

**Patented Aug. 29, 1899.**

U. S. PATENT OFFICE.

APPARATUS FOR GRINDING, SMOOTHING, AND POLISHING GLASS.

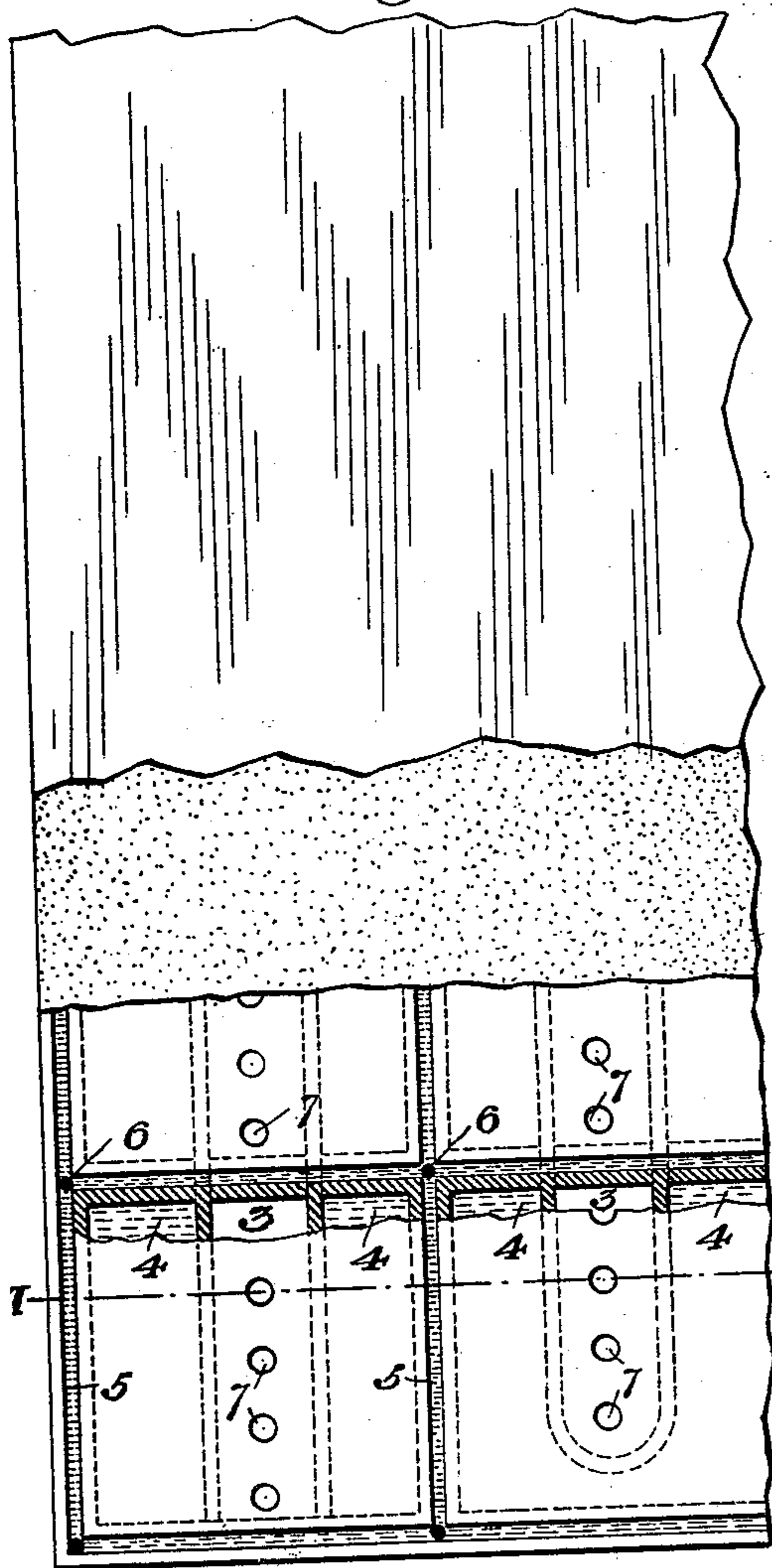
