W. B. TEMPLETON.

GEARED LIFTING JACK.

APPLICATION FILED JAN. 17, 1918.

1,325,962.

Patented Dec. 23, 1919.

2 SHEETS—SHEET 1.

Fig. 3

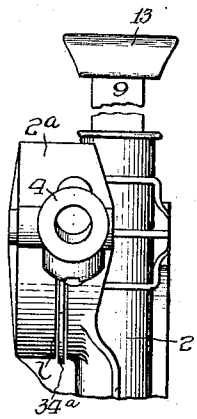


Fig. 2.

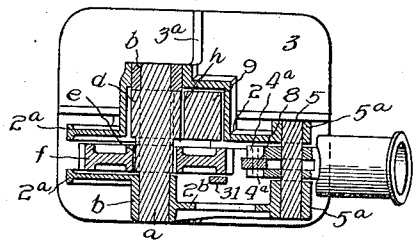


Fig. 4

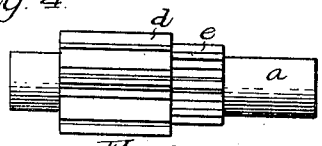
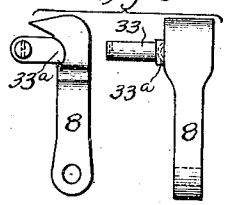


Fig. 6



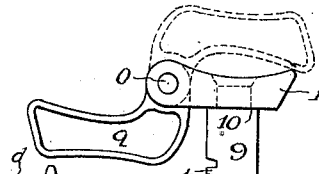
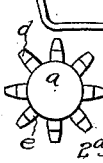


Fig. 1.

Fig. 5.



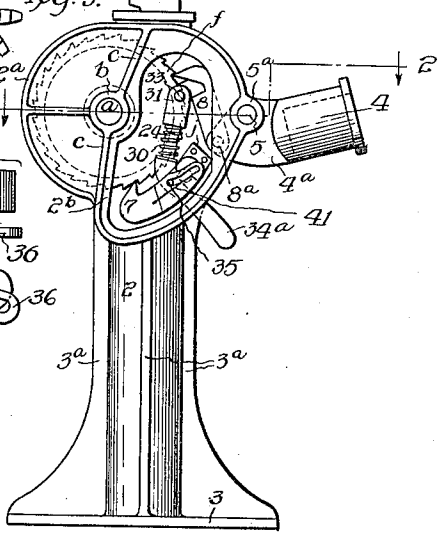


Fig. 7

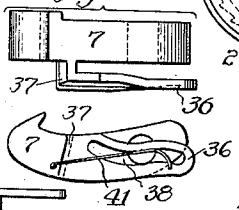
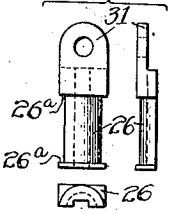


Fig. 9



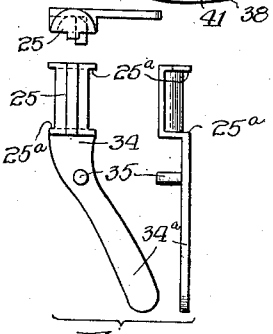


Fig. 8

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2 SHEETS—SHEET 2.

Fig. 10

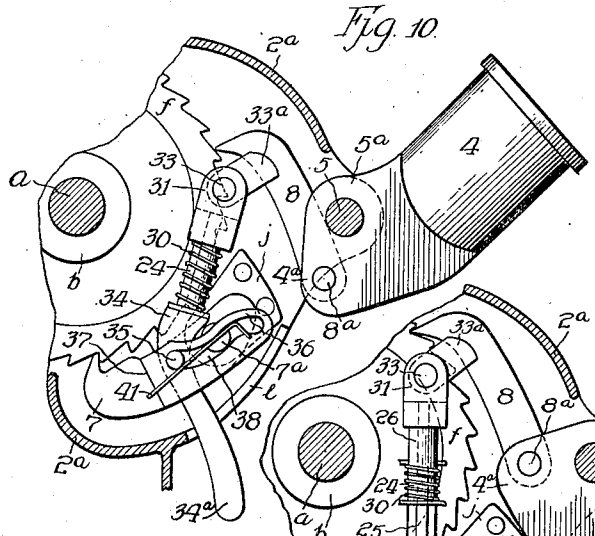


Fig. 11

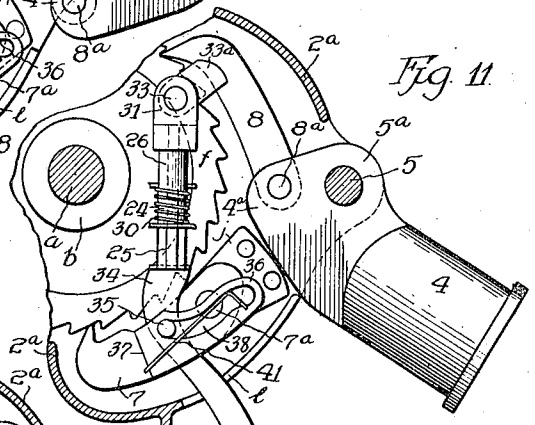


Fig. 12.

