

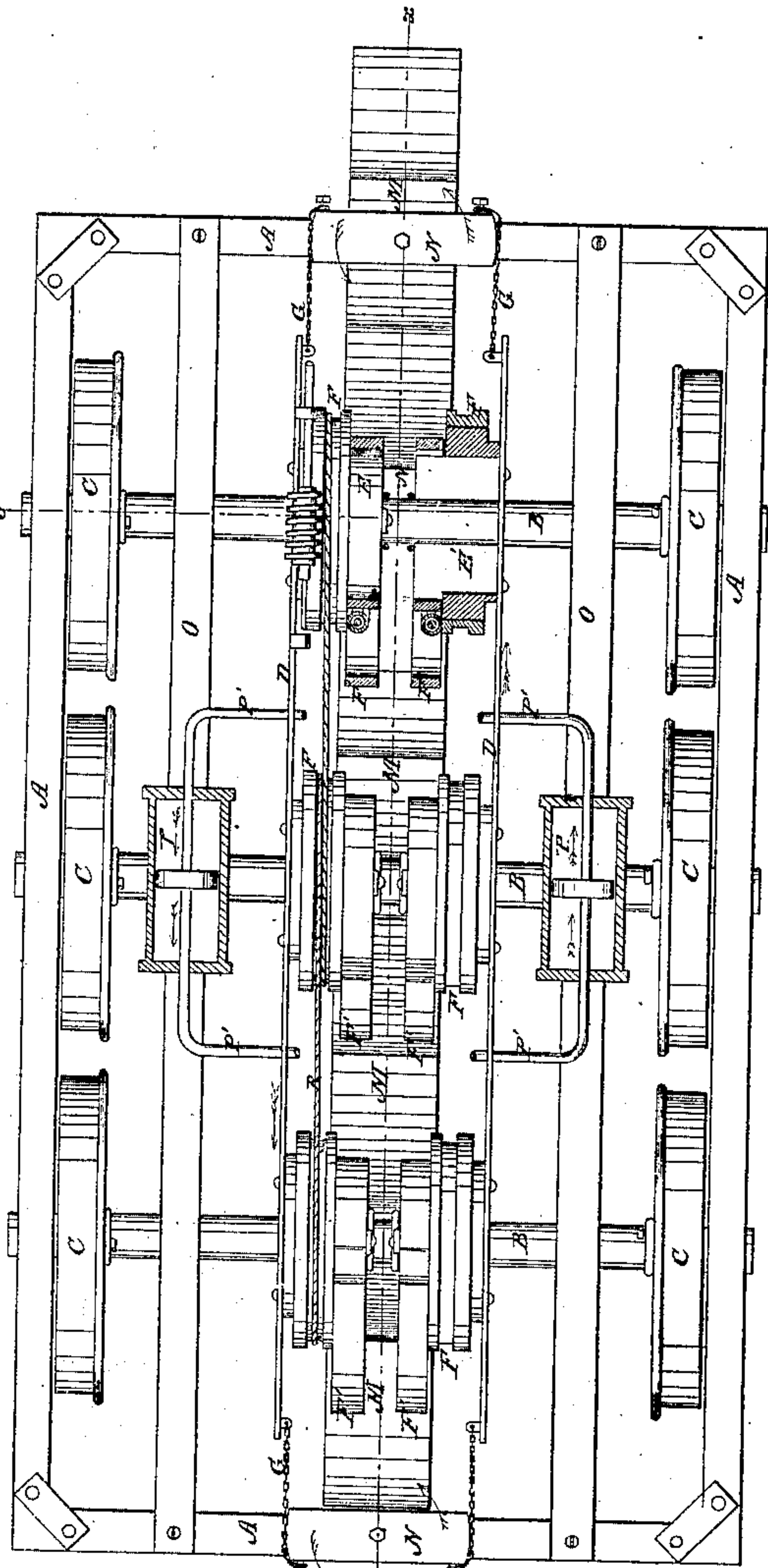
*C. Margutti.*

*Railway.*

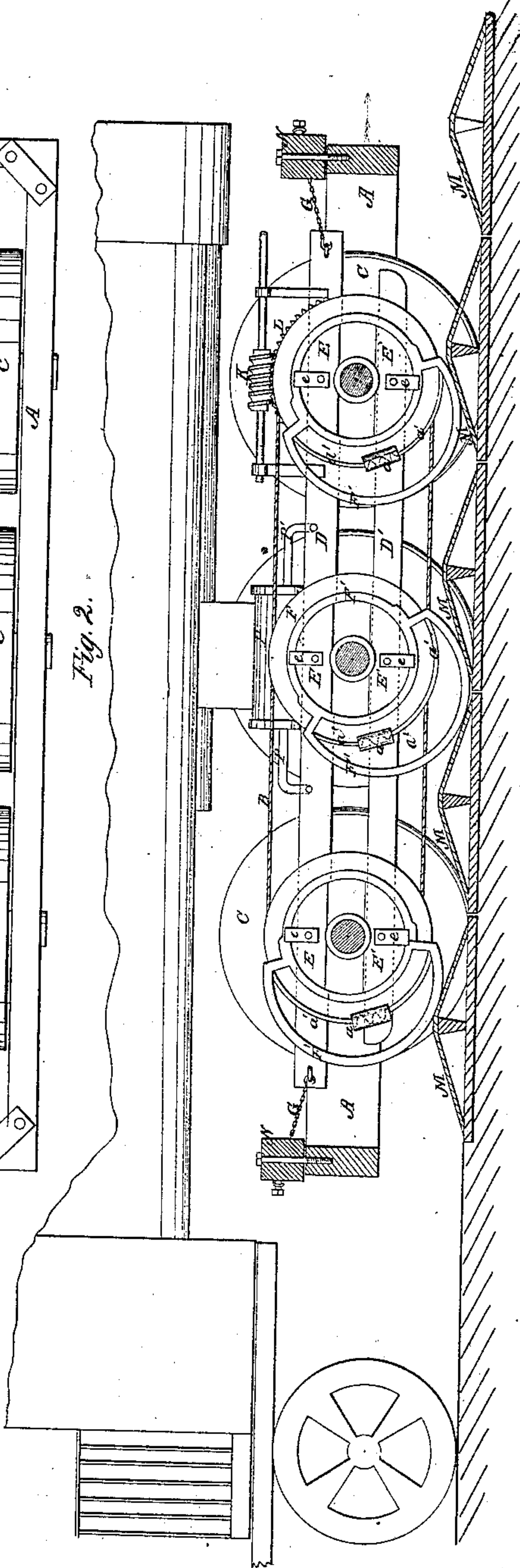
*N<sup>o</sup> 78,462.*

*Patented Jun. 2, 1868.*

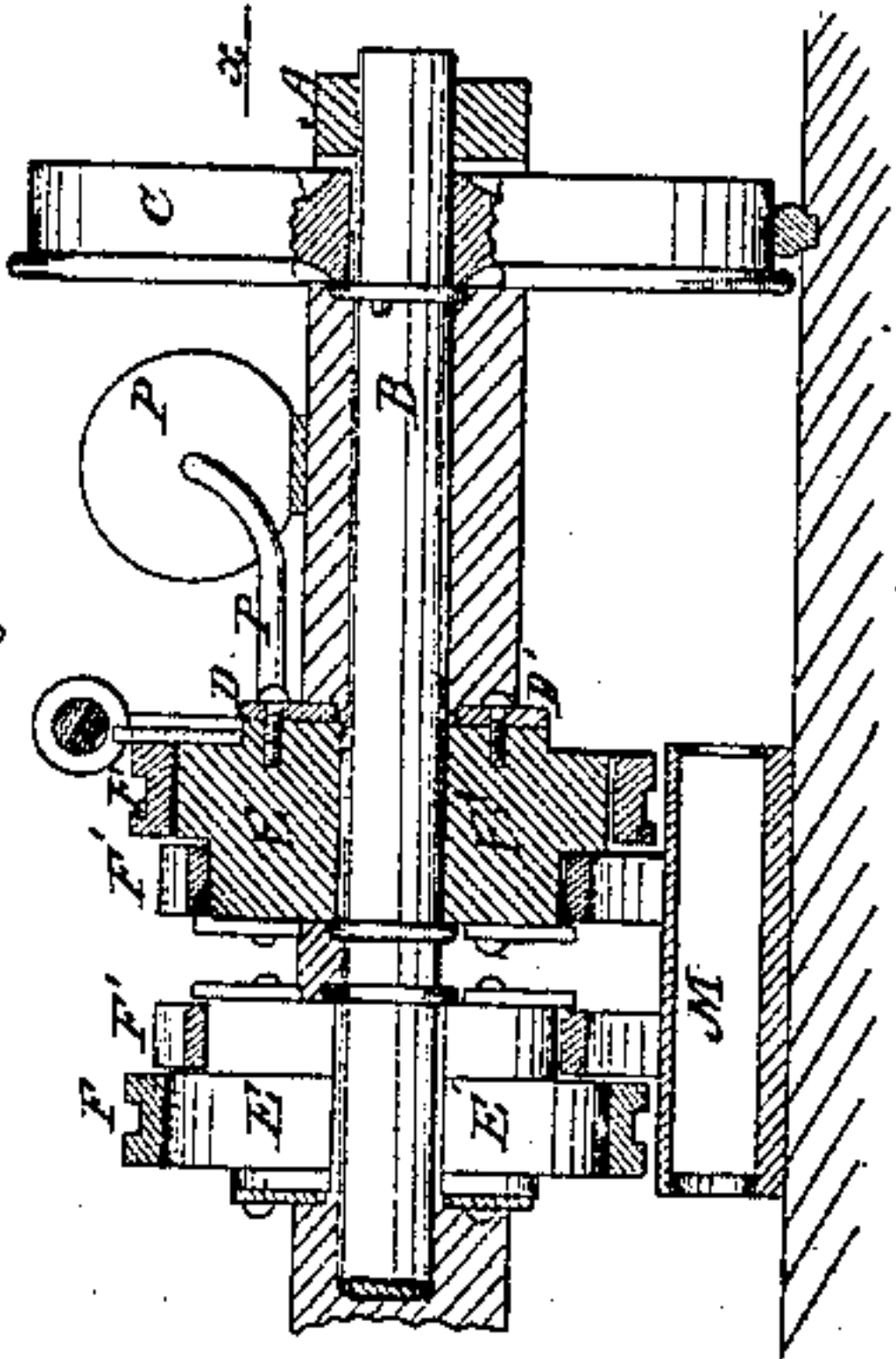
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# United States Patent Office.

CARLO MARGUTTI, OF MILAN, ITALY.

Letters Patent No. 78,462, dated June 2, 1868.

## IMPROVEMENT IN RAILWAYS.

The Schedule referred to in these Letters Patent and making part of the same.

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, CARLO MARGUTTI, of Milan, in the Kingdom of Italy, have invented a new and improved Method of Railway-Locomotion; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

This invention relates to a new and improved method of constructing locomotive-engines, and the tracks over which they run, and of increasing the friction or traction between the engine and the track for ascending inclined planes, and for passing around curves of short radii.

It consists in the construction, arrangement, and combination of the parts, as hereinafter specified.

In the accompanying plate of drawings—

Figure 1 is a plan view of my invention.

Figure 2 represents a central vertical longitudinal section of the same, taken in the line  $x x$ , fig. 1.

