

(No Model.)

A. D. COLE.
TURBINE WHEEL.

No. 364,804.

Patented June 14, 1887.

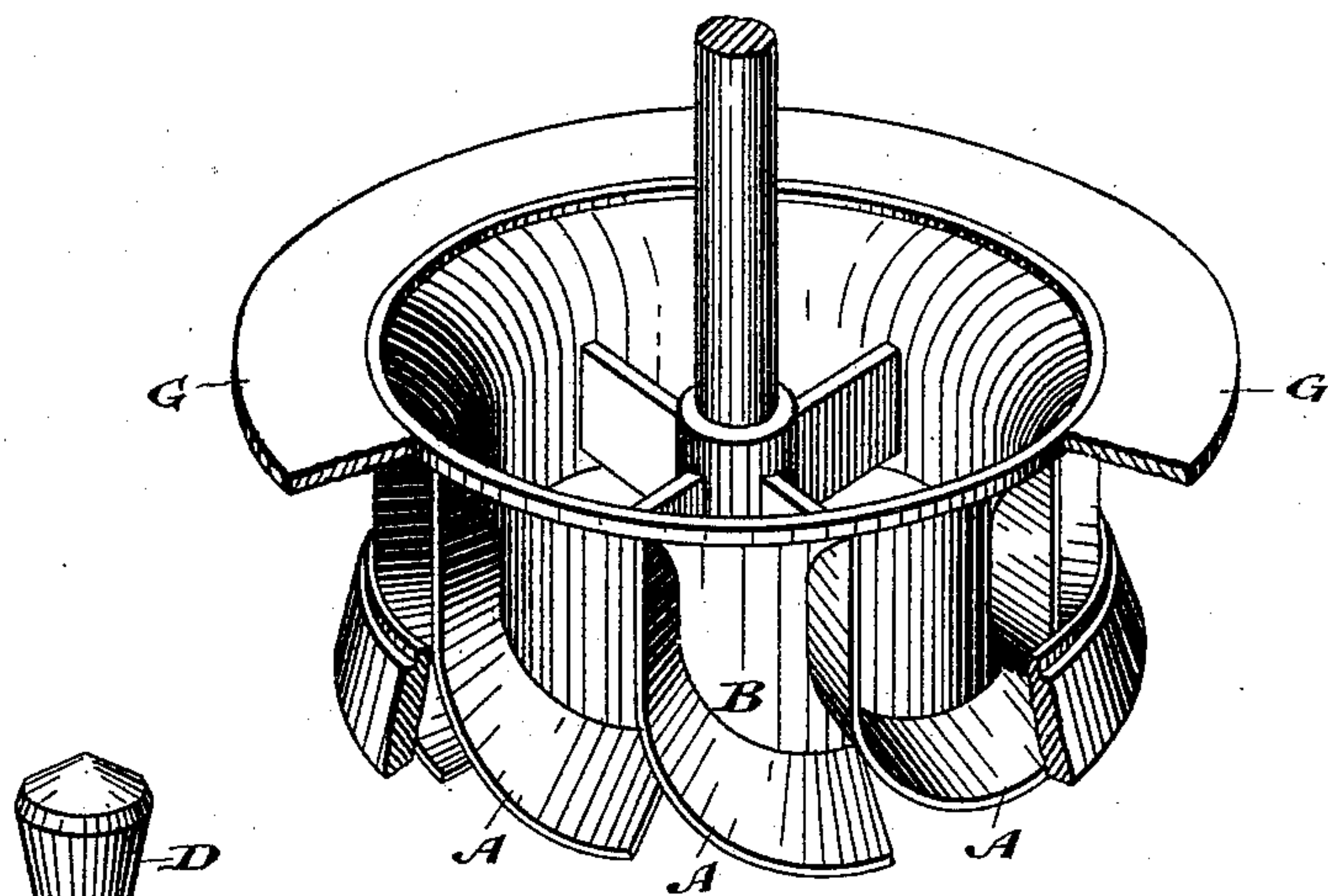


Fig.1.

