

March 24, 1936.

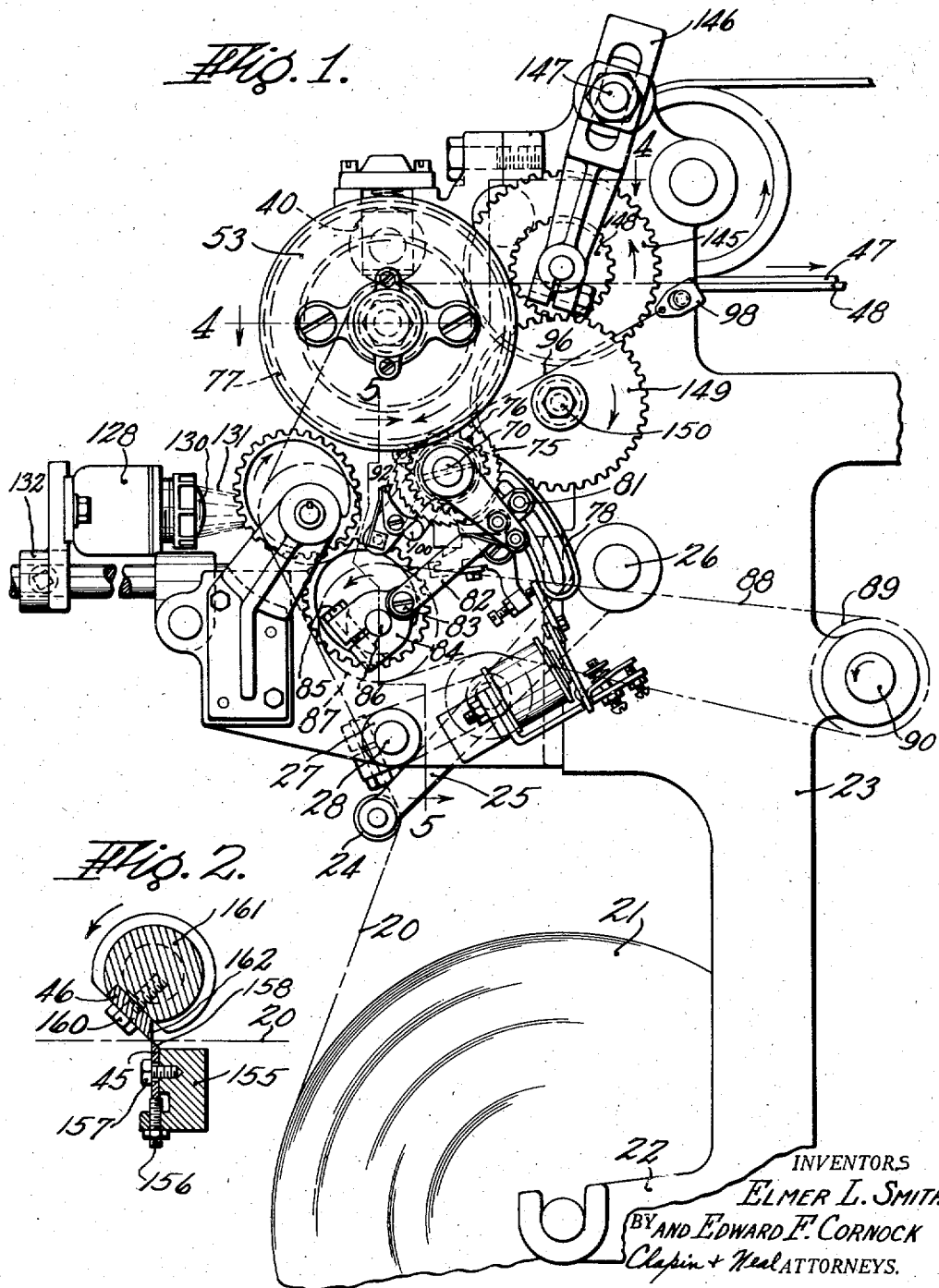
E. L. SMITH ET AL

2,035,201

WEB REGISTERING AND CUTTING DEVICE

Filed April 21, 1933

4 Sheets-Sheet 1



March 24, 1936.

