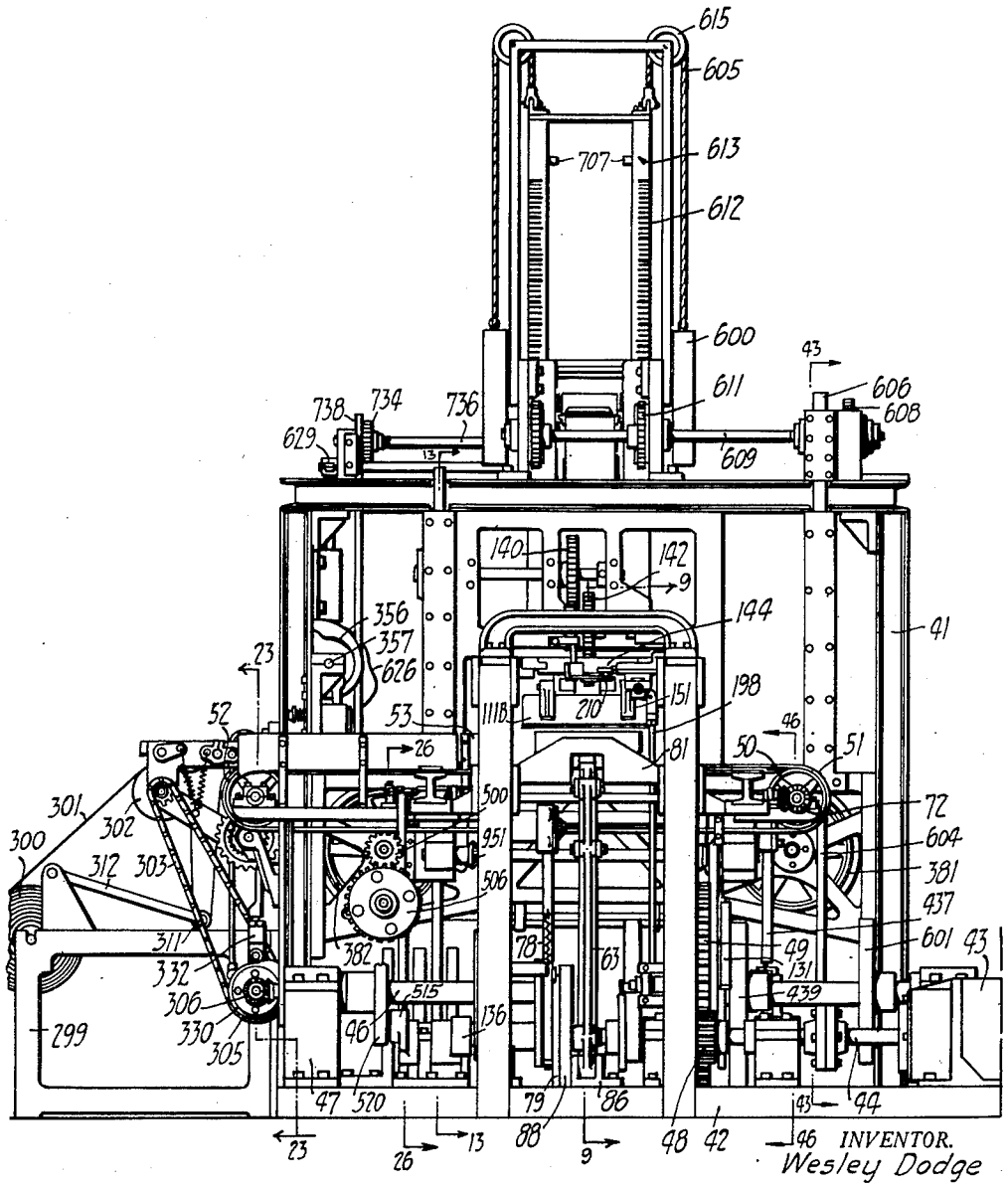
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LETTUCE PACKING MACHINE

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Fig. 1

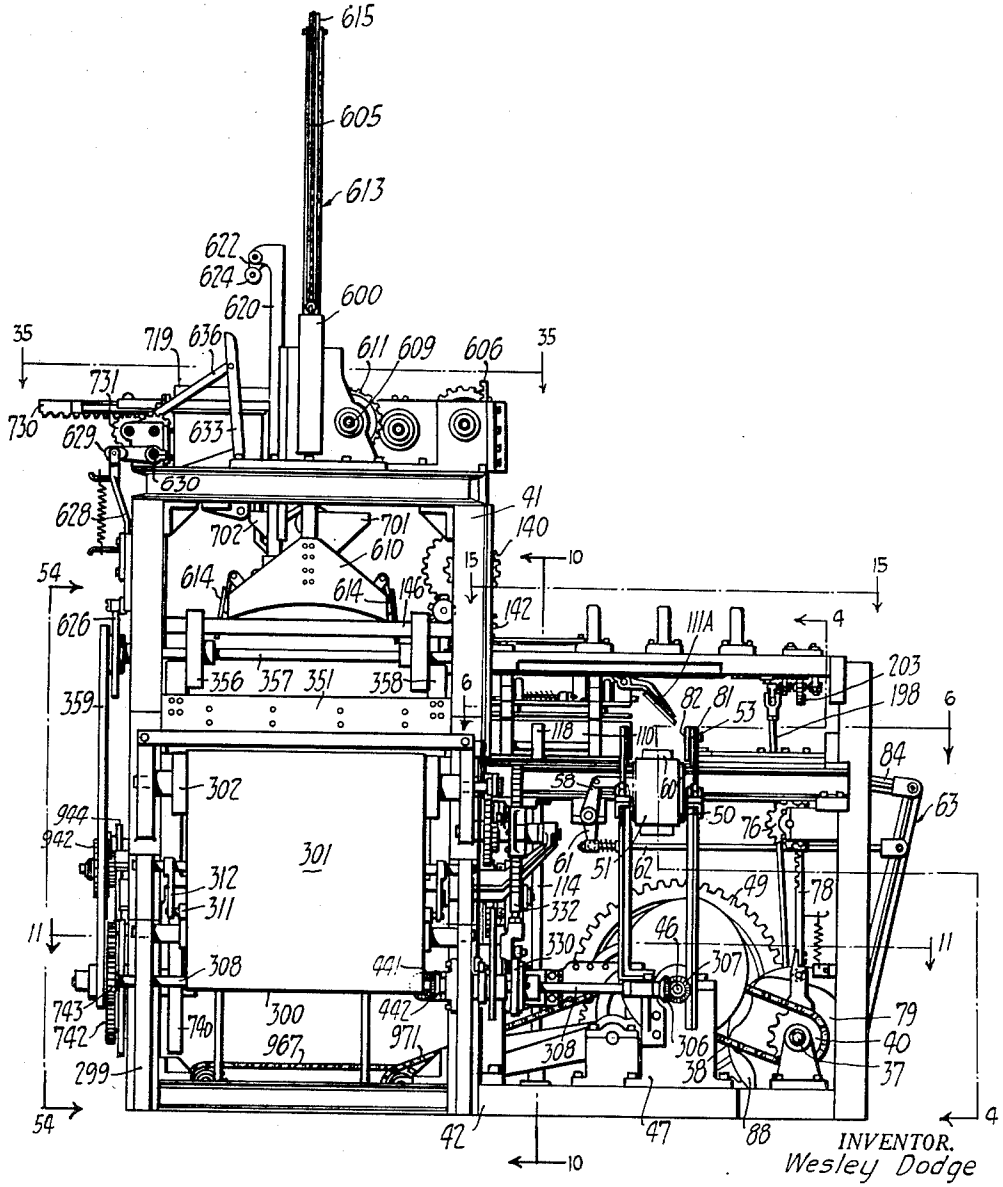


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Fig-2-



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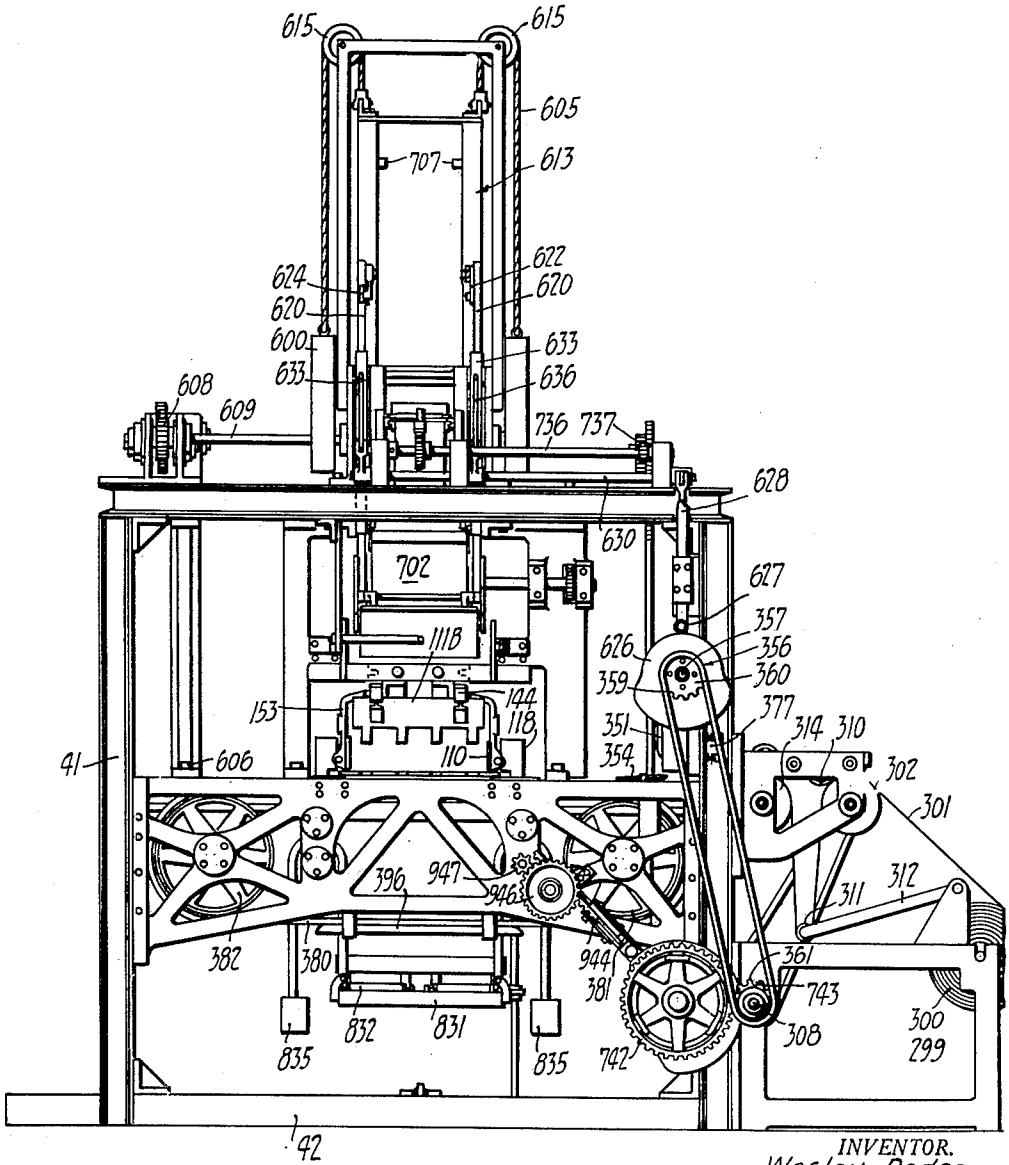
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Fig. 3



INVENTOR.
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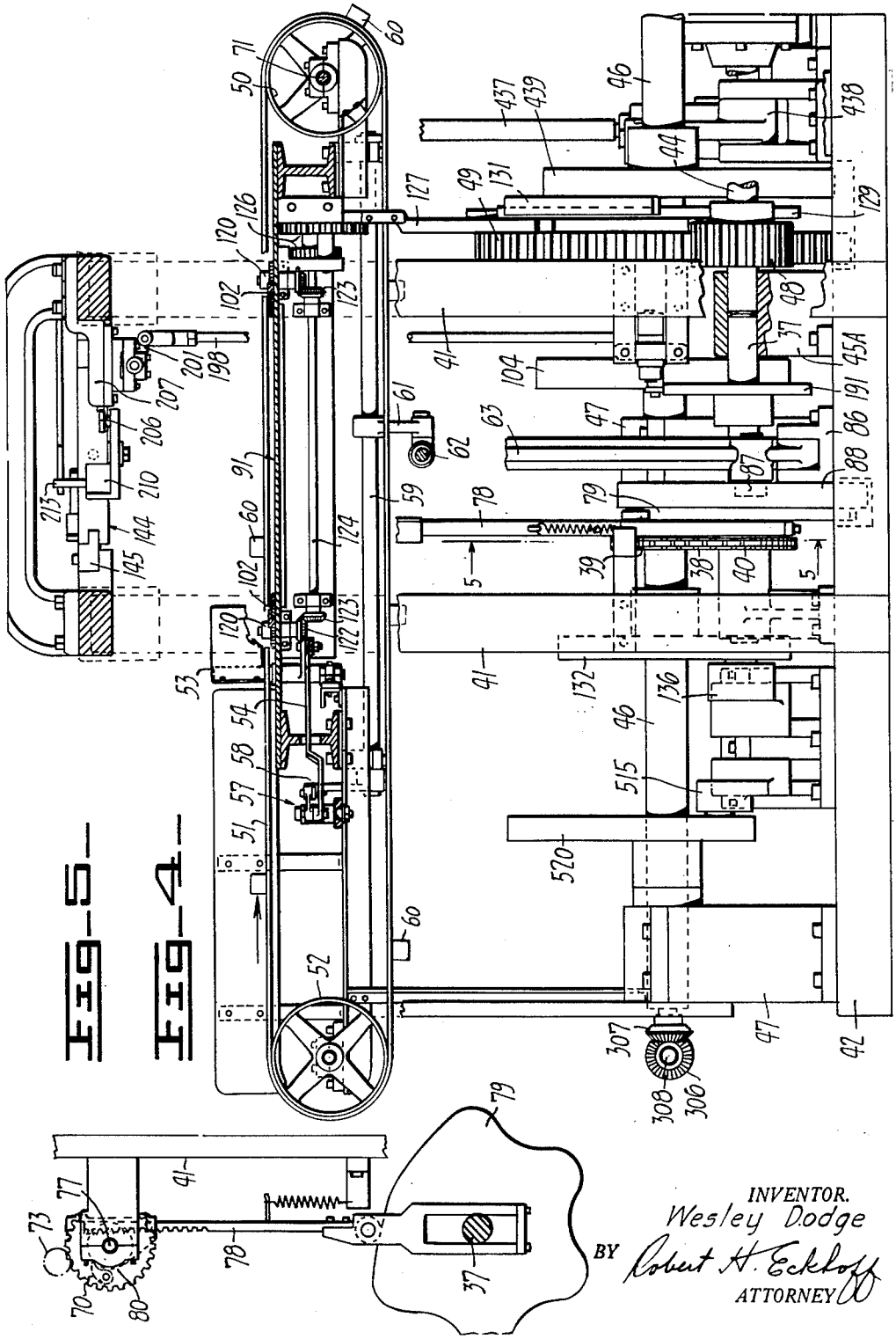


Fig. 5

Fig. 4

INVENTOR.
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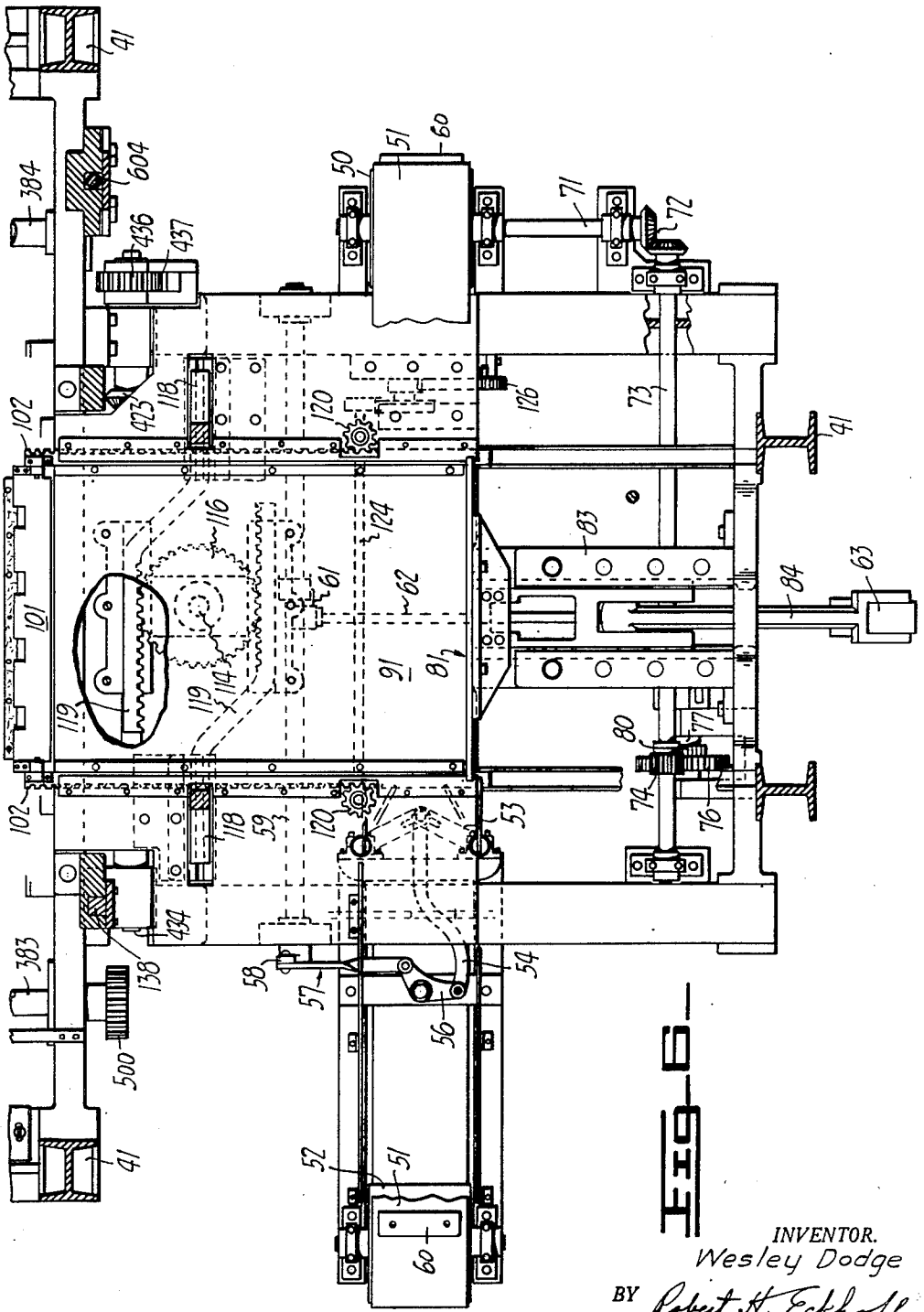


Fig. 6

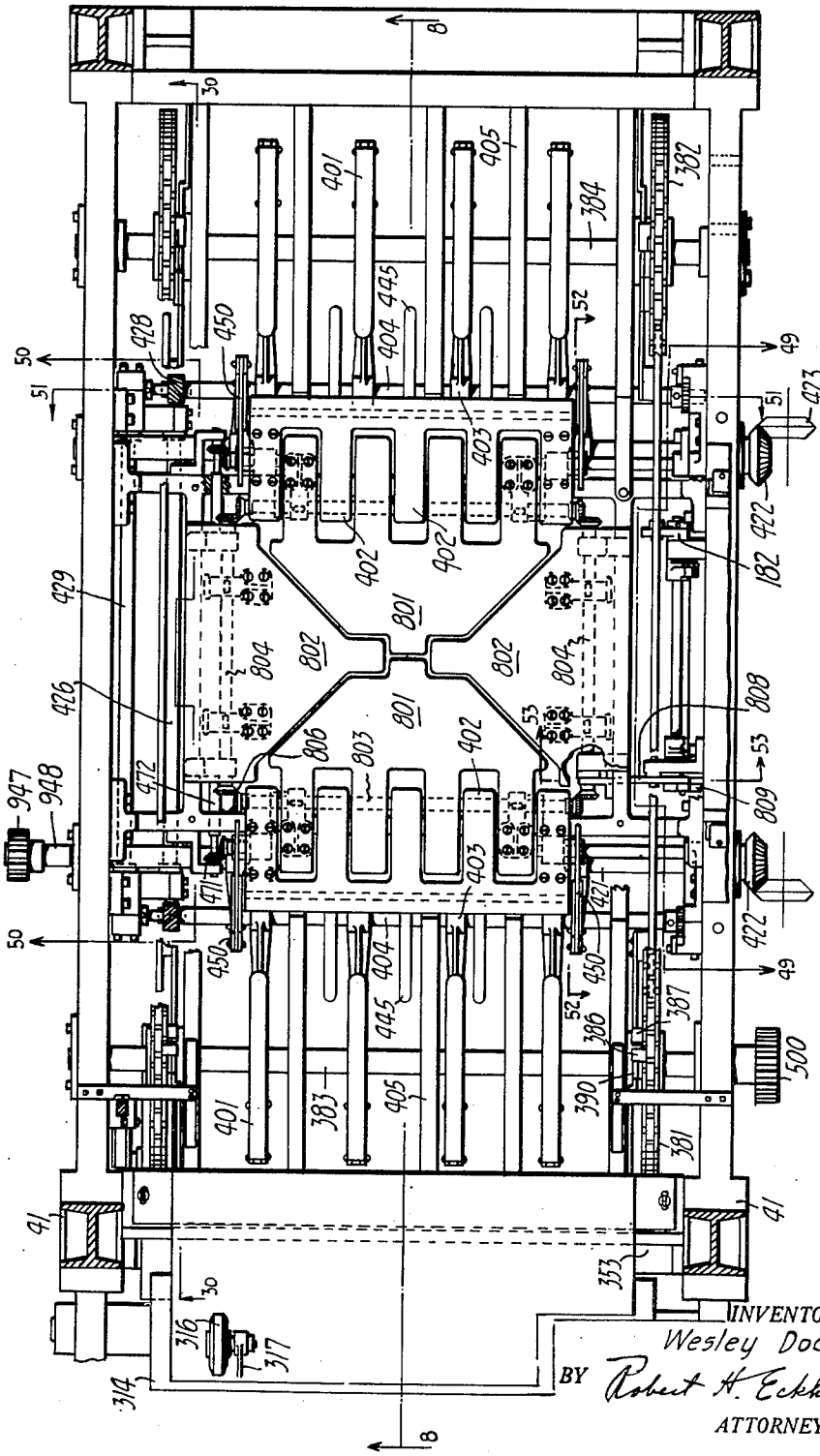
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Fig-7-



