2 Sheets—Sheet 1

T. E. CHANDLER.
Brick-Machine.

No. 219,909. Patented Sept. 23, 1879.

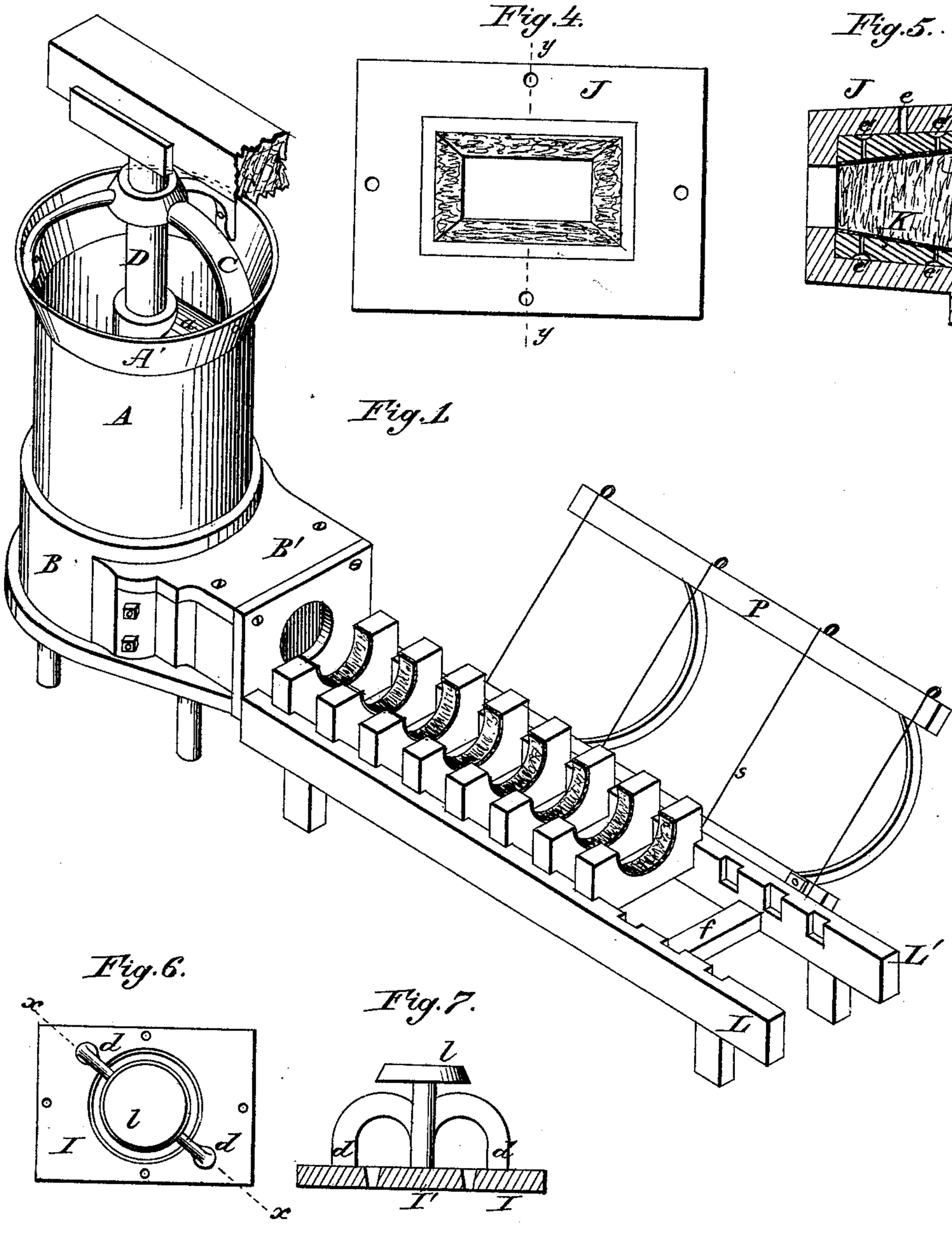

Fig. 1

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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F. H. Schutt.
D. P. Lowe

