

March 3, 1942.

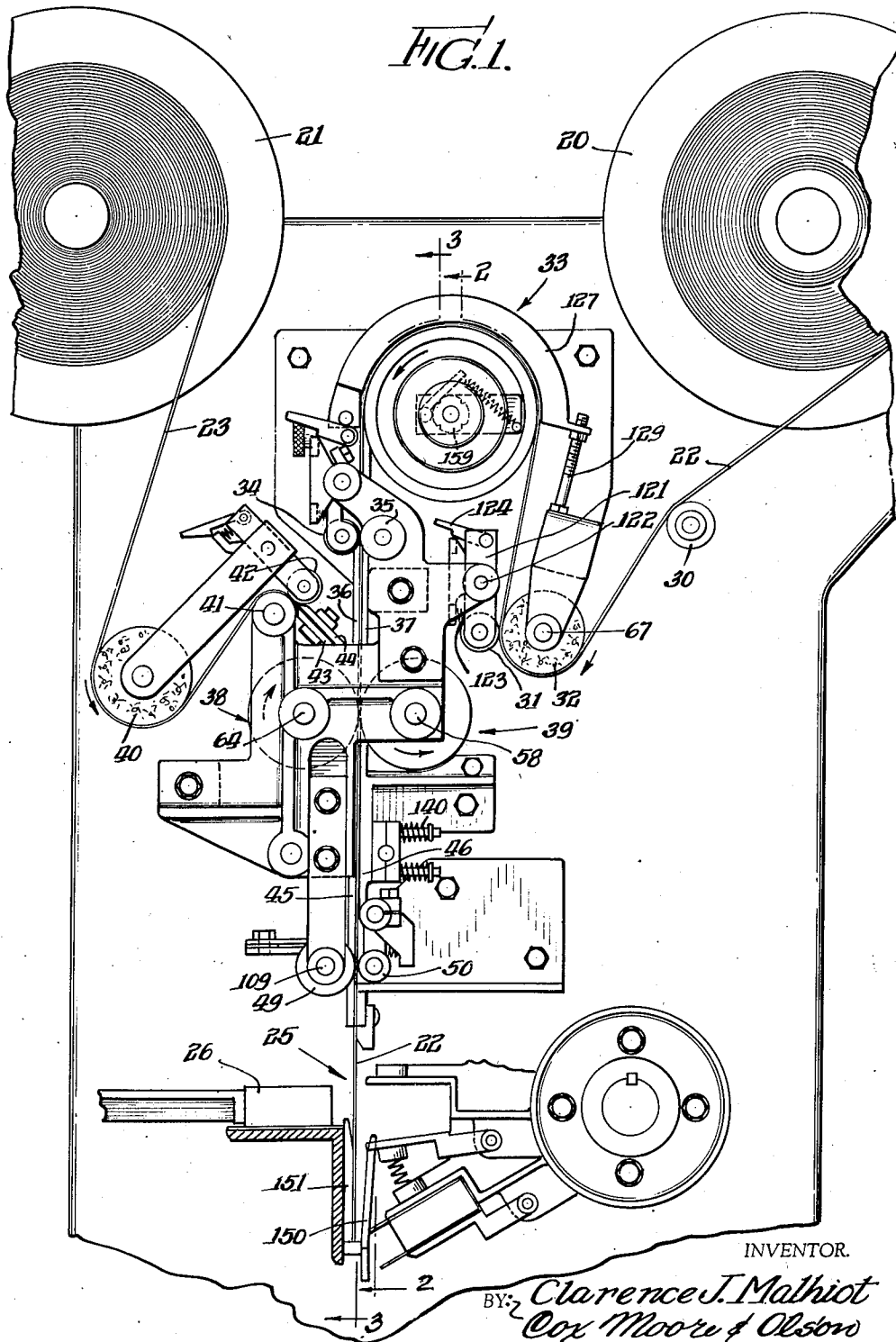
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2,275,262

WEB FEEDING MECHANISM

Filed July 3, 1940

6 Sheets-Sheet 1



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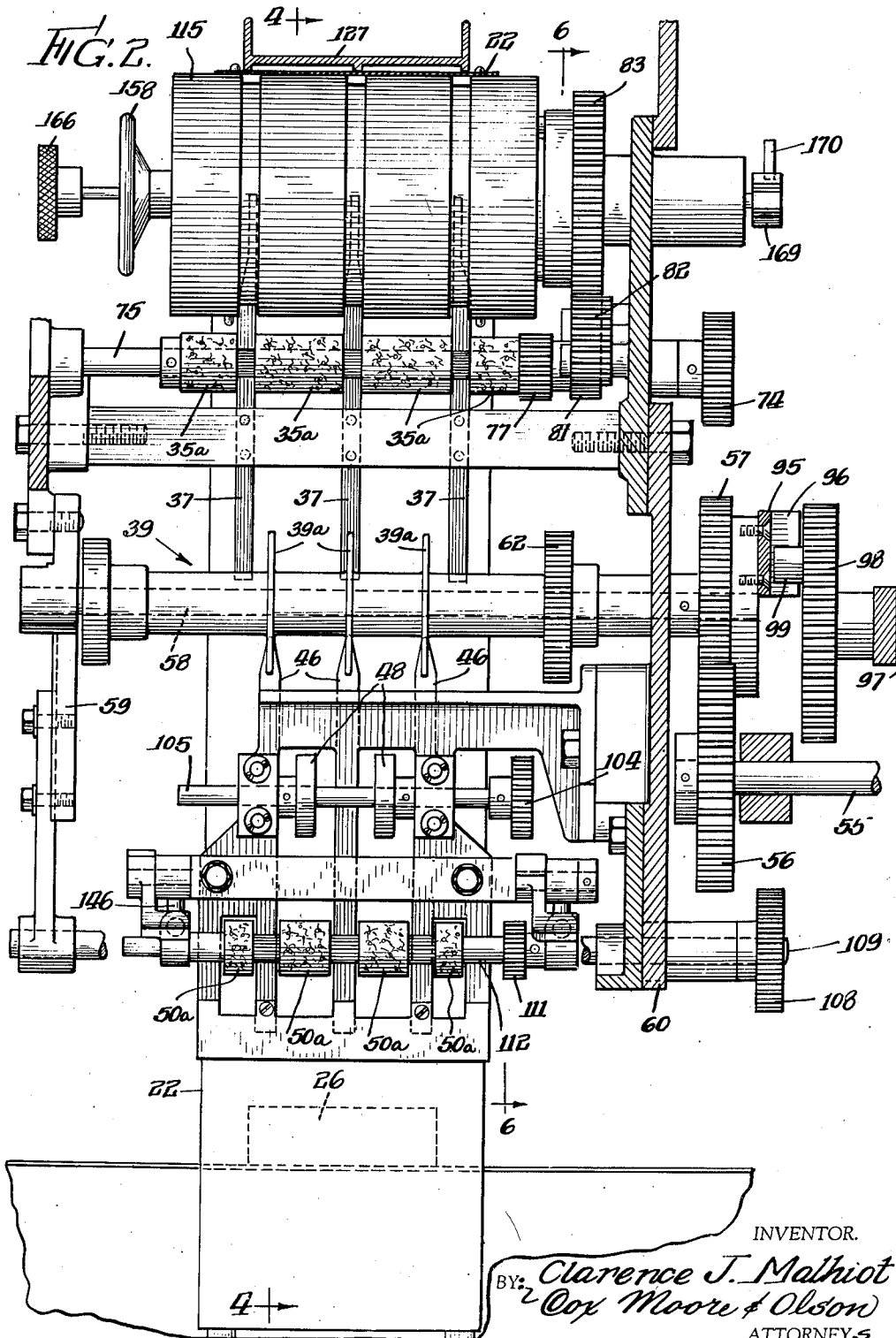
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WEB FEEDING MECHANISM

