

(No Model.)

2 Sheets—Sheet 1.

J. R. LITTLE.
METAL WHEEL.

No. 488,439.

Patented Dec. 20, 1892.

Fig. 1.

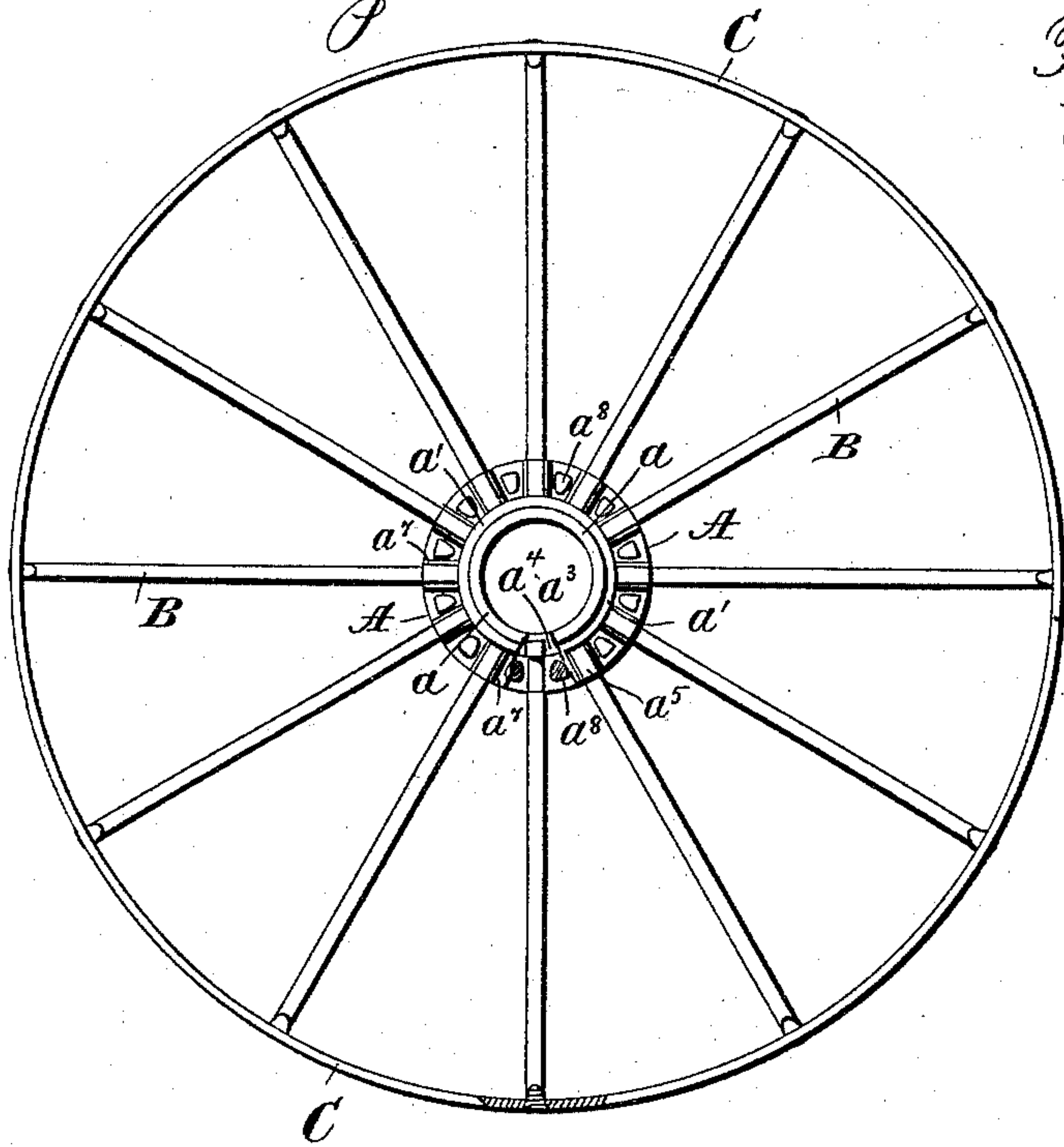


Fig. 2.

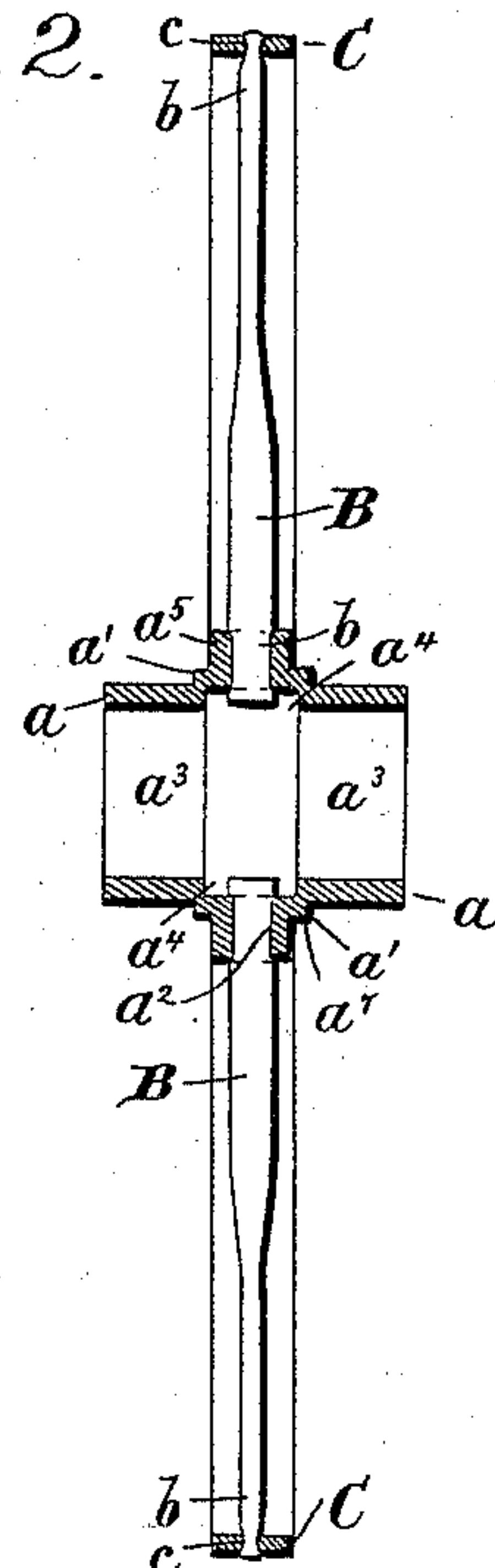


Fig. 3.

