J. S. CLARKE.

PULLING AND LOWERING IMPLEMENT.

APPLICATION FILED FEB. 12, 1917. RENEWED JULY 3, 1919.

1,331,414.

Patented Feb. 17, 1920.

2 SHEETS—SHEET 1.

Fig. 1

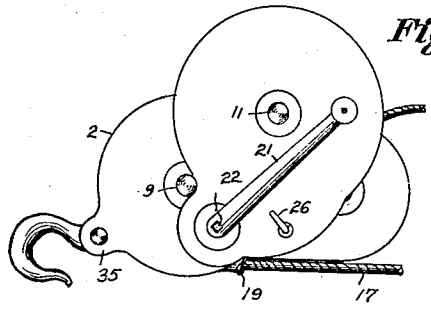


Fig. 2

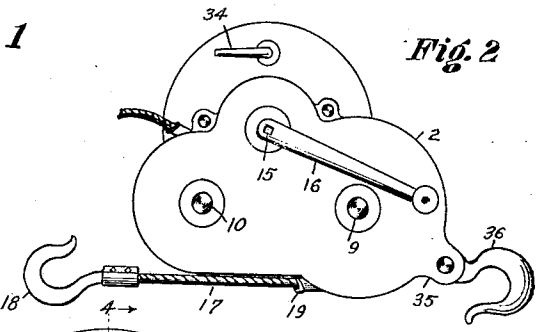


Fig. 3

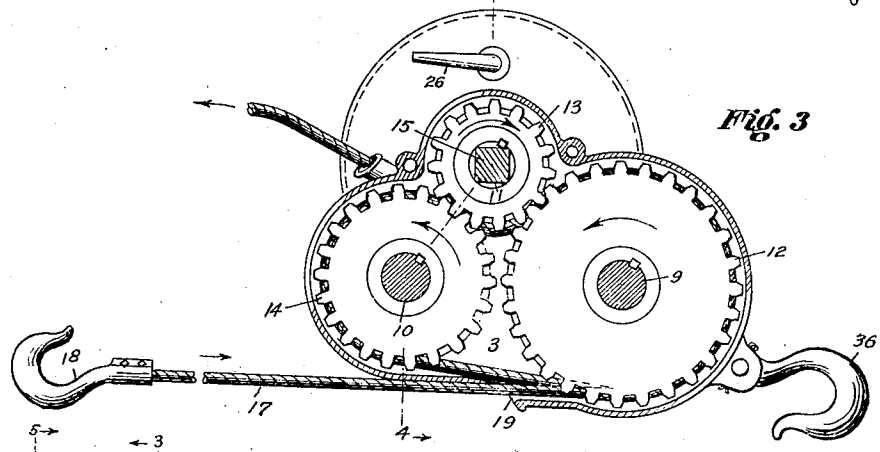


Fig. 4

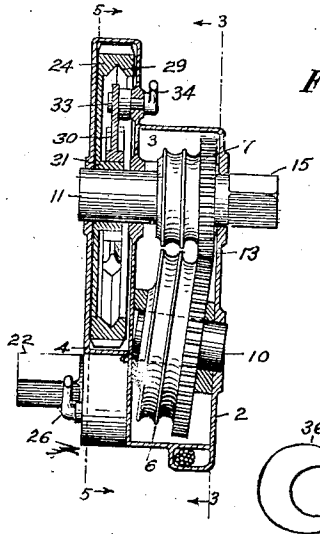
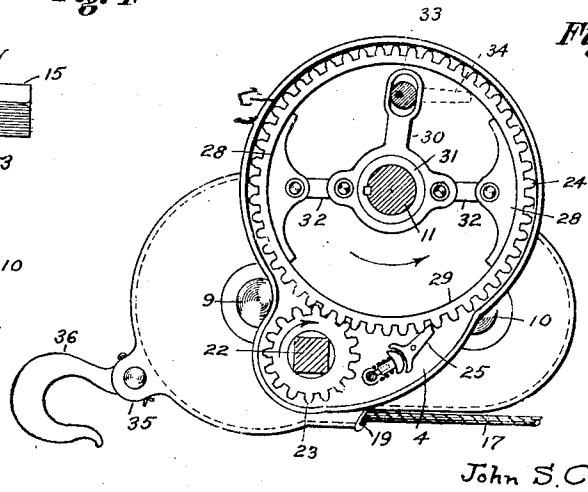


Fig. 5



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2 SHEETS—SHEET 2.

