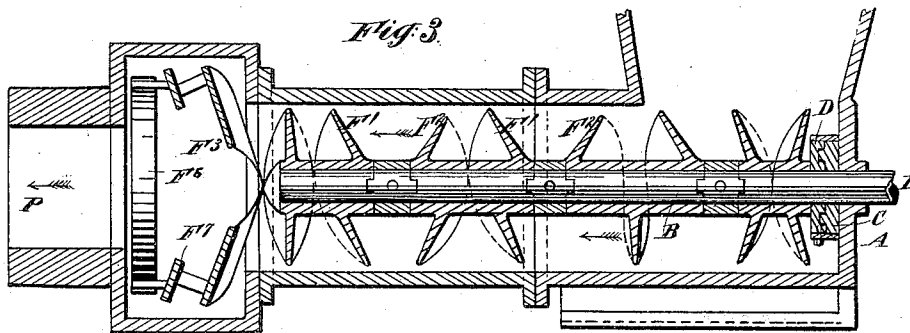
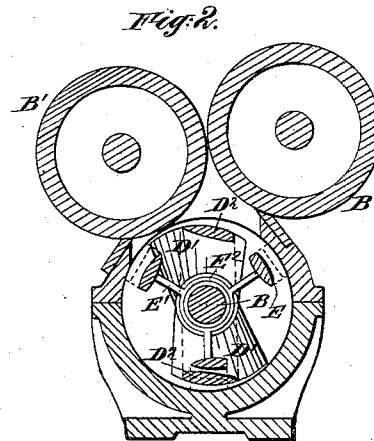
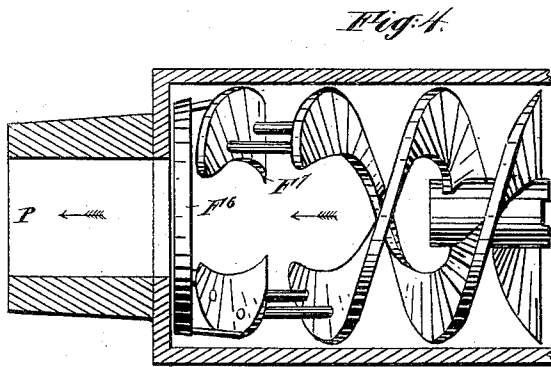
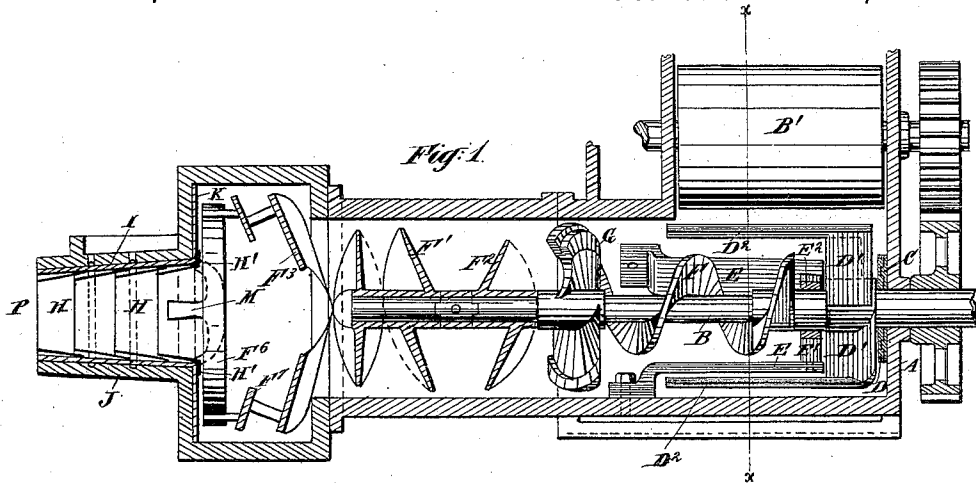


(No Model.)

2 Sheets—Sheet 1.

C. SCHLICKEYSEN.

MACHINERY FOR THE MANUFACTURE OF BRICKS AND TILES.
No. 309,567. Patented Dec. 23, 1884.



Witnesses:
J. C. Renwick.
Charles R. Seale.

