

(No Model.)

J. A. KURTZ.
APPARATUS FOR MANUFACTURING PLATE OR WINDOW GLASS.
No. 433,411. Patented July 29, 1890.

Fig. 2.

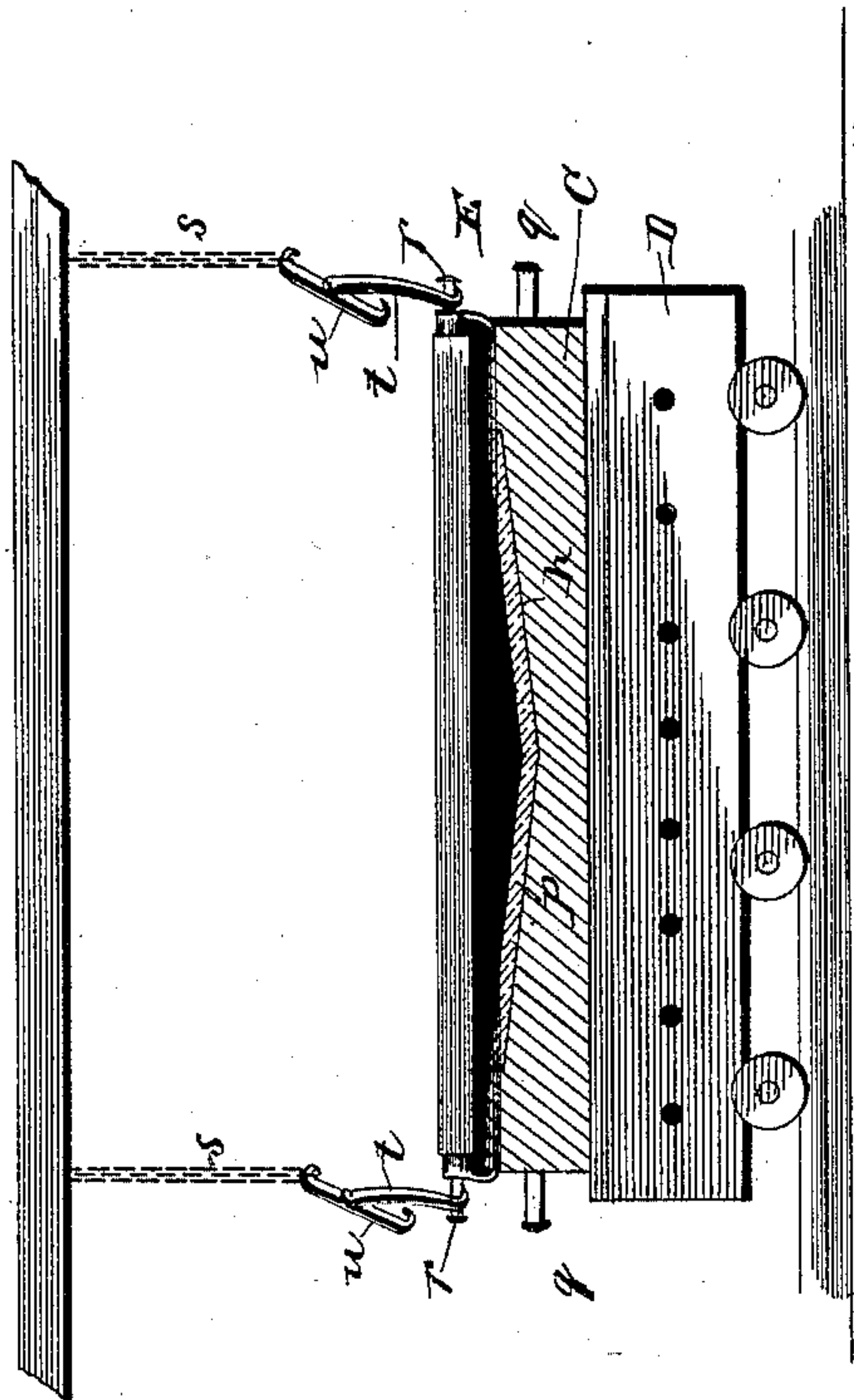


Fig. 4.

