

(No Model.)

L. E. C. J. BEERSTECHER.  
RAILWAY TRAIN PROTECTOR.

3 Sheets—Sheet 1.

No. 507,349.

Patented Oct. 24, 1893.

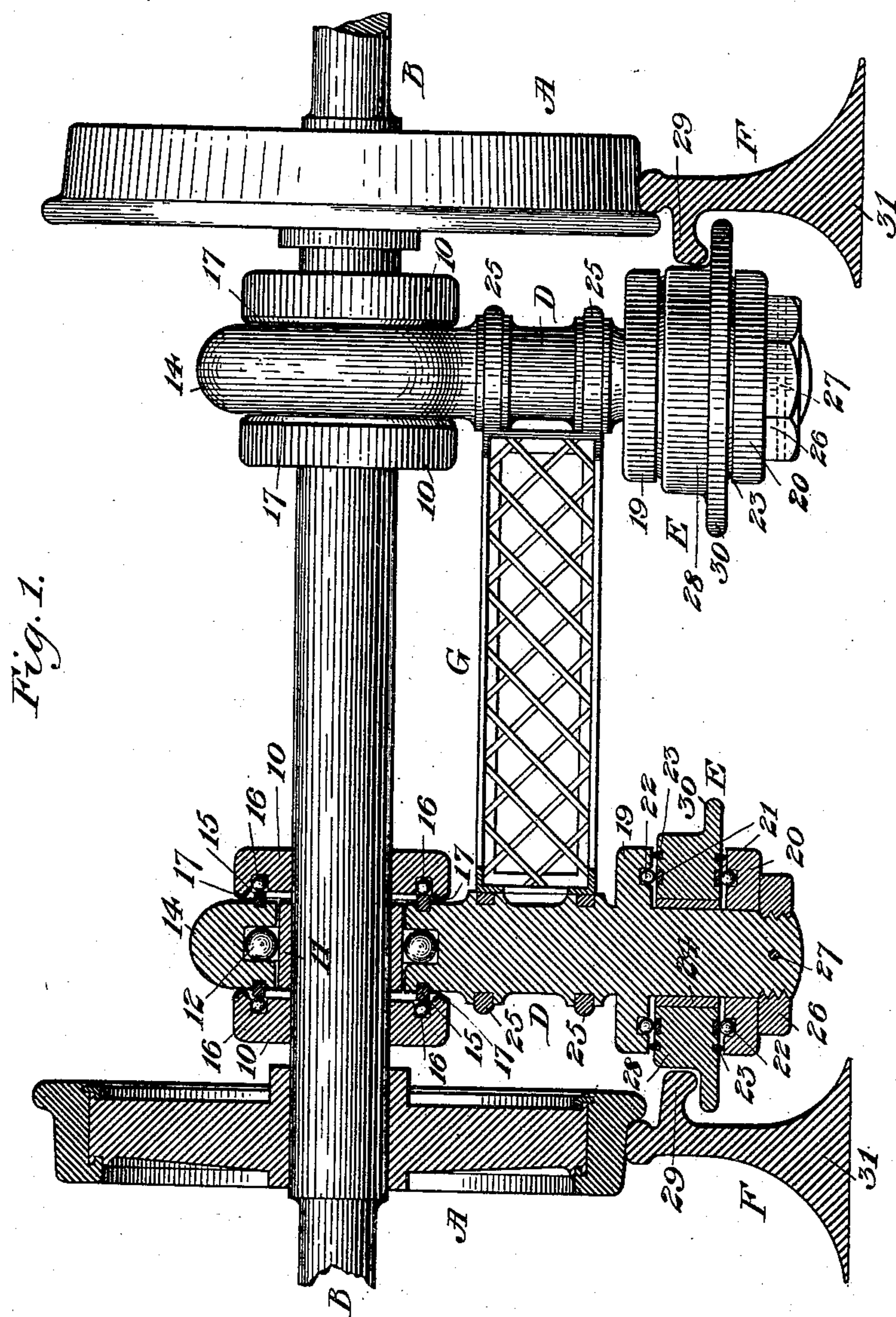


Fig. 1.

