3 Sheets—Sheet 1.

A. O'NEILL.

PIPE-MOLD.

No. 181,967. Patented Sept. 5, 1876.

FIG. 3.

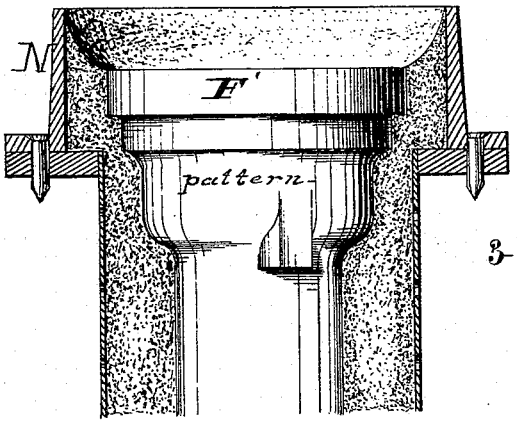
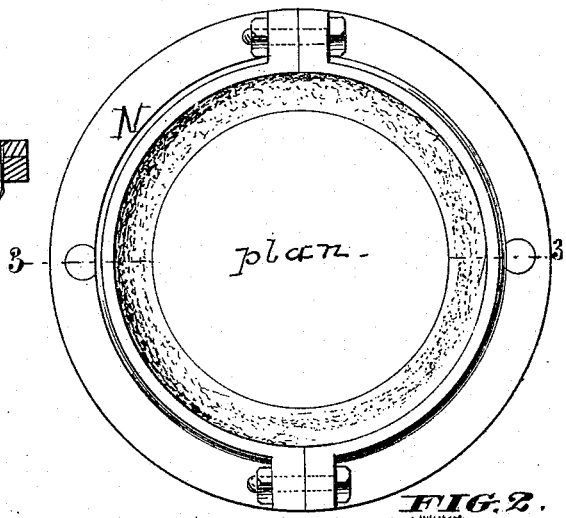


FIG. 1.



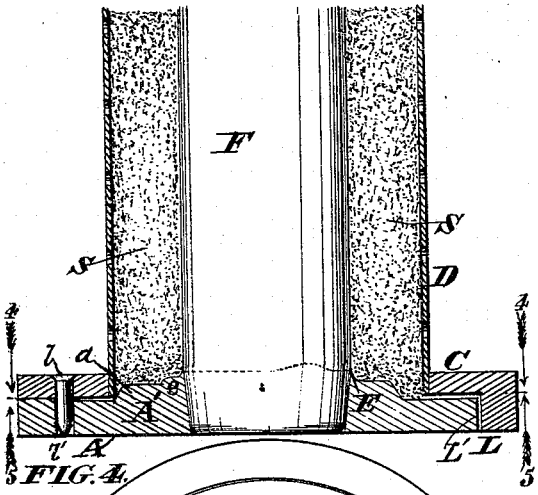
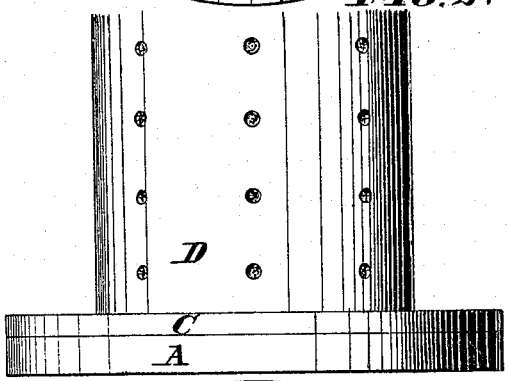
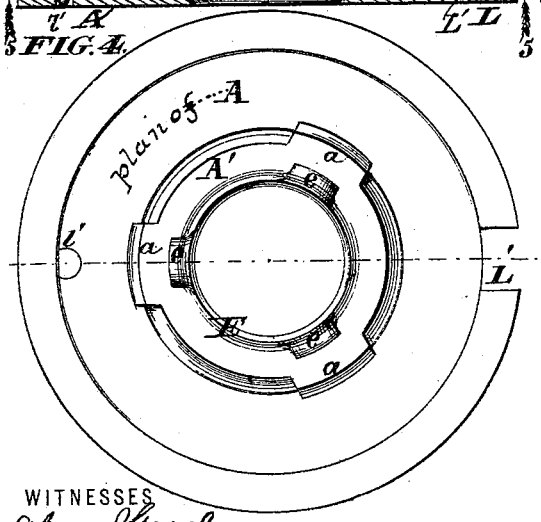


FIG. 4.

FIG. 2.





