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BY A. P. C.

A. DE JONG
WHEEL WITH SPRING SPOKES
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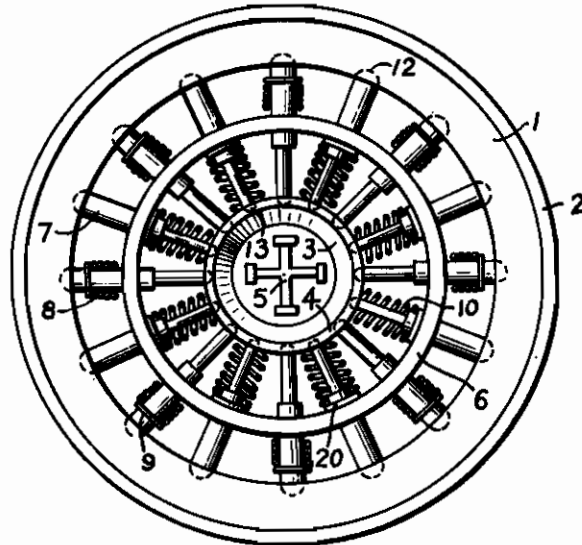


FIG. 1.

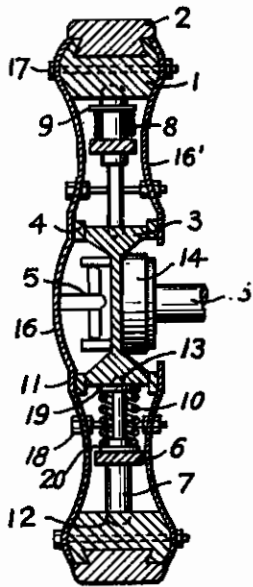


FIG. 2.

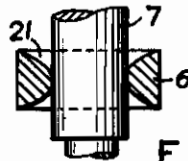


FIG. 3.

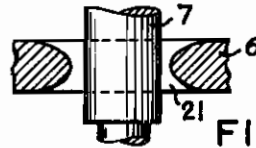


FIG. 4.

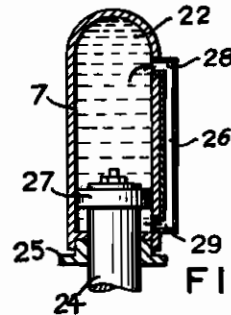


FIG. 5.

INVENTOR
Andries de Jong
BY *Fredrick E. Halen*

ALIEN PROPERTY CUSTODIAN

WHEEL WITH SPRING SPOKES

Andries de Jong, The Hague, Netherlands; vested
in the Alien Property Custodian

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My invention relates to a wheel with spring spokes.

One object of my invention is to create a wheel with spring spokes that can be used in place of wheels provided with pneumatic tires and having an elastic working at least about the same as said tire-wheels.

Another object of my invention is to provide a wheel with spring spokes which can be driven without hindering the elastic suspension of the hub.

A further object of my said invention is to create a wheel with spring spokes which has a simple structure and which can be manufactured cheaply.

Among the objects of my invention is also to furnish a wheel with spring spokes having about the same aspect as a wheel with a pneumatic tire.

Other and further objects of my invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the accompanying drawings an embodiment of my invention is shown.

Fig. 1 shows a side-view of a wheel according to the invention, the plate covering therewith being removed.

Fig. 2 shows a cross section according to the line II—II in Fig. 1, the plate covering also being shown.

Fig. 3 shows a cross section of the concentric ring in the neighbourhood of the width of passage for a damping plunger.

Fig. 4 shows a part of a longitudinal section of the concentric ring near said width of passage for a damping plunger and

Fig. 5 shows a suchlike plunger partly in cross section.

Therewith 1 indicates the rim of the wheel being provided with an elastic running surface 2 of solid gum or a suchlike material.

The hub 3 has guide faces 4 for the flat parts 11 of the covering plate 16.

This structure will be discussed hereinafter.

A cross-coupling 5 is fixed to the hub 3 said coupling also being performable as a so-called cross-coupling-disc.

Radial, hydraulic damping plungers 7 are arranged between the rim 1 and the hub 3, said plungers consisting of a wide and narrow part.

A spring 8 lies around the wider part of the plunger and is fastened to same for example by means of an adjustable ring 9, so that a certain play may be adjusted between the concentric,

stiff pressing-ring 6 and the end of this spring lying at the side opposite to the ring.

The wider part of the plungers contains an oil-chamber 22.

The drawsprings 10 lying around the narrow part of the damping plungers at the inside of the ring 6 are arranged in an intermittent manner relative to the compression springs 8. These damping plungers have spherical shaped wide and narrow ends, so that they fit in correspondingly formed apertures 12 and 13, respectively arranged at the rim 1 and at the hub 3. The hub 3 is fastened at a drum 14 or the like driven by the shaft 15.

