J. F. UHLHORN.

BRICK MACHINE.

APPLICATION FILED DEC. 7, 1907.

902,699.

Patented Nov. 3, 1908.

2 SHEETS—SHEET 1.

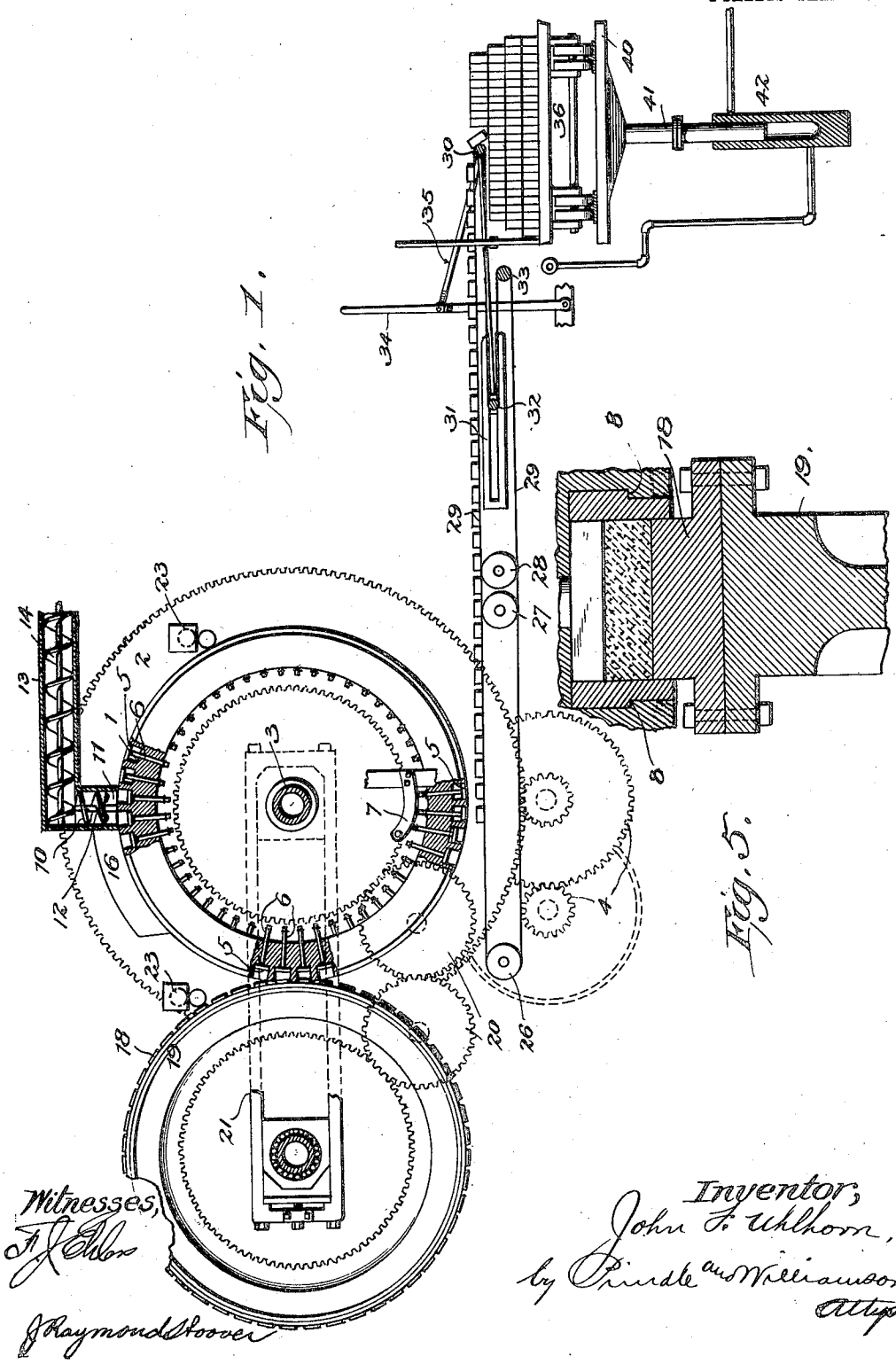


Fig. 1.

