

No. 892,907.

PATENTED JULY 7, 1908.

F. P. SNOW.

HOIST.

APPLICATION FILED APR. 4, 1907.

Fig. 1.

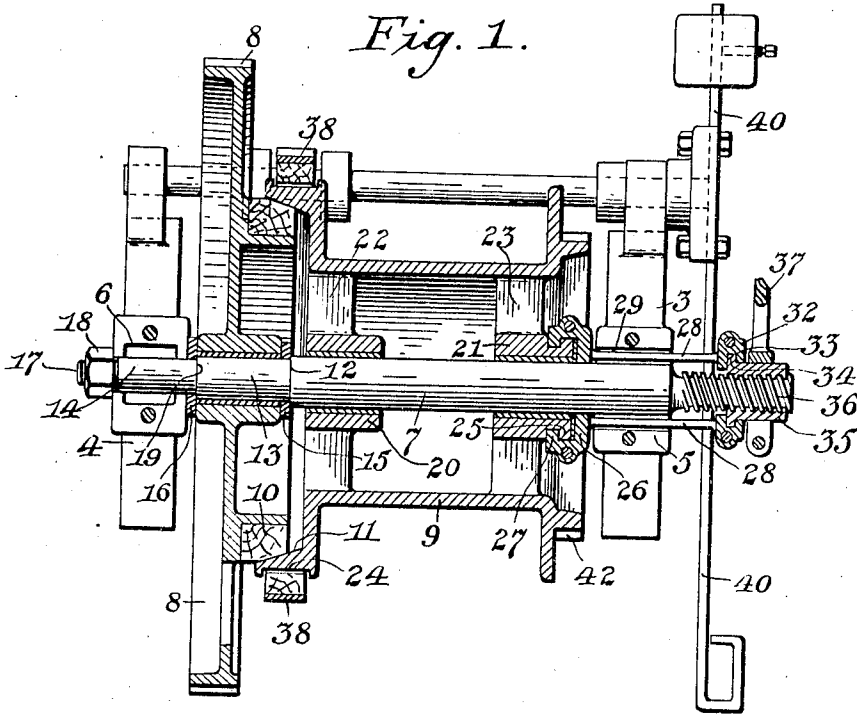


Fig. 2.

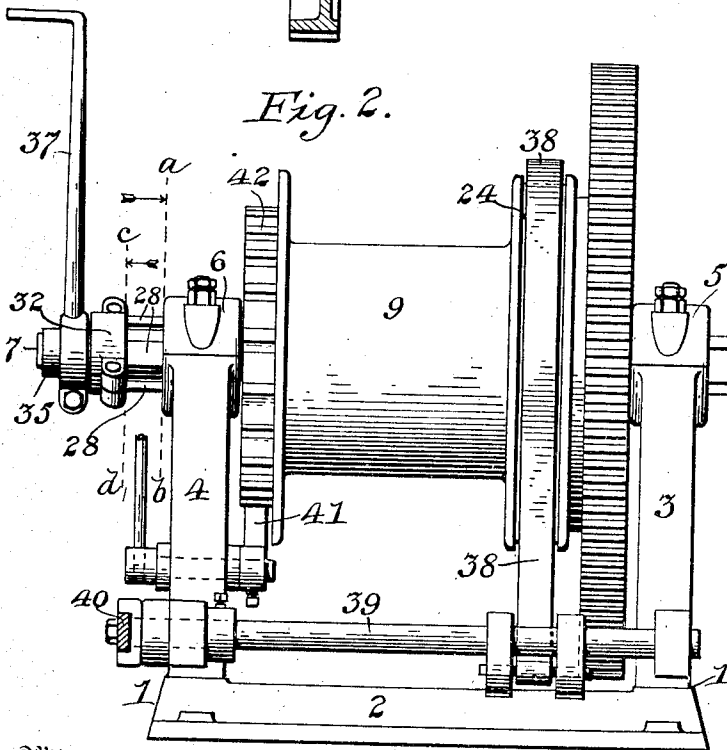


Fig. 3.

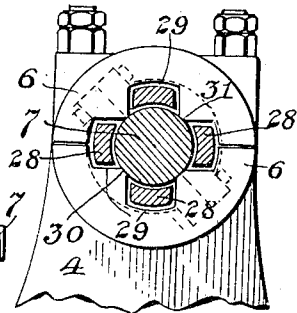
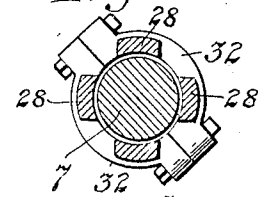


Fig. 4.



Inventor

Witnesses

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UNITED STATES PATENT OFFICE.

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HOIST.

No. 892,907.

