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LIFTING DEVICE

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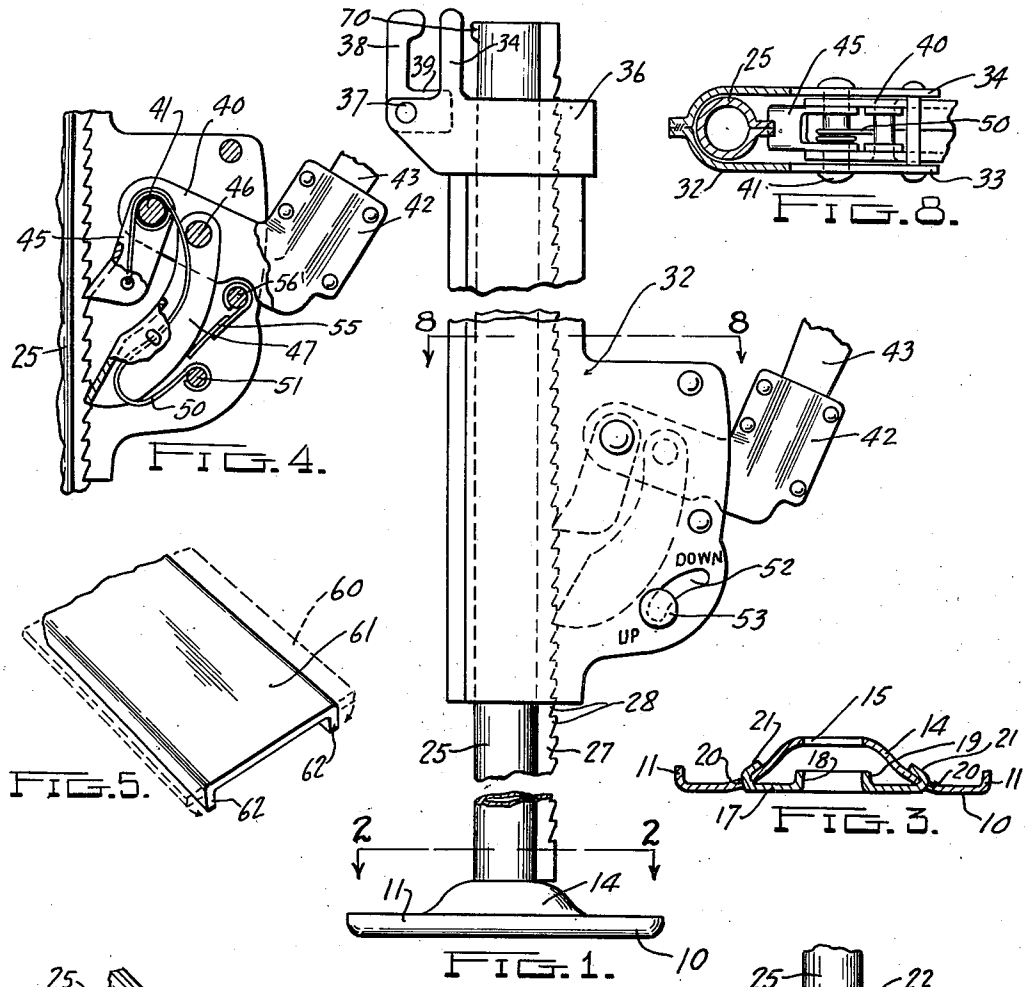


FIG. 4.

FIG. 8.

FIG. 1.

FIG. 5.

FIG. 3.

FIG. 6.

FIG. 7.

FIG. 2.

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LIFTING DEVICE

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8 Claims. (Cl. 254—111)

This invention relates to lifting jacks and method of making same, the invention embracing particularly the character of lifting jack wherein a rack and pawl mechanism are used for elevating the load.

The invention contemplates the provision of a lifting jack of the so-called ratchet type in which the thrust bar is of hollow configuration whereby a material decrease in weight of a lifting jack of this character is effected.

An object of the invention is the provision of a lifting jack wherein the base structure is fabricated of sheet metal to provide a stable support for the thrust bar.

Another object of the invention is the provision of a lifting jack structure in which the major components or elements are fabricated of sheet metal.

Another object of the invention resides in the process of forming a tubular member from sheet material and forming teeth upon the tubular member.

