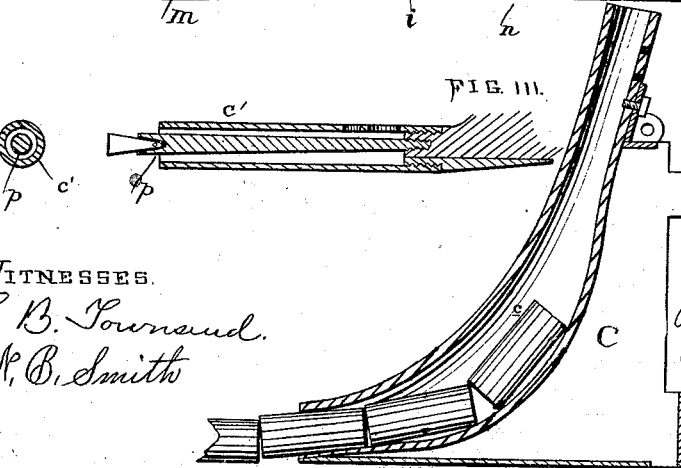
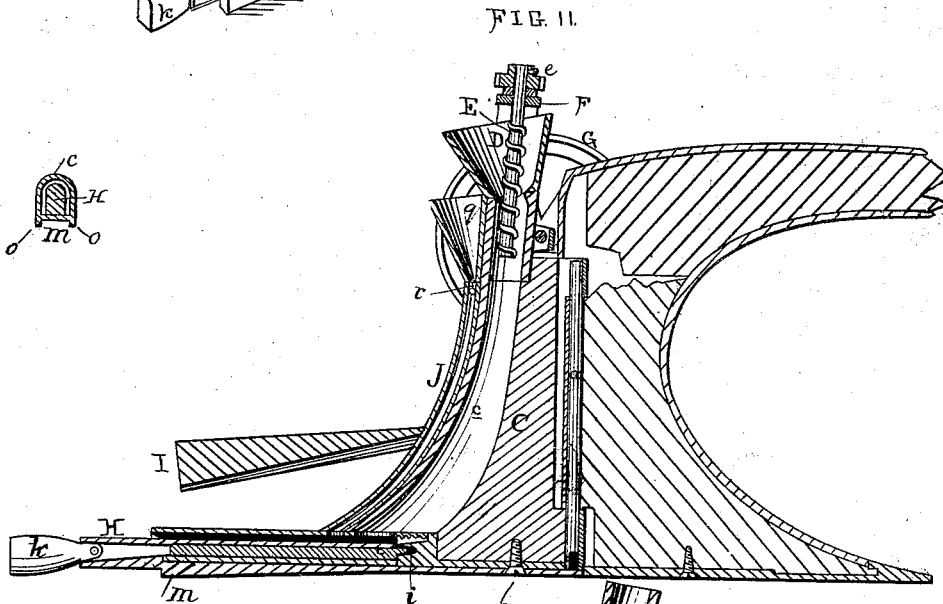
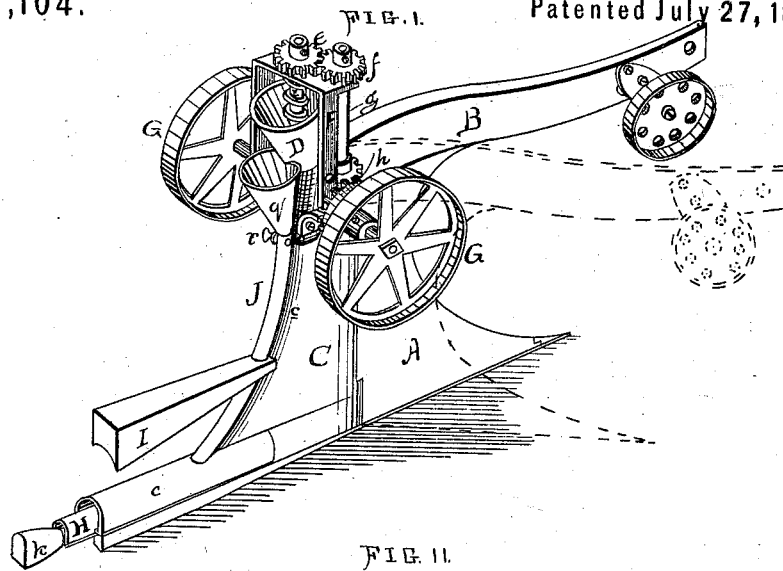


