(No Model.) 2 Sheets—Sheet 1.

# J. F. GESNER.

## FRAME AND PRESS FOR FORMING AND HARDENING PLASTIC MATERIALS.

No. 419,656. Patented Jan. 21, 1890.

Fig. 1.

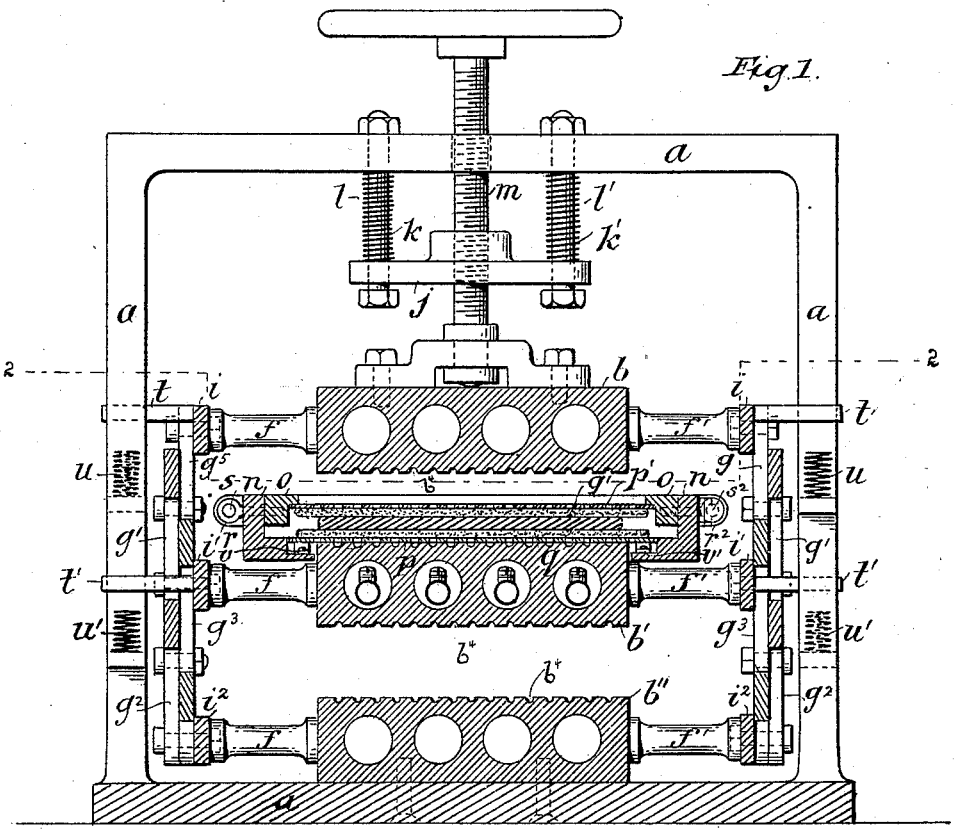
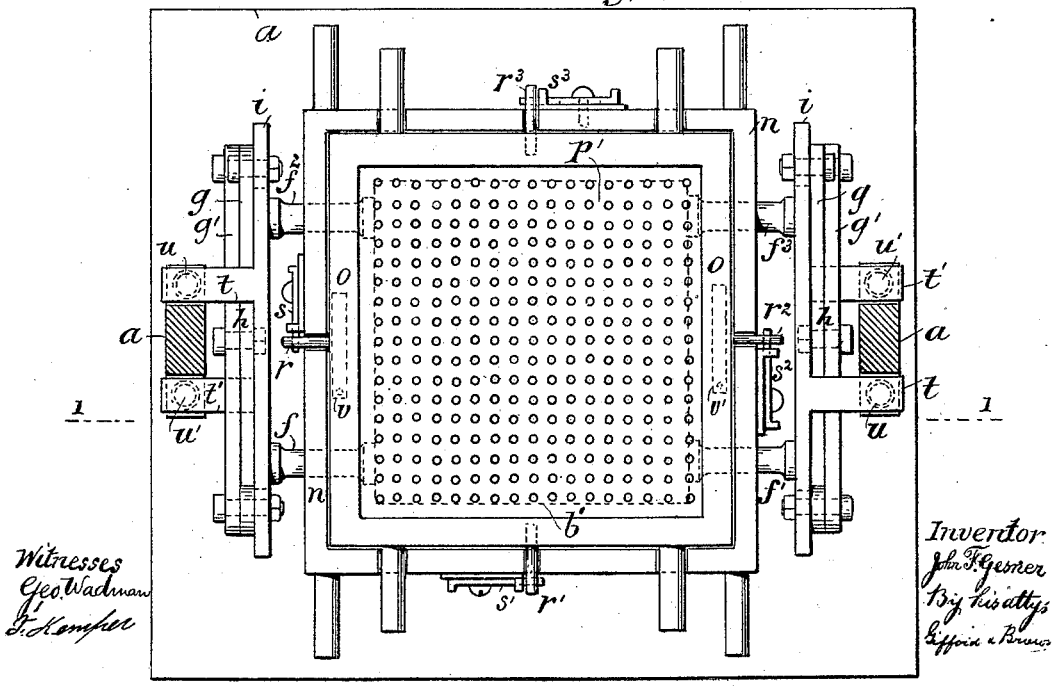



Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

# J. F. GESNER.

## FRAME AND PRESS FOR FORMING AND HARDENING PLASTIC MATERIALS.

No. 419,656. Patented Jan. 21, 1890.

Fig. 3

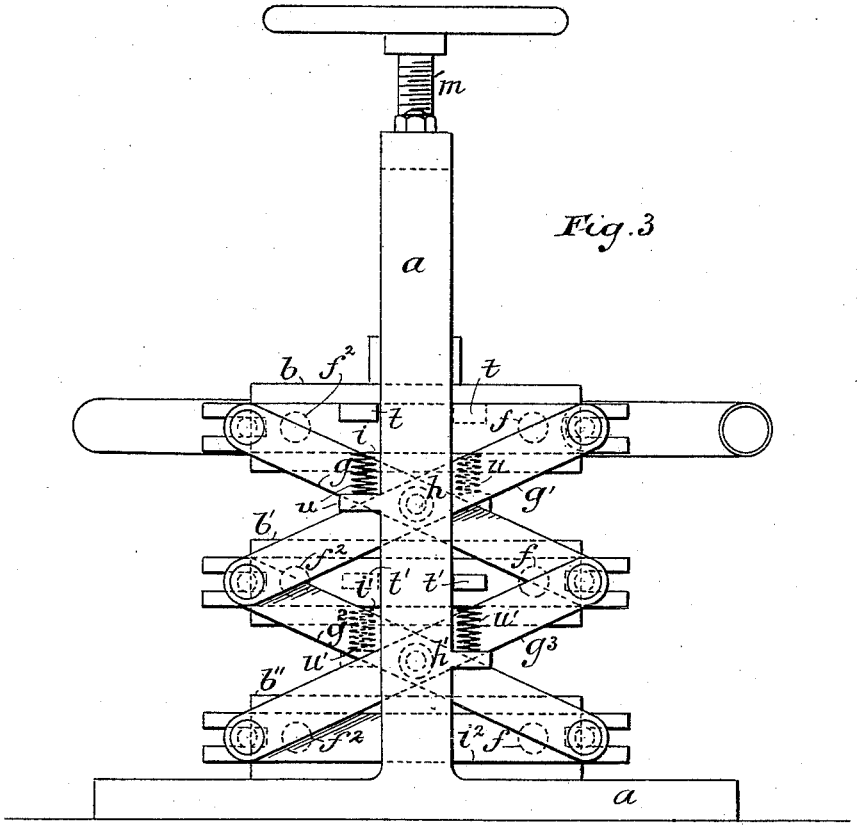
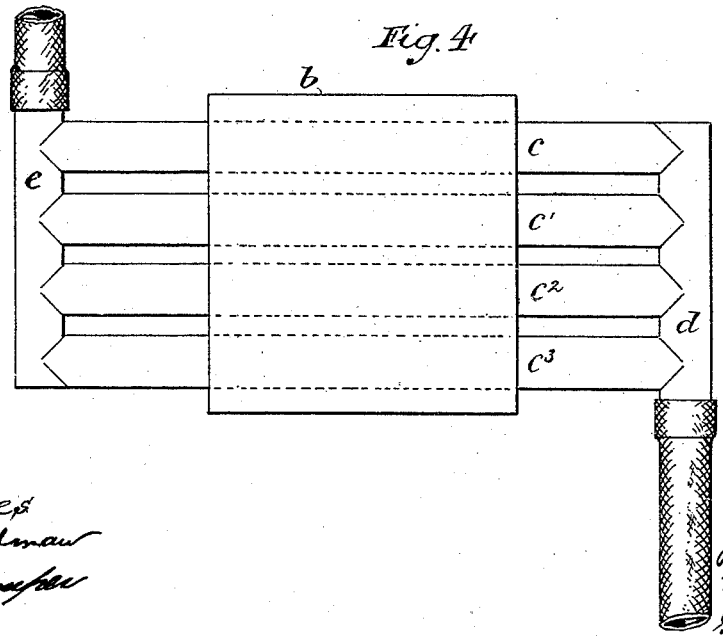



