

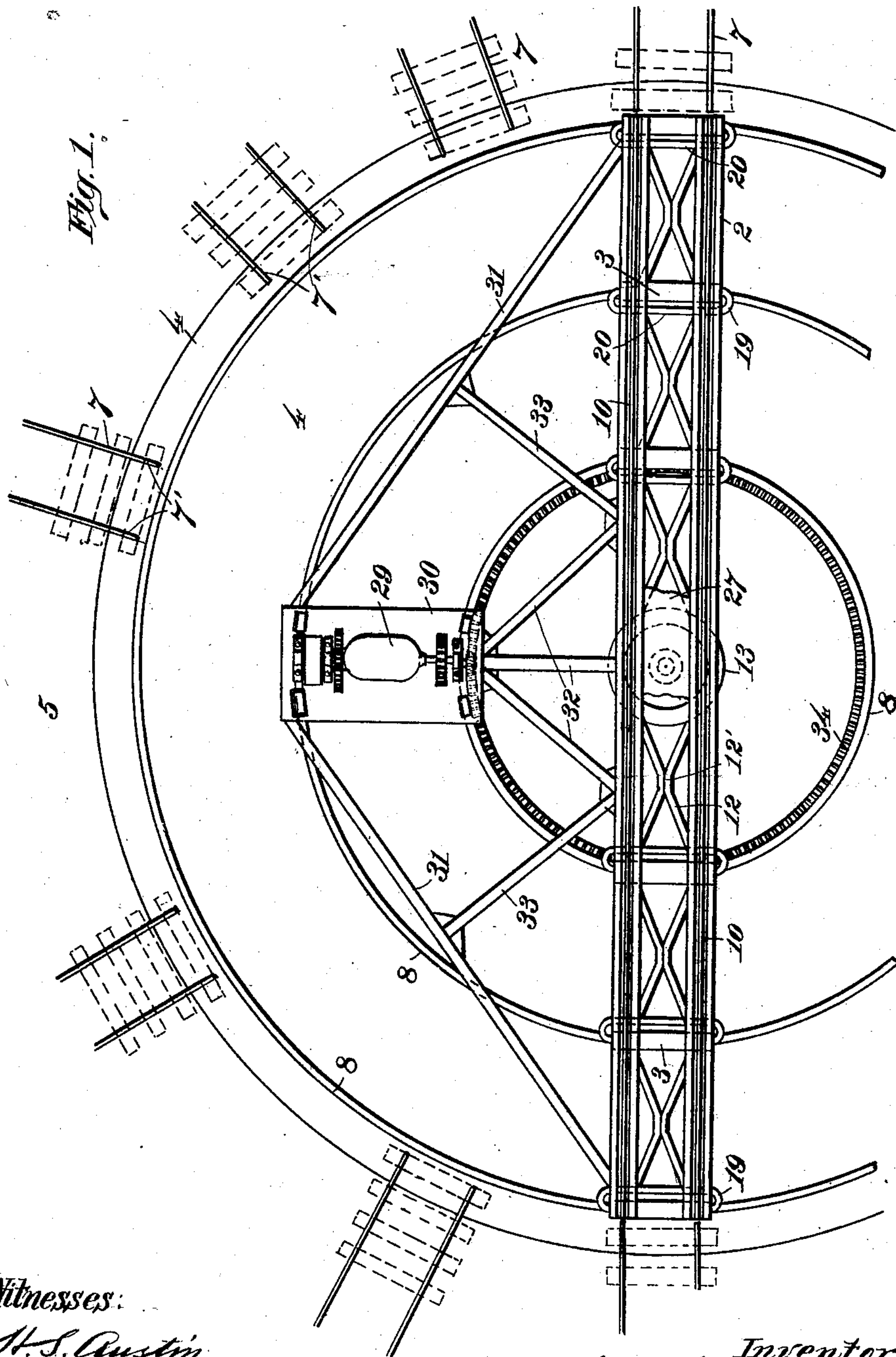
No. 889,371.

PATENTED JUNE 2, 1908.

C. G. HAWLEY.  
NORMAL SURFACE TURN TABLE.

APPLICATION FILED SEPT. 24, 1906.

3 SHEETS—SHEET 1.



Witnesses:

