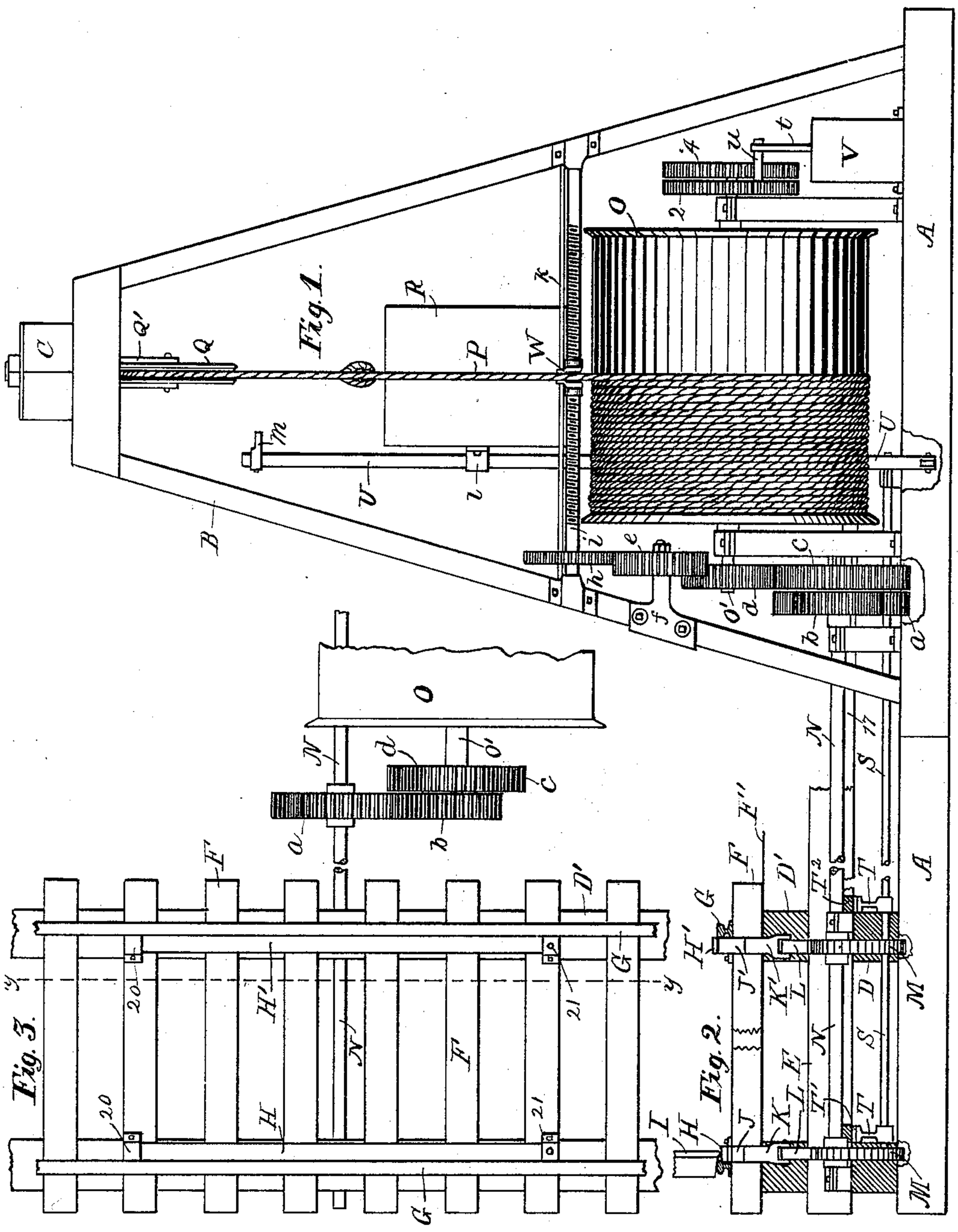
(No Model.) 2 Sheets—Sheet 1.

A. B. HOLLINGSWORTH & E. ROBARDS.

POWER MACHINE FOR PUMPS, &c.

No. 599,129. Patented Feb. 15, 1898.



