Oct. 28, 1952 M. SMITH ET AL 2,615,667

LADDER CLAMP

Filed Dec. 3, 1948 2 SHEETS—SHEET 1

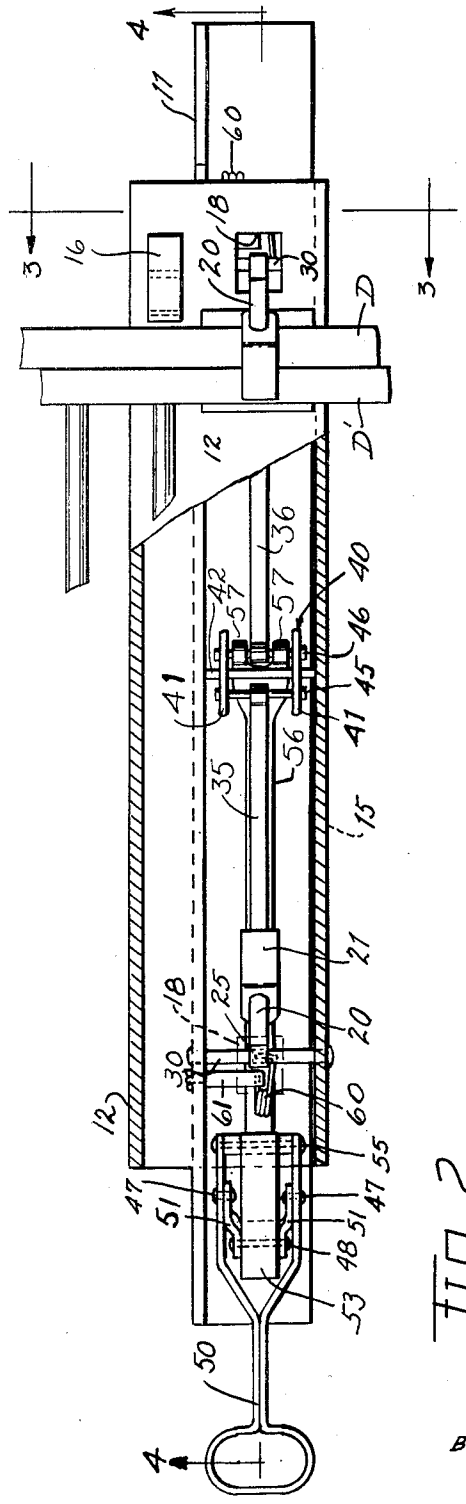


FIG 2

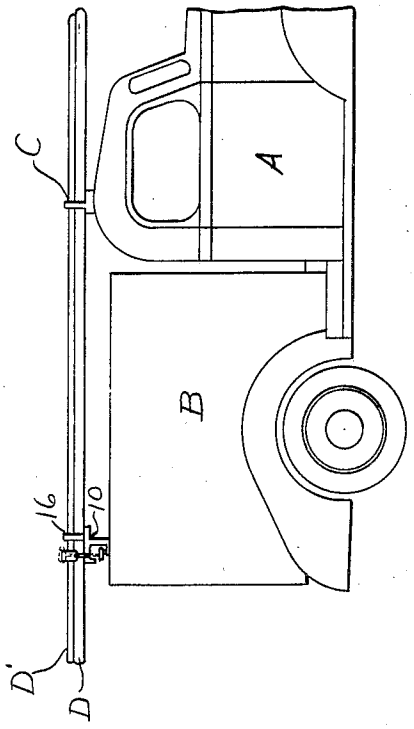


FIG 1

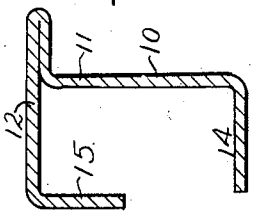


FIG 3

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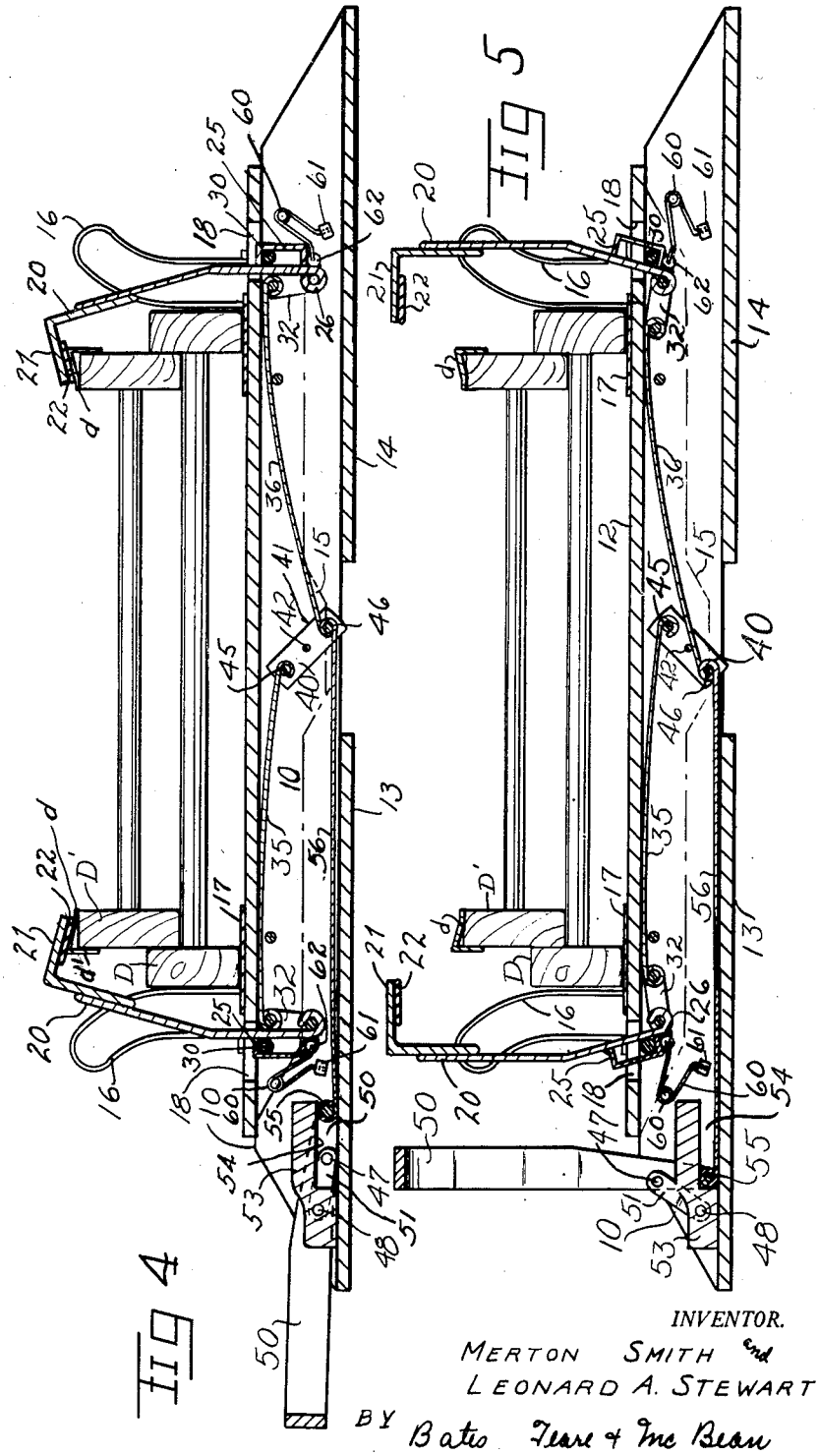


FIG 4

FIG 5

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LADDER CLAMP

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4 Claims. (Cl. 248—361)

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This invention relates to mechanism, suitable for mounting on a vehicle, to clamp in place thereon a ladder or ladders to be transported by the vehicle and to be readily releasable for use. An illustration of such a vehicle is a utility truck, and a convenient location for mounting ladders on such truck is on top of the vehicle where the ladders do not obstruct the workmen in obtaining access to the tool compartments of the vehicle or interfere with the vision of the driver.

The object of our invention is to provide an effective device adapted for mounting on a vehicle and which may be very readily operated to clamp a ladder or ladders in definitely held position for transporting, while with equally ready action it may release the ladder or ladders for use.

Our invention is illustrated in the drawings hereof as a clamping device adapted to support a plurality of ladders, or a plurality of ladder members which may constitute a single extension ladder, and by simple modification of the proportioning of the clamp shown may, if desired, clamp a single ladder or several ladders.

In the drawings, Fig. 1 is a side elevation of a motor vehicle of the utility truck type carrying a pair of surmounting ladders secured by our clamping mechanism; Fig. 2 is a plan, partly broken away, of the clamping device itself; Fig. 3 is a cross section of the frame of the device in a plane indicated by the line 3—3 on Fig. 2; Fig. 4 is a vertical section through the clamping device, the plane of the section being indicated by the line 4—4 on Fig. 2, this view showing the clamping mechanism in its locking position; Fig. 5 is a view similar to Fig. 4, but showing the parts in their unlocked position ready for the demounting or the mounting of the ladders.

