

March 30, 1943.

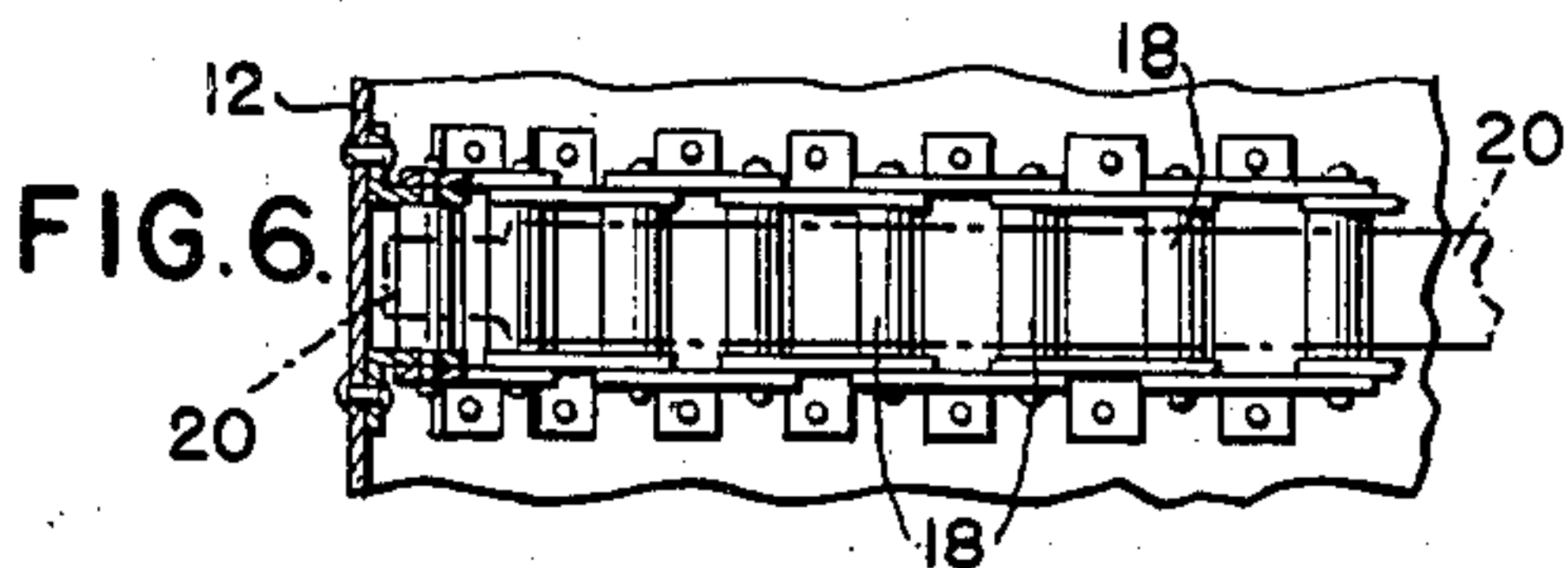
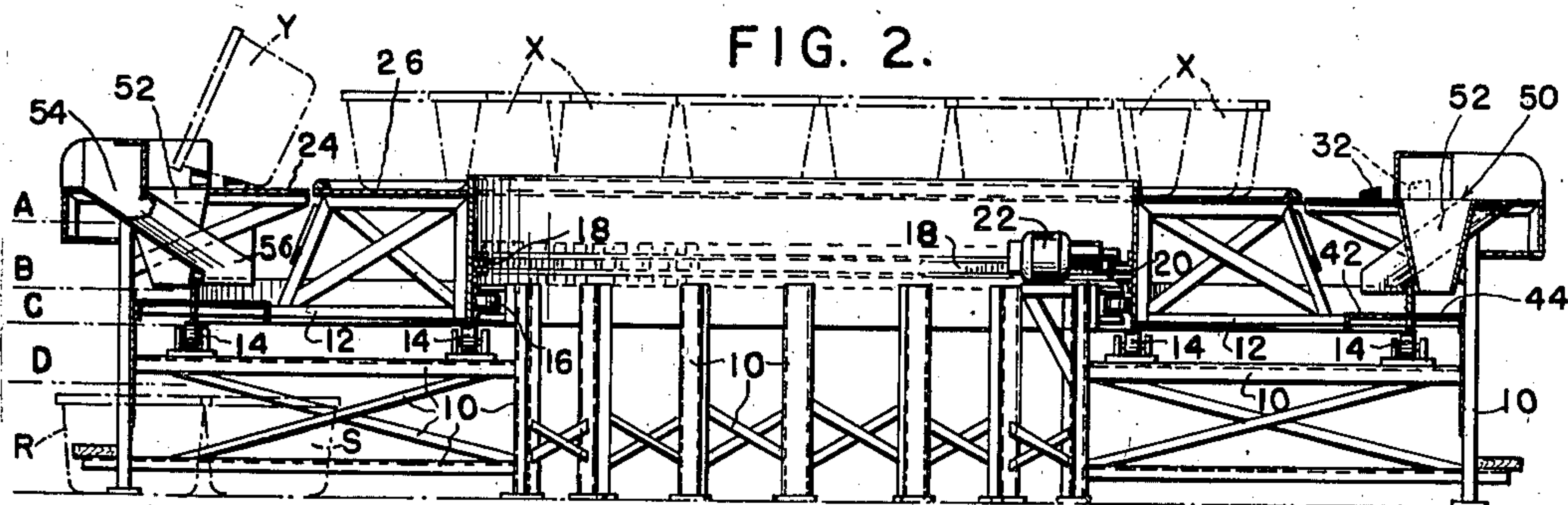
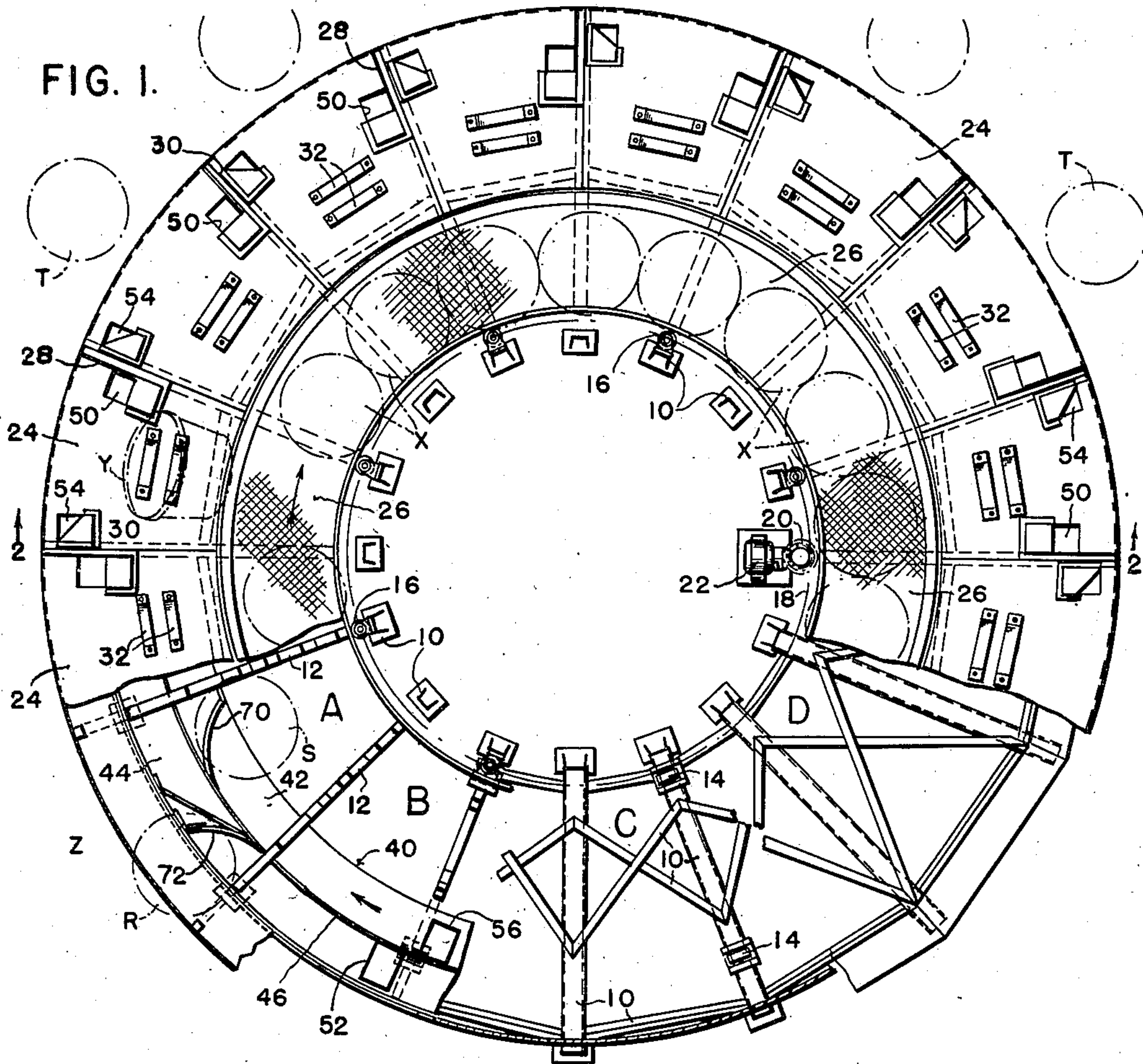
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2,315,013

