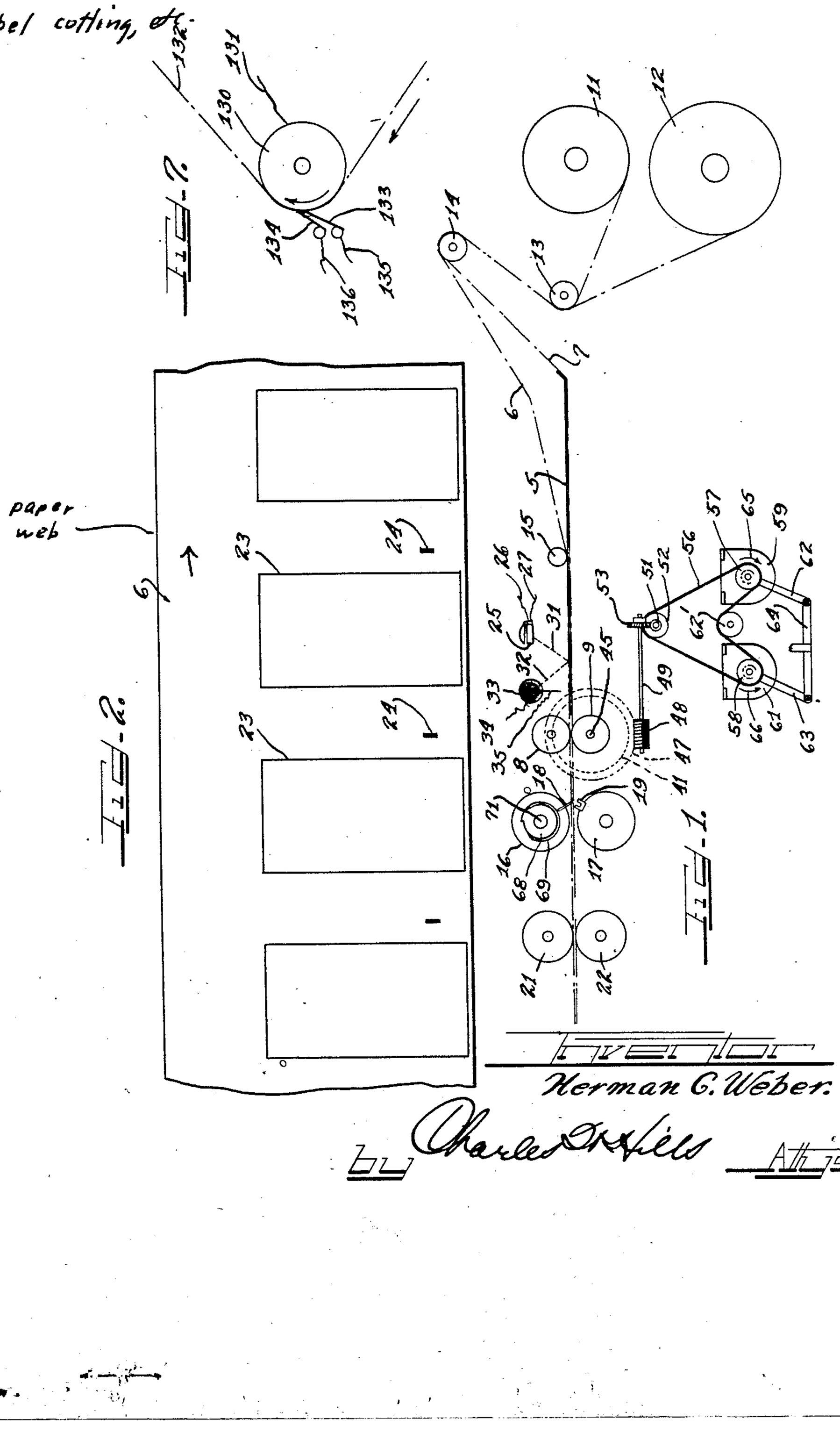
(7)

June 5, 1934. H. G. WEBER 1,961,538

LOCALIZING CONTROL DEVICE

Filed Jan. 23, 1933 3 Sheets-Sheet 1

Label cutting, etc.



