

Sept. 16, 1930.

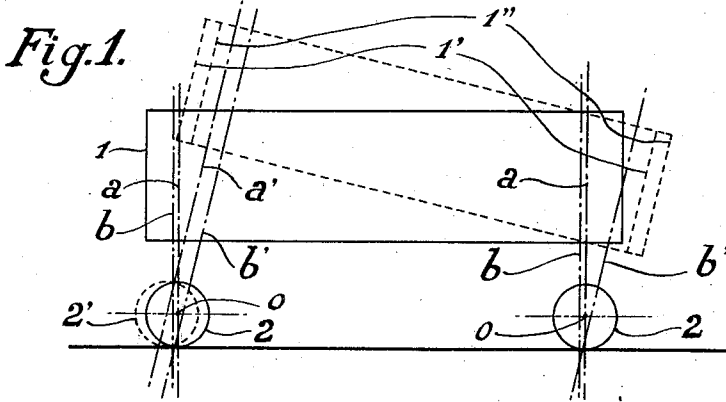
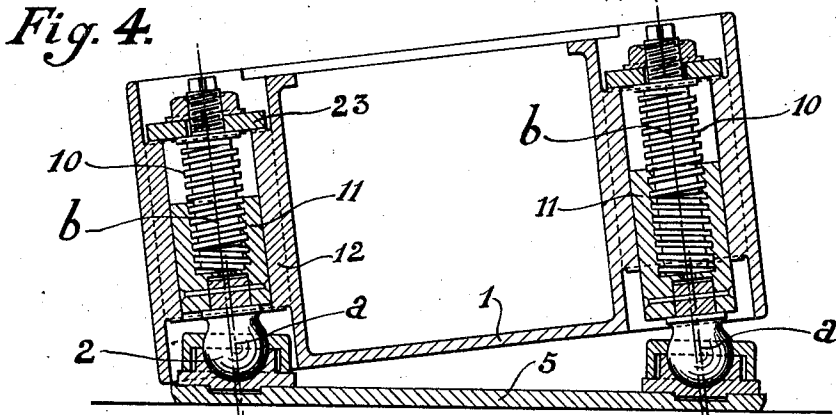
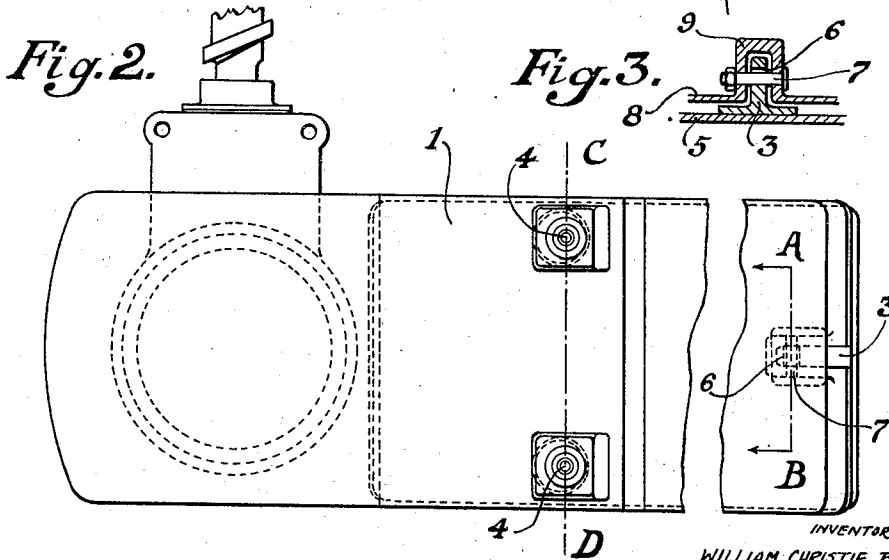
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1,776,099

LIFTING JACK FOR COAL CUTTING MACHINES AND THE LIKE

Filed Oct. 1, 1927

2 Sheets-Sheet 1



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Fig. 5.

