

(No Model.)

H. E. BANKER.
AUTOMATIC VALVE GEAR FOR TILE PRESSES.

No. 521,944.

Patented June 26, 1894.

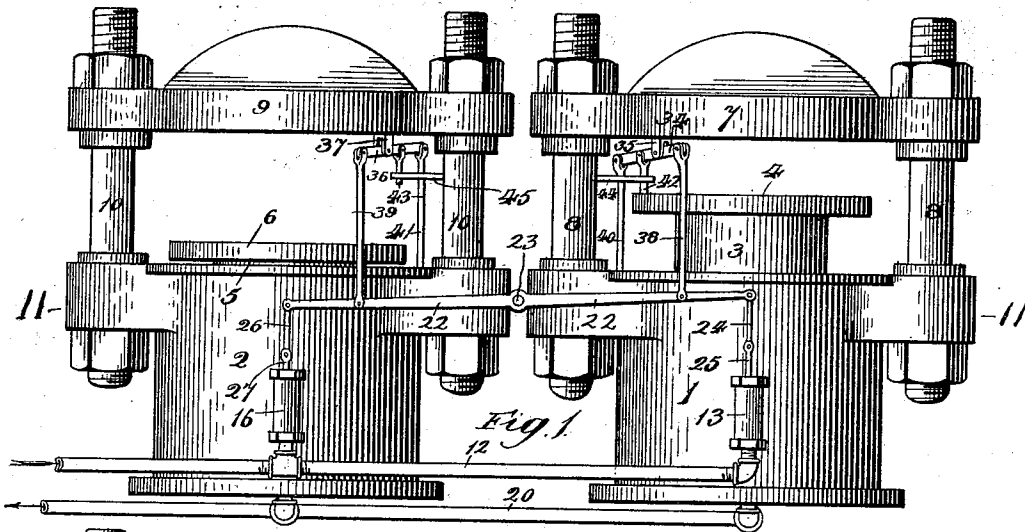


Fig. 1

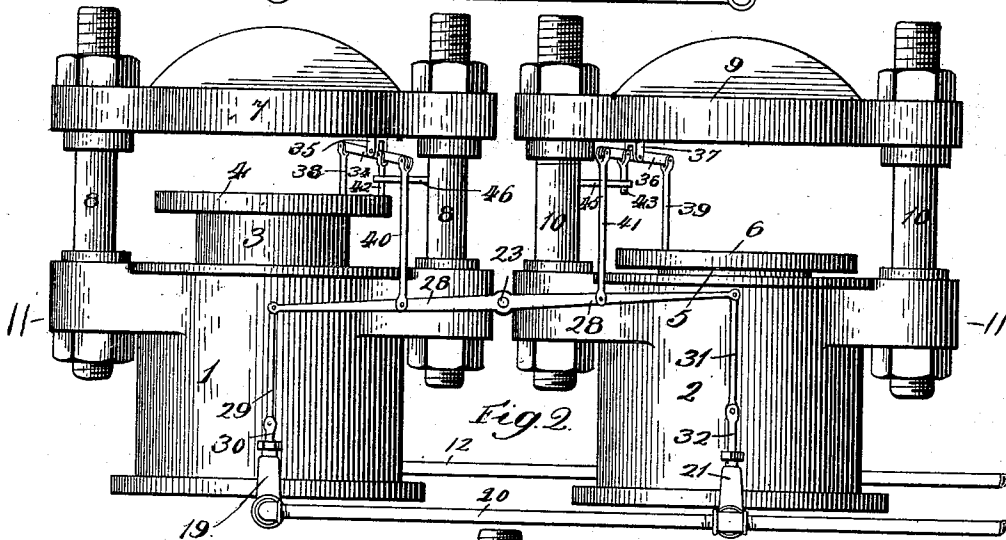
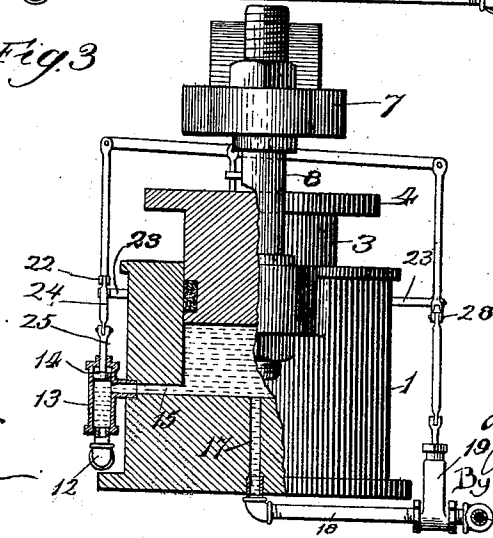


