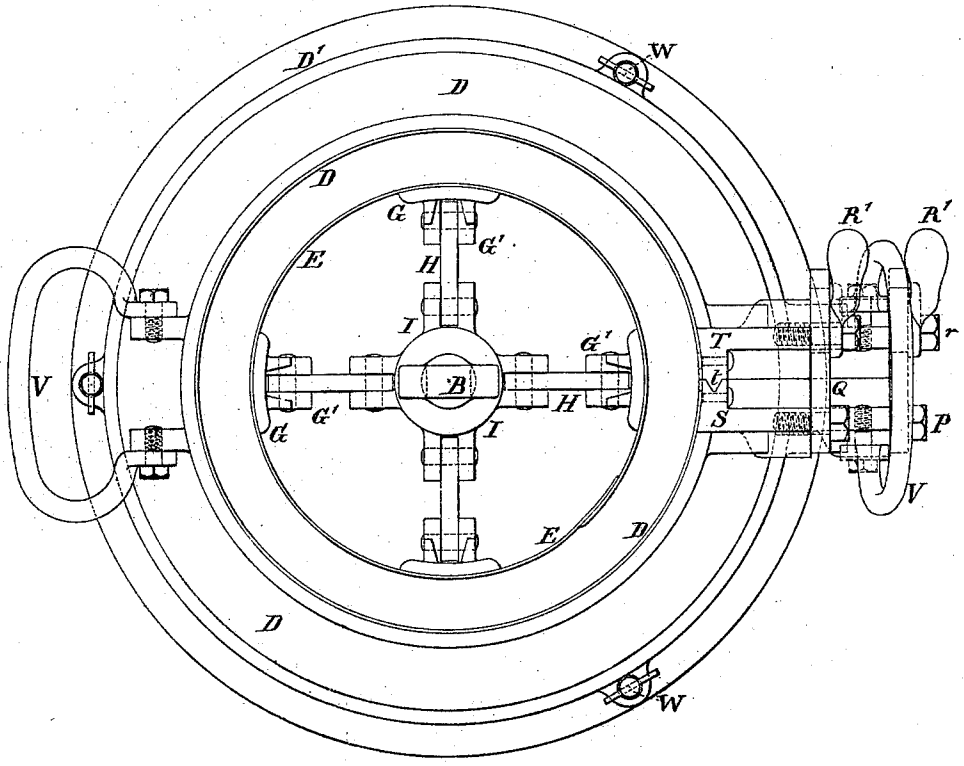
3 Sheets--Sheet 1.

J. S. ROAKE.

Improvement in Molds for Drain-Pipe.

No. 131,375. Patented Sep. 17, 1872.

Fig. 1.



Witnesses:

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Inventor:

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AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS)

