Oct. 4, 1955 J. F. PALKA 2,719,696

CABLE AND RATCHET WHEEL LIFTING JACK

Filed July 31, 1952 2 Sheets-Sheet 1

Fig. 1

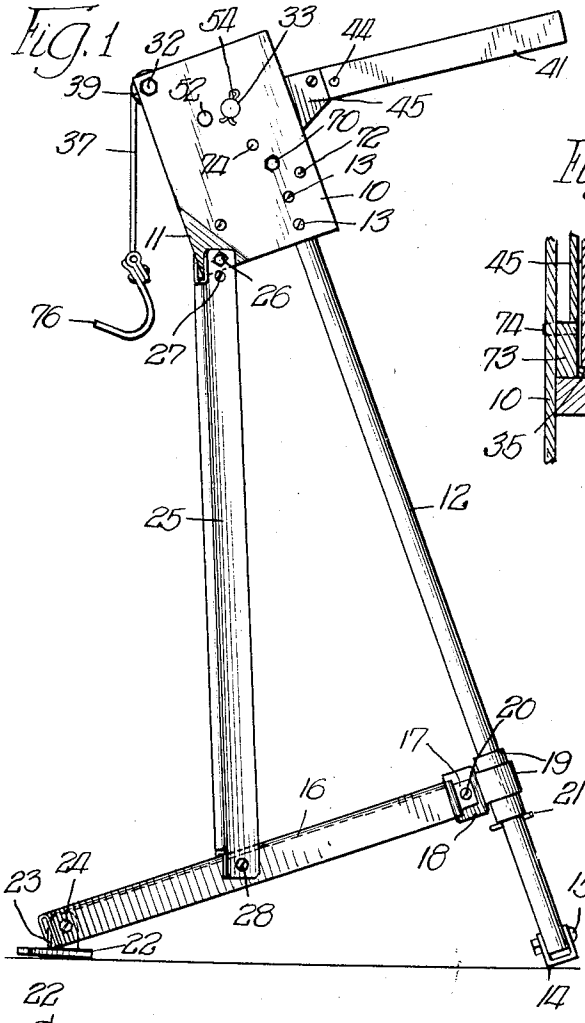


Fig. 9

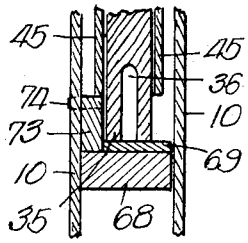


Fig. 2

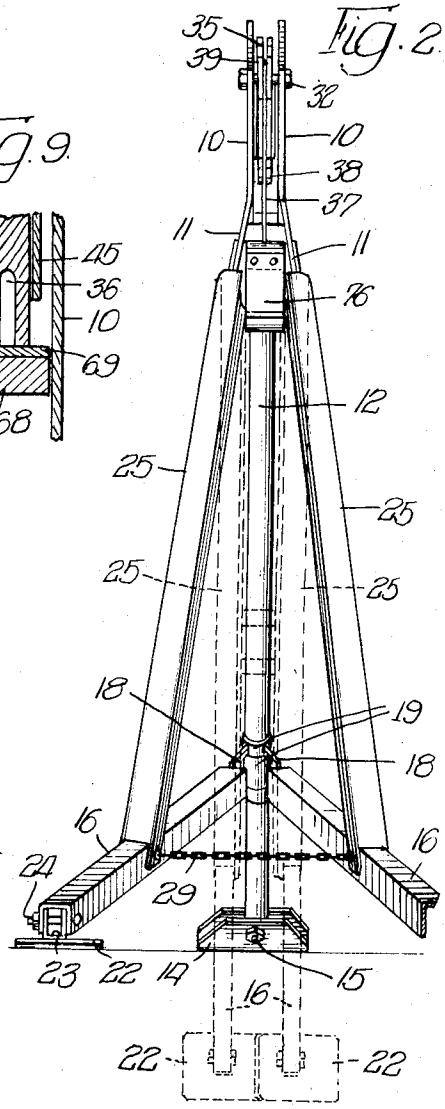
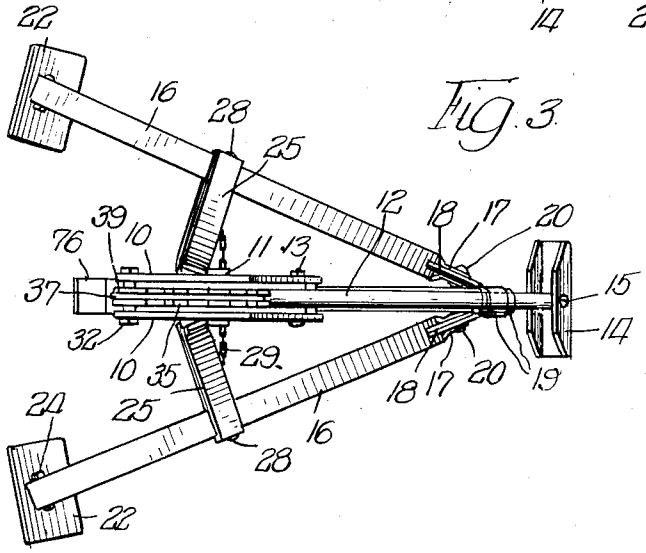


