

(No Model.)

H. ESTEP.

FURNACE FOR ANNEALING AND FLATTENING GLASS.

No. 314,524.

Patented Mar. 24, 1885.

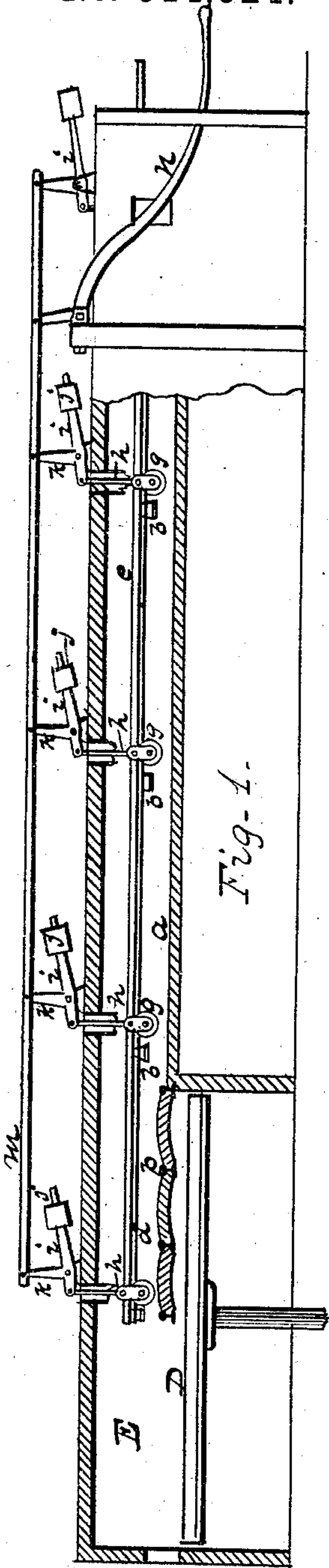


Fig. 1.

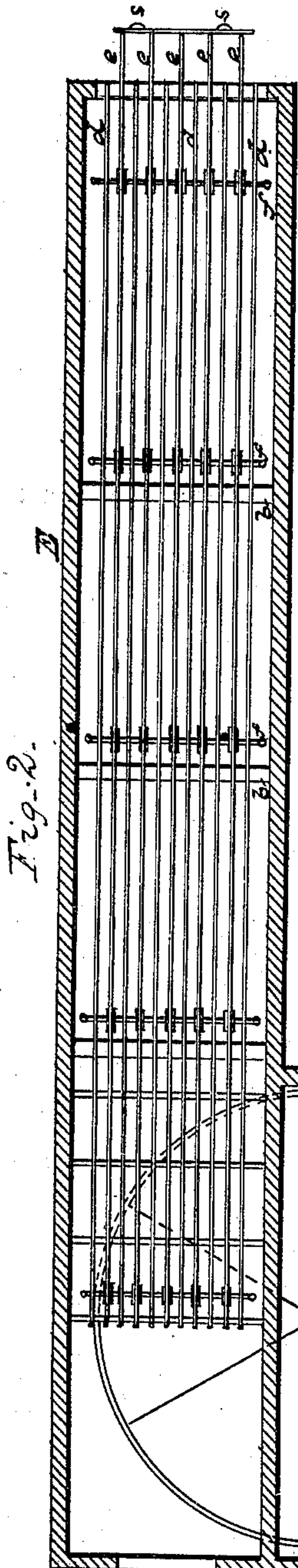


Fig. 2.