Still another object of the invention is the provision of simple and effective means for securing a thrust bar to a base structure, yet one which permits the thrust bar and the base structure to be easily and quickly disconnected to facilitate storing of the lifting jack when the same is not in use.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

Figure 1 is an elevational view of a lifting jack embodying my invention, part of the thrust bar being broken away;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1 illustrating the base structure;

Figure 3 is a vertical sectional view through the base structure of the lifting jack;

Figure 4 is a side elevational view showing a form of pawl mechanism of the lifting jack;

Figure 5 is an isometric view illustrating a portion of the thrust bar showing a step in its formation from a flat blank;

Figure 6 shows a further step in the process of forming the thrust bar;

Figure 7 is a fragmentary detailed view showing the means of removably securing the thrust bar to the base structure;

Figure 8 is a horizontal sectional view taken substantially on the line 8—8 of Figure 1.

While I have shown my invention as exemplified in a lifting device particularly adapted for lifting vehicles and the like, it is to be understood that I contemplate its use in or with other structures wherever the same may have utility.

Referring to the drawing in detail, the lifting jack consists of a base plate or member 10 which is formed with peripherally upwardly extending flange portions 11, which flanges lend strength and rigidity to the base plate permitting the same to be made of comparatively thin sheet metal. The central portion of the base member is raised to form a boss 14 which is provided with an opening 15 as illustrated in Figure 3. Positioned beneath the elevated portion 14 of the base plate and forming a part of the base structure is a member 17 formed of sheet metal preferably of rectangular configuration having a central circular opening 18 defined by a vertically extending flange portion 19 formed integrally with member 17. The base member 10 is provided with a plurality of spaced openings 20 and the member 17 is formed integral ear portions 21 which are adapted to be received into the openings 20 in the base member and are clinched or distorted as shown in Figures 2 and 3 to securely fasten the member 17 to the base plate 10, thus forming a composite base structure.

The lifting jack is provided with a hollow thrust bar or standard 25 which is provided with a flange portion 27 upon which is formed a plurality of teeth 28 as illustrated in Figure 1. The method of forming this tubular or hollow thrust bar will be hereinafter explained. Reciprocably mounted upon the thrust bar is a housing or carrier 32 fabricated of sheet metal, the housing being made of two substantially matched half sections 33 and 34 as shown in Figure 8. The upper part of the housing carries a cap member 36 having an integral projection 34. Pivotally secured as at 37 to the cap member is a bracket 38 formed with a laterally extending ledge portion 39, which is adapted to engage the load to be elevated, which engagement causes the upper part of bracket 38 to grip the bumper bar because the latter engaging the ledge 39 swings the bracket about the axis of the pivot 37.

Within the housing 35 is carried mechanism for elevating and retracting the housing and load engaging member. This mechanism includes a lever member 40 which is fulcrumed upon a pin 41

and is provided with a socket portion 42 adapted to receive a manipulating handle 43, a portion of which is illustrated in Figure 4. Pivotally supported upon pin 41 is a pawl 45, and also pivotally carried by the lever 40 by means of pivot 46 is a second pawl 47. The pawls 45 and 47 are interconnected by means of a spring 50, one extremity of which embraces a controlling pin 51 slidable in a slot 52 formed in one side wall 33 of housing 35, the pin 51 carrying a manipulating button 53 for changing the direction of the tension of the spring to change the action of the pawl mechanism in elevating or lowering the lifting jack housing structure. A resilient platform member 55 is pivoted upon a pin 56 and serves to guide the pawl 47 into engagement with the teeth 26 of the thrust bar 25 during the operation of lowering the lifting jack. This mechanism and its operation is more completely described and claimed in my copending application, Serial No. 141,141, filed on May 6, 1937.

The lower extremity of the thrust bar 25 is provided with diametrically aligned openings 21 in its side walls and within which normally projects U-shaped or "hairpin" like spring 22 having projecting portions 23 adapted to extend through openings 21 and beneath the interior wall of portion 14 of base member 10 in order to resiliently hold the thrust bar 25 in engagement with the base member 10 and member 17 as particularly shown in Figure 7. A substantial upward pull upon the thrust bar 25 while the base is held in fixed position causes the projections 23 of the hairpin spring 22 to move inwardly sufficiently to permit disengagement of the thrust bar from the base member.

The method of my inventtion of forming the hollow thrust bar of the jack structure includes the formation from a flat blank 60 of a uniplanar portion 61, the opposing edge portions being bent downwardly to produce the extending flange portions 62 as particularly illustrated in Figure 5. In the next step of forming the thrust bar, the member 61, a portion of which is illustrated particularly in Figure 6 is formed to cylindrical configuration with the walls of the projection 62 abutting to form the flange 27 so that the flange 27 is virtually double the thickness of the wall of the tube. The formation to the cylindrical configuration may be accomplished either by rolling or by bending the same in a die. I have found that portions 62 in abutment relation, as shown in full lines in Figure 6, are held together under the stresses inherently in the metal. They may, however, be spot welded or otherwise secured permanently together if desired. After the steps heretofore described and the formation of the tube have been made, the teeth 28 may be formed by milling or other machining operation. In this manner, the thrust bar may be formed from sheet material to a configuration having great strength and rigidity.