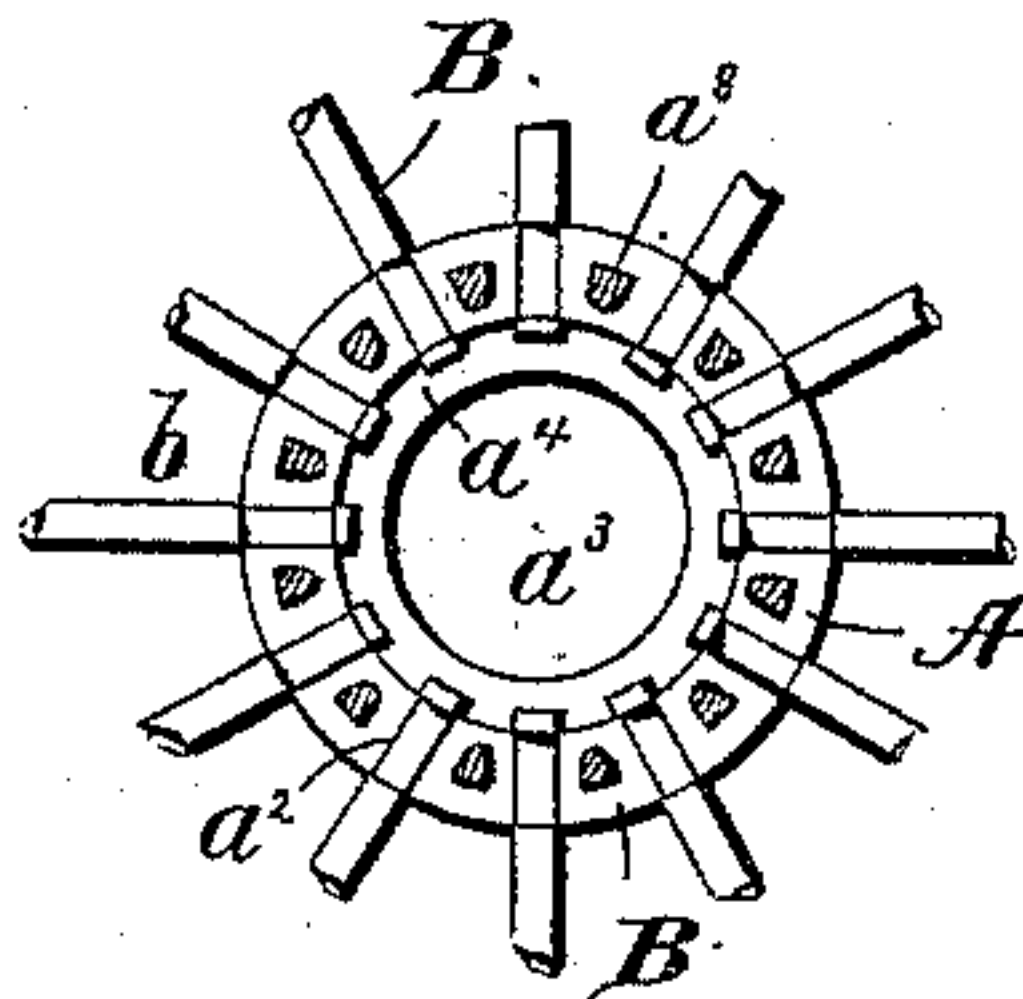


Fig. 4.

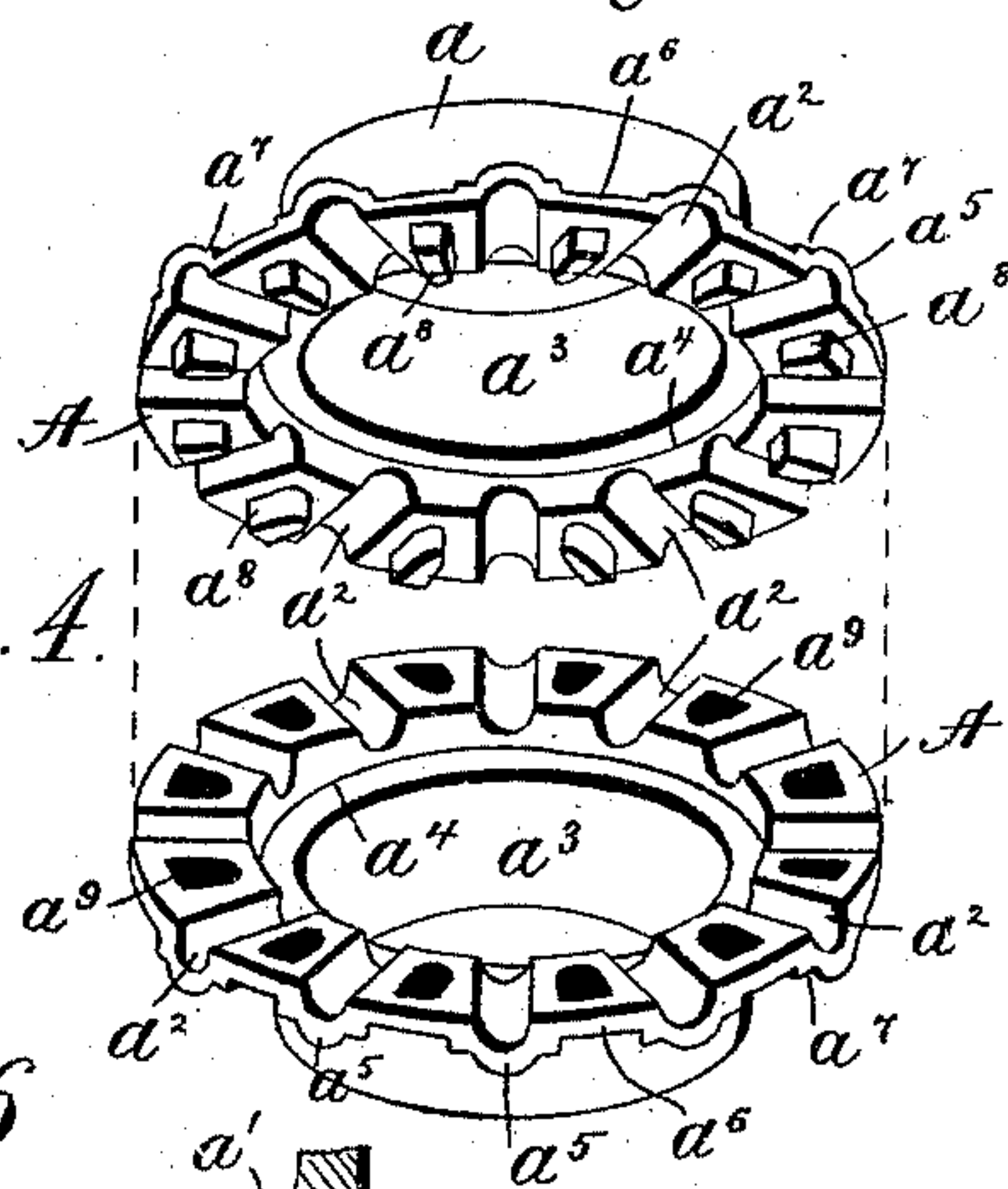


Fig. 5.

