

R. E. VERGE.
AIR CUSHION FOR VEHICLES.
APPLICATION FILED FEB. 7, 1911.

1,008,290.

Patented Nov. 7, 1911.
3 SHEETS-SHEET 1.

Fig. 1

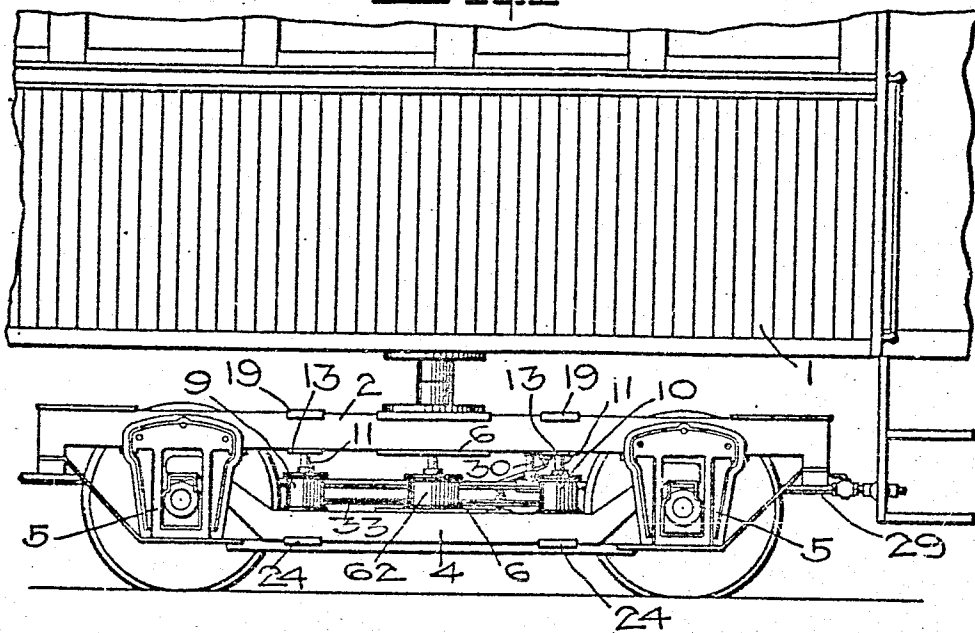
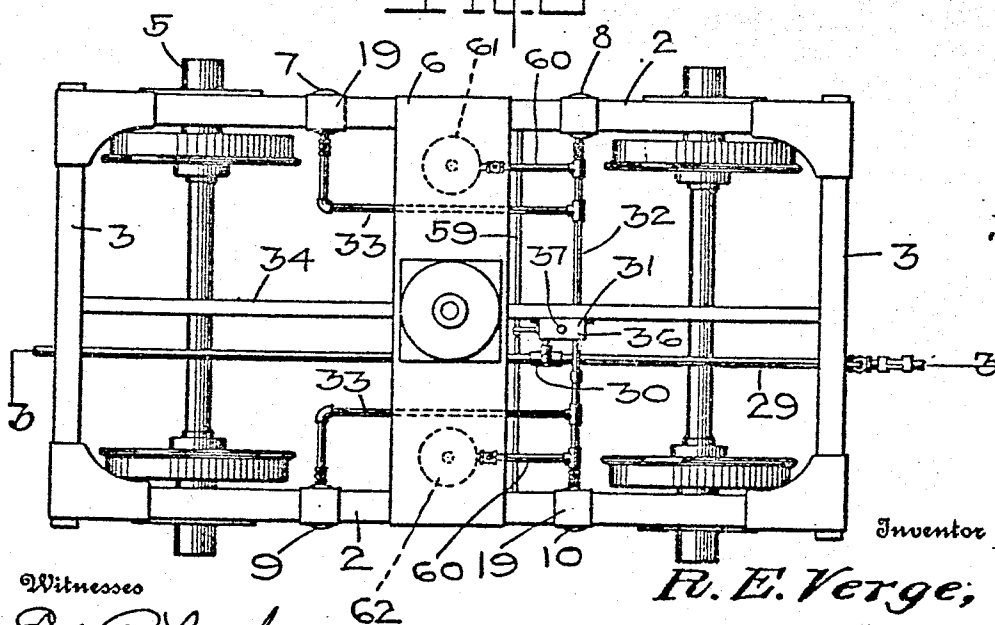


