2 Sheets—Sheet 1.

H. B. CAMP.

Tile-Machines.

No. 197,718. Patented Dec. 4, 1877.

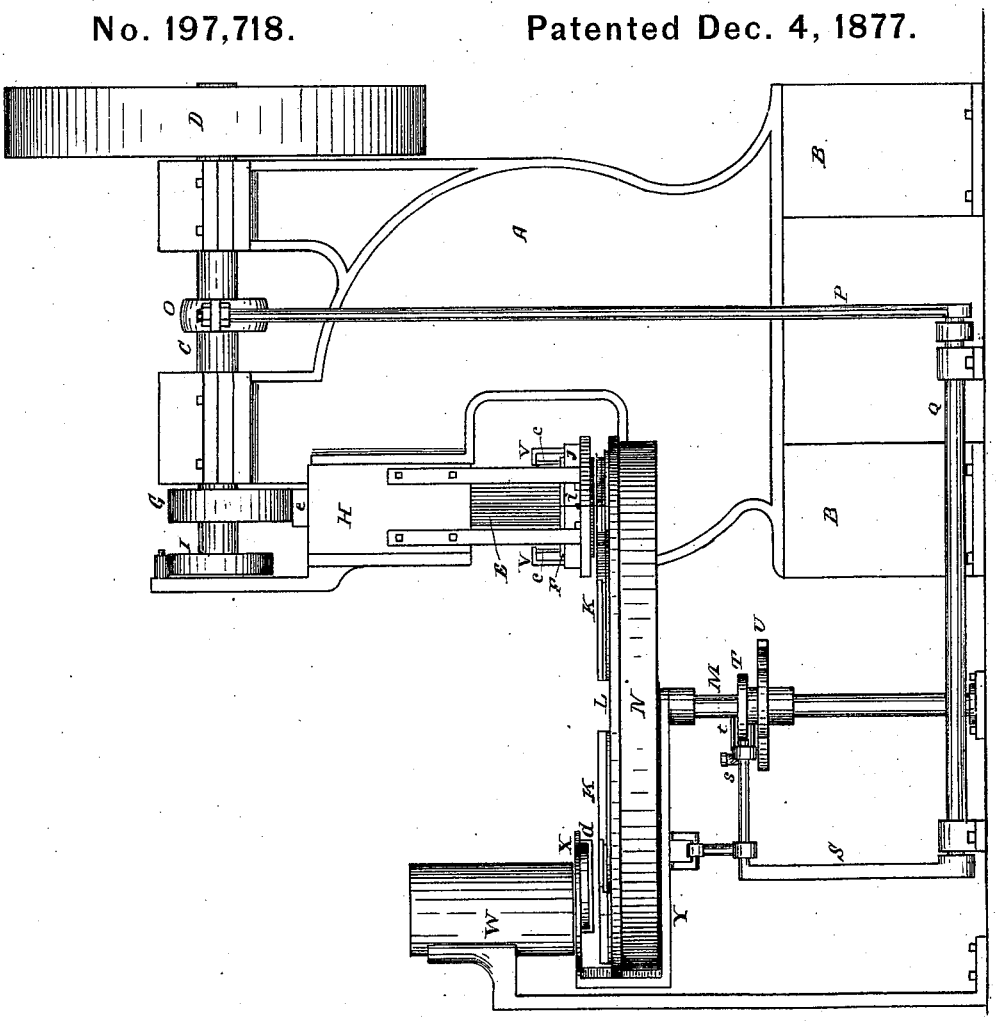

Fig. 1.

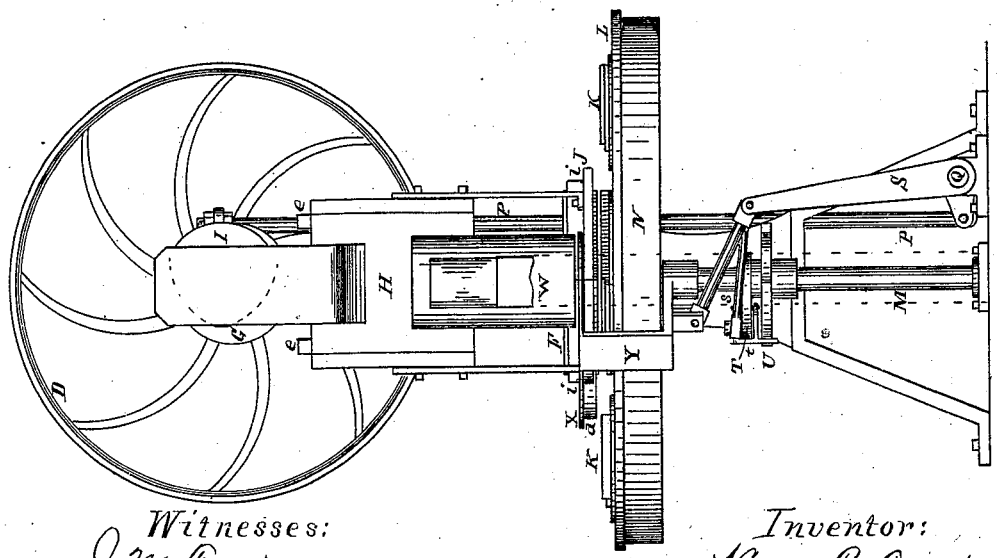

Fig. 2.

