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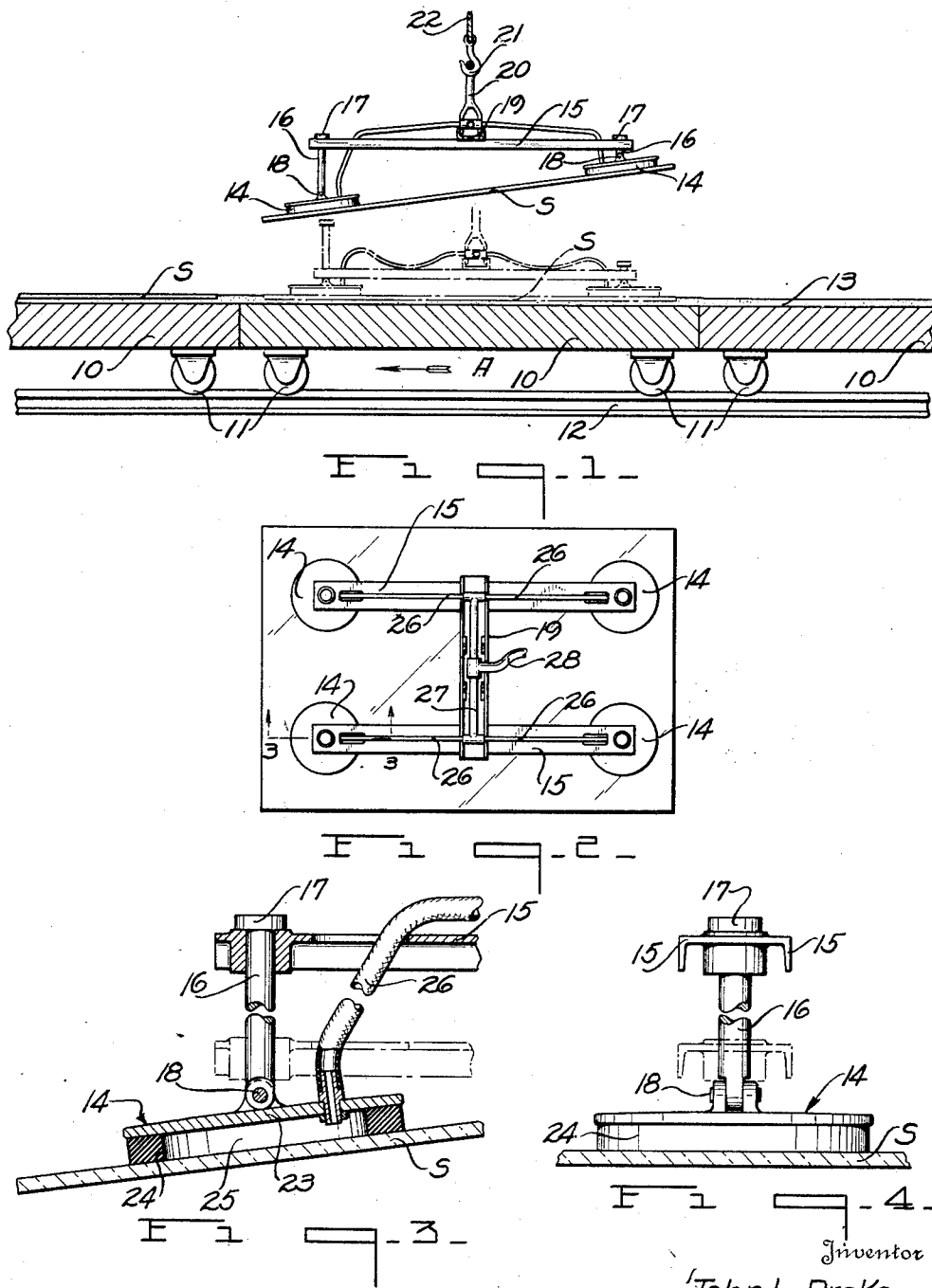
J. L. DRAKE

