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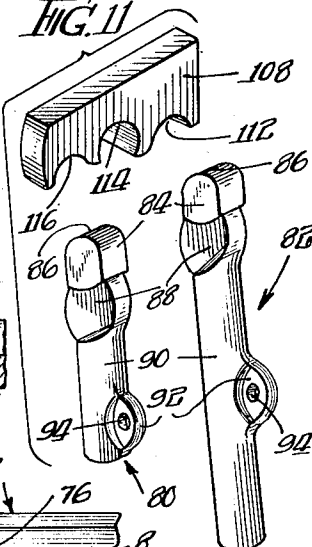
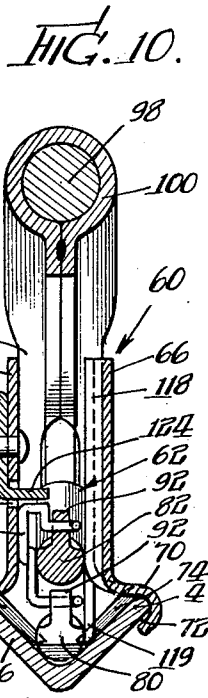
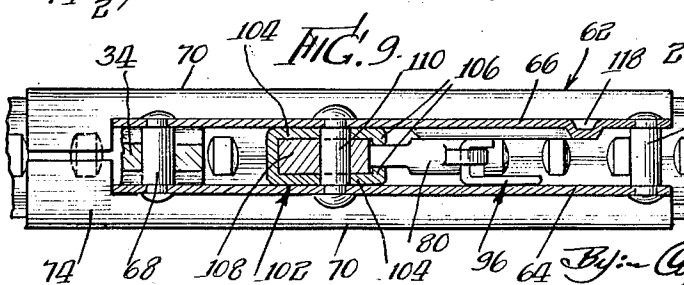
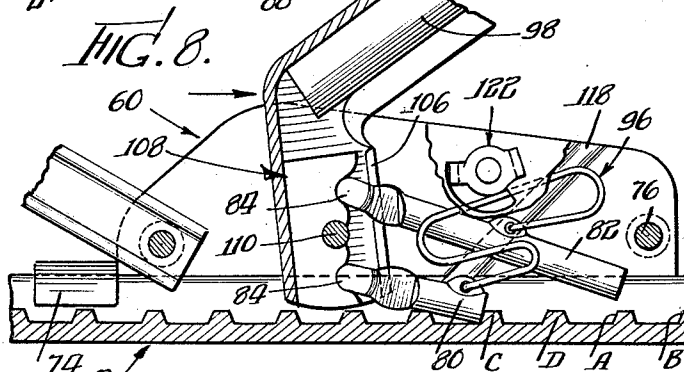
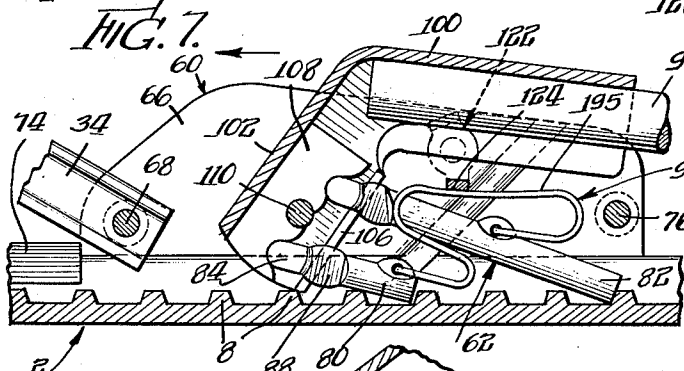
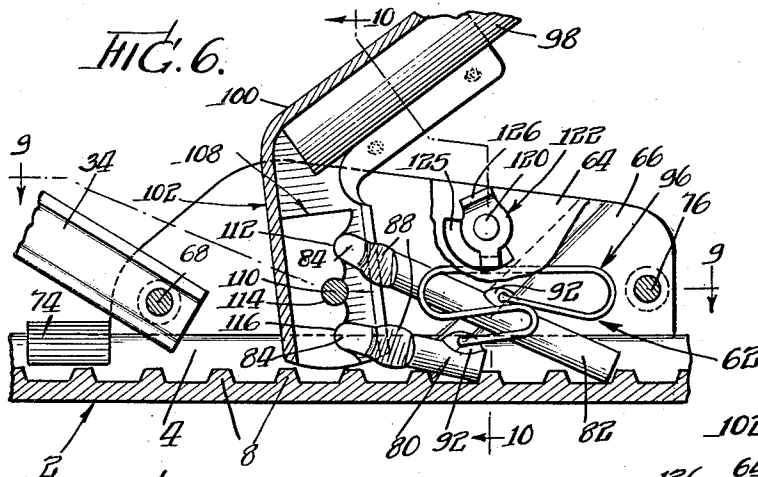
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2,361,690

