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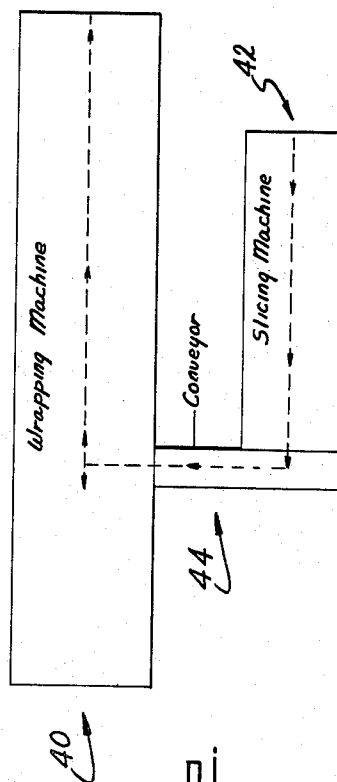
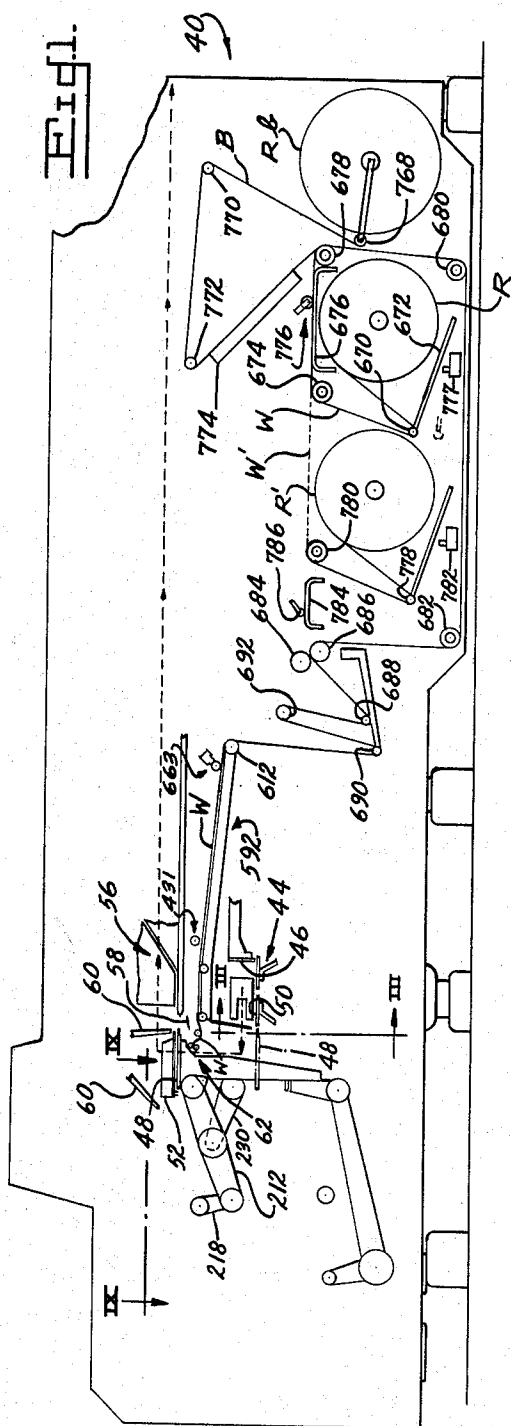
F. B. ROBERTS ET AL

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WRAPPING MACHINE

Filed Nov. 13, 1961

19 Sheets-Sheet 1



INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
ATTORNEYS

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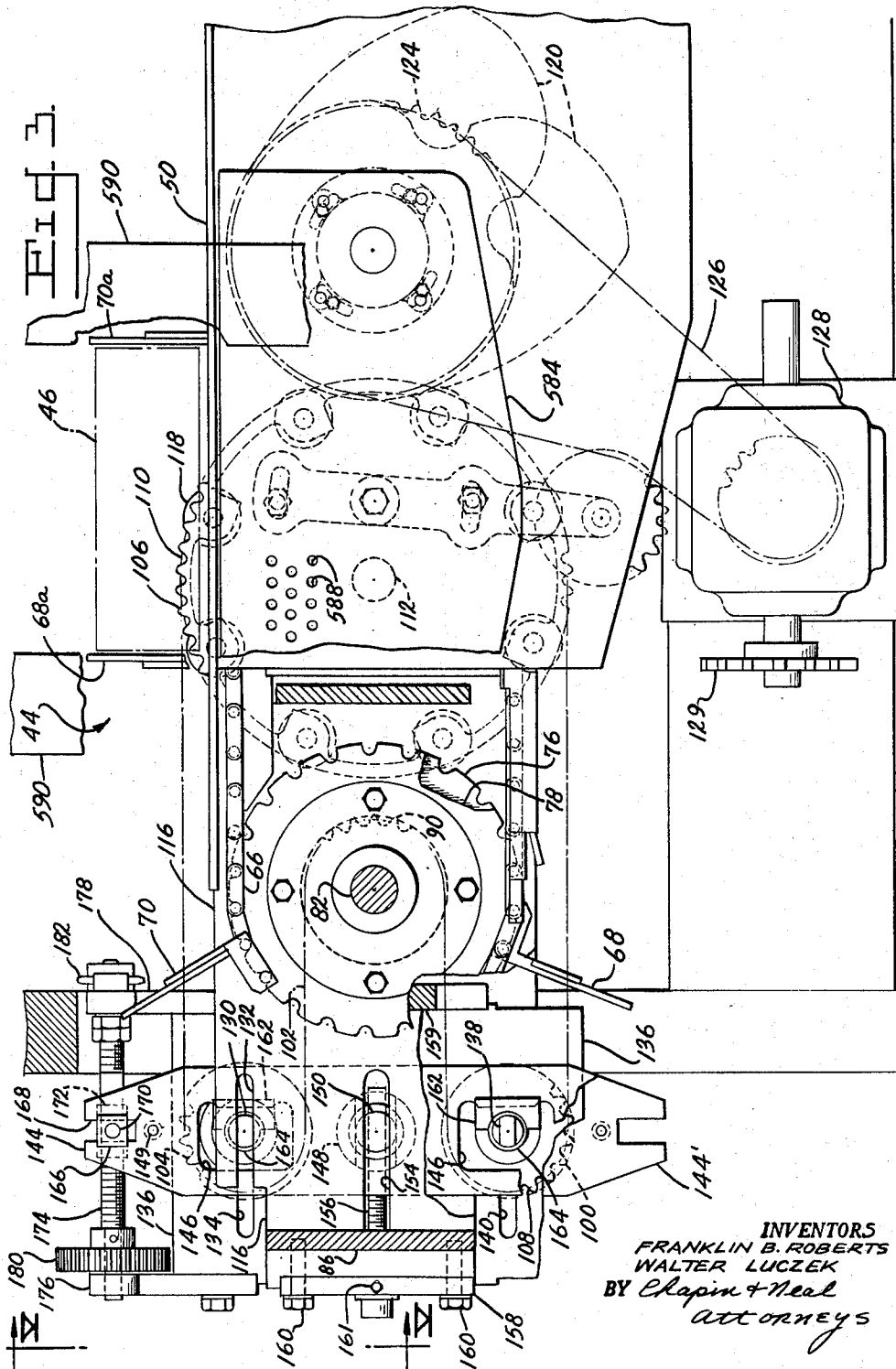
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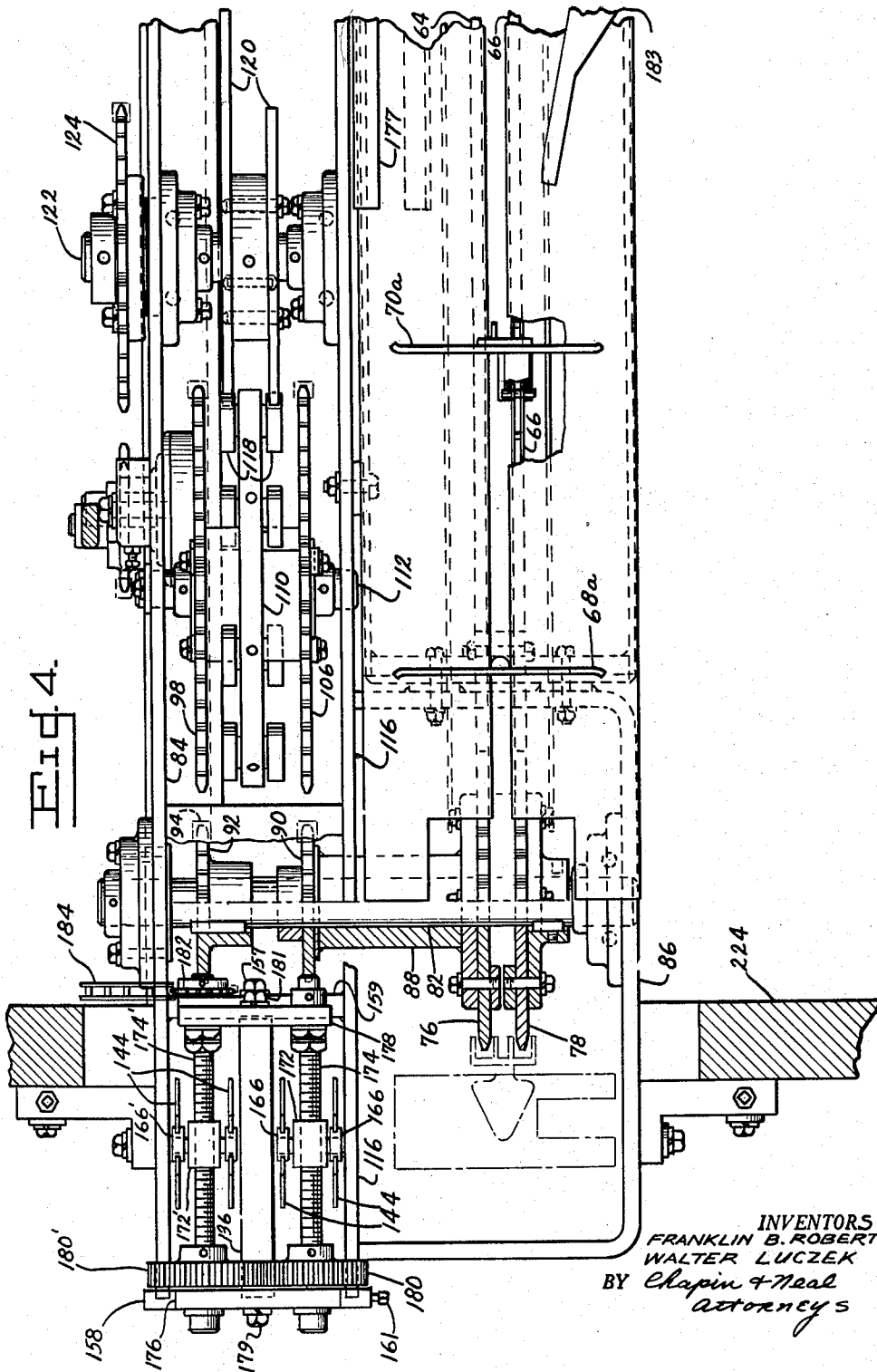
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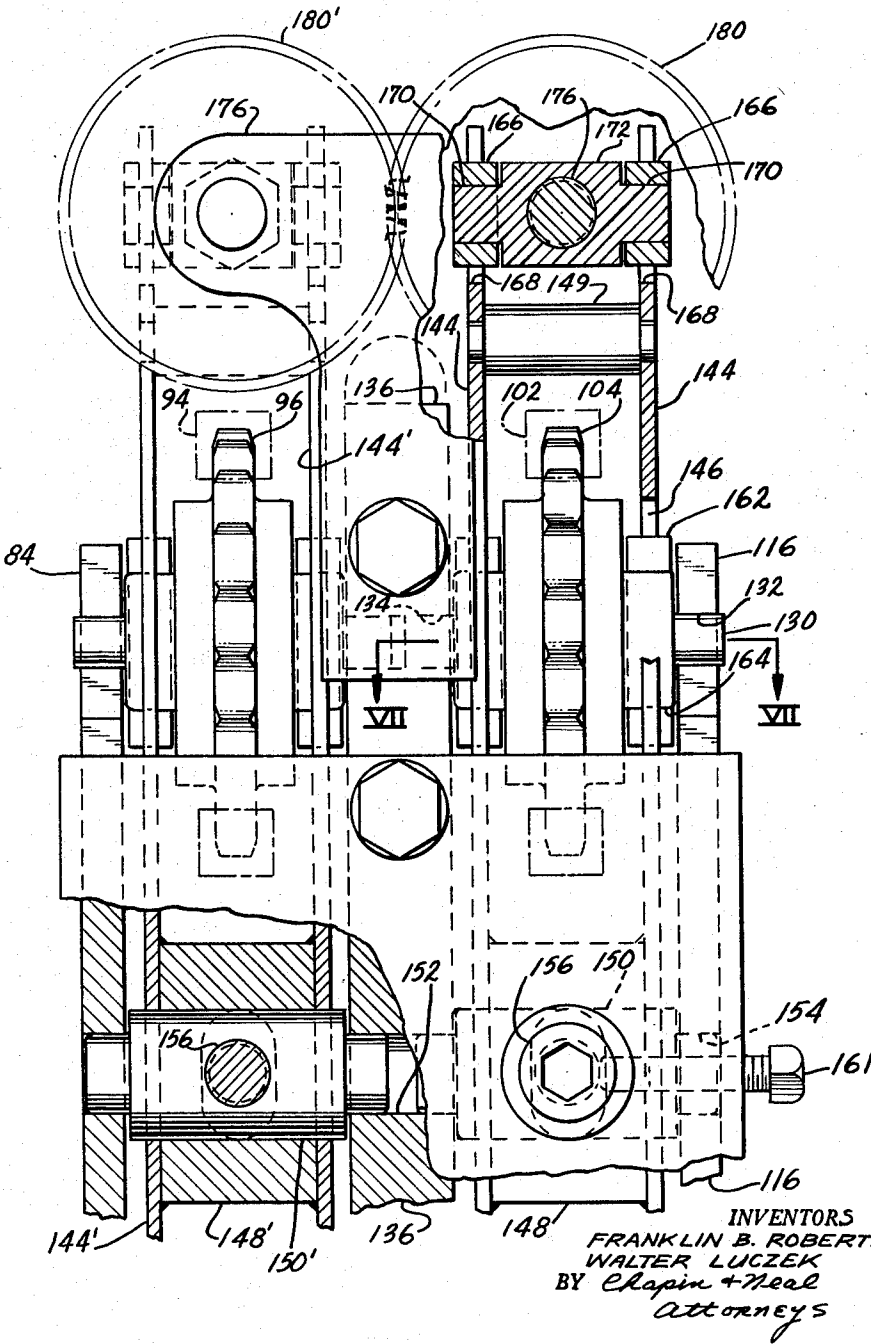
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Fig. 5.



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Fig. 6.

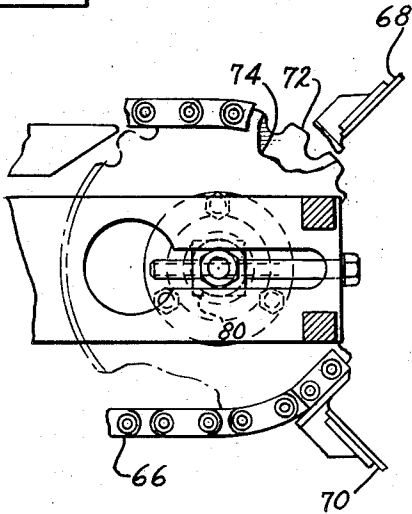


Fig. 7.

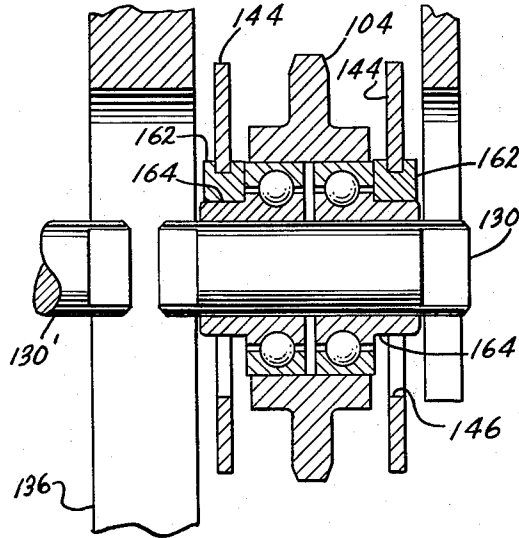
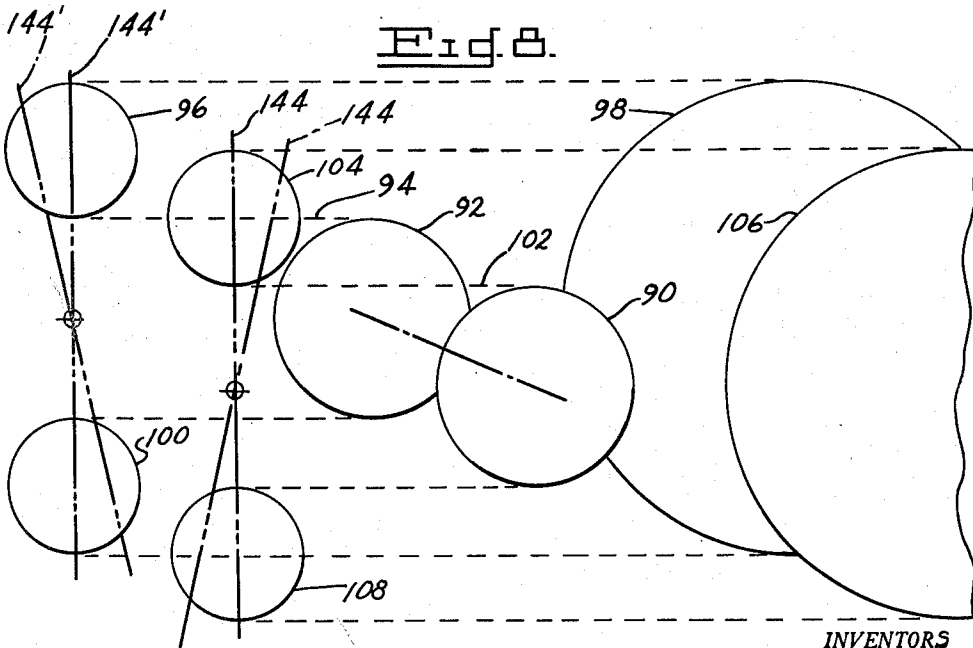


Fig. 8.



INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
ATTORNEYS

Feb. 23, 1965

F. B. ROBERTS ET AL

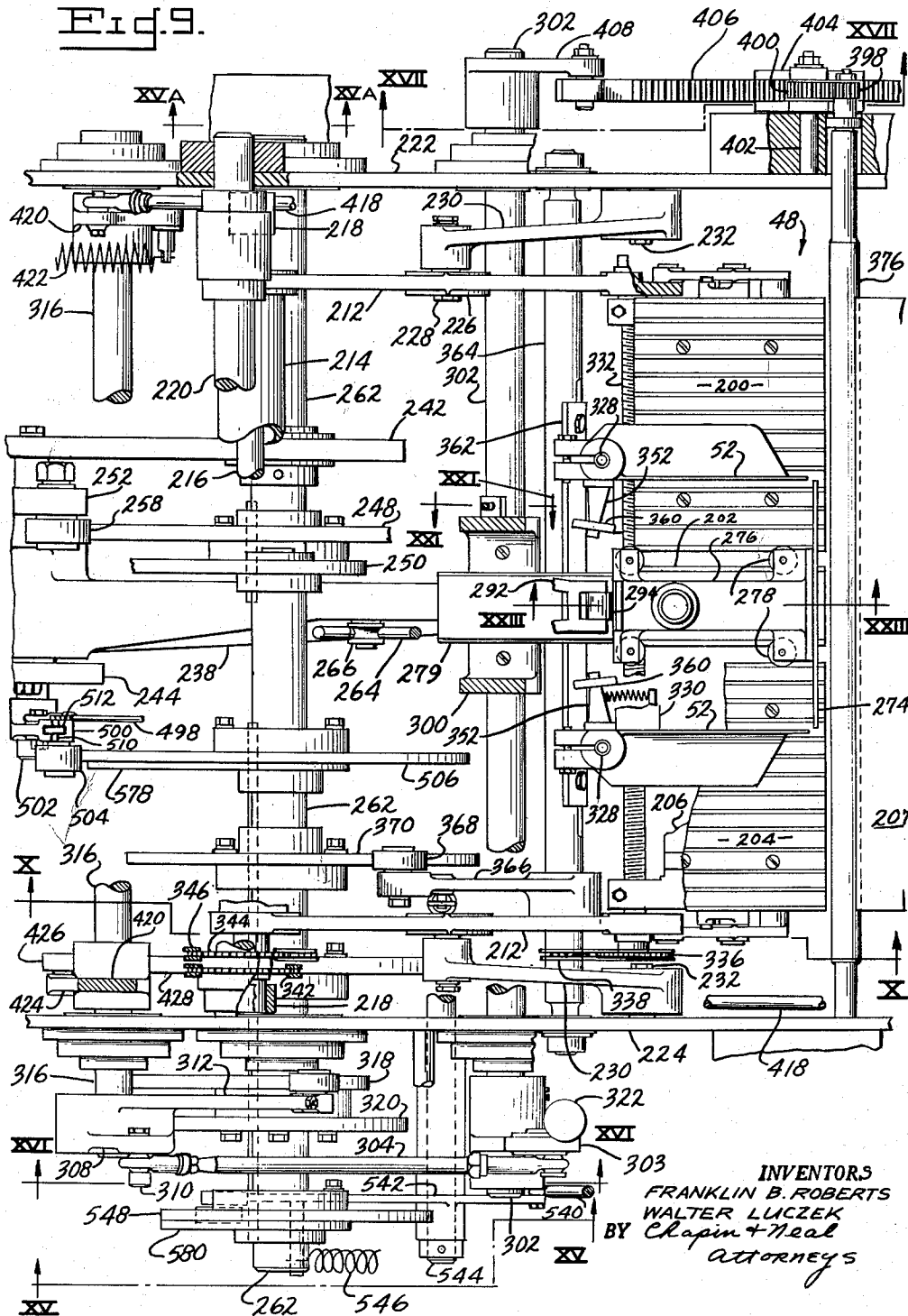
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Fig. 9.



INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY Chapin & Neal
ATTORNEYS

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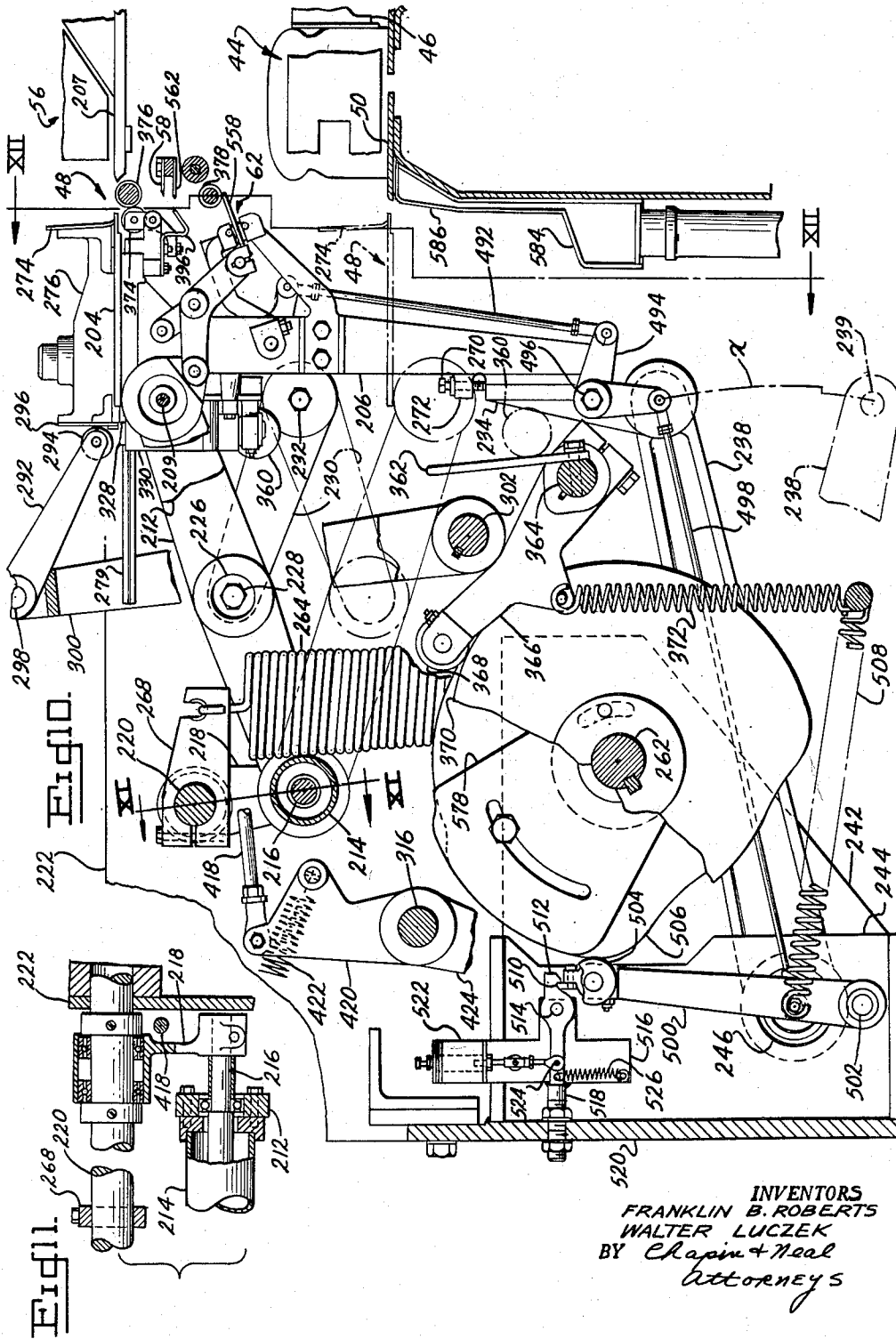
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Fig. 12.

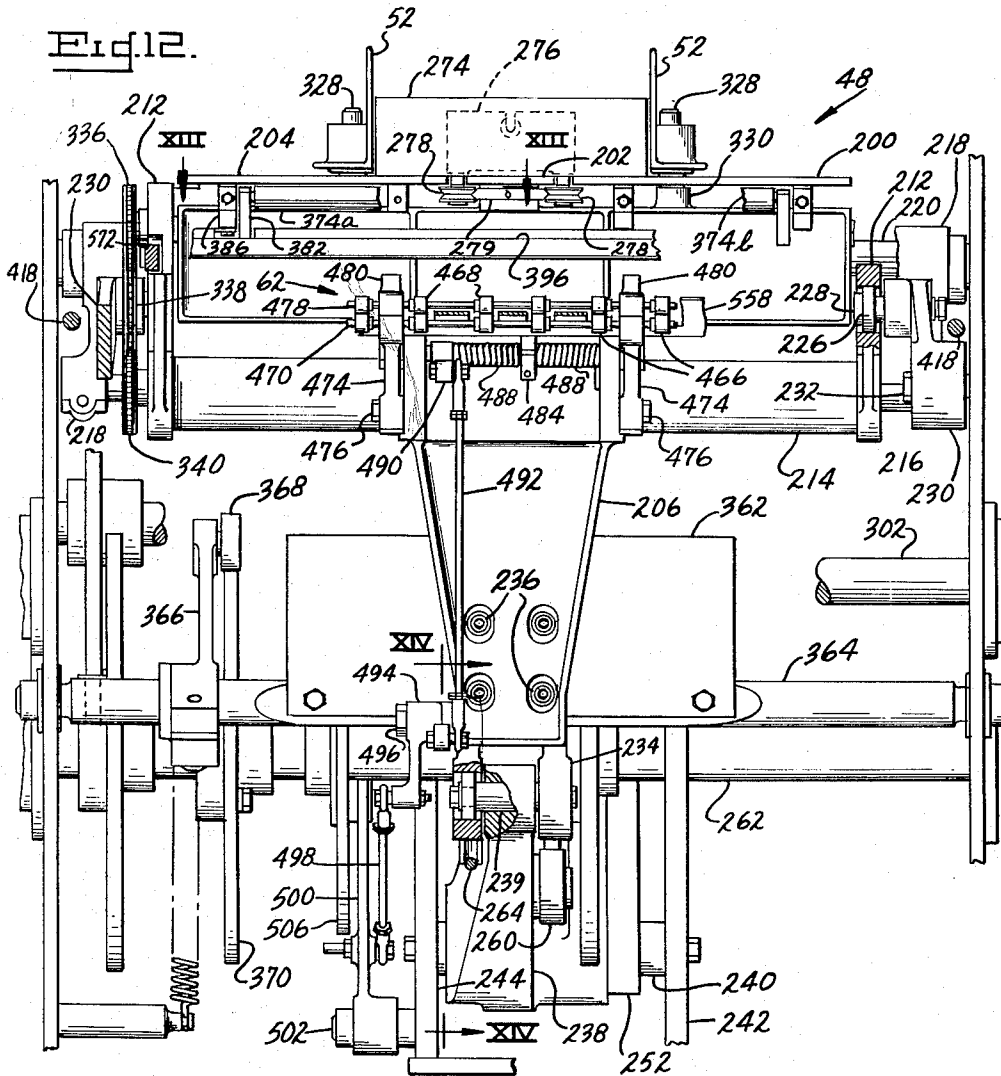
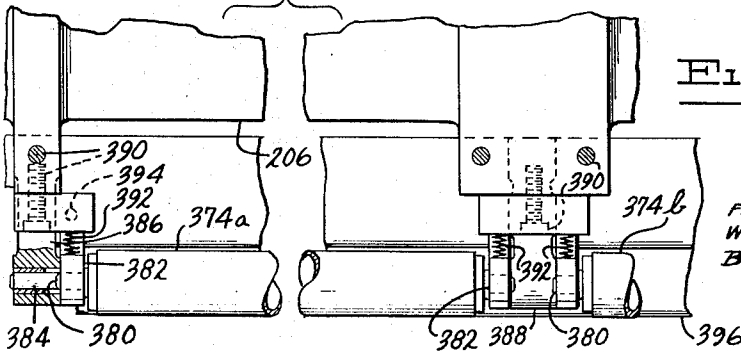


Fig. 13.



INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
Attorneys

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FIG. 19.

INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY Chapin & Neal
ATTORNEYS

Feb. 23, 1965

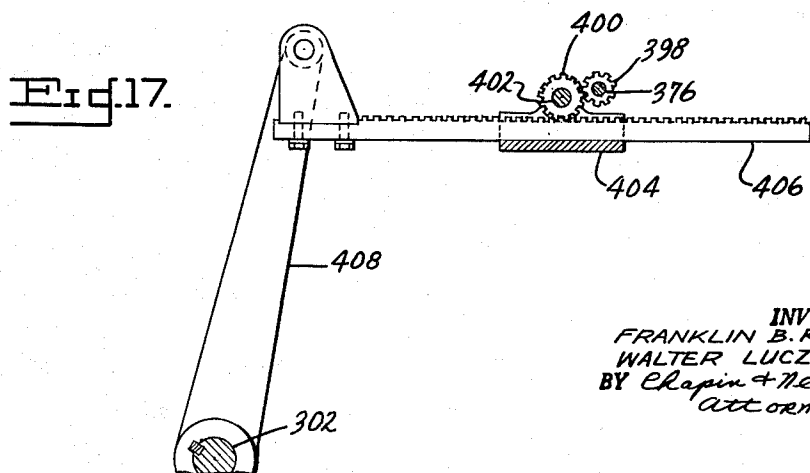
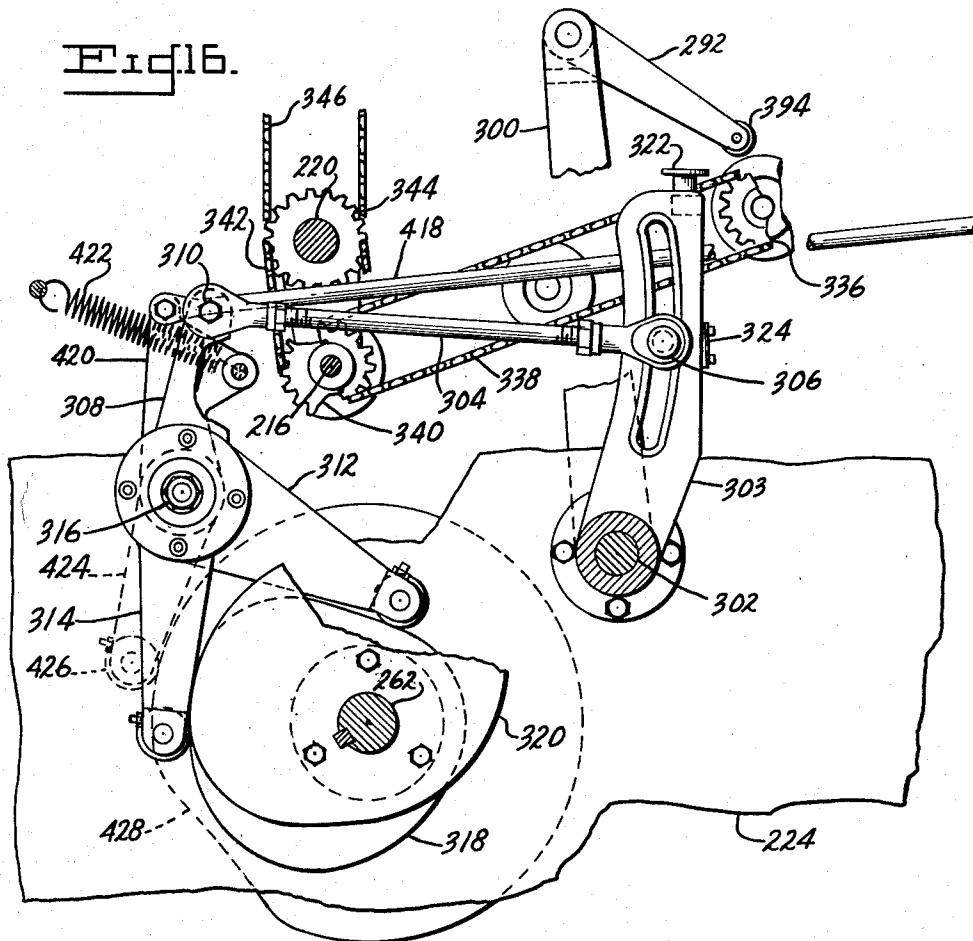
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INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY Chapin & Neal
attorneys