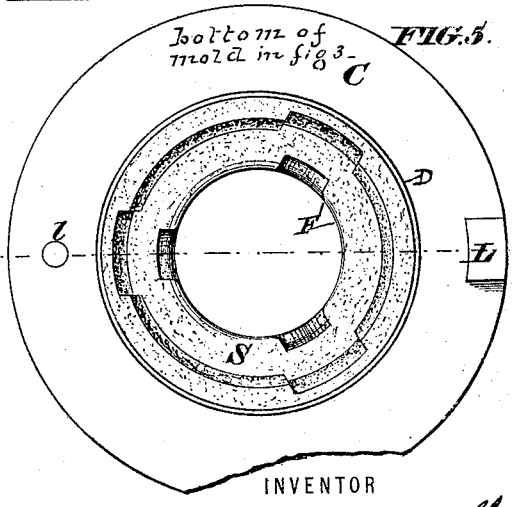


FIG. 5.

WITNESSES

Chas Hooch

A H Galt

INVENTOR

Andrew O'Neill

By Knight Bros Attorneys

3 Sheets—Sheet 2.

A. O'NEILL.

PIPE-MOLD.

No. 181,967. Patented Sept. 5, 1876.

FIG. 6.

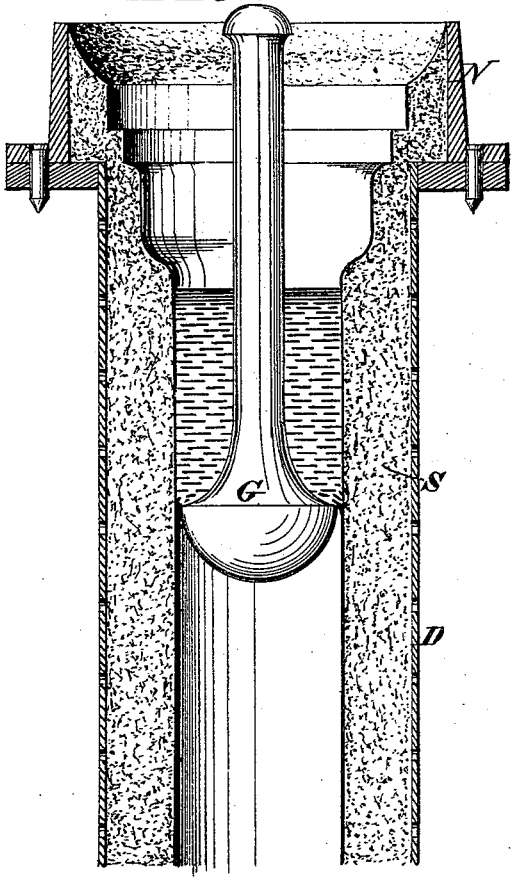


FIG. 8.

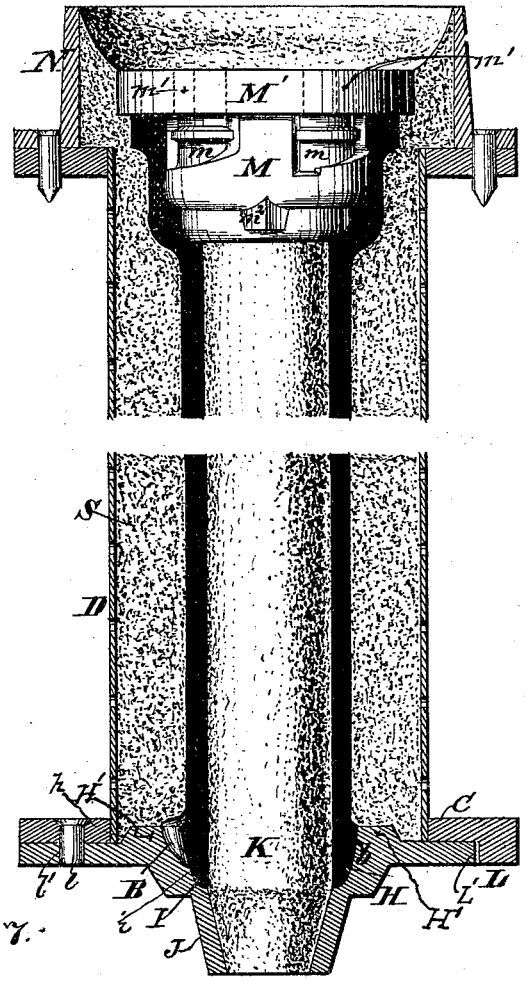


FIG. 7.

