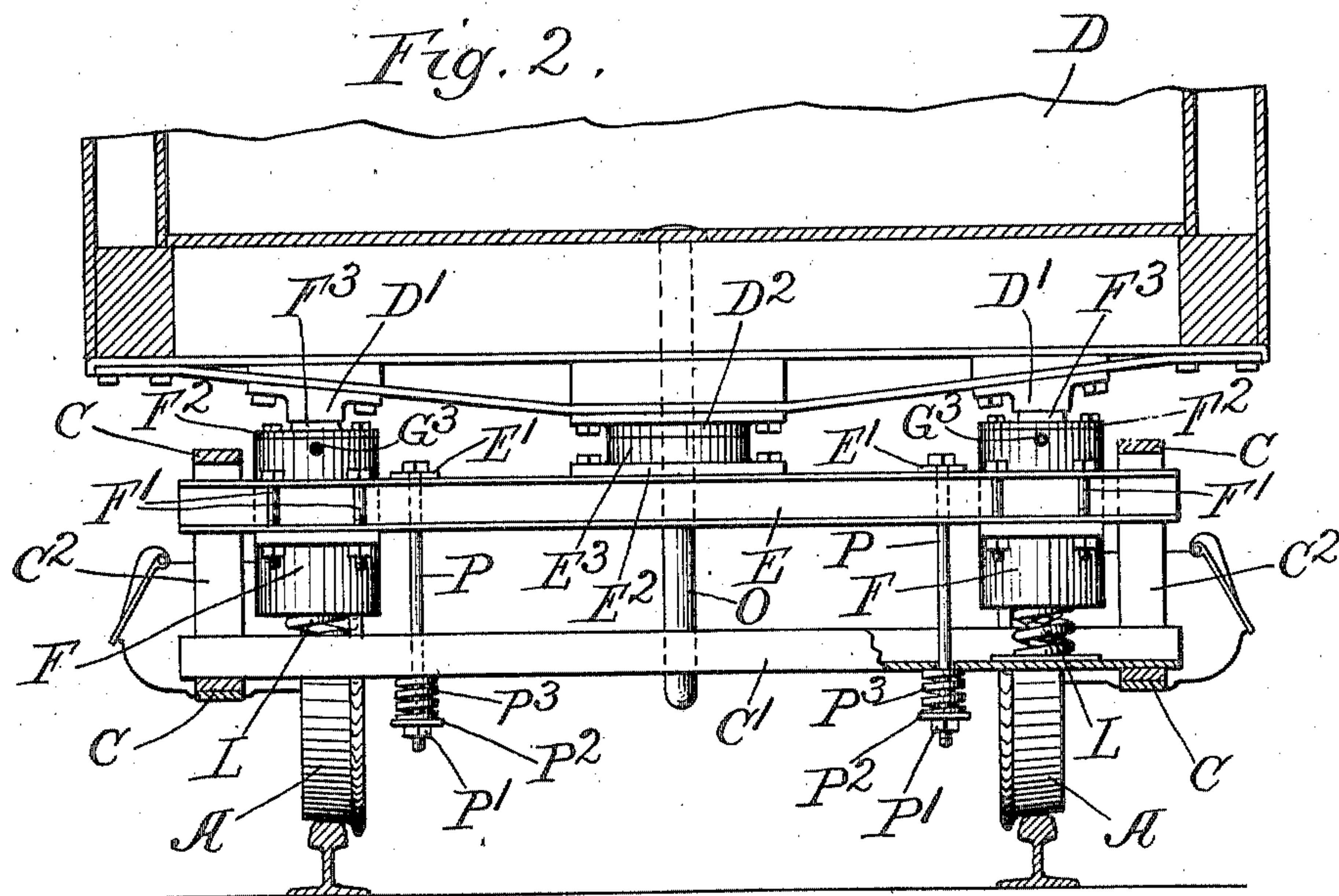
