

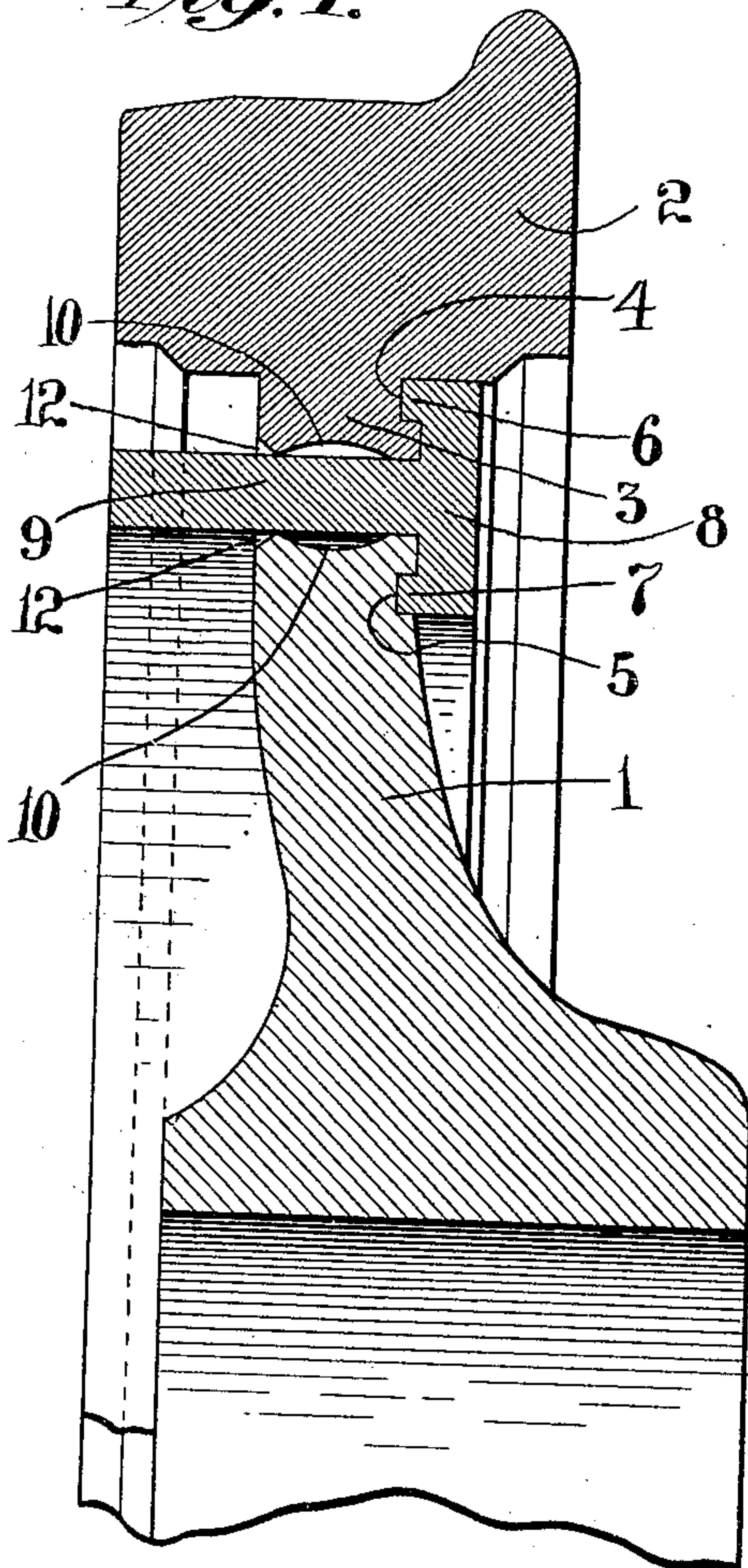
F. E. CANDA.  
CAR WHEEL AND PROCESS OF MAKING THE SAME.  
APPLICATION FILED JAN. 30, 1909.

925,424.

