(No Model.) 3 Sheets—Sheet 1.

C. J. MERRILL.

DRAIN TILE MACHINE.

No. 300,882. Patented June 24, 1884.

Fig. 1

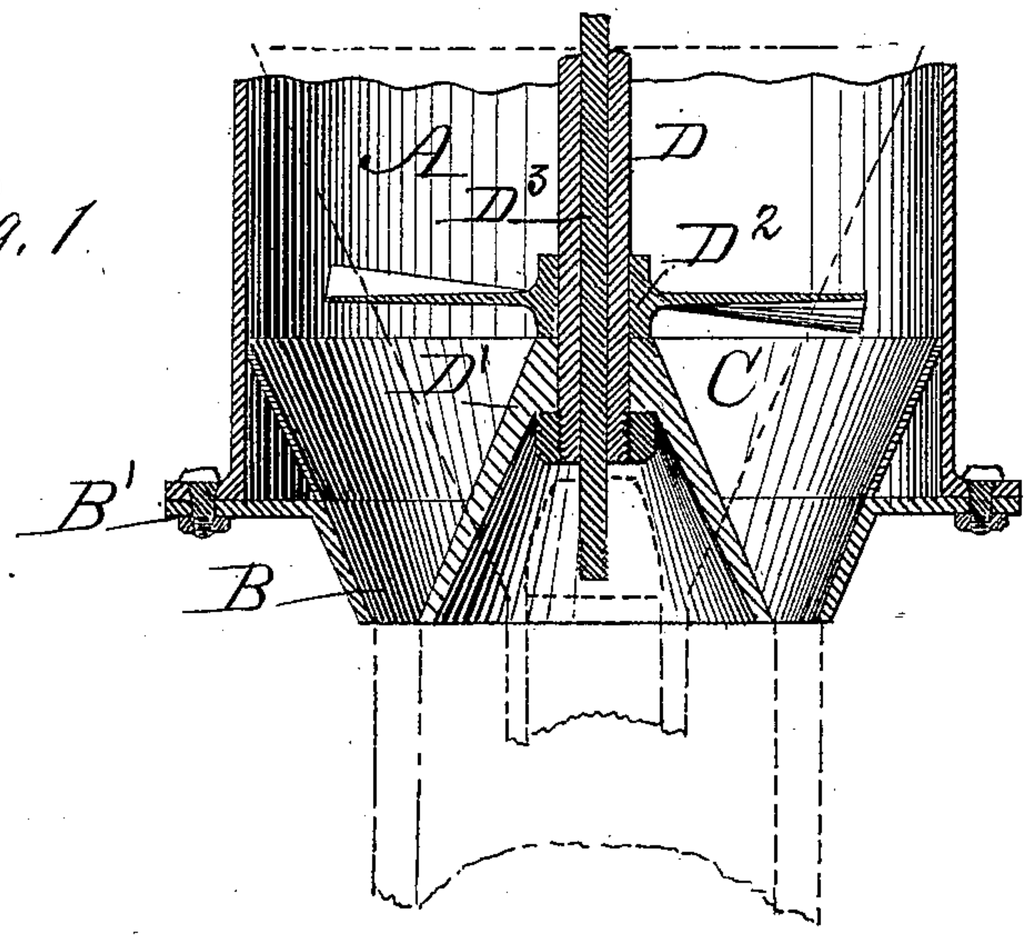
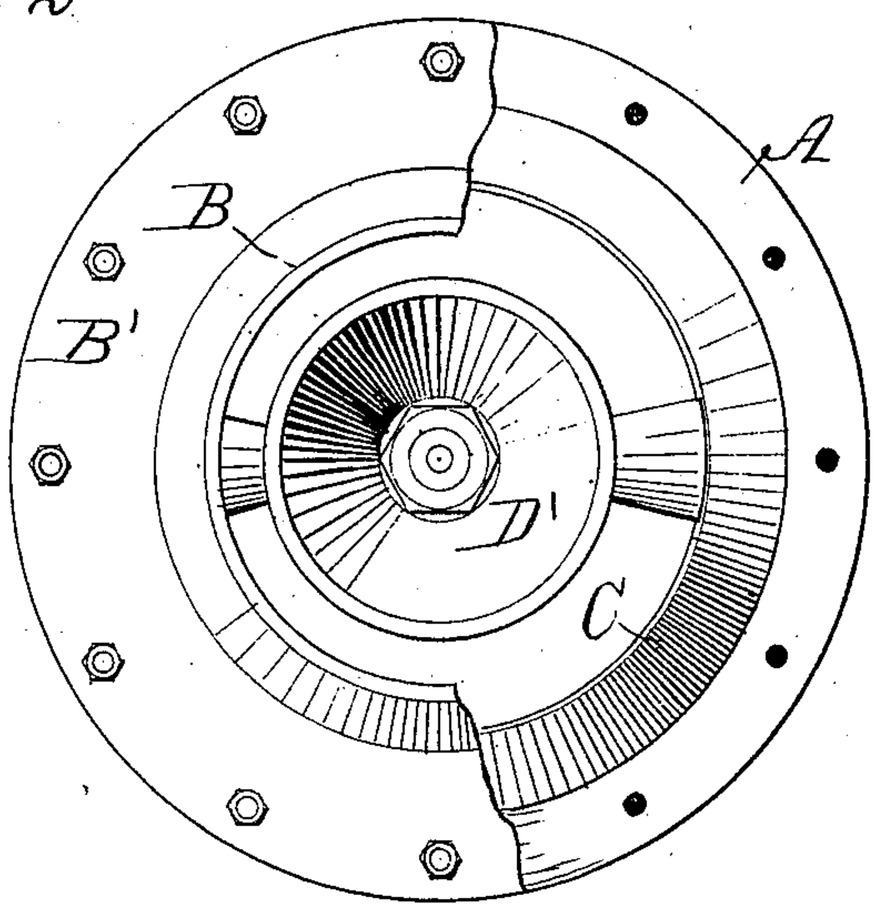