*H. S. Austin*

*John P. Lefevre*

Inventor

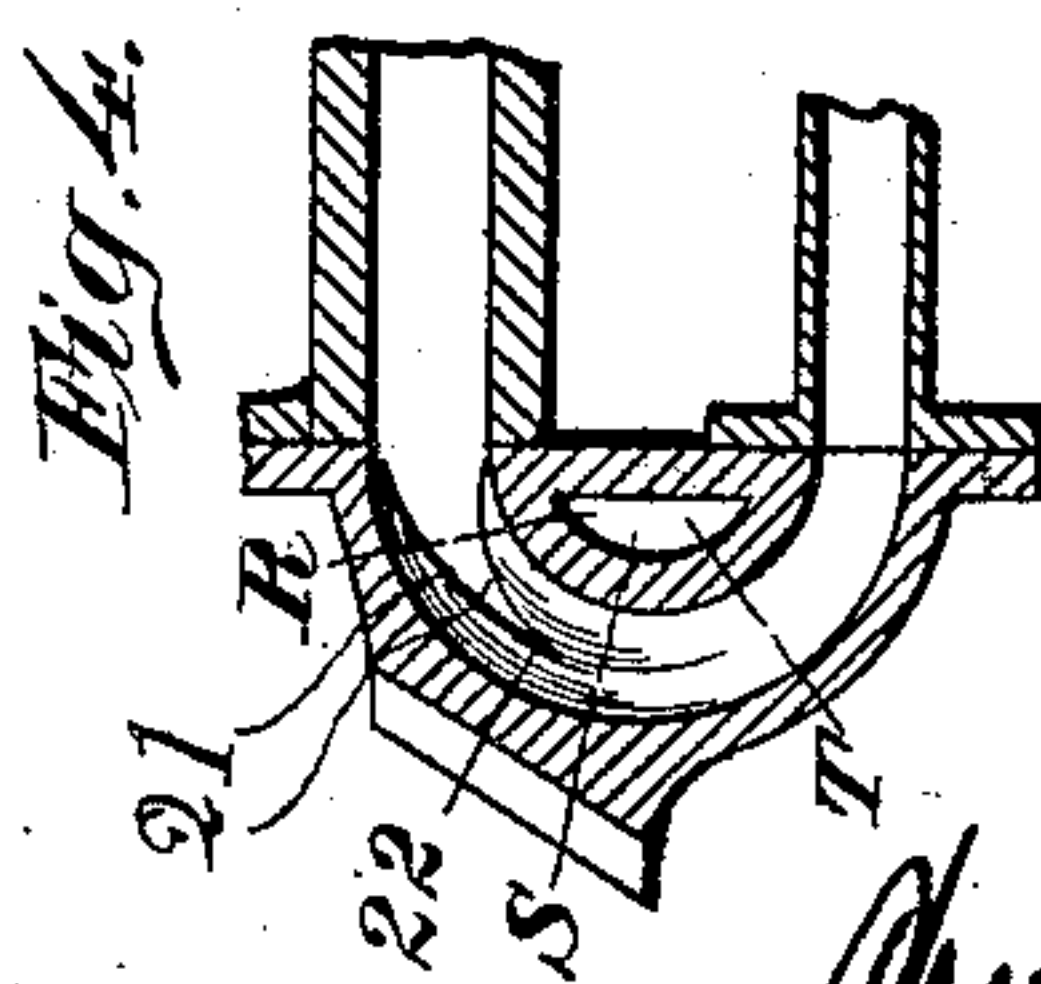
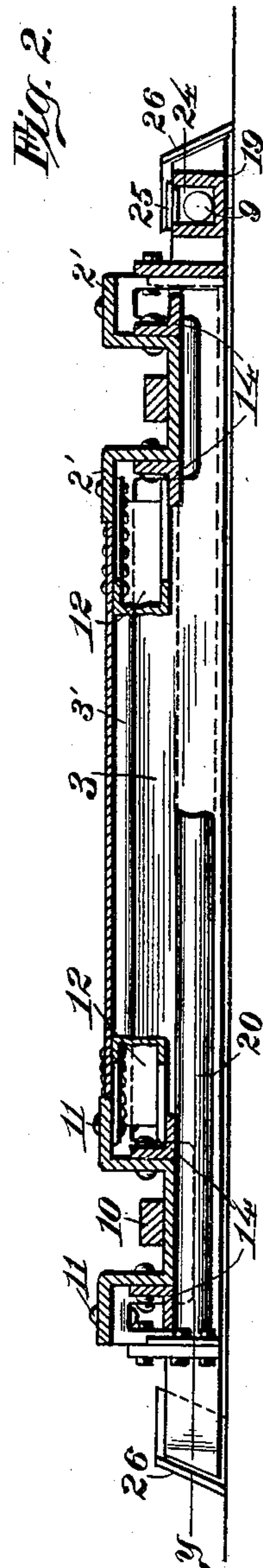
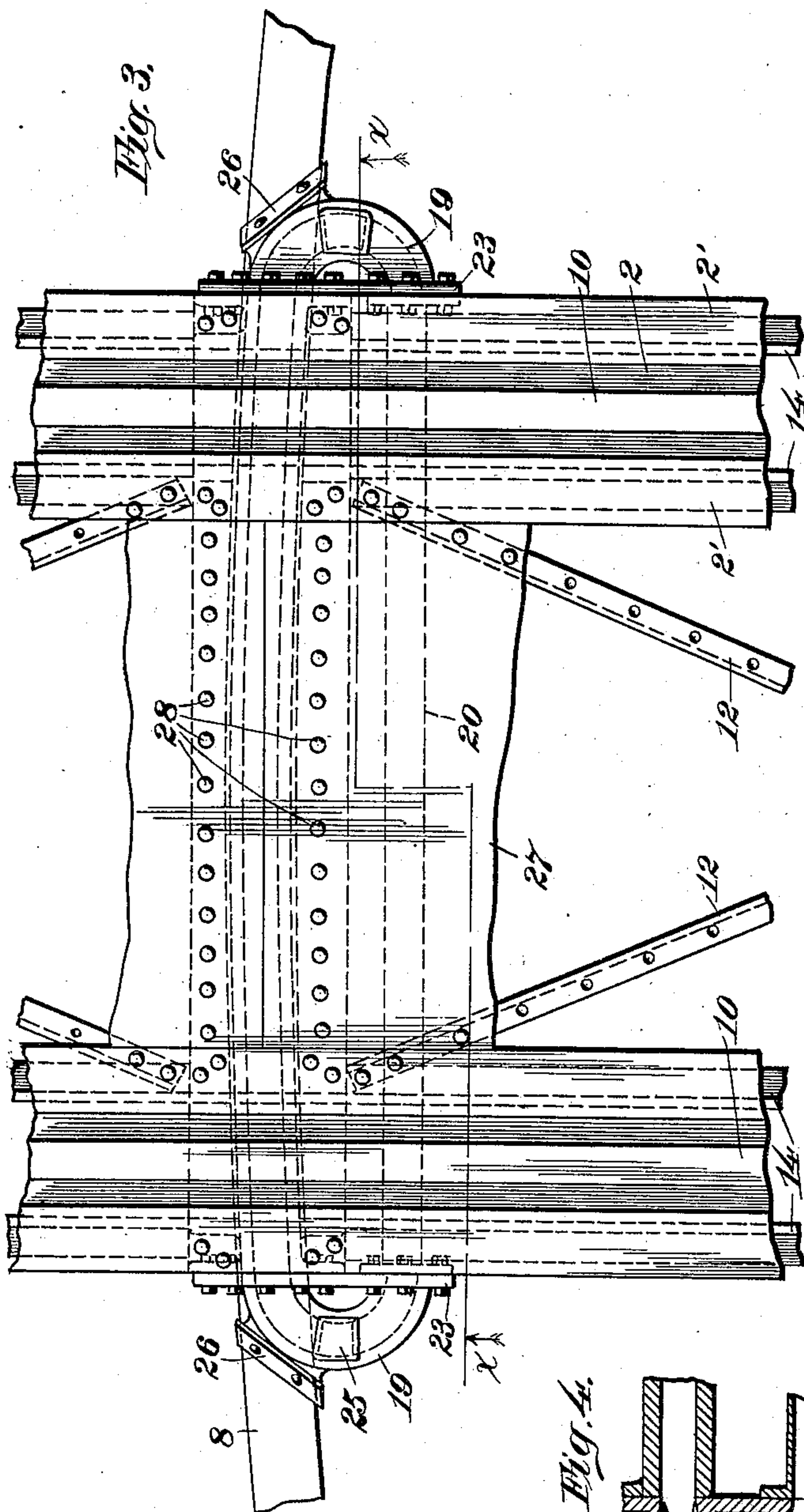
*Charles G. Hawley*