Inventor

Herman C. Weber.

by Charles Orfield Atty.

Cross Reference

Examine

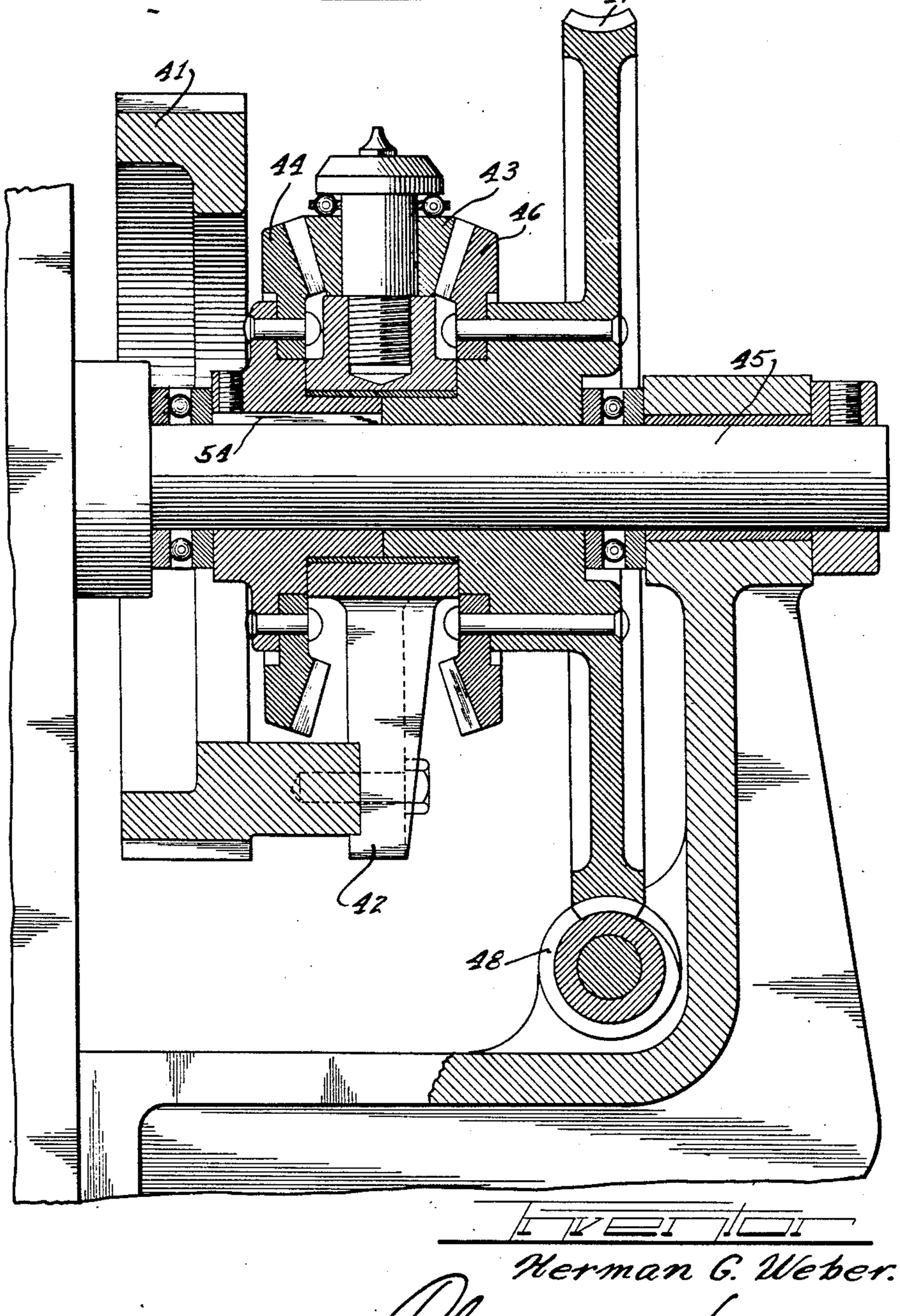
June 5, 1934.