Fig. 2



Witnesses

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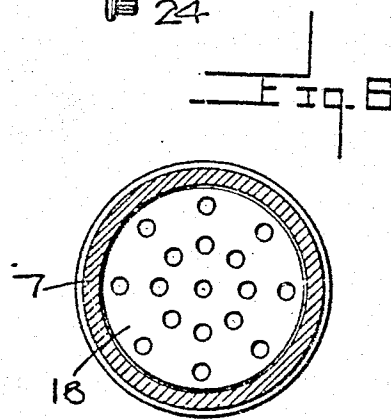
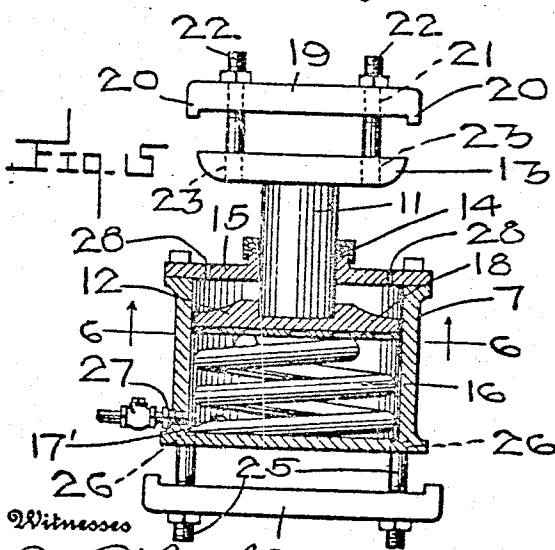
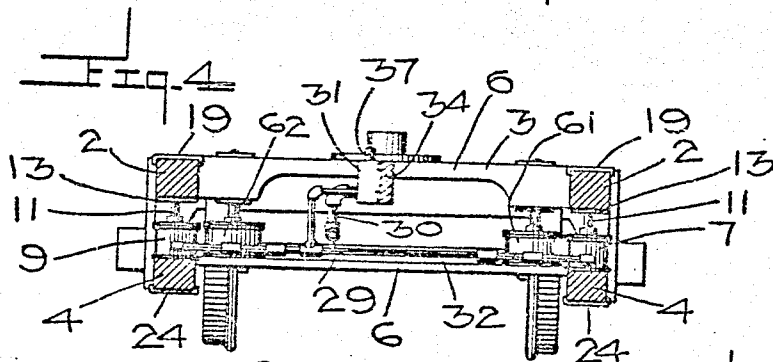
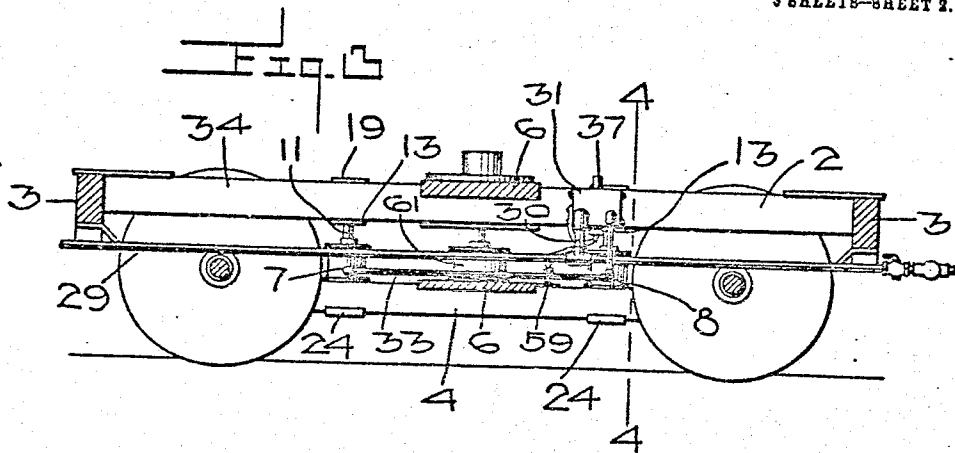
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3 SHEETS-SHEET 2.



