No. 692,521. Patented Feb. 4, 1902.

P. JOHNSON.

RAILROAD TURN TABLE.

(Application filed July 12, 1900.)

(No Model.) 3 Sheets—Sheet 1.

FIG.1

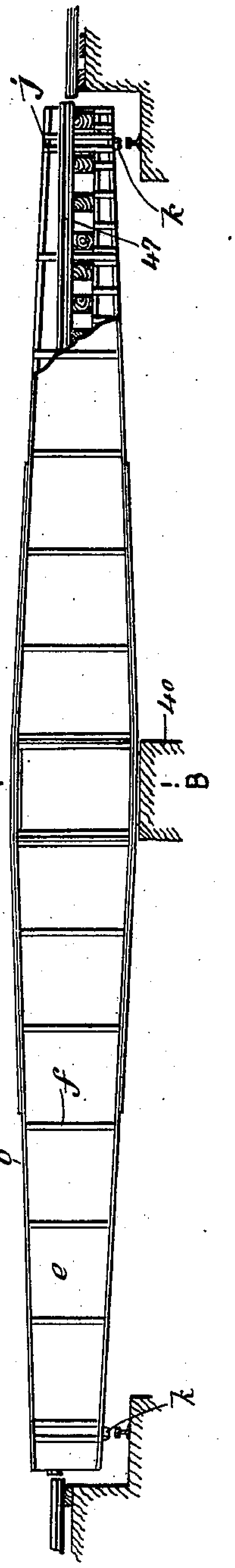
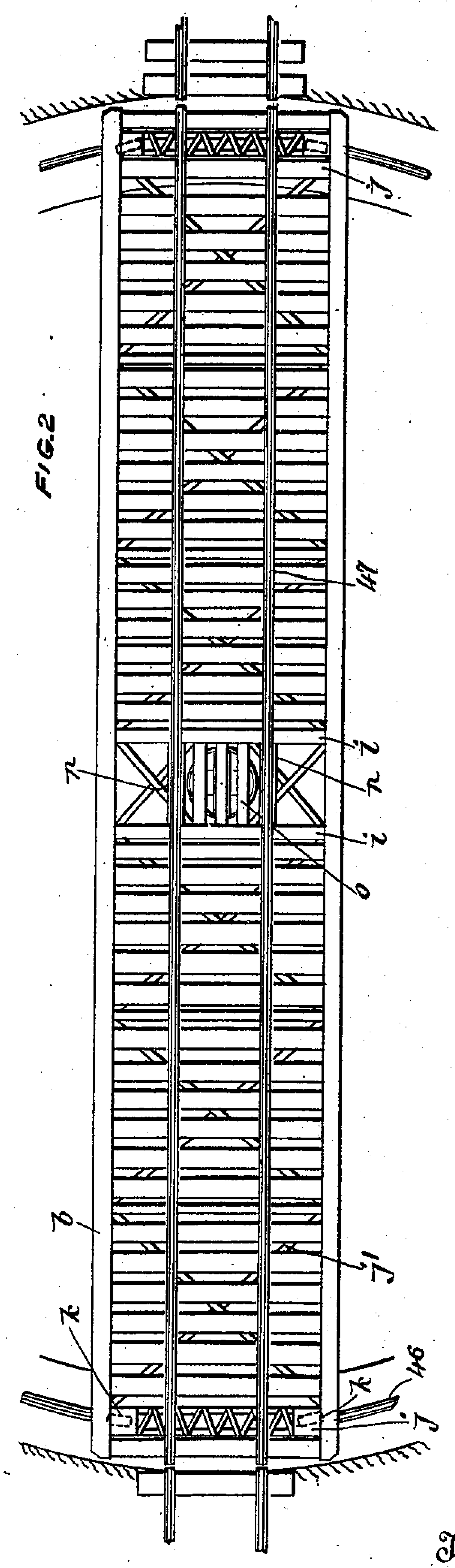


FIG.2



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By his Attorney
[illegible signature]

