No. 880,874. PATENTED MAR. 3, 1908.

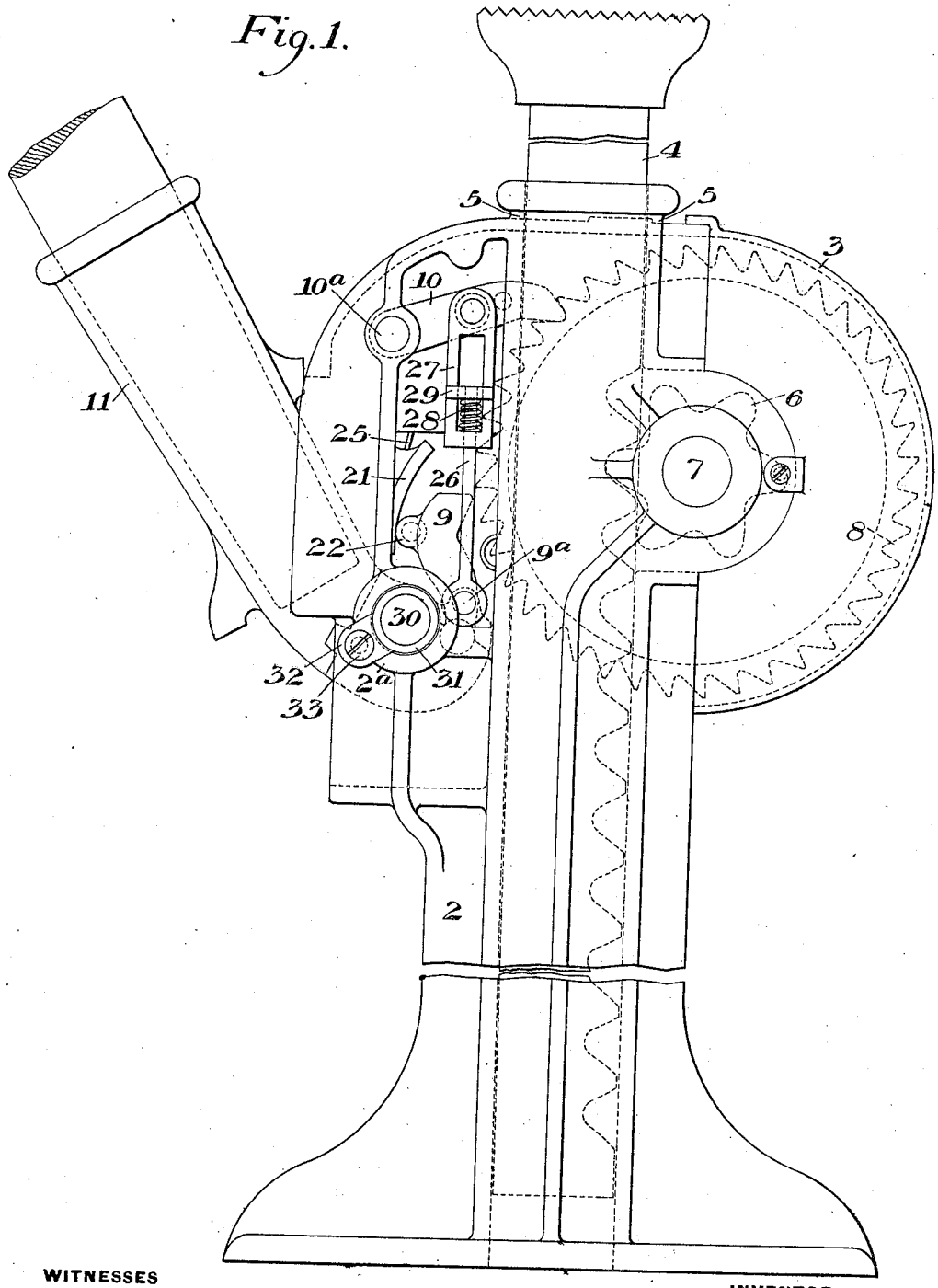
G. F. FREED.

LIFTING JACK.

