M. J. LEONARD.

TURN TABLE.

APPLICATION FILED APR. 13, 1909.

928,675.

Patented July 20, 1909.

6 SHEETS—SHEET 1.

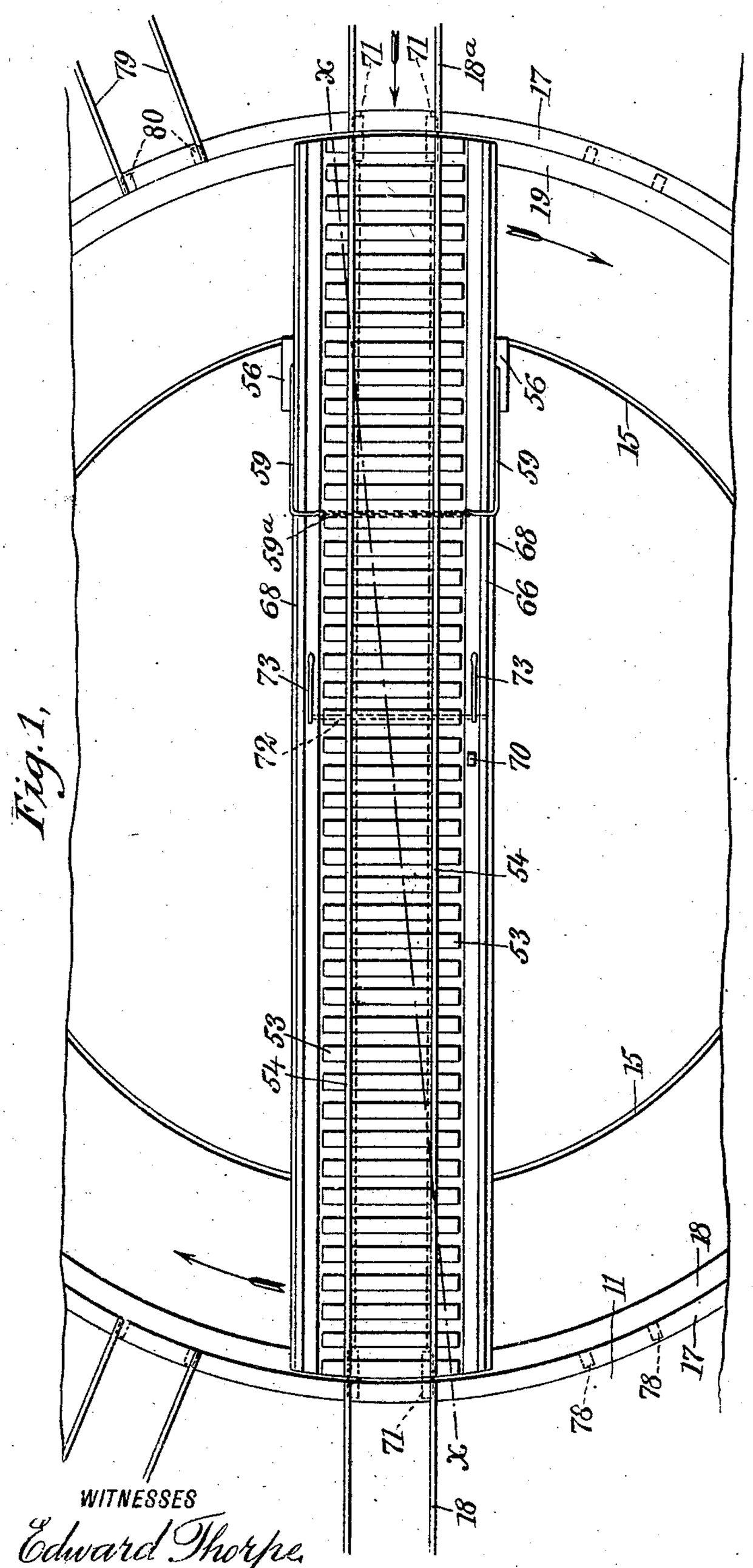

Fig. 1,

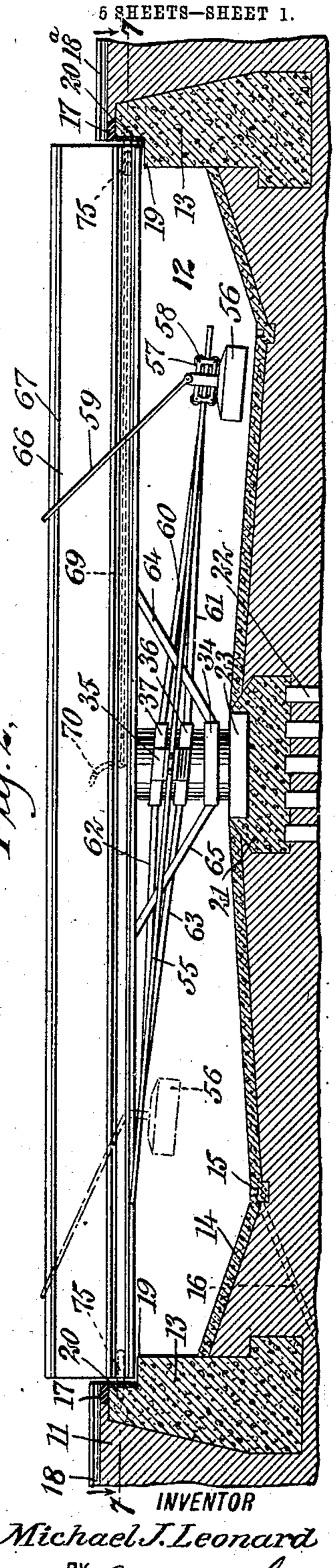

Fig. 2,

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5 SHEETS—SHEET 2.