Fig. 5.

Witnesses,
F. J. Teller
J. Raymond Hoover

Inventor,
John F. Uhlhorn,
by Pinckle and Williamson
Attys.

J. F. UHLHORN.

BRICK MACHINE.

APPLICATION FILED DEC. 7, 1907.

902,699.

Patented Nov. 3, 1908.

2 SHEETS—SHEET 2.

Fig. 3.

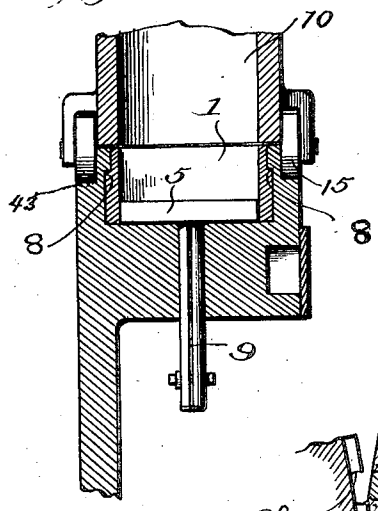


Fig. 2.

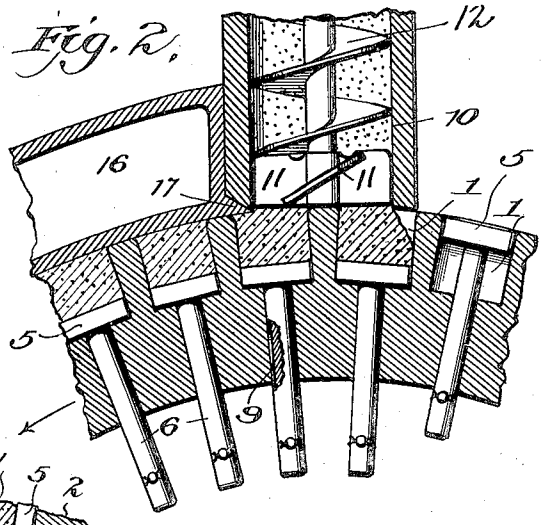


Fig. 4.

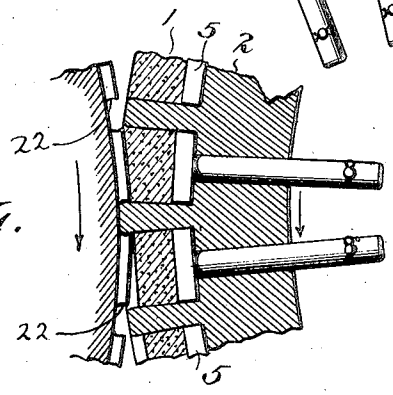


Fig. 6.

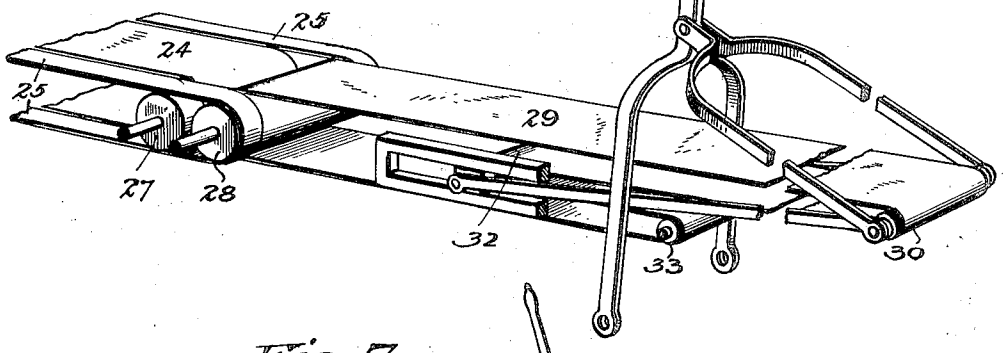
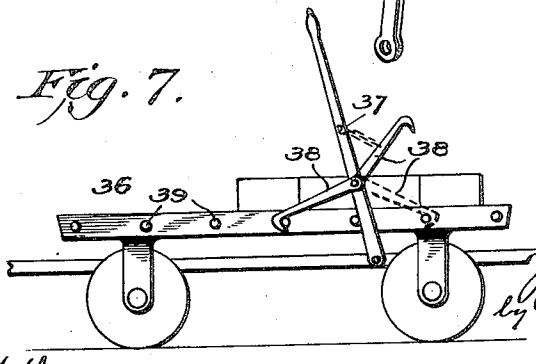