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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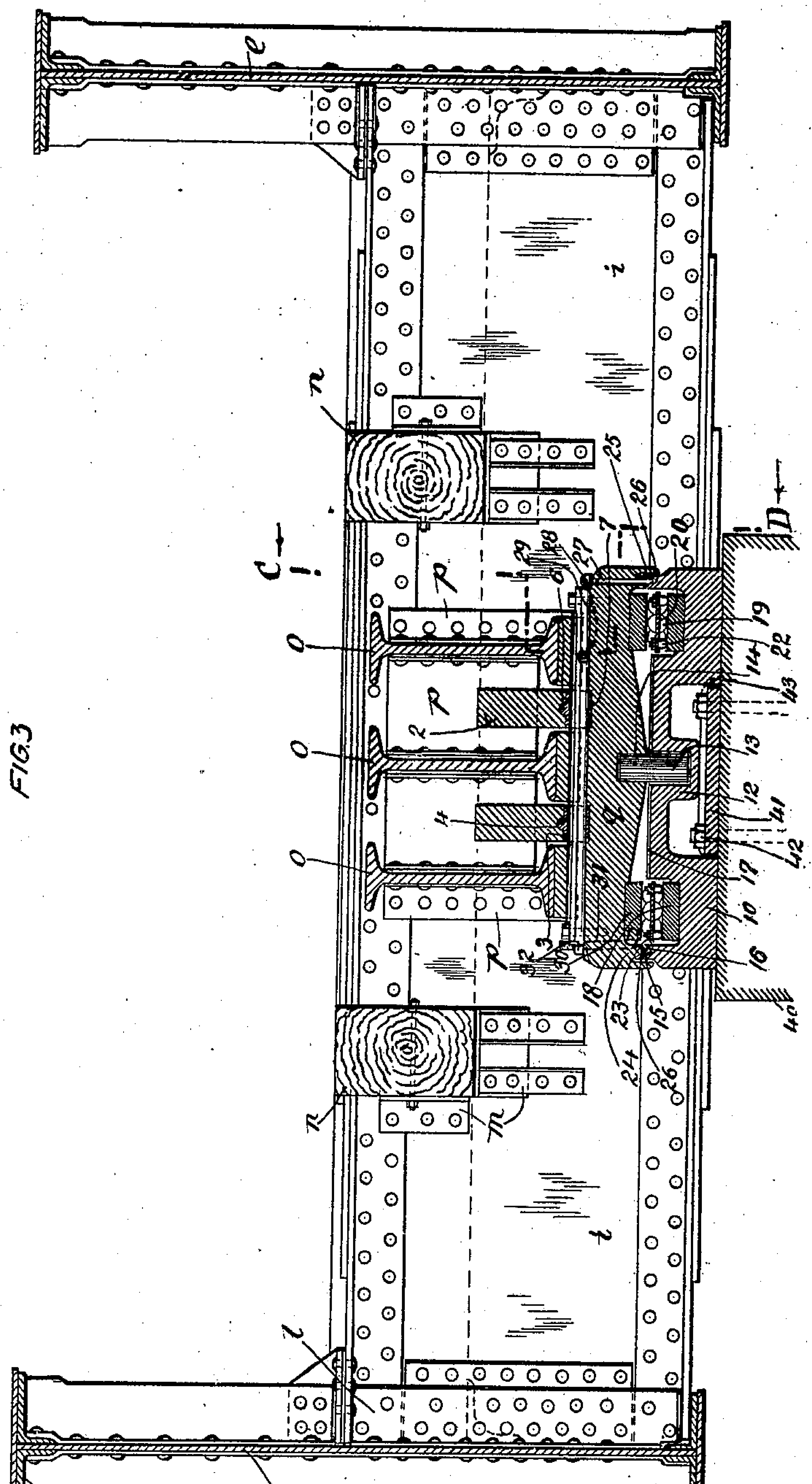
3 Sheets—Sheet 2.



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RAILROAD TURN TABLE.

(Application filed July 12, 1900.)

(No Model.) 3 Sheets—Sheet 3.

FIG. 4.

