

[54] TWO-COLUMN LIFTING PLATFORM

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[58] Field of Search254/7 R, 7 B, 7 C, DIG. 2, 254/92, 98, 89 R; 187/8.57, 8.59, 95

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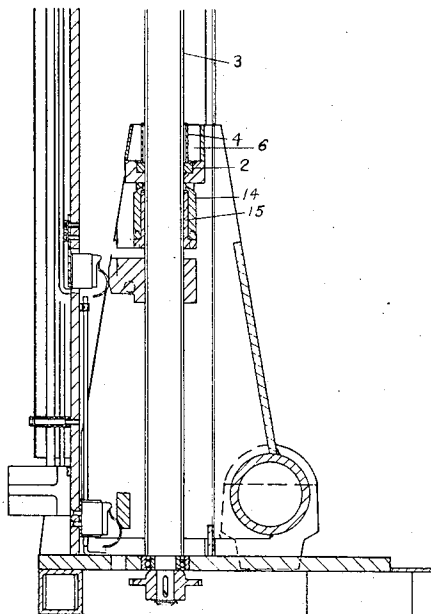
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[57] ABSTRACT

There is disclosed a two-column lifting platform with spindle-operated lifting carriage, e.g., for use in lifting motor vehicles, for example, for the purpose of inspection and maintenance, which comprises a carriage forming or carrying a platform for supporting the vehicle to be lifted, and two columns for moving the carriage vertically. At least one column comprises a threaded spindle carrying a nut secured to the lifting carriage, rotation of the spindle thus displacing the carriage. The carriage is also guided in its vertical movements by suitable lateral guide means. The spindle passes through a stepped bore in the lifting carriage, wherein a ring of oil-absorbent material is fitted in the stepped bore so that the inside peripheral face of the ring lies in an oil-transferring relationship against the periphery of the spindle and the ring is held in position by a flange sleeve which is pressed into the stepped bore and which defines a space for containing lubricating oil, the flange portion of the flange sleeve having one or more openings through which oil can flow to saturate the ring.

