

(No Model.)

2 Sheets—Sheet 1.

H. F. HAMMON.  
WHEEL FOR VEHICLES.

No. 574,538.

Patented Jan. 5, 1897.

Fig. 1.

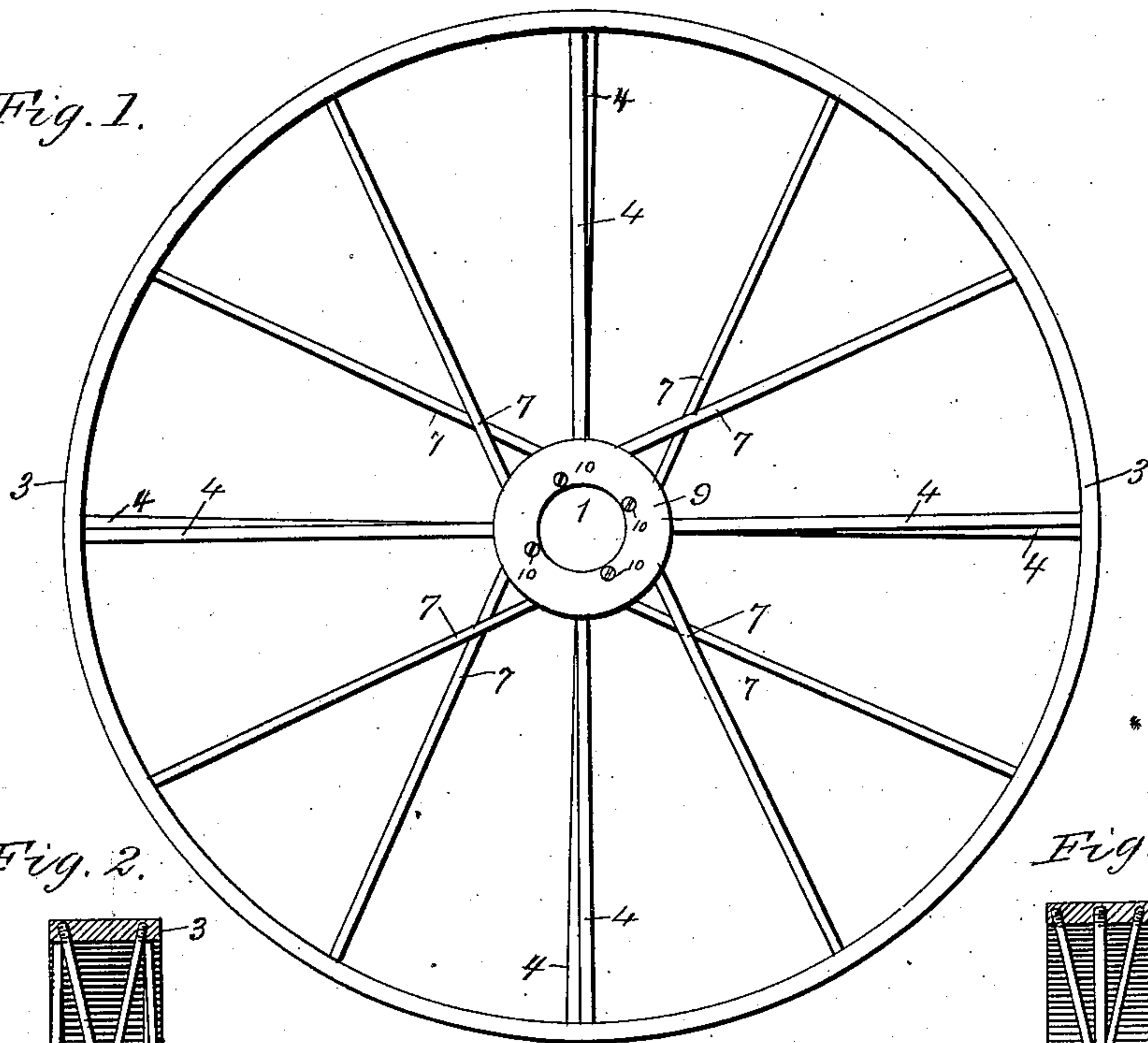


Fig. 2.

