(No Model.) 2 Sheets—Sheet 1.

M. & J. BIERLINE.

BRICK MOLD SANDING MACHINE.

No. 309,186. Patented Dec. 16, 1884.

FIG. 1

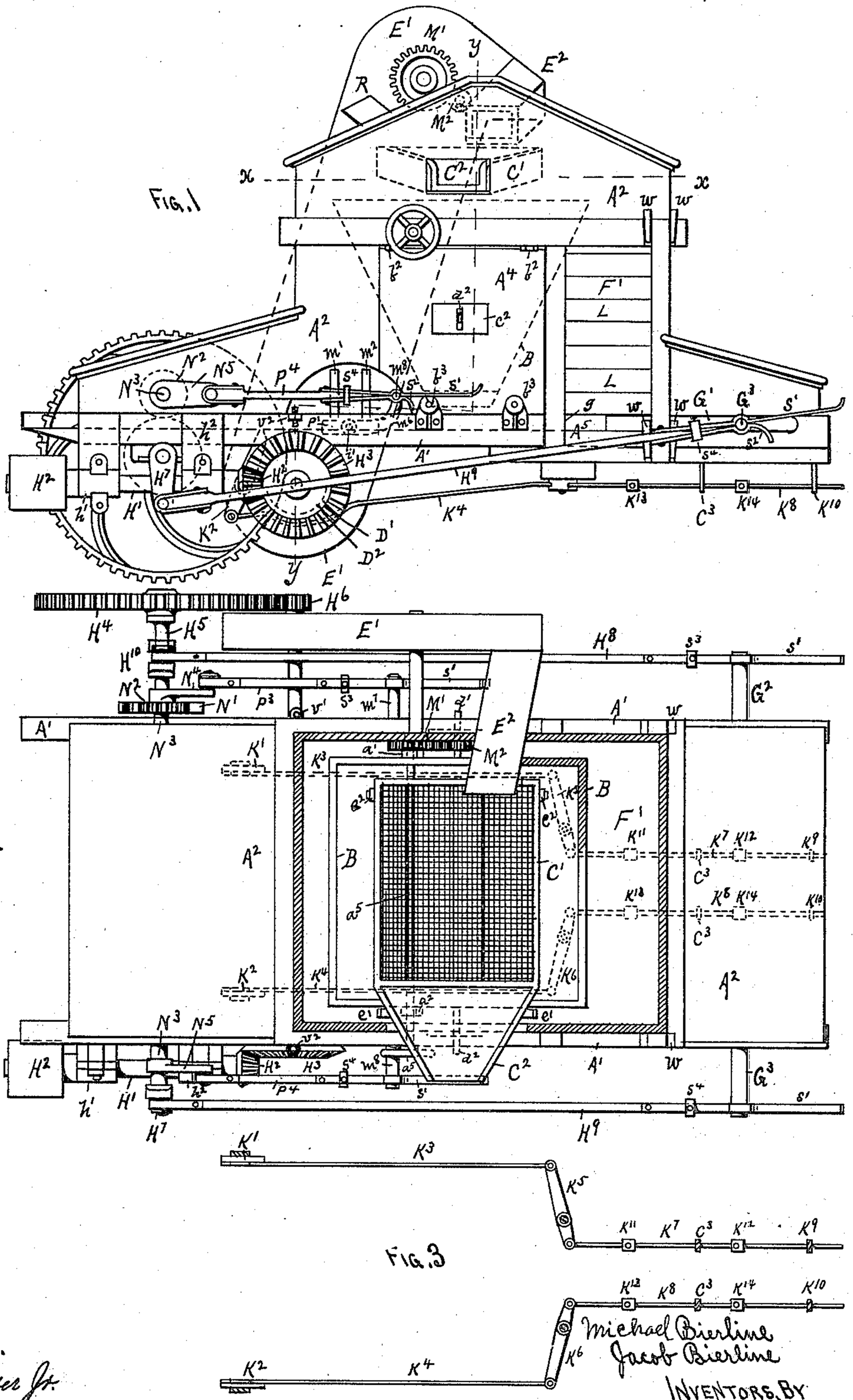

FIG. 2

FIG. 3

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 6

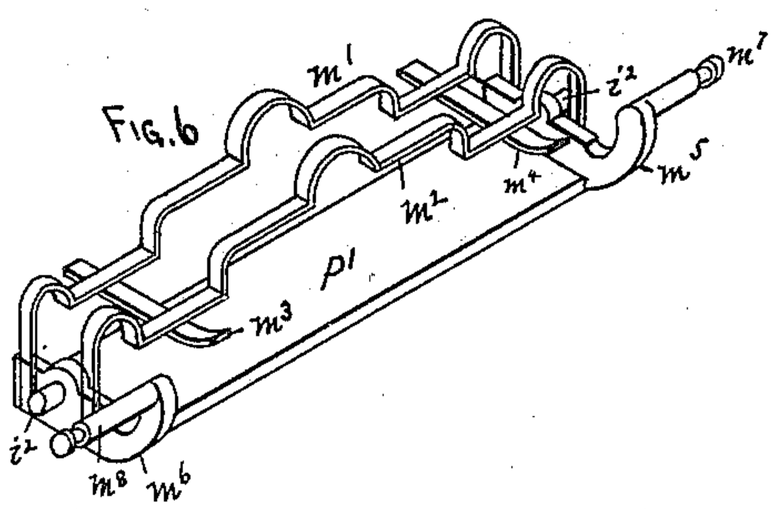


Fig. 4

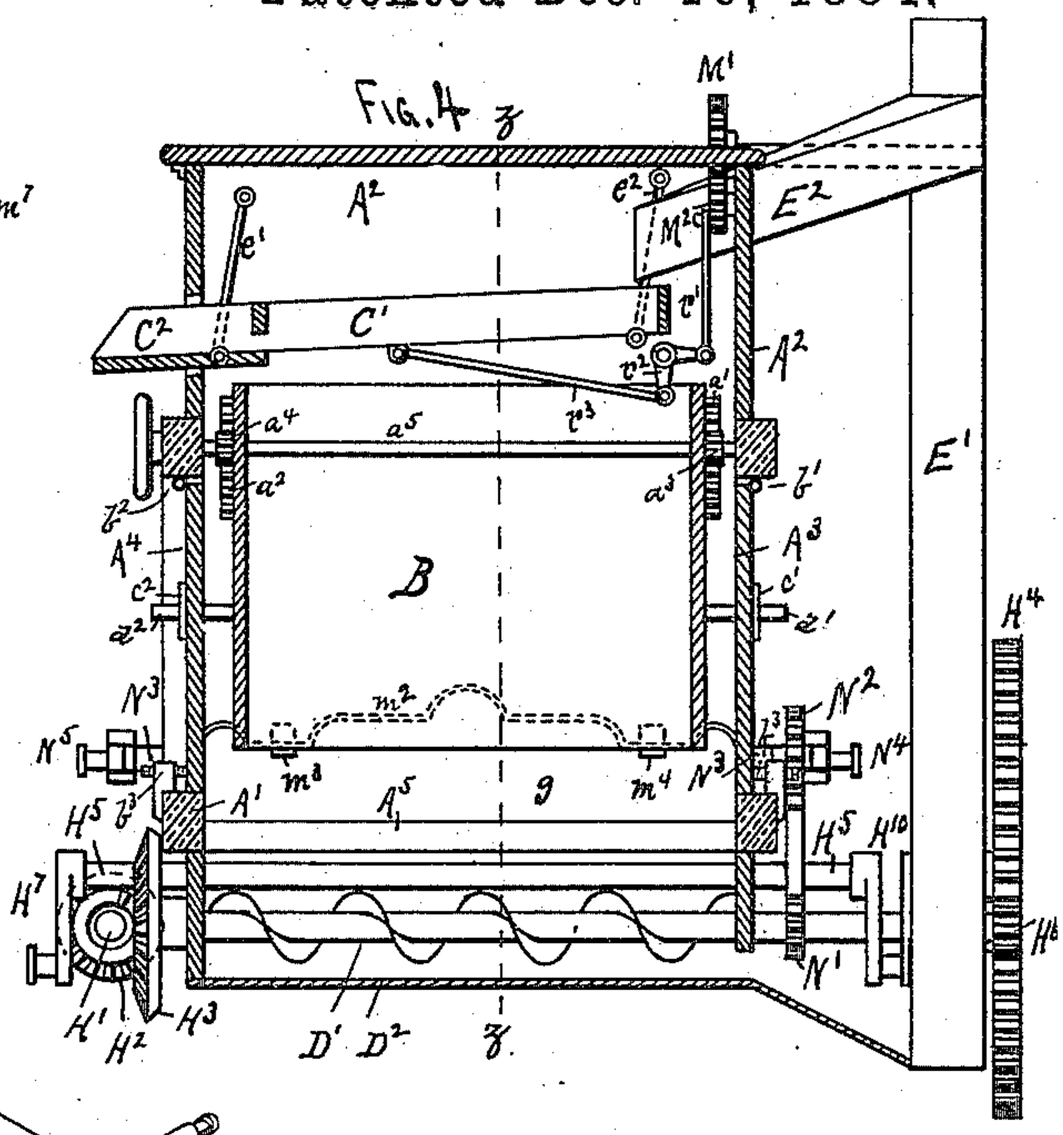


Fig. 7

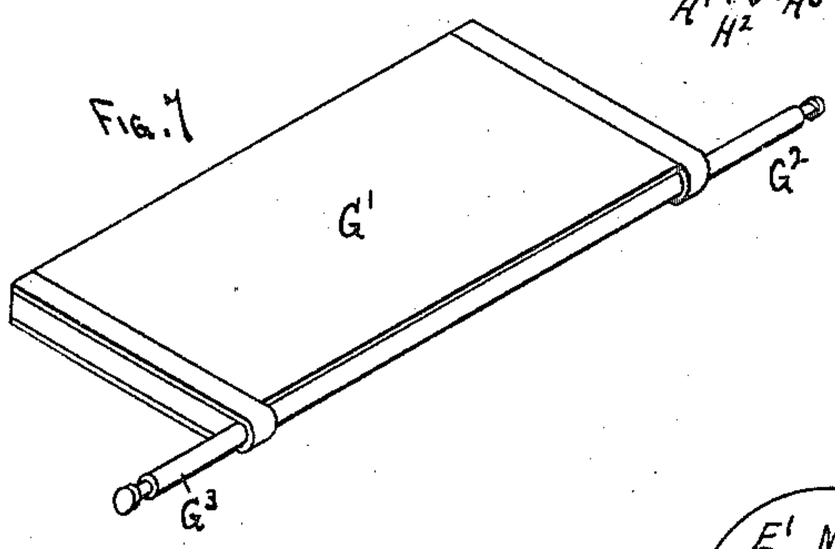


Fig. 5

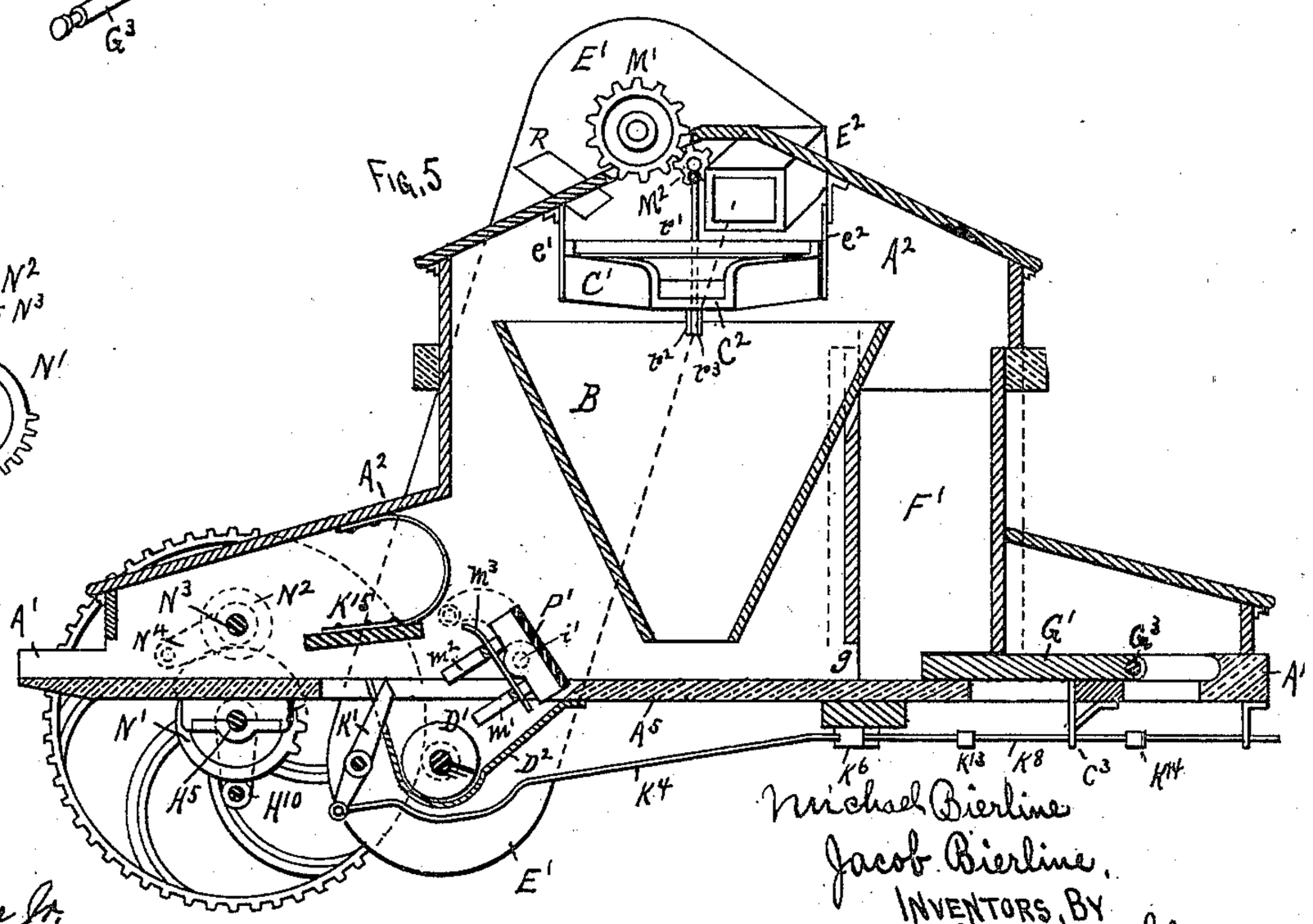
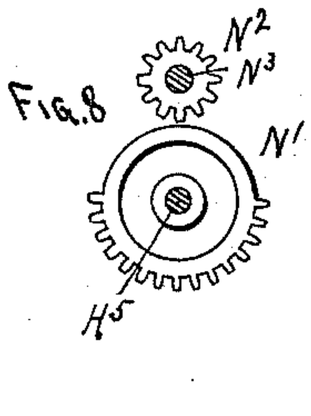


Fig. 8



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UNITED STATES PATENT OFFICE.

MICHAEL BIERLINE AND JACOB BIERLINE, OF CHASKA, MINNESOTA.