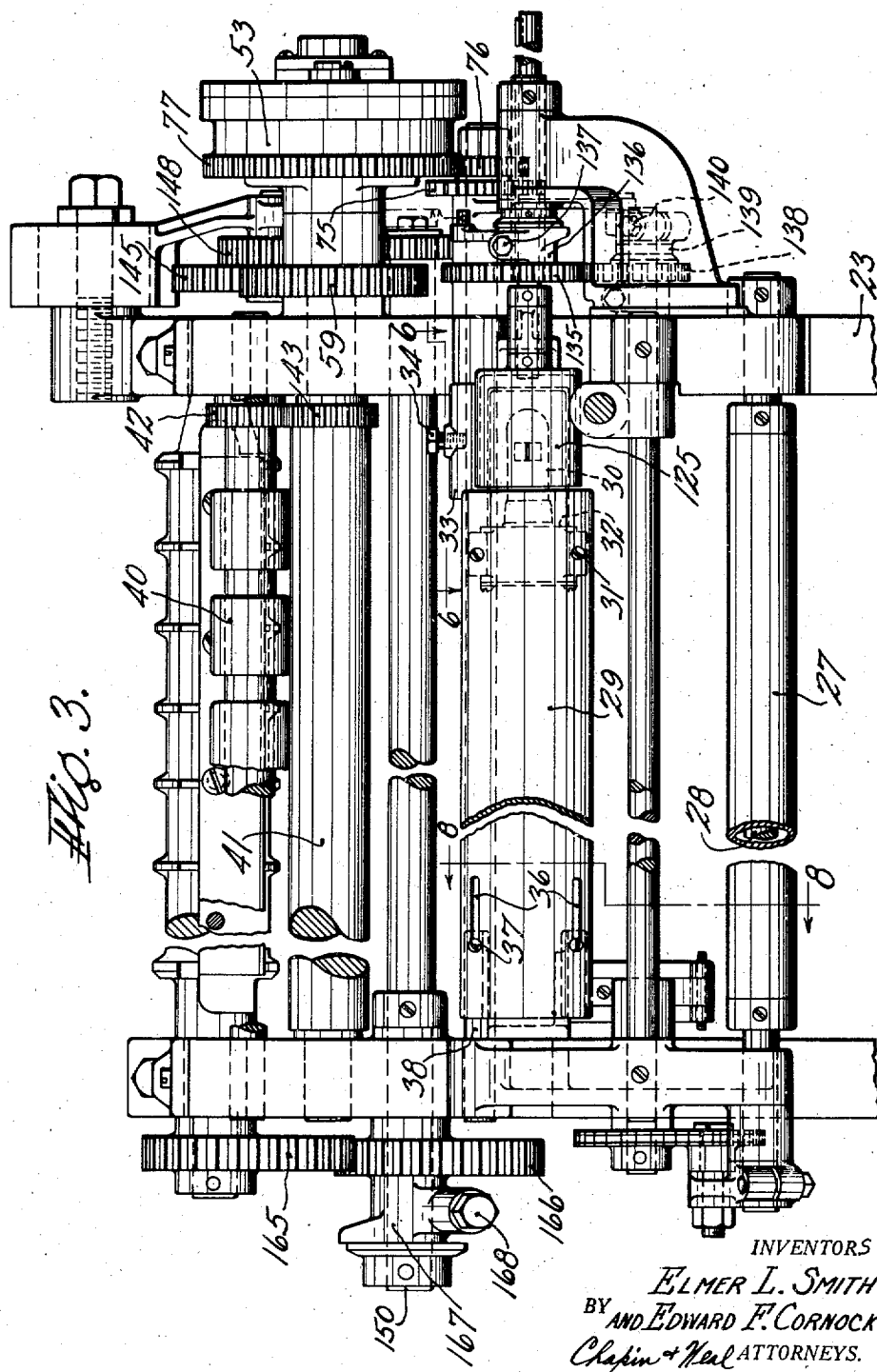
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WEB REGISTERING AND CUTTING DEVICE

Filed April 21, 1933

4 Sheets-Sheet 2



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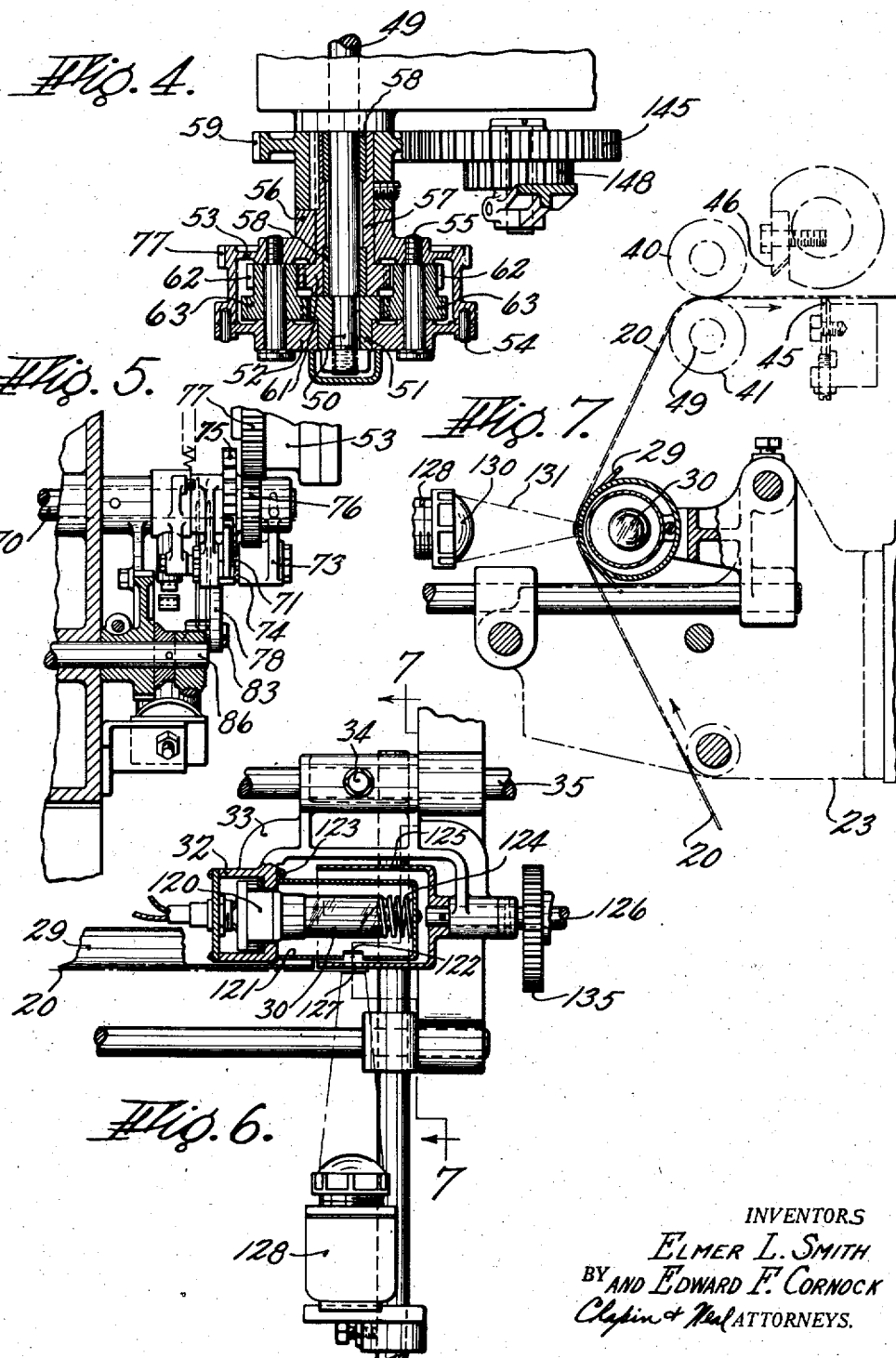
E. L. SMITH ET AL

