

S. P. Smith. Sheet 1, 5 Sheets.
Car Wheel.

Nº 28,512. Patented May 29, 1860.

Fig. 1.

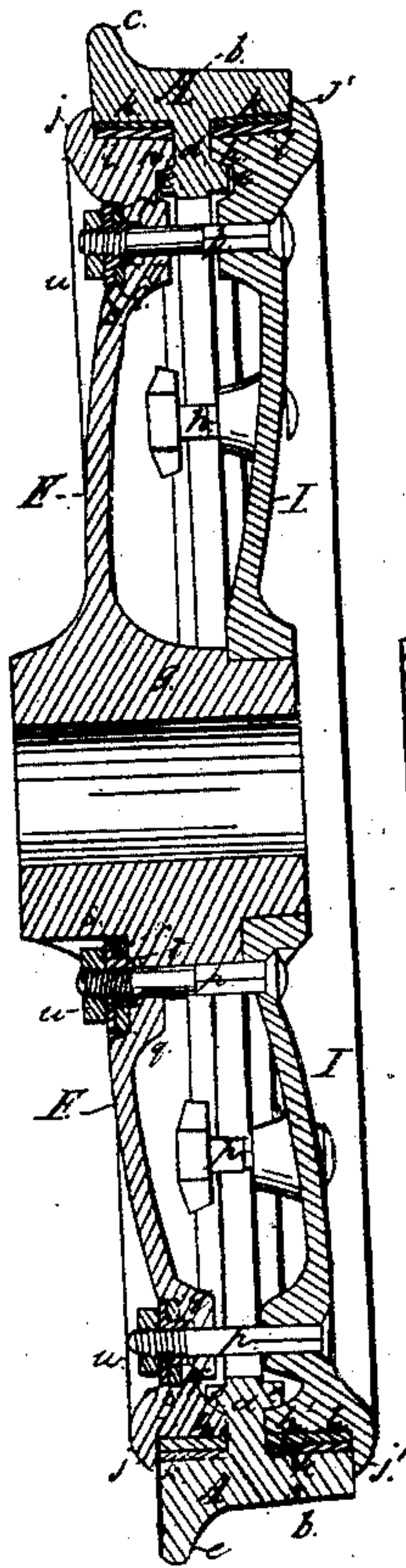
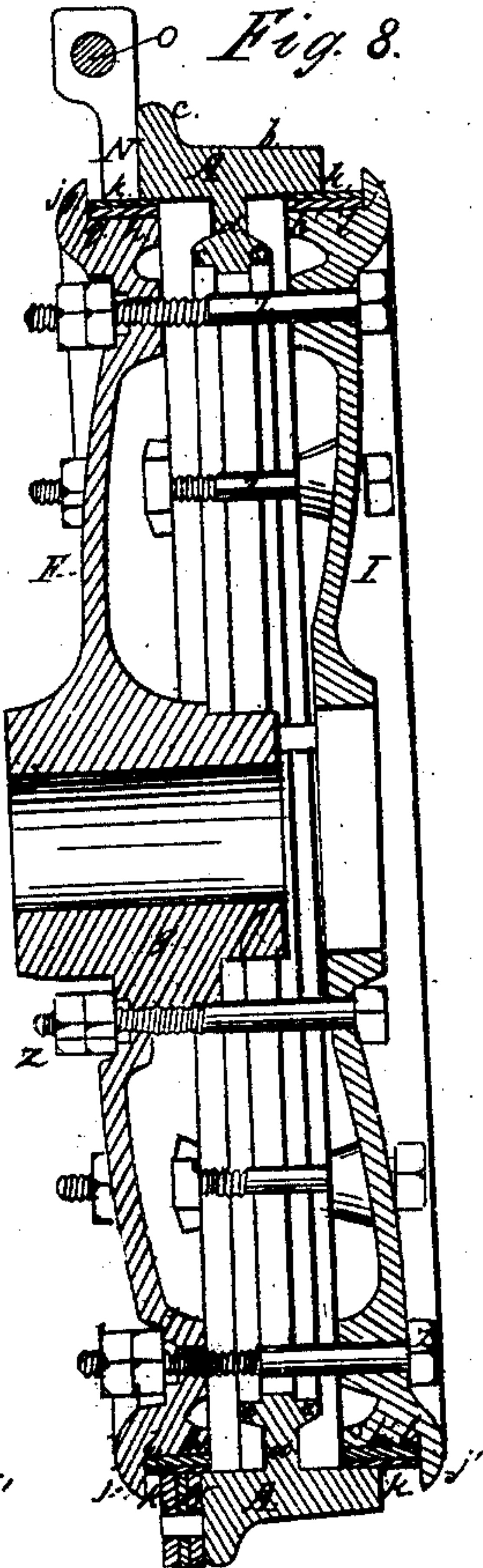


Fig. 8.