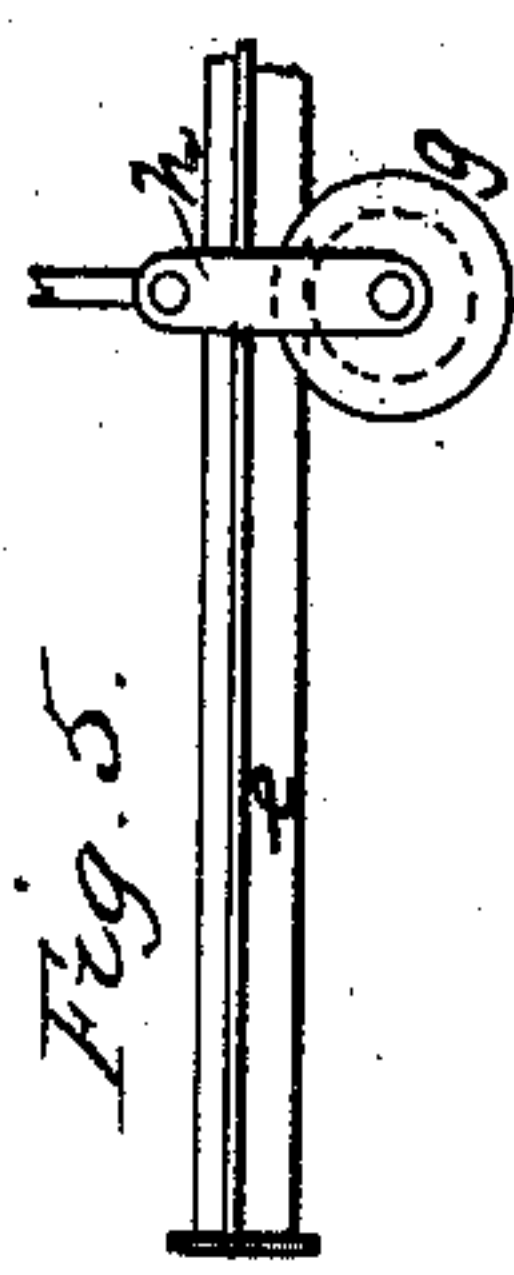


Fig. 5.