Witnesses:
J. M. Brazo
Geo. M. Wright

Inventor:
Horace B. Camp
per Humphrey & Lucas, Attys.

2 Sheets—Sheet 2.

H. B. CAMP.

Tile-Machines.

No. 197,718. **Patented Dec. 4, 1877.**

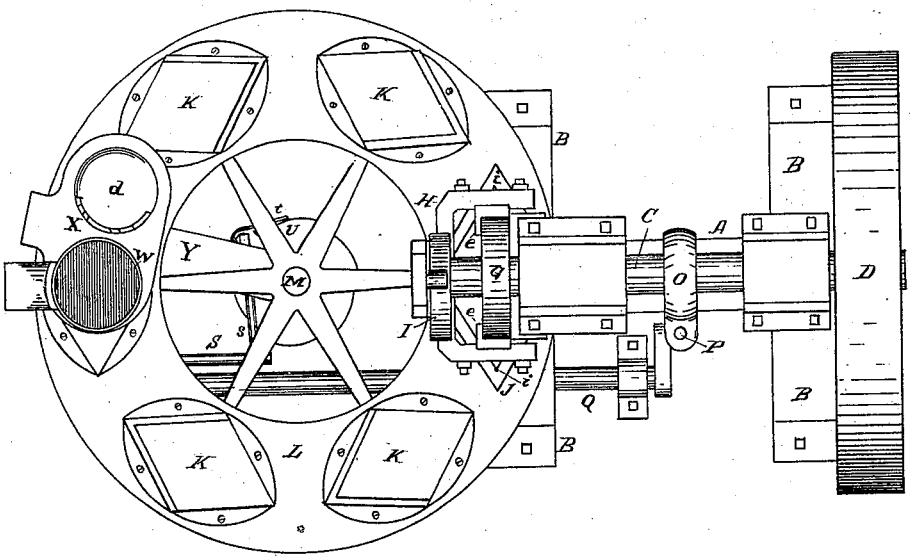

Fig. 3.

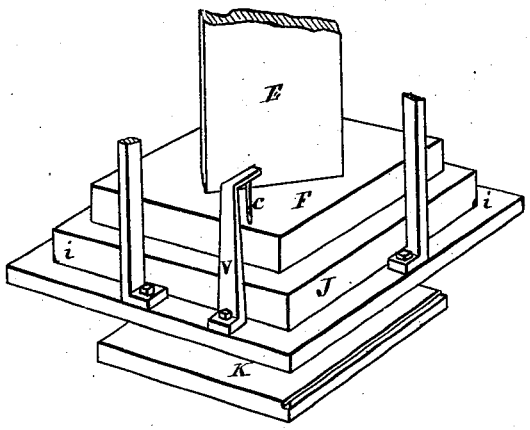

Fig. 4

Witnesses:

J. M. Fraze

Geo. M. Wright

Inventor:

Horace B. Camp

per Humphrey & Stuart

Attys

UNITED STATES PATENT OFFICE.

HORACE B. CAMP, OF CUYAHOGA FALLS, OHIO.

IMPROVEMENT IN TILE-MACHINES.

Specification forming part of Letters Patent No. **197,718**, dated December 4, 1877; application filed August 14, 1877.

To all whom it may concern:

Be it known that I, HORACE B. CAMP, of Cuyahoga Falls, Summit county, Ohio, have invented an Improved Tile-Machine, of which the following is a specification:

My invention is especially designed for the formation of roofing-tile from clay or other plastic material; but it may be applied to the formation of any pressed article capable of being shaped between upper and under dies.

The main features of my invention consist of a series of similar lower dies attached to a revolving horizontal table, and brought successively beneath the upper dies, which latter consist of two parts, viz., an outer shell, which forms the edge of the tile, and an upper die, sliding within the shell, and which forms the upper surface of the tile, each attached to suitable slides, and adapted to move independently with a vertical reciprocating motion. In combination with these elements, and moved by the same machinery, is also an automatic feeding apparatus.

In the accompanying drawings, Figures 1, 2, and 3 represent, respectively, a side elevation, a front elevation, and a plan, of my improved tile-machine; and Fig. 4, a perspective view of the dies and shell on an enlarged scale.