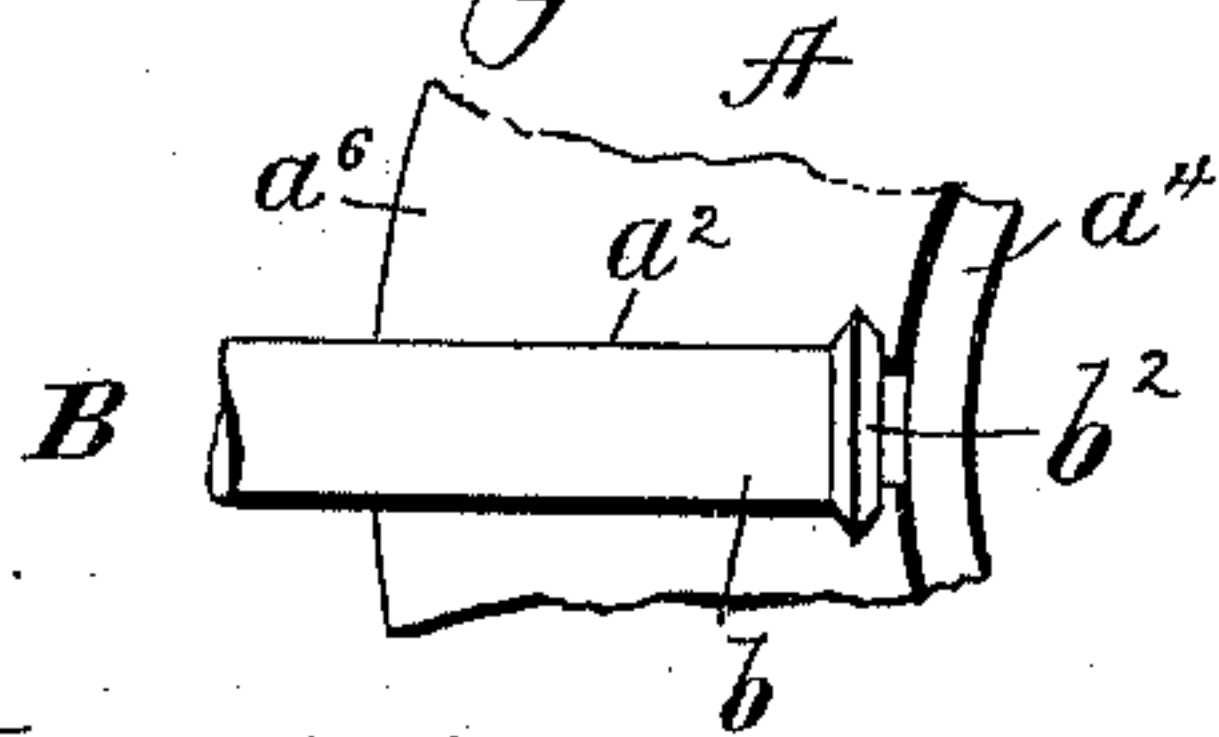
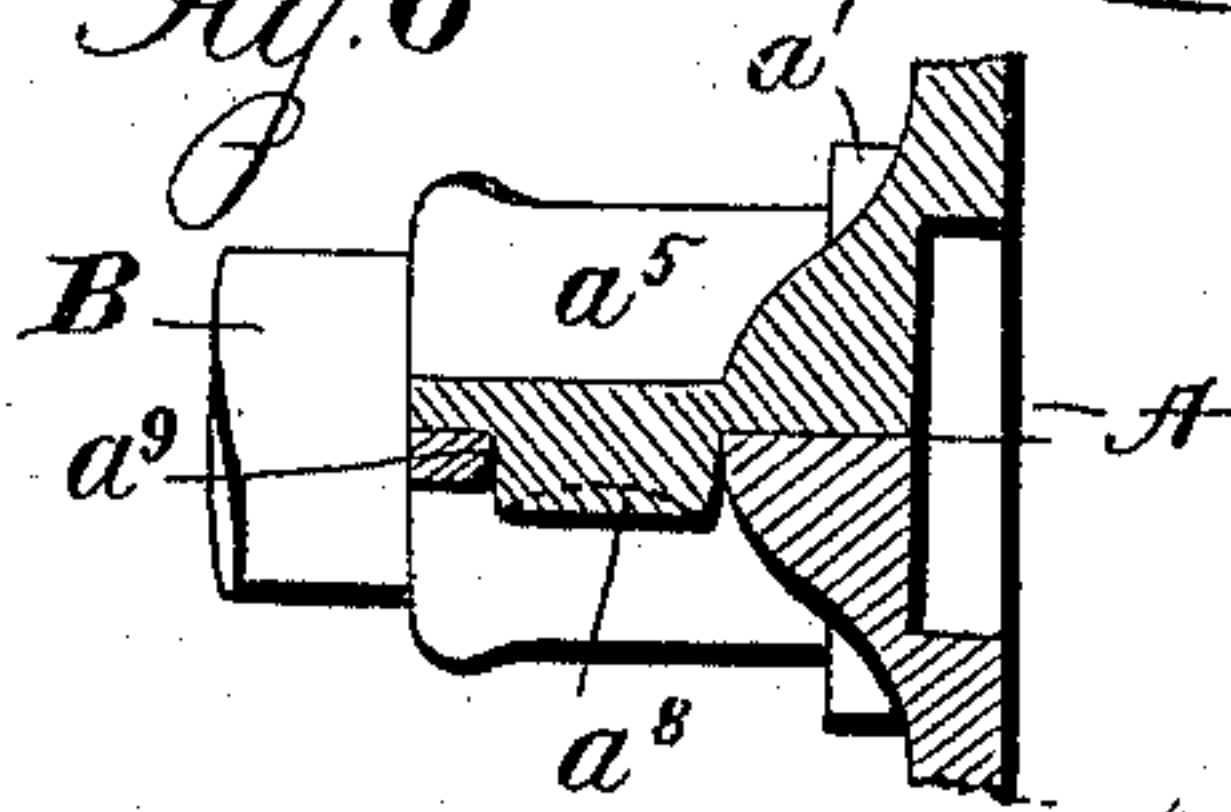


Fig. 6.



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Inventor.
James R. Little
by *Prindle and Russell*
his attorney

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Fig. 7.