Fig. 4

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JOHN F. GESNER, OF NEW YORK, N. Y.

## FRAME AND PRESS FOR FORMING AND HARDENING PLASTIC MATERIALS.

SPECIFICATION forming part of Letters Patent No. 419,656, dated January 21, 1890.

Application filed April 23, 1888. Serial No. 271,532. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN F. GESNER, of New York, in the county and State of New York, have invented a new and useful Frame and Press for Forming and Hardening Plastic Materials, of which the following is a specification.

My invention is especially designed for the treatment of the materials which are the subject of my application filed April 16, 1888, Serial No. 270,854, and which may, among other applications, be employed for building materials, such as tiling, artificial stone, &c. Its object is to subject several sheets or layers of the material to simultaneous and uniform heat and pressure under such conditions as will permit of the escape of vapors or steam.

Figure 1 is a vertical section of the press through the line 1 1 of Fig. 2. Fig. 2 is a sectional plan view through the line 2 2 of Fig. 1. Fig. 3 is an end view. Fig. 4 is a detail showing the heating-pipes.

*a* is a vertical frame.

*b b' b''* are the press-plates, of which there may be any required number. These press-plates may be provided with any suitable means of heating; but I prefer to employ a series of pipes like that shown in Fig. 4. The pipes *c c' c² c³* are in the same horizontal plane and extend through a corresponding series of holes in the plates *b b'*, &c.

*d* is the supply and *e* the escape pipe for the heating agent, connected by flexible tubes, so as not to interfere with the movements of the press-plates.

In lieu of the series of pipes passing through the plate, I can employ a series of burners, as shown, within the plate *b'*, Fig. 1, one row extending through each hole in the plate, and each row supplied with gas or burning-fluid by any suitable means. By either of the arrangements shown, or any other suitable means, I heat each of the plates as hot as required.

Each plate is provided with four arms *f f' f² f³*, arranged at each corner, and one pair projecting toward one end of the machine and the other pair toward the other end. Secured across the ends of each pair of these arms is a cross-piece *i i' i²*, each cross-piece being forked at the end, as shown.

*g g' g² g³* are links which cross each other in pairs at *h* and *h'*, and are there pivotally connected together. One extremity of link *g* is pivoted to one extremity of link *g³*, and the same is true of links *g'* and *g²*. Each of the pivots at the extremities of these links has a bearing in the forked end of one of the cross-pieces *i*, *i'*, and *i²*. By means of these arms, cross-pieces, and links the press-plates are compelled to move uniformly and parallel to one another, so that motion communicated to one must be transmitted to the others equally, and they will all move in parallel planes. Of course, the plates may be connected with the links *g g' g² g³* in any other suitable manner; but I prefer the arrangement above described.

