

Feb. 28, 1928.

H. MAMESSIER

1,660,845

ELASTIC WHEEL

Filed Aug. 14, 1923

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FIG. 1

FIG. 2

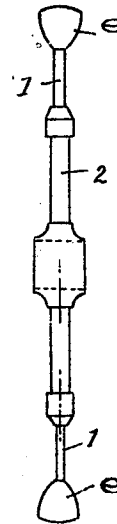
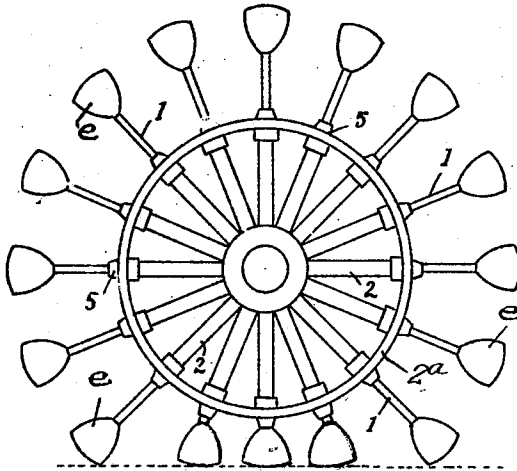


FIG. 3

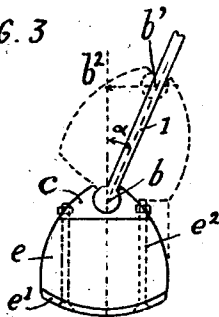


FIG. 4

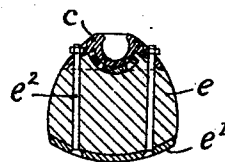
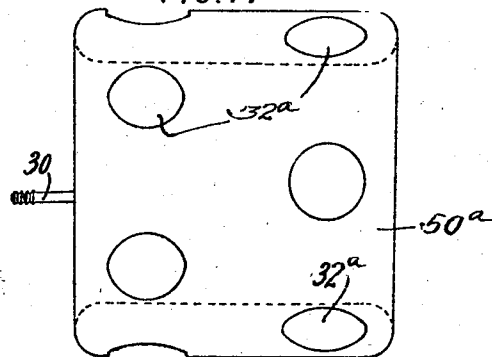


FIG. 11



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FIG. 5

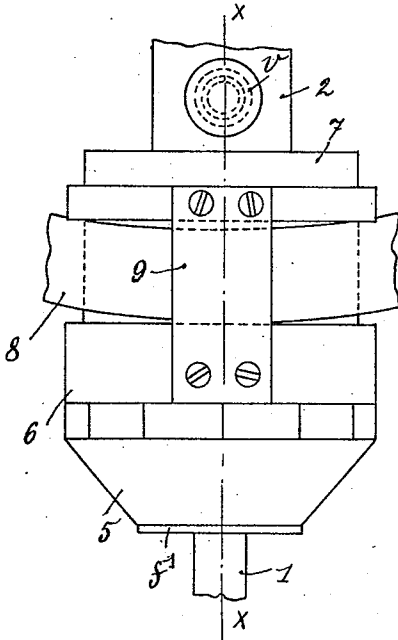


FIG. 6

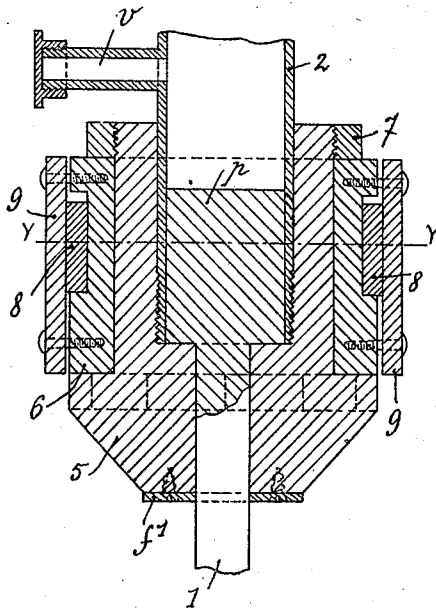


FIG. 8

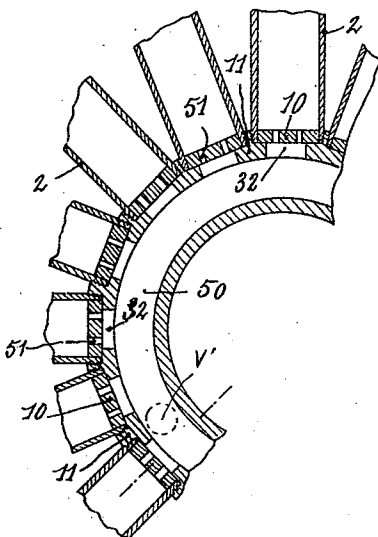
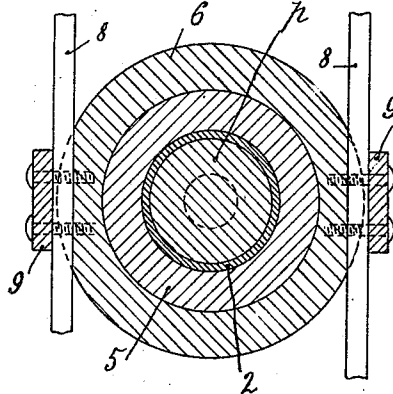


