

(No Model.)

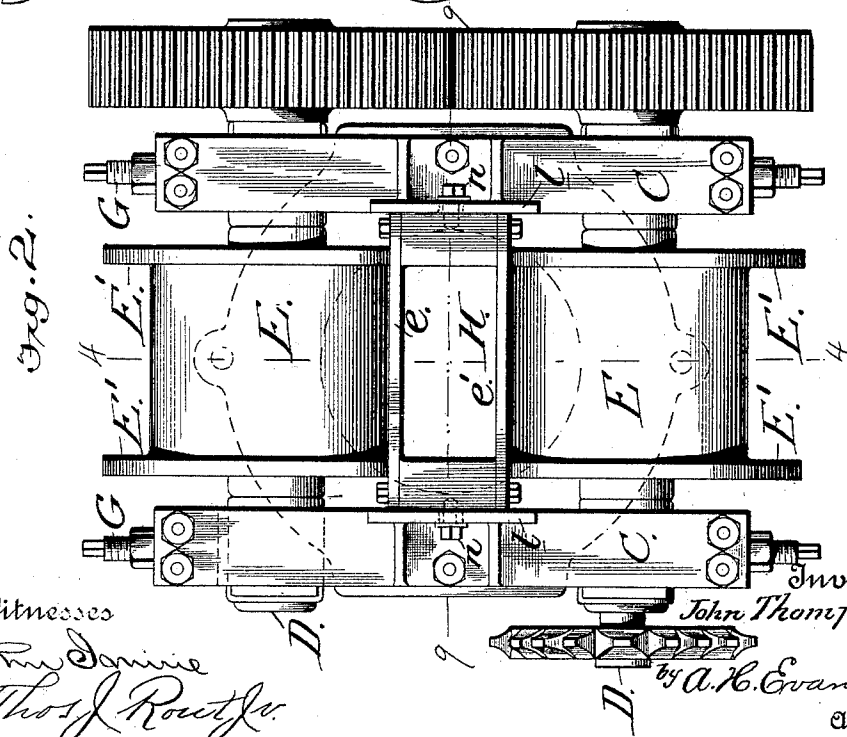
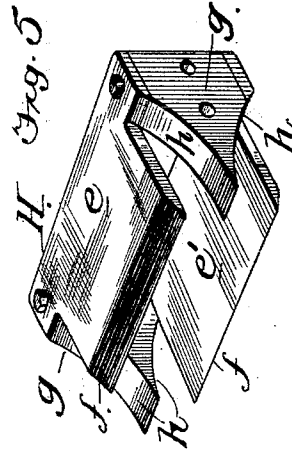
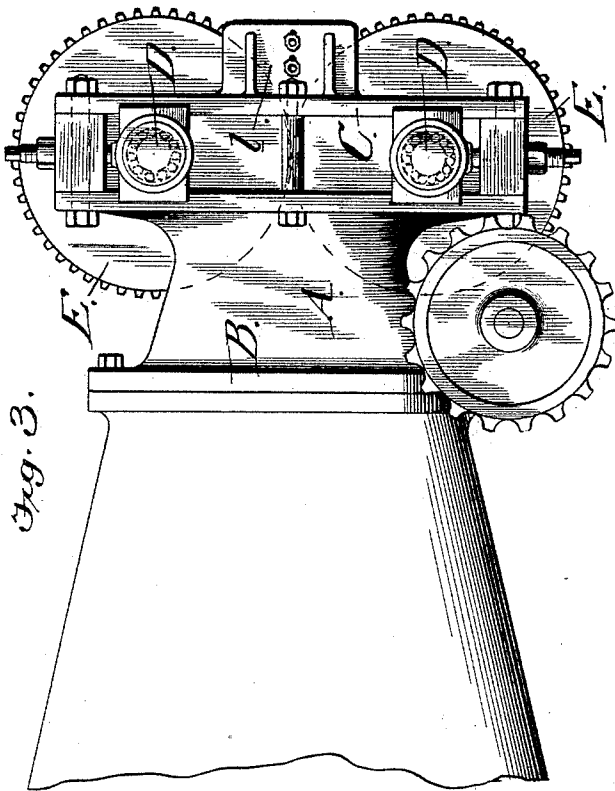
3 Sheets—Sheet 2.

