

1,060,860.

Patented May 6, 1913.

4 SHEETS—SHEET 1.

Fig. 2.

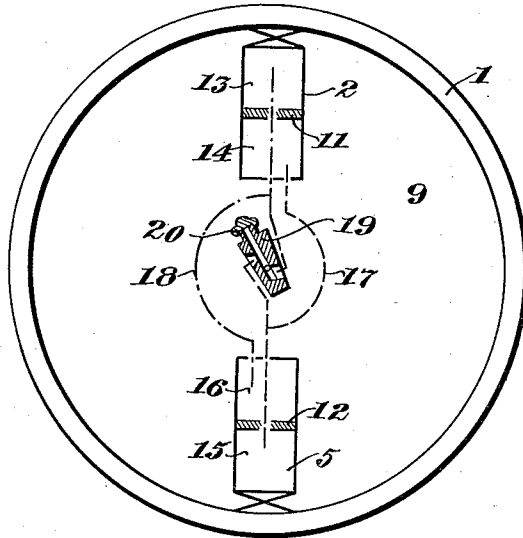
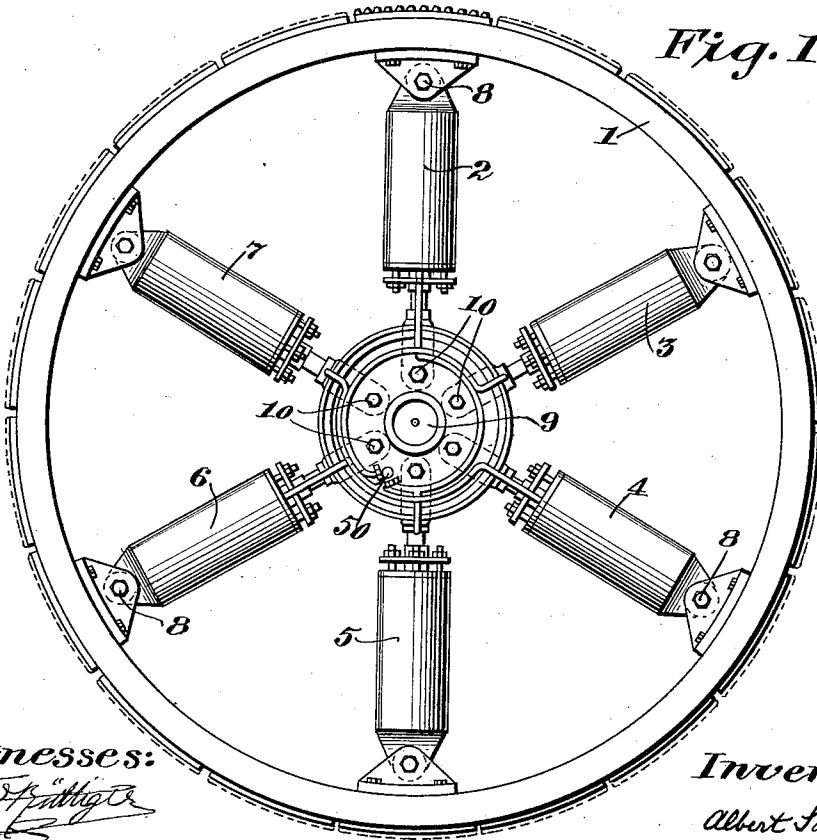


Fig. 1.



Witnesses:

Ferdinand Muth
Willy Muth

Inventor:

Albert Sauvert
by Ferdinand Muth
Attorney

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4 SHEETS-SHEET 2.