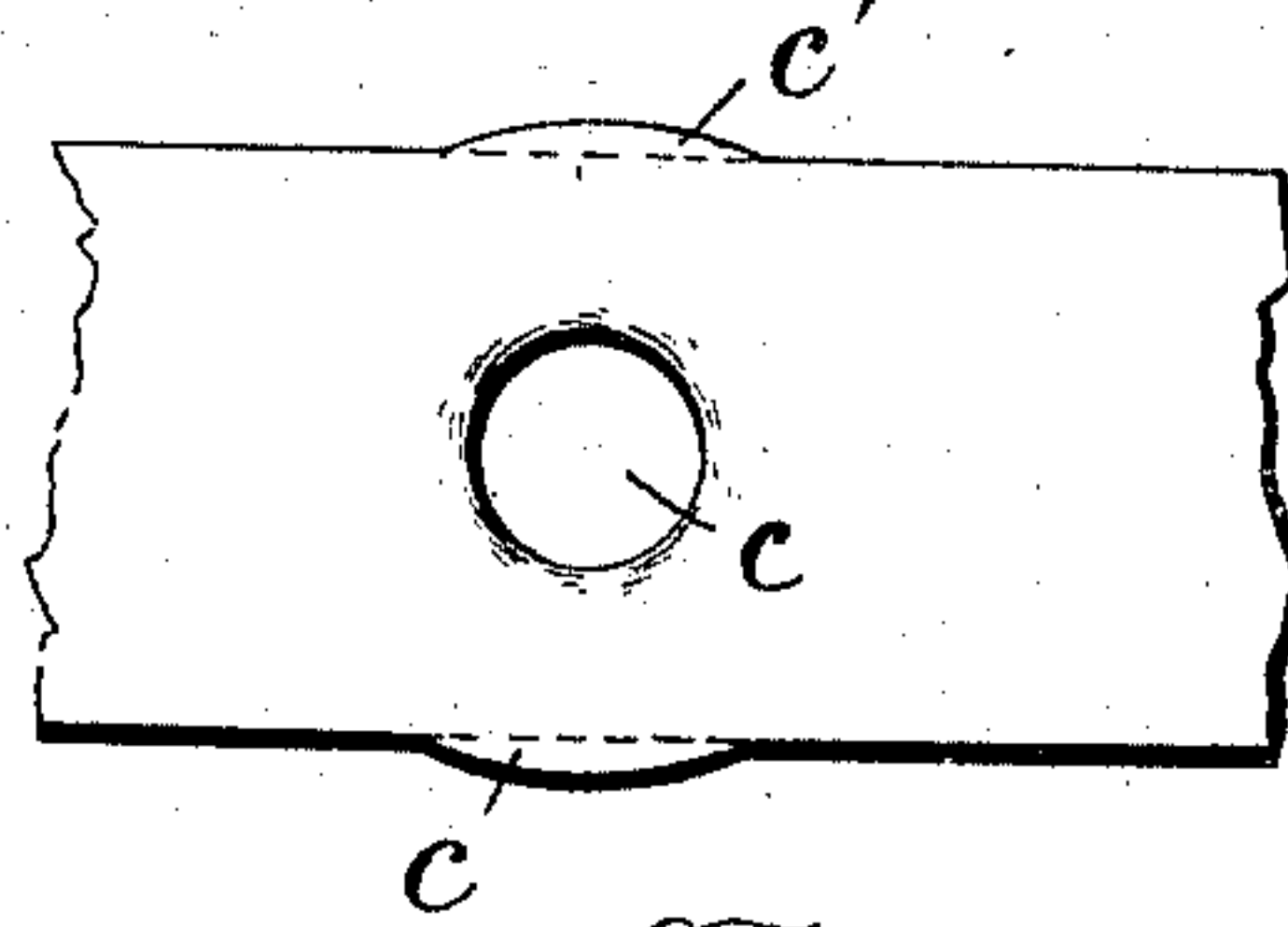
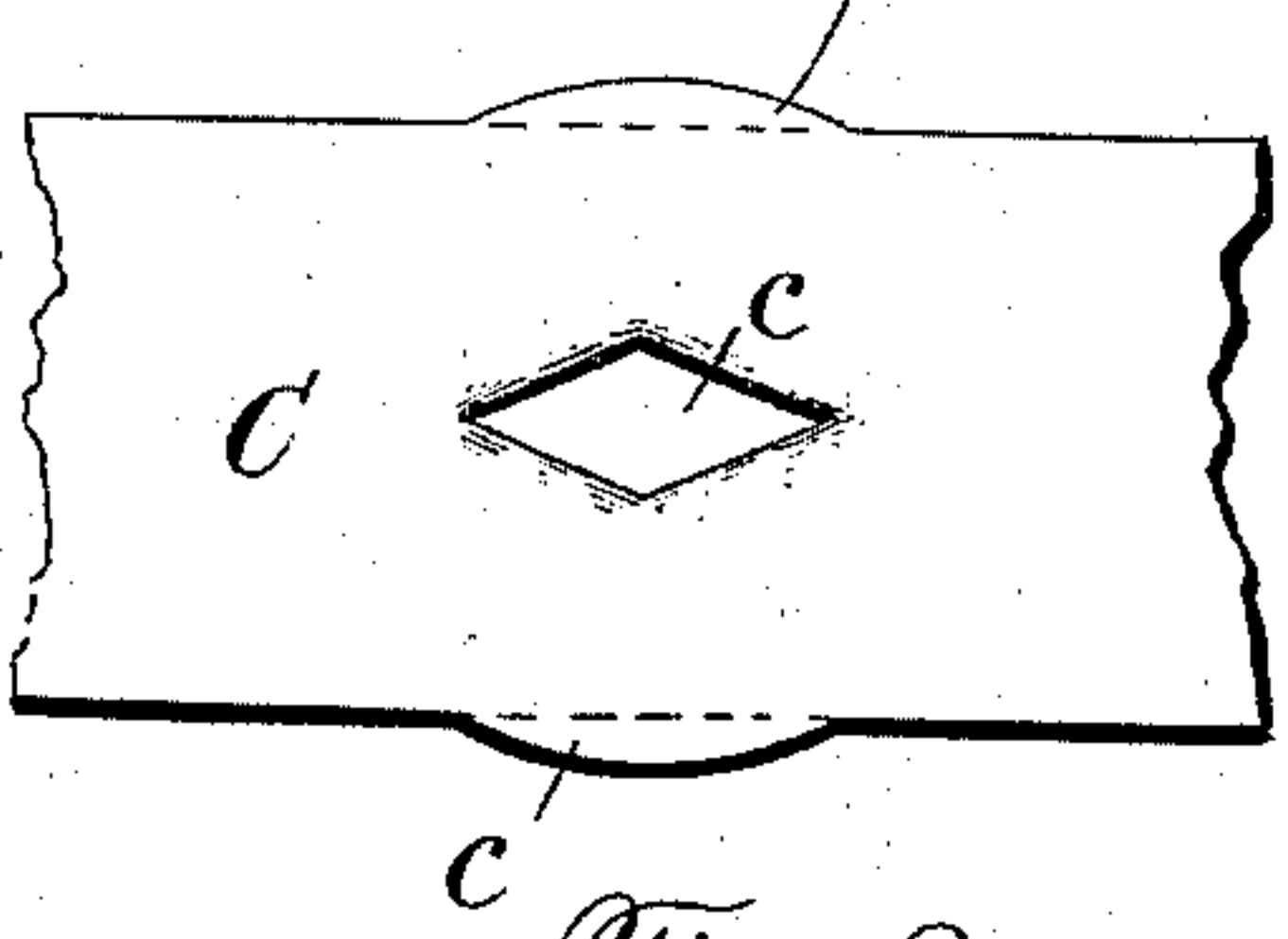