Witnesses.
D. L. O'Brien
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Inventor.
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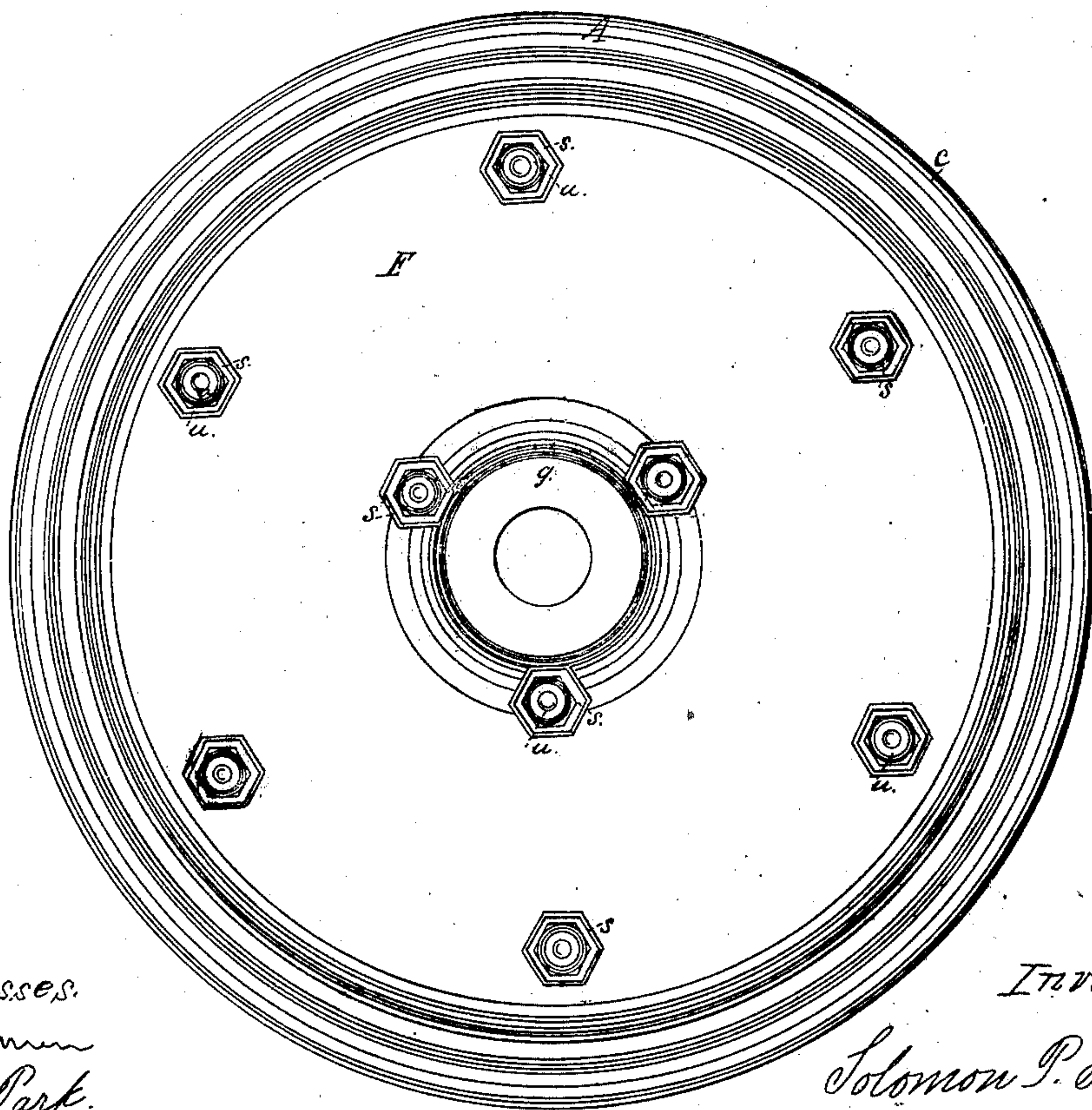
S. P. Smith. Sheet 2, of 3 Sheets.

