July 14, 1936. H. A. W. WOOD 2,047,813

WEB SPLICING DEVICE

Original Filed March 17, 1933 3 Sheets-Sheet 1

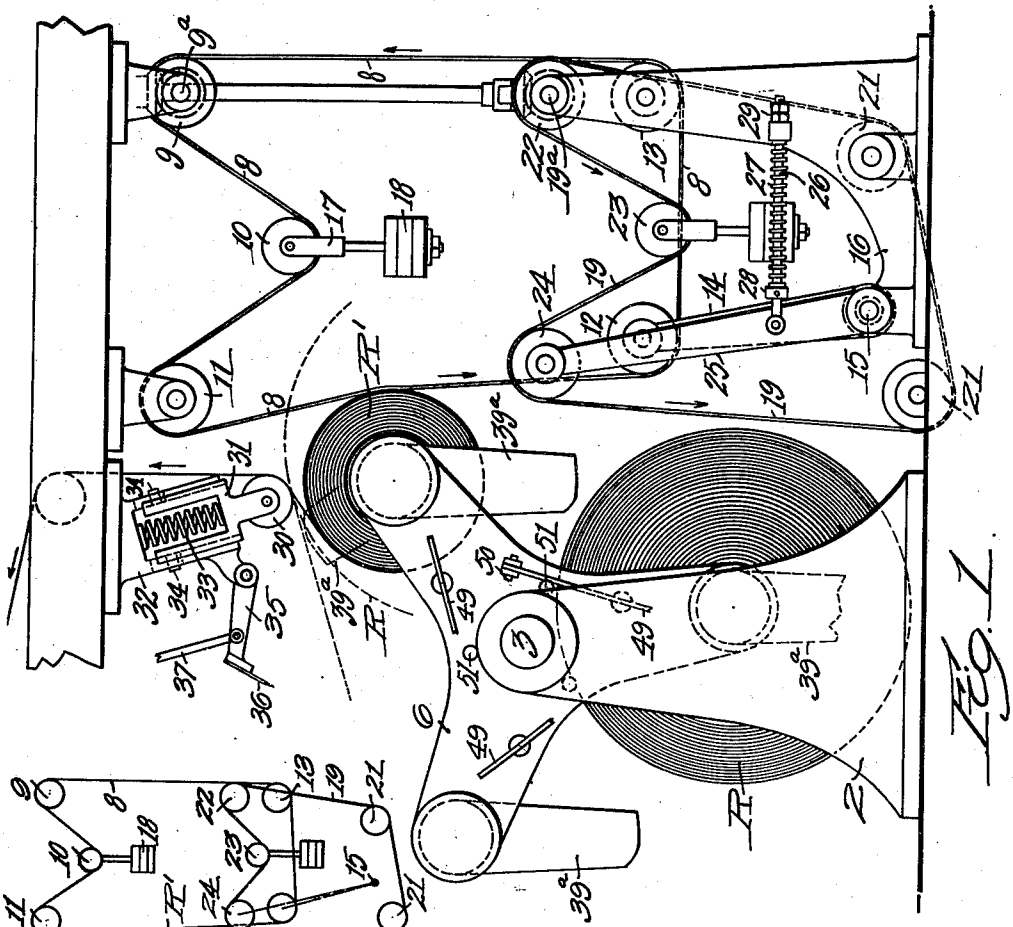

Fig. 1

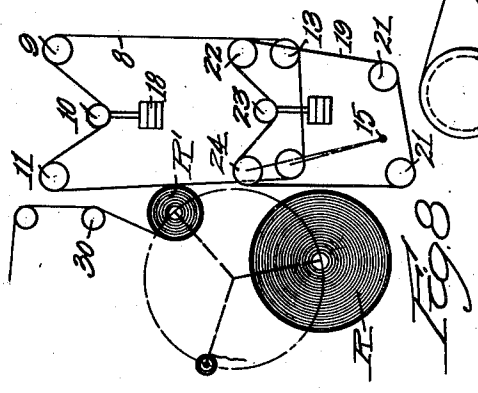

Fig. 8

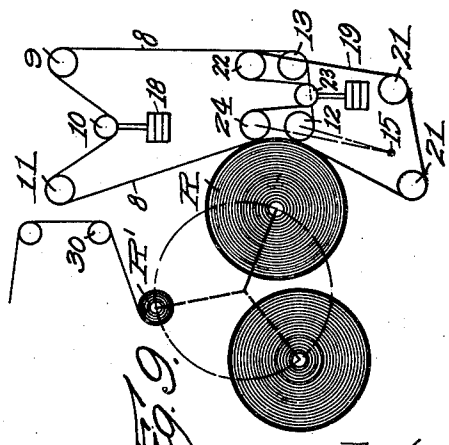

