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FITZPATRICKS 48 St. Vincent Street
Glasgow G2 5TT(GB)(54) **Tiltable support stand for vehicles.**

(57) A low cost, tiltable vehicle support stand (20) is provided which is inherently stable in use and is designed to develop a righting moment during vehicle setup operations so that a vehicle can be quickly and easily elevated to facilitate work thereon. The preferred support stand (20) includes a relatively wide base (22) having an elongate, transversely extending beam (38) secured thereto; a pair of padded vehicle-engaging members (48) are shiftably mounted on the beam (38) and are spaced apart a distance greater than the effective width of the base (22). In this manner the center of gravity of a supported vehicle lies in a plane which passes between the lateral side margins (34, 36) of the base (22), even in the event that the stand (20) or vehicle-engaging members (48) are located asymmetrically relative to the underside of the vehicle. This stand configuration also ensures that the vehicle and stand (20) will right themselves during initial setup, which generally involves sideways elevation and tilting of the vehicle, placing a pair of the support stands beneath the vehicle in a similarly tilted orientation, and lowering the vehicle to effect reverse tilting of the vehicle and stands (20) until the same are righted and the vehicle is elevated.

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TILTABLE SUPPORT STAND FOR VEHICLES5 Background of the Invention1. Field of the Invention

The present invention is broadly concerned with an improved, tiltable vehicle support stand, and a corresponding method, which greatly facilitates work on and around four wheel vehicles. More particularly, it is concerned with such a support stand which is especially designed to be particularly stable during use thereof, and which can be used to set up a vehicle without the usual time-consuming procedures of conventional supports.

2. Description of the Prior Art

Automobile repair shops and others many times need to elevate vehicles a short distance off the ground in order to facilitate various repairs and servicing. For example, tire changes and certain work beneath the vehicle (usually done with the aid of a low profile dolly) require that the vehicle be elevated off a shop floor.

The conventional practice in this regard is to initially elevate the front, rear or one side of the vehicle using an end lift or service jack, followed by positioning of a pair of individual stands under the elevated part of the vehicle adjacent the elevated wheels. This procedure is then repeated on the opposite end or side of the vehicle in order to completely elevate the latter off the shop floor. A number of problems arise in connection with this conventional procedure. Governmental regulations generally require positioning

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1 of stands under a vehicle as safety devices, even
if the jack used to lift the vehicle is left in
place. To be effective though, they must be
properly located and adjusted to positions just
5 below the overlying structure. But, because of
the trouble in locating and positioning the stands,
mechanics often ignore the safety aspects of the
stands in favor of saving time and simply leave
the vehicle on the jack or jacks without under-
10 lying stands. When stands are used to support
the vehicle so the jack or jacks can be used else-
where, the individual support stands must be even
more carefully placed beneath the vehicle in order
to ensure that the vehicle is evenly supported.
15 In addition, the effective heights of the support
stands must be precisely adjusted so that the
vehicle is stable in its elevated position, par-
ticularly if the shop floor is uneven. It will
also be appreciated that these steps of position-
20 ing and adjustment of the respective stands must
be performed from a rather awkward position adja-
cent or beneath the vehicle. Hence, support of a
vehicle in an elevated position using conventional
stands has proven to be a time-consuming and
25 sometimes difficult task.

Summary of the Invention

The vehicle support stand of the present
invention broadly includes a base adapted to rest
30 on a floor and which presents a pair of laterally
spaced apart, floor-engaging side margins. Struc-
ture defining a pair of laterally spaced apart
vehicle-engaging support regions is secured atop
the base with the regions above the floor. Fur-
35 ther, the vehicle-engaging regions are spaced

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1 apart a distance greater than the lateral distance
between the base side margins.

5 In preferred forms, the base comprises a
pair of elongated, separate, laterally spaced
apart foot members formed of metallic tube stock,
with an elongated, transversely extending beam
being rigidly connected to the foot members. The
beam supports a pair of relatively shiftable
upstanding bodies of inverted, generally U-shaped
10 configuration. A resilient friction pad is af-
fixed to the upper face of each U-shaped body,
whereas the depending legs thereof are apertured
and slidably receive the beam. The support stand
is of relatively low profile, and is especially
15 designed to develop a righting moment during
vehicle setup operations, and to be exceptionally
stable in use. To this end, the distance between
the side margins of the base, the distance between
the spaced-apart vehicle-engaging support regions,
20 and the height of the regions above the floor, are
correlated such that the center of gravity of a
supported vehicle lies in a plane passing between
the base side margins. Further, when the vehicle
is elevated and thereby tilted sideways during
25 setup operations with the tires on one side of the
vehicle engaging a floor, and a pair of support
stands are placed under the sideways tilted ve-
hicle similarly tilted, the center of gravity of
the vehicle again lies in a plane which passes
30 between the base side margins. In this fashion a
righting moment is developed which urges the
stands and vehicle back toward their fully righted
positions.