J. THOMPSON.

ROLLER DIE FOR BRICK OR TILE MACHINES.

No. 497,839.

Patented May 23, 1893.



Witnesses

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Thos J. Rauter

Inventor

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Attorneys

(No Model.)

3 Sheets—Sheet 3.

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Fig. 4.

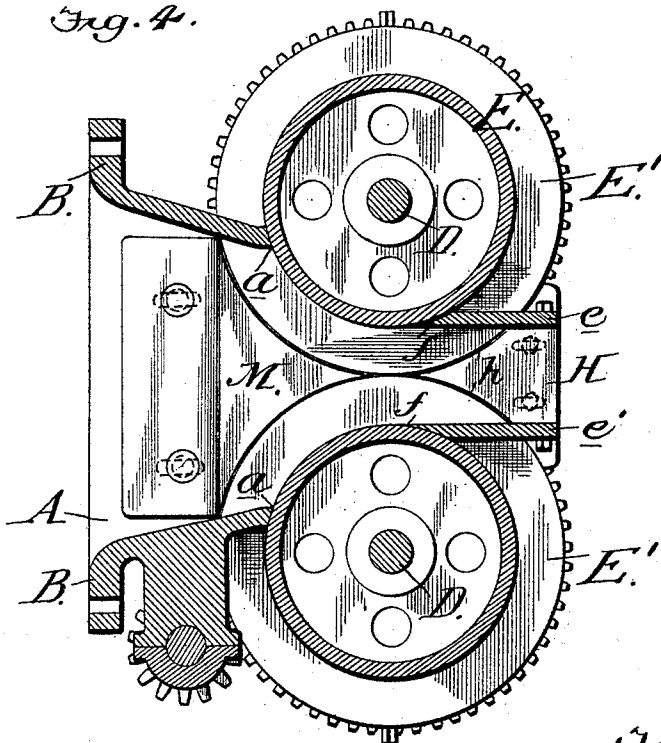
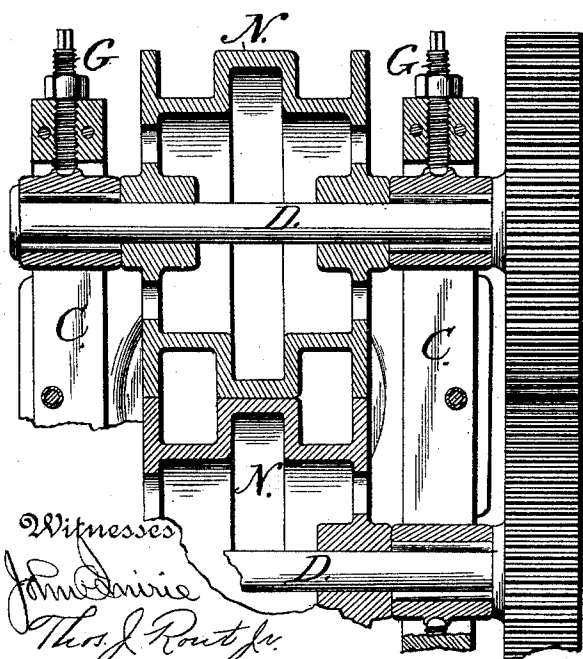


Fig. 6



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Fig. 7.

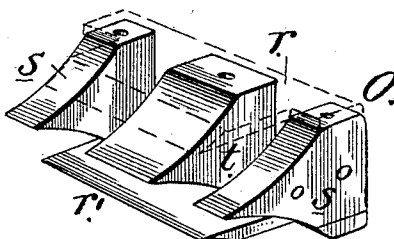
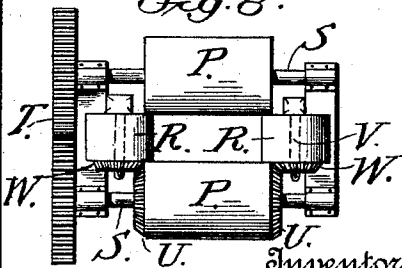


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN THOMPSON, OF BUCYRUS, OHIO, ASSIGNOR TO THE FREY-SCHECKLER COMPANY, OF SAME PLACE.

ROLLER-DIE FOR BRICK OR TILE MACHINES.

SPECIFICATION forming part of Letters Patent No. 497,839, dated May 23, 1893.