3 Sheets--Sheet 2.

J. S. ROAKE.

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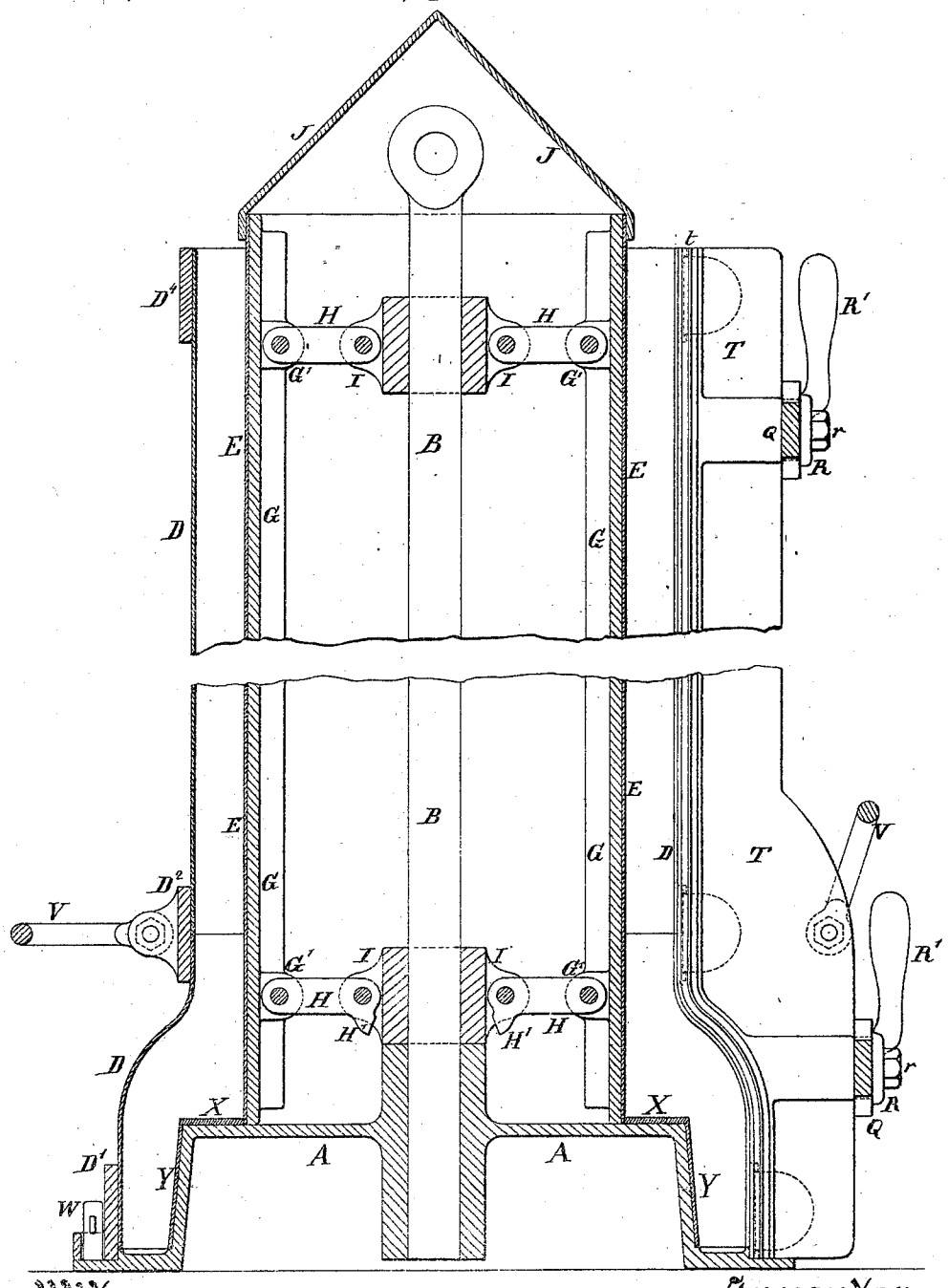
Fig. 2.



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3 Sheets--Sheet 3.

J. S. ROAKE.

Improvement in Molds for Drain-Pipe.

