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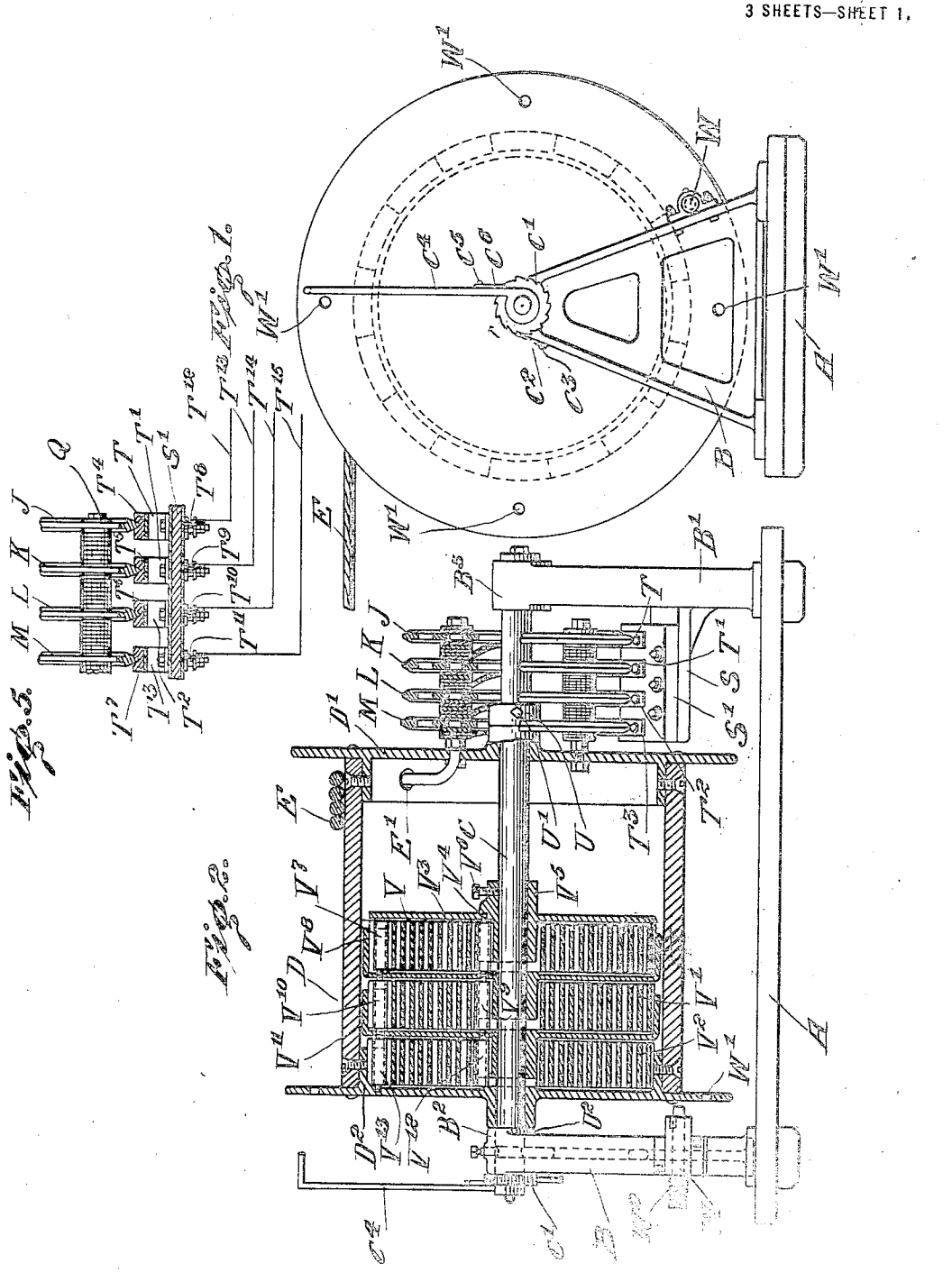
AUTOMATIC CABLE TAKE-UP DEVICE.

