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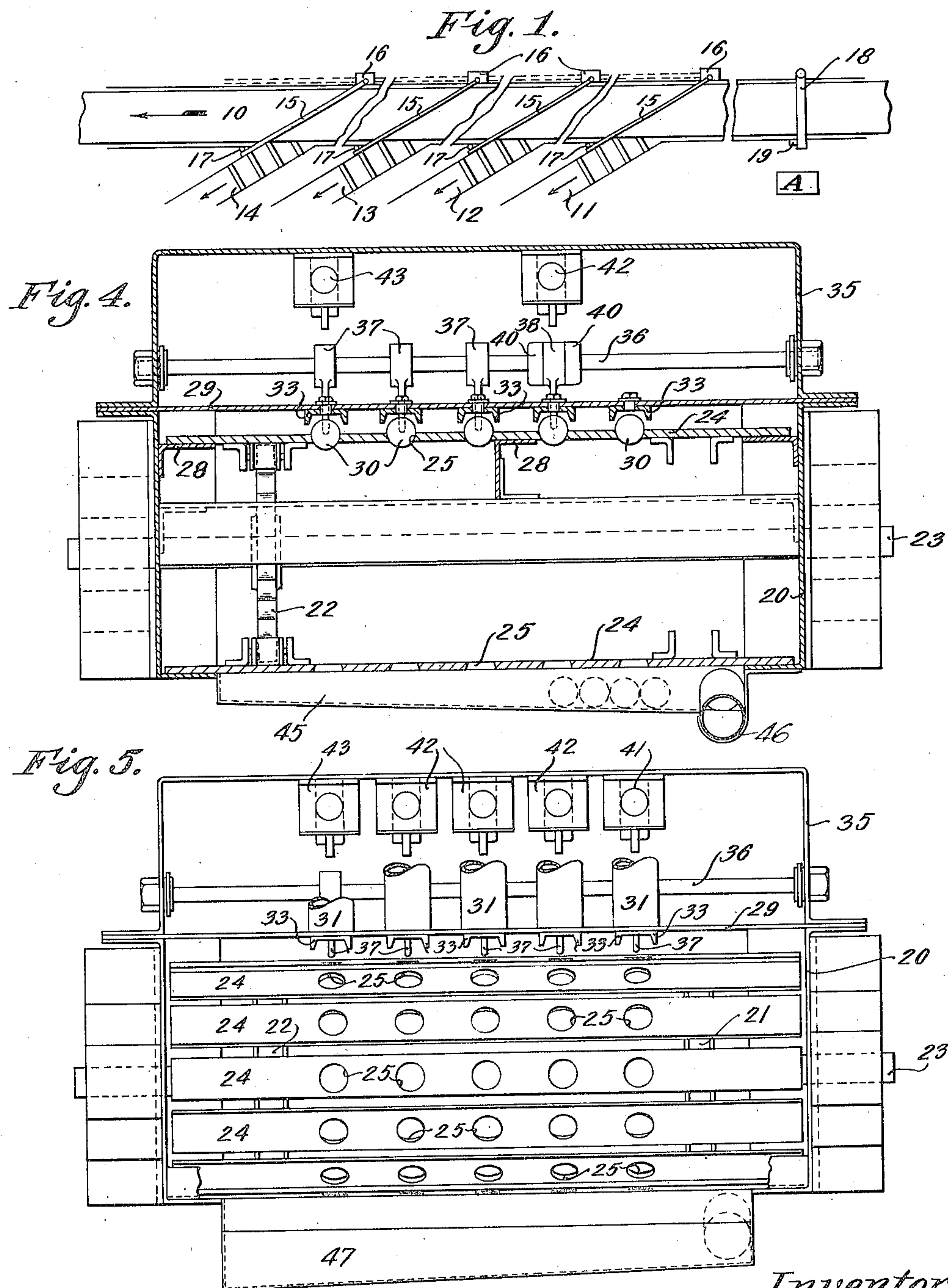
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2,011,827

