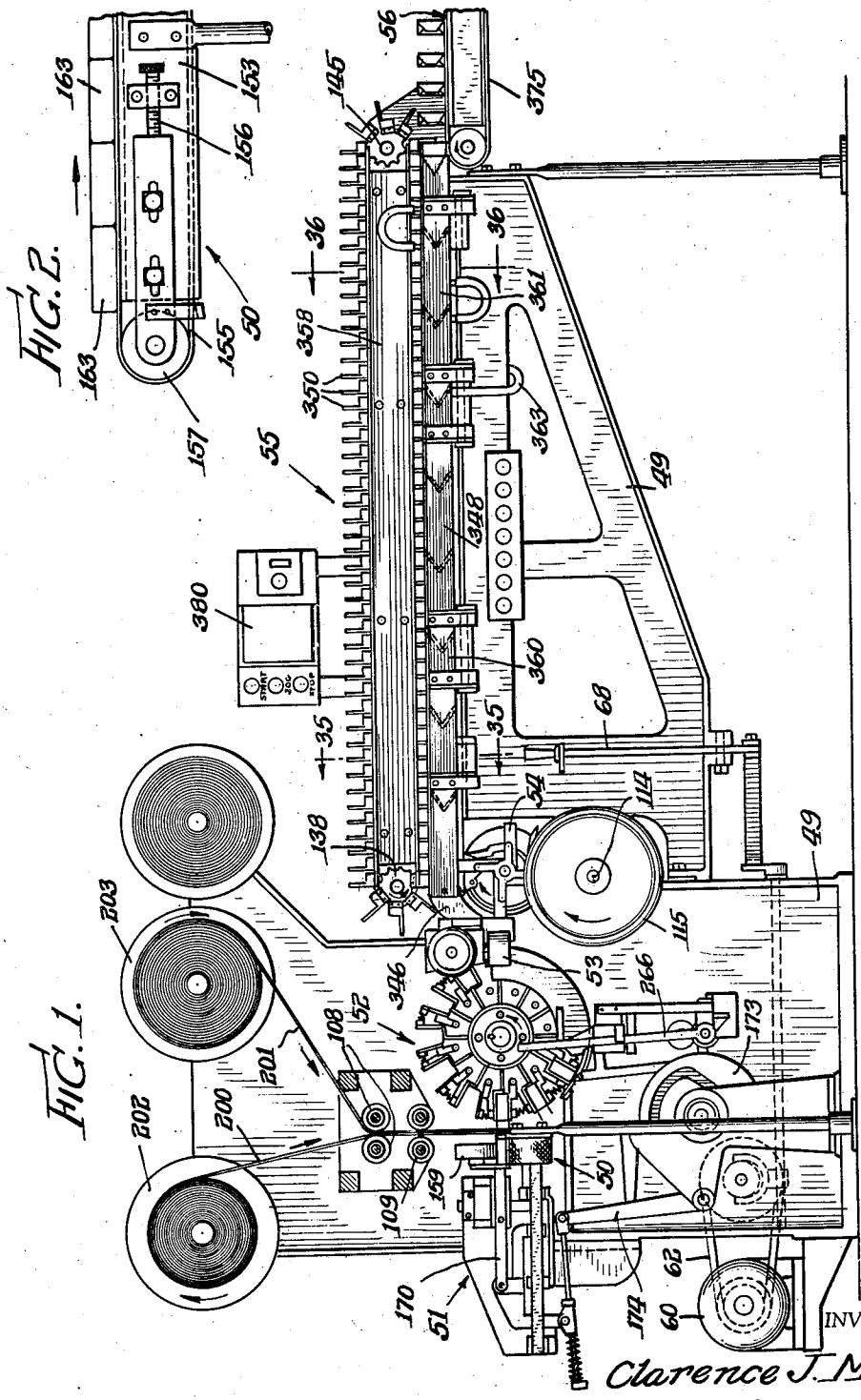
Sept. 10, 1946. C. J. MALHIOT 2,407,313

WRAPPING MACHINE

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INVENTOR.
Clarence J. Malhiot
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FIG. 3.

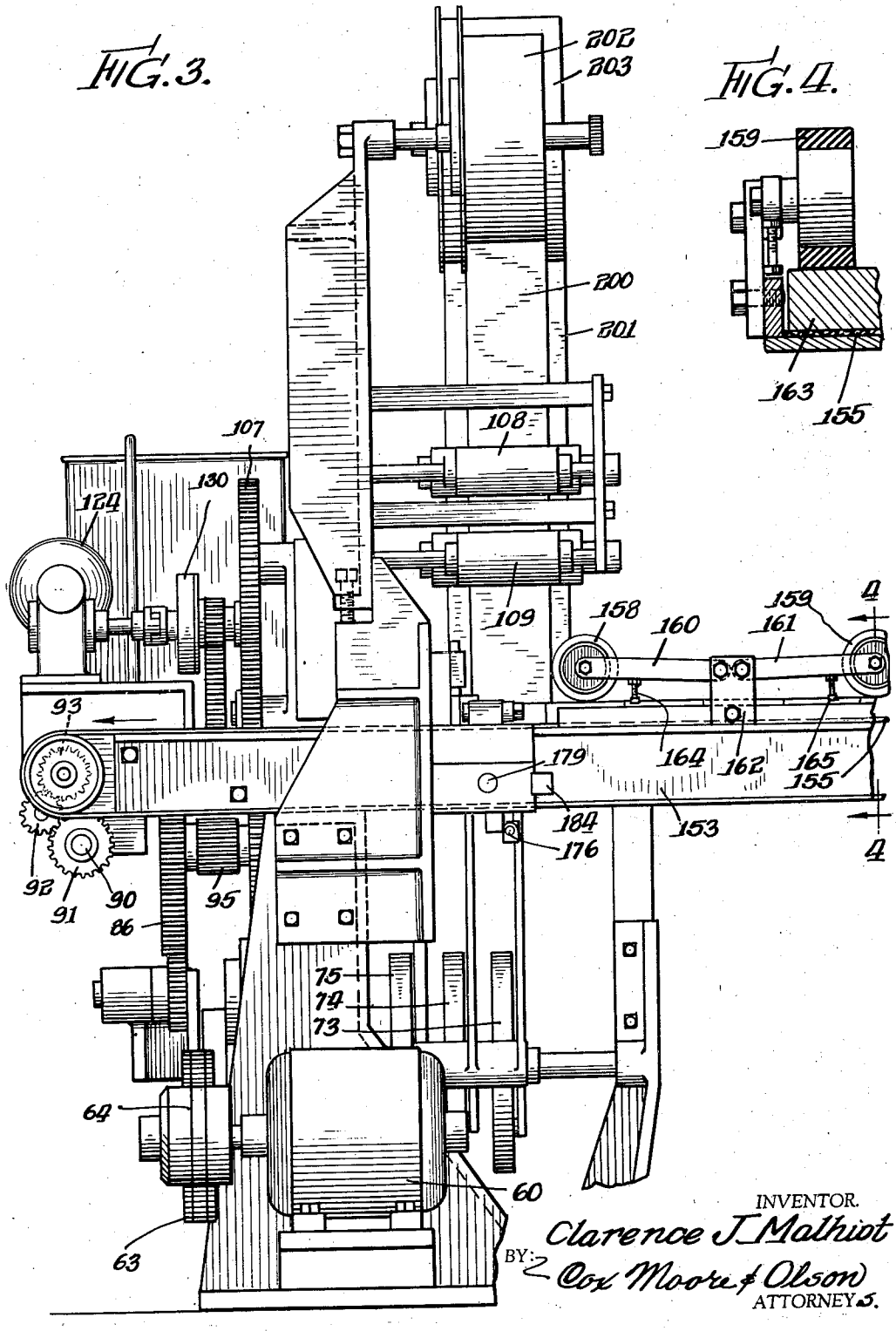


FIG. 4.

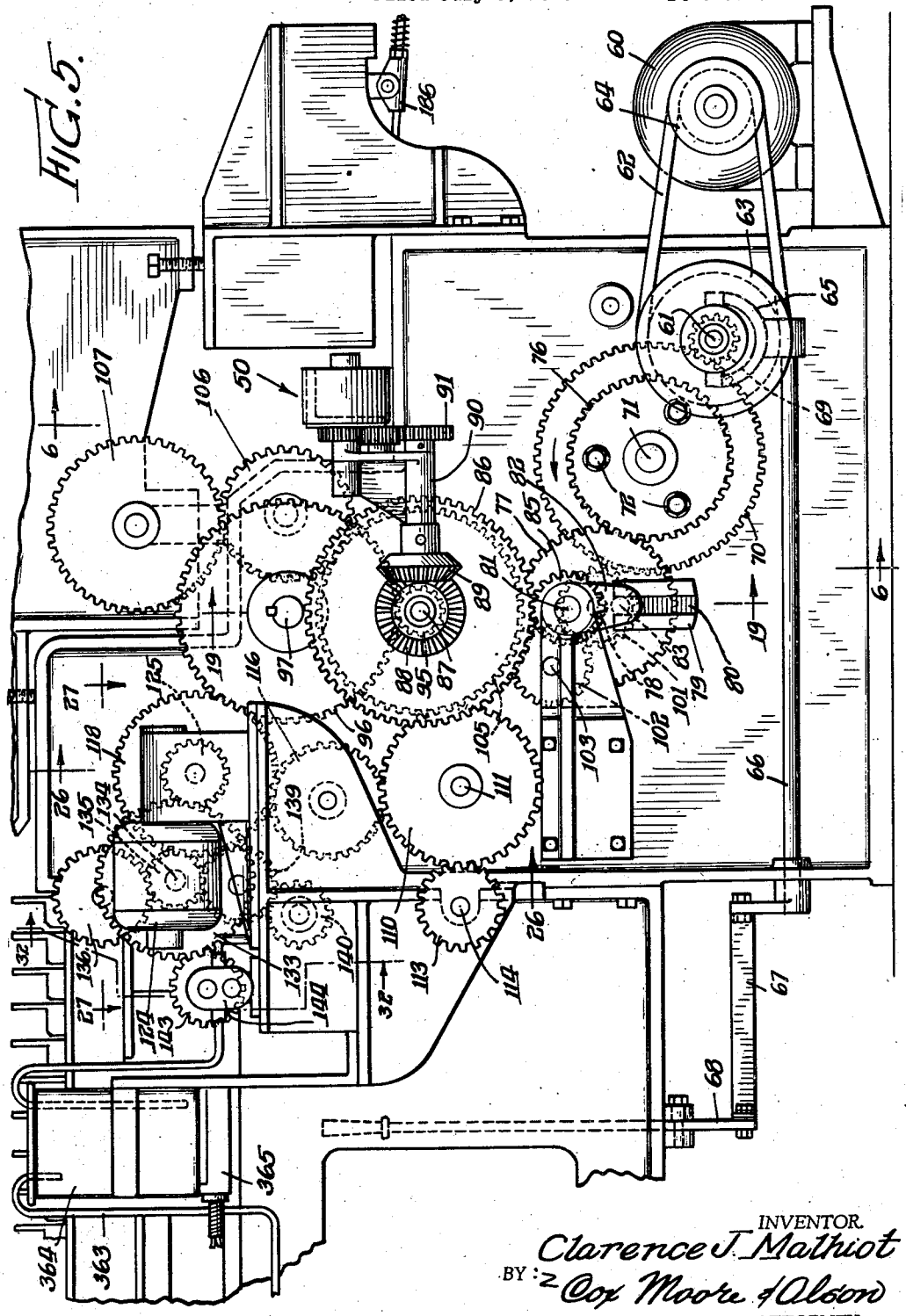
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FIG. 5.



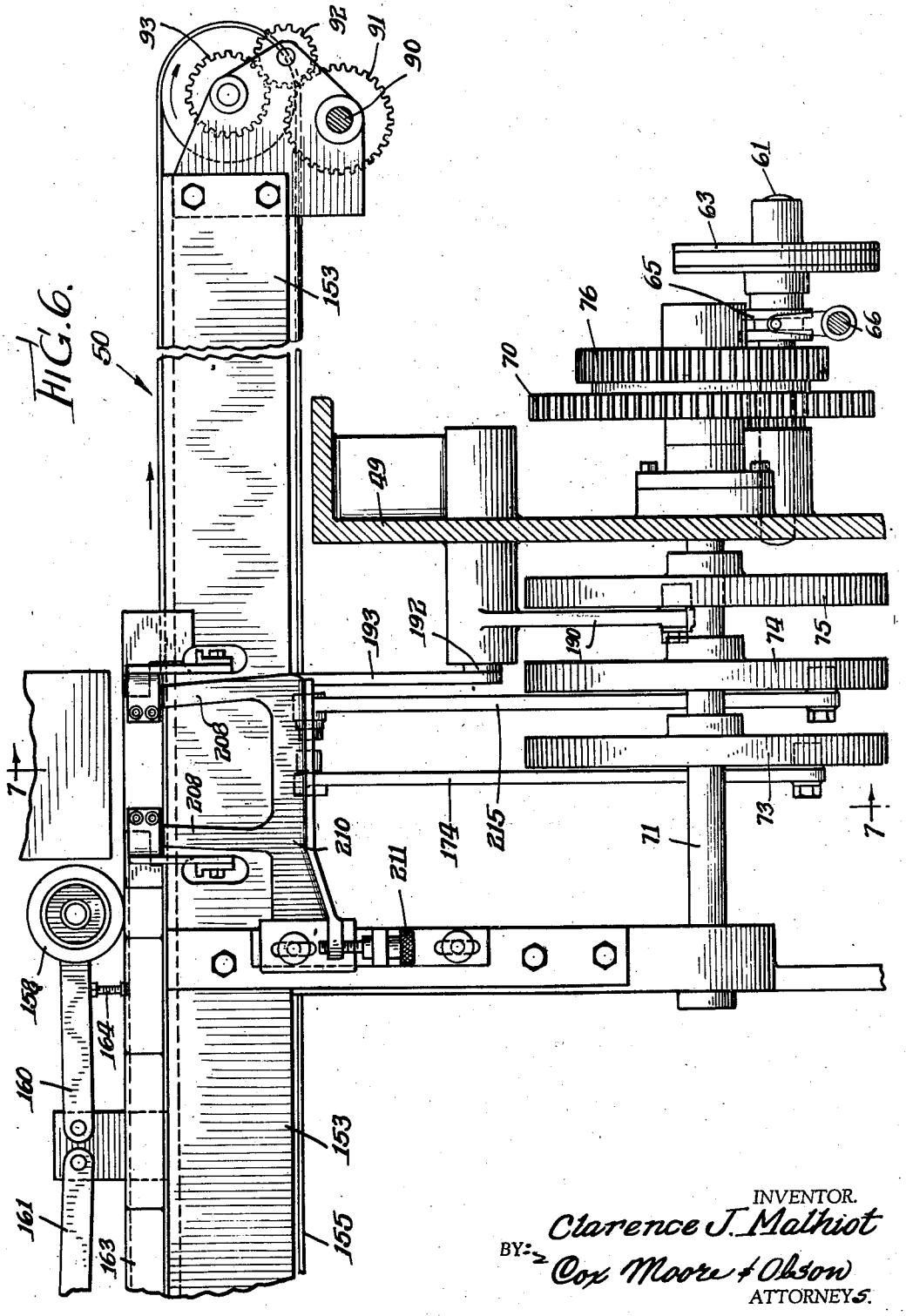
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FIG. 6.