APPLICATION FILED MAR. 29, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

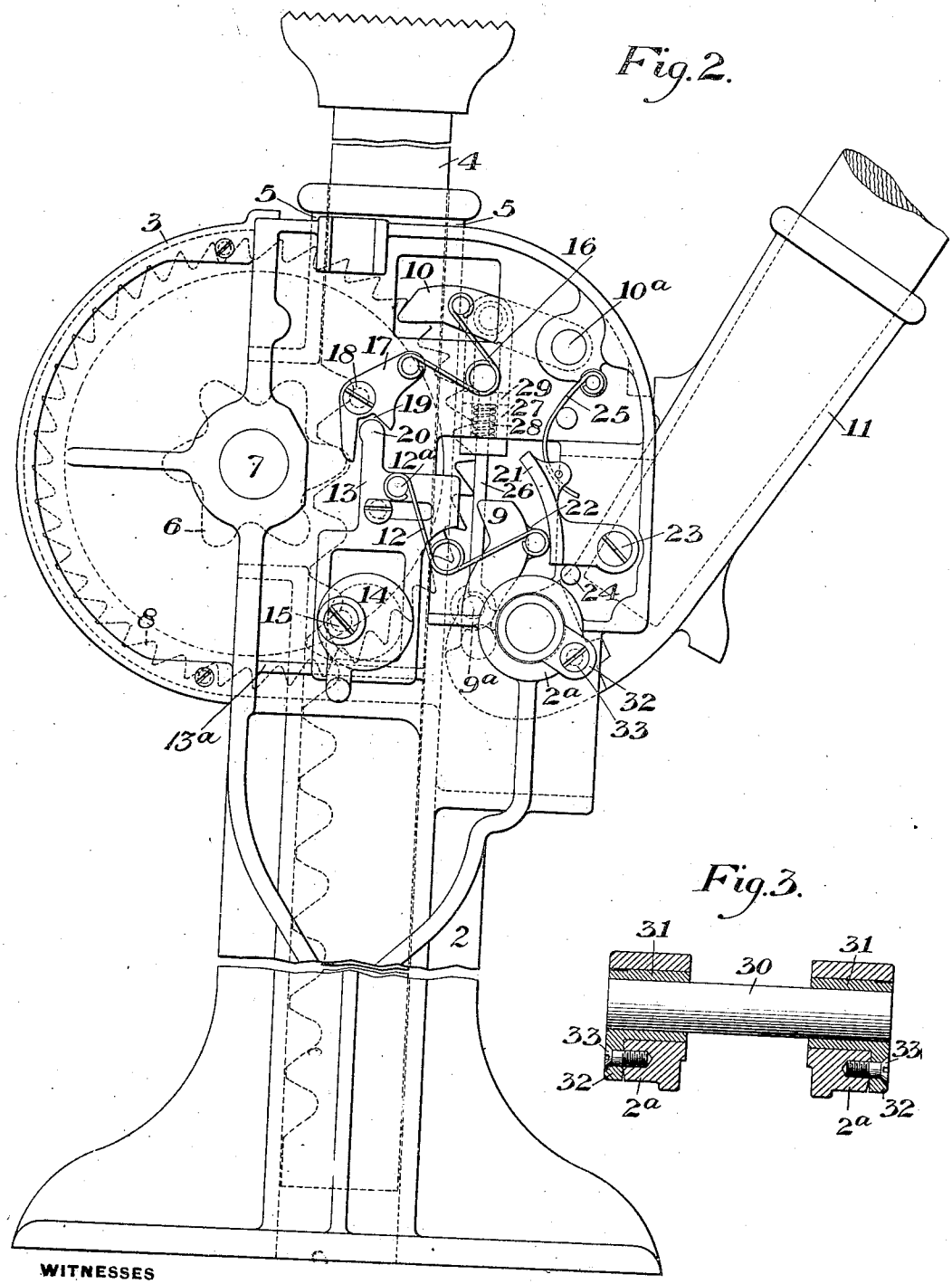

Fig. 3.