Figure 3 represents a partial central cross-section of the same, taken in the line  $y y$ , fig. 1.

Similar letters of reference indicate corresponding parts.

The frame A is made of like materials and in the same general form as the frames of the trucks of locomotive engines now commonly in use, and is supported by three pairs of wheels, C, rotating on the axles B.

Supported upon the frame A is a steam-engine, having the cylinders P of the same secured to the supports O in a horizontal position in the middle, and near each side of the frame A, as shown.

The piston-rods P' pass entirely through the cylinder P at both ends of the same, and, extending beyond the cylinder P, are attached by each end of the said piston-rod P' to the bars D.

The bars D are made of wood or metal, and extend nearly the entire length of the frame A above the axles B, and within the supports O, one on each side of and parallel with the frame A, as shown.

Said bars D are connected together, at both ends of the same, by the chains G, one of said chains G being attached to each end of each of said bars by one end, and by the other end to the levers N, as shown, so that by moving one of said bars D horizontally in one direction, the other of the said bars will be moved in like manner in the opposite direction, said bars D resting upon and being supported by the axles B, as shown.

Under the axles B, and parallel with the bars D, are two other like bars, D', each one of said bars D' being in the same vertical line with one of the bars D.

The bars D' are joined to the bars D by the bearings E, which are made in two segments, one of the segments of each bearing E being above, and the other of said segments being below the axles B; said segments of each of said bearings E being held together by one of the pulleys F, in such a manner that when the centre of one of the bearings E on one side of the frame A is coincident with the centre of the axle B, within the same, the centres of the other bearings E will be coincident with the centres of the other axles B.

The bearings E are cylindrical in form, are three in number on each side, one upon each end of each of the axles B within the frame A, and extend from said bars D and D' inwardly, and are of sufficient length to receive the pulleys F and the eccentric-segments F', as shown in the drawing, the arrangement being such that a reciprocating rectilinear motion of the piston-rods P' is thus communicated to the bearings E on one side, moving in a direction opposite to that of the bearings E on the other side.

The pulleys F are made of iron or other suitable material, one upon each of the bearings E, as shown, are equal in diameter, and are connected together by a cord or belt, R, passing over and around all the pulleys F on one side of the frame A, and another like cord passing over and around all the pulleys F on the other side of the frame A, in grooves in the circumference of said pulleys F, in such manner that when one of said pulleys F is rotated upon one of the bearings E, all the pulleys F so connected together on the same side of the frame A will rotate in the same direction.

Upon each side of the frame A, at either end of the same, and rotating in suitable bearings, on uprights from said frame A, as shown in the drawing, is an endless screw, K, the same being in a line parallel to the sides of the frame A.



Upon the pulley F on each side, at the same end of the frame as the endless screw K, and rigidly secured to said pulleys F, are the worm-wheels or segments of wheels L, said endless screw K fitting into the teeth of said worm-wheel, so that by giving a rotating motion to the endless screw K, a rotating motion is communicated to the worm-wheels L, and through the same to all the pulleys F on one side of the frame A, all the pulleys F on one side of said frame A being rotated by one screw K, and all the pulleys F on the other side of the frame A being rotated by another screw K, the screw K also serving to hold the pulleys F firmly in any desired position on the bearings E.

The eccentric-segments F' are made of iron or other suitable material, are placed, one upon each of the bearings E, are formed of a ring or band, by means of which the said pulleys F are held upon said bearings E, and a segment of a circle attached to a part of said band, so as to form a slot,  $a^2$ , between said segment of a circle and said band, to receive the guide  $a^1$  and spring  $a$  around said guide-rod  $a^1$ , as shown, the spring  $a$  being secured to the face of the pulley F, the centre of said segment being as much one side of the bearings E as may be necessary, according to the elevation and depression in the rail M, hereinafter described.

The eccentric-segments F' rotate or partially rotate on the bearings E, being stopped in the rotation of the same by the spring  $a$ .