Witnesses

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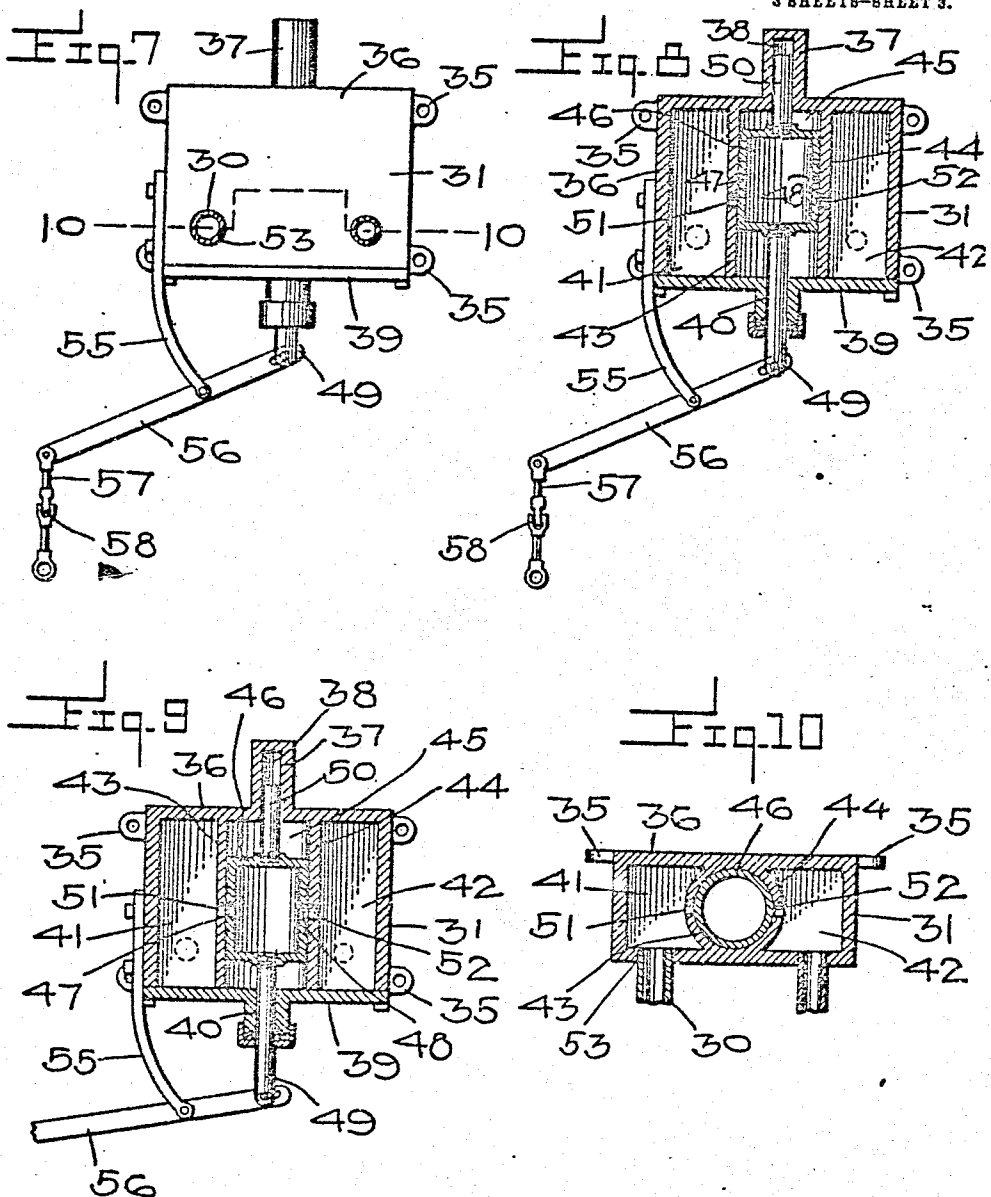
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

