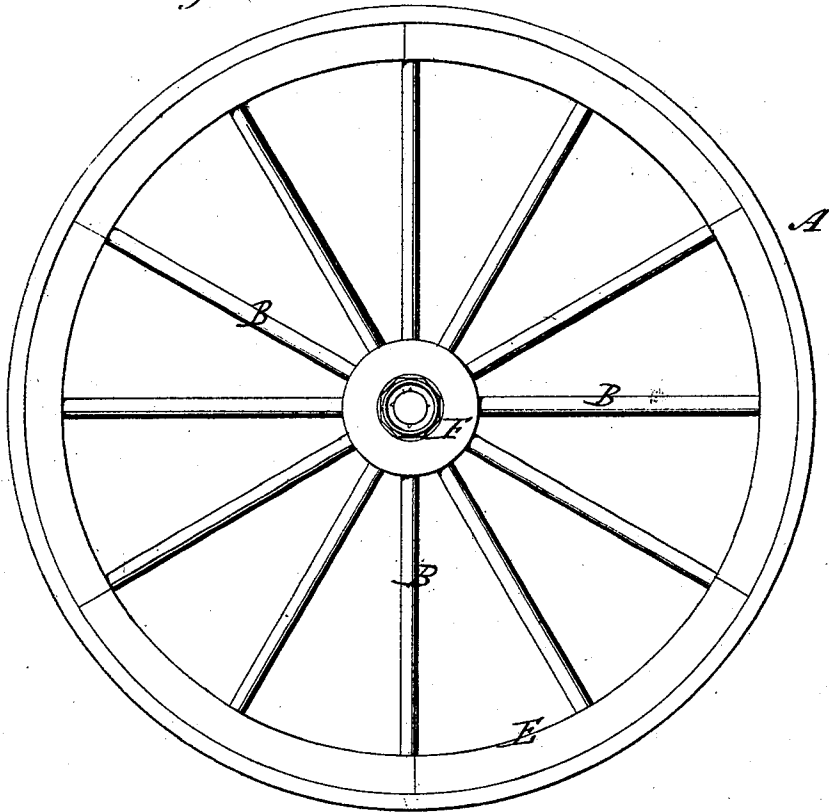


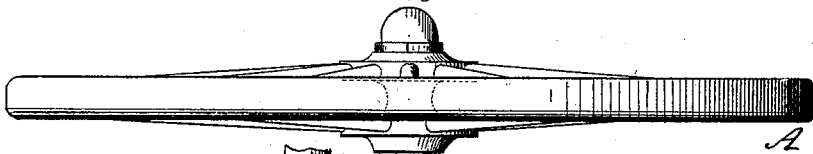
I. F. MUNSON.  
WHEEL FOR VEHICLES.

No. 102,853. *Fig. 1.*

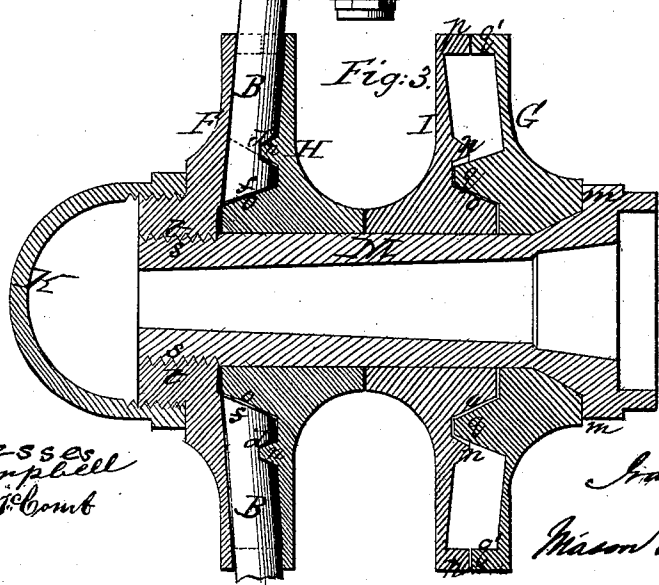
Patented May 10, 1870.