R. HOFFHEIN.  
 Tile-Making and Laying Machine.

No. 166,104.

Patented July 27, 1875.



WITNESSES.  
*F. B. Townaud.*  
*A. B. Smith*

INVENTOR  
*Reuben Hoffhein*  
*By his atty*  
*A. B. Smith*

# UNITED STATES PATENT OFFICE.

REUBEN HOFFHEIN, OF YORK, PENNSYLVANIA.

## IMPROVEMENT IN TILE MAKING AND LAYING MACHINES.

Specification forming part of Letters Patent No. 166,104, dated July 27, 1875; application filed May 25, 1875.

*To all whom it may concern:*

Be it known that I, REUBEN HOFFHEIN, of York, in the State of Pennsylvania, have invented a Tile Making and Laying Machine, of which the following is a specification:

The recognized advantages of underdraining to certain soils has led to the invention of various devices designed to facilitate the construction of permanent drains. Some of these devices are for the purpose of depositing ordinary drain-tiles in a trench made by a mole-plow, but so far as I am aware no machine has heretofore been produced intended or capable of making the required trench, and plastering its surface with a sufficient layer of cement or concrete; or, in other words, a machine to make and lay the tile at one operation, and in the form of a continuous tube.

My invention consists principally of a mole-plow, with a tile making and laying attachment hinged thereto; also in mixing and feeding mechanism automatically actuated to mix and feed cement or concrete to line the trench formed by the mole, and thus form a continuous cement or concrete tile, formed and deposited in one continuous operation; also in changeable-jointed shapers to shape and compact the cement or concrete against the wall; also in a covering-wedge to return the earth to the trench, and compact the same above the tile; and in water-tube to admit water to the trench or to the cement-tube for the purpose of facilitating its exits from the machine.

That others may clearly understand my invention, I will particularly describe it, having reference to the accompanying drawing, wherein—

Figure 1 is a perspective view of my full machine. Fig. 2 is a longitudinal section of the same. Fig. 3 is a longitudinal section of the tube divested of the mixing and feeding devices.

A is the plow and B is the beam, to which the draft-power is applied. At the front end of the beam B I place an adjustable gage-wheel to regulate the depth of penetration of the plow. The mole C is attached by a joint-bolt, *a*, to the rear edge of the plow A, so that the mole and plow may change their positions, and render it much easier to change the direction of advance than it otherwise would be.

In its simplest form the mole shown in Fig. 3 is attached. In this case the mole is constructed with a tube, *c*, large enough to permit the passage of ordinary drain-tile. The tube *c* opens at its upper end above the level of the ground, and at its lower end at the rear of the mole, so that the tiles as they pass down it are deposited exactly in the trench. The tube *c* is expanded toward its central part, so as to permit the tiles to pass down without binding, as shown in Fig. 3; but I prefer to employ with the tube *c* mixing, feeding, and molding devices, whereby tempered cement or concrete may be forced down through said tube, and the surface of the trench plastered therewith, so as to form a continuous tile, made and laid in a single operation, as the machine advances.