CONVEYER

Filed Sept. 27, 1932

4 Sheets-Sheet 1



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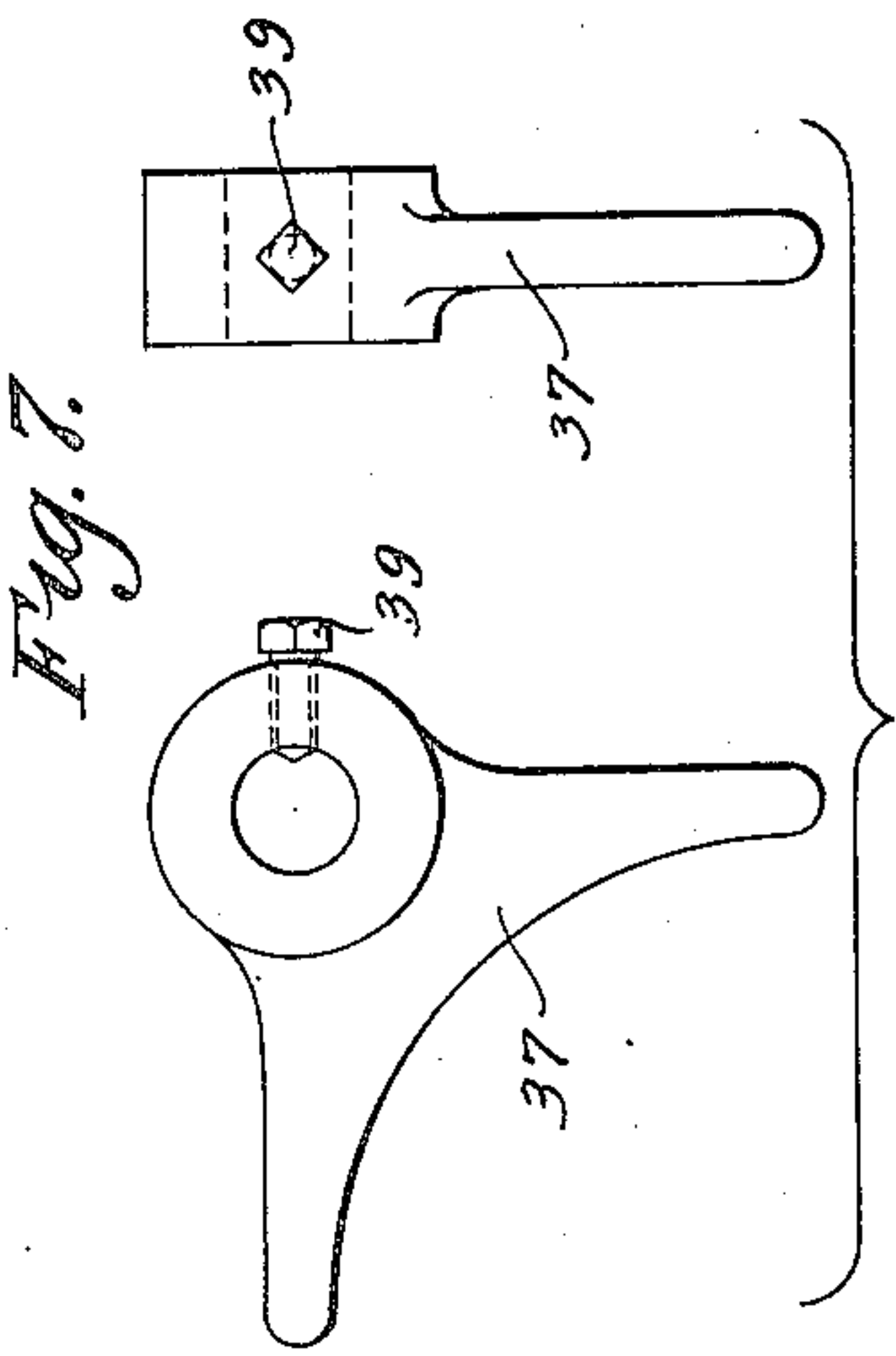
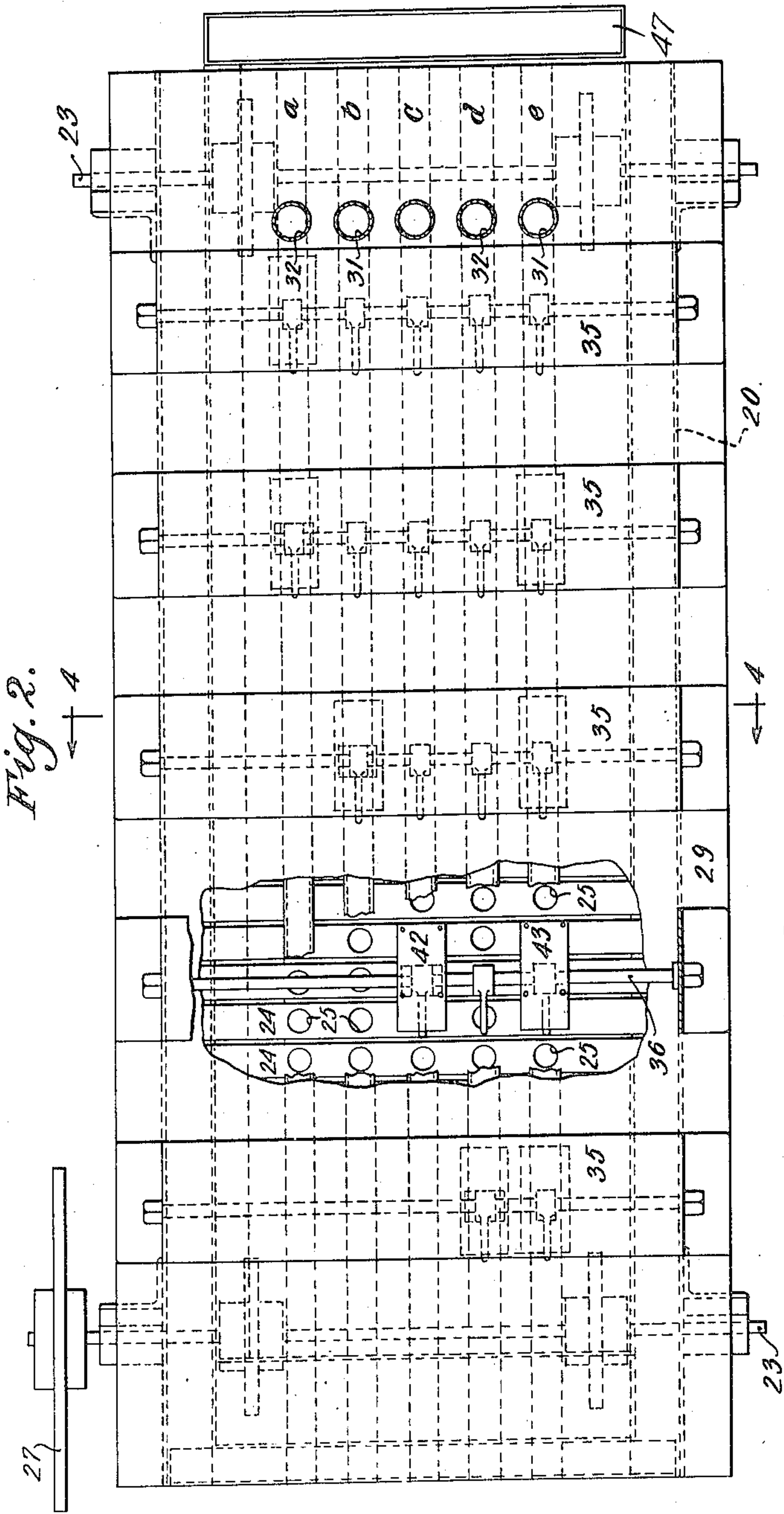
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CONVEYER

