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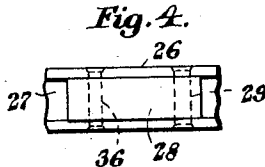
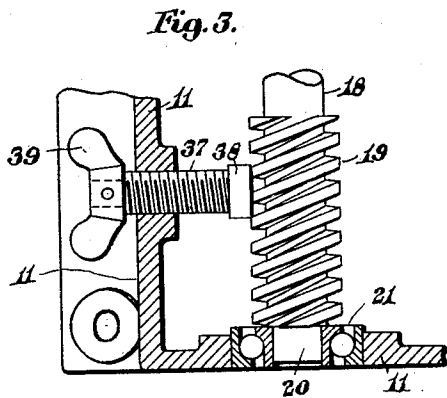
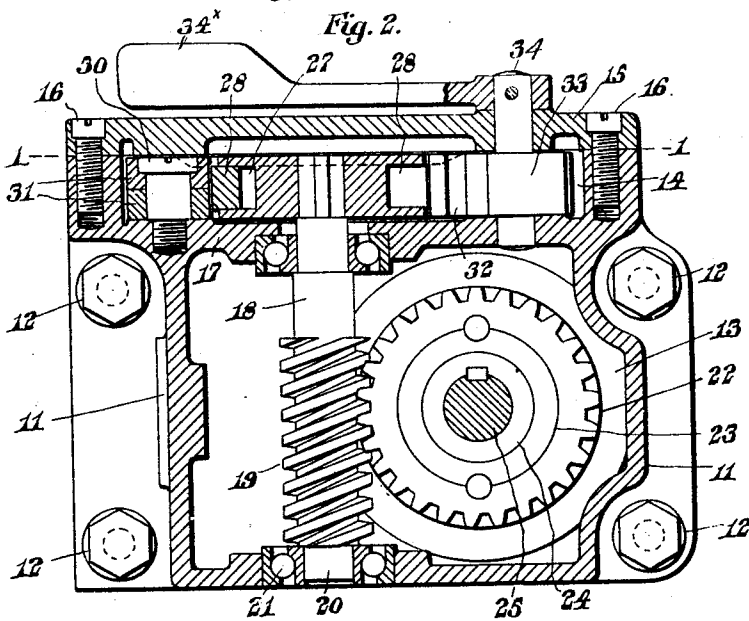
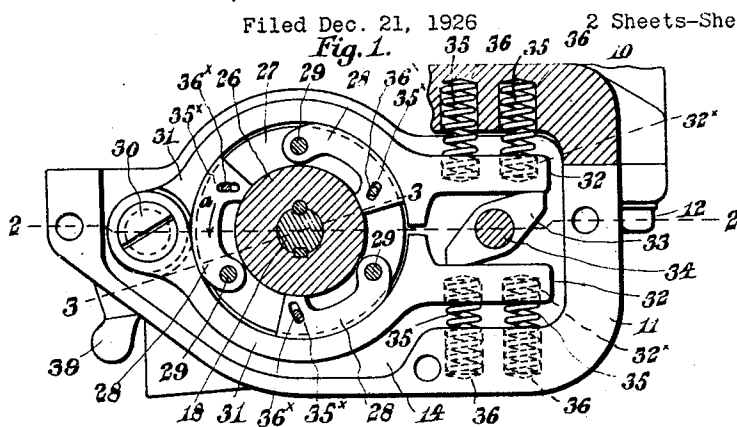
1,687,127

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BRAKE MECHANISM FOR LIFTING JACKS

Filed Dec. 21, 1926

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 5.

