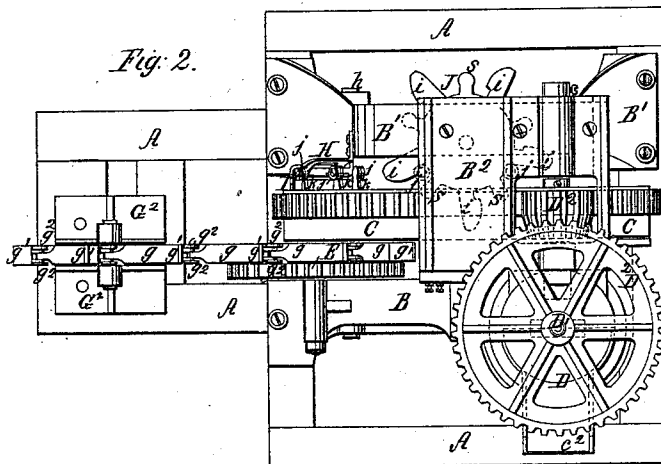
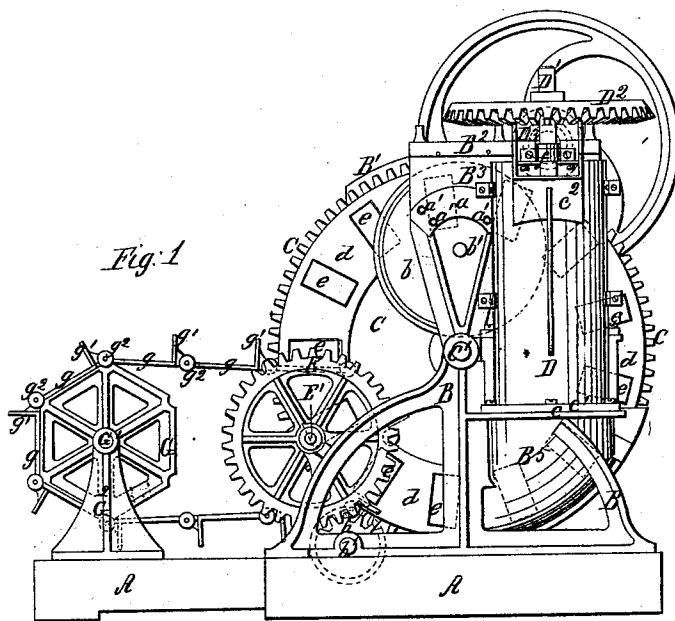


J. C. DEAN.
BRICK MACHINE.

No. 84,863.

Patented Dec. 15, 1868.



Witnesses:

A. J. Campbell
Clerk

Inventor,

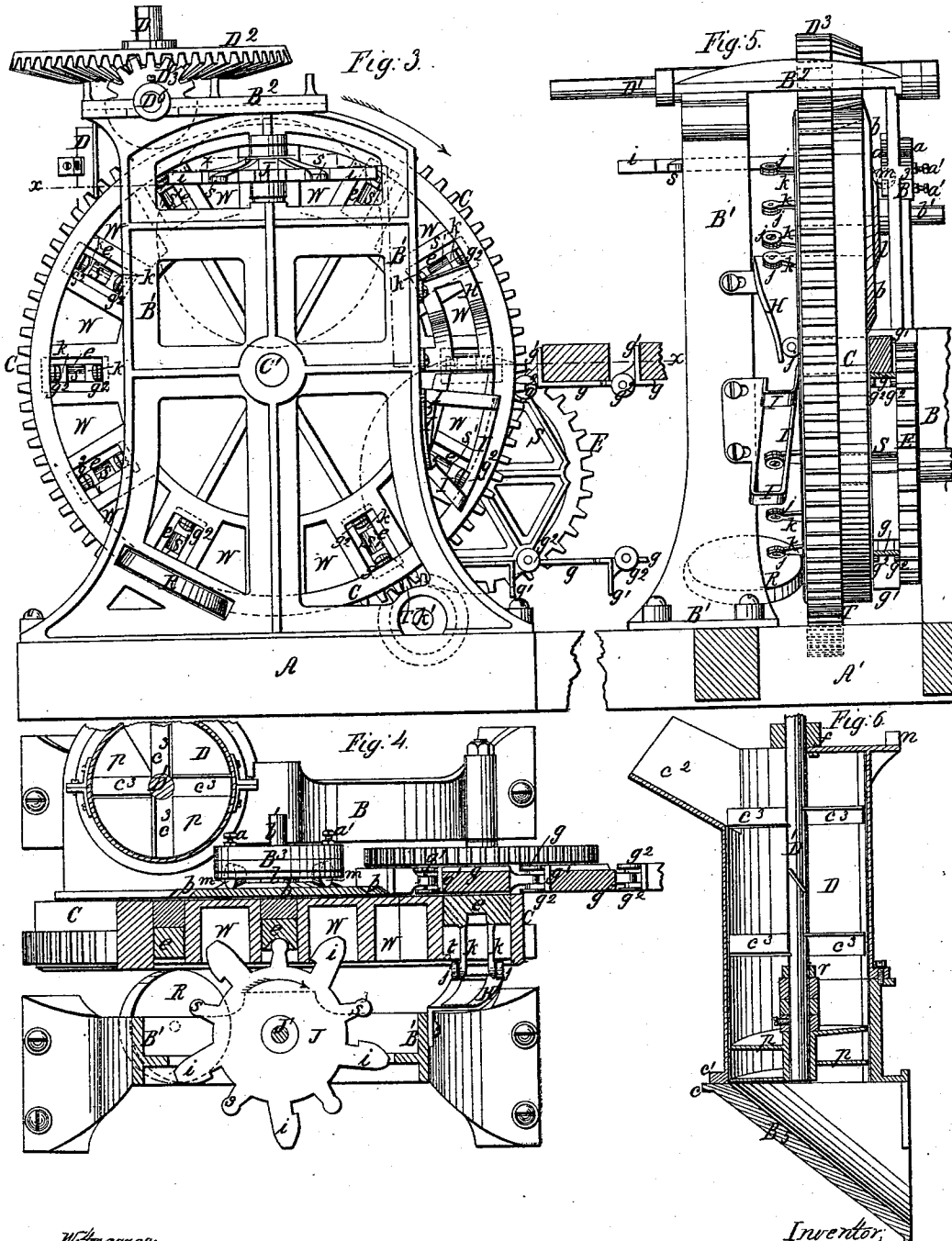
Jas. C. Dean

by
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United States Patent Office.

JAMES C. DEAN, OF CHICAGO, ILLINOIS.

Letters Patent No. 84,863. Dated December 15, 1868.

IMPROVED BRICK-MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES C. DEAN, of Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful Improvements in Brick-Making Machinery; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, sheet 1, is an elevation of the front side of the improved machine for making bricks.

Figure 2, sheet 1, is a top view of the machine.

Figure 3, sheet 2, is an elevation of the rear side of the machine.

Figure 4, sheet 2, is a section through the machine, taken in the planes indicated by the course of the red line $x x$ in fig. 3.

Figure 5, sheet 2, is an elevation of a part of one end of the machine.

Figure 6, sheet 2, is a diametrical section, through the pug-mill, and its mouth-piece, showing the feeding-screw and feathered mixing-blades.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain novel improvements on machinery which is designed for producing pressed bricks, and which consists principally of a revolving moulding-wheel, in which the clay is shaped and compressed, and a mixing and tempering-vessel or pug-mill, which delivers the clay directly into the mould-chambers of said wheel.

The invention and improvements which I have made are designed for removing several serious difficulties and objections attending brick-making machinery, of the above-mentioned class, as hitherto constructed, and to produce a machine, the several parts of which are so constructed, arranged, and adjusted, that while they will all work smoothly, and in harmony with each other, without being subjected to injurious strain and friction, they will also be very accessible, and easily kept in good working order.

The nature of my invention consists in a vertically-mounted and continuously-revolving moulding-wheel or drum, which is provided with laterally-movable followers, a pressure-plate, and certain means for carrying off the bricks as they are extruded from the said wheel or drum by the followers, in conjunction with a mixing and tempering-vessel, or pug-mill, which will force the clay into the mould-cells as they successively pass around, and supply these cells with the necessary amount of clay to produce the bricks, as will be hereinafter described.

The invention, also consists in combining with a vertically-arranged moulding-wheel or drum, an endless chain of carriers, for receiving the bricks as they are successively extruded from the vertical face of said wheel, and conducting them out of the way; said carriers consisting of rectangular tables, which will support two sides of each brick during the act of taking

the bricks from the mould-wheel, thereby preventing the bricks from being defaced or otherwise injured, as will be hereinafter described.

