(No Model.) 2 Sheets—Sheet 1.

J. H. AUBLE.

MOTOR MECHANISM FOR HORSELESS CARRIAGES.

No. 594,511. Patented Nov. 30, 1897.

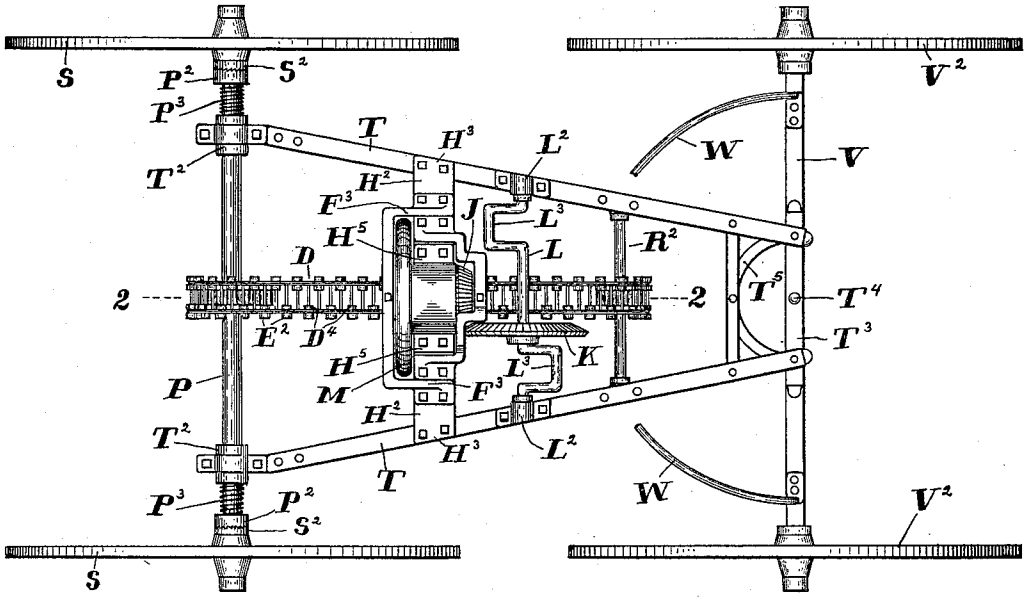

Fig. 1

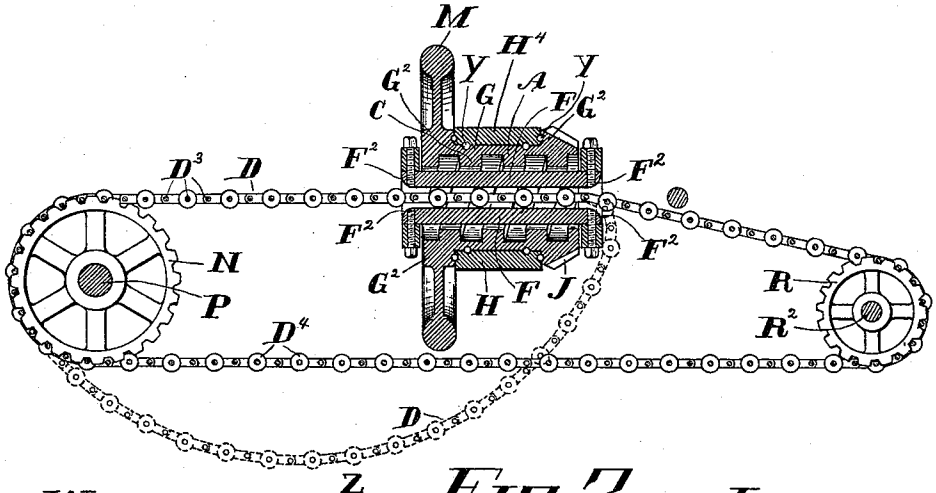

Fig. 2

WITNESSES

R. F. Seymour.

N. Smith.

INVENTOR

James H. Auble

per Wm. Hubbell Fisher,

Attorney.

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J. H. AUBLE.

