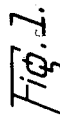


1,348,341.

55 SHEETS—SHEET 1.



WITNESSES
Wm. Helmer
M. A. Hurley.

INVENTOR

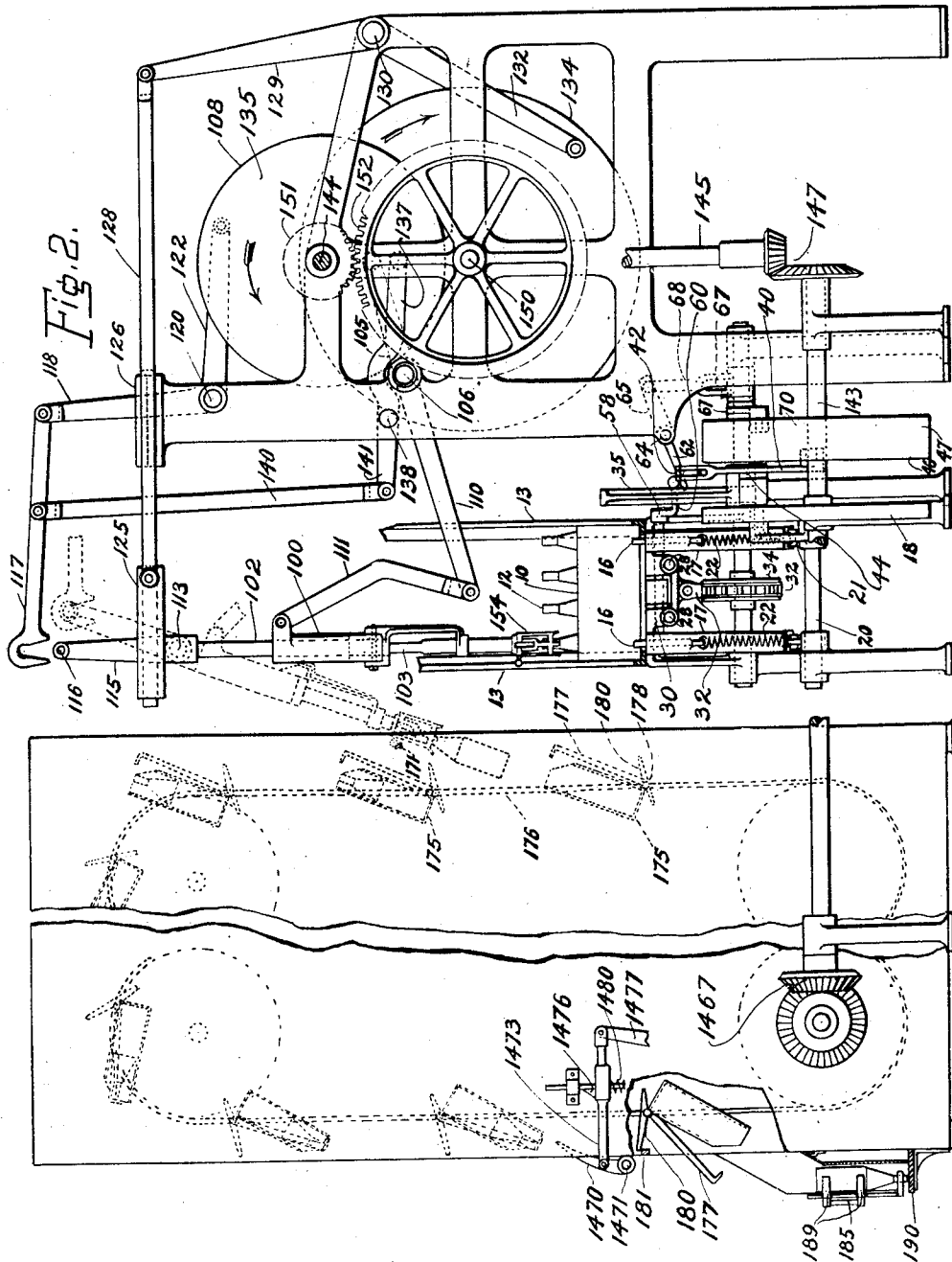
Executed E. M. Minkley
by his attorney
Philip Van Fleet Esq.

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 2.



WITNESSES
Wm Helmer.
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Philip, Hurst & West,

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 3.

1,348,341.

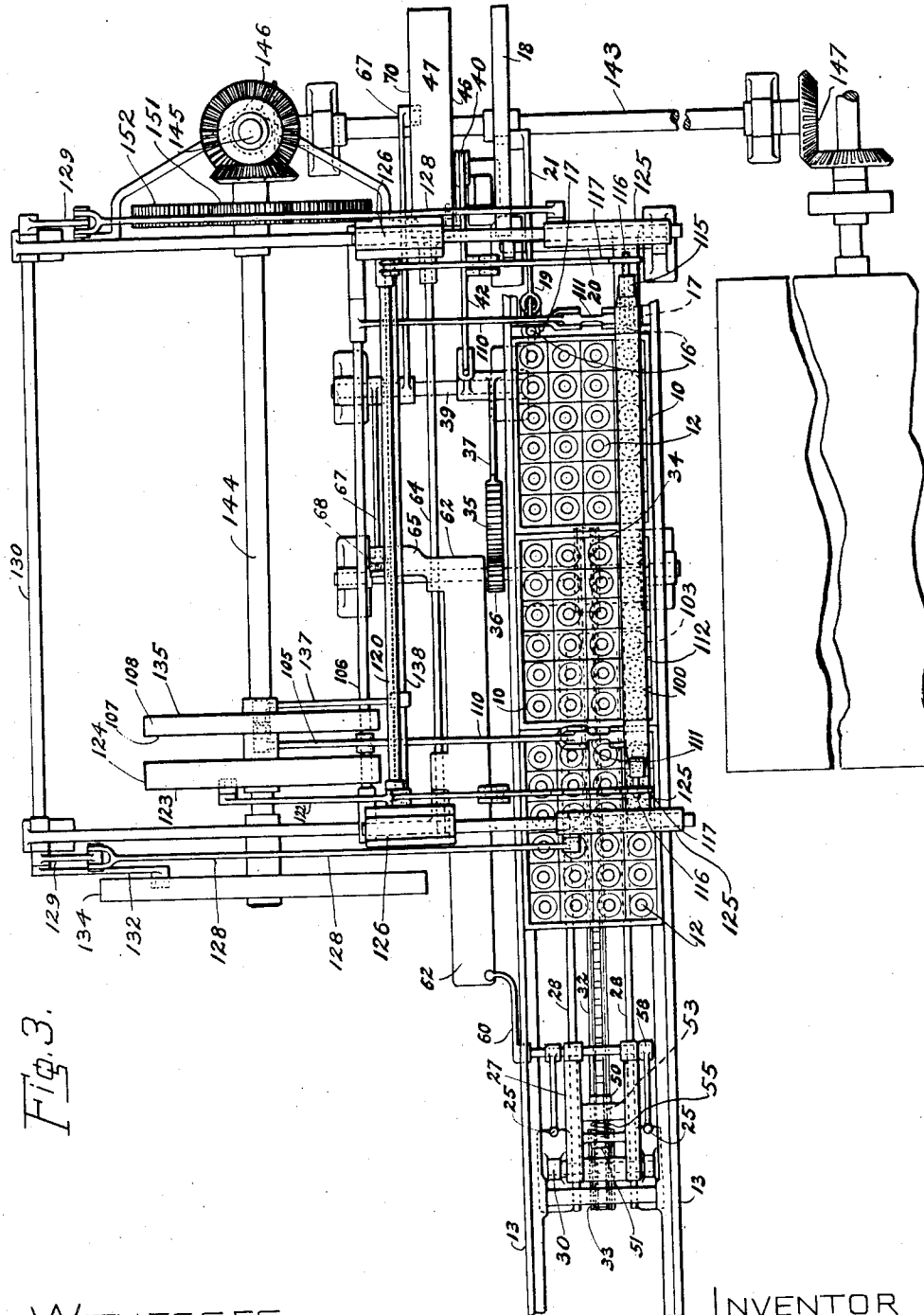


Fig. 3.

WITNESSES
Wm Helmer
M. A. Hurley.

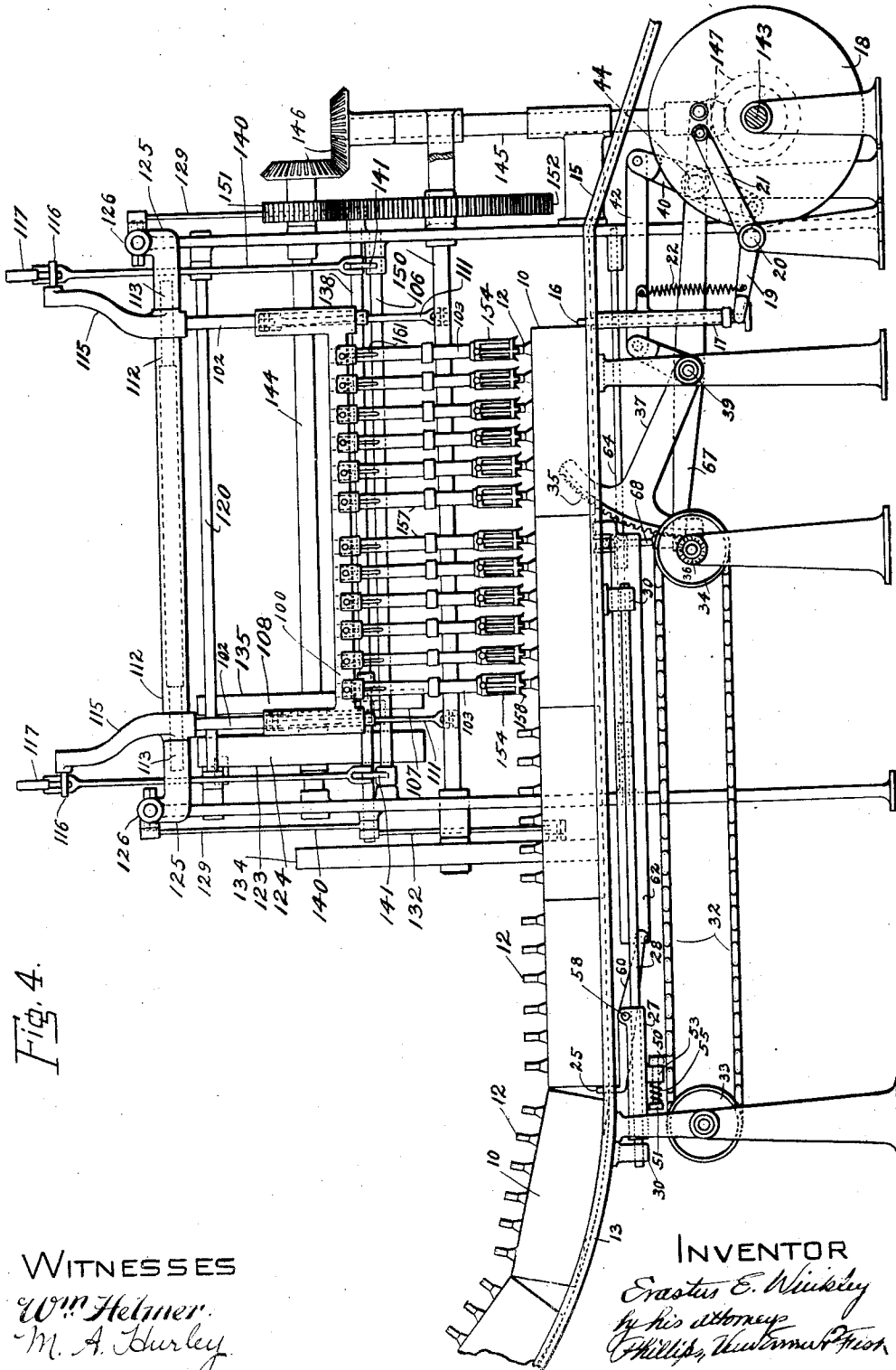
INVENTOR
Erastus E. Winkley
by his attorneys
Phillips, Hunt & Winkley

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

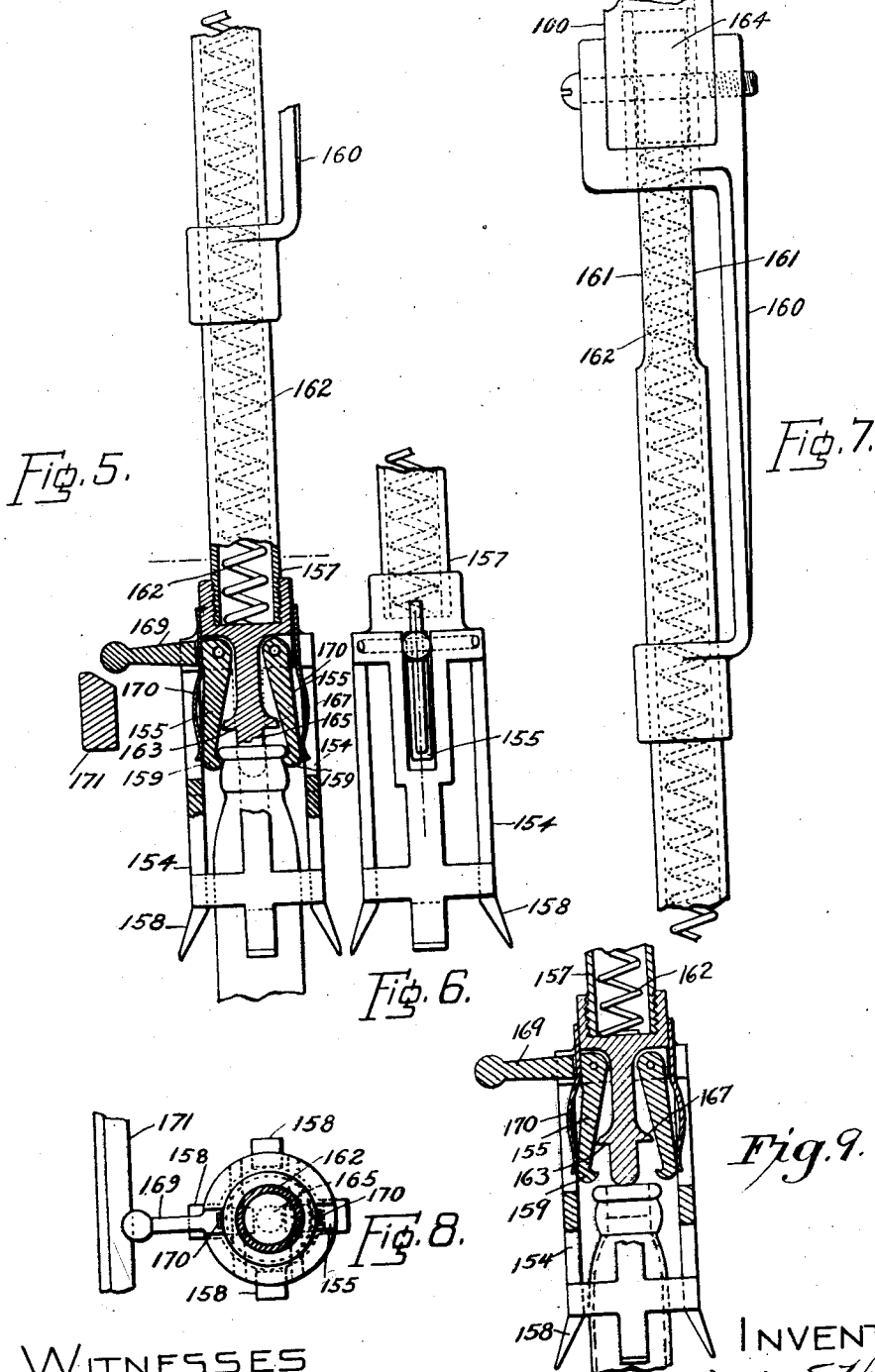
Patented Aug. 3, 1920.

55 SHEETS—SHEET 4.

1,348,341.



1,348,341.

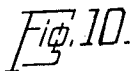
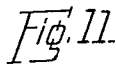


WITNESSES
Wm. Helmer
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Thompson & Winkley

1,348,341.

55 SHEETS—SHEET 6.



WITNESSES
Wm Helmer.
M. A. Hurley.

INVENTOR
E. E. Whiskey
by his atty. in law
J. H. Phillips, inventor, and J. H. Phillips

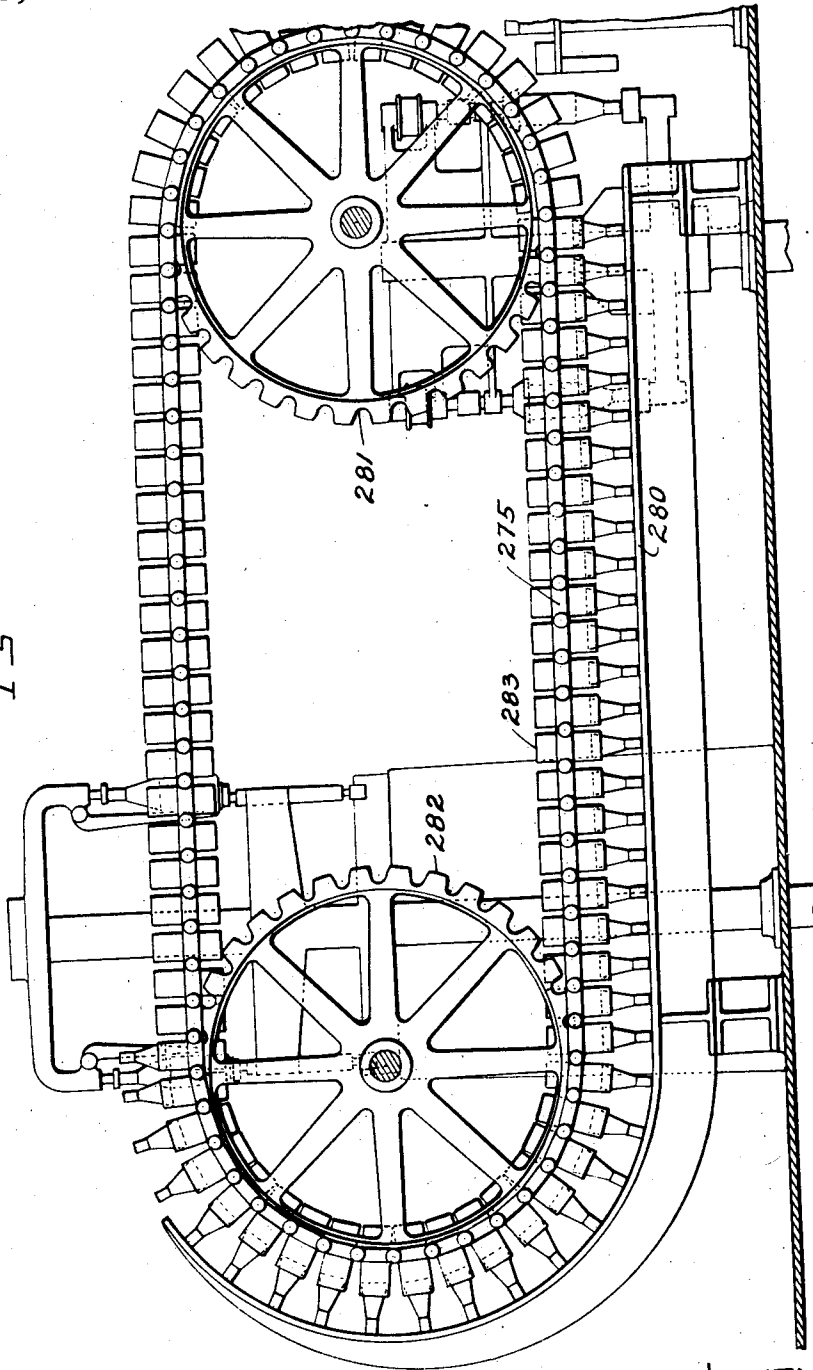
E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 7.

1,348,341.

Fig. 13.



WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Philip, Hurst & Co.

1,348,341.

55 SHEETS—SHEET 8.



W^m Helmer
M. A. Hurley.

INVENTOR

Ernest E. Whiskey
by his attorney
Phillip, Esq. in and from

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 9.

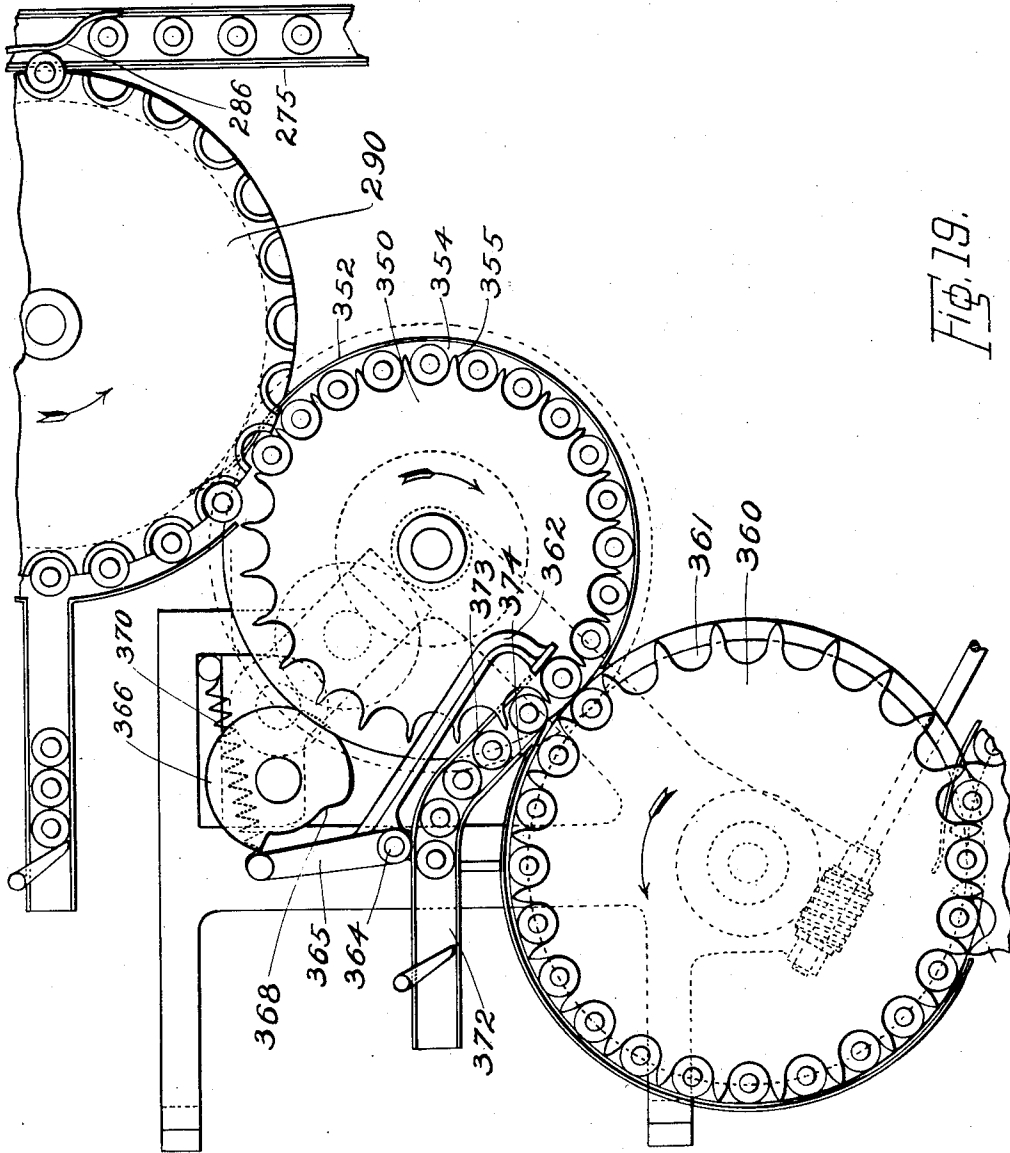


Fig. 19.

WITNESSES

Wm. Helmer
M. F. Hurley.

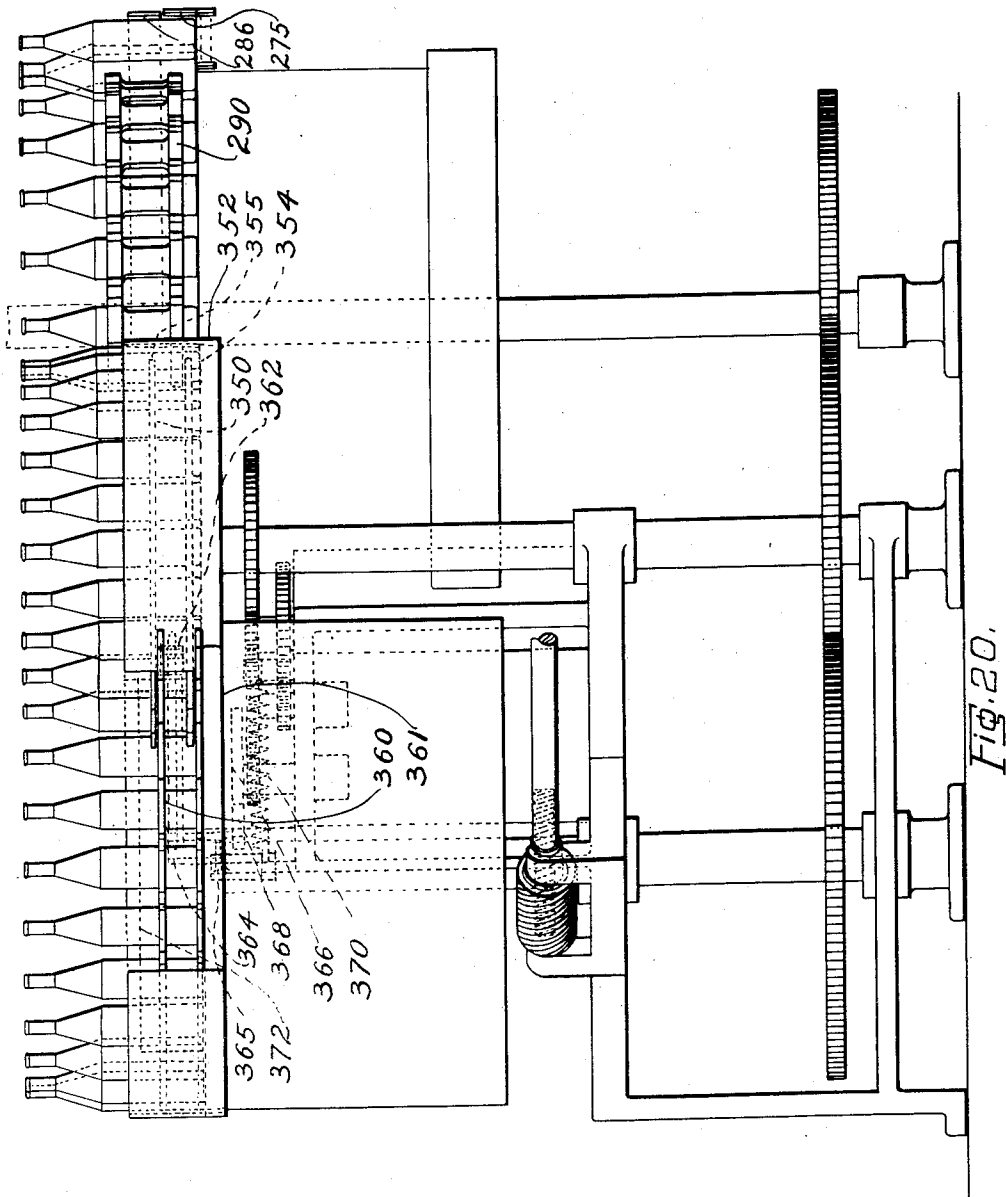
INVENTOR

Erastus E. Winkley
by his attorney
Hill, Winkley & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.
55 SHEETS—SHEET 10.



WITNESSES
Wm. Helmer
M. F. Hurley.

INVENTOR
Eustus E. Winkley
by his attorney
Phillips, Wadsworth & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 11.

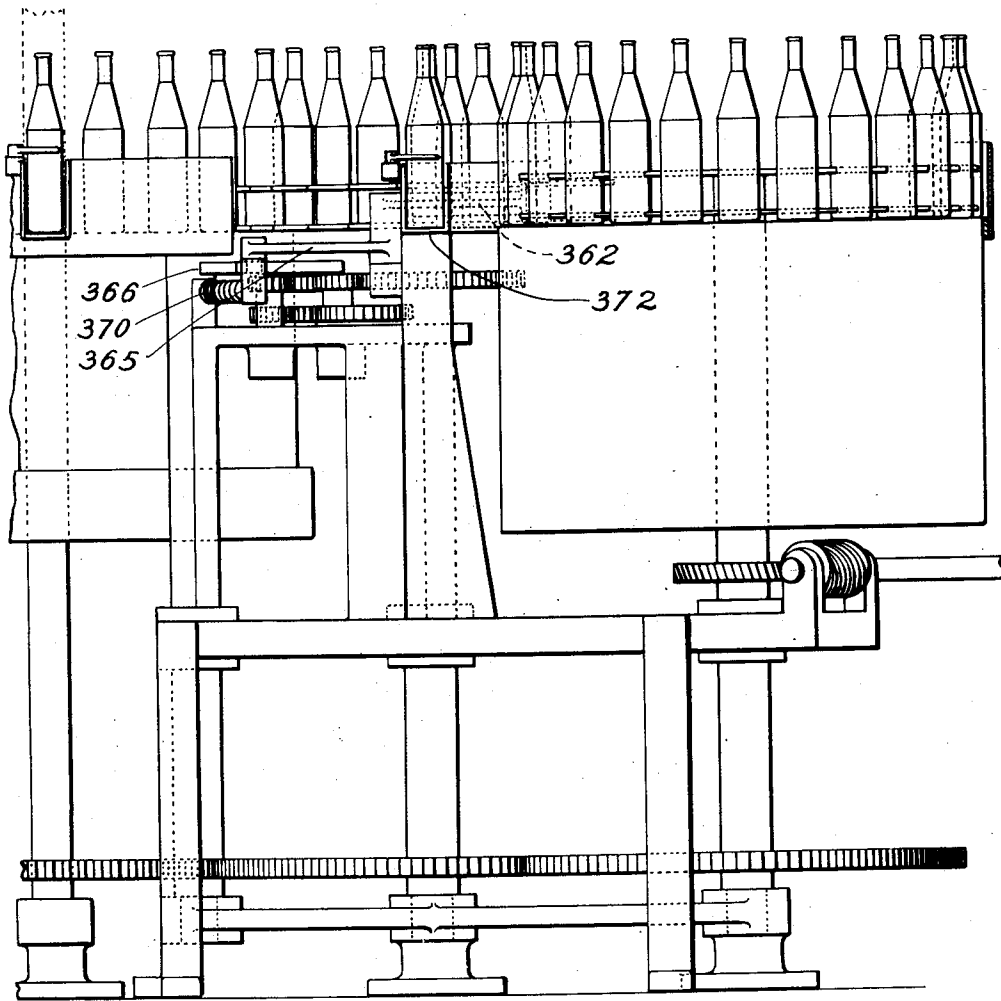


Fig. 21.

WITNESSES
Wm. Helmer
M. A. Hurley.

INVENTOR
Eustis E. Winkley
by his attorney
Phillips, Edmunds & Frick

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 12.

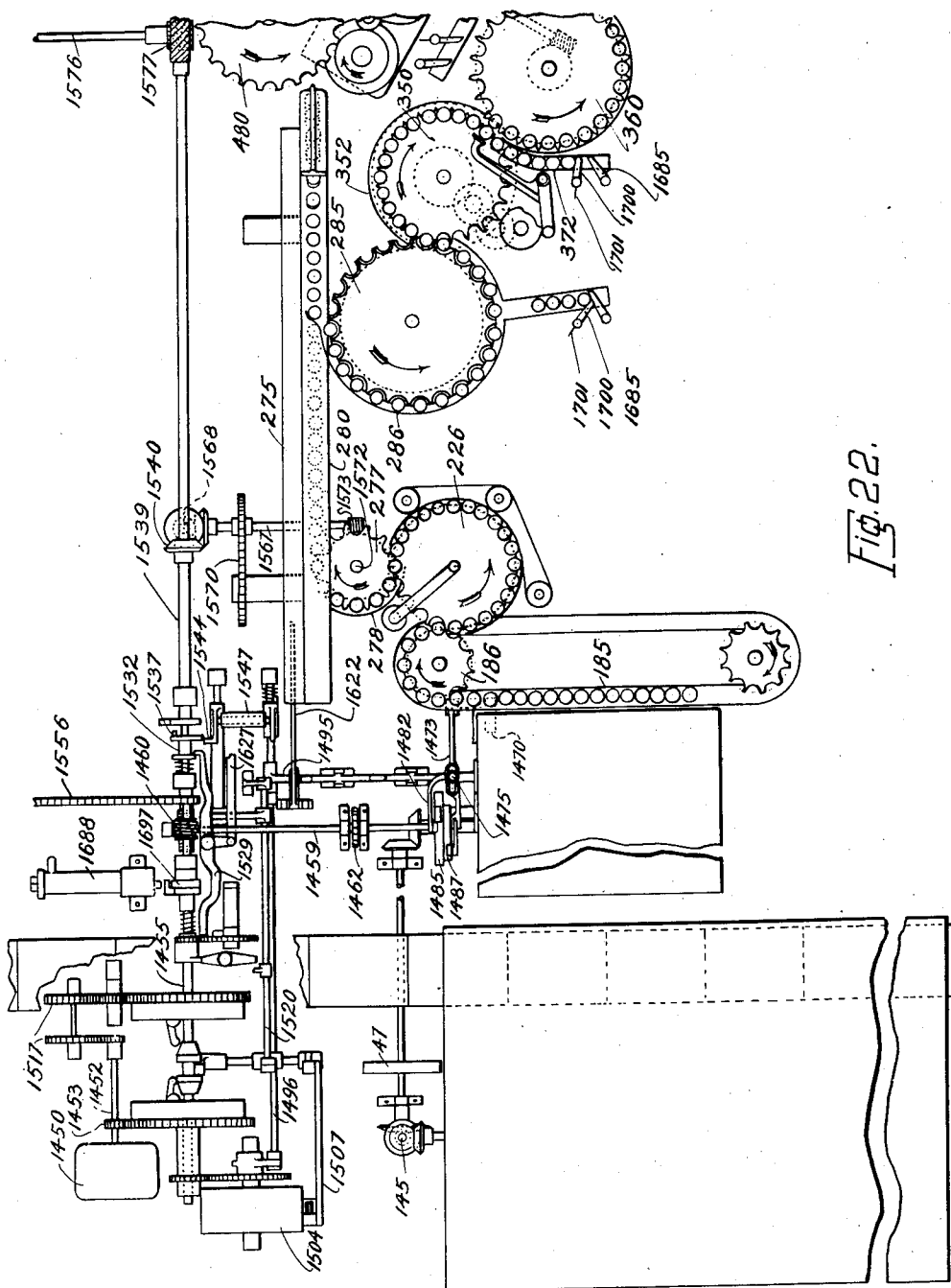


Fig. 22.

WITNESSES
Wm. Helmer
M. A. Hurley

INVENTOR
E. E. Winkley
by his attorneys
Phillips, Hurst & Co.

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 13.

1,348,341.

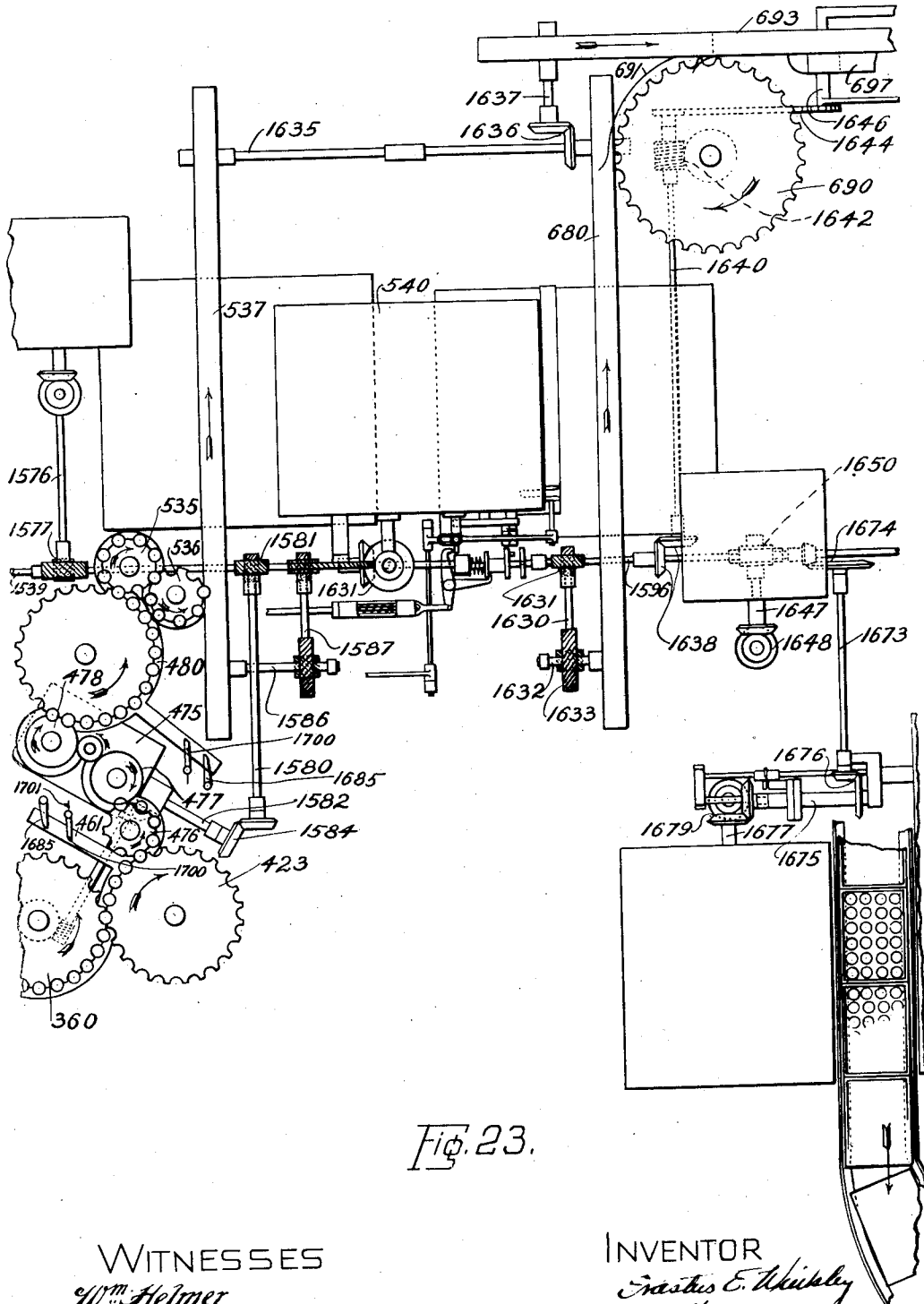


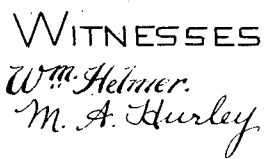
Fig. 23.

WITNESSES
Wm. Helmer
M. A. Hurley

INVENTOR
E. E. Winkley
By his attorney
Phillips, Newman & Fish

1,348,341.

