

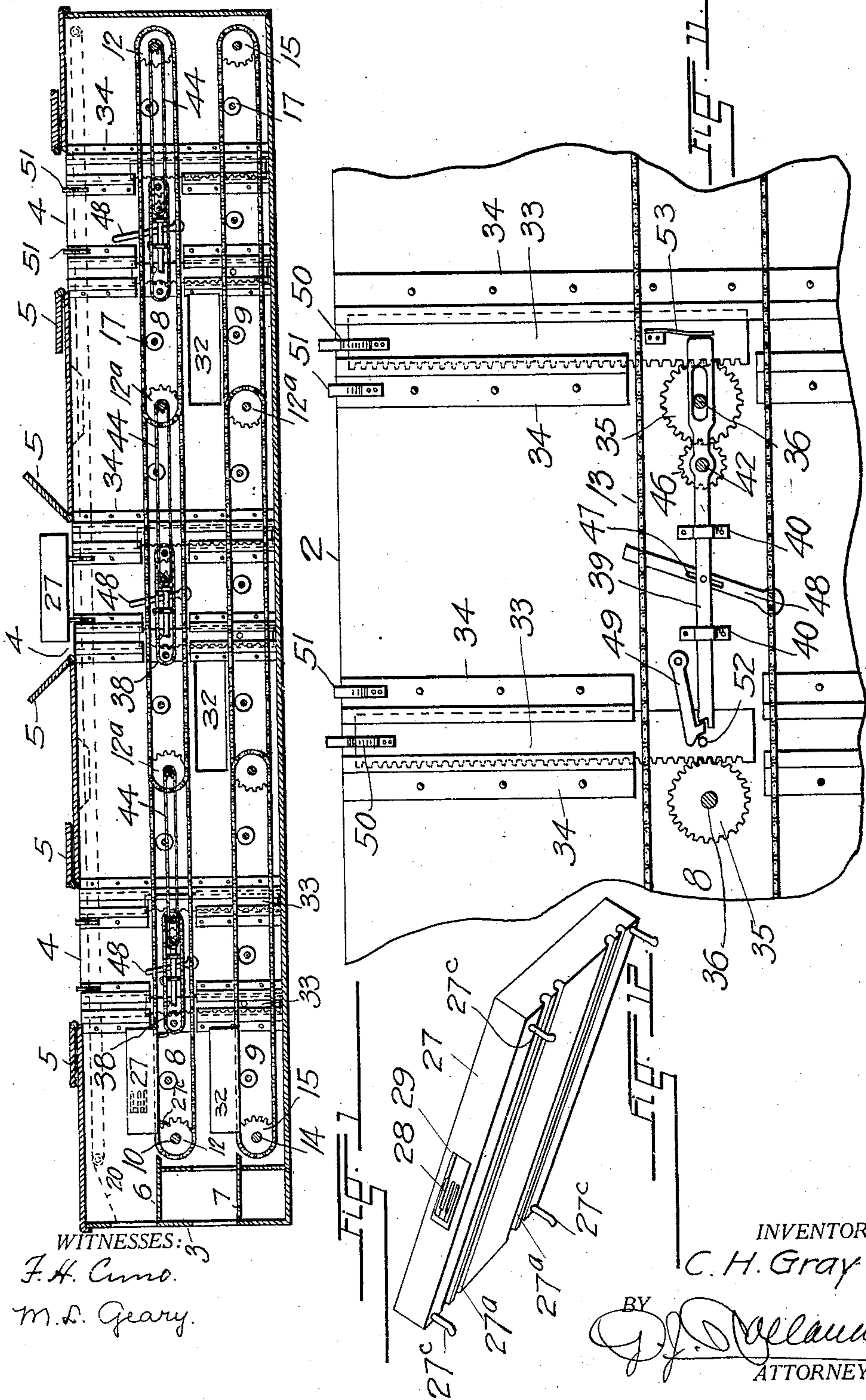
C. H. GRAY.
DUMB WAITER.

APPLICATION FILED MAY 26, 1909.

969,269.

Patented Sept. 6, 1910.