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WEB REGISTERING AND CUTTING DEVICE

Filed April 21, 1933

4 Sheets-Sheet 3



INVENTORS
ELMER L. SMITH
BY AND EDWARD F. CORNOCK
CLAYTON & McALPIN ATTORNEYS.

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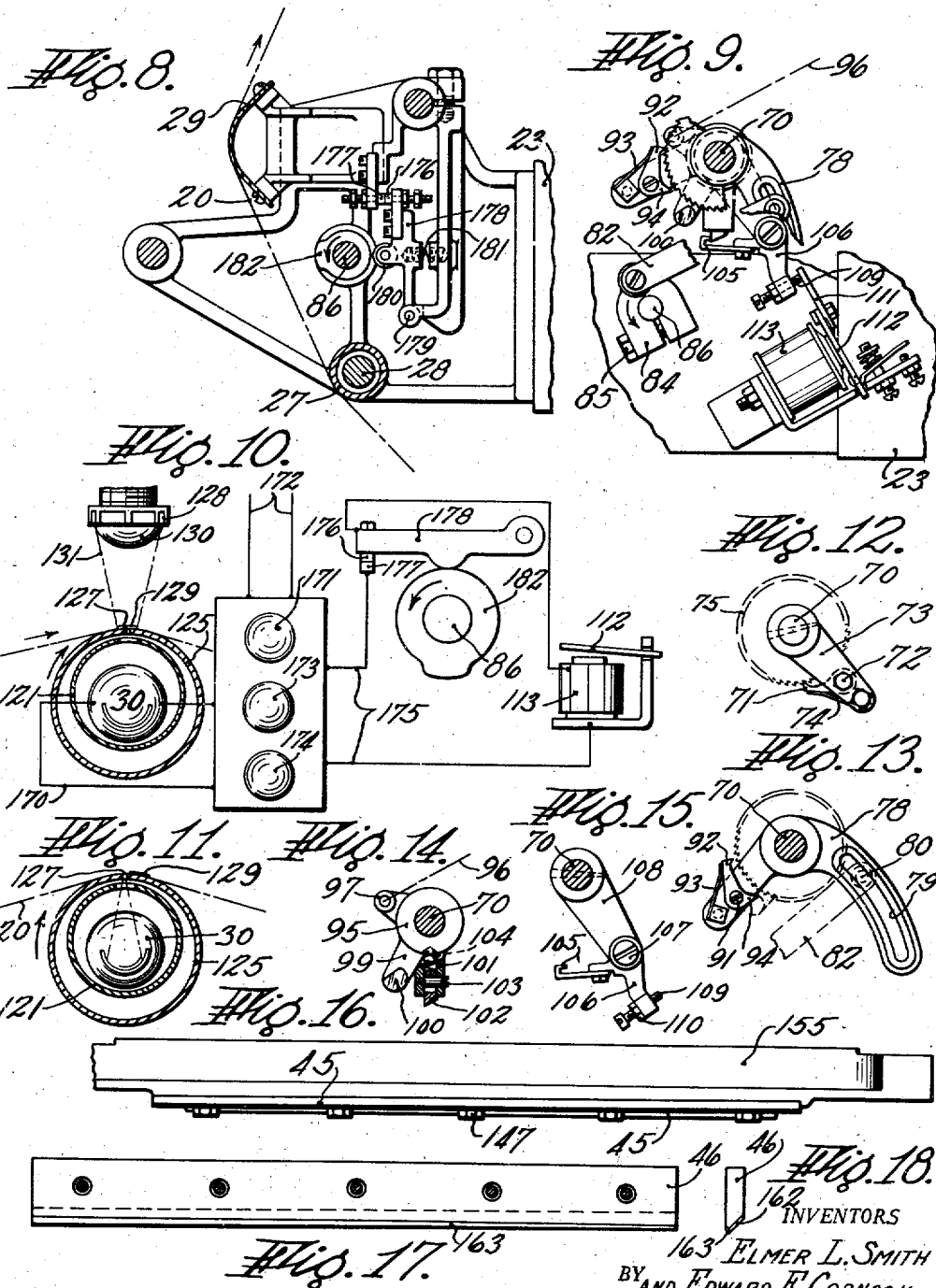
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2,035,201

WEB REGISTERING AND CUTTING DEVICE

Filed April 21, 1933

4 Sheets-Sheet 4



INVENTORS
ELMER L. SMITH
BY EDWARD F. CORNOCK
Chapin & Heel ATTORNEYS.

UNITED STATES PATENT OFFICE

2,035,201

WEB REGISTERING AND CUTTING DEVICE

Elmer L. Smith, Longmeadow, and Edward F. Cornock, Springfield, Mass., assignors to Package Machinery Company, Springfield, Mass., a corporation of Massachusetts

Application April 21, 1933, Serial No. 667,246

15 Claims. (Cl. 271-2.6)

This invention relates to mechanism for registering and cutting printed webs of paper so that the line of severance will be located in proper relation to the printing appearing on the web.