Fig. 7.



Witnesses,

J. Raymond Stoover

Inventor;

John F. Uhlhorn,

by Prindle and Williamson

Attys.

UNITED STATES PATENT OFFICE

JOHN F. UHLHORN, OF WASHINGTON, DISTRICT OF COLUMBIA.

BRICK-MACHINE.

No. 902,699. Specification of Letters Patent. Patented Nov. 3, 1908.

Application filed December 7, 1907. Serial No. 405,594.

To all whom it may concern:

Be it known that I, JOHN F. UHLHORN, of Washington, in the District of Columbia, have invented a certain new and useful Improvement in Brick-Machines, and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a brick machine embodying my invention portions of the machine being shown in section; Figs. 2, 3 and 4 are detail views on a larger scale and in vertical section of portions of the brick-forming mechanism; Fig. 5 is a detail view in cross section of a mold and its coöperating die; Fig. 6 a detail view in perspective of the delivery mechanism by which the brick may be loaded upon a car or other off-bearing device; Fig. 7 a detail view in side elevation of the means for moving the car step by step as the load progresses.

The principal object of my invention, and stating it generally, is to provide a brick-making machine by which the cost of manufacture of bricks may be materially decreased, in that handling of the brick-forming material and the finished product will be saved to a large extent, and by which re-pressing will be unnecessary, and yet the brick produced will be a superior product, and to such end my method consists in the brick machine constructed as hereinafter specified and claimed.

The type of brick machine in which I have embodied my invention, is the rotary mold type, and in the case of the machine shown in the drawings, the molds 1 are in the face or periphery of a drum or wheel 2, that is mounted upon a horizontal shaft 3 journaled in bearings in a suitable framework, to which shaft, for the purpose of revolving the mold, power is applied through a suitable train of gears 4 in an ordinary manner. Each mold 1 has its side walls formed, as usual, by liners, and its bottom by a radially movable plunger 5, the plunger having attached to it a radially inwardly extending rod or stem 6 which passes through and is guided by a radial opening in the rim or circumference of the wheel or drum. The weight of the plungers is such that when they are at the top of the wheel, they will normally descend to and remain in their innermost or mold-bottom forming position, at which time the material for forming the bricks is placed in them and they are moved radially outward to expel the finished brick when they reach the bottom of the wheel, by means of a push-out cam 7 which is in the path of the inner ends of the plunger rods or stems 6, and which by their contact with the cam, are moved radially outward. In order to prevent the outward movement of the plungers dislodging the mold liners, the latter are provided with shoulders which pass under overhanging flanges or ribs 8 on the inner sides of the mold-forming cavities of the wheel. To enable the ingress of air to the mold, and its egress therefrom beneath the plunger, which is necessary for the proper movements of the plunger, a passage from the mold beneath the plunger is provided as by means of a longitudinal channel or groove 9 in the side of the plunger rod or stem. Besides the exit of air from the mold to permit the inward movement of the plunger, the discharge or outward passage of air from the mold is of great importance for the proper formation of the brick, so that it will be free from air spaces, and the fit of the plunger with the sides of the mold is such that any air between the material in the mold and the mold bottom, will be forced past the plunger and beneath the same and into the air groove and channel in the side of the plunger rod or stem. The space between the plunger and the side of the mold while sufficient to permit the passage of air as described, is, of course, so slight that none of the material for forming the bricks can find its way between the plunger and the mold.