Inventor:
Thos. E. Chandler

2 Sheets—Sheet 2.

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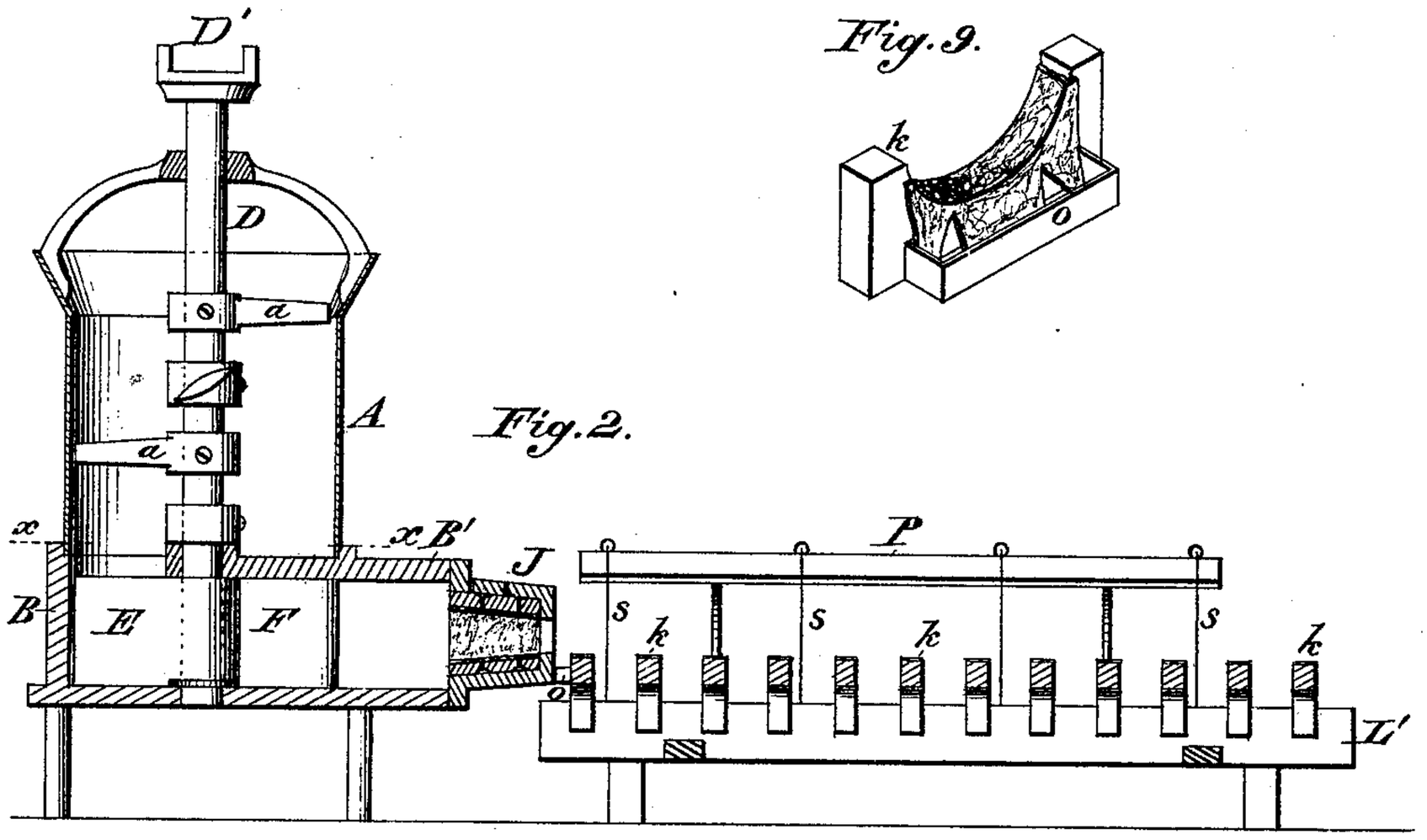


Fig. 2.

Fig. 9.