REGINALD E. VERGE, OF HALIFAX, NOVA SCOTIA, CANADA.

AIR-CUSHION FOR VEHICLES.

1,008,290.

Specification of Letters Patent.

Patented Nov. 7, 1911.

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To all whom it may concern:

Be it known that I, REGINALD E. VERGE, a subject of the King of Great Britain, residing at Halifax, in the Province of Nova Scotia and Dominion of Canada, have invented certain new and useful Improvements in Air-Cushions for Vehicles, of which the following is a specification.

The present invention relates to fluid cushioning devices for vehicles, and has for its primary object to equip a vehicle of any character with fluid cushions to eliminate the usual springs.

A further object of the invention is to construct a compact device to be suitably arranged beneath the body of a vehicle, and one that may be conveniently connected to a compressor or the like mounted upon and carried by the vehicle.

A still further and important object of the invention is to provide a system of this character with one or more automatic regulators so arranged that the movement of the body of the vehicle relative to the rigid portion or truck, will at all times admit a predetermined volume of fluid in the system.

A still further object of the invention is to provide additional means within the fluid cushioning cylinders, in the nature of coil springs, that would act as cushioning devices, in the event of leakage or breakage in any of the cylinders, for the time being.

Other objects and advantages will be apparent from the following description, and it will be understood that changes in the specific structure shown and described may be made within the scope of the claims without departing from the spirit of the invention.

In the accompanying drawings: Figure 1 is a side elevation, showing the invention as applied to a car truck, Fig. 2 is a top plan view of a truck, with the parts of the invention in their relative position, Fig. 3 is a longitudinal sectional view on line 3—3 of Fig. 2, Fig. 4 is a vertical sectional view on line 4—4 of Fig. 1, Fig. 5 is a vertical sectional view taken through one of the cylinders, Fig. 6 is a sectional view taken on line 6—6 of Fig. 5, Fig. 7 is a side elevation of the regulator, Fig. 8 is a vertical sectional view, Fig. 9 is a similar view showing the regulator in its recharging position, Fig. 10 is a transverse sectional view taken on line 10—10 of Fig. 7.

Referring to the drawings, in Fig. 1 the

system is shown applied to a railway car, in which the numeral 1 designates a portion of the car body. The truck bars 2 are of the usual construction. The transverse bars 3 have their ends suitably secured to the tops of the truck bars 2. Equalizing bars 4, of the usual construction are provided and have their ends resting upon the tops of the journal boxes 5. Suitably secured to the equalizing bars 4, are transverse bars 6, the purpose of which will be hereinafter described. Arranged between the truck bars 2 and equalizing bars 4 on each side are cylinders 7, 8, 9, and 10, each cylinder having piston rods 11 and piston heads 12, said piston rods having their outer ends formed with enlargements 13. The piston rods 11 are adapted to pass through suitable packed openings 14 in the cylinder heads 15. The piston heads 12 are of the usual construction, and are adapted to work within the cylinders. The coil springs 16 are arranged in each cylinder between the under side of the piston heads 12, said springs being secured to the bottom of the cylinders 17 by a suitable anchoring bolt 17'. The upper coil of each spring rests against the under side of a perforated plate 18, the upper side of said plate in turn engages the under side of the piston heads 12. The piston rods 11 are fixed to the truck bars 2 by plates 19 having legs 20, said legs straddling the truck bars and provided with openings 21 through which screw-threaded bolts 22 pass to engage the openings 23 carried by the enlargements 13, and upon proper manipulation of suitable nuts, the enlargements will be drawn toward the plates 19, thereby securely clamping the piston rods to the truck bars. This mode of engagement however, may be varied by recessing attachment of the parts. Similar plates 24 are provided to clamp the bottoms of the cylinders to the equalizing bars 4, said plates having screw-threaded bolts 25 passing therethrough having their ends adapted to engage internally screw-threaded sockets 26 formed in the bottoms of the cylinders. This is one form of attaching the cylinders to the frame work of vehicle, but it is obvious that any other method may be used. Each cylinder is provided with a check valve 27 suitably secured thereto, and near the bottom of the cylinder. The cylinder heads 15 are provided with vents 28, to allow the escape of air that might leak