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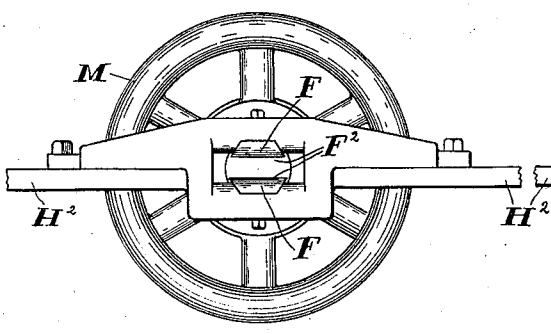

Fig. 3

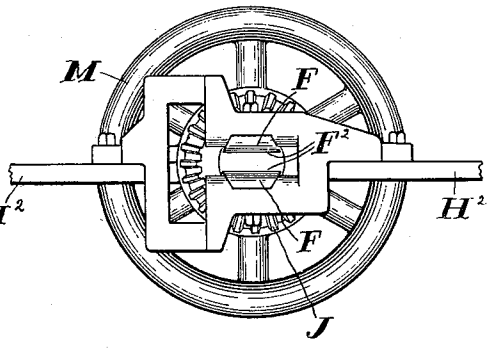

Fig. 4

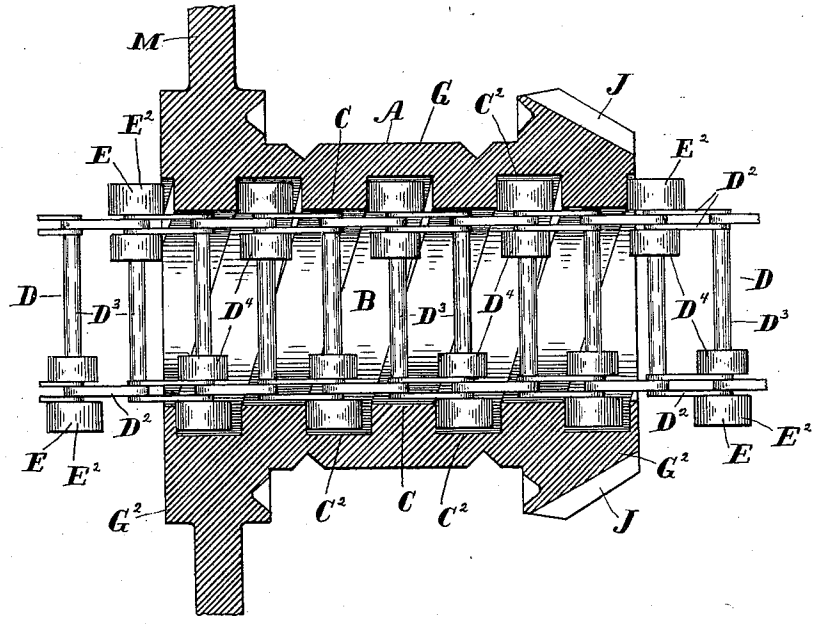

Fig. 5

WITNESSES

R. F. Seymour.
M. Smith.

INVENTOR

James H. Auble
per Wm. Hubbell Fisher,
Attorney.

UNITED STATES PATENT OFFICE.

JAMES H. AUBLE, OF LAWRENCEBURG, INDIANA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, OF THREE-FOURTHS TO JAMES M. GRAHAM, OF SAME PLACE, AND JOHN N. FOX AND LOUIS S. MATHEUS, OF DEARBORN COUNTY, INDIANA.

MOTOR MECHANISM FOR HORSELESS CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 594,511, dated November 30, 1897.

Application filed April 17, 1897. Serial No. 632,532. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. AUBLE, a citizen of the United States, and a resident of the city of Lawrenceburg, in the county of Dearborn and State of Indiana, have invented certain new and exceedingly valuable Improvements in Motor Mechanisms and in their Application to Horseless Carriages, of which the following is a specification.

Some of the objects of my invention are, first, to provide a motor mechanism which shall be capable of great power generated by a comparatively feeble initial force; secondly, to provide a mechanism that while embodying the above advantage shall be compact, simple, readily made, economical of manufacture, durable, and always efficient.

Other objects of my invention will be obvious hereinafter.

The several features of my invention and the various advantages resulting from their use, conjointly or otherwise, will be apparent from the following description and claims.

Inasmuch as the application of the primary features of my invention to a horseless carriage will illustrate these features, as well as certain additional features necessary to adapt the same for use in said carriage, I have in the accompanying drawings illustrated my invention in connection with such carriage.