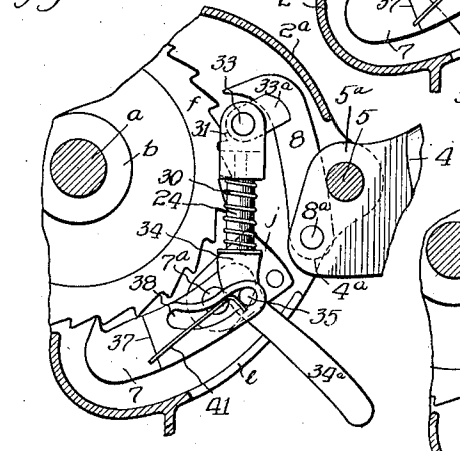
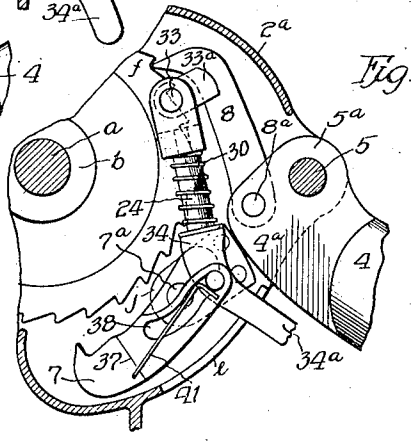


Fig. 13



Witness:
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UNITED STATES PATENT OFFICE.

WALTER B. TEMPLETON, OF CHICAGO, ILLINOIS.

GEARED LIFTING-JACK.

1,325,962. Specification of Letters Patent. Patented Dec. 23, 1919.

Application filed January 17, 1918. Serial No. 212,166.

To all whom it may concern:

Be it known that I, WALTER B. TEMPLETON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Geared Lifting-Jacks, of which the following is a specification.

My present invention is essentially an improvement of the lifting jack designed primarily for automobiles for which I have filed an application for U. S. Letters Patent bearing Serial No. 212,165, in the important feature of materially increasing the lifting power with the same leverage, by interposing a gear wheel and pinion between the lever-actuated pawls of the jack and its lifting bar While retaining all the advantages of the pawl-actuating and shifting device of the former construction, the present invention includes the feature of attaching the pawl-shifting cam to the lower pawl, whereby the cam is given an approximately horizontal direction, reducing the tendency of the pawl-shifting finger to work down in the slot of the cam, and giving the finger grip a much more favorable operative position beneath, and hence out of way of, the operating lever. This change has the additional advantage of reducing to a minimum all openings in the upper side of the protective casing, which now is shut all around excepting for a small slot in the under side for the shifting finger and a like opening for the swing of the operating lever.

In the present application I have also disclosed an application of the principle of the pawl-shifting mechanism contained in my former application, above referred to, to a single-acting jack, wherein the lifting effect is produced only on the down-stroke of the lever.

Several features shown in the present application are fully set forth, illustrated and claimed in Letters Patent previously issued to me, to which reference is here made to facilitate the description. Thus, the construction of the shaft and method of mounting on it the spur wheel and pinion are found in Letters Patent No. 1,143,558, dated June 15, 1915, gearing; the pawl-actuating links are practically the same as those described in No. 1,025,218, May 7, 1912, lifting jack. In the drawings annexed to and forming a part of this specification:

Figure 1 is a front elevation of the improved jack with a part of the casing removed to show the working mechanism;

Fig. 2 is a section on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a rear elevation of the upper part of the jack;

Fig. 4 is a side elevation of the operating shaft;

Fig. 5 is an end elevation of said shaft, looking at the special construction for keying the pinion to the shaft;

Fig. 6 is a detail group view showing the upper pawl in side and rear elevation;

Fig. 7 is a detail group view showing the lower pawl and its cam in side elevation and in plan;

Fig. 8 is a detail group view showing the pawl-lifting trigger and one of the link members in side and edge elevation and in plan;

Fig. 9 is a group view similar to Fig. 8 showing the other link member;

Fig. 10 is an enlarged vertical section of the casing, showing the operating mechanism as set for lifting, with the upper pawl about to engage the flank of a tooth of the ratchet wheel for an upward impulse, the load being sustained by the lower pawl;

Fig. 11 is a similar view, the pawls still being set for lifting, the operating lever being at the end of its downward swing, and the lower pawl about to engage the flank of a tooth of the ratchet wheel to take over the load now being borne by the upper pawl;

Fig. 12 is a view similar to Fig. 10, but with the operating mechanism set for the lowering of the load, the operating lever being near the end of its upward swing, the upper pawl being about to engage the tooth of the ratchet wheel next above the one from which it has just been released, and the load being sustained by the lower pawl; and

Fig. 13 is a similar view, with the pawls still set for lowering, the operating lever being at the end of its downward swing, the load being borne by the upper pawl, and the lower pawl set to engage the tooth of the ratchet wheel next above the one from which it has just been released.