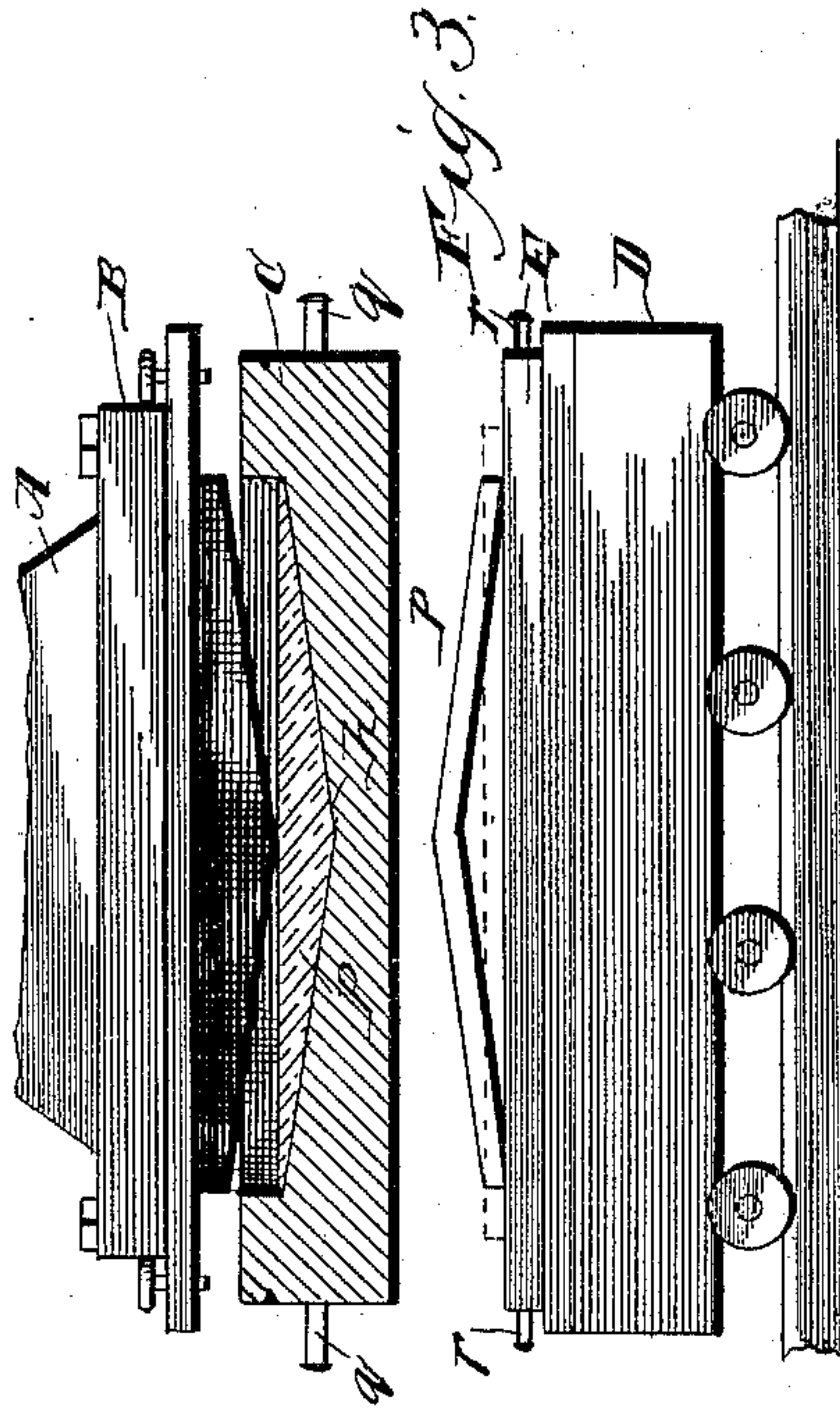


Fig. 3.

