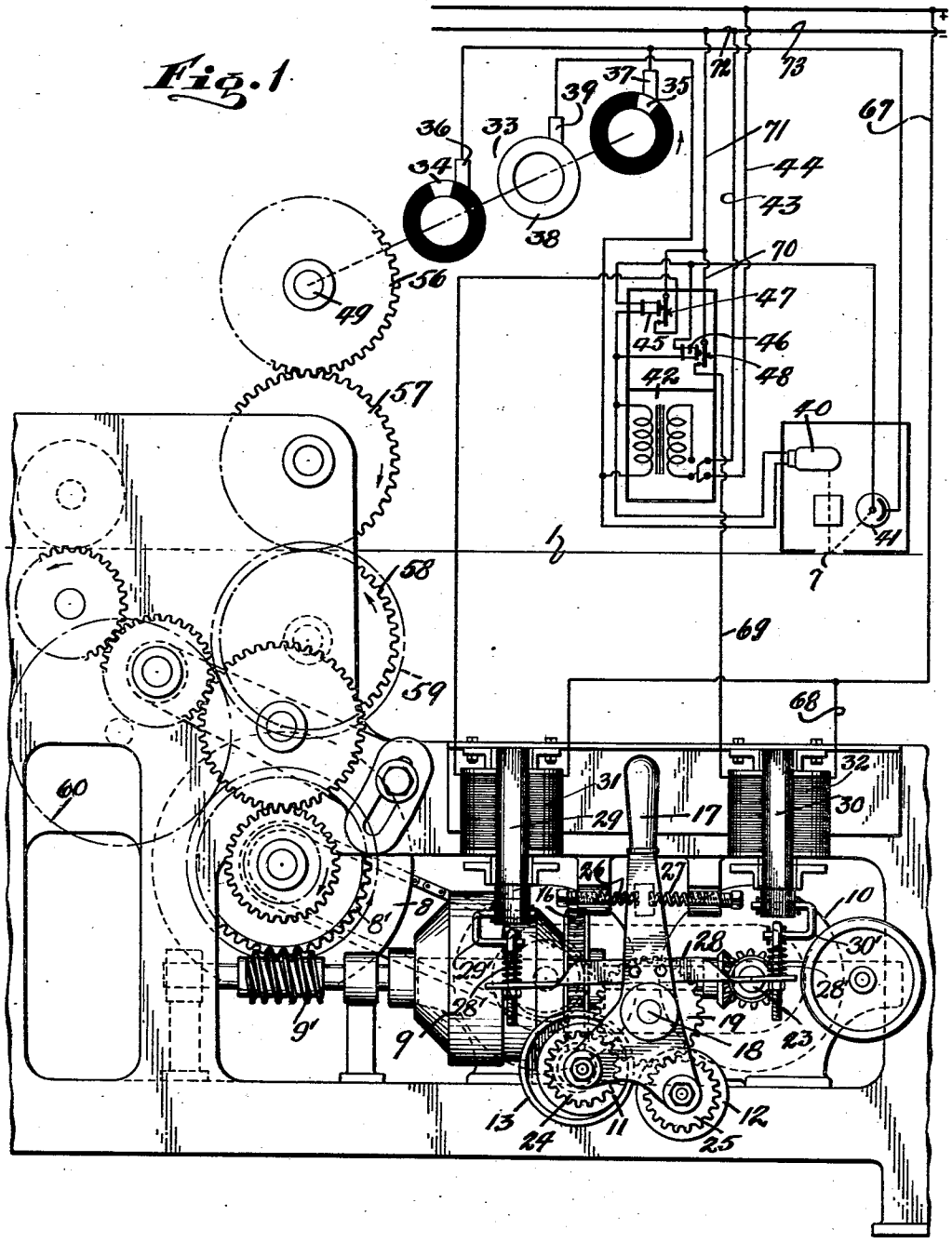
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BAG MAKING MACHINE

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Fig. 1.



