

Nov. 17, 1953

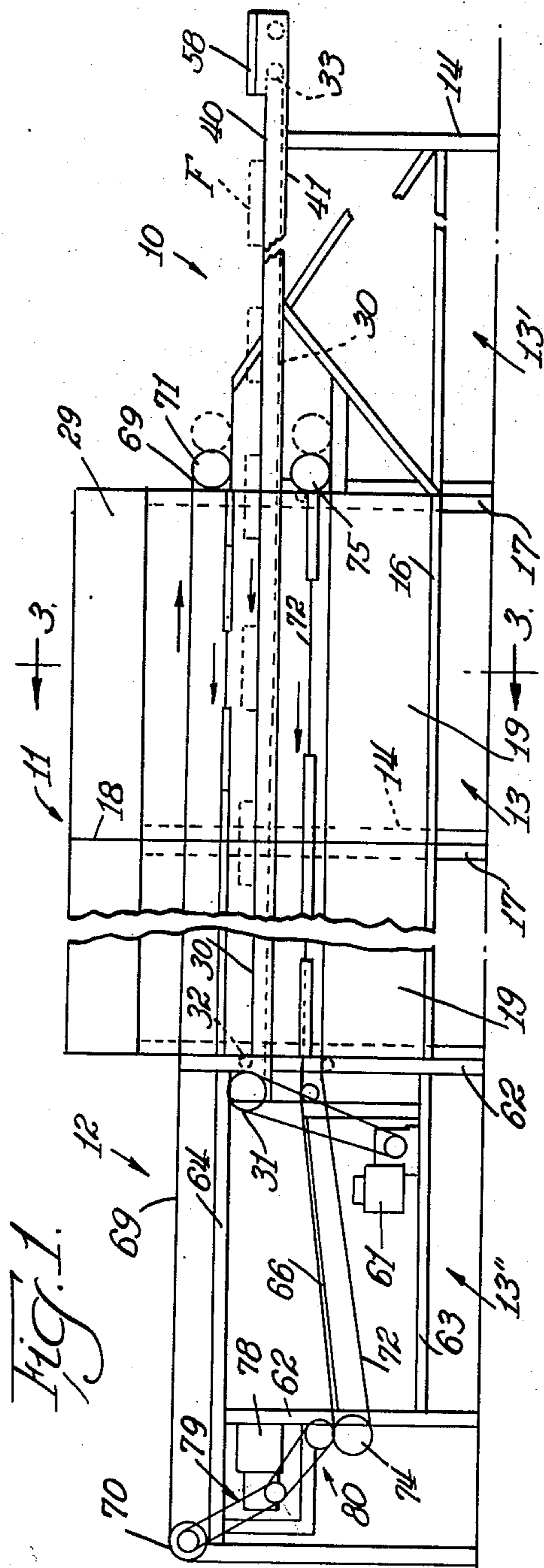
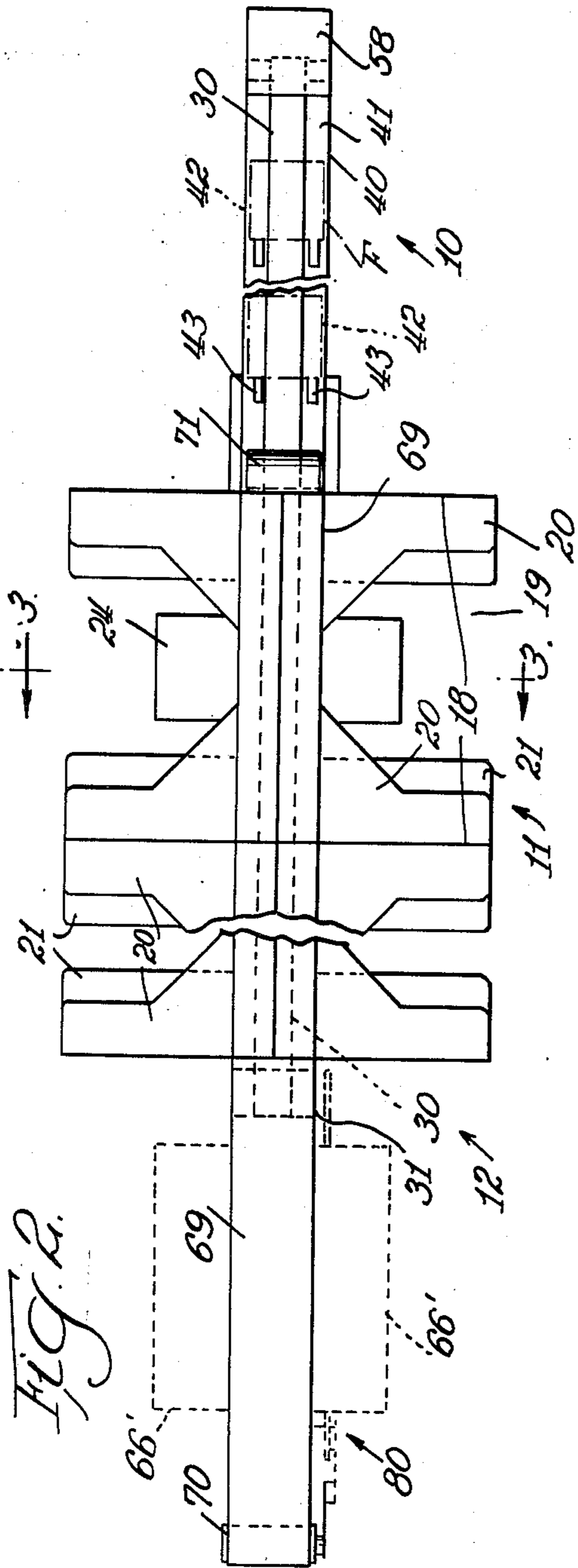
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2,659,473

CONTINUOUS FEED EGG ROOM EQUIPMENT

Filed Sept. 9, 1950

7 Sheets-Sheet 1



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CONTINUOUS FEED EGG ROOM EQUIPMENT

