3 Sheets—Sheet 1.

G. F. W. REBLE.

Railway and Locomotive.

No. 197,945. **Patented Dec. 11, 1877**

Fig. 1.

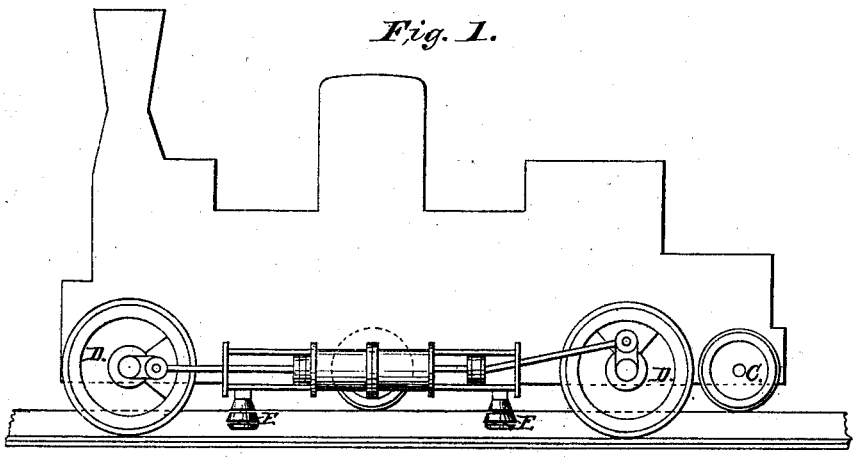

Fig. 2.

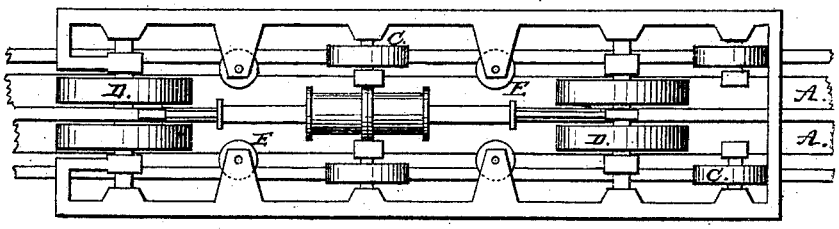

Fig. 3.

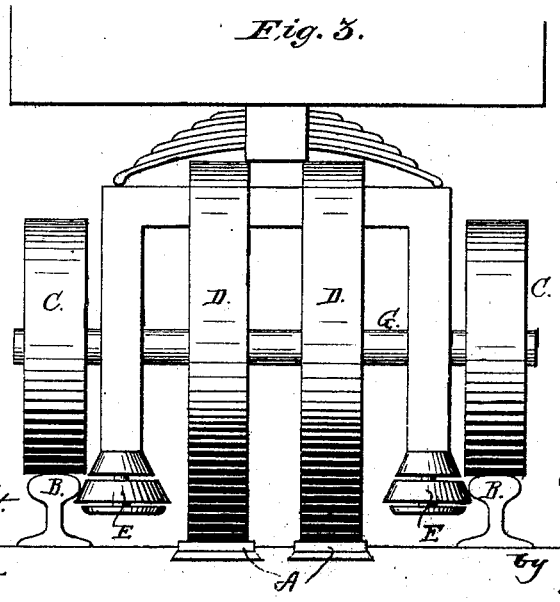

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Fig. 4.

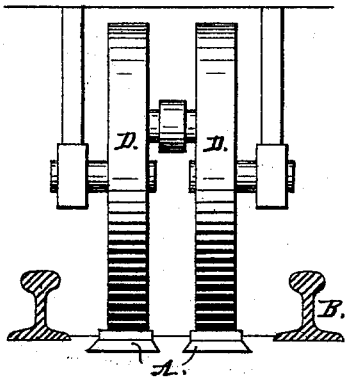


Fig. 5.

