

No. 693,362.

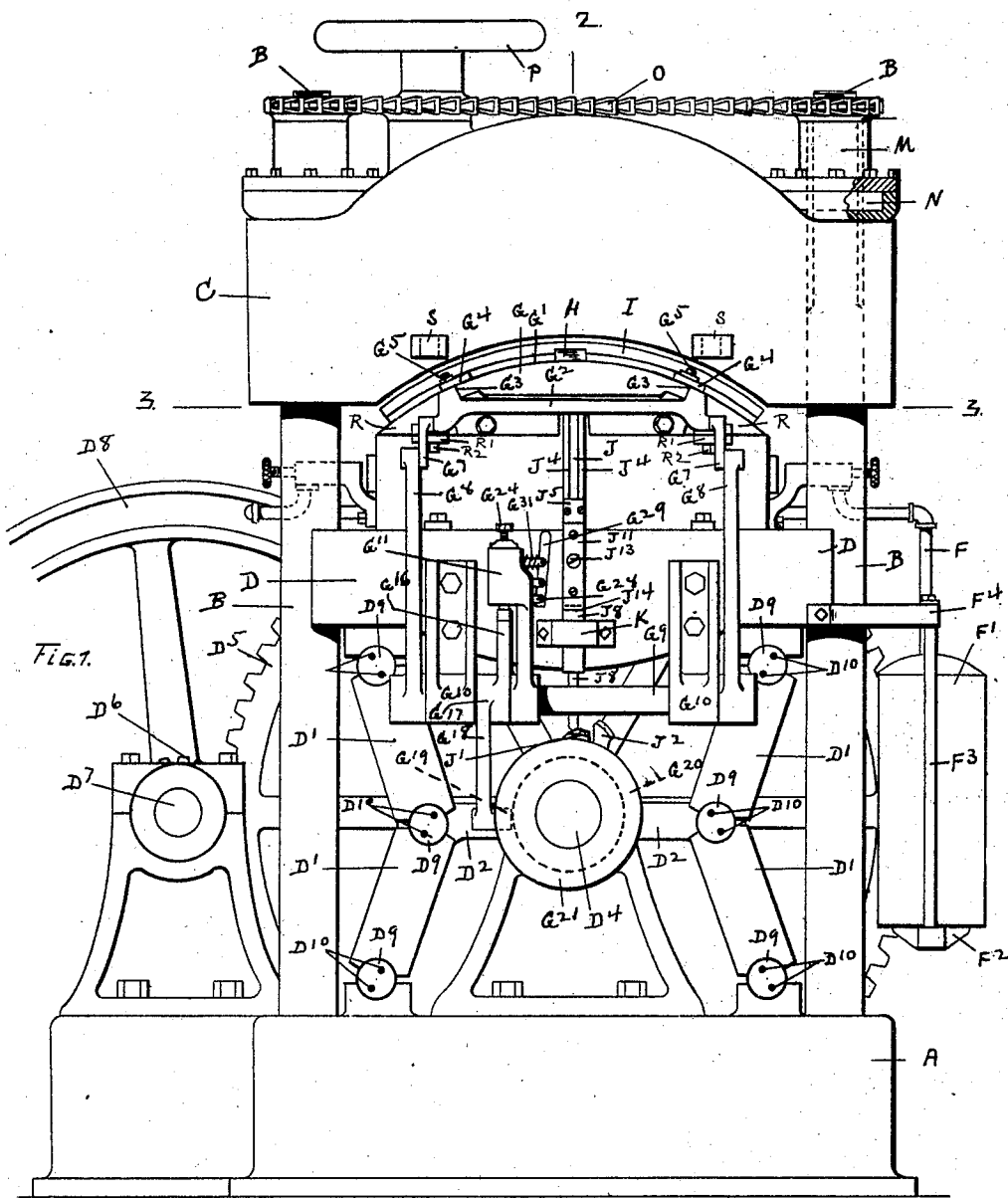
Patented Feb. 18, 1902.

