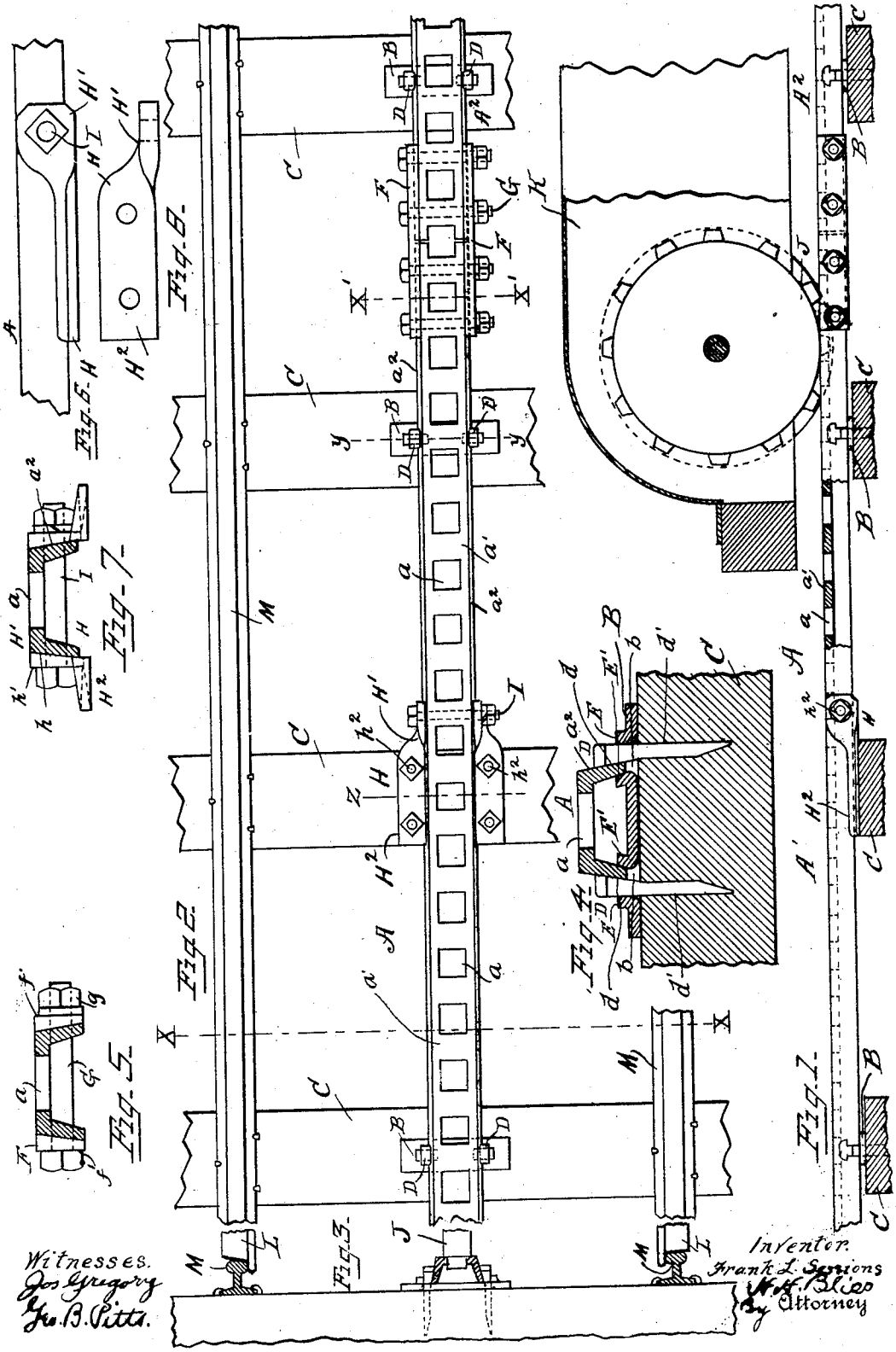
No. 896,766. PATENTED AUG. 25, 1908.

F. L. SESSIONS.

RACK RAIL.

APPLICATION FILED OCT. 9, 1905.



THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK L. SESSIONS, OF COLUMBUS, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE JEFFREY MANUFACTURING COMPANY, A CORPORATION OF OHIO.

RACK-RAIL.