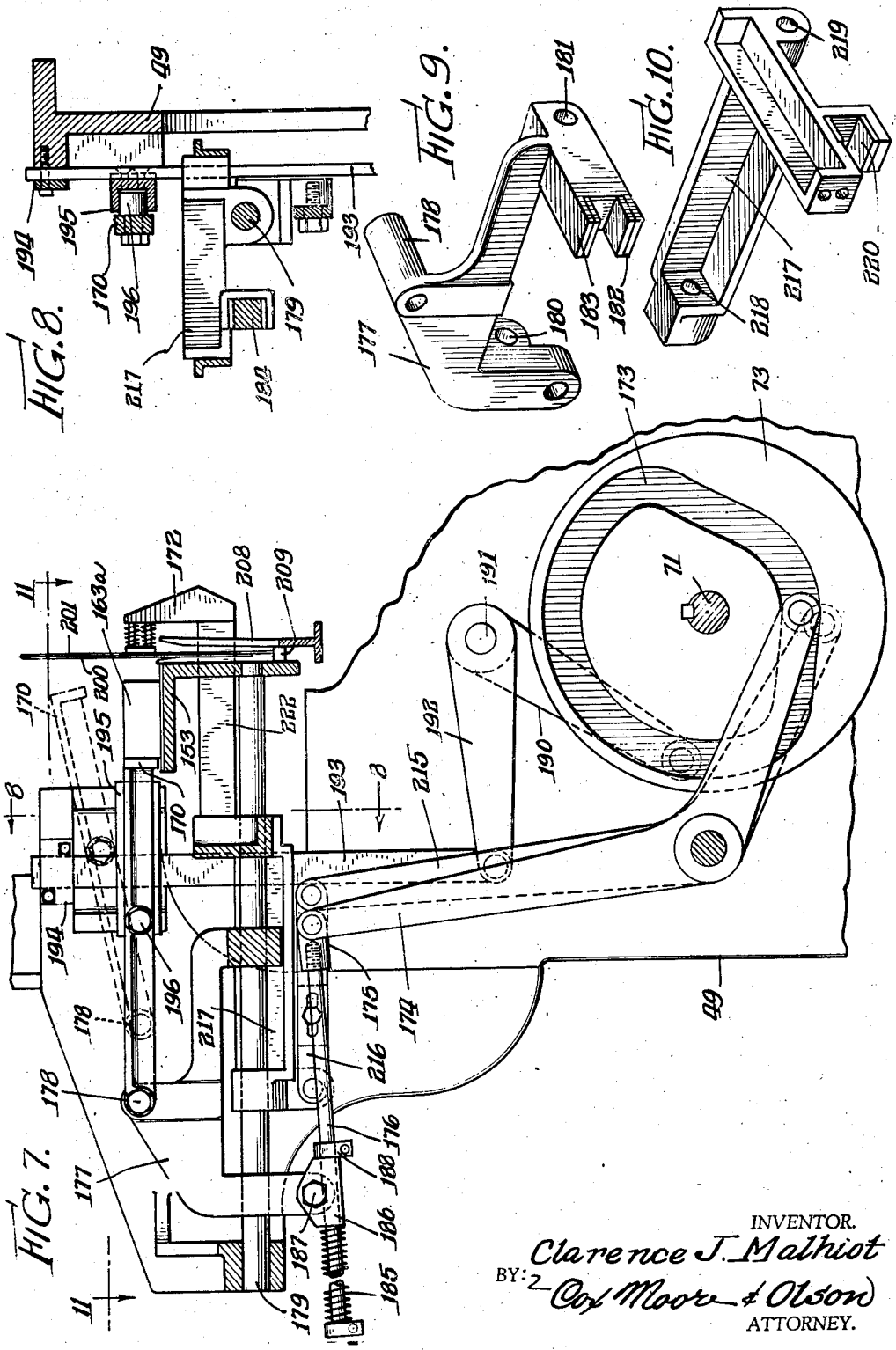


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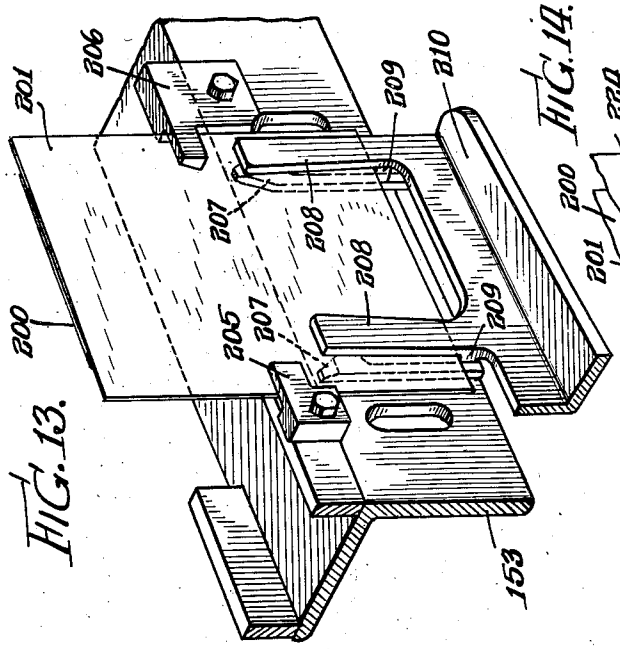


FIG. 13.

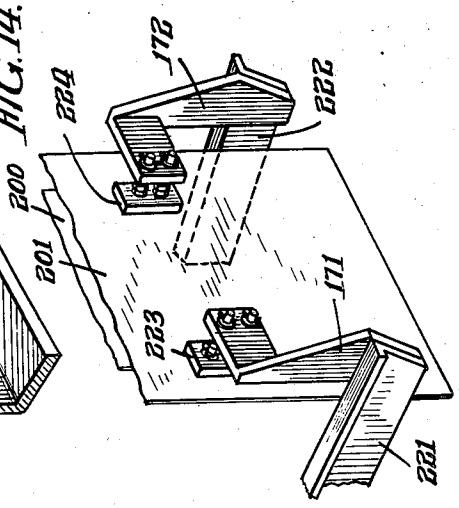


FIG. 14.

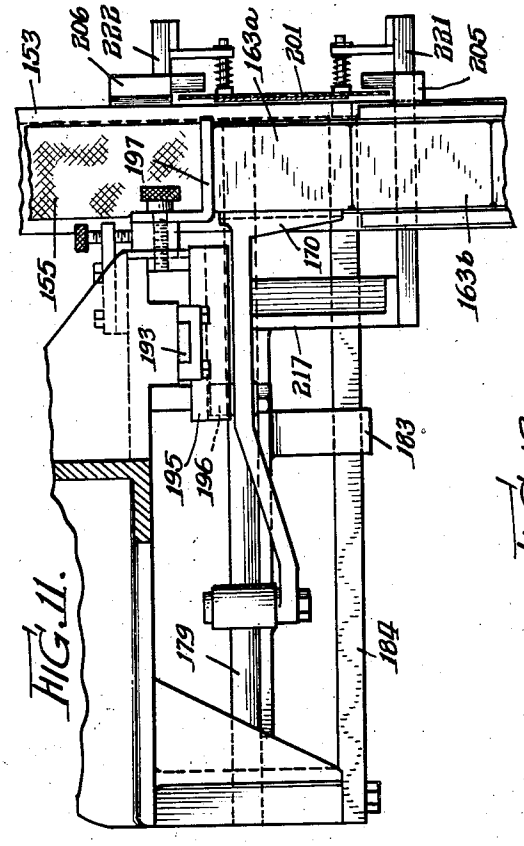


FIG. 11.

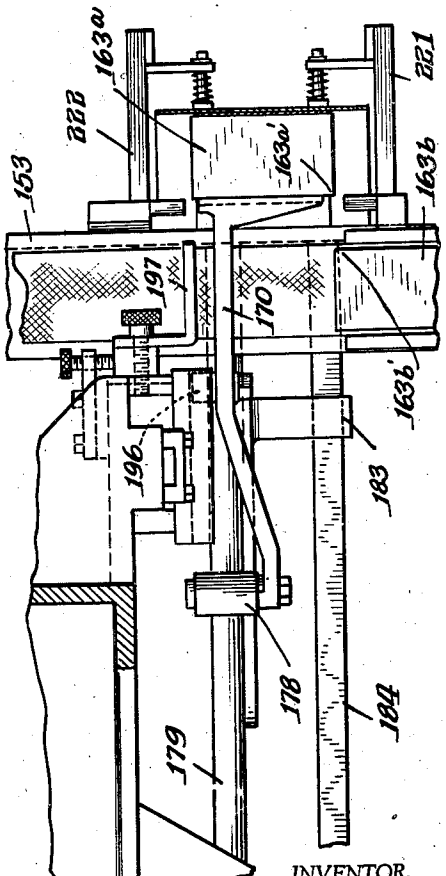


FIG. 12.

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FIG. 15.

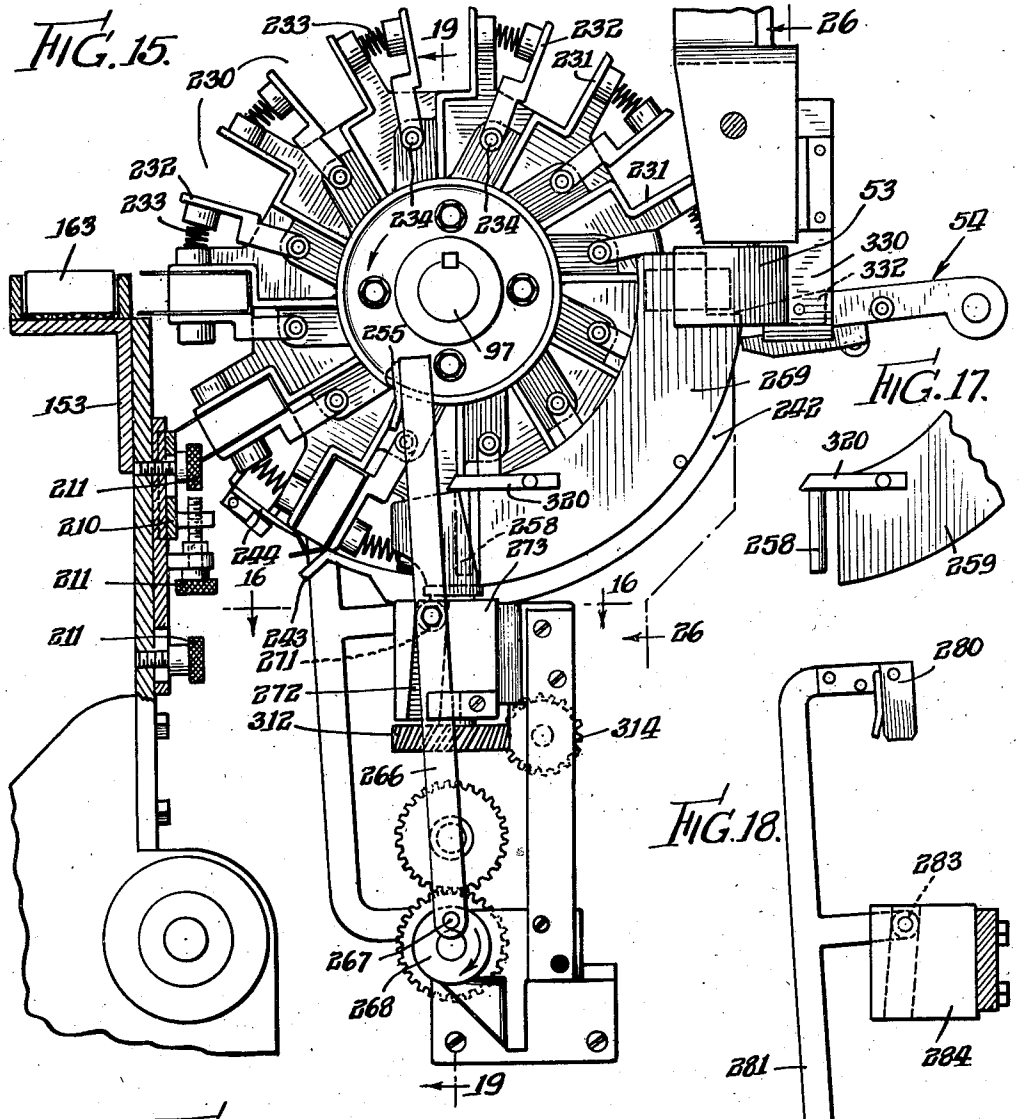
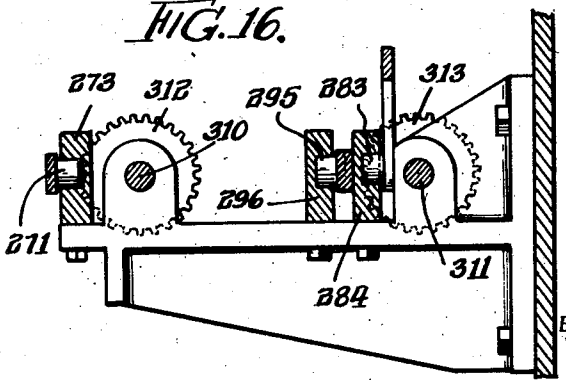


FIG. 17.

FIG. 18.

FIG. 16.



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FIG. 19.