4 SHEETS—SHEET 1.



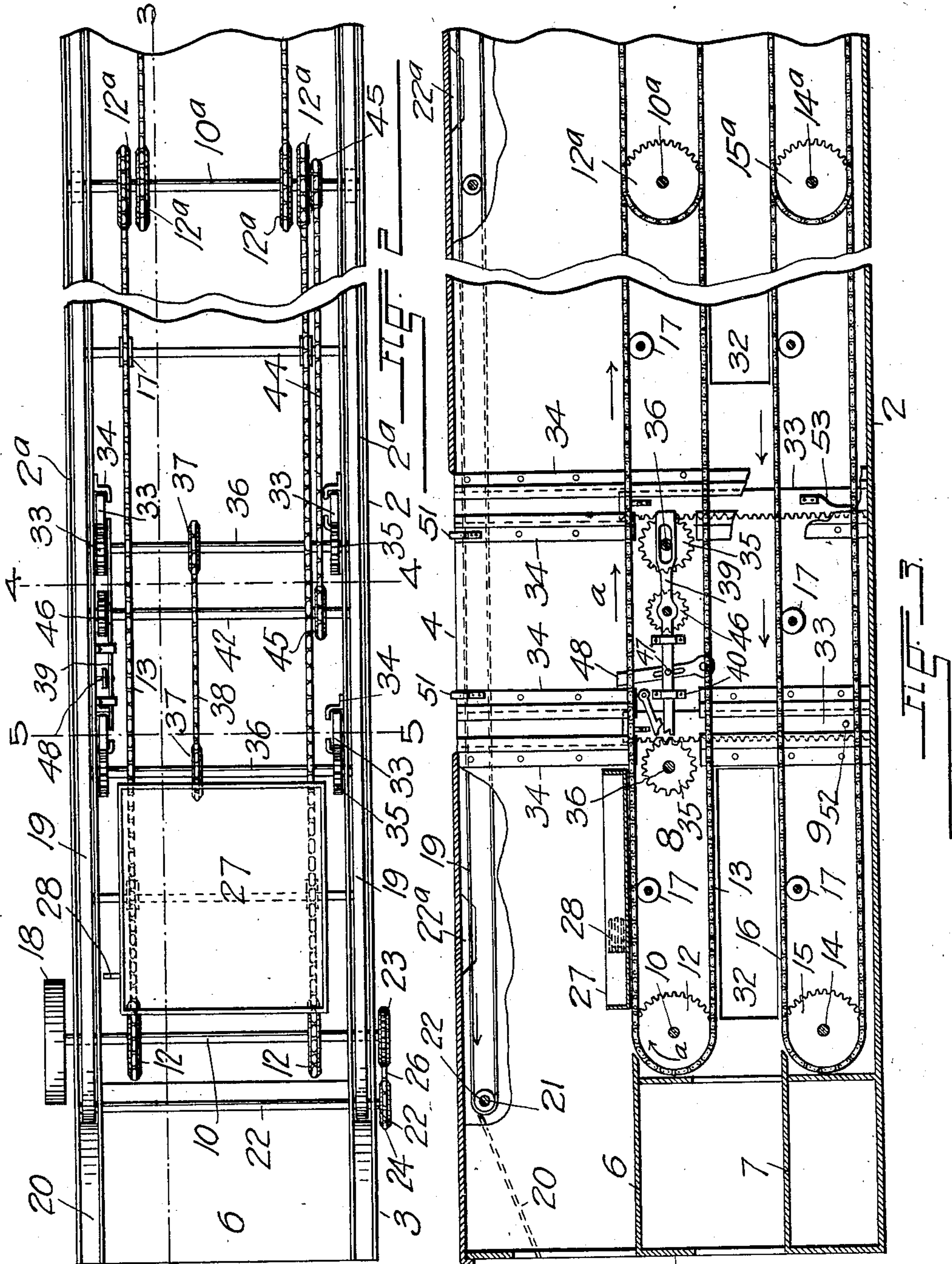
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WITNESSES:
F. H. Cunn.
M. L. Geary

