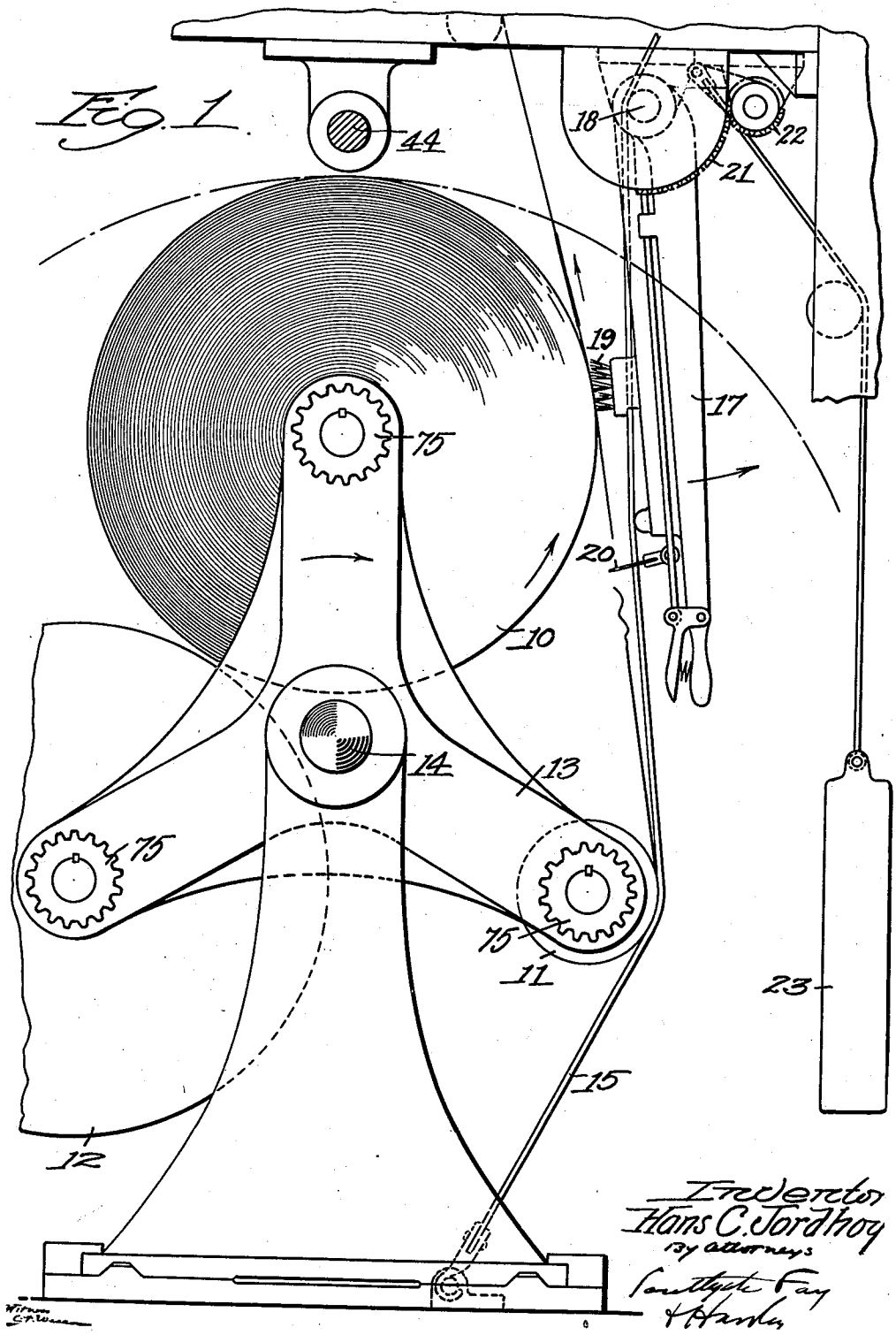
June 1, 1937. H. C. JORDHOY 2,082,400

WEB SPLICING DEVICE

Original Filed Jan. 20, 1933 3 Sheets-Sheet 1

Fig. 1.