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(No Model.) 2 Sheets—Sheet 2.

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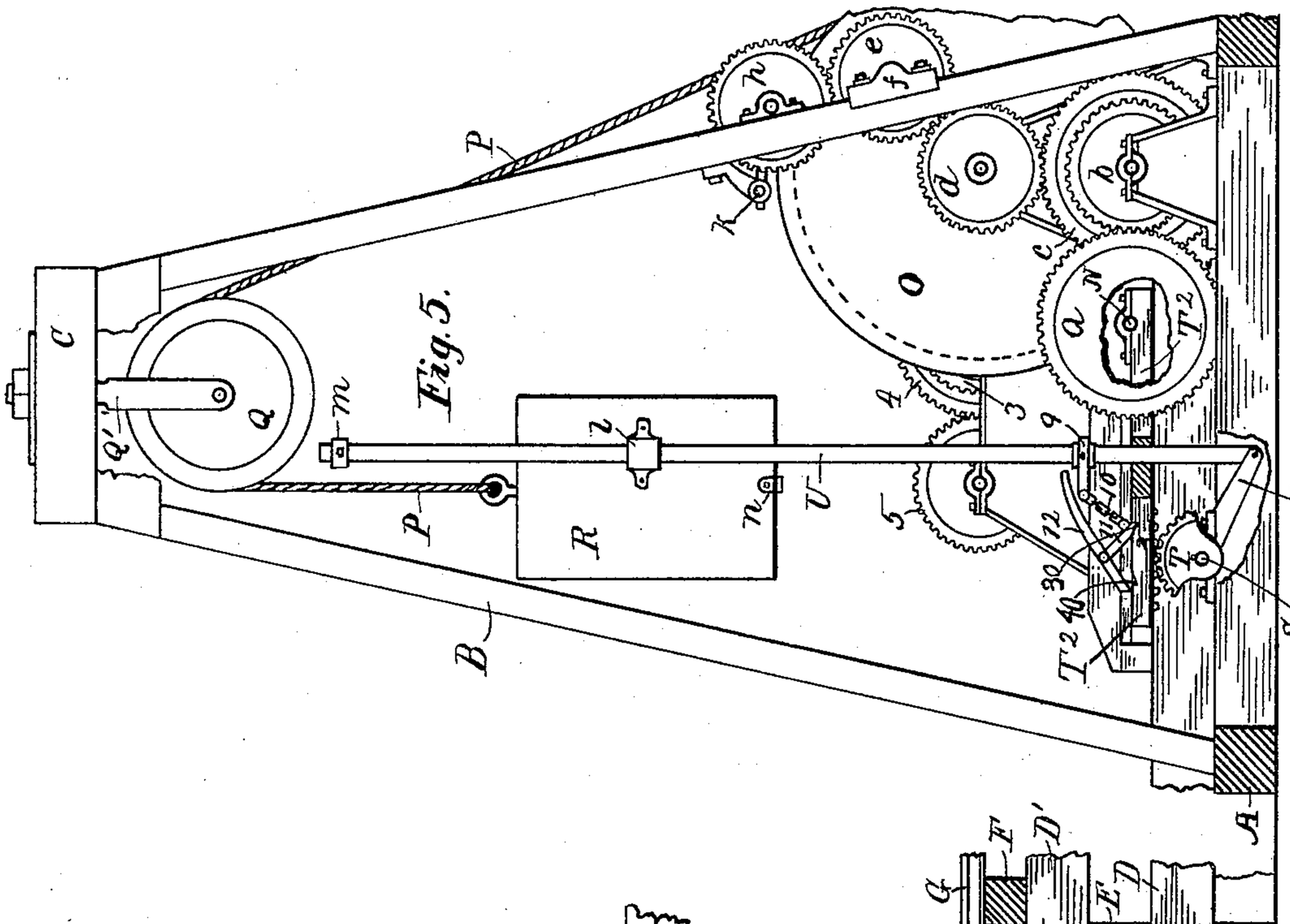

Fig. 5.