Feb. 23, 1965

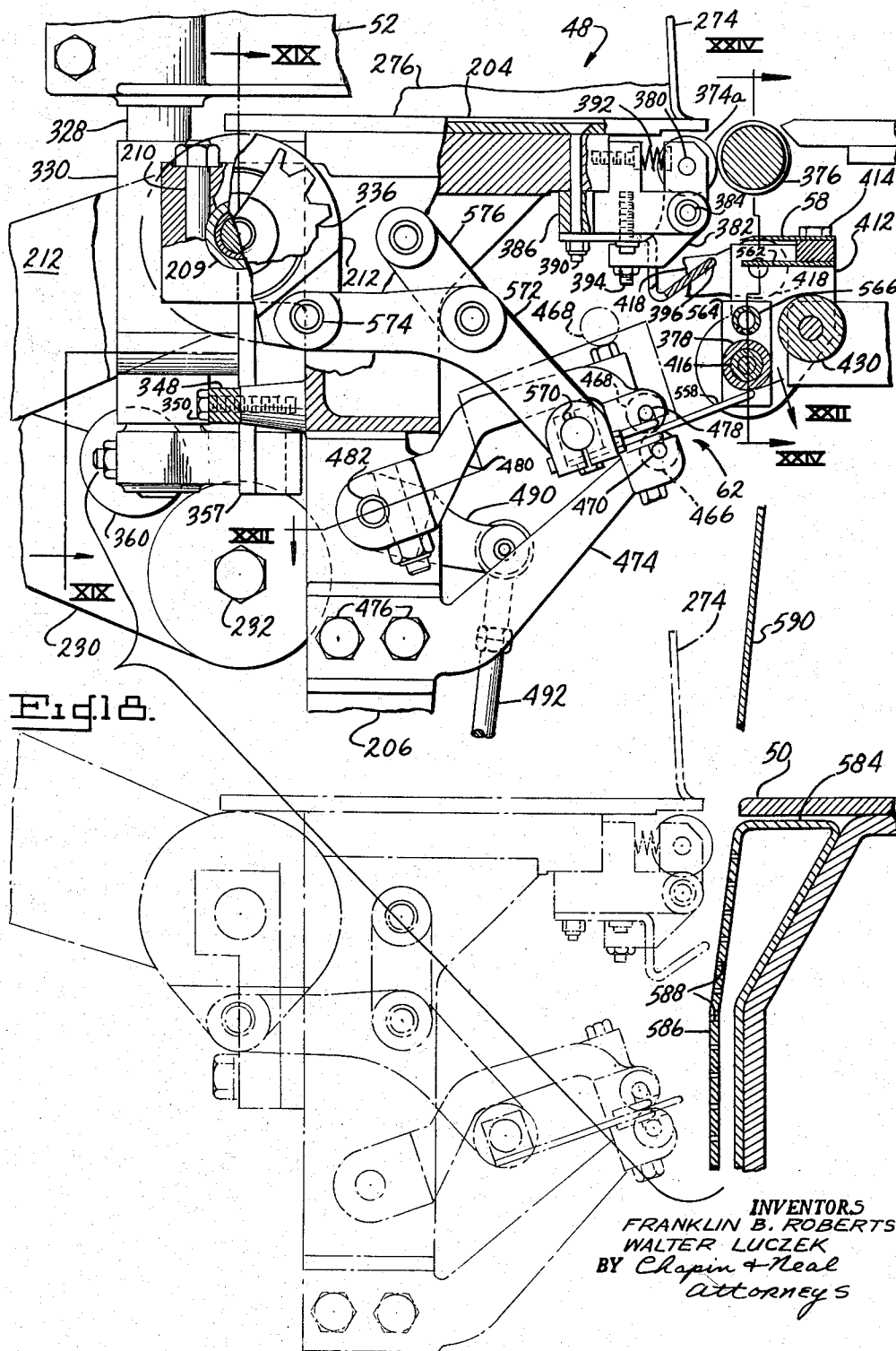
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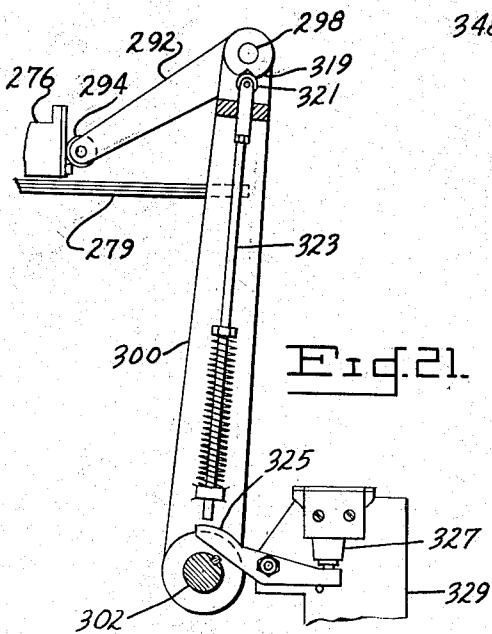
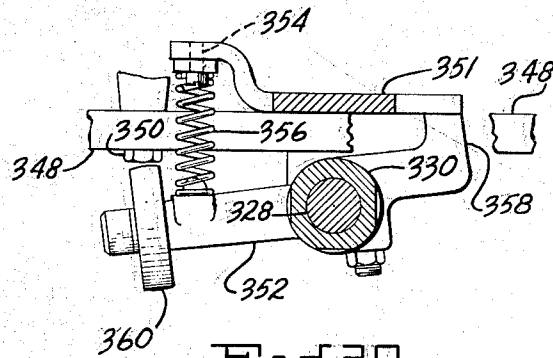
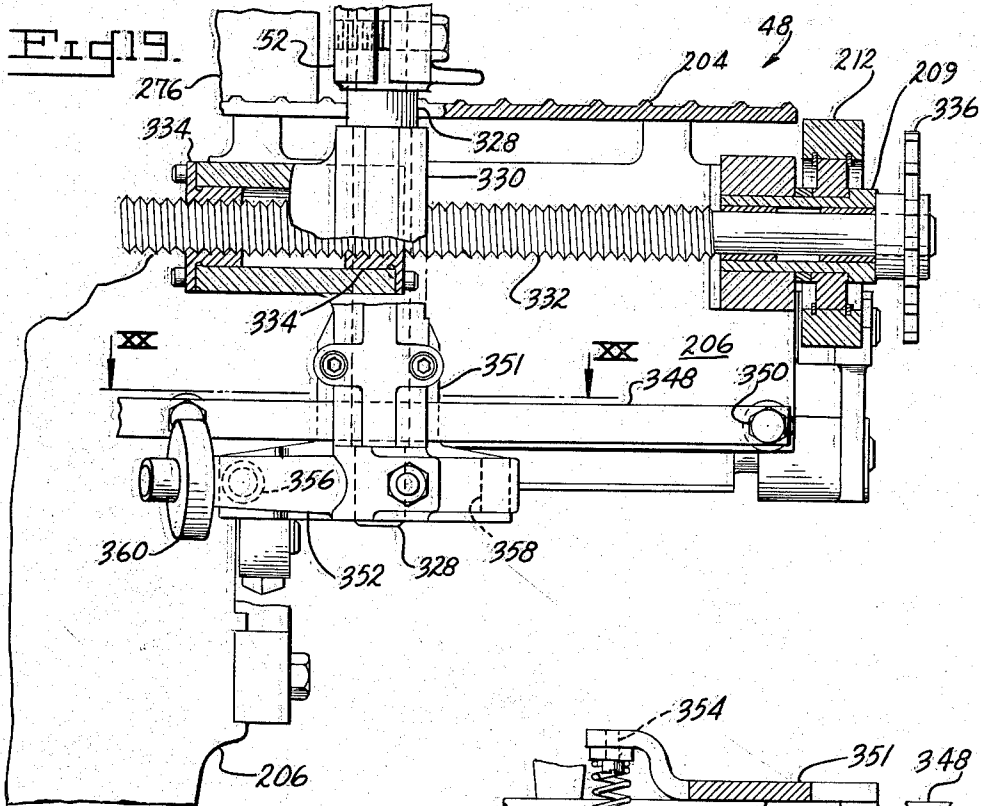
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INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin + Neal*
Attorneys

Feb. 23, 1965

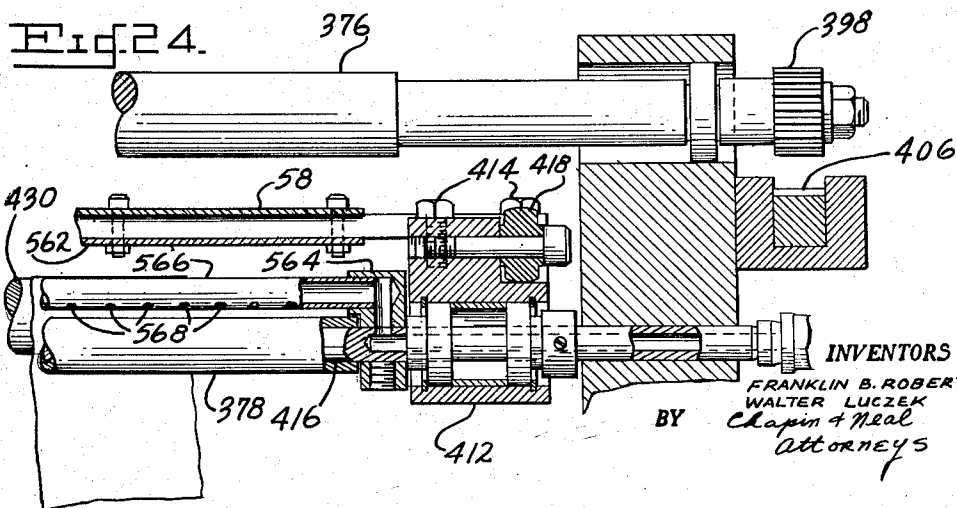
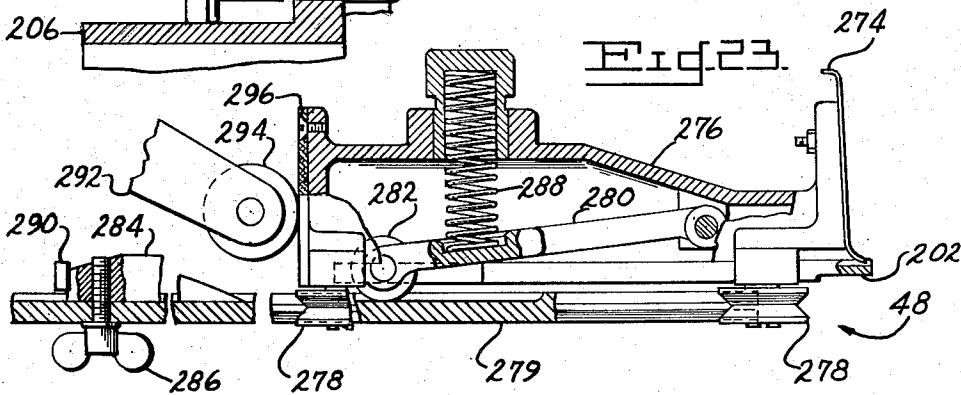
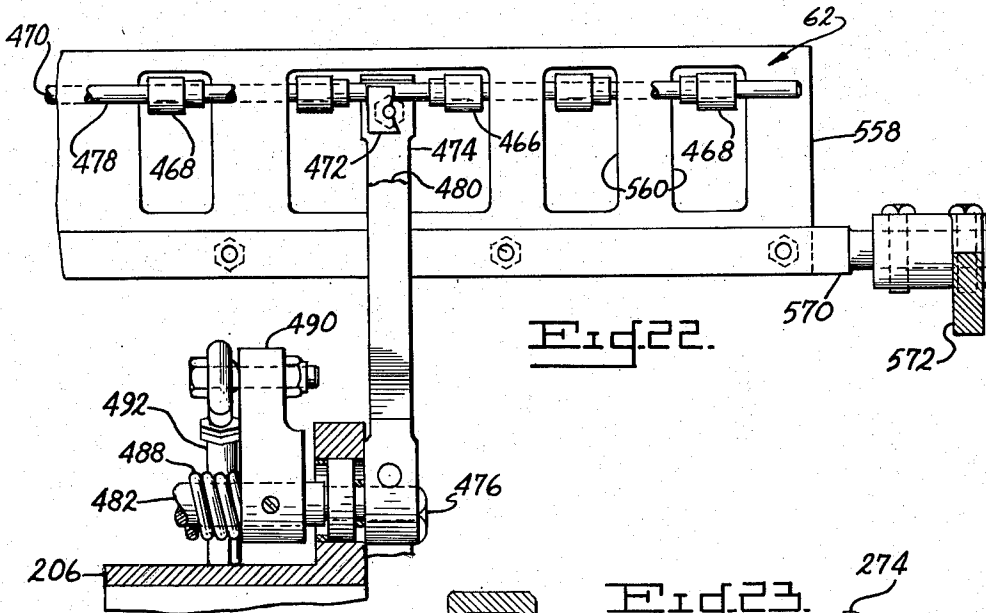
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INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
ATTORNEYS

Feb. 23, 1965

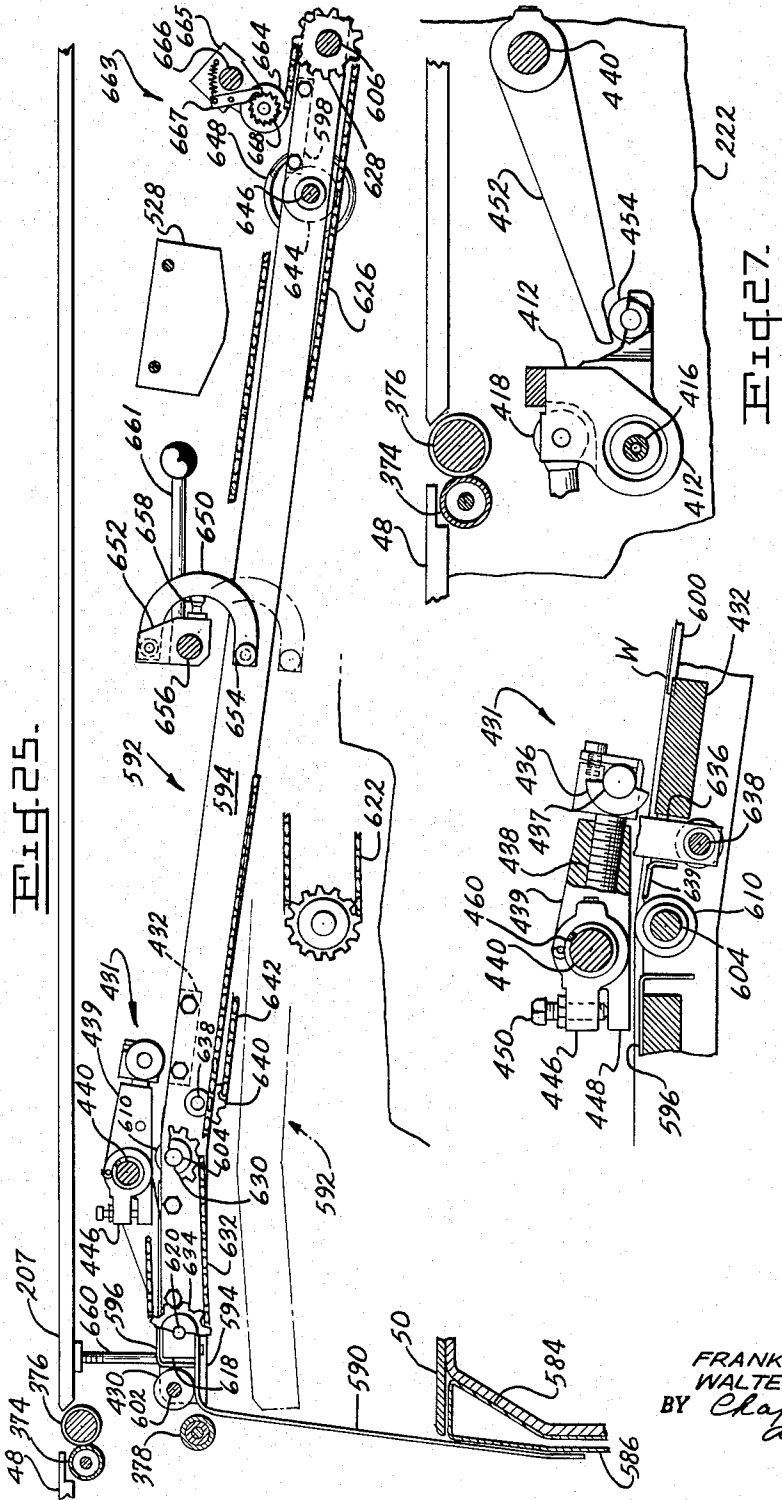
F. B. ROBERTS ET AL

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INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
ATTORNEYS

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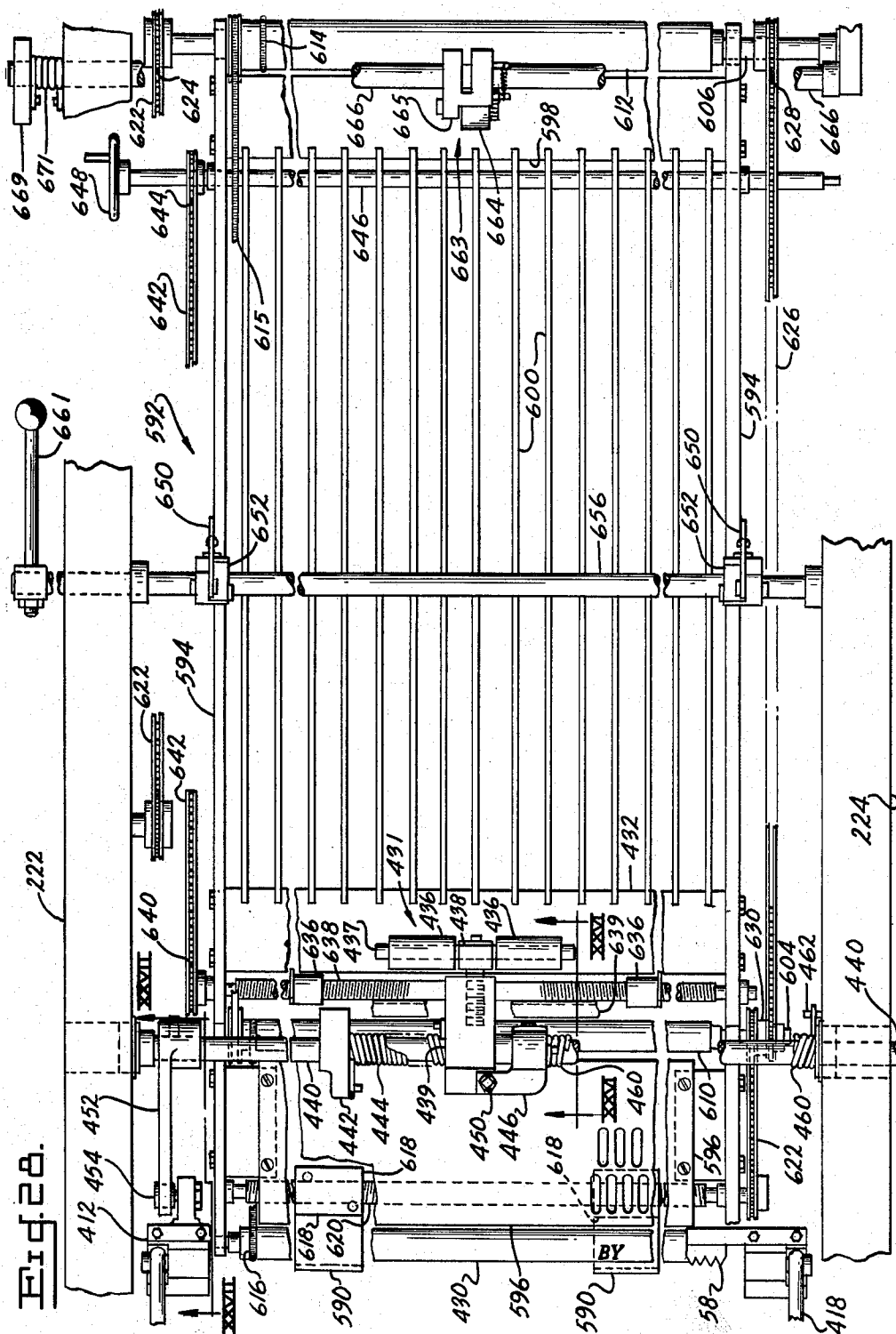
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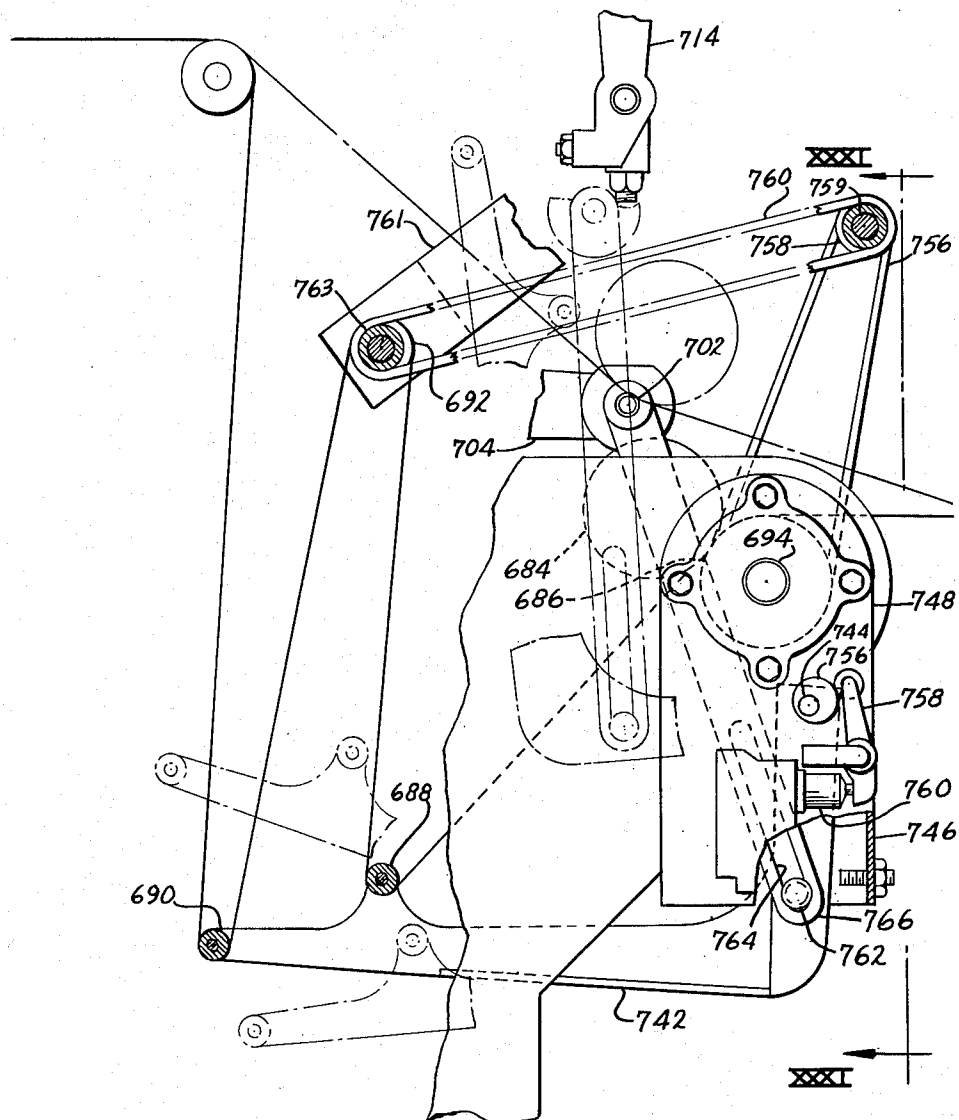


Fig. 29.

INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin & Neal*
attorneys

Feb. 23, 1965

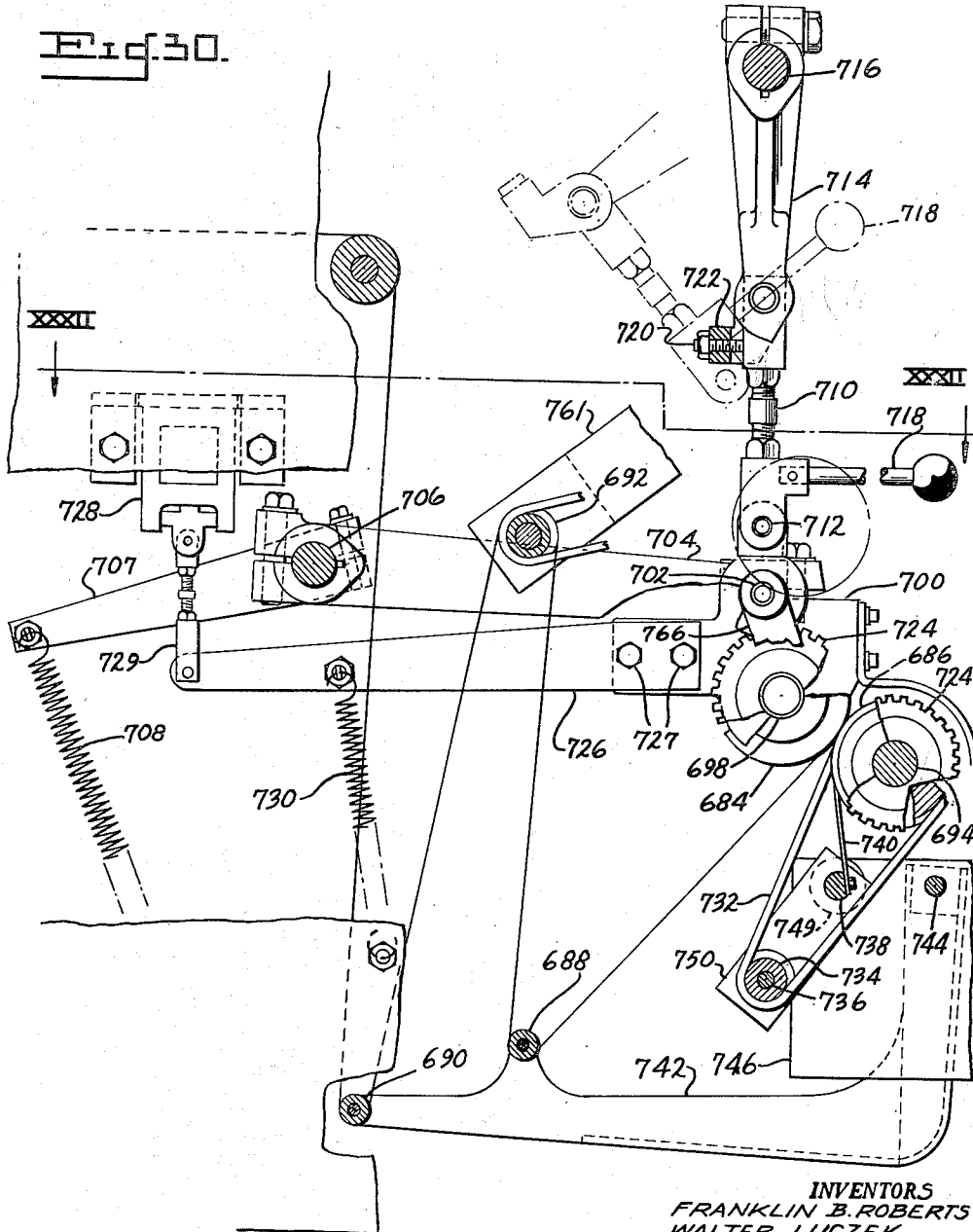
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Fig. 30.



INVENTORS
FRANKLIN B. ROBERTS
WALTER LUCZEK
BY *Chapin + Neal*
ATTORNEYS

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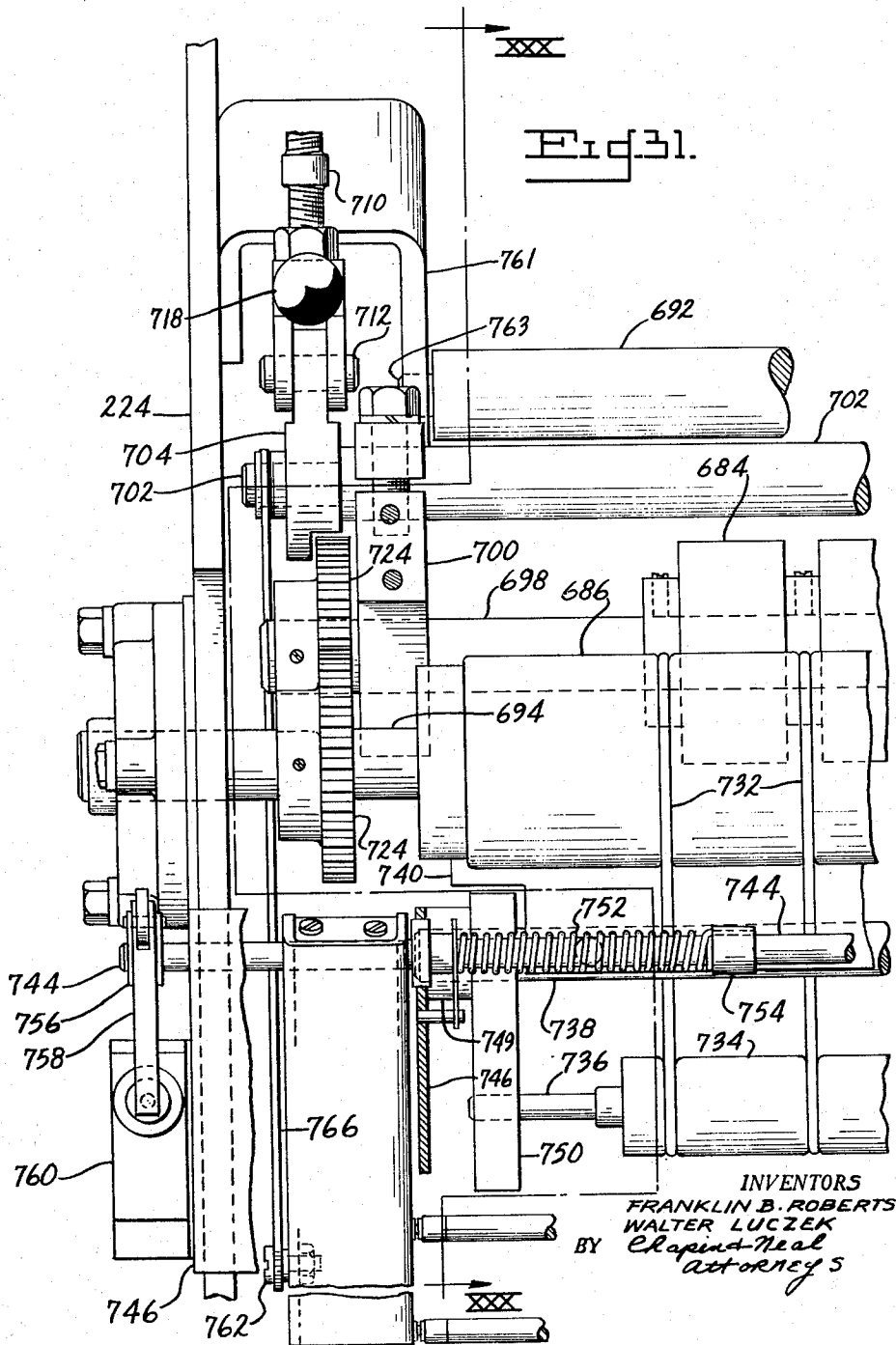
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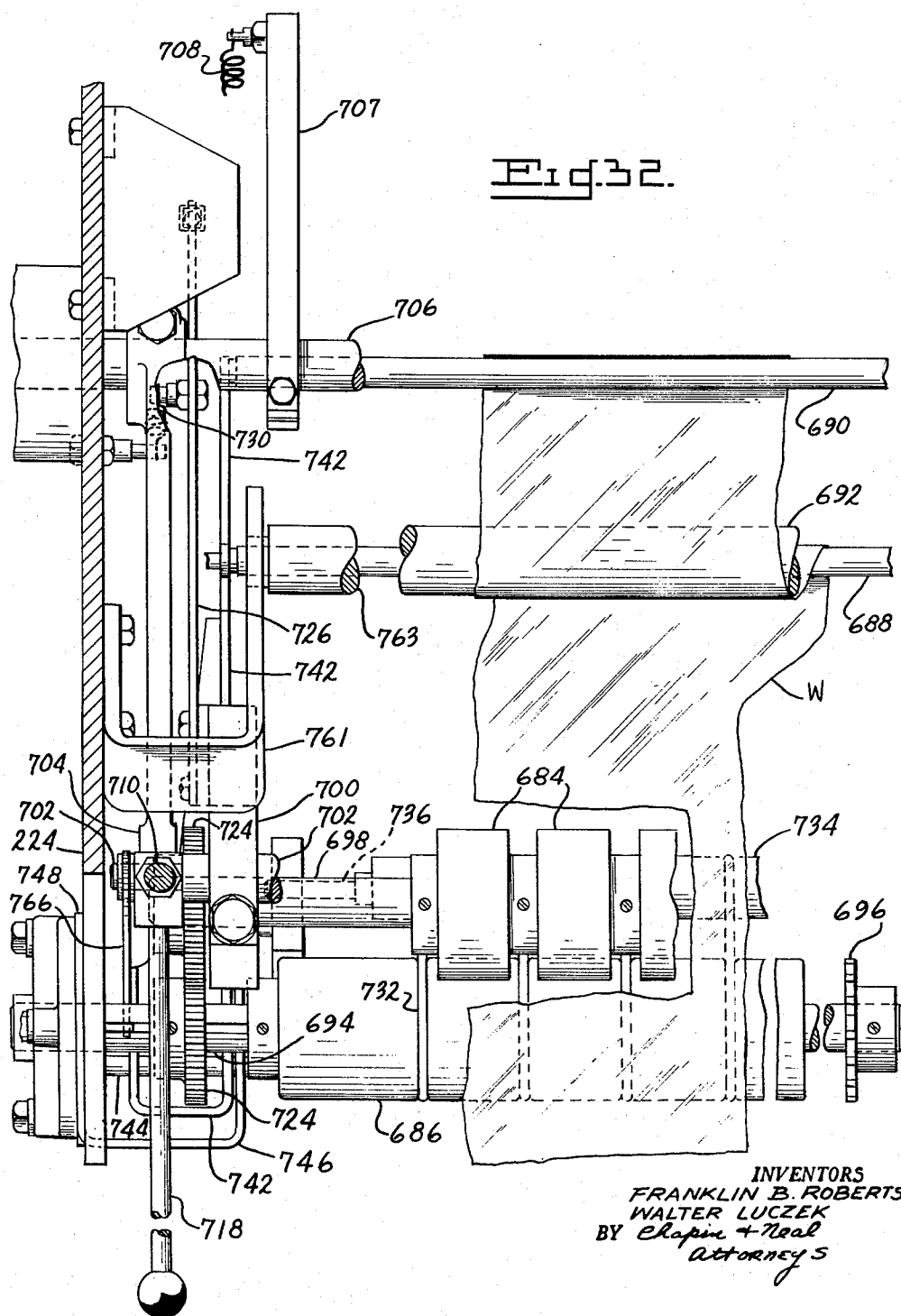
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WRAPPING MACHINE

Franklin B. Roberts, Springfield, and Walter Luczek, Indian Orchard, Mass., assignors to Package Machinery Company, East Longmeadow, Mass., a corporation of Massachusetts

Filed Nov. 13, 1961, Ser. No. 151,910
44 Claims. (Cl. 53—226)

The present invention relates to improvements in wrapping machines of the type normally employed in wrapping bread, it being understood, of course, that such machines may also be employed in wrapping other articles.

The general object of the invention is to increase the rate at which bread and similar articles may be wrapped.

Another object is to minimize the maintenance and service requirements for such machines.

A more specific object is to provide for improved control of the wrapper material as it is advanced to and around the articles to be wrapped and at the same time to facilitate the introduction of a new web of wrapping material into the machine in a minimum of time.

Another specific object is to provide improved means for obtaining registration of printed matter on the wrapper material relative to the articles being wrapped.

A further object of the invention is to minimize the number of adjustments required when changing over to wrap a different size of article, and in this regard particularly to improve the adjustment of conveyor means for advancing articles such as sliced loaves of bread to the wrapping machine.

In one aspect of the invention, the features of novelty are characterized by a wrapping machine in which linkage means are provided for moving an elevator between positions respectively aligned with infeed and discharge platforms. Preferably the elevator is horizontally disposed and moved along a rectilinear path.

Other aspects are characterized by the provision of means for severing a web after it has been partially encircled therein by raising an elevator from an infeed platform to a discharge platform. Gripper means movable with the elevator clamp the web and position it for wrapping the next article as the elevator moves back to the infeed platform. The web is thereby drawn from a web supply system during both strokes of the elevator. Where printed panels on the web are to be registered on the articles, release of the web from the gripper means is controlled by an electric eye mechanism.

The web supply system is characterized by means for providing a substantial length of the web under minimum tension which is readily available and facilitates its being fed during both movements of the elevator, viz as the elevator moves from the infeed platform to the discharge platform and then back again. The web supply system is also characterized by the ready manner in which various elements may be displaced to introduce a new web therethrough. The web supply system is further characterized by the provision of means for maintaining practically the entire length of web therein taut when the supply roll therefor has been exhausted thereby minimizing the inconvenience of starting a fresh supply roll.

The cross feed conveyor for delivering articles to the machine is characterized by the ease of its adjustment to accommodate articles of different lengths. This adjustment is made through the same means that are also employed to drive the conveyor.

The above and other related objects and features of the invention will be apparent from a reading of the following description of the disclosure found in the accompanying drawings and the novelty thereof pointed out in the appended claims.

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In the drawings:

FIG. 1 is an elevation of the present wrapping machine;

FIG. 2 is a diagrammatic plan view showing the working relation between this wrapping machine and a slicing machine;

FIG. 3 is an elevation, with portions broken away and in section, showing the cross feed conveyor incorporated in this machine and is taken generally on line III—III in FIG. 1;

FIG. 4 is a plan view of the portion of the conveyor seen in FIG. 3;

FIG. 5 is an end elevation, on an enlarged scale, of conveyor drive and adjusting mechanism as viewed on line V—V in FIG. 3;

FIG. 6 is a fragmentary view showing the outboard end of this conveyor;

FIG. 7 is a section taken on line VII—VII in FIG. 5;

FIG. 8 is a schematic view of the chain drive for advancing and adjusting the cross feed conveyor;

FIG. 9 is a plan view of elevator mechanism which receives loaves of bread from the crossfeed conveyor and control mechanism associated therewith; this view is taken generally on line IX—IX in FIG. 1 and portions have been broken away and shown in section for the sake of clarity;

FIG. 10 is a section taken generally on line X—X in FIG. 9;

FIG. 11 is a section taken on line XI—XI in FIG. 10;

FIG. 12 is a section taken on line XII—XII in FIG. 10;

FIG. 13 is a section taken, on an enlarged scale and with portions broken away, on line XIII—XIII in FIG. 12;

FIG. 14 is a section taken on line XIV—XIV in FIG. 12;

FIG. 15 is a view taken on line XV—XV in FIG. 9;

FIG. 15A is a section taken on line XVA—XVA in FIG. 9;

FIG. 16 is a section taken on line XVI—XVI in FIG. 9;

FIG. 17 is a section taken on line XVII—XVII in FIG. 9;

FIG. 18 is a section taken generally on the same line as FIG. 10 but on an enlarged scale and with different portions broken away and in section;

FIG. 19 is a section, on an enlarged scale, taken generally on line XIX—XIX in FIG. 18;

FIG. 20 is a section taken on line XX—XX in FIG. 19;

FIG. 21 is a section taken on line XXI—XXI in FIG. 9;

FIG. 22 is a section taken on line XXII—XXII in FIG. 18;

FIG. 23 is a section on an enlarged scale taken on line XXIII—XXIII in FIG. 9;

FIG. 24 is a section taken on line XXIV—XXIV in FIG. 18;

FIG. 25 is an elevation, with portions removed and in section, of a portion of the web supply;

FIG. 26 is a section, on an enlarged scale, taken on line XXVI—XXVI in FIG. 28;

FIG. 27 is a section, on an enlarged scale, taken on line XXVII—XXVII in FIG. 28;

FIG. 28 is a plan view of the position of the web supply system seen in FIG. 25;

FIG. 29 is an elevation with portions broken away and in section of a further portion of the web supply;

FIG. 30 is a view similar to FIG. 29 but taken generally on line XXX—XXX in FIG. 31;

FIG. 31 is a view taken on line XXXI—XXXI in FIG. 29;

FIG. 32 is a section taken on line XXXII—XXXII in FIG. 30.

