

Nov. 27, 1956

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2,771,787

PUSH-PULL JACK

Filed Nov. 8, 1955

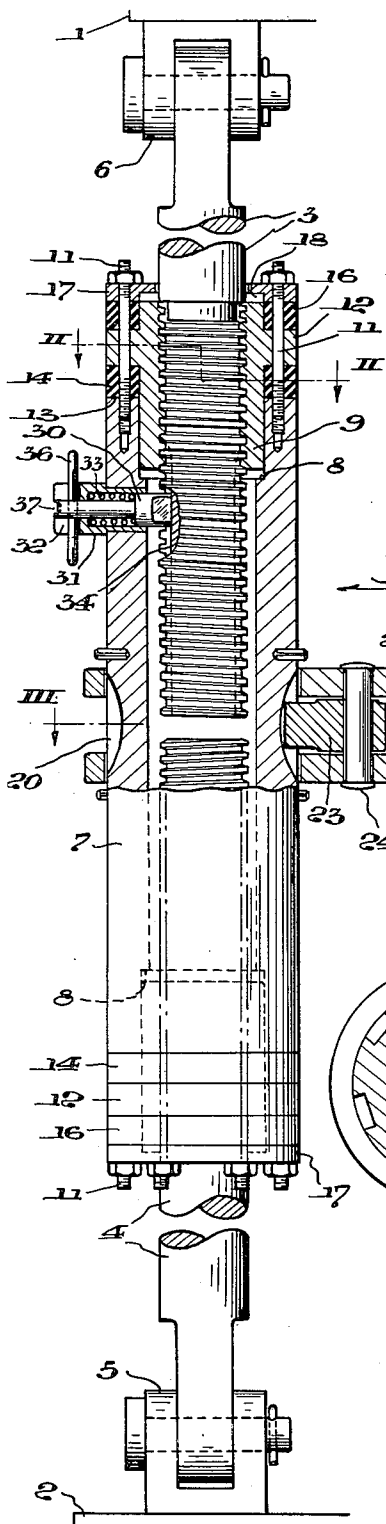


Fig. 1.

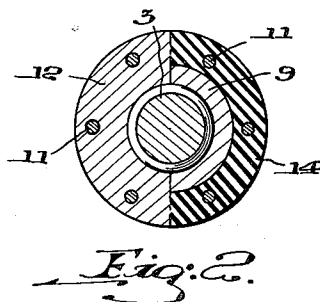


Fig. 2.

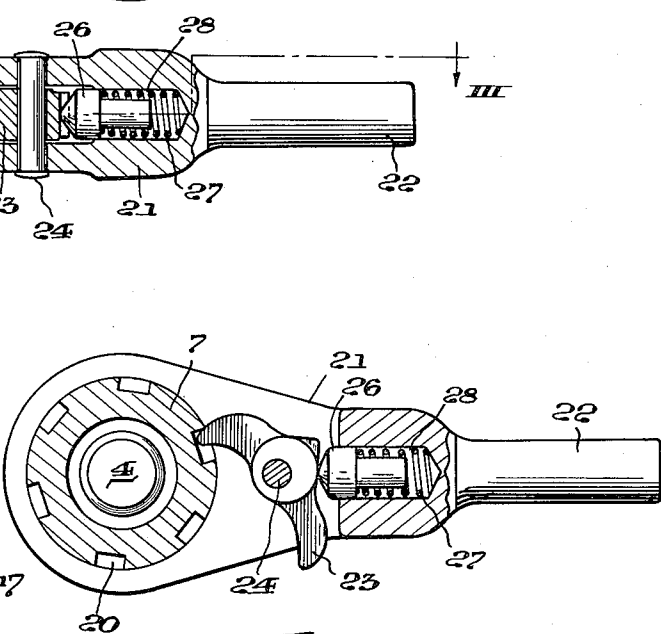


Fig. 3.