No. 896,766. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed October 9, 1905. Serial No. 282,048.

To all whom it may concern:

Be it known that I, FRANK L. SESSIONS, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Rack-Rails, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in a rack-rail railway system, that is a railway system in which use is made of a toothed or barred rack adapted to engage with a sprocket or toothed wheel on a locomotive or vehicle, the wheel and the rack together serving as a power device for positively propelling the vehicle having a toothed wheel and any other vehicle connected thereto.

Figure 1 is a side view of a portion of a rack-rail railway embodying my improvements; Fig. 2 is a plan view of the same; Fig. 3 is a cross-section on the line *x*—*x* of Fig. 2; Fig. 4 is a cross-section on the line *y*—*y* of Fig. 2; Fig. 5 is a section on line *x'*—*x'*, Fig. 2. Fig. 6 is a side view of a part of the rack-rail element showing the anchoring devices on a larger scale; Fig. 7 is a cross-section on the line *z*—*z* of Fig. 2; and Fig. 8 is a top view of the parts in Fig. 6.

A indicates as an entirety the rack-rail element. It is composed of sections A', A^2 which are placed end to end. I construct this of an ordinary form of angle iron such as rolled in the mills in standard form and used for many purposes. Each section is composed of a cross-plate or web having at its edges two downwardly extending outwardly inclined flanges. In the cross-plate or web part I form a series of rack apertures or sprocket openings *a*, cross-bars *a'* being left between the apertures against which the teeth of the driving wheel on the locomotive or vehicle bear.

It will be understood that any form of locomotive may be used. I have conventionally indicated an electric locomotive at K and a driving toothed sprocket wheel J thereon.

The locomotive has flanged track wheels L, L resting and rolling upon the ordinary track rails M, M. These wheels and rails may also be used, in the way frequently followed, as friction traction devices, if preferred. By examining Fig. 3 it will be seen that the track rails M, M and the rack-rail A are in substantially the same horizontal planes; but this also can be departed from if desired.

The rack-rail rests upon base plates B which are arranged in series along the track, each being supported by one of the ordinary sleepers or ties commonly used for carrying the track rails M, M. The base plates B may be castings or suitably heavy wrought metal sections, the latter being preferred. Apertures *b*, *b* are formed therein preferably by punching in such way as to turn up lugs or abutments E, E'.

The rail sections A', A^2 are firmly fastened in position in the way more particularly shown in Fig. 4. D, D are spikes of peculiar shape, each having on its inner side a face *d* which is inclined to the vertical at an angle equal to the angle of inclination of the outer face a^2 of the side wing of the rail. The outer sides or edges *d'* of the spikes are preferably vertical. The rail rests upon the plates B in such way that the inner lugs or abutments E' lie in the space between the side flanges of the rail and the lugs E, E lie some distance outside of the side flanges. The spikes D are driven into the body of the wooden sleepers or cross ties, each spike being first passed through one of the apertures *b* in the base plate. The outer straight vertical edge *d'* of these spikes lies snugly against one of the outer lugs E and the inclined face *d*, shortly before the spike is driven to its utmost begins to bear powerfully against the inclined face a^2 of the rail and to force it tightly against the inner lug E' and toward the opposing spike D.

The dimensions and formation of the parts are such that the spikes when driven down to their final position, where they securely hold the rail, have their ends well below the upper face of the rail so that they do not interfere in any way or lie in the path of any of the moving parts attached to the vehicle. The outward thrust of the spikes serves to lock and fasten the base plates in position on the ties C.

The rail sections A', A^2 are held together by means of connecting plates or bars F which are firmly fastened in place by the cross bolts G. In order to furnish vertical abutting surfaces for the bolt heads and nuts at *g* to engage, I shape each of the joint plates

F so that it shall have an inner inclined face corresponding to the inclination of the faces a^2 of the rail, and an outer vertical face f' to squarely engage with the inner surfaces of the bolt head or washer.