H. G. WEBER 1,961,538

LOCALIZING CONTROL DEVICE

Filed Jan. 23, 1933 3 Sheets-Sheet 2

Fig. 3.



Inventor

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250. RADIANT ENERGY

[redacted]

Examiner

Cross Reference

250-201

June 5, 1934.

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LOCALIZING CONTROL DEVICE

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Fig-5.

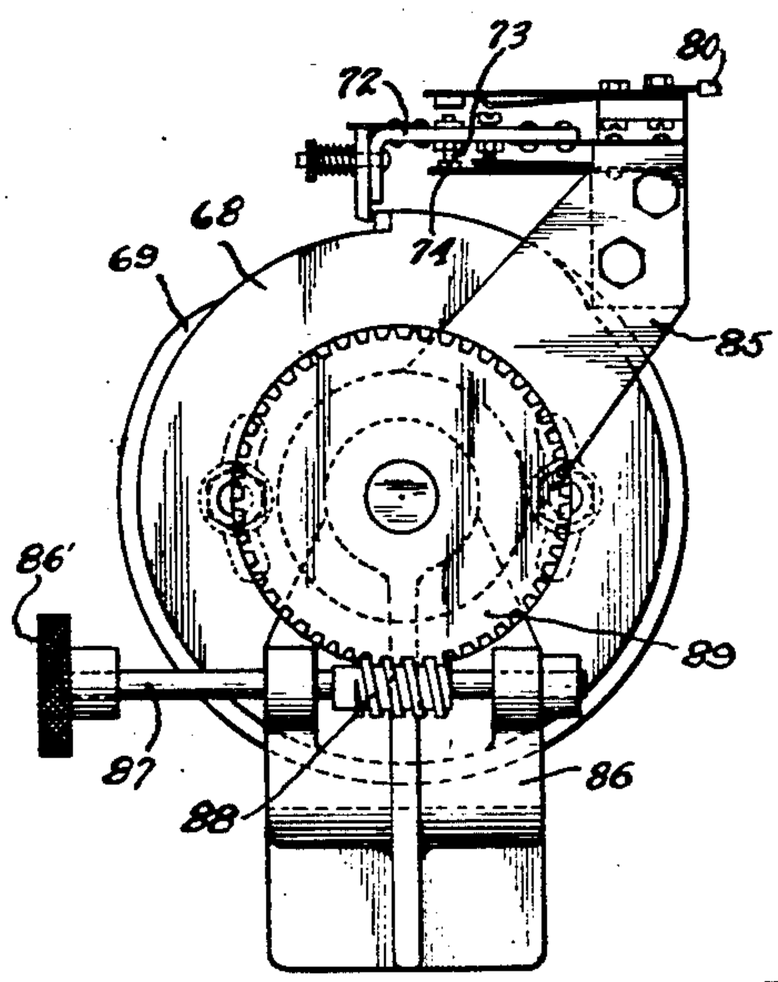


Fig-4.