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4 Sheets-Sheet 2



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CONVEYER

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4 Sheets-Sheet 3

Fig. 6.

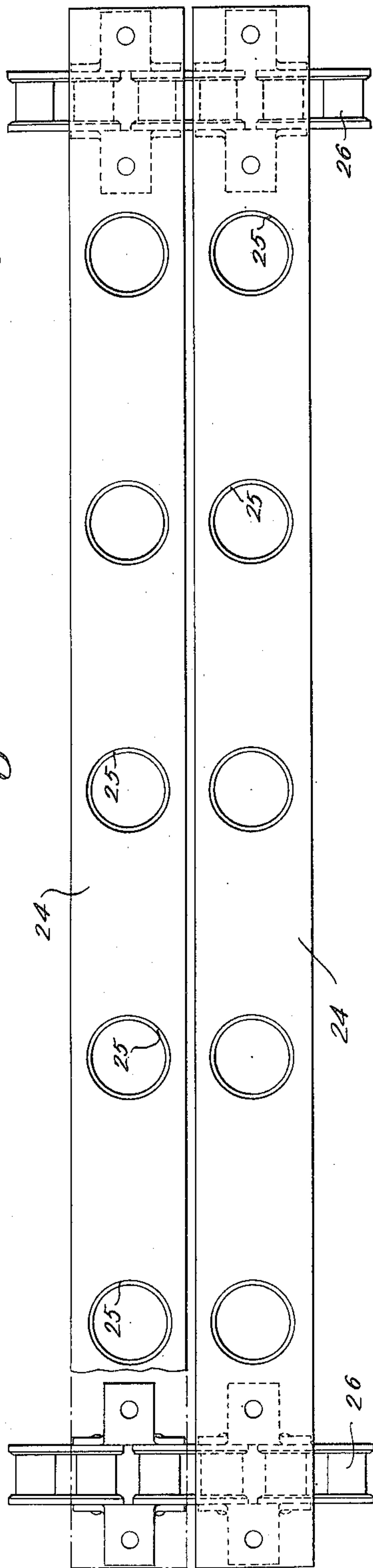
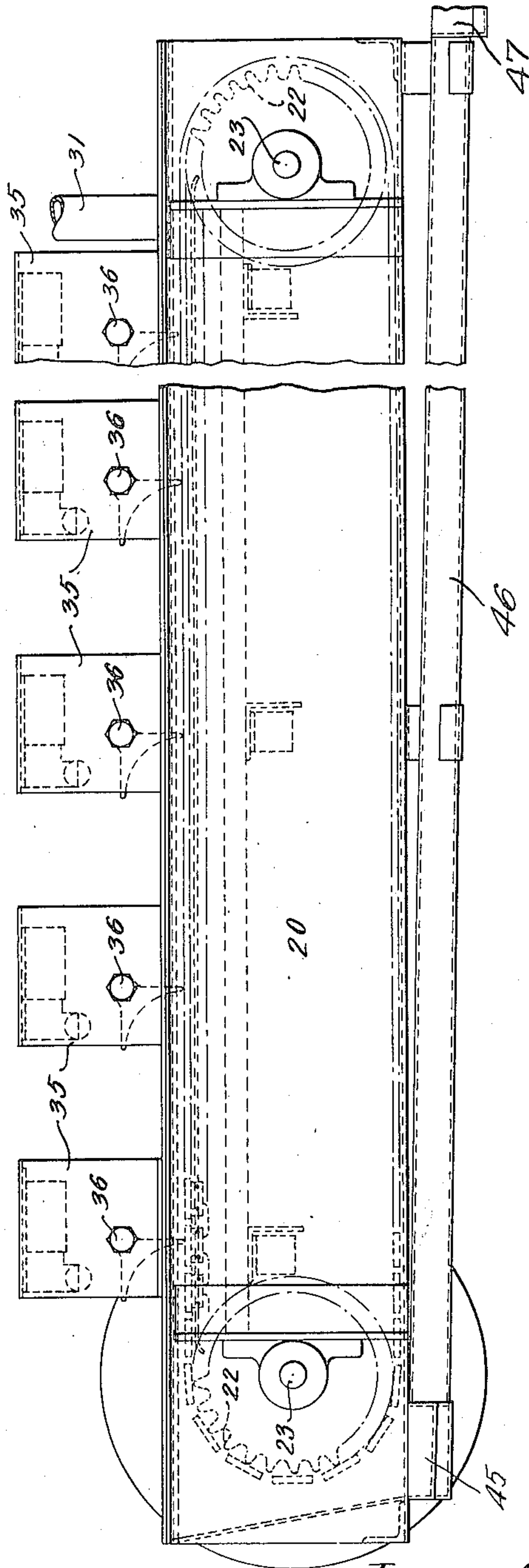