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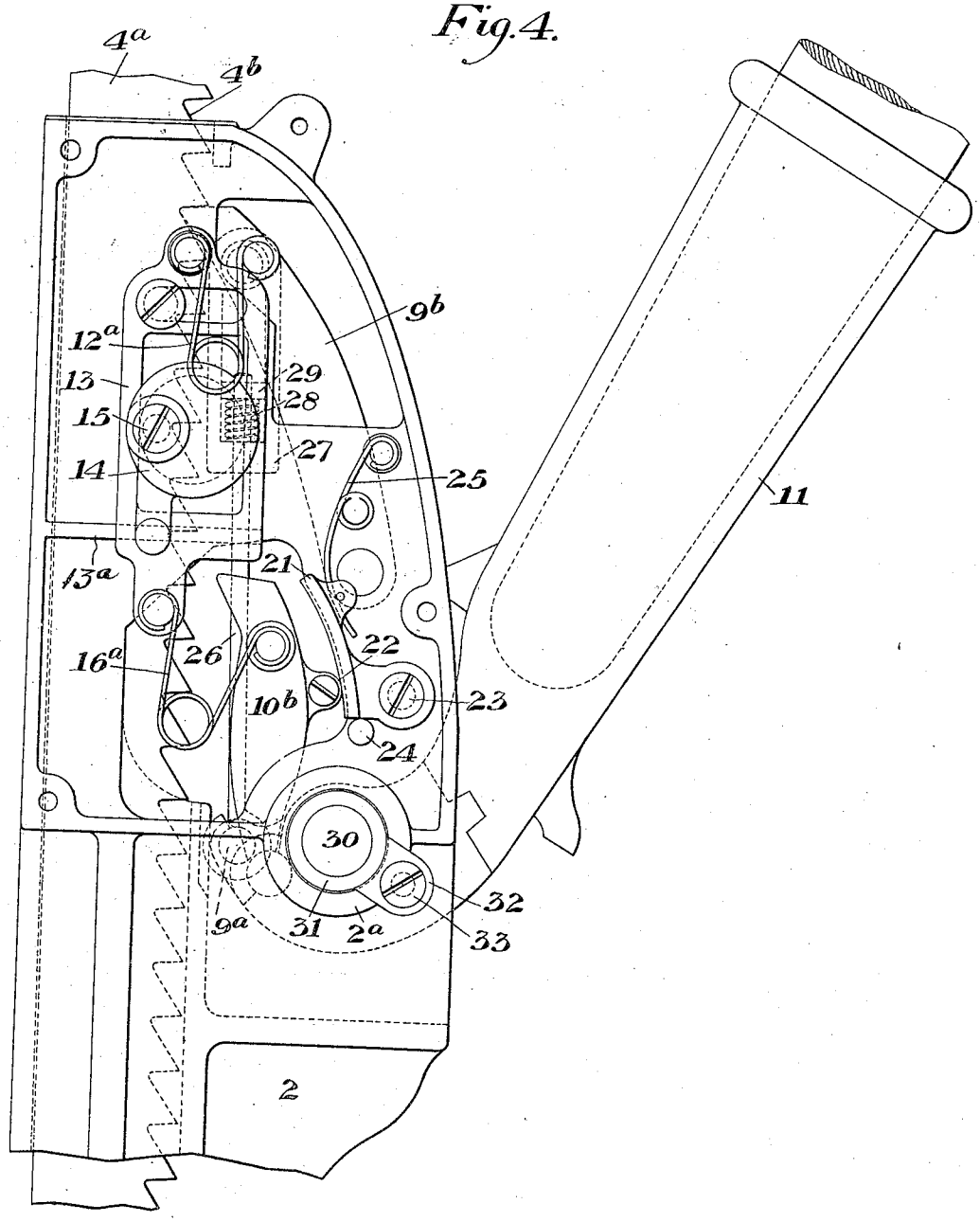
3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE F. FREED, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR TO THE DUFF MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

LIFTING-JACK.

No. 880,874. Specification of Letters Patent. Patented March 3, 1908.

Application filed March 29, 1906. Serial No. 308,680.

To all whom it may concern:

Be it known that I, GEORGE F. FREED, of Allegheny, Allegheny county, Pennsylvania, have invented a new and useful Lifting-Jack, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1 and 2 are side elevations of a lifting jack embodying my invention, taken from opposite sides, the actuating lever being broken away; Fig. 3 is a detail view of the bearings for the actuating lever; and Fig. 4 is a side elevation, showing a modified form of jack.

My invention has relation to lifting jacks of that class commonly known as ratchet lifting jacks, and more particularly to a novel arrangement of actuating pawls, and pawl mechanism for effectuating an automatic step-by-step lowering of the jack when loaded, the lifting and holding pawls being arranged and operated independently of each other so that injury to, or wear of, one pawl will not in any way affect the action of the other.

A further object of the invention is to provide means for facilitating the renewal of the bearings or bushings for the operating lever.

With these objects in view, my invention consists in the novel construction, arrangement, and combination of parts, all substantially as hereinafter described and pointed out in the appended claims.

In the drawings, 2 designates the frame of the jack, and 3 the inclosing casing for the gearing and other operative parts.