Inventor:
Carl Schlickeyesen
by his attorney
Thomas S. Peterson

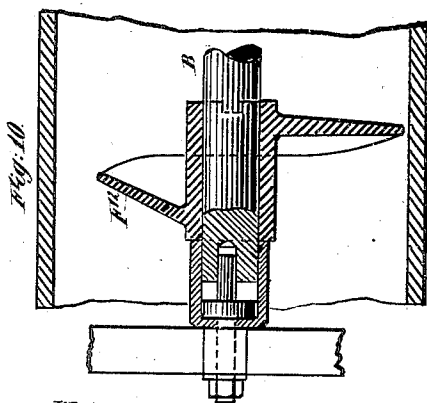
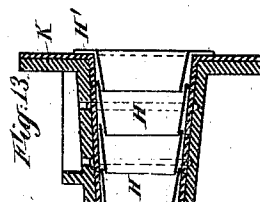
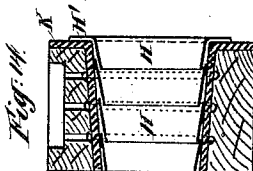
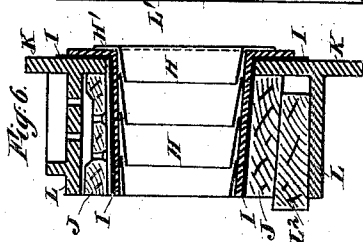
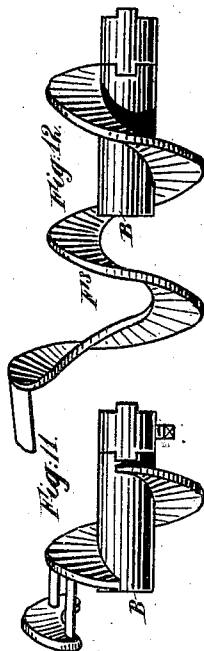
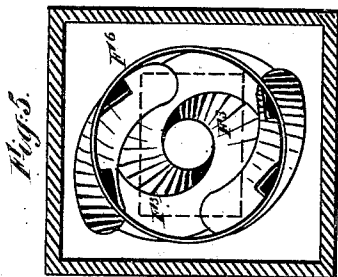
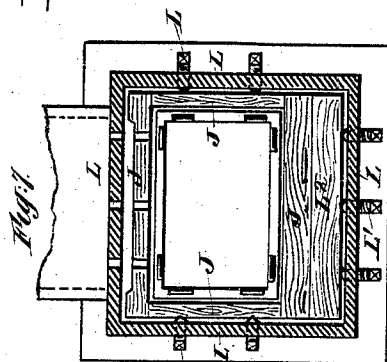
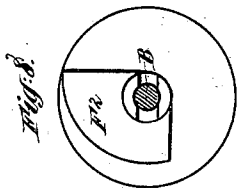
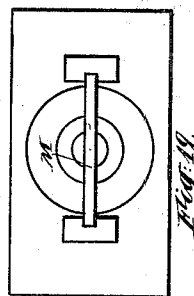
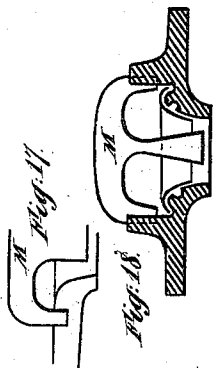
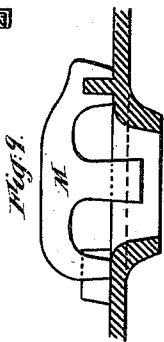
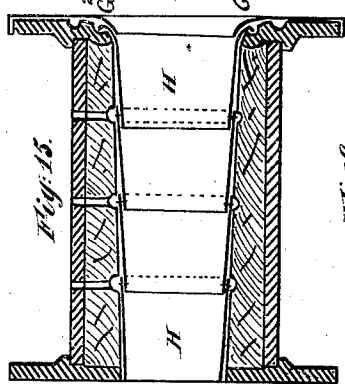
(No Model.)

2 Sheets—Sheet 2.

C. SCHLICKEYSEN.

MACHINERY FOR THE MANUFACTURE OF BRICKS AND TILES.
No. 309,567.

Patented Dec. 23, 1884.



Witnesses:
J. C. Rennie,
Charles H. Searle.

Inventor:
Carl Schlickeysen
by his attorney
Thomas D. Watson.

UNITED STATES PATENT OFFICE.

CARL SCHLICKEÿSEN, OF BERLIN, GERMANY.

