

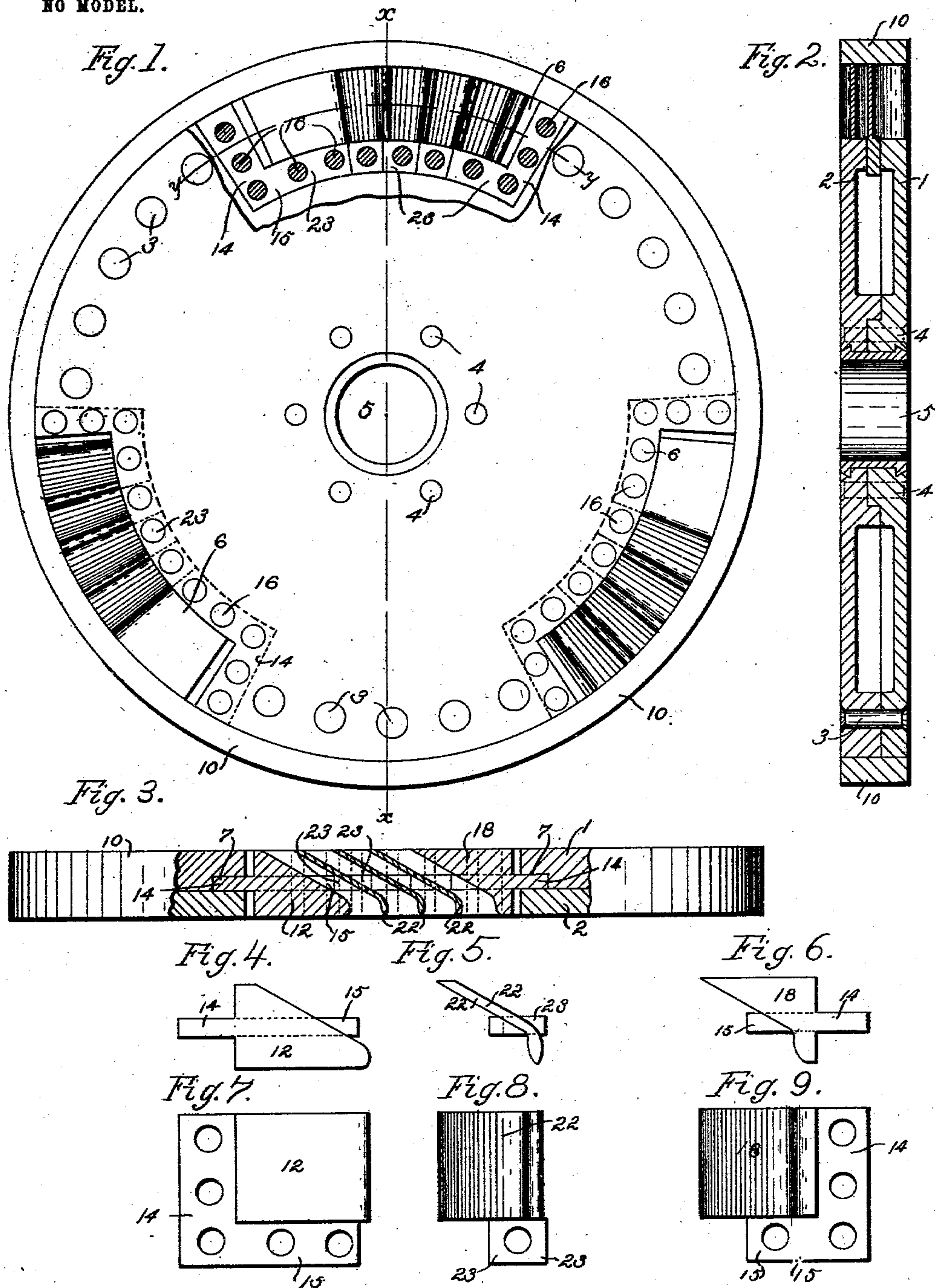
No. 745,496.

PATENTED DEC. 1, 1903.

H. HOLZWARTH.
TURBINE.

APPLICATION FILED OCT. 22, 1903.

NO MODEL.



WITNESSES:
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UNITED STATES PATENT OFFICE.

HANS HOLZWARTH, OF HAMILTON, OHIO, ASSIGNOR TO THE HOOVEN-OWENS-RENTSCHLER COMPANY, OF HAMILTON, OHIO, A CORPORATION OF OHIO.