Fig. 3



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Fig. 4

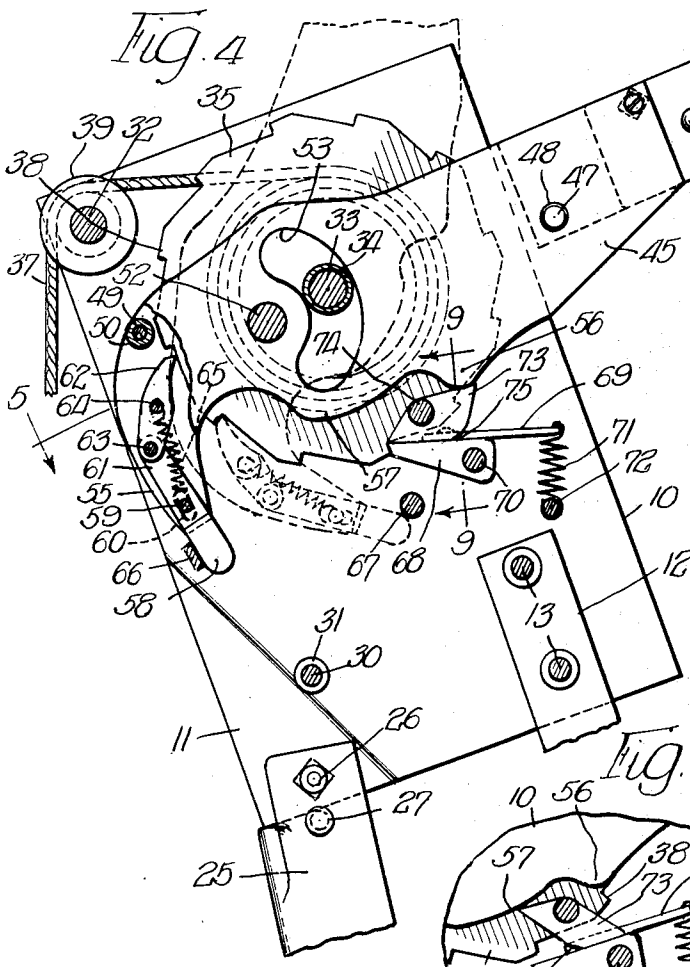


Fig. 6

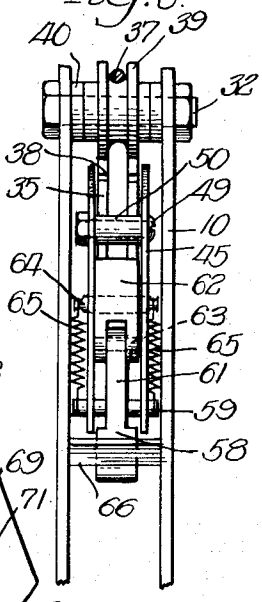


Fig. 8

Fig. 5

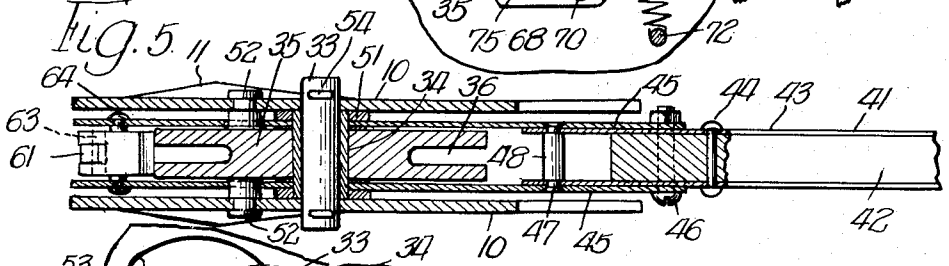
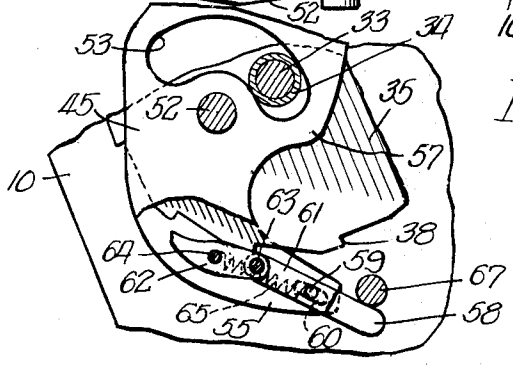


Fig. 7



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2,719,696

CABLE AND RATCHET WHEEL LIFTING JACK

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Application July 31, 1952, Serial No. 301,900

3 Claims. (Cl. 254—146)

The present invention relates to lifting jacks and has for its main object the provision of a jack which in its construction embodies essentially a cable wound upon a ratchet wheel, a pawl, and a handle capable of reciprocating motion for causing the cable either to wind upon or unwind from the ratchet wheel.

