(No Model.)

3 Sheets—Sheet 1.

J. A. THOMPSON.

BRICK MACHINE.

No. 564,263. Patented July 21, 1896.

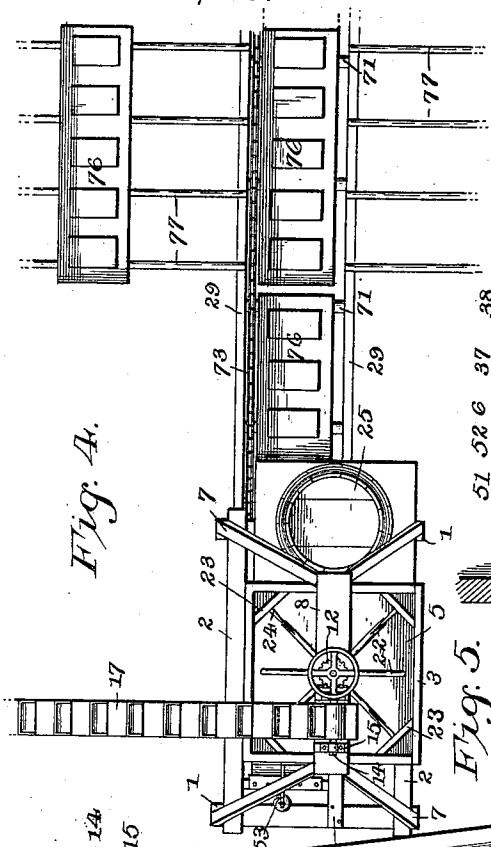


Fig. 4.

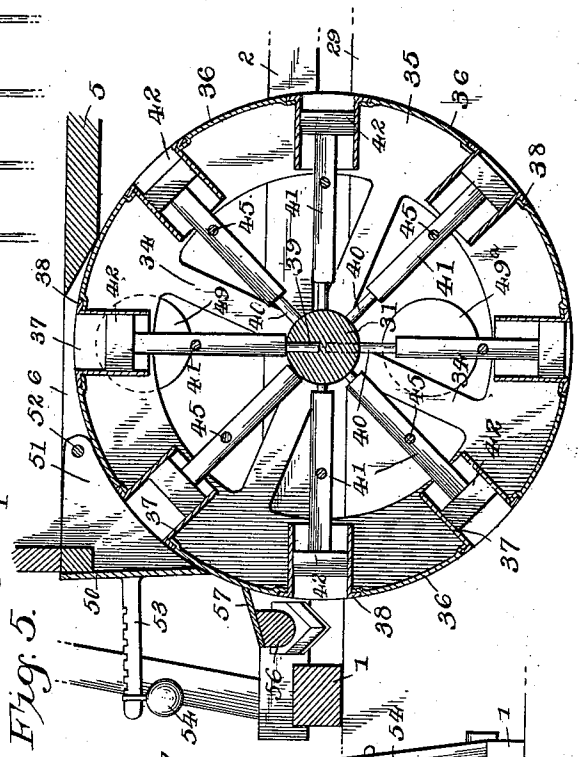


Fig. 5.

