Oct. 17, 1961 J. E. CLARKE 3,004,630

AUTOMOTIVE FRAME LIFT MEANS

Filed June 8, 1959

Fig. 1

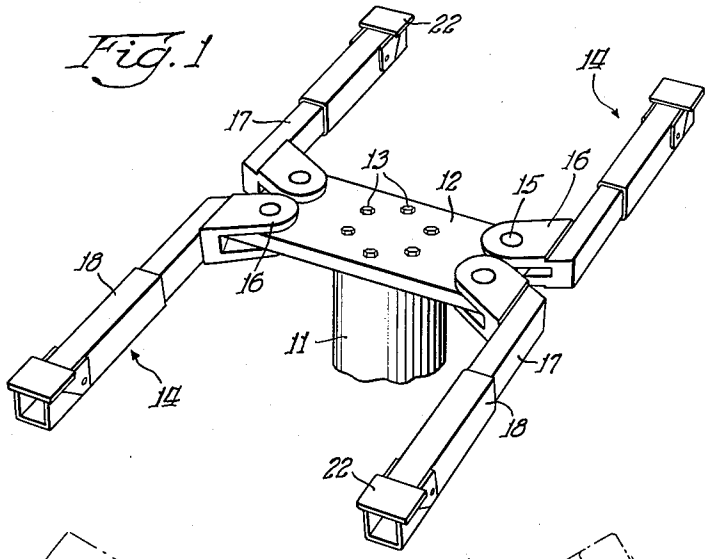


Fig. 4

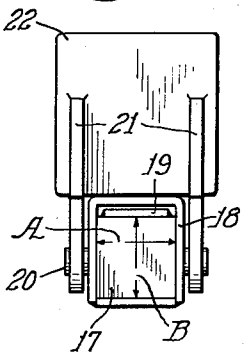


Fig. 2

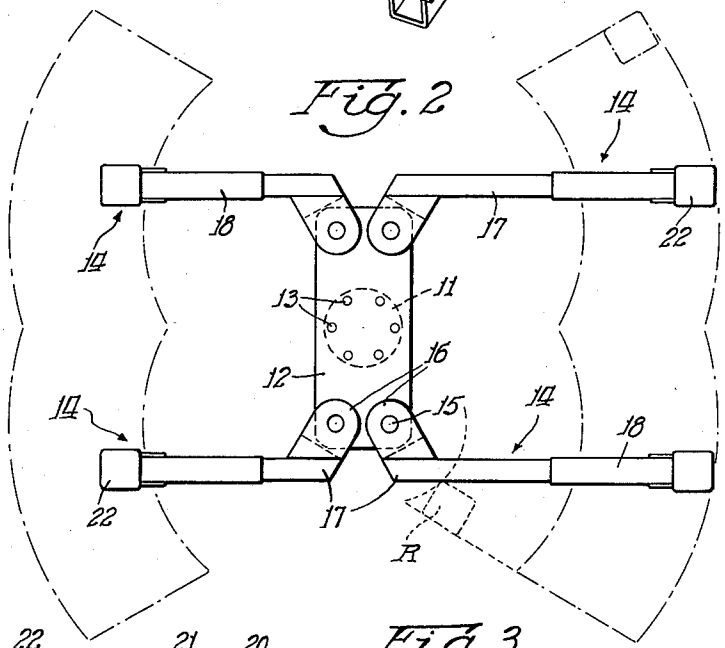


Fig. 5

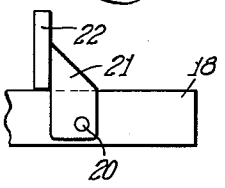
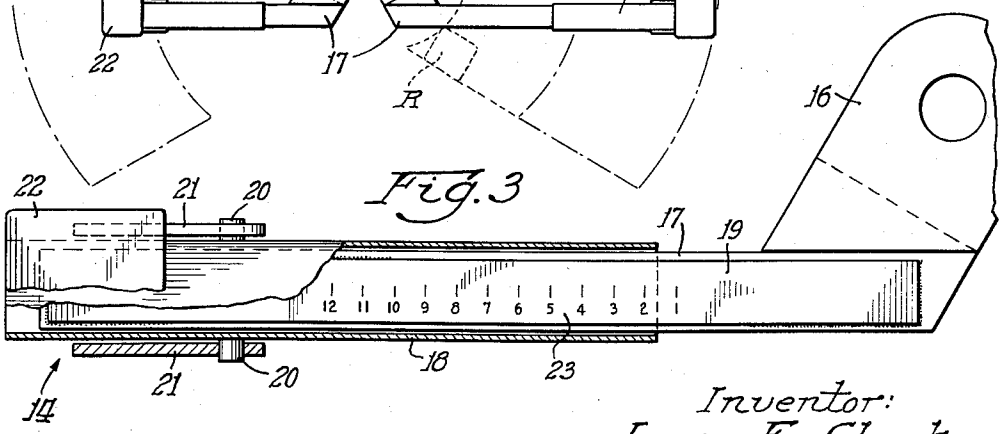


Fig. 3



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AUTOMOTIVE FRAME LIFT MEANS

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This invention relates to automotive frame lift means for automobiles, including cars and trucks, for use in service stations and the like, for servicing the underparts of a car.