Another object of the present invention is the provision in a lifting jack of the character indicated of a ratchet wheel having a cable wound therearound, the free end of the cable having a load-engaging hook, with a suitable mechanism for imparting a rotary movement to the ratchet wheel in one or the opposite direction for permitting the winding or unwinding of the cable, depending upon whether the load is to be elevated from the ground or lowered.

A further object of the present invention is the provision of a pair of pawls in association with a ratchet wheel aforesaid, one of said pawls being operable by a handle for imparting a rotary movement to the ratchet wheel in one direction for causing the winding of a cable upon said ratchet wheel for elevating a load, with the other pawl riding upon the teeth of the ratchet wheel during the rotary movement of the latter in one direction, the teeth of the ratchet wheel being engaged by the latter pawl for preventing the rotary movement of the ratchet wheel to the opposite direction.

A still further object of the present invention is the provision in a lifting jack of a ratchet wheel with a pair of pawls engaging said ratchet wheel, with the mechanism for causing alternate engagement and disengagement of the two pawls with the ratchet wheel for the purpose of permitting intermittent rotary shifting movement of the ratchet wheel in one direction for permitting lowering of the load suspended upon a cable wound around and affixed to the ratchet wheel.

Another object of the present invention is the provision of a suitable folding support for supporting the mechanism aforesaid.

With the above general objects in view and others that will appear as the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claims.

In the drawings forming a part of this application and in which like designating characters refer to corresponding parts throughout the several views:

Fig. 1 is a side elevational view of the present invention with the support thereof in an open set position;

Fig. 2 is a similar view, taken at an angle removed 90 degrees from that of Fig. 1;

Fig. 3 is a top elevational view of the present invention with the support thereof in an open position;

Fig. 4 is an enlarged side elevational view of the mechanism for winding or unwinding a cable upon a ratchet wheel;

Fig. 5 is a cross sectional view on line 5—5 of Fig. 4;

Fig. 6 is a front edge elevational view of the said mechanism;

Fig. 7 is a view illustrating an inoperative position of one of the pawls, with the mechanism for bringing the same into the inoperative position;

Fig. 8 is a side elevational view of another pawl while in an inoperative position; and

Fig. 9 is a cross-sectional view on line 9—9 of Fig. 4.

Referring in detail to the present drawings there is shown a pair of plates **10** which enclose a mechanism for winding in either direction a cable upon which a load is supported. The front lower corner of each of said plates **10** is bent outwardly for defining leaf **11**, for the purpose hereinafter described.

Said plates **10** are supported upon the upper end of tubular leg **12**. If preferable, the upper end of said leg **12** may be flattened or squared on transverse cross section. A pair of bolts **13** are passed through said plates **10** and the upper end of said leg **12** interposed therebetween. The heads of said bolts **13** bearing against one plate **10**, and nuts threadedly engaging the opposite ends of said bolts **13** will rigidly clamp the upper end of said leg **12** within said plates **10**. Said upper end of leg **12** is preferably located adjacent the lower end of said plates **10** and in the proximity of the rear edges thereof. It is noted that said leg **12** remains in parallelism with the longitudinal axis of said plates **10**.

The lower end of said leg **12** is receivable within an oblong, U-shaped foot **14**, which is in a hinged association with said leg **12** through bolt and nut **15** passed through the lateral portions of said foot **14** and said leg **12**, as is clearly seen in Figs. 1, 2 and 3. By virtue of the pivotal association of said foot **14** upon said leg **12**, the former can be shifted either to an extended transverse relation, or in a longitudinal relation when the support remains in a folded position.

The lifting jack support further includes a pair of braces **16**, each of which is made U-shaped on transverse cross-section. Adjacent one end the top portions of said braces **16** are cut away, and the sides thereof are bent towards each other as at **17**, in order to receive therewithin in an embracing relation leaf **18**. Each leaf **18** extends from an independent ring **19**. The two of said rings **19** encompass said leg **12** and are capable of upright shifting movement therewith. Pivots **20**, passed through the sides of said braces **16** and the embraced leaf **18** therewithin, permit angular swinging of said braces upon said leaves **18** and with relation to leg **12** when the adjacent ends of said braces are shifted in an upright direction upon said leg **12** through the medium of said rings **19**. Pin **21**, in a spaced relation with the lower termination of said leg **12**, constitutes means for limiting the downward shifting movement of the adjacent ends of said braces **16**, as best shown in Fig. 1.

Affixed to the opposite ends of each of said braces **16** is foot plate **22**. Each plate **22** has a U-shaped lug **23** extending from one face thereof. Each lug **23** enters the channel defined by the U-shaped construction of brace **16**, and is there hinged by and upon transversely passed bolt and nut **24**. By virtue of this arrangement foot plates **22** are angularly shiftable and adjustable upon the adjacent ends of braces **16**, in order that said foot plates **22** may assume proper position with relation to the ground and rest thereon flat in order to properly support said braces **16** upon the ground, as is best seen in Fig. 1.

Pivotally affixed to the laterally extending leaves **11** of plates **10** are standards **25**, by means of pivots **26**. These pivots **26** maintain standards **25** in a rather loose association with leaves **11** and plates **10** in order that said standards **25** may not only shift angularly towards leg **12**, but also away from or towards each other when the support is brought either to an open or folded position.