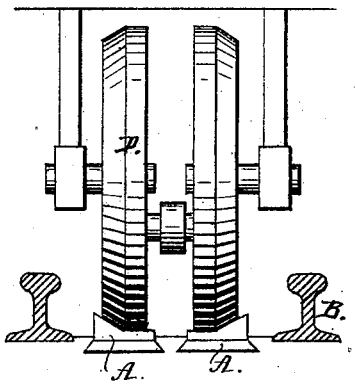


Fig. 6.

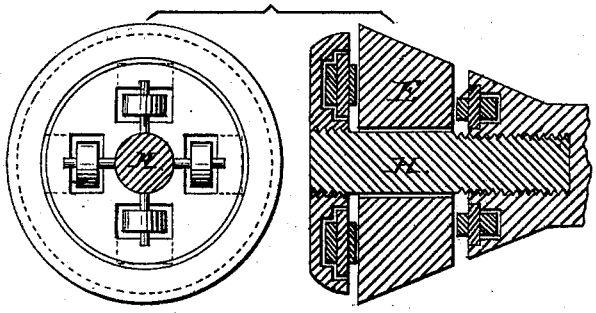


Fig. 7.

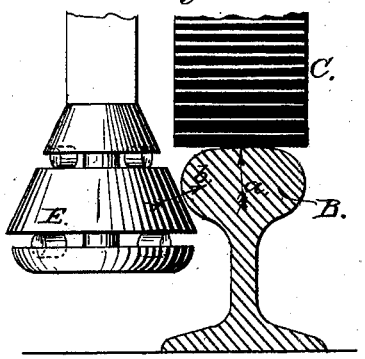
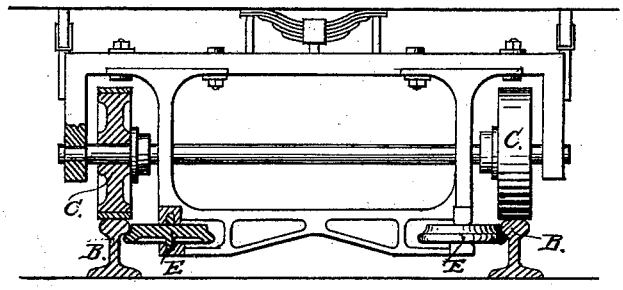


Fig. 8.



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Railway and Locomotive.

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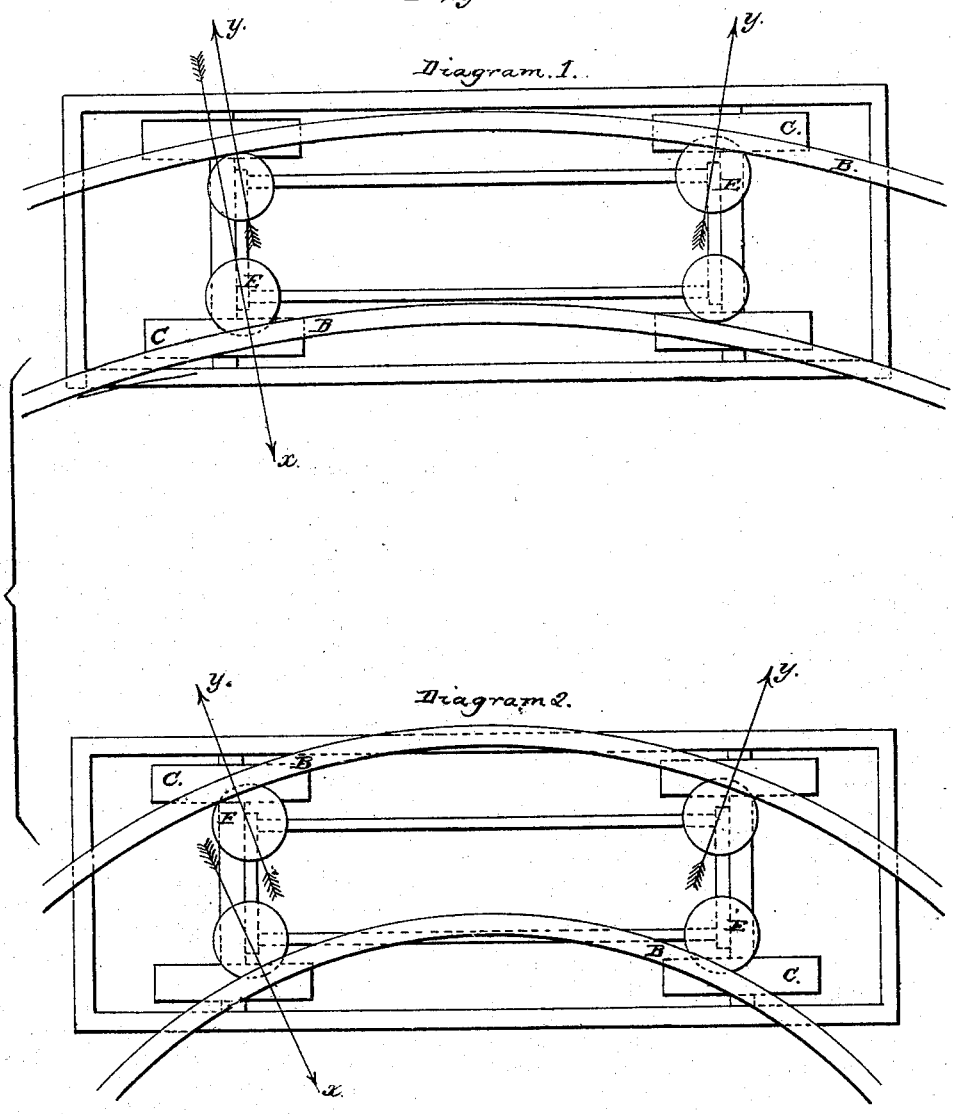
Fig. 9.