Fig. 6

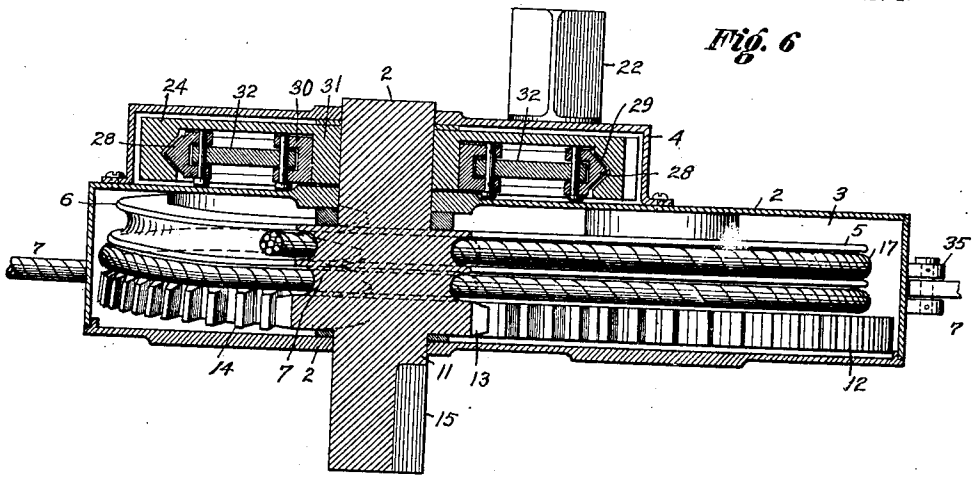
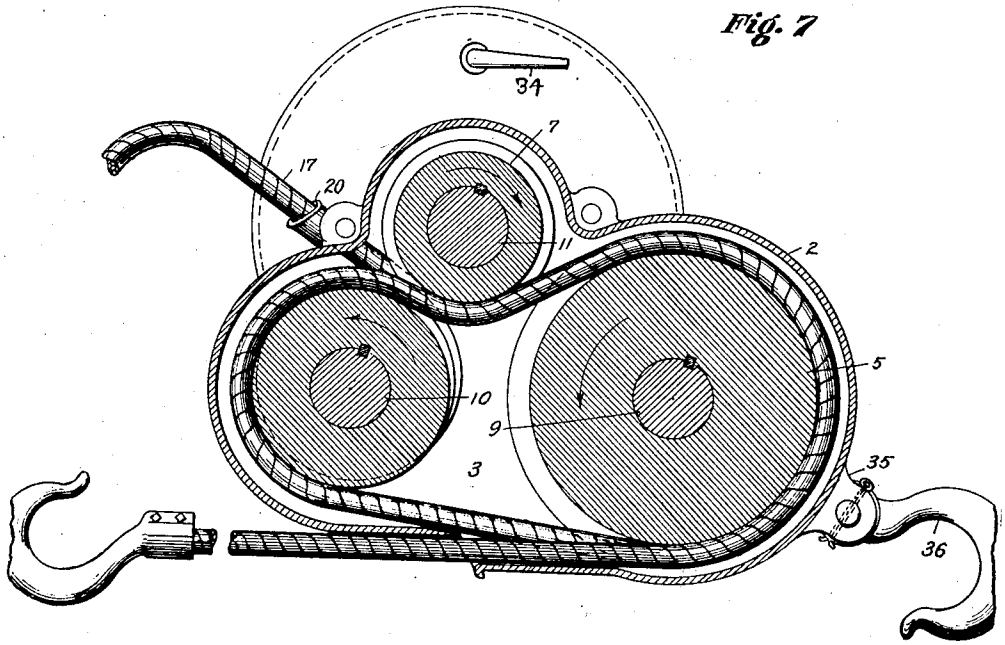


Fig. 7



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PULLING AND LOWERING IMPLEMENT.

1,331,414. Specification of Letters Patent. **Patented Feb. 17, 1920.**

Application filed February 12, 1917, Serial No. 147,986. Renewed July 3, 1919. Serial No. 308,535.

To all whom it may concern:

Be it known that I, JOHN S. CLARKE, a citizen of the United States, residing at East Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pulling and Lowering Implements, of which the following is a specification.