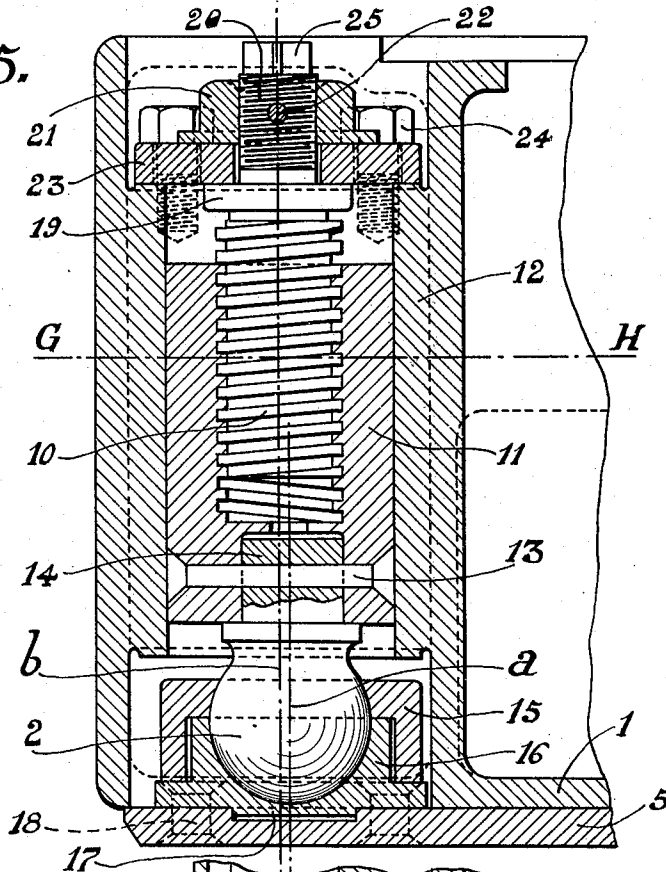
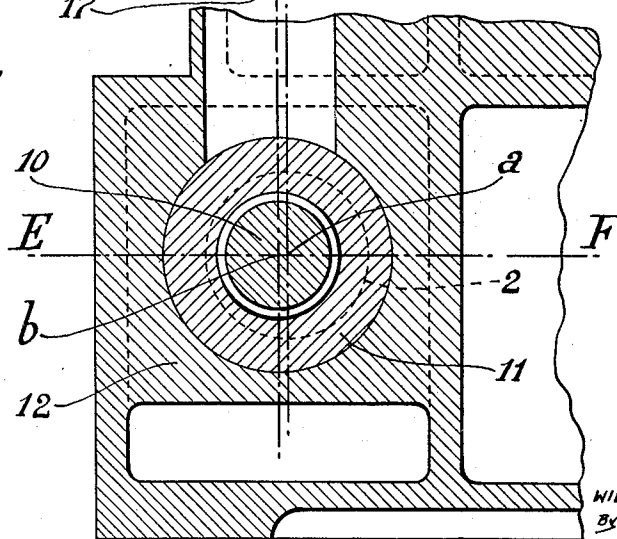


Fig. 6.



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LIFTING JACK FOR COAL-CUTTING MACHINES AND THE LIKE

Application filed October 1, 1927, Serial No. 223,442, and in Belgium October 13, 1926.

The present invention relates to lifting jacks and it has particular reference to screw jacks such as are used coal cutting machines and the like, in which it is required to move the machine bodily in order to obtain the necessary vertical and angular adjustment of the tools to suit varying conditions of work.