General description

Referring first to FIGS. 1 and 2, the present wrapping machine, indicated generally by reference character 40, is

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usually operated in combination with a conventional slicing machine 42 when wrapping bread. Loaves of bread discharged from the slicer are carried by an intermittently operating cross feed conveyor 44 to the wrapping machine. The path of movement of the loaves is indicated by the dash lines in FIGS. 1 and 2. Each loaf of bread is positioned in advance of a pusher 46 which is reciprocated by known mechanism to advance the loaf onto an elevator 48 which is aligned with a platform 50 forming a part of the conveyor 44.

The leading end of a web W of wrapping material is, at this time, disposed between the platform 50 and the elevator 48. As the loaf moves onto the elevator 48 it becomes partially encircled in the web W and at the same time portions of the web are folded against the end faces of the loaf by tuckers or folders 52 mounted on the elevator 48. The elevator is now raised along a substantially rectilinear path by its linkage mounting means, thereby drawing a length of web from a web supply system which originates with a supply roll R. When the elevator reaches the level of a folding channel 56 the loaf is partially advanced therein and is further encircled in the web W as more web is drawn from the supply system. The actual advance of the web W through the supply system will be more fully described hereinafter.

When the loaf is partially discharged from the elevator, a knife 58 is actuated to sever the web W and the loaf is then advanced through the folding channel by an overhead conveyor comprising spaced flights 60. As the loaf is advanced through the folding channel 56, the severed wrapper is lapped upon itself and its extensions are folded against the ends of the loaf in a known manner which requires no further description for those skilled in the art. In passing, it will be noted that the folding channel conventionally leads to or includes means for applying end labels, heat sealing the lapped portions of the wrapper, and then cooling the lapped portions to set the heat seals.

After the knife 58 is actuated, the severed end of web W is clamped by grippers 62 (this is the position of the parts illustrated in the drawings) and then the elevator 48 is lowered. A further length of the web W is therefore also drawn from the web supply system during downward movement of the elevator. As the elevator again approaches its lowest position, viz. aligned with platform 50, the grippers 62 release the web W so that it is properly positioned for wrapping the next successive loaf of bread.

Infeed conveyor

Reference is now made to FIGS. 3-8 for a description of the infeed conveyor 44. The conveyor comprises a pair of endless chains 64, 66 on which are respectively mounted spaced flights 68, 70. Each flight 68 forms with an adjacent flight 70, a cooperative pair of flights between which the loaves of bread are received, viz. the flights 68a and 70a, and advanced over the infeed platform 50. The chains pass around idler sprockets 72, 74 (FIG. 6) and driven sprockets 76, 78 (FIGS. 3 and 4) respectively, and are normally intermittently operated at the same rate to advance the loaves in the desired fashion. The sprockets 72, 74 are rotatable on a shaft 80 which is adjustable to tension the chains 64, 66 as needed. The sprockets 76 and 78 are supported by a shaft 82. Appropriate frame members are provided for supporting the shafts 80, 82 and the upper and lower runs of the chains 64, 66, none of which requires specific description for those skilled in the art.

More particularly the sprocket 78 (FIG. 4) is secured to the shaft 82 which is journaled on frame plates 84, 86. The sprocket 76 has secured thereto an elongated hub 88 which is journaled on the shaft 82. A second pair of sprockets 90, 92 are supported by the shaft 82 and respectively are drivingly connected to sprockets 76, 78. The sprocket 90 is secured to the hub 88 while the sprocket 92 is secured to the shaft 82.

A separate chain drive is provided for each of the sprockets 90, 92. Thus, a chain 94 passes successively

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around sprockets 96, 98, 100 (see also FIG. 8) and then back to sprocket 92; also, a chain 102 passes around sprockets 104, 106, 108 and then back to sprocket 90 (again see FIGS. 3 and 8).

The sprockets 98 and 106 (FIGS. 3 and 4) are secured to a central disc 110 and are jointly journaled on a shaft 112 which spans frame members 84, 116. The disc 110 carries cam followers 118 which engage a pair of conjugate Geneva cams 120. The cams 120 are secured to a shaft 122 which is journaled on the frame members 84, 116 and carries a sprocket 124. The sprocket 124 is rotated through a chain 126 from a gear unit 128 (seen only in FIG. 3) which in turn is driven through sprocket 129 from the power source for the wrapping machine and in proper timed relation to the operation of the other component parts of the machine.

It will thus be apparent that the sprockets 98 and 106 are intermittently operated at the same rate. Assuming for the moment that the axes for sprockets 96, 100, 104 and 108 are fixed, then the sprockets 90 and 92 will also operate at equal rates. This is the normal condition of the machine so that the chains 64, 66 and flights 68, 70 also travel intermittently at equal rates with the relative spacing therebetween maintained constant as the loaves of bread are intermittently advanced over the platform 50.

It is contemplated that the relative spacing between the flights 68, 70 will be adjustable so as to accommodate loaves of varying lengths. That is, a different size loaf which would require adjustment of the width of the folding channel and other adjustments normally expected in such a change of size.

To this end, the sprockets 96 and 100 (FIGS. 3 and 8) are movable toward and away from the sprocket 92 and the sprockets 104, 108 are movable towards and away from the sprocket 90.

The mounting of sprockets 104, 108 for such movement will now be described with reference to FIGS. 3, 4 and 5. Sprocket 104 is rotatably mounted on a shaft 130, the ends of which are flatted and guided for horizontal movement in slots 132, 134 formed in frame member 116 and a central plate 136. The sprocket 108 is rotatably mounted on a shaft 138, the ends of which are flatted and similarly guided for horizontal movement in a slot 140, formed in plate 136 and a similar slot in member 116 which is not seen because of the breakaway in FIG. 3. The sprockets 104, 108 are embraced by a pair of lever plates 144 with the shafts 130, 138 projecting through generally square openings 146 formed therein (see also FIG. 7). The lever plates 144 are joined by a central hub 148 and shoulder pins (FIG. 5) welded thereto. A shaft 150 passes through the hub 148 and has flatted ends which ride in horizontal slots 152, 154 formed in plate 136 and member 116. A screw 156 is threaded through shaft 150 (FIGS. 3 and 5) and is mounted in an end cap 158 in a manner preventing axial movement thereof. The end cap 158 is held in a fixed position against the central plate 136 by screws 160 and is also slotted to receive frame members 84, 116; screws 157 secure the plate 136 to a cross piece 159 welded to frame members 84, 116. Shaft 150 is positively located upon tightening of a set screw 161; thus the pivot axis for the lever plates 144 is held in adjusted position.

It will now be noted that crescent shaped shoes 162 (FIGS. 3, 5 and 7) are slotted to slide on vertical portions of the openings 146 and bear against the non-rotating inner races of ball bearings 164 which journal the sprockets 104, 108. The chain 102 is tightened (by adjusting screw 156) sufficiently to cause the shoes 162 to bear against the bearings 164 and plates 144, as shown.

It will now be seen that by pivoting lever plates 144, the sprockets 104, 108 will move inversely toward and away from the sprocket 90 an equal amount. The means for so pivoting the lever plates 144 comprise a pair of blocks 166 (FIGS. 3, 4 and 5) which are interdigitated into slots 168 formed in the upper ends of lever plates

144. The blocks 166 are carried by pintles 170 projecting from a block 172. A threaded shaft 174 is journaled in plates 176, 178 and held against axial movement relative thereto. The plate 176 is secured to the central plate 136 by screw 179 while plate 178 is held against the central plate 136 by a screw 181. It will now be apparent that by rotating the threaded shaft 174, the lever plates 144 will be pivoted in one direction or the other.

It will be seen from FIGS. 3-5 in the drawings that the sprockets 96, 100 are mounted in an identical manner to that for the sprockets 104, 108 and like portions are indicated by corresponding reference characters which have been primed. The only exception is that the threaded shaft 174' rotates in the opposite direction as its counterpart. It would be pointed out that screw 156' is independently adjustable so that the axis of pivot for plates 144 and 144' are not necessarily coincident. The lever plates 144' however also pivot in the direction opposite to that of the plates 144, but to an equal extent. The sprockets 96, 100 therefore move the same distance as the sprockets 104, 108 to rotate the driving sprocket 92 the same angular distance as the sprocket 90, but in the opposite direction (again reference is made to FIG. 8).

Assume, for example, that the plates 144 are pivoted clockwise (as indicated by the diagrammatical representation in FIG. 8), the sprocket 104 will move toward the sprocket 90 and the sprocket 108 will move away from the sprocket 90 an equal distance, thereby maintaining a constant length for the chain 102. The sprocket 106 is held against rotation by the action of the Geneva cams 120 which prevent free rotation of the disc 110. The resultant of these conditions is that the sprocket 90 is rotated in a clockwise direction. Simultaneously, the sprocket 92 is rotated an equal amount in a counterclockwise direction, as the plates 144' are pivoted in a counterclockwise direction.

As a result of this relative rotation of the sprockets 90, 92, the conveyor sprockets 76, 78 are rotated equal amounts in opposite directions. The adjacent or cooperative flights 68, 70 are thus moved towards and away from each other so that they will be properly spaced to receive whatever size loaf is being wrapped. It will be seen that this adjustment maintains each pair of cooperative flights 68, 70 equally spaced from a fixed center line so that the loaf will be properly centered relative to the wrapping machine. In greater detail, there are three "working" stations of the conveyor, viz, one for receiving loaves from the slicer, a second rest station, and a third station, where they are positioned for delivery to the elevator 48. The flights 68, 70 of each cooperative pair are equally spaced from the center lines of these stations.

As the loaves are advanced from the rest station to the delivery station, they are displaced against an upright plate 177 at the rear of platform 50 by a deflector bar 183. The flights 68, 70 are slotted to provide clearance for bar 183, as seen in phantom in FIG. 4. The loaves pass beyond the plate 177 and are then positioned closely adjacent the infeed pusher 46 so that each loaf will be engaged thereby with the same minimum impact.

Reverting back to the opposite rotation of the threaded shafts 174, 174', it will be seen that gears 180, 180' (FIGS. 3-5) are respectively secured to these shafts. A sprocket 182 is also secured to the shaft 174' and is driven through a chain 184. The chain 184 is connected to the drive for adjusting the folding elements of the machine, e.g. the side walls of folding channel 56, to fold various sizes of loafs. Such adjusting means are found in U.S. Patent No. 2,934,119 and it will be apparent that the chain 184 would be driven by these means. Thus, it is possible to simultaneously adjust the spacing of the flights 68, 70 and also the folding elements of the machine for the size of loaf which is to be wrapped.

Elevator mechanism

The elevator 48 (FIGS. 9, 10 and 12) comprises three plates 200, 202 and 204 which are secured to the upper end of a vertical arm 206 by screws 208. The arm 206 is mounted by a linkage means, now to be described, for substantially rectilinear movement between its lower position wherein it receives a loaf L at what may be considered an infeed platform (platform 50 of conveyor 44) and its upper position where the loaf is delivered to what may be considered a discharge platform (the base 207 of folding channel 56).

The arm 206 has bosses at its upper end in which tubular studs 209 (FIGS. 18 and 19) are secured by binding screws 210. Links 212 (see also FIGS. 9 and 10) are respectively pivotally mounted at one end on the studs 209. The opposite ends of the links 212 are secured to a tubular cross shaft 214 (FIG. 11) and are also journaled on a concentric shaft 216. The shaft 216 is secured at each end to a depending, generally vertically disposed arm 218. Each of the arms 218 is journaled on a cross shaft 220 which is secured to the main side frames 222, 224 of the wrapping machine. The side frames 222, 224 are compositely formed but for sake of simplicity will herein be referred to as unitary structures. Intermediate each link 212 is a bearing 226 (FIGS. 9, 10 and 12) which receives a stud 228 projecting from a further link 230. Each of the links 230 is pivotally mounted on a pin 232 projecting inwardly from the side walls 222, 224, respectively. A bracket 234 is secured to the lower end of the arm 206 by screws 236. A relatively long lever 238 is pivotally connected by a pin 239 (FIGS. 9, 12 and 14) to the bracket 234. The other end of lever 238 is secured to a shaft 240 which is journaled on sub-frame plates 242, 244 by bearings 246. Conjugate cams 248, 250 (FIGS. 9 and 14) control oscillating movement of the lever 238. To this end a lever 252 is pivotally mounted on the shaft 240 and is adjustably secured by screw 254 to an arm 256 integral with lever 238. The lever 252 is adjusted so that a follower 258 at its outer end will bear firmly against the cam 248 while a follower 260 carried by lever 238 bears firmly against the cam 250.

The cams 248, 250 are secured to a cam shaft 262 which is driven from an appropriate power source in proper timed relation to the operation of other mechanisms of the wrapping machine.

It will be seen that the path of travel x (FIG. 10) of the outer end of lever 236 describes a very flat arc which is essentially a straight line at the axis of pin 239. Also, and preferably, the upper and lower positions of the pivotal connection 239 fall on the same vertical line. As the arm 206 is moved downwardly by lever 238, the action of arms 218 is to swing rearwardly (to the left in FIG. 10) under the influence of the arcuate path of studs 228 as the links 230 pivot about pins 232. Thus, the shaft 216 is progressively moved rearwardly an amount equal to the outward swing of the ends of links 212 (at the axis of studs 209) as these links pivot about the shaft 216. After the links 212 reach a horizontal position (when the elevator is midway between platforms 207 and 50), the axis of studs 209 would tend to move rearwardly upon further pivot movement about shaft 216. Again the effect of the pivotal movement of links 230 and arms 218 provides the necessary compensation so that the path of movement of the axis of studs 209 is essentially, if not precisely, a straight line. With the axis of pin 239 being on the same vertical line in the upper and lower positions of the elevator, it is possible for the elevator 48 to be in an absolutely horizontal plane in the upper and lower positions of the elevator, as indicated by the phantom showings in FIGS. 10 and 18.

Preferably a counterbalancing spring 264 (FIGS. 10 and 14) extends from a stud 266 on lever 236 to an arm 268 secured to the shaft 220. The spring 264 minimizes the bearing load on the conjugate cams 248, 250 and the followers riding thereagainst.

Referring still to FIGS. 10 and 14, it will be seen that a screw 270 is threaded through a lug 272 on arm 206 and bears against the top of bracket 234. By first loosening the screws 236, it is possible to adjust the heightwise position of the elevator so that it is properly aligned with the conveyor platform 50 and the folding channel base 56. Actually, the throw of the elevator is slightly greater than the distance between these infeed and discharge platforms so that the elevator may be disposed slightly below the platform 50 and slightly above the floor of the folding channel 56. With this relationship there is no danger of the loaves stubbing as they enter or leave the elevator.

A receiver plate assembly (FIGS. 12 and 23) is mounted on the elevator and comprises the receiver plate 274 which is secured to a carrier 276. Four grooved wheels 278 are journaled on pins depending from the carrier 276 and embrace the beveled side edges of a guide 279 disposed beneath elevator plate 202. The receiver plate assembly is thus guided for longitudinal movement on the elevator 48. A lever 280 is pivotally mounted within the carrier 276 and has a roll 282 at its other end riding in a groove in elevator plate 202. This groove provides a guideway in which a ramp 284 is adjustably secured by screw 286. A spring 288 bears against the upper surface of lever 280 and prevents free movement of the receiver plate assembly relative to the elevator.

Functionally, when the elevator 48 is aligned with the conveyor platform 50, the receiver plate 274 will be disposed adjacent the front edge of the elevator, as indicated in FIG. 10. The loaf of bread presses the web W against the plate 274 as it is advanced onto the elevator by the infeed pusher 46. The infeed pusher imparts considerable momentum to the bread and carrier plate assembly which is absorbed as the roll 282 rides up the ramp 284 to compress spring 288. The rearward position of the loaf on the elevator is determined by engagement of the carrier 276 with lateral stops 290 projecting from the ramp 284. When the carrier 276 stops it has already been slowed down considerably by compression of spring 288. The force of spring 288 is adjustable to control this rate of movement.

The elevator is now raised to its upper position preparatory to the loaf being introduced into the folding channel 56. A discharge pusher 292 is provided for initially advancing the partially wrapped loaf from the elevator so that it may be engaged by the overhead conveyor 60. The pusher 292 (FIG. 10) has a roll 294 at its outer end which is arranged to engage a layer 296 of impact resistant material, such as sole leather, secured to the rear of the carrier 276. The opposite end of pusher 292 is pivotally mounted by a pin 298 to the upper end of a forked lever 300. The lever 300 is secured at its lower end to a cross shaft 302 which is journaled in the frame plates 222, 224. A slotted lever 303 (FIGS. 9 and 16) is secured to an end portion of shaft 302 extending beyond the frame plate 224. A link 304 is pivotally connected at 306 to the lever 303 and at its opposite end is pivotally connected to an arm 308 at 310. The arm 308 is integral with arms 312, 314, which are pivotally mounted as a unit on shaft 316. The shaft 316 is in turn journaled on the frame plates 222, 224. Conjugate cams 318, 320 are secured to the driven cam shaft 262 and engage followers on the arms 312, 314 to oscillate the arm 308 and lever 303 in proper timed relationship. The slot in lever 303 is generated on a radius swung from the pivotal connection 310 when the lever 303 is in its forward position, viz, the extreme clockwise position shown in FIG. 16. The pivotal connection 306 (between link 304 and arm 303) comprises a block (not shown) which is positioned lengthwise of the slot in lever 303 by a screw 322. The relative position of the pivotal connection 306 on lever 303 thus determines the throw of that lever as well as the throw of the discharge pusher 292. While the throw is varied the end position of pusher 292 re-

mains constant and its initial position is adjusted so that the roll 294 will be closely spaced from the rear surface of the receiver carrier 276 when the elevator 48 reaches its upper position. Screw 322 is therefore adjusted for the width of loaf being wrapped and an indicator 324 may be provided to indicate the proper position of the pivotal connection 306 for any given width of loaf.