8 Claims, 8 Drawing Figures



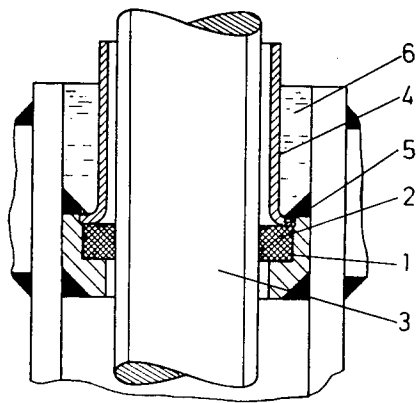


FIG. 1

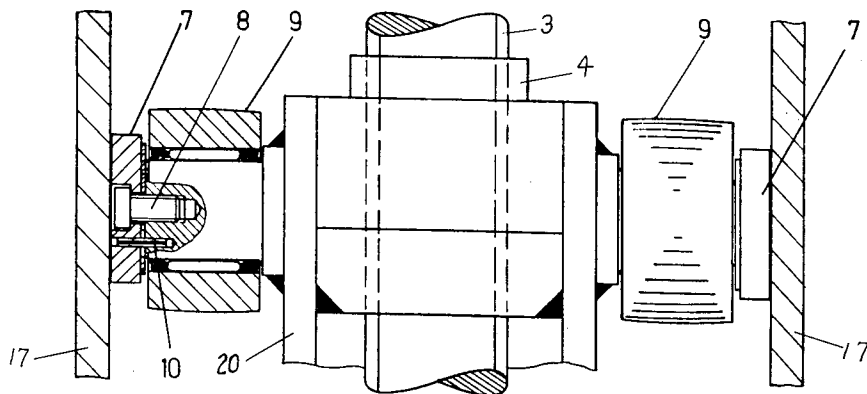


FIG. 2

FIG. 3

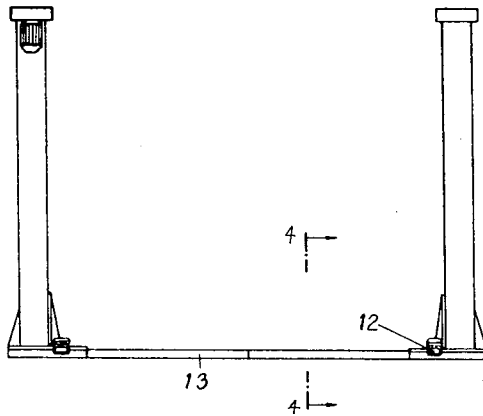


FIG. 4

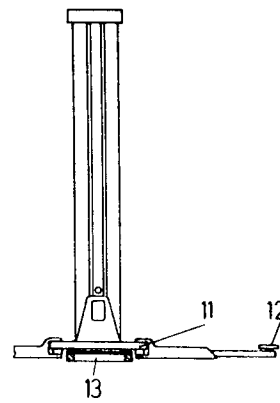


FIG. 5

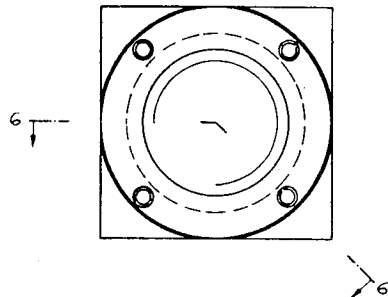
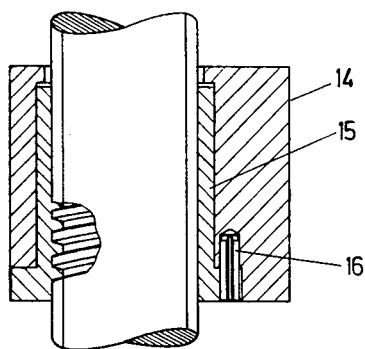
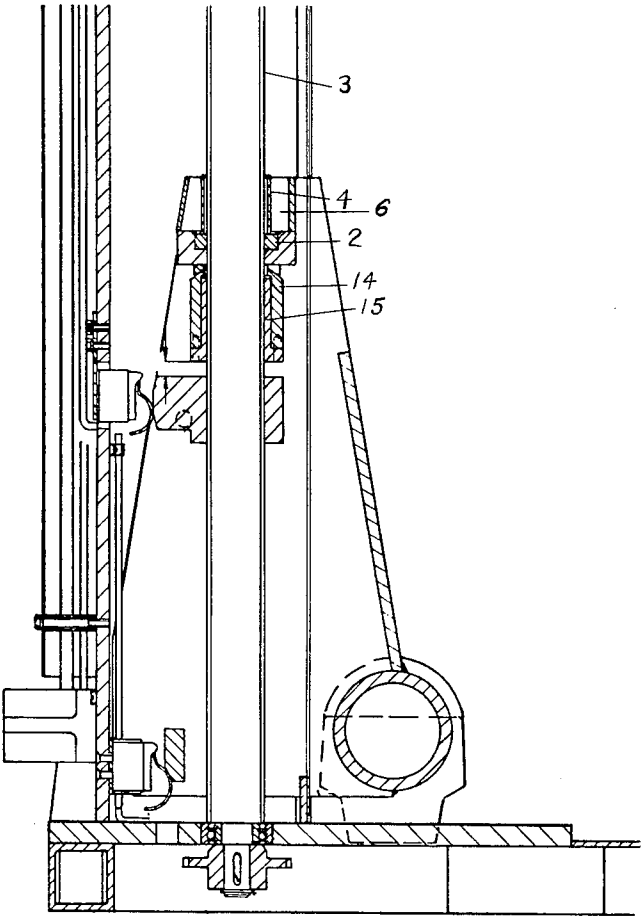