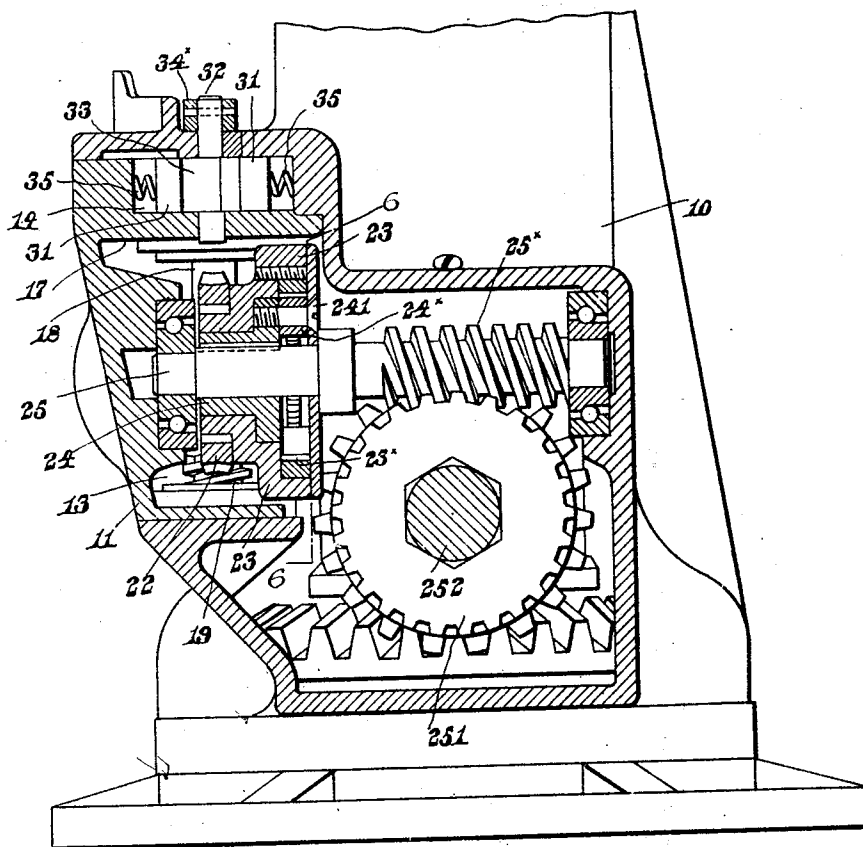
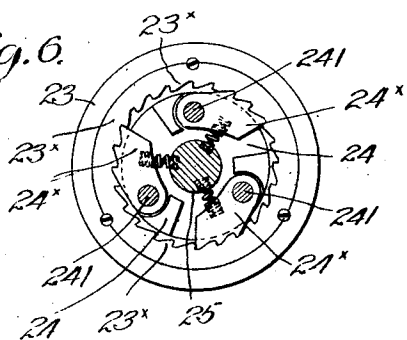


Fig. 6.



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UNITED STATES PATENT OFFICE.

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BRAKE MECHANISM FOR LIFTING JACKS.

Application filed December 21, 1926. Serial No. 156,110.

This invention relates to brake mechanisms for machines and is particularly well adapted for use in connection with self-lowering lifting jacks.

5 The object of the invention is to provide a means whereby the speed of lowering under a heavy load may be controlled by the operator and whereby under a light load the lowering may be accomplished with greater rapidity, means being associated with the controlling mechanism for positively locking such mechanism and preventing its operation when a load is to be retained for some-
10 time in its elevated position.

15 This object is attained by the mechanism illustrated in the accompanying drawings.

For the purpose of illustrating the invention, one preferred form thereof is illustrated in the drawings, this form having been
20 found to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized, and the invention is not limited to the precise arrangement and organization of these instrumentalities as herein
25 shown and described except as required by the scope of the appended claims.

Of the drawings:

30 Figure 1 represents a plan of a brake mechanism embodying the principles of the present invention, a portion thereof being shown in section.

Figure 2 represents a vertical section of
35 same on line 2, 2, on Fig. 1.

Figure 3 represents a vertical section of same on line 3, 3, on Fig. 1.

Figure 4 represents an elevation of a portion of the shoe carrying disk and showing
40 one of the shoes carried thereby.

Figure 5 represents a vertical section of a portion of a lifting jack showing the means for revolving the speed reduction gearing in one direction only.

45 Figure 6 represents a section of the one way clutch mechanism on line 6, 6, on Fig. 5.

Similar characters indicate like parts throughout the several figures of the drawings.

50 In the drawings 10 is a portion of the casing of a lifting jack to which is secured the member 11 by means of bolts 12.

This member 11 has a chamber 13 therein and at the top thereof is a depression 14 cov-

ered by a plate 15 secured to the member 11
by screws 16.

