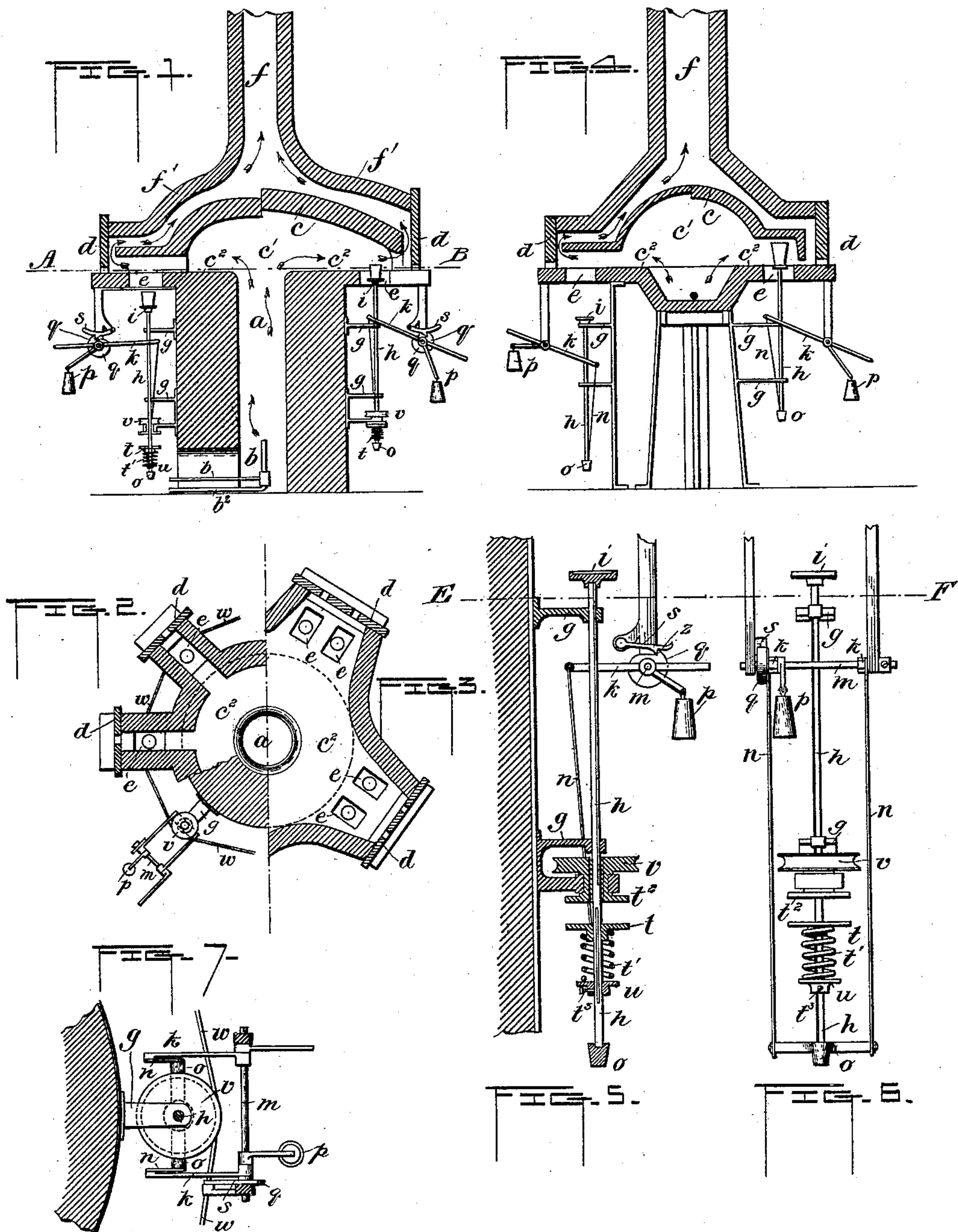


(No Model.)

H. SCHULZE-BERGE.  
FURNACE FOR HEATING GLASSWARE.

No. 411,131.

Patented Sept. 17, 1889.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

HERMANN SCHULZE-BERGE, OF ROCHESTER, PENNSYLVANIA.

## FURNACE FOR HEATING GLASSWARE.

SPECIFICATION forming part of Letters Patent No. 411,131, dated September 17, 1889.

Application filed November 19, 1888. Serial No. 291,293. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN SCHULZE-BERGE, of Rochester, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Furnaces for Heating Glassware; and I do hereby declare the following to be a full, clear and exact description thereof.

