H. C. BECKWITH & O. B. BJORGE.

RATCHET MECHANISM.

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1,082,842. Patented Dec. 30, 1913.

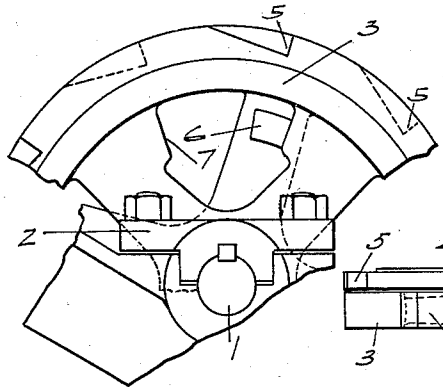
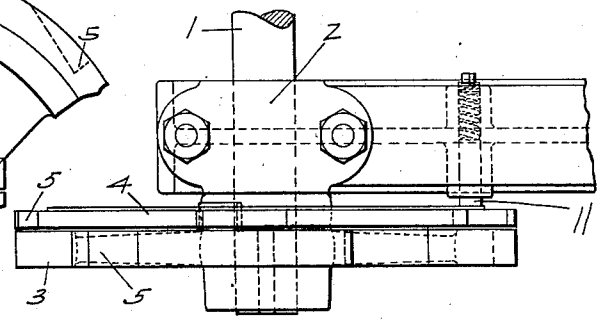


FIG. 4.

FIG. 3.



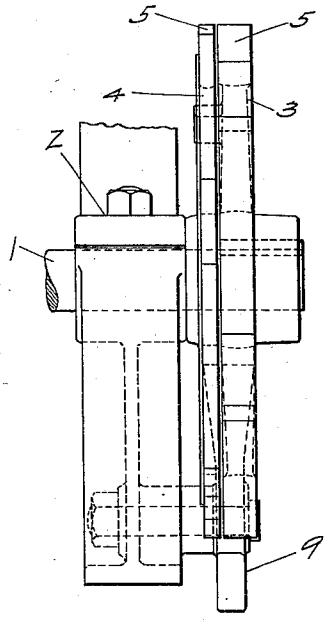


FIG. 2.

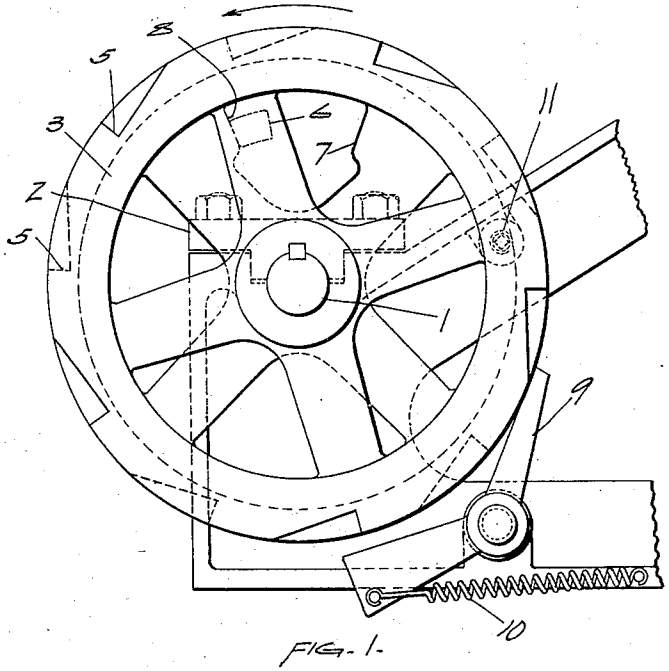


FIG. 1.

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RATCHET MECHANISM.

1,082,842. Specification of Letters Patent. Patented Dec. 30, 1913.

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To all whom it may concern:

Be it known that we, HENRY C. BECKWITH and OSCAR B. BJORGE, citizens of the United States, and residents of Duluth, county of St. Louis, and State of Minnesota, have jointly invented a new and useful Improvement in Ratchet Mechanism, of which the following is a specification, the principle of the invention being herein explained and the best mode in which we have contemplated applying that principle, so as to distinguish it from other inventions.

In connection with hoisting and like mechanism, it has been customary to utilize a ratchet device to hold the load in elevated position, although the power may be turned off. Moreover, the hoisting drums are thrown in and out of gear by means of friction clutches, so that when the motor is prevented from backing up, the load may be lowered by means of the clutch. Where the shaft is revolved at a very low speed, an ordinary ratchet and pawl will serve in the ratchet device just referred to; but on electric hoists, or the like, where the shaft, on the contrary, is revolved at a considerable speed, we have found it impracticable to use such ordinary pawl and ratchet for the reason that the pawl will be continually thrown out with great force as it is struck by successive teeth of the rapidly rotating ratchet wheel. We have accordingly devised our present improved ratchet mechanism wherein the pawl is automatically held out of engagement with the teeth of the ratchet wheel when the latter moves in the direction just referred to, although said pawl becomes operative almost instantly upon the direction of rotation of the wheel being reversed.

