Dec. 8, 1925. 1,564,781

C. C. HANSEN

DOUBLE DRUM HOIST

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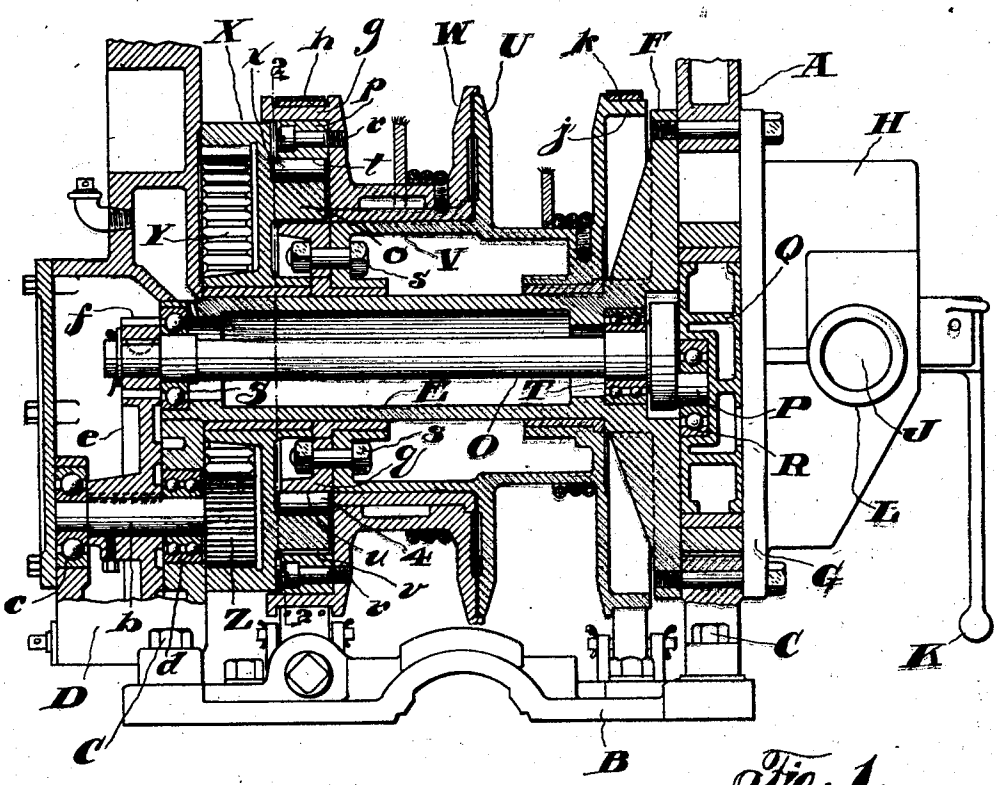


Fig. 1.

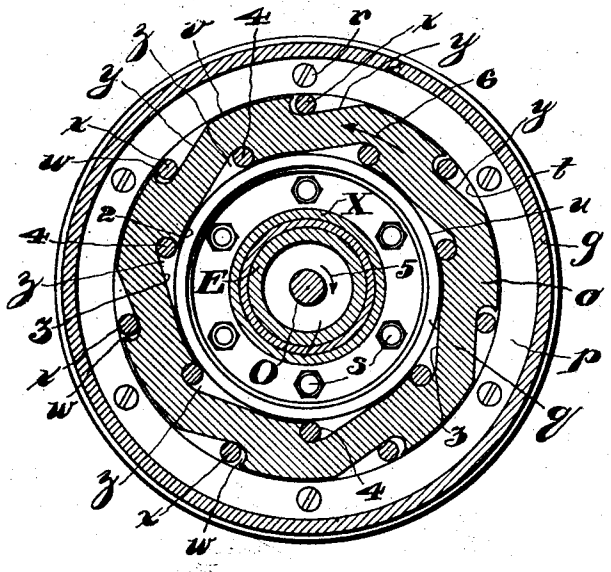


Fig. 2.

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DOUBLE-DRUM HOIST.

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To all whom it may concern:

Be it known that I, CHARLES C. HANSEN, a citizen of the United States, and a resident of Easton, in the county of Northampton and State of Pennsylvania, have invented a certain Double-Drum Hoist, of which the following is a specification, accompanied by drawings.

