No. 631,855. Patented Aug. 29, 1899.

G. A. MARSH.

APPARATUS FOR HOLDING GLASS.

(Application filed Feb. 7, 1898.)

(No Model.) 2 Sheets—Sheet 1.

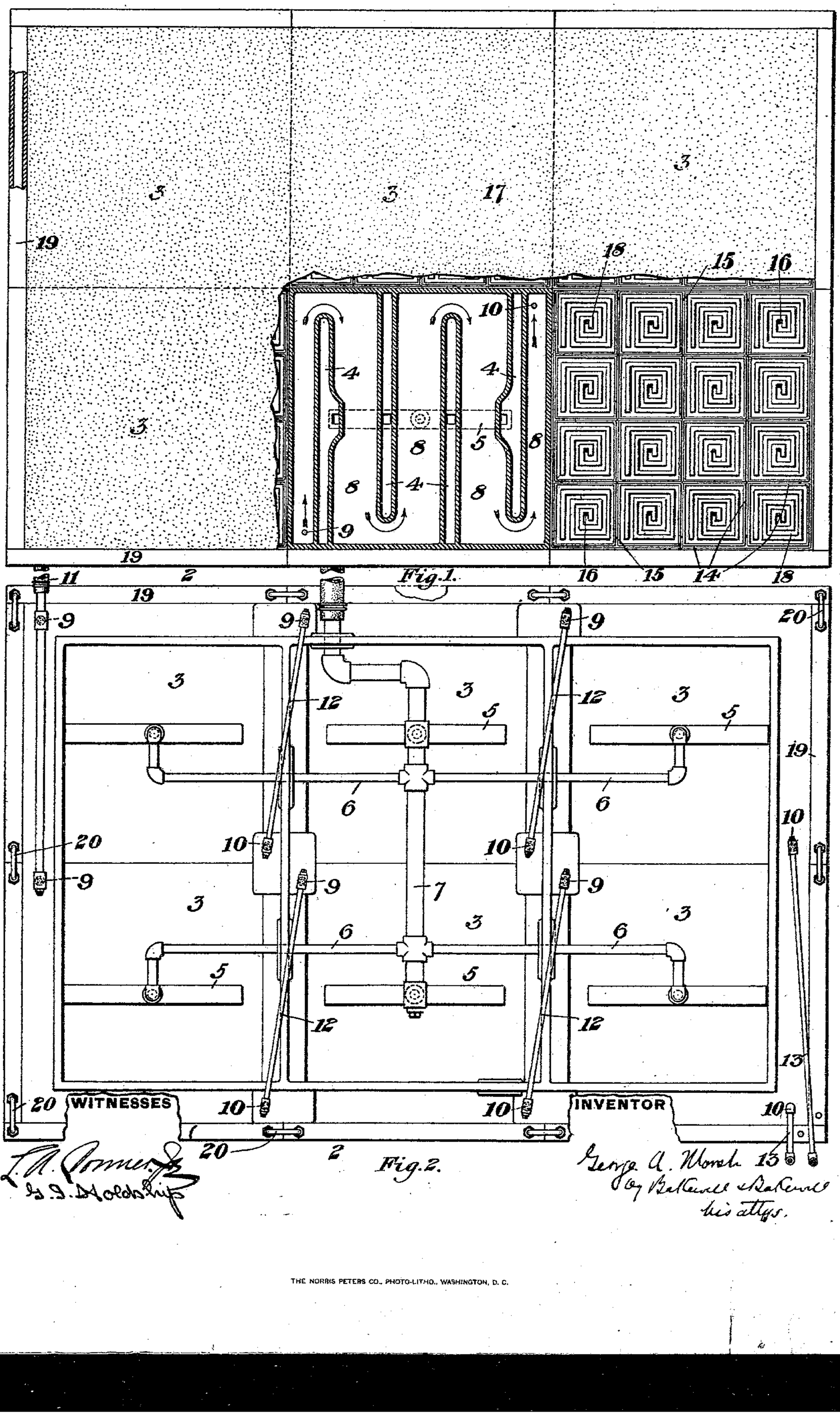

Fig. 1.

Fig. 2.

