Sept. 3, 1929. T. F. BAILY 1,727,191

CASTING APPARATUS

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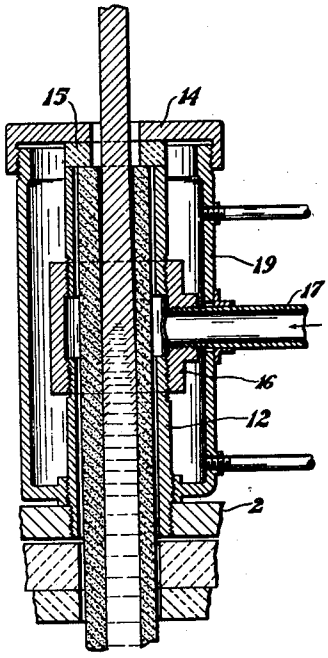


Fig. 2

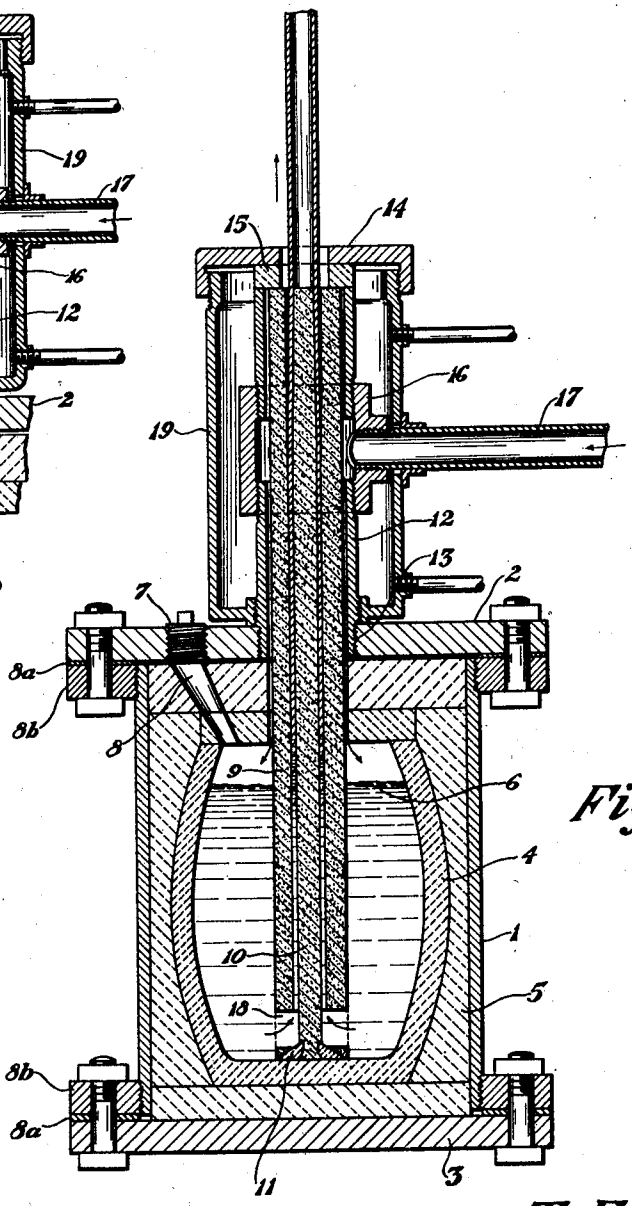


Fig. 1

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CASTING APPARATUS.

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The invention relates to the casting, from molten metal, of articles of uniform cross section throughout their length, and more particularly to what might be termed a continuous casting operation, as articles of any desired length may be cast without any change in the apparatus.

The object of the improvement is to provide an apparatus having a die of substantially the cross sectional shape to be produced in the cast article and which may be provided with a core to produce tubular castings, the lower portion of the die opening into a crucible of molten metal which may be forced continuously upward through the die by means of fluid pressure upon the top of the metal.

An embodiment of the invention is illustrated in the accompanying drawing, in which

Figure 1 is a vertical sectional view through the improved casting apparatus, designed for casting tubular sections; and

Fig. 2, a fragmentary vertical section showing the apparatus designed for casting solid sections.

The apparatus comprises a crucible of suitable size to contain the amount of molten metal necessary to produce castings of the desired length, which crucible may comprise the metal shell 1 and top and bottom plates 2 and 3, within which is located the refractory lining 4, insulated from the metal outer walls as by any suitable heat insulating material indicated at 5.

This crucible is adapted to contain molten metal, as indicated at 6 in the drawing, which may be poured into the crucible from time to time by removing the screw plug 7, from the feed opening 8, in the top of the crucible.