These mixing, feeding, and forming devices I will now describe. At the top of the tube *c* I place a hopper, D, into which the concrete or cement and water, if required, is placed from time to time, as may be required. A screw-shaft, E, is suspended from a gear-frame, F, and extends down through said hopper, and into the throat of the tube *c*, as far as may be required. At the top of said shaft E there is a pinion, *e*, which gears with a pinion, *f*, at the top of a shaft, *g*, which is actuated by a driver, *h*, on the axle of the master-wheels G G. The wheels G rest upon the ground, and as the machine advances they are caused to revolve and give motion to the screw E, whereby the contents of the hopper D are forced down into and along the tube *c*, and discharged at its lower end into the trench. A former, H, placed in the rear or lower end of the tube *c*, and extending forward far enough to its attachment at *i* to enable the concrete or cement to pass entirely around said former and escape in the form of a complete tube or pipe. If necessary, one or more dragging-moles, *k*, may be attached to the former H to fully expand and smooth the inner surface of the pipe, and insure its completeness, even if it should have been treated to too much water, or by the use of several of such moles, as many as may be found to be requisite, the concrete may be worked much thinner than would otherwise be possible, because however thin it may be the moles will

keep it in position until it "sets." As the plow advances it necessarily opens a trench extending from the surface down to the location of the tile, and it is therefore requisite to the best result that the earth shall be closed again over the mole, so as to leave a complete tube of soil, against which to plaster the cement. For this purpose I attach a gathering-wedge, I, to the rear side of the tube *c*, its point being forward and its lower side concave, and widest at its rear end, so that as it is advanced it takes earth from the side of the trench, and compacts it down upon and over the rear portion of the mole or tube *c*, and leaves an unbroken surface of earth to receive the cement or concrete as it issues from the rear end of said tube.

If the concrete or cement is used in a pretty stiff condition the wedge I will not be necessary for ordinary draining purposes, but if the object is to form a tube for the conveyance of water it will be required to insure against cracking or accidental rupture of the cement wall by the mole *k*. For ordinary draining purposes a horseshoe-tile is preferable, as it is open at the lower side and permits the water to enter there. When such open or horseshoe tile is to be laid the core or former H, as shown in Fig. 2, is used. Said former is attached at its rear end to the sole-piece *m*, which extends forward beneath the tube *c*, and covers the lower end of the joint-bolt, and is fastened in place with a screw, *n*. The sole-piece *m* is provided with two ribs or flanges, *o*, running along its lower edge to leave unbroken ground between the two sides of the tile, and to prevent the outside pressure from forcing the wall together. When a cylindrical pipe is to be laid for the purpose of conveying water or otherwise the piece *m* is removed and a cylindrical end piece is substituted for the horseshoe end or mole-piece *c'*, and a cylindrical core or former, *p*, is substituted for the horseshoe end piece, former H, and sole-piece *m*. A water-tube, J, with a

hopper, *q*, and stop-cock *r*, are attached for the purpose of injecting a little water upon the concrete or cement as it passes out of the tube *c* for the purpose of lubrication.

Having described my invention, what I claim as new is—

1. Combined with the mole C, substantially as described, a mixing and feeding device, whereby concrete or cement may be mixed, fed, and discharged into the trench at the rear of the mole.

2. Combined with the mole C the hopper D and screw E, driven by gearing *e f g h*, actuated by the rotation of the wheels G.

3. The mole C and the device for mixing, feeding, and discharging the cement or concrete, the hollow end piece or former, either cylindrical or horseshoe shaped, combined with a core, for the purpose set forth.

4. Combined with the discharge or end piece and its former or core the loosely-attached drag *k*, slightly larger than said core, for the purpose set forth.

5. Combined with the mole C and the discharge-pipe *c*, the covering and compressing wedge I, to close in the earth over the discharge end of said pipe, for the purpose set forth.

6. Combined with the mole C and the pipe through which the cement is to be passed into the trench, the water-pipe J, for the purpose set forth.

7. The process of constructing and laying concrete or cement tile in ground, substantially as described—that is to say, by means of a mole-plow, provided with a tube discharging at the rear of the mole—and an apparatus for mixing, feeding, and discharging cement or concrete over cores or formers into the trench made by said mole, substantially as set forth.

REUBEN HOFFHEIN.

Witnesses:

GEORGE M. SHETTER,  
H. S. MYERS.