

No. 707,831.

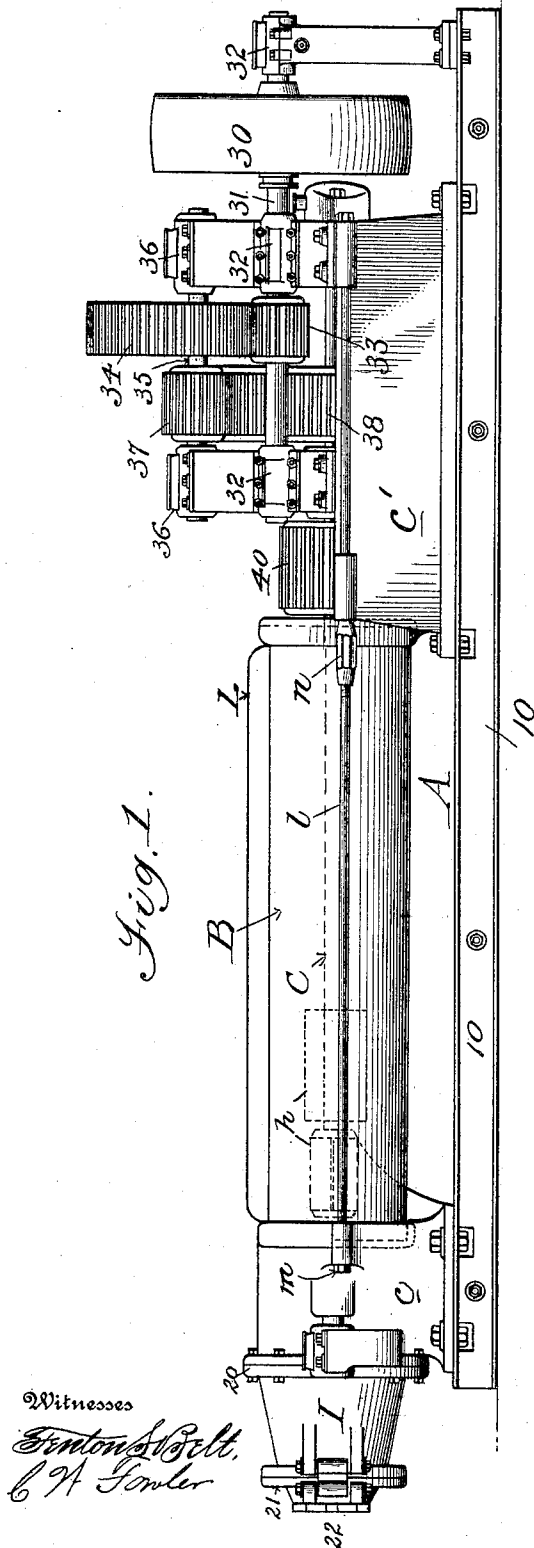
Patented Aug. 26, 1902.

W. R. CUNNINGHAM.
COMBINED TILE MACHINE AND PUG MILL.

(Application filed Apr. 16, 1902.)

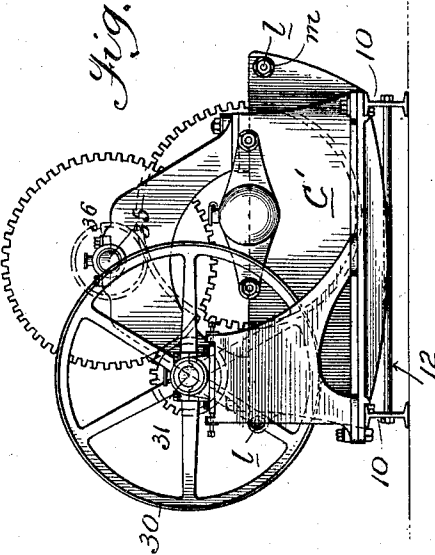
(No Model.)

2 Sheets—Sheet 1.



Witnesses
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C. H. Fowler

Fig. 3.



