E. LAMBKIN.

SPRING-MOTOR.

No. 172,456. Patented Jan. 18, 1876.

Fig. 1

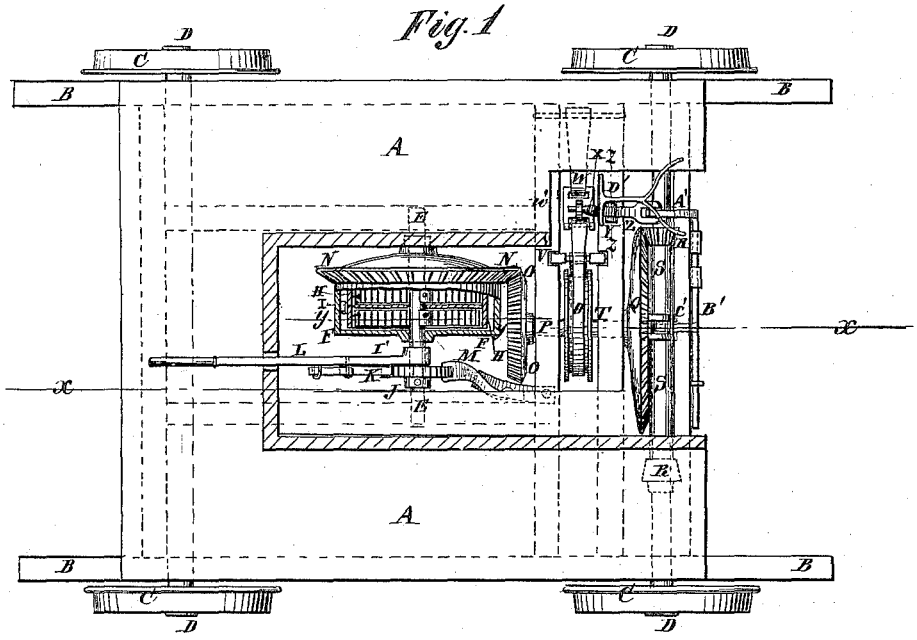


Fig. 2

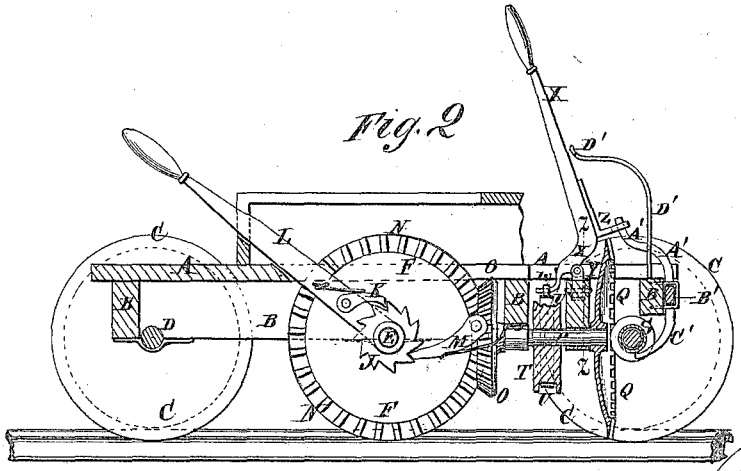


Fig. 4

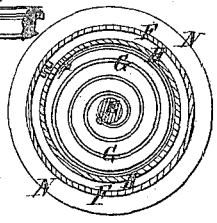


Fig. 3

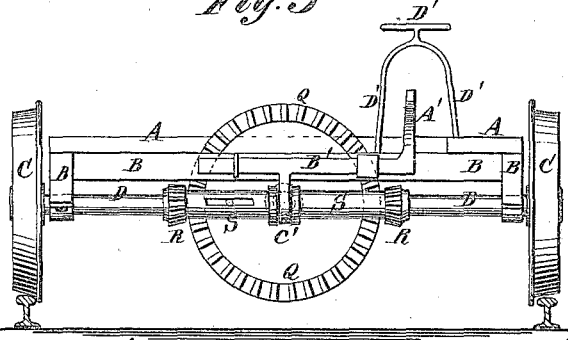
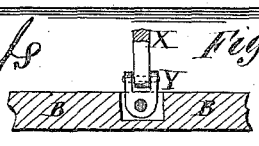


Fig. 5



WITNESSES:

A. W. Almqvist

Alex F. Roberts

INVENTOR:

E. Lambkin

BY

Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDWIN LAMBKIN, OF SEBEWAING, MICHIGAN.

IMPROVEMENT IN SPRING-MOTORS.

Specification forming part of Letters Patent No. **172,456**, dated January 18, 1876; application filed October 29, 1875.

To all whom it may concern:

Be it known that I, EDWIN LAMBKIN, of Sebewaing, in the county of Huron and State of Michigan, have invented a new and useful Improvement in Spring-Power, of which the following is a specification:

Figure 1 is a top view of my improved power, shown as applied to a hand-car. Fig. 2 is a vertical longitudinal section of the same, taken through the line *x x*, Fig. 1. Fig. 3 is a front view of the same. Fig. 4 is a detail section of the spring-drum, taken through the line *y y*, Fig. 1. Fig. 5 is a detail section taken through the line *z z*, Fig. 1.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved spring-power for running street-cars, railroad hand-cars, road vehicles, and driving machinery, which shall be simple in construction, effective in operation, and convenient and reliable in use.

