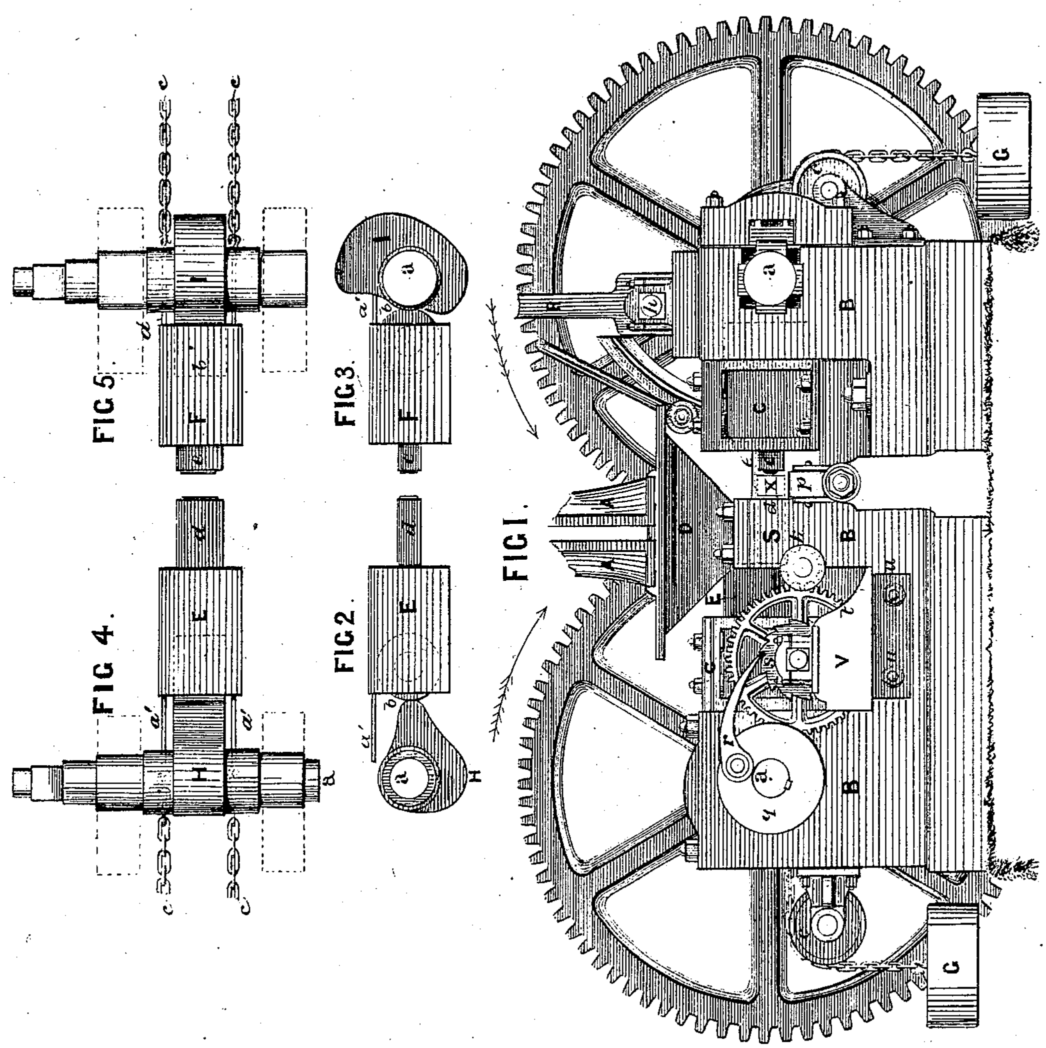
R. W. BROWNHILL.

Brick-Machines.

No. 196,782. **Patented Nov. 6, 1877.**



WITNESSES: J B Gould, J Crane

INVENTOR: Rowland William Brownhill

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FIG 8.

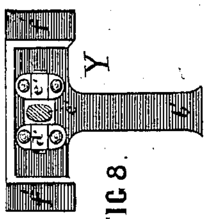

FIG 7.

