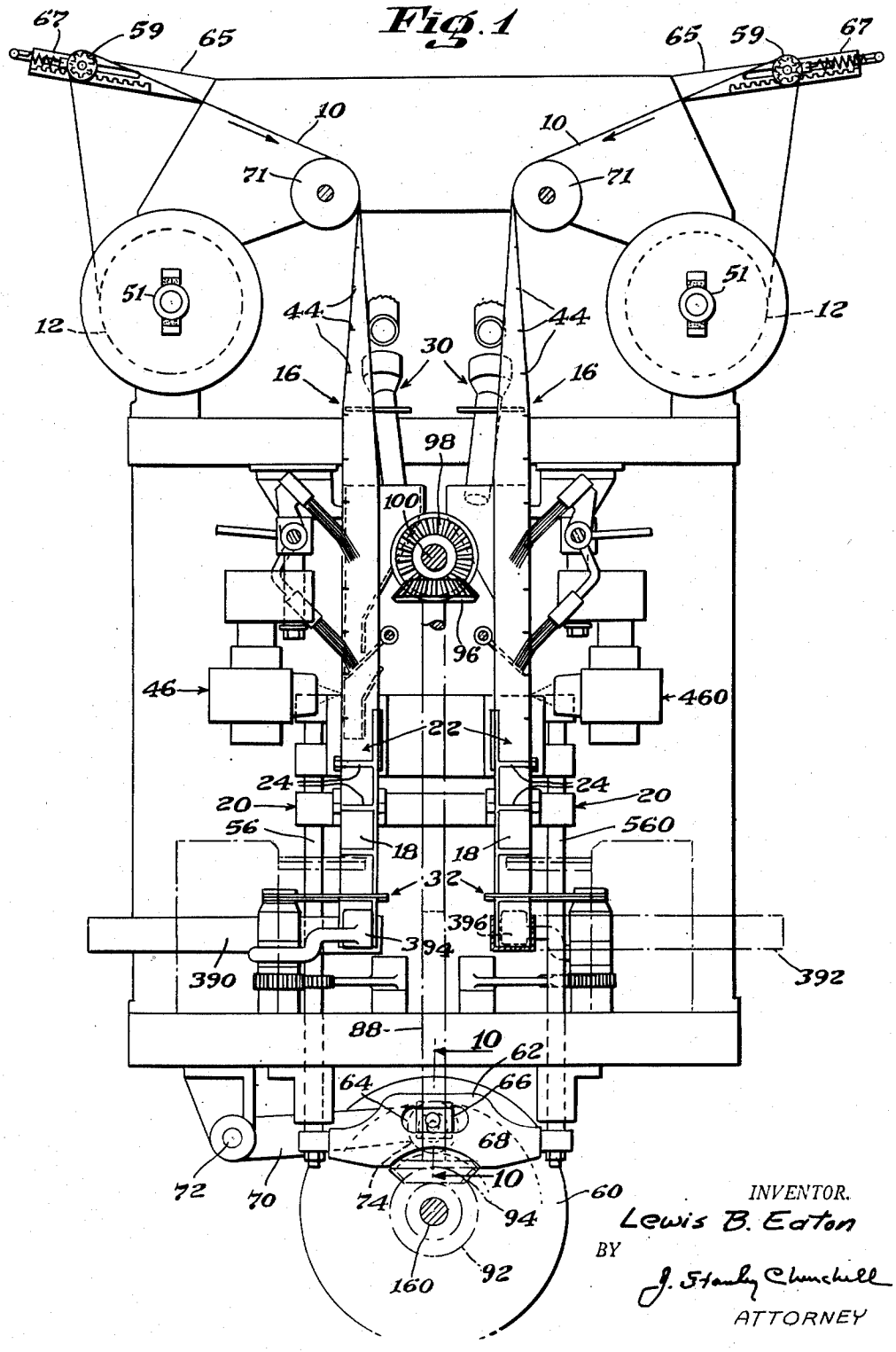
April 28, 1953 L. B. EATON 2,636,730

WEB FEEDING MEANS FOR CONTAINER FORMING APPARATUS

Filed March 30, 1948 5 Sheets-Sheet 1

Fig. 1




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WEB FEEDING MEANS FOR CONTAINER FORMING APPARATUS

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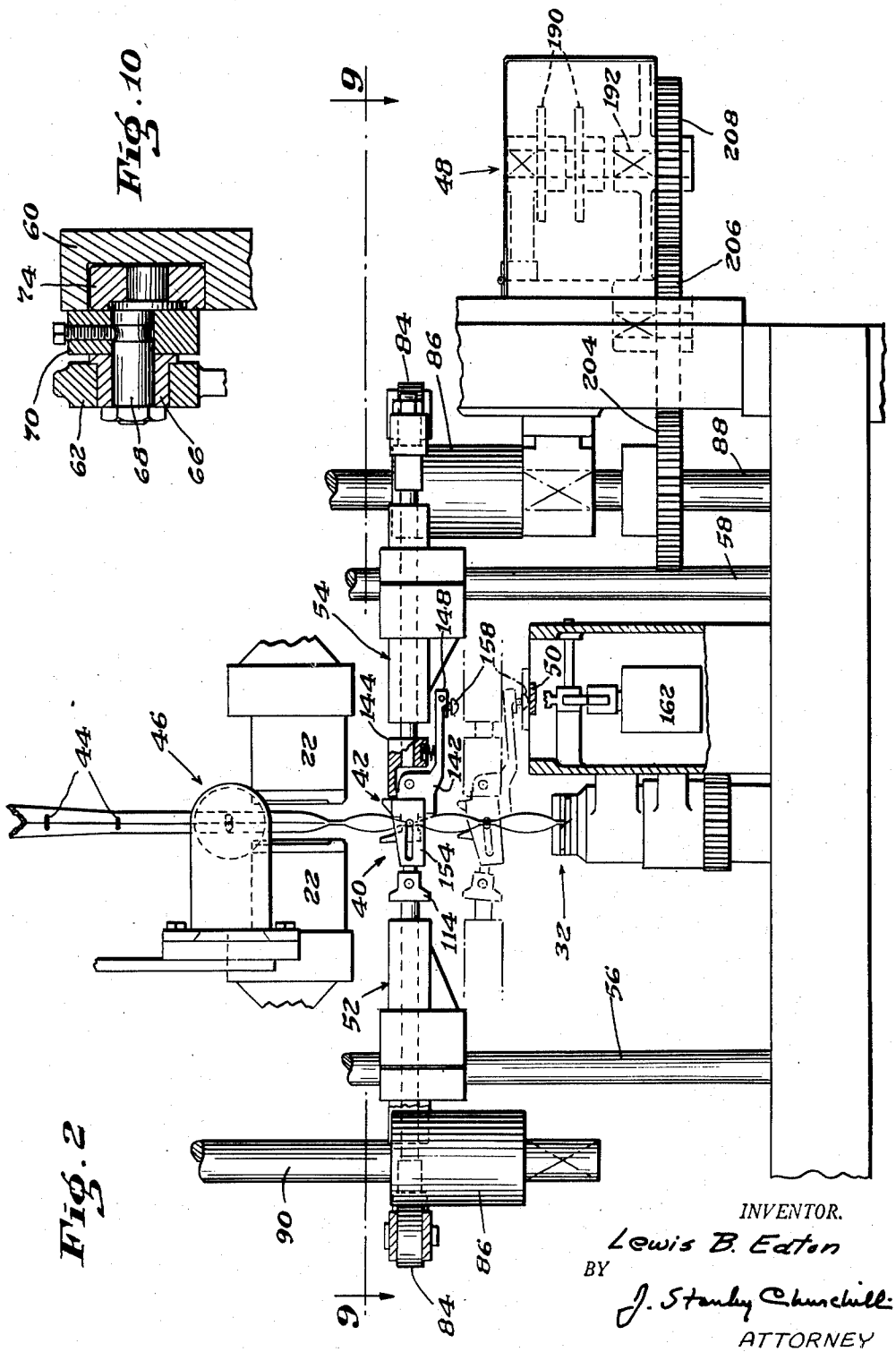