The invention consists in the peculiar construction of the spring-drum, and in means for applying a brake and operating a shifting mechanism, as will be hereinafter more fully described.

A represents the platform. B represents the frame-work, C the wheels, and D the axles, of a railroad hand-car. E is a shaft, placed parallel with the axles D, and the journals of which work in bearings attached to the frame-work B. Upon the shaft E is placed a drum, F. G are springs, two of which are coiled together around the shaft E, and are placed within a ring or band, H, which is placed within the drum F. One end of the pair of springs G is attached to the shaft E, and their other ends are secured to the ring or band H. The band or ring H is provided with lugs, which interlock with lugs formed upon the drum F, to cause said ring and drum to move together. A thin metallic disk or washer, I, is then placed upon the shaft E, and another pair of springs and their ring are placed upon the shaft E within the drum F, and so on until a spring of the desired power has been obtained. A spring thus formed will be much less liable to break than a spring of the same power formed in one piece. To the shaft E is rigidly attached a ratchet-wheel, J, with the teeth of which engages the spring-pawl K. The pawl K is pivoted to a lever, L, the lower end of which is pivoted to the shaft E. The upper end of the lever L projects up through a slot in the platform A into such a position that it may be conveniently reached and operated to turn the ratchet-wheel J and shaft E to coil the springs G. To the frame B is attached a spring pawl, M, which rests upon the teeth of the ratchet-wheel J, and prevents the shaft E from being turned back by the tension of the springs G. To the drum F is attached, or upon it is formed, a bevel-gear wheel and cap for closing the end of the drum N, the teeth of which mesh into the teeth of a bevel-gear wheel, O, attached to the shaft P. The shaft P is placed at right angles with the axles D and shaft E, and its journals revolve in bearings attached to the frame B. To the forward end of the shaft P is attached a large bevel-gear wheel, Q, which is placed just in the rear of the axle D, so that its teeth may mesh into the teeth of bevel-gear wheels attached to said axle D. R are two bevel-gear wheels attached to a sleeve, S, placed upon the axle D, and secured by a tongue and groove, a pin and slot, or other means that will allow it to have a longitudinal movement while carrying the axle D with it in its revolution. The gear-wheels R are attached to the sleeve S in such positions that either may be thrown into gear, and both may be thrown out of gear, with the gear-wheel Q by sliding the sleeve S upon the axle D. To the shaft P, between the gear-wheels O Q, is attached a pulley or drum, T, around which passes a strap, U, one end of which is attached to a pin or bolt, V, let into or otherwise secured to the frame B. The other end of the strap U is secured to one end of a bar, W, the other end of which is pivoted to the frame B. To the bar W, near its inner end, is attached a lug, *w'*, to receive the end of the short arm of the bent lever X, the middle part of the said short arm of which is pivoted to a block or coupling, Y, pivoted to the frame B, so that the long arm of the said lever X may have a longitudinal and transverse movement with respect to the car. To the forward side of the lever X, at its bend, is attached a fork, Z, which takes hold of the arm A' rigid-

ly attached to the bar B′. The bar B′ slides in keepers attached to a cross-bar of the frame B, and has an arm, C′, attached to it, which enters a groove in the sleeve S, so that the said sleeve may be moved longitudinally, to throw the gear-wheels R into and out of gear with the gear-wheel Q, by the lateral movement of the lever X. D′ is a T-shaped guide, the stem of which is attached to the frame B, and is forked to give it a rigid support. When not in use the lever X rests in the recess between the fork and the T of the guard or guide D′. To use the lever D′ it is moved to the rear side of the T-guide D′, which depresses the bar W, and draws the brake-strap U tightly around the pulley T, so that the shaft P cannot turn while the sleeve S and gear-wheels R are being shifted. The lever X is then moved laterally to shift the sleeve S and gear-wheels R, to cause the spring-power to move the car forward or backward, or to throw it out of gear, as may be desired. The spring G may be coiled by operating the lever L, or by a small engine, and can be kept coiled easily while propelling the car or machine by operating the lever L.

When the power is applied to street-cars an extra spring may be used in starting the car, and thrown out of gear when the said car has started.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a spring-motor, of the drum F, combined end cap and bevel-wheel N, spring G, rings H, and interposed disk or disks I with the shaft E to be driven, all constructed and operating as herein set forth.

2. The combination of the pulley or drum T, the strap U, the pivoted bar W, and the bent lever X with the shaft P and the gear-wheels N O Q R, that connect the spring-drum G H F with the axle or shaft D to be driven, substantially as herein shown and described.

3. The combination of the fork Z, the arms A′ C′, the sliding bar B′, and the sliding sleeve S with the gear-wheels R of the axle or shaft D, and with the lever X, that operates the brake T U W, substantially as herein shown and described.

EDWIN LAMBKIN.

Witnesses:
RICHARD MARTINI,
ALBERT GEYLER.