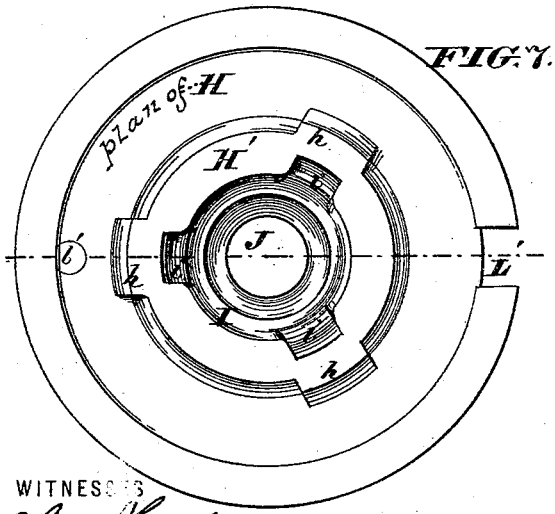
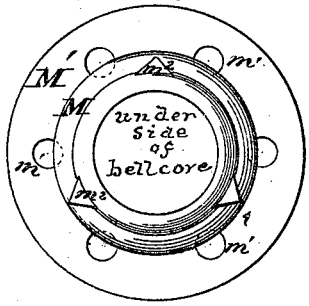


FIG. 9.



WITNESSES

Chas. Koch

A. H. Galt

INVENTOR

Andrew O'Neill

By Knight Bros Attorneys

3 Sheets—Sheet 3.

A. O'NEILL.

PIPE-MOLD.

No. 181,967. Patented Sept. 5, 1876.

FIG. 11.

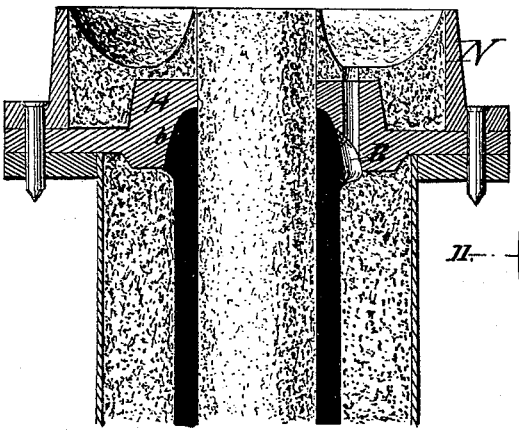
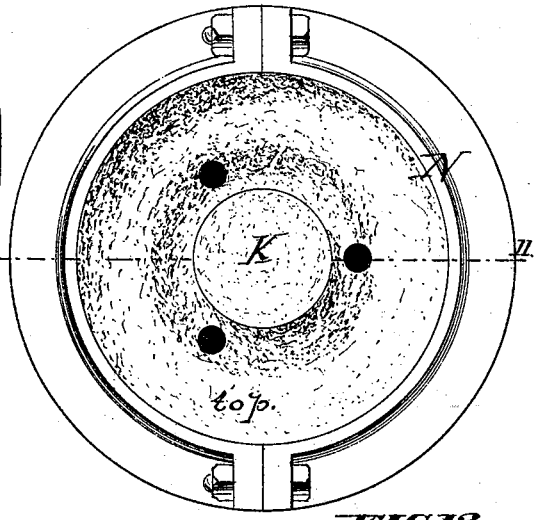


FIG. 10.



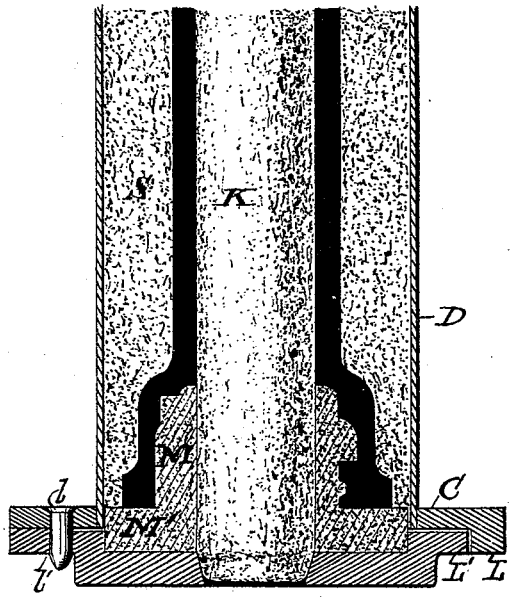


FIG. 13.