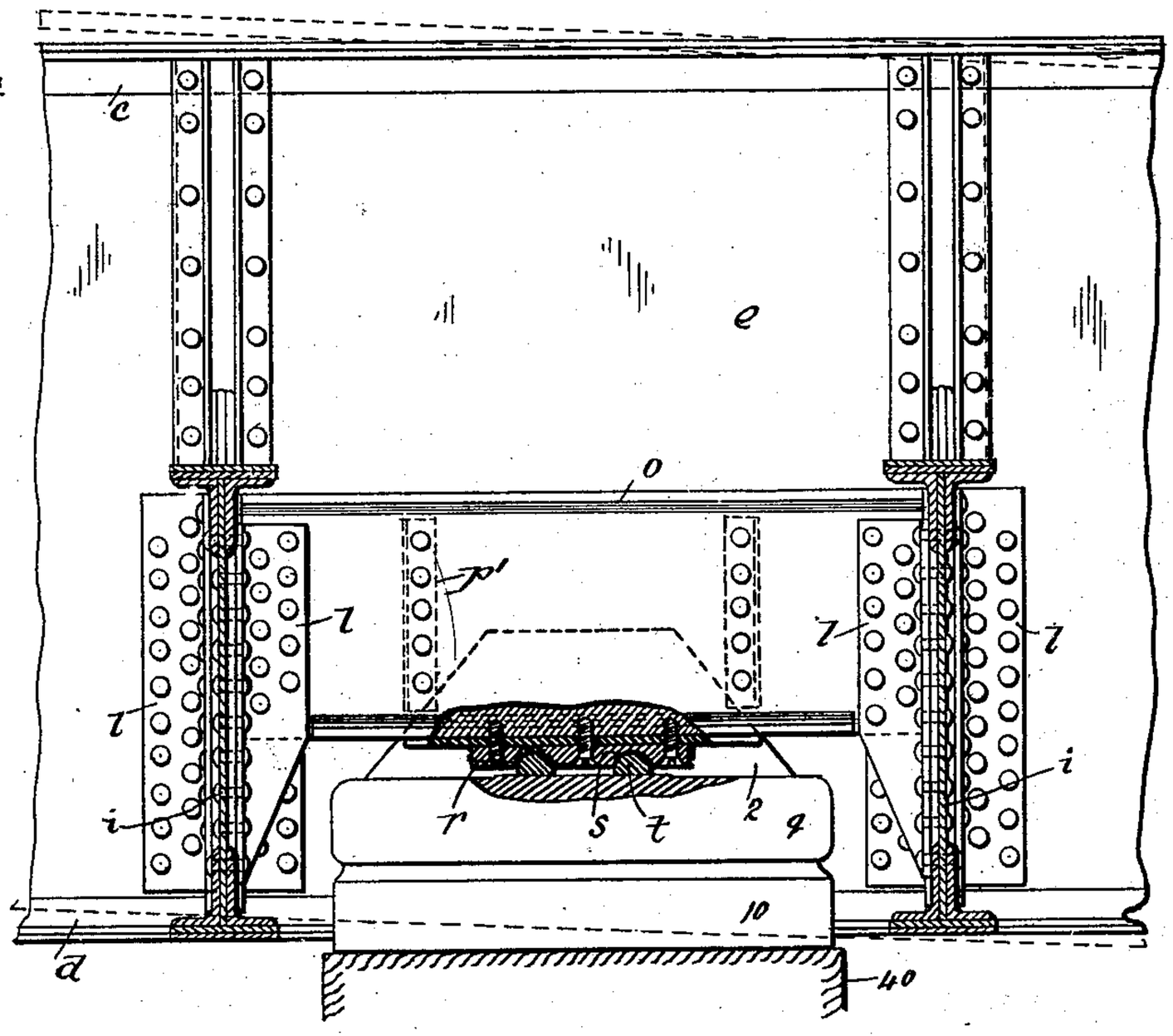
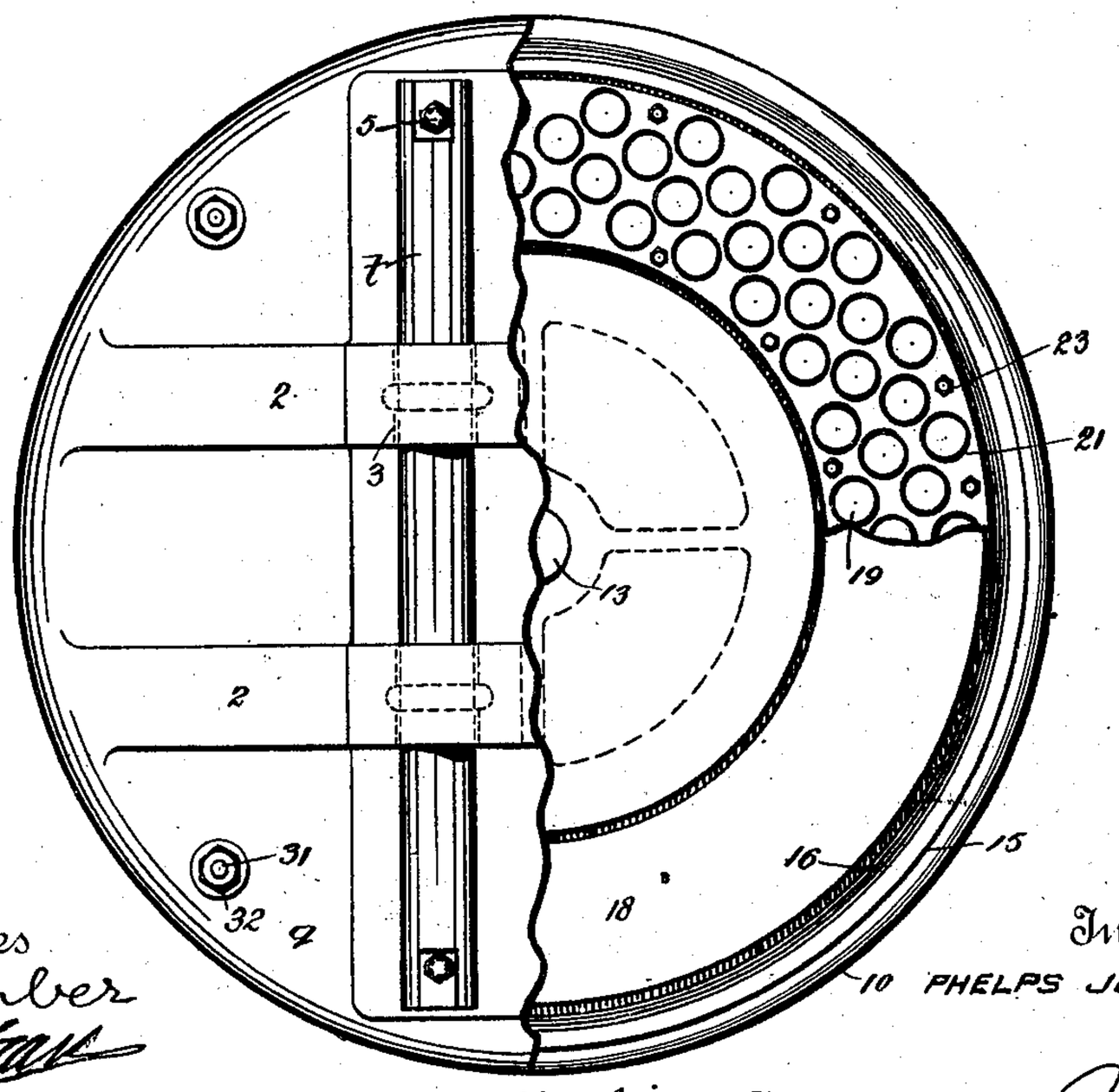