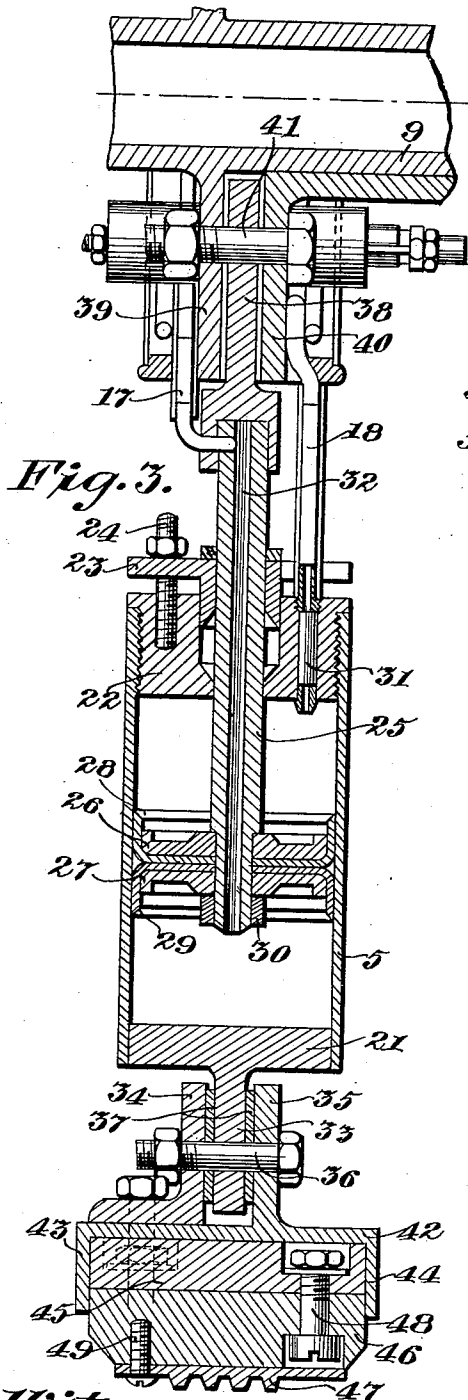


Fig. 3.

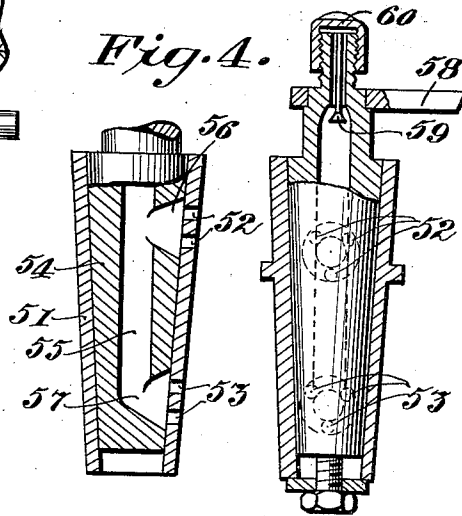


Fig. 4.

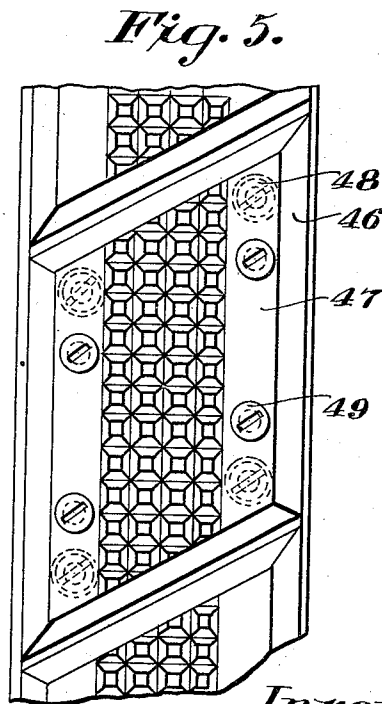


Fig. 5.

Witnesses:

First Witness
Willy Huth

Inventor:

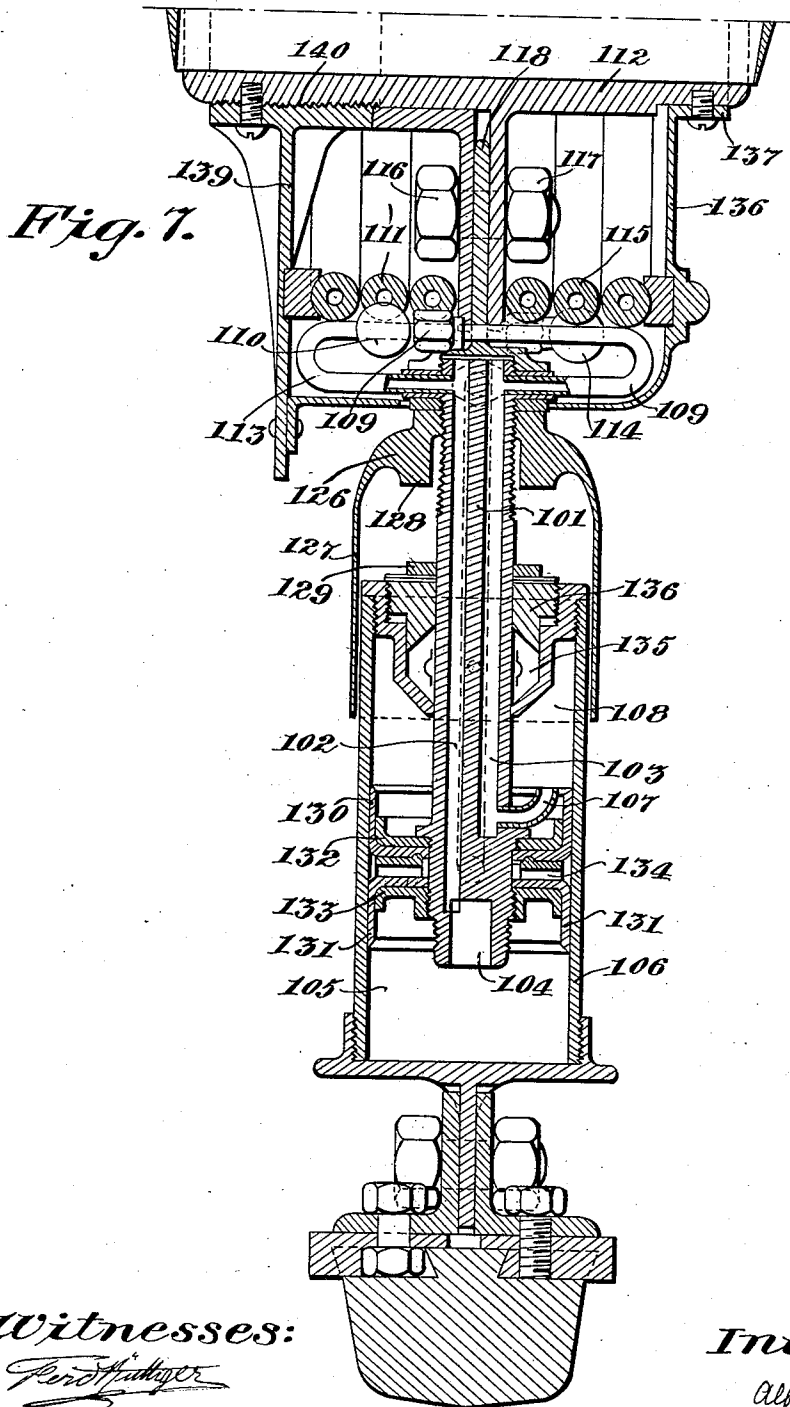
Albert Sauvert
by Frederick M. Munn
Munn

A. SAUVERT.
ELASTIC WHEEL.
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4 SHEETS—SHEET 4.



Witnesses:

Ferdinand Muehl
Willy Muehl

Inventor:

Albert Sauvert
by Ferdinand Muehl
Attorney

UNITED STATES PATENT OFFICE.

ALBERT SAUVERT, OF PARIS, FRANCE.

ELASTIC WHEEL.

1,060,860.

Specification of Letters Patent.

Patented May 6, 1913.

Application filed April 25, 1912. Serial No. 693,187.

To all whom it may concern:

Be it known that I, ALBERT SAUVERT, a citizen of the French Republic, residing at Paris, in the Republic of France, have invented certain new and useful Improvements in Elastic Wheels, of which the following is a specification.

