Feb. 10, 1931. J. J. MIZER 1,791,828

LIFTING JACK

Filed March 1, 1930

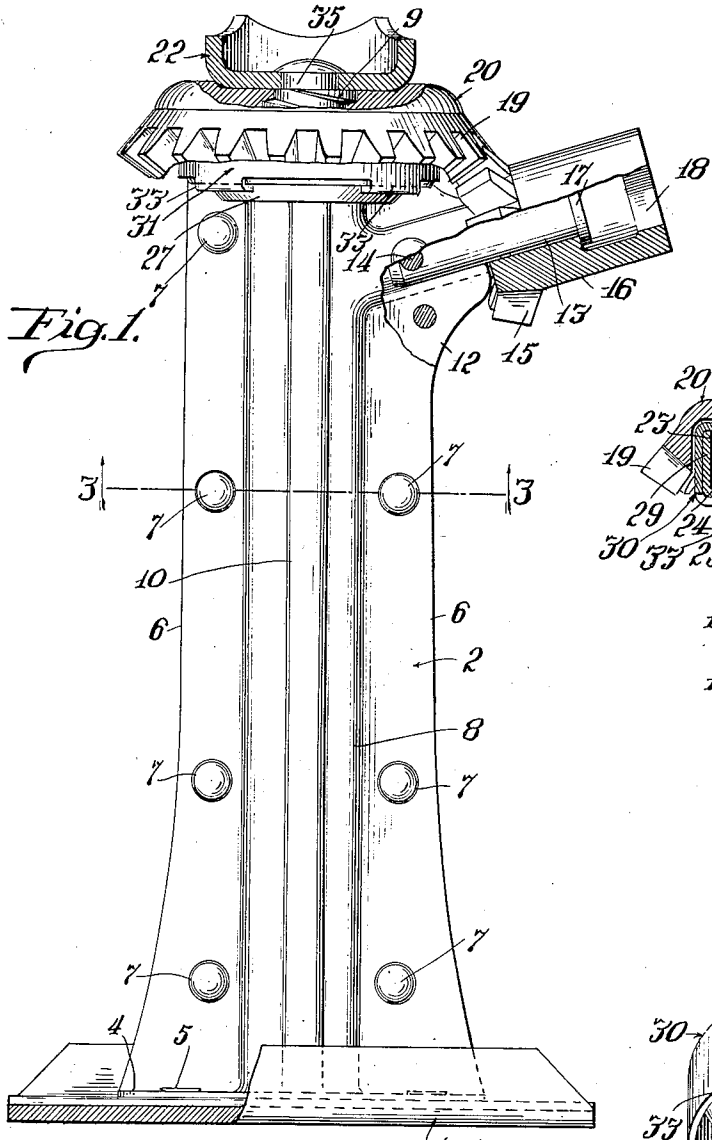


Fig. 1.

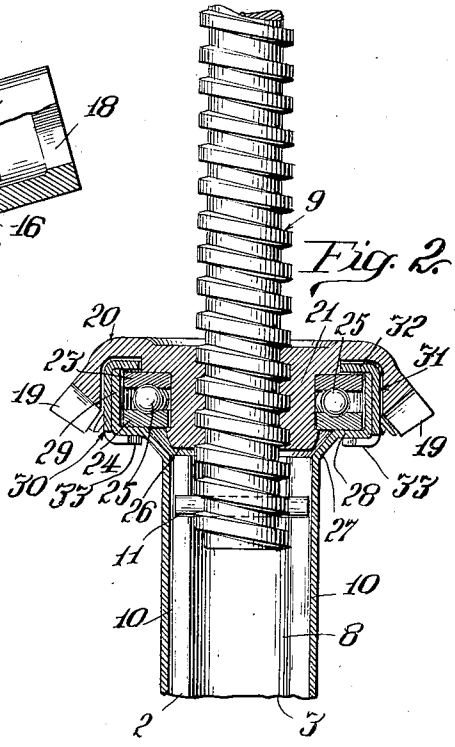


Fig. 2.