BRICK-MOLD-SANDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 309,186, dated December 16, 1884.

Application filed April 15, 1884. (No model.)

To all whom it may concern:

Be it known that we, MICHAEL BIERLINE and JACOB BIERLINE, both citizens of the United States, and both residents of Chaska, in the county of Carver, in the State of Minnesota, have invented certain new and useful Improvements in Brick-Mold-Sanding Machines, of which the following specification is a full, clear, and exact description, reference being also had to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a plan view, with the upper part in section on the line *x x* of Fig. 1. Fig. 3 is a plan view of the mold-pushing levers detached. Fig. 4 is a cross-sectional view of the line *y y* of Fig. 1. Fig. 5 is a longitudinal section on the line *z z* of Fig. 4. Fig. 6 is a detached perspective view of the mold-tilting frame. Fig. 7 is a detached perspective view of the mold-feeding plunger. Fig. 8 is a detached view of the partial gear and its pinion.

A′ is the base-frame, having erected thereon a casing, A^2, in which a hopper, B, is suspended. This hopper is provided on each side, near the top, with small racks a' a^2, with which pinions a^3 a^4 on a cross-shaft, a^5, journaled by its ends in the casing A^2, engage, so that the revolution of the shaft to the right or left will raise or lower the hopper, as desired. The sides of the casing A^2 opposite this hopper are formed into doors A^3 A^4, hinged at their tops at b' b^2, and adapted to be moved outward and inward at their bottoms by set-screws b^3, to form guides to the ends of the molds, as hereinafter shown. In these doors A^3 A^4 small slotted metal plates c' c^2 are fastened and attached to the ends of the hopper B, and projecting outward through the slots in these plates are guide-pins d' d^2, to act in conjunction with the shaft and pinions a^3 a^4 a^5, to hold the hopper in an upright position, while at the same time leaving the hopper and doors free to be adjusted, as before stated.