55 SHEETS—SHEET 14.



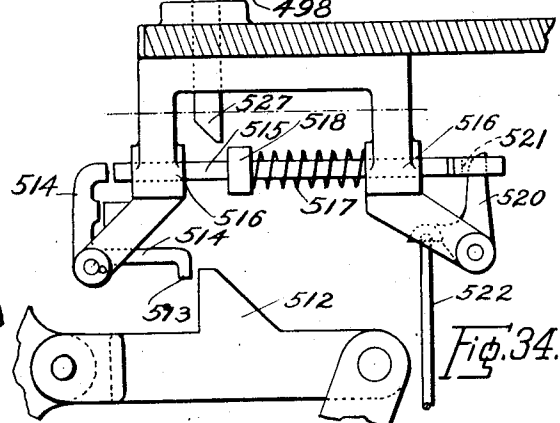
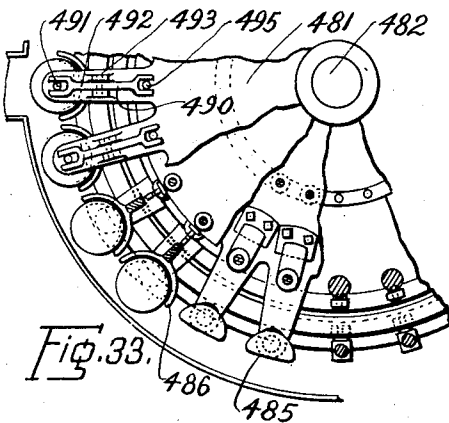
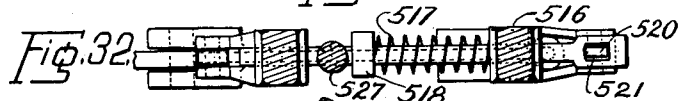
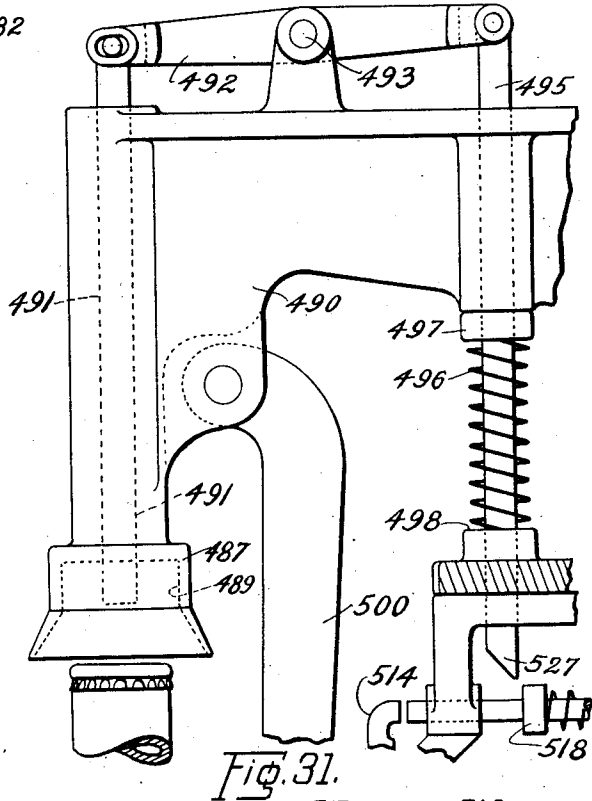
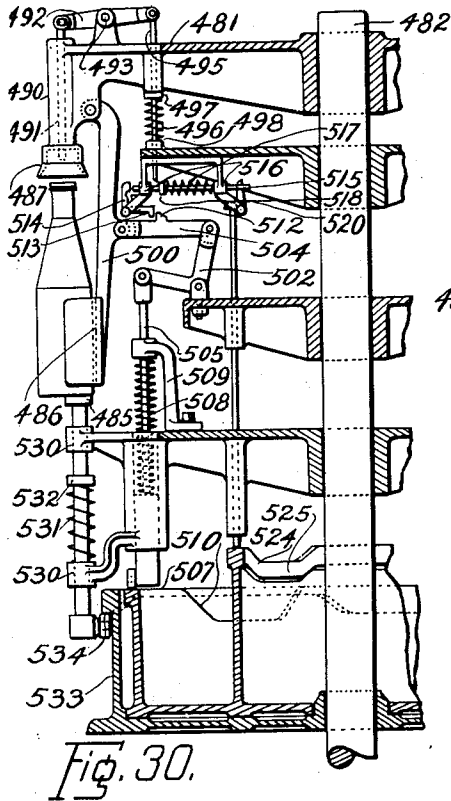
INVENTOR
Ernest E. Whiskey
by his attorneys
Phillips, Hewitt & Hiss

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 15.



WITNESSES
Wm. Helmer
M. A. Hurley.

INVENTOR
Eustas E. Winkley
by the attorney
Phillips, Hunt & Frost.

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 16.

1,348,341.

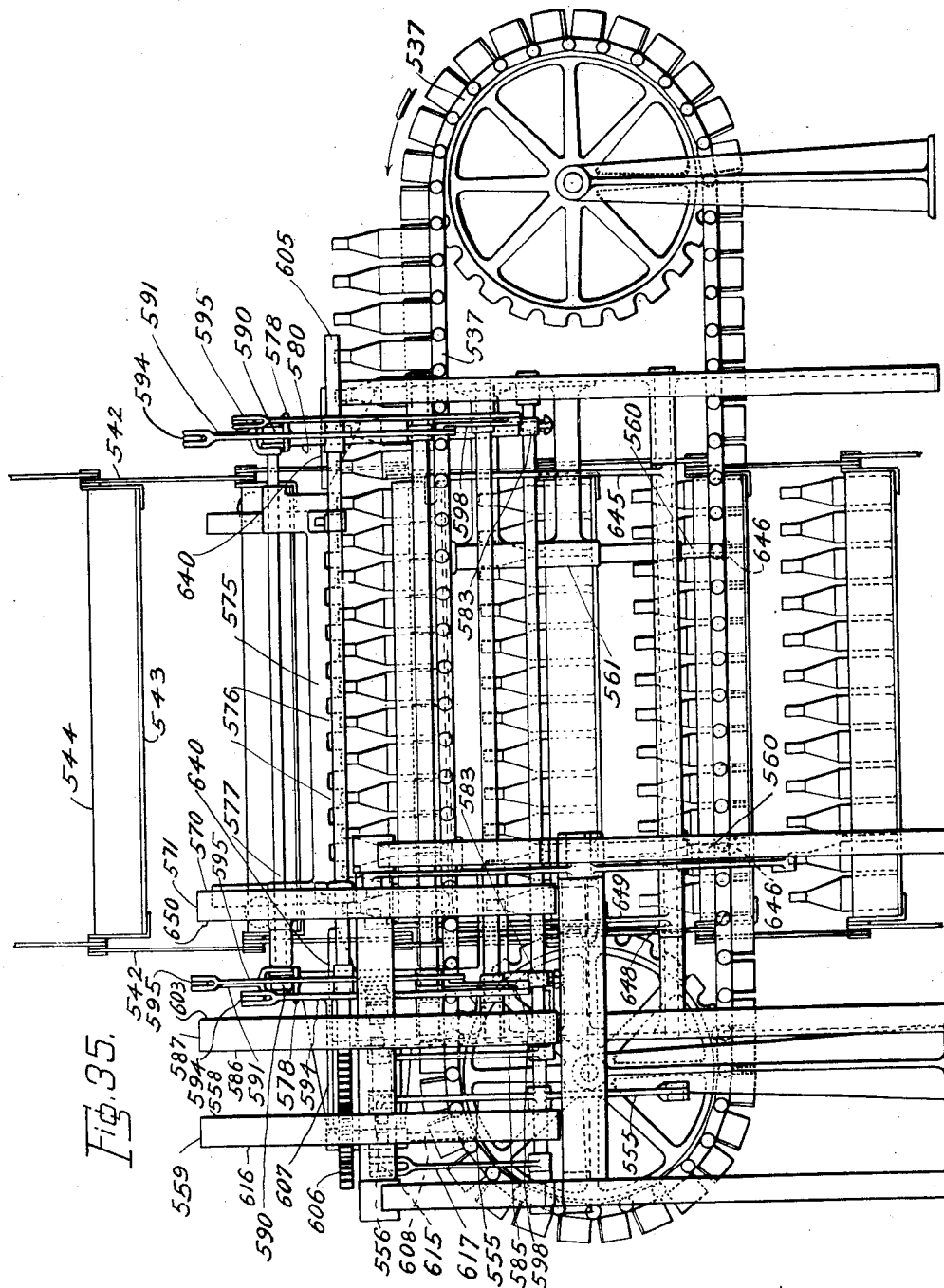


Fig. 35.

WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Philip, Lawrence & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 17.

1,348,341.

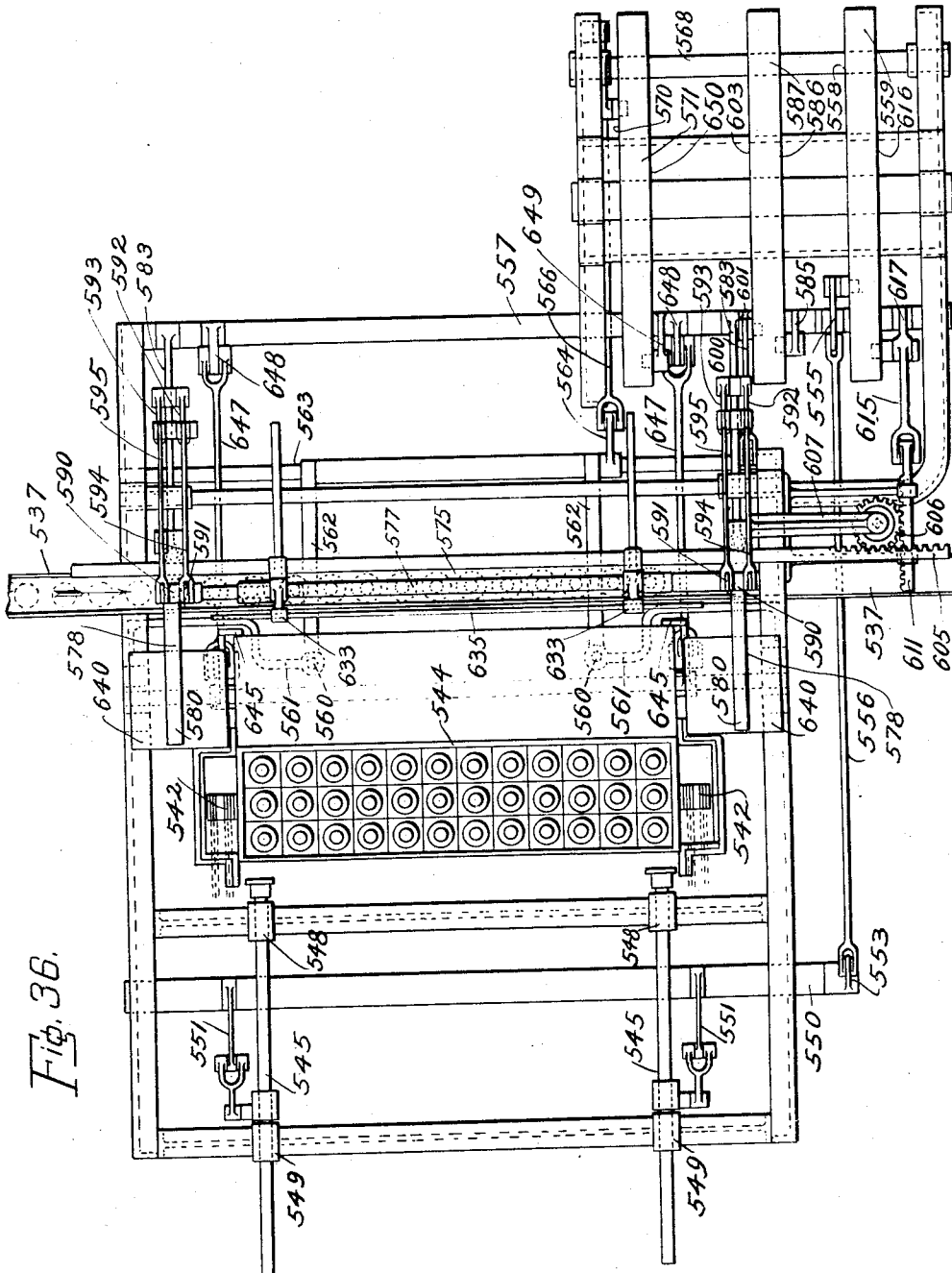


Fig. 36.

WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Phillips, Thompson & Wilson

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 18.

1,348,341.

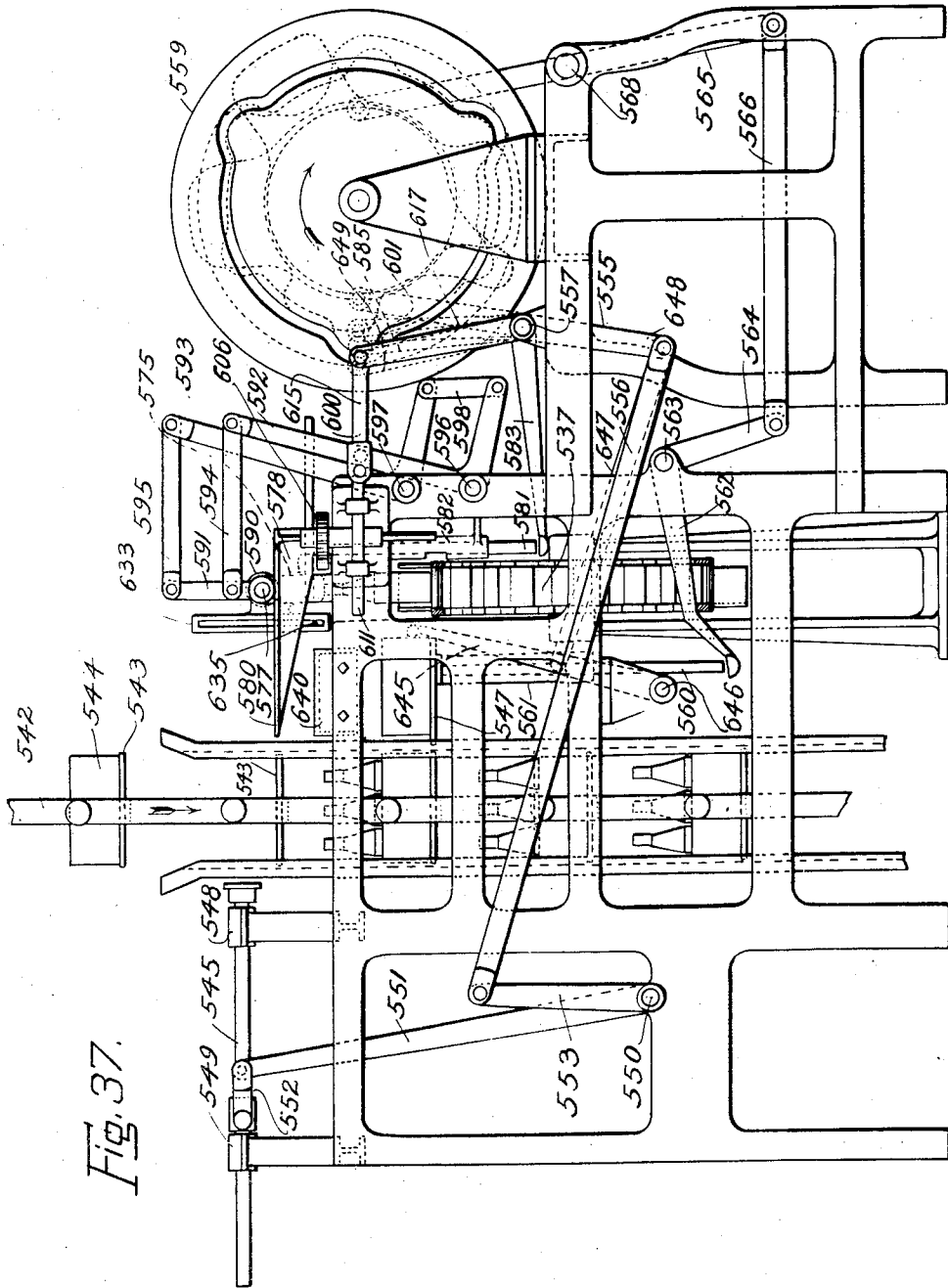


Fig. 37.

WITNESSES

Wm. Helmer.
M. A. Hurley.

INVENTOR

E. E. Winkley
by his attorney
Philip, Underwood & Son

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 19.

1,348,341.

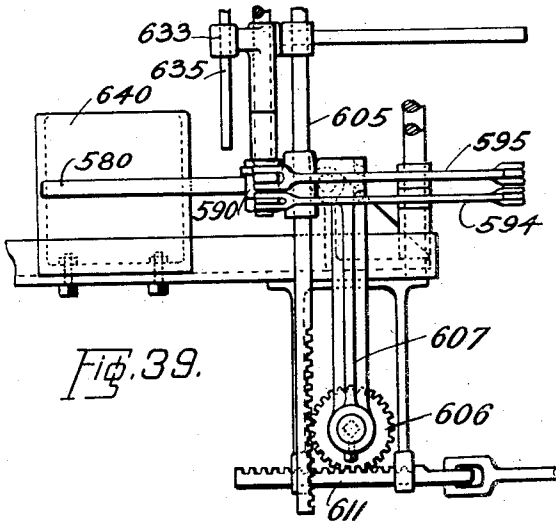


Fig. 39.

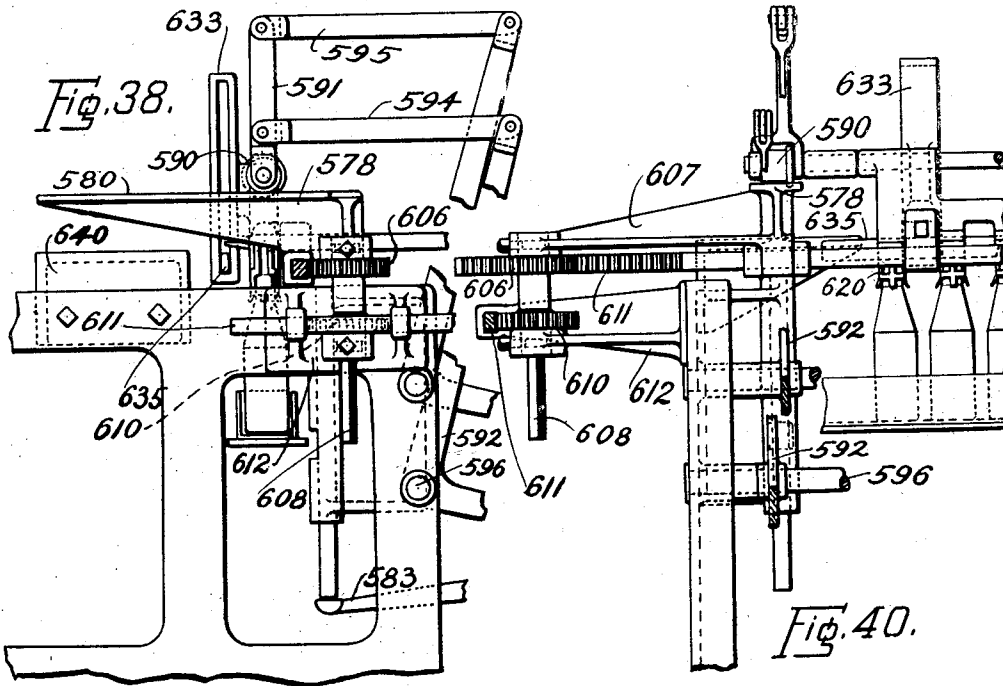


Fig. 40.

WITNESSES

Wm. Helmer.
M. A. Hurley.

INVENTOR

Ernest E. Winkley
by his attorney
Philip, Watson & Cook

1,348,341.

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 20.

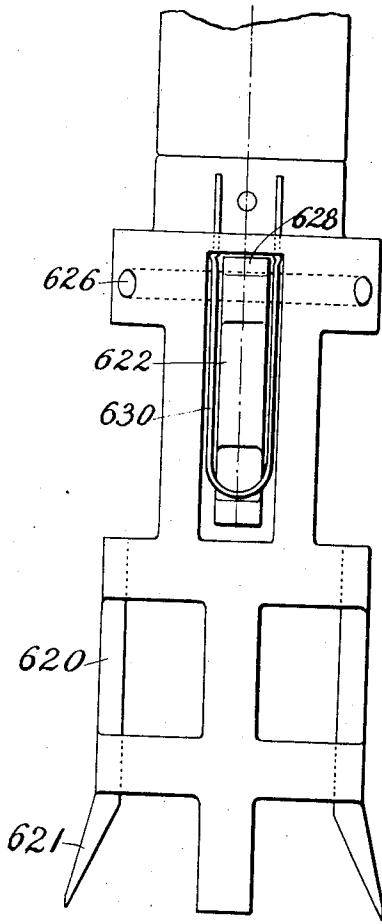


Fig. 41.

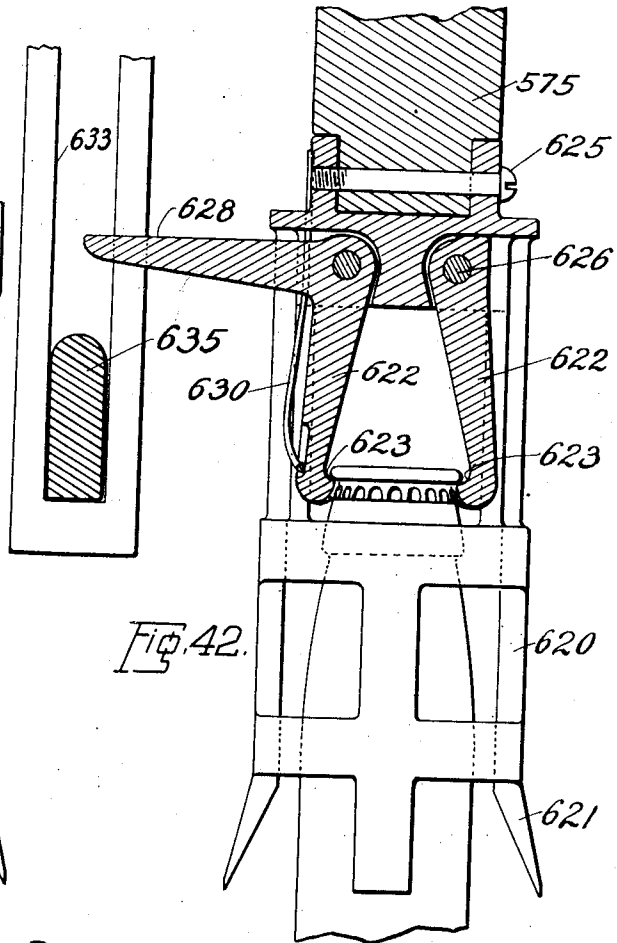


Fig. 42.

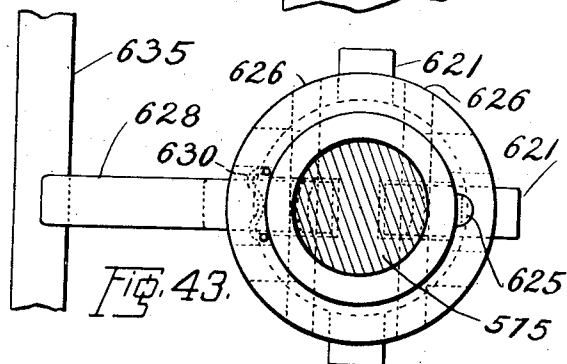


Fig. 43.

WITNESSES
Wm. Helmer.
M. A. Hurley.

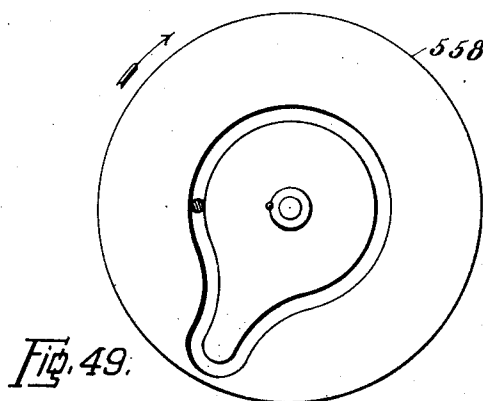
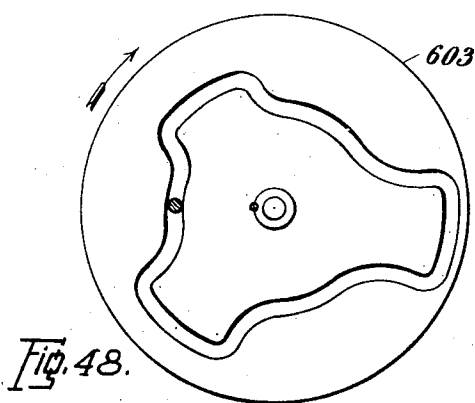
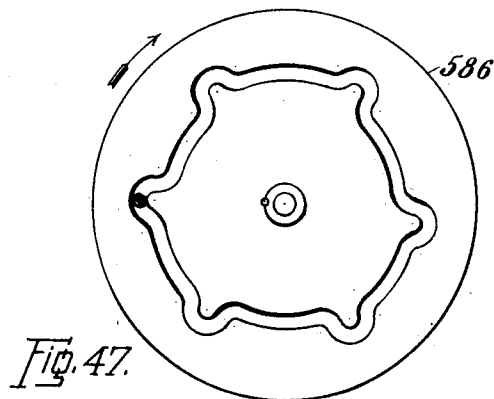
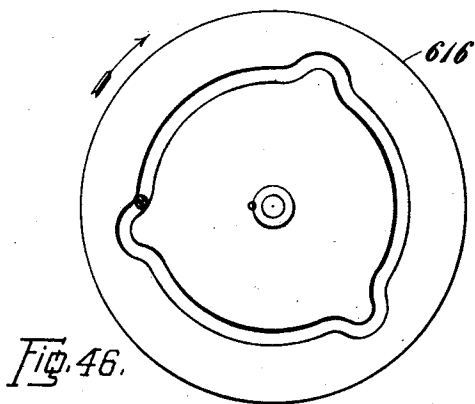
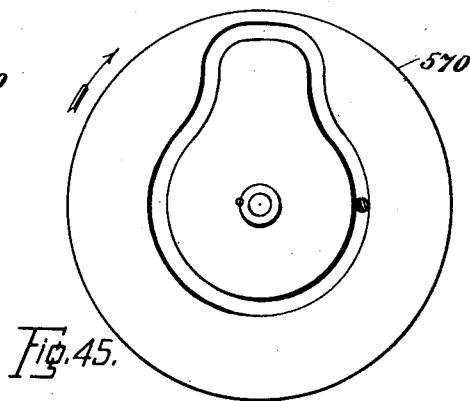
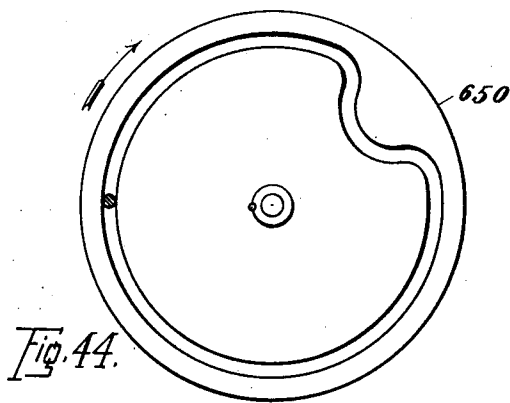
INVENTOR
Ernest E. Winkley
by his attorneys
Phillips, Van Orman & Fisk

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 21.



WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
Erastus E. Winkley
by his attorney
Phillips, Van Orman & Hook

1,348,341.

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.
55 SHEETS—SHEET 22.

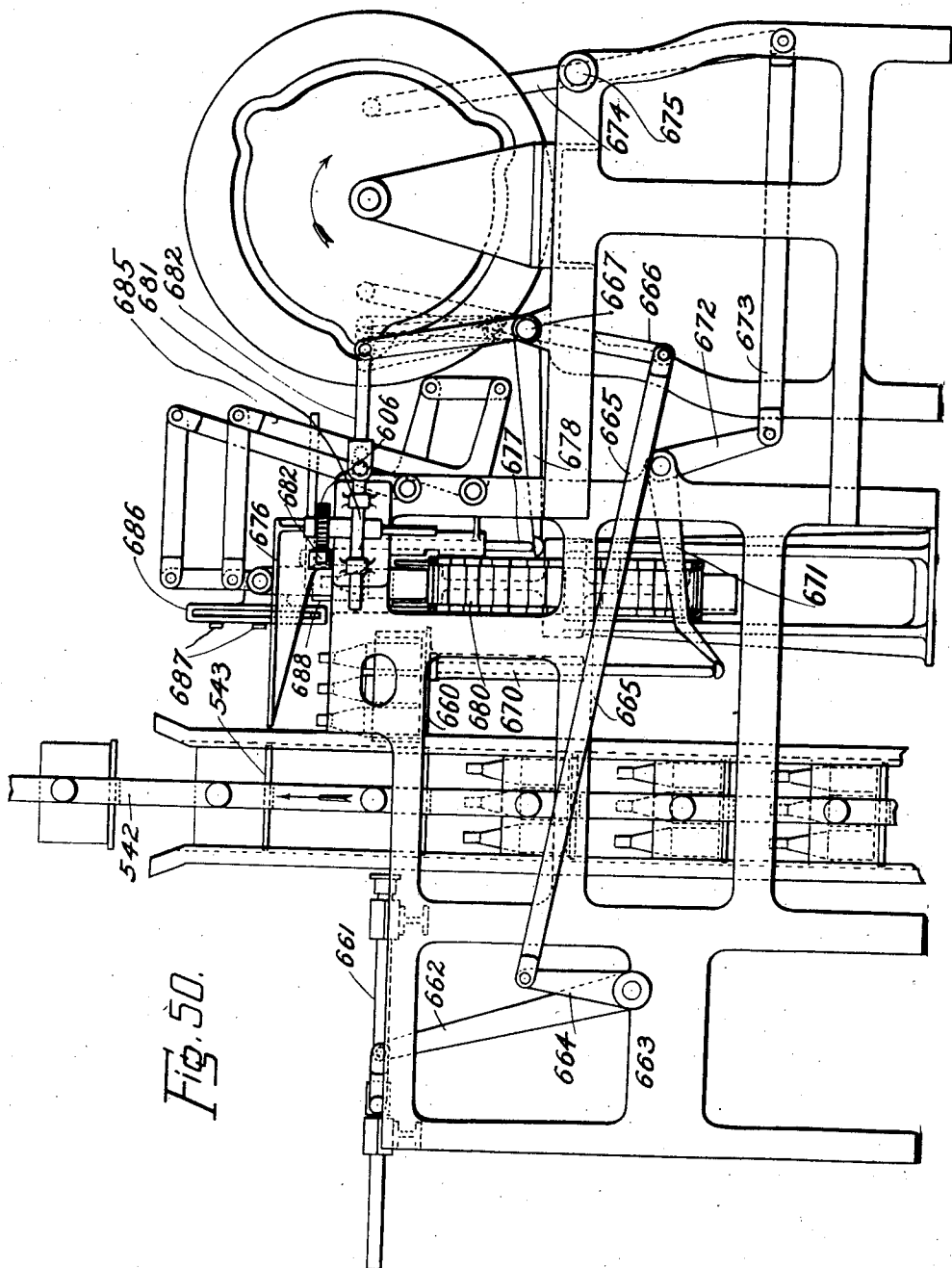


Fig. 50.

WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
Eustis E. Winkley
by his attorney
Phillips, Newcomb & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 23.

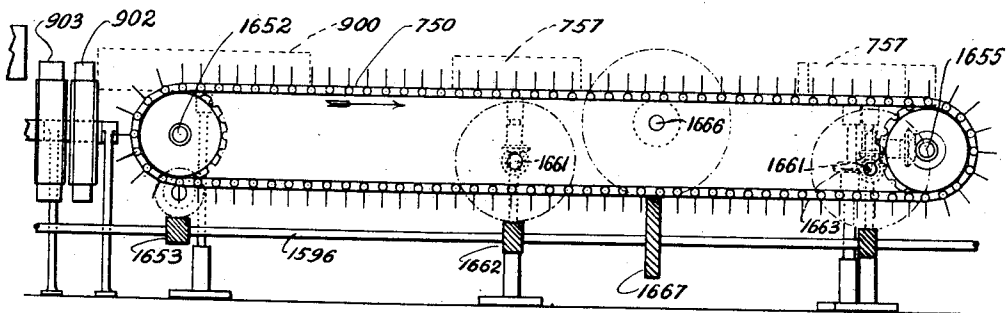


Fig. 52.

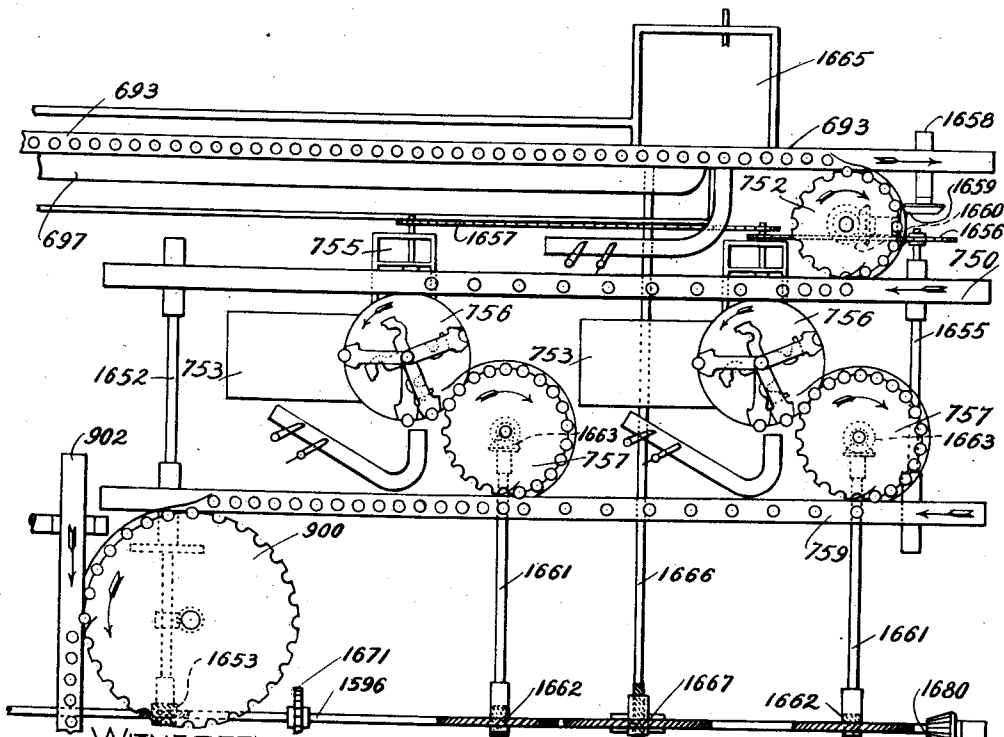


Fig. 51.

WITNESSES
Wm. Helmer
M. A. Hurley.

INVENTOR
E. E. Winkley
by his attorney
Phillips, Newman & Rich

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 24.

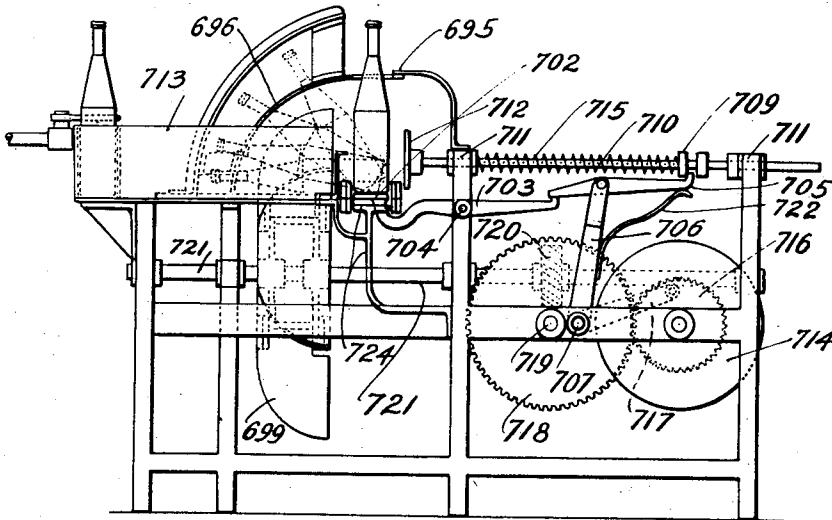


Fig. 53.

WITNESSES
Wm. Helmer.
M. A. Hurley.

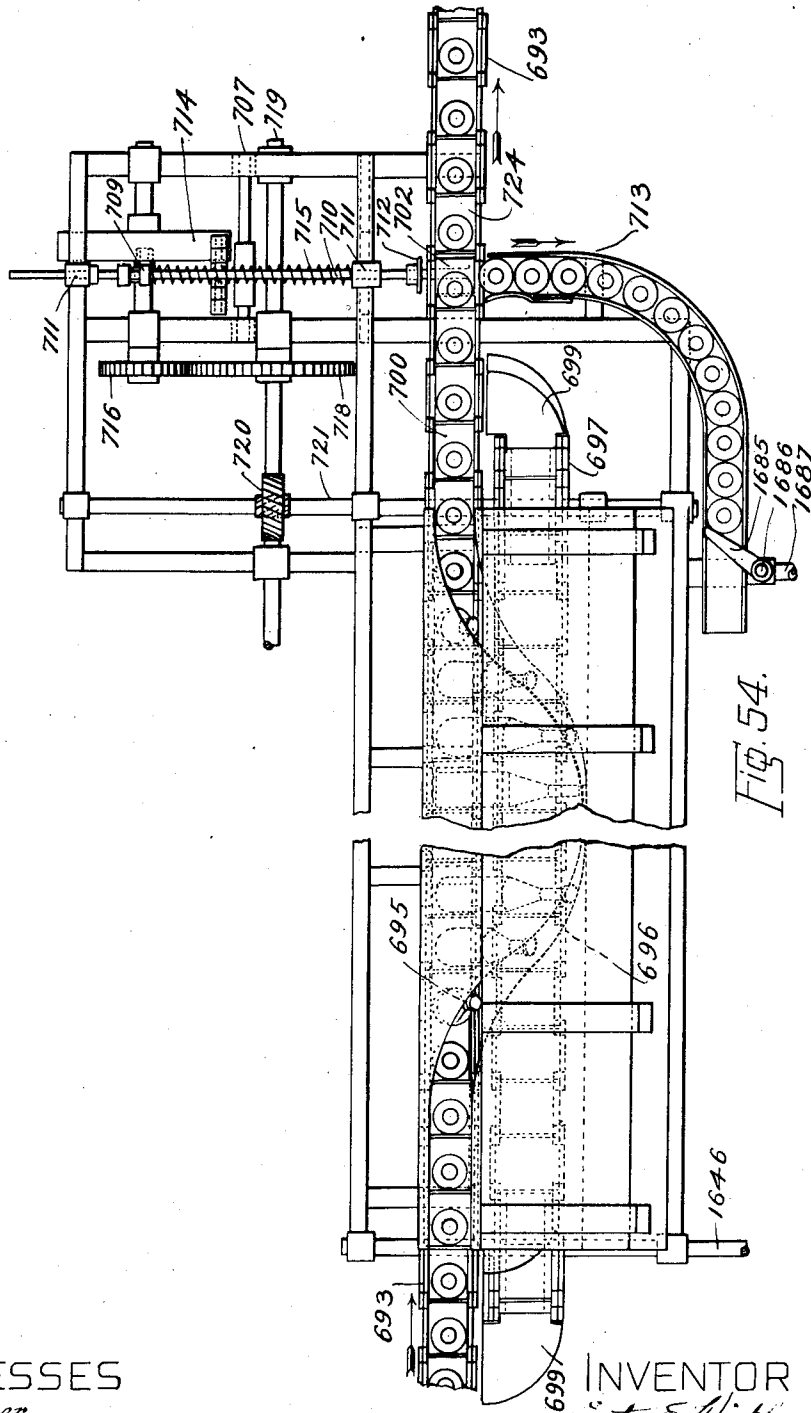
INVENTOR
E. E. Winkley
By *Phillips, Newcomb & Smith*

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 25.



