

Sept. 19, 1961

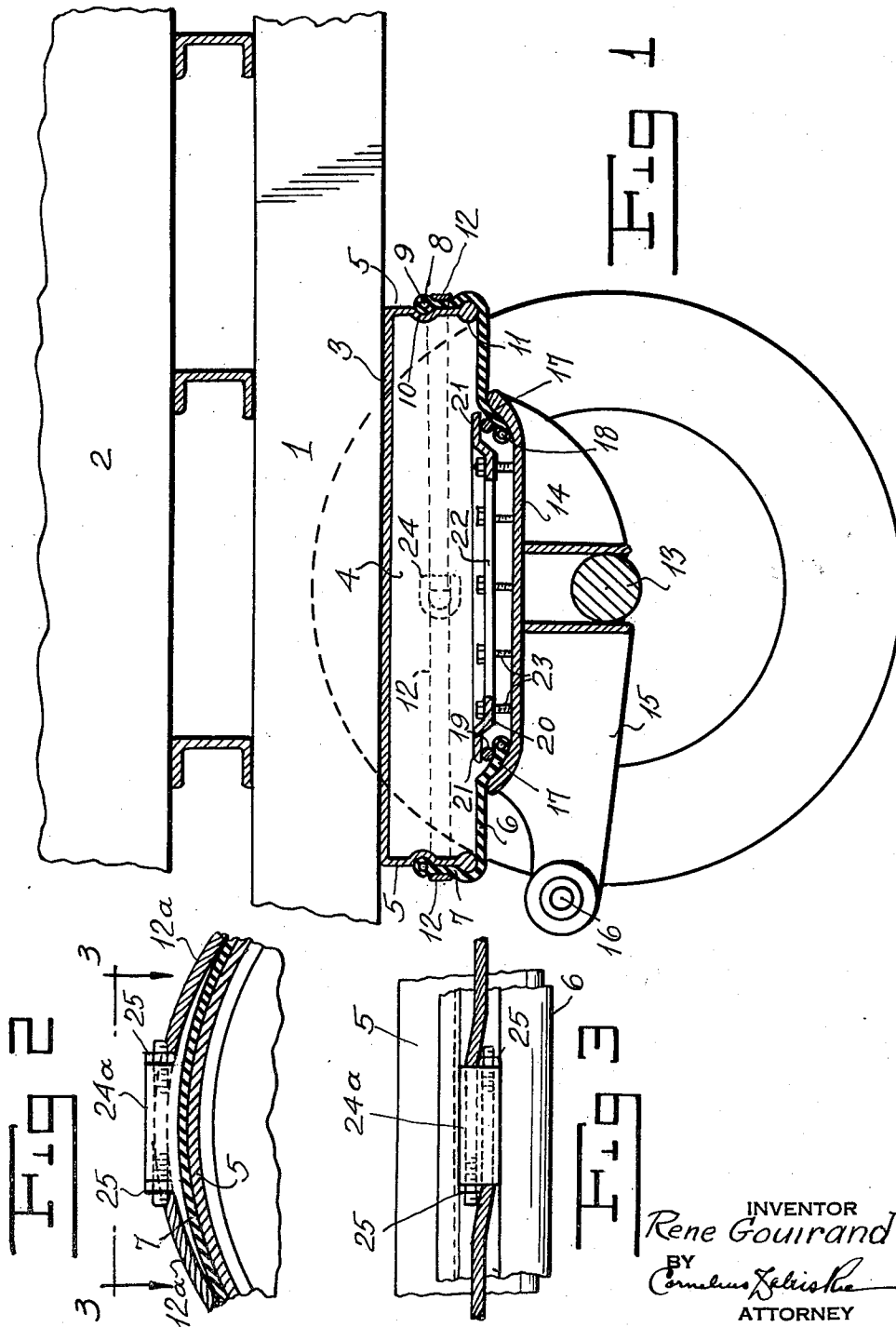
R. GOUIRAND

3,000,623

PNEUMATIC SUSPENSION FOR VEHICLES

Filed Nov. 20, 1959

2 Sheets-Sheet 1



Sept. 19, 1961

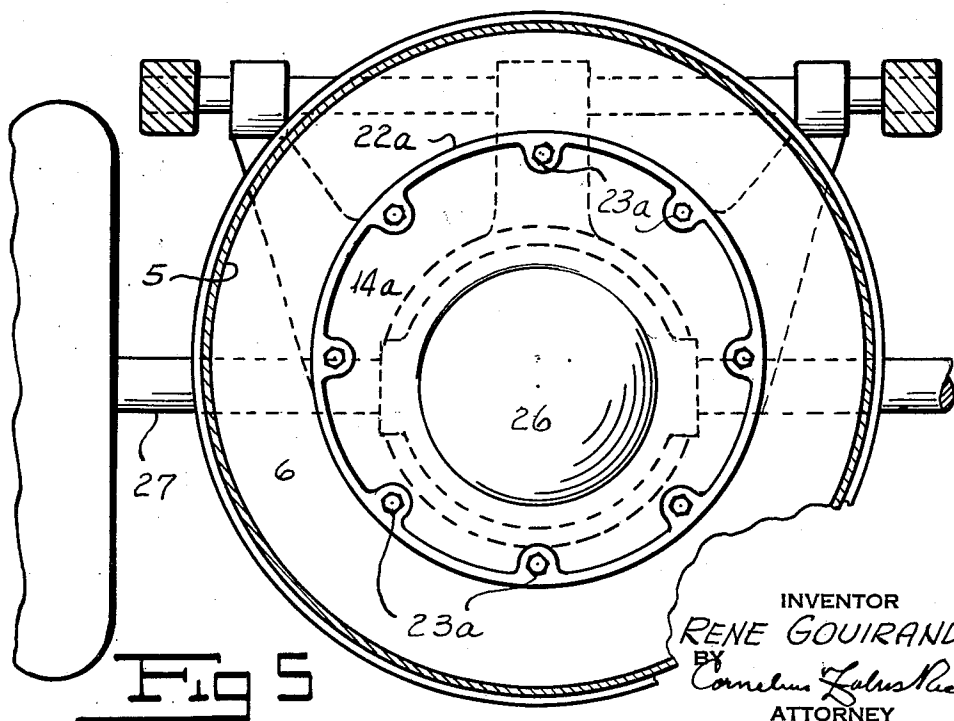
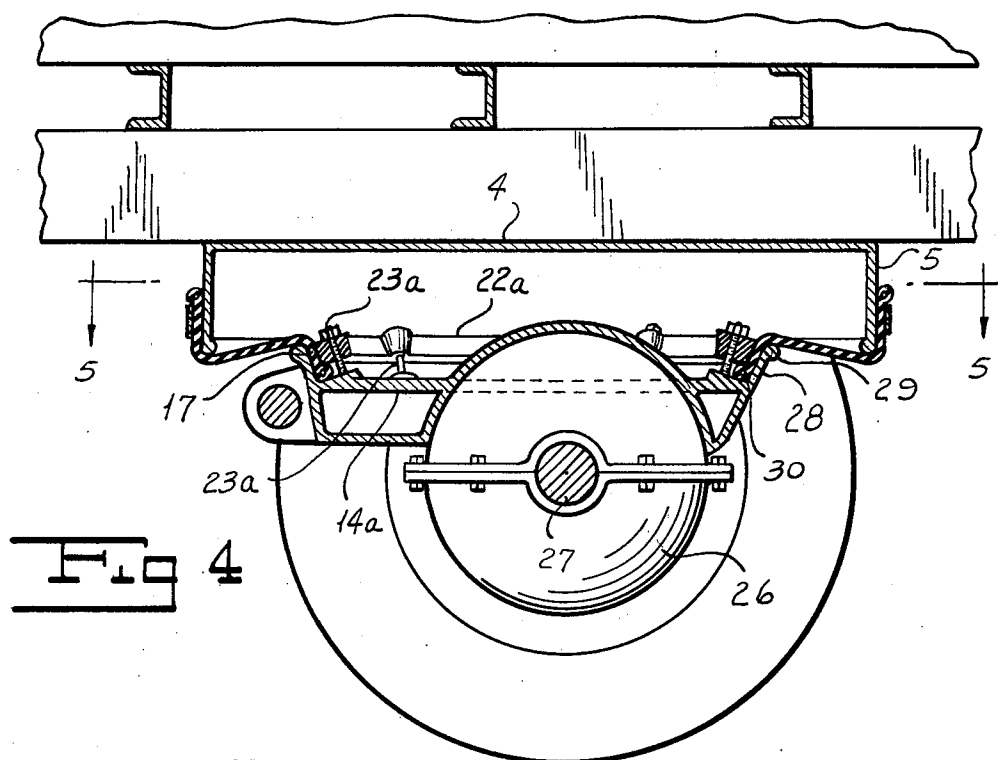
R. GOUIRAND

3,000,623

PNEUMATIC SUSPENSION FOR VEHICLES

Filed Nov. 20, 1959

2 Sheets-Sheet 2



INVENTOR
RENE GOUIRAND
BY
Cornelius Zukuskie
ATTORNEY

1

3,000,623

PNEUMATIC SUSPENSION FOR VEHICLES

Rene Gouirand, 210 W. 88th St., New York, N.Y.