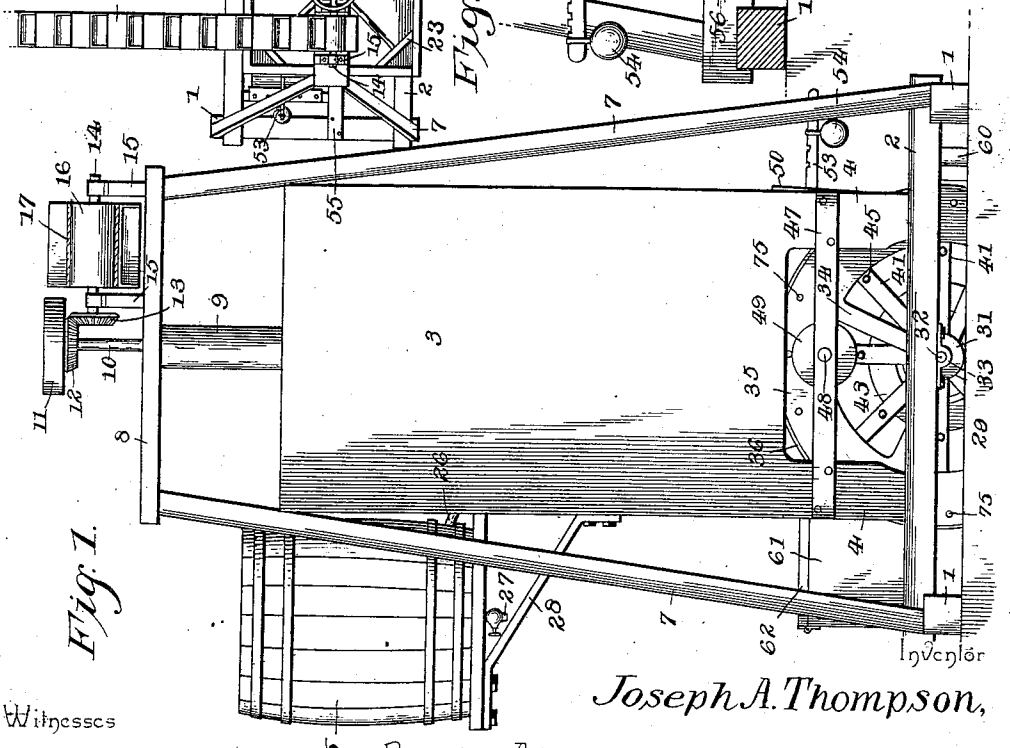


Fig. 7.

Witnesses

Chas. A. Ford.

[illegible]

Inventor

Joseph A. Thompson,

By his Attorneys.

C. A. Snow & Co.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 3 Sheets—Sheet 2.

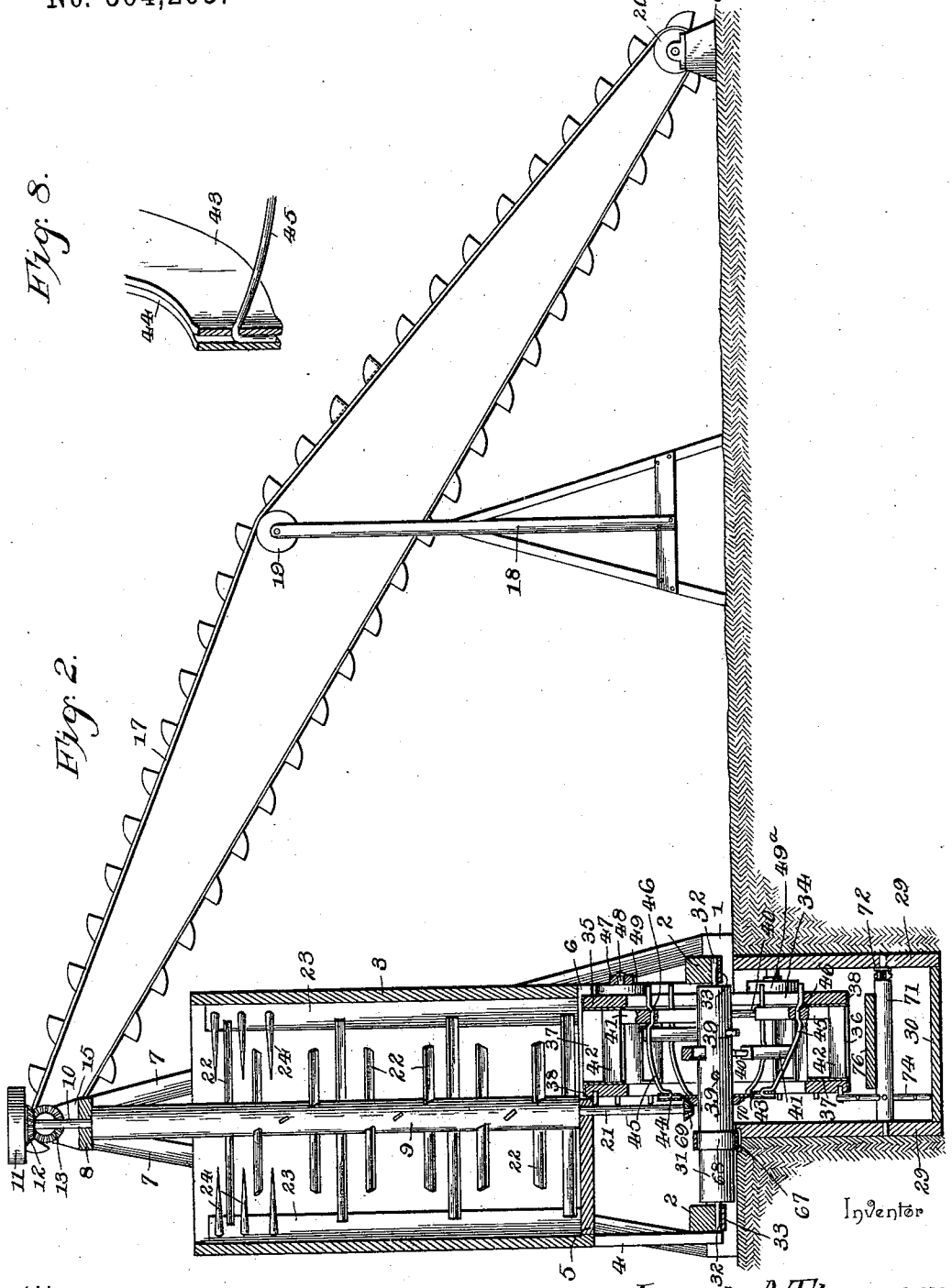
J. A. THOMPSON.