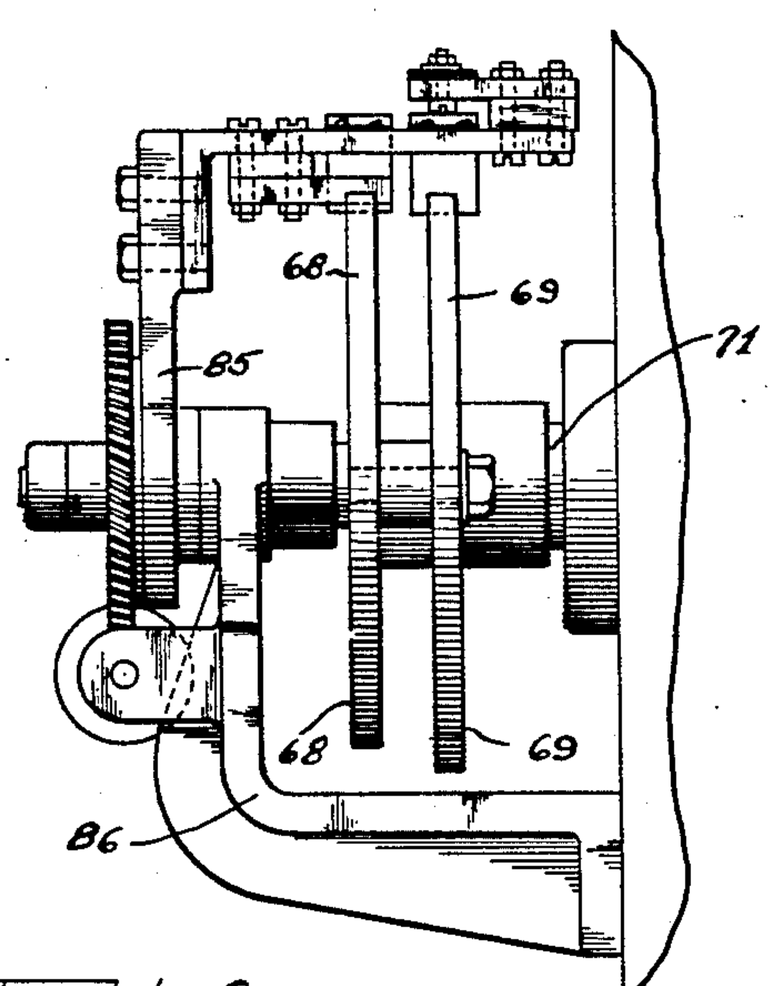
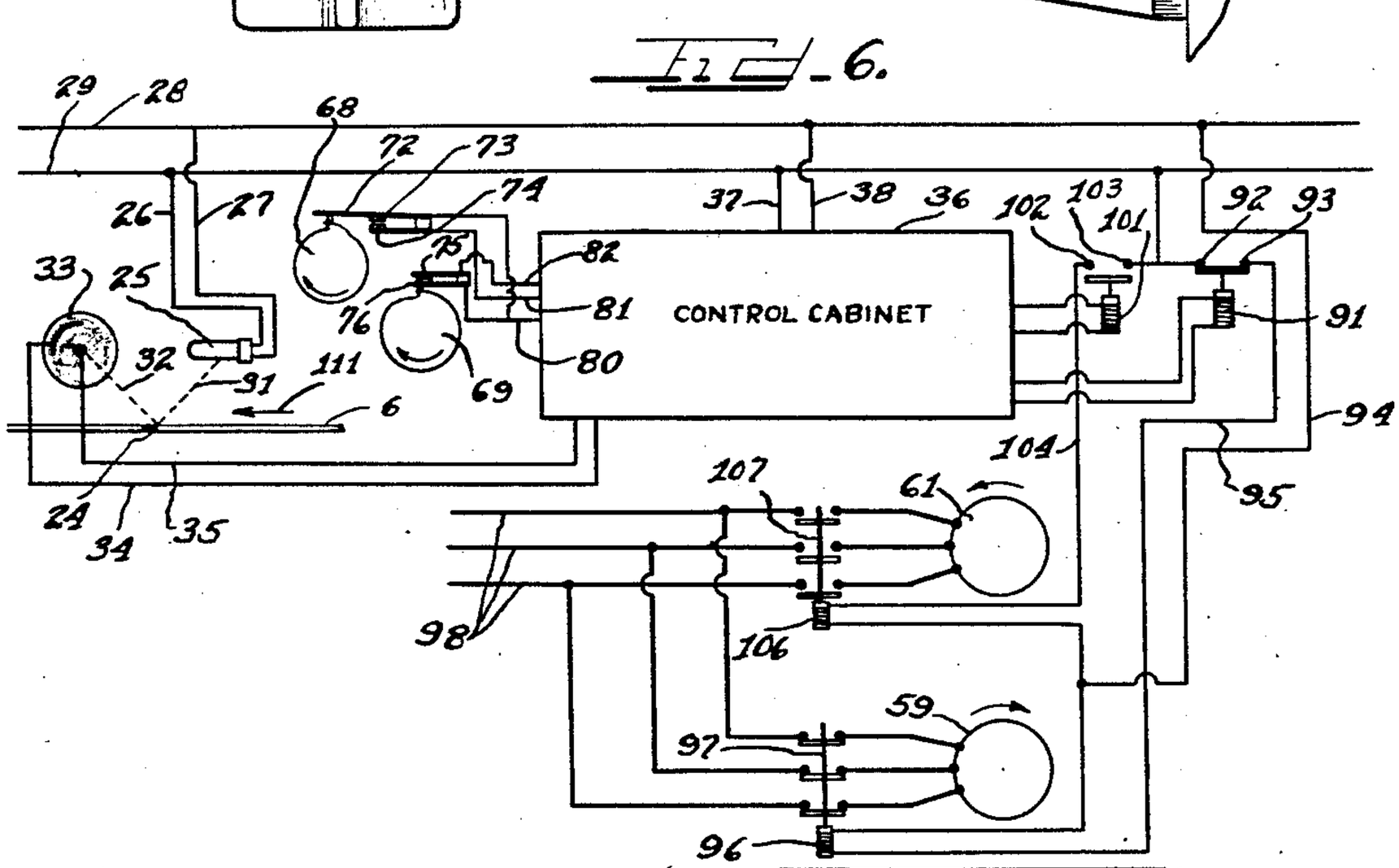