An additional bolt 27 is passed through standard 25 so that plate 10 through its leaf 11 may be supported thereon when the standard is in an open position, as seen in Fig. 1. By virtue of this arrangement pivot 26 does not alone support the weight of the load being lifted by the jack.

The sides of each standard 25, adjacent the lower end thereof are in an embracing relation with each brace 16, and intermediately of the two ends of the latter are pivoted thereon by means of bolts 28. Said bolts 28 in two braces 16 also engage chain 29 which limits the outward shifting movement to the open position of said braces 16 and standards 25, as shown in Fig. 2.

The relative position of the several parts of the said support when in an open position is shown in Figs. 1, 2 and 3. To fold the several parts of the support, position in dotted lines in Fig. 2, rings 19 are shifted upwardly upon leg 12. This, due to hinged connection between the adjacent ends of braces 16 through leaves 18 and pivots 20, causes the elevation of said braces to a substantially vertical position and substantially in parallelism with said leg 12. Due to the swivel connection of said braces 16 with leg 12 through rings 19 said braces are capable of shifting towards each other when in a folded position, as shown in Fig. 2.

The shifting movement of said braces 16 toward leg 12 and toward each other also actuates standards 25 to the corresponding directions, namely, said standards 25 shift toward said leg 12 and assume substantially parallel relation therewith, and also shift towards each other. These movements of standards 25 are permitted by pivots 26 and rather loose connection of said standards 25 with leaves 11 of plates 10. It is noted that standards 25 are somewhat wider than braces 16, so that when the two shift to a folded position, that is toward leg 12, braces 16 enter the channels defined by the U-shaped formation of said standards 25.

Referring now more particularly to the lifting mechanism which is located between said plates 10, it is first noted that the two plates in addition to bolts 13 are maintained in a relative rigid position by bolt 30 upon which an encompassing collar 31 is set, as well as by pulley supporting shaft 32 and ratchet wheel supporting shaft 33. Lining said shaft 33 is collar 34, the ends of which contact and bear against the inner faces of said plates 10.

Set upon said shaft 33 and collar 34 is ratchet wheel 35 which is provided with circumferential groove 36 for receiving therewithin cable 37, the inner end of which is rigidly affixed, in any suitable manner to the body portion of said ratchet wheel 35 and at the bottom of said groove 36. Said cable is adapted to wind within said groove 36, a number of convolutions of the said cable being shown in dotted line of Fig. 4. Said groove 36 slits the rim portion of ratchet wheel 35 into a pair of spaced rim sections, each of which is provided with uniformly and identically located teeth 38.

Bolt 32 is positioned at the upper corner of plates 10 and above standards 25, and supports pulley 39 over which cable 37 is passed. Spacers 40 set upon shaft 32, on each side of pulley 39 maintain the said pulley in a centered position within the space defined by said plates 10.

The handle for operating said ratchet wheel 35 includes handle bar 41, which may be made of wooden piece 42 lined on the sides with metal covers 43, said wooden piece 42 and covers 43 being joined and maintained in a rigid relative position by a plurality of rivets 44 passed in a transverse relation through said handle bar 41. The operative part of the handle includes a pair of spaced plates 45, which are in a superimposing relation with handle bar 41 and covers 43 and which are connected thereto by means of bolt 46 and rivet 47. Rivet 47 carries collar 48 which by its ends bears against the inner faces of said covers 43 and maintains the latter and said plates 45 in a rigid position.

The opposite, front end of said plates 45 are rigidly connected by means of bolt 49 and a spacing collar 50 set thereon. Each of said plates 45 is positioned on each side of ratchet wheel 35, and in a slightly spaced relation therewith, and is in a spaced relation with the adjacent plate 10. Spacing washer 51 set on each end of collar 34 maintains said plates 45 in a spaced relation with plates 10, and properly centered therewithin and in a proper operative position with relation to said ratchet wheel 35.

Each of said plates 45 is in a pivotal relation with the adjacent plate 10 by means of pivot bolt 52, the inner end of which is riveted, or otherwise suitably attached, to the respective plate 45. The outer reduced end of each pivot bolt 52 is passed through the adjacent plate 10 and is mounted therewithin. The outer ends of said pivot bolts 52 are extended outwardly of plates 10 and are hammered down to define rivet heads by virtue of which said rivet bolts 52 are maintained within plates 10 and are prevented from making any shifting movement transversely of said plates 10. Each plate 45 is further provided with arcuate slot 53, within which said shaft 33 and said collar 34 are accommodated. The slots 53 in the two plates 45 are of course alined. The two slots 53 are positioned within a comparatively short distance from said pivot bolts 52 and intermediately of said pivot bolts 52 and handle bar 41. The ends of said shaft 33 extend beyond the outer faces of plates 10 and receive dowel pins 54 preventing said shaft 33 from a longitudinal shifting movement.

From the hereinabove description it will be apparent that pivot bolts 52 constitute a pivot for said plates 45 upon which the handle is capable of making angular shifting movement into an upward or downward direction when actuated by handle bar 41 downwardly or upwardly. During the angular shifting movement of said handle in either direction slots 53 in plates 45 provide clearance and eliminate interference from said shaft 33 and collar 34.