- One object of the invention is to provide an improved mechanism of this type which is adapted for use where it is desired to forward the web continuously instead of intermittently. A further object is to improve the mechanism for determining the condition of register of the web. A further object is to improve the mounting and shielding for the electric eye or photoelectric cell which is employed as a web scanning device. A further object is to improve the accuracy of existing devices of this character, especially with relation to high rates of web feed. A further object is to provide the mechanical structure by which the desired corrections are introduced into the web feed. A further object is to provide improved means for adjusting the registering, feeding, and cutting mechanisms. Additional objects will appear from the following description and claims.

Referring to the drawings:

- Fig. 1 is a side elevation of a machine constructed in accordance with my invention;

Fig. 2 is a detail section through the stationary and movable cutting members;

- Fig. 3 is an elevation, looking from the left in Fig. 1, some parts being broken away and the light source for the photoelectric cell being removed;

Fig. 4 is a sectional plan view, taken on line 4-4 of Fig. 1;

- Fig. 5 is a sectional elevation, taken on line 5-5 of Fig. 1;

Fig. 6 is a detail plan on line 6-6 of Fig. 3, with the housing and shield for photoelectric cell shown in median section;

- Fig. 7 is a section on line 7-7 of Fig. 6;

Fig. 8 is a section on line 8-8 of Fig. 3;

- Fig. 9 is a fragmentary view similar to a portion of Fig. 1 but showing the parts in different positions;

- Fig. 10 is a diagrammatic view showing certain electrical connections;

- Fig. 11 is a diagrammatic view similar to a portion of Fig. 10 but showing a different condition of web registration;

- Figs. 12, 13, 14 and 15 are details of mechanisms appearing in Fig. 1, these mechanisms being removed from their common support in same order as that given by the arrangement of the figures;

Fig. 16 is a top plan view of the stationary web cutting knife;

Fig. 17 is a side view of the rotary knife; and

Fig. 18 is an end view of the rotary knife.

The present device is adapted to operate upon a web 20 of paper or other material, this being supplied from a reel 21 journaled upon brackets 22 which extend from the main frame 23. After leaving its reel the web 20 passes over the usual slack take-up roll 24 mounted for swinging movement upon arms 25 pivoted to the frame at 26 and urged in a counterclockwise direction as viewed in Fig. 1 by any suitable spring mechanism. The web then passes a guide roll 27 mounted for rotation upon a tie rod 28, by which means the web is directed in a constant angular direction to the guide 29 that positions it for the scanning operation of the photo-electric cell or electric eye 30. This guide 29 extends partway only across the web and is arcuate in cross section. At one end the guide 29 is secured by screws 31 (Fig. 3) to a cylindrical housing 32 (Fig. 6) formed at one side of a yoke-shaped bracket 33 which in turn is secured by a set screw 34 to a tie rod 35. At the other end the guide is slotted at 36 (Fig. 3) screws 37 passing through these slots being threaded into a bracket 38. By this means the guide may be shifted in accordance with 30 any lateral adjustment of the photo-electric cell which may be necessary to bring the latter into line with the spots or registering marks on the web. The detailed construction of the photo-electric cell mounting will be considered 35 below.

The web turns through an angle around the guide 29, and then passes between upper and lower feed rolls 40 and 41 respectively. The lower roll is preferably of steel, and the upper one made of cork and in the form of a longitudinally spaced series of short rolls, as shown in Fig. 3. The two rolls are geared together by pinions 42 and 43, the drive being through the lower roll as will be explained. Situated beyond the feed rolls are a stationary lower knife 45 and a revolving upper knife 46. Finally, the severed sheet is seized between feed belts 47 and 48 which may form a part of a sheet forwarding mechanism.

It will be convenient before taking up the web controlling mechanism to consider the driving mechanism for the feed rolls, it being through this driving mechanism that control of the registration of the web is accomplished. At 55

one end the shaft 49 bearing the lower feed roll 41 is extended through the frame and at a distance from the outer side of the frame has a reduced portion 50 (Fig. 4) on which is keyed a pinion 51 having a hub portion journaled in an end plate 52 secured to a housing 53 by dowels 54 and by studs 55. At its inner side this housing has a hub portion 56 journaled upon a sleeve 57 which in turn is journaled upon bushings 58 on the shaft 49. A gear 59 is keyed to the sleeve 57 and is rotated at constant speed by mechanism to be described, turning the sleeve at the same constant rate. The outer end of the sleeve is formed with a pinion 61 meshing with a series of differential pinions 62 freely mounted upon the studs 55. A second series of differential pinions 63 are formed integral with those of the first series, and are of somewhat larger size. These latter pinions mesh with the pinion 51 on the end of shaft 49. It will be seen that if the housing 53 is held stationary the gear 59 will, through the pinions 61, 62, 63, and 51, cause the shaft 49 to turn in the same direction and at a constant relative speed dependent upon the number of teeth on the several gears. If the housing is given a bodily rotation the difference in the sizes of the pinions 62 and 63 will cause a relative advance or retardation of the shaft 49 depending upon the direction in which the housing is moved. In the present case the housing is rotated in one direction only, the feed rolls being set to feed a length of web over or under the correct length and the housing being rotated periodically in a single direction with a frequency dependent upon the degree of correction required.