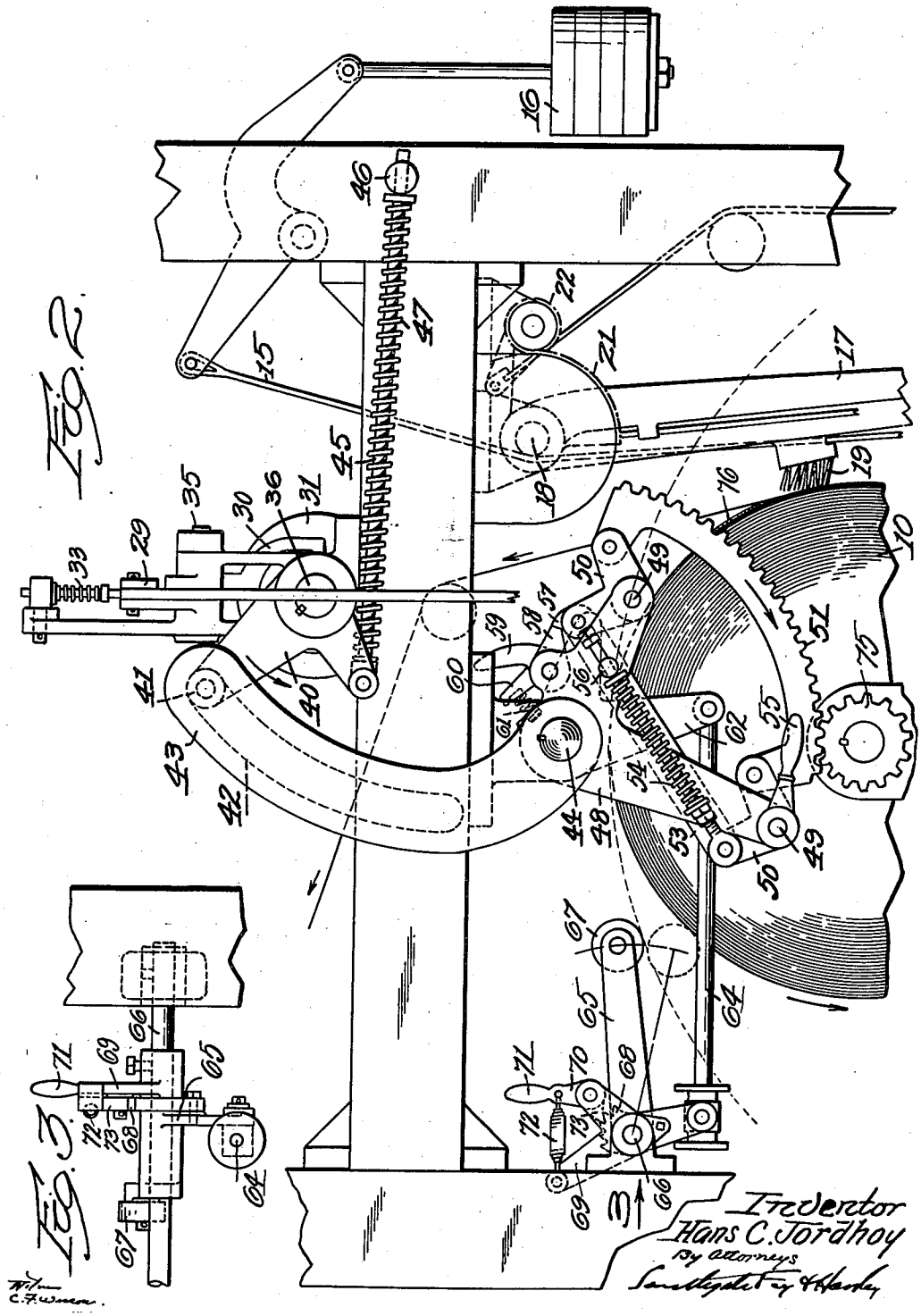


Inventor
Hans C. Jordhoy
By attorneys
Southgate Fay
& Hanley

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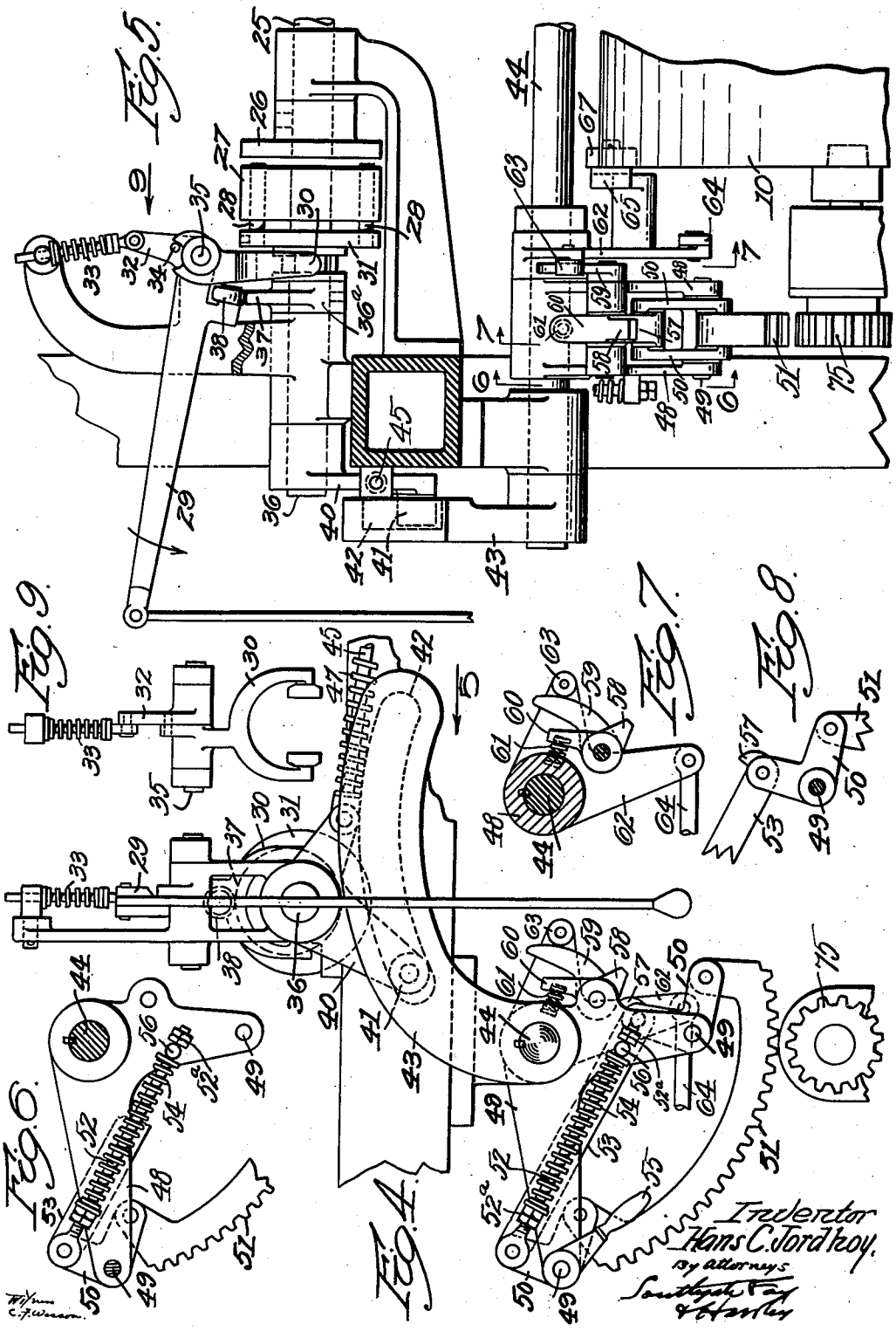
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WEB SPLICING DEVICE

Original Filed Jan. 20, 1933 3 Sheets-Sheet 3



Patented June 1, 1937 2,082,400

UNITED STATES PATENT OFFICE

2,082,400

WEB SPLICING DEVICE

Hans C. Jordhoy, North Plainfield, N. J., assignor to Wood Newspaper Machinery Corporation, New York, N. Y., a corporation of Virginia