FIG. 6





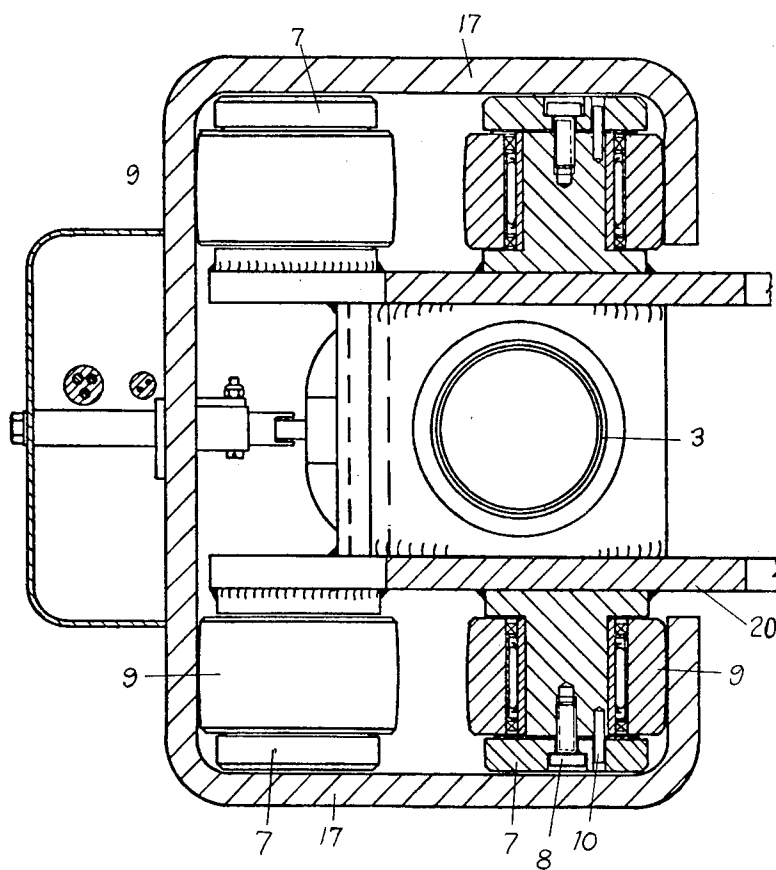


FIG. 8

TWO-COLUMN LIFTING PLATFORM

BACKGROUND OF THE INVENTION

In known lifting platforms, lubrication of the spindles is essential but can also be expensive and difficult. Either an oil pump is fitted for force-feed lubrication, or lubrication is effected continuously by hand, which is a complicated procedure often resulting in irregular lubrication. There is also the possibility of splash lubrication. In this case, a pick-up device dips into an oil reservoir and, as the lifting carriage is raised, applies oil to the spindle. A disadvantage of this kind of lubrication, however, is that the bottom spindle threads may receive plenty of oil, but the upper spindle threads receive less oil or even no oil at all.

Lifting nuts for cooperation with the threaded spindles are known, which are made entirely from bearing metal such as babbitt metal. The expensive bearing metals increase the cost of the lifting nuts. Either the breaking or tensile strength of the nuts may not be sufficient, owing to the nuts being made exclusively of bearing metal, or the forces acting on the nuts had to be allowed for by making the lifting nuts of larger dimensions.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a two-column lifting platform for lifting a motor vehicle, comprising two columns and a rotary spindle-operated lifting carriage guided by the columns, the spindle passing through a stepped bore in the lifting carriage, wherein a ring of oil-absorbent material is fitted in the stepped bore so that the inside peripheral face of the ring lies in an oil-transferring relationship against the periphery of the spindle and the ring is held in position by a flange sleeve which is pressed into the stepped bore and which defines a space for containing lubricating oil, the flange portion of the flange sleeve having one or more openings through which oil can flow to saturate the ring.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of a lifting platform according to the present invention will now be described by way of example with reference to the accompanying drawings in which:

FIG. 1 shows a longitudinal section through a part of a lifting spindle showing the lubrication thereof;

FIG. 2 shows a partial section through part of a lifting carriage with spindle and guide means;

FIG. 3 shows a front elevation view of the lifting platform;

FIG. 4 shows a partial section of the lifting platform on line 4—4 of FIG. 3;

FIG. 5 shows a plan view of one lifting nut; and

FIG. 6 shows a section of the lifting nut on line 6—6 of FIG. 5.

