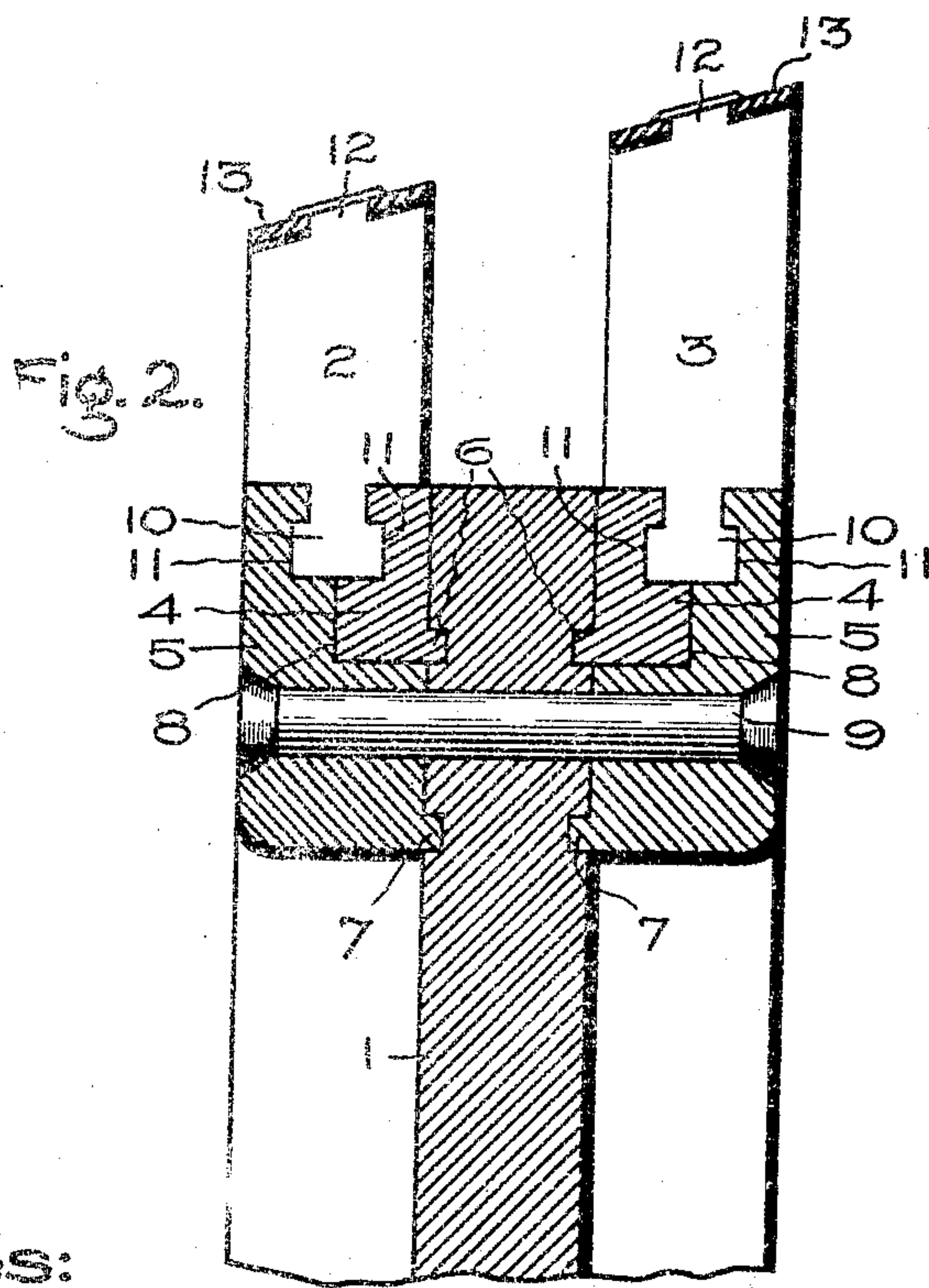
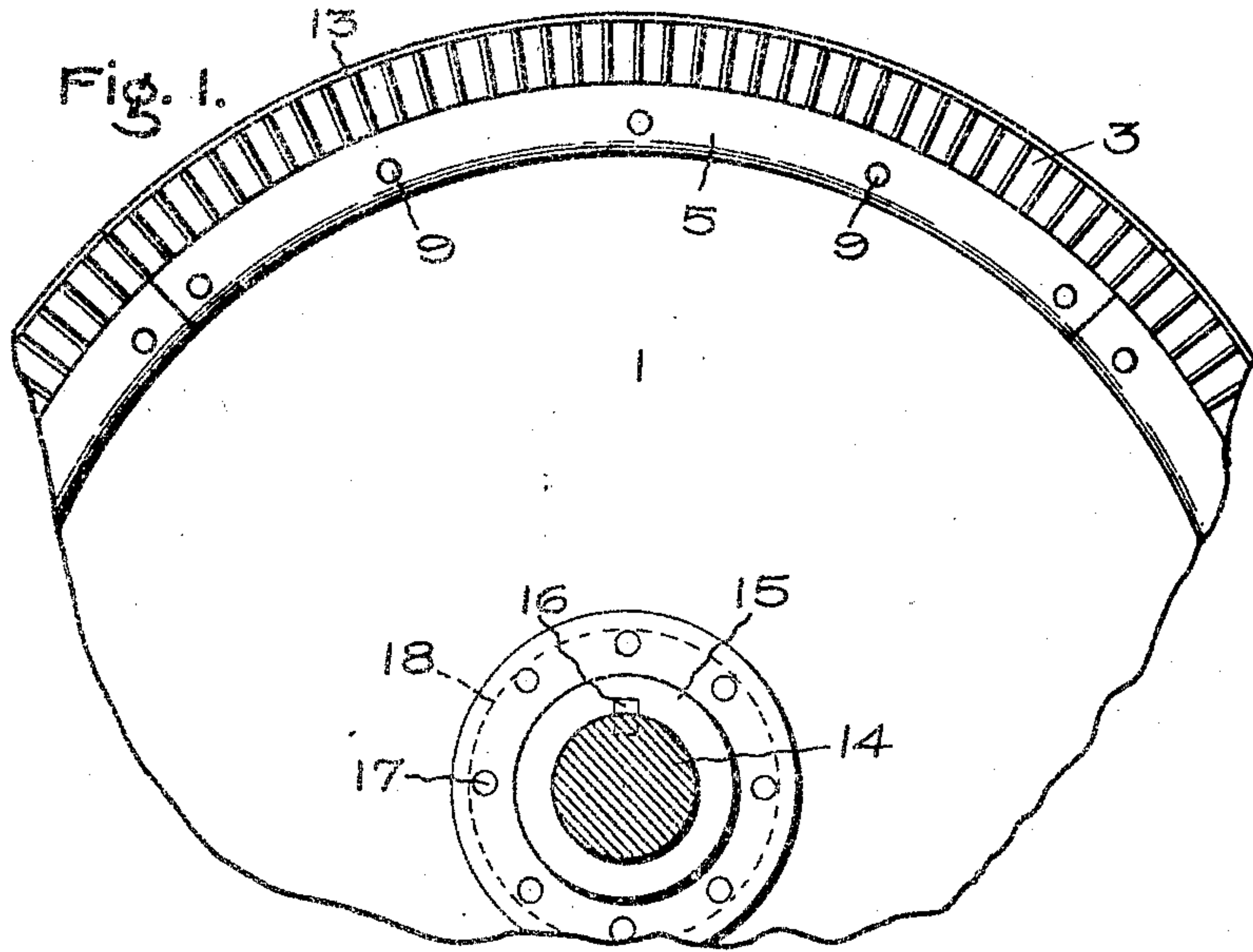


