A. F. ROCKWELL.

PROCESS OF CASTING.

APPLICATION FILED FEB. 25, 1911.

1,095,230.

Patented May 5, 1914.

Fig. 1

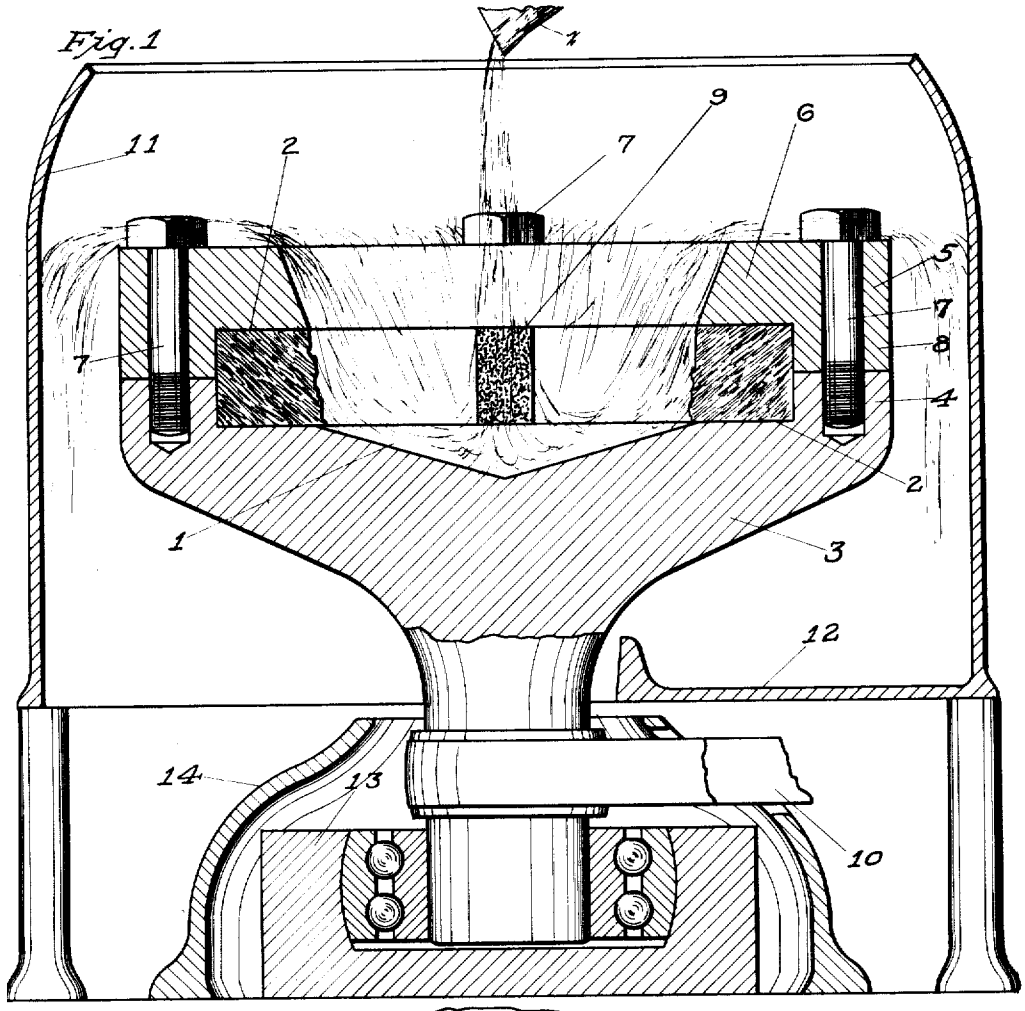
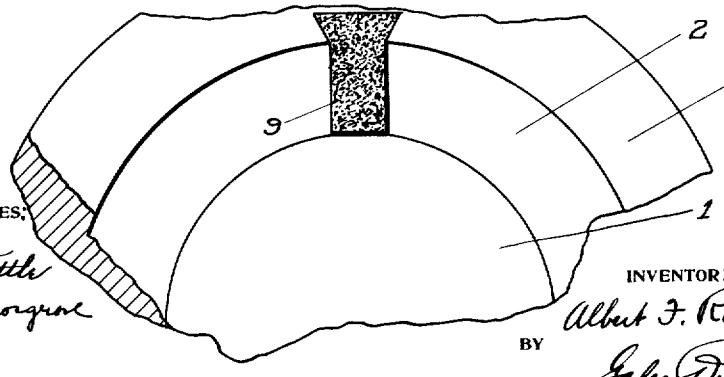


Fig. 2



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALBERT F. ROCKWELL, OF BRISTOL, CONNECTICUT, ASSIGNOR TO THE NEW DEPARTURE MANUFACTURING COMPANY, OF BRISTOL, CONNECTICUT, A CORPORATION OF CONNECTICUT.

PROCESS OF CASTING.

1,095,230. Specification of Letters Patent. Patented May 5, 1914.

Application filed February 25, 1911. Serial No. 610,832.

To all whom it may concern:

Be it known that I, ALBERT F. ROCKWELL, a citizen of the United States, residing at Bristol, county of Hartford, State of Connecticut, have invented a certain new and useful Process of Casting, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to processes of casting, and, although in nowise limited to such use, is particularly applicable to the casting of steel ingots which are to be subsequently rolled into wire for the manufacture of steel balls.