Fig. 3.



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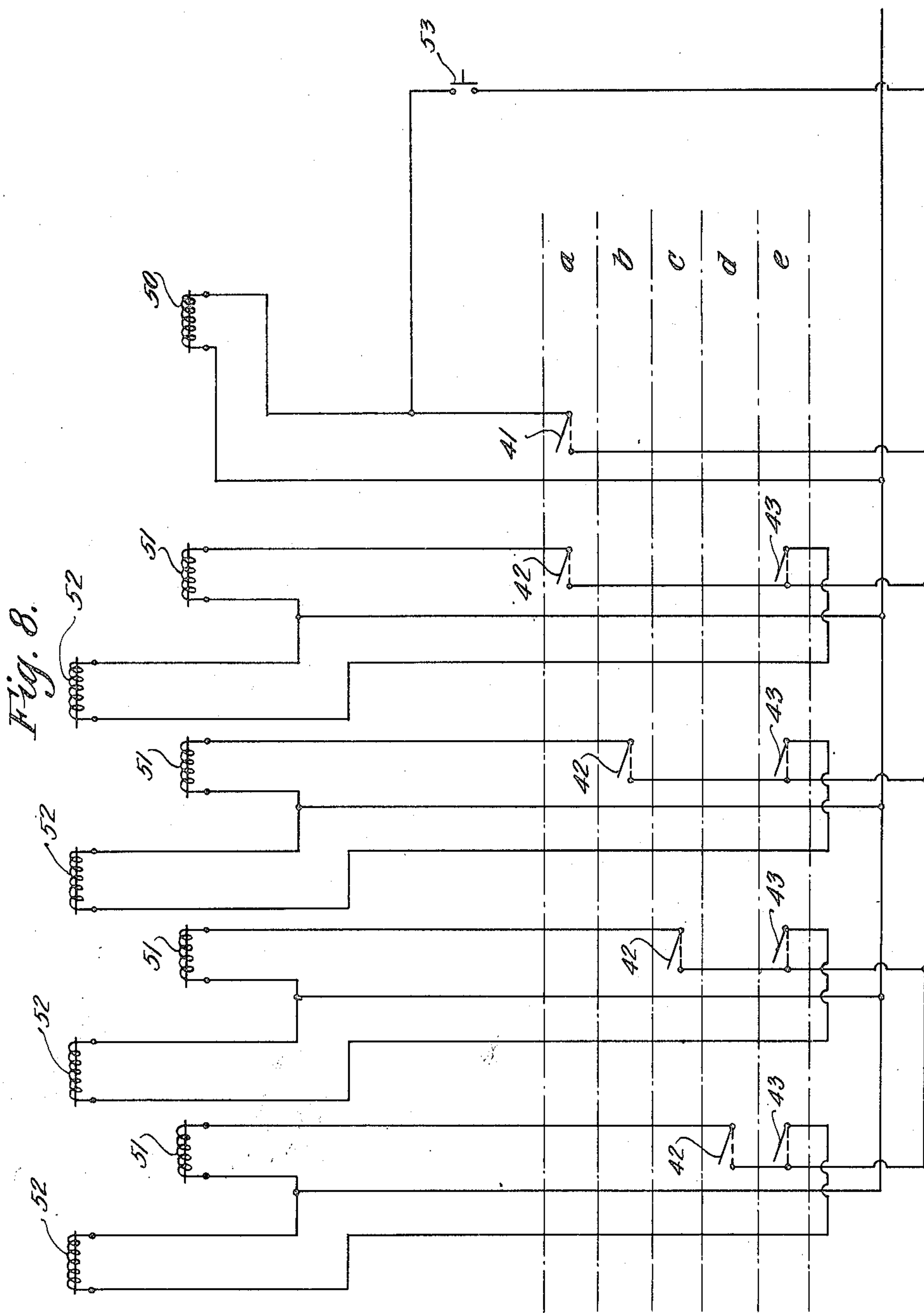
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CONVEYER

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,011,827

CONVEYER

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Application September 27, 1932, Serial No. 635,035

18 Claims. (Cl. 214—11)

This invention relates to an improvement in conveyers and more particularly in a conveyer system including a plurality of deflectors or other direction determining devices.