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Inventor  
L. E. C. J. Beerstecher  
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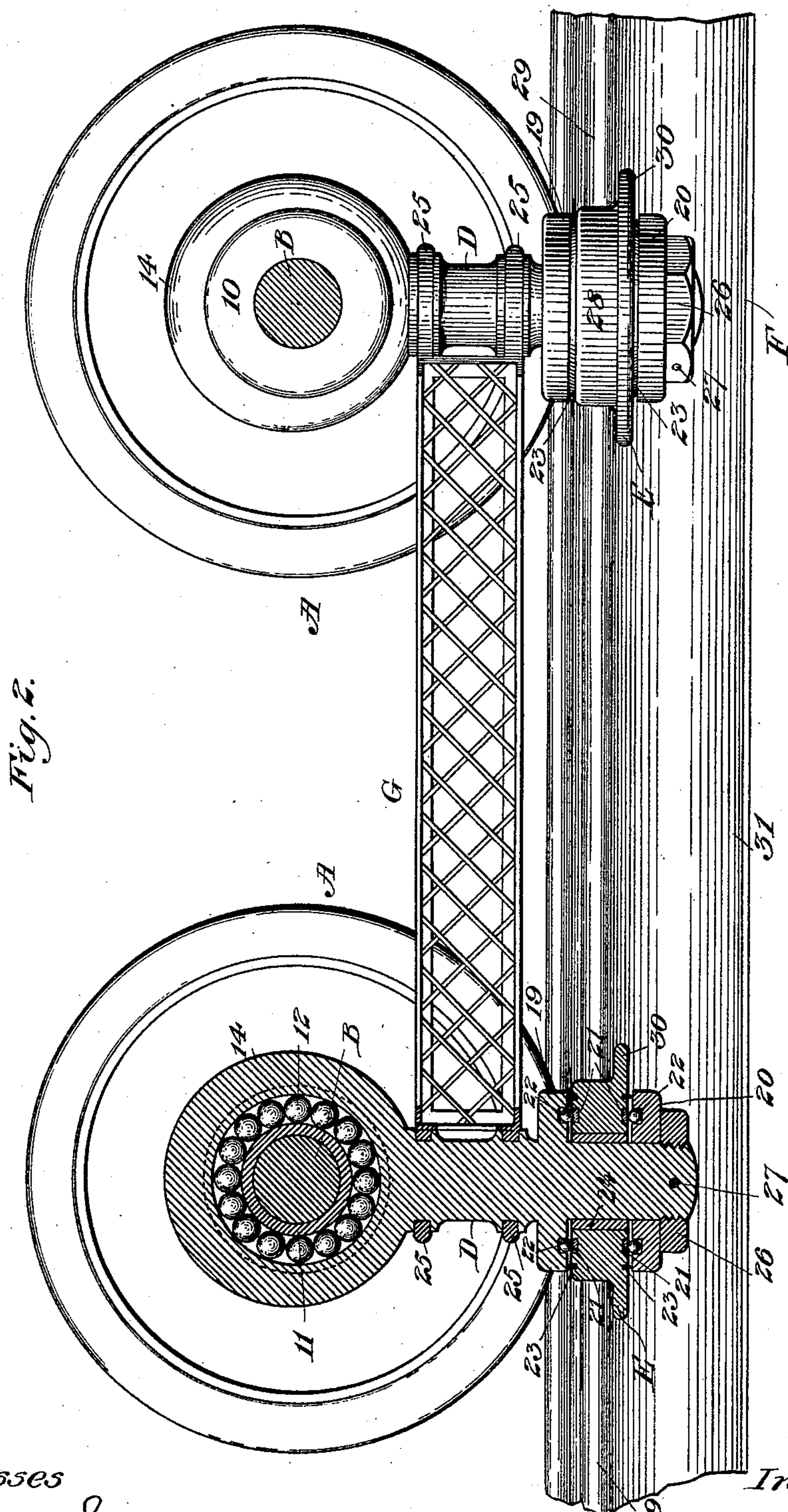
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3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 8.