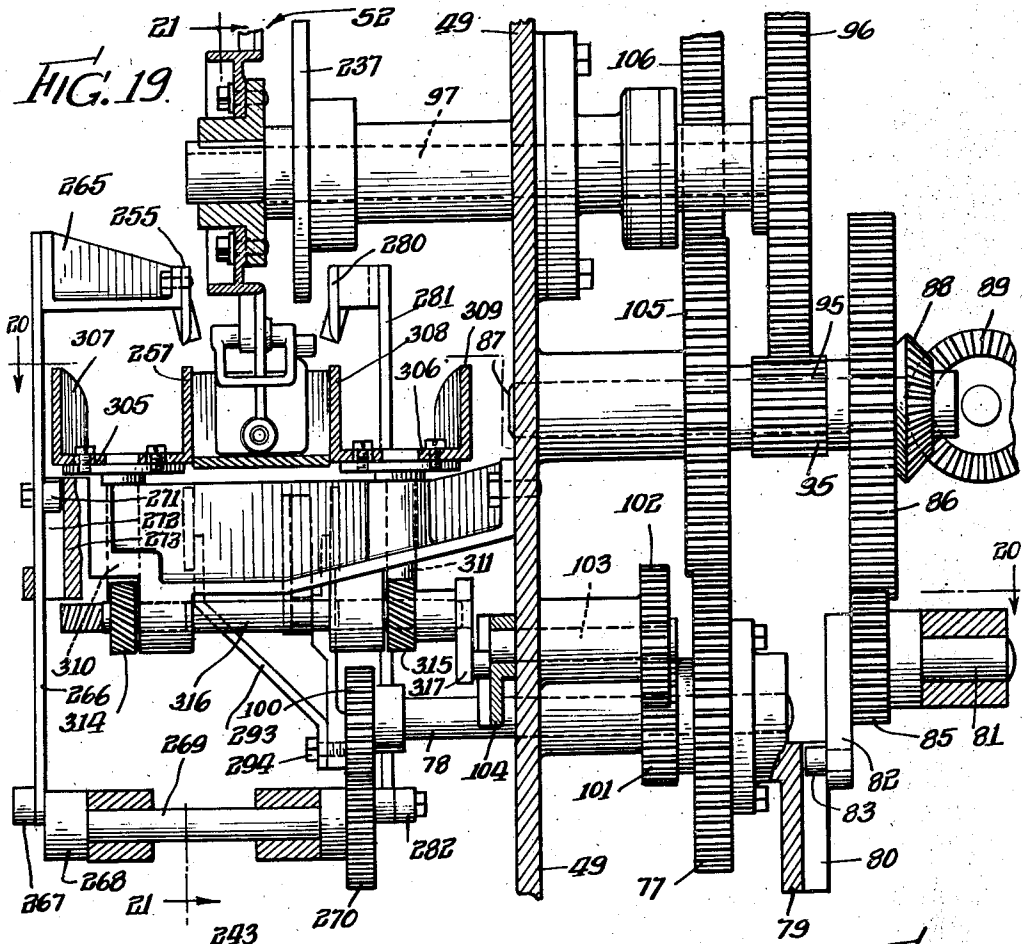
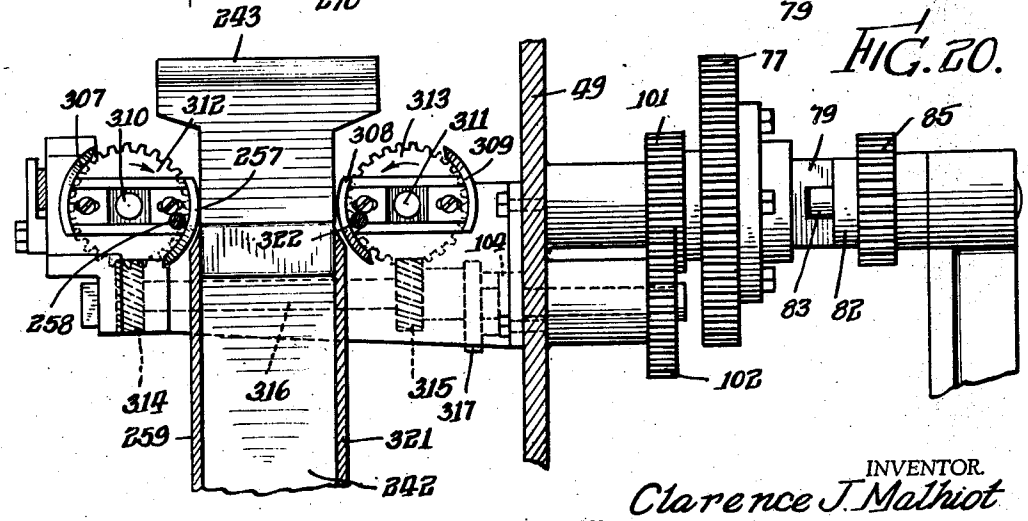


FIG. 20.



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FIG. 21.

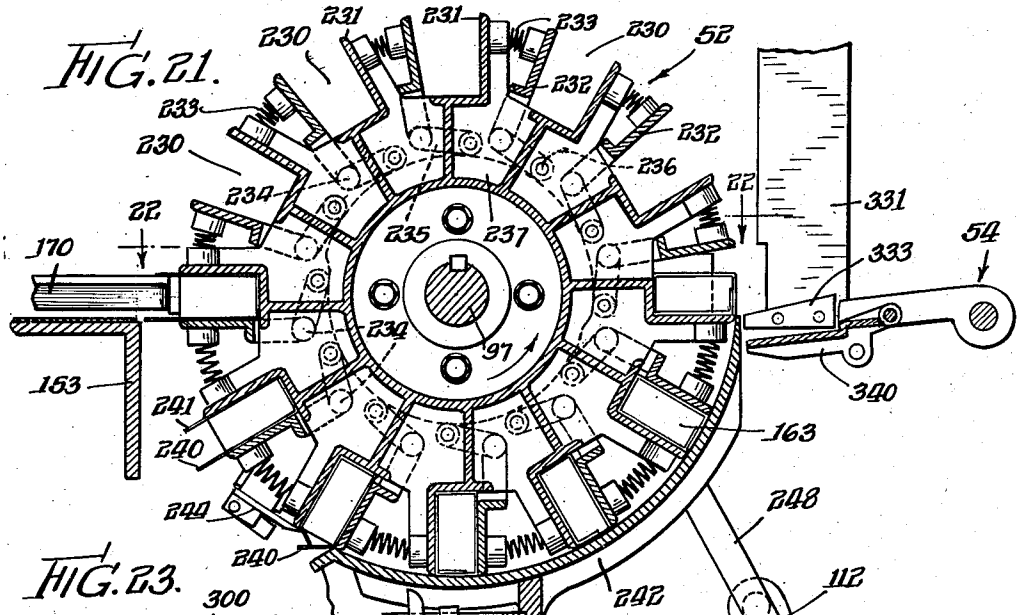
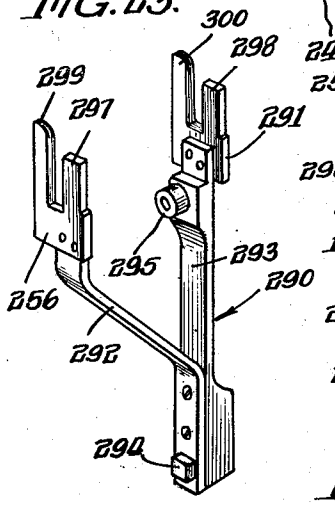


FIG. 23.



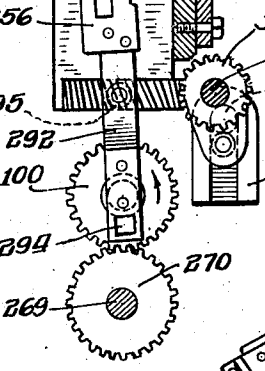
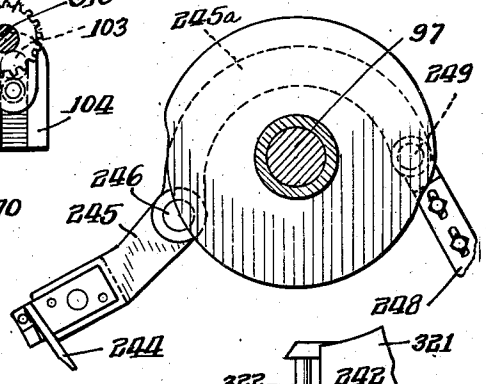


FIG. 24.



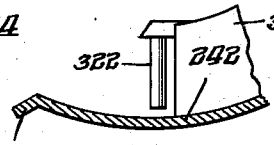


FIG. 22.

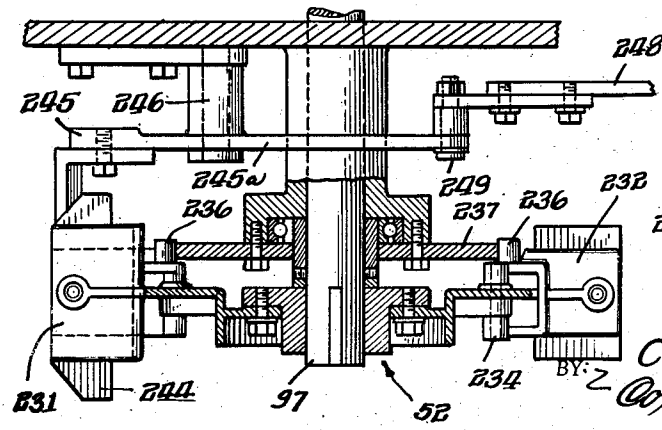
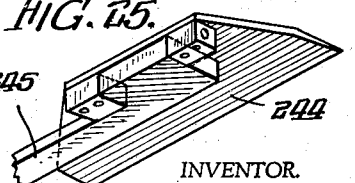


FIG. 25.



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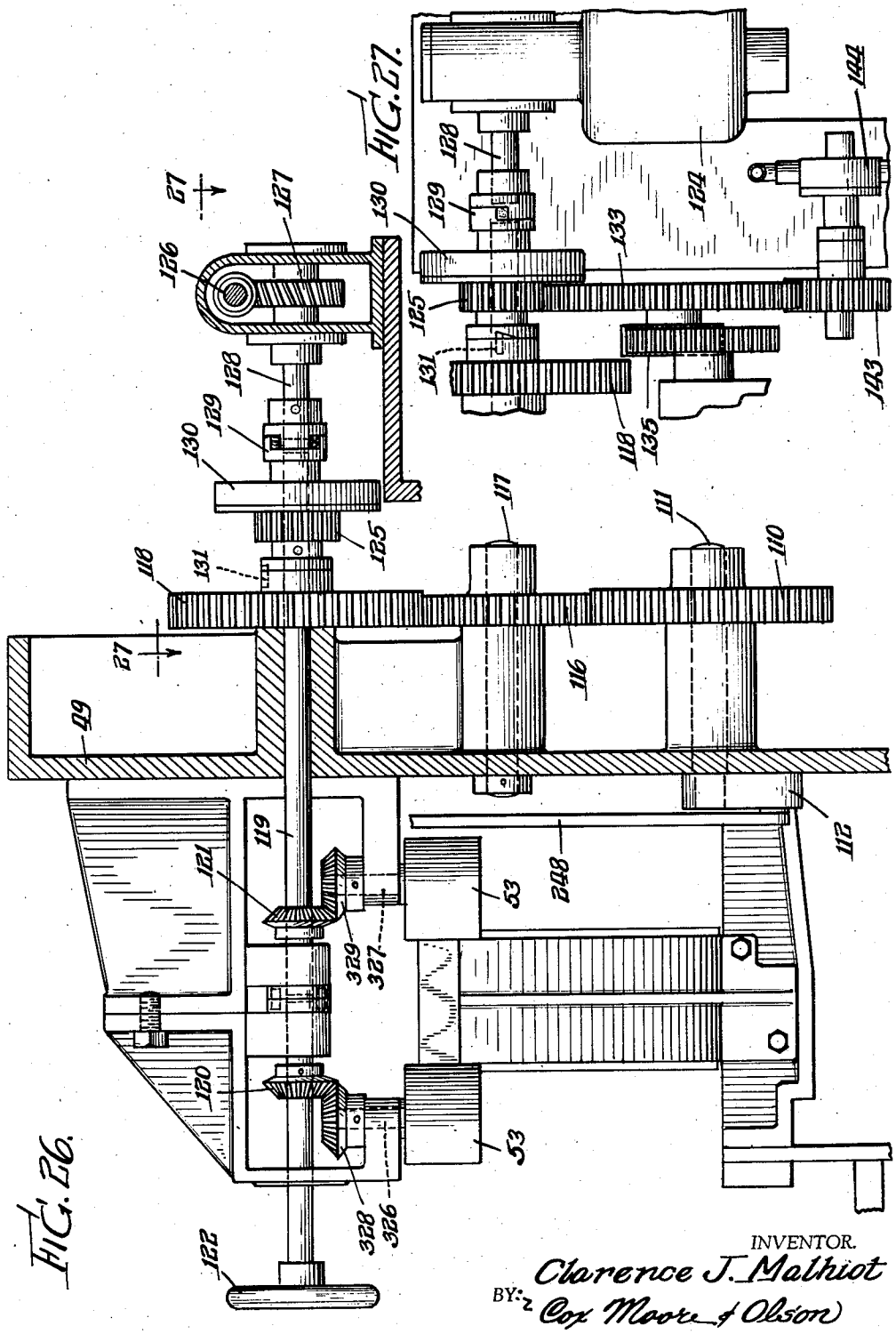


FIG. 27.

FIG. 26.

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FIG. 28.

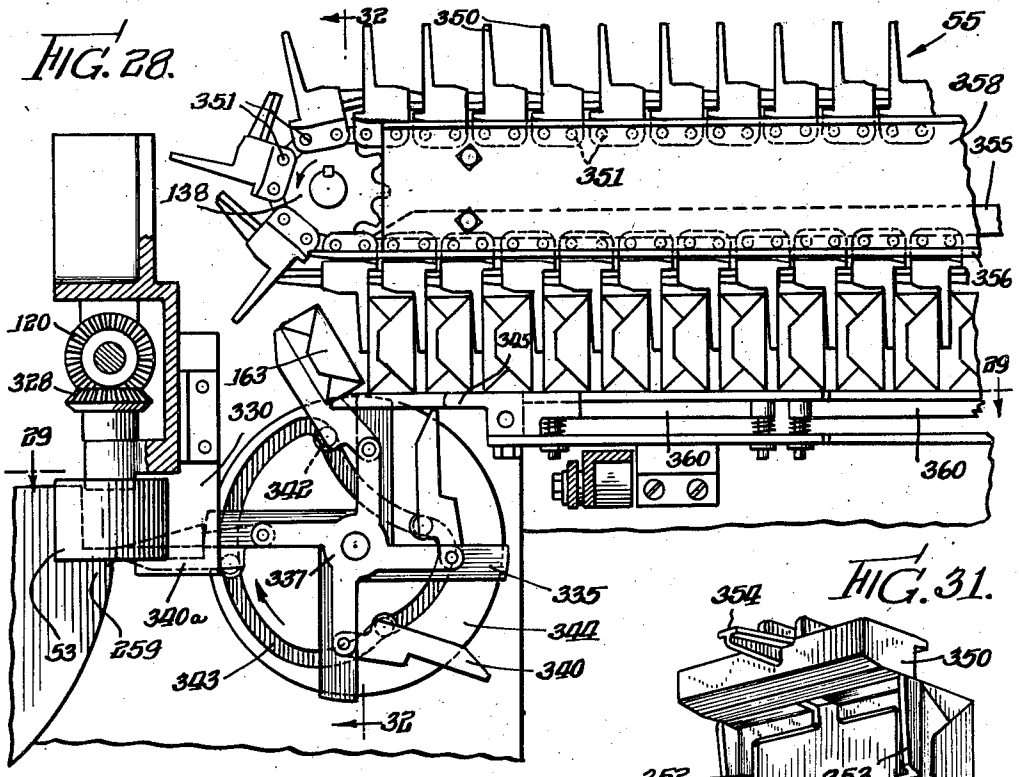


FIG. 31.

FIG. 29.