Fig-6.



Inventor

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Patented June 5, 1934

1,961,538

UNITED STATES PATENT OFFICE

1,961,538

LOCALIZING CONTROL DEVICE

Herman G. Weber, Sheboygan, Wis.

Application January 23, 1933, Serial No. 653,057

6 Claims. (Cl. 164—68)

This invention relates to an automatic localizer and will be described as combined and associated with a paper bag machine of the type disclosed in my United States Letters Patent No. 1,571,983 issued February 9, 1926, and to which reference is made for a description of the details of a paper bag machine, but this invention is not limited in its use to embodiment in such a machine.

An object of this invention is the provision of an improved automatic localizing regulator which is capable of detecting and correcting minute variations in the position of a character, mark, perforation, printing and other variations from a uniform body of material, relative to means for severing the material into pieces which may subsequently be made up into bags, boxes, or other containers or objects, such that the characteristics will be disposed on precisely predetermined parts of the completed objects.

Another object of this invention is the provision of such a localizer including certain controlling portions adapted to be driven continuously at a constant speed in synchronism with the cutting or severing means, and other driving mechanism including a constant speed drive for normally controlling the speed of movement of the material to be cut, toward the cutting means, and reversible variable speed drive mechanism acting through differential means or the like, to temporarily change the speed of the material to be cut, by accelerating or decelerating the same relative to the constant speed drive.

When advancing a sheet of paper temporarily faster than the normal operation of the draw roll, it is necessary that the accelerating motor be of variable speed and be adjusted to operate considerably faster than the retarding motor for retarding the paper, because of the additional friction to be overcome by suddenly increasing the speed of the paper through the machine. On the other hand, when the bag machine is operating at slow speed, both the accelerating and retarding motors should be adjusted to run at slower speed than when operating the bag machine rapidly, in order that better working conditions on the photo-electric cell will be obtained. This also applies to any other electrical control in connection with operating the localizer. It is obviously very important that the motors both for accelerating and decelerating the normal speed of the draw roll, should be of the variable speed type and be provided with suitable means whereby the speeds of each may be readily adjusted to obtain the best working conditions. By this specific construction I have been enabled to obtain extreme accuracy in the cutting of the sheet material and which any of the prior constructions heretofore known have not been able to obtain. It is therefore a further specific object of this invention to provide a construction involving the novel features herein pointed out in order to obtain much greater accuracy and faster operation than has been heretofore possible.

Various other objects and advantages of this invention will become apparent, to those skilled in the art, from the following detail descriptions of a specific embodiment of the invention with reference to the accompanying drawings and to my above-mentioned United States Letters Patent.

On the drawings:

Figure 1 is a diagrammatic illustration of parts of a machine for making bags or the like, showing this invention combined and associated therewith.

Figure 2 is a plan view of a fragment of material to be used for the making of paper bags and the like.

Figure 3 is an enlarged detail section of a differential mechanism and associated parts illustrating a specific application of my localizer control for cooperation with a main drive for normally controlling the speed of the material to be severed into pieces, certain of the parts illustrated in this figure being shown fragmentarily and in elevation.