FIG. 7 is a fragmentary side elevation view with parts in section of the base region of one spindle showing portions of the lifting carriage guide means and lubricator; and

FIG. 8 is a horizontal transverse sectional view generally comparable with the region depicted in FIG. 2.

As shown in FIG. 1, a ring 2 made of felt or another absorbent material is fitted into a stepped bore 1 in the lifting carriage. The ring 2 is prevented from moving in a vertical direction within the bore 1 by a flanged sleeve 4 which is a press fit in the bore 1, above the ring 2, the flange portion of the sleeve 4 being of a diameter to ensure a firm seat in the bore 1 and at the same time oil-tightly closing the bore 1 towards the ring 2. The sleeve 4 is also pressed into the bore 1 to a depth such that the ring 2 cannot move in a radial direction, but is firmly held in place. The outside diameter of the ring 2 is substantially equal to that of the bore 1, while its inside diameter is somewhat smaller than the diameter of a lifting spindle 3 which passes centrally through the bore in the carriage. As a result, the inner vertical peripheral face of the ring 2 lies closely against the outside peripheral periphery of the lifting spindle 3. The ring 2 is continuously saturated with high-viscosity oil through one or more openings 5 in the flange portion of the sleeve 4 from an annular space 6 formed between the outside face of the sleeve portion of the sleeve 4 and the surrounding part of the lifting carriage, the sleeve portion being of substantially smaller outside diameter than the flange portion and larger in inside diameter than the spindle 3 to ensure free motion. The ring 2 thus forms an oil reserve and, moving up and down along the spindle 3 as the latter rotates, provides lubrication thereof in any lifting position of the carriage.

Referring now to FIG. 2, the lifting carriage 20 is guided by means of support rollers 9 carried on cantilevered, i.e., overhung, shafts. Secured to the free end face of each of the overhung shafts is a respective slide member 7 which guides the carriage laterally, by sliding against vertical structural members or tracks 17. The slide members 7 are held in position by means of countersunk cylinder bolts or screws 8, and also prevent the associated rollers 9 moving laterally, that is, axially along their shafts, to an excessive degree. As a rotational force could be exerted on the slide members 7 by frictional contact with the end face of the rotating rollers 9, such a rotational force tending if unchecked to twist the slide members 7 and thereby loosen the bolts or screws 8, the slide members 7 are also secured in position relative to the shafts of the rollers 9 by securing means such as one or more offset pins 10 or the like members engaged in the slide members 7 and associated shafts. The slide members 7 are, for example, circular and are mounted coaxially to the rollers 9.

The FIG. 2 arrangement has the advantage that the lifting carriage with its guide means is of less structural height than previously proposed constructions in which the rollers and slide members are arranged one above the other.

In FIGS. 3 and 4, a carrier member 11 which is secured to the lifting carriage and which pivotally carries support arms with support plate members 12 for carrying a vehicle to be lifted, is extended beyond the width of a base frame member 13 at the foot of the vertical column. The pivotal connections between carrier member 11 and the support arms thus lie outside the member 13, so that the support arms can be lowered to a position in which they are almost flush with the roadway surface on which the lifting platform is standing. Thus, it is possible to lift a vehicle with very small ground clearance, without the arms coming to rest on

the frame members 13 and being impeded in their downward movement. The arms are pivoted under the vehicle to be lifted.

