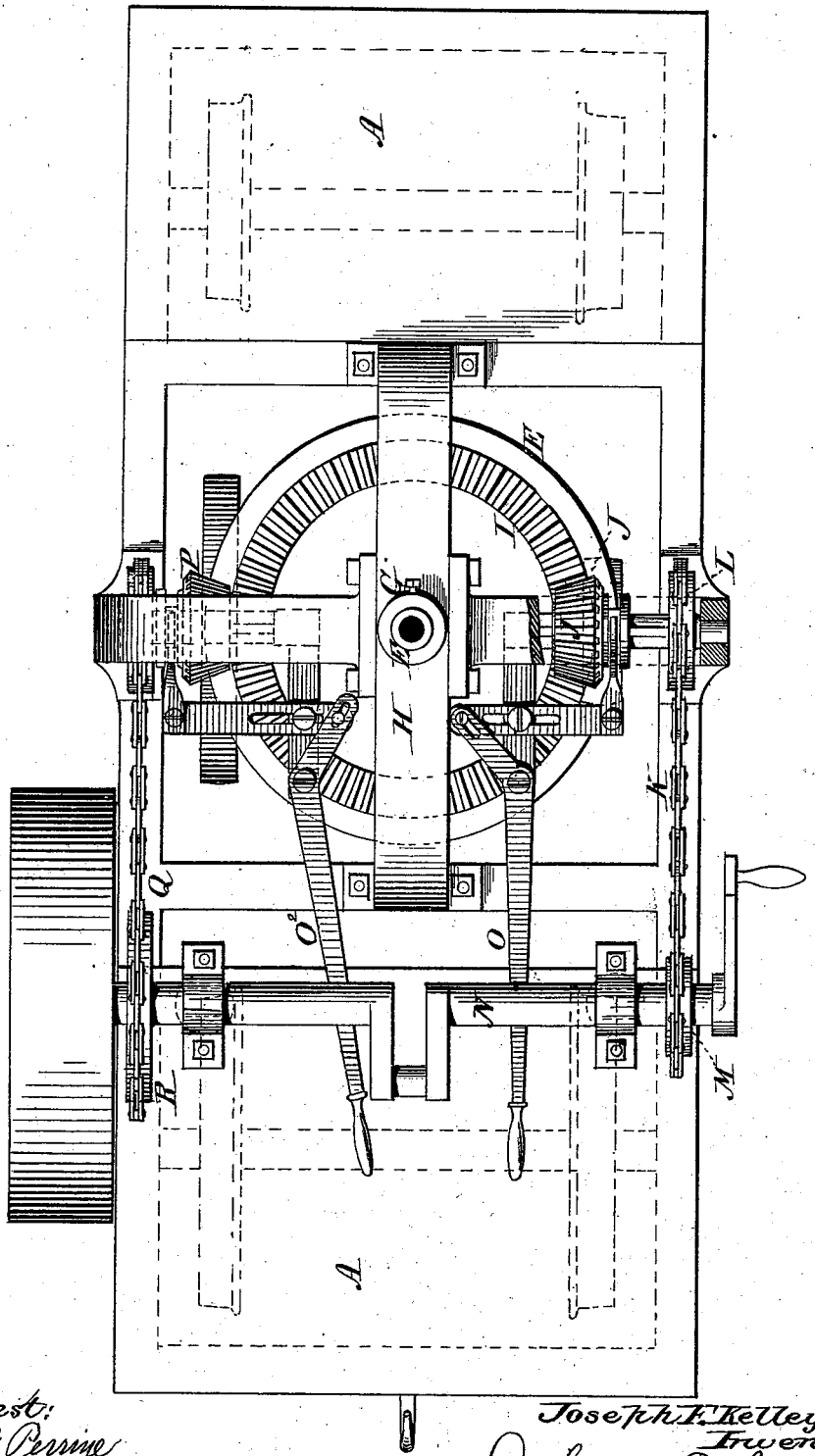
3 Sheets—Sheet 1.

