(No Model.)

3 Sheets—Sheet 1.

J. S. BALDWIN.

TRACTION MOTOR.

No. 429,804. Patented June 10, 1890.

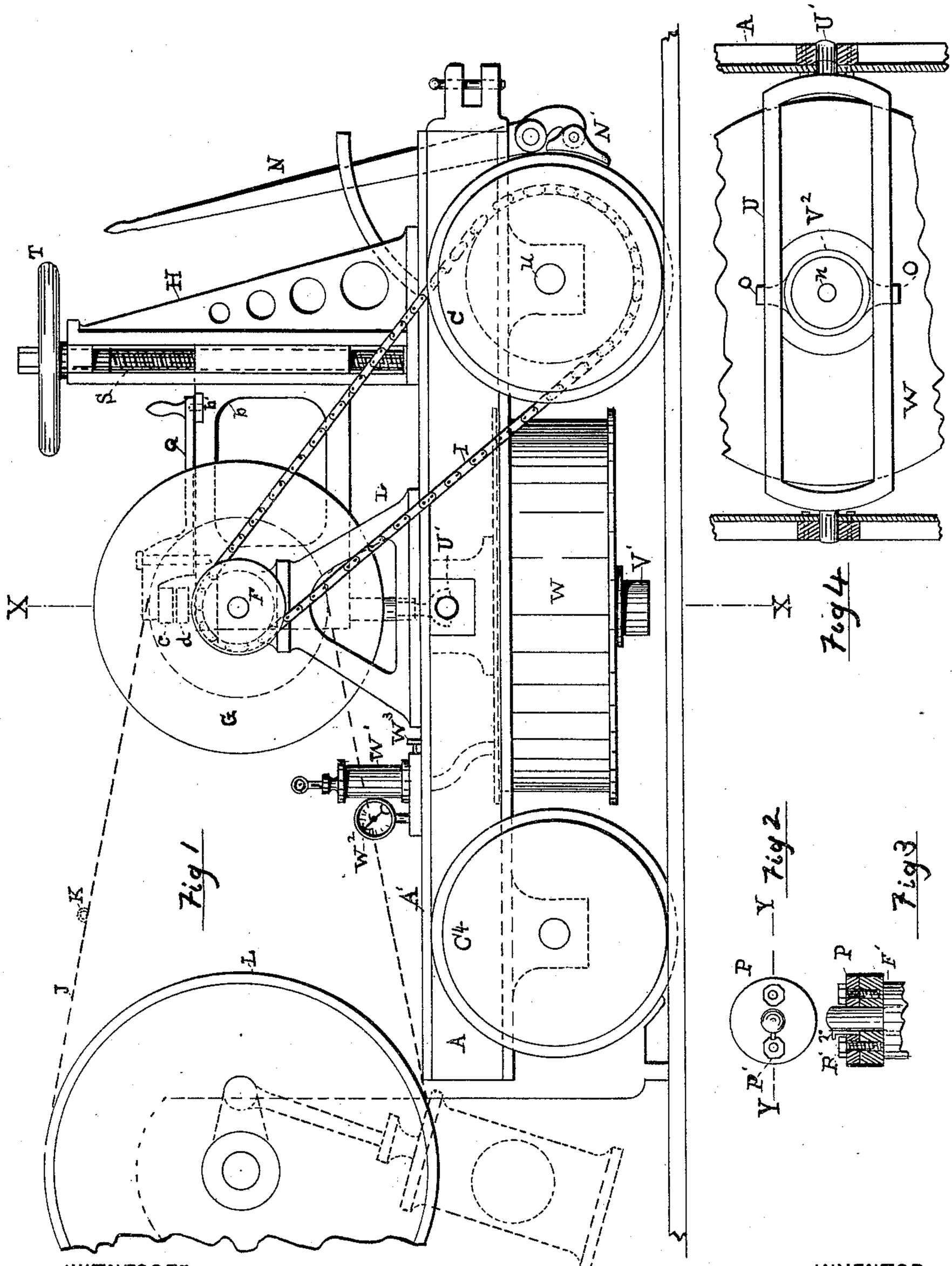

Fig 1

Fig 4

Fig 2

Fig 3

WITNESSES:

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C. E. Thompson

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(No Model.) 3 Sheets—Sheet 2.