MACHINERY FOR THE MANUFACTURE OF BRICK AND TILES.

SPECIFICATION forming part of Letters Patent No. 309,567, dated December 23, 1884.

Application filed April 23, 1884. (No model.) Patented in Germany November 27, 1883, No. 28,862; in France January 2, 1884, No. 159,517; in England January 8, 1884, No. 969; in Belgium February 25, 1884, No. 64,265, and in Austria-Hungary March 20, 1884, No. 1,776.

To all whom it may concern:

Be it known that I, CARL SCHLICKEÿSEN, of Berlin, Prussia, Germany, have invented certain new and useful Improvements in Machinery for the Manufacture of Bricks and Tiles, of which the following is a full, clear, and exact description.

My improved brick and tile machine produces a continuous bar or body of clay of the proper form. It consists of a pug-mill having rollers and screw-blades with other provisions for cutting and working the clay, and a water-lubricated telescopic die, and provisions for readily removing the core.

Pug-mills as heretofore constructed consisted of a hollow cylinder closed behind, and provided with clay-feeding opening knife-spindle with cutting and kneading knives or blades. Such have the following disadvantages: The clay is soon squeezed through between the spindle and the bearing at the back wall, thus in course of time damaging both, especially if the clay is sandy. When various substances are to be mixed or raw heavy clay to be worked, a badly-mixed bar with tree-bark-like structure is obtained. These defects are remedied in my machine.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a longitudinal vertical section. Fig. 2 is a cross-section on the line *x x*. The remaining figures represent modifications. Fig. 3 is a longitudinal vertical section. Fig. 4 is a corresponding view of a portion. Fig. 5 is a cross-section. Fig. 6 is a longitudinal section. Fig. 7 is a cross-section corresponding to Fig. 6. Fig. 8 is a cross-section. Figs. 9 and 10 are longitudinal sections. Figs. 11 and 12 are side views. Figs. 13, 14, 15, and 16 are longitudinal sections. Figs. 17 and 18 are horizontal sections. Fig. 19 is a face view corresponding to Fig. 18.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

On the inner face of the end A of the horizontal pug-mill I fix a disk, C, having annular projections and recesses, and on the pug-mill

spindle B, I fix a disk, D, with corresponding annular recesses and projections. The circumferential surface of both is covered by a wide ring, fixed on the last-named disk by means of screws. This ring runs up against the back wall, A, and as it wears it can be shifted up toward the end wall, so that the clay cannot pass through, because, in order to get to the bearing, it would have to run back at the end of the point or space between the disk C and the ring, the said space being so small there is not pressure enough behind to effect it. The knives or blades shown in Figs. 1 and 3, not only as heretofore, are fixed on the spindle at a right angle or at an acute angle, as the blades F², but I make also one or some of them to stand at an obtuse angle, such as the blade F'. The former knives force the clay on toward the outlet energetically, while the latter also force the clay out toward the casing. These knives F' are so constructed that the cutting-side reaches to the periphery of the cylinder, but the other side does not, in order that the clay caught by the knife or blade as the spindle turns may be pushed forward, and at the same time pressed against the walls of the cylinder, and then partly gushes back to the other side of the blade, escaping between the side of the blade and wall of the cylinder, thus effecting a grinding or crushing and mixing action. The same is effected in a less degree, when, on the contrary, the front edge of the blade is less than the back blade. The ordinary brick-machines also have the defect that a clay ring is formed in front of the last knife, which ring, by the pressure of the knife, is made very close near the periphery, while the core behind the knife-bosses is loose and open in texture. As this lack of clay at the core proceeds from the obstructions which the bosses offer to the flow of the clay toward the center, it is requisite, instead of the present knives, to make the knives near the outlet without bosses. This is done by continuing or prolonging the last knife-blades beyond the bosses, thus forming annular knives F³ without bosses, and between which the clay finds room both to penetrate from behind and to be pushed directly in by these prolonged knives. The closeness of the

