

# Firth & Ingham, Making Iron Pipes.

N<sup>o</sup> 37,037.

Patented Dec. 2, 1862.

Fig. 2.

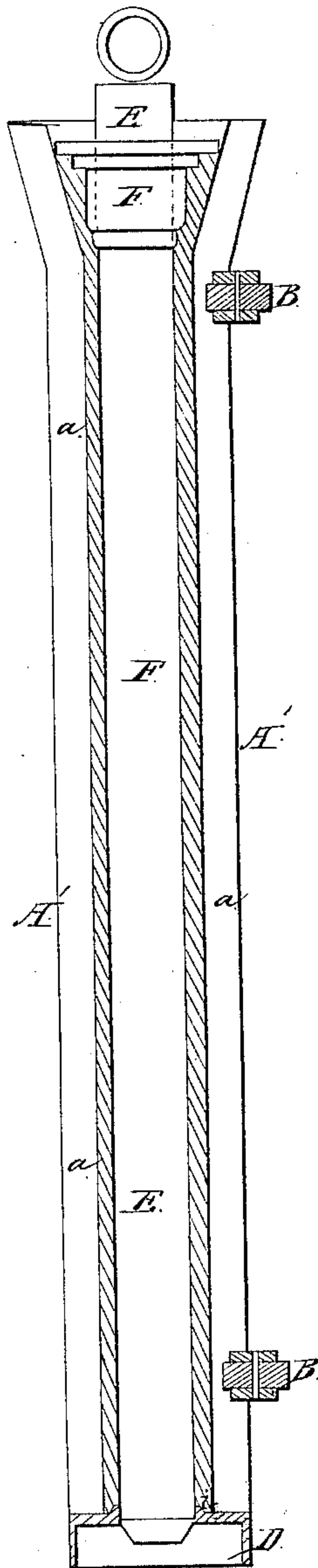


Fig. 1.

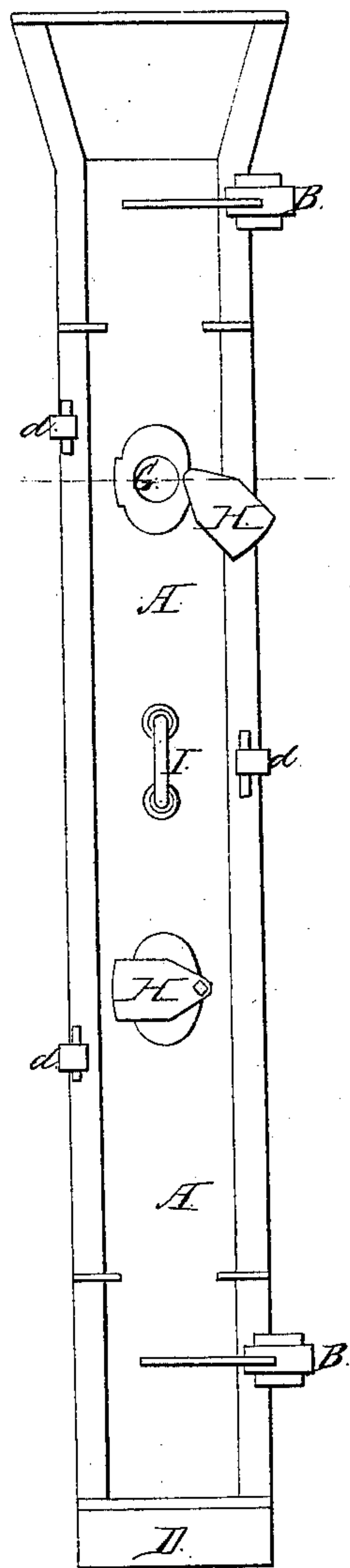


Fig. 3.

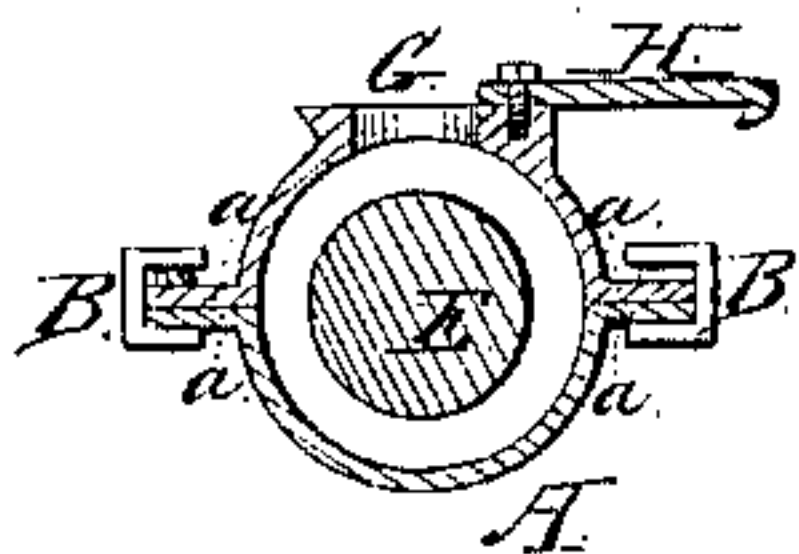


Fig. 4.

