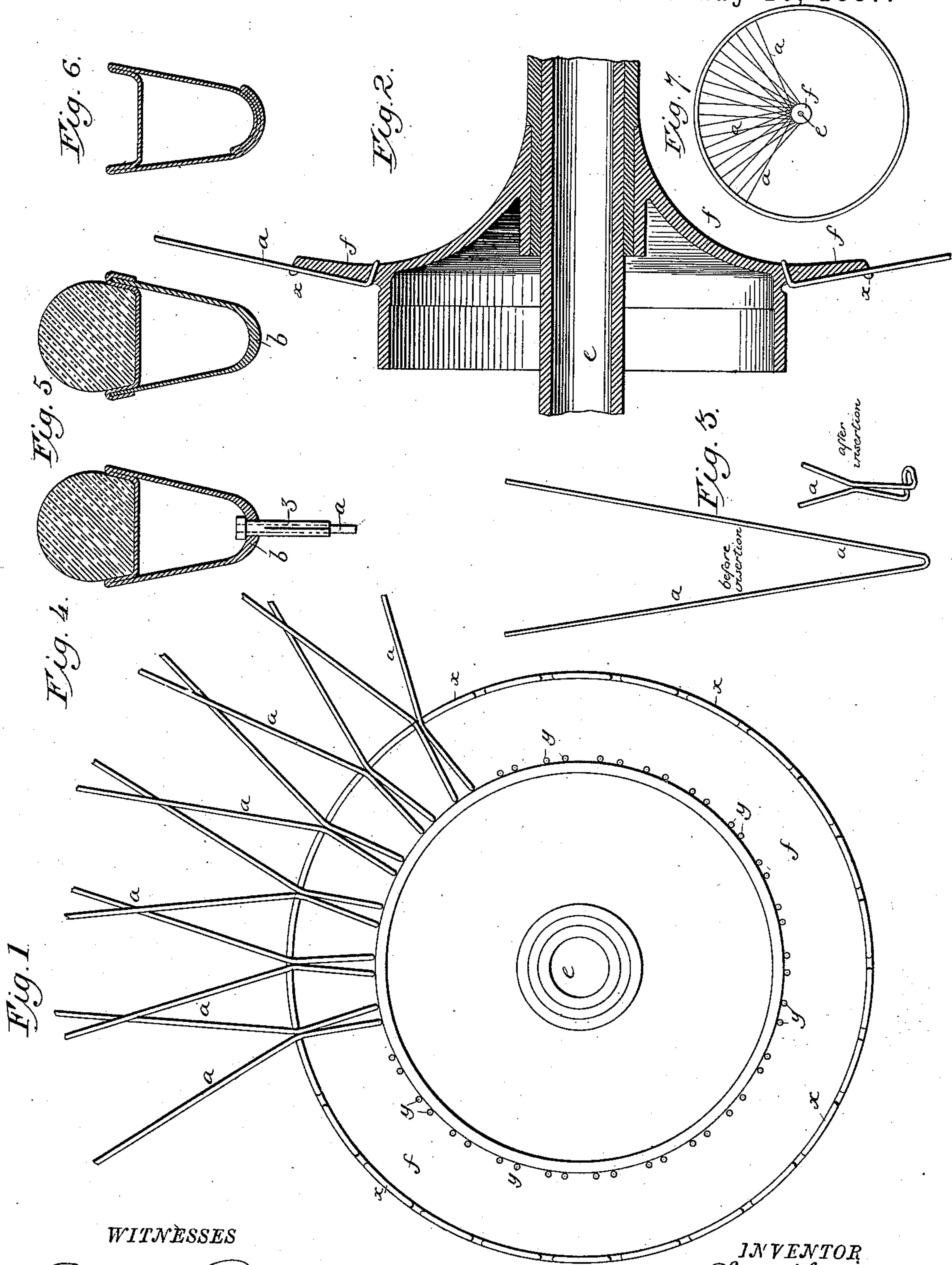


(No Model.)

W. S. KELLEY.
WHEEL FOR BICYCLES.

No. 362,514.

Patented May 10, 1887.



WITNESSES

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WHEEL FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 362,514, dated May 10, 1887.

Application filed June 27, 1885. Serial No. 169,970. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. KELLEY, of Smithville, in the county of Burlington and State of New Jersey, one of the United States of America, have invented certain new and useful Improvements in Wheels for Bicycles, &c., of which the following is a specification.

The aim of this invention is to provide a metallic wheel of the so-called "suspension" type which shall possess the qualities of extreme lightness, durability, and rigidity; and to this end it relates to an improved manner of constructing the hollow rim, to the improved construction of the hub, and to the improved manner of forming and attaching the spokes.