FIG. 7



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FIG. 12

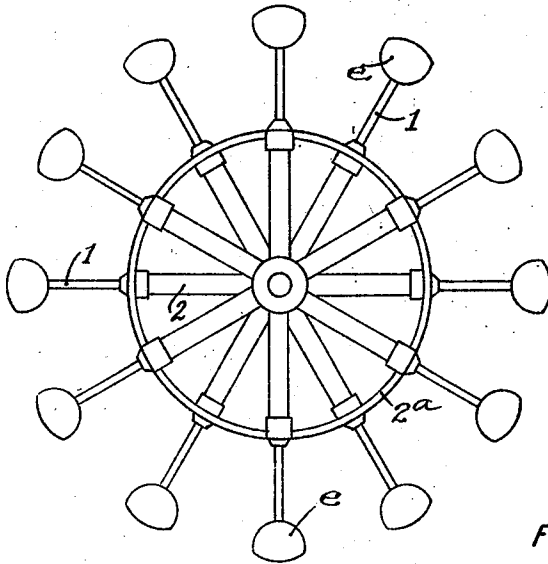


FIG. 13

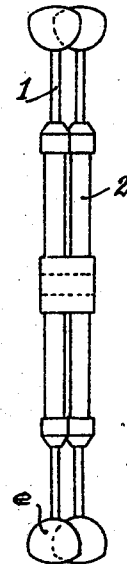


FIG. 10

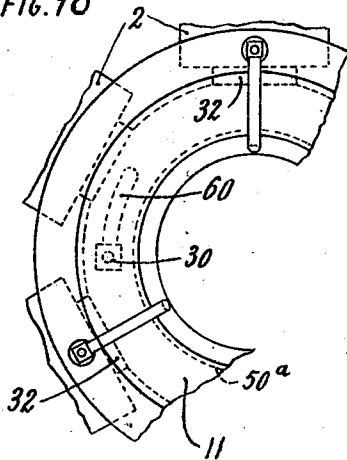
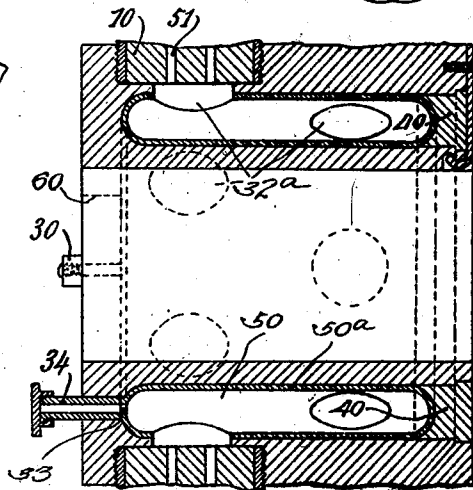


FIG. 9



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UNITED STATES PATENT OFFICE.

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ELASTIC WHEEL.

Application filed August 14, 1923, Serial No. 657,366, and in France August 16, 1922.

The present invention relates to a wheel comprising rods in radial disposition and having feet successively entering into contact with the ground during the rotation of the wheel, in such manner that the travel will be of an intermittent nature and will take place by means of successive contact with the ground.

The essential feature of the invention consists in the fact that the blocks or feet, which are mounted by ball-and-socket joints at the ends of the respective rods, are so shaped that the surface of the foot in contact with the ground shall be convex or spherical, and not flat, and the center of curvature may coincide substantially with the center of the ball-and-socket joint.

Due to the spherical or like convexity of the surface in contact with the ground, the wheel may roll with the greatest facility upon the ground, and the wheel can be steered about at all times, irrespectively of the nature of the ground.

Figs. 1 and 2 are respectively somewhat diagrammatic front and side views of the wheel provided with legs.

Fig. 3 is a detail view on a larger scale showing the operation of the ball-and-socket arrangement.

Fig. 4 is a section showing the ball-and-socket arrangement at the end of each leg.

Fig. 5 is a detail view showing the braking means for each leg.

Fig. 6 is a section on the line X—X of Fig. 5.

Fig. 7 is a section on the line Y—Y of Fig. 6.