Fig. 2



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(No Model.) 3 Sheets—Sheet 2.

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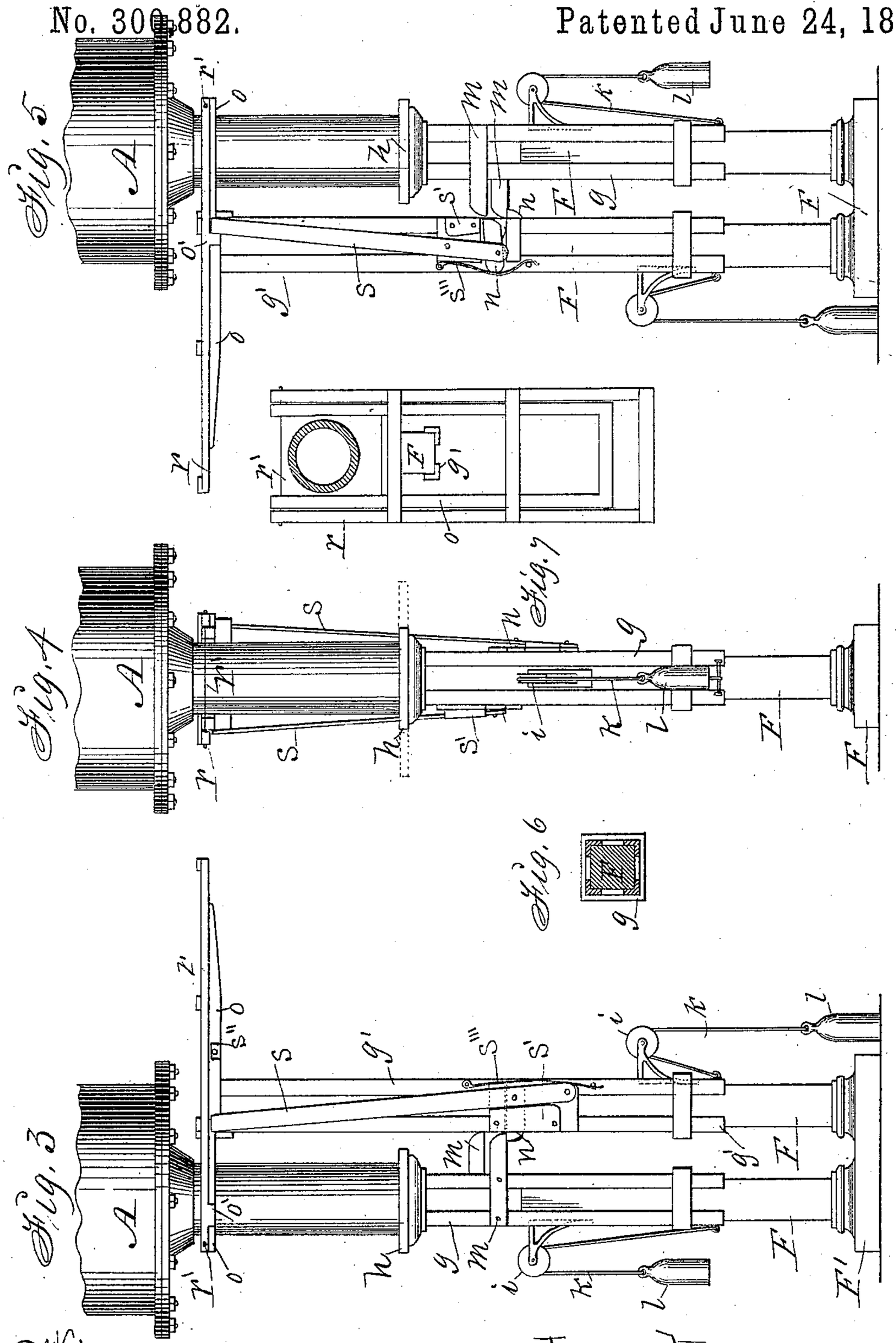

