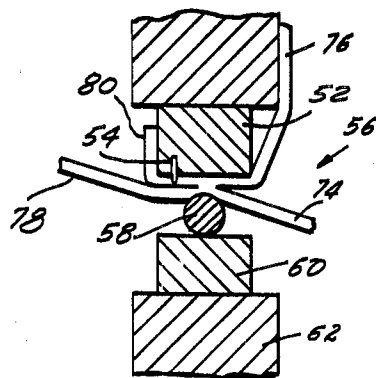
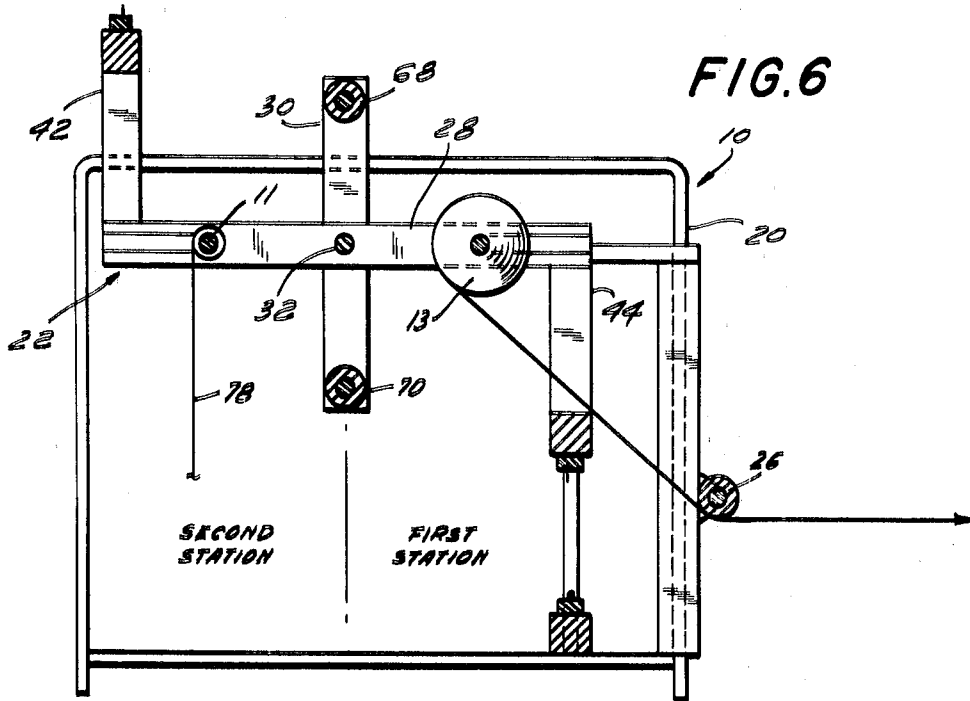


FIG. 5

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DEVICE FOR JOINING THERMOPLASTIC WEB MATERIAL

BACKGROUND OF THE INVENTION

In various industrial processes, as for example, in the laminating of a thermoplastic web material to a resin foam, thermoplastic material is fed from a web to the processing equipment for bonding the web material to the foam. In such processes considerably time and material is lost each time a web of material is exhausted and the associated equipment must be shut down while a new web is substituted therefor.

It is therefore a principal object of the present invention to provide a new and improved device which allows the continuous feeding of thermoplastic web material to other processing equipment without necessitating an interruption in the process at the exhaustion of a particular web.

SUMMARY OF THE INVENTION

This and other beneficial objects and advantages are obtained in accordance with the present invention by providing an improved device for the continuous joining of webs of thermoplastic material comprising a frame to which a multiweb support is shiftably mounted. The frame includes a first station having an outlet guide adapted to direct the length of material to suitable pickup rollers and a second station spaced apart from the first station. The web support which extends between the first and second stations includes first and second portions adapted to receive and secure webs of material which will shift from the first station to the second station as the web support is shifted. Web-joining means are provided at the first station which normally are inoperative but which become operative when the material in the web at the first station approaches exhaustion and the device is actuated to shift the web support so as to bring the web originally at the second station to the first station while simultaneously bringing the web originally at the first station (and approaching exhaustion) to the second station. Web-positioning means position the web at the first station so as to permit the joining means to effect the joining of the webs whereafter the new web at the first station serves to provide material to the takeup rollers while the web support portion at the second station is free to receive a fresh web so that the procedure may be repeated when it becomes necessary to do so.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG. 1 is a diagrammatic environmental view depicting the joining device of the present invention with associated laminating equipment;