BRICK MACHINE.

No. 564,263. Patented July 21, 1896.

Fig. 8.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 6.

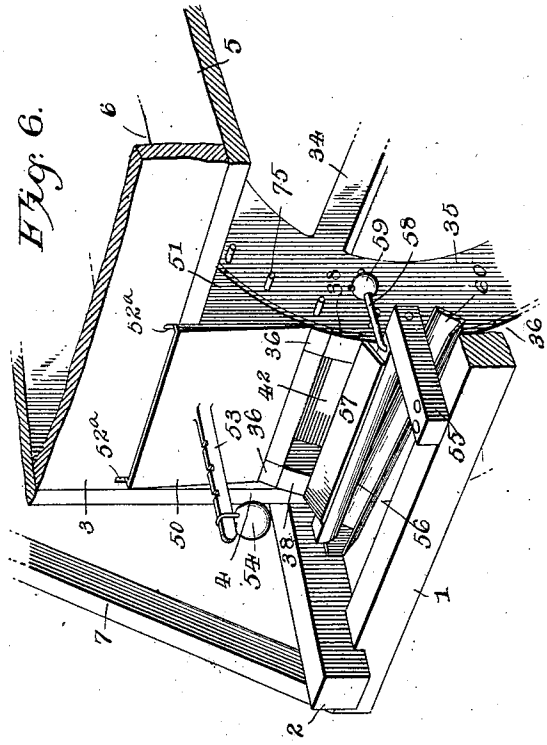


Fig. 7.

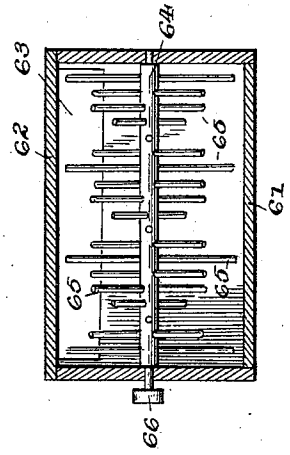
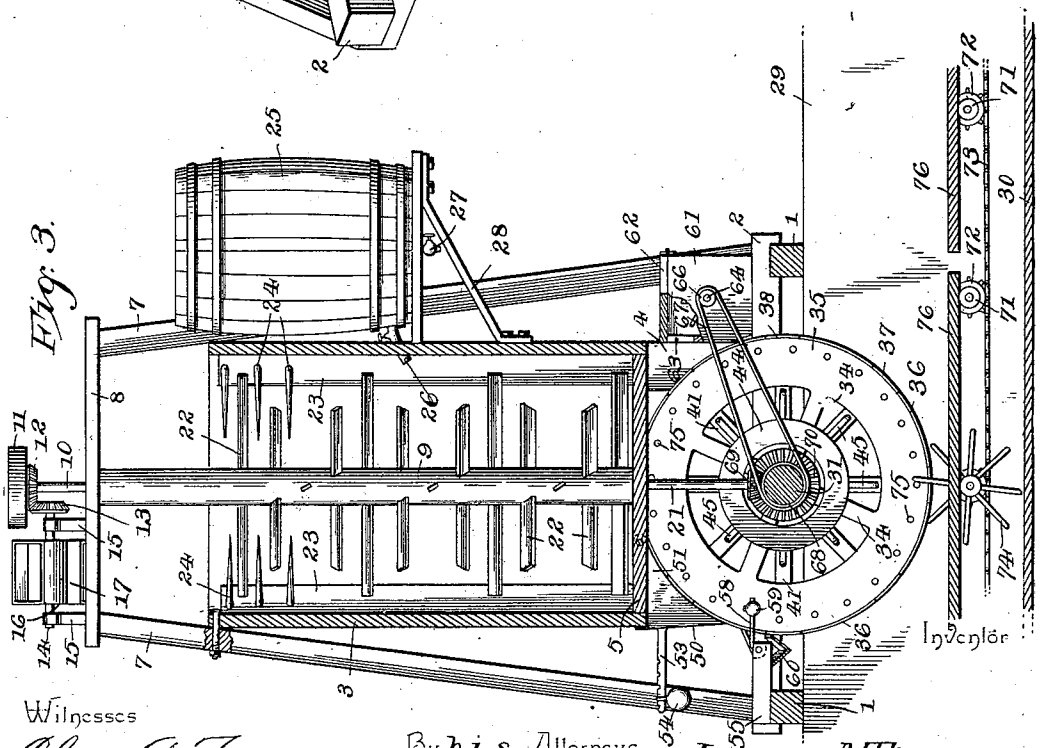


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH A. THOMPSON, OF ROCKMART, GEORGIA.