Filed Nov. 20, 1959, Ser. No. 854,478

3 Claims. (Cl. 267—15)

This invention is a pneumatic suspension for vehicles and more particularly for motor vehicles wherein the pneumatic chamber comprises a casing secured to the chassis frame of the vehicle and having an open bottom closed by a flexible diaphragm to which the running gear is attached for the purpose of pneumatically supporting the chassis frame and its load above the running gear. With structures of this type, it is essential that a hermetic seal be provided between the diaphragm and the casing of the pneumatic chamber, so that air pressure cannot leak from said chamber.

In the past it has been the practice to secure the diaphragm to the casing and to the running gear by means of bolts or screws passed through metallic rings and through the diaphragm and flanges on the casing. These bolts or screws must necessarily be placed quite closely together and inasmuch as they require holes through the diaphragm for their passage, the diaphragm is correspondingly weakened by the perforations thereby provided.

The object of the present invention is to eliminate the necessity of perforating the diaphragm and at the same time provide means for attaining reliable attachment and hermetic seals between the diaphragm and the casing and running gear.

Speaking generally, the present invention is characterized by the use of a diaphragm which overlaps the upstanding peripheral wall of the casing of the pneumatic chamber and is tightly bound thereto by a tension member which exteriorly surrounds said overlapping portion of the diaphragm to firmly bind said overlapping portion to said casing.

Additionally, the invention provides for the clamping of the diaphragm to the running gear by the employment of appropriate clamps, as hereinafter described, which function to provide an air-tight joint between these parts without requiring perforation of the diaphragm.

Features of the invention, other than those adverted to, will be apparent from the hereinafter detailed description and appended claims, when read in conjunction with the accompanying drawings.

The accompanying drawings illustrate different practical embodiments of the invention, but the constructions therein shown are to be understood as illustrative, only, and not as defining the limits of the invention.

FIG. 1 is a fragmental elevational view of a portion of a vehicle embodying the present invention, showing parts thereof in substantially central section.

FIG. 2 is a fragmentary view showing a modified form of tension member for securing the outer margin of the diaphragm to the casing of the pneumatic chamber.

FIG. 3 is a side elevation of the structure shown in FIG. 2, as viewed from the direction of the line 3—3 in the latter figure.

FIG. 4 is a view similar to FIG. 1, but showing a modified form of the invention.

FIG. 5 is a plan section on the line 5—5 of FIG. 4.

Referring to the drawings and more particularly to FIG. 1, 1 designates the chassis frame of the vehicle on which is supported any appropriate body 2. Mounted on the chassis frame is the casing 3 of a pneumatic chamber 4. This casing is closed at its top and sides and in practice is generally made with a side wall 5 of circular form.

In the accompanying drawings, the diaphragm 6 is shown as annular in form and is of such external diameter that its outer peripheral margin 7 may extend upwardly and overlap the exterior of the side wall 5. Said

2

margin 7 preferably terminates in a beaded edge 8 which includes a stiffening ring 9. The bead 8 is adapted to seat in a channel 10 formed in the exterior of the side wall 5, shown best in FIG. 1, and, if desired, the lower edge of the side wall 5 may be formed with an enlargement or bead 11.

To firmly attach or anchor the overlapping portion 7 of the diaphragm to the wall 5, I employ a tension member, shown in FIG. 1 as a strap 12, which horizontally embraces said overlapping portion 7 intermediate the beads 8 and 11 and is drawn tightly about said overlapping portion by any appropriate clamp 24, such, for example, as that shown in my Patent No. 1,698,813, January 15, 1929. Such a clamp, acting upon the opposite ends of the strap 12, will serve to place very considerable tension on the strap throughout its entire length and thereby form between the overlapping portions of the casing and the diaphragm a hermetic seal. If the casing of the pneumatic chamber is of extensive diameter two or three clamps of the character described, circumferentially spaced apart about the wall 5, may be employed, although ordinarily one is sufficient to produce and maintain the degree of tightness necessary to produce the results stated.