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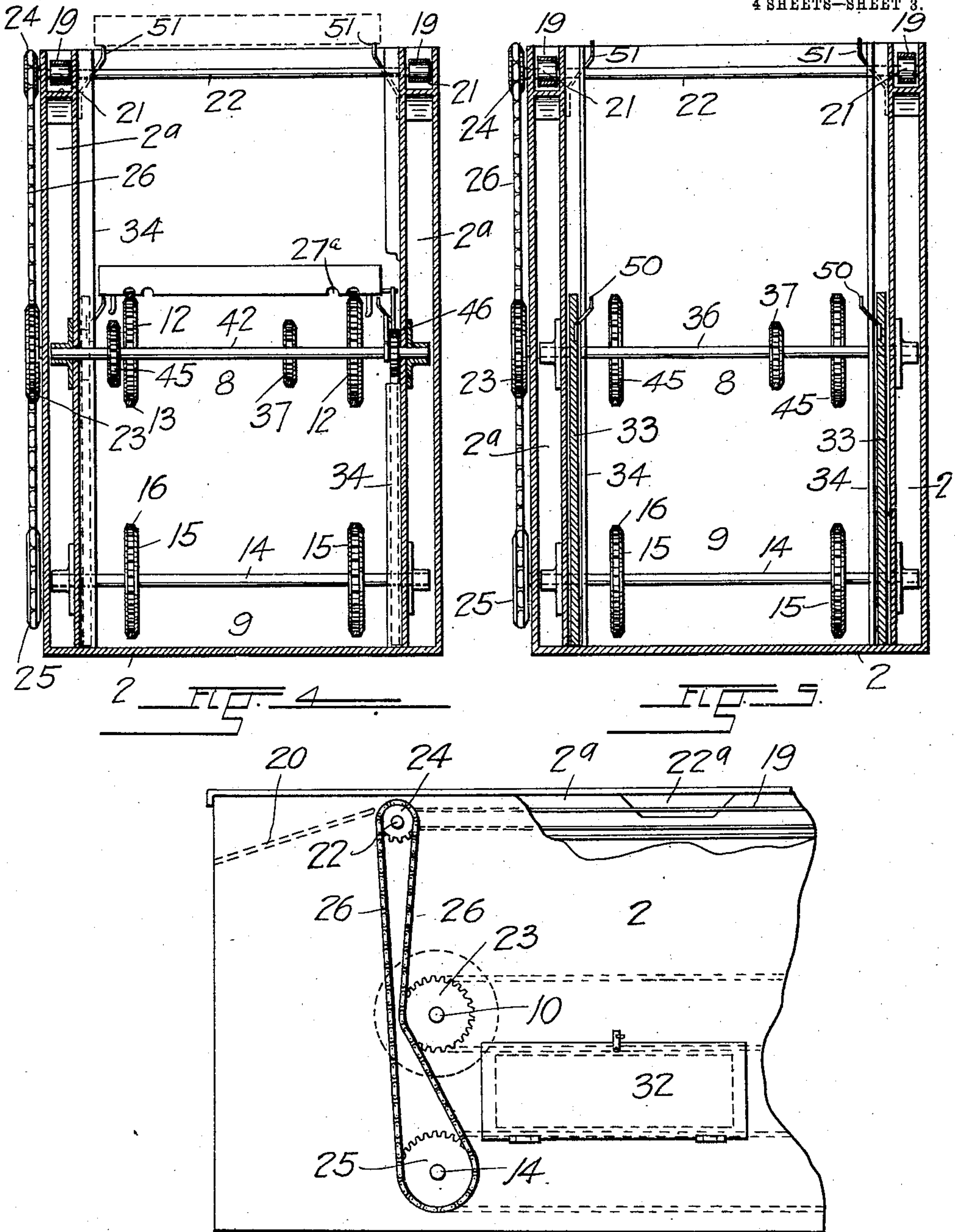
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