

(No Model.)

3 Sheets—Sheet 2.

J. T. PENNYCOOK. MANUFACTURE OF PLATE GLASS.

No. 434,400.

Patented Aug. 12, 1890.

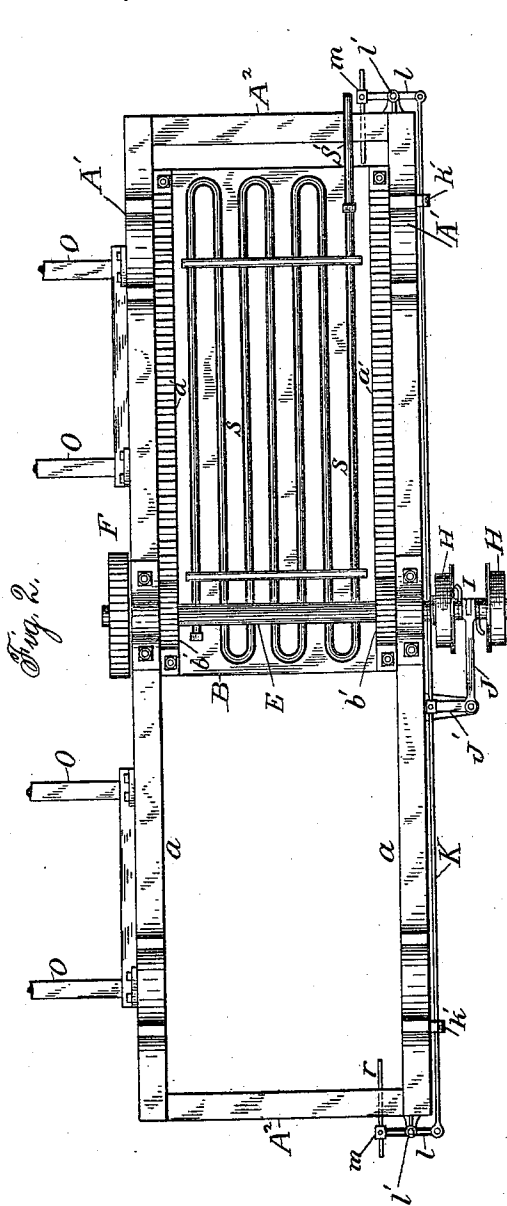


Fig. 2.

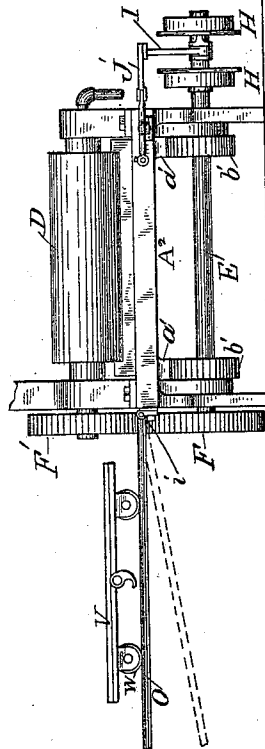


Fig. 3.

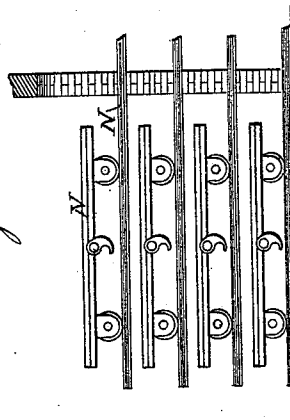


Fig. 4.

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 7.

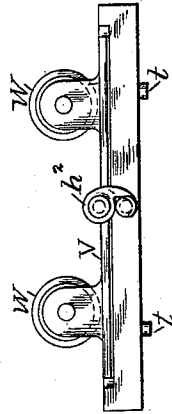


Fig. 8.