Rotation of the housing is obtained by a ratchet and pawl mechanism receiving its power from the main drive and controlled in its operation by the photo-electric cell which scans the web. The mechanical features of this ratchet device will be considered first. Projecting from the machine frame is a non rotating stud 70 (Figs. 1, 5, and 9), which may be formed from the end of one of the tie bars which hold the frame assembled. A series of mechanisms illustrated in Figs. 12, 13, 14 and 15 are mounted on the stud 70, those figures showing the order in which said mechanisms are placed from the outer end of the stud inwardly. The outermost one of these elements (Fig. 12) comprises a pawl 71 pivoted at 72 to an arm 73 pinned to the stud so that it does not rotate. A spring 74 presses on the pawl to hold it against a ratchet 75 which is free on the shaft and has fixed to it (Fig. 5) a gear 76 in mesh with a gear 77 on the housing 53. The pawl 71 serves as a hold-back to prevent movement of the ratchet, and consequently of the housing, in a backward direction.

To the rear of the ratchet an arm 78 (Fig. 13) is freely movable on the shaft. One end of this arm is provided with an arcuate slot 79 in which an adjustable pivot 80 is clamped by a nut 81 (Fig. 1). A link 82 joins this pivot with a crank pin 83 carried by a yoke 84 clamped by a bolt 85 upon the end of a rotating shaft 86. A sprocket 87 on this shaft is connected by a chain 88 with a sprocket 89 on a drive shaft 90, which may conveniently be a part of the wrapping machine or other mechanism to which the paper feed is applied, so that the shaft 86 is driven continuously at a constant rate. The other end of the arm 78 is provided with a pivot 91 for a pawl 92 held against the ratchet 75 by

a spring 93 and having a tail 94 by which the pawl may be held out of contact with the ratchet.

Situated still further to the rear on the stud 70 is a member 95 (Fig. 14), free on the stud and constantly urged in a clockwise direction (as viewed in Fig. 14) by a spring 96 coupled between an arm 97 and a clip 98 (Fig. 1) on the frame. A second arm 99 on the member 95 bears an abutment 100 which, when the spring 96 is left free to act, rests constantly against the pawl tail 94 and keeps the pawl out of contact with its ratchet. A third arm 101 is slotted to receive a sliding dog 102 guided by a pin 103 and pressed outwardly by a spring 104. This dog is adapted for engagement with a hook 105 (Fig. 15) carried on a bell crank 106 pivoted at 107 to the end of an arm 108 fixed against rotation on the stud 70. On the other end of the bell crank is an adjustable abutment in the form of a screw 109 held in place by a lock nut 110. This screw is positioned so as to be contacted with by a finger 111 projecting from the armature 112 of a standard relay or contact-closing type of electromagnet 113 which is in the circuit controlled by the photo-electric cell.

Whenever a current is established in the electro-magnet by the photo-electric cell the finger 111 will act on the bell crank to swing the hook 105 into the path of the dog 102. In accordance with the present invention the closure of the circuit through the magnet is not critical in its timing, since this circuit is arranged to remain closed for a considerable part of the cycle. Provided that the circuit through the magnet is closed during the inactive or counter-clockwise rotation of the pawl arm and remains closed until the pawl starts its active or clockwise movement the action will be the same. In any case the sole direct function of the magnet is to tilt the hook into the path of the dog 102, an operation requiring little expenditure of power as the bell crank may be made nearly evenly balanced. If the dog has not by that time passed the hook in its inactive stroke it is permitted by its spring to ride over it, and when the pawl carrier starts its clockwise motion the dog will be caught behind the hook as in Fig. 9 and prevented from further motion. It will be understood that except when the hook is shifted into this position the spring 96 will keep the abutment 100 against the tail 94 of the pawl and the members 78 and 95 will move as a unit with the pawl held out of engagement with the ratchet. When the hook holds the member 95 against movement, however, the abutment 100 can no longer restrain the pawl; and in that case the ratchet is engaged by the pawl and is rotated to cause a corresponding rotation of the housing 53 and therefore a correction in the angular position of the feed rolls. The correction applied is constant and predetermined in amount and is always in a single direction, the amount of correction given to the rolls being governed by varying the frequency rather than the magnitudes of individual corrections.

The electro-magnet is controlled by a photo-electric cell 30, which is mounted and shielded in a novel manner forming an important part of my invention. The tube is held on a standard socket 120 (Fig. 6) located in the cylindrical housing 32 which is formed as a part of the bracket 33. A shield 121, having an aperture 122 at one point for the admission of light, is screwed at 123 to the housing and preferably 75

bears a spring 124 which holds the tube yieldingly in position. The tube is thus fully protected against light coming from any direction except through the aperture 122. Surrounding the shield 121 is a rotating shutter 125 secured on the end of a shaft 126 journaled in the second arm of the bracket 33. This shutter has a narrow slit 127 which passes across the aperture 122 at each revolution of the shutter, permitting the entrance of light from a light source 128 unless the slit is closed by the registration with it of an opaque spot 129 printed upon the web 20. As is customary in light sources for use with photo-electric cells, a focusing lens 130 is provided to cause the light beam 131 to converge upon the cell, and the source is adjustable as at 132 in order to allow for accurate focusing.

The shutter 125 is mounted for rotation once during each cycle, being timed in the case shown so that the slit 127 passes the aperture 122 at the same instant as a spot 129 if the web is in accurate registration. The machine is intended to sever sheets of variable lengths, so that the distance between successive spots on the web will vary for each length of sheet. One sheet length must be pulled past the photo-electric cell in each cycle, while the shutter makes a single revolution. The web will accordingly slip over the shutter an amount equal to the excess of the sheet length over the circumference of the shutter. It is desirable not to have the slippage occurring at a time when the spot is passing the aperture 122, as this might cause the light beam reaching the cell to pass onto or off from the spot during the transit of the spot across the aperture, with a consequent disturbance of the action of the cell. Provision has therefore been made for driving the shutter at a variable speed, so that the effective portion of the light beam may be synchronized with the web at the instant of transit. For this purpose the shaft 126 is provided with an elliptical gear 135 adjustably held to the shaft by a split hub 136 and a clamp screw 137 (Fig. 3). A second elliptical gear 138 meshes with the first one and is held by a split hub 139 and a clamp screw 140 to the shaft 86 carrying the ratchet operating crank. By adjusting these gears relatively to the shutter the speed of the latter at the time of transit may be controlled so that it is the same as that of the web.

