

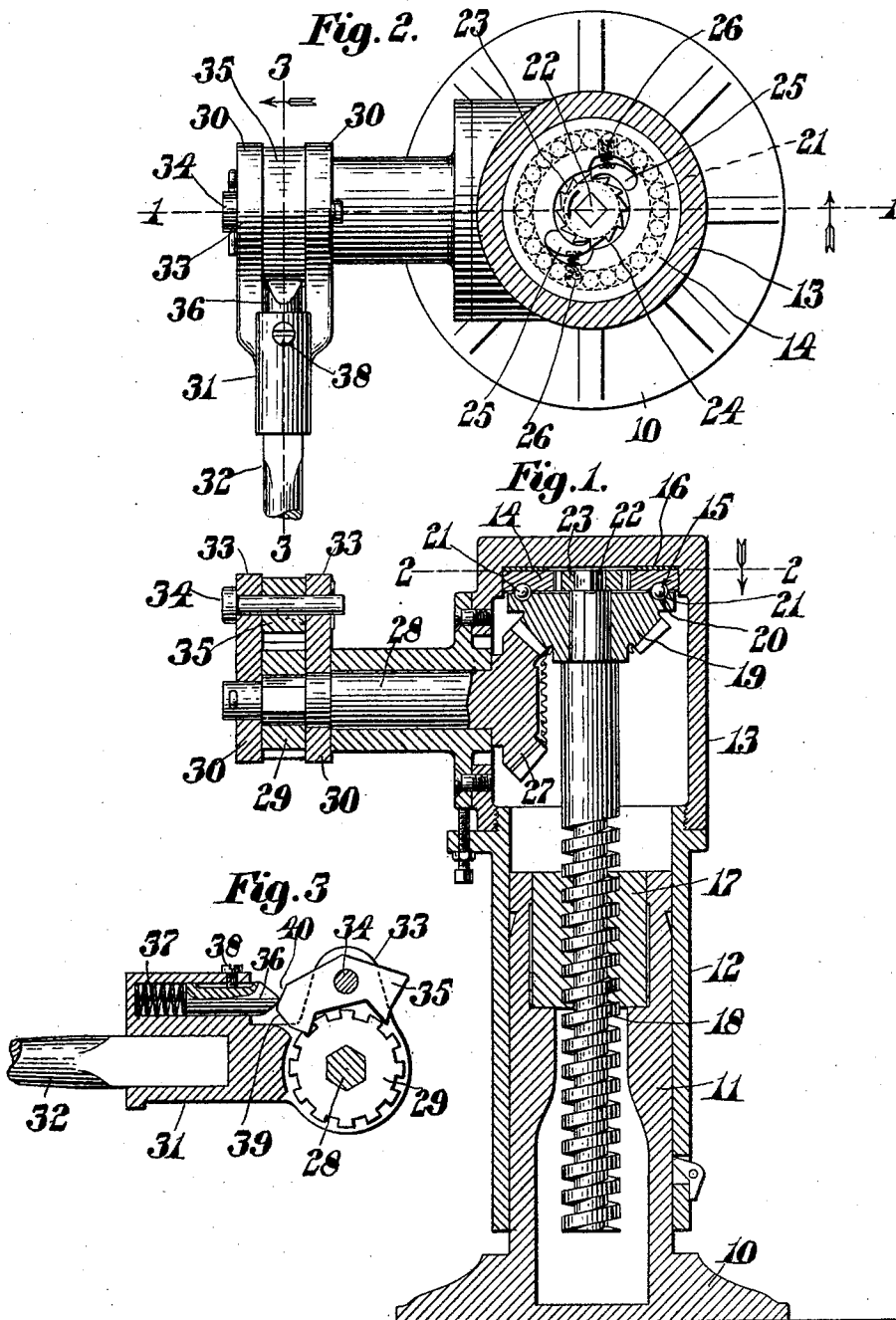
F. L. GORMLEY.

LIFTING JACK.

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933,705.

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UNITED STATES PATENT OFFICE.

FRANK L. GORMLEY, OF BOSTON, MASSACHUSETTS.

LIFTING-JACK.

933,705.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK L. GORMLEY, a citizen of the United States of America, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Lifting-Jacks, of which the following is a specification.

This invention relates to lifting jacks and particularly to that class of jacks which are known as ratchet screw jacks, and has for its object the provision of a means whereby the movable member is prevented from being accidentally lowered under a heavy load.

