

(No Model.)

3 Sheets—Sheet 1.

R. HELMHOLTZ.
LOCOMOTIVE RUNNING GEAR.

No. 514,320.

Patented Feb. 6, 1894.

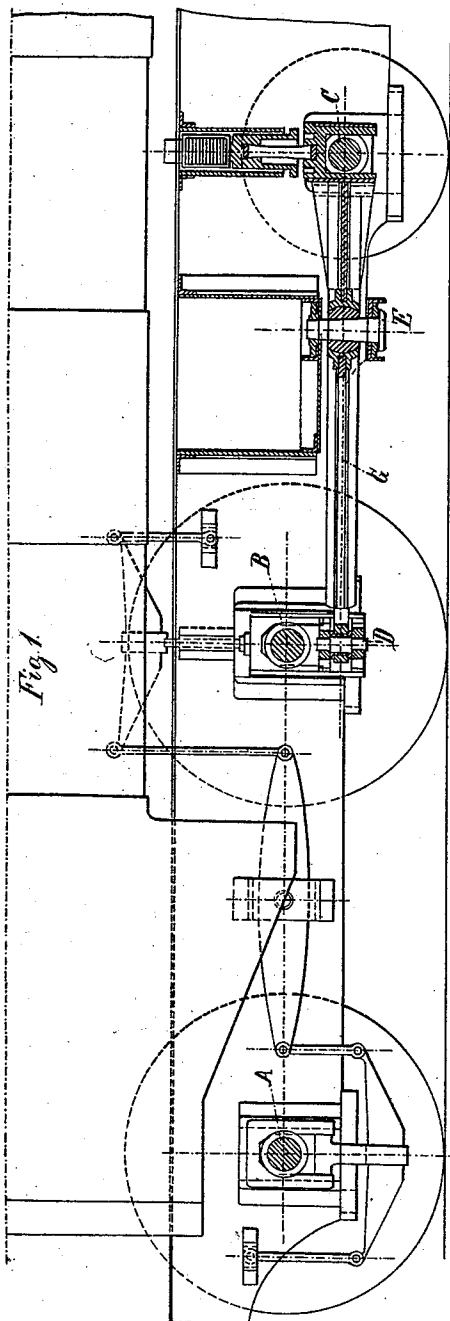


Fig. 1

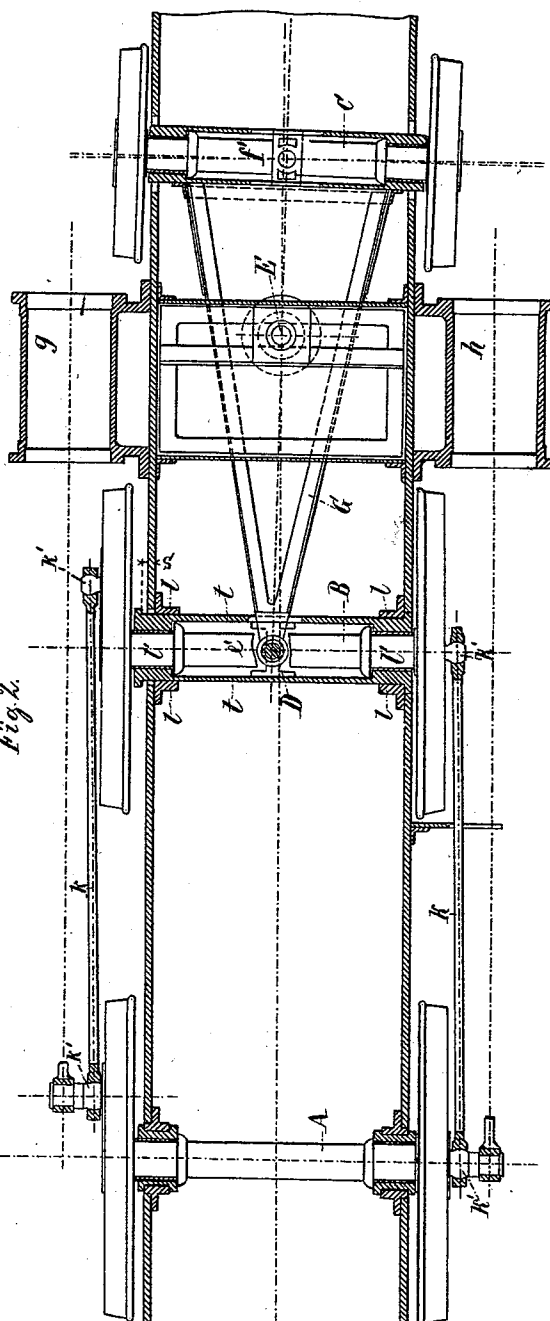


Fig. 2

Witnesses:

J. Capling
Charles S. Kelley

Inventor

Richard Helmholtz

By G. Litzman

Att'y

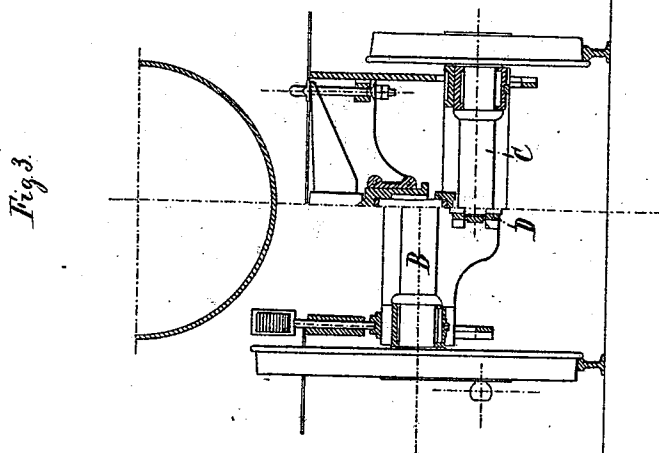
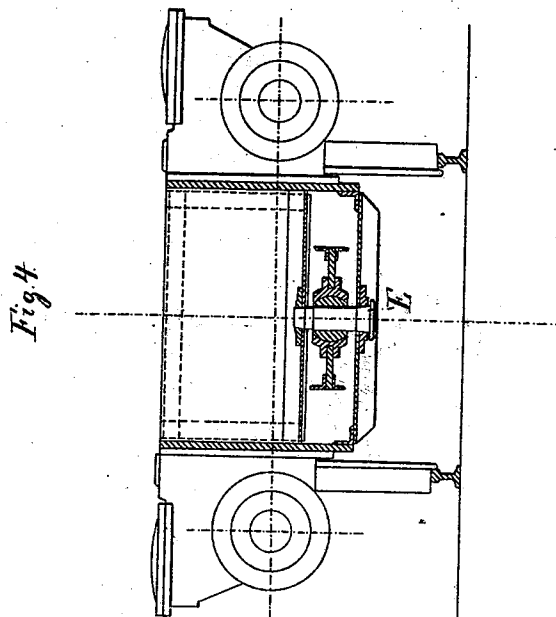
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R. HELMHOLTZ.
LOCOMOTIVE RUNNING GEAR.

No. 514,320.

Patented Feb. 6, 1894.



Witnesses:

J. B. Springer
Celeste S. Kelley

Inventor

Richard Helmholtz

By J. Littman

Att'y

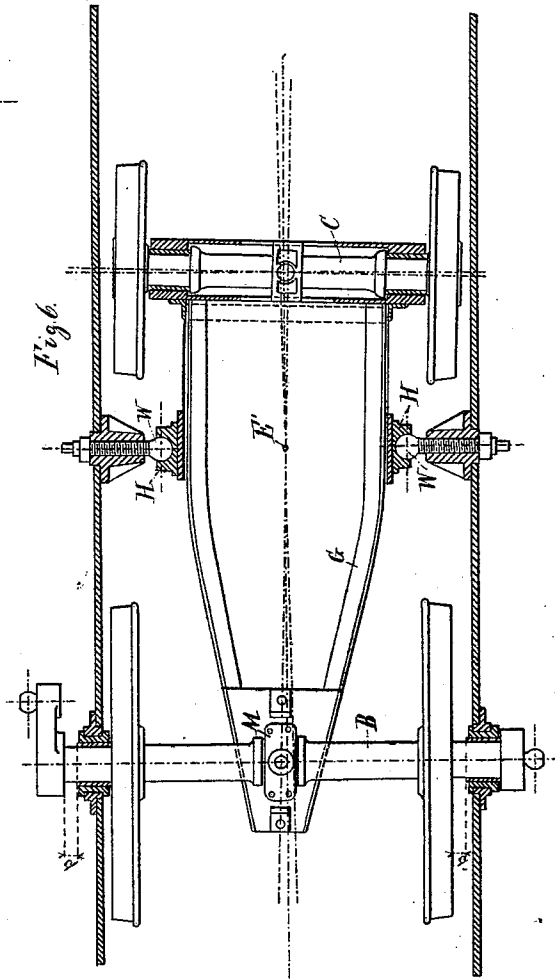
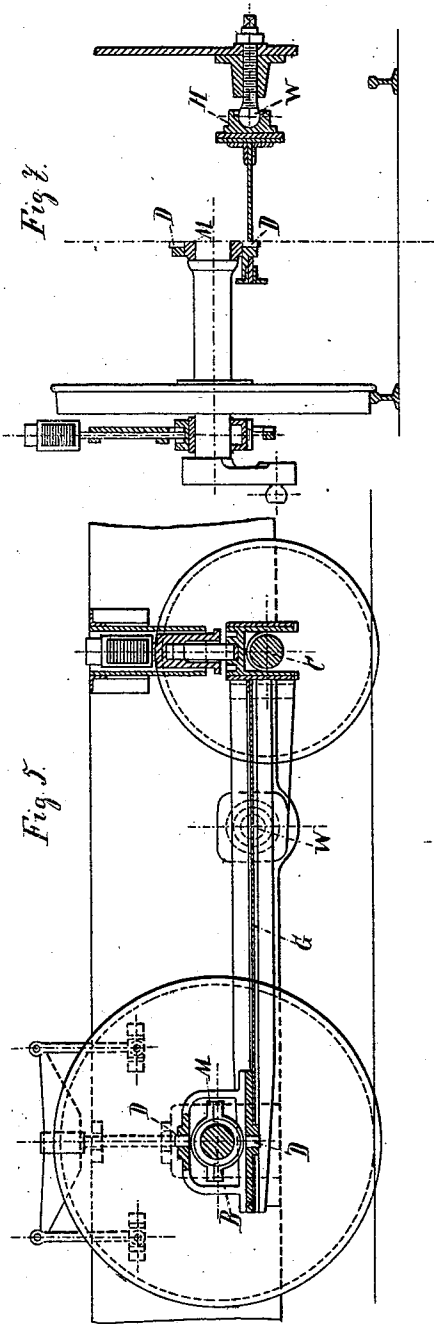
(No Model.)

3 Sheets—Sheet 3.

R. HELMHOLTZ.
LOCOMOTIVE RUNNING GEAR.

No. 514,320.

Patented Feb. 6, 1894.



Witnesses:

J. G. Langen
Celeste J. Kelley

Inventor

Richard Helmholtz

By G. L. Litchman
att'y

UNITED STATES PATENT OFFICE.

RICHARD HELMHOLTZ, OF KÖNIGSBERG, ASSIGNOR TO THE LOCOMOTIV-FABRIK KRAUSS & COMPANY, ACTIEN-GESELLSCHAFT, OF MUNICH, GERMANY.

LOCOMOTIVE RUNNING-GEAR.

SPECIFICATION forming part of Letters Patent No. 514,320, dated February 6, 1894.

Application filed November 2, 1893. Serial No. 489,880. (No model.) Patented in Germany October 29, 1887, No. 43,181; in Italy June 30, 1888, XXII, 2,365, and XLVI, 49,263; in Austria-Hungary October 25, 1888, No. 16,326 and No. 49,263; in Sweden October 30, 1888, No. 1,746, and in Norway October 31, 1888, No. 1,106.

To all whom it may concern:

Be it known that I, RICHARD HELMHOLTZ, a subject of the Emperor of Germany, residing at Königsberg, East Prussia, Prussia, Germany, have invented certain Improvements in Locomotive Running-Gear, (for which patents have been granted in Germany, No. 43,181, dated October 29, 1887; patent of addition in Germany, No. 57,886, dated January 10, 1891; in Austria-Hungary No. 16,326 and No. 49,263, dated October 25, 1888; in Italy, No. 2,365, Vol. XXII, and No. 49,263, Vol. XLVI, dated June 30, 1888; in Sweden, No. 1,746, dated October 30, 1888, and in Norway No. 1,106, dated October 31, 1888,) of which the following is a specification.