If the carrier 276 were pushed back on the elevator by a larger loaf than the link 304 is adjusted for, the roll 294 will overlies the carrier 276 and eventually be struck thereby as the elevator is raised to its upper position. In order to avoid breakage of parts, the arm 292 is free to swing upwardly relative to lever 300. At this point it will be noted that arm 292 is secured to pin 298 so that a collar 319 (FIG. 21) also secured thereto will be rotated from its illustrated position. The collar 319 has a notch which receives a roll 321 at the upper end of a rod 323. The rod 323 is guided for sliding movement in lugs projecting from lever 300 and is spring urged upwardly. When the collar 319 rotates the rod is depressed to engage a lever 325 which in turn actuates a switch 327. The lever 325 and switch 327 are mounted on a fixed bracket 329. Actuation of the switch results in deenergizing the main power source for the machine and the immediate stopping of the machine elements to prevent any breakage or fouling of the machine.

Elevator folders

When each loaf is fed onto the elevator, portions of the web W which extend beyond the ends of the loaf are folded against these ends by the folders 52. The folders 52 (FIGS. 9 and 12) are mounted on the elevator and spaced above the plates 200, 204 as they project toward the conveyor platform 50. The folders 52 are secured to upright posts 328 which are journaled on carriers 330 (FIG. 19). The carriers 330 are supported by a threaded shaft 332 which is journaled within the tubular studs 202. Actually threaded bushings 334 are screwed onto the shaft 332 and secured to the carriers 330. One end portion of the shaft 332 has right hand threads, while the opposite end portion has left hand threads. Thus, by rotating the shaft 332, the folders 52 may be simultaneously adjusted toward or away from each other in accordance with the length of loaf being wrapped. This adjustment is performed simultaneously with the adjustment of the folding channel and infeed conveyor as mentioned above. To this end, a sprocket 336 (see also FIGS. 9 and 16) is secured to the outer end of the shaft 332. A chain 338 extends from this sprocket to a double sprocket 340 rotatably mounted on the shaft 216. A chain 342 passes from the other portion of the sprocket 340 to a second double sprocket 344 rotatably mounted on the fixed shaft 220. The second portion of the sprocket 344 is driven through a chain 346 from the common power source for all the mentioned simultaneous adjustments.

Reverting back to the mounting of the folder carriers 330, it will be seen that they are maintained in upright positions by guide bars 348 (FIG. 18) secured by screws 350 to bosses on the arm 206. The bars 348 are captured between the lower end of the carrier 330 and a plate 351 secured thereto.

Provision is made for swinging the folders 52 to diverging positions as the loaves are fed onto the elevator 48. To this end an arm 352 (FIGS. 19 and 20) is secured to the lower end of each post 328. A screw 354 is threaded into each plate 351 to position one end of a spring 356. The spring 356 bears against the arm 351 to force a tail 358, at its other end, into engagement with the plate 351. In this illustrated position of the two arms 352, the folders 52 are yieldably maintained in parallel positions. As the elevator approaches its lower position, rolls 360, carried by arms 352, engage

a plate 362 (see phantom position in FIG. 10) and pivot the posts 328 in opposite directions to swing the folders 52 to diverging positions.

The folders 52 are therefore divergent as the loaf is advanced onto the elevator thereby minimizing, if not eliminating, any problems which might arise from misalignment or slight size variation. Preferably, the folders are again yieldingly urged towards their horizontal positions some time after the loaf has been introduced therebetween and before the elevator begins to rise. For these purposes the plate 362 is secured to a shaft 364 (FIGS. 9 and 10) which is journaled on the side frames 222, 224. A lever 366 is secured to the shaft 364 and has a follower 368 at its outer end which is held against a cam 370 by a spring 372. Cam 370 is also secured to the powered cam shaft 262 and rotates in proper timed relation to attain the resultant movement of the folders 52, described above.

Wrapper tightness control

When the elevator moves to its upper position, the web W depends between a pair of rolls 374, 376 (FIG. 10) and then is wrapped around a fixed idler roll 378. The roll 374 actually comprises two parts 374a and 374b (FIGS. 12, 13 and 18) which are mounted in similar fashion so that the following description will apply to either. The roll 374 is rotatably mounted on a shaft 380 which is secured at each end to an L-shaped arm 382. Pins 384 are secured to and project laterally from each arm 382. The outer pin 384 is pivotally received by a bracket 386, while the inner pin 384 is pivotally received by a common central bracket 388. The brackets 386, 388 are secured to the elevator arm 206 by screws 390. Springs 392 acting against the brackets 386, 388 urge the arms 382 outwardly to positions limited by engagement of stop screws 394, threaded through their lower portions, with the undersurface of brackets 386, 388. When the elevator 48 is raised to its upper position the web W is firmly clamped against the roll 376 by the yieldable roll 374.

The roll 376 (FIGS. 9 and 17) is journaled on the side frames 222, 224 and has a gear 398 secured to its end extending beyond the frame 222. The gear 398 meshes with a gear 400 which is rotatably mounted on a fixed shaft 402 projecting from the frame 222. A saddle 404 is pivotally suspended from the shaft 402 and provides a sliding journal for a rack 406 which meshes with the gear 400. The rack 406 is pivotally connected to a lever 408 which is secured at its lower end to the shaft 302 which is the same shaft to which the pusher lever 300 is secured. Thus, as the loaf is discharged from the elevator by pusher 292, the web W will be positively fed by a roll 376 as it is rotated by movement of rack 406. The feed of the wrapper web therefore does not exert a pull on the loaf during the final portion of encircling the loaf in a wrapper as it is discharged from the elevator. It will be remembered that the extent of motion of the shaft 302 is varied proportionately to the width of the loaf; the amount of web fed by roll 376 is therefore also dependent on this factor.

Web cut-off

The web W is severed by knife 58 after the loaf has been partially discharged from the elevator, and at the same time the web is preferably clamped at a point remote from the roll 378.

The knife 58 (FIGS. 18 and 24) is mounted in co-operative relation to a shear blade 396. The shear blade 396 is secured to the elevator arm 206 by the screws 390 previously referred to. The knife 58 preferably has sharpened serrated teeth and is secured at either end to a block 412 by screws 414. The blocks 412 are pivotally mounted on a fixed shaft 416 spanning the frame 222, 224 and serving as a support for the rotatable roll 378. A link 418 extends from one of the blocks 412 to a lever

420 (FIGS. 9, 10 and 16) which is secured to the shaft 316. Springs 422 are connected to the arms 420 and urge the knife 58 towards a web cutting position at all times. A cam lever 424 is integral with the near arm 420 and carries a follower 426 which engages a cam 428. The cam 428 is secured to the cam shaft 262 and rotated in such timed relation that the knife 58 is moved to cut the web W when the loaf has been discharged a predetermined distance from the elevator.

The previously mentioned clamping of the web is done so that there will be no tendency for the knife 58 to draw any further length of web from the web supply, as it cuts, whereby the web will be cleanly severed. It will be seen that the web W passes (FIG. 25) from roll 378 around a positioning roll 430 to a web brake 431 overlying a plate 432, which for present purposes will be assumed to be mounted in a fixed position. The web brake (FIGS. 26 and 28) comprises a pair of friction rolls 436 which are adapted to clamp the web against the plate 432. The rolls 436 are molded on a pin 437 which is secured to a T-shaped rod 438 which is threaded onto an arm 439 journaled on a cross shaft 440 which in turn is journaled at its opposite ends on the frames 222, 224. An arm 442 is secured to the shaft 440 and a torsion spring 444 acting between these two arms (439, 442) urges the rolls 436 towards the plate 432. Such movement is limited by the provision of a third arm 446 secured to the shaft 440 and overlying a tail 448 integral with the arm 439. A stop screw 450 is threaded through the arm 446 to engage the tail 448 and properly position the friction rolls 436. A lever 452 (FIGS. 27 and 28) is secured to the far end of shaft 440 and overlies a roller 454 which is mounted on the far knife block 412. The lever 452 is maintained in engagement with the roll 454 by a torsion spring 460 which acts against a fixed pin 462 and a pin 464 projecting from the arm 446.

It will be seen that when the knife is swung counter-clockwise to cut the web, the shaft 440 will rotate in a clockwise direction. The friction rolls 436 will engage and clamp the web (preferably before it is cut by knife 58) as the shaft 440 continues to rotate. This clockwise rotation of shaft 440, results first in deflection of the spring 460 and then deflection of spring 444. When the knife is returned to its inoperative position, these springs return the shaft 440 and web brake 431 to their illustrated inoperative positions.

Elevator web grippers

The grippers 62 (FIGS. 12, 18 and 22) for clamping the severed end of the web W comprise a lower set of fixed rolls 466 and an upper set of movable rolls 468. The rolls 466 are secured to a shaft 470 which is clamped by plates 472 to arms 474 which are fastened to the vertical elevator arm 206 by screws 476. The upper rolls 468 are secured to a shaft 478 which is similarly clamped to a pair of arms 480. The arms 480 are fastened to a shaft 482 which is journaled in the vertical arm 206. A clamp 484 intermediate the length of shaft 482, has pins projecting therefrom which receive the hooked ends of a pair of torsion springs 488. The opposite ends of these torsion springs bear against the arm 206 and tend to rotate the shaft 482 in a counter-clockwise direction to open the upper gripper rolls 468 to the phantom position seen in FIG. 18.

A lever 490 is also secured to the shaft 482 and is connected by a link 492 to a bell crank 494. The bell crank 494 is pivotally mounted on a stud 496 (FIGS. 10 and 12) projecting from the bracket 234 at the lower end of arm 206. The other end of bell crank 494 is connected by a link 498 to a cam lever 500 which is pivotally mounted on a stud 502 projecting from the frame plate 244. A follower 504 at the upper end of lever 500 is arranged to bear against a cam 506 which is secured to cam shaft 262 and arranged to open and

close the grippers 62 in proper timed relation. A spring 508 is secured to lever 500 for the purpose of assisting springs 438 in moving the described linkage in the direction for opening movement of the grippers.

When the grippers 62 are clamped against the leading end of the web, as is illustrated, it will be noted that the axis of pivotal connection between link 498 and bell crank 494 is coincident with the axis of pivotal connection between lever 238 and the arm bracket 234. Likewise the axis of connection between link 498 and lever 500 is coincident with the axis of oscillation for lever 238. Thus, when the arm moves down and the grippers are closed, these stated relationships maintain the gripper linkage in fixed relation relative to the elevator so that there is no variation in the clamping force as a result of elevator movement.

A replaceable striker plate 510 (FIG. 10) is secured to the upper end of lever 500 and engaged by a latch 512 which is pivotally mounted at 514 on a plate 516. The plate 516 is welded to stud 518 which is secured to an end frame wall 520. The latch 512 is engaged with the striker 510 by a solenoid 522 whose plunger is pivotally connected to the latch at 524. A spring 526 disengages the latch from the striker 510.

When the elevator is in its upper position, the sequence of events of present interest are as follows. The web is severed by the knife 58 and the severed end is introduced between the grippers 62 by means to be described shortly. The grippers close as the cam 506 displaces the lever 500 outwardly to a position where it is held by latch 512, the solenoid 522 being energized at this time. After the grippers 62 are closed the elevator 48 starts to move down; as this occurs, a further length of web is drawn from the web supply.

The web has printed thereon panels which are to be registered on the loaves being wrapped. An electric eye 528 (FIG. 25) remote from the elevator, scans the web and is actuated by indicia marks printed in predetermined relation to the panels. The spacing of the electric eye is such that when an indicia mark is detected thereby, a panel at the leading end of the web is properly positioned to register with the next loaf being wrapped. Thus, using a conventional electric eye circuit with the usual thyatron tube actuation, the solenoid 522 is deenergized when an indicia is detected by the electric eye. Spring 526 pivots the latch 512 to release lever 500 which is then free to swing to a low surface on cam 506 and the grippers open to leave the end of the web draped in front of conveyor platform 50. The printed panel at the leading end of the web is thus registered relative to the next loaf to be wrapped.

In order to obtain a positive release of the web in this registered position, it has been found preferable to simultaneously actuate the web brake 431. To this end shaft 440 (FIG. 15) has a lever 530 secured to its near end. A stud 532 projects from the lever 530 and is received in a slot 534 formed in one end of a link 536. The other end of link 536 is pivotally connected to a pivotally mounted bell crank 538. A link 540 (see also FIG. 9) is pivotally connected to the other arm of bell crank 538 and also to a lever 542 which is fulcrumed on shaft 544. A spring 546 urges the lever 542 towards a cam 548 secured to the powered shaft 262. A latch 550 (shown only in FIG. 15) is arranged to lock the lever 542 away from cam 548. Similarly to the latching arrangement for the gripper cam lever 500, a solenoid 551 engages the latch 550 with a striker plate 553 on lever 542, while a spring 555 disengages the latch when the solenoid 551 is deenergized. The cam 548 displaces the lever 542 to this locked position just as the elevator 48 starts to rise, the solenoid 551 being energized at this time. The previously mentioned circuit including electric eye 528 is arranged to deenergize the solenoid 551 simultaneously with the deenergization of solenoid 522 so that the web is released and the

brake is applied simultaneously. Thus when solenoid 551 is deenergized, lever 542 swings to a low surface on cam 548 so that shaft 440 will be rotated, by the described linkage, in a clockwise direction to apply the web brake 431. The lever 452 is free to lever the roller 454 (FIG. 27) when the brake is actuated at this time; while slot 534 permits free rotation of the shaft 440 when the web brake is applied as the web is being severed.

In the event of a failure in the electric eye circuit, to actuate the gripper release and web brake mechanisms, alternate means are provided for deenergizing the solenoids 522 and 551. These means take the form of a cam 554 (FIG. 15A) secured to shaft 262 which is arranged to actuate a switch 556 just prior to the elevator reaching its lower position. The switch 556 controls an alternate means for deenergizing the solenoids 522, 551 so that the web will be released at the bottom of the elevator stroke, even though it may not be registered.

In the event the web W does not have printed patterns which require registration, release of the web grippers 62 and simultaneous actuation of the web brake will be cam controlled. In this event, the solenoids 522, 551 and the latch mechanism associated therewith will be eliminated as will the electric eye. Adjustable cam pieces 578, 580 are positioned relative to cams 506, 548 respectively so that levers 500 and 542 will be displaced simultaneously at the proper time in the cycle to position the leading end of the web for any given size of loaf. It is contemplated that the adjustment of the cam pieces 578, 580, or their equivalent, could be made by a common adjusting mechanism.

As was indicated above, means are provided for facilitating the introduction of the cut end of the web between the grippers 62. To this end, a plate 558 (FIGS. 18 and 22) is mounted tangent with the lower gripper rolls 466, with slots 560 providing clearance for these rolls. The plate, in the upper position of the elevator 48, underlies the idler roll 378 around which the web is wrapped. When the web is cut, a dull edged deflecting blade 562, mounted beneath knife 58, displaces the cut end of the web towards the grippers and onto the plate 558.

In order to insure that the web end will actually extend between the grippers 62, an air assist is provided. Thus, blocks 564 (FIGS. 18 and 24) are secured to the shaft 416 and mount a tube 566. The tube 566 is connected to a source of pressurized air through passageways in one of the blocks 564 and one end of the shaft 416 and has holes 568 placed along its length and directed towards the grippers 62. The air assist positively directs the severed web end onto plate 558 and between the grippers 62.

Referring back to plate 558, this plate is secured to a shaft 570 (FIGS. 18 and 22) which is fastened to the lower ends of links 572. The opposite ends of links 572 respectively are pivotally mounted on studs 574 projecting from the elevator links 212 (see also FIG. 9). A pair of links 576 are pivotally mounted at their upper ends on the elevator arm 206 and respectively connected at their lower ends to the links 572 intermediate their lengths. The action of this linkage is to draw the plate 558 beneath the elevator 48 as it moves downwardly to clear the platform 50, as will be evident from FIG. 18.

Control means for registered web end

It has been found that with the high rates of operation which are involved, the free end of the web must be carefully controlled after its release by the grippers 62. To this end, a suction box 584 (FIGS. 3, 10 and 18) is provided beneath the conveyor platform 50. The box 584 is connected to a suitable vacuum pump and has a vertical wall 586 in which are formed a plurality of openings 588. The web W is drawn into contiguous relation with the wall 586 by the grippers 62. When the web is released from these grippers, it is automatically held by vacuum pressure against the wall 586.

It has also been found that when one or more loaves are missing from the conveyor 44, the infeed pusher 46 tends to draw the web over the platform 50 as the pusher is retracted. The free end of the web is therefore improperly positioned when a loaf is fed to the wrapping machine in a subsequent cycle of the conveyor; also there is a possibility of the web being struck by the conveyor flights 68, 70.

Relatively wide side guides 590 (FIGS. 3, 25 and 28) are therefore provided above the conveyor platform 50. The guides 590 are spaced apart somewhat greater than the length of loaf being wrapped, and are mounted in a manner, later described, which automatically maintains this spacing when the folding channel 56 is adjusted for a different length of loaf. The combination of the suction box 582 and guides 590 is effective at all times in maintaining the free end of the web in the position which is determined by the time it is released by the grippers 62.

Paper supply system

The paper supply system for the present machine begins with the supply R (FIG. 1) and, in certain respects terminates at the positioning roll 430. Immediately to the rear of roll 430, a substantial length of the web W is maintained under minimum tension on a paper plate 592 (FIGS. 25 and 28). The paper plate 592 comprises a pair of side rails 594 which are spanned by the web brake plate 432 as well as plates 596 and 598. A series of narrow longitudinal rods 600 extend between the plates 432 and 598 and the plate 596 is slotted so that there is a minimum of surface contact between the web W and the paper plate 592 as it passes thereover.

Three shafts 602, 604 and 606 span the rails 594 with rolls 610, 610 and 612 respectively being rotatably mounted thereon. A garter spring 614 rides in a groove formed in the roll 612 and is driven from a constantly rotating shaft (not shown) at a rate such that the peripheral speed of the roll 612 approximates the average rate of feed of the web W. Garter springs 615 and 616 also rotate the rolls 610 and 608 at this same rate. Thus, there are driven rolls supporting the web and tending to feed it from the paper plate at all times.

The upper ends of the web guides 590 are secured to blocks 618 which are mounted on a shaft 620 journaled on the rails 594. Each end portion of the shaft 620 has opposite hand threads so that the guides 590 will move toward or away from each other as the shaft 620 is rotated. The means for rotating the shaft 620 comprises a chain 622 which is driven by the adjusting means for the folding channel side walls previously referred to. The chain 622 drives a sprocket 624 secured to shaft 606. Chain 626 is driven by a sprocket 628 also secured to shaft 606 and is trained around a double sprocket 630 rotatable on shaft 604. A chain 632 extends from the other portion of the sprocket 630 to a sprocket 634 secured to the shaft 620 thereby completing the chain drive for adjusting the guides 590 simultaneously with the adjustment of the folding channel width. At this point it will be noted that the shaft 606 is, of course, rotatable relative to the rails 594.

