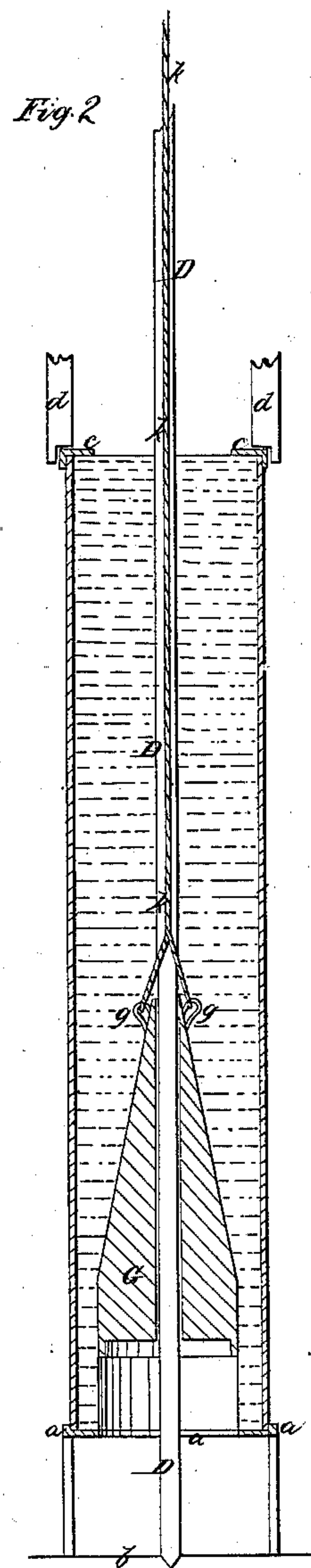
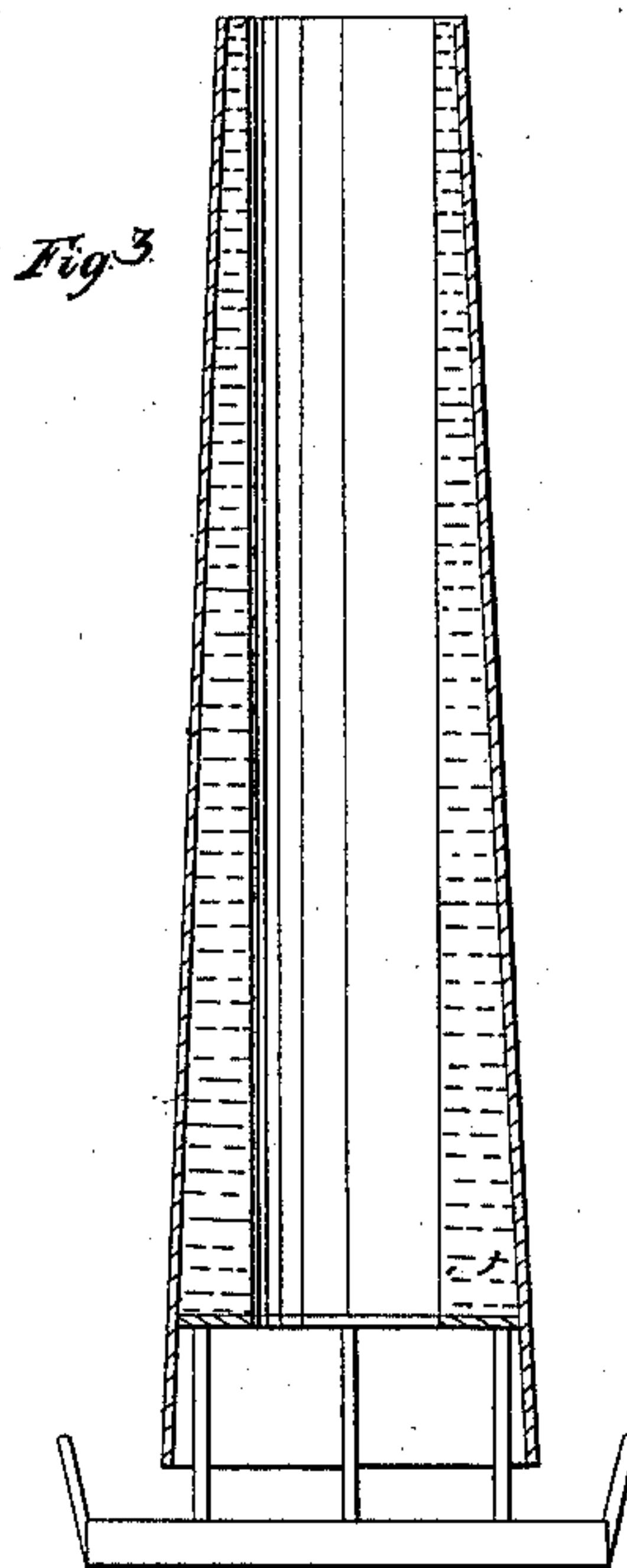