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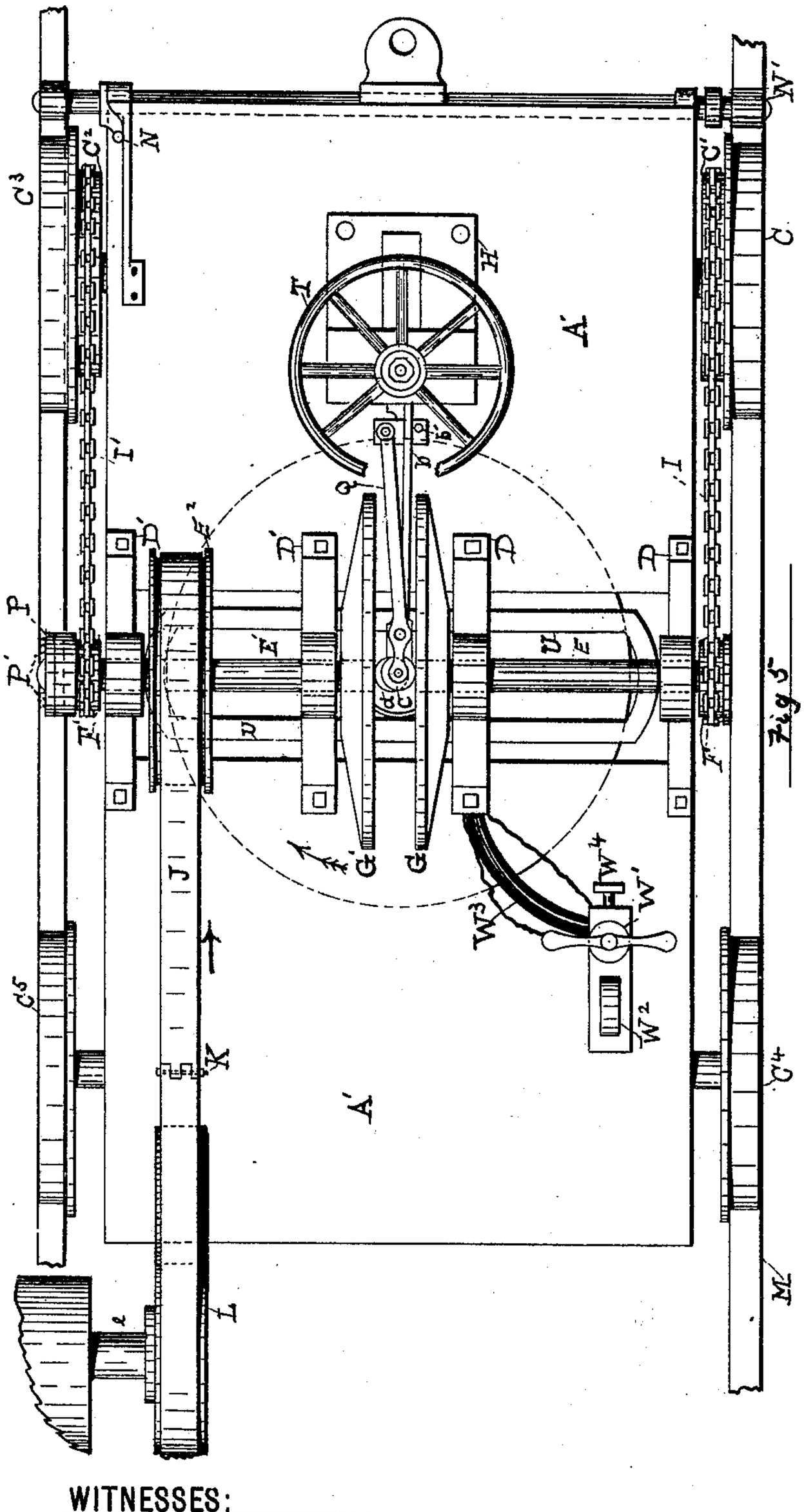