The invention also consists in a circular pressure-plate, which is so applied to the face of a revolving moulding-wheel as to rotate freely by the action of said wheel upon it, and serve as a means for resisting the pressure applied to the clay in the moulds, at the same time operating to smooth and finish the exposed faces of the bricks, and also acting as a scraper or clearer for removing any surplus clay which might adhere to the face of said moulding-wheel, as will be hereinafter described.

The invention also consists in effecting the required pressure upon the clay, while it is confined within the mould-cells of a revolving moulding-wheel, by means of a toothed disk, which is rotated by the action of said moulding wheel upon some of its teeth, while the intermediate teeth operate as plungers upon the followers in the mould-cells, and move them a greater or less distance toward a pressure-plate, according to the quantity of clay it is desired to press into a given space, as will be hereinafter described.

It also consists in the employment of adjustable cam-ways or inclined planes, in conjunction with a vertically-arranged and continuously-revolving moulding-wheel, for the purpose of effecting the expulsion of the bricks from one side of said wheels at the proper times, and also for retracting the followers after such expulsion, so as to leave the mould-cells open to receive fresh charges of clay from the pug-mill, as will be hereinafter described.

Furthermore, my invention consists in providing for communicating motion to the device for pressing and condensing the clay while in the moulds, and also to the device for carrying off the bricks from a vertically-arranged moulding-wheel, having its mould-cells made in one of its vertical sides, thereby effecting said operations in a positive manner, by a very simple means, as will be hereinafter described.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings—

A A represent sill-timbers, which are secured together in a strong and substantial manner, so as to form a solid foundation for supporting the brick-making machinery which I am about to describe.

B B' represent two upright side frames, which are securely bolted down to the sills A, and arranged at proper distances apart to receive between them the moulding-wheel C.

These frames B B' are constructed with suitable bearings, for receiving the journals of the horizontal shaft C of said wheel, and, if desirable, said bearings may be made in the form of removable journal-boxes, so that should it be found necessary to provide new bearings, after running the machine for a considera-

ble time, this can be readily done by substituting new boxes or bushing for the old.

Said frames B B' are also provided with a flanged head-plate, B², which will serve as a means for sustaining them against lateral thrust during the operation of the machine, as will be further explained hereinafter.

The moulding-wheel C is arranged to rotate in a vertical plane, and it is constructed with a suitable number of oblong rectangular cells or chambers, in which the clay is properly pressed into the required shape of bricks. These cells are made through the wheel C, at right angles to its vertical face *d*, and at regular intervals apart, in lines radiating from the axis of this wheel, as shown in figs. 1 and 3.

Each one of said cells is provided with a nicely-fitting follower or pressing-head, *e*, which is constructed with a central concave recess, *s*, in the middle of its back, and also with two arms, *k k*, carrying, on their rear extremities, anti-friction wheels *j j*, shown clearly in figs. 3 and 4.

The followers *e* are allowed to slide freely toward and from the front face *d* of the wheel C, and they are prevented from being forced backward out of their places by means of the shoulder-abutments *t*, formed upon said wheel, as shown in figs. 3 and 4.

The scope of movement of the followers may be regulated by applying set-screws in them, in such manner that, by adjusting these screws, more or less clay may be forced into the mould-cells, in front of the followers, according to the density required of the bricks.

Between the mould-cells are recesses, W W, which are made in the back of the wheel C, but which do not extend through it. These recesses are designed to receive teeth *i i*, which are formed at regular intervals apart upon the circumference of a horizontal disk, J, which disk is applied to a vertical shaft, J', having its bearings in the upper part of frame B¹, as shown in figs. 3 and 4.

Between the said teeth *i*, round-headed teeth *s s* are formed upon the disk J, which are designed to enter the recesses *s* made centrally in the backs of the followers *e*, and to operate as plungers for forcibly compressing the clay in the mould-cells, as the filled cells successively pass a vertical plane intersecting the axes of the shaft J and wheel C.

The teeth *i* and plungers *s*, upon the disk J, are spaced, relatively to the recesses W W and followers *e*, of wheel C, that, as this wheel revolves in the direction indicated by the arrows in figs. 1 and 3, it will engage with and act upon the teeth *i*, so as to cause the plungers *s* to fall into the recesses *s* in the followers, and move these followers toward the face *d* of the mould-wheel, thereby effecting the required pressure upon the clay, and determining the shape of the bricks.