LIFTING JACK

Filed Dec. 15, 1941

3 Sheets-Sheet 2



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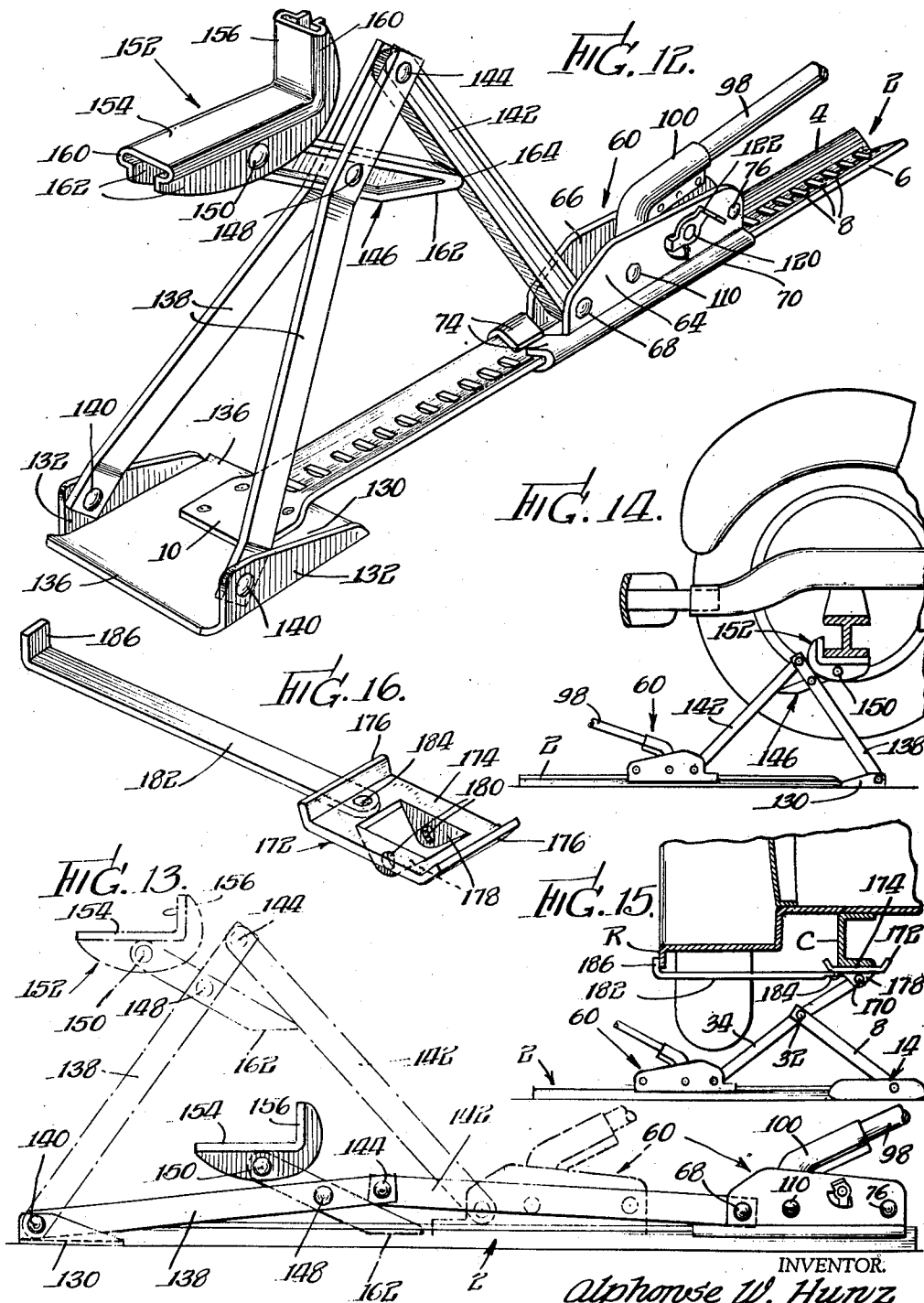
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UNITED STATES PATENT OFFICE