BRICK-MACHINE.

SPECIFICATION forming part of Letters Patent No. 564,263, dated July 21, 1896.

Application filed January 31, 1895. Serial No. 536,851. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. THOMPSON, a citizen of the United States, residing at Rockmart, in the county of Polk and State of Georgia, have invented a new and useful Brick-Machine, of which the following is a specification.

This invention relates to a brick-machine of that class wherein a revolving mold-wheel is the essential feature, said wheel being provided with peripheral mold-cavities in which the clay is pressed, and whereby the brick is formed. It is essential to these mold-wheels that means be provided whereby to expel the bricks, and the preferred type of expelling mechanism consists of a series of radially-movable plungers capable of stroking through the respective mold-cavities, and thereby expelling the brick.

My invention has these general features, and its principal object is to improve the construction of the mold-wheel, so as to make it capable of effectually forming the bricks and more regularly and uniformly expelling them.

A second object is to combine with the mold-wheel, or, in other words, to embody in the machine a mixing device, so that the clay may be mixed and transmitted directly to the mold-wheel. I contemplate an improved structure in the mixing apparatus by which the efficacy thereof is increased.

A further object is to provide means by which the delivery of the formed bricks will be more complete and efficient, and whereby they may be deposited upon suitable planks or plates and carried to the place of drying without being removed, so that it will be possible to form and dry the bricks without necessitating the handling of them, except indirectly through the medium of the planks or plates aforesaid. Finally, I contemplate improving the general structure and subordinate features of the machine, so as to increase its general efficiency, and so as to make it more desirable from a commercial standpoint.

With these objects in view my invention lies in certain peculiar features of construction and combinations of parts whereby I am enabled to fully attain the objects of my invention, as stated above.

In the drawings, Figure 1 represents a side elevation of a brick-machine in which the essentialities of my invention are embodied; Fig. 2, a transverse and vertical section thereof; Fig. 3, a longitudinal and vertical section thereof; Fig. 4, a plan view; Fig. 5, a vertical section taken through the mold-wheel and extending to the parts in horizontal alinement therewith; Fig. 6, a detail perspective of the devices for pressing the clay into the wheel and for scraping the periphery thereof, so as to rid it of superfluous clay; Fig. 7, a detail section taken longitudinally through the device for distributing sand throughout the periphery of the mold-wheel; Fig. 8, a sectional perspective view of a detail.

The frame of my machine comprises the transverse end base-beams 1, to the upper ends of which the longitudinal side base-beams 2 are mortised. These beams 1 and 2 are adapted to lie upon the surface of the ground and have the mixing-chamber 3 mounted upon them and extending vertically therefrom. This chamber is approximately square in cross-section, and has rigidly secured to each of its corners a leg 4, which extends downwardly to the side beams 2, and to which beams the said legs are rigidly secured. The upper end of the chamber 3 is left open, while the bottom is closed by a floor 5, said floor having formed therein an opening 6, which occupies a large portion thereof and which is provided for the exit of the clay, as will be better described hereinafter.

7 indicates four braces or guide-beams, which are rigidly secured one to each corner of the rectangular figure described by the beams 1 and 2, and which extend upwardly and inwardly to a point above the upper end of the mixing-chamber 3, where they are rigidly secured to the longitudinal cross-beam 8. The braces 7 engage the sides of the mixing-chamber at their upper extremities and are rigidly secured thereto at such points of engagement. By such a construction a twofold purpose is attained, namely, the mixing-chamber is braced and made rigid and the cross-beam 8 is supported firmly in place. The cross-beam 8 has for its purpose, principally, to furnish a bearing for the upper end of the mixing-shaft, though it collaterally aids in lending strength to the braces or guides 7, as will be obvious. The mixing-shaft is desig-

nated by the numeral 9, and is provided at its upper end with a reduced spindle 10, which is passed through a vertically-extending opening formed midway the beam 8, and whereby the mixing-shaft has the bearing referred to hereinbefore.

The spindle 10 projects above the cross-beam 8, and is there provided with a drive-pulley 11, which is adapted for primarily receiving the power which gives motion to the machine. This pulley is not necessarily of the form here shown and may be substituted by other suitable means, which substitution will perhaps prove necessary in the practical operation of my invention. It will be understood, however, that this is a matter of mere mechanical skill.