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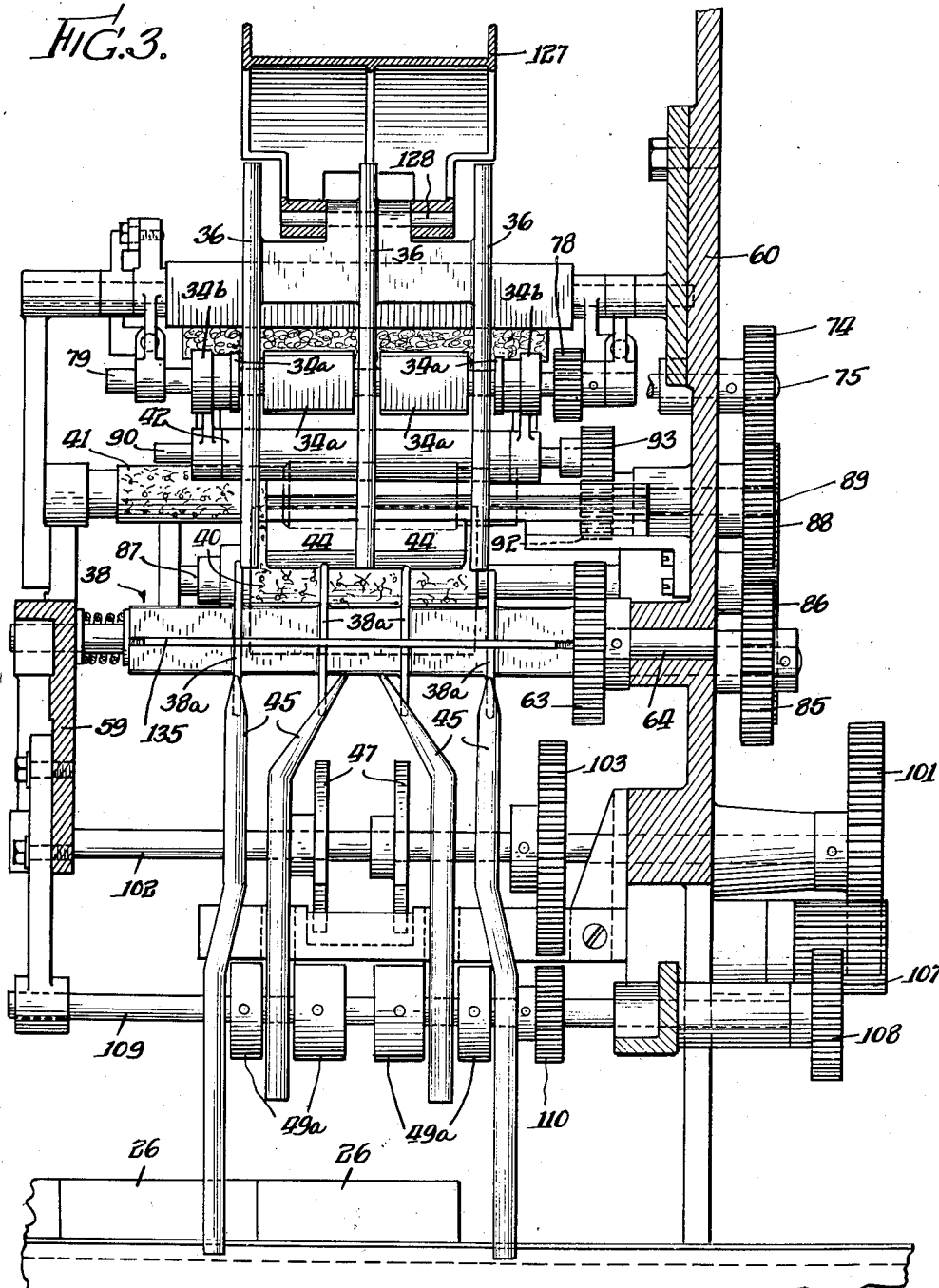
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WEB FEEDING MECHANISM

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FIG. 3.



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FIG. 4.

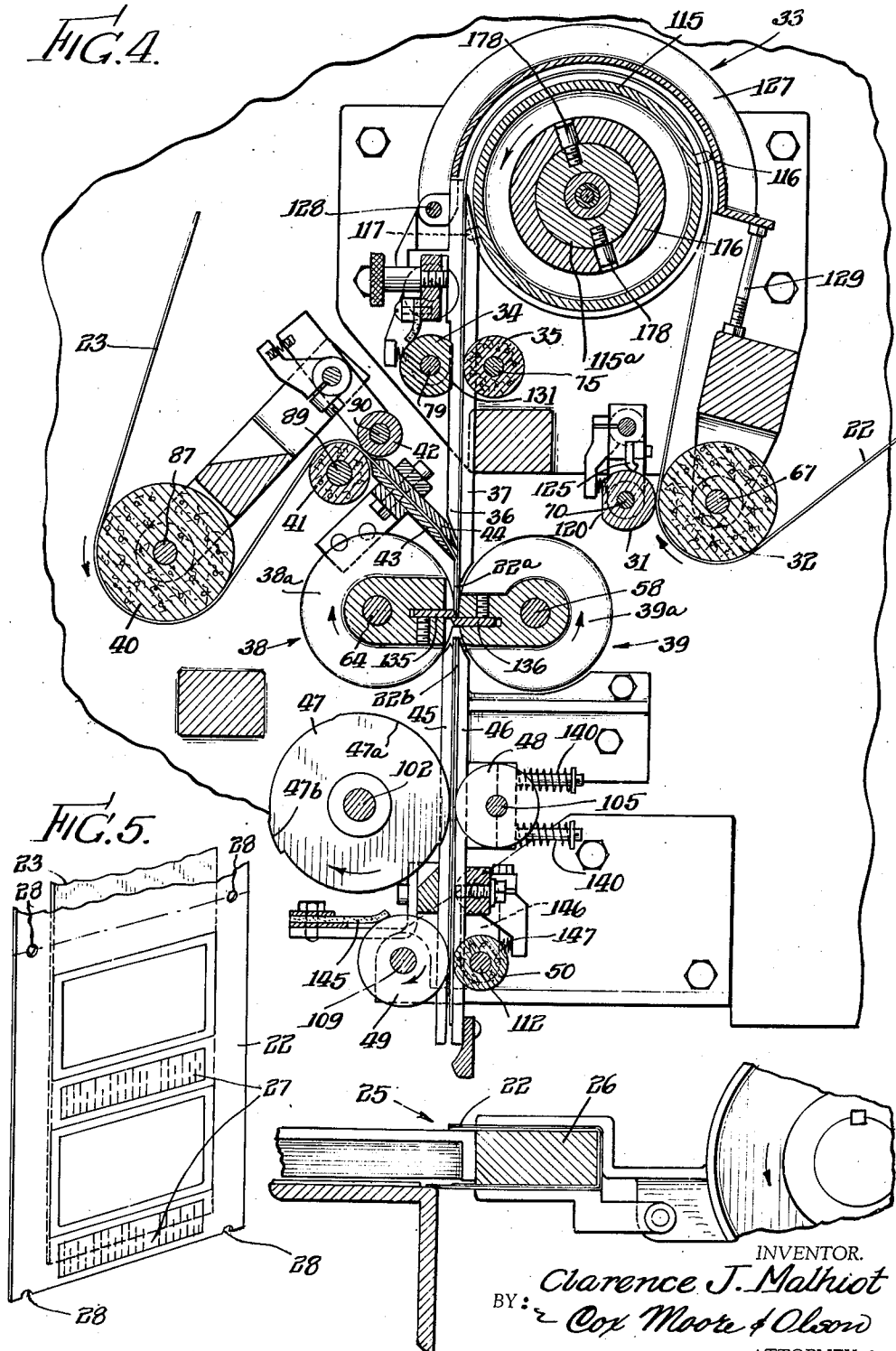
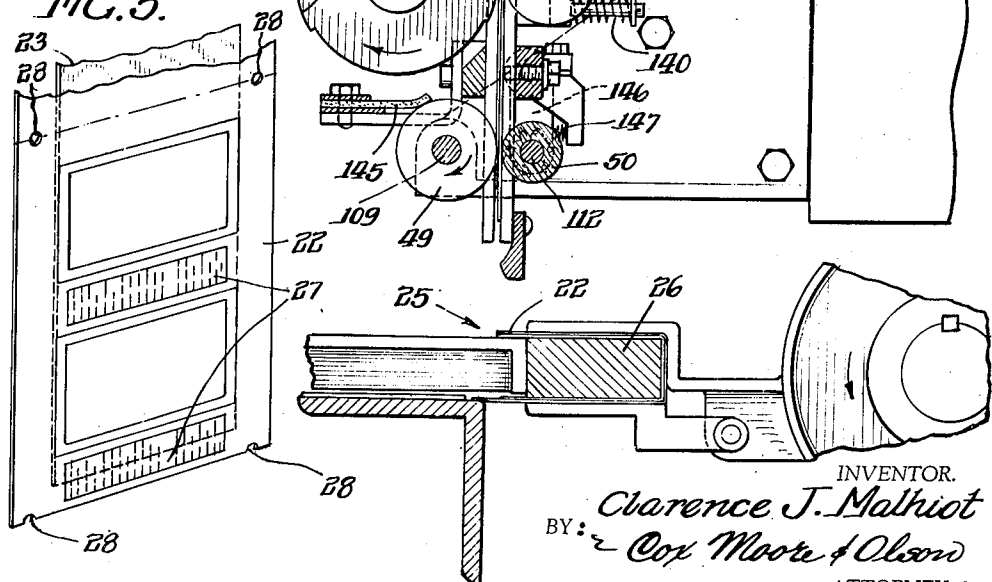


FIG. 5.