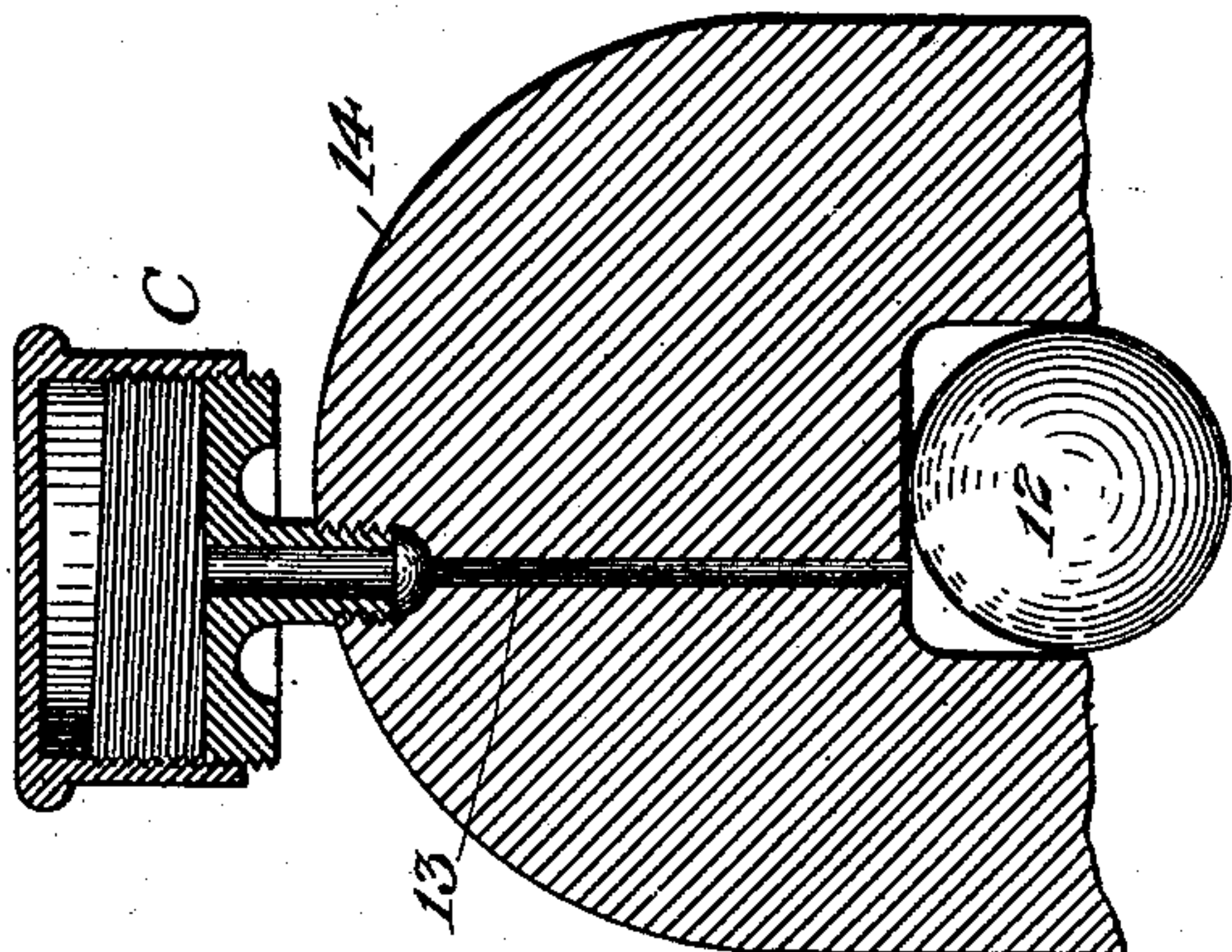


Fig. 9.

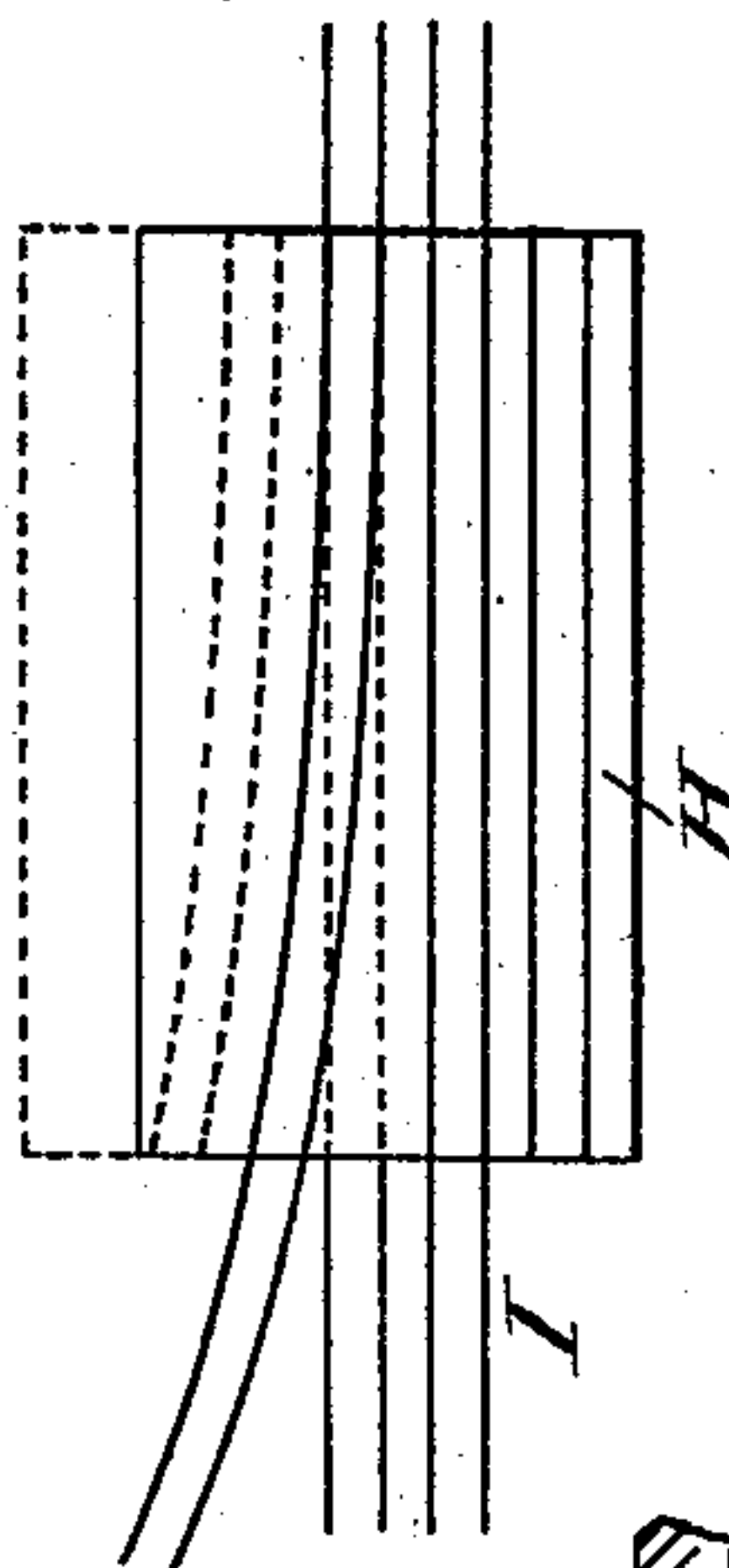


Fig. 4.