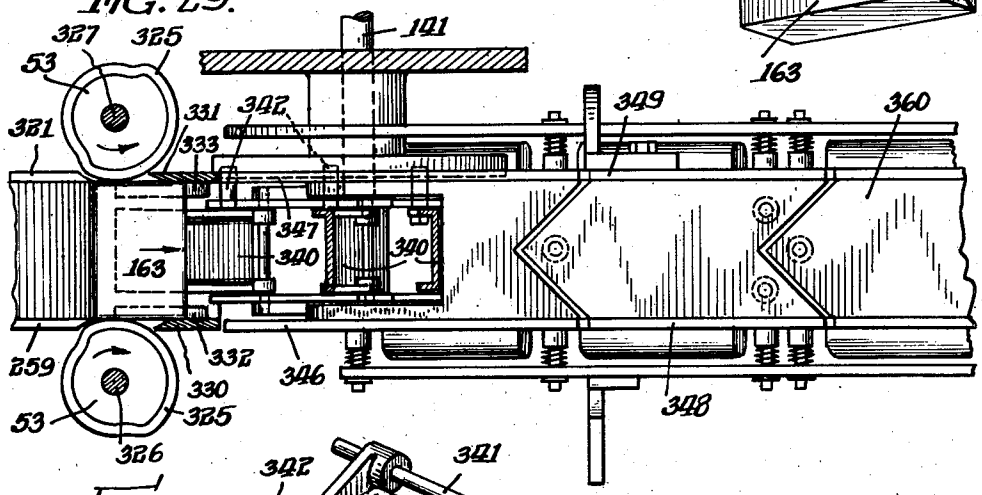
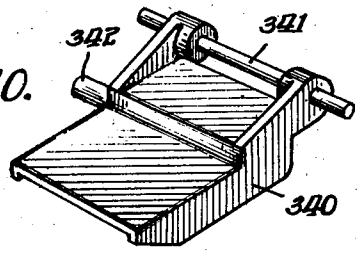


FIG. 30.



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FIG. 32.

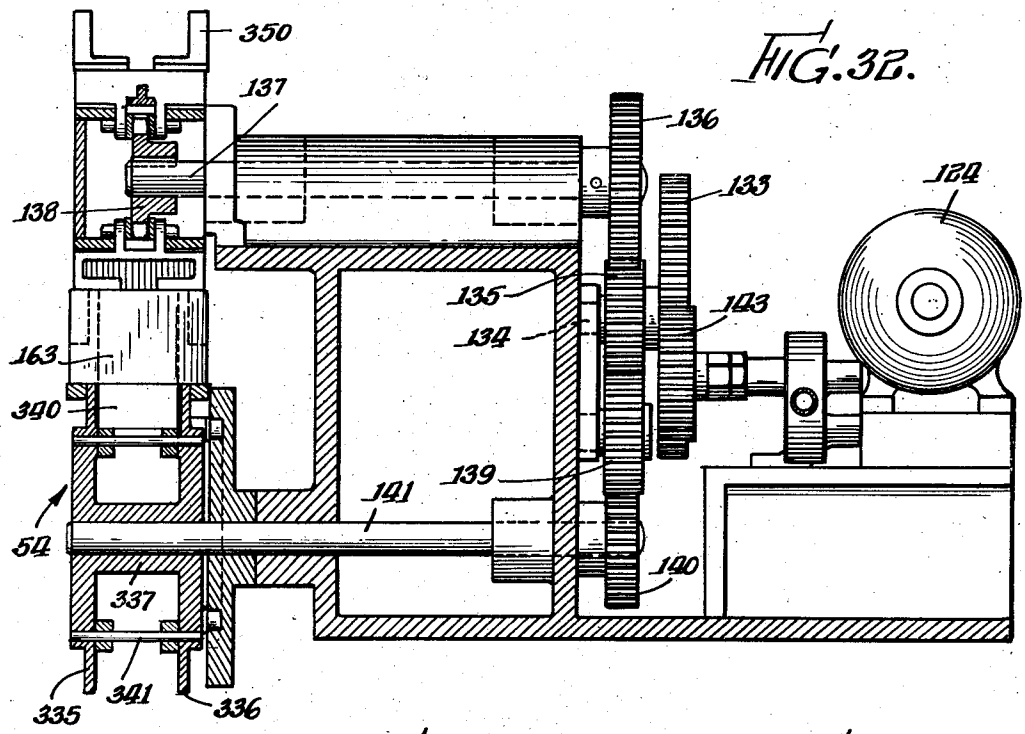


FIG. 33.

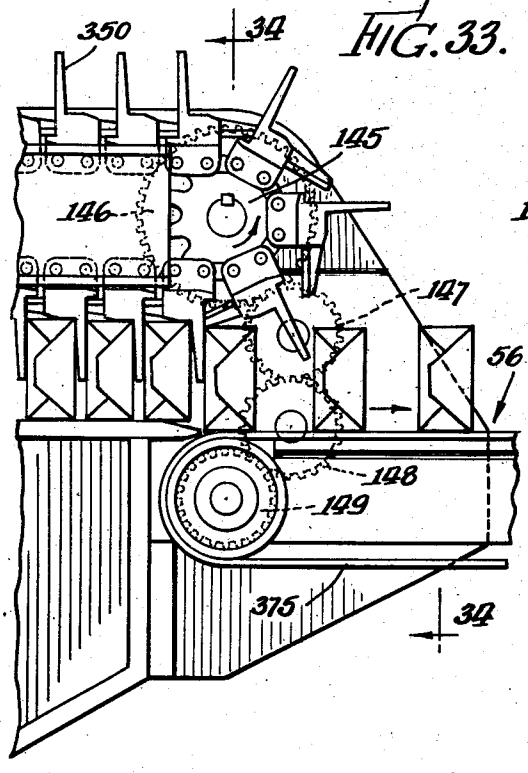
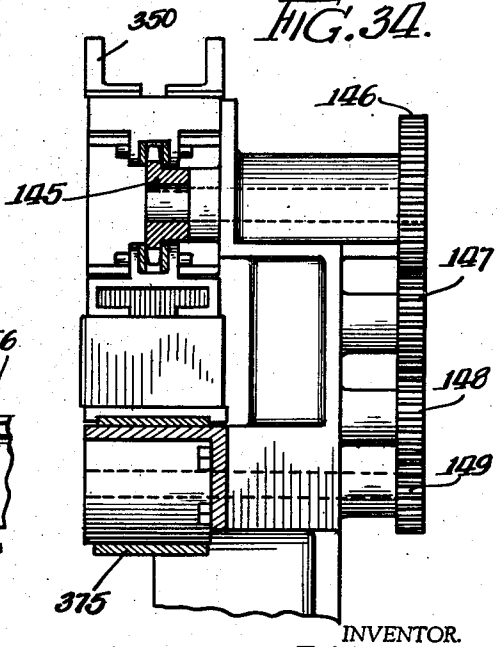


FIG. 34.



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FIG. 35.

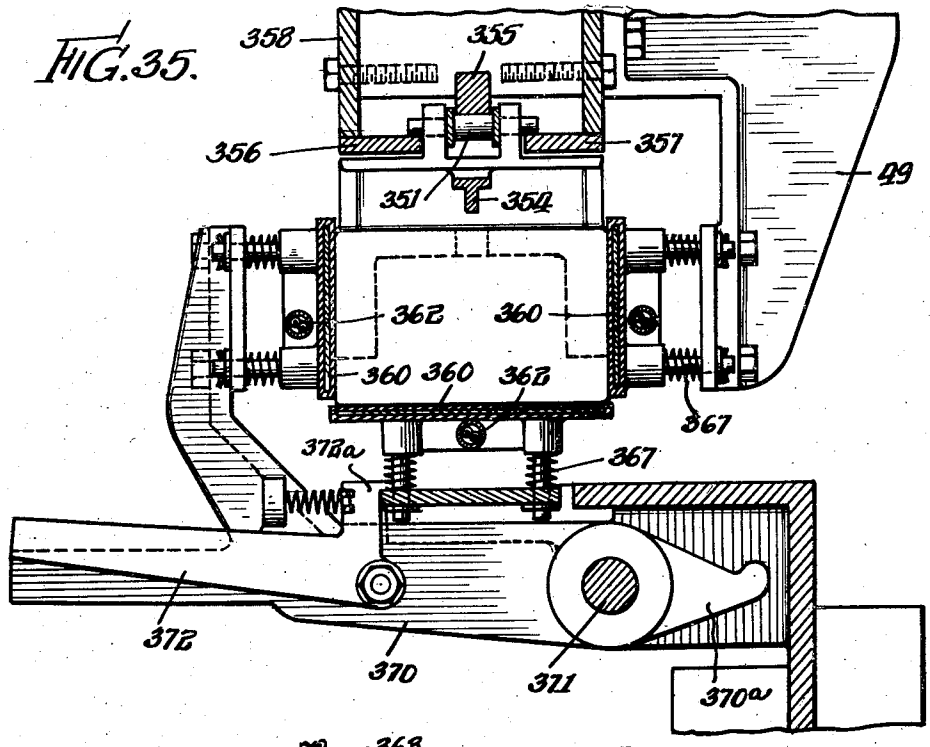
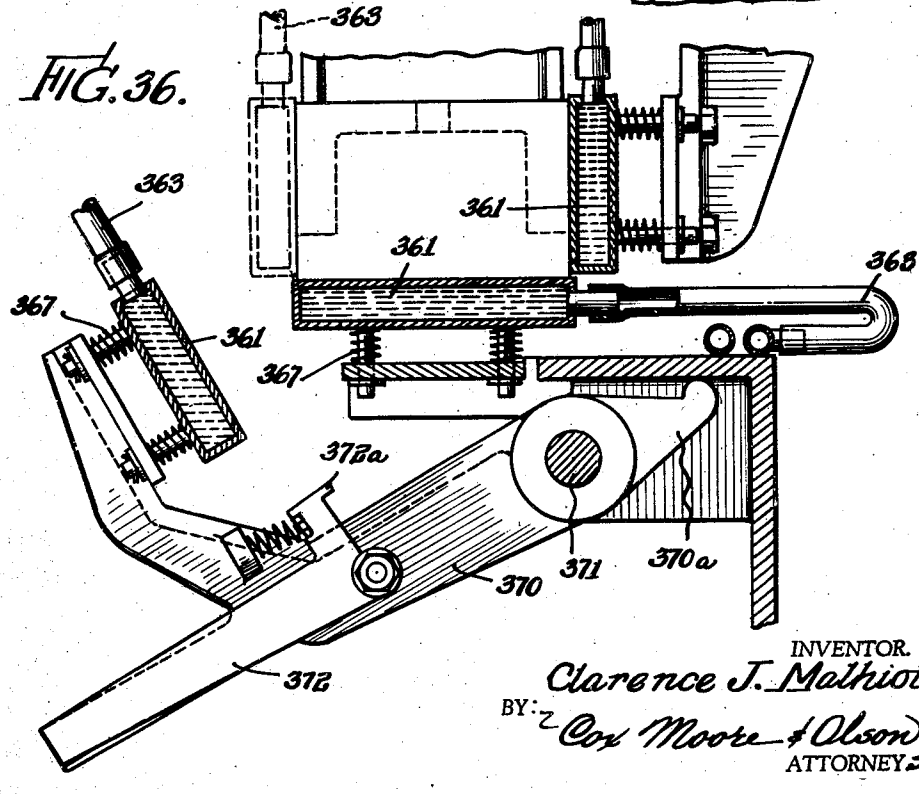


FIG. 36.



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FIG. 37.

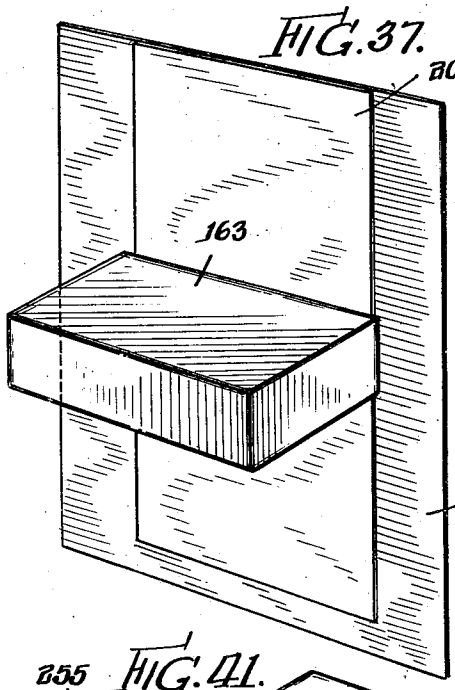


FIG. 38.

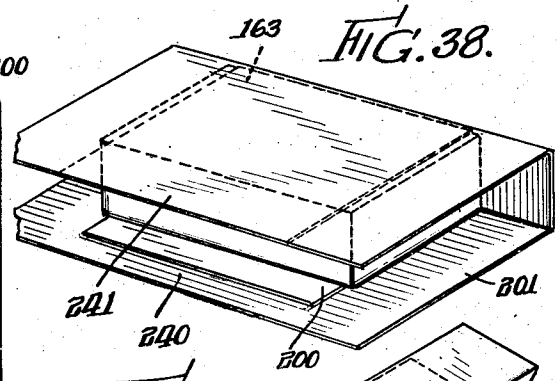


FIG. 39.

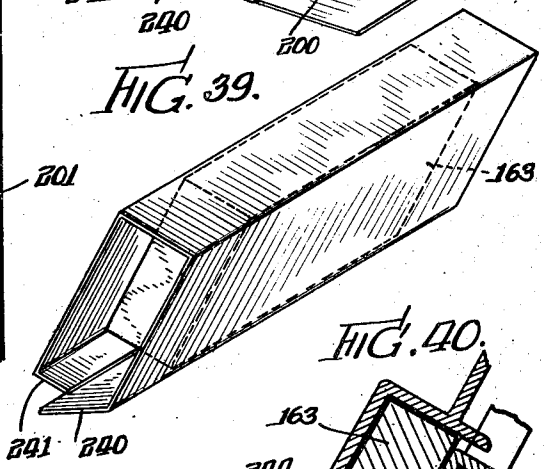


FIG. 41.

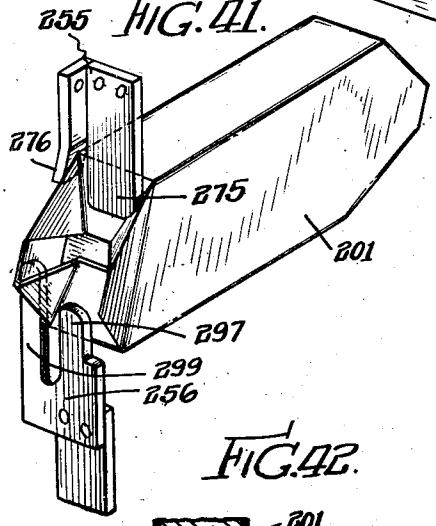


FIG. 40.

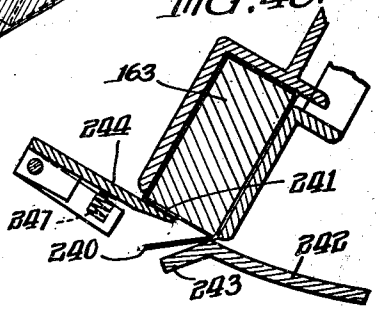


FIG. 44

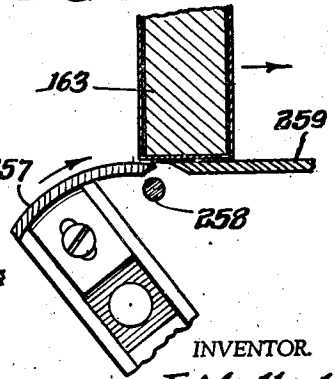


FIG. 42.