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(No Model.) 3 Sheets—Sheet 3.

C. J. MERRILL.

DRAIN TILE MACHINE.

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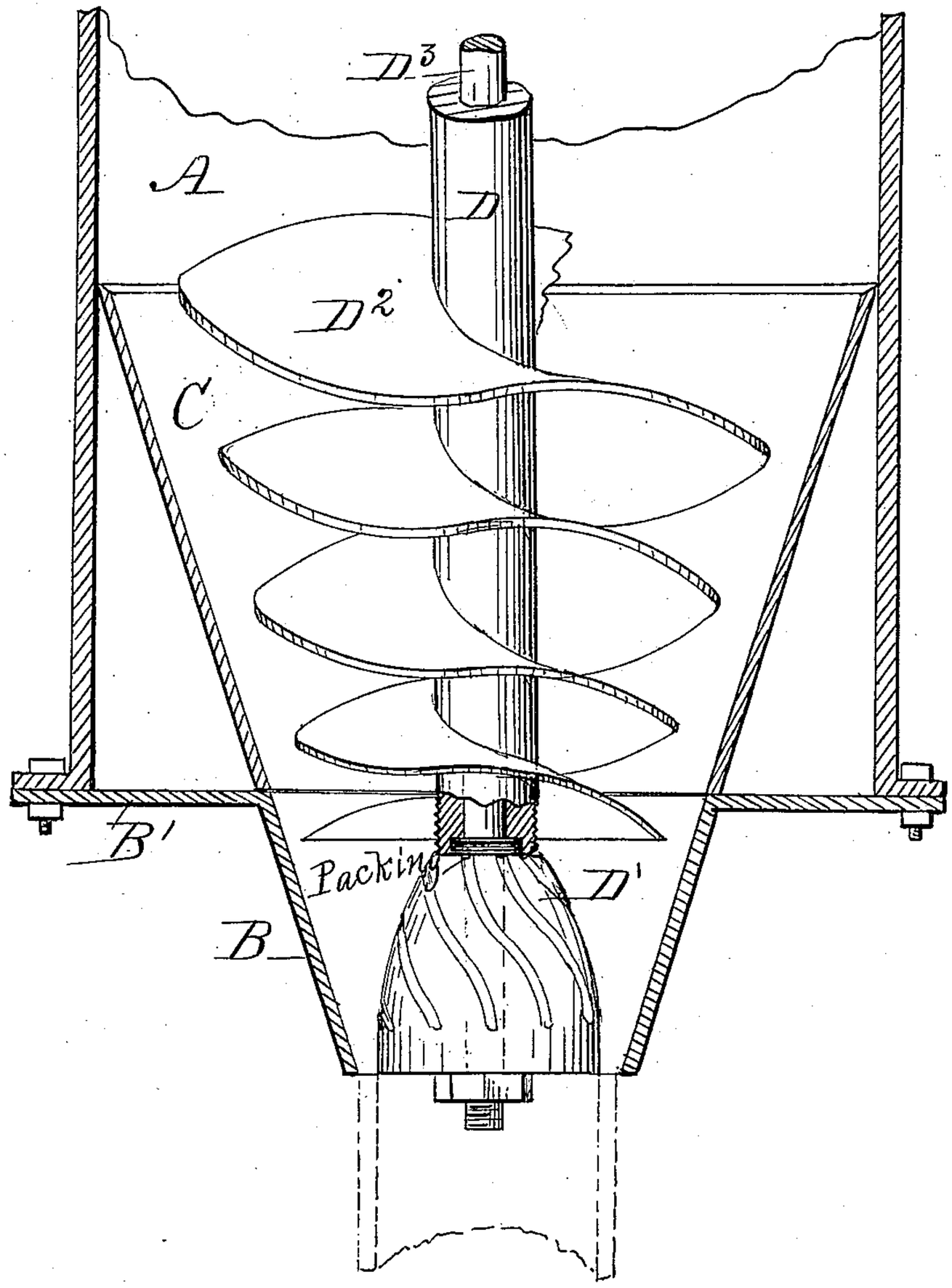
Fig. 8



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UNITED STATES PATENT OFFICE.