SORTING TABLE

Filed Aug. 3, 1940

5 Sheets-Sheet 1



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FIG. 3.

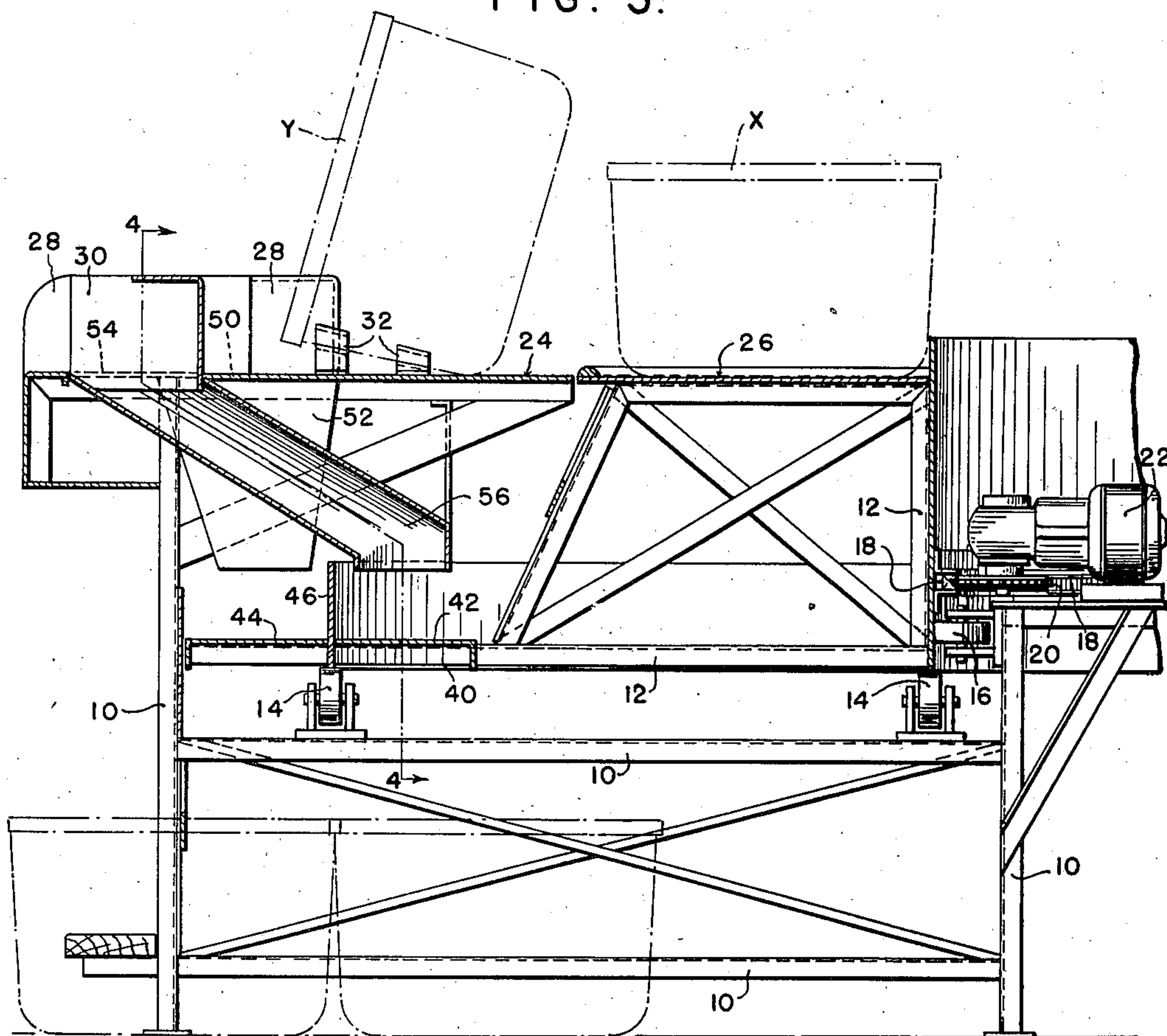


FIG. 4.

