(No Model.) 2 Sheets—Sheet 1.

M. & J. BIERLINE.

MACHINE FOR TEMPERING CLAY.

No. 398,373. Patented Feb. 26, 1889.

Fig. 3.

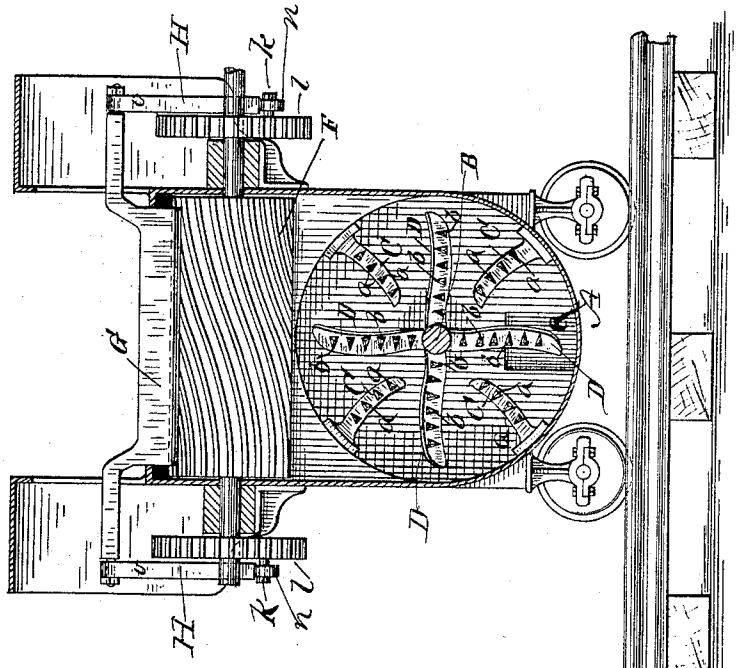
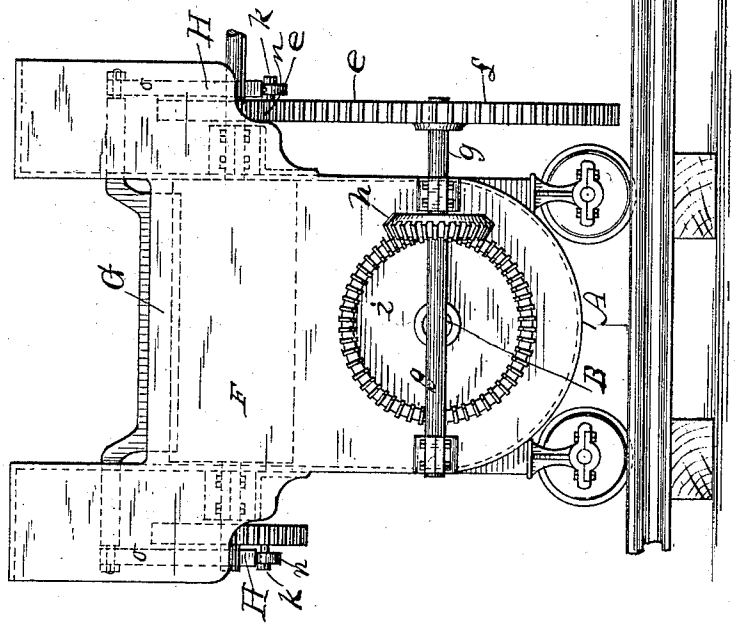


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

M. & J. BIERLINE.

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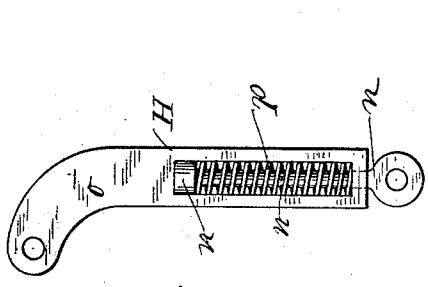


Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

MICHAEL BIERLINE AND JACOB BIERLINE, OF CHASKA, MINNESOTA.

MACHINE FOR TEMPERING CLAY.

SPECIFICATION forming part of Letters Patent No. 398,373, dated February 26, 1889.