A casing 2 of suitable metal, preferably cast iron, rises vertically and centrally from an ample base 3, to which it is firmly con-

nected by four like vertical stay ribs or webs 3^a, disposed in the form of a cross, each projecting at right angles from and integral with one of the sides of the vertical, central trunk in which travels a lifting bar 9, preferably of square section. At the top of this trunk the casing swells out laterally to form a housing 2^a of irregular shape, of approximately circular vertical section, which incloses all of the operating mechanism excepting the main lever and the handle of the pawl-shifting trigger. Access is given to the interior of the casing by an aperture in one side closed by a plate (not shown) fitting over a flanged frame 2^b integral with casing 2^a.

A transverse shaft *a* is mounted in bearings *b* formed centrally in each side of the casing and strengthened by ribs *c*, integral with the casing. This shaft carries integral with it a pinion *d*, and adjacent to it an integral seating *e* for a ratchet wheel *f*, which seating is formed of the continuations of the teeth of the pinion, each minus its addendum, as fully set forth in U. S. Patent No. 1,143,558, previously referred to. A rack *h*, the teeth of which extend across the forward face of the lifting bar 9, is always in engagement with the pinion.

A socket 4 into which is inserted a suitable handle bar (not shown) for the main operating lever, is provided with two flat, parallel ears or extension pieces 4^a, integral with the socket, and spaced apart sufficiently to accommodate between them the upper and lifting pawl 8, pivotally mounted on a pin 8^a, seated in ears 4^a at their innermost ends. The operating lever is articulated to a pivot pin 5 rigidly seated in a pair of parallel lugs 5^a projecting laterally from and integral with the rearmost ends of the sides of casing 2^a. The lower and dogging pawl 7 is pivotally mounted near its upper end on a stud 7^a, projecting inwardly from and at right angles to a plate *j* riveted to the solid side of the casing, in such a position that the claw of said pawl, which, in this case, is at its lower end, a distinctly novel feature in jack construction, will always be near the periphery of the ratchet wheel.

The pawl-shifting link, designated as a whole by 24, comprises two members 25 and 26 (Figs. 8 and 9) that are slidable endwise upon each other, said link members being embraced and held together by a coil spring 30 which abuts at its ends against semicircular shoulders 25^a and 26^a formed at the ends of the link members 25 and 26 respectively. A flat ear 31, integral with the link member 26 and forming at its inner end one of the shoulders 26^a, extends for a short distance above the upper shoulder of the other member 25 in a direction parallel to the axis of the cylinder formed by the two link members when in neutral position. At its upper end ear 31 is pivotally mounted on a stud 33, projecting integrally from and at right angles to the face of a lug 33^a, integrally offset from one side of the upper pawl 8 near its free end or ratchet-engaging point.

The other member 25 of the pawl-actuating link terminates at its lower end in an integral, flat, offset finger 34, the upper end of which forms one of the shoulders 25^a, and the lower end of which is fashioned into a handle 34^a, projecting through a slot *l* in the lower part of casing 2^a. Finger 34 and handle 34^a form the trigger for shifting or setting the pawls for lifting or lowering the load, as may be required. A stud 35 projecting integrally from and at right angles to the outer face of finger 34 is permanently in sliding engagement with a cam slot 38, cut in a cam plate 36, which extends parallel to the face of the dogging pawl 7, with which it is connected by a rectangular offset portion 37 (Fig. 7).

The distance between the cam plate 36 and the outer face of the lower cam is just sufficient to allow an easy play of the pawl-setting trigger, and the width of the cam slot is made such that the stud 35 may readily be moved along the camway, but will not be easily jarred or moved from any position in which it may be set. Additional security against the unintentional displacement of the shifting trigger is provided by a spring 41, preferably made of steel wire, one end of which is bent at right angles to the extension of the spring, and passed through a hole in pawl 7, being riveted over against the latter. Spring 41 lies closely against the outer face of the pawl, bearing against the under side of stud 35 in all positions of the latter, and terminates in a rectangular bend which comes directly under stud 35 when the latter is at the extreme right hand end of the cam slot, as shown in Figs. 12 and 13, in which position the stud 35 has its maximum tendency to work down the camway. Geometrically considered, the curve of this camway 38 closely approximates a sinusoid of very short maximum positive and negative ordinates. It will be observed that the forward half of the curve has its instantaneous centers of curvature above and to the left of the pawl pivot 7^a, that the rear half has its centers below and to the right of said pivot, and that the center of the pivot coincides substantially with the node of the sinusoid, where the latter crosses the line of abscissæ. Consequently, in any given position of the actuating lever the pawl-actuating link 24 will be in neutral position when stud 35 is opposite the pivot 7^a and will be extended in all positions of

the stud 35 forward of said pivot, and shortened in all positions of the stud along the camway rearward of the pivot.