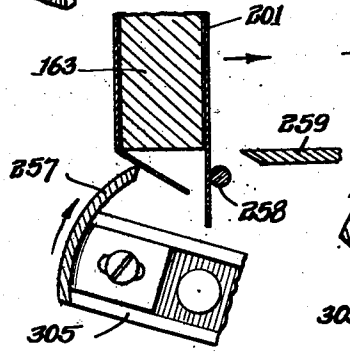
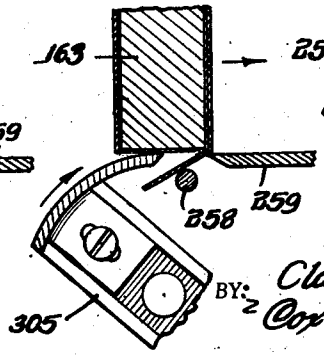


FIG. 43.



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Patented Sept. 10, 1946 2,407,313

UNITED STATES PATENT OFFICE

2,407,313

WRAPPING MACHINE

Clarence J. Malhiot, Oak Park, Ill., assignor to F. B. Redington Co., Chicago, Ill., a corporation of Illinois

Application July 3, 1940, Serial No. 343,849

33 Claims. (Cl. 93—7)

1

This invention relates to packaging or wrapping machines, and more particularly to such machines of the high speed automatic type.

It is an object of the invention to provide a packaging or wrapping machine of improved construction and operating characteristics, and more specifically to provide an automatically operable machine adapted for the high speed packaging or wrapping of frangible or relatively easily damaged articles.

A further object of the invention is to provide a machine of the foregoing type wherein various conveyor elements thereof are adapted for variable speed motion, as distinguished from uniform or intermittent operation, whereby to facilitate the passage of the articles or packages through the machine at high speed, but without shock or jar, and insuring a sufficient time interval of article or package movement at the various operating stations to permit adequate and complete operation of the mechanisms disposed at such stations.

More specifically stated, an object of the invention is to provide, in a machine of the foregoing type, continuously operable article or package conveying means such as conveyors, wrapping wheels, and the like, having alternate high and low speed cycles of operation, the high speed cycle providing for a maximum rate of travel of the articles along a predetermined path, and the low speed cycle insuring a sufficient time interval of article movement at a predetermined station or stations to permit the operation of the various operating mechanisms thereon.

Another object of the invention is to provide continuously movable variable speed packaging or wrapping elements having alternate high and low speed cycles of operation, the high speed cycle facilitating the approach of the elements into operative article or package engaging position, and the low speed cycle insuring the proper movement of the elements as they engage and operate upon the articles.

Still another object of the invention is to provide, in a packaging or wrapping machine, article engaging transmission elements of resilient construction whereby to allow for possible variations in the necessary movements of the articles as they are engaged by such elements and thereby obviate the possibility of damage to the articles by the elements.

Still another object of the invention is to provide, in a packaging or wrapping machine, a processing conveyor structure which may be operated independently of the machine and while other machine elements are not in operation.

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A still further object of the invention is to provide a conveyor structure in a packaging or wrapping machine particularly adapted for the handling of frangible articles, which conveyor is operable to move the articles along a predetermined path in spaced relation, independent motive means being provided for each article, whereby even though the conveyor may be relatively long, no cumulative crushing effect is applied to the articles in their transmission movement.

Various further objects, advantages and features of the invention will appear from the following specification when taken in connection with the accompanying drawings, wherein certain preferred embodiments of the invention are set forth for the purposes of illustration.

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

Figure 1 is a general assembly view, in front elevation, of a wrapping machine constructed in accordance with the principles of the present invention.

Fig. 2 is a partial detail view of the outer end of the feeding conveyor structure.

Fig. 3 is an end view of the machine, as seen from the left in Fig. 1, the outer end of the feeding conveyor being broken away.

Fig. 4 is a sectional view of the feeding conveyor, taken on the line 4—4 of Fig. 3.

Fig. 5 is a partial rear view of the machine, more particularly illustrating the drive gearing.

Fig. 6 is a sectional view through the machine, taken generally along the line 6—6 of Fig. 5 and more particularly illustrating the article feeding mechanism and associated drive, for feeding the articles from the feeding conveyor into the wrapping wheel.

Fig. 7 is a sectional view of the feeding mechanism, on the line 7—7 of Fig. 6.

Fig. 8 is a detail sectional view of the feeding mechanism, on the line 8—8 of Fig. 7.

Figs. 9 and 10 are detail perspective views of two of the slide members associated with the feeding mechanism.

Figs. 11 and 12 are sectional views of the feeding mechanism illustrated in Fig. 7, taken along the line 11—11 thereof and showing two of the operating positions of the mechanism.

Figs. 13 and 14 are detail perspective views of the wrapper paper guide means and clamping means, respectively, associated with the feed mechanism.

Fig. 15 is a detail view of the wrapping wheel and associated wrapping mechanisms, as seen from the front of the machine as in Fig. 1.

Fig. 16 is a sectional view of the wrapping mechanism, taken on the line 16—16 of Fig. 15.

Figs. 17 and 18 are detail views of two of the wrapping elements of the wrapping mechanism.

Fig. 19 is a sectional view of the wrapping wheel and associated wrapping mechanism, on the line 19—19 of Fig. 15 and also illustrating the associated drive structure, as indicated by the section line 19—19 of Fig. 5.

Fig. 20 is a sectional view through the mechanism of Fig. 19 on the line 20—20 thereof.

Fig. 21 is a sectional view through the wrapping wheel and mechanism on the line 21—21 of Fig. 19.

Fig. 22 is a sectional view through the mechanism of Fig. 21 on the line 22—22 thereof.

Figs. 23, 24 and 25 are detail views of various wrapping mechanism parts.

Fig. 26 is a sectional view through the machine, on the lines 26—26 of Figs. 5 and 15, more particularly illustrating the ejector elements for moving the articles from the wrapping wheel to the transfer wheel, and the associated drive mechanism.

Fig. 27 is a sectional view more particularly illustrating the overrunning clutch and independent drive for the processing conveyor, taken on the line 27—27 of Figs. 5 and 26.

Fig. 28 is a partial detail view of the ejector elements, transfer wheel, and infeed end of the processing conveyor as seen from the front of the machine as in Fig. 1.

Fig. 29 is a sectional view of the mechanism of Fig. 28 on the line 29—29 thereof.

Fig. 30 is a detail perspective view of one of the transfer wheel package support platforms.

Fig. 31 is a detail perspective view of one of the processing conveyor feed links.

Fig. 32 is a sectional view through the mechanism of Fig. 28, and associated drive, on the lines 32—32 of Figs. 5 and 28.

Fig. 33 is a detail view of the discharge end of the processing conveyor and the infeed end of the associated removal conveyor, as seen from the front of the machine.

Fig. 34 is a sectional view through the mechanism of Fig. 33 on the line 34—34 thereof.

Figs. 35 and 36 are sectional views through the processing conveyor on the lines 35—35 and 36—36 respectively of Fig. 1; and

Figs. 37 to 44, inclusive, are diagrammatic views illustrating the several steps in the wrapping of the articles as performed by the machine.

Referring more particularly to the drawings, the machine illustrated comprises a high speed automatic machine for packaging or wrapping bars of soap, such as laundry soap or the like. In the use of a machine of this type, it is desirable that the soap bars be fed to the machine as they come from the molding presses, at which time they are in soft, semi-plastic and frangible condition. Problems are presented in the handling of the semi-plastic bars to effect the high speed wrapping thereof without damage to the bars, which problems are solved by the present invention. While the machine as illustrated is thus particularly adapted for the high speed wrapping of semi-plastic soap bars, it is to be understood that the various features of the invention are adaptive for other uses and purposes, including the wrapping or packaging of other types of articles.

General machine structure

Referring to Fig. 1, the machine in general

comprises a frame 49, a belt feeding conveyor 50 upon which the soap bars may be placed in any desired manner, and by which they are fed to a feeding station, at which a feed mechanism generally indicated by the numeral 51 is located. The feeding mechanism feeds the bars, together with suitable paper wrappers or the like, into a rotatable conveyor or wrapping wheel generally indicated by the numeral 52. In the wrapping wheel, the wrapper is folded and the bars are wrapped by suitable wrapping or packaging devices, later to be described; and upon reaching transmission or ejector rolls 53, the wrapped bars are ejected from the wrapping wheel to a transfer wheel 54 which transfers them to a processing conveyor, generally indicated by the numeral 55. In the processing conveyor, the bars are passed along suitable processing elements, which in the particular machine illustrated are heating and cooling elements for sealing the wax paper wrapper in which the bars are wrapped and, after processing, the bars are ejected from the processing conveyor onto a removal conveyor 56 operable to deliver them to a suitable point of delivery.

Drive mechanism

The various mechanisms of the machine are all adapted to be driven in synchronized, timed relation by means of a main electric driving motor 60, Fig. 1, and a drive gearing mounted on the rear of the machine and best illustrated in Fig. 5. More particularly, referring to Figs. 1, 3, 5 and 6, the motor 60 drives a main drive shaft 61 through the intermediary of a flexible belt 62, belt pulleys 63 and 64, and a clutch mechanism 65. The pulley 63 is loosely mounted on the shaft 61, and the clutch mechanism 65, which may be any suitable form of disk clutch, is provided for connecting and disconnecting the driving engagement between the pulley and the shaft. The clutch is controlled by means of an oscillatable shaft 66 and a linkage 67 leading to a clutch control handle 68 mounted on the front of the machine in a position to be conveniently manipulated by the machine operator. It will be seen that while the pulley 63 is constantly operated so long as electric motor 60 is in operation, the main drive shaft 61 is operated only when the clutch 65 is engaged.

Drive shaft 61 carries a pinion 69 in driving engagement with a gear 70 mounted on a shaft 71. The gear 70 may be connected to the shaft 71 through an overload driving arrangement as indicated at 72. Such overload device may be of any suitable construction, and is provided for permitting the gear 70 to slip on the shaft 71 in the event of overload conditions in the machine. It is to be understood that overload mechanisms, for safety purposes, may be elsewhere provided in the drive connections if desired. Normally, however, the gear 70 effects the rotation of the shaft 71 as the gear is driven. This shaft projects forwardly through the machine frame 49, as best shown in Fig. 6, and near its front end carries three control cams 73, 74, and 75, forming the driving means for the feeding mechanism 51, as will be later described.

The shaft 71, at its rear end, also carries a gear 76 in driving engagement with a gear 77 mounted upon a shaft 78, see particularly Figs. 5 and 19. Gear 77 carries a block 79 provided with a longitudinal track 80. A shaft 81, offset with respect to the axis of shaft 78, carries a crank member 82, which crank is provided with a pin 83 engageable within the track 80 of the block

79. Accordingly, it will be seen that as the gear 77 is rotatably driven, moving the block 79 which is mounted thereon in a circular path, the crank pin 83 which is engaged in the block track will cause the rotation of the crank 82 and its associated shaft 81. But it is to be noted that while the gear 77 and the shaft 78 are driven at constant speed, the driving movement which is imparted to the crank 82 and its associated shaft 81 will be a variable speed motion, due to the offset displacement of the axes of the shafts 78 and 81. While the rotation of shaft 81 will be continuous, it will be at variable speeds comprising alternate fast and slow cycles of operation, the slow cycle of rotation being imparted thereto when the parts are in the position illustrated in Fig. 5, and the rapid cycle of operation being imparted when the crank and block 79 assume a position displaced 180 degrees from the position shown. While the rotation of the shaft 81 is alternately fast and slow, it is further to be noted that the acceleration and deceleration of the shaft 81 is gradual, whereby to avoid imparting shocks to the shaft or to the mechanisms operated therefrom. During operation, the pin 83 slides longitudinally in the track 80 and maintains driving engagement between the parts notwithstanding the offset relation of the shafts 78 and 81. The variable speed drive mechanism thus provided is well suited for the purposes of the present invention, but it is to be understood that other suitable forms of variable speed drives could be substituted.

Shaft 81 carries a pinion 85, Figs. 5 and 19, in engagement with a gear 86 mounted on a shaft 87, which shaft also carries a bevel gear 88 adapted to drive a cooperating bevel gear 89 mounted on one end of a shaft 90. The other end of shaft 90 carries a gear 91, Figs. 3, 5 and 6, which through gearing 92 and 93 drives the feeding conveyor 50. It will thus be seen that the feeding conveyor, to which more specific reference will hereinafter be made, is driven at variable speed through the several driving connections described.

Variable speed shaft 87 also carries a pinion 95, Figs. 5 and 19, in driving engagement with a gear 96 secured to a shaft 97 which extends forwardly through the machine frame and on its front end carries the wrapping wheel 52. The wrapping wheel is thus also driven at variable speed through its driving connections.

Constant speed shaft 78 also extends forwardly through the frame 49 of the machine and is provided on its front end with a gear 100 forming a part of the driving means for the wrapping mechanism, as will be later described. Adjacent its rear end, the shaft carries a gear 101 in driving engagement with gear 102 secured to shaft 103, extending forwardly through the frame of the machine and provided at its front end with a block 104 forming another driving element for the wrapping mechanism, as will be also later described. The gear 100 and the block 104, being driven from the shaft 78, are operated at constant speed.

Driving gear 77, further referring to Figs. 5 and 19, also meshes with an idler gear 105 which is loosely mounted on the shaft 87. This idler gear drives a gear 106 which in turn drives a gear 107 forming the driving mechanism for the paper feeding and cutting rolls diagrammatically indicated at 108 and 109 on Fig. 1. The specific construction of these paper feed and cutter rolls and their driving means forms no part of the present invention, and is only diagrammatically indicated.

Constant speed idler gear 105 also drives a gear 110, Figs. 5 and 26, secured to a shaft 111. This shaft also extends forwardly through the machine frame and carries a crank 112 at its front end, which crank constitutes another of the driving elements for the wrapping mechanism.

Gear 110 meshes with a gear 113 associated with a shaft 114 also extending through the machine frame and provided on its front end with a hand wheel 115, Fig. 1. Axial movement of shaft 114 serves to connect the gear 113 thereto by suitable clutch means, not shown, after which the shaft and the gear may be rotated by the hand wheel whereby to manually operate the drive gearing as for setting up purposes and the like.