35 Use of a jack which raises one side of
a vehicle and insertion of tiltable support

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1 stands as disclosed herein has a number of
further important advantages. It solves the prob-
lem of meeting governmental regulations requiring
stands because mechanics will not leave the
5 vehicle in a tilted position when all four wheels
must be raised off the ground yet they need not
position stands, then walk around to the opposite
side or end of the vehicle, again raise the same
and position more stands. Of significance in
10 this respect is the fact that no more than two
stands are ever required and they need not be
adjusted vertically or as precisely under the
vehicle as conventional stands.

15 Brief Description of the Drawings

Figure 1 is a perspective view of a
vehicle support stand in accordance with the
invention;

20 Fig. 2 is a rear elevational view of the
stand illustrated in Fig. 1;

Fig. 3 is an end elevational view of the
stand depicted in Figs. 1-2;

Fig. 4 is a sectional view taken along
line 4-4 of Fig. 2;

25 Fig. 5 is a sectional view taken along
line 5-5 of Fig. 4;

Fig. 6 is an end view illustrating
initial setup operations with the support stands
of the present invention and an elevated and side-
30 ways vehicle;

Fig. 7 is an end view similar to that of
Fig. 6 but illustrates the stands and vehicle
during righting of the same;

35 Fig. 8 is a view similar to that of Fig.
6, but illustrates the stands and vehicle fully
righted with the vehicle elevated off the floor;

1 Fig. 9 is a side elevational view of the
fully elevated vehicle depicted in Fig. 8, with a
tilting jack being illustrated in phantom and
located between the fore and aft vehicle supports
5 in accordance with the invention;

Fig. 10 is an enlarged view similar to
that of Fig. 8 and illustrates the preferred
relationship of the center of gravity of the
vehicle to the support stand;

10 Fig. 11 is a view similar to that of
Fig. 10, but illustrates the support stand asym-
metrically oriented beneath the vehicle while
nevertheless maintaining the desired relationship
of the vehicle center of gravity relative to the
15 stand; and

Fig. 12 is an elevational view of
another use of the support of the present in-
vention for elevating only the front portion of
the vehicle while the rear wheels thereof remain
20 in contact with the floor. Although not depicted,
it is understood that the opposite end of the
vehicle is lifted and another tiltable stand
placed under that end.

25 Description of the Preferred Embodiment

Turning now to the drawings, a vehicle
support stand 20 is illustrated in Figs. 1-3. The
stand 20 includes a floor-engaging base 22, struc-
ture broadly referred to by the numeral 24 which
30 defines a pair of laterally spaced apart vehicle-
engaging and supporting regions 26, 28, and means
such as welding which secures the structure 24 to
the base 22 with the regions 26, 28 being located
above the floor.

35 In more detail, the base 22 preferably

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1 includes a pair of laterally spaced apart tubular
metallic feet 30, 32. The feet 30, 32 present
corresponding floor-engaging side margins 34, 36,
5 which in turn define the lateral extremities of
the base.

The structure 24 includes an elongated,
transversely extending, metallic tubular beam
member 38 of rectangular cross section which is
connected to the feet 30, 32 through a short
10 connection beam 40 and appropriate welds 42, 44.
A handle 46 is welded to the upper face of beam
member 38 between the feet 30, 32 and projects
rearwardly from the beam 38 as viewed in Fig. 1.

The vehicle-engaging regions 26, 28 are
15 identical and each include an upstanding body 48
of inverted, generally U-shaped configuration.
Each body 48 includes a planar, uppermost bight
portion 50 and spaced apart, depending, converging
leg plates 52. A resilient pad 54 is secured to
20 the upper face of each bight 50, and is comprised
of a relatively dense foam rubber element and an
overlying neoprene rubber impregnated fiberglass
sheet 56 (see Fig. 5). The sheet 56 provides an
anti-slip surface in order to facilitate placement
25 and use of the stand 20 beneath a vehicle.