In the drawings similar letters of reference indicate corresponding parts.

Figure 1, Sheet 1, is a top view of the gear of a carriage and of my invention applied thereto. Fig. 2, Sheet 1, is a vertical longitudinal section of the mechanism shown in the preceding figure, the section being taken in the plane of the dotted line 2 2 of Fig. 1. Fig. 3, Sheet 2, is a detail—viz., a view of that end of the screw-threaded body A which faces toward the left in Fig. 1, the guide at this end, with its supports, and the gear and fly-wheel at the other end being present and in view. Fig. 4, Sheet 2, is a view of the other end of the screw-threaded body A and of the fly-wheel and of the guide at this end. Fig. 5, same sheet, is a view, enlarged, showing a horizontal central section of the screw-threaded body A and a plan view of the sprocket-chain and its novel accompaniments in place in the body A, the chain being broken off near each end of the cylinder, as shown.

I will now proceed to describe my invention in detail.

A indicates a body provided with a passage B through it, and the inner surface of this passage has projections arranged in a spiral direction, and thus forming or amounting to a (female) screw C. This screw is preferably continuous, as shown. The exterior of this body A is so formed and arranged as to be rotatable around a theoretical axis, and this axis is the axis of the female screw C. This body A is provided with means (exterior) whereby it can be rotated at will, and it is also suitably supported. One description of the means of support and of the means of rotation will be hereinafter given.

Through the passage B of the body A passes a sprocket-chain D, which latter for most effective work, or work which is in one direction and not reciprocatory, will be endless. In case the work is reciprocatory within narrow limits the chain need not be endless, for effective operation, but can move back and forth through the body A as the latter is rotated in one direction and then in the opposite direction. The sprocket-chain D has links D^2, as is usual with such chains. It (the chain) has lateral projections E, which extend into the hollows C^2 between the screw-threads of the screw C and engage with these threads. By revolving the body A its threads turn and move the sprocket-chain D through it and along in a given direction. By revolving the body A in the opposite direction its screw moves the sprocket-chain D through it in the opposite direction. The projections E of the sprocket-chain should make as little friction as possible with the threads, and to this end I provide or shoe each projection E with a roller E^2, and the latter is usually mounted on the projection E, (diminished in diameter,) the latter acting as the shaft on which the roller revolves. These rollers E^2 respectively move in the spaces between the screw-thread and engage the screw-thread C. It is desirable that the sprocket-chain pass

centrally through the body A—namely, in the plane of the axis of the screw C—and to this end I provide guides F in planes parallel to each other, which are present and are located in the body A. The main or central portion of the sprocket-chain runs on and in conjunction with these guides F, while the outlying projections E are in the spaces C^2 between the screw-threads of the female screw C. In order that the guides may the better allow the sprocket-chain to enter into the body A and also to leave the latter without friction or catching thereon, the guides have rounded beveled lips at F^2. These guides F are suitably supported.

That the sprocket-chain D may run very easily onto the guides and then along between them and in apposition to them I provide the chain with rollers D^4. These rollers D^4 preferably lie close to the links D^2, on the inner side of the latter, and rotate on journals. The cross-rods D^3, which are well understood as a part of a sprocket-chain, are preferably utilized as the journals for these rollers. These rollers are of greater diameter than the vertical width of the chain, and hence come into contact with the nearest guide F and roll over the same and carry the chain readily and with but little friction over the same. When the various parts of the mechanism are in the position shown in the drawings, the lower one of the guides F will be the one on which the rollers D^4 run.

It should here be remarked that for economy of construction the extensions E of the sprocket-chain are extensions of the cross-rods D^3. Where the links are close together, only every other rod D^3 on a side is provided with a roller D^4 or a roller E^2. Such is the construction shown on the drawings.

The preferred means of support for the body A are intimately combined with the preferred construction for enabling the body A to rotate around the theoretical axis of its female screw, and these means and these constructions are as follows: The exterior of the body A is formed into the shape of a barrel or cylinder G, and at each end I provide it with a flange G^2. This cylinder rests in a journal-bearing H, whose extended ends H^2 extend out and are suitably supported at H^3. A cap or upper journal-bearing H^4 incloses the upper part of the cylinder G and is duly secured at H^5 to the ends H^2 of the journal. In these journal-bearings the cylindrical body A can revolve.