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WEB FEEDING MECHANISM

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FIG. 6.

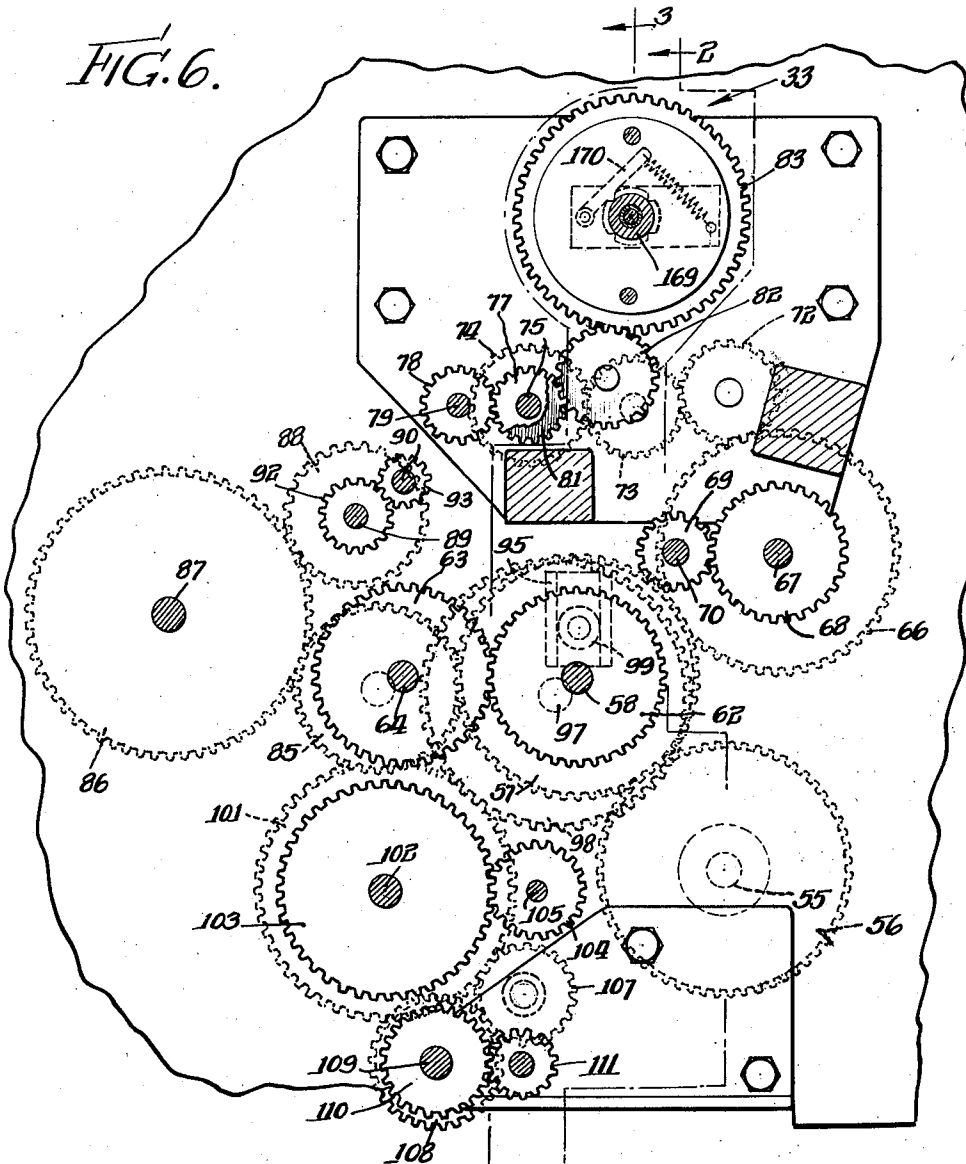
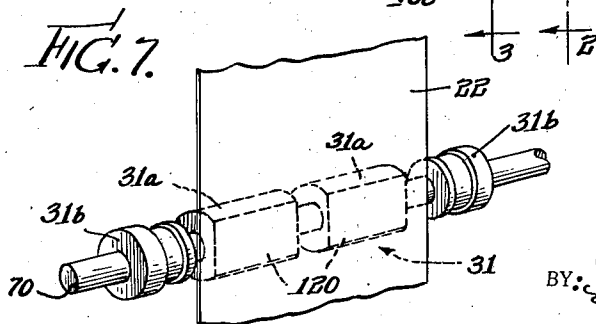


FIG. 7.



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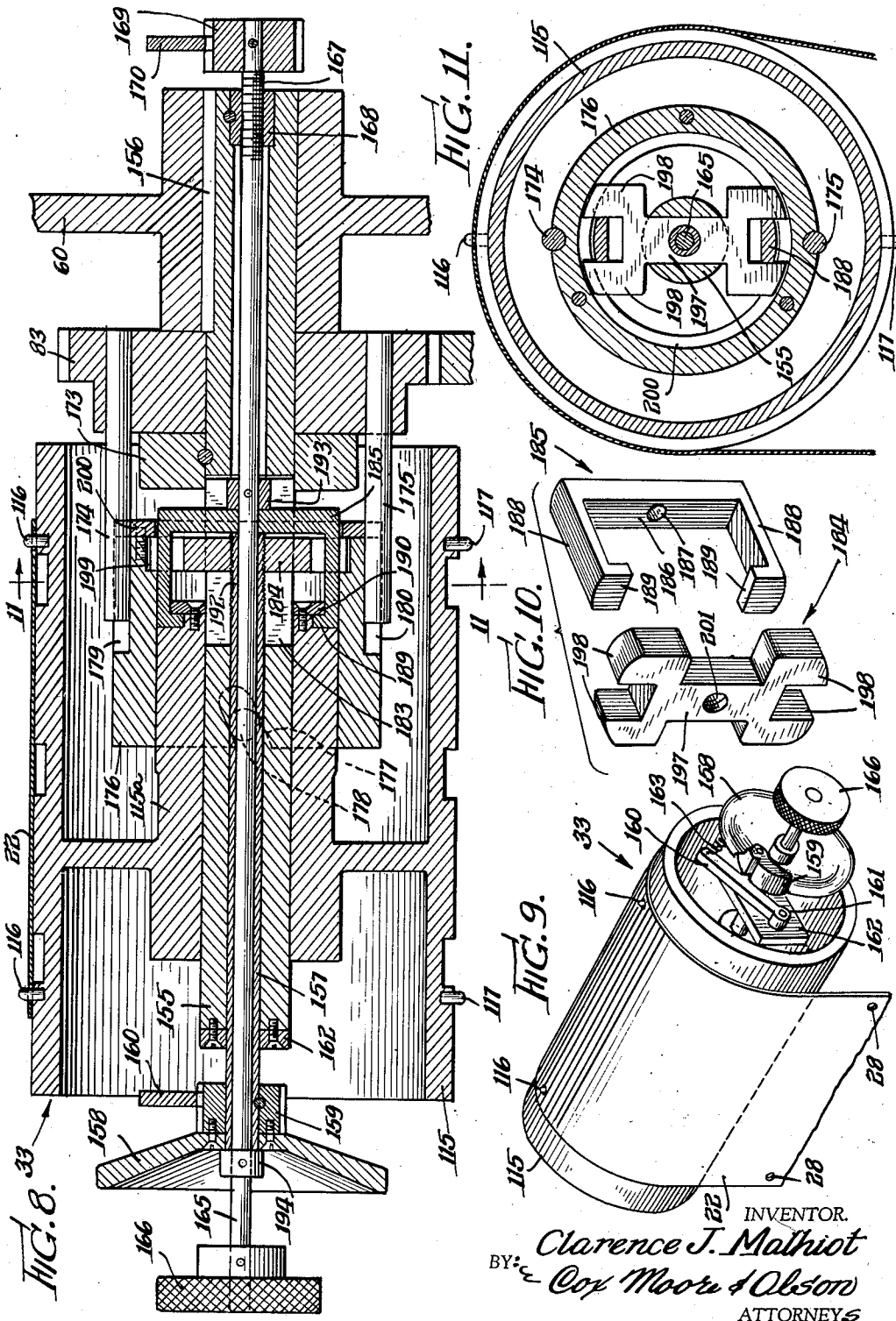
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**2,275,262**

## WEB FEEDING MECHANISM

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## UNITED STATES PATENT OFFICE

2,275,262

## WEB FEEDING MECHANISM

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Application July 3, 1940, Serial No. 343,850

25 Claims. (Cl. 164—68)

This invention relates to web feeding mechanisms, and particularly to mechanisms adapted to feed wrappers, labels, or the like in web form for use with wrapping or packaging machines.

