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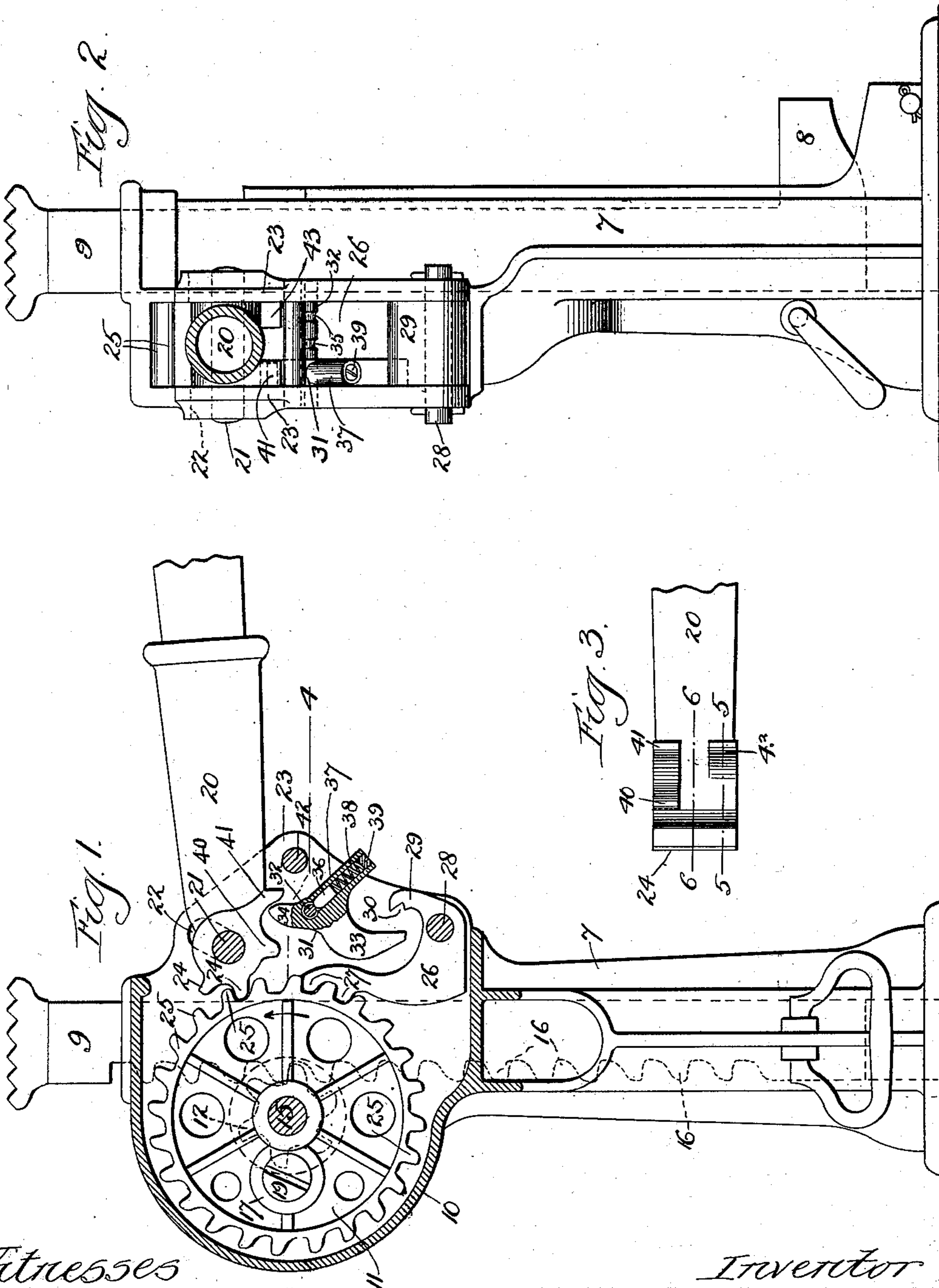
Patented June 19, 1900.

