

(No Model.)

A. R. MILLER.  
VEHICLE WHEEL.

No. 391,377.

Patented Oct. 16, 1888.

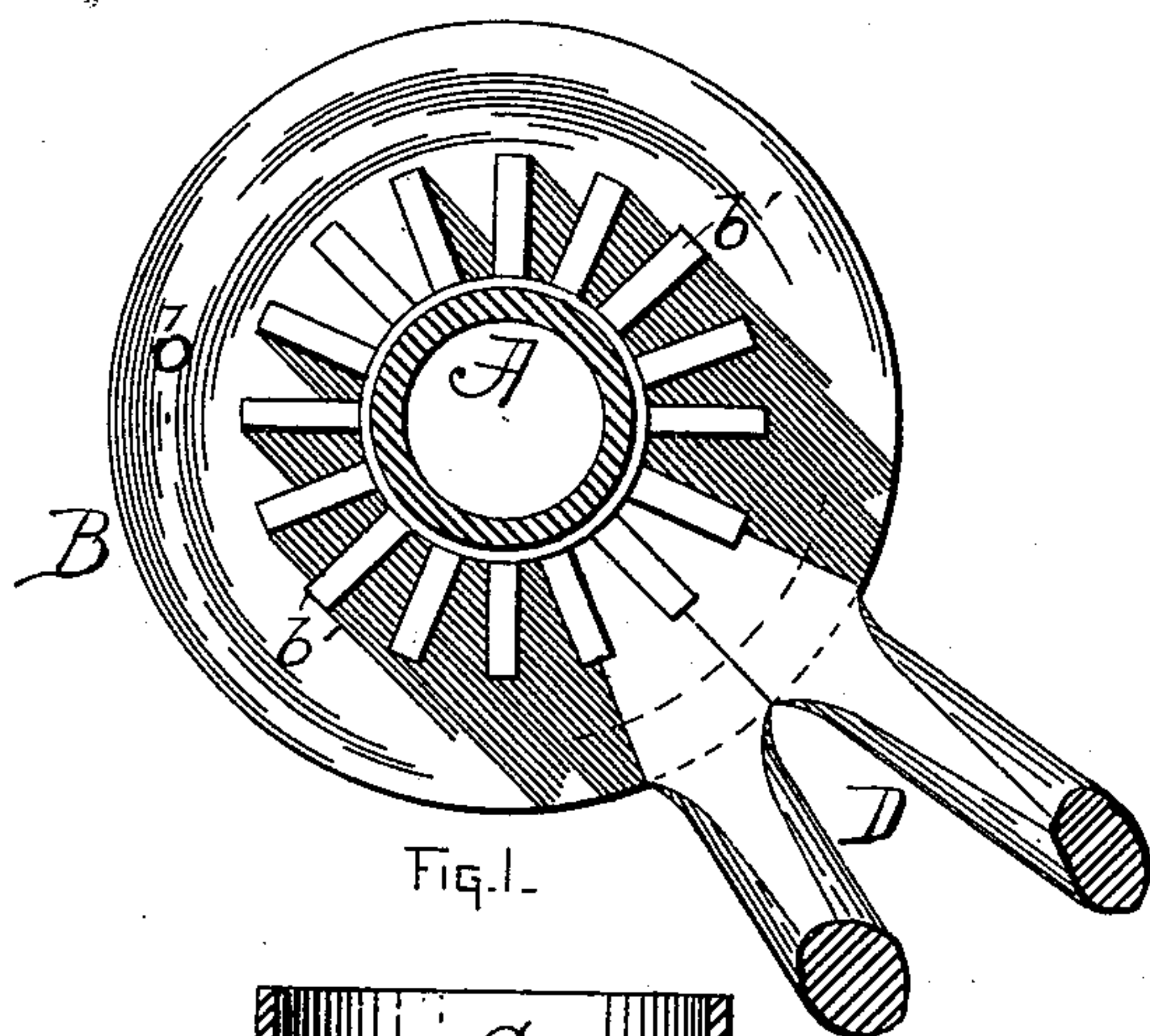


FIG. 1.