The arms 52 are apertured as at 58 and
slidably receive the beam 38. In this connection,
the apertures 58 are dimensioned relative to beam
38 so that the bodies 48 can be laterally shifted
30 along the length of the beam by grasping one leg
52 and pulling the entire body. However, if it is
attempted to shift the body 48 by applying a push-
ing force against one of the legs 52, the legs
frictionally bind against the beam 38 and prevent
35 such movement.

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1 In preferred forms, each body 48 further
includes a depending reinforcing member 60 which
is welded to the underside of bight 50 and extends
to a point closely adjacent the upper surface of
5 beam 38. The member 60 is preferably formed of
rectangular tubular metallic stock identical to
that used in forming the beams 38, 40 and feet 30,
32.

10 Figs. 6-9 illustrate the use of a pair
of stands 20 for elevating a vehicle 62 off a
floor 64. The vehicle 62 is a small automobile
having front and rear wheels 66, 68.

15 The first step in the method involves
elevation and sideways tilting of vehicle 62 such
that the tires on one side thereof engage floor 64
and the tires on the opposite side of the vehicle
are elevated. Such sideways tilting of vehicle 62
can most preferably be accomplished through use of
an improved side lift jack 70 which is placed
20 between the front and rear wheels 66, 68 as viewed
in Figs. 6 and 9. The jack 70 is fully described
in pending application for U.S. Letters Patent
entitled "Side Life Jack for Unibody Automobiles",
Serial No. _____, Filed: _____.

25 This application is expressly incorporated by
reference herein.

30 The next step of the method involves
placing a pair of vehicle supports 20 beneath the
tilted vehicle 62. Specifically, the supports 20
are individually slid beneath vehicle 62 from a
point adjacent the elevated side of the vehicle,
whereupon the adjacent end of the beam 38 is
elevated and the remote vehicle-engaging pad 54 is
wedged into contact with the underside of the
35 vehicle at a point closely adjacent the floor-

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1 engaged tires thereof. This has the effect of
holding the stand in an elevated and tilted
orientation (see Fig. 6) similar to that of the
vehicle 62.

5 The jack 70 is next lowered, which
causes the vehicle 62 to become righted by reverse
movement of the vehicle and support stands until
both feet of the latter firmly engage floor 64.
This action is illustrated in Fig. 7. In addi-
10 tion, Fig. 7 includes a line 72 which represents
the center of gravity of the vehicle 62. In this
connection, it will be seen that center of gravity
line 72 lies in a plane which passes between the
side margins 34, 36 of the bases 22 of the sup-
15 ports 20. Hence, a righting moment is established
when the vehicle and stand are in their tilted
orientation and jack 70 is lowered. This serves
to induce the reverse movement as described and
facilitates final elevation of the vehicle 62
20 above the floor on the stand 20.

Figs. 10 and 11 depict vehicle 62 in its
fully elevated position. In the case of Fig. 10,
the stands 20 are essentially symmetrically trans-
versely located relative to the underside of the
25 vehicle, i.e., the center of gravity depicted by
line 72 is centrally located between the vehicle-
engaging regions of the stands and lies in a plane
which passes centrally between the margins 34, 36.
On the other hand, Fig. 11 illustrates a situation
30 where one or both of the stands 20 are asymmetri-
cally transversely located relative to the ve-
hicle, i.e., the stand 20 of Fig. 11 is shifted
rightwardly as compared with Fig. 10. However, it
will be observed that, even in the asymmetrical
35 orientation of Fig. 11, the center of gravity line

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1 72 lies in a plane which passes between the margins 34, 36. Thus, in either case a high degree of stability is imparted to the elevated vehicle 62.

5 Fig. 12 illustrates a further use of a stand in accordance with the invention. In this case a single stand 20 is employed immediately aft of the front wheels 66. The stand 20 is positioned by conventionally raising the front end of
10 vehicle 62 and placing the stand beneath the vehicle in an appropriate location.

While the stand 20 in accordance with the invention has been illustrated with two separate vehicle-engaging regions 26, 28, those skilled in
15 the art will appreciate that, for example, a single elongated structure lying along the length of beam 38, could be employed. In this instance of course, the overall structure still presents a pair of spaced apart vehicle-engaging regions
20 which are spaced apart a distance greater than the lateral distance between the base side margins 34, 36. In a similar fashion, while base 22 has been depicted as being formed of separate feet 30, 32, a single plate or monolithic base could be em-
25 ployed. Numerous other alterations and modifications can also be made in the stand structure hereof, without departing from the spirit and scope of the invention.