The spikes D and base plates B above described act mainly to secure the rail in position against transverse displacing forces, although they operate to some extent also to prevent longitudinal movement of the rail sections. But the tendency to such longitudinal movement is very great because at times the rack-rail must experience the entire stress from the propelling effort of the vehicle, which, together with its train, is often equivalent to many tons. The frictional grip of the spikes D is not sufficient, and therefore I provide the rails with supplemental holding devices which anchor them against longitudinal displacement. H indicates one of these anchors. As shown, each is composed of a piece of twisted wrought metal having an upper plate or bar H′ and a lower foot piece H^2. The foot piece is secured by the bolts h^2 to the cross ties or wooden sleepers; the vertical plates H′ are secured to the sides of the rail by a cross bolt I. The inner face h of the plate or ear H′ is inclined to correspond to the surface of the side flange of the rail while the outer face h' is vertical so as to furnish a square abutting surface for the bolt head or the nut that may engage with the bolt. Of these anchoring devices H as many may be used as are found necessary, according to the circumstances.

What I claim is:—

1. In a rack-rail railway system the combination of a rack-rail having a top web or cross plate provided with apertures to receive the teeth of a locomotive driving wheel and having depending side flanges with inclined outer faces, the sleepers or ties on which the rails rest, and spikes adapted to be driven into the sleepers or cross ties, each spike having an inner surface inclined to correspond to the inclination of the outer face of the rack-rail and adapted to bear against said face, substantially as set forth.

2. In a rack-rail railway system a rack-rail having a top plate or cross web formed with apertures to receive the teeth of a locomotive driving wheel and having downward and outwardly extending flanges with inclined outer faces, sleepers or cross ties, a series of metallic base plates each resting upon a sleeper or cross tie and each having spike-receiving apertures, spikes adapted to be driven into the said sleepers or cross ties and to be passed through the said apertures in the base plates, each spike having a face inclined to the vertical to correspond to the inclined outer face of the rail, and each spike being adapted to hold in position upon the sleeper the rail and the base plate, substantially as set forth.

3. In a rack-rail railway system a rack-rail having a top web or cross plate and depending side flanges, the web being provided with apertures for receiving the teeth of a locomotive driving wheel, and the side flanges having downward and outward inclined faces, a series of base plates under the rail, each base plate having apertures and upwardly turned lugs, the upwardly turned lugs lying between the side flanges of the rail and spikes adapted to be driven into the cross ties or sleepers, each spike having a face inclined to the vertical to correspond to the inclined surfaces of the rail, substantially as set forth.

4. The combination of the rack-rail having the upper apertured web and the depending side flanges formed with outward and downward inclined outer faces, the base plate having the apertures the inner lugs between the side flanges of the rail and the outer lugs, and the spikes each having a face inclined to the vertical corresponding to the inclination of the outer surface of the side flange and each adapted to bear against one of the aforesaid outer lugs on the base plate, substantially as set forth.

5. In a rack-rail railway system the combination of the rack-rail sections A′ A^2 arranged end to end, each formed of a channel bar having a top apertured web and downwardly extending outwardly inclined flanges, connecting bars each having an outer vertical surface and an inner surface inclined to the vertical corresponding to the outer inclined surface of a side flange of the rail, and cross bolts having heads engaging with the vertical faces of the connecting plates, substantially as set forth.

6. In a rack-rail railway system the combination with the rack-rail formed of a channel bar having a top apertured web and downwardly extending outwardly inclined side flanges, of the anchor device, consisting of the plate or bar bolted to the depending side flanges of the rail and bolted to the transverse cross plate or sleeper said plate or bar having an outer vertical face and an inner face inclined to the vertical corresponding to the inclination of the outer surface of the side flange, substantially as set forth.

7. In a rack-rail railway system, the combination of a rack-rail of inverted channel form, base plates upon which the downward extending flanges of the rail rest, the base plates being perforated and provided with upward extending abutments with which the inner faces of the flanges of the rail engage, and spikes adapted to pass through the apertures in the said base plates and arranged to engage with and secure the rail in place, substantially as set forth.

8. In a rack-rail railway system, the combination of a rack-rail having inclined depending side faces and anchoring means for

preventing longitudinal movement of the rail, consisting of plates or bars, each being twisted intermediate its ends and having a portion arranged to lie against a face of the rail provided with an outer vertical surface and an inner inclined surface and a foot portion arranged to rest upon a transverse tie or sleeper, and means for securing the said plates or bars respectively to the rail and to the cross-tie or sleeper, substantially as set forth.

In testimony whereof I affix my signature, in presence of two witnesses.

FRANK L. SESSIONS.

Witnesses:
E. P. SNIVELY,
F. E. VAN SLYKE.