924,841.

Patented June 15, 1909.



Witnesses:

Marcus L. Byng.
 J. Ellis Glen.

Inventor,

Clarence M. Schultz,

By *Alfred J. Davis*
 Att'y.

UNITED STATES PATENT OFFICE.

CLARENCE M. SCHULTZ, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

BUCKET-WHEEL.

No. 924,841.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed February 10, 1908. Serial No. 415,080.

To all whom it may concern:

Be it known that I, CLARENCE M. SCHULTZ, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Bucket-Wheels, of which the following is a specification.

The present invention relates to bucket wheels and has for its object to improve their construction.

In the accompanying drawing which illustrates one of the embodiments of my invention, Figure 1 is a partial view in side elevation of a bucket wheel; and Fig. 2 is a partial axial section of the same.

In carrying out my invention, the web 1 of the wheel is made out of a flat steel plate of uniform thickness. These plates are comparatively inexpensive and can be rolled in a rolling mill to the exact, or approximately exact, thickness, so that the sides thereof do not have to be dressed or finished, except to receive the bucket supports and hub. These plates may be roughly sheared to approximately the proper diameter after which they are put in a boring mill or lathe and the peripheral surface turned true.

My improved wheel is provided with two rows of buckets 2 and 3, and it is evident that if a plate of uniform thickness is to be employed to form the web that special means must be provided to form the bucket securing means which are separate therefrom. If the disk be provided with an integral flange at the rim to form a part of the bucket securing means, it follows that the entire side surfaces of the web would have to be machined. I avoid this by providing a support of novel construction for each row of buckets. Each support comprises two members 4 and 5, an outer and an inner. The inner member 4 is provided with an annular projection 6 which enters an annular groove in the plate situated below the surface thereof, and the outer member 5 is provided with an annular projection 7 that also enters an annular groove formed in the same side of the plate and below the surface thereof, the two grooves being concentric.

