3 Sheets—Sheet 1.

J. S. VAN PELT, Jr.

CAR STARTER.

No. 190,101. Patented April 24, 1877.

Fig. 1.

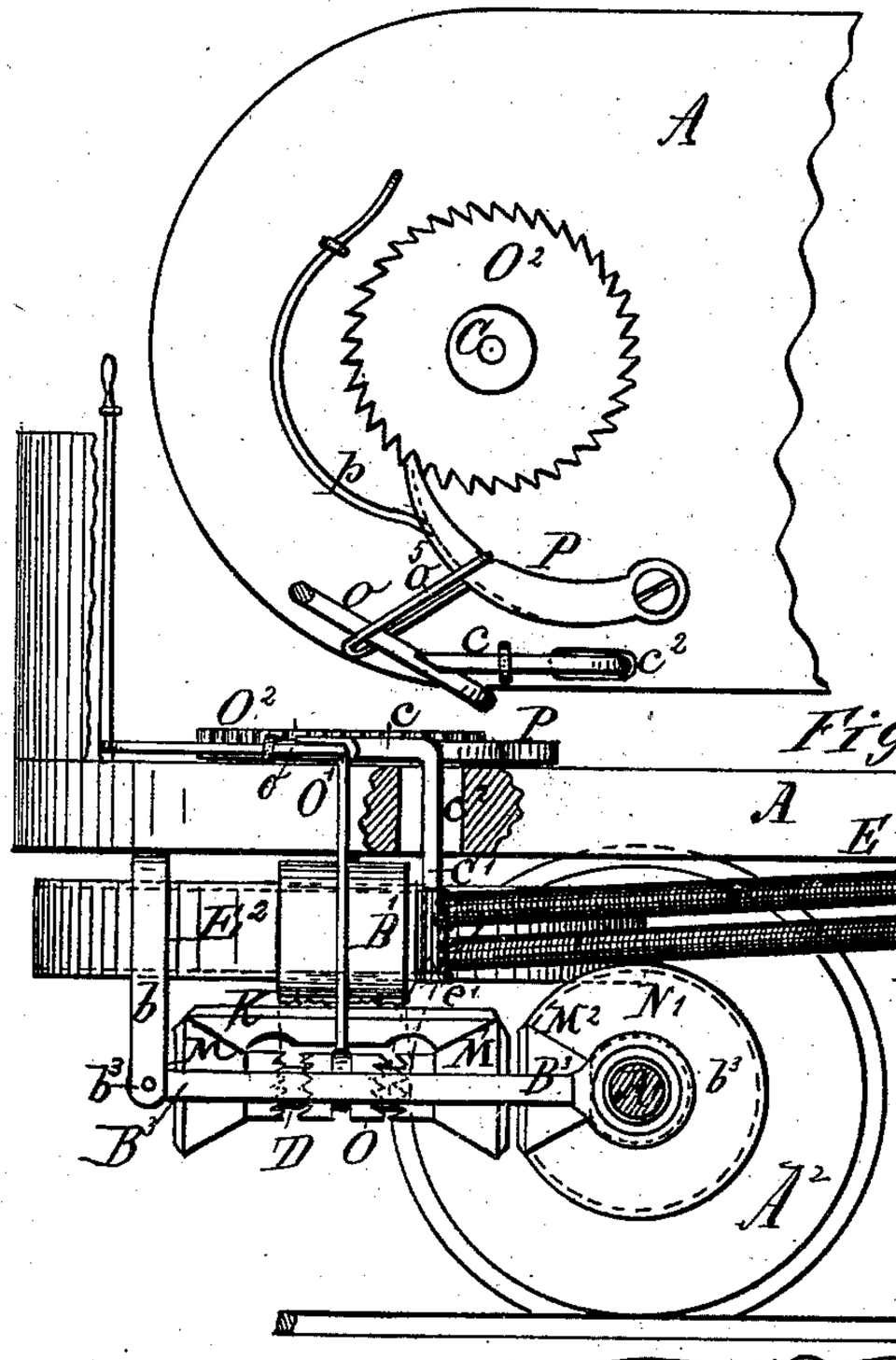

Fig. 2.