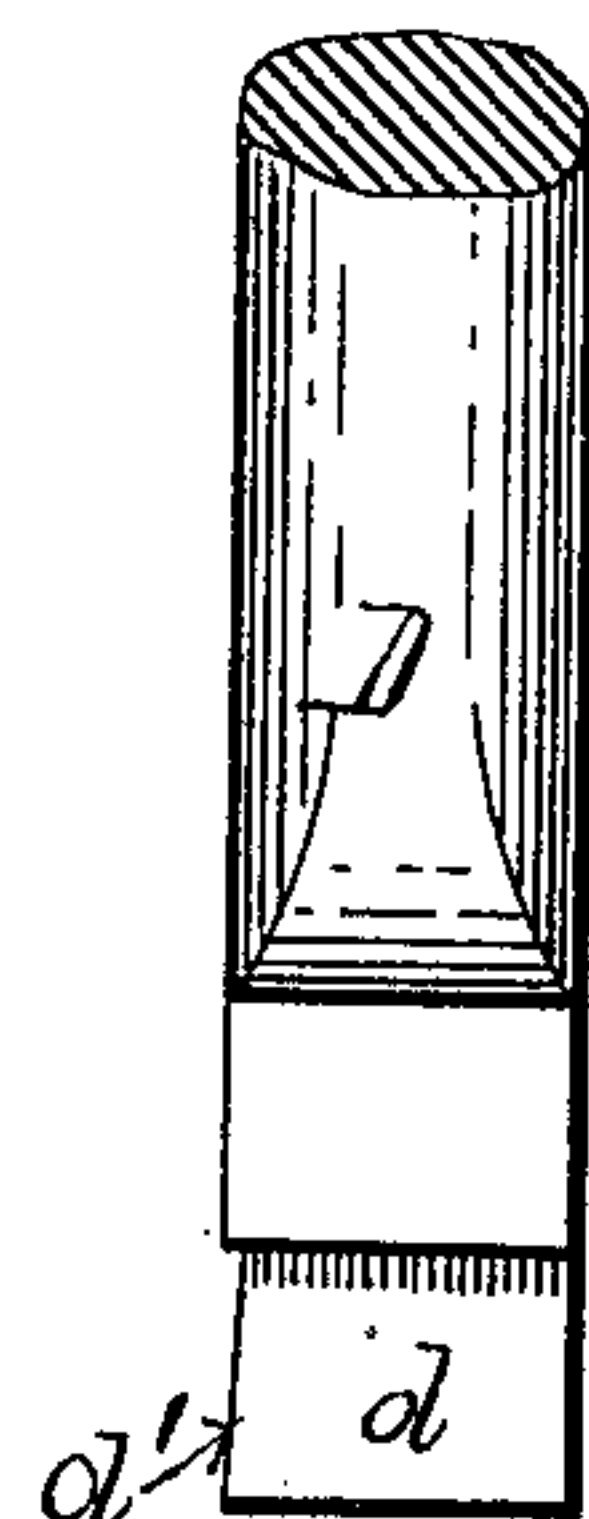


FIG. 3.