5 In systems of this type it is desirable to provide means under the control of an operator by which the course of travel of each article is determined independent of the size, shape or character of the articles. One such means is disclosed in the pat-
10 ent to Spooner, No. 1,528,227, dated March 3, 1925, and the present invention is a further develop- ment of the subject matter disclosed therein.

15 The primary object of this invention resides in the provision of a mechanism under the control of the operator and comprising a plurality of chutes each adapted to receive an element such as a marble or pellet and a plurality of trips each of which automatically actuates a selected de-
20 flector or direction determining device, each trip being associated with a particular chute and being engaged by the element received thereby. Preferably, as will be hereinafter disclosed, the marbles or pellets received in the chutes are ad-
25 vanced into engagement with the trips at a pre-determined rate of speed, as, for example, by a slat conveyer.

30 A further object of this invention resides in the provision of means actuated by the deflector control mechanism for permitting the advance of the selected article in timed relation to that marble or pellet by which the course of travel of the article is determined.

35 Other objects will appear from a consideration of the following description of one embodiment of the invention and of the accompanying drawings which illustrate one embodiment of the invention and in which;

40 Fig. 1 is a diagrammatic view illustrating a typical form of conveyer system with which the control mechanism embodying this invention might be employed;

Fig. 2 is a plan view with parts broken away of one embodiment of the control mechanism;

45 Fig. 3 is a side elevation of such control mechanism;

Fig. 4 is a cross-sectional view taken along the line 4—4 of Fig. 2;

50 Fig. 5 is an end elevation of the control mechanism taken from the right;

Fig. 6 is a plan view of one element of the control mechanism;

Fig. 7 is a side and end elevation of another element of the control mechanism; and

55 Fig. 8 is a typical diagram of the electrical wir-

ing which might be employed in carrying out the invention.

The selected conveyer system shown in Fig. 1 is of a well-known type comprising a main conveyer 10 and a plurality of branch conveyers 11, 12, 13 and 14 to which articles transported by the main conveyer are deflected by deflectors 15. Each deflector is advanced from the normal in-
10 operative position shown in dotted lines to the operative position shown in full lines by mechanism designated generally by the numerals 16, each of which includes as an operating element a solenoid, and is held in such operative position by a latch 17, which is retracted by a solenoid not shown. A barrier 18 normally extends across the
15 main conveyer 10 to prevent the travel of articles and is held in such position by a latch mechanism 19, one including a solenoid being here selected. These solenoids are indicated diagram-
20 matically in the wiring diagram of Fig. 8. Adjacent the barrier 18 is located the control mechanism A by which, as will be set forth below, the destination of each article traveling on the conveyer 10 is selectively determined by an operator.

25 The control mechanism A comprises an elongated casing 20 in which travels a slat conveyer 21 over end sprockets 22 carried on shafts 23. The conveyer slats 24 are provided with a plurality of pockets 25, here shown as apertures, in the present instance five in number, and are
30 carried by chains 26 which pass over the sprockets 22. Power may be applied to the left-hand shaft (Fig. 2) through a pulley or gear wheel 27. At the upper reach or run of the conveyer the slats travel over angle supports 28 and are thus held
35 a predetermined distance below the upper plate 29 of the casing 20. The pockets 25 are adapted to receive and carry elements, as for example marbles or pellets 30 fed thereto through chutes 31 which lead to openings 32 in the plate 29 over
40 the path of travel of the pockets. Mounted upon the under side of the plate 29 are guiding channels 33, the walls of which extend as shown in Fig. 4 at the sides of the marbles in the pockets and prevent their escape laterally therefrom.

45 Mounted in housings 35 supported on the casing 20 are rock shafts 36, which extend across the casing and carry a plurality of rocker arms 37 and 38. The arms 37 are fixed by set screws 39 to the shafts 36 (see Fig. 7), while the arms 38
50 turn freely on the shafts between collars 40 (see Fig. 4). The shaft 36 of the first housing, beginning at the right in Fig. 2, is provided with five rocker arms 37 and mounted in that housing is a circuit control device 41 positioned to be tripped
55

by one of the arms 37. The shafts 36 of the other housings each carry one rocker arm 38 and one or more rocker arms 37, and there is mounted in each housing a circuit control device 42 positioned to be tripped by the rocker arm 38 and a circuit control device 43 positioned to be tripped by a rocker arm 37. When the marbles transported by the slat conveyor 21 arrive at the end of the upper reach they fall out of the pockets 25 into a trough 45, which is so inclined that the marbles are returned by gravity through a pipe 46 into a trough 47 from which they can easily be removed by the operator.

In the typical wiring diagram shown in Fig. 8 the circuit control devices 41, 42 and 43 are all normally open circuit makers. The circuit maker 41 energizes a solenoid 50 of the barrier latch mechanism 19, each of the circuit makers 42 energizes a solenoid 51 of a deflector operating mechanism 16 and each of the circuit makers 43 energizes a solenoid 52, which retracts a deflector latch 17. A normally open switch 53 may be closed to keep the solenoid 50 energized when the barrier 18 is not in use. The circuits set up when the various circuit breakers are tripped will not be described in detail, since they are obvious from a consideration of the diagram in connection with the following description of the operation.