FIG. 5



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UNITED STATES PATENT OFFICE.

PHELPS JOHNSON, OF MONTREAL, CANADA.

RAILROAD TURN-TABLE.

SPECIFICATION forming part of Letters Patent No. 692,521, dated February 4, 1902.

Application filed July 12, 1900. Serial No. 23,381. (No model.)

To all whom it may concern:

Be it known that I, PHELPS JOHNSON, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Railroad Turn-Tables; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention has for its object to provide a railroad turn-table that will be more stable while in use, more readily balanced, and more durable than turn-tables heretofore known and one that will have a considerable base within or near which the center of gravity of the engine to be turned may fall when the table assumes its turning position.

The invention may be said, briefly, to consist in constructing a turn-table to rest when bearing its load upon a double center or two-point bearing extending transversely thereof and at the same time allow the table to tilt upon either of said centers and when performing its function have a uniform distribution of the stresses due to the load borne by the turn-table throughout a main frame and concentrated to a base, throughout which said stresses are in turn uniformly distributed. The main frame consists of main longitudinal girders supported upon transverse loading-girders extending between said longitudinal girders and in turn supported upon loading-beams extending longitudinally of the turn-table between said transverse loading-girders. These girders and beams are so arranged and braced together that the said concentration of the stresses upon a rigid base-casting will be effected through a section supported rotatably upon said rigid base-casting, said rotatable section having webs formed in one therewith, which have the function of distributing the stresses throughout said rotatable section. The base-casting and rotatable section are of peculiar construction and include novel means for lubricating the bearing-faces of said base-casting and rotatable section.