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7 Sheets-Sheet 2

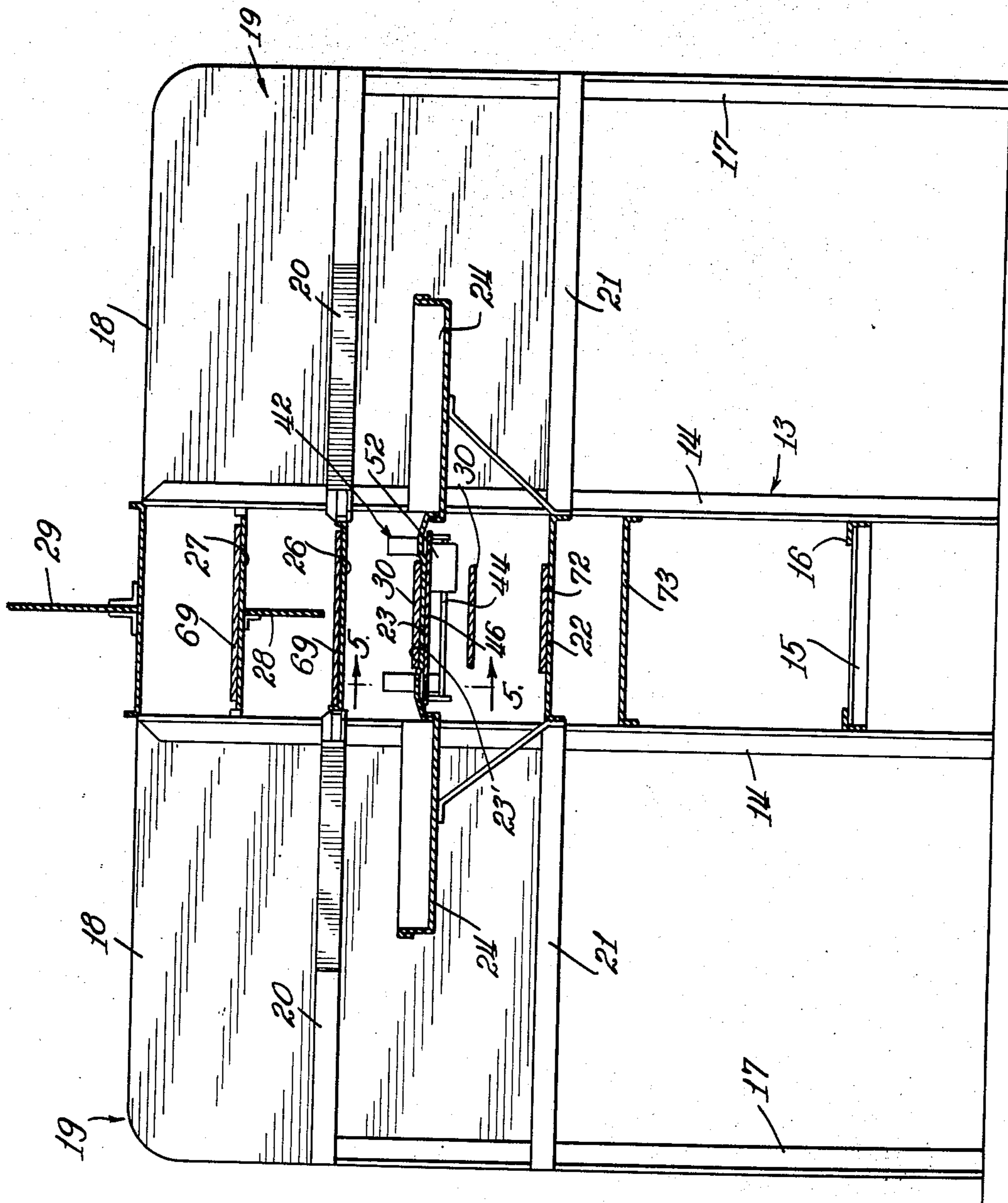


Fig. 3.

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7 Sheets-Sheet 4

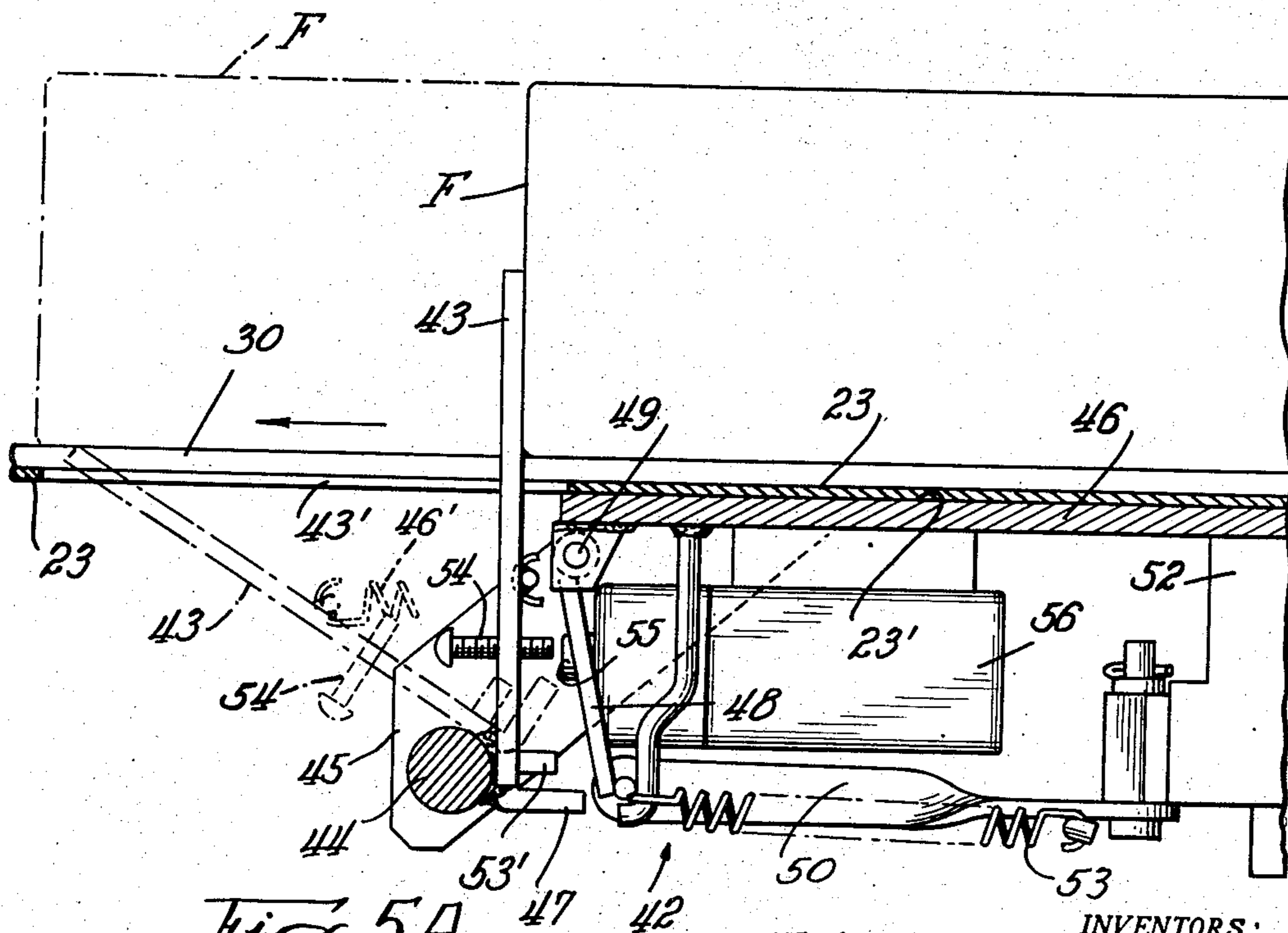
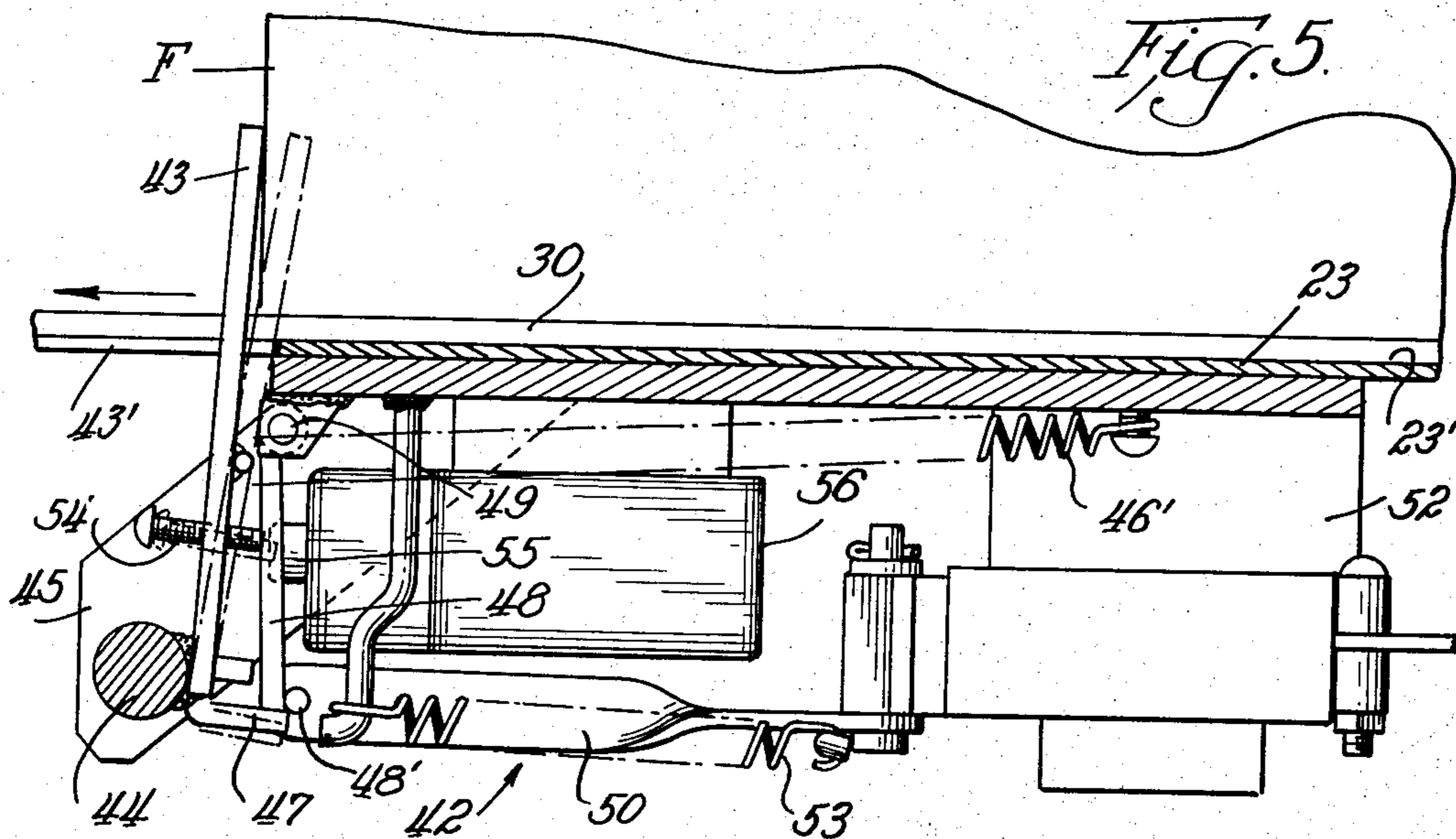