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UNITED STATES PATENT OFFICE.

GUSTAV F. W. REBLE, OF MOSCOW, RUSSIA.

IMPROVEMENT IN RAILWAYS AND LOCOMOTIVES.

Specification forming part of Letters Patent No. **197,945**, dated December 11, 1877; application filed September 7, 1877.

To all whom it may concern:

Be it known that I, GUSTAV FRIEDRICH WILLIAM REBLE, of Moscow, Russia, have invented certain new and useful Improvements in Railways; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a railway and locomotive containing my invention. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged end view of the same. Figs. 4, 5, and 7 are diagrams of portions of the same. Fig. 6 represents a detail of construction in section. Fig. 8 shows a modification of my invention, and Fig. 9 represents diagrams illustrating the operation of my invention.

This invention relates to railways, its object being to enable trains to move with greater velocity than heretofore, and to prevent them from running off the track.

Many defects exist in the means ordinarily employed to move railway trains. A common defect is the slipping of the driving-wheels of the locomotive when steam is turned on to start the train which is standing still. The friction of the driving-wheels upon the rails is not usually sufficient to prevent this slipping, as the train slowly gets into motion, the amount of which depends upon the grade and the weight of the train. Efforts have been made to obviate this difficulty by increasing the weight of the locomotive, by coupling several—three, or even four—pair of driving-wheels together, to augment the points of friction, all of which increase the wear of the rails and driving-wheels.

Another defect consists in the use of the same rails for the driving-wheels and the car-wheels. To attain the best results, these latter should run as smoothly and with as little friction as possible on the rails. If the latter and the car-wheels are made smooth, there will be less friction of the driving-wheels upon said rails, and, consequently, greater difficulty in moving the train. But if, on the other hand, the rails be roughened, the friction of the driving-wheels will be greater, but the car-wheels will be retarded, and with them the train.

Another defect consists in the use of flanges upon the car-wheels, which produce a great many frictional surfaces, causing them to adhere to the rails and retard the train, instead of allowing them to move freely. This defect is noticed as soon as the car is put in motion and turns to the right or left, a curve being seldom passed without an audible squeaking.

My invention consists in means for obviating these and other defects, consisting of separate rails with properly-roughened surfaces, upon which the driving-wheels run in frictional contact; main rails, with surfaces of proper smoothness, upon which the car-wheels run; and devices for preventing said wheels from running off the main rails, as will be hereinafter fully described and clearly claimed.