APPLICATION FILED JAN. 25, 1913.

1,235,092.

Patented July 31, 1917.

3 SHEETS—SHEET 1.



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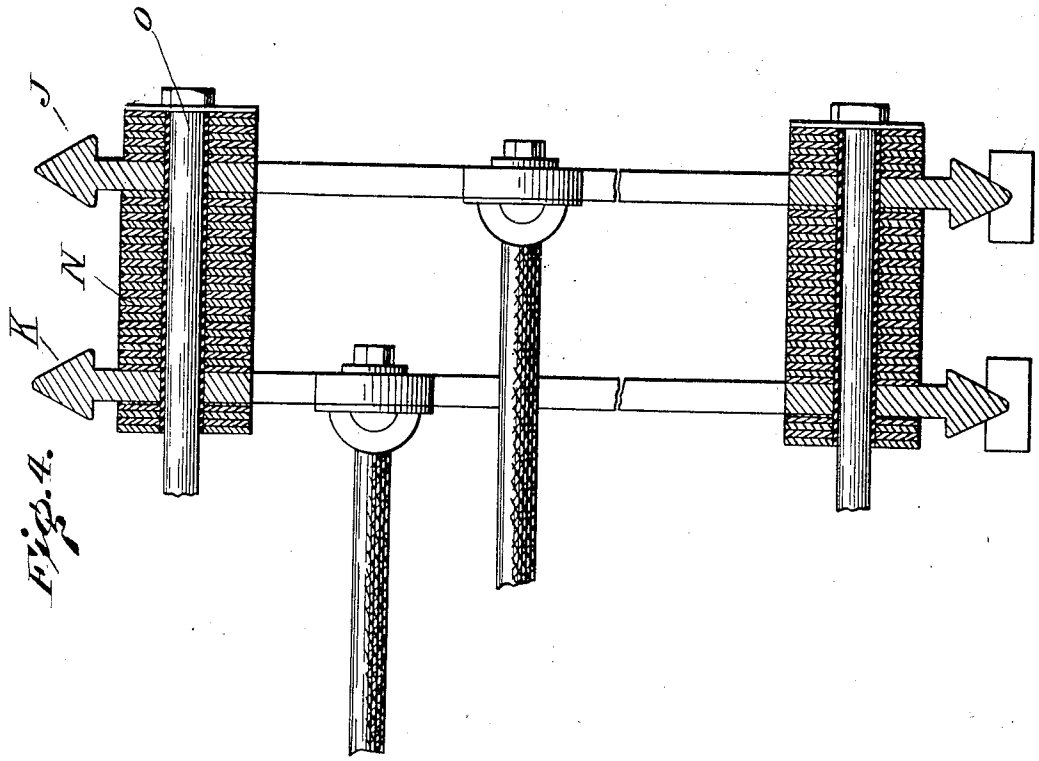


Fig. 4.

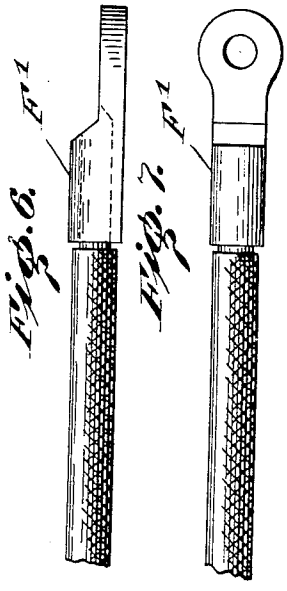


Fig. 6.

Fig. 7.