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3 SHEETS—SHEET 2.



*Witnesses:*

St. J. Austin  
John P. Lefevre.

*Inventor;*

Charles Wentworth Bradley



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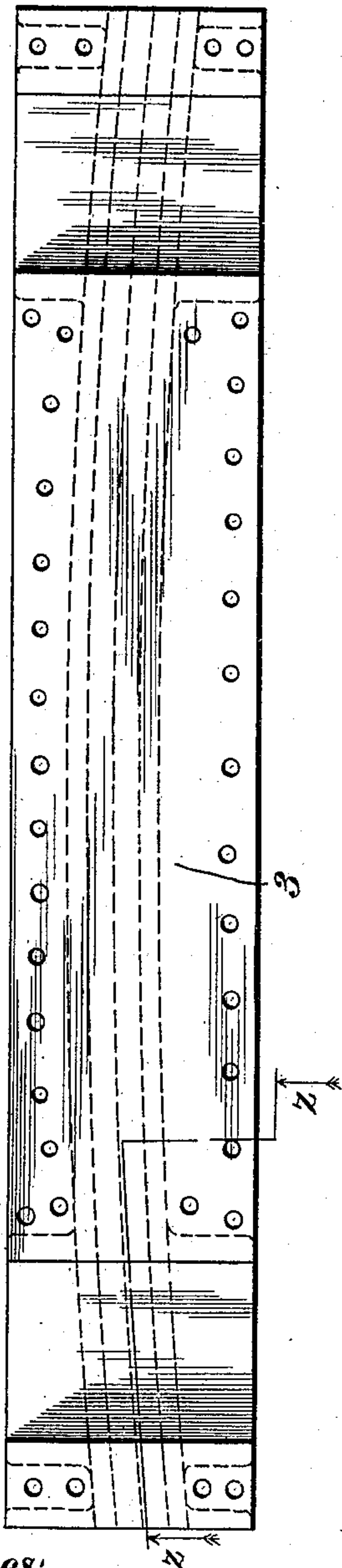
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3 SHEETS—SHEET 3.

Fig. 5.



Witnesses:

H. S. Austin  
John R. Lefevre

Fig. 6.

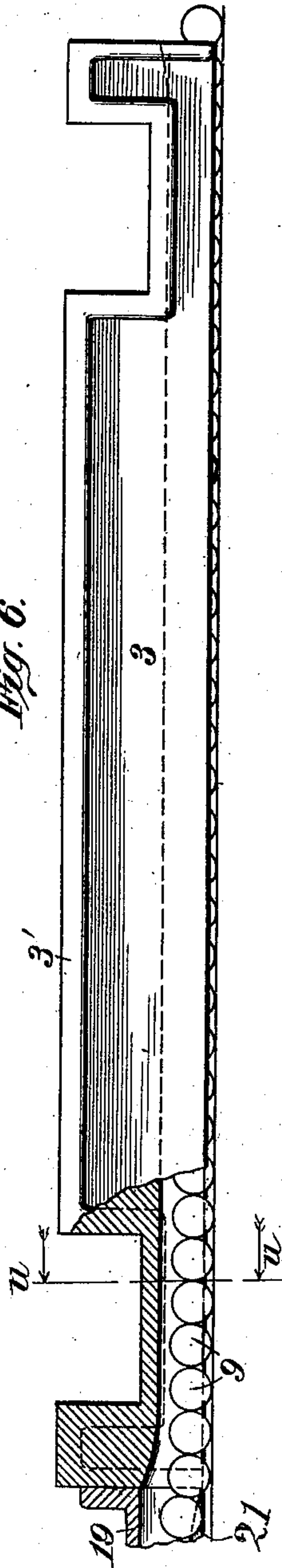


Fig. 7.