CALVIN J. MERRILL, OF DES MOINES, IOWA.

DRAIN-TILE MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,882, dated June 24, 1884.

Application filed September 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, CALVIN J. MERRILL, of Des Moines, in the county of Polk and State of Iowa, have invented an Improved Drain-Tile Machine, of which the following is a specification.

My object is to facilitate the making of various sizes of tile in one and the same machine and to overcome the difficulties of cutting off and delivering tile of large diameter.

Heretofore dods or molds of different sizes have been detachably and interchangeably connected with the cylinder of a machine; but when a mold smaller in diameter than the cylinder was used the movement of the clay would be obstructed by an annular open space or a shoulder existing between the wall of the cylinder and the mold. A corrugated tapering detachable lining has been placed within the tapering end of the cylinder of a brick-machine, through which clay was driven in a continuous solid bar; but my combination of a tapering shield with a cylinder of uniform diameter, a mold, a rotating shaft, an auger, and an inside former is novel and overcomes the difficulties of making drain-tiles of different sizes in one and the same machine.

I am also aware that a horizontally-rotating cut-off and vertically-moving delivering-platform have been combined with a vertical cylinder by means of cords, weights, and pulleys.

My invention consists in the combination of a flanged mold and an annular and tapering shield with the end of a cylinder and a former and auger or conveying blades fixed to a rotating shaft, and in the construction and combination of a horizontally-reciprocating cut-off and a vertically-moving delivering device with a vertical cylinder, as hereinafter fully set forth, in such a manner that molds of different sizes can be successively applied and used to produce and deliver tiles of different diameters advantageously.

Figure 1 of my accompanying drawings is a sectional view showing a detachable mold and shield and former and auger and duplex shaft combined with a vertical cylinder. Fig. 2 is an end view of a cylinder, showing part of the mold broken away and the shield and former and auger blades in their proper places. Fig. 3 is a side view of my cut-off and tile-delivering device in position under a machine. Fig. 4 is a front view of the parts shown in Fig. 3. Fig. 5 is the reverse side of the device shown in Fig. 3. Fig. 6 is a transverse section of one of the posts and sliding frames shown in Fig 3. Fig. 7 is a top view of the cut-off.

Jointly considered, these figures clearly illustrate the construction and operation of my complete invention.

A represents the cylinder of a tile-machine in a vertical position.

B is a detachable mold fixed to the annular flange of the cylinder by means of screw-bolts. The mold is of converging form, and has a flange, B′, formed integral therewith, to overlap the end face and flange of the cylinder to which it is attached.

C is my annular tapering shield, cast complete in one piece. Its top end and largest diameter corresponds with the inside measure of the cylinder against which it rests, and its lower end and smallest diameter corresponds with the largest diameter of the mold, so that when they are placed together, as shown in Fig. 1, they coincide and form a continuous annular inclined plane, upon which the clay is advanced from the wall of the cylinder to the end of the mold, where it is discharged in a continuous tube, ready to be cut into pieces as required to produce tiles. As the diameter of the mold is enlarged or diminished, the diameter of the lower end and the width of the shield must be changed accordingly, in order to prevent the clay from getting between the top edge of the shield and the cylinder to obstruct its advance from the cylinder into the mold.

D is a tubular shaft, to which a former, D′, and an auger, D^2, are detachably fixed. The size of the former must correspond with the diameter of the mold within which it is to be operated, and the length of the auger-blades with the diameter of the shield at the point nearest to the blades, for in making small tile the shield will extend upward relative to the cylinder and auger farther than when a mold of large diameter is used to make large tile.

D^3 is a solid shaft extended through the tubular shaft. In making small tile the former

D′ can be attached to the solid shaft, as indicated by dotted lines in Fig. 1 and clearly shown in Fig. 8, and rotated by means of suitable gearing at the opposite end of the machine at a greater rate of speed to facilitate the movement of the clay through the mold by means of spiral grooves formed in the surface of the former.