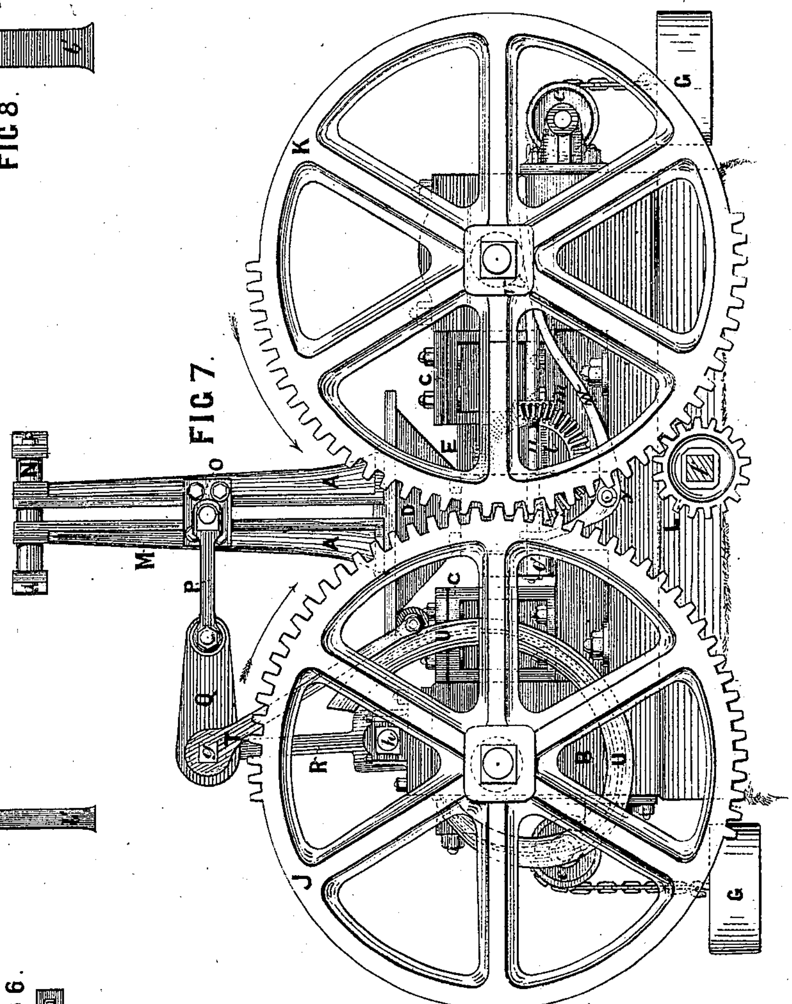

FIG 9.

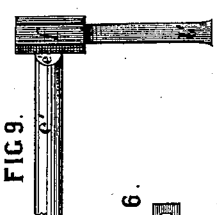

FIG 6.

WITNESSES { J B Gould
J Braun

INVENTOR.
Rowland William Brownhill

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

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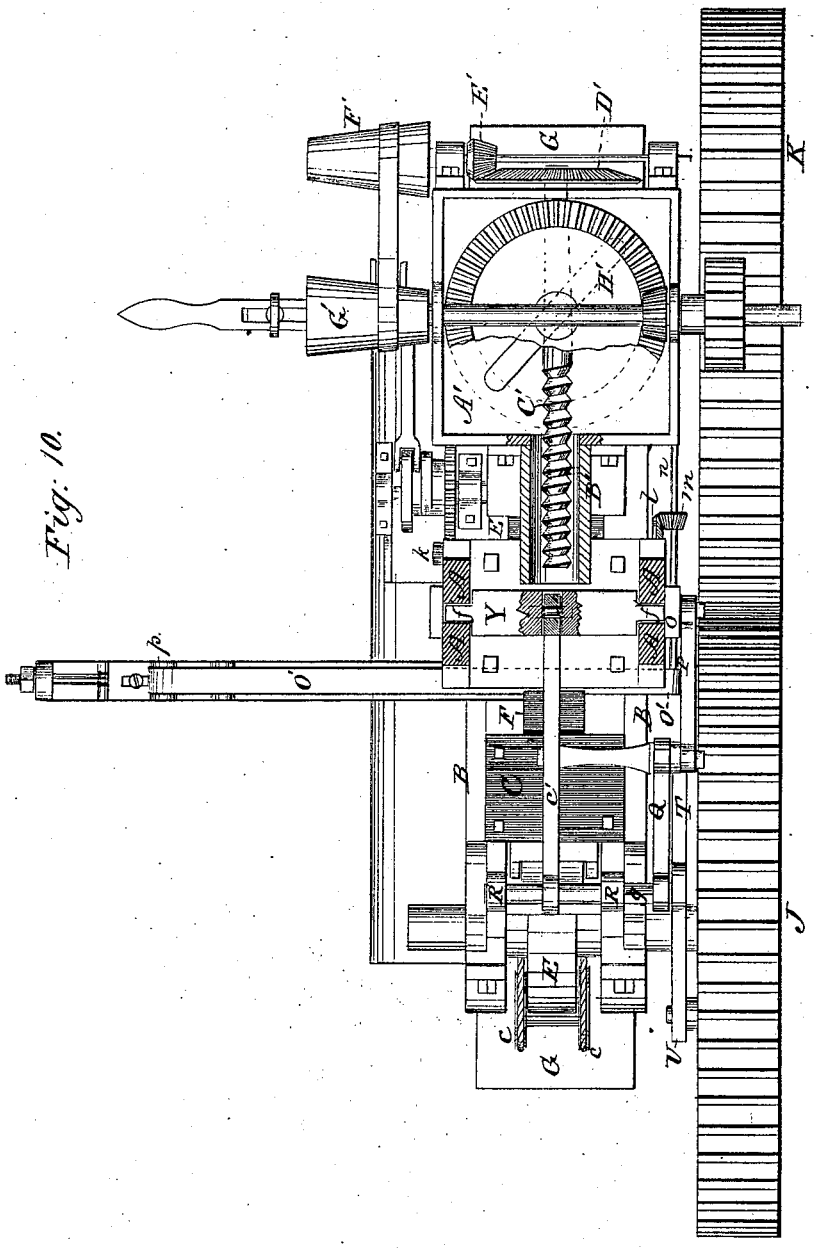
Fig. 10.