WITNESSES
Wm. Helmer
M. A. Hurley

INVENTOR
E. E. Winkley
by his attorney
Phillips, Newman & Reed

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 26.

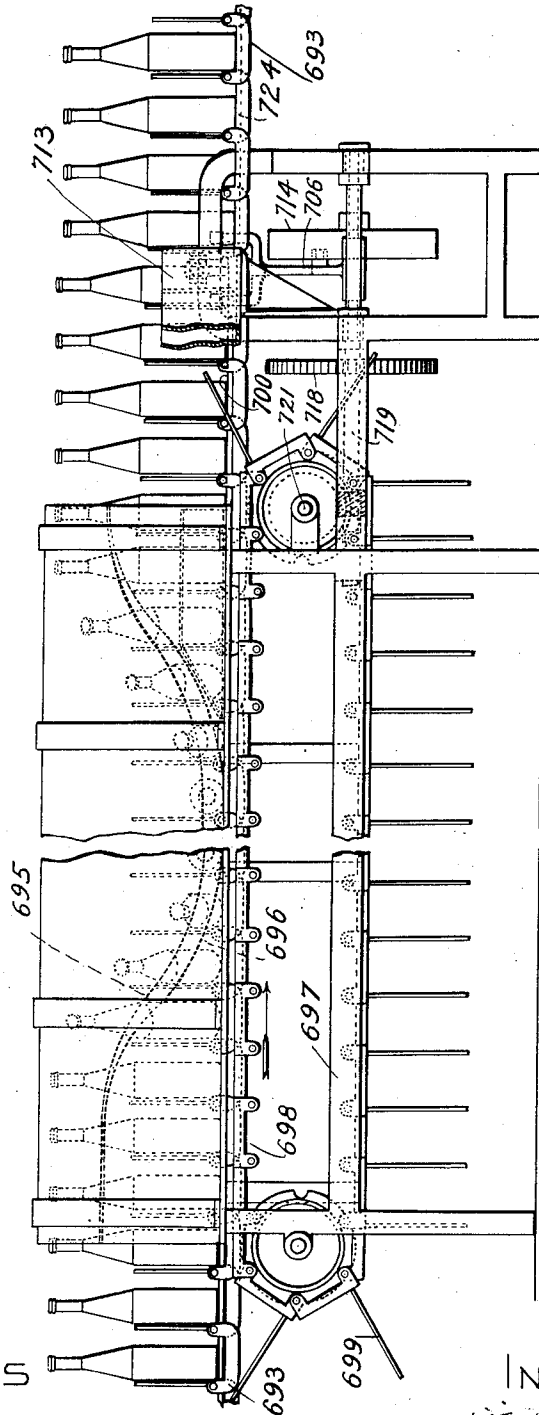


FIG. 55.

WITNESSES
Wm. Helmer
M. A. Hurley

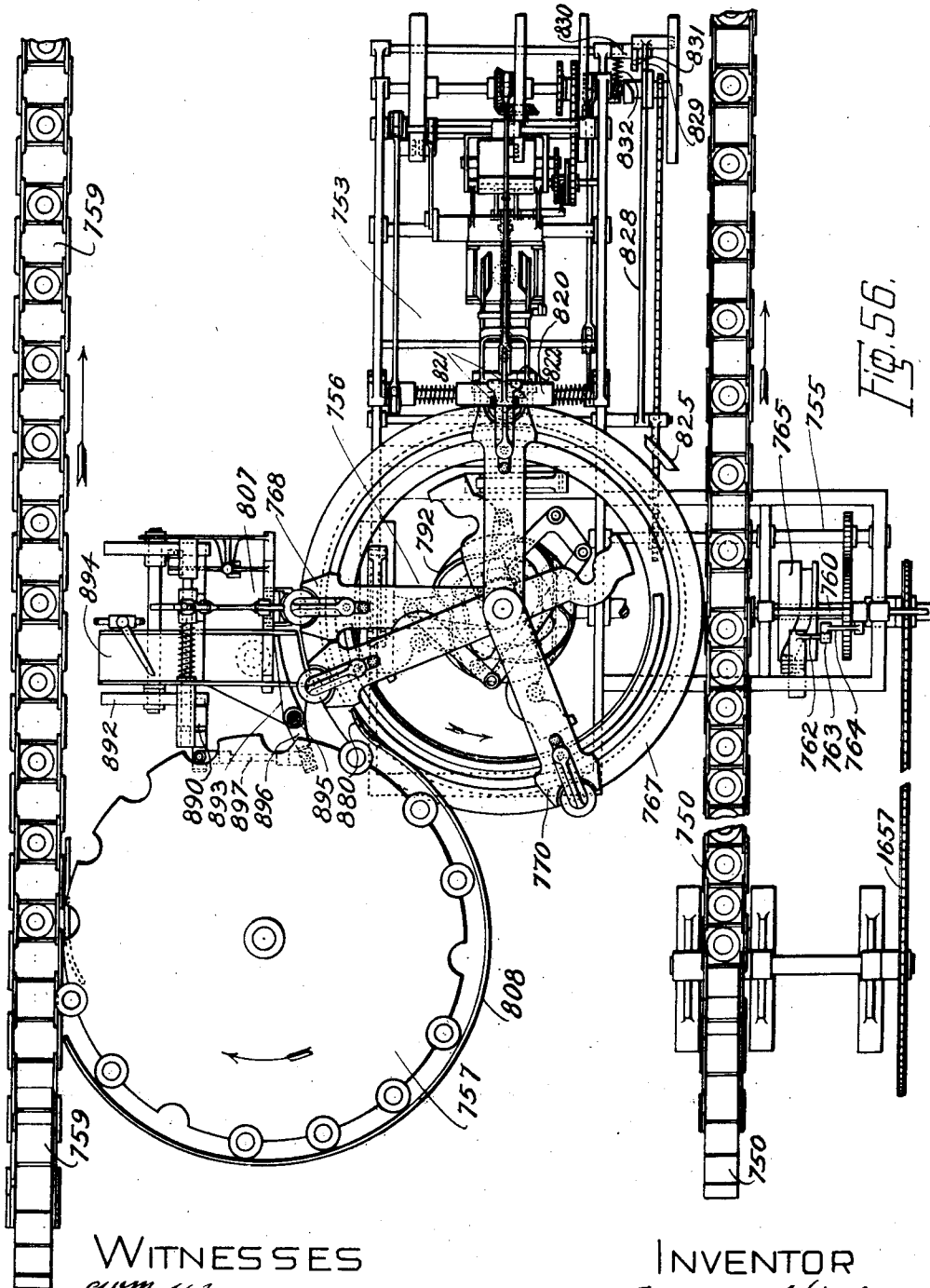
INVENTOR
E. E. Winkley
by his attorney
Phillips, Leutenants & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 27.



WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
Ernest E. Winkley
by his attorney
Phillip Van Emmer

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 28.

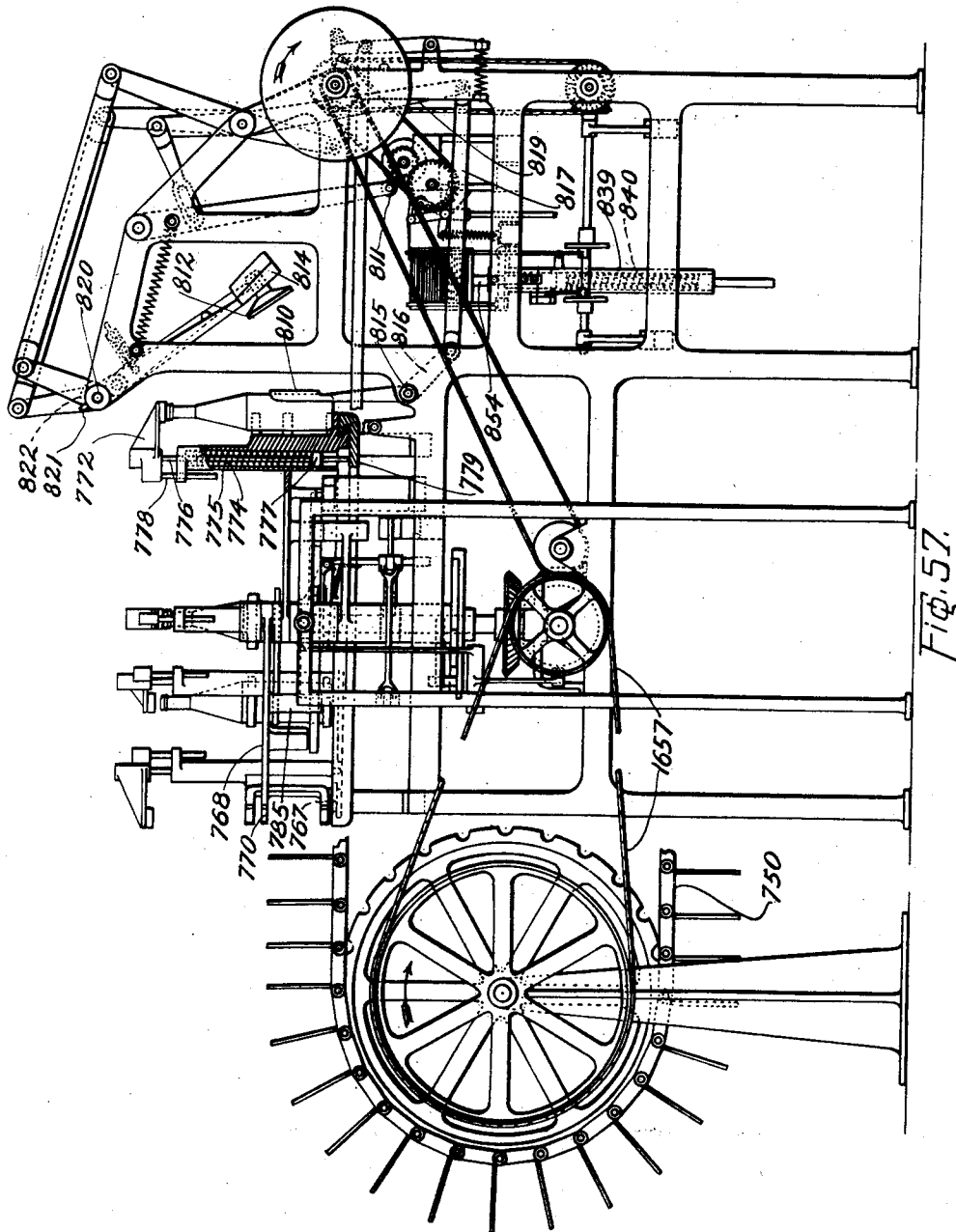


Fig. 57.

WITNESSES
Wm Helmer.
M. A. Hurley.

INVENTOR
Erasmus E. Winkley
by his attorneys
Phillips, Van Eenewald & Fish

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 29.

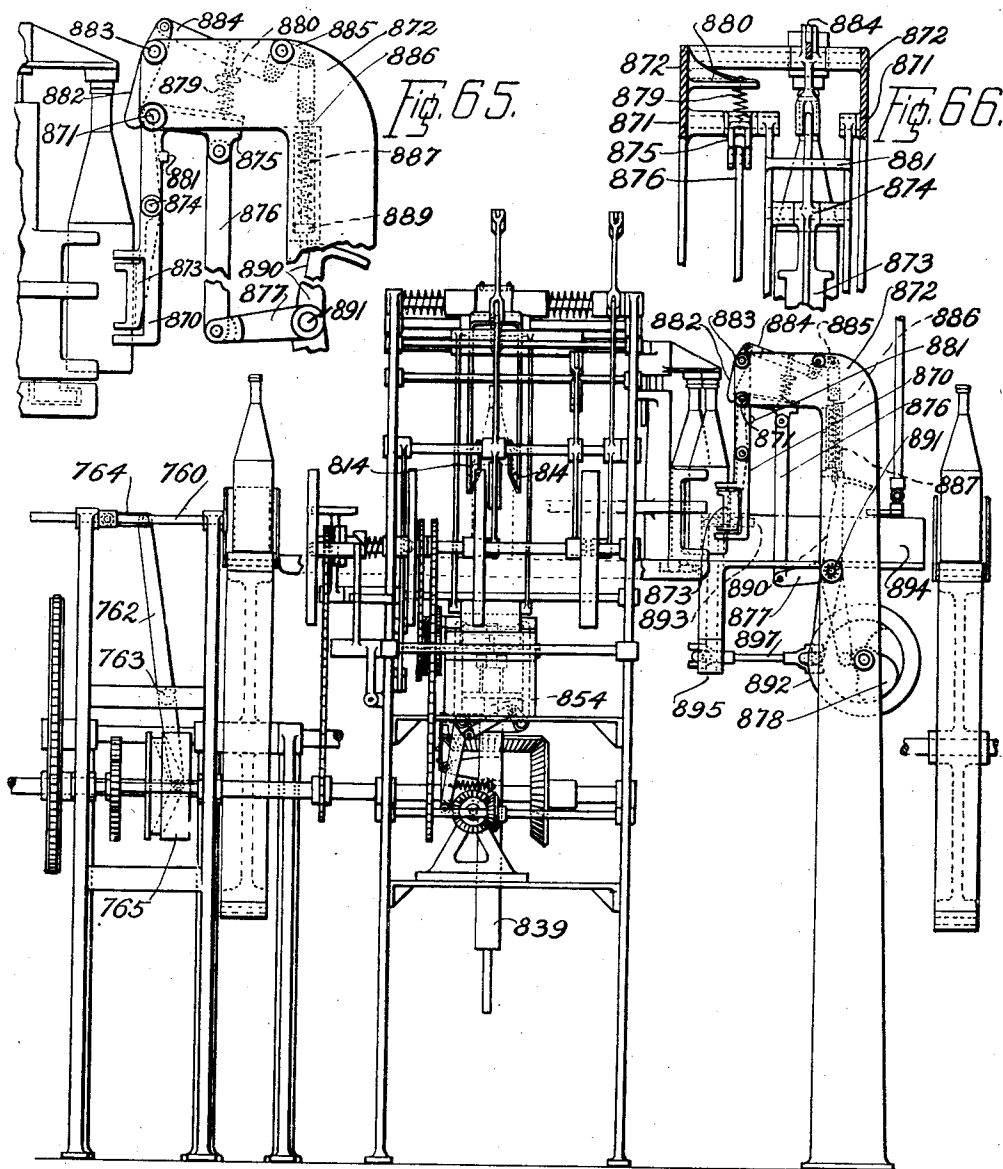


Fig. 58.

WITNESSES
Wm. Helmer
M. A. Hurley.

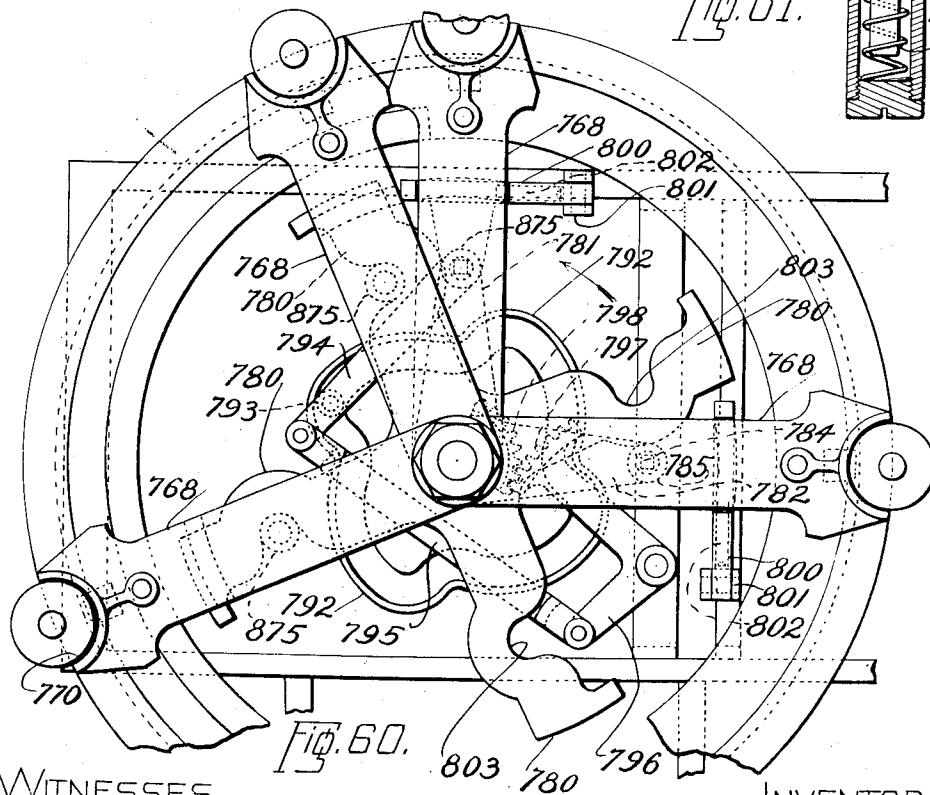
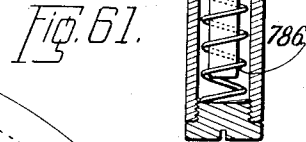
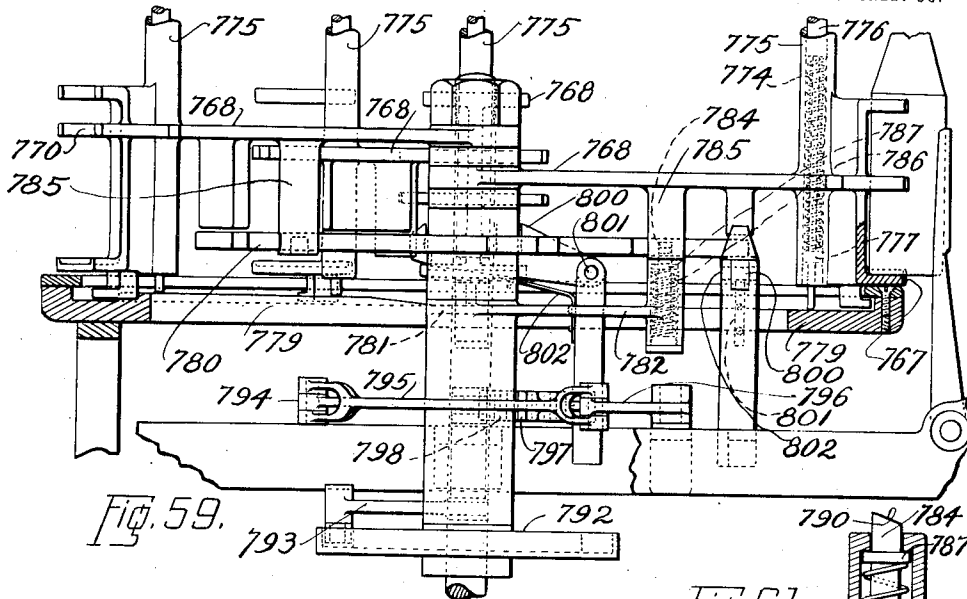
INVENTOR
E. E. Winkley
by his attorney
Phillips, Newcomb & Fish

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 30.



WITNESSES
Wm. Helmer
M. A. Hurley

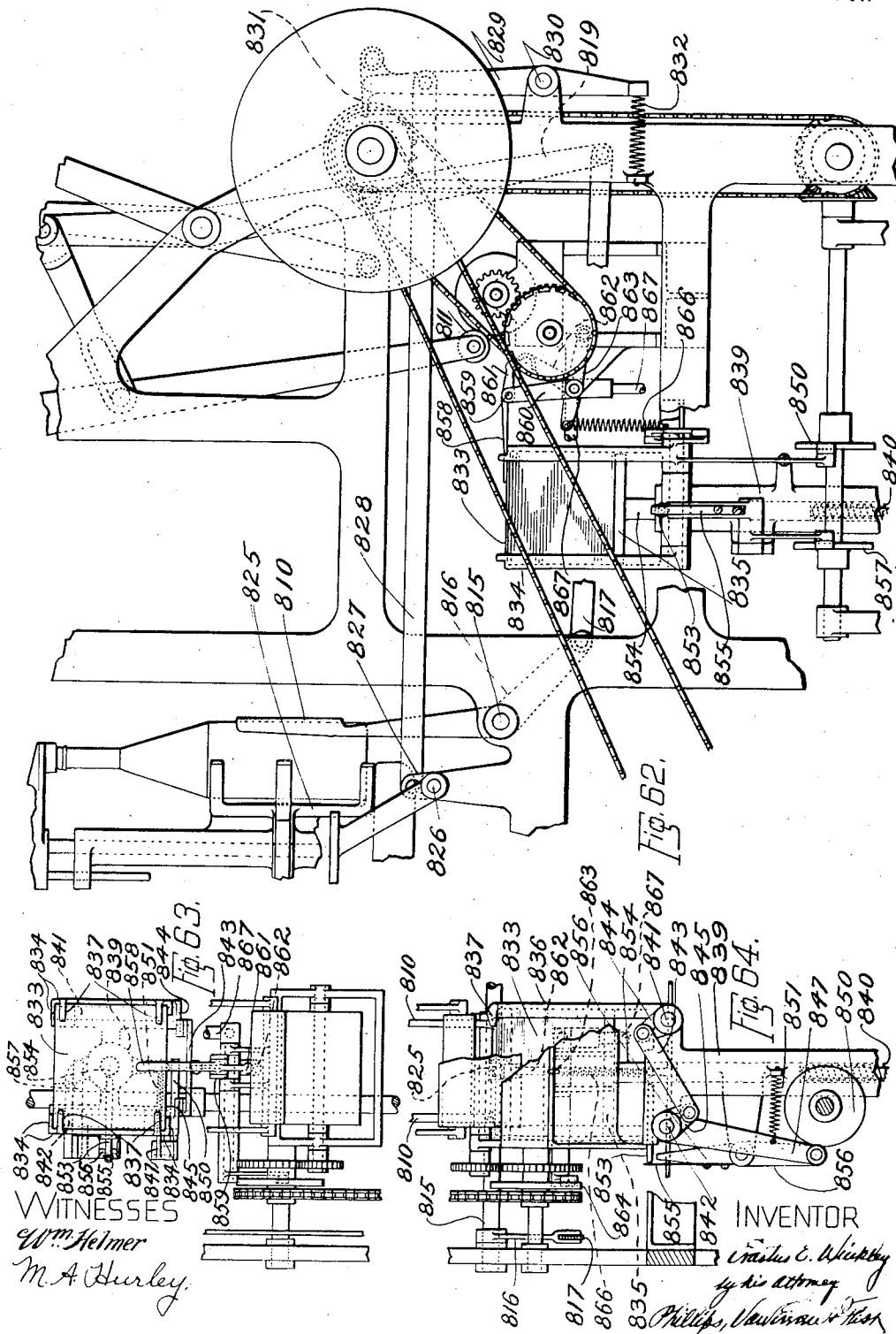
INVENTOR
Ernest E. Winkley
by his attorney
Phillips, New York City

E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 31.



E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 32.

1,348,341.

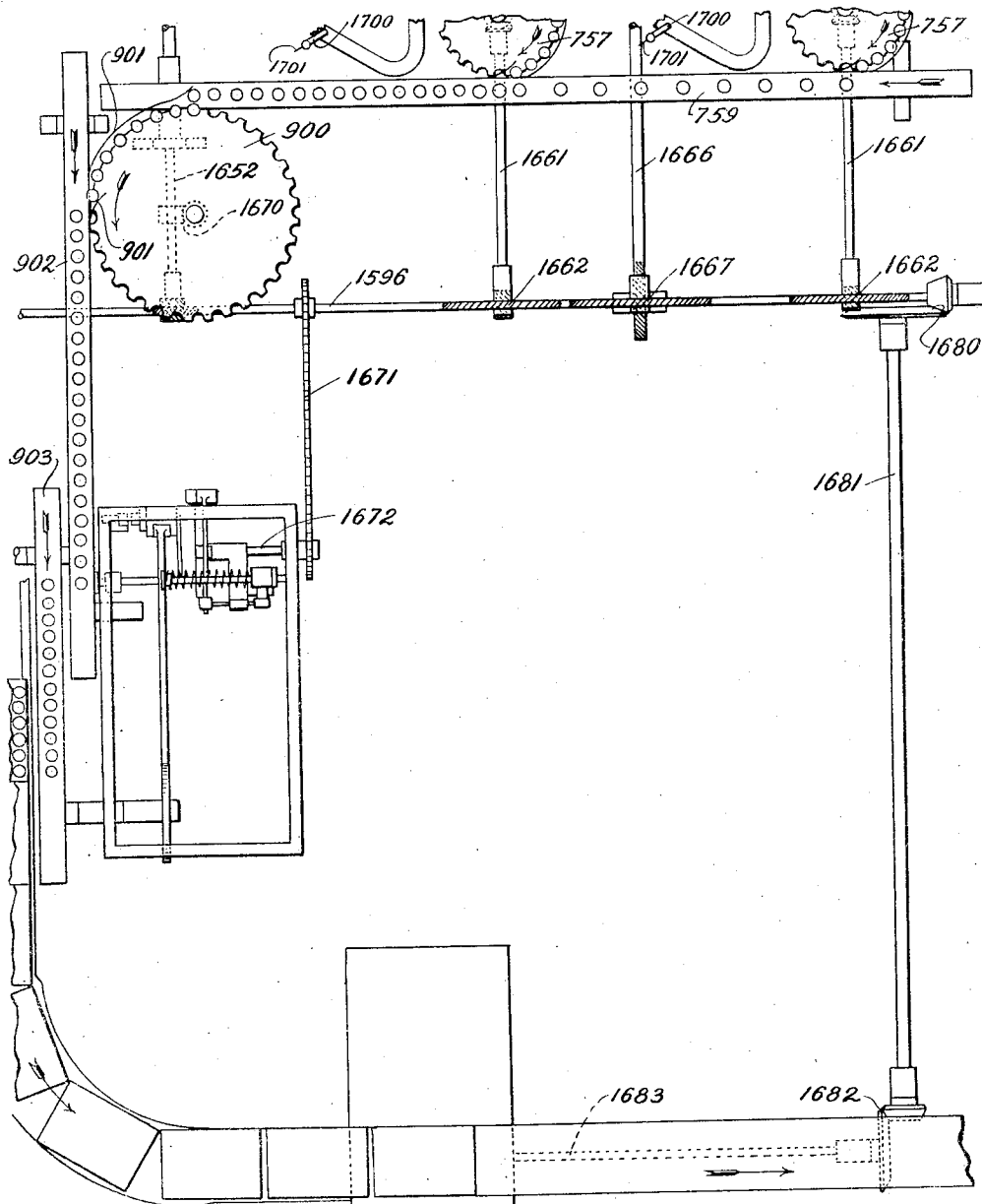


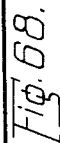
Fig. 67.

WITNESSES
Wm. Helmer
M. F. Hurley

INVENTOR
Erasmus E. Winkley
by his attorney
Phillips, Woodman & Hall

1,348,341.

55 SHEETS—SHEET 33.



Wm Helmer
M. A. Hurley

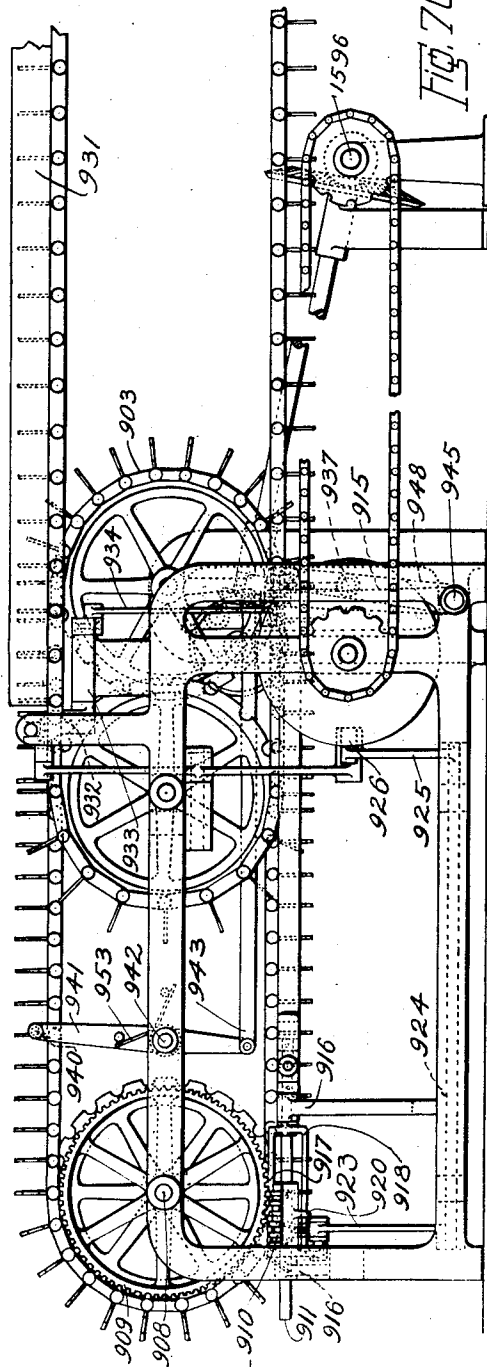
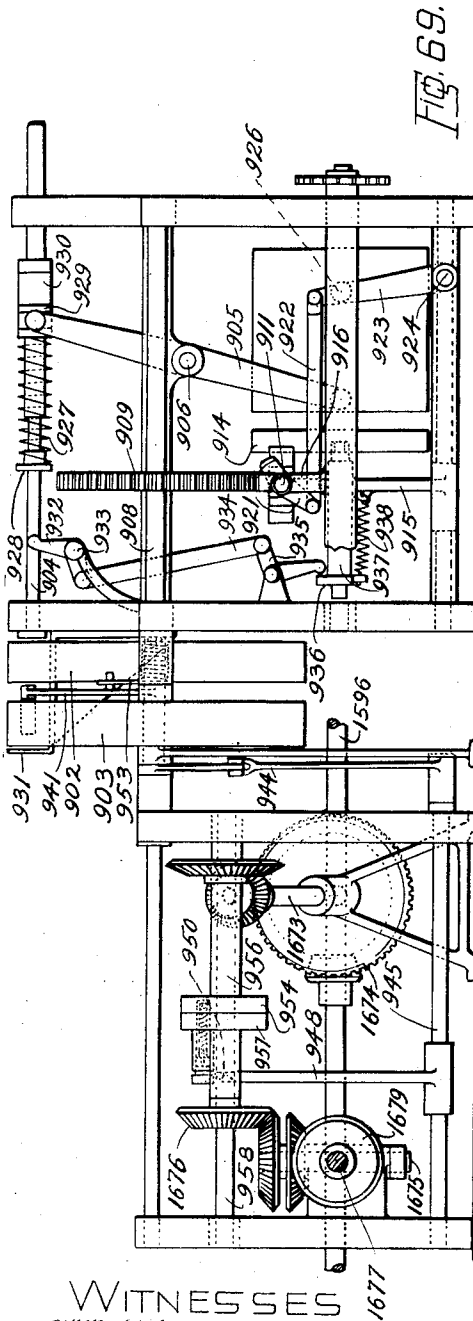
Erastus F. Whipple
by his attorney,
Phillips, Newcomb & Frost,

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 34.



WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
Eustus C. Winkley
by his attorney
Phillips, Howard & Winkley

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 36.

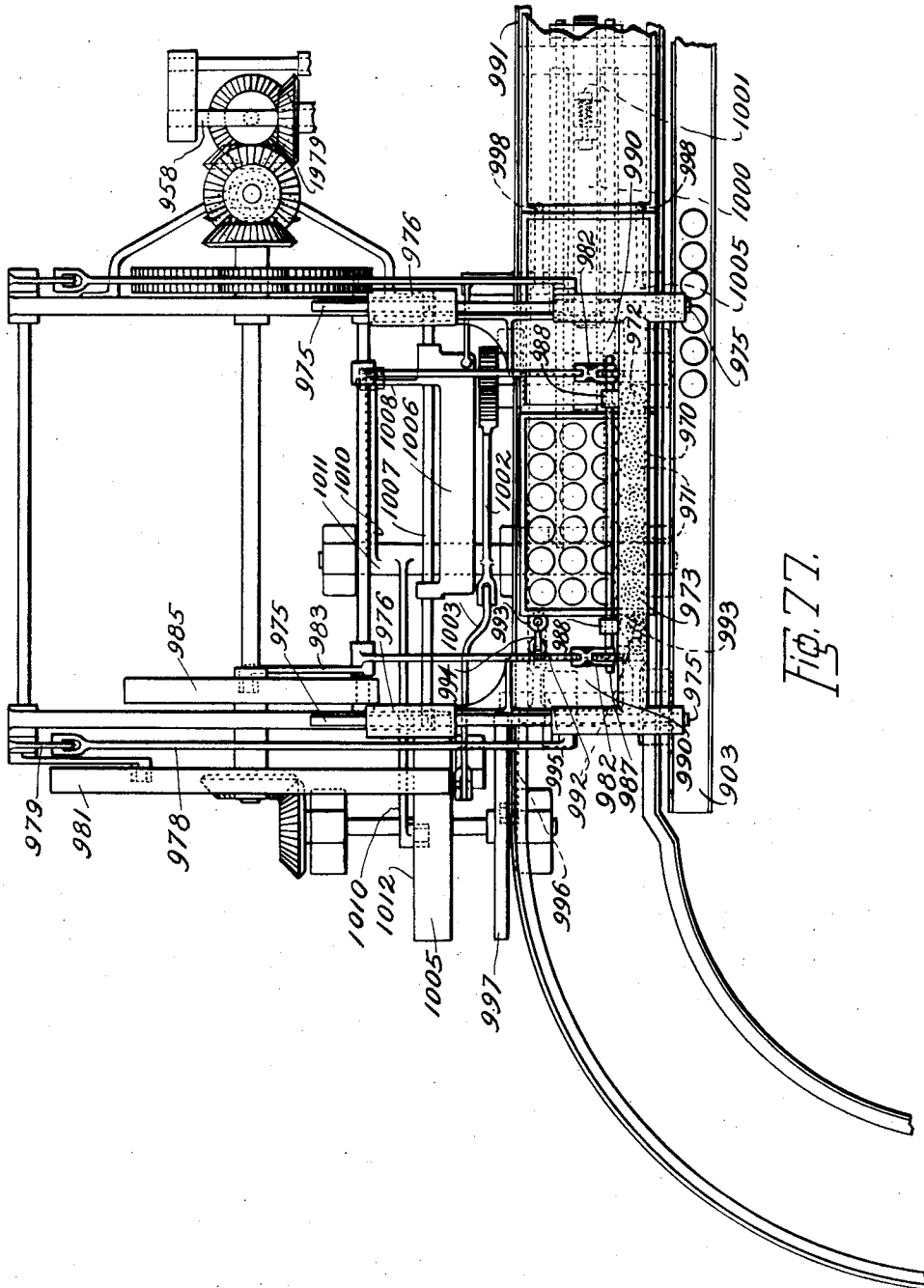


Fig. 77.

WITNESSES
Wm. Helmer.
M. A. Hurley.

INVENTOR
Ernest E. Winkley
by his attorney
Phillips, Van Cleave & Frost

E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914;

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 37.

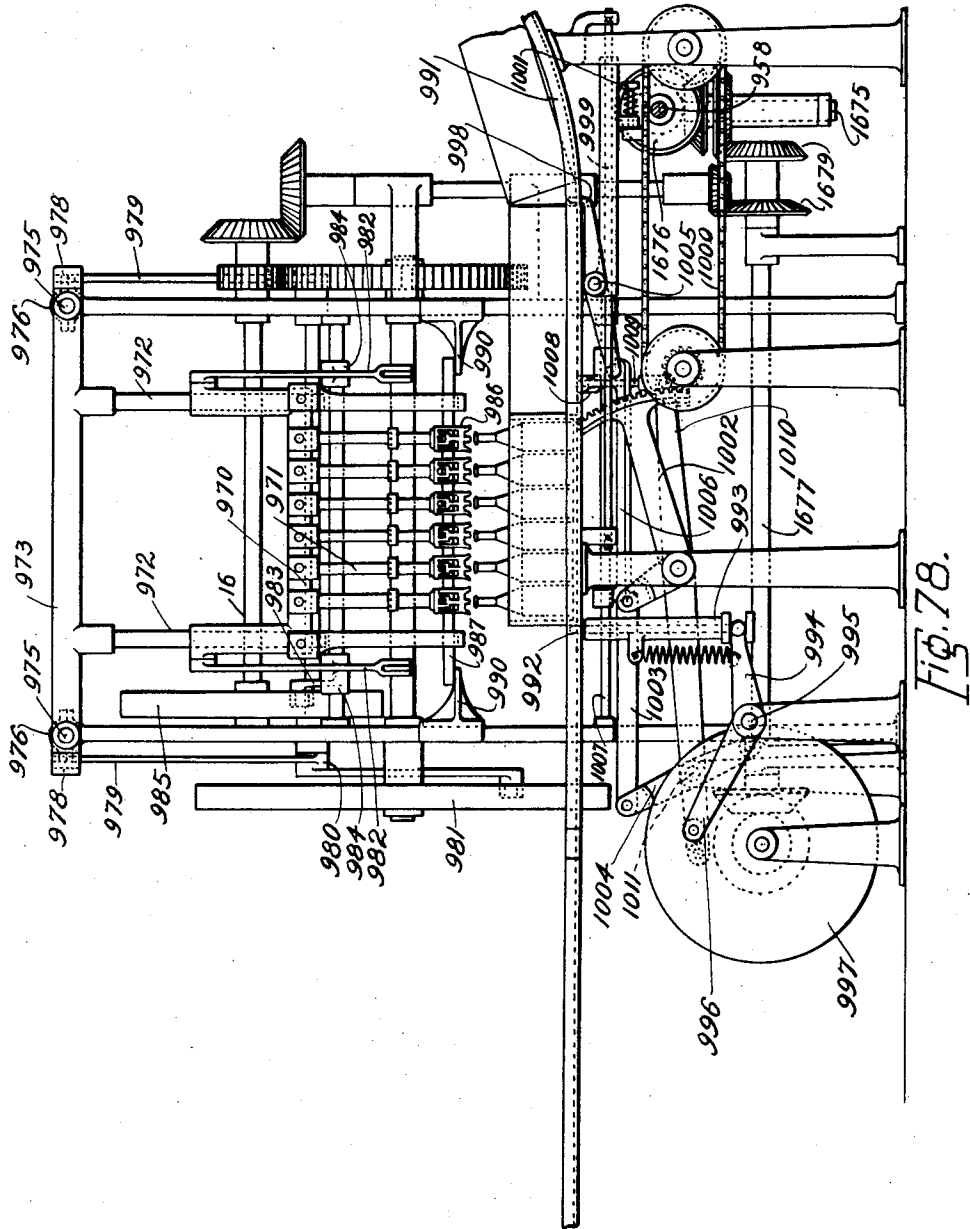


Fig. 78.

WITNESSES
Wm. Helmer
M. A. Hurley

INVENTOR
E. E. Winkley
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E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 38.