At the front end each of said plates 45 is provided with a downwardly directed projection 55. At the lower rim each plate 45 is provided with a pair of bulges 56 and 57. Bulge 57 is disposed below the lower termination of slot 53, while bulge 56 is positioned slightly farther in the direction of handle bar 41.

Positioned between projections 55 of the two plates 45 is a pawl mechanism for successively engaging teeth 38 of ratchet wheel 35 for imparting a rotary movement to the latter for winding thereon cable 37. The pawl mechanism includes bar 58 which is in a pivotal relation with said projections 55, is being pivoted upon pin 59. The ends of said pin 59 extend beyond the outer faces of said projections 55, and are located within slots 60 made in the lowermost terminations of said projections 55. The inner end of said bar 58 is reduced, for defining tongue 61, which enters the bifurcated end of pawl 62, within which the same is pivoted by pin 63. Intermediately of its ends, and substantially centrally thereof, said pawl 62 is pivoted upon pin 64, the ends of which are set within said plates 45 and pass outwardly therefrom. The projecting ends of pins 59 and 64, outwardly of each plate 45 are connected by coil springs 65.

From the hereinabove description of the said pawl mechanism it will be readily seen that coil springs 65 exert a pulling tension upon pins 59 and 64 for maintaining bar 58 and pawl 62 in a relative, angular, snapped, operative or inoperative position, shown in Figs. 4 and 7, respectively. It is noted that when a tripping pressure is applied to either side of bar 58 the same will be caused to angularly shift to one or the opposite direction, depending upon from which side of said bar 58 the tripping pressure was applied. Due to the pivotal connection of said bar 58 with pawl 62 through pin 63, the angular shifting of said bar 58 will be transmitted to said pawl 62, causing the latter to shift to one or the opposite di-

rection, again depending on which side of said bar **58** was pressed in order to shift the same.

It is further noted that pawl **62** is sufficiently wide to engage in unison a pair of teeth **38** made in the pair of sections of ratchet wheel **35** resulting from said groove **36**, as is clearly seen in Fig. 6.

Rigidly mounted within plates **10**, substantially on a horizontal line, and centrally of said plates **10** is a pair of tripping rods **66** and **67**. Said tripping rods **66** and **67** are in a spaced relation. On angular shifting of the handle, projections **55**, and the pawl mechanism therebetween, including said bar **58** are adapted to shift within the space defined by said tripping rods **66** and **67**. When said bar **58** hits said tripping rod **67** bar **58** will be caused to shift away from ratchet wheel **35**, which shifting will in turn cause the angular shifting of pawl **62** in the same direction, that is away from ratchet wheel **35** and out of engagement with teeth **38**. The shifting movement of said pawl **62** last hereinabove mentioned amounts to a snapping or trigger action due to the action of springs **65**. Since during the snapping action of bar **58** and pawl **62** the distance between pins **59** and **64** is not at all times equal, hence the provision of slots **60** in projections **55**, which permit shifting of pin **59** therewithin during the snapping action of said bar **58** and pawl **62**.

While tripping rod **67** causes pawl **62** to spring to an inoperative position relative to teeth **38**, when said bar **58** comes in contact with said tripping rod **67**, as seen in Fig. 7, tripping rod **66** on the other hand causes said pawl **62** to snap back into the operative position when said bar **58** hits said tripping rod **66**, as seen in Fig. 4. Obviously, the occasion for pawl **62** to be in an operative position, that is in engagement with ratchet wheel **35**, is needed when it is desired to impart a rotary movement to said ratchet wheel **35** to a clockwise direction as viewed in Fig. 4, that is when cable **37** undergoes a winding process within groove **36** and around the core of said wheel **35**. The occasion when it is desirable to bring said pawl **62** to an inoperative position will be hereinafter set forth.

The auxiliary pawl mechanism includes pawl **68** to which arm **69** is rigidly affixed. Said pawl is pivoted upon pin **70** for angular swinging movement. The outer free end of said arm **69** is engaged by one end of coil spring **71**. The opposite end of said coil spring is affixed to pin **72**. Pins **70** and **72** may transversely pass through both plates **10** and may be rigidly maintained therein by any suitable means. The front end of said pawl **68** is reduced in thickness, and is capable of blocking teeth **38** of ratchet wheel **35**, in a transverse relation, for the purpose of preventing the unwinding of said ratchet wheel in a counter-clockwise direction, as viewed in Fig. 4. This operative position of pawl **68** with relation to teeth **38** is maintained by means of coil spring **71**, which, pulling upon the adjacent end of arm **69** downwardly, shifts the operative end of pawl **68** upwardly. The said shifting movement of pawl **68** is of course due to its pivot by pin **70**.

Co-acting with said pawl **68** is rhomboid-shaped cam **73**. Said cam **73** is disposed between one of said plates **10** and the adjacent face of ratchet wheel **35**, and is pivoted, adjacent one of its corners upon pin **74**. Said pin is affixed to only one plate **10** and terminates with the face of said cam **73** opposite to the adjacent face of said ratchet wheel **35**, as is clearly seen in Fig. 9. Said pin **74** is located adjacent the upper, obtuse angle of said cam **73**.