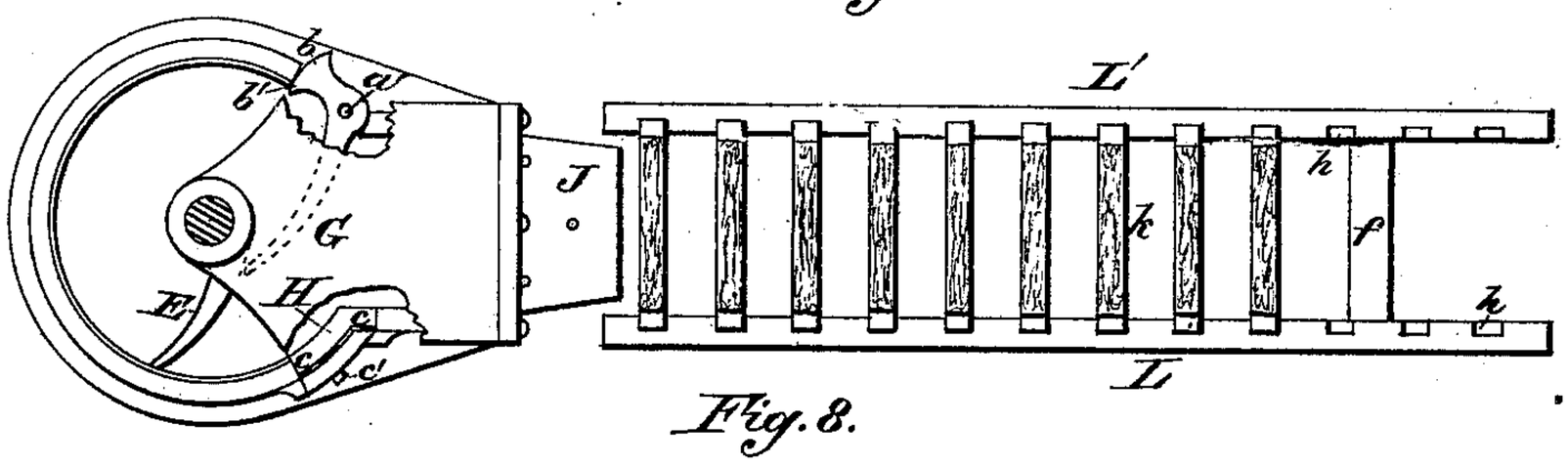
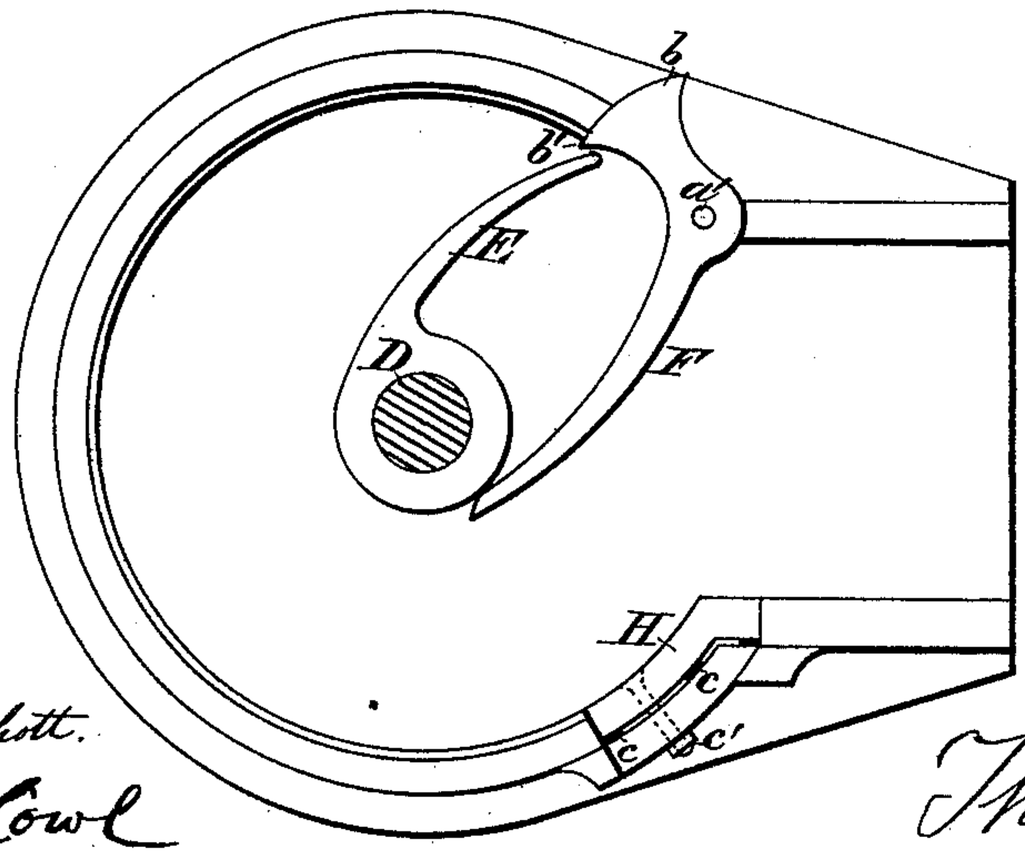


Fig. 3.