This invention relates to hoists, but more particularly to a double drum hoist having a single motor which may be a fluid actuated motor of the reversible type.

One object of the invention is to automatically connect one or the other of the drums with a single source of power to be rotated in accordance with the direction of rotation of the power element.

Another object is to construct a compact and rugged hoist capable of withstanding severe usage and to insure ease and certainty of operation.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention consists of the combinations of elements, features of construction, and arrangement of parts having the general mode of operation substantially as hereinafter described and more particularly pointed out in the appended claims and illustrated in the accompanying drawings.

Figure 1 is a longitudinal view in elevation partly in section of a hoist constructed in accordance with the practice of the invention, and

Figure 2 is a transverse view through Figure 1 on the line 2—2 illustrating the manner in which the drums are connected to be driven by the main driver.

Referring to the drawings, a motor A is mounted on one end of the base plate B and secured thereto by suitable bolts C. At the other end of the base plate B is a gear casing D which supports one end of a hollow center bearing E. The center bearing E extending longitudinally of the hoist is preferably formed integral with a plate F serving as a cover plate for one side of the motor A. A plate G serves as a cover for the opposite side of the motor and carries a valve chest H in which is located a suitable throttle valve J. A throttle lever K connected with the throttle valve J in any suitable and well known manner controls the movement of said valve. In this instance, the motor A is of the flat piston type frequently termed the Dake motor and reversal of said motor is controlled by the throttle valve.

Although a fluid actuated motor is indicated, it is to be understood that any other suitable motor of compact construction may be employed. Motive fluid for actuating said motor may be admitted into the valve chest through a suitable connection as indicated at L.

A main driving shaft O extends through the center bearing E and has a crank pin P at one end whereby said shaft is connected with a piston Q of the motor A. An anti-friction bearing R is in this instance inserted in the piston Q to receive the crank pin P. Additional anti-friction bearings S and T are arranged about opposite ends of the driving shaft O and are supported by the center bearing E.

Disposed rotatably on the center bearing E is a haulage drum U having an extension V which in this instance serves as a bearing for a tail rope drum W arranged rotatably beside the drum U. A main driver X is mounted loosely on the center bearing E for driving one or the other of the drums in accordance with the direction of rotation of the driving shaft O. An internal gear Y in this instance forms a part of the main driver X and is in constant mesh with an intermediate pinion Z mounted on a shaft *b* supported within the gear box D. The shaft *b* is preferably provided with anti-friction bearings *c* and *d* arranged in the gear box D and carries an intermediate gear *e* which meshes with a driving pinion *f* keyed or otherwise secured to one end of the driving shaft O.

Any suitable braking means may be provided for selectively holding the drums against rotation. In this instance a flange *g* is carried by the drum W to receive a brake in the form of a band *h* which encircles said flange and which may be provided with suitable mechanism (not shown) for manipulating said brake. Similarly a flange *j* is provided for the drum U to receive a band *k* constructed and manipulated as described in connection with the band *h*.

In accordance with the practice of the invention, a flange *o* preferably formed integrally with the internal gear Y is arranged rotatably between a drum driver *p* carried by the tail rope drum W and a drum driver

q carried by the haulage drum U. The drum drivers p and q may be formed integrally with the drums to which they are attached or may be formed separately as indicated in the drawings and secured to the respective drums in any suitable and convenient manner. In this instance, the driver p is held in position by screws r and and the driver q is secured to the drum Y by bolts s. The inner peripheral surface t and the outer peripheral surface u of the drum drivers p and q respectively are preferably formed smoothly, although if desired, slight indentations of suitable shape may be formed on these surfaces for the purpose more fully described hereinafter.

The drum drivers p and q are arranged concentrically with respect to each other and are rotatable through the same transverse plane. Since the flange o of the main driver X extends between the drum drivers, said flange also rotates through the same plane as the drum drivers.

