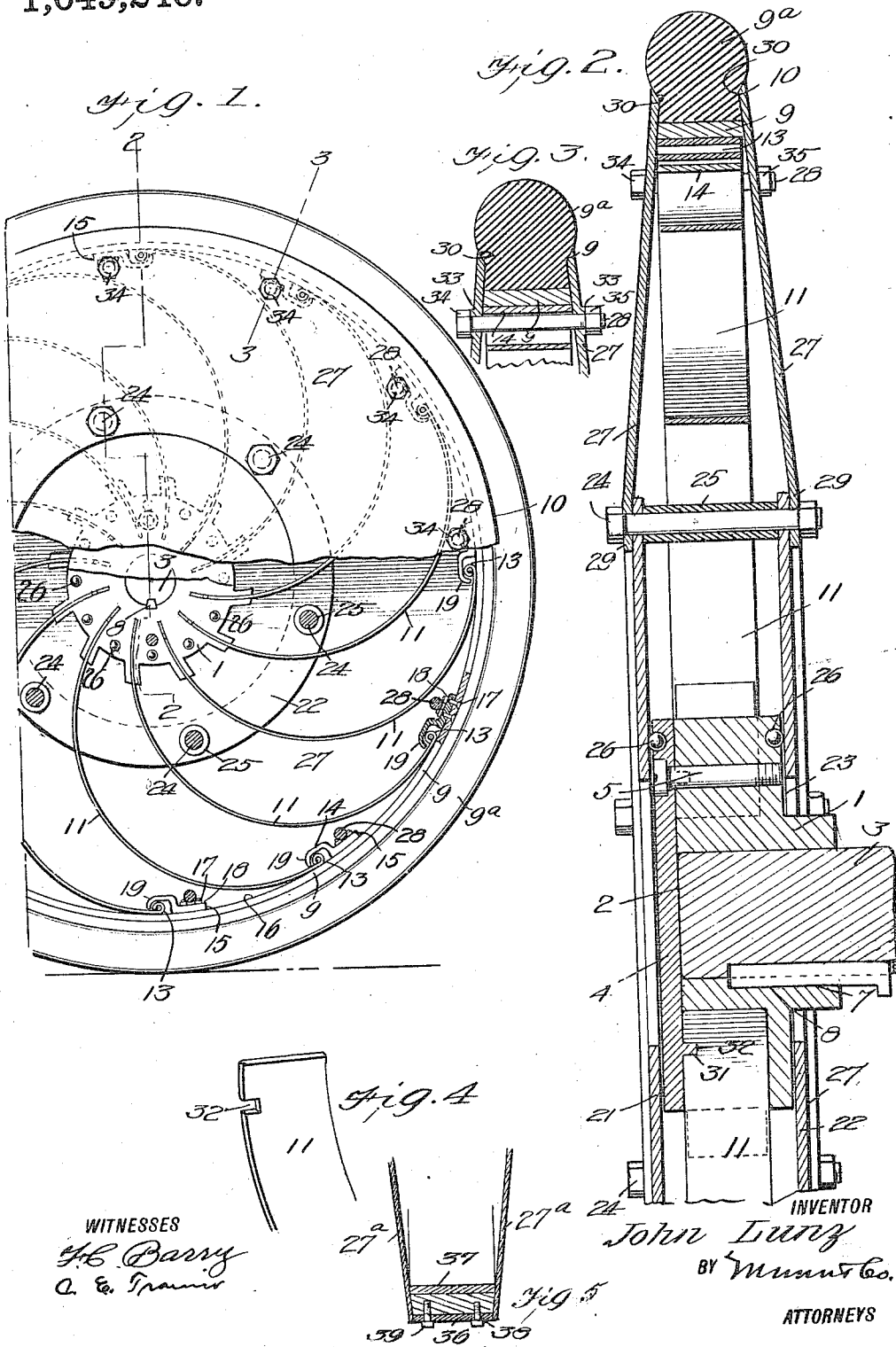


J. LUNZ.
 SPRING WHEEL.
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UNITED STATES PATENT OFFICE.

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SPRING-WHEEL.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN LUNZ, a citizen of the United States, and a resident of Belpre, county of Edwards, and State of Kansas, have invented certain new and useful Improvements in Spring-Wheels, of which the following is a specification.