Specification of Letters Patent.

Patented July 7, 1908.

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To all whom it may concern:

Be it known that I, FRANK P. SNOW, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Hoist, of which the following is a specification.

This invention relates to improvements in hoisting apparatus and particularly to that class of mechanism in which a revolving drum is employed in connection with actuating gearing driven by a suitable engine, a clutch mechanism being interposed between the said gearing and the drum for connecting and disconnecting them at will.

It is the object of the present invention to so construct the device that the wear upon the parts when in operation may be minimized and when the load is stationary, is practically eliminated.

With this and other objects in view, the invention consists in certain novel constructions, arrangements and combinations of parts as will be hereinafter fully described and claimed.

In the accompanying drawing, Figure 1 is a horizontal cross sectional view through the hoist mechanism taken centrally through the drum in alinement with its axis. Fig. 2 is a side elevation of the hoisting mechanism, looking at the same from the side on which the band brake is operated. Fig. 3 is a detail sectional view taken upon the line *a-b* and looking in the direction indicated by the arrow on Fig. 2, and, Fig. 4 is a detail view taken upon the lines *c-d* on Fig. 2 and looking in the direction indicated by the arrow.

I have shown in the accompanying drawing the manner in which I preferably construct my improved hoist mechanism in carrying out the spirit of this invention and I will now proceed with the description of such invention, reference being had to said drawing.

The main frame 1 is so formed that it is thoroughly braced and comprises the base 2 with standards 3 and 4 rising therefrom near its ends and provided with supporting boxes 5 and 6 at the top for receiving and rigidly supporting a shaft 7. The shaft 7 is tightly clamped in the boxes 5 and 6, so that it cannot rotate and the said shaft thus becomes a tie and bracing means for the upper ends of the said standards 3 and 4. Loosely

mounted upon the shaft 7, is the drive gear 8 and adjacent to it a winding drum 9, which is also loosely mounted on the shaft 7. The inner face of the gear 8 is provided with the cone member 10 of the clutch mechanism, the corresponding cup or socket member 11 being formed upon the adjacent end of the drum 9, as clearly shown in Fig. 1.

As it is important that the shaft 7 be rigidly secured in place, so that the drum with its load is not producing friction thereon when the load is not being lifted or lowered, so also it is important that the gear 8 which rotates loosely upon the shaft 7, shall be prevented from having a longitudinal movement upon the said shaft 7, and this not only because it must be kept in alinement with the gearing of the engine which drives it (not shown in the drawing) but also to make it possible to connect and disconnect the clutch members with a positive and effective movement. For this purpose the shaft 7 is formed with a shoulder as at 12, between which and the adjacent standard 4 the said gear 8 revolves. The shaft 7 is reduced at 13 to form the said shoulder 12 and is again reduced in size at 14, where it engages the supporting box 6. Suitable anti-friction washers 15 and 16 are interposed between the shoulder 12 and the gear 8 and between the box 6 and the said gear. The outer end of the shaft 7 which engages the standard 4 is screw threaded at 17 and provided with a nut 18 by which the shoulders 12 and 19 formed by the reduced portions of the shaft described, may be drawn against the washers 15 and 16, thus limiting the position of the gear 8 to its proper place on the reduced portion 13 of the shaft. It will be noted that the shoulder 12 prevents the gear 8 from going with the drum 9 when it is moved away therefrom to separate the clutch members.

The drum 9 is made in the ordinary form and is provided with two centrally arranged hubs 20 and 21 carried by inwardly extending spiders 22 and 23. One of the flanges of the drum 9 is widened at the periphery to form the usual band brake engaging portion 24. The hub 21 is formed at its outer end with an annular flange 25, which projects beyond the spider 23. In order to positively move the drum 9, the required amount, for bringing together and separating the members of the clutch, a thrust member 26 is employed, the inner end of said thrust member

being formed with an annular flange 27 which engages the flange 25 of the drum hub. The thrust member is so formed that it extends through the box 5 without interfering with the support of the shaft 7 in said box. This is important as it makes it possible to operate the thrust member from a point outside the standard 3, for controlling the drum. In carrying out this feature of the invention, the central portion of the thrust member is made in the form of a plurality of thrust bars, as at 28, which extend through recesses 29 formed in the inner faces of the box 5. The bars 28 are free to move longitudinally in the recesses 29, while the spaces between the bars permit portions of the box 5, as at 30 and 31, to extend inwardly sufficiently to engage and grip the shaft 7, as clearly shown in Fig. 3 of the drawing. The outer end of the thrust member is provided with a head portion 32, having an annular recess 33 which engages the flange 34 of a collar 35, mounted on the end of the shaft 7. In order to facilitate the placing of the thrust member in position, in assembling the parts of the machine, the thrust member is made in two sections as clearly shown in Fig. 4 of the drawing, the ends or heads of said sections, being clamped together by suitable bolts.

