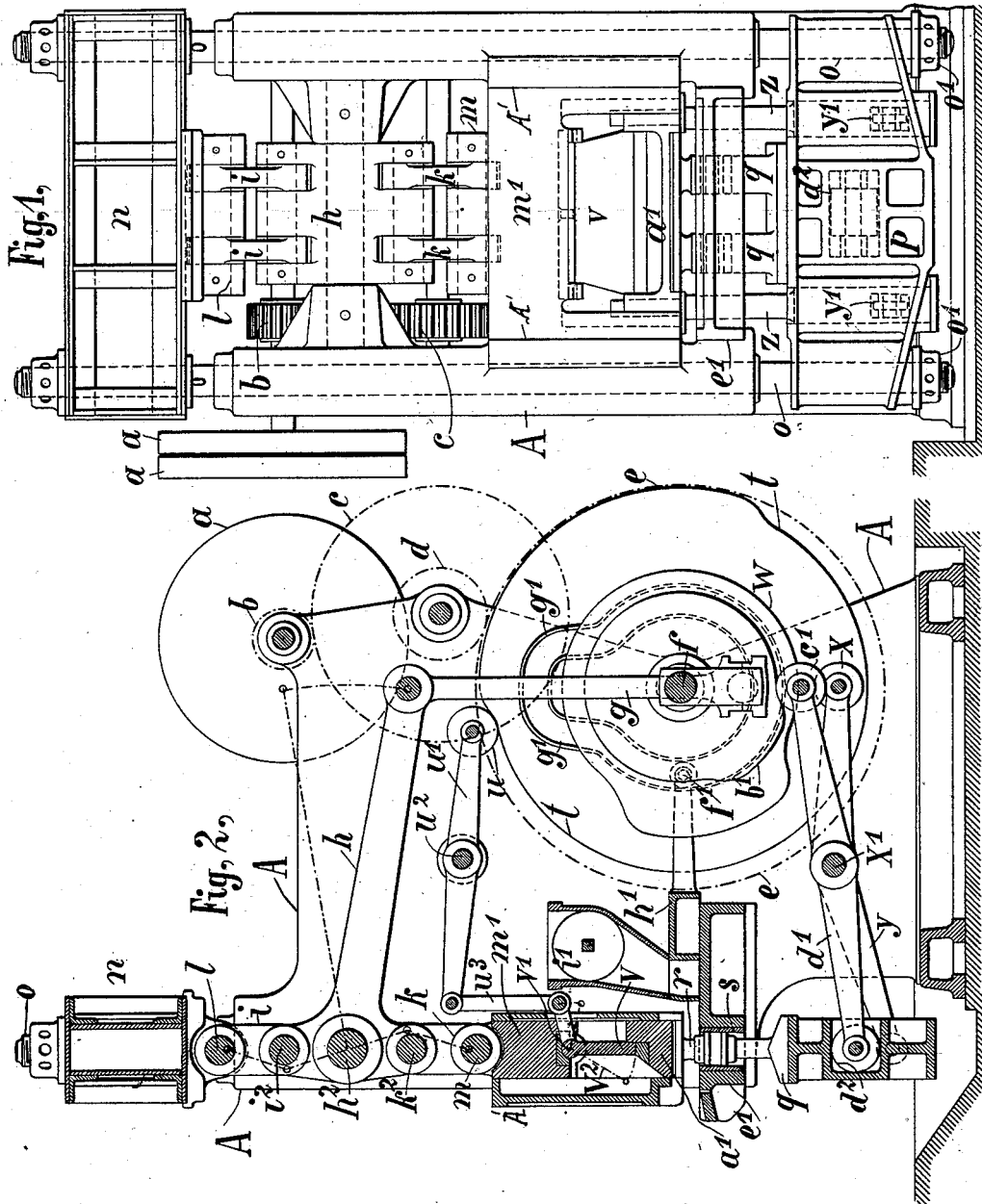


W. SURMANN.  
BRICK PRESS.

(Application filed Oct. 23, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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No. 650,139.

Patented May 22, 1900.