2,361,690

LIFTING JACK

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Application December 15, 1941, Serial No. 423,079

10 Claims. (Cl. 254—110)

This invention relates to new and useful improvements in lifting jacks and more particularly to such jacks adapted for use in connection with automobiles and trucks.

An object of the present invention is to provide a simple and inexpensive mechanical jack which may be manufactured at extremely low cost and which is positive and efficient in operation.

A further object is to provide a lifting jack comprising a longitudinal bar of angular cross-section having a plurality of teeth integrally formed therewith and so spaced apart lengthwise of the bar as to permit the bar to be shaped by hot-rolling, whereby the bar may readily and inexpensively be formed of high carbon steel, whereby the bar may be made comparatively light in cross-section and its weight correspondingly reduced, which is a very desirable feature in devices of this general character.

A further object is to provide a lifting jack comprising a horizontal bar having a housing slidable thereon and interconnected by a lever with a load-engaging member, and a suitable pawl mechanism being mounted within the housing and engageable with teeth on the bar, said pawl mechanism having an operating handle and being so constructed that one impulse is imparted to the housing for each up-stroke and each down-stroke of the handle, whereby two impulses are imparted thereto for each complete cycle of operation of the handle, thereby facilitating the operation of vertically translating the lifting member through the use of levers connected to the housing in either direction.

Other objects of the invention reside in the novel construction of the horizontal bar of the jack, whereby said bar may readily and conveniently be hot-rolled to facilitate manufacture; in the simple and inexpensive construction of the operating mechanism for the lifting head, which comprises a pair of pawls pivotally mounted on a suitable operating member at opposite sides of the pivotal support of said member, whereby a double-action is imparted to the lifting head for each complete stroke of the handle, regardless of the direction of movement of the lifting head on the post; in the novel spring means employed for urging the pawls or dogs into engagement with the teeth of the bar; and, in the means provided for adjusting the pawl mechanism to reverse the traveling movement of the lifting head.

Another object of the invention is to provide a lifting jack of such construction so that when

placed in position this load-lifting head will be substantially low enough to permit the operator to place it under the axle of a car conveniently.

Another object of the invention is to provide a lifting head that will also form a guide as to the correct position of the placement of the jack with respect to the axle.

Another object of the invention is to provide a load-lifting head having a connected locating or positioning device which will enable the operator to place the jack in a correct position without the necessity of being forced to crouch down on the ground to place the jack in correct position.

Another object is to provide a lifting head for the jack to engage different parts of the car besides the axle to raise the same.

Another object of the invention is to provide a jack construction that will have a substantial base construction that will prevent side slipping of the car when in raised position.

Another object is to provide the lifting head of the jack with a gauge member that may or may not be used to gauge the position of the lifting head with respect to the car.

Another object of the invention is to provide a jack construction that will permit the lifting head to project beneath the structure of the car and to engage the axle and in so doing also permit the operating handle to extend outwardly a sufficient amount to allow the jack to be conveniently operated.

These and other objects of the invention will appear from the following description and accompanying drawings:

Figure 1 is a perspective view of one form of a low level jack shown in partly raised position and incorporating some of the features of the invention.

Figure 2 is a side elevational view showing the jack in its lower position and being shown in dotted lines in its up or raised position.

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a view showing the application of the jack in connection with raising the front part of a car.

Figure 5 is a view showing the application of the jack in raising the rear end of an automobile.

Figure 6 is a sectional view taken on the line 6—6 of Figure 1 showing the mechanism for operating the jack.

Figures 7 and 8 are views similar to Figure 6 showing different positions of the operating member.

Figure 9 is a plan sectional view taken on line 9—9 of Figure 6.

Figure 10 is a sectional view taken on line 10—10 of Figure 6.

Figure 11 is a view of the pawls and pawl retaining block.