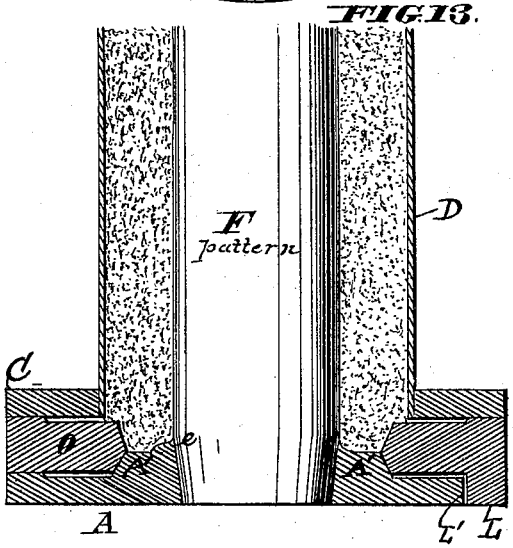
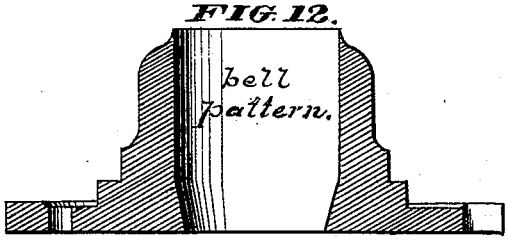


FIG. 12.



WITNESSES

Chas. J. Gooch

A. H. Galt

INVENTOR

Andrew O'Neill.

By Knight Bros. Attorneys

UNITED STATES PATENT OFFICE.

ANDREW O'NEILL, OF BALTIMORE, MARYLAND.

IMPROVEMENT IN PIPE-MOLDS.

Specification forming part of Letters Patent No. **181,967**, dated September 5, 1876; application filed February 23, 1876.

To all whom it may concern:

Be it known that I, ANDREW O'NEILL, of Baltimore, in the State of Maryland, have invented a new and Improved Process and Apparatus for Molding Pipe, of which the following is a specification:

My invention consists, in part, in casting pipes in vertical position with one or more chilled ends, as hereinafter described.

The invention consists, further, in molding pipes by the use of a follower or impression-plate, to produce one face of the matrix of the pipe end, and placing the matrix so formed over a chill, which produces the other face.

The invention further consists in the combination of a body-core to form the inner surface of the main portion of the pipe, and an annular bell-core, which is set in suitable position on the said body-core to form the interior surface of the bell end.

The invention further consists in the construction of a chill-plate to form a conical pipe end and coupling-lugs thereon.

In the accompanying drawing, the Sheet 1, embracing Figs. 1 to 5 inclusive, illustrates the formation of the external part of the mold. Figure 1 is a plan of the flask and pattern. Fig. 2 is an elevation of the lower part of the flask and the impression-plate. Fig. 3 is a longitudinal section of the flask and impression-plate on the line 3 3, Fig. 1, showing the pattern in elevation. Fig. 4 is a plan of the impression-plate, with the flask and pattern removed. Fig. 5 is a view of the lower end of the mold formed by the pattern and impression-plate. (Shown in Figs. 3 and 4.) Fig. 6 is a vertical section of the mold, illustrating the operation of applying the blacking thereto. Fig. 7 is a plan of the chill-plate which forms the bottom of the finished matrix. Fig. 8 is a vertical section of the finished mold, showing the core in elevation. Fig. 9 is an under-side view of the bell-core. Figs. 10, 11, and 12 illustrate the mode of casting pipe with the bell end down. Fig. 10 is a top view of the mold prepared for the purpose. Fig. 11 is a vertical section of the same. Fig. 12 is a vertical section of the bell-pattern. Fig. 13 is a vertical section of the lower part of a mold, with pipe-pattern and impression-plate in position, illustrating the mode of using the said impression-plate with a common flask, the base of which is not specially adapted to receive it.

The preferred mode of carrying out my invention is as follows: I provide an impression-plate, A, constructed with an upwardly-projecting annular prominence, A′, with radial projections *a a a*, on which the lower end plate or flange C of the flask D is seated. The inner margin of the annular plate C rests against the oblique outer faces of the lugs or projections *a a a*, which thus assist in centering the impression-plate beneath the flask.

By the use of three lugs, *a*, with inclined faces, I insure the effective contact of the base-plate or bottom of the flask with all of them, and I obviate the difficulty which exists in the use of a continuous annular centering-ridge from sand or other foreign matter becoming interposed between the said centering-ridge and the flask bottom.

The ridge E, rising from the inner margin of the annular prominence A′, constitutes a portion of the pattern, producing within the mold the necessary cavities to form the upper faces of the lugs B and fillet *b* on the spigot end of the pipe. The ridge E and its radial projections *e e e* are made with highly-polished surfaces.