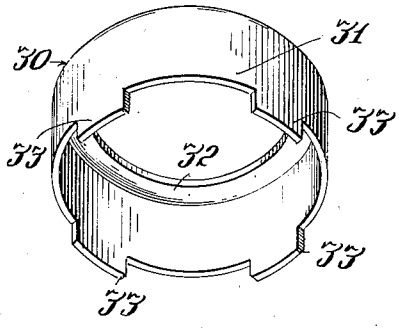


Fig. 4.

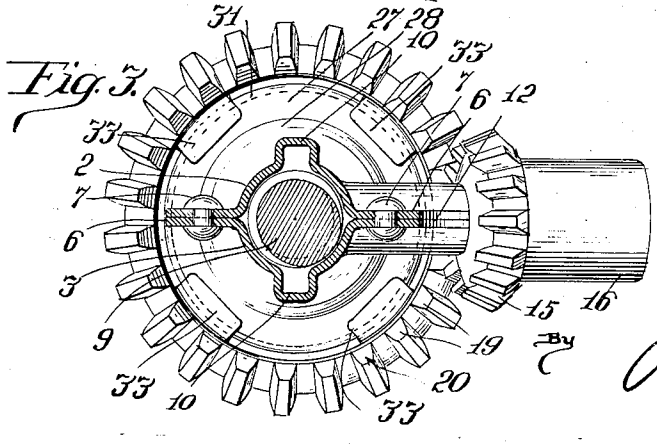


Fig. 3.

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UNITED STATES PATENT OFFICE

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LIFTING JACK

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This invention relates to new and useful improvements in lifting jacks, and more particularly to improved means for securing together and holding in assembled relation the parts of a jack of the screw type.

A common type of screw jack embodies a hollow standard, in which the lifting screw is movable vertically, the screw being threaded into the hub portion of a rotatable driving gear or other rotary driving member which is supported at the upper end of the standard. A suitable annular thrust bearing, preferably of the anti-friction type, is interposed between the driving gear and upper end portion of the standard to support the load while permitting relative rotation of these parts. It is desirable that simple and easily applied means be provided for locking these several parts together to prevent separation after they have been assembled, without interfering with the necessary relative rotary movements of the parts. The present invention relates to an easily applied annular locking collar for performing this function.

The principal object of this invention is to provide an improved lifting jack of the type briefly referred to hereinabove and disclosed more in detail in the specifications which follow.

Another object is to provide improved means for preventing separation of the relative removable parts of a lifting jack of the screw type.

Other objects and advantages of this invention will be more apparent from the following detailed description of one approved form of jack built according to the principles of this invention.

In the accompanying drawings:

Fig. 1 is a side elevation of the assembled jack, in lowered position.

Fig. 2 is a central vertical section through the upper end portion of the jack, with the lifting screw elevated.

Fig. 3 is a horizontal section, looking upward from the line 3—3 of Fig. 1.

Fig. 4 is a perspective view of the improved locking collar before it is applied.

In the present drawings we have shown a very simple form of single-screw jack, although it will be apparent as the description proceeds that this invention could be applied equally well to more complicated forms of multiple-screw jacks. The standard is built up of a pressed metal base 1 and a pair of similar pressed metal side frames 2 and 3. The side frames are formed with outwardly flanged lower ends 4 secured to base 1 by rivets 5. The side frames also have engaging side flanges 6 which are secured together by a plurality of rivets 7. The central portions of the side frames are bowed outwardly, as at 8, to each form half of the cylindrical channel for receiving the lifting screw 9, and each of the bowed portions 8 is formed with a vertical channel 10 adapted to receive one end of the guide pin 11 mounted in the lower end of lifting screw 9, whereby the screw is prevented from rotating without interfering with its vertical movements.

Near the upper end of the standard, one pair of side flanges 6 are bowed out, as at 12, to form a socket for receiving the lower end of a downwardly inclined stud shaft 13, which is locked in place by means of a key or pin 14. A driving pinion 15 has its hub 16 rotatably mounted on shaft 13, the hub being held in place by a collar 17 at the upper end of the shaft. The outer end 18 of the hub is shaped for engagement by a suitable handle member, by means of which the driving pinion is rotated.