Fig. 2

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WEB FEEDING MEANS FOR CONTAINER FORMING APPARATUS

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Fig. 3

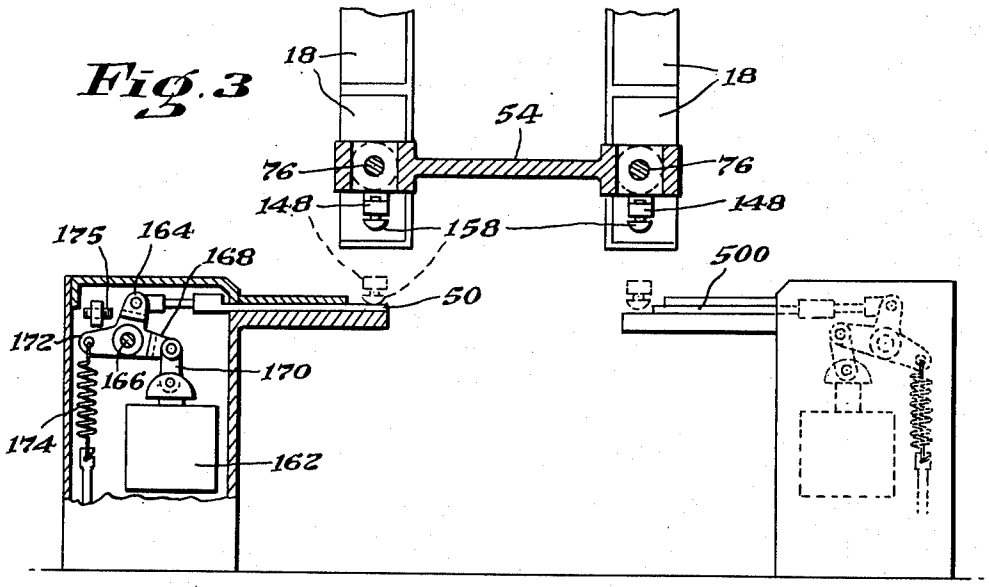



Fig. 4

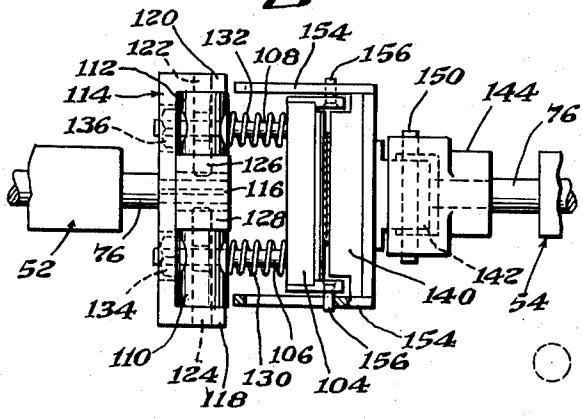



Fig. 6

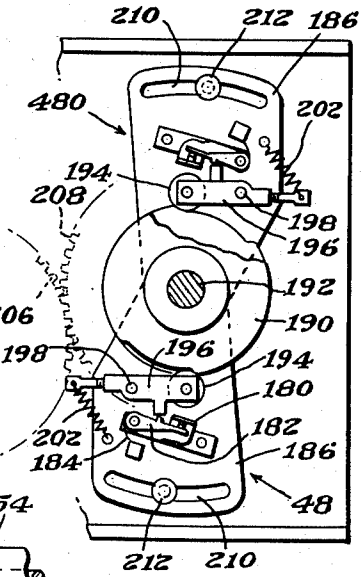
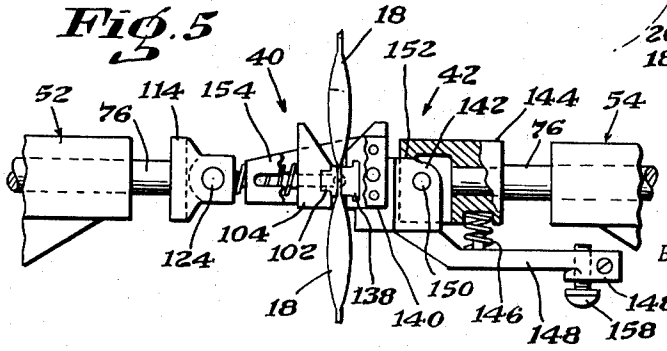