flow of clay is by these means under command and rendered perfect in all parts. It is also a known defect in these machines that in course of time hard lumps are formed on the walls against the outlet end, and at last reach to the outlet, where they tear the edges of the issuing bar of clay. In order to avoid this, I fix on the last blade or blades a cylindrical or conical sheet-iron ring, F^c, Figs. 1, 3, and 4, which, during its revolution, describes a circle around the outlet-opening P, so that no lump can form against it. A further provision for effecting the minutest subdivision and mixture of the clay in the pug-mill consists in the use of a pair of rolls, B' B', which rolls are placed over the inlet to the pug-mill, and may be driven from its spindle B, so as to work with the pug-mill knives at about the same circumferential speed, and at such a distance as to force a thick band of clay down into the pug-mill sufficient to keep it fully supplied. Below the inlet I provide the mixer-spindle with an (one or more) armed pressing-knife, D', having at the periphery one or more steel blades, D², parallel with the axis. These parallel blades D² rotate close against the inner sides of the cylinder for about the length of the rolls, and thus in each revolution cut up the band of clay coming from between the rolls, and at the same time press each such cut-off piece between them. Inside of the cylinder described by these blades D², I fix one or more flat knives, E, and extend them back nearly to the pressing-knife D', where I unite them by means of arms E' and a ring, E², thus forming a basket which offers resistance, and inside of this basket the pieces of clay will pass which are cut off from the band of clay from the rolls. I provide the pug-mill spindle at this place with a screw-blade, F, which pushes the clay forward continuously until it reaches a knife or set of knives, G, fixed on the spindle and extending to the inner periphery of the cylinder. In the continuation of the cylinder I provide the spindle with the aforesaid first-named boss prolongation and secondary and free standing knives at the outlet end. The telescopic water-lubricated die at the outlet end of the pug-mill has heretofore usually been made in the form of a stout wooden tube of the size corresponding with the brick or tile to be made, and provided with water-gutters or passages. The fish-scale or telescope-like sheet-iron strips which formed the inner pressing-surface were so nailed to the walls of the tube as to begin from the front end and so to cover the water-passages. But these latter easily become stopped up, and are then difficult to clean out. My improvements relating to this part of my invention are illustrated by Figs. 1, 6, and 7. The sheet-iron strips H, (shown in the longitudinal sectional view, Fig. 1,) and which form the die, are, according to my invention, by means of thin strips united with each other and with an end

flange, H', in such manner as to form an entire telescope-like tube with flange, so that it can be put in and taken out entire, and without need of special means of fastening. The outer tube with the water-passages may be a flange-tube, I, of wood, iron, or other suitable material, as shown in the longitudinal sectional view, Fig. 1, or it may, as shown in the longitudinal section, Fig. 6, and the cross-section Fig. 7, consist only of a sheet-iron tube which causes the water to circulate.

In order to afford the required strength for resisting the interior pressure of the clay against these thin walls, I provide outer strong plates, J, of wood or iron, and which are pressed from without by providing the end flange, K, against which the flange H' of the inner tube rests, with four box-shaped walls, L, within which lie the aforesaid stout plates J. I set up the latter by set-screws L' and wedges L². This construction has also this advantage, that dies of various sizes may be used for the same box, the intermediate parts being formed as required. This outer tube, with its water-passages, is formed as a solid box of soft plastic substance—such as gypsum or cement—which will afterward become hardened.

In order that the coring staples or clamps fastened to the inside of the conical or telescopic dies of this construction, adapted for producing tubular tiles, may not be in the way of removing the die, the end plate of this die is, as shown in longitudinal sectional views, Figs. 1 and 18, and face view, Fig. 19, on its inner side formed with projections having recesses or pegs for the said coring-clamp M to fit in or on, so that the flow of clay holds the clamp firmly in place, but so that the clamp on the removal of the die may be withdrawn at once, and then the conical or telescope tube removed. The die is thus easily taken to pieces and as easily put together.

Modifications may be made in the forms and proportions of nearly or quite all the parts without departing from the principle or sacrificing the advantages of the invention.

I may fix secondary knives or blades on the last shaft or prolongation knife end in the direction of the flow of the clay, and I may fix other knives, F², thereon which are standing quite free. These two kinds of knives F² and F³, which are without bosses, may of course be under an acute, right, or obtuse angle to the spindle, and be tapered off toward the outlet, as shown in Figs. 4, 11, and 12. A good result may be obtained if, instead of a complete ring, F³, one or more part rings or blades are provided, as shown in Figs. 11 and 12. The influence of the knives will thus reach directly to the outlet-opening, and a more perfectly homogenous bar of clay will be forced out. The knives D² on the spindle B on the inside of the cylinder may be formed with shear-edges to act as shears. The former knives may be formed to describe a cylinder or a cone, and in some cases I omit the rolls.

