

No. 863,140.

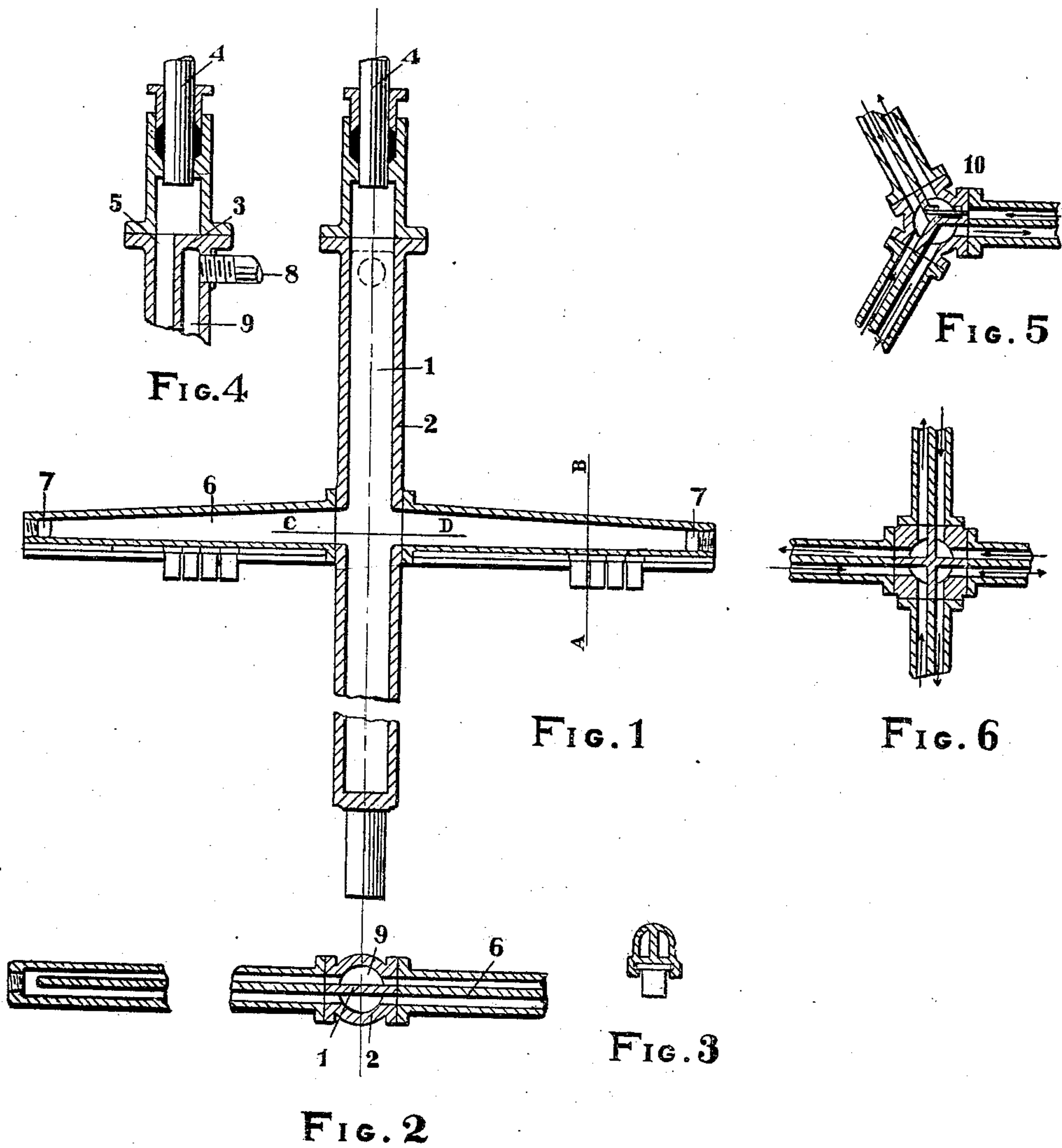
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WATER COOLED STIRRING SHAFT FOR ROASTING FURNACES.