In machines of this kind it is customary to support the frame or body of the machine on lifting jacks located on either side of its longitudinal axis, so that the frame may be raised or lowered when such jacks are operated together, or it may be tilted to the desired angle by operating only the jack or jacks on one side thereof. In order that the jacks may follow the tilt of the frame they are conveniently mounted on spherical feet. However if they are rigid with the machine frame, they have a tendency to jam when the machine is tilted and it has been proposed to allow one of the feet to slide laterally, causing all the side stresses to bear on the fixed foot. In another case where both feet are fixed, one jack only is held rigidly in the machine whilst the other is free to accommodate itself to the angle of tilt. Such arrangements, however, have certain inconveniences, and in particular that of weakening the support of the machine.

It is the object of my invention to obviate these inconveniences and to provide lifting or adjusting jacks which will be free of jamming and adapted to be rigidly held in a machine frame without requiring any displacement of their supporting feet when the machine is tilted.

To this end the lifting jacks according to this invention are formed of two parts mounted eccentrically with respect to each other so as to be capable of compensating by an angular motion a lateral displacement imparted to one of said parts. In the case of screw jacks for coal cutting machines, the axis of the screw preferably extends parallel to that of the spherical foot. When one of the jacks is operated to tilt the machine the screw automatically moves about the centre of such foot through the angle required to absorb

the lateral movement corresponding to the tilt of the machine frame.

In the accompanying drawings:

Fig. 1 is a diagram illustrating the operation of the device.

Fig. 2 shews by way of example a plan view of a coal cutting machine equipped with screw jacks according to this invention.

Fig. 3 shews a detail in section on line A—B of Fig. 2.

Fig. 4 is a cross section, on an enlarged scale, taken on line C—D of Fig. 2.

Figs. 5 and 6 illustrate a screw jack on a still larger scale, Fig. 5 being an axial section on line E—F of Fig. 6, and Fig. 6 a cross-section on line G—H of Fig. 5.

In Fig. 1, I have diagrammatically represented at 1 the frame of a coal cutting machine of rectangular cross-section, supported by screw jacks resting on spherical feet 2. In known structures wherein the jacks are rigidly held in the machine frame the axes of the screws coincide with the axes a of the spherical feet and if one only of the screws is operated the frame is tilted to a position such as shown in dotted lines at 1', the axis of this screw taking up the position a' , whereby the foot 2 supporting said screw is caused to move laterally to the position 2'.

In the structure according to my invention this lateral displacement is avoided owing to the fact that the screws are mounted eccentrically to the spheres 2. Thus in Fig. 1 the axes of the screws are shown at b , and on the machines being tilted they will turn through any required angle up to 180° about the centres O of the spherical feet 2 and take up the positions b' , the frame taking up the position 1'', while the feet 2 remain stationary. In practice the axis a of each spherical foot and the axis b of the corresponding screw are comprised in the same longitudinal plane (at right angles to the plane of Fig. 1) so as to permit of the axes b turning through 90° in the required direction as either of the jacks is operated.

This arrangement is of particular advantage in coal cutting machines which are supported on three points as shown in Fig. 2, i. e. on a support 3 on the longitudinal axis

of the machine and on a pair of screw jacks 4 mounted in the machine frame 1 and symmetrically located on either side of the longitudinal axis.

The support 3 may be of any suitable construction capable of allowing for universal movement of the frame within restricted limits. I have shown in Figs. 2 and 3 a rather crude but convenient support of current design consisting of a web 3 on the usual skid 5 supporting the entire machine. Through an eye 6 in this web extends a bolt 7 secured to the bottom wall 8 of the frame 1 which is recessed at 9 to accommodate the web 3. The diameter of the eye 6 is substantially larger than that of the bolt 7 and the recess 9 is proportioned so that the frame may have a certain freedom of oscillation about its longitudinal axis, in addition to being able to swing about the pivot 7.

The screw jacks herein shown (Figs. 4 to 6) comprise each a screw 10 engaging an internally threaded sleeve 11. The cylindrical outer wall of this sleeve is concentric to the axis *b* of the screw 10 and has a snug fit in a cylindrical recess 12 in the machine frame 1. The sleeve 11 is secured by means of a pin 13 to a member or projection 14 rigid with the spherical foot 2 supporting the screw jack.

