Aug. 23, 1960 J. H. HALSTEAD 2,949,978

VEHICLE LIFTING APPARATUS

Filed Dec. 19, 1958 3 Sheets-Sheet 1

FIG_1

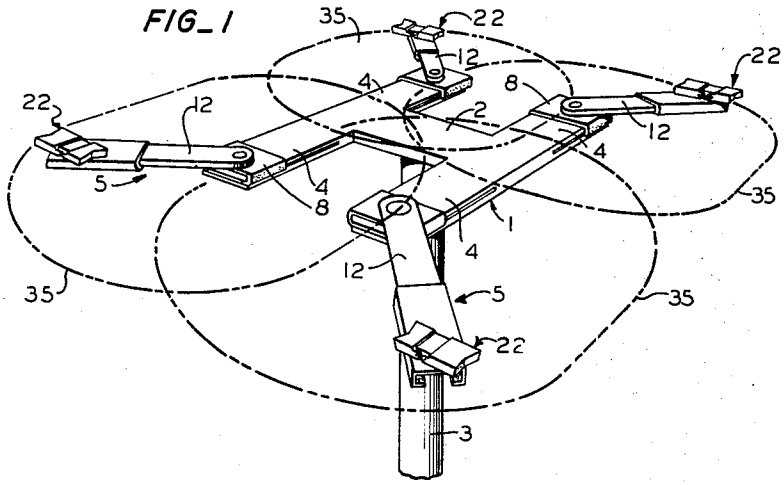


FIG_2

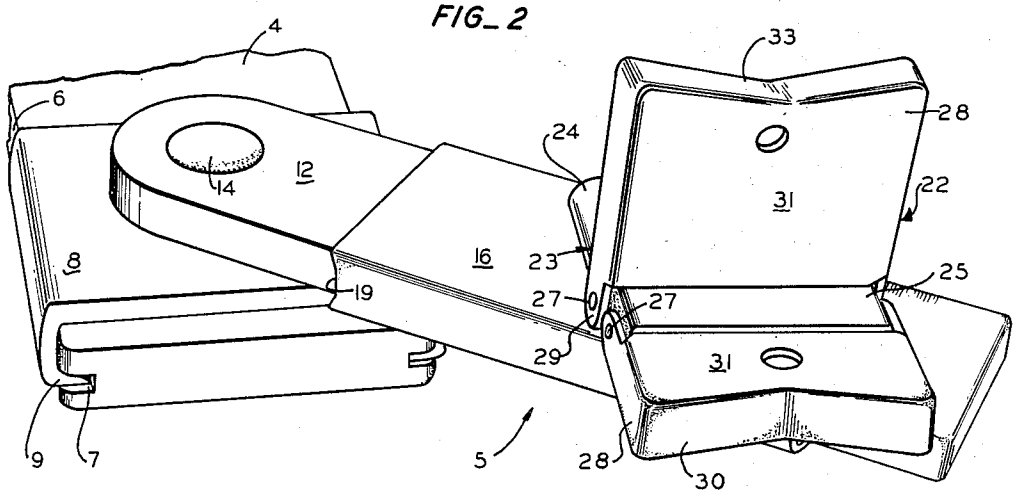
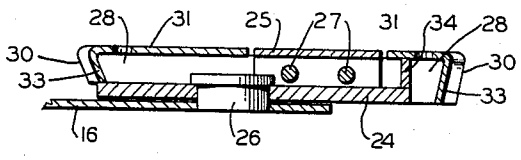