It will be seen that the wheel C and disk J rotate in the same direction, and that the round-headed plungers *s* are successively brought against the followers *e*, so as to operate centrally thereupon, from the commencement to the termination of each operation of pressing; consequently the followers will not be tilted or caused to bind in their boxes or cells, nor will there be any material amount of friction caused during said operation.

After passing a vertical plane, intersecting the axes of the wheel C and toothed disk J, the pressure will cease, and the end of each plunger *s* will instantly recede from its respective follower.

The vertical shaft of the toothed disk J may have its bearings in laterally-adjustable boxes, for the purpose of adjusting this disk to operate with correctness, and to compensate for any wearing of the parts.

During the operation of pressing the clay, as above

by means of a circular disk, *b*, with a bevelled knife-edge, which disk is keyed upon the extreme end of a short shaft, *b'*, that passes through a strong standard, B³, shown in figs. 1, 4, and 5.

The disk *b* serves as a cover or pressure-plate, for resisting the pressure against the clay, and to this end it is held firmly against the flat face *d*, of the mould-wheel C, by the standard B³, and allowed to turn about its axis by the application of anti-friction rollers *m m* to it, as shown in fig. 4.

In order to allow the rollers to turn freely, they are made of the form of frusta of cones, and roll against an annular-bevelled ridge, *l*, upon said pressure-plate.

To compensate for wear, the journals of the rollers *m m* may be applied to sliding boxes, which can be adjusted by means of set-screws *a a*, which are tapped through the standard B³, and provided with jam-nuts to prevent their working loose.

The pressure-plate *b* is bevelled circumferentially, for the purpose of forming a knife-edge, which will operate to scrape off and clear the face *d*, of the wheel C, of any clay which adheres to it.

The face *d*, of the wheel C, being much narrower than the diameter of the pressure-plate *b*, and being caused to bear upon this pressure-plate, above the axis thereof, it will be seen that the friction of the clay and the surface *d* will cause said pressure-plate to rotate in the direction of the rotation of the said wheel C, thereby avoiding considerable friction, and causing the pressure-plate to smooth the exposed surfaces of the clay in the moulds while passing this plate.

The standard B³ is supported upon the shaft C', of the moulding-wheel, between this wheel and the bearing-frame B, and it is sustained against lateral thrust by the flanged cap B² and frame B¹, as shown in fig. 5.

The moulding-wheel C is constructed with cogs around its circumference, which engage with a pinion spur-wheel, D², upon the main driving-shaft D¹. This shaft, D¹, thus communicates a continuous rotary motion to the said moulding-wheel.

Shaft D¹ has its bearing in the cap or tie-plate B³, and extends transversely across this plate. It is thus arranged for the purpose of communicating motion to a vertical shaft, D¹, which carries the mixing and feeding-devices of the pug-mill, as shown in figs. 4 and 6.

On the upper end of shaft D¹ a bevelled spur-wheel, D², is keyed, so as to engage with bevelled teeth upon one end of the pinion D³, thus employing only one pinion to drive the pug-mill and the moulding-wheel.

The pug-mill case consists of a vertical cylinder, D, which is provided with a hopper, *c*, and an inclined discharging-throat, B², through which latter the clay is forced into the mould-cells, as these cells successively pass by said throat.

The case D is centrally divided, so that one-half of it can be removed very readily, if occasion requires, and a portion of this case, with the throat B², may be cast solid with the bearing-frame B, so as to afford great strength and durability.

The discharge-opening of the mouth-piece B³ is nicely dressed and fitted against the raised face *d* of the moulding-wheel C, so as to prevent, as far as possible, the escape of any clay.

To prevent injury to the machine, and particularly to the edges surrounding the mould-cells, from stones and other hard substances which are often found mixed with the clay, I shall introduce a roller into the mouth-piece B³, which roller will be arranged so as to force out of the way any hard substance which might become lodged in the way of a mould-cell while in the act of leaving the said mouth-piece.

The shaft D¹ is suitably supported, in the centre of the cylindrical case D, by means of bearings *f* and *r*, and from this shaft feathered blades, *c*, radiate.

To the lower end of the shaft D¹ a screw-shaped

downward into the throat B^c after the clay has been properly mixed and tempered by the blades c^1 .

I do not confine myself to any particular form or construction of mixers and feeders, as various forms may be employed, which will thoroughly alternate and mix the clay before it enters the mould-cells in the wheel C.