Fig. 5A.

42
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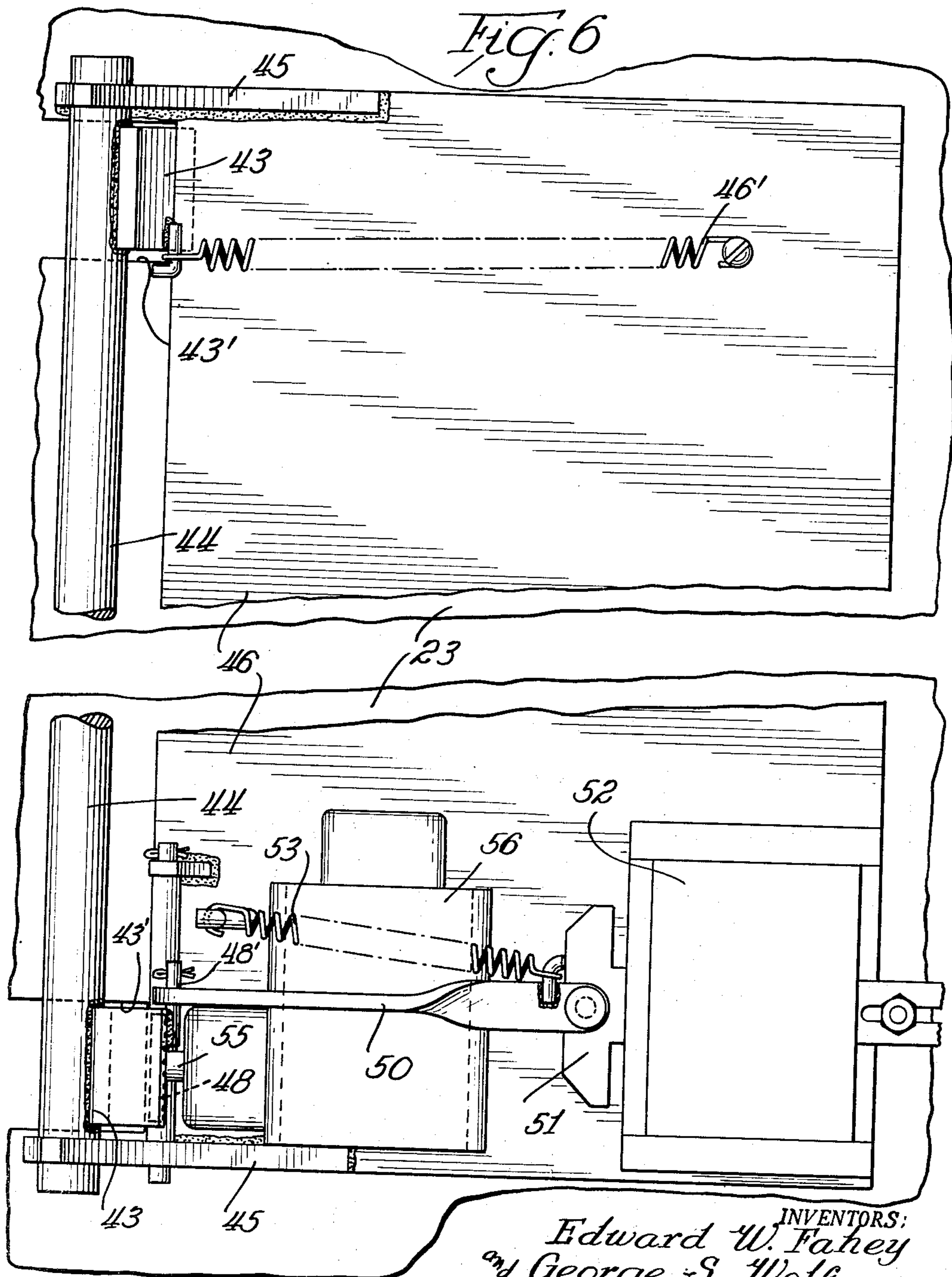
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7 Sheets-Sheet 5