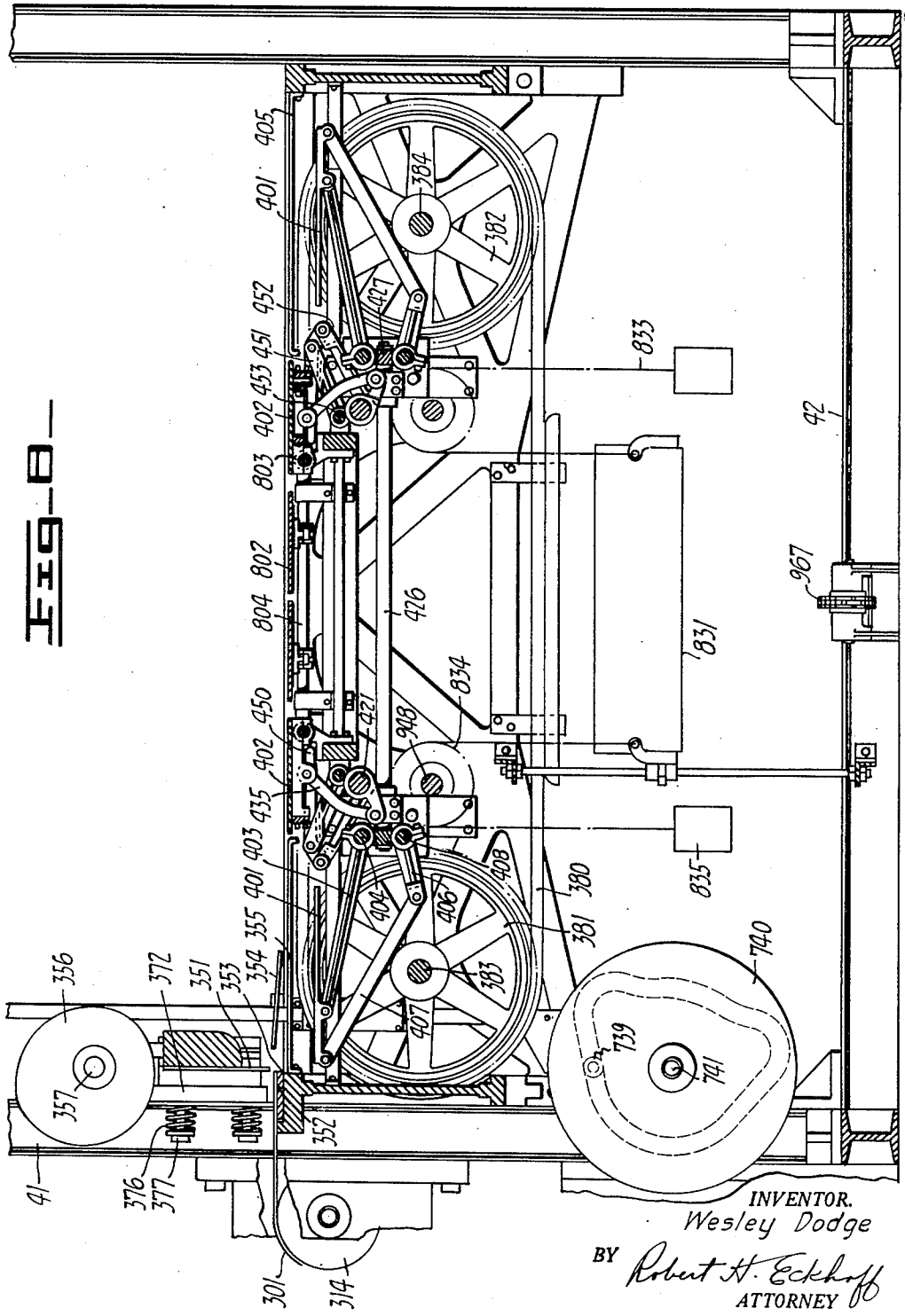
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Wesley Dodge
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Fig. 8



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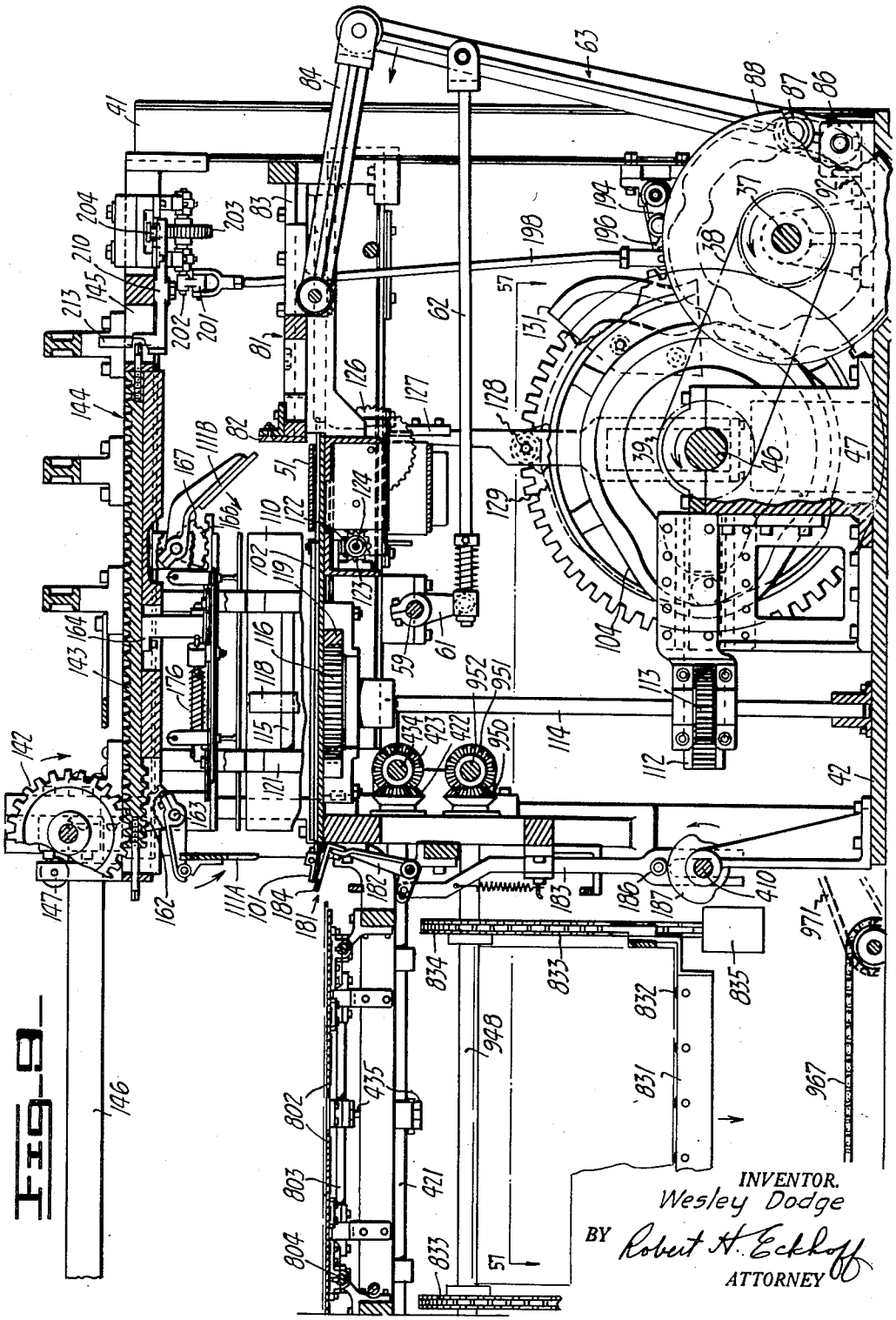


Fig. 8.

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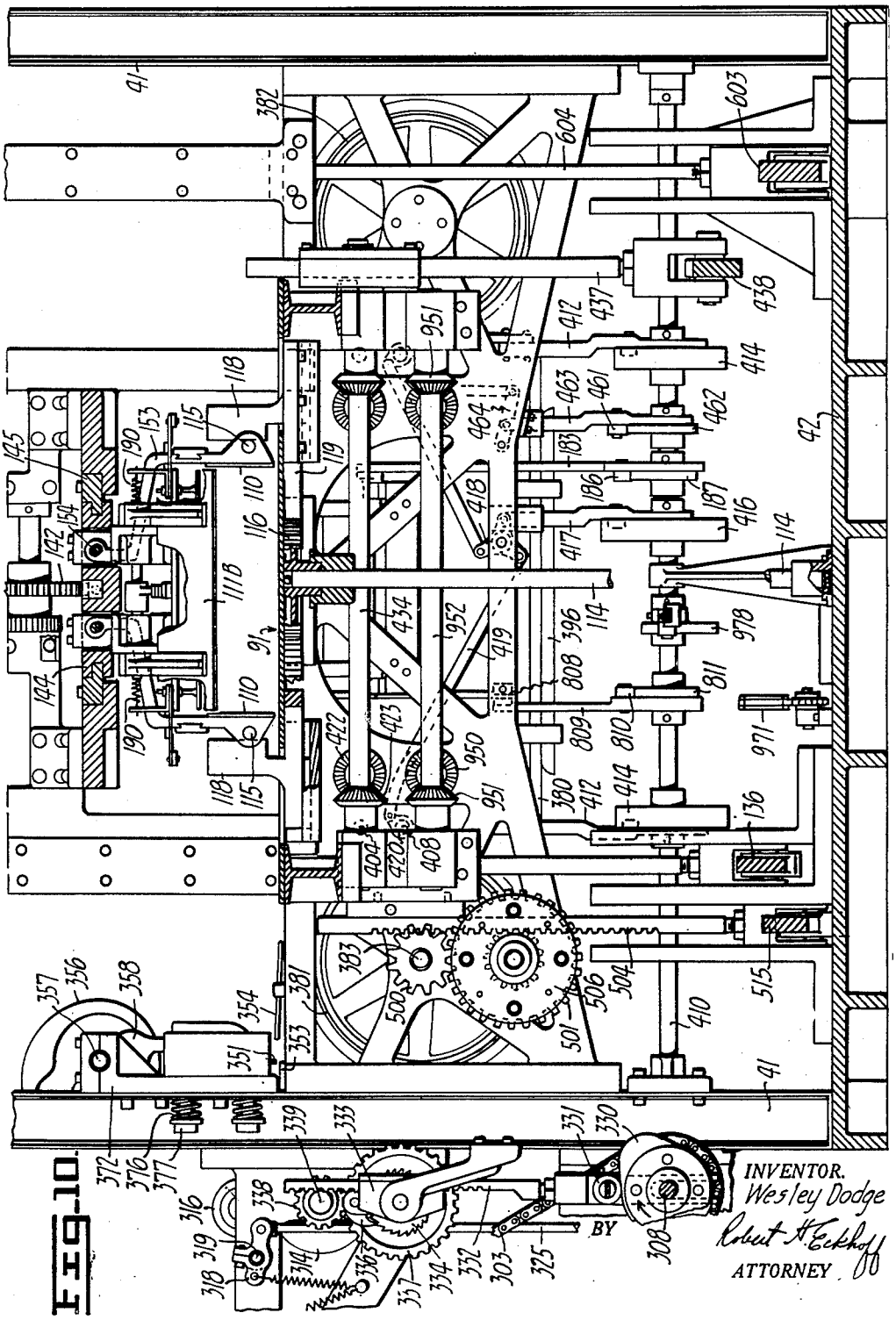


Fig. 10.

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Fig. 11.

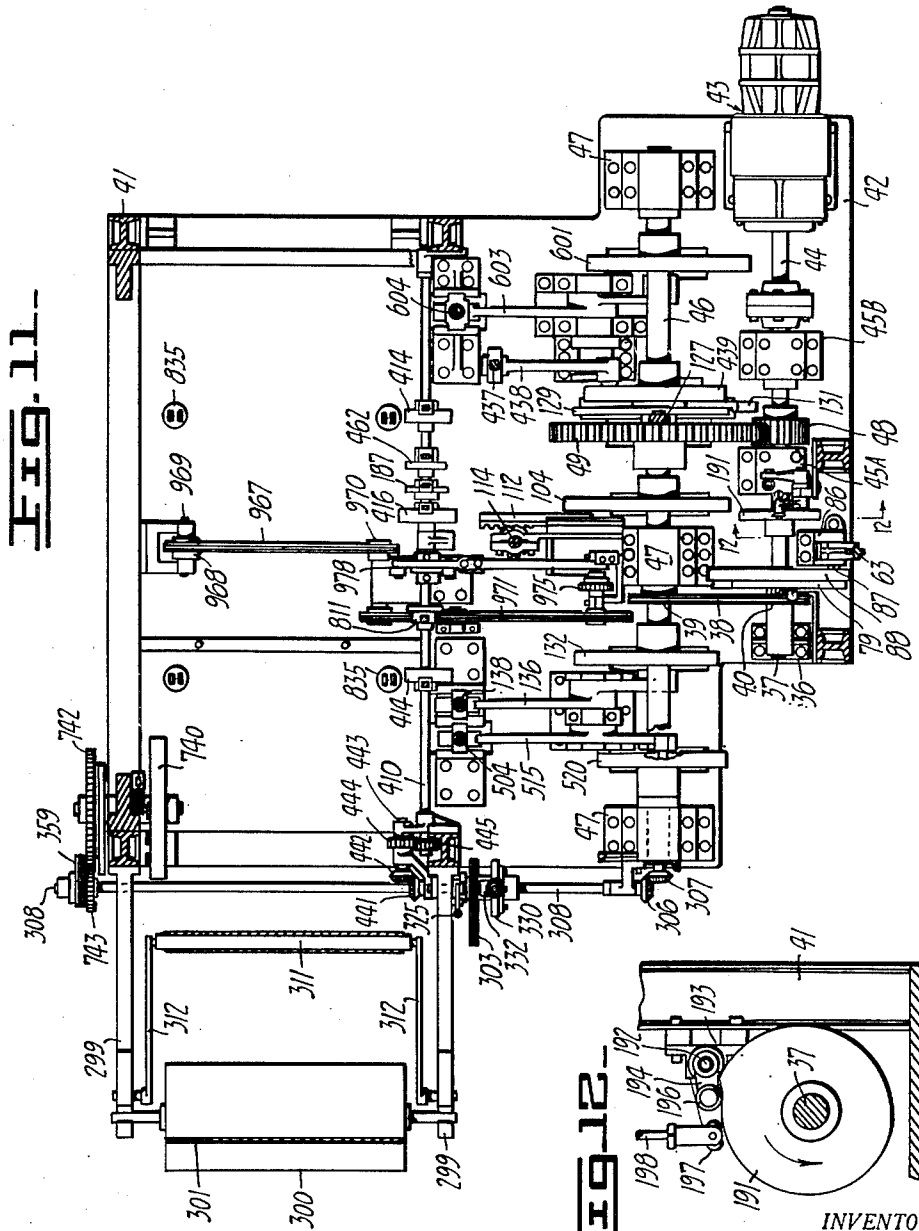


Fig. 12.

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Fig. 14

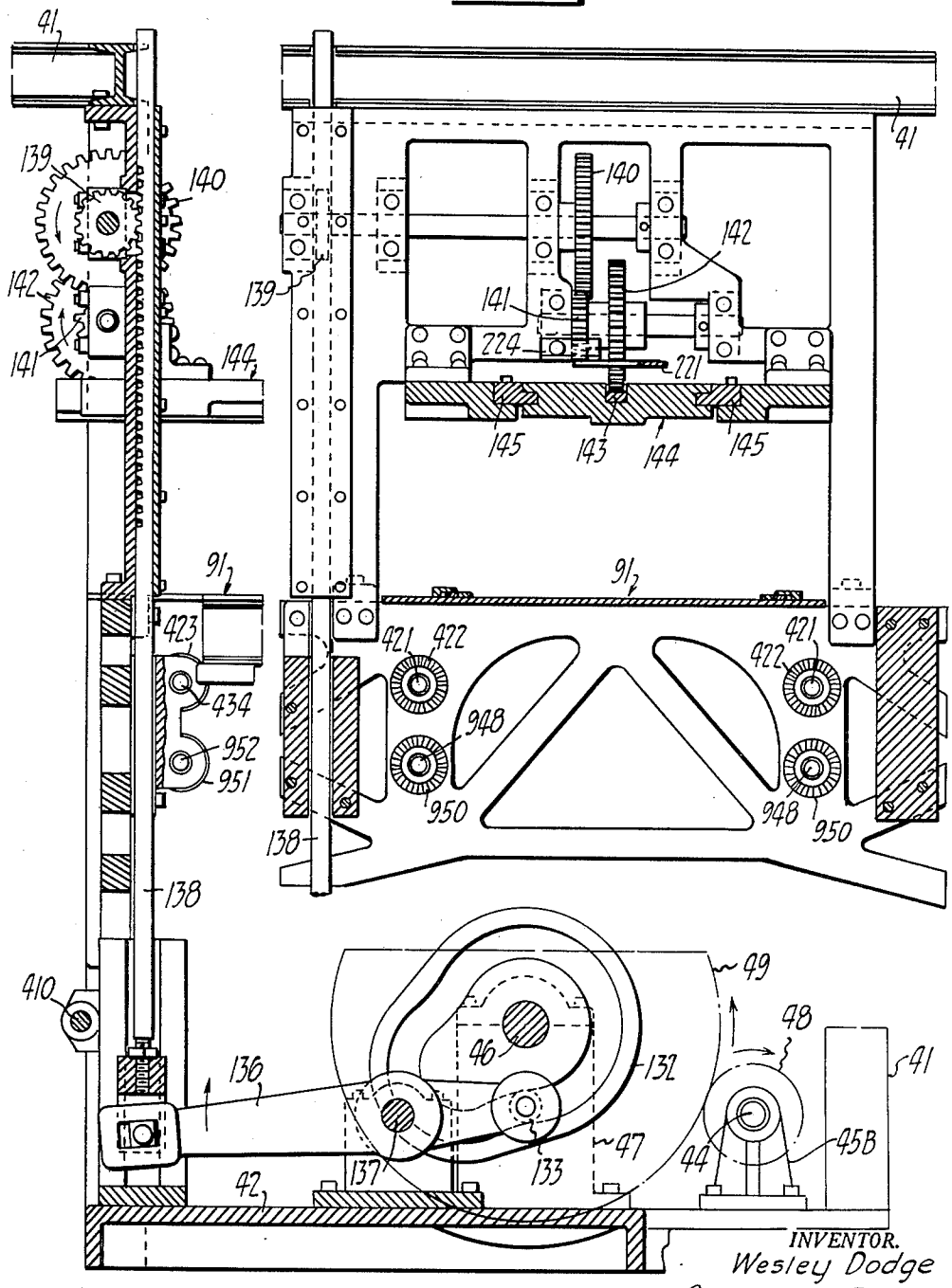


Fig. 13

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Fig. 15.