F. H. BANCROFT.
EMBOSSING MACHINE.

(Application filed Aug. 28, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

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W Price

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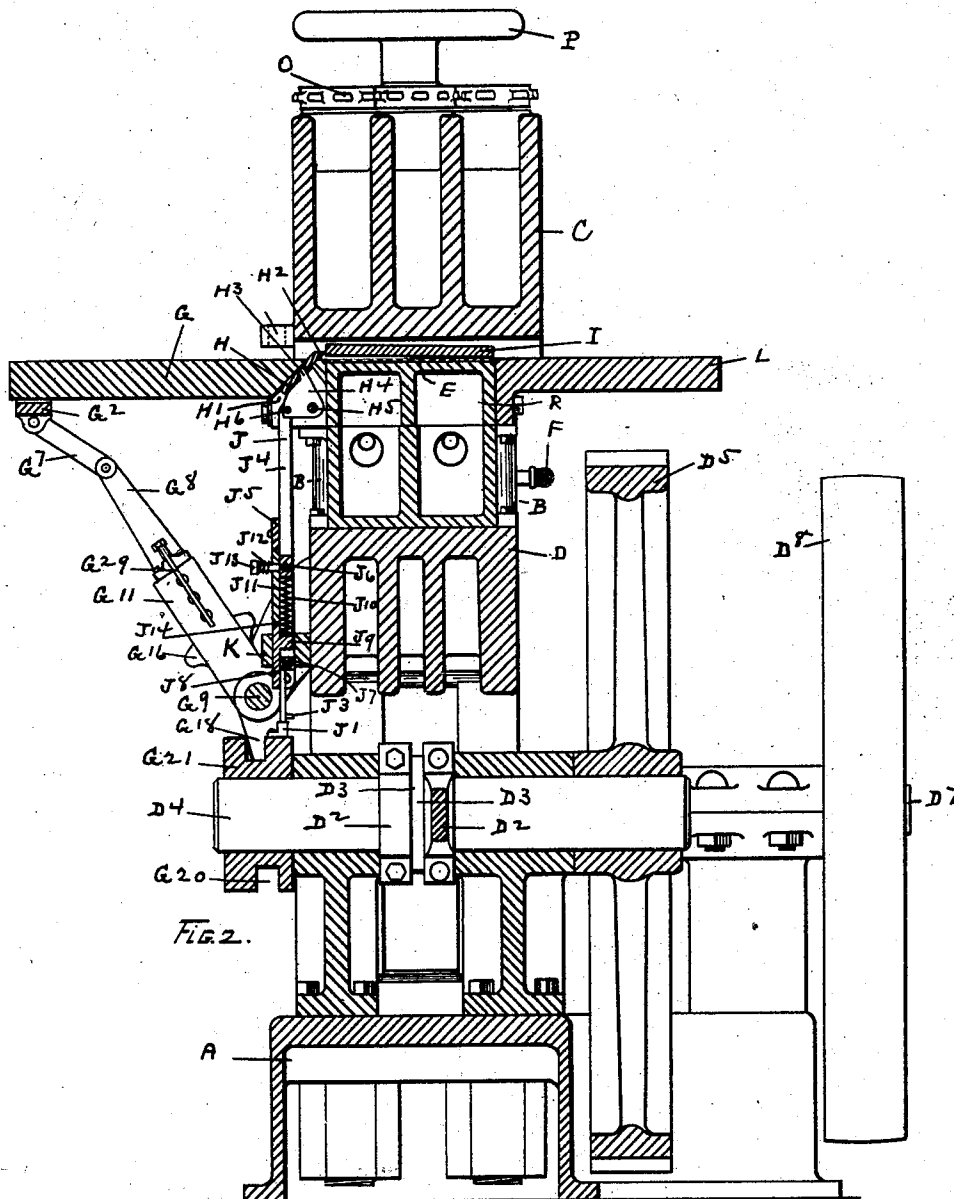


FIG. 2.