F. I. JOYCE.
LIFTING JACK.

(Application filed Jan. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses
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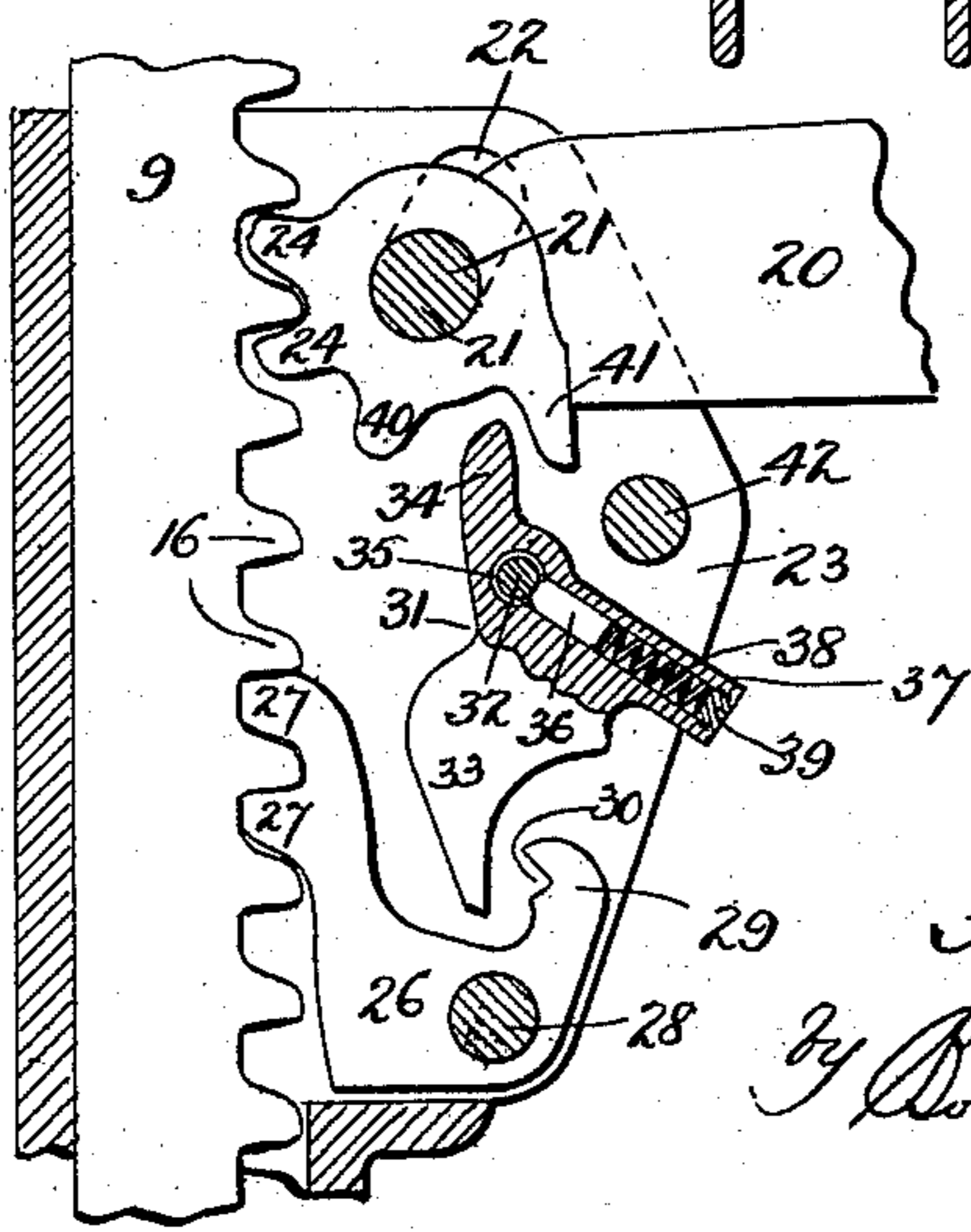
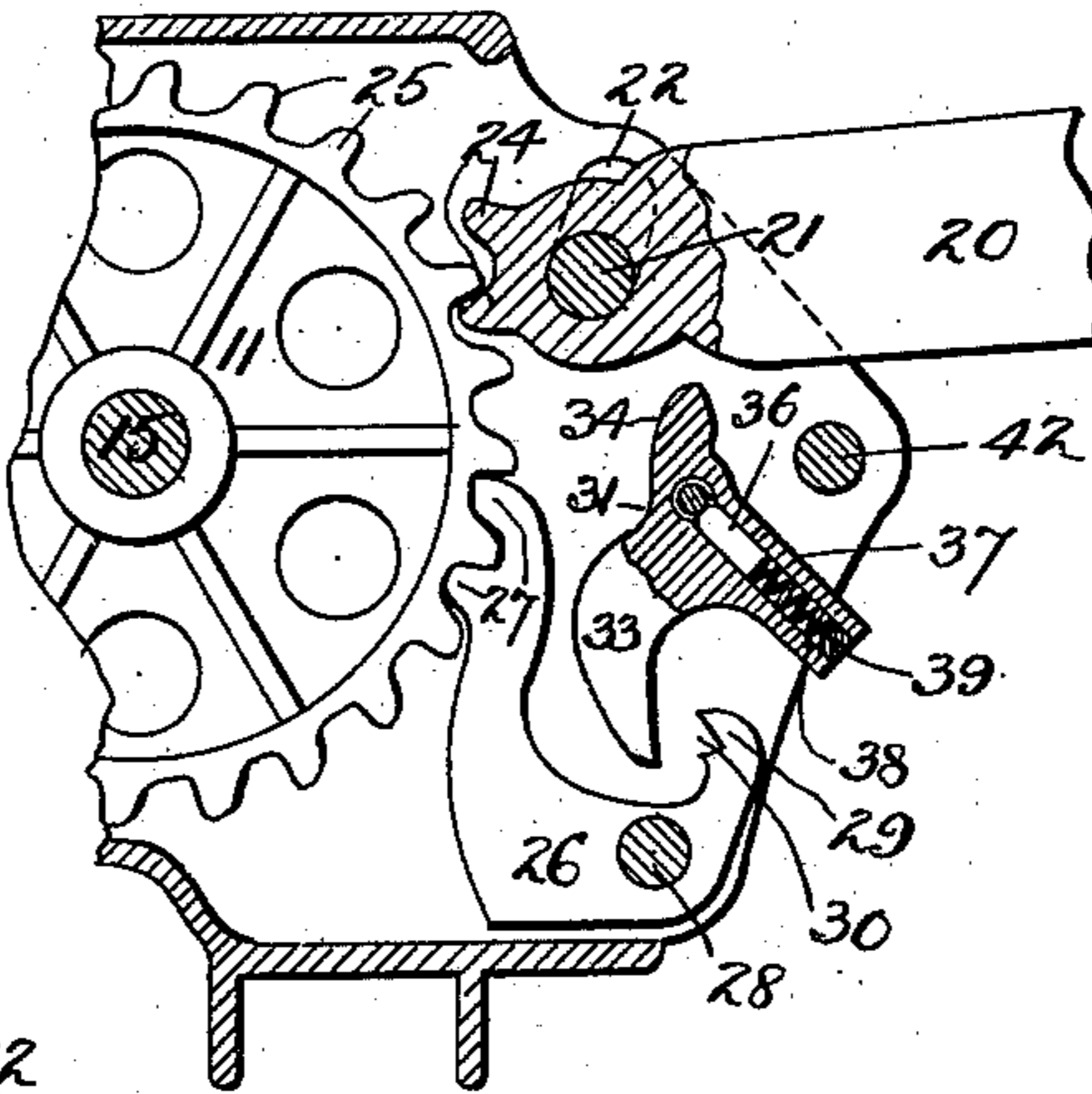
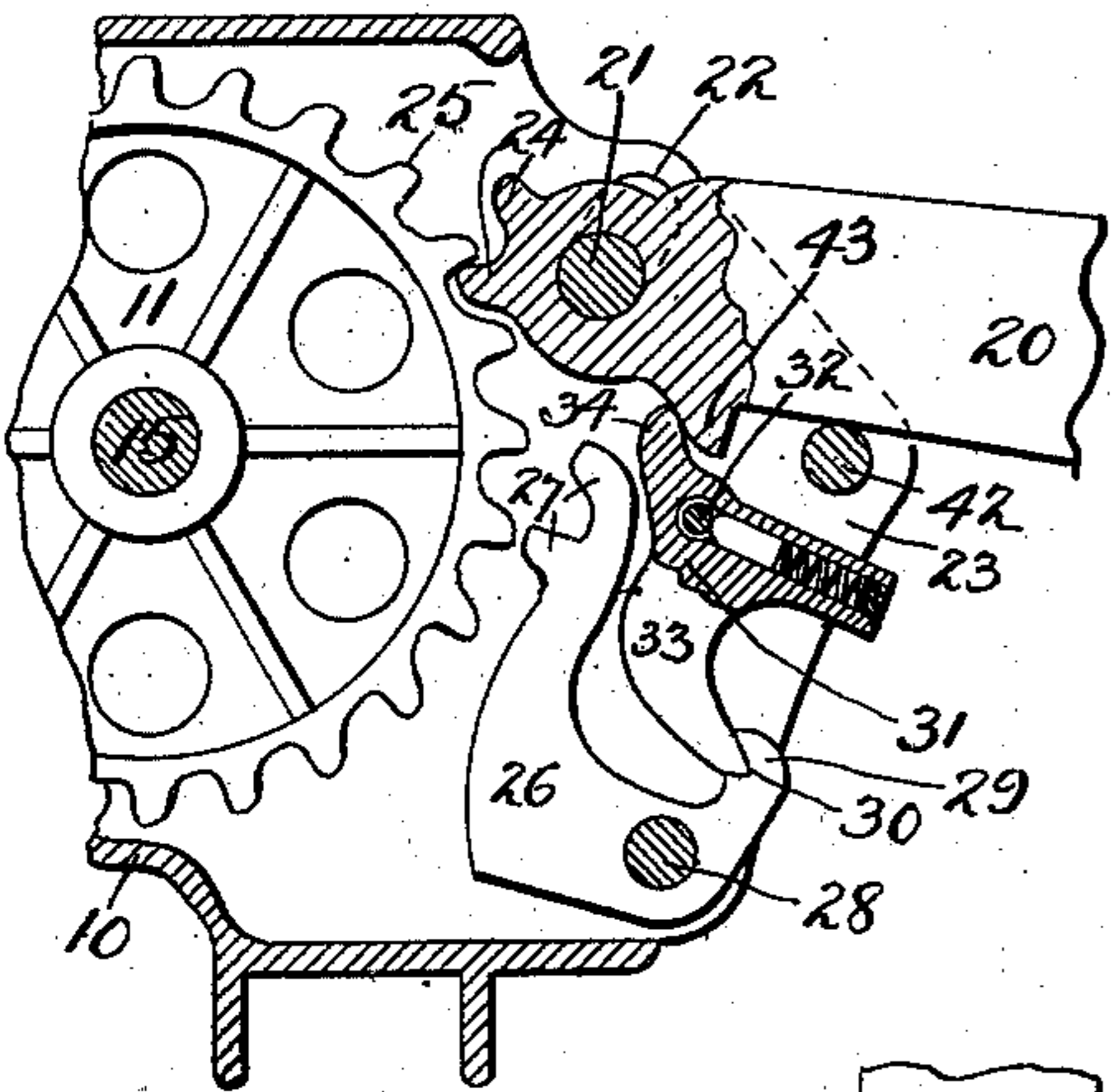