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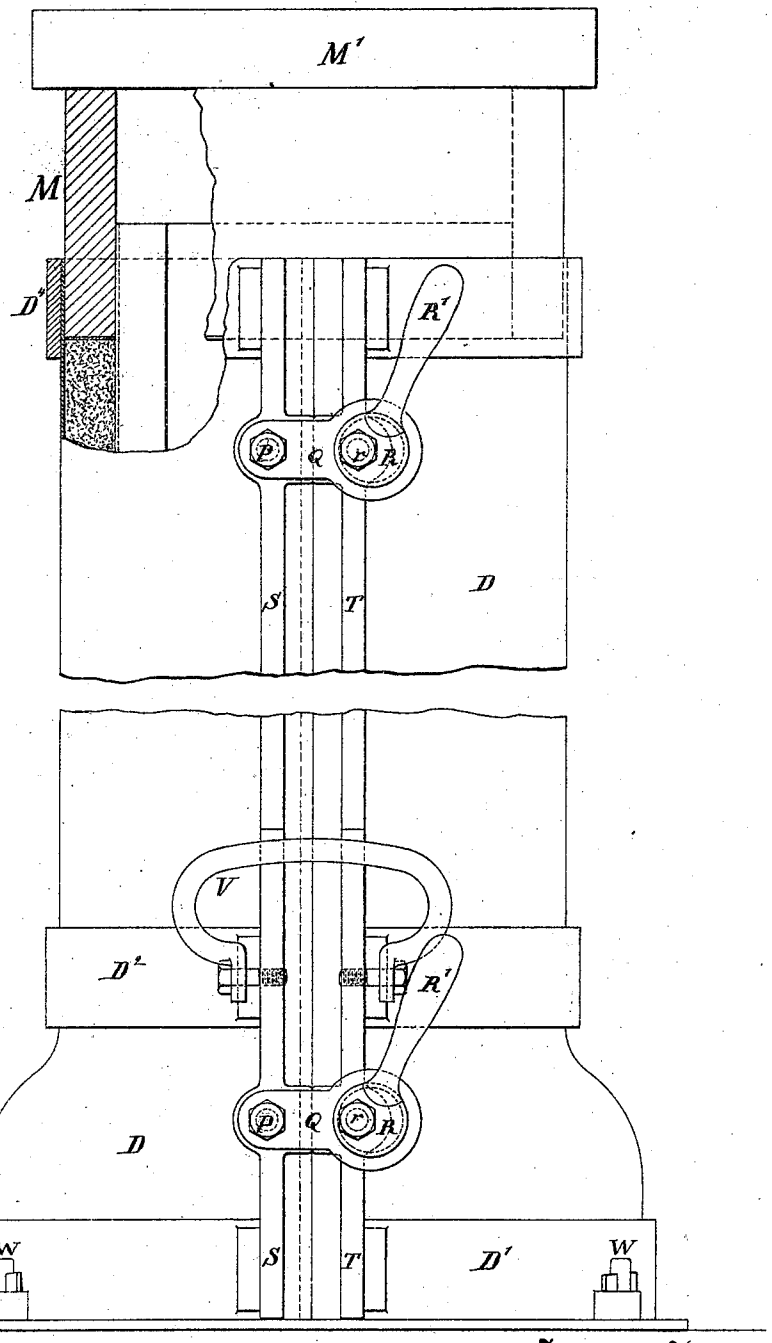
Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN S. ROAKE, OF WILLIAMSBURG, NEW YORK.

IMPROVEMENT IN MOLDS FOR DRAIN-PIPES.

Specification forming part of Letters Patent No. **131,375**, dated September 17, 1872.

To all whom it may concern:

Be it known that I, JOHN S. ROAKE, of Williamsburg, in the county of Kings and State of New York, have invented certain Improvements in Molds for Drain-Pipes, of which the following is a specification:

The invention is intended more particularly for molding pipes made from a composition in which sand and asphalt are largely employed. The composition is set forth in a patent issued to William A. Battersby, dated November 8, 1870; but it may be used in the molding of any material which requires but a moderate temperature and is subject to great shrinkage. The invention provides better than any means heretofore known to me for the contraction of the material, both in diameter and in length.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawing forms a part of this specification.

Figure 1 is a plan view; Fig. 2, a vertical section; Fig. 3, a side elevation with a portion broken away. Fig. 1 shows the mold with all the top work removed; Fig. 2 shows it with the conical cap ready to receive the hot composition; and Fig. 3 shows it with the weight compressing the composition after it is poured in.

Similar letters of reference indicate like parts in all the figures.

A is a bed-plate of cast-iron, formed with a boss in the center adapted to receive a vertical shaft, B, which supports the interior work of the core. The casting A is also formed with a deep offset near the periphery, adapted to mold the interior of the hub on the end of the molding-pipe, as will be readily understood.

In the molding of the Battersby pipe it is important to provide surfaces of zinc at all the principal points where the material comes in contact with the metal. The non-adhesive quality or lack of affinity between zinc and the composition allows them to be easily separated, while the composition will stick very tenaciously to iron and most other metals. I, consequently, plate the exposed portion, or the greater part of the exposed portion of the casting A, with a thin coating of zinc, applied either in the form of roll zinc, secured by riveting or otherwise, or in the form of a zinc coating applied directly on the metal. The parts of the mold which lie against and give form to the main surface on the interior and exterior of the pipe are of sheet zinc.