In Fig. 1, A indicates the utility truck proper, B the demountable body thereof, C a support on which may rest a plurality of ladders designated D and D^1. Our clamping device about to be described, is shown as being mounted on the rear portion of the body B and as extending transversely thereof and as being adapted to support the rear portion of the ladders and clamp them firmly. If desired, however, the clamping device may be mounted on the cab roof.

The frame of our clamping device, designated 10, is an elongated member having somewhat the form of a rearwardly facing channel beam. It is preferably made of sheet material bent to provide a vertical web 11, a top flange 12, two aligned bottom flanges 13 and 14, and a downwardly extending edge flange 15. The top flange 12 preferably has considerable width and as shown bends

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first outwardly of the channel and then backward on itself, to overhang the supporting web 11 in each direction.

Secured to the top flange 12 and rising therefrom are a pair of brackets 16, which are shown as gradually curving outwardly and provide between them an open space for the mounting of the ladders D and D^1. Suitable rub plates 17 are provided on this top flange 12 on which the rails of the lowermost ladder rest. We have thus provided means by which the ladders, shoved or dropped into place from the rear of the vehicle across the rub plates, may rest near the front of the vehicle on the support C, and near the rear on the frame 10 where they are held from lateral shifting by the upright brackets 16.

Our mechanism provides a pair of clamps 20 having inwardly overhanging arms 21 carrying clamping pads 22 on their under-surfaces. These clamps are adapted to stand in an idle position, as shown in Fig. 5, leaving the space between them clear for mounting the ladders, or they may be swung inwardly to the position shown in Fig. 4, where the pads 22 are forcibly brought down on the top of the ladder members to hold the ladders snugly down on their support.

The longitudinal bars of the ladder D^1 are preferably provided with edge protections *d* which the pads engage. These protections are shown in the form of angle strips which are diverted from the ordinary right angle bar to provide an upwardly and outwardly inclined top surface where the ladder is mounted, such surface extending substantially parallel with the pad 22 on the underside of the clamp arm.

Each clamp 20 extends freely through an opening 18 in the top flange of the support 10 and is slidably pivoted to a stationary transverse rod 30 mounted just below the top flange 12. This movable pivoting is effected by a channel-shaped clip 25 rigidly secured to the outer face of the clamp and slidably embracing the rod 30. Below the clip 25 the clamp is provided with an eye 26 which is pivotally connected to a comparatively short link 32. Pivoted to the other ends of these links 32 are comparatively long links, designated 35 and 36, extending in opposite directions, to the central region of the frame 10. At such central region the ends of these two long links are pivoted to opposite regions of a rocking member 40, which is centrally pivoted to the frame 10.

As shown in Fig. 2, this rocking member 40 comprises two side plates 41 pivotally carried by a central transverse rod 42 secured at one

end to the web 11 of the channel and at the other side to the flange 15, which in this region is of increased depth, as indicated in broken lines in Figs. 4 and 5. The eyes at the adjacent ends of the two links 35 and 36 are shown as embracing transverse rods 45 and 46 rigidly carried by the two side plates 41.

It will be seen from the construction described that if the rocking member 40 is rocked in one direction or the other the links 35 and 36 are correspondingly moved in a lengthwise direction, and this movement, by reason of the links 32 connecting them to the clamps, swings the clamps inwardly or outwardly, according to the direction of such rocking movement.

To effect the rocking operation of the member 40, we provide a manual lever 50 which is shown as a U-shaped loop pivoted at 47 to a pair of links 51 which are pivoted at 48 to a stationary block 53 mounted on the base flange 13. This block is recessed on its lower portion at 54 to provide an open space occupied by a transverse pin 55 on the lower end of the lever and by an eye embracing the pin and froming the end of a long link 56. This link extends just above the bottom flange 13 and is pivotally connected at its inward end to the rocking member 40. We have shown it as bifurcated at its inward end and having two eyes 57, Fig. 2, which embrace the same pin 46 to which the eye on the operated link 36 is centrally connected.

It will be seen from the construction described that the lever 50 may readily operate the rocking member 40 to rock the clamps in or out, that is to say, from their idle position of Fig. 5 to their locked position of Fig. 4. The lever is held automatically in the locked position by virtue of the fact that the pin 47 has been moved downwardly past the line joining the centers of the pins 48 and 55. As shown, the springs 60 are coiled members anchored at their lower ends to horizontal posts 61 projecting inwardly from the vertical web of the frame and having their upper ends bent laterally and occupying eyes 62 welded to the clamp member 20 and to the underside of its clip 25.