In this description of the operation of this system, it will be understood that the slat conveyor 21 of the control mechanism A travels at a definite speed relative to that of the articles transported by the main conveyor, and that the lanes in which the marbles are carried through the casing 20, designated as *a*, *b*, *c*, and *d* (see Figs. 2 and 8) are assigned to the branch conveyers 11, 12, 13 and 14 and control the deflection of articles thereto, while the lane *e* controls articles which are not to be deflected.

Assume that the barrier 18 is latched in position across the main conveyor and that an article to be deflected to the branch conveyor 11 is at the barrier, the operator then drops a marble 30 into that chute 31 at the right end in Fig. 5 leading to lane *a*. The marble enters the corresponding pocket 25 of a slat 24, is carried thereby along the lane, trips the rocker arm 37 on the shaft 36 in the first housing 35 and causes it to actuate the circuit maker 41, thereby energizing the solenoid 50 of the latch mechanism 19, which releases the barrier 18 and allows the article to advance. The marble then trips the rocker arm 38 on the shaft 36 in the second housing and causes it to actuate the circuit maker 42, thereby energizing the solenoid 50 of the mechanism 16, which operates the first deflector 15 and swings it into the operative position in which it is locked by the latch mechanism 17 so that the article will be deflected onto the branch conveyor 11. The marble is carried to the end of the casing, dropped into the trough 45 and returned to the operator. If the next article is also to be deflected to the branch conveyor 11 another marble is dropped into the same chute 31, but that marble merely acts to release the barrier, and its tripping of the arm 38 performs no function because the deflector 15 at that conveyor is held in the operative position by the latch mechanism 17. When, however, an article arrives at the barrier to be deflected to another branch conveyor, for example conveyor 14, the marble is dropped into the chute 31 feeding the lane *d*, and as that marble passes along the casing it trips, not only the rocker arm 37 of the first housing to release the barrier, but also the arms 37 of the second, third and fourth housings actuating the latch mechanisms of the de-

flectors at conveyers 11, 12 and 13 through circuit makers 41 and solenoids 52, and thus clearing the way for the article on the main conveyor. At the fifth housing it trips the rocker arm 38 which, through the circuit maker 42 and solenoid 51, causes the mechanism 16 to close the deflector 15 at the desired branch conveyor. Should the article be one to pass all the branch conveyers, a marble is dropped through the chute 31, which conducts it to lane *e* and the marble traveling through that lane trips a rocker arm 37 in each housing, thus releasing the barrier 18 and each of the deflectors 15.

Since there is only one rocker arm 38 in any housing they are mounted to swing freely upon their shafts. The rocker arms 37, however, are all fixed on the shafts and hence the tripping of any rocker arm in a housing causes the actuation of the circuit breaker 43 in such housing. It will be noted that the marbles traveling in each lane act not only to release the barrier and actuate the deflector of the desired branch conveyor but also to render the deflectors of the intermediate branch conveyers inoperative, thus clearing the way for the articles and insuring their uninterrupted travel to the proper branch conveyor or past all the branch conveyers.

When the switch 53 is closed the barrier 18 remains open and under these conditions it is only necessary to drop a marble into the control mechanism when the destination of an article differs from that of the preceding article.

While one embodiment of this invention has been shown and described in detail it will be understood that I am not limited thereto and that other embodiments thereof may be made without departing from the spirit and scope of the invention as set forth in the following claims.

I claim:

1. Mechanism for controlling the travel of articles through a conveyor system which includes a main conveyor, one or more branch conveyers leading therefrom, a deflector at the junction of each branch conveyor with the main conveyor, and means associated with each deflector for determining the position thereof, such mechanism including a barrier normally preventing the travel of articles on the main conveyor, one or more lanes through which elements travel, devices in each lane tripped by the elements traveling therein, and connections between such devices and the barrier and deflector position determining means whereby when the devices in the lanes are tripped the barrier permits the travel of an article and such deflectors are set in the operative positions.

2. Mechanism for controlling the travel of articles through a conveyor system which includes a main conveyor, one or more branch conveyers leading therefrom, a deflector at the junction of each branch conveyor with the main conveyor, and means associated with each deflector for determining the position thereof such mechanism including a barrier normally preventing the travel of articles on the main conveyor, one or more lanes through which elements travel, mechanism for causing said elements to travel through said lanes at a rate relative to that of the articles on the main conveyor, devices in each lane tripped by the elements traveling therein, and connections between such devices and the barrier and deflector position, determining means whereby when the devices in the lanes are tripped the barrier permits the travel of an article and

such deflectors are set in the operative positions to deflect articles on the main conveyer.