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Fig. 3.

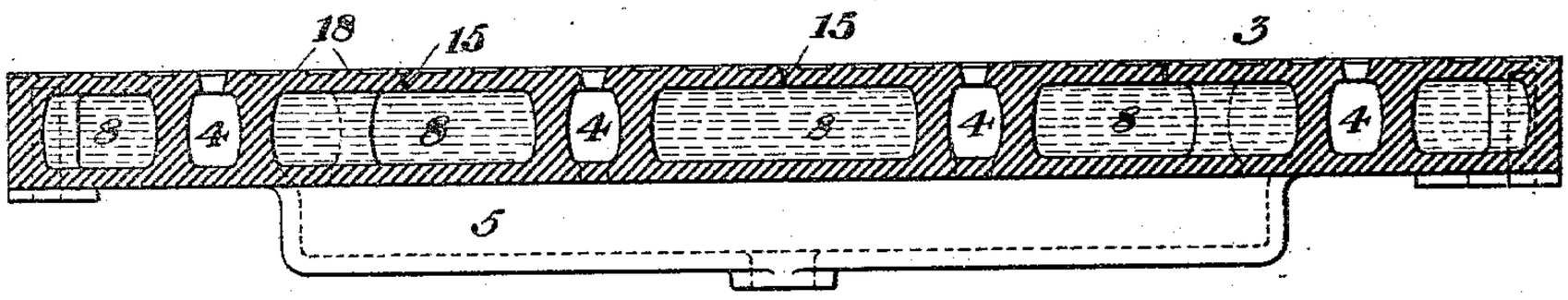


Fig. 4.

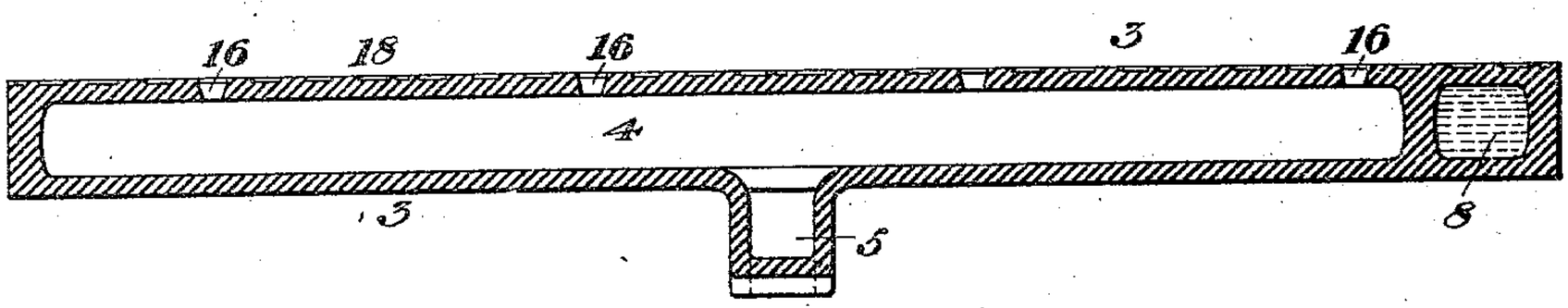


Fig. 5.