INVENTOR

Adolph Potdevin

BY

Riddle, Bethell and Montgomery.

ATTORNEYS.

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Fig. 2

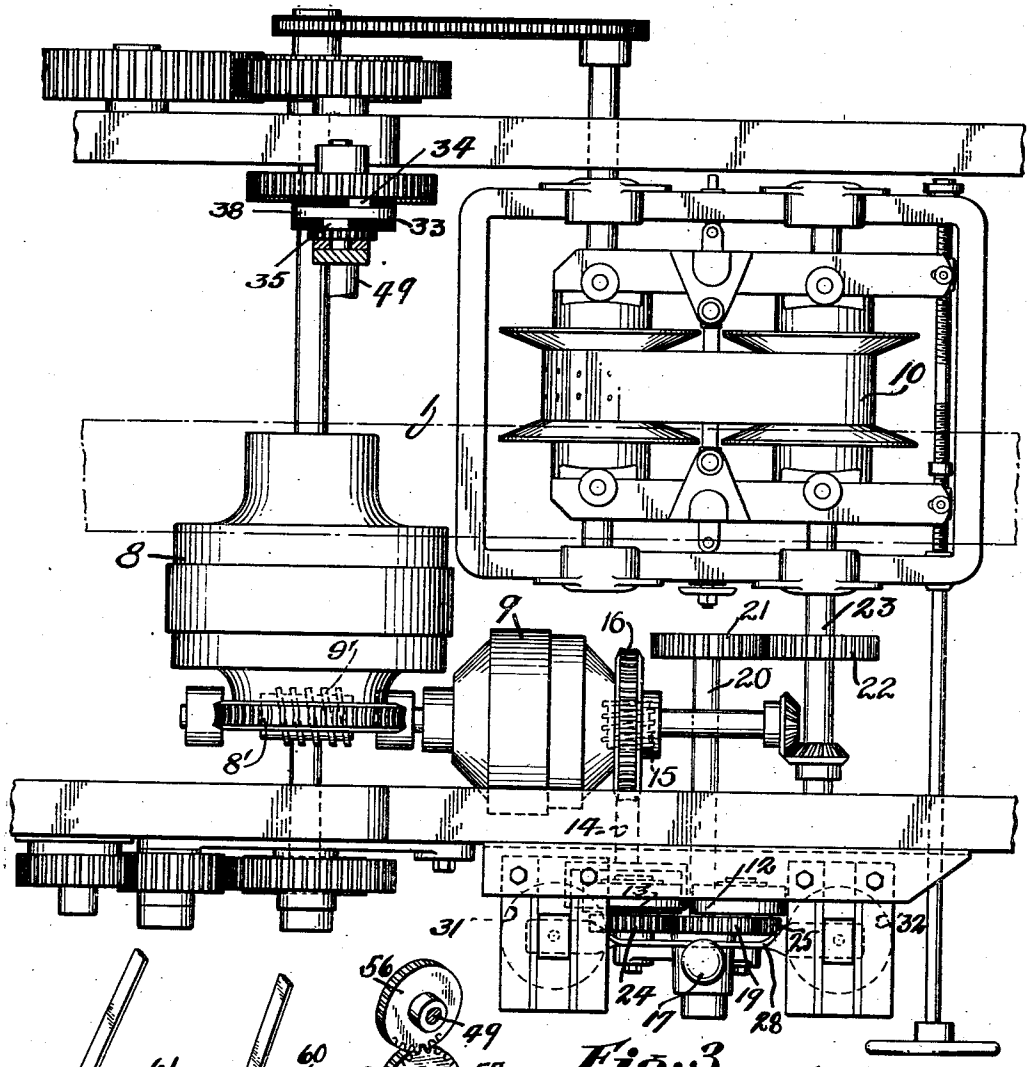
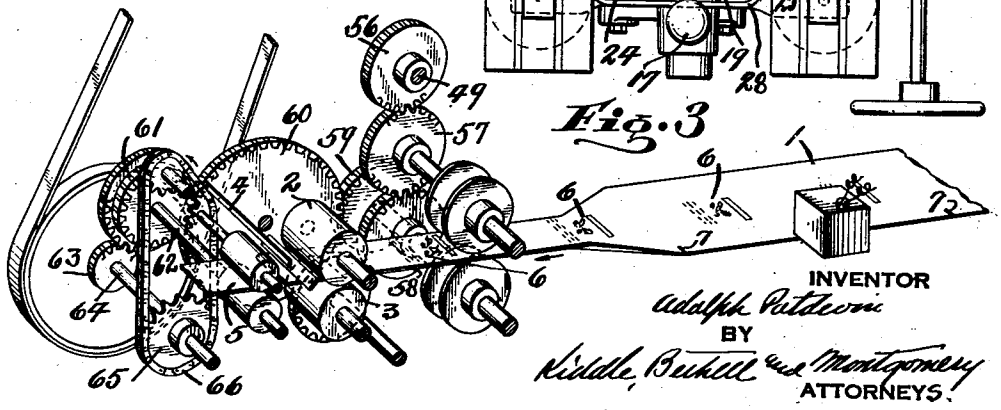