In operation, the pattern F is placed in position on the impression-plate A within the flask D, and the sand S rammed in. The pattern is then drawn, and the part of the mold thus formed is removed from the impression-plate A. A plug, G, is then introduced while the blacking is poured in, the said plug applying the blacking uniformly to the inner surface of the mold, and causing it to spread over the concavity at the lower part thereof, producing on this concavity a smooth surface, which will impart a like smooth surface to the working-faces of the lugs B. The mold, having been thus blacked, is placed in position on the chill-plate H, which is formed with an annular prominence, H′, and radial projections *h h h*, corresponding with the annular prominence A′ and radial projections *a a a* on the impression-plate A.

Within the annular ridge or prominence H′ on the chill-plate is a cavity, I, precisely corresponding in diameter with that formed in

the mold by the ridge E on the impression-plate. Within the concavity I of the chill-plate are radial recesses *i i i*, corresponding in position with those produced in the sand mold by the radial projections *e e e* of the impression-plate. The surfaces of the cavity I and recesses *i i i* are polished, so as to impart a smooth chilled surface to the fillet *b* and lugs B. Within the cavity I is a central conical seat, J, to receive the conical lower end of the core K. The bottom flange C of the flask is formed with any desirable number of lugs, dowels, or other projections, L *l*, fitting corresponding openings L′ *l′* in the impression-plate A and chill-plate H, so as to insure the seating of the flask in precisely corresponding position on the said impression-plate and chill-plate. The main portion of the sand core K tapers upward, so as to receive and hold the bell or hub core M and the core ring or cake M′, which may be molded in one with said bell-core M, or may be made separately therefrom, as preferred. The cake M′ is pierced with openings *m′*, to permit the descent of the molten metal. The upper flange F′ of the pattern forms the impression in the sand, for the reception of the core ring or cake M′.

The bell-core M, projecting downward from the cake M′, has the necessary conformation to impart the desired shape to the interior of the hub or bell of the pipe, having ribs *m* to form annular cavities within the bell, for the reception of the calking material and projections m^2 to form recesses which receive radial lugs on a soft-metal gasket.

Both parts, M and M′, of the bell-core and cake are made with a central opening to fit over the main core K, and, being placed at the requisite height thereon, the joint between the parts K and M of the compound core is stopped with clay or other suitable luting. The entire core, K M M′, being then placed in position within the flask, the cope N is placed over it, the remaining cavity is tamped with sand, and the metal is poured.

The casting thus produced has its conical spigot end chilled with a perfectly-smooth surface, adapting it to work on a gasket seated within the bell or hub of the adjacent pipe section, as I have described in another application for Letters Patent for an improved mode of coupling main and service pipes for water, gas, &c. The extent to which the lugs B are chilled is optional. If preferred, only the conical end of the pipe beyond the lugs need receive the chill, the lugs being entirely formed in the sand mold by the use of suitable patterns.

I have described a mode of carrying out my invention by the use of a flask specially adapted therefor. To adapt it for use in foundries which are already provided with appliances for casting pipes in the usual manner, I employ a supplemental flange or false bottom, O, to be coupled to the bottom plate of a flask, D, of common form, said supplemental flange being provided with the centering lugs or projections L *l*, already described.

I have described my invention as applied to the casting of pipes with the spigot end down and the hub upward. It may be operated equally well to cast pipe with the bell end or hub down, which is preferable in some respects, as it is believed to produce a more solid bell or hub. For this purpose no essential or radical change in the construction of the appliances is necessary; but they are simply inverted in position, as illustrated in Fig. 11, gates being formed in connection with the lug cavities.

If preferred, pipes may be cast with two spigot ends formed in the manner already described. This modification of the invention is specially adapted for the production of smaller pipes for the construction of heater-coils and for other purposes.

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

1. The impression plate or former A, constructed with an annular prominence, A′, with radial projections *a a*, and an internal ridge, E, with radial projections *e e*, to impart the required shape to the lower end of the sand mold, as described.

2. The chill-plate H, constructed with an annular cavity, I, centering lugs *h h*, and radial recesses *i i*, to form, in connection with a superposed sand mold, a chilled pipe end and lugs, as described.

3. The combination of the chill-plate, constructed with an annular prominence, H′, and centering lugs *h h*, and recesses *i i* with a sand mold formed by an impression-plate with recesses corresponding to the said prominence and lugs, as explained.

4. The combination of the body-core K and the bell-core M, and ring core or cake M′ adjustable thereon, as described.

5. The supplemental flange or false bottom O, combined with the impression-plate A, having annular prominence A′ and centering lugs *a a*, and adapted for use with a flask of common form, in the manner described.

ANDREW O'NEILL.

Witnesses:
JOHN A. ENGLISH,
EDWARD KERNEY.