FIG. 2 is a top plan view of the joining device of the present invention;

FIG. 3 is a side elevational view taken along reference line 3-3 of FIG. 2 in the direction of the arrows depicting the present device providing a supply of material from a web in the normal operating position;

FIG. 4 is a view similar to FIG. 3 depicting the first step in the joining operation wherein the web support is rotated to interchange the positions of the supply and auxiliary webs;

FIG. 5 is a view similar to FIG. 4 depicting the next step in the joining process wherein the joining means is shifted to an operable position so as to effect a seal between the material in the supply and auxiliary webs;

FIG. 6 is a view similar to FIG. 3 prior to the insertion of a new auxiliary web on the standby support wherein the original auxiliary web now serves as the supply web; and

FIG. 7 is a fragmentary, enlarged side elevational view of the means for joining the material of the two webs.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is illustrated in the accompanying Figures wherein similar components are indicated by the same reference numerals throughout the several views. Reference is now made to FIG. 1 wherein the web joining device 10 of the present invention is depicted as feeding a length of thermoplastic material 12 through accumulator 14 to a further processing machine, as for example, a laminator which is symbolically represented at 16. The accumulator 14 may be of the type well known in the art which comprises plurality of movable guide rollers 18 about which the material 12 is permitted to undulate. During periods when the accumulator input is slowed down for one reason or another, the guide rollers are shifted toward one another so as to allow a constant output. Similarly, if the equipment at the outlet side of the accumulator were caused to slow down for one reason or another, the rollers 18 of the accumulator would shift apart so as to absorb the excess material produced at its inlet side.

Reference is now made to FIGS. 3 and 4 wherein the joining device 10 of the present invention is shown in detail as including a frame 20 to which a turret assembly 22 is rotatably mounted. Suitable drive means, as for example an electric motor 24 are coupled to the turret assembly and adapted to cause the rotation of the same at predetermined intervals. The frame 20 is generally cubical in shape and includes a guide roller 26 at one end designed to direct the thermoplastic material of the web to be supported in the frame to the accumulator 14. The frame is sufficiently large to accommodate two webs or rolls of the thermoplastic material to be joined and, in this regard, the frame may be regarded as including two stations; a first station which encompasses the front area of the frame including the guide roller 26 and a feed roll (designated A) and a second station which includes the area occupied by the auxiliary roll (designated B) and its associated web support equipment. It should, of course, be noted that no clear boundaries exist between the first and second stations and that this terminology is merely used for convenience in regard to the following description.

The turret assembly 22 which is substantially coextensive in width with the frame 20 is formed of two perpendicularly intersecting elongated members 28 and 30. Member 28, which is normally in the horizontal position shown in FIG. 3, has affixed to it on opposite sides of pivot point 32 web-mounting portions 34 and 36. Lock pins 37 and 39 are shiftably mounted to opposite sides of the frame and cooperate with recesses 41 and 43 and 41a and 43a in locking the turret in position. The web-mounting portions 34 and 36, as shown in FIG. 2, each include shafts 38 and 40, respectively, which serve as axles for the webs A and B as they are unwound. The shafts may be driven or else they may be free turning under the action of the tensile force exerted on the free end of the web material. Transverse arms 42 and 44 extend outwardly from the extremities 46 and 48 of member 28 substantially parallel to the normally vertical member 30. In this connection, it should be noted that regardless of the position of the turret the transverse arm in the first station of the frame will always extend downwardly while the transverse arm in the second station will extend upwardly. Affixed to the free ends 50 and 52 of arms 42 and 44 are a plurality of pins 54 which extend across the entire width of the turret. Pins 54 serve to secure the loose forward end of the web material in a manner to be described forthwith. The pins are mounted to a pin support which in turn is fixed to the arms. Affixed to the bottom of frame 20 close to the forward end of the "A" station is the joining assembly 56 which is shown in considerable detail in FIG. 7.

Thus, the joining assembly 56 includes a nichrome heater wire 58 extending across the width of the device and suitably connected to a power supply source. The heater wire is seated on an insulation pad 60 which is coextensive with the wire and may be formed of asbestos, Teflon coated fiber glass, or the like. The wire and pad 60 are mounted to a piston head 62

which is adapted to be vertically shifted from a first position wherein the assembly 58 will not interfere with the free rotation of turret 22 to a second position wherein the wire 58 may be brought into substantial contact with the free end of a downwardly depending transverse arm which at any particular moment may be either 42 or 44 depending upon the orientation of the turret 22.