Fig. 3,

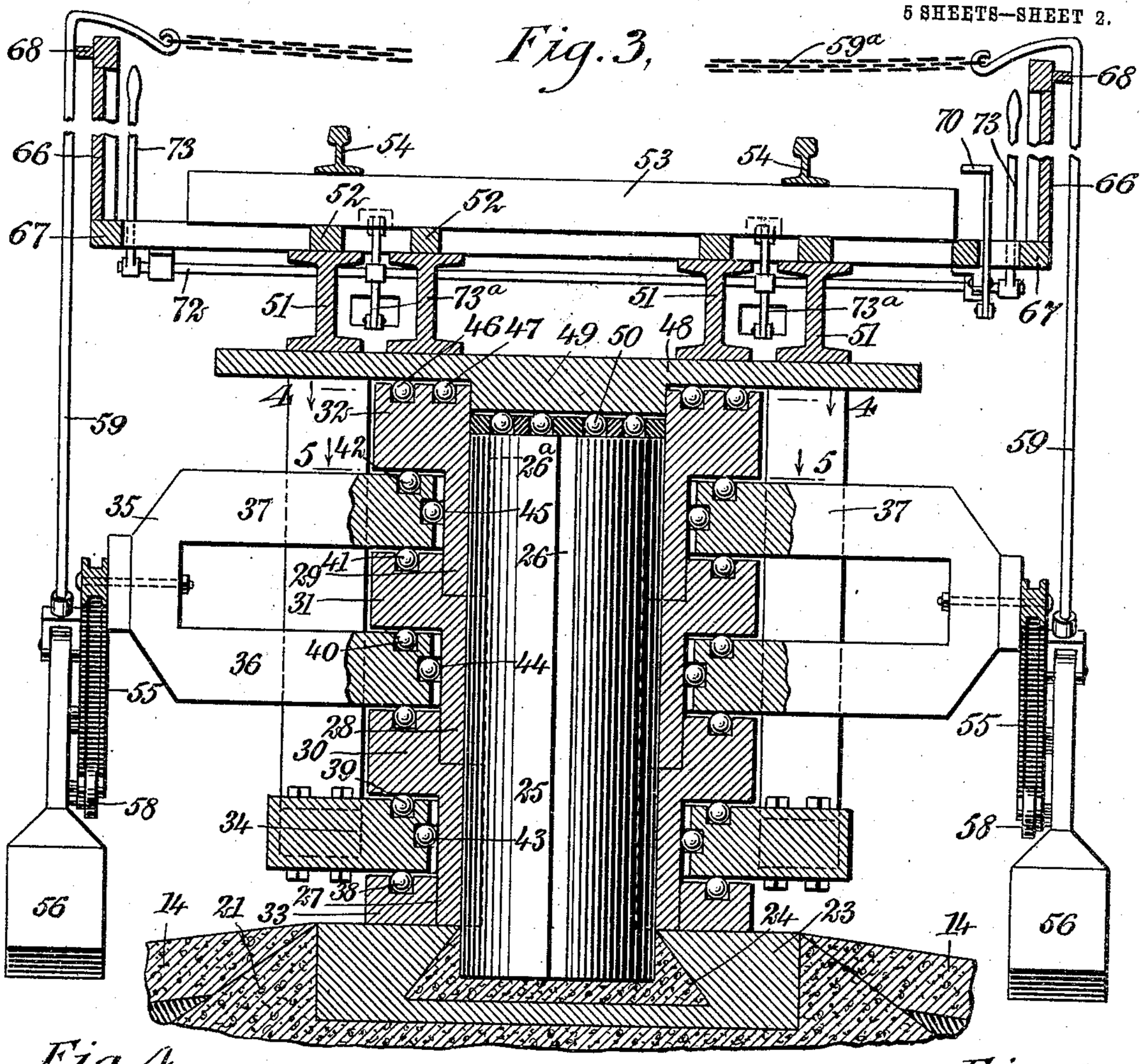

Fig. 4,

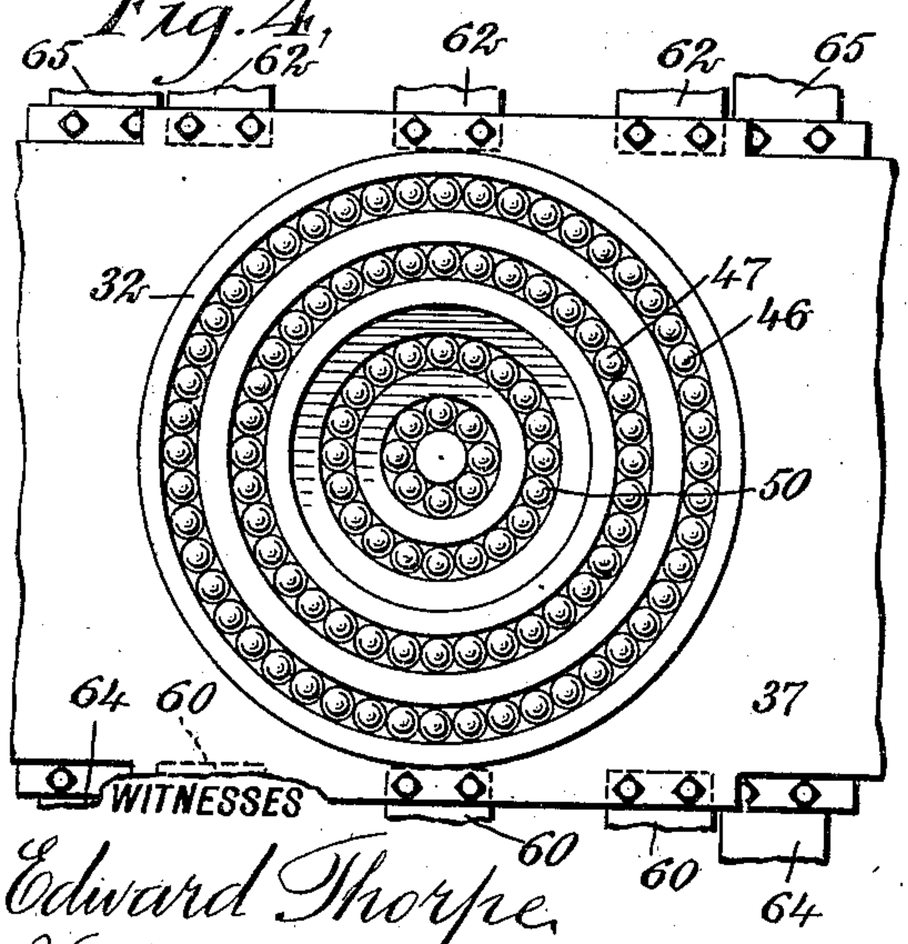

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