Figure 12 is a perspective view of a modified construction of a jack which is more adaptable to use for heavy loads such as trucks, etc.

Figure 13 is a side elevational view showing the jack in its lowered position in full lines and its raised position in dot and dash lines.

Figure 14 is a view of the jack and its adaptation for lifting the front portion of a car.

Figure 15 is a view of the jack and its adaptation for lifting the side of a car.

Figure 16 is a detail perspective view of a load-lifting member.

As thus illustrated the structure of the jack comprises a longitudinal horizontal bar 2 having angularly disposed flanges 4 and 6 and having spaced apart teeth 8 arranged in the bottom of the V formed by the flanges 4 and 6. The forward end of the bar 2 has a flattened portion 10 which is welded at 12 to a base plate 14 and having side flanges 16 which form a pivot support for the lever arms 18 through the medium of the pivot pins 20 supported on the flanges 16.

The base plate 14 has its forward and rearward edges slightly upturned as at 22 thereby permitting the jack to be moved backward and forward more easily, the upturned edges acting as camming surfaces to slide over small obstructions.

Connected by a pivot pin 24 to the lever arms 18 is a bar 26 which has its opposite end connected by a pivot pin 28 to the lifting head 30. The lever arms 18 are also pivotally connected at 32 to a lever bar 34 which in turn has its upper and outward end pivotally connected to the load-lifting head 30 by the pivot pin 36.

As shown in Figures 1 and 3 the load-lifting head 30 is formed of two sheet metal stampings 40 and 42, the one being a right and the other a left, each having a side wall 44 and right angle flanges 46 which form the load-lifting surface. They also provide an abutment or wall 48 which is a right angle extension of the flanges 46 and again are bent at an angle to form a lifting surface 50 which is inclined downwardly to the rear where it converges with the wall 48. This surface 50 is substantially lower than the surface 46, as will be seen in Figure 2, to allow this lifting head to project under a very low structure or axle.

In addition the flanges 46 are upturned at the rearward edges to form a slightly curved surface 52 which will accommodate the curved surface of a leaf spring and also allow the successive leaves of the spring to seat themselves securely on the lifting head 30 as indicated in Figure 5.

There is also provided a gauging finger 54 pivotally mounted on a pin 55 which is supported on the H-bar 34 and has at its outer end a spring 56 spaced between the lower end of the finger 54 and a nut 58 threaded on the outer end of the pin 55. The gauge 54 is thus held in any desired position due to the pressure of the spring 54 against it. As will be understood from Figure 1 the finger 54 is rotated into a down or inactive position but as shown in Figure 3 and 4 the gauging finger 54 is rotated upwardly so that when the jack is positioned under the axle of a car the gauge 54 will contact the axle to place the jack in correct position for raising the car without the necessity of the operator to crouch down and

look under the car structure in order to be sure that the position of the jack is its proper place with respect to the axle.

Referring again to the load-lifting member 30 it will be noticed in Figure 3 that the pivot pins 28 and 36 also provide spacing members between the two sides 44 to form a cheaply constructed lifting head that has all the strength and rigidity that is necessary for this type of jack.

An important feature of the present invention resides in the novel construction of the bar 2 which, as shown in Figures 1, 6, 10, and 12, is provided with a plurality of spaced teeth 8, arranged in the bottom of the V formed by the angularly disposed flanges 4 and 6 of the bar. The teeth are so shaped and spaced apart lengthwise of the bar as to permit the bar to be readily and conveniently formed or shaped by hot-rolling, whereby it may be made of a suitable high carbon steel. By thus hot-rolling the bar of high carbon steel, it may be made extremely light or small in cross-section, which is highly desirable, in that it materially reduces the weight of the jack, when completed, and still provides a jack having great strength. To facilitate the operation of hot-rolling the bar, the teeth 8 thereof are spaced apart approximately $\frac{3}{8}$ of an inch from center to center, and the oppositely disposed faces of the teeth are beveled, as shown in Figures 1 and 6.

A suitable housing generally indicated by the numeral 60 embraces the bar 2 and is free to slide longitudinally along the bar 2 when under the influence of the pawl operating mechanism 62 which is positioned directly above the bar 2 and between the side walls 64 and 66 of the housing 60. A pivot pin 68 connects the forward end of the H-bar 34 hereinbefore described to the side walls 64 and 66 of the housing 60, the pin 68 being of the same type as the pins 110 and 76 which also form spacing and connecting members between the side walls 64 and 66.