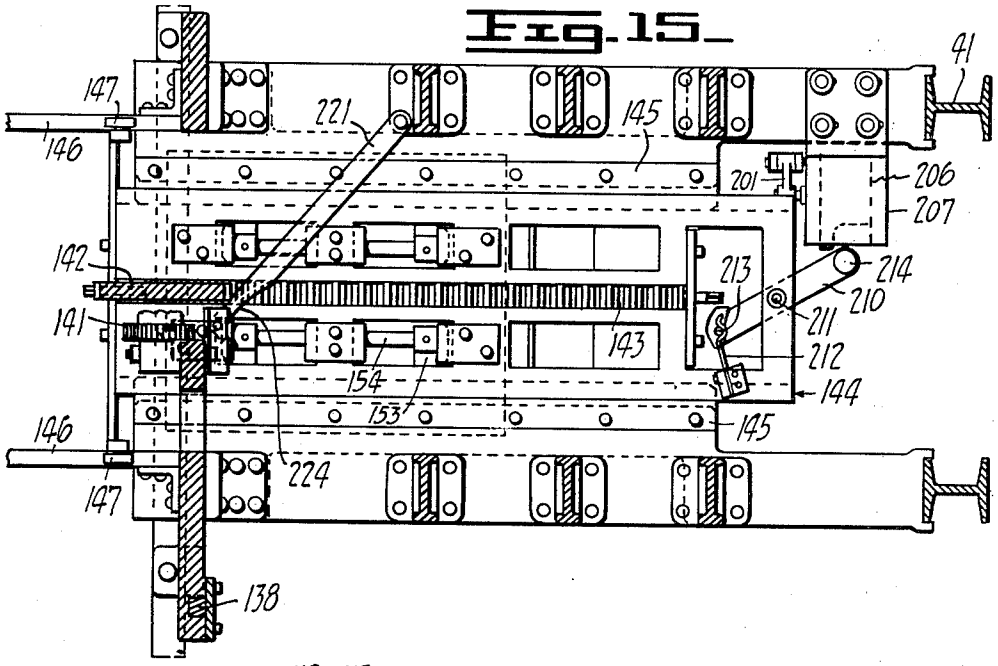


Fig. 16.

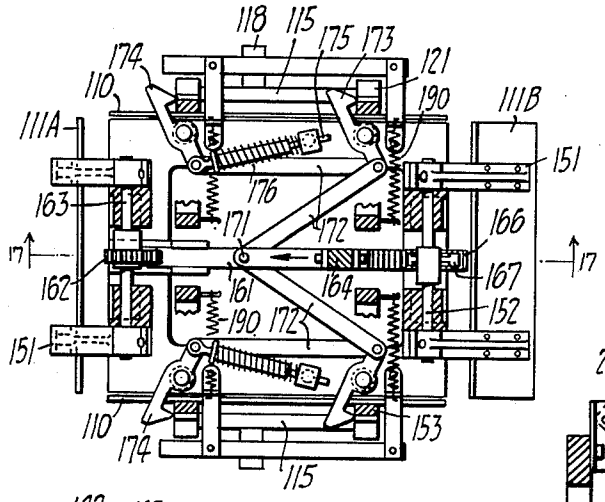


Fig. 18.

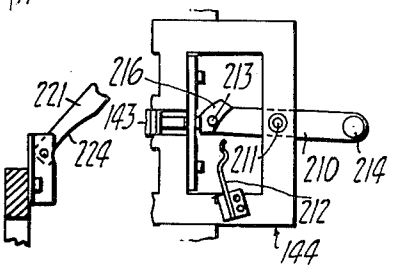
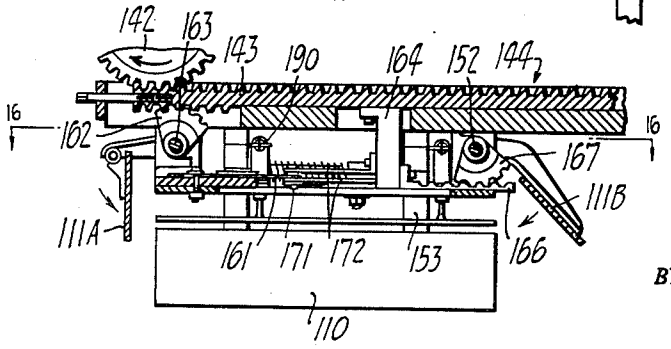


Fig. 17.



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Fig. 20.

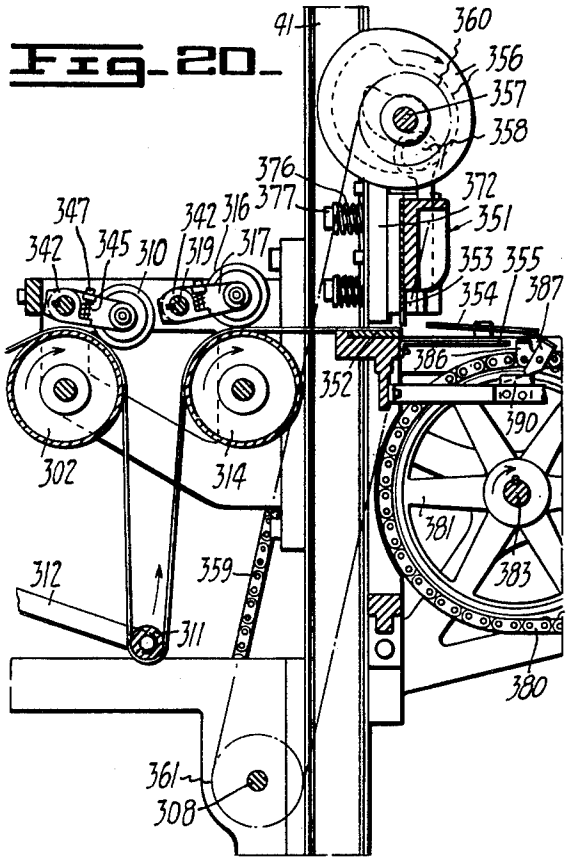


Fig. 19.

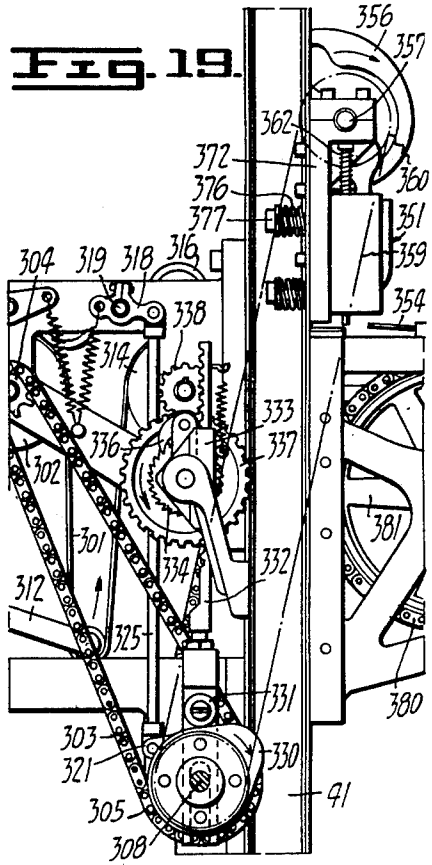


Fig. 22.

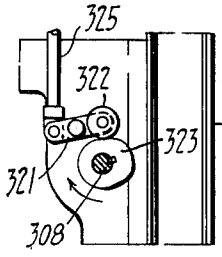
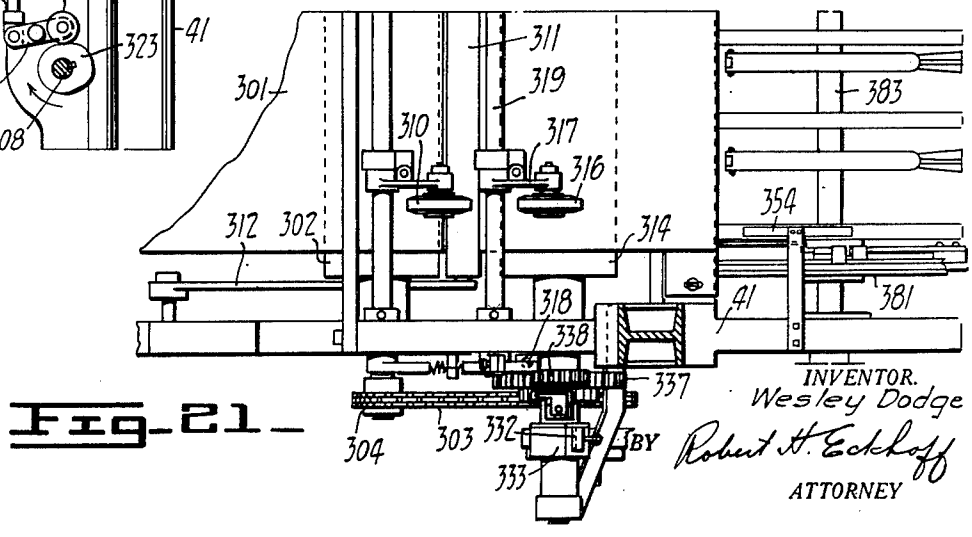


Fig. 21.



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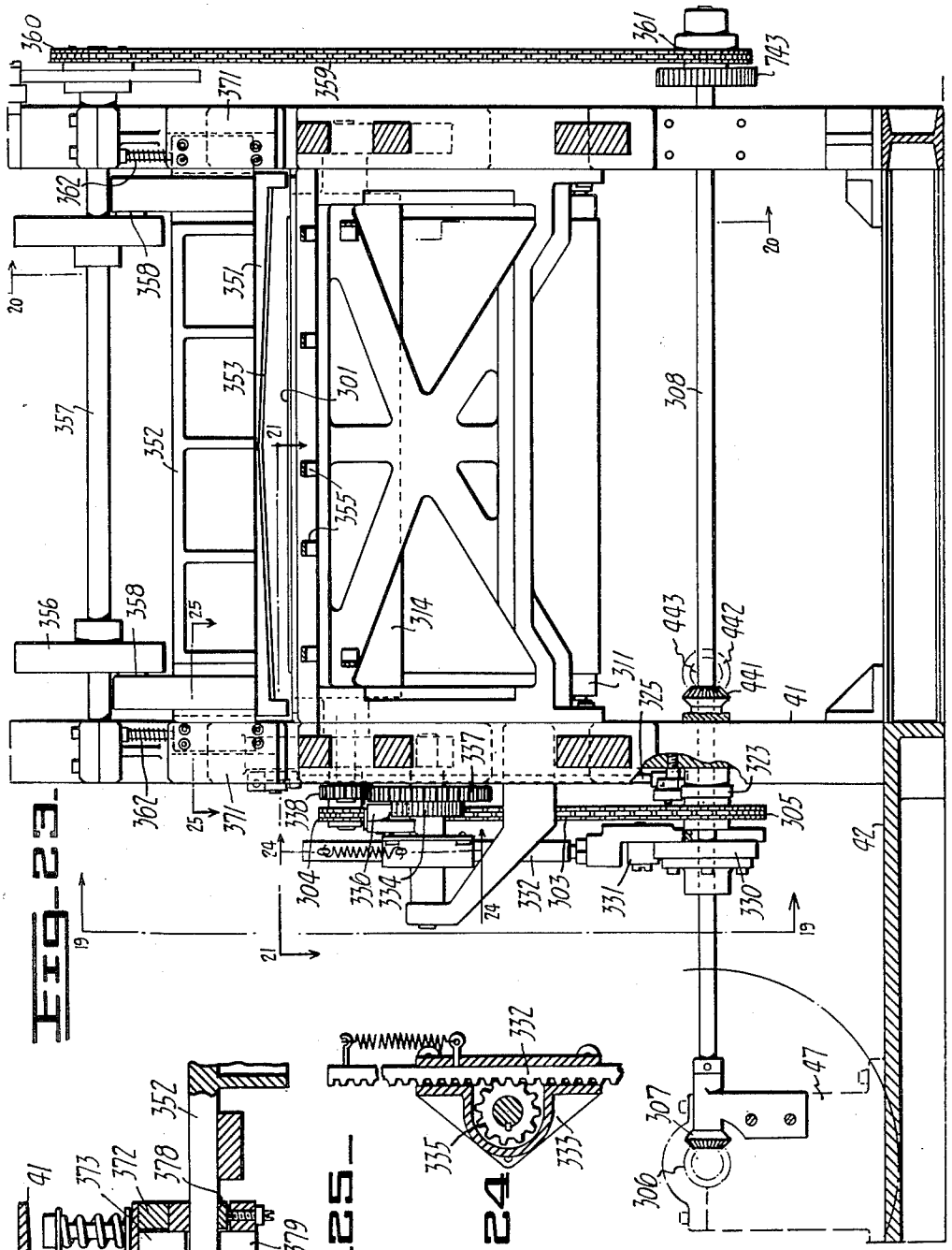


Fig. 23.

Fig. 25.

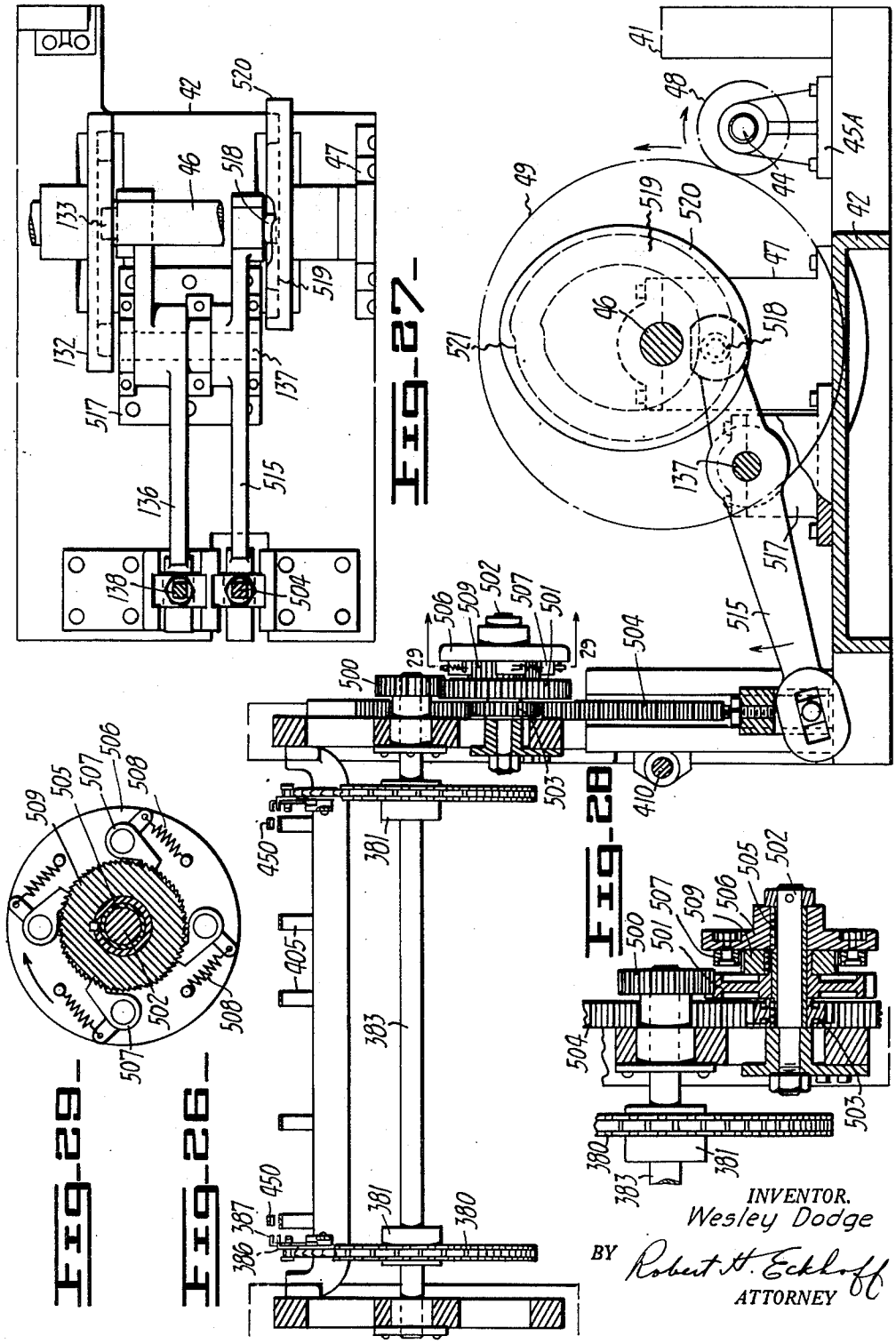
Fig. 24.

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Fig-30.

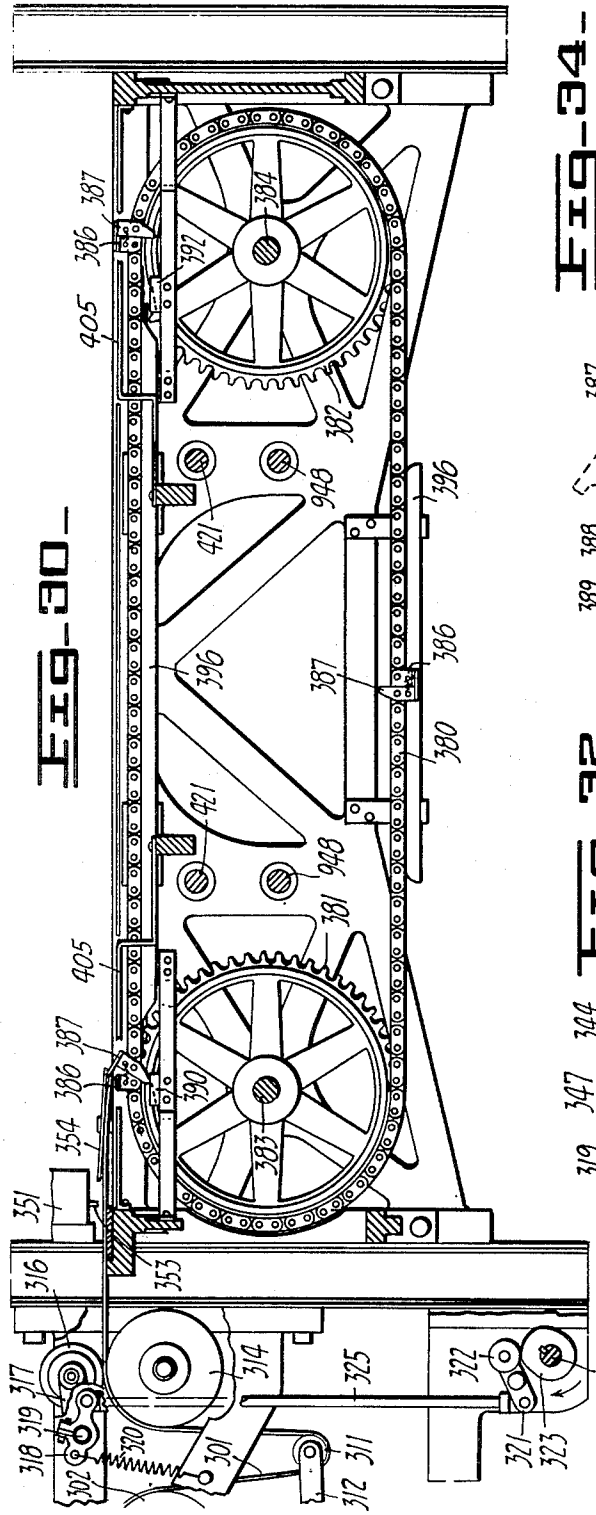


Fig-34.

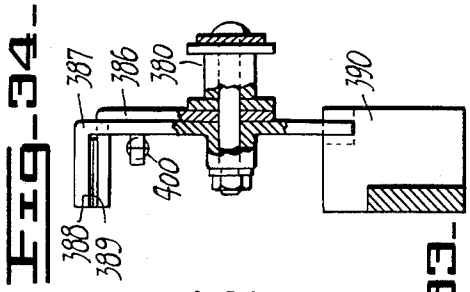


Fig-33.

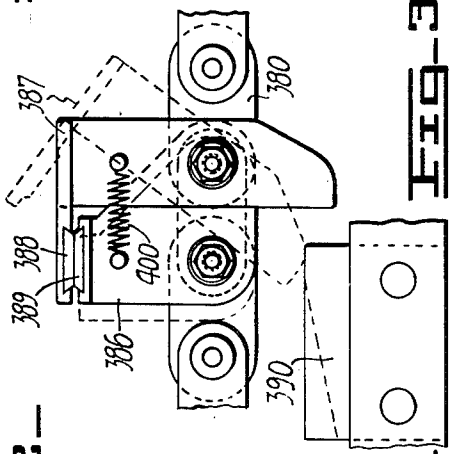


Fig-32.

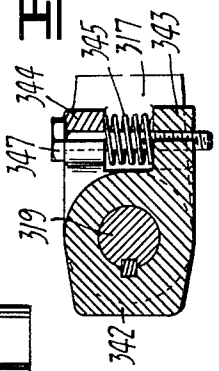
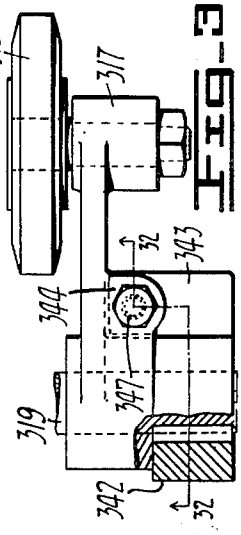


Fig-31.



