

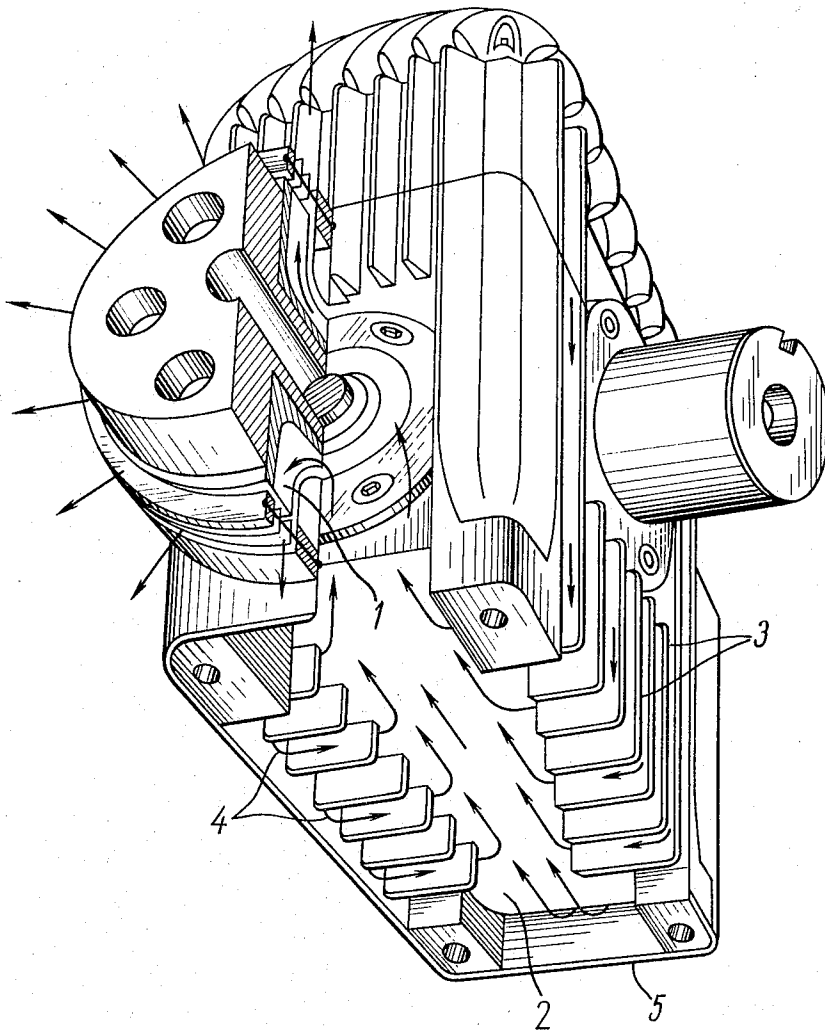
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APPARATUS FOR COOLING GEAR REDUCTION UNITS

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APPARATUS FOR COOLING GEAR REDUCTION UNITS

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1 Claim. (Cl. 165—47)

The present invention relates to an apparatus for cooling gear reduction units and, more particularly, it relates to cooling worm reduction units by means of an exhaust blower.

The load capacity of reduction units is well known to be limited as a result of their being heated.

Various attempts have been made to develop a universal system of cooling by introducing a special arrangement serving to cool the oil circulating through the cooling system or being cooled directly in the reduction unit by means of a coil pipe and the coolant circulating there-through. These devices are however too bulky and, therefore, do not find wide application nowadays.

I am aware that there have been proposed other devices for air cooling of reduction units such as forced cooling by means of a blower which drives the air along ribs installed parallel to the worm axis or through the inner passage ways also parallel to said worm axis, or upwards along the vertical ribs covered by a deflector; and also cooling by means of an exhaust blower which directs the airflow through the inner passage ways parallel to the worm axis.

All the previous designs are deficient in that they employ horizontal (i.e., along the worm axis) arrangement of the ribs or inner passage ways thus leaving no hopes for any standardization of the reduction unit housing, as performed without the blower, because the horizontal arrangement of the ribs in the reduction units having no blower turned out to be less efficient. Another disadvantage of the existing designs is that to force air they employ a blower, as air consumption here is limited owing to the additional losses at the blower inlet (when said blower is mounted on the driven end of the worm) and moreover, the air delivered into the reduction unit to cool the latter becomes heated to a certain extent in the blower, and thus, adversely affects the cooling efficiency.

Up till now all the known devices used heretofore possess necessarily one of the above-mentioned disadvantages if not both.

The apparatus proposed herein is based on a combination of an exhaust blower and vertically (i.e., perpendicular to the blower axis) arranged ribs provided on the reduction unit housing.

The invention is principally intended for cooling gear reduction units and like mechanisms and, particularly, it is adapted for cooling worm reduction units.

One object of the invention is to obtain a highly effective cooling of reduction units, and thus, increase their load capacity.

Another object of the invention is to standardize the existing reduction unit housings, as applied to both possible performances of the reduction unit housings either with a blower or without it.

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In accordance with these and other objects, the invention comprises a new apparatus, described hereinafter and specified in the appended claim.

The advantages of the invention will become apparent from the accompanying drawing which is an axonometric projection (bottom view) of a worm reduction unit.

Mounted onto the worm shaft is exhaust blower 1 receiving air from under the bottom of housing 2, said air first passing along ribs 3 vertically arranged on the reduction unit housing. The direction of air flow is indicated by arrows 4. The air circulates in the space defined at the housing sides by deflector 5, and at the side of the housing bottom, by a foundation plate (not shown in the drawing).

The present invention ensures an increase in the load capacity of the reduction unit, due to the improved efficiency of its cooling said efficiency being attained by directing the air flow along vertical ribs disposed normally to the worm axis and throughout the surface of the housing, and also by using an exhaust blower, the latter ensuring cooling of the reduction unit by the air not heated as it is passed through the blower.

The invention gives an opportunity to standardize the reduction unit housing, the latter being performed in two possible versions (either with a blower or without it) due to the vertical arrangement of the ribs, said ribs directing the flow of the cooling air.

The invention is described in connection with its preferred embodiment but it will be apparent that various modifications and changes of the invention may be effected by those skilled in the art without departing from the true spirit and scope of the invention.

These modifications are considered as falling within the essence and scope of the invention as described in the claim.

What is claimed is:

In an air cooled gear reduction unit the combination of a housing, a drive shaft mounted relative to the housing and carrying a driving gear thereon, a driven shaft mounted within the housing at right angles to the drive shaft and having a cooperative gear thereon, said housing having a bottom, a chamber beneath said cooperating gears, vertical cooling ribs extending in parallel spaced relation, a suction blower mounted on the driven shaft exteriorly of the housing, said housing including deflector components, said ribs providing communication to the space beneath said cooperating gear units, said space constituting a chamber extending parallel to the axis of the driven shaft and beneath the same, the arrangement being such that air is drawn into the housing to flow over said ribs to be directed thereby to said chamber beneath said cooperating gear units and is then constrained to flow parallel to the axis of the driven shaft for exhaust to atmosphere through said suction blower.

References Cited

UNITED STATES PATENTS

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CHARLES SUKALO, Examiner.