

H. MARTIN.

Improvement in Brick-Machines.

No. 131,363.

Patented Sep. 17, 1872.

Fig.1.

Fig.2.

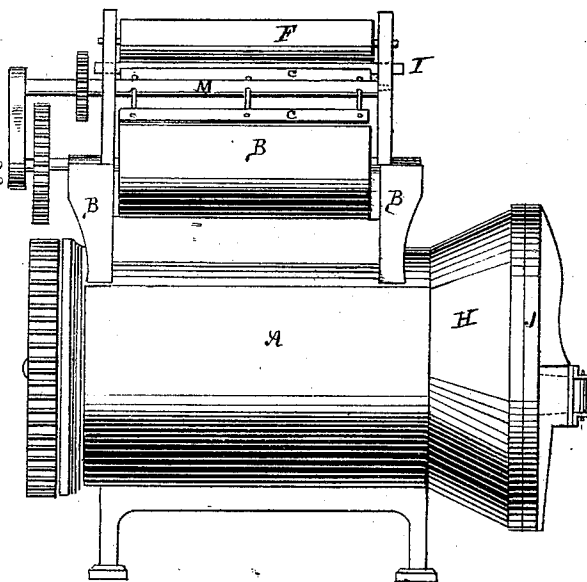
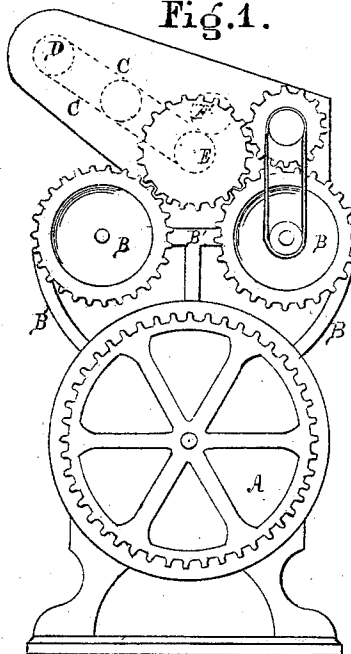


Fig.3.

Fig. 4.

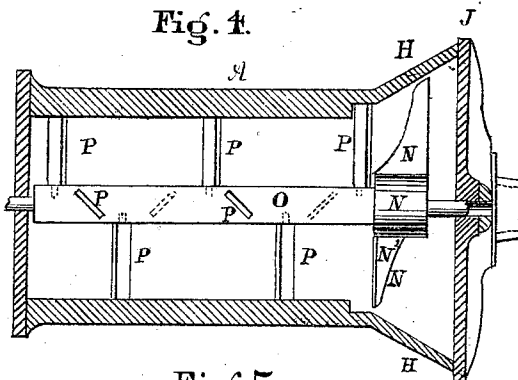
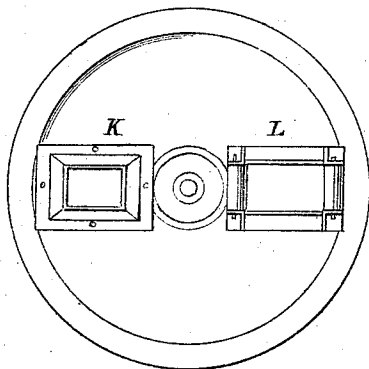


Fig.5.

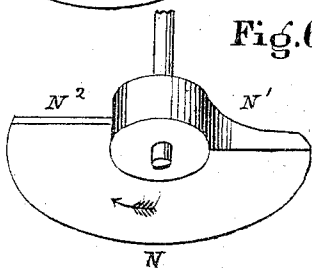
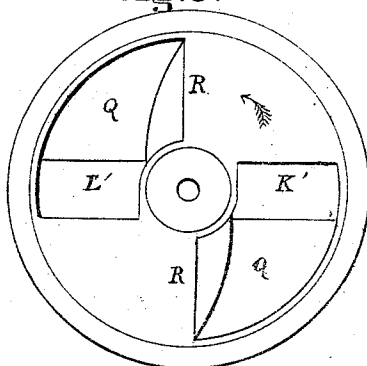


Fig.6.



Attest.  
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# UNITED STATES PATENT OFFICE.

HENRY MARTIN, OF CINCINNATI, OHIO.

## IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. 131,363, dated September 17, 1872.

*To all whom it may concern:*

Be it known that I, HENRY MARTIN, of the city of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Making Bricks, of which the following is a specification:

In ordinary pugging-machines for preparing the clay for making brick the clay is ground between the peripheries of two cylinders, whence it is fed to knives arranged upon a horizontal shaft and revolving within a cylinder. These knives cut up the clay. The first part of my invention relates to devices for effectively cutting up the clay immediately prior to its passage between the grinding-rollers. These devices consist, first, of a knife or knives, and, secondly, of an apron and feeding-rollers placed in juxtaposition with the knife, the knife-rollers and apron being made to revolve by appropriate power in such a manner that the clay, however stratified or full of lumps, may be fed evenly to the knife and be thoroughly cut up by such knife, and be well prepared for feeding to the grinding-rollers. The second part of my invention relates to the enlargement of that end of the pugging-cylinder in which the propeller revolves and from which the web emerges. The object of these various improvements under this part of my invention is to properly and effectively take the clay from the pugging-knives and press it through the openings in the cylinder and form a continuous web, and also to press out the web in successive impulses with sufficient time between such impulses for the brick-maker to cut the web, as it lies on the cutting-table, into brick, and to remove these bricks therefrom. The third part of my invention relates to a table, in which there is, first, a new arrangement of the wire-frame for cutting the web into bricks; and, secondly, to a device for separating the bricks after they are cut and before they are removed from the table. The fourth part of my invention relates to a lifter, which is a device for lifting the bricks from the cutting-table, combined with a device for separating the bricks while in the lifter.

In the accompanying drawing, Sheet 1, Figure 1 is a view of the gearing for operating the pugging-knives, the grinding-rollers, the

cutting-knives, and the rollers with the apron. Fig. 2 is a side elevation of the pugging-cylinder, grinding-rollers, and rollers of apron. Fig. 3 is an end elevation of the outside of that head which is upon the enlarged end of the pugging-cylinder. Fig. 4 is a vertical longitudinal section through the center of the pugging-cylinder, showing the pugging-knives within the pugging-cylinder; also, showing the enlargement of the end of said cylinder; also, the peculiar form of the propeller when seen in transverse vertical section through the center. Fig. 5 is an elevation of the inner side of that head which is upon the enlarged end of the pugging-cylinder. Fig. 6 is a view in perspective of the propeller aforesaid. Fig. 7 is a view in perspective of the cutting-table and the devices for cutting the web into bricks and for separating the bricks when so cut; also, the device for adjusting the space between the cutting-table and the dies. Fig. 8 is a view in perspective of the devices for lifting the bricks from the cutting-table and for separating them while lifted. Fig. 9 is a rear view in perspective of one of the separators belonging to the lifter. Fig. 10 is a view of the inner side of one of the side bars of the lifter. Fig. 11 is a side elevation of the slotted rod, which, sliding within the side of the lifter, operates the separators; and Fig. 12 is a view in perspective of the side and top of the sliding-rod, which operates the hangers of the cutting-table.

### *General Description.*

A is the pugging-cylinder, having, at H, an enlargement, formed by the sides of the cylinder being made to flare outwardly. A head, J, containing the dies K and L, fits onto the outer end of the enlargement H. B B are the ordinary grinding-rollers, placed, as usual, over the pugging-cylinder. The journals of these rollers rest in boxes supported by a suitable frame-work, B', fixed upon cylinder A. C is an endless revolving belt or apron, of suitable material, stretched around the rollers D and E, placed far enough apart to make the apron present sufficient surface for the retention of the necessary amount of clay. The apron is inclined below the horizontal a sufficient number of degrees to facilitate the carrying of the clay forward upon the apron to a

roller, F, placed directly over and quite close to the roller E. The cutting-knife consists of two blades, *c c*, fixed upon the outer ends of transverse rods, which, in turn, are attached to a horizontal shaft, M, parallel to and equidistant from each knife. Any appropriate device may be used for adjusting the knives at the desired distance from bar I, which latter is placed immediately in front of roller F for the clay coming from between the rollers E F to rest upon. One knife, or as many knives as desired, may be used. The various rollers aforementioned, the knives, and the axis with knives within the pugging-cylinder, are caused to rotate by any of the ordinary kinds of gearing, one kind of which—viz., that of toothed gear and pinion—is shown in Figs. 1 and 2. The gearing ought to be so arranged that the knives *c c* will rotate with greater rapidity than the roller F and the rollers of the apron. The relative speed of the knives may be varied with suitable gear, as desired. The knives revolve over and inward toward roller F.