It results from the spring construction just described that when the parts are in their idle position as shown in Fig. 5, the clamps are maintained in their uppermost position. However, when the operating lever 50 is turned down from the upright position of Fig. 5 to the operative position of Fig. 4, the shoving action on the link 56 and the consequent rocking of the member 40 with the shoving on the links 35 and 36 causes the links 32 to pull the clamps downwardly against the action of the springs at the same time that the lower ends of the clamps are moved outwardly and the upper ends swung inwardly. Such movement brings the links 32 into a substantially vertical position where the clamps are firmly held in their lowermost position with the overhanging arm snugly engaging the reinforced edges of the uppermost ladder.

It will be seen from the description given that our entire construction is mounted in a self-contained unit ready for mounting on the top of any vehicle body or cab. The operating members are housed within the channel space of the frame member 10 and thus well protected while being accessible for greasing as desired. The comparatively long links 35, 36 and 56 are preferably flat strips and thus may have the eyes on the ends thereof readily made by merely curling such end portions. The top and bottom flanges of the frame form guides for these flat strips and thus allow them to be comparatively thin and still form effective pushing members. All parts of the mechanism are simple members, may be economically constructed largely of sheet material and may be readily assembled.

We claim:

1. In a ladder clamp, the combination of a frame, a pair of positioning members carried thereby to leave a space between them for the mounting of a ladder or ladders extending across the frame, a pair of clamping members having inwardly projecting top portions adapted to engage or clear the ladders according to the position of the clamping members, each clamping member being slidably connected in an intermediate region with the frame, a comparatively short link pivoted to the lower end of each operating member, a centrally located rocking member, a pair of comparatively long links connecting opposite ends of such rocking member to the free ends of the short links, a manual operating lever adapted to extend in an upright position or a substantially horizontal position, a link pivotally connecting an intermediate region of the lever with the frame, a link connecting an intermediate lower end of the lever with the central rocking member, means for guiding the lower end of the lever to cause it to travel in a fixed path when moved, whereby the lever may swing the central rocking member and the rocking member swing the clamping members.

2. In a ladder clamp, the combination of a continuous frame adapted to be mounted on top of a vehicle and extend crosswise thereof, said frame having an upright web and top and bottom flanges, brackets extending upwardly from the top flange and defining a space between them for the mounting of ladders resting on the top flange, a pair of clamping members having inwardly overhanging top portions to engage the top edge of the rail of a positioned ladder, a pair of pins carried by the frame, said members extending downwardly alongside of the web of the frame and having slots embracing the respective pins, whereby the clamping member may move up and down as well as swing, a pair of comparatively short links pivoted to the lower ends of the clamping members, a central pivoted operating device adapted to be rocked in either direction, a link connecting the upper end of the rocking device with the free end of one of the short links and a link connecting the lower end of the operating device with the free end of the other short link, the said slotted connection between the clamping members and the stationary pivot pins allowing sufficient downward movement of the rocking clamping member to allow the said short links to stand substantially vertical above their pivotal connection with the clamping member, an operating lever, means connecting it with said rocking device, and a pair of springs acting on the clamping members and tending to maintain them in their uppermost position while allowing the operation of the linkage system described to lower the clamping members while swinging inwardly the upper ends thereof.

3. A ladder clamp for use with a frame member of channel formation having a web with top and bottom flanges, a pair of spaced ladder positioning members extending upwardly from the top flange, said ladder clamp comprising a pair of clamping members pivotally mounted on the web portion of the frame, a rocking operating

device within the channel of the frame, links within said channel connecting oppositely movportions of the operating device with the clamping members, and means for rocking the operating device.

4. A ladder clamp for use with an elongated frame comprising a sheet of metal bent to provide a bottom flange, a web, and a top flange bent first in one direction and then doubled on itself to project on the other side of the web and then having a downwardly extending flange, a pair of side positioning members secured to the top flange and extending upwardly therefrom to laterally position a ladder or ladders resting on the frame between such positioning members said ladder clamp comprising a pair of inwardly overhanging clamping members pivotally mounted on the frame and adapted to engage a positioned ladder or free it according to the position of the clamping members, a rocking operating device pivoted to the web and downward flange of the frame, and a linkage system connecting oppositely moving parts of said operating device with the pivotally mounted clamping members.

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