

No. 700,333.

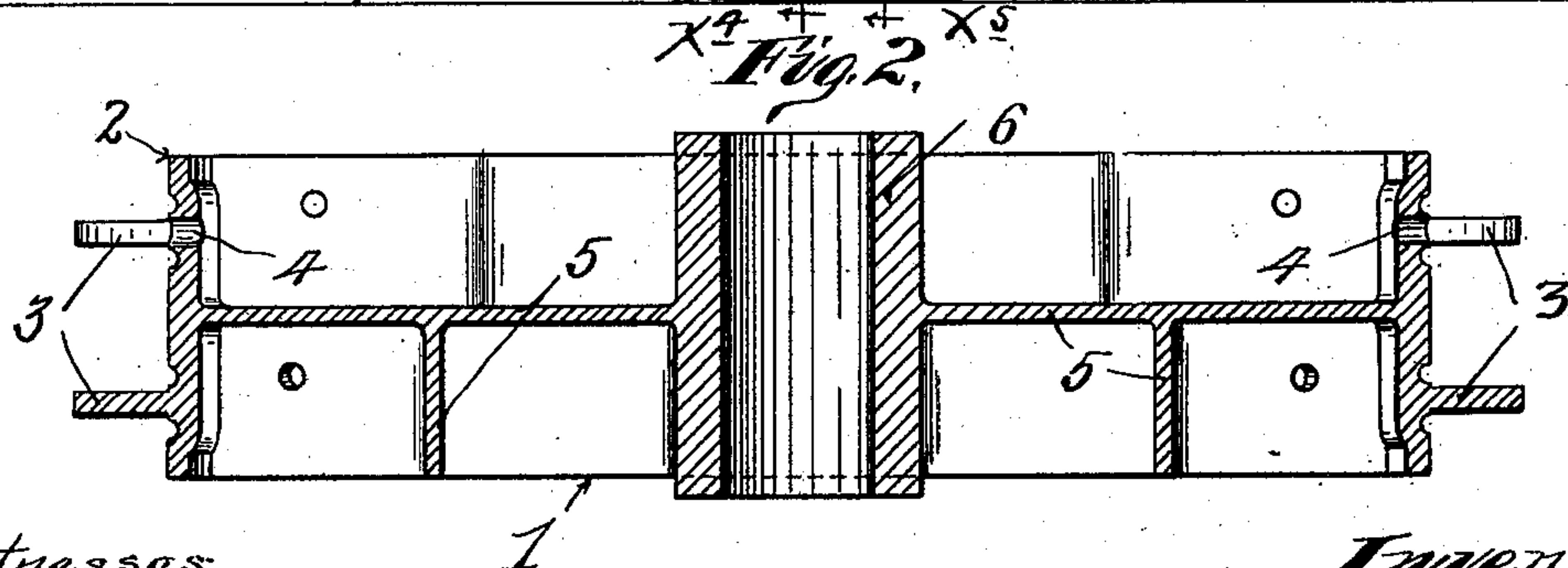