from the compression chamber of the cylinder. Suitably suspended under the bottom of the car floor is a main supply pipe 29, having a branch pipe 30 connected to the regulator 31, on the under side of the car floor to be hereinafter described. Leading from the opposite sides of the regulator 31 to the cylinders 8 and 10 are pipes 32, having T-joint sections and flexible connections formed therewith. Pipes 33 lead from the said T-joints to the cylinders 7 and 9. The truck is preferably provided with a centrally arranged longitudinal bar 34, to which are suitably secured depending brackets 35. Secured to and supported by the said brackets, by suitable means is the regulator 31. The regulator is preferably formed with a rectangular casing 36 having one of its ends provided with a reduced portion 37, said portion being preferably formed integral with the casing and having an internal bore 38. The other end of the casing is provided with a closing head 39, and having a central opening 40 therein. Casing 36 is provided with chambers 41 and 42, having division walls 43 and 44. By this construction a central chamber 45, in which is adapted to slide a piston valve 46, is provided. The piston valve 46 is provided with ports 47 and 48. To one end of the piston valve 46 is suitably secured a valve rod 49, said rod passing through the opening 40 in the head 39, and the opposite end of the valve 46 is formed with a rod 50, said rod being arranged in direct alinement with the valve rod 49, and adapted to slide freely in the bore 38 of the reduced portion 37. The division walls 43 and 44 are provided with ports 51 and 52. When in the position as shown in Fig. 8 of the drawings, the parts are so related that communication is shut off from chambers 41 and 42, and when in the position as shown in Fig. 9 of the drawings, the ports 51 and 47 are adapted to register, and the ports 48 and 52 are also in their registering position, thereby forming a direct communication between the chambers 41 and 42 and through the valve piston 46. An opening 53 is formed in the side of the regulator casing 36, and to which is suitably secured the branch pipe 30 of the main supply pipe 29, said opening leading directly to the chamber 41. Formed at each side of the chamber 42 are alined openings in communication with which are the pipes 32, said pipes leading to the cylinders. To one side of the casing 36 is a downwardly extending bracket 55 to the lower end of which is fulcrumed a lever 56, having one of its ends pivotally connected to the valve rod 49, and its opposite end pivotally connected to a link 57, which in turn is connected by a universal joint 58, to a rod 59 not shown, said rod being rigidly and suitably

secured to the transverse bar 6 which in turn connects with the equalizing bars 4.

From this construction and arrangement of parts it will be readily seen that when air is in the system, and the vehicle in motion, a constant volume and pressure of fluid is maintained in the respective cylinders and likewise in a portion of the regulator, and the parts will be in the position as shown in Fig. 8 of the drawings and should a leakage occur in the cylinders, or in any one of the cylinders, and the volume of fluid and pressure be so reduced that the piston valve would assume the position shown in Fig. 9 of the drawings, a communication would then be formed through the ports of the regulator, and the system recharged to its normal operative condition. Through the lever operating mechanism of the regulator, it will be apparent that when the parts are in the position shown in Fig. 8 of the drawings all communication from the storage tank or compressor and through the regulator is shut off, and the piston valve is allowed to work freely within the casing of the regulator as long as a predetermined pressure is maintained in the system, but should the pressure and volume be reduced to such an extent as to allow the equalizing bars 4 to move toward the truck bars 2, the piston valve will move downwardly until the ports therein register with the ports in the division walls, thereby allowing the recharging of the system.