3. Mechanism for controlling the passage of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer and the main conveyer and means associated with each deflector for determining the position thereof, such mechanism including a plurality of lanes through which elements travel, each lane being assigned to a particular deflector and to those in advance of that deflector, a slat conveyer for transporting the elements through the lanes at a rate relative to that of the articles on the main conveyer, means for feeding an element to a selected lane as an article, destined to the branch conveyer to which articles on the main conveyer are deflected by the particular deflector to which the lane is assigned, passes a certain point, and means actuated by said element as it is transported through the lane for causing the position determining means of the particular deflector to set that deflector in the operative position and causing the position determining means of the advance deflectors to set in the inoperative position any of such advance deflectors as may at that time be in the operative position whereby the article travels along the main conveyer to the particular deflector by which it is deflected undisturbed by any advance deflector.

4. Mechanism for controlling the passage of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer and the main conveyer, and means associated with each deflector for determining the position thereof, such mechanism including lanes through which elements travel, a slat conveyer for transporting the elements through the lanes at a rate relative to that of the articles on the main conveyer, devices in each lane tripped by the elements traveling therein, connections between such devices and the deflector position determining means, one device of each lane being associated with a particular deflector so that when tripped it sets that deflector in the operative position and the other devices of each lane being associated with the deflectors in advance of the particular deflector so that when tripped any deflectors in advance which may be in the operative position are set in the inoperative position, and means for feeding an element to any selected lane as an article in transit reaches a predetermined point whereby the deflector associated therewith is set in the operative position and the deflectors in advance of that deflector are in the inoperative position and the article travels undisturbed until deflected by the deflector associated with that lane.

5. Mechanism for controlling the travel of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer with the main conveyer, means associated with each deflector for moving it into operative position, and means for latching it in such position, such mechanism including a plurality of lanes through which elements travel, two devices in each lane tripped by the elements traveling therein, connections between one of the devices in each lane and said deflector moving means and connections between the other of the devices in each lane and the deflector latching means whereby the tripping of the devices in each lane by an element traveling therein will actuate

the latch means of one deflector and the moving means of another deflector.

6. Mechanism for controlling the travel of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer with the main conveyer, means associated with each deflector for moving it into operative position, and means for latching it in such position, such mechanism including a plurality of lanes through which elements travel, mechanism for causing said elements to travel through said lanes at a rate relative to that of the articles on the main conveyer, two devices in each lane tripped by the elements traveling therein, connections between one of the devices in each lane and said deflector moving means and connections between the other of the devices in each lane and the deflector latching means whereby the tripping of the devices in each lane by an element traveling therein will actuate the latch means of one deflector and the moving means of another deflector to deflect articles on the main conveyer to the desired branch conveyer.

7. Mechanism for controlling the travel of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer with the main conveyer, means associated with each deflector for moving it into operative position, and means for latching it in such position, such mechanism including a plurality of lanes through which elements travel, a slat conveyer for transporting the elements through the lanes at a rate relative to that of the articles on the main conveyer, two devices in each lane tripped by the elements traveling therein, connections between one of the devices in each lane and said deflector moving means and connections between the other of the devices in each lane and the deflector latching means whereby the tripping of the devices in each lane by an element traveling therein will actuate the latch means of one deflector and the moving means of another deflector to deflect articles on the main conveyer to the desired branch conveyer.

8. Mechanism for controlling the travel of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer with the main conveyer, means associated with each deflector for moving it into operative position, and means for latching it in such position, such mechanism including a plurality of lanes through which elements travel, a slat conveyer having pockets therein which receive and transport the elements through the lanes, chutes through which the elements are fed into the pockets in said slat conveyer, two devices in each lane tripped by the elements traveling therein, connections between one of the devices in each lane and said deflector, moving means and connections between the other of the devices in each lane and the deflector latching means whereby the tripping of the devices in each lane by an element traveling therein will actuate the latch means of one deflector and the moving means of another deflector.

9. Mechanism for controlling the travel of articles through a conveyer system which includes a main conveyer, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyer and the main conveyer, means associated with each deflector for deter-

mining the positions thereof, a barrier which prevents the advance of articles over said main conveyor toward said deflectors, and means for holding said barrier in the article preventing position, such mechanism comprising means for rendering said barrier ineffective and thus permitting the advance of an article, devices connected with the deflector position determining means, and means for actuating said barrier rendering means and the device connected with the deflector at the junction of a selected branch conveyor whereby that deflector is in the position to deflect the advancing article into its branch conveyor.

10. Mechanism for controlling the travel of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, means associated with each deflector for determining the positions thereof, a barrier which prevents the advance of articles over said main conveyor toward said deflectors, and means for holding said barrier in the article preventing position, such mechanism comprising means for rendering said barrier ineffective and thus permitting the advance of an article, devices connected with the deflector position determining means, and means for actuating said barrier rendering means and the device connected with the deflector at the junction of a selected branch conveyor whereby that deflector is in the position to deflect the advancing article into its branch conveyor, said last-named means including a plurality of lanes through which elements may travel, arms extending into said lanes to be tripped by said elements, which arms when tripped actuate said barrier rendering means, and means for advancing an element through a selected lane.