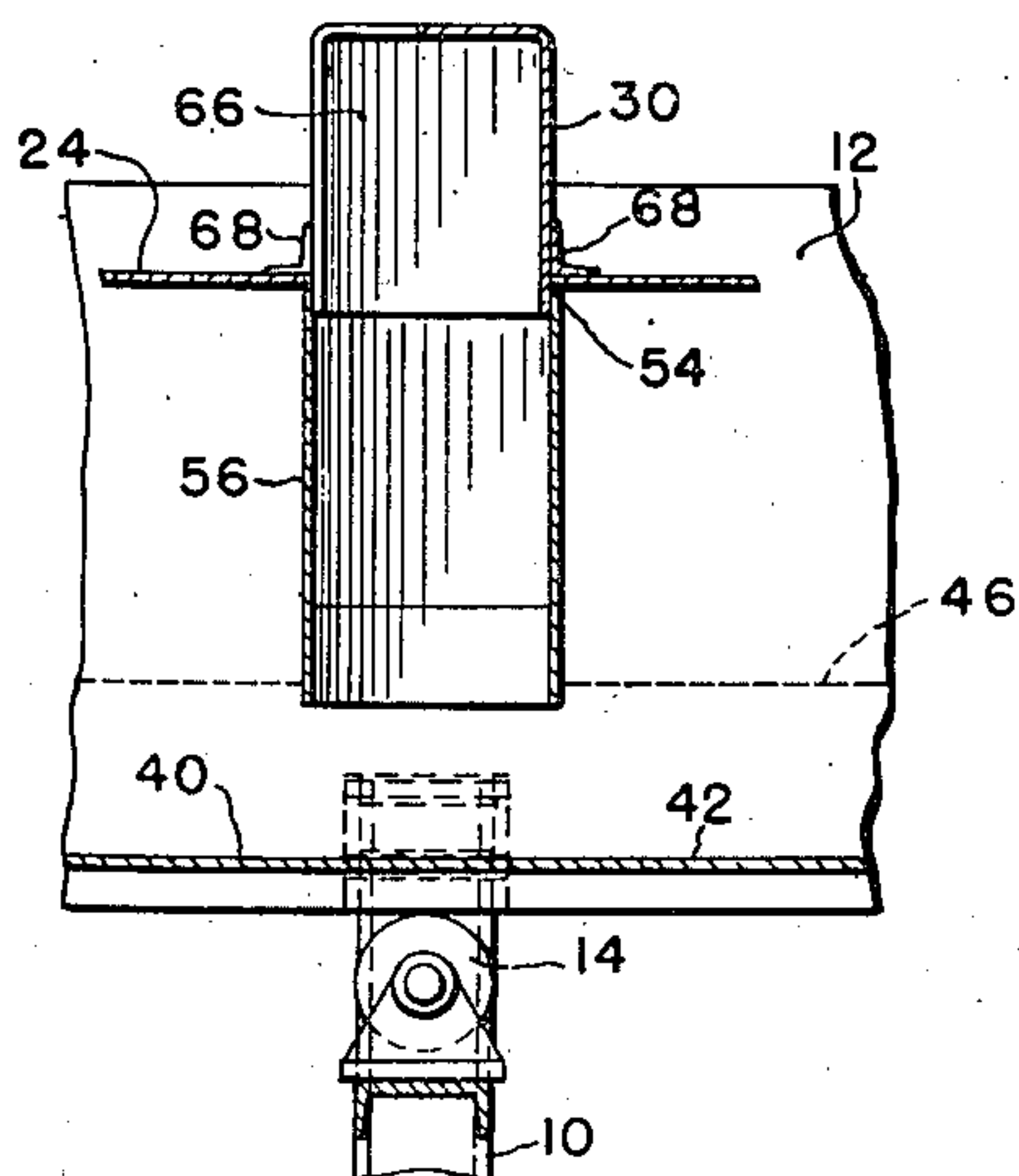
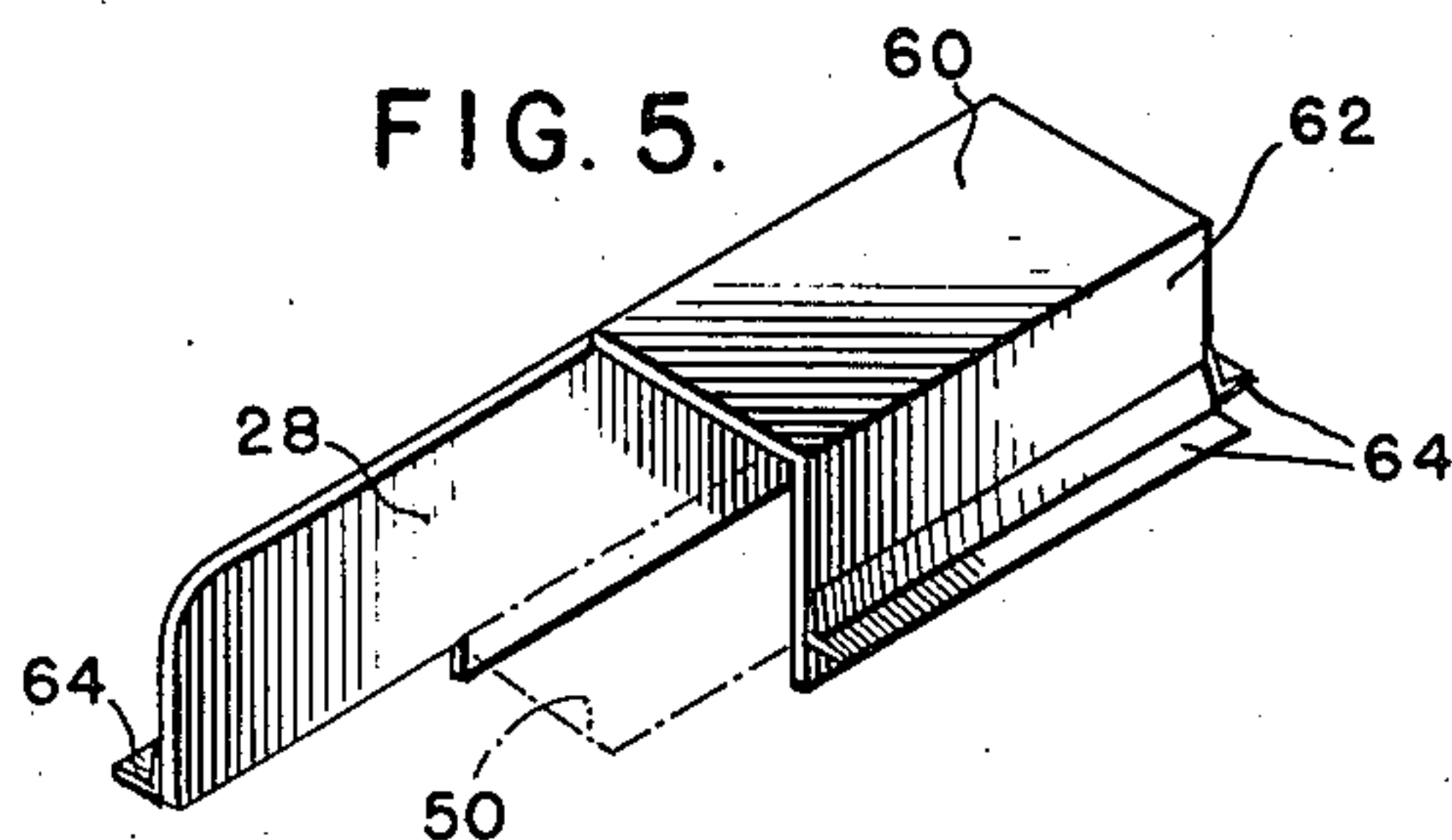


FIG. 5.



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FIG. 7.