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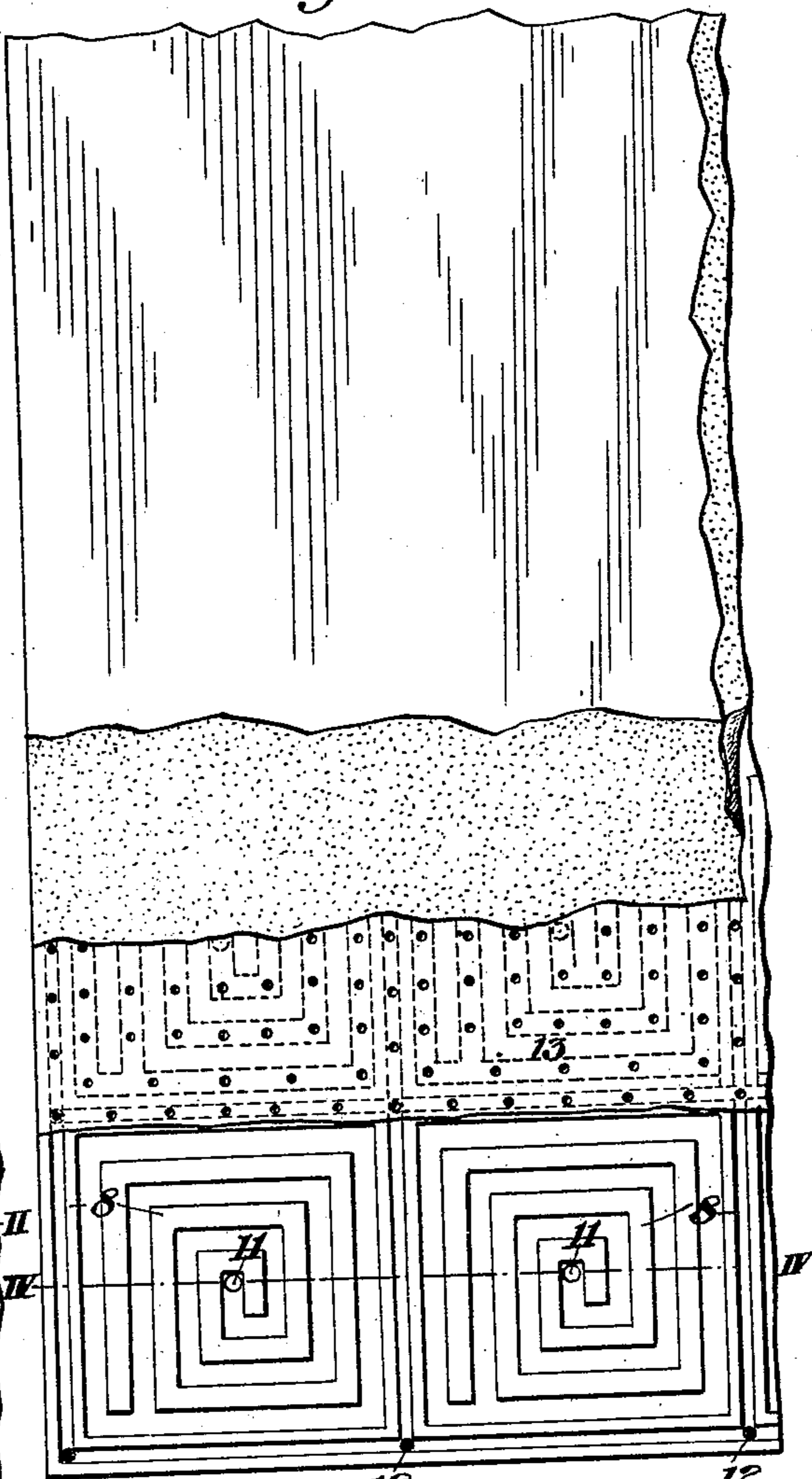
(Application filed Feb. 7, 1898.)