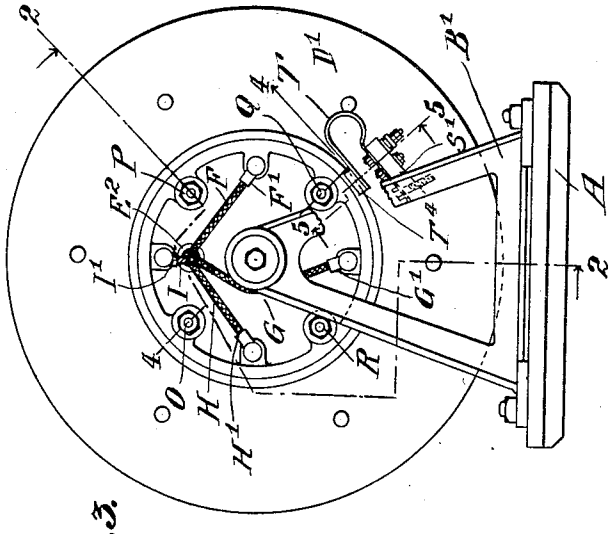


Fig. 3.

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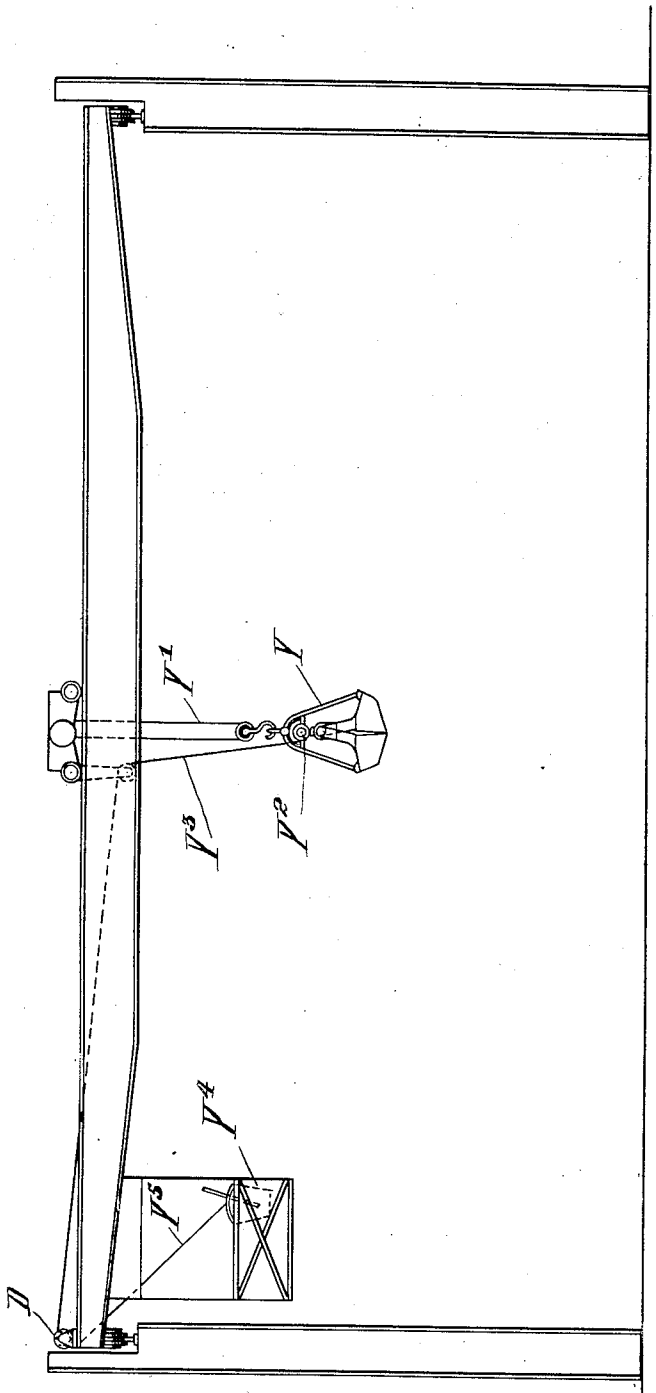
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3 SHEETS—SHEET 3.

Fig. 8.



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UNITED STATES PATENT OFFICE.