J. F. KELLEY.

Motor for Street-Cars.

No. 204,052. Patented May 21, 1878.

Fig. 1.



Attest:
H. C. Perrine
Floyd Norris.

Joseph F. Kelley,
Inventor.
By. Johnson & Johnson
Atty's

3 Sheets—Sheet 2.

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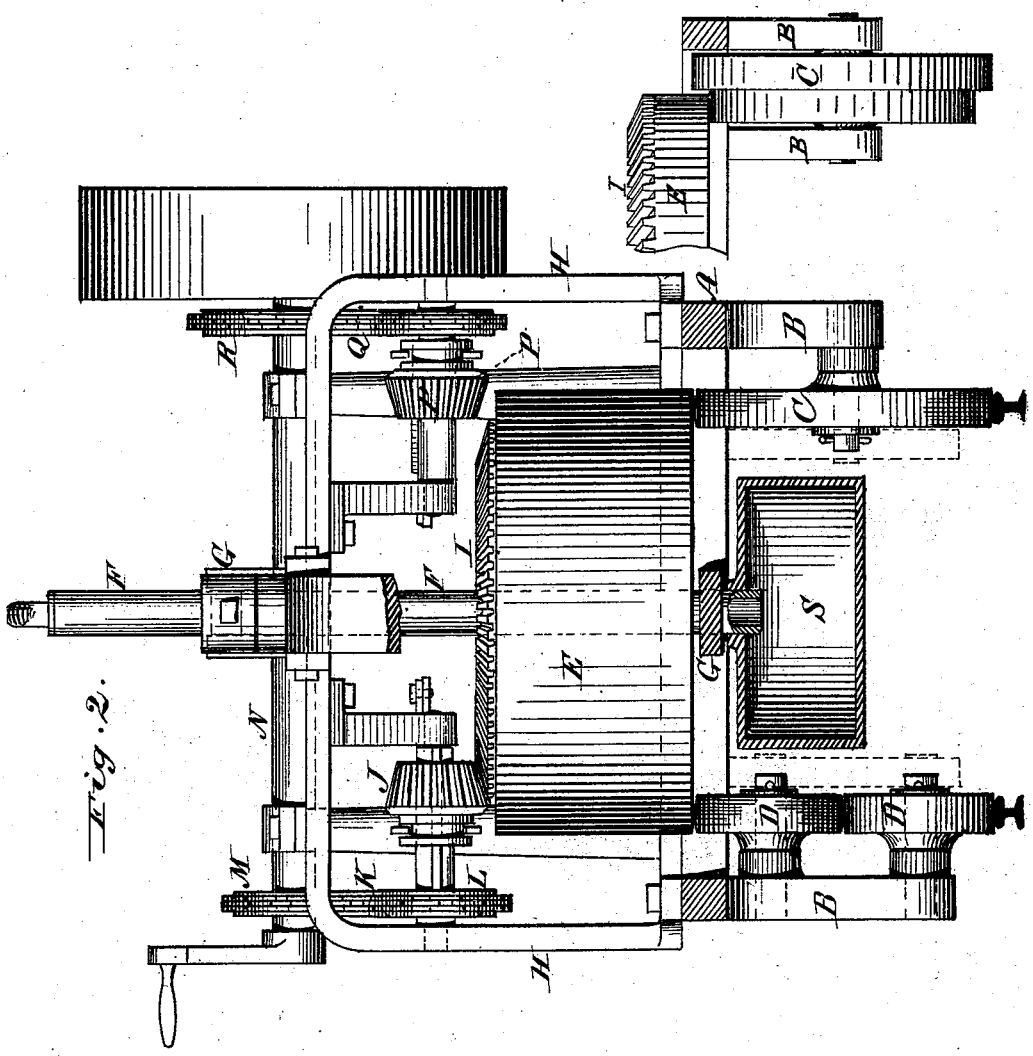

Fig. 2.

