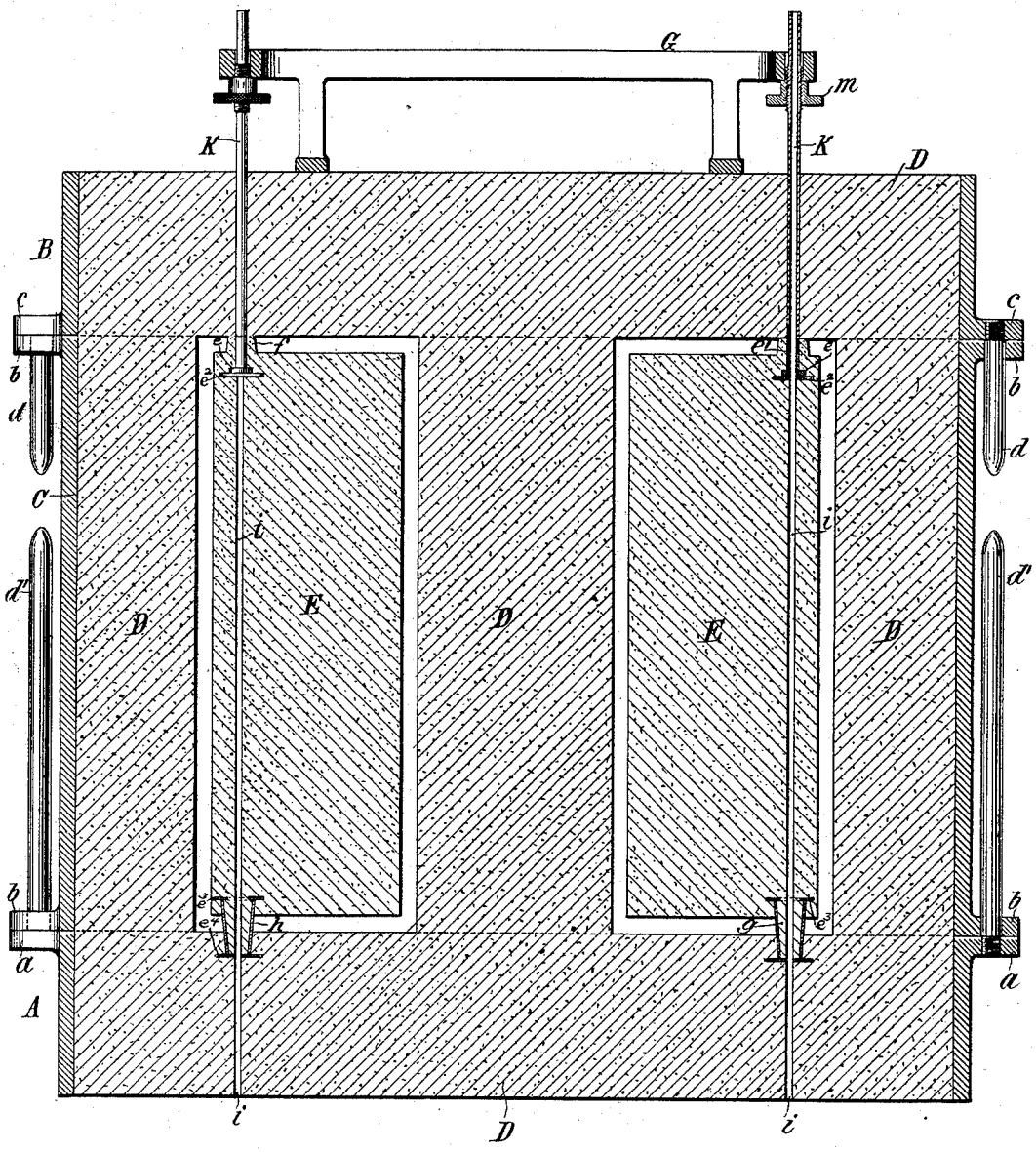
(No Model.) 2 Sheets—Sheet 1.

W. H. DRAKE & J. C. GREEN.

MEANS FOR CASTING.

No. 524,543. Patented Aug. 14, 1894.