Fixed to the spindle 10, at a point below the pulley 11, is the beveled gear 12, which meshes with a similar gear 13, fixed to the inner end of the shaft 14. The shaft 14 is, in turn, rotatably mounted in the boxes 15, fixed to the cross-beam 8. The other end of the shaft 14 is provided with a pulley 16, over which the carrier 17 operates. This pulley 16 and the carrier operating therewith may be of any suitable construction, it being essential that the same be capable of elevating the unmixed clay to the upper end of the mixing-chamber and of dumping the same thereinto. To this end the standard-like frame 18 is provided and mounted upon the ground, so as to project upwardly, it being provided at its upper end with an idler-pulley 19, whereby the proper tension in the carrier is maintained, while the lower end of the carrier operates over a pulley 20, having bearings in suitable boxes mounted directly upon the ground.

The shaft 9 is very much increased in thickness and has at its lower end a reduced portion or spindle 21, very similar to the spindle 10 and projecting through an opening in the floor 6 of the mixing-chamber, said opening forming a bearing for the shaft proper, while the spindle 21 projects below the opening and operates at said point, as will be described in the logical order of this specification. Fixed to the shaft 9, at points throughout that portion of its length which is within the mixing-chamber, are the mixing-blades 22, which are of no fixed number, and which are arranged spirally on the shaft, and with a diagonal edgewise disposition, so that they will exert upon the clay an influence similar to the influence exerted by the well-known propeller and kindred mechanical appliances. These blades gradually increase in width as they extend downwardly, so that the blades at the upper portion of the shaft 9 will be the narrowest, while the blades at the lower portion are the widest. The before-described disposition of the blades 22 and the rotary character of the the shaft 9 is such as will make the apparatus capable of exerting a compound influence on the clay. That is, the clay will be thoroughly pulverized, and at the same time will be forced downwardly and packed in the lower portion of the mixing-chamber.

Fixed within the mixing-chamber, and arranged one in each corner thereof, are the plates 23, which are four in number and which have their edges beveled, so as to be capable of fitting within the respective corners of the mixing-chamber and of destroying the abruptly-angular character of the mixing-chamber; or, in other words, of preventing the clay from becoming fixed within the corners of the mixing-chamber, which is a disadvantage thoroughly appreciated. These plates 22 extend from the lower end of the mixing-chamber upwardly to a point very near the upper end thereof.

Fixed to the upper portions of the plates 23 are the rigid and inwardly-projecting pins 24, which are preferably three for each plate, making a total of twelve, and which are adapted to coöperate with the blades 22 and assist in the operation of completely pulverizing the clods of clay, all of which is essential to the effective operation of a brick-machine.

25 indicates a water barrel or tank, which may be of any construction or capacity consistent with reason, and which has, at its lower portion, an outlet-pipe 26, extending downwardly and thence inwardly through an opening in the side of the mixing-chamber. 27 indicates a second outlet-pipe, which is arranged to direct its stream downwardly and which is provided with a faucet whereby it is commanded. The water barrel or tank is supported by means of the bracket-braces 28, which project outwardly and upwardly from the lower portion of the mixing-chamber, and which support a platform or equivalent structure upon which the barrel is seated.

Rigidly secured to the transverse end base-beams 1, and extending longitudinally with the machine and parallel with each other, are the walls 29, which are two in number and which project downwardly and perpendicularly from the beams 1 into a ditch formed in the ground, they being provided at their lower sides with a bottom 30. These walls 29 and their bottom 30 are provided to prevent the caving in of the sides of the ditch and to make the same uniform and durable. The ditch extends beyond the walls 29; but, if so desired, these walls may be made to project the whole length of the ditch. The ditch will be further described hereinafter in connection with other parts of my invention.

31 indicates the shaft or axis of the mold-wheel, and this, like the shaft 9, comprises an enlarged main portion having at its ends the reduced spindle-like portions 32. These latter portions 32 extend transversely, as the shaft proper, and below the longitudinal base-beams 2, to which they are rotatably connected by means of boxes 33, fixed to the under sides of the beams. The mold-wheel comprises in its construction the spokes 34, which are of a massive form, and which are

arranged in two sets, each set being circumferentially alined and arranged parallel with each other, their outer ends being respectively connected to the rims 35. The rims 35 are one for each set of spokes 34. The rims 35 have rigidly riveted or otherwise secured to their peripheries the heavy metallic plates 36, which are arranged equidistant from each other, and so as to leave spaces between them, which are also of equal size. These spaces form the mold-cavities or molds proper hereinbefore referred to, and are provided with the plates 37, which are also formed of heavy sheet metal, and which have their outer edges formed with flanges 38, which extend laterally and which are riveted or otherwise secured to the rims 35 and to the metallic plates 36, according to the location of the plates 37.