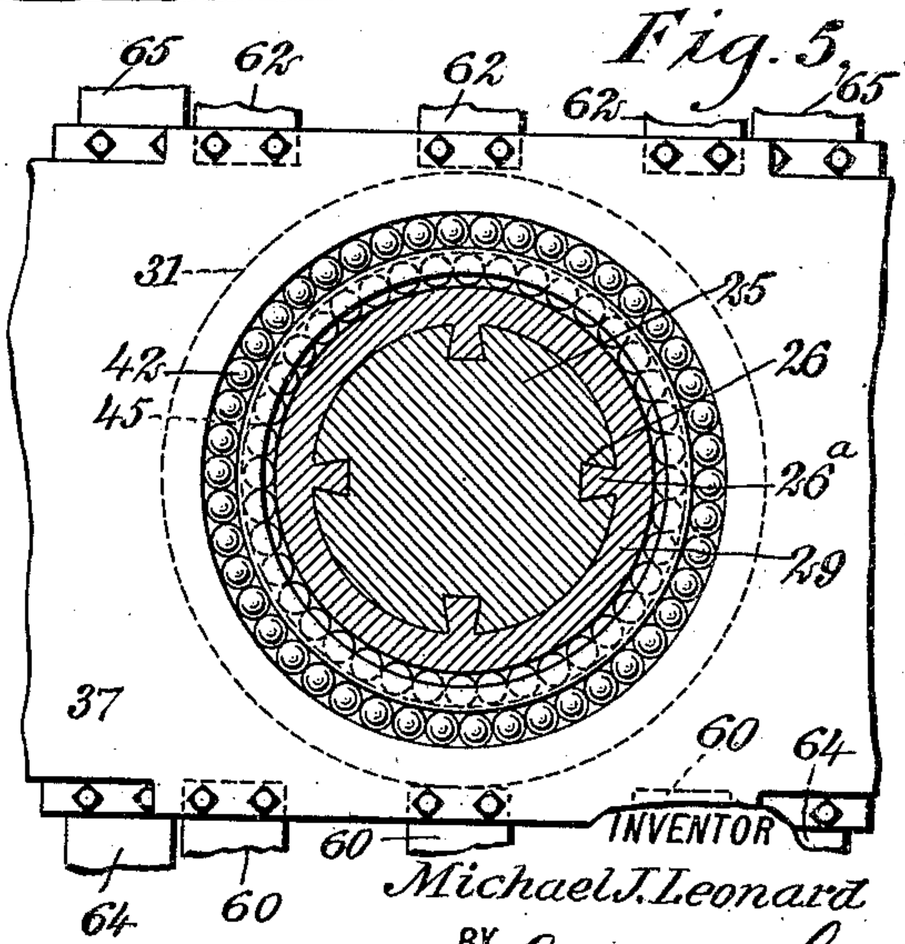
Fig. 5,



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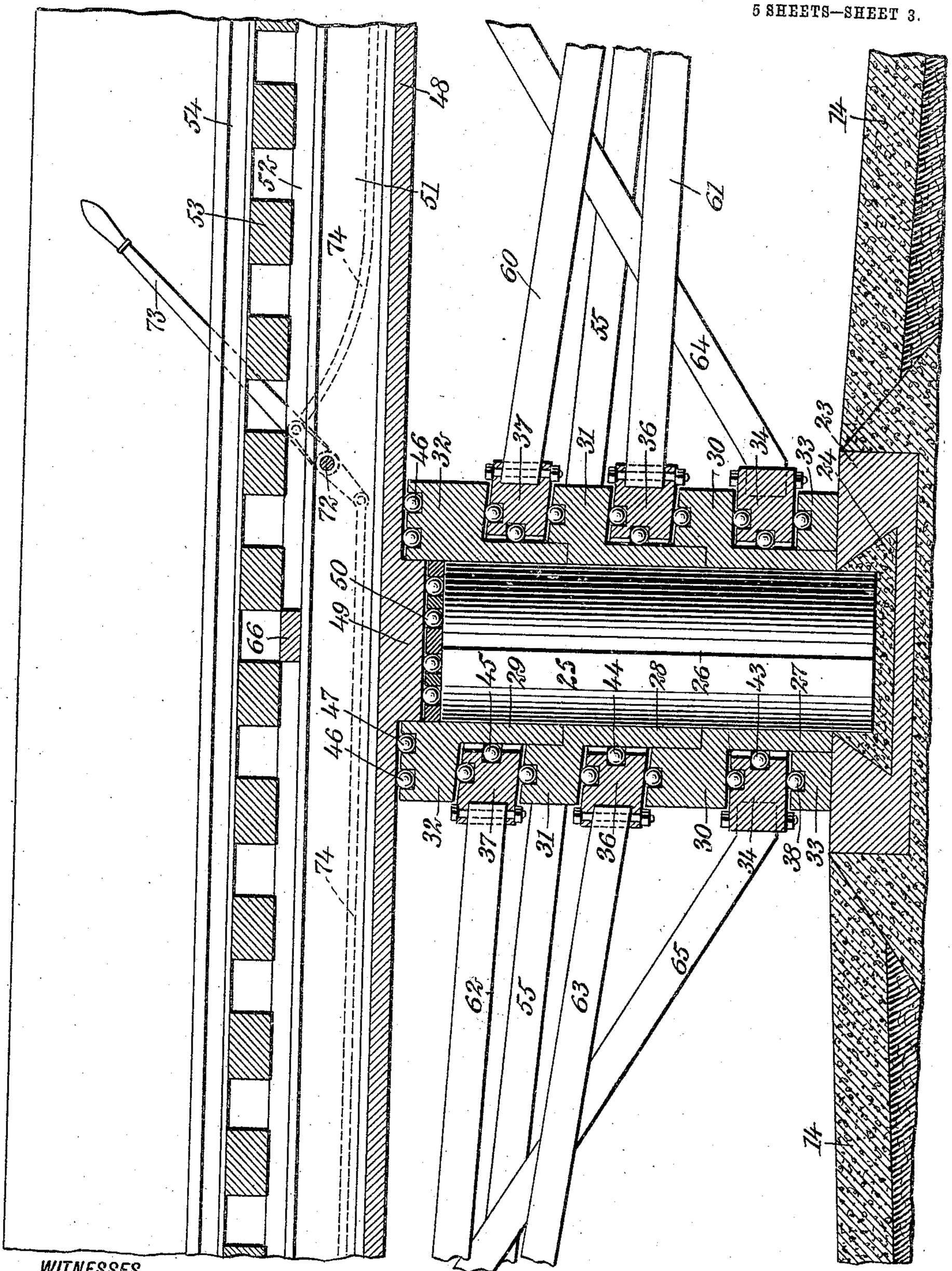