The collar or sleeve 35 is internally threaded so as to engage external screw threads 36 formed upon the reduced end of the shaft 7. An operating handle 37 is clamped in position upon the sleeve 35, so that by operating the handle the said sleeve, may be moved upon the threads 36, for actuating the thrust member and thus positively moving it in either direction. The threads 36 are given such a pitch as to make them a quick acting screw and a small amount of rotation of the sleeve 35 will impart sufficient movement to the thrust member to so move the drum 9, as to separate the members of the clutch.

The usual band brake 38 is employed and surrounds the flange 24 of the drum 9. The band is connected in any usual manner with a rock shaft 39 to which is attached a weighted foot lever 40. The band brake 38 is sufficiently loosely mounted to not interfere with the slight longitudinal movement necessary in the drum 9 for the operation of the clutch.

In using the hoist the master gear 8 is kept in motion, it being driven as above stated by any suitable engine not shown. When it is desired to wind a cable upon the drum 9, as in hoisting a load, the said drum is forced longitudinally upon the shaft 7 against the friction cone 10, through the agency of the thrust member 26 and the screw threaded sleeve 35, the movement of the operating lever 37 in one direction producing this action. When the said lever is moved in the opposite direction the drum is

withdrawn from the friction cone and the drum is no longer rotated with the gear 8. At such time the drum is controlled by the band brake 38 or, if it is desired to suspend the load an indefinite length of time, a pawl 41 mounted upon the standard 4 is thrown into engagement with the teeth of an annular ratchet 42 formed upon one of the flanges of the drum 9. It will be observed that when the drum is not driven for hoisting a load, or permitted to slip as when lowering the load, that there is no friction between the drum and the shaft, for both are held stationary. The only moving part at such a time is the gear 8 which runs freely upon said shaft. The wear upon the shaft is thus reduced to a minimum. The drum is readily and quickly controlled by the movement of the lever 37 and its movement is positive in either direction for causing the engagement or disengagement of the clutch members.

Although I have shown the limiting means for the gear 8 as an integral part of the shaft 7, it will be evident that the said limiting means of shoulder 12 may be separate from the shaft and secured or fastened thereon as in the case of a collar, band or the like, all within the spirit of the present invention.

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

1. A hoist mechanism comprising a frame having an abutment bearing and a gripping bearing, provided with shaft gripping projections, a shaft mounted in said bearings, a gear, and a drum loosely mounted on said shaft and means for reciprocating said drum on the shaft, extending between the gripping projections of the gripping bearing to a point outside the frame.

2. A hoisting mechanism comprising a frame having a non-revoluble shaft, an abutment bearing receiving one end of the shaft and capable of holding it with respect to endwise thrusts, a gripping bearing engaging the other end of the shaft and having gripping projections capable of preventing the rotation of the shaft, a gear and a drum loosely mounted on the shaft and means for reciprocating the drum, said means extending along the shaft and between the said gripping projections to a point outside the frame.

3. A hoisting mechanism comprising a frame and a fixed shaft, an abutment bearing on the frame receiving one end of the shaft, means for tightening the shaft in its position in said bearing, a gripping bearing also receiving the shaft and having gripping projections capable of preventing the rotation of the shaft, a gear loosely mounted on the shaft, a drum also loosely mounted on the shaft, a thrust member for moving the drum on the shaft with respect to the gear, the said thrust member extending between

the gripping projections of the bearing to a point outside the frame and means for operating said thrust member.

4. A hoisting mechanism comprising a frame, a fixed shaft mounted therein, a loose gear, a loose drum both mounted on said shaft, a thrust member for reciprocating the drum on the shaft, means for moving the thrust member and bearings upon the frame for supporting the said fixed shaft, one of said bearings being provided with inwardly extending gripping projections capable of surrounding the said thrust member and reaching inwardly to the shaft for supporting it and preventing its rotation.

5. A hoist mechanism comprising a frame, a non-revoluble shaft in said frame, a gear and a drum loosely mounted on said shaft, a thrust member for reciprocating the drum, having a plurality of bars extending outside the frame and bearings on the frame for supporting the shaft, one of said bearings having gripping projections extending between the bars of said thrust member for gripping and supporting the shaft without interfering with the movement of the said thrust member.

6. A hoisting mechanism comprising a frame, having an abutment bearing and a gripping bearing, a shaft mounted therein and formed with a shoulder or abutment for engaging the said abutment bearing, means for drawing the said shoulder or abutment against said bearing, gripping projections extending inwardly upon the interior of the said gripping bearing for supporting the shaft and yet forming passages along the shaft inside the bearing, a gear and a drum, both loosely mounted on the shaft and means extending through the passages between the gripping projections for moving the drum into or out of contact with the gear.