A beveled pinion J concentric with the screw C is connected to the body A, and for compactness one of the flanges G^2 is formed with teeth and thus made to constitute this pinion J. The teeth of this pinion mesh with the teeth of the beveled gear K, in turn fixed to a shaft L. By the rotation of the latter power is imparted to the gear K, and the rotation of the latter rotates the pinion J and the body A. When the power is intermittent—as, for example, when transmitted by a crank movement—then a heavy fly-wheel M to carry the cylinder past the crank-centers and secure uniformity of movement is preferably present, and may for compactness be connected to the other flange G^2 of the body A and the hub of the fly-wheel be one with such flange, substantially as shown. The guides F F may by suitable extensions, as F^3, be connected to the extensions H^2 of the journal-bearing, as shown, and thus be suitably supported.

Beyond one end of the body A the sprocket-chain D engages a sprocket-wheel N, and the latter turns a shaft P, which latter communicates rotary power as desired. Beyond the opposite end of the body A is another sprocket-wheel R, around which the sprocket-chain passes. This latter wheel R, supported on a suitable shaft R^2, will usually be an idler, but may be a power-wheel. The presence of this latter wheel R is not essential to the successful operation of my invention, and when desired it may be omitted. In such event, in case the axis of the screw C is horizontal, the lower half of the chain will drop down more or less, substantially as shown at Z, Fig. 2. Where the axis of the screw C is vertical and the power sprocket-wheel N is above the body A, there will be still less need of the second sprocket-wheel R.

The mode in which my invention operates is very simple and efficient. The power-shaft L is rotated and the body A revolved. The screw acts with great force upon the sprocket-chain D through the agency of the extensions E and moves it forcibly along, thus rotating the sprocket-wheel N. The latter communicates the power thus generated to its shaft or other device.

In the application of my invention to a horseless carriage a preferred mode of connecting it to the carriage is as follows: The rear shaft P of the sprocket-wheel N is provided at each end with a wheel, and these wheels S are turned by the shaft P. The connection between these wheels and shaft is preferably one which when the carriage is going around a curve allows one wheel to go faster than the other—to wit, a well-known device consisting of a ratchet-wheel P^2, fixed to the shaft P and engaging a circular ratchet S^2 on its wheels S. The latter turns loosely on shaft P, except as fixed thereto by the ratchet P^2. Ratchet P^2 is pressed against the ratchet S^2 by a spring, as P^3. The carriage-reaches T T at their rear ends are connected to the shaft P by suitable journal-bearings T^2 T^2, allowing the shaft to rotate therein and without slipping endwise through the bearings. The reaches are duly connected at front to the front bolster T^3 or equivalent device, and the bolster, &c., is pivotally connected by king-bolt T^4 and fifth-wheel T^5 or other device with the front axle V, provided with the front wheels V^2 V^2. Some steering device for changing the direction of the wheels is present. In the present

illustrative instance this device is a conventional one, consisting of a continuous bowed rod W, connected at each end to the reach and bowing out rearward far enough to be readily grasped by the rider or driver. This bowed rod is partly shown in Fig. 1, but is broken away at its center to the better disclose the more important mechanism beneath. The shaft R^2 is duly connected to the reaches, as shown, and the ends of shaft L are duly journaled in bearings L^2, attached to the reaches T. This shaft L is provided with cranks L^3 to enable the body A to be rotated, and these cranks are in the present illustrative instance adapted to be operated by the feet of the driver. The lower bearing H through its extensions H^2 is duly secured to the reaches and is supported thereby. Rotation of the shaft L by the cranks does, through the intermediate agency of the beveled gears K and J, rotate the body A and move the chain and drive the sprocket-wheel N and rotate the shaft P and wheels S and propel the carriage. The body A can be moved in either direction according as the cranks are turned and the carriage advanced or backed. If to be backed, suitable devices for temporarily locking the ratchets P^2 to S^2 will be present.

I prefer to reduce the friction between cylindrical body A and its bearings. For this purpose I provide the same with ball-bearings Y, certain lines of these ball-bearings being inserted between the cylinder and the bearing and other lines between the edge of each bearing and the adjacent flange of the cylinder.

