A. C. MOTT, JR., A. J. MEYER, J. K. HALTEMAN & C. H. WHEAWILL.

MOLD FOR CASTING SHELLS.

APPLICATION FILED SEPT. 25, 1918.

1,298,373.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 1.

Fig. 3.

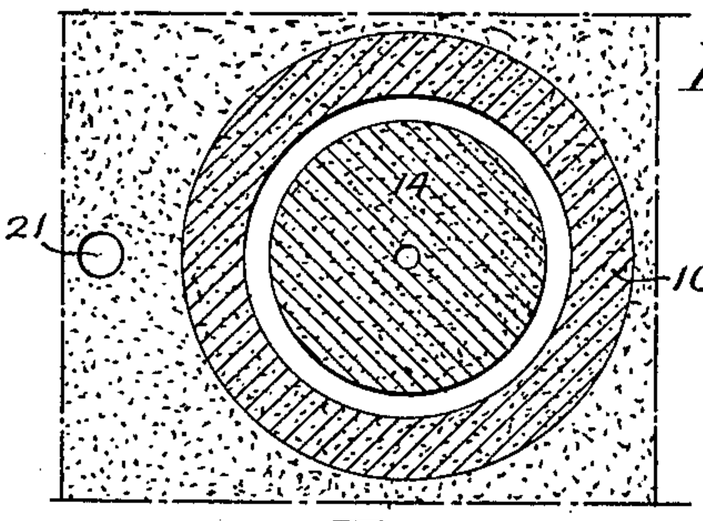


Fig. 4.

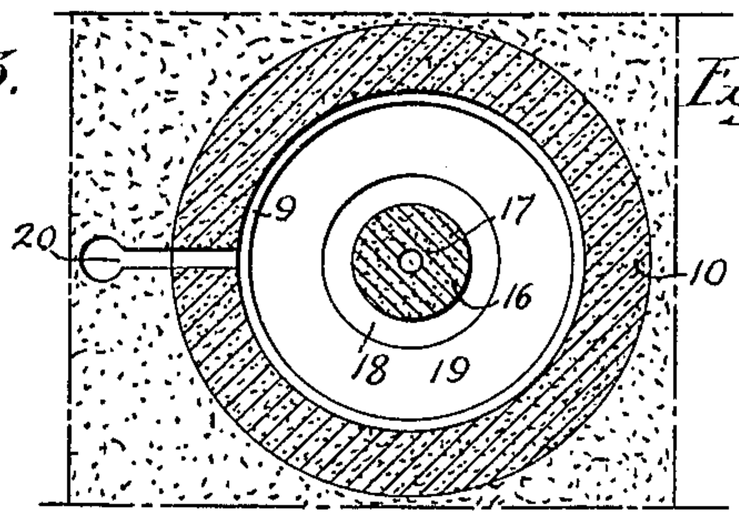


Fig. 2.