In Figures 1 and 2 are shown parts of a locomotive resting upon rails, the inner parts of said locomotive not being shown or referred to, since they are too well known to constructers to require illustration or description.

A are separate rails with properly-roughened surfaces for the driving-wheels, located between the main smooth rails B, upon which the car-wheels C, having axles G, run. D are driving-wheels of the locomotive, having broad treads resting upon the rails A. The engines that drive these wheels do not lie outside of them, but are in the middle of the locomotive, with their base-plates resting against each other, to develop their full power. One pair of these wheels runs before and the other pair behind the engines. If desired, they may run in one line, and the engines be placed side by side. If desired, the treads of these wheels may be covered with india-rubber, vulcanized, to augment their frictional contact.

In Figs. 1, 2, and 3, the treads of the driving-wheels are represented as horizontal or flat. If, however, it is found desirable, they may be made with angular surfaces, the separate rails A being made to correspond, one form of which is shown in Fig. 5.

The car-wheels C are provided with flat treads running upon the main rails B, and serve in the locomotive to relieve any unnecessary pressure of the driving-wheels upon the rails A through springs. The locomotive is also provided with guide-rollers E, which prevent the wheels C from running off the track, as will be fully hereinafter described.

By employing the car-wheels C, with flat treads, with the main rails B and rollers E, the friction is reduced, and the cars may be moved with less power, as will now be explained.

As illustrated in Fig. 7, there is no surface of friction, but only two points on each rail, (marked *a* and *b*.) The point of friction, *b*, is between the rollers E, placed in a horizontal position, and the rails B, the inclined rolling-surfaces of said rollers bearing against the inner edges of the rails and holding the car in place, thereby rendering it impossible for the car to run off the track. One construction of these rollers is shown most clearly in Fig. 6 in plan and section.

The roller is journaled upon an axle, H, and is located between two plates provided with three or four friction-rollers, to allow it to move freely, and making it unnecessary for the locomotive to use as much power as with the ordinary car-wheels, especially when rounding curves. Its inclined rolling-surface fastens, so to speak, the cars upon the main rails, and prevents, no matter what the radius of the curve may be or the speed of the locomotive and cars, the latter from running off the rails.

A modification of this part of my invention is shown in Fig. 8, in which the rollers E are used without friction-rollers, and their peripheries made to partially conform to the sides of the rails B. This form of construction is simpler and cheaper than the other, and performs the same function as the other.

The guiding-rollers have no duty to perform as long as the car is running exactly midway of the track, as they may then be allowed to roll free from the rails; but as soon as the car gets out of the middle of the track and turns to the right or to the left, the guiding-rollers will come into action at once. They will then roll on the inner side of the rail toward which the car has turned until the latter has resumed its former position. As long as the track is straight the pressure on these rollers will be but temporary, and even then comparatively light. As soon as the track curves they exhibit their full merit.

Fig. 9 shows the same car running over two different curves, Nos. 1 and 2. On both of them the guiding-rollers E have to undergo the pressure toward and from the center of the curve. These rollers, as shown in Figs. 7 and 8, bear upon the neck of the rail just below the head of the same, and thus prevent the wheels C from running off the track under any circumstances. Nothing but the power of the locomotive is necessary to pull the cars around the curve. The radius of the curve No. 2 is such as to cause a car with wheels made upon the old plan to run off the track, while a car provided with my invention takes this curve with entire safety, the proper power being used.

The advantages accruing from my invention are, longer durability of both rails and wheels, greater velocity, easier rolling, more comfortable traveling, and entire security from running off the track.

No great difficulty will arise from altering the switches and crossings to adapt them to my invention.

What I claim as new is—

1. The driving-wheels D D and car-wheels C C, in combination with separate and main rails A A B B, substantially as described.

2. The driving-wheels and car-wheels, in combination with separate and main rails and guiding-rollers, substantially as described.

3. The car-wheels, in combination with the guiding-rollers seated upon friction-rollers, and having guide-plates and inclined rolling-surfaces, and the main rails, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAV FRIEDRICH WILLIAM REBLE.

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