As will be noted upon observing Figure 10, the sides 64 and 66 are two separate similar members, one being a left-hand member and the other a right-hand member, and both being formed of stampings of suitable gauge sheet metal to provide the necessary strength for this type of jack. The side walls 64 and 66 are parallel to each other and have their lower marginal edges turned outwardly at 70 and then inclined downwardly to form guideways 72 about the flanges 4 and 6 of the bar 2. In addition there is also a pair of inturned flanges 74 formed from the side walls of the housing 60 and which overlie the flanges 4 and 6 of the bar 2 to form a guideway for the housing 60 and also a means for slidably attaching the housing to the bar 2. In addition there is also a spacing pin or rivet 76 positioned at the rear end of the housing 60 which in combination with the other pin 68 forms a structure that is cheaply made and provides a housing to enclose the pawl mechanism now to be described.

The jack operating mechanism, as clearly illustrated in Figures 6 to 11 inclusive, comprises two pawls 80 and 82, the latter being relatively longer than the pawl 80, and both being produced from standard rod stock, and each pawl having formed on its forward end a head 84 having an arcuate bearing surface 86. Also formed below the head is a flattened area which is spaced between the head and the rod portion 90, the rod portion 90 having ears 92 struck from their surfaces which ears have small holes 94 to accommodate the opposite ends of a spring 96. A suitable re-

movable operating handle 98 has one end inserted into a socket 100, said socket having a downwardly extending portion 102 provided with parallel side portion 104, and intumed marginal edges 106 which form a rectangular area to receive a bearing block 108. A pin 110 positions the block 108 in the housing 102 and also forms a pivot for the above mentioned assembly in the housing 62 hereinbefore described. The pivot 110 also forms one of the spacing members between the walls 64 and 66. The turned-in edges 106 form a retaining and guide means against the surfaces 88 of the pawls 80 and 82.

On the block 108 are three arcuate cut away portions 112, 114, and 116, the center cut out section forming an aperture for the pin 110 and the other cut away sections forming arcuate bearing surfaces for the ends 84 of the pawls 80 and 82. It will be noted that the cut away sections are positioned as closely as possible to the center cut away section 114. The purpose of locating the bearing surfaces for the pawls, which really amount to pivots for the pawls, so close to the central pivot section is to increase the power produced by the actuating handle 98 acting through the short leverage produced by positioning the pivot points of the pawls near the center pivot 110. Due to this construction the minimum amount of effort is needed to raise a great amount of weight. By locating the pivot 110 between the pivots 114 and 116 of the pawls it will readily be noted that when the handle is oscillated about the axis 110 the pawls 80 and 82 will alternately move forward and backward.

A spring 96 hereinbefore described is so shaped that it is constantly urging the pawls 80 and 82 into engagement with the teeth of the bar 2 when the pawls are in the position shown in Figures 6 and 7 and located directly above the spring and positioned at 120 on the side wall 64 of the housing is a latching member 120 having an inwardly extending lip 124 overlying the top section 195 of the spring 96 and also an outward extension 126 which forms an actuator to rotate the latch and bring the lip against the top of the spring to apply pressure against the spring surface 96. The latch 122 is situated on the outside of the housing 60 but has the lip 124 extending through an arcuate slot 125 in the side wall 64 of the housing 62.

In addition the side wall 66 of the housing 60 is formed with a diagonal rib 118 extending inwardly of the side wall 66 and acting as a retaining and bearing surface against which the sides of the pawls 80 and 82 contact. The opposite sides of the pawls 80 and 82 are held in alignment by the spring 96. There is also an extension 119 of the rib 118 (as shown in Figure 10) to contact the side of the lower pawl 80.