To the accomplishment of these and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—Figure 1 is a side elevational view of ratchet mechanism embodying our present improvements; Fig. 2 is an end elevation thereof; Fig. 3 is a plan view; and Fig. 4 is an elevational view of a detail as seen in the opposite direction from that of Fig. 1.

In the aforesaid figures, the shaft 1 may be regarded as the shaft of a hoisting drum of the character referred to above, or any other revolving shaft, to which it is desired to permit free motion in one direction, while preventing motion in the opposite direction. The shaft appearing in the several figures is suitably journaled in a box 2 therefor provided and carries two ratchet disks or wheels 3 and 4, the first of which is keyed to such shaft while the second is loosely mounted thereon, having limited rotative movement relatively to the first, as will presently appear. The diameters of the disks are the same, as also the spacing and dimensions of the notches 5 that form the ratchet teeth. The number of such teeth, although shown as five in Fig. 1, is obviously a matter of indifference; but by reason of their similar spacing and dimensions, it will be seen that upon the two disks being given proper relative position, said teeth will be brought into register, thus constituting of the two disks, in effect, one disk.

Relative movement between the two disks is limited by means of a lug 6 borne by the one, which plays between two stops 7 and 8 on the adjacent face of the other, such stops in the illustrated, spoked construction of wheel consisting of two adjacent spokes, as clearly shown in Figs. 1 and 4. The amount of movement thus permitted is such that the loosely mounted disk may rotate on the shaft relatively to the keyed disk, a distance equal to one-half that between successive ratchet teeth 5, in which position of the disk, the teeth on the two wheels will lie in the staggered relation shown in Fig. 1, and a smooth peripheral surface be, in effect, presented by the two disks taken together. In this position of the disks, therefore, it may be said that the teeth of either disk are covered by the other disk. As a result, when the disks are thus positioned, the pawl 9, which may be of any desired construction and location but is illustrated as lying below and to the rear of the disks, is prevented from engaging either ratchet wheel despite the action of the spring 10 connected with said pawl.

Laterally adjacent to the inner face of the loosely mounted disk or ratchet wheel 4, is a spring pressed plunger 11, that is adapted to frictionally bear against such wheel's face and thus exert a retarding action thereon. The latter will accordingly always lie in one or the other of the two limiting positions

relatively to the other disk, or wheel, 3 depending upon the direction of rotation of such other wheel. In other words, when such other wheel 3 rotates in the direction of the arrow in Fig. 1, which is the direction in which the pawl is normally inoperative, the wheel 4 is carried along with its ratchet teeth in staggered relation to those in the first; whereas, upon a reversal in direction of rotation of the wheel 3, the wheel 4 is held against rotation by the friction of such plunger 11 pressing on its face until the lug 6 is brought against the other stop 7, in which position the teeth on the two wheels register. Accordingly, it will be seen the pawl may now engage with such teeth and thus hold the wheels and shafts against rotation. When, however, the shaft is rotated in the other direction, viz., that in which the pawl is inoperative, anyhow, such pawl is kept entirely out of engagement with the teeth of the ratchet wheel, so that, no matter how fast the disks may revolve, such pawl will not be struck by the teeth and caused to rebound with disastrous effects upon the mechanism.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention.

1. In mechanism of the character described, the combination of a toothed-member; a pawl adapted to engage the teeth of said member to restrain motion of the latter in one direction but not in the other; a second member connected with, but having limited movement relatively to, said first member, the teeth of said first member being covered by the other member except in one relative position of said member; and means for retarding the movement of said second member.

2. In mechanism of the character described, the combination of a ratchet-wheel; a pawl adapted to engage the teeth of said wheel to restrain rotation thereof in one direction but not in the other; a second ratchet-wheel connected with, but having limited rotative movement relatively to said first wheel, the teeth of said wheels registering in one limiting relative position of the same but not in their other such position; and means for retarding the rotation of said second wheel, whereby it assumes such first limiting position when said first wheel rotates against said pawl and such second limiting position when said first wheel rotates away from said pawl.

3. In mechanism of the character described, the combination of a ratchet-wheel; a pawl adapted to engage the teeth of said wheel to restrain rotation thereof in one direction but not in the other; a second ratchet-wheel connected with, but having limited rotative movement relatively to said first wheel, the teeth of said wheels registering in one limiting relative position of the same but not in their other such position; and a spring pressed plunger bearing against said second wheel for retarding its rotation, whereby said wheel assumes such first limiting position when said first wheel rotates against said pawl and such second limiting position when said first wheel rotates away from said pawl.

Signed by us this 17th day of December, 1910.

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Attested by—
E. J. ROWLEY,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."