Fig. 2

Fig. 3



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UNITED STATES PATENT OFFICE.

HOWARD E. BANKER, OF WESTERN SPRINGS, ILLINOIS.

AUTOMATIC VALVE-GEAR FOR TILE-PRESSES.

SPECIFICATION forming part of Letters Patent No. 521,944, dated June 26, 1894.

Application filed July 3, 1893. Serial No. 479,542. (No model.)

To all whom it may concern:

Be it known that I, HOWARD E. BANKER, a citizen of the United States, residing at Western Springs, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Valve-Gear for Tile-Presses, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to tile-presses, and also to various other presses for analogous classes of work, such as are actuated by hydraulic and similar power.

The invention relates, more particularly to the valve-mechanism of such presses, and the primary objects of my invention are to produce a valve-mechanism, for a plurality or series of such presses, which shall be so constructed and arranged that the advance of the plunger of one press shall automatically so operate the valve-mechanism as to produce an automatic retraction of the plunger of another press of the series; thus effecting a continuously automatic alternation in the operation of the presses.

To the above purposes, my invention consists in certain peculiar and novel features of construction and arrangement, as hereinafter described and claimed.

The more precise nature of my invention will be better understood when described with reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a pair of tile-presses provided with an automatic valve-gearing embodying my invention. Fig. 2 is a similar view of the same, but viewed toward the opposite side from that exposed in Fig. 1. Fig. 3 is an end elevation of the same; parts being broken away and in transverse vertical section to more clearly show the construction.

In the said drawings, 1 designates the cylinder of one of its pair of tile presses and 2 the cylinder of the companion-press. In themselves, these presses are of the usual form and are shown as of the vertical type; 3 and 5 designating the plungers, of the presses 1 and 2 respectively, these plungers being arranged to rise and fall in their cyl-

inders and carrying at their upper ends the bed-plates 4 and 6 respectively.

7 and 9 designate the horizontal cap-pieces or plates toward and away from which the plungers 3 and 5 with their plates 4 and 6 move; the cap-plates 7 and 9 being shown as supported respectively by vertical standards 8 and 10 rising from the upper ends of the cylinders 1 and 2, or from brackets 11 formed upon the upper ends of said cylinders.

I will here state that while I have shown a valve-gearing embodying my invention as applied to this particular form of tile-press, and that while such press is shown as a vertically acting press, it will be obvious, from the ensuing description, that the valve-mechanism is applicable to other styles of vertical presses, and also to other than vertically acting presses, without departing from the essential spirit of my invention. However, as shown, 12 designates an inlet or supply pipe leading from any suitable source of water-supply, under head or pressure, and extending horizontally across one side of the machine. At one end, this inlet-pipe 12 is connected to an inlet-valve casing 13 containing a vertically movable inlet-valve 14 and communicating, by a lateral outlet, located near the upper end of the valve-casing, with an inlet-channel 15 formed in the lower part of the cylinder 1 and communicating with the piston-chamber thereof. At a suitable point, this inlet-pipe 12 is also connected to a second inlet-valve casing 16 which is similar in all respects to the inlet-valve casing 13 and which communicates in precisely similar manner with the piston-chamber of the cylinder 2; the inlet-valve casing 16 containing also an inlet-valve (not shown) which is precisely similar to the inlet-valve 14 just described. The arrangement is such that, when the inlet-valves 14 are alternately raised, water is allowed to flow through the valve-casings 13 and 16 and the pistons or plungers 3 and 5 are caused to alternately rise, while when the inlet-valves 14 are depressed, water is shut off from the valve-casings and cylinders, and the pistons are allowed to descend alternately.