The pinion 15 meshes with the teeth 19 of a driving gear 20 having a central downwardly extending cylindrical hub portion 21 which is internally threaded to receive the lifting screw 9. The load is supported at the upper end of screw 9 by means of a rest 22 and this load is transmitted from screw 9 to the gear 20, which in turn is supported from the upper end of the standard through a suitable anti-friction bearing comprising upper and lower race rings 23 and 24 and an annular series of balls or rollers 25 interposed between the two race members. The race rings 23 and 24 fit about the hub 21 of the gear 20, although the lower race ring 24 is adapted to rotate with relation to the hub. The bearing assembly is non-separably mounted on the hub 21 by riveting or swag-

ing outwardly the lower end of the hub, as indicated at 26, so as to engage beneath the lower race ring 24, although a detachable collar or pin or other holding means could be employed for this purpose. The riveted flange 26 in the example here illustrated is a simple and economical means for holding the bearing assembly in place on the hub.

The upper end of the standard is cupped outwardly at 27 to receive the bearing assembly, this cup portion comprising a laterally extending flange or collar 28, upon which the lower race ring 24 is supported, and an upwardly extending collar 29 adapted to surround the assembled bearing members. This entire cupped portion of the standard is pressed into the upper end portions of the two side frame members 2 and 3.

The locking collar (shown in perspective in Fig. 4) comprises a cylindrical portion 31 adapted to fit around the upper cylindrical portion 29 of the standard, an upper inwardly extending annular flange 32 adapted to engage over the upper end of the standard and the upper race ring 23, and a plurality of ears 33 projecting downwardly from the ring portion 31 and adapted to be bent inwardly and clamped against the supporting collar or seat 28 at the bottom of the cupped upper end of the standard.

In assembling this improved and simplified jack, the two pressed metal or stamped frame members 2 and 3 are riveted together and then riveted to the base plate 1. The stud shaft 13 is inserted through the hub 16 of driving pinion 15 and then the inner end of this shaft is inserted in the socket 12 of the casing and the securing pin 14 is inserted and riveted in place. The reduced upper end 35 of the screw 9 is inserted through the rest 22 and riveted in place, the screw is threaded into the driving gear 20, and the guide pin 11 driven through a suitable diametrical opening provided therefor in the lower end of the screw 9. The locking collar 30 is then positioned over the hub of gear 20 and the assembled members of the anti-friction bearing are then slipped into place over the hub 21 and the lower end of the hub is riveted, as indicated at 26, to hold the bearing members, and consequently the locking collar 30 in non-separable relation to the driving gear. This assembly is now inserted into the upper end of the standard so that the bearing members will rest within the upper cupped end portion 27 of the standard, and the ears 33 are bent into clamping position beneath the lower supporting flange 28 of the cupped portion. The jack is now assembled ready for use, and the parts are all held in non-separable relation, although the necessary relative movements are permitted. It will be seen that the jack consists of a few simple and economically constructed parts which are quickly and easily assembled and securely locked in position.

There are numerous well known forms of double-screw jacks, in which an outer screw sleeve is threaded into the driving gear 20, and a supplemental screw is threaded within this screw sleeve. It will be apparent that such jacks can be constructed in exactly the same manner as the single screw jack hereinabove described, although it may be necessary to increase the size or proportions of some of the parts to accommodate the extra screw or screws.

I claim:

1. In a lifting jack comprising a standard, a rotatable driving member and an annular bearing to support the rotary member on the standard, the bearing being non-separably connected about the driving member, and the standard being formed with a cupped upper end portion to receive and support the bearing, means for locking the parts together comprising a clamping member engaged about the bearing and cupped portion of the standard.

2. In a lifting jack comprising a standard, a rotatable driving member and an annular bearing to support the rotary member on the standard, the bearing being non-separably connected about the driving member, and the standard being formed with a cupped upper end portion to receive and support the bearing, means for locking the parts together comprising an annular collar engaged about the cupped portion of the standard and having an inwardly flanged upper end to engage over the bearing and a plurality of ears on its lower end to be clamped beneath the cupped portion of the standard.

3. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, means for locking the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and means for locking the bearing assembly in the seat to prevent separation of the parts.

4. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, means for locking the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end

of the standard being outwardly cupped to form a seat for the bearing assembly, and clamping means engaged about the cupped portion of the standard and the bearing assembly to prevent separation of the parts.

5. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, means for locking the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and an annular locking collar adapted to surround the cupped upper end of the standard, the collar having an inwardly flanged upper end to engage over the upper race member and a plurality of ears on its lower end to be clamped under the cupped portion of the standard.

6. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, the lower end of the hub being riveted outwardly to hold the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and means for locking the bearing assembly in the seat to prevent separation of the parts.

7. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, the lower end of the hub being riveted outwardly to hold the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and clamping means engaged about the cupped portion of the standard and the bearing assembly to prevent separation of the parts.

8. A lifting jack comprising a standard, a lifting screw, a driving gear formed with a downwardly extending hub internally threaded to receive the screw, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, the lower end of the hub being riveted outwardly to hold the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and an annular locking collar adapted to surround the cupped upper end of the standard, the collar having an inwardly flanged upper end to engage over the upper race member and a plurality of ears on its lower end to be clamped under the cupped portion of the standard.

9. A lifting jack comprising a standard formed of a pair of similar pressed metal side members and a pressed metal base plate secured together, the side members being formed to provide a tubular vertical passage for a lifting screw with a vertical guide slot therein, the side members also being pressed outwardly at the upper end to form a cupped portion for receiving and supporting a bearing, a driving pinion mounted at one side of the standard, a driving gear meshing with the pinion and having a central downwardly projecting cylindrical hub which is internally threaded, a lifting screw threaded in the hub, a guide pin in the lower end portion of the screw and engaging in the guide slot in the standard, a pair of annular ball race members mounted about the hub of the driving gear, a series of ball bearings interposed between the races, the lower end of the hub being riveted outwardly beneath the lower race member, the assembled antifriction bearing consisting of the balls and races being received within the cupped portion of the standard, and an annular locking collar adapted to surround the cupped upper end of the standard and having an inwardly flanged upper end engaging over the upper race member and a plurality of ears on its lower end which are bent in under the cupped portion of the standard.

10. A lifting jack comprising a standard, a lifting member, a driving gear formed with a downwardly extending hollow hub through which the lifting member is vertically movable, driving connections between the hub and lifting member, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, means for locking the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and clamping means engaged about the cupped portion of the standard and the bearing assembly to prevent separation of the parts.

11. A lifting jack comprising a standard, a lifting member, a driving gear formed with

a downwardly extending hollow hub through which the lifting member is vertically movable, driving connections between the hub and lifting member, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, means for locking the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and an annular locking collar adapted to surround the cupped upper end of the standard, the collar having an inwardly flanged upper end to engage over the upper race member and a plurality of ears on its lower end to be clamped under the cupped portion of the standard.

12. A lifting jack comprising a standard, a lifting member, a driving gear formed with a downwardly extending hollow hub through which the lifting member is vertically movable, driving connections between the hub and lifting member, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, the lower end of the hub being riveted outwardly to hold the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and clamping means engaged about the cupped portion of the standard and the bearing assembly to prevent separation of the parts.

13. A lifting jack comprising a standard, a lifting member, a driving gear formed with a downwardly extending hollow hub through which the lifting member is vertically movable, driving connections between the hub and lifting member, a bearing assembly comprising a pair of annular race members adapted to engage about the hub and an annular series of antifriction members interposed between the races, the lower end of the hub being riveted outwardly to hold the bearing assembly on the hub while permitting relative rotary movement of the hub and lower race member, the upper end of the standard being outwardly cupped to form a seat for the bearing assembly, and an annular locking collar adapted to surround the cupped upper end of the standard, the collar having an inwardly flanged upper end to engage over the upper race member and a plurality of ears on its lower end to be clamped under the cupped portion of the standard.

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