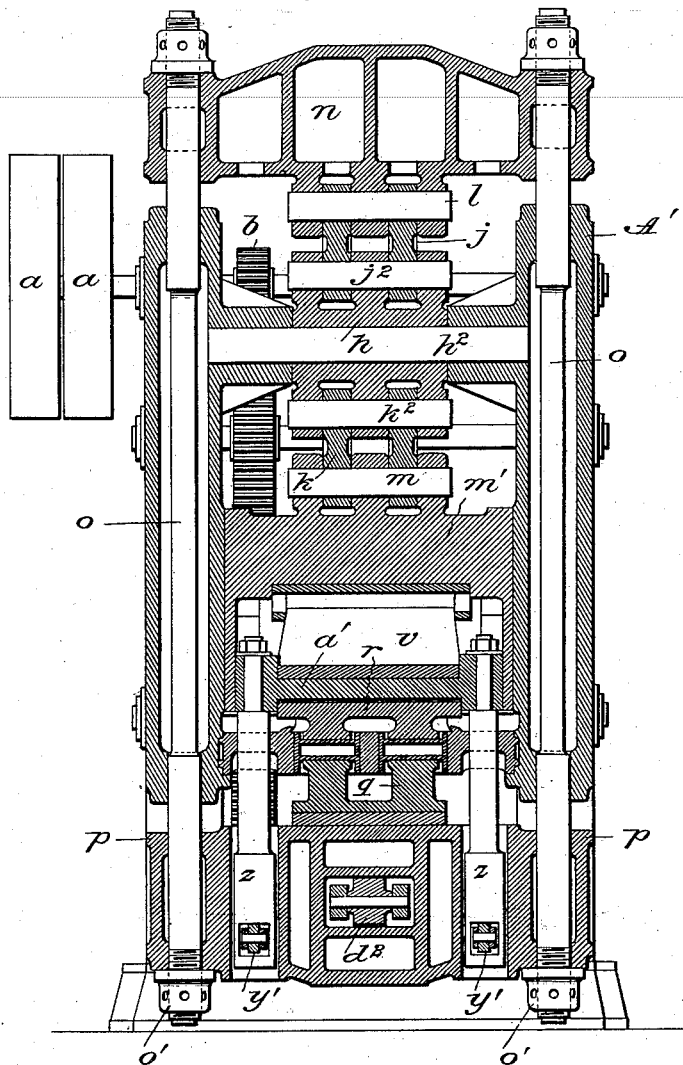
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2 Sheets—Sheet 2.

Fig. 3.



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# UNITED STATES PATENT OFFICE.

WILHELM SURMANN, OF MEIDERICH, GERMANY.

## BRICK-PRESS.

SPECIFICATION forming part of Letters Patent No. 650,139, dated May 22, 1900.

Application filed October 23, 1897. Serial No. 656,204. (No model.)

*To all whom it may concern:*

Be it known that I, WILHELM SURMANN, a subject of the German Emperor, residing at Meiderich, near Ruhrort, Rhenish Prussia, Germany, have invented new and useful Improvements in Brick-Presses, (for which I have obtained Letters Patent in the following countries: Germany, not yet issued, dated June 3, 1896; Austria, No. 46/3,985, dated October 10, 1896; France, No. 257,563, dated June 25, 1896; Hungary, No. 6,495, dated July 6, 1896; Belgium, No. 122,215, dated June 29, 1896; Russia, not yet issued, dated June 10, 1896; England, No. 15,753, dated July 16, 1896, and Luxemburg, No. 2,768, dated March 3, 1897,) of which the following is a specification.

My invention relates to dry-stuff brick-presses; and its objects are the following: First, to give from above and from below an equal and simultaneous pressure on the stuff in the mold; secondly, that before exerting the effect of this pressure an intermediate press-plate can be shifted away from the upper die or piston for a determined period, so as to get a lift-space for said upper pistons and the bridge-piece to which they are fixed; thirdly, to provide means for effecting a quick lift of said upper pistons out of the mold in order to insure the quick pushing out from below of the pressed bricks by the lower pistons and the refilling of the mold immediately after a quick downward return of said lower pistons. In order to effect these purposes, I construct the press with a special system of cams, eccentrics, and levers which actuate the lower pistons upward for pushing out the brick and downward for the refilling of the mold by moving downward the cross-beam supporting the pistons on two side columns on which it slides, and I construct another special system of cams, eccentrics, and levers actuating quickly and in the right moment the upper pistons independently from the toggle-lever action of the press and within the framing of the pressing cross-head, and I arrange a third set of cams and levers actuating the intermediate press-plate in shifting it from or inserting it between the bridge-piece and the pressing cross-head. The filling of the molds is done in the known manner by a sliding plate moving under a filling-trough with a transporter in it and being actuated by a cam, disk, and rod. The final pressure is then given by the toggle-le-

ver arrangement simultaneously from above and from below on the pistons, transmitting it to the stuff in the molds.