The opposite corner of said cam **73**, adjacent the opposite obtuse angle thereof, is rounded, as at **75** for permitting said cam to ride easily upon said pawl **68** in order to depress the latter to an inoperative position or spring it to an operative position, as seen in Figs. 8 and 4, respectively.

The depressing of pawl **68** by cam **73** for bringing said pawl to an inoperative position, that is out of engagement with teeth **38** of ratchet wheel **35**, is against the tension of spring **71**. When cam **73** is brought to an inoperative position, shown in Fig. 4, the pawl **68** automatically shifts toward the rim of ratchet wheel **35** to engage teeth **38**, which shifting is done by the tensioning action of spring **71** upon arm **69**.

If pawl **68** is in engagement with one set of teeth **38** on two sections of the rim portion of ratchet wheel **35**, the rotation of ratchet wheel **35** to a counter-clockwise direction, as viewed in Fig. 4, by virtue of the pulling force of load upon cable **37**, will be prevented due to the block at teeth **38** by pawl **68**. If however the handle is shifted downwardly to its maximum downward shifting movement by virtue of the manual pressure exerted upon handle bar **41**, bulge **56** exerts strong downward pressure upon one of the longer sides of cam **73** and adjacent one of its acute angles, and causes the angular shifting movement of said cam upon the upper face of said pawl **68**. Such angular shifting movement of said cam **73** causes said cam to ride by its rounded corners **75** upon the upper face of pawl **68**, until said cam **73** comes to rest by its adjacent shorter side upon the upper face of said pawl **68**, position shown in Fig. 8.

When however the handle is shifted to the opposite direction, that is when handle bar **41** is shifted upwardly as far as it will go, bulge **57** comes in contact with the opposite shorter side of cam **73**, adjacent the opposite acute angle thereof, and further pressure by said bulge **57** will cause said cam **73** to angularly swing until the cam assumes its original inoperative position. That latter operation shifts cam from its position, shown in Fig. 8, to that shown in Fig. 4.

If it be assumed that pawl **68** is in engagement with the rim of ratchet wheel **35**, as seen in Fig. 4, the angular swinging motions of the handle will intermittently bring pawl **62** in engagement with the teeth of the ratchet wheel for shifting the ratchet wheel to a clockwise direction, as seen in Fig. 4, provided however that the downward shifting movement of the handle bar **41** is short of bringing bulge **56** in contact with cam **73**. As long as the contact of bulge **56** with cam **73** is avoided on the downward swinging movement of handle bar **41**, then pawl **68** will continue to remain constantly in an operative engagement with the rim of the ratchet wheel. When this condition is observed pawl **62** alone coming intermittently in engagement successively with teeth **38** will drive ratchet wheel **35** to its rotary movement in a clockwise direction, as viewed in Fig. 4. Each downward shifting movement of handle bar **41** will cause pawl **62** to rotatably shift the ratchet wheel to the extent of the space defined by a pair of adjacent teeth upon the ratchet wheel in a circumferential relation. Shifting of the wheel to that extent will cause the next teeth to come in engagement with pawl **68** to maintain the ratchet wheel at rest and prevent its shifting to a counter-clockwise direction when the handle bar **41** is shifted upwardly. Of course, upward shifting movement of said handle bar **41** will cause pawl **62** to come out of engagement with the teeth upon ratchet wheel with which it was immediately prior thereto in engagement, and to ride upon the wheel rim until said pawl **62** springs into engagement with the next teeth in a downward direction in order to repeat the operation thereupon when the handle bar **41** is again swung downwardly. The intermittent swinging movement is imparted to said handle bar **41** until cable **37** has wound itself around the wheel as far as desired, that is until the load engaged by cable **37** has been elevated from the ground as far as desired. The free end of cable **37** has rigidly affixed thereto hook **76** to engage a bumper of a motor vehicle or any other part thereof, or any other object for that matter.

The occasion for unwinding cable **37** from ratchet wheel **35** arises either when it is desired to extend cable **37** preparatory to engaging hook **76** with a load or when it is desired to lower the load from its elevated position. To accomplish either of the said objects handle bar **41** is shifted downwardly until bulge **56** comes in engagement