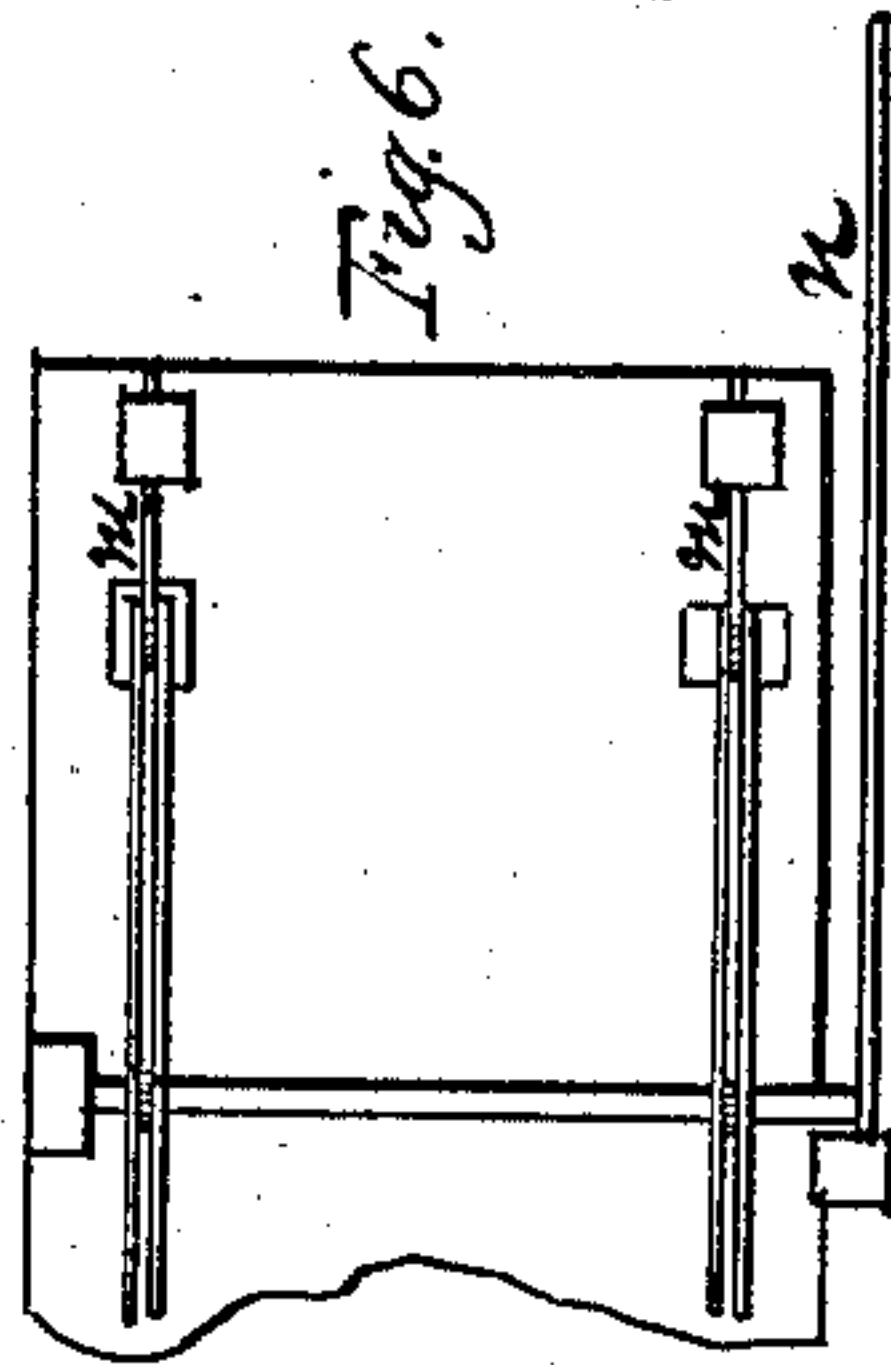


Fig. 6.

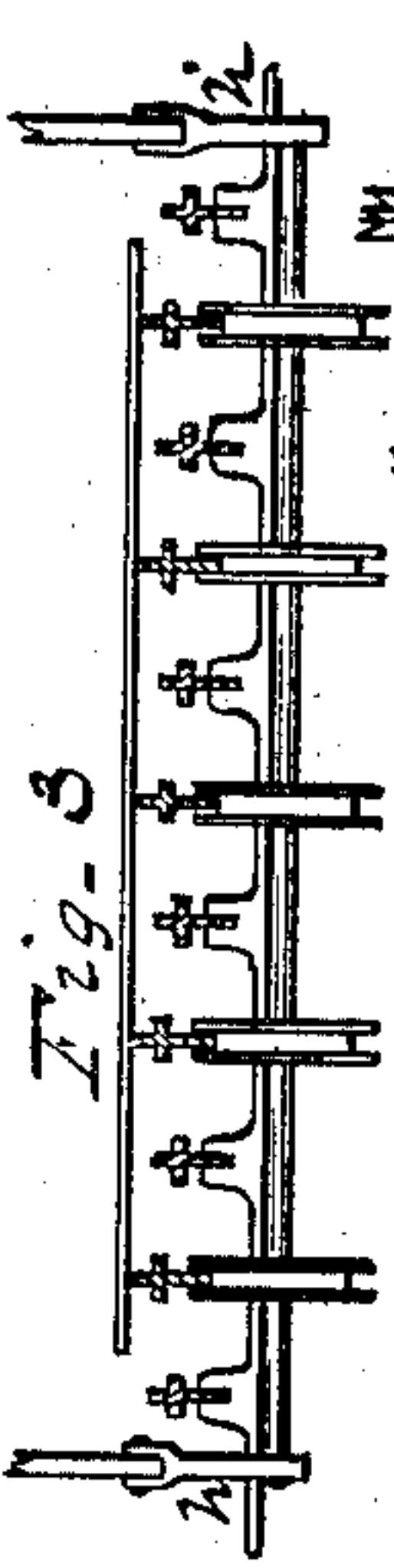


Fig. 3.

