(No Model.)

W. A. WRIGHT.

SPEED CHANGING MECHANISM.

No. 475,735. Patented May 24, 1892.

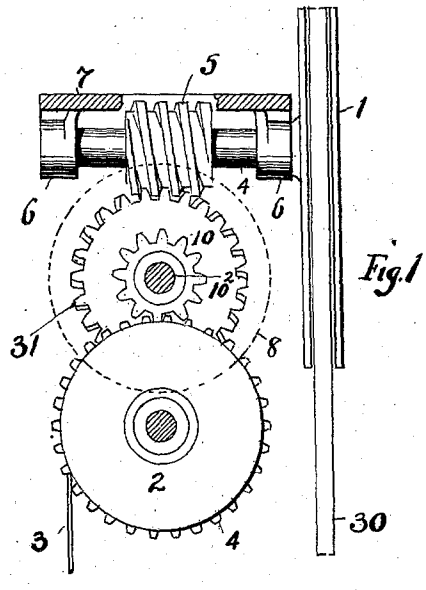

Fig. 1

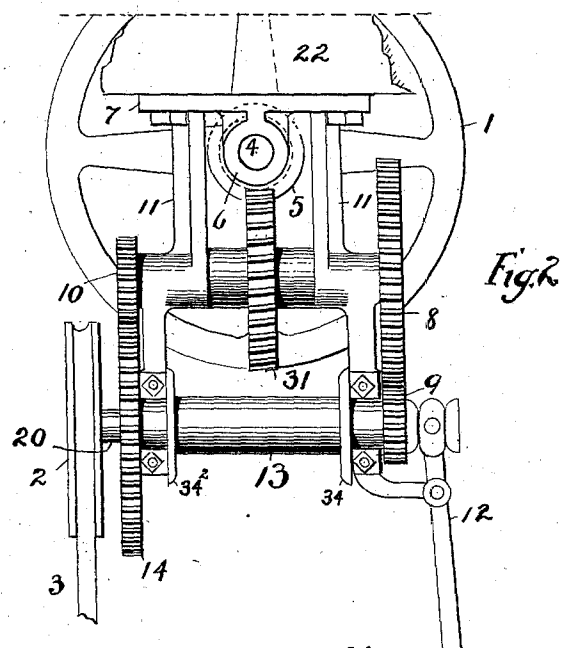

Fig. 2

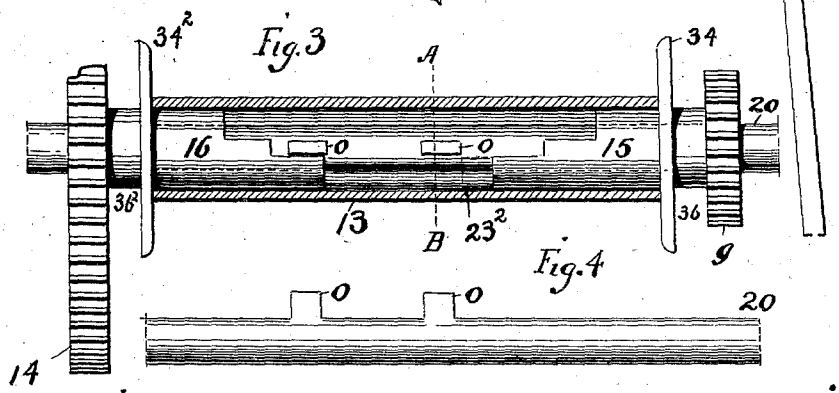

Fig. 3

Fig. 4

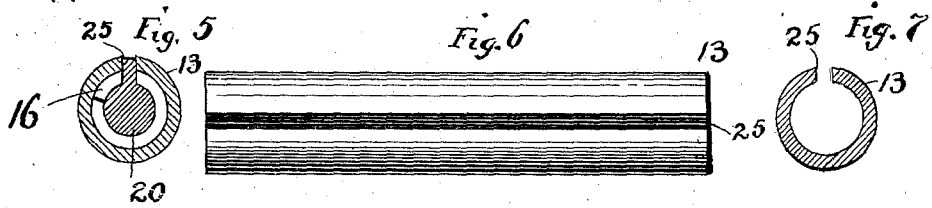

Fig. 5

Fig. 6

Fig. 7

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SPEED-CHANGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 475,735, dated May 24, 1892.

Application filed January 28, 1892. Serial No. 419,548. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. WRIGHT, a citizen of the United States, residing at Centerton, in the county of Burlington and State of New Jersey, have invented certain new and useful Improvements in Speed-Changing Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention has reference to a speed-changing mechanism for cranes, elevators, hoists, &c.; and it consists of an arrangement of parts fully set forth in the following specification and accompanying drawings, which form part thereof.

The object of my invention is to provide a speed-changing mechanism that will be safely and easily operated, positive in its action, strong and simple in its construction, and entirely under the control of the operator while the crane or elevator to which it is applied is in action. To accomplish this object I employ a shaft movable longitudinally while in circular motion and provided with two pins and two irregular-shaped sleeves, which sleeves are made integral with a pinion on one end and a spur-wheel on the opposite end of said shaft. Surrounding said irregular-shaped internal sleeves is a longitudinal slotted sleeve, which sleeve answers the purpose of the rope or chain supporting drum customary in machines of this class.

In the drawings like parts are figured with a similar character in the different views.

Figure 1 is a transverse section on the shafts of an elevator and elevation of the worm and power wheel. The bearings for the two shafts supporting the pinion and gear are removed. Fig. 2 is a side elevation of the chain-drum friction-wheel and the gears and an end view of the power-wheel with its shaft-bearings. Fig. 3 is a longitudinal section of the sleeve forming the drum and a plan of the sliding shaft with the revolving sleeves in place. Fig. 4 is a side elevation of the sliding shaft and pins. Fig. 5 is a section through the line A B, Fig. 3. Fig. 6 is a plan of the sleeve in which the slot 25 is shown. Fig. 7 is a transverse section of the sleeve with the shaft removed.