WITNESSES:

W. W. Hollingsworth

Edw. W. Byrn

INVENTOR:

Rowland William Brownhill

BY

Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROWLAND WILLIAM BROWNHILL, OF WALSALL, ENGLAND.

IMPROVEMENT IN BRICK-MACHINES.

Specification forming part of Letters Patent No. **196,782**, dated November 6, 1877; application filed July 17, 1876.

To all whom it may concern:

Be it known that I, ROWLAND W. BROWNHILL, of Walsall, in the county of Stafford, England, have invented a new and Improved Brick-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to an improved machine for making bricks and other similar articles from grosser materials, and a greater variety of the same, than is usually employed for this purpose.

It is an improvement upon that form of brick-machine in which a vertical beater or plunger drives down the materials from a hopper into the mold, where said materials are pushed to one side and compressed into shape by two steam-heated plungers operating adversely to each other from the action of two cams placed upon shafts on each side of the hopper, which shafts are geared together by cog-wheels, and the brick, after being pressed, is delivered to a traveling belt for further removal.

The present improvements consist in the particular construction and arrangement of the pistons with the inclosing-cases for said pistons, the mold, and the actuating-cams; in the particular means for operating the carrier-belt; and in the peculiar construction and arrangement of devices for operating the plunger, as hereinafter more fully described.

Figure 1 is a partial front elevation. Fig. 7 is a rear elevation. Figs. 2, 3, 4, 5, 6, 8, 9 are details; and Fig. 10, a plan view, partly in section, this view showing also, on the right, additional device, placed above one of the plungers, for feeding the material to the hopper.

The guides A A for the beater stand on the top of the hopper D, but are broken off in Fig. 1 for want of space. B B B represent the front side of the machine, which is a facsimile of the back side, a lengthwise opening being formed in this heavy cast-iron frame for two cams to work between. The said cams are shown in Figs. 2 and 3 separately over the respective positions which they occupy in Fig. 1, said cams defining their positions in relation to the other working parts, as shown in Fig. 1, and also to the hollow pistons E F with the pressers *d* and *e*, by reason of their location above the same.

Figs. 4 and 5 represent edge views of the cams, showing their axes and extensions of the same for receiving two large spur-wheels, hereinafter referred to, but omitted in these views. The center of the axes of the cams, also the axes of the spur-wheels, above referred to, are marked *a a*. In these views, as at Figs. 4 and 5, a top view of the hollow pistons E F and pressers *d e* is shown.