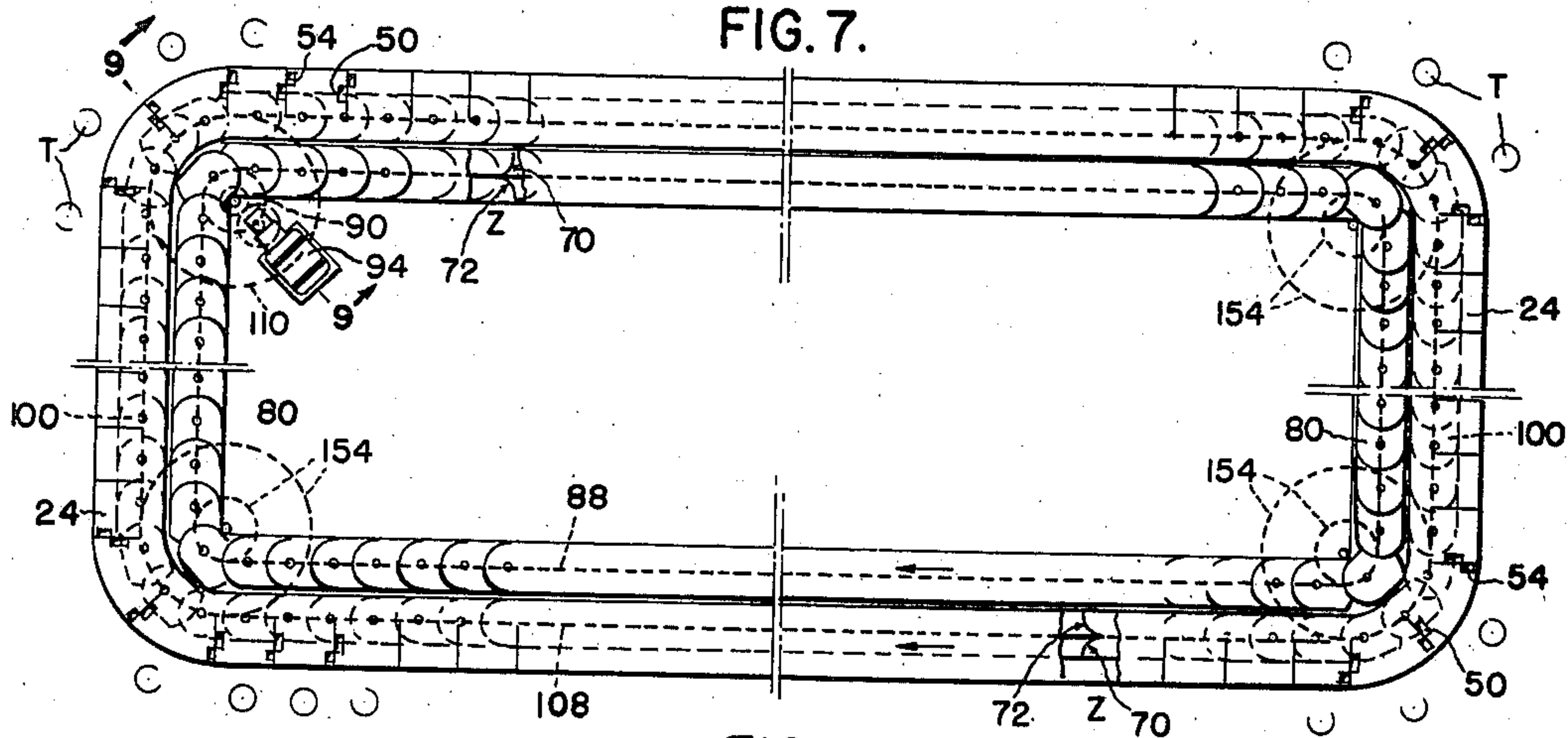


FIG. 8.