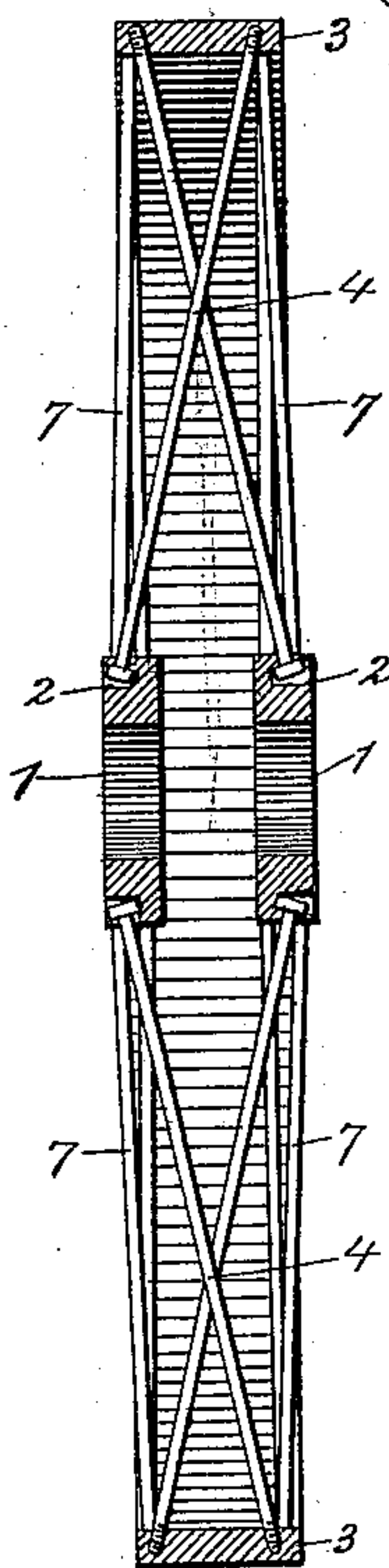


Fig. 4.

