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Car-Propeller.

No. 214,466. Patented April 15, 1879.

FIG. 1.

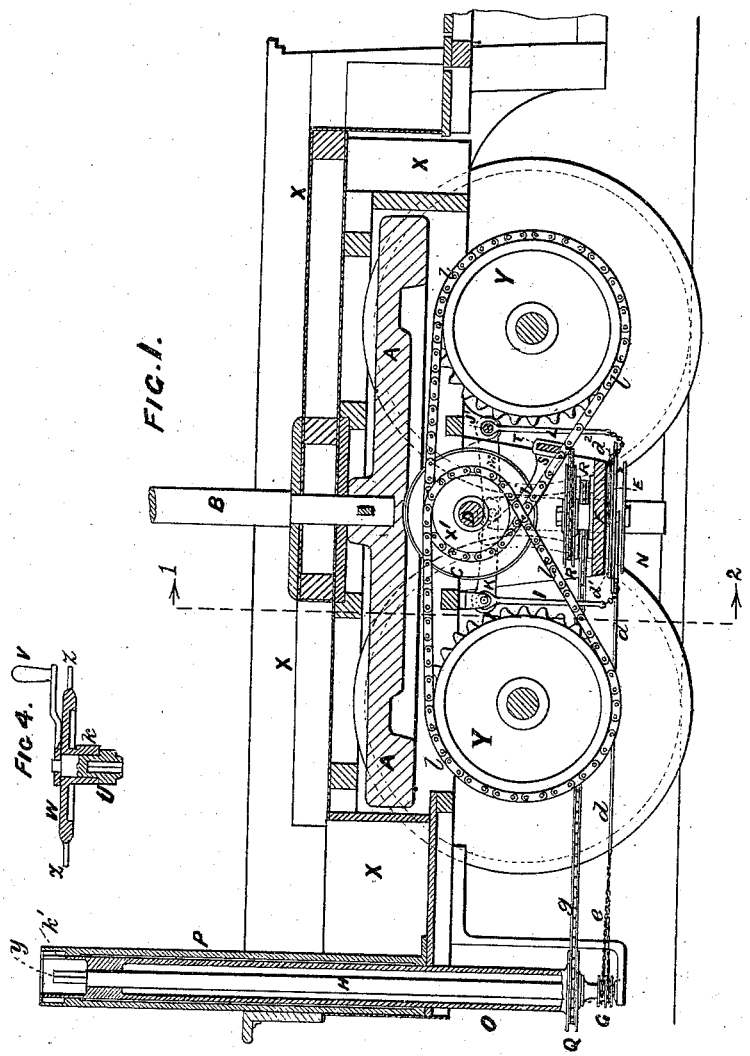

FIG. 4.