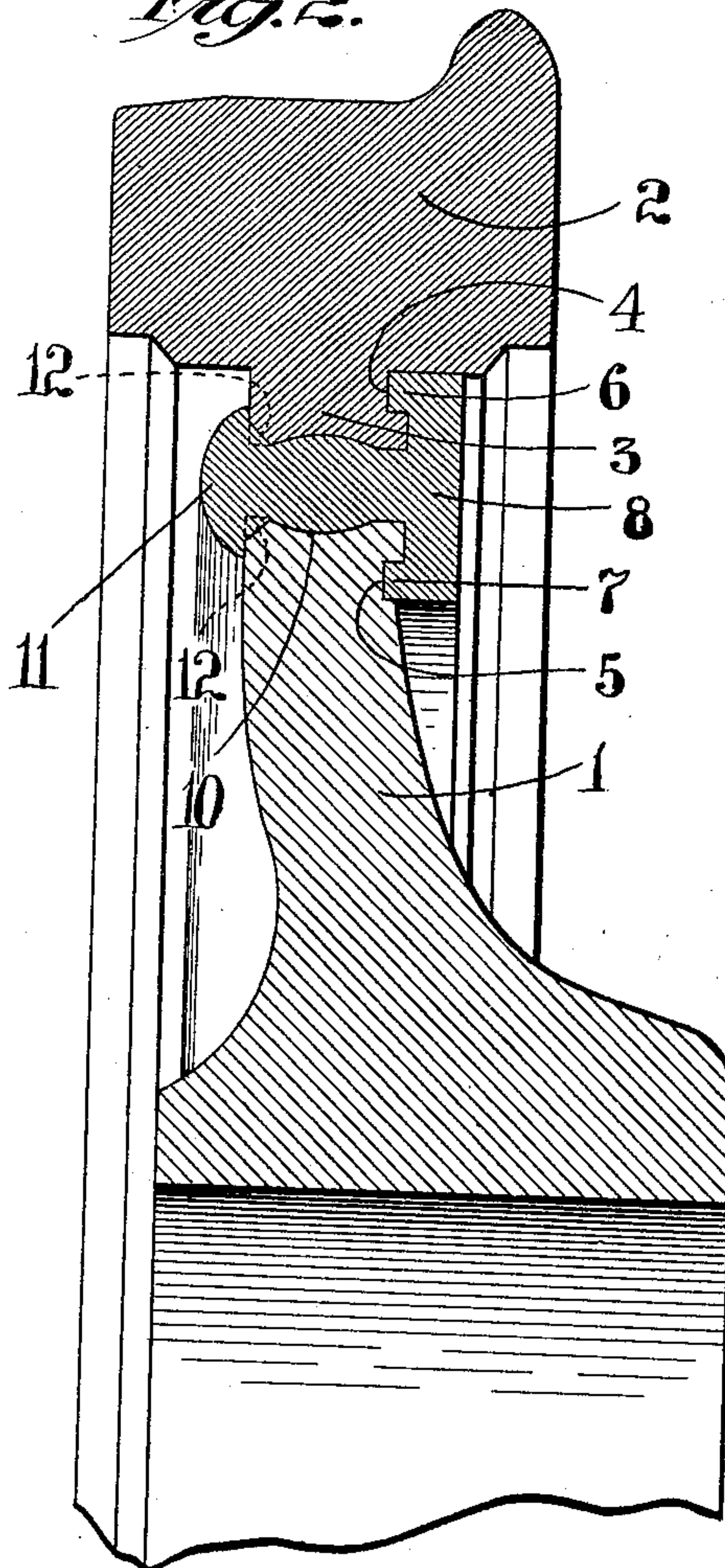
Patented June 15, 1909.