Constant speed gear 110 further meshes with and drives a gear 116, Figs. 5 and 26, secured to a stub shaft 117, the gear 116 in turn being arranged to drive a gear 118 which is loosely mounted on a shaft 119, the latter extending forwardly through the frame of the machine and being provided at its forward end with a pair of bevel gears 120 and 121 adapted to drive the ejector rolls 53, and with a hand wheel 122. The arrangement is such that the shaft 119 may be driven either from the gear 118 or from a supplementary independently operable power source which in the particular embodiment of the mechanism disclosed comprises an electric motor 124. To this end a gear 125 is pinned to the shaft 119, and clutch devices are provided so that the gear and the shaft may be driven selectively either from the power gear 118 or the electric motor 124, as will best be understood by reference to Figs. 26 and 27 of the drawings, seel also Figs. 3 and 32. More specifically, the motor shaft is provided with a worm 126 adapted to drive a worm gear 127 mounted on a stub shaft 128. This shaft is connected by means of a coupling 129 to one part of a one-way overrunning clutch device 130 which may be of any suitable construction, the other part of the clutch being rigidly associated with the gear 125. Similarly an overrunning clutch assembly 131 forms a one-way driving connection between the hub sections of gears 118 and 125. It will thus be seen that the gear 125 and its associated shaft 119 may be driven selectively either from the power gear 118 or the electric motor 124, the motor 124 remaining stationary when the shaft is driven from gear 118, and similarly the gear 118 being uninfluenced when the shaft is independently driven by the motor 124. By this means it will be seen that the shaft 119 as well as gears driven from the gear 125, later to be described, may be independently operated by the motor 124 while the gear 118 and the various mechanisms associated therewith heretofore described are not in operation. The hand wheel 122 furnishes a hand power means for the shaft 119 and its associated structures.

Referring further to Figs. 5, 27 and 32, the gear 125 meshes with and drives a gear 133 mounted on a stub shaft 134, the shaft also carrying a gear 135 adapted to drive a gear 136. Gear 136 is mounted on a shaft 137, the forward end of which carries a sprocket 138 forming the driving means for the processing conveyor. Gear 135 also meshes with and drives a gear 139 which in turn drives a gear 140, the latter being mounted upon a shaft 141 which at its front end carries the transfer wheel 54. It will thus be seen that the gear 125, selectively operable, as previously described, is adapted to drive the ejector rolls 53,

the transfer wheel 54, and the processing conveyor 55 by means of the connections described. Gear 133 also meshes with and drives a gear 143 adapted to operate a cooling water pump 144 associated with the processing conveyor.

Referring to Figs. 33 and 34, it will be seen that the sprocket 145 at the discharge end of the processing conveyor is provided with a gear 146 which, through gearing 147, 148, is adapted to drive a gear 149 associated with and forming the driving means for the removal conveyor 56.

Having described the drive mechanism of the machine, the several mechanisms operated thereby will now be more specifically considered.

Feeding conveyor

Referring to Figs. 1 to 6 inclusive, it will be seen that the feeding conveyor, generally indicated by the numeral 50, more specifically comprises an elongated frame structure 153 carrying an endless belt or the like 155 adapted to be driven at alternately fast and slow speeds by its drive gear 93. An adjustment screw 156, Fig. 2, may be provided for positioning the end roller 157 for the outer end of the conveyor, thus providing for the proper tensioning of the conveyor belt. Fig. 2 shows the outer end of the conveyor, such end being cut away from the views illustrated by Figs. 3 and 6. In this connection it is to be understood that the conveyor may be of any length suitable for the particular machine. A pair of pressure rollers, preferably rubber, 158 and 159 carried by arms 160 and 161 pivoted to a bracket 162 are provided for engaging the upper faces of the soap bars 163 as they are fed into the machine on the conveyor. The pressure rollers are urged into engagement with the soap bars by gravity, their downward movements being limited by adjustment screws 164 and 165. The pressure rolls aid in maintaining the soap bars against undesired slippage on the surface of the conveyor belt, the rectangular bars preferably being fed to the conveyor, as best shown in Fig. 2 so that they are in longitudinally alined and abutting relation.

Feed mechanism

As the soap bars, being fed inwardly on the feeding conveyor, reach a feeding or loading station adjacent the wrapping wheel 52, they are fed or loaded into the wrapping wheel from the conveyor by the feed mechanism generally indicated by the numeral 51, and best shown in Figs. 1, 3 and 6 to 14 inclusive of the drawings.

The feeding mechanism derives its power from the three control cams 73, 74 and 75, driven from the main drive mechanism of the machine at constant speed as previously described. Cams 73 and 75 control the movements of a main pusher bar or feeding member 170 which transfers the soap bars from the feeding conveyor belt into the wrapping wheel, whereas cam 74 operates and controls a pair of paper clamp members or arms 171 and 172, Fig. 14, which holds the wrappers in proper position against the soap bars as they are fed by the pusher into the receiving pockets of the wrapping wheel.

More specifically, control cam 73 is provided with a cam slot 173, Fig. 7, which operates and controls the movements of a pivoted bell-crank lever 174. The upper end of this bell-crank lever is provided with a bracket 175 which threadedly receives a shaft 176 connected to and adapted to operate a slide 177 to which the pusher bar 170 is pivotally connected by a pivot connection 178, Fig. 7. The detailed construction of the slide 177 will be best understood from its perspective detail view, Fig. 9. The slide is horizontally reciprocable upon a stationary shaft 179, Figs. 7, 8, 11 and 12, carried by the frame of the machine, the slide being provided with openings 180 and 181 for bearing engagement with the shaft. The slide is also provided with a pair of bifurcations 182 and 183 adapted to loosely embrace a square shaft 184 for slidable movement therealong, the shaft 184 also being carried by the frame of the machine. Shafts 179 and 184 form a track structure for guiding the slide in its horizontal movements. Normally the slide moves as a unit with the shaft 176 and to this end a compression spring 185 normally holds the bracket 186, which is pivoted to the slide as indicated at 187 and through which the shaft 176 extends, in engagement with a collar 188 fixed to the shaft. However, in the event that the pusher 170 engages abnormal resistance, as for example in the jamming of articles in the machine, the spring 185 will yield permitting shaft 176 to move idly within the bore of the bracket 186.

To control the vertical movements of the pusher, control cam 75 is provided with a cam track which operates a lever 190 pivoted as indicated at 191, Fig. 7, a second lever 192 being associated with the lever 190 for movement therewith. Lever 192 is pivotally connected to a vertically reciprocable bar 193 which is guided in its vertical movements by a stationary guide bracket 194 secured to the frame of the machine. As best shown in Figs. 7, 8, 11 and 12, the vertically reciprocable bar 193 carries a U-shaped bracket 195 having a horizontally extending trough track in which a roller 196 carried by the pusher or feeding member 170 is adapted to reciprocate. It will be seen that by means of the mechanism described the vertical pivoting of the pusher 170 may be controlled by the movements of bar 193, while the pusher is simultaneously horizontally reciprocated by the slide 177. The slide 177 and the bar 193 are so timed in their movements that a substantially horizontal motion will be imparted to the pusher 170 as it moves to the right as seen in Figs. 7, 11 and 12 to eject the soap bar 163*a* which is at the feeding station from the conveyor into the wrapping wheel, the end of the pusher being returned in an upwardly directed generally elliptical path so as to clear the succeeding soap bar 163*b* which is being fed to the feeding station by the feeding conveyor belt as the pusher feeder is being retracted for its next succeeding feeding operation. As the succeeding bar reaches the feeding station, it is brought into engagement with and positioned by an adjustable stop member 197, Figs. 11 and 12.

The fast and slow movements of the conveyor belt 155 are also so timed with respect to the movements of the pusher 170 that the slow movement of the belt takes place as the soap bar at the feeding or loading station, such as bar 163*a*, is being ejected from the belt, the rapid belt movement taking place after the bar has been removed to bring the next succeeding bar, such as bar 163*b*, quickly into position at the feeding station and into engagement with the stop 197. This type of belt movement constitutes an important feature of the invention. The rapid belt movements facilitate high speed operation of the machine, the mechanism being adapted to wrap bars at speeds in excess of two hundred bars per minute. At the same time, during the time that the bar at the feeding station is being removed from the belt conveyor by the pusher

170, the belt is moving at a relatively slow speed thus minimizing the crushing effect of the succeeding bars against the bar being ejected. As has been previously stated, the bars are received by the machine in a wet and soft semi-plastic readily frangible condition, and if excessive pressures exist between the trailing edge of the bar being removed and the leading edge of the succeeding bar, the corners of these edges, as indicated at 163a' and 163b' in Fig. 11, may be easily damaged. Additionally, the acceleration and deceleration of the belt is gradual so that no jerks or shocks are transmitted to the articles and uncontrolled slipping is minimized, the rubber pressure rolls 158 and 159 aiding in maintaining the driving relation between the belt and the bars superimposed thereon.

As the soap bar is fed from the conveyor into the wrapping wheel it is pushed against cut outer and inner wrappers, the initial enclosing of the bars in the wrappers being accomplished as the bars are moved into the wrapping wheel pockets. Suitable inner and outer wrapper sheets 200 and 201 may be mounted in web-form upon rolls 202 and 203 respectively carried on the upper frame portion of the machine, Fig. 1, the webs being fed to the feeding station by feeding rolls 108 and severed into suitable wrapper lengths by cutter rolls 109 diagrammatically indicated on Fig. 1, as previously described. Mechanism may also be included for causing the end of the outer wrapper to extend beyond the inner wrapper end, Figs. 37 and 38, to facilitate the outer wrapper sealing, as will be later described. As best shown in Figs. 7 and 13, as the wrappers are fed to the feeding station they are aligned and held in position by a series of adjustable positioning devices. These devices comprise a pair of adjustable brackets 205 and 206 and a series of finger stops 207, 208 and 209 carried by a support bracket 210 adjustably carried on the frame of the machine and adjustable by a series of adjustment screws 211, as best shown in Figs. 6 and 15. In addition to these stationary guide brackets there are the two movable clamp members 171 and 172 controlled by the movement of the cam 74, as previously indicated. More specifically, control cam 74 carries a cam track adapted to operate a bell-crank lever 215, Figs. 6 and 7, the upper end of which is connected by means of a link, 216, adjustable as to length, to a slide bracket 217 shown in perspective detail in Fig. 10. This slide bracket is provided with alined openings 218 and 219 adapted to receive the bar 179 and with a bifurcated bracket portion 220 adapted to receive the square bar 184, the bars 179 and 184 guiding the slide 217 in its horizontal movements as in the case of the slide 177 previously described. The slide 217 carries the movable paper clamps by means of arms 221 and 222, Fig. 14, extending forwardly therefrom, the clamps themselves being provided with spring-pressed presser blocks 223 and 224 at their upper ends. As will be best understood by reference to Figs. 11 and 12, the slide 217 is so controlled by its control cam as to maintain the presser blocks in contact with the wrappers, holding them in clamping engagement with the soap bar, as the latter is moved into the pocket of the wrapping wheel, the presser blocks being caused to move with the bar as it is transferred, whereby to maintain the proper positioning of the wrappers with respect to the bar as it is received into the wrapping wheel pocket.

The initial folding of the wrappers around the bar as it is moved into the wrapping wheel is diagrammatically indicated in Figs. 37 and 38 of the drawings.

Conveyor or wrapping wheel and packaging mechanism

The conveyor or wrapping wheel 52 and its associated packaging or wrapper folding mechanism is best illustrated in Figs. 1 and 15 to 25 inclusive of the drawings. The wrapping wheel, Figs. 15, 21 and 22, moves counterclockwise as seen in Figs. 15 and 21. It is provided with a series of circumferentially disposed article or package receiving pockets 230, the trailing wall 231 of each pocket being fixed and the leading wall 232 of each pocket being in the form of a pivoted lever spring-urged by compression springs 233 into pocket-closing or bar-gripping position. Each lever 232 is pivoted as indicated at 234 and is provided with an extending arm 235 carrying a roller 236 at its end adapted to bear against the periphery of a fixed cam 237. Referring to Fig. 21, it will be seen that the contour of cam 237 is such as to permit springs 233 to move the levers 232 into pocket-closing positions as each pocket becomes alined with the feeding pusher 170 at the loading station to receive the soap bar and wrapper therefrom, the pocket remaining closed in bar-gripping position as the bar and wrapper are moved past the several wrapping devices until the pocket is moved a distance of approximately 180 degrees to a discharge position at the transfer wheel 54 whereupon the cam causes the pocket lever to be opened so that the wrapped bar may be readily withdrawn by the ejector rolls 53.

As has been previously explained, the wrapping wheel being driven from the speed variator devices 79, 82, it is moved at gradually accelerating and decelerating alternate fast and slow speeds. By this means the movements of the wheel pockets will be slowed down at predetermined points to facilitate the loading or unloading of the pockets and the operation of the various wrapping mechanisms upon the bars and wrappers carried thereby, and speeded up in their transit between such points to increase the speed of operation of the machine. At the same time the entire mechanism moves without jerks or shocks, the driving arrangement thus preserving the advantages of an intermittently operable wrapping wheel structure without the disadvantages thereof. More specifically, the wrapping wheel is operated at its slow point of travel when in the position illustrated in Figs 15 and 21, when the soap bars are being fed thereto by the pusher 170 and removed therefrom by the ejector rolls 53.

After the bars have been loaded into the wrapping wheel pockets, and as the pockets move counterclockwise from the loading or feeding station, the side edges 240 and 241 of the wrappers project radially outwardly from the bars as best indicated in Figs. 21 and 38. The wrapping wheel has a fixed guide 242, Fig. 21, associated therewith, the advance or left edge of which is provided with a folding lip 243 which is adapted to engage the leading wrapper edge 240 and fold the same into engagement with the body of the soap bar. However, immediately prior to the engagement of the leading wrapper edge against the folding lip 243, a tucking member 244, Figs. 21, 24 and 25, swings in a counterclockwise path at a more rapid rate of movement than the movement of the wrapping wheel, engaging the trailing wrapper edge 241 and tucking the same under the wrapper edge 240 as the latter is folded into position. The folding action will be best

understood by reference to Fig. 21, and also to the diagrammatic views, Figs. 39 and 40. The tucking member 244 is pivotally mounted upon one arm of a lever 245 which lever is in turn pivotally mounted on the frame of the machine as indicated at 246, Fig. 24. A spring 247, Fig. 40, yieldingly urges the tucking member into engagement with the surface of the soap bar during the wrapper tucking operation. The lever 245 is operated by a link 248, adjustable as to length, and pivotally connected to the lever arm 245a as indicated at 249, Figs. 22 and 24. The link 248 is in turn pivotally connected to and operated by the crank member 112, Figs. 21 and 26, driven from the main drive mechanism of the machine, as previously described. It will be seen that as the crank is rotated, lever 245 will be oscillated upon its axis 246 to reciprocate the tucking member 244 and effect the tucking action described. After the side edges of the wrapper have thus been folded into position, they are maintained in folded position continuously while the soap bars are in the wrapping wheel by the fixed guide 242.

As the partially wrapped soap bars reach a position displaced approximately 90 degrees from the feeding or loading station, a series of end folding members become operative upon the projecting end portions of the wrapper, performing the necessary folding operations upon the projecting wrapper ends and thus completing the folding of the wrappers. The sequence of the end folding operations will be best understood by reference to Figs. 41, 42, 43 and 44. It will be seen that upper and lower end folding members 255 and 256 are first simultaneously operable to effect the creasing and forming of the underlying end folds. Just as folders 255 and 256 start to withdraw, a rotary folder 257 becomes operative to form the trailing overlying fold, and substantially simultaneously as the package continues its movement in the wrapping wheel a stationary folding pin 258 becomes operative to partially fold the leading overlying end fold into position, the folding being completed and the completed end folds being held in folded position upon continued movement of the package by a side wall section 259 formed as a part of the guide structure 242, previously described. It is to be understood that similar end folding and holding devices are provided for operation upon the projecting wrapper ends at both ends of the package.