Witnesses,
Harry Smith
Hubert Howson

Inventor:
Daniel Spill
by his Attys.
Howson and Sons

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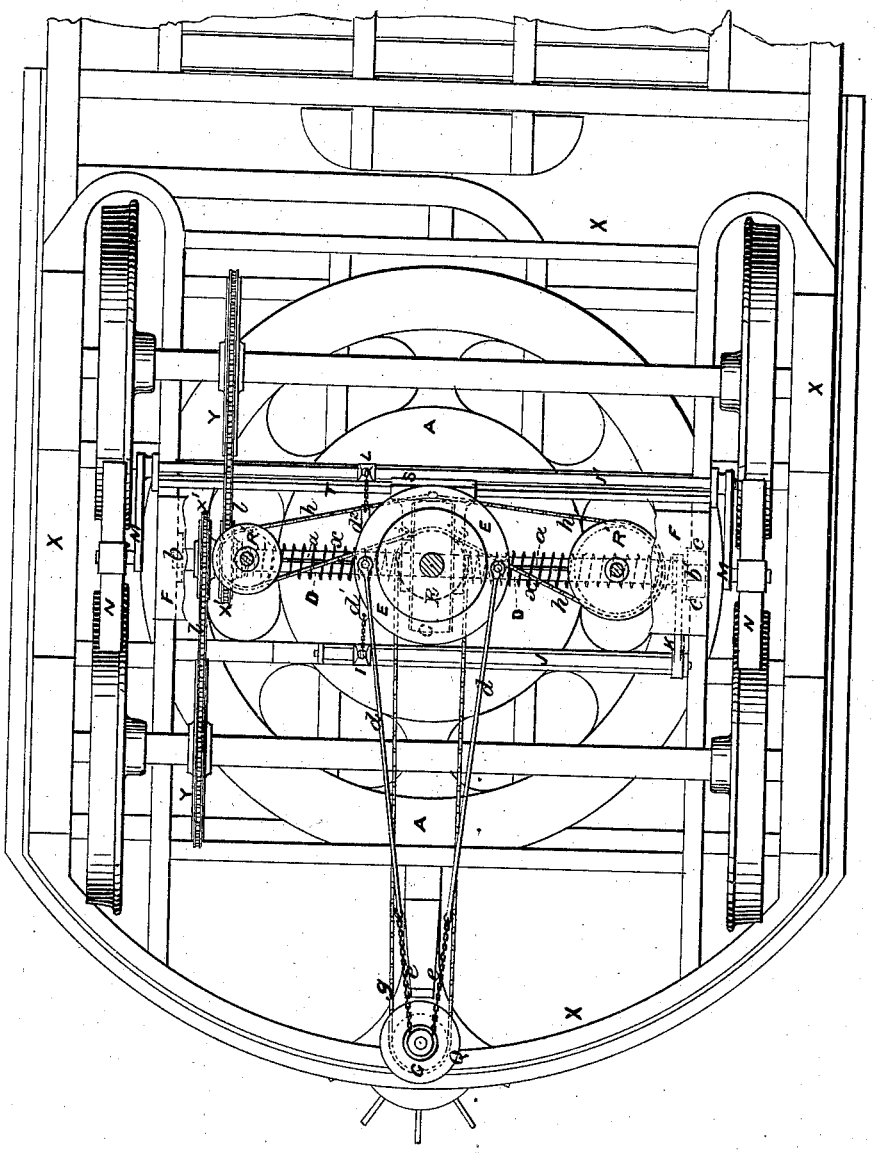
FIG. 2.



Witnesses,
Harry Smith
Thomas McElwain

Inventor:
Daniel Spill
by his Attys
Munn and Co

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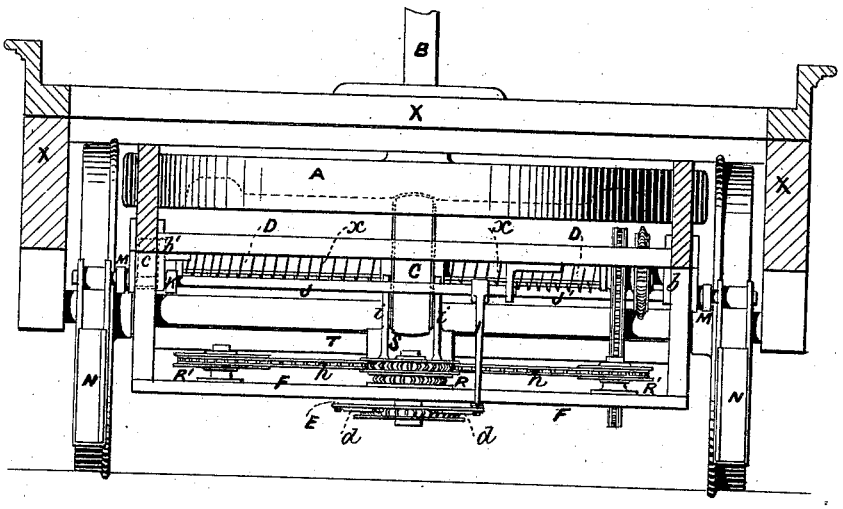
D. SPILL.

Car-Propeller.

No. 214,466. Patented April 15, 1879.