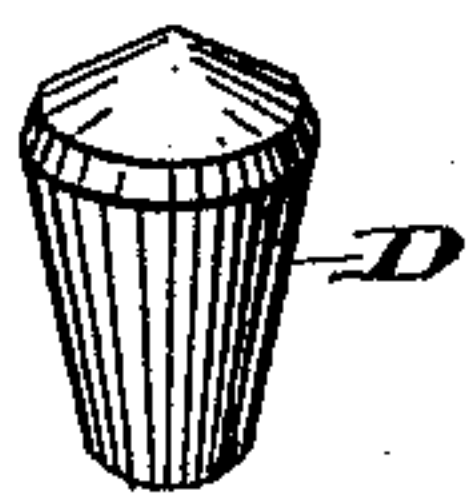


Fig. 4.

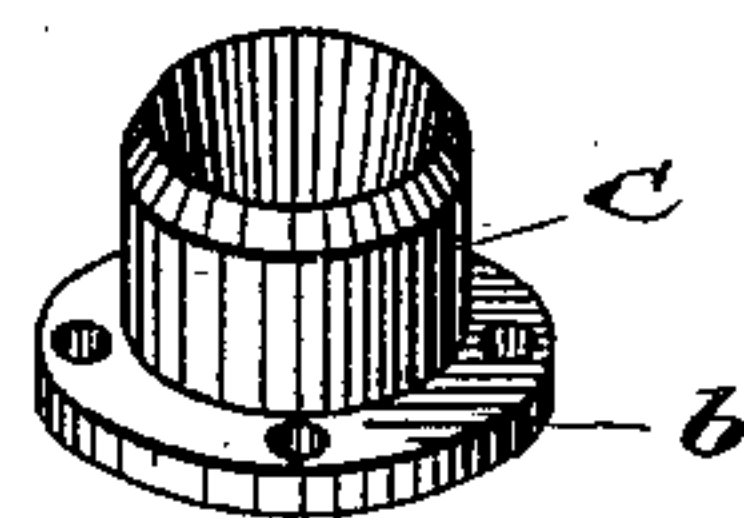


Fig. 5.