Fig. 5




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WEB FEEDING MEANS FOR CONTAINER-FORMING APPARATUS

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Fig. 7

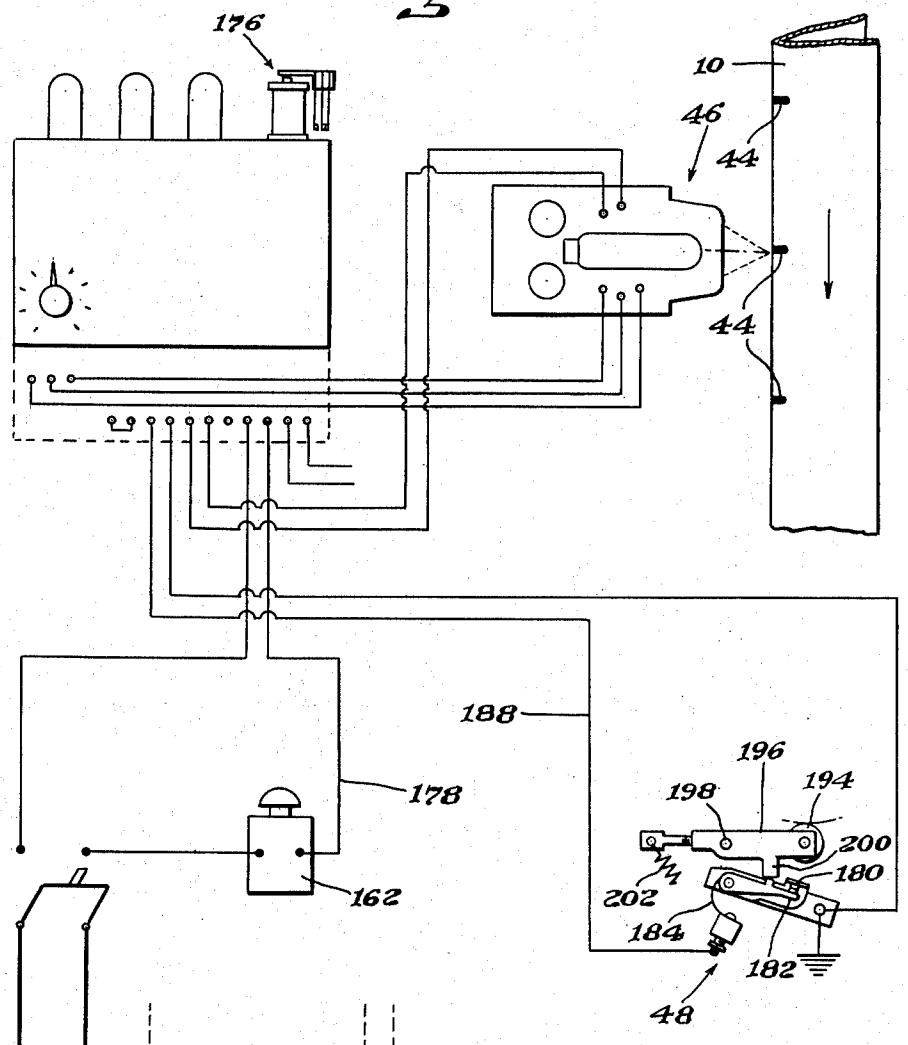
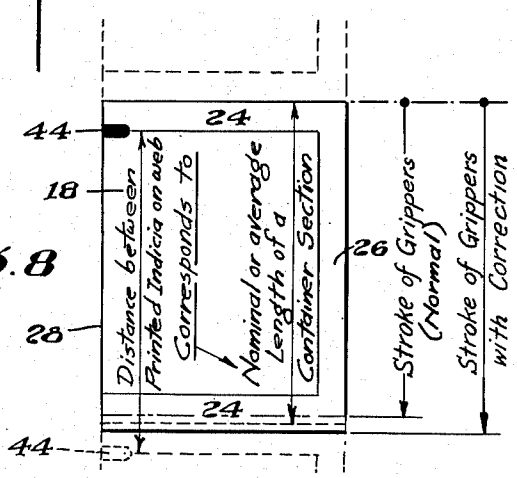



Fig. 8




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WEB FEEDING MEANS FOR CONTAINER FORMING APPARATUS

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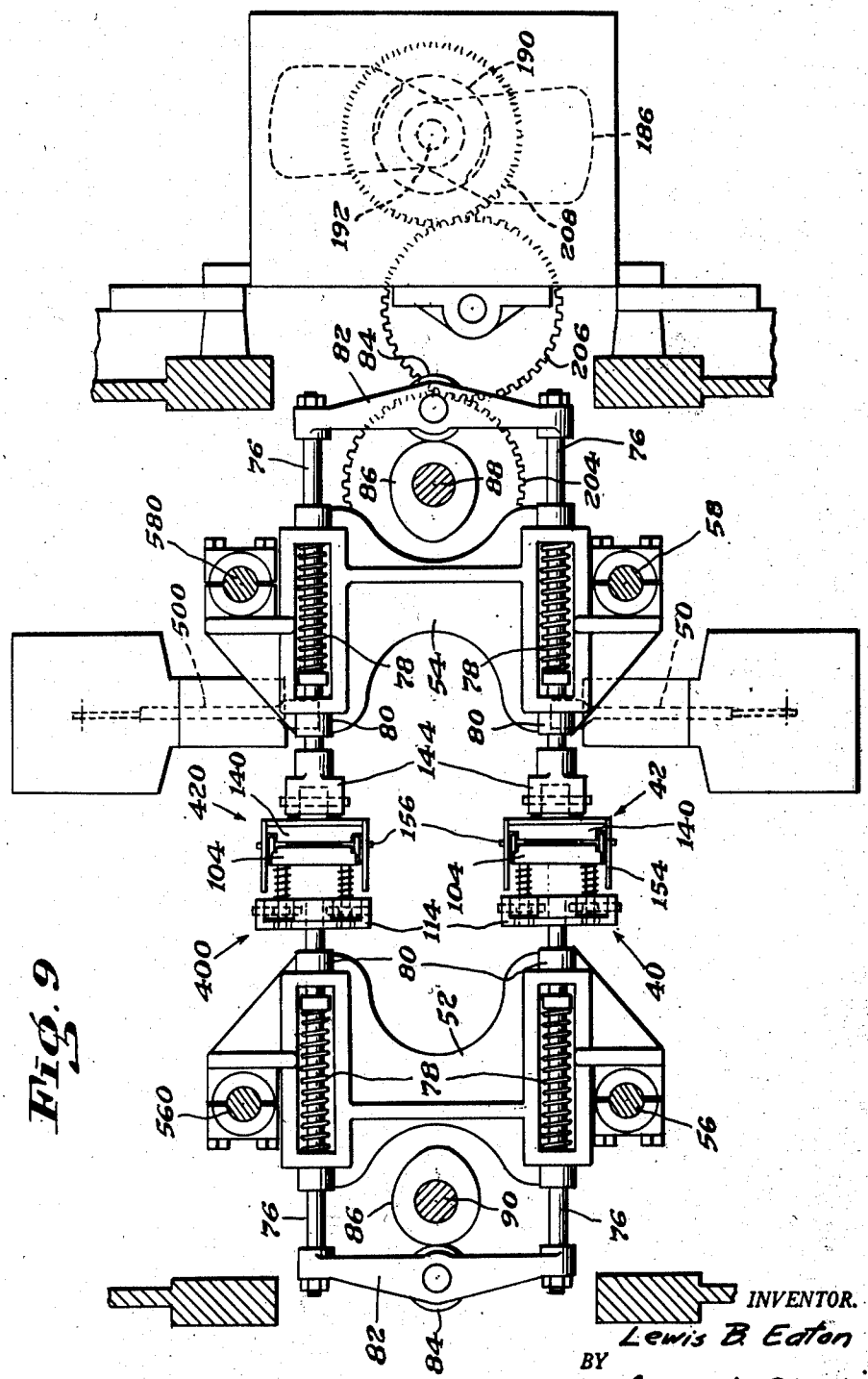