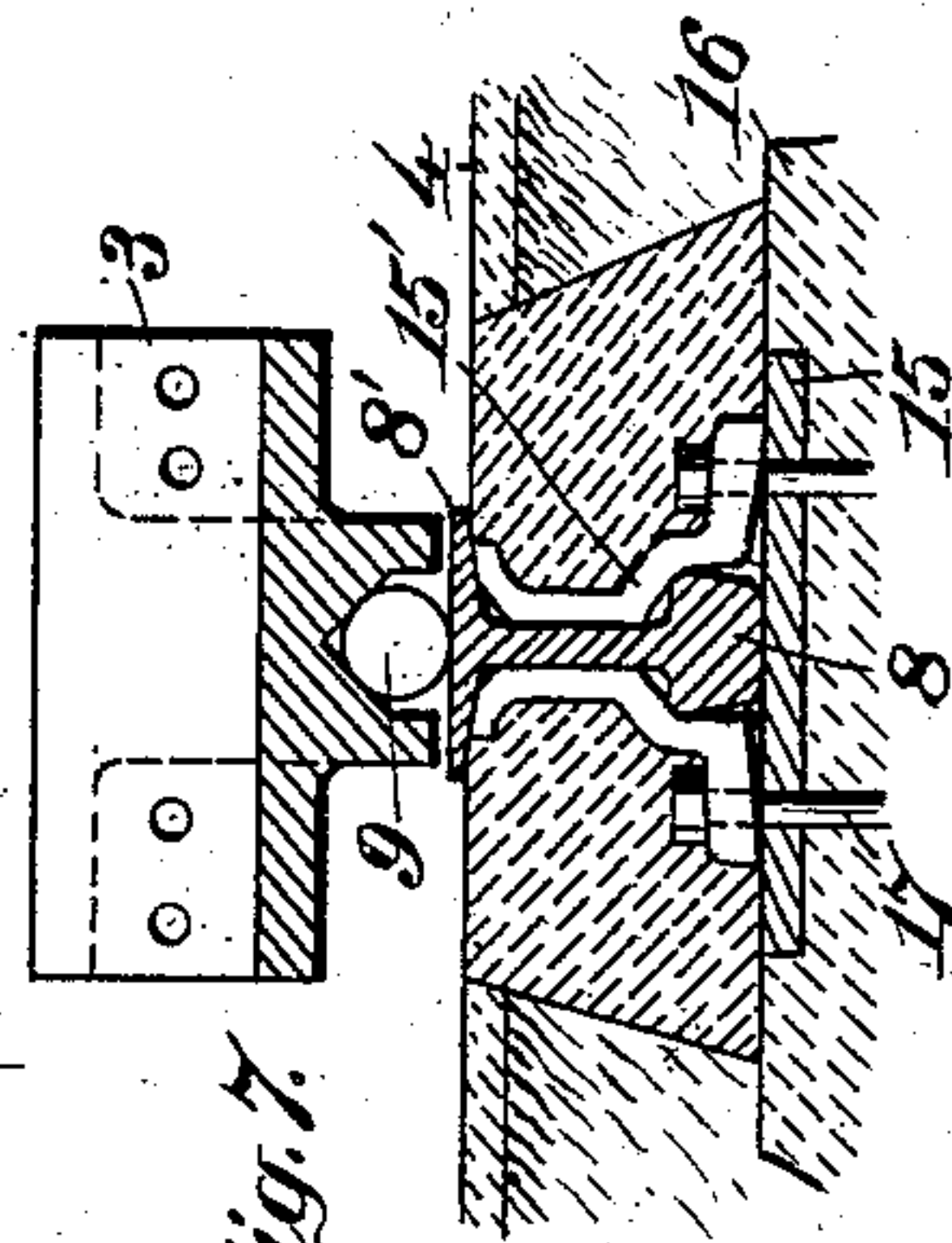


Fig. 8.

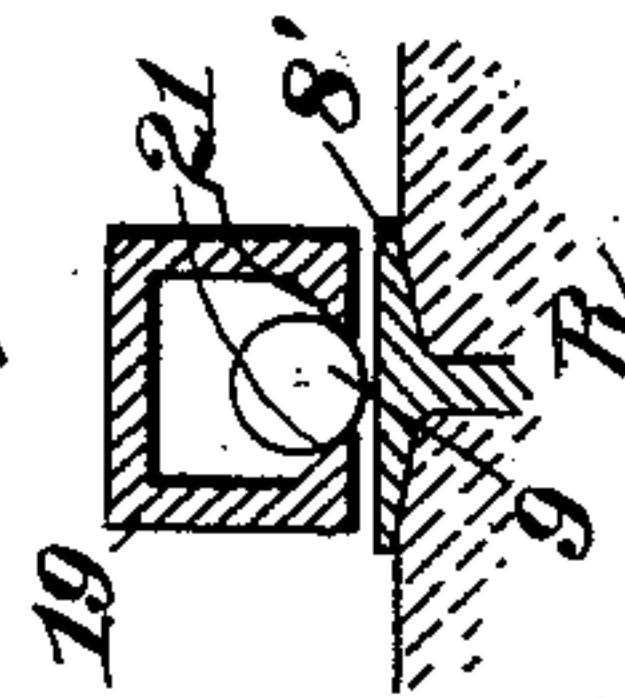


Fig. 9.

