No. 894,441. PATENTED JULY 28, 1908.

F. I. JOYCE.

LIFTING JACK.

APPLICATION FILED AUG. 28, 1905.

2 SHEETS—SHEET 1.

Fig. 2.

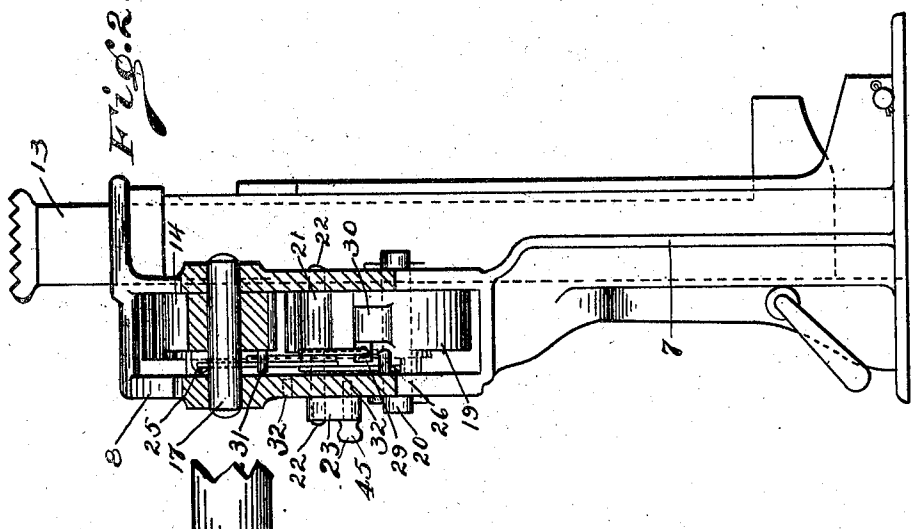

Fig. 1.

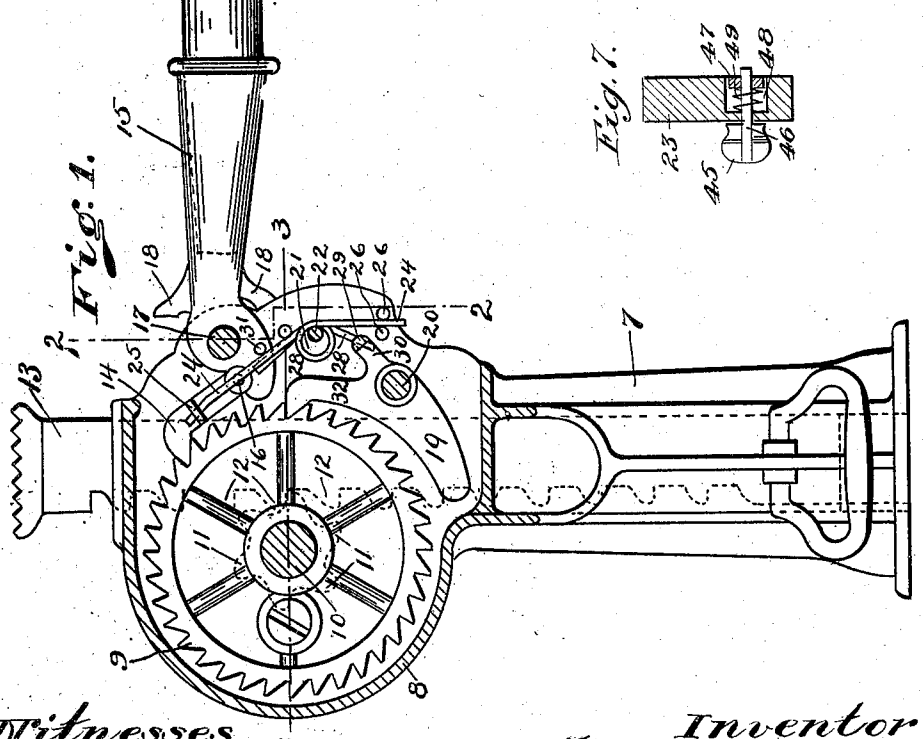

Fig. 7.

Witnesses

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2 SHEETS—SHEET 2.