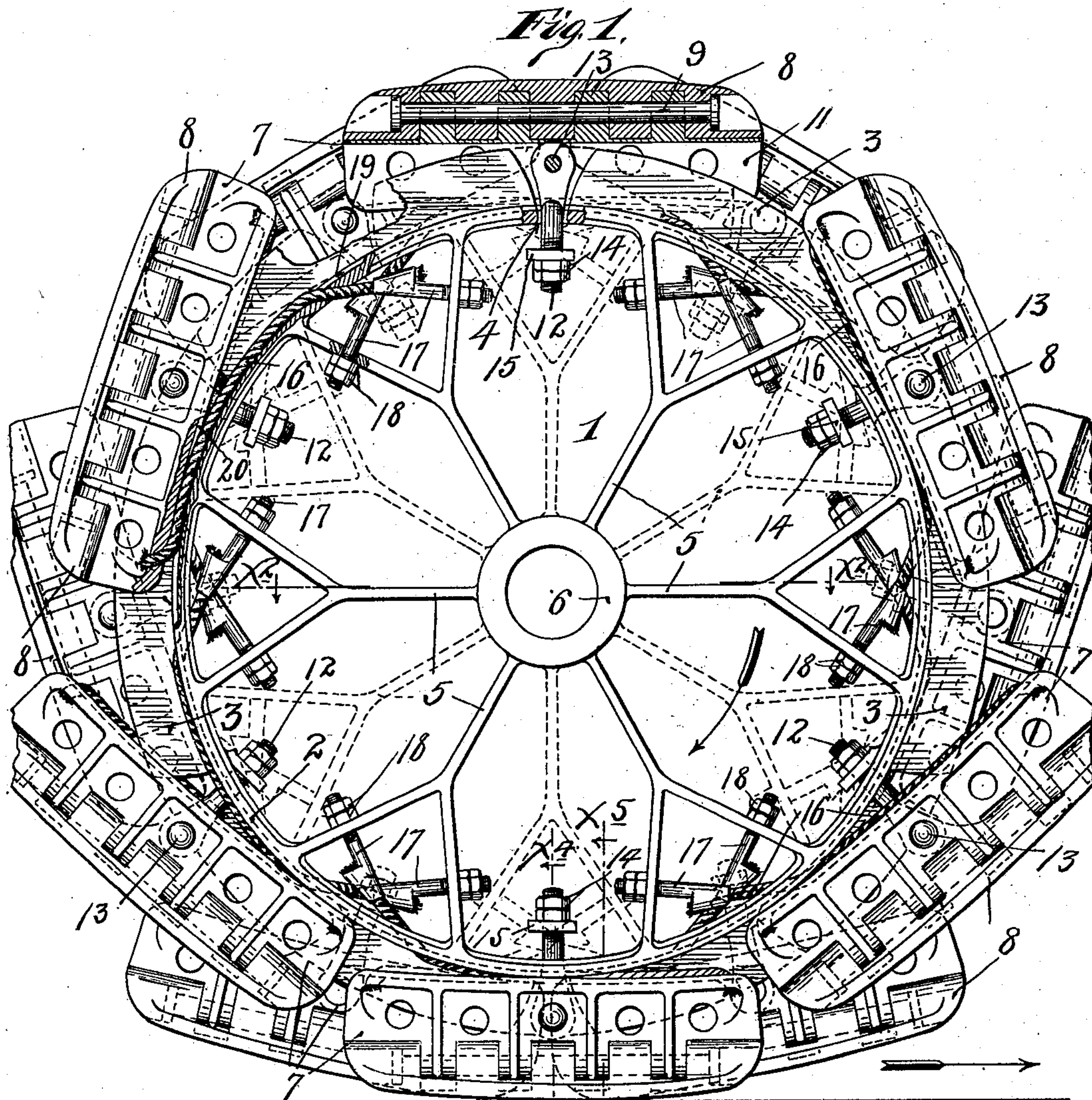
Patented May 20, 1902.