Fig. 9

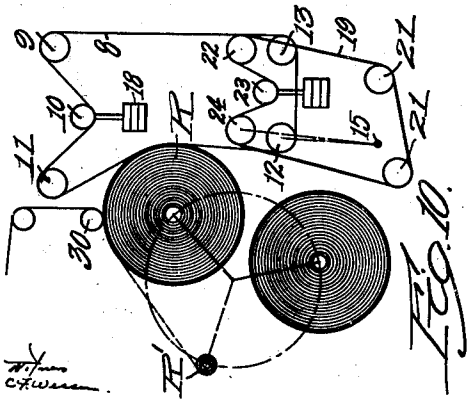

Fig. 10.

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WEB SPLICING DEVICE

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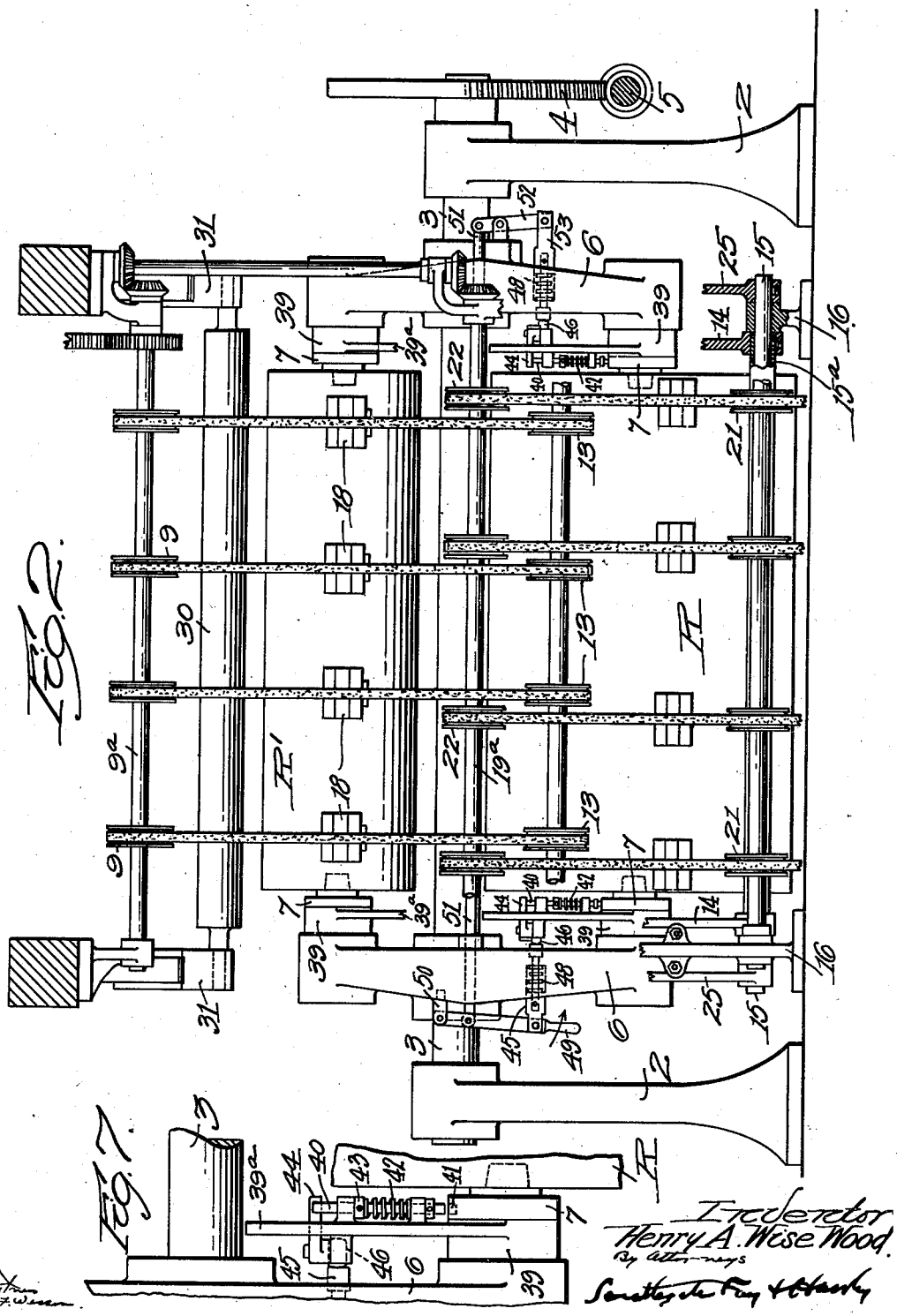

Fig. 2.