A desirable characteristic of such lifts is that they cause as little obstruction as possible to access to the vehicle underparts while adequately supporting the vehicle in raised position for the purpose. Supporting the vehicle on its wheels provides a maximum of access but that has the disadvantage of not leaving the wheels free for removal or for other work thereon. For this reason lifting the vehicle by frame engagement is frequently preferred, but here again, because of the horizontal area occupied by the support means, accesibility to the vehicle underparts has been unduly restricted.

The present invention aims to provide a structure of the frame lift class that conserves the space occupied by the lift support members while increasing their strength and rigidity, thereby enabling a service station to handle more vehicles with enhanced efficiency and safety.

The foregoing and other objects and advantages will be apparent from the following description, taken together with the accompanying drawing, showing an illustrative embodiment of the invention, and in which drawing:

FIGURE 1 is a perspective view of frame lift means embodying the present invention;

FIGURE 2 is a plan view, slightly reduced, of the structure of FIG. 1, indiacting in broken lines selective arcuate adjustments of the members;

FIGURE 3 is an enlarged plan view of one of the members in separated relation and herein being the one shown for example in the lower left-hand corner of FIG. 2;

FIGURE 4 is an end view, on the scale of FIG. 3, looking at the left-hand end of the latter, with parts in an alternative position; and

FIGURE 5 is a fragmentary side elevational view of the structure of FIG. 4 looking at the left-hand side of the latter, but again on a reduced scale.

Referring in detail to the illustrative construction shown in the drawing, the numeral **11** designates a piston or plunger of a hydraulic vertically extensible ram which may be suitably mounted in a garage floor or the like and further details of which need not be here described. Carried on top of the ram plunger **11** is a transverse bolster structure **12** centrally secured to the plunger as by bolts **13**.

Following the present invention, at each corner of the bolster **12** is pivotally mounted a wing member **14** on a vertical pivot **15**, each wing member having a bifurcated hinge portion **16**, the bifurcations of which embrace the bolster between them, and an inner arm element **17** extending integrally from the hinge portion and angularly thereto so that even when the inner arm elements **17** are aligned in parallel, a pair of them, extending in the same direction from the bolster, cover a wider area than the distance between the pivots **15**. Telescoped onto the inner hinged arm elements **17** are outer or adapter arm element **18**. A description of one of the wing members **14** will suffice for each.

Characteristically of the present invention, the cross-section of the inner arm element **17**, which is desirably of solid metal, is such that its vertical dimension is approximately as great as its horizontal dimension. Preferred dimensions therefor, in one instance, are a width of two and one-half inches for the horizontal dimension A (FIG. 4) and a thickness of two and one-half inches for the vertical dimension B. In the present embodiment, the vertical dimension B is further slightly increased by a gusset strip **19** that is laid on top of the inner arm element and suitably welded to its upper face lengthwise thereof, from a point adjacent the hinged portion **16** to the outer end of the arm, the gusset strip **19** being, say, one-quarter inch thick. The inner arm element **17** being as here shown of solid square cross-section, is thus reinforced in strength and stiffness for carrying vertical loads, since by doubling the thickness of the bar its strength is increased four times while at the same time greatly increasing its stiffness factor or moment of inertia and achieving a reduction in weight.

The outer adapter arm element **18** is advantageously of box beam formation and of inner dimension to telescope fairly snugly and smoothly onto the inner arm element **17**, including the gusset or gauge strip **19** along the top of the latter.

Adjacent the outer end of the outer arm element **18** are formed a pair of oppositely extending horizontal trunnions **20** on each of which is pivoted an ear **21**, the ears jointly carrying an adapter block **22**. In one pivotal position of the ears **21** the adapter block may lay on the upper surface of the outer arm element **18** as seen in FIGS. 1, 2, and 3 or, in an alternative position of the ears, the adapter block may stand on edge on the arm as seen in FIGS. 4 and 5. In harmony with the minimized width of the arms **17–18**, the adapter block **22** is also minimized in width, that is, in horizontal dimension.