When it is desired to lower the lifting head 30, the latch member 122 is swung to the position shown in Figure 8, whereby the end portion 124 thereof moves out of engagement with the portion 195 of the spring 96. When thus positioned, the tension in the spring 24 will cause the dogs 80 and 82 to alternately move out of engagement with the teeth 8 of the bar 2, when the handle is oscillated. In other words, when the latch member 122 is positioned as shown in Figure 8, and the handle 98 is in its uppermost position, as shown in this figure, the spring will cause the lower end of the dog 82 to move out of engagement with the rack bar or teeth 8 of the bar, whereby when the handle is moved downwardly from the position shown in Figure 8,

to that shown in Figure 7, the dog 82 will pass the top of the tooth A, and engage the next succeeding tooth B therebehind. When the dog 82 engages the tooth B, the load is transferred from the pawl 80 to the pawl 82, and the spring 96 then causes the dog 80 to swing out of engagement with the tooth C, whereby it will next engage the tooth D, when the handle is swung upwardly. From the foregoing, it will thus be noted that when the latch member 122 is in the position shown in Figure 8, continued manipulation of the handle 98 will cause the housing 62 to travel rearwardly along the bar, thereby to lower the load.

When the latch is in the position shown in Figures 6 and 7, the movement of the housing on the bar is reversed, because the latch member thereby positions the spring so as to urge the dogs into engagement with the teeth 8 of the bar, whereby oscillation of the handle will cause the dogs to so engage the teeth of the bar as to cause the housing and load-engaging member to travel outwardly on the bar.

As hereinbefore mentioned the housing has pivotally fixed to it the H-bar 34 which in turn is connected to the lifting head at 36. Therefore upon movement of the housing 60 to the right or left along the bar 2 it will cause the lever arm 34 to raise the load-lifting head in a substantially vertical path.

Referring to the drawings, and particularly to Figure 1, it will be seen that the force is applied at the point 58 and the fulcrum is at 32, the resistance at 36, therefore this arrangement of levers would be of the first class. In addition the lifting head 30 is retained in its upright position due to the arrangement of the lever 26 and its connection with the lifting head and the links 18.

Furthermore the novel construction of the pawl mechanism is such that a double action is obtained. In other words, for each complete cycle of movement of the operating handle, two impulses are imparted to the lifting head in either direction, depending upon the position of the latch member 122. It will also be noted that a single spring provides the resilient means for urging both pawls into or out of operative engagement with the teeth of the bar. The latch member 122 projects from the housing 62, as shown in Figures 6, 7, and 8, whereby the operator may readily shift it from one position to the other by engaging it with the toe of his shoe. The construction of the pawl mechanism in the entire jack is extremely simple and inexpensive, whereby the jack may be manufactured at extremely low cost. Also, because of the horizontal rack bar being made from high carbon steel, which is possible because its construction is such that it may be hot-rolled, the jack may be made very light in weight, a very desirable feature in an automobile jack. The bar 2 is composed of a single length of bar iron of any suitable cross-section, which may be applicable for the purpose.

As shown in Figure 4 the lifting head is engaging the front axle of a car, moreover the lifting head is situated directly below the axle, due to the gauging finger 54 contacting the axle and informing the operator that the lifting head is in the correct position. Also note that the operating handle of the jack is sufficiently out from under the car to afford easy manipulation.

Referring to Figure 5, it will be observed that the lifting head is contacting the leaf spring of the car which may be desirable in some cases,

although it could be moved in to contact the rear axle. In either instance the jack is positioned very easily and without a lot of shifting back and forth to get it in the proper position, and also the actuating handle is always sufficiently exposed so as not to make it difficult to operate.

In some cases it may be necessary to use the dropped down portion of the lifting head to enable the operator to place the device under an extremely low axle, for instance when a wheel has been completely removed and wherein the axle may be substantially contacting the ground.

In Figures 12 and 13 of the drawings there is shown a modified construction wherein the lifting power of the jack is increased by the utilization of a combination of levers of the first and second classes. There is also shown a modified type of load lifting head.

As it will be understood, the rack bar 2, the housing 60, and the pawl mechanism 62 are of the same construction as that shown in the first form of the invention (Figures 1-11) hereinbefore described. The forward end of the rack bar 2 being welded to the base plate 130 having side flanges 132 and front and rear edges curved upwardly as at 136, which perform the same function as the edges 22 formed on the base plate 14 of the hereinbefore described jack.