D is a sheet of thick zinc, spun or otherwise formed with a suitable enlargement near the base to form the hub of the pipe, as indicated clearly in Fig. 2. It is adapted to open along a vertical joint on one side. It is strongly hooped or strapped at several different levels, as indicated by D^1, D^2, &c., the straps not being continuous hoops, but being each open on one side, and formed with stout flanges or eyes turned outward to allow their being firmly locked together and unlocked again, as required. When the ends of the straps D^1, D^2, &c., are firmly joined together the mold for the outside of the pipe is in the proper condition to receive the composition. A cylinder of sheet-zinc, E, open also along one side, is mounted within and concentric to the part D, and is of sufficiently less diameter to allow for the thickness of the pipe; it molds the interior surface of the pipe. The edges of the sheet E, instead of abutting together overlap or pass each other, as shown clearly in Fig. 1. Any shrinkage of the molded pipe in the act of hardening or afterwards may be compensated for by the simple sliding of the edges of the sheet E further past each other. G G G G are removable pieces adapted to fit against the inner surface of the sheet E and hold it firmly in the proper position. Each piece G is formed with lugs G′, which receive links H turning on pivots, as represented, and connecting it to corresponding lugs or rings I fixed on the core-shaft B. When the core-shaft B is depressed into its place, as shown in Fig. 2, the links H are level, or very nearly so. After the hot material has been poured in and the mold filled, the core-shaft B is lifted at the proper moment. The lifting movement of the shaft B lifts the rings I, and draws inward, by means of the links H, all the several staves or supporting pieces G. This movement so contracts the diameter of the entire interior work that it may be readily lifted out, and the overlapping sheet E is then at liberty to contract freely. It therefore increases its overlapped condition all that is necessary to allow for the contraction of the pipe. A few seconds later the sheet E is lifted out of the interior, and, afterwards, by unlocking the several means

which have held together the rings D^1, D^2, &c., the contact of the external casing D with the pipe is slackened, and the part D and its attachments may then be lifted off and the finished section of pipe may be removed at leisure.

The Battersby material is liable to be in a thick or semi-fluid condition when poured, and I find it important to provide special means to guide it into the top of the mold. To this end I provide a conical cap, J, fitted as represented, and discharge the material as nearly as possible upon the point or apex of this cap. The material may be aided in its distribution by operating any suitable tool, by hand or otherwise.

So soon as the mold is filled with the semi-fluid composition I apply a heavy follower, M, upon the upper edge, pressing directly upon the material. I propose to load this follower, under some conditions, with additional weights, as indicated by M′, the purpose being to provide such a load as will be certain to press down the material in the act of contracting. The result is a shorter and more dense section of pipe. It will be understood that the follower M may be removed before the composition has fully set, so that no time may be lost in removing the core-shaft B and its attached parts at a little later stage in the hardening process.

Although I have in the above referred to the straps or open hooks D^1 D^2 as simply turned outward to form flanges or eyes to abut together at the opening line, the drawing represents them as sufficiently wide apart to receive between them two stout castings, which extend longitudinally up and down the mold. These castings, marked, respectively, S and T, form, really, the abutting or tightly-fitting edges of the exterior mold. They are riveted firmly to the eyes on the ends of the hooks D^1 D^2, and are matched together by a V-shaped ridge, *t*, on the part T, which matches accurately into the corresponding groove in the part S. To keep the edges of the metal sheet D perfectly in position small rivets are employed, holding the sheet D against the respective castings S and T, the heads on the inside being countersunk.