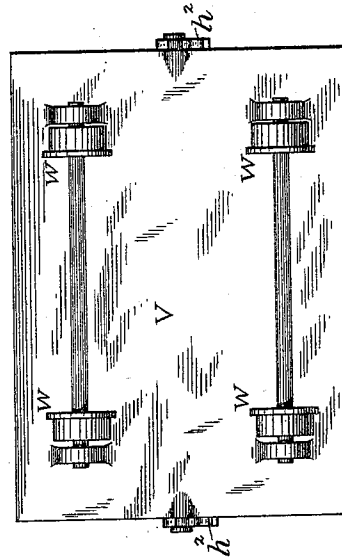


Fig. 5.

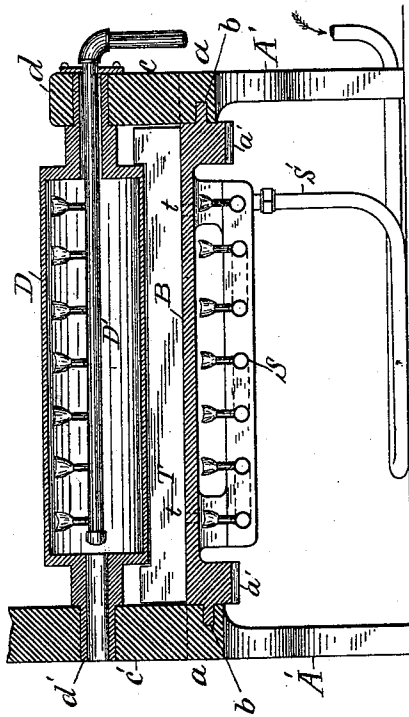
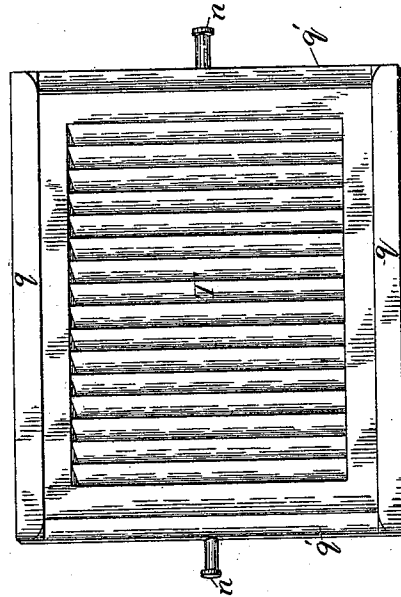


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN T. PENNYCOOK, OF NEWARK, NEW JERSEY, ASSIGNOR; BY DIRECT AND MESNE ASSIGNMENTS, TO EDWARD M. MCCOOK, OF RIVERSIDE, CONNECTICUT.

MANUFACTURE OF PLATE-GLASS.

SPECIFICATION forming part of Letters Patent No. 434,400, dated August 12, 1890.

Application filed March 21, 1890. Serial No. 344,790. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. PENNYCOOK, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in the Manufacture of Plate-Glass; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to certain novel improvements in machinery which is adapted for molding plates of glass, and also to give different configurations to the glass; and the nature of my invention consists in the following mechanism, which will be fully understood from the following description and claims, taken in connection with the annexed drawings, in which—

Figure 1 is a perspective view illustrating my improved molding devices, and also showing the railway-connection thereof with an annealing-furnace. This view shows the crane and also shows the rectangular reciprocating molding-plate at one end of the track. Fig. 2 is a bottom view of the track, the coil of heaters for heating the bed-plate, also illustrating the gearing for giving reciprocating movements to said bed-plate, and also showing the shifting-gearing for giving the traversing movements to this plate. Fig. 3 is a vertical view of one end of the machine, the crane being removed, showing a plate-carrier truck mounted on a hinged track on its way with a glass plate to one of the tracks in the annealing-furnace. Fig. 4 is a vertical side view of a series of plate-trucks arranged in part of an annealing-furnace, showing the glass plates thereon and the rail-tracks on which said trucks are supported in said furnace. Fig. 5 is a vertical cross-section through the pressing-cylinder and the heaters thereon; also showing the heaters for the reciprocating bed and the flexible tube which furnishes gas for the heaters. Fig. 6 is a top view of