W. L. JUDSON.  
TREAD FOR WHEELS.

(Application filed Sept. 21, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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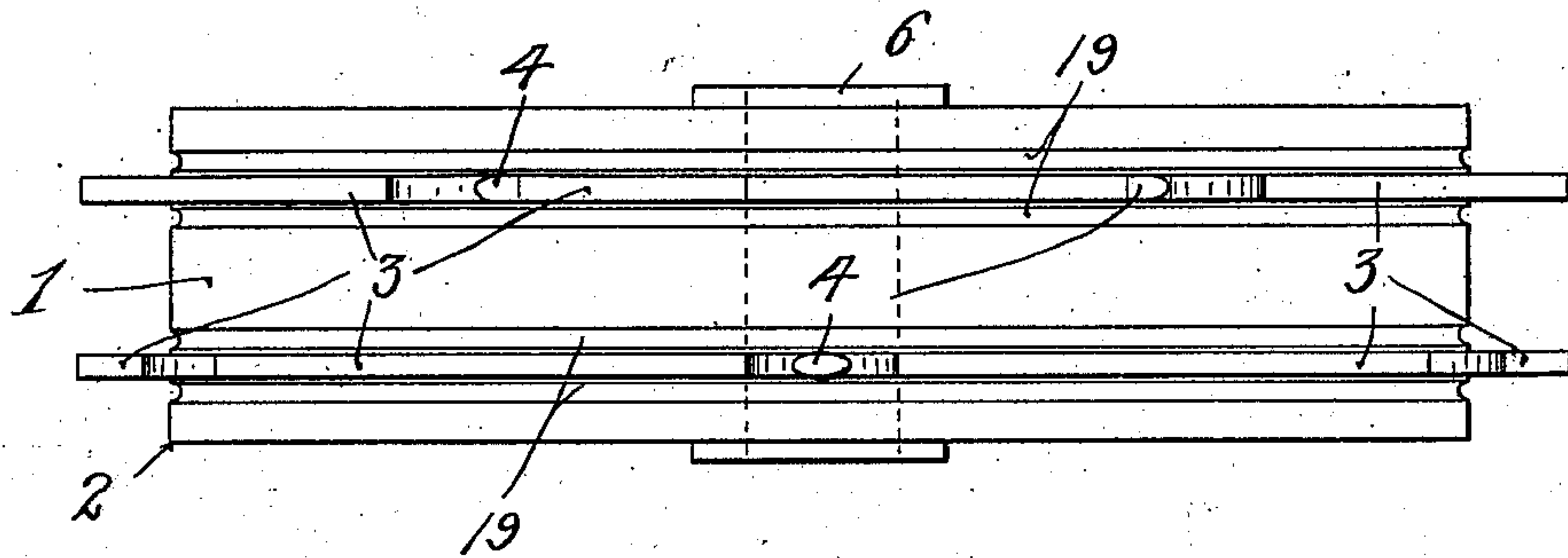