*Fig. 2.*



*Fig. 3.*



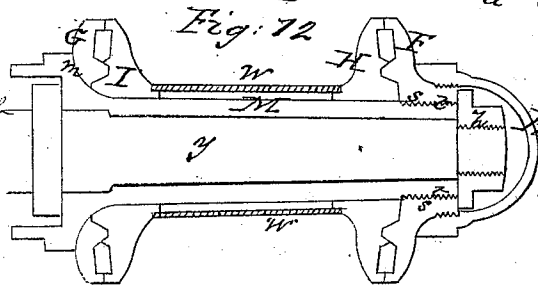
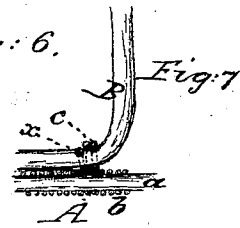
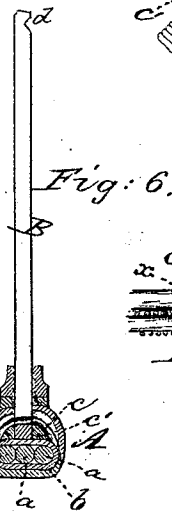
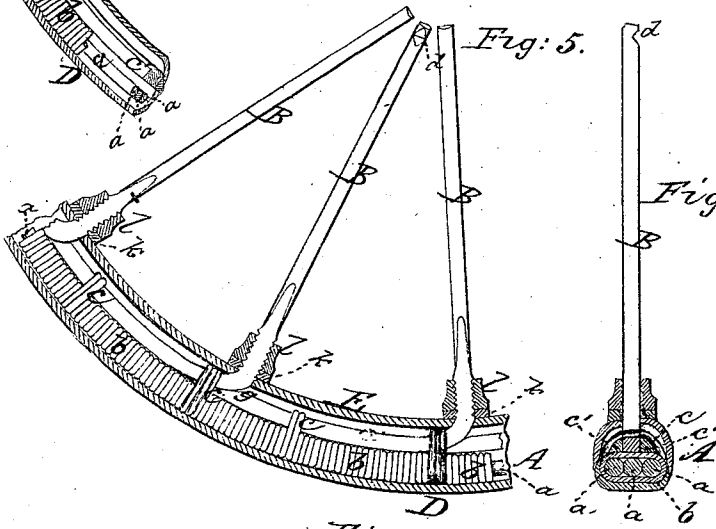
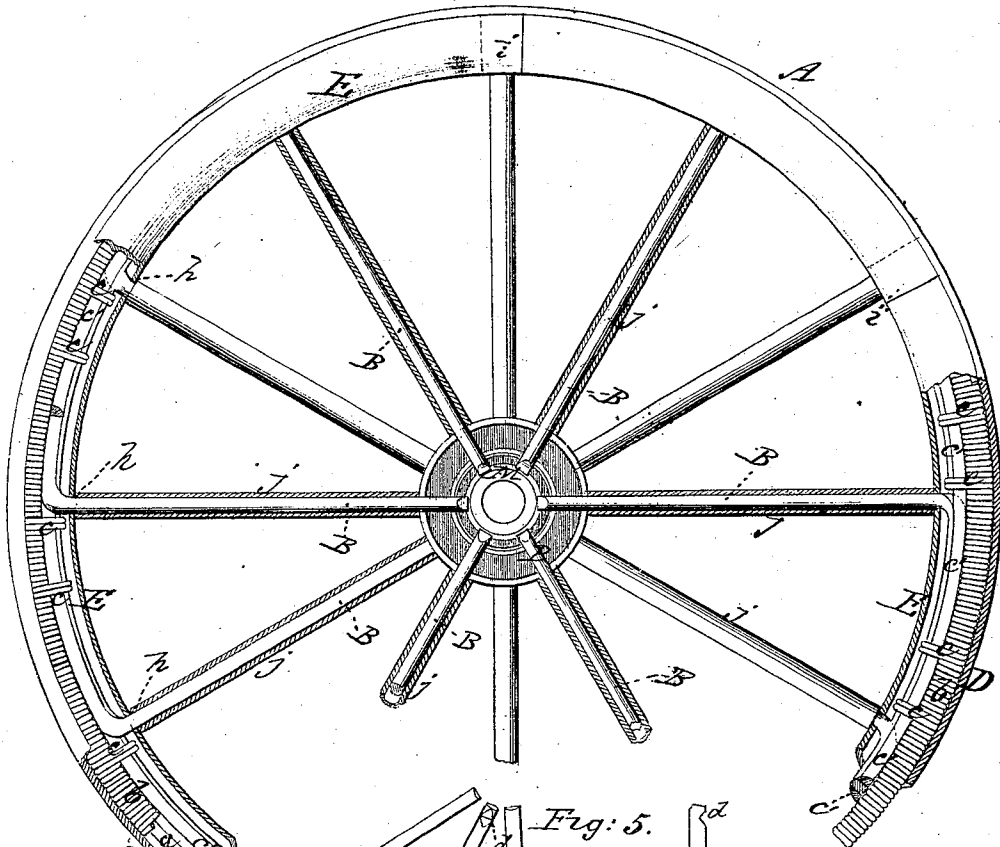
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*J. N. Campbell*  
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*by*  
*Mason Sawicki*

