No. 839,560. PATENTED DEC. 25, 1906.

J. C. DAVIS.

PROCESS OF MAKING CASTINGS.

APPLICATION FILED JULY 19, 1904.

Fig. 1

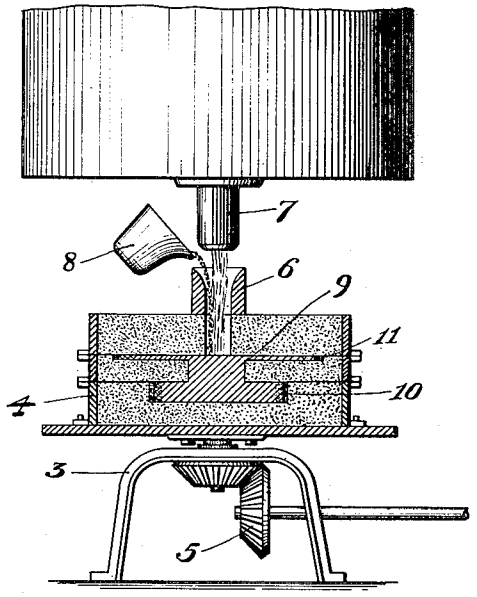
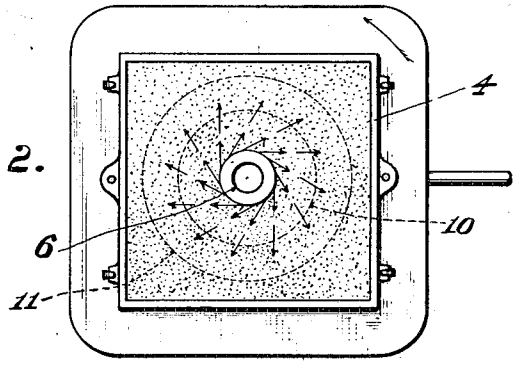


Fig. 2.



WITNESSES;

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PROCESS OF MAKING CASTINGS.

No. 839,560. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed July 19, 1904. Serial No. 217,262.

To all whom it may concern:

Be it known that I, JAMES CAREY DAVIS, a citizen of the United States, residing at Hinsdale, Dupage county, in the State of Illinois, have invented a certain new and useful Process of Making Castings, of which the following is a specification.

My invention relates to the art of casting metals, and particularly to making castings in which a hardening element is intermixed with metal in order to modify its tempering properties, the invention being an improvement upon the process set forth in the patent to Davis No. 727,103 of May 5, 1903. The objects of the present invention are, to provide a method of mixing a hardening element in a casting in predetermined quantity and position therein and to introduce this element more easily; to provide a casting which has distinct strata capable of being hardened and other strata and parts which are left soft; and to generally improve processes of making castings with portions capable of being tempered. These objects, and other advantages which will hereinafter appear, I attain by means of the mode of manipulation as hereinafter set forth, and by use of the apparatus illustrated in its essentials in the accompanying drawings, wherein—

Figure 1 is a sectional view of a rotatable mold and side elevations of the other parts of the apparatus, and

Figure 2 is a top plan view of the mold and casting indicating the method of distribution of the hardening element in the casting.

In the patent above referred to the process is more particularly adapted to distributing the hardening element throughout the casting, but in varying proportions, by means of centrifugal forces which act during the pouring of the metal. But this is not necessary in providing a single definite stratum of metal which is capable of being hardened in the furnace while the remainder of the casting is left soft. If it is desired to introduce the hardening element at several distinct points in the casting and in varying proportions at different places this may be accomplished also, as hereinafter described. For my purposes I find it convenient to use the apparatus shown in the drawings, from which it will be seen that upon a suitable stand 3 I have mounted a rotatable mold 4 which is driven by any convenient form of gearing 5 and during the rotation of the mold the metal is poured into the gate 6 from feed spout 7, and a convenient form of ladle such as indicated at 8 is used to introduce into the metal a finely divided hardening element such as manganese.

I have shown for illustration a circular casting 9 which may be desired to harden upon its outer periphery 10 as indicated by the density of shading in the drawings. In the procedure, while the mold is stationary, I introduce into the gate 7 a quantity of the molten metal and at the same time, or thereafter, the hardening element from the ladle 8, and when these, properly proportioned, have entered the mold, I begin the rotation of the mold by turning the gears 5, which will first cause the mixture of steel and hardening element to travel outward to the periphery 10 and distribute itself evenly along that part. Thereafter, and while the rotation is still proceeding, I continue the pouring of the metal alone, and fill up the remainder of the casting with the soft metal so that when afterward the article is placed in the furnace and cooled suddenly it will be hardened along the outer periphery 10 and the remainder will be soft. In case I should desire the flange 11 also hardened upon its outer surface as indicated in the drawing, the hardening element may be introduced momentarily after the casting 9 is filled up to the level of the flange 11. From the above it is evident that I am able to determine with great precision and in a variety of ways the distribution of the hardening element throughout the casting, the effect desired being secured by alternate or intermittent rotation and nonrotation of the mold. The casting now being taken out of the mold and machined, and then placed in the furnace for heating it will be understood that the presence of the manganese in the particular points indicated will render the casting capable of hardening at the outer periphery 10 while the central portion of the casting 9 and the main part of the flange will remain soft and tough. The various advantages of this method will be apparent to those familiar with the art.

Having thus described my invention and illustrated its use, what I claim as new, and desire to secure by Letters Patent, is the following:

1. The process of making castings which consists in introducing a certain quantity of molten metal and a hardening element into a

mold, while the same is stationary, then rotating the mold to distribute the hardening element on the outer periphery of the casting and thereupon filling up the remainder of the mold with the metal alone.

2. The process of making castings consisting in introducing molten metal and a hardening element in a mold, while it is stationary, then rotating the mold to distribute the hardening element, and then filling up the remainder of the mold with the molten metal as the rotation continues, substantially as and for the purposes described.

3. The casting process which consists in pouring metal into a mold and mixing with it a hardening element of greater specific gravity, then rotating the mold to distribute the hardening element upon the outer periphery, then pouring in more of the metal so that the center of the casting is soft, then again introducing a hardening element to distribute it at a different part of the periphery, substantially as and for the purpose described.

4. The process of making castings which consists in introducing a hardening element intermittently at various strata of the casting and rotating the mold to distribute it upon the outer peripheries of such strata and pouring the center of the casting with metal alone, and thereafter heating and tempering the casting so that it is hard where the hardening element is present and soft in the other portions.

5. The process of making castings which consists in pouring into a mold while stationary a certain quantity of metal and adding thereto during the pouring operation a hardening element of greater specific gravity, then rotating the mold to distribute the said hardening element with the metal containing the same upon the outer periphery of the mold, and then continuing the rotation of the mold and at the same time pouring therein the metal alone.

In testimony whereof I have hereunder signed my name in the presence of the two subscribed witnesses.

JAMES CAREY DAVIS.

Witnesses:

JANE CARPENTER,

ALBERT G. MILLER.