As illustrated, the axis *b* of the screw and sleeve is eccentric to the spherical bearing and extends parallel to the axis *a* of the latter, the eccentricity being proportioned according to the magnitude of the lateral movement to be absorbed. The foot 2 is mounted in a bearing 15, 16 which may be secured in position on the supporting plate 5, as by a tenon 17 and rivets 18.

To provide the desired rigid connection with the machine frame the screw 10 has an annular top shoulder 19 and on its upper end 20 is screwed a nut 21 locked by means of a pin 22. Between the shoulder 19 and nut 21 is comprised a plate 23 rigidly secured to the frame 1 by bolts 24. Accordingly when the screw 10 is rotated in one or the other direction by operating its polygonal head 25, it will lift the frame by means of the shoulder 19 or lower it by means of the nut 21.

If one only of the screw jacks is operated the screws 10 will follow the tilt imparted to the frame. Since the spherical feet 2 are prevented from sliding laterally, the sleeves 11 will turn each about the axis *a* of its foot, through the angle required to compensate for the lateral movement corresponding to the tilt of the frame. This angle of course should not exceed 180° since locking then would take place, but the eccentricity can be so proportioned that the lateral movement corresponding to any amount of tilt required in practice may be compensated for by a ro-

tation of less than 180°, a rotation of about 90° being fully sufficient in most cases.

It will be understood that the particular construction herein described and illustrated may be varied without departing from the spirit of my invention.

I claim:

1. In a lifting jack for coal cutting machines and the like, the combination of a member having a cylindrical bore therein, a cylindrical member engaging said bore and capable both of sliding and rotary motion therein, a supporting foot secured to one end of said cylindrical member, said foot being rotatable through an angle of 180° on an axis eccentric to said bore, and means for moving one of said members relatively to the other.

2. In a lifting jack for coal cutting machines and the like, the combination of a member having a cylindrical bore therein, a cylindrical sleeve engaging said bore, said sleeve being internally screw-threaded, a screw in threaded engagement with said sleeve, said screw being rotatably mounted in said member and locked against axial movement with respect thereto, and a supporting foot eccentrically secured to the lower end of said sleeve, said foot being rotatable through an angle of 180° on an axis parallel to the axis of said bore.

3. In a lifting jack for coal cutting machines and the like, the combination of a member having a cylindrical bore therein, an internally threaded cylindrical sleeve slidable and rotatable in said bore, a co-operating screw rotatably mounted in said member and locked against axial movement with respect thereto, said screw being coaxial with said sleeve and said bore, and a spherical supporting foot rotatable through an angle of 180° on an axis parallel to the axis of said screw, said foot being secured to the lower end of said sleeve.

4. In a lifting jack for coal cutting machines and the like, the combination of a stationary bearing, a spherical foot rotatable through 180° in said bearing, a cylindrical member resting on said foot, the axis of said cylindrical member being parallel to that of said foot and bearing, a casing having a cylindrical bore surrounding said cylindrical member, and means interposed between said casing and said cylindrical member for moving said casing axially of said member.

5. In a coal cutting machine, the combination with a frame having a pair of cylindrical bores, of internally threaded cylindrical sleeves slidable and rotatable each through an angle of 180° in said bores, co-operating screws rotatable in said frame and locked against axial movement relative thereto, spherical supporting feet secured one to the lower end of each of said sleeves, said feet being rotatable each on an axis parallel to that of the sleeve secured thereto.

6. In a coal cutting machine, the combination with a frame having a pair of cylindrical bores, of a skid, a pair of spherical bearings fixed on said skid, a rotatable spherical
5 foot in each of said bearings, a cylindrical member mounted eccentrically on each of said feet, each of said cylindrical members being slidably engaged and capable of rotation through 180° in one of said cylindrical bores,
10 and means interposed between said frame and each of said cylindrical members for lifting and lowering said frame with respect to either of said members.

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