(No Model.)

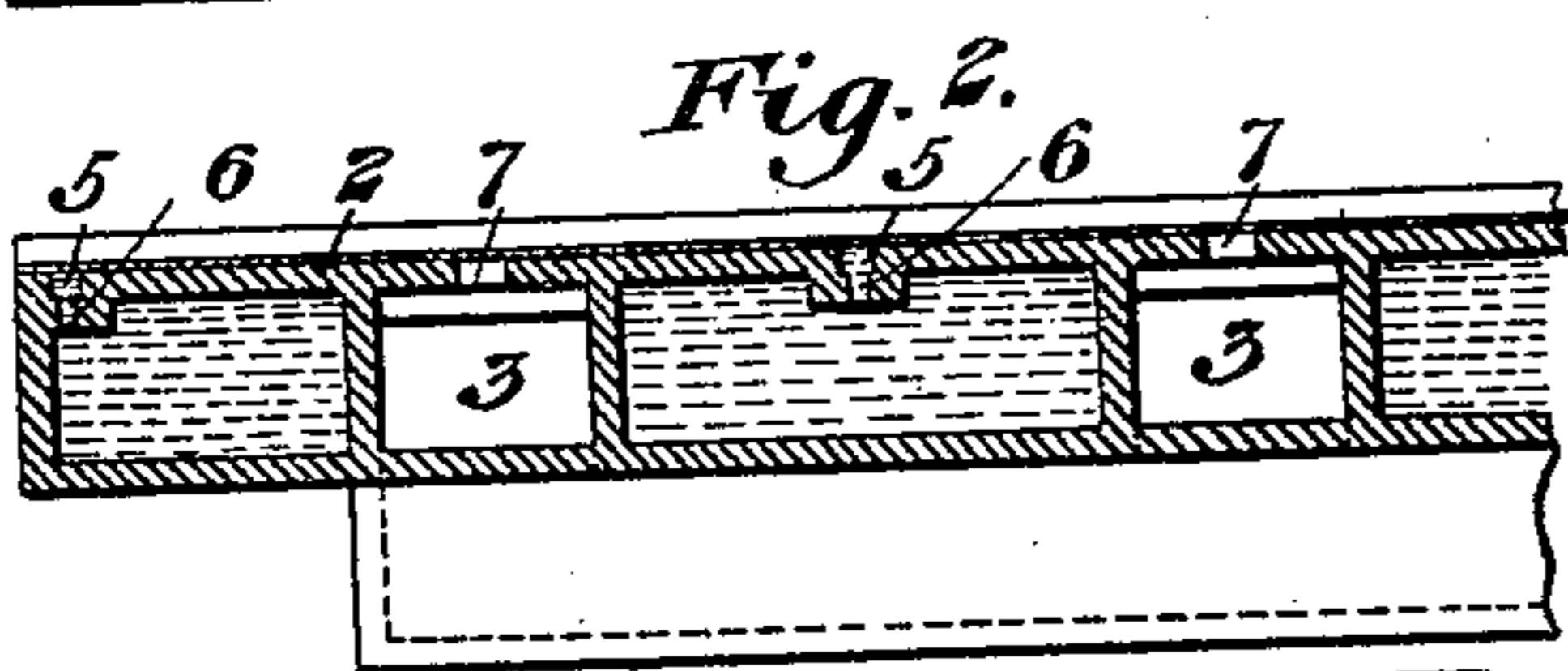
*Fig. 1.*



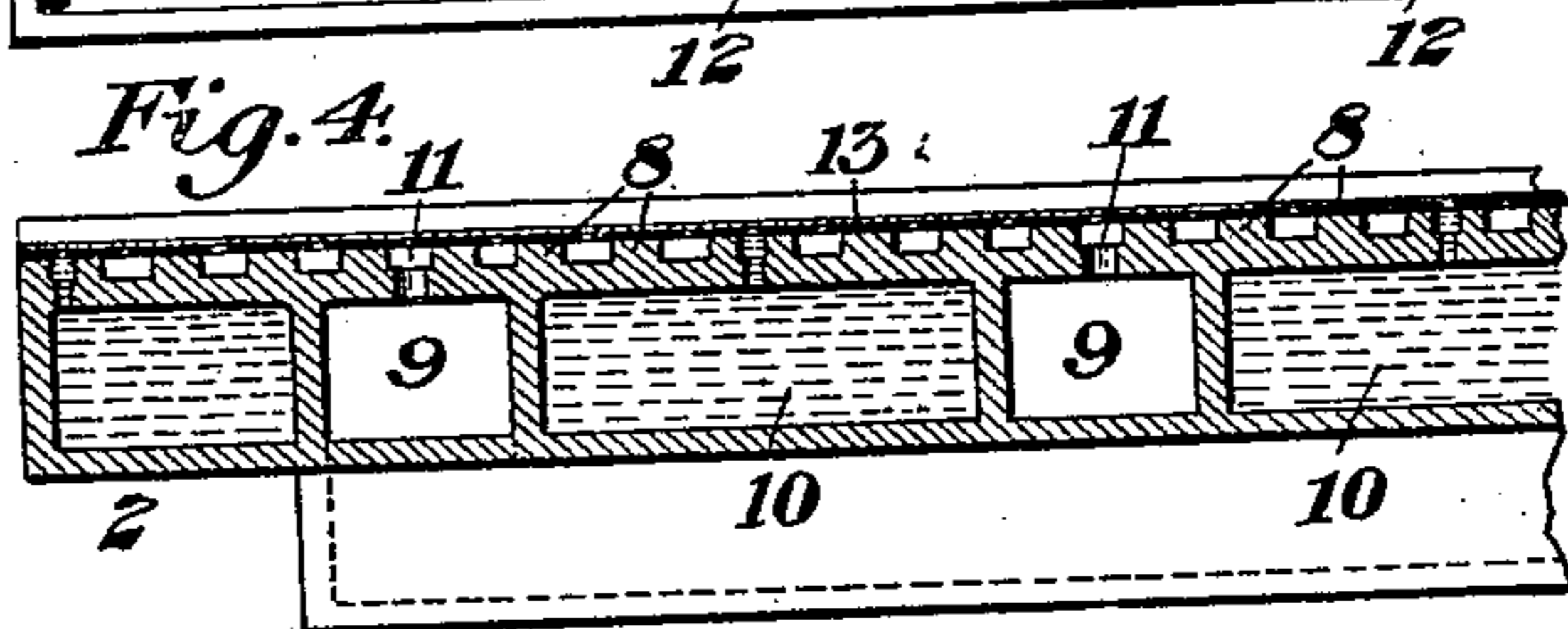
*Fig. 3.*



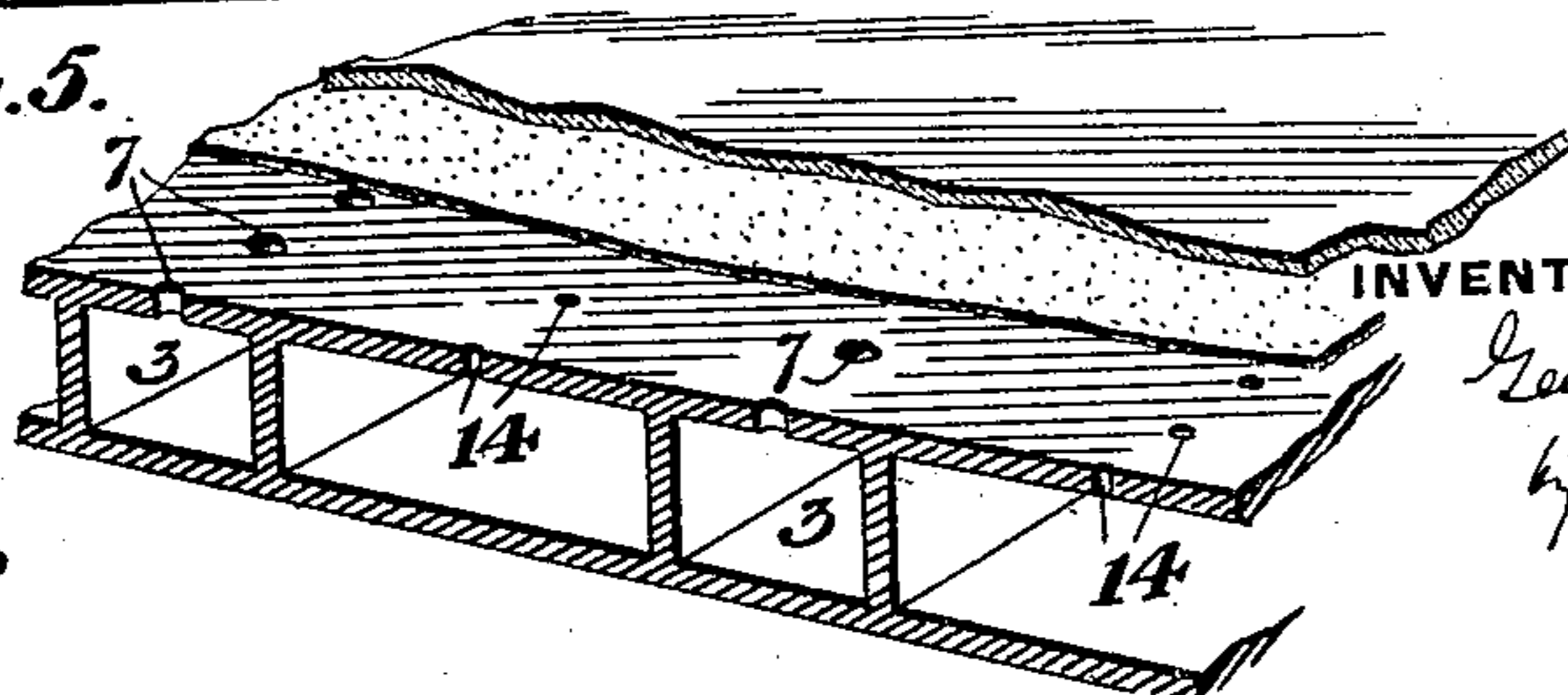
*Fig. 2.*



*Fig. 4.*



*Fig. 5.*



**WITNESSES**

L. A. Comer  
S. S. Haddock

INVENTOR

George. A. Marsh  
by Bakerell & Bakerell  
his attys.

# UNITED STATES PATENT OFFICE.

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

APPARATUS FOR GRINDING, SMOOTHING, AND POLISHING GLASS.

SPECIFICATION forming part of Letters Patent No. 631,898, dated August 29, 1899.

Application filed February 7, 1898. Serial No. 669,439. (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  
5 and useful Improvement in Apparatus for  
Grinding, Smoothing, and Polishing Glass, of  
which the following is a full, clear, and exact  
description, reference being had to the ac-  
companying drawings, forming part of this  
10 specification, in which—

Figure 1 is a top plan view, partially broken  
away, of a portion of a glass-holding table  
constructed in accordance with my invention.  
Fig. 2 is a cross-section on the line II II of  
15 Fig. 1. Fig. 3 is a view similar to Fig. 1, show-  
ing another form of table and the one which  
I prefer in actual practice. Fig. 4 is a cross-  
section on the line IV IV of Fig. 3, and Fig.  
5 is a detail perspective view of a section of  
20 another form of the table.