My present invention relates to an improvement in furnaces for reheating parts of glassware up to the melting point.

The furnace is represented in the accompanying drawings, in which—

Figure 1 is a compound vertical section of the furnace, one half of the figure representing one form of the furnace, and the other half representing a modification thereof. Fig. 2 is a horizontal section on the line A B of Fig. 1. Fig. 3 is a horizontal section of a modification, taken as if on the line A B of Fig. 1. Fig. 4 shows in vertical section a modification of the furnace. Figs. 5, 6, and 7 are detail views, Fig. 6 being a front elevation of the working parts of the furnace, Fig. 5 a vertical central section thereof, and Fig. 7 being a horizontal cross-section on the line E F of Figs. 5 and 6.

Like symbols of reference indicate like parts in each of the figures.

As represented in Fig. 1, the furnace comprises an eye or combustion-flue *a* of refractory material, in which is a gas-burner *b*, which may be provided with pipes *b*<sup>2</sup> for introducing compressed air into the burner to mingle with the gas. Above the flue *a* is a combustion-chamber *c*<sup>1</sup>, surmounted by an arched crown *c*, which covers the floor *c*<sup>2</sup> of the chamber, and at the ends of the crown are openings *d*, which afford to the combustion-chamber communication with flues *f*<sup>1</sup>, which lead to a stack *f*. The crown *c* is constructed somewhat after the manner of the crown of a reverberatory furnace, so as to deflect the burning gases as they emerge from the eye *a* down upon the floor *c*<sup>2</sup>. The floor of the combustion-chamber extends out laterally beyond the eye of the furnace, so as to form projecting ledges, which are accessible from below. In these ledges or projections of the floor there are openings or glory-holes *e*, through which the glass articles to be re-

heated are raised vertically by means of rods or similar instruments, and thus inserted into the combustion-chamber. The glass articles may be raised through such opening entirely or only partially, accordingly as the whole or only a part of the article is desired to be heated. In the latter case only such parts are exposed to the action of heat which are passed up into the path of the gases of combustion, while the lower parts of the object are protected to some extent from the action of the heat by contact with the external atmosphere and by the current of cold air which is drawn into the combustion-chamber through the holes *e*. In this way it is possible to melt, for instance, the rim of a tumbler for the purpose of giving it a smooth finish, while the bottom part of it remains cool and unmelted. The gases of combustion, after passing over the floor *c*<sup>2</sup>, are carried off by the flues *f*<sup>1</sup> and stack *f*.

The carrying-rods for elevating the glass articles through the holes *e*, together with the means for raising and for revolving the same, are illustrated in Figs. 1, 5, 6, and 7. Each rod *h* is attached to the exterior of the wall of the eye of the furnace by the bearings or brackets *g*. Figs. 5, 6, and 7 represent this arrangement on a larger scale. The rod *h* is vertically movable in its bearings *g* and is provided with a cap or top plate *i*, upon which is placed the glass article to be heated in the furnace.

The rod *h* is adapted to be rotated by means of a belt-pulley or other gearing *v*, which is loosely mounted on the rod and is supported by a suitable bracket. This belt-pulley, which is normally disconnected from the rod *h*, is adapted to be connected therewith by a clutch acting in combination with a device for raising the rod into the furnace, of which I have illustrated a desirable form in the drawings.

*k* are levers, which are fixed to a shaft *m* and have links *n*, which connect them with a cross-bar *o*, on which the conical lower end of the rod *h* is stepped and has its bearing. The shaft *m* is provided with a counterweighted lever *p*, which is of sufficient gravity to nearly balance the weight of the rod *h*, and this shaft is also provided with a stop device consisting of a disk or wheel *q*, having a notch *z* in its



periphery, into which a gravity dog or catch *s* fits. By adjusting the position of the notch *z* with relation to the shaft *m* the stop device can be timed so as to arrest or lock the carrying-rod *h* at any desired height. The unlocking of the carrying-rod *h* is effected by raising the dog *s*, so as to disengage the notch *z* of the disk, when the weight of the carrying-rod *h* causes it to descend.

On the lower portion of the rod *h* is a friction-disk *t*, which is secured thereto by a feather and spline, which permit it to move vertically on the rod. The friction-disk *t* is supported by a spiral spring *t'*, which rests upon a collar *u*, adjustably fixed to the rod *h* by a set-screw *t''*. The collar, spring, and friction-disk can thus be set higher or lower upon the carrying-rod *h*.