Fig. 7.

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WEB SPLICING DEVICE

Original Filed March 17, 1933 3 Sheets-Sheet 3

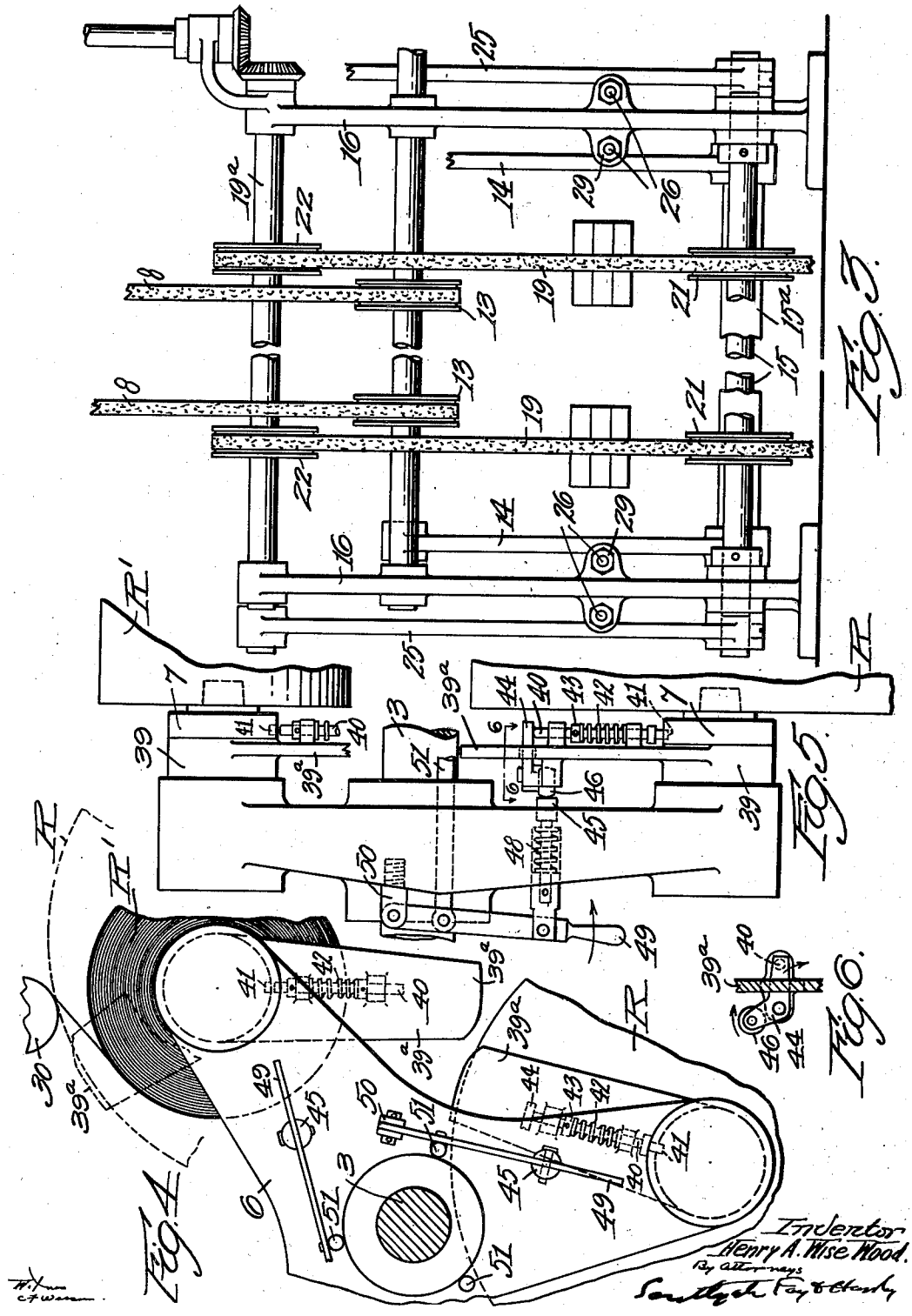

Fig. 3.