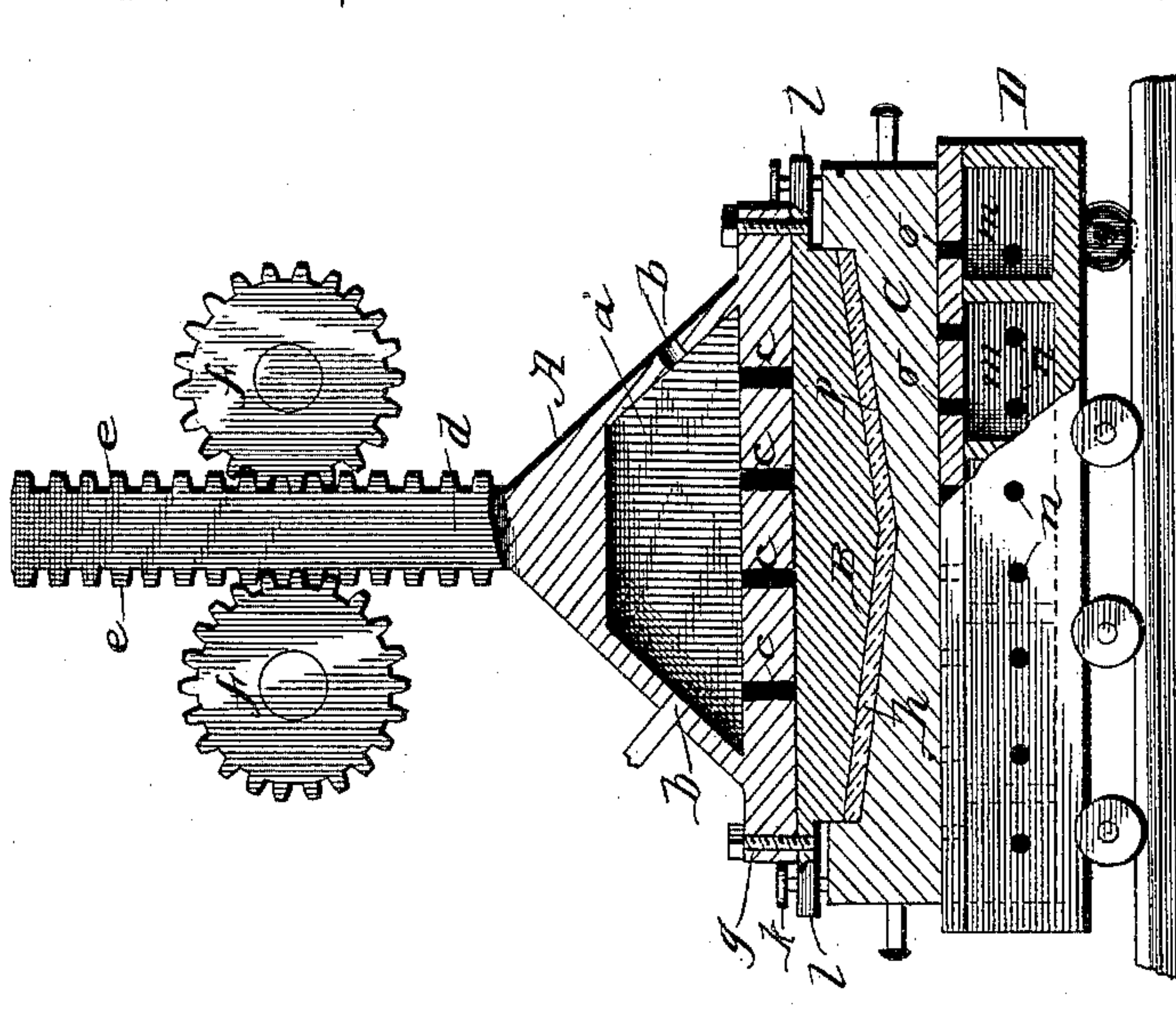


Fig. 1.

Witnesses:
Geo. Y. Thayer
G. A. Taubenschmidt

Inventor:
John A. Kurtz
By *Johnston, Reinohl & Dyer*
his Attorneys.

UNITED STATES PATENT OFFICE.

JOHN A. KURTZ, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO SIMPSON R. HORNER AND JAMES R. McCLELLAND, BOTH OF SAME PLACE.

APPARATUS FOR MANUFACTURING PLATE OR WINDOW GLASS.

SPECIFICATION forming part of Letters Patent No. 433,411, dated July 29, 1890.

Application filed November 5, 1889. Serial No. 329,272. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. KURTZ, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Manufacture of Plate or Window Glass; and I do hereby 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.

My invention relates to the manufacture of plate or window glass, and has for its object certain improvements in the construction of apparatus, which will be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical longitudinal section of a plunger, an upper and lower die, with a stratum of glass between them removing the glass from the die, and a truck, partly in section; Fig. 2, a similar view of the lower die, a flat plate upon it, and the truck on which the die rests; Fig. 3, a side elevation of the truck with the glass removed from the die and lying upon the plate shown in Fig. 2; and Fig. 4, a longitudinal section of the dies, showing the upper die entering the lower die to displace the glass and form it into a sheet.