The method in which this part of my invention operates is as follows: Power is applied and the gearing set in motion. The clay to be prepared for the web is thrown upon the apron, which carries the clay between rollers E and F, where it is mashed and the large lumps in it broken and formed into a continuous sheet, which latter is delivered over the bar I. At this point it comes into contact with the revolving knives *c c*, and is by them cut into very fine strips. It then falls between the grinding-rollers, where it is thoroughly ground and then fed into the pugging-knives, which again cut it up and reduce it to a homogeneous mass and push it forward to the propeller. The sides of the enlarged end may be varied in shape, as desired—for example, they may be straight instead of flaring, and be connected to the narrow part of the cylinder by a shoulder. The shape of the enlargement is immaterial, the essence of the invention being the enlargement of the end for the reception of the propeller. The propeller N is fitted upon and is turned by the axis of the pugging-knives. It may be varied in shape, but the shape I deem best is that seen in Figs. 4 and 6, Plate 1; the shape of the side elevator is that of a semicircle, and the transverse form that of the segment of a screw. The plane of the edge at N<sup>2</sup> is considerably behind that of N<sup>1</sup>, (see Fig. 4,) and, beginning at N<sup>2</sup>, the front side of the propeller gradually rises in a curved ascent to N<sup>1</sup>. The propeller is turned in the direction of the arrow, Fig. 6, and, receiving the clay from the pugging-knives, forces it forward against the head J of the cylinder. In order to facilitate the propulsion of clay from the propeller through the openings K' L', through the head J, to the dies, portions of the inner side of the head J are chamfered away at the edge R, and increase in depth very evenly but rapidly until they reach the rear edges of the dies affixed on the exterior side of the head. This inclined plane aids in

introducing the clay into the openings L' and K', through which latter the clay passes into the dies K L. These dies K L are placed upon the front of the cylinder-head J. I generally use two dies, placed as shown, one on each side of the center of the head. I may, however, use one only, or more than two, if desired. The precise point on the cylinder for the location of the dies is immaterial. The interior of each die is made of brass or other proper metal. The dies are usually formed after one of three styles. One style of dies has rollers placed in a recess in the front of each side edge of the die, so that only about one-half of the rollers projects beyond the plane of the edges of the top and bottom of the die. The interior of this die is so shaped that its orifice narrows slightly from rear to front, except that from the point where the sides of the die reach the rollers to the top and bottom of the die it is straight to the front edge. The second style of dies is one which consists of two or more of this aforesaid style of dies, placed one upon another, in order to form a more perfect web, &c. The third style of die is that shown on the left hand, in Fig. 3. The whole orifice narrows slightly from rear to within three-fourths of an inch of the front, from which point to the front edge the sides, top, and bottom of the orifice are straight. The peculiar conformation of these dies renders them fit for shaping the clay web; the latter, forced by the propeller through one of the openings K' or L' at pleasure, passes through die K or L.

The table, Fig. 7, consists, first, of a false table, by which the real table is supported and rendered adjustable. The false table consists of bottom beams S S, each of these beams supporting two of the legs of the real table. The front end of each of these upright beams is attached to an upright, S<sup>1</sup>. These two uprights are connected at the top and bottom and at the middle, if necessary, by transverse beams S<sup>2</sup>. T T<sup>1</sup> T<sup>2</sup> T<sup>3</sup> are the legs of the cutting-table, one leg at each corner thereof. In the feet of these legs are rollers, by which the table rolls upon the beams S. V is a horizontal beam, connecting leg T with T<sup>1</sup>; and V', similar to V on the opposite side of the table, connects T<sup>2</sup> and T<sup>3</sup>. W W are the hangers, which slide upon the beam V. The flanges of these hangers lap over the outside of this beam. In the middle of the outside of this beam runs a longitudinal slot. Each hanger has upon the inner side of its flange a horizontal bead, fitting into the slot aforesaid. This bead prevents the hangers from rising off from the beam V. To keep the bead of the flanges always in the horizontal slot a bar, U, parallel to beam V is placed outside of but close to them. Against the bottom of these flanges, and between and parallel to beams U and V, extends rod Y, (shown dotted in Fig. 7, and clearly in Fig. 12,) on the front end of which is a rack, operated by a pinion, *e*. Upon the under side of the hangers are pins, which fit into longitudinal slots in the upper side of the rod Y. These slots are of