Application filed November 19, 1892. Serial No. 452,573. (No model.)

To all whom it may concern:

Be it known that I, JOHN THOMPSON, of Bucyrus, in the county of Crawford and State of Ohio, have invented certain new and useful Improvements in Roller-Dies for Brick, Tile, or Pipe Machines, as set forth in the accompanying drawings, forming part of this specification, in which—

Figure 1, is a perspective view of the discharge end of a brick, tile or pipe machine. Fig. 2, is an end view of the same. Fig. 3, is a side view of Fig. 2. Fig. 4, is a sectional view on line 4—4 of Fig. 2. Fig. 5, is a detail in perspective of the "slicker" or mouth piece. Fig. 6, is a cross sectional view of the machine showing the roller dies with central circumferential flanges, and showing the gear wheels in elevation. Fig. 7, is a perspective view of a "slicker" or mouth piece of modified form. Fig. 8, is a modification showing a roller die formed essentially of four rolls connected with a driving mechanism whereby the rolls are rotated simultaneously and two of such rolls on opposite sides having a speed different from the others. Fig. 9, is a horizontal sectional view on the line 9—9 of Fig. 2. Fig. 10, is a detail showing one of the rollers in section.

My invention relates to machines and devices for the formation of bricks, tiles, pipes and analogous articles, from clay or other plastic or semi-plastic material, and my invention consists essentially in providing the discharge end of such brick, tile, or pipe machine, with movable walls or surfaces adapted to engage the column of clay or other material and by a combined drawing and compressing action thoroughly compacting and compressing the material and conducting it to the discharge in a smooth and finished condition.

My invention also consists in disposing of said movable surfaces so that they found the boundary walls of the discharge at a point back of the outlet from the "slicker" or mouth whereby the surfaces engage the column of clay or material, drawing it toward the longitudinal center of the outlet, and compressing it from all sides, and finally discharg-

ing it through said outlet in a finished condition and with smooth external sides.

My invention further consists in connecting said movable surfaces with a mechanism whereby they are positively operated and the opposing surfaces at the longitudinal sides of the column of clay or material move at a differential speed from the others.

My invention also consists in forming upper and lower rolls with end flanges whereby the circumference of the body of the rolls becomes the upper and lower movable surfaces for the upper and lower surface of the column of clay or material, and the end flanges become the movable surfaces for sides of the said column, and being further removed from the center of motion of the rolls move over the side surfaces of the clay or material at a greater speed than the body portion or upper and lower surfaces.

My invention also consists in connecting said rolls or movable surfaces with each other and with a positive driving mechanism whereby they rotate in unison, two of said surfaces moving at a speed greater than the surfaces which act upon the upper and lower faces of the column of clay or material.

My invention further consists of the constructions, arrangements, and combinations of devices which I shall hereinafter fully describe and claim.

To enable others skilled in the art to which my invention appertains to make and use the same I will now describe its preferred construction and indicate the manner in which the same is carried out.

In the class of brick, tile and pipe making machines known as "stiff clay" machines, in which the clay after a preliminary preparation by pugging blades operating in a suitable casing, is expressed through forming dies by some suitable device, such as a plunger or screw, in most clays there is a tendency for the clay to assume a concentric formation. This formation may be so pronounced as to form what is termed striæ or "laminations" in which the adhesion of the clay is broken. These formations are due to several causes, the principal one of which

comes from the friction of the external walls of the forming die; the clay at these points being retarded in its flow and resulting either in the actual fracture of the external surface, or the central part of the moving column pushes ahead of the outer portions thereby making the center of the column less dense, and forming a "core" with partially broken or disturbed bond with the slower moving external portions, producing the concentric striæ or "laminations" before mentioned; a result that is common to all heretofore known die expressing machines relating to this art, and in some machines it is more pronounced than in others. To overcome the objectionable features above mentioned, various appliances have been used, including dies for forcing or crowding the clay toward the center; by introducing some lubricant between the moving mass and the fixed external walls of the forming die; or by using rolls at the outlet or discharge. But these appliances have not affected the disposition of the clay in the moving column, and where the lubricant has been employed it has been at the expense of friction at the external sides of the column; or in other words where lubricant is used there is less resistance to the moving column of clay, but the introduction of the lubricant is uncertain at best and other complications arise in the subsequent handling of the product.