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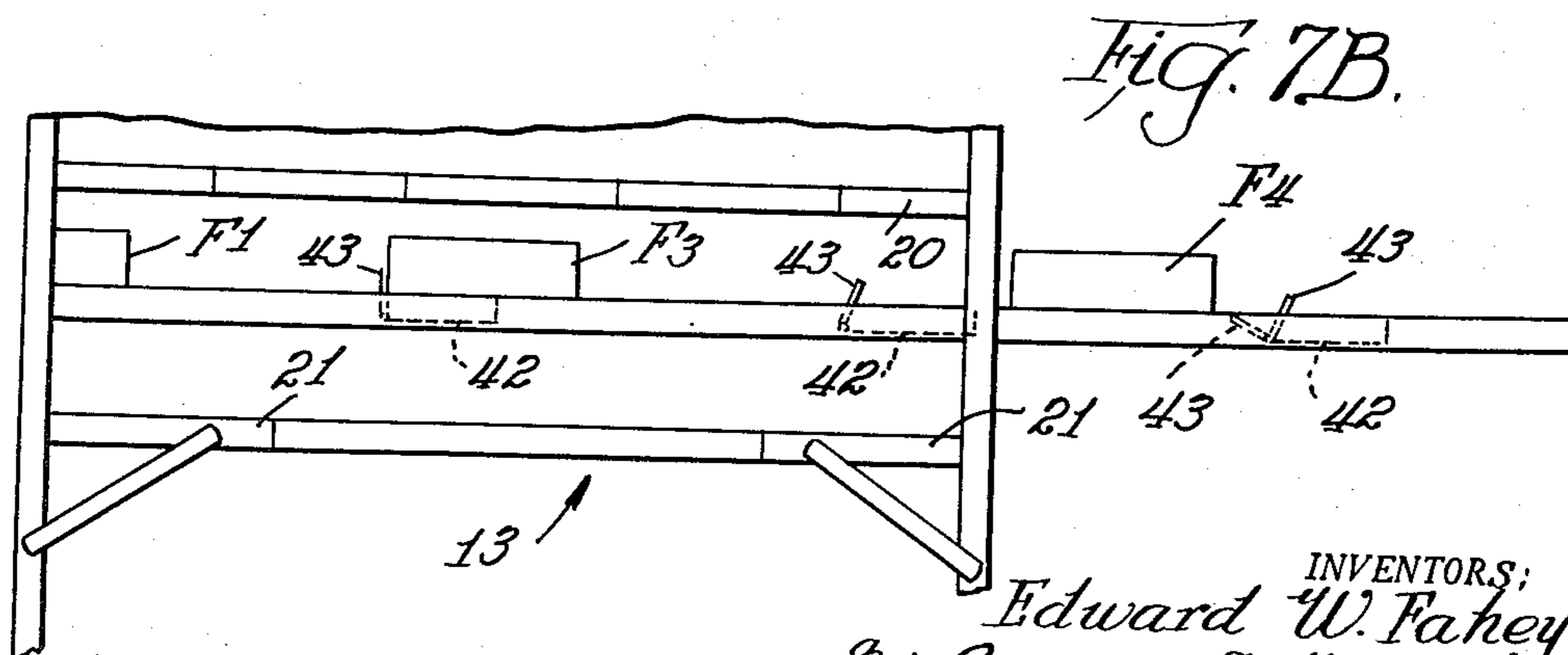
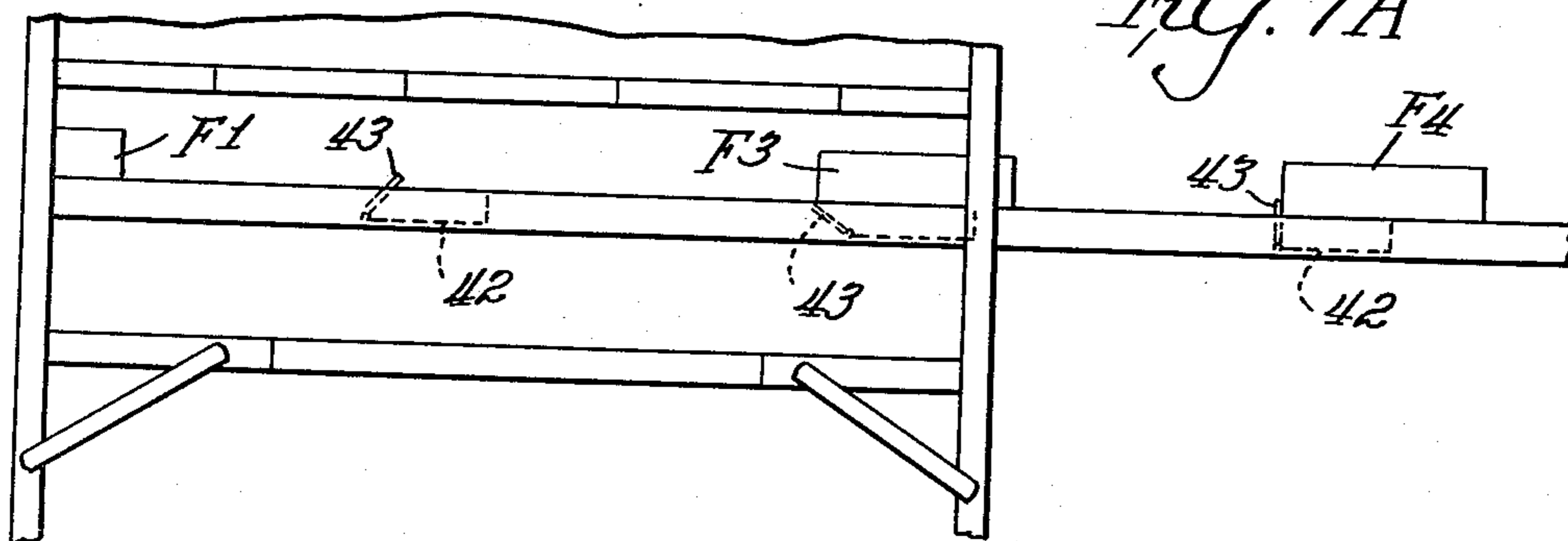
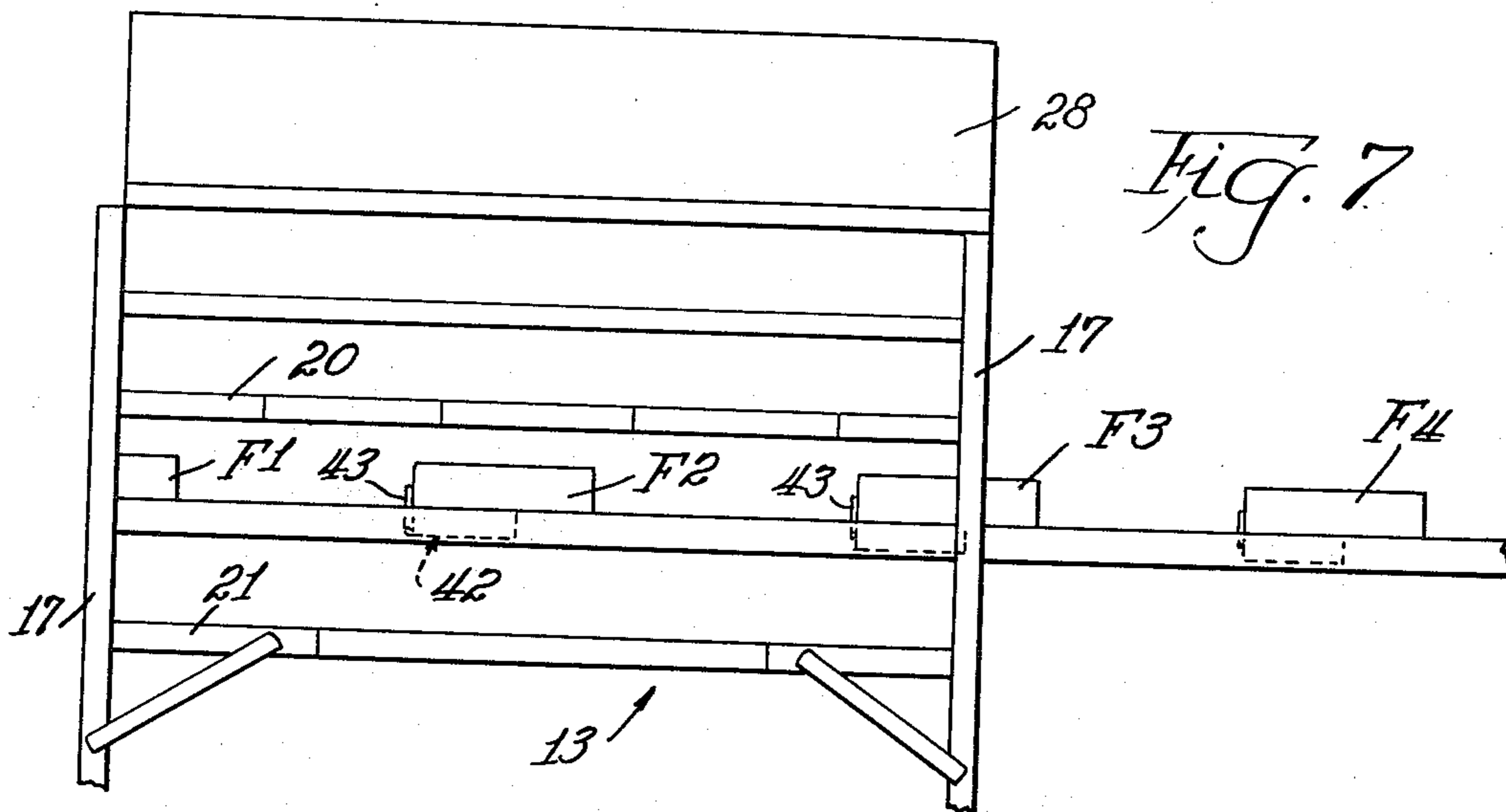
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CONTINUOUS FEED EGG ROOM EQUIPMENT