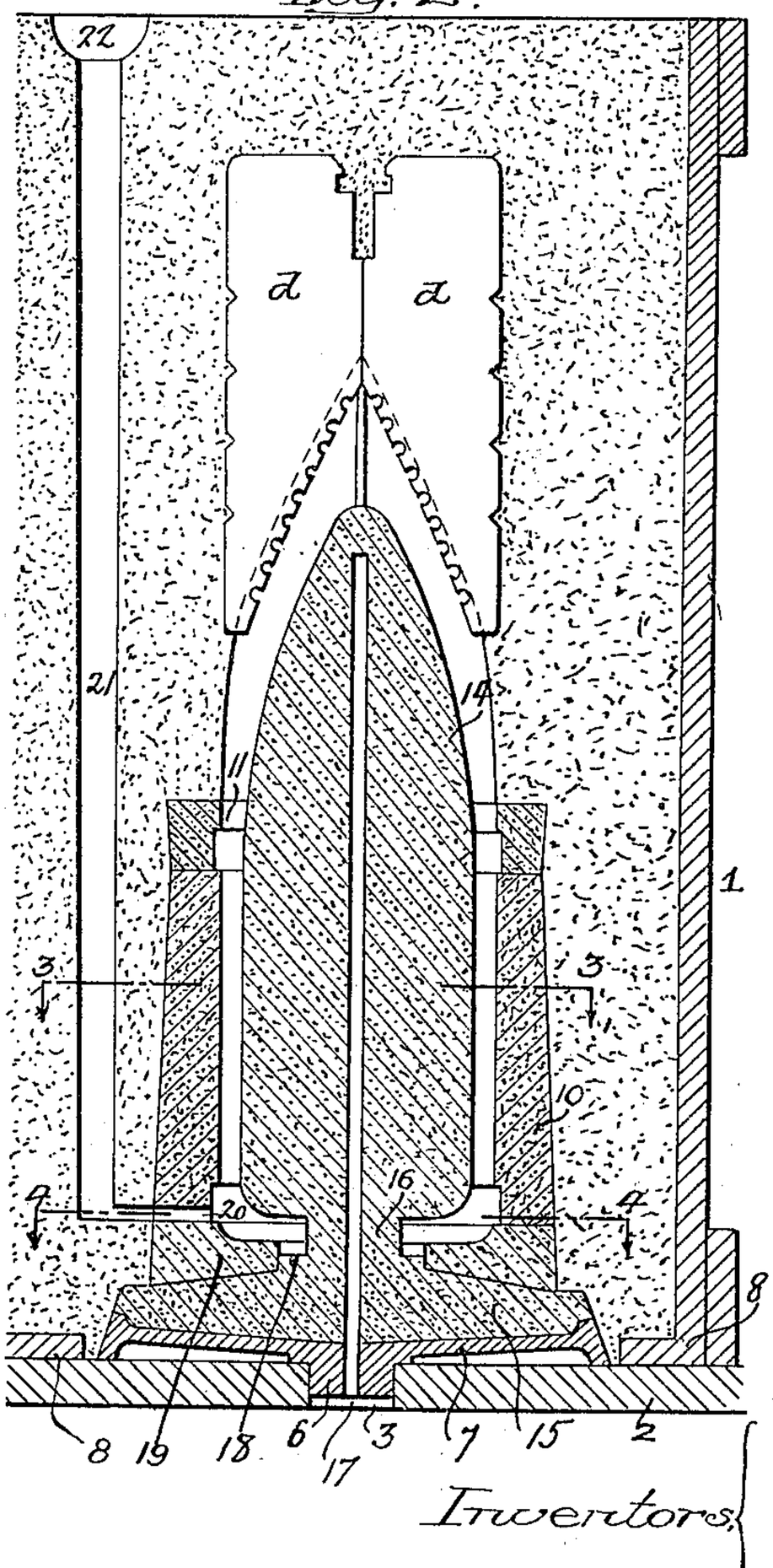
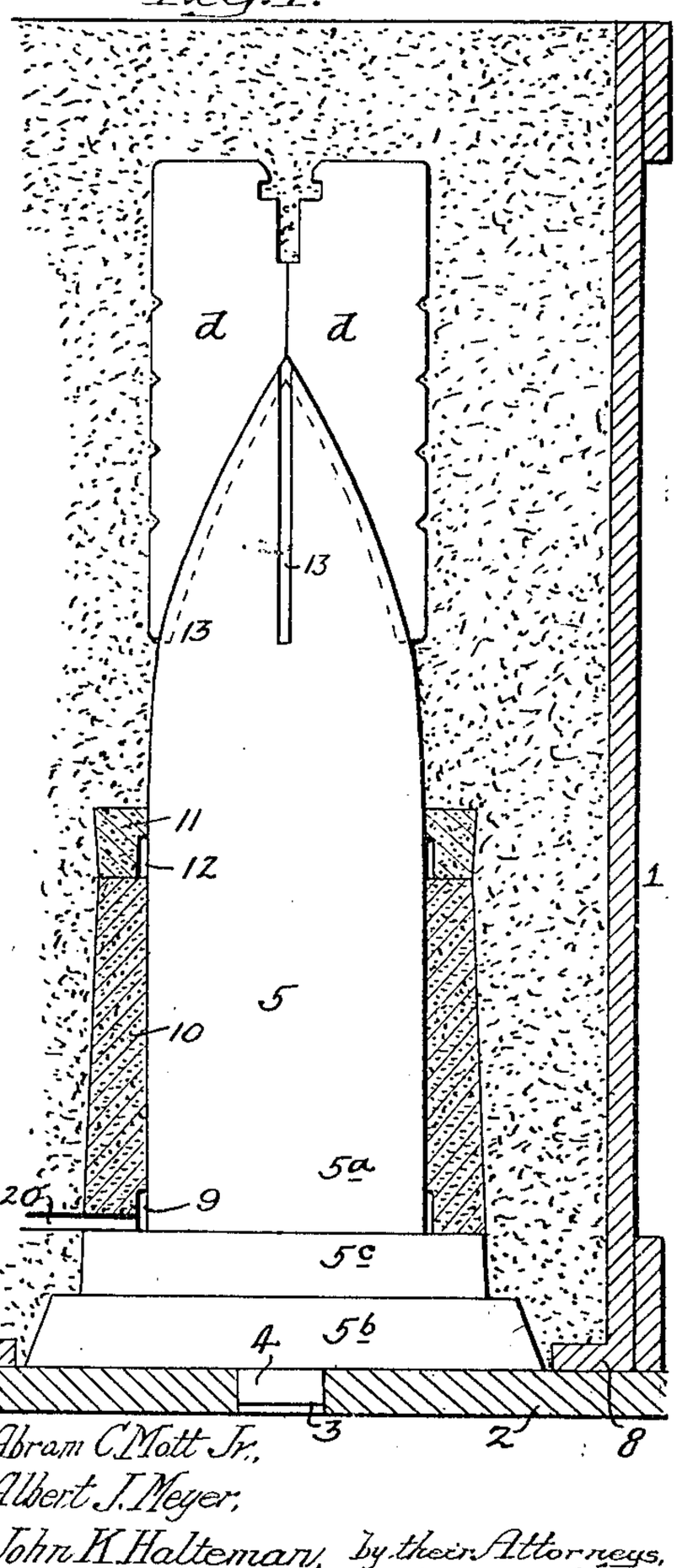


