E. C. BASS & E. S. HOUGH.

RESILIENT WHEEL.

APPLICATION FILED DEC. 2, 1909.

1,014,558.

Patented Jan. 9, 1912.

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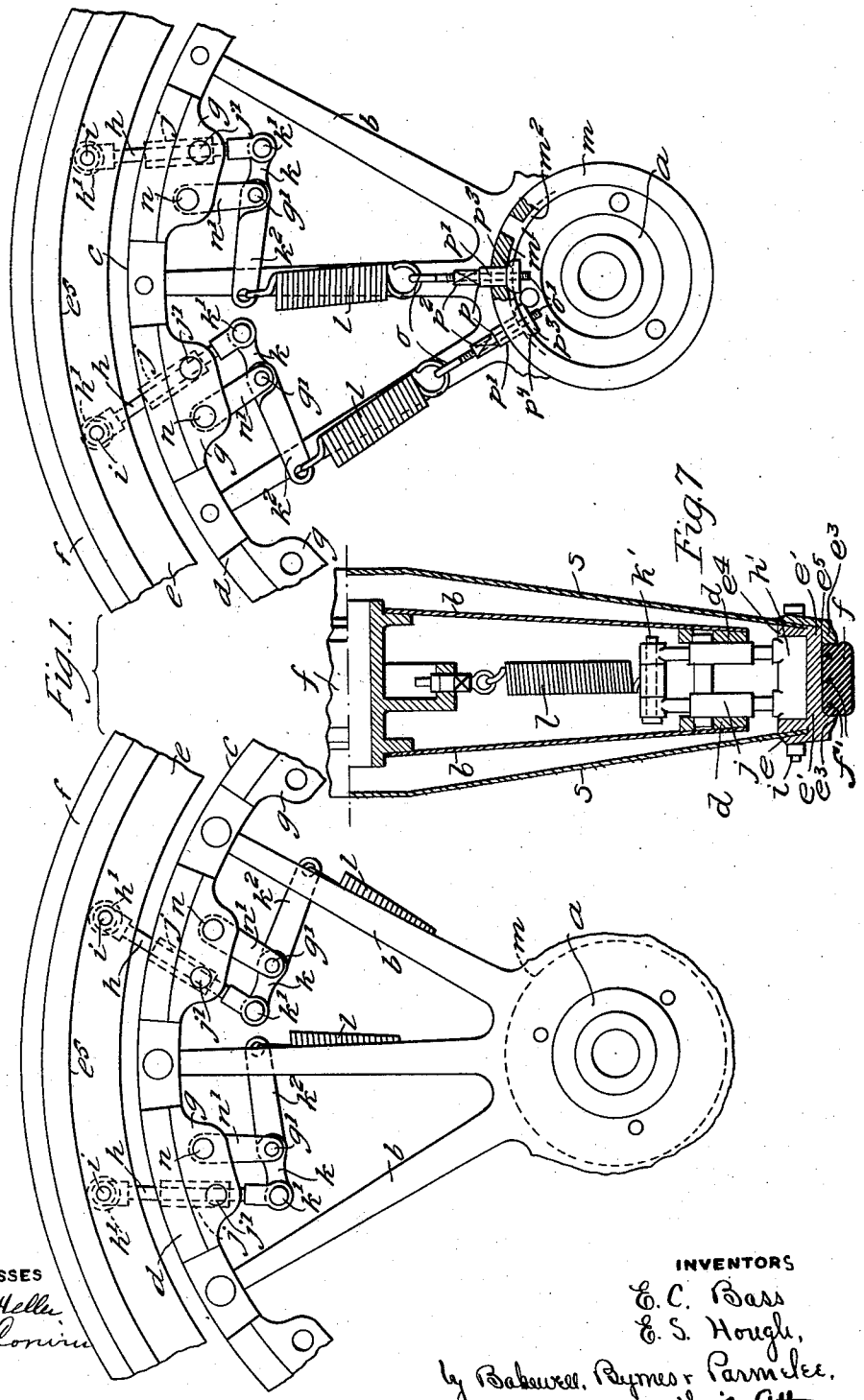

Fig. 1.