Fig. 6.

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5 SHEETS—SHEET 4.

Fig. 7.

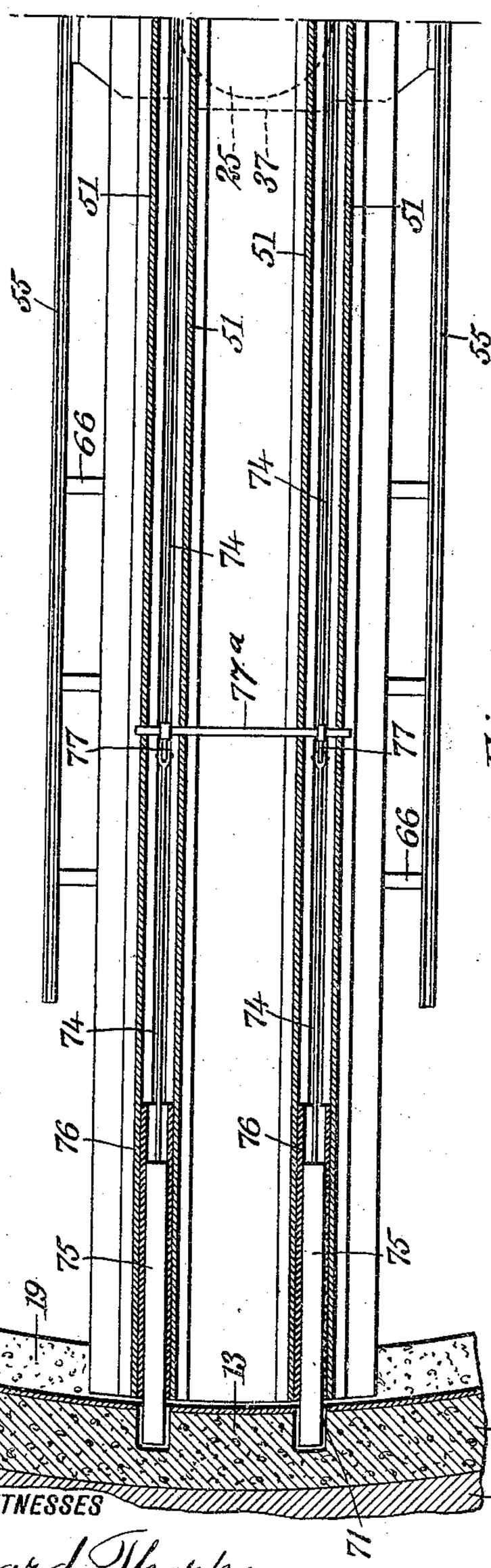
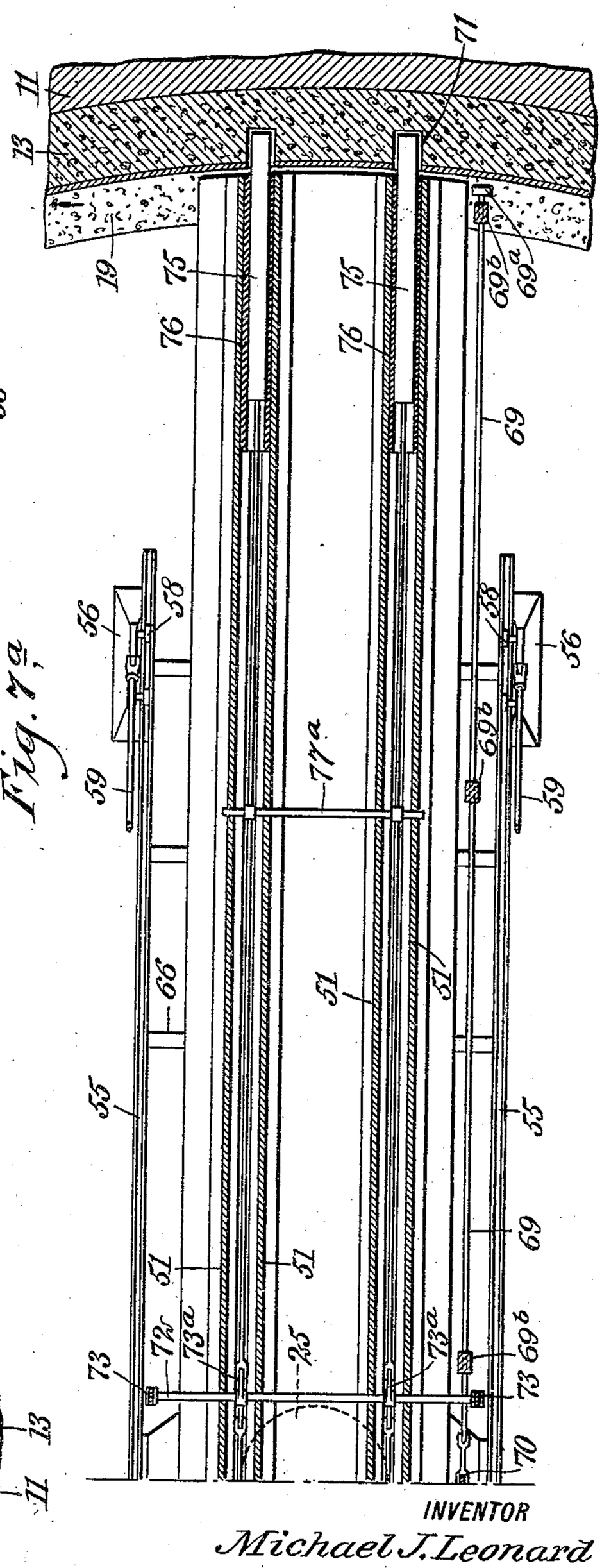