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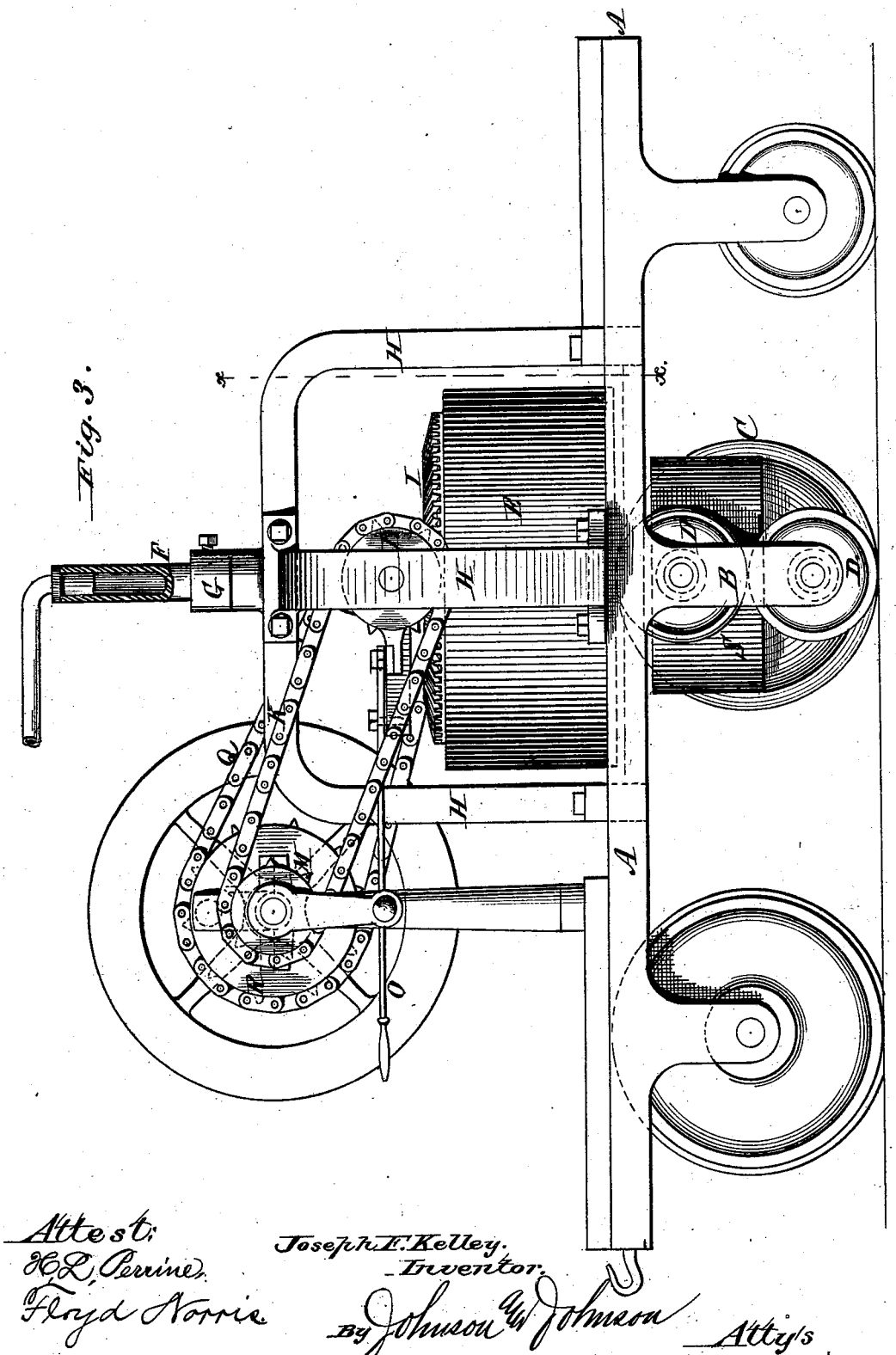
Fig. 3.



Attest:
E. L. Perrine.
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UNITED STATES PATENT OFFICE.