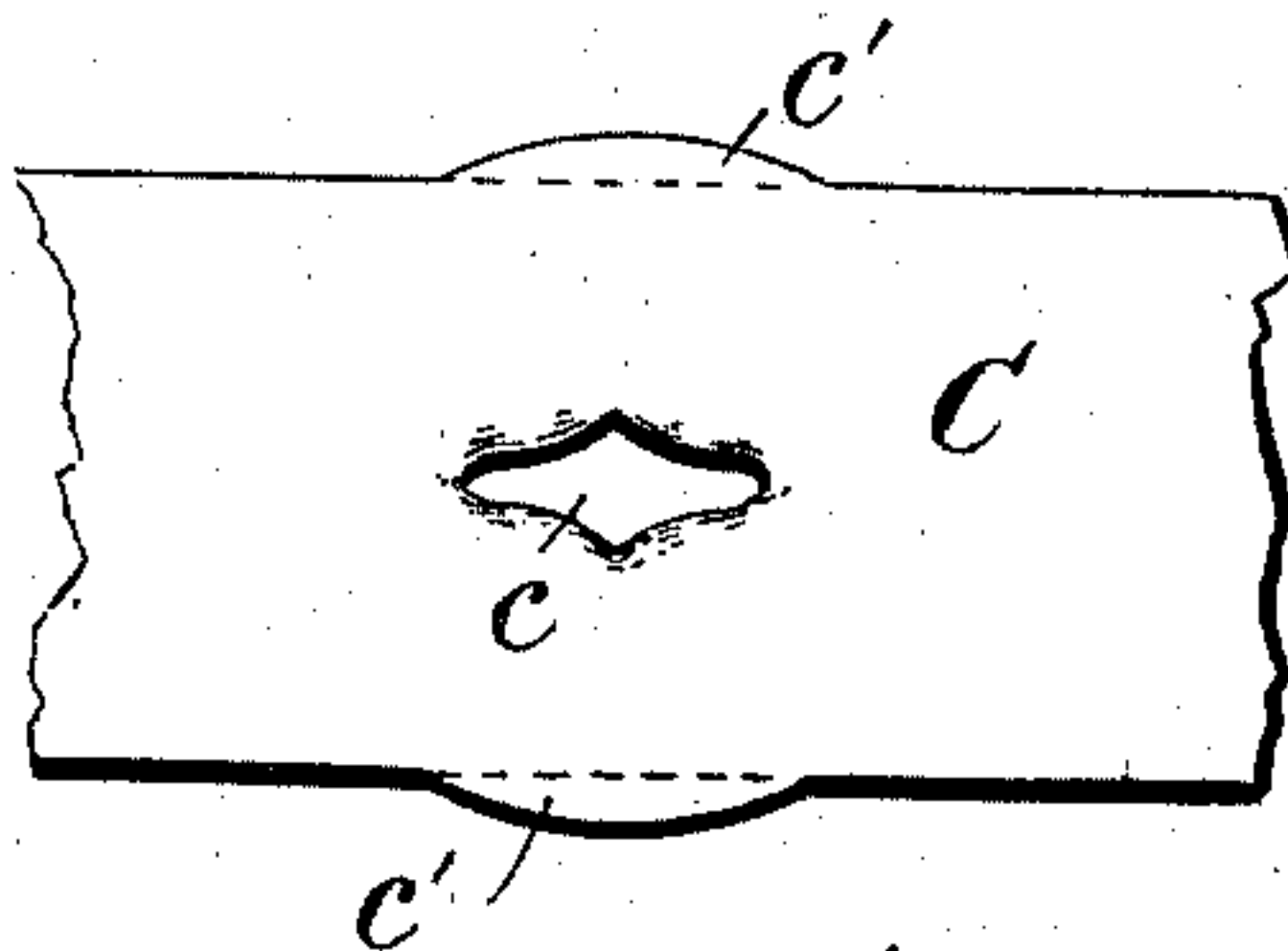
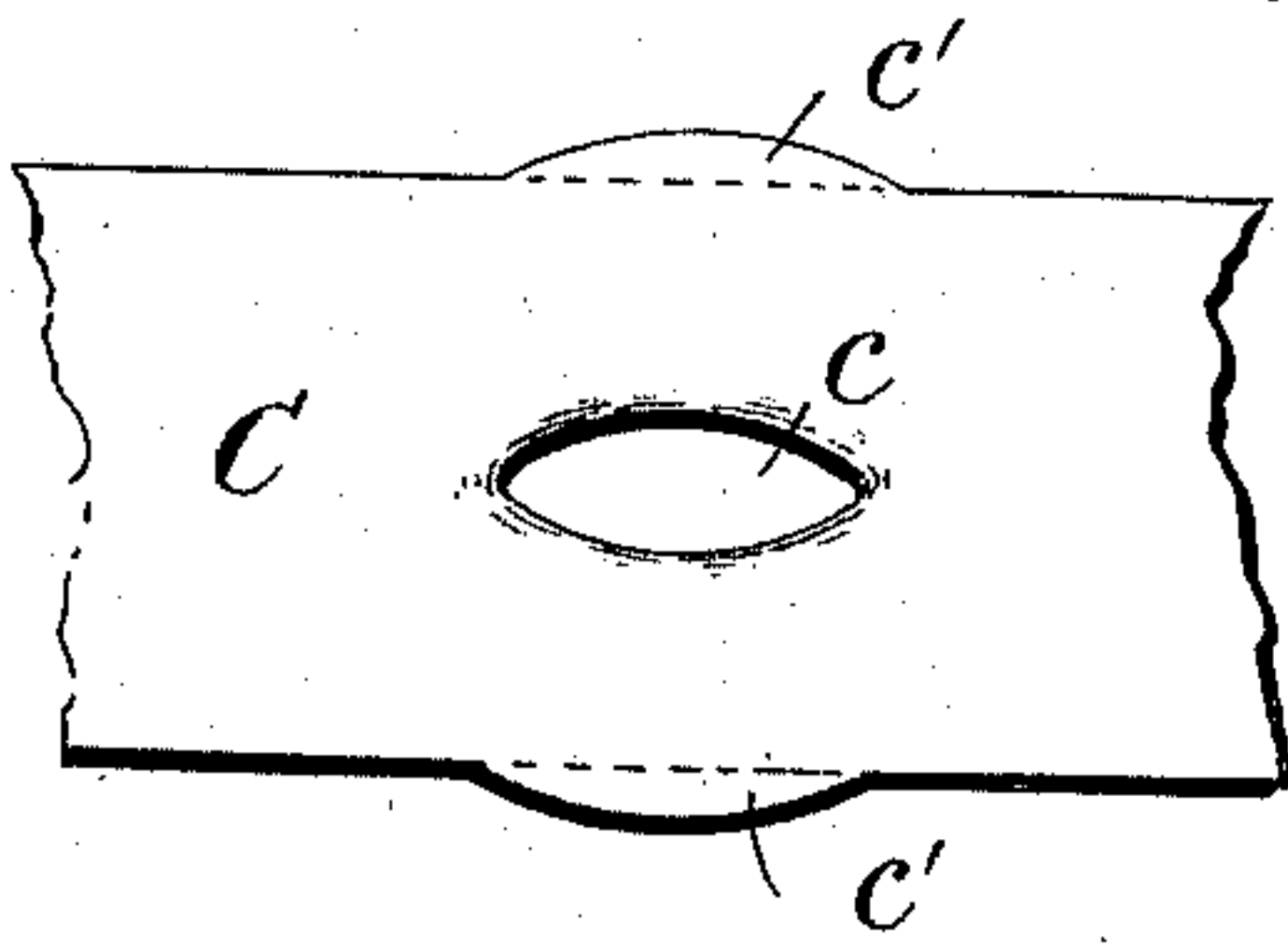