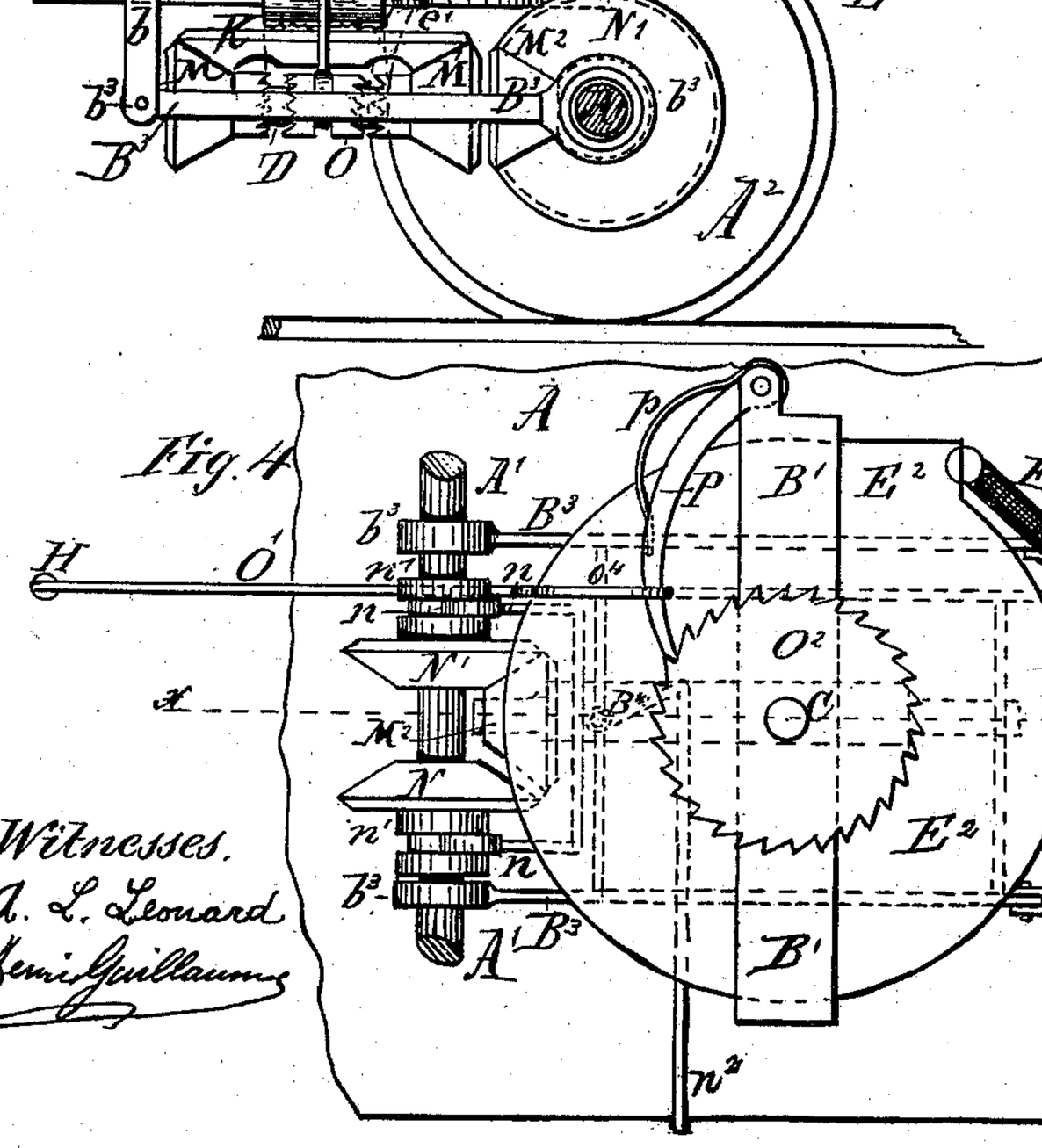

Fig. 8.

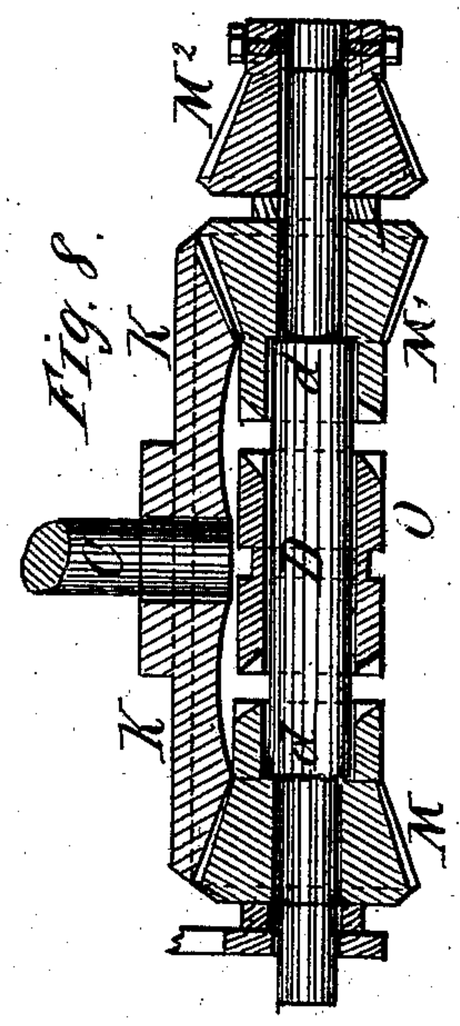

Fig. 9.