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7 Sheets-Sheet 6



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7 Sheets-Sheet 7

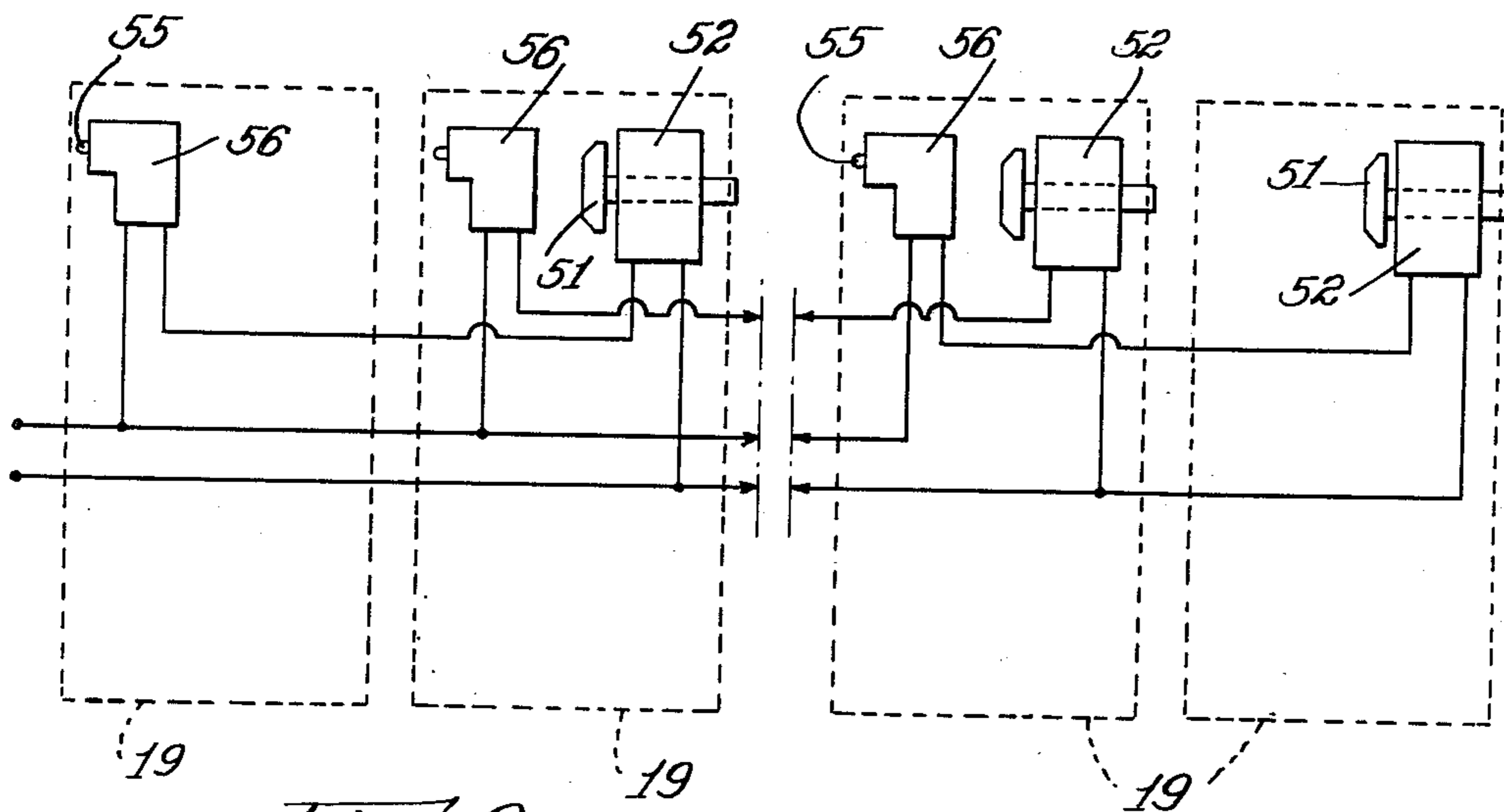
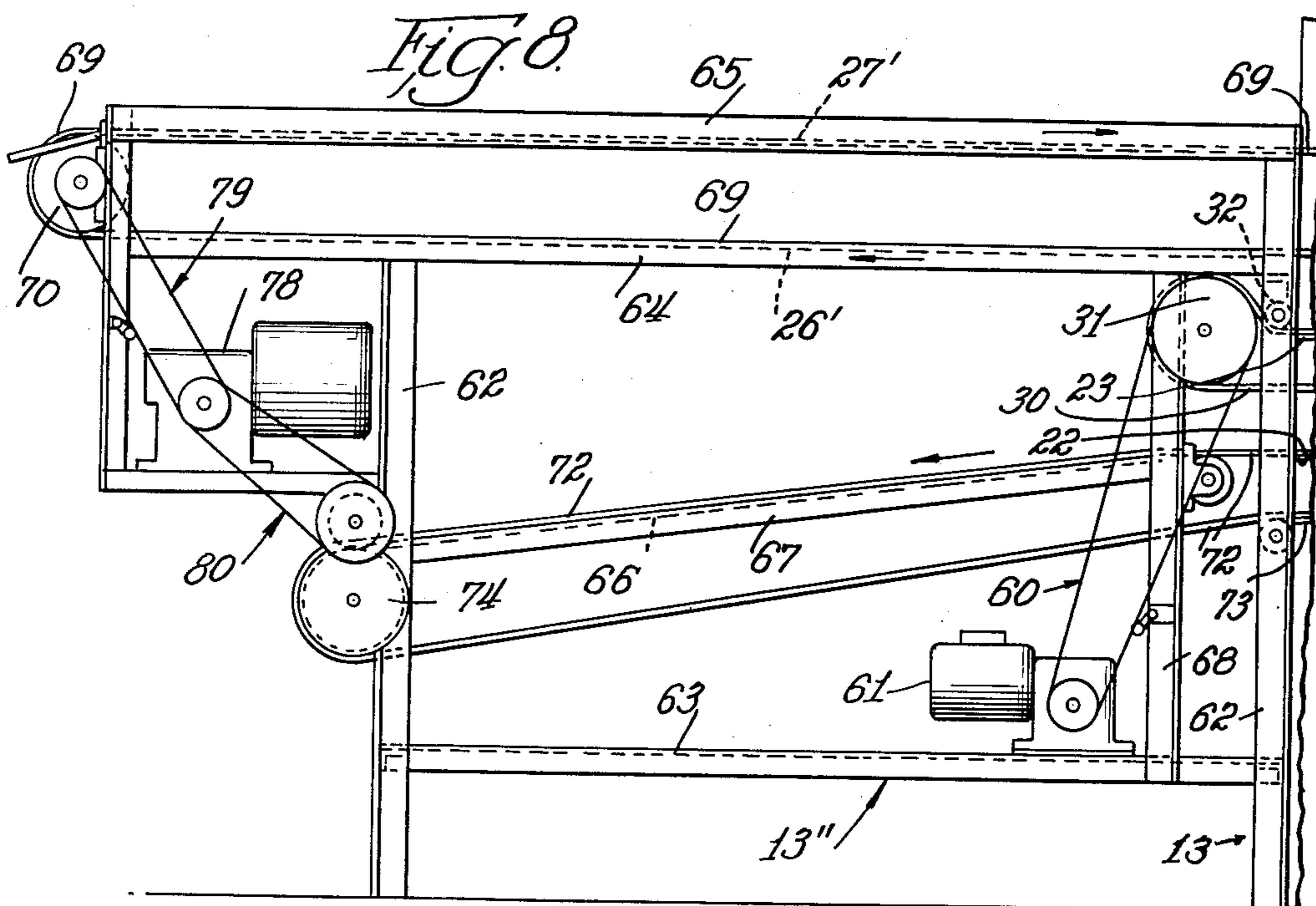