C′ is a screen suspended by hangers e' e^2 from the casing A^2 above the hopper B, through which all the sand passes to the hopper, as hereinafter described. This screen is arranged with a discharge nozzle or spout, C^2, leading out through the side of the casing, to afford means for the escape of the stones, clods, and other matter too large to pass through the meshes of the screen.

D′ is a screw-conveyer running in a trough, D^2, sunk below the floor A^5 of the base A′, and adapted to feed the sand which falls into it out into the foot of an elevator, E′, attached to the side of the machine, the upper end of the elevator being provided with a spout, E^2, leading into the upper part of the casing A^2, and adapted to discharge the sand from the elevator upon the screen C′, as shown. By this means the sand, after passing through the hopper and serving its purpose in sanding the molds, is carried up again and fed into the hopper, to be used over and over again without waste. On the opposite side of the hopper from the conveyer D′ is an oblong box or mold-receiver, F′, open at one or both ends, and having a slot, *g*, at the bottom next to the hopper, as shown in Fig. 5. Into this receiver the molds L are placed one above the other, as shown in Fig. 1.

G′ is a flat plate adapted to slide upon the floor A^5, beneath the receiver F′, to serve as a plunger to force the bottom mold forward beneath the hopper, as hereinafter shown.

H′ is a horizontal shaft journaled in hangers h' h^2 on the base-frame A′, and having a driving-pulley, H^2, on one end and a bevel-pinion, H^2, on the other. This bevel-pinion engages with a bevel-gear, H^3, on one end of the conveyer-shaft, by which means the latter is driven. The lower pulley of the elevator E′ is mounted upon the outer part of the conveyer-shaft, and outside of the elevator-casing, upon the outer end of the conveyer-shaft, is a pinion, H^6, engaging with a gear H^4, on a cross-shaft, H^5, journaled beneath the frame A′, as shown, by which means the latter shaft is slowly revolved at the same time as the conveyer and elevator.

In the shaft H^5, between the gear H^4 and frame A′, is a crank, H^{10}, and upon the opposite end of the same shaft, outside the opposite side of the frame A′, is another crank, H^7, these two cranks being attached by connecting-rods H^8 H^9 to studs G^2 G^3, projecting from the ends of the plunger-plate G′, so that the latter will be moved backward and forward by the revolution of the shaft H^5.

N′ is a partial gear fast upon the shaft H^5, between the frame A′ and crank H^{10}, and adapted to engage with a pinion, N^2, on a third shaft, N^3, journaled in the frame or casing above and parallel with the shaft H^5.

Upon the outer ends of this shaft N^3 are cranks N^4 N^5, as shown.

P′ is a tilting-frame having trunnions i' i^2 upon its ends, by which it is pivoted in the sides of the base-frame A′ above and partially within the trough D^2, and so mounted in said frame that when resting in a horizontal position, as shown in dotted lines in Fig. 1, its bottom will be flush with the floor A^5, so that one of the molds, when pushed along by the plunger G′, will run upon this tilting-frame without obstruction. Attached to the ends and passing across the top of this tilting-frame are two spring-straps, m' m^2, having smaller horizontal straps m^3 m^4 attached beneath them near their ends, as shown. These latter straps will be held down by the springs m' m^2, so that when a mold is forced in beneath them they will hold it down in the frame and prevent its falling out when the frame is tilted. Projecting from the ends of the tilting-frame are arms m^5 m^6, and projecting outward from the ends of these arms are studs m^7 m^8, attached by connecting-rods P^3 P^4 to the pins of the cranks N^4 N^5. By this means, when the shaft H^5 is revolved, the frame P′ will be revolved upon its trunnions one-half a revolution, to turn the mold held therein upside down and dump the sand within it into the conveyer-trough, as shown in Fig. 5, and then return the tilting-frame back to its former position with the mold still in it.

As before stated, the gear N′ is a partial gear, having teeth only upon about one-half its periphery, as shown in Fig. 8, so that the pinion N^2 will be revolved only about one-half the time and remain stationary the remainder of the time, and this vacant space will be so placed with relation to the cranks H^{10} H^7 that this pause will occur while a fresh mold is being forced into the tilting frame; hence the latter will be operated only while the plunger is making its return-stroke, and remain stationary during the forward stroke.