The invention consists in providing the upper end of the screw member with a toothed disk with the teeth of which is adapted to engage a pawl pivotally mounted in an annular plate freely revoluble upon the gear for rotating said screw, a friction disk being interposed between said annular plate and the movable member of said lifting jack. This construction provides a means whereby during the raising of the movable member the screw with the disk secured thereto is freely rotated independently of the annular plate surrounding said disk but when the raising of the movable member ceases and the weight of the load upon said movable member tends to move the screw downwardly in its nut on the stationary member, the pawl interposed between said annular plate and disk will engage the teeth of the latter and cause the two members to move simultaneously and owing to the friction between the contacting surfaces of the annular plate and the inner face of the movable member the disk on the screw will be either locked and prevented from moving or will move under considerable difficulty, thus preventing the movable member from being accidentally lowered.

The invention consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a vertical section of a lifting jack embodying the features of this invention, the cutting plane being on line 1—1 on Fig. 2. Fig. 2 represents a horizontal section of the same, the cutting plane being on line 2—2 on Fig. 1, and Fig. 3 represents a vertical section of the screw operating mechanism, the cutting plane being on line 3—3 on Fig. 2.

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

In the drawings, 10 represents a suitable base supporting a stationary standard 11 over the outer periphery of which is fitted a movable sleeve 12, to the upper end of which is threaded a head 13. In the upper end of the head 13 is mounted a plate 14 provided with an annular groove 15. Between the plate 14 and the inner face of the head 13 is interposed a friction disk 16. The standard 11 is provided with a nut 17 to which is threaded a screw 18, to the reduced upper end of which is splined a gear 19 having an annular groove 20 in the upper face thereof in which is mounted a plurality of anti-friction members 21, the upper portions of which project into the annular groove 15 of the annular plate 14, thus permitting the annular plate 14 to be freely revoluble about the axis of the screw 18 on said anti-friction members 21.

To the squared end 22 of the screw member 18 is secured a disk 23 provided with a plurality of ratchet teeth 24 with which engage the pawl members 25 mounted in depressions in the annular plate 14 and forced into engagement with the teeth 24 of said disk 23 by means of the springs 26, all as indicated in Figs. 1 and 2.

The gear 19 meshes with a gear 27 formed upon or secured to a revoluble shaft 28 to the reduced end of which is keyed or otherwise secured a ratchet 29, between the two arms 30 of a bifurcated member 31. This bifurcated member 31 is provided with an operating handle 32 and in ears 33 formed upon the arms 30 is secured a pin 34 upon which is mounted the double acting pawl 35, one of the teeth of which is retained in engagement with the teeth of the ratchet 29 by means of the locking bolt 36 mounted in a socket in the member 31 and forced outwardly by means of the spring 37. The bolt 36 is prevented from turning by means of the screw 38 engaging a longitudinal slot in the bolt 36, as indicated in Fig. 3, and the outer end of said bolt is V-shaped so that the point thereof will engage either the face 39 of the pawl 35 to cause one of the teeth thereof to engage with the ratchet wheel 29 or with the face 40 to cause the other tooth of the pawl to engage with the ratchet wheel, the particular tooth to be engaged with the ratchet wheel 29 being determined by the di-

rection in which it is desired to turn the gear 27.

It is obvious that by giving the handle 32 an up-and-down or pump-handle motion with the pawl 35 in the position shown in Fig. 3, the gears 19 and 27 will be rotated so as to cause the screw 18 to turn within the nut 17 to cause a lifting of the head 13 relative to the standard 11. It is also obvious that when the position of the double-acting pawl 35 is reversed and the V-shaped end of the locking bolt 36 is in engagement with the face 39 of said pawl and the same motion is accorded to the handle 32 a reverse motion will be accorded to the gears 19 and 27 and the screw 18 will be turned in its nut 17 to cause a lowering of the head 13. When the handle 32 is operated to cause a lifting of the member 13 the toothed disk 23 turns freely in the direction of the arrow indicated thereon in Fig. 2 of the drawings without necessarily moving the annular plate 14 which surrounds said disk, this disk 14 being prevented from movement with the disk 23 by means of the friction disk 16 interposed between the same and the upper end of the member 13.

