March 17, 1942. H. L. GRAPP 2,276,614

COOLING DEVICE

Filed March 13, 1941

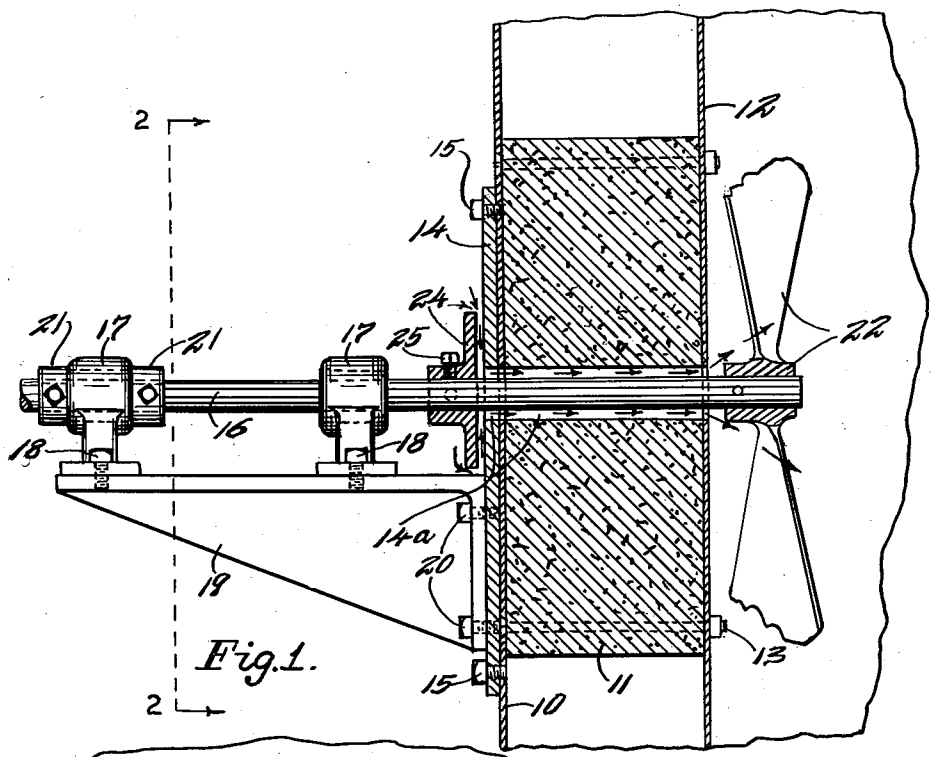


Fig. 1.

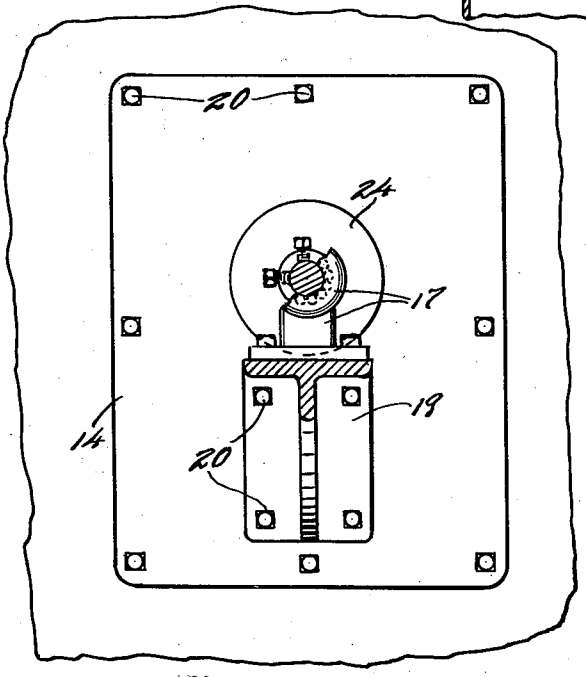


Fig. 2.

Inventor
HERBERT L. GRAPP
By Chas. C. Perf.
Attorney

Patented Mar. 17, 1942 2,276,614

UNITED STATES PATENT OFFICE

2,276,614

COOLING DEVICE

Herbert L. Grapp, Minneapolis, Minn.

Application March 13, 1941, Serial No. 383,143

3 Claims. (Cl. 263—1)

This invention relates to a furnace or heated chamber and particularly to a means for cooling a shaft extending into said chamber.

In heated chambers such as furnaces of various kinds, and heat treating chambers it is necessary to have a shaft extending through an opening in the wall of the furnace or chamber. This shaft often drives a fan disposed within the chamber by means of which air is drawn into the chamber. A problem has arisen of cooling this shaft so that the shaft bearings that must be located adjacent the furnace or chamber wall will not be unduly heated. The heat from the chamber is conducted through said shaft to the bearings and some cooling means is necessary.

It is an object of this invention to provide a very simple and efficient means carried by the shaft which will absorb the heat from the shaft and which in turn will be cooled by the air drawn into the furnace or chamber.