4 designates the usual lifting bar which is mounted for vertical movement in guides 5 of the frame 2 and which is actuated in the form of jack shown in Figs. 1 and 2, by means of the pinion 6 on the shaft 7 of the gear wheel 8.

9 is the lifting pawl, which will also be hereinafter referred to as the short pawl, and 10 is the holding or retaining pawl, which will also be referred to hereinafter as the long pawl. The pawl 9 is pivotally connected to the short arm of the actuating lever 11 at 9^a, while the long pawl 10 is pivoted in the frame 2 on the shaft or pin 10^a, both pawls being arranged to engage the teeth of the gear wheel 8 in the manner hereinafter described.

12 is a spring which is connected at one end to the pawl 9 and at its opposite end to a pin 12^a of a shifting device, or lowering block 13 which is arranged to be moved on a guide 13^a horizontally towards and away from the pawl 9 by means of an eccentric 14, pivoted at 15 to the frame 2.

16 is a similar spring which is connected at one end to a pin or projection of the pawl 10 and at its opposite end to a dog 17 pivoted to the frame 2 at 18, and having a recess 19 which is engaged by a finger 20 of the lowering block 13.

21 is a cam or guide, whose inner curved face is engaged by a projection 22 of the pawl 9 for the purpose of forcing said pawl inwardly into engagement with the teeth of the gear wheel 8, in the manner hereinafter described. This cam guide is movably connected with the frame 2 by the pin or screw 23, and also rests upon a pin or projection 24, its upper end being engaged by a spring 25. The short arm of the operating lever 11 is connected with the pawl 10 through the medium of a rod 26, slotted link or yoke 27, and spring 28, the spring being seated between the nut 29 at the upper end of the rod 26 and the bottom of the slot in the link or yoke, through which the upper end portion of the rod 26 loosely extends.

The operation of raising a load consists in actuating the socket or operating lever 11, thereby causing the short pawl 9 to engage the teeth of the gear wheel 8 and move said gear wheel, and thereby the lifting bar 4 through the medium of the pinion 6. This operation is effected, of course, by the downward movement of the lever 11, the long pawl 10 holding the load while the lever is being raised. The operation in this respect is substantially similar to that of other lifting jacks.

In lowering the loaded jack, the lifting block or shifting device 13, which, in raising the load, is over at its extreme left-hand position (looking at Fig. 2), in which position the springs 12 and 16 are in tension, is moved over to its extreme right-hand position as shown in Fig. 2, thereby putting both of said

springs under compression. With the parts in the position shown in Figs. 1 and 2, the load is held by the engagement of the pawl 10 with the gear wheel 8, and as the load is taken by this pawl, the pawl 9 is thrown out of engagement by means of the spring 12, and is held out of engagement while the lever is being raised. As the lever is lowered, the pawl 9 is raised and is guided by the cam surface 21 into engagement with the next tooth on the gear, the spring 12 keeping it sufficiently away from the wheel to clear the point of the tooth. As soon as the pawl 9 takes the load, the pawl 10 is thrown out of engagement by the spring 16. As the lever 11 is now raised, the load is carried by this pawl. The pawl 10 is positively forced into engagement with the teeth of the gear 8 for the purpose of taking the load when the operating lever is at its lowest point by means of the described connection with the operating lever; that is to say, as the lever 11 is raised, the rod 26 is drawn downwardly through the yoke or link 27 until the nut 29 engages the spring 28. Said spring then pulls the pawl 10 into engagement with the gear wheel at a certain point in the stroke of the lever. This spring 28 also forms a lost motion connection which permits further movement of the rod 26 after the pawl 10 makes its engagement. When the short pawl 9 is thrown out of engagement by the spring 12 and the lever is moved downwardly, the rod 26 slides freely in the link 27, so that as soon as the pawl 9 again takes the load there is space enough between the underside of the nut 29 and the spring 28 to permit the pawl 10 to be thrown out of engagement by the spring 16 without any interference.

It will be noted that the springs 12 and 16 are very light springs, as they have no work to do beyond moving the pawls, and this is not done until the load has been entirely taken off the pawl which is to be moved. The operations just described are repeated at each stroke of the lever 11, thereby effecting a step-by-step lowering of the load.