Fig. 8.

Fig. 9.

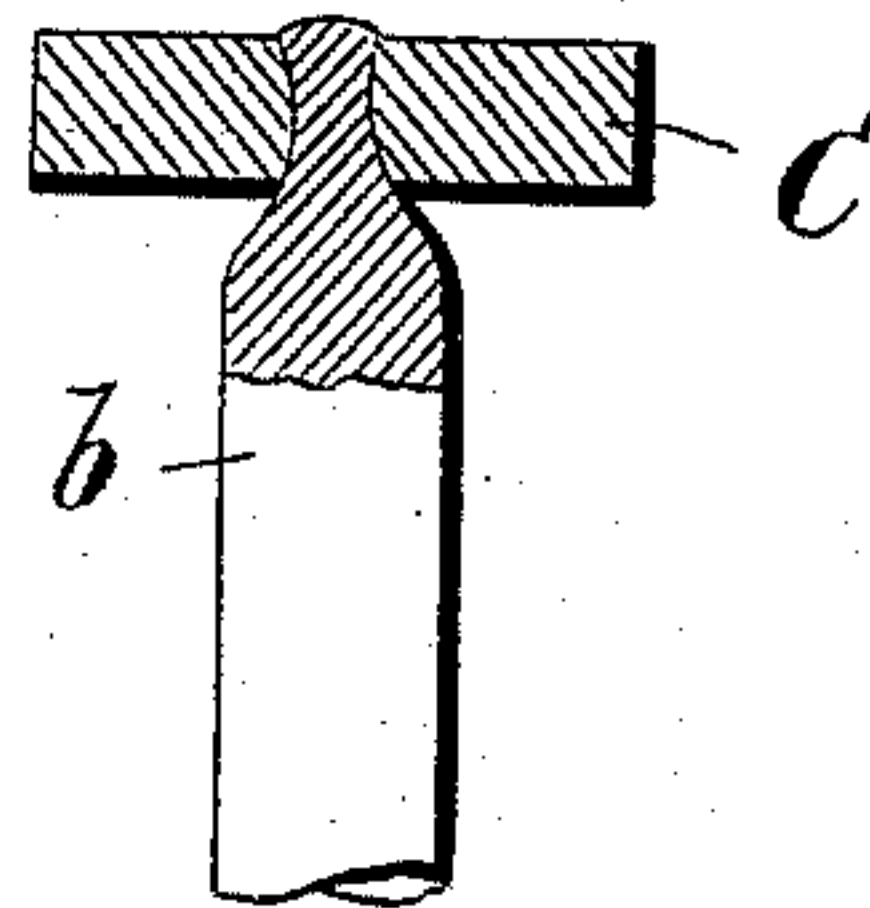
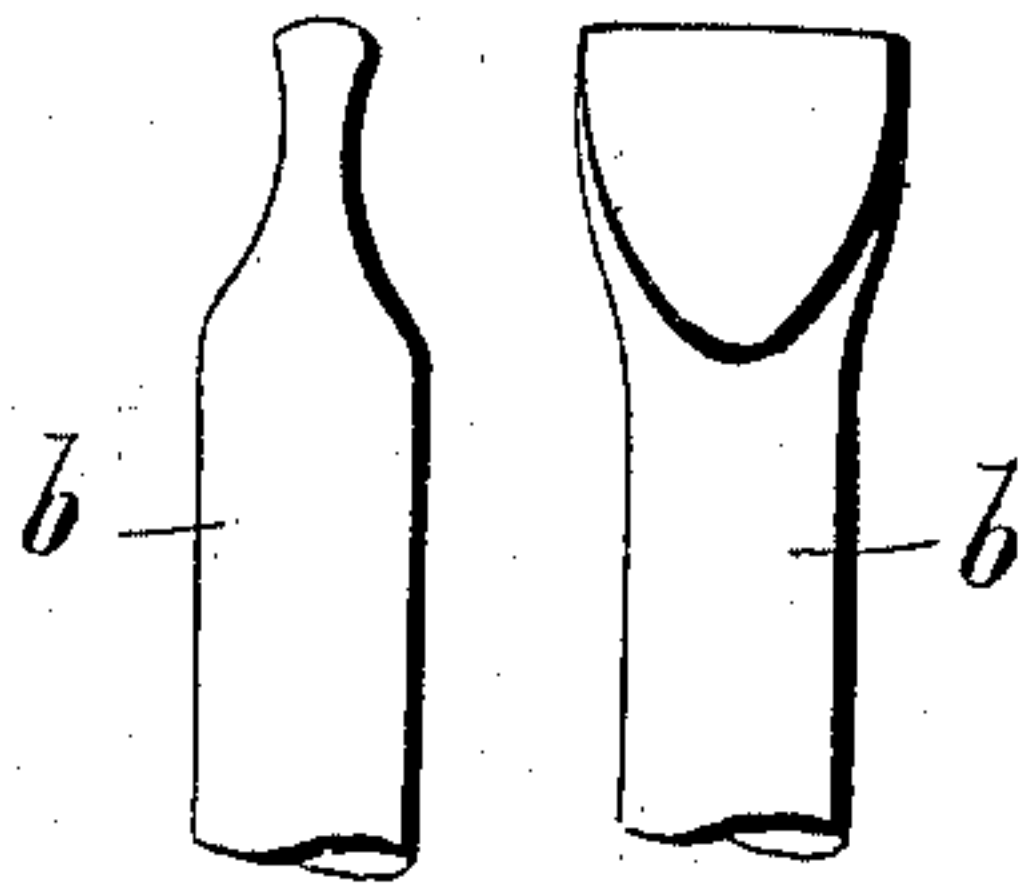
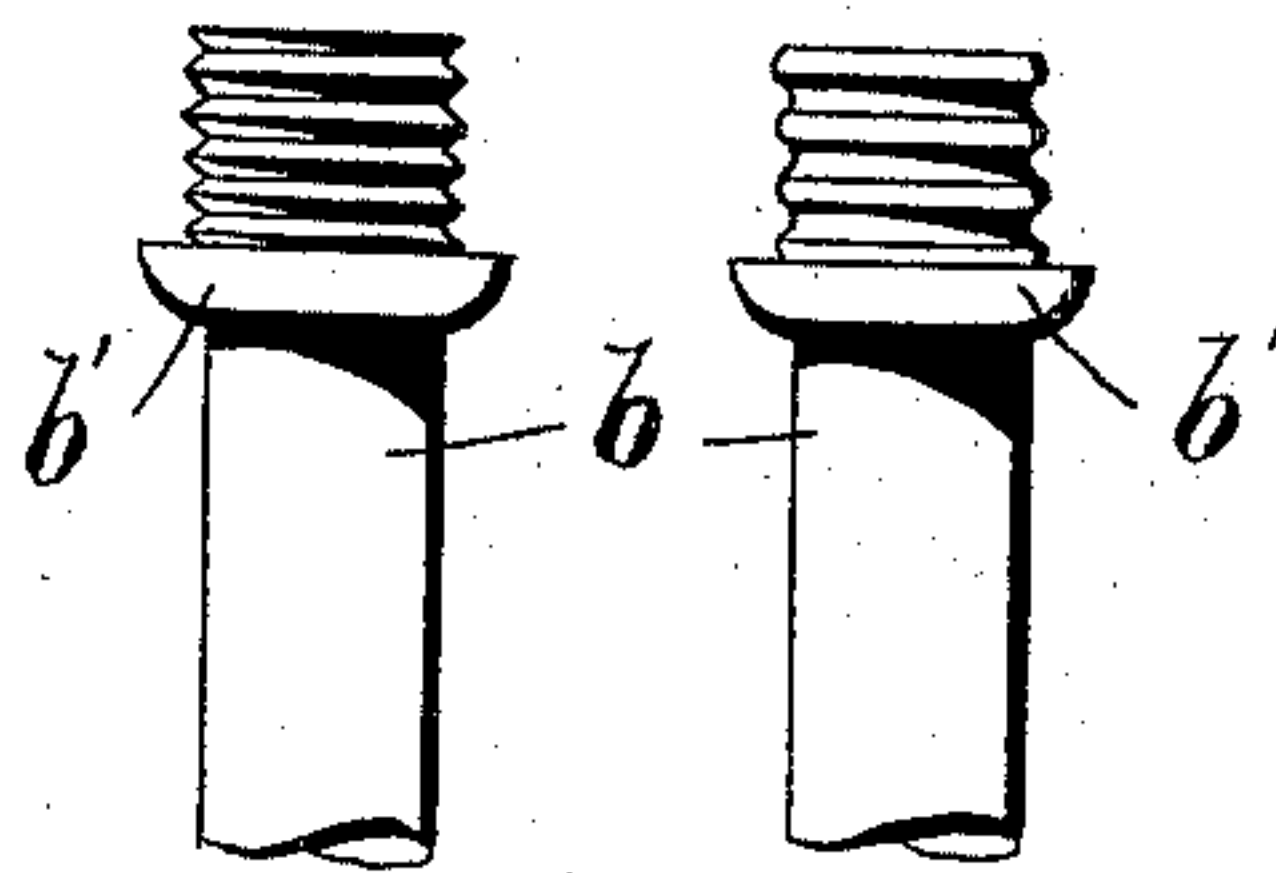
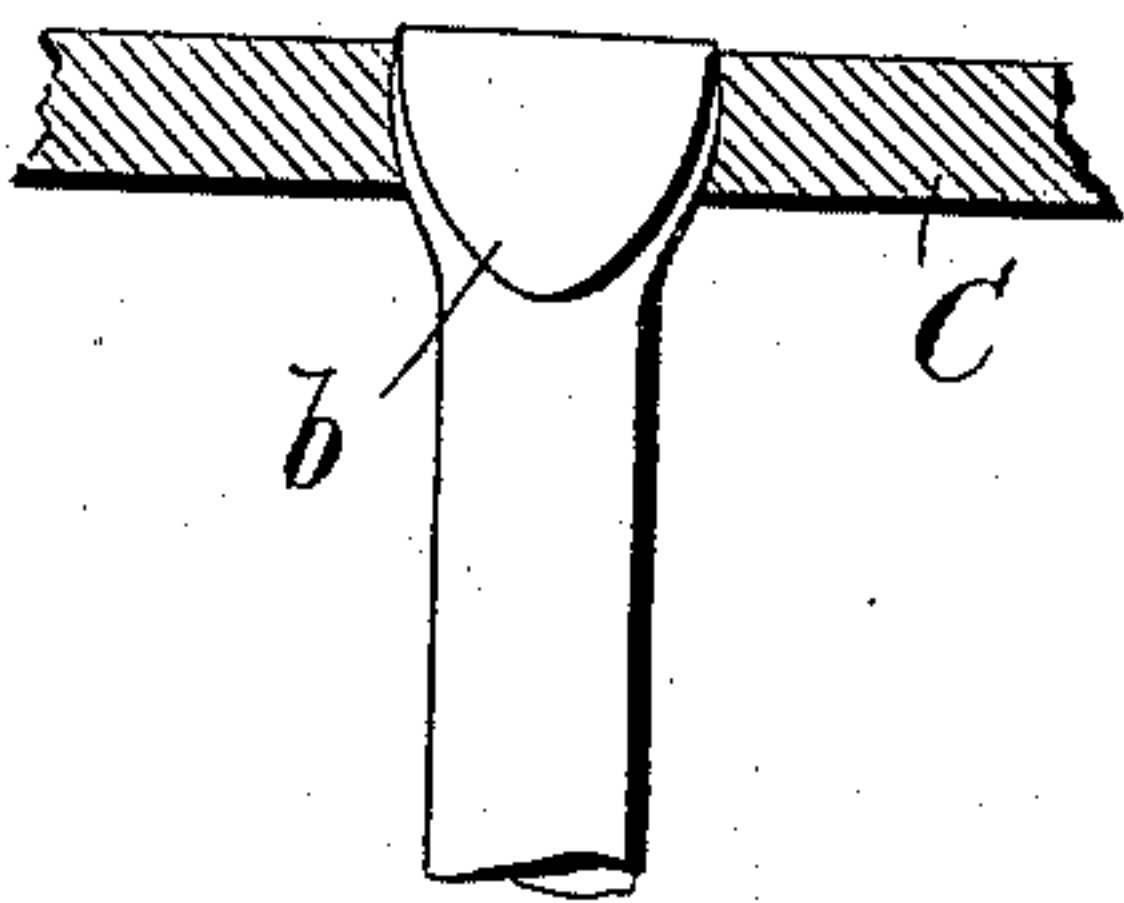