Fig. 8.



Attest:
H. H. Schott.
D. P. Cowl

Inventor:
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UNITED STATES PATENT OFFICE.

THOMAS E. CHANDLER, OF INDIANAPOLIS, INDIANA, ASSIGNOR OF ONE-HALF HIS RIGHT TO FRANKLIN TAYLOR, OF SAME PLACE.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. **219,909,** dated September 23, 1879; application filed May 7, 1879.

To all whom it may concern:

Be it known that I, THOMAS E. CHANDLER, of the city of Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Brick and Tile Machines; and I do hereby declare the following to be such a full, clear, and exact description thereof as will enable others to construct and use the same, reference being had to the accompanying drawings, and to the letters of reference placed thereon, similar letters indicating corresponding parts in the different figures.

This invention relates to an improvement in that class of brick and tile machines in which the clay is forced from the pug-mill in a continuous line of the proper width and thickness to form a brick, or in tubular form for draining pipes or tiles, requiring only to be cut into proper lengths to complete the formation of the articles ready for the kiln; the object being to remedy some of the defects in existing machines, among which may be named the defective means employed for receiving the tile and brick as it comes from the forming-die, and the insufficient lubrication of the latter as well as the receiving devices, and, further, the inefficient working of the cut-off devices heretofore used for restraining the forward movement of the clay while the tile or brick are being cut into proper lengths upon the receiving-table; and the invention consists in the construction and arrangement of devices for accomplishing the above-named objects, as will be hereinafter fully described, and then specifically pointed out in the claims.

In the drawings, Figure 1 is a perspective view of the machine complete, showing the general arrangement of the several parts with relation to each other. Fig. 2 is a vertical section through the pug-mill, pressure-chamber, forming-dies, and receiving-table. Fig. 3 is a horizontal section of the pug-mill, and also shows a plan of the receiving-table, with the reversible blocks placed in position to receive the bar of clay for making brick as it comes from the die. Fig. 4 is an end view of the die-casing and felt-lined die used for making brick. Fig. 5 is a vertical section of the same on the line *y y*, showing the relative arrangement of the parts and the method of applying the lubricating material. Fig. 6 is a rear view of the die used for making large round tile or drain-pipes; and Fig. 7 is a section of the same on the line *z z*, showing the method of sustaining the core in its proper position. Fig. 8 is an enlarged plan of the lower part of the machine, showing the construction and arrangement of the feed wing or cam with relation to the abutment or pressure wing. Fig. 9 is a side view of one of the reversible receiving-blocks, and illustrates the manner of applying the felt covering upon which the bar of clay, as it comes from the dies, is received.

The pug-mill of this machine consists of a cylindrical case, A, preferably formed of sheet metal, the lower end of which is inserted in a groove formed for its reception in the top of the cast-iron chamber B, which also forms the supporting-bed of the machine. The upper end of the cylinder A carries a rim, A′, to which is bolted the bridge-tree C. This bridge-tree carries the upper journal-bearing of the vertical shaft D, the lower end of which rotates in a suitably-formed journal-box in the bottom of the chamber B. Upon the upper end of the shaft D is secured the box D′, in which the lever for applying animal-power to operate the machine is placed; but when steam-power is used this box is replaced by a gear-wheel, through which motion is communicated to the moving parts of the machine. Secured to the shaft D, and revolving with it within the cylinder A, are the tempering-wings *a*, more or less in number, and so shaped that as they revolve they not only thoroughly cut and mix the clay, but by the inclinations of their lower face tend to press it down into the mud-chamber B at the bottom of the machine. This mud-chamber is of circular form, and is provided with an extension, B′, at one side, which serves as a pressure-chamber for the reception of each charge of tempered clay before it is forced through the forming-dies.

Upon the lower end of the shaft D, and revolving within the mud-chamber, is secured a curved or cam-shaped feed and pressure wing, E, which, as the shaft revolves, gathers the clay and forces it into the pressure-cham-

ber B′, passing the abutment wing or scraper F in its rotation. This wing or scraper is pivoted in the wall of the chamber at *a′*, and is provided with a cam-shaped section, *b*, the exterior face of which is concentric to the pivot *a′*. This face bears against a corresponding curve of the opening in the side wall of the chamber B, which receives this part of the wing F, thus forming a joint between the wing and the wall of chamber B sufficiently tight for all practical purposes.