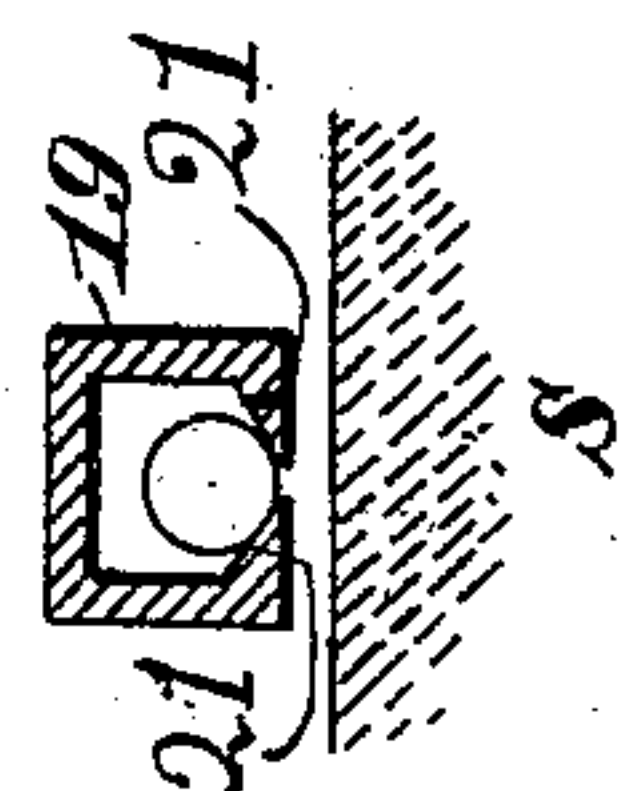
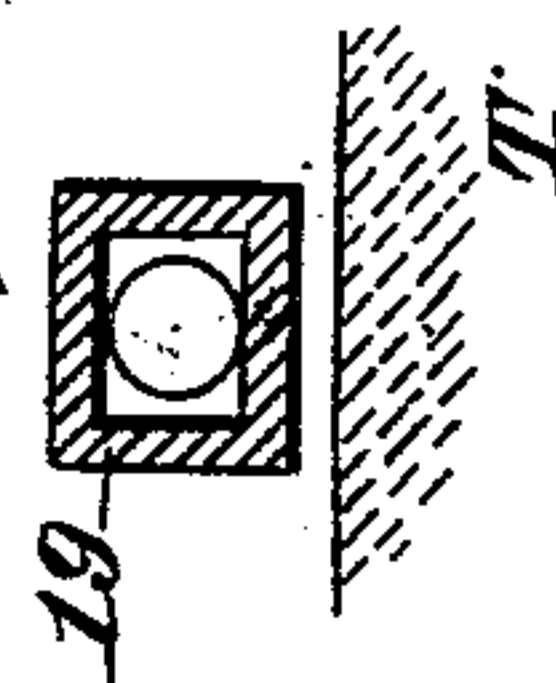


Fig. 10.



Inventor

Charles G. Hawley



# UNITED STATES PATENT OFFICE.

CHARLES GILBERT HAWLEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK A. GALE,  
OF CHICAGO, ILLINOIS.

## NORMAL-SURFACE TURN-TABLE.

No. 889,371.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed September 24, 1906. Serial No. 335,889.

*To all whom it may concern:*

Be it known that I, CHARLES GILBERT HAWLEY, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new, useful, and Improved Normal-Surface Turn-Table, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same.

My invention relates to railroad turn tables and has particular reference to improvements in so-called normal-surface turn tables.

A normal-surface turn table is one which  
15 is constructed entirely or substantially entirely above the level of the ground on which the tracks to be served are laid. The purpose in so constructing a turn table is to do away with the deep pits of the more common  
20 types of turn tables, long recognized as most objectionable.

The primary object of my invention is to provide a normal surface turn table of a height exactly or substantially corresponding  
25 to the normal height of the rails composing the incoming and outgoing yard tracks which center at the table.

Another object of the invention is to provide a turn table of this class which shall be  
30 amply strong to carry the heaviest of railroad rolling stock, and generally to so improve the construction of normal surface turn tables as to adapt them to modern requirements.

35 Still another object of the invention is to simplify the construction of such tables and lessen the cost of installing and maintaining them.

A further object of the invention is to im-  
40 prove the construction and operation of turn table supporting or carrying means to the end that the loads and strains shall be distributed in a better manner, and to thereby enable the production of a turn table of less  
45 weight than usual and which may be moved or turned with less power.

A further and particular object of the invention is to lessen the frictional resistance to the turning of the table and a further ob-  
50 ject is to improve the mechanism employed for rotating large turn tables.

Other objects of my invention will appear hereinafter.

My invention consists generally in a turn

table of the construction and combination of 55 parts hereinafter described and particularly pointed out in the claims.

The essential features of my invention, as more fully described hereinafter, are, a low table comprising longitudinal stringers and a 60 plurality of cross members or cross carriers whereon the stringers are arranged; a central pivot for said table; a plurality of circular tracks or rails having their tops substantially flush or level with the ground or 65 yard surface, said tracks being concentric with the table center and being spaced to correspond to the spacing of said cross carriers; roller bearings interposed between the cross carriers and their respective circular 70 rails; means in connection or associated with each cross bearer for returning the rollers or balls from the rear end thereof to its forward end, according to the direction of movement of the table; and, a table turning mechan- 75 ism, preferably mounted for movement with the table. These essential features and further features and details of my invention will be readily understood by reference to the accompanying drawings, forming a part of this 80 specification and in which

Figure 1 is a plan view of a turn table embodying my invention; Fig. 2 is an enlarged vertical transverse section on the irregular line X—X of Fig. 3, viewed in the direction 85 of the arrows; Fig. 3, is a plan view of the structure shown in Fig. 2; Fig. 4, is a sectional detail on the line Y of Fig. 2; Fig. 5 is a top view of one of the cross bearers; Fig. 6 is a side view or elevation thereof partly in sec- 90 tion on the line Z—Z of Fig. 5; Fig. 7, is a vertical section on the line U—U of Fig. 6; and Figs. 8, 9, and 10 are diagrammatic sectional views substantially on the lines, R, S and T respectively of Fig. 4, showing the 95 manner in which the antifriction balls are elevated at the ends of the cross bearer.

Modern turn tables are from 50 to 90 feet in length. The table represented in the drawings is of such dimension and may be of 100 even greater length if desired; for the reason that the numerous rotating supports (bearers) of the table in effect divide it into a plurality of short self sustaining sections, each complete in itself and obviously, any desired 105 number of these sections may be used.