Fig. 1



Witnesses:
Raphaël Netter
J. S. McBorren

Inventors:
William H. Drake
John C. Green

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2

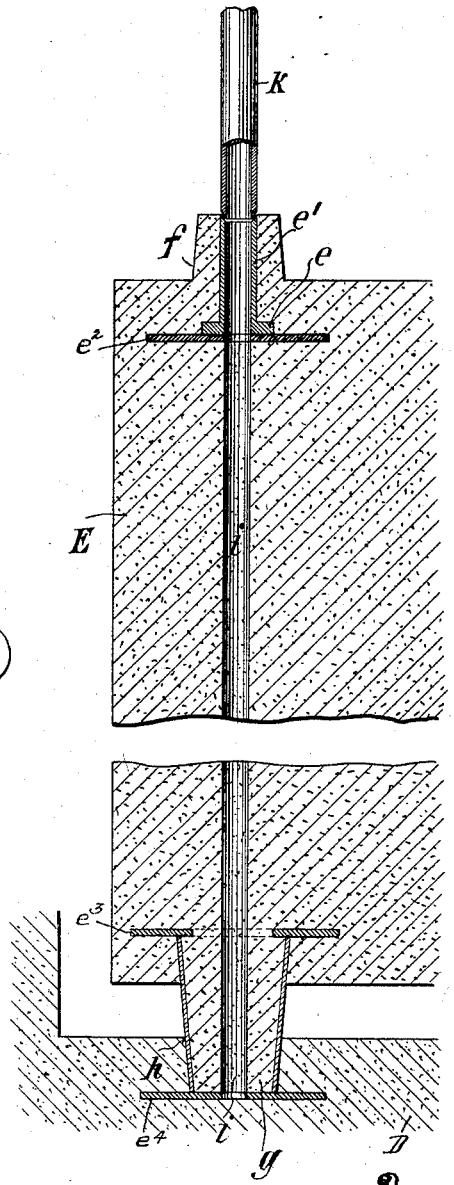
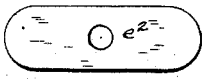


Fig. 3



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John C. Green

UNITED STATES PATENT OFFICE.

WILLIAM H. DRAKE AND JOHN C. GREEN, OF HACKETTSTOWN, NEW JERSEY; SAID GREEN ASSIGNOR TO SAID DRAKE.

MEANS FOR CASTING.

SPECIFICATION forming part of Letters Patent No. 524,543, dated August 14, 1894.

Application filed July 2, 1892. Serial No. 438,846. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. DRAKE and JOHN C. GREEN, citizens of the United States, and residents of Hackettstown, in the county of Warren and State of New Jersey, have invented certain new and useful Improvements in Means for Casting, of which the following is a specification.

This invention relates to means for casting, and it has for its object the venting of the cores and also the strengthening and supporting of the small parts of the core which are adapted to seat into the core-prints formed by the pattern in the molding sand, which small parts of the core are found to be too frail to perform the function for which they are designed without some protecting and strengthening means.

Our invention is described hereinafter in connection with sufficient of a casting apparatus to illustrate the application of our improvements, and the particular features for which protection by letters patent is desired are set out in claims at the end hereof.

In the accompanying drawings which form a part of this specification, and in which like parts are indicated by like letters of reference in all the views, Figure 1 is a vertical sectional view of a flask properly assembled with the molding sand in place, and cores placed within the spaces that have been formed by the patterns, the configuration and dimensions of the cores being such as to provide the requisite space between the cores and molding sand for the metal that is to form the structure to be cast. Fig. 2 is a fragmentary vertical sectional view of one of the cores on a scale larger than Fig. 1, showing the supporting jacket enveloping the small portion of the core at its bottom, and the hollow chaplet embedded within the upper portion of the core and a metal tube (partly in section) seated in the upper end of the tube-portion of the chaplet, and Fig. 3 is a plan view of one of the supporting plates hereinafter referred to.

In Fig. 1 the chaplet and its tube and the communicating tube which extends through the molding sand of the cope, and also the adjusting wheel by which the core through means of the chaplet and cross-beam secured to the cope is prevented from rising when the metal is poured, and also the ears on the several parts of the flask, are shown in section on the right of the view and in full lines on the left thereof.