Fig. 5.

Fig. 6.

Fig. 4.

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UNITED STATES PATENT OFFICE

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WEB SPLICING DEVICE

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Application March 17, 1933, Serial No. 661,253
Renewed November 29, 1935

8 Claims. (Cl. 242—58)

This invention relates to a web splicing device used in connection with the web to be fed to a printing press.

The principal objects of the invention are to provide two means for rotating the web roll or controlling its rotation arranged so that as the fresh web roll is brought into splicing position it is rotated first by one means and then passes under the control of the other means before the splice is actually accomplished; to provide means to prevent the web splicing means from operating until the desired moment and insuring that the web splicing means does not press the web against the press roll except at the proper time, thus preventing trouble with the picking up of the pasted end of the fresh roll, and to provide means at each end of the paper roll detachably secured to the chuck for lifting a web pressing and splicing means each time a pasted portion passes by and means for detaching the said operating means, thereby permitting the web splicing means to press the web against the fresh roll to make the splice during the revolution of the web roll during which it is desired to make a splice.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings, in which

Fig. 1 is an end view of a web splicing device showing a preferred embodiment of this invention;

Fig. 2 is an elevation;

Fig. 3 is a similar view of a part of the device shown on enlarged scale;

Fig. 4 is a fragmentary elevation similar to Fig. 1 on enlarged scale;

Fig. 5 is a side view of the same;

Fig. 6 is a sectional view on the line 6—6 of Fig. 5;

Fig. 7 is a detail view of one of the spider arms showing the lifting rod detached from the chuck;

Fig. 8, like Figs. 1 and 4, shows the position of the parts when the running roll has been reduced to a small diameter and is controlled by the upper set of belts;

Fig. 9 shows the next position of the parts in which it has been decided that the running roll is small enough to start the splicing operation and the reel has been turned to move it forward to the position in which the splice is to be made, and

Fig. 10 is a diagrammatic view showing the position of the parts when the splice is being made.

The invention is shown as applied to a type of a web roll supporting device in which a pair of pedestals 2 provide rotatable mounting for a horizontal shaft 3 which may be rotated in any desired manner, as by a worm wheel 4, worm 5 and a suitable source of power. The shaft 3 provides mounting for a pair of spiders 6 which constitute a reel and carry rotatable chucks 7 for mounting the paper rolls. The splicing operation is performed when the fresh roll R has moved up in a counterclockwise direction to the position shown in Fig. 10 and of course the running roll R' is substantially exhausted.

For the purpose of speeding up and controlling one of the web rolls a set of running belts 8 is shown, each one passing over a driving pulley 9, a weight pulley 10 and idlers 11, 12 and 13. Each driving pulley 9 is mounted on a shaft 9a which is connected with the press to which the web is supplied so that it will rotate in certain relationship to the speed of the press but it may be driven in any desired way. Each pulley 10 is provided with a yoke 17 and weights 18 to provide tension for the belt. The idler 12 is mounted on a spring-pressed oscillatable frame 14, which is fixed to a sleeve 15a loose on a shaft 15 mounted in a supporting bracket 16. This frame is pivoted to permit of the motion of the idler 12 so that it can be pressed in a clockwise direction by a roll engaging behind it and can be forced toward the roll to cause the belt or belts to engage the same.

A lower set of belts 19 may be driven at a speed other, and preferably lower, than the belts 8 by a pulley 22 on a second shaft 19a which is connected with the press preferably. The gear ratio in connection with these two shafts 9a and 19a may be unequal so that one set of belts is driven faster than the other. The belt or belts 19 pass over idler pulleys 21 and weight pulley 23 provided with a similar set of weights as described above and an idler 24, which is mounted on a second frame 25 fixed to the shaft 15 which is free to turn.

It will be understood that the frames 14 and 25 are formed of an arm on each side of the press. Springs are provided for holding these frames forward on the rolls and allowing them to yield when the belts are engaged by a large roll. In each case this comprises a spring rod 26 carrying a spring 27 and collar 28. The rod penetrates a portion of the bracket 16 and has on the opposite side a check nut 29 which acts as a stop in each case to prevent excess motion of the frame. This lower set of belts permits bringing the press roll up to web speed by two accelerating steps, first by the slower action of the belts 19 and later by the swifter belts 8. This also

provides means whereby extra tension during the running of the web may be secured by having the running roll operate against the slower speed set of belts at the bottom instead of the high speed belts 8.