Fig. 9

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UNITED STATES PATENT OFFICE

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CONTINUOUS FEED EGG ROOM EQUIPMENT

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Application September 9, 1950, Serial No. 183,982

5 Claims. (Cl. 198—19)

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The present invention relates to an improved material supply and handling system for large scale, commercial egg rooms in which bulk eggs are received, graded and repacked for retail sale. More particularly, the invention concerns an automatically controlled, continuous feed installation adapted to advance a linear series of bulk egg containing filler and flat assemblies or units along and past a row of candling stations at which individual candlers from time to time withdraws filler and flat units from the advancing series, candle and grade eggs removed from the withdrawn unit, and repack the same in one-dozen capacity cartons.

It is an object of the invention to provide an automatically controlled feed system of the above sort, embodying a continuously traveling, endless, elongated conveyor having a plurality of work or candling stations disposed side by side along and on both sides thereof, in which a plurality of automatic stop devices are positioned at and between successive individual stations for the purpose of automatically insuring that an adequate supply of uninspected eggs is at all times available before each of the candling stations.

A further object of the invention is to provide an apparatus or system of the foregoing type, characterized by a continuously traveling, endless, horizontally disposed conveyor for egg containing filler and flat assemblies, by individual work stations arranged in succession along the length of the conveyor, and by automatic feed control devices positioned at and between the stations, wherein the absence of a filler and flat unit at or adjacent any one of the stations, either as the result of manual withdrawal of the unit from the conveyor and device in a lateral direction into the candling station, or by automatic lengthwise advance of the unit on the conveyor as a result of remote controlled tripping of the control device in question, is effective to release or trip the control device immediately to the rear thereof, thereby insuring a continual, intermittent advance of the filler and flat units to replenish the supply at the depleted control device or station.

Another object is to provide a continuously traveling conveyor system featuring automatic control devices operating as described in the preceding paragraph, in which unfailing replenishment of the supply of bulk eggs in filler and flat units at any given depleted station is accomplished without needless and undesired operation of the control devices in advance of that station, such as would result in the piling up of

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filler and flats adjacent the forward end of the apparatus.

It is a still further object of the invention to provide an automatic supply apparatus or system as referred to above which has various further conveyor provisions combined therewith for the discharge of ungraded or rejected eggs, and for the supply to the candlers at the work stations of adequate empty erected cartons to be packed, as well as other packing materials.

Yet another object is to provide a system or apparatus of the type referred to which may be furnished in the form of individual prefabricated station units adapted to be assembled in any desired number, depending upon the desired egg room capacity, and to be associated with the various conveyors of the system in a very simple and expeditious manner, the resultant installation being inexpensive and occupying a minimum of floor space.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the construction and operation of the device.

A single embodiment of the invention is presented herein for purpose of illustration, and it will be appreciated that the invention is susceptible of incorporation in other modified forms coming equally within the scope of the appended claims.

In the drawings,

Fig. 1 is a relatively small scale, more or less diagrammatic view in side elevation of the egg room system or apparatus in accordance with the invention, certain duplicated parts of the same having been omitted for the purpose of reducing the over-all length of the figure;

Fig. 2 is a top plan view of the apparatus of Fig. 1, similarly broken;

Fig. 3 is an enlarged view in transverse vertical section along line 3—3 of Figs. 1 and 2, illustrating the relationship of conveyor and candling station structure at the longitudinal midpoint of one of the stations;

Fig. 4 is a fragmentary side view illustrating in somewhat greater detail than Fig. 1 the filler and flat in-feed or loading end of the apparatus;

Figs. 5 and 5A are like fragmentary, still further enlarged views in longitudinal section on line 5—5 of Fig. 3, illustrating details of a control device of the apparatus whereby the automatic intermittent supply and replenishment of filler and flat assemblies at the work or candling

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stations is effected, these views differing only in the relative positions assumed in operation by certain of the parts thereof;

Fig. 6 is a bottom plan view, broken to preserve compactness, illustrating further structural details of the control device;

Figs. 7, 7A and 7B are fragmentary schematic views in side elevation illustrating the operation of the apparatus in performing its supply and replenishing functions;

Fig. 8 is a fragmentary view in side elevation illustrating the provisions for driving the various conveyors of the system or apparatus, located at the discharge end of the latter; and

Fig. 9 is a schematic wiring diagram showing certain electrical units of the various automatic control devices of the system and the wiring involved in the operation of the same.

Referring to Figs. 1 and 2 of the drawings, the apparatus of the invention is elongated and horizontally extended in character. Generally, it is composed of three main sections, i. e., a right-hand in-feed or loading section 10, an intermediate candling and cartoning section 11 and a left-hand discharge section 12. These sections comprise various instrumentalities, to be hereinafter described in greater detail, which are supported on a framework 13.

Particular structural features of this framework, which are illustrated in greater detail in Figs. 3, 4 and 8, form no part of the invention; however, they illustratively comprise a series of longitudinally spaced pairs of inner angle iron uprights 14 braced by angle iron cross pieces 15 and longitudinally extending side members 16 (as well as other means to be described) to provide a rigid supporting structure. In the candling and cartoning section 11, the inner uprights 14 function along with transversely aligned pairs of outer uprights 17 to support a series of longitudinally spaced, imperforate vertical partitions 18 separating successive, longitudinally arranged candling booths or stations 19.

Referring to Figs. 2 and 3, suitable upper and lower side shelves 20, 21, respectively, are appropriately supported on the station partitions 18. An elongated flat belt-supporting surface or slide 22 is disposed between the inner frame uprights 14 to extend longitudinally of the candling and cartoning section 11, as well as the discharge section 12 of the apparatus. This slide is appropriately supported at its opposite sides by the framework and in turn braces the latter. A generally similar belt-supporting slide or surface 23 is arranged parallel to and above the slide 22, this last named surface 23 extending throughout the length of the candling and cartoning section 11 and the loading section 10 of the apparatus. It is downwardly and outwardly inclined at its opposite sides to facilitate lateral withdrawal therefrom of bulk egg-containing filler and flat assemblies or units, designated F, from a conveyor supported thereon onto fixed candling trays 24 in stations 19. The trays are appropriately supported centrally of the respective candling booths 19 and at a height which promotes convenient and comfortable access by the candler, as clearly indicated in Figs. 2 and 3.

A still further pair of vertically spaced belt supporting slides 26, 27 is disposed above the slide 23, as illustrated in Fig. 3. Like slide 22, the members 23, 26 and 27 are secured to frame uprights 14 and materially brace and rigidify the structure. Slides 26, 27 sustain the two horizontally traveling reaches of a further conveyor

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belt by which empty erected cartons C are supplied to the candlers at the respective booths 19 and the filled cartons are carried away from those stations. An elongated separator panel 28 depends from slide 27 for the purpose of defining two parallel conveyor paths thereon along which filled cartons of candled eggs are transported out of the candling and cartoning section 11. Slides 26, 27 extend throughout the length of the candling and cartoning section 11 and the discharge section 12. A vertically projecting divider panel 29 between opposed booths 19 extends medially above and along the length of the section 11 to insure privacy in the booths.