Heretofore provision was made for the escape of air, when pouring the metal, by perforating the core with holes, but with large castings this has not always proved satisfactory in preventing the formation of blow-holes in the casting. By our invention whereby the core is provided with a longitudinal bore through it which communicates at the upper end with the chaplet tube, which latter is in communication with a tube extending clean through the molding sand of the cope, the said bore of the core also extending into and through the molding sand of the drag, we provide an efficient means of venting the core.

Referring to the drawings, the drag or lower section of the flask is indicated by A, and the cope or top section thereof by B. The intermediate section or main body of the flask is indicated by C. These parts are of the usual construction and are provided with ears or lugs a, b, c, for co-operating with the steadying pins d, d'.

The molding sand in the respective sections of the flask is indicated by D it being filled in and rammed in the usual manner, the pattern being in position within the central section of the flask. The pattern is removed by a crane or otherwise, after taking off the cope of the flask to permit such removal, and the cores placed in position within the space provided by the pattern. The core-prints of the pattern provide the required depressions in the molding sand of the drag for receiving the small projecting portions of the core which serve to support the core in proper position with the necessary space between its bottom and the adjacent molding sand.

The cores are indicated by E, and they are constructed of such material as is usually employed for making casting cores. In molding the core we embed therein near its top surface, preferably near its circumference, a chaplet consisting of a centrally perforated disk e and a tube e' extending upward and from said disk substantially to the top sur-

face of the small portion f at the top of the core, which small portion f by surrounding said tube serves to protect the same when the molten metal is poured around the core. The disk or plate e is made small enough to permit of its removal through the hole formed in the casting by the small portion f which surrounds the chaplet at the top of the core. Because of the small size of this plate it may not, in some cases, be sufficient in itself to prevent the chaplet from crushing down into the core when the metal is poured and the pressure exerted. We therefore propose to make use of a larger plate e^2 preferably of oblong form to support the plate or disk e. This plate e^2 perforated centrally to provide a vent passage, as shown in the drawings, is embedded in the core E when molding the latter and is in immediate contact with the chaplet disk e. This plate is of sufficient length to prevent the crushing effect referred to and is of a width which will permit it to be removed through a hole in the casting formed by the projecting portion f of the core E. The chaplet disk e is secured to or, preferably, formed integrally with its tube e'.

The small portion g of the core E at its bottom which is adapted to seat into the core-print formed by the pattern in the molding sand of the drag A, is surrounded when molding the core by a tube or jacket of sheet metal or other suitable material h which serves to strengthen and support said small portion of the core which is found too frail without such reinforcing means to perform the functions intended. The tube or jacket h extends for one-fourth of its length—more or less—up into the body of the core E. To prevent the weight of the core from crushing the protecting jacket or tube h up into the core, we provide the core, in molding the same, with plate e^3 which is located within the body of the core in contact with the said supporting jacket or tube h the said plate being perforated centrally to permit the formation of the vent bore i. We also place a similar plate e^4 in the molding sand within the drag A, immediately beneath the protecting tube or jacket h and in contact therewith as shown in the drawings, the said plate e^4 also being centrally perforated in line with the bore i through the core. The function of the plate e^4 is to prevent the core from settling down too low and assist in maintaining it in its position during the process of casting. The several plates e^2, e^3, e^4, may be substantially of the form indicated in Fig. 3, of sufficient length to furnish the requisite support and narrow enough to permit of their removal through the openings in the casting formed by the projecting portions f g of the core. The plate e^3 will preferably be cut out centrally so as to provide little if any metal immediately above that portion of the core included within the walls of the tube or jacket h so that the core material may be completely filled in within said jacket. In the casting process it is important that the core should be held stationary to produce a perfect casting. If the core should settle or rise in the process of casting, the casting would be too thick at one end and too thin at the other, if not entirely ruined. If the chaplet should crush down into the core, or the protecting tube should crush into the core, pieces of the core would be forced out into the space between the surface of the core and the molding sand provided for the metal, and the molten metal would enter the fractures of the core, resulting in a poor or worthless casting. To guard against mishaps of this description we make use of the supporting plates e^2, e^3, e^4, as, described. In some instances these plates may not be required, particularly where the casting is not very heavy. It is desirable, however, to always make use of them.