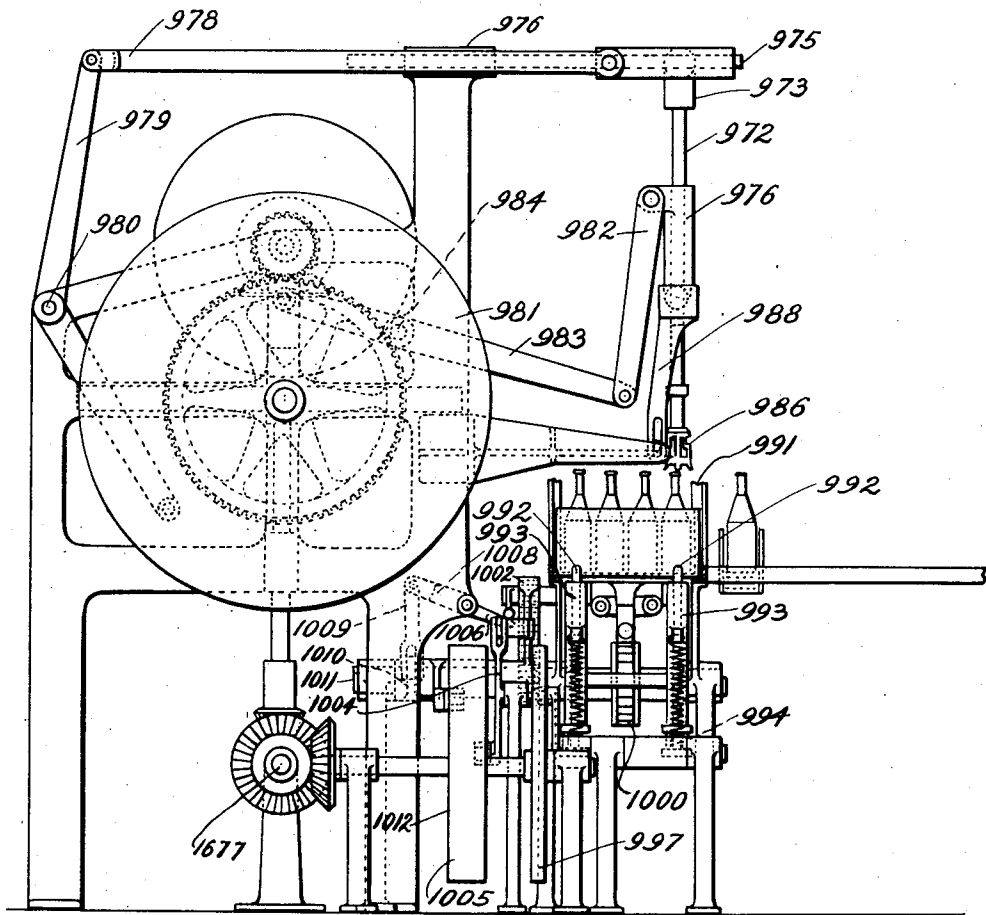


Fig. 79.

WITNESSES

Wm. Helmer.
M. A. Hurley.

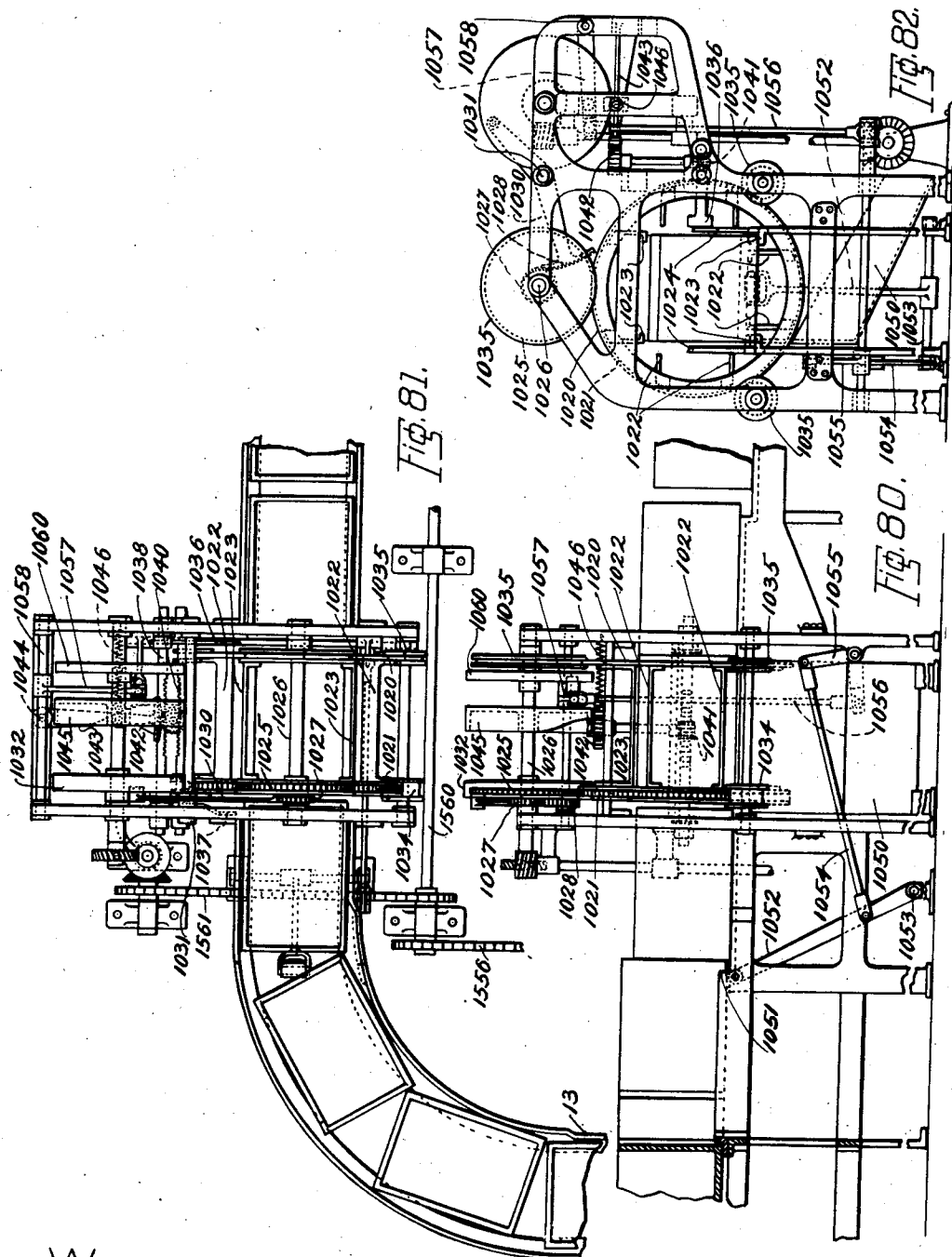
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1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 39.



WITNESSES
Wm. Helmer.
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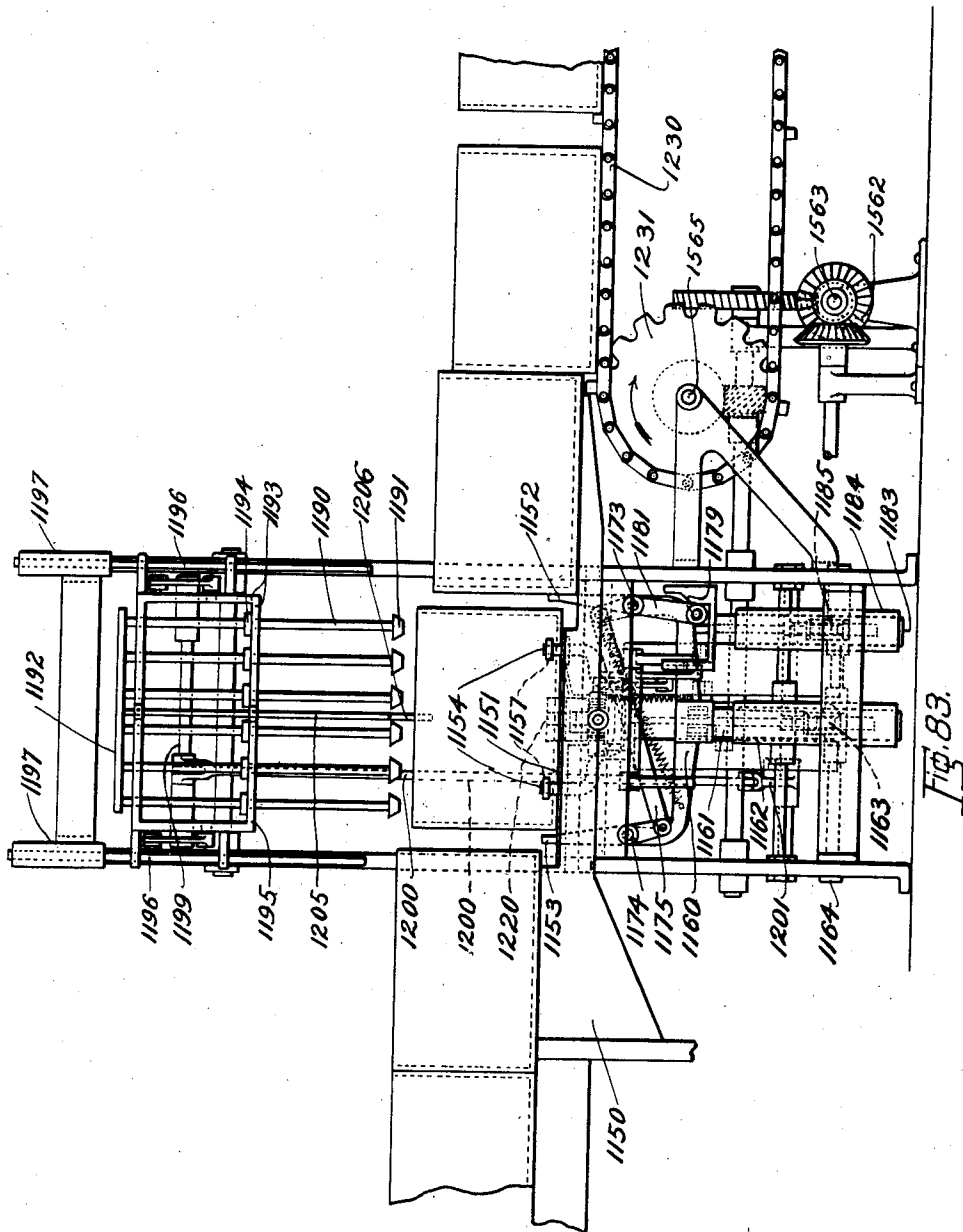
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E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

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55 SHEETS—SHEET 40.



WITNESSES
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

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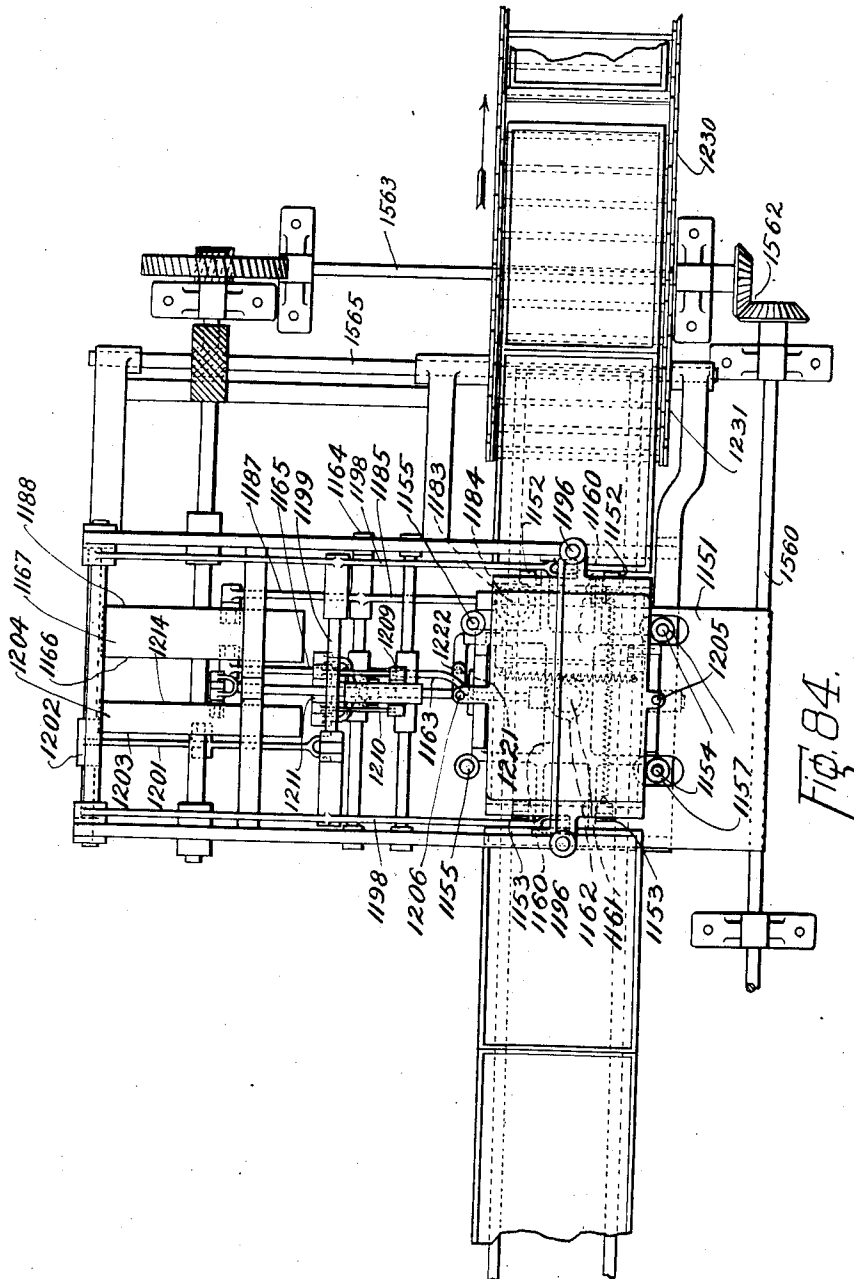


FIG. 84.

WITNESSES
Wm. Helmer.
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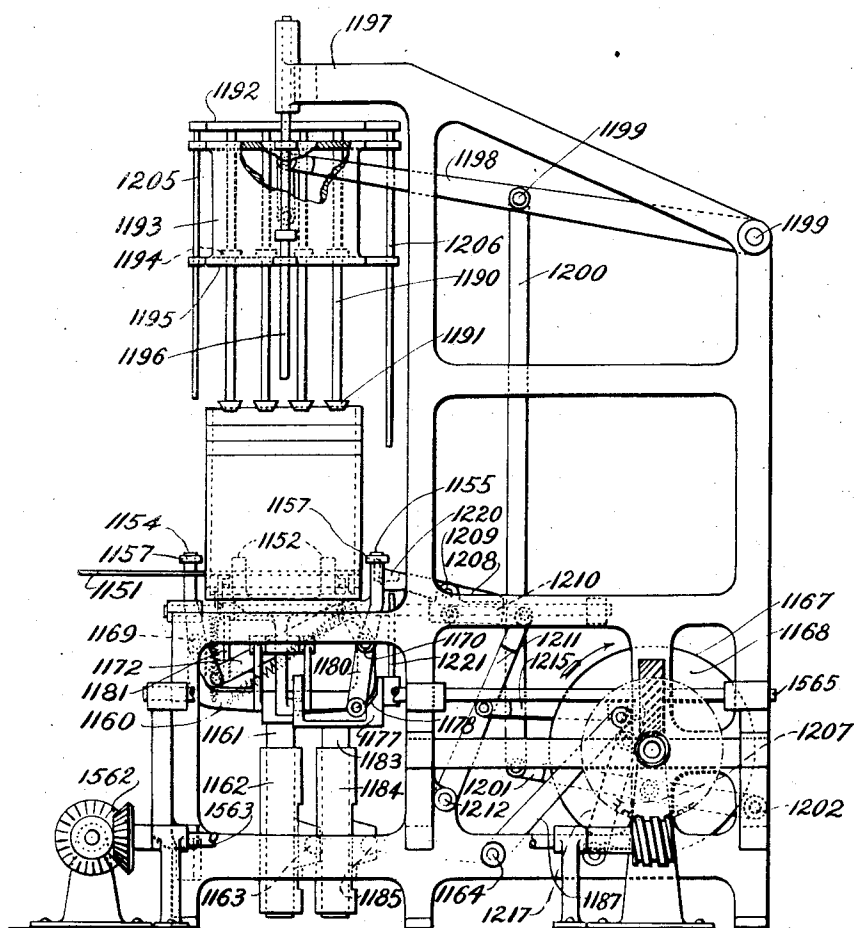
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 42.

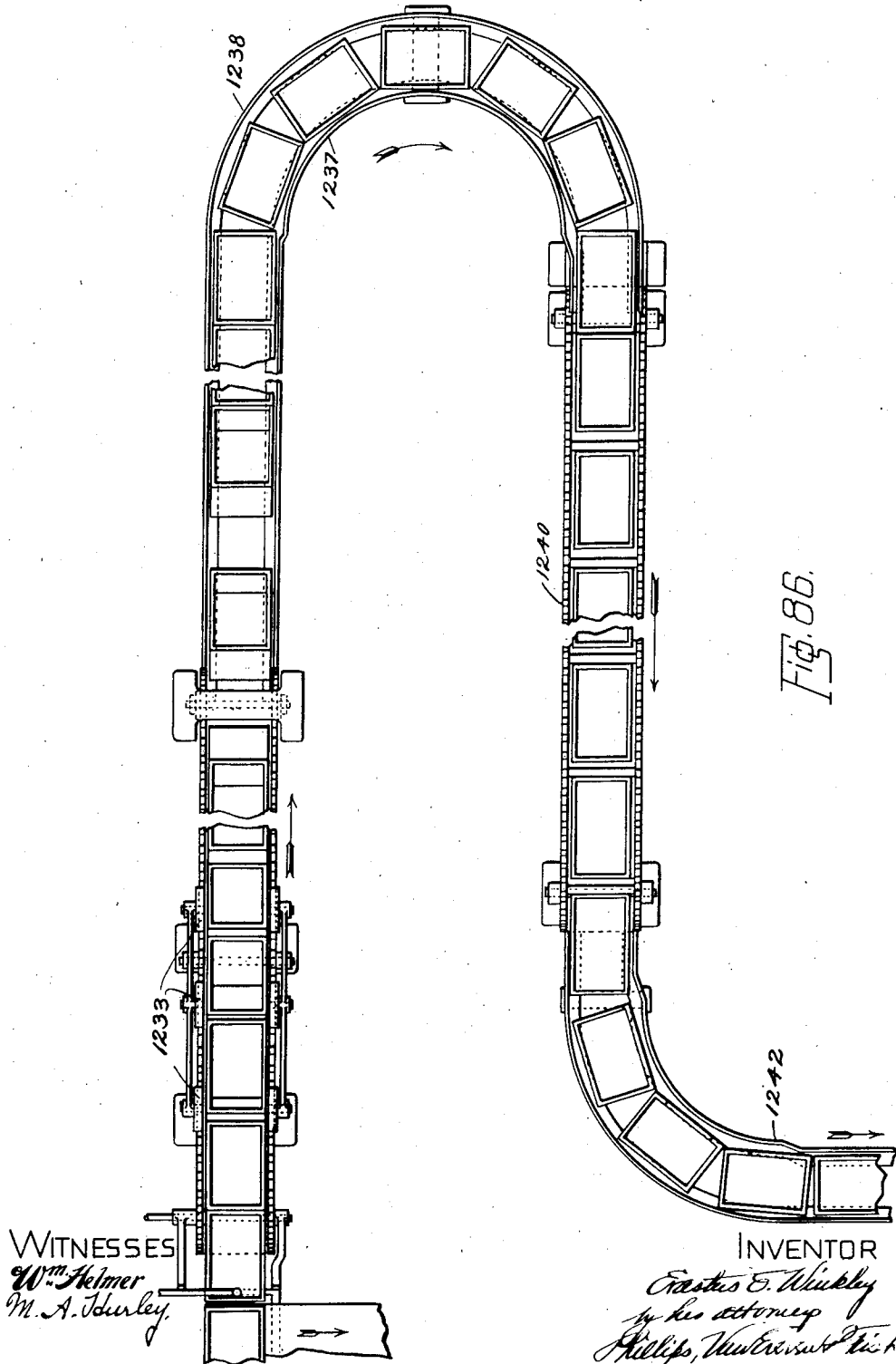


E. E. WINKLEY.
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

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Patented Aug. 3, 1920.

55 SHEETS—SHEET 43.



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E. E. WINKLEY,
MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.
55 SHEETS—SHEET 44.

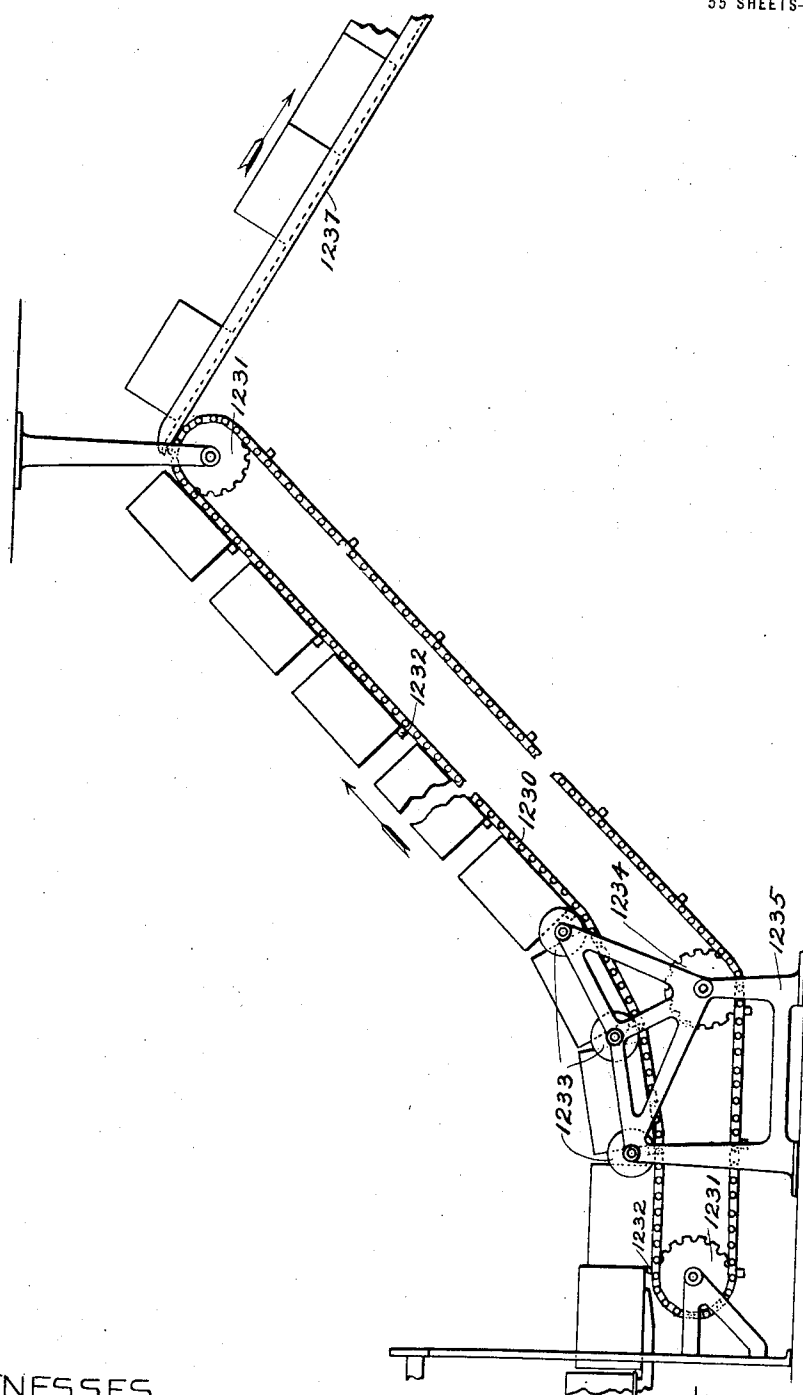


Fig. 87.

WITNESSES
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

Patented Aug. 3, 1920.
55 SHEETS—SHEET 45.

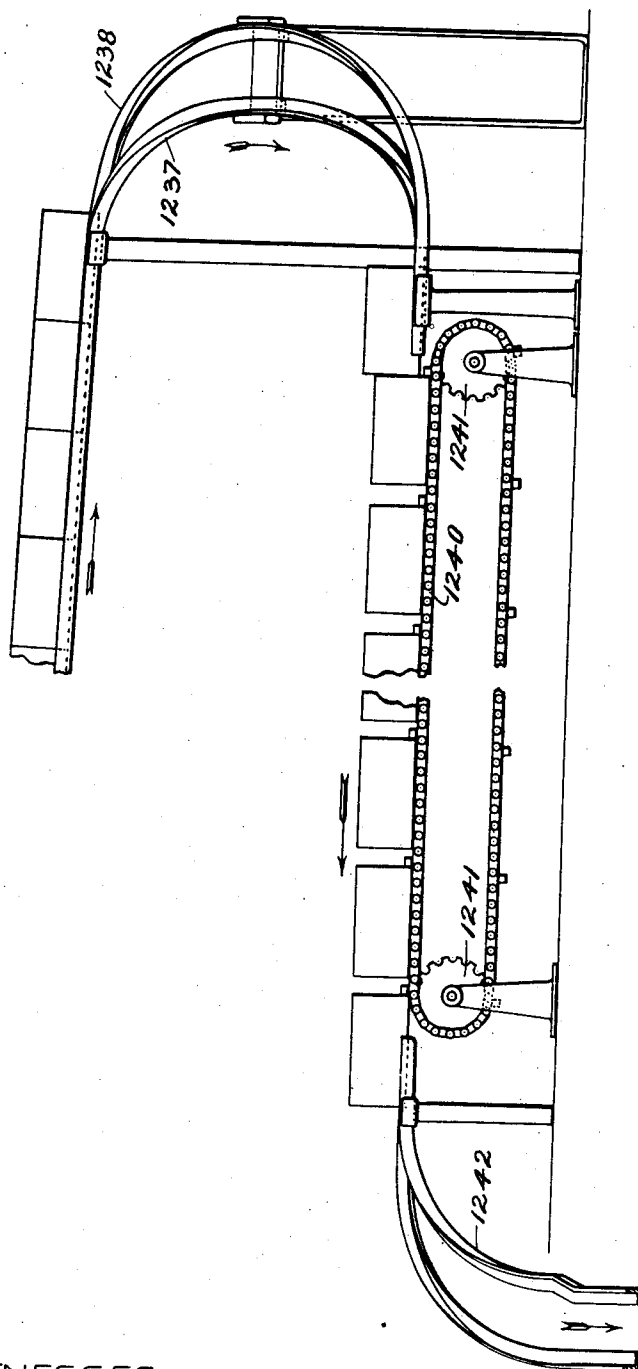


Fig. 88.

WITNESSES
Wm. Helmer
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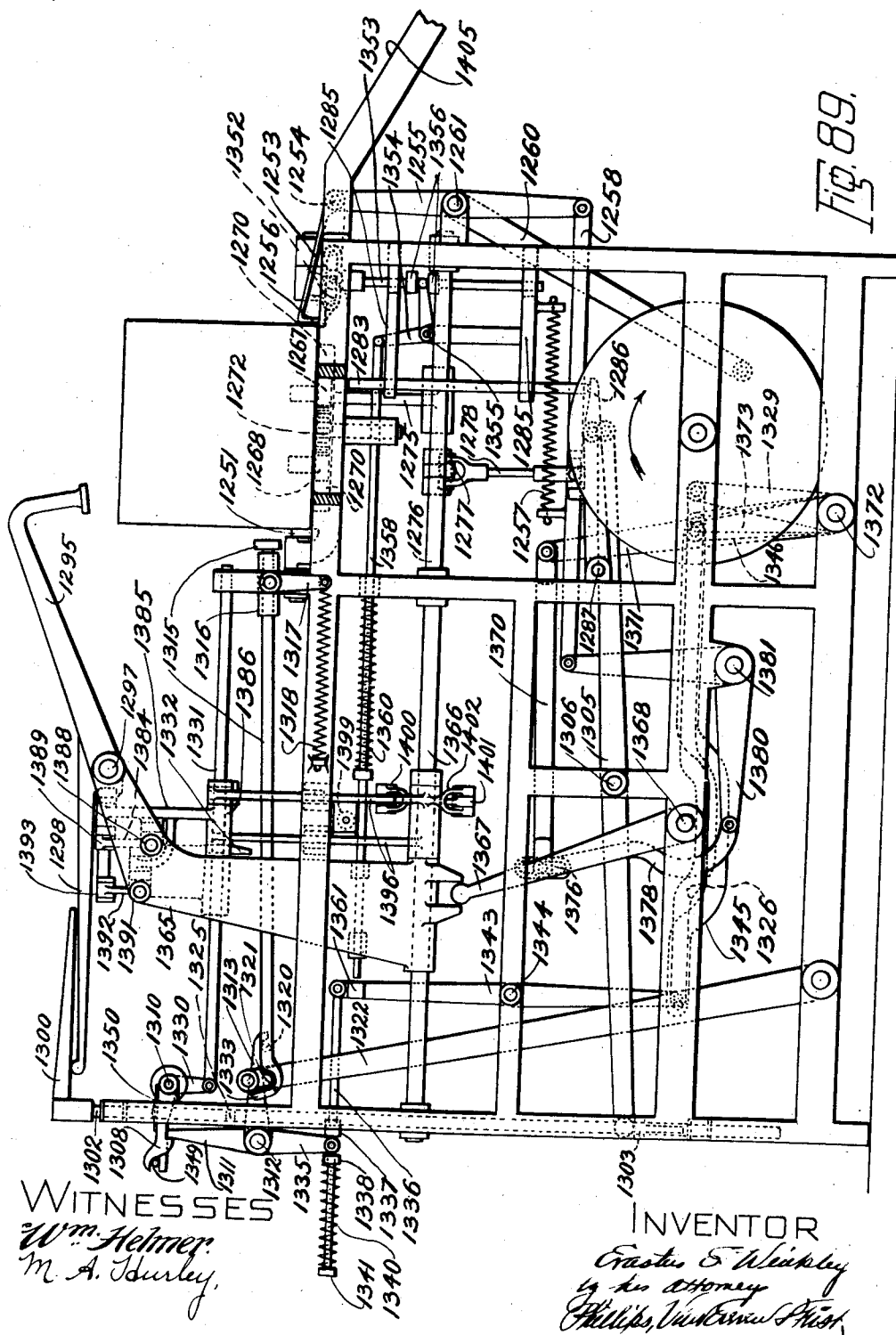
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APPLICATION FILED JULY 13, 1914.

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55 SHEETS—SHEET 46.



1,348,341.

55 SHEETS—SHEET 47.



Fig. 90.

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1,348,341.

55 SHEETS—SHEET 48.



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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

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55 SHEETS—SHEET 50.

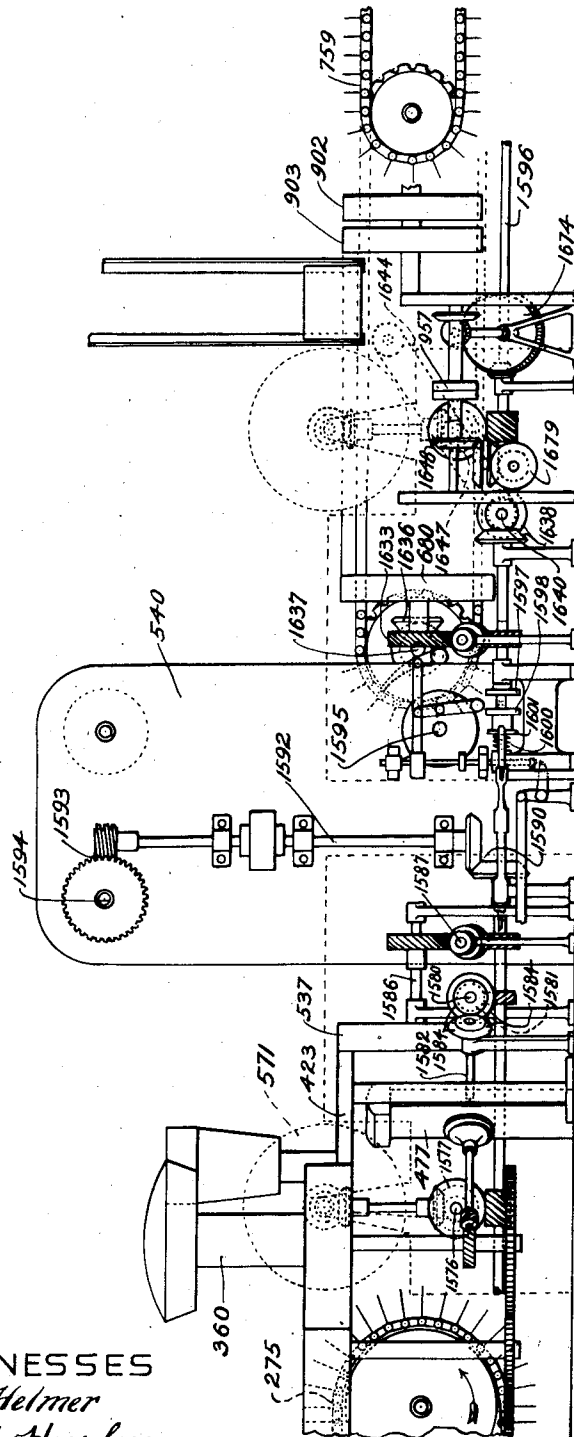


FIG. 93.

WITNESSES
Wm. Helmer
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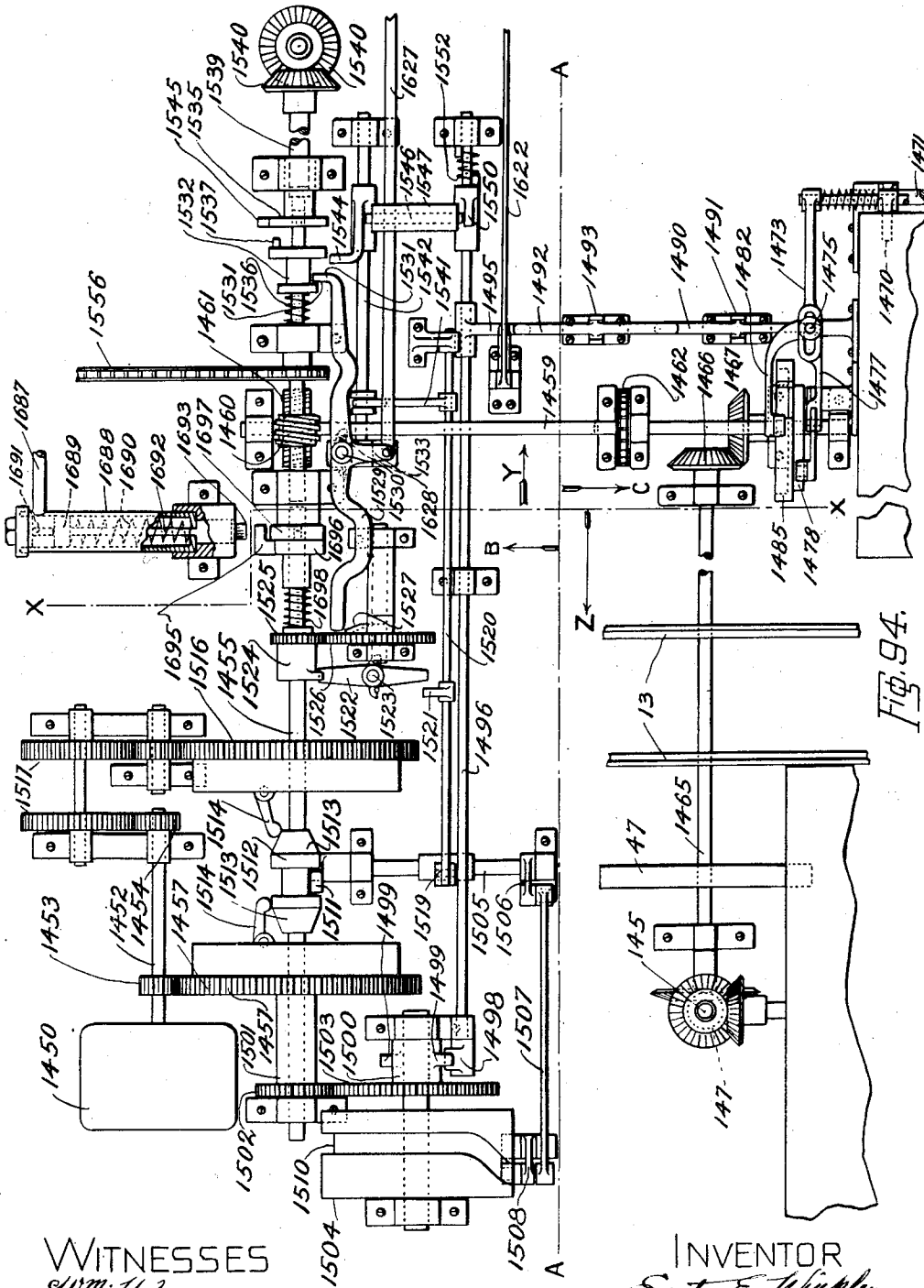
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APPLICATION FILED JULY 13, 1914.

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55 SHEETS—SHEET 51.



WITNESSES
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 52.

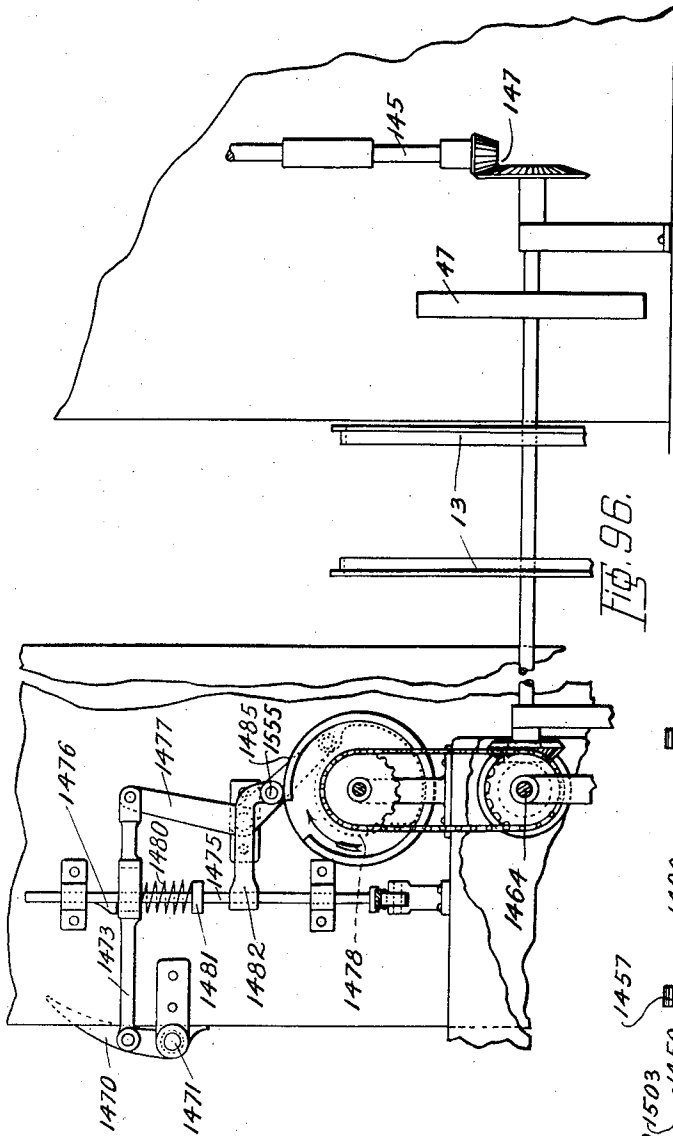


Fig. 96.