F F are posts fixed in parallel positions to a base, F′, to be secured to the floor, or a suitable support directly under the cylinder and mold of the tile-machine.

g g′ are sliding frames placed upon the posts F. The frame on the front and short post has a platform, *h*, fixed on its top to receive and support the end of a tile when it is severed from the clay-tube projecting downward from the machine.

i is a pulley secured to the front of the post by means of a bracket.

k is a cord fixed to the lower end of the sliding frame, and passed over the pulley *i*.

l is a weight attached to the end of the cord *k*, to draw the sliding frame upward on the post when it is relieved from the pressure of the tile upon the platform *h*. The frame *g′* on the rear and long post is operated by a weight in the same manner.

m m are bars fixed to the opposite sides of the sliding frame *g* on the front post, to extend toward the frame on the rear post.

n n are latches pivoted to the frame on the rear post, to alternately engage the bars *m*, and thereby retain the platform *h* elevated at the proper height required to receive the tile as it is cut off from the continuous clay-tube that is forced downward from the cylinder and mold.

o o are the side bars of a frame fixed to the top of the long post and in a horizontal position, to support the sliding frame *r*, of corresponding shape and size, that carries a fixed wire, *r*, at its front end.

s s are levers pivoted to the opposite sides of the frame *g′* on the long post. Their lower ends and short arms are pivoted to the latches *n*, and their free ends extend up against the sides of the bars *o* of the frame fixed to the top of the long post.

o′ are cams fixed to the side bars of the sliding frame *r*, to alternately engage the free ends of the levers *s*.

s′ are stops fixed to the frame *g′*, to restrict the motions of the levers *s* and the horizontally-sliding frame and cut-off *r r′*.

s″ are stops fixed to the side bars, *o*, for the same purpose.

s‴ are springs fixed to the frame *g′* in such a manner that they will, in their normal condition, press the latches *n* toward the bars *m*.

In the practical operation of the sliding cut-off *r r′*, I simply take hold of the cross-bar at its rear end and slide it forward and backward at proper intervals of time and regardless of its point of elevation relative to the mold and cylinder, as required to cut off tiles from the clay-tube as fast as they are measured off successively by coming in contact with the platform *h*. When the wire *r′* is in position relative to the clay-tube as shown in Figs. 3, 4, 5, and 7, a backward motion of the sliding frame that carries it is required to draw the wire through the clay-tube and to sever a tile therefrom. The same motion will operate one of the levers *s*, and thereby withdraw the latch *n* from the bar *m* and allow the sliding frames *g g* on the posts to descend jointly under the pressure of the tile, which is heavier than the weights *l*, that are employed to counterbalance the same frames and elevate them again when the finished tile is removed from the platform *h* at the top of the frame on the front post. A reverse or forward motion of the cut-off operates the lever and latch on the opposite side to accomplish the same results, so that a tile is measured, cut off, and carried away from the mold at each motion of the sliding cut-off, and the difficulties incident to making large and small tile in one and the same machine obviated by the use of my invention.

Being aware that annular flanges and hinges have been extended from a dod and mold into a cylinder, I do not therefore claim a flaring annular detachable shield as a novel element in a tile or brick machine; but my manner of combining it with other elements in a straight cylinder is novel and greatly advantageous in producing the results contemplated and hereinbefore stated.

I claim as my invention—

1. In a drain-tile machine, the combination of a detachable mold, B B′, a detachable annular and tapering shield, C, and the end of a straight cylinder, to operate in the manner set forth, for the purposes specified.

2. The combination of a mold, B B′, a shield, C, that extends inward from the mold to engage the wall of the cylinder, a rotating shaft, and a detachable former, D, and a detachable auger, D^2, to operate in the manner set forth, for the purposes specified.

3. A cut-off and delivering device for drain-tile machines, composed of two sliding frames on parallel posts, a platform at the top of one of the sliding frames, adapted to receive and carry a tile in a vertical position, a horizontal frame at the top of the other sliding frame, adapted to support a horizontally-sliding frame having a wire stretched across its end, weights, cords, and pulleys to counterbalance the vertically-sliding frames, and levers and latches for connecting and co-operating the two vertically-sliding frames and the horizontal frame and cut-off, in the manner set forth, for the purposes specified.

4. The combination of a vertically-sliding frame, *g*, having projecting bars *m* at its opposite sides, and a platform, *h*, at its top, and the parallel sliding frame *g′*, having latches *n* and levers *s* on its opposite sides, with a horizontal frame and sliding cut-off at the top of the frame *g′*, for the purposes set forth.

5. In combination with a drain-tile ma-

chine, a vertically-moving device for measuring and delivering a tile, and a horizontally-sliding cut-off, substantially as shown and described, for the purposes specified.

6. The cut-off and delivering device for drain-tile machines, composed of the following elements, to wit: two fixed parallel posts, a sliding frame, and platform *g h*, having fixed bars *m*, a sliding frame, *g'*, having a frame, *o o*, at its top and latches *n* at its sides, the sliding frame and cut-off *r r'*, the levers S, and suspended weights *l*, substantially as shown and described.

CALVIN J. MERRILL.

Witnesses:
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