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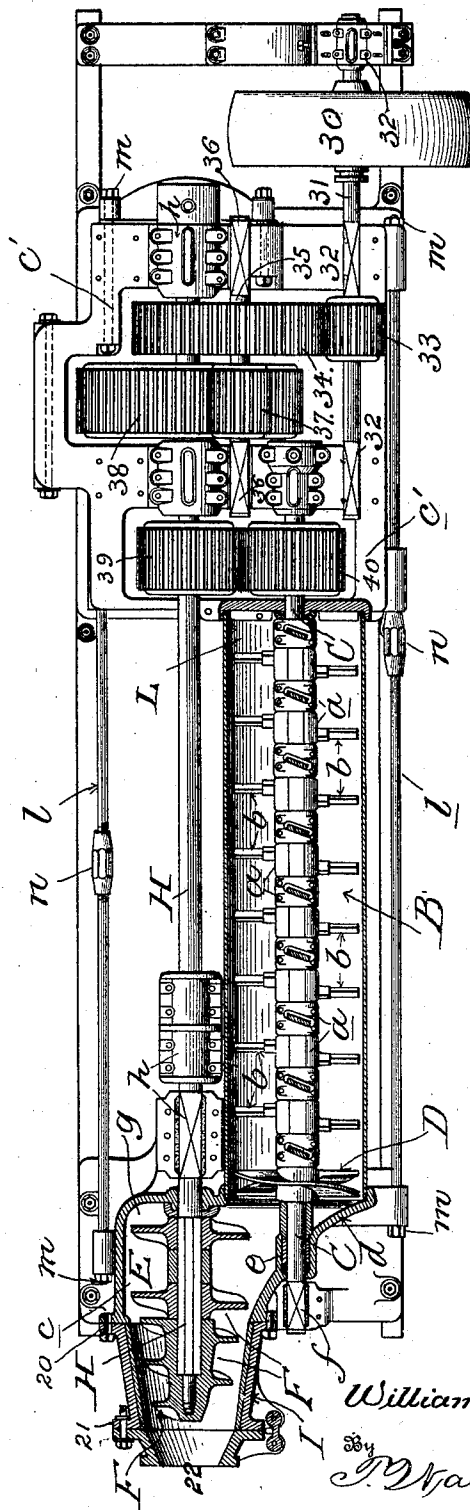
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2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM R. CUNNINGHAM, OF BUCYRUS, OHIO, ASSIGNOR TO THE
AMERICAN CLAY-WORKING MACHINERY COMPANY, OF BUCYRUS,
OHIO, A CORPORATION OF OHIO.

COMBINED TILE-MACHINE AND PUG-MILL.

SPECIFICATION forming part of Letters Patent No. 707,831, dated August 26, 1902.

Application filed April 16, 1902. Serial No. 103,226. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. CUNNINGHAM, a citizen of the United States, residing at Bucyrus, in the county of Crawford and State of Ohio, have invented new and useful Improvements in a Combined Tile-Machine and Pug-Mill, of which the following is a specification.

This invention relates to certain new and useful improvements in that class of clay-working machinery known as "combined tile-machines and pug-mills," wherein the clay is fed into the pug-mill portion of the machine and is tempered therein and then fed into the tile-machine portion and expressed therefrom, preferably through a die of any desired form attached to the outlet end of the machine.

The invention consists, essentially, in arranging the mixing-cylinder and clay-expressing cylinder in a horizontal plane substantially side by side, in forming laterally a curved connecting-throat between the two cylinders, and in combining with said throat the propeller or expressing-auger of the tile-machine.

It also consists of the parts and the constructions and combinations of parts, which I will hereinafter describe and claim.

In the accompanying drawings, in which similar letters of reference indicate like parts in the several figures, Figure 1 is a side elevation of a combined tile-machine and pug-mill embodying my invention. Fig. 2 is a horizontal sectional view on the line *x x* of Fig. 1. Fig. 3 is an end view.

In carrying out my invention I construct any suitable and firm bed or foundation A, upon which the superstructure is supported. This bed may include I-beams 10 and transverse tie-bolts 12, as shown in Fig. 3, or it may represent any well-known form of secure base, upon which the mixing-cylinder and the clay-expressing cylinder are mounted.