3 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*



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Frank E. Hoffman

by

Inventor:

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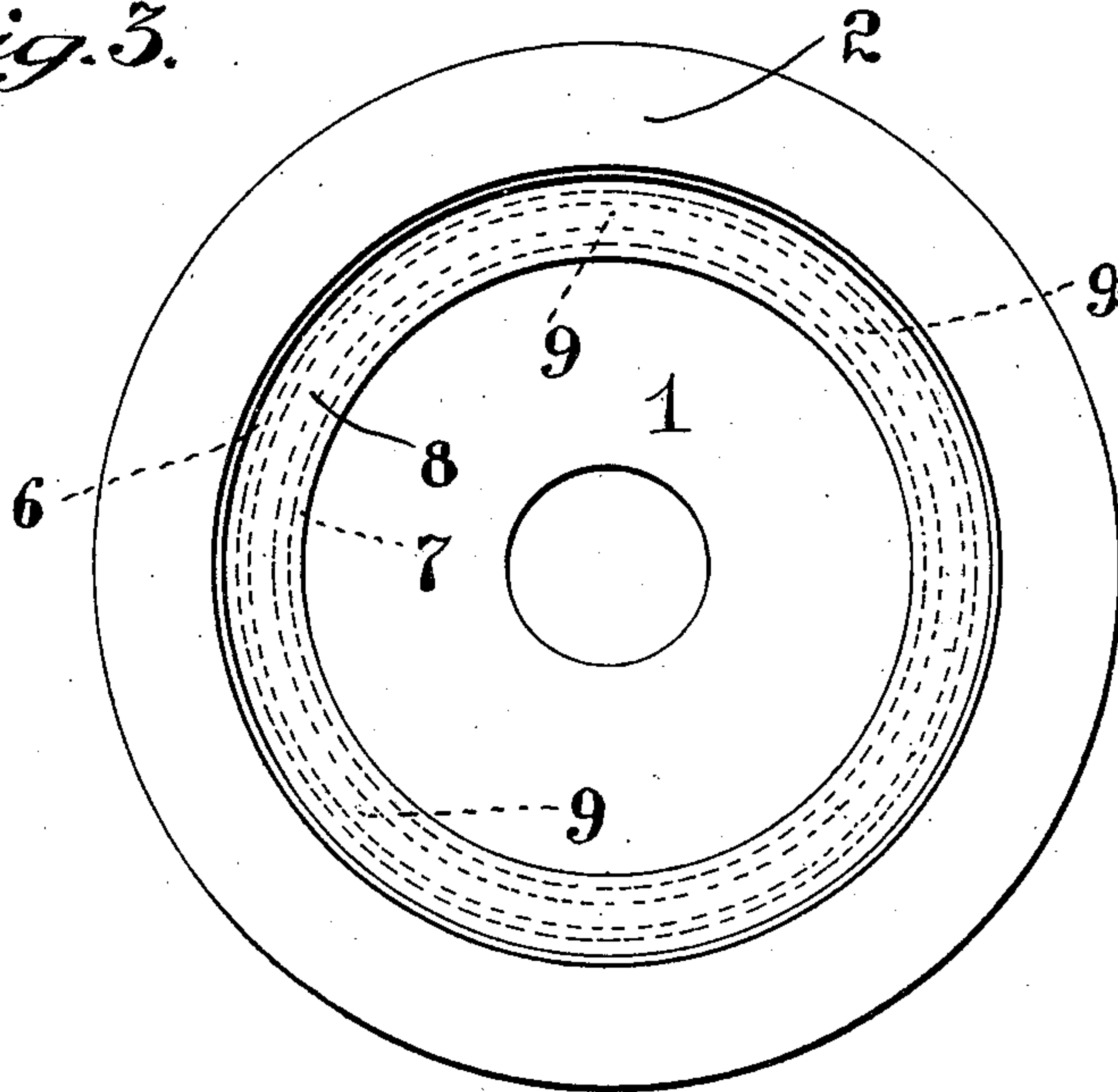
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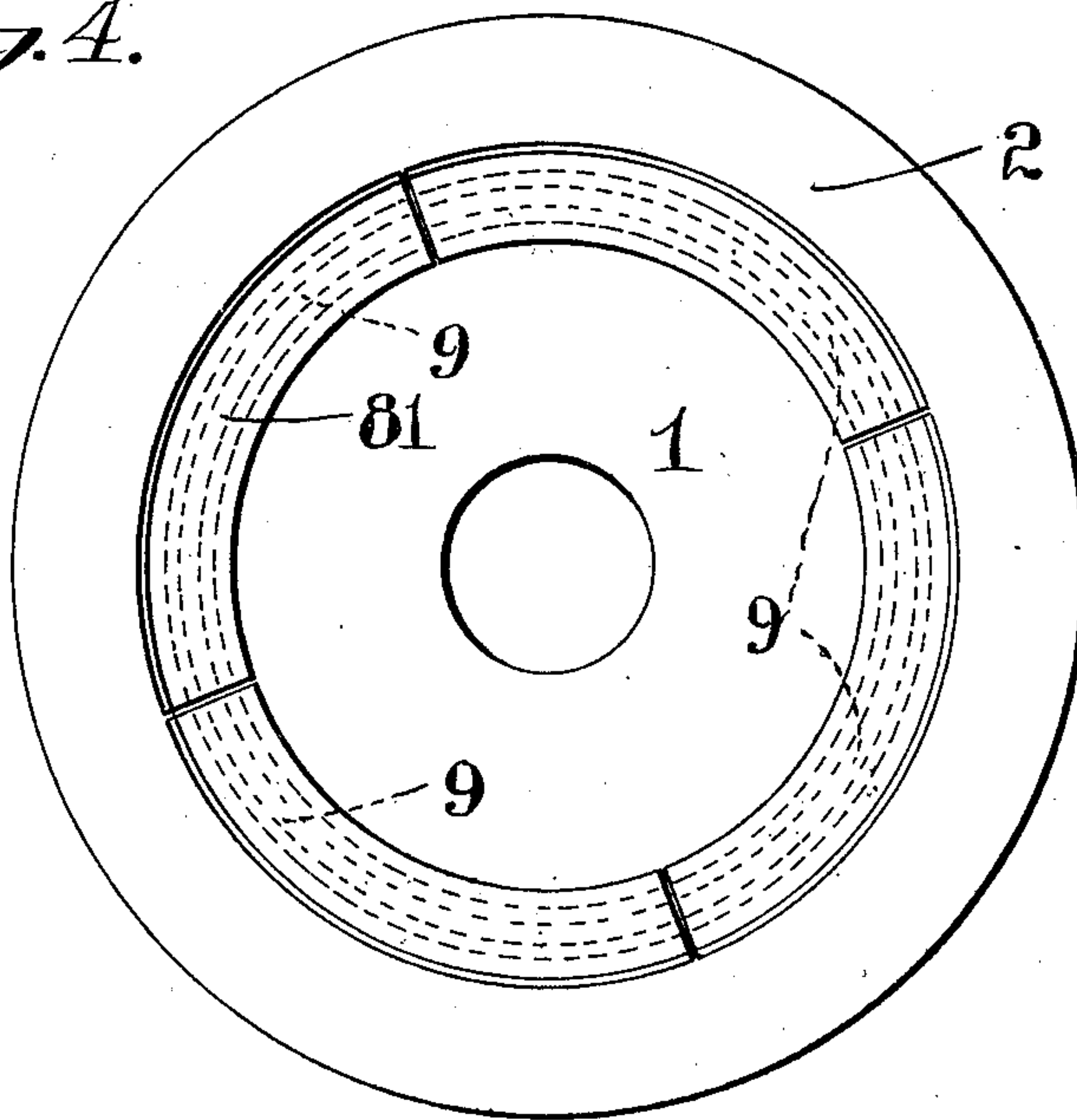
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3 SHEETS—SHEET 2.