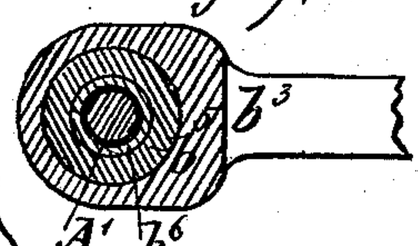

Fig. 4.

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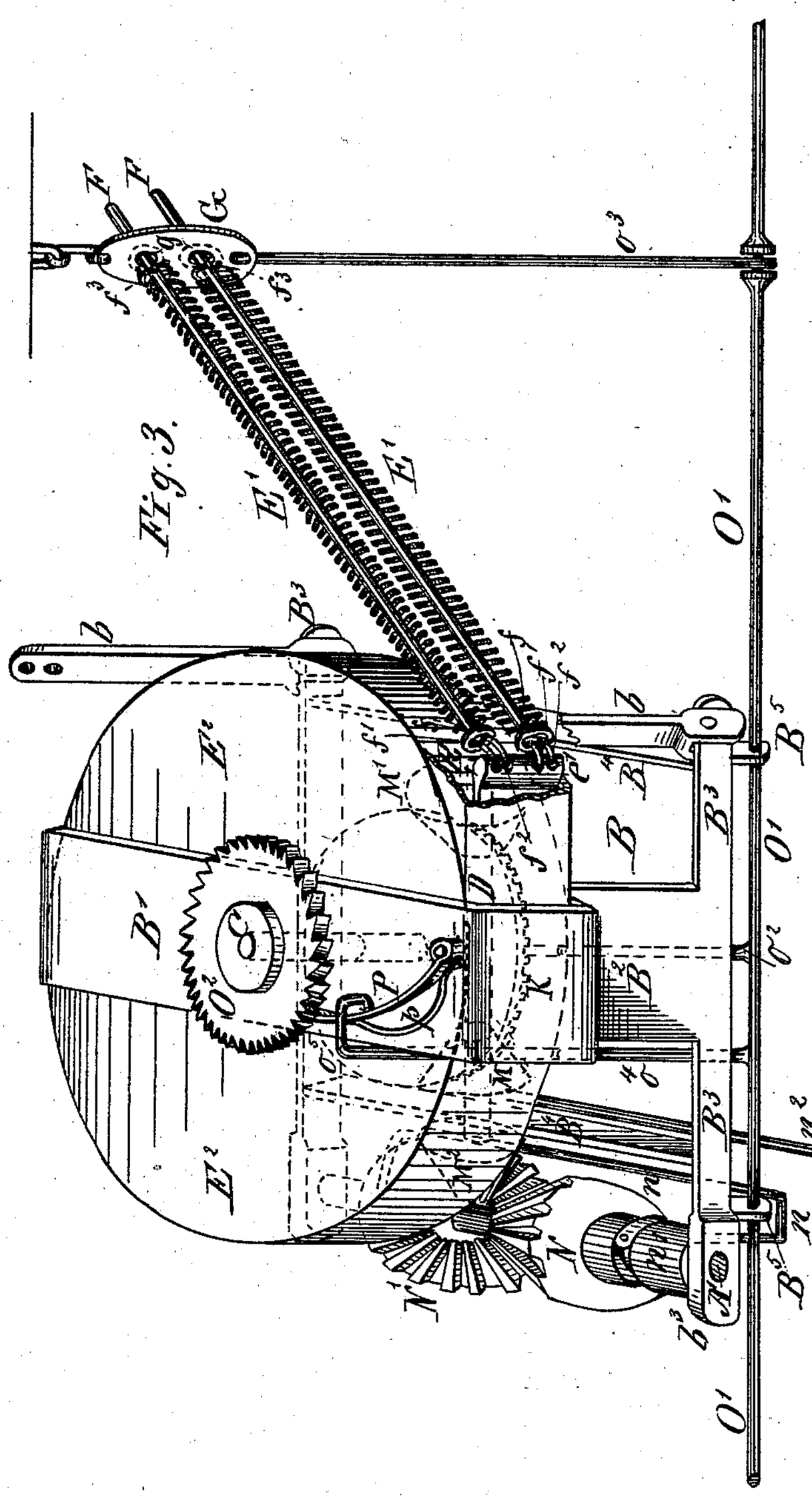

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Fig. 7.