Considering now the details of the movement of the pawl-setting mechanism, in Fig. 10 the stud 35 has been moved to the extreme forward end of the camway, and the operating lever swung to near its uppermost position, carrying the upper pawl to the position shown, in which it is about to push upward the tooth-flank just above it, as soon as the lever begins its downward swing. If the lever remains in any position while the shifting trigger is moved, the pivot 33 on the upper pawl becomes practically the center of motion of the pawl-actuating link, and the position of the lower pawl is determined by the position of stud 35 in the camway, while the position of the upper pawl is determined for all practical purposes solely by the position of the actuating lever. Thus, in Fig. 10, the link 24 is slightly extended and causes the claw or toe of the lower pawl to swing upward into engagement with the ratchet wheel because the pull of stud 35 is forward of pivot 7^a, while in Fig. 12 the claw is still swung into engagement with the ratchet wheel, in spite of the shortening of link 24, because center 33 on the upper pawl has been moved so far down and nearer to the pivot 7^a that the stud 35 pushes down the extreme rear end of the cam plate 36, causing the forward end to tilt upward. In Fig. 11 the same rear end of the cam plate is pulled up by the pawl-link because the downward swing of the main lever has carried the center 33 upward and away from the pivot 7^a. It will be observed from this analysis that in this arrangement the spring of the pawl-link really does no work in pulling the pawl claws into or pushing them out of position, being useful merely for pulling together members 25 and 26, enabling the link as a whole to be extended or shortened.

On the upper end of the lifting bar 9 is secured a head 13 having a concave upper load engaging surface, and to the forward side of this head is hinged at *o* a lifting toe *q* which may occupy either of the full or dotted line positions shown, as the exigencies of service may require.

I claim:

1. In a lifting jack, the combination of a casing, a lifting bar guided therein and formed with a rack, a shaft journaled in said casing, a pinion on said shaft engaging said rack, a ratchet wheel on said shaft, an operating lever fulcrumed in said casing, an upper pawl articulated to said lever and engaging said ratchet wheel, a lower dogging pawl articulated to said casing and having a cam-way rigid therewith, a lengthwise elastic expansible and contractible link articulated at its upper end to said upper pawl and at its lower end having slidable engagement with said cam-way, and manually operable means for shifting the lower end of said link from one end to the other of said cam-way.

2. In a lifting jack, the combination of a casing, a lifting bar guided therein and formed with a rack, a shaft journaled in said casing, a pinion on said shaft engaging said rack, a ratchet wheel on said shaft, an operating lever fulcrumed in said casing, an upper pawl articulated to said lever and engaging said ratchet wheel, a lower dogging pawl articulated to said casing and having a cam-way rigid therewith, a lengthwise elastic expansible and contractible link articulated at its upper end to said upper pawl and at its lower end having slidable engagement with said cam-way, manually operable means for shifting the lower end of said link from one end to the other of said cam-way, and means for yieldably retaining the lower end of said link at either end of said cam-way.

3. In a lifting jack, the combination of a casing, a lifting bar guided therein and formed with a rack, a shaft journaled in said casing, a pinion on said shaft engaging said rack, a ratchet wheel on said shaft, an operating lever fulcrumed in said casing, an upper pawl articulated to said lever and engaging said ratchet wheel, a lower dogging pawl articulated to said casing, a plate rigid with said dogging pawl and formed with a cam slot, a lengthwise elastic expansible and contractible link articulated at its upper end to said upper pawl, a stud on the lower end of said link engaged with said cam slot, manually operable means for shifting said stud from end to end of said cam slot, and spring means for retaining said stud in either shifted position.

4. In a lifting jack, the combination of a casing, a lifting bar guided therein and formed with a rack, a shaft journaled in said casing, a pinion on said shaft engaging said rack, a ratchet wheel on said shaft, an operating lever fulcrumed in said casing, an upper pawl articulated to said lever and engaging said ratchet wheel, a lower dogging pawl pivoted to said casing, a plate rigid with said dogging pawl and formed with a sinusoidal cam slot having its oppositely curved branches symmetrically disposed with reference to the pivot of said dogging pawl, a lengthwise elastic expansible and contractible link articulated at its upper end to said upper pawl, a stud on the lower end of said link engaged with said cam slot, manually operable means for shifting said stud from end to end of said cam slot, and spring means for retaining said stud in either shifted position.

WALTER B. TEMPLETON.