The eccentric-segments F' are held against the wheels F by the metallic buttons  $e$ , pivoted to the hub E E' at convenient points on the inner end of the same, as shown.

The railroad is built upon any grade less than the rise of about seventy-five feet in height in the distance of one thousand feet, and may be built in curves of very short radii, my improvement of the same consisting in the addition of a corrugated or wave-shaped rail, M, between the two rails now commonly used.

The rail M is made of iron or other suitable material, and is formed in alternate elevations equidistant from each other, as shown in the drawing, the distance from one elevation to another being in proper proportion to the diameter of the eccentric-segments F', said rail M being of sufficient width on top to receive the eccentric-segments F' on both sides of the middle of the frame A, as shown in the drawing.

The operation is such, that by the reciprocating motion of the bearings E, the frame A being placed over the outside rails of the track, with the wheels C upon the same, the eccentric-segments F' on one side of the frame A will be forced backwards against the inclined planes of the rail M, and stopped from rotating by the spring  $a$ ; the frame will be forced forwards, and the eccentric-segments F' on the other side of the frame A being carried also forward by the bars D and D', will drop or be forced by the spring  $a$  into the depressions of the rail M, rotating sufficiently in so doing as not to be hindered in the forward movement of the same by the elevations upon the rail M, so that it is obvious, that the frame A will be forced forwards at each backward movement of the piston P' by all the eccentric-segments F', one side of the frame A acting against the elevations on the rail M, while all the segments F' on the other side of the frame A, in the forward movement of the same, will partially rotate, so as not to hinder the forward motion of the same, and will be forced back to the former position of the said eccentric-segments F' after the highest part of the elevation of the rail has been reached, when, by the reverse motion of the piston-rods P', the latter eccentric-segments F' will present the necessary resistance against the rail M, while the former eccentric-segments F' will partially rotate so as not to be hindered in the forward movement of the same, the operation being similar to that of a man walking, and by changing the eccentric-segments F' to the other side of the axles B by the endless screw K and pulleys F, a motion in the opposite direction will be given to the frame A and the entire locomotive.

The eccentric-segments F' are so set with respect to each other that one only of the same on each side will, at the end of the forward movement of the same, rest at the lowest point of the depression of the rail M.

I claim as new, and desire to secure by Letters Patent—

1. A locomotive, provided with the eccentric-segments F', which act upon a corrugated or wave-shaped rail M, in the manner substantially as shown and described.

2. Operating the eccentric-segments F' by means of the reciprocating bars D D' and the attached bearings E of the same, substantially as shown and described, and for the purposes set forth.

3. The combination of the reciprocating bars D D' with the steam-driving cylinders P, substantially as shown and described, and for the purposes set forth.

4. The arrangement of the bars D D', connected together substantially in the manner shown and described, so that the movements of the bars D D' on one side, and its attachments, will produce a movement in the opposite direction of the other bars D D' and their attachments.

5. The combination of the reversing-pulleys F with the eccentric-segments F', substantially as herein shown and described.

6. The springs  $a$  in combination with the eccentric-segments F', substantially as shown and described, and for the purposes set forth.

7. The slots  $a^2$  in the eccentric-segments F', as and for the purposes shown and described.

8. In combination with the eccentric-segments F' and pulleys F, I claim the buttons  $e$ , for holding said segments F' against the pulleys F, substantially as shown and described.

9. In combination with the eccentric-segments F', I claim the rail M, constructed and arranged substantially as described, for the purpose specified.

10. The propulsion of railway-cars by means of corrugated or worm-shaped rails M, and a locomotive-mechanism in conjunction with said rails, substantially as shown and described, and for the purposes set forth.

The above specification of my invention signed by me, this 12th day of October, 1867.

CARLO MARGUTTI.

Witnesses:

EUGENIO PUGADZ,

GOMMASO PERELLI PARADISI.