TURBINE.

SPECIFICATION forming part of Letters Patent No. 745,496, dated December 1, 1903.

Application filed October 22, 1903. Serial No. 178,061. (No model.)

To all whom it may concern:

Be it known that I, HANS HOLZWARTH, a citizen of Germany, residing at Hamilton, county of Butler, and State of Ohio, have invented new and useful Improvements in Turbines, of which the following is a specification.

My invention relates to improvements in turbine stationary partitions and nozzles.

The object of my invention is to provide means whereby the parts composing the walls of the nozzles may be separately formed and whereby the act of securing them in position will also affect their adjustment in a manner to provide a nozzle of the exact size and shape required for maximum efficiency.

In the following description reference is had to the accompanying drawings, in which—

Figure 1 is a side view of a partition or division wall in an axial-flow turbine, showing three sets of nozzles, one of the disks composing said wall being partially broken away to show the adjustment of the nozzle-section. Fig. 2 is a sectional view of the same drawn on line *xx* of Fig. 1. Fig. 3 is a segmental section drawn on line *yy* of Fig. 1. Fig. 4 is a detail view of one of the end members of a group of nozzles. Fig. 5 is a detail view of an inner member of such group. Fig. 6 is a detail view of the other end member. Figs. 7, 8, and 9 are views of the parts shown in Figs. 4, 5, and 6, respectively, drawn at right angles thereto.

Like parts are identified by the same reference characters throughout the several views.

The nozzle ring or partition is composed of two disks 1 and 2, secured together by bolts 3 and 4. 5 is a central aperture through which the turbine-shaft passes. Each of the disks is provided with peripheral notches 6, and the inner face of the disk 2 is recessed at 7 along the sides and ends of the notches 6, whereby when the disks are secured together a channel is formed at 7 in the side and end walls of the passage through the disks formed by the notches 6. A ring 10 covers the outer edges of the disks 1 and 2.

The nozzle-passages are located in the apertures provided by the notches 6. The shape

and size of these passages are determined by nozzle members 12, 18, and 22. The members 12 and 18 are adjusted to the respective ends of the aperture 6 and are provided with flanges 14, fitting the end recesses 7, and inwardly-projecting flanges 15, fitting the recess 7 at the base of the aperture 6. The intermediate members 22 are provided with angularly-positioned flanges 23, also fitting the recess 7 at the base of the aperture 6. The flanges 14, 15, and 23 are secured in position by rivets 16, which pass through the disks 1 and 2 and through said flanges, thereby securing each of the nozzle members in position.

It will be observed that the faces of the end members 12 and 18 which oppose the intermediate members 22 are diagonally disposed, and these faces, together with the faces of the intermediate members 22, determine the shape of the nozzle-passages.

With the above-described construction it will be observed that the several parts composing the nozzle ring or partition may be stamped out or cast and readily assembled with a minimum amount of machine-work.

In view of the fact that the character of the nozzles is determined by the members 12, 18, and 22, which are relatively small and easily formed in the exact shape desired, it is obvious that the cost of construction is reduced to a minimum. In assembling the parts each of the members may be adjusted to one of the disks, preferably to the disk 1, and the disk 2 then placed in position and riveted thereto, the holding-rivets 16 of the nozzle members being also adjusted and headed. The outer ring 10 is then adjusted to position.

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

1. In a turbine, a nozzle-partition comprising two annular members provided with peripheral notches registering with each other; nozzle members located in said notches and having flanges engaged in recesses at the sides and ends of said notches; holding devices passing through said partition members and through the flanges of the nozzle members and a ring encircling said partition members.

2. A nozzle-partition provided with segmental nozzle-apertures; nozzle members located in said apertures; and having flanges fitting recesses in the portions of said partition which constitute the walls of said apertures and holding devices passing through said apertures and the flanges of the nozzle members.

3. In a turbine, a nozzle-partition comprising a pair of disks provided with segmental notches in their outer edges; recesses extending inwardly from said notches in the inner face of one of the disks; nozzle members located

in said notches and having flanges fitting said recesses; rivets passing through said disks and flanges of the nozzle members and a ring covering the peripheral edges of said disks and the outer edges of the nozzle members.

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

HANS HOLZWARTH.

Witnesses:

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