C C are casings, that are cast in parts, and bolted down to the bed on each side by projecting flanges, flanges being also formed on their top edges, to which the tops are bolted. These cylinders are lined with thick plates of brass or gun metal, planed and trued on their inner surfaces for receiving the hollow pistons E F, which are fitted with large friction-rollers, marked *b b*. These rollers work on internal axes, and are held against the faces of their respective cams by suitable weights or springs, as shown in Figs. 1 and 7, marked G G, attached to the projecting bolts *a' a'*, Figs. 2, 3, 4, 5, by chains working over pulleys, also shown in Fig. 1, marked *c c*, by which means the hollow pistons E F, with their presses *d e*, are retired as the throw of the cams diminishes.

The face of the pressers is represented at Fig. 6, which face forms the side of the brick to be molded. The rectangular projecting panel upon said face will impart a corresponding depression to the brick, and as the face of the presser *e* is formed in the same way, each side of the brick, when molded, will have sunken panels formed thereon; but by the same means any other configuration may be imparted to the flat side of the brick made by this machine.

The hollow pistons are made sufficiently thick in substance to permit of a hole or holes being formed in them and continued to the pressers *d* and *e*, through which steam may be conveyed to the latter parts for the purpose of heating them, in order that they may more freely press the material of which the bricks are formed without clogging.

Fig. 7 represents the reverse side of the machine to Fig. 1, with the large spur-wheels before referred to, marked J and K, with a few

of the working cogs only. The pinion L, which is the driving-wheel, works in a strong bearing, deriving its motion by the shaft *f* from any prime mover operated by steam, water, or any convenient power. The arrows denote the directions in which the large wheels work.

M is the upper extension of guides A A, secured on the top of the hopper, which guides are duplicated on the other side (see Fig. 10) for the cross-head *y* of the beater to work between, the cross-piece N connecting the tops of the guides being steadied by any convenient stay secured thereto. The plate O, which is secured to the standards, forms a pivot for link P, which is connected to the arm Q, Figs. 7 and 10. This arm is keyed onto the square shaft marked *p*, which is supported by the swinging standards, marked R, working on the center at *h*, Fig. 7, by which means, in connection with others about to be described, a vertical reciprocating action is obtained for lifting a heavy weight or beater working between the standards. (Shown in a detached flat view at Fig. 8.)

The lower part descends into the mold-box, marked S, Fig. 1, to beat down the clay of which the brick is to be made. To actuate this beater or weight the arm T, secured rigidly to the shaft *g*, terminates with a friction-roller, which works on the face of an irregular spiral flange, marked U U, and by rocking shaft *g* oscillates arm *c'*, Figs. 9 and 10, which latter is pivoted to the beater and rigidly attached at the other end to shaft *g*.

The pinion, marked *k*, Fig. 1, works on an axis that extends to the back of the machine, which axis carries also a beveled wheel, *l*, Fig. 7, which gears with a beveled pinion marked *m*, fixed to a longitudinal shaft which carries a fixed pulley, around which an endless band works, marked O'. This band works over a corresponding free pulley in front of the machine, Figs. 1 and 10, marked *p*, and has an intermittent motion imparted to it by the revolving face-plate, marked *q*, Fig. 1, secured on the axis *a*. On this face-plate the pawl *r* works and acts on the ratchet-wheel *s*, which is secured on the axis that carries the cog-wheel marked *t*, which axis is supported on the carriage and bracket V, and which carriage is secured to the frame of the machine by screw-bolts, as at *u u*.

The continuous band hereinbefore referred to is for the bricks to fall upon as they are ejected from the mold; but, in case the brick still adheres to the face of the presser that has forced it out, the band is elevated against the under edge of the brick, which has a tendency to detach the brick from the face of the presser. This is effected by the small finger or projecting pin from the axis of the large spur-wheel K, (shown in dotted lines at *v*,) Fig. 7, which presses down the long end of the lever *w*, which works on a fulcrum at *y*. This lever is bent up, terminating with a loose eye, through which the shaft *n* works, so that as the finger or projecting pin *v* passes over this lever it elevates the pulley that carries the band and removes the brick just at the moment it is presented for that purpose, the machine with its working details being exhibited just at the time a brick is delivered, which brick is shown in end view at X, Fig. 1. The projecting pin *v*, Fig. 7, is just coming into operation to elevate the band O' for receiving the brick, as shown.