one of the glass molds adapted to form a plate having angular ribs, which, in connection with the truck illustrated by Figs. 7 and 8, will produce a plate of glass having said ribs on one side and a plane or flat surface on the opposite side. Figs. 7 and 8 illustrate the removable truck upon which the glass plates are supported and moved into the annealing-furnace.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the annexed drawings by letter, A designates a rectangular track-frame, which is supported upon legs A' A' in a horizontal position. This frame is rigid in every part, and is sustained upon a substantial base, so that there shall be little or no vibration. The ways *a a* are parallel to each other, and these ways afford tracks, which are horizontally grooved at *b* for truly guiding a longitudinally-reciprocating bed B, which is provided with angular guiding and stay ribs *b'* at the ends of this bed, the longitudinal extensions *b²* of which are double-beveled at their ends.

At or near the middle of the length of the frame A and rigidly secured upon the longitudinal ways *a a* thereof are pillow-blocks *cc'*, which afford journal-bearings for the tubular journals *d d'* of a hollow cylinder D, which cylinder may be plain-faced, or on its face different characters may be made, which will be impressed into the soft glass. This cylinder D is provided internally and centrally with a gas-pipe D', having numerous gas-jets for heating the cylinder and keeping it at a temperature which approximates the temperature of glass when in a molten condition. This cylinder, as well as the reciprocating bed-plate, is heated and kept at a certain degree of heat necessary to retain the glass in a proper condition for manipulation and transfer to the annealing-furnace. I therefore employ, in combination with the bed-plate B, a serpentine heater S, which is connected to a natural or an artificial gas-feeder by a flexible tube S', which latter allows the bed B to reciprocate, and at the same time the flame can be maintained.

On the lower side of the bed B and along-side of the parallel bars *a a* are rack-bars *a' a'*, which are rigidly secured to the said bed. These bars are clearly shown in Fig. 2. With
 5 these racks *a' a'* engage toothed pinions *b' b'*, which are keyed on a horizontal transverse shaft E. On one end of the shaft E is keyed a cog-wheel F, which engages with one end of a similar wheel F' on the hollow journal of
 10 the cylinder D, thus transmitting by said twin wheels F F' a uniform movement, which is synchronous with the reciprocating movements of the bed-plate B. On the opposite end of the shaft E to the end on which is
 15 keyed the cog-wheel F, I apply two belt-pulleys H H', both of which turn loosely on said shaft. The pulley H is run with a straight belt from a drum on a main driving-shaft, and the pulley H' is run from the same driving-shaft by a crossed belt. Between these two
 20 belt-pulleys and on the shaft E is loosely applied a clutch-bearing arm I, to the upper end of which is pivoted a short angular rod J, which is pivoted to an arm J', that is rigidly secured to a longitudinally-movable rod
 25 K, which extends from one end to the other of the main supporting-frame A. This rod is sustained by short elongated hole-brackets *k' k'*, and its ends are pivoted to the outer ends
 30 of short levers *l*, which have their fulcra at *l'* on brackets secured to the transverse end bars A² of the main frame. The inner ends of this short lever *l* are formed with tubular
 35 bosses *m*, through which pass longitudinally-shifting rods *r*, which protrude freely through the said end bars A² and are endwise adjustable by means of binding-screws *r'*. My object is to transmit a continuous rotative motion from a prime motor, a reciprocating recti-
 40 linear movement to the bed B. The ends of the bed itself impinging alternately against the rods *r r*, shift the rod K endwise, which, acting through the medium of the clutching device I, automatically reverses the move-
 45 ments of the bed B at proper times.

I may use any well-known clutch between the driven wheels on the shaft E to effect the movements above described. I prefer to employ the well-known pawl-and-ratchet clutching device.