The projections or shoulders on the said members receive the strains due to centrifugal force and are anchored by the walls of the grooves. The outer member 5 is shouldered or cut away at 8 to receive the inner

member 4, and the parts are secured in place by the axially-extending rivets or bolts 9. It will be noted that each rivet or bolt holds the two inner members 4 and also the outer members 5 on the bucket support.

The buckets are provided with bases 10 of suitable shape, for example, in inverted T or equivalent shape. These bases are seated in grooves 11 formed partly in the member 4 and partly in the member 5 of the support. The buckets may be spaced apart by spacing blocks in the usual manner. The ends of the buckets are provided with integral tenons 12 which project through correspondingly shaped holes in the cover or shroud 13 and are afterward riveted over to secure the same in place. The bucket covers are made in sections, as indicated in Fig. 1, as are also the bucket supports, since this facilitates assembling. Under certain conditions, however, the supports can be made annular, the structure otherwise being the same.

The wheel is mounted on a shaft 14 by means of the hub 15, the latter being secured by a key 16 to the shaft. The hub is secured to the web by axially-extending bolts or rivets 17. If desired, the hub may be provided with a shoulder 18 indicated in dotted lines, which enters a groove in the web and is formed below the side surface thereof; the object of this annular shoulder or projection being to relieve the bolt 17 of strains due to centrifugal force.

From the foregoing it will be seen that I am able to produce a wheel which is simple in construction and relatively inexpensive to manufacture, the greatest saving being brought about by reason of the fact that I may use so-called "commercial steel plates" which do not have to be finished except at or about the portions which support the buckets and receive the hub and shaft. It is further to be noted that all of the shoulders on the web which receive centrifugal strains are located below the side faces thereof, and hence no extra metal is required for the purpose.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but

I desire to have it understood that the apparatus is only illustrative, and that the invention can be carried out by other means.

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

1. In a bucket wheel, the combination of a web composed of a flat plate having annular grooves therein located below the side face and on the same side, a support for the buckets comprising annular members that engage and hold the buckets against centrifugal stresses, each member being provided with a projection which enters a groove in the web, and means for clamping the support to the web.
2. In a bucket wheel, the combination of a web composed of a metal plate having annular grooves formed below the side face, a plurality of buckets each having a retaining base, a support which engages the bases and holds the buckets on the wheel, the said support comprising two independent annular members each engaging the buckets and provided with annular shoulders or projections which enter the grooves in the web, and axially-extending means which clamp the support to the web.
3. In a bucket wheel, the combination of a web formed of a metal plate and having annular grooves formed below the side face of the plate, a bucket support comprising inner and outer members, the outer member having a projection which enters one of the grooves of the plate and another projection which engages the buckets and is cut away to form a recess for the inner member of the support, the inner member being provided with a projection that engages the buckets and a second projection that enters the other groove in the plate and fits into the recess in the outer member, axially-extending means which pass through the outer member and the plate and unite the parts, and a plurality of buckets having bases which engage and are held by the projections on the inner and outer members of the support.
4. In a bucket wheel, the combination of a web comprising a metal plate having annular grooves arranged on opposite sides and located below the side surfaces thereof, buckets arranged in rows, a support for each row of buckets comprising an inner and an outer member, each member being provided with a projection which enters a corresponding groove in the web and bucket retaining means, and axially-extending means which

pass through the web and the outer members of the supports for uniting the parts.

5. In a bucket wheel, the combination of a web comprising a flat metal plate of uniform thickness having two annular grooves formed in each side, the shoulders being below the side surfaces of the plate, a bucket support located on each side of the web and comprising inner and outer members, the inner member having an annular projection which enters the outer groove in the web, the outer member having a projection which engages the inner groove in the web, bucket securing means on both members, axially-extending means which pass through the outer members and the web and secure the outer and also the inner members in place, and buckets arranged in rows each row being held in place by one of the said supports.

6. A bucket wheel comprising a web formed of a flat metal plate, a plurality of buckets, each having a base, a two-piece support containing a groove to receive the bases of the buckets, and means for attaching the support to the side face of the plate.

7. A bucket wheel comprising a web formed of a flat metal plate and having an annular groove formed therein below its side face, a plurality of buckets, a two-piece support containing a groove that receives and holds the buckets, one of said parts having a projection that enters the groove to relieve the attaching means of centrifugal strains, and attaching means that pass through both parts of the support and also the said plate.

8. In a bucket wheel, the combination of a web formed of a metal plate and having annular concentric grooves formed below a side face thereof, a bucket support comprising members, the outer of which has a projection that enters one of the grooves of the plate and another projection that engages the buckets, the inner member being provided with a projection that enters the other groove in the plate, axially-extending means that pass through the outer member and the plate and unite said parts, and a plurality of buckets carried by the support.

In witness whereof, I have hereunto set my hand this sixth day of February, 1908.

CLARENCE M. SCHULTZ.

Witnesses:

JOHN A. McMANUS, Jr.,
OTTO F. PERSSON.