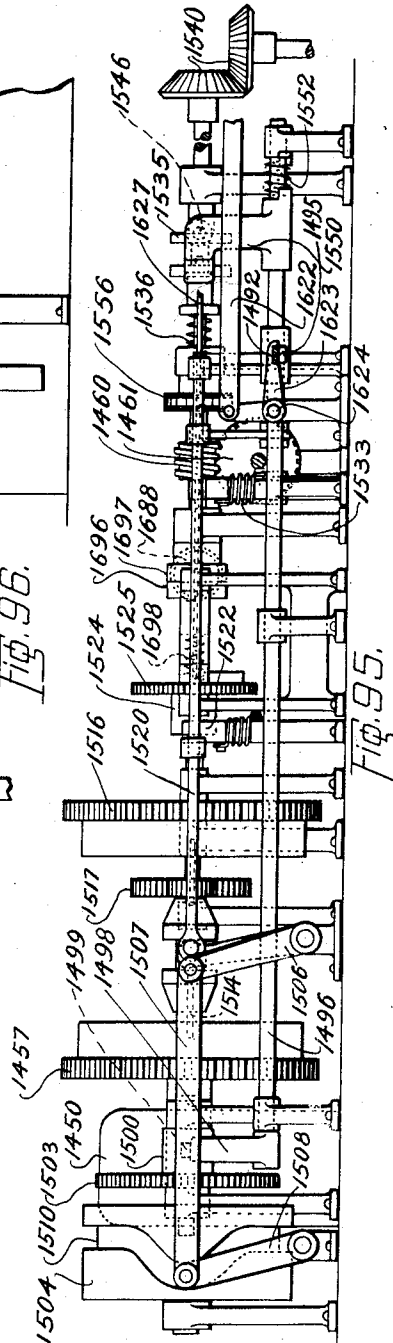


Fig. 95.

WITNESSES

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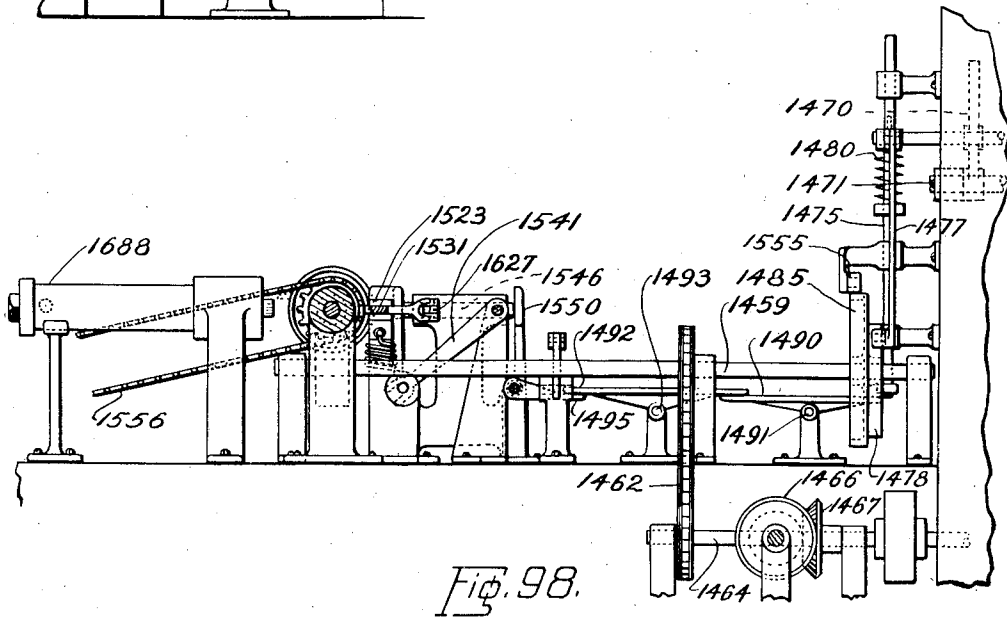
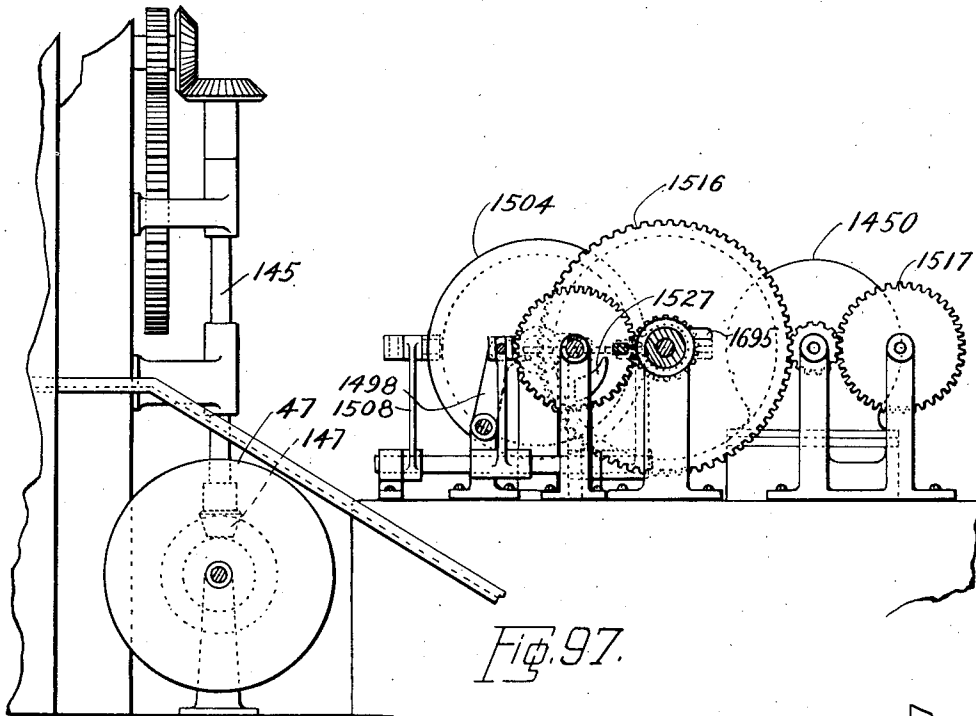
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 53.



WITNESSES
Wm. Helmer.
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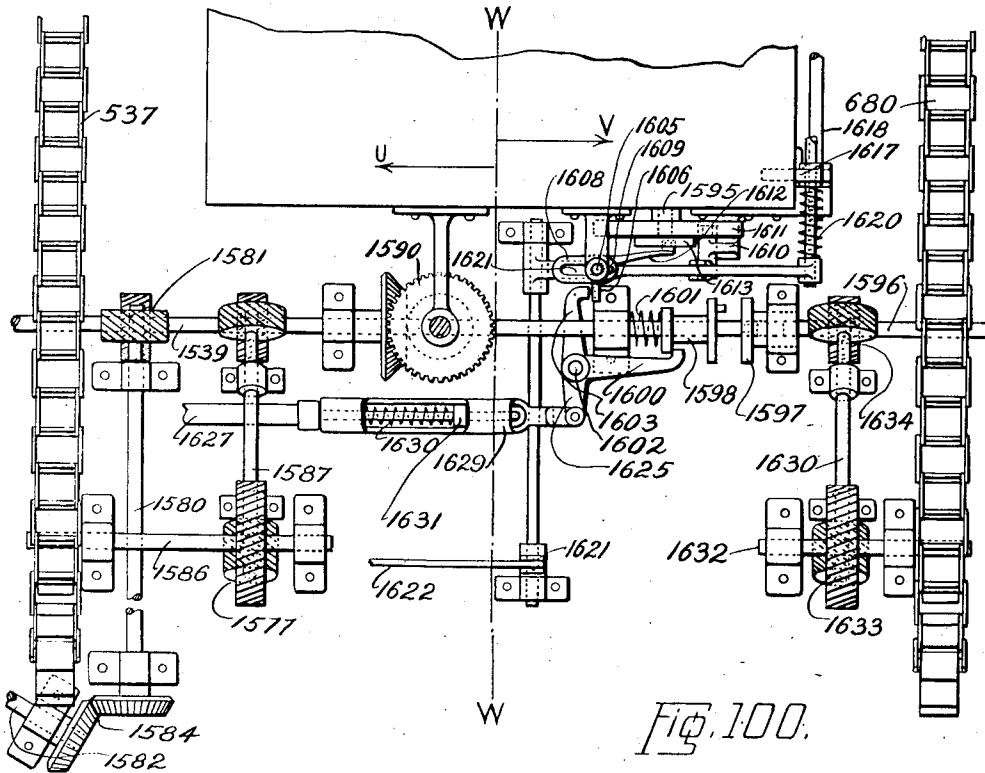
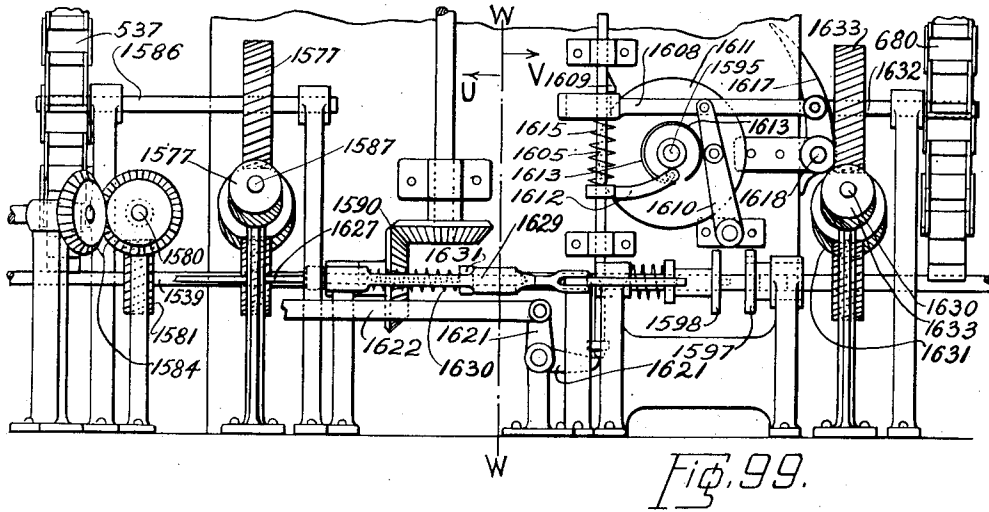
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

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55 SHEETS--SHEET 54.



WITNESSES
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MACHINE FOR PACKAGING MATERIALS.
APPLICATION FILED JULY 13, 1914.

1,348,341.

Patented Aug. 3, 1920.

55 SHEETS—SHEET 55.

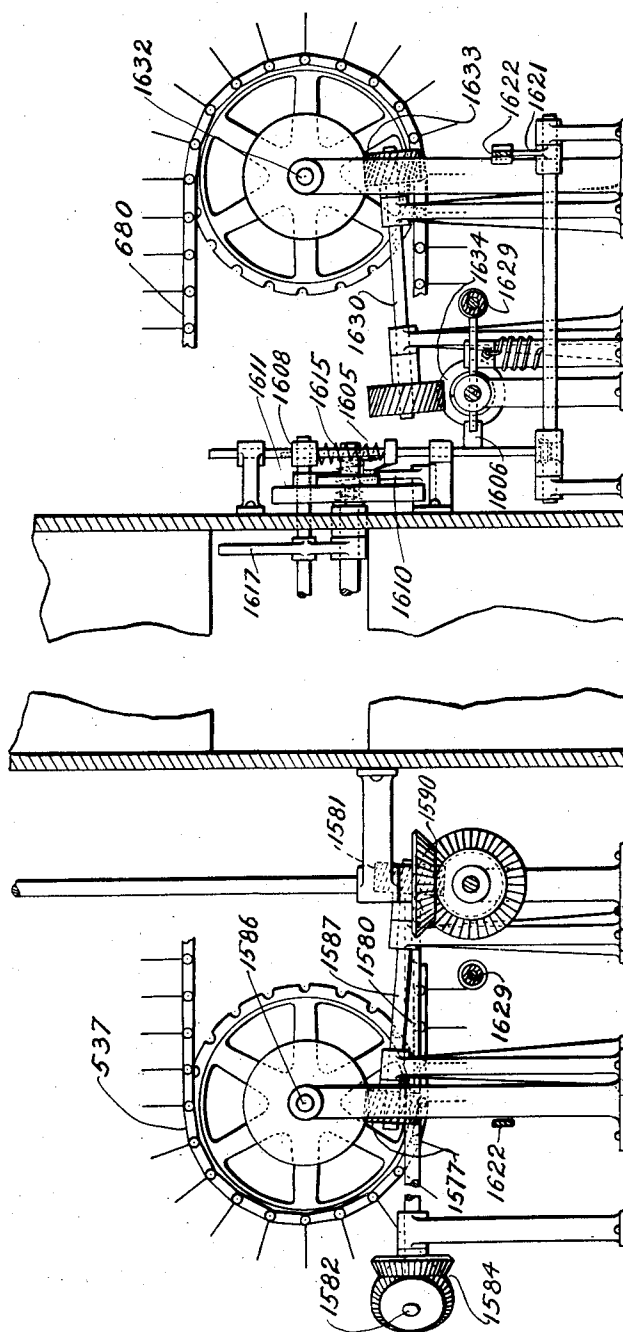


FIG. 102.

FIG. 101.

WITNESSES
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By his attorney
Phillips, Vandeventer & Fish

UNITED STATES PATENT OFFICE.

ERASTUS E. WINKLEY, OF LYNN, MASSACHUSETTS.

MACHINE FOR PACKAGING MATERIALS.

1,348,341.

Specification of Letters Patent.

Patented Aug. 3, 1920.

Application filed July 13, 1914. Serial No. 850,762.

To all whom it may concern:

Be it known that I, ERASTUS E. WINKLEY, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Packaging Materials; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to machines for packaging materials, and more particularly to machines of this character which are employed for the bottling of liquids.

Malt beverages, tonics and other liquids of various kinds are manufactured in large quantities in bottled form and as the bottling operations require the more or less constant attendance of a number of skilled operators the cost of the bottling operations amounts to a considerable portion of the total cost.

One object of the present invention is to provide a machine for bottling liquids which is automatic in its operation and normally performs all of the necessary operations occurring in connection with the bottling of liquids without manual intervention. A further object of the invention is to provide mechanism for handling the empty cases after the bottles are removed therefrom and preparing them for the reception of the filled bottles at the completion of the bottling operation.

With the above objects in view the various features of the invention consist in certain novel features of construction, combinations and arrangements of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art from the following description.

It will be understood by those skilled in the art that although the present invention is embodied in a machine for bottling liquids and is hereafter described and claimed in a machine of this type, this designation in the claims is for convenience only and certain features of the invention are equally applicable to machines for packaging fluid, semi-fluid, or other kinds of materials.

In the accompanying drawings illustrating the preferred form of the invention; Figure 1 is a view representing diagrammatically the entire system for handling the bottles and cases; Fig. 2 is a side elevation

of the machine for transferring the empty bottles from the cases to the soaking machine and illustrates a portion of the soaking machine and the mechanism for discharging the bottles therefrom; Fig. 3 is a top plan view of the transferring machine; Fig. 4 is a front elevation of the transferring machine illustrating the manner in which the cases fed with empty bottles are fed to the machine; Figs. 5 to 8, inclusive, are details illustrating the construction of the bottle gripping members and actuating devices; Fig. 9 is a detail similar to Fig. 5, illustrating the position of the gripping members when the neck of the bottle is closed; Fig. 10 is a top plan view partly in section of the bottle washing machine and cooperating conveyer; Fig. 11 is an elevation partly in section of the machine shown in Fig. 10; Fig. 12 is a detail showing a side elevation of the mechanism for clamping a bottle in the washing machine; Fig. 13 is a side elevation of the bottle reversing mechanism; Fig. 14 is a side elevation partly in section, of the pressure testing machine; Fig. 15 is a top plan view partly in section of the machine shown in Fig. 14; Fig. 16 is a detail showing a sectional view of the air and check valve; Figs. 17 and 18 are details illustrating the pressure diaphragm which controls the operation of the bottle ejecting mechanism; Fig. 19 is a plan view partially diagrammatic illustrating the intermittently operating mechanism for feeding the bottles to the filling machine; Figs. 20 and 21 are elevations illustrating the mechanism for feeding the bottles to the filling machine; Fig. 22 is a view partially diagrammatic, illustrating the actuating mechanism for the system and the first portion of the train of machines from the soaker to the filling machine; Fig. 23 is a diagrammatic view illustrating the drive mechanism and the train of machines continued from the filling machine shown in Fig. 22; Fig. 24 is a detail illustrating a plan view of a portion of the weighing machine for testing the bottles after they have been filled; Fig. 25 is a vertical section illustrating the weighing mechanism shown in Fig. 24; Figs. 26 to 29, inclusive, are details showing the stationary cams for operating the weighing mechanism; Fig. 30 is an elevation partly in section, of the machine for testing the bottles after they have been capped; Fig. 31 is a detail illustrating

the capper testing head; Fig. 32 is a detail illustrating a portion of the bottle ejecting mechanism controlled by the capper testing head; Fig. 33 is a plan view, partly in section, of the machine shown in Fig. 30; Fig. 34 is a detail illustrating the ejecting mechanism employed in the capper testing machine; Fig. 35 is a front elevation of the machine for transferring the bottles from the moving conveyer to the baskets of the pasteurizing machine; Fig. 36 is a top plan view of the machine shown in Fig. 35; Fig. 37 is a side elevation of the machine shown in Fig. 35; Figs. 38 to 40, inclusive, are details illustrating a portion of the mechanism employed in a machine for transferring the bottles to the pasteurizing machine; Figs. 41 to 43, inclusive, are details illustrating the construction of the gripping members employed in the machine for transferring the bottles to the pasteurizing machine; Figs. 44 to 49, inclusive, are details showing the cams employed in the machine for transferring the bottles to the pasteurizing machine, shown in Fig. 35; Fig. 50 is a side elevation of the machine for transferring the bottles from the pasteurizing machine to the moving conveyer; Fig. 51 is a plan view, partially diagrammatic, of the labeling and label testing machines, and mechanism for conveying the bottles to these machines and removing them therefrom; Fig. 52 is a diagrammatic view illustrating an elevation of the mechanism for transferring the bottles to the labeling machines; Fig. 53 is an elevation of the mechanism for laying the bottles upon their sides and weighing them after they have been removed from the pasteurizing machine; Fig. 54 is a top plan view of the mechanism shown in Fig. 53; Fig. 55 is a front elevation of the mechanism shown in Fig. 53; Fig. 56 is a plan view, partially diagrammatic, of the labeling and label testing machines and the mechanism for removing the bottles to and from the machines; Fig. 57 is a side elevation, partly in section, of the labeling machine and bottle feeding mechanism; Fig. 58 is an elevation of the machine shown in Fig. 56, taken at right angles to the elevation shown in Fig. 57; Fig. 59 is a detail showing an elevation upon an enlarged scale of mechanism for feeding the bottles to the labeling machine; Fig. 60 is a detail showing a plan view of the mechanism shown in Fig. 59; Fig. 61 is a detail showing a sectional view of the pin for operatively engaging the bottle carrying arm with the actuating member; Fig. 62 is a detail illustrating upon an enlarged scale mechanism for feeding the labels and for stopping the labeling machine if no label is removed from the pile; Figs. 63 and 64 are details illustrating the label holding and feeding mechanism; Figs. 65 and 66 are details showing side and front elevations respectively of the feeder mechanism for determining whether the label has been properly applied to the bottle; Fig. 67 is a diagrammatic view illustrating the mechanism for transferring the bottles from the labeling machines to a point where they may be removed to the empty cases and the mechanism for testing the cases after the bottles have been placed therein; Fig. 68 is a top plan view, partially diagrammatic, showing the mechanism for removing the bottles from the continuously moving conveyer on to the intermittently moving conveyer from which they are placed in the empty cases; Fig. 69 is an end elevation of the mechanism shown in Fig. 68; Fig. 70 is a front elevation of the mechanism shown in Fig. 68; Figs. 71 to 73, inclusive, are details illustrating the mechanism for intermittently moving the receiving conveyer; Figs. 74 and 75 are details illustrating the clutch and operating mechanism therefor for actuating the bottle transferring mechanism; Fig. 76 is a detail illustrating the portion of the mechanism shown in Figs. 71 and 72; Fig. 77 is a top plan view of the machine for transferring the bottles from the conveyer to the empty case; Fig. 78 is a front elevation of the machine shown in Fig. 77; Fig. 79 is an end elevation of the machine shown in Fig. 77; Fig. 80 is a front elevation of the machine for turning the cases and mechanism for feeding the cases to the machine; Fig. 81 is a top plan view of the mechanism shown in Fig. 80; Fig. 82 is an end elevation of the mechanism shown in Fig. 80; Fig. 83 is a front elevation of the machine for testing the cases to determine whether they have been completely emptied; Fig. 84 is a top plan view of the machine shown in Fig. 83; Fig. 85 is an end elevation of the machine shown in Fig. 83; Fig. 86 is a plan view of the conveyer for transferring the empty cases from one point to another; Fig. 87 is an elevation of a portion of the conveyer and illustrating the method by which the empty cases are elevated; Fig. 88 is an elevation illustrating another portion of the conveyer for the empty cases; Fig. 89 is a side elevation of the machine for testing the cases to determine whether they are filled with bottles; Fig. 90 is a top plan view of the machine shown in Fig. 89; Fig. 91 is a front elevation of the machine shown in Fig. 89; Fig. 92 is an elevation partially diagrammatic, of the mechanism for actuating the bottling system; Fig. 93 is an elevation partially diagrammatic, illustrating the continuation of the mechanism shown in Fig. 92; Fig. 94 is a plan view of the actuating mechanism for the bottling system illustrating more particularly the mechanism for automatically starting and stopping the system; Fig. 95 is an elevation illustrating

upon an enlarged scale a portion of the actuating mechanism for the bottling system; Fig. 96 is a detail illustrating an elevation of the mechanism for controlling the driving mechanism when the first row of bottles passes through the soaking machine; Fig. 97 is a detail illustrating an end elevation, partly in section, of a portion of the actuating mechanism; Fig. 98 is a detail illustrating an elevation of the control mechanism upon the soaking machine and connections between this mechanism and the actuating mechanism; Fig. 99 is a detail illustrating an elevation of the control mechanism upon the pasteurizing machine; Fig. 100 is a plan view of the mechanism shown in Fig. 99; Fig. 101 is an elevation, partly in section, of a portion of the driving mechanism; and Fig. 102 is a side elevation, partly in section, of the driving mechanism illustrating the control mechanism upon the pasteurizing machine and the connections therefrom.

The present invention performs automatically all of the essential operations which take place in the bottling of liquids including the filling, sealing and labeling of the bottles. In addition, the empty bottles are prepared for the filling operation by first soaking them in a washing solution and next scrubbing or washing them both upon the exterior and the interior, and after the bottles have been filled and sealed they are sterilized for a suitable length of time and then labeled. The bottles are thus soaked, washed, filled, capped, pasteurized and labeled, the several operations taking place automatically and in the sequence named. In order to render the handling of the bottles completely automatic they are in addition transferred from the case to the soaking machine and from the labeling machines are returned to the case mechanically. It will be obvious to those skilled in the art that the bottles may return in the cases in such a condition that they are not usable and furthermore, they may become unfit for use on account of one or more of the bottling operations being performed improperly. In order to avoid the necessity of constantly watching the operations the bottles are subjected to a plurality of testing operations which initially determine whether the bottles are fit for use and next test the bottles, after each of the essential operations has been performed in order to determine whether the preceding operation has been properly performed. If the bottle is imperfect owing to the improper or non-performance of the preceding operation it is rejected automatically and only the perfect bottles are passed on to the next machine, the rejects or imperfect bottles being collected in a discharge chute convenient to the operator. The provision of these testing

operations is of extreme importance as it enables the machine to operate continuously, the bottles which are imperfectly operated on being discarded immediately after the operation, preventing any subsequent operations from being performed upon the bottle and insuring that all of the filled bottles which are placed in the cases shall be in perfect condition.

After the bottles have been removed from the cases and simultaneously with the filling of the bottles the cases are operated upon to remove broken bottles or other refuse therefrom and are then tested to determine whether this refuse has been completely removed from all of the compartments and if any refuse is found to remain in the compartments the case is rejected in order that it may be cleaned manually. After the cases have been tested they are conveyed at a predetermined rate of speed to the point where they receive the filled bottles, after which they are transferred automatically to a case testing mechanism which determines whether each compartment in the case is provided with a bottle and if not, rejects the case.

As a considerable length of time is required for the passage of the bottle completely through the machine it is advisable to start only a portion of the machine when the first bottles move therethrough and to start the operation of the remainder of the machine only when the bottles are in readiness to be operated upon thereby. To this end the machine is conveniently divided into a plurality of units, all of which are actuated by a common prime mover and are adapted to be successively connected therewith at predetermined intervals. The starting of each successive unit is controlled by the passage of the bottles through the machine and the control mechanism is operated when the first bottles have passed substantially through the preceding unit and are in readiness to be operated upon by the next following unit.

The machine is brought from a position of rest to the normal rate of speed by a plurality of stages and upon operatively connecting each additional unit to the actuating mechanism the speed of the preceding units is automatically reduced until the additional unit has been connected to the drive and then all of the driven units are brought up to the normal rate of speed. In order to automatically stop the machine if any one of the operations is not being performed properly each one of the testing machines is connected with the actuating mechanism in such a manner that when a predetermined number of bottles have been discharged the drive shaft is disconnected automatically and the machine stopped. In order to call the attention of the operator

to the fact that some particular operation is not being performed properly before the stopping of the machinery an indicator is operated when a lesser number of bottles have been discharged, thus enabling the operator to remedy the difficulty, if possible, before the machine is stopped.

In the illustrated embodiment of the invention shown diagrammatically in Fig. 1 of the drawings the cases filled with empty bottles are fed by gravity along the case conveyer until they arrive at the bottle transferring machine. After their arrival at this machine they are located and retained in position during the removal of the bottles from the case and they are deposited in the pockets of a soaking machine located upon the opposite side of the conveyer chute. The bottle transferring machine is provided with gripping members which remove an entire row of bottles at a time, the members operating automatically to grip only bottles of the proper height, leaving bottles which are too long or too short in the cases. After the bottles have been deposited in the soaking machine they are passed through a washing solution in a manner well-known to those skilled in the art and are then discharged with their open ends downward into the pockets of a moving conveyer. This conveyer transfers the bottles to a washing machine which subjects them to a jet of washing fluid upon the inside and scrubs them upon the outside to remove the labels and thoroughly clean the bottles. After the bottles have been washed they are held with their open ends downward for a predetermined length of time to allow them to completely drain and are then righted and conveyed to a pressure testing machine. The bottles may have been initially nicked or cracked, or may have reached this condition during their passage through the washing and soaking machines and the pressure test is intended to determine whether the bottles are sound, and if not, to reject them and prevent the performance of the subsequent operations upon the imperfect bottles. To this end the open end of the bottle is connected with a source of air under pressure and if the bottle is sound the connection is normally sealed and the air cannot escape, but if the bottle leaks the pressure in the connections drops and the ejecting mechanism is allowed to operate, discharging the bottle. The perfect bottles are then fed, one at a time to the filling machine, the filling machine feed operating only to transfer a bottle to the turret of the filling machine when a vacant space is presented and if the filling machine becomes clogged for any reason whatsoever the feeding mechanism does not operate. After the filling machine has operated the bottles are again tested in order to determine whether they have been

completely filled and this is conveniently accomplished by weighing each bottle and if below the required weight the bottle is discharged. The filled bottles are then transferred to the capping machine which operates in the usual manner to seal the top of the bottle, after which each bottle is tested to determine whether the preceding capping operation has been properly performed, the bottle being rejected if no cap has been applied and if the cap has been applied, but improperly. From the capping test the bottles are transferred to a continuously moving conveyer which carries them to the pasteurizing machine. As the bottles reach a position opposite the pasteurizing machine they are automatically transferred from the continuously moving conveyer to the baskets of the pasteurizing machine and after their passage through the machine are again transferred automatically from the baskets to a second receiving conveyer. It frequently happens that during the passage of the filled bottles through the pasteurizing machine the pressure inside of the bottles breaks them and it is essential to determine whether this has occurred during the pasteurizing operation. To this end the bottles are diverted from an upright position sufficient to allow the contents to partially or wholly drain out if the bottle is broken or the cap loosened during the pasteurizing operation and each bottle is then weighed and if any of the contents have drained out and the bottle lightened it is rejected. After the bottles have been pasteurized and tested they are operated upon by the labeling mechanism and as the labeling of the bottles is a somewhat slower operation than the others two separate labeling mechanisms are employed and feeding mechanism is provided for automatically transferring alternate bottles to each labeling machine. The labeling mechanisms are provided with means for determining whether a label is applied to the bottle and in addition, to determine whether the label has been properly applied. If the label has been improperly applied it forms a bunch upon the surface of the bottle and the bottle is rejected in the usual manner. From the labeling mechanisms the bottles are transferred to the continuously moving conveyer from which they are in turn transferred to an intermittently moving conveyer and from this conveyer are placed in the cases. The intermittently moving conveyer is arranged to feed forward a single space only upon the transfer of a bottle thereto. With this mode of operation the vacant spaces caused by the rejection of the bottles during the preceding operations are taken care of, all of the spaces upon the intermittently moving conveyer being filled. After a predetermined number of bottles have been

transferred to the intermittent conveyer sufficient to form one row in a case the operation of the bottle transferring mechanism is automatically started and this row of bottles is transferred to the case.

After the empty bottles have been removed from the cases the case is fed to a mechanism for turning it sufficiently to cause whatever is contained in the compartments to drop out by gravity and is then righted and conveyed to a mechanism which tests the case to determine whether each of the compartments has been completely emptied. If any bottles or other debris remain in the cases the case is rejected. After the cases have been filled with perfect bottles they are transferred to a mechanism which tests each compartment in order to determine whether it is occupied by a bottle and if any compartment is vacant the case is rejected, the perfect cases being delivered at any suitable point.

The entire machine is operated by a single prime mover which is operatively connected with a main drive shaft through low and high speed gearing and each one of the mechanisms for performing the several operations is operated from the main drive shaft through suitable connections. In order to prevent the operation of the entire machine when the bottles are first started the first starting of the machine serves simply to operate the mechanism for transferring the bottles from the cases to the soaking machine, and in addition, the case turning and testing machines. These machines alone continue to operate until the first bottles have passed through the soaking machine and are ready to be delivered to the washing machine, when the control mechanism is actuated to set into operation the second unit of the machine which performs all of the operations upon the bottle up to and including the pasteurizing operation. In order to properly start the second unit the speed of the preceding machines is first reduced, the second unit is then connected to the drive shaft and all of the driven machines are then driven at the high rate of speed. The first and second units continue their operation until the first bottles have passed through the pasteurizing machine, when a similar control mechanism is then operated to start the third unit of the machine which performs all of the remaining operations upon the bottles and cases. With this construction only those portions of the machine which are actually doing useful work are operated, the other portions of the machine remaining idle until the proper time.

The cases 10 containing the empty bottles 12 are fed to the transferring machine down an inclined chute 13. That portion of the chute adjacent the machine is horizontal, as

shown clearly in Fig. 4, and in order to move the cases a predetermined distance along this portion of the chute and position them properly beneath the transferring mechanism a series of gaging and feeding fingers 70 are employed. In the illustrated embodiment of the invention, two cases are positioned beneath the transferring mechanism and all of the bottles in each of the two cases are removed simultaneously. When two of the cases have been emptied the feeding mechanism is operated to feed two more cases into place, pushing out the two cases from which the bottles have been removed, these cases sliding off the inclined end 80 of the chute.

The cases are positioned beneath the transferring mechanism by a pair of gaging fingers 16 which are normally held projecting above the bottom of the chute to serve as a stop against which the end of the first case abuts. Each pin is slidably mounted in a sleeve bearing 17 and is operatively connected to a cam 18 through rocker arms 19 secured to a shaft 20 and an arm 21 connecting the shaft and cam 18. In the illustrated embodiment of the invention the gaging fingers are normally retained in operative position by tension springs 22 connected to the rocker arms 19. The cases are fed into position beneath the transferring mechanism by feeding fingers 25 which project above the bottom of the chute at a distance from the fingers 16 approximately the length of four cases, thus causing the forward feeding movement of these fingers to push two full cases into place and displace two empty cases. It will be noted from an observation of Fig. 4 that owing to the curvature of the chute 13 a space is formed between the fourth and fifth cases, allowing the fingers 25 to rise into position behind the fourth case. The feeding fingers 25 are fulcrumed upon a crosshead 27 slidably mounted upon parallel guide rods 28 secured at their opposite ends in bearings 30 mounted upon the chute. The crosshead is caused to traverse back and forth to operate the feeding fingers by an endless chain or carrier 32 passing over sprocket wheels 33 and 34 at its opposite ends and operated intermittently through a toothed segment 35 and gear 36 secured to the shaft of the sprocket wheel 34. The toothed segment 35 is formed upon one arm of a bell crank 37 loosely sleeved upon the shaft 39 and having its opposite arm connected to a lever 40 through a link 42. The lever 40 is fulcrumed between its ends at 44 and has its opposite end operatively connected with a path cam formed in the face 46 of the cam 47. In order to allow for slight discrepancies in the length of the cases the crosshead 27 is yieldingly connected to the carrier 32. The carrier is provided with a stud 50 in

which is rigidly secured a headed pin 51 passing loosely through a stud 53 formed upon the bottom of the crosshead and yieldingly held in engagement with the stud 50 by a spring 55 interposed between the head of the pin 51 and the stud 53. The feeding fingers 25 are held in their elevated or operative position during the forward movement and are then depressed and retracted to engage behind the next pair of cases. To this end the fingers are pivoted at 58 upon the crosshead 27 and are provided with an arm 60 which has its free end operatively connected to a hinged elevating table 62, as shown clearly in Figs. 2 and 3. The elevating table 62 is hinged upon a rod 64 and is provided with a rearwardly projecting arm 65 connected to a rocker lever 67 through a link 68. The rocker lever 67 is actuated to impart the proper movements to the elevating table by a path cam formed in the face 70 of the cam 47.

After the cases 10 have been moved into the proper position in the transferring machine a series of bottles are engaged and removed from the cases and are then carried to the next machine into which they are automatically discharged. In the illustrated embodiment of the invention the transferring mechanism is arranged to engage simultaneously with a row of bottles in two cases and after this row has been removed and discharged the mechanism automatically engages with the next following row and so on until the cases have been completely emptied. To this end a gripper carrying head 100 is slidably mounted at its opposite ends upon supporting standards 102 and carries a plurality of gripper members indicated generally at 103. The gripper carrying head is actuated to first cause the grippers to engage and automatically grasp the bottles and is then elevated to remove the bottles from the cases, in which elevated position the head is retained until the standards have been moved forward, when the head is again depressed to carry the bottles into a position where they may be engaged by the ejecting device and discharged from the grippers. The head is actuated by an arm 105 secured at one end to a rock shaft 106 and connected at its free end to a path cam formed in the face 107 of the cam disk 108. The rock shaft 106 is operatively connected to the opposite ends of the head through arms 110 secured at one end of the rock shaft and connected to the head through links 111. In order that the gripper carrying head may be moved bodily to transfer the bottles from a position above the cases into a position above the next succeeding machine where they may be discharged, the standards are mounted in a rocker frame 112 which is fulcrumed at 113. In order to rock the standards and gripper carrying

head at the proper intervals the rocker head is provided with two upwardly projecting arms 115, which are provided with pins 116 engaged by hooks 117 fulcrumed on arms 118 secured to a rock shaft 120. The rock shaft is actuated by an arm 122 operatively connected at its free end with a path cam formed in the face 123 of the cam disk 124. In addition to the vertical movements of the gripper carrying head to engage with the bottles and the bodily swinging movements of the head to remove the bottles into a position where they may be discharged it is essential that movements be imparted to the head to position the head automatically over each separate row of bottles in order that a vertical movement imparted to the head shall engage the bottles properly. To this end the rocker head 112 is supported at its opposite ends by a pair of carriers 125 slidably mounted in bearings 126 formed in the machine frame. The carriers are actuated by mechanism comprising connecting rods 128 and arms 129 secured to a rock shaft 130. The rock shaft is provided with a depending arm 132 which is connected to a path cam formed in one face of a disk cam 134. In order to cause the hooks 117 to engage and release the arms 115 at the proper intervals they are operatively connected with a path cam formed in the face 135 of the disk cam 108 through an arm 137 secured to a rock shaft 138 and rods 140 connecting each hook midway of its ends to an arm 141 secured to the rock shaft. The various disk cams are properly designed and timed to first depress and elevate the gripper carrying head to engage with a row of bottles and remove them from the cases, to then swing the rocker head about its fulcrum 113 by means of the hooks 117 in order to shift the gripper carrying head into a position where the bottles may be discharged, and to finally again depress the gripper carrying head while the hooks retain the head and standards in the position shown in dotted lines in Fig. 2 of the drawings. The above mode of operation causes one row of bottles to be automatically removed from the cases, but in order to remove all of the bottles without requiring the attention of the operator it is necessary to impart some movement to the heads in order to move them into a position in which the next succeeding row of bottles may be engaged, and in addition, it is advisable to release the hooks from engagement with the arms 115 in order that this movement may take place freely. In consequence, the rocker head is supported in the carriers 125 which are actuated after the first row of bottles has been discharged to move the grippers into position above the next row of bottles and retain them in this position during the engaging and removal of the bottles from the cases and to then move the grip-

pers and bottles back to the initial position, in which position the hooks 117 engage with the arms and the cycle of operations which took place with the preceding row of bottles is again repeated. This feeding movement is designed and timed to move the grippers into position over each row of bottles in the case. In the illustrated embodiment of the invention the usual type of case is disclosed which contains four rows of bottles with six bottles to the row, thus four distinct cycles of operation are given to the transferring mechanism to completely empty two cases, after which two more cases are fed into position, ejecting the empties which slide off the inclined end of the chute by gravity. The transferring machine is operated through a shaft 143 to which the cam disks 18 and 47 are secured and drives the cam shaft 144 through a countershaft 145 and intermeshing sets of bevel gears indicated respectively at 146 and 147. The cam shaft 144 carries the cam disks 108 and 124 and the cam disk 134 mounted upon the cam shaft 150 which is driven from the shaft 144 through a pinion 151 and gear 152 so constructed that the cam shaft 150 is driven at a slower rate of speed than the cam shaft 144 as the cam 134 causes the feeding of the grippers into position for different rows of bottles.

As stated previously, the bottles are automatically engaged by the grippers 103 and in addition, the grippers are arranged to automatically compensate for bottles of varying heights and to reject and leave in the cases any bottles from which the caps have not been removed or which are plugged so that it would not be possible to fill them. Each gripper consists of a cage or centering device 154 and gripper arms 155 both mounted upon the lower end of a sleeve 157. The centering device 154 is provided with a series of outwardly flaring feet 158 at its lower end which pass over the top of the bottle and position it properly for engagement by the gripping arms, as shown clearly in Fig. 5 of the drawings. Each gripping arm is fulcrumed at its upper end and is provided at its lower end with a hook shaped projection 159 adapted to engage beneath the usual bead formed upon the bottle. The under face of the gripping arms is rounded to allow them to slide readily over the head of the bottle and each arm is provided with a spring, and after passing over the head of the bottle the arms automatically swing into position to engage beneath the bead. It will be obvious that the bottles will vary in height and that in order to be entirely automatic the gripper mechanism must operate to grip all bottles without breaking the longer bottles on account of the undue pressure and without failure to engage and grasp the shorter bottles. To this end the sleeve 157 is slidably mounted in

a bracket 160 secured to the gripper carrying head 100, as shown clearly in Fig. 2 of the drawings. The sleeve is connected to the bracket through a pin and slot connection indicated at 161 and is normally maintained in depressed position by a spring 162 inclosed in the sleeve and interposed between a fixed block 164 and the lower end of the sleeve, as shown clearly in Figs. 5 and 7 of the drawings. The provision of the pin and slot connection 161 determines the limits of movement of the sleeve and in its normally depressed position the sleeve is arranged to cause the grippers to engage with the shortest bottle which can possibly be encountered. Whenever longer bottles are encountered by the grippers the sleeve is depressed by the gripper carrying head until the faces formed upon the abutment 163 engage with the head of the bottle, in which position the gripping arms engage beneath the head of the bottle and further movement of the gripper carrying head compresses the spring 162 without breaking the bottle. If the bottles are so long that they could not be operated upon properly the gripper head will not clear them when moving into position and the bottles will be pushed to one side in the case and remain in the case without being engaged and removed by the grippers. In order to prevent the grippers from engaging with and discharging bottles in which the opening is closed the abutment 163 is provided with a feeler 165 which normally projects within the neck of the bottle without affecting the operation of the grippers, but if for any reason whatsoever, the feeler 165 encounters an obstruction, further downward movement of the grippers is prevented and the spring 162 is compressed, thus retaining the grippers above the neck of the bottle and allowing the bottle to remain in the case. It will be noted from an inspection of Fig. 5 that the abutment 163 is provided with a flange 167 which determines the inward limit of movement of the gripper arms in order that they may be spaced apart sufficiently to spread outwardly over the head of a bottle when the gripper head is depressed. After a bottle has been engaged by the gripper and removed to a position adjacent to the next machine, mechanism is provided for automatically opening the gripper to release the bottle and allow it to be discharged. To this end one of the gripper arms 155 is formed as a bell crank lever having a second arm 169 which engages with a stop as the gripper head is moved downwardly to discharge the bottles, as shown in Fig. 2 of the drawings. The engagement of the arm 169 with the stop rocks the bell crank and releases the bottle which is allowed to drop by gravity. In order to insure the return of the gripper arms to their initial position

and to render the gripping of the bottle more positive the arms are normally retained in engagement with the flange 167 by springs 170. In the illustrated embodiment of the invention, as shown in Fig. 2, the stop consists of a fixed bar 171 extending completely across the soaking machine and arranged to simultaneously engage with the arms 169 of the row of grippers, thus releasing all of the bottles at once.