An inward projection or hook, *b′*, upon the part *b* of the wing F is caught by the extreme end of the feed-wing in its revolutions and forced backward and the inlet of the pressure-chamber B′ opened, the movement continuing until the feed-wing slips by the projection *b′*. As the rotation of the feed-wing continues the clay is pushed into the pressure-chamber, being prevented from continuing its movement around the shaft within the mud-chamber B by the abutment-wing F, the free end of which rests upon and, as it were, scrapes the convex faces of the wing E, and as the latter continues to rotate, forces the whole charge into the chamber B′, at the same time displacing and forcing through the dies the charge which had preceded it.

It will be seen that this abutment-wing conforms in size to a cross-section of the pressure-chamber, so that when it closes the clay in the pressure-chamber cannot escape backward into the mud-chamber, the abutment-wing being carried into this position across the mouth of the pressure-chamber by the action of the feed-wing, and remaining in that position until relieved by the end of the feed-wing striking the projection *b′*.

In order to prevent the clay from rising and flowing over the abutment-wing while being forced into the pressure-chamber, a triangular covering or pressure-plate, G, which may also form the cover of the pressure-chamber, enters the mud-chamber and covers the abutment-wing throughout the whole of its movement, thus preventing the escape of any clay after it has been carried under it, except by passing through the pressure-chamber and dies. The inner end of this covering-plate G may form an additional bearing for the shaft D, thus adding stiffness to it at the point where it would be most liable to spring.

A portion, H, of the mud-chamber adjoining the pressure-chamber is made adjustable, so that the end of the pressure-wing E shall always be in close proximity to it as it passes, thus preventing the escape of clay by the end of the feed-wing. The adjustability of this portion or packing-piece H is obtained by placing it in a recess in the wall of the chamber B, with rubber or other suitable springs, *c*, behind it, which tend continually to force it inward. This tendency is counteracted and the packing-piece retained and adjusted in the desired position by the bolts *c′*, two or more in number, which have their adjusting-nuts upon the outside of the chamber, where they are always accessible. This spring-packing not only stops the leakage and return of clay to the mud-chamber, but, by its elasticity, prevents breakage of the pressure-wing by such small stones or other obstructions as might be mingled with the clay, thus doing away with quite an important item in the cost of keeping the machine in repair.

The clay, after entering the pressure-chamber, is ready for its passage through the dies, which are of different construction, to suit the shape of the article to be formed, whether brick or draining-tile. If the latter, and of large size, a die similar to that shown in Figs. 6 and 7 may be used, which consists of a plate, I, having an orifice through it of as great diameter as the pipe to be formed. Within this orifice is placed a core, I′, of less diameter than the orifice, the annulet surrounding it constituting the thickness of the pipe or tile. This core I′ is held in place by the semicircular supports *d d*, which are attached at one end to the core and at the other to the plate I.

Where smaller pipe is made, two or more forming-orifices may be placed in the same plate, thus greatly expediting the manufacture.

If brick is to be made, a differently-constructed die is used, consisting of the outer case or die-holder, J, which is bolted to the pressure-chamber and receives and holds the die K within it. This die is of rectangular cross-section, but tapers both internally and externally from the side next to the pressure-chamber to that at which the bar of clay makes its exit, the outside taper being merely sufficient to give the die a firm seat in the casing J. The internal taper, however, is much more, as it is necessary to have as large an opening next to the pressure-chamber as possible, in order to give the clay free entrance, while the smaller end is contracted to the same size and contour as would be exhibited by a cross-section of the bar of clay from which the bricks are cut. The inside of this die K is fully lined with a heavy thick felt, which receives the lubricant applied to the die through the orifices *e* in the casing J. Grooves or channels *e′* are formed around the die, and serve, too, in connection with numerous small holes passing from the channels through it to the felt lining, to equally distribute the lubricating material to all parts of its inner surface.