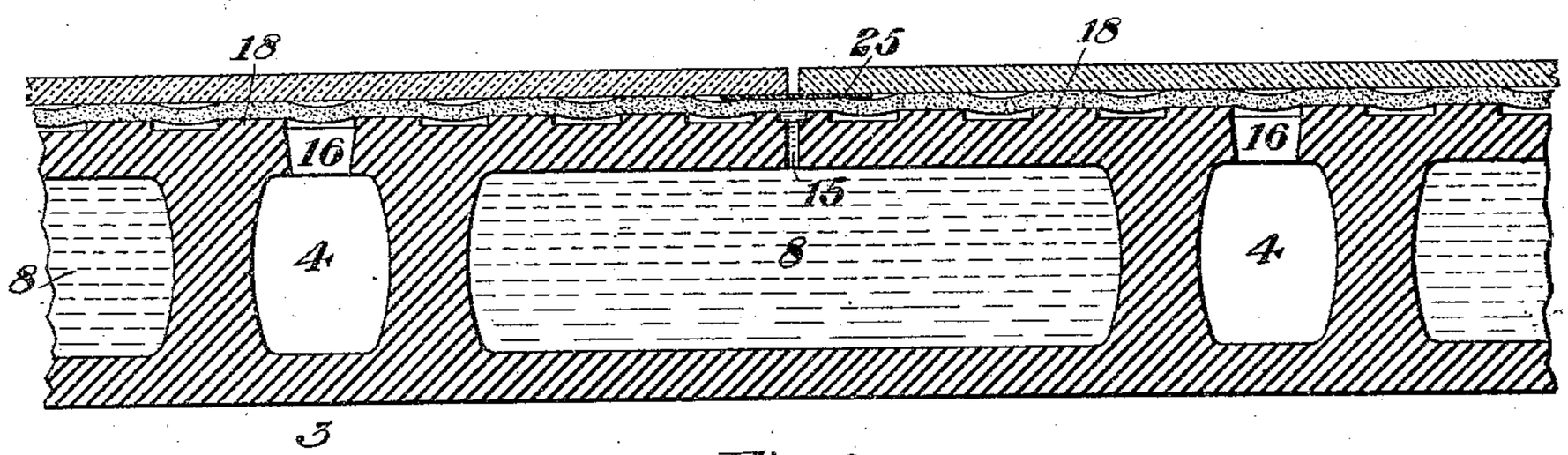
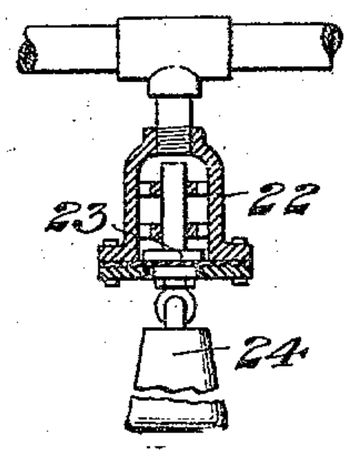


Fig. 6.



WITNESSES

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INVENTOR

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UNITED STATES PATENT OFFICE.

GEORGE A. MARSH, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE MARSH PLATE GLASS COMPANY, OF SAME PLACE.

APPARATUS FOR HOLDING GLASS.

SPECIFICATION forming part of Letters Patent No. 631,855, dated August 29, 1899.

Application filed February 7, 1898. Serial No. 669,437. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. MARSH, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Holding Glass, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top plan view, partly broken away, of a table constructed in accordance with my invention with the flat packing in place thereon. Fig. 2 is a bottom plan view of the table. Figs. 3 and 4 are enlarged sectional views, taken at right angles to each other, of one of the sections. Fig. 5 is an enlarged detail view showing the juncture of two sheets over a water-channel, and Fig. 6 is a detail view of the release-valve I employ.

My invention relates to that class of tables for holding plate-glass wherein a vacuum system is employed; and it consists in an improved construction of the table and its chambers and supporting-ribs for the glass, in a relief-valve to prevent the vacuum from exceeding a predetermined limit, in means for heating the edge portions of the table, and generally in the construction and arrangement of the parts, as hereinafter more fully described, and set forth in the claims.

I will first describe that part of my invention which relates to the system of chambers in the table, the invention in this respect relating to that system of chambers described in my Patent No. 477,305, dated June 22, 1892. In the said patent I show above the vacuum-chambers of the table a chamber arranged to contain a heating or cooling medium, such as water. In my new construction I place the vacuum-chambers and the fluid-chambers side by side in substantially the same plane. Thus in the table 2, (shown in the drawings,) which is preferably composed of six sections 3, I provide each section with vacuum-chambers 4, which extend alternately from each end of each section to a point near the other end, as shown by dotted lines in Fig. 3. Each of these vacuum-chambers communicates with a chamber 5, cast upon the bottom of each section, the chambers 5 being connected by branch pipes 6 with a main pipe 7, leading to the vacuum-forming apparatus. Between the vacuum-chambers extend the liquid heating or cooling chambers 8, these chambers communicating with each other at alternate ends of the section.