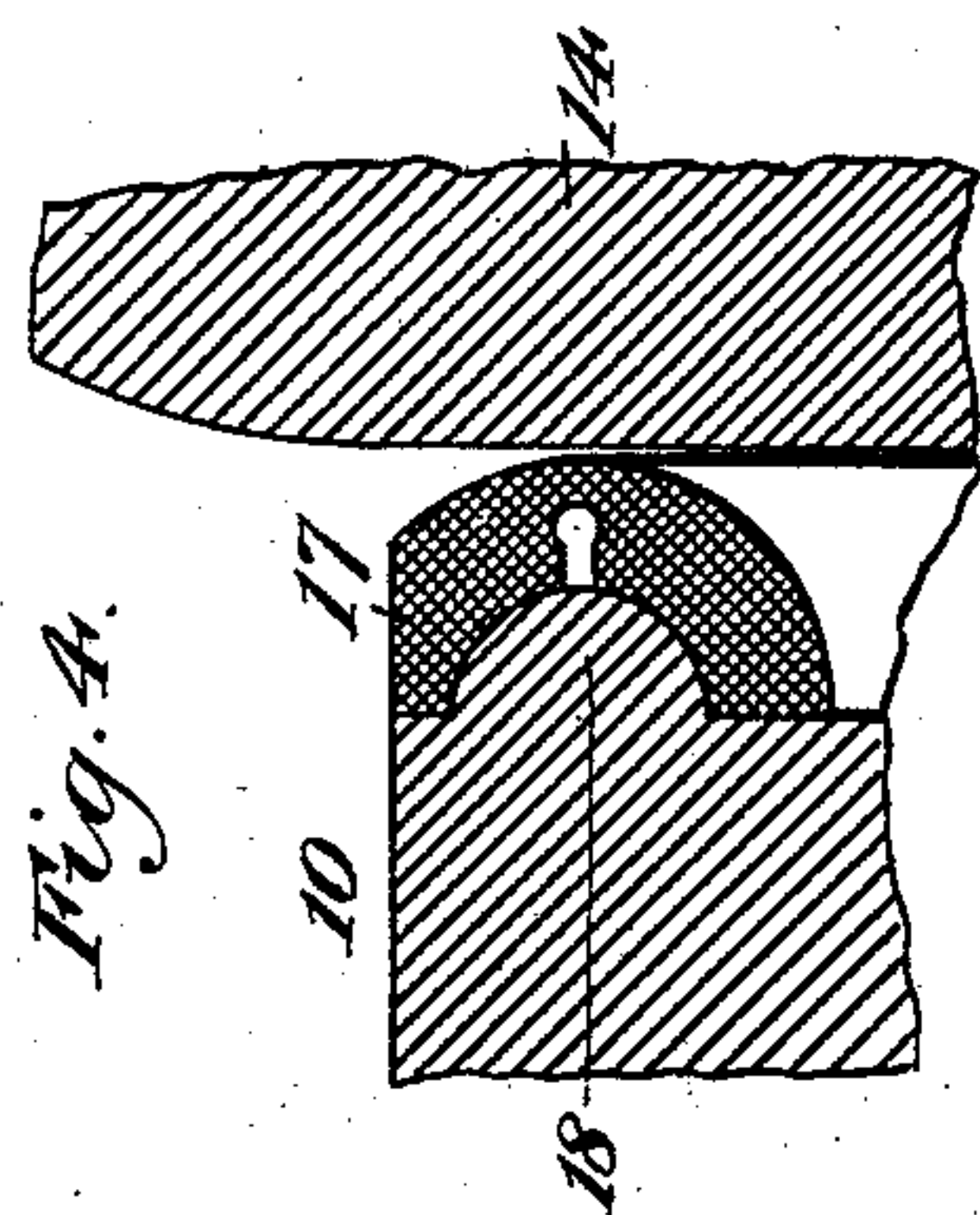


Fig. 5.