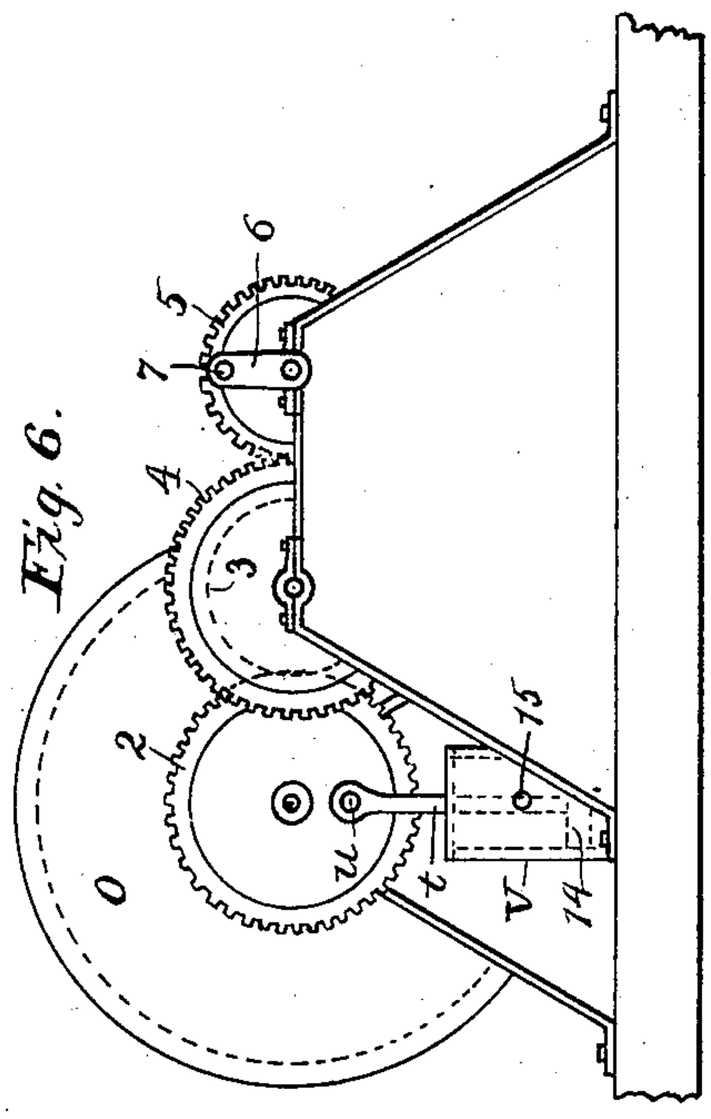

Fig. 6.