By the use of my shifting mechanism it is not necessary to have the gears change position when I wish to obtain a slow or fast speed or lift a heavy or light load. They are kept absolutely stationary in so far as any longitudinal movement is concerned. This in a material degree removes the liability to breakage of teeth in the gear-wheels and the annoyance of putting the teeth in gear when it is desirable to change speeds and increase or decrease the power of the machine.

1 is a power-wheel to which the power is applied through the cord or chain rope 30 in the usual manner in hoisting elevators, &c. 4 is a shaft to which this wheel 1 is fixed. This shaft is supported by bearings 6 6, which in turn are held by bolts to the frame 22.

5 is a worm fixed to shaft 4, which worm drives the worm-gear 31, fixed to shaft 10^2. Motion is thus communicated to the shaft 10^2 and power transmitted to the shaft 20 through the gear 8 and pinion 9 for fast speed and light weights and through the pinion 10 and gear 14 for slow speed and heavy weights. The flange 34, sleeve 36, and pinion 9 are all united in one piece—that is to say, the flange and sleeve are turned from one piece and the pinion 9 is driven or keyed onto this sleeve, and likewise the flange 34^2, with its sleeve, and the gear 14. These sleeves 36 and 36^2 act as journals for the drum and entire shifting mechanism. The flanges 34 and 34^2 have also irregular-shaped sleeves extending on the opposite side of the flange and gear and are shown in Fig. 3 by 15 and 16. In Fig. 2 this is shown held in its proper place by the bearings of the hangers 11 11.

2 is a grooved pulley, and 3 is a friction-belt thereon.

The shaft 20 is snugly fitted to the hole, which passes through the aforementioned sleeves, flanges, and gears and is free to revolve therein. The sleeve 13 incloses the internal portion of the sleeves 15 and 16, as shown in Fig. 3, and that portion of the shaft also.

O O are two pins. These pins are free to move longitudinally in the longitudinal groove 25 of the sleeve 13, and being securely fixed to the shaft 20 will move when the said shaft is moved. In Fig. 3 the dotted lines indicate the position of the shaft.

It will now be seen by referring to Fig. 3 that the sleeve 16 of the gear 14 and flanges

34^2 are in engagement with the pin O at the left side of the shaft 20. This gear 14, being in engagement with the pinion 10 of the shaft 10^2, is therefore the position which would produce the greater power and the slower speed. When I desire to increase the speed, I shift the shaft 20 to the right. By so doing the right-hand pin O will engage with the projecting part of the sleeve 15, and as the sleeve is literally but an integral connection of the pinion 9 the conditions as to power and speed are reversed, as the gear 8 drives the pinion 9, and the machine is therefore in fast speed. The shaft 20 is operated longitudinally by the shifting mechanism 12. By the mechanism and operation described it is therefore evident that by pushing the handle of the shifter 12 to the right I put the fast gear in action, and by pushing the same handle to the left, as in Fig. 2, the slow gear is put in action. When the length of the sleeves 15 and 16 within the flanges are of a length to admit of the two extreme ends of the pins O O clearing the projecting points of the said sleeves, the shaft 20 will be free to revolve without any effect on the gears, and by this means a weight can be lowered very rapidly and the life of the mechanism prolonged. By, however, extending the length of the projection on any of the sleeves, as shown at 23^2 of sleeve 15, it will be impossible to disengage the pins O O from one or other of the gears 14 or 9 through their sleeves 16 and 15, respectively.

Special constructions or constructions for special purposes may require either one or the other of the above-described specific length of sleeves.

While the drawings show my improvement as applied to an elevator only, it must not be understood that I limit myself to its use in this connection. It would find an equal field for use in the construction of cranes and all sorts of hoists where it is desirable to make provisions for a change of speed from a greater to a lower, or vice versa, and a like change of power.

I do not limit myself to the mere details of construction, as I could modify it in various ways without departing from the spirit of my invention.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a speed-changing mechanism, of a longitudinally-movable shaft provided with two pins, two sleeves with projecting ends, a longitudinally-slotted sleeve, and means for moving said shaft longitudinally in either direction, as and for the purpose specified.

2. The combination, in a speed-changing mechanism, of a longitudinally-movable shaft, a sleeve inclosing one end of said shaft and forming a journal therefor, a pinion secured to said sleeve, a sleeve inclosing the opposite end of said shaft and forming a journal therefor, a gear-wheel secured to this sleeve, means for engaging the said shaft to the one sleeve when moved in one direction, and means for engaging the said shaft to the other sleeve when moved in the opposite direction, said gear and pinion remaining stationary as to longitudinal movement independently of the longitudinal movement of the shaft.

3. The combination, in a speed-changing mechanism, of a longitudinally-movable shaft, a sleeve inclosing one end of said shaft and forming a journal therefor, a pinion secured to the outer end of this sleeve, a sleeve inclosing the opposite end of said shaft and forming a journal therefor, a gear-wheel secured to the outer end of this sleeve, a chain-supporting drum or sleeve inclosing the said sleeves, means for operatively connecting the said shaft with the said inclosing drum or sleeve, means for engaging the said shaft with the said pinion-supporting sleeve when moved in one direction, and means for engaging the said shaft with the gear-wheel-supporting sleeve when shifted in the opposite direction, substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

WILLIAM A. WRIGHT.

Witnesses:
FRANK B. STOCKLEY,
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