FIG_8



INVENTOR.
JOHN H. HALSTEAD
BY
Boyken, Mohler & Wood
ATTORNEYS

Aug. 23, 1960 J. H. HALSTEAD 2,949,978

VEHICLE LIFTING APPARATUS

Filed Dec. 19, 1958 3 Sheets-Sheet 2

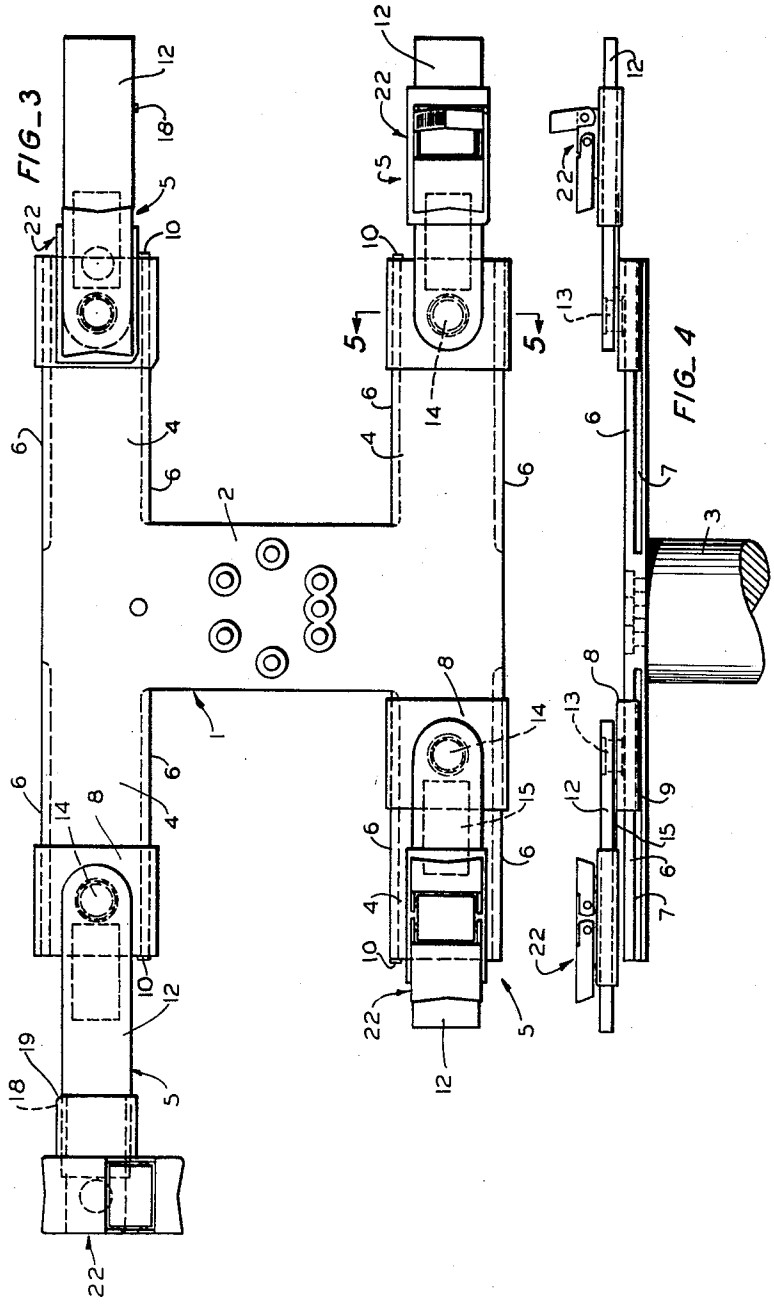


FIG_3



FIG_4

FIG_5

INVENTOR.
JOHN H. HALSTEAD
BY
Boyden, Mohler & Wood
ATTORNEYS

Aug. 23, 1960 J. H. HALSTEAD 2,949,978

VEHICLE LIFTING APPARATUS

Filed Dec. 19, 1958 3 Sheets-Sheet 3

FIG_ 6

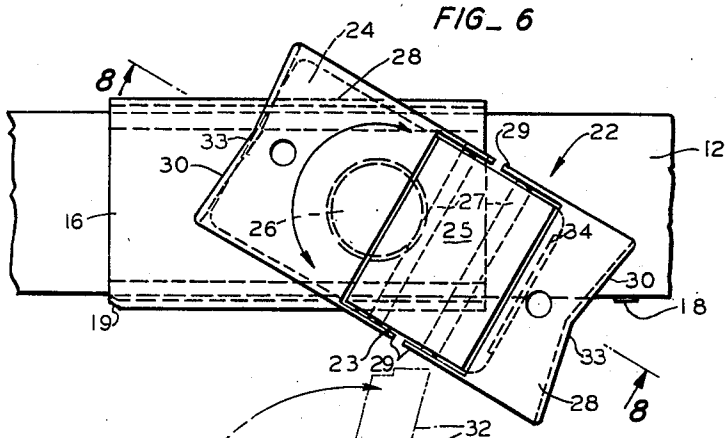


FIG_ 7

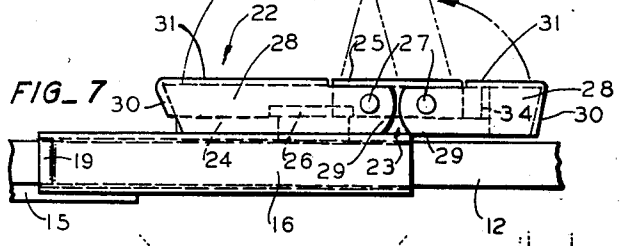


FIG_9

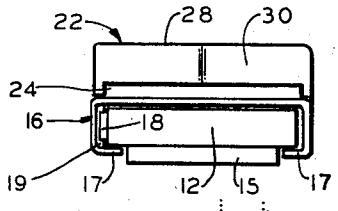


FIG_10

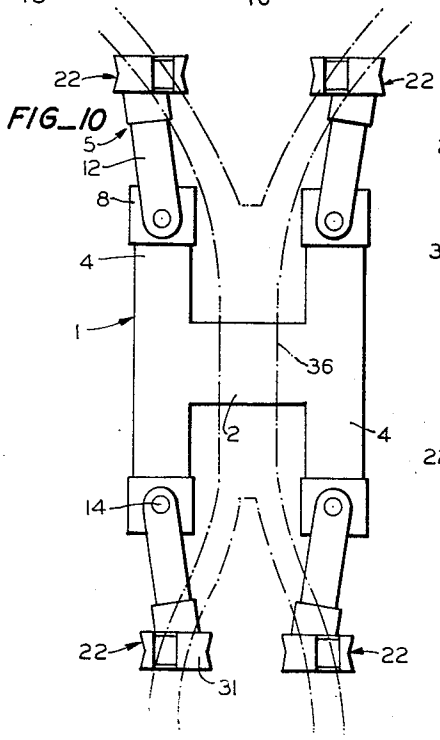
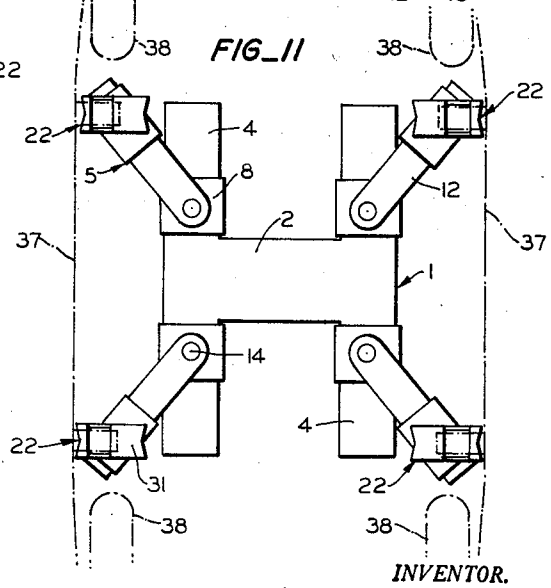


FIG_11



INVENTOR.
JOHN H. HALSTEAD
BY
Boyken, Mohler & Wood
ATTORNEYS

United States Patent Office 2,949,978 Patented Aug. 23, 1960

2,949,978

VEHICLE LIFTING APPARATUS

John H. Halstead, 1024 Emory St., San Jose, Calif.

Filed Dec. 19, 1958, Ser. No. 781,771

5 Claims. (Cl. 187—8.75)

This invention relates to apparatus for lifting vehicles and more particularly to improved features for vehicle lifts such as are used in service stations and the like.

It is well known that most automobile service stations and garages employ vehicle lifts or hoists for raising vehicles to an elevated position for facilitating the performance of lubrication, mechanical repair services and the like. Most such service stations are presently called upon to service a great variety of makes, both foreign and domestic, models, and body types of vehicles. Considerable variation exists in the size of these vehicles, the points at which they can be supported for lifting and the obstructions to supporting engagement provided on the underside of the vehicle.