This invention relates to a pulling and lowering implement in which a cable is gripped between and wound around a set of sheaves geared together and operated by a hand crank, and the invention is of especial utility wherever a powerful compact portable device may be needed for pulling, lifting or lowering purposes.

In the accompanying drawings, Figures 1 and 2 are reduced views of the device looking from opposite sides thereof. Fig. 3 is a side view of the internal parts and a section of the casing on line 3—3, Fig. 4.

Fig. 4 is a transverse section on line 4—4, Fig. 3. Fig. 5 is a side view of the brake mechanism and a section of the casing on line 5—5, Fig. 4. Fig. 6 is a horizontal section and plan view on a larger scale than the foregoing figures, and Fig. 7 is a vertical section on line 7—7, Fig. 6.

The implement comprises a casing or shell 2 made of cast or stamped parts of metal with a main chamber 3 and a side compartment 4. A set of three sheaves 5, 6 and 7, of different diameters are provided with trunnions or separate shafts 9, 10 and 11, respectively, which extend transversely through the walls of the casing and are journaled therein. Each sheave is also provided with two annular collateral grooves and gear teeth at one side thereof, and the gear teeth 12 for sheave 5 mesh with the gear teeth 13 on the small sheave 7, and the gear teeth 13 mesh in turn with the gear teeth 14 on sheave 6, see Fig. 3. The shaft 11 for the small gripping sheave 7 has a square extension 15 projected outside of the casing 2, and a crank handle 16 is adapted to be removably engaged with said extension to rotate the shaft and sheave 7 and the meshed gears and their corresponding sheaves also, and by such rotation to impart forward feed and pull on a cable 17, shown in the drawings as provided with a hook 18 at one end thereof. This cable enters the casing through an opening 19 and passes partly around sheave 5 in the first groove adjacent gear teeth 12 and passes therefrom to the bottom of the first groove in sheave 7 and thence around sheave 6 to its bottom and continuing from the first groove in sheave 6 to the second groove in sheave 5 and upwardly and partly around the same and thence on a straight line to the bottom of the second groove in sheave 7 where a pinching or gripping effect is obtained on the bite line between sheave 6 and sheave 7 and from which point of grip or bite the cable 17 passes freely out of the casing through an opening 20. Axle 10 is inclined relatively to axle 11, see Fig. 3, thereby inclining sheave 6 relatively to both sheaves 5 and 7, so that the cable is received in the first groove at the top of sheave 6 on a direct line from the first groove in sheave 5 except for the bend produced by sheave 7, and is carried in its half turn downwardly about sheave 6 to a point in a straight line with the second groove at the bottom of sheave 5. The cable in passing from the second groove at the top of sheave 5 comes to the gripping point or bite of the second groove in sheaves 6 and 7 on a straight line, and the inclination given to sheave 6 separates it from sheave 7 at the first set of grooves therein to such an extent that the cable is free to pass beneath the first set of grooves without pinch or bite, whereas the surfaces at the second set of grooves in said sheaves are brought into closer relation to produce a pinch or bite on the cable. Thus in rotating sheave 7 clockwise by crank 16 a forward movement is imparted to the cable where pinched and only a reasonable amount of grip or pinch is required because of the extensive frictional contact obtained by reaving the cable around the other sheaves which are geared to sheave 7 and positively driven thereby, and the heavier the load or pull the more tightly the cable will be stretched over and around the sheaves 5 and 6 and against sheave 7. In this way the gripping effect on the cable is distributed over all the sheaves and slipping of the cable prevented and the feed of the cable is positive at all the sheaves because of their geared connection with the crank shaft 11.

A double cranking arrangement is also

preferred for a pulling instrument of this kind, so that the device may be either slowly or quickly operated. Therefore, I provide supplementary gearing which is adapted to be operated by a second crank 21, or by the same crank 16 when removed from extension 15 on one side of the casing and shifted to a square shaft 22 projecting from the opposite side of the casing, see Figs. 4 and 6. This shaft has a pinion gear 23 thereon located in compartment 4 which also contains a dished or recessed gear 24 in meshed engagement with pinion 23. Gear 24 is keyed or otherwise affixed to shaft 11 so that when rotation is imparted thereto through crank 21 on shaft 22 increased power will be transmitted at a slower speed to gear 13 and therethrough to gears 12 and 14 and their respective sheaves. Back rotation of the gears, whether operated from one side of the casing or the other, is prevented by a spring pressed pawl 25 located at the bottom of compartment 4, and said pawl may be thrown out of engagement with the teeth of gear 24 by shifting a short lever 26 which is projected out of the casing at one side of shaft 22.

