H. F. WILLETT.

CHAIN HOIST.

APPLICATION FILED MAR. 9, 1920.

1,385,600.

Patented July 26, 1921

2 SHEETS—SHEET 1.

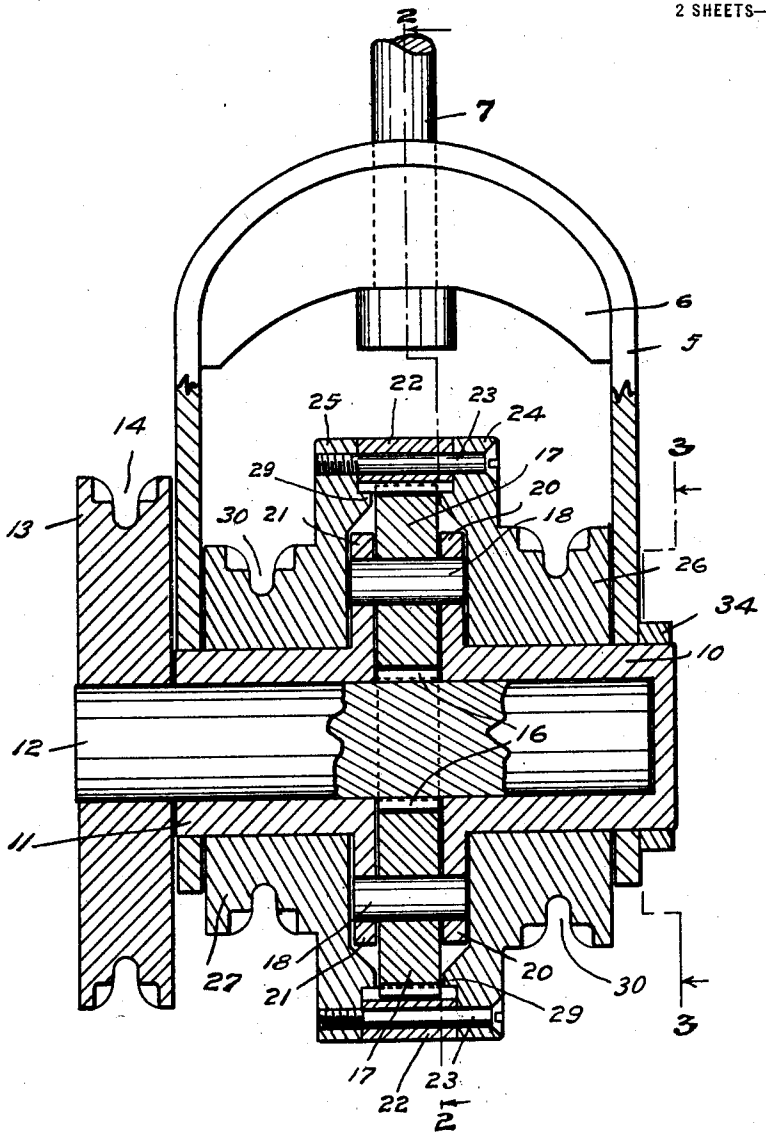


Fig. 1

Inventor

Hazen F. Willett

By his Attorney

Fred C Matheny

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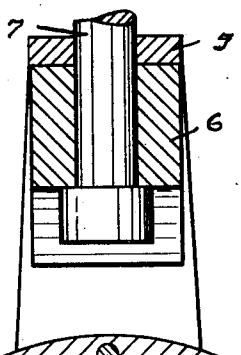
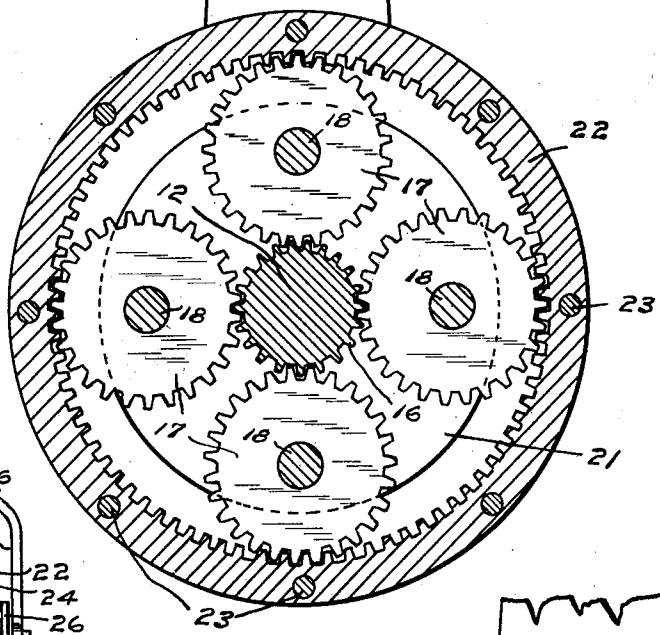