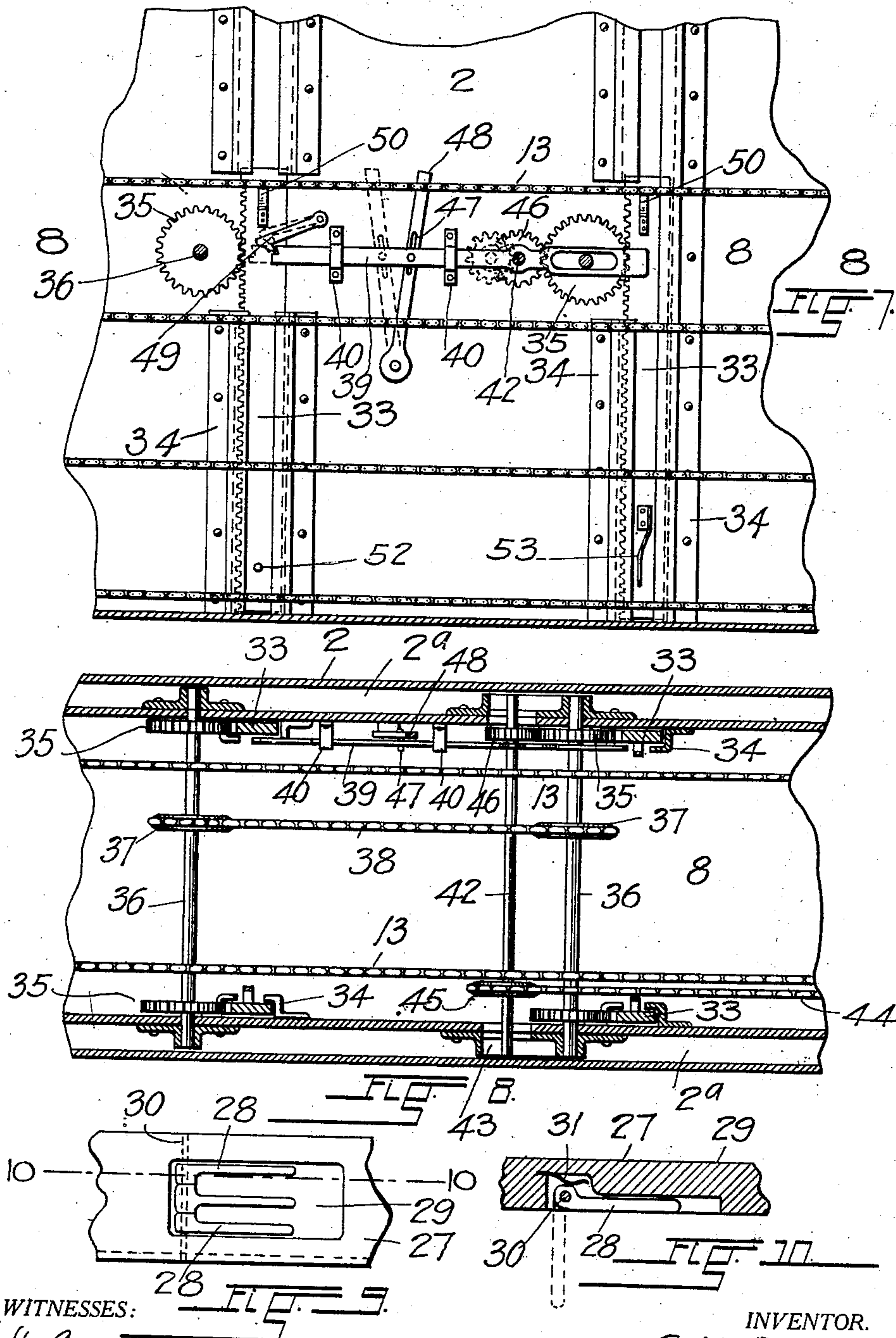
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UNITED STATES PATENT OFFICE.