The type of lift most preferred by the usual service station or garage is the so-called "frame lift," that is, one that is adapted to engage portions of the frame of the vehicle to be lifted. Deficiencies have been found to exist in prior art lifts by reason of the failure thereof to provide sufficient flexibility of operation to accommodate the great variety of frame and body conditions met under ordinary conditions of operation.

More particularly, known lifting apparatus, in which it is intended to position the vehicle with its wheels straddling the lifting apparatus, has failed to provide a sufficient range of movement for the vehicle frame engaging members of the apparatus to reach the appropriate supporting positions on large vehicles. In those vehicles in which sufficient range for this purpose is provided it has become increasingly difficult if not impossible to locate small cars in the aforementioned straddling position with respect to the lift.

It is therefore a main object of this invention to provide a vehicle lift having a large range of movement of positionable frame-engaging devices, yet a relatively small compact fixed-position base.

Another object of this invention is the provision of an improved vehicle lift which will accommodate a great variety of sizes and styles of vehicles.

Still another object of this invention is the provision of a vehicle lift which may be readily and easily positioned to positively engage and safely support a vehicle at a plurality of points on the underside thereof.

It is a further object of this invention to provide vehicle lifting apparatus which safely supports a vehicle in an elevated position and at the same times provides sufficient clearance for access to the underside of the vehicle.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of the improved lift of this invention;

Fig. 2 is a greatly enlarged perspective view of one of the positionable vehicle supporting devices of the apparatus of Fig. 1;

Fig. 3 is a top plan view of the lift apparatus of Fig. 1;

Fig. 4 is a side elevational view of the apparatus of Fig. 1;

Fig. 5 is an enlarged cross sectional view taken along line 5—5 of Fig. 3;

Fig. 6 is an enlarged top plan view of one of the vehicle frame engaging pads of the apparatus of Figs. 1, 3;

Fig. 7 is a side elevational view of the pad of Fig. 6;

Fig. 8 is a longitudinal sectional view as seen generally from line 8—8 of Fig. 6;

Fig. 9 is an end elevational view of the pad of Fig. 6;

Fig. 10 is a reduced scale plan view of the device of this invention shown in use with a vehicle "X-frame"; and

Fig. 11 is a plan view similar to Fig. 10, showing the device in use with a short wheel-based vehicle.

In detail, referring to Figs. 1, 3, the vehicle lift of this invention includes a horizontal, H-shaped base member, generally designated 1, the cross piece 2 of which is secured to the upper end of a conventional lift cylinder piston 3 (Fig. 4). The lift cylinder and its associated piston 3 may be of any suitable hydro-pneumatic or hydraulic type operative to project piston 3 generally vertically upwardly from a garage or service station floor or the like. Base member 1 in its initial position is supported by piston 3 on or closely adjacent such floor and is adapted to be raised to some elevated position by said piston.

The legs of member 1 provide opposed pairs of parallel, spaced, elongated rails 4. It will be obvious that rails 4 may be made of any suitably strong material and joined in any suitable manner to cross piece 2, but preferably the entire base member 1 should be integrally formed or welded from relatively high strength sheet steel.

Rails 4 each provide elongated tracks for carrying the vehicle frame engaging devices, generally designated 5, to be hereinafter described in detail. In the form shown in the drawings these tracks comprise the opposed, parallel side edges 6 which extend longitudinally of rails 4. Said side edges may be longitudinally grooved as at 7 (Figs. 2, 4, 5), for a purpose to be described.

The positionable frame engaging devices 5 mounted on the rails 4 are identical in construction and the description of one of said devices will thereby be understood to be applicable to each of said devices. Said device 5 includes a shoe 8 sildably mounted on the rail 4 for sliding longitudinally thereof. Preferably, said shoe is formed from a plate extending transversely of the upper side of rail 4 and bent downwardly and inwardly (Fig. 5) to form opposedly inwardly extending flanges 9 extending around side edges 6 and received in grooves 7. It is obvious that flanges 9 may extend under side edges 6 in the event the provision of grooves 7 is not desired. A stop 10 (Fig. 3) is provided at the end of each rail for preventing shoe 8 from sliding off said end.