The flange 27 does not extend the full length of the tube but only to the point where it contacts with the elevated portion 14 of the base to limit the extent of movement of the thrust bar into the base member. A portion of the upper extremity of the side wall of the thrust bar is forced outwardly as at 70 to form a stop means to prevent the load engaging member and the housing structure from being disengaged with the thrust bar.

It is apparent that within the scope of the invention, modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

I claim:

1. A device of the character disclosed including a base member; a hollow thrust bar removably secured to the base member; said thrust bar comprising a split sheet metal tube having its edges laterally extending and formed with a plurality of teeth; a load engaging element movably carried on said thrust bar; and mechanism cooperating with the teeth in said thrust bar for actuating said load engaging element.

2. A device of the character disclosed including a base member provided with an opening; a hollow thrust bar removably secured to the base member by projecting through said opening; said thrust bar having a lateral projection extending throughout a major portion of the length of said thrust bar and having one end adapted to contact with the surface of said base member adjacent to the opening formed thereon for limiting the extent of movement of said thrust bar into the base member; a housing slidably mounted upon said thrust bar; a load engaging element cooperatively associated with said housing; and mechanism carried by said housing and engageable with the projection on said thrust bar for moving said housing along the thrust bar.

3. A device of the character disclosed including a composite base member comprising spaced surfaces provided with aligned openings forming a supporting bearing; a thrust bar formed of sheet metal removably carried in the supporting bearing of the base member by projecting through said aligned openings; said thrust bar having a longitudinally extending flange adapted to contact with the surface of said base member for limiting the extent of movement of said thrust bar into the supporting bearing of said base member; a load engaging element movably carried on said thrust bar; and mechanism cooperating with said thrust bar for actuating said load engaging element.

4. A device of the character disclosed including a base member; a hollow thrust bar removably secured to the base member; said thrust bar having abutting flanges forming a laterally extending longitudinal projection; said projection having teeth formed thereon; a housing slidably mounted upon said thrust bar; a load engaging element cooperatively associated with said housing; a stop means formed on said thrust bar to prevent the load engaging member and the housing from being disengaged from said thrust bar; and mechanism carried by said housing and engageable with the teeth on said projection for moving said housing along the thrust bar.

5. A device of the character disclosed including a base member; a thrust bar formed of sheet metal removably secured to the base member; said thrust bar having abutting flanges providing a double walled laterally extending longitudinal toothed projection; a housing slidably mounted upon said thrust bar; a load engaging element cooperatively associated with said housing; a lever pivoted upon said housing; and pawl mechanism connected to said lever and cooperating with the projection on said thrust bar for moving said housing along the thrust bar.

6. A device of the character disclosed, in combination, a base member having an opening; a standard projecting into said opening having a laterally extending flange engageable with said base member for limiting the extent of move-

ment of said thrust bar into said base member; a load engaging element carried by the standard and slidable thereon; mechanism engageable with said laterally extending flange for actuating the load engaging element; said standard having a hollow interior portion; and a U-shaped spring carried within said standard and engageable with a portion of said base member to hold the standard and base member together.

7. A device of the character disclosed, in combination, a base member having an opening; a hollow standard formed of sheet metal having an end portion projecting into said opening and having laterally extending flanges in abutting relationship providing a double walled projection; a load engaging element carried by the standard; mechanism for actuating the load engaging element; the side walls of said standard adjacent a juncture of the same with the base member having diametrically opposed openings; and means projecting through the openings in said standard and projecting beneath a portion of said base member to hold the standard and base member together.

8. A device of the character disclosed, in combination, a base member having an opening; a standard formed of sheet material having a portion projecting into said opening and a laterally extending flange contacting with the surface of said base member adjacent to said opening for limiting the movement of said standard with respect to said base member; a load engaging element carried by the standard; mechanism for actuating the load engaging element; said standard having a hollow interior portion, the side walls of said standard adjacent a juncture of the same with the base member having diametrically opposed openings; a U-shaped spring positioned in the interior of said standard, said spring having portions projecting through the openings in said standard and engageable with the wall of said base member to hold the standard and base member together.

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