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CLAIMS

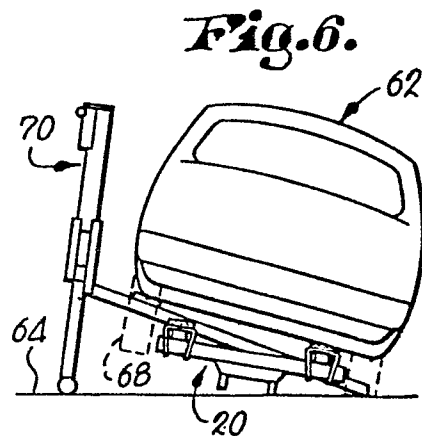
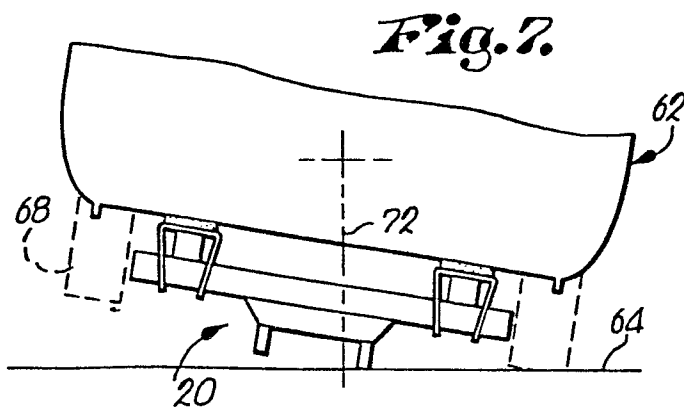
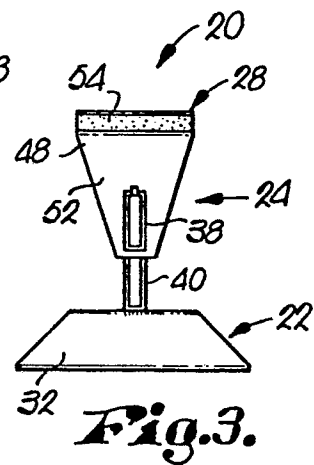
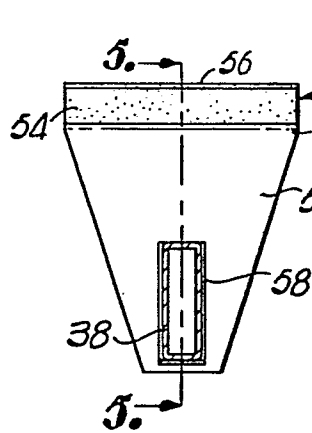
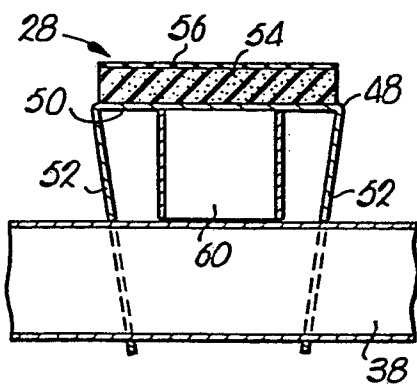
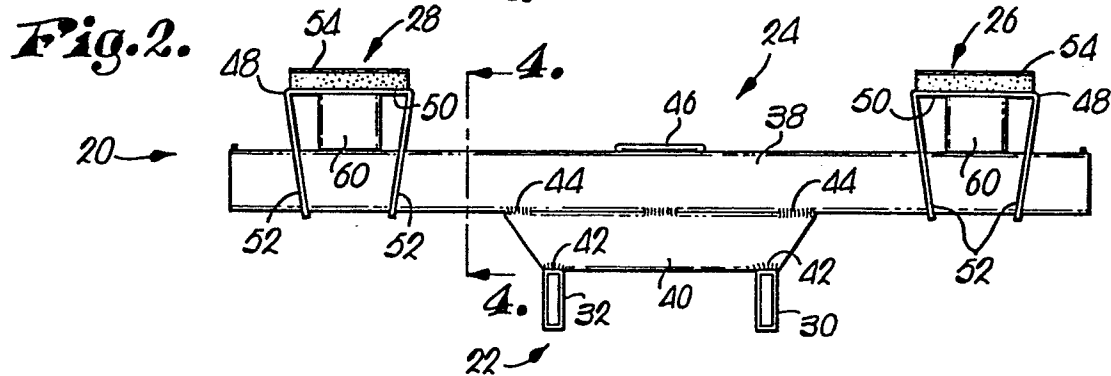
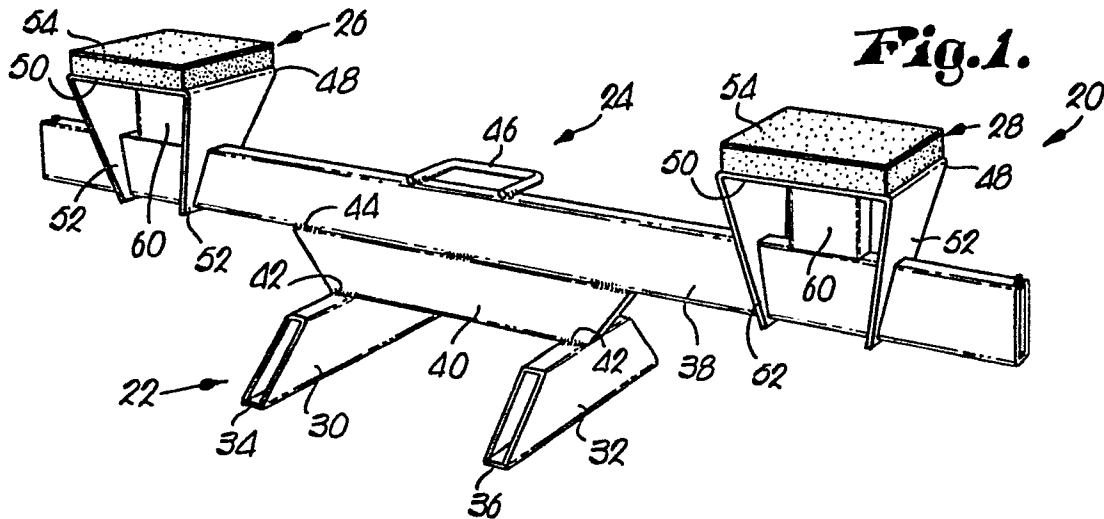
1. A vehicle support stand characterised by a base (22) presenting a pair of spaced apart floor-engageable margins (34,36), and a structure (24) defining a pair of vehicle-engageable regions (26,28) spaced apart in the same direction but further than the margins (34,36) and secured to the base (22).
2. A vehicle support stand according to claim 1, characterised in that the base (22) comprises a pair of spaced apart foot members (30,32) respectively presenting the margins (34,36) and elongate transversely of the direction in which they are spaced apart.
3. A vehicle support stand according to claim 1 or 2, characterised in that the structure (24) comprises an elongate beam (38) and a pair of upstanding elements (48) slidably mounted on the beam (38) for selective positioning therealong, each element (48) having a resilient pad (54,56) on the upper face thereof presenting the vehicle-engageable regions (26,28).
4. A vehicle support stand according to claim 3, characterised in that each of the elements (48) is in the form of an inverted U-shaped body, the legs (52) of which are apertured for slidably receiving the beam (38).
5. A vehicle support stand according to claim 4, characterised in that the U-shaped body has a reinforcing member (60) secured to and depending from the underside of the bight (50) interconnecting the legs (52) to close proximity with the beam (38).
6. A method of elevating a four wheel vehicle off a floor, characterised by the steps of tilting the vehicle (62) with tires (68) on one side thereof engaging the floor (64) and the tires (68) on the other side of the vehicle (62) elevated, placing beneath the vehicle (62) a vehicle support stand (20) according to any preceding claim, tilting the stand (20) until the region (26 or 28) closer to the floor-engaging tires (68) contacts the underside of the vehicle (62), the margin (34 or 36) closer to the