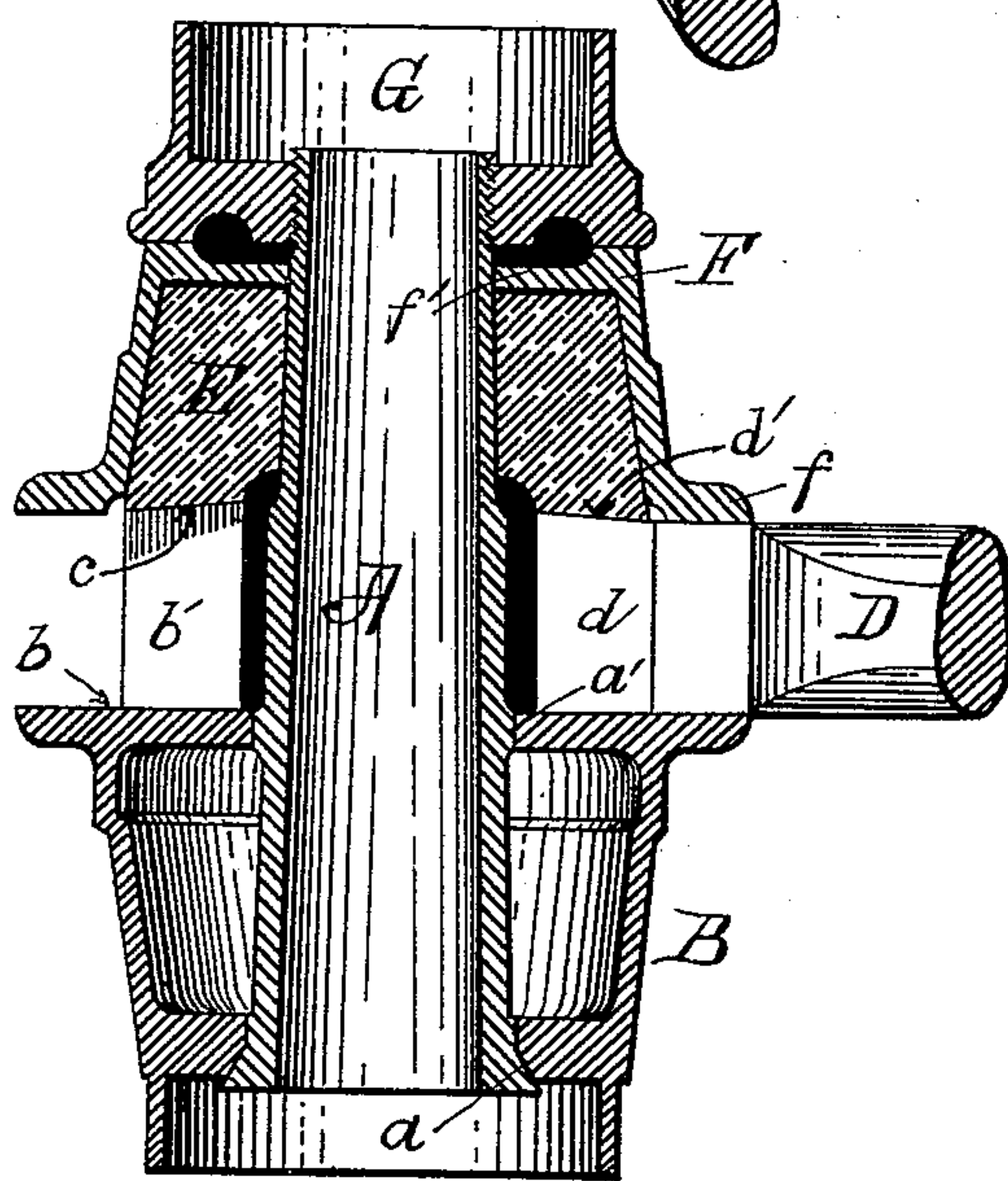


FIG. 2.

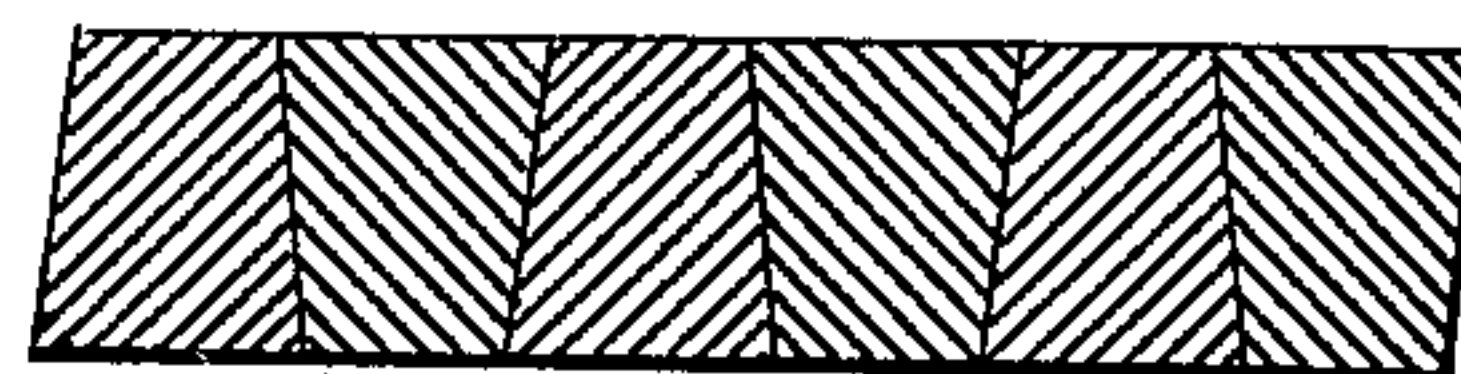


FIG. 4.