The receiving or cut-off table, upon which the pipe or clay bar is delivered from the dies, is formed of two longitudinal side pieces, L and L′, connected together by the girts *f*. On the inner side of these side pieces is formed a series of recesses or gains, *h*, placed directly opposite to each other, and extending from the top downward to a sufficient distance to hold firmly the receiving-blocks *k*. These blocks are cut out so as to give a circular form to one of their edges corresponding to the external surface of the pipes being made, while the opposite edge of the block is left straight to give a suitable support to the clay bar for making bricks. Both edges of the blocks are covered

with felt, and to one or more of them is applied a trough or reservoir, *o*, into which the edge of the felt covering enters, and by its absorbent power takes up a sufficient quantity of the water or other lubricant with which the trough is supplied to keep its surface always in a condition to allow the clay to slip easily over it.

It will be observed that these blocks *k* are reversible in the gains *h*, so that the same set of blocks may be employed in the manufacture of pipe or brick, it being only necessary to place them in the frame with that side up which shall suit the die being used on the machine, as is shown in the drawings, Fig. 1 having the blocks arranged with their concaved edges up to receive pipe, while Fig. 2 shows the straight edge up, as when the brick-die is used.

Hinged to the side piece L′ is the cutting-frame P, provided with the cross-wires S, placed at such a distance from each other as is required for the length of each brick or section of pipe, the length of this receiving-table must be such that it will take a bar or pipe equal to what is formed by the clay forced out of the dies at each revolution of the shaft D by the pressure-wing E, the time between these movements or pulsations of the clay being occupied in cutting and removing the contents of the table.

It will be apparent that the ordinary cut-off table, provided with rolls for receiving the clay as it comes from the dies, might be used with this machine, if desired; but the system of felt-covered and lubricated receiving-blocks above described is believed to be preferable.

The operation of the machine is as follows: Clay, with a proper quantity of water, is placed in the mill, where it is ground and mixed by the tempering-wings in the usual manner, and then is carried downward into the mud-chamber by the force of gravity aided by the action of the tempering-wings. It is here collected by the feed or pressure wing, and carried under the pressure-plate, where its rotative movement is intercepted by the abutment wing or scraper, and it is thus made to diverge into the pressure-chamber, from which it passes through the dies and onto the cut-off table.

It will be obvious that there is a tendency of the clay to form a channel through the center of the pressure-chamber. This is more apparent in stiff than in soft clay, and is also more noticeable in manufacturing large than small tile, and is due to the friction at the sides of the chamber, so that in dies with two openings the tendency is for the tile to diverge from each other as they issue from the die, and in three-hole dies the middle one will run out farther than those at the side, and the side streams will diverge from each other. To remedy this we find that an obstructing or deflecting plate, *l*, placed on the arch on supports *d d* in the rear of the issue, throws or spreads the clay toward the sides of the chamber, and thereby equalizes the flow of clay through it. This plate can be made adjustable, if desired, so as to vary the flow or divert the clay from one side to the other; or it can be made of irregular form, so as to be free where the flow is sluggish, and impede it where the tendency is to run out too freely.

Having thus described my invention, I claim as new and desire to secure by Letters Patent the following:

1. In a brick or tile machine having an attached pug-mill with vertical shaft carrying horizontally-moving mixing-arms and pressure-wing, the combination, with aforesaid elements, of the vibrating abutment-wing placed between the mill and pressure-chamber to produce an intermittent flow of clay through the dies, as described.

2. The rotating feed or pressure wing operated by the vertical pug-mill shaft, in combination with the vibrating abutment-wing and quadrant-shaped plate G, forming the top of the pressure-chamber within the pug-mill, as set forth.

3. In a brick or tile machine, the vibrating abutment-wing for producing an intermittent flow from the pressure-chamber, in combination with the spring packing-plate placed in on one side of said chamber to prevent leaking and breakage, as set forth.

4. In a brick or tile machine, the adjustable spring packing-plate H, constructed and arranged substantially as and for the purpose described.

5. The combination of the adjustable spring packing-plate with the rotating feed or pressure wing, as and for the purpose described.

6. In a brick or tile machine, the felt-covered reversible blocks *k*, constructed substantially as and for the purpose specified.

7. The felt-covered reversible blocks *k*, in combination with the troughs *o*, for holding water or other lubricant, all arranged and operating in the manner set forth.

In testimony that I claim the foregoing I hereunto affix my signature this 21st day of April, 1879, in the presence of two subscribing witnesses.

THOS. E. CHANDLER.

Witnesses:

HERMAN A. WERBE,

A. P. STANTON.