For the sprocket-chain there may be substituted another description of chain, or even a pulley-band, having extensions for engaging the screw-thread of the body A. While these latter are not as desirable as the sprocket-chain, they nevertheless come within the scope of my invention, and the term "sprocket-chain" in the claims will be understood to cover such equivalents.

The advantages of my invention and its several features are quite apparent.

The range of devices and instruments to which my invention is applicable is wide and the opportunities for its use are exceedingly varied.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination of the rotatable body A, having the female screw, and the sprocket-chain having extensions, engaging said thread, and guide through the body, for holding the chain in position in the body A while passing through the latter, substantially as and for the purposes specified.

2. The combination of the rotatable body A, having the female screw, and the sprocket-chain having extensions, engaging said thread, and guide in the passage through the body, the chain having rollers for running over the guide, substantially as and for the purposes specified.

3. The combination of the rotatable body A, having a screw-threaded passage through it, and the sprocket-chain, having extensions on which are rollers, engaging the screw-thread, and also rollers, and a guide composed of plates or bars parallel, and beveled at their terminals, the last-named rollers of the chain engaging said guide-plates, substantially as and for the purposes specified.

4. The combination of a cylindrical body having end flanges, and journal-bearings grasping the cylinder, and within a passage provided with screw-thread, and a chain for being moved through this passage, and engaging the threads of this cylindrical body, substantially as and for the purposes specified.

5. The combination of the cylinder A, interiorly-screw-threaded passage, and flanges, and journal-bearings embracing the cylinder in conjunction with the flanges, and the ball-bearings, and chain engaging the screw-thread, substantially as and for the purposes specified.

6. The combination of the cylinder A interiorly-screw-threaded passage, and flanges, and journal-bearings embracing the cylinder in conjunction with the flanges and the ball-bearings, located between the cylinder and bearings, also between the flanges and bearings, substantially as and for the purposes specified.

7. The combination of the cylinder, having interior screw-threaded passage, and chain engaging said screw, and journal-bearings, in which said cylinder rotates, and end flanges on said cylinder, one of said flanges being combined with a toothed wheel and a second toothed wheel in connection, substantially as and for the purposes specified.

8. The combination of the cylinder, having interior screw-threaded passage, and chain engaging said screw, and journal-bearings, in which said cylinder rotates, and end flanges on said cylinder, one of said flanges being combined with a toothed wheel and a second toothed wheel in connection, and a fly-wheel fixedly connected to the cylinder, substantially as and for the purposes specified.

9. The combination of the cylindrical body screw-threaded interiorly, chain whose extensions engage the screw-thread, flanges on the cylindrical body, journal-bearings, in which the latter revolves, treadle, shaft thereof, wheel thereof, connected with and turning the cylindrical body by a wheel in conjunction with the latter, fly-wheel, wheel operated by the chain, and connected to the axle of a carriage-gear, reaches or frame of the gear, the bearings of the cylinder and of treadle-shaft being supported by the carriage-gear, substantially as and for the purposes specified.

10. The combination of a rotatable body A, having a screw-threaded interior passage, and

a chain whose extensions engage the threads of the passage, and a wheel, receiving from the chain the motion of the latter, for imparting it to other mechanism, and bearings in which the body A revolves around the axis of its screw, and means substantially as described for imparting to the body A a rotary movement, substantially as and for the purposes specified.

11. The combination of a rotatable body A, having a screw-threaded interior passage, and a chain whose extensions engage the threads of the passage, and a wheel, receiving from the chain the motion of the latter, for imparting it to other mechanism, and another wheel beyond the other end of the body A to receive the chain, substantially as and for the purposes specified.

12. The combination of the rotatable cylinder A, having female screw, chain having extensions engaging with the screw-thread, and bearings in which the cylinder A revolves, and guides through the cylinder for holding the chain in position while passing through the cylinder, the guides being fastened to and upheld by the journal-bearings, by the end extensions, substantially as and for the purposes specified.

13. The combination of the rotatable cylinder A having female screw, chain having extensions engaging with the screw-thread, bearings in which the cylinder revolves, end flanges on the cylinder, the one provided with pinion, and the other with fly-wheel, and the chain-guide through the cylinder, having end plates, which pass outside of the flanges, and in extension unite with the extensions of the bearings, substantially as and for the purposes specified.

JAMES H. AUBLE.

Attest:
WM. E. JONES,
K. SMITH.