with cam 73 for the purpose of kicking off pawl 68 out of its engagement with the teeth 38 in the ratchet wheel 35, in order to bring cam 73 to its operative position so that the latter may bring pawl 68 to its inoperative position, as is shown in Fig. 8. Of course, during that last operation pawl 62 remains in engagement with the teeth of the ratchet wheel, there being a strong mutual engagement therebetween due to the pulling force exerted upon the ratchet wheel by cable 37, be it by the action of the load upon the cable or by the manual pull exerted thereon. Due to the pulling force exerted upon cable 37, either by the load or by manual pressure thereon the teeth of the ratchet wheel in engagement with pawl 62 drag the latter downwardly by virtue of the rotatable shifting of ratchet wheel 35 in the counter-clockwise direction, as viewed in Fig. 4, again due to the pulling force of the load or manual pressure applied to cable 37. This action of course brings the projections 55 with their pawl mechanism downwardly as far as the same will go until bar 58 will come in contact with tripping rod 67. Simultaneously with this action bulge 57 comes in contact with cam 73, as seen in Fig. 8. While tripping rod 67 due to its pressure exerted upon bar 58 brings about the snapping action of the pawl mechanism which actuates pawl 62 in order to bring the latter pawl out of its engagement with the teeth in the ratchet wheel with which the same was theretofore in engagement, as shown in Fig. 7, instantaneously prior thereto pawl 68 has already come in engagement with teeth next in succession due to the unwinding of ratchet wheel, and by virtue of the assumption of an inoperative position by cam 73 due to the actuation thereof by bulge 57.

It will therefore be seen that as soon as bulge 57 has come in engagement with cam 73 to bring it into an inoperative position, and thereby to bring pawl 68 to an operative position with the ratchet wheel and in engagement with the teeth thereof, at that very instant bar 58 has come in engagement with tripping rod 67 for snapping pawl 62 out of engagement with the ratchet wheel teeth. This operation permits shifting of the ratchet wheel in the counter-clockwise direction, as seen in Fig. 4, and to the extent of one space between two adjacent teeth around the circumference of the ratchet wheel. To continue the unwinding of cable 37 upon the ratchet wheel as many reciprocating motions are imparted to the handle bar 41 as are necessary. It may be mentioned that on the downward shifting of handle bar 41 manual pressure thereagainst must be applied. However, as soon as pawl 68 has come in engagement with the ratchet wheel the pressure upon cable 37 is sufficient not only to shift the ratchet wheel to the extent of one space between the adjacent teeth thereon but also is sufficient to elevate handle bar 41 without any need of exerting manual pressure thereon in an upward direction, and this by virtue of the pressure upon pawl 62 exerted thereon by the teeth in engagement therewith.

On the following downward swinging of handle bar 41 bar 58 shifts toward tripping rod 66, and as soon as the two come in a mutual contact, said bar 58 is shifted to an operative position in order to snap back pawl 62 in engagement with the ratchet wheel. As soon as said last named pawl has come in engagement with the ratchet wheel bulge 56 has again and instantaneously come in engagement with cam 73 to actuate it into its operative position and thereby to cause the shifting of pawl 68 away from ratchet wheel 35. As soon as said cam caused pawl 68 to come out of engagement with the ratchet wheel the latter is permitted to rotatably shift due to the action thereon by cable 37 unil the next teeth 38 have come in engagement with said pawl 62. This engagement again shifts ratchet wheel 35 thereby again elevates handle bar 41, and before bar 58 has come in engagement with tripping rod 67 cam 73 is hit by bulge 57 to repeat the operation hereinabove described.

From the hereinabove description it will therefore be seen that in order to cause the unwinding of cable 37 and thereby to cause rotatable shifting of ratchet wheel 35 in the counter-clockwise direction, as viewed in Fig. 4, alternate actions of pawls 62 and 68 upon the rim of the ratchet wheel take place. During each alternate action of said pawls upon the rim of the ratchet wheel the latter is permitted to rotatably shift to the distance defined by a set of adjacent teeth upon the ratchet wheel. During the alternate movements of the ratchet wheels toward or away from the rim of the ratchet wheel cam 73 is acted upon by bulges 56 and 57 to alternately spring pawl 68 either to or away from the ratchet wheel. During these alternate actions the alternate actions by tripping rods 66 and 67 exert their alternate tripping action upon bar 58 in order that the same may spring pawl 62 to or away from its engagement with the rim of the ratchet wheel.

It is observed that when cable 37 unwinds from ratchet wheel 35 either due to a pull exerted thereon manually or by the weight of the load when it is desired to lower the same, pawls 62 and 68 in their action upon ratchet wheel 45 are akin to that of an escapement mechanism.

To epitomize the action of the several parts of the invention when it is desired to lower the load, that is when it is desired to permit cable 37 to unwind due to a rotary movement imparted to ratchet wheel 35 to a counter-clockwise direction, as viewed in Fig. 4, and if it be assumed that cam 73 is in its inoperative position, as seen in Fig. 4, the following actions by the several parts take place:

1. On the downward swinging movement of handle bar 41, bar 58 brushes against tripping rod 66 in order to bring pawl 62 in contact with the rim of the ratchet wheel. During this operation cam 73 still remains in an inoperative position, with pawl 68 in engagement with one set of teeth upon the rim of the ratchet wheel.

2. Further manual pressure at handle bar 41 causes bulge 56 to actuate cam 73 to an operative position for disengaging pawl 68 from the teeth with which the same was in engagement immediately preceding this operation.

3. The pull upon cable 37 causes rotary movement of ratchet wheel 35. This movement is permitted due to the fact that pawl 68 is out of engagement with the ratchet wheel, and further due to the fact that pawl 62, although in contact with the rim of the ratchet wheel is nevertheless out of engagement with the teeth with which the same was in engagement immediately prior to this operation. So the rotary movement of ratchet wheel 35 causes pawl 62 simply to ride upon the back of the teeth with which the same was in engagement immediately prior to this operation, until the next teeth come in engagement with pawl 62.