*Fig. 3.*



*Fig. 4.*



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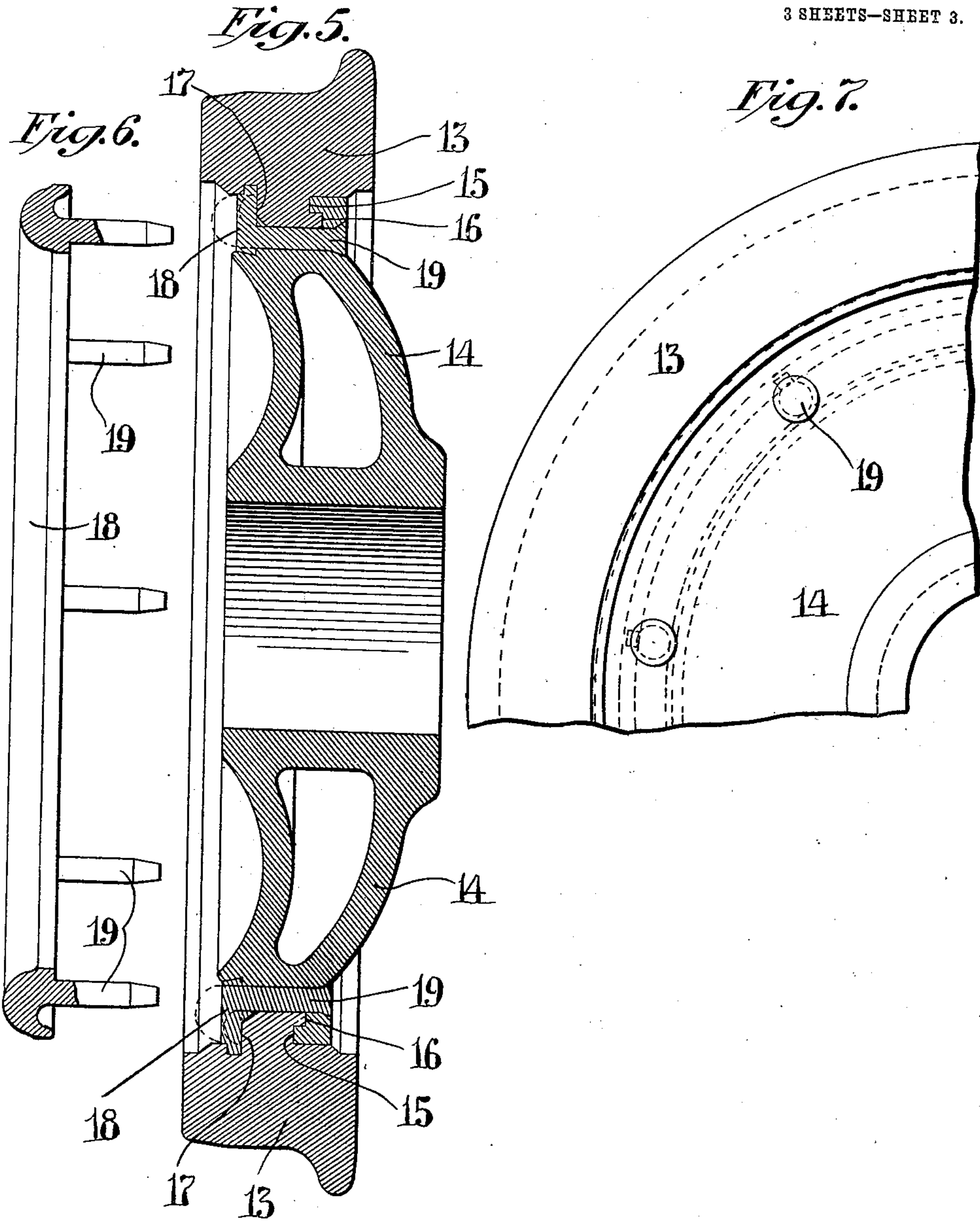


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3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

FERDINAND E. CANDA, OF NEW YORK, N. Y., ASSIGNOR TO CANDA BROTHERS, OF NEW YORK, N. Y., A COPARTNERSHIP.

## CAR-WHEEL AND PROCESS OF MAKING THE SAME.

No. 925,424.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed January 30, 1909. Serial No. 475,296.

*To all whom it may concern:*

Be it known that I, FERDINAND E. CANDA, a citizen of the United States of America, and a resident of New York, county of New York, and State of New York, have invented a certain new and useful Car-Wheel and Process of Making the Same, of which the following is a specification.

My invention relates to car wheels and like metal wheels comprising two annularly related members secured together, and to a process of making the same, and my invention comprises a wheel comprising two annularly related members relatively interlocked and held together as herein described, and to a process of making such wheels comprising the assembling of the two members, one within the other, the fitting into coaction with such members, of interlocking means adapted to interlock with both said members and provided with means projecting through the wheel to the opposite side thereof, and the upsetting of such projecting means so as to hold the interlocking means in place, and to fill a space between the said two annularly related members of the wheel. These and other features of my invention are more fully hereinafter pointed out and set forth in the appended claims.