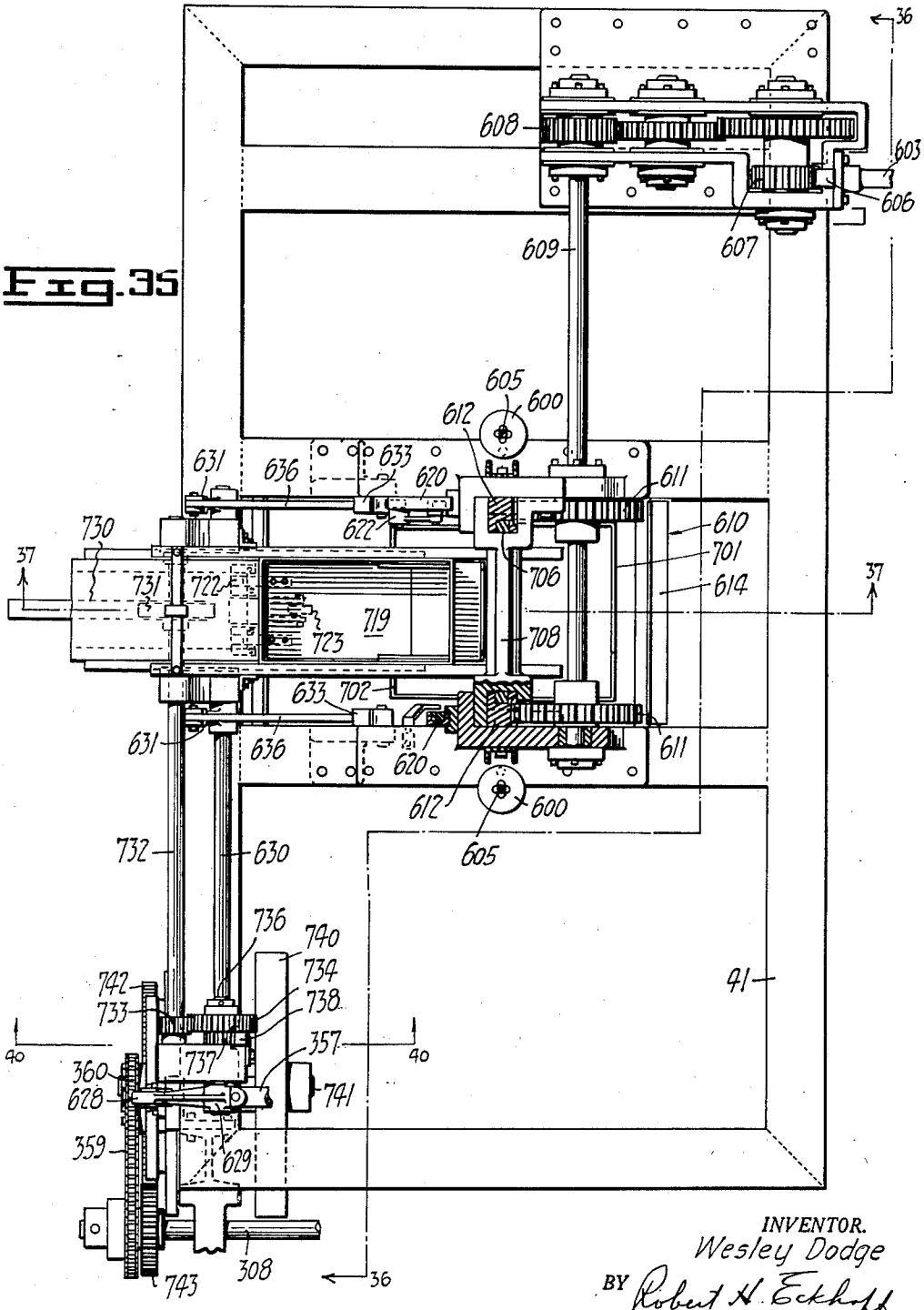
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Fig. 35



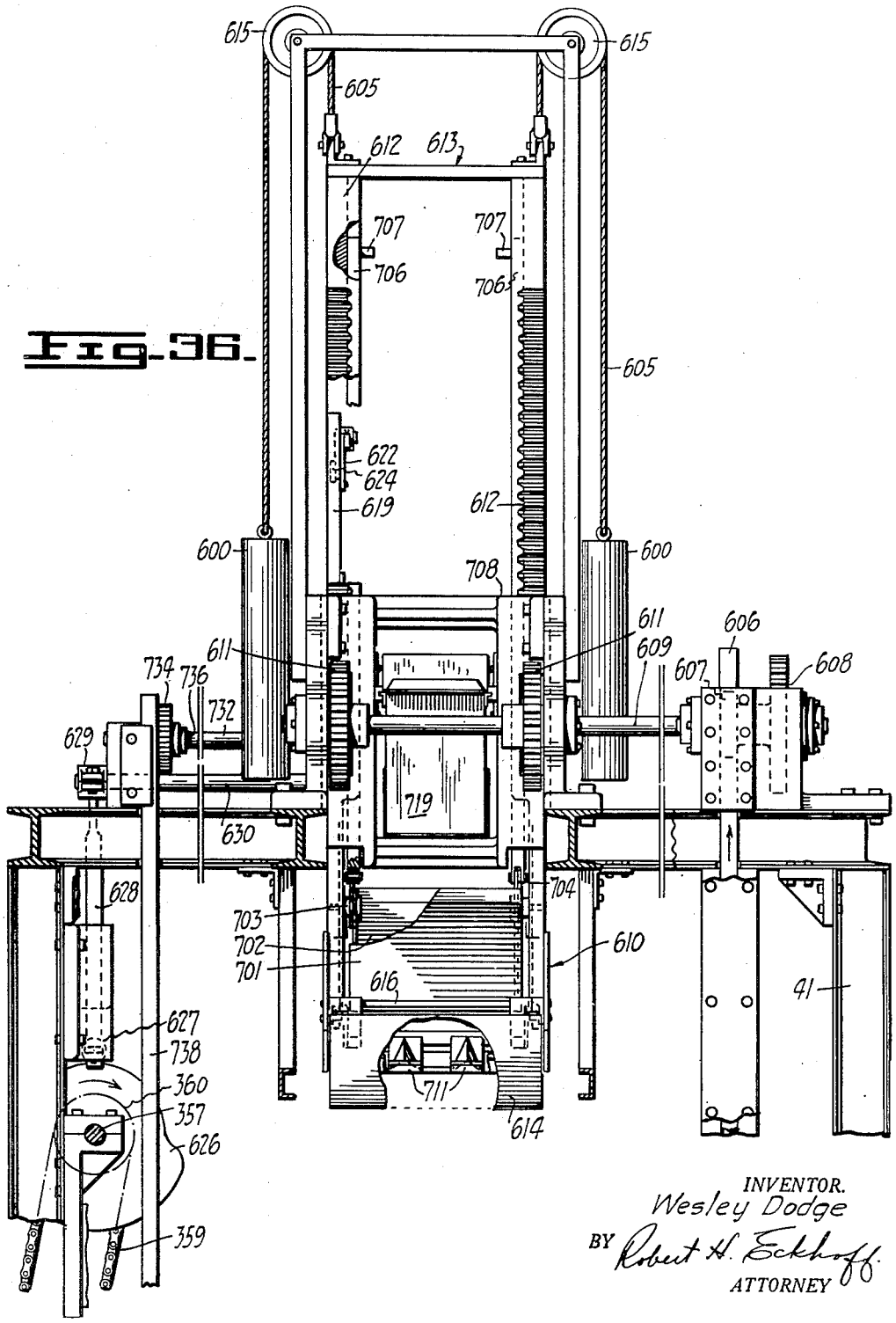
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Fig. 36.



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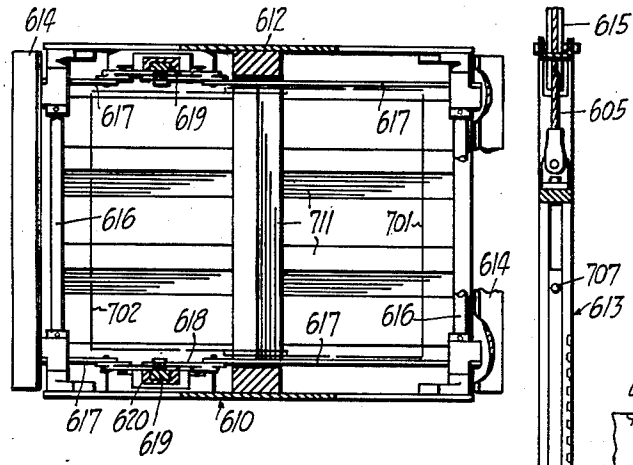


Fig-38-

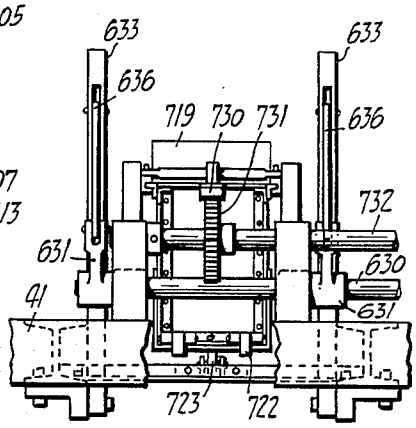
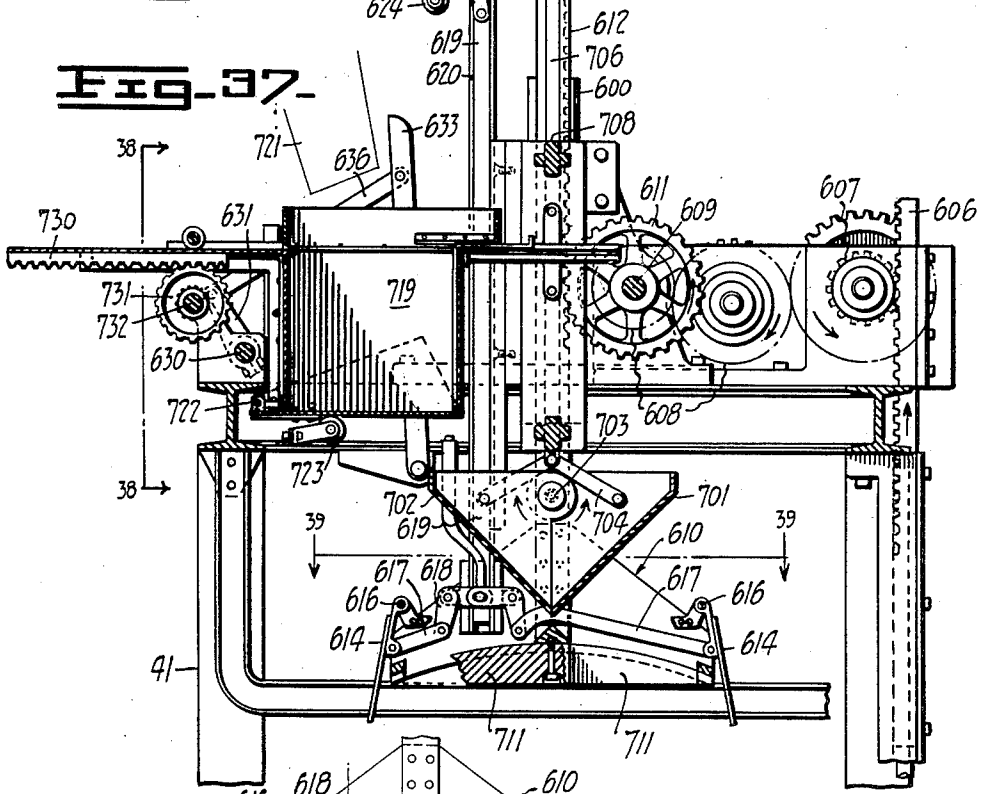


Fig-39-



Fig-37-



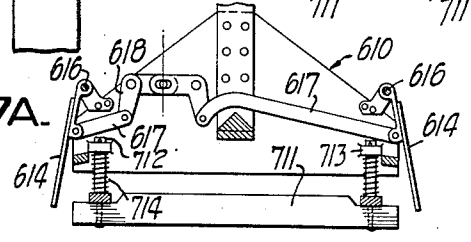


Fig.37A.

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Fig. 41.

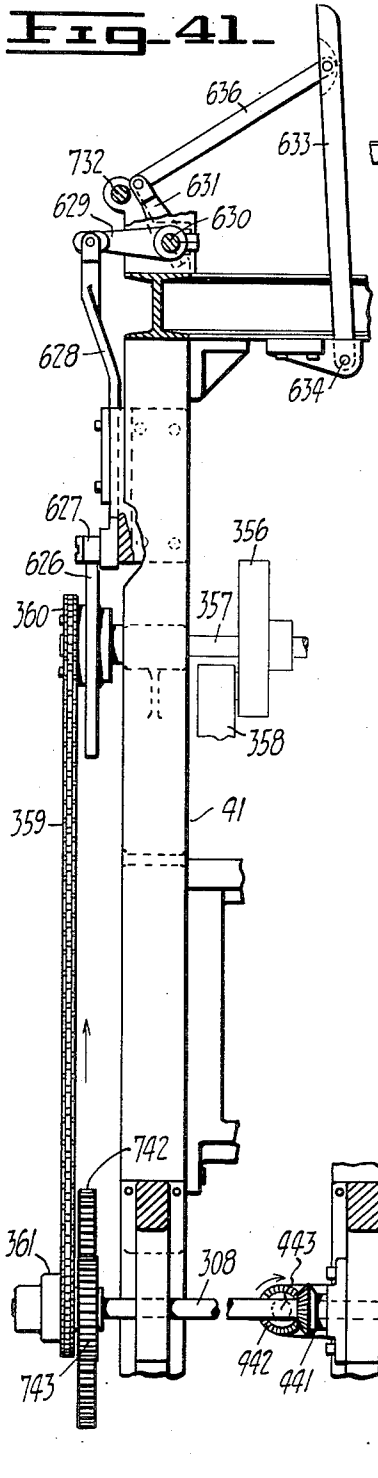


Fig. 40.

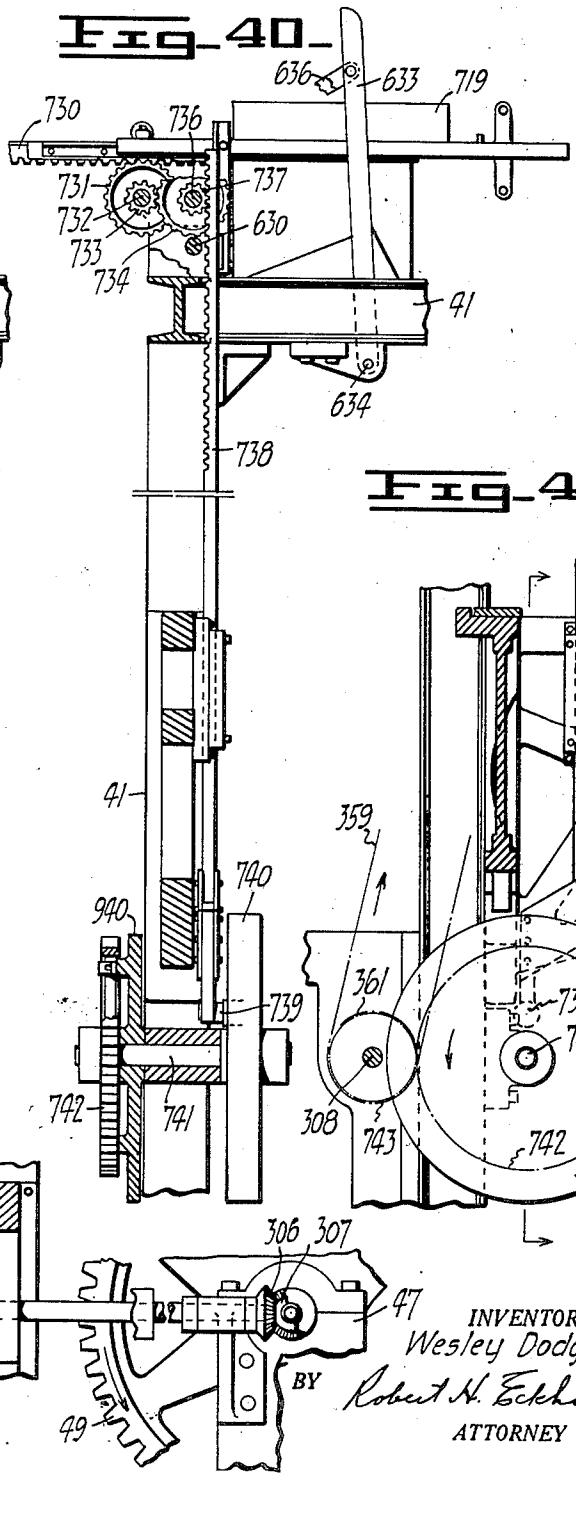


Fig. 42.

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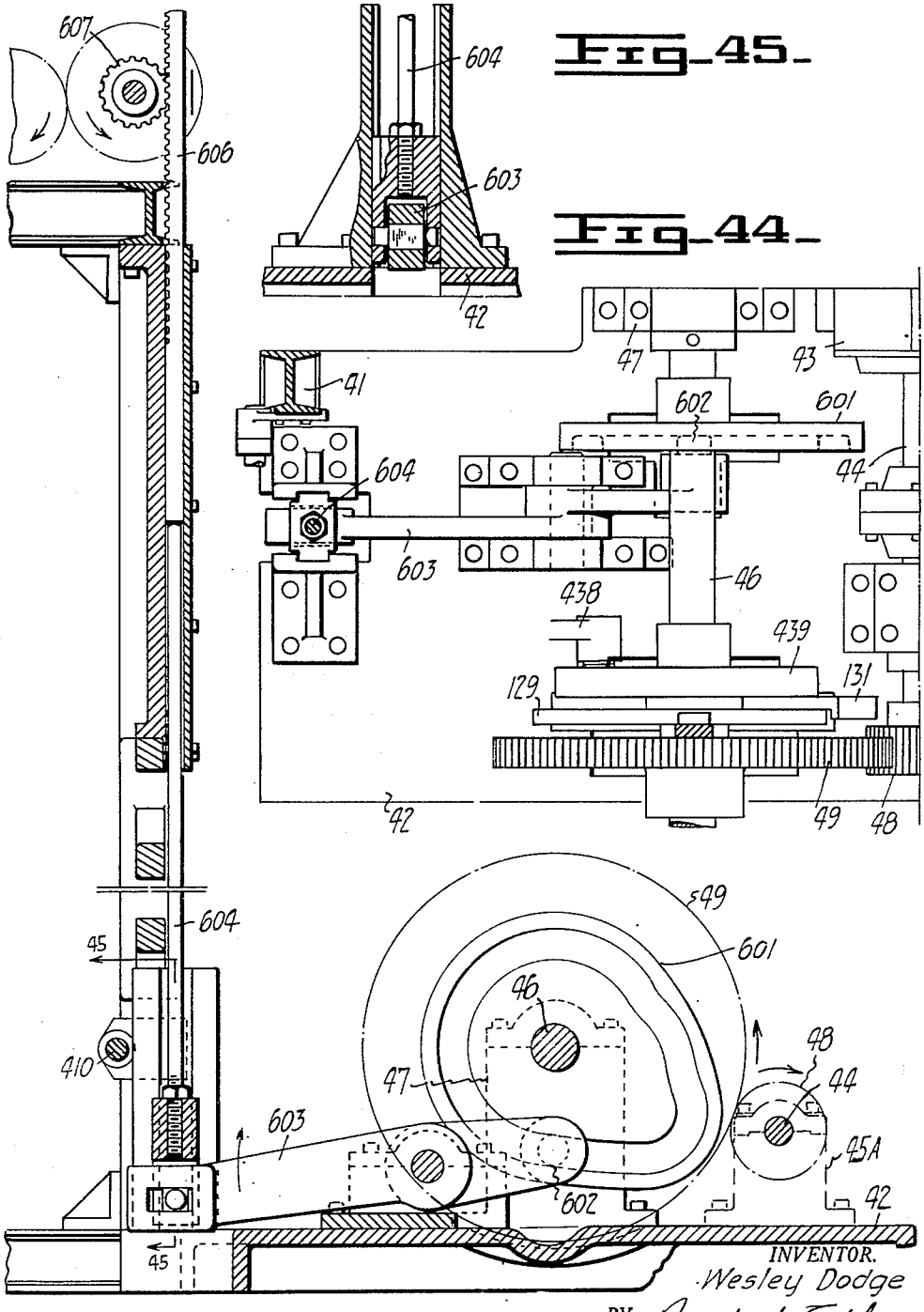