Reference being had to the drawings and the letters thereon, A indicates a plunger having a heating-chamber *a*, which may be supplied with gas through the apertures *b*, or it may be heated by any other suitable means. The lower face of the plunger may be grated or perforated, as shown at *c*, to conduct the heat from the chamber *a* to the upper die B; and the upper end of the plunger is provided with a bar *d*, having gear-teeth *e* thereon, which engage with the pinions *f* for raising and lowering the plunger and the upper die. The upper die B is secured to the plunger A in any suitable manner, and for the purpose of illustration screw-bolts *g* are shown, but clamps or any other suitable appliances may be used.

C indicates the lower die, which in the present instance has a cavity or recess *h* in it, the

bottom of which is inclined to afford a ready means for the escape of air as the upper die, with the projection *i*, corresponding with the cavity in the lower die, descends and displaces the molten glass lying in the cavity *h* and forms it into a sheet of any predetermined thickness. The gage or thickness of the sheet is determined by means of the set-screws *k k*, which project through a flange *l* on the upper die and bear upon the upper surface of the lower die.

D indicates a truck, the body of which is hollow and forms a heating-chamber *m*, supplied with gas through apertures *n*, or heated by any other suitable fuel. The upper surface of the truck-body is perforated, as shown at *o*, for the purpose of heating the lower die C, resting upon it. The cavity in the die C may be of other forms, provided, always, that there is provision made somewhere for the escape of the air entrapped by the upper die in its descent upon the molten glass. After the glass has been pressed out into a sheet in the dies the upper die is raised, the truck D and the lower die C removed from under the plunger A, and a flat plate E clamped or otherwise secured to the upper surface of the lower die, as shown in Fig. 3. The lower die is then raised from the truck D, inverted, and the plate E placed upon the truck, when the die B is removed and the sheet of glass *p* allowed to flatten out on the plate E, as shown in Fig. 4, or, if necessary, it may be pressed out and flattened by any suitable means, such as a roll. After the glass has been flattened it is put into a suitable annealing-furnace. The surfaces of the dies with which the glass comes in contact are polished to form smooth surfaces for the purpose of imparting corresponding smooth surfaces to the glass.

The gas for heating the plunger and truck may be conducted through rubber tubing, and when desired a blast of air may be introduced to the heating-chamber through one or more of the apertures therein, for the purpose of regulating the temperature of the dies.

The lower die C is provided with trunnions *q q*, and the plate E with trunnions *r r*, for convenience of handling them, and they are

raised from the truck D by means of chains s, having links *t t*, and levers *u u*, secured to the chains and links and fulcrumed in the latter.

5 Having thus fully described my invention, what I claim is—

10 1. In apparatus for the manufacture of plate or window glass, the combination of upper and lower dies for forming the glass into a sheet, and a separate plate constructed to be secured to the upper surface of the lower die, and upon which the glass is flattened, substantially as described.

15 2. In apparatus for the manufacture of plate or window glass, the combination of a reversible lower die and means for heating it, an upper die, a plunger for operating said upper die and means for heating the same, a flattening-plate, and suitable clamps, substantially as described.

20 3. In apparatus for the manufacture of plate or window glass, a lower die having a cavity to receive molten glass, and means for heating the die, in combination with an upper die having a projecting face, a plunger to which the upper die is secured, and means for heating the latter die, substantially as described.

25 4. In apparatus for the manufacture of plate or window glass, a lower die having a cavity provided with an inclined bottom, and means

for heating said die, in combination with an upper die having a face corresponding with the angle of the bottom of the cavity in the lower die, a plunger to which the upper die is secured, and means for heating said upper die, substantially as described. 35

5. In apparatus for the manufacture of plate or window glass, the combination of a lower die having a cavity provided with an inclined bottom, a truck having a heating-chamber in the body thereof, an upper die having a face corresponding with the angle of the bottom of the cavity in the lower die, and a plunger having a heating-chamber, substantially as described. 40 45

6. In apparatus for the manufacture of plate or window glass, the combination of dies for forming the glass into a sheet, means for determining the thickness of the sheet of glass, a truck for supporting the lower die and supplying heat thereto, and a flattening-plate constructed to be secured to the lower die, substantially as described. 50

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

JOHN A. KURTZ.

Witnesses:

J. H. DAWSON,
D. C. REINOHLE.