M′ is a gear upon the shaft of the upper elevator-pulley, and engaging with a pinion, M^2, having a crank pin and rod, r', connected by a bell-crank, r^2, and rod r^3 to the screen C′, so that the latter will be rapidly vibrated to cause the sand to pass through it more readily. A spout, R, may be set through the casing A^2, through which to feed sand to the hopper B, but will be arranged so that the sand will first pass through the screen C′, to remove coarse particles. The molds, after being moistened, will be placed in the receiver F′, the latter being large enough to receive seven or eight at a time, as the case may be, and as fast as one is removed from the bottom of the pile by the plunger G′ another will be placed in the receiver, and so on as fast as necessary. By the reciprocatory movement of the plunger G′ the lower mold is forced out from beneath the remainder above it in the pile and pushed forward beneath the hopper B, where it is immediately filled with sand and remains stationary until the next stroke of the plunger shall cause the second mold to come beneath the hopper, when this second mold will force the first mold filled with sand beneath the springs m' m^2 into the tilting-frame P′. At this point the pinion N^2 will begin to be acted upon by the teeth of the partial gear N′, and through the cranks and rods revolve the tilting-frame one-half a revolution and turn the mold held in it by the springs upside down, and dump the sand contained in it into the conveyer D′, from whence it is conveyed and elevated to the hopper again, as before stated. Then the tilting-frame is returned to its former position in time to receive another mold, the mold first forced into it being pushed out of the tilting-frame by the next mold, and so on, each revolution of the shaft H^5 feeding a fresh mold beneath the hopper and tilting the preceding one to remove the surplus sand. When the mold in the tilting-frame is forced out by the next one which follows it, the expelled mold will remain close to the edge of the tilting-frame, and would, were it not removed, interfere with the next tilting of the frame. To avoid this we arrange beneath the floor A^5, just forward of the tilting-frame P′, two small rocker-arms, K′ K^2, pivoted near their centers in hangers or to a cross-shaft beneath the frame A′. The upper ends of these rocker-arms are pointed, while their lower ends are connected by rods K^3 K^4 to the inner ends of two lever-arms, K^5 K^6, pivoted beneath the floor A^5, as shown. The outer ends of these lever-arms have pivoted to them rods K^7 K^8, running backward beneath the frame A′ and supported at their outer ends by hangers K^9 K^{10}.

Attached to the under side of the plunger-plate G′ are downwardly-projecting guides or hangers C^3, each having a hole or slot in its lower end, through which the rods K^7 K^8 pass.

K^{11} K^{12} are two stops on the rod K^7, one on each side of its hangers C^3, and K^{13} K^{14} are two similar stops on the rod K^8, one on each side of its hangers C^3. By this arrangement, when the plunger-plate G′ is moved away from the hopper B, the hangers C^3 C^3 will strike the stops K^{12} K^{14} and move the rods K^7 K^8 backward and throw the upper points of the rocker-arms K′ K^2 backward, as shown in Fig. 5. Then at the return-stroke of the plunger-plate the hangers C^3 C^3 will strike the other pair of stops, K^{11} K^{13}, and throw the upper ends of the rocker-arms K′ K^2 forward, and they, rising up through the floor A^5 by their curved line of travel, will catch the mold which has just been expelled from the tilting-frame P′ and move it forward out of the way of the next mold. Thus each expelled mold is moved away from the tilting-frame a short distance at each stroke of the plunger, so as to be out of the way of the next stroke of the tilting-frame. A spring-plate, K^{15}, will be arranged across the machine inside the casing A^2, above the rocker-arms K′ K^2, beneath which the expelled molds are forced, to hold the latter down and prevent the rocker-arms from throw-

ing them too far upward. By this means the perfect action of the rocker-arms is insured.

Different qualities of clay from which the bricks are to be formed and different conditions of the atmosphere or degrees of moisture of the sand may require some slightly-different adjustments of the tilting-frame. If the atmosphere or the sand is very dry, then the tilting-frame will not be required to be revolved quite as far as when there is more moisture in the atmosphere or sand, as under the latter conditions the sand will not adhere quite so readily to the molds. To provide for this adjustment we arrange set-screws v' v^2 upon the frame A′, upon which the studs m^7 m^8 will strike to regulate the distance which the tilting-frames P′ will be revolved.