After the core E is thus prepared with the supporting jacket h around the small portion g and with the hollow chaplet e, e' embedded in position and extending into the small portion f at the top of the core, we make a bore longitudinally in a line with the hollow chaplet, the said bore extending through the protected portion g of the core within the protecting jacket or tube h. We thus form a vent hole i clean through the core.

When the cores E constructed as above described are placed in position, connection is made between the hollow chaplet e, e' and the outside atmosphere by a tube k the lower end of which is beveled and fits into the correspondingly formed end of the tube e' of the chaplet (thus forming a ground joint), said tube k extending up through the molding sand of the cope through the cross-bar G which is bolted or otherwise secured to the cope B. The bore through the molding sand within the cope which is to receive the said tube k is made sufficiently large to permit the said tube k to be readily seated within the entrance of the tube e' of the chaplet, the sand being afterwards rammed tightly around said tube k to firmly embed and hold the same in position. The primary function of the chaplet e with its connected rod or tube is to hold the core in proper position when the metal is poured through the ingate and to prevent the internal pressure causing the core to be displaced from its position. The requisite degree of pressure is exerted upon the chaplet for the purpose stated by means of the hand-wheel m operating upon the screw threaded portion of the tube k and co-operating with the cross-bar G as shown. In lieu of hand-wheel m any equivalent means may be employed, as for example a key, weight or screw.

The disk or plate e of the chaplet serves to prevent the tube portion e' from crushing down into the core by the upward pressure exerted when the metal is being poured between the core and the molding sand.

The cross-beam G is preferably connected in a detachable manner to the outer surface of the cope B by bolts, but it may be secured

in position in any suitable manner so as to serve the function of a guide and brace for the projecting ends of the tube *k* and the operating wheels *m*.

The top surface of the cope B may be fitted with a frame work such as is commonly employed to assist in holding the molding sand against displacement. This framework is not shown as it forms no part of our invention.

We have made use of this invention in the manufacture of a sectional tubular boiler embodying a series of concentrically arranged fire flues, but the invention is of course of general application in making hollow castings, especially of the heavier kind.

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

1. A core for casting provided with a chaplet including a disk or plate, arranged in the core in combination with a supporting plate in immediate contact with the disk or plate of the chaplet, substantially as set forth.

2. A core for casting provided with a chaplet comprising a disk or plate arranged in the core and having an opening therethrough and a tube connected with said disk or plate, the said core provided with a bore extending longitudinally through it in communication with the opening in the disk, substantially as set forth.

3. A core for casting provided with a hollow chaplet the upper end thereof extending to the top surface of the core, in combination with an exterior vent tube, the joint between said chaplet and vent tube being beveled, substantially as set forth.

4. A core for casting provided with a projecting piece at its bottom for the purpose stated, a reinforcing jacket or tube of suitable material surrounding said projecting piece, and a plate embedded in the core immediately above the top of said projecting tube, substantially as set forth.

5. A core for casting provided with a projecting piece at its bottom for the purpose stated, which is reinforced by a jacket of suitable material, in combination with a plate embedded in the molding sand of the drag below said reinforced projecting piece, substantially as set forth.

6. A core for casting provided with a projecting portion of core material at its bottom, combined with a tube or jacket of sheet metal or other suitable material which surrounds the said projecting portion and extends up into the body of the core for a portion of its length, substantially as set forth.

7. A core for casting provided with a projecting portion which is adapted to fit in the core-print and which is reinforced by a protecting jacket, as explained, and also having a plate embedded in the body of the core in immediate contact with the upper edge of the said protecting tube, in combination with a plate embedded in the molding sand of the drag and in contact with the lower edge of aforesaid protecting jacket.

Signed at Hackettstown, in the county of Warren and State of New Jersey, this 13th day of June, A. D. 1892.

WILLIAM H. DRAKE.
JOHN C. GREEN.

Witnesses:
M. D. HAYWARD,
D. M. COOK.