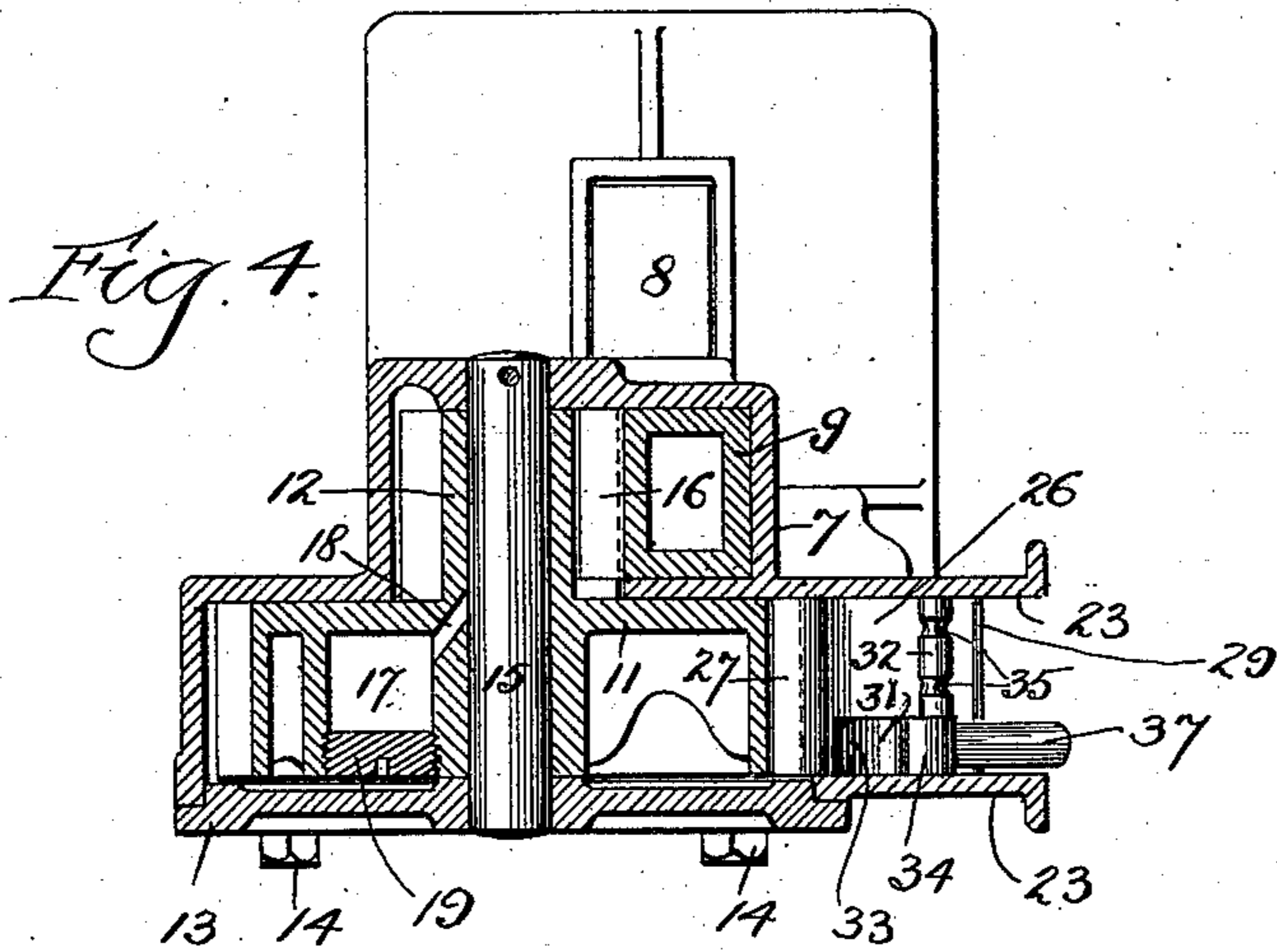
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANK I. JOYCE, OF DAYTON, OHIO.