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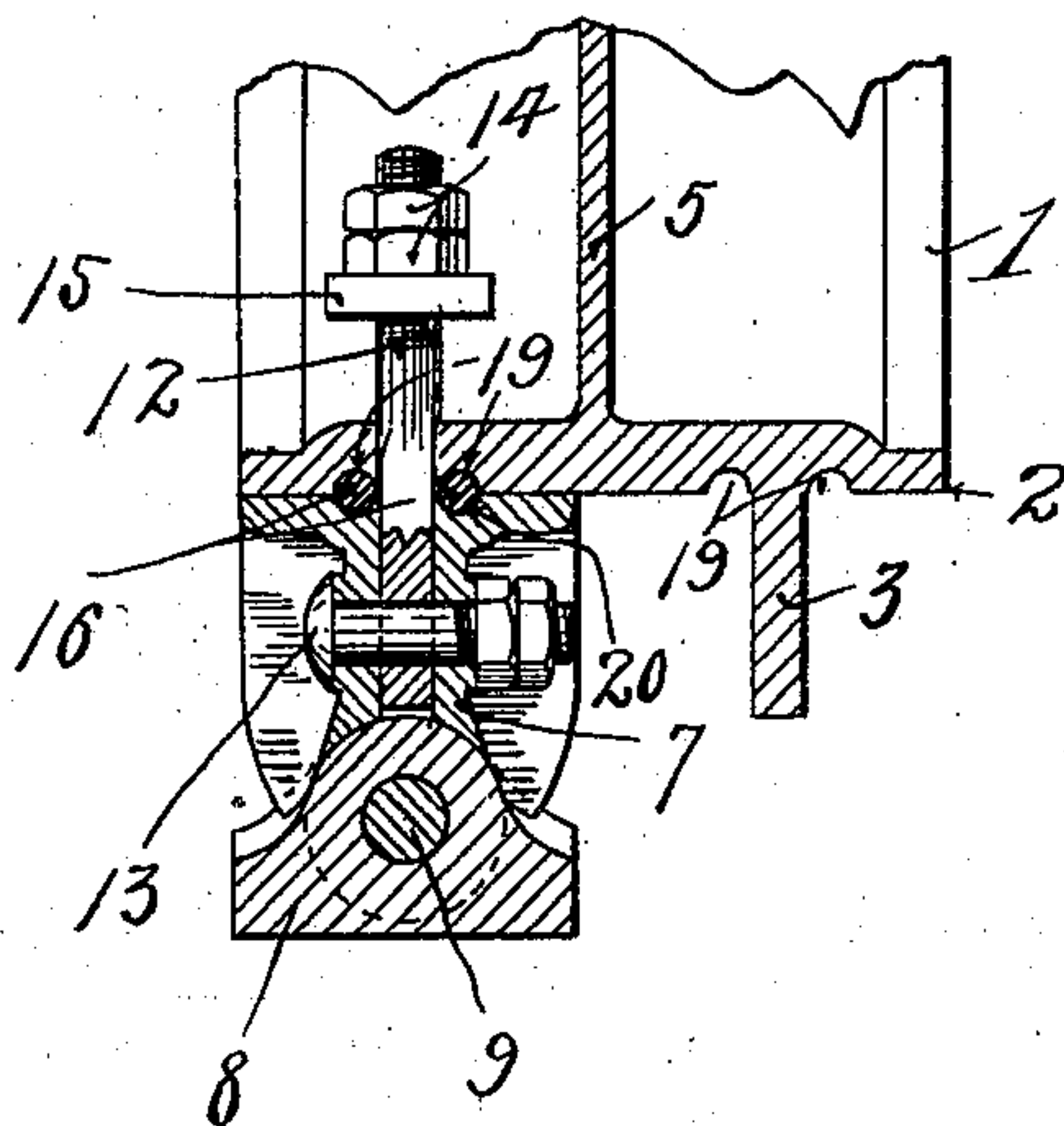
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2 Sheets—Sheet 2.