Between the chamber 13 and depression 14 is the partition 17 through which extends the upper end of a shaft 18 having a worm 19 formed thereon, the lower reduced end 20
60 of said shaft being mounted in an antifriction bearing 21 in the bottom of the member 11.

The worm 19 meshes with the worm gear 22 keyed to a flanged member 23 loosely
65 mounted upon a pawl carrying member 24 keyed to a horizontal shaft 25 having a worm 25* thereon meshing with a worm gear 251 on the driving shaft 252 of a lifting jack.

The pitch of the thread of the worm 25*
70 on the horizontal shaft 25 is such as to permit it to be rotated by the gear 252 in whichever direction the driving shaft 251 is rotated.

The pawl 24* mounted on a pin 241 carried by the pawl carrying member 24 rides
75 over the ratchet teeth 23* on the flanged member 23 when the member 24 is moving in one direction and engages with these teeth 23* when the member 24 is rotating in the
80 opposite direction. Due to this mechanism the worm gear 22 and worm 19 can rotate in one direction only.

This means of transmitting motion from the driving shaft to the worm wheel is substantially the same as shown and described
85 in Letters Patent No. 1,570,962 issued to me January 26, 1926, it is believed that it is unnecessary to show and describe the same in the present application, to any greater
90 extent than is illustrated in Fig. 5 as the particular means employed to impart rotary motion to said worm gear forming no part of the present invention.

While the shaft 25 may be revolved in
95 either direction the worm 19 is revoluble in one direction only and that is in the direction which permits the lowering of the load.

Some means is required to control the speed of rotation of this worm 19 in order
100 to regulate the lowering of the ram of the lifting jack of which the brake mechanism forms a part.

This controlling means consists of a disk 26 having a peripheral groove 27 therein
105 in which are disposed a plurality of shoes 28 each pivoted at one end to the disk 26 by a pin 29.

As the disk rotates in the direction of the arrow *a* on Fig. 1 the free ends of the shoes 28 will be moved outwardly by centrifugal force.

5 Pivoted at 30 to the partition 17 are two brake arms 31 which are curved to fit around the periphery of the disk 26 and have at their free ends substantially parallel portions 32, between which is disposed a cam member 33 secured to or formed integral with a pin 34 extending upwardly through the top plate or cover 15, the upper end of said pin having an actuating lever 34* secured thereto.

15 The lower end of the pin 34 has a bearing in the partition 17.

Under normal conditions the portions 32 are forced into contact with the cam member 33 by the spring 35, the outer ends of which are disposed in pockets 36 in the casing 10 and member 11 while their inner ends are disposed in sockets 32* in the portions 32 of arms 31.

When the cam 33 is in the position indicated in the drawings there is sufficient friction between the shoes 28 and arms 31 to prevent the rotation of the ram under the load supported thereby.

If it is desired to lower the load the operator moves the lever 34* in the direction of the arrow *a* on Fig. 1, thereby separating the arms 31 to a greater extent and reducing the friction between the contacting faces of the shoes 28 and arms 31.

35 By properly manipulating the lever 34* any desired amount of friction between arms 31 and the shoes 28 may be obtained and as a consequence any desired speed of lowering may be attained.

40 When lowering a heavy load it is imperative that frictional contact be maintained between the shoes 28 and the arms 31.

Sometimes, however, it is desired to lower more rapidly and this is particularly true when there is a light load on the ram and in this case there is no need of a frictional contact between the shoes 28 and arm 31.

In such a case it is necessary to move the arms 31 about the pivot 30 a sufficient distance to break all contact with the shoes 28 and some means must be provided therefore to limit the outward movement of the shoes 28.

To accomplish this each shoe 28 is provided near its outer end with an elongated slot 35* through which extends a pin 36* mounted in the disk 26.

Obviously when the inner end of the slot 35* comes into contact with the pin 36* further outward movement of the shoe 28 is prevented and it cannot follow the outward movement of the arm 31.

This feature is of great importance as provision is made whereby a slow rotation of the worm 19 at any desired speed may be

obtained when a heavy load is being lowered and with the same mechanism a greatly increased speed may be attained when a light load is being lowered.