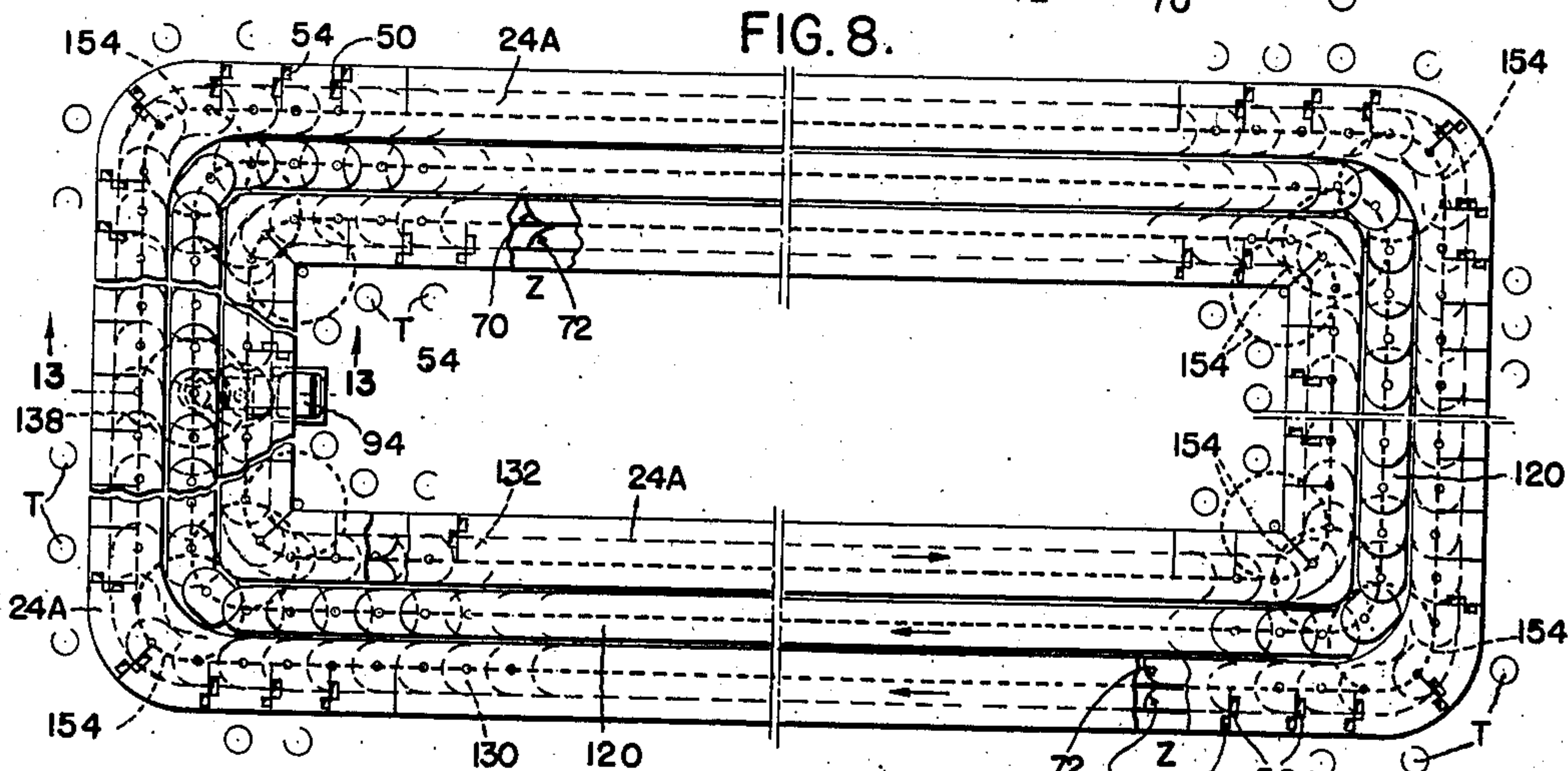
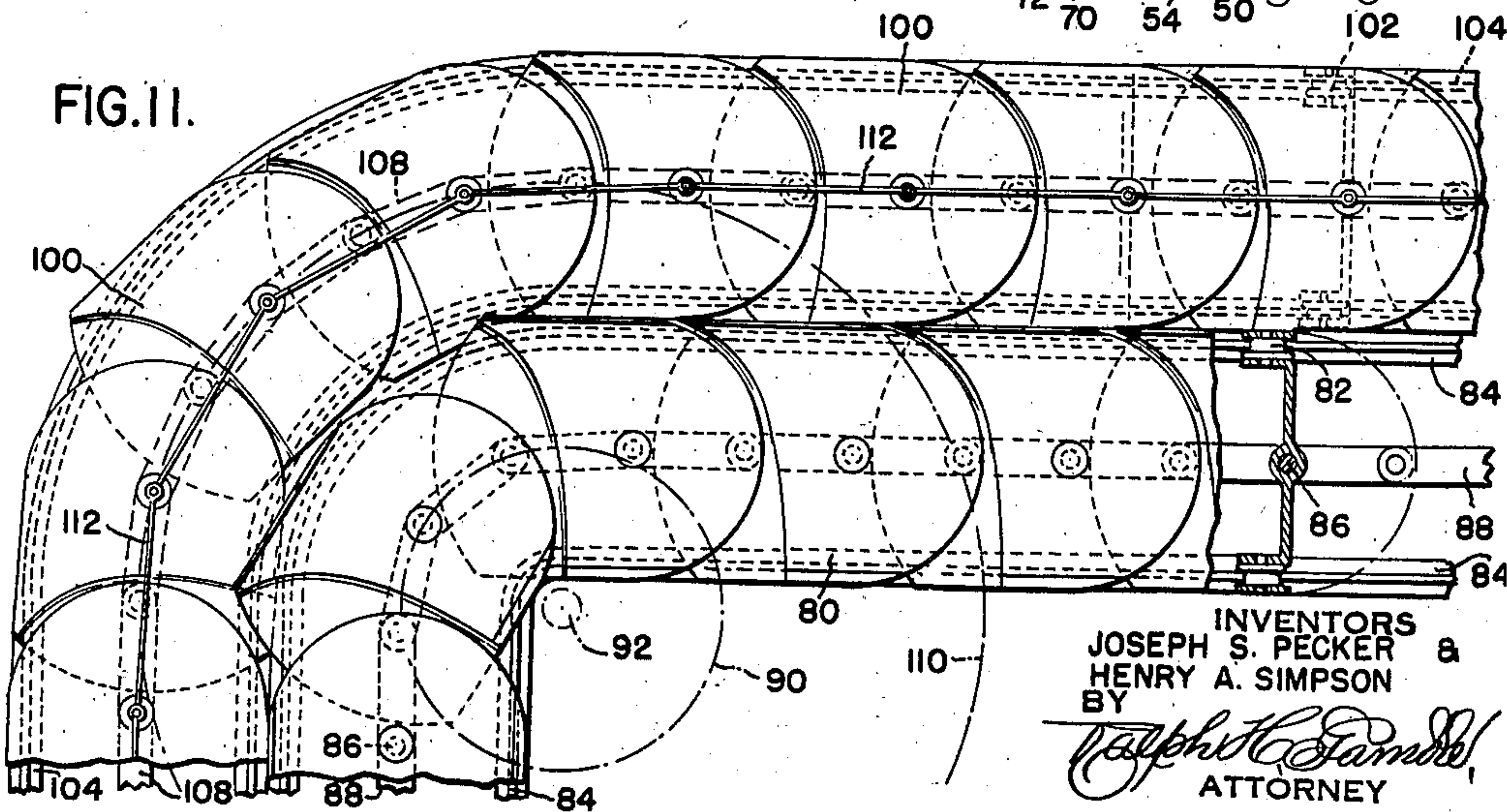