This invention relates to an elastic wheel the hub of which is connected with the pistons by means of articulated links, said pistons being movably mounted in cylinders closed at both ends and filled with air under pressure. The cylinders are connected with the felly by means of articulated links or joints. The cylinders are arranged in even numbers. The inner chamber of one of two opposite cylinders communicates freely and continuously with the outer chamber of the other cylinder so that any two opposite pistons will rest upon equal buffers of compressed air whatever may be the inclination of the cylinders. All the chambers are simultaneously filled with air and at the same pressure by means of a valve which permits of connecting all the cylinders by means of an inflating valve and to insulate the same the one from the other after the air chambers have been filled.

In the accompanying drawings two forms of construction of the invention are shown.

Figure 1 is a front elevation of the improved elastic wheel. Fig. 2 shows diagrammatically the communications between two opposite cylinders. Fig. 3 is a cross section taken through the axis of one of the cylinders. Fig. 4 shows in vertical section the cock. Fig. 5 is a plan view of the tread. Fig. 6 shows in front view the improved wheel according to the second form of construction. Fig. 7 is a longitudinal section through one of the spokes of the wheel. Fig. 8 is a section taken along the axis of the hub and through the axis of the air valve.

Upon the felly 1 of the wheel six cylinders 2, 3, 4, 5, 6, and 7 are pivotally fixed in such a manner that they can swing in the plane of the wheel around their pivots 8. These cylinders are closed at both ends and they engage each a piston. All the pis-

ton rods are hingedly fixed to the hub 9 by means of bolts 10.

Fig. 2 shows diagrammatically two opposite cylinders 2 and 5 for example with their pistons 11 and 12. The piston 11 separates the cylinder 2 into two chambers 13 and 14 and the piston 12 separates the cylinder 5 into two chambers 15 and 16. The inner chamber 14 of the cylinder 2 communicates by means of a tube 17 with the outer chamber 15 of the cylinder 5 and the chambers 13 and 16 of the two cylinders are connected in the same manner by a tube 18. The cylinders of all the other groups are connected and arranged in a similar manner.

The three connecting tubes 17 of the three groups of cylinders and the three connecting tubes 18 are each connected by a branch tube with a cock 19 so that, if this cock is turned all the tubes can be connected with the central boring of the cock 19. This cock carries at its end 20 an air valve which serves for filling the cylinders with air under pressure. All the air chambers are simultaneously filled with air under pressure whereupon the valve 20 is closed and the cock 19 is turned so that the tubular connections are shut off the one from the others, only the inner chambers of two opposite cylinders being connected with the outer chambers of the opposite cylinders.

It is easy to understand that the load on the hub which is transmitted to the two pistons 11 and 12 of the cylinders 2 and 5 compresses the air in the chambers 14 and 15; as said chambers communicate the two air buffers work in the same manner and the two pistons 11 and 12 carry a similar part of the load. This is also the case with the pistons of any group of two opposite cylinders. The six pistons therefore rest upon six air buffers of compressed air. The strains exerted upon two opposite pistons being at every moment equal and acting in opposite directions they are balanced whichever may be the angle of inclination of the cylinders of the group.

Figs. 3 and 4 show in which manner the idea of the invention is practically executed. The cylinder 5 has a bottom plate 21 and a

top plate 22 which carries a stuffing box 23 maintained in position by means of a set screw 24. The top plate 22 is traversed by a rod 25 of the piston and this piston is composed of two disks 26 and 27 between which leather disks 28 and 29 are arranged. A nut 30 screwed upon the lower threaded end of the rod 25 serves for securely fixing together the several parts of the piston. The top plate 22 has a passage way 31 into which a flexible connecting tube 18 is screwed. The rod 25 of the piston is hollow and its boring 32 communicates with the flexible connecting tube 17. The bottom plate 21 of the cylinder has an extension 33 which is situated between two jaws 34 and 35 and connected with the same by means of a bolt 36. Leather washers 37 are inserted between the inner surfaces of said jaws 34 and 35 and the outer surfaces of the extension 33. The inner part of the piston rod has an extension 38 which is inclosed between two jaws 39 and 40 fixed upon the hub 9, a bolt 41 serving for connecting the extension with said jaws. The jaw 39 is made in one piece with the hub 9 and the jaw 40, consisting of an angle iron, is placed upon said hub. The felly is formed by a U iron 42 made in one piece with the jaw 35. Between the flanges 43 and 44 of the U iron an india rubber ring 45 is located which is covered by a rim 42 composed of wooden segments 46 covered by a metal tread 47. The wooden rim 46 is connected with the india rubber ring 45 by means of bolts 48, said india rubber ring having cavities for the reception of the heads of the bolts. The tread 47 is fixed upon the wooden segments 46 by means of screws 49.