such a length that when the rod is moved longitudinally the hangers will be, one after the other, moved along, and left separated from each other at equal distances. The hangers have, in one end of their body, and inside of beam V, a vertical slot, X, cut for the reception of the cutting-wire, as hereinafter described. On that side of the cutting-table which is opposite to that just described is a similar set of hangers, and a similar rod for operating the hangers. This latter rod V' is operated by a pinion, b. Both pinions e and b are fixed upon an axis, g, the latter working in bearings in shoulders fixed to the front of the cutting-table, and operated by a lever, a, affixed, as shown, to the top of one of the pinions, or at some desirable point, so that both pinions and their respective rods are operated together. Wooden rollers Z, provided with metallic journals, are supported between the opposite hangers by their journals resting upon the top of the supports in little semicircular bearings cut to receive them. The number of rollers supported between two opposing hangers—one on each side of the table—is usually two, but may be varied, as desired. These rollers support the web as it is forced from the die forward upon the cutting-table. *f h i* is a frame for the cutting-wires, the bar *f* being above and parallel with the top of the table, while bar *i*, similar and parallel to *f*, is below the table. The front ends of these beams are connected together by a vertical bar, *h*. Between bars *f* and *i* are strung the cutting-wires, placed at a sufficient distance apart to cut the web into bricks of proper dimensions. *m m* are stationary rods, a short distance apart, lying in the same horizontal plane, and having their ends fastened to the upper portion of the legs T<sup>1</sup> T<sup>2</sup> of the cutting-table. The rear end of bar *f* slides upon these two rods, which perform the double office of vertical supports and braces to prevent lateral tension. A horizontal rod, J<sup>2</sup>, is arranged to slide transversely through the sides T<sup>1</sup> and T<sup>2</sup>, and is attached to bar *f* between the rods *m m*. The rear end of the bar *i* is firmly attached to a rod, K<sup>2</sup>, which is parallel to and in the same vertical plane with the bar J<sup>2</sup>. This bar, K<sup>2</sup>, extends and slides through both legs T<sup>1</sup> and T<sup>2</sup> of the table. On each side of and parallel to this bar K<sup>2</sup>, and between the legs T<sup>1</sup> and T<sup>2</sup>, extend two wires (similar to *m m* above) on which the bar *i* slides. The bars J<sup>2</sup> and K<sup>2</sup> at one end are connected together by a vertical piece, *l*, and at the other end by a similar piece, *l'*. The pieces *l* and *l'* serve as handles to manipulate the cutting-wires. It will thus be seen that the frame with the wires can be pushed back and forth from one side of the table to the other, the bars K<sup>2</sup> J<sup>2</sup> sliding through the legs T<sup>1</sup> and T<sup>2</sup>, and carrying with them the frame *f h i* along the upper wires *m m* and along similar wires below. The use of the bracing-rods *m m* obviates the employment of a diagonal brace passing from

the top of vertical bar *h* to the top of one of the vertical handles *l l'*. No. 10 represents a device for moving the cutting-table backward and forward.

The method in which the cutting-table is operated is as follows: The lever *a* is turned sufficiently to cause the pinions *e b* to move the rods Y so that all the hangers W on each side of the table are brought nearly together, but just far enough apart to allow the knives to pass between them. The knives have previously been drawn close to the beam V, and been stationed in the slots X in the hangers W, where they are just opposite the openings between the hangers. The web being forced from the dies onto the rollers Z is allowed to come forward until it covers all the rollers. The cutting-frame is then pushed forward and the knives pass through and cut the web into bricks. The knives are then pushed forward till they reach the beam V'. The lever *a* is then turned so that the hangers are separated; as they separate the bricks are separated, and are thus in a position to be taken up by the lifter. The handle is used to adjust the cutting-table to the mouth of the feeding-die.