In various types of machines, for example wrapping or packaging machines, papers such as wrappers or labels are initially fed toward the wrapping or packaging mechanism in web form, being severed into individual wrappers or labels, and individually associated with the packages as an incident to the packaging operations. Where the webs are provided with printed indicia or various types of identifying marking at spaced intervals, it is desirable that the individual wrappers or labels be severed so that such printed indicia will always bear the same and desired positioning in the individual sheets. This may be accomplished by providing indexing mechanism operable to position the web and maintain it in a predetermined position with respect to the operation of the severing means.

It is an object of the invention to provide an indexing mechanism for web feeding apparatus of the type stated, of improved construction and operation. More specifically it is an object of the invention to provide indexing mechanism of the mechanical type, wherein driving means is provided for driving the web, independent of the indexing mechanism or devices proper.

It is a further object of the invention to provide an improved mechanical indexing mechanism for web feeding apparatus wherein independent driving means is provided for driving the web at a rate of speed which may be and preferably is different from that of the indexing mechanism, the latter being periodically operable to index the web with respect to its driving means.

A still further object of the invention is to provide in a mechanical indexing mechanism of the type stated, means for releasing the driving connection between the web and its driving means as the mechanical indexing mechanism becomes operative to position the web, whereby to facilitate the positioning operation.

Another important object of the invention is to provide an indexing mechanism for web feeding apparatus wherein the indexing mechanism is operative during the operation of the apparatus to adjust both the lateral and longitudinal position of the web with respect to the mechanism operating upon it, for example, periodically operable web severing means.

Still additional objects of the invention are to provide in a web feeding mechanism, presser

means for maintaining superimposed webs in predetermined position upon severance, and speed control feeding means for transmitting the webs both before and after severance through and to the various machine mechanisms at a predetermined and controlled speed.

Various other objects, advantages and features of the invention will be apparent from the following specification when taken in connection with the accompanying drawings wherein a preferred embodiment of the invention is set forth for purposes of illustration.

In the drawings, wherein like reference numerals refer to like parts throughout:

Fig. 1 is a general assembly view of a web feeding mechanism constructed in accordance with one preferred embodiment of the invention.

Fig. 2 is a vertical sectional view through the mechanism of Fig. 1 on the line 2—2 thereof, the sectional line 2—2 also being indicated on Fig. 6.

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 1, the line 3—3 also being indicated on Fig. 6.

Fig. 4 is a transverse sectional view through the apparatus substantially on the line 4—4 of Fig. 2.

Fig. 5 is a detail view of the superimposed webs.

Fig. 6 is a transverse sectional view through the apparatus, more particularly illustrating the rear drive gearing, and taken substantially on the line 6—6 of Fig. 2.

Fig. 7 is a detail perspective of one of the web driving rollers.

Fig. 8 is a detail sectional view of the indexing roller.

Fig. 9 is a perspective view of the roller on a reduced scale.

Fig. 10 is an exploded view of certain of the roller parts, more particularly relating to the roller adjustment mechanism, and

Fig. 11 is a sectional view through the roller on the line 11—11 of Fig. 8.

#### General structure

Referring primarily to Figs. 1 and 4, the apparatus in general comprises a pair of supply drums 20 and 21 adapted to carry the supply rolls for the webs 22 and 23 which in the web feeding apparatus of the invention are indexed, superimposed and severed into individual sheets, and delivered to a delivery station generally indicated by the numeral 25. In the particular embodiment illustrated, the delivery station 25 may be the initial wrapping station of a wrapping or

packaging machine, and the webs 22 and 23, as best shown in Fig. 5, may constitute the outer and inner wrappers respectively for the articles or packages 26 to be wrapped. While the invention is thus shown in conjunction with a wrapping or packaging machine for articles, as it is particularly adapted for use in such connection, it is to be understood that the mechanism of the invention, and the various features thereof, may be adapted for various uses and purposes within the scope of the claims.

In the particular embodiment illustrated the web 22 for forming the outer wrappers is of the wax-paper type and is provided, as shown in Fig. 5, with printed indicia 27 and a series of indexing devices 28 which more specifically are aligned openings on either side of the web and cut or otherwise formed therein at predetermined spaced intervals.

The web 22 is led from the supply drum 20 over an idler roll 30, Figs. 1 and 4, to a first set of driving rollers 31 and 32 arranged on the infeed side of the indexing mechanism or roller drum generally indicated by the numeral 33. From the first set of driving rollers the web is led over the indexing drum to a second set of driving rollers 34 and 35 arranged on the outfeed side of the drum, and then by means of guides 36 and 37 to a pair of cooperating cutter rolls 38 and 39.

The cutter rolls are adapted to operate as a severing means for both webs and to that end the inner wrapper web 23 is superimposed with the outer wrapper web prior to the time that the webs reach the cutter rolls. More specifically, the web 23 is led from its supply drum over a single driving roller 40 to a pair of cooperating driving rollers 41 and 42, and then by means of guides 43 and 44 into superimposed relation with web 22 immediately in advance of the cutter rolls.

From the cutter rolls the superimposed wrappers, which are now in the form of individual sheets, are led by means of guides 45 and 46 through a pair of presser rolls 47 and 48, which act to secure the superimposed sheets together in relatively immovable relation, and then through a pair of final driving or delivery rolls 49 and 50 to the delivery of packaging station 25.

#### *Drive mechanism*

The indexing drum, cutter rolls, presser rolls, and the several driving rolls of the apparatus are all adapted to be driven in predetermined timed relation by means of interconnected driving mechanisms which are best shown in Figs. 2, 3 and 6 of the drawings.

More specifically, a main drive shaft indicated by the numeral 55, Figs. 2 and 6, which may be driven by any suitable power source, carries a gear 56 in driving engagement with a gear 57 mounted upon and adapted to drive a shaft 58 which carries the right cutter roll 39, as seen in Figs. 1 and 4, the shaft 58 being journaled in the forward and rear frames 59 and 60 respectively of the machine. Shaft 58 also carries a gear 62 adapted to mesh with and drive a gear 63, Figs. 3 and 6, which latter gear is mounted upon and adapted to drive a shaft 64 carrying the left cutter roll 38. It will thus be seen that both cutter rolls are adapted to be driven in synchronized relation from the main drive shaft 55 of the machine, by means of the gearing connections described.

The gear 57 also meshes with and drives a gear 66, Fig. 6, mounted upon a shaft 67 which carries

the right-hand feed roller 32, as seen in Figs. 1 and 4, of the first set of driving rollers for the outer wrapper web 2. Shaft 67 also carries a gear 68 which meshes with and drives a gear 69 mounted upon the shaft 70 carrying the left-hand feed or driving roller 31. The two driving rollers 31 and 32, the initial driving rollers for the outer wrapper web 22, are thus driven in synchronized relation for withdrawing the outer wrapper web from its supply drum.

Gear 66 meshes with and is adapted to drive a gear 72, Fig. 6, which gear in turn drives a gear 73 adapted to mesh with and drive a gear 74, Figs. 2 and 6, secured to the shaft 75 which carries the right-hand feed roller 35 of the second set of driving rollers for the outer wrapper web. Shaft 75 also carries a gear 77 adapted to drive a gear 78, Figs. 3 and 6, mounted upon shaft 79 which carries the left driving roll 34 of the second driving roller set. It will thus be seen that the driving rollers 34 and 35 are both adapted to be driven, and in synchronized relation with the first driving rollers 31 and 32.

Shaft 75 also carries a gear 81, Figs. 2 and 6, adapted to drive a gear 82 which in turn drives gear 83 formed as a part of the indexing drum mechanism 33, whereby to drive said mechanism in synchronized timed relation with the driving rolls 34 and 35 on the outfeed side of said mechanism and with the driving rolls 31 and 32 on the infeed side thereof.