LIFTING-JACK.

SPECIFICATION forming part of Letters Patent No. 651,860, dated June 19, 1900.

Application filed January 21, 1898. Serial No. 667,510. (No model.)

To all whom it may concern:

Be it known that I, FRANK I. JOYCE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Lifting-Jacks, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to lifting-jacks, and is particularly valuable for use in track-jacks—that is to say, in lifting-jacks especially adapted for use in operating upon railway-tracks. My improvements may, however, be advantageously applied to lifting-jacks of various other forms, and I wish it to be understood that while I have described such improvements as applied to track-jacks I do not wish to be limited to their use in jacks of that class. In lever lifting-jacks it is usual to move the lifting-bar vertically either by the direct action of the lever, which is provided with a number of teeth which mesh with the rack carried by or formed in the lifting-bar, or through the instrumentality of wheel-and-pinion mechanism, the pinion meshing with the lifting-bar and the wheel with the lever, so that by operating the lever the lifting-bar may be raised or lowered. For the purpose of retaining the lifting-bar in position when raised a pawl has usually been provided, and when lowering the lifting-bar it was consequently necessary to disengage the pawl from the lifting-bar or the wheel by hand. This made the operation of lowering the lifting-bar tedious and unsatisfactory; and one of the objects of my invention is to provide an improved lifting-jack in which the operation of lowering the lifting-bar may be performed as expeditiously and as conveniently as that of raising it, the pawl being automatically operated to release the lifting-bar or the wheel by which it may be operated to permit it to be lowered.

A further object of my invention is to provide means whereby the lifting-bar may be permitted to drop suddenly, the pawl being automatically moved out of operative position and held so, thus providing for the quick release of the jack from the track, as is frequently necessary, owing to the approach of trains, &c.

My invention consists in certain improvements which will be hereinafter pointed out.

I accomplish the objects of my invention as hereinafter specified and as illustrated in the drawings.

That which I regard as new will be set forth in the claims.

In the accompanying drawings, Figure 1 is a front elevation of a jack, the body being shown in section. Fig. 2 is an end view thereof. Fig. 3 is a detail, being a view of the under side of the inner end of the operating-lever. Fig. 4 is a section on line 4 4 of Fig. 1. Figs. 5 and 6 are vertical sectional views showing the operating mechanism when adjusted for different operations, the inner end of the operating-lever shown in Fig. 5 being a sectional view on line 5 5 of Fig. 3 and the view of said lever in Fig. 6 being a section on line 6 6 of Fig. 3; and Fig. 7 is a vertical section of a portion of a jack in which the operating-lever engages directly with the lifting-bar.

Referring to the drawings, 7 indicates the standard of a jack, which in the form illustrated is provided with a vertical opening at one side through which projects an arm 8, connected to the lifting-bar 9.

10 indicates a casing arranged at the upper part of the standard and adapted to receive the wheel 11 and pinion 12, by which the lifting-bar 9 is operated. As best shown in Fig. 4, the wheel 11 and pinion 12 are arranged with their axes in alinement, and preferably the said pinion and wheel are made integral with each other, as shown. The casing 10 is of suitable shape to receive said wheel and pinion and is provided at the front with a cover or removable side 13, which is secured in place by bolts 14. By this construction the wheel and pinion may be removed together from the casing 10, affording convenient access to the other parts of the mechanism.

15 indicates a shaft for the wheel 11 and pinion 12. The shaft is supported in sockets in the casing 10 and cover 13. As best shown in Fig. 4, the pinion 12 meshes with a rack 16, formed in the lifting-bar 9, so that by rotation of the wheel 11 the lifting-bar may be raised or lowered.