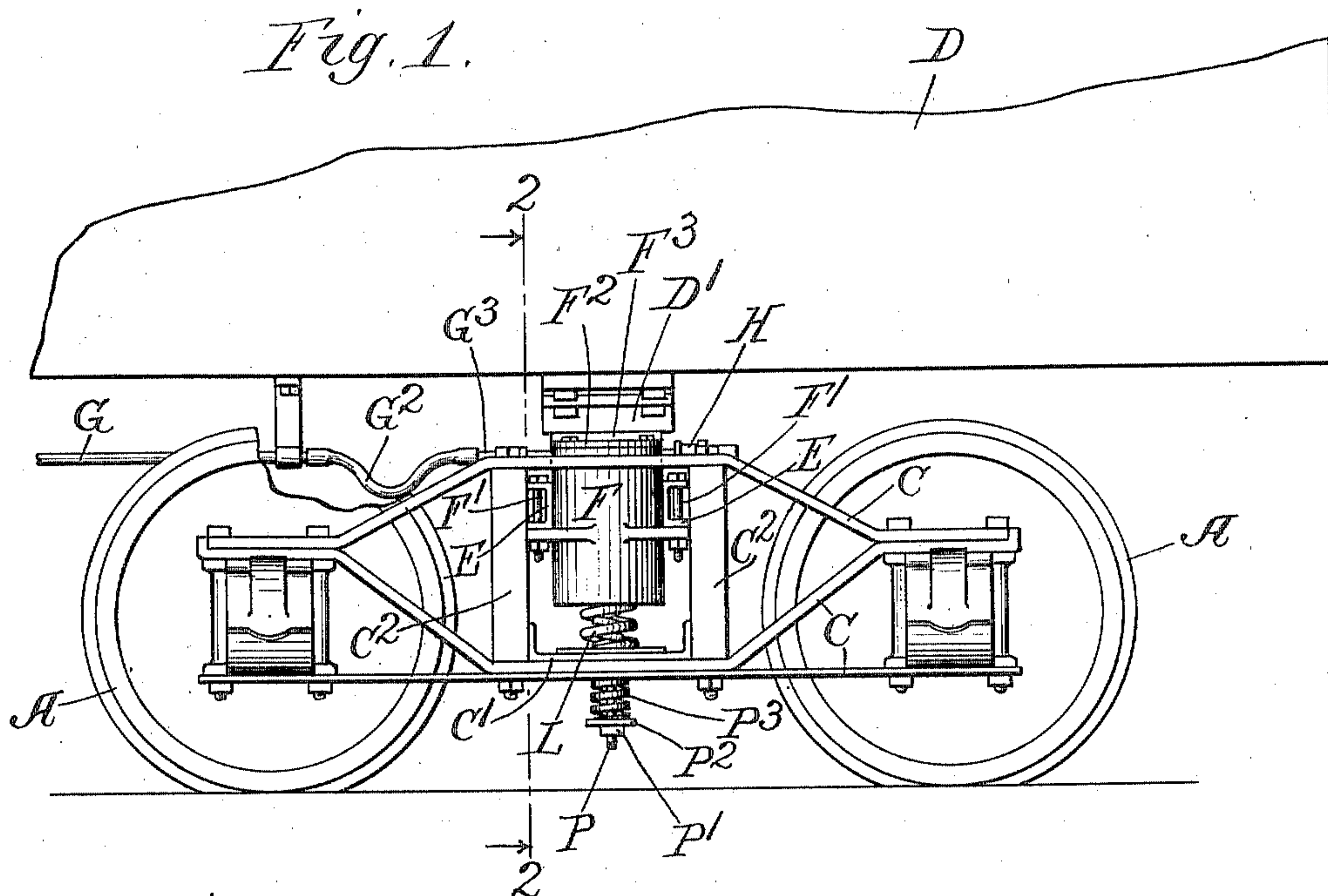