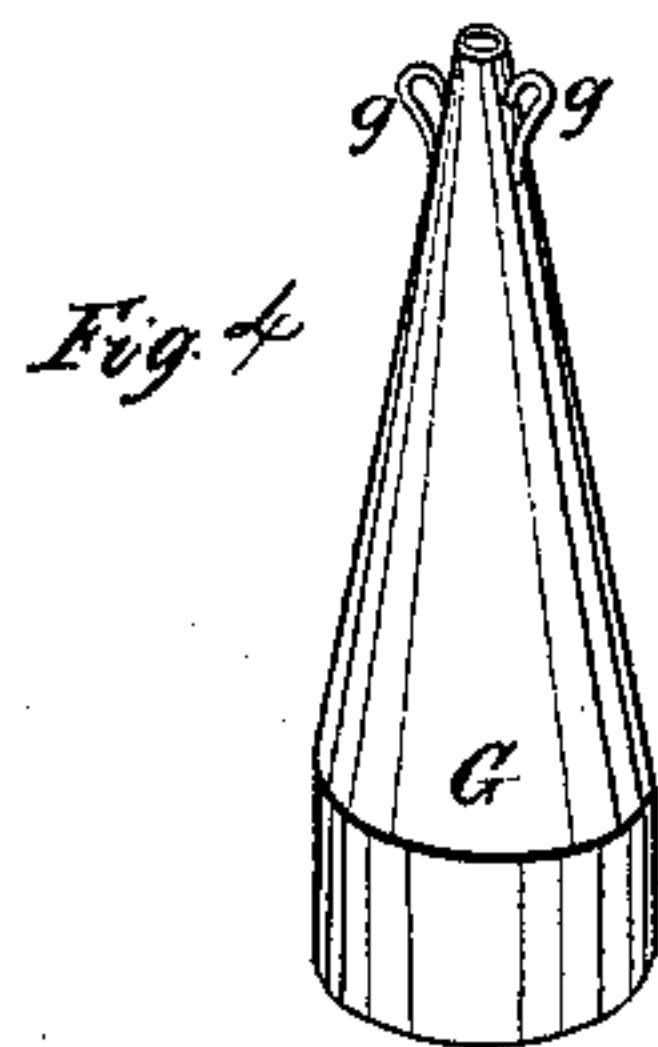
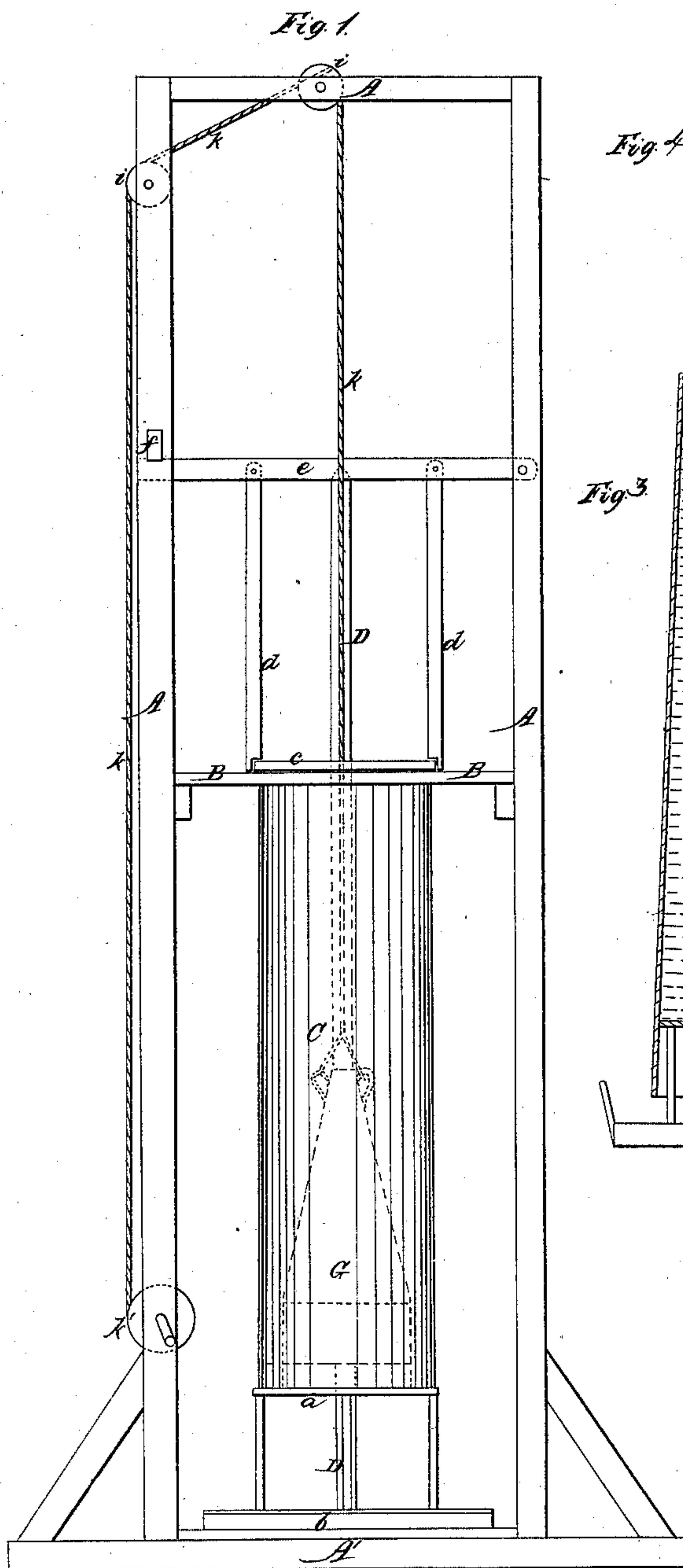