APPLICATION FILED MAY 16, 1904.



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# UNITED STATES PATENT OFFICE.

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## WATER-COOLED STIRRING-SHAFT FOR ROASTING-FURNACES.

No. 863,140.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed May 16, 1904. Serial No. 208,287.

*To all whom it may concern:*

Be it known that we, WILLIAM J. BECKER and JOHANN FRIEDRICH MAX PATITZ, citizens of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Water-Cooled Stirring-Shafts for Roasting-Furnaces, of which the following is a specification.

Our invention relates to water cooled stirring shafts for roasting furnaces.

The object of the invention is to provide a simple construction by which the shaft may be properly and effectively cooled without the addition of unnecessary parts to the construction.

The invention is described in the following specification and illustrated in the accompanying drawing, in which,—

Figure 1 is a section through the center of the shaft and stirring arm. Fig. 2 is a horizontal section through the stirrer arms on the line C, D. Fig. 3 is a section on the line A, B. Fig. 4 is a section on a central plane on the upper part of the stirring shaft showing the water admission port. Fig. 5 is a horizontal section through the shaft and arms where three arms are used. Fig. 6 is a similar section with four arms.

The shaft is constructed as follows: In order to avoid the use of piping, a central partition 1 is cast into the shaft 2, as shown. This central partition is closed on top at one side, as shown in Fig. 4 at 3. The inlet pipe 4 leads into a chamber above the inlet 5 through the stuffing box, as shown. The partition at the points where the stirrer arms are attached extends through to the interior of the shaft. The stirrer arms are likewise divided by longitudinal partitions 6, which, however, do not extend entirely through the arm but end a short distance from the end of the arm, thus providing an opening 7 for the passage of the water. The central partitions of the arms abut against the central partitions of the stirrer shaft, and packing may be provided if desired, although an ordinary joint will generally be sufficient. The water issues through the outlet pipe 8.

The circulation in the shaft is as follows: Entering through 4, the water passes between the inside of the shaft and the central partition to the bottom of the shaft which is closed, as shown. The water must therefore pass through the stirrer arms, around the central partitions 6, through the openings 7, to the other side of the shaft 9, then passing upwardly and out through the pipe 8. It will be noted that the flow of water to the arms is direct from the shaft in each case, that is, each arm receives water directly from one of

the shaft compartments. This, in other words, permits of a flow to the arms in multiple, thus avoiding the flow of water as to either a feeding compartment or an exhaust compartment of the shaft, from one arm to another arm.

Fig. 5 shows the means employed when three stirrer arms are used. In this figure the two right hand compartments are open to the supply. The left hand compartment is open to the outlet. The water circulation is as shown by the arrows. From the upper right hand compartment the water passes through the upper arm around to its partition and again through the arm to the left hand compartment and thence to the outlet. From the lower right hand compartment it passes first through the lower arm around its partition and again through the arm to the left hand compartment and thence to the outlet and second, through the right hand arm around its partition and again through the arm and thence through pipe 10 to the left hand compartment and outlet.

Fig. 6. In this case, opposite diagonal compartments are open to inlet or outlet respectively, and the water passes, for instance, through the right hand side of the lower arm, the lower side of the right hand arm, around the respective partitions to the outlet; and likewise from the upper end of the left hand arm, around the partition to the outlet, and similarly through the top arm. It will thus be seen that every part of the shaft and arms is thoroughly cooled in either construction. Five arms could be employed if desired, and proper water connections made to provide circulation.

One great advantage of this improved water cooling is that the cold water comes in direct contact with the heated surfaces; whereas when piping is used, the pipes must first be cooled, which is a direct loss. Another advantage is the simplicity of construction, as the partitions are cast directly into the parts.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A water cooled stirring shaft, a stirrer arm extending therefrom, vertical partitions forming passages through the shaft and arm and connections for permitting a flow of water through the passages.

2. In a water cooled stirring shaft and arms, vertical partitions therein, and connections permitting a flow of water therethrough in multiple.

In testimony whereof we affix our signatures in presence of two witnesses.

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Witnesses:

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