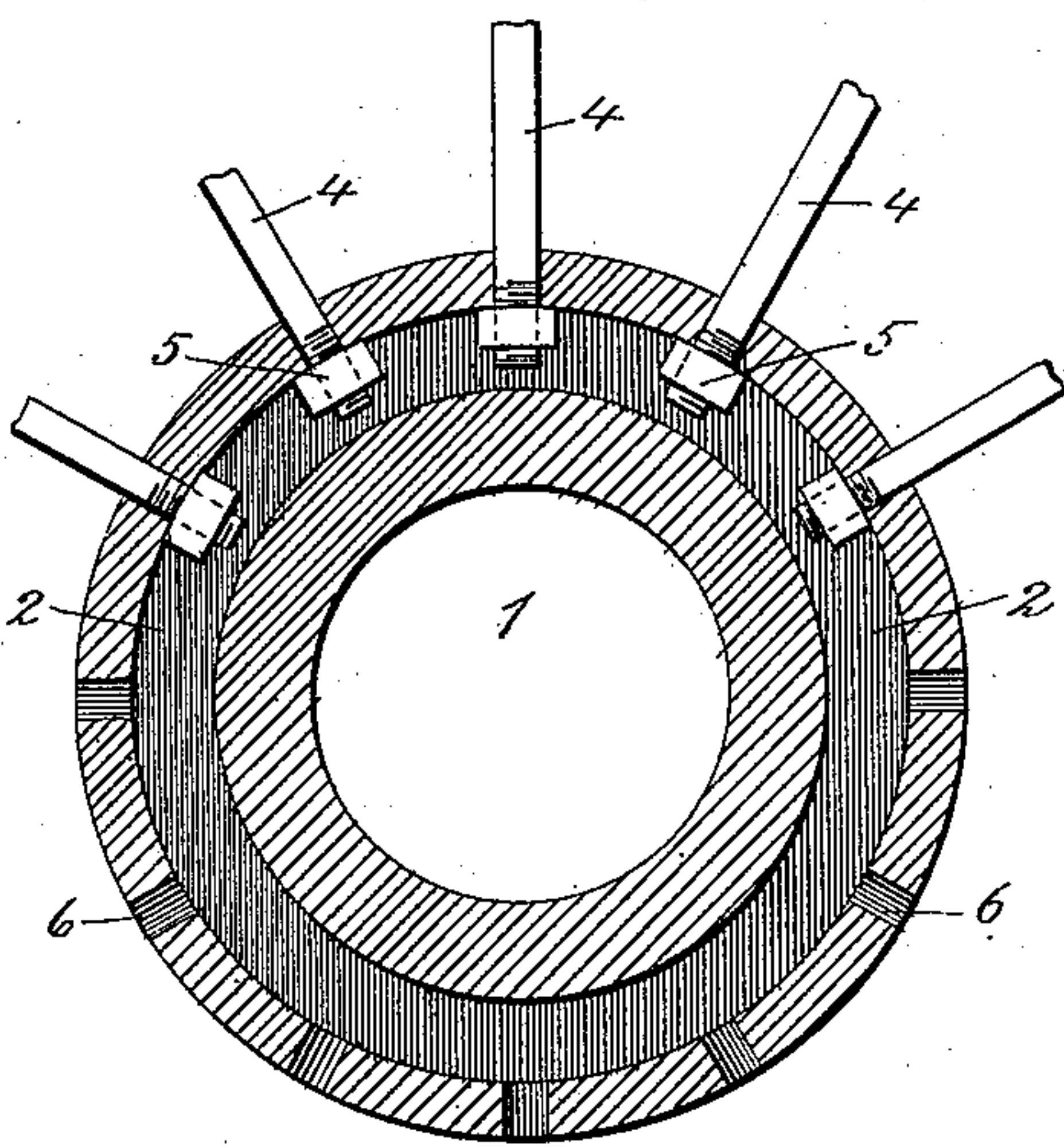
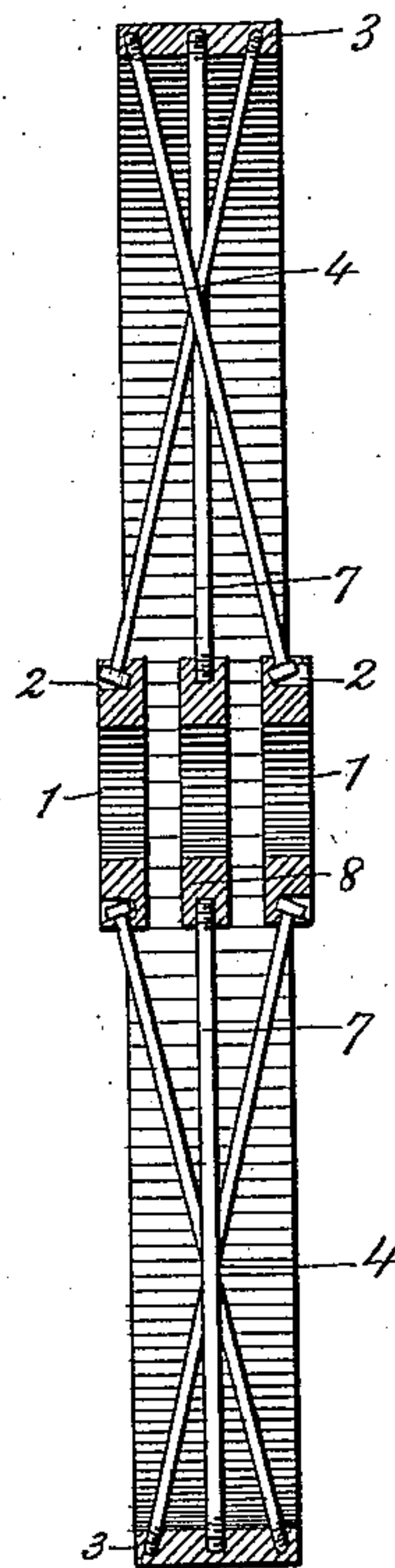


Fig. 3.