Fig. 7a.



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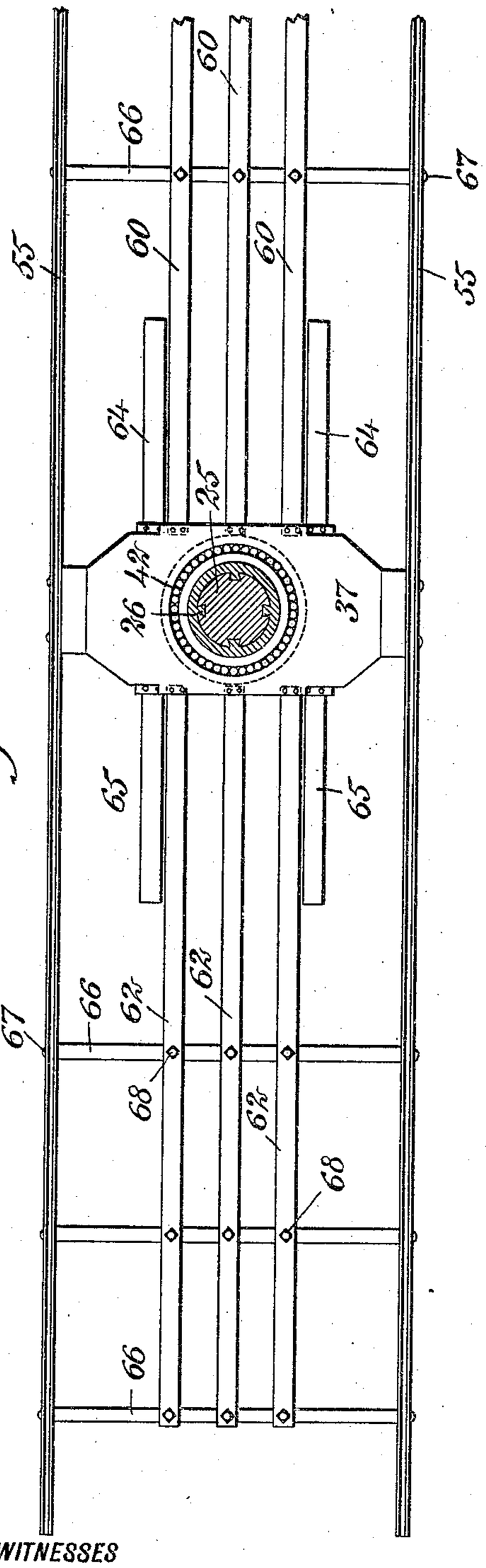

Fig. 8,

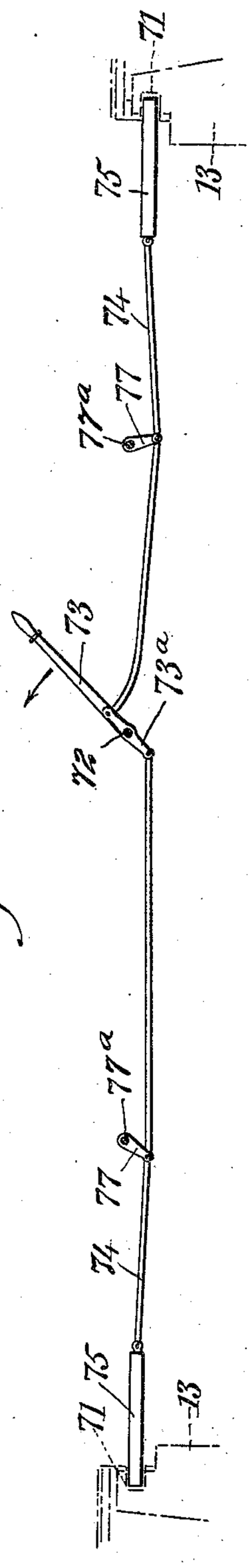

Fig. 9,

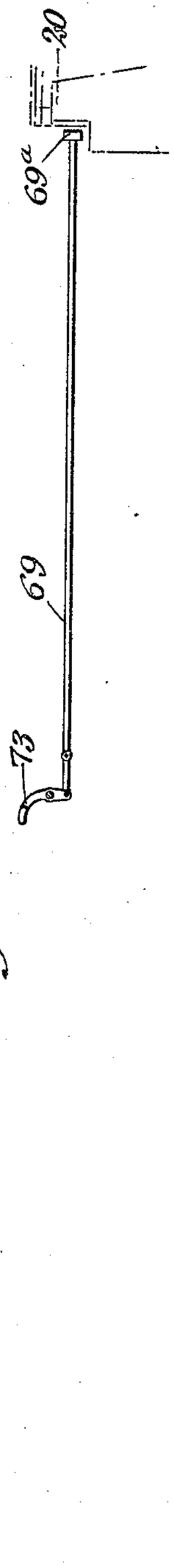

Fig. 10.