No. 811,622.

PATENTED FEB. 6, 1906.

M. DOWNER.
AIR CUSHION FOR VEHICLES.
APPLICATION FILED MAY 7, 1904.

2 SHEETS—SHEET 1.



Witnesses.

Edward T. Krapp.
Homer L. Kraft.

Inventor.

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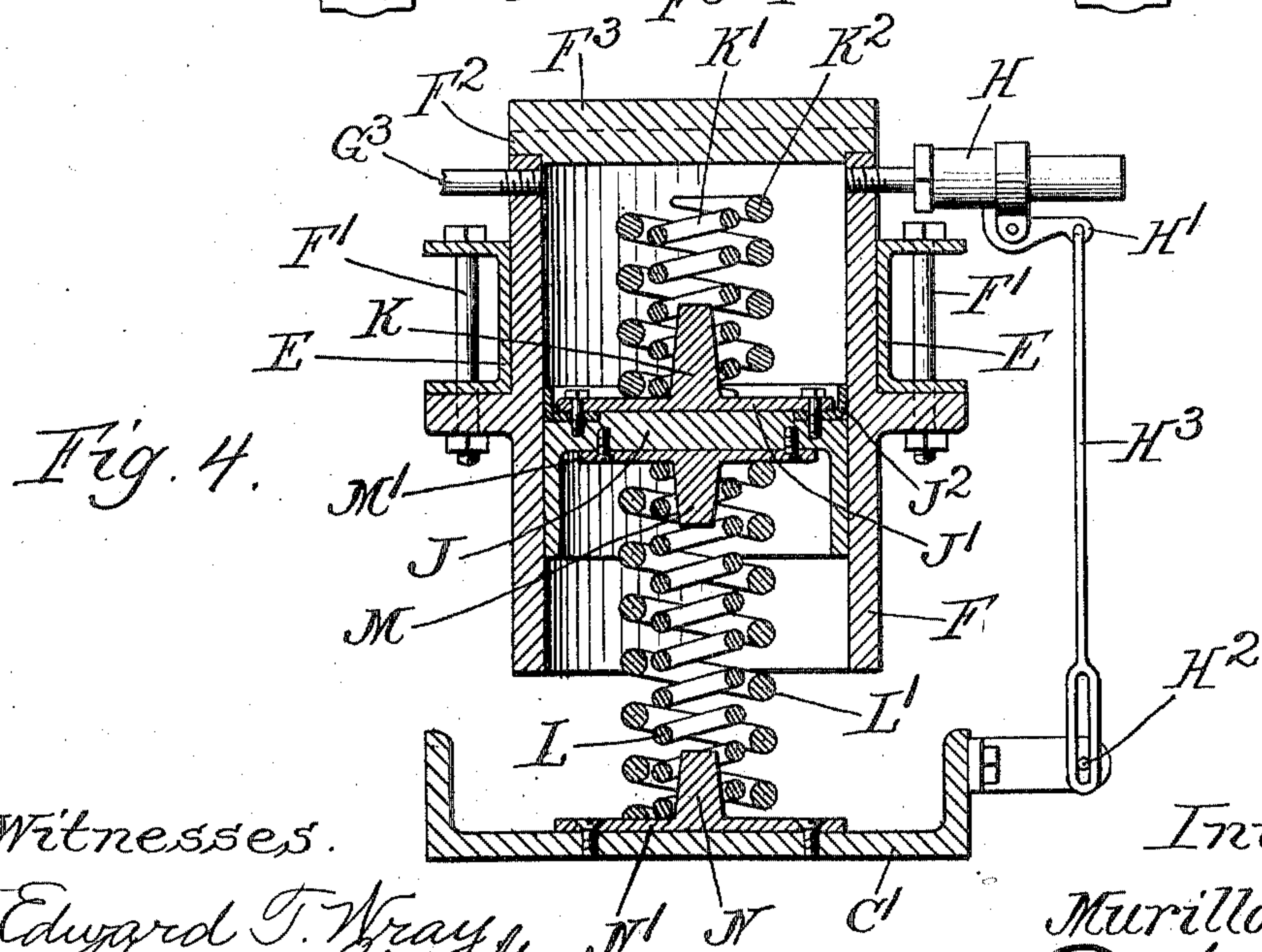
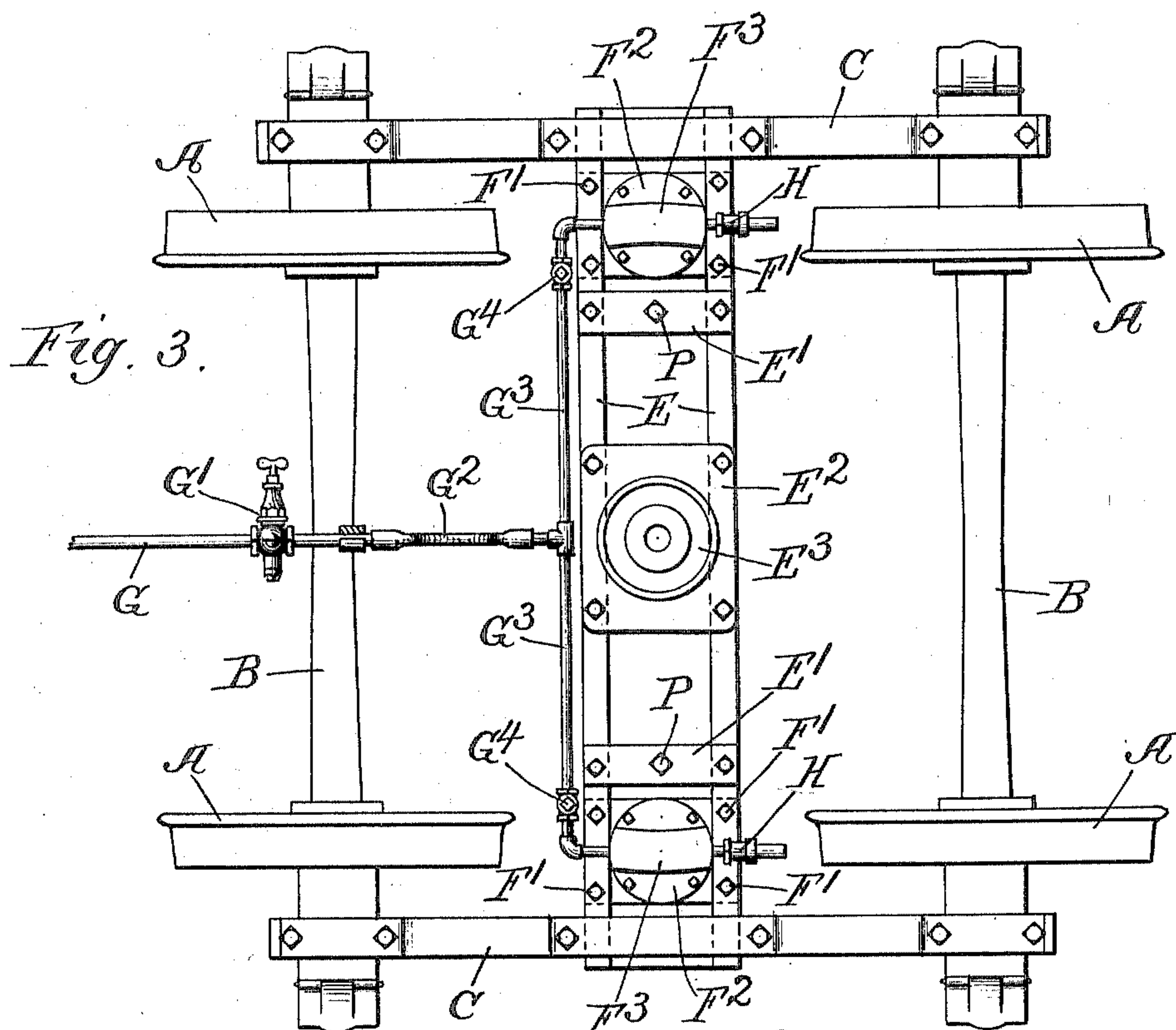
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2 SHEETS—SHEET 2.



