

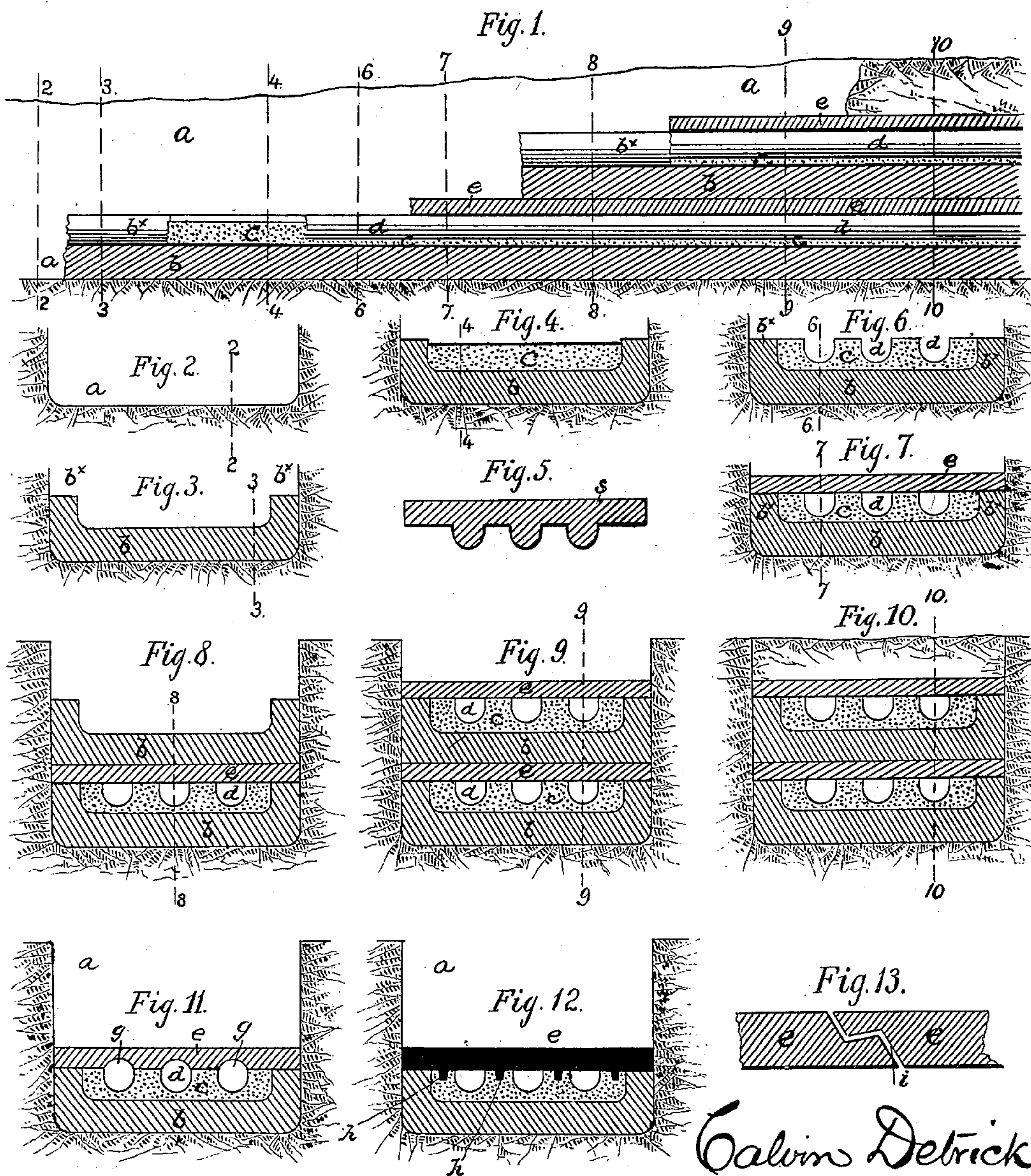
(No Model.)

C. DETRICK.

CONTINUOUS UNDERGROUND PIPE AND METHOD OF MAKING THE SAME.

No. 245,284.

Patented Aug. 9, 1881.



Witnesses:

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# UNITED STATES PATENT OFFICE.

CALVIN DETRICK, OF PHILADELPHIA, PENNSYLVANIA.