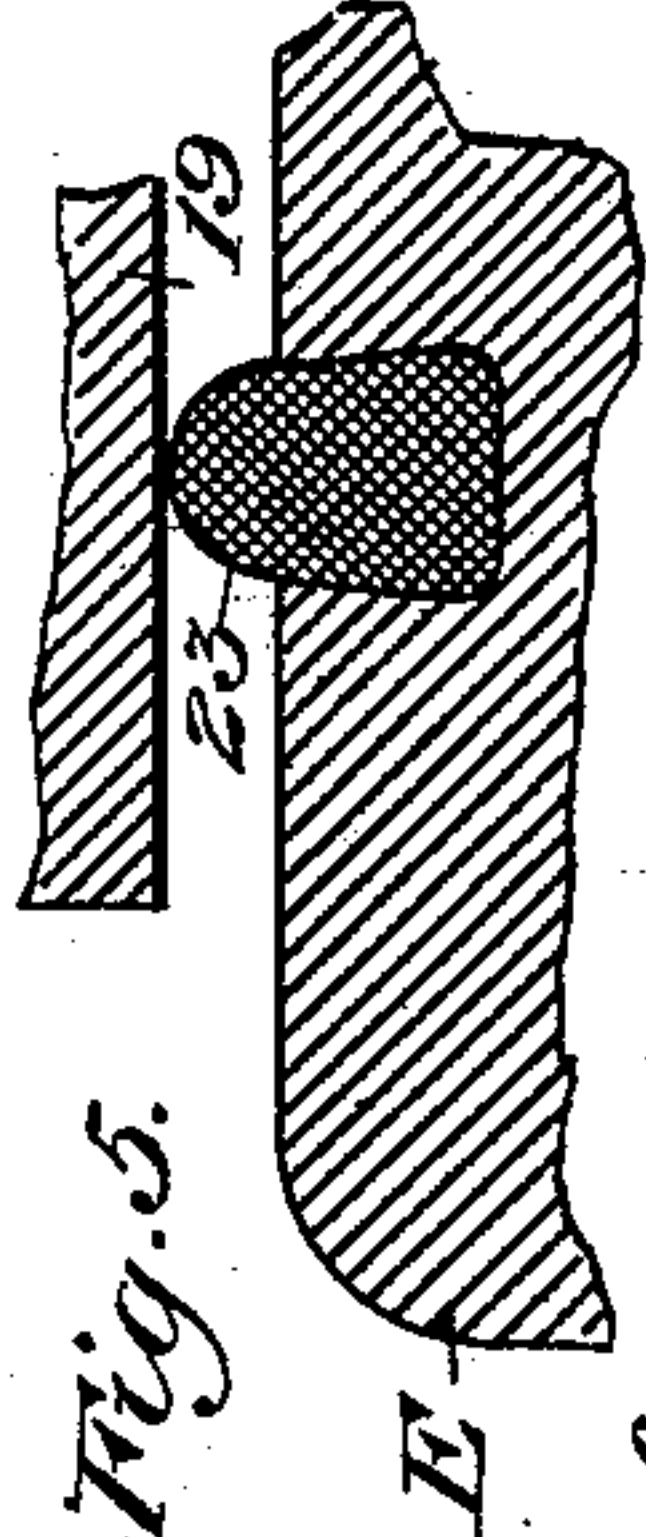


Fig. 6.

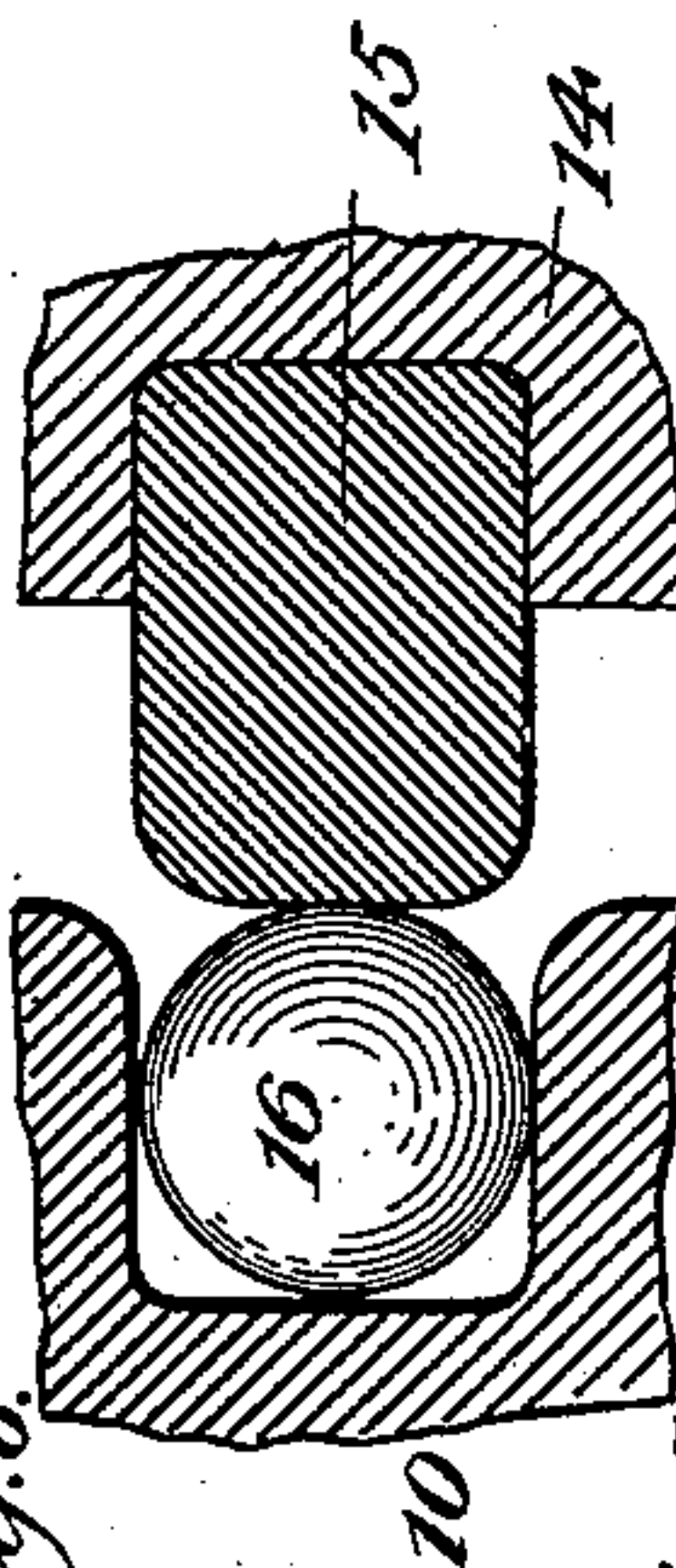


Fig. 7.