The objects of my invention are, to provide a simple, strong and reliable wheel, such as specified, comprising annularly related members united together, and, preferably, formed of materials of different degrees of hardness, to so design this wheel that it may be constructed at relatively little expense, and to provide a process of making such wheel capable of being carried out expeditiously and with relatively little expense, and, in particular, with relatively little machining of the parts.

It is very important that the tire or tread of a car wheel shall be of a very hard and tough steel. A tire of such material not only has greater inherent endurance than the best chilled cast iron, or than softer steel, but has far greater capacity to resist the formation of "flat spots", and so does not require truing as frequently as does the chilled iron or soft steel tread.

Flat spots on the treads of car wheels are usually due to slipping of the wheel on the track after the application of the brake, and necessitate the removal of the wheel from

the car and its truing up by grinding or turning down the tread of the wheel. Not only does this truing remove a considerable proportion of the material of the wheel rim, so reducing correspondingly the permissible mileage of the wheel, but it necessitates laying up the car for a considerable period of time, and considerable expense in machining and grinding; the total expenses from these causes and from the decreased mileage of the wheel being very considerable. Where a wheel is formed entirely from one grade of steel, as for example, in the case of an ordinary forged or pressed steel wheel, it is impracticable to have the rim or tread of the wheel materially harder than the material of the hub of the wheel, because the hub of the wheel must be of metal soft enough to permit the hub to be bored for the reception of the axle, and also because a relatively soft grade of steel must be used to permit the extreme alteration of section involved in converting an ingot or billet into a forged or pressed car wheel. My invention overcomes these objections; permitting the hub portion and wheel body to be made of one grade of metal, either steel, cast iron, or any other suitable material, and the tire to be made of a very hard and tough grade of steel, and these two members of the wheel when assembled, are united in such manner that they become thereafter practically one, though it is nevertheless easy, when desired, to remove the tire and to replace it with a new tire. Making the tire and the wheel body of different grades of metal has the further advantage that a steel best adapted, by reason of its hardness and toughness, for use in the wheel tire, is expensive, and the cost of the wheel may be materially reduced by using a less expensive grade of steel for the wheel body and hub, this part of the wheel not requiring extreme hardness and toughness.

In the accompanying drawings I illustrate various constructions of car wheels embodying my invention, and the methods of making the same.

In the said drawings: Figure 1 shows an axial section of portions of the two annularly related members assembled, and of the keying ring in place ready for upsetting; Fig. 2 is a similar view of the same parts after the upsetting of the web of the keying ring; Fig. 3 shows a side view of the com-



pleted wheel; Fig. 4 is a similar view showing alternative means for locking the parts of the wheel together; Fig. 5 shows an axial section of a complete wheel, illustrating alternative locking means; Fig. 6 shows an elevation and partial section of the keying ring employed in Fig. 5, showing the ring as it is prior to being pressed into the wheel; and Fig. 7 shows a fragmentary side elevation of the completed wheel.

Referring first to Figs. 1, 2 and 3, numeral 1 designates the wheel body of any suitable form, and numeral 2 the tire, which in this case is shown as a flanged tire such as car wheels are customarily provided with. I have indicated by different sectioning, that the metal of these two parts are different, the tire being preferably a hard and very tough steel, while the wheel body 1 may be of much softer steel, or may even be of cast iron, though cast steel is much preferable. The tire 2 is provided on its inner side with an inwardly projecting rib 3 opposite the end of the web of wheel body 1, and in this rib 3 and in the web of the wheel body are grooves 4 and 5 respectively, adapted to receive ribs 6 and 7 of a keying piece 8. This keying piece is ordinarily a complete ring, as indicated in Fig. 3, but is sometimes segmental, as indicated in Fig. 4, where 81 designates said keying piece; in such case a number of the keying pieces being usually employed. This keying piece is customarily provided with a web 9 projecting through a corresponding recess between the tire and wheel body to the opposite side of the wheel, and adapted to be upset, as shown in Fig. 2. The space 10 through which this web 9 projects is of convex cross section, as clearly indicated in Figs. 1 and 2, so that when the web is upset, and fills this space, the web is held in place not only by the head 11 formed on it, but also by the enlargement of its body at its central portion. Thereby, the keying piece 8 is held in place very securely, and also the two annularly related members of the wheel are secured together very rigidly and without necessity of accurate fitting of the rib 3 of the tire to the periphery of the wheel body 1.