Fig. 1.



Inventors,

Abram C. Mott Jr.,
Albert J. Meyer,
John K. Halteman, by their Attorneys,
Charles H. Wheawill, Howson & Howson

A. C. MOTT, Jr., A. J. MEYER, J. K. HALTEMAN & C. H. WHEAWILL.

MOLD FOR CASTING SHELLS.

APPLICATION FILED SEPT. 25, 1918.

1,298,373.

Patented Mar. 25, 1919.

2 SHEETS—SHEET 2.

Fig. 7.

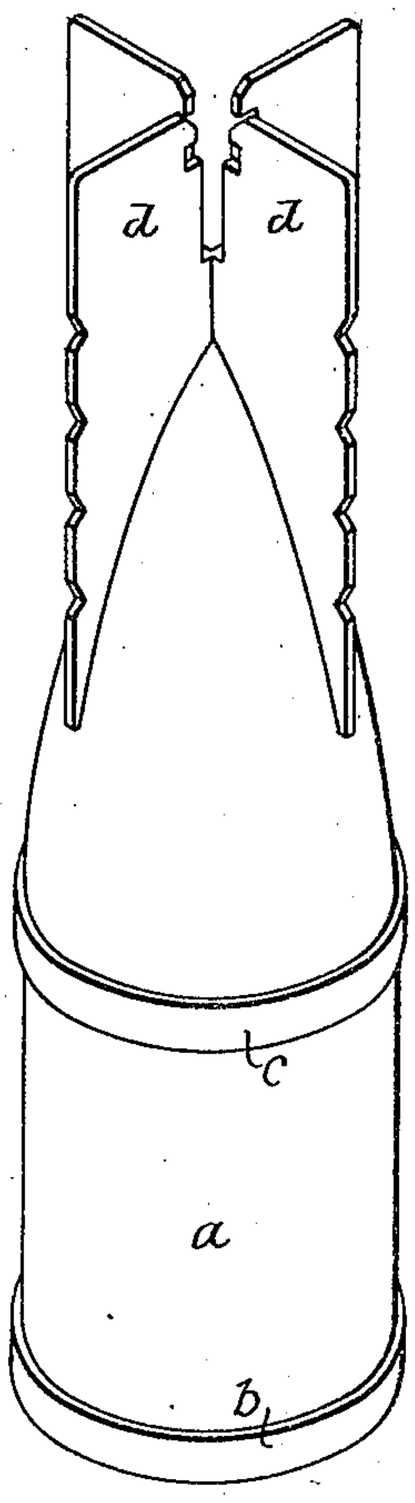


Fig. 5.