Fig. 9

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# UNITED STATES PATENT OFFICE

2,636,730

## WEB FEEDING MEANS FOR CONTAINER FORMING APPARATUS

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Application March 30, 1948, Serial No. 17,946

9 Claims. (Cl. 271—2.6)

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This invention relates to container forming apparatus.

In general the object of the invention is to provide a novel and improved packaging machine wherein a printed web of flexible sheet material, such as heat sealable printed paper, is utilized to produce successive filled and sealed containers in a rapid, efficient and commercially acceptable manner and wherein novel provision is made for controlling the feeding of the web to effect registration of the successive printed sections of the web with relation to the container forming mechanisms within tolerances permitted by the commercial acceptability of the packages produced. In its preferred embodiment the invention is embodied in a tea-bagging machine.

With this general object in view and such others as may hereinafter appear, the invention consists in the packaging apparatus and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawings illustrating the preferred embodiment of the invention, Fig. 1 is side elevation of a packaging machine embodying the present invention; Fig. 2 is a front elevation of the lower portion of the machine shown in Fig. 1 and illustrating the web advancing mechanism; Fig. 3 is a side elevation of a portion of the control mechanism for the web advancing mechanism as viewed from the right of Fig. 2; Figs. 4 and 5 are detail views in plan and front elevations respectively of the web advancing grippers; Fig. 6 is a plan view detail of a cam operated switch forming a part of the control mechanism; Fig. 7 is an electrical wiring diagram for the control mechanism; Fig. 8 is a front elevation of a completed container and adjacent sections indicating the length of the normal advance and the advance with a corrective stroke relative to the predetermined length of a container section or distance between the printed indicia on the web; Fig. 9 is a plan view of the gripper units as view from the line 9—9 of Fig. 2; and Fig. 10 is a detail view in cross section taken on the line 10—10 of Fig. 1.

In general, the present invention contemplates package forming apparatus for making individual packages wherein an elongated web of container forming material is intermittently advanced to folding, filling and sealing mechanisms to form a strip of connected packages, and then to cutting mechanism for severing the strip through sealed connecting portions to form individual packages.

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In accordance with the present invention provision is made for controlling the intermittent linear advance of the web into operative position to the package forming and severing mechanisms in accordance with substantially equally spaced printed indicia on the web defining the length of individual container sections whereby to assure registration within predetermined tolerances of successive printed sections with the package forming and cutting instrumentalities irrespective of variations in the web induced by variations in the humidity and other conditions of operation.

In the illustrated embodiment of the invention the mechanism for controlling the intermittent linear advance of the web includes a detecting element arranged to cooperate with the spaced indicia upon the web during the linear movement thereof and means responsive to said detecting element for varying the linear stroke of the advancing mechanism in accordance with the position of the web at a predetermined time in the cycle during such advance.

In practice, and in accordance with the present invention, the normal uncorrected stroke of the web advancing mechanism is preferably arranged to advance the web a distance slightly less than the predetermined length of a package section or slightly less than the distance between successive indicia, and the correcting stroke of the web advancing mechanism is preferably arranged to advance the web a distance slightly more than the predetermined spacing between successive indicia except in those unusual instances where the web expansion or contraction equals its correction. Thus, the web advancing stroke is continually being increased or decreased relative to the predetermined average spacing, as controlled by the detecting means, the cumulative effect of successive shortened or normal advancing strokes causing the spaced indicia to "creep up" relative to the detecting means and the cumulative effect of successive lengthened or correcting strokes causing the spaced indicia to "creep down" relative to the detecting means, so as to maintain the advance of the web within predetermined limits and in operative relation to the container forming and severing mechanisms, the correcting stroke occurring during the same cycle of advance in which the detection is made.

The present invention is herein illustrated as embodied in a duplex type of packaging machine wherein two printed webs are concurrently advanced into operative position to the bag forming and severing mechanisms and, in accordance with another feature of the invention provision

is made for selectively controlling the advance of the webs in accordance with the position of the spaced indicia of the respective webs during a predetermined period in the cycle of operation during such advance whereby to assure registration of the webs within predetermined tolerances with their respective container forming and severing mechanisms, the correction of the advancing stroke being made during the same cycle in which such correction is indicated.

Referring now to the drawings, the present invention is illustrated as embodied in a commercial machine for making tea bags from an elongated web or strip of thin paper in accordance with the method disclosed in the United States patent to Patterson, No. 2,272,530 issued February 10, 1942. In general the machine comprises an improvement upon the apparatus disclosed in the United States patent to Patterson, No. 2,385,229 issued September 18, 1945. As herein shown, such machines may be constructed in duplex form for simultaneously producing two strips of connected and filled bags and for severing the strips through sealed portions thereof to form individual tea bags.