The driving rollers 40, 41 and 42 for the inner wrapper web 23 are also adapted to be driven in synchronized and timed relation from the main drive shaft of the machine, and to this end the gear 57 is also adapted to mesh with and drive a gear 85, Figs. 3 and 6, which in turn meshes with and drives a gear 86 secured to the shaft 87 which carries the single driving roller 40. Gear 86 also drives a gear 88 secured to shaft 89 which carries the lower feed roller 41 of the second inner wrapper driving rollers, the upper driving roller 42 of this mechanism mounted on shaft 90 being driven from the shaft 89 through the gearing 92 and 93.

The presser rolls 47 and 48 and the associated delivery rolls 49 and 50 are adapted to be driven at variable speed, as distinguished from the constant speed drive mechanisms heretofore described. To this end, as best seen in Figs. 2 and 6, the gear 57 carries a block 95 provided with a longitudinal track 96. A shaft 97, offset with respect to the axis of shaft 58 upon which gear 57 is mounted, carries a gear 98 which gear is provided with a crank pin 99 engageable within the track 96 of the block 95. Accordingly it will be seen that as the gear 57 is rotatably driven, moving the block 95 which is mounted thereon in a circular path, the pin 99 which is engaged within the block track will cause the rotation of the gear 98. But it is to be noted that while the gear 57 is driven at constant speed, the driving movement which will be imparted to the gear 98 will be a variable speed motion, due to the offset displacement of the axes of the shafts 58 and 97. While the rotation of gear 98 will be continuous, it will be at variable speeds comprising alternate fast and slow cycles of operation as the driven pin 99 moves toward and away from the axis of shaft 58 during the rotation of the parts. The pin slides longitudinally in the track 96 and maintains continuous driving engagement. It is further to be noted that while the speed of rotation of gear 98 is alternately increased and de-



creased, during each revolution of operation, the acceleration and deceleration of the gear is gradual, whereby to avoid imparting shocks to the gear or to the mechanisms operated therefrom. The variable speed drive mechanism thus provided is similar to that disclosed in my Patent No. 2,188,282, dated January 23, 1940, but it is to be understood that other suitable forms of variable speed drives may be substituted, or a constant speed drive for the gear 98 may be utilized, if desired.

Gear 98 meshes with and drives a gear 101, Figs. 3 and 6, mounted on shaft 102 which shaft carries the left presser rolls 47 as seen in Fig. 4. Shaft 102 also carries a gear 103 adapted to mesh with a gear 104, Figs. 2 and 6, mounted on the shaft 105 carrying the right presser rolls 48. By means of this gearing the cooperating presser rolls are both driven continuously, but at alternating increasing and decreasing speeds, one complete speed alternation being provided for each revolution of gear 98 and shaft 102, the gears 98 and 101 being of the same size.

Gear 101 also meshes with and drives a stub gear 107, Figs. 3 and 6, which in turn drives a gear 108 mounted on the shaft 109 which carries the left delivery roll 49. A gear 110 is also mounted on shaft 109, this gear being adapted to mesh with and drive a gear 111, Figs. 2 and 6, mounted on the shaft 112 carrying the right delivery roll 50. The delivery rolls are thus both driven, and at variable speed in synchronized relation with the rotation of the presser rolls 47 and 48.

#### *Indexing mechanism and associated web driving structures*

As best shown in Figs. 8 and 9, the indexing mechanism 33 includes a cylinder drum member 115 adapted to be rotatably driven from the gear 83, the latter being driven by means of the drive connections heretofore described. The connections between the cylinder member and the gear, and the detailed construction of the drum structure will be later described in connection with the description of the indexing structure adjustment mechanism.

The cylinder or indexing member 115 is provided with two pairs of pins or projections 116 and 117 diametrically disposed and adapted to be brought successively into engagement with the openings 28 in the outer wrapper web, upon rotation of the cylinder, to effect the web indexing operations. More specifically, the web may be provided with indicia 27 as heretofore described, and the openings or indexing devices 28 bear a proper predetermined relation to this indicia. By engaging the pins 116 and 117 within the openings in the web as the web is driven, the web is maintained in proper predetermined position with respect to the indexing drum, and inasmuch as the drum is driven in synchronized relation with the cutter rolls or operating mechanism 38, 39, the web will also be maintained in proper position with respect to such operating mechanism whereby to effect the web severance in the proper manner with respect to its indicia or the like.

In mechanical indexing mechanisms, difficulty may be encountered if the indexing drum is utilized both as a positioning means and a driving means for the paper web, more particularly in the likelihood of damage resulting to the web as the drum pin projections are brought into engagement with the paper openings. In ac-

cordance with the present invention this difficulty is avoided by the utilization of the indexing drum only as an indexing means for the web, independent web driving means being provided, and the relation between the driving means and the indexing mechanism being such as to permit the proper functioning of the indexing mechanism while still utilizing the advantages of the independent web drive.

More specifically, referring to Figs. 1 and 4, the driving rollers 31 and 32 which are disposed on the infeed side of the indexing drum are so proportioned with respect to the drum that their peripheral speed is slightly in excess of the peripheral drum speed so that during normal driving operations, when the rollers are in operative driving contact with the web 22, the web will be withdrawn from the supply drum 20 and transmitted to the indexing drum or cylinder member 115 at a rate slightly in excess of the speed at which the web is transmitted through the indexing structure. This action accumulates a predetermined quantity of slack on the infeed side of the indexing drum. However, as best shown in Fig. 7, the driving roller 31 is provided with a cut-away or fiat section 120 on its main web engaging body portions 31a so that periodically, once during each revolution of the roller 31, the driving connection between the rollers and the web is released. The movements of the roller 31 are so timed with respect to the movements of the indexing drum 115 that the cut-away section becomes operative to release the driving engagement just as the drum pins 116 or 117, as the case may be, are being and become seated within the openings 28 of the web. In other words, the rollers 31 and 32 first operate to introduce a predetermined quantity of slack into the web on the infeed side of the indexing drum. This slack is utilized to permit the drum pins to be seated within the web openings without any possible tearing or damage to the web. Then as the pins are thus seated, the cut-away roller section 120 becomes operative to release the normal driving connection between the driving rolls 31 and 32 and the web, permitting the indexing drum, after the seating of the pins, to take the accumulated slack out of the web. Thereafter and upon continued movement of the rollers 31 and 32 the latter again become operative to drive the web at a slightly excess rate of speed and the operation is repeated. The indexing drum is thus utilized substantially only as an indexing means for the web, the driving of the web being performed by the rolls 31 and 32. The indexing of the drum pins into the web openings occurs without a driving action and while the web is in slack condition, precluding tearing or mutilation of the paper. It is to be understood that the indexing drum upon each operation of the cut-away section 120 takes out that amount of slack which has been introduced by the driving rolls 31 and 32 during the preceding operation, the drum thus acting to control the web speed and effect the indexing operations. In the particular embodiment illustrated the drive gearing is such that roller 31 operates two revolutions for each one-half revolution of the indexing drum, so that two releases of the web take place for each pin seating. However, it is to be understood that this gear ratio is merely a matter of selection, the desired feature being the seating of the pins while the web is in slack condition.

The driving rollers 31 and 32 may be of any

suitable structure, and in the particular embodiment disclosed the roller 32 is preferably a continuous cylinder of slightly yieldable material such as cork or the like. The roller 31, as best shown in Fig. 7, may be of steel or the like, the two circular end portions 31b thereof being constantly engageable with roller 32 to maintain the spacing between the rollers, and the cut-away section 120 being provided only in the main body web engaging portions 31a of the roller, as stated. As will be seen from Figs. 1 and 4, roller 31 is carried upon a bracket 121 pivoted to the frame of the machine as indicated at 122, a compression spring 123 being provided for urging the bracket counterclockwise to maintain the rollers 31 and 32 in yielding contact. A latch member 124 may be provided for holding the roller 31 away from roller 32 against the action of the compression spring when desired as for setting-up purposes or the like. Roller 31 may also be provided with a felt wiper or the like 125, as illustrated in Fig. 4. As the web leaves the rollers 31 and 32 and passes over the surface of the indexing drum, it is guided by means of a semi-cylindrical guide member 127 pivoted to the machine frame as indicated at 128 and maintained in proper spaced relation with the surface of the indexing drum by means of an adjustable support leg 129.