The lifter (Fig. 8) is made as follows: P is the handle, consisting of a rod of proper thickness to be grasped by the hand, and about as long as the lifter. If the lifter is to be moved by other than manual power the handle must be modified accordingly. *x x'* are the two side bars of the lifter. On the inner side of each of these bars is sunk a longitudinal slot extending nearly the whole length of the bar. In this slot plays a closely-fitting rod Z', in which latter are longitudinal slots 1, 2, 3, and 4, each slot being so much longer than the one preceding it as to enable the separators *t* to be properly separated. These separators *t* are attached to the inner part of one of the sides by means of staples placed on the inner side of the separator, usually four in number, two at the top and two near the bottom of said inner side. In the inner side of each of the bars *x x'*, aforesaid, are two secondary slots, one above and the other below the main slot, and parallel thereto. In each secondary slot is fixed a wire, which is parallel to, and also a short distance from, the sides and back of the slot. The upper wire passes through the two upper staples 7 7 in each separator, and the lower wire through the lower staples 8 8. From the center of the inner side of the separator-block projects a stub, 9, which is fitted into one of the slots 1, 2, 3, and 4 in the sliding rod Z'. The other separators are precisely similar to the one just described, and are attached to the side in a similar manner, and the stub of each is fitted into one of the slots in the sliding rod Z'. Of course the length of the sides and the number of separators used may be varied at pleasure. The length of each slot in the rod will depend upon the number of separators in the lifter, as the slots are to be so arranged that the rod will move one separator a required distance, and

then the next separator the same distance from the one preceding it, the object sought being to separate the separator-blocks from each other the same distance. Upon the back of the slotted movable rod is attached a flange or shoulder, which extends through the side bar and projects beyond the exterior of said side. Upon the top of this projecting part is a rack into which a pinion  $u$  engages. Pinion  $u$  turns on a pin entering the side  $x$ , and is worked by a lever,  $r'$ .

The devices for operating the separators in the other side  $x'$  are precisely similar to those just described. The tops of the levers operating the pinions  $u$  on each side, are connected by a cross-bar,  $r$ , which serves as a handle, and enables the separators on both sides to be moved together or apart simultaneously, as in the separating devices of the cutting-table. The handle of the lifter is divided vertically in half. Arms  $g$  extend up obliquely from the ends of the side bars nearly to the handle; when crossing each other, they ascend vertically and are attached to that half of the handle opposite. At the point where the arms from each side cross each other, they are attached together by a pivot, Fig. 8. When the halves of the handles are brought closely together, the lateral distance between the separators must be a little less than the length of the brick to be lifted. The operation of the hinged joint of the arms, just described, is like that of a pair of pinchers. By moving apart the halves of the handle, the sides  $x$  and  $x'$  recede from each other. By drawing the halves together, the sides approach each other.

The method of using my device is as follows: The bricks being cut on the cutting-table and not yet separated, the separators on the lifter are brought together and the halves of the lifter being allowed to separate, the lifter is brought down so that the sides  $x x'$  inclose the ends of the brick, and so that each separator-block is exactly opposite to and covers the end of one brick. The halves of the handle are then brought together in the hand, when the sides  $x x'$  will firmly grasp the bricks between them, and the lifter holding the bricks is then raised and carried to the desired point. The bricks can be separated while in the lifter by simply moving the connecting-

rod  $r$ , thus moving the pinions  $u$ , which in turn operate their respective racks, which move the sliding slotted rods  $Z'$ , which latter by means of the stubs 9 move apart the separators and with them the bricks. Thus separated, the bricks are then placed where desired and the lifter withdrawn. The separators are then brought together and the lifter is then ready for a second operation. Whenever the bricks have been previously separated by the separating devices upon the cutting-table, the separators in the lifter are separated previously to placing it over the bricks, after which the lifter is applied to the bricks and tightened upon them as before, when the bricks are removed by it and carried to the point selected.

What I claim as my invention is—

1. The apron C and rollers E and F, in combination with the cutting-knives  $c c$ , as and for the purpose set forth.
2. The bar I, in combination with the apron C, feed-rolls E and F, and knives  $c c$ , substantially as and for the purpose set forth.
3. In combination with the cylindrical body of the pugging-machine and the propeller, the gradual enlargement of the end, substantially as and for the purpose set forth.
4. The cutting-table, in combination with the hangers W and sliding frame for the cutting-wires, substantially as and for the purpose set forth.
5. The laterally-sliding frame, braced substantially as described, and provided with cutting-wires, for the purpose set forth.
6. The slotted rod Y, for separating the hangers on the cutting-table, substantially as and for the purpose set forth.
7. The false table, in combination with the cutting-table and hangers W, substantially as and for the purposes specified.
8. In combination with the false table the cutting-table and the hangers W, the device No. 10 for removing the cutting-table from the die, substantially as described.
9. The lifter provided with the separators  $t$  and slotted rods  $Z'$ , substantially as described, and for the purpose set forth.

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