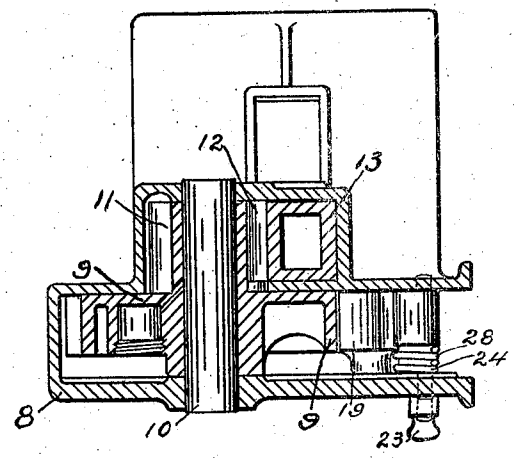

Fig. 3.

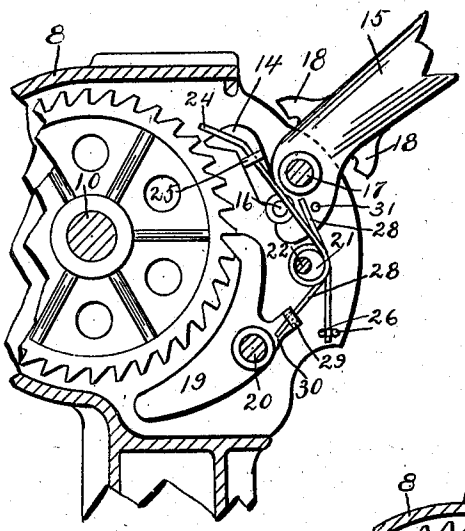

Fig. 4.

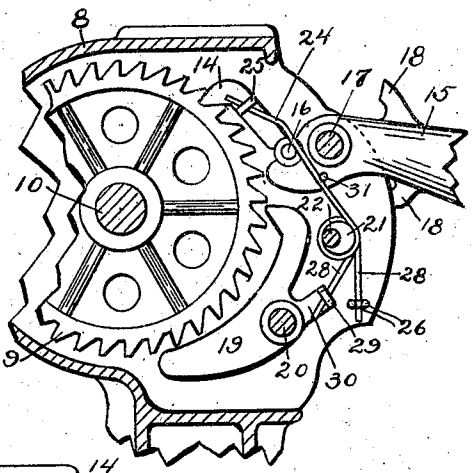

Fig. 5.

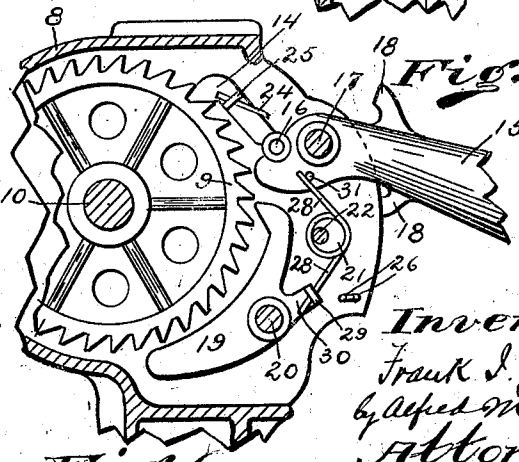

Fig. 6.

Witnesses

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LIFTING-JACK.

No. 894,441. Specification of Letters Patent. Patented July 28, 1908.

Application filed August 28, 1905. Serial No. 276,065.

To all whom it may concern:

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

My invention relates to lifting jacks, more particularly for automobiles and the like, designed for somewhat lighter work than the heavy railway jacks, but, of course, adapted for any class of work within the capacity of the jack.

The invention consists of that certain novel construction and arrangement of parts to be hereinafter particularly pointed out and claimed, and it especially consists in the novel construction and operation of a pair of springs coöperating with the lifting and retaining pawls whereby the springs are mounted on an eccentric, so that by adjusting the eccentric the action may be employed either to raise or to lower the lifting bar by a step by step movement.

In the drawings Figure 1 is a front elevation of the lifting jack, the casing being in section, and the parts arranged for raising the lifting bar. Fig. 2 is a vertical section of same, taken on the lines 2—2 of Fig. 1. Fig. 3 is a horizontal section taken on the lines 3—3 of Fig. 1. Fig. 4 is a front elevation of the operating mechanism with the springs arranged for lowering the lifting bar step by step, and with the lifting pawl in a position about to engage one of the teeth of the gear wheel. Fig. 5 is a similar view in the second position for lowering the lifting bar, with the retaining pawl released from the wheel. Fig. 6 is a similar view to that shown in Fig. 5 with the lifting pawl spring broken away. Fig. 7 is a sectional detail of the means for locking the eccentric crank.

