June 13, 1933. P. R. FRANCIS 1,913,439

HOIST

Filed Nov. 28, 1930

Fig. 1.

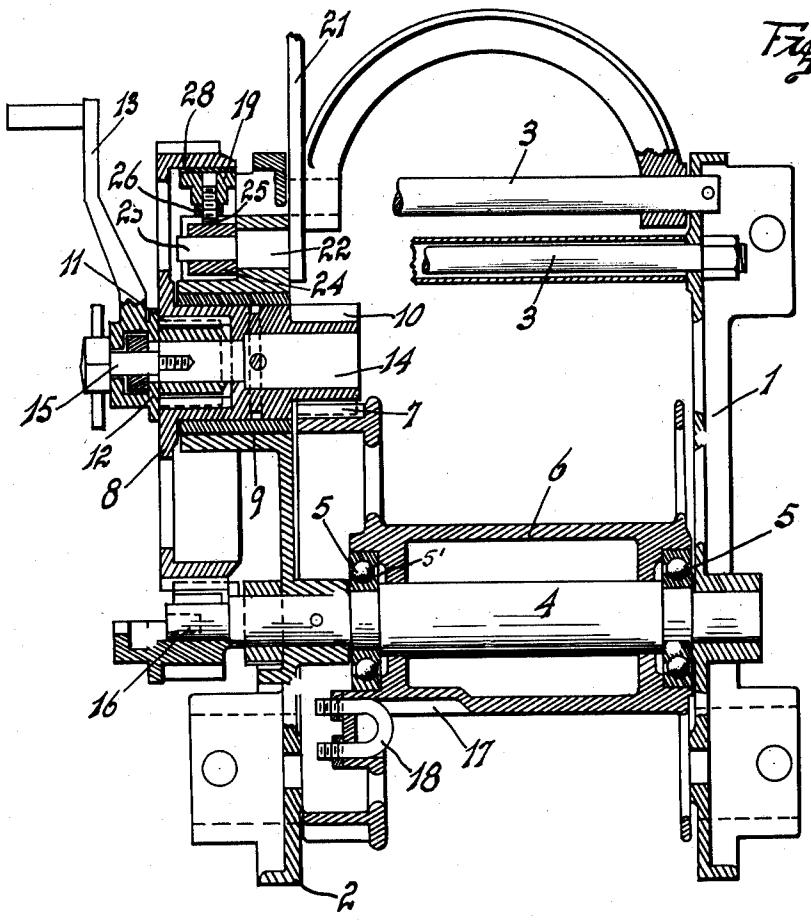
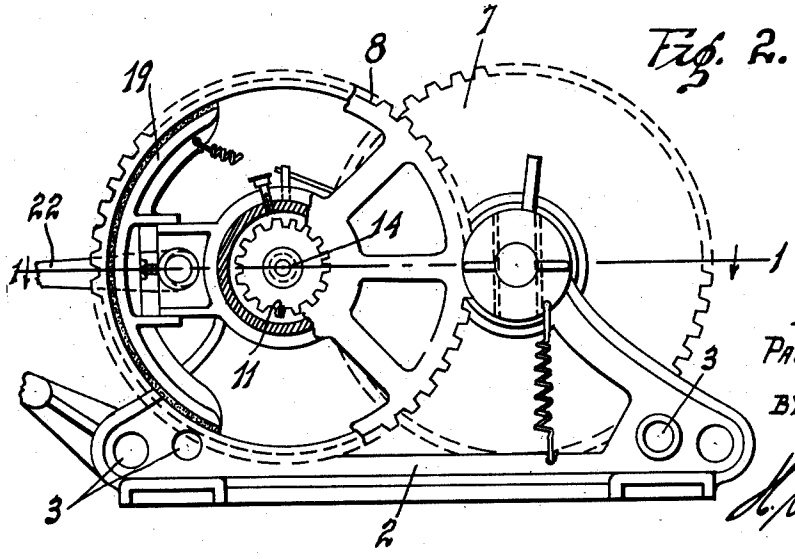


Fig. 2.



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HOIST

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This invention relates to a hand hoist in which a considerable range in both speed and lifting capacity can be obtained by quickly and easily varying the gear ratios.

An object of my invention is to provide a novel hand hoist, the frame of which is rigidly braced and in which the drum shaft acts as one of the braces.

Another object is to provide a novel means of securing the end of the cable to the drum.

Other objects, advantages, and features of invention may appear from the accompanying drawing, the subjoined detailed description, and the appended claims.

In the drawing:

Figure 1 is a longitudinal, sectional view of my hoist taken on line 1—1 of Figure 2, with other parts broken away.

Figure 2 is an end view of the same with parts broken away to show interior construction.

Referring more particularly to the drawing, the hand hoist comprises two parallel frame members 1—2. These frame members are rigidly spaced and secured together by means of a plurality of truss-rods 3. These rods are preferably adjacent the bottom of the frame members, as shown in Figure 2. A drum shaft 4 extends between the frame members 1—2 and is mounted therein. The bearings for the drum shaft are preferably of the anti-friction type, as shown at 5—5. The drum shaft 4 is adjacent the top of the frames 1—2 and acts as a brace for the top of the frame.

The shaft 4 is stationary and the drum 6 rotates thereon, the drum rotating upon the anti-friction bearings 5—5. The drum 6 is provided with a gear 7 on one end thereof, said gear being provided with external teeth. A second gear 8 is journaled on the frame 2, and preferably on a sleeve bearing 9. The gear 8 is provided with an integral pinion gear 10 which meshes with the gear 7.