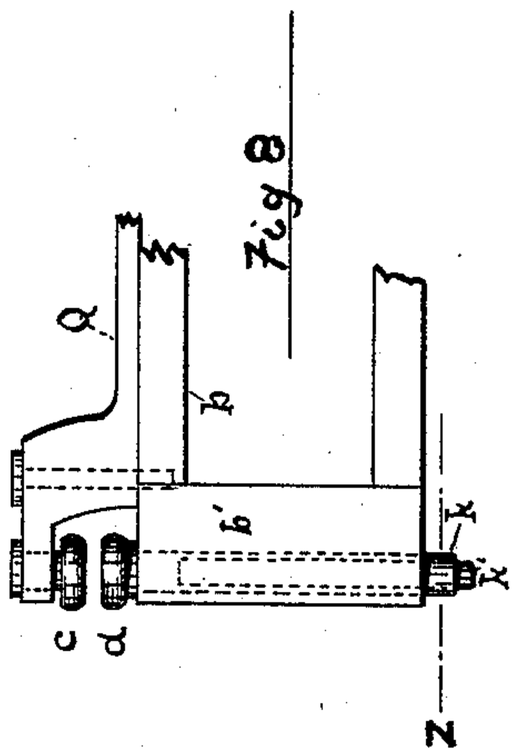

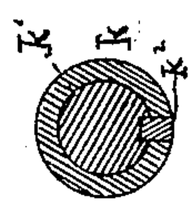

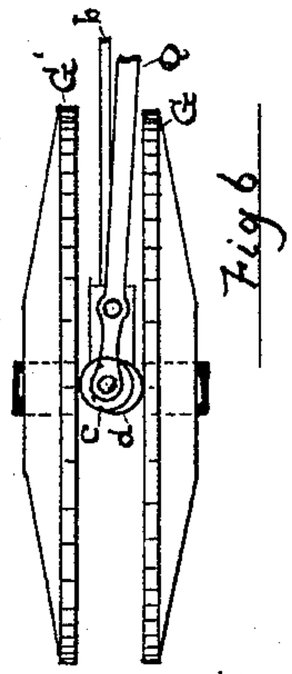

WITNESSES:

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(No Model.) 3 Sheets—Sheet 3.

J. S. BALDWIN.

TRACTION MOTOR.

No. 429,804. Patented June 10, 1890.