The upper end of the pug-mill case has a bracket projecting from it, upon which lugs, n , are formed for receiving over them one of the flanged edges of the cap or tie-plate B^2 , thus making this plate serve also to assist in steadying the pug-mill case.

By reference to figs. 3, 4, and 5, it will be seen that I arrange an anti-friction roller, R, on the opposite side of the wheel C to the pug-mill, and directly opposite the mouth of this pug-mill. This wheel is supported in bearings in frame B^1 , and designed to roll in contact with the back face of wheel C, for the purpose of resisting the lateral strain upon this wheel C, caused by the pressure against it of the clay which is in the mouth of the pug-mill.

The impinging-surfaces of wheel R and wheel C are suitably bevelled, to prevent the former wheel from dragging.

When the clay has been fed into the mould-cells in wheel C, and properly pressed by the devices above described, the bricks thus produced are successively discharged from their respective cells, and delivered upon an endless carrier, which latter conducts them off a proper distance, to be removed by hand.

The expulsion of the bricks is effected by means of the curved two-way inclined plane H, which is secured to the frame B in proper position to expel the bricks at proper times. This inclined plane H may be applied to the frame B^1 so that it can be readily adjusted and set in any desired position. Its office is to receive against it the rollers j, j , on the arms k, k , of each follower, and force the followers forward until its front face is flush with the surface d of the wheel C, thus expelling the bricks.

Below the inclined ways H is another two-way inclined plane, I, which is constructed with two inclined ways, so arranged as to take the rollers j, j , after the expulsion of each brick, and retract each follower, as it descends, on its way back to the pug-mill to receive another charge of clay. This leaves the mould-cells open to receive the clay from the mill, and obviates an objection to the forcing of the followers back by the clay in the act of filling the mould-cells.

As the arms k, k of each follower, e , are applied to it, equidistant from the middle of its length, it will be seen that by a proper adjustment of the double-way inclined planes H I, they will act squarely upon each follower, and prevent it from tilting and binding against the walls of its cell.

The cogs upon the periphery of the moulding-wheel engage with a pinion-wheel, T, which is upon a horizontal transverse shaft, h' , which shaft has its bearings in both of the side frames B, B^1 . This shaft also carries a pinion spur-wheel, h , which engages with a spur-wheel, E, upon a short shaft, E' , which has its bearings upon frame B, shown in figs. 1, 2, and 4.

The wheel E has an hexagonal drum, S, secured concentrically to its face nearest the wheel C, around which drum an endless chain of carrying-tables are passed, which also pass around a similarly-shaped drum, G, which is located at any desired distance from the mould-wheel C.

This latter drum, G, is supported so as to turn with drum S, by means of a shaft having its bearings in the upper ends of standards G^2 , as shown in figs. 1 and 2.

The tables consist of horizontal plates, g , with their rear ends, g' , turned up at right angles to them. These tables are suitably linked together, and at their connected joints they are furnished with anti-friction rollers, g , which are received by recesses formed in the

angles of the drums S and G, as the tables pass around with these drums.

The drum S is so arranged, with relation to the position of each brick at the moment of its discharge from its cell, that the bricks are taken hold of by the right-angular surfaces, g, g' , of the tables, and while supported in this manner by their ends and edges, they are moved away from the moulding-wheel, to allow of the free discharge of the bricks.

The size of the hexagonal drums, the size of the tables, and the speed of these parts should be so nicely adjusted (which can be readily done by the arrangement described, and by driving direct from the moulding-wheel) that the tables will successively arrive at the proper point to receive the bricks at the moment the bricks are fully extruded from their cells, so that it will not be necessary to stop the movement of the moulding-drum or the carrying-off tables to effect said object.

In practically carrying out my invention, I shall provide means for keeping the face, d , of the moulding-wheel, and the exposed front faces of the followers, freely oiled, which may be done by applying a roller, covered with some absorbent substance, to the face of the mould-wheel below the shaft of this wheel. This will prevent the clay from adhering to the parts so lubricated, and greatly reduce the friction of said parts.

And should it be found desirable to employ means auxiliary to those above described for compelling the clay in the discharging-mouth of the pug-mill to enter the moulding-cells, this may be done by introducing another screw or feeder into said mouth, which might readily be operated by means of the bevel-spur wheel upon the pug-mill shaft, acting through the medium of spur-wheels and shafts suitably arranged.