Fig-45-

Fig-44-

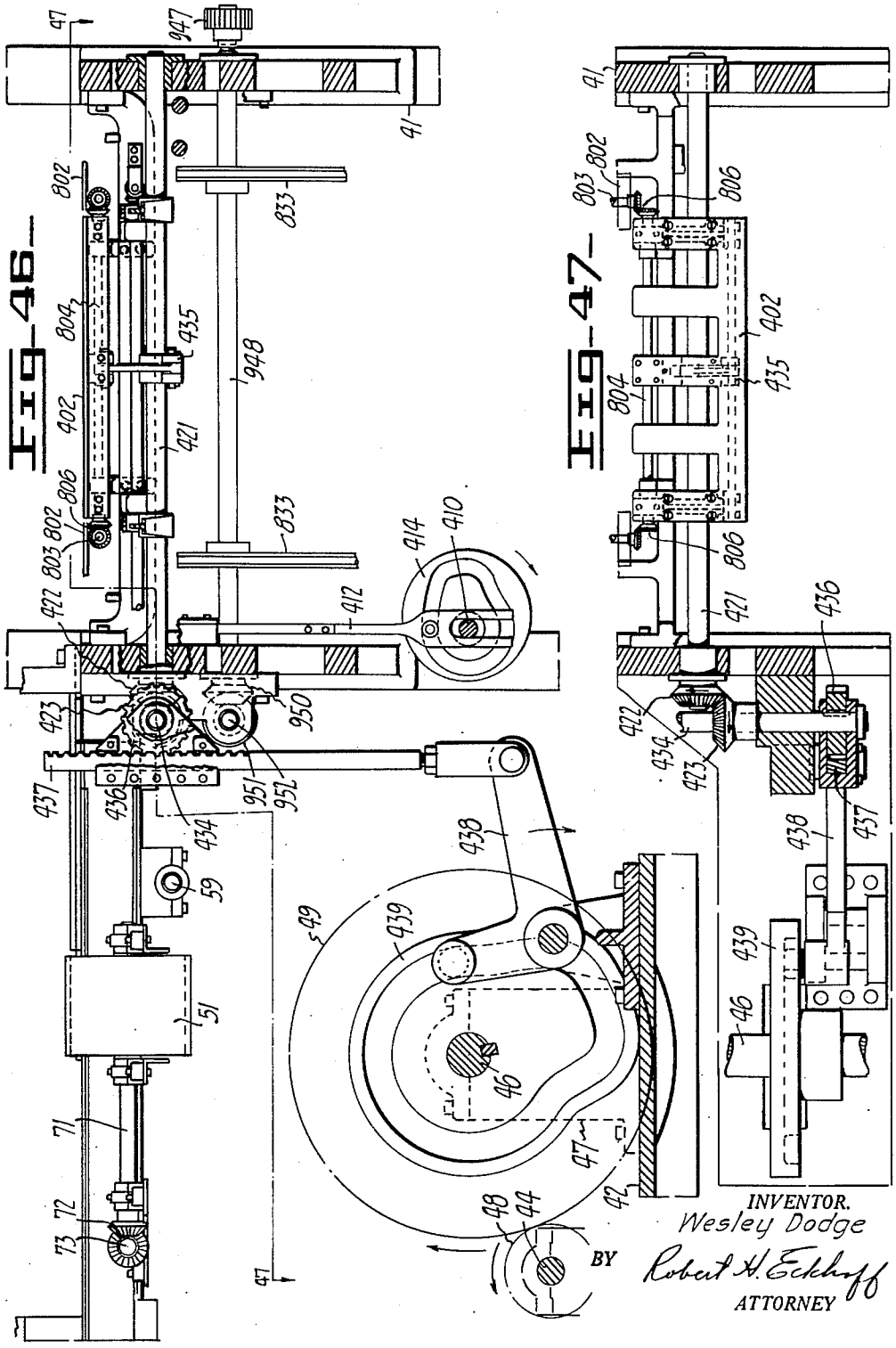
Fig-43-

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Fig-48-

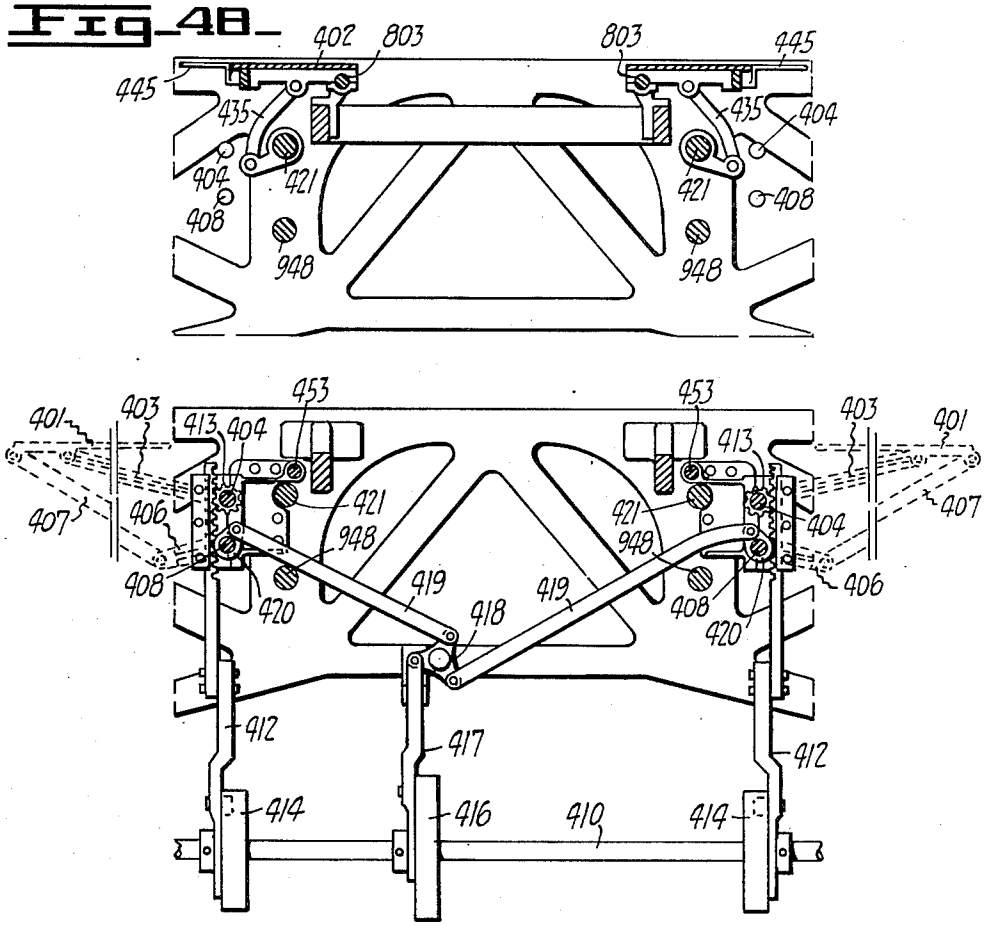


Fig-49-

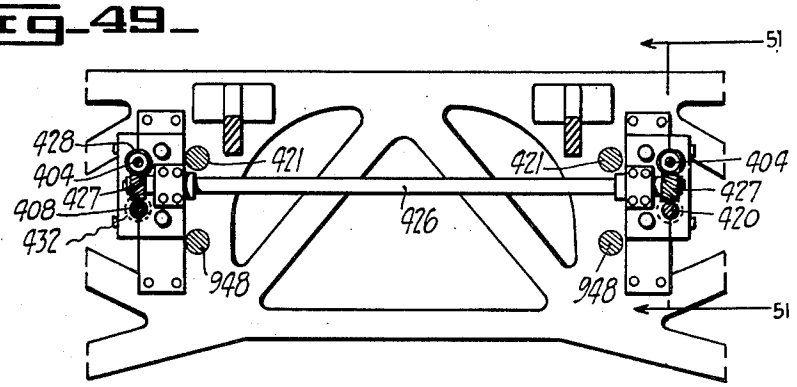


Fig-50-

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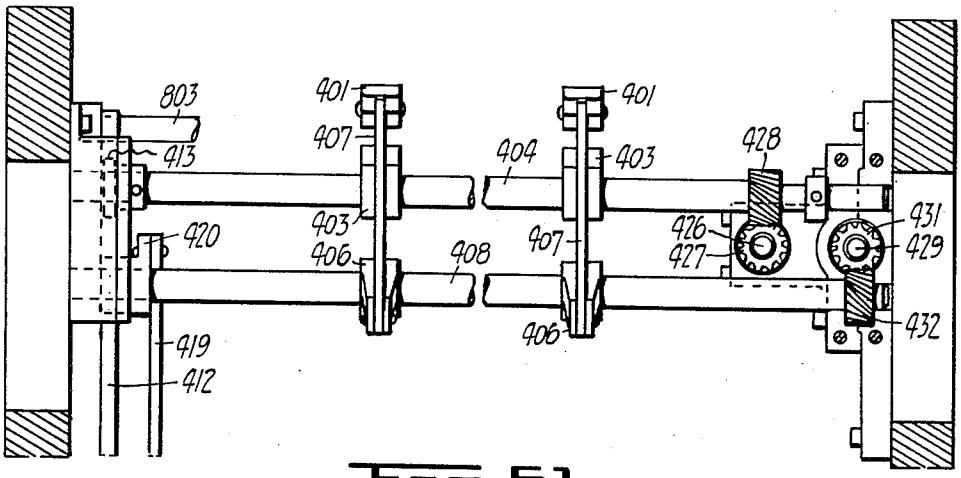


Fig-51-

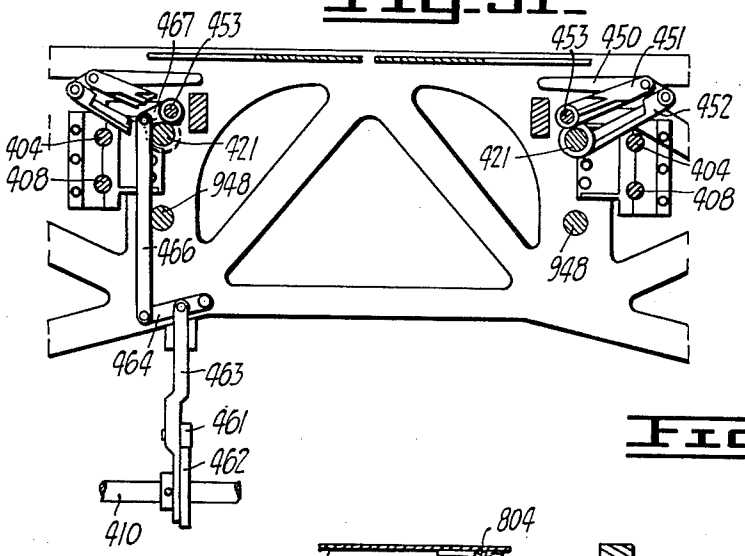


Fig-52-

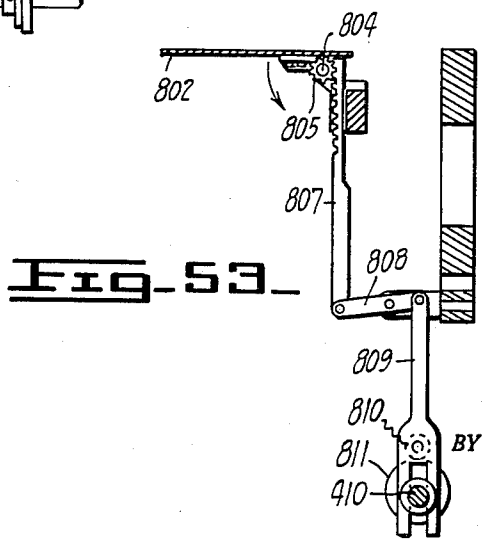


Fig-53-

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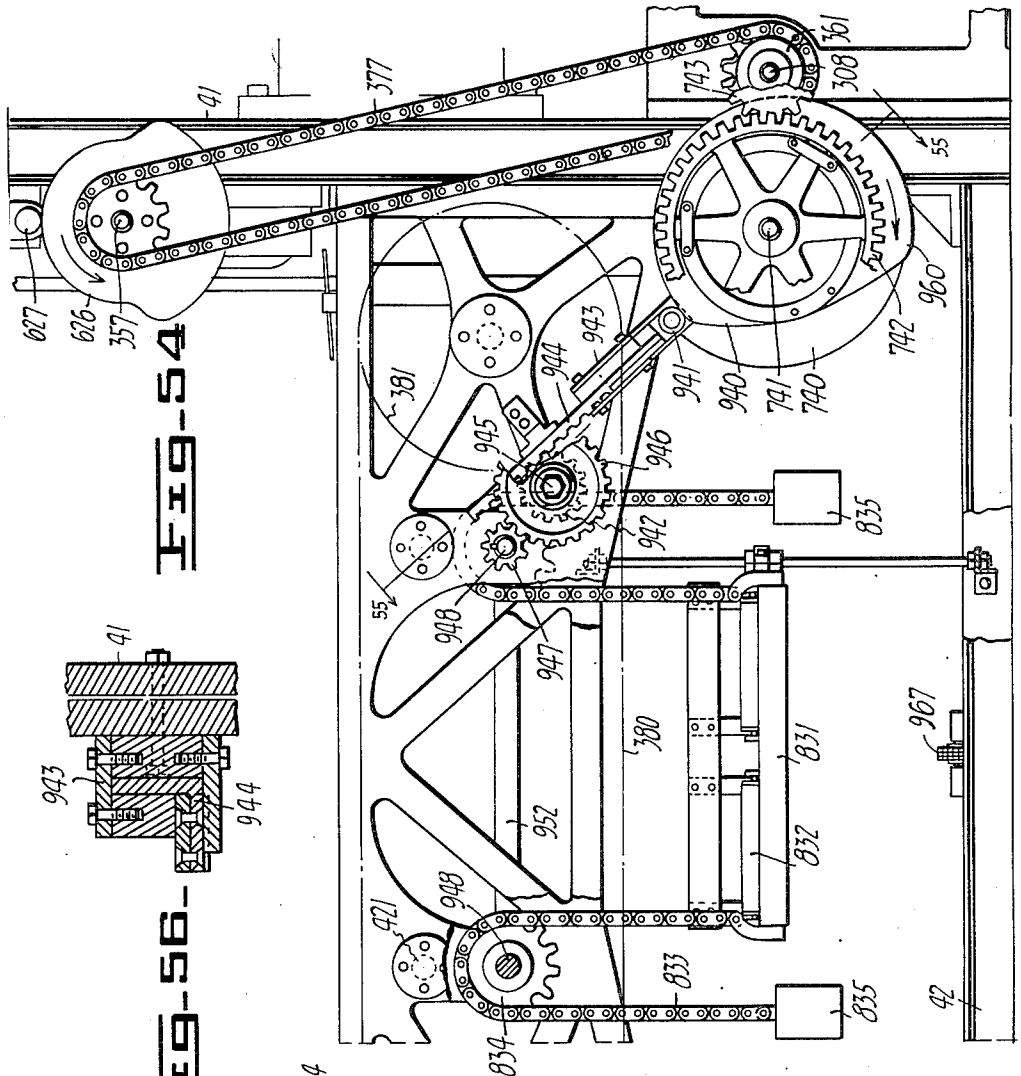


Fig-54

Fig-56

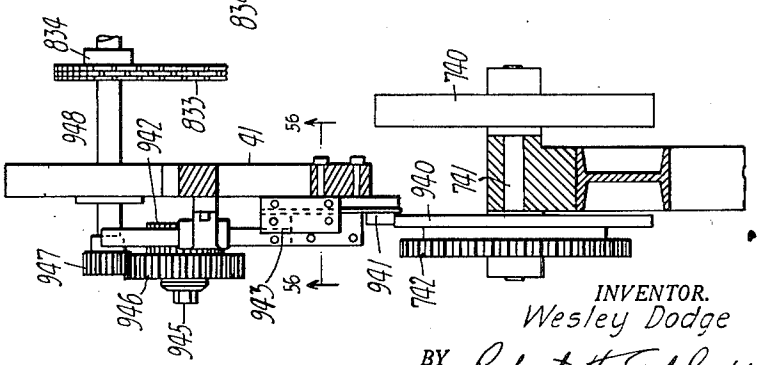


Fig-55

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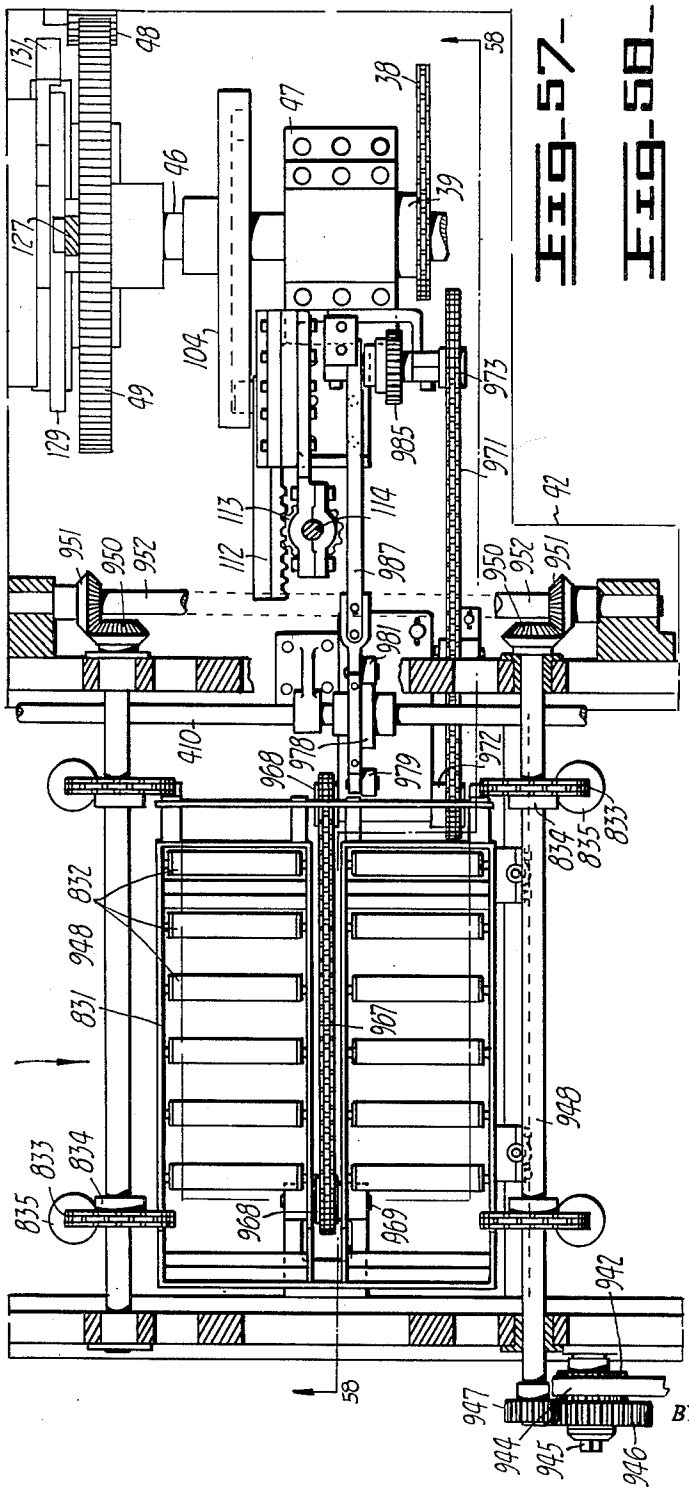


Fig. 57.

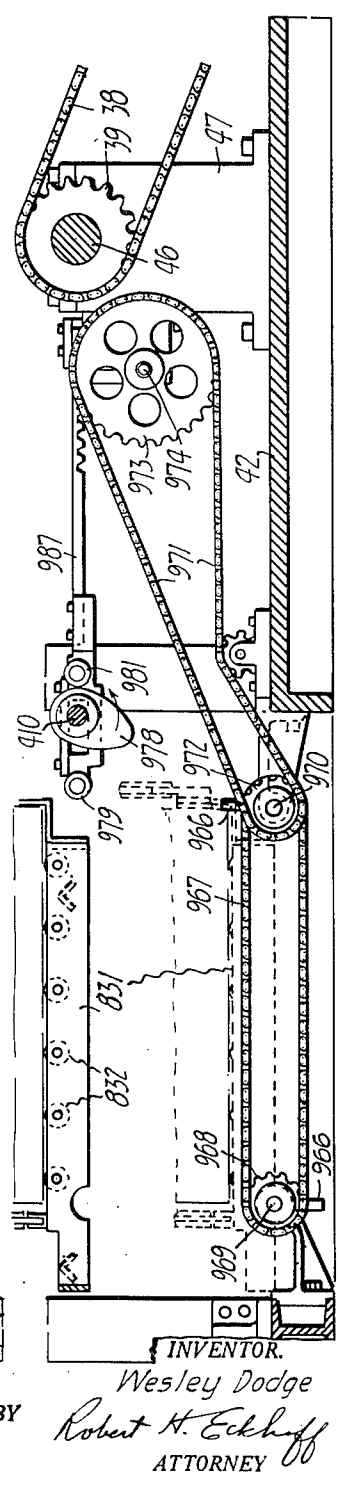


Fig. 58.