In order to vary the amount of rotation given to the web feed rolls during each cycle, and thereby to control the length of sheet cut, a change speed gearing is provided for driving the lower feed roll 41. It will be recalled that the drive for this roll was obtained from a gear 59 acting through the differential gearing described in connection with the feed correcting mechanism. This gear meshes with a gear 145 rotatable on the end of an arm 146 adjustably held to the machine frame at 147. A gear 148 is fixed to gear 145 and meshes with a gear 149 on a driving shaft 150 which receives a constant rotation from the machine to which the sheet feed is to be applied. By changing these gears any desired rate of web feed can be obtained.

The lower knife 45 is stationary, and is held to a fixed bracket 155 (Figs. 2 and 16) by adjusting screws 156 and clamp screws 157. The upper edge of this knife is beveled at 158, its straight side facing against the direction of movement of the web, and being positioned at a slight angle across the web. The rotating knife blade 46 is secured by bolts 159 to a knife-carry-

ing cylinder 161 which has reduced ends journaled in the frame. The knife blade is beveled off at 162 with its flat side facing against the direction of movement of the web, and is provided with a slight additional bevel 163 (Fig. 18) on the flat side, this bevel increasing progressively from one end of the blade to the other. The knife is ground so that its cutting edge is always at the same radial distance from the axis around which it rotates, but is displaced angularly around this axis so that it generally corresponds to the angular arrangement of the stationary knife. Because of this construction the knives coact to produce a shearing cut, starting at one side of the web and proceeding in an angular direction across the machine, this angle being chosen so that the resultant cut across the moving web is substantially straight and at right angles to the web edges. It is preferable that the knives move at a much higher speed than the web during the instant of cut, and an elliptical gear drive is provided generally similar to that used in driving the shutter, to raise the cutter speed at this point in the cycle. The upper cutter shaft has one elliptical gear 165 pinned to it, its angular position being chosen so that when the cutting blades are in contact the highest speed is being delivered to the upper blade. This gear is in mesh with a second gear 166 held by a split hub 167 and a binding screw 168 onto the main driving shaft 150 previously referred to. By this adjustment the knives may be set in proper relation to the machine to which the cut sheets are delivered.

The amplifying relay which is controlled by the photoelectric cell is not illustrated in detail as in itself it forms no part of my invention. Preferably a thermionic relay is used, as this is at once more sensitive and more rapid in response than a mechanical relay. Preferably, also, the relay comprises a mercury vapor cut-pump tube of the so-called thyatron type supplied with direct current through a suitable rectifier circuit if necessary. A tube of this type, when supplied with direct current in its plate circuit, has the characteristic of being easily and rapidly rendered conductive by a momentary excitation of its grid circuit, and retaining this conductivity independently of any grid excitation until the plate circuit is broken positively. Furthermore, it is desirable that the photo-electric cell be connected in a manner to give current in the output circuit of the amplifier when light falls upon the cell. Photo-electric amplifiers having these characteristics may be obtained in commercial form upon the market and need not be described in all their electrical details here. Of course certain mechanical features of the invention are usable with amplifiers of other forms from that indicated as preferred, and the apparatus could in some aspects be adapted to such other forms. The preferred type of amplifier has definite advantages when used in combination with the mechanism described, as will now be more particularly pointed out.

As was mentioned above, it is preferred to use an amplifier the output circuit of which is energized by light striking the photo-electric cell, but which is not deenergized by the cessation of this light. This has the advantage of requiring only a very brief duration of illumination while leaving the output circuit closed for a sufficient time to actuate the necessary me-

chanical parts without sensitive and critical adjustment. In Fig. 10 the cell 30 is shown as coupled by a circuit 170 to an amplifier comprising a rectifier tube 171 receiving current from an alternating current supply 172 and changing this into direct current; a thermionic amplifier tube 173, and a vapor type output tube 174. The output circuit from this tube is indicated at 175 and passes through the coil of the electro-magnet 113 and through contact members 176 and 177. Member 176 is carried upon an arm 178 shown diagrammatically in Fig. 10 and in detail in Fig. 8. The arm is pivoted to the frame at 179 and bears a cam roll 180 pressed by a spring 181 against a cam 182 fixed to the shaft 86. Normally the members 176 and 177 are in contact, but are separated once during each cycle to break the current through the magnet previously established by the thyatron tube.

The operation of the device will now be described. During the main part of the web feeding cycle the feed rolls operate in the usual manner at a constant rate of feed. Due to the fact that the mechanism can correct in one direction only it is necessary to bias the feed in such a manner that even when a web having a normal length between spots is being fed a correction will be called for periodically. With the device thus set, (in this case by means of the replaceable gears driving the feed rolls) variation in the spacing of the spots on the web due to atmospheric or other causes will change the frequency of the corrections applied by means of the ratchet mechanism but not their magnitude. The timing of the device is such that if a spot arrives over the aperture 122 at the same time as the slit 127 no light reaches the photo-electric cell and no correction is made. If the spot does not cover the aperture light will fall on the cell and a correction will occur. Due to the bias given to the feed rolls, however the spot does not miss the slit except in one direction unless in entirely abnormal situations.