An outlet-channel 17 is shown as extending from the bottom of the piston-chamber of the cylinder 1 and to this outlet channel is con-

nected one end of a branch outlet-pipe 18. At
 its opposite end, the branch outlet-pipe is con-
 nected with the casing 19 of a vertically mov- 70
 able outlet-gate valve, of any usual or pre-
 ferred type; this casing 19 being located at the
 opposite side of the cylinder 1 from that to
 which the inlet-valve casing 13 is adjacent,
 and being also connected to a main outlet-
 pipe 20 shown as extending horizontally at
 10 the opposite side of the machine from that to
 which the main inlet-pipe 12 is adjacent. At
 a suitable point, this main outlet-pipe 20 com-
 municates also with a second outlet-gate valve
 casing 21 which casing communicates with
 15 the lower part of the piston-chamber of the
 cylinder 2 in precisely the same manner as
 the outlet-gate valve casing 19 communicates
 with the piston-chamber of the cylinder 1;
 the outlet-valve casing 21 being located at
 20 the opposite side of the cylinder 2 from the
 inlet-valve casing 16, and containing a verti-
 cally movable gate similar to the gate in the
 casing 19. The arrangement is such that, by
 alternately raising the outlet-valve gates in
 25 the gate-valve casings 19 and 21, the water
 will be alternately discharged from the cyl-
 inders 1 and 2 and the plungers 3 and 5 will
 be allowed to alternately descend.

22 designates a rock-arm which is secured
 30 midway of its length upon one end of a rock-
 shaft 23; this shaft extending horizontally
 between the upper ends of the two cylinders
 1 and 2 and the rock-arm 22 extending along
 that side of the machine to which the inlet-
 valve casings 13 and 16 are adjacent. At one
 35 of its ends, the rock-arm 22 is connected, by
 a pendent link 24 to the upper end of the
 stem 25 of the inlet-valve 14, and at its op-
 posite end said rock-arm is connected by a
 40 pendent link 26 to the upper end of the stem
 27 of the inlet-valve in the valve-casing 16.

Upon the opposite end of the rock-shaft 23,
 from that which carries the rock-arm 22, is
 secured (midway of its length) a second rock-
 45 arm 28 one end of which is connected by a
 pendent link 29, to the upper end of the stem
 30 of the outlet-gate in the valve-casing 19.
 The opposite end of the rock-arm 28 is con-
 nected, by a pendent link 31, to the stem 33
 50 of the companion outlet-gate in the valve-
 casing 21.

34 designates a lever which is pivoted mid-
 way of its length in a hanger 35 which is
 pendent from the under side of the cap or
 55 head 7, and 36 designates a second lever
 which is pivoted midway of its length in a
 hanger 37 pendent from the under side of the
 cap or head 9; these levers 34 and 36 extend-
 ing approximately transversely above the
 60 plungers 3 and 5 respectively.

To one end of the lever 34 is connected the
 upper end of a pendent link 38 the lower end
 of which is connected to the rock-arm 22 near
 that end of said rock-arm to which the link
 65 24 is connected. To the corresponding end
 of the companion-lever 36 is connected the
 upper end of a pendent link 39 the lower end

of which is connected to the rock-arm 22 near
 that end of said rock-arm to which the link
 26 is connected. To the opposite end of the
 lever 34, from that end to which the link 38
 70 is connected, is connected the upper end of a
 pendent link 40 the lower end of which is
 connected to the companion rock-arm 28 near
 that end of said rock-arm to which the upper
 75 end of the link 29 is connected. To the op-
 posite end of the lever 36, from that end to
 which the link 39 is connected, is connected
 the upper end of a pendent link 41 the lower
 end of which is connected to the rock-arm 28
 80 near that end to which the pendent link 31 is
 connected.

To the lever 34, at a point between its
 hanger 35 and the end to which the link 40
 is connected, is pivotally connected the up- 85
 per end of a short pendent striker-arm 42,
 while to the companion-lever 36, at a point
 between its hanger 37 and the end to which
 the link 41 is connected, is pivotally con-
 nected the upper end of a second short pend- 90
 ent striker-arm 43. These arms 42 and 43
 are shown respectively as working loosely
 through the outer ends of guide-arms 44 and
 45 which extend horizontally from the two in-
 ner standards 8 and 10 of the machine, but 95
 these guide-arms may either be employed or
 dispensed with as preferred.

