

W. T. HOPSON & C. B. REARICK.
PROCESS OF CASTING STEAM TURBINE WHEELS, &c.
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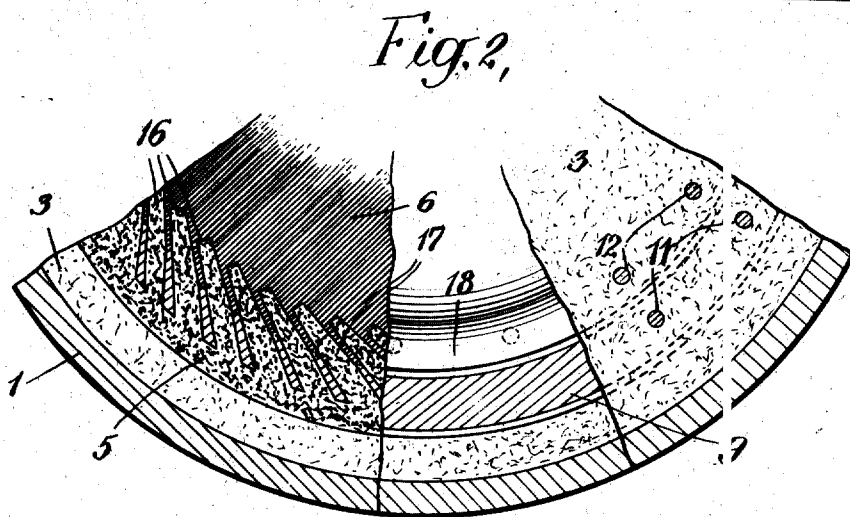
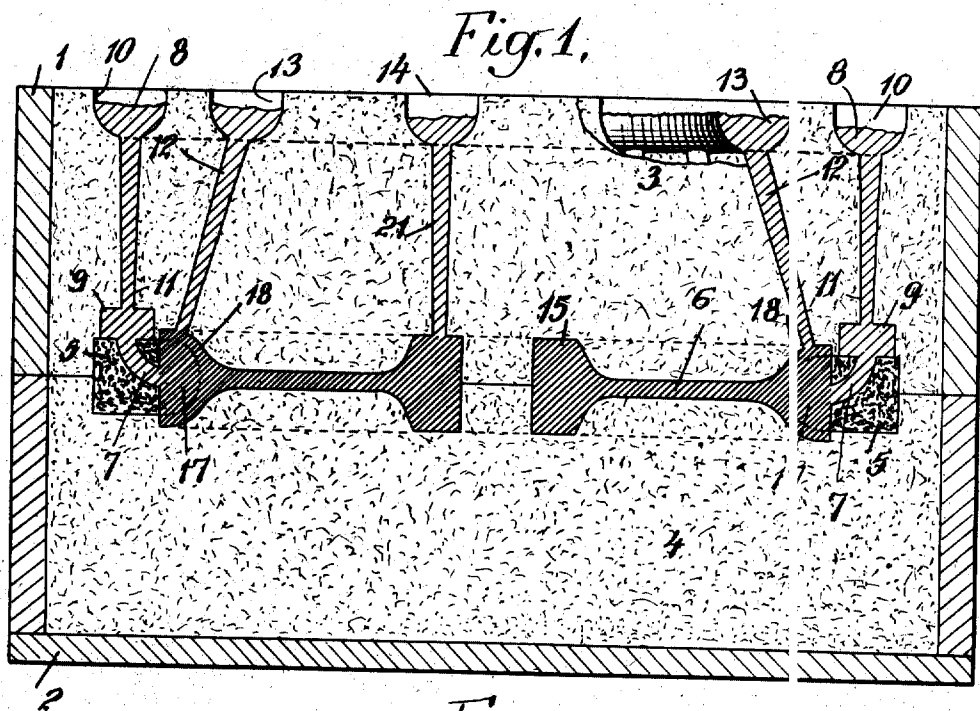
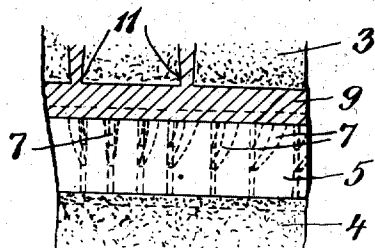


Fig. 3.



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PROCESS OF CASTING STEAM-TURBINE WHEELS, &c.

1,008,478.

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To all whom it may concern:

Be it known that we, WILLIAM T. HOPSON, of New London, Connecticut, and CHARLES BEMIS REARICK, of New York city, New York, citizens of the United States, have made certain new and useful Inventions Relating to Processes of Casting Steam-Turbine Wheels, &c., of which the following is a specification, taken in connection with the accompanying drawing, which forms part of the same.

This invention relates to processes of casting steam turbine wheels having thin bucket vanes or other objects having thin partitions, lugs or teeth which consist in pouring the metal into a suitable distributing basin which communicates through sprues in the mold with a heavy flow ring adjacent said partitions or with a relatively heavier portion of the casting itself adjacent the partitions and in flowing the molten metal thus supplied through such thin partitions and connected runners communicating with the flow ring so as to prevent chilling the metal entering the partitions, and thereby secure strong sound partitions of unusual thinness.

In the accompanying drawings showing in a somewhat diagrammatic manner an illustrative mode of carrying out this invention, Figure 1 is a vertical central section through the mold and casting. Fig. 2 is a partial horizontal section thereof; and Fig. 3 is a partial vertical section taken outside the casting.