Any appropriate running gear may be employed according to this invention. In the one shown, an axle 13 is mounted on arms 15, pivoted to the chassis at 16. The arms 15 carry a plate 14 of dish construction. The inner margin 17 of the annular diaphragm is adapted to overlap the outer margin of this plate and is provided at its free edge with a bead 18, preferably enclosing a reinforcing ring of metal or the like. A pressure distributing ring 19 is adapted to bear upon the inner margin 17 of the diaphragm, as shown, and on this pressure ring bears a plurality of clamps 20. These clamps may be individual clamps spaced about the inner margin of the diaphragm, but they are preferably in the form of outwardly projecting clamping flanges 21 formed on a pressure ring 22. The ring 22 is perforated for the passage of bolts or screws 23 which exert sufficient downward pressure upon the ring 22 to clamp the inner margin of the diaphragm to the plate 14 in a manner to form therewith an impervious seal.

In the structure of FIG. 1 a strap, preferably of metal, which may in practice be covered by an envelope of rubber or other suitable matter, is shown as a means for clamping the outer peripheral margin of the diaphragm to the pneumatic chamber. In FIGS. 2 and 3, a cable 12a serves the same purpose. The opposite end of this cable are provided with threaded terminals which pass through openings in a terminal block 24a and receive nuts 25 which, when tightened, draw the cable tightly about the diaphragm to produce a hermetic seal of the character described.

In assembling the structure hereinbefore described, the inner margin of the diaphragm is first attached to the plate 14 of the running gear and thereafter the outer margin of the diaphragm is attached to the casing of the pneumatic chamber. If at any time it is desired to either change the diaphragm or disconnect the running gear from the chassis frame, the outer margin of the diaphragm may be released by relieving the tensioning means of the strap or cable, whereupon the running gear may be lowered to detach it from the chassis frame.

In the modified form of construction shown in FIGS. 4 and 5, the outer margin of the diaphragm is secured to the side wall 5 of the pneumatic chamber 4 by a band or cable in the same manner as hereinbefore described. However, the plate 14a, which corresponds to the plate 14, is mounted on and forms part of the differential housing 26 of the rear axle 27. This plate 14a is bordered by an upstanding peripheral flange 28 provided at its

free edge with a bead 29. The inner margin 17 of the diaphragm 6, with a reinforced free edge 30, overlaps the flange 28, as shown, and a ring 22a is adapted to be seated against the overlapping margin of the diaphragm by screws 23a which pass through knobs spaced apart circumferentially of the ring and thread into tapped holes in the plate 14a. As these screws are tightened, they draw the ring 22a into tight wedging and clamping engagement with the marginal portion of the diaphragm and form, between it and the flange 28, a hermetic seal.

The diaphragm of the present invention may be associated with the cooperating parts of the suspension in a simple and efficient manner and much more expeditiously than this could heretofore be accomplished when a great number of bolts or nuts had to be manipulated in order to assemble or disconnect the parts. Moreover, the means which I have described are more effective in producing permanent hermetic seals for the stresses imposed upon the diaphragm during operation of the vehicle are distributed uniformly about both margins of the diaphragm and there is thus no tendency of the diaphragm to tear in the zones of its attachment.

The foregoing detailed description sets forth the invention in its preferred practical embodiments, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. A pneumatic suspension for vehicles comprising: a chassis frame provided with a rigid walled pneumatic chamber open at its bottom, a wheeled axle below said open bottom, a rigid plate carried by said axle and provided with a peripheral upwardly diverging flange, an annular flexible diaphragm the outer margin of which is secured to the rigid pneumatic chamber to form a hermetic

seal therewith, the inner margin of said diaphragm overlying and overlapping the diverging peripheral flange of said plate, a pressure ring overlying and bearing upon the inner margin of said diaphragm, and a succession of screws annularly spaced about said pressure ring and passing through openings in said ring remote from the inner edge of the diaphragm, said screws being threaded into said plate in spaced relation to the inner margin of the diaphragm to force the pressure ring into tight gripping relation with the diaphragm and produce a hermetically sealed joint between the diaphragm and the plate.

2. A pneumatic suspension according to claim 1, wherein a distributing ring is positioned between the pressure ring and the inner margin of the diaphragm to ensure the formation of such hermetic seal.

3. A pneumatic suspension according to claim 1, wherein the plate is provided with arms extending longitudinally of the chassis frame with the free ends of said arms pivoted to said frame.

References Cited in the file of this patent

UNITED STATES PATENTS

231,100	Richardson	Aug. 10, 1880
1,406,443	Cook et al.	Feb. 14, 1922
1,413,818	Wilkinson	Apr. 25, 1922
1,479,282	Burns	Jan. 1, 1924
2,023,135	Hawkins	Dec. 3, 1935
2,638,357	Larison	May 12, 1953
2,747,862	Gouirand	May 29, 1956

FOREIGN PATENTS

10,749	Great Britain	of 1909
400,616	Great Britain	Oct. 24, 1933
1,112,259	France	Nov. 9, 1955