9 is the liquid-inlet port for each section, and 10 the corresponding outlet-port, the outlet being located at the diagonally opposite corner of the section from the inlet, so that the water is compelled to traverse and heat or cool the entire section before it passes out.

In Fig. 2 I show the fluid-pipe system, 11 being the supply-pipe, having branches entering the end sections of the table at the points 9. The water having traversed each section, passing in the circuitous course through the water-chambers, passes out through the diagonally opposite corner into connecting-pipes 12, which lead to the supply-ports of the adjacent sections. The two separate currents of water thus continue longitudinally of the table and are taken off through outlet-pipes 13. The several pipes are secured in place after the sections are cast, and the system is especially adapted for ease, simplicity, and cheapness of construction.

Each section of the table is divided into a number of cells by means of the parallel ribs 14, which form surface channels, into which the water passes through the small holes 15, connecting with the water-chambers. Each cell is connected by a suitable hole 16 with one of the vacuum-chambers, and the operation of the table is similar to that described in my above-recited patent, a packing of paper or similar material 17 being laid over the table and the glass being placed upon this packing.

In operating with this general system I have found considerable difficulty in obtaining an even and uniform action upon the glass, owing to its tendency to bend down within the cells, giving the glass when ground or polished a wavy appearance. To overcome this difficulty, I have found that it is necessary to provide within each cell a series of uniformly-distributed supports, which may consist of ribs 18, cast integral with the table. I have shown in the drawings one form of arranging these ribs, and it is evident that

many other forms may be easily devised, the essential point being that they shall be evenly and uniformly distributed within the cell. It is also necessary in order to give perfect support for the glass that the area of the bearing-surface of these ribs should be equal to and preferably greater than the area of the vacuum-space between them. Thus if the area of a cell is, say, forty-nine inches I preferably provide about twenty-nine square inches of bearing-surface, leaving about twenty square inches of vacuum-surface. It is characteristic of polishing-machines that the operative area of the polishing-disks is considerably less than the area of the supporting-table and the sheets of glass secured thereon and that in order to bring all portions of the surface of the glass uniformly under the action of the polishing-disks the frame carrying the latter is reciprocated back and forth, and the glass-supporting table is also reciprocated back and forth, but in a direction at right angles to the line of movement of the polishing-disks. It follows from these characteristics that while the middle portions of a sheet of glass will be subjected to the nearly constant action of the disks the portions of the sheet adjacent to the edges will be shifted in and out from in under the polishing-disks and will therefore be subjected to a considerable loss of heat by radiation. To compensate for this loss of heat and to maintain all portions of the sheet at or nearly at the same temperature, I provide means whereby heat can be applied locally to the edges of the table, such means being independent of any means employed for regulating the temperature of the middle portions of the table. A convenient means for effecting this purpose consists of a pipe 19, secured to the edges of the table and connected to a steam-supply. This pipe may consist of a series of independent sections connected by short pipe-sections 20. The middle portions of the glass-sheet being constantly subjected to the action of the polishing-disks will be raised to a higher temperature than the edge portions and will suffer little loss of heat by radiation, whereas the edge portions will not be subjected as constantly and uniformly to the action of the disks and will be subjected to loss by radiation. By applying a highly-heated fluid to the edges of the table the portions of glass adjacent thereto can be raised and maintained at or nearly at the same temperature as the portions constantly under the polishing-disks.

A very important part of my invention consists in a relief-valve 21, which is arranged to prevent the pressure on the glass from exceeding a predetermined limit. I show one form of this valve in Fig. 6, the valve-casing 22 having within it the upwardly-movable valve 23, to which is hung a weight 24. This valve is connected to the main vacuum-pipe at a suitable point, and it is evident that when the vacuum passes a certain limit—determined by the size of the weight—the valve 23 will rise and allow air to enter the vacuum-pipe, thus preventing the vacuum from exceeding a certain determined amount, the action being the reverse of a safety-valve upon a pressure system. The form of this relief-valve, as well as the point at which it is attached, may be varied widely without departing from this part of my invention, since I consider myself the first to use a relief-valve upon a vacuum-table for holding glass.