When the threads of the screw 18 are of a certain coarse pitch and the head 13 is subjected to the weight of a heavy load, sometimes the screw 18 would turn in the nut 17 and cause the accidental lowering of the head relative to the standard 11 if some device was not provided to prevent this action which is dangerous and obviously objectionable. By the devices shown and described, however, this objection is entirely overcome as when the screw begins to turn in the reverse direction the teeth 24 on the disk 23 will come into engagement with the pawls 25 and tend to cause the annular plate 14 to revolve therewith. The friction, however, between this annular plate and the movable member 13 due to the interposition of the friction disk 16 between said plate 14 and member 13 will wholly prevent the rotation of the screw 18 in the nut 17 and the consequent lowering of the member 13 or will so limit it as to prevent any accident from occurring.

It is obvious that during the lifting of the member 13 the toothed disk 23 is free to revolve with the screw 18 independently of the pawl-carrying plate 14 surrounding the same, this plate being prevented from movement with the disk by the contact between it and the inner face of the end of the movable member 13. As soon, however, as the head 13 is subjected to a heavy load the weight of which is sufficient to cause a tendency of the screw 18 to accidentally rotate in the nut 17, the rotation of the screw 14 will cause the teeth of the disk 23 to engage with the pawls 25 in the annular plate 14 and oblige this annular plate to rotate there-

with, overcoming the friction between the plate and the member 13, or if this friction is in excess of the weight upon the member 13 the annular plate 14 will not rotate with the member 13 but will obviously prevent the rotation of the screw 18, thus preventing the lowering of the member 13.

It is believed that the operation and many advantages of the invention will be fully understood from the foregoing description.

Having thus described my invention, I claim:

1. In a lifting jack, the combination of a stationary member; a movable member thereon; a screw for said movable member; means for rotating said screw; an annular plate interposed between said screw rotating means and said movable member; and means interposed between said annular plate and screw adapted to connect them and insure the simultaneous rotation of said plate and screw in one direction and to disconnect them to permit independent movement of said screw in the opposite direction.

2. In a lifting jack, the combination of a stationary member; a movable member thereon; a screw for said movable member; a gear for rotating said screw; an annular plate on said gear; a disk secured to said screw; and means interposed between said disk and annular plate adapted to disconnect them during the rotation of said screw in one direction to permit said screw to rotate independently of said plate and to connect them in the rotation of said screw in the opposite direction to insure the simultaneous movement of said plate and screw.

3. In a lifting jack, the combination of a stationary member; a movable member thereon; a screw for said movable member; a gear for rotating said screw; an annular plate on said gear; a disk secured to said screw; means interposed between said disk and annular plate adapted to disconnect them during the rotation of said screw in one direction to permit said screw to rotate independently of said plate and to connect them in the rotation of the screw in the opposite direction to insure the simultaneous movement of said plate and screw; and a friction disk between said plate and movable member.

4. In a lifting jack, the combination of a stationary member; a movable member thereon; a screw for said movable member; a gear for rotating said screw; a disk secured to said screw provided with a plurality of ratchet teeth; and an annular plate on said gear provided with a pawl engaging said ratchet teeth.

5. In a lifting jack, the combination of a stationary member; a movable member thereon; a screw for said movable member; a gear for rotating said screw; a disk secured to said screw provided with a plural-

ity of ratchet teeth; and an annular plate on said gear provided with a spring-pressed pawl engaging said ratchet teeth.

6. In a lifting jack, the combination of a
5 stationary member; a movable member thereon; a screw for said movable member; a gear on said screw; a plate member on said gear; a disk member secured to said screw; and a pawl pivotally secured to one of said
10 members and adapted to engage teeth formed upon the other member, thus insuring the simultaneous rotation of said disk member and plate member in one direction while permitting independent movement of said
15 screw in the opposite direction.

7. In a lifting jack, the combination of a
stationary member; a movable member thereon; a screw for said movable member; a gear on said screw; a plate member on said
20 gear; a disk member secured to said screw; a pawl pivotally secured to one of said members and adapted to engage teeth formed upon the other member, thus insuring the simultaneous rotation of said disk member
25 and plate member in one direction while per-

mitting independent movement of said disk member in the opposite direction; and a plurality of anti-friction members interposed between said plate and gear.

8. In a lifting jack, the combination of a
30 stationary member; a movable member thereon; a screw for said movable member; a gear on said screw; a plate member on said gear; a disk member secured to said screw; a pawl pivotally secured to one of
35 said members and adapted to engage teeth formed upon the other member, thus insuring the simultaneous rotation of said disk member and plate member in one direction while permitting independent movement of
40 said disk member in the opposite direction; and a friction disk interposed between said movable member and said annular plate.

Signed by me at 4 Post Office Sq., Boston, Mass., this 28th day of January, 1909.

FRANK L. GORMLEY.

Witnesses:

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