The pillow-block *c'* is extended upwardly and provided with an overhanging bracket P, which affords the bearings for the spindle of a crane Q, the free end of the arm of which
 55 has depending from it a block and tackle, (shown in Fig. 1 of the annexed drawings,) to the lower block of which is hitched a bail R. This bail is provided on the lower ends of its arms with hooks *h*, which are designed to
 60 grapple or engage with button-head studs *n* formed on the ends of the mold T at the middle of the width thereof. The bail R affords such a large arch that the mold T and a truck V can be at the proper time lifted
 65 from the bed B and turned over, leaving the glass plate upon said truck, so that the latter can be transferred upon its wheels, plate up-

ward, on track O, and run into the annealing-furnace M upon any one of a series of tracks N which are arranged therein.

It will be observed by reference to Fig. 3
 70 that the track-rails O are hinged at *i* to the inner side bar of the main frame so that they can be adjusted to the planes of the several track-rails N in the annealing-furnace, thus
 75 allowing the trucks to be moved from the molding-frame with the glass upon their surfaces into the annealing-furnace, previous to which the trucks are unhooked from the mold T and the mold returned to its place upon
 80 the reciprocating bed B.

The mold B, which I have above described, is constructed somewhat like a printer's "chase," having raised longitudinal sides *q*
 85 *q* and outwardly and downwardly beveled ends *q' q'*, the flat tablet of the truck V being adapted to fit snugly within the chase or mold and to be locked thereto by means of hooks *h²* on the ends of the tablet engaging
 90 with the button-head pins *n* on the ends of the chase. On the bottom of the chase or mold I fix studs *t*, four in number, which enter apertures made in the bed B and thus fix the mold-chase in proper position for receiving the molten glass from the furnace, at the
 95 same time allowing it to be readily removed when desired.

The operation of my glass-molding machine is as follows: The molten glass is flowed upon the mold T, which, like all parts of my
 100 device that contact with the glass, is kept at a given heat by the means above described. The bed is moved beneath the cylinder D, and the surplus glass is forced upon the bed over one end of the mold. When the mold
 105 has fully passed the cylinder, a truck-plate V is adjusted upon it, and the hooks *h²* are engaged with the studs *n* on the mold frame or chase T. The hooks on the bail R are then engaged with the studs *n*, and the mold,
 110 together with the truck-plate V, is lifted and reversed, so that the truck-wheels *w* are in alignment with the hinged rails O at one end of the main frame A. The crane is then swung, and the truck with the molded glass
 115 upon its upper side is run into the annealing-furnace M upon the stationary rails therein. The process is repeated automatically at each terminus of the stroke of the bed B, using two
 120 doors M' M' for the annealing-furnace M. It will be observed that the rectilinear reciprocating movements of the bed B are strictly automatic, by reason of this bed touching the push-rods *r* at the termini of its strokes, the
 125 said rods operating to shift the clutch on the shaft E to give the forward and backward movements to the bed B.

Having described my invention, I claim—

1. In a glass-molding machine, the combination, with the reciprocating mold-bed thereof, of a crane adapted to swing horizontally
 130 over the bed, a block and tackle carrying a depending bail having hooks at its lower ends, and a truck adapted to set over the

mold and provided with hooks to engage suitable stud-pins on the mold, so as to secure the mold and truck together for reversal, substantially as specified.

5 2. In a glass-molding machine, the combination, with the track-frame, the annealing-furnace, and the tracks extending into the same, of the reciprocating mold-bed, the crane and block and tackle, and the truck provided
10 with hooks to engage stud-pins on the mold-bed, substantially as and for the purposes specified.

3. The combination, in a glass-molding machine, of the track-frame, the reciprocating mold-bed arranged to travel thereon, and the truck and connections whereby the said truck
15 may be secured to the mold to hold the two together, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN T. PENNYCOOK.

Witnesses:

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J. MCNAMEE.