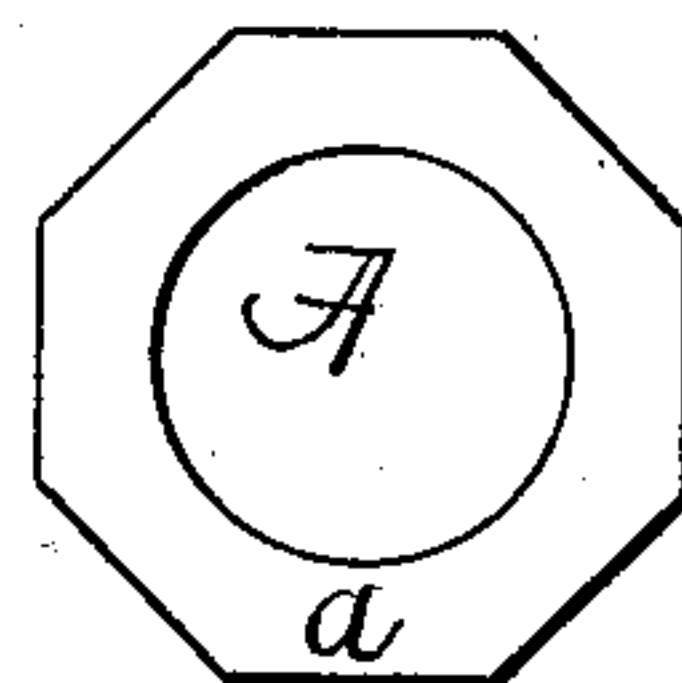


FIG. 5.

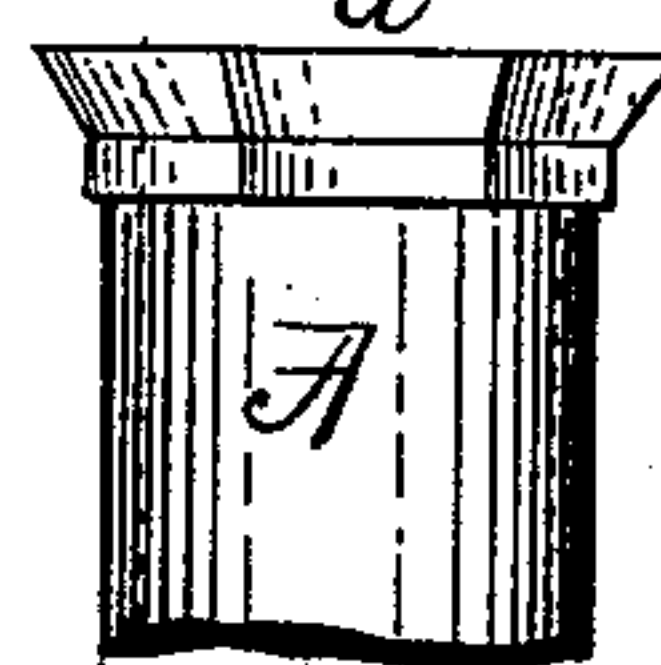


FIG. 6.

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By his Attorney  
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# UNITED STATES PATENT OFFICE.

ASA R. MILLER, OF ATLANTA, GEORGIA.

## VEHICLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 391,377, dated October 16, 1888.

Application filed June 1, 1888. Serial No. 275,771. (No model.)

*To all whom it may concern:*

Be it known that I, ASA R. MILLER, a citizen of the United States of America, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Vehicle-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, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

The object of this invention is to so improve vehicle-wheels as to make them stronger, more durable, and more easily repaired; and it relates to the construction of the hub and the form of the spokes and their attachment to the hub.