As the paper web 22 leaves the indexing drum it is delivered to the second feed or driving rolls 34 and 35. These rolls of the apparatus are arranged to operate at a peripheral speed slightly slower than the peripheral speed of the indexing drum, whereby to permit the accumulation of a predetermined quantity of slack in the web on the outfeed side of the drum during normal driving movements. This slack is utilized to facilitate the removal of the indexing drum pins 116 or 117 from the openings in the paper web without the possible tearing or mutilation of the paper, and after the removal of the pins the slack is eliminated. To this end, as will be best understood by reference to Figs. 3 and 4, the web engaging portions 34a of the roller 34 are provided with a flat or cut-away section 131 which is operative upon each revolution of the roller to release the driving engagement between the rollers and the web. In the particular embodiment of the structure disclosed, roller 34 is so driven as to make two revolutions for each one-half revolution or pin-seating of the indexing drum, and the timing is such that the cut-away section 131 becomes operative on one of these revolutions just as the drum pins 116 or 117, as the case may be, are removed from the openings in the web. In other words, the rollers 34 and 35 operate to accumulate a predetermined quantity of slack on the outfeed side of the indexing drum to facilitate the removal of the drum pins from the paper openings without tearing or paper mutilation, and then as and after the pins have been removed the cut-away section 131 becomes operative to release the driving engagement between the rollers 34, 35 and the web whereby to permit the removal of the web slack.

The removal of the slack in the web upon release of the driving engagement with the rollers 34 and 35 is facilitated by the action of the guides 36 and 37, previously described. These guides embrace the opposite sides of the web and tend to straighten it out to remove any slack as the cut-away roller section 131 becomes operative.

As best shown in Fig. 2, roller 35 is section-

alized as indicated at 35a to straddle the three guides 37 and is preferably of suitably yieldable material such as cork or the like. Roller 34, as best seen in Fig. 3, in addition to the web engaging sections 34a straddling the guides 36, previously described, is provided with two circular sections 34b adapted to engage roller 35 and maintain the spaced relationship therewith. Roller 34 may be of steel or the like. It is mounted on a pivoted bracket, spring-urged into engagement with roller 35, and provided with latch and wiper devices as in the case of driving roller 31 heretofore described.

#### *Cutter rolls, delivery rolls and associated structures*

The cutter rolls 38 and 39 are adapted to sever both the inner and outer wrapper webs simultaneously, and to that end the webs are brought into superposed relation prior to the cutting operation. More specifically, the web 23 for the inner wrapper upon removal from its supply drum 21 is initially fed over a single feed or driving roller 40. This roller may be a cylinder of cork or the like, driven as heretofore described. From the roller 40 the web is fed between the pair of feed rolls 41 and 42 and thence by means of the guides 43 and 44 to the cutter rolls. As in the case of the previously described cooperating driving rollers, roller 41 may be of yieldable material, such as cork, whereas roller 42 is of metal such as steel and is preferably mounted upon a pivoted bracket spring-urged into engagement with roller 41 and equipped with latch and wiper devices. The speed of rolls, 40, 41 and 42 is preferably slightly slower than the speed of travel of the web 22 so that an inner wrapper length somewhat shorter than that of the outer wrapper is fed through the cutter rolls between each operation thereof. By this means the lower end of the outer wrapper may be made to project a predetermined distance beyond the end of the inner wrapper, as best shown in Fig. 5, which may in some instances be desired.

The cutting or web-severing mechanism comprises the cutter rolls 38 and 39 adapted to carry cutting knives 135 and 136 respectively, as best shown in Fig. 4. Cutter roll 38 is provided with four circular fins 38a, Fig. 3, and roll 39 is similarly provided with three circular fins 39a, Fig. 2, the fins 39a being aligned between the fins 38a, and all of the fins being of a diameter so as to just contact the webs and facilitate their guiding through the cutter roll structure. The knives 135 and 136 cooperate to sever the webs into individual wrappers of predetermined lengths. Preferably the knives are operated substantially as the cut-away portion 131 on roller 134 becomes operative, the knives thus severing the webs and freeing the end 22a thereof to facilitate the straightening of the web by the guides 36 and 37, as previously described.

From the cutter rolls the wrappers are delivered by means of the guides 45 and 46, Figs. 2, 3 and 4, first to the presser rolls 47, 48 and thereafter to the delivery rolls 49, 50. As has been previously indicated, one of the wrapper webs, preferably the outer wrapper 22 in the particular embodiment illustrated, is of the wax-paper type. The presser rolls are utilized to press the two wrappers together whereby to cause the wax to adhere with a light adhesive action, thus facilitating the movement of the wrappers as a unit through the delivery rolls and to the packaging station 25. As best shown

In Figs. 2 and 3, there are two presser rolls or discs 47 and two rolls or discs 48 in alignment therewith, the discs being preferably of metal and the discs 48 being circular and yieldingly urged into engagement with the rolls or discs 47 by means of springs 140. As shown in Fig. 4, the rolls 47 are provided with a long high cam surface 47a and a short high cam surface 47b, and limiting means is provided for the movement of the rolls 48 under the action of springs 140 so that the sets of rolls are in contact only when the high cam surfaces 47a or 47b are in operative contacting position with the wrappers.

The delivery roll 49 is sectionalized into four sections 49a straddling the guides 45, as shown in Fig. 3. It may, for example, be of metal such as steel and equipped with a wiper device 145, Fig. 4. The cooperating delivery roll 50 may be of cork or the like and sectionalized as indicated at 50a, Fig. 2, to straddle the guides 46. It may also be carried by a pivoted bracket 146 spring-urged by means of a compression spring as indicated at 147, Fig. 4, to hold roller 50 in driving engagement against roller 49.

In the operation of the presser and delivery rolls, the timing is such that the advancing end 22a, Fig. 4, of the wrapper web 22 reaches the presser rolls as the high spot 47b comes into operative web-engaging position. At this time the cut-away section 131 of roll 34 is operative on its second or off cycle, and the cam surface 47b of the presser roll is utilized to insure and maintain the continued driving of the outer wrapper web. Due to the slower feeding movement of the inner wrapper web 23, the advancing end thereof is sufficiently behind the end of the outer wrapper so that the inner wrapper is not engaged by cam surface 47b and the wrappers are not pressed together thereby. The web end 22a reaches the delivery rolls substantially as the long cam surface 47a of the presser rolls become operative pressing the wrappers and securing them together, and just as the cutter knives 135 and 136 operate to sever the webs. At this time the presser and delivery rolls, which operate synchronously together, have just passed their minimum speed point and are accelerating due to the action of the variable speed mechanism 96, 99 heretofore described. The presser and delivery rolls upon this engagement with the webs are moving at substantially web speed, and upon their continued acceleration act to deliver the severed wrappers rapidly to the packaging station and into engagement with the packaging guides such as indicated at 150 and 151, Fig. 1. The trailing edge 22b, Fig. 4, of the severed wrappers clears the delivery rolls substantially at the point of their maximum speed of operation.

#### *Indexing mechanism adjustment*

In devices of the character herein disclosed, it is desirable that the indexing mechanism be adjustable to adjust the longitudinal positioning of the web with respect to any operating mechanism operable thereupon, such for example as the cutter rolls 38 and 39, whereby to maintain the accurate positioning of the web with respect to the operation of the operating means. Such longitudinal web adjustment may be effected by advancing or retarding the indexing drum with respect to its driving means which is synchronized with the cutter mechanism. It is also desirable that the web be transversely adjustable, as by an axial shifting of the indexing

drum, to maintain its proper delivery through the several mechanisms. In accordance with the present invention, the indexing mechanism is adjustable to effect both the longitudinal and transverse adjustment of the web; and both of these adjustments may be made while the machine is in operation and without the stopping of the web, an important feature, so that in the event the spacing of the web indicia varies or the web otherwise gets out of proper position either longitudinally or transversely, the proper adjustments can be readily made without the stopping of the machine.

The detail construction of the indexing drum and its adjustment means will be best understood from Figs. 8 to 11 inclusive. As previously stated, the cylinder or indexing member 115 is rotatable, driven from the gear 83. More particularly, the machine frame 60 carries a stationary bearing sleeve 155, Fig. 8, the sleeve being keyed or fixed to the frame by means of a key 156. Sleeve 155 forms a bearing for the rotatable hub portion 115a of the indexing cylinder 115.