Swingably supported on shoe 8 of each frame engaging device 5 is an elongated arm 12. The pivotal connection between arm 12 and shoe 8 comprises a pivot pin 13 (Fig. 5) welded to and projecting upwardly from said shoe. At one end arm 12 is provided with an aperture for rotatably receiving the upper end of pin 13 and its head 14 thereby supporting arm 12 for 360° rotation in a horizontal plane about the vertical axis of pin 13.

On the underside of arm 12 there is preferably provided a reinforcing plate 15 welded to said arm and extending from a point adjacent pivot pin 13 toward the other, remote end of arm 12. The end of plate 15 adjacent pin 13 is in slidable engagement with the upper surface of shoe 8, thereby providing a spacer between said arm and said shoe and a horizontal bearing support for swinging said arm about its pivot. The remaining portion of plate 15 comprises a reinforcing member for the cantilevered portion of arm 12.

Slidably mounted on each arm 12 is a slide 16 (Figs.

2, 6–9). Slide 16 may be formed from a plate extending across the arm and having its opposed marginal edge portions bent downwardly and inwardly to provide opposedly inwardly extending flanges 17 (Fig. 9) engaging under the longitudinal, parallel side edges of arm 12. The mounting of slide 16 on arm 12 is seen to be generally the equivalent of the mounting of shoe 8 on rail 4. In this manner slide 16 may be moved to any desirable position along the length of arm 12 from pivot pin 13 to the outer end of said arm. A stop 18 (Figs. 3, 6, 9) projecting from one of the side edges of arm 12 is engageable by an inwardly directed flange 19 on slide 16 to prevent the movement thereof beyond the outer end of arm 12. It will be noted that slide 16 may be removed from arm 12 by sliding the former over the inner end of said arm at pivot pin 13. The previously described reinforcing plate 14 is sufficiently narrower than arm 12 (Fig. 9) so that it will not interfere with sliding movement of slide 16.

Each slide 16 carries a vehicle frame engaging pad, generally designated 22. Said pad comprises a base element generally designated 23, which includes an elongated plate 24 having an inverted channel 25 extending thereacross with its downwardly depending side legs welded to the edges of plate 24. Base element 23 is supported for rotation about a vertical axis on slide 16 by means of a pivot pin 26 (Figs. 6, 7, 8) which is journalled through plate 24 and may have its lower end rigidly secured, as by welding, to the portion of slide 16 above arm 12. Channel 25 presents a generally horizontal upwardly directed surface which is thereby supported for rotary movement about 360° in a horizontal plane.

The depending side legs of channel 25 are apertured to receive pivot means in the form of a pair of horizontal, parallel pins 27. Pins 27 serve to swingably connect a pair of opposing jacks 28 to base member 23 by virtue of their being connected to adjacent ears 29 formed at one of the respective ends of said jacks on opposite sides of channel 25.

Jacks 28 extend oppositely from these adjacent ends at ears 29 to outer ends 30 beyond the outer ends of plate 24. It will be noted in the drawings that the outer end 30 of one of said jacks is at a greater distance from the horizontal pivot means 27 than the other of said jacks. Each of said jacks is thereby supported on base element 23 for swinging from a first position, in which its upper, flat surface 31 (Fig. 7) is generally coplanar with the upper surface of channel 25, to a second position, denoted by dot-dash line 32, projecting upwardly from said channel. In this second position the outer end 30 of the jack is directed upwardly toward the frame of a vehicle placed thereover. Obviously, the longer of the two jacks will project above channel 25 further than the shorter.

The outer end 30 of each of said jacks has a shallow, generally V-shaped cross section in a plane parallel to the plane of the upper surface 31 thereof providing an upwardly opening depression 33 (Fig. 2) when said jack is in the aforementioned second position. Said jack is supported in said second position by the engagement of the edge of the web forming upper surface 31 with the upper surface of channel 25.

When jacks 28 are in the horizontal position coplanar with channel 25 they are supported by engagement with one end of plate 24 and an upwardly projecting tongue 34 (Figs. 6, 7) respectively. In this latter position upper surfaces 31 of the jacks and the upper surface of channel 25 provide an upwardly directed flat surface for engagement with the frame of a vehicle to be lifted.