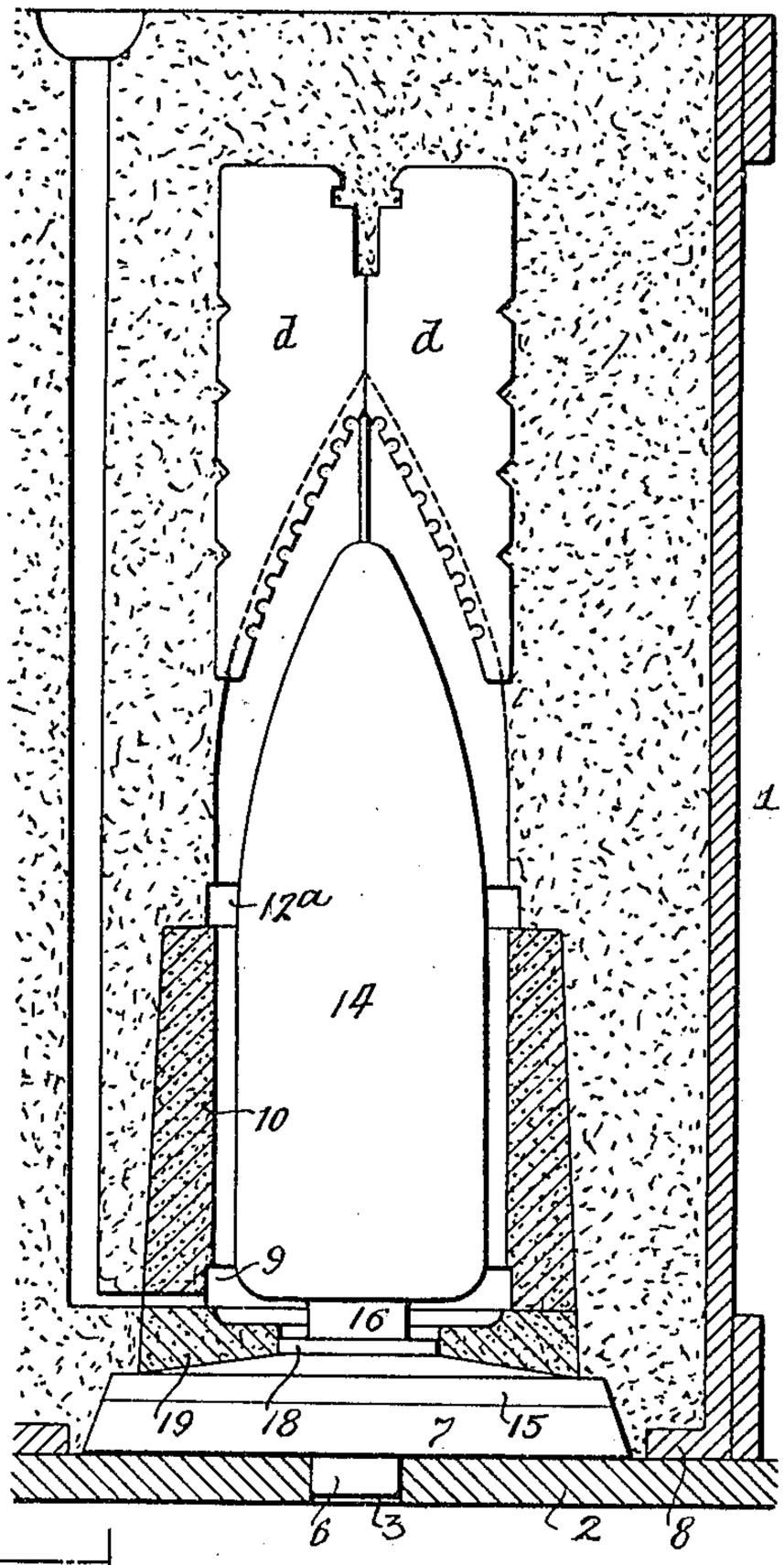
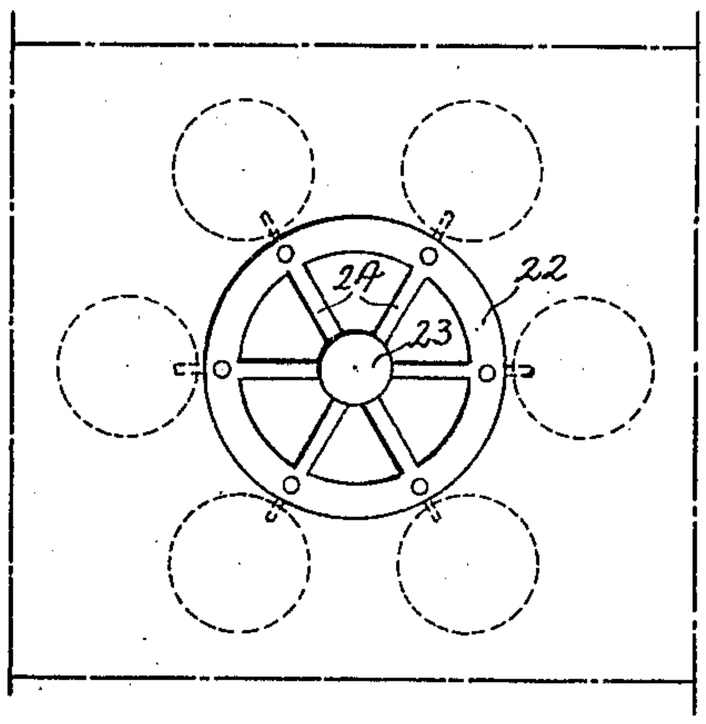