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(No Model.)

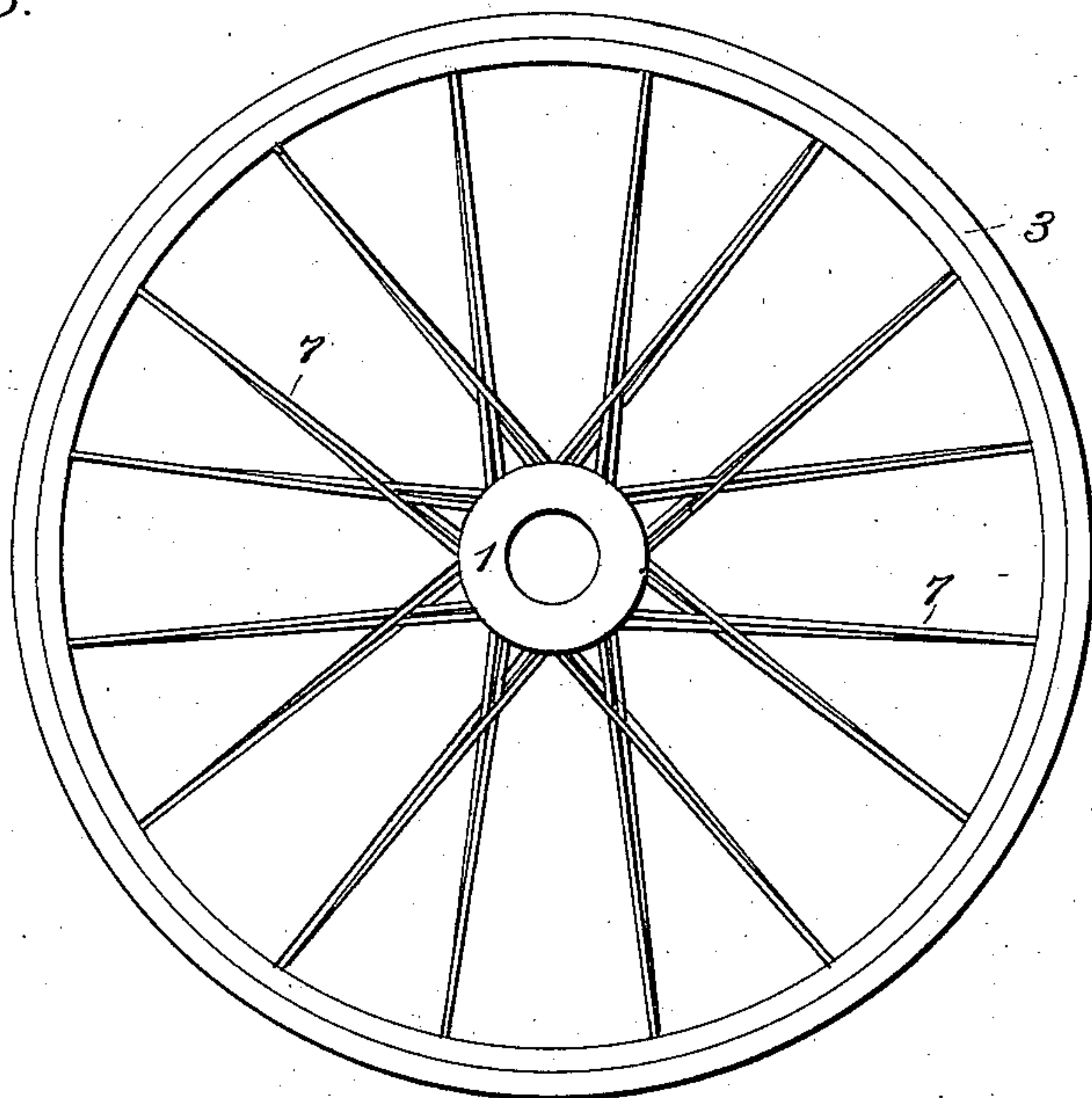
2 Sheets—Sheet 2.