This vehicle frame engaging surface is generally rectangular in shape (Figs. 3, 6) and, it will be noted, the vertical axis of pivot pin 26 is offset from the center thereof near the end 30 of one of jacks 28. In other words, the vehicle engaging pad 22 is eccentrically mounted for rotation on slide 16. This construction not only provides lifting pad 22 with a greater "reach," as when one of its ends projects beyond the end of slide 16 but also permits greater flexibility in positioning the lifting pad for the maximum positive engagement of a greater portion of its surface with the vehicle frame.

In many lifting situations it will be found desirable to employ the device of this invention with jacks 28 in the horizontal or first position so as to provide a large upwardly directed area for engaging the vehicle frame. Because of the wide range of horizontal movement of the individual pads 22 with respect to the horizontal extremities of base member 1, it is a relatively easy matter for the operator to correctly position the pads for maximum support and safety in the lifting operation.

In instances where the portions of the vehicle frame to be engaged are at different levels, either of the jacks 28 may be swung to the upright position to facilitate level lifting of the vehicle. Use of the jacks in this upright position is also advisable where it is desired to provide greater clearance between the vehicle undercarriage and the lift structure for making portions of said undercarriage more accessible.

Vehicle manufacturers often specify which portions of the under carriage or frame should be engaged by a lifting device. In many passenger automobiles these areas are relatively large and flat, and may easily be engaged by lifting pads 22 in the horizontal position. However, in some vehicles such as light trucks, the portion of the frame to be engaged may be relatively narrow and/or positioned vertically upwardly from other portions of the vehicle undercarriage which are not to be engaged by the lift. The provision of the lifting pad of this invention which cannot only be moved horizontally to the desired position but also rotated in said position is highly advantageous in meeting these unusual situations. The V-shaped depressions 33 in the ends of the jacks 28 are adapted to receive a frame or axle member therein and to support it against sidewise movement. Since the frame or axle member to be received may be oriented differently with respect to other portions of the vehicle the ability of the lifting pad 22 and its jack 28 to be rotated greatly facilitates the correct positioning of the jack so that such frame or axle member rests in the V.

Figs. 10 and 11 illustrate some particular applications of the lifting apparatus herein described. In Fig. 10 a so-called "X frame" of a vehicle is shown in dot-dash lines 36 superimposed over a plan view of the lift of this invention. The precise positioning of the pads 22 with respect to this type of frame enables the lift herein described to securely and safely support the vehicle in perfect balance.

The improved features of the lift of this invention enable the base member 1 to be both shorter and narrower than in conventional lifts so that a relatively narrowly wheel-based car may be driven over the same. By swinging arms 12 inwardly of rails 4 and positioning shoes 8 adjacent cross piece 2, a sports car 37 or the like (Fig. 11) may easily be positioned straddling the lift. Arms 12 may then be swung outwardly between the wheels 38 of the small car so that pads 22 will engage the proper pick-up positions near the outer extremities and between the wheels of such a vehicle.

The lift of this invention may also be constructed with sufficient strength and rigidity to lift any of the variety of conventional vehicles and yet maintain an overall height from the floor to the upper side of pads 22 of less than 5". Fig. 1 further illustrates the substantial range of movement of the vehicle frame engaging pads with respect to the relatively small dimensions of base member 1 by the overlapping patterns of movement indicated by dotted lines 35.

Although this invention has been described and illustrated in detail, such is not to be taken as restrictive thereof since all modifications that would appear to one

skilled in the art are to be included within the spirit and scope of the appended claims.

I claim:

1. In apparatus for supporting vehicles during lifting including a base member adapted to extend under a vehicle, a vehicle frame engaging pad comprising: a base element, vertical pivot means for connecting said element to said base member mounting said element for rotation about a vertical axis, a pair of opposed jacks, horizontal pivot means swingably connecting said jacks to said element for swinging of each of said jacks from a first position in which said jacks extend oppositely away from said horizontal pivot means with their upper flat surfaces generally coplanar and horizontal to a second position in which one of said jacks projects upwardly from said element, the opposed outer ends of said jacks having a shallow, generally V-shaped cross section providing an upwardly opening depression for receiving a frame member of a vehicle to be supported when said jack is in said second position, and said outer end of one of said jacks being at a greater distance from said horizontal pivot means than the other.