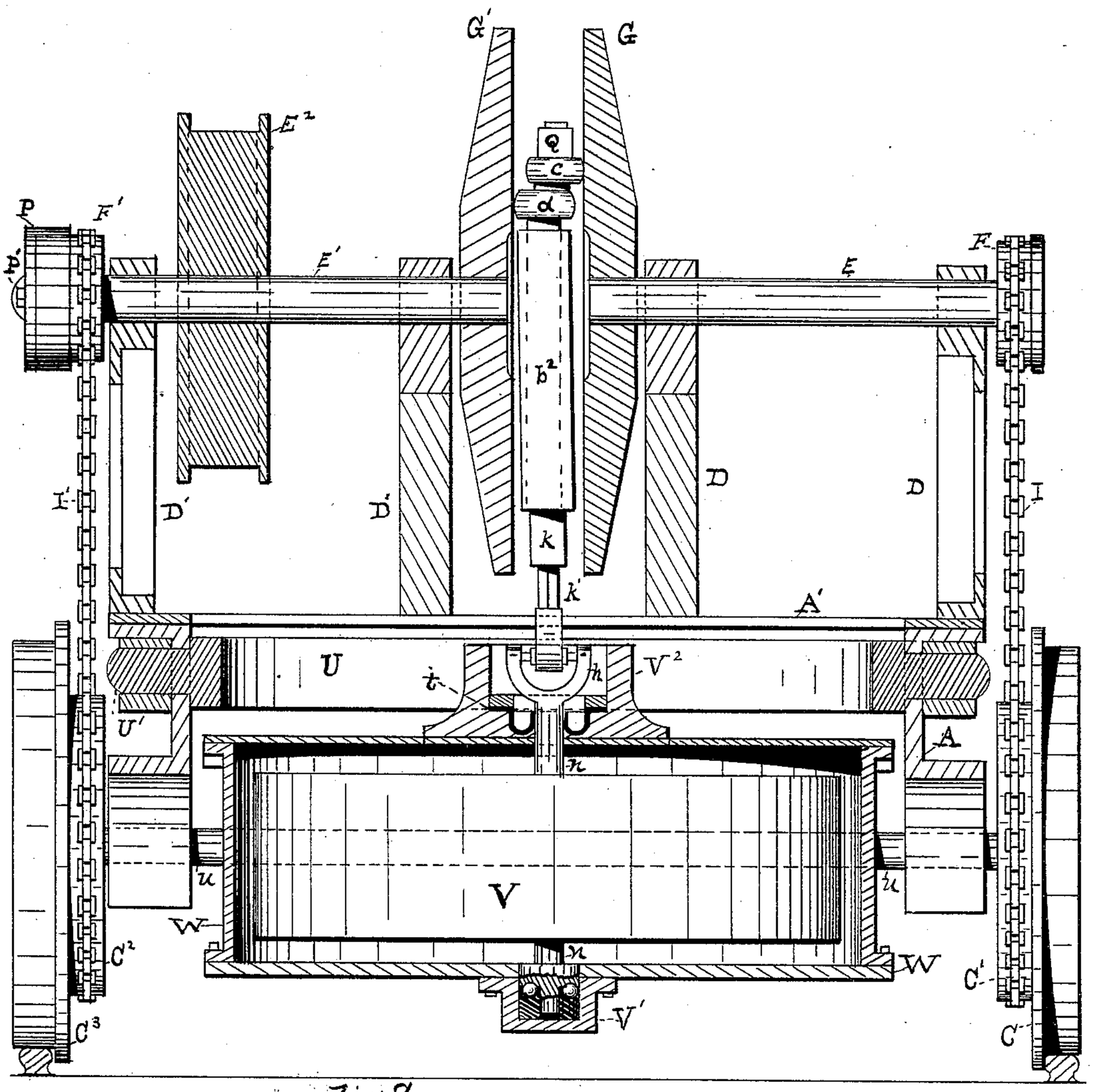

Fig 9

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES S. BALDWIN, OF NEWARK, NEW JERSEY, ASSIGNOR TO SAMUEL H. BALDWIN, OF SAME PLACE.

TRACTION-MOTOR.

SPECIFICATION forming part of Letters Patent No. 429,804, dated June 10, 1890.

Application filed January 27, 1890. Serial No. 338,221. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. BALDWIN, of the city of Newark, county of Essex, and State of New Jersey, have invented a new and Improved Traction-Motor System, of which the following is a specification.

My invention relates to that class of traction-motors in which power or energy supplied from a stationary source is stored up in a suitably arranged and constructed vehicle, transmitted to and applied by the running-gear of said vehicle, and employed to effect the movement thereof over a railway or other suitable road, and also, when desired, to effect the movement over said road of other and attached vehicles.

My system differs from others having a like object; and its novelty chiefly consists in the storage of power or energy supplied from a stationary source in a revolving body carried by a vehicle and having preferably the form of a disk or fly-wheel revolving in a substantially horizontal plane protected from the retarding influence of atmospheric contact, and connected with the running-gear of said vehicle by mechanism adapted, under the control of an operator, to convert the power or energy of said revolving body, irrespective of the momentary speed thereof, into a movement of said vehicle adapted in speed and direction to the requirements of practical work.

My invention is embodied in certain mechanism and processes, all of which will be hereinafter more fully described, and finally pointed out in the clauses of the claim.