Car Wheel.

N^o 28,512.

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Fig. 2.



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S. P. Smith. Sheet 3, 5 Sheets.

Car Wheel.

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S. P. Smith. Sheet 4.5 Sheets.
Car Wheel.

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Fig. 4.

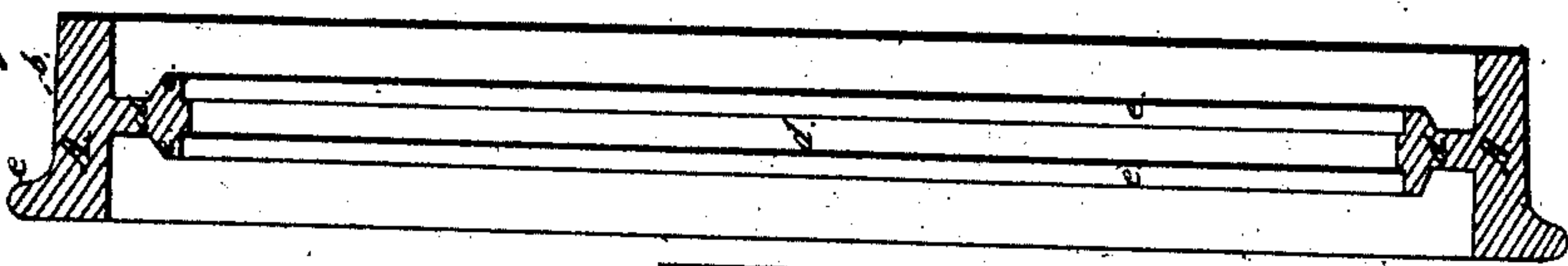


Fig. 7.