For full comprehension, however, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a side elevation of my improved turn-table. Fig. 2 is a plan view thereof. Fig. 3 is an enlarged transverse vertical sectional view thereof, partly broken away, taken on line A B, Fig. 1. Fig. 4 is a vertical sectional view taken on line C D, Fig. 3; and Fig. 5 is a plan view, partly in section, of the rotatable section and base-casting.

The frame of my improved turn-table consists of a pair of main longitudinal girders *b* of compound structure, comprising upper and lower angle-irons *c* and *d*, respectively, web-plates *e*, and braces *f*, all connected together by rivets or in any other manner usual in bridge-work. These main girders *b* are connected together by a pair of main transverse girders *i*, constituting loading-girders, located about midway of the length of said main longitudinal girders and a short distance apart, while the whole of this structure is braced together by a pair of end girders *j* (upon which the usual rollers *k* are mounted) and a series of diagonal and transverse stays *j'*. These loading-girders *i* are connected at their ends to the main longitudinal girders by angle-irons *l* (see Fig. 4) and are furnished with the usual angle-iron brackets *m* for supporting the ends of wooden stringers *n*, the ties proper being supported upon angle-iron brackets secured in the usual way to the webs of the main girders.

A series of three loading-beams *o* support the structure, as thus far described, and are connected between and transversely of the loading-girders by angle-irons *p*, (see Fig. 3,) said loading-beams being located a short distance apart and are braced together by channel-iron webs *p'*, the whole being supported, through said loading-beams, upon a rotary casting *q*, to which it is connected by a rocking connection upon a double fulcrum, as I will now describe.

A saddle-plate *r* is secured to the under side of each of the loading-beams and is formed with a pair of transverse grooves *s*, semicircular in cross-section and located a short distance apart and near the middle of each saddle-plate, said grooves in the respective plates being in line with one another, and the saddle-plates rest, through said grooves, upon a pair of centering or fulcrum rods *t*, secured upon the rotatable casting

and when the live load is upon the turn-table constituting a two-point bearing, as will presently be described.

A pair of webs 2 are cast in one with the surface of the rotary casting and take between said loading-beams, the function of these webs being to distribute any strain exerted either thereupon or upon any part of the surface of said casting throughout the entire casting. A pair of apertures 3 are cored out of each web near the base thereof, and each aperture has a keyway 4 formed in the roof thereof. The centering or fulcrum rods extend through said apertures (which are of greater transverse area than said rods) from side to side of the upper surface of the rotary casting and are secured in place by screw-bolts 5, taking through the ends thereof and into the casting and also by cast joints 6, formed by pouring a molten metal into the space between the rods and the walls of the apertures 3, thereby filling up the entire aperture and forming keys in the keyways, besides filling recesses 7, cored out of the surface of said casting beneath the apertures, which completes these cast joints.

The rotary casting rests upon and is rotatably connected to a base-casting 10, and the under side thereof is formed to constitute the roof of an oil-chamber, the lower half whereof is constituted by the base-casting, which, for better comprehension of this portion of my invention, I will describe in detail before completing the description of the rotary casting. This stationary base 10 is cast with a central hub 12, in which the lower end of a pin 13 is rotatably set, the function of this pin being to localize the rotatable part relatively to the base-casting, and the upper end thereof is rigidly set in a seat 14 in the rotatable casting, into which seat it is forced. The top of the base is cast with an angular circumferential channel 15, having its outer wall of greater height than the inner wall, which forms the outer wall of an annular recess 16, constituting an oil-chamber, the inner wall whereof is of less height than its outer wall, this oil-chamber being connected to the hub 12 by an oil-groove 17, formed in the surface of the middle portion of the base, which is also below the level of the outer wall of said oil-chamber. A steel ring 18 rests in this annular recess and constitutes a tread for a series of balls 19, spaced relatively to one another and retained in the position in which they are located by a harness-plate 20, formed with a series of holes 21 of slightly greater diameter than said balls to allow them freedom to rotate, while said plate is supported about midway of the height of said balls upon the elongated heads 22 of a series of screw-bolts, diminished and screw-threaded to take upwardly through holes in said plate and receive retaining-nuts 23 on their upper ends.