HERBERT S. ATKINSON, OF EAST ORANGE, NEW JERSEY, AND HERMAN J. BRENDLIN, OF NEW YORK, N. Y., ASSIGNORS TO THE HAYWARD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

AUTOMATIC CABLE-TAKE-UP DEVICE.

1,235,092. Specification of Letters Patent. Patented July 31, 1917.

Application filed January 25, 1913. Serial No. 744,088.

To all whom it may concern:

Be it known that we, HERBERT S. ATKINSON, a citizen of the United States, residing at East Orange, in the county of Essex and State of New Jersey, and HERMAN J. BRENDLIN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Cable-Take-Up Devices, of which the following is a full, clear, and exact specification, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a device for automatically taking up slack in, and paying out, cables for excavating buckets, and is more especially designed for use in connection with an electrically operated bucket, such, for example, as illustrated in the application for patent of Herbert S. Atkinson, Serial No. 735,183 filed December 6th, 1912, wherein wire conductors are employed for conducting the electrical current to and from the motor on the bucket from a more or less distant operating point. In using such a bucket, where there is a considerable rise and fall in the vertical operating movements thereof, a take-up device for taking up the slack in the electrical conductors is quite essential.

While our invention is more especially designed for use in connection with a bucket of the character above mentioned, we desire it to be understood that it is not limited thereto, but is capable of other uses, as, for example, in taking up slack in, and paying out, a tag line frequently employed in connection with an ordinary line-operated hoisting bucket, wherein no electrical conductors are used.

The object of our invention is to provide a take-up device of the character stated, including means on said device whereby, when it is used to take up slack in a cable formed of one or more electrical conductors, electrical contacts are provided between the terminals on a movable or rotating part of the device and stationary terminals forming the terminals of the conductors employed for transmitting the electrical current from a distant point.

A further object of our invention is to provide, in connection with such a device, energy-storing means for automatically actuating the rotatable part of said device, with convenient means for increasing or decreasing the amount of energy so stored.

A further object of our invention is to provide an automatic take-up device so constructed that no damage can result to the apparatus in case of sudden release of the tension normally exerted thereon by the pull of the cable, due to accidental breakage or otherwise.

Other objects, such as economy of construction, simplicity of parts, and facility of adjustment and operation will be readily apparent from the following description, taken in connection with the accompanying drawings, in which,

Figure 1 is a side elevation of the device;

Fig. 2 is a longitudinal section of the device on line 2—2 of Fig. 3, with certain parts shown in elevation;

Fig. 3 is an elevation from the side opposite that shown in Fig. 1;

Fig. 4 is an enlarged detail on line 4—4 of Fig. 3, with certain parts omitted;

Fig. 5 is an enlarged detail section on line 5—5 of Fig. 3;

Fig. 6 is a side elevation of one of the wire connectors;

Fig. 7 is a plan of the view shown in Fig. 6; and

Fig. 8 is a diagrammatic view showing one application of the device, as used with an electrically operated bucket.

Referring to the construction illustrated, A indicates a base plate, to which are bolted, at each end thereof, a support or stanchion B, B′, the upper portion of each of which is apertured to form a journal-bearing B^2, B^3 for a shaft C mounted therein. One end of the shaft C is provided with a ratchet gear C′, rigidly secured thereto, engaging the teeth of which ratchet is a pawl C^2, secured to the support or stanchion B at C^3, which pawl normally prevents rotation of said ratchet and shaft in one direction but permits rotation in the other. Loosely mounted upon the shaft C is a lever C^4, secured to which, at C^5, is a pawl C^6, which is adapted to actuate, through said lever, the ratchet gear C′ in one direction, but which is free to slip over the teeth of said gear in the opposite direction.