Witnesses.

Edward T. Wray
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UNITED STATES PATENT OFFICE.

MURILLO DOWNER, OF CHICAGO, ILLINOIS.

AIR-CUSHION FOR VEHICLES.

No. 811,622.

Specification of Letters Patent.

Patented Feb. 6, 1906.

Application filed May 7, 1904. Serial No. 206,842.

To all whom it may concern:

Be it known that I, MURILLO DOWNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Air-Cushions for Vehicles, of which the following is a specification.

My invention relates to air-cushions for cars and like vehicles, and has for its object to provide new and improved constructions for devices of that class.

It is illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of a car-truck with my invention applied thereto. Fig. 2 is a vertical sectional view on line 2 2 of Fig. 1. Fig. 3 is a plan view of the truck, and Fig. 4 a vertical section through one of the cylinders.

Like letters of reference indicate like parts in all of the drawings.

A A are the wheels of the car, and B B the axles, which are mounted in any suitable manner on the truck. The truck may be made of the side bars C C in the manner shown, connected by the channel-bar C' and the uprights C² C².

D represents the body of the car, having the bolsters D' D' at the sides with bearing-faces thereupon.

D² is a central car-bolster having a circular bearing-plate.

Between the car-body and the truck is a floating bolster made to support the cushioning devices and the car-body. This bolster is preferably made of the transverse bars E E and the longitudinal connecting-braces E' E'. It has centrally thereon the plate E², provided with a circular bearing E³ to engage with the bearing-face of bolster D² on the vehicle-body. At each end of the floating bolster is a cylinder F, secured between the transverse bars E E by the bolts F' F' or in any desired manner. The cylinders are provided each with a removable top piece or cap F², which carries the bearing-plate F³ to engage with the bearing-face on one of the side bolsters D' of the wagon-body, there being a sliding connection between these parts, as shown. If preferred, a roller-bearing might be inserted at this place. The cylinders F F are supplied with air by the pipe G, having therein the pressure-regulating valve G' and a flexible part G², so as to provide for the turning of the truck. Beyond the flexible part the pipe has two branches G³ G³, having therein the check-valves G⁴ G⁴, one branch

leading to each of the cylinders. To provide against the possibility of too great a pressure of air in the cylinders, each of such cylinders is provided with a blow-off valve H, operated by a pivoted crank-arm H', which is connected to a pin H² on the channel-bar C' by the slotted link H³. The parts of this device are so adjusted that when the cylinder is raised to a predetermined distance above the truck the link H³ automatically opens the valve to permit the escape of air from the cylinder. Within each cylinder is a plunger J, having on the upper side the disk J' and a suitable packing-ring J².

It is the purpose of my cushioning device to use air as a cushioning means; but to provide for the emergency which would arise if the supply of air should give out or if the piston or cylinder should become leaky and defective I have in readiness an auxiliary or emergency cushioning device which is adapted to be brought into play if need be. This device consists of a spring or other elastic part which is placed within the air-cushion, preferably seated upon the plunger. To this end I provide the plunger with the stud K, and around this stud are placed, preferably, two spiral springs K' K', one within the other. These springs do not normally engage with the upper end of the cylinder; but should the air-supply fail or become considerably diminished the cylinder will in consequence be lowered and find a flexible support upon these springs. The attaching device for the plunger is also made elastic and is preferably composed also of two spiral springs L L', one within the other. These springs are held in proper position by the stud M, extended from the plate M' on the lower side of the piston, and by a similar stud N on a similar plate N' on the channel-bar C. These springs are made, preferably, very heavy and ordinarily do not add much to the elasticity of the cushion, but come into play as a cushioning device when the air gives out in the cylinder. In order to prevent the swinging longitudinally or from side to side, a king-bolt O may be used. This bolt passes through the bottom of the vehicle-body and through the central bolster-plate E³ and the channel-bar C', thus forming a pivot upon which the wagon-body may turn and also insuring true vertical motion of the cushioning devices.

In addition to the blow-off valve H, which limits the upward travel of the floating bolster by the diminution of air-pressure, I also

provide positive means for limiting such travel. These consist in the bolts $P^1 P^1$, secured to one of the transverse bars E and passing through the channel-bar C' . These bolts are threaded at their ends and provided with nuts $P^1 P^1$ and the washers $P^2 P^2$. Between the washers and the channel-bar C' are interposed spiral springs or other elastic members $P^3 P^3$.

I have thus illustrated and described with some particularity the application of my invention to use in air-cushioning devices for car-trucks and similar vehicles; but the invention could obviously be equally well used in other sorts of vehicles. Also the particular forms and constructions set forth are merely by way of illustration of a particular application of my invention and might be greatly varied without departing from the broad spirit of my invention, and therefore I do not limit myself to the particular forms and constructions above set forth.