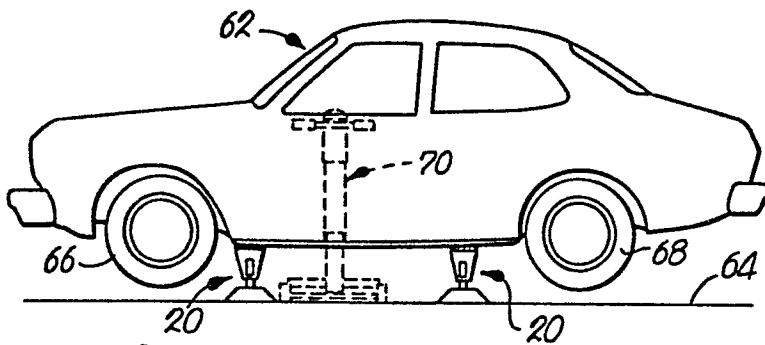
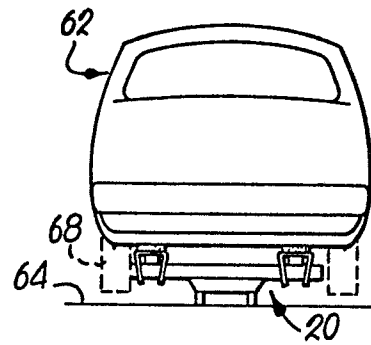
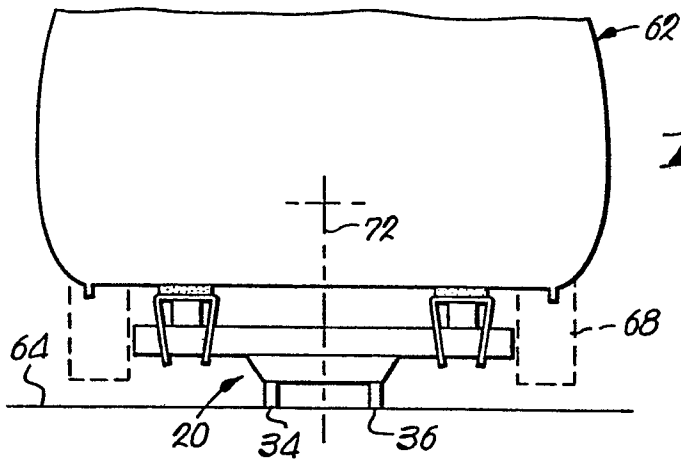
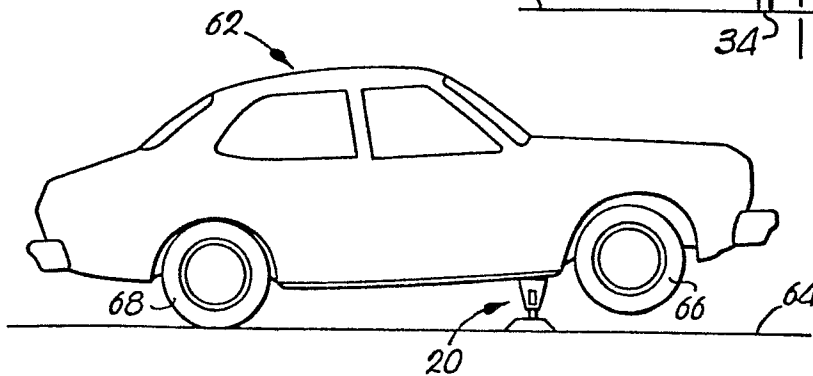
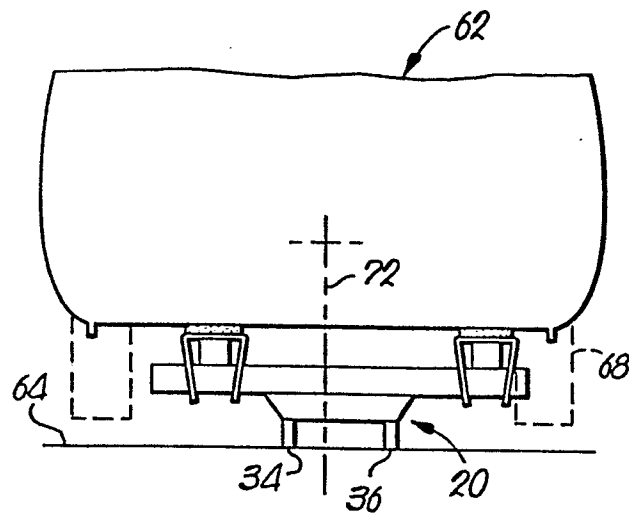
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10 floor-engaging tires (68) engages the floor (64), the
remaining margin (34 or 36) is elevated and the center
of gravity (72) of the vehicle (62) lies vertically between
both margins (34,36), and tilting back the vehicle (62)
and the stand (20) to a position where both margins
15 (34,36) engage the floor (64) and the vehicle (62) is at
least partially supported by the stand (20).

7. A method according to claim 6, characterised in that
two stands (20) are placed beneath the vehicle (62)
respectively fore and aft of the center of gravity (72) of
the vehicle (62) so that on tilting back the vehicle (62)
5 and the stands (20) the vehicle (62) becomes fully
supported by the stands (20).

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**Fig. 9.****Fig. 8.****Fig. 10.****Fig. 11.****Fig. 12.**