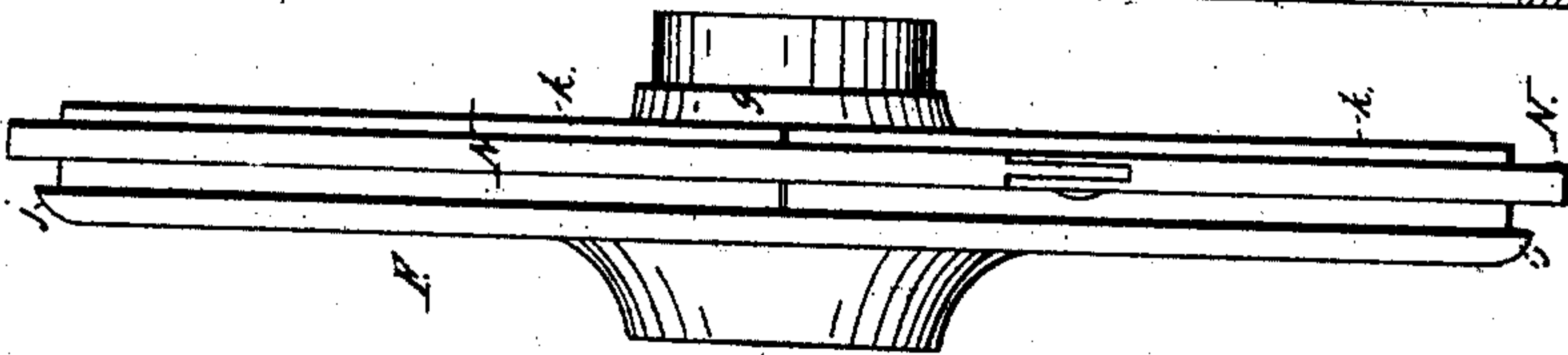
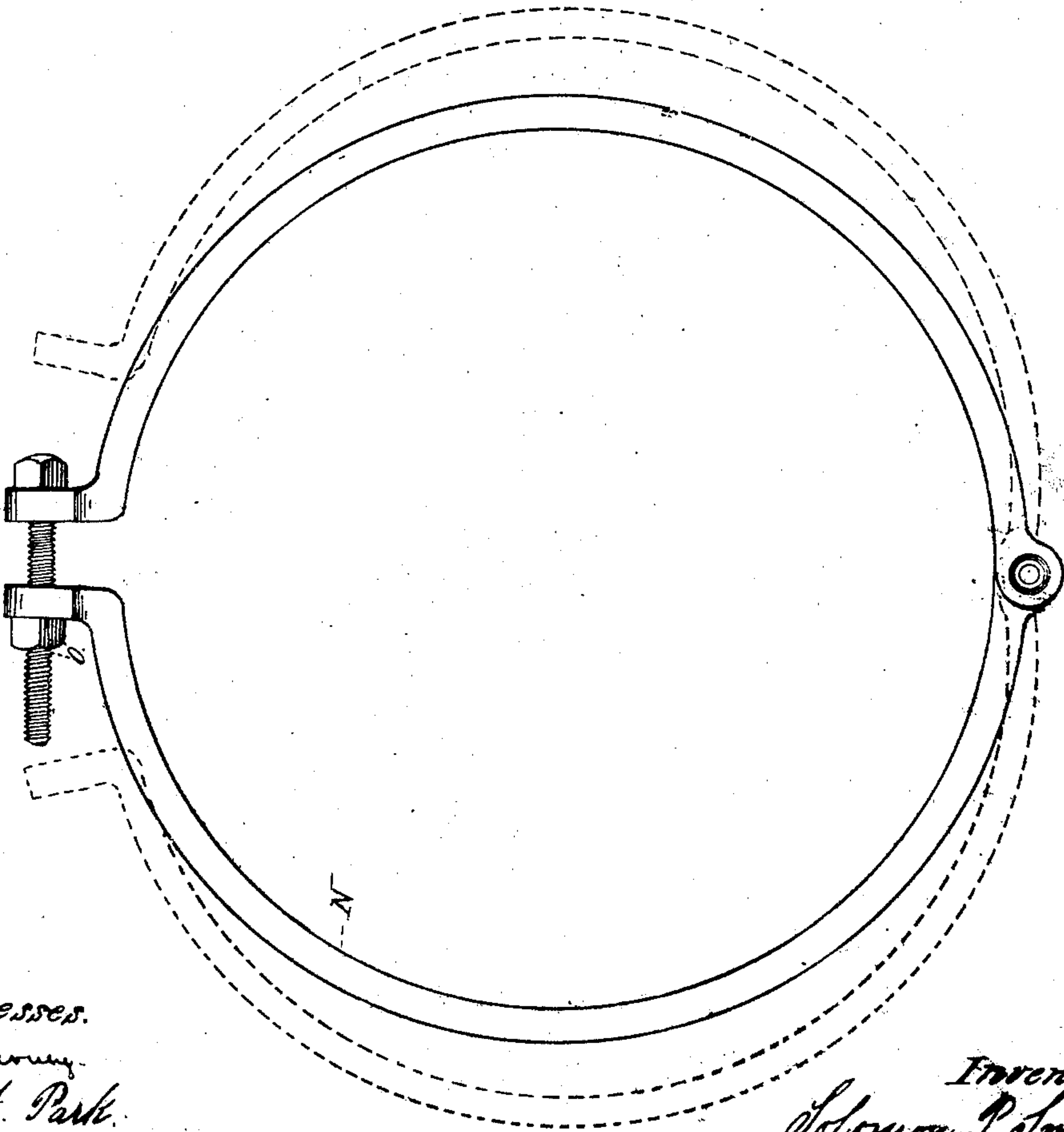


Fig. 6.



Witnesses.

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A. F. Park.

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This invention is not in print.

S. P. Smith. Sheet 5, 5 Sheets.
Car Wheel.

No 28,512.

Patented May 29, 1860.

Fig: 10.