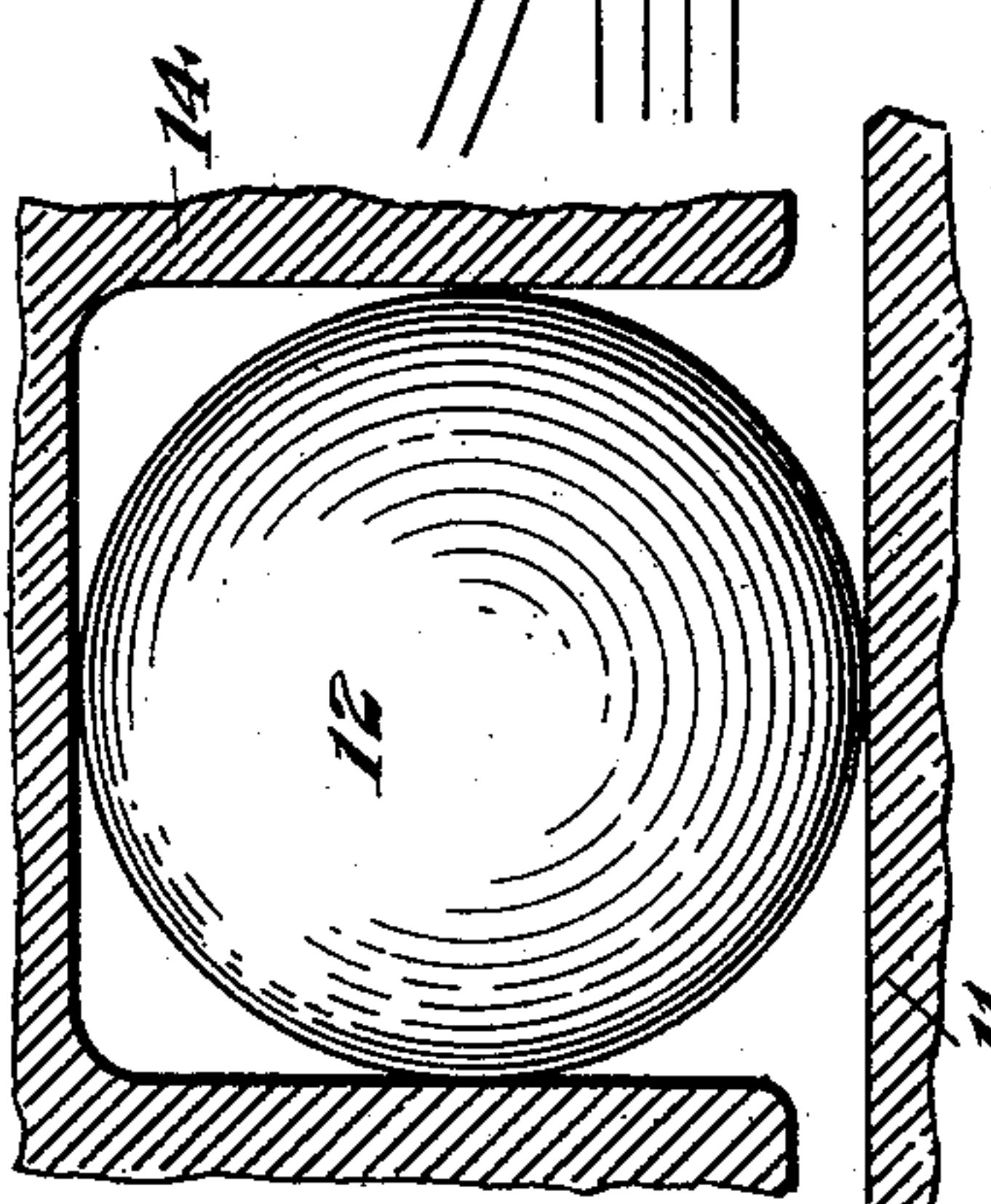


Fig. 3.