Fig. 7

WITNESSES

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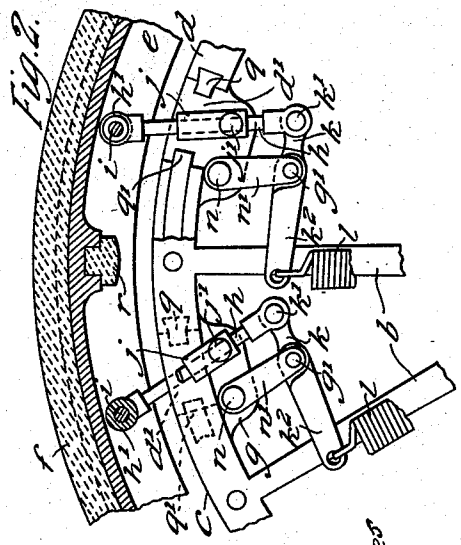

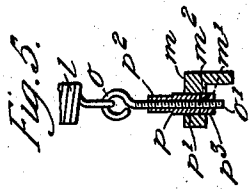

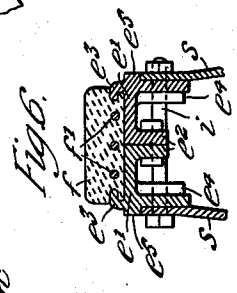

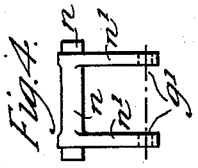

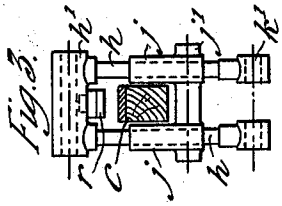

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UNITED STATES PATENT OFFICE.

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RESILIENT WHEEL.

1,014,558. Specification of Letters Patent. Patented Jan. 9, 1912.

Application filed December 2, 1909. Serial No. 530,940.

To all whom it may concern:

Be it known that we, ERNEST CHARLES BASS and EDWARD STAMFORD HOUGH, both of London, England, have invented certain new and useful Improvements in Resilient Wheels, of which the following is a specification.

This invention relates to spring wheels for road or other vehicles of the kind in which an outer floating rim is correlated with an inner rim, rigid with the wheel hub, in such manner as to transmit the drive while allowing a certain relative movement of the two rims both circumferentially and radially. Usually in such wheels the floating rim is supported on the fixed rim by means of interposed springs or other elastic cushions, which are thus normally and generally always in compression.

According to the present invention the two rims are connected by means of a series of main links, pivoted on one rim, that coöperate with a series of levers, fulcruming on rocking links pivoted on the other rim or on a member attached thereto. Each lever has one end pivotally connected with one of the main links and the other end with the end of one of a series of springs which are in tension and preferably adjustable. The other ends of the series of springs are connected to a suitable member, as for example a ring, encircling and fixed to the hub.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents part elevations of the two sides of a wheel with the improvements applied and in which the inner rim is connected to the hub by means of spokes; Fig. 2 is a part section through the two rims and at right angles to the axle of the wheel shown in Fig. 1; Fig. 3 is an elevation of twin trunnion blocks or rocking guide sleeves showing a metal bound wooden inner rim; Fig. 4 is an elevation of a rocking link; Fig. 5 is a sectional view through the hub ring showing means for adjusting the normal tension of the spring; Fig. 6 is a cross-section through the outer rim showing one method of attaching the tread to the outer rim, and Fig. 7 is a part elevation and part section of a modified form of wheel having the inner rim connected by plates or disks to the hub, and showing the relative positions of the rims, rim rings, trunnion blocks, rocking links, the hub and other parts.