My invention relates to that class of tables  
for holding glass during the operation of  
grinding, smoothing, or polishing it wherein  
a vacuum is employed for holding the glass  
25 sheets in place. In my prior patents, Nos.  
477,303, 477,305, and 477,306, dated June 21,  
1892, and No. 488,925, dated December 27,  
1892, covering apparatus of this character I  
have described a glass-holding table the up-  
30 per face of which was provided with a multi-  
plicity of cells either by means of a system  
of projecting ribs, a reticulated packing laid  
upon the table, or other suitable means. I  
have now discovered that I can employ a table  
35 for this purpose having a substantial part of  
its face constituting a flat supporting-surface  
for the glass by exhausting the air from be-  
tween the glass sheet and its flat supporting-  
surface and that I obtain important advan-  
40 tages by the use of this flat-faced table. I  
am enabled to use this flat supporting-surface  
by employing means for exhausting air from  
between the glass sheet and the surface, also  
by surrounding at least a major part of a flat  
45 supporting-surface which is connected to a  
vacuum apparatus by a seal, and further by  
laying upon the flat supporting-surface con-  
nected to the vacuum a flat covering or pack-  
ing, which is preferably porous and upon  
50 which the glass sheets are laid.

My invention consists in the above-men-

tioned separate combinations, and further in  
the construction and arrangement of the  
parts, as more fully described, and set forth  
in the claims.

In the drawings, referring to the form of  
Figs. 1 and 2, 2 represents a portion of a ta-  
ble containing vacuum-chambers 3 and fluid-  
chambers 4, arranged alternately therein. The  
upper face of this table constitutes a flat sup-  
60 porting-surface and is provided with a series  
of water-channels 5, sunken therein. The  
fluid-chambers 4 connect with these channels  
by holes 6, and the vacuum-chambers com-  
municate with the upper face of the table 65  
through holes 7, these vacuum-chambers be-  
ing connected to any desirable apparatus for  
exhausting air from them. I prefer to employ  
water in the fluid-chambers, but it will be un-  
derstood that other fluids may be employed, as 70  
I intend to cover the construction independ-  
ent of the particular fluid used. These fluid-  
chambers may be connected to any suitable  
source of supply.

In using this table I cover its top with a 75  
flat layer of porous material, such as paper  
or closely-woven cloth, and lay the glass  
sheets upon this packing, they being placed  
so that their edges are between the holes  
leading to the vacuum-chambers. The vacu- 80  
um apparatus being started into operation,  
a suction is produced on the lower faces of  
the glass sheets, which holds them in place  
during the grinding or polishing. Preferably  
at about the same time that the vacuum ap- 85  
paratus is started I supply water under a  
light pressure to the fluid-chambers of the  
table, and this water, seeping up through the  
holes into the water-channels and constantly  
moistening the packing, seals the edges of the 90  
glass sheets around the flat supporting-sur-  
faces on which they rest, so that a sufficient  
vacuum is obtained to hold the sheets in  
place. The water also moistens the lower 95  
faces of the glass sheets and prevents their  
being stained and serves to regulate the tem-  
perature of the table, which without this fluid  
would rise to too high a point on account of  
the heat generated by the friction of the pol-  
ishing-blocks upon the glass when the glass 100  
is being polished. Although it is ordinarily  
preferable to interpose between the under

surface of the glass sheet and the top of the table a sheet of porous material which would form vacuum-cells, such porous sheet is not necessary, as it is practically impossible to make the surfaces of the table and sheet of glass so true and flat that they would bear upon each other at all points, and hence it will be possible to cause the air to flow laterally under the sheet of glass to the ports or openings in the table through which the air is exhausted, thereby obtaining a sufficient vacuum to hold the sheets of glass on the table. When one face of the glass sheets has been acted upon, the vacuum may be destroyed, and the glass sheets being released are turned over and again held by reestablishing the vacuum.