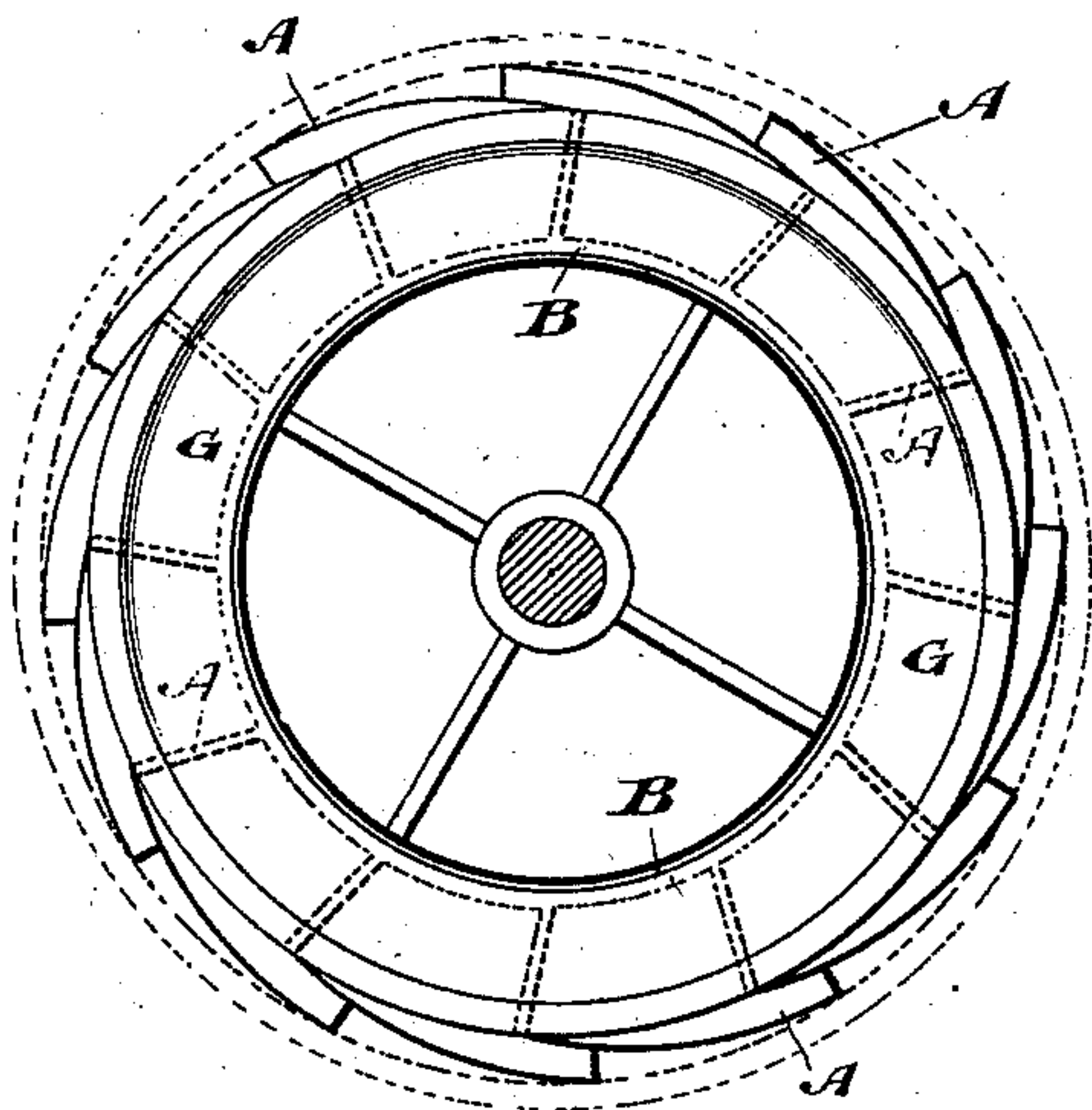


Fig. 2.