In machines of the type to which my invention relates which are on the market, the brick-forming material is delivered to the molds from a hopper, which besides other objectionable features, has the objection that it involves the presence of a large mass of material over the mold, which imposes thereon an objectionable amount of pressure or weight. I have invented a feeding mechanism by which practically no greater weight or pressure is applied to the wheel from the brick-forming material than that from the quantity necessary to form a brick. Said feeding mechanism comprises a vertical box or chamber 10, that internally is circular in cross section, whose internal diameter is equal to the length of a mold or brick to be formed, in which is a vertical shaft which at its lower end or contiguous to the top of the wheel, has several helical wings or blades 11 like those of a screw propeller, and above said blades a short section of spiral or screw con-

veyers 12 the pitch of the wings or blades 11 being greater than the pitch of the thread of the screw. The pitch suitable for these blades is dependent to some extent upon the general character of the material, a stiff mixture requiring that the blades be set to a relatively steep pitch. These blades have a striking as well as a compressing and smoothing effect. The brick-forming material is delivered to the top of the box or chamber 10 from a horizontally arranged cylinder 13, through which the material is forced or fed by a screw conveyer 14. The purpose of the helical blades at the bottom of the box or chamber, is to positively force the brick-forming material into the mold beneath with some degree of pressure, and the provision of the screw conveyer 12 on the shaft in the upper part of the chamber above the blades or vanes is to deliver the material gradually and not in a mass or lump to the blades or vanes, so as to enable the latter to properly handle or work upon the material to force it into the mold and prevent the clogging which would occur were the material dumped or dropped upon the vanes or blades in a lump or mass. The feeding box or chamber is supported at its lower end from the wheel or drum 2, and to reduce wear and friction to a minimum, wheels or rollers 15 are mounted at the bottom of the box or chamber, that rest upon the periphery of the wheel and support the bottom edge of the box or chamber out of contact therewith.

To prevent the escape of material from the box or chamber as the wheel moves its molds from beneath the same, and to provide means for smoothing or finishing off the outer surfaces of the lumps or blocks of material delivered to the molds, I employ a smoothing device which consists of a block or box 16, which rests against and closely fits the periphery of the wheel for the distance of several molds, beginning at a point on the side of the box or chamber at which the molds pass beneath the latter, and on its lower corner contiguous to such side of the box or chamber, the block or box 16 has a lip 17 that projects beneath the contiguous lower edge of the box or chamber wall, and constitutes a knife or cutter that prevents the passage of any material from the box or chamber above the plane or surface of the top of the mold. The wall of the box beneath which the lip 17 is situated extends at a right angle or substantially a right angle to the periphery or surface of the mold, and the upper or outer surface of the lip 17 is inclined or beveled, and the contiguous surface of the box wall is similarly formed so that a tight joint is formed between the lip and the box wall, which prevents the exudation of material from the box. Thus no material is permitted to escape from the feeding box or chamber which would be objectionable not only as soiling the machine, but because of its requiring extra handling. The smoothing device is preferably in the form of a box so that it may be heated, as by the admission of steam, so as to impart heat to the material in the molds, which is desirable for the proper manipulation of the material. Besides heating the material in the molds, the mold wheel is also heated by the heat applied to the smoothing device, and this heating of the mold wheel is of special importance in operating upon such material as sand and lime. The purpose of this heating is to prevent the material sticking to the mold wheels and the die surfaces, which it will do if they are cold.