When pawl 25 is thrown out the gears may be rotated reversely, and the cable 17 carried out or extended at its hook end 18 to the limit of length of the rope or cable, and the cable may be endless or any length of rope or cable may be used. The use of the device is not limited to the mere pulling of objects, but may also be used as a lowering device to deposit any given load from a suitable height to a lower elevation, and such lowering may be controlled by a friction brake comprising a pair of friction shoes 28 arranged diametrically opposite each other within the circular recess or side of the dished gear 24, see Fig. 5. A radial movement of shoes 28 and a braking action is obtained by rocking an oscillatory member 30 on its supporting hub 31, this movement being communicated to the shoes by toggle links 32, and the oscillating movement being effected by an eccentric 33 on the inner end of the short shaft of lever 34 which is journaled in the wall of casing 2 above shaft 11, see Fig. 4. Lever 34 throws the shoes either in or out of engagement with grooved wall 29 of gear 24 and permits or prevents its rotation and therethrough acts with like effect on the remaining gears and their respective sheaves.

The casing is also provided with ears 35 at one end or corner thereof to which the hook 36 or other anchoring device is affixed and which hook is substantially in a straight line with the line of pull on the end of cable 17 having hook 18.

What I claim is:

1. In a pulling instrument, a pair of sheaves each having a pair of annular grooves and a third sheave having a pair of grooves and inclined to rotate in a plane with one of its grooves closely adjacent, a groove in one of the sheaves and its other groove diagonally related to the pair of grooves in the other sheave, a cable rove upon said sheaves, and means to impart rotation jointly to all three sheaves.

2. In a pulling instrument, a casing having three sheaves journaled therein and geared to rotate together, a cable rove around a pair of said sheaves and gripped between the third sheave and one of said pair of sheaves, cranking means for said sheaves, and a pawl to stop reverse movements of said sheaves.

3. In a pulling instrument, an inclined sheave and a second sheave opposite thereto and a cable rove about said sheaves, a cable gripping sheave intermediate said pair of sheaves, gearing for all said sheaves, crank means to operate the sheaves, and a brake to control rotation of said sheaves.

4. In a pulling instrument, a pair of sheaves and a cable rove thereon and a third gripping sheave to feed said cable, and separate crank shaft extensions and gearing on opposite sides of said instrument to rotate said sheaves at different speeds.

5. In a pulling instrument, a rotatable cable-feeding member, a pair of sheaves opposite said member, a cable rove upon said sheaves and gripped between said member and one of said sheaves, gearing for said member and sheaves, crank means to operate said gearing, and a friction brake to control the rotation of said sheaves.

6. In a pulling instrument, a casing having collateral chambers, a set of sheaves in geared connection in one chamber, a cable rove upon two of said sheaves and gripped for feed movements by the third sheave, a gear and pinion in the other chamber, and cranking means to rotate the third sheave direct or through said pinion and gear.

7. In a pulling instrument, a casing and a set of sheaves journaled therein and geared to rotate together and having a projecting shaft for crank engagement, a cable rove upon two of said sheaves in feeding gripping engagement with a third sheave, a dished gear and a gear pinion having a crank shaft to rotate said third sheave, and a friction brake within said dished gear to control rotation of said sheaves and unwinding movements of said cable.

8. In a pulling instrument, two sheaves mounted to rotate on parallel axes extending transversely of said casing, a third sheave mounted to rotate on an axis extending transversely of said casing but inclined relatively to said parallel axes, a cable rove around two of said sheaves and gripped for feed movement by the third sheave, intermeshing gears for said sheaves to rotate

them jointly, and supplemental gears to rotate said sheaves at slower speed and with increased pulling power.

9. In a pulling instrument, a casing, two sheaves mounted to rotate on parallel axes, a third sheave mounted to rotate in an inclined plane on an axis inclined to said parallel axes, each sheave having a pair of annular grooves collaterally therearound, a cable rove around one of said two sheaves and said third sheave and pinched by the other of said pair of sheaves.

Signed at Cleveland, in the county of Cuyahoga, and State of Ohio, this 1st day of February, 1917.

JOHN S. CLARKE.