17 indicates an oil-chamber in the wheel 11, and 18 an oil-duct leading therefrom to the shaft 15. The oil-chamber 17 is provided with a screw-cap 19. The wheel 11 is adapt-

ed to be rotated by a lever 20, which is fulcrumed upon a pin 21, arranged in slots 22 in the ribs 23, arranged at the side of the casing 10, as shown in Figs. 1 and 2. As shown in Fig. 1, the slots 22 are inclined with reference to the wheel 11 to permit the lever 20 to be moved away from said wheel, and thereby permit the teeth 24 of said lever to move out of mesh with the teeth 25 of the wheel 11, so that the lever may be adjusted for the next stroke.

26 indicates a retaining-pawl having one or more teeth 27, which pawl is pivoted upon a suitable pivot 28, mounted in the ribs 23. As shown in Fig. 1, the pivot 28 is placed to one side of the center of gravity of the pawl, so that the weight of the pawl normally holds it in engagement with the teeth of the wheel 11.

29 indicates an arm which projects from the pawl 26 at the opposite side of the pivot 28 from the teeth 27. The arm 29 has a notch 30, as shown in Fig. 1.

With the construction as thus far described by operating the lever 20 in the usual way the wheel 11 may be caused to rotate in the direction indicated by the arrow in Fig. 1, thereby raising the lifting-bar 9, and owing to the position of the pawl 26 such rotation of the wheel will be permitted, but reverse rotation thereof prevented. In order to lower the lifting-bar 9, therefore, it would be necessary, unless further apparatus were provided, to move the pawl 26 out of engagement with the wheel 11 by hand, when by throwing the lever 20 up into the slot 22 as far as possible its teeth 24 would be moved out of mesh with the teeth of the wheel 11, permitting the lifting-bar to fall suddenly, or by throwing the lever 20 up into the slot 22 part way only and by releasing the pawl 26 at each movement of the lever the wheel 11 could be reversely rotated at the rate of one tooth for each movement of the lever. In order to avoid the necessity of operating the pawl 26 by hand, however, further mechanism is provided, as follows:

31 indicates a dog which is pivotally supported upon a pivot 32 at a point between the pivots 21 and 28. The pivot 32 is located at a point considerably above the center of gravity of the dog 31, as indicated in Fig. 1.

33 indicates the lower arm of the dog 31, which arm is adapted to engage the arm 29 of the pawl 26 and to fit into the notch 30 thereof, as best shown in Fig. 5. The dog 31 is also provided with an upwardly-extending arm 34, said arm extending in proximity to the adjacent part of the lever 20. As best shown in Figs. 2 and 4, the dog 31 is comparatively narrow, its width being equal to less than one-third of the distance between the ribs 23, so that said dog may be moved transversely upon its pivot 32. For the purpose of securing the dog at different points upon the pivot 32 said pivot is provided with three peripheral grooves 35, which are spaced apart a short distance, and said dog is pro-

vided with a pin 36, fitted in a tubular socket in an arm 37, as shown in Fig. 6. The inner end of the pin 36 is rounded, as illustrated in said figure, and it is adapted to fit into the grooves 35, being held in its innermost position by a spring 38 and plug 39, the latter serving to retain the spring in position. The plug 39 is screw-threaded, so that it may be readily adjusted or removed. As illustrated in Fig. 4, the grooves 35 are rounded, and as the pin 36 is yieldingly held in said grooves said pin does not operate to prevent transverse movement of the dog by the operator; but it is sufficient to prevent accidental displacement of the dog.

40 41 indicate lugs formed on the under side of the inner end of the lever 20, near one edge thereof, as shown in Fig. 3. Said lugs are a short distance apart and receive between them the arm 34 of the dog 31 when said dog is at the left-hand end of the pivot 32 or in the position shown in Fig. 4. By this construction when the lever 20 is depressed the lug 41 will strike the arm 34 of the dog 31, moving said arm inward or to the left, thereby throwing the arm 33 outward or to the right until it strikes the arm 29 of the pawl 26 and enters the notch 30 therein. In the meantime the rotation of the wheel 11, caused by the downward movement of the lever, has rocked the pawl 26 away from the wheel 11, releasing the wheel, and the pawl being held in this position by means of arm 33 engaging in notch 30 of arm 29 the wheel is free to rotate and permit the lifting-bar 9 to descend when the outer end of the lever 20 is lifted. The lever 20 may then be thrown up to its uppermost position to disengage the wheel 11, the pawl 26 being held out of engagement with the wheel 11 until said lever has been rocked sufficiently to permit the lifting-bar 9 to descend through the rotation of the wheel 11 the space of one tooth, when the pawl 26 will be released automatically by the action of the lug 40 upon the arm 34 of the dog 31, said lug striking said arm and throwing it outward, thereby releasing the arm 33 of said dog from the arm 29 of said pawl and permitting said pawl to return to operative position, as illustrated in Fig. 1. By the time the lug 40 comes into engagement with the arm 34 of the dog 31 the lifting-bar 9 has descended through the rotation of the wheel 11 the space of one tooth, and the pawl 26 upon being thrown back into its operative position engages the next higher teeth 25 on the wheel 11 from those with which it was formerly in engagement. With the lifting-bar now locked by the pawl 26 the lever 20 is moved so as to raise the pivot 21 thereof up into the slot 22 and disengage the teeth 24 from the teeth 25. The free end of said lever is then slightly depressed and the pivot 21 returned to its lowermost or normal position in the slot 22, when the teeth 24 are brought into engagement with the next higher teeth 25 from those with which they were formerly in engagement. The above operation may