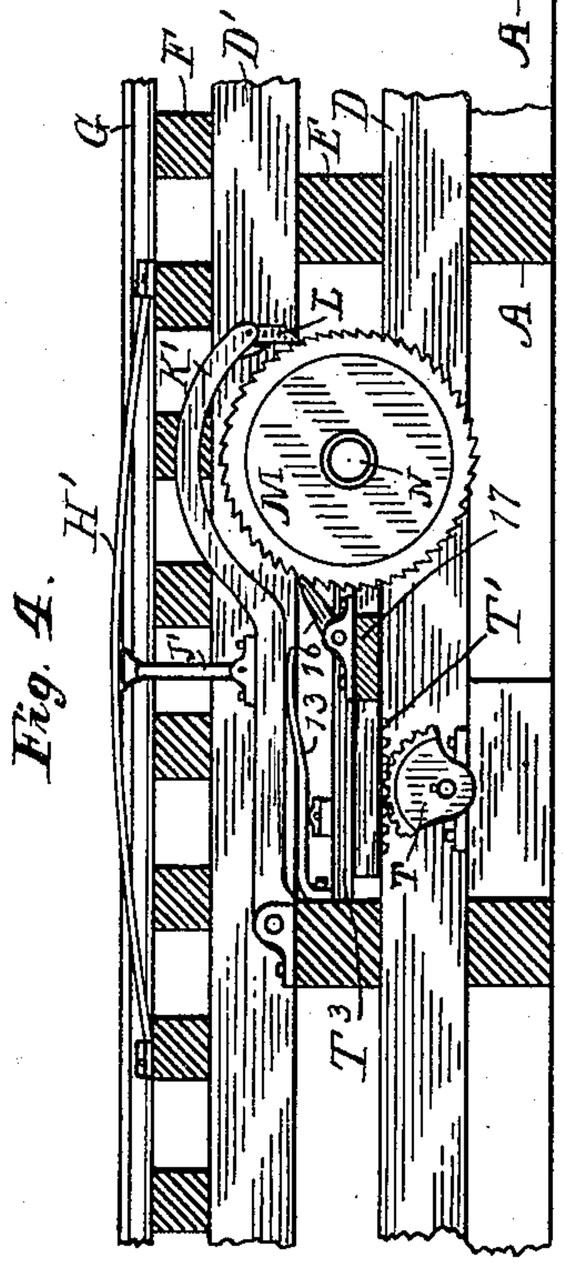

Fig. 4.

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UNITED STATES PATENT OFFICE.

ALFRED B. HOLLINGSWORTH AND EDWARD ROBARDS, OF STILESVILLE, INDIANA.

POWER-MACHINE FOR PUMPS, &c.

SPECIFICATION forming part of Letters Patent No. 599,129, dated February 15, 1898.

Application filed October 2, 1897. Serial No. 653,846. (No model.)

To all whom it may concern:

Be it known that we, ALFRED B. HOLLINGSWORTH and EDWARD ROBARDS, citizens of the United States, residing at Stilesville, in the county of Hendricks and State of Indiana, have invented certain new and useful Improvements in Power-Machines for Pumps, &c.; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and numerals of reference marked thereon, which form a part of this specification.

Our invention relates to the class of machines used at pumping-stations on railways and elsewhere for operating pumps by which water is raised and discharged into tanks; and it consists in novel machinery which is actuated by a weight and a new and novel mechanism whereby the weight is raised for action by means of the weight of railway-cars passing in their usual course and also in the different parts and combination thereof, as will be more fully described hereinafter.

Our object is to provide means by which pumps may be operated automatically with the least expense for attendance and supplies incident to operation, which may be constructed at small cost, and which shall be efficient, durable, and economical in use; and we attain these in our invention, illustrated in the accompanying drawings, in which—

Figure 1 represents a front elevation of the motor-machine proper; Fig. 2, a cross-sectional view showing the mechanism for elevating the motor-weight in its relation to the motor; Fig. 3, a top plan view of a section of railway-track connecting with our mechanism; Fig. 4, a longitudinal sectional view of the section of track, showing our machinery in connection therewith, taken on the line *y y* in Fig. 3, looking toward the motor; Fig. 5, a side elevation of the motor, and Fig. 6 a view of a portion of the motor at the side opposite to that shown in Fig. 5.

In the construction of our invention we excavate and lay a suitable foundation A somewhat below the grade-line F′ of the railway, and the base of the derrick B is preferably on the foundation. Upon the foundation is a suitable frame, preferably of heavy timbers, as D D′ and E, to support the machinery and rails G, the latter resting upon cross-ties F or not, as may be desired.

The motor proper consists of a derrick B, made of any desired material to provide necessary strength, and, being suitably braced, has a cap-piece C, to which is suspended a pulley Q, journaled in a swivel-hanger Q′. The derrick is of suitable height to allow for sufficient travel for the weight R, and when convenient may be erected over the well, so that the weight may travel down into it, in which case the machine would run longer or the derrick would require less height. A drum O is mounted and journaled on suitable supports, and is rotated by means of a gear-wheel *d*, secured to the drum-shaft O′. A cable P is attached at one end to the drum O and is wound around its periphery, while its other end passes over the pulley Q and supports the weight R, the gravity-weight of which operates the pump through suitable intermediate gearing. Above the drum is journaled a shaft *i*, having suitable screw-threads, which are engaged by the threaded guide-yoke W, having a finger at each side of the cable, the yoke being balanced by a sliding engagement with the rod *k*, which is suitably supported by the derrick-frame. The shaft *i* is rotated uniformly with the speed of the drum by means of the gear-wheel *h*, secured thereto and meshing with the intermediate wheel *e*, journaled on the bracket *f* and meshing with the gear-wheel *d*. As the shaft rotates the yoke is forced by the screw-threads to travel along its length and guide the cable, so that the latter cannot mount the adjoining coils. Thus a uniform tension and leverage is maintained at all times when the weight is above the lower limit of its travel—that is, suspended. The weight is provided with a guide *l*, which slides over the reversing-rod U, and also with a lug *n*, adapted to engage the pawl 12 and trip-arm 9.