Application January 20, 1933, Serial No. 652,679
Renewed September 3, 1935

14 Claims. (Cl. 242—58)

The principal objects of this invention are to provide a web splicing device which will not be as expensive as those machines which are designed to make splices at the full speed of a high speed press and yet will be capable of splicing at a speed much higher than the threading speed; to provide means for increasing the productiveness of the press, that is, reducing the amount of loss of time involved in reducing the speed of the press and increasing it before and after the splicing and still retain a comparatively simple device; to provide a construction in which the strength of the web will not be depended upon for bringing the incoming roll up to speed; to provide for imparting to the incoming roll a rotation by force applied other than through the running web itself by a drive that will necessarily give uniform acceleration to the speed of the new roll from zero to running speed of the web within one revolution when the paster is to be made, and to provide means for taking care of the variations in the sizes of the rolls to bring them up to web speed and adjust the power applied to the new roll in accordance with its size so that, whatever the size may be, the new roll will rotate at web speed when the splice is made.

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 splicing device constructed in accordance with this invention showing the parts in the position assumed when the splice is just being made;

Fig. 2 is a similar view showing the position of the parts just after the new roll has come into position for splicing and the operating mechanism is about to start;

Fig. 3 is an elevation of the automatic means for controlling the speed of the new roll in accordance with its size as indicated by the arrow 3 in Fig. 2;

Fig. 4 is a view similar to Fig. 2 showing the position of the parts at the end of the operation;

Fig. 5 is an elevation of the same, partly in section but looking in the direction of the arrow 5 in Fig. 4;

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

Fig. 7 is a sectional view on the line 7—7 of Fig. 5;

Fig. 8 is a fragmentary view of one segment operating lever and connected parts shown in the same position as in Fig. 7, and

Fig. 9 is an elevation of the operating lever controlling means taken in the direction of the arrow 9 in Fig. 5,

In order to print newspapers with a considerable degree of speed it is necessary to splice the new paper rolls to the running web without stopping the press because the deceleration of the press and its acceleration take considerable time. In general this has been done in the past, in connection with the rotatable reel carrying a number of paper rolls, at threading speed. This, as stated, requires deceleration and acceleration. Recently machines have been developed to make these splices at the full speed of the press automatically. Such splicing machines are expensive. This invention is designed to fill the gap now existing between the very slow threading speed pasting method and the automatic pasting method. By this invention the productiveness of the presses is increased without necessitating the expensive automatic machines.

Very often the slow speed pasters depend on the strength of the web for bringing the incoming roll up to the speed required. This results in web breaks and a further decrease in the efficiency of the whole plant. By this invention a rotation is imparted to the incoming roll by force applied by other means than the running web. A drive is provided that will necessarily give uniform acceleration to the speed of the new roll from zero to the running speed of the web in a single revolution when the paster is made. Provision is made also for adjusting the length of time during which this speeding means is connected with the new roll to the size of the roll because the larger the roll the fewer the turns per minute necessary to get the surface up to web speed.

Referring particularly to Fig 1 the parts shown therein are all old and they are shown only as an example. The invention can be applied to other types of roll supporting and web splicing mechanism but they are made to work particularly effectively with this type. The fresh roll 10, the running roll 11, and the spare roll 12 are mounted on a well known type of reel 13 rotating with a shart 14. Although not shown herein it is well understood that this shaft and reel are ordinarily rotated by a motor which can be operated as desired for the purpose of turning the reel around and bringing the new roll into pasting position as shown in Fig. 1 and thereafter

bringing it into running position, that is, the position shown by the roll 11.

In this figure is shown a tension device consisting of a plurality of straps 15 to which the tension is applied and adjusted by removable weights 16. Also a part of the splicing mechanism is shown in the form of a frame 17 pivoted on a shaft 18 having a brush or brushes 19 for use in performing the splicing action and also having a knife 20 for severing the web. The operation of these parts is well understood. The frame 17 has rigidly connected with it a gear segment 21 meshing with another segment 22 which is provided in a well known way with a weight 23 for holding the brush frame 17 back in inoperative position and allowing it to move to operative position.