Referring to the accompanying drawings, Figure 1 represents a side elevation of the hub of my improved wheel with a portion of the spokes attached thereto. Fig. 2 represents an axial section through one side of the same. Fig. 3 is a view illustrating the form of the spokes before and after their application to the hub. Figs. 4, 5, and 6 are views illustrating in cross-section my rim in its several forms, equivalents of each other, and the manner of attaching the spokes thereto. Fig. 7 is a side elevation of the wheel as a whole, a portion of the spokes being omitted.

My invention relates to that class of wheels in which a metallic rim or felly provided with a circumferential groove to receive an elastic tire is connected by wire spokes to flanges or hubs fixed on opposite ends of an axle. For the purpose of illustration I have shown my improvements as embodied in a wheel having a tubular axle and side flanges to be driven by a clutch mechanism, as in the so-called "Star" bicycle, now in general use; but it is to be understood that the improvements are applicable without change or modification to those wheels which have propelling-cranks fixed on the extremities of a solid axle.

In constructing my improved wheel I provide a central axle, *e*, having at its two ends annular radial flanges or hubs *f*. The outer or side face of each flange is formed with a peripheral lip, *x*, which is notched at suitable intervals to admit of the spokes being let therein from the outside against the outer face of the flange. The flange is also provided with holes or openings *y* at points between the lip *x* and

the axle. These holes are commonly arranged in pairs, as shown in the drawings—one pair opposite each of the notches in the lip. The spokes *a* are constructed in pairs by bending or doubling a piece of wire at its middle into a V shape, as plainly shown in Fig. 3. In applying them I take a bent wire, representing two spokes, and pass its extremity from the inside outward through two of the holes *y* in the flange or hub, drawing them outward until the inner end of the wire is seated firmly against the inner side of the flange. I then bend the two ends outward past the circumference, seating them in one of the notches of the lip, and snugly against the outer face of the flange, as plainly shown in Figs. 1 and 2, after which their extremities are attached to the rim.

The rim may be of any approved construction and the spokes attached thereto in any proper manner; but I prefer such as shown in Figs. 4, 5, and 6, of a hollow or tubular form, grooved circumferentially in the outer face to receive the tire, and thickened at the inner or base portion to give the required stiffness and to permit of the spokes being the more securely attached. In Fig. 4 the rim consists of a seamless tube having its outer portion pressed inward to form the groove and its inner portion rolled "from the solid," of relatively great thickness, as shown at *b*. In Fig. 5 the thickened inner portion of the rim is rolled from the solid, as in the previous figure; but the outer portion consists of a separate part seamed and pressed or otherwise secured to the inner portion. In the construction shown in Fig. 6 the rim is formed of a seamless tube of uniform thickness, and the inner or base portion given the extra thickness demanded by folding or doubling the metal upon itself.

The essence of my invention as regards the rim consists in giving the base portion an increased thickness, for the purposes stated. One simple and efficient mode of attaching the spokes to the rim is represented in Fig. 4, in which *z* represents a long tubular nut or nipple having an exterior flange at the outer end. This nut is inserted through the inner portion of the rim and screwed upon the outer end of the spoke, being held in position against the strain of the spoke by its flange seated within the rim. The inner end is of angular or other

suitable cross-section, so that it may be turned by a wrench or other tool to tighten or release the spoke without removing the rubber tire.

Having thus described my invention, what I claim is—

1. In a suspension-wheel having the flanged hub, the combination, with said hub, of the spokes formed in pairs by bending wire to a U shape, said spokes being passed through the hub from one and the same side and extending on the opposite side to the rim.
2. In a suspension wheel, the rim and the flanged hub, combined with wire spokes formed in pairs by bending wire to a U shape, the two ends of each wire being inserted through the flange from one side and extended on the opposite side outward to the rim in divergent lines without crossing each other.
3. In a suspension-wheel, the rim and the flanged hub, combined with wire spokes formed in pairs, as described, said spokes inserted through the hub from one side and extended thence to the rim, each wire having its two spokes crossed upon the other spokes without crossing each other, as described.
4. In a wheel for a bicycle or tricycle, spokes constructed of wire bent into a U form having their middle portion passed through separate holes in the hub and its ends or arms reunited

at a point outside of said holes and then extended in different lines to the rim of the wheel.

5. The hub having the openings *y*, arranged in pairs, and the notched flange *x*, in combination with the U-shaped spokes inserted through the openings and extended thence outward through the notches.

6. The hollow rim having the thickened base portion, substantially as described.

7. The hollow rim having the flat-bottomed groove in its outer face and the thickened base or inner surface, as described.

8. In combination with a hub having a radial flange with spoke-receiving notches or guides at the periphery, a series of wire spokes extending inward through said notches or guides along the side face of the flange and projected at the inner end through said flange, substantially as described.

9. In a bicycle-wheel, the hollow rim having a thickened or re-enforced portion on the line of its attachment to the spokes.

10. In a bicycle-wheel, a hollow rim having a flat tread located within and bracing its opposite walls.

WILLIAM S. KELLEY.

In presence of—

PHILIP T. DODGE,

WILLIAM H. SHIPLEY.