Application filed January 20, 1888. Serial No. 261,389. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL BIERLINE and JACOB BIERLINE, citizens of the United States, residing at Chaska, in the county of Carver and State of Minnesota, have invented certain Improvements in Machines for Crushing and Tempering Clay; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

Our present invention consists in improvements upon the clay crushing and tempering machine for which Letters Patent No. 368,643 were granted to us August 23, 1887. In that patent we represented and described an upright machine with a vertical revolving shaft in a vertical drum or cylinder. It was also represented as supported by a truck with carwheels, to enable the machine to be run upon rails or a railway-track, and thus enable it to be conveniently moved from place to place. The disadvantages of the construction shown and described in the patent are chiefly that, being a vertical or upright machine, the height of the feed-hopper is so great that a platform or stage is required to be used with the machine, adding much to its expense and weight, and rendering it inconvenient to operate and feed. We obviate these objections in our present invention by a change of construction, whereby we place the shaft and drum or cylinder in a horizontal position, thereby making the hopper not more than half as high as in the former machine, and easily fed into without any stage or platform; also reducing the weight of the construction by bringing the operative parts near the base or support, and otherwise simplifying and improving the construction, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a front end view of the improved machine; Fig. 2, a side view of the same, showing a portion of the side of the cylinder broken away to display a portion of the interior construction; Fig. 3, a vertical section of the same in a plane indicated by the line 1 1, Fig. 2; Fig. 4, a side view, on an enlarged scale, of one of the improved connecting rods or arms employed for moving the feed-bar up and down over the crushing and feeding rolls employed.

Like letters designate corresponding parts in all of the figures.

In the drawings, A represents the drum or cylinder; B, the operating-shaft therein; C C, fixed arms armed with teeth *a a* on the inside of the cylinder; D D, curved blades armed with teeth *b b* on the revolving shaft; F, the grooved or fluted clay-crushing and feed rolls; G, the bar over the said rolls, having an up-and-down movement; and H H, the connecting rods or arms by which the up-and-down movement is imparted to the said bar, all fulfilling the same purposes as the corresponding parts in the former patent.

In the present invention we place the cylinder A in a horizontal position, as shown, whereby the main objects above set forth are effected, and consequently the revolving shaft B is also horizontal. In order to enable us to thus arrange the cylinder and shaft, we place the grooved rolls F F crosswise over the side of the cylinder, near the front end, the cylinder underneath the same being flared and open at the upper side, as shown in Fig. 3. Thus the clay, as it drops from between these two rolls, falls in a thin sheet crosswise of the cylinder and in a plane corresponding with the plane of revolution of curved blades D D, and thus is all immediately acted upon by the said blades in the most direct and efficient manner, and never drops or passes too rapidly through the cylinder or without being thoroughly operated upon by the blades. In order to move the clay to the rear discharge end of the cylinder with the requisite rapidity, we give the blades an inclination in the proper direction to drive the clay back, as shown in Fig. 2, where the side of the cylinder is shown broken away. By this arrangement of the cylinder and of the revolving blades we are enabled also to dispense with the curved sweeps set forth in the former patent for assisting the discharge of the clay through the aperture *c*, Fig. 3, in the rear end of the cylinder. The gear for driving the shaft B is also simplified and cheapened by the construction and arrangement set forth in this specification. Thus we dispense with the sprocket wheels and chains described in the former patent and drive the shaft B from the roll-shaft *d*, Fig. 2, by means of a spur-

wheel, *e*, on the shaft *d*, gearing immediately with a spur-wheel, *f*, on a transfer-shaft, *g*, and a bevel-wheel, *h*, on the latter shaft gearing into another bevel-wheel, *i*, on the shaft B.

Another improvement in the present invention consists in the improved connecting rods or arms H H, which move the bar G up and down, and which are mounted, respectively, on crank-pins *k k* on the spur gear-wheels *l l* on the shaft *m* of the fluted roll, which is geared to the shaft *d* of the other roll. This improvement consists in making each connecting rod or arm with two parts, *n o*, one sliding in or on the other, and inserting a coiled or equivalent spring, *p*, between the two parts of the arm, so as to allow the parts to be pulled away from each other to a greater or less extent against the force of the spring, which immediately brings them together again and shortens the arm to its normal length as soon as the separating force is removed. With this construction the springs *p p* have sufficient strength to force the bar down upon the clay in the hopper or over the rolls as powerfully as required, but yield and allow the arms to lengthen, so that the bar may not be forced down violently or broken in case a stone or other unyielding obstruction is in the clay and struck by the bar.

We claim as our invention—

1. In a machine for crushing and tempering clay, the combination of a horizontal tempering-cylinder, a horizontal blade-shaft in the said cylinder, and a pair of fluted clay-crushing and feed rolls mounted crosswise of the tempering-cylinder and over its forward end, substantially as and for the purpose herein set forth.

2. In a clay crushing and tempering machine, in combination with the upwardly and downwardly moving bar and crank-wheels for driving the same, the connecting rods or arms, made each in two parts, and a spring between the two parts adapted to act to draw the parts together and yield to a sufficient force tending to separate them, substantially as and for the purpose herein specified.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

MICHAEL BIERLINE.
JACOB BIERLINE.

Witnesses:
LOUIS FEESER, Jr.,
M. H. MUYRES.