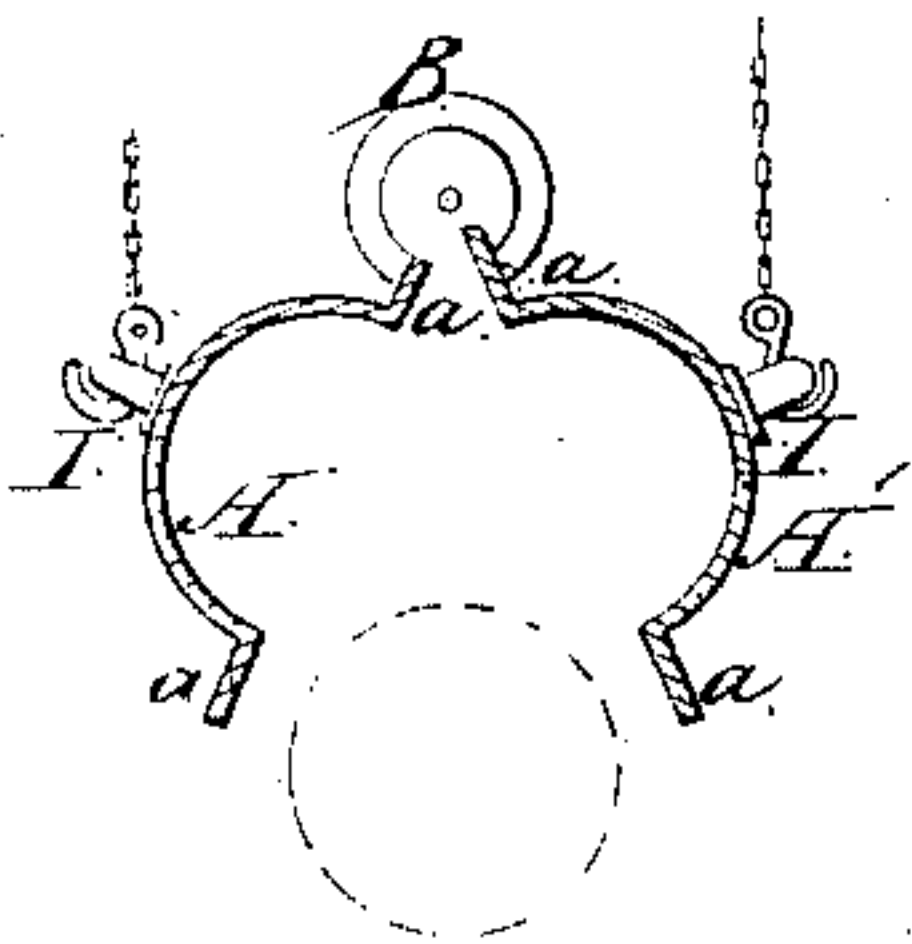
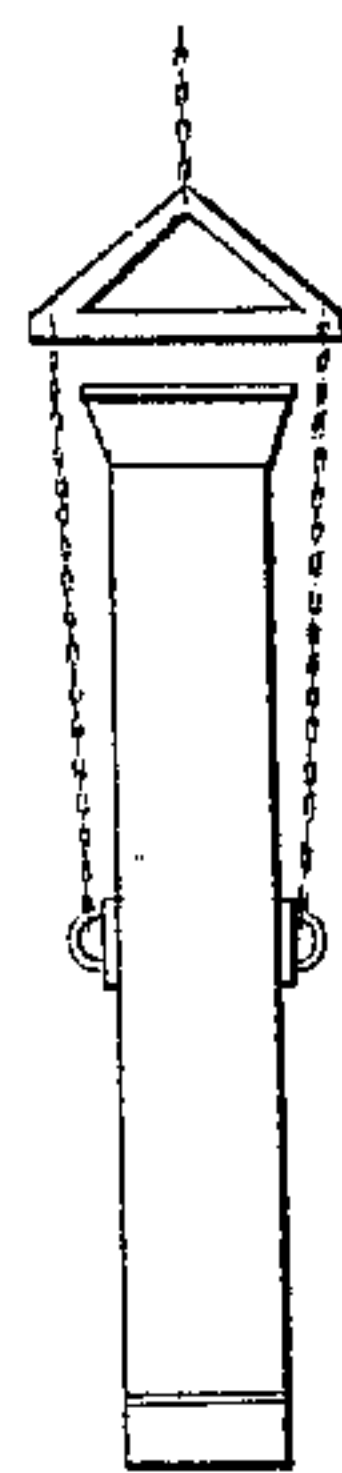


Fig. 5.