The operation of the above described valve-
 mechanism is as follows: Assuming the plun- 100
 ger 3 to be the one which is rising, the platen
 4 of said plunger will, at the completion of the
 upward movement of said piston, strike the
 lower end of the striker-arm 42 and tilt the
 lever 34 so as to force the link 38 downward,
 and so also as to draw the link 40 upward. 105
 The downward movement of the link 38 de-
 presses that end of the rock-arm 22 to which
 the link 24 is connected and depresses the in-
 let-valve 14 in the valve-casing 13 so as to
 close said valve, and thus shut off the water 110
 from the piston 1. Simultaneously, the up-
 ward movement of the lever 34 and the con-
 sequent upward movement of the link 40 lifts
 and opens the outlet-gate in the casing 19
 and allows the water to escape from the cyl- 115
 nder 1; the plunger 3 instantly descending.
 On the other hand, the depression of said end
 of the rock-arm 22 to which the link 24 is con-
 nected is accompanied by the ascent of the
 opposite end of said rock-arm and of the link 120
 26 which is connected thereto. This ascent
 of the link 26 lifts and opens the inlet-valve
 in the valve-casing 16 and admits water to the
 cylinder 2, and at the same time, the ascent
 of this end of the rock-arm 22, acting through the 125
 link 39, tilts the companion-lever 36 so as to
 depress that end of said lever to which the
 link 41 is connected. The depression of the
 link 41 lowers and closes the outlet-gate in
 the casing 21 and so prevents the escape of 130
 water from the cylinder 2; the plunger 5 of
 said cylinder consequently rising as the plun-
 ger 3 of cylinder 1 falls. Plunger 5, at the
 completion of its upward movement, strikes

the striker-arm 43 and effects a reversal of the valve and gate movements just described; shutting the inlet-valve in the casing 16 and opening the inlet-valve 14 in the casing 13 and simultaneously opening the outlet-gate in the casing 19 and closing the outlet-gate in the casing 21, so that the plunger 5 begins to fall and the plunger 3 simultaneously begins to rise. There is thus automatically effected a continuous alternate rising and falling of the plungers 3 and 5 and the attendant is simply required to place a mold upon the rising plunger and to remove the mold from the falling plunger.

It is to be understood that while I have shown and described but two cylinders and their valves and gates and connections, there may be four, six, eight or any desired number of such cylinders with their described appurtenances; the gearing being extended in obvious manner. It is also to be understood that while I have mentioned water as the motive-force for the pistons or plungers, compressed air, or steam or other fluid under pressure may be employed for such purpose. It is also to be understood that, if desired, the inlet-pipe 12 may be the outlet-pipe and the outlet-pipe 20 may be the inlet-pipe; the inlet passages 15, in such event, being outlet-passages, and the outlet-passages 17 being inlet-passages, while the positions of the valves 14 and the gates in the casings 19 would be transposed. Such arrangement would simply necessitate the attachment of the striker-arms

42 and 43 to the tilting levers 34 and 36 at points between the hangers 35 and 37 and the connecting-rods 38 and 39, instead of at points between the pivot-hangers and the connecting-rods 40 and 43, as shown.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination with a plurality of press-cylinders and their plungers or pistons, of an inlet and an outlet valve for each cylinder, rock-arms connecting the inlet-valves in pairs, rock-arms connecting the outlet-valves in pairs and tilting levers connected to the rock-arms and actuated alternately by the plungers or pistons, so as to automatically open and close the valves alternately, substantially as set forth.

2. The combination with a plurality of cylinders and their pistons or plungers, of an inlet and an outlet valve for each cylinder, rock-arms connecting the inlet-valves in pairs, rock-arms connecting the outlet-valves in pairs, and tilting levers connected to said rock-arms and carrying striker-arms for contact with the pistons or plungers, so as to enable said pistons to automatically open and close the valves alternately, substantially as set forth.

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Witnesses:

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