I. F. MUNSON.  
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No. 102,853.

Fig: 4. Patented May 10, 1870.



Witnesses  
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# United States Patent Office.

IRA F. MUNSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

Letters Patent No. 102,853, dated May 10, 1870.

## IMPROVED WHEEL FOR VEHICLES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, IRA F. MUNSON, of Washington city, District of Columbia, have invented a new and useful Improvement in Wheels for Carriages and other Vehicles; and I do hereby declare that the following is a description of the same, with the accompanying drawings, in which—

Figure 1 is a side view, and

Figure 2, an edge view of my wheel.

Figure 3 is a sectional view of a portion of the wheel.

Figure 4 is a front view, showing part of the wheel broken away, and parts of it in elevation and in section.

Figure 5 is a sectional view of a part of the wheel, slightly modified by applying retaining and jam-nuts to the spokes.

Figure 6 is a section of the portion of wheel shown in fig. 5.

Figure 7 is also a section of the same portion.

Figure 8 is a cross-section of the wheel shown in fig. 4, plate 2, in the line  $x x$ .

Figure 9 is an elevation of one of the spokes.

Figures 10 and 11 are views showing the inner matching faces of the hub-plates.

Figure 12 is a sectional view, showing a slight modification of the hub, by separating the pairs of matching-plates with a short tube. This view illustrates the manner in which the hub is confined to the axle.

The same letters of reference in the several figures indicate corresponding parts.

The object sought by my invention is to overcome the serious objection to all spoked wheels, whether the same are composed partly of iron and wood or of wood entirely, viz., unequal shrinkage in the parts, and, while I have aimed to attain nearly a uniform expansion and contraction of the different parts, I have also obviated a serious objection to all spoked wheels which are composed wholly of iron, viz., weakness at the points of junction between the spokes and the felloes or rim, and great weight in the wheel; and, further, in aiming to overcome the last-named defects in iron wheels, I have secured not only the object desired, viz., lightness and great strength, but also a sufficient degree of flexibility, and also facility for tightening up the spokes, rim, and hub of the wheel; and, withal, I have produced a wheel which may be manufactured in a cheap and expeditious manner, and of which, parts, for the repair thereof, may be kept on sale by the trade, so that, at very slight cost and trouble, any part of the wheel, which in time shall have become impaired, may be renewed.

The nature of my invention consists—

First, in a new felloe or rim.

Second, in a new spoke.