Formed in the outer peripheral surface v of the flange o are a plurality of pockets w to receive rotatable rollers x. The pockets w preferably extend across the entire face v of the flange o and have a tapered portion y terminating at one end in the face v. In like manner, a plurality of pockets z are formed across the inner peripheral surface 2 of the flange o and like the pockets w also have a tapered portion 3 inclining from the pocket z to the surface 2. Rollers 4 are arranged rotatably in the pockets z. The rollers x and 4 are of such diameter that when the rollers are in releasing position, a slight clearance exists between the rollers and the adjacent drum driver.

In operation of the device, assuming that the driving shaft O is being rotated in the direction indicated by the arrow 5, power will be transmitted through the train of gearing described and will rotate the main driver X in the direction indicated by the arrow 6. Rotation of the main driver in this direction causes the rollers x to rotate or otherwise move along the tapered portion of the pockets and become wedged between said tapered portion and the inner peripheral surface t of the drum driver p. In this way, the drum driver becomes firmly and positively connected with the main driver. Upon reversal of the direction of rotation of the driving shaft O, and consequently the main driver X, the rollers x will return along the tapered portion y of the pockets w into said pockets and release the drum driver p. Simultaneously the rollers 4 in the pockets z in the inner portion of the flange o will roll along the tapered portion and become wedged between said tapered portion and the surface u of the drum driver q thus rotating the drum U with the main driver X.

By this construction a positive and simple connection may be formed between the driving element and the drums, and since the rollers are arranged rotatably in the flange o the contacting surface of the rollers may constantly change so that the wear will be distributed over a large area as compared with devices constructed for similar purposes having a single point of contact or wearing surface.

I claim:

1. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, drum drivers carried by the drums, a main driver connected to be rotated by the driving shaft, and means rotatable in the main driver for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

2. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, drum drivers secured to the drums, said drum drivers being arranged concentrically with respect to each other and rotatable through the same transverse plane, and automatic means carried by the main driver and rotatable with respect thereto for frictionally engaging one or the other of the drum drivers in accordance with the direction of rotation of the main driver.

3. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, concentrically arranged drum drivers secured to the drums and having smooth peripheral surfaces, said drum drivers being rotatable through the same transverse plane, and means carried by the main driver and rotatable with respect thereto for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

4. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, cylindrical drum drivers secured to the drums and having smooth peripheral surfaces, said drum drivers being concentrically arranged with respect to each other and rotatable through the same transverse plane, and rollers carried by the drum driver and rotatable therein for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

5. In a hoist, the combination of a frame,

a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, a main driver comprising an internal gear and a flange, said main driver being connected to be rotated by the driving shaft, concentrically arranged cylindrical drum drivers secured to the drums and having smooth peripheral surfaces, said drum drivers and the flange being rotatable through the same transverse plane, and rollers carried by the flange and rotatable therein for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

6. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, concentrically arranged cylindrical drum drivers secured to the drums to rotate in the same transverse plane and having smooth peripheral surfaces, a main driver connected to be rotated by the driving shaft comprising an internal gear and a flange, said flange extending between the drum drivers, and rollers carried by the flange and rotatable therein for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

7. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, concentrically arranged cylindrical drum drivers secured to the drums to rotate in the same transverse plane and having smooth peripheral surfaces, a main driver connected to be rotated by the driving shaft comprising an internal gear and a flange, said flange extending between the drum drivers, opposed pockets in the flange and rollers rotatable in the pockets for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

8. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, concentrically arranged cylindrical drum drivers secured to the drums to rotate in the same transverse plane and having smooth peripheral surfaces, a main driver connected to be rotated by the driving shaft comprising an internal gear and a flange, said flange extending between the drum drivers, opposed tapered pockets in the flange and rollers rotatable in the pockets for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

9. In a hoist, the combination of a frame, a driving shaft supported by the frame, a reversible motor for rotating the driving shaft, a pair of drums rotatable about the driving shaft, concentrically arranged cylindrical drum drivers secured to the drums to rotate in the same transverse plane and having smooth peripheral surfaces, a main driver connected to be rotated by the driving shaft comprising an internal gear and a flange, said flange extending between the drum drivers, opposed tapered pockets in the inner and outer peripheral surfaces of the flange and rollers rotatable in the pockets for frictionally engaging one or the other of said drum drivers in accordance with the direction of rotation of the main driver.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.