The grooved belt-pulley *v* is rotary in its bearings and is provided at the lower end of the journal with a friction-disk *t''*. If the carrying-rod is raised sufficiently by means of the levers *k* or by any other suitable means, the sliding friction-disk *t* will meet the friction-disk *t''* of the pulley *v*, and if the latter disk is then revolving it will transmit rotary motion to the carrying-rod.

The devices for raising, locking, revolving, and lowering the carrying-rod are, as shown in the drawings, so arranged relatively to each other that the carrying-rod *h* at its lower positions does not revolve, that if raised it commences to revolve and continues to revolve while locked by the disk *q* and dog *s*, and when unlocked the rod drops by its own gravity and at the same time stops revolving.

As shown in Figs. 2 and 3, the furnace may be provided with several openings *e* in the floor, each fitted with carrying-rods and their accessories. The several grooved pulleys of the several carrying-rods may be revolved by a single belt *w*, passing around them in succession and connected with a driving-pulley.

The openings *e* in the floor around the furnace-stack can be arranged variously. They can be located singly or they may be located in pairs, as shown in Fig. 3, or in triplets. The openings may be located in the floor beneath the crown, as shown at the right side of Fig. 1, or in the sole of a flue passing from the combustion-chamber, as shown at the left side of this figure. They may be located in banks or ledges around a portion of the combustion-chamber, which may be provided with floors at several levels. By the use of the word "floor" I intend to indicate any ledge or portion of the combustion-chamber or of a flue communicating therewith, whether strictly horizontal or not, which is accessible from below.

If desired, the eye or combustion-flue *a* may be done away with entirely, and the gases may be introduced into the combustion-chamber directly, as shown in Fig. 4.

In place of the gas-burner a suitable grate or fire-place may be substituted.

The motion of the carrying-rod in raising

or lowering the glass articles need not be absolutely vertical, but it may be arranged so as to be inclined, and, if desired, the rod may be adapted to be raised and lowered simply, but without means for rotating it. This I show in Fig. 4.

In practical use of the furnace the glass article—such as a tumbler—is placed upon the carrying-plate *i* by the workman, who then depresses the outer end of the lever *k*, thereby elevating the carrying-rod *h*, so as to project the tumbler through the hole *e* into the combustion-chamber in the path of the hot gases, and simultaneously to bring the rod by means of the friction-clutch into gear with the rotating mechanism before described, and finally automatically to lock it in this elevated position. The use of the spring *t'* permits the limits of vertical movement of the rod to be somewhat varied without affecting its connection with this rotating mechanism. The rotation of the rod preserves the glass article in proper shape and subjects it on every side to the heat, and when it has been sufficiently heated it is withdrawn by releasing the catch *s*, and thus permitting the rod to drop by gravity.

It is not always necessary that the carrying-rod be at rest in its lower positions; but, on the contrary, it may be advisable to keep it constantly revolving. In such case the friction-disks can be done away with and a key, pin, or projection which protrudes into the slot of the carrying-rod may be attached to the grooved pulley itself.

The advantages of my invention will be appreciated by those skilled in the art to which it pertains. The elevation of the glass articles from below instead of inserting them horizontally into a glory-hole, as now practiced, enables me to dispense with tightly-gripping holders, which may mar or scratch the glass. The operation of heating the article may be performed with great rapidity, and the extent to which the heating shall reach on the glass article may be accurately limited, so that, if desired, the rim of a tumbler may be fused without affecting the lower portions thereof. By use of my improved apparatus the labor of heating the articles is very much lessened, and it may be performed with much greater rapidity than has heretofore been possible.

I claim—

1. A furnace for heating glassware, consisting in a combustion-chamber provided with a floor over which the gases of combustion pass and which is provided with a glory-hole or glory-holes accessible from below for the introduction and withdrawal of a glass article, substantially as and for the purposes described.

2. A furnace for heating glassware, consisting in a combustion-chamber and a floor provided with a glory-hole or glory-holes accessible from below, in combination with a carrying-rod located below the glory-hole and



means for raising the rod thereto, substantially as and for the purposes described.

5 3. A furnace for heating glassware, consisting in a combustion-chamber and a floor provided with a glory-hole or glory-holes accessible from below, in combination with an upwardly-movable rotary carrying-rod located below the glory-hole and means for effecting the upward motion and revolution

of the carrying-rod, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 2d day of November, A. D. 1888.

HERMANN SCHULZE-BERGE.

Witnesses:

W. B. CORWIN,  
J. K. SMITH.