Fig. 2



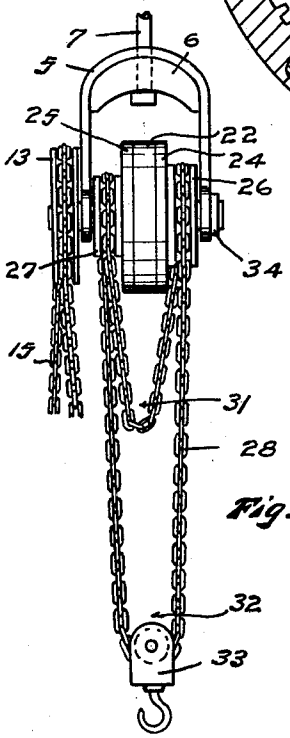


Fig. 4

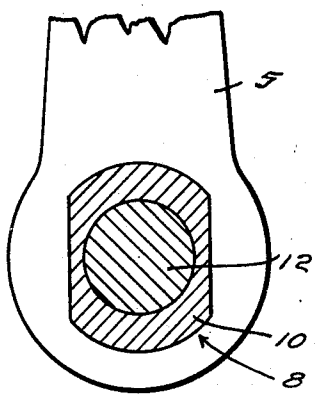


Fig. 3

Inventor

Hazen F Willett

By His Attorney

Fred C Matheny

UNITED STATES PATENT OFFICE.

HAZEN F. WILLETT, OF SEATTLE, WASHINGTON, ASSIGNOR OF ONE-HALF TO JOHN R. FORMAN, OF SEATTLE, WASHINGTON.

CHAIN-HOIST.

1,385,600. Specification of Letters Patent. Patented July 26, 1921.

Application filed March 9, 1920. Serial No. 364,441.

To all whom it may concern:

Be it known that I, HAZEN F. WILLETT, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Chain-Hoists, of which the following is a specification.

This invention relates to improvements in chain hoists of the type that are adapted for raising and lowering heavy loads and the object of this improvement is to provide a chain hoist of simple and efficient construction that is capable of developing a great amount of power and of sustaining a heavy load in proportion to its weight and size.

A further object is to provide simple gear mechanism of novel and efficient form for increasing or multiplying the power and transmitting such power to the drums over which the main lifting chain is wound.

Other and more specific objects will be apparent from the following description taken in connection with the appended claims.

In the accompanying drawings, Figure 1 is a view in vertical mid-section of a chain hoist constructed in accordance with my invention; Fig. 2 is a view of the same partly in elevation and partly in cross section substantially on a broken line 2, 2 of Fig. 1; Fig. 3 is a fragmentary view in sectional elevation substantially on a broken line 3, 3 of Fig. 1; and Fig. 4 is a view in elevation on a reduced scale of the chain hoist showing the operating chains connected therewith.

Like reference numerals designate like parts throughout the several views.

Referring to the drawings the numeral 5 designates a support or bracket of inverted U shape, that is, internally provided at its upper end with a reinforcing block 6 through which passes a bolt or rod 7 by which the chain hoist may be suspended.

The lower ends of the bracket 5 are provided with elongated holes 8, see Fig. 3, for the reception of the correspondingly shaped ends of sleeves 10 and 11, the bracket serving to support the sleeves 10 and 11 and to prevent them from turning.

Extending lengthwise through and journaled within the sleeves 10 and 11 is a shaft 12 that is provided on one end with a fixedly mounted wheel 13 having peripheral recesses 14 of well known shape for the reception of an actuating chain 15, see Fig. 4.

The shaft 12 is provided, at about the medial plane of the hoist, with an integrally formed gear pinion 16 that is arranged to mesh with a plurality of larger gear pinions 17 that are journaled on bearing pins 18 that extend crosswise between two spaced apart annular flanges 20 and 21 that are integral with and extend outwardly from the sleeves 10 and 11 respectively. The outer peripheral portions of the pinions 17 mesh with an internally toothed ring gear 22 that is rigidly secured by bolts 23 to annular flanges 24 and 25 that project from the inner edges of pulleys 26 and 27 that are journaled on the sleeves 10 and 11. The flanges 24 and 25 are preferably shouldered as at 29 to form a better support for the ring gear.