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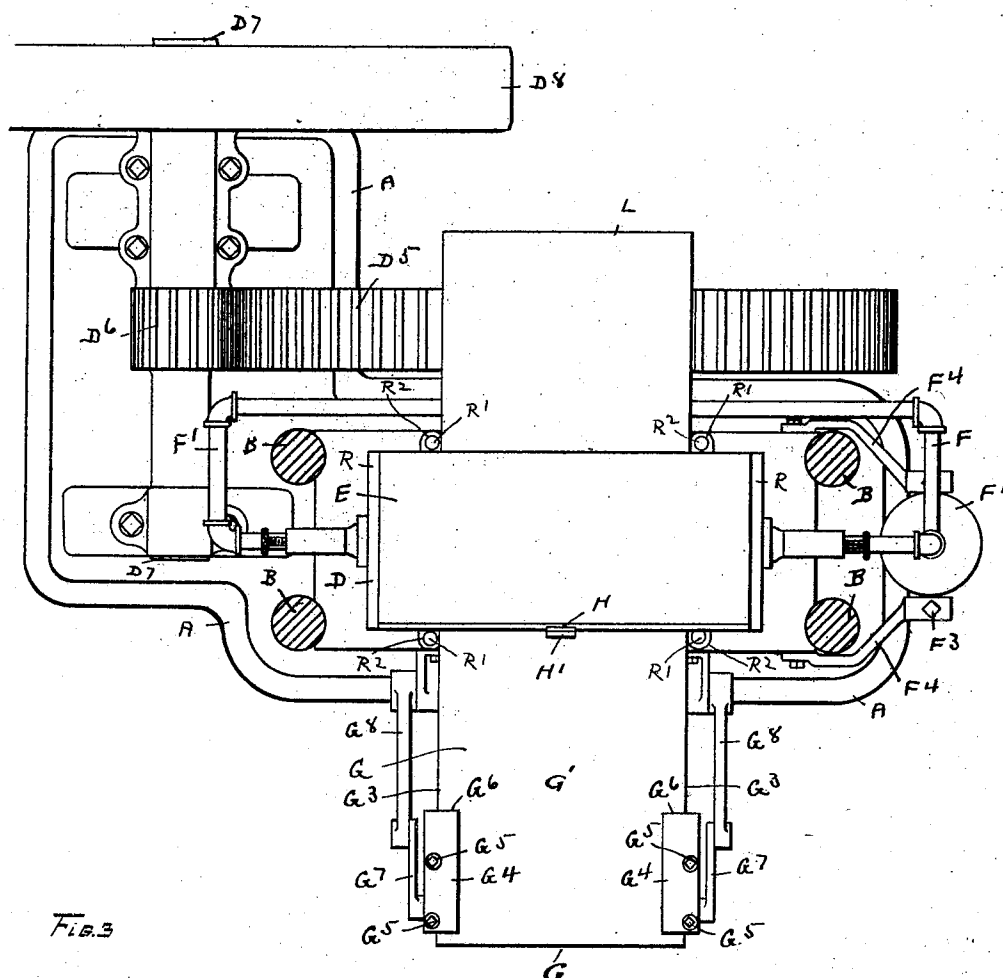
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4 Sheets—Sheet 3.



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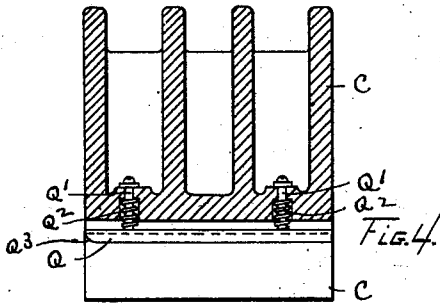
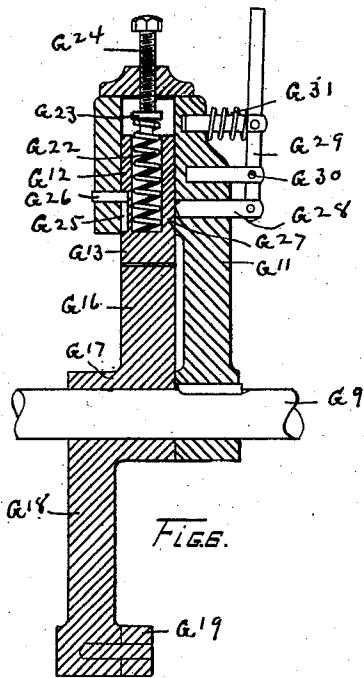
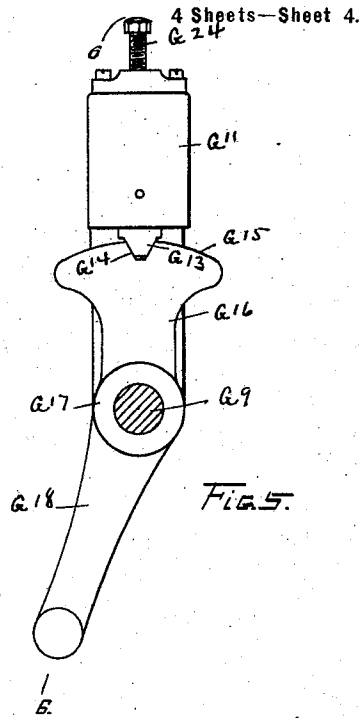
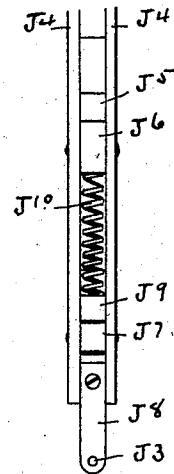
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UNITED STATES PATENT OFFICE.