The material after it has been placed in the molds as described, and its outer surface smoothed or finished off, is next subjected to powerful pressure, and for this purpose I preferably employ a series of rotary dies 18, preferably agreeing in number with the number of molds, and secured to the circumference or periphery of a wheel or drum 19 of the same diameter as the mold wheel, and said die carrying drum is geared to and receives motion from the mold wheel shaft by a train of gears 20 so proportioned as to secure absolute timing of the revolution of the molds and dies, and since the parts are subjected to enormous pressures, the shafts of the two drums are strongly tied together by frames 21. The shafts of the two wheels or drums are mounted in ball bearings, so as to make unnecessary any oiling or lubricating of the bearings, as this is almost impracticable by reason of the fact that all the parts of the machine are kept heated to a temperature which rapidly dries up any lubricant.

In order to prevent any wear of either the surfaces of the molds or the surfaces of the dies by the entrance of the dies into and their passage from the molds, the walls of each mold at the outer corners are slightly beveled or chamfered outwardly, and each die on its front and rear sides is provided with a recess or groove 22. Thus at the points where there might be contacting surfaces, the contiguous surfaces of mold walls and dies relatively recede or move away from each other. Of course the material engaging surfaces of the dies and of the plungers are flat, in order that the brick may have flat surfaces. To prevent the brick-forming material adhering to either the mold wheel or the dies, I preferably apply to the surfaces of each, glycerin, oil, water, or any other liquid that will answer the purpose, and a convenient and satisfactory way of so applying such liquid, is to employ a device 23, similar to the familiar roller inking fountain of printing presses, the rollers of which may be readily driven by friction from the peripheries of the mold or die-carrying wheel.

Situated beneath the mold wheel, there is an off-bearing mechanism which consists of

three belts, side by side, a comparatively wide central one 24, preferably of some suitable fabric, such as Gandy belting, and a comparatively narrow one 25 at each side, preferably of steel, the total width of the three belts being about equal to the length of a brick, so as to well support the latter, and at one end all three belts pass over a common wheel or pulley 26, to which power is applied to drive the belts, and at the other end the middle belt which is shorter than the other two, has its own pulley or wheel 27, and the other two belts are mounted on a common wheel or pulley 28. Also passing over the pulley 28 is a belt 29, which lies between the two belts 25, and whose width is the same as that of the belt 24, and to said belt 29 the bricks are delivered by the belts 25. From the pulley 28 the brick-supporting portion of the belt 29 passes over a pulley 30 journaled in a horizontally movable frame 31, and from the pulley 30, said belt runs to a second pulley 32 also journaled in said horizontally movable frame 31, and from said second pulley 32, said belt 29 passes to and over a stationarily mounted pulley 33, and from the latter the belt goes back to the pulley 28, which is also stationarily journaled. It will be seen that by moving the pulley journaling frame back and forth horizontally, the pulley 30 and the portion of the belt passing thereover may be caused to occupy different positions horizontally, and thus the point or place of deposit of bricks traveling over the belt 29, may be readily changed, and yet the belt be at all times maintained in a taut condition. For the convenient shifting or movement of the pulley carrying frame, a hand lever 34 is provided which is connected by a link 35 to some convenient point of the frame.