It is a further object of the invention, in connection with a heated chamber having a wall with a passage therethrough, a shaft extending through said wall into said chamber and means for drawing air into said chamber through said passage, to provide a disk formed of a metal having high heat conductivity such as aluminum, which disk is disposed closely adjacent said wall whereby said disk will absorb heat from said shaft and the air drawn through said passage will wipe around said disk and cool the same.

It is a further object of the invention to provide such a disk as set forth in the preceding paragraph, which disk extends parallel to said wall, means for holding said disk in various positions on said shaft whereby in addition to its cooling function said disk may be used to regulate the amount of air drawn into said chamber through said passage.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawing in which like reference characters refer to similar parts throughout the several views and in which:

Fig. 1 is a view partly in side elevation and partly in vertical section through the chamber wall and disk used; and

Fig. 2 is a vertical section taken on line 2—2 of Fig. 1 as indicated by the arrows, some portions being broken away.

Referring to the drawing, a wall 10 of a highly heated chamber is shown such as a furnace or heat treating chamber. At the inner side of the wall a block 11 of insulating material is shown and a portion 12 of a fan casing is shown. Headed and nutted bolts 13 extend through block 11 and walls 10 and 12. A plate 14 is secured to the outer side wall 10 by the bolts or screws 15. Plate 14 and wall 10 have a passage 14a extending therethrough, which passage also extends through block 11 and casing wall 12. while this passage may be variously formed, it preferably is made cylindrical. A shaft 16 extends centrally through passage 14a, the same being supported in bearings 17 secured by bolts 18 to a bracket 19. Bracket 19 is in turn secured to plate 14 by the bolts 20. Bearings 17 will be of the ball bearing or other suitable type and collars 21 may be secured to shaft 16 at either side of one bearing 17 to hold shaft 16 against longitudinal movement. Shaft 16 will be driven by and have connected thereto a motor not shown. At the inner end of shaft 16 it has secured thereto a fan 22, only a portion of which is shown. In accordance with the present invention a disk 24 is provided, the same having a hub secured to shaft 16 by the screws 25. Disk 24 will be made of metal having a high heat conductivity such as aluminum, bronze or an aluminum alloy.

In operation shaft 16 is driven and fan 22 is thus driven. Fan 22 draws air through the furnace both through passage 14a and through other openings not shown. A high temperature is maintained in the said chamber and shaft 16 becomes quite hot. This heat will naturally be transmitted by the shaft to the bearings 17 particularly bearing 17 nearest the wall 10. With the disk 24 in use however, the heat in shaft 16 is largely absorbed by said disk. The air drawn into the chamber through passage 14a as indicated by the arrows in Fig. 1 must pass around or wipe the disk 24. The disk is cooled by this air and the heat is thus carried away by the air. The air being supplied from the atmosphere outside the furnace or heating chamber is quite cool. The disk 24 is disposed with its flat side quite close to and parallel to plate 14 and the disk can be moved closer to or farther from plate 14 by loosening screws 25 and can thus be secured in different positions. Said disk can thus be used to regulate the amount of air being drawn through passage 14a. This gives an additional air regulation and the disk thus has an air regulating function in addition to its major cooling function.

From the above description it will be seen that

I have provided a very simple and efficient means for carrying away the heat from shaft 16 and thus preventing bearing 17 from becoming unduly heated. The device has been amply demonstrated in actual practice and found to be very successful and efficient. With a temperature of 1200 degrees in the chamber it is possible to hold one's hand on bearing 17. The device gives unexpectedly efficient results.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of applicant's invention, which generally stated, consists in a device capable of carrying out the objects above set forth, in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:

1. The combination with a heated chamber, a shaft extending through one wall thereof, said wall having a passage therethrough somewhat larger than said shaft, and means for drawing air into said chamber through said passage of a disk formed of metal having a high conductivity secured to said shaft closely adjacent said wall whereby heat from said chamber and shaft will be absorbed by said disk and air drawn into said passage by said means will wipe around said disk and cool the same.

2. The combination with a heated chamber, a shaft extending through one wall thereof, said wall having a passage therethrough somewhat larger than said shaft, and means for drawing air into said chamber through said passage of a disk formed of metal having a high heat conductivity and having a hub secured to said shaft, said disk extending closely adjacent and parallel to said wall so that air drawn into said passage by said means will wipe around said disk and pass between the same and said wall to cool said disk and shaft and means for holding said disk in different positions for regulating the amount of air drawn into said furnace.

3. The combination with a heated chamber having a wall, a bracket secured to said wall, a bearing carried by said bracket, a shaft journaled in said bearing extending through said wall into said chamber, said wall having a passage therethrough about said shaft, a fan secured to said shaft within said chamber for drawing air through said passage and a disk secured to said shaft and extending close to and parallel to said wall so that air drawn into said passage by said fan will wipe around said disk and pass between the same and said wall to cool said disk and shaft and means for holding said disk in various positions on said shaft.

HERBERT L. GRAPP.