Fig. 3



INVENTOR
Adolph Potdevin
BY
Riddle, Bicknell and Montgomery
ATTORNEYS.

Patented Aug. 17, 1937

2,090,307

UNITED STATES PATENT OFFICE

2,090,307

BAG MAKING MACHINE

Adolph Potdevin, Garden City, N. Y., assignor to Potdevin Machine Company, Brooklyn, N. Y., a corporation of New York

Application November 20, 1934, Serial No. 753,818

13 Claims. (Cl. 271—2.6)

The present invention is directed to an improvement in bag making machines and has for one of its objects the provision of a construction whereby the required accuracy is assured in cutting the bag making material into bag lengths.

Those skilled in the bag making art appreciate the difficulty experienced in cutting accurately to length the material from which the bags are to be made, owing to irregular feeding, stretching of the bag making material by reason of the tension to which the same is subjected in passing through the machine, atmospheric conditions, etc. Then, too, owing to dampness, the material often shrinks. These conditions are particularly troublesome where a design has been printed on the face of the bag making material, stretching or shrinking of the material varying the distance between impressions as will be appreciated. Then again inaccuracies often occur in printing the design on the bag making material varying the spacing of the designs, and while these inaccuracies are slight they must nevertheless be taken into account in dividing the bag making material into bag lengths because it is quite desirable that the design on the finished bag be positioned accurately with respect to the ends of the bag.

In the making of printed bags, that is, bags having printed matter or other design on their face, the paper or other material from which the bags are to be made is first printed up and the printed material is drawn from a roll into the bag making machine where it is cut into bag lengths preparatory to being formed into bags. Inasmuch as the design on the bag making material must be accurately positioned in the finished bag, it will be obvious that the cutting off operation must be performed with great care and accuracy, and that if there be any irregularities in the spacing of the designs on the material, due to variations which may occur in the feeding of the web through the printing press, or due to slippage of the material between the feed rollers of the bag machine, or from any other cause, something must be done to compensate for these inaccuracies. It will be appreciated, furthermore, that inaccuracies in proper timing of the cut-off knife and speed of travel of the material results in loss of material, and as the error is generally cumulative it will be appreciated that great quantities of material may be spoiled in but a few minutes.

The present invention provides a construction wherein the difficulties above referred to are overcome in a very practicable fashion, and accurate positioning of the design with respect to the bag length assured.

In general my improved construction provides a variable speed driving mechanism which may be of the type disclosed in Potdevin Patent No. 1,836,279 of December 15, 1931 or Potdevin Patent No. 1,931,034 of October 17, 1933, this variable speed drive being capable of being controlled manually, and of being controlled automatically by a photoelectric cell or "electric eye", whereby the bag making material will be speeded up or slowed down, as the case may be, when the design on the paper is "out" so as to bring the cut-off into proper relation to the design on the material, and so that in each bag length the design will be accurately located or positioned.