The bottles are discharged from the transferring machine into a series of pockets provided in a soaking machine of the usual type. This soaking machine is provided with a traveling belt or other suitable type of conveyer for carrying the bottles and by means of which they are fed through a washing liquid to loosen and remove foreign matter from the bottles and enable them to be readily cleaned by the washing machine. As this general type of machine is well known, only the mechanism for transferring the bottles automatically to and from the machine has been disclosed in detail. The bottles are discharged into a series of pockets 175 which are supported upon a suitable conveyer 176 indicated diagrammatically in Fig. 2 of the drawings. A suitable number of pockets are provided in each row to simultaneously receive the row of bottles discharged from the transferring machine and the mechanism is so timed that each row of bottles is discharged without stopping the continuous movement of the conveyer. Upon referring to Fig. 2 of the drawings it will be noted that each pocket is provided with an automatic latch which is opened by gravity to allow the bottle to enter the pocket and is then closed in a like manner to retain the bottle in the pocket during its passage through the soaker. The latch, as shown in Fig. 2 of the drawings, comprises a hook 177 pivoted at 178 and arranged to swing beneath the head of the bottle and close the pocket when the pocket is positioned with its open end on the under side. After the passage of the bottles through the machine they are automatically discharged from the pocket by tripping the latches which close the pocket through a tripper arm 180 secured to a latch 177 and arranged to engage with a stop or abutment 181 when the pocket has reached the position in which the bottle is to be discharged. One or more abutments are provided and are arranged to operate all of the latches simultaneously, thus discharging an entire row of bottles which are received by a conveyer indicated generally at 185, on Fig. 10 of the drawings. This conveyer is operated continuously at a uniform rate of speed and comprises an endless chain passed over two sprockets indicated in Fig. 1 and one of the sprockets being shown at 186 in Fig. 10 and having a laterally pro-

jecting arm 189 connected to each link, the links being so proportioned and designed that the space between each pair of arms 189 is sufficient to receive one bottle. The bottles are supported in position in the pockets of the chain by a shelf 190 upon which the bottle stands with the open end downward.

The bottles are automatically transferred by the conveyer 185 to a washing machine. This is accomplished by a series of curved deflecting fingers 225 which engage with the bottles on opposite sides of the feeding arms 189, as shown clearly in Figs. 10 and 11. These deflecting fingers transfer the bottles into receiving pockets formed in the spider or cage 226 of the washing machine. The bottles come to the washing machine with more or less of the solution from the soaking machine on both their inner and outer surfaces and in the illustrated embodiment of the invention the bottles are positively rotated and are engaged upon the outside by a series of brushes, the interior of the bottle being subjected to a jet of cleansing fluid. As shown clearly in Figs. 10 and 11 of the drawings the spider 226 is provided with a series of arms 227 having bifurcated outer ends 228 which embrace and position the bottle. Each bottle is supported with the open end down upon a freely rotatable bearing member 230 and is clamped in position against this bearing member by a cup shaped clamping member 231 secured upon the lower end of a shaft 232, provided with a drive pulley 233. The shaft 232 is slidably supported in bearings formed in the spider and is elevated and depressed to clamp and release the bottle by a cam 235 which operatively engages an arm 236 secured to the shaft 232, as shown in Fig. 12. The clamping member 231 is normally retained in a depressed position in engagement with the bottle by a spring 238 which is connected to a rearwardly projecting arm 239 which has a free end slidably mounted in ways 240 to retain the arm 236 in the proper operative relation with the cam 235. As will be evident from an inspection of Fig. 10 of the drawings, the cam 235 is arranged to permit the clamp 231 to engage with the bottle immediately after being received into the machine, the cam track then stopping and allowing the clamp to retain the bottle in position until the cycle of operations have been completed and just prior to the discharge of the bottle, when the clamping member is again raised by the cam 235 to release the bottle and permit its removal. In order to rotate the bottles during their engagement with the cleaning brushes a driving belt 241 is driven from a main drive pulley 242 and is guided by pulleys 243 and 244 in such a manner as to cause

the belt to engage with several of the drive pulleys 233 at one time and consequently rotate the corresponding clamping members and bottles held thereby. During the rotation of the bottles they are scrubbed upon the outside to remove the labels or dirt by a plurality of brushes indicated generally at 245 and constructed in any suitable manner to engage with the separate bottles. In the illustrated embodiment of the invention the cleaning brushes consist of a plurality of independent sections 246 secured at their lower ends in the brush frame and having their upper ends independently secure and adjusted through a pair of clamping screws and wing nuts 248. From an inspection of Fig. 12 it will be noted that the cam track 235 is supported upon a standard 250 which is provided with an arm 251 carrying a feed pipe 252 upon its inner free end. The pipe 252 is concentric with the axis of rotation of the spider and is connected by a swivel joint 253 with a header pipe 254 secured in the spider. This pipe communicates with an annular chamber 255 having a series of connections 256 leading therefrom to each bearing member 230, which is provided with a duct positioned immediately beneath the open end of the bottle. In order to form a tight joint between the bearing and the open end of the bottle to prevent the escape of water, a pipe 258 is slidingly mounted in the bearing and is automatically actuated by a closed cam track 260 to enter the neck of the bottle after it has been clamped in position and cause the jet of water to be forced into the bottle from the inside. In addition, it is desirable to provide means for automatically controlling the supply of water to each bottle in order to start the flow of water after the bottle has been clamped in position and automatically cut it off prior to the removal of the bottle from the machine. To this end any suitable type of valve indicated at 261 is located in each pipe and is controlled by a fixed cam track 262 engaging with the lower end of a valve actuating stem 263 to open the valve after the pipe 258 has been inserted in the neck of the bottle and close the valve prior to its removal from the bottle. In order to permit movements of the pipe 258 relative to the other connections a flexible joint 265 is provided. With this construction it will be noted that the bottles are automatically engaged by the washing machine, are clamped in position by the clamping member 231, and are then subjected on their interior to a jet of water flowing from the pipe 258 which has been elevated in to the neck of the bottle. At a certain point in the rotation of the turret the driving pulleys 233 are engaged by the belt 241 and are caused to rotate the bottles when in engagement with the cleaning brushes. After the brushes have operated upon the exterior of the bottle and prior to their automatic removal from the machine the pipe 258 is removed from the neck of the bottle and the valve 261 is closed and the clamping member 231 is elevated to release the bottle and allow its discharge, all of these operations taking place automatically without requiring the attention of the operator.

After the bottles have been soaked and washed they are in a clean condition with the labels removed ready for the filling and subsequent operations which must take place preparatory to the return of the filled bottles to the cases. Prior to the filling of the bottles, however, it is desirable that cracked or otherwise imperfect bottles shall be detected and removed from the machine in order to insure that the filling and subsequent operations shall be performed only upon perfect bottles. It is advisable to pass the bottles through the washing machine with their open end downward in order that the cleansing fluid which is forced into the bottle may flow out and cause the bottle to drain properly, but when the bottle arrives at the filling machine it must be reversed and stand in an upright position, and to this end mechanism is provided for automatically transferring the bottles from the washing to the filling machine and for reversing the position of the bottles during their passage. In the illustrated embodiment of the invention this mechanism is arranged to carry the bottles for some distance with their open ends downward in order that the bottles may be completely drained before coming to the filling machine. Referring to Figs. 22 and 13 of the drawings, the bottles are transferred from the washing machine to a traveling carrier or belt 275 of any suitable form, the mechanism for transferring the bottles from the machine to the carrier consisting of a recessed wheel 277 and a stationary deflector 278, as shown clearly in Fig. 22. The bottles are transferred to the carrier 275 with their open ends downward and in this position are supported upon a shelf 280, as shown clearly in Fig. 13. The carrier 275 shown in the illustrated embodiment of the invention comprises an endless link chain passing over the sprockets 281 and 282 and having a bottle carrying pocket 283 secured to each link. As will be obvious from an inspection of the drawings, the bottles are carried for some distance with their open ends downward supported by the shelf 280 in order that they may be completely drained, but as the carrier 275 passes around the sprocket 282 the position of the bottles is gradually changed until they are supported in an upright position, the shelf 280 being curved to conform to the periphery of the sprocket and serving to support the bottles until they are positioned sub-

stantially upright, in which position they are supported by the pockets 283. As stated previously, it is advisable to test the bottles to detect cracks or other imperfections prior to the filling operation, and to this end the bottles are transferred from the conveyer 275 to a pressure testing machine indicated generally at 285 by means of the usual type of stationary guard or deflector 286.

The pressure testing machine detects the imperfect bottles by subjecting them to an internal pressure and if leakage occurs this pressure is lowered, but if the bottle is tight the pressure is maintained constant and the bottle is passed on to the following machines. The testing machine comprises a rotating bottle carrier 290 mounted upon a vertical shaft 291 and carrying devices for supporting and clamping the bottles and for detecting leaks and rejecting the imperfect bottles. Each bottle is retained in proper position by a semi-circular guide 292 which embraces the side of the bottle, shown clearly in Fig. 14, and is supported on an arm 293 pivoted at 294 to an overhanging arm 295 forming a portion of the carrier 290. After the bottle has been received in the machine it is supported by a spring 298 slidably mounted in bearings formed in the carrier.

In order to clamp the bottle in position the finger 297 is normally interposed between a collar 299 secured to the finger and a portion of the machine frame. When engaged and forced upward by the finger 297 the upper or open end of the bottle is clamped firmly against a bearing 300 provided with a flexible gasket to insure a tight joint. In order to control the movements of the finger 297 automatically and to allow the convenient reception and removal of the bottles to and from the machine the lower end of the finger is connected with a cam path 302 formed upon the under face of a stationary disk cam 304. With this construction the cam path operates to depress the finger to allow the bottle to be moved into the machine and to be removed therefrom but during the passage of the bottle through the machine the cam is arranged to allow the spring 298 to actuate the finger and maintain the bottle firmly in engagement with the clamping head 300. In order to apply an internal pressure to the bottle the arm 295 is provided with a passage 305 communicating with an annular supply chamber 306 and arranged to allow the passage of air or other fluid to the interior of the bottle. Communication with the passage between the annular chamber and the passage 305 is controlled by a check valve 307, shown in detail in Fig. 16 of the drawings. This check valve is of the usual form having a stem 308 slidably mounted in a bearing 309 secured to the arm and normally retained in engagement with its seat by the pressure of the air in the chamber 306. In order to open the valve automatically at predetermined intervals a sliding valve rod 310 projects into the passageway 305 beneath the valve and has its lower end operatively connected with a closed cam path 312 formed in the disk cam 304. This cam path is constructed and arranged to normally maintain the valve rod 310 inoperative, thus cutting off the pressure from the passage 305, but prior to the movement of each bottle into position opposite the discharging chute 313 the valve rod is elevated to open the valve and allow the pressure to be communicated through the passage 305 to the interior of the bottle. If the bottle is tight a uniform pressure will be maintained in the passage, but if on the other hand the bottle is nicked or cracked to cause it to leak the pressure in the passage will drop, indicating that the bottle is imperfect and should be rejected. This dropping of the pressure is accordingly utilized to control the operation of the ejecting mechanism. In the illustrated embodiment of the invention the positioning guide 292 serves also as the means for ejecting an imperfect bottle and to this end the arm 293 is connected through a link 315 with a bell crank lever 316 normally actuated by a compression spring 317 to rock the bell crank and swing the arm 293 outwardly in a direction to eject the bottle. The free end of the bell crank is connected through a rod 318 with a cam path 319 formed on the cam disk 304 which is constructed and arranged to normally retain the bell crank in the position shown in Fig. 14 against the tension of the spring, thus maintaining the ejecting mechanism inoperative except at predetermined intervals. In order to automatically control and prevent the operation of the ejecting mechanism except in the case of imperfect bottles, the arm 293 is provided with a hook 320 engaged by a latch 321 pivoted at 322 to the carrier. When the latch 321 engages with the hook 320, as shown in Fig. 14, the arm 293 will be locked in the position shown. The movements of the latch into and out of operative position are controlled automatically through a regulating valve shown in the illustrated embodiment of the invention as a diaphragm 324 secured in a chamber 325 communicating freely with the passage 305. The diaphragm valve is normally engaged by the upper end of an operating rod 327 connected at its lower end to the latch 321 and normally elevated by a spring 329. The operation of the several mechanisms for testing and ejecting the bottles takes place just prior to the movements of the bottles into position opposite the discharging chute 313 and after the ejecting of the bottles the cams return the various parts to their normal position. While the bottle is clamped in position between the finger 297 and the

clamping head 300 the cam path 312 opens the valve 307 causing an internal pressure to be applied to the bottle. If the bottle is tight this pressure through the diaphragm 5 324 immediately depresses the latch 321 and locks the arm 293 in the position shown in Fig. 14 so that immediately thereafter when the recess in the cam 320 occurs to allow the spring 317 to eject the bottle the latch 321 10 prevents the ejecting movement. If, on the other hand, the bottle is cracked or otherwise imperfect the pressure in the passage 305 is not maintained constant and the resultant low pressure is not sufficient to move the latch 321 into engagement with the hook 15 320, thus when the ejecting mechanism is free to operate through the spring 371 the arm 293 is swung outwardly, ejecting the bottle from between the two clamping 20 members. It will be observed that the clamping effect of the finger 297 is secured by the spring 298, this construction allowing the bottle to be forced out from between the clamping members, the finger yielding as 25 this takes place. Immediately after the bottle is rejected the cams return the parts to their normal position and the valve 307 is closed, shutting off communication with the passage 305.

30 After the bottles have been tested to determine whether they are free from imperfections, as cracks and nicks, they are conveyed automatically to the filling machine. The filling machine is of the turret type 35 and it sometimes happens that the bottles are not discharged therefrom after being filled, or the machine clogs and stops for some reason, and when this occurs it is essential that the stream of bottles continuously 40 fed to the filling machine from the preceding machines shall be diverted and not clog the mechanism. To this end a transferring and controlling mechanism is interposed between the testing machine and 45 the filling machine and is so arranged that the empty bottle is diverted into a discharge chute if there is no vacant pocket to receive it in the filling machine. To this end the bottles are transferred from the turret 50 of the testing machine to a rotary turret or conveyer 350 by the usual type of stationary guard or deflector 352. This turret is provided with a stationary shelf 354 to receive the bottles and a series of pockets 55 355 to feed the bottles through the machine. The turret of the filling machine indicated at 360 rotates in close proximity to the turret 350, as shown in Fig. 19 and the movements of the two turrets are so timed that 60 two spaces are positioned opposite to one another at a point where the peripheries of the turrets approach most closely. Each bottle is transferred from one of the pockets 355 to a corresponding pocket 361 by a 65 feeding arm 362 fulcrumed vertically at 364

and having an arm 365 extending rearwardly which operatively engages with the periphery of a rotary cam 366. The cam 366 is supported to rotate in a horizontal 70 plane by mechanism hereinafter to be described at a speed which causes it to make one complete rotation for each bottle which is fed into position by the turret 350. From an inspection of Fig. 19 it will be noted 75 that during the major portion of its rotation the cam 366 retains the arm 362 in an inoperative position, but when the bottle reaches a position in which it is to be ejected into the pocket 361 the end of the arm 365 is allowed to drop into a depression 368 80 formed in the periphery of the cam, thus causing the arm under the action of a tension spring 370 to swing forward and push the bottle from one pocket to another. It will be noted with this construction that if 85 a bottle is already present for some reason or other in the pocket 361 the arm 362 under the action of the spring 370 will be unable to force a new bottle into the pocket and this bottle will then be carried on with 90 the turret. In order to remove these bottles from the turret a discharge chute 372 is provided having stationary deflecting ribs 373 and 374 which guide the bottle from the turret into the chute. 95

The filling machine, as shown diagrammatically in Fig. 19, is of the turret type and may be of any suitable design. This machine is not described in detail as the 100 specific machine forms no part of the present invention. A machine of this type suitable for the present purpose is disclosed in a patent to Winkley, No. 1,216,036, February 13, 1917.

It some times happens that the bottles are 105 either not completely filled or are not filled at all by the filling machine and in order to make the system completely automatic it is essential that only those bottles which have been completely filled shall be passed to the 110 capping machine. To this end the bottles are transferred from the filling machine to a testing machine indicated generally at 423. This machine comprises the usual turret 425 115 mounted upon a vertical shaft 426 and carrying supporting and positioning devices for the bottle. Each bottle is positioned by a semi-circular guide 427 and is supported on a shelf 428. This shelf is fulcrumed at 430 upon the turret and its outer end rests 120 upon a cam path 431 formed in a stationary cam disk 432. In order to determine whether the bottle has been completely filled or not it is weighed, and ejecting mechanism controlled by the weight of the bottle 125 is arranged to operate and discharge the bottle if it is light owing to its being incompletely filled. To this end the guide 427 is formed upon a head 434 slidably mounted upon an arm 435 secured to the turret and 130

the head is connected with the upper end of a lever 437 pivoted to the turret at 438 and operatively connected with the face of a cam disk 440 through an arm 441. The cam normally retains the head 434 in a retracted position against the action of a spring 442 connected to the lower depending end of the lever 437. It will be noted, however, from an inspection of Fig. 26 that the cam is provided with a recess 446 which releases the lever 437 and allows it to advance the head 434 under the action of the spring 442. In order to control the operation of the ejecting mechanism and cause it to actuate the head 434 only when the bottle is light, a balance rod 450 is slidably mounted in bearings formed in the turret and is normally depressed by a spring 452 which is designed to substantially balance a filled bottle, an adjustment screw 453 being provided to vary the compression of the spring and adjust the mechanism for varying conditions. The shelf 428 is provided with a rearwardly projecting arm 455, the end of which is positioned beneath the rod 450. As stated previously, the end of the shelf upon which the bottle rests is normally supported by the cam 432, but it will be noted from an inspection of Fig. 29 that this cam is provided with a recess 457 which allows the shelf to drop down under the weight of the bottle until the arm 455 engages with the lower end of the rod 450. If the bottle is of the proper weight or is slightly heavier than usual the arm 455 will be moved into the path of the hook 460 forming a part of the head 434. As will be noted from an inspection of Figs. 24 and 25, this hook is bifurcated to allow the hook to move laterally with relation to the rod 450. With this construction the bottles are normally supported by the shelf 428 resting against the cam 432, and the ejecting mechanism is retained inoperative by the cam 440 until each bottle reaches a point opposite the discharging chute 461, indicated diagrammatically in Fig. 23. In this position the recesses 446 and 457 in the stationary cams are reached and the shelf 428 is then supported by the rod 450 and the head 434 is free to be moved by the spring 442. If the bottle has been completely filled and is of standard weight or slightly heavier the arm 455 will be moved against the action of the spring 452 into the path of the hook 460 and prevent the advance of the ejecting head 434. If the bottle is light, however, the weight will not be sufficient to compress the spring and the head 434 will be free to move forward and eject the bottle. The two disk cams 432 and 440 are shown in detail in Figs. 26 to 29, inclusive and are formed of two separate pieces fitting within one another and locked against relative movement by a plurality of lugs 441 formed upon the

cam 440 and corresponding recesses 442 formed upon the interior of the cam 432.

After the bottles have been tested to determine whether they are wholly or partially filled they are transferred to a capping machine indicated at 475 in Fig. 23 of the drawings. The automatic transference of the bottles from the weighing machine to the capping machine is accomplished through idler wheels 476 and 477. Although the capping machine may be of any suitable type well known in the art it is preferred to employ the machine shown and described in a patent to Winkley, No. 1,260,499, March 26, 1918.

It frequently happens that the capping machine either does not operate to cap a bottle at all, or applies the cap improperly to the bottle and in order to make the operation of the system entirely automatic it is desirable that the presence of these bottles shall be detected and that they be removed from the machine. The bottles are next conveyed to a machine which automatically tests the bottles and rejects them, first, if no cap has been applied to the bottle, and second, if a cap has been applied, but improperly. To this end the bottles are conveyed from the capping machine 475 through an idler 478 to a testing machine indicated generally at 480 which is provided with a turret indicated at 481 mounted upon a vertical shaft 482. As the bottles are transferred to the testing machine each bottle is supported individually upon a bottle support 485 and is positioned by a curved guide member 486 constructed to embrace the side of the bottle. The bottle is tested to determine whether the capping operation has been performed properly by a hollow shield 487 having an outwardly flaring lower edge and provided with an internal bore 489 slightly larger in diameter than the face of the cap. The shield 487 is formed integral with a stationary bracket 490 and is provided with a plunger 491 slidably supported therein. The upper end of the plunger is connected to an operating lever 492 fulcrumed upon the bracket at 493 and connected at its opposite end to an operating rod 495 which is normally arranged to depress the plunger by a spring 496 interposed between a collar 497 secured to the rod and an abutment 498 formed upon the turret. With this construction the normal position of the plunger 491 is as shown in Fig. 31 of the drawings in which the lower end of the plunger is positioned slightly above the lower end of the bore 489. The detecting mechanism is set into operation by a vertical movement of the bottle into the shield 487 and if a cap has been properly applied the head of the bottle is moved upwardly into the bore 487 and the cap pressed against the lower end of the plunger 491 operates the plunger and con-

nected mechanism against the action of the spring 496. On the other hand, if the cap has been applied improperly to the head of the bottle it will engage with the outwardly flaring portion of the shield 487 and prevent the movement of the head of the bottle into the bore 489 and if no cap has been applied to the bottle at all the head is free to move into the bore 489 but the end of the plunger projects down into the neck of the bottle. In either case the vertical movement of the bottle does not cause a corresponding vertical movement of the plunger 491. With this construction it will be obvious that if the plunger 491 is elevated the ejecting mechanism would be retained inoperative, whereas if the plunger is not moved it indicates that the bottle has been improperly capped and the ejecting mechanism should be allowed to operate. To this end the guide 486 is supported upon the lower end of an arm 500 pivoted at its upper end to the turret and connected midway of its ends to one arm of a bell crank 502 through a link 504. The opposite arm of the bell crank is connected to an operating rod 505 operatively connected with a stationary disk cam 507 at its lower end. The operating rod 505 is maintained in operative engagement with the face of the cam by a spring 508 interposed between a bracket 509 and a shoulder formed upon the rod. As shown clearly in Fig. 30, the cam 507 is provided with a recessed portion 510 which is arranged to release the operating rod 505 at the proper time and allow the spring 508 to swing the arm 500 outwardly and eject the bottle if the arm is not locked in position at this time. In order to prevent the ejecting movement of the arm in the case of bottles which have been properly capped the link 504 is provided with a projection 512 which is normally engaged by a lip 513 formed upon one arm of a bell crank lever 514. The opposite arm of the bell crank is positioned in operative relation to a slide rod 515 slidably mounted in bearings 516 formed in the turret and actuated through the compression spring 517 interposed between one of the bearings 516 and a collar 518 secured to the rod. The rod 515 is maintained out of engagement with the bell crank 514 except at predetermined intervals, however, by a bell crank 520, one arm of which engages in a slot 521 formed in the rear end of the rod 515 and having its opposite arm connected to an operating rod 522 bearing at its lower end upon a stationary disk cam 524. The disk cam, as stated, is constructed to normally retain the rod 515 out of engagement with the cooperating bell crank but is provided with a recess 525 to allow the rod to move freely under the action of the spring 517, if not otherwise locked. From an inspection of Figs.

30 and 31 it will be noted that the lower end of the rod 495 is provided with a toe 527 which engages with the face of the stop collar 518 at certain intervals and locks the rod 515 against movement. With the above described construction, when the plunger 491 is elevated by a properly capped bottle the toe 527 is moved into engagement with the collar 518, locking the rod 515 and allowing the lip 513 to remain in engagement with the shoulder 512 to prevent an ejecting movement of the arm 500 when released by the recess 510 in the disk cam 507. On the other hand, if the plunger is not elevated the rod 515 is not locked in position and is operated at the proper time by the spring 517 to rock the bell crank 514 and unlock the arm 500 which is then operated at the proper time by the spring 508 to eject the bottle. In order to move the head into operative relation to the detecting mechanism at the proper time the work support 485 is slidably mounted in bearings 530 and is normally elevated by a spring 531 interposed between one of the bearings in a stop collar 532 secured to the work support. The lower end of the work support is operatively connected with a stationary disk cam 533 provided with an undercut face 534, shown clearly in Fig. 30. This cam is arranged to release the work support at the proper time and allow it to elevate the bottle through the spring 531 which, however, will not elevate the bottle against the resistance which would occur if a cap had been improperly applied and engaged with the side of the shield 487.

The capped and filled bottles are automatically transferred from the capper testing machine to the pasteurizing machine by a pair of idler wheels 535 and 536 and a conveyer indicated at 537 in Fig. 23 of the drawings. This conveyer moves continuously across the front of the pasteurizing machine and the bottles must be removed from the conveyer and placed in the cases of the pasteurizing machine automatically. The pasteurizing machine is of the usual type comprising a large tank or receptacle containing the pasteurizing fluid and an endless conveyer in the tank, and arranged to convey the bottles through the pasteurizing fluid and carrying a series of baskets or cases in which the bottles are placed. The conveyer for transferring the bottles to the pasteurizing machine has a continuous movement at right angles to the conveyer of the pasteurizing machine itself, and in order to accomplish the removal of the bottles from one conveyer to the other the transferring machine is interposed between the traveling conveyer and the pasteurizer. This transferring machine engages the empty cases of the pasteurizer as the conveyer moves downward and pushes them from the conveyer on to a supporting table. The table

is then immediately lowered to bring the cases into a position for the convenient reception of the bottles. In this lowered position the case is supported substantially at the height of the traveling conveyer carrying the bottles. A row of bottles sufficient to fill the case is then automatically engaged by a series of grippers which have a downward and upward movement to engage and remove the bottles from the pockets of the conveyer, a forward movement to position the row of bottles over the case, and a downward and ejecting movement to drop the bottles into the case, and finally an upward and rearward movement to return the grippers to their initial position. It will be obvious that as the grippers engage with the bottles they are continuously moving in a transverse direction and in order to insure the positive engagement of a bottle by each gripper a transverse movement is imparted to the gripper carrying head during the engagement and removal of the bottles from the conveyer. During the removal of the bottles the head is moved transversely at the same speed as the conveyer, thus preventing any relative transverse movement of the gripper carrying head and the bottles at this time. The pasteurizing machine is indicated at 540 in Fig. 23 and is provided with the usual type of endless conveyer 542 carrying a series of shelves 543 which are pivotally supported upon the conveyer to permanently retain the cases 544 in an upright position during the passage of the cases through the machine. As shown clearly in Fig. 37 of the drawings, the bottles are placed automatically in the cases during the downward movement of the conveyer 542 past the conveyer 537. When each empty case reaches a position in which the next preceding case is positioned opposite the bottle conveyer 537, it is engaged at opposite ends by ejecting members 545, as shown in Fig. 36 and pushed on to a supporting table 547, which at this time is supported at the level of the upper shelf. Each ejecting member 545 is slidably mounted in bearings 548 and 549 and is operatively connected with a rock shaft 550 through the arms 551 and links 552. The rock shaft is provided with an arm 553 operatively connected with the lower end of a lever 555 through a connecting rod 556. The lever is fulcrumed upon a shaft 557, and is operatively connected at its upper end with a path cam formed in the face 558 of the disk cam 559. This cam is arranged to impart one complete reciprocation forward and back to the feeding members for each case 544. After the case has been moved into position upon the table 547 the table is immediately dropped into the position shown in Fig. 37, in which position the bottles may be conveniently received therein. To this end the table is supported at its opposite ends by a pair of vertically sliding standards 560 secured at their upper ends to the table and slidably supported in bearings formed in a pair of brackets 561 secured to the machine frame. The lower end of each of the standards 560 is engaged by the free end of an arm 562 mounted upon a shaft 563. Both arms are actuated by an arm 564 secured to the shaft 563 and operatively connected with a lever 565 through a connecting rod 566, as shown clearly in Fig. 37. The lever 565 is fulcrumed upon a frame 568 and has its upper end operatively connected with a path cam formed in the face 570 of a cam disk 571. This mechanism is arranged to elevate the shelf into a position where it may receive an empty case, immediately drop the shelf to the position shown in Fig. 37, and then retain the shelf in this position during the filling of the case and while the filled case is removed to the conveyer of the pasteurizing machine. As will be seen from an inspection of the drawings, each case contains three long rows of bottles and the gripper carrying head is so arranged that a sufficient number of bottles shall be engaged simultaneously by the grippers to completely fill one row of each case, thus causing the gripper carrying head to make three complete cycles of operation to completely fill a single case. To this end a gripper carrying head 575 is provided with a sufficient number of gripper members, indicated at 576, to completely fill one row of the case. The gripper carrying head, as shown in Fig. 35, is mounted upon a transverse shaft 577 supported at its opposite ends upon brackets 578. The brackets 578 are vertically movable to cause the grippers to engage and remove the bottles from the conveyer and drop them into the cases, and the gripper carrying head is movable back and forth upon the upper faces 580 of the brackets to remove the bottles from a position over the conveyer to the proper position over each case. Each bracket 578 is secured to a standard 581 sliding vertically in a bearing 582 secured to the machine frame. The lower end of each standard is operatively engaged by an arm 583 mounted upon the shaft 557, both arms being rigidly connected with an upwardly extending arm 585 operatively connected with a cam path formed in the face 586 of the cam disk 587. The cam 586 is so designed that two complete reciprocations are imparted to the gripper carrying head for each row of bottles which is transferred from the conveyer to the case, the first reciprocation engaging and removing the row of bottles from the conveyer and the second dropping and ejecting the bottles into the cases and returning the gripper carrying head to its original position. The gripper carrying

head is supported at its opposite ends upon the brackets 578 by a pair of roller bearings 590 which move along the faces 580 of the brackets, and this movement is conveniently imparted to the head by a system of levers forming a parallel motion in order to always maintain the gripper carrying head and bottles supported thereby in an upright position. The opposite ends of the head are provided with upwardly extending arms 591, each of which is connected with bell cranks 592 and 593 by links 594 and 595 respectively. The bell cranks are pivoted respectively at 596 and 597 and have their opposite ends connected together by a link 598. With this construction, when the bell cranks are rocked the standards 591 and the gripper carrying head will be moved back and forth upon the brackets 578 without inclining the standards 591 or gripper carrying heads from an upright position. The back and forth movement is imparted to the gripper carrying head by an operating rod 600 connected at one end to one of the bell cranks 592 and having its opposite end supported by an arm 601 in operative engagement with a cam path formed in the face 603 of the disk cam 587. In order to fill each case completely, three complete reciprocations must be imparted to the gripper carrying head, and in the illustrated embodiment of the invention the row of bottles farthest away from the conveyer is first filled and the succeeding movements of the gripper carrying head are decreased automatically to position the bottles properly for the next two rows. The movements imparted to the gripper carrying head by the cam 603 may be seen clearly from an inspection of Fig. 48 of the drawings. It will be noted that although some slight back and forth movement of the gripper carrying head may take place on account of the vertical movement of the brackets 578, yet this movement is negligible, as the vertical movement of the gripper carrying head is only sufficient to elevate the bottles to clear the tops of the cases and whatever movement is imparted to the gripper carrying head on account of this will be taken care of by the loose fit of the bottles in the pockets of the conveyer. As stated previously, the bottles are engaged by the gripper carrying head while they are being fed forward continuously by the conveyer 537 and in order to insure that this engagement of the bottles shall take place properly it is desirable that a like movement shall be imparted to the gripper head during the engagement of the bottles and their removal from the pockets of the conveyer. To this end the gripper carrying head, as shown clearly in Fig. 35, is slidably mounted upon the shaft 577 and has provision for a limited back and forth movement upon this shaft.

This movement is imparted to the gripper carrying head by a rack 605 secured to the gripper carrying head meshing with a driving pinion 606 supported in a bearing formed by an arm 607 secured to one of the brackets 578. The pinion 606 is rigidly secured to a shaft 608 which supports a gear 610 meshing with a driving rack 611. It will be noted that the pinion 606 and shaft 608 move vertically with the bracket 578 and that the gear 610 and rack 611 are supported in bearings formed in an arm 612 and maintained against vertical movement. The gear 610 is locked against rotation relative to the shaft 608 by any suitable means and with this construction the vertical movement of the bracket do not affect the operative connection between the driving rack 611 and the driven rack 606. Reciprocatory movements are imparted to the driving rack 611 through a link 615 connected at one end to the rack and at its opposite end to a cam path formed in the face 616 of the disk cam 559, the link 615 being supported in operative position relative to the cam path by an arm 617, shown clearly in Fig. 36. With this construction the gripper carrying head is moved transversely during the engagement of the bottles by the head and during their removal from the pockets of the conveyer is retained in this position during the forward and downward movement of the head to advance and deposit the bottles in the case, and is then moved back to return the head to its initial position prior to the engagement of the next succeeding set of bottles upon the conveyer. Each gripper carrying head 576 comprises a bottle positioning cage or spider 620 having outwardly turned lower ends 621 and pivoted gripper members 622 having inturned hooks 623 formed upon their lower ends. The bottle positioning spider is detachably secured to the gripper carrying head 575 by means of a bolt 625, and the gripper members are fulcrumed upon the spider at 626. One of the gripper members 622 is provided with an outwardly extending tail 628 and is connected with a spring 630 which normally presses the gripper member inward to retain the head of the bottle between the gripper members after it has been engaged thereby, as shown clearly in Fig. 42. After the gripper carrying head has been moved forward to position the bottles properly with relation to the empty case, mechanism is provided for causing the downward movement of the gripper carrying head to automatically eject the bottles from the gripper members. To this end the gripper carrying head is provided at its opposite end with two vertically slotted members 633 in which an ejecting bar 635 is loosely supported. The tail 626 of each gripper, as shown clearly in

Fig. 38, projects over the bar which normally rests at the bottom of the vertical slots. In order to elevate this bar and cause the bottles to be ejected from the grippers the opposite ends of the bar when the gripper carrying head is located over the cases are positioned above a pair of stationary brackets 640, and as the gripper carrying head descends the bar 635 engages with the tops of the brackets and is moved upwardly to engage the tail 628 of the gripper members and actuate the grippers to release the bottles. Upon again elevating the gripper carrying head the bar and the gripper members resume their initial position in order that the next set of bottles may be engaged properly. After each case has been completely filled with bottles it is removed from the shelf 547 to the shelf 543 of the conveyer, which by this time has reached a position opposite the shelf 547. It may be stated at this time that the conveyer of the pasteurizing machine moves very slowly, thus enabling an empty case to be removed from the conveyer, filled with bottles, and returned to the conveyer while the shelf has progressed from the upper position of the shelf 543 to the lower position of the shelf. After the case is filled it is engaged adjacent its opposite ends by the intumed upper ends of a pair of transferring arms 645 fulcrumed upon the machine frame at 646. Each arm is connected through a link 647 with an arm 648 mounted upon the shaft 557, and both of the arms 648 are rigidly connected with an upwardly extending arm 649 operatively engaging at its upper end with a cam path formed in the face 650 of the cam path 571, as shown clearly in Fig. 36. It will be noted that this cam is arranged to slide the case from the shelf 547 on to the shelf 543 and is then returned to its initial position in which it remains until the next succeeding case is to be removed. In order to prevent the confusion arising from the multiplicity of cams employed for operating the various elements of the machine a separate sheet has been made showing each of the cams in detail, these cams being shown in Figs. 44 to 49, inclusive.

As stated previously, the pasteurizing machine is of a well-known form having a series of bottle carrying cases supported upon an endless conveyer which carries the bottles back and forth through the pasteurizing liquid. This pasteurizing machine is not shown in detail as this type of machine is common and well known in the art and specifically forms no part of the present invention. The bottles are automatically transferred to the machine when the conveyer is moving downward and are removed from the machine during the upward movement of the conveyer. The machine for accomplishing the automatic transfer of the bot-

tles from the pasteurizer to a traveling conveyer is similar in construction and mode of operation to the machine heretofore described for transferring the bottles from the conveyer to the pasteurizer. In the present machine, as the conveyer 542 moves upward the cases are successively pushed from the shelf 543 of the conveyer on to a table 660 which is located in a depressed position to receive the cases. The transfer of the cases is effected by the feeding members 661 engaging opposite ends of each case in the usual manner and operated through the arm 662 mounted upon the rock shaft 663 operatively connected with each feeding member, arm 664, connecting rod 665, lever 666 fulcrumed at 667 operatively connected with a disk cam not shown. The table 660 is maintained in a depressed position during the removal of the bottles from the case and is then elevated to position the empty case opposite the upper level of the shelf 543 when the case is returned to the shelf of the conveyer 542. To this end the table 660 is mounted upon the standard indicated at 670, and moved vertically by the arms 671 and 672 respectively, the connecting rod 673 and the operating lever 674 fulcrumed at 675 and connected with a disk cam not shown. The bottles are removed from the cases by a gripper head which is supported on brackets 676 mounted upon standards 677 vertically movable through the arm 678 operatively connected with a disk cam not shown and are moved transversely in the usual manner at the same speed as the conveyer 680 by the usual type of mechanism comprising the rack 681 and the rack 682 at right angles thereto through suitable intermeshing gears. The rack 681 is operated from a disk cam through the connecting rod 682. The above described construction is substantially identical with the construction and mode of operation of the machine for transferring the bottles from the conveyer to the pasteurizer, the only differences being certain necessary changes in the shape of the cams. For this reason it has not been considered necessary to show this machine in detail. The mechanism for imparting a back and forth movement to the gripper head to position the head successively over the row of bottles in the case and transfer the bottles from the case to the conveyer comprises the usual form of parallel motion indicated at 685 moving the gripper head back and forth upon the upper face of the bracket 676. In addition to transferring the bottles from the case to the conveyer this mechanism is also utilized to transfer the empty case from the table 660 to the shelf 543 when elevated to the upper level. To this end the slotted heads 686 are connected by transverse bars 687 which engage behind the case as the members move forward and push on to the

shelf 543. In order to do this it is obviously necessary to change the cam 603 in order that this additional movement shall be imparted to the head 686. It will also be noted that the bottles are ejected from the gripper head when the head is positioned over the conveyor instead of over the case and to this end the bracket 688 with which the ejecting bar contacts is positioned beneath the bar when the gripper head is retracted to actuate the bar and drop the bottles into the pockets of the conveyor 680.