H. Knight, Tile Machine.

N^o 39,579.

Patented Aug. 18, 1863.



Witnesses
R. F. Campbell
O. Schuler

Inventor
Henry Knight
by his agent
Mason, Minick & Estlin

UNITED STATES PATENT OFFICE.

HENRY KNIGHT, OF BROOKLYN, NEW YORK.

IMPROVED DRAIN-TILE MACHINE.

Specification forming part of Letters Patent No. 39,579, dated August 18, 1863.

To all whom it may concern:

Be it known that I, HENRY KNIGHT, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in the Construction of Water and Drain Pipes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my machine, supposed to be in operation. Fig. 2 is a vertical diametrical sectional view of a cylindrical pipe, showing the "former" therein in the operation of spreading the cement. Fig. 3 shows, in section, a tapering pipe when finished. Fig. 4 is a perspective view of the cylindro-conical forming-tool.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a new and useful improvement in coating the inside surfaces of thin metallic pipes—for drainage and other purposes—with hydraulic cement, using in the operation such parts of the machinery, already secured to me by Letters Patent, as may be required.

The object of my invention is to dispense with the use of a solid cylindrical core, which extends the entire length of the pipe to be coated, and the operation of tamping the cement around this core; and also to dispense with all protuberances or outside guides on the forming-tool, employing instead thereof a central guide or guides for keeping the axis of the forming-tool coincident with the axis of the pipe during the entire passage of the former through the pipe; and also for preventing the forming-tool from wobbling or spreading the cement unequally over the surface of the pipe, all as will be hereinafter described.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The drawings represent two kinds of cemented pipes, differing only in respect to their external shape—one being cylindrical and the other tapering—but both pipes are coated in the same manner and by the same mechanical means.

A represent a tall frame-work, supported

and braced in a perpendicular position to the flooring A', as shown in Fig. 1.