As above noted, in the normal use of the jack as a lifting jack, the shifting device or block 13 is moved to the left by a half rotation of the eccentric 14, thereby placing the spring 12 under tension, and also actuating the dog 17 which puts the spring 16 under tension, so that said springs act to normally hold their respective pawls in engaging position. My invention is also applicable to lifting jacks in which the lifting bar is actuated directly by the engagement of the pawls instead of through the medium of gearing. This form of the invention is illustrated in Fig. 4, in which the lifting bar 4^a is shown as provided with teeth 4^b which are directly engaged by the pawls 9^b and 10^b which correspond respectively with the pawls 9 and 10 of the form as first described. The springs 12^a and 16^a are also like the springs 12 and 16 with the exception that the dog 17 is omitted, and the spring 12^a is connected directly to the shifting device or block 13^a. The action of the pawls upon the toothed bar 4^a is in all respects similar to their action on the gear wheel in the form first described.

The operating lever 11 is secured to the shaft 30 which is pivotally mounted in the frame 2, in the bushings 31 (Fig. 3). These bushings wear rapidly in use and require frequent renewal. To facilitate such renewal, I arrange them as shown in Fig. 3, wherein they are inserted into the frame-arms 2 from the outer sides of said arms and are held against turning by means of lugs or projections 32, which engage recesses in the frame bosses 2^a. Displacement of the bearings by outward movement is prevented by means of screws or pins 33. When it is desired to renew these bushings, this can be readily done without dismembering the jack by removing the pins or screws 33 and then removing the bushings and inserting new ones in their place.

The advantages of my invention whereby I obtain an automatic step-by-step lowering action through the described arrangement of independent pawls so that any wear or damage to the short or lifting pawl will have no effect on the action of the long or holding pawl,—will be appreciated by those skilled in the art. A further advantage consists in the simplicity and certainty of action of the pawl-operating devices and in the facility with which any worn or defective part may be readily renewed or replaced.

Various changes may be made in the details of construction and arrangement of the various parts without departing from the spirit and scope of my invention, since

What I claim is:—

1. In a lifting jack, an operating lever, a lifting pawl actuated thereby, a holding pawl and a member connecting said lever and the holding pawl for forcing the pawl into working position when the jack is operated to lower the load; the connecting member for the holding pawl being independent of the means which force the lifting pawl into its engaging position substantially as described.

2. In a lifting jack, an actuating lever, a lifting pawl, a holding pawl, a spring connected to said holding pawl, means for putting said spring under either compression or tension, and a connection between said holding pawl and the lever; substantially as described.

3. In a lifting jack, a lifting pawl, a holding pawl, a separate spring for each of said pawls, and means for putting said springs under either compression or tension; substantially as described.

4. In a lifting jack, a lifting pawl, a holding pawl, separate springs for said pawls, and a

movable device for putting the said springs under either compression or tension; substantially as described.

5. In a lifting jack, an actuating lever, a holding pawl pivoted to the frame of the jack, a spring arranged to force said pawl out of operative position when the load is being lowered, and a connection between the lever and the pawl arranged to force said pawl into operative position at predetermined times; substantially as described.

6. In a lifting jack, an actuating lever, a lifting pawl carried thereby, a holding pawl, an operating connection between the lever and the holding pawl, separate springs for the two pawls, and a movable device arranged to put the springs under either compression or tension; substantially as described.

7. In a lifting jack, an actuating lever, a lifting pawl carried thereby, a cam arranged to force said pawl into engaging position, said cam having a yielding connection with the jack frame; substantially as described.

8. In a single-acting lifting jack, a pair of alternately-acting pawls arranged to successively take the load in both the raising and the lowering operation of the jack, independent springs for the said pawls, and independent means for forcing said pawls into engaging positions in both raising and lowering movements, whereby the engaging action of each pawl is effected independently of the engaging action of the other pawl; substantially as described.

9. In a single-acting jack, an operating lever, a lifting pawl carried by the lever, a holding pawl pivoted to the frame, a member connecting the holding pawl to the lever and acting to pull the pawl into engaging position in the lowering action of the jack, a spring for moving the pawl out of engaging position during the lowering operation, and independent means for moving the lifting pawl into and out of engaging positions; substantially as described.

10. In a lifting jack, an operating lever, a holding pawl, a lifting pawl, a connection between the holding pawl and the lever for moving said pawl into engaging position during the lowering of the load, and a spring for moving the said pawl out of engaging position during the lowering of the load, said connection and spring being arranged to operate independently of the lifting pawl; substantially as described.

In testimony whereof I have hereunto set my hand.

GEORGE F. FREED.

Witnesses:
JOHN MILLER,
H. M. CORWIN.