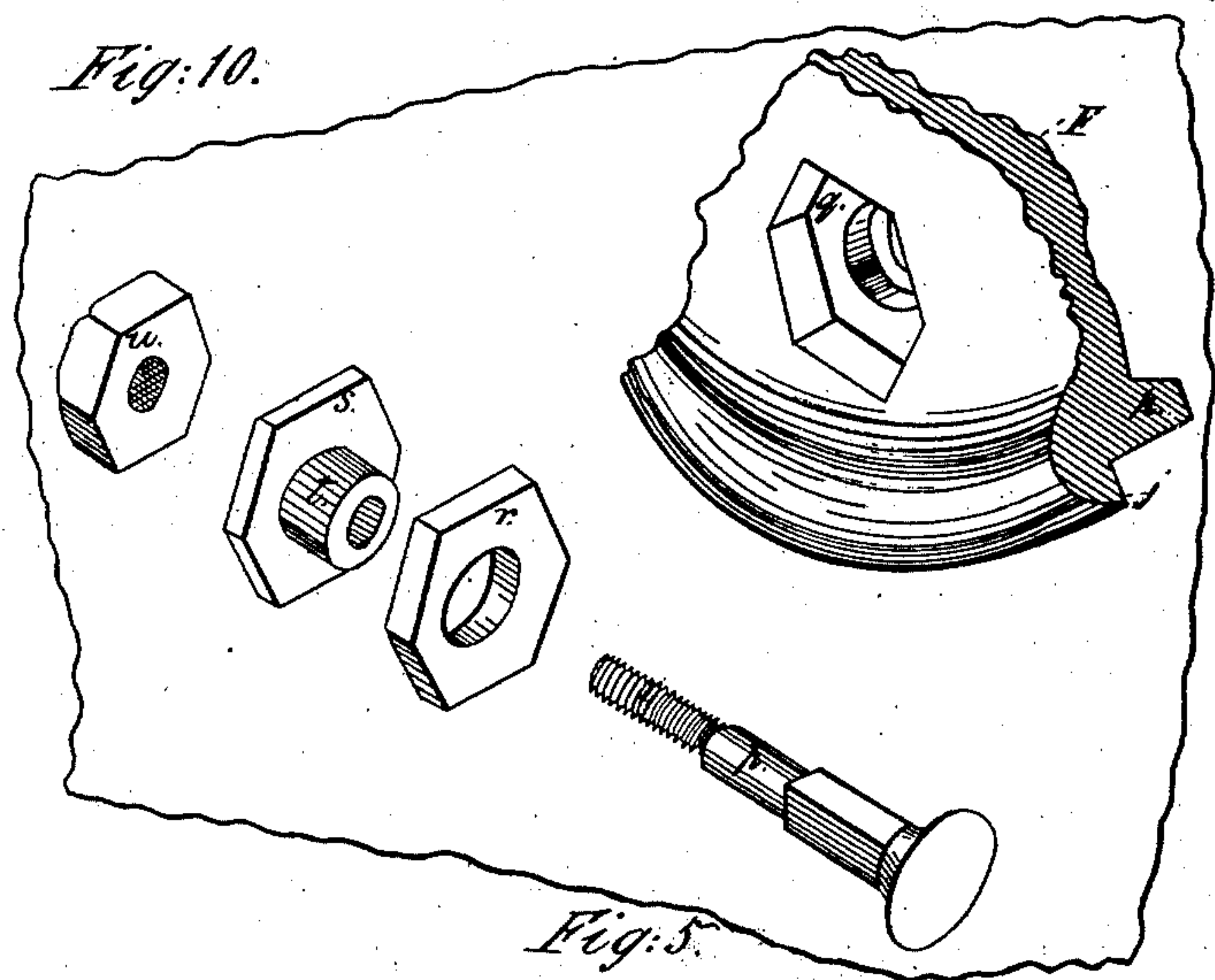
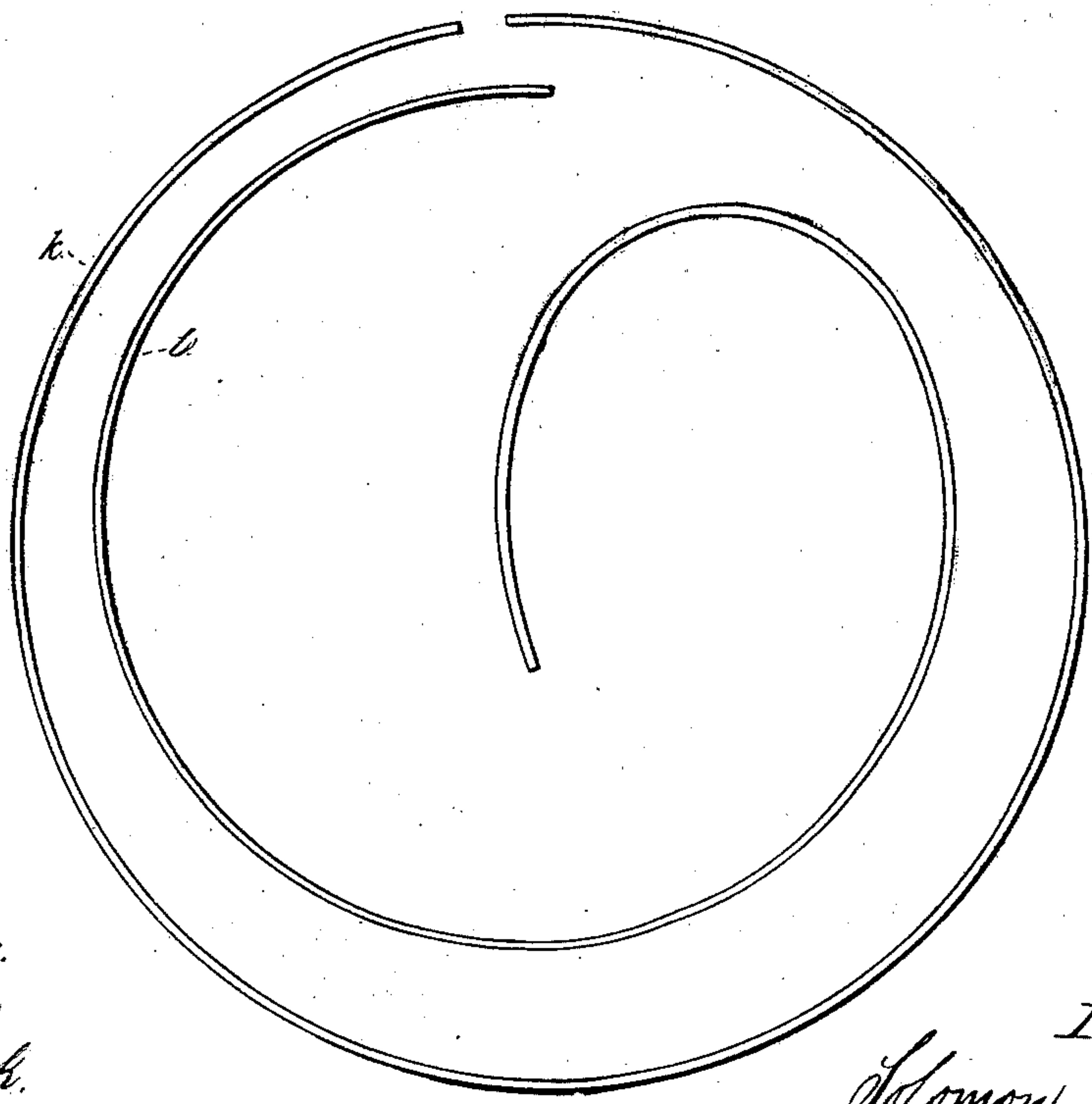