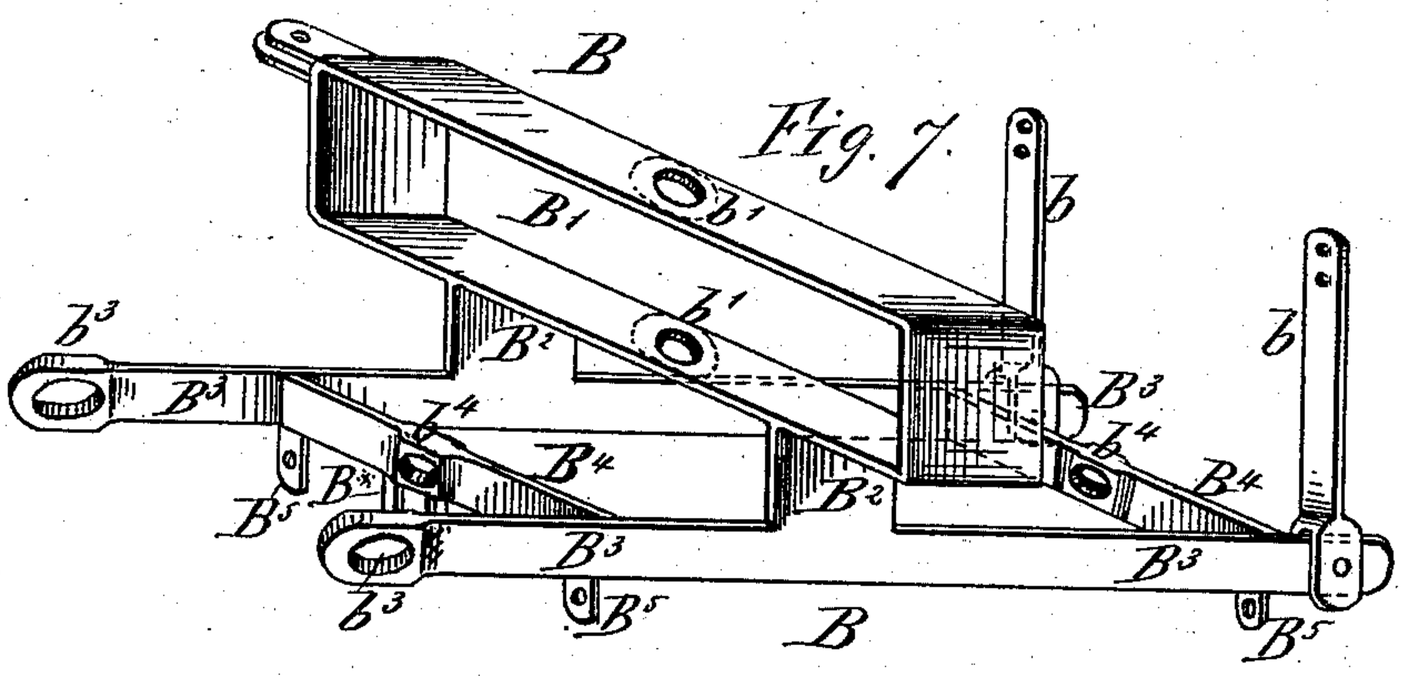


Fig. 6.