JOSEPH F. KELLEY, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN MOTORS FOR STREET-CARS.

Specification forming part of Letters Patent No. **204,052**, dated May 21, 1878; application filed April 13, 1878.

To all whom it may concern:

Be it known that I, JOSEPH F. KELLEY, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Engines for Street and other Railways; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My improved engine is designed for propelling street or other cars.

I use a horizontal revolving weighted wheel, which is borne upon the tops of the traction-wheels, and drives them by friction.

The revolving weighted wheel is carried by a vertical shaft suitably supported upon the truck-frame, and is driven by any suitable connections.

The traction driving-wheels are carried by short axles, and the revolving weighted wheel rests upon and drives them by friction at its opposite sides; and in order that said wheels may be driven in the same direction and at the same speed, I employ at one side of the revolving weight two independent traction-wheels, one resting upon the other, each having a diameter just half that of the single traction drive-wheel, which causes the lower one of these two traction-wheels to revolve forward, and, as both together equal the diameter of the single wheel, they therefore act as a single drive-wheel, and give the same motion and traction-power as the opposite single wheel.

The weight of the wheel must be sufficient to produce the required traction-power of the driving-wheels; and for street-cars, whose speed is comparatively slow, said wheel is driven by a bevel-gear on its upper face by means of a bevel-pinion suitably connected with the crank-shaft. This pinion is adapted to be thrown in and out of gear with the revolving weighted wheel to disconnect it from the crank-shaft or engine of small power, when it is desired to stop the car, which may have the usual brake appliances for this purpose, if deemed necessary.

For greater speed, the prime motor is connected directly with the vertical weight-shaft in any suitable manner, and the cog-gearing is not used.

For street-cars in which the weighted wheel is driven by a face-gear, I employ an independent pinion at the side of the revolving weighted wheel opposite the first-named pinion and connect it with a similar shifting device, so that when the first pinion is thrown out the second may be thrown into gear; and I drive this second pinion by a larger pulley on the crank-shaft, so as to give greater speed, as may be desired. In this case the motion of the weighted wheel will be in the same direction; but the engine must be reversed.

I use a revolving condenser arranged beneath the weighted wheel and carried by its shaft, which is hollow, and connects at its upper end with the exhaust-steam pipe of the engine, so that the steam being exhausted into this condenser is, by its motion and some water therein, quickly condensed, and all puffing noise avoided.

For compactness and the utilization of weight, the boiler may be arranged upon and supported by the revolving weight by means of anti-friction rolls, so as to render it independent of the revolving motion of the weighted wheel.

This engine for drawing cars, while serving to transmit the power applied to operate it, uses such power advantageously by reason of the power being applied directly to the tops of the traction-wheels.

Referring to the drawings, Figure 1 represents a top view of a truck frame-work with my revolving weighted wheel applied thereto; Fig. 2, a front elevation of the same, and Fig. 3 a side elevation.

The mechanism is mounted upon a truck-frame, A, which is coupled with the car, and has the usual flanged wheels; but I do not use them as the traction-wheels.

Between the front and rear axles of the engine I arrange, upon short axles between hangers B B, traction-wheels C D, and upon the tops of these I arrange and support a horizontal revolving weighted wheel, E, so as to drive by friction the traction-wheels. This weighted wheel is supported in position by a vertical shaft, F, passing through upper and lower bearings G in a frame, H, rising from the truck-frame.

The traction-wheels are driven from oppo-

site sides of the revolving weighted wheel; and to obtain a forward motion of the traction-wheels at both sides I use at one side two small wheels, D D, one upon the other, of equal diameter, and both together equal in diameter to the single wheel C, so that I obtain an equal power of the traction-wheels in the same direction, as the weighted wheel, resting upon the upper one of said wheels D and driving it backward, thereby drives the lower one forward. In this way I drive the traction-wheels by a continuous frictional rolling contact at their tops, so that their short axles are relieved of the weight of the wheel E, and serve only to hold the wheels in place, being fitted with the usual boxes and springs, and the driving power applied at a point always diametrically above the point of traction.