I prefer to deliver the bricks from the belt 29 to a car, so that said belt 29 thus becomes a loading device, the car 36 being preferably mounted on tracks that run at right angles to the direction of travel of the loading belt, and it being moved horizontally as fast as a row of bricks is deposited thereon by the operation of the loading belt, and for so moving it, I provide a hand lever 37 which is provided with two oppositely extending pulling dogs or pawls 38 that engage pins or teeth 39 on the side of the car at fixed intervals apart, corresponding to the dimension of the brick, which determines the extent of horizontal movement of the car. But one of the pulling dogs or pawls operates at a time, so that when the car has been moved in one direction by the use of one of said dogs or pawls as far as is convenient, it is moved in the opposite direction by the other dog or pawl, so that there is no necessity after the car has been moved in one direction to enable it to receive one row of bricks horizontally, to shift it back again to the point of commencement for the reception of the next horizontal row of bricks, because the next horizontal row of bricks can be deposited on the car by moving it in the reverse direction step by step, by means of the other pulling dog. Besides moving the car horizontally to enable one row of bricks after another to be deposited thereon, I provide for moving the car vertically, to enable one row of bricks after another to be placed upon a previously deposited row, and this is conveniently done by mounting the car tracks upon a vertically moving platform 40, which is supported on a piston 41 of an ordinary hydraulic lift 42. It will be seen that I provide for either such manipulation of the loading belt or of the car as to enable the loading of the latter in all directions required to place the bricks in rows transversely, longitudinally and vertically, without any manual handling of the bricks whatever, and that the operation of loading the car can be done most expeditiously.

The rollers 15 besides being anti-friction supports for the feeding box or chamber, also perform the useful office of maintaining the feeding box or chamber in proper position with reference to the mold, by confining their sidewise or lateral movement, and for this purpose the rollers 15 extend into annular grooves in the mold wheel, or overlap the same on opposite sides and bear upon circumferential shoulders, or flanges, 43, on the respective sides of the mold wheel, which shoulders may be formed by being cast integral with the mold wheel, or separately formed and bolted, or otherwise secured thereto.

Because of the enormous pressure to which I am enabled to subject the brick-forming material in the mold, and the gradual application of such pressure, I am able to compact or compress the material to a very large degree, thus, for example, pressing it to such an extent as to reduce the thickness of a mass of material in the mold from $3\frac{1}{2}$ inches to $2\frac{1}{2}$ inches, the latter dimension being the thickness of the finished brick, and in this case as will be readily understood, the protrusion or entrance of the die into its mold being one inch. This great degree of compression is of especial value in the manufacture of bricks from sand and lime, and results in the production of a brick that is exceedingly dense, hard, and from which air and moisture are practically expelled.

The bricks as delivered from the molds lie flatwise on the off-bearing belt, and when they are delivered to the car, they are turned upon edge, the bricks making a quarter turn in passing off the loading belt 29 where the latter goes over the pulley 30 at the discharge end, the latter having such relative position to the plane of the surface on which the brick is deposited that the brick will be at a

greater angle than 45° from the horizontal as it passes downward off the belt, but if necessary, the belt with its pulley 30 could be moved longitudinally enough to tilt the brick being deposited to a vertical position in contact with a previously delivered brick, or against a temporary supporting surface which is used in the case of the first brick of a row. Said supporting surface consists of a board suitably supported by stakes, or otherwise, from the car at the point where it is desired that the first brick of a row shall be deposited, and the bricks are deposited to form a pile of such form as is desired.

As is shown in detail in Fig. 5, the dies 18 are preferably made separate from the wheel or drum 19, to which they are attached as by means of bolts as shown, which pass through flanges on the dies and wheel.

I prefer to use glycerin to prevent the adhesion of the brick-forming material to the surfaces engaged thereby, because glycerin, besides being a splendid lubricant, does not discolor the brick nor congeal.

Having thus described my invention, what I claim is—

1. In a brick machine, the combination of a source of supply of brick forming material, a mold carrier, a feed box or chamber between the source of supply and the mold carrier, material-engaging feeding screw form means in the feed box, and a pressure applying device consisting of helical blades or vanes situated contiguous to the mold carrier and of greater pitch than said screw-form feeding means whereby a striking and compressing effect is produced.

2. In a brick machine the combination of a traveling mold carrier, a feed box, and anti-friction devices interposed between the feed box and the mold carrier.

3. In a brick machine the combination of a traveling mold carrier, a feed box, and rollers on opposite sides of the feed box bearing on supporting surfaces on the carrier.

4. In a brick machine the combination of a traveling mold carrier, a feed box, and rollers on opposite sides of the feed box overlapping the opposite sides of the carrier, and engaging supporting surfaces on the carrier.