A web pressing roll 30 is provided mounted in spring-seated slide bearings 31 carried by brackets 32 attached to the opposite sides of the frame of the machine. Springs 33 with the assistance of the weight of the connected parts tend to force the web-pressing roller 30 in a downward direction in the form shown. Stops 34 work in slots of the bracket 32 to limit the downward motion of this web pressing roll. Knife arms 35 are pivotally attached to the bracket 32 and provide a mounting for a web severing knife 36. This knife may be operated in any convenient manner by a link 37 to sever the web after a splice has been made.

The web roll, as has been stated, is provided with roll supporting chucks 7 as usual. On each one of them is freely pivoted a cam arm 39 having at the free end a cam 39^a for holding back the roll 30 when it engages it. Figs. 1 and 4 in dotted lines show this action about to take place. This cam arm carries a radial detent rod 40 adapted to fit in a hole 41 in the chuck 7. When engaging in that hole the arm 39 is locked to the chuck 7 and will rotate with it and, of course, with the web roll. At other times it will hang down by gravity. A spring 42 in cooperation with a collar 43 tends to retain the detent collar outwardly to remove it from the hole 41. On the cam arm 39 is pivoted on a radial axis a lever 44 in such a manner that one end of it will normally project over the end of the detent rod 40 and positively hold its other end in the recess 41. Plungers 45 are provided, one mounted in each arm of the spider. On the lever 44 is carried a roller 46 adapted to engage the plungers 45 as the arm 39 rotates with the roll when the plungers are projected in toward the roll. This frees the end of the detent rod 40 by moving the lever 44 beyond it and allows the spring 42 to move the rod 40 out of the recess 41. This disconnects the cam arm from the chuck and allows the former to swing down into a free depending position. A spring 48 on the spider tends to hold the plunger 45 outwardly until such time as a handle 49, one located on each arm of the spider, is pressed toward the paper roll for the purpose of affecting the disengagement of the cam arm 39 from the chuck when it is time to make the splice.

The handle 49 is pivotally attached by a poppet 50 to the spider and has an extension rod 51 pivoted to it and extending across the reel where it is pivotally connected with a lever 52 and in turn connected with a plunger 53. These two plungers 45 and 53 are located on opposite sides of the reel and perform similar functions on both sides simultaneously.

The plungers 45 and 53 on both ends of the reel are located in such angular position that, no matter when the handle 49 is operated, the plungers engage the rolls 46 at that point in the revolution of the roll when the cam arms extend toward the center of the reel. The cam arms are disconnected at this point and continue to hang by gravity at their lowest position. This silences the cams. Before this the cams 39^a at the highest point of their rotation have engaged the opposite ends of the roller 30 and held it up when the pasted area on the roll passed that point. On rotation of the web roll, if the handle 49 is released, the rod 40 will remain in the recess in the chuck and the arms 39 will continue to rotate with the chucks. Then on the very next rotation of the fresh roll, after handle 49 is operated, the cams 39^a do not engage the roller 30 and thus they permit its springs to force the roller against the web roll and thereby effect the splice.

In Fig. 8 the parts are shown as running in their normal position feeding the web to the press and the running roll R' gradually being reduced in size. At this time it is running in contact with the upper belts 8 which are the faster running belts and the fresh roll R has not yet come into contact with the belts. At this stage the motor operating the reel is started and the roll R is brought into contact with the lower belts 19. They cannot rotate it quite up to web speed but can accelerate it so that as the reel travels in counterclockwise direction this roll R will be rotated up to a certain speed by the lower belts. Then, while passing the points shown in Fig. 9, the roll will be engaged by both sets of belts and later on, as shown in Fig. 10, will be operated more rapidly by the belts 8 at web speed. The action of the belts is entirely automatic except as influenced by the pressure of the roll coming against them.

The rolls 12 and 24 being yieldingly mounted as stated, allow these belts to be wrapped around a considerable arc of the roll while it is large enough to cause that condition. Of course, after the roll R' leaves the control of the belts 8 it should be acted on by a brake, which is not shown herein and not the subject matter of this invention, in order to provide sufficient tension until the pasting is completed. Just before the parts reach the position shown in Fig. 10 the handle 49 is operated. The arms 39, which before have been rotating with the chuck on account of the rod 40 being forced inwardly by the lever 44, are now released by the action of the plunger 45 against the roll 46 on both sides of the frame and these arms drop down. Just before this they have been in the position shown in dotted lines in Figs. 1 and 4. Each time the new roll R comes around to the position where the pasted point is under the roll 30 the cam 39^a lifts the roll so that it will not engage the pasted area. Now this arm does not engage the roll 30 on the next revolution and the pasting operation is performed as shown in Fig. 10. Of course, the arms 39 register with the pasted area.