A shaft 25 is connected with the printing press to be operated by a shaft thereof or it could be operated by a separate motor. At any rate, it turns constantly proportionately to the speed of the press. It has secured to it a clutch section 26. On a shaft 36 is a second clutch section 27 through which clutch pins 28 are adapted to pass to engage with the clutch section 26 and drive this clutch 27 and shaft 36 positively with the shaft 25. An operating lever 29 is provided with a yoke 30 connected with a plate 31 which carries the pins 28. The machine therefore is started to operate by pulling down on this lever and pushing the pins into place. The lever 29 is provided with an arm 32 connected with a stationary part of the device by a toggle joint having a spring 33 for holding it in either one of its extreme positions. Also on the arm 32 is a pin 34 operating in a notch in the hub of the bracket which supports the shaft 35. The yoke 30 of course operates when the lever 29 is pulled down enough to bring the pin 34 into contact with one of the sides of the notch. Then the lever is held in that position by the spring 33 and the toggle until released. It may be stated at this point that the shaft 36 is in alignment with the shaft 25 and to this shaft is keyed the clutch section 27. On this shaft also is fixed a collar 36a having a cam 37 which at the end of a partial rotation of the shaft 36 will engage a roller 38 on the operating lever 29 and restore the operating lever 29 to inoperative position shown in Fig. 5.

On the shaft 36 is fixed another collar having an arm 40. On this arm is a freely rotatable roll 41 operating in a cam slot 42 in a cam arm 43 fixed on a shaft 44. The arm 40 is provided with an extension which is connected by a slidable rod 45 with a poppet 46 on the frame and provided with a spring 47 which, when the parts are released, will restore the arm 40 to the position shown in Fig. 2 which is the inoperative position.

The shaft 44 is mounted in bearings on the frame of the press. Also fixed on the shaft 44 is a lever 48 having two arms in each of which is a pin 49. On these two pins 49 are pivoted a pair of bell cranks 50. At corresponding ends of each bell crank is pivotally mounted the end of a segmental rack 51. To the other arm of each of the bell cranks 50 is pivotally connected a link 53. To one bell crank is pivotally connected a screw rod 52 on which is a spring 54. On the lever 48 is a stud 56 perforated to allow the rod 52 to slide therein. On this screw rod are adjustable check nuts 52a at each end. Therefore, the spring tends to turn the two bell cranks. On one of the pins 49 is fixed a hand lever 55 by which the two bell cranks can be swung, both in the same direction to raise or lower the segmental rack 51, as shown in Fig. 4. The link 53 has a tooth 57. On one of the arms of the double lever 48 is a pivot on which is mounted a latch 58 and a cam 59 connected to turn with it and also an arm 60 which is pressed by a spring 61 as indicated in Fig. 7 and which spring is seated in a depression in the hub of the lever 48.

Mounted on the shaft 44 is a bell crank 62, arranged to turn freely and provided on one arm with a free roller 63 for engagement with the cam 59. The other arm of this bell crank is pivotally connected with a rod 64 which has an adjustable connection with one arm of a lever 65 pivoted on a stud 66 on the frame of the machine. The other arm of this lever has a roll 67. Also fixed with respect to this lever is a rack 68 and an arm 69. Swingably mounted on the projection of a fixed bracket is an arm 70 provided with a handle 71 connected by a spring 72 with the arm 69. On this arm 70 is a pawl 73 for engaging the rack 68.

In operation, with the parts in the position shown in Fig. 2, the new roll 10 has been moved to pasting position and the brush has been moved up also to pasting position. The operating lever 29 is now pulled down. It will be understood that at this time the roller 38 is not in engagement with the cam 37 as will be explained later. The pulling down of the lever connects the clutch and starts the shaft 36. The arm 40 moves downwardly as indicated by the arrow in Fig. 2. The motion of this arm swings the cam 43 from the position shown in Fig. 2 over to the position shown in Fig. 4. The lever 48 moves with the cam as they are both fixed to the shaft 44.

It will be noticed that in this position the bell cranks 50 and the segment 51 are latched in position by means of the latch 58 engaging the tooth 57. The lever 48 moves with the cam 43 but the lever 62, having previously been moved by the roll 10 engaging the roller 67, is held in stationary position by the ratchet 68 and pawl 73 and the connecting mechanism. Now the movement of the cam 43 in the same direction moves the rack in the direction of the arrow in Fig. 2 and rotates the fresh web roll 10 in the direction of the web and by the power of the press or other power which is applied to the shaft 25. The parts are so arranged that the roll will start from stationary position and in one rotation of the pinion 75 will come up to web speed or approximately so. Therefore, as the cam 43 and the lever 48 turn in a clockwise direction, after the rack 51 has moved through a distance somewhat less than its length, the cam 59 moving down with the lever 48, will engage the roll 63 on the lever 62. This moves the latch 58 upwardly and releases the mechanism, thus stopping the further rotation of the roll 10 by power. The spring 54 is free to move the rack 51 out of mesh with the pinion 75, one of which is located on each of the studs of the several rolls and fixed thereto. Now the paster is made in the usual way and the rack 51 is released from the pinion 75 at a time controlled by the size of the roll 10 through the roller 67 and lever 62.