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EMBOSSING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 693,362, dated February 18, 1902.

Application filed August 23, 1899. Serial No. 728,680. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. BANCROFT, a citizen of the United States, residing at Gardner, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Embossing-Machines, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

10 Figure 1 represents a front view of an embossing-machine embodying my invention. Fig. 2 is a vertical central sectional view on line 2 2, Fig. 1. Fig. 3 is a top view, with the head removed, on line 3 3, Fig. 1. Fig. 4
15 represents a central sectional view on line 2 2, Fig. 1, showing a modification of the machine by the introduction into the head of a friction device for checking the momentum of the article to be embossed as it is fed to the machine. Fig. 5 is a side view, on a larger
20 scale, of the yielding clutching mechanism by which the feeding mechanism is connected with the driving power. Fig. 6 is a sectional view of the same shown on line 6 6, Fig. 5. Fig. 7 is a rear view of a portion of the mechanism for lifting the work out of engagement with the embossing-die.

Similar letters refer to similar parts in the different figures.

30 My invention relates to an embossing-machine in which the article to be embossed is compressed against the face of a die and between a stationary head and a reciprocating follower, which may be actuated by any of
35 the known means employed in machines of this class, such as a hydraulic cylinder, toggle-joint, or screw. The machine illustrated in the accompanying drawings has its reciprocating follower actuated by a pair of toggle-joints; and my invention consists in the novel features of construction and arrangement of parts, as hereinafter described, and set forth in the annexed claims.

45 My invention is particularly designed for embossing-machines which require a heated die; and it has for some of its objects to provide means for limiting the period of contact of the embossed article with the heated die in order to prevent discolorization and also
50 to provide means for mechanically feeding the pieces to be embossed to the machine.

Referring to the accompanying drawings, A denotes the base of the machine, and B B vertical rods mounted upon opposite sides of the base A and supporting at their upper
55 ends a head C. The vertical rods B B serve as guides for the follower D, which has a reciprocating motion by means of the toggle-joint levers D', which are actuated in the usual and well-known manner by means of
60 eccentric-straps D² and eccentrics D³, carried upon a shaft D⁴, which is rotated by means of a gear D⁵ and pinion D⁶ from the revolving shaft D⁷, carrying a fly-wheel D⁸, which
65 also serves as a belt-pulley by which the power is imparted to the machine. The joints of the toggle-joint levers D' are formed by providing semicircular recesses to receive the
70 spindles D⁹, which are placed loosely in the semicircular recesses and are held in place by the pressure upon the levers. Each of the spindles D⁹ is capable of being rotated in its bearings in order to equally distribute lubricating material applied to its exposed surfaces, and to enable the spindles to be rotated
75 I provide them with spanner-holes D¹⁰.

The embossing-machine represented in the accompanying drawings is adapted for embossing the concave side of curved pieces—such, for example, as are used for the backs
80 of chairs—and the opposing surfaces of the head C and follower D are curved to correspond with the curvature of the piece to be embossed. The follower D is hollow and supports on its convex upper surface a die E,
85 which is heated by means of a flame within the hollow follower, supplied by fuel through pipes F. In the machine shown gasoline or other fuel under pressure is supplied from a reservoir F', which is carried upon a shelf F²,
90 suspended by rods F³ from arms F⁴, projecting from one side of the follower D, so that the reservoir is given a rising-and-falling motion corresponding to the motion of the
95 follower D.