The flanges 132 provide supports for a pair of lever arms 138 pivotally attached to the flanges 132 by the pivot pins 140, and having their upper portions converging to provide a space wherein a lever bar 142 is pivotally attached by a pivot pin 144. A pin 68 on the forward part of the housing 62 pivotally attaches the lower end of the lever arm 142 to the housing 62. Pivotal connection at 148 to the lever arms 138 is another lever arm 146 which in turn has attached at 150 to its outer end a pivotally mounted load-lifting head 152, having load contacting surface 154 and a right angle gauging surface 156, and being formed of a sheet metal stamping having marginal edges 160 and side flanges 162, which in turn have apertures to accommodate the pivot pin 150 on the bar 146. On the opposite end of the bar 146 there is a beveled off portion 162 (see Figure 13) to allow for clearance when the jack is in lowered position. In addition the end of lever 146 has a contacting end 164 which contacts the under surface of the lever bar 142 when the jack is raised. Therefore when the jack is operated the housing 60 moves and applies a force at the point 68 to the lever 142 which is fulcrumed at 144, to raise the levers 138 and the pivot 148 that supports the load-lifting head 152, and the lever bar 146 being fulcrumed at 148 and having force applied at 164 make it a lever of the first class actuated by a lever of the second class due to the fact that the resistance or lever 146 is intermediate of the fulcrum 144 and 68 of the lever 142. Therefore by combining the two arrangements of levers a very powerful lifting action is produced which is needed more when heavy loads are to be raised. Referring to Figure 14, it will be noted that the jack is so positioned to underlie the front axle of the car and that the load-lifting head 152 is positioned with the surface 156 against the side of the axle, which arrangement helps to properly place the jack before operation. The head 152 being pivotally mounted will adjust itself properly to conform with any slight angle upon which the car may be inclined.

Another embodiment of the lifting head as ap-

plied to this type of jack is shown in Figures 15 and 16, wherein the construction of the jack is substantially the same as that shown in Figures 1 to 11, with the exception that the lever 26 is eliminated and the H-bar 34 is pivotally attached at 170 to the modified type of lifting head 172, which is formed from flat stock and comprises the load contacting surface 174 and the upturned flanges 176 and the downwardly extending ears 178 which are provided with apertures 180 to receive the pin 170 for the lever 34.

As shown in Figure 15 the load-lifting head 172 is contacting the underside of a car frame or channel C, which means that the jack has been moved into position from the side of the car. The running board of the car being quite low to the ground would make it almost impossible for the operator to know how far he should move the jack under the car in order for it to be in a correct position with respect to the frame or channel C without the use of a gauge or measuring device.

To accommodate such a condition there is provided a gauge bar 182 which has a predetermined length for any specified car and is loosely pivoted at 184 to the load-lifting head 172. The opposite end of the bar 182 is bent at right angles to form a projection 186, which when used will be placed against the running board of the car as shown in Figure 15. The operator, by the use of this gauge bar 182, will be able to position the jack so that the load-lifting head 172 will be in the correct position with respect to the frame channel C before the jack is operated to raise the car. A jack that is supplied with a car will have a correct length of gauge bar that will be predetermined by the distance between the center of the frame channel C and the outer edge of the body or running board R which may vary in different makes of cars.

Obviously the invention is not limited to the specific forms disclosed herein but is capable of other modifications and changes without departing from the spirit and scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. A lifting jack comprising a horizontally disposed bar having an angular cross section and provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar and located within the angle thereof, a base plate attached to said bar, a housing containing mechanism to engage said teeth and being slidable longitudinally on said bar, said housing having spaced apart parallel side walls to contain mechanism to engage said teeth on said bar, said walls being held in spaced relationship, and having reversely bent flanges to overlie the flanges of said angle bar, said wall flanges being bent downwardly at an inclination to conform with the angle of the flanges of said angle bar, a load lifting member, a first lever having one end pivoted to said housing and its opposing end pivoted to said load lifting member, a second lever having pivotal connection with said first lever and said base plate, operating means for actuating the mechanism in said housing to vertically raise and lower said load lifting means.

2. A lifting jack comprising a horizontally disposed bar having an angular cross-section and provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar and located within the angle thereof, a housing containing mechanism

to engage said teeth and being slidable longitudinally on said bar, said housing having spaced apart parallel side walls, pivotally mounted mechanism therein to engage said teeth on said bar, spacing means for holding said walls in spaced relationship, said spacing means forming pivotal supports for said mechanism, lever actuating means for said mechanism pivotally connected to said housing to vertically raise and lower the lifting member.