then be repeated to lower the lifting-bar another step. When, therefore, the dog 31 is in the position illustrated in Fig. 1, the lifting-bar 9 may be lowered by a step-by-step movement, the pawl 26 being rocked upon its pivot into and out of engagement with the wheel 11 by the swinging of the lever 20. It will be noted that during the downward movement of the operating-lever 20 when the parts are in the positions shown in Fig. 1 of the drawings the only action effected is to slightly raise the lifting-bar 9 and to disengage the pawl 26 from the wheel 11. The upward movement of the operating-lever 20, however, the teeth 24 thereon engaging the teeth 25 on the wheel 11, turns said wheel in a direction opposite that indicated by the arrow, Fig. 1, and lowers the lifting-bar 9 until the lug 40 on the lever 20 comes into engagement with the arm 34 of the dog 31, when said dog is thrown out of engagement with the notch 30 on the pawl 26 and permits said pawl to fall back into engagement with the wheel 11 and arrest the further downward movement of said lifting-bar. The term "step-by-step" movement, therefore, employed in this specification and in the claims is intended to cover such movement as that above described—that is, that during the operation of the lever 20 in one direction no downward movement of the lifting-bar 9 is effected, but that during the operation of the lever 20 in the other direction said lifting-bar is moved throughout a part of the distance to its lowermost position. When it is desired to permit the lifting-bar 9 to drop suddenly to its lowermost position, the dog 31 is shifted to the other end of its pivot 32, then occupying the position illustrated in Fig. 5. At this point the lever 20 is provided with a lug 43, which corresponds to the lug 41, the lug 40 being omitted, as illustrated in Figs. 3 and 5. With the dog 31 in this position the downward movement of the lever 20 moves the pawl 26 out of operative position, as above described and as illustrated in Fig. 5. By then throwing the lever 20 upward to its highest position its teeth 24 will move out of engagement with the wheel 11, so that said wheel will be free to rotate in a reverse direction and the lifting-bar 9 will be permitted to drop to its lowermost position. For lifting purposes the dog 31 is moved to an intermediate position upon its pivot, at which point the lever 20 is without means, as the lugs 40, 41, and 43, for engaging the arm 34 of said dog. (See Figs. 3 and 6.) Said dog, therefore, is inoperative, leaving the pawl 26 in its operative position unaffected by the operation of the lever 20, except as to clicks upon the teeth of the wheel 11.

From the above description it will be noted that by my improved construction the jack may be readily arranged for different operations, as all that is necessary to do is to shift the dog 31 into the desired position, the operation of the pawl being entirely automatic.

In Fig. 7 I have illustrated an application

of my improvements to a lifting-jack in which the lifting-lever 20 acts directly upon the rack 16 of the lifting-bar 9. The pawl 26 also engages directly with the rack of the lifting-bar instead of with the wheel 11, as in the construction illustrated in the other views.

I have described my invention in detail; but I do not wish to be limited to the specific details of construction set forth, as many modifications may be made without departing from my invention.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a lifting-jack, the combination of a lifting-bar, a lever, means for communicating motion from the lever to the lifting-bar, a retaining device for the lifting-bar, and means operated by the movement of said lever for moving said retaining device out of operative position to release said lifting-bar, the said lever being constructed and arranged to be moved out of operative connection with said lifting-bar when raised to its highest position, substantially as described.

2. In a lifting-jack, the combination of a lifting-bar, a lever adapted to be operated to raise and lower said lifting-bar, means for communicating motion from the lever to the lifting-bar, a retaining device for said lifting-bar, and means for automatically moving said retaining device into and out of operative position, alternately, as the lever is rocked to lower the lifting-bar step by step, substantially as described.

3. In a lifting-jack, the combination of a lifting-bar, a lever adapted to be operated to raise and lower said lifting-bar, means for communicating motion from the lever to the lifting-bar, a retaining device for said lifting-bar, and means operated by the movement of said lever for moving said retaining device into and out of operative position, alternately, as the lever is rocked to lower the lifting-bar step by step, substantially as described.