My invention is an improvement in spring wheels and has for its object the provision of a simple, inexpensive device of the character specified, which while having approximately the resiliency of a pneumatic tire, will be devoid of the disadvantages of such tires.

In the drawings: Figure 1 is a partial side view of the improved wheel, with parts broken away; Figs. 2 and 3 are sections on the line 2—2 and 3—3 of Fig. 1; Fig. 4 is a detail perspective view of a portion of a spoke; and Fig. 5 is a transverse section of a modified construction.

In the present embodiment of the invention, the hub 1 of the wheel has a central opening 2 for the spindle 3, and a cover plate 4 is held on the outer end of the hub by cap screws 5. The end of the spindle bears against the cover plate. A key 8 is provided for securing the hub to the spindle.

The rim 9 of the wheel is a ring and the tire 9^a is approximately circular in cross section, the inner face 10 however, being flattened and seating on the rim, and the said rim is connected to the hub by means of a plurality of resilient spokes. Each of the said spokes is in the form of a resilient plate 11, arched or curved longitudinally in the plane of its width, and arranged with its wide dimension transverse to the wheel.

The plates are similarly arranged with respect to each other, each plate having its inner end received in an approximately radial slot 12 in the hub, and the outer end of each plate is provided with a transverse rib 13, formed in the present instance by bending over the extremity of the spoke in cylindrical form.

The rib 13 is secured beneath the inwardly offset portion 14 of a bracket plate, consisting of two portions 14 and 15 offset laterally from each other. The portion 15 is of greater thickness than the portion 14 and is secured to the inner face of a ring 16, on the inner face of the rim. The plates 14—15 are secured to the ring 16 by bolts 17, each of which is passed from without inward, and

is engaged by nuts 18 on the inner side of the bracket plate.

The ring 16 is countersunk to receive the heads of the bolts, and the free end of each of the portions 14 of the bracket plate is bent laterally toward the ring, as shown at 19, to prevent displacement of the rib 13. The hub is provided with a radial extension 20 at each slot 12, and each of the said slots cuts the extension so that a lip is formed on each face of the plate. A ring or washer 21 is arranged on the outer face of the hub, and a similar ring 22 is arranged on the inner face. Each ring has a central opening 23.

The rings are connected at their outer edges by means of bolts 24, and arbors or bushings 25, encircle the bolts between the rings. The arbors or bushings hold the edges of the rings properly spaced, and a ball bearing 26 is arranged between each ring and the hub near the periphery of the hub. The bearing of the ring 21 engages the disk or cover plate 4.

The rings 21 and 22 form a portion of the housing for the wheel, the remaining portion being formed by segmental plates 27. The plates 27 are arranged with their inner edges overlapping the outer edges of the rings, and the bolts 25 pass through the overlapping edges. Bolts 28 connect the plates adjacent to the rim.

The plates 27 have their inner edges bent laterally, as shown at 29, to fit the outer faces of the rings, and at their outer edges the plates lap against the sides of the tire, and against the edges of the rim. The tire is cut away on each side to fit the said edges, as shown at 30 in Fig. 2. The bolts 28 are so arranged that the bolts 17 are on opposite sides of each bolt 28, and the bolt 28 rests between the said bolts 17 and the nuts 18.

The slots 12 for the inner ends of the spokes are cut from the outer side of the hub, (Fig. 2), and the cover plate fits against the outer edge of each spoke. The said plate is provided with an annular rib 31 on its inner face, which engages a similarly shaped groove in the hub, and each spoke plate is notched at the groove as shown at 32, to receive the rib. The rib 31 thus forms a lock for preventing outward movement of the inner ends of the spokes, and the outer ends are locked by the portions 19 of the

plates 14—15. A boss 33 is provided at each end of each bolt 28, on the plates 27, to permit the heads 34, and the nuts 35 of the bolts to rest flat and squarely, as shown in Fig. 3.