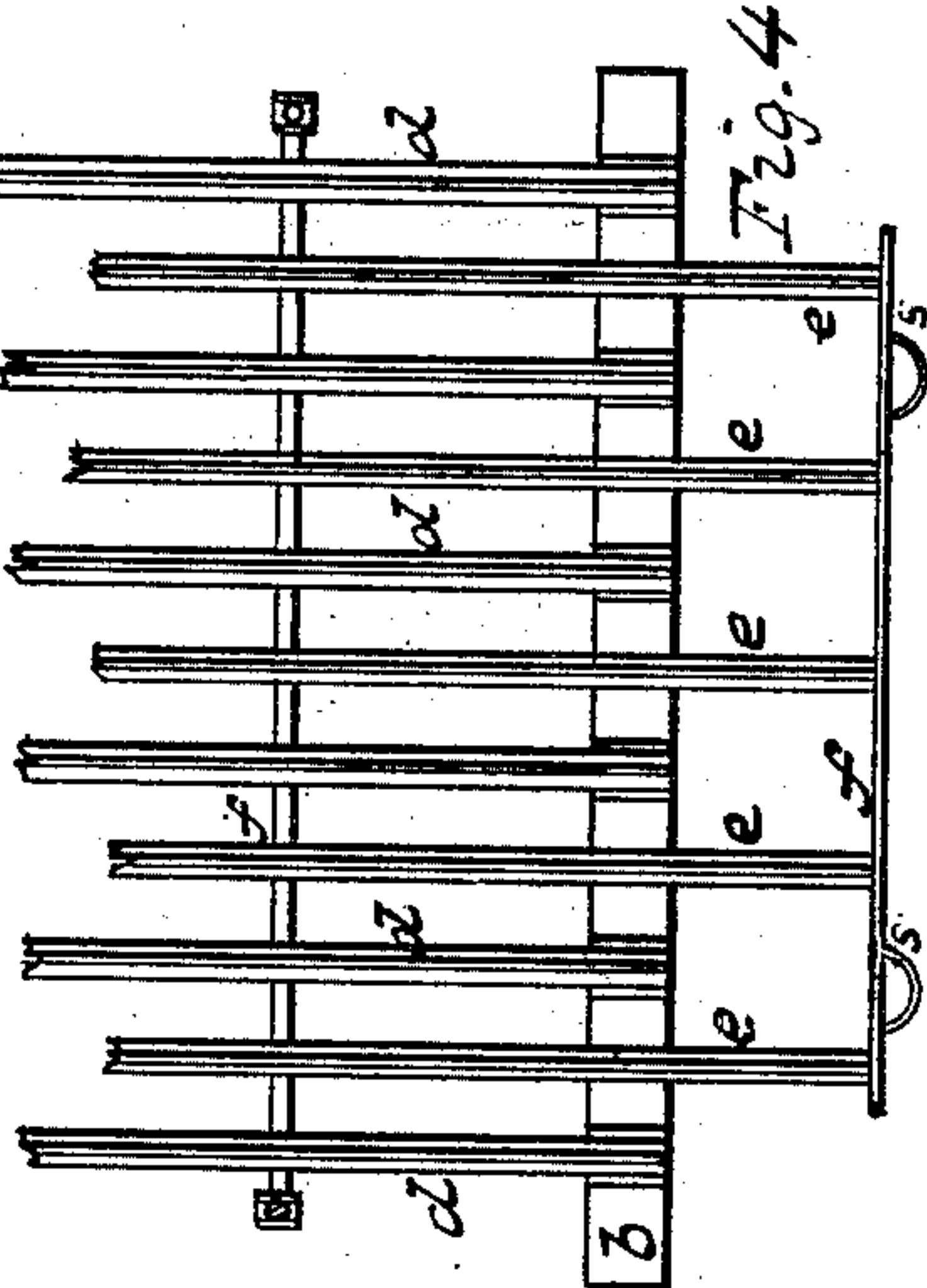