Fig. 10.

Fig. 11.



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UNITED STATES PATENT OFFICE.

JAMES R. LITTLE, OF QUINCY, ILLINOIS.

METAL WHEEL.

SPECIFICATION forming part of Letters Patent No. 488,439, dated December 20, 1892.

Application filed April 12, 1892. Serial No. 428,802. (No model.)

To all whom it may concern:

Be it known that I, JAMES R. LITTLE, a citizen of the United States, and a resident of Quincy, in the county of Adams, and in the State of Illinois, have invented certain new and useful Improvements in Metal Wheels; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1, shows a view in side elevation of a wheel made in accordance with my invention, parts of the rim and hub being broken away; Fig. 2, a view of a section on line x, x , of Fig. 1; Fig. 3, a view of a section through the hub, on a central plane at right angles to the hub axis, the portions of the spoke in and adjoining the hub, being shown as not in section; Fig. 4, a perspective view showing, on an enlarged scale, the two halves of the hub separated; Fig. 5, a detail view showing one of the hub halves, with a different form of spoke receiving cavity and spoke end; Fig. 6, a detail sectional view, showing the manner in which the hub halves are secured together; Fig. 7, a detail view, on an enlarged scale, showing portions of the wheel rim having different shaped spoke tenon receiving openings or mortises formed in them; Fig. 8, two views showing in elevation the form of spoke tenon for the first of the several forms of mortise shown in Fig. 7; Figs. 9 and 10, sectional views showing cross and longitudinal sections of portions of the rim, with the form of tenon shown in Fig. 8 compressed therein, and Fig. 11, a detail view showing in side elevation a tenon provided with screw-threads, and one having corrugations.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to produce an improved metal wheel, and to this end my invention consists in the wheel and in the parts thereof, constructed and arranged as hereinafter specified.

In the drawings, A designates the hub, B B the spokes, and C, the rim of the wheel, to which the outer ends of the spokes are secured in a new and improved manner, as shown in the drawings and described hereinafter.

The hub A, I form in two halves, the plane of division being at right angles to the hub

axis. Of these halves, one of which I call the male and the other the female half, each has the cylindrical portion a , to form one end of the completed hub, the annular enlargement a' , the series of radial cavities a^2, a^2 , to receive and partly inclose the portions of the spokes placed in them, the central bore a^3 and the offset or rabbet a^4 at the inner end of the latter, with which the cavities a^2, a^2 , communicate.

From the annular enlargement a' extend the radial half bosses a^5, a^5 , along within which run the spoke receiving cavities. These half bosses are connected together by webs a^6, a^6 , extending from the edge of one half boss to that of the next adjoining one. Along the outer sides of the half bosses, close to the webs a^6, a^6 , run the longitudinal ribs or ledges a^7, a^7 , forming abrupt shoulders for the engagement of the compressing dies, to be referred to hereinafter. The male hub half has, formed on or attached to its web portions a^6, a^6 , the inwardly extending riveting pins or projections a^8, a^8 , to engage and project through the corresponding rivet openings a^9, a^9 , in the female half, when the two hub halves are placed face to face. The completed hub, with the spoke ends, securely fastened therein, is formed from these half hubs, by inserting the spoke ends in their cavities a^2, a^2 , compressing the halves upon such ends, and heading down the riveting pins or projections a^8, a^8 , where they project through the opening in the female hub half as indicated in Figs. 1, 2 and 6. During such compressing operation, not only the enlargement on the hub halves, but also the half bosses a^5, a^5 , are firmly and closely compressed upon and about the spokes. The riveting or heading down of the pins or projections a^8, a^8 , secures the hub halves in the relative positions to which they are forced by the compressing devices.

Such devices, which need not be described at length in this present case, that has nothing to do with the means of making the wheel, but covering only the manufactured article, are preferably of the kind and operating in the manner set forth fully in my pending application Serial No. 424,854, being adapted as pressure is applied by a suitable press, to force the hub halves toward each other, compress them upon and around the inclosed portions of the spokes, and head down the riveting

pins or projections to lock the hub halves together in their compressed condition.