Fig. 8 is a section of a hub comprising the liquid braking means for the rods.

Fig. 9 is a section of a modified form of the hub, and Fig. 10 is the corresponding front view.

Fig. 11 is an external view of the ring shown in Fig. 9.

Figs. 12 and 13 are respectively front and side views of a wheel embodying the hub shown in Fig. 9.

The said wheel consists of a plurality of rods 1 in radial position extending outwardly of the respective cylinders 2, the latter being connected together by a common frame 2^a. At the end of each rod is provided a ball portion *b* (Fig. 3) which co-operates with the socket *c* formed in the block or foot *e*.

The surface of the foot *e* in contact with

the ground is convex, as shown in the two views taken at right angles, Figs. 1 and 2. The foot *e* comprises a sole *e*¹; this sole *e*¹ and the socket *c* are fixed by the bolts *e*².

It will be observed that a great advantage is offered by the ball-and-socket joint *b c*; in particular, it allows the rod, after the block or foot has entered into contact with the ground, to pivot on the ball-and-socket joint, and provides for the shortening of the rods 1 without any risk of breakage of the latter; as shown in Fig. 3, when the rod 1 enters its cylinder, the ball *b* will not occupy the position *b*² but the position *b*¹, the length *b*²—*b*¹ being equal to *b b*¹ sin α .

When the wheel moves forward and when for instance three of the feet have entered into contact with the ground (Fig. 1), there is produced not only a displacement of the rods relatively to the feet by the pivoting at the ball-and-socket joints, but also a slight rolling of said feet upon the ground; in this latter case, the stresses will be a minimum, and are in fact less than in the known devices with ball-and-socket mounting in which the blocks or feet are flat and have a certain play allowing them to slide relatively to the ball-and-socket joint.

Furthermore, due to the spherical form employed, the wheel can be steered about at all times with great facility.

In order to connect the piston with the pump barrel a nut 5 is screwed to the end of the pump barrel. The same allows the piston rod to pass loosely; the shoulder interior of nut 5 acts as an abutment for the piston head *p*. A rubber *f*¹ is used for maintaining in a clean state the part of the rod which enters into the pump barrel. The nut 5 carries a collar 6 which is set in position and maintained whilst being able to rotate about the nut 5, in virtue of the ring 7 being screwed upon the nut 5. Rings 8 are provided, fitting in recesses in the collar 6 for connecting the pump cylinders 2 rigidly together, and retained in position by members 9. The inner ends of the pump cylinders fit in suitable recesses in the hub and are closed by any suitable means such as plugs.

Any suitable medium may be employed for obtaining the desired braking action in the cylinders 2, such as compressed air admitted to each cylinder through its valve *v*.

The invention may likewise be adapted for the use of a liquid braking medium as

shown in Fig. 8, wherein a large channel 50 is provided within the body of the hub 11 so as to allow the liquid of all pump barrels 2 to pass from the one into the other. Holes 51 are made in the plugs 10 which close the pump barrels and the braking effect is obtained by the passage of the liquid through these holes. In this case a single filling valve v' may be employed.

Figs. 12 and 13 show a third form of construction in which two series of cylinders are coupled. As shown, the wheel is provided with twelve rods and is constructed in such a manner that three rods will act in a useful way under severe shocks. But of course another number of cylinders and of rods can be used without departing from the invention.

In the modification shown in Fig. 9, the hub 11 has mounted in the channel 50 a hollow ring 50^a, held in place by retaining ring 40, (see Figs. 9 to 11), which is rotatable and has the openings 32^a cooperating with the openings 32 in the hub 11 which communicate through the holes 51 in the plugs 10 with the cylinders 2. The rotation of the ring 50^a is limited by a lug 30 which works in a slot 60 formed in the hub 11.

This embodiment is equally well adapted to use with air, for example, in each cylinder,

or with liquid, all of the cylinders being in communication. All the openings 32 may be closed and the air or other medium in the ends of the cylinders used for braking, by rotating the said ring, or the openings 32 and 32^a may be made to coincide for charging purposes, and in this position the opening 33 of the ring coincides with a nozzle 34 formed in the hub 11. By means of this nozzle, the air may be compressed in the cylinders, or air may be removed if the internal pressure is excessive. The said ring is then again rotated until the openings 32 are closed. The nozzle 34 may be provided with a valve if desired. It is observed that in the position of coincidence of the said openings, the braking can likewise be effected by means of a liquid, since all the cylinder ends are in communication.

What I claim is:

A wheel comprising a hub, separate rods extending outwardly of the hub, feet mounted by ball-and-socket joints upon the ends of the respective rods, and whereof the outer surface entering into contact with the ground has a spherical form, and elastic means for braking the radial motion of each rod.

In testimony whereof I have signed this specification.

HENRI MAMESSIER.