In constructing the table I prefer to employ longitudinal members or stringers, 2—2,



which are continuous, that is, which extend unbrokenly from end to end of the table; nevertheless, the table may be properly defined as comprising a plurality of sections, each made up of a cross member or carrier, and longitudinal members of sufficient length to reach the next cross carrier, 3—3, and if desired the table may be so constructed, the only requirement being that in such cases the longitudinal members shall be properly spliced. Continuous stringers provide maximum strength with minimum weight and this is the essential factor which ordinarily leads me to use continuous stringers in lieu of spliced members. The table is held by a central pivot about which it rotates. The swing of the table determines and defines the turn table surface 4 as distinguished from the ground or yard surface, 5, surrounding the turn table. In carrying out my invention, I prefer to provide a concrete bed or surface, 4, for the turn table and except for slight depressions which are necessary to the drainage of the turn table surface, said surface is flush or level with the surface, 5, of the railroad yard. The yard tracks, 7—7, lead up to, and their ends, 7', may be laid upon, the edges of the circular concrete bed 4 in position to meet the ends of the turn table, the end tie or ties being embedded in the concrete. On the turn table surface and embedded therein, I lay a number of circular rails or tracks 8—8, concentric with the pivot of the table. These circular tracks are of different diameters and their tops, 8', project slightly above the turn table surface. Rails of special cross section may be employed, if desired, but I prefer to employ ordinary railroad rails, curving them and inverting them as shown in Fig. 6. The rail may be used in normal position, the head of the rail being amply wide to receive the row of wheels, rollers or balls on which the table rolls, but I prefer to use the wider base of the rail in most cases and thereby provide a safe track for the rolling members, even though the rail be inaccurately curved, as sometimes occurs.

I prefer to employ balls as the rolling members of the turn table bearings, as they permit a very low construction of the table and provide a large number of bearing points with but slight friction. The cross bearers of the turn table are provided with suitable ball bearing grooves which may be of various forms in cross section, but which preferably afford only two points of contact with the balls. The inverted V shaped groove section shown in Fig. 7 embodies this feature and the balls travel upon the inverted rails, 8. An equivalent construction of the turn table bearings is a rail or track, 8, provided with a V shaped groove for holding the balls, in combination with a cross bearer having a plane or substantially plane bottom surface.

Each cross bearer rests on a row of balls, 9, and in connection with each cross bearer, I provide an idle roll returning device, connected with the ends of the cross carrier in such manner that the balls upon leaving one end thereof are returned to the other end. By such a device I am enabled to avoid the use of continuous annular rings of balls co-extending with the turn table rails, 8, and to accomplish the purpose with a much smaller number of balls, while permitting the balls to roll as freely as in the ordinary ball bearing.

Means which are operated by the movement of the table may, if desired, be employed for causing the return travel of the antifriction balls; but I prefer to employ the fixed, return races or ducts shown in the drawings, thereby avoiding all complications incident to rotary conveyers or the like, which, as indicated may be substituted.

The turn table, as shown in the drawings, comprises two parallel track supporting stringers, 2, resting upon the spaced cross bearers, 3. The flanged channel members or stringers are represented as resting upon the bottoms of the recesses in the cross bearers. In this regard the drawings are misleading, the fact being that the channel members are of slightly less depth than said recesses or notches, it being desirable to preserve the elasticity of the stringers throughout and to avoid resting of the load directly upon the thinnest portions of the cross members. In effect, the load is suspended from the top flanges of the channel members, and said members are preferably designed with this end in view.

The stringers, 2, carry the low rails, 10, hereafter referred to as the turn table rails. Preferably these rails are only of sufficient height to hold the wheel flanges of rolling stock off the stringers, 2. The flanges, 2', of said stringers are secured by rivets, 11, to cross bearers, 3, which are provided with upper lateral flanges, 3', for this purpose.

The track supporting structure described may be strengthened or braced in any suitable manner. As shown, braces, 12, having their ends secured to the flanges 2', perform this function. These braces, instead of extending obliquely from one cross bearer to the next, are preferably shaped and arranged as shown in Fig. 1; they being riveted together at their middle points, 12'. The cross carriers, 3, are positioned directly above the respective tracks, 8, and are formed with ball bearing surfaces, which, as already stated, may be either plane, concave or grooved.

The center of the turn table is provided with a stringer-connecting member or members, preferably of annular form.

13 designates an annular cross bearer or supporting member beneath which is a circular track (not shown), and between said track and bearer, a series of antifriction rolls may



be employed. The center pin or center pin bearing of the table may be secured to, or integral with, this central bearer, 13.

The track supporting stringers, 2, may be reinforced, with reference to the load carried thereby, between the cross bearers, 3. This may be accomplished by means of preferably continuous angle bars, 14, riveted to the inner sides of said stringers at a sufficient height to pass over the tubes, 20.

The structure herein shown is such that the tops of the rails upon the table are level with the tops of the rails of the yard tracks, while the tops of the table-carrying rails are in the plane of the bottom of the yard tracks. In cases where very heavy rolling stock is to be handled, I prefer to increase the thickness or height of the cross bearers. This necessitates either a relative lowering of the table rails or raising of the stub ends of the yard tracks. Otherwise the structure remains the same. The cross bearers, 3, or those portions thereof supporting the stringers, 2, may in effect be raised or deepened by forming them without the depressions or recesses; but it is preferable to elevate them between the stringers and also at their ends, in order to provide bearing and attaching surfaces for the stringer flanges, 2'.

When the turn table track is formed by an inverted rail of standard section, the rail is provided with suitable supporting devices consisting of chairs or the like; as the combination of base plates with angle lugs. The base plate, 15, of the chair, is laid upon the concrete or other foundation, 16, and its lateral members, 15', are bolted together through the web of the rail 8. The chair may be anchored by bolts, 17. The upper part of the foundation wall is then constructed upon and around the rail, 8, and raised flush with the ground surface, 4. The chairs or supporting devices are spaced at suitable distances around the circular track.