It is preferable to provide side guides 636 (FIGS. 26 and 28) for laterally positioning the web W on the paper plate 592. The guides 636 (not necessarily shown in their proper positions due to the breakaways in the drawing) are mounted on a shaft 638 which has opposite hand threads on either end portion so that rotation thereof will simultaneously move the guides 636 toward and away from each other. The guides 636 are maintained upright in a slot formed between plate 432 and an angle piece 639 which also spans the rails 594. The shaft 638 is so rotated by a chain drive which includes sprockets 640, 642 and chain 644. The sprocket 644 is secured to a shaft 646 journaled on the rails 594 with a hand wheel 648 being secured thereto for adjustment of the guides 636. This adjustment is independent of the folding channel adjustment since the width of the web is also dependent

on the girth of the articles being wrapped as well as being dependent on their length.

The rails 594 are pivotal relative to shaft 606, as already noted, so that the paper plate is free to swing downwardly as a unit to facilitate the introduction of a new web of wrapping material thereover or for repair and maintenance purposes. Normally, the paper plate is maintained in its elevated, operative position by a toggle mechanism which comprises a pair of crescent shaped levers 650 which are pivotally mounted at their upper ends on arms 652 and at their lower ends on pins 654 projecting from the side rails 594. The arms 652 are secured to a cross shaft 656 which is journaled on the side frames 222, 224. A screw 658 is adjustably threaded into each arm 652 to insure that the toggle linkage will be self-locking in the illustrated operative position of the paper plate. Screws 660 are adjustably threaded into the base plate 207 of the folding channel. The rails 594 are sprung against the screws 660 to give rigidity to the paper plate 592. Hand levers 661 are threaded into an arm 662 secured to shaft 656 to facilitate rotation of arms 652 to lower the paper plate 592 to the illustrated phantom position. The paper plate is thus lowered from the web brake 431 and also the roll 378 so that access to this area of the machine may be had through an opening (not shown) in the side frames 222, 224. It is then an easy matter to feed a new web of sheet material through this portion of the web supply.

Also associated with the paper plate 592 is a one-way brake 663 comprising a friction roll 664 rotatable at the lower end of an arm 665 which is secured to a cross shaft 666. A pawl 667 is mounted on arm 665 and spring urged into engagement with a toothed wheel 668 pinned to the roll 664. The shaft 666 is journaled on the frames 222, 224 and has a lever 669 secured to its far end. A torsion spring 671 bearing against pins on the lever 669 and frame 222 urge the shaft 666 in a counterclockwise direction causing the roll 664 to yieldingly press the web against plate 598 and thereby prevent retractive movement of the web.

In order that the supply of web on the paper plate 592 be under minimum tension, power means are provided for drawing the web from the supply roll R.

As a preliminary to the description of these means, the path of web W from the supply roll R to the paper plate 592 will first be described with reference to FIG. 1. The web W extends from roll R around a slackener roll 670 which is journaled on a pivotal arm 672. The angular position of the arm 672 controls a paper roll brake (not shown) which is effective on the roll R and in known fashion prevents overfeeding of the web W. From roll 670 the web passes up and around a fixed idler roll 674, over a plate 676 and then downwardly as it passes around another fixed idler roll 678. Idler rolls 680, 682 guide the web as it passes beneath roll R towards the paper plate 592. From roll 682 the web extends upwardly and between a pair of auxiliary feeding rolls 684, 686. Next, the web is festooned around a pair of movable slackener rolls 688, 690 and a fixed, rotatable roll 692, and finally passes over roll 612 to the paper plate 592.

The rolls 684, 686 are intermittently operable to draw the web from roll R and feed it to the loop forming means as will now be evident from the following detailed description having reference to FIGS. 30-32. Feed roll 686 is secured to a shaft 694 which is journaled at its opposite ends on the frames 222, 224. A sprocket 696 is secured to the far end of the shaft 694 and is driven from the power source for the machine. Feed roll 684 is compositely formed of individual rubber rolls secured to and spaced apart along a shaft 698. The shaft 698 is journaled on blocks 700 which are secured to a cross shaft 702. The reduced ends of this shaft are pivotally received by arms 704 which in turn are secured to a cross shaft 706 journaled on frames 222, 224. An arm 707 is also secured to shaft 706 and spring 708 connected

thereto tends to rotate the arms 704 and raise feed roll 684 away from roll 686. Toggle linkages are provided to maintain feed roll 684 in its illustrated working position. Thus, a link 710 is connected by pin 712 to an upstanding lug on each arm 704. The links 710 are actually turnbuckles which are pivotally connected to upper links 714 which are secured to a pivotally mounted cross shaft 716. A handle 718 projects from each of the links 710 and either may be raised to elevate the roll 684, with the assistance of spring 708 which maintains roll 684 in an elevated position. Screws 720 are threaded through extensions 722 of links 714 and engage links 710 to lock this toggle linkage when either handle 718 is lowered. The roll 684 is thus locked in its working position relative to roll 686. The effective lengths of links 710 are adjusted so that roll 684 is parallel to roll 686 and properly spaced therefrom to function in the manner now to be described.

The action of the feed rolls 684, 686 is intermittent and dependent on the length of the web festooned around the slackener rolls 688, 690 which is detected in a manner hereinafter described. Briefly stated, when this length reaches a given minimum the rolls 684, 686 feed a further amount of web until the length attains a given maximum.

It will be seen that gears 724 are respectively secured to the shafts 694 and 698. In the working position of the roll 684, as illustrated in full lines, the gears 724 are in mesh at all times, however, when the length of web around the slackener rolls reaches said given maximum, the roll 684 is spaced slightly from the roll 686 so that no feed pressure is applied to the web W. This spacing would be in the order of .030 in. When the length of web around said slackener rolls is less than said given minimum, the blocks 700 are pivoted to swing the roll 684 against the roll 686. This pivotal movement of blocks 700 is controlled by an arm 726 secured to one of said blocks by screws 727 and connected at its other end to the plunger of a solenoid 728 by link 729. The means detecting the length of web around slackener rolls 688, 690 control energization of solenoid 728. When the given minimum web length is reached, the solenoid is de-energized and a spring 730 acting on arm 726 rotates the blocks 700 about the axis of the shaft 702 and presses roll 684 against roll 686 so that the web will be fed by these rolls. When said maximum web length is reached, the solenoid 728 is energized and the arm 726 is swung upwardly thereby to space the roll 684 from the roll 686.

Before leaving the feed rolls 684, 686, it will be pointed out that certain wrapping materials in particular tended to wrap around the roll 686 with a resultant breaking of the web or other malfunction. Polyethylene film proved to be most troublesome in this respect. To overcome this problem a series of garter springs 732 are mounted in grooves formed in the roll 686 opposite the spacings between the segments of roll 684. A second grooved roll 734 is rotatably mounted on a fixed shaft 736. The garter springs effectively strip the web W from the roll 686 without any danger of injury to either the web or the roll. A second fixed shaft 738 is disposed beneath roll 686 and has secured thereto a doctor blade 740 which further prevents any tendency of the web to cling to the roll and also prevents any buildup of wax or the like thereon.

The slackener system comprising rolls 688, 690 and 692 will now be described with reference to FIGS. 29-32. The rolls 688, 690 are rotatably mounted on L-shaped arms 742 which in turn are secured to a shaft 744. The shaft 744 is journaled at each end on a U-shaped bracket 746 which has an upstanding arm 748 (FIGS. 29 and 32) which is secured against the frames 222, 224 respectively by the bolts which secure the bearing for shaft 694. At this point it will be noted that the ends of doctor blade shaft 738 (FIGS. 30 and 31) are secured at bosses 749 integral with the brackets 746.

The shaft 736 is mounted on plates 750 secured to opposite ends of shaft 738.

A torsion spring 752 (FIG. 31) acts against a pin projecting from bracket 746 and a collar 754 secured to shaft 744 to counterbalance the weight of arms 742 and slackener rolls 688, 690 so that a minimum pull is exerted on the web W as it is festooned around these rolls. The amount of pull on the web is also minimized by providing a feed assist with the roll 692. A garter spring 756 (FIG. 29) passes around a groove in feed roll 686 and drives a double pulley 758 rotatable on a fixed shaft 759. A second garter spring 760 extends from the pulley 758 and around roll 692 to rotate the roll 692. The described double festoon arrangement thus enables the web to be drawn from a supply loop with a very minimum of tension. Further, the supply of web on the paper plate also has a minimum tension which at all times remains substantially constant. This "minimum tension" web supply has been found of great importance in obtaining the high rates of operation performed by the present machine. The feeding of web during the down stroke of the elevator contributes to these high rates of operation, and is particularly facilitated by the "minimum tension" web supply.

With further reference to the roll 692, it will be seen (FIGS. 29 and 32) that downwardly open, U-shaped brackets 761 are secured to the frames 222, 224 and a shaft 763 spans the inner legs of these brackets. The roll 692 is rotatably mounted on shaft 763.

The means for detecting the length of web in the slackener system will now be described. Shaft 744 projects beyond the bracket 746 (FIGS. 29 and 31) and has an eccentric 756 secured to its outer end. An arm 758 carrying a roller at one end engages the eccentric 756 while the other end of arm 758 engages the plunger of a switch 760 secured to bracket 746. The switch 760 is connected in series with solenoid 728 and when closed energizes this solenoid to separate the feed rolls 684, 686; conversely, when this switch is open, the solenoid 728 is deenergized and spring 730 closes these feed rolls. When the arms 742 raise above the illustrated position, the switch 760 is opened and the web is fed by the rolls 684, 686 until the slackener festoon increases and the arms 742 lower below the illustrated position whereupon the switch 760 is closed and these feed rolls separate. There is sufficient lag in the actuation of the feed rolls 684, 686 so that in the usual course of operation, the solenoid is actuated only once in each wrapping cycle.

It will be seen that studs 762 project from the arms 742 and are received in slots 764 formed in links 766. The upper ends of links 766 are pivotally mounted on reduced ends of the shaft 702 of the above described toggle mechanism. In normal operation the studs 762 ride freely in the slots 764. However, when the toggle mechanism is raised to the phantom position of FIGS. 29 and 30, the links 766 are effective in raising the arms 742 to the upper phantom position of FIG. 29. With the rolls 688, 690 thus automatically elevated, a new web of wrapping material may now be readily fed through the slackener system. It will be observed that the U-shaped brackets 761 provide clearance for the arms 742 in this elevated position.

Reverting again to the travel of the web from the roll R to the feed rolls 684, 686, it is to be understood that the web path previously described is illustrative and based primarily on the assumption that a band of lesser width than web W is also to be wrapped about the loaves of bread.

The band B is drawn from a supply roll Rb and passes around a slackener roll 768 which is carried on a pivotal arm to control a brake and prevent overfeeding from roll Rb, the same as is done with roll R. From slackener 768 the band B passes around a pair of fixed idler rolls 770, 772 and then over a heated platen 774.

The band B is preferably wax paper or other heat

softenable or sealable material which will adhere to the web W after passing over the platen 774. From roll 678, the band B may be considered as an integral part of web W.

When the web W is exhausted from supply roll R, slackener roll 670 will drop to the lower phantom position and in so doing will actuate a switch 777 which immediately stops operation of at least the elevator 48 so that little or no web will be drawn from the supply system thereafter. Movement of the web W is stopped before the trailing end thereof can pass beyond a one-way brake 776 which acts upon the web W as it is confined against the plate 676. The brake 776 is similar in construction and operation to the previously described one-way brake 663.

It will now be apparent that the web W remains controlled and taut from the brake 776 to the brake 663 when the roll R is exhausted. Actually, the web W remains controlled or taut throughout the web supply system as there is nothing tending to disturb the remainder of the web on the paper plate at this time.

It is now a simple procedure to splice the leading end of a fresh web to the trailing end of the exhausted web. This is preferably done by drawing the leading end of a web W' from a roll R' around a slackener roll 778, a fixed idler roll 780 and then over the idler roll 674. The plate 676 may conveniently be used as backing in splicing the two webs together. Arm 672 is then latched in an elevated position permitting closure of switch 777 and allowing operation of the machine to be reactuated. Changing from roll R to R' involves only a matter of a few seconds as roll R' would previously have been mounted in place and the leading end of web W' positioned for the splicing operation. Once the simple splicing operation has been performed, the entire web supply is immediately ready to wrap further loaves of bread.

When the roll R' is exhausted, the arm for slackener 778 contacts a switch 782 to again stop operation of the elevator and thereby maintain the web supply taut from the paper plate 592 to the one-way brake 776. The leading end of a web drawn from a new roll R is spliced to the trailing end of web W' and the machine again set in operation once the switch 782 is deactuated.

If desired, means can also be provided to stop operation of the machine upon exhaustion of the band roll Rb but no special means are required to maintain the band web taut since it is attached to the web W in its travel through most of the web supply system.

When the band B is not being used, the web W is trained around the opposite side of idler roll 674 over roll 780 and then over a plate 784 directly to the feed rolls 684, 686. A one-way brake 786 effective against plate 784 again maintains the web W taut within the web supply system when the roll R is exhausted. The one-way brake 786 corresponds in all essential respects to the brake 776 when the previously described path of the web was used. Web W' is then drawn from roll R' and trained around the opposite side of idler roll 780 to be spliced to the trailing end of web W.

In the foregoing description reference has been made to various switches, solenoids and electrical circuits. The arrangement of these circuits and the method of connecting the electrical elements referred to are routine for anyone skilled in the art once the desired purposes herein stated have been set forth. Thus they are representative only of a means for attaining the desired ends and have not been shown in detail.

Many advantageous features will be found in the use of the apparatus herein described. In particular, attention will be drawn to the high speed of operation which is obtained with the linkage mounted elevator 48 and the overall simplicity which results from supporting the loaves on a horizontal plane at all times.

The high speeds of operation are facilitated by the fact that wrapping material is being drawn from the web sup-

ply system substantially throughout the entire cycle of operation. Thus a portion of the web requirement is drawn from the supply system as a loaf is fed onto the elevator 48. A further length of web is so drawn as the elevator moves to its upper position. An additional length of web is drawn (by rolls 374, 376) from the supply system as the loaf is discharged from the elevator. Finally a further length of web is drawn from the supply system as the elevator moves to its lower position and the web is clamped by the grippers 62.

This mode of feeding the web is greatly facilitated by the minimum tension web supply system which makes the web so readily available.

Other advantageous features are found in the ease with which different lengths of loaves may be wrapped. That is, the provision of common power means for simultaneously adjusting the spacing between the infeed conveyor flights (68, 70), the paper guides 590 and the side folders 52 and the side walls of the folding channel 56.

Also the various means which are provided for facilitating the introduction of a new web of wrapping material are particularly attractive to commercial users.

Having thus disclosed the invention what is claimed as novel and desired to be secured by Letters Patent of the United States is:

1. A wrapping machine comprising a horizontally disposed infeed platform, a horizontally disposed discharge platform spaced thereabove and vertically aligned therewith, an elevator comprising a plate having a first position contiguous with and horizontally aligned with said infeed platform and a second position contiguous with and horizontally aligned with said discharge platform, a vertical arm supporting said plate, a first link pivotally connected at one end to said arm and disposed generally longitudinally of said platforms, a generally vertically disposed second link pivotally connected at one end about a fixed axis and pivotally connected at its other end to the other end of said first link, a third link pivotally connected to said first link intermediate its length and extending towards said elevator, said third link also being pivotally mounted about a fixed axis intermediate the upper and lower portions of said platform and means for reciprocating the lower end of the vertical arm along a generally vertical path whereby the elevator plate will move along a substantially rectilinear path.

2. A wrapping machine as in claim 1 wherein means are provided for adjusting the heightwise position of the vertical arm relative to said lever.

3. A wrapping machine comprising a horizontally disposed infeed platform, a horizontally disposed discharge platform spaced thereabove and vertically aligned therewith, an elevator comprising a plate having a first position contiguous with and horizontally aligned with said infeed platform and a second position contiguous with and horizontally aligned with said discharge platform, a vertical arm supporting said plate, a first link pivotally connected to the arm adjacent the upper end thereof and extending longitudinally outwardly from said platforms, a generally vertically disposed link pivotally connected at its lower end to the outer end of said first link, said vertical link being pivotally mounted at its upper end about a fixed axis, a third link pivotally connected at one end to said first link midway between the points of pivotal connection at the ends thereof, said third link being pivotally connected at its other end about a fixed axis on a vertical line intersecting the axis of pivotal connection between said first link and said vertical arm, said named axis for the third link being midway between the upper and lower positions of the pivotal connection between said first link and said vertical arm when the elevator is in said first and second positions, a relatively long lever pivotally connected to the lower end of said vertical arm and cam means for oscillating said lever between upper and lower positions wherein the axis of connection between the lever and the vertical arm generates a relatively flat arc and

lies on a common vertical line in the extreme positions of the lever.

4. A wrapping machine as in claim 3, wherein the first link is connected at one lateral side of the vertical arm, a duplicate first link is connected to the opposite side of the vertical arm and corresponding vertical and third links are mounted in the identical fashion to the vertical and third links connected to the first-named first link, and further wherein a counterbalancing spring is connected to the lever to urge the elevator and the linkage associated therewith upwardly.

5. A wrapping machine comprising a horizontally disposed infeed platform, a horizontally disposed discharge platform spaced thereabove and vertically aligned therewith, an elevator having a first position contiguous with and horizontally aligned with said infeed platform and a second position contiguous with and horizontally aligned with said discharge platform, linkage means for mounting said elevator and moving it between said positions along a substantially rectilinear path and a pair of end folders mounted on said elevator, spaced thereabove and projecting towards said infeed platform in the first position of said elevator, and means for swinging said folders to diverging positions when the elevator reaches its first position and means yieldingly urging said folders towards parallel positions when the elevator starts to move upwardly from its first position.

6. A wrapping machine comprising a horizontally disposed infeed platform, a horizontally disposed discharge platform spaced thereabove and vertically aligned therewith, an elevator comprising a plate having a first position contiguous with and horizontally aligned with said infeed platform and a second position contiguous with and horizontally aligned with the said discharge platform, linkage means for mounting said elevator and moving it between said first and second positions, said linkage means including a link pivotally connected to said elevator adjacent and beneath said plate, a shaft journaled on the axis of the pivotal connection between said link and said elevator, said shaft having threads at its opposite end portions of the opposite hand, a carrier mounted on each end portion of said shaft, a folder supported by each of said carriers and spaced above said elevator plate and projecting towards said infeed platform in the first position of said elevator, means for swinging said folders to diverging positions when the elevator reaches its first position, and means yieldingly urging said folders toward parallel positions when the elevator starts to move upwardly from its first position, and means for rotating said shaft to move the folders towards and away from each other to space them apart a distance approximating the length of the articles being wrapped, said adjusting means including a sprocket secured to said shaft and a chain connected thereto and movable with said link.