I employ connecting-straps Q, operated by eccentrics R, as means of opening and closing the exterior part of the mold. In practice, in casting ordinary pipes, I employ four of the straps or open hooks D, and between each and its neighbor operate one of the short tie-straps *q*, bolting each to the part S by a bolt, P, and connecting the other end to the part T by means of an eccentric, R, having a handle, R′. The eccentric R turns on a bolt, *r*, set in the casting T. When the handle R′ is turned to the left it relaxes the mold and allows the V-shaped ridge *t* to move out of the groove in which it is fitted, and the diameter of the exterior of the mold is increased; in other words, the mold opens a little along the joint between the castings S and T. When it is to be tightened the several handles R′ are turned again to the right. V V are handles, by which the external mold may be conveniently lifted. The one which is mounted astride of the joint should be applied with sufficient play to allow the joint to open and close. Although I have spoken of the exterior sheet D as formed in one piece with an enlargement for the hub the drawing represents an enlargement near the bottom as made in a separate piece. I prefer this mode of construction, using plain roll-zinc for the main body and a carefully-spun piece—which may be of thicker material—for the enlargement at the bottom. These two pieces are nicely abutted together and secured within one of the rings D^2 by riveting. Fig. 2 represents thin pieces of zinc fitted over the base-casting to receive the contact of the hot material and prevent its sticking thereto. Fig. 3 represents a thin annular piece of zinc applied at the top of the hot composition, separating it from the heavy ring M. This latter piece may be fixed to the ring M. These provisions insure the presence of the metal, zinc, to which the Battersby composition does not stick, at all the points except the extreme lower edge of the mold. This may also be correspondingly faced, but I have not found it necessary in my experiments. I believe that the composition becomes sufficiently chilled before arriving at that point to avoid the tendency to stick, even to cast-iron. I have marked the piece of sheet-zinc which molds the inner surface of the hub by the letter Y, and the thicker piece of metal which molds the plane surface above by the letter X. It is practicable to substitute a plating of zinc for the part Y, but I cause the thick piece X to perform another important function. It applies around the exterior of the lower edge of the inner sheet of zinc E, and holds it inward in the proper position. It will be observed, also, that the conical cap J extends down on the upper edge of the sheet E. This sheet E may be formed with an inclination to contract its diameter, but such tendency cannot be relied upon to hold it inward with sufficient firmness prior to the pouring of the composition. Furthermore, it is important that the overlapping edges of this sheet E shall press tightly together, and in practice I prefer to make it with a slight tendency to expand. The bottom sheet X should be of sufficient thickness and strength to hold the lower edge reliably together. This end may be still more effectually served by producing a slight annular groove in the bed-casting A. We propose in our future patterns to sink the central portion of the bed-casting A, considerably below the composition of the plate X, and to correspondingly lengthen the inner sheet E and the work interior thereto. I provide the lowermost set of toggles or loose radial links H with arms H′, extending downward a little, as represented. These serve as stops to prevent the links H and their attachments

from dropping down too far when the core is being introduced or removed. It will be understood that one core—by which term I include the central shaft B, links H, and longitudinal staves or removable pieces G—may serve for a considerable number of bed-castings, A, and interior lap-sheets E and exterior sheets D, with connections. I do not consider it essential to success that the toggles or loose radial links H shall turn in precisely the directions indicated. They may turn horizontally, instead of vertically, if preferred. It is not essential that the overlapping of the edges of the sheet metal E be at the precise point shown. It is on some accounts better to so introduce the removable parts that one of the strips or staves G shall press outward directly against the lapping edges. To avoid a tendency of the vertical abutting pieces S and T on the outside to become displaced vertically, relatively to each other, I can insert a transverse pin or key not represented. It may be important to adopt such a precaution to avoid the tendency to displacement due to the oblique pull of the straps Q under some conditions. W represents bolts fixed in the bed-plate A, which pass through the lugs formed on the exterior of the lower ring D^1, and hold down on the entire outer parts of the mold by means of keys, as shown.

I claim as my invention—

1. The supporting-staves G, toggles H, and shaft B, in combination with each other, and with the core-sheet E, and adapted to serve in the molding of highly contractile material, as herein specified.

2. The combination of the cap J, the contractible core B E and its connections, the external envelope D D^1, &c., and the base-casting A, constructed and arranged for joint operation, so as to mold pipes with swelled hubs, as herein specified.

3. The follower M, in combination with the parts D E and their connections, and the base-casting A, so as to follow up or compensate for the endwise shrinkage of the material, as herein specified.

4. The straps Q and eccentrics R with the turning means R′, in combination with the outer mold D D^1, and its connections, as specified.

5. The ridge *t* on the part T matching into the corresponding groove in the part S, and arranged relatively to the outer mold D D^1, as and for the purposes herein set forth.

6. The sheet-zinc facing pieces X and Y, in combination with the iron or other supporting material behind, and forming a non-adhesive molding-surface, as specified.

In testimony whereof I have hereunto set my hand this 26th day of April, 1872, in the presence of two subscribing witnesses.

JOHN S. ROAKE.

Witnesses:

WM. C. DEY,

ARNOLD HÖRMANN.