Witnesses;

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# UNITED STATES PATENT OFFICE.

JOHN FIRTH AND JOHN INGHAM, OF PHILLIPSBURG, NEW JERSEY.

## IMPROVED FLASK FOR CAST-IRON PIPES.

Specification forming part of Letters Patent No. 37,037, dated December 2, 1862.

*To all whom it may concern:*

Be it known that we, JOHN FIRTH and JOHN INGHAM, both of Phillipsburg, Warren county, State of New Jersey, have invented certain Improvements in Flasks for Facilitating the Manufacture of Cast-Iron Pipes; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention relates to improvements, fully described hereinafter, in flasks for facilitating the manufacture of cast-iron pipes by what is known as "vertical molding in dry sand," our improvements being designed with the view of remedying the defects of ordinary flasks, which have hitherto been of such a nature as to render this process of molding tedious and uncertain in its results.

In order to enable others skilled in the art to make and use our invention, we will now proceed to describe its construction and operation, and to compare it with the plan hitherto practiced for conducting the same manufacture.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is an exterior view of our improved flask in which to mold cast-iron pipes; Fig. 2, a view with one-half the flask removed; Fig. 3, a transverse section of the flask on the line 1 2, Fig. 1; Fig. 4, also a transverse section of the flask, showing the manner of suspending the same for the purpose of discharging the contents; and Fig. 5, a view, drawn to a reduced scale, of the flask as it appears when suspended in a vertical position to the sling-chains.

Similar letters refer to similar parts throughout the several views.

Prior to describing our invention it will be necessary to state that it relates to the construction of the boxes or flasks used for the manufacture of cast-iron pipes by the process generally known as vertical molding in dry sand, the usual methods of practicing, which process we will now proceed to describe briefly, in order that our invention may be more thoroughly understood.

In manufacturing cast-iron pipes by vertical molding in dry sand the flasks consist of a number of shells, usually of about three feet in length, and having nearly the same form

transversely as the pipes to be cast, but somewhat larger in diameter. The first shell is placed in a vertical position with the pattern inside, (the patterns in common use having a length of from four to six feet.) The annular space between the two is then packed or rammed with sand thrown in at the top. After the packing is completed another shell is placed over the pattern and secured by clamps to the first shell. The pattern is then elevated, and the annular space between this second shell and the pattern is then packed with sand. A third shell is added, the pattern is again elevated, and the annular space rammed, as before. This process is continued until a mold of the desired length is produced, this mold being sometimes contained in three, sometimes four, sections of flasks or shells secured to each other.

The mold when completed is blackwashed on the inside, raised from the pit in which it has been formed, and then removed to the drying-oven.

There are several defects in this manner of manufacturing pipes by vertical molding in dry sand. The molds are apt to become crooked owing to the following causes: The short pattern may be drawn too high, and therefore have a tendency to be easily moved out of the proper line, or an excessive ramming of the sand on one side of the pattern more than the other will tend to produce a like result, or the tackle of the crane when not in line with the center of the pattern will cause the latter to depart from its proper course while being elevated. Other causes of the mold becoming crooked are the numerous joints, the number of clamps, some of which will yield more than others, owing to the expansion of the mold in the oven. There are other objections to this mode of constructing dry-sand molds for pipes, such as the necessity of repeatedly connecting the tackle of the crane to and disconnecting it from the pattern and flasks, the great amount of clamping required in securing the flasks, the delay in hoisting and lowering the sections of the flasks, and hoisting the molds when finished from the ramming-pits in common use, for the purpose of depositing them in the drying-oven, the ever-varying height of the flasks, which renders the process of ramming most inconvenient



to the molder, and other defects, all of which our improvements have been especially designed to remedy.