It sometimes happens that during the passage of the bottles through the pasteurizing machine they are broken or the cap becomes loose or knocked off and when this occurs it is essential that these bottles be detected and rejected in order that nothing but perfect bottles shall be presented for the next succeeding operation. In order to determine whether the bottles have passed through the pasteurizing machine successfully they are subjected to a weighing operation. The bottles having the requisite weight are passed on and those which are too light are discharged into a chute. In order to enable this weighing test to determine whether the bottles have been cracked in the pasteurizing operation they are laid down upon their sides and retained in this position for a period sufficient to enable the contained liquid to partially or wholly escape if the bottles are not tight. To this end the bottles are fed along by the conveyor 680 until they reach a transfer wheel 690 which is arranged through the cooperation of a stationary deflector 691 to transfer the bottles from the conveyor 680 to a second conveyor 693, as shown clearly in Fig. 23 of the drawings. Upon opposite sides of this conveyor are located a pair of cooperating guides 695 and 696 which are arranged to provide a curved slot into which the neck of the bottle enters, as shown clearly in Figs. 53 to 55, inclusive, turning the bottle from an upright position into a horizontal position, as shown in Fig. 55, and after retaining it in this position for the proper time interval, again riding the bottle into its initial position. In order to feed the bottles properly when resting upon their sides it is necessary to provide an additional conveyor which engages the bottle above the bottom. This conveyor is indicated at 697 and, as shown clearly in Fig. 54, is mounted at one side of the conveyor 695 and travels at the same speed as the conveyor 693. The conveyor is provided with a series of links 698 which partly support the bottle, and arms 699, one of which engages behind the bottle and feeds it forward. The bottle when in an upright position is supported wholly upon a stationary table 700 and the conveyor 693 merely acts to slide the bottles

ahead on this table. After the bottles have been returned to their upright position they are successively moved on to a scale platform 702 supported upon the end of a lever 703 fulcrumed upon the frame at 704. The rear end of this lever engages beneath the end of a second lever 705 pivoted upon one arm 706 of a bell crank fulcrumed at 707. The opposite end of the lever 705 is provided with an upturned hook which is arranged to engage behind a collar 709 secured to an ejecting rod 710. The ejecting rod 710 is slidingly mounted in bearings 711 mounted upon the machine frame and is provided with an ejecting member 712 which is arranged to engage behind the bottle if too light and remove it into the discharge chute indicated at 713. The ejecting rod is normally maintained in an inoperative position by a compression spring 715 interposed between the frame of the machine and the stop collar 709. The bell crank is continuously oscillated by a path cam formed in one face of a cam disk 714 to which the opposite arm 717 of the bell crank is connected. The cam disk is mounted upon the same shaft with a gear 716 which is continuously rotated from a driving gear 718 journaled at 719 and a spiral driving gear 720 mounted upon the shaft 721. The lever 705 is normally retained in the position shown in Fig. 53 by a spring 722, and in this position serves to actuate the ejecting rod and move a bottle into the discharge chute upon the forward oscillation of the bell crank. If the bottle is of the proper weight, however, the scale platform 702 is depressed until it is positioned upon a level with the stationary table 724, and in this position the lever 705 is tilted until the hooked end is disengaged from the collar 709, thus breaking the operative connection between the bell crank and ejecting member and allowing the spring 715 to retain this member in an inoperative position. It will thus be noted that if the bottle is of sufficient weight it is fed along the stationary table 724 by the conveyor 693 and that owing to the difference in levels between the table 724 and the table 700 the movement of the scale platform simply lowers the bottle from one level to the next.

After the bottles have been weighed they are fed automatically to a machine which applies a suitable label to the side of the bottle. As these labeling machines operate somewhat slower than the preceding mechanisms it is desirable to provide two labeling machines which operate alternately on successive bottles. Furthermore, the continuous movement of the bottle must be stopped during the application of the label and to this end mechanism is provided for removing every other bottle from the line and feeding it to a labeling machine, the remain-

ing bottles being fed to a second labeling machine. The bottle is received by a carrier which automatically transfers it from the traveling conveyer into operative relation with the labeling machine and retains it in this position during the labeling operation. At the conclusion of the labeling operation the bottle is transferred to a testing machine in order to determine whether the label has been properly applied, and if improperly applied the bottle is discarded. As will be seen clearly from an inspection of Fig. 51 of the drawings the bottles are transferred from the conveyer 693 to a conveyer 750 in the usual manner by an idler wheel 752. The conveyer 750 serves to feed the bottles into position for the two labeling machines indicated at 753, the bottles being automatically transferred from the conveyer to the labeling machines by bottle removing mechanism 755 and transferring carriers 756 in connection with each labeling machine. It will be noted from an inspection of the drawings that the mechanisms 755 operate to feed alternate bottles to the labeling machine and that upon the completion of the labeling operation the bottles are transferred by idler wheels 757 to a second traveling conveyer 759, the idler wheels 757 being so timed with relation to one another and with the traveling carrier that the bottles are received by the vacant spaces in the carrier. Each one of the bottle removing mechanisms comprises a pusher 760 slidably mounted in bearings and operated through a lever 762 fulcrumed at 763, and a link 764 connecting the pusher and lever. The lower end of the lever is operatively connected with a cam path formed in the cam disk 765 so arranged that an ejecting movement is imparted to the pusher when alternate bottles arrive in position opposite it. With this construction the pusher removes every other bottle from the conveyer 750 to a supporting shelf 767 formed upon the end of one of the arms 768. The carrier is provided with a plurality of arms 768 which are moved intermittently to first receive the bottle from the conveyer, transfer it to the labeling machine, retain it in a stationary position during the labeling operation, next transfer it to the label testing machine and retain it in position during the testing operation, and finally transfer it to the idler wheel 757. The bottle is positioned in the end of the arm by a curved portion 770 which embraces the side of the bottle, as shown clearly in Figs. 56 to 60 and is clamped to the arm by a clamping member 772 projecting over the top of the bottle and normally held in engagement therewith by a spring 774 supported in a hollow head 775 and serving to depress the clamp in the usual manner through a stem 776 and a stop collar 777 secured to the stem. The clamp is prevented from turning or twisting in the bearing by a depending guide rod 778 parallel with the stem 776 and slidably supported in the head 775. The lower end of the stem rests upon a stationary cam track 779. In order that the bottle may be released by the clamp at the proper time intermittent movements are imparted to the arm 768 by a plurality of continuously rotated arms 780 and an oscillating bell crank 781. Assuming that one of the arms is in position to receive a bottle and that the bottle has been moved thereon the arm 782 of the bell crank 781 is oscillated beneath the arm 768 and a spring pressed pin 784 operatively engages with a recessed boss 785 formed upon the arm. This construction is clearly shown in Figs. 59 to 61, inclusive, in which it will be seen that the pin 784 is normally elevated by a spring 786, the limit of movement being determined by a stop collar 787. In order that the pin 784 shall engage with the recessed boss 785 upon movement only in one direction it will be noted that the pin is rectangular in cross section and is provided with a beveled upper end 790. The bell crank 781 is oscillated at a much higher speed than the arm 780 and immediately upon the engagement of the arm 782 with one of the arms 768 the movement of the bell crank is reversed, carrying the arm with the bottle from a bottle receiving position into a bottle labeling position, as shown clearly in Fig. 56. The bell crank is then oscillated in the opposite direction, the beveled end of the pin disengaging automatically from the recessed boss to engage and carry forward a second arm. The bell crank is operated by a rotary cam 792 through an arm 793 engaging with the cam, a second arm 794, a connecting rod 795, and a bell crank 796. The bell crank 796 is provided with a toothed segment 797 which meshes with a second segment 798 secured to the bell crank 781. With this construction, for each rotation of the cam shaft 4 reciprocating movements are imparted to the bell crank. When the arm 768 carrying the bottle is moved into a bottle labeling position it passes over a spring locking member 800 which is provided with a slot approximately the width of the arm serving to lock the arm in position after it is disengaged from the bell crank 781. The locking member, as seen in Fig. 59, comprises a recessed arm fulcrumed at 801 and normally pressed upward by a spring 802. As stated previously, the arms 780 are rotated continuously and while the arm 768 is locked in a bottle labeling position the corresponding arm 780 is approaching it from the rear. The movement of this arm is so timed that at the completion of the labeling operation the arm advances into a position where the notch 803 engages behind the boss 785 and

riding over the locking lever 800 depresses it to allow the advancing movement of the arm 768. Simultaneously with this, the bell crank 781 has been returned in order to cause the arm 782 to engage with a second bottle carrying arm 768 and this movement also causes the engagement of an arm 805 of the bell crank with the arm 768 which is in position before the labeling machine. This engaging movement is accomplished in the same manner by a beveled spring pressed pin 784 after the arm 768 has been unlocked from its position before the labeling machine. The forward movement of the bell crank then carries the arm 768 away from the arm 780 into a position before the label testing machine at the same time that the second arm 782 carries a bottle from the conveyer into a position before the labeling machine. The arm 780 continues its forward rotation at a slower speed and as the face of the arm is wider than the slot in the locking arm 800 it is not engaged and locked thereby. The arm 768 is locked in position before a label testing machine 807, shown clearly in Fig. 56, by a second locking arm 800 and at the conclusion of the testing operation the arm 780 has again advanced into a position to engage the arm 768 and move it forward into a position where the bottle is diverted through the idler wheels 757 by a stationary deflector 808. If no label is picked up by the labeling machine the operation of the mechanism is automatically stopped in order that the operator may determine the cause of the failure to operate and if no bottle is fed to the machine the label applying mechanism is temporarily stopped until the next bottle is fed into position. As shown clearly in Figs. 56 and 57 the bottle is positioned opposite label applying fingers 810 which are first moved over a glue roll 811 and next engage with the face of the label, finally transferring the label to the side of the bottle. After the label has been placed in position upon the face of the bottle a sticker 812 advances to clamp the label upon the bottle and the margins of the label are next engaged by wiping members 814 which move inwardly and at the same time separate to wipe out the label smoothly on the bottle. The label applying fingers are secured to a rock shaft 815 and are actuated from a rotary cam through suitable connections including an arm 816, connecting link 817 and a second arm 819. The label sticker and wipers are fulcrumed at 820 and operated by suitable rotary cams, the wiping members having pins 821 which operatively engage after the forward movement of the wipers has ceased with a cam 822 which moves between the pins to spread the wipers apart and smooth the margins of the label outwardly. This mechanism for picking up the label and applying it to the side of the bottle in its general construction and mode of operation is well-known and, therefore, has not been described in detail. In order to stop the operation of the labeling mechanism if no bottle is presented in position for a label a detector finger 825 is supported upon a shaft 826 and is connected to an arm 827 and a link 828 with a stop lever 829 fulcrumed at 830 and having a nose 831 arranged to operatively engage with a slot formed in a rotary clutch to stop the operation of the labeling mechanism. The lower end of the lever is engaged by a compression spring 832 which serves to normally maintain the nose 831 in engagement with the clutch and if no bottle is presented to the machine the lever is maintained in this position and the labeling mechanism does not operate. If a bottle is presented to the machine, however, the movement of the bottle on the carrier past the detecting finger 825 moves the finger outwardly and releases the nose of the lever 829, allowing the operating shaft for the labeling mechanism to make one complete rotation. The pile of labels indicated at 833 is contained within a skeleton case 834 and supported upon a movable platform 835. The upper face of the pile of labels is engaged by a pair of retaining members 836 which have hook shaped upper ends 837 projecting over the top of the label and retaining it in place against the pressure of the table which is slidably mounted in a bearing 839 and normally pressed upward by a spring 840. When the label applying fingers 810 engage with the top label it is desirable to spread the fingers in order that the label may be readily removed. To this end the fingers are fulcrumed respectively at 841 and 842 and are connected by a link 843 and arms 844 and 845. The arm 845 is connected directly to a depending operating arm 847 which is operatively connected at its lower end with a suitable rotary cam indicated at 850. The rotary cam is designed in such a manner that at predetermined intervals a spring 851 connected to the arm 847 is permitted to oscillate the arm and spread the fingers to allow the removal of the label. In order to prevent the table 835 from suddenly moving upward and ejecting all of the labels when the fingers 836 are separated a sliding rod 853 is arranged to engage with the side of the table support 854 and prevent the upward movement of the table when the fingers are separated. To this end the outer end of the rod is engaged by a spring 855 secured to a lever 856 which is operatively connected at its lower end with a rotary cam 857. With this construction, at predetermined intervals a yielding pres-

sure is applied to the rod 853 to force it into engagement with the support 854 and prevent upward movement of the support. If no label is picked up by the label applying fingers 810 it indicates either that the supply of labels is exhausted, or that something is wrong with the labeling mechanism and to this end a detector finger 858 normally rests upon the upper face of the label and is tilted each time that a label is removed from the pile. A detecting finger is fulcrumed at 859 upon an arm 860 and is provided with a tail 861 which normally engages with the slotted upper end of an arm 862 when lifted by the label. A third arm 863 is operatively connected at its free end with a rotary cam 864 provided with a suitable depression in order that at predetermined intervals a spring 866 may oscillate the arms 862 and 863 in a forward direction if the arm 862 is not retained in position by the tail of the finger 861. With this construction, if no label is removed the finger 858 remains in position and does not engage with the arm 862, thus when the outer end of the arm 863 reaches the depression in the cam 864 the two arms 862 and 863 are oscillated, closing a valve in the air controlling pipe 867 and stopping the operation of the machines. If a label is present, however, and is removed from the pile the finger 858 is oscillated until the tail engages with the lever and retains it in an inoperative position against the action of the spring 866. After the arm 863 has passed the depression in the rotary cam the tail 861 of the ejecting finger is released from the lever 862 and the action of gravity returns the finger into position on the pile of labels. As stated previously, the bottles are automatically transferred after the labeling operation is completed, to a label testing machine in order to determine whether the label has been properly wiped on to the bottle, and if not, to reject the bottle. To this end, each bottle is transferred by the arm 768 to the label testing machine 807. The label testing machine is provided with a positioning finger 870 fulcrumed at 871 upon an overhanging frame 872 and having a detecting member 873 loosely pivoted upon it at 874. The positioning member 870 is oscillated at predetermined intervals by an arm 875 and connecting rod 876 connected at its lower end to one arm of a bell crank 877. The second arm of the bell crank is operatively connected with the periphery of a cam disk 878. The positioning finger is yieldingly moved into engagement with the face of the bottle by a compression spring 879 interposed between the face of the arm 875 and a fixed stop 880. As the positioning member 870 moves forward it carries the member 873 with it, the movement of the member 873 with relation to the member 870 in one direction being determined by a stop bar 881. If the label is properly applied to the bottle the positioning member 870 engages with the bottle without moving the lower end of the detecting member 873 outwardly, but if the label has not been wiped on smoothly and a portion of it is bulged out, the lower end of the member 873 is swung outwardly, moving the upper end in the opposite direction and correspondingly oscillating a lever 882 fulcrumed at 883 connected through a link 884 with one arm of a bell crank 885. The second arm of the bell crank 885 is connected to a sliding pin 886 normally depressed by a spring 887 surrounding the pin bearing against a stop 889 secured to the pin. The lower end of the pin normally engages with the upper end of a lever 890 fulcrumed at 891, having its lower end operatively connected with a rotary cam 892. From the above described construction it will be noted that if the label has been properly applied the pin 886 remains in a depressed position and prevents the operation of the lever 890, but if the label has been improperly applied the pin is elevated against the action of the spring, allowing the lever 890 to be oscillated by the cam 892. When this oscillation of the lever takes place it swings a deflecting finger 893, shown clearly in Fig. 56, behind the bottle, causing the bottle upon its forward movement by the carrier to be diverted into a discharge chute 894. The deflecting finger is secured to a rock shaft 895 having an arm 896 projecting therefrom and connected to the lower end of the lever 890 through a link 897. After the bottles have been tested to determine whether the labels have been applied properly the arm 768 carrying the bottle is again picked up by one of the arms 780 and moved forward until the bottle is engaged by the deflecting guide 880, the bottle clamp 772 in the meantime having been elevated to release the bottle.

The bottles after being labeled and tested are in condition to be transferred to the empty cases which in the meantime have been moved into position where they may be refilled. It will be noted that the bottles are removed from the labeling machines upon a continuously moving conveyer and that as certain of the bottles must have been discarded there will be empty spaces present upon the conveyer. If the bottles were transferred directly from this conveyer to the cases, corresponding vacant spaces would be present in the case and in order to prevent this and completely fill each case mechanism is provided for transferring the bottles from the continuously moving conveyer to an intermittently moving conveyer which

is caused to operate only when a bottle is positioned upon it, thus presenting an unbroken line of bottles to the bottle transferring mechanism. When a line of bottles sufficient to complete one row in a case has been placed upon a conveyer the bottle transferring mechanism is automatically set into operation to transfer this row of bottles to the case. The bottles, as shown clearly in Fig. 67, are transferred from the label testing machines to a continuously moving conveyer 759 and from this conveyer are transferred through an idler wheel 900 and a stationary deflector 901 to a conveyer 902 moving continuously at right angles to the conveyer 759. From the conveyer 902 the bottles are transferred to an intermittently operated conveyer 903 moving parallel thereto, as shown clearly in Figs. 67 and 68. The bottles are transferred from one conveyer to the other by a transfer finger 904 moving transversely of the conveyers, as shown clearly in Fig. 69 and operated through a lever 905 fulcrumed at 906 and having its lower end operatively connected with a suitable path cam formed in the rotary cam cylinder 907. This cam disk is so designed and timed with relation to the movement of the conveyer 902 that a transfer movement is imparted to the finger 904 when each bottle carrying compartment upon the conveyer arrives opposite the finger. When a bottle has been transferred from the continuously moving conveyer 902 to the conveyer 903 the latter is moved forward to bring the next vacant compartment into position to receive a bottle. To this end the conveyer is supported at one end by a shaft 908 which is provided with a gear 909 rotated by a toothed rack 910. The toothed rack 910 is pinned to a shaft 911 operatively connected through a universal joint 912 with a connecting rod 913 which is actuated from a rotary cam disk 914 through the arm 915. With this construction a longitudinal movement of the connecting rod 913 slides the rack 910 in bearings 916 and rotates the gear 909 sufficiently to move the conveyer forward one space. In order to lock the conveyer in this position and at the same time allow the return of the rack to its initial position it is essential that mechanism be provided for disengaging the rack 910 from the gear and for locking the gear during the time that the rack is disengaged. To this end a locking rack 917 is formed upon a rectangular frame 918 loosely supported upon the shaft between the bearings 916 to prevent longitudinal movement relative to the gear. The frame 918 is made to oscillate with the rack 910 through a pair of depending flanges 920 which engage opposite sides of one member of the frame and prevent relative angular movement of the two while permitting a longitudinal movement of the rack 910 relative to the rack 917. In order to oscillate the rack 910 at predetermined intervals to disengage it from the gear and engage the rack 917 a forked arm 921 projects from the rack 910 and is connected through a link 922 with an arm 923 secured at its lower end to a rock shaft 924 having a second arm 925 secured thereto operatively connected at 926 with a second path cam formed in the cylinder 907. With this construction the rack 910 serves to advance the conveyer one space and this rack is then oscillated out of engagement with the gear and returned to its initial position, the rack 917 in the meantime meshing with the gear to lock the conveyer in position. It will be noted from an inspection of Figs. 71 to 73, inclusive, that the angular relation of the two racks is such that the rack 917 meshes with the gear 909 before the rack 910 is completely disengaged therefrom. It is desirable, however, to provide mechanism for automatically rendering the conveyer feeding mechanism inoperative if no bottle is transferred from the conveyer 902. To this end the transfer finger 904 is yieldingly connected with a lever 905 through a spring 927 interposed between a stop collar 928 secured to the finger and a sleeve 929 loosely mounted upon the finger and connected with the upper end of the lever 905, the movement of the sleeve 929 under the action of the spring being limited by a stop collar 930 secured to the finger. In the normal operation of the machine as the transfer finger is fed forward it carries the bottle with it from one conveyer to the other until the movement of the bottle is limited by the partition 931 located parallel to the conveyer, after which, further movement of the transfer finger is prevented and a continued movement of the lever serves merely to compress the spring 927 without imparting any further movement to the stop collar 928. If no bottle is present, however, the finger continues its forward movement, carrying the stop collar with it and this further movement of the stop collar 928 is utilized to break the operative connection for feeding the conveyer. To this end a bell crank 932 is fulcrumed at 933 with one arm positioned in the path of movement of the stop collar 928 and having its second arm connected through a link 934 with one arm of a bell crank 935. The second arm of the bell crank 935 is positioned opposite a shoulder 936 secured to a member 937 sliding in the arm 915. The member 937 carries the cam roll which operatively connects the arm 915 and the disk cam 914 and when this cam roll is removed from engagement with the disk cam the conveyer is not advanced. The operative connection between the arm 915 and the disk cam is normally maintained by a spring 938 connecting the slide and member 937 with the frame of the machine. It will be

noted that an oscillatory movement is imparted to the arm 915 in order to partially rotate the gear 909, but the collar 936 is so designed that when the operative connection is to be broken the arm of the bell crank always engages with the collar. After a number of bottles sufficient to fill one row in a case have been transferred to the intermittently moving conveyer these bottles are automatically transferred to a case and to this end in the illustrated embodiment of the invention control means are provided for setting into operation the case transferring mechanism after the required number of bottles have been positioned upon the conveyer. A feeler finger 940 projects over the conveyer 903 in position to be engaged by the foremost bottle of the row and is mounted upon the upper end of a lever 941 fulcrumed at 942 having its lower end connected through a link 943 to a second lever 944 fulcrumed upon the shaft 945 having a second arm 948 extending upwardly therefrom and carrying upon its upper end a beveled clutch operating member 950 which normally engages with a head 951 secured to the outer end of a clutch pin 952 to disengage the clutch for operating the transfer mechanism. It will be noted that the lever 941 is normally retained in the position shown in Fig. 70 by a spring 953 and that when engaged by a bottle after the required number of spaces have been filled the lever is oscillated to remove the beveled clutch member 950 from engagement with the clutch pin, allowing a spring 953 to move the end of the pin into a recess formed in a continuously driven clutch member 954. It will be noted from an inspection of Figs. 69 and 74 that the transfer mechanism is operated from the shaft 958 through suitable gearing which drives a continuously operated sleeve 956 carrying the clutch member 954. The clutch pin 952 is carried by a driven clutch member 957 which is secured to the shaft 958 from which the transfer mechanism is operated. From an inspection of Fig. 74 it will be noted that the clutch pin is hollow in closing the spring 953 which is interposed between the closed end of the clutch pin and a stop member 960 positioned in the bore of the collar and secured to the clutch member 957 by a pin 961 projecting through slots formed in the sides of the clutch pin 952. With this construction it will be noted that when the member 950 is oscillated to release the clutch pin it is immediately pressed forward by the spring 955 and when the recess in the continuously rotated member 954 reaches a position opposite the end of the clutch pin it is forced into the recess, operatively connecting the two clutch members and starting the transfer mechanism. When the transfer mechanism is started it immediately removes the row of bottles, allow-

ing the member 950 to return to its initial position to break the operative connection between the two clutch members after one complete rotation of the shaft.

The transferring mechanism employed for removing the bottles from the conveyer 903 to the empty cases is similar in its construction and mode of operation to the machine employed for transferring bottles initially from the cases to the soaking machine, and in consequence, will be only briefly described. To this end a gripper carrying head 870 carrying a plurality of grippers 971 sufficient in number to fill at a single operation one complete row in the case is slidably mounted upon parallel guide rods 972. The guide rods 972 are supported by a crosshead 973 provided with slide rods 975 slidably mounted in bearings 976 formed in the machine frame. The crosshead is advanced and retracted to first position the grippers over a row of bottles upon the conveyer and then return the grippers carrying the bottles to the proper position over the case by a connecting rod 978 connecting the crosshead with a lever 979 fulcrumed at 980 and connected at its lower end with a path cam formed in a cam disk 981. In the illustrated embodiment of the invention the path cam is designed to impart four complete reciprocating movements to the crosshead, the first movement being the greatest, in order to deposit the row of bottles in the spaces farthest removed from the conveyer and each succeeding movement diminishing in extent in order to fill the intervening rows successively. The grippers are retained in an elevated position during the movement into position over the row of bottles on the conveyer and then depressed to engage with the bottles, elevated sufficient to cause the bottles to clear the sides of the case, retained in this position during the retracting movement of the grippers until the bottles are positioned over the proper spaces, and are then depressed to deposit the bottles in the case. To this end the gripper carrying head 970 is connected through links 982, lever 983, fulcrumed at 984, and operatively connected at its rear end with a path cam formed in the face of a cam disk 985. The gripper members indicated at 986 are of the usual form actuated by a common releasing bar 987 which is slidably mounted at its opposite ends in slotted brackets 988 depending from the gripper carrying head. When the gripper carrying head is in its retracted position with the bottles suspended over the case the ends of the bar are located above a pair of releasing platforms 990 which engage with the ends of the bar upon the depression of the grippers to release the grippers and allow the row of bottles to be deposited in the case. It will be noted from an inspection of Fig. 78 of the

drawings that the empty cases are fed to the machine down an inclined chute indicated generally at 991 and the position of the case to be filled is determined by a pair of fingers 992 which project through the bottom of the chute in front of the case. The fingers 992 are slidably mounted in bearings 993 and are operatively connected at their lower ends with forked arms 994 secured to the rock shaft 995 having an arm 996 projecting therefrom and operatively connected at its free end with a path cam formed in the face of the cam disk 997. The cam disk is so designed that the fingers remain elevated during the placing of the bottles in the case. After the case has been filled the fingers are depressed to allow the case full of bottles to be advanced out of the machine. The feeding movement of the cases is accomplished as described in connection with the previous transfer machine by a pair of feeding fingers 998 engaging behind the second case, as shown clearly in Fig. 78, and mounted upon a feed slide 999 yieldingly connected to the endless chain 1000, as indicated at 1001. The endless chain is operated in the usual manner by a bell crank 1002, link 1003 and lever 1004 operatively connected with a path cam formed in the cam disk 1005. The fingers are elevated to advance the cases and are then depressed in order that they may be returned to their initial position. To this end the fingers are fulcrumed upon the slide 999 at 1005 and the opposite ends of the fingers rest upon a pivoted table 1006 which is hinged upon the rod 1007 and raised and lowered by an arm 1008 projecting from the table, a link 1009 connecting the arm with a lever 1010 fulcrumed at 1011 and operatively connected at its rear end with a path cam formed in the face 1012 of the cam disk 1005. It will be remembered that in connection with this machine, one complete row of bottles is transferred from the conveyor to the case and the machine then stops until a second row of bottles has been placed upon the conveyor, the first cycle of operations then being repeated, and this is continued until the case is completely filled, the mechanism for feeding the cases obviously operating to feed a case forward only after it has been completely filled. While the various operations are being performed upon the bottles the empty cases are automatically transferred from the point at which they are emptied to the point at which they are filled and in the meantime are manipulated automatically to first remove all broken bottles or debris from the cases and are then tested to determine whether they have been completely emptied.

It will be remembered from the foregoing description that the empty cases are ejected from the machine which transfers the bot-

ties from the cases to the soaking machine and these cases are pushed along a chute to a machine for turning them upside down in order to thoroughly empty and clean out the compartments. As the cases are discharged from the transferring machine two at a time it is necessary to operate the case reversing and testing machines at twice the speed of the transferring machine in order to handle the cases as they come from the transferring machine. Assuming that the foremost case of a pair has just been fed into position in the machine indicated in Figs. 80 to 82, inclusive, it is positioned in a drum consisting of a pair of annular rings 1020 and 1021 secured together by longitudinally extending ribs 1022. The case is held loosely in place in the drum by laterally extending feet 1023 which engage the corners of the case and arms 1024 engaging the sides of the case, as shown clearly in Fig. 82. The case is fed into the drum right side up and in order to reverse the position of the case a partial rotation is imparted automatically to the drum. To this end the annular ring 1021 is provided with gear teeth and is driven by a gear 1025 secured to the shaft 1026. The shaft 1026 is provided with a small gear 1027 which meshes with a toothed segment 1028 formed upon one arm of a bell crank 1030 fulcrumed at 1031, having a second arm operatively engaging with a path cam formed in the cam disk 1032. This construction is designed to partially rotate the drum through a quarter to half revolution in order to cause whatever may be contained in the case to be emptied into the discharge chute. The drum is supported and guided in its movements by grooved idler wheels 1034 engaging with the annular ring 1021 and corresponding idler wheels 1035 engaging with the annular ring 1020. The case is located approximately during the turning movement in order to cause the contents to be emptied into the discharge chute by a pair of fingers 1036 and 1037 normally positioned outside of the path of movement of the case, as shown clearly in Fig. 82, but arranged to embrace opposite ends of the case when the turning movement has been partially completed. After the case has been turned sufficient to cause it to enter between the fingers they are moved toward one another to center the case by a sliding rack 1038 secured to the finger 1036, and a corresponding rack 1040 secured to the finger 1037. The racks are moved in opposite directions by a pinion 1041 engaging between them and actuated by a toothed segment 1042 formed upon the end of an arm 1043 fulcrumed at 1044 and operatively connected with a face cam 1045. The arm is retained in operative engagement with the face cam by a spring 1046 connecting the arm and frame of the machine. The con-

tents of the case are emptied into an inclined chute indicated at 1050. It will be noted that two cases are fed to the machine simultaneously from the transferring machine and that after the first case has been operated upon by the present machine auxiliary means must be provided for feeding the second case into position prior to the movement of the next two cases forward.

To this end the chute is provided with a ledge indicated at 1051 which enables a feeding member 1052 to engage behind the second case and feed it into the machine and then return to its initial position without engaging with the end of the next succeeding case positioned at the top of the ledge 1051. The feeding member is fulcrumed at 1053 and is connected by a link 1054 with one arm of a bell crank 1055. A second arm of the bell crank is connected through a link 1056 with an arm 1057 fulcrumed at 1058 and operatively connected with the path cam formed in the cam disk 1060. With this construction the feeding member engages behind each second case, moves it into position in the reversing machine, and then returns to its initial position beneath the following case, as shown in Fig. 80 until the next batch of cases are fed into the machine. The cases are fed uniformly, one at a time from the reversing machine to the testing machine which operates at a speed equal to the reversing machine and at twice the speed of the transferring machine.

After being emptied the cases are transferred by gravity to a machine which tests them in order to determine whether any broken bottles or other debris still remain in the compartments and which rejects those cases which have not been completely emptied. To this end the cases are pushed from behind along the guides 1150 and dropped onto a stationary platform 1151, as shown clearly in Fig. 83. In order that the cases may be tested it is essential that they be positioned upon the platform both longitudinally and laterally and to this end the positioning fingers 1152 and 1153 are arranged to engage respectively with the ends of the case and position it longitudinally, and the fingers 1154 and 1155 serve to engage with the sides of the case and position it transversely. It will be noted from an inspection of Figs. 83 and 95 that the fingers 1154 and 1155 are provided with anti-friction rolls 1157 which engage in the case and allow it to easily move past the fingers. The positioning fingers are moved toward and from one another to engage and position the case and release it at the proper intervals, and at the same time are elevated and depressed in order that they may be removed from the path of the case during its feeding movement to and from the machine. To this end the positioning fingers are all supported upon a vertically movable head 1160 which is provided with a stud 1161 sliding in a vertical bearing 1162 and operated through an arm 1163 fulcrumed at 1164 and having an arm 1165 extending rearwardly therefrom and operatively connected at its free end with a path cam formed in the face 1166 of a cam disk 1167. With this construction the crosshead carrying the positioning fingers is retained in a depressed position during the movement of the case into and out of the machine and is elevated after the feeding of the case in the machine and retained in this position sufficiently long to position the case prior to the operation of the testing mechanism. It will be noted from an inspection of Figs. 83 and 85 that the fingers 1154 and 1155 are fulcrumed upon the crosshead respectively at 1169 and 1170 and are connected respectively below and above the fulcrum by a link 1172 so that an oscillation of one of the fingers 1155 causes an oscillation of the fingers 1154 in an opposite direction. The fingers 1152 and 1153, as shown clearly in Fig. 83, are fulcrumed at 1173 and 1174 respectively, and are connected in a like manner by a link 1175. All of the positioning fingers are operated simultaneously by a cam indicated generally at 1177 and having cam faces 1178 and 1179 which operate respectively the lateral positioning fingers and the longitudinal positioning fingers through depending arms 1180 and 1181. The cam 1177 is provided with a stud 1183 sliding vertically in a bearing 1184 and operated through an arm 1185 fulcrumed at 1164 and having a second arm 1187 secured thereto. The arms are oscillated to impart vertical movements to the cam 1177 at the proper intervals to open and close the positioning fingers by a path cam formed in the face 1188 of the cam disk 1167 and operatively connected to the free end of the arm 1187. It will be noted that the positioning fingers do not clamp the case in position, but rather move toward one another in order to position the case centrally beneath the testing mechanism if it is out of alinement and are then depressed to drop them below the bottom of the case during the operation of the testing mechanism. In order to determine whether all of the compartments in the case have been completely emptied a plurality of testing rods equal in number to the compartments in the case are lowered into the case, one testing rod entering each compartment. If any one of the testing rods encounters an obstruction in the compartment the case ejecting mechanism is permitted to operate and the case is discharged from the machine. If all of the compartments are clear, however, the fingers move down a sufficient distance to render the case ejecting mechanism inoperative and the case is fed along

the chute. To this end a plurality of testing rods 1190 provided with enlarged ends 1191 are secured to a head 1192. These rods are supported loosely in a cage 1193, as shown clearly in Figs. 83 and 85, the downward movement of the rods being limited by collars 1194 secured to the rods and engaging with the bottom plate 1195 of the cage. The cage is slidingly mounted on parallel guide rods 1196 secured in a head 1197. Vertical movements are imparted to the cage by arms 1198. The two arms 1198 are connected by a cross bar 1199 which supports a link 1200 connected at its lower end with an arm 1201. The arm 1201 is fulcrumed at 1202, operatively connected midway of its ends with a path cam formed in the face 1203 of the cam disk 1204. The cam is so designed that the cage is depressed until the lower ends of the testing rods engage with the bottom of the compartments if all of the compartments are vacant. If one of the fingers encounters an obstruction, however, further movement of the fingers in a downward direction will be stopped, causing a relative movement of the fingers and cage. The head 1192 is guided relative to the cage by a pair of guide rods 1205 and 1206 secured to the head and extending through bearings formed in the cage, the guide rod 1206, as noted in Fig. 85, being considerably longer than the guide rod 1205 and serving to control the operation of the ejecting mechanism. The mechanism for ejecting the cases at predetermined intervals consists of a case engaging member 1208 pivoted at 1209 upon a slide 1210 which is operated by an arm 1211 fulcrumed at 1212 and connected to a path cam formed in the face 1214 of the cam disk 1204 through a link 1215 supported at its free end by an arm 1207. During the downward movement of the testing mechanism the member 1208 is positioned, as shown in Fig. 85, with its outer recessed end elevated and positioned beneath the end of the guide rod 1206. If all of the compartments are vacant the downward movement of the testing rod is sufficient to cause the end of the guide rod 1206 to engage with the recess 1220 in the member 1208 and rock this member into a position where the free end will clear the bottom of the case upon a forward ejecting movement of the slide 1210. If one of the compartments contains a broken bottle or obstruction, however, the downward movement of the testing rods is arrested and the guide rod 1206 will not engage with and rock the member 1208 so that upon a forward movement of the slide 1210 this member will engage with the side of the case and eject it from the machine. In order to return the member to its initial position whenever it has been depressed by the guide rod 1206 an upstanding pin 1221 is mounted in the

crosshead 1160 and engages beneath a boss 1222 when the crosshead is elevated to locate a new case in an operative position. In order to retain the member 1208 in any position to which it is moved a pivot connection 1209 is provided with a friction joint which is designed to permit the member to be oscillated from an operative to an inoperative position or vice versa and to be retained in this position until again actuated. After the case has been tested it is removed from the machine along a chute by the pressure of the cases from behind. From the testing machine the cases are picked up by an endless conveyer 1230 supported at its opposite ends by sprockets 1231, as shown clearly in Fig. 87. Each case is engaged by a stud 1232 secured upon the endless conveyer at predetermined intervals and the conveyer is guided in its course by a plurality of idler rolls 1233 and a sprocket 1234 all journaled in a frame 1235. When the cases reach the top of the elevation they are discharged upon an inclined chute 1237 down which they move by gravity. This chute may be of any desired length in order to accommodate the required number of cases and is provided with one or more reverse bends indicated at 1238, as indicated in Figs. 86 and 88, and preferably a second endless conveyer 1240 supported at opposite ends by sprockets 1241, which carries the empty cases for a considerable distance in a horizontal plane from which they are again discharged into the inclined chute indicated at 1242 which brings them automatically to the transferring machine for filling the cases with bottles.