From the outer ends of the plates 37 the same extend radially and inwardly, and are rigidly secured to the inner sides of the rims 35 and to their contiguous edges, so as to form radially-extending chambers, open at each end, and these chambers compose the mold-cavities of my invention. Formed in the shaft 31, and disposed radially, are the sockets 39, which are arranged at different points throughout the length of the shaft, and which have located therein the rods 40, said rods being arranged to be capable of free longitudinal movement in their places. The outer ends of the rods 40 project beyond the shaft 31, and each outer end is provided with a plunger-bar 41, thus making the aggregate number of plunger-bars eight, such being the aggregate number of the mold-cavities, and it is into these cavities that the outer ends of the plunger-bars 41 respectively project, so as to be capable of reciprocating therein. Fixed to the outer ends of the plunger-bars 41, and one for each bar, are the plates 42, which are made to be capable of movement in the mold-cavities, but to snugly engage the sides thereof, and this engagement is necessarily snug enough to prevent the passage of the plastic clay, even when under the highest pressure to which it is subjected during the operation of my machine.

Rigidly secured to one side of the mold-wheel, and concentric with the periphery thereof, is the band of metal 43, which has lying flush against its outer side a second band similar to it in form and designated by the numeral 44.

45 indicates eight connecting-rods, which are arranged within the space inclosed by the mold-wheel, and which extend parallel with the shaft 31, their outer ends being bent transversely and passed through openings in the band 43, the bent ends being arranged between the bands 43 and 44. The rods have at their middles the bends 46, which pass through openings in the respective bars 41, whereby the rods and bars are connected to each other. Thus it will be seen that the bars 41 are held at a normal position, which will place the plates 42 a distance below the outer ends of the mold-cavities, which will make the outer portions of the same capable of receiving an amount of plastic clay sufficient to form the bricks, or, in other words, will make the outer portions of the molds of a size equal to that of the bricks.

47 indicates a bar or beam which is rigidly secured to the legs 4 at one side of the machine, and which extends longitudinally and horizontally. Fixed to this beam 47, and at the middle thereof, is a stub-shaft 48, which projects inwardly from the beam and is rigidly secured in place. Rotatably mounted upon the stub-shaft 48 is an upper wheel 49, which is arranged with its periphery at its lower side projected downwardly to a point within the path of the free ends of the connecting-rods 45, so that as the mold-wheel revolves these free ends will be successively engaged with the wheel 49 and operate as a cam and push them inwardly toward the axis of the mold-wheel. This operation will cause the plunger-bar 41, with which that rod 45 which engages wheel 49 is connected, to be reciprocated. Thus the plunger-bar at the upper side of the mold-wheel is moved downwardly, which enlarges the mold-cavity with which said bar operates, and permits it to receive a quantity of clay, whereby the brick is formed. As the wheel continues its revolution the rod 45 will be disengaged from wheel 49, thus causing the plate 42 of the plunger-bar referred to to move outwardly in the mold-cavity, so as to decrease the size of the same, which will compress the clay as is necessary to the forming of the brick and as will be more fully described hereinafter.

Simultaneously with this operation the lower plunger-bar 41 will be reciprocated downwardly by a lower wheel 49^a, so that the plate 42 will move to the very extremity of the mold-cavity in which it operates. This operation will result in the delivery of the brick in its completed state. Means are provided for receiving the said completed brick and for carrying it away, all of which will be described hereinafter. The lower cam-wheel 49^a, which causes the mold-cavities to have their contents discharged, is mounted on a suitable stub shaft or journal.

The opening 6 in the floor 5 of the mixing-chamber extends to one side of the same, and is provided at said side with a plate 50. This plate is formed of sheet metal, and comprises a main portion of a width equal to the width of the mold-wheel and having a vertical extent which will make it capable of inclosing the space between the bottom of the mixing-chamber and that point on the periphery of mold-wheel which is directly below the outer end of the opening 6. The ends of the main portion of the plates 50 have formed integral therewith the reduced portions or arms 51. These arms 51 are triangular in shape, whereby they are made capable of occupying and of closing the space which is left between the

main portion of the plate 50 and the periphery of the mold-wheel inward from said plate. Thus it will be seen that the plate 50 and its reduced portions or arms 51 form the sides of a downwardly-extending subchamber, which has for its bottom the adjacent periphery of the mold-wheel, and which has an open upper end communicating with the mixing-chamber proper. The extremities of the arms 51 are perforated transversely and provided with the pins 52, which pass through them and into the floor of the mixing-chamber, whereby the plate 50 is mounted so that its main portion will be capable of swinging in the arc of a circle and toward and from the periphery of the mold-wheel. To facilitate this movement of the plate 50, the adjacent side of the mixing-chamber is formed with two slots 52^a therein, which are arranged so that they may respectively receive the arms 51 of the plate 50 and permit the upward movement thereof.