The parts of the die which engage the respective halves of the hub, are, as fully described in my said pending case, preferably, provided with abrupt surfaces to engage squarely the side or end of the enlargement a' , and the sides of the ribs or ridges a'' , a''' , on the half bosses, so that the compressing pressure will be applied directly to such portions, in such way, that the wedges of the die cavities will not become worn by rubbing over portions of the hub body or bosses. If the inner spoke ends are inserted between the hub halves, so as to project beyond the inner ends of the cavities a'' , a''' , into the rabbet or offset from the hub bore, they will, when the compression of the hub upon the spokes is completed, be a little longer than the compressed portions of the spokes, inclosed in the cavities, and will, consequently, form heads to engage the inner wall of the enlargements a' , a'' , on the hub halves. By these heads, and the uncompressed portions of the spokes outside of the hub bosses, the spokes and hub are interlocked. The interlocking can be secured in another way, by providing the cavities in the hub halves with offsets to receive enlarged portions b'' on the spokes (see Fig. 5); such enlargements being formed either before the insertion of the spokes between the hub halves, or afterward, during the compression, by the flow of the metal of the compressed spokes into the cavity offsets; or the arrangement shown can be reversed, the hub cavities being provided with ribs or projections to be pressed into the spokes. The outer ends of the spokes are, as shown in the drawings, secured in the rim in a peculiar way, the metal of the rim being spread, so as to leave openings or mortises, and afterward being forced in again or compressed upon portions of the spokes inserted in such openings. The process by which this securing is obtained, is fully set forth and described in my pending application Serial No. 428,803 and need not, therefore, be explained at length herein.

The spreading of the rim to leave the mortises c , c' , to receive the spoke ends or tenons b thereon, can be secured by means of round nosed punches or chisels used to penetrate divide and spread the rim metal without any previous punching of the rim, or to simply spread the rim after small holes have been cut or punched out at the points where the mortises are to be.

The narrow elliptical mortises shown in Fig. 7 are made with a flat round nosed chisel, with its sides inclined, so that the greater part of the spreading of the metal is toward the sides of the wheel rim, producing swells or bulges c' , c'' , on the rim edges. There is, however, some spreading of the metal of the rim in a longitudinal direction, such as is caused to a greater extent by the chisels or punches for forming the other shaped mortises, seen in Fig. 7. The rim openings or mortises having

been thus formed with a dividing and spreading of the metal, the spoke ends, formed into tenons to enter the openings, are inserted therein, and then the spread metal is forced inward and compressed upon them in any desired way, so as to grip and hold them most firmly in the rim. The metal which has been spread sidewise with reference to the rim, so as to form the swellings or bulges on the rim edges, can be forced inward, after the spoke tenons are inserted in place, by suitable dies or pressing devices applied directly to the rim on opposite sides thereof, while the longitudinally spread metal can be driven, pressed, or forced toward and upon the spoke tenons by suitable rim clamping dies, or other devices, as desired.

As my present case has nothing to do with the means or mechanism by which the wheel is produced, but only with the wheel and its parts as made, it is not necessary for me to describe said devices herein.

The tenons b , b' , on the spoke can be formed in any desired way by a shaping of the spoke end, with an upsetting of a portion of the spoke, if a tenon thicker than the rod forming the main part of the spoke is desired.

I contemplate providing each spoke with a shoulder or enlargement b' , as shown in Fig. 11, to engage the inner face of the rim, when the tenon is in place thereon, such shoulder being formed either before or during the rim compressing operation. The said shoulder can, of course be present, and be employed with any form of spoke tenon.

In order that there may be an interlocking of the contacting surfaces of rim and tenon, the latter can be made to have an enlargement or head on its further end, as shown in Fig. 8, or can be threaded or corrugated, as indicated in Fig. 11. Either the tenon, or mortise, or both, can be thus threaded or corrugated without departure from my invention, the result being in either case, the same; viz:—an interlocking of the surfaces of tenon and mortise, when the spread rim metal is compressed or forced upon the tenon. Where the rim is in a cold state during the compressing operation, the tenon, if formed without the enlargement or head on its outer end, will, by the pressure of the rim metal upon it, be caused to have such a head after the rim compression, as indicated in the cross sectional view shown in Fig. 9, because of the greater confinement and compression of its inner portion entirely inclosed in the rim mortise.

The spokes can be fastened to the rim, as described, either one at a time, or all together, and either before, after, or at the time that their inner ends are secured to the hub. The rim, as operated upon can be a welded or unwelded one, and its spread parts, to be compressed upon the spoke tenons, can be heated by any desired appliance before or during the compression. Such heating is not necessary, in order that the compressing may be per-

formed, but makes the latter easier and besides secures a shrinking of the compressed metal upon the spoke tenon, during the subsequent cooling, which may tighten the grip of the rim upon said tenon.

My wheel, made and having its parts arranged and constructed and shown and described, is most solid and rigid in structure, having a hub which, while strong and compact, is capable of being very cheaply made, and its spokes secured to both hub and rim most firmly and effectually, so that they cannot get loose at either end, even after long continued usage of the hardest kind.

I do not claim or intend to cover by the claims, in the present application, a wheel in which the rim, having its spoke receiving mortises made by cutting or punching out portions of the rim metal without spreading of the latter, is secured to the spokes by being compressed upon portions of them inserted in the mortises, as such a wheel is covered by my pending United States application Serial No. 428,805.

Having thus described my invention, what I claim is—

1. As an article of manufacture, a wheel having its hub made in separate parts inclosing portions of the spokes and fastened together, and the outer ends of its spokes fastened to the rim by portions of the latter being compressed upon them, substantially as and for the purpose specified.

2. As an article of manufacture, a wheel having its hub made in separate parts compressed upon portions of the spokes, and fastened together, and the outer ends of its spokes attached to the rim by tenons inserted in holes made by spreading the metal of the rim and secured there by compression of the spread metal upon them, substantially as and for the purpose shown.

3. A wheel having its hub made in separate parts which are compressed upon portions of the spokes, so as to compress the material of the latter and hold the spokes without welding, and are secured to each other, so as to maintain the compression of the inclosed spoke portions, substantially as and for the purpose described.

4. In a wheel, in combination with the spokes, the hub made in separate parts compressed upon portions of the spokes and riveted together, substantially as and for the purpose specified.

5. In a wheel, in combination with the spokes, the hub made in two halves, provided with cavities to receive the portions of the spokes, one half having rivet openings, and the other being provided with riveting pins or projections entering the openings in the other half, and headed down, substantially as and for the purpose shown.

6. In a wheel, in combination with the spokes, the rim having openings or mortises receiving the spoke ends, made by spreading the metal of the rim and its spread metal forced in upon the spoke ends, substantially as and for the purpose set forth.

7. In a wheel, in combination with the spokes provided with tenons to enter the openings in the rim, the rim having its spoke tenon-receiving openings made so as to spread its metal, and the portions so spread compressed upon the spoke tenons, substantially as and for the purpose shown.

8. In a wheel, in combination with the rim having the spoke receiving openings made so as to spread its metal, the spokes having portions inserted in the openings and gripped by the metal of the rim compressed upon them, such portions of the spokes being formed so that they interlock with the engaging metal of the rim, substantially as and for the purpose specified.

9. In a wheel, in combination with the rim having spoke tenon receiving openings, made so as to spread the metal of the rim, the spokes having tenons engaging such openings, fastened therein by compressing and shrinking the spread metal upon them, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 24th day of February, A. D. 1892.

JAMES R. LITTLE.

Witnesses:

THEODORE B. POPE,
S. DEIDESHEIMER.