After the cases have been filled with sealed bottles they are tested finally in order to determine whether all of the compartments have been filled and if not, the case is discarded and the vacant compartment or compartments filled manually. As the cases vary somewhat, both in length and width, it is essential that they be centered automatically in order to locate the case properly with relation to the testing mechanism. This centering mechanism is first actuated to center the case and is then automatically removed from the path of the case, either if the case is discarded, or is passed along as a perfect case. To this end a case is fed on to a table 1270 forming a part of the testing machine and located at a lower level than the bed of the conveyer in order that the case may pass over the centering fingers during its movement into the machine. The case is centered laterally with relation to a fixed abutment 1251 by a positioning finger 1253 hinged at 1254 on the upper end of a lever 1255 and having a downwardly projecting face 1256 which engages with the side of the case and has its lower edge slidingly supported upon the

table. The positioning member 1253 is normally moved toward the fixed stop 1251 by a tension spring 1257 which oscillates the lever 1255 through a rod 1258 connected to the lower end, as shown clearly in Fig. 89. The positioning member is removed automatically from engagement with the case by an arm 1260 secured to the lever and fulcrumed therewith at 1261 and operatively connected at its free end with a path cam formed in the face 1262 of the cam disk 1263. The case is centered in the direction of its length by a plurality of cooperating positioning members 1265 and 1266 respectively. These fingers are supported upon oppositely moving racks 1267 and 1268 slidably mounted in a table 1270 and meshing with a pinion 1272. With this construction, upon a movement of one of the racks both racks are moved in opposite directions to move the positioning members toward and from one another equal amounts. The movements are imparted automatically to the racks by an arm 1275 connected to the rack 1267 supported at its lower end upon a rock shaft 1276. The rock shaft is connected by suitable connections including an arm 1277, a link 1278, and an arm 1279 with a path cam formed in the face 1280 of a cam disk 1263. This cam path is open upon one side and merely serves to impart a positive separating movement to the jaws, the movement of the jaws toward one another being imparted yieldingly, as hereinafter described. In order to remove the centering members from the path of the case when it is to be discharged from the machine they are supported upon the table 1270 which is hinged upon the machine frame at 1282, as shown clearly in Fig. 91 and supported at its free end by a stem 1283. The stem is yieldingly mounted in bearings 1285 and is supported at its lower end upon an elevating arm 1286 fulcrumed at 1287 and operatively connected with a path cam formed in the face 1288 to a cam disk 1290. This cam is designed to tip the free end of the table sufficiently to allow the centering members 1265 to clear the bottom of the case when it is discharged from the machine. After the case has been centered in the machine each row of compartments is tested to determine whether it contains its full quota of bottles. The testing mechanism operates upon the rows successively and if a vacant space is contained in any one of the rows the case is rejected at the completion of the operation. To this end a plurality of testing fingers 1295 sufficient in number to operate upon all the bottles in one row simultaneously extend transversely over the case and are loosely pivoted upon a rock shaft 1297. Each testing finger is provided with a rearwardly projecting tail 1298 which engages with the under side of a table 1300 to

normally retain the fingers in an elevated position. The table 1300 is supported by a pair of standards 1302 sliding vertically in bearings formed in the machine frame and connected at their lower ends by a cross bar 1303. The table is normally depressed by a lever 1305 fulcrumed at 1306 and having one end bearing upon the upper side of the cross bar, as shown clearly in Figs. 89 and 91. The opposite end of the lever is operatively connected with a path cam formed in the face 1307 of the cam disk 1290 which is designed to positively depress the table and elevate the testing fingers at predetermined intervals and release the table to permit the dropping of the fingers under the action of gravity in order to engage with the bottles in the cases. The fingers are so proportioned with relation to the table 1300 and the sliding standards that if no bottle is present the downward movement of any one finger under the action of gravity is sufficient to elevate the table 1300 and standards 1302. This further elevation of the table is utilized to control the operation of the ejecting mechanism at the proper intervals. To this end a latch 1308 is fulcrumed at 1310 and normally hooks over the upper end of an arm 1311 mounted upon the rock shaft 1312. A second arm 1313 is secured to the rock shaft and normally maintains the free end of an ejecting rod 1315 in a depressed position. The ejecting rod, as shown clearly in Fig. 89, slides in a bearing 1316 pivoted in the frame and provided with an arm 1317 which has a tension spring 1318 connected to its free end in order to oscillate the bearings and normally elevate the rear end of the ejecting rod 1315. The ejecting rod 1315 is connected to the arm 1313 by a stud 1320 mounted in the rod engaging beneath the hook shaped end of the arm 1313. The spring 1318 constantly tends to force the end of the rod 1315 upwardly and when the arm 1311 is released by the latch 1308 the two arms 1311 and 1313 are rocked, allowing the depression 1321 formed in the end of the rod 1315 to operatively engage with the upper end of an arm 1322. It will be observed from an inspection of the drawings that each time the table is released by its operating cam the downward movement of the testing fingers elevates it a slight amount and that if one of the compartments in a case is vacant a continued movement of one of the fingers imparts a further elevation to the table. In order to cause this movement to release the latch member 1308 one of the standards 1302 is provided with a boss 1325 which engages with the latch 1308 upon a sufficient elevation of the table and trips the latch from the upper end of the arm 1311. This tripping of the arm then establishes an operative connection between the ejecting arm 1322 and the ejecting rod 130

1315 which is maintained until the arm is operated to eject the case. The arm is operated automatically to eject the case when all of the rows have been completely tested by a path cam formed in the face 1327 of the cam disk 1328. The arm 1322 is connected to the cam through a connecting rod 1326 supported at its end opposite the arm by a pivoted member 1329, as shown in Fig. 89. This cam simply operates to positively depress the table 1300 and lift the testing fingers at predetermined intervals, and permits the testing fingers to operate under the action of gravity at other times. When the latch 1308 is raised by the elevating of the table to trip the arm 1311 it rocks an arm 1330 fulcrumed at 1310 and connected at its lower end to a sliding rod 1331 having a dog 1332 secured thereto, as shown in Fig. 89. The latch and arm 1330 are frictionally connected to the shaft 1310 so that they are retained in any position into which they are moved, thus causing the dog 1332 to remain in the position into which it is moved until the boss 1333 formed upon the end of the rod 1315 engages with the dog 1332, returning the dog and latch to their initial positions. In order to return the parts to their initial positions after the ejecting mechanism is operated the rock shaft 1312 has an arm 1335 depending therefrom which is connected at its lower end with a rod 1336. The lower end of the arm 1335 is forked and positioned at one side by a fixed collar 1337 secured to the rod 1336 and positioned at its opposite side by a collar 1338 loosely supported upon the rod and having a spring 1340 interposed between the collar 1338 and a second collar 1341 secured to the rod. After the case has been ejected and the ejecting member 1315 returned to its initial position the rod 1336 is actuated to rock the arm 1311 back to its initial position beneath the latch. This movement is accomplished by an operating lever 1343 fulcrumed upon the frame at 1344 and connected at its upper end to the rod 1336. The lower end of the lever is connected to a link 1345 which is supported at its opposite end by an arm 1346 and is operatively connected with a path cam formed in the face 1347 of the cam disk 1328. In order to permit the movement of the arm 1311 beneath the latch 1308 without permanently rocking the latch about the fulcrum 1310 the latch 1308 is loosely mounted upon the rock shaft 1310 and is connected with a second arm 1348 frictionally held upon the shaft and provided with a pin 1349 with which the end of the latch engages to limit the downward movement and a spring 1350 connecting the upper sides of the two members to normally maintain the latch in engagement with the pin 1349. With this construction, when the latch is disengaged by the upward movement of the table the arms 1330 and 1348 are rocked about the shaft 1310 carrying the latch 1308 therewith and are frictionally retained in this position until the ejecting movement returns all three members to their initial positions. When the arm 1311 is returned by the cam to its initial position it rides along the end of the latch 1308 lifting only the latch against the action of the spring 1350, which immediately returns the latch to lock the arm 1311 in position. It will be observed that the positioning member 1253 must be removed from the path of the case whenever the ejecting mechanism is tripped and prior to the operation thereof. To this end the positioning member 1253 is provided with a slotted rib 1352 which operatively engages with the upper end of an elevating rod 1353. The elevating rod is operatively connected to a bell crank 1354 fulcrumed at 1355 and having a pair of collars 1356 secured to the rod upon opposite sides of one arm of the bell crank, the opposite arm of the bell crank is connected at its free end to an operating rod 1358 which is normally retarded by a spring 1360 to retain the positioning member 1253 in the path of the case, as shown clearly in Fig. 89. The operating arm 1358 is moved against the action of the spring 1360 upon the tripping of the ejecting mechanism by a boss 1361 formed upon the upper end of a lever 1343 and positioned in the path of the end of the operating arm 1358. With this construction, when the upper end of the lever is oscillated it moves the operating rod 1358 and connected mechanism to depress the elevating rod 1353, and in a like manner depress the positioning member 1253, retaining it in its depressed position until the spring 1360 is allowed to return the parts. It will be obvious from the foregoing description that as the cases vary in length and width the positions of the various compartments both longitudinally and laterally will vary accordingly, and if the testing members are to be accurately positioned over each compartment, compensating mechanism must be provided for adjusting the position of the testing members. The testing fingers engage first with the nearest row of bottles in the case, are then advanced to engage with the next row and so on until all of the rows in the case have been tested. To this end the rock shaft 1297 upon which the fingers are fulcrumed is supported at its opposite ends in heads 1365 slidingly mounted in parallel guide rods 1276 and 1366, the heads being operatively connected with the upper ends of operating arms 1367 secured to a rock shaft 1368. A thread arm 1369 is secured to the rock shaft between the arms 1367 and is operatively connected at its upper end with a link 1370 and an arm 1371 secured to a

rock shaft 1372. A second arm 1373 is also secured to the rock shaft and operatively connects with a path cam formed in one face of the cam disk 1375. This construction serves to impart an intermittent advancing movement to the heads in order to position the testing fingers successively over different rows and to then retract the fingers at the completion of the testing operation. In order to automatically adjust the traversing movement of the fingers in accordance with the variation in width of the cases the actuating mechanism for the heads is operatively connected with the positioning member 1253 and is adjusted in accordance with the location of this member. To this end the link 1370 is adjustably supported in a slot 1376 formed in the upper end of the arm 1369 and has a curved link 1378 depending therefrom. The curved link is pivotally connected at its lower end to one arm of a bell crank lever 1380 fulcrumed at 1381. The opposite arm of the bell crank is connected to the end of the rod 1258 which is operatively connected with the positioning finger 1253. With this construction the variation of the in and out movement of the positioning finger to accommodate varying widths of cases will automatically adjust the end of the arm 1370 with relation to the arm 1369 and thus lengthen or shorten the traversing movements of the testing fingers with relation to the case and accurately position the fingers laterally over each row of bottles. In addition to adjusting the position of the fingers laterally it is necessary to provide an adjustment of the fingers longitudinally of the case to accommodate the variation in position of the compartments for different lengths of cases. It will be noted that the cases are centered longitudinally by moving the positioning members from both ends, thus bringing the center line of each case in approximately the same position irrespective of the length of the case. Accordingly, the testing fingers are located longitudinally by moving the fingers upon each side of the center line toward and from one another, the amount which each finger moves varying in accordance with the distance of the finger with relation to the center line of the case. From an inspection of Figs. 90 and 91 it will be noted that there are six testing members fulcrumed upon the shaft 1297. In order to adjust the position of these testing fingers longitudinally with relation to the compartments the fingers are divided into two groups, the members of one group being moved toward the members of the other group, the outside member of each group having the greatest movement. Each of the outside fingers is connected to the upper end of a lever 1385 fulcrumed at 1386. The lever 1385 is connected to a slide 1387 at 1388 located between its fulcrum 1386 and the up-

per end. The slide 1387 is provided with a vertical arm 1384 connected with the second testing finger 1295 by a lateral stud 1389. An arm 1390 fulcrumed in the same horizontal plane with the arm 1385 is also connected at its upper end to this finger and at a point between its fulcrum and the upper end is connected to a slide 1391. The slide 1391 is provided with a vertical arm 1392 connected through a lateral pin 1393 with the inside testing finger 1295. With this construction it will be noted that the connections 1388 and 1389 are moved at equal rates of speed which is less than the speed of the outside testing finger and that the sleeve 1391 and the connection 1393 are moved at equal rates of speed less than the speed of the second finger 1295, thus with this construction the fingers are moved at varying rates of speed diminishing from the outside to the inside fingers. The levers 1385 are respectively connected at their lower ends by links 1395 to a pair of arms 1396 fulcrumed respectively upon the rock shaft 1276 and a parallel rock shaft 1366. The testing members are normally moved toward one another by a tension spring 1399 connecting the arms 1396. The arms are connected together by a transverse rod 1401 connected at one end to an arm 1400 extending upwardly from the rock shaft 1276 and at its opposite end to an arm 1402 extending downwardly from the rock shaft 1366 so that upon a movement of the cross rod the arms 1396 are oscillated in opposite directions. It will be recalled from the foregoing description that the rock shaft 1276 serves to actuate the longitudinal positioning fingers, thus the movement of the positioning fingers and testing fingers toward and from one another is obtained by a common operating means comprising the cam, the cam tending to separate the fingers, and the tension spring 1399 serving to bring them together when permitted by the cam. The case, if rejected, is carried away by an inclined chute, indicated at 1405.

The entire bottling system is actuated from a single prime mover and the various machines are suitably connected in timed relation with one another in order that the various operations shall be performed in the proper sequence. It will be obvious to those skilled in the art that it is desirable owing to the great number of moving parts to bring the system to the normal speed of operation by several stages and in the present invention this is accomplished by first starting the machines at a low speed and immediately after the machines have reached this speed, shifting into the high or normal speed of operation. Furthermore, as a considerable length of time is required for the passage of the bottles through the system it is conveniently divided into a plurality of

units which are successively connected with the actuating mechanism when the bottles reach the first machine of the unit. With this construction and mode of operation, upon starting the system into operation, the machines for performing the preliminary operations on the bottles are first started, and after the bottles have passed through these machines, completely filling the machines, and they reach the first machine of the next unit, the second unit is automatically thrown into operation, this being repeated with the third unit when the bottles have reached it. In the illustrated embodiment of the invention, upon starting the system the transferring machine for removing the bottles from the cases and the soaking machine are first operated, the rest of the system remaining idle. As the conveyer of the soaking machine travels slowly and holds a comparatively large number of bottles, a considerable length of time will elapse before this machine is completely filled and the first bottles are carried into a position for removal to the washing machine. As soon as the soaking machine has been completely filled and the first bottles are ready for removal to the washing machine the second unit comprising the washing, filling, capping and pasteurizing machines are thrown into operation and after the bottles have passed through the pasteurizing machines the third unit comprising the labeling and remaining machines are automatically thrown into operation. The common prime mover for the entire system is indicated at 1450 and preferably comprises an electric motor of suitable design and power. This motor is provided with a shaft 1452 having a high speed gear 1453 and a low speed gear 1454 which are connected automatically at predetermined intervals with the main drive shaft 1455. In the normal operation of the mechanism, when the motor 1450 is started the shaft 1452 is connected with the shaft 1455 to the high speed gear 1453 and an intermeshing gear 1457 connected to the shaft 1455. The shaft 1455 is permanently connected with a counter-shaft 1459 through a worm 1460 and worm wheel 1461 connected respectively to the shafts 1455 and 1459. The counter-shaft 1459 is connected through a drive chain 1462 with a second shaft 1464, as shown clearly in Figs. 94 and 98. The soaking machine is driven directly from the shaft 1464 and the transferring machine for removing bottles from the cases is driven from this shaft through a shaft 1465 and a pair of intermeshing bevels 1466 and 1467 connecting the shafts 1465 and 1464. These two machines alone are driven at high speed until a sufficient number of bottles have been transferred from the cases to completely fill the soaking machine, when the first line of bottles in their passage through the machine operatively engage with a row of controlling fingers 1470 pivoted at 1471 and operatively connected with the actuating mechanism to set into operation the second unit of the system. To this end the controlling fingers 1470 are provided with a link connection 1473 having a slotted portion through which a sliding rod 1475 passes. The rod 1475 is provided with a shoulder 1476 which normally rests upon the link 1473 at one end of the slot, as shown clearly in Fig. 96. The opposite end of the link 1473 is connected with one arm of a bell crank 1477 having its opposite arm connected with the periphery of a cam disk 1478 which is arranged to oscillate the bell crank and reciprocate the link 1473 at predetermined intervals to remove the link from beneath the shoulder 1476 and permit the depression of the rod 1475. The rod 1475 is provided with a depressing spring 1480 interposed between the link 1473 and the collar 1481 and is maintained in an elevated position against the action of the spring by an arm 1482 secured to the rod and having its free end bearing upon the periphery of a cam disk 1485. From an inspection of Fig. 96 it will be noted that the periphery of the cam disk 1485 is broken away at one point to allow the depression of the rod 1475. If no bottles are present at this point in the soaking machine the link 1473 will maintain the rod in an elevated position when this occurs, but if a bottle is present in the soaking machine and engages with the controlling finger 1470 the rod is allowed to drop and connect the operating mechanism with the next machine in the system. To this end the lower end of the rod, as shown clearly in Fig. 98, engages with one side of a tilting table 1490 fulcrumed centrally at 1491. The opposite end of the table engages beneath a second table 1492 fulcrumed centrally at 1493 and having its opposite end bearing upon the free end of an arm 1495 secured to the rock shaft 1496, as shown clearly in Fig. 94. The rock shaft 1496 carries an arm 1498 which normally engages beneath one of two projections 1499 formed upon a sleeve 1500. The sleeve 1500 forms one member of a Horton clutch of the usual construction so arranged that when the sleeve is maintained against rotation the clutch is disengaged, and when the sleeve is allowed to rotate the two members of the clutch are engaged with one another. This is the usual type of one direction clutch and as it specifically forms no part of the present invention is not shown and described in detail. The high speed gear 1457 is provided with an elongated hub 1501 carrying a driving pinion 1502 which meshes with a large gear 1503 arranged to be connected to a disk cam 1504 through the Horton

clutch hereinbefore referred to. Upon oscillating the arm 1498 the gear 1503 is automatically connected with the cam disk 1504 which is thereupon rotated and oscillates a clutch shaft 1505. The clutch shaft 1505 is connected to the cam disk through an oscillatory arm 1506, a link 1507 and a second arm 1508 connected with the cam path 1510 formed in the cam disk. The clutch shaft 1505 is provided with a clutch operating arm 1511 which is operatively connected with a sliding clutch collar 1512 having a pair of wedge shaped surfaces 1513 connected through the arms 1514 with the high and low speed driving gears indicated respectively at 1457 and 1516. These clutches are also of well-known construction and operate in the usual manner to connect either gear to the drive shaft by sliding the clutch collar back and forth upon the shaft. When the clutch operating cam 1504 is rotated the clutch collar 1512 is immediately moved lengthwise upon the shaft to disconnect the high speed gear 1457 from the shaft and connect the low speed gear 1516 thereto. The low speed gear is continuously operated from the motor shaft 1452 through the small pinion 1454 mounted upon the motor shaft and a suitable system of intermediate gearing indicated generally at 1517. With this construction the speed of the transferring and soaking machines is automatically reduced preliminary to the starting of the remainder of the machines at a low speed, after which the high speed is again connected to drive the machines at a normal rate of speed. At the same time that the high speed is disconnected the remainder of the machines in the second unit are connected with the motor drive. To this end the clutch operating shaft 1505 is provided with an arm 1519 having a sliding operating rod 1520 carrying a dog 1521 which engages with one end of a lever 1522 fulcrumed at 1523. The opposite end of the lever is normally positioned beneath a projection formed upon one member of a Horton clutch 1524, and when the lever is oscillated by the dog 1521 the clutch 1524 automatically connects a gear 1525 with the drive shaft 1455. The gear 1525 meshes with a second gear 1526 which carries a cam rib 1527 arranged to oscillate a lever 1529 fulcrumed at 1530 and having an upturned end 1531 which engages with one member 1532 of a pin clutch. The lever 1529 is normally retained in the position shown in Fig. 94 by a spring indicated at 1523 and when oscillated by the rotation of the gear 1526 releases the member 1532 and permits its movement toward a second clutch member 1535 under the action of the spring 1536. The clutch members are of the usual form, the member 1532 carrying a pin 1537 which engages with a corresponding slot formed in the clutch member 1535 to connect the drive shaft 1455 with a second shaft 1539 alined therewith. This second shaft 1539 serves to drive the machines of the second unit through the intermeshing bevels 1540 and connecting mechanism to be hereinafter described. After the clutch members have been engaged all of the machines of the system up to and including the pasteurizing machine are being driven at a reduced speed and it is desirable that immediately upon reaching this speed means shall be provided for automatically shifting to the high or normal speed. To this end the rod 1520 is provided with an arm 1541 secured thereto, engaging with a second sliding rod 1542 carrying a curved arm 1544. The movement of the rod 1542 carries the curved end of the arm 1544 into the path of a projection 1545 formed upon the clutch member 1535 and as the clutch member rotates this projection engages with the arm and oscillates it, sliding a pin 1546 in a bearing 1547. The sliding movement of this pin serves to oscillate the shaft 1496 through an arm 1550 secured to the shaft and having its free end engaging with the opposite end of the pin. It will be noted that after the shaft 1496 has been oscillated to allow the rotation of the cam disk 1504 it is returned to its initial position by a spring 1552 in order to cause the arm 1498 to engage beneath one of the projections 1499 and stop the cam disk after approximately one-half a revolution. When the shaft 1496 is again oscillated by the engagement of the projection 1545 with the arm 1544 the cam disk is allowed to resume its rotation and the ensuing movement oscillates the clutch shaft 1505 and returns the clutch collar 1512 to the position shown in Fig. 94, disconnecting the low speed gear 1516 and reconnecting the high speed gear 1457, this changing from low to high speed being arranged to take place as soon as possible after all of the machines have been started. It will be noted from an inspection of Figs. 96 and 98 that the arm 1482 is positioned at one side of the periphery of the cam 1485 and is provided with a cam roll 1555 which engages with the periphery, thus when the arm drops into the recess formed in the periphery of the roll to permit the depression of the rod 1475 it remains in this position until again returned to its initial position manually, the connections between the rod 1475 and the clutch shaft 1496 being arranged to allow the rod to remain in its depressed position without interfering with the operation of the actuating mechanism. In addition to the bottle transferring and soaking machines the case overturning and testing machines are also operated from the drive shaft 1455 when the actuating mechanism is first started. To this end a drive chain 1556 connects the shaft 1455 with a

shaft 1560, which actuates the case over-
turning machine through a drive chain 1561
and the case testing machine through the
intermeshing bevels indicated at 1562 and
5 a transverse shaft 1563. In addition, the
shaft 1560 operates the chain shaft 1565
through the shaft 1563 and connecting worm
gearing. The shaft 1565 carries the sprocket
wheel 1231 supporting and driving one end
10 of the conveyer 1230. As shown clearly in
Figs. 22 and 23, the continuation of the
main drive shaft indicated at 1539 extends
substantially throughout the length of the
chain of machines and the various machines
15 are driven through suitable connections
from this shaft. The washing machine and
conveyers for transferring the bottles to and
from the washing machine are operated from
the shaft 1539 through a counter-shaft 1567
20 connected to the shaft 1539 through a verti-
cal shaft 1568 and intermeshing bevel gears,
as shown in Figs. 22 and 92. The conveyer
280 is actuated from the counter-shaft 1567
through a drive chain 1570. The drive
25 chain 1570 actuates the conveyer through
the driving sprocket 282. As shown clearly
in Fig. 92 the counter-shaft 1567 is con-
nected to a vertical shaft 1572 through worm
gearing indicated at 1573 and the washing
30 machine 226 and transfer belt 185 are op-
erated from the vertical shaft 1572 through
the spur gearing indicated at 1575 in Fig.
92. The machine for transferring the bot-
tles from the conveyer 537 to the pasteuriz-
35 ing machine 540 is operated from a counter-
shaft 1576 connected to the drive shaft 1539
through intermeshing worm gears 1577.
The filling, capping, and accompanying
testing machines and transfer mechanisms
40 are operated through a counter-shaft 1580
connected to the shaft 1539 through inter-
meshing worm gears 1581, and operatively
connected with a second shaft 1582 through
intermeshing bevel gears 1584. The con-
45 veyer 537 is operated by a conveyer shaft
1586 and a counter-shaft 1587 operatively
connecting the conveyer shaft with the main
shaft 1539. With this construction it will
be noted that all of the machines for han-
50 dling the bottles after leaving the soaker
up to and including the pasteurizing ma-
chine are operated from the common drive
shaft 1539. It will be recalled that the
system in connection with the actuating
55 mechanism may be considered as divided in-
to three separate units, the driving mecha-
nism for the first two units having already
been described, and the third unit is auto-
matically set into operation after the first
60 bottles have passed through the pasteuriz-
ing machine. This starts the machine for
transferring the bottles from the pasteurizer
to the conveyers and the following machines
including the labeling machines and trans-
65 ferring and testing machines. To this end,

as shown clearly in Figs. 23, 99 and 100 the
pasteurizing machine is provided with a
controlling mechanism which is arranged to
start the actuation of the last unit when
the pasteurizing machine has been substan- 70
tially filled with bottles. To this end the
pasteurizing machine is driven from the
main drive shaft 1539 through intermesh-
ing bevels 1590, a vertical shaft 1592 and
worm gearing 1593 operatively connecting 75
the pasteurizing shaft 1594 with the vertical
shaft 1592. The pasteurizing shaft through
any suitable system of connections continu-
ously rotates a cam shaft 1595, as shown in
Fig. 93. In order that the operation of the 80
last unit may be controlled independently
of the preceding units a separate drive
shaft 1596 is provided in alinement
with the drive shaft 1539 and connected
thereto at predetermined intervals by a pin 85
clutch having a recessed clutch member 1597
and a pin clutch member 1598. The two
members of the clutch are normally disen-
gaged by a hooked arm 1600 engaging with
the member 1598 and retaining it in the 90
position shown in Fig. 100 against the action
of a spring 1601. The arm 1600 is ful-
crumed at 1602 and has a second arm 1603
extending therefrom and normally retaining
the arm 1600 in the position shown in Fig. 95
100. This is accomplished by the locking
rod 1605 which is normally retained in the
position shown in Figs. 99 and 102 and is
provided with a lateral projection 1606 en-
gaging behind the end of the arm 1603. The 100
locking rod is normally maintained in an
elevated position in the usual manner by a
slotted link 1608 which engages beneath a
projection 1609 formed upon the rod 1605.
This link is reciprocated during the opera- 105
tion of the pasteurizing machine by an os-
cillatory arm 1610 connected at its free end
to the link and operatively engaging with
a cam disk 1611. The locking rod is re-
tained in an elevated position by an arm 110
1612 secured to the rod and operatively en-
gaging with the inside of a peripheral cam
1613 which is provided with an opening in
the periphery to allow the arm to drop
through at predetermined intervals. A 115
spring 1615 surrounding the rod and inter-
posed between the link and arm 1612 con-
stantly tends to depress the rod, which in
the normal operation of the apparatus is
supported by the arm 1612 when the link 120
1608 is withdrawn from beneath the projec-
tion 1609. When the first line of bottles
reaches the point, however, where it is de-
sired to start the preceding machine the line
of bottles contacts with controlling fingers 125
1617 fulcrumed at 1618 and connected with
the link 1608, as shown clearly in Fig. 99,
thus holding the link in a retracted position
and allowing the locking rod to be depressed
when the end of the arm 1612 is positioned 130

opposite the opening in the cam 1613. The parts are normally retained in the position shown in Fig. 99 by a coil spring 1620 surrounding the shaft 1618, as shown in Fig. 100. The downward movement of the locking rod rocks a bell crank 1621 having one arm positioned beneath the lower end of the locking rod and the second arm connected through a rod 1622 with one arm of a bell crank 1623 fulcrumed at 1624, as shown in Figs. 94 and 95 and having its second arm bearing upon the arm 1495. With this construction the depression of the locking rod rocks the arm 1495 and clutch operating shaft 1496, causing the clutch 1500 to be engaged and the controlling mechanism to be actuated to first disengage the high speed, next engage the low speed, and finally engage the high speed, as heretofore described. In order to cause this movement of the control mechanism to permit the engagement of the clutch members 1597 and 1598 the arm 1600 is provided with a tail 1625 which is connected through a rod 1627 with a depending arm 1628 secured to the lever 1529, as shown clearly in Fig. 94, thus when the control mechanism is actuated to rock the lever 1529 the arm 1600 is rocked in a like manner, permitting the engagement of the clutch members to drive the shaft 1596 from the shaft 1539. It will be recalled, however, that this lever is rocked in order to actuate the receiving unit and in order to permit this movement to take place without affecting the arm 1600 the rod 1627 is yieldingly connected with the tail 1625 through a casing 1629 forming a bearing for the end of the rod 1627 and a spring 1630 surrounding the rod inside of the casing and a collar 1631 secured to the rod. With this construction until the locking rod 1605 is depressed the lateral projection 1606 prevents a rocking movement of the arm 1603 and movements of the lever 1529 serve merely to compress the spring. When the locking rod is depressed, however, the arm 1603 is free to oscillate and the rocking movements of the lever then serve to lock the arm 1600 and permit the engagement of the two clutch members 1597 and 1598. The conveyor which receives the bottles after they are transferred from the pasteurizing machine is operated, as shown clearly in Figs. 23 and 100 by a counter-shaft 1630 connected to the shaft 1596 by worm gearing 1631, and to the conveyor shaft 1632 by worm gearing 1633. The conveyers 537 and 680 are driven at equal rates of speed and are connected at their rear ends by a cross shaft 1635, as shown in Fig. 23, which operates the conveyor 693 through the intermeshing bevel gears 1636 and conveyor shaft 1637. The idler wheel 690 for transferring the bottles from the conveyor 680 to the conveyor 693 is driven from the shaft 1596 through the intermeshing bevels 1638, the counter-shaft 1640 and worm gearing 1642. The counter-shaft 1640 in addition drives the auxiliary conveyor 697 through a drive chain 1644 connecting the shaft 1640 with the conveyor shaft 1646. The mechanism for conveying the bottles from the pasteurizing machine to the second conveyor 680 is operated by a transfer shaft 1647 connected to the main drive 1596 through bevel gearing 1648 and worm gearing 1650. The conveyers 750 and 759 for feeding the bottles to and removing them from the labeling machines respectively are operated from the main drive 1596 through a counter-shaft 1652 operatively connected to the shaft 1596 through the worm gearing 1653, as shown in Fig. 51. This counter-shaft supports one end of the conveyers and drives them at an equal rate of speed. The opposite ends of the conveyers are supported by a second shaft 1655 which serves to drive the bottle feeding mechanism 755 through driving chains 1656 and 1657. The idler wheel 752 for transferring the bottles from the conveyor 693 to the conveyor 650 is operated from a shaft 1658 supporting the rear end of the conveyor 693 through a set of bevel gears 1659 and a second set of bevel gears 1660. The two labeling machines and testing machine are driven at equal rates of speed through counter-shafts 1661 operatively connected with the main drive 1596 through worm gearing 1662. The counter-shaft 1661 drives directly the idler wheel 757 through bevel gearing 1663 and the labeling machines are driven from the idler wheels through suitable connections. It will be recalled that after the bottles are moved from the pasteurizing machine they are first tipped on their sides to empty liquid if the bottles are broken, and are then weighed to see if they have been cracked in the pasteurizing operation. This weighing machine is indicated generally at 1665 in Fig. 51 and is operated by the counter-shaft 1666 connected to the main drive shaft through the worm gearing 1667. The idler wheel 900 for transferring the bottles from the conveyor 759 to the conveyor 902 is operated from the shaft 1652 through a pair of skew gears 1670. From the continuously running conveyor 902 the bottles are transferred to an intermittently moving conveyor 903 and this transferring machine and the conveyor 903 are operated from the drive shaft 1596 through a drive chain 1671, as shown clearly in Fig. 67, connecting the drive shaft with a transfer shaft 1672. The bottles are transferred from the intermittently moving conveyor 903 into the cases by a machine indicated generally in Fig. 23 of the drawings. This machine is operated by a counter-shaft 1673 connected with the main drive shaft through intermeshing bevels 1674. The counter-shaft

1673 operates a short shaft 1675 through bevel gears 1676 and the shaft 1675 is connected with the machine shaft 1677 through bevel gears 1679. The cases are finally passed through a testing machine which is operated from the main drive shaft through the intermeshing bevel gears 1680, shaft 1681, intermeshing bevel gears 1682, and a second shaft 1683, as shown clearly in Fig. 67 of the drawings. From the foregoing description of the actuating mechanism it will be noted that all of the machines are driven from a common line of shafting, thus reducing the back lash upon starting the machines to a minimum and furthermore simplifying the construction and arrangement of the actuating mechanism for the system. In addition, it will be further noted that all of the connections to the various machines are either through gears or positively operated chains and that the clutches for connecting the several units with one another are of the pin and slot type which accurately register with one another, causing all of the machines to be driven in perfect synchronism with one another.

It will be recalled that at certain points in the passage of the bottles through the system they are tested and if found imperfect are rejected into a discharge chute. In certain cases it may happen that one of the machines is operating improperly or does not operate at all, and when this occurs the discharge chute will quickly back fill. In order to prevent the continued operation of the system when a failure occurs in one of the machines, mechanism is provided for automatically stopping the system when a predetermined number of bottles have accumulated in the discharge chute. To this end each of the discharge chutes is provided with a pivoted finger 1685 extending across its open end and connected with a suitable pipe or valve indicated at 1686 and located in a main air pipe 1687. The finger is normally maintained in position across the pipe with the valve closed, but upon the discharge chute becoming filled the finger is rocked to open the valve and allow the pipe to become filled with air under pressure from any suitable source, not shown. The air pipe 1687 is connected with a controlling member, as shown clearly in Fig. 94, for throwing the entire system out of operation. To this end the air pipe opens into the top of a closed casing 1688 above a piston 1689 which is normally retained in the upper end of the casing by a spring 1690, this elevated position being determined by a pin 1691 secured in the top of the cylinder and bearing upon the face of the piston. The piston carries a stem 1692 extending through the bottom of the cylinder and having a wedge shaped lower end 1693. Upon the opening of any

one of the valves the compressed air flows into the cylinder and moves the piston downwardly against the action of the spring. This carries the wedge shaped end 1693 beneath a projection 1695 formed upon a clutch member 1696. The clutch member 1696 normally engages with a second clutch member 1697 through the usual type of pin and slot connection and is retained in this position by a spring 1698, the movement of the wedge shaped end 1693 sliding the clutch member 1696 upon the shaft 1524 against the action of the spring. It will be obvious to those skilled in the art that it is desirable to warn the operator if any one discharge chute is being filled prior to the automatic stopping of the entire system in order to enable the operator to remove the bottles and remedy the difficulty if possible. To this end each of the discharge chutes is provided with a pivoted finger 1700 located in the path of the bottles ahead of the finger 1685 and arranged to be oscillated by the bottles and close an electric circuit through a contact indicated at 1701. The closing of this electric circuit operates in any suitable manner an annunciator or alarm bell to indicate to the operator that something is wrong, and in addition, the particular discharge chute which is filled with bottles in order to instantly determine the seat of the difficulty.

It is to be understood that the term "capping" wherever used throughout the specification and claims is intended to indicate sealing the end of the bottle in any desired manner.

What is claimed as new, is:—

1. A machine for packaging materials, comprising means for cleaning bottles, means for filling bottles, means for sealing bottles, connected mechanism constructed and arranged to cause the several means to operate automatically and in timed relation, and means for performing a characteristic test upon the bottles to determine whether or not an operation preceding the testing operation has been properly performed. 105
2. A machine for packaging materials, comprising means for cleaning bottles, means for filling bottles, means for sealing bottles, means for sterilizing bottles, means for labeling bottles, connected mechanism constructed and arranged to cause the several means to operate automatically and in timed relation and means for detecting when the several means have functioned imperfectly. 115
3. A machine for packaging materials, comprising means for cleaning bottles, means for filling bottles, means for sealing bottles, means for sterilizing bottles, means for labeling bottles, connected mechanism constructed and arranged to cause the several means to operate automatically and in 125

timed relation, and means for performing a characteristic test upon the bottles to determine whether a preceding operation has been properly performed.

- 5 4. A machine for packaging liquids comprising mechanism for performing a plurality of operations successively upon bottles, and means for transferring the bottles from containers to the mechanism initially, and for transferring the bottles from the mechanism to the containers at the conclusion of the operations.
- 10 5. A machine for packaging materials comprising means for performing a plurality of operations successively upon bottles, mechanism for transferring the bottles from containers to the mechanism at the commencement of the operations and from the mechanism to the containers at the conclusion of the operations, and means for operating upon the empty containers during the performance of the operations upon the bottles.
- 20 6. A machine for packaging materials comprising mechanism for filling bottles, mechanism for sealing bottles, and mechanism for testing the bottles in a characteristic manner after each of the preceding operations, the several operations taking place automatically and in the sequence described.
- 30 7. A machine for packaging materials, comprising mechanism for moving a bottle into a position in which the contents will leak out if the bottle is cracked, mechanism for subsequently weighing the bottle, and connected mechanism for causing these operations to take place automatically and in the sequence described.
- 40 8. A machine for packaging materials, comprising means for pasteurizing a bottle, means for actuating the bottle to cause the contents to leak out if the bottle is cracked in the pasteurizing operation, means for subsequently weighing the bottle, and
- 45 means for thereafter rejecting the bottle if below a predetermined weight.
- 50 9. A machine for packaging materials comprising mechanism for filling a case with bottles and case testing mechanism constructed and arranged to determine whether the case has been completely filled with bottles, the operations taking place automatically and in the sequence described.
- 55 10. A machine for packaging materials comprising a plurality of detecting members equal to the number of compartments in a case, mechanism for causing the members to operatively engage with the bottles in a case, and means operatively connected
- 60 with the detecting members to eject the case if one or more compartments in the case are vacant.
11. A machine for packaging materials comprising a plurality of detecting mem-

bers, means for retaining the case in a stationary position during the operation of the detecting members, means for moving the detecting members into engagement with the bottles in a case, a case ejecting member, and operative connections between the detecting members and case ejecting member.

12. A machine for packaging materials comprising a plurality of detecting members, a case support, case positioning fingers and operative connections between the positioning fingers and the detecting members for automatically adjusting the relative position of the detecting members in accordance with the position of the positioning fingers.

13. A machine for packaging materials comprising a case support, a plurality of detecting members, mechanism for actuating the members and means for automatically centering the case with relation to the detecting members.

14. A machine for packaging materials comprising a case support, a plurality of detecting members arranged to engage simultaneously with one complete row of bottles in the case, and mechanism for advancing the detecting members to automatically engage successive rows of bottles.

15. A machine for packaging materials, comprising mechanism for actuating a container to remove any bottles or parts thereof which may be located in the compartments, mechanism for thereafter testing the container to determine whether all of the compartments have been completely emptied, and means for feeding a container from one mechanism to the other, the operations taking place automatically and in the sequence described.

16. A machine for packaging materials comprising a plurality of testing plungers, a container support, mechanism for actuating the plungers to enter the compartments in an empty container, and means for ejecting the container if all the compartments are not completely emptied.

17. A machine for packaging materials comprising mechanism for performing a plurality of operations on bottles, mechanism for simultaneously performing a plurality of operations upon the bottle containers, means for filling the container with bottles at the completion of the operations and mechanism for finally testing the filled containers.

18. A machine for packaging materials comprising mechanism for performing a plurality of operations upon bottles, cooperating mechanism for performing a testing operation after each of the operations to determine whether the operation immediately preceding has been properly per-

formed, the several operations taking place automatically and in the sequence described.

19. A machine for packaging materials comprising mechanism for cleaning, filling and sealing bottles, and mechanism for testing the bottles after each of the preceding operations, the several operations taking place automatically and in the sequence described.

20. A machine for packaging materials comprising mechanism for filling bottles, mechanism for testing the bottles to determine whether they are properly filled or not, mechanism for sealing the bottles and mechanism for operatively engaging with the sealed end of the bottle to determine whether the bottle is properly sealed or not, the several operations taking place automatically and in the sequence described.

21. A machine for packaging materials comprising a plurality of units, a common actuating mechanism for all of the units, and control means for automatically connecting successive units to the actuating mechanism.

22. A machine for packaging materials comprising a plurality of units, a common actuating mechanism for all of the units, and control means for automatically connecting successive units to the actuating mechanism, the control means being constructed and arranged to bring the driven units from a position of rest to the normal speed through a plurality of stages.

23. A machine for packaging materials comprising mechanism for operating upon bottles, a discharge chute for holding imperfect bottles, actuating mechanism, and means operated by a predetermined number of bottles in the discharge chute to automatically disconnect the actuating mechanism.

24. A machine for packaging materials comprising mechanism for operating upon bottles, a discharge chute, means for indicating the presence of a predetermined number of bottles in the discharge chute, actuating mechanism, and means for disconnecting the actuating mechanism by a predetermined number of bottles in the discharge chute greater than the number of bottles indicated.

25. A machine for packaging materials, comprising mechanism for filling and sealing packages, mechanism for thereafter testing the packages to determine whether the preceding operations have been properly performed, and mechanism for ejecting containers in which the filling or sealing operations have been improperly performed as detected by the testing mechanism.

26. A machine for packaging materials, comprising mechanism for filling and sealing packages, mechanism for thereafter testing the packages to determine whether the preceding operations have been properly performed, and connected means constructed and arranged to cause the several mechanisms to operate automatically and in timed relation.

27. A machine for packaging materials, comprising mechanism for performing a series of connected operations upon packages, means for testing the packages to determine whether the operations have been properly performed, and means for ejecting a package after an operation has been performed and prior to the next operation if the preceding operation has been improperly performed.

28. A machine for packaging materials, comprising a series of mechanisms for performing connected operations upon packages, and connected mechanism constructed and arranged to transfer from one operating mechanism to the next only those packages upon which the preceding operation has been properly performed.

29. A machine for packaging materials, comprising mechanism for performing a series of connected operations upon packages, means for testing the packages to determine whether the operations have been properly performed, means for ejecting those packages which are determined imperfect by the testing mechanism, and means for stopping the machine when a predetermined number of packages have been ejected.

30. A machine for packaging materials, comprising means for filling a bottle, means for sterilizing a bottle, and means for weighing a bottle subsequent to the sterilizing operation to determine whether any of the contents of the bottle have leaked out during the sterilizing operation.

31. A machine for packaging materials, comprising mechanism for initially removing bottles from a container, mechanism for filling and sealing the bottles thus removed, mechanism for thereafter transferring these bottles to the containers, and driving means for causing the several mechanisms to operate automatically and in timed relation.

ERASTUS E. WINKLEY.

Witnesses:

GEO. E. STEBBINS,
ALICE ACKROYD.