3. A lifting jack comprising a horizontally disposed bar provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar, a housing slidable longitudinally on said bar, said housing having spaced apart walls to contain pawl and latch mechanism to engage said teeth on said bar, one of said walls being formed with an inclined rib having an extension to form a bearing and guiding surface for said pawl mechanism and the other of said walls supporting a latch to selectively control said pawl mechanism.

4. A lifting jack comprising a horizontally disposed bar having an angular cross-section and provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar and located within the angle thereof, a housing containing mechanism to engage said teeth and being slidable longitudinally on said bar, said housing supporting a pivotal connection, a pawl-actuating lever for said connection, said lever having a portion projecting from said housing to receive an operating handle, and having its opposite end formed with interconnected parallel side walls, actuating pawls, engaging the teeth of said bar and a member retained by said side walls for pivotally engaging said pawls.

5. A lifting jack comprising a horizontally disposed bar having an angular cross-section and provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar and located within the angle thereof, a housing containing mechanism to engage said teeth and being slidable longitudinally on said bar, said housing supporting a pivotal connection for a pawl-actuating member, said member having a portion projecting from said housing to receive an operating handle, and having its opposite end formed with parallel side walls, said side walls having parallel intumed edges, pawl members guided by said edges in their movement during operation of said handle.

6. In a device of the character described, a toothed bar, a pair of actuating pawls adapted to engage said teeth on said bar, a housing having parallel side walls, said pawls being disposed in parallel alignment between the side walls of said housing, a lever pivoted to said housing and having spaced walls enclosing a pivot block, one of said pawls being substantially of greater length than the other pawl and both pawls being pivotally held in spaced apart relationship by said pivot block, each of said pawls having flat parallel surfaces adjacent their pivotal head to engage intumed edges of said lever.

7. A lifting jack comprising a horizontally disposed bar having an angular cross-section and

provided with a plurality of teeth integrally formed therewith, said teeth being spaced apart longitudinally of the bar and located within the angle thereof, a lifting member, a housing containing mechanism to engage said teeth and being slidable longitudinally on said bar, lever means pivotally connected at one end of said housing and having its other end pivotally connected to said lifting member, a fulcrum provided by an intermediate lever pivotally connected to the pivot on said housing and to the pivot on said lifting member, said intermediate lever having fixed pivotal connections with said base member, and intermediate of said base pivot and said first mentioned fulcrum pivot, another lever, pivotally connected to fulcrum a supporting lever and having its opposite end pivotally connected to said lifting member, said fulcrum supporting lever being formed of two identical bars, each disposed oppositely to each other and both being formed with lower, intermediate, and upper pivot receiving apertures.

8. A lifting jack having a toothed bar, a base, a housing slidable along said bar, a combination of levers of the first and second class, said combination consisting of a lever having a pivoted connection with the housing, pawl operating mechanism in said housing movable longitudinally of said toothed bar, the other end of said lever being pivotally connected to the end of a second lever in turn pivoted to said base, said second lever having an intermediate pivot for a third or load-lifting lever, said load-lifting lever having a load-lifting head pivoted on its outer end and having its opposite end contacting the under side of the first mentioned lever between the pivot connection on the housing and the pivoted connection to said second mentioned lever.

9. A lifting jack comprising a horizontally disposed, toothed bar, a base plate attached thereto, a housing slidable along said bar, a mechanism in said housing to engage said toothed bar, a load lifting member, a first lever having one end pivoted to said housing and having its opposite end pivoted to said load lifting member, a second lever having pivotal connections with said first lever and said base plate, means for operating the mechanism in said housing to vertically raise and lower said lifting means.

10. In a lifting jack comprising a longitudinal bar, a plurality of teeth spaced apart longitudinally thereof and integrally formed therewith and located within the confines of the bar, the interdental recesses in cross section transversely of the bar being curved to facilitate rolling of the bar, said curved surface being formed by the interdental walls spreading outwardly in a direction away from the lowest point of the recesses, a pawl mechanism containing a pair of pawls for engaging said teeth, said pawls being similarly curved and adapted to be received in the interdental recesses, a support slidable longitudinally along said bar and containing said pawl mechanism, lifting means connected to said support, and operating means for translating said support thereby moving said lifting means.

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