FIG. 3.



Witnesses Hubert Hodgson
Harry Smith

Inventor
Daniel Spill
by his Attys
Howson and Son

UNITED STATES PATENT OFFICE.

DANIEL SPILL, OF HOMERTON, ENGLAND.

IMPROVEMENT IN CAR-PROPELLERS.

Specification forming part of Letters Patent No. **214,466**, dated April 15, 1879; application filed March 7, 1877.

To all whom it may concern:

Be it known that I, DANIEL SPILL, of Homerton, in the county of Middlesex, England, have invented certain Improvements in Apparatus for Propelling Cars, of which the following is a specification.

My invention relates to certain improvements in propelling cars; and the main objects of my invention are, first, to so construct the devices through which the car is driven from any motive-power engine that the car may be stopped without stopping the engine; and, second, to so construct the driving appliances that the speed at which the car is driven may be regulated. These objects I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1, Sheet 1, is a vertical section of the end of a street-car on which the driving appliances are arranged; Fig. 2, Sheet 2, an inverted plan view of the same; Fig. 3, Sheet 3, a transverse section on the line 1 2, Fig. 1; Fig. 4, Sheet 1, a detached sectional view of a portion of the device to be applied to part of the mechanism shown in Fig. 1.

In the drawings, X represents the truck-frame at one end of the car, and to bearings in this frame is adapted a vertical shaft, B, to be driven by the motive-power engine, which may be arranged in any convenient position on the frame. To this shaft is secured the driving wheel or disk A, which, in the present instance, is arranged in a horizontal position immediately below the platform of the frame.

A horizontal shaft, D, is adapted to turn in bearings *b b'* on opposite sides of the frame, and on this shaft is mounted a friction-wheel, C, secured by means of a feather, *a*, Fig. 2, so as to turn with said shaft, but so as to be free to slide longitudinally thereon. The driving-wheels of the car are to be driven from this shaft D, and one of its bearings, *b'*, is arranged in a guide, *c*, so as to admit of being raised or lowered for the purpose of bringing the periphery of the friction-wheel C into and out of contact with the under surface of the disk A in order to start or stop the vehicle. This bearing *b'* may be raised or lowered by various devices; but in the present instance I have shown it as operated through the medium of a drum, E, mounted in bearings on the under side of the transverse bar F, which is secured to or forms part of the frame-work below the shaft D, Figs. 1 and 3.

To the under side of the upper flange of this drum, at points near the periphery and diametrically opposite each other, are pivoted or jointed two rods, *d d*, as shown in Fig. 2. These rods extend toward the front end of the frame, and the ends of the rods are connected to each other by a chain, rope, or band, *e*, which is passed twice round a pulley, G, keyed to the lower end of a vertical spindle, H, Fig. 1, adapted to be operated by the driver of the vehicle, as described hereinafter.

To the upper face of the drum E, immediately over the pivoting-point of one of the rods *d*, are pivoted two rods, d^1 d^2, one of which, d^1, is connected by links or a cord to the pendent arm I, Figs. 1 and 2, keyed to the horizontal spindle J, mounted in suitable bearings in the frame, and carrying at one end an arm, K, Figs. 1, 2, and 3. This arm K is so connected to the bearing *b'* of the shaft D as to be able to raise or depress said bearing in its guide *c*, as explained hereinafter. The other rod, d^2, extends in an opposite direction, and is connected by a chain or cord to a pendent arm or lever, L, secured to a horizontal transverse shaft, J', Fig. 2, mounted in suitable bearings, and carrying at each end a horizontal lever, M, by which the brakes N may be raised or lowered into or out of contact with the peripheries of the running wheels of the vehicle, as shown in Figs. 1 and 2.

The upright spindle H is stepped at its lower end into a suitable bracket or bearing fixed to the under side of the vehicle, as shown in Fig. 1, and is fitted in a tube or hollow spindle, O, which is adapted to a socket-standard, P, secured to the frame at the end of the vehicle.