More specifically, referring to Figs. 15, 16 and 19, it wil be seen that the upper end folding member 255 is carried by a bracket 265 mounted on the upper end of a crank arm 266, the lower end of which is pivotally connected as indicated at 267 to a crank disc 268 carried at one end of a shaft 269. The other end of the shaft carries a gear 270 which is adpated to be driven by the gear 100 which is operated at constant speed by the main drive mechanism of the machine, as previously described. Crank arm 266 carries a roller 271 adapted to slide within a substantially vertical guide track 272 formed in guide block 273 mounted upon the frame of the machine. It will be seen that as the crank disc 268 is rotated clockwise, as seen in Fig. 15, roller 271 will be vertically reciprocated within the guide track of the guide block 273, thus imparting a generally elliptical motion to the folding member 255. The major axis of this elliptical path of travel is vertical, and the horizontal component of the movement allows the folding member to move with the package as it is transported by the wrapping wheel. In other words, as the folding member 255 is moved downwardly, as seen in Fig. 15, into engagement with the wrapper end to effect the folding operation, it simultaneously moves to the right while in contact with the package to accommodate the movement of the folding member to the translation of the package in the pocket of the wrapping wheel. The wrapping wheel is preferably arranged to be moving at its slow rate of travel during the engagement of the folding member, thus allowing sufficient time for its operation and without requiring a rapid horizontal component of movement. Referring more particularly to Fig. 41, it will be noted that the folding member 255 is provided with two fingers 275 and 276, the former constituting the folding member for the upper underlying end fold and the latter being a guide for the trailing edge of the wrapper.

The folding member 280 which performs the functions of folding member 255 upon the other end of the package wrapper is similarly shaped and partakes of similar movements. To this end it is carried at the upper end of a crank arm 281, the lower end of which is pivotally connected as indicated at 282 to the gear 270, the construction being best understood by reference to the detail view of this mechanism as shown in Fig. 18. Crank arm 281 is also provided with a roller 283, Figs. 16 and 18, slidable within the substantially vertical guide track of a guide bracket 284, so that as the gear 270 is rotated clockwise as seen in Fig. 18, an elliptical movement is imparted to the folding member 280 in a manner and for a purpose as previously described with reference to folding member 255.

The lower end folding member and its manner of operation will be best understood by reference to Figs. 16, 19, 21 and 23. It will be seen that this folding member, generally indicated by the numeral 290 in Fig. 23, not only carries the folding plate 256, previously described, but is also provided with a second folding plate 291 for cooperation upon the opposite end of the package, the folding plates 256 and 291 being carried by support arms 292 and 293 respectively. The lower end of folding member 290 is pivotally connected as indicated at 294 to the gear 100, and the arm 293 of the member is provided with a roller 295 operable within a generally vertical guide track formed in a guide block 296 as best shown in Figs. 16 and 21. It will be seen that as the gear 100 is rotated counterclockwise, as seen in Fig. 21, a generally elliptical path of movement will be imparted to the folding members or plates 256 and 291, and more specifically as the folding members are raised into engagement with the projecting wrapper ends to effect the folding operation, the folding plates will be simultaneously moved to the right, as seen in Fig. 21, while in contact with the wrapper whereby to accommodate for the movements of the package with the wrapping wheel as previously described in connection with the action of the upper end folding members 255 and 280. As also previously described, the upper and lower end folding members may be substantially simultaneously operable at the slow point of movement of the wrapping wheel. It is to be noted that the folding plates 256 and 291 are provided with directly operable folding fingers 297 and 298 as well as with guide fingers 299 and 300 respectively engageable with the trailing wrapper edge portions.

The rotary end folding members and their as-

sociated driving devices are best shown in Figs. 19 and 20, parts of the driving devices or mechanisms also being shown in Figs. 15, 16 and 21. There are two rotary end folders 305 and 306, one for either end of the package. The front folder 305 adjustably carries the folding member 257 as well as a duplicate folding member 307, and the rear rotary folder 306 also similarly adjustably carries two duplicate folding members 308 and 309. Folders 305 and 306 are mounted on shafts 310 and 311 respectively which shafts carry spiral gears 312 and 313 at their lower ends. These gears are operated from a pair of spiral gears 314 and 315 mounted on a shaft 316, the inner end of which carries a crank 317 operated by the block 104, previously described. The block and crank driving arrangement 104, 317 is similar to the block and crank 79, 82 incorporated in the main drive mechanism of the machine and previously described, so that while the block 104 is rotated at constant speed by its driving mechanism the crank 317 will impart a gradually accelerating and decelerating variable speed motion to shaft 316 and the associated rotary folders 305 and 306 driven thereby.

By means of the variable speed drive mechanism, the speeds of the rotary folders 305 and 306 may be controlled so as to effect maximum high speed operation of the machine while still affording sufficient time for the folders to perform their folding functions. More specifically, the speeds may be controlled so as to rotate the folders 305 and 306 at high speed to bring their folding members or devices rapidly into juxtaposition to the wrapper, the folders thereafter being slowed down as the folding devices engage the wrapper so as to properly correlate the speed of movement of the parts and effect the wrapper folding operation. It is to be understood that folder 305 rotates clockwise and folder 306 counterclockwise, as seen in Fig. 20 at alternately high and low speeds to bring the folding devices 257, 307, 308 and 309 successively into engagement with the packages. The folders 257 and 308 operate, for example, on one package, whereas the folders 307 and 309 operate upon the succeeding package. The rotary folders preferably contact the package to effect their folding operation just as the upper and lower end folders 255, 280, 256 and 291 have reached the innermost limits of their travel and are starting to withdraw, the several folder devices being shaped and positioned so that no interference results.

As the overlying end folds on the trailing side of the package are folded into engagement with the package ends by the rotary folders, as just described, continued movement of the package in the wrapping wheel brings the leading overlying end folds into engagement with stationary folding pins to fold such latter folds inwardly and complete the end folding operations. More specifically, the folding pin 258, previously described, is carried at the forward end of the side wall 259 of the guide structure 242 by means of a support bracket 320, as will be best understood by reference to Figs. 15 and 17. Similarly, the oppositely disposed side wall 321 of the guide structure carries a pin 322 operable upon the opposite end of the package, Fig. 20. It is to be understood that, due to the bodily movement of the package with the wrapping wheel, the rotary folders, while engaging and folding the trailing overlying end folds, do not progress rapidly enough to contact the leading overlying end folds so that the latter may be properly folded into position by the stationary folding pins, as described. The relative timing and speeds of movement between the rotary folders and wrapping wheel, including their independent acceleration and deceleration control, insure such operation. The folding of the leading fold is completed and the folds then retained by the side walls 259 and 321, the action being best understood by reference to Figs. 42, 43 and 44.

Ejector rolls and transfer wheel

The ejector rolls and transfer wheel, with their associated guide structures, form a package transmission mechanism for removing the wrapped soap bars from the wrapping wheel and depositing them onto the processing conveyor structure. The actions of the ejector rolls and transfer wheel will be best understood by reference to Figs. 15, 21, 26, 28, 29, 30 and 32.

Referring to Fig. 29, it will be seen that the ejector rolls 53, of which one is provided for operation upon each end of the package, are cam-shaped and faced with rubber sleeves, as indicated by the numerals 325. The ejector rolls are mounted upon shafts 326 and 327 respectively, these shafts being provided with beveled gears 328 and 329 at their upper ends adapted to be driven from the gears 120 and 121 secured to the driving shaft 119, as previously described.

As best shown in Figs. 15 and 29, the side walls 259 and 321 of the guide structure 242 are cut away so as to permit the wrapped bars to be contacted by the ejector rolls and removed from the wrapping wheel. Additional stationary guide plates 330 and 331, one for each end of the package, are adapted to contact the package ends and maintain the wrapper folds in position immediately as the package ends are released from contact with the surfaces of the ejector rolls. The side plates 330 and 331 for retaining the ends of the package have associated therewith a pair of lower guide plates 332 and 333, Figs. 21 and 29, which are adapted to engage the bottoms of the bars as they are moved by the ejector rolls and guide the bars into proper engagement with the transfer wheel.

The transfer wheel, generally indicated by the numeral 54, and driven by shaft 141, Fig. 32, as previously described, rotates at uniform speed in a clockwise direction as seen in Figs. 15, 21 and 28. More specifically, the transfer wheel comprises a pair of side sections 335 and 336 formed integral with a hub structure 337, Figs. 28 and 32, each side section being in the form of a series of radially extending spokes, there being four spokes on each side section in alinement in the particular embodiment illustrated. Each pair of spokes carries a package support platform 340 shown in perspective detail in Fig. 30, pivotally mounted on the spokes by means of shafts 341. Each support platform is provided with a projecting pin 342 engageable in a cam track 343 formed in a stationary control cam 344 carried by the frame of the machine so that as the transfer wheel is rotated each support platform is caused to independently pivot on its supporting spokes in a predetermined controlled manner.

In the operation of the ejector roll and transfer wheel transmission mechanism, the high cam surfaces of the ejector rolls come into position to grip the wrapped bars just as the bars are brought into alinement with the rolls by the movement of the wrapping wheel. The gripping action takes place at the slow point in the movement of the

wrapping wheel and just as the pivoted lever **232** for the particular conveyor pocket is moved to release position. Rotation of the ejector rolls causes the wrapped bars to be moved to the right, as seen in Figs. 15, 21, 28 and 29, the forward bottom edge of the bar being guided by the guide plates **232** and **233** and the end folds being retained in position by the guide plates **330** and **331**. It is important to note that the rubber sleeves **325** on the ejector rolls provide a slightly yieldable surface of contact against the bars whereby to permit the bars to freely follow their guided path of travel while still being positively gripped at all times by the rolls. The bar is deposited onto the support platform of the transfer wheel just as the platform is moved into bar-receiving position by the control cam, as illustrated at **340***a* in Fig. 28, the bar thereupon being transported by the platform onto the main support track **345** of the processing conveyor. During the time that the bars are being carried by the support platforms, the end folds are retained in position by a pair of extensions **346** and **347** associated with the guides **348** and **349**, Figs. 1 and 29, provided on either side of the support track of the processing conveyor. As the wheel platform deposits the bar upon the conveyor support track it is pivoted counterclockwise by the control cam so as to clear the conveyor track and the bar deposited thereon upon continued movement of the transfer wheel.

Processing and removal conveyors

The processing conveyor, generally indicated by the numeral **55**, is best illustrated in Figs. 1, 28, 29 and 31 to 36 inclusive of the drawings. The conveyor comprises a series of feed links **350**, one of which is shown in perspective detail in Fig. 31, the links being pivotally connected together by means of auxiliary connector links as indicated at **351** into the form of an endless flexible chain engageable over the driving sprocket **138** associated with the infeed end of the conveyor and the driven sprocket **145** associated with the discharge end. Each feed link comprises a pair of depending bar engaging arms **352** and **353**, Fig. 31, and a tail member **354** engageable with a slot in the following feed link, Fig. 35, and operable to maintain both the link to which it is secured and the link with which it engages in alined and proper position. Additionally, elongated supporting bars **355**, **356** and **357**, Figs. 28 and 35, are provided engageable with the opposite sides of the pivot pins **351** to positively maintain the links in position when they are on the lower reach of the conveyor in bar feeding position. The guide bars are formed as a part of the conveyor frame structure **358** which frame structure also supports the sprockets **138** and **145**. As will be best understood by reference to Fig. 28, the movement of the links **350** is so timed with respect to the movement of the support platforms of the transfer wheel as to cause the links to successively and individually engage the bars as they are deposited on the support track **345**, feeding them to the right as seen in Figs. 1 and 28.

In the particular embodiment of the invention illustrated the outer wrapper **201** of the soap bars is of the wax paper type and the processing conveyor is utilized for sealing the folded wrapper about the bar. To this end the side guides and support track of the processing conveyor along the infeed end are formed as a plurality of heating elements or shoes **360**, Figs. 1, 28 and 35, whereas the corresponding parts of the discharge end of the conveyor are formed as a series of cooling elements or shoes **361**, Figs. 1 and 36. The heating shoes **360** may be electric heating elements, the current being supplied thereto by wires **362**. The cooling shoes preferably have water circulated therethrough by means of flexible conduits **363**, the conduits being associated with a reservoir **364**, Fig. 5, and the pump **144** serving as the water circulating means. Preferably the reservoir **364** has an electrical heating element **365** associated therewith by means of which the water may be kept at the proper warm temperature. It is to be understood that as the wrapped bars are passed along the processing conveyor, the folded waxed wrapper is sealed about the bars, the wax first being rendered plastic for sealing by the heating elements and thereafter cooled to the proper degree by the warm water cooling elements. The heating and cooling elements are resiliently urged against the ends and bottom of the wrapped bars as indicated by springs **367**, whereby to be brought into firm contact with the bottoms and ends of the packages which contain overlying wrapper portions to be sealed. It is further to be noted that the bars are individually conveyed or propelled on the processing conveyor, so that even though the conveyor be of relatively long length to afford the necessary processing functions, there is no cumulative crushing effect upon the bars.

As will be seen by reference to Figs. 35 and 36, the heating and cooling elements on the exterior side of the conveyor may be withdrawn to permit ready access to the bars within the conveyor should such be necessary. To this end these elements are carried by a series of pivoted levers **370** pivoted to the frame of the machine as indicated at **371** and adapted to be releasably latched in raised position, as shown in Fig. 35, by spring-pressed auxiliary latching levers **372** provided with latch projections **372***a*. The downward pivotal movement of the levers **370**, when released, is limited by the tail portions of the levers, **370***a*, as shown in Fig. 36.

The removal conveyor may be of any suitable structure to transport the wrapped bars to a suitable point of delivery. As illustrated, the removal conveyor comprises an endless belt **375** driven from the processing conveyor sprocket **145** by suitable gearing, as previously described.

Summary of operation

The machine is provided with a main electrical control panel **380** carrying suitable controls for the main driving motor **60**, the auxiliary driving motor **124** and the electric heating elements of the machine. Assuming that the main driving motor **60** is in operation, the machine is started by manipulation of the clutch control lever **68** which initiates operation of the several drive mechanisms of the machine.

The feeding conveyor **50**, being placed in operation, feeds the soap bars to the feeding or loading station of the machine, the conveyor being driven at alternate fast and slow speeds for the purposes described. At the feeding station the pusher **170** of the feeding mechanism pushes the soap bars through the cut wrappers which are suitably fed to the feeding station by the guide and cutter rolls **108** and **109**, the wrappers with the bar partially enclosed therein, as shown in Fig. 38, being deposited within the pocket **230** of the wrapping wheel which is in receiving position and which is simultaneously closed into gripping relationship with the bar. As the bar

is moved from the feeding conveyor into the wrapping wheel, the movable wrapper guides 171 and 172 insure the maintained positioning of the wrapper with respect to the bar.