Fig. 10 illustrates the transit of a spot across the aperture 122 in such a position as to cover the slit 127. Under these conditions, which represent accurate registration of the web, no current passes in the output circuit of the amplifier. The electro-magnet 113 is accordingly not energized and the hook 105 is not raised. This leaves the member 95 free to rotate under the influence of the spring 96 in one direction and the pawl carrier 78 in the other, abutment 100 resting continuously against the tail of the pawl 71 and keeping it out of contact with the ratchet 75. No correction therefore occurs. If the spot is displaced forwardly of the slit 127 by a contraction of the web, light from the source 128 will reach the photo-electric cell and will cause current to flow through the magnet 113. This will occur when the pawl is moving in its inactive stroke, counterclockwise as viewed in Fig. 13, the exact instant being unimportant. This independence of the correcting mechanism from the timing of the web scanning device is of considerable value as it permits much freer adjustment of the machine for producing sheets of different lengths, and is made possible by the use of an amplifier or relay of the standard type which delivers a persisting output current when it is once activated. The resetting cam 182 is timed to break the output circuit after the pawl has started its power or clockwise stroke, and hence after the member 95 has been retained

by the hook 105 if it is going to be. Instead of having operation of ratchet 75 occur whenever connection is required, it would of course be possible to adjust the normal feed of the web and the operation of the magnet so that the ratchet would be operated whenever a spot was in proper position, and would be inactive to cause a correction when a spot was out of register.

What we claim is:

1. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a stationary photo-electric cell, a cylindrical shield surrounding the cell and having a light-admitting slit therein, means for forwarding the web along a path in contact with said shield and between it and the light source, and means for rotating the shield around the photo-electric cell and upon an axis extending transversely of the path of motion of the web and at a surface speed substantially corresponding with that of the web as the slit makes contact with the web.

2. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a photo-electric cell, an apertured guard surrounding the cell, a cylindrical shield surrounding the guard and having a light-admitting slit therein, means for guiding a web past the shield with the indicia thereon in line with the aperture, and means for rotating the shield around both the cell and the guard upon an axis extending transversely of the path of motion of the web.

3. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a photo-electric cell, a shield surrounding the cell and having a light-admitting slit therein, said shield being mounted for rotation in surface contact with the web, means for rotating the shield with a variable angular velocity, and means for adjusting said rotating means so that the angular velocity at the instant of registration of the indicia with the slit may be made such that the surface speeds of the shield is momentarily the same as the surface speed of the web.

4. In a web handling device of the type in which an indicia bearing web is fed past a detecting device by continuously rotating feed rolls, that construction of detecting device comprising a light source, a photo-electric cell, a shield surrounding the cell and having a light admitting slit therein, means for forwarding the web along a path in contact with the shield and between it and the light source, and means connected with the feed rolls for rotating the shield upon an axis extending transversely of the path of motion of the web including a pair of elliptical gears adjustably mounted so that the peripheral speed of the shield when the slit makes contact with the web may be made the same as the linear speed of the web being delivered by the feed rolls.

5. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device and adjustable to handle varying lengths of web in a single cycle, that construction of detecting device comprising a light source, a photo-electric cell positioned to receive light from the source after said light contacts the web, a shutter positioned to intercept the light from said source, means for mov-

ing the shutter at a variable speed, and means for adjusting the speed of the shutter so that the light beam reaching the cell is, at the line of the web traveling at the same speed as the web.

5 6. In mechanism for controlling the register of an indicia bearing web relative to a web treating machine, having web feeding rolls, a three part differential drive for said rolls having one part connected to the feed rolls, a second
10 part connected to a continuous drive, and a third part adapted for progressive movement to control the timing of the rolls; mechanism for causing progressive movement of said third part comprising a ratchet coupled to said third part,
15 a pawl, means for oscillating the pawl, and means controlled by the register of the web and operable during the continuous motion of the second part and before the start of a power stroke of the pawl to determine whether the
20 pawl shall operate on said power stroke.

7. In mechanism for controlling the register of an indicia bearing web relative to a web treating machine, having web feeding rolls, a three part differential drive for said rolls having one part connected to the feed rolls, a second
25 part connected to a continuous drive, and a third part adapted for angular movement to control the timing of the rolls; means for applying to said third part during the continuous motion of the second part a succession of angular rotations of predetermined and equal
30 amounts, and means responsive to the condition of register of the web for varying the frequency of application of said rotations.

8. In mechanism for controlling the register of an indicia bearing web relative to a web treating machine, having web feeding rolls, a three part differential drive for said rolls having one part connected to the feed rolls, a second
40 part connected to a continuous drive, and a third part adapted for movement to control the timing of the rolls; mechanism for causing progressive movement of said third part during the continuous motion of the second part comprising a ratchet coupled to said third part,
45 a pawl, means for oscillating the pawl, a follower normally held against the pawl to hold the pawl out of contact with the ratchet, and means controlled by the register of the web for holding said follower out of contact with the pawl
50 during a power stroke.