Fig: 5.



Witnesses.
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UNITED STATES PATENT OFFICE.

SOLOMON P. SMITH, OF TROY, NEW YORK.

CAR-WHEEL.

Specification forming part of Letters Patent No. 28,512, dated May 29, 1860; Reissued February 13, 1872, Nos. 4,760 and 4,761.

To all whom it may concern:

Be it known that I, SOLOMON P. SMITH, of the city, of Troy, in the county of Rensselaer and State of New York, formerly of the village of Crescent, in the county of Saratoga, in the aforesaid State, have invented certain new and useful improvements in the construction of such compound iron car-wheels as have the rim supported or held in place by separable disks or plates secured together by bolts passing through perforations therein; and I do hereby declare that the following contains a full and exact description of my invention, reference being had to the annexed drawings, which make a part of this specification, and in which—

Figure 1 is a vertical section of one of my improved wheels in the plane of its axis; Fig. 2 an elevation of one side of the wheel; Fig. 3 an elevation of one side with the front-plate removed; Fig. 4 a diametrical section of the rim; Fig. 5 an edge view of the parts of a compound band-packing that is inserted between the rim and the parts which support it; Fig. 6 a side view of a clamp-ring for compressing the band-packing upon the side-plates before they are inserted in the rim; Fig. 7 an edge elevation of a side-plate with the band-packing and clamp-ring applied thereto; Fig. 8 a diametrical section showing the plates partly inserted in the rim; and Fig. 9 is a section and Fig. 10 detached projections on a larger scale than the other drawings, of a set of the parts by which the plates and rim are secured together.