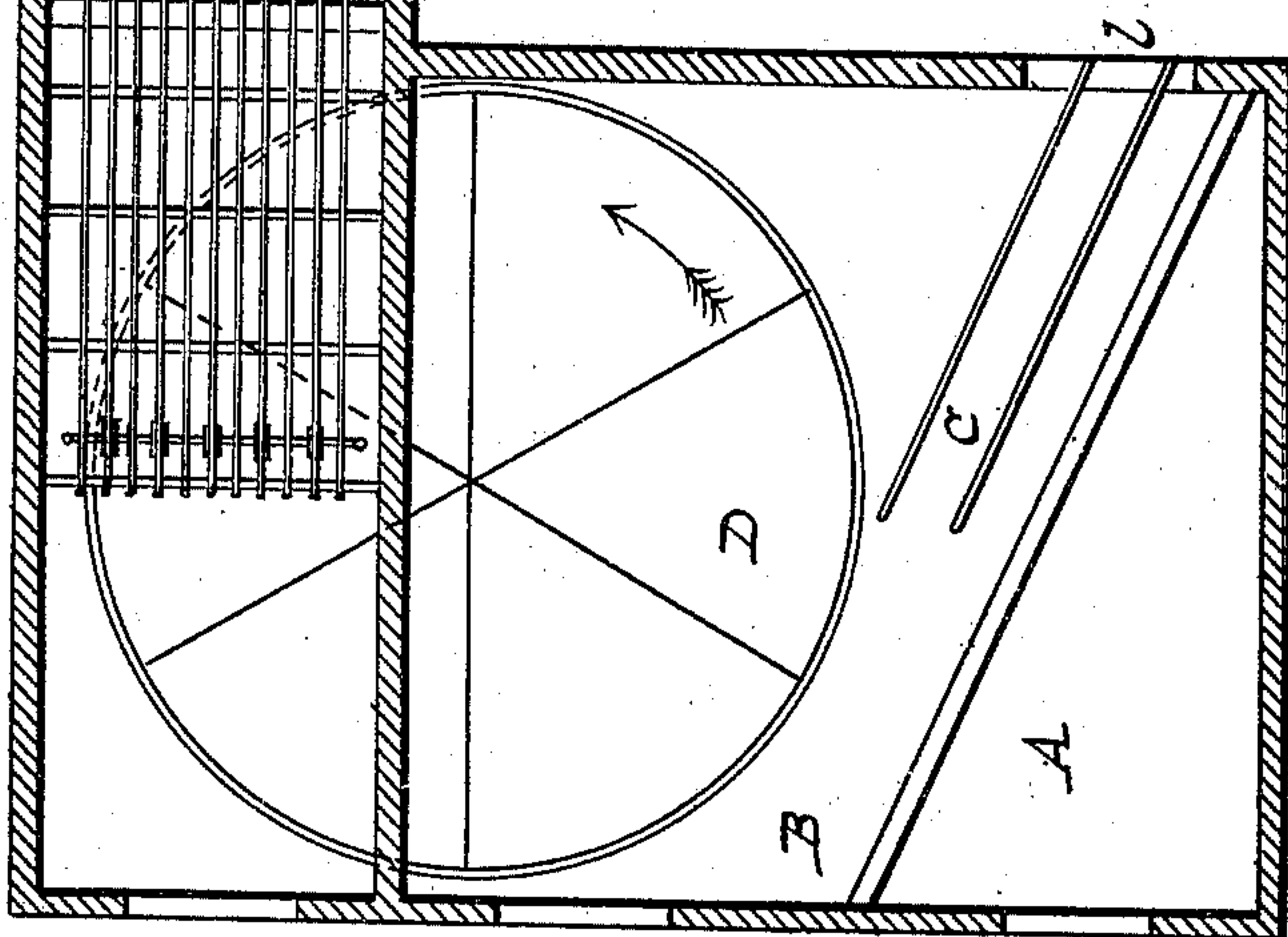