FIG. 11.



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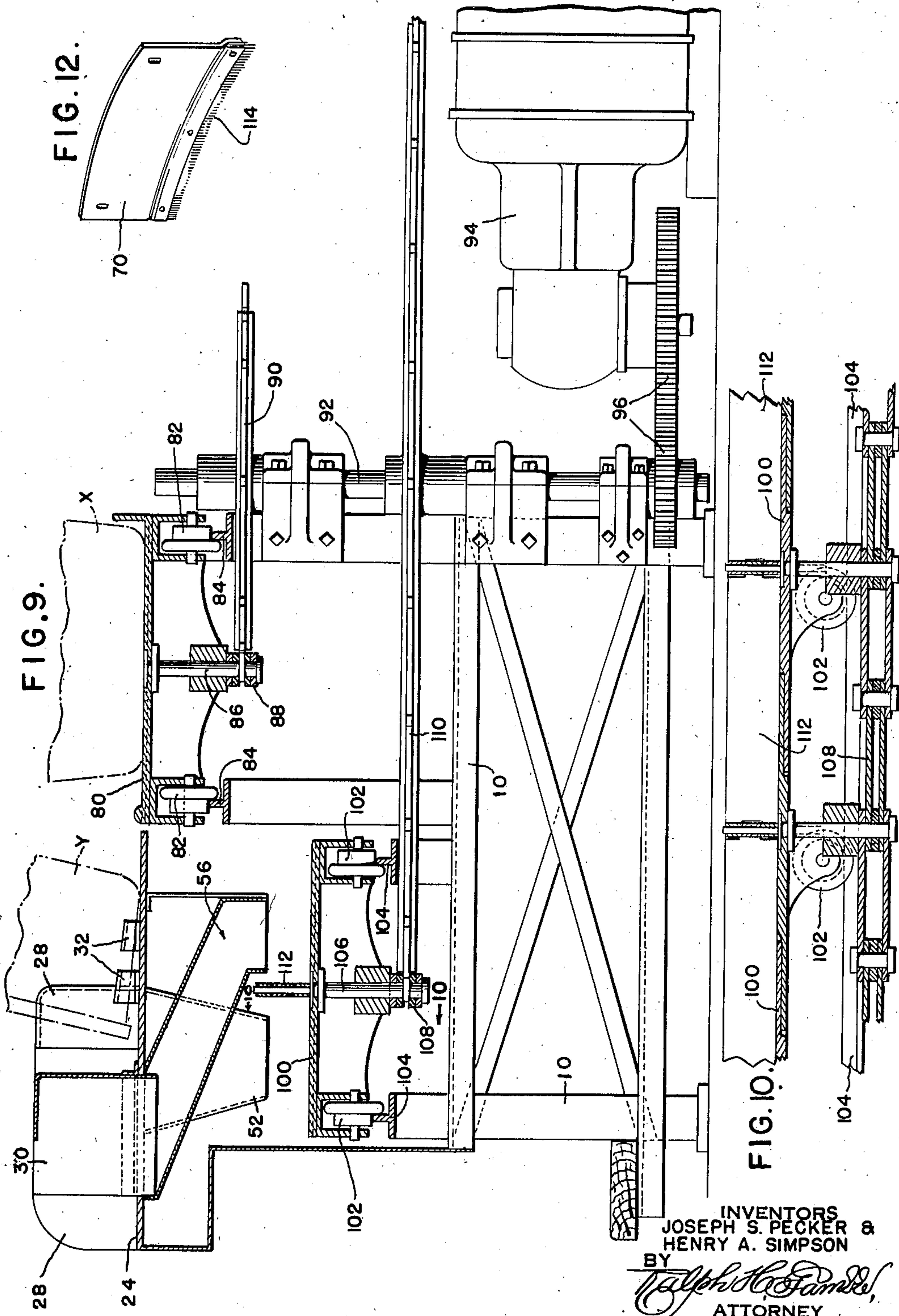
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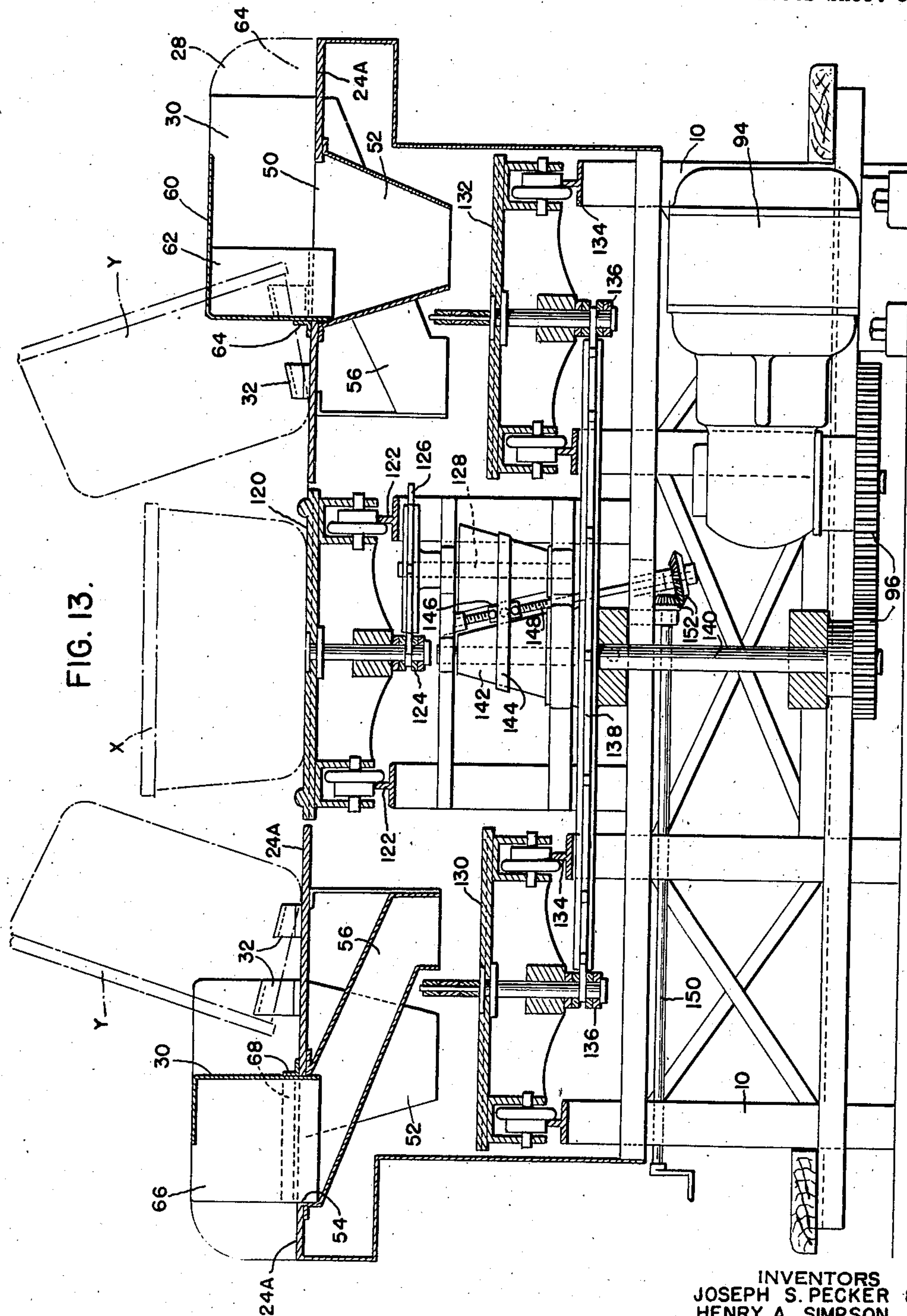
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UNITED STATES PATENT OFFICE

2,315,013

SORTING TABLE

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Application August 3, 1940, Serial No. 350,688

1 Claim. (Cl. 209—122)

This invention pertains to sorting tables and is especially directed to that class of table wherein a multiplicity of operators are positioned for separating articles into various classifications, or desirable from undesirable matter.

One purpose of this invention is to provide a table which will automatically convey the matter to be sorted or separated to individual operators, and to carry the separated matters from each operator to individual containers in which the separated matter is placed, or to other conveyors to carry the matter to desired points.

A further purpose is to provide a large capacity table occupying a comparatively small area and, at the same time, provide convenience and comfort for the operators.

A further purpose is to provide a stationary table structure at which operators are positioned for the sorting operation, and a moving structure having one table arranged on a plane similar to the stationary structure, for conveying matter to be sorted to the operators, and for a second table arranged on another plane, for conveying the sorted matter from the operators.

A further purpose is to provide an outer stationary table and an inner rotating table, with spaces arranged around the outer table and partitioned from one another to provide working space for individual operators, and to provide a separate space for loading filled containers to the inner rotating table and to remove empty containers therefrom.

A further purpose is to provide a substantially circular structure having a fixed area designed for the preparation of vegetables for cooking, canning, or eating, and a rotating area provided for conveying filled containers of vegetables or fruits to, and empty containers from the operators, and a second rotating area provided for the reconveying of the edible portions of the vegetables or fruits to one container and the waste portions thereof to another container.

A further purpose is to provide a novel driving mechanism in the form of roller bearings or the like, connected and evenly spaced about the driven structure, and in line with and adapted to be engaged by the driving member.

A further purpose is to provide a structure which is simple in design and construction, and built of rust-resisting materials, so that it may be easily cleaned without subjecting the metal portions to deterioration and the objection of the presence of rust where edibles are handled.

A further purpose is to provide partitions in cooperation with table openings to determine

individual operating spaces, to incorporate said partitions with hooded coverings for the openings and to make them easily removable for cleaning purposes.

5 A further purpose is to provide an endless conveyor structure adapted to travel various paths, and associated therewith a fixed structure of similar contour for the positioning of the operators, and further to associate therewith means for bringing receptacles containing matter to be sorted to the operators and in taking away the empty receptacles, also means for conveying the sorted matter to a desired point of discharge.

10 A further purpose is to provide an endless sorting table having a configuration other than circular, along both sides of which is arranged a plurality of sorting stations for individual operators, and to provide a conveyor central thereof to supply the operators with material to be sorted, while beneath each of the side portions are arranged conveyors for moving the matter separated by the operators to desired points of discharge, and further to provide conveniently arranged stations for feeding the central conveyor and for the removal of the separated or sorted matter from the side conveyors.

15 A further purpose is to provide means for regulating the relative speed of travel of the respective conveyors.

20 A further purpose is to provide driving mechanism for the conveyors, so that their direction of travel will not alter the respective arrangements of the individual sorting stations, i. e. where sorting operators are facing and on opposite sides of the table, the right hand receiving chutes will be at the right and of the same structural design in either case, and the same will be true of those located at the left hand side of each operator, so that the hooded covers for the chutes may be interchanged from one side of the table to the other, and the sorting motions of an operator will be the same regardless of which side the operator is working on.