In the accompanying drawings:

Fig. 1 is an elevational view adjacent the starting end of a bag making machine embodying my invention;

Fig. 2 is a plan view of Fig. 1; and

Fig. 3 is a more or less diagrammatic view of part of a bag making machine embodying my invention.

Referring to the drawings in detail, the paper or other bag making material 1 is advanced continuously through the machine by forwarding rollers, shown at 2 and 3, the material after it leaves these rollers passing a cut-off station comprising constant speed cut-off knife 4 where the material is cut into bag lengths 5, the bag lengths from thence being forwarded through the machine for the bottoming and other finishing operations.

As above noted the purpose of the present invention is to insure proper positioning of the paper in the machine as it comes to the cut-off station so that the designs, indicated at 6 on Fig. 3, on the face of the paper 1 will be properly positioned on each bag length.

In printing up the bag making material I provide the face of the same with light-reflecting indicating devices, such as the marks 7, and inasmuch as these indicating devices are applied to the paper at the time the designs 6 are applied they necessarily will have a fixed relation, so far as position is concerned, to the designs 6. These indicating devices or marks 7, may be in the nature of a glossy ink mark or spot, capable of reflecting light, and as will be brought out hereinafter, cooperate with an "electric eye" automatically to control the position of the bag making material in the machine when it arrives at the cut-off station so that the cut-off will

be effected properly with relation to the designs 6.

The speed of the feed rollers 2 and 3 is varied or controlled by differential 9 and a variable speed drive 10, in accordance with the two patents above referred to, the present invention providing for both the automatic and manual shifting of the normally stationary housing of the differential 9 if the bag material is not in proper position when it arrives at the cut-off station, so as momentarily to vary the speed of the housing of the differential 8 through the worm and worm gear connection 9' and 8', respectively, between the differentials 9 and 8, momentarily to vary the speed of the feed rollers and hence the travel of the web 1.

To effect this shifting or regulation of the housing of the differential 9 I provide continuously rotating elements 11 and 12 in the form of friction discs adapted to be moved automatically into engagement with the inside or the outside of a rotatable element or drum 13, mounted on a shaft 14 extending transversely of the machine and carrying a worm 15 which is in constant mesh with a worm wheel 16 on the housing of the differential 9. The friction discs 11 and 12 are carried on a lever 17 pivoted at 18. In line with the fulcrum of this lever is a gear 19 on a shaft 20 which extends transversely of the machine and carries a gear 21 which meshes with gear 22 on the shaft 23 of the variable speed drive 10. This drive for the shaft 20 is merely illustrative. This shaft may be driven from any other part of the machine or any other source of power. The gear 19 meshes with two gears 24 and 25 concentric with and secured to the friction discs 11 and 12, respectively.

The lever 17 is maintained in central or neutral position by springs 26 and 27.

It will be apparent that when the lever 17 is shifted to one side of its central or neutral position the disc 11 will engage the inside of the drum 13 to rotate the same to impart rotation to the housing of the differential 9 and that when the lever 17 is shifted in the opposite direction the disc 12 will engage the outside of the drum 13 to cause the housing of the differenial 9 to be rotated in the opposite direction.

This shifting of the lever 17 may be effected by hand which is of advantage in setting up the machine initially, or when the paper is so much "out" that considerable paper must pass through before the automatic device can bring the paper into correct position again, which of course is wasteful of paper, hand operation being of advantage also in the event the paper breaks during operation of the machine, in that by manipulation of the hand lever the paper can be shifted at any time and to any extent regardless of the position of the indicating marks.

As above pointed out the shifting of the lever 17 is also effected automatically. In this connection a bar 28 is secured to the lever, this bar projecting from either side of the lever, the projecting ends of the bar being attached to the armatures 29 and 30 of electromagnets 31 and 32, respectively, by bolts 28' carried by the bar and members 29' and 30' connected to these bolts and to the armatures 29 and 30, respectively.