Third, in a new mode of uniting the spokes and the rim.

Fourth, in a mode of preventing lateral deflections of the outer portion of the spokes.

Fifth, in a new mode of applying the tire.

Sixth, in a sheathing for the inner circumference of the rim.

Seventh, in retaining-nuts and jam-nuts, or the equivalent thereof, for fastening the said sheathing or covering in position.

Eighth, in hollow auxiliary spokes, inclosing a portion of the main spokes.

Ninth, in spoke-clamping hub-plates, screw-tapped, and screwing directly upon an external thread of the axle-box, for the purpose of clamping a set of spokes between itself and a fellow plate, which is not screw-tapped, but is fitted loosely on the axle-box, so as to bear, either directly or indirectly, against another pair of such plates, which, also, are not screw-tapped, but fitted to abut against a shoulder of the axle-box.

Tenth, in a peculiar formation of the inner faces of the clamping-plates and of the inner ends of the spokes, whereby the spokes are forced home outwardly, and at the same time held in position.

To enable others skilled in the art to make and use my invention, I will proceed to describe one practical mode of making it.

To make the rim or felloe A, I take steel wire, of, say about No. 10, wire-gauge, and bend it into a circle, carrying it around helically two or more times, or, if preferred, I make a nest of wire circles or rings, welding the ends of each together, and placing these rings side by side one another, the same as when wound helically.

The nest of wires  $a a a$  thus formed is bound together laterally, by being snugly wrapped with fine wires  $b$ , say of about No. 16, wire-gauge; this wire being carried around helically, and made to bind the nest of larger wires firmly, at all points, except at proper intervals where binding-loops  $c c$  are formed for receiving the outer portions of the spokes and the wires  $c c$ , between which said outer curved portions of the spokes lie, and by which they are kept from lateral movement.

I may, in some cases, use only one bar of steel,  $a$ , and wrap it with wire,  $b$ . I, however, prefer the nest of wires wrapped.

The spokes B are made of steel wire, bent so as to form nearly a right angle at the point where they adjoin the rim, as shown in fig. 9.

The radial part of the spoke has a V-shaped notch,  $d$ , formed in its circumference, so as to fit a similar rib,  $n$ , on the inner face of each of the hub-plates H I, and the inner end or terminus of said part of the

spoke is beveled, as at *f*, so as to match a beveled shoulder, *o*, or abutment, also formed on the said hub-plate.

The circular portion of the spoke is beveled or chamfered off, as at *g*, so as to wedge under the angle of a felloe spoke, where the parts of the wheel are put together.

The wires *c c*, which form the channel or groove on the inner circumference of the felloe or rim, are nearly in the form of a triangle, but the outer side is curved, as shown. These wires are bent into the form of a ring, but their meeting ends are not united, and are inserted through the loops of the rim or felloe, or I may, in some instances, dispense with these wires, but prefer to use them as shown.

The tire *D* is formed of a flat bar of steel, which is grooved or channeled on its inner side in the manner shown in the drawing, fig. 8. The channel or groove is slightly concave, so that, when the tire is shrunk upon the rim, a bearing contact shall only be maintained at the edges or corners of said rim, and a space, *g*<sup>1</sup>, (see fig. 8,) shall exist between the tire and the rim between these corners.

By concaving the tire, a side, as well as a peripheral hold upon the rim, and at the same time great strength in the tire to resist vertical pressure, are secured.

The sheathing *E* is, in the transverse section, in the form of an arch, corresponding to the inner circumference of the rim, and attachments thereto, and is made of sheet metal, and in segments of a little greater length than the longest distance between every pair of spokes.

Midway between the ends of each of the segments a hole is cut through the sheathing corresponding to the size of a spoke, and at each end of the segmental pieces an open oblong slot, *i*, is cut. All of these segments, except the last, are applied after the curved outer ends of the spokes are inserted in their channel, and through the loops, by slipping them over every alternate radial part of the spokes before the clamping-plates of the hub are brought into position.