A splined or toothed socket 11 is formed in the gear 8, and a handle pinion 12 fits in the splines 11. A handle 13 is secured to, or is integrally formed with the pinion 12 and said pinion is rotated by means of said handle. A stub shaft 14 is mounted in the gear 8 axially with the pinion 10, and the handle pinion 12 fits on to the outer end of this shaft. The gear is secured to the shaft in meshing engagement, as shown in Figure 1, by means of a headed bolt 15 which screws into the end of the shaft 14.

When it is desired to change the gear ratio, the handle pinion 12 is removed from the position shown in Figure 1 and is secured to the outer end of the drum shaft 4. The outer end of said shaft is reduced as at 16 so that the pinion fits thereon. The teeth on the pinion in this latter position engage the external teeth on the gear 8 thus causing said gear to rotate and in turn rotating the drum shaft 6 through the medium of the meshing gears 7—10.

The cable is secured to the drum 6 in the following manner: A groove or recess 17 is formed in the drum 6 adjacent one end thereof. A U-bolt 18 fits in the groove 17 and extends through the side wall of the drum 6. The cable is attached to the U-bolt 18 and the bolt is then secured to the drum, as shown in Figure 1. Due to the long recess or groove 17, there is no sharp kink or abrupt turn in the cable, therefore, the cable will wear longer and will lay more smoothly on the drum.

A hand brake is provided for the hoist which consists of an arcuate shoe 19 engaging the inner brake surface 28 of the gear 8. The shoe is moved into engagement with the gear by means of an eccentric on the hand lever 21. When the hand lever 21 is rotated, the eccentric will cause the arcuate brake shoe to contact the gear 8, thus holding the load which may be upon the drum 6. The lever 21 is formed with a trunnion 22 which is journaled in the frame 2. An eccentrically mounted shaft 23 projects from the trunnion 22. A strap 24 surrounds the shaft 23 and a threaded stud 25 rises therefrom. A nut 26 screws onto the stud 25 and bears against the brake shoe 19 to adjustably space said shoe from the strap 24.

The drum 6 is provided with oil chambers 5′ therein adjacent to the anti-friction bearings 5 so that oil is constantly fed to the bearings.

Having described my invention, I claim:

1. A hand hoist comprising two frame members, a plurality of brace rods secured in the frame members and extending therebetween, a stationary drum shaft, means securing the drum shaft to the frame members, a drum journaled on the stationary drum shaft, an external gear formed on the drum, a large driving gear journaled in one frame member, a pinion on said last named gear, said pinion meshing with the gear on the drum, a handle pinion, said large gear having splines therein to receive the handle pinion, a stub shaft in the large gear, said handle pinion being mounted on one end of the stub shaft, means detachably securing the handle pinion to the stub shaft, and a handle on the handle pinion.

2. A hand hoist comprising two frame members, a plurality of brace rods secured in the frame members and extending therebetween, a stationary drum shaft, means securing the drum shaft to the frame members, a drum journaled on the stationary drum shaft, an external gear formed on the drum, a large driving gear journaled in one frame member, a pinion on said last named gear, said pinion meshing with the gear on the drum, a handle pinion, said large gear having splines therein to receive the handle pinion, a stub shaft in the large gear, said handle pinion being mounted on one end of the stub shaft, means detachably securing the handle pinion to the stub shaft, and a handle on the handle pinion, one end of said drum shaft being reduced and adapted to receive said handle pinion whereby the handle pinion meshes with the large gear to increase the gear ratio of the hoist.

3. A hand hoist comprising two frame members, a plurality of brace rods secured in the frame members and extending therebetween, a stationary drum shaft, means securing the drum shaft to the frame members, a drum journaled on the stationary drum shaft, an external gear formed on the drum, a large driving gear journaled in one frame member, a pinion on said last named gear, said pinion meshing with the gear on the drum, a handle pinion, said large gear having splines therein to receive the handle pinion, a stub shaft in the large gear, said handle pinion being mounted on the end of the stub shaft, means detachably securing the handle pinion to the stub shaft, a handle on the handle pinion, and means adjustably securing said handle to the handle pinion, one end of said drum shaft being reduced and adapted to receive said handle pinion whereby the handle pinion meshes with the large gear to increase the gear ratio of the hoist.

4. A hand hoist comprising two frame members, a plurality of brace rods secured in the frame members and extending therebetween, a stationary drum shaft, means securing the drum shaft to the frame members, a drum mounted on the stationary drum shaft, anti-friction bearings between the shaft and the drum, said drum having oil recesses therein adjacent the anti-friction bearings, an external gear formed on the drum, a large driving gear journaled in one frame member, a pinion on said last named gear, said pinion meshing with the gear on the drum, a handle pinion, said large gear having splines therein to receive the handle pinion, a stub shaft in the large gear, said handle pinion being mounted on one end of the stub shaft, means detachably securing the handle pinion to the stub shaft, and a handle on the handle pinion.

5. A hand hoist comprising two frame members, a plurality of brace rods secured in the frame members and extending therebetween, a stationary drum shaft, means securing the drum shaft to the frame members, a drum journaled on the stationary drum shaft, an external gear formed on the drum, a large driving gear journaled in one frame member, a pinion on said last named gear, said pinion meshing with the gear on the drum, a handle pinion, said large gear having splines therein to receive the handle pinion, a stub shaft in the large gear, said handle pinion being mounted on one end of the stub shaft, means detachably securing the handle pinion to the stub shaft, and a handle on the handle pinion, an arcuate brake shoe positioned in said large gear, said large gear having an internal brake surface formed therein, a hand lever, an eccentric on the hand lever, and means connecting the eccentric and the arcuate brake shoe whereby the brake shoe is moved into engagement with the brake surfaces of the large gear.

In testimony whereof, I affix my signature.

PAUL R. FRANCIS.