The cock 50, Fig. 1, is arranged at a suitable point between the two jaws of the hub. It consists of a body 51 upon the upper part 52 of which a group of three sockets is screwed, a second group of three sockets being screwed upon the lower part 53. The plug 54 of the cock has a central boring 55 which has two conical enlargements 56 and 57 adapted to register with the groups of sockets 52 and 53 when the cock is turned. A key 58 serves for turning the plug of the cock. The boring 55 is closed at the upper end by an ordinary air valve 59 closed by a screw cap 60.

In order to fill the cylinder chambers with air under pressure the cock is opened and air under pressure is forced into all the chambers simultaneously whereupon the cock is closed so that the different cylinders are shut off the one from the other and that only the inner and outer chambers of two opposite cylinders communicate.

The load which rests on the hub is distributed between the six pistons which each

rests upon air buffers the air of connected chambers being compressed to the same degree of pressure.

The second form of construction differs from the first by the following improvements:—

(1) The tubes which connect the inner and outer chambers respectively of two opposite cylinders are replaced by channels arranged in the corresponding piston rods. These channels are connected by means of flexible metal tubes and by means of circular crowns which permit of the oscillating movement of the piston rods with regard to the hub.

(2) The six circular crowns can either be made to communicate so that the twelve cylinder chambers communicate with each other or be shut off the one from the other by means of a specially constructed cock.

(3) Upon the rod of each piston a nut is mounted which can be screwed down so as to come in contact with the cylinder and to prevent the movement of the piston. If for example the nut of the piston rod which stands perpendicularly below the hub is screwed home when the vehicle is at rest the piston is rigidly connected with its cylinder so that the entire load acting upon the hub is supported by a rigid spoke and the leather washers of the pistons are not submitted to any strain.

The piston rod 101 (Fig. 7) has two channels 102 and 103; the channel 102 terminates in a cavity 104 arranged at the end of the rod and in the outer chamber 105 of the cylinder 106. The channel 103 is connected by means of a bent channel 107 with the inner chamber 108 of the cylinder. This bent channel serves for preventing the lubricant from flowing into the channel 103. This channel 103 terminates at its inner end in a flexible metal tube 109 the end 110 of which terminates in a circular crown 111 which is concentric with the hub 112. This crown 111 is connected on the other hand by a flexible connecting tube 109 with the channel of the rod of the opposite piston which terminates in the outer chamber of the opposite cylinder. In Fig. 7 there is only shown one of the spokes of the wheel, the opposite spoke being of identical construction. The channel 102 has a flexible connecting tube 113 the end 114 of which terminates in a circular crown 115 which communicates with the inner chamber of the opposite cylinder. The rod 101 of the piston is pivotally mounted upon the hub 112 by means of a bolt 116 and of a nut 117 so that it can slightly oscillate around the axle 118.

The flexible connecting tube 109 is connected at one end with the crown 111 and consequently with the hub while the other

end of the same is connected with the piston rod 101. This second end of the connecting tube can displace itself for a distance of about 2 to 4 mm. to either side of its medium position. With this object in view the connecting tube 109 is made of steel so that it is sufficiently flexible. Around the hub six circular steel crowns are arranged concentrically with the hub, three of the crowns being mounted at one and three at the other side of the hub. Each of these six crowns is connected by a branch tube 119 with the cock 120 the plug 121 of which has a central boring 122 with six openings 123 arranged along the same generating line so that they can simultaneously register with the ends of the connecting pieces 119. When the plug of the cock is in this position the twelve chambers of the cylinders communicate with each other. The boring of the plug 122 is closed by an air valve 124 which in its turn is closed by a screw cap 125. In order to make the wheel ready for service the cock is brought into such a position that the six crowns 111 to 115 communicate with one another the twelve cylinder chambers being thus connected the one with the other. The tubular socket of a bottle filled with air under pressure is connected with the plug and the cylinders are thus filled with air under pressure whereupon the plug of the cock is turned through 180° shutting off the six crowns 111 to 115 the one from the other. At this moment each crown serves merely for connecting the inner and outer chamber respectively of two opposite cylinders as has been hereinbefore described with reference to the first form of construction.