Figure 4 is a view illustrating in elevation details of the controlling cam elements and associated parts, some of which are shown fragmentarily.

Figure 5 is a left end elevation of that shown in Figure 4.

Figure 6 is a diagrammatic illustration of my invention together with a circuit diagram and

Figure 7 is a diagrammatic illustration of a modification which may be incorporated in the invention as a substitution for other parts.

As shown on the drawings:

In Figure 1 is shown diagrammatically portions of a paper bag machine including a table 5 along which the sheets of paper 6 and 7 are drawn by draw rolls 8 and 9, from the rolls of paper 11 and 12 adjacent one end of the table. Suitable tension rollers 13, 14 and 15 are preferably employed for maintaining the proper tension on the paper as it is advancing to the cutting cylinders 16 and 17 where it is severed into pieces by cooperating cutting members 18 and 19. After each piece is severed from the strip of paper passing

through the machine, it is moved forwardly by the transfer rolls 21 and 22 to other parts of the machine for completion of the bag making process. A more detail description of a paper bag machine incorporating the above-described features may be had by reference to my above-mentioned Patent No. 1,571,983.

In Figure 2, a plan view of the sheet of paper 6 illustrates, by the rectangular figures 23, characters, markings, printing, and the like to be placed in a predetermined position on each of a series of completed bags to be formed from the sheet of paper 6. In order that the portions 23 may be accurately disposed on the completed bag, it is necessary that the sheet 6 be accurately cut at predetermined places. In order to insure that the paper 6 will be properly positioned for the cutting operation, certain characteristics 24 representing printed spots either light or dark relative to the color of the sheet 6, as may be desired, are formed on the sheet of paper together with the forming of the portions 23 and serve as a controlling factor.

Again referring to Figure 1, there is illustrated a source of light 25, preferably an electric light bulb which receives electric current through the conductors 26 and 27 from the main control conductors 28 and 29 as best illustrated in Figure 6. The spot 24 on the paper, when passing under the source of light 25, will receive rays of light 31 therefrom and reflect the same or a portion thereof along the broken line 32 to a photo-electric cell 33, for varying the conductivity of the same and, as a result, varying the flow of current through the conductors 34 and 35 leading thereto from the control cabinet 36 which in turn receives a supply of electric current through conductors 37 and 38 from the main control conductors 28 and 29. As this invention does not reside in the details of a photo-electric cell, or its manner of operation, the same is herein shown only diagrammatically.

In a machine of the type herein illustrated, the cutting cylinders 16 and 17 are preferably driven at a constant speed by any suitable means and in synchronism with the main drive gear 41 illustrated in Figure 3, which is connected through a spider 42 and differential gears 43 and 44 to the shaft 45 of the draw roll 9 as seen in Figures 1 and 3. The gear 41 is also connected through the gears 43 and 46 with a worm gear 47 also shown in Figure 1 by broken lines. The gear 47 is loosely mounted on the shaft 45 and is rotatable thereon by a worm 48 on a shaft 49, driven through the medium of a worm 51 on the pulley 52, which worm 51 cooperates with and drives a worm gear 53 on the shaft 49. The gear 44 of the differential, is splined to the shaft 45 by a key 54 such that when the worm gear 47 remains stationary, the shaft 45 rotates with the main drive gear 41 as a unit.

The worm 48 is of such a pitch that it cannot be reversed or rotated in either direction by force exerted upon it from the gear 47. For this reason, the gear 47 remains stationary and causes the draw roll shaft 45 to rotate with the drive gear 41 as a unit except when rotary movement is imparted to the gear 47 through the worm 48, the movement of which is controlled by the movement of the pulley 52 driven by a flexible element 56 preferably a belt or the like, which is trained over the pulley 52. The belt 56 is also trained over pulleys 57 and 58 driven, respectively, by control motors 59 and 61, and over a suitable stress pulley 62' for maintaining a suitable tension in the belt.