WITNESSES

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UNITED STATES PATENT OFFICE.

MICHAEL JOSEPH LEONARD, OF LONG BRANCH, NEW JERSEY, ASSIGNOR OF ONE-HALF TO ROBERT D. MARTIN, OF LONG BRANCH, NEW JERSEY.

TURN-TABLE.

No. 928,675. Specification of Letters Patent. Patented July 20, 1909.

Application filed April 13, 1909. Serial No. 489,635.

To all whom it may concern:

Be it known that I, MICHAEL JOSEPH LEONARD, a citizen of the United States, and a resident of Long Branch, in the county of Monmouth and State of New Jersey, have invented a new and Improved Turn-Table, of which the following is a full, clear, and exact description.

My invention relates to turntables suitable for general use, and more particularly to turntables employed in connection with railways for the purpose of turning locomotives and other unusually heavy pieces of rolling stock.

More particularly stated, my invention relates in the main to turntables controllable in part by gravity, the arrangement being such that the gradual descent of a weight causes the rotation of the table.

My invention comprehends a turntable the upper surface of which always remains at the same level, the descent of the weight thus being independent of the upper level of the table—the weight being raised by the forward movement of the locomotive or other piece of rolling stock to be turned.

My invention further comprehends certain details of construction whereby the general efficiency of turntables is increased.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a fragmentary plan view of the turntable and the pit which it occupies, the movable parts being shown in their normal positions; Fig. 2 is a longitudinal section showing the revoluble table and the arrangement of the weights and the weight tracks associated therewith for the purpose of turning the table by aid of gravity; Fig. 3 is an enlarged cross section taken substantially through the center of the table and showing the construction whereby the weight tracks are supported upon ball bearings and also whereby the table and various parts associated with it are enabled to turn by aid of the ball bearings; Fig. 4 is a fragmentary horizontal section upon the line 4—4 of Fig. 3, looking in the direction of the arrows and showing the arrangement of the ball races forming a part of the main bearing for supporting the turntable; Fig. 5 is a fragmentary section upon the line 5—5 of Fig. 3, looking in the direction of the arrows, and showing one of the bearings for the spider used for supporting the weight tracks; Fig. 6 is a fragmentary longitudinal section through the central portion of the table and the various ball bearings associated with it for supporting the table and also for supporting the revoluble spider, the plane of which is slightly inclined in order to enable the weights to be shifted by aid of gravity; Fig. 7 is a horizontal section upon the line 7—7 of Fig. 2, looking in the direction of the arrows, and showing the locking mechanism at one end of the table for the purpose of holding the latter in its normal position; Fig. 7[a] is a section upon the same plane as that appearing in Fig. 7, but showing the opposite end of the table and its locking mechanism, together with the weights used for rotating the table; Fig. 8 is a fragmentary view partly in plan and partly in section, showing the weight tracks and the spider upon which the same are mounted; Fig. 9 is a diagrammatic elevation showing how the locking mechanism is controllable by either of the hand levers; and Fig. 10 is a diagrammatic elevation showing the construction and action of the foot-operated brake.

In the earth 11 is formed a pit 12 bounded peripherally by an annular wall 13 of concrete and provided with a floor 14, also of concrete, this floor having a channel 15 communicating with an exit passage 16 for removing any rain water which may chance to fall into the pit. Resting upon the annular wall 13 is a metallic ring 17 used for supporting the ends of service rails 18, 18[a]. The wall 13 is provided near its top with an annular step 19 and also with a ring 20 resting upon this step.

A bed plate 21 made of concrete and having generally the form of a massive disk rests upon piling 22 and slightly interlocks therewith so as to form a substantial anchorage, so that the bed plate 21 is immovable. Sunken into the bed plate 21 is a metallic plate 23 provided with a filling 24 of concrete, this filling having a general conical form. At 25 is a center post, the lower end of which is secured rigidly within the filling 24, the center post being thus fixed relatively to the bed plate and to the earth. The center post 25 is provided with splineways 26 adapted to receive splines 26[a]. The center post is encircled by annular sleeves 27, 28,

29, the splines 26ª being integral with these sleeves and extending radially inward therefrom, as will be noted in Figs. 3 and 5.

The sleeves 27, 28, 29 are respectively provided at their tops with bearing rings 30, 31, 32. Resting upon the metallic plate 23 is a bearing ring 33 which supports a ring 34. At 35 is a spider comprising bottom and top plates 36, 37 integral with each other. The bearing rings 33, 34 and the spider 35 are provided upon their tops with annular rows of balls, 38, 39, 40, 41, 42, and are further provided with rows of balls 43, 44, 45, disposed internally as shown in Fig. 3. The balls 43 engage the outer surface of the sleeve 27, the balls 44 the outer surface of the sleeve 28, and the balls 45, the outer surface of the sleeve 29.