25 Further purposes and attendant advantages will become readily apparent from the detailed description of an illustrated embodiment of my invention, reference being had to the accompanying drawings in which:

30 Fig. 1 is a plan view, partly in section, said section being taken at different levels respectively indicated as A, B, C, and D which correspond to levels indicated by like letters in Fig. 2.

35 Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional detail of parts shown at left hand end of Fig. 2.

Fig. 4 is a sectional detail taken on line 4—4 of Fig. 3.

Fig. 5 is a perspective view of a partition including a hooded covering for a chute opening.

Fig. 6 is a detail elevation, partly in section of a novel driving means, indicated diagrammatically in Figs. 1 and 2.

Fig. 7 is a diagrammatic plan of a table arrangement in other than circular form, and wherein the movable tables are propelled and guided over trackways.

Fig. 8 is a view similar to Fig. 7, but showing operator tables on both sides of the movable conveyor table.

Fig. 9 is an enlarged transverse section taken on line 9—9 of Fig. 7, illustrating the driving mechanism for the conveyors and their guiding trackways.

Fig. 10 is an enlarged sectional detail of a conveyor and its propelling chain, taken on line 10—10 of Fig. 9.

Fig. 11 is a detailed plan view of two conveyors as shown in Figs. 7 and 9, illustrating their action when moving about sprocket wheels when changing their direction of travel.

Fig. 12 is a perspective detail of a deflector plate used in connection with the forms of our invention shown in Figs. 7 and 8.

Fig. 13 is an enlarged sectional detail taken on line 13—13 of Fig. 8, and is similar in scale and purpose to Fig. 9.

Referring now to the drawings, and especially to Figs. 1 to 6 inclusive, a suitable stationary frame is indicated at 10 and a rotatable frame at 12, each of which are cross-braced to form adequate support. Fixed upon certain of the horizontal members of frame 10 are castors 14 upon which the rotatable frame is carried and enabled to move, while certain other vertical members of frame 10 carry similar castors 16 for maintaining the rotatable frame 12 in its proper circumferential relation to the fixed elements comprising frame 10.

Fast around the inner periphery of the movable frame is an endless roller chain construction 18 adapted to coact with a sprocket wheel 20 driven through gear reduction mechanism housed integral with the motor 22, the latter being fixedly mounted on stationary frame 10.

Attached to the upper part of the fixed frame 10 is a table top 24, which surrounds a movable table top 26 supported and carried by the movable frame 12, the level of both table tops being substantially the same.

The table top 26 is designed for the reception and conveyance of containers of material to be sorted while the table top 24 is designed to accommodate a number of operators about its outer edge. The outer table is also divided into comfortable working areas for the operators, each area being segregated by partitions 28 and 30 arranged at the left and right respectively of each operator. In front of each operator is arranged a cradle 32 comprising in the present design a pair of straps, arranged at an angle to support, and curved to fit, the containers carrying the material to be sorted. These containers indicated at X are retained upon the moving table 26 by the raised inner periphery, and by a half round bead at the outer circular edge adjoining the fixed table 24. The upper surface of the movable or conveyor table 26, is preferably

roughened to further assist in keeping the containers relatively placed.

These containers are moved in their circular path before the operators and when it is desired to sort their contents, the operator reaches for a container and draws it from the moving table 26, over the retaining bead, tilts it on its side and brings it to a rest against the cradle 32 as indicated at Y, Figs. 1, 2 and 3. When the container has been emptied, the operator moves it back across the bead onto the table 26 in any space created by the prior removal of a full container, and it is then moved to a point indicated at Z for a purpose hereinafter described.

Carried upon the rotating frame 12 outward of the table top 26 and beneath table top 24 is a second table 40 divided into an inner and outer section, 42 and 44 respectively, by a vertical annular partition wall 46. Both this table formation and the vertical wall dividing it are continuous and form a complete circle.

Arranged in the fixed table top 24 to the left of each operator and associated with partition 28 is an opening 50 and formed beneath the table top and registering with section 44 of the second table 40 is a chute 52. Also associated with partition 30 is an opening 54 in table top 24 and it likewise has a communicating chute 56 leading to a position above the top of section 42 of the second table 40. Both partition structures are similar, the left hand one 28 being shown in a detailed perspective in Fig. 5. It comprises a hooded section 60, the side walls 62 of which, together with a side wall 28 of the partition are formed integral, and fastened near the bottom are angles 64 which act as stops to position and maintain the structure within the opening 50. The right hand partition structure is illustrated in section in Fig. 4, the partition 30 here being shown integral with top, side and end walls 66 with angles 68 arranged similar to angles 64, for positioning and maintaining the structure in opening 54 in table top 24 and aligned with chute 56.

All the operating stations around the table are alike and carry openings and chutes to the right and left as just described, with one exception. At any convenient point between two of the operating spaces, we provide a loading and unloading space, in the drawings indicated at Z—Fig. 1. In this space, no openings are provided in the table top 24, and no hooded partitions are therefore necessary as it is designed for loading the filled containers upon the moving table top 26 and removing empty containers therefrom.

In the same space and arranged in scraping contact with the upper faces of moving tables 42 and 44, we provide scrapers 70 and 72 respectively, fixed by suitable bracing attached to frame 10.

The scraper 70 contacting with table 42 is arranged at an angle so as to divert any deposit from the moving table off to one side and into a container S placed in line therewith, while the scraper 72 contacting with table 44 is arranged at another angle so as to direct any deposits thereon off to the opposite side and into another container R placed to receive same.

If desired, separate conveyors could be positioned in line with the points of discharge and the separated materials conducted to required points by their aid.

In operation of this particular form of our invention, the attendant stationed at Z lifts the containers over the table 24 and onto the moving

table 26. This the attendant continues to do as long as any empty space remains. As the containers move from their loading point to points adjacent the operators, they are moved manually by the operators from the moving table 26 to the fixed table 24 where they are brought to rest in a tilted position supported in the cradle 32 (indicated at Y—Figs. 1, 2 and 3).

In this position, the material is handled by the operator who draws it from the container, sorts, prepares, inspects, cleans, selects, or otherwise separates the material, placing the accepted in chute 52 to be dropped by gravity to moving table 44, and the rejected in chute 56 to be conveyed to table 42, or vice versa. It does not make any difference which of the two sides 42 and 44 of moving table 40 is selected for any given material, but the operators must be uniform in their choice, i. e. if chute 52 is designated for one certain classification, then each of the operators must use that particular chute for one and the same material.

With the separated material deposited on the respective sides of moving table 40, it is conveyed thereby until it contacts the scrapers 70 and 72 fixedly arranged in its path, and the material is then diverted from the respective sides and into the containers R and S, or onto "flight" conveyors if such are substituted at these points, to be taken to any desired destination.

While we have only shown means for the separation of material into two classifications, we fully realize the possibility of adding additional openings in the stationary table top, with connecting chutes each leading to a receiving table, and a separate means for collecting from each of these receiving tables and segregating the separated materials.

In the form of our invention illustrated in Figs. 5, 7, 9, 10, and 11, we have shown the same principle adapted to tables other than circular, retaining the novel features of the round table and merely adapting them to spaces requiring other shapes. While in this particular form, we have illustrated a substantially rectangular table, it will be readily appreciated from an examination of the structure, the same may be adapted to an almost endless variety of contours.