In the use of rolls in the forming die, two general forms have been used; one in which the column is formed by a tapered outlet and the rolls fixed at the outlet are simply finishing rolls and affect only the external part of the column, the disposition of the clay in the column having been made prior to the clay reaching the rolls. Such rolls, therefore, do not overcome the objections before noted. Where two rolls only are used and the other sides formed by fixed walls, the resistance of these walls retards the clay at these points, resulting in fracture of the column or at best an unequal disposition of the material; and where four rolls have been used mechanical difficulties have arisen in the successful application of power to all, and two of the rolls have simply served as "idlers," assuming that such rolls will turn with the moving column of clay; but this has been proven not true as their motion is less than that of positively-driven rolls, and hence they offer some resistance to the moving clay with the same results as the fixed sides before mentioned.

To overcome the objections before noted and to especially avoid the formation of "laminations" in the column of clay or other plastic material and for forming a compact, dense and finished product is the essential object of my invention; and these advantages are produced, essentially, by the employment of two or more positively-driven rolling surfaces substantially of the form herein shown.

If two rolls are used I locate one above the

other and have their contiguous faces located within the outlet or chamber through which the column of clay is expressed, the said faces forming two sides, the upper and lower, of the chamber, while the other two sides are formed either by other rolls or by flanges on the ends of the two rolls first mentioned; said flanges extending beyond the plane of the body of the rolls whereby they perform the combined function of compressing the clay and expressing it through the mouth piece or "slicker." The result of this construction is to make the center of the column more homogeneous and uniform throughout, and of greater density than has heretofore been obtained by the die expressing machines now in use.

To make my invention more manifest and to completely disclose its mechanical structure I will now refer to the drawings for a more detailed explanation.

In the said drawings A represents a suitable casting which forms the discharge end of the pugging chamber through which the column of clay passes and in which it is expressed. This casting has a flange B at its inner end by which it is bolted to a similar flange on the frame of the pugging chamber.

Suitably journaled upon any well known or desired form of frame work comprising the sides or standards C shown in Figs. 1, 3 and 6, are upper and lower horizontal disposed shafts D upon which the rolls E are mounted one above the other, said rolls having the peripheries of their body portions projecting through openings *a* in the casting A whereby their adjoining surfaces form the upper and lower walls of the chamber at their point of entrance thereto, and are adapted to operate upon the upper and lower surfaces of the column of clay. These rolls are driven by a positive gearing, such as the intermeshing gear wheels F on the shafts D, which may be connected with the main driving mechanism of the machine in any suitable manner; and they are located at the end of the pugging chamber in which the clay is mixed and conveyed forward, and by any well known form of "wiper" or "propeller," not shown, is brought up in a granular condition to the rolls. The size of these rolls will be proportionate to the area of the column, and the faces of the rolls form the upper and lower walls for the column of material. These rolls are provided with the end flanges E' which are extended beyond the plane of the body of the rolls and practically form the side walls of the pugging chamber, the distance which said flanges project being preferably the same on each roll so that the area of the opening formed between the surfaces of the body of the rolls and the flanges is the exact counterpart of the column of clay in cross section. These rolls have the combined function of compressing the clay, and forming and expressing it in the chamber; while the action of their flanges

is to give quite as much expressing power at the sides as at other points, this power being in exact proportion to the diameter of the flanges.

5 The shafts of the rolls are mounted in boxes *d* and the faces of the rolls may be adjusted toward and from each other to keep their flanges in contact by means of the adjusting screws *G* or other well known appliances.

10 Beyond the rolls and securely bolted to the frames *C* is what is termed a "slicker" or forming die *H* the purpose of which is to offer some resistance to the rolling action of the rolls, as there is not enough adhesion in some
15 clay to permit of its being rolled into form, and the rolls would tear the column; but the slight resistance offered by the outer die or "slicker" which is of slightly tapered form, is sufficient to prevent the bond of the clay
20 being broken, but in no way affects the disposition of the clay in the column. The result of this special arrangement is to give a disposition of material in the column that is homogeneous and uniform throughout and of
25 greater density than has heretofore been obtainable in machines of this class. There is no tendency to break at any point of the moving column, and the slight taper that is given the "slicker" or forming die beyond
30 the rolls may be varied to suit conditions peculiar to different materials.