To the lower end of the tube or hollow spindle O is keyed a wheel or pulley, Q, round which passes a pitch-chain, band, or rope, *g*, extending to and passing round the lower barrel of a double wheel or pulley, R, mounted on the cross-bar F. Round a portion of the periphery of the upper barrel of the wheel or pulley R passes an endless pitch-chain, band, or rope, *h*, which extends on each side of the

wheel or pulley R, and passes round a wheel or pulley, R′, mounted at each end on the upper side of the said bar F. (See Figs. 2 and 3.) This chain or band is secured to a sleeve or carrier, S, which is adapted to slide on a horizontal transverse bar, T, of angular section, secured at each end to the corresponding ends of the frame-work or bar F at the side of the frame of the vehicle, as shown in Figs. 1 and 3.

Projecting from one side of the sleeve or carrier S are two arms, *i i*, which fit on opposite sides of and embrace the friction-wheel C like an ordinary belt-shifting fork, so that on the sleeve or carrier S being moved on the bar T in either direction the friction-wheel C is carried with it, for the purpose hereinafter described.

Around the driving-shaft D, between each side of the friction-wheel C and the bearings *b b′* of the said shaft, are arranged spiral springs *x x*, which serve to keep the friction-wheel C, when in its normal position, in the center of the driving wheel or disk A.

In Fig. 4 is represented a detached view of the handle and wheel for operating the upright spindle H and the tube or hollow spindle O. In this arrangement U is a cap, which fits on the square *y*, formed on the upper end of the upright spindle H, and to the top of this cap is secured a handle, V, for operating or turning the cap U and spindle H.

W is a hand-wheel, formed with radial arms *z z*, numbered successively from, say, 1 to 10, the number on the handle brought opposite the driver or operator indicating the speed in miles per hour at which the vehicle is propelled, as explained hereinafter.

The boss or hub of the wheel W is adapted to turn on the upper portion of the cap U and bears upon a shoulder on the latter.

On the hub of the wheel W is formed a rib adapted to a corresponding slot or notch, *k′*, formed in the upper edge of the hollow spindle O, as shown in Fig. 1.

Motion is communicated from the driving-shaft D to the running wheels of the vehicle through the medium of pitch-chains, bands, or belts passing over wheels X′ X′, which are keyed or otherwise secured to the driving-shaft D, and over the wheels Y Y on the respective axles of the running wheels, or the power may be transmitted from the driving-shaft D by any other suitable gearing or mechanism, as may be found most desirable.

The operation of the various parts is as follows:

It is to be assumed that the handle V and hand-wheel W are in their proper positions on the top of the socket-standard P, so that the handle V can be employed to actuate the upright spindle H by means of the cap U, and that the hand-wheel W can be used to operate the upright tube or hollow spindle O by means of the tooth or rib *k*, adapted to the notch *k′*.

It is also to be understood that the motive-power engine before mentioned is in operation, and communicates a constant rotary motion to the wheel or disk A, and that the friction-wheel C is at the same time at the central portion of, but out of contact with, the under face of the wheel A, Fig. 3.

It being desired to propel the vehicle at, say, its maximum speed, the driver partially rotates the upright spindle H by the handle V and cap U, and the wheel or pulley G, acting upon the rods *d d*, turns the drum or disk E to a corresponding extent, and the latter, through the rod d^1, pulls upon the lever I, thereby partially turning the shaft J, which raises the lever K, and with it the bearing *b′* of the driving-shaft D, the effect of the combined movement being to raise the friction-wheel C and to bring its periphery in contact with the said central portion of the friction-face of the wheel or disk A. Simultaneously with this movement of the friction-wheel C the rod d^2, and consequently its connected lever L, shaft J′, and levers M, are slackened, and the brakes N are thereby free to drop out of contact with the peripheries of the running wheels of the vehicle. The hand-wheel W is now gradually rotated until that one of its radial arms *z* which corresponds in number to the desired maximum speed in miles per hour is brought opposite to the driver. By this movement the hollow spindle O is gradually rotated to a corresponding extent, and the wheel or pulley Q, acting through the endless pitch-chain *g*, gradually turns the double-wheel or pulley R, which causes the endless pitch-chain *h* to travel over the pulley R′, and in so doing to pull the sleeve or carrier S along the bar T, and with it, by means of the fork *i i*, the friction-wheel C is moved along the driving-shaft D and across the running or friction face of the wheel or disk A. The friction-wheel C is thus gradually carried farther from the center of the wheel A, so that the speed of the rotation of the shaft D, and consequently the speed of the vehicle, is gradually increased until the friction-wheel C arrives near the outer edge of the said face, or in that position thereon which gives the required ratio between the speed of the wheel or disk A and that of the friction-wheel C for driving the vehicle at its desired maximum speed.