The crucible is gas tight, the cover and bottom plates being provided with gaskets 8^a which are clamped to the screw rings 8^b, thus tightly sealing the joints between the top and bottom walls and the side walls of the crucible.

The die 9, which is preferably formed of graphite or similar heat resisting material, has the central opening of substantially the cross sectional shape to be produced in the cast article, and, where, as in the present case, it is desired to cast tubular articles, a core 10, of the same material as the die, is mounted within the central opening of the die and spaced therefrom.

Both the die and core are preferably located in vertical position and extend from the bottom of the crucible to a point spaced above the top thereof and are both held against vertical movement.

The core is fixed at its lower end, below the point of solidification of the article being cast, to the bottom of the crucible lining 4, as indicated at 11, or the core may be fixed to the lower end of the die which is itself held against vertical movement as will be later described.

For the purpose of fixing the die against vertical movement, and also to provide means for admitting air under pressure to the crucible, a sleeve 12 may surround the die, in spaced relation thereto and be connected at its lower end, as by the screw threads 13, to the cover plate of the crucible.

The upper end of the jacket 19 may receive the flanged threaded cap 14, provided with a gasket 15, of asbestos or the like, for engagement with the upper end of the die, thus holding the same against upward movement with relation to the crucible.

This sleeve 12 may be provided, intermediate its ends, with a T coupling 16, to which is connected a pipe 17 communicating with any suitable source of fluid under pressure.

The die 9 is provided, near its lower end, with openings 18 to admit the molten metal under pressure, and for the purpose of compensating for shrinkage of the cast tube as it solidifies, the upper portion of the core 10 is tapered as shown on the drawing.

For the purpose of more quickly solidifying the metal, as it is forced through the die, any suitable cooling apparatus, such as the water jacket 19, may surround the upper portion of the die above the level of the crucible.

In operating the apparatus, to produce castings of uniform cross section, and of any desired length, the crucible is filled with molten metal, as indicated in the drawing, and fluid under pressure is admitted, from the pipe 17, into the upper end of the crucible, the fluid pressure forcing the molten metal downward in the crucible and through the openings 18, in the lower end of the die, forcing the metal continuously upward through the die, the cast metal solidifying as it passes upward through the die and being continuously cooled as it passes through the portion of the die surrounded by the water jacket.

As the casting emerges from the upper end of the die it is sufficiently solidified and cooled to be handled in any well known manner to

carry the same away from the die. It will be seen that castings of any desired length may be produced with this apparatus, the length of the casting being limited only by the amount of molten metal supplied to the crucible, and as this molten metal may be replenished from time to time there is no limit to the length of castings which may be produced.

By this process a uniform cross section is maintained throughout the entire length of the casting as well as elimination of pipe.

In the case of articles of solid cross sectional shape this method of casting is especially desirable for eliminating pipe in the interior of the casting, as the metal cools first at the outside and the molten interior is continually supported at its lower end by molten metal under pressure, thus maintaining pressure upon the interior of the casting until the same solidifies, as illustrated in Fig. 2.

I claim:

1. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die having its lower end opening into the crucible below the level of the molten metal, a core located in spaced relation within the interior of the die and means for continuously forcing molten metal under pressure upward through the die and around the core by fluid pressure upon the top of the metal.

2. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die having its lower end opening into the crucible below the level of the molten metal, a tapered core located in spaced relation within the interior of the die and means for continuously forcing molten metal under pressure upward through the die and around the core.

3. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die having its lower end opening into the crucible, a tapered core located in spaced relation within the interior of the die, means for continuously forcing molten metal under pressure upward through the die and around the core and means for cooling the metal as it passes through the die.

4. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die formed of graphite and having its lower end opening into the crucible below the level of the molten metal and means for continuously forcing molten metal under pressure upward through the die by fluid pressure upon the top of the metal.

5. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die formed of graphite having its lower end opening into the crucible below the level of the molten metal, a core formed of graphite located in spaced relation within the interior of the die and means for continuously forcing molten metal under pressure upward through the die and around the core by fluid pressure upon the top of the metal.

6. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die formed of carbonaceous material and having its lower end opening into the crucible below the level of the molten metal and means for continuously forcing molten metal under pressure upward through the die by fluid pressure upon the top of the metal.

7. An apparatus for casting metal of uniform cross section comprising a crucible adapted to contain molten metal, a die formed of heat resisting material and having its lower end opening into the crucible below the level of the molten metal and means for continuously forcing molten metal under pressure upward through the die by fluid pressure upon the top of the metal.

In testimony that I claim the above, I have hereunto subscribed my name.

THADDEUS F. BAILY.