It will be seen that the splicing means cannot operate until the operator has moved the handle 49 and then during the immediate subsequent revolution of the new roll the splicing is accomplished. Yet the splicing means, the roll 30, is actuated out of contact with the pasted area of the fresh roll once every revolution before that time. In this way the picking up of the pasted end is avoided.

It will be seen also that the lower set of belts permits the bringing of the fresh roll up nearly to press speed and that the cooperation of the upper set of belts accelerates this speed to web speed. Also the lower set of belts provides means whereby extra tension may be secured by having the running roll operate against the slower speed set of belts. That is, if it is necessary to provide additional tension, the reel may be moved backwardly from the running position shown in Fig. 8 so that the roll R' is down in contact with the slower belts 19.

Although I have illustrated and described only one form of the invention I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited in this respect otherwise than as set forth in the claims, but what I claim is:—

1. In a web splicing device, the combination of movable means for supporting the fresh and running rolls and means whereby the fresh roll may be brought up to web speed before splicing in a plurality of accelerating steps, each one increasing the speed of rotation of the fresh roll.

2. In a web splicing device, the combination with means for supporting the running roll and the fresh roll, of a set of belts for engaging the running roll and a second set of belts for engaging the fresh roll before it is brought into contact with the first named belts, both sets of belts being located on the same side of the fresh roll where, in some positions of the fresh roll, both sets of belts will engage the fresh roll at the same time.

3. In a web splicing mechanism, the combination with means for supporting the running roll and a fresh roll, of two sets of belts, one set of belts being in position to engage the running roll and operating substantially at web speed, the other set of belts being operated at a different speed and being in position to engage the fresh roll, and movable means for adjusting the position of the belts to give them a wrap around a substantial arc of the surface of said rolls.

4. In a web splicing mechanism, the combination with means for supporting the running roll and a fresh roll, of two sets of belts, one set of belts being in position to engage the running roll and operating substantially at web speed, the other set of belts being operated at a slower speed and being in position to engage the fresh roll before the fresh roll is brought into running position and into engagement with the first set of belts, and movable means for adjusting the positions of both sets of belts to give them a wrap around a substantial arc of the surface of each of said rolls.

5. In a speed controlling device for the rolls of a web splicing mechanism, the combination of two sets of endless belts, means for running one of the sets of belts at substantially web speed from the press, means operated from the press for running the other set of belts at a slower speed, and yielding means for pressing said belts against the rolls in such a way as to secure a wrap around a substantial arc of the rolls.

6. In a web splicing mechanism, the combination of a chuck adapted to support the center of a web roll and to rotate therewith, an arm pivoted on the same axis as said chuck and free to swing thereon, a rod carried by said arm, the chuck having a recess in its surface into which the end of said rod is adapted to engage, means for engaging the end of the rod and holding the chuck and arm positively connected together, and means on the arm for preventing the pressing of the running web against the fresh web roll at the spot where the paste is applied thereto.

7. In a web splicing mechanism, the combination of a chuck adapted to support the center of a web roll and to rotate therewith, an arm pivoted on the same axis as said chuck and free to swing thereon, a rod carried by said arm, the chuck having a recess in its surface into which the end of said rod is adapted to engage, yielding means for normally forcing the rod away from the chuck, a lever for engaging the end of the rod and holding the chuck and arm positively connected together, means for operating said lever to release the rod and disconnect the arm from the chuck, and means on the arm for preventing the pressing of the running web against the fresh web roll at the spot where the paste is applied thereto.

8. In a web splicing mechanism, the combination of a rotatable reel, a plurality of rolls carried thereby, and web splicing means in position to splice the web to the fresh roll which carries exposed fresh glue, with means rotating with the fresh roll, for moving the web splicing means out of position for splicing as the pasted portion passes, thereby preventing the splice from being made, a lever carried by said rotating means, a plunger on the reel adapted to be moved into the path of said lever to turn it, a detent rod having means for connecting the rotating means, so that it will rotate, or disconnecting it, said lever normally acting to hold the detent rod in connecting position, whereby when the plunger is moved into the path of the lever, the web splicing means will move out of position so that the splice may be made.

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