9. In mechanism for controlling the register of an indicia bearing web relative to a web treating machine, having web feeding rolls, a three part differential drive for said rolls having one part connected to the feed rolls, a second
55 part connected to a constant speed drive, and a third part adapted for movement to control the timing of the rolls; mechanism for causing progressive movement of said third part comprising a ratchet coupled to said third part,
60 a pawl, means for oscillating the pawl, a follower normally held against the pawl to hold the pawl out of contact with the ratchet, a hook adapted to engage said follower and prevent it from following the pawl during a power stroke, an electro-magnet positioned so that
65 when energized it will shift said hook into a position to engage the follower, and means controlled by the register of the web for energizing the electro-magnet.
70

10. In mechanism for controlling the register of an indicia bearing web relative to a web treating machine, having web feeding rolls, a three part differential drive for said rolls hav-

ing one part connected to the feed rolls, a second part connected to a constant speed drive, and a third part adapted for movement to control the timing of the rolls; mechanism for moving said third part comprising a ratchet
5 coupled to said third part, a pawl, means for oscillating the pawl, a follower normally held against the pawl to hold the pawl out of contact with the ratchet, a balanced hook adapted to be swung to engage the follower and prevent
10 it from following the pawl during a power stroke, an electro-magnet positioned so that when energized it will shift said hook into a position to engage the follower, a photo-electric cell positioned to be affected by indicia on the web,
15 an amplifier connecting said cell to the electro-magnet and of a type such that momentary excitation of the cell will cause a persisting current through the electromagnet, means for timing the operation of the cell with the passage of the web so that deviations in registry will produce activation of the cell during the inactive stroke of the pawl, and means for breaking the current through the electromagnet during the power stroke of the pawl.
25

11. In a web handling device controlled by the coaction of indicia on the web with a detecting device, means for feeding the web, a ratchet, means connected to the ratchet for introducing a correction into said web feeding
30 means, an oscillating pawl, means operative at a definite point in the cycle approximating the beginning of the power stroke of the pawl for determining the effectiveness or non-effectiveness of the pawl during the next succeeding
35 power stroke, elements including a detecting device responsive to variations from registry of the indicia on the web and operative during a portion of the idle stroke of the pawl to cause the operation of said determining means, and
40 means for resetting said determining means during the power stroke of the pawl.

12. In a web handling device controlled by the coaction of indicia on the web with a detecting device, means for feeding the web, a ratchet, means connected to the ratchet for introducing a correction into said feeding web
45 feeding means, a positively operated pawl carrier, a pawl on the carrier coacting with the ratchet, a follower spring-held against the pawl
50 for normal travel therewith and operable when so held to hold the pawl out of contact with the ratchet, and means responsive to the registry of the web for holding the follower from travelling with the pawl during a power stroke
55 of the pawl carrier.

13. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a
60 photoelectric cell, a cylindrical shield surrounding the cell mounted on an axis transverse to the path of travel of the web, and having a light-admitting slit therein, a guard plate preventing undesired light from reaching the cell and having a light admitting slit with which
65 the slit in the shield aligns during its rotation, means for forwarding the web with the indicia thereon passing between the light source and the aligned slits, and means for rotating the
70 shield upon its axis.

14. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a photo-

electric cell, a cylindrical shield surrounding the cell, mounted on an axis transverse to the path of travel of the web, and having a light admitting slit therein, means for preventing light falling on the cell from affecting its controlling action except during a predetermined part of the cycle of the device, means for forwarding the web with the indicia thereon in a path between the light source and the shield and with the indicia in alignment with the light admitting slit in the shield, and means for rotating the shield upon its axis.

15. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a photoelectric cell, a cylindrical shield surrounding the cell, mounted on an axis transverse to

the path of travel of the web, and having a light admitting slit therein, means for preventing light falling on the cell from affecting its controlling action except during a predetermined part of the cycle of the device, means for forwarding the web with an uninterrupted motion during the detecting action of the device and in a path between the light source and the shield with the indicia in alignment with the light admitting slit in the shield, and means for rotating the shield upon its axis with a surface speed substantially the same as that of the web at the time when the indicia on the web comes into registration with the light admitting slit in the shield.

ELMER L. SMITH.
EDWARD F. CORNOCK.

CERTIFICATE OF CORRECTION.

Patent No. 2,035,201.

March 24, 1936.

ELMER L. SMITH, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 63, for "sroke" read stroke; and second column, line 48, claim 3, for "speeds" read speed; page 5, first column, line 4, claim 5, after "web" first occurrence, insert a comma; and second column, line 47, claim 12, strike out the word "feeding"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D. 1936.

(Seal)

Leslie Frazer
Acting Commissioner of Patents

electric cell, a cylindrical shield surrounding the cell, mounted on an axis transverse to the path of travel of the web, and having a light admitting slit therein, means for preventing light falling on the cell from affecting its controlling action except during a predetermined part of the cycle of the device, means for forwarding the web with the indicia thereon in a path between the light source and the shield and with the indicia in alignment with the light admitting slit in the shield, and means for rotating the shield upon its axis.

15. In a web handling device of the type controlled by the coaction of indicia on the web with a detecting device, that construction of detecting device comprising a light source, a photoelectric cell, a cylindrical shield surrounding the cell, mounted on an axis transverse to

the path of travel of the web, and having a light admitting slit therein, means for preventing light falling on the cell from affecting its controlling action except during a predetermined part of the cycle of the device, means for forwarding the web with an uninterrupted motion during the detecting action of the device and in a path between the light source and the shield with the indicia in alignment with the light admitting slit in the shield, and means for rotating the shield upon its axis with a surface speed substantially the same as that of the web at the time when the indicia on the web comes into registration with the light admitting slit in the shield.

ELMER L. SMITH.
EDWARD F. CORNOCK.

CERTIFICATE OF CORRECTION.

Patent No. 2,035,201.

March 24, 1936.

ELMER L. SMITH, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, first column, line 63, for "sroke" read stroke; and second column, line 48, claim 3, for "speeds" read speed; page 5, first column, line 4, claim 5, after "web" first occurrence, insert a comma; and second column, line 47, claim 12, strike out the word "feeding"; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 28th day of April, A. D. 1936.

Leslie Frazer

Acting Commissioner of Patents

(Seal)