The motors 59 and 61 are preferably of a variable speed type, the details of which are immaterial. In order to vary the speed of the motors 59 and 61, suitable controlling handles 62 and 63 are provided which, if desired, may be connected together by a bar 64 and be actuated as a unit. In the normal operation of this invention, the motors 59 and 61 are electrically connected to a power line in a manner to be driven in opposite directions and in the directions indicated by the arrows 65 and 66 respectively. These motors are not driven in opposite directions at the same time, but when one motor is being driven in one direction, the other motor is idling in the opposite direction from the normal driving direction and vice versa.

In Figures 4 and 5, there is shown enlarged details of controlling cams 68 and 69 which are mounted on the shaft 71 of the cutting cylinder 16, for rotation therewith at a constant speed. By reference to Fig. 6, it will be seen that the cam 68 upon rotation acts upon a switch blade 72 for periodically breaking the electrical connection between contacts 73 and 74 which control the operation of the motor 61. Upon rotation of the cam 69, the switch contacts 75 and 76 are periodically caused to separate for controlling the operation of the motor 59. A common conductor 80 connects the movable contacts 73 and 76, and extends to the control cabinet, and separate conductors 81 and 82 respectively are connected with contacts 74 and 75 and extend to the control cabinet. A contact arm 85 is journalled for oscillatory movement on a supporting bracket 86 and is adapted to be adjusted by an adjusting element 86' through which movement is imparted to a shaft 87 and through the worm 88 and the worm gear 89 to the arm 85 with which it moves as a unit. It will be obvious that the controlling cams may be varied in form provided that they and their associated switch blades are adjusted to control the associated circuits in the manner described hereinafter.

In Figure 6 is shown a relay 91 for closing a circuit through contacts 92 and 93 when energized, thereby completing a circuit through conductors 94 and 95 through a switch actuating relay 96 which, when energized, closes the switch 97 to connect the retarding variable speed motor 59 to the main power line 98. A similar relay 101 is adapted, when energized, to close a circuit through contacts 102 and 103 thereby completing a circuit through conductors 94 and 104 for energizing a relay 106 to close the switch 107 and connect the variable speed accelerating motor 61 to the main power line 98.

The detail construction of the material within the control cabinet 36 is immaterial so far as this invention is concerned and will not be herein described. It is sufficient to say that electrical energy enters the control cabinet through conductors 37 and 38 and that the arrangement is such that, when the spot 24 on the paper 6 whether of lighter or darker color than the paper, passes through the path of light 31 to affect the conductivity of the photo-electric cell 33 at the same instant that either of the cams 69 or 68 is causing the contacts controlled respectively thereby to be in closed position, the corresponding relay 91 or 101 will close the circuit through the corresponding control line and close the main switches of the corresponding control motors 59 or 61 as the case may be for retarding or advancing the gear 47

shown in Figure 3 and consequently retarding or advancing the draw rolls 8 and 9 relative to the cutting cylinders 16 and 17. To better illustrate this point, it will be seen that in Figure 6 the paper 6 moving in the direction of the arrow 111 has just carried the spot 24 through the intersections of lines 31 and 32, during which time contacts 75 and 76 controlled by the cam 69 were closed. With this relation existing, relay 91 was caused to close contacts 92 and 93 thereby causing the retarding motor 59 to be actuated by power from the main line 98. With the retarding motor 59 operating, the belt 56 will move in the direction indicated by the arrow 65 which causes a temporary retarding of the paper 6. If the paper 6 had been slow or retarded too much, the contacts 73 and 74 would have been closed at the instant that the photo electric cell 33 was affected by the change of reflection of light as a result of the spot 24 moving through the point of intersection of lines 31 and 32, in which case the relay 101 would have been closed, causing the accelerating motor 61 to operate for moving the belt 56 in the direction indicated by the arrow 66 in Figure 1 thereby advancing the paper momentarily. It will now be evident that if the spot arrives in the cutting position at the proper moment the photo-electric cell circuit control circuit is open for at that moment both of the cam-operated switches are open. If, however, it arrives a moment too soon then one of the cams has not as yet opened its circuit and the cell can control one motor. If, on the other hand, it arrives a moment late the other cam has by then moved into the circuit-closing position, and the other motor can now be controlled by the cell. Just how long during each revolution of the cams control of one or the other of the motors can exist may be determined by slow or quick-acting relays and switches, and by other expedients familiar to workers in the elcctrical art.