When referring to the revolving plungers s , I do not confine myself to a vertical mould-wheel, as these plungers will operate successfully when applied to well-known horizontal mould-wheels properly chambered to receive the propelling-teeth of said plungers; but in all other respects I do confine my invention to a brick-machine which consists of a vertical mould-wheel, a vertical pug-mill, with a lateral branch, and of a vertical pressure-plate, all constructed and operating essentially as herein described.

By using a vertical pug-mill, in an arrangement such as described, the advantages of a vertical mould-wheel are secured, and at the same time the gravity of the clay is made available for aiding in filling the moulds. This is not so in a combination which employs a horizontal pug-mill and vertical mould-wheel.

Again, by having the pug-mill vertical, the mixer-shaft can be driven by the interposition of a single wheel between the spur-teeth on the mould-drum and the bevel or crown-wheel of the mixer-shaft, and thus the machine greatly simplified; and by using spur-teeth on the circumference of the vertical mould-wheel, the endless brick-carrier table can be driven by the interposition of a single wheel, or two narrow wheels, between said spur-teeth and a spur-wheel on the head-shaft of the carrier-table.

Again, by arranging the pressure-plate b directly over the axle of the mould-wheel, the plunger s can be located at the top of the frame, at a point where the frame is made strong, in order to sustain the strain. And in this connection I will state that by this arrangement the mould-wheel can be stayed by a wheel, R, in such a manner that whatever pressure is brought to bear by the plungers s upon the upper part of the mould-wheel is sustained by said wheel, and thus the mould-wheel is kept in a true vertical position—a very important thing in the operation of moulding bricks, which require to have the pressure applied squarely and centrally upon them when in the mould-cells.

The arrangement and construction of the endless chain of angular tables are such that the horizontal part of each table passes under the brick while it is being forced out of its cell, and at the moment the brick is fully cut of its cell the vertical part of the table takes hold of the end of the brick and frees the brick from its sticking contact with the follower. As the contact is being destroyed, the bottom of the brick is supported by the base-portion of the tables.

Having described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a vertical pug-mill, having a lateral branch, a moulding-wheel revolving in a vertical plane and having horizontal mould-cells, and a pressure-plate, *b*, constructed, operated, and arranged substantially as and for the purpose described.

2. The revolving pressure-plate *b*, applied above the axis of the mould-wheel, which revolves in a vertical plane, in combination with a stop, *R*, arranged below said axis of the mould-wheel, and with a rotary plunger, *J* *s*, a mould-wheel and followers, substantially in the manner and for the purpose described.

3. The combination of the rotary pressure-plate *b*, rollers *m m*, and the mould-wheel, substantially as and for the purpose described.

4. The arrangement of an endless chain of right-angled tables *g g'*, which are open at both sides and at one end, so as to pass under bricks as they are extruded laterally from the mould-cells, and also support them while they are being separated from the followers by the vertical portions of the tables, in combination with a vertically-revolving mould-wheel, substantially in the manner and for the purpose described.

5. A toothed disk or wheel, *J*, or its equivalent, for acting upon the followers and producing the pressure upon the clay, in combination with a moulding-wheel or drum, substantially as and for the purposes described.

6. Constructing the moulding-wheel with recesses, *w*, for receiving the propelling-teeth of a disk, *J*, between which teeth are plungers, *s*, for producing the pressure upon the clay, while in the mould-cells, substantially as described.

7. The rotary pressing-plunger or plungers *s*, substantially as and for the purpose described.

8. The combination of a rotary disk, or shaft, or hub, *J*, with a plunger or plungers, *s*, attached to it, and a revolving plate, *b*, and a mould-wheel and followers, substantially as and for the purpose described.

9. The combination of the vertical pug-mill, vertically-revolving mould-wheel, with its followers, vertical pressure-plate, and the chain of angular carrying-off tables, constructed, arranged, and operated substantially as described.

10. The double cams or inclined ways *H I*, applied to frame *B'*, and adapted to serve the purposes described, in combination with followers and the vertically-arranged revolving mould-wheel *C*, substantially as described.

11. The construction of the frame, with the portion *B'*, of such a form that it constitutes a lateral branch of the pug-mill, such lateral branch being cast with and on the side of the frame, substantially in the manner shown and described.

12. The construction of the frame so as to admit of the arrangement of the several parts of the press or moulding and pressing-contrivances upon it, in the manner shown and described, such frame having the tying-cap and bearing-plate *B'* applied to its part *B'* and to its part *B'*, all substantially as and for the purpose set forth.

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Witnesses:

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