5. In a brick machine the combination of a traveling mold carrier, a feed box, and a scraper consisting of a lip interposed between the feed box and the contiguous surface of the mold carrier, the lip and feed box having similarly inclined engaging surfaces, said surfaces terminating in a single cutting edge or scraper.

6. In a brick machine the combination of a traveling mold carrier, a feed box, and a smoothing block having a scraper consisting of a lip interposed between a wall of the feed box and the contiguous surface of the mold carrier, said wall of the feed box extending at a right angle or substantially a right angle to said surface of the mold carrier, and the engaging surfaces of the lip and wall being inclined and meeting in an edge.

7. In a brick machine the combination of a traveling mold carrier, a feed box, a smoothing block having a scraper consisting of a lip interposed between a wall of the feed box and the contiguous surface of the mold carrier, said wall of the feed box extending at a right angle or substantially a right angle to said surface of the mold carrier, and the engaging surfaces of the lip and wall being inclined and meeting in an edge and means for heating said block.

8. In a brick machine for the manufacture of bricks from sand and lime, the combination of a rotary series of molds, a rotary series of dies that respectively enter into and compress the material within the molds, and a rotary support for the dies to which they are rigidly attached, the contiguous end surfaces of a die and mold being complementarily grooved and chamfered to permit them to pass each other.

9 In a brick machine the combination of a traveling mold carrier, having a mold whose bottom is formed by a movable plunger, a guiding stem for the plunger, and an air passage or channel leading from the bottom of the mold along the stem.

10. In a brick machine, the combination of brick forming mechanism, a horizontally shiftable brick delivery device, and a vertically movable brick receiver.

11. In a brick machine, the combination of brick forming mechanism, a horizontally shiftable brick delivery device, a brick receiver, and means for shifting the position of the brick receiver step by step.

12. In a brick machine, the combination of brick forming mechanism, a horizontally shiftable brick delivery device, a brick receiver, and means for shifting the position of the brick receiver step by step horizontally in a direction crosswise of the direction in which the brick delivery device is shiftable.

13. In a brick machine, the combination of brick forming mechanism, a horizontally shiftable brick delivery device, a brick receiver, means for moving the brick receiver horizontally step by step, and means for moving the brick receiver vertically.

14. In a brick machine the combination of brick forming mechanism, a brick delivery device shiftable horizontally and a brick receiver shiftable vertically and horizontally.

15. In a brick machine, the combination of brick-forming mechanism, two brick-supporting traveling devices so arranged that bricks may be delivered from one to the other, and a traveling brick-supporting means contiguous to both of said other devices, where bricks pass from one to the other.

16. In a brick machine, the combination

of brick-forming mechanism, a delivery apron, a second apron traveling contiguous to the end of said first mentioned apron and delivering bricks thereto, and a brick-supporting surface contiguous to said aprons at the point where bricks are delivered from one to the other.

17. In a brick machine, the combination of brick-forming mechanism, two brick-carrying aprons arranged end to end from one of which bricks are delivered to the other, and a belt at each side of the brick-delivering apron and extending alongside the other at the place where bricks are delivered from one to the other.

18. The combination of a delivery apron, stationarily and shiftably mounted rollers over which said apron passes, a second apron traveling contiguous to one of the stationarily mounted rollers, and delivering articles to the first-mentioned apron, and a belt at each side of said second named apron, and extending alongside of said first named apron.

19. In a sand lime brick machine, the combination of a traveling series of molds, a traveling series of dies that respectively enter into and compress the material within the molds, a lubricator for said dies and a heating and smoothing block contiguous to the molds to maintain a temperature to prevent the formed bricks from sticking to said lubricated dies.

In testimony that I claim the foregoing I have hereunto set my hand.

JNO. F. UHLHORN.

Witnesses:
CHAS. J. WILLIAMSON,
F. J. EHLERS.