At 46, 47 are two annular rows of balls supported by the bearing ring 32. At 48 is a bearing plate provided centrally with a boss 49, this boss resting directly upon a ball bearing 50, as will be understood from Figs. 3 and 6. At 51 are I-beams and mounted upon the same are sills 52 supporting cross ties 53 upon which are rails 54 extending practically the entire length of the table. At 55, 55 are tracks which are supported by the spider 35 and are used in raising the weights 56. Because of the peculiar office of these tracks 55 I designate them as "weight tracks." They are inclined obliquely to the general horizontal level of the table, as will be understood from Figs. 2 and 3. The weights 56 hang from carriages 57 (see Fig. 2) each provided with wheels 58 which engage the upper and lower surfaces of each track 55.

At 59 is a bail, the central portion of which has the form of a chain 59ª. This bail when pushed along in a substantially horizontal direction, as indicated by full and dotted lines in Fig. 2, raises the weights 56 from the lower ends of the tracks 55 to the upper ends thereof. Connected with the bearing plates 37, 36 are brace rods 60, 61, 62, 63 which co-act with the spiders 35 in supporting the weight tracks 55 and in holding the same in proper working relation. At 64, 65 are braces, the inner ends of which are mounted upon the bearing ring 34, the upper ends of these braces engaging the table upon opposite sides of the center post.

At 66 are side walls which rest upon and are supported by longitudinal beams 67 forming part of the table. Mounted upon the side walls 66 and disposed adjacent to the upper surfaces thereof are strips 68 which form guides for the bail 59. The brake rod 69 (see Figs. 7ª, 10) is provided with a brake shoe 69ª and is slidably supported in bearings 69ᵇ. This brake rod 69 is pivoted to a brake lever 70 to be controllable by the operator's foot. By stepping upon the brake lever 70 so as to depress the same, the brake rod 69 is moved longitudinally and the brake shoe 69ª pressed against the stationary ring 20, thereby stopping the rotation of the table.

The annular wall 13 is provided with holes 71 and disposed upon substantially the same level as these holes is a rocking shaft 72. Hand levers 73 are mounted upon this rocking shaft and are used for actuating it. At 73ª are arms mounted rigidly upon the rocking shaft. Rods 74 are connected with the arms 73ª, and pivoted to these rods are bolts 75 which are adapted to enter the holes 71 in the annular wall 13 (see Fig. 9). The rods 74 are supported midway of their length by arms 77 mounted upon stub shafts 77ª. The operator, by shifting either of the two hand levers 73 back or forth, can throw the bolts 75 out or draw them inward, so as to lock the turntable or to release the same, as the case may be. The bolts 75 are slidably mounted in bearing sleeves 76, these bearing sleeves being disposed intermediate the I-beams 51, as will be understood from Fig. 7. The annular wall 13 is further provided with bolt holes 78 (see left of Fig. 1) for the purpose of receiving the bolts 75. At 79 (see upper right-hand portion of Fig. 1) are service rails and adjacent to the same are other bolt holes 80, the latter being diagrammatically opposite the bolt holes 78.

The line X—X, Fig. 1, represents the central line of the turntable when the latter occupies a position of maximum stability. Hence, when the turntable occupies the position indicated in Fig. 1, so that the rails 54 are in registry with the service rails 18, 18ª, the weights 56 are a trifle below their uppermost limit and have a tendency to descend, thereby tending to turn the table.

The operation of my device is as follows: The parts being in their normal position, as in Fig. 1, the movable parts are, of course, at this time stationary and the rails 54 of the table are in registry with the service rails 18, 18ª. As the line X—X in Fig. 1 indicates a position of stable equilibrium, the position of the service rails 18, 18ª is such that when the weights 56, occupy normally the position indicated by full lines at the right of Fig. 2, are moved to the left, as indicated by dotted lines in the figure last mentioned, the weights tend to turn the table in a clockwise direction according to Fig. 1. That is to say, the table, when in its normal position, is in unstable equilibrium, at least when the weights 56 are raised as indicated by dotted lines in Fig. 2. The piece of rolling stock (for instance, a locomotive) if resting upon the service rails 18, 18ª, may move upon the turntable in the direction indicated by the arrow at the extreme right of Fig. 1. If the piece of rolling stock be a locomotive its pilot engages the chain 59ª which is a part of the bail 59, and by moving this bail along,

as indicated by dotted and full lines in Fig. 2, the weights 56 are moved gently up the incline formed by the weight tracks 55. The operator now grasps one of the hand levers 73, and by its aid rocks the shaft 72. In doing this he causes the withdrawal of the bolts 75 from the bolt holes 71, and thereby releases the turntable which, under control of the weights 56, rotates in a clockwise direction according to Fig. 1. If the operator desires to connect the table rails 54 with the service rails 79 so as to shift the locomotive upon these service rails, he merely watches the rotation of the table until the ends of the table rails 54 register with the ends of the service rails 79, and then depresses the foot lever 70 so as to apply the foot brake and stop the further rotation of the table. By a little practice he can easily make the table stop in exactly the right position, he applying the brake early enough to allow for checking the momentum of the table. If, instead of connecting the rails 54 with the service rails, the operator desires to connect them with the service rails 18ª—or in other words, if he desires to turn the table half a revolution—he relies upon the momentum of the table and its burden to carry the ends of the rails 54 a little past the line X—X so as to connect them with the rails 18ª. The rotation of the table being stopped as before, by the application of the foot brake, the operator next grasps either of the hand levers 73, and by turning the shaft 72 forces the bolts 75 outwardly, thereby locking the table firmly in position.

The action of the weights 56 in turning the table may be readily understood by reference to Fig. 2. The bearing plates 36, 37, in rotating do not turn upon the principle of a nut mounted upon a spool, but they simply turn in fixed planes. In doing this each weight track 55 is raised at one of its ends and lowered at its other end while rotating relatively to the center post. The table rails 54 and most of the superstructure of the table, together with the braces 65, have a simple rotating motion in a plane which never changes. The weight tracks 55, brace rods 60, 61, 62, 63, and spider 35, however, may be, all together, considered as a single body which has a more complicated motion. This body, like the superstructure of the table, turns relatively to the center post, but at the same time one end of the body is gradually lowered and the other end gradually raised. The net result is that the weights 56 in descending—that is, in moving from their position indicated by dotetd lines at the left of Fig. 2, to their position indicated by full lines at the right of this figure—describe a semicircle, or portion thereof, according to the distance to which the table is turned, and in doing this they, together with the rotating member supporting them, gradually move downward to a distance represented by the difference in altitude of the weight 56 shown by dotted lines at the left of Fig. 2, and the same weight shown by full lines at the right of said figure.