Mounted upon the shaft C is a hollow

drum member D provided with flanged side plates D′, D². About the drum member D may be coiled a cable indicated at E (which in this instance is formed of a plurality of electrical conducting wires), which latter, at its inner end, is projected through an opening E′ in the periphery of the drum member D, and through an opening E² in the side D′ of said drum member. The cable E, after passing through the opening E² is separated into its individual components, comprising the insulated wires F, G, H, I, which are respectively connected, by means of the connectors F′, G′, H′, I′, to a series of electrical conducting rings J, K, L, M, which rings are properly insulated, as indicated at N in Fig. 4 and are rigidly held in position, and to the drum member D, by means of a plurality of bolts indicated at O, P, Q, R.

The support B′ carries a bracket S which, in turn, carries a block S′, to which are secured a plurality of springs T, T′, T², T³, each of which springs respectively carry brushes T⁴, T⁵, T⁶, T⁷. Suitably mounted upon the block S′, and properly insulated, are a plurality of binding posts T⁸, T⁹, T¹⁰, T¹¹, to which binding posts may be connected a plurality of electrical conducting wires T¹², T¹³, T¹⁴, T¹⁵, through which wires and binding posts, and through the springs T, T′, T², T³, and through the brushes T⁴, T⁵, T⁶, T⁷, electrical current may be transmitted to and from the conducting rings J, K, L, M.

The drum member D is held in position on the shaft C, at one end, by means of the nut U, held by the screw U′, and, at the other end, by means of a shoulder U² on the support B.

The automatic means for actuating the drum to take up slack in the cable E comprises a spring battery within the drum member D, consisting of the coiled springs V, V′, V², the first named of which is, at its inner end, secured to the case-plate V³, by means of the pin V⁴, which case-plate forms a part of, and is carried by a hub member V⁵, keyed to the shaft C, by means of the set screw V⁶. The outer end of the spring V is, by means of the pin V⁷, secured to a case-plate V⁸, which latter is secured, by the pin V⁹ to the inner end of the spring V′, the outer end of the spring V′, being secured by the pin V¹⁰, to a case-plate V¹¹, which case-plate, by means of the pin V¹², is secured to the inner end of the spring V², said spring, at its outer end, being secured, by the pin V¹³, to the side D² of the drum member D, the arrangement being such that when the shaft C is rotated in the direction of the arrow, as indicated in Fig. 1, the effect is to carry therewith, the case-plate V³ and thereby wind up the coiled spring V, which when sufficient tension is placed thereon, rotates with the shaft C and carries therewith the case-plate V⁸, which latter, in turn, winds up the coiled spring V′, and when the tension on it is sufficient, it rotates with the shaft C and carries thereby the case-plate V¹¹, which, in its rotation, winds up the coiled spring V², the tension exerted by all of said springs being transmitted to the drum member D to rotate the latter, as occasion requires.

When the shaft C is rotated to wind up the springs V, V′, V², the drum D may be held stationary by means of a pin W, carried by the support B, and adapted to be moved into one of a series of apertures W′, on the flange of the side plate D² of the drum D, said pin W being normally retracted from operative position by means of the spring W².

Referring to Fig. 8 of the drawings, Y indicates, in whole, a hoisting bucket, the holding and hoisting line of which is indicated at Y′, the opening and closing mechanism of which bucket is actuated by an electric motor Y², to which motor electrical current is transmitted by a cable Y³, said cable being connected to the drum member D of the take-up device herein illustrated and described.

It will be understood that current is supplied to the bucket through one of the well known forms of electric controller, as indicated at Y⁴ in Fig. 8, from which it passes to the take-up device through the cable indicated at Y⁵. It will be further understood that each of the cables shown at Y³ and Y⁵ in Fig. 8, comprises a group of electrical wires. The cable Y⁵ when separated into its constituents being illustrated in Fig. 5 at T¹², T¹³, T¹⁴, T¹⁵, which are respectively connected to the binding posts T⁸, T⁹, T¹⁰, T¹¹, the current then going to and from the conducting rings J, K, L, M, and thence to the conducting wires F, G, H, I, which latter pass through the opening E², and thence, in the form of the cable E, around the drum member D.