In Figure 7, a modification is shown including a roll 130 preferably formed with a metal surface and being suitably connected to a source of electric energy by a conductor 131. The paper 132 is perforated at predetermined intervals for localizing purposes instead of having spots 24 printed thereon. As the perforations pass under the contact arms 133 and 134, respectively, which are connected to conductors 135 and 136, they complete circuit through the conductors 131 and 135 also through conductors 131 and 136, respectively. The device shown in Figure 7 is adapted to be substituted for the photo-electric cell shown in Figure 6 by connecting the conductors 131, 135 and 136 to the control mechanism for causing the retarding or accelerating motors to be actuated in the manner above described in case the perforation on the paper 132 is too far advanced or retarded relative to the cutting drum 16 which is actuated together with the cams 68 and 69 as a unit.

From the foregoing description, it will be understood that this invention is susceptible of various forms and modifications without departing from the principle thereof. Accordingly, I desire that the patent to be granted hereon shall not be restricted in any manner except as necessitated by the prior art.

I am aware that many changes may be made and numerous details of invention may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon otherwise than is necessitated by the scope of the appended claims.

I claim as my invention:

1. In a paper bag machine, a device for controlling the localizing of printed matter on the paper with respect to a line of severance, comprising a main driving means, a pair of variable speed oppositely driven motors, a pair of draw rolls for moving the paper through the machine, cutting means, a differential connection between said main driving means and said motors and one of said drive rolls, and means including cams and a photo cell controlled by the position of a spot on the paper relative to the position of the cutting means to operate one or the other of said motors when said spot is out of register to retard or accelerate the speed of said draw rolls through the medium of said differential.

2. In a paper bag making machine, a device for controlling the localizing of a design on the paper relative to a line of severance or of fold, comprising a main driving means including a gear, a pair of variable speed oppositely driven electric motors, a speed reducing mechanism, a single drive connecting element between said motors and said speed reducing mechanism, a pair of draw rolls, a differential gearing including said gear between said draw roll and said speed reducing mechanism, a rotary cutter, cam means on said rotary cutter, a photo-electric cell and control mechanism responsive in accordance with the operation of said cam means and the energization of said photo electrical cell as dependent upon a characteristic of the paper to energize one or the other of said motors to accelerate or retard the speed of rotation of said draw rolls.

3. In combination, a driven member for moving material, a primary driving means connected to drive said member, a secondary driving means comprising a pair of variable speed electric motors, a differential connection between said secondary driving means and said primary driving means and said driven member, circuit means connecting said motors for selective energization of said motors to accelerate or retard said driven member, and means responsive to the position of a point on the material connected to selectively control said circuit means.

4. In combination, a driven member for moving material, a primary driving means connected to drive said driven member, a secondary driving means comprising a pair of variable speed electric motors, a differential connection between said secondary driving means and said primary driving means and said driven member, circuit means connecting said motors for selective energization of said motors to accelerate or retard said driven member, switch means connected in said circuit means, and means responsive to the position of a point on the material connected cooperatively with said switch means.

5. In combination, a driven member for moving material, a primary driving means connected to drive said member, secondary driving means comprising a pair of variable speed electric motors, a differential connection between said secondary driving means and said primary driving means and said driven member, circuit means adapted to energize one of said motors to accelerate said driven member, other circuit means adapted to energize the other of said motors to retard said driven member, and means responsive to the position of a spot on the material to selectively control both of said circuit means, and

thereby selectively control energization of said motors.

6. In combination, a driven member for moving material, a primary driving means connected to drive said member, secondary driving means comprising a pair of variable speed motors, a differential connection between said secondary driving means and said driven member, a continuous belt connected to said differential connection and to both of said motors and forming a common driving connection between said motors whereby one of said motors is adapted to be driven by the other of said motors, and circuit means adapted to be selectively energized for selective energization of one or the other of said motors, respectively, to retard or accelerate said driven member, respectively.

HERMAN G. WEBER.