As the wrapping or conveyor wheel is operated at alternate fast and slow speeds, as previously described, the bars and associated wrappers are carried past the packaging or wrapping devices comprising the side folding devices 243—244, the upper end folding devices 255 and 280, the lower end folders 256, 291, the rotary end folders 257, 307, 308, 309, and the pin and guide end folders 258, 322, 259, 321 whereby to effect the several wrapper folding operations. As the wrapped bars reach a discharge position opposite the ejector rolls 53, the pockets of the wrapping wheel are opened, the bars are gripped by the ejector rolls and passed into the transfer wheel 54 which in turn deposits them on the infeed end of the processing conveyor.

In the processing conveyor the wax paper wrapper is sealed first by contact with the heating elements and thereafter by contact with the cooling elements of the processing conveyor structure. As previously described, the processing conveyor and the transmission mechanism therefor comprising the ejector rolls 53 and the transfer wheel 54 may be independently driven while the other elements of the machine are stationary, by means of the auxiliary driving motor 124. By this means the bars may be removed from the processing conveyor after the machine proper is stopped.

From the processing conveyor the wrapped bars are transmitted to the removal conveyor and delivered to a suitable point of delivery.

Claims to the conveyor mechanism 53, and associated parts, are presented in a divisional application.

It is obvious that numerous changes may be made in the specific structural embodiments set forth without departing from the spirit of the invention. Accordingly the invention is not to be limited to the structural embodiments set forth and described, but only as indicated by the following claims.

The invention is hereby claimed as follows:

1. A packaging machine comprising a package conveyor having alined pockets for conveying packages from a receiving station to a discharge station, packaging mechanism associated with the conveyor and engageable with the packages while the same are being transported between said stations, means for driving the conveyor continuously at alternately increasing and decreasing speeds, and control means for controlling the driven means to drive the conveyor at its slow rate of travel when the pockets thereof are alined with the receiving and discharge stations.

2. A wrapping machine comprising a conveyor wheel having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a stationary folder member against which wrapper portions are adapted to engage, and a cyclically operable movable folder member in an arcuate path around the pivotal axis of the conveyor wheel movable at a faster rate of travel than the associated conveyor pocket and cooperable with the stationary folder member to effect a wrapper folding operation.

3. A wrapping machine comprising a conveyor wheel having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a folder member movable along the arcuate path of travel of the conveyor pockets and also movable transversely to the path of travel of the conveyor pockets to effect a folding operation.

4. A wrapping machine as defined in claim 3 wherein said folder member is operably engageable with the wrappers during the slow point of movement of the conveyor.

5. A wrapping machine comprising means for holding an article and associated wrapper at a folding station, a wrapper folder engageable with the wrapper for folding it at said folding station, said folder being movable in a circular path around a fixed axis of rotation, and means for driving the folder continuously at alternating increasing and decreasing speeds.

6. A wrapping machine comprising a continuously movable conveyor having a series of alined pockets for carrying articles and associated wrappers past a wrapping station, wrapping mechanism including a folder member adapted to contact the wrappers at the wrapping station, said folder being movable in a circular path around a fixed axis of rotation, and means for driving the folder continuously at alternating increasing and decreasing speeds.

7. A wrapping machine comprising a conveyor having a series of alined pockets for holding articles and associated wrappers, means for driving the conveyor continuously at alternating increasing and decreasing speeds whereby to move the articles and wrappers past a wrapping station, wrapping mechanism including a wrapping member engageable with the wrappers at the wrapping station, and means for driving the wrapping member continuously at alternating increasing and decreasing speeds, said conveyor and wrapping member driving means being independently adjustable whereby to independently control the fast and slow points of travel of the conveyor and wrapping member.

8. A wrapping machine comprising a movable conveyor having a series of pockets for carrying articles and associated wrappers past a wrapping station, and wrapping mechanism for folding the wrappers at said station, said wrapping mechanism including a folding arm, one end of which is adapted to engage the wrappers, a driving member movable in a substantially circular path to which the other end of the arm is connected, and a guide having a cam track in which a portion of the arm is reciprocable along an axis substantially perpendicular to the path of travel of the conveying pocket at the wrapping station whereby to impart a substantially circular motion to the wrapper engaging end of the arm.

9. A wrapping machine as defined in claim 8 wherein said wrapper engaging arm is adapted to provide end folds in the wrapper and wherein the wrapper engaging end thereof is provided with a pair of spaced fingers one of which directly contacts the wrapper to produce an underlying end fold therein and the other of which engages

the trailing edge of the wrapper to guide said trailing edge.

10. A wrapping machine comprising a conveyor having a series of alined pockets for carrying articles and associated wrappers past a wrapping station, wrapping mechanism at said station engageable with the wrappers for folding the same, said wrapping mechanism including a pair of oppositely disposed folder members, means for moving said folder members substantially simultaneously toward the mid-point of the article for engagement with the wrapper to produce underlying end folds therein, a third folder member, means for moving said third folder member along a path of travel at right angles to the paths of travel of said pair of folder members for engagement with the trailing end edge of the wrapper to produce a fold therein overlying said first mentioned folds, and independent driving means for said pair of folder members and for said third folder member.

11. A wrapping machine comprising a movable conveyor having a series of alined pockets for carrying articles and associated wrappers past a wrapping station, wrapping mechanism at said station engageable with the wrappers for folding the same, said wrapping mechanism including a pair of oppositely disposed folder members, means for moving said folder members substantially simultaneously toward the mid-point of the article for engagement with the wrapper to produce underlying end folds therein, a third folder member, means for moving said third folder member along a rotary path of travel at right angles to the paths of travel of said pair of folder members for engagement with the trailing end edge of the wrapper to produce a fold therein overlying said first mentioned folds, and independent driving means for said pair of folder members and for said third folder member.

12. A wrapping machine comprising a continuously movable conveyor having a series of alined pockets for carrying articles and associated wrappers past a wrapping station, wrapping mechanism at said station engageable with the wrappers for folding the same, said wrapping mechanism including a pair of oppositely disposed folder members, means for moving said folder members substantially simultaneously toward the mid-point of the article for engagement with the wrapper to produce underlying end folds therein, a third folder member, means for moving said third folder member along a rotary path of travel at right angles to the paths of travel of said pair of folder members for engagement with the trailing end edge of the wrapper to produce a fold therein overlying said first mentioned folds, a fourth stationary folder member for engaging the leading end edge of the wrapper upon movement of the conveyor whereby to produce a second overlying wrapper end fold therein, and independent driving means for said pair of folder members and for said third folder member.

13. A packaging machine comprising packaging mechanism, a processing conveyor for receiving packages from the packaging mechanism, transfer mechanism for transferring the packages from the packaging mechanism to the conveyor, package treatment devices associated with the conveyor to which the packages are subjected by movement of the conveyor, driving means for driving the packaging mechanism, the transfer mechanism and the processing conveyor in synchronized relation, and a second driving means independently operable for driving the transfer mechanism and the processing conveyor when the packaging mechanism is not in operation.

14. A wrapping machine comprising wax paper wrapping mechanism, a processing conveyor for receiving wrapped packages from the wrapping mechanism, transfer mechanism for transferring wrapped packages from the wrapping mechanism to the conveyor, wax paper treatment devices including heating and cooling means associated with the conveyor to which the packages are subjected by movement of the conveyor, means for driving the wrapping mechanism, transfer mechanism and conveyor in synchronized relation, and independent means for operating the transfer mechanism and the conveyor while the wrapping mechanism is not in operation.

15. A wrapping machine comprising wax paper wrapping mechanism, a processing conveyor for receiving wrapped packages from the wrapping mechanism, transfer mechanism for transferring wrapped packages from the wrapping mechanism to the conveyor, wax paper treatment devices including heating and cooling means associated with the conveyor to which the packages are subjected by movement of the conveyor, said conveyor including independent driving means for each wrapped package.

16. A wrapping machine as defined in claim 8, wherein means is provided for continuously operating the conveyor.

17. A wrapping machine comprising a movable conveyor having a series of pockets for carrying articles and associated wrappers past a wrapping station, and wrapping mechanism for folding the wrappers at said station, said wrapping mechanism including a folding arm, one end of which is adapted to engage the wrappers, a driving member movable in a substantially circular path to which the other end of the arm is connected, and guiding means for guiding an intermediate portion of the arm along a reciprocable path of travel whereby to impart a substantially circular motion to the wrapper engaging end of the arm.

18. A wrapping machine as defined in claim 17, wherein means is provided for continuously moving the conveyor.

19. A wrapping machine as defined in claim 10, wherein means is provided for continuously moving the conveyor.

20. A wrapping machine as defined in claim 11, wherein means is provided for continuously moving the conveyor.

21. A packaging machine as defined in claim 13, wherein said package treatment devices comprise heat transfer means engageable with the packages on the conveyor.

22. A wrapping machine comprising a conveyor wheel having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a folder member mounted upon an axis substantially coincident with the axis of rotation of the conveyor wheel, said folder member having a portion in juxtaposition to the periphery of the wheel engageable with the wrappers, and means for reciprocating said folder member so that said wrapper engaging portion thereof is projected at a speed greater than the peripheral speed of the wheel to effect a wrapping operation upon said wrappers.

23. A wrapping machine comprising a conveyor wheel having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a first folder member having a wrapper engaging portion juxtaposed to the periphery of the wheel, means for reciprocating said folder member to move said wrapper engaging portion along an arcuate path of travel substantially coaxial with the axis of rotation of the wheel, a second folder member, and means for moving said second folder member to impart thereto an increment of movement along the path of travel of the wheel periphery and an increment of movement transversely of the path of travel of the wheel periphery.

24. A wrapping machine comprising a conveyor having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a pair of folder members against which wrapper portions are adapted to engage to effect end folding operations thereon, independent driving means for said folder members whereby the operation thereof may be adjusted relative to each other and in accordance with the increasing and decreasing speeds of travel of the conveyor, means for imparting to one of said folder members an increment of movement along the path of travel of the conveyor, and means for imparting to the other folder member an increment of movement transversely to the path of travel of the conveyor.

25. A wrapping machine comprising a conveyor having a series of alined pockets for conveying articles and associated wrappers along a predetermined path of travel, means for propelling the conveyor continuously at alternately increasing and decreasing speeds of travel, and wrapper folding mechanism engageable with the wrappers while retained in said pockets, said mechanism comprising a pair of folder members against which wrapper portions are adapted to engage to effect end folding operations thereon, independent driving means for said folder members whereby the operation thereof may be adjusted relative to each other and in accordance with the increasing and decreasing speeds of travel of the conveyor, means for imparting to one of said folder members an increment of movement along the path of travel of the conveyor, and means for imparting to the other folder member an orbital movement including an increment along the path of travel of the conveyor and an increment transversely to the path of travel of the conveyor.

26. A wrapping machine comprising wax paper wrapping mechanism, a processing conveyor for receiving wrapped packages from the wrapping mechanism, transfer mechanism for transferring wrapped packages from the wrapping mechanism to the conveyor, and wax paper treatment devices including heating and cooling means associated with the conveyor to which the packages are subjected by movement of the conveyor, said heating and cooling means comprising shoes disposed along and engageable with at least three sides of the wrapped packages, levers for supporting the shoes disposed along one side of the packages, and latch means for controlling the movement of the levers from an operative position juxtaposed to the conveyor to an inoperative position removed therefrom.

27. A wrapping machine comprising a first conveyor for conveying a series of articles to be wrapped, drive means operable at alternately increasing and decreasing speeds for continuously operating said conveyor, wrapper feeding mechanism for feeding wrappers for the articles, a second conveyor for receiving the articles from the first conveyor and the wrappers from the wrapper feeding mechanism, wrapping mechanism associated with the second conveyor and operable upon the articles and wrappers while being conveyed thereby, said second conveyor also being driven by said drive means whereby both said conveyors are operated at alternating increasing and decreasing speeds in direct proportional relationship, feeding mechanism for feeding the articles from the first conveyor to the second conveyor, and means for operating said feeding mechanism to effect its feeding operation during the slow increments of travel of both said conveyor structures.

28. A wrapping machine comprising a first conveyor for conveying a series of articles to a feeding station to be wrapped, drive means operable at alternately increasing and decreasing speeds for continuously operating said conveyor, means for feeding wrappers to said feeding station, a second conveyor for receiving the articles and associated wrappers at the feeding station, said second conveyor also being driven by said drive means whereby both said conveyors are operated at alternating increasing and decreasing speeds in direct proportional relationship, wrapper folding mechanism associated with the second conveyor and operable upon the articles and wrappers while being conveyed thereby, feeding mechanism at the feeding station for feeding the articles from the first conveyor to the second conveyor, and means for operating the feeding mechanism at the slow points of travel of the conveyors, said feeding mechanism comprising means for feeding the articles from the first conveyor into engagement with the wrappers and onto the second conveyor, the wrappers being partially wrapped about the articles as an incident to the feeding operation.

29. In a packaging machine, an elongated endless band conveyor having an elongated flat surface upon which articles are adapted to be conveyed to a feeding station in contacting alined relation, drive means for continuously operating said conveyor at alternating increasing and decreasing speeds, feeding mechanism at the feeding station having a member movable transversely of the conveyor for removing the articles from the conveyor, means for operating said member during the slow point of movement of the conveyor, and means for feeding a wrapper into position to be engaged by the article as it is removed from the conveyor by said member.

30. A wrapping machine comprising a conveyor for conveying a series of articles to be wrapped to a feeding station along a given path of travel, wrapper feeding mechanism for conveying wrappers in sequence to said feeding station along a given path of travel, wrapping mechanism including a conveyor device having a series of pockets for receiving articles and associated wrappers at the feeding station, means for driving the conveyor device continuously at alter-

nately increasing and decreasing rates of travel, feeding mechanism for feeding the articles into engagement with the wrappers and into the pockets, a wrapper holder movable with the feeding mechanism for engaging the wrappers and clamping them between the holder and the articles as the articles are moved into the pockets of the conveyor device, and means for independently propelling said wrapper member for movement independent of the feeding mechanism.

31. A wrapping machine as defined in claim 30, wherein the wrapper holder is provided with a resiliently mounted wrapper contacting member.

32. A wrapping machine as defined in claim 30, wherein means is provided for opening and closing the pockets of the conveyor device as the articles are received in the pockets and discharged therefrom.

33. A wrapping machine comprising a first

conveyor for conveying a series of articles to be wrapped, a second conveyor for receiving the articles from the first conveyor, drive means for continuously operating both said conveyors at alternating increasing and decreasing speeds, said drive means comprising a substantially constant speed rotatable driving member adapted to be connected to a source of power supply, a driven member, crank means connecting said driving and driven members whereby substantially simple harmonic motion is imparted to the driven member upon the constant speed rotation of the driving member, and positive driving toothed connections between said driven member and both said conveyors whereby the varying speeds of said conveyors are maintained in direct proportional relationship during the operation of the machine.

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