It is well known that these feed rolls come to the printing press in different sizes although they are all intended to be alike. If the rotation of the rolls were all continued the same length of

time their surface speeds would vary in proportion to the diameter of the different rolls. To avoid this difficulty the roll 67 and its connected parts are provided. When the reel brings the roll 10 bodily around to the full line position shown, the outer surface of the roll has to pass along an arc indicated by a broken line. This arc is at varying distances from the center of the reel proportionate to the radius of the web roll. Consequently as the web roll passes the roll 67, which is normally in dotted line position, it will push the roll 67 up to the full line position in Fig. 2 and move the rod 64 and lever 62. It also moves the rack 69 along the spring-pressed pawl 73 and this pawl holds the arm 65 in the position in which it has been placed until released by operation of the handle 71. The effect of the motion of the roll 67 is to swing the lever 62 on the shaft 44 on which it is freely mounted into the position shown in Fig. 7 so that it controls the time at which the rack 51 is disengaged.

In this way it will be seen that the surface speed of the rotation of the roll 10 is determined by its own diameter and the parts are so proportioned that this surface speed of rotation is practically the same as the full speed of the running web, no matter whether this roll 10 is of normal size or not. The roll 10, of course, is provided with the usual paste spots 76 and the operating of splicing itself is the same as that heretofore known in machines of this general character.

When the shaft 36 is rotated nearly a full revolution the cam 37 restores the arm 29 to operating position by engaging the roll 38 as stated. After splicing the roll 67 is restored to the dotted line position ready for another splice by manipulation of the handle 71, the pawl 73 being restored again to the ratchet at a point further along. The segmental rack 51 can be moved to an elevated or depressed position by the handle 55.

The mechanism of this machine is very much more simple and less costly than that of the automatic machines above mentioned and yet the productiveness of the press is very greatly increased because the press itself does not have to be slowed down to threading speed in order to make the splice.

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 do claim is:—

1. In a web splicing device, the combination with means for supporting a web roll and a power-driven shaft, of a movable arm, means for connecting said arm with said shaft to be driven thereby, and means operated by said arm for imparting a motion of rotation to the web roll through the center thereof.

2. In a web splicing device, the combination of an oscillatory arm, means for connecting it with a source of power to turn it, a pivotally mounted gear segment, means to turn said gear segment by the motion of the arm, a web roll supporting device, and a pinion mounted on the web roll supporting device and connected with the web roll to rotate it, said pinion being located in position to be rotated by the motion of said segment.

3. In a web splicing mechanism, the combination of an arm and a lever mounted to oscillate on an axis and connected with each other to move together, a cam on said arm, means for operating said cam to turn the arm, a gear segment movably mounted on the lever and adapted to be fixed in position on the lever, and means operated by the gear segment for turning a web roll through substantially a complete rotation.

4. In a web splicing device, the combination of a lever pivoted to swing on an axis, means for swinging said lever, a pair of bell cranks mounted on the lever, a segmental rack connected at its opposite ends with the two bell cranks, means for connecting the opposite ends of said bell cranks to provide a parallel motion, and a pinion located in position to be turned by the movement of the rack with the lever.

5. In a web splicing device, the combination of a lever mounted to swing on an axis, a pair of bell cranks pivoted to the opposite arms of the lever, a gear segment pivotally connected with the corresponding arm of each bell crank, means for connecting the opposite arms of the bell cranks to cause them to move together, a spring connected with one bell crank and adjustable means movable relatively to the lever to which the other end of the spring is connected, whereby the adjustment of the free end of the spring can be caused to control the turning of the bell cranks into such position as to move the gear segment circumferentially.