In the operation of such a machine, and as illustrated in Fig. 1, a web of heat sealable paper 10 is withdrawn from a supply roll 12 thereof and advanced over container forming mechanism 16 which operates to fold the web longitudinally along a medial line to bring together the two half sections of the web preparatory to forming a strip of connected bag sections 18. The paper is preferably drawn over the forming mechanism 16 by vertically and horizontally reciprocable gripping and advancing mechanism 20 operative to nominally advance the strip substantially one bag length each cycle of operation and to present the strip in operative relation to the sealing mechanism, indicated generally at 22, and which is arranged to apply heat and pressure to seal the strip simultaneously along a transverse zone 24 and an adjacent longitudinal zone 26 during each sealing operation to form a series of connected package sections closed on one side by the folded edge 28 and heat sealed along the remaining side and at the top and bottom.

The paper being unwound from the supply roll 12 and advanced by the gripper mechanism 20 is arranged to pass over a takeup roll 59 mounted for axial movement in a bracket 65 and then over a roller 71 which may be intermittently driven in timed relation to the linear advance of the gripper mechanism. The movable takeup roller 59 is yieldingly urged outwardly in its supporting bracket 65 by springs 67 and is capable of inward movement during the unwinding operation in order to maintain the web relatively taut and to take up any slack between the gripper mechanism and the supply roll. Provision may also be made for preventing inadvertent unwinding of the web from the supply roll 12 by providing the latter with suitable retarding means such as a friction brake or bearing, indicated at 51.

Provision is also made in such prior machines for depositing successive charges of the commodity into successive of the uppermost bag sections as they are being formed by feeding mechanism indicated generally at 30, the feeding mechanism operating in timed relation to the operation of the strip advancing and heat sealing mechanisms 20, 22 respectively, and, in the operation of the machine, the open top of a package which has been provided with a charge of the commodity during one cycle of operation is closed during a succeeding cycle. Thereupon, the strip is intermittently advanced to cutting mechanism, indicated generally at 32 which operates to sever the strip through successive transverse sealed portions 24 to form individual filled and sealed packages.

The machine illustrated and described in the Patterson Patent No. 2,385,229 above referred to was particularly designed for producing paper tea bags made from a web of plain, unprinted heat sealable paper, and such machines are at the present time in extensive successful commercial use. However, when printed webs are used in a machine having a linear web advancing mechanism arranged to advance the web a fixed distance at each cycle of operation, that is the length of a package section, it is difficult to maintain correct registration of successive printed package sections with the package forming instrumentalities since, in practice, the sections may vary due to inaccuracies in printing, atmospheric conditions, stretching of the web during withdrawal or possible slippage of the web. Thus, in the operation of such prior machines on a printed web, any slight variations in the printed sections will be cumulative so that eventually the web will depart from registration with the package forming and cutting mechanisms.

In the illustrated embodiment of the invention, each web gripping and advancing mechanism 20 includes a pair of opposed cooperating gripper units 40, 42 mounted to be horizontally reciprocated into and out of gripping engagement with the web, and, to be vertically reciprocated to advance the web each cycle of operation. In practice, the linear stroke of the grippers is initially adjusted so as to normally advance the web a distance slightly less than the package length or distance between successive substantially equally spaced markings 44 on the web. As herein shown, each gripper 40, 42 is also mounted for pivotal movement in its supporting member to be capable of being rocked while in gripping engagement with the web to effect advancement of the web beyond the normal stroke when actuated by control mechanism responsive to the position of the markings 44 at a predetermined time in the web advancing cycle of operation so as to effect a correction in the linear advance of the web during the same cycle in which the lack of registration is detected. In general, the control mechanism includes a photo-sensitive detector, indicated generally at 46, arranged to cooperate with the spaced markings 44 during the advancing cycle of operation; a timing switch 48 arranged to render the detector operative at a predetermined time in the web advancing cycle, and a solenoid operated member 50 arranged to cooperate with the grippers to effect advancement of the grippers beyond the normal stroke when actuated by the detector mechanism. In practice, the photo-sensitive detector is placed relative to the web so that the light beam image is concentrated on the edge of the web at a point approximately halfway between two markings 44 when the web is at rest as illustrated in Fig. 1. Thus, during intermittent advancement of the web the light beam image may be intercepted by the marking at about the halfway point in its advance, as illustrated in Fig. 7. The detector unit herein illustrated is arranged to be excited to effect a corrective stroke only when the light beam is intercepted by the mark during the "scanning" period that is, when the circuit is closed by the timing switch 48, and then only when the beam is cut off by the leading edge of a rapidly passing mark. If the mark does

not appear during the scanning period, no correction is made, and, if the beam falls directly on the mark and the mark then passes by so that the beam then falls on the relatively lighter background of the web during the scanning period, no correction is made.

In the operation of the apparatus, assuming that the average package length is approximately 2½ inches, for example, successive uncorrected or shortened linear strokes, adjusted to advance the web about $\frac{1}{32}$ of an inch less than the average package length, or $2\frac{13}{32}$ inches, will effect a gradual or cumulative rising or "creeping up" of the marks **44** relative to the light beam until a point is reached where the light beam is intercepted by a mark moving therepast, and, when this occurs, a correction stroke is applied during the same cycle in which such detection is made, to advance the web a distance slightly more, approximately $\frac{1}{32}$ of an inch more, for example, than the average length of a package section, making the total advance about $2\frac{17}{32}$ inches. Thus it will be seen that the web advancing stroke is either increased or decreased relative to the predetermined package length, continually between predetermined limits, unless the variations in the web cause no detection whereby to obtain registration of successive package sections with the container forming mechanism and cutting mechanisms within the predetermined permitted tolerances.

Referring now to Figs. 1 and 2 for a more detailed description of the web advancing apparatus, as therein shown, opposed gripper units **40**, **42** are arranged to be horizontally reciprocated in brackets **52**, **54** respectively the latter being adjustably clamped upon vertical rods **56**, **58** supported for vertical reciprocation in suitable bearings provided in the machine frame. The rods **56** and **58** are arranged to be vertically reciprocated in timed relation to the operation of the package forming mechanisms by a cam **60** mounted fast on the main cam shaft **160**, and, as herein shown, provision is made for initially adjusting the effective stroke of the cam in order to adjust the linear advance of the grippers with relation to the length of package sections of the web. The rods **56**, **58** are secured at their lower ends to a pair of yoke shaped tie pieces **62** only one of which is shown, the tie piece **62**, having a central slotted portion **64** for cooperation with a slide block **66** mounted on one end of an eccentric stud **68** carried in a lever **70** fast on a rocker shaft **72**, the eccentric stud being rotatably adjustable in the lever **70** as shown in Fig. 10. The eccentric end of the stud **68** is provided with a roller **74** cooperating with the fixed cam path of the cam **60**.