Attached to the front side of the follower D is a shelf G, having its upper surface G' corresponding to the upper surface of the die E and forming a support upon which the work
100 to be embossed is laid and from which it is fed to its proper position between the die E and the head C by means of a reciprocating

feeder G^2 , sliding along ways G^3 on the opposite edges of the shelf G . The reciprocating feeder G^2 is provided with pushing-plates G^4 , attached to the feeder by bolts G^5 and overlapping the surface G' of the shelf G , so that their forward ends G^6 will come in contact with the piece to be embossed supported on the shelf G . The plates G^4 are preferably made of wood and are detachable from the feeder, so that different lengths may be used in order to vary the position of the piece to be embossed when left by the forward stroke of the feeder. The feeder G^2 is connected by links G^7 with the ends of arms G^8 , carried upon a rocking shaft G^9 , which is journaled in bearings G^{10} , attached to the follower D . The rocking shaft G^9 is provided with an arm G^{11} , carrying in its end a sliding pin G^{12} , having a beveled end G^{13} , which engages a beveled notch G^{14} , formed in the concentrically-curved surface G^{15} of an arm G^{16} , which projects from a hub G^{17} , capable of turning on the shaft G^9 . The hub G^{17} also has an arm G^{18} , carrying in its free end a cam-roll G^{19} , running in the groove G^{20} of a cam G^{21} , attached to the shaft D^4 . The sliding pin G^{12} is forced downwardly by a spiral spring G^{22} , having one end held in a recess in the pin and its opposite end acting against the flanged head of a follower G^{23} , which is capable of being forced downwardly by a screw G^{24} in order to vary the tension of the spring G^{22} . The sliding pin G^{12} is provided with a slot G^{25} , which is engaged by a pin G^{26} , held in the arm G^{11} , in order to limit the motion of the sliding pin G^{12} , and also with a notch G^{27} , arranged, when the pin is raised, to be engaged by the end of a latch G^{28} , carried on the end of a lever G^{29} , which is pivoted at G^{30} and actuated by a spring G^{31} , in order to force the latch G^{28} into engagement with the notch G^{27} and hold the sliding pin in its raised position. When the beveled end G^{13} of the sliding pin G^{12} is in engagement with the beveled notch G^{14} , it forms a yielding clutch connection between the arm G^{16} and the arm G^{11} , causing the oscillating motion of the arm G^{16} , as actuated by the cam G^{21} , to be imparted to the shaft G^9 and a reciprocating motion to be given to the feeder G^2 , which is so timed with the movement of the follower D as to carry the piece to be embossed forward when the follower D is in its lowest position. In case undue resistance is offered to the forward movement of the feeder, the beveled end of the sliding pin G^{12} is thrown out of the notch G^{14} , causing the sliding pin G^{12} to be raised and held out of engagement with the arm G^{16} by means of the latch G^{28} , thereby disconnecting the feeder G^2 from its actuating-cam. When it is desired again to connect the feeder with the actuating-cam, the sliding pin G^{12} is released by moving the lever G^{29} against the tension of the spring G^{31} and withdrawing the latch G^{28} from the notch G^{27} in the sliding pin, thereby allowing the pin to be again forced into the beveled notch G^{14} by the tension of the spring G^{22} . When

the piece to be embossed has been squeezed between the die E and the under surface of the head C and the follower D depressed, the embossed piece, which still clings to the figured surface of the die, is released from the die by releasing mechanism which comprises a sliding finger H , sliding in ways H' , formed in the shelf G and at an oblique angle to the surface of the die E . The sliding finger H is provided at its upper end with a sharp edge H^2 , adapted to engage the edge of an embossed piece I , lying upon the die E . The finger H is provided with a recess to receive a tooth H^3 upon an oscillating segment H^4 , pivoted at H^5 to the shelf G and at H^6 to the upper end of a lifter J , which slides in the bracket K , attached to the follower D , and having at the proper period a positive up-and-down motion by which the segment H^4 is rocked to impart a sliding movement to the finger H . The lifter J is moved in an upward direction by means of a cam J' , attached to the periphery of the rotating cam G^{21} and acting against the lower end of the lifter J , and its downward movement is effected by means of a cam J^2 , attached to the cam G^{21} and moving over the pin J^3 to draw the lifter down. The lifter J consists of two parts, the upper part being pivoted to the segment H^4 and the lower part being actuated by the cams J' and J^2 . The upper portion of the lifter consists of the parallel bars J^4 J^4 , united by the transverse cross-bar J^5 , which is attached to the front edges of the bars J^4 J^4 and also by the blocks J^6 J^7 , which are placed between the bars J^4 J^4 . The lower portion of the lifter consists of a bar J^8 , placed in alinement with the cross-bar J^5 and having a projection J^9 extending between the parallel bars J^4 J^4 and normally held in contact with the block J^7 by a spiral spring J^{10} , bearing against the projection J^9 and the block J^6 . Placed between the bar J^8 and cross-bar J^5 is a plate J^{11} , held in position against the forward edges of the bars J^4 J^4 by means of a spiral spring J^{12} , held on a stud J^{13} , projecting from the block J^6 . The meeting edges J^{14} of the bar J^8 and plate J^{11} are slightly beveled, Fig. 2, and as the lifter is raised by the upward motion of the bar J^8 , with its beveled upper edge in contact with the beveled lower edge of the plate J^{11} , whenever an undue resistance is offered to the rocking motion of the segment H^4 the plate J^{11} is forced outwardly against the tension of the spring J^{12} by the upper beveled edge of the bar J^8 , allowing the bar J^8 to move upwardly while the bars J^4 J^4 remain at rest and compressing the spring J^{10} . As the finger H moves up it engages the forward edge of the embossed piece I and lifts it from the die and at the same time imparts a slight forward movement to the embossed piece, so that as the finger H is withdrawn and the embossed piece I allowed to fall the figure embossed thereon will not match the figure on the die, causing the embossed piece to lie loosely upon