As before stated, the hopper B will be adjustable upward and downward, the object of this adjustment being to adapt the lower edge of the hopper to the varying thicknesses of the molds. The front side of the receiver F′ will also be adjustable by wedges *w*, as shown in Figs. 1 and 2, so as to adapt the width of the receiver to the widths of the molds.

As before stated, the sides of the casing A^2 are provided with adjustable doors A^3 A^4, their object being to adapt the width of the casing to the length of the molds, and thus guide them centrally beneath the hopper, so that every separate compartment will be sure to receive its quota of sand. The ends of the connecting-rods H^8 H^9 and P^3 P^4 are provided with spring-clamps s' s^2, which are secured by their rear ends to the rods, and are still further held thereon by collars s^3 s^4, and adapted to enclasp the studs G^2 G^3 and m^7 m^8 from opposite sides. The upper springs, s' s', are longer than the lower ones, s^2 s^2, and the latter are provided with downwardly-curved ends, as shown. These springs will be stiff enough to hold the studs between them when the plunger-plate and tilting-frame are operating with their ordinary amount of friction; but in event of any obstruction occurring whereby the plunger-plate or frame P′ is retarded, then the springs will pull off from the studs and the latter ride beneath the long projecting ends of the upper springs, s' s', and leave the plate and tilting-frame stationary, and then at the return-stroke the springs will again catch upon the studs, and if the obstruction is removed will continue their work, as usual, but will continue to release themselves from the studs until the obstructions are removed. By this means all danger of the breakage of the rods, &c., by the clogging or obstructing of the movements of the plunger-plates or tilting-frame is removed. Only one stud, m^7 or m^8, on the tilting-frame and only one rod, P^3 or P^4, may be used, if desired.

When this machine is used to sand the molds to be used in that class of brick-machines into which the molds are fed from the rear, the molds may be pushed directly into the brick-machine from this sanding-machine.

The plunger G′ may be adjustable upon the connecting-rods, or the latter may be adjustable upon the cranks, so as to adapt the plunger to correspond to the widths of the molds.

Having described our invention and set forth its merits, what we claim is—

1. In a brick-mold-sanding machine, the combination of a hopper, B, through which the sand is fed to the molds, a plunger-plate, G, by which the molds are fed, one at a time, in an upright position beneath the hopper, and a tilting-frame, P′, whereby the sanded molds are tilted, one at a time, to discharge the surplus sand, and then again brought into an upright position, substantially as and for the purpose herein specified.

2. In a brick-mold-sanding machine, the combination of a hopper, B, mold-receiver F′, plunger-plate G′, tilting-frame P′, and means for intermittently moving said plunger-plate and tilting-frame, substantially as described.

3. In a brick-mold-sanding machine, the combination of the hopper B, receiver F′, plunger-plate G′, tilting-frame P′, conveyer D′, elevator E′, and screen C′, substantially as shown.

4. In a brick-mold-sanding machine, the combination of a hopper, B, mold-receiver F′, plunger-plate G′, tilting-frame P′, rocker-arms K′ K^2, and means for intermittently moving said plunger-plate, tilting-frame, and rocker-arms, substantially as set forth.

5. The combination of the hopper B, receiver F′, plunger-plate G′, shaft H^5, adapted to be revolved, and provided with cranks H^6 H^7 and partial gear N′, shaft N^3, provided with cranks N^4 N^5 and pinion N^2, and connecting-rods H^8 H^9 and P^3 P^4, connecting said cranks with said plunger-plate and tilting-frame, substantially as described.

6. The combination of the plunger-plate G′, having studs G^2 G^3, shaft H^5, adapted to be revolved, and having cranks H^6 H^7, and connecting-rods H^8 H^9, provided with spring-clamps s' s^2, substantially as shown.

7. In a brick-mold-sanding machine, a tilting-frame, P′, adapted to receive the brick-mold after being sanded, having spring-plates m' m^2, and means whereby said frame may be tilted to discharge the surplus sand, substantially as and for the purpose specified.

8. In a brick-mold-sanding machine, the combination of a hopper, B, mold-receiver F′, plunger-plate G′, tilting-frame P′, rocker-arms K′ K^2, spring-plate K^{15}, and means for intermittently moving said plunger-plate, tilting-frame, and rocker-arms, substantially as and for the purpose described.

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

MICHAEL BIERLINE.
JACOB BIERLINE.

Witnesses:
PETER ILTIS,
CHAS. BORNSTEIN.