The brace rods 64 being mounted upon opposite sides of the four brace rods 60, 61, 62, 63 maintain these four brace rods, and consequently maintain the weight tracks 55, in proper alinement with the main body of the turntable and the rails 54 carried thereby, and in doing this the brace rods 64, 65, do not interfere in the slightest degree with the raising of the weights 56 by aid of the bail 59 nor with the descent of these weights owing to the rotation of the supporting member carrying them.

The turntable does not make more than one-half a revolution at a time, and after each use of the turntable the weights 56 are in their lowermost position, as indicated in Fig. 2. They thus normally occupy a position intermediate the position of the center post and that of the piece of rolling stock approaching the table for the purpose of being turned. In other words, the weights are normally upon the "near" side of the table and only occupy the "far" side of the table when pushed to that side by the piece of rolling stock to be turned.

From the above description it will be seen that the action of the turntable is as nearly as practicable automatic. The motive power used for turning the table while furnished immediately by the weights 56, is ultimately supplied by the motions of the piece of rolling stock. This is a great advantage and is accomplished without lowering the position of the table rails 54 in the slightest degree.

In this construction of table there is no necessity for the usual ring employed to support the table and the ring track for supporting such ring. The brace rods 64, 65 are located in a position favorable for supporting the outer ends of the table and these brace rods, together with the bearing ring 34, enable me to discard entirely the parts just mentioned.

No matter how many times the turntable may be used it always rotates in the same direction, the weights 56 are always found by an incoming locomotive or other piece of rolling stock to be turned, to occupy the same relative position (see right of Fig. 2), and the table rails 54 always occupy the same place and are always at the same elevation notwithstanding the ascent and descent of the weights 56.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a turntable, the combination of a revoluble member for supporting a piece of rolling stock to be turned, a second revolu-

ble member disposed adjacent to said first-mentioned revoluble member and operatively connected therewith, said second-mentioned revoluble member including weight tracks, weights supported by aid of said weight tracks and adapted to be moved along the same, and means for guiding said second-mentioned revoluble member so as to enable said weights to turn the latter and thereby actuate said first-mentioned supporting member.

2. The combination of a revoluble member for supporting a piece of rolling stock to be turned, a track disposed adjacent to said supporting member and normally inclined, a weight supported by said track and adapted to travel thereupon and to turn said track bodily upon a center, connections from said track to said supporting member for enabling the rotation of said track upon said center to turn said supporting member, and means for enabling a piece of rolling stock to move said weight up said incline.

3. The combination of a center post, bearing plates encircling the same and crossing the axis of said center post obliquely, a track connected with said bearing plates and normally oblique to the axis of said center post, a weight movable along said track, means controllable by movements of a piece of rolling stock for moving said weight along said track, thereby raising said weight, and connections from said supporting member to said track for enabling the rotation of said track to turn said supporting member.

4. The combination of a revoluble member for supporting a piece of rolling stock to be turned, a spider connected with said supporting member and adapted to aid in turning the latter, tracks carried by said spider and normally inclined relatively to the axis of said center post, and weights supported upon said tracks and movable relatively thereto for the purpose of turning said spider.

5. In a turntable, the combination of a supporting member for turning a piece of rolling stock, a center post for sustaining said supporting member, sleeves mounted thereupon, a spider encircling said sleeves and provided with ball races, thereby forming a ball bearing between said spider and said sleeve, connections from said spider to said supporting member for turning the latter, and means for turning said spider.

6. The combination of a stationary annular bearing member provided with a ball race and with balls occupying the same, a revoluble annular member disposed adjacent to said stationary annular bearing member and engaging said balls, a center post disposed concentrically of both of said bearing rings, a supporting member revoluble in relation to said center post, brace rods extending from said revoluble bearing member obliquely upward therefrom so as to engage said supporting member, and means for turning said supporting member upon said center post.

7. In a turntable, the combination of a stationary center post, a revoluble member mounted thereon, a ball bearing disposed intermediate said revoluble member and said center post, a spider encircling said center post, a ball bearing disposed intermediate said spider and said center post, tracks carried by said spider, weights movable relatively to said tracks for the purpose of turning said spider, and connections from said spider to said revoluble member for turning the latter.

8. In a turntable, the combination of a fixed center post, sleeves splined relatively to said center post and incapable of rotating relatively thereto, one of said sleeves being provided with a bearing ring, a spider supported by said bearing ring and revoluble relatively thereto, tracks carried by said spider, weights movable relatively to said tracks, a revoluble supporting member, and means for connecting said revoluble supporting member with said spider for the purpose of enabling said weights to turn said spider and said revoluble member.

9. The combination of a revoluble member for supporting a piece of rolling stock or the like to be turned, a track journaled so as to turn in a plane slightly oblique in relation to the general plane occupied by said revoluble member, and a movable weight to be supported by said track for the purpose of turning said revoluble member.

10. The combination of a revolving table mounted to turn in a fixed plane, an inclined track journaled to turn bodily in another fixed plane disposed obliquely in relation to said first-mentioned plane, a weight to be supported upon said track and normally occupying a position adjacent to the lower end of the latter, and means controllable by movements of a piece of rolling stock for moving said weight along said track, thereby raising said weight.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MICHAEL JOSEPH LEONARD.

Witnesses:

CHARLES C. PATTERSON,

J. WESLEY SEAMAN.