It is desirable that a yielding pressure should be exerted upon the press-plates, and to this end I suspend the cross-piece *j* below the top cross-piece of the frame by the bolts *k k'*, so that the cross-piece *j* is free to rise or fall on the bolts. I insert spiral springs *l l'* between the top cross-piece of the frame and the cross-piece *j*, which springs tend to press the cross-piece *j* down against the heads of the bolts *k* and *k'*.

*m* is a screw which is threaded into a nut on the cross-piece *j* and the end of which screw is swiveled to the top of press-plate *b*. This screw *m* passes through but is not threaded into the top cross-piece of the frame. By this arrangement it is obvious that when the screw is advanced so as to force the top press-plate away from the cross-piece *j* the pressure of the springs *l l'* is brought to bear on the top press-plate and by the connecting-links transmitted to each of the other press-plates, also arranged horizontally. The opposing faces of the press-plates may be channeled, as shown, the grooves or channels being lettered *b⁴*.

I will next describe the apparatus or case within which the plastic material is to be placed and rolled out and held while being pressed. It is shown in plan view in Fig. 2 and in cross-section in Fig. 1. *n* is a square frame, rabbeted, as shown, so as to receive an inside frame *o*. The frame *o* is also rabbeted, as shown. The central openings of these frames are of the size to admit the passage of the press-plates. In the rabbets of the frames *n* and *o* are two perforated sheet-metal plates

$p$ and $p'$. Between these plates are two thicknesses of cloth, (preferably asbestus cloth,) and the plastic material is placed and rolled out between the two layers of asbestus cloth. $q$ $q'$, Fig. 1, are the two layers of asbestus cloth. $r$ $r'$ $r^2$ $r^3$ are eyes connected with the inner frame, and extend out so as to be secured to the outer frame each by a bolt $s$ $s'$ $s^2$ $s^3$. I may use any other convenient means to secure the two parts of the frame together.

In order that the weight of the press-plates may be compensated for, I provide projections $t$ $t'$ on each of the upper plates, in the path of each of which as it descends is a spring $u$ $u'$, properly secured on a supporting-frame.

In operating the machine the frame $n$ and parts inclosed therein are removed from the press-plates. Then the frame $o$ is removed from the frame $n$; also the perforated plates and asbestus cloth. The perforated plate $p$ is then placed over the opening in the frame $n$ in the position shown. Then a layer of asbestus cloth is placed over the perforated plate. Then the asbestus cloth is sprinkled with a powdered absorbent material, such as chalk, clay, silica, &c.; then a layer of plastic material, which is rolled out with a roller and sprinkled with absorbent powdered material. Then the second layer of asbestus cloth is laid over the plastic material; then the second perforated plate $p'$; then the frame $o$, which is secured to frame $n$ by the bolts $r$ $r'$ $r^2$ $r^3$. Now the case may be handled as much as desired without disturbing its contents. The perforated metallic plates keep the material stiff, and the asbestus cloth keeps it smooth and prevents its sinking into the holes of the perforated metal, and the frame binds the whole together. The frame $o$, overlapping, as it does, the opening between the plates by which the material is held, will limit the extent to which the material may spread laterally, so that as the pressing continues and the material is pressed out laterally until its edges come in contact with the frame $o$ the material will be held under confinement in all directions at the edges as well as on the sides. Next it is placed in the press, so that the press-plates will act upon the opposite perforated plates within the frame-openings. Next the press-plates are screwed together, so as to bring the yielding pressure of the springs $l$ and $l'$ to bear upon the plastic material. The plates are now heated to a gradually-increasing temperature, and the moisture is expelled from the plastic material through the asbestus cloth, the perforated plates, and the channels on the surface of the press-plates. If the material at first has a tendency to swell under the heat, the springs $l$ $l'$ will admit of its doing so to any desired extent; but as the operation continues, if the material shrinks, the springs will cause the plates to follow it up and preserve a substantially uniform pressure until the extent of motion permitted by the bolts $k$ $k'$ is reached, when the operator will know the operation is complete. By having nuts on the bolts $k$ $k'$, as shown, the extent of this motion may be adjusted at will.