The pulley 26 is slightly larger than the pulley 27 or vice-versa so that when a chain 28 is passed in one direction around one of said pulleys and in an opposite direction around the other of said pulleys and both pulleys are rotated the chain will wind upon or unwind from the larger pulley 26 faster than it unwinds from or winds upon the smaller pulley 27, thereby winding in or letting out the chain very slowly with a consequent increase in power that is proportional to the reduction in speed.

The pulleys 26 and 27 are provided with peripheral recesses 30 of the usual form for the reception of the chain 28.

The chain 28 is preferably endless as shown in Fig. 4 and when in use is wound around the pulleys 26 and 27 as shown and hangs in two loops 31 and 32 one of which loops passes through a pulley block 33 that may be connected with a load that is to be lifted and the other of which loops hangs idle and is taken up or let out as the block 33 is lowered or raised.

The bolts 23 secure the ring gear 22 and the two pulleys 26 and 27 rigidly together so that when the ring gear is driven the pulleys move simultaneously therewith.

When the shaft 12 is turned by exerting a pull on the chain 15 the gear teeth 16 meshing with the pinions 17 will rotate such pinions and cause them to drive the ring gear 22 and the pulleys 26 and 27. The pivots 18 of the ring gears are supported in fixed re-

lation with respect to the bracket 5 by reason of the elongated or irregularly shaped holes in the ends of the bracket that fit over the similarly shaped ends of the sleeves 10 and 11.

The end of the sleeve 10 is preferably closed as shown in Fig. 1 and such end is long enough to project through the bracket 5 and is provided with a collar 34 to prevent displacement of the bracket.

This chain hoist is neat and compact in construction, is not expensive to manufacture, and is much lighter in proportion to its load handling capacity than the ordinary device of this nature. The gear mechanism by which the power is transmitted and increased is all compactly housed within the hoist thereby protecting it from dust and dirt and making it possible to have such gear run in lubricant.

From the foregoing description taken in connection with the accompanying drawings the advantages of the construction and of the method of operation of this chain hoist will be readily apparent to those skilled in the art to which the invention pertains, and while I have described the principle of operation of the invention together with the device which I now consider to be the best embodiment thereof, I desire to have it understood that the device shown is merely illustrative and that such changes may be made as are within the scope of the following claims.

What I claim is:

1. A chain hoist comprising a shaft, means for turning said shaft, a gear wheel rigid with said shaft, two sleeves disposed on said shaft on opposite sides of said gear wheel, means supporting said sleeves against rotation, a plurality of pinions journaled on said sleeves and meshing with said gear wheel on said shaft, a ring gear meshing with all of said pinions, and a chain receiving pulley rigidly secured to each side of said ring gear, one of said chain receiving pulleys being larger than the other.

2. A chain hoist comprising a shaft, a gear rigid with said shaft, a sleeve mounted on each end of said shaft, a bracket supporting both of said sleeves to prevent the same from turning, an annular flange on the inner end of each of said sleeves, bearing pins extending crosswise between said flanges, pinions journaled on said bearing pins and arranged to mesh with said gear on said shaft, a chain receiving pulley journaled on each of said sleeves, said chain receiving pulleys being of different size, and an internally toothed gear rigid with both of said chain receiving pulleys and meshing with all of said pinions.

3. A chain hoist comprising a shaft, a gear rigid with said shaft, a sleeve mounted on each end of said shaft, a bracket supporting said sleeves to prevent the same from turning, an annular flange on the inner end of each of said sleeves, bearing pins extending crosswise between said flanges, pinions journaled on said bearing pins and arranged to mesh with said gear on said shaft, a chain receiving pulley journaled on each of said sleeves said chain receiving pulleys being of different size, flanges on the inner ends of said chain receiving pulleys, and an internally toothed gear secured between said flanges and meshing with all of said pinions.

4. A chain hoist comprising a shaft, an integral gear on said shaft, a sleeve journaled on said shaft on each side of said gear, a chain receiving pulley on one end of said shaft, an annular flange on the inner end of each of said sleeves and arranged on opposite sides of the gear on said shaft, pinions disposed between said flanges and meshing with said gear on said shaft, bearing pins for said pinions, said bearing pins extending crosswise between said two flanges; a U shaped bracket engaging the outer ends of said sleeves to support said chain hoist and prevent said sleeves from turning, a chain receiving pulley journaled on each of said sleeves; one of said chain receiving pulleys being larger than the other; an annular flange on the inner edge of each of said chain receiving pulleys, and an internally toothed gear secured between said flanges on said chain receiving pulleys and meshing with all of said pinions.

Signed at Seattle, Washington, this 28th day of February, 1920.

HAZEN F. WILLETT.