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COOLING DEVICE FOR METAL RECTIFIERS

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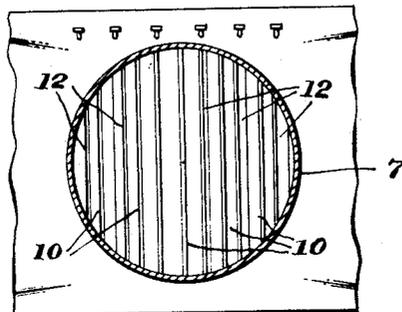
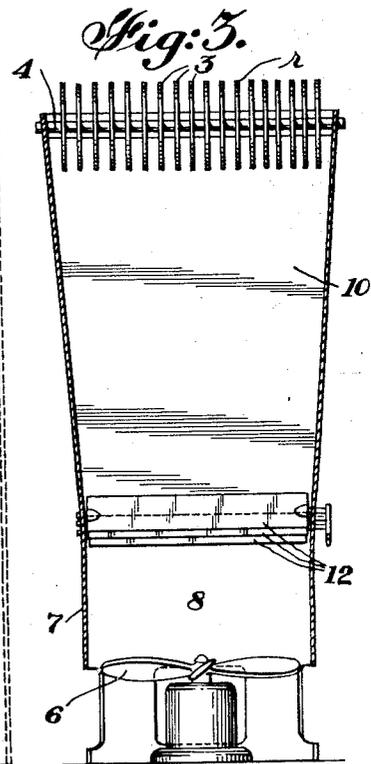
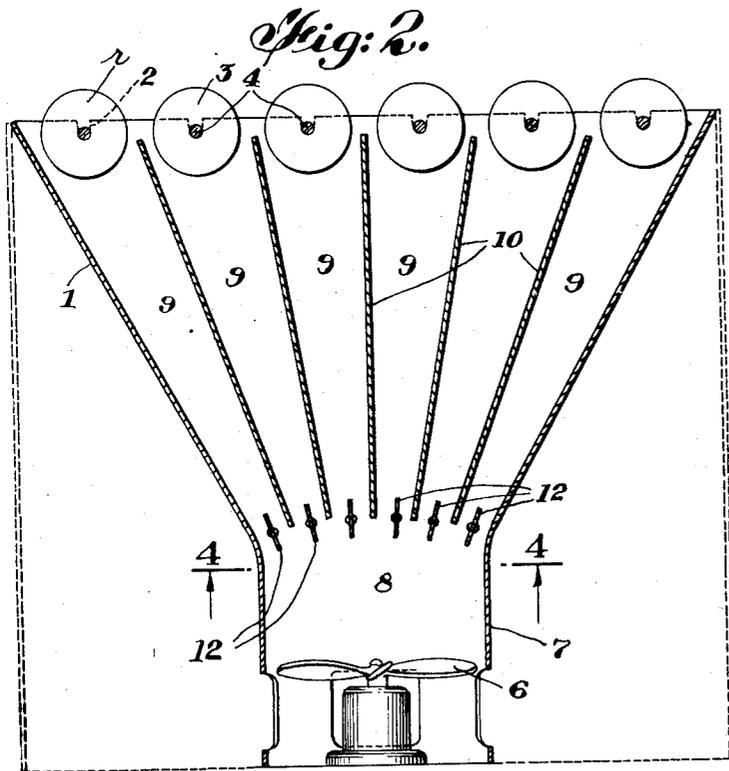
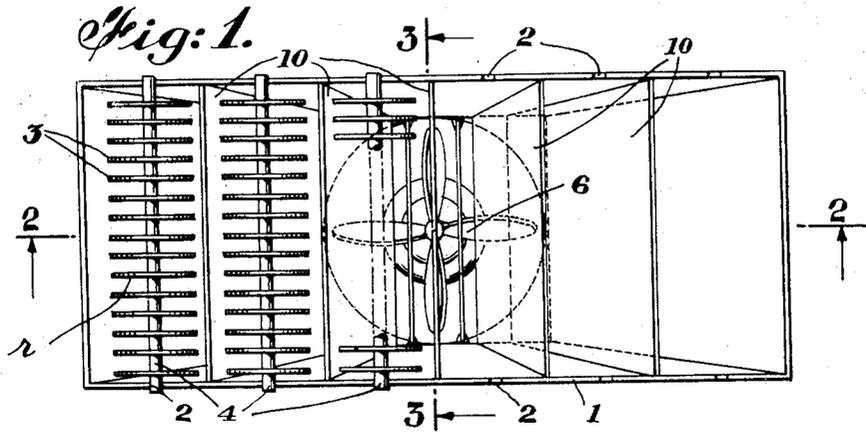


Fig: 4.

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COOLING DEVICE FOR METAL RECTIFIERS

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5 Claims. (Cl. 175—366)

This invention relates to rectifier apparatus of the air cooled type and consists of an improved assembly thereof including an air cooling system therefor of advanced design adapted to direct the air currents to and through the rectifier discs in a manner to obtain high efficiency of heat transfer and more uniform cooling thereof and to further permit of selectively controlling the air flow to shut off the air currents to one or more of the rectifiers on occasions of non-use while maintaining substantially uniform cooling current air flow to the remainder of the units.

The improved arrangement is particularly designed for the cooling of metal plate rectifier stack assemblies such as the selenium plate type wherein the stack units are composed of a series of spaced rectifier plates clamped together by a central stud passed through apertures therein in the known manner. The present apparatus employs a multiple arrangement of standard size rectifier units in a conveniently accessible position and having associated therewith forced draft cooling means including a fan or blower directing an air stream into a distributing or plenum chamber communicating with specially designed passages or conduits individual to each of the rectifier units or stacks for uniformly directing of the air flow through the plates thereof. The improved cooling arrangement further provides valve means for closing off of individual air passages when not required and as related to which the combined area of intake to the passages has a margin in excess of the air intake area of the fan or blower to permit of partial closing without air velocity loss.