7 is the standard for the jack, provided in its upper portion with a casing 8 to inclose the wheel 9, which is mounted on a shaft 10 journaled in the casing, and which wheel also carries the pinion 11 to engage the teeth 12 of the rack formed on the lifting bar 13, so that by the rotation of the wheel 9 the lifting bar will be raised or lowered.

For actuating the wheel 9, I provide the lifting pawl 14, which is pivoted at 16 on the inner end of the lifting lever 15, which lever is pivoted on the pin 17 supported in the sides of the casing. The lifting lever is provided with lugs 18—18, which come in contact with suitable stops on the casing to limit the movement of the lever in either direction beyond its necessary action.

19 is the retaining pawl weighted at its lower end to normally throw the upper and retaining end of the pawl into engagement with the teeth of the wheel 9, this pawl being pivoted on the pin 20 supported in the casing.

21 is an eccentric pin mounted between the side walls of the casing by the pin 22, to which pin 22 is secured the hand crank 23 for rotating the eccentric. The operating handle 45 of this crank 23 is mounted on the pin 46, which carries a collar 47 seated in the recess 48 in the under side of the crank 23, while a coiled spring 49 bears between this collar 47 and the base of the recess 48 in the crank, forcing the inner end of the pin 46 toward the casing, and in the two working positions seating the pin in the sockets or depressions 32, 32 in the casing, so as to lock the crank and the eccentric in place. In order to change the position of the eccentric, the operator pulls out the handle 45, which withdraws the pin 46 from the recess 32, so that the crank can be turned.

24 is the lifting pawl spring, the upper end of which engages in a slotted lug 25 on the pawl, the spring being coiled around the eccentric 21, and its lower end being held between the lugs 26—26 on the casing. This spring 24 is so constructed and coiled on the eccentric that when the eccentric is in the position shown in Fig. 1, the upper end of the spring will bear upon the lug 25, and keep the pawl 14 pressed towards the wheel, the spring itself sliding through the lug on the pawl, as the pawl is raised. In this position of the eccentric towards the wheel, the parts are arranged for raising the lifting bar, the lever 15 is raised and lowered, the retaining pawl 19 holding the weight as the lever is raised to permit the pawl 14 to take into the next lower tooth, and as the lever is lowered, the retaining pawl 19 is pushed out of engagement with the wheel and then springs in to engage the next tooth by its own weight. 28 is another spring coiled on the eccentric with its lower end engaging the slotted lug 29 on the heel 30 of the retaining pawl. The upper end of this spring 28 extends upwards along the face of the inner end of the lifting lever, and in front of the pin 31 on said lever,

leaving sufficient space so that when the eccentric, around which the spring is coiled, is towards the wheel 9 there is no tension on this spring, and it merely hangs loosely without effect on the retaining pawl 19. Now, when it is desired to lower the lifting bar, the eccentric 21 is rotated a half turn into the position shown in Figs. 4, 5, and 6, and the effect of this rotation of the eccentric is to change the tension of both of the springs 24 and 28 coiled thereon. In this new position of the eccentric, the tension of the spring 24 is such as to tend to throw the lifting pawl 14 out of engagement with the wheel 9, so that when the lifting lever 15 is raised, as shown in Fig. 4, the lifting pawl will become disengaged from the wheel while the retaining pawl will hold the weight. As the lever 15 is then lowered, the pawl 14 will be raised until the pin 31 on the lever 15 comes in contact with the spring 24, and the further lowering of the lifting lever will cause the pin 31 to push the spring towards the wheel, and thus carry the lifting pawl 14 into the next higher tooth of the wheel. At the same time that this movement takes place, the pin 31 will contact with the upper end of the spring 28, which will exert a tension on the spring bearing with its lower end on the heel of the retaining pawl to throw the retaining pawl out of engagement with the wheel, and the load will then be carried by the lifting pawl, and by raising the lever 15, the wheel 9 and the lifting bar 13 will be dropped one tooth until the pin 31 is withdrawn from the end of the retaining pawl spring 28, when the retaining pawl by its counter weight will be thrown into engagement with the next higher tooth, thus again taking the weight. As soon as the retaining pawl takes the weight, the lifting pawl is thrown out of engagement with the wheel by the back tension of the spring 24, and the process is repeated until the lifting bar has been dropped step by step as far as desired.