33 designates a continuously rotating selector switch which is rotated in fixed timed relation with the operation of the cutting knife 4. This switch comprises two segmental contacts or conducting segments 34 and 35 cooperating with fixed brushes 36 and 37, and a ring contact 38 cooperating with brush 39. As indicated diagrammatically in Fig. 1 the conducting segments 34 and 35 are offset with respect to each other.

40 designates a light source the light from which is reflected from the surface of the light-reflecting indicating devices 7 to a photo-tube 41. The source of light 40 receives current from a transformer 42 the primary side of which is connected to power mains by conductors 43 and 44.

45 and 46 designate electromagnets the circuits of which are controlled by the photo-tube 41, these electromagnets controlling switches 47 and 48, respectively, which in turn control the circuits of the lever operating electromagnets 31 and 32.

The selector switch 33, above referred to, is mounted on shaft 49. This shaft carries a gear 56 meshing with gear 57 in turn in mesh with gear 58. On the shaft carrying the gear 58 is gear 59 meshing with gear 60 in mesh with gear 61 on shaft 62, the gear 61 meshing with gear 63 on shaft 64 carrying one of the sprockets 65 for the chain 66 carrying the cut-off knife 4. The gear train just described obviously insures that the selector switch 33 and knife 4 will be driven in predetermined timed relation to each other.

With the bag making material 1 passing through the machine from right to left, as viewed in the drawings, and assuming for the moment that the bag making material is in proper position with respect to the constant speed knife 4, so as to be severed correctly with respect to the designs 6 on the face of the bag making material, when an indicating device 7 moves into the position shown in Fig. 1, so that light from the light source 40 is reflected from the indicating device to the photo-tube 41 the contact segments 34 and 35 at that instant will be out of engagement with their respective brushes 36 and 37. Consequently the electromagnets 31 and 32 will not be energized and the speed-changing lever 17 will remain in neutral position and the discs 11 and 12 will remain out of contact with the drum 13. Let us assume, however, that the bag making material is out of position so that the knife 4 would sever the paper incorrectly relatively to the designs 6. Under these conditions when an indicating device 7 moves under the light source 40 one of the brushes 36 or 37 will be riding on its contact segment.

In Fig. 1 I have assumed that the brush 37 is riding on its conducting segment 35. Under these conditions the electromagnet 46 will be energized to close the switch 48 to close the circuit of the electromagnet 32. This circuit for the electromagnet 32 may be traced from one side of the line, conductors 67, 68, winding of the electromagnet 31, conductor 69, switch 48, conductors 70, 71 and 72, 73 to the other side of the line. Energizing of the electromagnet 32 will draw the right hand end of the bar 28 upwardly, as viewed in Fig. 1, pivoting the lever 17 to the left, as viewed in the same figure, into position to bring the friction disc 11 into engagement with the drum 13. Inasmuch as the discs 11 and 12 are constantly rotating, rotation of the worm wheel 16 on the housing of the small differential 9 is effected to rotate said housing in a direction as determined by the disc 11, thereby temporarily to vary the speed of the driving mechanism and hence the speed of the feed rollers 2 and 3 and the speed of the bag making material 1. This variation in speed is but momentary, i. e. until segment 35 rides from beneath its brush 37, the circuit to the electromagnet being immediately broken and lever 17 automatically returning to

neutral position. This operation will be repeated each time an indicating device 7 passes under the light source 40, until the paper 1 has been adjusted to correct position, whereupon, as above explained, brush 37 and contact 35 will be out of engagement with each other when indicating device 7 is beneath light source 40. When the bag making material 1 is "out" in the opposite direction, it will be understood that the electromagnet 31 will be energized to bring the disc 12 into engagement with the drum 13 to rotate the housing of the differential 9 in the opposite direction to which it was rotated before, to vary the speed of the material 1 until the same is correctly positioned.