The same letters of reference indicate like parts in all the figures.—

One part of my invention consists in shaping and uniting together the rim and plates of a car-wheel as follows, to wit: A is the rim which has a tread, *b*, and a flange *c*, of the ordinary or any suitable form. The rim has, at or near the middle of its inner side, an annular rib, *d*, that projects inward. The inner surface of the rim on each side of the rib *d*, is cylindrical, or a little flaring, and concentric with the tread.

F is a disk which has a hub, *g*, at its center, to receive the axle, and, around its circumference, has a collar or shoulder, *h*, which extends under and supports one side of the rim to the rib *d*. I is another disk which also has around its circumference a

collars or shoulder *h'*, which likewise extends under and supports the other side of the rim to the rib *d*. The disk I fits upon the hub *g* as seen in Fig. 1, or it may have a part of the hub formed with it, and be fitted on the axle, or it may fit upon an annular projection or shoulder on the inner side of the disk F between its hub *g* and shoulder *h*. The disks, F, I, have continuous flanges, *j*, *j'*, projecting radially beyond the outer surface of the shoulders *h*, *h'*, and to, or nearly to, or beyond the inner surface of the rim. The rim, A, is made of cast-iron, with a chilled tread, or of wrought iron, malleable cast iron, or steel; and the disks or plates, F, I, are made of either cast iron, wrought iron, malleable cast iron, or steel, as may be required, and are either made straight, dished, waved, with spokes, or of any other suitable form.

I insert between the inner surface of the rim and the outer surface of the shoulders *h*, *h'*, of the disks, a compressed, compound band-packing, composed of an outer flat band, *k*, of wrought iron, steel, or any other suitable hard and tough material, and an inner fillet, *l*, of vulcanized india rubber or any other suitable yielding and elastic packing substance. Those packings are first put around the shoulders *h*, *h'*, of the disks, with one edge next to the flanges *j*, *j'*, and are forcibly compressed thereon before the rim is or can be put on over the packings. To effect the compression of the packings on the disks I employ a powerful clamp of any suitable form and construction. The clamp may consist of a stout iron ring, N, about half as wide as the packing, *l*, and having a tangent-screw, *o*, in it by which the ring may be powerfully contracted. The clamp is put around the packing on the shoulder, as shown in Fig. 7, and then contracted until the packing is so compressed that it will not yield materially under the ordinary weight or pressure to which it is to be submitted when the wheel is in use. At this degree of compression of the packing, the rim can be and is just pressed tightly on over the packings, by means of temporary screw-bolts, *z*, Fig. 8, or by the use of any other suitable pressing contrivance, the clamp ring being loosened and removed during the latter part of the operation, in case the flanges *j*, *j'*, prevent it from being slid off over them.

The flanges j, j' , serve to keep the packings k, l from sliding off from the shoulders h, h' while being pressed into the rim. The rib d is made either with or without any flanges e, e , on its sides; and extends inward any desired distance beyond the inner edges of the packings l, l . When the disks, F, I , and rim, A , are thus shaped and put together with the ring-packings k, l , they are secured in place by any suitable number and kind of bolts, p , put through holes in the disks and tightened upon them.

By the above described construction, which constitutes one part of my invention, certain important advantages are secured. The rib d , at or near the middle of the inner surface of the rim, not only directly strengthens the rim, but may also furnish bearings for the inner edges of the shoulders h, h' so that the flanges j, j' of the disks may be thereby relieved, to a greater or less degree, of the lateral strains of side concussions against the rim; and by merely having continuous flanges, e, e , on the sides of the rib d , just within the collars h, h' , of the disks, as in Fig. 1, the rim will be thereby secured to the wheel even though the rim should become broken transversely into sections while running. By powerfully compressing the india rubber or other yielding and elastic packings, l, l , on the shoulders h, h' , and inserting the packings when thus compressed, as above described, the packings may be and are left so condensed in the wheel that they will, not only equalize the pressure on the inner surface of the rim, and stop vibrations in the rim, and prevent them from extending through the disks and axle; but will, by their elastic pressure outward, prevent the rim from being sprung inward and broken, and the shoulders h, h' , from sinking into and thereby soon wearing out or breaking up the packings, under the ordinary heavy concussions to which the wheel is subject in use. By having the packings, l, l , inclosed on all sides, as above described and represented in the annexed drawings, no parts of those packings can work out so as to leave the rim loose. By having the surfaces between which the packings, k, l , are held compressed, parallel or nearly so to the axis of the wheel, neither the elastic pressure of the packing itself, nor the weight of the car upon the packings, will materially tend to force the rim and disks apart sideways. By having bands, k , of iron or some other hard and tough material, around the soft packings l , those packings are readily compressed and the rim and disks easily put together and taken apart without destroying the packings. By inserting two sets of packings, one on each side of the rim, the packings may be more easily compressed and inserted than if all the packing was introduced from on one side of the rim as has

been the case in car-wheels heretofore made, or proposed, with a packing composed of an inner india-rubber fillet and an outer metallic band inserted between the rim and the supporting-disk.