2. In apparatus for supporting vehicles during lifting including a base member adapted to extend under a vehicle, a vehicle frame engaging pad comprising: a base element, vertical axis rotatable connecting means connecting said element to said base member and mounting said element for rotation about a vertical axis, a pair of jacks each having an upper supporting surface and an adjacent end surface extending transversely of said upper surface, horizontal axis pivot means swingably connecting said jacks at points remote from their said end surfaces to said element for swinging of each of said jacks from a first position in which said upper surfaces of said jacks are generally horizontal and coplanar to a second position in which said end surface of one of said jacks is elevated from said element and directed upwardly for supporting a frame member of a vehicle thereon, said end surface of one of said jacks being more remote from said horizontal axis pivot means than the other.

3. In a vehicle lift including a horizontally extending base member, a plurality of vehicle frame support devices, each comprising: an elongated arm, pivot means connecting one end of said arm to said base member for swinging said arm in a horizontal plane with the other end of said arm extending outwardly away from said base member and describing an arc of a circle overlapping the corresponding circle of an adjacent arm, a slide supported on said arm for sliding from said one end to said other end of said arm, a vehicle frame engaging pad having an upper supporting surface of substantial rectangular area, and means supporting said pad on said slide for rotation of said pad with respect to said arm about a vertical axis extending through said pad for orienting said pad to provide maximum support area to such vehicle frame, said vertical axis being offset from the center of said surface.

4. In a vehicle lift including a horizontally extending base member, a plurality of vehicle frame support devices, each comprising: an elongated arm, pivot means connecting one end of said arm to said base member for swinging said arm in a horizontal plane with the other end of said arm extending outwardly away from said base member and describing an arc of a circle overlapping the corresponding circle of an adjacent arm, a slide supported on said arm for sliding from said one end to said other end of said arm, a vehicle frame engaging pad having an upper supporting surface of substantial rectangular area, and means supporting said pad on said slide for rotation of said pad with respect to said arm about a vertical axis extending through said pad for orienting said pad to provide maximum support area to such vehicle frame, said pad including at least one jack providing said upper surface and having an adjacent end surface extending transversely of said upper surface, horizontal axis pivot means swingably supporting said jack at a point remote from said end surface for swinging said jack from a first position in which said upper surface extends generally horizontally to a second position in which said end surface is directed upwardly for supporting such vehicle frame.

5. In a vehicle lift including a horizontally extending base member, a plurality of vehicle frame support devices, each comprising: an elongated arm, pivot means connecting one end of said arm to said base member for swinging said arm in a horizontal plane with the other end of said arm extending outwardly away from said base member and describing an arc of a circle overlapping the corresponding circle of an adjacent arm, a slide supported on said arm for sliding from said one end to said other end of said arm, a vehicle frame engaging pad having an upper supporting surface of substantial rectangular area, and means supporting said pad on said slide for rotation of said pad with respect to said arm about a vertical axis extending through said pad for orienting said pad to provide maximum support area to such vehicle frame, said vertical axis being offset from the center of said surface, said base member including two opposed pairs of spaced, parallel, horizontally extending rails connected to power lifting means and a shoe slidably mounted on each of said rails for sliding longitudinally thereof, each said arm being connected to one of said shoes.

References Cited in the file of this patent

UNITED STATES PATENTS

2,593,635	Walker	Apr. 22, 1952
2,612,355	Thompson	Sept. 30, 1952
2,659,455	Green	Nov. 17, 1953
2,777,538	Cochin	Jan. 15, 1957
2,878,897	Cochin	Mar. 24, 1959
2,899,020	Halstead	Aug. 11, 1959
2,904,132	Haddix	Sept. 15, 1959

FOREIGN PATENTS

182,213	Austria	June 10, 1955
497,847	Belgium	Sept. 15, 1950
1,143,700	France	Apr. 15, 1957