In making this wheel, the tire 2 having been rolled and its groove 4 cut, and the wheel body having been cast and its groove 5 formed therein, either during the casting operation, or by subsequent cutting, these two parts of the wheel are assembled, the tire 2 being heated slightly, say to a black heat. It should be heated slightly higher than tires are customarily heated when they are to be shrunk onto wheel bodies. The keying piece or pieces 8, heated to a forging heat, is then put in place and the web 9 is upset, preferably by the action of a suitable forging press, though it may be done by other means, as for example, by means of

hammers. In this way the convex space 10 is filled, the metal of the web, when upset, filling the space between the web of the wheel body and the rib 3 of the tire. The tire 2 is heated, as above explained, in order that as the keying piece 8 shrinks in cooling, said tire may shrink with it and so obviate any looseness. To prevent relative rotation of the tire and wheel body, suitable notches 12 are provided in said tire and wheel body, which will be filled by the metal of the web 9 when the same is upset, as indicated in Fig. 2.

In the form of wheel shown in Figs. 5, 6 and 7, the tire, here numbered 13, and the wheel body, here numbered 14, have engaging shoulders 15 and 16. On the opposite sides of the wheel there is a groove 17 adapted to receive a keying ring 18 (Fig. 6) having dowels 19 adapted to project through recesses formed in the wheel body to the opposite side of the wheel, and there to be headed. The keying ring 18 is of such form that when inserted at a forging heat, and pressed into place, it spreads, so filling the groove between the tire and wheel body.

This form of wheel is also illustrated and claimed broadly in my prior application filed January 18, 1909, Serial Number 473,002.

What I claim is:—

1. A method of forming car wheels and the like, which comprises assembling two separately formed members, one of which is an annulus adapted to fit over the other, interlocking a keying piece with recesses of said members on one side of the wheel and passing a projecting portion of it through to the opposite side of the wheel and there heading it, and by pressure applied to said keying piece forcing metal thereof into a notch provided in one of said members and thereby preventing subsequent rotation of one of said members with respect to the other.

2. A method of forming car wheels and the like, which comprises assembling two separately formed members, one of which is an annulus adapted to fit over the other, engaging a keying piece with grooves formed in said two members and passing a projecting portion of it through a recess convex in cross section between said members, and upsetting said projecting portion and thereby filling such recess.

3. A method of forming car wheels and the like, which comprises assembling two separately formed members, one of which is an annulus adapted to fit over the other, and is heated to a higher temperature than such other, engaging a keying piece with grooves formed in said two members and passing a projecting portion of it through a recess convex in cross section between said members, and upsetting said projecting portion while at a forging heat and thereby filling such re-



cess, the annular member shrinking with shrinkage of the projecting portion because of its initially higher temperature than the other member.

5 4. A wheel comprising separately formed annularly-related members and a keying piece interlocked with said members, and having means projecting through the wheel and secured at the opposite side thereof  
10 against removal, said keying piece having projections engaging notches in said members and thereby preventing relative rotation of said members.

15 5. A wheel comprising separately formed annularly-related members having between them a space for the reception of a filling and a keying piece having ribs fitting within corresponding recesses in said annularly related members, and having a projecting portion  
20 within such space and upset therein to fill the same and to form a metallic connection

tion between the annularly related members of the wheel.

6. A wheel comprising separately formed annularly-related members having between 25 them a space for the reception of a filling, said space being convex in cross section, and a keying piece having ribs fitting within corresponding recesses in said annularly related members, and having a projecting portion 30 within such recess and upset therein to fill the same and to form a metallic connection between the annularly related members of the wheel.

In testimony whereof I have signed this 35 specification in the presence of two subscribing witnesses.

FERDINAND E. CANDA.

Witnesses:

H. M. MARBLE,

FRANK E. RAFFMAN.