A nut 126 is screwed upon the piston rod. This nut has a cylindrical bell-shaped extension 127 telescoped over the end of the cylinder 106. By turning this nut 126 it can be screwed down along the rod 101 until its lower end 128 bears upon a leather washer 129 mounted upon the upper part of the cylinder 106. In this manner the piston is rigidly connected with the cylinder. When the vehicle is at rest the nut 126 of the spoke which stands perpendicularly under the hub is screwed home. In this manner the entire load is transmitted by the hub to one rigid spoke but not to the air buffers whereby the wearing of the piston packing is avoided.

The piston is composed of two leather disks 130 and 131 connected by means of nuts 132 and 133. Between the two leather disks the central disk 134 is situated which has radial channels upon one of its surfaces which are connected with a channel for lubrication provided in the rod 101 but not shown in the drawings. The lubrication of the packing 135 inclosed in the stuffing box 136 is also effected from this channel.

The annular crowns 111 and 115 situated close to the hub are inclosed in a casing 136 of thin metal fixed on the one hand by a flange 137 upon the hub 112 and on the other hand by a flange 138 upon the circular flange 139 which is screwed at 140 upon the hub.

I claim:—

1. An elastic vehicle wheel comprising in combination with the felly and the hub, radially arranged cylinders closed at both ends pivotally fixed with the outer end to the felly, pistons in said cylinders dividing the same into two equal compartments, piston rods pivotally connected with the hub, tubes connecting the inner chamber of one piston with the outer chamber of the opposite piston and means for connecting said tubes with a common channel for the supply of air under pressure to the cylinder chambers, substantially as described and shown and for the purpose set forth.

2. An elastic vehicle wheel comprising in combination with the felly and the hub, radially arranged cylinders closed at both ends pivotally fixed with the outer end to the felly, pistons in said cylinders dividing the same into two equal compartments, piston rods pivotally connected with the hub, tubes connecting the inner chamber of one piston with the outer chamber of the opposite piston, a cock to which all the connecting tubes are connected and an air valve upon one end of the central boring of the plug of said cock, substantially as described and shown and for the purpose set forth.

3. An elastic vehicle wheel comprising in combination with the felly and the hub, radially arranged cylinders closed at both ends pivotally fixed with the outer end to the felly, pistons in said cylinders dividing the same into two equal compartments, piston rods pivotally connected with the hub having two air channels and a lubricating channel, the air channels communicating with the outer chamber of its cylinder and with the inner chamber of the opposite cylinder, tubes connecting the inner chamber of one piston with the outer chamber of the opposite piston and means for connecting said tubes with a common channel for the supply of air under pressure to the cylinders, substantially as described and shown and for the purpose set forth.

4. An elastic vehicle wheel comprising in combination with the felly and the hub, radially arranged cylinders closed at both ends pivotally fixed with the outer end to the felly, pistons in said cylinders dividing the same into two equal compartments, piston rods pivotally connected with the hub, tubes connecting the inner chamber of one

piston with the outer chamber of the opposite piston, and means for connecting said tubes with a common channel for the supply of air under pressure to the cylinder chambers, a nut screwed upon the piston rod and a bell-shaped extension of said nut telescoped over the inner end of the cylinder, said nut serving to lock the piston with its

cylinder, substantially as described and shown and for the purpose set forth. 10

In witness whereof I have hereunto set my hand in the presence of two witnesses.

ALBERT SAUVERT.

Witnesses:

H. C. COXE,

ALBERT DE CARSALADE.

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