A sleeve 157 is mounted within the fixed bearing 155, the sleeve 157 being rotatably adjustable within the bearing by means of a hand wheel 158 keyed or otherwise suitably fixed to the end thereof. A detent device comprising a notched cylindrical member 159 secured to the hand wheel 158, and a cooperating detent lever 160 pivoted to the frame of the machine, is associated with sleeve 157, in connection with the adjustment thereof. More particularly, the detent lever 160 is pivoted as indicated at 161, Fig. 9, to a frame plate 162, Figs. 8 and 9, secured to the end of the fixed bearing sleeve 155. Lever 160 is provided with a projection engageable selectively with the notches of the member 159, a tension spring 163 normally urging the lever projection into releasable engagement with the notches. The arrangement is such that the hand wheel 158 may be rotated to adjustably position the sleeve 157, against the action of the spring 163 and the associated detent lever 160, but the latter serves as a retaining means for holding the position of the sleeve after release of the hand wheel, and also as a means for indicating to the operator the amount of rotational adjustment which has been made. The rotational adjustment of the hand wheel 158 effects the longitudinal adjustment of the web through advancement or retarding of the cylinder 115 by means which will be presently described.

A shaft 165 is in turn mounted within sleeve 157, and is rotatably adjustable therein by means of a hand wheel or knob 166 secured to the front end of the shaft. The rear end of the shaft carries a threaded portion 167 rotatable within a threaded sleeve 168 secured to or formed as a part of the stationary bearing sleeve or frame member 155. It will thus be seen that as shaft 165 is rotated by means of the hand wheel or knob 166, the longitudinal position of the shaft will be varied or adjusted by reason of the threaded engagements 167, 168. The adjustment of shaft 165 by the knob 166 effects the transverse adjustment of the web by the axial shifting of the indexing cylinder, as will presently be described. The extreme rear end of the shaft carries a notched member 169 cooperable with a pivoted detent lever 170, the parts 169 and 170 serving as a detent mechanism for holding the shaft in adjusted position and for indicating the amount of movement thereof, the parts being

similar in structure and function to the corresponding detent parts 159 and 160, previously described.

The main driving gear 83 rotates on the fixed bearing sleeve 155, the gear being retained against longitudinal movement by reason of its bearing against the frame 60 on one side and against the collar 173 fixed to sleeve 155 on the other. Gear 83 carries a pair of driving pins 174 and 175, Figs. 8 and 11, adapted to have driving engagement with a sleeve 176 mounted on the hub portion 115a of the main indexing cylinder. Sleeve 176 is provided with an angular slot 177 and the hub member 115a is provided with a pin 178 engageable within the slot so that normally as sleeve 176 is rotatably driven by the gear 83 the indexing cylinder 115 is correspondingly driven therewith. However, sleeve 176 is movably journaled on the cylinder hub portion 115a, and it will be seen that if the sleeve is axially shifted with respect to the hub, shifting pin 178 within the slot 177, due to the taper of the slot 177, a relative rotational movement will be imparted between the parts to effect the advancement or retarding of the indexing drum relative to its driving means, whereby to effect the longitudinal adjustment of the web. In this connection it is also to be noted that the driving pins 174 and 175 engage within elongated slots 179 and 180 respectively in the sleeve 176, so that the sleeve may be rotatively driven by the pins, notwithstanding the axial adjustment thereof.

The means for effecting the axial shifting or adjustment of sleeve 176, relative to the cylinder 115, to effect advancement or retarding of the indexing cylinder and the resulting longitudinal web adjustment, as well as the means for bodily axially shifting the cylinder to effect transverse web adjustment, is illustrated in Figs. 8, 10 and 11. To this end the main fixed or bearing sleeve 155 is provided with a vertically extending elongated slot 183 in which there is arranged a bifurcated adjustment member 184 and a U-shaped adjustment member 185, shown in perspective detail and in separated relation in Fig. 10. The member 185 is provided with an elongated body portion 186 mounted within and adapted to slide relative to the slot 183 of the main bearing sleeve, this body portion 186 being provided with a central opening 187 adapted to rotatably receive the shaft 165. The member 185 is also provided with a pair of forwardly extending arms 188 terminating in radially inturned flanges 189. These flanges, as best shown in Fig. 8, are adapted to abut and have rotational bearing engagement with the end of the cylinder hub 115a, and are maintained in such relation by means of a washer 190 suitably secured, as by means of screws or the like, to the end of the hub. The thickness of flanges 189 is such as to only maintain a bearing engagement so that the cylinder hub 115a and its associated washer 190 may rotate freely with respect to the U-shaped adjustment member 185 while at the same time being prevented from axial shifting with respect thereto. The body portion 186 of member 185 is loosely clamped between the threaded end 192 of the sleeve 157 and a collar 193 secured to shaft 165, the shaft also being provided near its forward end with a second collar 194 adapted to abut the forward end of sleeve 157.

The bifurcated adjustment member 184 is also provided with a body portion 197 adapted to be slidably received within the slot 183 of frame

sleeve 155. This body portion terminates at either end in a pair of bifurcated extensions 198 adapted to loosely embrace the arms 188 of adjustment member 185 for slidable movement with respect thereto. As will be understood by reference to Figs. 8 and 11, the extensions 198 project into a cut-away section 199 of the sleeve 176 for rotatable bearing engagement therewith, the extensions and the adjustment member 184 being prevented from axial movement with respect to the sleeve by means of a washer 200 suitably secured to the end of the sleeve. The body portion 197 of the adjustment member is provided with a threaded opening 201 which threadedly receives the end 192 of the adjustment sleeve 157.

In the operation of the indexing mechanism, gear 83 normally drives the indexing cylinder 115 by means of the pins 174, 175 and the sleeve 176, as previously described, these parts being freely rotatable with respect to the adjustment members 184 and 185 by reason of the rotatable bearing connections therewith. In the event that it is desired to transversely adjust the web 22 in the machine, the control knob 166 is operated, and as the shaft 165 is axially shifted due to the threaded engagement 167, 168, collars 193 and 194 cause a bodily axial shifting of the indexing drum structure including drum member 115, sleeve 176 and the adjustment members 184 and 185. This adjustment effects an axial shifting of the drum to transversely shift the web 22 with respect to the various operating mechanisms of the machine. This adjustment does not affect the driving relation between sleeve 176 and hub 115a, and due to the pin and slot connections 174, 179, 175, 180 the driving relation between gear 83 and the indexing cylinder is maintained. The adjustment may be made during operation of the drum.

On the other hand, if it is desired to advance or retard the drum with respect to its driving means, hand wheel 158 is rotated. This causes an axial shifting of adjustment member 184 relative to sleeve 157 due to its threaded connection therewith, which axial movement is transmitted to the sleeve 176, shifting the sleeve relative to the hub 115a and either advancing or retarding the drum depending upon the direction of adjustment. The adjustment may be made during operation of the apparatus, and it does not disturb the action of the driving pins 174 and 175.

#### Summary of operation

In the operation of the apparatus, as the main drive shaft 55 is operated, the outer and inner wrapper webs 22 and 23 respectively are drawn from the supply drums, superposed, and transmitted to the cutters 38 and 39 where they are severed into individual wrapper lengths. From the cutters the individual wrappers are transmitted to the presser rolls 47 and 48, causing them to be adhesively secured together, and thence to the delivery rolls 49 and 50 which deliver them at appropriate rapid speed to the packaging station 25.

The webs, and more particularly the indicia bearing web 22, is indexed with respect to the cutters by means of the indexing mechanism 33 including the driven indexing drum 115 bearing the mechanical indexing pins 116 and 117 cooperating with appropriately located openings 28 in the paper web. The feed rolls 31, 32 on the in-feed side of the indexing drum drive the web slightly faster than the movement of the drum whereby to accumulate a predetermined quantity

of slack in the web to facilitate the introduction of the indexing pins into the web openings, the driving action rolls 31 and 32 being periodically released; and similarly the rolls 34 and 35 on the outfeed side of the indexing drum drive the web at a predetermined slower rate of travel than the movement of the drum whereby to accumulate slack on the outfeed side of the drum to facilitate the removal of the drum pins from the web openings, the driving action of rolls 34 and 35 also being periodically released.

During rotation of the drum and while the machine is in operation, the web may be either transversely adjusted in the machine, or advanced or retarded with respect to the action of the cutter rolls, as may be desired, by the adjustment controls 166 and 158 respectively associated with the indexing mechanism.

It is obvious that various changes may be made in the specific embodiment set forth for purposes of illustration without departing from the spirit of the invention. Accordingly the invention is not to be limited to the precise embodiments set forth and described, but only as indicated in the following claims.

The invention is hereby claimed as follows:

1. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, mechanical indexing mechanism including a sensing member for mechanically engaging and positioning the web with respect to the operation of the operating mechanism, and independent driving means for driving the web at the indexing station.

2. Web feeding mechanism comprising means for guiding a web having perforations at spaced intervals along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, mechanical indexing mechanism including an indexing roller having a projection engageable with said web perforations for mechanically engaging and positioning the web with respect to the operation of the operating mechanism, and independent driving means for driving the web at the indexing station.