With this construction it will be seen that by rotary adjustment of the eccentric stud **68** the effective length of the lever arm **70** may be varied, rotary adjustment in one direction operating to increase the distance from the center of the rocker shaft **72** to the center of the roller **74** to decrease the effective stroke, and, rotary adjustment in the opposite direction operating to decrease the distance from the center of the rocker shaft to the center of the roller to increase the stroke. Thus, the linear movement of the gripper units may be initially adjusted so as to effect a linear advance of the web a distance slightly less than the average spacing between successive markings **44**. It will be understood that the gripper carrying brackets **52**, **54** may also be adjusted on their respective rods **56**, **58** to align the cooperating gripper units **40**, **42** for cooperation with successive transverse sealed portions **24** of the web.

While the above description has been confined thus far to the operation of one pair of cooperating gripper units **40**, **42** for advancing a web of container forming material into operative relation to the bag forming instrumentalities, it will be understood that in the duplex machine herein illustrated, an identical and simultaneously operating pair of gripper units **400**, **420** are carried by the brackets **52**, **54** respectively, as illustrated in Fig. 9, the brackets being also adjustably supported upon similar vertical rods **560**, **580** arranged to be vertically reciprocated by the cam **60** through similar connections including a lever arm fast on the rocker shaft **72** so that in operation, the gripper units are simultaneously operated to cause the webs to be advanced into operative relation to their respective container forming, filling and severing mechanisms.

As illustrated in Figs. 2 and 9, each gripper unit **40**, **42** and their corresponding units **400**, **420** are supported for horizontal reciprocation upon individual rods **76** slidingly carried in the brackets **52**, **54**, each rod being provided with a coil spring **78** interposed between a portion of its supporting bracket and a collar **80** adjustably secured to the rod, the springs being arranged to urge the grippers inwardly into cooperating engagement with their opposing grippers and the container forming webs. The rods **76** of each unit are joined at their outer ends by a tie piece **82** and each tie piece carries a roller **84** arranged to cooperate with elongated cams **86** secured to vertical cam shafts **88**, **90** respectively. Thus, in the operation of the machine, the gripper units **40**, **400** and **42**, **420** are horizontally reciprocated simultaneously into and from engagement with the webs, the springs **78** effecting a yielding engagement therewith and the cams **86** operating to positively separate the grippers. The vertical cam shafts **88**, **90** are arranged to be rotated from the main cam shaft **160** by connections including bevel gears **92**, **94** to the vertical shaft **88**, bevel gears **96**, **98** to a horizontal shaft **100**, and a second set of bevel gears to the vertical shaft **90**.

As above stated, the cooperating gripper units **40**, **42** and the corresponding pair of cooperating gripper units **400**, **420** are mounted for pivotal movement so that when actuated by the control mechanism, the grippers effect an advance of the web a distance slightly more than that of the predetermined reciprocating stroke of the grippers, and, as best shown in Figs. 4 and 5, the gripper unit **40** includes a web engaging member **102** mounted in a retaining member **104** supported upon two spaced rods **106**, **108** slidingly mounted in rocker members **110**, **112** supported for pivotal movement in a U-shaped bracket **114** secured to the end of the horizontally reciprocable rod **76**. The rod **76** is reduced in diameter at the connecting end and the U-shaped bracket **114** is assembled against the shoulder formed by the reduced diameter and is retained on the rod by a block **116** keyed to the end of the rod, the bracket being secured to the block to prevent rotation of the bracket. The rocker members **110**, **112** are fitted between the side faces of the block **116** and the arms **118**, **120** of the U-shaped bracket and are pivotally mounted therebetween upon spaced axially aligned pins **122**, **124** extending from the arms **118**, **120** respectively and pins **126**, **128** extending from opposite sides of the

block 116, such structure permitting clearance openings centrally of the rocker members 110, 112 for sliding movement of the spaced rods 106, 108. Springs 130, 132 coiled about the rods 106, 108 respectively and interposed between the rear face of the retaining member 104 and the inner faces of the rocker members 110, 112 tend to urge the web engaging member or gripper 102 into yielding engagement with the web and its opposed gripper unit. Lock nuts 134, 136 threadedly secured to the outer ends of the spaced rods 106, 108 respectively and arranged to cooperate with the outer faces of the rocker members 110, 112 are provided to adjustably limit the movement of the web engaging member towards its cooperating gripper unit. The above described structure is designed to permit manual retraction of the web engaging member for initially inserting and adjusting the web between the gripper units and also to permit yielding engagement of the gripper 102 with its cooperating gripper during pivotal movement thereof.

The opposing gripper unit 42 comprises a web engaging member or gripper 138 supported in a retaining member 140 which in turn is secured to a rocking member 142 pivotally mounted in a supporting block 144 keyed to the reduced end of the opposing horizontally reciprocable rod 76. A spring 146 interposed between the underside of the block 144 and an arm 148 extended from the rocking member 142 tends to urge the latter in a clockwise direction about its pivot 150, and cooperating engaging surfaces 152 of the block 144 and member 142 serve to limit the rotation of the member 142 and to normally retain the pivotally mounted unit 42 in a horizontal plane relative to the web. In order to normally retain the opposing pivotally mounted unit 40 in a horizontal plane and to effect simultaneous rocking of the two cooperating units, the unit 42 is connected to the unit 40 by a pin and slot connection, comprising slotted plates 154 extending from either side of the retaining member 140 of the unit 42 arranged to receive pins 156 carried on either end of the retaining member 104 of the unit 40. The pins 156 are supported in alignment with the point of contact of the web engaging members 102, 138 so that in operation the rockingly mounted unit 40 is normally maintained in a horizontal position with the unit 42, and, when the arm 148 of unit 42 is rocked in a counterclockwise direction, viewing Fig. 5, the opposing unit 40 will be correspondingly rocked in a clockwise direction. The web engaging element 138 may and preferably will be made of a yieldable material and is provided with a relatively flat web engaging face, and, the cooperating element 102 is preferably provided with a knurled metal face curved at a radius corresponding to the line of rocking movement.