As illustrated in Figs. 1 through 4 and 8, a continuously traveling endless conveyor belt 30, of width substantially less than that of belt slide 23, is disposed to extend longitudinally through the candling and cartoning section 11 and the loading section 10, with its upper reach supported on the slide surface 23. The latter is preferably shaped along its midsection, as shown in Fig. 3, to form a belt trough 23' and bring the upper belt and slide side surfaces approximately flush. Belt 30 is trained around a left-hand drive pulley 31 journaled on the framework 13 immediately to one side of the leftmost candling booth 19, as illustrated in Figs. 1 and 8, a small idler 32 immediately adjacent pulley 31 serving to maintain the upper belt reach in a horizontal plane. At its opposite, right-hand end the belt is trained around a small idler pulley 33, as shown in Figs. 1 and 4. The lower reach thereof may be appropriately sustained by suitable intermediate idlers in a well known manner. End idler 33 is preferably adjustable lengthwise of the apparatus in order to take up belt slack.

The various members of the in-feed or loading section 10, including those described above, are mounted on an extension 13' of the main framework 13, illustrated in Fig. 4 as comprising a pair of uprights 35 suitably braced by lower horizontal angle iron side members 36 and inclined struts 37, 37'. A pair of elongated horizontal frame side members 40 is supported by these provisions, the belt pulley 33 being suitably journaled in members 40. The latter also support a full width right-hand end extension 41 of the belt carrier, table or support 23.

As illustrated in Fig. 3, the belt 30 is supported approximately at the level of the pair of trays 24 in the opposed candling booths 19, as it travels along the belt slide 23. Thus a filler and flat F which is halted at that station by an automatic control device 42 located at the station may be conveniently slid off the conveyor belt and onto the tray for manual inspection, candling and cartoning of its eggs. Structural details of the control device are illustrated in Figs. 5 and 6, and the operating characteristics thereof are depicted in Figs. 7, 7A and 7B, to which reference should now be made.

A number of the control devices 42 are spaced along the length of the conveyor belt 30, the distribution being such that one device is located just to the left of the longitudinal center of each of the booths 19 and one adjacent and immediately within its right-hand partition 18. In this manner a filler and flat unit F which is halted by the central control device 42 is directly aligned in the transverse sense with a candling tray 24 onto which it is later drawn by one or the other of the candlers. Likewise, a unit F is halted directly beneath each partition 18, in full view of the candlers in four neighboring booths.

Referring to Figs. 5, 5A and 6, each control device includes a pair of rigidly connected, up-standing trip or stop fingers 43, one positioned on either side of the belt 30. Fingers 43 project upwardly through slots or apertures 43' in belt slide 23 and terminate sufficiently above the top surface of the latter to be engaged by a filler and flat unit F traveling on the advancing belt 30. The belt travels between fingers 43 and is of less width than the filler and flat, but the presence of two fingers 43 insures that, even though a filler and flat unit is improperly positioned on the belt to overlap only one side thereof, it will nevertheless engage and trip the other finger for a purpose to be described.

Fingers 43 are welded at their lower ends to a transverse pivot rod 44 and the rod is journaled at its opposite ends in a pair of forwardly depending arms 45. Arms 45 are carried by a rectangular supporting plate 46 which is rigidly supported by the framework 13, 13', as by being welded to the lower side of slide 23. A relatively weak coil spring 46' secured to plate 46 and to trip finger 43 immediately below the plate serves to urge the finger clockwise toward the rear edge of slide opening 43'. It engages against this edge when a filler and flat is absent from the station controlled by the particular device 42 in question.

One of each pair of stop fingers 43 is provided with a rearwardly extending latching ear 47 immediately adjacent pivot rod 44, which ear is adapted to be engaged, in the locked condition of the control device 42 shown in Fig. 5, by a depending latching dog 48 pivotally mounted at 49 adjacent the forward edge of the mounting plate 46. The dog has the lower end thereof pivotally connected to an electromagnet-controlled pull rod 50 by means of a lateral pin 48' welded thereon and pivotally engaging the pull rod, and is adapted to be swung counterclockwise thereby and out of latching engagement with the locking ear 47. The pull rod is pivotally connected at its opposite end to the core or armature 51 of a solenoid, generally designated 52. The movement of the dog in clockwise direction into latching engagement with ear 47 is effected by a coil spring 53 connecting the pull rod with a fixed anchor on plate 46, and this movement is limited by a stop lug 53' fixed on the locking ear 47.

Stop or trip finger 43 is provided with an adjustable screw tappet 54 which, in the tripping position of the arm shown in broken line in Fig. 5, engages and closes the control button 55 of a normally open micro-switch, generally designated 56, carried by plate 46. As illustrated in the wiring diagram of Fig. 9, each of the micro-switches 56 is wired to the solenoid 52 of the control device 42 immediately following it; hence, closing of the normally open switch at a given station 19 energizes the solenoid of the succeeding device 42 located between booths or stations. The effect is to retract the electromagnet pull rod 50 of said succeeding device, thus disengaging its latch dog 48 from its stop finger 43, as shown in solid line in Fig. 5A. This allows the stop finger to be forced forwardly by a previously locked filler and flat on belt 30 from the locked solid line position of Fig. 5 to the completely withdrawn, broken line position shown in Fig. 5A.

It should be noted in connection with Fig. 9 that the control device 42 at the extreme left-hand side of the apparatus omits the solenoid 52.

Being at the last station, its stop finger 43 does not swing downwardly, merely pivoting between the positions shown in solid and broken lines in Fig. 5. It may be positively limited in movement to the former position to act as an end feed stop in the absence of the latch dog 48, leaving its micro-switch 56 open in this position. In the latter broken line position which is assumed when a filler and flat is not present, the finger swings rearwardly to close the switch and energize the succeeding solenoid 52. It should also be noted that the micro-switch is omitted from the control device at the extreme right-hand end of the system, in loading section 10, inasmuch as there is no further solenoid to the right to be controlled.

In the operation of the apparatus as so far described, an attendant at the loading section 10 removes filler and flat assemblies F containing loose ungraded eggs from a packing case, rests the same on a suitable, fixed hopper-like support 58 and, from time to time, pushes the same forwardly onto the advancing belt 30. Referring to Figs. 5 and 5A in conjunction with Figs. 7, 7A and 7B, if it be assumed that a filler and flat has been properly supplied to and is present at the control device 42 of the first or right-hand pair of candling booths 19 of section 11, being held by the stop finger 43 in lateral alignment with the pair of candling trays 24 in the booths; and if it be assumed that all booth control devices and intermediate control units to the right and left of this first pair have also been similarly supplied, i. e., that the system is in fully supplied condition, the position of the parts of the control device 42 at the first pair of booths will be as represented in solid lines in Fig. 5 and the general set-up will be as illustrated in Fig. 7. For convenience a series of fillers and flats appearing in Figs. 7 and 7B have been specially denoted F1, F2, F3 and F4. All microswitches 56 are open and all solenoids 52 are de-energized.

Should either of the candler at the first station remove the central filler and flat F2 at that station, the stop finger 43 of the central control device 42 swings to the position shown in broken lines in Fig. 5, being urged by the spring 46' into engagement with the rear edge of the slide slot 43'. The situation which now prevails is depicted in Fig. 7A. The microswitch of the device in question has been closed by the finger and the solenoid 52 of the intermediate device 42 immediately to the right or rear is energized. This causes latch dog 48 to be shifted from the locking position of Fig. 5 to the trip or release position shown in Fig. 5A. As a result the finger 43 swings from the solid to the dotted line position of Fig. 5A permitting the filler and flat F3 to advance on moving belt 30 to the central station, as in Fig. 7A. Upon arrival it engages and is halted by the stop arm 43 which has been relatched upon return to upright position; and this engagement results in the reopening of the normally open switch of the central device. The solenoid of the succeeding device is now de-energized, allowing its finger 43 to assume switch closing stop position. The above action repeats successively to the rear, the filler and flat unit F4 coming up to replenish the device vacated by unit F3, etc., until all booth and intermediate stations are restocked. Each filler and flat is positively stopped and held in accessible position until removed, either by a candler at one

of a pair of opposed stations or as the result of moving forward to replace the supply of eggs at a preceding station, as described.