Rigidly secured to the center of the main plate 50, and projecting out horizontally and longitudinally therefrom, is the arm 53, which is serrated or ratcheted throughout its length and which has the weight 54 adjustable thereon. By these means the plate 50 is given a tendency downward and caused to firmly yet yieldingly engage the periphery of the mold-wheel. By these means a surface is formed against which the clay may be pressed in forming the bricks, as it will do when the several plunger-bars 41 resume their normal positions after having been moved inwardly by contact indirectly with the wheel 49.

Secured to one of the base-beams 1, and adjacent to the plate 50, is the short longitudinally-extending beam 55, which has rotatably mounted therein one spindle or trunnion of the rock-bar 56. This bar 56 extends transversely and parallel with the beam 1, and has its remaining trunnion journaled in an opening in one of the beams 2. Fixed to the bar 56, and extending longitudinally thereon, is the scraper-plate 57, which extends throughout the length of the bar 56, and which is arranged with its edge in engagement with the periphery of the mold-wheel. This engagement is made forcibly, though yielding, by means of the arm 58, which is fixed to the bar 56, and which projects inwardly and slightly upwardly therefrom. 59 indicates a weight adjustably mounted on the arm 58, whereby the rock-bar 56 is given a normal tendency, which will cause the scraper-plate 57 to continually engage the periphery of the mold-wheel.

60 indicates a trough which has one end rigidly secured to that base-beam 2 which has the rock-bar 50 journaled therein, and which has its remaining end secured to the wall 29, which is opposite said beam 2. This arrangement gives the trough 60 an incline, and the said trough is located directly beneath the outer edge of the scraper-plate 57, so that the matter scraped by said plate will drop therefrom and into the trough 60, down which it will gravitate to the lower end thereof, whereupon it is delivered outside of the walls 29.

Mounted upon the beam 1, which is opposite the beam carrying the scraper-blade 57, is the sand-box 61, which is arranged opposite the periphery of the mold-wheel, and which is of a length equal to the width of said periphery. This box is provided with a swinging lid 62, whereby its top may be closed and opened to permit the entry of sand or whatever material may be used in the box. 63 indicates an opening in the box 61, which is never closed, and which is located on the inner side thereof and at the upper portion of said side. This opening is provided to permit the exit of the sand in box 61, and so that it will be thrown directly upon the periphery of the mold-wheel. Extending transversely through the center of the box 61, and journaled in the sides thereof, is the shaft 64, which carries a number of blades 65. These blades 65 are very numerous and are arranged closely together, they being narrow, so as to be capable of revolving with the shaft 64 and of throwing the sand through the opening 63 in the box 61. One end of shaft 64 is extended beyond the box 61 and provided with a pulley 66, over which a belt 67 operates, and this belt proceeds inwardly to a pulley 68, fixed upon the shaft 31 of the mold-wheel. By these means the motion of the shaft 31 is transmitted to the shaft 64, and it is preferred that the pulley 68 be much larger than the pulley 66, so that the motion will be multiplied in its transmission. The said box 61 may contain sand, oil, or water, or indeed any substance which will be capable of preventing the clay from sticking to the periphery of the mold-wheel and to the sides of the cavities.

The lower spindle 21 of the mixing-shaft 9, being that which is extended through and below the floor of the mixing-chamber, is provided at its lower extremity with a beveled pinion-gear 69, which meshes with a corresponding cog-rim 70, fixed to the inner side of the mold-wheel. By these means the motion of shaft 9 is transmitted to the mold-wheel and the same operated.

Located within the ditch, or between the walls 29 and at the bottom thereof, are the rollers 71, which are revolubly mounted in place, and which form a carr er for the completed bricks. These rollers are provided with sprocket-wheels 72, over which a chain 73 operates, and it is by these means that the rollers are made to revolve. The r oller which is located directly beneath the mold-wheel is provided at one end with a series of radial arms 74, which mesh with a co responding series of studs 75, projecting out transversely from the adjacent side of the mold-wheel. Thus as the mold-wheel revolves the arms 74 and 75 will mesh with each other and cause the rollers 71 to be revolved, thus setting the carrier into operation.