Fig. 4.



Witnesses:

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FURNACE FOR ANNEALING AND FLATTENING GLASS.

SPECIFICATION forming part of Letters Patent No. 314,524, dated March 24, 1885.

Application filed October 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, HARRISON ESTEP, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have made an Improvement in that class of Furnaces Designed for the Purpose of Flattening and Annealing Window-Glass, wherein a revolving table is used, upon which cylinders of glass are placed to be heated and made flat, then lifted from the table onto a frame traveling through a longer and gradually-cooling portion of the furnace, whereby the flattened sheets of glass become properly annealed.

It consists in the construction and arrangement of parts, as will be hereinafter described, and particularly pointed out in the claim.

To enable others to fully understand my invention, I will proceed to describe it by reference to the accompanying drawings, wherein—

Figure 1 represents a longitudinal vertical section of so much of a glass-annealing furnace as comprises my invention; Fig. 2, a plan of the entire furnace; Fig. 3, an end view of the stationary receiving-rack and movable barred frame; Fig. 4, an enlarged top view of a front portion of said fixed and movable bars; Fig. 5, a detached and enlarged portion of one of the movable rails or bars supported by a friction-roller or revolving hanger; Fig. 6, a top view of the exit end of the furnace.

To put my invention into practice, I construct a furnace very similar to those in ordinary use for the purpose of flattening and annealing window-glass, having the usual fireplace, A, receiving-chamber B, passage-way C for the introduction of such glass cylinders or "rollers" required to be acted on, together with the necessary doors leading to the furnace and the revolving table D inside, all of which are generally coupled with a suitably long annealing-chamber, E, through which the glass is made to travel in a gradually-diminishing heat.

For the purpose of my invention, lengthwise of and above the floor *a* of this annealing-chamber E, I affix a number of transverse beams, *b*, and place thereon a series of iron rods, *d*, all arranged in the same horizontal plane and separate a suitable distance from each other, so as to form a long and stationary

iron grate rigidly secured in place, and which extends almost the entire length of said chamber E, leaving only a vacancy at that end nearest the revolving wheel or table D sufficiently large to enable the flattened sheets of glass to be manipulated and lifted from the table D onto the approximate portion of said grate.

Separate from but alternating with the rods *d* constituting the stationary grate are a series of other and similar rods, *e*, so attached to cross-bars *f* as to be lifted bodily and together from the spaces between and above the surface of the fixed grate, and given in addition thereto a combined movement back and forth in the direction of their length. Each side of this movable rack or swinging frame is carried by several small anti-friction wheels, *g*, respectively supported in hangers *h*, attached to one end of a short bell-crank, *i*, the opposite end of which is provided with an adjustable weight, *j*, to counterbalance the rack. These several bell-cranks *i* are arranged above and outside of the annealing-chamber, and pivoted in supports thereon, the upper arm, *k*, of each bell-crank being properly connected to a long horizontal rod, *m*, that extends over all, which in turn is so attached to a suitable hand-lever, *n*, as that on its depression the internal and movable rack or swinging frame may be lifted a proper height above the stationary grate, and by a reverse action of the lever *n* the swinging frame may be made to resume its former and lowest position; and for the purpose of giving the swinging frame or rack a reciprocating rectilinear movement it is provided with a couple of hand-pulls, *s*, that always remain outside of the furnace and thereby keep cool.

Arranged over that portion of the revolving table D beneath the stationary grate or fixed rods *d* is a horizontal division-wall, *p*, represented as a series of connecting arches that may consist of iron plates or brick-work, for the purpose of properly guiding and distributing the heat over, under, and all around the fixed and movable grates and any glass that may be placed thereon.

The several parts having been constructed as herein shown and described, the furnace brought to a proper heat, and the circular table D given a slow rotary movement in a

direction indicated by the arrow thereon, a cylinder of glass, duly prepared after the manner and for the purpose of undergoing the flattening and annealing process, may then be introduced through the doorway *l* into the oblique channel *C*, and received by a man on the opposite side of the furnace, who will lift the cylinder of glass from the said channel and transfer the same to the nearest portion of the revolving table, which soon arrives at that degree of heat as will cause the cracked or split cylinder of glass to open, spread out, and eventually become flat, whereupon the table *D* should be rotated until the flattened glass is carried under and opposite the ends of the stationary and moving grates, ready to be lifted thereon and passed through the annealing-chamber, to be delivered therefrom in the manner and by the means hereinbefore described.

I attach importance to the fact that in the construction of my furnace I arrange the arches *p* midway between the revolving table

D and the swinging grate-frame, whereby a uniform heat is conveyed to the glass on said frame. By this arrangement of the arches over the said table the swinging frame is prevented from being warped or burned out by the heat.

Having thus set forth the nature of my invention and the device for carrying the same into effect, I claim—

In a furnace for annealing and flattening window-glass, the combination, with the chamber *E*, having a revolving table and swinging grate-frame, of the arches *p*, located above said table and below the inner end of said swinging grate-frame, whereby heat is evenly distributed to the glass on the frame, and the said frame prevented from being warped or burned out, as shown and described.

HARRISON ESTEP.

Witnesses:

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