The foregoing sequence of operations takes place upon the removal of a filler from any of the candling booths to the left of the first station. Thus tripping of the central control device 42 of the booth immediately to the left of that shown in Figs. 7, 7A and 7B causes unit F¹ to advance as described above. The operation is unfailing and requires little attention due to the simplicity of the parts and wiring and other connections thereof.

Conveyor belt 30 is driven from the drive pulley 31 immediately to the left of the candling and cartoning station 11, as shown in Figs. 1 and 8, which pulley is in turn driven through a chain and sprocket arrangement, generally designated 60, from a gear head motor 51. This motor is supported on a forward extension 13'' of the framework 13, comprising angle iron uprights 62 braced by horizontal side members 63 and by pairs of vertically spaced, parallel angle iron side members 64, 65. The latter support forward extensions 26', 27' of the belt sustaining surfaces or slides 26, 27, respectively (shown in Fig. 3) of the candling and cartoning section 11. A forwardly and downwardly inclined unloading shelf or slide 66 is supported by the angle iron side members 67 extending between the forward uprights 62 and a pair of further upright struts 68 on which pulley 31 is sustained. The slide extensions 26', 27' support the lower and upper reaches, respectively, of an elongated, horizontally disposed conveyor belt 69 which is positioned above the belt 30. It extends throughout the length of the candling and cartoning section 11 and discharge unloading section 12 of the apparatus, as illustrated in Fig. 1, and this belt is trained at its opposite ends around the pulleys 70, 71. Its upper reach, traveling to the right and supported by the horizontally and longitudinally aligned slides 27, 27', serves as an in-feed conveyor for empty, erected cartons for the various candling stations 19, from which cartons may be conveniently removed by the candlers. The lower reach of belt 69, supported on the slides 26, 26', serves as an outwardly traveling, double path conveyor for cartons filled with graded eggs by the candlers, being divided by depending partition 28 to separate cartons filled by candlers on opposite sides of the conveyor. These filled cartons may be removed by an attendant at discharge section 12 or they may be caused to pass through an automatic carton closing and dating machine (not shown).

A further elongated, horizontally extending conveyor belt 72 is arranged in vertically aligned relation to and beneath the main filler and flat conveyor belt 30. The upper reach of this belt is sustained in the candling and cartoning section 11 by the slide 22, as shown in Fig. 3. Its lower reach may be sustained by suitably spaced idlers or by the slide 73 shown in Fig. 3. Belt 72 is sustained in section 12 by the downwardly inclined unloading shelf or slide 66. It is trained at its opposite ends around the pulleys 74 and 75 in sections 12 and 11, respectively, as illustrated in Figs. 1 and 8. Conveyor 72 is utilized to transport out of the candling and cartoning section all reject eggs, excess fillers and flats, etc. Table surfaces 66' adjoin slide 66 onto which these materials, etc. may be removed.

Pulleys 70 and 74 which drive the belt conveyors 69, 72, respectively, are driven from the

gear head motor 78 on frame 13'' through the chain, sprocket and gear arrangements 79, 80, respectively. Further description of this structure is unnecessary.

The foregoing combination of candling booth, conveyor and automatic control structures affords an egg room system which performs all of the necessary supply and removal functions for a modern-day high capacity egg room, employing a minimum of attending personnel other than the candlers and requiring a minimum of floor space. Its operating parts are simple, inexpensive and require little or no servicing or other attention. As stated, an installation of any desired capacity may be had by simply assembling end to end the desired number of booth units, which are prefabricated with this purpose in view, and applying the corresponding conveyor and control members. Assurance is had that each and every one of a relatively large number of candlers are at all times supplied with filler and flat assemblies for candling, grading and cartoning. Moreover, the cartoning materials involved in these operations are efficiently supplied and removed, eliminating cluttering of the work stations and involving a minimum of non-productive work on the part of the candlers.

We claim:

1. Apparatus of the type described, comprising an endless and continuously driven conveyor, a plurality of article stop devices spaced along said conveyor, said devices each including an article halting member acting in operative position to halt articles on said conveyor and normally maintained in said operative position, but being shiftable to article releasing position, and means to control said devices coordinately, comprising an actuating unit operatively connected to each of said members and normally maintaining the same in said article halting position, a control unit associated with and controlled by each of said article halting members, and means connecting said respective control units with the actuating unit of a device to the rear thereof, with reference to the direction of conveyor travel, to cause shifting of the article halting member of a given device to article releasing position when the preceding article holding member is in article halting position and an article is absent from its associated device.
2. Apparatus of the type described, comprising an endless and continuously driven conveyor, means providing a plurality of work stations arranged along said conveyor, a plurality of article stop devices spaced along said conveyor, there being a device located at each of said stations, said devices each including an article halting member acting in operative position to halt articles on said conveyor and normally maintained in said operative position, but being shiftable to article releasing position, and means to control said devices coordinately, comprising an actuating unit operatively connected to each of said members and normally maintaining the same in said article halting position, a control unit associated with and controlled by each of said article halting members, and means connecting said respective control units with the actuating unit of a device to the rear thereof, with reference to the direction of conveyor travel, to cause shifting of the article halting member of a given device to article releasing position when the preceding article holding member is in article halting position and an article is absent from its associated device.

3. Apparatus of the type described, comprising an endless and continuously driven conveyor, means providing a plurality of work stations arranged along said conveyor, a plurality of article stop devices spaced along said conveyor, there being a device located at and a device located between each of said stations, said devices each including an article halting member acting in operative position to halt articles on said conveyor and normally maintained in said operative position, but being shiftable to article releasing position, and means to control said devices coordinately, comprising an actuating unit operatively connected to each of said members and normally maintaining the same in said article halting position, a control unit associated with and controlled by each of said article halting members, and means connecting said respective control units with the actuating unit of a device to the rear thereof, with reference to the direction of conveyor travel, to cause shifting of the article halting member of a given device to article releasing position when the preceding article holding member is in article halting position and an article is absent from its associated device.

4. Apparatus of the type described, comprising an endless, elongated and continuously driven conveyor, a plurality of movable article stop devices spaced along said conveyor, said devices acting in their operative position to halt articles on the conveyor and being in operative article halting position in the absence of an article on said conveyor at the respective devices, and means to control said devices coordinately, comprising an electrically energizable unit operatively connected to each of said devices to control article halting and releasing action thereof, a switch associated with and actuated by each of said devices when the latter are in article halting position and an article is not present and halted thereby, a detent releasably engageable with each of said devices to hold the same in said last named position, but out of switch actuating position, when an article is present and halted

thereby, and mechanical connections and wiring respectively connecting said device detents and switches with the electrically energizable unit of a device to the rear thereof with respect to the direction of article travel.

5. Apparatus of the type described, comprising an endless, elongated and continuously driven conveyor, means providing a plurality of work stations arranged along said conveyor, a plurality of movable article stop devices along said conveyor, said devices projecting from below the conveyor above the upper surface of the latter and acting in their operative position to halt articles on the conveyor, said stop devices being in operative article halting position in the absence of an article on said conveyor at the respective devices, and means to control said devices coordinately, comprising an electrically energizable unit operatively connected to each of said devices to control article halting and releasing action thereof, a switch associated with and actuated by each of said devices when the latter are in article halting position and an article is not present and halted thereby, a detent releasably engageable with each of said devices to hold the same in said last named position, but out of switch actuating position, when an article is present and halted thereby, and mechanical connections and wiring respectively connecting said device detents and switches with the electrically energizable unit of a device to the rear thereof with respect to the direction of article travel.

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