The wheel as shown in Figs. 1 and 2 comprises a metal or other outer rim e solid or otherwise, with or without a seating for a tread tire, and an inner rim either solid or built up to comprise a metal, wood, or other suitable felly c, with strong metal rings d connected thereto. The inner rim may be at a suitable distance from and within the outer rim and is rigidly connected to the hub by means of spokes or metal plates b. The rim rings d, which may consist of a series of segmental sections, are fixed on either side of the felly and may be also slotted on their opposing inner faces for the reception of a resilient medium as hereafter referred to. These rings, as shown in Figs. 1 and 2, each carry a series of brackets g rigidly connected therewith. To each bracket is pivoted one of a series of rocking links n, each preferably provided with a pair of inwardly projecting arms n' which support at their inner ends g' a fulcrum pin for one of the series of levers k coöperating therewith.

The main links h, which may be disposed in pairs, are each connected at one end to a rocking member h' pivoted on a pin i carried by the outer rim, and are pivotally attached at the other end to an end k' of one of the levers k, which levers are fulcrumed between their ends at g' in the arms n' of the rocking links n. The main links pass through trunnion blocks or guiding sleeves j pivoted at j' to the brackets g whereby mutual lateral support is provided and the two rims are maintained in the same plane of rotation during a relative movement thereof.

To the hub member m or ring encircling the hub, there are attached, by one end, a number of strong springs l, capable of being adjusted; the other ends of the springs are connected to the ends k^2 of the levers k.

The tension of each of the springs l may be adjusted in some suitable manner; one form of adjusting device is illustrated in Figs. 1 and 5. A nut p, having a cylindrical body portion p', an end part p^2 shaped to fit a spanner and a head p^3, Fig. 1, is adapted to be screwed on to the shank o' when the latter is inserted through a hole m' formed in the ring m. A recessed seating m^2 of the same width as the nut, is formed in the ring m for retaining the nut in position after an adjustment has been made, and the head of the nut has curved shoulders p^4 so that when the nut is turned

by a spanner applied to the end p^2 to bring the long flat sides of the head transverse to the seating m^2, the curved shoulders of the head will ride up over the edges of the sides of the seating and so allow the nut to be fully rotated and the tension of the spring adjusted.

To prevent the impact of the sleeves against the sides of the slots d' formed in the rim rings and also to reduce noise as the wheel travels, suitable resilient means carried by the inner rim may be employed to limit the movement of the main and rocking links and minimize shock, and may comprise rubber stops or cushions inserted in the slotted seatings provided for the purpose in the rings d on either side of the rocking sleeves.

In Fig. 2, on the right of the sleeves j a dovetail slot in the rim ring and filled with a resilient medium q is shown, the latter projecting slightly into the recess d' through which the sleeves pass. On the left a continuous slot is formed in the ring and is filled with a resilient medium q'.

Should there be excessive relative movement between the two rims, contact between the two might occur; to prevent this contact and minimize shock, means of a resilient nature may be provided which will at the same time have the tendency to reduce noise. Such means might be a series of rubber stops such as r secured in seatings on one of the rims, for instance on the outer rim, as in Fig. 2; alternatively, or in addition, similar stops might be secured to the sleeves h' on the pins i as in Fig. 3.

If desired, in order to lessen shock, the outer rim may be provided with a solid rubber or other tire f forced into a suitable seating as in Figs. 1 and 2.

In the modified form of wheel shown in Fig. 7, the inner rim is made up of the rings d spaced apart and connected rigidly to the hub by the plates b, which pivotally support the trunnion blocks j.

In Fig. 6 is shown another way in which the tire may be applied and secured. In this case the outer rim is made in two or more parts e' which are bolted together in any manner and having inwardly projecting inner flanges e^2 which are bolted together, and inwardly projecting external flanges provided with bosses e^4 through which pass the bolt pins i on which the sleeves h' of the main links pivot, the flanges e^3 extend outwardly and are shaped to engage in grooves formed in the sides of the tire f which may have the usual base wires f'.

To protect the springs l and other parts from dust and dirt, suitable covers s flexible or otherwise may be secured to one or both sides of the wheel. As shown in Fig. 6 these covers may rest upon seatings e^5 formed on the outer faces of the rims and be secured by means of nuts on the ends of the pivot pins i.