6. In a web splicing device, the combination with a lever mounted to turn on an axis, a parallel motion connection mounted on said lever, a gear segment connected with the parallel motion connection, said gear segment being curved on the same axis as that on which the lever turns, and means movable independently of said lever for moving the segment outwardly or inwardly.

7. In a web splicing device, the combination of a lever mounted to swing on an axis, a segmental rack supported by said lever, a parallel motion connection for carrying and moving the rack, a pinion in position to be engaged and rotated by the rack, another lever mounted to swing on the same axis as the first lever, the second lever being adjustable and having a cam roll thereon, a cam movably mounted on the first lever, a latch fixed with respect to the cam, and a tooth on the parallel motion connection for cooperation with said latch to hold the rack in position to engage the pinion and operate it, whereby when the roll engages the cam and operates it the latch will be disengaged from the tooth and the rack will be free to be withdrawn from the pinion.

8. In a web splicing device, the combination with means for supporting a web roll and a power-driven shaft, of a movable arm, means for connecting said arm with said shaft to be driven thereby, means operated by said arm for imparting a motion of rotation to the web roll through the center thereof, and means controlled by the diameter of the web roll for disconnecting the motion imparting means from the web roll.

9. In a web splicing device, the combination of a lever mounted to swing on an axis, a segmental rack supported by said lever, a parallel motion connection for carrying and moving the rack, a pinion mounted on an axis with which pinion the rack is adapted to engage, a spring connected with the parallel motion connection, another lever mounted to swing on the same

axis as the first lever, the second lever being adjustable, a latch on the first lever, a tooth on the parallel motion connection for cooperation with said latch to hold the rack in position to engage the pinion and operate it, a web roll connected with said pinion to be rotated thereby, said web roll being movable bodily along a path, a roller in position to be engaged by the web roll as it moves along said path into splicing position, means for holding the roller in the position in which it is set by the web roll, and means connected with said roller for adjusting the position of the second lever and thereby controlling the point at which the latch will be disengaged from the tooth.

10. In a web splicing device, the combination of a lever mounted to swing on an axis, a segmental rack normally concentric with said axis but mounted on said lever to move outwardly or inwardly, a second lever mounted to swing freely on the same axis, means for adjusting the position of the second lever controlled by the diameter of the web roll being spliced, a tooth mounted to move when the rack moves, a latch on the first lever in position for engaging the tooth to latch the segment in position, a cam movable with the latch, and a roll on the second lever which the cam is adapted to engage, the position of said roll being adjusted by said adjusting mechanism and thereby controlling the time of engagement of the roll by the cam and thereby controlling the time during which the rack is retained in its outward position.

11. In a web splicing device, the combination of a shaft, two levers, one fixed to the shaft and the other pivoted thereon, means for turning the shaft, a segmental rack movably mounted on the first lever, a pinion in position to be rotated by the motion of the first lever when the rack is in mesh with the pinion, means connected with said pinion for rotating a fresh web roll, a spring for normally withdrawing the rack from meshing with the pinion, a latch for holding the rack in meshing position, a roller adapted to engage the web roll, ratchet mechanism for holding the roller in any position in which the web roll places it, means connected with the roller for holding the second lever in a definite position, and means on the second lever for releasing the latch in accordance with the motion of the first lever in a direction to rotate the web roll for splicing, whereby the adjustment accompanied by the position of the roller will control the time at which the rack will be withdrawn by said spring from the pinion.

12. In a web splicing device, the combination of a shaft connected to the press to which the web is directed and rotating in proportion to web speed, a second shaft in alignment therewith, a clutch connecting the two shafts, an operating lever for closing the clutch, a cam on the second shaft for throwing the operating lever into a position to open the clutch, yielding means for throwing the second shaft back to initial position, and means connected with the second shaft for rotating the web roll up to web speed.

13. In a web splicing device, the combination with a running web and a fresh roll, of press driven means to accelerate the fresh roll to web speed within one revolution of the fresh roll, and means controlled by the fresh roll diameter to regulate the motion imparted to the fresh roll.

14. In a web splicing device, the combination with a running web and a fresh roll, of means for accelerating the fresh roll to web speed within one revolution of the fresh roll, and means controlled by the fresh roll diameter to regulate the rotation imparted to the fresh roll.

HANS C. JORDHOY.