In operation, when the wheel strikes an obstruction, the spokes yield, permitting the rim to approach the spindle. The spindle is suspended from above as well as propped from below and every spoke acts at all times to assist in cushioning the spindle. The spindle may also move angularly with respect to the rim.

It will be noticed that the plates 11 are of such length, that the connection of its ends with the hub and rim are not in radial alignment. The outer end of each spoke lies on the inner face of the rim, and the spokes are in fact tangential to the rim.

The plates 27 and the rings or washers 21 and 22, greatly increase the strength of the wheel, while not detracting any from its resiliency. In addition the said plates and washers relieve the spring spokes 11 from all side strain.

In the construction shown in Fig. 5, the tire 36 may be of wood on a metal rim 37, and an outer tire 38 is provided of metal. The plates 27^a corresponding to the plates 27 of the construction of Figs. 1 to 4 extend beyond the rim engaging the side edges of the metal tire 38, and act as a clamp to prevent lateral movement of the wooden or metal tires. The tire 38 is secured to the tire 36 by means of screws 39. The said screws have heads as shown and are passed from without inward, the heads being on the outer surface of the tire 38, and acting as studs to prevent skidding.

I claim:

1. A wheel comprising a hub provided with spaced slots substantially radial to the hub and opening at one side and on the periphery thereof, a rim, a plurality of spokes between the hub and the rim, each of the said spokes being arched longitudinally in the plane of its width and having its inner end received in a slot of the hub, the outer end of each spoke having a transverse rib and lying on the inner face of the rim, a bracket plate on the rim for each spoke, each bracket plate consisting of two laterally off-set portions, one of said portions being secured to the rim and the other overlying the outer end of the spoke, the last-named portion having a transverse rib for engagement by the rib of the spoke to prevent dislodgment of the spoke end, said hub having an annular groove on the side on

which the slots open the groove cutting the slots, each spoke having a notch registering with the groove, and a disk secured to the said side of the hub and having an annular rib fitting the groove and the notches.

2. A wheel comprising a hub provided with spaced slots substantially radial to the hub and opening at one side and on the periphery thereof, a rim, a plurality of arched spokes between the hub and the rim, each of the said spokes being arched longitudinally in the plane of its width and having its inner end received in a slot of the hub, the outer end of each spoke having a transverse rib and lying on the inner face of the rim, and a bracket plate on the rim for each spoke, each bracket plate consisting of two laterally off-set portions, one of said portions being secured to the rim and the other overlying the outer end of the spoke, the last-named portion having a transverse rib for engagement by the rib of the spoke to prevent dislodgment of the spoke end.

3. A wheel comprising a hub and a rim, and arched resilient spokes connecting the hub and the rim, each of the said spokes having one end connected to the hub and the other lapping on the inner surface of the rim, the spokes being similarly arranged, means for connecting the outer end of each spoke to the rim, and a connection between the rim and the hub for preventing lateral movement of the rim with respect to the hub, said connection comprising washers arranged on each side of the hub and extending beyond the periphery thereof, segmental plates arranged in annular form between the rim and the washers, the inner ends of the said plates lapping on the outer edge of the washers, bolts connecting the washers and the plates and extending transversely of the wheel, said washers being movable radially with respect to the hub.

4. A wheel comprising a hub and a rim, and arched resilient spokes connecting the hub and the rim, and a housing at each side of the wheel, each housing consisting of disks arranged on opposite faces of the hub and segmental plates between the outer edges of the disk and the rim, said plates extending beyond the rim and engaging the sides of the tire, bolts connecting the plates, and the disks and other bolts connecting the plates at the rim.

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Witnesses:

FRANK BEERS;
WM. F. SOTE.