Having thus described the nature of the said invention and the best means we know of carrying the same into practical effect, we claim:—

1. In a resilient wheel, a hub, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with one of the rims, a series of levers each fulcruming on a rocking link and elastically connected with the hub, and a series of main links pivoted at one end to the second rim and at the other end to the said levers.

2. In a resilient wheel, a hub, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with one of the rims, a series of levers each fulcruming on a rocking link and elastically connected with the hub, a series of main links pivoted at one end to the second rim and at the other end to the said levers, and means correlated with the main links and the second rim and adapted to maintain the two rims in the same plane of rotation during a relative movement thereof.

3. In a resilient wheel, a hub, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with one of the rims, a series of levers each fulcruming on a rocking link and elastically connected with the hub, a series of main links pivoted at one end to the second rim and at the other end to the said levers, and trunnion blocks embracing the main links and pivotally supported on the rim carrying the rocking links, whereby the two rims are maintained in the same plane during a relative movement of the rims.

4. In a resilient wheel, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with the inner rim, a series of levers fulcruming on the rocking links, a corresponding series of springs connecting one end of each lever to the hub, a corresponding series of main links pivoted at one end to the outer rim and at the other end to the levers, sleeves embracing the main links and adapted to pivot on the inner rim and maintain the two rims in the same plane of rotation during a relative movement of the rims, and means for adjusting the tension of said springs.

5. In a resilient wheel, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with the inner rim, a series of levers fulcruming on the rocking links, a corresponding series of springs connecting the ends of the levers to the hub, a corresponding series of main links arranged in pairs and pivoted at one end to the outer rim and

at the other end to the levers, guide sleeves embracing the main links and adapted to pivot on the inner rim and maintain the two rims in the same plane of rotation during a relative movement of the rims, means for adjusting the tension of said springs, and resilient means carried by the inner rim and adapted to limit the movement of the rocking and main links and to minimize shock.

6. In a resilient wheel, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with the inner rim, a series of levers fulcruming on the rocking links, a corresponding series of springs connecting the ends of the levers to the hub, a corresponding series of main links arranged in pairs and pivoted at one end to the outer rim and at the other end to the levers, sleeves embracing the main links and adapted to pivot on the inner rim and maintain the two rims in the same plane of rotation during a relative movement of the rims, means for adjusting the tension of said springs, and a resilient medium carried by one of the rims and adapted to abut against the other rim during a relative movement of the rims and to minimize shock.

7. In a resilient wheel, a floating outer rim, an inner rim rigidly attached to the hub, a series of rocking links pivotally connected with the inner rim, a series of levers fulcruming on the rocking links, a corresponding series of springs connecting the ends of the levers to the hub, a corresponding series of main links arranged in pairs, and pivoted at one end to the outer rim and at the other end to the levers, sleeves embracing the main links and adapted to pivot on the inner rim and maintain the two rims in the same plane of rotation during a relative movement of the rims, means for adjusting the tension of said springs, a resilient medium carried by one of the rims and adapted to abut against the other rim during a relative movement of the rims and thereby minimize shock, and resilient means carried by the inner rim and adapted to limit the movement of the rocking and main links and to minimize shock.

8. In a resilient wheel a hub, a floating outer rim, an inner rim rigidly attached to the hub, a series of levers fulcruming in the inner rim and elastically connected with the hub, a series of main links pivoted at one end to the outer rim and at the other end to the said levers, the said outer rim consisting of a plurality of parts, both of said parts having inwardly projecting internal flanges provided with bolts for bolting said parts together, inwardly projecting external flanges provided with bosses formed for the reception of the pivots of the main links, and outwardly extending flanges constituting a seating, and a tread fitted to said seating and having grooves adapted to engage the outwardly extending flanges.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ERNEST CHARLES BASS.
EDWARD STAMFORD HOUGH.

Witnesses:
JOSEPH MILLARD,
WALTER J. SKERTEN.

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