From all of the foregoing it will be seen that I have provided an arrangement or construction for bag making machines employing a variable speed drive for the paper or other bag making material, in which the drive can be varied manually, properly to position the paper, means being provided whereby the drive is automatically controlled by indicating devices which are provided on the surface of the bag making material, accurately cut, these indicating devices, through the medium of electrical equipment, being adapted to shift a differential housing, thereby momentarily speeding up or slowing down the bag making material so that the cut-off will be precisely located, particularly with respect to printed matter or other design appearing on the surface of the bag making material.

It is to be understood that changes may be made in the details of construction and arrangement of parts within the spirit and scope of my invention. For example, I have described the indicating devices 7 on the bag making material as light reflecting. It is to be understood that these devices might be transparent with the photo-tube disposed at the opposite side of the paper from the light source. It is to be understood also that if desired this device might be light absorbent so that the control would be effected by cutting the light off from the photo-tube instead of reflecting or directing light to the tube, all within the purview of my invention.

What I claim is:

1. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, driving mechanism for said rolls including a differential, adjustable variable speed mechanism including a second differential for driving the housing of said first differential, a constantly rotating element, and a photoelectric cell the operation of which is controlled by the web being handled for moving said rotating element into operative position with respect to said second differential temporarily to vary the setting of the same thereby to vary the setting of the housing of the first differential and the position of the web with respect to said constant speed mechanism.

2. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, driving mechanism for said rolls including a differential, adjustable variable speed mechanism including a second differential for driving the housing of said first differential, a constantly rotating element, and a photoelectric cell operative when the web being handled is incorrectly positioned with respect to said constant speed mechanism for moving said rotating element into operative position with respect to said second differential to shift the housing of the first differential thereby temporarily to vary the speed of said friction rolls.

3. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, driving mechanism for said friction rolls including a differential, adjustable variable speed mechanism for constantly driving the housing of said differential, a pivotally mounted constantly rotating element, an electromagnet for moving said element on its pivot into operative relation to said adjustable speed mechanism, thereby temporarily to vary the setting of the housing of said differential to effect a temporary variation in the speed of said friction rolls, and a photoelectric cell cooperable with the web for controlling the circuit of said electromagnet.

4. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, differential gearing continuously rotating in one direction for driving said friction rolls, constant speed mechanism for operating intermittently on the advancing web, adjustable variable speed mechanism cooperable with said differential gearing, a pivotally mounted rotatable element, an electromagnet for pivoting said rotatable element to bring the same into operative relation to said variable speed mechanism to alter the setting of the same thereby to vary the speed of said differential gearing temporarily to vary the speed of the friction rolls, and a photoelectric cell controlled by the web for controlling the circuit of said electromagnet, whereby under predetermined conditions the speed of the friction rolls is varied temporarily to vary the position of the web with respect to the said constant speed mechanism.

5. In a machine of the class described, web handling apparatus comprising in combination friction rolls for continuously advancing the web, constant speed mechanism for operating intermittently on the advancing web, driving mechanism for said friction rolls including a differential, adjustable variable speed mechanism for constantly driving the housing of said differential, a pair of continuously rotating elements, a common pivoted carrier for said elements, electromagnets for pivoting said carrier selectively to bring said rotating elements into engagement with the variable speed mechanism temporarily to vary the same and hence the speed of the driving mechanism for the friction rolls, and a photoelectric cell controlled by the web for selectively controlling said electromagnets.

6. In a machine of the class described, web handling apparatus comprising in combination friction rolls for continuously advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, adjustable variable speed mechanism cooperable with said differential gearing, said variable speed mechanism including a differential, a drum geared to the housing of said differential, a friction disc on the inside and a friction disc on the outside of said drum, a pivoted carrier common to said friction discs, a drive for rotating said discs, and a manually operable lever for pivoting said carrier selectively to move either of said discs into

engagement with said drum to rotate the latter thereby to shift the housing of the differential and effect a variation in the differential gearing for the friction rolls to alter the position of the web with respect to the said constant speed mechanism.