CONTINUOUS UNDERGROUND PIPE AND METHOD OF MAKING THE SAME.

SPECIFICATION forming part of Letters Patent No. 245,284, dated August 9, 1881.

Application filed May 23, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, CALVIN DETRICK, of Philadelphia, Pennsylvania, have invented an Improvement in Continuous Underground Pipes and in Methods of Making the Same, of which the following is a specification.

My invention relates to such tubing, pipes, or underground conduits or passages as are employed for purposes of drainage, sewerage, water-supply, gas-supply, inclosure of electric, telegraphic, or telephonic wires, pneumatic, hydraulic, or other kindred uses.

The object of the invention is the construction of a wholly continuous composite pipe embodying one or a series of seamless hermetically-tight ducts or passage-ways, adapted, by virtue of the method of its construction, to be formed of any required length, and to be constituted of suitable plastic or readily-molded fluid or semi-fluid material, adapted to solidify into a rigid and impervious mass of the predetermined configuration and arrangement.

To the above ends my invention consists in the method of laying and forming continuous pipe, hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 represents a longitudinal sectional elevation, a trench in which, in its successive stages, is being conducted my method of laying pipe. Figs. 2, 3, 4, 6, 7, 8, 9, and 10 represent, in transverse sectional elevation, views across the trench of Fig. 1, taken, respectively, on dotted lines of Fig. 1 marked with numerals corresponding to those of the several sectional views referred to, the said cross-sectional views referred to, taken in connection with Fig. 1, representing, as fully as is possible by means of pictorial illustrations, the method by which my pipe is formed and laid. Fig. 5 is a transverse sectional view of a convenient form of die adapted to form the passages to the shape indicated—for instance, in Figs. 7 to 10 of the drawings. Fig. 11 is a transverse central sectional elevational view of a slightly-modified form of what I term the "slab." Fig. 12, a similar view of the same, representing a construction in which the slab is provided with longitudinally-extending tongues, designed to form or to register within corresponding grooves in the substance of the layer of asphalt-concrete, or other material in which the ducts or passages are formed; and Fig.

13, a transverse sectional view of a convenient form of joint, where it is desired to form the slab in separate parts and unite the parts.

Similar letters of reference indicate corresponding parts.

My pipe is laid and made in the following manner.

A trench, *a*, is first dug in the ground to the required depth, and in the required direction from the point of departure of the intended pipe to the point at which such pipe is to terminate.

The bottom of the trench is preferably leveled, as indicated at Fig. 2, and on line 2 2 of Fig. 1. This leveling is effected by any convenient means.

After the trench has been formed and leveled as above, it is, if desired, suitably hardened—as, for instance, by pressure, percussion, or impact, unless the consistency of the ground renders such hardening unnecessary. The bottom of the trench is then supplied with a walled layer or trough, *b*, as I find it convenient to term the formation of artificial stone, as indicated at Fig. 3 and at line 3 3 of Fig. 1.

This trough *b* may be formed in any desired manner—that is to say, it may either be constructed by the laying upon the floor of the trench of blocks of artificial stone or kindred hard material or else by the flowing of plastic material upon said floor and its subsequent molding thereon into the form represented in Fig. 3 of the drawings—that is to say, as a longitudinally-extending base provided with side walls *b*<sup>x</sup>; or, again, this trough may be previously formed in sections and subsequently laid in place in the trench.

When the trough has been laid as above and is hard it is then filled, or nearly filled, with such soft or plastic fluid or semi-fluid material as it is desired to form the passage or passages in, as represented at *c* in Fig. 4 and at line 4 4, Fig. 1, such material being preferably asphalt-concrete, although many other substances adapted to subsequently solidify will answer the purpose. Into the substance of this layer by any suitable die, stamping device, or other means is then impressed the form of the passages or ducts *d*, as represented in Fig. 6, and at line 6 6, Fig. 1. I have devised the die *s* represented in Fig. 5 as a convenient means of forming these ducts. It is to be understood that one or a series of these



ducts is to be formed in the layer, according to the proportions desired. In the drawings, as a convenient number, I have represented three.

The impress of the form of the ducts is to be made before the layer hardens. After the layer has hardened to the required extent a slab or covering of artificial stone, *e*, Fig. 7, and line 7 7, Fig. 1, hardened asphalt-concrete, glass, or other vitreous material, covered, if desired, with asphalt, iron, or wood, likewise coated or felted with asphalt, is to be superimposed upon the layer, preferably to the entire width of the trench, so as likewise to rest upon the walls of the trough to form a covering to the ducts.