In order to prevent water seeping up between the edges of the matched plates where their juncture comes over one of the water-channels, I place over the paper at this point a strip of non-porous material 25, as shown in Fig. 5, since unless this were used the water would creep onto the upper faces of the glass plates and interfere with the grinding or polishing.

The advantages of the various parts of my invention will be apparent to those skilled in this art. The alternate arrangement of the vacuum-chambers and the liquid chambers gives a simple form of construction, while the conductivity of the iron or metal composing the sections insures a practically uniform distribution of the heating or cooling action of the liquid. The liquid is uniformly distributed, so that there will be no excess at any point in the water-channels, and the arrangement of the chambers is such that the liquid traverses all parts of each section before passing to the next. The check-valve is an essential feature, as it prevents the possibility of too great a pressure being brought upon the glass. The pipe surrounding the table and arranged to contain a heating fluid enables the outer parts of the table to be kept at a uniform temperature with the inner portions, and the non-porous strip at the meeting edges of the plates, where such edges are above the water-channel, prevents access of water to the upper face of the plates.

Many changes in the form, construction, and relative arrangement of the parts may be made by those skilled in the art without variance from my invention, since

What I claim is—

1. A table for holding glass provided with a series of fluid-chambers and a series of vacuum-chambers arranged intermediate of and in line with the fluid-chambers, substantially as set forth.

2. A vacuum-table for holding glass having a series of vacuum-chambers therein, liquid-chambers between the vacuum-chambers, and connecting-passages between the opposite ends of the liquid-chambers.

3. A vacuum-table for holding glass, having vacuum-chambers therein extending alternately from each end to a point near the other end, and liquid-chambers between the vacuum-chambers, said liquid-chambers connecting with each other at their ends.

4. A vacuum-table for holding glass, having vacuum-chambers therein, said table hav-

ing a series of open water-channels, and liquid-chambers within the table between the vacuum-chambers and communicating with said water-channels.

5. A vacuum-table for holding glass, having therein a series of vacuum-chambers, said table having open water-channels on its upper face, and being provided between the vacuum-chambers with connected liquid-chambers in communication with the water-channels.

6. A vacuum-table for holding glass, having therein a series of vacuum-chambers extending alternately from each end to a point near the other end, said table having a series of open water-channels on its upper face, and being provided with liquid-chambers between the vacuum-chambers, said liquid-chambers being connected with each other and communicating with the open channels.

7. A vacuum-table for holding glass formed of several sections, each section having vacuum-chambers and open liquid-channels communicating with liquid-chambers located between the vacuum-chambers, a liquid-main having branches extending to the sections and connected to the liquid-chambers, and outlets from the liquid-chambers at the opposite corners of the sections.

8. In a vacuum-table for holding glass, a vacuum-cell having a sealing means surrounding the same, and a series of rib-supports distributed within the cell, the amount of bearing-surface of said supports being at least substantially as great as the amount of vacuum-surface.

9. In a vacuum-table for holding glass, a vacuum-cell having a water-channel surrounding the same, and within the water-channel a series of uniformly-distributed supports, the bearing-surface of said supports being greater than the amount of vacuum-surface within the cell.

10. The combination of a glass-holding table, and heating means located adjacent to the edges of the table and arranged to so apply heat to the portions of the table adjacent to the edges as to maintain such portions at approximately the same temperature as the body portion during the grinding and polishing operation, substantially as set forth.

11. A glass-holding table having secured around the edges thereof a conduit for the passage of fluid for maintaining the portions of the glass adjacent to the edge portions of the table at approximately the same temperature as the body or interior portions thereof, substantially as set forth.

12. In a vacuum-table for holding glass, a vacuum-cell having a surrounding open liquid-channel, and a strip of non-porous material placed above the channel and beneath the meeting edges of glass sheets thereover.

13. In a vacuum-table for holding glass, the combination with a vacuum-cell having a surrounding open liquid-channel, of porous packing for the channel, and a non-porous strip upon the packing above the channel.

In testimony whereof I have hereunto set my hand.

GEORGE A. MARSH.

Witnesses:
G. I. HOLDSHIP,
C. E. MACKOWN.