The use and operation of my invention are as follows: A supply of air is admitted to the cylinders by pipe G through the pressure-regulating valve G' and is held in such cylinders by the check-valves $G^4 G^4$. The springs $L L'$, as has been said, give, preferably, but little elasticity to the cushioning devices, but are useful in taking up any side motion of the vehicle-body, so that the plunger will operate in the cylinder without hindrance and also come into play if for any reason the air-supply gives out. In this event the cylinders sink down upon springs $K' K^2$, which provide thereupon a sufficiently elastic support for the vehicle. The devices $P P$ are also useful to put a positive limit upon the upward travel of the floating bolster and its supported parts, without, however, causing any destructive jolt or strain. These devices also come into play when the air-supply gives out, operating to retain the bolster in place against the recoil of the substituted springs $K' K^2$ in the event of a sudden jar. Therefore it will be seen that my device provides, in conjunction with a complete system of air-cushions, an equally-complete system of springs adapted to come into action whenever the air-cushions fail to work. The removable caps $F^2 F^2$ of the piston admit of easy repair of such cylinders, such as the replacing of packing, when that becomes necessary.

I claim—

1. In an air-cushioning device for vehicles an air-cushion to normally carry the load and a spring within such cushion adapted to provide an elastic support for the vehicle when the pressure of air is diminished in the cushion.

2. An air-cushion for vehicles comprising a cylinder and a plunger in combination with a spring normally in engagement with but one of the parts of such cushion, and adapted to

engage with the other so as to support the vehicle when the air-pressure in the cylinder is diminished.

3. In an air-cushion for vehicles the combination of a cylinder, a plunger therein, a spring upon the plunger normally out of engagement with the end of the cylinder and adapted to be brought into engagement therewith when the pressure of air in the cylinder is diminished.

4. An air-cushioning device for vehicles adapted to be interposed between the body of the vehicle and its running-gear, comprising an air-cylinder associated with one of such parts of the vehicle, a plunger in such cylinder such plunger and cylinder adapted to coact to normally carry the load and a flexible connection between the plunger and the other of such parts.

5. In an air-cushion for vehicles the combination of an air-cylinder, a plunger in such cylinder, a spring on each side of such plunger, the one within the air-chamber normally not under tension, the one on the other side of the plunger being adapted to form a connection between the plunger and one of the parts of the vehicle to be cushioned.

6. In an air-cushion for vehicles the combination of a floating bolster, a cylinder on such bolster having a removable cap and adapted to form a support for the vehicle-body, a plunger in the cylinder and a connection between the plunger and the running-gear of the vehicle.

7. In an air-cushion for vehicles the combination of a floating bolster, a cylinder on such bolster having a removable cap and adapted to form a support for the vehicle-body, a plunger in the cylinder, and an elastic support between the plunger and the running-gear of the vehicle.

8. In an air-cushion for vehicles the combination of a floating bolster, a cylinder on such bolster, a bearing-plate on the cylinder adapted to provide a sliding bearing for the vehicle-body, a plunger in such cylinder, and a flexible support interposed between the plunger and the running-gear of the vehicle.

9. In an air-cushion for vehicles the combination of a floating bolster, a cylinder on such bolster, a bearing-plate on the cylinder adapted to provide a sliding bearing for the vehicle-body, a plunger in such cylinder, a flexible support interposed between the plunger and the running-gear of the vehicle, and a device adapted to limit the upward travel of the floating bolster.

10. In an air-cushioning device for vehicles the combination of a floating bolster, an air-cushion interposed between such bolster and the running-gear of the vehicle, and a device for limiting the upward travel of the bolster comprising a bolt and an elastic device thereon adapted to be put under tension when the bolster is raised.

11. In an air-cushioning device for vehicles the combination of a floating bolster with a cylinder at each end, sliding bearings for the vehicle-body on such cylinders, plungers in § the cylinders, and flexible connections between the plungers and the running-gear of the vehicle.

12. In an air-cushioning device for vehicles the combination of a floating bolster with a • cylinder at each end, sliding bearings for the vehicle-body on such cylinders, plungers in the cylinders, flexible connections between

the plungers and the running-gear of the vehicle, and a support for the vehicle-body centrally of the bolster.

13. In a cushion device for vehicles, the combination of an air-cushion to normally carry the load, with an auxiliary spring adapted to provide an elastic support when the pressure of air is diminished in the cushion. 15 20

MURILLO DOWNER.

Witnesses:

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