The "slicker" or forming die *H* has a form substantially like that shown in Fig. 5 and it consists of an upper and lower plate *ee'* with
35 beveled inner edges *f* whereby they may be fitted close to the periphery of the rolls as shown in Fig. 4 and they have end plates *g* with reversely curved inner ends *h* against which the outer rim of the flanges *E'*, form a
40 close bearing; the inner walls of the slicker being in line with the inner faces of the flanges. In order that any wear between the slicker or forming die and the rolls or their flanges may be taken up, I form the plate *l*
45 of the casting or frame with slots *m* in which the bolts *n* by which the slicker is bolted in position, are mounted, whereby upon loosening these bolts the "slicker" may be adjusted for the purpose stated. A similar adjust-
50 ment may be provided for the plates *M* just in front of the rolls so that by a simple adjustment of these parts all wear about the faces of the rolls may be taken up and close bearing formed.

55 The vertically disposed flanges *E'* projecting as they do beyond the plane of the face of the rolls, and being further removed from the center of motion of said rolls, have a greater speed than the curved faces of the
60 rolls and by reason of this not only impart a smooth and finished appearance to the column of clay but compress the clay toward the center to make this portion of the column more homogeneous and uniform and of great
65 density; and prevents the formation of striae or "laminations."

In Fig. 6, the rolls are shown as having central circumferential flanges *N* instead of the smooth unbroken surfaces shown on the rolls in Figs. 2 and 4. The reason for this is that
70 the rolls shown in Figs. 2 and 4 are for what is termed "side cut" brick while in the rolls shown in Fig. 6 the clay is expressed in two distinct and separate columns, and is for "end cut" brick. When using the roll of Fig. 6, I
75 also employ the form of slicker or forming die *O* shown in Fig. 7, which has its top and bottom plates *r r'* and end plates *s* but also has the intermediate plate *t*; the form and function of this slicker or forming die being
80 otherwise identical with that described for Fig. 5.

As a full equivalent for the flanged rolls before described and as another manner for obtaining the results before noted I may em-
85 ploy the four-roller die shown in Fig. 8. In this figure the upper and lower rolls *P* are longer than the side rolls *R* and they are mounted upon shafts *S* and driven by gearing
90 *T* in the same manner as that before disclosed for the rolls *E*. One of these rolls *R* has its opposite ends formed with beveled gears *U* and the frame of the machine is formed with pins or shafts *V* upon which the side rolls *R*
95 are loosely mounted; the said rolls having their inner curved faces interposed between the inner faces of the upper and lower rolls so as to form the side walls for the column of clay; and one end of these side rolls is
100 formed or provided with beveled pinions *W* adapted to mesh with and be driven by the bevel gears of one of the other rolls. This arrangement of gearing enables me to maintain the differential speed before alluded to
105 and the construction is applicable for all the purposes ascribed to the flanged rolls.

The working faces of the rolling surfaces may be ornamented if desired to produce an ornamental brick, tile or pipe, and the several shafts and journals may be provided with
110 ball or roller bearings as shown.

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

1. In a brick, tile, or pipe machine, a forming die consisting of rollers whose body portions form upper and lower surfaces or walls, said rollers having flanges projecting beyond the plane of said walls and forming side walls whose rolling movement is differential to that
120 of the upper and lower walls.

2. In a brick, tile, or pipe machine, a forming die formed of rolling surfaces, in combination with a "slicker" or mouth piece adjustably secured whereby it may be adjusted
125 toward and from said surfaces, substantially as herein described.

3. In a brick, tile, or pipe machine, the forming die formed of flanged rollers or walls between which the column of material is ex-
130 pressed in combination with a "slicker" or mouth piece adjustably secured and having

curved portions adapted to receive a portion of the flanges and form a close joint therewith, said slicker having its inner walls in line with the vertical inner wall of the flanges.

- 5 4. In a brick, tile, or pipe machine, the combination of rolls having flanges, a plate adjustably secured in front of the rolls and a "slicker" or mouth piece adjustably secured at the rear of the rolls, said plate and "slicker"

or mouth piece having their inner walls in line with the inner walls of the flanges and having their surfaces contiguous to the flanges recessed to receive the latter.

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Witnesses:

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