In the ordinary type of these combined machines the pug-mill or mixing-cylinder is disposed vertically above the clay-expressing cylinder and extends over the latter about eighteen (18) inches, more or less, and at the end of the mixing-shaft next to the clay-ex-

pressing cylinder are placed wipers or other devices, whose essential purpose is to divert the course of the clay emerging from the mixing-cylinder and direct the clay vertically into the expressing-cylinder. When the clay is soft and sticky, it will readily adhere to the wiping devices, and thereby impair the capacity of the machine, and it is necessary to work the clay stiff to prevent its adhering. As a great many clays are soft and of a natural sticky character and accordingly have to be worked soft, the ordinary type of machine before generally described is not a success in working such class of clays and in operation causes loss and expense to the purchaser. The present invention aims to overcome the defects of the former machine and to economize in the space required for the machine and in reduction of running expenses. As distinguished from the old form of these combined machines, I place the mixing-cylinder and the clay-expressing cylinder approximately side by side in substantially the same horizontal plane and connect said cylinders by a laterally-inclined throat, as I will now specifically indicate.

The mixing-cylinder B is of the usual or any well-known construction and is appropriately mounted. Through the cylinder B extends the shaft C, to which are fixed hubs *a*, having mixing-blades *b* formed with or secured to them in any well-known and appropriate manner, said blades serving to mix and temper or "pug" the clay and cause it to travel forward for transfer to the expressing-cylinder of the tile-machine. At the forward end of the mixing-cylinder the shaft C has fixed to it a propeller or short auger D, which serves to take the clay that has been worked and advanced through the mixing-cylinder by the blades *b* and force it into the expressing-cylinder, and to facilitate this action I form the expressing-cylinder E in the form of a short casing *c*, having a laterally-curved wall *d*, which extends across the end of the mixing-cylinder and forms the end thereof, said wall having an appropriate packing or gland *e*, through which passes the shaft C of the mixing-cylinder, the end of which shaft has a suitable bearing in a box

or bearing *f* on the casting *c* of the expressing-cylinder. This casting has its base bolted to the base or foundation of the machine, and it is formed with a cylindrical portion 5 having a rear wall *g*, through which passes the shaft *H* of the expressing screw or auger, said shaft extending horizontally parallel with and exterior to the mixing-cylinder and being mounted in the boxes or bearings, as 10 at *h*, and the casting *c* is immovably connected with a casting *c'* at the head end of the machine by means of the long longitudinally-extending tie-bolts *l* and nuts *m*, thus giving rigidity and stability to the whole 15 structure, said tie-bolts being adjustable in the direction of their length by means of turnbuckles *n* to take up any looseness or wear between the parts.

The propeller or expressing-auger *F* is of 20 the usual or desired character, preferably formed of sections, and it operates in the clay-cylinder to take the clay as it is forced into said cylinder through the curved throat by means of the tempering-blades and the 25 propeller *D* on the mixing-chamber and force said clay through the front end of the cylinder *E*, which end consists of a detachable casting *I*, having a general cone shape and having flanges 20 21, the former of which is 30 designed to be bolted to a flange on the front end of the clay-cylinder, while the flange 21 is designed to have fastened to it the flanged base of a die or former, as shown at 22, for shaping or forming the clay column as it 35 leaves the machines.

The power to operate the mixing devices and the clay-expressing devices is derived from a main pulley 30, fixed to a shaft 31, mounted in boxes at 32 and provided with a 40 pinion 33, which meshes with and drives a gear-wheel 34, fixed to a shaft 35, mounted in boxes 36 and carrying a pinion 37, which meshes with and drives a large gear 38 on the shaft *H* of the clay-expressing cylinder, said shaft *H* having also fixed to it a pinion 45 39, which meshes with and drives a corresponding pinion 40 on the mixing-shaft *C*, as shown in Fig. 2.

While I have shown the train of gearing 50 just described and consider it a very desirable form for my purpose, still I do not wish to be understood as limiting the salient features of my invention as in connection with any particular power devices.

55 In operation the clay is fed into the mixing-cylinder at the head end *L*, when it is caught by the mixing-blades and worked and tempered and forced forward toward the throat. Just before the clay reaches the throat it is 60 caught by the propeller *D* and forced into and along the lateral throat into the inlet end of the clay-expressing cylinder, where it is caught by the propeller or auger thereof and forced through the discharge end of the cyl- 65 inder in the usual well-known manner.