the face of the die in position to be delivered from the machine by the forward movement of the succeeding piece as it is fed forward by the reciprocating motion of the feeder G^2 , and in order to carry the embossed piece clear of the machine the shelf L is provided, projecting over the gear D^5 .

The upper ends of the rods B B are screw-threaded and carry nuts M, having flanges N inclosed in the head C, so that the adjustment of the nuts M will raise or lower the head C, and the nuts M are provided with sprocket-wheels carrying a chain O, which is rotated by means of a sprocket and hand wheel P in order to simultaneously rotate the nuts M. The adjustment of the head C by means of the nuts M and chain O is not new and forms no part of our present invention, and therefore we have not deemed it desirable to show or describe the same in detail.

The operation of my machine is as follows: The head C is adjusted relatively to the position of the die E, so as to give the desired compression to the piece of wood to be embossed. A reciprocating motion is imparted to the follower D, and as the follower reaches its lowest position the piece of wood is placed upon the shelf G, the adjustable wooden plates G^4 having been made the proper length to cause the piece to be embossed to be pushed forward into the proper position by the reciprocating motion of the feeder G^2 . As the feeder moves back the action of the toggle-joint levers pushes the follower D upwardly and compresses the piece inserted between the head C and die E. The follower then moves downwardly, and as soon as space is provided for lifting the embossed piece off the die the sliding finger H is pushed obliquely against the edge of the embossed piece I, causing it to be lifted out of engagement with the die E and pushed forward. The finger H is then withdrawn to clear the path for the succeeding piece to be embossed, which is fed forward from the shelf G at the next forward reciprocation of the feeder G^2 . As the succeeding piece is pushed between the die and the head C the piece already embossed is pushed forward by a quick movement, which carries it over the shelf L. The only attention required from the attendant is to place at the proper time a new piece upon the shelf G in front of the pusher-plates G^4 .

It is necessary to impart a high degree of heat to the die E in order to produce a smoothly-embossed surface and prevent the checking of the grain of the wood, and it is desirable that the embossed piece be raised out of contact with the heated die as soon as possible in order to prevent discolorization of the wood, and it is also desirable that the mechanism by which the embossed piece is released from the die shall be immediately withdrawn in order to clear the path, so that the succeeding piece may be automatically fed to the machine placed in accurate registration with the die E. These results are se-

cured by the machine above described, which allows the pieces to be fed rapidly and delivered from the machine.

When the machine is operated at a very high rate of speed, I employ a friction device in the head C in order to retard the forward movement of the piece as it is fed by the reciprocating feeder G^2 and prevent its momentum from carrying it away from the forward ends of the pusher-plates G^4 . The retarding device is represented in Fig. 4, in which the head C is represented with a recess in its under surface to receive a friction-plate Q, attached to a series of spindles Q' , which extend into recesses in the head C and are forced downwardly by spiral springs Q^2 . The friction-plate Q is arranged to extend below the surface of the head C, and the forward end Q^3 is slightly rounded to allow the piece to be embossed to pass freely beneath it. As the piece to be embossed is pushed forward it raises the friction-plate Q, compressing the spiral springs Q^2 and thereby applying pressure to the upper surface of the piece to be embossed and producing sufficient resistance to overcome its momentum.