A specific form of idle roll returning device is shown in detail in Figs. 3, 4, 5, 8, 9, and 10. This device comprises two semicircular ball ducts, 19, secured to the respective ends of the cross carrier, 3, and a tube, trough, or conduit, 20, connecting said ducts, 19. One end of each duct, 19, is in communication with the roller bearing surface of the cross carrier and its other end is connected to the tube, trough, or conduit, 20. There is thus formed an endless ball race. The balls or rollers beneath the cross carrier will be moved in the same direction thereas but at slower speed, in other words, the balls or rollers will lag behind the cross carrier when the turn table is in motion. Thus the balls or rollers will be discharged, as it were, from the rear end of the cross carrier into one of the semicircular ducts, 19, and received through the other duct, 19, at the forward end of the cross carrier. This circulation of the balls or

rollers is permitted by the connecting conduit, 20. In order to cause the balls to pass from the track or lower bearing surface into the idle roll returning device at the rearward side of the table, I provide lifting devices arranged within the respective curved ducts, 19. Said devices comprise an inclined surface or surfaces upon which the balls are pushed or drawn by the mutual action of the track and the cross bearer surface thereon. These inclined ball lifting surfaces may be formed directly upon the bottoms of said ducts, as shown. The ball is first engaged below its center by two inwardly turned flanges, 21, which lie close to the track and are adapted to lift the ball therefrom. These flanges converge in the direction of movement of the balls and unite, as shown, at 22, thereby forming a groove in the bottom of the duct. This groove may continue and meet the straight portion, 20, of the ball returning device, or the bottom of the duct 19 may become flat, as shown in Fig. 10. The bottom of the duct 19, when formed in this or any similar manner, will thus transfer the balls or rollers from the bearing surface into the connecting conduit, 20, at one side of the table, and at the other side of the table the balls or rollers will reënter upon the bearing surface. As the bottoms of the ducts, 19, are upwardly inclined from the cross bearers, the tops thereof are correspondingly inclined, or are raised sufficiently to permit the balls to pass through their upper portions.

The ducts, 19, are provided with flanges, 23, which are bolted to the ends of the cross bearers and also to flanges upon the ends of the idle ball conduit, 20, thus supporting the latter. One or both of the ducts, 19, may be provided with an opening, 24, large enough to receive one of the balls or rollers, said opening being closed by a cap, 25. The members, 26, shown at the ends of the cross bearers, represent track cleaning appliances, comprising one or more parts adapted to effectually clean the track of obstacles and gritty substances, which would cause undue wear of the roller bearings. When the roller bearing surfaces of the cross carrier extend the full length thereof it is convenient to attach these appliances to the curved castings, 19, as shown in Fig. 3.

In lieu of the return races whereby the balls are lifted from the track level, I may employ wider turn-table tracks and permit the balls to return upon the surfaces thus afforded. This construction dispenses with the ball elevating means, but retains the curved guides or returns at the ends of the bearing surfaces.

The track stringers, 2, may be continuously connected by a flat plate secured thereto by rivets and extending substantially the length of said stringers. Such a plate strengthens and stiffens the turn table structure and pro-



vides a footway for pedestrians. As shown in the drawings, a plate, 27, of this character is laid upon the cross carriers and secured thereto with rivets, 28.

5 The turn table is driven by a motor, 29, mounted on a platform, 30, which is provided with wheels or roller bearings running upon two of the tracks, 8. The platform is rigidly connected to the turn table by braces, 31 and  
10 32. Braces, 33, may be extended from the turn table to connect with braces 31. This arrangement of braces is not arbitrary and is simply one mode of transmitting the driving impulse from the motor to the table. The  
15 motor, 29, is geared to a driving pinion which meshes with the circular rack, 34, anchored to a suitable foundation within the turn table surface.

Any suitable means for accurately registering and locking the turn table with any of  
20 the tracks, 5, may be employed.

As various modifications of the invention will readily suggest themselves to one skilled in the art, I do not limit my invention to any  
25 of the specific forms described herein.

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

1. A normal surface turn table comprising  
30 circular tracks sunk in a normal surface and a table composed of a plurality of self sustaining sections, each section comprising longitudinal members and a revolving support, substantially as described.

35 2. The combination with converging yard tracks of a turn table surface, circular tracks laid therein with their tops in the plane of the bottoms of the yard tracks and a turn table comprising a plurality of self sustaining sections, each composed of longitudinal mem-  
40 bers and a supporting member, substantially as described.

3. The combination with converging yard tracks of a turn table surface, circular tracks  
45 laid therein with their tops in the plane of the bottoms of the yard tracks and a turn table comprising a plurality of self sustaining sections, each composed of longitudinal members and a supporting member, provided  
50 with a roller bearing, substantially as described.

4. The combination with converging yard tracks of a turn table surface, circular tracks  
55 laid therein with their tops in the plane of the bottoms of the yard tracks, and a turn table comprising a plurality of self sustaining sections, each composed of longitudinal members and a supporting member provided with a roller bearing and with idle roll returning  
60 means, substantially as described.

5. The combination with converging yard tracks of a turn table surface, circular tracks  
65 laid therein with their tops in the plane of the bottom of the yard tracks, and a turn table comprising a plurality of sections, each com-

prising longitudinal channeled rail members and a transverse supporting member, substantially as described.

6. A normal surface turn table comprising longitudinal rail members, a cross carrier  
70 supporting said members, said carrier having a roller bearing surface, a circular track beneath said carrier, and a roller bearing consisting of rolls and roll returning means, the latter being adjacent and belonging to, said  
75 cross carrier, substantially as described.