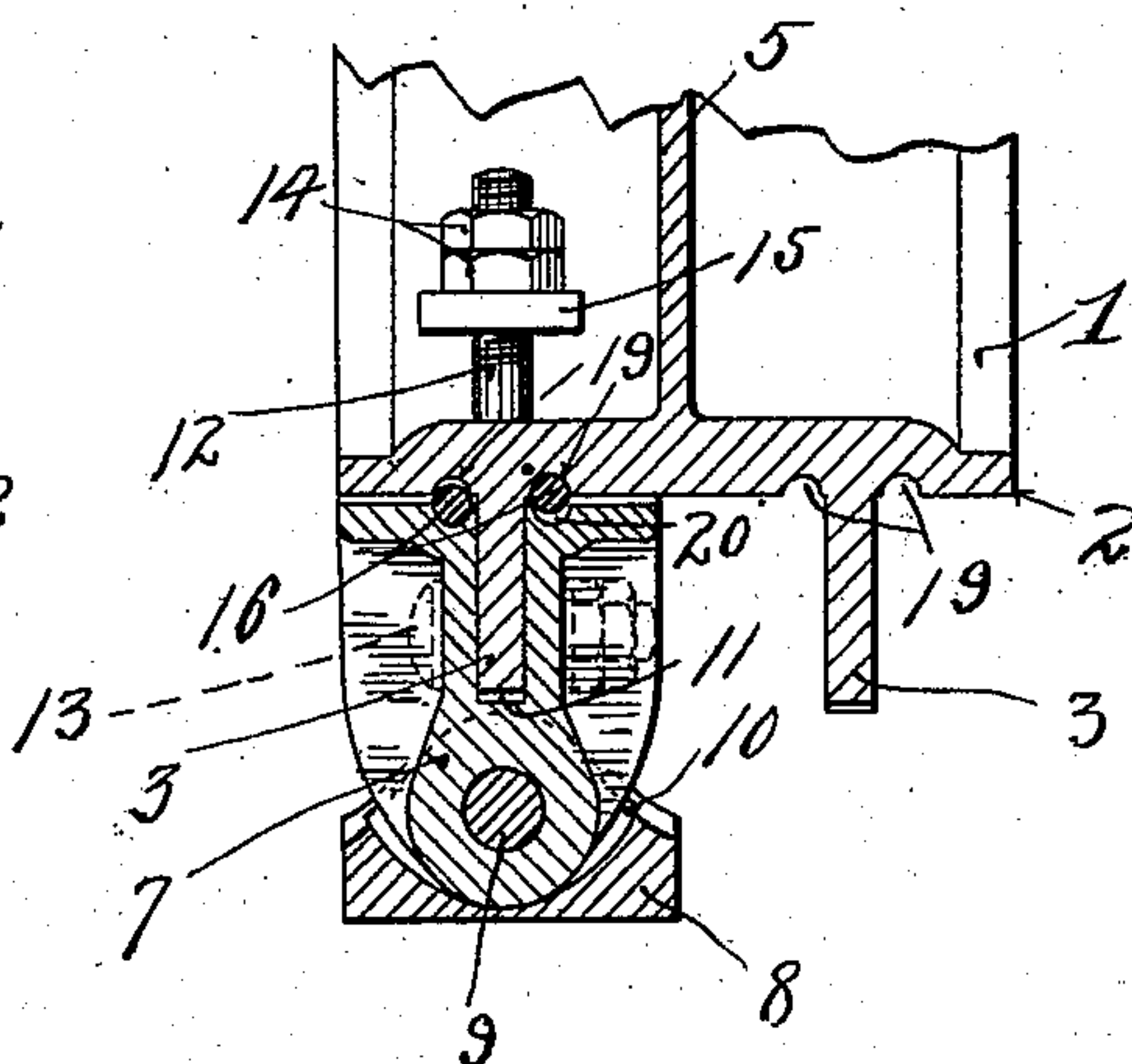
*Fig. 3.*



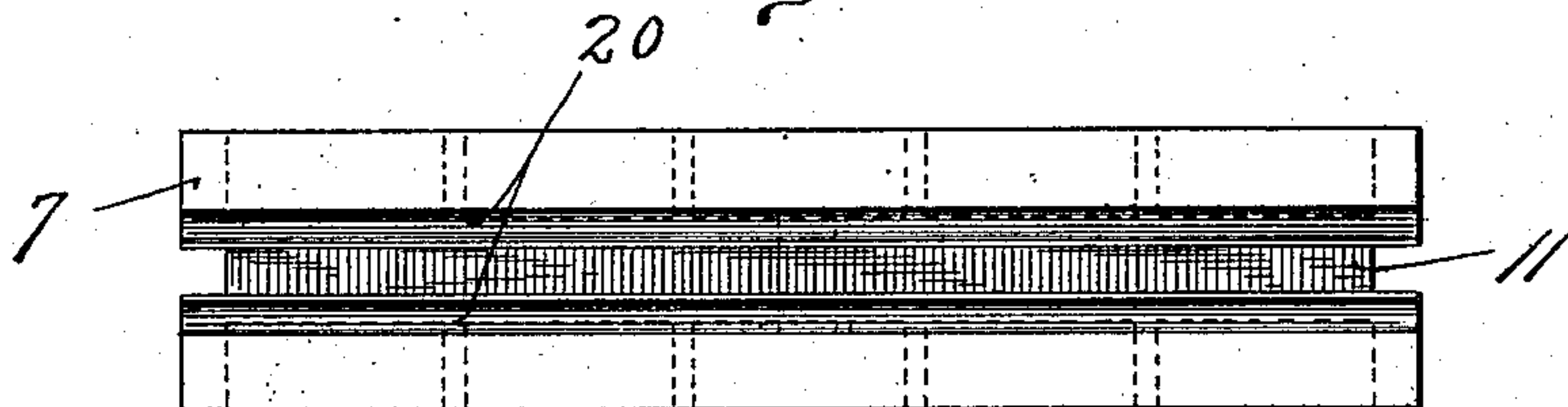
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



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# UNITED STATES PATENT OFFICE.

WHITCOMB L. JUDSON, OF CHICAGO, ILLINOIS.

## TREAD FOR WHEELS.

SPECIFICATION forming part of Letters Patent No. 700,333, dated May 20, 1902.