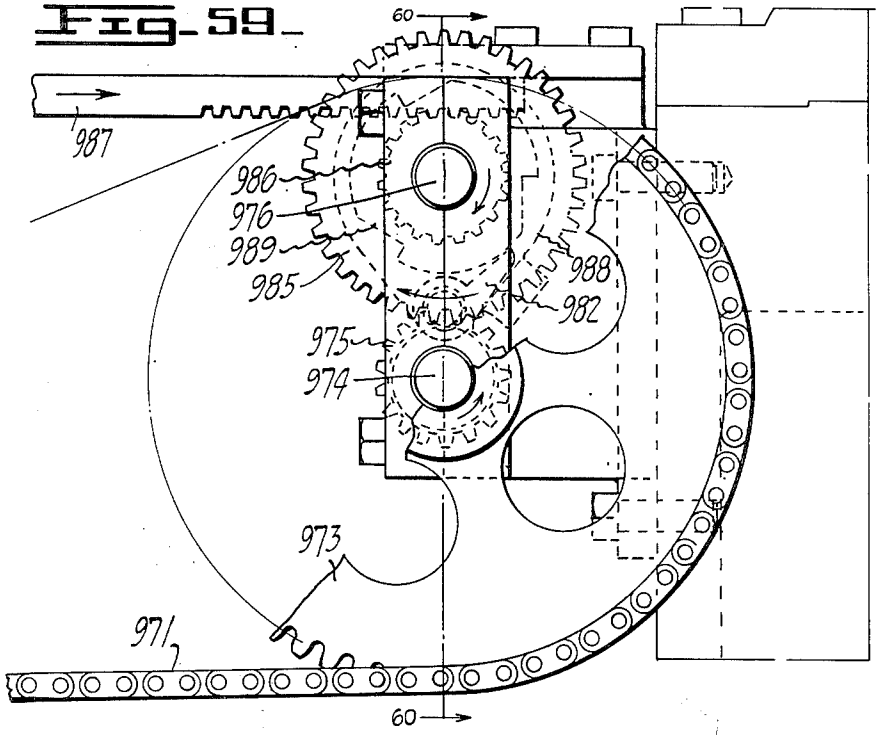
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Fig. 59.



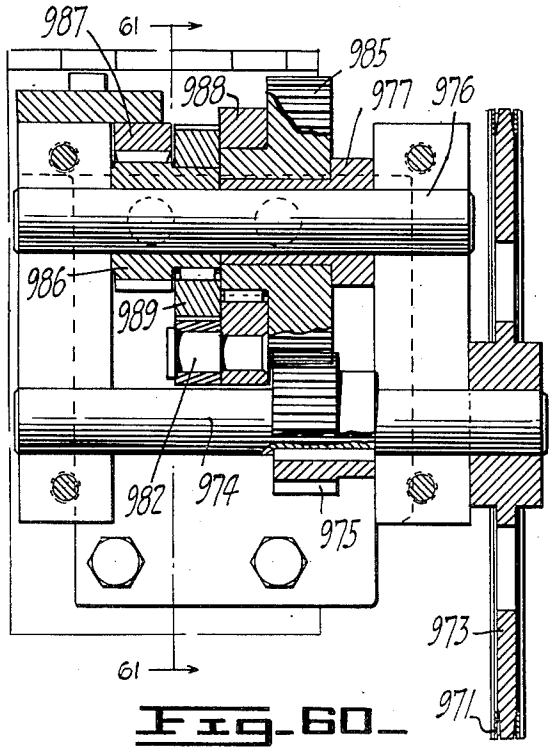
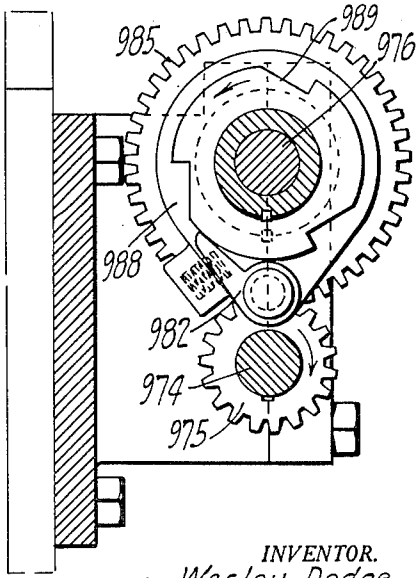


Fig. 60.

Fig. 61.



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Dec. 26, 1939. W. DODGE 2,184,290

LETTUCE PACKING MACHINE

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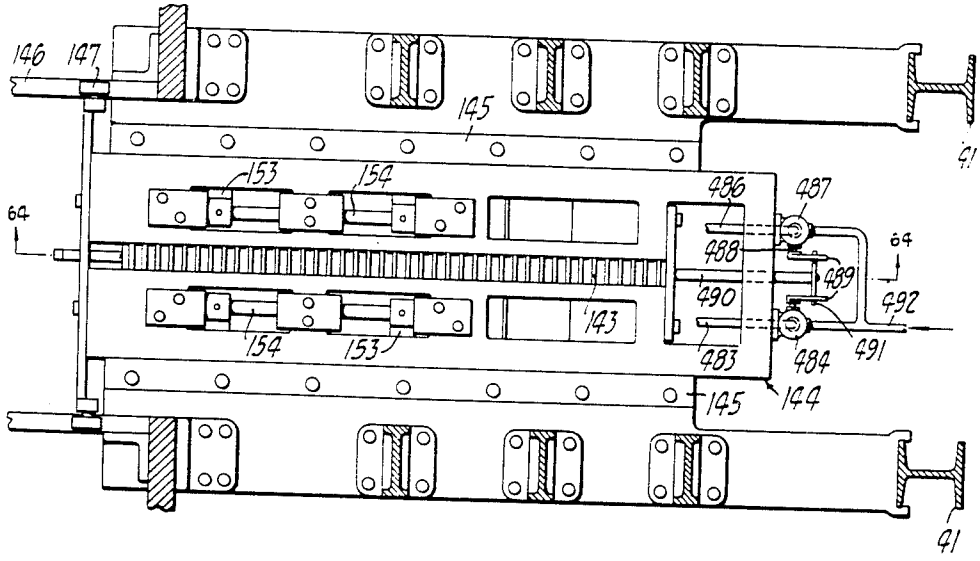


Fig-62-

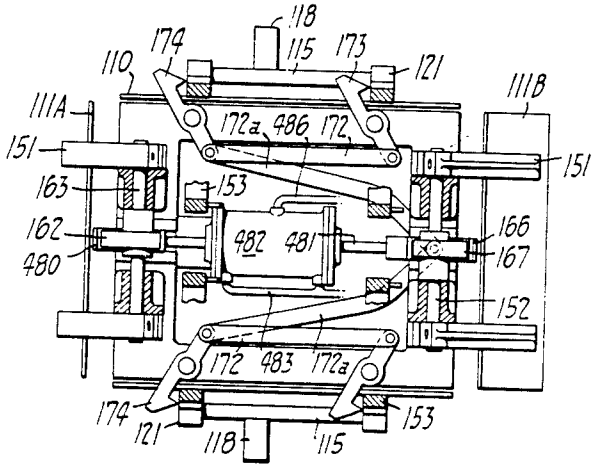


Fig-63-

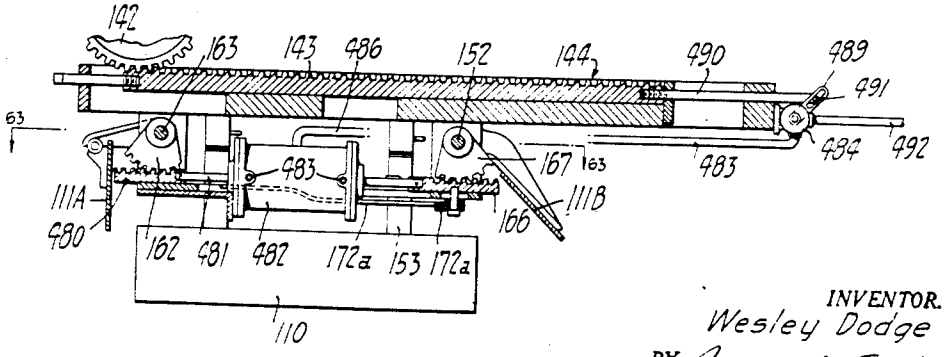


Fig-64-

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Patented Dec. 26, 1939 2,184,290

UNITED STATES PATENT OFFICE

2,184,290

LETTUCE PACKING MACHINE

Wesley Dodge, Oakland, Calif., assignor to Paterson Pacific Parchment Company, San Francisco, Calif., a corporation of California

Application April 12, 1938, Serial No. 201,551

35 Claims. (Cl. 93—2)

This invention relates to a machine for the packaging of lettuce and other vegetables as carrots and fruits such as oranges, peaches and grapefruit.

In my application Ser. No. 121,574 filed January 1, 1937, I have disclosed the preparation for market of fruits and vegetables, particularly lettuce, by assembly into a novel package. Thus a group of lettuce heads is wrapped in a water proof, moisture permeable wrapper, such as is provided by vegetable parchment, and this, together with ice, is deposited in an assembled condition in a crate, the ice being outside of the wrapper. While it is possible to practice that invention satisfactorily by hand operation, actual shipping operations are conducted on such a large scale that it is desirable to provide a machine operation to the end that the speed thereof can be increased. To illustrate this point further, it is not unusual for a single lettuce producing area, for example, to cut, trim, crate, ice, pack and ship on an average as many as 200 refrigerator cars a day. When it is recalled that each car contains on an average of 18,600 heads, the magnitude of this operation becomes apparent. The machine of the present invention enables the heads of lettuce, after they have been trimmed and conditioned, that is, the outside leaves removed, to be assembled automatically into a group containing a predetermined number of heads assembled in a predetermined manner. These are then automatically wrapped and positioned in a crate, the wrapper being placed around the layer of heads so as to be in close engagement with the heads. Ordinarily three layers of lettuce are placed in a lettuce crate. The present invention provides means for icing the layers as they are placed in the crate.

It is in general the broad object of the present invention to provide automatic means for packing lettuce.

A further object of the present invention is to provide means for automatically assembling a plurality of lettuce heads into a package of predetermined size containing a predetermined number of heads of lettuce.

Another object of the present invention is to provide automatic wrapping means for assembled heads of lettuce. An advantage of this is that by wrapping and compressing the heads one is able to pack a materially greater number of heads in each crate.

A further object of this invention is to provide means for compressing a wrapped lettuce package and for inserting the wrapped package into a crate.

A further object of the present invention is to provide a novel means for icing wrapped lettuce.

An additional object is to provide a machine for carrying on the method of my application aforementioned.

In the drawings accompanying and forming a part hereof I have disclosed the preferred mechanism embodying the present invention. However, it is to be understood that this is only the present preferred means and that other means may be adopted within the skill of those in the art and within the scope of the claims.

In the drawings accompanying and forming a part hereof Figure 1 is a side elevation of the machine.

Figure 2 is an end elevation.

Figure 3 is a side elevation, the view being taken from that side opposite that in Figure 1.

Figure 4 is a side view, partly in section, illustrating the lettuce feeding means into the machine as well as certain of the power operating mechanism.

Figure 5 is a section taken along the lines 5—5 in Figure 4 illustrating the structure of one of the cam operated means.

Figure 6 is a plan view, partly in section, of the means provided for assembling the lettuce package prior to wrapping.

Figure 7 is a plan view of the paper folding and tucking mechanism, the collapsible bed upon which the package is wrapped prior to its delivery to the crate.

Figure 8 is a section taken along the line 8—8 in Figure 7, illustrating the construction of the wrapping mechanism, the false bed upon which the package is formed and the crate retaining means.

Figure 9 is a section taken along the line 9—9 in Figure 1, illustrating the relationship of certain of the parts of the package forming mechanism prior to its transfer to the wrapping table.

Figure 10 is a section taken along the line 10—10 in Figure 2, this view illustrating the relationship of various parts of the machine at one stage in the operation.

Figure 11 is a section taken along the line 11—11 in Figure 2, the view illustrating the relationship of various power operating means provided for various units.

Figure 12 is a section taken along the line 12—12 in Figure 11.

Figure 13 is a section taken along the line

13—13 in Figure 1, showing the power operating means for the carriage transfer.

Figure 14 is a side view, partly in section, showing the relation of various parts of the carriage transfer mechanism and the carriage.

Figure 15 is a section taken along the line 15—15 in Figure 2, the view illustrating the relation of certain portions of the carriage.

Figure 16 is a view taken along the line 16—16 in Figure 17, showing the relation of the package compressing means and the latches therefor.

Figure 17 is a view taken along the line 17—17 in Figure 16, showing the relation of the carriage operating means and the operating elements of the carriage whereby the assembled lettuce package is compressed.

Figure 18 is a fragmental view illustrating the latch mechanism on the carriage, shown in plan in Figure 15 in one operative position.

Figure 19 is a section taken along the line 19—19 in Figure 23, showing a portion of the paper feed operating mechanism.

Figure 20 is a side elevation partly in section showing the relation of certain parts of the paper feed mechanism.

Figure 21 is a section taken along the lines 21—21 in Figure 23, showing the relation of certain portions of the paper feed mechanism.

Figure 22 is a fragmental view of the cam follower and eccentric cooperating with the roller release and one of the paper feed rolls.

Figure 23 is a section taken along the line 23—23 in Figure 1, showing the paper cutting means.

Figure 24 is a section taken along the line 24—24 in Figure 23.

Figure 25 is a section taken along the line 25—25 in Figure 23.

Figure 26 is a section taken along the line 26—26 in Figure 1, showing the power means for operating the paper delivery means to the paper and package assembly bed.

Figure 27 is a plan view, partly in section, showing the power operating means for the paper feed to the bed and the carriage transfer means.

Figure 28 is a section taken through a portion of the drive means for the paper feed to the bed.

Figure 29 is a section taken along the line 29—29 in Figure 26, showing a ratchet construction.

Figure 30 is a view taken along the line 30—30 in Figure 7, illustrating the relation of the paper feeding mechanism to the paper delivery means.

Figure 31 is a plan view, partly in section, showing one of the rollers of the paper feed mechanism.

Figure 32 is a section taken along the line 32—32 in Figure 31.

Figure 33 is a side elevation showing diagrammatic operation of the paper gripping means.

Figure 34 is an end elevation, partly in section, showing operation of the paper gripping means of Figure 33.

Figure 35 is a plan view taken along the line 35—35 in Figure 2. This view shows the relation of the icing means and the ram which forces the assembled package into a crate.

Figure 36 is a section along the line 36—36 in Figure 35, showing an end elevation, partly in section, of the ram and icing mechanism.

Figure 37 is a section along the line 37—37 in Figure 35, showing further the relation of the package compressing means, the ram and the icing mechanism, while Figure 37A illustrates a modification of the ram.

Figure 38 is a section along the line 38—38 in Figure 37 illustrating the ice delivery means.

Figure 39 is a section along the line 39—39 in Figure 37 showing details of the ram construction.

Figure 40 is a side elevation, partly in section, illustrating a portion of the mechanism for operating the icing means, the section being taken along the line 40—40 of Figure 35.

Figure 41 is a side elevation illustrating a drive for the compressing means associated with the ram.

Figure 42 is a side elevation, partly in section, illustrating the power operating mechanism for the icing cam.

Figure 43 is a side elevation, partly in section, taken along the line 43—43 in Figure 1.

Figure 44 is a plan view of a portion of the drive mechanism shown in Figure 43.

Figure 45 is a view taken along the line 45—45 in Figure 43.

Figure 46 is a section along the line 46—46 in Figure 1.

Figure 47 is a section along the line 47—47 in Figure 46.

Figure 48 is a section to illustrate the operation of the paper folding plate, while Figures 49, 50, 51, 52, and 53 are respectively sections taken along the indicated section lines in Figure 7.

Figure 54 is a side elevation illustrating the drive mechanism for the crate handling means.

Figure 55 is a section along the line 55—55 in Figure 54.

Figure 56 is a section along the line 56—56 in Figure 55.

Figure 57 is a plan view, partly in section, of the crate handling mechanism.

Figure 58 is a section along the line 58—58 of Figure 57.

Figure 59 is a side elevation of a portion of the drive for the crate handling mechanism.

Figures 60 and 61 are sections along the corresponding section lines of Figures 59 and 60.

Figures 62, 63 and 64 respectively corresponding to Figures 15, 16 and 17, illustrate a modified form of the carriage.

Briefly stated, the machine of the present invention can be said to comprise an assembly means for a group of the articles to be packed. In the preferred form of the machine which I have successfully cperated I group together several heads of lettuce, usually either four or five, depending on the number to be placed in a crate. These are pushed by a suitable plunger onto a bed, a forward movement of the grouped heads being restrained by a movable wall which is automatically advanced. Another row of grouped heads is then moved into place by the plunger mechanism, the restraining wall advancing as each row is moved into place. When five rows, for example, have been positioned by the plunger, an assembled group is provided, four heads of lettuce wide and five rows deep, for example. This assembled group is then compressed, first from the sides and then upon the ends by a transfer carriage. The restraining wall is moved out of the way, being utilized as a bridge over which the assembled heads of lettuce are passed to a wrapping table.

While the group of lettuce heads is being assembled, a sheet of paper has been drawn over a suitable package wrapping means. The sheet is automatically cut to length and positioned over

a wrapping table. Upon this positioned sheet, the assembled heads are placed by the transfer carriage. As soon as the carriage has passed the restraining wall, the wall is moved back into position to receive and restrain the first row of the next group of heads to be assembled. The transfer carriage, which has transported the previously assembled heads, is then returned to a position superimposed over the groups of heads undergoing assembly for subsequent wrapping and packing.

The paper wrapping means in the meanwhile has gone into operation, the ends of the paper being first pressed up and in to compress the sides of the package and then folded over the top of the package, with one side interleaved under the other. The ends of the package are then tucked in against the package. A compressor and retaining means carried by a ram then operates to tuck down the upper projecting ends of the paper, at the same time gripping the package. The ram then moves down, forcing the package down into a crate positioned beneath the wrapped package. This tucks in the projecting bottom ends of the paper.

As the package goes into position, the crate comes up to meet it, for the first layer in the crate. Ice is preferably automatically delivered onto the package as it is placed in the crate, so that refrigeration is provided the lettuce in the crate. When the lettuce is positioned in the crate and is iced, the ram is returned and a false bottom, on which the wrapping occurs, is moved back into place. A new sheet of paper is then drawn into place and thereupon the carriage transfers the newly assembled heads of lettuce, as previously explained. This is wrapped in the positioned paper and deposited in the crate, ice being placed upon it. The same operation is again repeated, although with the uppermost layer of lettuce the icing operation is ordinarily omitted automatically. When the crate is filled, three layers ordinarily completing a crate, the crate is automatically moved out of position and a new crate is inserted.

The details of construction and operation of the present preferred machine of this invention will now be discussed with particular reference to the embodiment illustrated in the drawings by way of example.

Frame

The machine of the present invention includes a suitable frame made up of a plurality of channels **41** and structural members secured together upon a suitable base **42**.

The drive means

A motor **43** is secured on base **42** to drive shaft **44** supported by journals **45A** and **45B** on the base. A main cam shaft **46**, also supported by journals **47** on the base, is driven by gear **48** on shaft **44** in mesh with gear **49** on the shaft **46**. Shaft **46** rotates once for each five rotations of shaft **44**. In axial alignment with shaft **44** and supported by journal **45A** and journal **36** is a shaft **37**. This is driven by chain **38** passed over sprockets **39** and **40** respectively on shaft **46** and shaft **37**.

Other drive shafts are included. For example, shaft **308** is driven by mitre gears **306** and **307** by shaft **46** (Figure 11) while a second cam shaft **410** is driven off of shaft **308**. As appears in Figure 11, shaft **308** carries a mitre gear **441** driving a mitre gear **442** on a stub shaft **443**. A gear **444** on shaft **443** drives shaft **410** which is suitably journaled as are the other shafts.

The vegetable package assembling means

Means are provided for assembling a predetermined number of the vegetable articles to be packaged. For example, in assembling lettuce preparatory to crating, I preferably proceed by making up a package in which a number of heads of lettuce are gathered into a row, there being five rows in each layer. Depending on the package finally desired, four or five heads are placed in each row. Thus each layer of lettuce comprises usually twenty or twenty-five heads. In the machine of the present invention the lettuce is delivered to the space between slats **60** and onto a belt **51** carried by opposite spaced pulleys **50** and **52**. (Figures 4 and 6.) The four heads of lettuce are assembled on the belt, gates **53** being provided to act as a positive stop for slats or blocks **60** and heads placed between slats **60** in a timed operative relation to the belt and slats.

These gates are positioned on opposite sides of the belt, as appears in Figure 6, and are connected together by a suitable linkage **54** to a bell crank **56**. The bell crank is operated by a member **57** which extends between bell crank **56** and a lever **58** carried on a rock shaft **59** suitably journaled upon the machine. The rock shaft carries a depending lever **61** which is operated by a rod **62** joined to a cam operated reciprocating member **63** (Fig. 9). The cam operated push member and its operation will be presently described.

The lettuce positioning mechanism

Pulley **50**, that which appears on the right-hand side of Figures 4 and 6, is driven by shaft **71**. This shaft is in turn driven through mitre gears **72** by shaft **73**. Gear **74** on shaft **73** is intermittently rotated by a gear **76** on shaft **77**. A gear **80** and shaft **77** are rotated when rack **78** is raised and lowered by cam **79** on shaft **37** (Figures 2 and 5). A ratchet and pawl **70** (Figure 5) ensures that the rack **78** is effective to rotate gear **76** in only one direction, and therefore shaft **73**, when the rack is raised vertically in Figure 2. This secures an intermittent drive for the belt. The timing relation is such that the belt comes to rest with the grouped heads of lettuce, either four or five, positioned in front of pusher mechanism **81**.