While I have illustrated my improvements as applied to a construction of lifting jack in which a wheel and pinion are employed to actuate the lifting bar, it will be evident that the lifting and retaining pawls could be applied directly on the rack of the lifting bars, and the lifting bar raised and lowered directly without the intervention of the wheel and pinion, and my invention, therefore, is equally applicable to the ordinary construction of straight bar jacks as well as to the geared jack which is illustrated in the drawings.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a lifting jack, the combination of a lifting bar, a lever adapted to be operated to raise and lower said lifting bar, means intermediate said lifting bar and lever for effecting the operation, a retaining device for said lifting bar, and a spring normally inoperative acting on said retaining device to reverse its operation when the lever is operated to lower the lifting bar, and mechanism for throwing said spring into operation.

2. In a lifting jack, the combination of a lifting bar, a lever, means intermediate the lifting bar and lever for raising said lifting bar, and a spring to effect the operation when the lifting bar is raised, a movable mounting for said spring, with means for changing the relative position of said movable mounting, whereby the action of the intermediate means may be reversed for lowering the lifting bar.

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 intermediate said lifting bar, and lever, for raising and lowering same, a retaining device for the lifting bar, and springs for enforcing the operation of said intermediate means, and retaining device, said retaining device spring being normally inactive with mechanism for reversing the operation of the spring for said intermediate means and simultaneously throwing said retaining device spring into operation.

4. In a lifting jack, the combination of a lifting bar, a lever adapted to be operated to raise and lower said lifting bar, a pawl pivoted on the lever to effect said operation, a spring to enforce the action of said pawl with a movable bearing point therefor, a retaining device for the lifting bar, and means for changing the bearing point of said spring, whereby the tension thereof may be reversed to reverse the action of the pawl when the lifting bar is lowered.

5. In a lifting jack, the combination of a lifting bar, a lever adapted to be operated to raise and lower said lifting bar, a pawl pivoted on the lever to effect said operation, a spring to enforce the action of said pawl, a retaining device for the lifting bar, and means for changing the position of said spring, and a pin on the lever to operate said spring to reverse the action of the pawl when the lifting bar is lowered.

6. In a lifting jack, the combination of a lifting bar, a lever to be operated to raise and lower said lifting bar, a retaining device for the lifting bar, and a spring normally inoperative, with means for changing the position of said spring, and mechanism for throwing said spring into operation to reverse the action of the retaining device when the lifting bar is lowered.

7. In a lifting jack, the combination of a lifting bar, a lever adapted to be operated to raise and lower said lifting bar, a pawl pivoted on the lever to effect said operation, a spring to enforce the action of said pawl, a retaining device for the lifting bar, and a spring normally inactive in contact with said

retaining device, with means for changing the position of both of said springs, and a pin on the lever to operate said springs to reverse the action of said pawl, and retaining device.

8. In a lifting jack, the combination of the lifting bar, a lever adapted to be operated to raise and lower said lifting bar, a pawl pivoted on the lever to effect said operation, with a spring to enforce the action of said pawl, a weighted pawl to retain the lifting bar, with a spring normally inactive in contact with said pawl, an eccentric pin, upon which said springs are mounted, and means for turning said eccentric to change the position of said springs, with a pin on the lifting lever to contact with said springs when changed.

9. In a lifting jack, an actuating lever, a lifting pawl, a holding pawl, a separate spring for each of said pawls, and means for putting said springs in action to force said pawls out of engagement during the lowering movement, substantially as described.

10. In a lifting jack, an operating lever, a lifting pawl actuated thereby, a spring for holding said lifting pawl in engagement during the lifting operation, means for reversing the action of said spring during the lowering operation, and pin on the operating lever to contact with said spring and force the lifting pawl into engagement at predetermined times during the lowering operation, substantially as described.

11. In a lifting jack, an actuating lever, a lifting pawl, a holding pawl, a separate spring for each of said pawls, and a movable device for putting said springs in action to force said pawls out of engagement during the lowering movement, substantially as described.

12. In a lifting jack, an actuating lever, a lifting pawl, a holding pawl, separate springs for each of said pawls, means for putting said springs in action, to force said pawls out of engagement during the lowering movement, and connection for each of said springs with the actuating lever to overcome the action of the lifting pawl spring and to release the tension of the holding pawl spring, to permit the pawls to come into engagement, substantially as described.

13. 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 means for releasing the tension of said spring to permit the holding pawl to take operative position at predetermined times during said lowering operation, substantially as described.

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Witnesses:
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