In order to have the segmental pieces overlap one another, it is necessary to make the sheathing segments a little longer than segments of the rim.

The last sheathing segments may be applied by dividing it into two parts, longitudinally, or in any other convenient practical manner.

To hold the sheathing in place, I employ auxiliary tubular spokes *j j*, applied around the main spokes, and between the hub and sheathing, as shown in fig. 4. These are slipped over the radial parts of the spokes before the hub-plates are adjusted to their position.

These auxiliary spokes give great strength, with lightness, and also a finish.

Instead of using these auxiliary spokes, I may use retaining-nuts *k k* and jam-nuts *l l*, or, if desired and practical, I may use nuts and washers without jam-nuts.

The hub of the wheel is composed of four cast-metal plates *F G H I*, fitted on a cast-metal box *M*, which is constructed with an abutting shoulder *m*.

The inner faces of two of these plates, *H I*, are formed with a V-shaped rib, *n*, a beveled shoulder, *o*, and a rib, *p*, with semicircular recesses *p' p'* in it, while the other two plates are formed with ribs *q q'* and semicircular recesses *r r'* in it, as represented in figs. 3, 10, and 11.

The shoulders between the recesses *r' r'* serve to aid the shoulders between the recesses *r r* in preventing the spokes from shifting laterally in the hub, while

the rib *n* prevents the spokes from slipping in or out after they have been forced home. The bevel *o*, acting on the beveled end *f* of the spokes, causes the forcing home of the same when the hub-plates are screwed up.

The three plates *G H I* are loose on the box *M*, while the other plate *F* is screw-tapped, as at *t*, and screws upon a thread, *s*, formed on the outer end of the box.

It is apparent that, if the ends of the spokes are placed in between the plates, and the screw-tapped plate screwed home, the whole set of plates and spokes will be bound firmly together.

*K* is a cap, screwing on the end of the screw-tapped hub-plate. This cap covers the end of the axle *y* and the nut *z* thereon.

The spokes are arranged in the hub and in the rim so as to stand oblique to a vertical line, and the obliquity of one set of spokes is the converse of that of the other set.

In some cases it may be desirable to use a long hub, and, in order to avoid weight, I propose to employ a light tube, *w*, between each pair of hub-plates, as shown in fig. 12.

In putting the wheel together, it is deemed best to have the loops *c* come quite close to the angle or bend of the spokes, so as to sustain the strain at that point.

Any required number of loops may be employed between each pair of spokes, and, to prevent slipping of the curved parts of the spokes, one or more of the wires of the loops may, if found necessary, be let down into a notch, *x*, formed in said parts of the spokes, as shown in fig. 7.

The loops may be formed separate from the wrapping wire *b*, if desired, but I prefer the mode shown.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The rim or felloe *A*, constructed substantially on the principle set forth.

2. The spokes *B*, constructed substantially as described.

3. The loops *c*, for holding the outer portion of the spokes in place, substantially as described.

4. The wire or bars *c c*, forming the groove for the outer portion of the spokes, in combination with the loops *c*, substantially as described.

5. The tire, constructed and applied so that the space *g* is left between the rim or felloe and the tire, substantially as described.

6. The sheathing, made in segments, in combination with the continuous metal rim or felloe, the sheathing and rim or felloe being constructed substantially as described.

7. The combination of the continuous felloe or rim *A*, segmental sheathing *E*, and retaining nuts, or retaining and jam-nuts, or the equivalent of the said nuts, substantially as and for the purpose described.

8. The auxiliary tubular spokes *T*, in combination with main spokes, substantially as described.

9. The screw-tapped plate *F t*, in combination with the screw-tapped box *M s* and sliding plates *G H I*, substantially as described.

10. The combination of the bevels *f o* with the rib *n* and notch *d* and notched rib *q*, in the construction of the hub-plates, substantially as described.

IRA F. MUNSON.

Witnesses:

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EDM. F. BROWN.