Pusher mechanism **81** comprises a sliding plunger having a vertical face member **82** (Figures 6 and 9), passing between slats **60**. The plunger is supported for a reciprocating sliding movement between slides **83** and is connected by arm **84** to cam operated member **63**. Member **63** is suitably supported at its lower end upon the base, as is indicated at **86**. A cam follower **87** is engaged with the cam **88**, the follower being carried by pusher member **63**. The plunger face member **82** engages and forces the heads of lettuce off of the belt and onto the package assembly bed generally indicated by **91**. The pusher advances each row by the thickness of the head. Thus each new'y positioned row of heads pushes the previously pushed heads on by the thickness of the newly positioned row and against wall member **101**, as will presently appear.

The pusher operation, as will appear from an examination of cam **88**, displaces five rows of lettuce from the belt. An assembled group of heads of lettuce is then in place on bed **91**. At this

instant, the dwell portion 92 (Figure 9) of cam 88 comes into engagement with the follower. As a result, the transfer carriage mechanism presently described, compresses the assembled heads and removes them to make room for assembly of another group.

The lettuce positioning means

Positioned at the front of the package being assembled and in engagement with the front face thereof is a wall member indicated by 101. This member is hinged on the ends of opposite racks 102 (Figures 6 and 9). Normally, this member stands in a vertical position intermediate the ends of bed 91, to prevent lettuce from rolling or being pushed on beyond the bed 91. However, as will presently appear, when the package is undergoing assembly this member is advanced across the bed to the end whereat it drops down and provides a transverse support or bridge to permit smooth passage of the lettuce on to a wrapping table top for the package wrapping operation.

Racks 102 are moved successively by gears 120 a step at a time. These gears are driven by mitre gears 122 which are in turn in mesh with mitre gears 123 on a shaft 124 driven through gears indicated general'y at 126 which are driven by a rack 127 (Figures 4 and 9). Rack 127 carries a follower 128 which rotates off of cam 129. Cam 129 includes a box cam section 131 as well as five sections which are effective to advance wall 101 as each row of lettuce is moved into place and then, as the entire mass of assembled lettuce is moved onto the wrapping table the wall rotates into a horizontal position (Figure 9) to bridge the gap between the assembly bed and the wrapping bed. As soon as the lettuce has passed over the wall, the box cam section 131 is engaged. The form of the box cam section 131 is such that the wall 101 is returned first to a vertical position and then back across the assembly bed to receive and engage the initial row of lettuce which is to be positioned prior to assembling of a new group of heads.

The package compressing and transfer means

When the heads are assembled, the group is compressed into a compact mass and then transferred. The side compressor means will now be described.

Cam 88 includes the relatively long dwell indicated by 92. (Figure 9.) This dwell permits the presently described lettuce compression and transfer means to get the assembled group of heads out of the way and to permit return of wall 101 before the next row of four is pushed into position. The lettuce compressing and handling means are operated off cam 104 and cam 132 on shaft 46 (Figure 13). It is to be noted from the track on cam 132 that it is such that a relatively long dwell exists (the cam portion concentric with shaft 46) during which the last three rows are being assembled. While the package transfer means is transferring one package, or an assembled group of heads, the first two rows are being assembled.

The package assembling means comprises a carriage 144 supported by slides 145, track 146 and track roller 147 (Figure 9). Suitably supported on the carriage and carried above the lettuce heads being assembled are the means for first compressing the lettuce and then carrying it over to the wrapping table top. This means includes opposite side members 110 and end members 111A and 111B. Members 110 are carried by arms 151 secured on shafts 152 and 153. Members 111A and 111B are carried by arms 153 on shafts 154.

Normally members 110, 111A and 111B are carried in an extended position such that the lettuce heads can be readily assembled between them. However, when the assembled heads are positioned, cam 104 comes into operation and sides 110 are moved in against the bias of springs 190 to compress the heads of lettuce. Thereafter ends 111A and 111B are moved in to compress further the heads of lettuce. The compression operation on side members 110 is effected by means of cam 104 moving rack 112 to rotate gear 113 on shaft 114. Shaft 114 carries gear 116 which is effective to move toward each other upstanding arms 118 on racks 119. These arms engage rollers 115 positioned between ears 121 on the sides 110 and move them in toward each other (Figures 6, 9 and 16), against the bias of spring 190. Presently they are latched.

In Figures 62, 63 and 64, I have shown the end members 111A and B moved by racks 166 and 480 on the ends of independent piston rods 481 which extend from opposite end of cylinder 482. The racks engage segments 162 and 167, segment 162 being in a different relation to member 111A on shaft 163 from that in which it is shown in Figure 17. Pipes 483 admit or release fluid at opposite ends of the cylinder under control of valve 484 while pipe 486 and valve 487 admit or release fluid at the middle of the cylinder and between the pistons (not shown) carried on rods 481.

Each valve includes a plug 488 having a slotted lever 489 thereon. A rod 490 extends from slide 143 and carries a cross arm 491 extending through each slot in the slotted levers 489. Initial movement of the slide to the left in Figure 62 rotates the levers 489 to release fluid from the cylinder ends through an atmospheric release port (not shown) in valve 484 and admit fluid under pressure through valve 487 from fluid inlet pipe 492. The pistons move apart and rotate the members 111A and B to hold compressed positively the lettuce therebetween.

When the rack is moved to the right, at the end of the carriage travel, the members 111A and B are rotated, being returned to that position in which they appear in Figure 64. This movement of rack 143 rotates valve 484 to admit fluid to the cylinder ends while valve 487 releases to atmosphere.

Locking of members 110 by latches 173 and 174 follows the same procedure as previously disclosed. Linkage 172*a* connects the latches to the racks 480, adjacent member 111B as appears in Figure 63.

The operation of end members 111

End members 111A and 111B are moved in positively whereupon side members 110 are locked. A cam 132 is mounted on drive shaft 46. A cam follower 133 (Figure 13) is engaged with a track on this cam and is operated thereby. Lever 136, pivotally mounted at 137, is effective to raise and lower rack 138. This rotates gear 139 and sets into motion a gear train which includes gears 140, 141, 142 (see Figure 14). Gear 142 is meshed with a rack 143 (Figures 9, 14, 15, 16 and 17) slidable for a limited distance on sliding carriage indicated generally by numeral 144 and carried in slides 145. Rotation of gear 142 is

effective to move the transfer carriage from position over the lettuce assembly table 91 to the wrapping table.

In the embodiment disclosed, initial movement of rack 144 is effective to close end members 111A and 111B and release the locks for members 110. While the rack 143 is thus employed, means independent of the rack can also be utilized. The utilization of rack 143 will now be described.

Rack 143 carries a rack 161 in engagement with gear segment 162 carried upon shaft 163. Movement of rack 143 to the right is effective to rotate gate 111A counterclockwise in Figure 17, rack 143 carrying a depending arm 164 with a rack 166 engaged with quadrant gear 167 carrying end gate 111B.

Initial movement of rack 143 is effective to move end gates 111A and 111B together to compress the lettuce. When the gates are moved down, the rack 143 has reached the limit of its travel on the carriage and further rotation of gear 142 moves the carriage. Movement of the rack 143 locks members 110; movement of rack 143 is effective to move member 171, and thereby linkage 172 connected to it, member 171 being connected to arm 164 carried and moved by rack 143. This results in latches 173 and 174 being rotated, assisted by springs 176 which are maintained in a state of compression on rods 175, to force the latches to engage and retain side members 110 in that position in which lettuce heads are maintained in a compressed condition. This happens during the early portion of the movement of the rack 143.

Locking of the end gates

Prior to movement of the carriage the end gates 111A and 111B are locked positively in position. The means for securing this will now be described.

Referring particularly to Figure 11, shaft 37 carries a cam 191 (see Figure 12). A shaft 192 is suitably journaled as at 193 upon the frame. This shaft carries a lever 194 supporting a cam follower 196 and engaging cam 191. The other end of shaft 192 carries a lever 197 for reciprocating rod 198. Rod 198, as appears in Figures 2, 4, 9 and 15, extends to lever 201 mounted upon a shaft 202. This shaft 202 carries a gear 203 and engages with a rack 204 for reciprocating a cam 206 carried in a slide 207 (Figure 9).

Lever 210 is hinged upon the carriage as at 211 (Figure 15). Normally this lever is maintained in that position in which it appears in Figure 15, spring finger 212 engaging pin 213. Just prior to that instant when the carriage starts its forward movement, cam 206 is projected into the path of roller 214 on the other end of lever 210 whereby the lever is rotated in a clockwise direction in Figure 15, and end 216 is moved in to abut and lock the projecting end of rack 143 which, in the meantime, has been moved to the left in Figure 15 so that the lever 210 can move into that position in which it appears in Figure 18 and in which the rack 143 is positively locked.

The lever 210 remains in the position in which it appears in Figure 18 until the presently described movement of the carriage has been nearly completed. To permit subsequent release of the lettuce compressing and transfer means, member 221 is positioned on the frame in the path of pin 213. This member includes a cam 224 cooperating with pin 213 and rotating lever 210 in a counterclockwise direction to release the rack 143.

Carriage movement

Continued rotation of the cam 131 results in carriage 144 and the entire package being transferred across on to the wrapping table shown in Figure 7 and to be presently discussed in detail. When the carriage reaches the end of travel it is positioned over the package wrapping table (on which a sheet of paper is in place), the carriage being then supported by the slides 145 and by track 146 and suspension rollers 147. As the carriage moves forward, member 181 is moved in a counterclockwise direction in Figure 9, bell crank 182 being rocked by arm 183 so that member 181 bridges the distance between the table and member 101 which has, as previously disclosed, been brought into this position.

Member 181 also serves to hold the sheet of paper as the lettuce is placed on it, the member having a rubber edge indicated at 184 which retains the paper against the table. Member 183 is operated by a cam follower 186 engaged with a cam 187 on cam shaft 410.

When the carriage reaches the end of its travel and the rack 138 is moved downwardly instead of upwardly the first downward motion of the rack is effective to move the gear train in a reverse direction. This results in movement of rack 143 to the left and, in turn, a release of the latches 173 and 174, and opening of members 110 and 111A and 111B, whereupon the lettuce is released. Members 111A and 111B are opened positively while springs 190 pull members 110 open to ensure quick release. When the rack 143 has returned to the right, further downward movement of the rack 138 is effective to return the carriage to its initial position. During the forward travel of the carriage, its release and rearward travel, two lettuce rows have been assembled and wall 101 has been returned and been advanced twice as the two rows were inserted. The previously cited sequence of operation continues.

The paper feeding mechanism

Means are provided for continuously feeding a measured length of paper across the bed of the machine. A roll of paper 300 is mounted upon a suitable support frame 299, as appears in Figure 1. From the roll, a length 301 is extended over a continuously positively driven roller 302 (Figure 20). This roller is driven by a chain 303 extending over a sprocket 304 on the roller axle. The chain is in turn extended about a sprocket 305 on shaft 308 which carries a mitre gear 306. This gear is meshed with a similar gear 307 (see Figures 1, 11 and 23) on shaft 46. Rollers 310 are suitably urged to ensure that the paper sheet is maintained in contact with the roller 302. The length of paper loops down over roller 302 continuously and is guided by a roller 311 extended between arms 312 so that the paper loops properly. The paper extends upwardly over a roll 314 which, as will presently appear, is intermittently driven. Rollers 310 and 316 are carried upon arms 317 on suitable supporting shafts, rollers 316 being carried on shaft 319 to press the paper against the intermittently driven roller 314. Lever 318 is secured to shaft 319 which also carries the arms 317 supporting the rollers 316. This shaft is rocked intermittently by rod 325 against the bias of spring 320. Rod 325 is connected to one end of lever 321 carrying a cam follower 322 engaging a cam 323 on continuously rotated shaft 308 (Figures 22 and 30). The roller engagement is intermittent

and the rollers 316 are released from against paper on the intermittently driven roller 314 as soon as the drag grippers engage the paper. They are returned when the paper is severed, as will be presently discussed, to hold the paper against roller 314.

Roller 314 is intermittently driven by a cam 330 carried upon shaft 308 (Figures 10 and 23). A cam follower 331 follows the cam and raises rack 332 in its guide 333. This results in rotation of a gear 335, within the guide, which in turn rotates ratchet wheel 334. Depending on the direction of rotation, pawl 336 may engage the ratchet wheel and ensure rotation of gear 337 which is meshed with gear 338 on the shaft 339 carrying roller 314. Paper fed over roll 314 passes over a guide plate 352 and between knife blade 351 and cutting edge 353 and thence on between guides 354 and 355 to be engaged by paper carrying mechanism to be presently described.

Each roller 310 and 316 is carried on an arm 317 on a supporting shaft (Figures 31 and 32). A spring support 342 is keyed to this shaft. The spring support has an extending ear 343 cooperating with a like ear 344 on the arm 317 which is free on the shaft. A spring 345 is positioned between the ears and a stud 347 serves as a spring retaining means and a tension adjusting means.

Operation of the knife blade

The knife blade is carried (Figures 19, 20 and and 23) between suitable frame supports on the machine, and is raised and lowered by cams 356 carried upon a shaft 357, cam followers 358 engaging the cams. Shaft 357 is rotated by chain 359 which extends about a sprocket 360 on the shaft 357 and a sprocket 361 on shaft 308.

The configuration of cams 356 is such that the knife blade is only operated to cut the paper after a given length of paper has been positioned and at an instant when roll 314 is at rest. Springs 362 maintain the followers against the cams to ensure accurate following.

The knife adjusting means

In Figure 25 I have shown means for resiliently supporting the knife blade. The knife blade 351 is reciprocated in a slide in a channel member 371. The channel member is positioned on one of the H beam supports 41. A spacer 372, connected to channel member 371 by pins 373, supports and spaces the member 371 from the H beam 41. Studs 377 are screwed into member 371 and extend through apertures 374 in the spacer 372 and in the H beam. Springs 376 are interposed between the heads of the studs and the H beam, to provide a resilient support for the channel member 371. This ensures that if the knife blade jams it will not be broken, springs 376 providing for flexibility. The movement of the knife blade in the slide in member 371 is adjusted by studs 375 and plate 378 slidably supported on pins 379 in the channel in member 371.

The paper carrying means

Means are provided for carrying the paper into position. This means includes opposite chains 380 carried upon oppositely positioned sprockets 381 and 382 (Figures 7 and 30), on shafts 383 and 384. Mounted upon each chain and extended inwardly is an angle member 386 (see Figure 33). Rotatably mounted upon each chain and cooperatively adjacent each angle 386 is a member 387. Members 386 and 387 are provided in pairs on opposite sides of the machine, a total of three on each chain (Figure 30). The angle member 386 and the rotatable member 387 carry cooperating rubber insert 388 and metal insert 389. A spring 400 biases the member 387 so that the two inserts are normally engaged. As the sprockets are rotated, each member 387 is engaged with a fixed abutment 390 positioned adjacent the paper emerging from between the guides and past the knife blade. This serves to move member 387 into the dotted line position of Figure 33. When the member 387 passes beyond the abutment 390, it snaps back and engages, between the inserts, the positioned sheet of paper which is then dragged across the bed of the machine. When the sheet reaches the other end of the machine stop 392 is engaged (Figure 30). This again moves the member 387, the sheet of paper is released. During its travel, the sheet of paper stops for an instant, the knife is dropped and the sheet is severed. Thereupon the severed sheet is moved on until stop 392 is engaged. In this manner the sheet of paper is positioned suitably on the bed of the machine. When the knife cuts the paper, rollers 316 are engaged with the paper on roll 314 to retain it in position. Shortly after the sheet is severed, roll 314 is driven to feed a new sheet on past the knife and toward the wrapping table. To support the chain, intermediate sprocket supports 396 are provided (Figure 30).

The drive for the paper carrying means

The chains 380 are intermittently driven, shaft 383 carrying a gear 500 (Figures 10 and 26). Gear 500 is in turn in mesh with a gear 501 on a sleeve 505 on countershaft 502. This sleeve carries a pinion 503 which is engaged by a rack 504. The pinion is secured to the sleeve and at the end of the sleeve, opposite to pinion 503, is secured a ratchet plate 506. This plate carries a plurality of pawls 507 (Figure 29), biased by springs 508 to engage ratchet wheel 509. The ratchet wheel is secured to gear 501 which can rotate upon sleeve 505 connecting and joining gear 503 and ratchet plate 506.

The rack 504 is reciprocated by lever 515 (Figure 26). This lever is mounted on shaft 137 carried by suitable journal 517 on the base (Figure 27). The lever carries a cam follower 518 which is engaged with a cam track 519 on a cam 520, on shaft 46. Cam track 519 includes a dwell 521 which permits a 5° stop during which the knife severs the paper.

The package forming mechanism

With the sheet of paper in position the carriage transports across the machine the assembled, compressed heads of lettuce. It will be recalled that wall 101 is moved downwardly and member 181 is moved to grip the paper as the heads pass over and are deposited on the previously positioned sheet of paper, member 181 providing a bridge.

As soon as the members 110 and 111A and 111B have opened and the carriage has started its return trip, mechanism is put into operation to wrap the paper about the package and compress the package. This mechanism comprises a plurality of spaced folding fingers 401 and side compressor plates 402, positioned on opposite sides of the machine. The folding fingers are positioned between a plurality of spaced stationary paper supports 405. (Figures 7, 8, 46–52 inclu-

sive.) The fingers 401 are supported by links 403 carried on shaft 404. Links 407 are carried upon shaft 408, and, with links 406, support the outboard end of the fingers.

Means are provided for rotating shafts 404 and 408 simultaneously to move the opposite fingers 401 toward each other. The timing is such that one set of fingers move up and in toward the other set a little late so that the paper ends are placed one on top of the other. Shaft 426 (Figure 51) carrying gears 427 meshed with gears 428 in shafts 404 provides an interlock on shafts 404. Shaft 429, carrying gears 431 meshed with gears 432 on shaft 408, provides an interlock on shaft 408.

Shafts 404 and 408 are respectively operated in a timed relation. Thus racks 412 each operate a gear 413 on each shaft 404, each rack 412 being operated off of a cam 414 carried upon cam shaft 410 (see Figure 49). Each shaft 408 is operated off a cam 416 also carried on the cam shaft 410, a cam follower (not shown) operating a lift member 417 to rotate plate 418. Links 419 connect the plate to arms 420 carried upon each shaft 408. The timing is such that one set of fingers move up and in toward the other set a little late so that the paper ends are placed one on top of the other and the paper is formed into a tube with the lettuce inside.

Compressor plates 402 are rocked about shafts 308 on which they are carried by linkage 435 connecting them to rocking shafts 421. Shafts 421 (Figures 1 and 47) carry bevel gears 422 which are connected to bevel gears 423. Bevel gears 423 are carried upon cross shaft 434 in turn driven off the rack 437. Gear 436 is carried on an end of shaft 433 (Figure 47) in mesh with rack 437. This is reciprocated by bell crank 438 engaged with cam 439 on shaft 46. The compressor plates rock inwardly together to compress and hold the package of lettuce, extensions 455 on the plates assisting by lifting the paper upwardly. The operation timing is such that, at the instant the extensions 455 have the paper about vertical, fingers 401 move in, hit the paper and fold it over and down whereby, when the operation is over, the lettuce is encased in an open ended tube.

The paper end tucking means

Means are provided for tucking in the ends of the paper tube in which the lettuce is now positioned. This means comprises end tucking fingers 450 mounted upon links 451 and 452 at the ends of the table (Figures 7 and 52). Links 451 and 452 are respectively keyed to shafts 453 and supported freely on shaft 421. One of the shafts 453 is oscillated by cam follower 461 engaging cam 462 on cam shaft 410. The cam follower 461 is carried by a riser 463 which oscillates a lever 464 carrying a link 466 engaged with an arm 467 on one of shafts 453. Shafts 453 are interconnected by suitable bevel gearing 471 on shafts 472 (Figure 7). This results in the ends of the paper tube, in which the lettuce is encased, being tucked inwardly.

Package compression

The positioning of the paper, the positioning of the assembled heads of lettuce, the inward movement of the paper folding fingers and the side compressing walls to form a tube and the end tucking has been previously discussed. There now remains to fold down the package ends and compress the wrapped package, and to then ice and deposit the assembled wrapped package in a container therefor, such as a crate. These various operations will now be discussed.

The compressing ram

To provide for the proper timed operation of the presently described mechanism a cam 601 is provided on shaft 46 (Figure 43). A cam follower 602 engages this cam and operates lever 603 to raise and lower rod 604. Adjacent the upper end of the rod, a rack 606 is provided, enmeshed with a gear 607. Gear 607 is one of a train (see Figure 43) which includes (see Figure 35) a plurality of gears driving gear 608 on shaft 609. Shaft 609 in turn carries (see Figure 37) gears 611 which are meshed with rack 612. Rotation of gears 611 is effective to reciprocate a ram (Figures 2, 36, 37 and 39) indicated generally by 613 downwardly to engage the package positioned beneath it. The ram is counterbalanced by weights 600 which are connected to the ram by cables 605 passed over guide wheels 615.