The invention consists of an axle-box on which is fitted one end of the hub, having a flange against which one side of the spokes is pressed, and having radial flanges between which the spokes are inserted, a wooden ring having a conical concavity on one of its ends to press against correspondingly-formed edges of the spoke-tenons, and a dish-shaped washer forming the greater part of the other end of the hub, a nut by which the whole is clamped together, forming the remainder of that end of the hub, the several parts being constructed and arranged substantially as will be hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a section through the axle-box, showing the flange against which the spokes rest and the radial flanges. It also shows two spokes in position. Fig. 2 is a central longitudinal section through the hub on the center line of two opposite spokes, one spoke only being shown. Fig. 3 is a side view of a spoke, showing the dovetail on the tenon as being cut into the spoke to the depth of its inclination, instead of being raised from it, as shown in Fig. 2. Fig. 4 is a section through several spokes on the line  $x x$ , Fig. 1, showing the alternating bevels on the spokes. Fig. 5 is an end view of the larger end of the axle-box. Fig. 6 is a side view of a portion of the same end.

In the drawings like reference-marks indicate corresponding parts in the several views.

A is the axle-box, which also performs the additional function of binding together the several parts of the hub which is constructed upon it. On the inner or larger end of this axle-box is a shoulder,  $a$ , preferably of conical form, and having a number of flat sides to suit the corresponding seat in the end of the hub. The portion, B, of the hub that forms the inner end and carries the disk-shaped flange  $b$  and the radial flanges  $b'$  is also fitted to an annular projection,  $a'$ , on the axle-box.

The radial flanges  $b'$  are of a number corresponding with the spokes, and have between them a wedge-shaped opening for the tenons  $d$ , the balance of that portion of the spoke that is within the circumference of the flange  $b$  being also wedge-shaped and of such a width and angle as will cause the spokes to cover the entire flange. The form in cross section of the spoke in the part last described—that is to say, between the shoulders of the tenons  $d$  and the outer edge of the flange  $b$ —is shown in Fig. 4, in which they are shown as being beveled alternately on their sides, by reason of which each alternate spoke may be placed in position with the thick edge on the flange  $b$ , and the intermediate ones, having reverse bevels on their sides, be driven in edgewise between them, which will avoid the necessity of driving on the ends of the spokes, by reason of which the outer ends of the spokes may be tenoned before the spokes are put into the hub, which will save a considerable expense in the construction of the wheel. The spokes, being inserted between the flanges  $b'$  and driven to a bearing on the flange  $b$ , are held in that position by the wooden ring or ring of other elastic or compressible material, E, having a conical concavity,  $c$ , to rest against the correspondingly-shaped edges  $d'$  of the tenons  $d$ , the result of which is a dovetailed joint between the spokes and ring E that will prevent the accidental withdrawal of the spokes. The ring E is inclosed by the dish-shaped washer F, that fits, by its flange  $f$ , on the edges of the spokes, as shown in Fig. 2, and by the web  $f'$  fitting the axle-box, the flange  $f$  and ring E being pressed against the spokes by the nut G, which is screwed on the end of the axle box A.

In the construction of these wheels it is preferable to make the ring E of such a length as will cause it to press somewhat harder on the



spokes than will the flange of the washer, as it, being of a compressible material, will more readily form a perfect contact with the spokes.

In the putting up of these wheels I apply a great pressure on the flange *f*, to cause as perfect a bearing on the spokes as is possible, and thereby compress to a somewhat greater degree the tenons *d*, which extra pressure, being at the smaller and extreme part of the spoke, is not detrimental to its strength, but acts, in conjunction with the dovetailed joint, to prevent its withdrawal, and by the compression of the tenons edgewise causes them to fill the spaces between the radial flanges. The nut *G*, being screwed on while the other parts are held in this position by pressure, as above described, will hold them in that position. Whenever it is necessary to remove and replace any of the spokes, the nut must be unscrewed and the ring and washer taken off. After inserting new spokes the ring *E* should be replaced in the same position as to the remaining spokes as it was before removal, as it, being compressi-

ble, will have been somewhat changed in form on its concaved surface by the greater or less density or degree of hardness of different spokes. When only a small number of spokes have been renewed, the nut will have sufficient force to seat the washer and ring. 25

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is— 30

In a vehicle wheel, the axle-box *A*, ring *E*, washer *F*, and nut *G*, in combination with the hollow part *B*, provided with flange *b* and the radial flanges *b'*, and spokes *D*, which have the tapered portion of the part which enters the hub dovetailed, and its extremity formed into a tenon, *d*, to fit between said radial flanges, substantially as shown and described. 35 40

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

ASA R. MILLER.

Witnesses:

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A. A. WOOD.