7. A hoist mechanism comprising a frame, a non-revoluble shaft mounted therein, bearings for receiving said shaft, one of said bearings being formed with interrupted portions in its shaft engaging surface, a gear and a drum loosely mounted on the shaft, a thrust member for reciprocating the drum with respect to the gear, the said thrust member extending through the interrupted portions of the bearing to a point outside the frame and means outside the frame for operating the same.

8. A hoisting mechanism comprising a frame having an abutment bearing and a gripping bearing, a shaft mounted in said bearings and formed with an annular shoulder for engaging the abutment bearing, a nut engaging the end of the shaft for drawing the said shoulder against the bearing, a gear and a drum loosely mounted on the said shaft and means capable of reciprocating the drum on the shaft.

9. A hoisting mechanism comprising a

frame having an abutment bearing and a gripping bearing, a shaft mounted in said bearings and formed with an annular shoulder for engaging the abutment bearing, a second inner shoulder being also formed on the said shaft, a gear loosely mounted on the shaft and confined between said second shoulder and the abutment bearing to prevent its movement longitudinally of the shaft, a drum loosely mounted on the shaft and means for connecting or disconnecting it from the gear.

10. A hoist mechanism having a frame, a gear, a drum and a non-revoluble shaft supporting said gear and drum, an abutment bearing and a gripping bearing, the said gripping bearing having inwardly extending gripping projections for engaging the shaft, a thrust member movably engaging the drum and having a series of bars extending along the shaft and between the said gripping projections and means outside the frame for reciprocating the said thrust member, for operating the drum.

11. A hoisting mechanism comprising a frame having shaft gripping bearings, a shaft gripped therein, the said shaft being reduced in size to form limiting shoulders near one end, a gear loosely mounted on the reduced portion, a nut threaded upon the end of the shaft outside one of said bearings and capable of drawing the shouldered portions of the shaft toward said bearing for limiting the position of the gear on the shaft, a movable drum loosely mounted on the shaft, friction clutches interposed between the said gear and drum and means for positively moving the drum toward or away from the said gear.

12. A hoisting mechanism comprising a frame having bearings for receiving a shaft, one of said bearings having inwardly extending shaft gripping projections, a non-revoluble shaft mounted in said bearings, a gear and a drum loosely mounted on the shaft, a thrust member formed with an inner head loosely engaging the drum and an outer head outside the frame and thrust bars connecting the two heads and extending through the spaces between said gripping projections and means on the outer end of the shaft for reciprocating said thrust member.

13. A hoisting mechanism comprising a frame, having shaft bearings, one of which is provided with inwardly extending gripping projections, a non-revoluble shaft, a gear and a drum loosely mounted on the shaft, a thrust member having inner and outer heads connected by thrust bars, the said bars extending loosely between the gripping projections, a screw cap or sleeve mounted on the outer end of the shaft and means for turning the same to reciprocate the thrust member and thereby the drum inside the frame.

14. A hoist mechanism comprising a frame having gripping bearings, one of which is formed with inwardly facing passages, a shaft gripped in said bearings and
5 extending beyond the bearing having said passages, a gear loosely mounted on the shaft, a drum also loosely mounted on the shaft, the said gear and drum having opposing frictional faces, a thrust member loosely
10 connected with the drum and extending through the passages of said bearing, a screw cap engaging threads formed upon the thread shaft and connected with the said thrust member and means for turning the
15 said cap on said thread for actuating the thrust member and causing the connecting or separation of the said drum and gear.

15. A hoist mechanism provided with shaft supporting standards, a gripping bearing formed upon one of said standards, hav-
20 ing inwardly extending gripping projections with spaces between them, a fixed shaft mounted on the standards, the said gripping projections being arranged to clamp upon
25 the same, a gear and a drum movably

mounted on the said shaft and a thrust member engaging said drum for reciprocating it, the said thrust member extending through the spaces between the gripping projections to a point outside the frame.

16. A hoist mechanism having shaft gripping bearings, one of said bearings being provided with gripping projections having spaces between them, a shaft mounted in said bearings and gripped by said projections,
35 a gear and a drum mounted on the shaft, a thrust member having bars extending through the spaces of the gripping bearing the said thrust member being capable of reciprocating the said drum and means out-
40 side the frame of the hoist for moving the thrust member back and forth.

In testimony whereof, I have hereunto set my hand at Los Angeles, county of Los Angeles, and State of California, this 28th
45 day of March, 1907.

FRANK P. SNOW.

In the presence of—

E. LOIS BOUCHER,
CASSELL SEVERANCE.