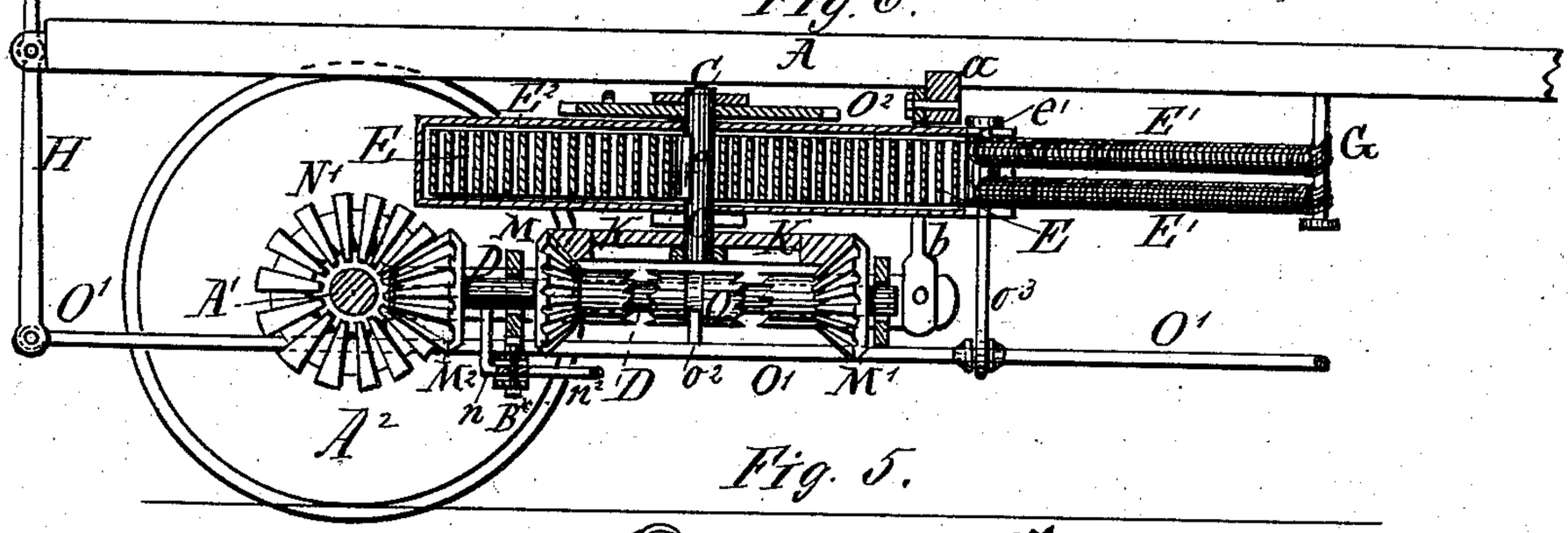
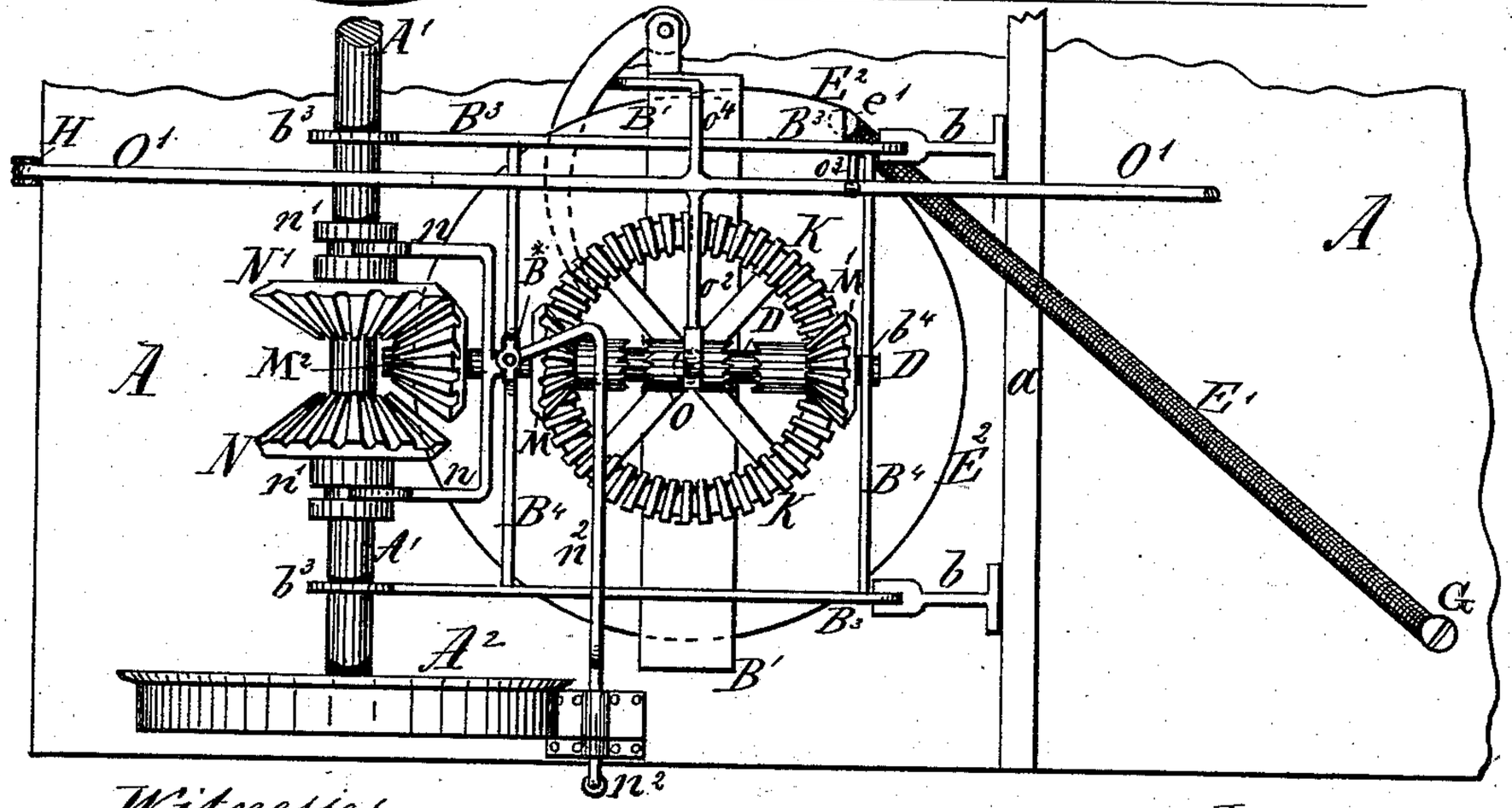


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN S. VAN PELT, JR., OF EVERGREEN, VIRGINIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO ARTHUR HASWELL GREENE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN CAR-STARTERS.