7. In a machine of the class described, web handling apparatus comprising in combination friction rolls for continuously advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, adjustable variable speed mechanism cooperable with said gearing, said variable speed mechanism including a differential, a drum geared to the housing of said differential, a friction disc on the inside and a friction disc on the outside of said drum, a pivoted carrier common to said discs, a drive for constantly rotating said discs, an electromagnet for each disc to pivot the same selectively into contact with said drum thereby selectively to shift the housing of the differential of the variable speed mechanism to effect a variation in the differential gearing temporarily to vary the speed of the web, and a photoelectric cell dependent for its operation upon the position of the web for controlling the circuits of said electromagnets.

8. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, variable speed mechanism, cooperable with said differential gearing, and including a drum, a continuously rotating element within said drum, a similar element exterior of said drum, said elements being pivotally mounted, and a lever manually and automatically operable selectively to rock either of said rotating elements into engagement with said drum thereby to vary said variable speed mechanism to effect a variation in said differential gearing and a temporary variation in the speed of the friction rolls.

9. In a machine of the class described, web handling apparatus comprising in combination friction rolls for continuously advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, adjustable variable speed mechanism cooperable with said differential gearing, said variable speed mechanism including a differential, a drum geared to the housing of said differential, friction discs, a pivoted carrier common to said friction discs, a drive for rotating said discs and a manually operable lever for pivoting said carrier selectively to move either of said discs into engagement with said drum to rotate the latter, thereby to shift the housing of the differential and effect a variation in the differential gearing for the friction rolls to alter the position of the web with respect to the said constant speed mechanism.

10. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, variable speed mechanism cooperable with said differential gearing and including a drum, a continuously rotating element within said drum, a similar element exterior of said drum, said elements being pivotally mounted, and a lever manually operable selectively to rock either of said rotating elements into engagement with said drum thereby to vary said variable speed mechanism to effect a variation in said differential gearing and a temporary variation in the speed of the friction rolls.

11. In a machine of the class described, web handling apparatus comprising in combination friction rolls for advancing the web, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, variable speed mechanism cooperable with said differential gearing and including a drum, a continuously rotating element within said drum, a similar element exterior of said drum, said elements being pivotally mounted, and a lever automatically operable selectively to rock either of said rotating elements into engagement with said drum thereby to vary said variable speed mechanism to effect a variation in said differential gearing and a temporary variation in the speed of the friction rolls.

12. In a machine of the class described, apparatus for handling printed web having indicating devices on the face thereof in fixed relation to the printing on the web comprising in combination friction rolls for continuously advancing the web, a constant speed motor, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, adjustable variable speed mechanism cooperable with said gearing, said constant speed mechanism, differential gearing and said variable speed mechanism being driven by said constant speed motor, means driven by said constant speed motor for adjusting said variable speed mechanism to vary said differential gearing temporarily to vary the speed of the friction rolls without varying the speed of said motor, and a photoelectric cell controlled by the said indicating devices for controlling said adjusting means, to effect operation of said constant speed mechanism in predetermined relation to the printing on the web.

13. In a machine of the class described, apparatus for handling printed web having indicating devices on the face thereof in fixed relation to the printing on the web comprising in combination friction rolls for continuously advancing the web, a constant speed motor, constant speed mechanism for operating intermittently on the advancing web, differential gearing for driving said friction rolls, adjustable variable speed mechanism cooperable with said differential gearing, said constant speed mechanism, differential gearing and said variable speed mechanism being driven by said constant speed motor, means comprising an electromagnet and contacts therefor driven by said constant speed motor for adjusting said variable speed mechanism, thereby to vary the differential gearing temporarily to vary the speed of the friction rolls without varying the speed of said motor, and a photoelectric cell controlled by the said indicating devices and cooperating with said contacts for controlling the circuit of said electromagnet, thereby to bring the printing on the web into predetermined relation to the constant speed mechanism.

ADOLPH POTDEVIN.