The main part of the machine is attached to and supported by the frame A, which stands upon the legs B B. Journaled in the upper part of said frame is the shaft C, turned by the pulley D. On the front of this frame A are cast or attached suitable guides *e e*, within which moves the slide E, carrying on its lower end the upper die F, and moved with a vertical reciprocating motion by the cam G. Upon the outside of the guides *e e* is fitted another slide, H, also having a vertical reciprocating motion, moved by the cam I, and carrying the shell J, hereinafter referred to. The lower dies K K are attached to the platform L, which is keyed to and turned by the shaft M. The platform L rests upon an annular bed, N, attached to and supported by the frame A, and the upper surface whereof, being planed smoothly, affords a sliding seat, upon which the platform L revolves.

In practice, it will be found convenient to have both the annular bed N and lower die F cast hollow, and charged with steam, when in use, to facilitate the separation of the dies from the tile after the latter is pressed. Upon the shaft C is an eccentric-cam, O, connected to a crank on one end of the shaft Q by the rod P; and upon the opposite end of the shaft Q is a crank-arm, S, which is connected by a rod, *s*, to, and moves a loose collar, T, on, the shaft M.

This collar T carries a pawl, *t*, which engages the ratchet U on the shaft M, and thereby the cam O causes, at each return stroke of the upper die F and shell J, a partial revolution of the platform L, sufficient to bring one of the dies K in position beneath the upper die and shell.

In operation, one of the lower dies K being in position beneath the upper die, with a portion of clay thereon, by the action of the cams I and G the shell J first descends and surrounds the die K, to which it is accurately fitted. The upper die then descends within the shell and presses the clay into the desired shape, all excess of clay escaping through the holes *i i* in the ends of the shell J. The upper die still remaining on the clay, the shell J first ascends; the upper die F then ascends, a partial revolution of the platform then ensues, and the operation is repeated.

I desire to call especial attention to the arrangement of the lower die, shell, and upper die, and the relative motion of the latter two at the time of forming the tile. The upper die never entirely leaves the interior of the shell J. When the shell J descends upon the die K the three parts form a closed mold, with the unpressed clay therein.

By causing the shell J to rise first, I cut off the two streams of surplus clay at the holes *i i*, leave the edges of the tile smooth and clean cut, and permit the upper die to ascend without tearing the green tile, which could not be done if the shell J remained down.

In practice, it is found that, with every precaution to prevent it, there is always incorporated in the pressed tile particles of compressed air, which, by its expansive force, would, if the die F remained at its extreme pressure as the shell J was removed, force the clay out laterally between the upper and lower dies, thereby destroying the line and smoothness of the edges of the tile. I avoid this by using an eccentric-cam, G, to operate the upper die,

whereby the upper die begins slowly to ascend the instant after its extreme pressure, thereby permitting the clay to expand upward by the time the shell ascends above it.

Nail-holes are made in the tile as follows: Upon the shell J are two standards, V V, the upper angle whereof is so high as not to interfere with the greatest separation of the upper die and shell. Projecting downward from the top of these are pins *c c*, which pass through holes in the upper die, and of such length that their lower ends shall rest against the face of the lower die K when the shell J is at its extreme downward stroke. Their operation will be readily understood from the foregoing description of the press, as they follow the motion of the shell J.

The feeding device consists of a hollow open cylinder, W, supported over one of the lower dies when the latter is at rest, as shown. Across the bottom of this cylinder slides a plate, X, supported by an arm, Y, which swings horizontally on the shaft M. In this plate is a depression, *d*, as large as the interior circumference of the cylinder W, the side of said depression toward the center of the plate being open, and the edge of the plate at that opening sharpened to form a knife. This plate is caused to oscillate across the lower end of the cylinder W by a pitman, attached to the crank-arm S.

In operation, a roll of tempered clay is placed in said cylinder. By the action of the arm S in revolving the platform L, the depression in the plate X is brought beneath the cylinder, and into this the roll of clay settles, when, by the return of the plate, a slice of clay is cut off and falls on the die below.

I claim as my invention—

1. In a machine for making pressed forms, the combination, with an upper and under die, of the shell J, all arranged and operating substantially as and for the purpose hereinbefore set forth.

2. In combination with the upper die F and shell J, the circular platform L, bearing a series of lower dies, all arranged and operating substantially as and for the purpose hereinbefore set forth.

3. The herein-described tile-machine, consisting of the upper die F, shell J, platform L, and lower dies K, all operated by suitable machinery, substantially as shown, in the manner herein described.

4. In combination with dies F and K and shell J, the pins *c c*, arranged and operating substantially as and for the purpose hereinbefore set forth.

5. In combination with the dies F and K and shell J, the holes *i i*, for the purpose specified.

6. In combination with the platform L and dies K, the cylinder W and plate X, substantially as and for the purpose hereinbefore set forth.

HORACE B. CAMP.

In presence of—
C. P. HUMPHREY,
E. W. STUART.