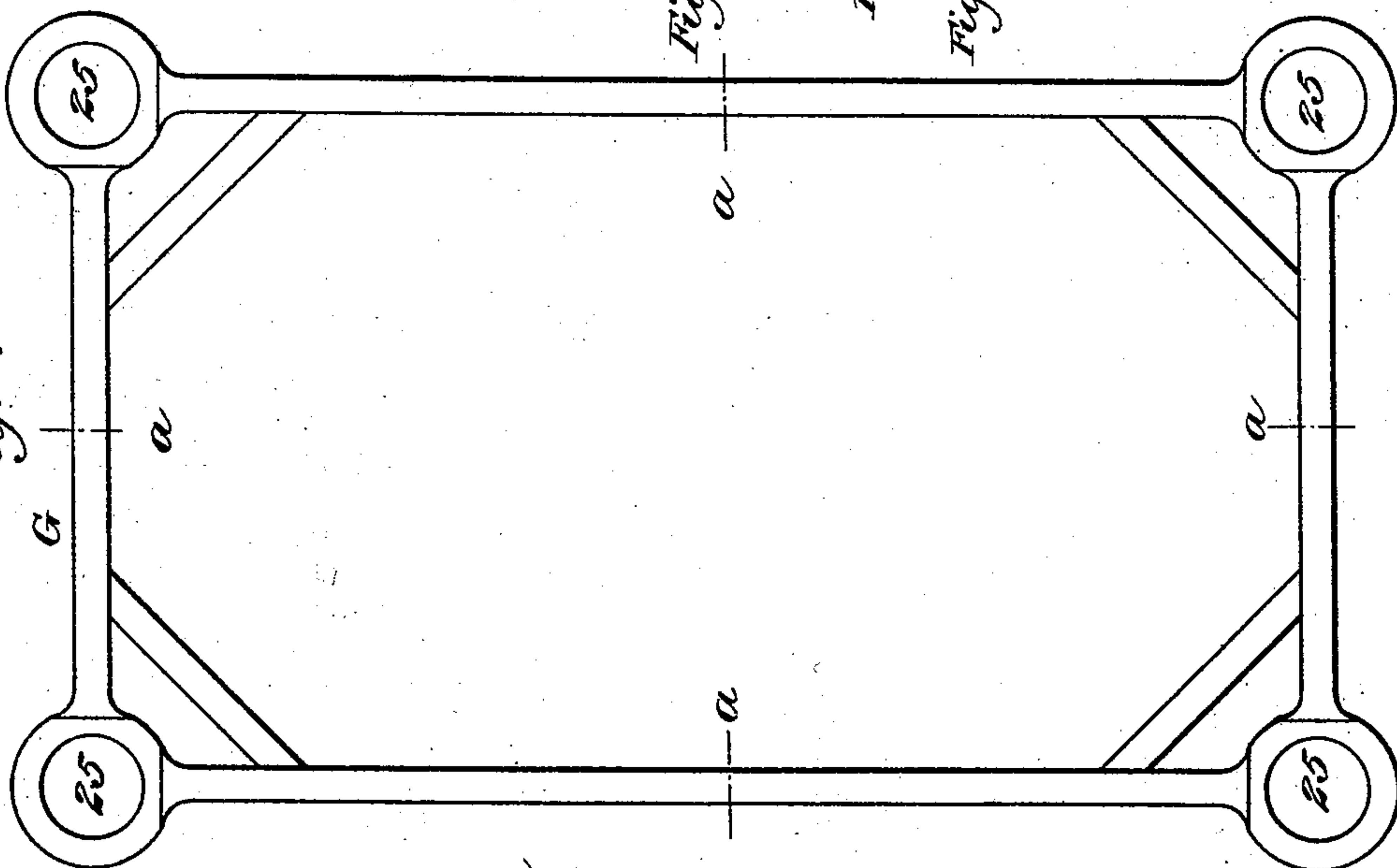


Fig. 3a.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

LEONARD E. C. J. BEERSTECHER, OF THE HAGUE, NETHERLANDS.

## RAILWAY-TRAIN PROTECTOR.

SPECIFICATION forming part of Letters Patent No. 507,349, dated October 24, 1893.

Application filed June 30, 1893. Serial No. 479,290. (No model.)

*To all whom it may concern:*

Be it known that I, LEONARD ELISABETH CATHARINUS JAN BEERSTECHER, a subject of the Queen of the Netherlands and a resident of The Hague, Netherlands, have invented a new and useful Improvement in Railway-Train Protectors, of which the following is a specification.

This invention relates primarily to railway rolling-stock, but involves a track, or rails at least, of peculiar construction.

It consists in certain novel combinations of parts hereinafter set forth and claimed.

The general objects of the invention are to protect railway trains against derailment, and thus to provide for running such trains at high speeds, and at the same time to increase the safety of railway travel. The objects of the several combinations will be understood by those skilled in the art from the following description of the parts.

Three sheets of drawings accompany this specification as part thereof.

Figure 1 of these drawings represents a cross-section through the track of the railway showing that main-portion of the protector which is carried by the train partly in section. Fig. 2 is a view at right angles to Fig. 1, partly in section and partly in elevation. Fig. 3 is a plan view of the trussed frame detached. Fig. 3<sup>a</sup> represents a cross-section on any of the lines marked *a* in Fig. 3. Figs. 4 to 7 inclusive are sectional details enlarged from Fig. 1. Fig. 8 is a sectional detail on a smaller scale, showing a lubricator; and Fig. 9 is a diagram illustrating the proposed mode of switching the protected trains.

Like letters and numbers refer to like parts in all the figures.

In carrying this invention into effect in the best way now known to me, the carrying wheels A of the trucks of the engine tender and all cars are united in pairs by rotary horizontal axles B, somewhat heavier and stronger than those commonly used; and each axle is provided with two pairs of fast collars 10 near the respective carrying wheels, and with a tight sleeve-ring 11 between each pair of collars; such rings in common with certain other wear-resisting parts being of very hard steel

known as "diamond steel" and hereinafter so termed. As the axles rotate, each ring revolves in contact with diamond-steel balls 12, suitably confined within an endless groove, as in Figs. 1, 2, 6, 7, and 8, in communication by a passageway 13 with a suitable lubricator C, Fig. 8; such groove and passageway being formed within the loop-shaped head 14 of a short vertical "shaft" D, which depends from the axle B as in Figs. 1 and 2. The sides of said head, or "loop" as it is hereinafter termed, and the opposing inner faces of said collars 10 have coincident annular grooves concentric with the axle, provided respectively with rings 15 of diamond steel, and with diamond-steel balls 16, Fig. 6; and the collars are further provided, outside of said grooves and concentric therewith, with annular dust-guards 17, Fig. 4, either metallic or of gutta-percha or the like, which, in the form here shown, are sprung over beads 18 on the collars, and project almost into touch with the respective sides of the loop.