FIGS. 5 and 6 show the construction of the lifting nut which cooperates with the lifting spindle 3 of FIG. 1, rotation of the spindle moving the nut, and therewith the carriage 20 in which the nut is carried, in a vertical direction. A flanged sleeve 15 comprising bearing metal and having an internal thread mating with the thread of the lifting spindle is pressed into a stepped bore in a steel sleeve 14 which is secured in the lifting carriage. The weight of the carriage and any load thereon will tend to force the flanged sleeve 15 into the steel sleeve 14, the flanged portion of the sleeve 15 bearing the weight on its upward surface, as is clearly shown in FIG. 6. One or more securing members such as a pin 16 or like member prevent relative rotational movement between the two sleeves 14 and 15. The nut thus enjoys a high tensile strength, by virtue of the steel sleeve 14, while the cost of the nut is reduced relative to a nut made entirely of bearing metal, as the dimensions of the inner sleeve 15 can be kept to a minimum compatible with safe reliable operation.

It should now be apparent that the two-column lifting platform as described hereinabove possesses each of the attributes set forth in the specification under the heading "Summary of the Invention" hereinabove. Because the two-column lifting platform of the invention can be modified to some extent without departing from the principles of the invention as they have been outlined and explained in this specification, the present invention should be understood as encompassing all such modifications as are within the spirit and scope of the following claims.

What is claimed is:

1. A two-column lifting platform for lifting a motor vehicle, comprising:
 - two upright columns;
 - a lifting carriage;
 - a rotatable spindle;
 - means connecting the rotatable spindle to the lifting carriage for raising and lowering the carriage upon rotation of the spindle;
 - means on the lifting carriage engageable with at least one of the columns for guiding the carriage with respect to the at least one column when the carriage is being raised and lowered;
 - means defining an opening in the lifting carriage having means defining an upwardly facing annular shoulder therein;
 - an annular ring of lubricating oil-absorbent material disposed upon said shoulder with the inner peripheral surface thereof in oil transferring engagement with the external peripheral surface of the rotatable spindle;
 - a tubular sleeve received within said opening, said tu-

bular sleeve having means defining an annular, downwardly facing flange thereon at the lower end thereof disposed to engage said annular ring of lubricating oil-absorbent material;

- 5 said tubular sleeve, above said flange thereof being annularly spaced radially inwardly from the periphery of said opening to define between the periphery of said opening and the exterior of said tubular sleeve, above said flange thereof, a lubricating oil reservoir;
- 10 means on said carriage maintaining said tubular sleeve fixed with respect to said opening in the disposition with respect to the annular ring as recited; and
- 15 means defining at least one port through the flange of said tubular sleeve communicating the lubricating oil reservoir with the annular ring of lubricating oil-absorbent material.

2. A lifting platform according to claim 1 wherein the ring is made of felt.

3. A lifting platform according to claim 1 wherein the means for guiding the carriage comprises at least two overhung shafts on the lifting carriage, each of the shafts carrying a guide roller and having a slide member secured to the end face of the shaft, the rollers and the slide members guidingly locating the lifting carriage respectively in two horizontal directions perpendicular to each other.

4. A lifting platform according to claim 3 wherein each slide member is connected to the associated shaft by a screw connection, at least one additional securing member being provided to prevent the slide member rotating relative to the respective shaft.

5. A lifting platform according to claim 4 wherein the slide members are circular and are mounted coaxially relative to the respective shafts.

6. A lifting platform according to claim 1 further comprising a base frame member physically interconnecting the two columns at the foot of each column wherein the lifting carriage carries a carrier member to which vehicle support arms are pivotally connected, the carrier member being extended so that the arm pivotal connections lie outside the width of the base frame member at the feet of the columns.

7. A lifting platform according to claim 1 wherein means connecting the rotatable spindle to the lifting carriage comprises a lifting nut which cooperates with the spindle to move the lifting carriage vertically, the lifting nut comprising a steel sleeve and a flanged sleeve which is pressed into the steel sleeve and which is made of bearing metal, the flanged sleeve having means defining internal threading cooperating with means defining external threading on the spindle.

8. A lifting platform according to claim 7 wherein a securing pin engages into the steel sleeve and the flange sleeve, to prevent relative rotation therebetween.

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