Fig. 6.



Inventors:
Abram C. Mott Jr.,
Albert J. Meyer,
John K. Halteman,
Charles H. Wheawill,
by their Attorneys.
Howson & Howson

UNITED STATES PATENT OFFICE.

ABRAM C. MOTT, JR., ALBERT J. MEYER, JOHN K. HALTEMAN, AND CHARLES H. WHEAWILL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO ABRAM COX STOVE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MOLD FOR CASTING SHELLS.

1,298,373. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed September 25, 1918. Serial No. 255,549.

To all whom it may concern:

Be it known that we, ABRAM C. MOTT, JR., ALBERT J. MEYER, JOHN K. HALTEMAN, and CHARLES H. WHEAWILL, citizens of the United States, and residents of Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain Improvements in Molds for Casting Shells, of which the following is a specification.

One object of our invention is to improve the process of molding articles so that accuracy is assured and there will be comparatively few imperfect castings. This object we attain by providing a core and a support therefor and encircling forms forming the external surfaces of the article and supported on the core structure.

Another object of the invention is to provide a mold for casting articles, such as shells, having vanes in which the vanes are located in the mold and secured to the shell during the process of casting, the mold being formed partly by sections of core material and green sand.

These objects we attain in the following manner, reference being had to the accompanying drawings, in which:

Figure 1 is a sectional elevation through a mold showing a pattern and cylindrical sections in position;

Fig. 2 is a view, similar to Fig. 1, showing the mold with the core in position and ready for pouring the metal;

Fig. 3 is a sectional plan view on the line 3—3, Fig. 2;

Fig. 4 is a sectional plan view on the line 4—4, Fig. 2;

Fig. 5 is a sectional view of a modification;

Fig. 6 is a diagrammatic plan view of the mold showing the method of casting a series of shells simultaneously; and

Fig. 7 is a perspective view of the shell cast in the mold illustrated in Fig. 2.

Referring to the drawings, 1 is the flask, which may be made to accommodate the mold for one shell, or may be arranged as shown in Fig. 6 to accommodate molds for a series of shells. 2 is the bottom plate of the flask and is perforated at 3. This perforation is arranged to receive a projection 4 on the pattern 5 and when the pattern is removed and a core located in the mold then it receives a projection 6 of a metallic plate 7 forming the base on which the core is mounted. The flask has an internal flange 8 at the base so as to retain the sand rammed in the flask when the flask is inverted, the pattern removed and the core is located in the mold. Where a series of molds is located within a single flask then there is a perforation 3 for each mold, as this perforation not only centers the pattern, but also the core. The pattern 5, in the present instance, is formed as shown in Fig. 1, having a body portion 5^a, a base 5^b and an offset portion 5^c. When the pattern is in place a cylindrical section 10 is located over the body portion 5^a and rests on the offset portion 5^c. This cylindrical section has an annular recess 9 at the base to form the ring *b* of the shell *a*, Fig. 7. This cylindrical section is also slightly tapered, as shown in Fig. 1, and mounted above the cylindrical section 10 is an annular section 11 having an annular recess 12 therein in which is formed the band *c* of the shell, Fig. 7. This annular section is preferably tapered in a reverse direction to the section 10. The pattern 5 is tapered at the upper end and has a series of slots 13 therein, four in the present instance, to receive the edges of the four vanes *d* of the shell, Fig. 7. In the lower edge of the vanes is a series of undercut notches which allows the cast metal to flow through the vanes so as to hold the vanes rigidly to the cast shell. Where the vanes are not used, then the shell has simply a plain tapered end.

