The present invention relates to large rims or rotary members subjected to heavy stress by reason of high speed, the large diameter also necessitating construction in segments. This is the case particularly with the rims of the pole-fitted wheels constituting the rotors of alternators of large diameter.

The main object of the invention is to provide an improved rim composed of metal plates cut out in the shape of annular segments, stacked, and clamped together by means of bolts or the like.

Other objects and advantages of the invention will appear from the following description, in which reference is made to the accompanying drawings showing examples of carrying out the invention.

In these drawings:

Fig. 1 represents an individual segment of the improved rim; Fig. 2 shows three such segments arranged in a single bed or layer, and Fig. 3 shows the annulus completed by three further segments arranged in a second bed or layer.

Fig. 4 is an edge view or elevation of a stack of segments comprising eight layers, each pair of layers constituting an annulus such as shown in Fig. 3.

Fig. 5 shows a bed or layer corresponding to Fig. 2 but in which the second layer is to comprise only two segments, the complete annulus having five segments.

Fig. 6 is an elevation showing a complete annulus such as shown in Fig. 3, mounted upon a spider and notched to receive the alternator pole-pieces.

Fig. 7 is a detail illustrating the arrangement of the bolt holes for the assembly of the segments, and

Fig. 8 is a partial section on a larger scale, taken on the vertical center-line of the left-hand row of holes in the segment seen on the right of Fig. 7.

Figs. 1 to 4 relate to the particular case where the rim-annulus is divided into six segments, one of which is represented in Fig. 1. At the extremities of each such segment there are pierced at A and B several rows of holes for the assembly bolts, and upon the inner edge there is cut out at C a notch intended for one of the driving keys of the rim.

In order to construct the improved rim by means of these elementary plates and assembly bolts, the following method is adopted:

Upon a plane horizontal erecting surface there is placed a first bed or layer formed by three plates arranged as shown in Fig. 2; numbering the six segments composing a complete annulus in the order 1, 2, 3, 4, 5, 6, the first three plates will represent the segments 1, 3, 5.

Upon this first bed or layer, there is placed a second formed by the plates representing the segments 2, 4, 6 in such a way that the edges of the adjacent plates are superposed and that the bolt-holes coincide, as shown in Fig. 3. Other beds or layers are then added to build up the required depth or thickness.

There is thus obtained a stack of plates represented in elevation by Fig. 4, and which have only to be assembled by bolts, of which the stems pass through the holes provided for that purpose.

The rim thus formed comprises sector-shaped channels of a number almost equal to that of the elementary plates and of a volume nearly equivalent.

In the case where the annulus is divided into an odd number of segments, for example five, the method of construction remains the same except that the plane erecting surface is replaced by a helicoidal surface, in such a way that the plate 5 of the first bed overlaps the plate 1, Fig. 5, the second bed comprising only the two plates 2 and 4, and so on.

The invention is applicable whatever be the number of segments in each annulus and whatever be the number and the disposition of the notches for the keys. It is likewise applicable if the assembly bolts are replaced by bars, rivets or equivalent members.

The rim is mounted in known manner, for example upon a spider F and in the case where it is intended for the construction of an alternator it comprises upon its periphery a series of notches G cut in dove-tail shape, intended to receive the pole-pieces, as indicated in Fig. 6. These notches may be cut out from each elementary plate before assembly or on the contrary be cut in the mass of the rim after assembly.

In the case of an alternator mentioned above, there is likewise arranged at the foot of each pole-piece and in each of the channels provided between the elementary pole-pieces, a steel filling piece D, Fig. 6, of suitable shape. These parts are fixed to the rim by bolts such as E, or in any other known manner. They are intended to allow the flux coming from the poles to spread out suitably in the rim. Between each of the said parts there are still provided sufficient gaps to allow the ventilation of the machine.

The bolting together of such a rim may com-
prise in addition the following special arrangement intended to distribute the load equally between the bolts.

It is advantageous to provide for the bolting of each end of the elementary plates by means of bolts distributed in several parallel rows and arranged in quincunx, as represented in Figs. 1 to 6 and as shown on a larger scale in Fig. 7, the number of bolts in each row being a maximum in the central row or rows; this arrangement is known for the riveting and bolting of metal plates; it allows of sharing the load between a large number of bolts without having to weaken the plate excessively by a large number of holes distributed along a single line.

In order that the assembly shall be effective, it is essential that the load shall be distributed almost equally between the bolts. This condition is not fulfilled in general by the known arrangement. In the case of three rows as represented in Fig. 7, it is the extreme rows b and c which support almost the whole load within the limit of the resistance of the material.

To obviate that drawback, according to the invention, each of the holes in the last row on each elementary plate is milled out or counterbored, as shown in Fig. 8 (which is a section of the plate A, Fig. 7, upon the line c), so as to reduce the bearing surface of the plate upon the bolt to a value such that the elastic limit of the plate shall be attained at its bearing upon the bolt when the load transmitted attains a desired value.

Upon the plate a, Fig. 7, it will therefore be the three holes in the row c which will be treated in this way, and upon the plate b the three holes in the row b.

Now, therefore, when centrifugal tension is set up progressively in the plates, the bolts of the extreme rows that take up their load; when it is attained, their holes will become oval and the supplementary load upon the plate will be transmitted wholly to the bolts of the middle row a.

If the bolted joint comprises more than three rows of bolts, it will be all the holes outside the middle row c (or outside the two middle rows, in the case of an even number) which will be milled out.

The milling can be executed in any suitable way other than that represented by way of example in Fig. 8; the essential point is to reduce to a given value the bearing surface of the plate upon the stem of the bolt or the like.

What I claim is:

1. A high-speed rim composed of metal plates in the form of annular segments, the opposite extremities of said plates being formed with several substantially radial rows of holes, said plates being juxtaposed in successive layers with their extremities overlapping in pairs so as to leave channels between adjacent extremities of plates in the same layer, each overlapping pair of extremities having their several rows of holes in register, and fastening means passed through said registering holes.

2. A high-speed rim composed of metal plates in the form of annular segments, each segment representing an odd submultiple of a circumference, the opposite extremities of said plates being formed with several rows of holes, said plates being juxtaposed in layers of different numbers alternately with their extremities overlapping with their holes in register, said juxtaposed plates leaving sector-shaped channels between the extremities overlapped by an adjacent plate, and fastening means passed through said registering holes.

3. A high-speed alternator rotor rim, composed of metal plates in the form of annular segments, the opposite extremities of said plates being formed with several rows of holes, said plates being juxtaposed with their extremities overlapping in pairs and their apertures in register, said juxtaposed plates leaving sector-shaped channels between the extremities overlapped by an adjacent plate, fastening means passed through said registering apertures, and filling pieces inserted in said channels adjacent to the pole-piece positions.

4. A high-speed rim composed of metal plates in the form of annular segments, the opposite extremities of said plates being formed with several rows of holes, said plates being juxtaposed with their extremities overlapping and their several rows of holes in register, said juxtaposed plates having the holes in the inner and outer rows at each extremity counterbored to leave a reduced thickness of material, and bolts passed through said registering holes, the counterbored holes having narrower surfaces bearing on said bolts than the holes in the middle rows.

5. A high-speed rim composed of metal plates in the form of annular segments, superposed with their extremities overlapping in pairs, leaving channels between adjacent extremities of alternate plates, and assembly bolts passing through several rows of substantially radial holes in each pair of superposed extremities, said plates being bored out around the bolt holes of the extreme rows in each plate to reduce the bearing surface of said plate upon the bolts passing through the holes of said extreme rows.

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