In compound iron car wheels which have the parts held together by a series of bolts, it is very important that there should be india-rubber or some other soft and elastic packings, r , between the screw-nuts, u , (or the keys or whatever other equivalent devices may be employed to tighten the holding bolts p ,) and the plate F , (or whatever part of the wheel the tightening devices of the holding-bolts may bear against), in order, to prevent the tightening devices of the bolts from being soon worked loose by the jarrings to which the wheel is subject in use; and, to prevent the bolts from being broken or stretched and weakened by the expansions, or the outward pressure in use, of the parts held together by the bolts; and to equalize, or distribute to several of the holding bolts, the strains which result from side concussions of the wheel while running, and which would otherwise be sustained by only one or two of the bolts. But although I believe that I first arranged packings of india-rubber between the nuts of the holding-bolts of a compound car-wheel and the parts held together by the bolts; yet that feature alone does not constitute any part of my invention herein claimed and is not sufficient to secure the full practical value of those packings for the purposes above mentioned. For, when the india-rubber packings r are left open or exposed around their edges or peripheries, the packings will in such cases, upon running the wheel, soon become squeezed and worked out of place so as to leave too little elastic pressure on the nuts; and when the india-rubber packings are allowed to come in contact with the holding bolts themselves, the packings are then so squeezed against and stuck fast to the bolts that it is then difficult to remove the bolts in repairing the wheel, and that the bolts cannot be taken out of the wheel without injuring or destroying the packings in the operation.

The second part of my invention consists in inclosing the india-rubber or other soft and elastic packing, r , (when placed between the screw-nut u or any equivalent tightening-device of a holding-bolt p , and the plate F or whatever part of the wheel the tightening device of the holding-bolt bears against,) by means of a combination of a collar or sleeve, t , which loosely surrounds the holding-bolt between the packing and the bolt, a washer or follower, s , arranged between the packing and the tightening device of the holding-bolt, and a ring closely surrounding the packing, or, the sides of a recess, q , in which the packing is placed; all

the parts being so formed, and arranged and fitted together, substantially as represented in the annexed drawings, that while the packing is left free to be compressed to any
 5 required degree by the holding bolt, no part of the packing can be squeezed or worked out of place so as to leave too little elastic pressure against the tightening device of the holding bolt, nor be pressed in
 10 contact with the holding bolt so as to interfere with the free removal of the latter, or render it necessary to injure or destroy the packing, or to in any manner disturb the packing or any of the parts by which it is
 15 inclosed, in taking out the bolt upon repairing the wheel.

I do not claim countersinking either the heads, or the tightening devices, of the bolts which hold the parts of a compound car-
 20 wheel together; and it is not even essential to any part of my invention that either the heads, or the tightening devices of the holding bolts should be countersunk. Neither
 25 do I herein broadly claim interposing india-rubber or any other elastic packings between the tightening devices of the holding bolts and the parts of the wheel which are held together by the bolts.

What I claim as new, and of my invention in the construction of compound car- 30 wheels, and desire to secure by Letters Patent is—

1. Making the inner side of the rim A, with a continuous mid-rib, *d*, and a cylindrical or slightly flaring surface at each side 35 of the rib, and the peripheries of the supporting-disks, F, I, with shoulders, *h*, *h'*, and flanges, *j*, *j'*, as and for the purposes herein set forth, the said rim and disks being united together by means of compound 40 band-packings, *k* *l*, *k' l'*, in the manner herein described.

2. Including the elastic packing *r*, when placed between the tightening device of the holding-bolt and the body of the wheel, by 45 means of a ring or recess, *q*, follower, *s*, and collar, *t*, all constructed and arranged together, as above described, so that while the packing is left free to be compressed to any required degree, no part of the packing can 50 be squeezed or worked out of place nor pressed in contact with the holding bolt.

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Witnesses:

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A. F. PARK.