H. F. HAMMON.  
WHEEL FOR VEHICLES.

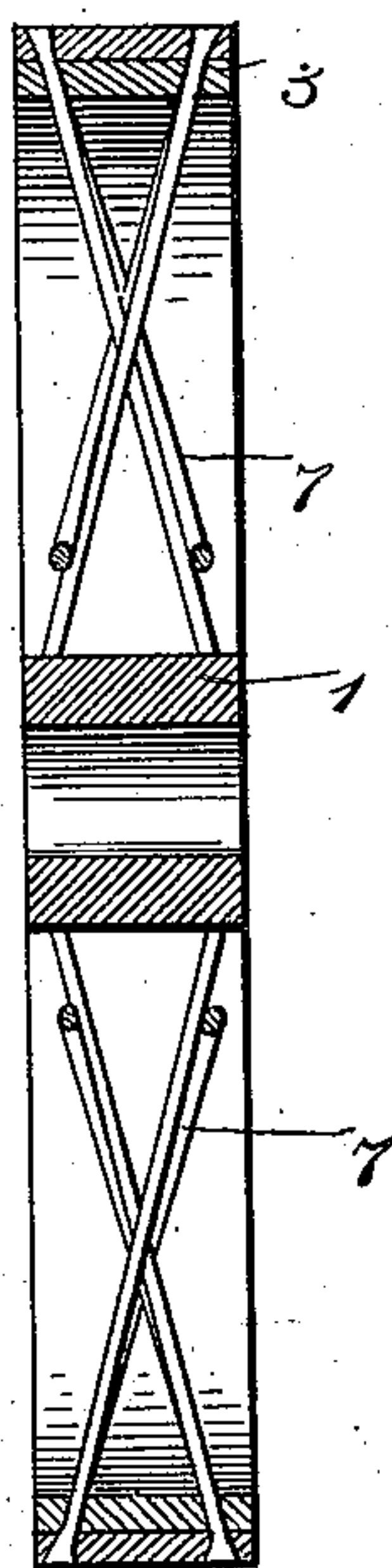
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*Fig. 5.*



*Fig. 6.*



Witnesses.

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# UNITED STATES PATENT OFFICE.

HIRAM F. HAMMON, OF PALM BEACH, FLORIDA.

## WHEEL FOR VEHICLES.

SPECIFICATION forming part of Letters Patent No. 574,538, dated January 5, 1897.

Application filed September 17, 1890. Renewed December 3, 1892. Serial No. 454,005. (No model.)

*To all whom it may concern:*

Be it known that I, HIRAM F. HAMMON, a citizen of the United States, residing at Palm Beach, in the county of Dade and State of Florida, have invented certain new and useful Improvements in Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates generally to wheels, such as may be employed for vehicles, wind-mills, water-wheels, pulleys, and other structures requiring light and strong wheels, and particularly to suspension-wheels in which the load or weight is supported by the upper spokes for increasing their strength and that of the wheels, instead of the weight being held by the lower spokes, as in most other wheels, which renders them less strong and also liable to flexure; and my invention consists in the improved construction and arrangement or combination of parts hereinafter fully disclosed in the description, drawings, and claims.