7. A wrapping machine as in claim 6 wherein the folders are secured to vertical posts journaled on said carriers and further wherein oppositely-directed, laterally-extending arms are secured to the lower ends of said posts and a plate is disposed below the level of the infeed platform and arranged to engage said arms and rotate said posts to so swing said end folders to diverging positions as the elevator reaches its first position and means for swinging said plate away from said arms prior to upward movement of the elevator whereby the folders may be yieldingly urged to parallel positions at that time.

8. A wrapping machine comprising a horizontal infeed platform, a horizontal discharge platform spaced thereabove and vertically aligned therewith, an elevator having a first position contiguous with and horizontally aligned with said infeed platform and a second position contiguous with and horizontally aligned with said discharge platform, and linkage means for mounting said elevator and moving it between said positions, means for transferring an article from the infeed platform to the elevator in the first position thereof, means for transferring the article from the elevator to the discharge

platform in the second position thereof, a supply of wrapping material including a web drawn from a supply roll, means for guiding said web along a path passing over a positioning roll and draping the leading end of the web between the elevator and the infeed platform whereby an article advanced onto the elevator will be partially encircled in the wrapper as the web is moved to its second position, means for severing the web when the elevator is in said second position and means mounted on the elevator and below the article receiving surface thereof for gripping the severed end of the web and clamping it as the elevator moves back to its first position and means for releasing said gripping means to unclamp the web before the elevator again moves towards its second position, said gripping means comprising in part the web positioning means.

9. A wrapping machine as in claim 8 wherein the elevator comprises a vertical arm and the elevator moving means comprise a relatively long lever pivotally connected at the lower end of said arm, and means for oscillating the lever and further wherein the gripping means comprise a fixed gripper secured to said arm and a second gripper thereabove pivotally mounted on said arm for movement between open and gripping positions and the means for gripping and releasing the web comprise a link connected to said upper gripper and to a bell crank mounted on said arm and pivotal on the axis of pivotal connection between the lever and the arm, and a second link connected to the bell crank, and a cam actuated lever to which the second link is pivotally connected on the axis of oscillation of said first-named lever.

10. A wrapping machine as in claim 8 wherein the linkage means include a link pivotally connected to said elevator, a shear blade is mounted on the elevator in co-operative relation with said severing means, the gripping means comprise upper and lower grippers disposed below and inwardly of said shear blade, and further wherein a catcher is provided adjacent said grippers, said catcher having its upper surface projecting outwardly of said shear blade and leading between said grippers in their open position whereby when the severed web end lies on said surface it will be readily gripped by said grippers, and linkage means connecting said catcher to said elevator link for retractive movement of the catcher as the elevator moves to its first position.

11. A wrapping machine as in claim 10 wherein means are provided for clamping the web simultaneously with actuation of the releasing means.

12. A wrapping machine as in claim 9 wherein means are provided for actuating said web clamping means as the severing means is operated and thereafter releasing said clamping means for subsequent actuation when the gripping means are released.

13. A wrapping machine as in claim 11 wherein the web has a series of printed panels thereon and detecting means are provided for sensing the arrival in a predetermined position of the printed panel at the leading end of the web and means responsive to a sensing by said detecting means for actuating said releasing means.

14. A wrapping machine as in claim 13 wherein means are provided for actuating said responsive means in the event of a failure in said detecting means.

15. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, means for moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform and the elevator, knife means for severing the web when the elevator is in its second position, means movable with said elevator for gripping the severed end of the web, means for thereafter moving the elevator back to its first position and means for releasing said gripping means to free the web end prior to the next subsequent movement of the elevator to its second position.

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16. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having a plate movable between first and second positions in which said plate is respectively aligned with said platforms, means for moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform and the elevator, knife means for severing the web when the elevator is in its second position, a shear blade mounted on said elevator below said plate in co-operative relation with said knife means, a pair of upper and lower grippers disposed below and inwardly of said shear blade, said grippers being movable with said elevator, said grippers being open when said knife means are actuated, a catcher adjacent said grippers and having its upper surface projecting outwardly of said shear blade and leading between said grippers in their open position whereby when the severed web end lies on said surface it will be readily gripped by said grippers, means for closing said grippers on said severed web end, means for thereafter moving the elevator back to its first position and means for opening said grippers to free the web end prior to the next subsequent movement of the elevator to its second position.

17. A wrapping machine as in claim 16 wherein a blunt-edge deflecting blade is spaced beneath said knife means and the knife means and deflecting blade straddle the shear blade when the web is severed, whereby the deflecting blade displaces the severed web end toward the grippers and further wherein air assist means are provided for blowing the severed web end against the upper surface of the catcher.

18. A wrapping machine as in claim 17 wherein means are provided for retracting the catcher inwardly of the elevator as the elevator moves towards its first position.

19. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, means for moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform and the elevator, knife means for severing the web when the elevator is in its second position, gripper means movable with said elevator for gripping the severed end of the web, means for thereafter moving the elevator back to its first position, means for releasing said gripping means to free the web end prior to the elevator reaching its first position, a web brake effective on said web at a point remote from said platforms, and means for actuating said web brake simultaneously with the releasing of said gripping means.

20. A wrapping machine as in claim 19 wherein cam means are provided for actuating the gripper release and the web brake actuation, and further wherein means are provided for adjusting the time of actuation of said gripper release and web brake actuation during the movement of the elevator to its first position in order that the leading end of the web may be properly positioned for the wrapping of a subsequent article.

21. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, means for moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material having printed panels spaced along its length, said web being draped between said infeed platform and the elevator, knife means for severing the web when the elevator is in its second position, gripper means movable with said elevator and closable to grip the severed end of the web, means for thereafter moving the elevator back to its first position, detecting means for sensing the arrival of a printed panel at the leading end of the web in proper registration relative to said infeed platform, and means responsive to a sensing of said detecting means for open-

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ing the gripper means to free the web end and position it in predetermined relation relative to the infeed platform prior to the arrival of the elevator at its first position.

22. A wrapping machine as in claim 21 wherein a web brake effective on said web at a point remote from said platforms is provided, and means are provided for simultaneously actuating said web brake in response to said sensing of the detecting means.

23. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, linkage means for mounting and moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform and the elevator, a web supply system terminating at a positioning roll disposed intermediate said platforms and spaced from said elevator as it moves therepast and means effective upon said web for maintaining a minimum tension in a substantial length of the web spaced rearwardly of said positioning roll, knife means for severing the web when the elevator is in its second position, means mounted on said elevator for gripping the severed end of the web, said linkage means thereafter moving the elevator back to its first position and means for releasing the gripping means to free the web end prior to the next subsequent movement of the elevator to its second position.

24. A wrapping machine comprising a generally horizontally disposed infeed platform, a generally horizontally disposed discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, linkage means for mounting and moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform of an elevator, a web supply system comprising a positioning roll disposed intermediate said platforms and closely spaced from said elevator as it moves therepast, a second roll over which said web passes, a generally horizontal paper plate for supporting the web, said paper plate having the positioning roll mounted at one end thereof and said second roll mounted at the other end thereof, and means for rotating said rolls in a direction tending to feed the web towards the elevator thereby minimizing the tension in the web as it is drawn from said paper plate, knife means for severing the web when the elevator is in its second position, means mounted on said elevator for gripping the severed end of the web, said linkage thereafter moving the elevator back to its first position and means for releasing the gripping means to free the web end prior to the next subsequent movement of the elevator to its second position.

25. A wrapping machine as in claim 24 wherein the supply system comprises a supply roll of wrapping material from which the web is initially drawn, a pair of intermittently operating feed rolls disposed between the supply roll and paper plate, means for forming a loop in the web between said feed rolls and said paper plate, and further wherein are provided means responsive to said loop decreasing below a given minimum for rendering the feed rolls operative and means responsive to the loop exceeding a given maximum for rendering the feed rolls inoperative.

26. A wrapping machine as in claim 25 wherein the loop forming means comprise a fixed rotatable roll and a pair of movable rolls mounted for movement as a unit towards and away from said fixed roll and the web is trained from said feed rolls around one of said movable rolls, over said fixed rotatable roll, under the other movable roll, and then over the paper plate, thereby forming a double festoon in the web.

27. A wrapping machine as in claim 24 wherein the paper plate is of openwork construction and comprises

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at least one relatively wide supporting surface underlying said web and further wherein a web brake is provided having a friction roll closely spaced from said web above said surface, and means are provided for actuating said brake simultaneously with the release of the gripping means to clamp said web against said surface and also wherein the paper plate is pivotally mounted about the axis of said second roll and means are provided for lowering said paper plate to facilitate the feeding of a new web of wrapping material thereover.

28. A wrapping machine as in claim 24 wherein the supply system comprises a supply roll of wrapping material from which the web is originally drawn, a pair of intermittently operating feed rolls disposed between the supply roll and the paper plate, loop forming means disposed between the feed rolls and the paper plate and comprising a fixed rotatable roll and a pair of movable rolls, said web being trained from said feed rolls, around one of said movable rolls, over said fixed rotatable roll, under the other movable roll, and then over the paper plate, thereby forming a double festoon in the web, a swingable arm on which said movable rolls are mounted, and further wherein the paper plate is of openwork construction and comprises at least one relatively wide supporting surface underlying said web and a web brake is provided with a friction roll closely spaced from said web above said surface and means are provided for actuating said brake simultaneously with the release of the gripping means to clamp said web against said surface and further wherein the paper plate is pivotally mounted about the axis of said second roll and means are provided for lowering said paper plate about said axis to facilitate the feeding of a new web of wrapping material thereover, and also means are provided for spacing one of said feed rolls a substantial distance from the other of said feed rolls and additionally wherein means, connecting said spacing means to said arm, raise the two movable rolls of the loop forming position when said one feed roll is so spaced, to facilitate the feeding of a new web of wrapping material through the paper supply system.

29. A web supply system from which successive lengths of web are drawn at varying rates, said system comprising a supply roll of sheet material from which the web is initially drawn, a positioning roll over which the web passes as it is intermittently drawn from the system, a pair of intermittently operating feed rolls disposed between the supply roll and the positioning rolls, one of said feed rolls being movable relative to the other to a position in spaced relation therefrom, means for forming a loop in said web between said feed rolls and said positioning roll, means responsive to said loop decreasing below a given minimum for pressing said movable feed roll against the other roll to render the feed rolls operative and means responsive to the loop exceeding a given maximum for spacing said movable feed roll a short distance in the order of a small fraction of an inch from said other feed roll to thereby render the feed rolls inoperative and further including means for spacing said movable feed roll a substantial distance from the other feed roll and means, connecting said last named means, for displacing the loop forming means out of loop forming position to facilitate the introduction of a web therethrough.

30. A web supply system from which successive lengths of web are drawn at varying rates, said system comprising a supply roll of sheet material from which the web is initially drawn, a positioning roll over which the web passes as it is intermittently drawn from the system, a pair of intermittently operating feed rolls disposed between the supply roll and the positioning rolls, one of said feed rolls being journaled at its ends on a pair of blocks, a pair of levers on which said blocks are pivotally mounted about an axis spaced generally above and longitudinally offset from the axis of said other feed roll

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whereby one feed roll is movable to a position spaced from said other feed roll, means for forming a loop in said web between said feed rolls and said positioning roll, means connected to said blocks and responsive to said loop decreasing below a given minimum for swinging said one feed roll to press it against the other feed roll and thereby render said feed rolls operative, and means responsive to the loop exceeding a given maximum for pivoting said blocks to swing said feed roll to a position spaced a small fraction of an inch from said other feed roll to thereby render the feed rolls inoperative, said levers being swingable about a remote axis to raise the said one feed roll and space it a substantial distance from said other feed roll.

31. A web supply system as in claim 30 wherein the loop forming means comprise a fixed rotatable roll and a pair of movable rolls mounted on a pivotable arm for movement towards and away from said fixed roll, said web being trained from said feed rolls under one of said movable rolls, over said fixed rotatable roll, under the other movable roll, and then towards said positioning roll, and further wherein a toggle linkage is provided pivoting said levers upwardly and a stud projects from at least one of said arms, a link is pivotally connected to said lever and has a slot in its lower end receiving the stud, the length of said slot being sufficient to permit normal movement of the lever as the length of the web around said rolls varies during the feeding of the web, said arm being raised upwardly as said toggle is broken to displace the one feed roll a substantial distance from said other feed roll and thereby displace said movable rolls out of loop-forming position to facilitate the introduction of a new web therethrough.

32. A web supply system from which successive lengths of web are drawn at varying rates, said system comprising a supply roll of sheet material from which the web is initially drawn, a positioning roll over which the web passes as it is intermittently drawn from the system, a pair of intermittently operating feed rolls disposed between the supply roll and the positioning roll, means for forming a loop in said web between said feed rolls and said positioning roll, means responsive to said loop decreasing below a given minimum for rendering the feed rolls operative, means responsive to the loop exceeding a given maximum for rendering the feed rolls inoperative, a second roll spaced from said positioning roll along the length of the web and between said positioning roll and said loop forming means, a generally horizontal paper plate disposed between said positioning roll and said second roll for supporting the web intermediate said positioning roll and said second roll, said last named rolls being mounted at opposite ends of the paper plate and means for rotating said rolls in a direction tending to feed the web outwardly of said loop forming means, thereby further minimizing the tension in the web as it is drawn from the paper plate.

33. A web supply system as in claim 32 wherein the paper plate is of openwork construction and comprises at least one relatively wide supporting surface underlying said web, and a web brake is provided with a friction roll closely spaced from said web above said surface, and further wherein the paper plate is pivotally mounted about the axis of said second roll, and means are provided for lowering said paper plate about said axis to facilitate the feeding of a new web of wrapping material thereover.

34. A web supply system as in claim 30 wherein a grooved rotatable roll is mounted beneath said other feed roll and said other feed roll has grooves aligned with the grooves of said grooved roll and further wherein garter springs ride in said grooves to prevent adherence of the web to said other roll as it is wrapped therearound.

35. In combination with a pair of feed rolls for feeding a web of sheet material wherein the web of sheet material is wrapped around one of said feed rolls for a sub-

stantial peripheral distance, an idler roll spaced from said one feed roll, said one feed roll and said idler roll having aligned circumferential grooves formed therein and garter springs riding in said grooves to strip the web of sheet material from said one feed roll and prevent its adherence thereto.

36. A wrapping machine comprising an infeed platform, a discharge platform spaced thereabove, an elevator having first and second positions respectively aligned with said platforms, linkage means for mounting and moving said elevator from its first to its second position to encircle an article in the leading end of a web of wrapping material draped between the infeed platform and the elevator, a web supply system terminating at a positioning roll disposed intermediate said platforms and spaced from said elevator as it moves therepast, and means effective upon said web for maintaining a minimum tension in a substantial length of the web spaced rearwardly of said positioning roll, knife means for severing the web when the elevator is in its second position, means mounted on said elevator for gripping the severed end of the web, said linkage means thereafter moving the elevator back to its first position and means for releasing the gripping means to free the web prior to the next subsequent movement of the elevator to its second position whereby the web will be drawn from the web supply system during movement of the elevator, said web supply system comprising a paper plate extending rearwardly of said positioning roll, said paper plate being generally of openwork construction and having at least one supporting surface of substantial width, a one-way brake mounted above said paper plate and engaging said web as it is advanced towards said positioning roll and preventing movement in the reverse direction, said web supply system further comprising a supply roll of sheet material from which the web is originally drawn, a pair of intermittently operating feed rolls disposed between said paper plate and said supply roll, means for forming a loop in the web between said feed rolls and said paper plate, means responsive to said loop decreasing below a given minimum for rendering the feed rolls operative and means responsive to the loop exceeding a given maximum for rendering the feed rolls inoperative, and a splicing plate disposed between the supply roll and the feed rolls over which the web is trained, a one-way brake riding against the web as it passes over said splicing plate and preventing the retractive movement of the web beyond said plate, and means responsive to exhaustion of said supply roll for stopping operation of said elevator so that the web will not be drawn from the web supply system after the supply roll is exhausted and the web will remain taut from the splicing plate to the positioning roll.

37. A web supply system wherein a web is drawn over a plurality of rolls from a supply roll of sheet material, said system comprising a plate adjacent said supply roll and over which the web is drawn, a one-way brake effective on said web as it passes over the plate and preventing retractive movement of the web, and means responsive to the exhaustion of said supply roll for preventing further portions of the web from being drawn from the system prior to the trailing end of the web passing beyond said plate.

38. A web supply system as in claim 37 wherein the web supply system terminates in a positioning roll, a pair of intermittently operating feed rolls are provided between said plate and said positioning roll and loop forming means between the positioning roll and the feed rolls control operation of the feed rolls and further wherein a second one-way brake is effective on said web between the positioning roll and the loop forming means.

39. In combination with a wrapping machine, an infeed conveyor comprising a pair of endless chains having spaced flights spaced along their lengths, each flight form-

ing a cooperating pair with an adjacent flight on the other conveyor, each of the cooperating pairs being spaced apart a distance approximating the width of articles to be carried therebetween, sprockets around which said chains pass, means for simultaneously driving said chains at the same rates, and means effective through said driving means for varying the relative angular positions of said sprockets to adjust the spacing between said cooperating flights for different sizes of articles.

40. A combination as in claim 39 wherein a pair of said sprockets are relatively rotatable about a common axis, with one chain passing around each sprocket of said pair and the driving means comprise two separate chain drives respectively rotating said pair of sprockets and means for intermittently and simultaneously operating said chain drives at the same rate and the varying means comprises means for varying the relative positions of the two chain drives to thereby impart relative rotation to said pair of sprockets.

41. A combination as in claim 40 wherein the chain drives respectively pass around driving sprockets which are drivingly connected to the respective conveyor sprockets and rotatable about said common axis, each chain drive also passing around a pair of spaced idler sprockets, and a fourth sprocket, said fourth sprockets being secured against relative rotation and also being intermittently rotated and means for simultaneously, equally and inversely varying the distance of each idler pulley, in one chain drive, from its associated drive sprocket to rotate same about said common axis, and means for simultaneously, equally, and inversely varying the distance of each idler pulley, in the other chain drive, from its associated driving sprocket and in the proper direction to rotate same on said common axis in a direction opposite that of the other driving sprocket and means for operating said varying means simultaneously.

42. A combination as in claim 41 wherein the idler sprockets of each pair are mounted on shafts which are slidable in horizontal shafts and each pair of sprockets is moved by a lever pivotally mounted on an axis midway between said slots and the varying means comprise means for simultaneously pivoting the levers in opposite directions.

43. A combination as in claim 42 wherein the axis of each lever may be independently shifted to control the tension of said chain drives.

44. In combination with a wrapping machine comprising a folding channel having side walls and means for varying the spacing between said side walls; an infeed conveyor having pairs of flights which embrace opposite ends of articles in feeding them to the wrapping machine, and means driven by said varying means for adjusting the spacing between each pair of flights simultaneously and coextensively with the adjustment of the spacing between the folding channel side walls.

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FRANK E. BAILEY, *Primary Examiner*.

BROMLEY SEELEY, *Examiner*.