Application filed September 21, 1901. Serial No. 76,015. (No model.)

*To all whom it may concern:*

Be it known that I, WHITCOMB L. JUDSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Treads for 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 present invention has for its especial object to provide an improved tread for traction-wheels and other wheels whereby they are adapted to travel over deserts or other sandy country.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view in side elevation with some parts broken away, showing a wheel designed in accordance with my invention. Fig. 2 is a horizontal section on the line  $x^2 x^2$  of Fig. 1 with the shoes and other removable parts of the wheel removed from working position. Fig. 3 is a plan view of the wheel stripped of the shoes. Fig. 4 is a transverse section on the line  $x^4 x^4$  of Fig. 1. Fig. 5 is a transverse section on the line  $x^5 x^5$  of Fig. 1, and Fig. 6 is a plan view of one of the shoes removed from working position.

The numeral 1 indicates the wheel proper, which is provided with a peripheral face 2, having broken or sectioned peripheral flanges 3. The sections of the two peripheral flanges 3 are in staggered arrangement, and between the abutting ends of said sections said face 2 is provided with perforations or bolt-seats 4. Said wheel 1 is also shown as provided with reinforcing-ribs 5, which connect the face 2 with the hub 6 of said wheel.

To provide for both transverse rocking movements and longitudinal rolling movements, the shoes are formed in two sections 7 and 8, which have interlapping pivotal hinge-lugs connected by hinge-bolts 9. As best

shown in Figs. 4 and 5, the shoe-sections 7 and 8 are given clearance, as at 10, so that said sections 8, which are the ground-engaging sections, are free for transverse rocking movements. The shoe-sections 7 are provided with longitudinally-extended channels 11, which receive and closely engage the sections of the shoe-guiding flanges 3 of the wheel. The central portion of each shoe stands in line with one of the perforations 4 in the wheel-face 2. A shoe-retaining bolt 12 is passed through each perforation 4, and the outer end thereof is pivoted at 13 to the intermediate portion of said shoe. The inner ends of the said bolts 12 are provided with suitable stops, preferably afforded each by a pair of lock-nuts 14 and a heavy washer or cushion 15, of rubber, leather, or similar material, which serves to prevent the said nuts 15 from striking the face or peripheral portions of the wheel, and thereby producing a clatter when the wheel is in motion. The nuts 14 are so adjusted that the inner surfaces of the shoe-sections 7 are free for rolling engagement with the wheel-face 2 under the movement of the wheel without throwing strains on the said nuts and bolts.

To hold the shoes against endwise slipping or sliding movement on the face of the wheel and to insure a rolling engagement therewith as distinguished from a pivotal or slipping movement, each shoe is secured to the periphery of the wheel by a pair of reversely-extending flexible connections 16, preferably afforded by short sections of wire cable or rope. The outer ends of these cables are connected in pairs to the opposite free ends of the shoe-sections 7, and the inner ends thereof are passed through the periphery or face of the wheel and are adjustably anchored to the said wheel, as shown, by means of anchor-bolts 17, passed through the wheel flanges or ribs 5 and provided with tightening-nuts 18. By means of these adjustable anchor-bolts 17 and nuts 18 the cables 16 may always be kept taut regardless of their natural tendency to stretch. The intermediate portions of the cables 16, as will most clearly appear by reference to Figs. 4 and 5, work in cooperating guide-channels 19 and 20, formed, re-



spectively, in the wheel-face 2 and in the contacting faces of the shoe-sections 7.

It will be noted that the ground-engaging faces of the shoe-sections 8 are curved longitudinally. This is very desirable, as it facilitates the turning of the wheel in the steering action. In other words, with a wheel, say, forty inches in diameter a running-face equivalent to that of a wheel approximately sixteen feet in diameter may be provided. The rim-engaging surfaces of the shoe-sections 7 are advisably struck concentric with the ground-engaging surfaces of the corresponding shoe-sections 8. This provides shoes which are of the same thickness from end to end, and thus prevents the axis of the wheel from being given an undulatory or vertically rising and falling movement in running from one shoe to the other.