The objects of my invention are, first, to provide a wheel with an improved arrangement of metallic rods or spokes for counteracting the dishing and torsional strains thereon, and, second, to provide the same with a peculiar and useful construction and arrangement of hubs or collars and rim to which to secure the inner and outer ends of said spokes. These objects are attained by the construction of wheel illustrated in the accompanying drawings, forming part of this specification, in which the same reference-numerals indicate the same parts, and in which—

Figure 1 represents a side view of my improved wheel; Fig. 2, an axial section of the same; Fig. 3, an axial section of a modified construction of wheel having a central hub or collar arranged between the two outer ones; and Fig. 4, an enlarged vertical sectional view of one of the hubs or collars, showing the annular groove near the periphery thereof, the slots or holes in the upper wall of said groove, and the inner ends of a number of the spokes secured therein. Figs. 5 and 6 are respectively side and axial sectional views of a modified construction of wheel in which only non-radial or tangential spokes are used.

In the accompanying drawings, the numeral 1 indicates the hubs or collars, which are preferably formed with annular grooves 2 in their outer faces near their peripheries. These collars may be either shrunk or otherwise tightly secured to the axle or to a hub or sleeve which turns therewith, or, if desired, they may be loosely fitted upon said axle, according to the character of the machine in which the wheel is employed.

The rim 3 may be either plain or flanged and may have a tire, either plain or flanged, secured thereto.

Pairs or sets of radial metallic rods or spokes 4 are so secured with their outer ends in the rim and with their inner ends in the peripheries of the hubs or collars 1 as to incline inwardly and cross each other near their outer ends, said outer ends being secured near the edges of the rim, as plainly shown in Figs. 2 and 3. These spokes are screwed into the rim at their outer ends and provided at their inner ends with nuts 5, which are inserted through slots or holes 6, formed in the peripheries of the hubs or collars and which open into the grooves 2, within which said nuts fit and are secured.

Other pairs or sets of spokes 7 project tangentially from and are fastened to each of the hubs or collars 1 and also to the rim 3, near the edges of the latter; also, they are secured at their inner and outer ends to said hubs or collars and the rim in the same manner as or similar to the spokes 4 and are arranged to cross each other near their inner ends, as more plainly shown in Fig. 1; or they may be secured in the center of the rim and in the periphery of a central hub or collar 8, as shown in the modification illustrated in Fig. 3.

I do not wish to limit myself to any particular manner of fastening the spokes in the wheel; as they may be attached the same as in bicycle-wheels, or with heads or nuts on their outer ends in the rim and with threaded inner ends to be screwed into the collar or a hub or sleeve; also, in connection with the peculiar arrangement of the spokes thus far and hereinafter described I regard any fastening for said spokes at their inner or outer ends as within the scope of my invention.

On the outer faces of the hubs or collars 1 are secured shields or caps 9, as shown in Fig.



1, for excluding dust or dirt from the annular grooves 2 and the slots or holes 6. These caps may be fastened in place by the screws 10 or by having internal screw-threads fitted to corresponding threads on the peripheries of the hubs or collars.

The inwardly-inclined central spokes 4, which cross each other toward their outer ends, counteract any dishing strain upon the wheel, while the outside nearly straight spokes 7, which cross each other near their inner ends, counteract any torsional strain thereon. For effecting these results I have found it preferable in practice to arrange the spokes 4 radially and the spokes 7 tangentially, as thereby the entire strain upon the wheel is perfectly axial upon or in a line with the hubs or collars.

While I prefer in my wheel to use radial spokes for taking the dishing strains, and tangential or non-radial spokes for taking the torsional strains, I do not confine myself to this construction, but may use instead the construction shown in Figs. 5 and 6, in which all of the spokes of the wheel are tangential or non-radial, each spoke being secured at its inner end to the hub of the wheel at a point near the end of the hub and being connected at its outer end to the rim of the wheel near its edge and on the opposite side of the wheel from its inner end, the spokes crossing from one side of the wheel to the other, so that in this way the tangential spokes are able to take both torsional and dishing strains. This construction is perhaps not so strong as my preferred construction, as shown in Figs. 1 and 2, but has the advantage of being much simpler, and because of the smaller number of spokes each of these spokes may be made stronger than in the first construction without undue increase in weight. For some purposes this latter construction may be sometimes preferable to the first, and I therefore expressly reserve the right to make separate application for Letters Patent for the construction of wheel shown in Figs. 5 and 6.