From the description thus far it will be observed that in operation the printed container forming web 10 having spaced registration marks 44 thereon, corresponding to the length of successive package sections, will be intermittently advanced a distance slightly less than the distance between registration marks, initial adjustment of the amount of linear feed being accomplished by rotation of the eccentric roller stud 68 in the lever arm 70, and, it will also be observed that each gripper unit is mounted for cooperating pivotal movement to permit an additional increment of the web to be advanced when correction is required. As best shown in Fig. 3, the rocking of the gripper units to effect such additional advancement of the web includes



the solenoid operated stop bar 50 arranged to be extended into the path of a stud 158 adjustably carried in the arm 148 of the rocker member 142. The solenoid 162 is arranged to be energised to effect extension of the bar 50 through connections from the detector unit 46, and, as shown in Fig. 3, the stop bar is connected to one arm 164 of a three-armed lever pivotally mounted at 166, a second arm 168 being connected by a link 170 to the solenoid armature, and the third arm 172 being connected by a spring 174 arranged to retain stop bar 50 in a retracted position until moved by the operation of the solenoid. A stop screw 175 may be provided for cooperation with the arm 164 to adjustably limit the retracted position of the bar 50, as shown.

Referring now particularly to Fig. 7, the detector unit 46 is arranged to energise the solenoid 162 to effect an additional advance of the web when the unit is actuated by a registration mark 44, and, as herein shown, the detector unit may comprise any usual or preferred photo-sensitive control system adapted to concentrate a beam of light on the web and arranged to be excited by a rapid change in the reflective characteristics of the surface upon which the beam is concentrated, such as a rapid change from a light to a dark surface of the moving web, the dark surface being herein illustrated as comprising the spaced registration marks 44, arranged to intercept the beam, and when the detector unit is thus excited it is arranged to operate a relay 176 to close a circuit 178 to the solenoid 162. In practice, the light beam is on all the time but the unit is operative to actuate the relay 176 upon interception of the beam only during a predetermined time in the cycle of operation, herein defined as the scanning period, and corresponding to a time when the web has been advanced substantially halfway in its movement from one position of operation to another.

As shown in Figs. 6 and 7, the scanning period is controlled by the timing switch 48 which includes a stationary contact 180 and a movable contact 182, the movable contact 182 being normally urged into circuit closing engagement with the stationary contact 180 by a leaf spring 184. The contact members 180, 182 are mounted upon an adjustable bracket 186, and, the switch is operated to open and close a circuit 188 to the detector unit 46 in timed relation to the operation of the machine by a cam 190 fast on a vertical cam shaft 192 and, a cooperating cam roller 194 carried by an arm 196 pivotally mounted at 198. The arm 196 is provided with an extension 200 arranged to engage and rock the contact arm 182 to open the circuit 188, and a spring 202 is provided to urge the roller 194 against its cam. The switch cam shaft 192 is arranged to be rotated from the vertical shaft 88 by a gear train including a gear 204, idler gear 206 and gear 208 fast on the switch cam shaft 192.

Thus, the circuit 188 to the detector unit is closed by the cam 190 to provide a scanning period during the advancing stroke, at which time the detector unit is rendered operative to energise the solenoid when the light beam is intercepted by a registration mark. The time at which the scanning period starts relative to the moving period of the web may be varied by rotary adjustment of the contact carrying bracket 186 which latter is mounted for rotary movement on the switch cam shaft 192 and is provided with an arcuate slotted portion 210 at its outer end arranged to receive a bolt 212 for fastening the bracket in its adjusted position.

It will be understood that the characteristics of the preferred detector unit 46 are such that if the light beam is directly in alignment with a registration mark 44 when the timing switch 48 is closed, thus indicating substantially uniform registration of the package sections with the container forming mechanisms, the relay 176 will not be actuated and also if the light beam is directed on the mark and then passes from the mark to the relatively lighter surface of the web material during the scanning period, also indicating substantially uniform and commercially acceptable registration of the package sections, the relay will not be actuated to effect additional advancement of the web. The only time the detecting unit will respond to the passage of the moving web is when the light beam is first directed onto the relatively light surface of the web material when the timing switch is closed and is then rapidly intercepted by the passage of a relatively darker surface registration mark during the scanning period, such position being indicated generally in Fig. 7 wherein the switch contacts 180, 182 are closed and the light beam is about to be intercepted by a mark 44, indicating that the package sections are lagging slightly behind substantially uniform registration with the container forming and severing instrumentalities.

Upon interception of the light beam by the registration mark at such time, the relay 176 will be actuated to close the circuit 178 to the solenoid 162 which is in turn energised to extend the stop bar 50 into the path of the rocker arm 148 so that as the gripper members approach the end of their normal stroke, the web is given an additional and preferably predetermined increment of advancement by the cooperative rocking action of the rocker members 140, 142. Thereafter, in the operation of the apparatus, the gripper units are moved apart to disengage the web and are returned to their normal horizontally aligned position for cooperation with the next succeeding transversely sealed portion of the web during the next cycle of operation. It will thus be seen that the correcting action of the web advancing mechanism occurs during the same cycle of operation that a deviation from a substantially uniform position of advancement is detected so as to assure that none of the package sections deviate from such position beyond predetermined commercially acceptable limits.

From the description thus far it will be seen that in the operation of the web advancing mechanism successive normal or uncorrected web advancing stokes which are slightly less than the average spacing of the printed package sections of the web will cause the marks to rise relative to the light beam concentrated on the moving web and that this action will be cumulative so that eventually the mark will intercept the light beam, as described, to effect additional advancement of the web. As herein shown, similar control mechanism is provided for controlling each web of a duplex container forming machine, and includes a similar detecting unit 460, solenoid operated bar 500, and timing switch 480 so that in operation, although the web advancing mechanisms are simultaneously operated through the cam 60, yet each web may be individually controlled to selectively effect an additional advance of the web as determined by its individual detecting unit.

Thus, the package forming webs are maintained in substantially uniform registered relation with their respective package forming mechanisms comprising the package sealing mechanism 22, filling mechanism 30, and severing mechanism 32 which may comprise the mechanisms illustrated and described in the Patterson Patent No. 2,385,229 above referred to, and to which reference may be had for a more complete description of the structure and mode of operation of such mechanisms. As herein shown, successive connected filled and sealed packages advanced into operative position to the severing mechanism 32 are cut off and received in suitable guides 390, 392 through which they are advanced by intermittently operated pusher arms 394, 396 to be delivered from the machine.