In virtue of the staggered arrangement of the shoes three thereof are always held in contact with the ground. The shoes mounted as above described have rolling engagements with the periphery of the wheel and do not and cannot slip with respect thereto. It is evident that this is an important feature, inasmuch as even the slightest slipping movement would result in a great waste of power. It is also evident that the action obtained with the shoes mounted as described is very different from that obtained by shoes simply mounted on pivots. The applicant's device simply uses the shoes as track-sections, which it lays down one after the other, to afford track over which the wheel proper is run very much in the same manner as if a permanent track were laid therefor.

As the point of contact between the wheel-face and the shoes constantly changes, any sand or dirt caught between the same is given all possible chance to escape, and, in fact, the sand is positively worked out from between the said parts under the movement of the wheel. The flexible connections permit the shoes to separate slightly from the face of the wheel to clear sand or other material caught between the same.

The shoe-sections 8 are adapted to rock transversely of the wheel whenever they strike a rock or other irregularity in the road-bed, and thereby relieve the said shoes and the wheel from abnormal strain, which would otherwise be thrown upon the same.

This wheel was especially designed for use on ore-wagons for carrying heavy loads across deserts or sandy country, but is adapted for general use either as a traction-wheel or as a wheel for vehicles which are to be drawn by animal or other power.

The invention is of course capable of considerable modification within the scope of my invention.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a wheel, of a tread

therefor comprising a series of shoes mounted for rolling engagement with the periphery of said wheel, and reversely-extending pairs of flexible connections attached at their inner ends to the said wheel, following the periphery thereof at their intermediate portion and attached at their outer ends to the opposite free ends of said shoes, substantially as described.

2. The combination with a wheel having a peripheral shoe-guiding flange, of a series of shoes mounted for rolling engagement with the periphery of said wheel and guided by said flange, and reversely-extending pairs of flexible connections attached at their inner ends to said wheel, following the periphery thereof at their intermediate portions and attached at their outer ends to the opposite free ends of said shoes, substantially as described.

3. The combination with a wheel, of a series of shoes having rolling engagement with the periphery of said wheel, loosely-pivoted retaining-bolts connecting the central portions of said shoes to the periphery of said wheel with freedom for rocking movements, and reversely-extending pairs of flexible connections attached at their inner ends to said wheel, following the periphery thereof at their intermediate portions and attached at their outer ends to the opposite free ends of said shoes, substantially as described.

4. The combination with a wheel having a peripheral shoe-guiding flange, of a series of shoes having rolling engagement with the periphery of said wheel and guided by said flange thereof, loosely-pivoted retaining-bolts connecting the central portion of said shoes to the periphery of said wheel with freedom for rocking movements, and reversely-extending pairs of flexible connections attached at their inner ends to said wheel, following the periphery thereof at their intermediate portions and attached at their outer ends to the opposite free ends of said shoes, substantially as described.

5. The combination with a wheel having peripheral shoe-guiding flanges, of shoes in staggered arrangement guided by said flanges, and retaining-bolts loosely pivoted to the central portions of said shoes and passed through the periphery of said wheel, substantially as described.

6. The combination with a wheel, of a series of shoes having rolling engagement with the periphery of said wheel, reversely-extending pairs of flexible connections attached at their inner ends to said wheel, following the periphery thereof at their intermediate portions and attached at their outer ends to the opposite free ends of said shoes, and means for adjusting said flexible connections to take up slack, substantially as described.

7. The combination with a wheel having a peripheral shoe-guiding flange, of a series of shoes mounted for rolling engagement with the periphery of said wheel and guided by



said flange thereof, and reversely-extending  
pairs of flexible connections adjustably at-  
tached to said wheels at their inner ends, fol-  
lowing the periphery thereof at their inter-  
5 mediate portions and attached at their outer  
ends to the opposite free ends of said shoes,  
substantially as described.

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

WHITCOMB L. JUDSON.

Witnesses:

G. J. ATKINS,  
A. HALEY.