Referring to the accompanying drawings, embraced in three sheets, in which like letters of reference refer to like parts in the several figures, Figure 1, Sheet 1, shows in side elevation a traction-motor ready to move, a band-wheel of a steam-engine or other stationary motor, and the outline of a belt employed to connect said band-wheel and motor. Fig. 2 shows in end elevation, and Fig. 3 in partial section on line Y, Fig. 2, a clutch; and Fig. 4 shows in plan a portion of the frame-work of the motor, a yoke, and a portion of the casing of a fly-wheel. Fig. 5, Sheet 2, shows in plan the above traction-motor, (a portion of the floor being broken away to show a flexible tube,) a belt connecting the same with the band-wheel of a stationary engine or other like source of power, and the outline of a fly-wheel casing. Fig. 6 shows an alternate or reversed position of a lever and disks pertaining to Fig. 5. Fig. 7 shows a transverse section of a telescopic shaft on the line Z, Fig. 8. Fig. 8 shows in side elevation a portion of a bracket carrying a telescopic shaft. Fig. 9, Sheet 3, shows a vertical transverse section of a motor on line X, Fig. 1, with two disks and a portion of a bracket in elevation, the interior of a vacuum-casing for a fly-wheel, a fly-wheel and universal joint, and adjustable hanger for said casing.

In Figs. 4, 5, and 9 certain details elsewhere fully shown have been omitted to secure clearness of representation in the parts specifically referred to in connection with said figures.

The general frame-work of the motor, as shown in Figs. 1, 5, and 9, consists of iron or steel channel-bars A and a deck or flooring A′ of similar material. Any other approved frame-work may be employed in lieu of that shown.

C, C^3, C^4, and C^5 are flanged wheels of the ordinary construction. The wheel C has securely attached thereto a sprocket-wheel C′, adapted to receive the chain I. C^3 in like manner is provided with a sprocket-wheel C^2, adapted to receive the chain I′. The wheels C and C^3 having a common axle *u*, Figs. 1 and 9, any movement imparted to one will cause the movement of the other, and they will act in unison as driving-wheels for the vehicle.

N, Figs. 1 and 5, is a brake-lever, and N′ a brake of ordinary construction.

V, Fig. 9, is a fly-wheel having a shaft *n*, terminating at its upper extremity in a fork *h*, forming part of a universal joint. Said shaft revolves in boxes V′ V^2, attached to the casing W, Figs. 1, 4, and 9. This casing is preferably of air-tight construction, and the upper box V^2 is provided with a cup-leather *t*, adapted to embrace an adjacent portion of the shaft *n* and prevent the entrance of air, while at the same time permitting the free revolution of said shaft. The box V^2

also has two projecting studs O, Fig. 4, which engage with and move freely in the yoke U, Figs. 4, 5, and 9, said yoke being hung by the studs U′, one of which is also shown in Fig. 1 and is free to move thereon. As thus arranged, the fly-wheel V is free within certain limits to maintain its plane of revolution without other resistance than that imposed by the slight inertia and friction of the above-named attached parts.

W′, Figs. 1 and 5, is an air-pump; W², a vacuum-gage; W³, a flexible tube connecting said pump with the interior of the casing W, and W⁴ is a valve for admitting air to the said casing. By the use of this pump air may be exhausted from said casing W and a vacuum formed therein, thus excluding the fly-wheel V from the retarding influence of atmospheric contact.

k k′, Figs. 7, 8, and 9, is a telescopic shaft of ordinary construction connected at its lower extremity with the fork N, Fig. 9, and forming therewith a universal joint. The shell or sleeve *k* of said shaft is carried by a box *b*², Figs. 8 and 9, which in turn is attached to the bracket *b*, supported by a stand H, Figs. 1 and 5, and raised and lowered by a screw S and hand-wheel T. The upper end of the shaft K is provided with a disk *d*, formed of compressed wood or other suitable material, preferably semi-elastic and firmly attached to said shaft. It is apparent that the said disk may be actuated by power furnished from the fly-wheel V through the said shaft and universal joint, irrespective of the relative positions of said wheel and disk.