By providing the universal joint 57 between the fulcrumed lever 56 and the rod 59 (not shown) any movement of the vehicle will be accommodated, and will allow vertical movement of the piston valve within the regulator.

Two or more cylinders are provided and connected to the system by suitable pipes 60. In the drawings these cylinders are designated by the numerals 61 and 62, said cylinders are shown supported upon the spring board 6 and have their piston rods suitably connected to the bar 34.

While this system has been shown applied to a railway truck, it is of course apparent that the same, by minor changes, could be readily used upon automobiles, or in fact upon any vehicle wherein it is desired to substitute pneumatic cushions for the usual heavy and cumbersome springs.

It is preferable that air, under pressure, be used, but it is understood that any other fluid may be employed with equal results.

From the foregoing description it will be seen that each car may be equipped with a main supply pipe running throughout the length of the car, and having its ends provided with suitable couplings, flexible or otherwise, so that when the cars are coupled, a direct communication is formed from a common supply and through each regulator.

When applied to automobiles and other machines, it is only necessary that a main supply pipe be connected to the regulator and the storage tank or a compressor.

5 What is claimed is:

1. In combination with a vehicle, a truck having the usual sills and equalizing bars, a plurality of air cylinders, arranged between said bars, each cylinder having a piston head adapted to work therein, a head, a piston rod passing through said head, and having an enlargement thereon, said enlargement resting against the truck bar, a plate straddling said bar, bolts passing through the plates and enlargements to clamp the piston rod to the truck bars, a second plate straddling the equalizing bar, bolts passing therethrough to engage openings in the bottoms of the cylinders to clamp the same to the equalizing bar, a coil spring arranged between inner faces of the piston head and bottoms of the cylinders, a fluid inlet check valve formed in the cylinders near their bottoms, and in communication with a source of supply, a pressure and volume regulator arranged between the cylinders and said source of supply, and actuated automatically by the relative movement of the car body to the rigid portion of the truck.

2. In combination with a vehicle truck, a plurality of air cylinders, a main supply pipe, branch pipes leading to each cylinder, a pressure and volume regulator suitably secured to the truck and arranged between the main supply pipe and the branch pipe, said regulator comprising a casing, division walls formed therein, and being provided with ports, said division walls separating the casing into a central chamber and side chambers, an air inlet formed in one of the side chambers, a piston valve adapted to

work within the central chamber and having ports formed in its head, aligned openings formed in one of the side chambers, and having branch pipes connected at said openings, a bracket rigidly secured to the outside of the casing, a lever fulcrumed to the bracket and having one of its ends pivotally connected to the valve rod, and its opposite end swivelly connected to the equalizing bar, the ports in the valve piston being adapted to register with the ports in the division walls when pressure or volume is reduced.

3. In combination with a vehicle truck having the usual truck and equalizing bars, air cylinders arranged between said bars, said cylinders having piston heads therein, a closure head, piston rods passing through said heads, and connected to the truck bar, said cylinders having their bottoms fixed to the equalizing bars and spring board, an air inlet check valve formed near the bottom of the cylinders and connected to a source of supply, and a pressure and volume regulator arranged between the cylinders and source of supply.

4. In combination with a vehicle truck, having the usual truck and equalizing bars, a plurality of cylinders arranged between the said bars, a main supply pipe, branch pipes leading to the cylinders, and a pressure and volume regulator arranged between the main supply pipe and source of supply, and means connected between the regulator and the truck whereby the regulator will be actuated by the vertical jolting motion of the load.

In testimony whereof I affix my signature, in the presence of two witnesses.

REGINALD E. VERGE.

Witnesses:

ANNIE ROBERTSON,
T. P. RONNAN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."