I have described the case composed of the frames $n$ and $o$, and the perforated plate and asbestus cloth as used in combination with the press. In treating comparatively thin layers of material I, however, contemplate employing this case without any press. Thus the material is placed within it, rolled out thin, and confined, as already described. Then the case is laid away, preferably in a drying-room, until the material within has suitably hardened, the case meantime acting to preserve the form and surface thereof. Especially where this case is to be used without the press, I prefer to insert four springs $v$ $v'$ between the frame $n$ and the perforated plate next to it, one at each side of the frame. When the frames $n$ and $o$ are fastened together with the material within, these springs are compressed, and during the operation of hardening the material, will exert a constant pressure, so that the perforated plates will move to or from each other as the material shrinks or expands.

I have shown the plates $p$ and $p'$ as both being perforated; but I contemplate sometimes using perforations only in one of them, depending upon driving the moisture off from one side of the material.

I claim—

1. The combination, with each two adjacent members of a series of press-plates, of four links, each link being pivoted at its one end to one of said press-plates and at its opposite end to the other, whereby the uniformity of motion of all the press-plates in the series is preserved, substantially as described.

2. In combination, the press-plates provided with means for being heated, a stationary frame and spring mechanism interposed between the stationary frame and the press-plates, and a screw whereby pressure is applied, substantially as described.

3. In combination, the stationary frame, the series of press-plates, the pivoted links connecting each one of the series with another, whereby the uniformity of the motion of each is maintained, the screw whereby the pressure is exerted, and the spring interposed between the screw and the stationary frame, whereby the pressure is made yielding, substantially as described.

4. In combination, the press-plates provided with means for being heated, a perforated plate covering the face of the material being pressed, and a frame surrounding the edges of the material, whereby the material is prevented from spreading laterally, substantially as described.

5. In combination, the press-plates provided with grooved surfaces and with means for being heated, a perforated plate covering the face of the material being pressed, and a

frame surrounding the edges of the material, whereby the material is prevented from spreading laterally, substantially as described.

6. In combination with the press-plates provided with means for being heated, a removable case for the material being pressed, consisting of two plates and the telescoping frames *n* and *o*, whereby the edges of the material are inclosed and the plates are held to the faces thereof, substantially as described.

7. In combination with the press-plates, the screw, the spring interposed between the screw and the main frame to exert a yielding pressure, a removable case inclosing the edges of the material and of a proper size to admit of the passage of the press-plates through it, and the plates arranged above and below the material being pressed within the removable frame, substantially as described.

8. In combination, the press-plates, the plates for holding the material being pressed, the frames between which the material-holding plates are held, and means for holding the frames in the desired adjustment, substantially as set forth.

9. A case for holding plastic material while hardening, which consists of two plates, a case inclosing the edges of the plates, and springs arranged in said case to press said plates toward each other, substantially as described.

10. In combination, two plates adapted to compress a plastic material between them, the face of one of the plates being provided with ducts extending along its face to the margin for the escape of moisture, and means for supplying heat to the pressing-plate, substantially as set forth.

11. In combination, two plates adapted to compress a plastic material between them, one of said plates being provided with ducts for the escape of moisture from the plastic material while being subjected to pressure, means whereby said plastic material is subjected to heat while under confinement between said plates, and means whereby a yielding pressure is produced by said plates upon said plastic material as the same is being subjected to heat, substantially as described.

12. In combination with two plates adapted to press a plastic material between them, a porous fabric interposed between the plastic material and one of said plates, means whereby said plastic material is subjected to heat while under confinement between said plates, and means whereby a yielding pressure is produced by said plates upon said plastic material as the same is being subjected to heat, substantially as described.

JOHN F. GESNER.

Witnesses:
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