Specification forming part of Letters Patent No. **190,101**, dated April 24, 1877; application filed February 22, 1877.

To all whom it may concern:

Be it known that I, JOHN SERENO VAN PELT, Jr., of Evergreen, in the county of Prince George and State of Virginia, have invented certain new and useful Improvements in Car-Starters, of which the following is a specification:

My invention relates to that class of car-starters in which a spring is employed as a motive power, to assist the horse or horses to overcome the dead weight of a car, and is applicable alike to cars having one direction of motion only, as well as cars in which the line of motion is reversed at each terminus of a route; and consists in a hinged frame carrying the operating mechanism, the journal ends of said frame being provided with yielding or flexible bearings in which the axle of the drive-wheels revolves, to deaden and diminish the shocks to the operating mechanism when the wheels travel over uneven rails, or from any other cause.

The invention further consists in a peculiar arrangement of mechanism to wind up the spring by the forward motion of the car, and a novel mode of mounting or connecting such spring with a yielding or elastic connection, which will follow the motion of the spring as soon as the latter is fully wound up, and automatically throw the winding mechanism out of gear, thus preventing all danger of the breaking of said spring; and, lastly, the invention consists in certain details of arrangement and construction, as fully described hereinafter.

In the accompanying drawings, Figures 1 and 2 are a plan view and side elevation, respectively, showing the mechanism as applied to a car having but one direction of motion. Fig. 3 is a perspective view, showing the general arrangement of mechanism as applied to cars having their line of motion reversed. Figs. 4 and 5 are top and bottom plan views, respectively; and Fig. 6, a vertical transverse section on line *x x*, Fig. 4, of the same. Fig. 7 is a perspective view of the supporting-frame. Fig. 8 is a longitudinal section of the pinion shaft D, and Fig. 9 is a section through the journal end of one of the arms of the supporting-frame.

A is a portion of the body of the car under which the mechanism is located, and B is the hinged carrying or supporting frame, preferably made of metal, and consisting of a shelf or casing, B^1, short uprights B^2, the arms B^3, and the girts or transverse braces B^4. The upper and lower plates of the shelf or casing B^1 are provided with suitable bearings b^1, for the reception and passage of the vertical shaft C, and the transverse braces B^4 are similarly provided with bearings b^4 for the pinion-shaft D, while one end of the arms or side pieces B^3 form journals b^2, in which the axle of one pair of drive-wheels freely turn.

Those portions of the frame forming journals for the shafts just mentioned are re-enforced or enlarged, as shown in dotted lines at b^1, and full lines at b^3 and b^4, Figs. 3 and 7.

The journals or bearings b^3 are made yielding by inserting an annular rubber cushion, b^5, between said bearing and a similar metallic washer, b^6, upon the axle A^1, so as to relieve the frame and mechanism supported thereon from the effect of the shocks imparted thereto by the axle when the wheels A^2 of the car travel over uneven rails or meet with an obstruction, as shown by Fig. 9.

The other end of the arms B^3 is pivoted or hinged to flanges *b*, bolted or otherwise secured to the bottom of the car, or to one of the transverse girts *a*, according to the location of the mechanism which is placed in front of the car when applied to cars having but one direction of motion, while on cars having two directions of motion, the mechanism is located between the axles of the drive-wheels, and in the latter case a slight modification of shifting mechanism is required to operate the devices from either end of the car.

C is the vertical or spring shaft, which has its bearings in the frame B, and carries at its lower end a bevel-wheel, K, into which gear two bevel-pinions, M M^1, loosely mounted on the counter-shaft D, which has its bearings in the transverse braces B^4 B^4 of the frame B. This shaft D is of varying diameter, so as to form shoulders at *d*, to prevent the pinions M M^1 from slipping out of gear with the wheel K.

M^2 is another bevel-pinion, rigidly mounted at one end of the shaft D, and gearing into a bevel-pinion, N or N^1, loosely mounted on the axle A^1 of the drive-wheels A^2. When the car has but one direction of motion one bevel-pinion, M N, on shaft D and axle A^1 is employed, and in this case the pinion N is rigid-

ly mounted on the axle A^1 since the motion of the latter is not reversed; but when this motion is reversed, as is the case in cars moving in both directions, the bevel-pinions N N^1 must be loosely mounted upon said axle, and provided with suitable throwing-in and throwing-out mechanism to actuate the bevel-wheel K when the line of motion of the car is reversed. This shifting mechanism consists of a forked clutch-lever, *n*, grasping the grooved and enlarged hubs n^1 of the pinions N N^1, said lever *n* being pivoted or fulcrumed in a bracket, B*, on one of the transverse braces B^4 of the frame B, and of a connecting-rod, n^2, which passes to the side of the car where it is locked in position in any convenient manner, to prevent the accidental shifting of the bevel-pinions or the shifting mechanism being tampered with, such shifting being effected at each end of the line.