In order to wind up the cable and raise the weight so as to enable the motor to perform its functions, we provide suitable gearing of

an equally simple and effective character. On suitable supports a rotating shaft is journaled, to which is secured a gear-wheel *c*, meshing with the drum-wheel *d*, and a gear-wheel *b*, which meshes with the gear-wheel *a* when the latter is automatically thrown into engagement with it for the purpose of raising the weight. The wheel *a* is secured to the shaft N, which is suitably journaled and mounted on a sliding frame T^2, coupled by a tie-bar 17 and guided by slides T^3. The frame T^2 carries tooth-racks T′, engaging with toothed segments T, which are secured to the journaled shaft S, at the opposite end of which is secured a lever 8, pivoted to the rod U at its lower end when above ground or at any point when extending into a well. Ratchet-wheels M M are secured to the shaft N on a vertical line at the inner side of each rail G, and above each ratchet-wheel is mounted a lever K or K′, both being alike, and are suitably pivoted at one end and supported by the frame. The free end of each lever carries a pivoted pawl L, so hung that the point of the pawl normally drops by gravity into the teeth of the wheel. The lever is held up by means of a spring 13, suitably supported, and it carries a pivoted push-bar J or J′, suitably guided, which is pressed by a long flat leaf-spring H or H′, supported at the ends by suitable anchor-pieces 20 and 21, being secured in the latter and permitted to slide endwise in the other. The springs H H′ have a comparatively long radius and the center normally sets above the surface of the adjacent rail and close to its inner side. In Fig. 2 the spring H is shown pressed down by contact with the flange I of a car-wheel. At the opposite end of the drum, secured to its shaft, is a gear-wheel 2, meshing with a wheel 3, secured to a suitably-journaled shaft, to which is also secured a gear-wheel 4, meshing with a gear-wheel 5, secured to a suitably-mounted shaft, and to the latter is secured a crank 6, carrying a wrist-pin 7, to which may be connected a pump by any desired intermediate means—such as by a pitman or lever—the connection being constant, and as it is usual to elevate water through a pipe discharging over the top of a tank the amount of resistance is uniform, therefore self-governing, and any suitable system of float and levers and brake may be used to stop the movement of the machinery whenever the tank is full of water. Any suitable ratchet device may be applied conveniently in this train of gearing, so that the pump will remain at rest while the weight is being elevated, as the wheel 4 may be loose on its shaft and be driven by a pawl and ratchet-wheel in connection with the wheel 3.

In order to guard against accidental damage should the pump become disconnected by the weight descending too rapidly, we provide a governor consisting of a cylinder V, secured to the frame or base, in which is a loosely-packed piston 14, connected by a rod *t* to a pin *u*, secured to the wheel 2. The heads of the cylinder are closed; but at the longitudinal center is a port 15 to admit air, which when the piston travels rapidly is compressed at each end, but when at a normal speed leaks past the piston and out of the port, the latter being provided, if desired, with a valve to regulate the quantity of air admitted. The compressed air and alternating vacuum in the cylinder retards the motion as much as may be decided upon.

In connection with each ratchet-wheel M is a dog 16, mounted on the sliding frame T^2, to retain the purchase when the weight R is being elevated. On a suitably-arranged frame is pivoted a dog 11, connected by a flexible link or chain 10 to the trip-arm 9, secured to the rod U, and is adapted to drop into a suitable ratchet-notch 30 in the frame T^2 to retain it in proper position when the wheel *a* is in gear with the wheel *b*, as shown. A dog 12 is also suitably pivoted and adapted to engage a reversely-inclined notch 40 in the frame T^2 to retain it in position when the wheel *a* is out of gear.