The mode of supplying the clay to the hopper from whence bricks are to be made may be varied; but I prefer setting up an auxiliary inclined hopper, A', Fig. 10, in which the clay or other material may be emptied from a wheelbarrow, and conveyed from this auxiliary hopper to the hopper proper I apply a wood trough, B', in which a shaft, C', revolves, having a projecting spiral blade around its periphery, making about one revolution, say, every nine inches, more or less, as may be required. This spiral screw may be set in motion by the action of the machine in any convenient way; but I have found that by applying a bevel-wheel, D', at the outer end of the shaft carrying the spiral, and suitable bearings provided for the shaft to work on, the said bevel-wheel may be geared with a corresponding wheel, E', fixed at the end of the shaft carrying a pulley, F', around which pulley a band works in connection with a pulley, G', formed on a shaft geared with the large spur-wheel K, a bevel-gearing, H', serving to operate a stirrer for the said hopper.

We will suppose that the material is regularly fed into the auxiliary hopper, and has been conveyed along by the spiral screw into the hopper proper of the machine, and that this regulated supply is made continuous with the working of the machine, which we will now suppose to commence its operation. The first movement will retire the hollow piston E and presser *d*, and simultaneously begin to advance the hollow piston F and presser *e*, their action being regulated by the eccentric form of the respective cams H and I that regulate their motion. At this time the cavity in the interior of the mold-box S will be entirely free to receive the clay, and the progress thus made will have moved around the large wheel J sufficiently to allow the lever T, by which the beater is elevated, to pass over the end of the spiral elevator secured on the inside of the wheel J, and marked U U, when the lever T will be suddenly relieved, thereby allowing the beater to drop with a force equivalent to its weight onto the clay in the hopper.

The lower portion of the beater (shown separate in front view at Fig. 8) marked *b'* will drive the clay down into the die, and the pressers *d* and *e* will gradually advance, pressing the clay solidly together, when the advancing action of the presser *d* and the retiring action of the presser *e* will carry forward the brick out of the machine, the action of the spiral U U gradually coming into use again as the wheel J turns by the contact of the face of the

spiral with the elevating-lever T, which again elevates the beater. The pawl *r* then comes into operation, to give motion to the endless band, and the projecting pin *v* on the large wheel K is made to press on the lever before described, for slightly elevating the band on the rear side to receive the brick from between the advanced presser.

Referring again to the beater, Figs. 8 and 9, the arm C′ is broken off and shown in section, but which arm has gudgeons at its end, and is attached to the beater by the two caps *d′* and *e′*, which are held onto the beater by screw-pins. By this means the lever has free action in its connection. The parts *f′* and *f′*, Figs. 8 and 10, work in the openings of the standards.

Fig. 9 represents an edge view of the beater with the lever *c′* broken off, but which, if continued as in Fig. 10, forms a rigid connection with the elevating-lever T, Fig. 7.

The bottom end of the beater marked *b′* may be slightly enlarged on its lower face, for the purpose of clearance when knocking down the clay or other material of which the bricks are being formed, which material is by no means arbitrary as to its nature and condition.

The material I am now using is coarse marl, unground and in a dry state, so that bricks made by my machine are ready as soon as made to be taken to the kiln for burning.

Bricks of irregular shape molded and pressed by my machine will involve an alteration of the parts that gives form to such irregular bricks, and the same observation will apply when molding carbonaceous or bituminous matter into blocks for fuel or heating purposes. The parts for giving form to such blocks have only to be adapted in size and shape to permit said blocks to be as readily produced by this machine as ordinary bricks.

What I claim is—

1. The pistons E and F, having pressers *d* and *e*, in combination with the mold S, having a chamber adapted to receive the pressers *d* and *e*, the casings C, having chambers adapted to receive the pistons E F, the actuating-cams H I, and the weights G, substantially as and for the purpose described.

2. The disk *q*, pawl *r*, ratchet *s*, gear-wheel *t*, and pinions *k*, in combination with the bevel-wheels *l* and *m*, the shaft *n* carrying the endless-belt pulley, the pivoted lever *w* carrying shaft *n*, and the projecting pin *v* on the main gear-wheel for operating said lever, substantially as and for the purpose described.

3. The combination of the guide-standards A A, the arm *c′*, carrying a plunger, the link P, rock-arm Q, shaft *g*, swinging standard R, lever T, and spiral flange or cam U attached to one of the main wheels, substantially as and for the purpose described.

In witness whereof I, the said ROWLAND WILLIAM BROWNHILL, have hereunto set my hand and seal this 8th day of June, A. D. 1876.

ROWLAND WILLIAM BROWNHILL. [L. S.]

Witnesses:

J. B. GOULD,

J. BRAME.