The accompanying drawings represent the press, in which—

Figure 2 shows a vertical section of the machine. Fig. 1 shows a front view of the same; and Fig. 3 is a detail view of the machine, partly in vertical section, showing the operation of the bars *z*.

The motion is transmitted to the press by the pulleys *a a*, driving a set of gear-wheels *b c d e*, turning a crank-axle *f*. Connecting-rods *g* actuate crank-levers *h*, swinging on an axle *h<sup>2</sup>*, fixed in the standard-frame *A*. Links *i* and *k*, connected to lever *h* by bolts *i<sup>2</sup>* and *k<sup>2</sup>* and to a vertically-movable cross-beam *n* and a vertically-guided cross-head *m'* by bolts *l* and *m*, respectively, form a system of toggle-levers, giving to said cross-head *m'* and to cross-beam *n* opposite equal and simultaneous oscillation, as is easily understood in following the dotted lines on Fig. 2, which show that the centers of bolts *i<sup>2</sup>* and *k<sup>2</sup>* reach the extreme positions of their path when they both are in the same vertical line with the center of axle *h<sup>2</sup>*.

The vertical oscillations of cross-beam *n* are transmitted by two side rods *o*, guided in the boxes *A'* of frame *A*, to the lower cross-beam *p*, which takes a seat on the nuts *o'* at the lower ends of rods *o* and is movable upward on the latter. This cross-beam *p* carries the lower pistons *q*, which enter into a fixed table *e'* of the frame and are capable of moving up and down in the molds *s*, contained therein.

The link-bolt *m* presses down the cross-head *m'* in its guides between the frame-standards simultaneously with and in the same measure as bolt *l* is lifting. The upper pistons *r*, fixed to the cross-head's bridge-piece *a'* and movable vertically in it, are pressed into the molds *s* when the intermediate pressing-plate *v* is inserted and kept in place between the bridge-piece *a'* and the body of the cross-head *m'* during the pressing effect.

As soon as the pressure has taken place a two-armed lever *u'*, swinging on axle *u<sup>2</sup>*, fixed between the framing-standards, is actuated by a cam *t*, moving a roller *u* at the end of one arm of lever *u'*, and so, by a connecting-link *u<sup>3</sup>*, shifts out of its vertical position the pressing-plate *v*, hinged at *v'*, into the posi-

tion shown in dotted line at  $v^2$ , disengaging thereby the bridge-piece  $a'$ . The latter, with its upper pistons  $r$ , is then free to be lifted promptly by action of cam  $w$ , which, pressing down roller  $x$  at end of lever  $y$ , swinging on axle  $x'$ , lifts by rollers  $y'$ , working in suitable housings of rods  $z$ , guided in the lower cross-beam  $p$ , as shown in Fig. 3, the said bridge-piece  $a'$ . The lower pistons  $q$  are then actuated by cam  $b'$  through the interposition of rollers  $c'$  at the ends of levers  $d'$ , turning on said axle  $x'$ , and reaching with their other ends and roller  $d^2$ , held thereon, into a suitable pocket of lower cross-beam  $p$ , lifting the latter quickly away from the nuts  $o'$  on the rods  $o$ , and thereby lifting said lower pistons  $q$ , standing thereon, to a height such that the top surfaces of the pistons  $q$  exactly come flush with the surface of the table  $e'$ . Then another cam  $q'$  actuates roller  $f'$  at the end of a rod of box  $h'$ , so that the latter, sliding on table  $e'$ , pushes, first, the brick thrown out of the mold away from the table, and as meanwhile the lower pistons  $q$ , with cross-beam  $p$ , have returned to their lowest position the filling of the molds by box  $h'$  is accomplished immediately after. The necessary material is falling into the front part, open at the top, of box  $h'$  from a transporter  $i$ , placed above the table  $e'$ , and closed afterward by the upper back plate of box  $h'$ . As soon as the filling-box  $h'$  has then returned into its original position (shown in Fig. 1) the bridge-piece  $a'$ , holding the upper pistons  $r$ , sinks down quickly, the cam  $w$ , levers  $y$ , and rods  $z$  allowing their descent, and the intermediate press-plate  $v$  is then moved into its vertical position by the connection of rod  $w^3$  and lever  $u'$  with roller  $u$ , worked by cam  $t$ . Then the lever  $h$  is pulled downward by connecting-rod  $g$  and crank  $f$ , and when they approach their lowest point increasing pressure is exerted upon the two pistons  $r$  and  $q$  simultaneously and with equal force.