O is a clutch-coupling adapted to be shifted to and fro on the shaft D, to throw one or the other of the pinions M M^1 in or out of gear with the bevel-wheel K. As the arrangement of this shifting mechanism varies slightly to effect a similar result, however, in both styles of car, I will first describe it as applied to a car moving in one direction only; and in this case the clutch-lever O^1 passes directly from the clutch to the side of the car, and is there bent, as at *o*, to pass onto the platform where the driver stands, the platform end being connected to any convenient arrangement of shifting-lever. O^2 is a ratchet-wheel, rigidly mounted on the upper end of the vertical shaft C, which serves to lock the spring when wound up by means of the pawl P held in the teeth of the ratchet by the spring *p*, the pawl P being connected to the bent portion *o* of the lever O^1 by means of a link, *p'*, or other suitable means, in such a manner as to permit the lever O^1 to move out sufficiently to throw the coupling-sleeve out of gear with either bevel-pinion M M^1 when the spring is fully wound up before actuating or throwing the pawl out of gear with the ratchet-wheel O^2.

This is effected in the following manner:

E is a spiral spring, located within a metallic casing, E^2, to keep it free from dirt and dust, said spring-casing E with its inclosed spring being mounted upon the shelf B^1, between its upper and lower plates of the frame B.

The inner end *e* of the spring E is made fast to the shaft C, while its outer end e^1 is connected to a shifting-lever, C^1, the upper end of which is bent, as at *c*, and is there grooved for the reception of the horizontal portion *o* of the shifting-rod O.

The lever C^1 passes through a slot, c^2, in the bottom or platform of the car, of sufficient length to permit the lever C^1 to move backward and forward with the end e^1 of the spring E, which is connected to two coiled springs, E^1 E^1, one end, *f*, of which is made fast near the eye f^1 of the rods F, while the other end, f^2, of said spring is made fast to a bolt, or preferably a swinging plate, G, the rods having free play or sliding freely in suitable apertures *g* in said plate G, which is hung from the bottom of the car, or from one of the transverse girts *a* at such an angle as to lie within the path of revolution of said spring E, and practically form a prolongation thereof.

It is evident that so soon as the spring is fully wound up by the forward motion of the car (the pinion N being then in gear with the bevel-wheel K by means of the shifting-rod O^1) the outer end e^1 of said spring E will follow the motion of winding, the yielding connection E' E' permitting such motion, and, with the end *e'*, the lever C^1 will be moved forward, and, carrying with it the bent or horizontal portion *o* of the clutch or shifting lever O^1, will cause the latter to disengage the clutch O from the pinion M, which latter, being loosely mounted, will permit the shaft D to revolve freely without actuating the bevel-wheel K; and when the car has stopped, and it is desired to give it a start by means of the motive spring E, the lever O is pressed further outward, to release the pawl from the ratchet-wheel and permit of the unwinding of the spring E; and when the car is again in motion, the driver shifts the lever O^1 inward, to throw the pinion M into gear with the wheel K and rewind the spring E, which latter, when fully wound up, automatically shifts the lever O^1 to throw the winding mechanism out of gear, as described.

When the mechanism is adapted to a car whose line of motion is reversed at each end of the route, the shifting-rod O^1 must be so arranged as to permit its being operated from either end of the car, and in this case the rod O^1 runs longitudinally of the car from one end to the other, and is connected to a pivoted lever, H, passing in front of, or, preferably, through the platform of the car, the rod O^1 having suitable bearings in depending ears B^5 on that side of the frame B where the rod is located, as it may be located either at the right or left or in the center of the frame B, below the mechanism, as plainly shown by Figs. 3, 4, 5, and 6. The rod O^1 is provided with an arm, O^2, connected to the clutch-coupling o^1 and an arm, o^3, connected to the lower end of the plate G, as fully shown by Fig. 3. A third arm, o^4, bent to form a loop, o^5, or hook, passes up in front of the frame-shelf B^1 to engage the pawl P, said loop or hook o^5 having sufficient play before carrying with it the pawl P in its forward movement, to permit the pinion M or M' to be thrown out of gear with the bevel-wheel K when the main spring E is fully wound up, and through its yielding connection pulls the plate G and arm o^3 forward, and with it the shifting-rod O^1 and clutch-arm o^2, to effect this throwing out of gear of the winding mechanism, as described.