It is obvious that other arrangements of spokes are possible. For instance, radial spokes may be used alone for taking both dishing and torsional strains, or radial spokes may be used for taking the torsional strains and tangential or non-radial spokes used for taking the dishing strains. These latter constructions, however, I regard as essentially weaker and inferior in every way to my preferred constructions.

Various means for securing the spokes to the rim and hubs or collars may be devised without departing from the spirit of my invention, and, although this construction and arrangement or combination of parts is principally intended for vehicle, suspension, wind, and water wheels, it is evident that it may be applied to pulleys of various kinds and to other similar machine elements where combined lightness and strength are desired.

For the hubs or collars shown in Fig. 3 may

be substituted a plain hub having two end fastenings and one central fastening for the inner ends of the spokes, such as three peripheral rows of holes drilled or otherwise formed in said hub, or any other suitable style of fastening within the knowledge of the ordinary mechanic may be employed.

Having thus fully described the construction and arrangement or combination of the several parts of my improved wheel and its advantages, what I claim as new therein is—

1. A wheel provided with a series of radial spokes, a series of tangential or non-radial spokes, and means for rigidly securing both of said series of spokes in place, substantially as described.

2. A wheel provided with a rim, a central fastening, radial spokes secured thereto, inclined inward and arranged to cross each other, and tangentially-arranged spokes also secured to said rim and fastening, substantially as described.

3. A wheel provided with a rim, a central fastening, tangentially-arranged spokes secured thereto and arranged to cross each other near their inner ends, and radial spokes also secured to said rim and fastening, substantially as described.

4. In a wheel, the combination, with a rim and a central fastening, of spokes secured thereto and arranged to incline inward and cross each other, and other spokes secured to said fastening and rim and also arranged to cross each other, substantially as described.

5. In a wheel, the combination, with a rim and a central fastening, radial spokes secured thereto and arranged to incline inward and cross each other, for resisting dishing strain, and tangential spokes secured to said fastening and rim and also arranged to cross each other, for resisting torsional strain, substantially as described.

6. In a wheel, the combination, with a rim and central hubs or collars, of spokes secured thereto and arranged to incline inward and cross each other, for resisting dishing strain, and other spokes secured to said rim and central hubs or collars and also arranged to cross each other, for resisting torsional strain, substantially as described.

7. In a wheel, the combination, with a rim and central hubs or collars, of radial spokes secured thereto and arranged to incline inward and cross each other, for resisting dishing strain, and tangential spokes secured to said rim and hubs or collars and also arranged to cross each other, for resisting torsional strain, substantially as described.

8. In a wheel, the combination, with a rim and hubs or collars, of spokes secured thereto and arranged to cross each other, for resisting dishing and torsional strains, substantially as described.

9. A wheel provided with a rim, collars, a series of radial spokes which are connected to said collars, arranged to cross each other near said rim and connected thereto near its



edges, a series of straight, tangential or non-radial spokes, and means for securing the several parts in place, substantially as described.

10. A wheel provided with a rim, collars, a series of radial spokes which are connected to said collars, arranged to cross each other near said rim and connected thereto near its edges, a series of straight, tangential or non-radial spokes, arranged to cross each other near their inner ends, and means for securing said spokes in place, substantially as described.

11. In a wheel, the combination, with the rim 3 and the central hubs or collars 1, formed with the annular grooves 2 and the slots or

holes 6 and provided with the caps 9, of the series of radial spokes 4, arranged to incline inward and cross each other toward their outer ends, a series of tangential spokes 7, arranged to cross each other near their inner ends, and means at the outer and inner ends of said spokes for securing them to said rim and hubs or collars, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HIRAM F. HAMMON.

Witnesses:

GEO. M. ROBBINS,

WALTER S. GRAHAM.