Instead of making each die-ring in four separate pieces forming the four sides of the same, I may, as shown in the longitudinal sectional view, Fig. 15, make the die of a flange, G², with conical telescopic pieces of tube H, one within the other, and by the said flange G² secured in the interior of the wood or other tube, and pressed against the latter by the bar of clay flowing through it; or the die may, as shown in the longitudinal sectional view, Fig. 9, consist only of one short conical flange-tube which terminates just behind the water-passage, so that the outer envelope-tube gives the clay bar its outer form and smooth surface. The outer tube may be made of a loose but firmly compressible substance, such as slag-wool.

Having thus fully described my invention, I claim as new, and desire to secure by Letters Patent—

1. In a brick and tile machine with pug-ging knives or spindle, providing the front or back wall with a disk with concentric annular grooves and projections, the spindle having a disk with correspondingly formed annular projection and grooves, and working against the first-named disk, the disk on the spindle having a broad ring working with one edge against the wall, and capable of being set up and refixed as it wears for the purpose of preventing the entry of the clay between the spindle and the bearing, substantially as shown and described.

2. So forming or extending the one or more bladed shaft-knives F² that one or more blades of the same, by prolongation of the screw-blades in the direction of the screw-thread beyond the shaft, form one or more prolongation pressing-blades, F³, which on the side toward the axis in contradistinction to the other have no connection with a knife-axle, but form free or independent blades, for the purpose of not only allowing the clay which is pushed forward by the prolongation knives themselves to escape toward the axle, but also to allow the flow of clay coming from the rear to pass through between the prolongation knives in and around their axis of revolution, substantially as shown and described.

3. Fastening on the shaft prolongation knives short bars or secondary knives, which again at their free end carry screw-knives F⁷, which are otherwise not connected to the axle or shaft, hence forming so-called "free" knives, so that not all the material on the pressing side of the knives should be pushed forward by the knives, but a part of it should pass back between the knife and the wall, substantially as shown and described.

4. Fastening on the last blades, near the outlet-die, and by means of secondary knives, a cylindrical or conical sheet-iron ring about concentric with the axis, or instead of a com-

plete ring, part rings which describe a circle of about the size of the die-opening, for the purpose of preventing the collection of hard lumps of clay within this circle, and also in order to prevent or diminish the friction of the traveling bar of clay against the surrounding clay or against the walls of the vessel in the space between the last expelling-knives and the die-opening, substantially as shown and described.

5. The combination of one or more of the clay-cutting knives and parts F¹ F² F³ F⁶ F⁷ with each other, and with ordinary clay-cutting knives and parts for the purpose of mixing clay and other substances, rendering them homogeneous and pushing them forward axially, substantially as shown and described.

6. Forming a head-plate with box L L for receiving a telescopic die with outer parts or pieces which are set up against the die by means of screws L' L', substantially as described.

7. Placing between the end of the cylinder of the clay-cutter and the die a box of greater sectional area than that of the cylinder, for the purpose of being able to employ a prolongation free knife which reaches to the outside wall of such box, and pushes the clay there forward in its whole width, for the purpose of, by such enlargement of the cylinder, causing a thorough disturbance of the structure of the clay produced therein, and to be able to fill evenly a die of much larger sectional area, substantially as shown and described.

8. The application, on the shaft of a clay-cutter and against the back wall of same, of a pressing-knife, at one or more blade ends of which a knife is fixed nearly parallel to the axis of the cylinder, which knife in rotation sweeps past the feed-opening for the purpose of cutting the clay coming therefrom in narrow strips and pushing them inward, substantially as shown and described.

9. The application, within the parallel knife described, of one or more basket-knives for the purpose of wiping the clay streaks off the parallel knives, and withdraw them from further rotation, substantially as set forth.

10. Applying clay-cutting knives or screws around the knife within the fixed basket-knives in order to push the clay coming within their reach away from under the feed-opening near the closed cylinder in the direction of the outflow, as described.

In testimony whereof I have hereunto set my hand, at Berlin, this 28th day of December, 1883, in the presence of two subscribing witnesses.

CARL SCHLICKEYSEN.

Witnesses:

CARL GRONERT,
PAUL RÜHUE.