It is obvious that by the arrangement of the insertion of press-plate  $v$  it is rendered possible to accelerate the downward as well as the ascending movement of the upper pistons independently from the regular movements of the toggle-lever system without uncoupling the latter.

By using the double-acting and opposite movement away from each other of bolts  $l$  and  $m$  the frame  $A$  is relieved from the pressing strain, and the rods  $o$  and the strong cross-beams  $n$  and  $p$  take up the whole thrust of the pistons, and the relatively-small distance traveled by said bolts gives a favorable toggle-lever pressure for both the upper and lower pistons at one and the same time.

I am aware that toggle-lever brick-presses have been used before, and I do not claim such a press broadly; but

What I do claim, and desire to secure by Letters Patent, is—

1. In a brick-press the combination of frame

$A$ , crank-axle  $f$ , connecting-rod  $g$ , swinging at its lower end on said crank-axle, lever  $h$ , pivoted at  $h^2$  to the said frame and provided with three arms, one, long and two, short, and pivoted at the end of its long arm to the upper end of the rod  $g$ , links  $i$  and  $k$  pivoted to the two short arms of the lever  $h$ , at  $i^2$  and  $k^2$  respectively a cross-beam  $n$ , pivoted at  $l$  to said link  $i$ , a cross-head  $m'$  pivoted to said link  $k$  at  $m$ , and the dies  $r$  adapted to be automatically connected to and disconnected from said cross-head  $m'$  substantially as set forth.

2. In a brick-press the combination of frame  $A$  having cylindrical borings in its side columns, connecting-rod  $g$ , crank-axle  $f$  on which said connecting-rod swings, the three-armed lever  $h$ , pivoted to the frame and connected to rod  $g$ , links  $i$  and  $k$ , pivoted to said lever, cross-beam  $n$  and cross-head  $m'$  movable bridge-piece  $a'$ , detachably connected to said cross-head and carrying pistons below it connected to said links respectively, vertical side rods  $o$ , fitting in said bearings in frame  $A$ , and connected at their upper ends to cross-beam  $n$ , the lower cross-beam  $p$ , attached to the lower ends of said guide-rods and pistons  $q$  fixed on said cross-beam  $p$ , substantially as set forth.

3. In a brick-press the combination of a system of crank-arms and levers, a reciprocating cross-head  $m'$ , moved by said system, a movable bridge-piece  $a'$ , means for rigidly connecting said bridge-piece and cross-head, a cross-beam  $p$  beneath said bridge-piece, movable rods  $z$  guided in said cross-beam and attached at their upper ends to said bridge-piece, and means for moving said rods  $z$ , substantially as set forth.

4. In a brick-press the combination of a reciprocating cross-head  $m'$ , means for moving said cross-head a movable bridge-piece  $a'$ , means for rigidly connecting said bridge-piece and cross-head, a cross-beam  $p$  beneath said bridge-piece, movable rods  $z$  guided in said cross-beam  $p$ , and attached to said bridge-piece, means for moving said rods, the axle  $x'$ , lever  $d'$  pivoted on said axle, and cam  $b'$  adapted to press on one end of said lever, its other end being adapted to move said cross-beam  $p$  substantially as set forth.

5. In a brick-press, the combination of a reciprocating cross-head  $m'$ , means for moving said cross-head, a movable bridge-piece  $a'$ , means for rigidly connecting said bridge-piece and cross-head, a cross-beam  $p$  beneath said bridge-piece, movable rods  $z$  guided in said cross-beam, and attached to said bridge-piece, the axle  $x'$ , levers  $y$  pivoted on said axle, and cam  $w$  adapted to press on one end of said levers, the other ends being adapted to move said rods  $z$  substantially as set forth.

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