The ram includes a head 610 carrying opposite pivoted end members 614 which are adapted to engage the ends of the package and compress them together. These end members are pivotally mounted as at 616 and are moved together by links 617 being suitably manipulated. Links 617 are in turn engaged with links 618 which are carried upon slide members 619. The slide members 619 are carried on uprights 620 on the ram and are each joined by a link 621 to a bell crank 622 carried upon an end of upright member 620. A roller 624 is carried upon each bell crank and through this roller the bell crank is suitably manipulated to bring members 614 together, compress the lettuce and fold down the upper end portions of the paper tube in which the lettuce is now encased.

Referring to Figure 41, it has been previously brought out that shaft 357 was rotated by chain 359. Positioned upon this shaft is a cam 626 engaged by a cam follower 627 carried upon a sliding member 628. The sliding member rocks the shaft 630 which extends across the machine (Figure 35) the slide 628 being engaged with a lever 629 on the shaft (Figure 41). Another lever 631 on the shaft serves to rock arm 633 which is pivotally supported on the frame as at 634, link 636 connecting the arm and lever. The extending end of arm 633 engages roller 624, as the ram drops, and rocks the bell crank 622 counterclockwise in Figure 37. This brings the end members 614 in to force down the upper ends of the tube wrapper and to compress the lettuce to crate size. The wrapped package is secured by members 614 and is held between them against gravity.

The icing operation

Carried on the end of the rack members are hopper members 701 and 702 (Figure 37). These are pivotally mounted as at 703 and are joined by links 704 to slides 706 carried in each rack 612. Each slide member 706 carries a pin 707 adjacent its upper end, which engages a stop 708 when the ram is depressed. Upon this happening, the hopper portions 701 and 702 move apart to release crushed or snow ice carried therein down through the grill 711 extending between side members 614 and onto the package beneath. The grill engages the package and, as the rack continues to be depressed, forces the iced package down into the crate which is positioned below.

To ensure that the paper, in which the lettuce is wrapped, is retained about the lettuce, the grill

711 is suspended by rods 712 passed through ears 713. Springs 714 are positioned between the ears and the grill to permit raising of the grill while it is engaged with the wrapped package while the ram is lowered. The grill thus depends below the ram and flattens down the paper on top of the package before and while the members 614 are lowered and finally moved in to engage the package. Springs 714 ensure early and continued engagement of the grill with the package.

The ice feed

Ice is deposited in a reciprocable hopper 719 from an ice conveyor indicated diagrammatically at 721 in Figure 37. The bottom of the ice hopper is hinged as at 722 and in one position is supported by a roller 723. As the hopper moves to the right in Figure 37, the bottom opens to release ice to the package icing hopper provided by portions 701 and 702.

Reciprocating movement of the ice hopper 719 is effected by rack 730 enmeshed with gear 731 on shaft 732. Shaft 732 (Figure 40) is driven by a gear 733 in turn in mesh with a gear 734 carried upon shaft 736. Gear 737, on shaft 736, is in mesh with a rack 738. The rack is moved upwardly by a cam follower 739 which is engaged with butterfly icing cam 740 on shaft 741. Cam 740 includes two risers thereon and a dwell so that ice delivery to the ice hopper occurs only twice with one omission of icing for each rotation of shaft 741. Shaft 741 is rotated by a gear 742 driven by gear 743 on shaft 308. The gear ratio is such that shaft 741 rotates once for each three rotations of shaft 308. This ensures that ice is deposited between the two inner layers in the crate so that each layer is iced.

Positioning the wrapped package

As the rack is moved downwardly, the grill 711 engages the wrapped lettuce, and the false bottom members 801 and 802 are forced to rock about the shafts upon which they are supported. These shafts are indicated at 803 and 804, and are interconnected by suitable bevel gears indicated at 806 so that the shafts move and the members move as a unit. The members are normally biased into a horizontal position by suitable springs (not shown). The shafts are also moved positively by a gear 805 (Figure 53) on one of the shafts 804, rack 807 engaging the gear. This rack is moved by lever 808 engaged with a rod 809 and carrying a cam follower 810 adjacent a forked end of rod 809, the cam follower being engaged with cam 811 on cam shaft 410. The entire wrapped package of lettuce is then deposited in the crate positioned below members 801 and 802.

At this point, the far travel of the ram, the pin 707 is engaged and the ice hopper is opened to release ice onto the positioned package. When members 801 and 802 are in a vertical position, the package slides through them. This tucks up the bottom portion of the ends, completing the package. In this, the package is held between and compressed by end members 614 and member 802 cooperating and overlapping to hold the wrapped package from falling into the crate. The package is deposited in the crate by the ram, not by gravity. And in the crate, the package is in a compressed condition, so that the ram releases quickly without disturbing the lettuce.

The crate support

The crate is supported upon a suitable framework 831 which has a plurality of rollers 832 thereon. Framework 831 is normally positioned in a raised position by chains 833 which are passed over sprockets 834. Weights 835 on the ends of the chains serve to counterbalance the weight of the frame and the crate.

Crates are automatically delivered to the framework 831, in the direction of the arrow in Figure 57, which is then in its lowermost position.

Cam 940 (Figure 54) on shaft 741 is engaged by a cam follower 941. This follower moves rack 944 which in turn rotates a gear 942 on a stub shaft 945. A guide 943 secured to the frame positions the rack, the guide retaining a flange on the rack, as appears in Figure 56. A gear 946 on shaft 945 drives a gear 947 on one of the shafts 948. Shafts 948 are interconnected by bevel gears 950 and bevel gears 951 on shaft 952.

Cam 940 raises the box into its uppermost position, the box or crate rising to meet the descending first layer of lettuce when the cam is engaged with the follower at about point 960. Thereafter the cam falls off, permitting the box to drop slightly until the last layer of lettuce is positioned when the cam permits the box to drop entirely and engage with finger 966 on chain 967 (Figures 57 and 58). Chain 967 is carried between sprockets 968 on shafts 969 and 970. Shaft 970 is driven by chain 971 which in turn extends around sprockets 972 and 973, the last named sprocket being on shaft 974.

As appears in Figures 59 and 60, gear 975 is also carried upon shaft 974 and this is in turn meshed with gear 985 carried on shaft 976, next to spacer 977. Gear 986 on shaft 976 is engaged with rack 987. Cam 978, operating between cam followers 979 and 981 (Figure 57), is effective to oscillate the rack and impart a kick out motion to the filled crate on the positioned frame but in engagement with the finger or kick out arm 966 on the chain. Gear 985 carries pawl plate 988 secured thereto while gear 986 carries ratchet 989 secured thereto. The pawl 982 is biased to engage the ratchet 989 when the ratchet is rotated by gear 986 counterclockwise in Figure 61. This ensures that the kick out chain only operates in one direction.

Conclusion

While I have disclosed one form of my machine herein, that at present preferred, various modifications thereof are possible within the skill of those in the art. The wrapping material, while preferably a water proof moisture permeable sheet, can be of any suitable material.

The machine of the present invention enables uniform crate packing to be practiced, something virtually impossible in hand packing. In packing lettuce, the lettuce is usually sized as forty-eight, sixty and seventy-five to the crate. These are mixed in the crate because, with hand packing, the true number of heads of a given size, in the larger sizes, cannot be packed. With the machine packing of this invention, it is possible to pack a crate completely with even pressure throughout, with a given size of lettuce head. Thus, this machine enables 60 size sixty heads to be packed to fill the crate; with hand packing, for example, one can place only about 54 size sixty heads, and the remainder, 6 heads, size seventy five heads. Even with this mixed packing, damage is done to the heads.

The machine of the present invention, in fact, enables the lettuce to be packed with such even pressure distribution that it is possible to pack

four layers instead of the usual three. In this instance, the last or uppermost layer rises above the edges of the crate slightly. However, by pressing down the opposite edges of the crate lid a "bulged pack" is achieved without damage to the lettuce. In case four layers are packed in a crate it is necessary to change the timing of the icing cam so that it deposits ice upon three of the layers and skips the fourth. It is also necessary to coordinate the crate delivery and removal.

I claim:

1. A packing apparatus for vegetables as lettuce comprising means for assembling a number of said vegetables into a group of predetermined shape and size, means for wrapping said assembled group in a wrapper, means for compressing said wrapped group tightly together, means for depositing the wrapped compressed group into a container in which the state of compression is maintained, and means for depositing ice on top of the wrapper of said deposited group.

2. A packing apparatus for vegetables as lettuce comprising means for assembling a number of said vegetables into a group of predetermined shape and size, means for transferring said assembled group onto a wrapper, means for wrapping said assembled group in a wrapper, means for compressing said wrapped group tightly together, means for depositing the wrapped compressed group into a container in which the state of compression is maintained, and means for depositing ice on top of the wrapper of said deposited group.

3. A packing apparatus for vegetables as lettuce comprising means for wrapping a number of said vegetables in an assembled group in a wrapper, means for compressing said wrapped group tightly together, means for depositing the wrapped compressed group into a container in which the state of compression is maintained, and means for depositing ice on top of the wrapper of said deposited group.

4. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving each delivered row of heads off said delivery means onto means for receiving said row of heads, each delivered row being deposited on said receiving means at a selected position different from that of any other previously delivered row, and carriage means operable upon movement of a predetermined number of rows onto said receiving means to remove heads on said receiving means.

5. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row of heads off said delivery means onto means for receiving said row of heads, carriage means operable upon movement of a predetermined number of heads onto said receiving means to remove heads on said receiving means, and wrapping means for receiving heads transferred by said carriage means and wrapping said heads as a group.

6. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row of heads off said delivery means onto means for receiving said row of heads, carriage means operable upon movement of a predetermined number of heads onto said receiving means to remove heads on said receiving means, wrapping means for receiving heads transferred by said carriage means and wrapping said heads as a group, and compressing means for compressing the wrapped heads into a flat rectangular group assembly.

7. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row of heads off said delivery means onto means for receiving said row of heads, carriage means operable upon movement of a predetermined number of heads onto said receiving means to remove heads on said receiving means, wrapping means for receiving heads transferred by said carriage means and wrapping said heads as a group, compressing means for compressing the wrapped heads into a flat rectangular group assembly, and means for transferring said compressed assembly into a container for said vegetables.

8. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row of heads off said delivery means onto means for receiving said row of heads, carriage means operable upon movement of a predetermined number of heads onto said receiving means to remove heads on said receiving means, wrapping means for receiving heads transferred by said carriage means and wrapping said heads as a group, compressing means for compressing the wrapped heads into a flat rectangular group assembly including a bottom support for said assembly, means for moving said support to release said assembly and permit said assembly to pass down through an aperture defined by said support when moved by said moving means, and means for engaging said assembly and supporting said assembly while said engaging means lowers said assembly into a container for said assembly.

9. In a machine of the character described, means for delivering a plurality of loose compressible articles periodically as a group, means for moving each group as delivered onto an assembly bed, a movable carriage positioned over said bed and including article compressing means, means for operating said compressing means upon assembly of a predetermined number of said articles to compress said articles into a composite group, and means for moving said carriage after said compressing means are in article engaging position and have compressed said articles.

10. In a machine of the character described, means for delivering a plurality of loose compressible articles periodically as a group, means for moving each group as delivered onto an assembly bed, article restraining means cooperating with said bed to position articles, a movable carriage positioned over said bed and including article compressing means, means for operating said compressing means upon assembly of a predetermined number of articles to compress said articles, means for moving said carriage after said compressing means are in article engaging position, means for moving said restraining means out of restraining position upon initial carriage movement away from said bed and for returning said restraining means to cooperate in positioning articles delivered for assembly while said carriage is out of position.

11. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row

of heads off said delivery means onto means for receiving said row of heads, and carriage means operable upon movement of a predetermined number of heads onto said receiving means to first tightly compress said predetermined number of heads together and then to remove heads on said receiving means.

12. A packing apparatus for vegetables as lettuce comprising means for delivering lettuce heads in a row containing a predetermined number of heads, means for moving said delivered row of heads off said delivery means onto means for receiving said row of heads, carriage means operable upon movement of a predetermined number of heads onto said receiving means to first tightly compress said predetermined number of heads together and then to remove heads on said receiving means, and wrapping means for receiving heads transferred by said carriage means and wrapping said heads as a group.

13. A packing apparatus for vegetables as lettuce comprising means for assembling and compressing a number of said vegetables into a group of predetermined shape and size, means for wrapping said assembled group in a wrapper, means for depositing the wrapped compressed group into a container therefor, and means for discharging over said deposited group a predetermined quantity of ice.

14. In a machine of the character described, means providing a support bed for a sheet of paper, means for positioning a sheet of paper on said bed, means for depositing on said sheet a predetermined number of articles, means for rotating toward each other opposite portions of said support bed to interleave ends of said paper sheet and provide a tube about said articles, and means for rotating toward each other the other opposite portions of said support bed to fold up the bottom extending overhanging end portions of said tube and to compress said articles.

15. In a machine of the character described, means providing a support bed for a sheet of paper, means for positioning a sheet of paper on said bed, means for depositing on said sheet a predetermined number of articles, means for rotating toward each other opposite portions of said support bed to interleave ends of said paper sheet and provide a tube about said articles, means for folding the upper extending overhanging end portions of said tube, and means for rotating toward each other the other opposite portions of said support bed to fold up the bottom extending overhanging end portions of said tube and to compress said articles.

16. In a machine of the character described, an article wrapping and compressing means including opposite pairs of bed support members, and means for moving each pair separately and in a sequential order from a first position, in which said members are parallel and lie in a common plane to provide a support bed, to a second position in which said members define a chute, the first moved pair being supported for rotation toward each other to confine articles therebetween, the second moved pair being supported for rotation toward each other while said first pair are in rotated position to cooperate therewith in defining a compressing chute through which as said articles descend they are compressed.

17. In a machine of the character described, means providing a support bed for a sheet of paper, means for positioning a sheet of paper on said bed, means for depositing on said sheet a predetermined number of articles, means for rotating toward each other opposite portions of said support bed to interleave ends of said paper sheet and provide a tube about said articles, a ram positioned over said bed and carrying means for folding the upper extending overhanging end portions of said tube means for lowering said ram and operating said folding means to fold said tube portions and hold said articles, and means for rotating toward each other the other opposite portions of said support bed to fold up the bottom extending overhanging end portions of said tube and to compress said articles.

18. In a device of the character described, a support bed including a plurality of rotatably supported members normally coplanar and cooperating to provide a flat support, means for positioning a wrapper on said flat bed, means for positioning a plurality of articles on said wrapper, and means for wrapping said wrapper about said positioned articles to provide a package, and means for rotating said bed members to withdraw support from said package and provide a vertically extending chute down which said package slides.

19. In a device of the character described, a support bed including a plurality of rotatably supported members normally coplanar and cooperating to provide a flat support, means for positioning a wrapper on said flat bed, means for positioning a plurality of articles on said wrapper, and means for wrapping said wrapper about said positioned articles to provide a package, and means for rotating said bed members to compress said package and simultaneously to withdraw support from said package and provide a vertically extending chute down which said package slides in a compressed state.

20. In a device of the character described, a support bed including a plurality of rotatably supported members normally coplanar and cooperating to provide a flat support, means for positioning a wrapper on said flat bed, means for positioning a plurality of articles on said wrapper, and means for wrapping said wrapper about said positioned articles to provide a package, and means for rotating said bed members to compress said package and simultaneously to withdraw support from said package and provide a vertically extending chute down which said package slides in a compressed state, and means for positioning a container beneath said chute to receive said compressed package.

21. In a machine of the character described, means for delivering a plurality of rows of loose compressible articles to a station in said machine, a carriage, means supporting said carriage for travel from over said station to a discharge position, and compressing means carried on said carriage and effective to compress said delivered articles on said station and retain said compressed articles for transport by said carriage from said station to said discharge position.

22. In a machine of the character described, means for positioning a plurality of rows of loose compressible articles at a first position in said machine, a carriage, means supporting said carriage for travel from over said first position wherein said carriage is over said article to a discharge position, compressing means carried on said carriage and effective to compress articles at said first position and retain said compressed articles for transport by said carriage from said first position to said discharge position, and means effective after operation of said compressing means to move said carriage from said first

position whereby said carriage transports said compressed and retained articles.

23. In a machine of the character described, means for positioning a plurality of rows of loose compressible articles at a receiving position in said machine, a carriage, means supporting said carriage for travel from over articles at said receiving position to a discharge position, compressing means carried on said carriage and effective to compress articles at said receiving position and retain said compressed articles for transport by said carriage from said receiving position to said discharge position and means effective upon said carriage reaching said discharge position (1) to release said compressing means and (2) to initiate return of said carriage.

24. In a machine of the character described, means for positioning a plurality of rows of loose compressible articles at a receiving position in said machine, a carriage, means supporting said carriage for travel from said receiving position to a discharge position, compressing means carried on said carriage and effective to compress articles of said receiving position and retain said compressed articles for transport by said carriage from said receiving position to said discharge position, means effective after operation of said compressing means to move said carriage from said receiving position whereby said carriage transports said compressed and retained articles and means effective upon said carriage reaching said discharge position (1) to release said compressing means and (2) to initiate return of said carriage.

25. In a machine of the character described, means for positioning a plurality of rows of loose compressible articles at a receiving position in said machine, a carriage, means supporting said carriage for travel from said receiving position to a discharge position, compressing means carried on said carriage, and including opposite pairs of members, and means for moving each pair together and whereby said articles are compressed and held between said members.

26. In a machine of the character described, means for positioning a plurality of rows of loose compressible articles at a receiving position, a carriage, means supporting said carriage for travel from said receiving position to a discharge position, compressing means carried on said carriage, and including opposite pairs of members, and means for moving each pair together whereby said articles are compressed and held and said carriage is effective to compress articles at said receiving position and retain said compressed articles for transport by said carriage from said receiving position to said discharge position.

27. In a machine of the character described, a carriage movable back and forth between a first and a second position, article compressing and retaining means carried by said carriage, means for operating said compressing means, means for moving said carriage, and means effective on operation of said moving means to initiate operation of said operating means to compress and retain articles positioned cooperatively adjacent said carriage, before said carriage moves.

28. In a machine of the character described, a carriage movable back and forth between a first and a second position, article compressing and retaining means carried by said carriage, means for operating said compressing means, means for moving said carriage, and means effective on initial operation of said moving means to move said carriage from said first to said second position first to initiate operation of said operating means to compress and retain articles positioned cooperatively adjacent said carriage, before said carriage moves.

29. In a machine of the character described, a carriage movable back and forth between a first and a second position, article compressing and retaining means carried by said carriage, means for operating said compressing means, means for moving said carriage, and means effective on initial operation of said moving means to move said carriage from said first to said second position first to initiate operation of said operating means to compress and retain articles positioned cooperatively adjacent said carriage, before said carriage moves and upon said carriage reaching said second position to release said compressed articles.

30. In a machine of the character described, an article packing frame including a plurality of movable members, means for delivering substantially continuously a stream of articles, means for simultaneously removing from said stream in row form a plurality of delivered articles, means for transferring simultaneously in layer form a plurality of said rows to said article packing frame, means for moving said members to contract said frame and compress articles placed in layer form within the confines of said frame, means for positioning a crate to receive articles assembled and compressed by said frame, and an ejector for forcing said compressed layer into said crate.

31. In a device of the character described, means for positioning a flat wrapper sheet horizontally, means for depositing on said sheet a substantially compact assembly composed of a plurality of separate compressible articles to be wrapped, and means for folding extended portions of said sheet over said articles to encase said assembled articles and, during the course of said folding, compressing said assembly while encased in said folded wrapper whereby said articles are retained in said wrapper in a compacted state.

32. In a device of the character described, means for positioning a flat wrapper sheet horizontally, means for depositing on said sheet a substantially compact assembly composed of a plurality of separate compressible articles to be wrapped, means for folding extended portions of said sheet over said articles to encase said assembled articles and, during the course of said folding, compressing said assembly from the sides while encased in said folded wrapper whereby said articles are retained in said wrapper in a compacted state, means for receiving said wrapped assembly in a compressed state, and means for transferring said wrapped assembly into said receiving means and compressing said assembly from the top and bottom while said assembly is in said receiving means.

33. In a machine of the character described, an article packing frame including a plurality of oscillatable members, means for depositing upon said frame a preformed layer made up of a plurality of rows of said articles, means for moving said members to contract said frame and compress articles placed in layer form within the confines of said frame, means for positioning a crate to receive articles assembled and compressed by said frame, and an ejector for forcing said compressed layer into said crate.

34. In a machine of the character described, an article packing frame including a plurality of movable members, means for moving said members to contract said frame and compress articles

placed in layer form within the confines of said frame, means for wrapping articles compressed by said frame, means for positioning a crate to receive articles assembled and compressed by said frame and wrapped by said wrapping means, and an ejector for forcing said compressed and wrapped layer into said crate.

35. In a machine of the character described, an article packing frame including a plurality of movable members, means for moving said members to contract said frame and compress articles placed in layer form within the confines of said frame, means for wrapping articles compressed by said frame, means for moving said frame to deposit said compressed articles on said wrapping means, means for positioning a crate to receive articles assembled and compressed by said frame and wrapped by said wrapping means, and an ejector for forcing said compressed and wrapped layer into said crate.

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