CHARLES H. GRAY, OF DENVER, COLORADO.

DUMB-WAITER.

969,269.

Specification of Letters Patent.

Patented Sept. 6, 1910.

Application filed May 26, 1909. Serial No. 498,491.

To all whom it may concern:

Be it known that I, CHARLES H. GRAY, citizen of the United States of America, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Dumb-Waiters, of which the following is a specification.

This invention relates to new and useful improvements in dumb-waiters and more particularly in the class of devices by means of which dishes and other articles are carried to and from the dining room of a restaurant or hotel through the instrumentality of horizontally moving conveyers.

The object of my invention resides in the provision of an apparatus of simple construction and great practicability in use, which in addition to the endless conveyers by which the dish trays are carried from and to the kitchen, includes a mechanism whereby said trays when carried from the kitchen, are automatically deposited at predetermined points in the dining room.

The apparatus has, furthermore, one or more supplementary conveyers which are employed to carry orders, money or other small articles from the dining room into the kitchen.

I attain the above objects by the mechanism shown in the accompanying drawings in the various views of which like parts are similarly designated and in which—

Figure 1, represents a longitudinal sectional view of the apparatus, Fig. 2, an enlarged, fragmentary plan view of the same, with the top of the casing in which the conveyers and other parts of the mechanism are inclosed, omitted, Fig. 3, a vertical section taken along the line 3—3 Fig. 2, Fig. 4, a transverse section taken along the line 4—4 Fig. 2, Fig. 5, a similar section taken along the line 5—5 Fig. 2, Fig. 6, a fragmentary side elevation of one of the ends of the device, Fig. 7, an enlarged, vertical section of a portion of the apparatus, showing the mechanism by means of which the dish-carrying trays are automatically lifted from the conveyer and deposited at stations in the dining room, Fig. 8, a horizontal section taken along the line 8—8 Fig. 7, the conveyers and members of the above named mechanism having been shown in elevation, Fig. 9, a fragmentary side elevation of one of the trays employed in connection with the apparatus, showing the stops which by

engagement with a member of the mechanisms at the stations, cause the tray to be lifted from the conveyer upon which it was carried, Fig. 10, a horizontal section taken along the line 10—10 Fig. 9, Fig. 11, a fragmentary view similar to Fig. 7, with the vertically movable parts of one of the before mentioned mechanism in the raised position and, Fig. 12, a perspective underneath view of the dish carrying tray.

Referring to the drawings by numerical reference characters, let the numeral 2 designate a rectangular casing which may extend the entire length of the dining room and which projects at one of its extremities, 3, into the kitchen, pantry or other apartment from where the articles of food, dishes and utensils used in the dining room, are procured. The top of this casing which may be used by the employees of the dining-room as a counter or a depository for dishes and articles of food, is provided with a plurality of openings 4, which designate the stations at which the trays coming from the kitchen, are deposited in the dining room and which may be closed by means of lids 5.

The end 3 of the casing is provided with two platforms 6 and 7 upon which the trays in which the dishes are carried to and from the dining room, are deposited and whose upper surfaces are in a plane with the endless conveyers 8 and 9 which extend the entire length of the casing.

While I do not desire to limit myself to the use of any special construction or material, I preferably form the conveyers 8 and 9, of two chains carried parallel over sprocket wheels mounted upon parallel shafts which are revolvably supported in bearing boxes at opposite ends of and in transverse relation to the casing 2.

In the drawings, the shafts, sprocket wheels and chains comprised in the upper conveyer 8, by which the trays are carried from the kitchen to the dining room, are respectively designated by the numerals 10, 12 and 13 while the similar parts included in the lower conveyer 9, which returns the trays from the dining room, are indicated by the reference characters 14, 15 and 16.

In constructing a conveyer of more than ordinary length, it may be formed of a plurality of consecutively arranged, endless chains, by the use of intermediate shafts and 14^a carrying two sets of juxtaposed sprocket wheels 12^a and 15^a. This construc-

tion has been shown in Figs. 1, 2, and 3 of the drawings, although for convenience in explanation, it has been assumed that each of the two conveyers is composed of two single endless chains. Idle pulleys 17 mounted upon transverse shafts, support the upper sides of the chains to prevent their sagging in consequence of their own or imposed weights. One of the end shafts 13 of the upper conveyer, 8, is provided with a pulley 18 through the instrumentality of which power is transmitted to the continually moving parts of the apparatus, from a conveniently located source of energy.