11. Mechanism for controlling the travel of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, means associated with each deflector for determining the positions thereof, a barrier which prevents the advance of articles over said main conveyor toward said deflectors, and means for holding said barrier in the article preventing position, such mechanism comprising means for rendering said barrier ineffective and thus permitting the advance of an article, devices connected with the deflector position determining means, and means for actuating said barrier rendering means and the device connected with the deflector at the junction of a selected branch conveyor whereby that deflector is in the position to deflect the advancing article into its branch conveyor, said last-named means including a plurality of lanes through which said elements may travel, arms extending into said lanes to be tripped by said elements, which arms when tripped actuate said barrier rendering means and said devices, and means for advancing an element through a selected lane.

12. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, and means associated with each deflector for determining the positions thereof, such mechanism comprising operator controlled means including a single actuator for determining the position of the deflectors of a selected branch conveyor and

of each branch conveyor in advance of the selected branch conveyor whereby the deflector of the selected branch conveyor is set in the operative position and the deflector of each branch conveyor in advance of the selected branch conveyor is set in the inoperative position and an article traveling on the main conveyor is deflected to such selected branch conveyor.

13. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, and means associated with each deflector for determining the positions thereof, such mechanism comprising devices connected with the position determining means of each deflector, and operator controlled means including a single actuator for actuating the positioning determining means of such devices whereby the deflector of a selected branch conveyor is set in the operative position and the deflector of each branch conveyor in advance of the selected branch conveyor is set in the inoperative position and an article traveling on the main conveyor is deflected to such selected branch conveyor.

14. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, and means associated with each deflector for determining the positions thereof, such mechanism comprising a plurality of lanes through which elements travel, means for moving the elements through the lanes, each lane being assigned to a particular branch conveyor, devices in each lane connected with the position determining means of the deflector of the branch conveyor assigned to that lane and of the deflector of each branch conveyor in advance of the assigned branch conveyor, and operator controlled means for supplying an element to a selected lane, which element actuates the devices in the lane to set the deflector of the assigned branch conveyor in the operative position and the deflector of each branch conveyor in advance thereof in the inoperative position, whereby an article traveling on the main conveyor is deflected to the branch conveyor assigned to such selected lane.

15. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a deflector at the junction of each branch conveyor and the main conveyor, and means associated with each deflector for determining the positions thereof, such mechanism comprising a plurality of lanes through which elements travel, means for moving the elements through the lanes, each lane being assigned to a particular branch conveyor, devices in each lane connected with the position determining means of the deflector of the branch conveyor assigned to that lane and of the deflector of each branch conveyor in advance of the assigned branch conveyor, and operator controlled means for supplying an element to a selected lane, which element actuates the devices in the lane to set the deflector of the assigned branch conveyor in the operative position and the deflector of each branch conveyor in advance thereof in the inoperative position, whereby an article traveling on the main conveyor is deflected to the branch conveyor assigned to such selected lane, a lane assigned to none of the branch conveyers

and devices in said lane connected with the position determining of each of the deflectors, which devices are actuated by an element supplied to that lane to set all the deflectors in the inoperative position, whereby an article traveling on the main conveyor is not deflected to any of the branch conveyers.

16. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a normally inoperative deflector at the junction of each branch conveyor and the main conveyor, means associated with each deflector to move it into the operative position in which an article in transit is deflected from the main conveyor to a branch conveyor, and means associated with each deflector to latch and maintain it in its operative position, such mechanism comprising operator controlled means including a single actuator for actuating the moving means of the deflector of a selected branch conveyor and for rendering inoperative the latching means of the deflector of each branch conveyor in advance of the selected branch conveyor to release such as may be in the operative position so that an article in transit on the main conveyor passes undisturbed to the deflector of such selected branch conveyor, and is deflected thereby to that branch conveyor.

17. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a normally inoperative deflector at the junction of each branch conveyor and the main conveyor, means associated with each deflector to move it into the operative position in which an article in transit is deflected from the main conveyor to a branch conveyor, and means associated with each deflector to latch and maintain it in its operative position, such mechanism comprising devices connected with the moving means and the latching means of each deflector,

and operator controlled means including a single actuator for actuating the device connected with the moving means of the deflector of a selected branch conveyor to set it in the operative position and for actuating each device connected with the latching means of the deflector of each branch conveyor in advance of the selected branch conveyor to render it inoperative and release such deflector or deflectors as may be in the operative position so that an article in transit on the main conveyor passes undisturbed to the deflector of such branch conveyor, and is deflected thereby to that branch conveyor.

18. Mechanism for controlling the passage of articles through a conveyor system which includes a main conveyor, a plurality of branch conveyers leading therefrom, a normally inoperative deflector at the junction of each branch conveyor and the main conveyor, means associated with each deflector to move it into the operative position, and means associated with each deflector to latch it in its operative position, such mechanism comprising a plurality of lanes through which elements travel, means for moving the elements through the lanes, each lane being assigned to a particular branch conveyor, devices in each lane connected with the moving means of the deflector of the branch conveyor assigned to that lane, and with the latching means of the deflector of each branch conveyor in advance of the assigned branch conveyor, and operator controlled means for supplying an element to a selected lane, which element actuates the devices in the lane to set the deflector of the assigned branch conveyor in the operative position and render inoperative the latching means of the deflector of each branch conveyor in advance of the assigned branch conveyor whereby an article traveling on the main conveyor is deflected to the branch conveyor assigned to such lane.

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