G, Figs. 1, 5, 6, and 9, is a circular plate or flange securely attached to one end of the shaft E, running in boxes supported by the stands D. The other end of said shaft has secured thereto a sprocket-wheel F, adapted to receive the chain I, and through the same to drive or be driven by the driving-wheel C and its sprocket-wheel C′.

G′, Figs. 5, 6, and 9, is a flange similar to, parallel with, and facing the flange G. It is secured to and carried by a shaft E′, running in boxes on stands D′. The outer end of said shaft is provided with a flange P, securely attached thereto by a key. By the side of said flange is a sprocket-wheel F′, adapted to receive the chain I′ and to discharge the functions assigned to F. It is not secured to the shaft E′, but may be secured to or released from the flange P by inserting or removing the bolts P′, as will be seen upon reference to Figs. 2 and 3. As thus arranged, the sprocket-wheel F′ may be either free or may, when the bolts P′ are inserted, either drive or be driven by the shaft E′.

E², Figs. 5 and 9, is a flanged pulley secured to the shaft E′, and is adapted to receive a belt J. (Shown in plan, Fig. 5, and in outline in Fig. 1.)

K is a clasp or shackle adapted to permit the easy connection or removal of said belt.

L, Figs. 1 and 5, represents the band-wheel of a steam-engine or of any equivalent stationary source of power. The belt J is adapted to transmit power from said band-wheel to the pulley E², and thence to the flange G′.

c, Figs. 1, 5, 8, and 9, is an idler-disk, of compressed wood or other suitable material, carried by a lever Q, which is pivoted to the bracket *b*, and which, being operated by an attendant, will force said disk either against the flange G, as shown in Fig. 5, or against flange G′, as in Fig. 6. In either of these positions it may be secured by the entrance of a stud at its extremity into a recess, as *b′*, Figs. 1 and 5. When placed in an intermediate position, the disks *c* and *d* will not press upon either of the flanges G G′; but when disk *c* is pressed against the flange G, as in Fig. 5, it will force the bracket *b* in the opposite direction and the disk *d* against the flange G′. The slight movement required for this purpose is permitted by the springing of said bracket. A reverse movement of said lever and the disk *c* will force the disk *d* against the flange G, as shown in Fig. 6. In either case said disk *d*, being in frictional contact with the face of one of said flanges, is adapted either to drive or be driven, as the case may be.

The operation of the invention is as follows: The motor and its parts and the belt J being in the position shown in Fig. 5, the fly-wheel V at rest and the bolts P′ removed, then the band-wheel L being caused to revolve and drive the belt J in the direction indicated by the arrow, said belt will in turn drive the pulley E², shaft E′, and flange G′, which by frictional contact with the disk *d* will impart to said disk, its attached shaft *k k′*, universal joint *h*, Fig. 9, and fly-wheel V a rotary motion. By raising the disk *d*, through the action of the screw S and hand-wheel T, a gradually-increasing speed may be imparted to said fly-wheel V. During this operation the sprocket-wheel F′ is stationary, the shaft E′ revolving freely therein. The flange G is also stationary, serving merely as a rest for the idler-disk *c*. By operating the pump W′ a vacuum is formed in the casing W. When the above operations are completed, the fly-wheel should be revolving at a very high velocity in a vacuum as perfect as can be practically obtained. The lever Q is then moved until the disks *c* and *d* are free from the flanges G G′. The band-wheel L may then be stopped, the belt J unshackled and removed, and the sprocket-wheel F′ made fast to the flange P, as already described. The motor will then be in the general position shown in Fig. 1 and free to move. The lever Q being now thrown in the position shown in Fig. 5, the disk *d* will with a little slipping actuate, through the flange G′ and attached parts, the driving-wheels of the motor, which will then move from left to right at a speed easily controlled by raising or lowering the bracket *b* by the means already described. It is apparent that this movement may be re-