According to the illustrative manner of carrying out this invention shown in the drawing, the sections of the flask 1 containing the upper and lower sections 3, 4 of the green sand or baked sand mold may be mounted on the usual mold board 2. The casting which may be any object having thin partitions on its periphery for instance, such for example, as thin lugs, teeth, or bucket vanes, such as 17, in the case of the steam turbine wheel illustrated, may have a relatively thicker rim 18 substantially inclosing or shrouding these partitions and connecting them with the web 6 which may extend inward to connect with the enlarged hub 15. As is specially desirable in steam turbine wheels these partitions may by the present method be cast of the extreme thinness of one-tenth of an inch or less in some cases and still secure strong sound castings when bronze or other suitable metal is used.

The mold may be formed in the usual way and the wheel bucket or recesses 16 on either side of the partition 17, for instance be formed by the use of sectional or integral cores 5 arranged in the mold as indicated. A heavy or relatively large sectioned flow ring or gate is provided located at any convenient point adjacent the partitions so that during the casting process there may be a relative flow of metal through the partitions and runners connecting them with the flow ring so that the molten metal passing in either direction between the heavy gate and the parts of the casting adjacent the partitions prevents chilling of metal entering the partitions and insures the strong and sound character of these thin partitions. For example, the heavy gate may be in the form of the flow ring 9 extending around the turbine wheel adjacent the partitions and for convenience formed in contact with any side of the ring of cores 5, for instance on top of these cores, as illustrated in the drawing. A series of tapering runners 7 may be used to connect this flow ring to each of the partitions, as indicated in Figs. 1 and 3 of the drawing and a series of sprues 11 serves to connect this heavy gate with a distributing basin 10 which may be in the form of a circular ring around the top of the mold in case a turbine wheel is being cast. It is also desirable to have another distributing basin 13 which may be in similar circular form connected by a series of sprues 12 with the part of the casting adjacent the partitions, such, for example, as the relatively heavy rim 18 and also if desired one or more separate sprues 21 may supply metal to the other portions of the casting such as the hub 15 from one or more basins 14 in the top of the casting.

In pouring the mold the molten metal is supplied to either one or both of the distributing basins, so that for instance the metal enters and fills the flow ring or gate 9 and passing through the series of runners 7 flows rapidly through the thin partitions 17 to supply the adjacent parts of the casting and in thus flowing through the partitions prevents chilling of the metal entering them and obviates cold-shuts and other imperfections in these thin partitions. Additional metal may also if desired be independently supplied to the casting as through the basins 13 or 14 in which the molten metal

8 would in any event rise during the casting operation.

Having described this invention in connection with illustrative methods, devices and arrangements of steps, to the details of which disclosure the invention is not of course limited, what is claimed as new and what is desired to be secured by Letters Patent is set forth in the appended claims.

1. The process of casting in sand molds steam turbine wheels or the like having thin cored peripheral partitions which consists in pouring the metal into a continuous distributing basin communicating with a heavy flow ring above and adjacent said partitions, in supplying the molten metal from said flow ring through runners to each of said thin partitions adjacent the middle portion of its edge to allow the metal to flow through said partitions during the casting operation to prevent chilling the metal entering said partitions and to supply the adjacent portions of the casting and in independently supplying additional metal to the casting.
2. The process of casting in sand molds steam turbine wheels or the like having thin peripheral partitions which consists in pouring the metal into a circular distributing basin communicating through sprues with a heavy flow ring adjacent said partitions, in supplying the molten metal from said flow ring through runners to each of said thin partitions to allow the metal to flow through said partitions during the casting operation to prevent chilling the metal entering said partitions and to supply the adjacent portions of the casting and in independently supplying additional metal to the casting.
3. The process of casting in sand molds steam turbine wheels or the like having thin cored peripheral partitions, which consists in pouring the metal into a circular distributing basin communicating through sprues with a heavy flow ring adjacent said partitions, in supplying the molten metal from said flow ring through runners to each of said thin partitions adjacent the middle portion of its edge to allow the metal to flow through said partitions during the casting operation to prevent chilling the metal entering said partitions and to supply the adjacent portions of the casting and in independently supplying metal to the casting.
4. The process of casting steam turbine wheels or the like having thin peripheral partitions which consists in pouring the metal into a continuous distributing basin communicating with a flow ring adjacent

said partitions, in supplying the molten metal from said flow ring through runners to each of said thin partitions to allow the metal to flow through said partitions during the casting operation to prevent chilling the metal entering said partitions and to supply the adjacent portions of the casting.

5. The process of casting steam turbine wheels or the like having thin peripheral partitions which consists in forming a heavy flow ring adjacent said partitions and communicating through runners with each of said thin partitions and in flowing the molten metal through said runners and partitions during the casting operation to prevent chilling the metal entering said partitions.

6. The process of casting steam turbine wheels or the like having thin peripheral partitions which consists in forming a flow ring adjacent said partitions and connected through runners to each of said partitions and in flowing the molten metal through said partitions and runners during the casting operation to prevent chilling the metal entering said partitions.

7. The process of making in sand molds castings having thin partitions which consists in forming a flow gate adjacent said partitions and connected through runners with a plurality of said partitions and in flowing the molten metal through said runners and partitions during the casting operation to prevent chilling the metal entering said partitions.

8. The process of making in sand molds castings having thin edge partitions which consists in forming a heavy flow gate adjacent said partitions and connected through runners with said partitions and in flowing the metal through said runners and partitions during the casting operation to prevent chilling the metal entering said partitions.

9. The process of making in sand molds castings having thin edge partitions which consists in forming above and adjacent said partitions a heavy flow gate connected through runners with a plurality of said partitions and in flowing the molten metal through said runners and partitions during the casting operation to prevent chilling the metal entering said partitions.

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