The follower D is provided with a removable die-supporting top R, attached to the body of the follower by means of lugs R' and bolts R^2 , enabling other die-supporting tops to be substituted having different curvatures, and the head C is provided with lugs S S, to which pieces can be bolted in order to vary the curvature of the pressing-surface of the head or to enable flat pieces to be embossed by filling the concave recess of the head C with a piece having a flat face and substituting for the die-supporting top R of the follower a top having a flat instead of a convex face.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an embossing-machine the combination of a pair of pressing members, of a shelf for supporting the work in alinement with said pressing members, a reciprocating feeder moving in a line parallel with said shelf, and a pair of detachable plates attached to the opposite sides of said feeder and overlapping the opposite edges of said shelf, substantially as described.

2. In an embossing-machine, the combination with a pair of pressing members and a reciprocating feeder of a driving-shaft, connecting mechanism between said shaft and said feeder, consisting of a cam G^{21} , a rocking frame actuated by said cam and comprising the arm G^{18} and an arm G^{16} having a curved surface G^{15} and a notch G^{14} , a rock-shaft G^9 , an arm G^{11} attached to said rock-shaft, a sliding spring-actuated pin G^{12} engaging said notch by which the motion of the rocking frame is imparted to said rock-shaft, a latching mechanism by which said sliding pin is held out of engagement with said notch, arms G^8 attached to said rock-shaft, and links G^7 between said arms and said feeder, substantially as described.

3. In an embossing-machine, the combination with a pressing mechanism having a reciprocating member and comprising a pair of pressing-surfaces of a die forming one of said pressing-surfaces, a lifting mechanism arranged to engage the embossed work and move the same in a line obliquely to the face of the die and means for actuating said lifting mechanism, substantially as described.

4. In an embossing-machine the combination with a reciprocating feeder and a pressing mechanism comprising a reciprocating member and an embossing-die forming one of the pressing-surfaces, of means for lifting the work out of an engagement with the die and moving it out of registration with the die, in advance of the reciprocating movement of the feeder, substantially as described.

5. In an embossing-machine, the combination with a pressing mechanism comprising a reciprocating member and an embossing-die forming one of the pressing-surfaces, of means for releasing the embossed piece from the die, and a yielding connection between the releasing mechanism and the driving power, substantially as described.

6. The combination with fixed and reciprocating pressing-surfaces, an embossing-die forming one of said pressing-surfaces, of a finger sliding in ways obliquely to the face of said die, a rocking segment by which said finger is moved, an actuating-cam and an intermediate lifter between said cam and segment, whereby said segment is rocked to slide said finger above the face of the die and a cam by which the motion of said segment and finger is reversed, substantially as described.

7. In an embossing-machine, the combination with a pressing mechanism, comprising fixed and reciprocating members, of a die carried by the reciprocating member and a friction device held in the fixed member, whereby a frictional resistance is imparted to the work as it is fed to the pressing mechanism, substantially as described.

8. In an embossing-machine, the combina-

tion with a pressing mechanism and a feeding mechanism by which the work is fed to said pressing mechanism, of a spring-actuated plate held by the pressing mechanism and in advance of the movement of said feeding mechanism, whereby a frictional resistance is imparted to the work as it is fed to the pressing mechanism, substantially as described.

9. In an embossing-machine comprising a pressing mechanism having a reciprocating member and a die carried thereby, of a heating apparatus for heating said die, a shelf carried by said reciprocating member, and a fuel-supplying reservoir supported on said shelf, substantially as described.

10. In an embossing-machine, the combination of a supporting-stand, a fixed pressing member held by said stand, a movable pressing member moving in vertical ways, a pair of toggle-joint levers by which said movable member is actuated, a shaft journaled between said toggle-joint levers, eccentrics carried by said shaft, intermediate connecting mechanism between said eccentrics and said toggle-joint levers, a gear on said shaft, a pinion engaging said gear, a driving-shaft carrying said pinion and a belt-pulley on said driving-shaft, substantially as described.

11. The combination with the pressing members, of a pair of toggle-joint levers, a shaft operatively connected with said levers and journaled between them, a cam on one end of said shaft, a feeding mechanism operated by said cam, a gear on the opposite end of said shaft, and means for rotating said shaft, substantially as described.

In testimony whereof I have signed my name to this specification, in presence of two subscribing witnesses, this 23d day of August, 1899.

FRANK H. BANCROFT.

Witnesses:

BERTHA M. ATKINS,
ALBERT A. UPTON.