versed by reversing the position of the lever Q and disks *c* and *d*, as shown in Fig. 6. During the above operations the flanges G G′ always revolve in the same direction as related to each other, but are simultaneously reversed with each reversal of the movement of the vehicle. The idler-disk *c* discharges in each case simply the office of fulcrum. I am aware that by well-known mechanical means either flange G or G′ could, when not employed to transmit power, remain at rest; but in the hands of comparatively unskilled operators—such as are usually employed on tramways—a multiplicity of levers is to be avoided, and simplicity is cheaply purchased at the cost of a little extra friction, as involved in the arrangement above described. To stop the vehicle the lever Q is placed in an intermediate position, disengaging both disks *c* and *d*, and the brake is applied in the usual manner. In view of the high speed necessary to store up in a revolving body a sufficient amount of energy for practical purposes, it is apparent that no sudden change in the plane of revolution could take place. The rotation of the above-described fly-wheel about a substantially vertical axis, while not absolutely essential, is a very desirable feature, as it permits the turning of curves with little or no motion of the wheel and casing on the hangers, whereas if the axis were horizontal such an operation would often call for a change of position so great and abrupt as to be inconvenient and in some cases dangerous.

In describing my invention as applied to a vehicle having flanged driving-wheels adapted to run upon a railway I do not limit myself to that specific form of running-gear. It is obvious that a drum could be substituted for said driving-wheels, and I employ the term "driving-wheel" as the representative of any well-known form of running-gear now generally known and used in such vehicles, and capable of being substituted for that shown by the mere exercise of skill. It is also apparent that the fly-wheel shown and described could have a different form without changing its functions. I employ the term "fly-wheel" as a representative of any convenient revolving body. It is not absolutely essential in all cases that said fly-wheel shall have a vacuum-casing; but such protection against the retarding influence of atmospheric contact is very desirable, especially where a vehicle is liable to long-continued absence from a charging-station, as in case of street blockades, &c. The cup-leather described could, if desired, be replaced by a stuffing-box.

I am aware that other mechanism than that described could be used for transmitting power from the fly-wheel to the running-gear of the above-described motor. Such devices are in common use by dentists and machinists. I regard the substitution of any such device for that described and shown as a mere operation of skill.

Having described my invention, what I claim as new is—

1. In a traction-motor system, the combination, in a vehicle, of a driving-wheel and frame-work, with a revolving fly-wheel arranged and adapted to actuate said driving-wheel, and a vacuum-casing for said fly-wheel, substantially as and for the purpose set forth.

2. In a traction-motor system, the combination, in a vehicle, of a driving-wheel and frame-work, with a revolving fly-wheel arranged and adapted to actuate said driving-wheel, a vacuum-casing, and a self-adjustable support for said fly-wheel arranged and adapted to permit said fly-wheel to freely maintain its plane of rotation irrespective of the varying position of said vehicle, substantially as and for the purposes set forth.

3. In a traction-motor system, the combination, in a vehicle, of a driving-wheel and frame-work, with a fly-wheel arranged and adapted to revolve about a substantially vertical axis, a self-adjusting hanger therefor, and a self-adjusting apparatus arranged and adapted to transmit power from said fly-wheel to said driving-wheel, substantially as and for the purposes set forth.

4. In a traction-motor system, the combination, in a vehicle, of a fly-wheel, an extensible and flexible shaft connected therewith, a disk operated thereby, a plate or flange arranged and adapted to be rotated at different speeds by said disk, a driving-wheel, and a chain or equivalent connecting mechanism arranged and adapted for transmitting motion from said plate to said driving-wheel, substantially as and for the purposes set forth.

5. In a traction-motor system, the combination, in a vehicle, of a driving-wheel and frame-work, with a revolving fly-wheel arranged and adapted to actuate said driving-wheel, and a self-adjustable support for said fly-wheel arranged and adapted to permit the same to freely maintain its plane of rotation irrespective of the varying position of said vehicle, substantially as and for the purposes set forth.

JAMES S. BALDWIN.

Witnesses:
J. WARD SMITH,
CHAS. E. S. THORN.