4. The next teeth 38 coming in engagement with pawl 62 exert pressure upon said pawl 62 and cause the handle to swing back, with handle bar 41 swinging to an upward direction. At this point the rotary shifting movement of ratchet wheel 35 has taken place to the extent of the space defined by a pair of adjacent teeth 38 upon the rim of the ratchet wheel.

5. Continuing pressure of the teeth now in engagement with pawl 62, which pressure if desired may be supplemented by manual pressure at the handle bar 41 in an upward direction, will bring bulge 57 in contact with cam 73 for actuating the latter into an inoperative position for causing the return of pawl 68 in engagement with the rim of the ratchet wheel.

6. Instantly upon the completion of the last hereinabove stated operation of pawl 68 bar 58 comes in an engagement with tripping rod 67 disconnecting pawl 62 from teeth 38 upon the rim of ratchet wheel 35, so that pawl 68 is the only block against the teeth with which the same has come now in engagement to prevent continuing rotary movement of the ratchet wheel.

7. On downward swinging movement of bar 41 bulge

56 coming in engagement with cam 73 shifts said cam 73 into an operative position for shifting pawl 68 to an inoperative position.

Repetition of the several functions in the above numbered paragraphs in sequence will continue to cause ratchet wheel 35 to rotatably advance until the length of cable 37 has been extended as far as desired.

The body portions of handle plates 45 adjacent the ends of slots 53 coming in contact with sleeve 34 as said plates 45 come in contact therewith when the handle bar 41 is shifted into an upward or downward direction limit the maximum movement of said handle bar 41 and of plates 45.

From the hereinabove description it will be apparent that it is not absolutely necessary to have a pair of braces 16, or a pair of standards 25. One of each will suffice. When one standard is pivoted within head plates 10 by one of its ends and to one brace 16 by the opposite end, the support will operate reasonably well when the end of brace 16 is pivotally affixed to a ring such as ring 19, shiftable in an upward direction upon leg 12.

While there are described herein preferred embodiments of the present invention, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

1. A lifting jack comprising a supporting frame, a ratchet wheel rotatably mounted on said frame and having teeth thereon, said ratchet wheel supporting in a winding relation a load-engaging cable, a pawl pivotally mounted on said supporting frame, a cam pivoted on said frame in position to engage said pawl, said cam having a first, stable, angular position in which it prevents said pawl from engaging said teeth and a second, stable, angular position in which it allows said pawl to engage said teeth, an operating arm pivotally mounted on said supporting frame and having a first bulge on an edge thereof in position to shift said cam from said first position to said second position when said operating arm is moved to one end of its path of travel and a second bulge on an edge thereof in position to shift said cam from said second position to said first position when said operating arm is moved to the other end of its path of travel, and a teeth-engaging member mounted on said arm for engaging said teeth on said ratchet wheel.

2. A lifting jack comprising a pair of plates in a rigid spaced relation, a ratchet wheel journaled for a rotary movement between said plates and having teeth thereon, said ratchet wheel supporting in a winding relation a load-engaging cable, a pawl mounted for pivotal movement between said plates, a cam pivotally mounted on one of said plates and positioned between said ratchet wheel and said one of said plates at a location where it will engage said pawl, said cam having a first, stable, angular position in which it prevents said pawl from engaging said teeth and a second, stable, angular position in which it allows said pawl to engage said teeth, an operating handle mounted for pivotal movement between said plates and having a portion in the space between said ratchet wheel and said one of said plates, said portion of the operating handle including an edge having a first bulge in position to shift said cam from said first position to said second position when said operating handle is moved to one end of its path of travel and a second bulge in position to shift said cam from said second position to said first position when said operating handle is moved to the other end of its path of travel, and a teeth-engaging member mounted on said handle for engaging said teeth on said ratchet wheel.

3. A lifting jack comprising a supporting frame, a ratchet wheel rotatably mounted on said frame and having teeth thereon, said ratchet wheel supporting in a winding relation a load-engaging cable, a pawl pivotally mounted on said supporting frame, a cam pivoted on said frame in position to engage said pawl, said cam having a first, stable, angular position in which it prevents said pawl from engaging said teeth and a second, stable, angular position in which it allows said pawl to engage said teeth, an operating arm pivotally mounted on said supporting frame and having a first bulge on an edge thereof in position to shift said cam from said first position to said second position when said operating arm is moved to one end of its path of travel and a second bulge on an edge thereof in position to shift said cam from said second position to said first position when said operating arm is moved to the other end of its path of travel, a teeth-engaging member pivotally mounted on said arm for engaging said teeth on said ratchet wheel, a coil spring attached to said teeth-engaging member and arranged so that when its axis is in one angular position an end of said teeth-engaging member will be urged toward said ratchet wheel and when its axis is in another angular position said end of said teeth-engaging member will be urged away from said ratchet wheel, and means including a pair of stationary members for shifting the axis of said coil spring between said positions when said operating arm is moved to the ends of its path of travel.

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