When the pattern is removed, the undercut edges of the vanes *d* project into the hollow portion of the mold, as shown in Fig. 2. After the pattern is in position and the two sections 10 and 11 are properly located on the pattern and the vanes also properly placed in position, then the green sand is rammed around the pattern and the other forms by jogging, after which the flask is inverted and the bottom plate 2 is detached and the pattern 5 is removed, leaving the vanes and the sections 10 and 11 in place. The core 14 is placed in position and the flask is again inverted ready for pouring, as shown in Fig. 2. The core 14 is mounted on the metallic plate 7, which is shaped as shown in Fig. 2, and the core has a base 15 of

substantially the same diameter as the plate 7 and a neck 16 forming the opening in the end of the shell. There is an offset portion 18 of the base, which forms a flange surrounding the opening. 19 is a ring made in two or more sections and of the same material as the core. This ring is made in cross section, as clearly shown in Fig. 2, and rests on the base 15 of the core and is shaped to conform to the shape of the end of the shell and rests against the cylindrical section 10 of the mold, completing the outer wall of the mold.

In the present instance, 20 is the gate of the mold and 21 is the sprue leading from the trough 22 at the upper end of the mold and this trough is connected with the central pouring chamber 23 by radial ducts 24, Fig. 6, where a series of molds are poured at the same time. Where there is a single mold, then the metal is poured directly in the sprue.

When the mold is poured, the metal flows into the space between the core and the annular sections 10 and 11 and also flows around the projecting edges of the vanes *d* and, when the molten metal is set, the vanes are securely held to the casting. In some instances, the annular section 11 may be dispensed with and the annular recess 12ª may be formed in the green sand of the mold, as in Fig. 5. In this instance, the section 10 is inserted in the mold after the pattern has been removed, the pattern forming the recess 12ª, as well as the recess for the cylindrical section 10. Heretofore, it was deemed necessary, when casting articles such as shells, to have a double flask, *i*, *e*., to have a flask having both a cope and a drag and in many instances the shells were cast on their sides, but we find that by casting the shells in an upright position, in the manner shown and described, a much simpler mold can be made than heretofore and one which insures a larger percentage of accuracy.

The core has a vent 17, as shown in Fig. 2, which is open at the bottom.

We claim:

1. The combination of a mold for casting shells having bands; a flask; a base; a core forming the interior of the shell and connected to the base by a contracted neck; a cylindrical section surrounding the body portion of the core and spaced therefrom and having an annular groove therein; and green sand forming the balance of the mold so that when the metal is poured it will flow into the space between the core and the outer wall formed by the cylindrical section and the sand mold and will flow into the annular groove forming the ring of the shell.

2. The combination in a mold for casting shells, of a flask; a base plate having a holder therein; a plate having a projection adapted to the holder; a core supported by the plate; a segmental ring mounted on the plate below the core; a cylindrical section mounted on the ring and having an internal diameter greater than the core; green sand packed in the flask and forming the balance of the mold and also the support for the cylindrical section so that when the metal is poured it will flow into the space between the core, the cylindrical section and the ring.

3. The combination in a mold for casting shells, of a flask; a base plate having a perforation therein; a plate mounted on the base plate and having a projection adapted to the perforation in said base plate; a sand core having an extended base and a contracted neck mounted on the last mentioned plate; a segmental ring mounted on the extended base of the core, also made of core sand; a cylindrical section resting on the last named section and spaced from the core and having an annular recess therein; a second annular section mounted on the first section and also having an annular recess therein; and sand rammed around the patterns and forming the balance of the mold.

4. The combination in a mold for casting shells, of a flask; a base plate; a metallic plate mounted on the base plate; means for centering the metallic plate on said base plate; a core supported by the metal plate and having a body portion forming the interior of the shell; a contracted neck and an extended base, said core being tubular; a segmental ring of core material mounted on the base of the core and forming one end of the shell; an annular section of core material mounted on the segmental ring and forming the body portion of the shell; an annular recess in the interior wall of said section forming the ring at one end of the shell; a mold for forming the other ring; sand rammed in the mold and forming the support for the annular section and also forming the balance of the shell; and vanes located in said sand and arranged to be cast onto the shell when the metal is poured into the mold.

In witness whereof we affix our signatures.

ABRAM C. MOTT, JR.
ALBERT J. MEYER.
JOHN K. HALTEMAN.
CHAS. HENRY WHEAWILL.