Here the stationary portions of the table are practically identical with that shown in the first form, the difference being in the design of the movable or conveying tables. These are composed of overlapping plates adapted to be moved on castors or the like, in the form of an endless conveyor, over guiding tracks, and are adapted to pivot in such manner as to make possible the movement of each plate in relation to its adjoining plate in any horizontal plane.

In this form, 80 designates the overlapping plates of the conveyor for conducting the containers to and from the operators and they are arranged in like position to moving table top 26 in the first form. Each plate 80 is supported on castors 82 which are adapted to roll on and be guided by tracks 84 suitably supported on frame 10. Each plate 80 is further provided with a pivot 86 which connects with an endless sprocket chain 88, said chain in turn connecting with and being driven by a sprocket wheel 90 supported on a driven shaft 92. The shaft 92 is suitably supported by the stationary frame 10 and motion is imparted thereto from a motor and reduction gearing 94 through the medium of a pair of gears 96, one of which is driven by the motor

and the other being fixedly attached to the shaft.

100 designates the second movable table, also composed of overlapping plates, which table is arranged in like position and for like purpose as moving table 40 of the first form. These plates are supported on castors 102 adapted to ride and be guided by tracks 104 which are also supported on fixed frame 10. Each plate 100 is also provided with a pivot 106, connecting with a second endless sprocket chain 108, said chain being connected with and driven by a sprocket wheel 110 attached to shaft 92. Each pivot 106 extends above the overlapping plates 100, and interposed between two of said extensions is a flexible plate 112, arranged in a vertical position to form a partition wall similar to partition 46 and for like purpose. These plates are hingedly connected to and one plate is disposed between each adjoining pivot, so as to form a continuous partition throughout the entire length of this moving conveyor. The chutes 52 and 56 lead to the respective sides of conveyor table 100 just as in the circular form and material separated by the operator is fed thereto, to be conveyed to a point of discharge where it is acted upon by scrapers similar to 70 and 72. There is, however, a slight difference in the scrapers acting in conjunction with the overlapping plates and we have illustrated same in detail in Fig. 12. Here, due to the required uneven upper surfaces of these plates to accommodate the overlapping and swiveling, we have provided a flexible bottom for each scraper in the present showing a brush 114 so that all parts of these faces can be contacted and material removed therefrom.

In operation, this second form is identical with the first already described, the upper table 80 conveying material to be sorted to the operators and carrying the empty containers away and the table 100 conveying the separated material to its respective points of discharge.

It is possible if the latter form is applied to a conveyor of sufficient length, that more than one attendant position Z for loading, unloading and collecting separated material, will be required. This will, however, in no way, affect the design here disclosed other than to possibly add an additional pair of scrapers and brushes 114 for each added station Z. It might be well to also point out that the difference in the speed of travel of the respective tables 80 and 100 caused by the greater diameter of sprocket wheel 110 over that of sprocket wheel 90, will in no way affect the operation. In designing this table, we had a human equation to consider, some operators being faster than others, it would not have been advisable to design a device in which coordination of table speeds to time of material separation were a necessity, therefore the fact that the moving tables travel with equal speed in one design and different speeds in the other has no bearing whatsoever upon their operation.

We have found, however, that in some instances, certain materials can be sorted, generally by all the operators, with greater speeds than others, and it is therefore desirable to include an arrangement whereby the speed of the feeding conveyor can be varied to suit this condition. Such arrangement has been included in a third form of our invention, illustrated in Figs. 8 and 13, wherein the fixed supporting structure is indicated at 10, the driving motor at 94 furnishing power for the conveying mechanisms through gears 96 as in the previous form just described.

In this third form, the containers are carried to the operators positioned on both sides of a fixed double table 24A, by an endless conveyor 120 adapted to be guided over a trackway 122 propelled by a sprocket chain 124, the latter being driven by a sprocket wheel 126 carried on a vertically arranged shaft 128 suitably supported in stationary frame 10 (see Fig. 13).

The conveyor 120 is similar in design and function to conveyor 80, Fig. 9, in the second form of our invention, and two other conveyors 130 and 132 are similar in design and for like purpose as conveyor 100, Fig. 9, also disclosed in the second form. These two latter conveyors are arranged, one beneath each of the fixed tables 24A and are also guided over trackways 134 propelled by sprocket chains 136 which, in turn, are driven by a sprocket wheel 138 fixed on a vertical shaft 140 supported in stationary frame 10. The lower end of the shaft 140 is provided with one of the pair of gears 96 through which it receives its propelling power from motor 94.

It will thus be seen that power imparted through the gears 96 from the motor will cause shaft 140 to turn, carrying therewith sprocket wheel 138 which, in turn, will drive chains 136—136 and cause the conveyors 130 and 132 to move in opposite directions over their respective trackways 134.

The shaft 140 is further provided with one element of a speed changing device 142, the other element of which is fast upon shaft 128. A belt 144 forms a means of power transmission between the two elements, being controlled by the tines of a forked member, the position of which is determined by an internally threaded shifting device 146 operated by the rotation in either direction of a threaded shaft 148, which is, in turn, controlled from a crank operated shaft 150 through the medium of a pair of meshing bevelled gears 152. In the present showing, a well-known type of speed varying device comprising a pair of oppositely disposed cones is illustrated, but any of the various and well-known devices marketed for this purpose could be utilized.

The various openings, partitions and chute arrangements in this form are identical with that of the two preceding forms and therefore bear like reference numbers to indicate like parts.

It will be observed that the conveyor 130 is moved in a direction opposite to the direction of movement of conveyor 132. This is desirable, as it permits of the same arrangement of the dif-

ferently designed partitions 23 and 30 and chutes 52 and 56 in either side of table 24A, so that an operator shifting from one side of the table to the other, will still have a chute 52 at the operator's left and a chute 56 at the operator's right, and further it permits the interchanging of these partitions and their attached hooded covers to any openings 50 and 54 on either side of the table. In some usages, these partitions are removed for cleaning at the end of a day's run; it can, therefore, readily be seen that the interchangeable feature is highly desirable, as no care need be exercised in returning each partition to that opening from which it was removed.

In the forms of our inventions wherein the conveyors are moved over trackways, we employ idlers 154 about which the several conveyor chains are caused to turn. These idlers are placed wherever turns in the run are required and will operate with equal efficiency on either side of a chain, so that all turns need not be made in the same direction (as illustrated) and paths of travel of various forms are therefore made available to suit most any required shape of table and trackway.

In the present showing of the second form, in Figs. 7 and 9, we have, for convenience, placed the driving mechanism at one of the turns, thus eliminating the necessity of idlers at that point. This, however, is not essential and it could just as readily be placed as shown in the third form, Figs. 8 and 13.

In view of our invention and disclosures, variations and modifications to meet individual whim or practical need, will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of our invention without copying the structure shown, and we, therefore, claim all such insofar as they fall within the reasonable spirit and scope of our invention in the following appended claim.

We claim:

The combination of a stationary sorting table and a movable conveyor table, said tables having adjacent margins, partitions dividing the top of the table into a series of stalls one for each operator, the table within each stall provided with at least two discharge ports, each port provided with a hood for facilitating the feeding of material to said port, said hood being in part at least, integral with its adjacent partition.

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