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2,771,787

PUSH-PULL JACK

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Application November 8, 1955, Serial No. 545,747

11 Claims. (Cl. 74—424.8)

This invention relates to screw jacks, and more particularly those that can either push or pull a load.

One place that push-pull jacks can be very useful is in tying down truck trailers on railroad cars or ships while the trailers are being shipped from one location to another. The jacks can be connected to the trailers and their supports and then manipulated to pull the trailers down far enough to hold them firmly in place. Such a connection is much better than the present chain tie-down, because it will withstand compression as well as tension loads, whereas the chain tie-downs are suitable for tension loads only.

It is among the objects of this invention to provide a push-pull jack that permits limited cushioned extension and contraction of the jackscrews when they are under compression or tension, whereby to reduce the vibration and the shock loads that would be imparted to the jack when used for holding a trailer on a railroad car.

In accordance with this invention the jack has a tubular barrel with an end portion that has an outwardly facing transverse surface. Slidably mounted in this end portion is a nut that is not allowed to rotate in the barrel. A jack screw extends through the nut and outward beyond it for connection to a load. The nut has a transverse surface facing the transverse surface of the barrel but spaced from it, and there is resilient cushioning means between those two surfaces. The nut also has an outwardly facing transverse surface engaged by resilient cushioning means, the outer end of which is engaged by retaining means connected to the barrel. Suitable means is provided for effecting relative rotation between the screw and nut in order to move the screw axially through the barrel. When the jack is under load, the cushioning means permit limited axial movement of the nut and screw in the barrel in either direction. Preferably, both ends of the jack are constructed in the same way, so that jack screws extend out of both ends of the barrel. In such a case the two screws are threaded in opposite directions so that they will move toward or away from each other.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

Fig. 1 is a side view of my jack, shown partly in longitudinal section; and

Figs. 2 and 3 are horizontal sections through the jack taken on the lines II—II and III—III, respectively, of Fig. 1.

Referring to Fig. 1 of the drawings, my push-pull jack is shown tying down a truck trailer 1 to a railroad car 2 that is to convey it to its destination. The jack therefore is shown in a more or less upright position and will be described that way, although it will be understood that the jack can be used in any position. The particular jack illustrated is equipped with two jack screws 3 and 4, one of which is connected to a bracket 5 on the railroad car and the other of which is connected to a bracket 6 on the trailer riding on the car. The two jack screws are threaded in opposite directions; i. e.,

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right and left hand threads, and extend into a tubular barrel 7 which preferably is cylindrical.

Each end of the passage through the barrel is enlarged to provide an internal radial shoulder 8 spaced a short distance from the adjacent end of the barrel. Slidably axially in each end of the barrel is a nut 9, which has threads that mesh with the threads on the jack screw extending through it. The nut is prevented from turning in the barrel in any suitable manner, but preferably by studs 11 that extend slidably through an integral radial flange 12 encircling the nut. The inner ends of the studs extend through an outwardly facing transverse surface 13 of the barrel and are threaded in the barrel. In the particular design of barrel shown, surface 13 is the end surface of the barrel. Also, the nut extends out of the barrel and the flange 12 is spaced from surface 13. The opposite sides of the flange likewise are transverse surfaces.

Filling the space between the flange and the end of the barrel is resilient cushioning means, most suitably a ring 14 of rubber or rubber-like material, through which the studs 11 extend, as shown in Figs. 1 and 2. A similar annular cushion 16 encircling the outer end of the nut engages the opposite side of the flange. To hold the cushions and nut in place, a collar 17 mounted on the studs encircles the jack screw at the outer end of the nut and engages the outer end of the outer cushion 16. The inner end of the collar is provided with a recess 18, which normally spaces the outer end of the nut from the collar the same distance as the inner end of the nut is spaced from shoulder 8 in the barrel. It will be seen that a compressive load on the jack screws will cause the nut flanges to compress the inner cushions. However, movement of the nuts toward each other is limited by the barrel shoulders 8. Tension on the jack screws will tend to pull the nuts in the opposite direction and compress the outer cushions, but this movement will be limited by the end collars 17.