As the bucket, indicated at Y in Fig. 8 is hoisted and lowered, the slack in the cable Y³, which would normally result from the hoisting movement, is taken up by the automatic actuation of the drum member D of the take-up device, and when the bucket is lowered, the cable Y³ is paid out automatically by said drum member D.

The automatic action of the drum may also be utilized for swiftly and conveniently winding the cable on the drum when the two are to be connected up, it being simply necessary to place tension on the springs V, V′, V², by means of the lever C⁴.

In case of accidental breakage of the cable Y³, no harm can result to the mechanism—as would be the case were the springs connected to a fixed shaft,—since, in such contingency, the shaft being free to turn in

one direction indefinitely and the ratchet and pawls acting in one direction only, the shaft, drum and springs, in case of such breakage, would spin until rested, and acceleration of the drum, due to its momentum, would have no damaging effect upon the springs.

What we claim is:

1. In a device of the class described, the combination of a cable, a drum member to which an end of said cable is secured, a shaft for rotatably supporting said drum member axially, tension means connected to said shaft and to said drum member within and for rotating the latter, an upright support provided with bearings for said shaft, ratchet mechanism secured to said shaft, means on said support adapted to prevent rotation of said shaft in one direction, a crank juxtaposed to said shaft, and means on said crank engaging said ratchet mechanism for causing rotation of said shaft in the opposite direction, whereby said shaft, in case of undue acceleration of said drum member in winding, is capable of freely rotating in the same direction as the direction of winding movement of said drum member, such free rotation of the shaft, on undue acceleration of the drum member, being due to the weight and momentum of the drum member in its winding movement.

2. In a device of the class described, the combination of a cable, a drum member to which said cable is secured, a shaft rotatably supporting said drum member axially, a spring connected to said shaft and to said drum member within and for rotating the latter, an upright support provided with bearings for said shaft, ratchet mechanism on said shaft, means on said support adapted to prevent rotation of said shaft in one direction, and a crank-actuated pawl engaging said ratchet mechanism for causing rotation of said shaft in the opposite direction, whereby said shaft, on undue acceleration of said drum member, may be capable of free movement in the direction of winding movement of the drum member, such free movement of said shaft, on undue acceleration of the drum member, being due to the weight and momentum of the drum member in its winding movement.

3. In a device of the class described, the combination of a cable, a drum member to which said cable is connected, a shaft rotatably supporting said drum member axially, an upright support provided with bearings for said shaft, a plurality of coiled springs within said drum member and connected thereto and also connected to said shaft, a ratchet gear secured to said shaft, a pawl on said support engaging said ratchet gear and preventing rotation of said shaft in one direction, a crank juxtaposed to said shaft, and a pawl on said crank engaging said ratchet gear to actuate said shaft in the opposite direction, whereby said shaft, in case of undue acceleration of the drum member, may be free to move in the direction of winding movement of the drum member, such free movement of said shaft, on undue acceleration of the drum member, being due to the weight and momentum of the drum member in its winding movement.

4. In a device of the class described, the combination of a cable, a drum member to which said cable is connected, a shaft for rotatably supporting said drum member, tension means connected to said shaft and to said drum member for rotating the latter, a support provided with bearings for said shaft, and pawl and ratchet mechanism connected to said support and to said shaft for rotating the latter to increase or decrease the tension of said tension means, said mechanism permitting said shaft to freely rotate in the direction of winding movement of the drum member on undue acceleration of the latter, such free rotation of the shaft, on undue acceleration of the drum member, being due to the weight and momentum of the drum member in its winding movement.

5. In a device of the class described, the combination of a cable, a drum member to which said cable is connected, a shaft for rotatably supporting said drum member, tension means connected to said shaft and to said drum member for rotating the latter, a support provided with bearings for said shaft, pawl and ratchet mechanism connected to said support and to said shaft for rotating the latter to increase or decrease the tension of said tension means, and means for holding said drum stationary when said mechanism is operated, said mechanism permitting said shaft to freely rotate in the direction of winding movement of the drum member on undue acceleration of the latter.

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