As heretofore produced castings frequently contain gas pockets and like flaws, and they also frequently have portions consisting largely or wholly of dross or other material which is below the standard of the major portion of the metal in the casting. Such castings, are, obviously, weak and unsatisfactory; much of a casting frequently has to be cut away to eliminate the relatively soft and impure material when this appears adjacent the surface, and gas pockets produce long, concealed seams or flaws when the casting or ingot is rolled, as in making wire.

My object is to provide a method whereby there can be produced a casting having a body of uniform grade and density.

A further object is to provide a method whereby there can be provided a casting having a solid body, free from gas pockets and the like.

A further object is to provide a method whereby there can be produced a wire, plate or the like free from the above indicated weaknesses and deficiencies.

To these ends, and also to improve generally upon processes of the character indicated, my invention consists in the various matters hereinafter described and claimed.

In the accompanying drawings Figure 1 is an elevation, chiefly in section, of an apparatus used in practising my process, portions being broken away to economize space; and Fig. 2 is a plan view of a portion of the base member.

In practising my process, molten metal (*e. g.*, steel) is poured upon a rapidly rotating table, such as 1, which leads to a circumferential mold, as 2, and the centrifugal force developed by the rapidly rotating table hurls the metal into the mold and there causes the metal atoms to pack together solidly into a homogeneous body. Of course, the stream of metal from the ladle, as *x*, is broken into smaller masses as it strikes the table, and gas is thus given an opportunity to escape, such smaller masses being then forcibly packed into the open-sided mold so that opportunity for the formation of gas pockets in the casting is avoided. Furthermore, the heavy and desirable particles of the mass of metal are hurled toward the outer circumference of the mold while the lighter and undesirable particles (such as dross and other impurities) assume a position nearer the center of the table, and as more and more heavy and desirable particles are forced into the mold while the mass is molten, these lighter particles are forced farther and farther toward the inner circumference of the mold until they flow out of the mold and escape, thus leaving the casting a solid and homogeneous one of uniform grade and density and free from impure portions as well as from gas pockets and the like.

In practice I prefer to pour the molten metal rapidly upon the table at the beginning of the operation and until the mold is about filled, and to then pour an excess of metal somewhat more slowly to give the pure and heavy particles of this excess metal opportunity to crowd the lighter particles out of the mold and to carry off such dislodged particles. After the production of this ring-shaped casting it can be straightened and rolled into any desired form, *e. g.*, wire suitable for the manufacture of balls. Of course, the mold can be of any desired cross section, thus making it possible to produce castings having various cross-sectional shapes.

In the apparatus here illustrated, the base member 3 has the table 1 formed in its upper face, such table being here shown as slightly depressed centrally and inclining upwardly and outwardly, and this base member has a flange or circumferential ridge 4 about said table and spaced therefrom. A top plate 5, having an extension 6 which overlies the portion of the base member between said table and said flange 4, co-

operates with said base member to produce the before mentioned pocket or mold 2, and this top plate is preferably removably secured to the base member, as by the heavy screws 7, so that it can be easily removed to permit the ready withdrawal of the completed ingot or other casting. Preferably the said flange 4 of the base member is of less height than that of the pocket 2, the top plate 5 in such event having, as shown, a coöperating flange or extension 8, so that upon the removal of the top plate the casting projects above the flange 4 and can thus be readily grasped. If desired a suitable spacing member, such as a fire-brick 9 clamped between the base member 3 and the top plate 5, can be provided for causing the ingot to be cast split, thus avoiding the necessity of subsequently splitting the ring-shaped casting when it is to be rolled.

Any suitable means, such as the belt 10, can be employed for rotating the base member 3. I prefer to provide a guard 11 for deflecting metal escaping from the member 3, such guard being here shown as having a portion 12 for projecting the belt 10. The supporting base 13 and its adjacent parts are preferably protected by the guard 14.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is

1. The process of casting which consists in supplying an excess quantity of molten metal to an open mold whereby impurities are dislodged and caused to flow off; substantially as described.

2. The process of casting which consists in substantially filling an open mold with molten metal, and then while the metal is molten forcibly supplying excess molten metal; substantially as described.

3. The process of casting which consists in supplying excess molten metal to a rapidly rotating mass of molten metal contained in a mold; substantially as described.

4. The process of casting which consists in rapidly rotating a mold containing molten metal and open upon its side toward the center of rotation, and supplying excess metal to said mold by centrifugal action; substantially as described.

5. The process of casting which consists in substantially filling an open mold with molten metal and separating the impurities from the pure metal, and then while the metal so supplied is molten supplying an excess of molten metal and separating its impurities from its free metal and forcing the pure metal of the excess to dislodge and replace the impurities of the metal first supplied; substantially as described.

6. In the process of casting, the method of purifying the molten metal, consisting in introducing it into a rapidly rotating mold open at its side toward the center of rotation and separating the metal and impurities by centrifugal force, and then introducing an excess of molten metal and forcing the previously separated impurities out of the mold; substantially as described.

In testimony whereof, I hereunto affix my signature, in the presence of two witnesses.

ALBERT F. ROCKWELL.

Witnesses:
J. C. ENO,
A. A. HUANE.

Correction in Letters Patent No. 1,095,230.

It is hereby certified that in Letters Patent No. 1,095,230, granted May 5, 1914, upon the application of Albert F. Rockwell, of Bristol, Connecticut, for an improvement in "Processes of Casting," an error appears in the printed specification requiring correction as follows: Page 2, line 26, for the word "projecting" read *protecting;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of May, A. D., 1914.

[SEAL.]

R. F. WHITEHEAD,
Acting Commissioner of Patents.