At a suitable height, depending upon the length of the sections of pipe to be coated with cement, above the floor A is a staging, B, having a hole through it through which the upper extremity of the section of pipe C projects. This stage or shelf B is suitably hinged or capable of being removed entirely from the frame A for the purpose of introducing and removing the pipes before and after they are coated. The lower ends of the pipes are mounted upon a stool consisting of a flanged ring, *a*, into which the lower end of pipe C fits, and four or more legs which elevate the ring *a* some distance above the removable base *b*, to which the legs of the ring are affixed, as shown in Fig. 1. The upper end of the pipe C has also a similar ring, *c*, applied to it, the interior diameter of which is equal to the interior diameter of the pipe when it is finished or cemented. This latter ring, *c*, is held down in its place on top of the pipe by means of two vertical struts, *d d*, notched at their lower ends to allow these ends to fit over the ring, and hinged at their upper ends to a cross-beam, *e*, which is itself hinged at one end between the uprights of one side of the frame A. The opposite end of this beam *e* is held down by means of a wedge-key, *f*, as shown in Fig. 1, by removing which the cross-bar *e* can be thrown up, so as to release the ring *c* and to allow the shelf B to be raised, thus releasing the pipe C from the machine. The hinged cross-bar *e* serves also another important purpose, it being the upper bearing and holder for the end of a central rod, D, which, when all the parts are arranged for operation, as shown in Figs. 1 and 2, passes through the center or axis of the pipe C and rests in a step-bearing in the base-plate *b* of the stool upon which the pipe C is supported. This central rod, D, thus fixed, serves as a guide for the cylindro-conical forming-tool G, (shown clearly in Figs. 2 and 4,) which is constructed with a smooth exterior surface and a hole through its axis, by means of which latter it can be placed on the rod D and kept in its place thereon. The two eyes *g g*, at the apex of the forming-tool G, have attached to them a cord, *k*, which proceeds upward and is passed over the pul-

leys *i i* at and near the top of frame A, and thence carried down and passed around a windlass, *k'*, by means of which the cord can be wound up or unwound and the forming-tool raised or depressed.

The several parts constituting the machine thus being explained, the operation of covering the interior surface of a thin metal pipe with cement is as follows: The outer metallic casing of the pipe is secured in a vertical position in frame A, as above described, and completely filled with the cement which is to form the inner coating or lining. Before putting in the cement the forming-tool G is lowered to its fullest extent, and, all being ready, this forming-tool is drawn up through the pipe and through the contained cement by winding cord *k* around the windlass *k'*, leaving below it a uniform thickness of cement adhering to the interior surface of the metallic pipe. This coating will be equal in thickness throughout to the space between the circumference of the cylindrical part of the forming-tool and the metallic pipe. The cylindrical conical forming-tool in its ascent presses the cement outward and compacts it against the surface of the metallic pipe while the lower cylindrical portion of this forming-tool performs the office of smoothing the interior surface of the pipe. The base ring *a* serves as a support for the cement during the operation of the tool G, and this ring gives a finish to the lower end of the pipe. The cap-ring *c* is intended to confine a sufficient quantity of cement in the upper end of the pipe to allow the forming-tool to finish

this end as it makes its exit therefrom. Thus it will be seen that by simply passing the tool G through the metallic pipe when it is filled with cement the coating of the pipe from end to end is perfectly accomplished. By increasing or diminishing the diameter of the cylindro-conical forming-tool with respect to the diameter of the metallic pipe to be coated this coating can be put on thicker or thinner, as may be desired. When one pipe has been coated in this way, the wedge *f* is removed, the beam *e* with its struts *d d* raised, thus allowing the ring *c* and the platform B to be lifted up for releasing the pipe and also the central guide-rod, D. The finished pipe is now removed and set away to dry, and another metallic pipe secured in the machine to be coated, as before described.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Guiding and directing the passage of the forming-tool through the pipe in its operation of spreading the cement thereon by means of a stationary rod, G, substantially as described.

2. The employment of base and cap rings *a c*, or their equivalents, in conjunction with a conical forming-tool, G, substantially as and for the purposes described.

Witness my hand in the matter of my application for a patent for improved mode of constructing water and drain pipes.

HENRY KNIGHT.

Witnesses:

CHAS. FOWLER,
GEORGE JANES.