In laying the slab it is preferable that the portions of the layer with which it is to be in contact should be hot, or otherwise be in a soft, plastic, or glutinous condition, so as to insure the hermetical inclosing of the ducts by the slab. After the slab has been thus laid the earth in the trench, when the slab is not level with the surface, is to be replaced upon it; or, if the trench is a deep one and it is so desired, a second trough, as indicated in Fig. 8 and at line 8 8, Fig. 1, can be formed and laid, as described, upon the slab, a layer impressed with ducts formed in said trough in the manner of the layer first above described, and a second slab or covering superimposed thereupon, all as indicated in Fig. 9, and at line 9 9 of Fig. 1, after which the earth *f* of the trench can be replaced upon the uppermost slab, as indicated in Fig. 10 and at line 10 10 of Fig. 1.

The composition of which the layer within the trough may be composed is, broadly speaking, any substance capable of being molded or impressed and adapted subsequently to solidify in its impressed form.

The trough, as stated, may be of any desired material, artificial stone or concrete compounds being well adapted to perform the functions sought for.

When desired, the slab can be provided with grooves *g*, as represented in Fig. 11, corresponding to the ducts in the layer, so that when the slab is applied the ducts can be formed of an approximately circular section, or, in fact, of any section desired.

In Fig. 12 is represented a construction of slab in which dovetails or tongues *h* are provided to the slab, which are designed to be embedded in the substance of the layer, as represented.

In Fig. 13 is represented a convenient joint, *i*, to be employed when the slab is jointed either longitudinally or transversely. This joint is designed to be filled with a luting of cement or other suitable material.

It will be obvious from the foregoing description that my method enables the continuous formation of a continuous seamless pipe provided with either one or a series of independent bores of any desired configuration. It will also be obvious that my pipe is adapted to be formed and laid below the ground in such position and relation thereto as it is designed that the pipe should permanently oc-

cupy. It will likewise be obvious that all joints and couplings are dispensed with, as, indeed, are all handling and transportation of sections of pipe, my invention providing a means whereby seamless pipe having one or many bores or ducts of any desired configuration and extension can be simultaneously manufactured and laid in position for its subsequent permanent use.

I am aware that pavements and other roadways have been constructed by superimposing upon a substratum of hardened bituminous béton laid direct in the ground and formed with sewers or large gutters, a series of slabs formed of cast-iron frames having cells in which are fixed bituminous paving-stones or slabs, and which are provided with grooves or hollows for giving hold to horses' feet, and with openings to drain the surface pavement into the sewers; and to such structure I lay no claim, as it is essentially characteristic of my invention that there should first be formed within the earth-trench a walled layer or trough of artificial stone or kindred hard material, which receives the continuous mass of plastic material within which the ducts are formed and protects it from the earth by forming, in connection with the top covering, a hard and impervious envelope or integument to the resulting pipe.

Having thus described my invention, I claim—

1. The method of forming continuous seamless pipe hereinbefore described, which consists, first, in excavating to the required depth, shape, and extent, and in the required direction a trench or channel in the ground, in which it is desired that a pipe should be laid; second, in progressively laying, constructing, or otherwise forming within said trench a walled layer or trough of artificial stone or kindred material; third, in progressively placing within said trough a layer, stratum, bed, or continuous mass of plastic, fluid, semi-fluid, or kindred material adapted to subsequently solidify; fourth, in impressing in said layer, by any suitable means, one or more ducts or passage-ways; fifth, in superimposing upon said layer, with its formed ducts, a slab or covering of artificial stone, glass, or other vitreous material, coated metal, wood, or the like, all substantially as described.

2. A continuous seamless pipe formed of a walled layer or trough of artificial stone or kindred material, containing within its walls a layer, stratum, bed, or continuous mass of hardened plastic, fluid, semi-fluid, or kindred material, formed with ducts or passage-ways covered by a slab or other covering of artificial stone or kindred material, substantially as set forth.

In testimony whereof I have hereunto signed my name this 20th day of May, A. D. 1881.

CALVIN DETRICK.

In presence of—

J. BONSALE TAYLOR,  
W. C. STRAWBRIDGE.