The casing 2 is constructed with double side walls to provide spaces 2^a in which the boxes employed to carry the various transverse shafts, are disposed, and the upper portions of these spaces are occupied by the supplemental conveyers 19 by which orders, money and other small articles are conveyed from the dining room to be delivered in inclined chutes 20 at the kitchen end 3 of the casing.

Each of the two conveyers 19 is composed of an endless belt which is carried around pulleys 21 upon shafts 22 mounted transversely of the casing near its ends.

To facilitate depositing articles upon either of the conveyers 19, the outer walls of the sides of the casing are formed with openings 22^a as has been shown in Fig. 3 of the drawings.

In the operation of the apparatus, the conveyer 8 by which the trays are carried to the dining room, travels in the direction of the arrows *a* Fig. 3, and this movement is transposed into a similar movement of the conveyers 9 and 19 in opposite direction, through the instrumentality of sprocket wheels 23, 24 and 25, mounted outside the casing respectively upon the protruding extremities of shafts 10, 22 and 14, and a chain 26 which, being carried around the wheels 24 and 25 on the driven shafts 22 and 14, exteriorly engages the intermediate wheel 23 upon the driving shaft 10.

The trays 27 in which the dishes and utensils are carried to and from the dining room, are formed in their bottom surfaces with parallel grooves 27^a which are adapted to receive the two chains of which the longitudinally moving conveyers 8 and 9 are composed for the purpose of preventing lateral displacement of the tray when imposed thereon. When placed upon a table or other flat surface the trays are supported upon legs 27^c which prevent their bottom from coming in contact with said surface and soiling the same with oil brought in the grooves by the chains of the conveyer. Each tray 27 is furthermore provided in one of its sides with a plurality of adjustable stops through the instrumentality of which the mechanisms designed to deposit the trays at

the various stations of the casing are actuated. These stops, which are best shown in Figs. 9 and 10 of the drawings, consist of arms 28 which are normally disposed in vertical order within a recess 29, in the side of the tray and which are fulcrumed at one of their extremities upon a vertically disposed rod 30.

The fulcrumed ends of the arms are formed with cams which engage springs 31 placed in the recess and designed to maintain, in coöperation with said cams, the arms either in their retracted or in their operative position which latter is shown in broken lines in Fig. 10.

Below each of the openings 4 in the top of the casing, which designate the stations at which trays carried into the dining room by the conveyer 8, are deposited, is arranged a mechanism which when actuated by one of the stops on the moving tray, lifts the latter from the chains upon which it was carried and raises it to a point above the counter from where it is removed by the employees of the dining room to be subsequently returned to the kitchen by means of the conveyer 9 upon which it is placed through doors 32 in the sides of the casing.

Each of the above mentioned mechanisms comprises a lifting element composed of four rack-bars 33, disposed oppositely in juxtaposition to the inner surfaces of the side walls of the casing and which are vertically movable in angle-guides 34 rigidly secured upon said walls.

The teeth of the racks, which are formed in an edge of each bar are operatively engaged by gear wheels 35 upon shafts 36 which are rotatably mounted transversely of the casing 2 and which are connected by means of sprocket wheels 37 and a chain 38 to move in unison in the same direction.

A bar 39 is horizontally-slidably supported in U shaped brackets 40 secured to a side of the casing, and this bar carries one extremity of a transverse shaft 42, the other end of which is slidably supported in a bearing 43 at the opposite side of the casing.

The shaft 42 connects by means of a chain 44 and sprocket wheels 45 and 45, with one of the end shafts 10 of the conveyer 8, so as to move in unison therewith and it carries a pinion 46, which when the sliding bar 39 is in one of its extreme positions, meshes with the adjacent one of the gear wheels 35 which engage the rack-bars 33.

A laterally extending pin 47 on the bar 39, projects through a longitudinal slot in a lever 48 which is fulcrumed at its lower extremity, upon the side of the casing and which extending above the upper surface of the conveyer 8, is, in practice, engaged by one of the stops 28 on the tray 27.

The levers 48 at the various consecutive stations increase in length progressively

from the end 3 of the casing to its opposite extremity, the end of the shortest one at the first station, projecting in the path of the lower stop on a tray carried upon the conveyer 8, that of the one at the second station in the path of the second stop and so on to the last station at which the lever is longest to be engaged by the uppermost stop of the series arranged at the side of the tray.