As before mentioned, in the machines of this class as heretofore made the tempering

or mixing cylinder is located vertically above the clay-expressing cylinder, and some form of wiper or transfer device is required to 70 force the soft sticky clay from one cylinder to the other, and in some forms of soft clays it is almost impossible to work them to advantage. In my machine I am enabled to work a greater variety of clays by placing 75 the mixing-cylinder and the clay-expressing cylinder in different vertical planes and on substantially the same level instead of one over the other, and I am permitted to form a relatively large lateral throat or opening be- 80 tween the two cylinders, which prevents choking. The discharge end of the mixing-cylinder being curved by reason of the curved wall of the casting which forms the clay-expressing cylinder causes the clay to have a more 85 natural flow into the latter cylinder, and by placing a propeller or auger on the end of the mixing-shaft *I* force the clay by direct power from one cylinder to the other, and thereby overcome the difficulty of trying to induce 90 clay or plastic material to fall by gravity. My arrangement also gives a positive feed at this point of transfer, thereby increasing the capacity of the machine and overcoming the trouble of the clay "barreling up" on the 95 wipers of the before-mentioned machines. By placing the cylinders horizontally and substantially side by side I also gain four (4) more feet in the height of machine, which is important, because all of the adjunctive clay- 100 elevating machinery and the building necessary to house this machine are correspondingly lowered, thereby reducing the cost of building. Also when the clay is conveyed 105 such from a floor below the one on which the machine sets the conveyer is placed at a less angle, thereby overcoming the trouble of the clay rolling back by gravity to the foot end of the conveyer. I am also enabled to dis- 110 pense with the staging or elevated framework which is essential for the operator of the said former machines and which necessitates the employment of an extra operator to attend to the die and cutter.

With my machine the operator stands on 115 the same floor-level with the machine and the cutting appliances, (not shown,) which permits said operator to attend the machine and the cutting machinery, thereby dispensing with an extra operator and saving the cost of 120 the same.

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

1. In a machine of the character described 125 the combination of two separate and independent cylinders placed substantially in the same horizontal plane and means connecting the discharge end of one cylinder with the inlet end of the other cylinder, one of said 130 cylinders having clay-tempering devices and the other cylinder having a clay-expressing mechanism and said devices and mechanism extending parallel and in the same direction.

2. In a machine of the character described the combination of two separate and independent cylinders placed in different vertical planes and substantially in a common horizontal plane, and a forwardly-inclined lateral passage connecting the outlet end of one cylinder with the inlet end of the other cylinder; a shaft extending through one of the cylinders and provided with mixing and tempering devices; a shaft passing through the other cylinder, and provided with an expressing mechanism, said mixing and tempering devices and expressing mechanism extending parallel in the same direction, and a prime mover and power-transmitting mechanism between the same and the said shafts, for rotating the latter.

3. In a machine of the character described, the combination of two separate and independent cylinders of unequal length extending in the same direction and placed horizontally substantially side by side, and with the outlet of one cylinder connecting horizontally with the inlet of the other cylinder; a shaft extending through one of said cylinders and provided with mixing or tempering blades, and a propeller or auger arranged proximate to the discharge end of the cylinder; a shaft passing through the other cylinder; and a propeller or auger on said second shaft and receiving the discharge from the first-named propeller and expressing it

through the outlet of the second cylinder; said shafts extending in the same direction and means for operating said shafts.

4. In a machine of the character described the combination of a horizontally-disposed cylinder; a shaft passing therethrough, and provided with clay mixing and tempering blades, and a propeller on said shaft proximate to the discharge end of the cylinder; a second cylinder offsetting in a horizontal plane the first-named cylinder, and extending forward of and in the same direction as the first-named cylinder, and having a horizontally-curved wall forming a lateral, forwardly-inclined, throat between the discharge end of one cylinder and the inlet end of the other cylinder; a shaft passing through the second cylinder and provided with an expressing propeller or auger, adapted to receive the clay forced through said throat by the first-named propeller and express it through the discharge end of the second cylinder without materially changing the direction of travel of the clay; and power-transmitting mechanism for operating said shafts.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

WILLIAM R. CUNNINGHAM.

Witnesses:

J. L. SECRIST,
J. B. MACY.