4. In a lifting-jack, the combination of a lifting-bar, a lever, means for communicating motion from the lever to the lifting-bar, a retaining device for the lifting-bar and means separate from said lever and operable thereby for locking said retaining device out of operative position to permit the lifting-bar to descend, substantially as described.

5. In a lifting-jack, the combination of a lifting-bar, a lever, means for communicating motion from the lever to the lifting-bar, a retaining device for the lifting-bar, means separate from said lever for locking said retaining device out of operative position to permit the lifting-bar to descend, and means for throwing said locking means and the operating mechanism therefor into and out of operative relation to each other, substantially as described.

6. In a lifting-jack, the combination of a lifting-bar, a lever adapted to be operated to raise and lower said lifting-bar, means for communicating motion from the lever to the

lifting-bar, a retaining device for said lifting-bar, and means actuated by said lever for automatically moving said retaining device out of operative position to permit the lifting-bar to be lowered, said means being adapted to be moved transversely into and out of operative relation with said lever, substantially as and for the purpose specified.

7. In a lifting-jack, the combination with a lifting-bar, of a retaining-pawl, an operating-lever for raising and lowering said lifting-bar, means for communicating motion from the lever to the lifting-bar, and a swinging dog adapted to be positively operated in both directions by said lever to move said pawl into and out of operative position, substantially as described.

8. In a lifting-jack, the combination of a lifting-bar, a lifting-lever, means for communicating motion from the lever to the lifting-bar, a retaining-pawl, a swinging dog adapted to move said pawl out of operative position, said swinging dog being movable transversely upon its pivot, and means carried by said lever for engaging said dog when in a certain position and causing it to swing upon its pivot for moving said pawl, substantially as described.

9. In a lifting-jack, the combination of a lifting-bar, an operating-lever having a tooth 43, means for communicating motion from the lever to the lifting-bar, a retaining-pawl having an arm 29, and a swinging dog interposed between said lever and pawl, said dog having arms 34 and 33, substantially as described.

10. In a lifting-jack, the combination of a lifting-bar, an operating-lever having lugs 40 and 41, means for communicating motion from the lever to the lifting-bar, a retaining-pawl having an arm 29, and a swinging dog interposed between said lever and pawl, said dog having arms 34 and 33, substantially as described.

11. In a lifting-jack, the combination of a lifting-bar, an operating-lever having lugs 40, 41 and 43, means for communicating motion from the lever to the lifting-bar, a retaining-pawl, and a swinging dog having arms 33 and 34, said dog being movable upon its pivot, substantially as described.

12. In a lifting-jack, the combination of a lifting-bar, an operating-lever having lugs 40, 41 and 43, means for communicating motion from the lever to the lifting-bar, a retaining-pawl, a swinging dog having arms 33 and 34, said dog being movable upon its pivot, and means for preventing accidental displacement of said dog, substantially as described.

13. In a lifting-jack, the combination of a lifting-bar, a lifting-lever for operating said bar, said lever having lugs 40, 41 and 43, and provided with a passage by said lugs 41 and 43, means for communicating motion from the lever to the lifting-bar, a retaining-pawl, and a swinging dog having arms 33 and 34 for operating said pawl, said dog being movable laterally upon its pivot, substantially as described.

14. In a lifting-jack, the combination with a lifting-bar, of a lifting-lever having a lug 41, means for communicating motion from the lever to the lifting-bar, a retaining-pawl having an arm 29 with a notch 30 in said arm, and a swinging dog 31 having an arm 33 adapted to enter said notch and an arm 34 adapted to be engaged by said lug 41, substantially as described.

15. In a lifting-jack, the combination with a lifting-bar, of a retaining-pawl, an operating-lever for raising and lowering said lifting-bar, means for communicating motion from the lever to the lifting-bar, and a transversely-adjustable swinging dog adapted to be operated by said lever to move said pawl out of operative position, substantially as described.

16. In a lifting-jack, the combination of a lifting-bar, a lever for raising and lowering said lifting-bar, said lever being adapted to be shifted into either operative or inoperative relation with said lifting-bar, and means for lowering said lifting-bar step by step by operating said lever, substantially as described.

17. In a lifting-jack, the combination of a lifting-bar, a lever for raising and lowering said lifting-bar, said lever being adapted to be moved into either operative or inoperative relation with said lifting-bar, means operating in connection with said lever for suddenly lowering said bar by continuous movement, and means operating in connection with said lever whereby the lifting-bar may be lowered by a step-by-step movement, substantially as described.

18. A lifting-jack comprising a lifting-bar, a shiftable dog, a pawl and a lever provided with means whereby said lever, in connection with the elements mentioned, is adapted to give to said bar either a step-by-step lowering movement, or a sudden continuous lowering movement, substantially as described.

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