10 It will thus be understood that the employee at the kitchen end of the apparatus can pre-determine by placing one of the stops of the tray imposed upon the conveyer 8, in its operative position, at which one of
15 the various stations said tray will be lifted from the chains to be deposited upon the top of the casing.

When by the engagement of the stop on the tray with the end of the lever 48, the
20 bar 39 is moved so as to bring the pinion 46 in engagement with the gear wheel 35, as is shown in Fig. 7, a gravity pawl 49, drops in position in a notch cut in an end of the bar and thereby locks the latter against retro-
25 grade movement. The pinion 46, which rotates continuously by reason of its connection with the shaft of the conveyer 8, imparts a rotary movement to the cooperative shafts 36 and this movement is transposed
30 through the instrumentality of the gear-wheels 35, into an upward movement of the rack-bars 33. The latter are provided at their upper ends, with inwardly projecting lugs 50 which normally extend below the
35 upper surface of the conveyer 8 and which when the said bars move upwardly, engage the under surface of the superposed tray so as to raise it from the chains upon which it was disposed.

40 Projecting inwardly from the sides of the casing in the path of the upwardly moving tray, are four resilient stops 51 the free upper ends of which protrude above the upper surface of the counter. When the tray,
45 impelled upwardly by the bars 33, engages the stops 51, the latter are pressed against the sides of the casing until the said tray has passed, when they reassume their normal position to arrest downward movement of
50 the tray when the bars 33 are released and by their gravitative tendency, return to their normal, lowermost position. The release of the bars at the time they have reached their uppermost position, is accomplished by the
55 cooperative actions of a lug 52 at the lower end of one of the bars and a spring 53 on the bar opposite at the same side of the casing, the former of which engages a projection on the pawl 49 so as to raise the latter out of engagement with the sliding bar
60 39 which is subsequently impelled to its original position by the action of the spring 53, which, prior to the engagement of the lug 52 with the pawl 49, had been engaged
65 and tensioned by the opposite end of the bar.

The sliding bar having, by its return movement, carried the pinion 46 out of mesh with the gear 35, arrests further upward movement of the bars 33 and the latter, impelled by gravitation, will at once drop to their original position, leaving the tray they carried upwardly, supported upon the resilient supports 50 at the top of the casing. 70

As the operation of the apparatus has been referred to at intervals in the course of the foregoing description, no further explanation is deemed necessary at this point and I wish it understood that while I have shown and described the apparatus in the best form now known to me, variations in the arrangement and construction of the various parts comprised therein may be resorted to without departing from the spirit of my invention. 75

What I claim and desire to secure by Letters Patent is: 85

1. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a plurality of lifting devices consecutively arranged on said casing, a tray carried upon said conveyer and having a corresponding plurality of vertically arranged, adjustable stops, mechanisms adapted to operate said devices and each including an actuating lever, the levers of the various mechanisms projecting respectively in the paths of the corresponding stops on the tray so as to be impelled thereby. 90

2. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a tray carried on said conveyer, an elevator on said casing adapted to engage said tray, a mechanism adapted to operate said elevator and to be actuated by the movement of the conveyer, and stops at the upper portion of the casing adapted to arrest downward movement of the tray when it has been raised by said elevator beyond a predetermined elevation. 100

3. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a tray carried on said conveyer, an elevator on said casing adapted to engage said tray, a mechanism adapted to operate said elevator and to be actuated by the movement of the conveyer, a device adapted to lock said mechanism against retrogradation during the upward movement of the elevator, stops at the upper portion of the casing adapted to arrest downward movement of the tray when it has been raised by the elevator beyond a predetermined elevation, and a means to release the said mechanism at a predetermined point of the upward movement of the elevator whereby the latter is rendered free to move in opposite direction. 110

4. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer 120

horizontally movable therein, a tray carried on said conveyer, an elevating device having a vertical rack and adapted to engage said tray, a gear wheel engaging said rack, a movable element including a driving pinion and adapted to be actuated by the movement of said conveyer so as to carry said pinion in mesh with said gear, and stops at the upper portion of the casing adapted to arrest downward movement of the tray when it has been raised by said device beyond a predetermined elevation.

5. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a tray carried on said conveyer, an elevating device composed of a plurality of vertically movable members having vertical racks and adapted to engage said tray, coöperatively associated gear wheels engaging said racks, a movable element including a rotatory driving pinion and adapted to be actuated by the movement of the conveyer so as to carry said pinion in mesh with one of said gears, and stops at the upper portion of the casing adapted to arrest downward movement of the tray when it has been raised by said device beyond a predetermined elevation.

6. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a tray carried on said conveyer, an elevating device having a vertical rack and adapted to engage said tray, a gear wheel engaging said rack, a movable element including a driving pinion and adapted to be actuated by the movement of said conveyer so as to carry said pinion in mesh with said gear, a means adapted to automatically lock said element against retrogradation during the upward movement of said device, stops at the upper portion of the casing adapted to arrest downward movement of the tray when it has been raised by said device beyond a predetermined elevation, and coöperative means on said device whereby said element is released and simultaneously returned to its normal position at a predetermined point of the upward movement of the elevating device.

7. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a tray carried on said conveyer, an elevating device having a vertical rack and adapted to engage said tray, a gear wheel engaging said rack, a slidable element including a driving pinion and adapted to be actuated by the movement of said conveyer so as to carry said pinion in mesh with said gear, a gravity pawl adapted to lock said element against retrograde motion during the upward movement of said device, a resilient member on said device adapted to impel said element to its normal position, a projection

of said device adapted to disengage said pawl from said element at a predetermined point of the upward movement of said device, and stops at the upper portion of said casing adapted to arrest downward movement of the tray when it has been raised by said device beyond a predetermined elevation.

8. In a dumb-waiter, a suitable casing, a tray, two endless horizontal conveyers moving simultaneously in opposite directions and each adapted to carry the superimposed tray and a means actuated by the movement of one of the said conveyers, adapted to separate the said tray therefrom and to deposit it at a predetermined point of the said casing.

9. In a dumb-waiter, a suitable casing, a tray, three endless conveyers horizontally movable on said casing, two of them being adapted to carry the superimposed tray, a means for converting the movement of one of the said conveyers into a movement of the other conveyers in the opposite direction, and a means actuated by the movement of the first named conveyer, adapted to separate the said tray therefrom and to deposit it at a pre-determined point of the said casing.

10. In a dumb-waiter, the combination with a suitable casing, of a lifting device movable thereon, an endless conveyer horizontally movable within the said casing, a mechanism for converting the movement of the conveyer into an upward movement of the said device, a means normally holding said mechanism in an inoperative position and a tray carried on said conveyer and adapted to release the said mechanism, when it has reached a predetermined point of said casing, the said device being adapted to raise the said tray from the said conveyer and to carry it upwardly.

11. In a dumb-waiter, the combination with a suitable casing, of a lifting device movable thereon, an endless conveyer horizontally movable within the said casing, an adjustable mechanism for converting the movement of the conveyer into an upward movement of the said device, a means normally holding said mechanism in an inoperative position, a tray carried on said conveyer and adapted to release the said mechanism, when it has reached a predetermined point of said casing, the said device being adapted to raise the said tray from the said conveyer and to carry it upwardly, and a means to automatically retain the tray in its elevated position during consequent downward movement of the lifting device.

12. In a dumb-waiter, the combination with a suitable casing, of an endless conveyer horizontally movable therein, a plurality of lifting devices consecutively arranged on said casing, adjustable, mechanisms for converting the movement of the

said conveyer independently into an upward
movement of each of the said lifting devices,
separate means for holding each of the said
mechanisms in an inoperative position and a
5 tray carried on the said conveyer and hav-
ing adjustable means adapted to release any
one of the said mechanisms, the said devices
being each adapted to raise the said tray

from the said conveyer and to carry it up-
wardly.

In testimony whereof I have affixed my
signature in presence of two witnesses.

CHARLES H. GRAY.

Witnesses:

G. J. ROLLANDET,
M. L. GEARY.

10