As was previously mentioned, turret 22 includes member 30 which is substantially perpendicular to the web support member 28 and is thus in a normally vertical position. Member 30 is affixed to member 28 and will rotate therewith about pivot point 32. Affixed to the free ends 64 and 66 of member 30 are identical take out guide rollers 68 and 70, respectively. The length of member 30 is such as to enable one of the rollers 64 or 66 (depending upon the orientation of turret 32) to engage the length of material 72 extending between the "A" station web and guide roller 26 and to direct the same to a position where it will not interfere with the operation of the device as will be discussed forthwith and particularly with the further rotation of the turret.

The operation of the device of the present invention may best be understood by a consideration of FIGS. 3 through 6. In FIG. 3 the device is shown with two webs of thermoplastic material 11 and 13, one each secured to shafts 34 and 36, respectively. The leading edge of web 11 as shown is directed through guide roller 26 to the associated accumulator 14. When web 11 approaches its final winding, just prior to the complete exhaustion of web 11, the joining device of the present invention will be actuated either automatically or manually causing the turret assembly to rotate through 180° to the position shown in FIG. 4. In this connection, the lock pins 37 and 39 will first be withdrawn from their associated recesses to allow the free rotation of the turret. After the turret has rotated through slightly more than 90° guide roll 70 will engage the length of material 72 and by keeping this material out of the path of motion of the turret will cooperate in directing web 11 to its new position while allowing the continuous unraveling of this web. When the turret has rotated a complete 180° the lock pins 37 and 39 will be again shifted inwardly to lock the turret in its new position. Prior to web 11's reaching total exhaustion, the joining device 56 will be actuated as shown in FIG. 5 by raising the heating element 58 to the elevated position shown and simultaneously applying an electrical current across the element. During this phase of operation the device will have to be temporarily stopped from feeding further material to the accumulator. However, the accumulator 14 will provide sufficient material so as not to necessitate the stopping of the associated laminating or other processing equipment. As the heated wire is brought into the joining position of FIG. 5 it serves to join the trail end 74 of the material from web 11 to the leading end 76 of the material of web 13 by welding the two to one another and simultaneously severs the remnant 78 of web 11 and the front edge 80 of web 13 that was affixed to pins 54. After the splicing operation is completed, the device may then be reactivated and web 13

will then supply the necessary material until it is exhausted. In this regard, the joining assembly 56 will be reshifted to its inoperative position to await the exhaustion of web 13. As web 13 is unraveling, the remnant 78 of web 11 is removed and a new web will be positioned on shaft 36 to await the exhaustion of web 13.

Thus, in accordance with the above description, a device is shown for effecting the joiner of two rolls of thermoplastic material.

Having thus described my invention what I claim is :

1. An improved device for the joining of webs of thermoplastic material comprising: a frame; a first station of said frame including web outlet guide means; a second station of said frame spaced apart from said first station; a turret assembly including two perpendicularly intersecting members rotatably mounted to said frame at their intersection point, one of said members having transverse arms extending outwardly in opposite directions from the ends thereof; web support means shiftably coupled to said frame and extending between said first and second stations and having identical first and second portions adapted to receive and secure webs of thermoplastic material thereto wherein both of said portions are adapted to be shifted from said first and said second stations; said web support means comprising said turret assembly one member; means affixed to the ends of said one member and adapted to secure the leading edge of said web material and to cooperate in directing said material to said joining means, said end-securing means comprising two substantially identical pluralities of pins in side by side array affixed to the free ends of said arms, said arrays extending for substantially the entire width of said frame; means to shift said first and second portions between said first and second stations; web-joining means at said first station adapted to be shifted from an inoperative position to an operative position after said web support means has been shifted from said first station to said second station whereby to effect the joining of the webs supported on said first and second portions; and, web-positioning means affixed to said portions and adapted to direct portions of the associated webs to said web-joining means.

2. The invention in accordance with claim 1 wherein said first and second portions of said web support comprise web supporting shafts substantially coextensive with the width of said frame disposed upon opposite sides of said intersection point.

3. The invention in accordance with claim 1 wherein said joining means includes an electrically conductive wire shiftably mounted to said frame and adapted to be shifted from a first position displaced from said web material to a second position in contact with said web material.

4. The invention in accordance with claim 1 further comprising means for locking said web support means' first and second portions at said first and second stations.

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