3. Web feeding mechanism comprising means for guiding a web along a predetermined path, driving means for driving the web, operating mechanism for operating on the web at predetermined spaced intervals, and mechanical indexing mechanism operable at predetermined intervals including a sensing member for mechanically engaging and adjusting the web with respect to its driving means whereby to synchronize the movement of the web with the operation of the operating mechanism.

4. Web feeding mechanism comprising means for guiding a web having spaced mechanical positioning devices along a predetermined path, driving means for driving the web, operating mechanism for operating on the web at predetermined spaced intervals, and mechanical indexing mechanism having mechanical indexing devices operably engageable with the positioning devices of the web operable at predetermined intervals for mechanically adjusting the web with respect to its driving means whereby to synchronize the movement of the web with the operation of the operating mechanism.

5. Web feeding mechanism comprising means for guiding a web along a predetermined path, driving means for driving the web, mechanical indexing mechanism including a driven indexing

member having a sensing element for mechanically engaging and controlling the speed of movement of the web, and means for periodically adjusting the position of the web with respect to its driving means whereby to compensate for possible differences in speed of operation of the indexing member and the web driving means.

6. Web feeding mechanism comprising means for guiding a web along a predetermined path, driving means for driving the web, mechanical indexing mechanism including a driven indexing member having a sensing element for mechanically engaging and controlling the speed of movement of the web, means for driving said member at a speed of operation different from that of the web driving means, and means for periodically adjusting the position of the web with respect to its driving means whereby to compensate for differences in speed of operation of the indexing member and the web driving means.

7. Web feeding mechanism comprising means for guiding a web along a predetermined path, indexing mechanism including a driven indexing member having a sensing element for mechanically engaging and controlling the speed of movement of the web, means for driving said indexing member at a speed of operation slower than the speed of operation of the web driving means, and means for periodically retarding the movement of the web with respect to its driving means an amount equal to the speed differential between the indexing member and the web driving means.

8. Web feeding mechanism as defined in claim 7 wherein said retarding means comprises mechanism for periodically releasing the driving connection between the web and the driving means.

9. Web feeding mechanism as defined in claim 7 wherein said web driving means comprises a pair of cooperating web gripping rollers, and said retarding means comprises a flat spot on at least one of said rollers for periodically releasing the driving engagement between the rollers and the web.

10. Web feeding mechanism comprising means for guiding a web along a predetermined path, driving means comprising a pair of cooperating web gripping rollers for driving the web, mechanical indexing mechanism including a driven indexing member for controlling the speed of movement of the web, means for driving said member at a speed of operation different from that of the web gripping rollers, and means for periodically releasing the driving connection between the web and said web gripping rollers comprising a flat spot on at least one of said rollers adapted to come into operative juxtaposition with the web, said rollers being provided with cooperating circular portions beyond the area of the web for maintaining the axial separation of the rollers, and spring means for urging the rollers relatively toward each other.

11. Web feeding mechanism comprising means for guiding a web having spaced mechanical positioning devices along a predetermined path, driving means for driving the web, and mechanical indexing mechanism having mechanical indexing devices cooperable with the positioning devices of the web for gripping the web at predetermined intervals whereby to adjust the web with respect to its driving means, and said web driving means including provisions for releasing the driving connection between the web and its driving means at such intervals to facilitate the adjusting operation.

12. Web feeding mechanism comprising means

for guiding a web having perforations at spaced intervals along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, mechanical indexing mechanism including an indexing roller having a projection engageable with said web perforations for positioning the web with respect to the operation of the operating mechanism, and driving means on the infeed side of the indexing roller for normally driving the web at a faster rate of travel than the movement of the indexing roller whereby to accumulate a predetermined amount of slack in the web as said roller projection is engaged therewith, said driving means being releasable from the web as the indexing roller projection is engaged with the perforation of the web.

13. Web feeding mechanism comprising means for guiding a web having perforations at spaced intervals along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, mechanical indexing mechanism including an indexing roller having a projection engageable with said web perforations for positioning the web with respect to the operation of the operating mechanism, driving means on the infeed side of the indexing roller for normally driving the web at a faster rate of travel than the movement of the indexing roller, said driving means being releasable from the web as the indexing roller projection is engaged with the perforation of the web, a second driving means on the outfeed side of the indexing roller for normally driving the web at a speed slower than the movement of the roller, said second driving means being releasable from the web as the indexing roller projection is disengaged from the web perforation.

14. Web feeding mechanism comprising means for feeding a pair of webs into juxtaposed relation, at least one of said webs having a wax-like coating thereon, means for periodically severing the juxtaposed webs to provide wrappers of predetermined length, and presser rolls associated with the severing means for pressing the webs together whereby to adhesively retain them in a relatively fixed position.

15. Web feeding mechanism comprising means for guiding a web along a predetermined path, cutting means for cutting the web at predetermined spaced intervals, indexing mechanism for positioning the web with respect to the operation of the cutting means, and driving means on the outfeed side of the cutting means engageable with the web as it leaves the cutting means, said driving means having a progressively increasing speed upon engagement with the web from a speed substantially that of the indexing mechanism to a speed substantially in excess thereof.

16. Web feeding mechanism comprising means for guiding a web along a predetermined path, cutting means for cutting the web at predetermined spaced intervals, indexing mechanism for positioning the web with respect to the operation of the cutting means, and driving means on the outfeed side of the cutting means engageable with the web as it leaves the cutting means, said driving means having a progressively increasing speed substantially during its entire period of contact with the web.

17. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, and mechanical indexing mechanism including a sensing element

for mechanically engaging and positioning the web with respect to the operation of the operating mechanism, said indexing mechanism being adjustable with respect to the operation of the operating mechanism during operation of the web feeding mechanism.

18. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, mechanical indexing mechanism for positioning the web with respect to the operation of the operating mechanism, said indexing mechanism being transversely adjustable to adjust the transverse position of the web and longitudinally adjustable to adjust the longitudinal positioning of the web with respect to the operation of the operating mechanism, both of said adjustment means being operable during the operation of the web feeding mechanism.

19. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, indexing mechanism including an indexing roller having means for mechanically engaging and positioning the web, a driving gear for said roller, said driving gear being in synchronized relation with the operating mechanism, and means for axially shifting the roller to transversely shift the web with respect to the operating mechanism, said shifting means being operable while the roller is in operation and without disabling its connection to the driving gear.

20. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, indexing mechanism including an indexing roller having means for mechanically engaging and positioning the web, a driving gear for said roller, said driving gear being in synchronized relation with the operating mechanism, and means for advancing or retarding the position of the roller with respect to its driving gear, said last named means being operable while the roller is in operation and without disabling the driving connection between the roller and the gear.

21. Web feeding mechanism comprising means for feeding a first web along a predetermined path, means for feeding a second web along a predetermined path at a rate of speed slower than the movement of the first web, cutter mechanism, means for superimposing said webs and feeding them in superposed relation to the cutter mechanism, and means for feeding the webs from the cutter mechanism, said last named means being operable to grip both web sheets and feed them at the same rate of travel substantially simultaneously with the operation of the cutter mechanism.

22. Web feeding mechanism comprising means for guiding a web along a predetermined path, operating mechanism for operating on the web at predetermined spaced intervals, driving means for driving the web, indexing mechanism for periodically indexing the web with respect to the operation of the operating mechanism, and means for periodically releasing the action of the driving means as the indexing mechanism operates whereby to permit the indexing mechanism to effect the indexing of the web.

23. Web feeding mechanism as defined in claim 22 wherein the web driving means comprises a pair of cooperating rollers adapted to grip and



drive the web, and wherein said release means comprises a flat spot on at least one of said rollers to effect a release of the driving action.

24. Web feeding mechanism as defined in claim 22 wherein the web driving means normally drives the web at a speed of travel substantially different from the web speed as controlled by the indexing mechanism, whereby on each operation

of the indexing mechanism and release of the driving means the speed difference is compensated.

25. Web feeding mechanism as defined in claim 22 wherein additional driving devices are provided for propelling the web upon the release of the driving action of the driving means.

CLARENCE J. MALHIOT.

CERTIFICATE OF CORRECTION.

Patent No. 2,275,262.

March 3, 1942.

CLARENCE J. MALHIOT.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 3, for "web 2" read --web 22--; page 7, second column, line 22, claim 7, after "path," insert --driving means for driving the web, mechanical--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

~~Signed and sealed~~ this 23rd day of June, A. D. 1942.

(Seal)

Henry Van Arsdale,  
Acting Commissioner of Patents.