This invention relates to certain improvements in locomotive running gear and has for its object to provide certain improved devices whereby the running of curves is facilitated as will be hereinafter fully described.

The novel features of my invention will be carefully defined in the claims.

In the accompanying drawings which serve to illustrate my invention—Figure 1 is a vertical longitudinal section through the running gear of a locomotive provided with my improvements, and Fig. 2 is a horizontal section through the same in the plane of the line *c-d* in Fig. 1. Fig. 3 is a transverse vertical sectional view one half in the plane of line *e* and the opposite half in the plane of line *f* in Fig. 2. Fig. 4 is a transverse vertical sectional view in the plane of line *g-h* in Fig. 3. Figs. 5, 6 and 7 are views similar to Figs. 1, 2 and 3 showing the application of my improvements to that style of locomotive wherein the wheels are inclosed.

In the drawings A, A, indicate the rear drivers of the locomotive, fixed on shaft A^x, which is journaled in the usual or any preferred manner. The forward drivers B, B, are connected to the rear drivers A by connecting rods *k, k*, having universal joints *k'*, *k'*, connecting them to the drivers A and B, at their opposite ends. The forward drivers B are also fixed on an axle B^x the central portion of which is rotatively mounted in a box or shield *t* extending entirely across the frame

of the engine and mounted in suitable bearings therein, in such a manner as to be capable of endwise movement. The shield *t* is squared to prevent its rotation and at its center a pin D depends from its under side as clearly seen in Fig. 1. The truck wheels C are also mounted on an axle C^x incased in a shield *t'* similar to shield *t* and also adapted for endwise movement in the frame and these two shields *t* and *t'* are united or tied together by a tie piece or bridge G having a triangular form, the apex thereof being pivotally mounted on pin D and the base thereof fixed to or formed integrally with the shield *t'*. The central portion of this bridge or tie piece G is pivoted at E by a universal joint to the forward portion of the main engine frame, as clearly seen in Figs. 2 and 4. By this construction it will be seen that the drive wheels of the locomotive and also the trucks are rendered capable of a certain degree of motion in the frame whereby they are permitted to accommodate themselves to curves in the tracks. When the bearings of the axles are arranged outside the wheels as is usually the case with those locomotives having inclosed wheels, it is difficult to employ the shields *t, t'* for the reason that they would have to be made to encircle the wheels, and for this class of locomotives I prefer to provide the construction seen in Figs. 5, 6 and 7. In this construction, the driver axle B^x is provided near its center with two collars between which is held a yoke I having two pins D^x, D^x, on which is pivoted the rear end of the bridge or tie piece G as clearly seen. The forward sleeve or shield *t'* is of the same construction as that last described, but in lieu of the universal joint E, at the center of the bridge G, the said bridge is pivoted at opposite sides with two universal or ball bearings E^x, E^x, whereby the forward end of the main engine frame is supported. The operation of the device is the same as that first described.

I do not wish to be understood as limiting myself to the exact construction and arrangement of my improvements as herein shown, since it is evident that considerable modification may be made therein without mate-

rial departure from the principles of my invention.

Having thus described my invention, I claim—

5 1. The combination with the frame of a locomotive, of the wheels and their axles, longitudinally movable therein, and a bridge or tie piece connected at opposite ends to said axles and at its central part to said frame, substantially as set forth.

10 2. The combination with the frame of a locomotive, of the wheels and their axles longitudinally movable therein, shields encircling the central portions of said axles, and a tie
15 piece or bridge connected at opposite ends to said shields and at its central part to said frame, substantially as set forth.

3. The combination with the frame, of a locomotive, of the wheels and their axles longitudinally movable therein, and a tie piece or 20 bridge connected at opposite ends to said axles and at its central part to the main frame by a universal joint, substantially as set forth.

4. A locomotive having longitudinally movable wheels and axles connected in pairs, each 25 pair being pivotally connected with the main engine frame, substantially as set forth.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

RICHARD HELMHOLTZ.

Witnesses:

EMIL HENZEL,

A. MÄNDL.