In Figs. 1 and 2 I have shown the shifting and locking mechanism on top of the platform; but in practice this is mounted and

arranged on the frame B, as shown in Figs. 3, 4, 5, and 6, to permit the mechanism and frame to yield to the vertical reciprocating motion of the car on its springs; and this may be arranged in various ways, according to the location of the mechanism—as, for instance, in Fig. 4 the pawl is mounted on an ear or projection, B^6, on the frame, and the arm o^4, with its hooked end o^5, passes up in front of the frame over the spring-casing; and in Fig. 5 the arm o^4, with its hooked end o^5, passes up near the outer end of the frame, while in Fig. 3 the pawl is mounted on the top plate of the frame itself; and as these are mere details of arrangement, governed only by the location of the mechanism under the car, I do not wish to limit myself to any particular location of shifting-rod and its connections.

Nor do I wish to limit myself to the use of the yielding connection with the mainspring in car-starters only, as it is evident that such a connection is applicable to almost all spring-motors, especially watches and clocks, and similar mechanisms operated by spring-power. In such devices the end of the spring may carry suitable indicating devices to denote that the spring is fully wound up, instead of throwing the winding mechanism out of gear, as above described. Another great advantage is obtained by this yielding connection with a mainspring—namely, the tension of such spring is more evenly distributed, and it is not liable to snap at the short coils, as is almost invariably the case with such springs when wound up too rapidly or too tight, and in this manner forms a regulating or compensating device readily applicable to most spring-motors. The strength of the auxiliary springs should be equal, or nearly so, to that of the mainspring, and need not necessarily be a coiled or spiral spring, as any yielding connection to effect the desired purpose will answer. I have here described and shown two coiled springs, E^1 E^1, instead of which one may be employed, if desired; but by employing two of such springs their resisting power to the mainspring E is more equally distributed.

Having now described my invention, what I claim is—

1. The combination, with the operating or starting mechanism, and one of the drive-wheel axles, of the frame B, having arms B^3 B^3, one end of which is hinged to supports or hangers *b*, the other end being provided with flexible or yielding bearings b^3 for said wheel-axle, all constructed and operating as and for the purposes specified.

2. In a spring-motor, a flexible or yielding connection with one end of the main or motive spring, substantially as and for the purposes described.

3. The mainspring E and its shaft C, in combination with an auxiliary spring or springs, substantially as and for the purpose specified.

4. The auxiliary spring or springs, in combination with the outer end of the mainspring C, and a yielding bearing to permit said auxiliary spring or springs to more readily follow the movement of the mainspring C, to operate the throwing-out mechanism, substantially as described.

5. The winding mechanism, consisting of the bevel-pinion N or N^1, loosely mounted on the wheel-axle, in combination with the bevel-pinion M or M^1, and the bevel-pinion M^2, mounted on the counter-shaft D, the bevel-wheel K, shaft C, and spring F, and the yielding supporting-frame, all constructed and operating substantially as described.

6. The winding mechanism above described, and suitable throwing-in and throwing-out out mechanism for the same, in combination with the main or motive spring and its yielding connection or auxiliary spring or springs, so arranged that the mainspring, when fully wound up, will automatically throw the winding mechanism out of gear, substantially as described.

7. The winding mechanism above described, the clutch-pulley O, shifting-rod O^1, having arm *o*, the mainspring E, and its yielding connection, and the lever C^1, all arranged, combined, and constructed to operate substantially as described, for the purpose specified.

8. The winding mechanism, the clutch-pulley O, and shifting-rod O^1, and its connection o^3, the plate G, auxiliary springs E^1 E^1, and the mainspring, and its shaft or arbor, all combined, constructed, and operating substantially as described, for the purpose specified.

9. The mainspring and its shaft, the winding mechanism, the throwing-in and throwing-out mechanism, above described, and the ratchet-wheel O^2 and spring-pawl P *p*, all constructed and operating substantially as described, for the purpose specified.

10. The reversing-gear, consisting of the clutch-lever *n* n^1, constructed as described, in combination with the bevel-pinion N or N^1, the pinion M^2, and bevel-pinion M or M^1, the bevel-wheel K, and spring-shaft and spring E, all arranged, constructed, and operating substantially as and for the purposes specified.

11. The carrying-frame B, having a shelf or ledge, B^1, in combination with the spring-casing E^2, and its inclosed spring and shaft C, and the winding and shifting mechanism, all constructed and operating as described.

12. The mainspring E, coiled springs E^1, rods F, and swinging plate G, all combined and constructed to operate as set forth.

In witness that I claim the foregoing I have hereunto set my hand this 17th day of February, 1877.

JOHN SERENO VAN PELT, JR.

Witnesses:
HENRY ORTH,
S. F. AUSTIN.