The wing members **14** are made lefts and rights with a pair extending in each of two opposite directions from the bolster. As soon schematically in FIG. 2, the wing members may be swung horizontally inwardly and outwardly, together or apart, on their pivot pins **15**, as suggested in broken lines in FIG. 2, to accommodate the width of the under-frame of the car or truck to be serviced, thus enhancing the versatility of the apparatus, which is further enhanced by the provision for slidability of the outer arm element **18** on the inner arm element **17** to shorten or extend the composite wing **14**. In order to calibrate such extensions of all four wings uniformly, or at least two of them extending in the same direction, the gauge strips **19** may carry on their faces, as seen in FIG. 3, correspondingly located scale markings **23** with which the inner ends of the outer arm elements may be brought into register selectively as desired.

The adapter blocks **22** may be used in the down or flat position as shown in FIGS. 1, 2, and 3 for most present day automobiles which have low or underslung frames. For use of the apparatus with cars having higher frames or irregular surface underframes, the adapter blocks may be turned up on edge as shown in FIGS. 4 and 5, to accommodate such variations.

So constructed and arranged, by means of the present invention, it will be seen from FIG. 1 that the vertical dimension of the inner arm element is within the horizontal plane of the bolster arm. The height of the wing members above the bolster is no greater than if the arms were of flat shape resting on the bolster. In other words, the enhanced vertical dimension of the arms is provided by thickening the latter in a direction downwardly from the top of the bolster and at the same time narrowing the width of the arms, not only without impairment of but rather with enhanced strength and stiffness of the arms and without objectionable increase in overall height of the lift. At the same time an important conservation of both the over-all weight of the superstructure and the

occupied space is accomplished, the present wing members covering a substantially minimized portion of the under-car working area, thus opening wide areas of the latter, formerly inaccessible, for expeditious service operations, such as servicing of mufflers and tail pipes, gas lines, brake lines, wiring and the like.

Enhanced versatility of the apparatus is afforded by reversibility of the outer or adapter arm element **18**. In other words, as indicated in dotted lines in FIG. 2 at R a block **22** may be brought closer to the hinged point **15** by reversing the arms **18** end for end on the inner arms **17** and these then have an arc of adjustability as indicated by the dotted lines.

The word "frame" as here used in intended to include not only conventional chassis frames but vehicle underbody parts between the wheels, and even the vehicle body itself, where presenting pick-up points as here contemplated.

An illustrative embodiment of the invention having been shown in compliance with the statute, such changes may be made as fall within the scope of the appended claims without departing therefrom.

What is here claimed is:

1. In a vehicle underbody lift apparatus, the combination with a vertically reciprocable ram plunger for mounting in the floor and a generally rectangular, flat, cross bolster extending to each side of said plunger and attached thereto, of four wing members, each one of which is secured to a corner of said bolster respectively, each of said wing members comprising a solid inner arm of approximately square cross-section, a hinge portion attached to one side of said arm at one end thereof and extending angularly away from said side in a horizontal direction, the depth of said portion being approximately equal to the depth of said arm, the extending end of the portion being bifurcated and extending above and below said bolster at a corner thereof, pivot pin means positioned vertically between the bifurcated end of the portion and said bolster, a box section outer arm snugly telescoped onto said inner arm to provide an extension of adjustable length, and a support block positioned on the top of said outer arm adjacent the outer end thereof, pivotally connected thereto and moveable between a first position at which it is flat against the top of said outer arm and a second position at which it stands erect on said outer arm with an end against the top of the outer arm, whereby a girder support is provided between said bolster and said support block which will have sufficient stiffness to support its share of the weight of the vehicle with a clearance height above the floor not substantially greater than the depth of the outer arm while providing room under the bolster, and without undue width obscuring the under portion of a vehicle supported on said apparatus.

2. In a vehicle underbody lift apparatus, the combination with a vertically reciprocable ram plunger for mounting in the floor and a generally rectangular, flat, cross bolster extending to each side of said plunger and attached thereto, of four wing members, each one of which is secured to a corner of said bolster respectively, each of said wing members comprising a generally horizontal telescoping support arm of adjustable length including a solid inner part of approximately square cross-section and a box section outer part snugly telescoped onto said inner part, a hinge portion attached to one side of one of said parts at one end thereof and extending angularly from said side in the direction away from the other end of said part in a generally horizontal direction, the depth of said portion being approximately equal to the depth of said one part, the extending end of the portion being bifurcated and extending above and below said bolster at a corner thereof, pivot pin means pivotally connecting the bifurcated end of the portion and said bolster, and a support block pivotally connected to the other part adjacent the outer end thereof and moveable between a relatively horizontal position and an erect position, whereby a girder support is provided between said bolster and said support block which will have sufficient stiffness to support its share of the weight of the vehicle with a clearance height above the floor not substantially greater than the depth of the outer part while providing room under the bolster, and without undue width obscuring the under portion of a vehicle supported on said apparatus.

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