The under side of the rotatable casting *q* has its periphery formed with an apron 24 to overhang the circumferential channel 15 and comprises a depending flange 25 and a filling portion 26, angular in cross-section and taking into said channel 15 and reducing its capacity to a thin layer just sufficient to act as a seal to prevent the entry of dust into the oil-chamber, while an oil-hole 27 extends from the top surface of the rotatable casting to the inner beveled side of said filling portion, thereby communicating with the channel. A removable plug 28 is provided to close the oil-hole 27 and is connected to the rotatable casting by a chain 29.

A steel ring 30, corresponding to the ring 18, is secured to the under side of the rotatable casting by a series of I-bolts 31, the horizontal portions whereof take into holes in the perimeter of the ring before the latter is set in place, and when being set in place the vertical portions of said bolt are projected through holes in the said rotatable casting and receive retaining-nuts 32. This ring 30, like the ring 18, constitutes a tread and serves as the direct bearing-face of the rotatable casting upon the balls.

The base-casting rests upon the usual masonry 40 and is held thereon against vertical displacement by the weight of the whole structure and against lateral displacement by the same weight augmented by an anchor-plate 41, secured to the masonry by bolts 42, a recessed central portion of the under side of the base taking over this anchor-plate and presenting an annular shoulder 43 to closely encircle the periphery of said anchor-plate.

The pit in which my improved turn-table is located, rails 46, upon which the rollers *k* at intervals run, and the rails 47 upon the turn-table are and may be constructed and secured in place in the manner usual and well known to those skilled in the construction of railroad turn-tables.

The operation of my improved turn-table is as follows: The end of the turn-table at which the locomotive (or other portion of rolling-stock to be turned) is received is depressed, which will cause the table-frame to tilt upon the adjacent fulcrum-rod *t*, as shown in dotted lines in Fig. 4; but when the locomotive is received upon the table-frame it will assume the normal horizontal position, (shown in Fig. 1,) and in such position the stresses will be distributed throughout the various girders and beams and concentrated, through the loading-beams *o* and the two-point bearing-rods *t*, to casting *q*, throughout which it is distributed by the webs 2 and finally brought to bear throughout the treads and ball-bearings. The lubrication of the ball-bearings and the center pin upon which the table turns is effected by pouring oil through the oil-hole 27 in the rotary casting into the annular channel 15, the inner wall whereof it will overflow and flood the oil-chamber 16 and, in fact, the complete interior of the base-casting up to the level of the outer wall of the annular channel 15. This will cause the balls, the two steel treads, and

the center pin, with its sockets, to be immersed in the lubricant.

It is obvious from the foregoing that my improved tilting turn-table will have a considerable base within or near which the center of gravity of the engine to be turned may fall when the table assumes its horizontal or turning position. It is also obvious that the distance within which the center of gravity of the engine and table combined must then fall is the distance between the two fulcrum-rods *t*, and the diameter of the treads and ball-bearings is made larger than the distance between said fulcrum-rods in order that with the center of gravity of the engine and table combined falling within the space between said rods, but nearer one of said rods than the other, the resultant inequality of distribution of the load among the balls under such conditions will still be permissible.

What I claim is as follows:

1. The combination with the tilting frame of a railroad turn-table, of a rotatable base; a pair of fulcrum-rods secured parallel to one another upon the surface of said rotatable base and said rods being located one on each side of the center of said frame, said frame resting transversely upon but being detached from said rods; and means for retaining said frame against horizontal displacement and allowing it freedom for vertical displacement, substantially as described and for the purpose set forth.