76 indicates a series of planks or boards, which are of a width equal to considerably less than the width of the ditch, and which may be of any length desired. It is preferred, however, that they be not longer than the distance between the two transverse beams 1. These boards are successively placed on the rollers 71 and advanced along the same by means of the revolutions of said rollers. Thus the planks are moved step by step, so as to make it possible for the bricks to be deposited thereon in regular lines.

It will be understood that the movement of the rollers 71, and consequently the planks that may be placed thereon, is not a continuous one, but that it is a regular step-by-step movement, calculated to cause the planks 67 to rest during the deposit of the brick thereon, and to move so as to make room for a second brick during the advancement of the next mold-cavity.

The planks or boards 76 are carried along the ditch until they reach the skids 77. These skids consist of a series of transverse beams provided with smooth upper surfaces which are to be lubricated in practice. These beams are located directly adjacent to the carrier or the rollers 71, and as one of the boards or planks 76 reaches the said skids they are to be moved off of the rolls and upon the beams of the skids. Owing to the lubricated upper surfaces of these beams the planks or boards may be slid along the same and arranged in regular series thereon, so as to be dried by the action of the sun. Thus it will be seen that by means of my invention the bricks are not touched until they are thoroughly dry, and that the complete operation of forming them is carried on without having to touch them. It will be understood that the planks are to be placed upon the rollers 71 at the side of the machine opposite the side having the skids and allowed to be advanced along the same, as has been explained.

In the use of my improved brick-machine the clay is placed upon the carrier 17 in its dry state and carried up and emptied into the mixing-chamber 3. Here it is subjected to the action of the rapidly-revolving blades 22 and pins 24, which latter devices are rigid with the mixing-chamber, and whereby the clods are effectively crushed. As the clay gravitates down to about the middle of the mixing-chamber the water from the barrel 25 comes in contact therewith and combines with it to form the mud essential to the manufacture of the brick. During this operation the blades 22 act on the clay to force it downwardly and to pack it into the bottom of the mixing-chamber, so that it will be forced into the mold-cavities.

The mold-wheel is revolving continuously during this operation, and as the clay is mixed to the proper consistency it will be forced into the mold-cavities and formed into the bricks, as has been explained hereinbefore, and by means of the action of the plunger-bars 41 and cam-wheel 49. The completed bricks are, as has been before explained, deposited upon the planks 76 and carried away to the skids to be dried by the action of the sun, or, if desired, in the usual kiln. My invention is especially adapted, however, for drying bricks by means of the sun, and some variation in the delivery or carrier mechanism will be necessary to adapt it for use in connection with kilns.

By means of my invention a more regular and compact brick is produced, and it is made possible to operate the machine by the use of less power than ordinarily. It will also be observed that but little labor is required to be employed, all of which adds greatly to the efficiency and desirability of the invention.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having described the invention, I claim—

1. In a brick-machine, the combination with means for feeding the plastic clay, of a mold-wheel having a series of radially-disposed mold-cavities, a radially-extending plunger-bar operating in each, a series of rods mounted on the axle of the mold-wheel and connected to the plunger-bars, a plate secured to one side of the mold-wheel, a series of rods fixed to said plate and connected to the plunger-bars and passed transversely to the opposite side of the wheel, the upper and lower cam-wheels engaged by the free ends of said rods, and means for operating the mold-wheel, substantially as described.

2. In a brick-machine, the combination with means for feeding plastic clay, of a mold-wheel having a series of radially-disposed mold-cavities, a series of radially-extending plunger-bars operating in the cavities, a series of rods mounted on the axle of the mold-wheel and connected with the plunger-bars, a plate secured to one side of the mold-wheel, a series of rods fixed to the said plate and connected to the plunger-bars and extending transversely to the opposite side of the wheel, and devices for engaging the said rods to depress the plunger-bars, substantially as described.

3. In a brick-machine, the combination of a mold-wheel having radially-disposed mold-cavities, a series of plunger-bars operating in the cavities, a series of rods fixed to the wheel at one side thereof and connected with the plunger-bars and extending transversely to the opposite side of the wheel, and upper and lower cam-wheels engaging the free ends of the rods, substantially as described.

4. In a brick-machine, the combination of a mold-wheel, means for feeding the plastic clay thereto, a box located adjacent to the periphery of the mold-wheel and having an opening arranged adjacent to the said periphery of the mold-wheel, a horizontal shaft revolubly

mounted within the box and located below the opening, blades rigidly mounted on the shaft and operating to throw the contents of the box upon the periphery of the mold-wheel, means for connecting the shaft with the axle of the mold-wheel, and means for revolving the mold-wheel substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOSEPH A. THOMPSON.

Witnesses:

CHARLES EDWARDS,

W. E. HESS.