The jack is operated by a ratchet arrangement, as shown in Figs. 1 and 3. Thus, the center of the barrel 7 is provided with a number of circumferentially spaced notches 20 and is encircled by a forked ratchet case 21 provided with a handle 22 for oscillating it around the barrel. Between the barrel and the handle, a ratchet pawl 23 is mounted in the fork on a pivot pin 24. A plunger 26 is pressed against the back of the pawl by a coil spring 27 disposed in a fork opening 28, in which the plunger slides. When the outer ends of the jack screws are fastened to the members that they are to pull together or push apart, the barrel can be rotated step by step by swinging the ratchet handle back and forth.

After the jack has been extended or retracted the desired amount, the barrel can be locked so that it can not be accidentally turned, nor can it turn or work loose due to heavy vibration of many hours duration. This is done by means of a latch 30 slidably mounted in a cup 31 extending through a radial hole in the wall of the barrel. The cup projects from the barrel and has a transverse slot 32 in its outer end. The inner end of the latch is pressed by a coil spring 33 into a longitudinal slot 34 in the side of the adjacent jack screw. When it is desired to turn the barrel, the latch is pulled out of the screw slot by its cross bar handle 36, which is then turned 90° and released so that it will seat in notches 37 in the outer end of the cup and hold the latch retracted.

Although a jack such as disclosed herein can be used for tying down a trailer on a railroad car or ship, it will not transmit vibrations and shocks like a solid jack, because the cushions will dampen them, and thus provide a safer and smoother ride for the cargo.

According to the provisions of the patent statutes, I have

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explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A push-pull jack comprising a tubular barrel having an end portion provided with an outwardly facing transverse surface, a nut slidably mounted in said end portion for axial movement only, a jack screw extending through the nut and outward from it, the nut having an inwardly facing transverse surface spaced from said barrel transverse surface, resilient cushioning means between said surfaces, the nut also having an outwardly facing transverse surface, resilient cushioning means engaging said last-mentioned surface, retaining means engaging the outer end of the second cushioning means, means connecting the retaining means to the barrel, and means for effecting relative rotation between the screw and nut to move the screw axially of the barrel, said cushioning means permitting limited axial movement of the nut in the barrel in either direction when the jack is under load.

2. A jack according to claim 1, in which the barrel is provided with an internal shoulder normally spaced from the nut but adapted to limit inward movement of the nut when the inner cushioning means is compressed.

3. A jack according to claim 1, in which said cushioning means are annular cushions.

4. A jack according to claim 1, in which said retaining means is a collar encircling the jack screw and limiting outward movement of the nut when the outer cushioning means is compressed.

5. A jack according to claim 1, including means carried

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by the barrel adapted to be projected into engagement with the jack screw to lock it against rotation in the barrel.

6. A jack according to claim 1, in which said connecting means are studs extending slidably through said cushioning means and secured in the barrel side wall.

7. A jack according to claim 6, in which said studs also extend slidably through the portion of the nut between its said transverse surfaces.

8. A jack according to claim 1, in which said barrel transverse surface forms an end surface of the barrel.

9. A jack according to claim 8, in which said nut transverse surfaces are the opposite sides of a radial flange surrounding the nut.

10. A jack according to claim 1, in which both ends of the jack are constructed the same with a jack screw extending out of each end of the barrel, the two screws being threaded in opposite directions for movement toward and away from each other.

11. A push-pull jack comprising a tubular barrel, an end portion of the barrel having a radial surface, a nut slidably mounted in the barrel and projecting outward beyond said surface, a jack screw threaded in the nut and projecting therefrom, the nut having a surrounding flange spaced outward beyond said surface, resilient cushions surrounding the nut on opposite sides of said flange, means engaging the outer end of the outer cushion and connected with said barrel to hold the nut in the barrel, and means for effecting relative rotation between the screw and nut to project and retract the screw, said cushions permitting limited axial movement of the nut in the barrel.

No references cited.