2. The combination with a rotatable base of a railroad turn-table, of a pair of fulcrum-rods secured parallel to one another upon the surface of said rotatable base and said rods being located one on each side of the center of said turn-table; a frame consisting of a pair of main longitudinal girders; a pair of spaced girders arranged transversely of said longitudinal girders midway of the length thereof; means for connecting said transverse girders rigidly to said longitudinal girders; a series of spaced beams extending longitudinally of said frame between said transverse girders; means for connecting said longitudinal beams rigidly to said transverse girders; the frame thus formed resting transversely upon but being detached from said rods; and means for retaining said frame against horizontal displacement and allowing it freedom for vertical displacement, substantially as described and for the purpose set forth.

3. The combination with a rotatable base of a railroad turn-table, of a pair of fulcrum-rods secured parallel to one another from the surface of said rotatable base, and said rods being located one on each side of the center of said turn-table; a frame consisting of a pair of main longitudinal girders; a pair of spaced girders arranged transversely of said longitudinal girders midway of the length thereof; means for connecting said transverse girders rigidly to said longitudinal girders; a series of spaced beams extending longitudinally of said frame between said transverse girders; means for connecting said longitudinal beams rigidly to said transverse girders; a transversely-grooved saddle-plate secured upon the under side of the frame thus formed and having its grooves fitting upon said fulcrum-rods but being detached from said rods with freedom for vertical displacement, substantially as described and for the purpose set forth.

4. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a rotatable section; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; a ball-bearing between said rotatable section and the base-casting, and means for localizing said rotatable section relatively to the base-casting, substantially as and for the purpose set forth.

5. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a rotatable section; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; a depending annular peripheral flange upon said rotatable section and overhanging the periphery of said base-casting; a ball-bearing between said rotatable section and the base-casting, and means for localizing said rotatable section relatively to the base-casting, substantially as and for the purpose set forth.

6. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; an annular tread located in said oil-chamber; a series of balls supported upon said tread, a rotatable section having on its under side an annular tread resting upon said series of balls; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; and means for localizing said rotatable section relatively to the base-casting, substantially as and for the purpose set forth.

7. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber; a seat formed concentrically of said rigid base, the surface of said

rigid base between said seat and oil-chamber being set below the top of the outer wall of said oil-chamber; a rotatable section; a ball-bearing between said rotatable section and the base-casting, and a pin carried rigidly by said rotatable section concentrically thereof and taking into said seat in the rigid base-casting, substantially as and for the purpose set forth.

8. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a seat formed concentrically of said rigid base, the surface of said rigid base between said seat and oil-chamber being set below the top of the outer wall of said oil-chamber; a rotatable section; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section a ball-bearing between said rotatable section and the base-casting and a pin carried rigidly by said rotatable section concentrically thereof and taking into said seat in the rigid base-casting, substantially as and for the purpose set forth.

9. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a seat formed concentrically of said rigid base, the surface of said rigid base between said seat and oil-chamber being set below the top of the outer wall of said oil-chamber; a rotatable section a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; a depending annular peripheral flange upon said rotatable section and overhanging the periphery of said base-casting; a ball-bearing between said rotatable section and the base-casting and a pin carried rigidly by said rotatable section concentrically thereof and taking into said seat in the rigid base-casting, substantially as and for the purpose set forth.

10. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a seat formed concentrically of said rigid base, the surface of said rigid base between said seat and oil-chamber being set below the top of the outer wall of said oil-chamber; a rotatable section; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; a depending annular peripheral flange upon said rotatable section and overhanging the periphery of said base-casting; and a pin carried rigidly by said rotatable section concentrically thereof and taking into said seat in the rigid base-casting, substantially as and for the purpose set forth.

11. A base for a railroad turn-table consisting of a rigid base-casting formed with an annular oil-chamber the surface of the outer wall whereof is formed with a channel having its outer wall of greater height than its inner wall; a seat formed concentrically of said rigid base, the surface of said rigid base between said seat and oil-chamber being set below the top of the outer wall of said oil-chamber; an annular tread located in said oil-chamber; a series of balls supported upon said tread; a rotatable section having on its under side an annular tread resting upon said series of balls; a depending annular filler-section formed upon the under side of the periphery of said rotatable section and projecting into and partially filling said channel, and said rotatable section having an oil-passage leading from the top thereof to the under side of said filler-section; a depending annular peripheral flange upon said rotatable section and overhanging the periphery of said base-casting; and a pin carried rigidly by said rotatable section concentrically thereof and taking into said seat in the rigid base-casting, substantially as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

PHELPS JOHNSON.

Witnesses:
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