We make the flask of two pieces, A and A', each piece being of the desired length of the mold, and being so formed that when the two are fitted together they will form a hollow cylinder of the proper diameter. The two semi-cylindrical pieces are connected together at two or more points on one edge only by hinges B B, which are so formed and constructed that the flask can be made to assume the form represented in Fig. 4, the two pieces being prevented by the hinges from opening beyond the relative position illustrated in that view. At the junction of the two pieces A and A' each piece is furnished with suitable flanges, *a*, and these flanges are secured firmly together by clamps and wedges *d d*, so as to render the flask one rigid tube incapable of becoming disarranged. The lower end of each half of the flask is provided with a flange for attachment, by screws, bolts, or other suitable fastenings, to what we term the "ramming-plate," D, in which is a central opening for receiving the lower end of the pattern E, and round this opening is an annular projection, the purpose of which will be rendered apparent hereinafter. The upper end of the flask is enlarged in diameter, and made of the conical form represented, for the admission of the collar F, which fits loosely on, so as to be readily detached from the pattern, and which forms the socket usually found on one end of a cast-iron pipe. The flask, with the plate D, is deposited in the ramming-pit and the pattern E inserted in its proper position, after which the process of ramming the sand into the annular space between the inside of the flask and the pattern is commenced and continued until the entire space is tightly packed, including the space inclosing the socket-pattern F.

In manufacturing water and gas pipes it is usual to cast small bosses at suitable intervals throughout the length of each pipe, the bosses being the points to which branch pipes may be connected without weakening the main pipes. We form these bosses by the aid of holes G in the side of the flask and the covers H, as follows: After the desired body of sand has been rammed round the main pattern E, and prior to the withdrawal of the latter, the doors or covers H are moved so as to expose the holes G, after which a body of sand of the same diameter as the hole is removed through the openings by means of a suitable instrument, the quantity removed being sufficient to leave the pattern E bare opposite the hole. A small mold having the form of the desired boss on one side is then inserted into the space formed by the withdrawal of the sand and the door is closed over the opening G and secured on one side by means of a pin or bolt on which the door turns, and on the opposite side by an eccentric beveled lip or projection on the door, fitting to a counter

projection on the flask, as seen in Fig. 3. After this the pattern E is withdrawn and the mold is blackwashed and removed to the drying-oven, and from thence, when properly dry, is conveyed to the casting-pit, and there cored and otherwise prepared for the reception of the molten metal. After the latter has become sufficiently cool the tackle of the crane is attached to the flask by means of sling-chains hooked to the staples I, one staple or its equivalent being situated on each half of the flask, as seen in Fig. 4. The flask, with its contents, is then elevated from the casting-pit and swung round with the crane to a proper position above the floor of the foundry. As the staples I are situated midway or nearly so between the opposite ends of the flask, the latter will be suspended horizontally above the floor, and in this position it will remain while the clamps *d d* are removed. The staples are so situated in respect to the joints of the flask that the moment the clamps are removed the weight of the flask and its contents causes the two halves of the flask to separate at the lower joint and assume the position shown in Fig. 4, so that the contents of the flask will be at once discharged onto the floor. The flask is then closed and clamped, and is ready to be again turned into a vertical position, which operation is accomplished by depressing the lower end into a pit or opening in the floor, the flask readily turning at the points where it is hooked to the sling-chains, and assuming the desired vertical position, Fig. 5, after which it is placed in its proper position in the pit and is ready for the ramming process. The hinges B B prevent the two halves of the flask from opening farther apart than is necessary to allow the pipe and sand to fall out and insure the correct closing of the two halves together. In turning the flask into a horizontal position for the purpose of discharging the contents care is taken to have the hinged portion uppermost.

It will be readily seen that the usual short pattern cannot be used in combination with flasks of full length of the desired pipe, even if a short pattern were desirable, which, for reasons above given, is not the case. We therefore employ, in combination with the flask of a length sufficient to inclose the entire mold, a pattern of or about the length of the desired pipe.

As the flask and pattern are made of the full length of the pipe to be cast, and as it is rigid from end to end, it will be evident that no inequality in the mold can take place, from causes explained above, in reference to the usual plan of forming dry-sand molds for pipes vertically; that the molds can be formed more readily in our improved flask than by those made in detached pieces, which require a number of fastenings and repeated elevations of the pattern, and that the contents of our improved flask can be more readily discharged than from those made in sections. In short, that the whole process of forming the mold



and rendering the flask in a proper condition for use in the making of another mold is facilitated.

At one end of a water or gas pipe it is usual to make a small bead or rounded flange. This has hitherto been formed by a loose collar of the form of the bead being slipped onto the end of the body-pattern, a plan which frequently causes much trouble to the molder. We dispense with this loose collar, and form on the ramming-plate D an annular projection, *i*, which leaves the sand with the plate after imparting an impression of the desired form of the bead to the inside of the mold.

We do not desire to claim, broadly, the use of staples in connection with molding-flasks, nor the hinging together of two parts of a flask; but

We claim as our invention and desire to secure by Letters Patent—

The combination, substantially as set forth, of the two halves A and A' of the flask hinged together, the staples I, or their equivalents, the flanges *aa*, and clamps B B, or their equivalents, for the purpose specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN FIRTH.  
JOHN INGHAM.

Witnesses:

BENJAMIN N. SMITH,  
GEORGE ROSS.