7. A normal surface turn table, comprising longitudinal rail members, a cross carrier supporting said members, said carrier having  
80 a roller bearing surface, a circular track beneath said surface and a roller bearing comprising rolls, a number of which are active and the remainder idle at any given time and idle roller returning mean, all carried by the  
85 turn table, substantially as described.

8. A normal surface turn table comprising longitudinal rail members, a cross carrier having a roller bearing surface, a circular  
90 track beneath said surface and a roller bearing, comprising active and idle rolls, and so constructed as to return the rolls from the rearward to the forward end of the bearing surface, during movement of the turn table,  
substantially as described.

9. A normal surface turn table, comprising  
95 longitudinal rail members, a cross carrier having a roller bearing surface, a circular track beneath said cross carrier, and a roller bearing carried entirely by the turn table, said bearing consisting of rolls and means for  
100 causing the rolls to travel from the rearward to the forward end of the cross carrier, during movement of the turn table, substantially as described.

10. A normal surface turn table compris-  
105 ing longitudinal rail members, a cross carrier, a circular track, and a roller bearing carried by the turn table, said bearing comprising active and idle rolls and so constructed as to return the rolls from the rearward to the for-  
110 ward end of the bearing surface, during movement of the turn table, substantially as described.

11. A normal surface turn table compris-  
115 ing longitudinal rail members, a cross carrier, a circular track, and a roller bearing carried by the cross carrier, said bearing comprising active and idle rolls and so constructed as to return the rolls from the rearward to the for-  
120 ward end of the bearing surface, during movement of the turn table, substantially as described.

12. A normal surface turn table, compris-  
125 ing longitudinal stringers, a cross carrier connecting said stringers and having a roller bearing surface, a circular track beneath said surface, and a circulating roller bearing, comprising rolls and idle roll returning means, a number of the rolls lying between  
130 the cross carrier and the track and the re-



mainder lying within the roll returning means, substantially as described.

13. A normal surface turn table, comprising longitudinal stringers, a cross carrier connecting said stringers and having a roller bearing surface, a circular track beneath said surface and a circulating roller bearing, comprising rolls and idle roll returning guides, a number of the rolls lying between the cross carrier and the track, and the remainder lying within the roll returning guides, substantially as described.

14. A normal surface turn table, comprising longitudinal rail members, a cross carrier having a roller bearing surface, a circular track beneath said cross carrier, and a roller bearing carried entirely by the turn table, said bearing consisting of rolls and guides for causing the rolls to travel from the rearward to the forward end of the cross carrier, during movement of the turn table, substantially as described.

15. A table for transferring rolling stock from one track to another, said table having a plurality of cross bearers, in combination with stringers supported thereby, roller tracks alined with said bearers, sets of rollers interposed between each cross bearer and the corresponding track, and means extending from end to end of each cross bearer for returning the rollers from one end of the cross bearer to the other, substantially as described.

16. A normal surface transfer table, comprising longitudinal channeled rail stringers, a plurality of cross carriers connecting and supporting said stringers, and a circular central cross carrier, substantially as described.

17. A normal surface transfer table, comprising longitudinal channeled rail stringers, a plurality of cross carriers connecting and supporting said stringers, and a circular central cross carrier, said cross carrier being provided with a roller bearing and an idle roll returning device, substantially as described.

18. The combination, with concentric circular tracks within a turn table surface, of a plurality of turn-table cross-carriers alined with said tracks, and longitudinal track stringers connected and supported by said cross carriers, one of the carriers being circular and supporting the center of the turn table, the cross carriers being provided with roller bearings, substantially as described.

19. The combination, with concentric circular tracks within a turn table surface, of a plurality of turn table cross carriers alined with said tracks, and longitudinal track stringers connected and supported by said cross carriers, one of the carriers being circular and supporting the center of the turn table, said circular carrier providing a central bearing for the table, substantially as described.

20. A normal surface turn table, comprising longitudinal channel stringers, cross bearers thereunder, and braces connecting said stringers between the cross bearers, substantially as described.

21. A normal surface turn table, having longitudinal parallel depressed load bearing portions, and a plurality of cross carriers, each having a roller bearing surface and provided with an idle roll returning device, substantially as described.

22. In a turn table, longitudinal members, a cross carrier having a roller bearing surface, a roll guide held adjacent and substantially parallel to said bearing surface, the ends of said guide being curved to meet the ends of said surface and rolls within said guide, the function of the guide being to return the rolls from the rearward to the forward end of the roller bearing surface, substantially as described.

23. In a turn table, longitudinal members, a cross carrier having a roller bearing surface, a roll conduit held adjacent and substantially parallel to said bearing surface, the ends of said conduit being curved to meet the ends of said surface, and rolls within said conduit, the function of the conduit being to return the rolls from the rearward to the forward end of the roller bearing surface, substantially as described.

24. In a turn table, longitudinal members, a cross carrier having roller bearing surfaces, a pick up device for taking the rolls from the rearward end of said surface and a guide for returning them to the forward end thereof, substantially as described.

25. In a turn table, longitudinal members, a cross carrier having roller bearing surfaces, a pick up device for taking the rolls from the rear yard end from said surface and a conduit for returning them to the forward end thereof, substantially as described.

26. In a turn table, longitudinal members, a cross bearer having a roller bearing surface, a roll returning conduit held close to said surface, the ends of said conduit being curved to meet the ends of said surface, and a pick up device within one of said conduit ends, substantially as described.

27. In a turn table, longitudinal members, a cross bearer having a roller bearing surface, a roll returning conduit held close to said surface, the ends of said conduit being curved to meet the ends of said surface and a pick up device within each end of said conduit, substantially as described.

In testimony whereof, I have hereunto set my hand, this 30th day of August, 1906, in the presence of two subscribing witnesses.

CHARLES GILBERT HAWLEY.

Witnesses:

JOHN R. LEFEVRE,  
F. G. KNIGHT.