In Figs. 3 and 4 I show a table the upper face of which is provided with cells such as described in my prior patents, each cell having a series of supporting-ribs 8 symmetrically arranged therein. This table is provided with vacuum-chambers 9, arranged alternately with fluid-chambers 10, each cell communicating with a vacuum-chamber by a hole or holes 11. The water-channels are connected with the fluid-chambers by holes 12, arranged at intervals. To convert this table, which is of the cell or rib-top class, into a table having a flat supporting-surface for the sheets, I cover its top with a thin perforated sheet of metal 13, which may be made in one or several parts and which is fastened thereon, so as to seal the various air and water channels from each other. This sheet may be made of copper, aluminium, or other desirable material which will not rust under the action of the water and will afford a flat bearing-surface for the glass. The perforations in this metal sheet are so arranged as to communicate with the various air and water channels, and when the flat sheet-packing is placed upon it and the glass sheets laid upon the packing, with their edges matched between the holes, the operation will be the same as before described with the form of Figs. 1 and 2.

In the form of Fig. 5 I show a table which is the same as that of Figs. 1 and 2, except that in place of the water-channel I employ a series of holes 14, which connect the flat bearing-surface with the fluid-chamber. The operation of this table is the same as that of the other forms.

The advantages of my invention will be apparent to those skilled in the art. A more uniform bearing-surface for the glass sheet is afforded than with the cell or rib-top table, and I have discovered that the flat supporting-surface obviates a marking of the glass sheets, which sometimes results when they are supported on a ribbed surface. The table is also simpler and cheaper to construct and operate.

The table may be provided at any desirable points with grooved channels leading from the holes communicating with the vacuum-

chambers or with additional water-channels. The shape and arrangement of the chambers and the holes may be otherwise varied, and many other changes may be made in the form and arrangement of the parts without departing from my invention.

Within the scope of my invention as defined in my broader claims I intend to include constructions in which a substantial part of the supporting-surface is made to conform to the above description, with a flat bearing-surface, from between which and the glass sheets the air is exhausted, whether the remainder of the table be constructed in this manner or otherwise—as, for example, in accordance with the drawings of my prior patent.

I claim—

1. A glass-holding table having a flat supporting-surface connected with a vacuum apparatus, and a sealing means around the flat surface.
2. A glass-holding table having a substantial portion of its face constituting a flat supporting-surface and connected with the vacuum apparatus, and a flat covering for said surface.
3. A glass-holding table having the major portion of its face constituting a flat supporting-surface and connected to a vacuum apparatus, and a flat covering for said surface.
4. A glass-holding table having a substantial portion of its face constituting a flat supporting-surface and connected to a vacuum-chamber, and a fluid-chamber in the table and arranged to regulate its heat.
5. A glass-holding table having a substantial portion of its face constituting a flat supporting-surface and connected to a vacuum apparatus, and a fluid-chamber also connected to this surface.
6. A glass-holding table having a substantial portion of its face constituting a flat supporting-surface and connected to a vacuum-chamber, and a flat porous packing arranged to cover this surface.
7. A glass-holding table having a flat supporting-surface connected to a vacuum apparatus, a flat covering for said surface, and a sealing means around the flat surface.
8. A glass-holding table having a flat supporting-surface connected to a vacuum apparatus, a flat porous packing arranged to cover the surface, and means for supplying a fluid to this packing around the surface to seal the same.
9. A glass-holding table having a substantial portion of its face constituting a flat supporting-surface and connected to a vacuum apparatus, a fluid-chamber in the table and connected with channels in its face, and a flat porous packing arranged to cover the flat surface.
10. A cell or rib-top glass-holding table connected with a vacuum apparatus, and a perforated plate covering the cell or rib portion.
11. A glass-holding table having a face pro-

vided with cells or ribs and connected to a vacuum apparatus, a perforated plate covering the face, and a flat sheet of packing arranged to be laid over the perforated plate.

5 12. A glass-holding table having its face provided with a series of cells, each communicating with a vacuum apparatus, a flat perforated plate of metal secured over the cells, and a flat sheet of porous packing arranged  
10 to be laid over the perforated plate.

13. A glass-holding table having its face provided with a series of cells, each commu-

nicating with a vacuum apparatus, a water-channel surrounding each cell, a flat perforated plate arranged to cover this face, and 15 a flat porous packing arranged to be laid upon the plate.

In testimony whereof I have hereunto set my hand.

GEORGE A. MARSH.

Witnesses:

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