Each vertical shaft D is provided in turn, near its lower end, with a pair of collars 19, between which a horizontal guard-wheel E rotates when it comes in contact with the contiguous rail F of the track; the opposing faces of the guard-wheel and collars have coincident annular grooves, concentric with the shaft, provided respectively with rings 21 of diamond steel and with diamond-steel balls 22, which may be similar in all respects to those shown at 15 and 16 (Fig. 6) and above described; and the wheel is further provided at both sides with annular dust-guard rings 23, Figs. 1, 2 and 5, outside of said rings 21 and balls 22, and concentric with their grooves. In the form represented these dust-guards (Fig. 5) are of gutta-percha or the like, and are sprung into dove-tailed grooves in the wheel. The wheel is also provided with an anti-friction bushing or lining ring 24 of suitable metal.

Between the collar 19 and loop 14 of each vertical shaft, it is provided with circumferential flanges between which it is embraced by loops 25 at one corner of a light trussed frame G, shown detached by Figs. 3 and 3<sup>a</sup> as above, which is suitably constructed of bar



steel; its function being to prevent any deflection of the guard-wheels, or, in other words, to keep them in correct working position, whatever the velocity of the train or the inclination of the track may be.

Nuts 26 screwed on the lower ends of the shafts D, and pins 27 for locking the same, in combination with loose collars 20 opposed to fast collars 19 integral with the body of the shaft, illustrate suitable joints and fastenings to provide for assembling the parts as above. Such details are omitted elsewhere to prevent confusion. They will readily be supplied by machinists skilled in the art, and form no part of the present invention. Lubricators C, or other suitable lubricators, may be attached wherever they are required; the balls and their coacting rings may be transposed relatively to each other; and other like modifications will suggest themselves to those skilled in the art.

Each guard-wheel E is further constructed with a peripheral tread 28 matching a laterally projecting guard 29 on the rail F, and with a deep peripheral flange 30 which projects beneath such guard as in Fig. 1. The rails should furthermore be of ample height, and as strong as may be required, and securely united by means of a heavy base 31 with metallic cross-ties. The shape of the rails is immaterial, so long as they are adapted to coact as above with said guard-wheels E to prevent derailment, and at the same time to coact efficiently with the carrying wheels A of the train, as in Fig. 1.

For switching or shunting protected trains, I have adopted what I term "switch bridges" H, Fig. 9, sliding on steel bearers at right angles to the main track I, as indicated by dotted lines in the figure, and moved by hydraulic steam or electric power. The rails of these switch-bridges or switches will be substantially similar to those shown at F, so as to maintain the coaction of efficient guards with the guard-wheels E, to prevent derailment.

It will be apparent that with such construction of the rails and rolling stock, it is only necessary to adequately fasten and support the track in order to render trains perfectly safe against derailment even at the highest velocities, and on the shortest curves.

Having thus described the said improvement, I claim as my invention and desire to patent under this specification—

1. In combination with a suitable track the rails of which have inwardly projecting guards, a railway vehicle having carrying wheels on horizontal axles, vertical shafts depending from said axles, guard-wheels on the lower ends of said shafts coacting with said guards of the rails, and means whereby said shafts are braced against deflection, for protecting

such vehicle against derailment in the manner set forth.

2. In combination with a suitable track the rails of which have inwardly projecting guards, a railway vehicle having carrying wheels on horizontal axles, vertical shafts depending from said axles, guard-wheels on the lower ends of said shafts having peripheral treads which coact with the inner surfaces of said guards and peripheral flanges at bottom which project beneath said guards, and means whereby said shafts are braced against deflection, substantially as hereinbefore specified.

3. In a railway vehicle protected against derailment, the combination of the horizontal axles of two pairs of carrying wheels, vertical shafts depending from said axles between the carrying wheels and near the latter respectively, horizontal guard-wheels on the lower ends of said shafts, and a trussed horizontal frame having corner loops which embrace the respective shafts above said guard-wheels, substantially as hereinbefore specified.

4. In a railway vehicle protected against derailment, the combination of carrying wheels on rotary horizontal axles, said axles being further provided with pairs of collars fast thereon between said wheels, vertical shafts having loops at their upper ends which embrace said axles between said collars, and are in turn provided with pairs of collars at their lower ends, and guard-wheels rotating between the collars last named, substantially as hereinbefore specified.

5. In a railway vehicle protected against derailment, the combination with each guard-wheel of a vertical shaft having a pair of collars the opposing surfaces of which have grooves concentric with the shaft, the interposed wheel having grooves coincident with those of said collars and annular dust-guards external to said grooves, and anti-friction balls and opposing rings within said grooves, substantially as hereinbefore specified.

6. In a railway vehicle protected against derailment, the combination with each guard-wheel and its shaft of a subjacent rotary axle provided with a pair of collars having annular grooves concentric with the axle and annular dust-guards external to said grooves, an interposed loop at the upper end of the shaft having grooves coincident with those of said collars, and opposed to the axle, and anti-friction balls and opposing rings within said grooves and between said loop and the axle, substantially as hereinbefore specified.

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