Heretofore, when it is desired to sustain a load in raised position for a considerable time it has been necessary to depend upon the friction of the brake mechanism which includes springs for forcing brake arms against a rotating disk or shoes carried thereby.

It has been found objectionable to depend upon springs where the load is to be left elevated for a considerable period and therefore a positive lock has been provided to coact with the worm 19 to prevent its rotation under the weight of the load.

This lock consists of a screw 37 radiating from the axis of the worm 19 and provided at its inner end with a head 38 of soft metal which may be jammed against the thread of the worm and effectually prevent its rotation regardless of the weight supported.

The screw 37 is threaded to the member 11 and has on its outer end a winged turning member 39.

Under normal conditions the head 38 is free from contact with the worm 19.

It will be apparent, therefore, that the worm 19 has coacting therewith both a positive lock and also means whereby its rotation may be controlled to a slow speed under a heavy load or to a greatly increased speed under a light load.

Preferably the slots 35* are of different lengths so that the three pawls 28 when moved outwardly by centrifugal force successively come into contact with the pins 36* which limit their outward movement.

As a consequence, as the brake arms 31 are separated the frictional contact is first removed from one pawl, then from another pawl and finally from the third pawl.

This is a great advantage as a much greater variation of frictional contact between the brake arms 31 and shoes 28 is obtained.

It is believed that the operation and many advantages of the invention will be understood without further description.

Having thus described my invention, I claim—

1. The combination of a rotatable worm; a worm gear meshing therewith and rotatable in one direction only; a disk carried by the worm shaft having a peripheral groove; brake shoes pivotally mounted in the groove of said disk and adapted to be moved outwardly about their pivots by centrifugal force during the rotation of said shaft; and adjustable brake arms with the inner faces of which the free ends of said shoes coact.

2. The combination of a rotatable worm; a worm gear meshing therewith and rotatable in one direction only; a disk carried

by the worm shaft; brake shoes pivoted to said disk and adapted to be moved outwardly by centrifugal force during the rotation of said shaft; pins carried by said disk and
 5 extending through elongated slots in said shoes to limit the outward movement of said shoes; and adjustable brake arms with which said shoes coact.

3. The combination of a rotatable worm;
 10 a worm gear meshing therewith and rotatable in one direction only; a disk carried by the worm shaft; brake shoes pivoted to said disk and adapted to be moved outwardly by centrifugal force during the rotation of
 15 said shaft; two pivoted brake arms opposite the periphery of said disk; a cam between the free ends of said arms; springs for retaining said free ends in contact with the cam; means carried by said disk and coact-
 20 ing with shoulders on said shoes for limiting the outward movement of said shoes; and means for moving said cam to separate said arms.

4. The combination of a rotatable worm;
 25 a worm gear meshing therewith and rotatable in one direction only; a disk carried by the worm shaft; brake shoes pivoted to said disk and adapted to be moved outwardly by centrifugal force during the rotation
 30 of said shaft; brake arms with which said shoes coact; and means for successively limiting the outward movement of said shoes.

5. The combination of a rotatable worm;

a worm gear meshing therewith and rotatable in one direction only; a disk carried
 35 by the worm shaft; brake shoes pivoted to said disk and adapted to be moved outwardly by centrifugal force during the rotation of said shaft, said shoes having slots of
 40 varying length in their free ends; brake arms with which said shoes coact; and pins on said disk extending through said slots and adapted to successively contact with the inner ends of said slots.

6. The combination of a rotatable worm;
 45 a worm gear meshing therewith and rotatable in one direction only; a disk carried by the worm shaft having a peripheral groove; brake shoes pivotally mounted in the groove of said disk and normally bear-
 50 ing at their outer ends against the bottom of the groove and projecting slightly beyond the walls of said groove, said shoes being adapted to move outwardly about their pivots by centrifugal force during the rotation
 55 of said shaft; adjustable brake arms with the inner faces of which the projecting portions of said shoes normally engage; and means carried by said disk for limiting the out-
 60 ward movement of said shoes when said brake arms are separated.

Signed by me at 746 Old South Bldg.,
 Boston, Mass., this 27th day of November,
 1926.

FRANK L. GORMLEY.