In practical use, the weight R, being at the lower limit of its travel, has pushed the dog 12 out of its notch by contact with the lug *n*, which afterward presses down upon the arm 9, which, being secured to the rod U, forces it down and pushes down the lever 8, causing the frame T^2 to slide forward, so that the wheel *a* meshes with the wheel *b*, at the same time bringing the ratchet-wheels M M into contact with the pawls L. This position is maintained until when a train of cars passes over the track the flange of each wheel pushes down the levers K K′ and rotates the ratchet-wheels a short distance at each thrust and through the train of gearing winds the cable around the drum and consequently raises the weight R, which is retained in elevation by the pawls 16 engaging the ratchet-wheels M M after each movement. When the weight R has gained the proper elevation, it comes in contact with the trip-arm *m*, secured to the rod U, which is raised until it first lifts the dog 11 and then the lever 8, the latter being connected in a suitable compensating slot in rod U, thus forcing the frame T^2 back and disengaging the wheels *a* and *b* as well as the pawls L and wheels M M, while the dog 12 drops into its notch and holds the winding mechanism out of gear. The descending weight will then supply power and operate a pump until it arrives at the lower limit of its travel, when the same operation is automatically repeated continuously.

It is obvious that any suitable arrangement of framing and gearing may be used and variations made in the relative power and speed conditions in the various adaptations within the limits and scope of our invention, as we do not limit ourselves to the particular details of construction shown herein, nor is it necessary to use two ratchet-wheels and connections.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A power-machine comprising a frame, a suitably-mounted drum, a derrick and a swiveled pulley at the top thereof, a cable attached to said drum and running over said pulley, a weight as a prime mover suspended at the opposite end of said cable, gear-wheels connecting said drum whereby it may be rotated, a shaft mounted on a sliding frame and extending below a railway-track, a ratchet-wheel on said shaft, a pawl engaging said ratchet-wheel to actuate it, a pawl to prevent the backward movement of said ratchet-wheel, and means whereby said actuating-pawl may be given a reciprocating motion by the flanges of the wheels of passing railway-cars to rotate said ratchet-wheels and elevate said weight, gear-wheels connecting said shaft to said drum, and means whereby said gear-wheels may be engaged and disengaged by moving and reversing said sliding frame at each end of the limit of travel of said weight, substantially as shown and described.

2. In a power-machine of the class described, the combination of a shaft mounted transversely under a railway-track upon a sliding frame, a ratchet-wheel secured to said shaft, a pivoted lever having its free end above said ratchet-wheel, a pawl pivoted on said sliding frame and engaging said ratchet-wheel, a pawl at the free end of said lever adapted to engage said ratchet-wheel, an arched leaf-spring mounted adjacent to a rail of said track so that a wheel-flange may form a contact therewith and press its central portion down, a push-bar or suitable means to form connection between said spring and said lever whereby the pressure of said flange shall rotate said ratchet-wheel, a suitable motor having a drum, a cable attached at one end thereto and running over an elevated pulley, a weight as a prime mover attached to the opposite end of said cable, and intermediate gearing whereby the rotation of said shaft shall wind said cable around said drum, substantially as shown and described.

3. In a power-machine of the class described, the combination of the sliding frame mounted below the railway-track, the shaft thereon, the ratchet-wheel, the lever and pawl, the pawl on said frame, means whereby passing car-wheels may depress said lever and impart motion to said ratchet-wheel, the gear-wheel on the opposite end of said shaft, the drum suitably mounted, the derrick, the pulley hung thereto, the cable on said pulley and secured at one end to said drum, the weight at the opposite end of said cable, the cable-guide, gear-wheels connecting said drum to said gear-wheel at the end of said shaft, the reversing-rod adapted to be acted upon by said weight at each end of its vertical travel to engage and disengage said connecting gear-wheels, the dogs and pawls and trip-arms and suitable means whereby said sliding frame may be controlled to automatically throw said gearing in and out of engagement, substantially as shown and described.

In testimony whereof we affix our signatures in presence of two witnesses.

ALFRED B. HOLLINGSWORTH.
EDWARD ROBARDS.

Witnesses:
LONZO MCANINCH,
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