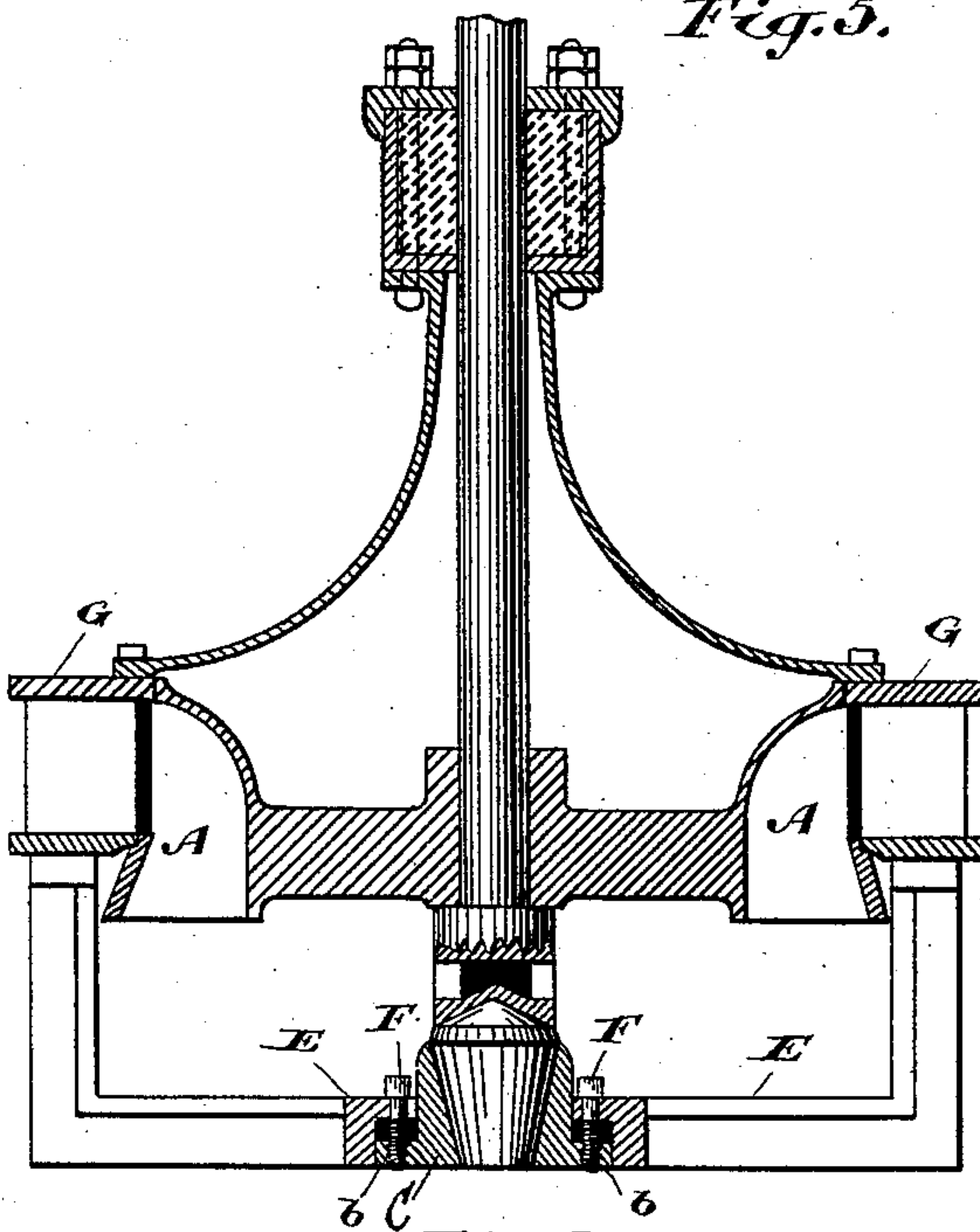


Fig. 3.

Witnesses.

F. B. Fetherstonhaugh

J. M. Jackson

Inventor:

A. J. Cole

by Enald. C. Ridout of
Atty

UNITED STATES PATENT OFFICE.

ASHLEY D. COLE, OF TORONTO, ONTARIO, CANADA.

TURBINE WHEEL.

SPECIFICATION forming part of Letters Patent No. 364,804, dated June 14, 1887.

Application filed January 3, 1887. Serial No. 223,173. (No model.)

To all whom it may concern:

Be it known that I, ASHLEY DODGE COLE, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, millwright, have invented certain new and useful Improvements in Turbine Wheels, of which the following is a specification.

The object of the invention is to provide a step for the turbine wheel which may be readily adjusted vertically and removed at will without disturbing the wheel; and it consists in the peculiar combination and the novel construction, arrangement, and adaptation of parts, substantially as hereinafter more particularly explained.

Figure 1 is a perspective sectional view of the wheel, showing the form and arrangement of the buckets. Fig. 2 is a plan of the same. Fig. 3 is a sectional elevation of the wheel, showing the adjustable step in position. Fig. 4 is a perspective detail of the step, and Fig. 5 is a perspective detail of the step-socket.

In the drawings, A represents the buckets, which are made of sheet metal shaped and set in position as indicated in Figs. 1 and 2. The line of each bucket, it will be noticed, is vertical for about two-thirds of the depth of the center B, and is then curved gradually until it reaches the bottom of the center B, at a short distance from the bucket immediately next to it.

Instead of setting the buckets A so as to radiate from the center of the wheel, each bucket, it will be seen on reference to Fig. 2, is set on a tangent from the center. Consequently they offer no resistance to the contraction of the cast metal during the process of its cooling, and therefore the metal will not crack.

It will be evident that when the buckets are set radially they offer considerable resistance to the shrinking of the top of the cast-metal center B; but when set tangentially the cast metal as it cools and shrinks only bends the sheet

metal slightly more tangentially, and thus the cracking of the cast metal is prevented.

C is a bracket forming a socket for the step D, it being bored out as indicated to receive the tapered step D, as shown. This socket-bracket C is fitted into a hole made in the frame E, a recess around the said hole being made in the said frame E, as indicated, into which recess the flange *b* on the socket-bracket C fits, screwed holes being made in the said flange *b* to receive the screw-bolts F, which fit into holes made in the frame E, and are utilized for the purpose of adjusting the socket-bracket C vertically, so as to elevate the step D as it wears away.

When it becomes necessary to remove and change the step D, I place blocks of wood between the frame E and bottom of the wheel, when the bolts F may be unscrewed so as to permit the socket-bracket C, with the step D, to drop below the frame E, room being of course left below the said frame so as to permit the withdrawal of the said bracket and its replacement by another, the wheel being in the meanwhile supported by the blocks, located as specified.

What I claim as my invention is—

The combination, with the frame E, provided with a hole to receive a socket-bracket, and a recess around said hole, of the bracket C, having tapering socket and flange *b*, and inserted in said hole in the frame with the flange *b* in said recess, the tapering step D in said socket, and the screw-bolts F, engaging screwed holes in said frame and the flange of the bracket, substantially as shown and described, and for the purpose specified.

Toronto, December 11, 1886.

A. D. COLE.

In presence of—

CHARLES C. BALDWIN,
CHAS. H. RICHES.