The described and other features and advantages of the present improvements will be more fully understood by reference to the accompanying drawing wherein like reference characters are applied to the corresponding parts in the several views.

In the drawing:

Fig. 1 is a plan view of the improved rectifier apparatus of the present invention;

Fig. 2 is a central, vertical, longitudinal section therethrough on line $x-x$ of Fig. 1;

Fig. 3 is a vertical, cross-sectional view on line $y-y$ of Fig. 1; and

Fig. 4 is a bottom plan view of the distributing passage structure as viewed upwardly from sectional lines $z-z$ of Fig. 2.

In the preferred embodiment of the invention here shown $1-1$ indicate side wall members of a casing, downwardly and inwardly inclined and provided on their upper parallel edges with bear-

ing recesses 2, oppositely disposed, for the rectifier units r . Each of the units r is composed in the customary arrangement of a series of equidistantly spaced rectifier plates or discs 3 clamped upon studs 4 provided with bearing extensions at each end fitted to the recesses 2 to position the units in transversely extending, parallel and equidistantly spaced relation as shown. For the cooling of the rectifier units a motor driven fan or blower 6 is mounted at the base of the apparatus within a cylindrical conduit portion 7 of an air conduit member or casing. This conduit member, of improved design is extended upwardly from the cylindrical base portion with progressive flare or widening thereof to provide a distributing chamber 8 immediately above the fan and conducting passages 9-9 formed by the transversely extended partitions 10-10. These partitions subdivide the conduit to form the passages 9 as shown, individual to each of the rectifier units and to be of progressively widening, rectangular cross-sectional area from the lower intake openings thereof, communicating with the chamber 8, to their top openings within which the rectifier units are partially positioned.

The passages 9 are as shown, desirably formed to have a uniformly progressive widening from their lower intake portions to the upper discharge ends thereof in a special manner conducive to uniform cooling of the plates, the air flow spaces of which substantially conform to the intake areas of the passages. As will be noted by reference to Fig. 4, the transverse partitions, have a spacing relation to establish the air intake areas to be substantially uniform with relation to the circular air stream of the blower to effect more uniform distribution thereof.

As a further feature, as best shown in Fig. 2, rotatably supported valves or dampers 12, are positioned in the intake openings of each of the distributing passages 9 permitting the closing off of the cooling passages of open circuit rectifiers if desired. The increased combined area of the intake openings relative to the cross-sectional area of the portion 7 permits of such closing without materially affecting the operating efficiency.

The described arrangement provides a simplified supporting and cooling unit for a multiple arrangement of rectifier stacks adopted to direct the air flow in a manner to obtain more uniform cooling and to avoid eddy currents and unevenly distributed air current flow, as commonly experienced with fan cooling systems as hereto-

fore employed. As will be appreciated, the compact unit thus provided may be readily installed within a rectangular housing for auxiliary equipment as shown in dotted lines with provisions for cooling effect on the latter by utilization at the air intake to the fan.

I claim:

1. A cooling apparatus for multiple rectifier stack assemblies and the like comprising a cooling unit having a casing providing support for the rectifier stacks to extend transversely thereof and formed with a cylindrical base intake conduit portion, a distributing chamber thereabove and air passages from the distributing chamber individual to each of the rectifier stacks, said air passages having progressively increased cross-sectional area from their intake to their discharge openings and a blower positioned in the intake conduit portion.

2. A cooling apparatus for multiple rectifier stack assemblies and the like comprising a cooling unit having a casing providing support for the rectifier stacks to extend transversely thereof and formed with a base intake conduit portion, a distributing chamber portion above the intake conduit and air passages from the distributing chamber individual to each of the rectifier stacks, said distributing chamber and air passages having progressively increased cross-sectional area from their intake to their discharge openings and a blower positioned in the intake conduit.

3. A cooling apparatus for multiple rectifier stack assemblies and the like comprising a cooling unit having a casing providing support for the rectifier stacks to extend transversely thereof and formed to provide a base intake conduit portion, a distributing chamber portion thereabove

and a flared upper portion, transverse partitions disposed in the flared upper portion dividing said portion into air passages individual to each rectifier stack and of progressively increasing rectangular cross-sectional area from the intake to the discharge ends there, and a blower positioned in the intake conduit.

4. A cooling apparatus for multiple rectifier stack assemblies and the like comprising a cooling unit having a casing providing support for the rectifier stacks to extend transversely thereof and formed to provide a base intake conduit portion, a distributing chamber portion thereabove and a flared upper portion, transverse partitions disposed in the flared upper portion dividing said portion into air passages individual to each rectifier stack and of progressively increasing rectangular cross-sectional area from the intake to the discharge ends thereof, valves positioned in the intake openings of the passages and a blower positioned in the intake conduit.

5. A cooling apparatus for multiple rectifier stack assemblies comprising a cooling unit having a casing providing support for the rectifier stacks to extend transversely thereof and formed to provide a cylindrical base intake conduit portion and having a flared upper portion, transverse partitions disposed in the upper portion providing air passages individual to each rectifier stack of progressively increasing rectangular cross-sectional area from the intake to the discharge ends thereof and said partition lower ends being positioned in vertical planes relative to the cylindrical intake conduit portion for like area subdivision of the air stream therefrom and a blower positioned in the intake conduit portion.

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