To enable driving of the wheel while its elastic working remains present, plates 18 and 16' are arranged, said plates being connected with the hub 3 by means of above mentioned cross coupling 5.

By this the hub can be displaced relative to the rim of the wheel out of the center of same, while driving remains possible.

The hub 3 being displaced relative to the plates 18 and 16' the flat parts 4 of the hub slide along the flat parts 11 of the plates.

The plates 18 and 16' are connected to each other and to the rim 1 by means of bolts 17 and 18.

The draw springs 10 are fastened to the hub 3 and the ring by means of adjustment rings 19 and 20 so that the tension of same can be regulated.

The damping plungers 7 being compressed over some distance, the springs 8 abut with their inside ends against the ring 6, so that when compression goes on they will be compressed less or more.

Now the effected forces will be transmitted to the draw springs 10 lying above the hub 3 by means of the ring 8.

Remaining within the scope of the invention it is possible to make the compression springs less strong than the draw springs so that the former will be compressed wholly before the latter will come into action.

However it is also possible to make the compression springs stronger than the draw springs, so that at first the the latter will come into action and after that the compression springs.

To prevent a too large drawing out of the draw springs for instance a rabbet may be arranged at the damping plungers.

The drawing shows an example of performance according to first mentioned case, with which the compression springs itself, when wholly com-

pressed, form a displacement limiting rabbet.

In both cases the resistance of the wheel against shocks and bumps gradually increases.

Figs. 3 and 4 show in what manner the damping plungers 7 pass through the ring 6.

The width of passage 21 in the cross section of the ring 6 has about the same breadth as the plungers, in the longitudinal direction of this ring however these openings are somewhat larger.

By this the plungers are able to displace somewhat relative to the ring 6 so that they can get another position which is necessary in connection with the displacement of the hub 3 out of the center of the wheel, the latter being loaded.

To enable overturning of the plungers over a certain angle in a better way, the openings 21 have a rather sharp inner edge which also is advantageous for the mounting of the wheel.

For by this arrangement the plungers can be placed somewhat sloping in the ring 6, together lying in a conical shaped plane and with their small ends reaching in a direction to the shaft 15 so that they can be placed with their broad ends into the apertures 12. After that the small ends are to be placed into the apertures 13 of the hub 3 still lying somewhat to the outside.

This being done the hub 3 with the plungers can be pushed to the center of the wheel.

Fig. 5 finally shows the performance of the hydraulic damping plungers. The wider part of same has a chamber 22, filled with a fluid e. g. oil.

The rod 24 being displaceable into the wider part of the plunger arrangement and lying tightened by means of a packing gland 25, the piston 27 pushes the oil or other fluid through the opening 28, the by-pass canal 26 and the opening 29 to the space being present under the piston 27.

By this a gradually damping working will be obtained, so that the wheel according to the invention in practice can take up all shocks and this in a manner at least as well as with wheels with a pneumatic tire.

The arrangement works as follows:

In the beginning only the plungers will be compressed, taking up the light shocks.

The load increasing also the compression

springs 8 will come into action by that the play between these springs and the ring 6 disappears.

The springs 8 being compressed wholly the effected forces will be transmitted to the draw springs 10 lying above the hub 3 by means of the presson ring 6.

As appears from the abovementioned the resistance of the wheel against shocks gradually increases, while—and this is very advantageous—the hydraulic plungers will damp the light shocks so that a wheel according to the invention has about the same effect as a wheel with a pneumatic tire.

The cross coupling 5 therewith enables driving of the wheel in an excellent manner, this coupling not hindering the elastic suspension of the hub 3. The coupling consists of a cross 5 turnable between two ears arranged at the hub on one hand and turnable between two ears arranged at the plate 16 on the other hand.

From this plate (and the plate 16') the driving force will be transmitted to the rim 1 so that the elastic working of the plungers and springs will not be hindered by that they otherwise would be obliged to transmit a driving couple.

It will be clear that the invention also includes those performances with which a very small play is present between the compression springs and the ring 6, even if this play would be very slight or not at all present.

The resistance of a spring when coming into action in the beginning is very small, so that no practical cooperation with the ring will be present then.

Also in this case the damping plungers can do their work very well.

My invention is not limited to the embodiments shown, but various changes may be made without departing from the scope of my invention.

So the invention may be used not only for motorcars, but also for motorcycles, bicycles, sportcars, perambulators etc.

In that case the dimensions of plungers, springs etc. of course must be altered correspondingly.

ANDRIES DE JONG.