The weighted wheel must be sufficient to produce the required traction, and its under surface is adapted to revolve upon the tread-surface of the traction-wheels, or upon a surface of less diameter than the traction-surface, so that the weight-bearing surface can be kept clean and free from mud or slush. This bearing-surface, of less diameter than the wheels C and D, when used, is formed upon the inner faces of the traction-wheels.

This engine, when used for street-cars, is driven by means of an upper face bevel-gear, I, into which gears a shifting-pinion, J, mounted upon a short shaft having its bearings in the frame H and driven by a chain, K, passing over a sprocket-wheel, L, on said pinion-shaft, and a similar sprocket-wheel, M, on the crank-shaft N, which is driven by hand-power applied to the crank, a steam-engine of small power suitably connected thereto, or some other prime motor ordinarily used.

A shifting-lever, O, pivoted upon the frame H, has a clutch-connection with the pinion J, for throwing it out of gear with the revolving weighted wheel to stop the car. This connection is for giving the slow speed for street-cars; but for increasing the speed an independent pinion, P, (carried by a short shaft at the opposite side of the weighted wheel, and thrown into gear with its face-gear I by a second shifting-lever, O^2,) is driven by a sprocket-wheel and chain-connection, Q, with a larger sprocket-wheel, R, on the crank-shaft. This independent pinion-connection gives the same direction of motion to the weighted wheel, and the movements of the crank-shaft and engine are reversed, and thus give the car the required increased speed. This second pinion-gear will also back the cars without reversing the rotation of the driving-shaft N by simply throwing said pinion in gear when the pinion J is thrown out.

I arrange a revolving condenser, S, on the lower end of the weighted wheel-shaft F, which is hollow and connected with the exhaust pipe or pipes of the engine, so that the exhaust-steam is discharged into this revolving condenser, and by its motion and water therein is quickly condensed, and the water may be discharged from time to time, or pumped back into the boiler, by suitable connections. This arrangement of the revolving condenser utilizes its weight for traction-power.

In using this engine for fast trains, the engine-connection is made direct with the vertical shaft F of the weighted wheel. I have not shown this connection for fast trains; but it is obvious that it may be made by crank or otherwise. In this case the gear and shifting pinions will not be used, but the engine will control the motion of the weighted wheel directly. I contemplate, also, arranging the boiler upon the revolving weighted wheel by means of anti-friction rolls, so as to utilize the weight of the boiler upon the traction-wheels, the boiler, of course, being independent of the revolving motion of the weighted wheel.

The weight E may be made comparatively shallow, so as to bring the cog-wheel I as near the platform as possible, and additional weights may be secured upon the shaft F above said cog-wheel. In this case a powerful spring or springs may be arranged to press upon said shallow weight and take the place of the upper or additional weights, the design being to obtain the proper driving friction upon the tops of the drivers. I propose, also, to use proper brake devices for the revolving weight, to be applied and operated in any suitable way to stop the motion of the weight, and thereby stop the car or train, for the same friction-power which drives the car or train will also stop it.

The weighted wheel is especially adapted for use on street-railways, while the spring and light friction-wheel are for use on the ordinary railways of rapid transit.

I claim—

1. In an engine for railway-cars, the combination, with the traction-wheels C D thereof, of a horizontal revolving weighted wheel, E, supported upon the tops of the traction-wheels and driving them, as set forth.

2. In an engine for railway-cars, the combination of a horizontal revolving weighted wheel, E, of the traction-wheels D D, one upon the other, and the single traction-wheel C, upon which the weight is supported for transmitting speed, as described.

3. The combination, with a horizontal revolving weighted wheel E and the traction-wheels C D D, upon the tops of which it is supported for operation, as described, of the face gear-wheel I, the shifting-pinions J and P, and their connections with the crank-shaft, for the purpose specified.

In testimony that I claim the foregoing I have affixed my signature in the presence of two witnesses.

JOSEPH F. KELLEY.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.