By the revolution of the friction-wheel C and the driving-shaft D motion is communicated to the running wheels of the vehicle by the driving-wheels X′ X′ acting through the chains *l l* and wheels Y Y, as before mentioned. By gradually drawing the friction-wheel C in this manner from the central or neutral position toward the outer edge of the running or friction face of the wheel or disk A—*i. e.*, from the minimum to the maximum speed—a slow and easy motion is insured to the vehicle at starting.

Although the description here given is for propelling the vehicle at its maximum speed, the speed may be varied or regulated at pleasure by retaining the friction-wheel C at any

intermediate point of its travel between the center and outer edge of the face of the wheel or disk A. To effect this the hand-wheel W is only partially rotated until one of its radial arms *z*, indicating the desired speed in miles per hour, is brought opposite to the driver.

The vehicle may be stopped in two ways: first, by turning the handle V in the reverse direction, so as to slacken the rod d^1, which allows the bearing b' to drop in its guide *c*, and consequently causes the friction-wheel C to fall out of contact with the wheel or disk A. At the same time the drum or disk E pulls upon the rod d^2, which raises or brings the brakes N into contact with the running wheels, and thereby speedily retards and stops the vehicle. Secondly, by simply releasing the hand-wheel W without the handle U, in which case the friction-wheel C is brought to the center of the wheel or disk A, or into a neutral position, by the action of the spiral springs *x x*, so that no motion of the vehicle ensues, Fig. 3.

If found desirable, however, the hand-wheel W may be retained in any desired position by a suitable locking device, in which case the vehicle can be stopped or started by the handle U, as described.

I claim as my invention—

1. In an apparatus for propelling cars, the combination of the horizontal wheel or disk A, adapted to be driven by a motive-power engine with a shaft, D, from which the driving-wheels of the car are to be driven, and a friction-wheel, C, mounted on said shaft D so as to rotate therewith, but capable of longitudinal adjustment thereon, substantially as described.

2. The combination of the disk A, to be driven by the engine, with the feathered shaft D, friction-wheel C, mounted thereon, and the carrier S.

3. The combination of the revolving disk A with the feathered shaft D, friction-wheel mounted thereon, carrier S, and springs *x*, as and for the purpose described.

4. The combination of the revolving disk A, adjustable friction-wheel C, carrier S, chain or band *h*, pulleys R′ R′, and pulley R, under the control of the operator, all substantially as set forth.

5. The combination of the revolving disk A and driving-shaft D, carrying the friction-wheel C, and adapted to bearings, one of which is adjustable vertically, as and for the purpose set forth.

6. The combination of the revolving disk A with the driving-shaft D, carrying the friction-wheel C, and adapted to bearings *b b′*, with mechanism, substantially as described, for lowering one of said bearings when the car-brakes are applied, and raising the bearing when the brake is withdrawn from the wheels.

7. The combination of the drum E, under the control of the operator, with the rod *d* and arm I on the shaft J, which carries the lever K for raising and lowering the adjustable bearing of the driving-shaft, as set forth.

In witness whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DANIEL SPILL.

Witnesses:
CHAS. MILLS,
FREDK. C. DYER,
47 *Lincoln's Inn Fields, London.*