From the above description it will be seen that provision is made in the present apparatus for controlling the intermittent advance of a printed web of container forming material into operative position to the package forming and severing mechanisms in accordance with substantially equally spaced printed indicia on the web defining the length of individual container sections, the control means being adapted to correct the linear advance of the web during the same cycle in which a deviation from the predetermined spacing is detected beyond the permitted tolerances.

While the preferred embodiment of the invention has been herein illustrated and described it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In a machine of the character described, a combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections comprising a pair of horizontally and vertically reciprocable grippers arranged to intermittently advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, control means including means for detecting the position of a registration mark at a predetermined time during the advance of the web, and means responsive to said control means arranged to cooperate with said grippers to increase the advancing stroke when and only when a deviation from a predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time for advancing the web an additional fixed increment as the grippers approach the end of their normal advancing stroke whereby to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

2. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections comprising a pair of horizontally and vertically reciprocable grippers arranged to intermittently advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, said grippers being also mounted for pivotal movement, control means including means for detecting the position of a registration mark at a predetermined time during the advance of the web, and means cooperating with said grippers and responsive to said detecting means when and only when a deviation from a

predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time, for effecting pivotal movement of the grippers as they approach the end of their normal advancing stroke to effect a longer stroke and thus effect an additional fixed increment of advance of the web to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

3. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections, comprising a pair of horizontally and vertically reciprocable grippers arranged to normally advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, said grippers being also mounted for pivotal movement, control means including a normally inoperative photo-sensitive detector arranged to cooperate with said registration marks, a timing switch for rendering said detector operative to detect the position of a registration mark at a predetermined time during the advance of the web, and means responsive to said detecting means and movable into engagement with a portion of said grippers when and only when a deviation from a predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time for effecting pivotal movement of the grippers to increase the advancing stroke as they approach the end of their normal advancing stroke and thus effect an additional fixed increment of advance of the web to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

4. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections comprising a pair of horizontally and vertically reciprocable grippers arranged to normally advance the web a fixed distance slightly less than the predetermined package length each cycle of operation, control means including electro-responsive means for detecting the position of a registration mark at a predetermined time during the advance of the web, and a solenoid operated member responsive to said control means arranged to cooperate with and engage a portion of said grippers to effect an additional advancing movement when and only when a deviation from a predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time, for effecting an additional fixed increment of advance of the web as the grippers approach the end of their normal advancing stroke whereby to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

5. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections, comprising a pair of horizontally and vertically reciprocable grippers arranged to normally advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, said grippers being also mounted for pivotal movement, control means including a normally inoperative photo-sensitive detector arranged to cooperate with said registration marks, a timing switch for rendering said detector operative to detect the position of a registration mark at a predetermined time during the advance of the web, and a solenoid operated member responsive to said control means when and only when a deviation from a predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time for cooperation with and engageable with a portion of said grippers to effect pivotal movement thereof to increase the advancing movement as they approach the end of their normal advancing stroke and thus effect an additional fixed increment of advance of the web to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

6. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections comprising a pair of horizontally and vertically reciprocable grippers, cam operated means for effecting vertical reciprocation of said grippers, means for initially adjusting the linear stroke of said cam operated means to intermittently advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, control means including means for detecting the position of a registration mark at a predetermined time during the advance of the web, and means responsive to said control means arranged to cooperate with said grippers to effect an additional advancing movement when and only when a deviation from a predetermined position beyond an allowable tolerance is detected as determined by the interception of the detecting means by the registration mark during said predetermined time for advancing the web an additional fixed increment as the grippers approach the end of their normal advancing stroke whereby to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

7. In a machine of the character described, in combination, web feeding means for intermittently advancing a web having substantially equally spaced registration marks thereon defining successive package sections comprising a pair of horizontally and vertically reciprocable grippers arranged to intermittently advance the web through a normal fixed stroke slightly less than the predetermined package length each cycle of operation, said grippers being also mounted for pivotal movement and having opposed web engaging elements, one comprising a flat faced resilient member and the other comprising a cooperating curved face knurled metallic member, control means including means for detecting the position of a registration mark at a predetermined time during the advance of the web, and means responsive to said detecting means and movable into engagement with a portion of said grippers when and only when a deviation from a predetermined position beyond an allowable tolerance is detected

as determined by the interception of the detecting means by the registration mark during said predetermined time, for effecting pivotal movement of the grippers to increase the advancing movement as they approach the end of their normal advancing stroke and thus effect an additional fixed increment of advance of the web to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

8. In a duplex machine of the character described, in combination, web feeding means for intermittently advancing two webs each having substantially equally spaced registration marks thereon, defining successive package sections, comprising a pair of horizontally and vertically reciprocable grippers for each web, means for operating said grippers simultaneously to normally advance the webs a fixed distance slightly less than the predetermined package length each cycle of operation, control means for each web including means for detecting the position of a registration mark at a predetermined time during the advance of the web, and means responsive to said control means arranged to cooperate with the respective grippers to increase the advancing movement when and only when a deviation from a predetermined position beyond allowable tolerances is detected as determined by the interception of the detecting means by the registration mark during said predetermined time for selectively effecting an additional fixed increment of advance of such web as the grippers approach the end of their normal advancing stroke whereby to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which said deviation is detected.

9. In a duplex machine of the character described, in combination, two web feeding means for intermittently advancing webs each having



substantially equally spaced registration marks thereon, defining successive package sections, comprising a pair of horizontally and vertically reciprocable grippers for each web, means for operating said grippers to normally advance the webs simultaneously a fixed distance slightly less than the predetermined package length each cycle of operation, said grippers being also mounted for pivotal movement, control means for each web including means for detecting the position of a registration mark at a predetermined time during the advance of the webs, and means responsive to said control means including a member movable into engagement with and arranged to cooperate with and effect pivotal movement of the grippers to increase the stroke as they approach the end of their normal advancing stroke when and only when a deviation from a predetermined position beyond allowable tolerances is detected as determined by the interception of the detecting means by the registration mark during said predetermined time whereby to selectively effect an additional fixed increment of advance of a web to obtain a net advance slightly more than the predetermined package length during the same cycle of operation in which such deviation is detected.

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