1,801,305

GLASS HANDLING APPARATUS

Filed Feb. 3, 1928

2 Sheets-Sheet 1



By Frank Fraser,
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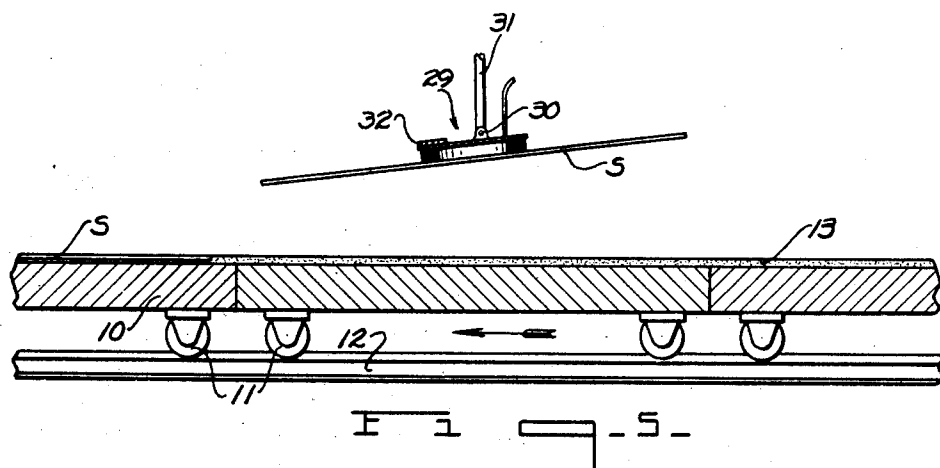
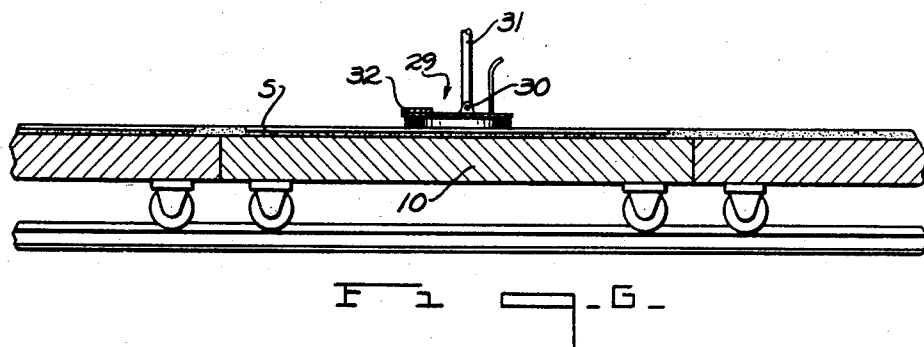
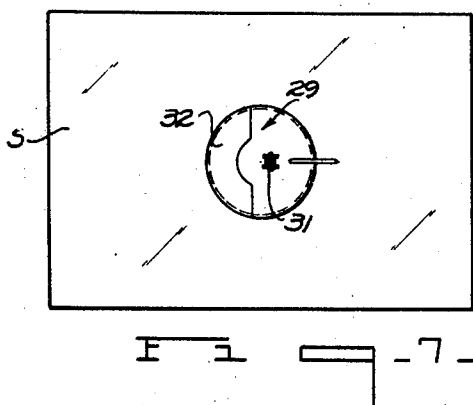
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GLASS HANDLING APPARATUS

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2 Sheets-Sheet 2



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GLASS-HANDLING APPARATUS

Application filed February 3, 1928. Serial No. 251,483.

This invention relates to sheet glass handling devices and more particularly to improvements therein tending to simplify, render more efficient and improve the same generally.

An important object of this invention is to provide sheet handling means wherein a sheet of glass may be deposited upon a table in such a manner as to substantially prevent the formation of air pockets or bubbles thereunder.

Another object of this invention is to provide a sheet handling device whereby a sheet may be deposited upon a table or the like by bringing first one edge into engagement with the table and then gradually depositing the remainder of the sheet thereon.

Another object of the invention is to provide sheet handling apparatus of this nature wherein the sheet is carried by the handling apparatus in a tilted or angular position and automatically brought into a horizontal position upon engagement of the sheet with a table or other horizontal support.

Still another object of this invention is to provide sheet handling apparatus of this character wherein suction or vacuum means are employed for engaging or holding the sheet.

Still another object of this invention is to provide sheet handling means particularly applicable for use with a continuous grinding and polishing system wherein adequate means is provided for handling the sheet in conjunction with the continuous moving members thereof.

Various other objects, advantages and novel details of construction of this invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawings wherein:

Fig. 1 is a vertical longitudinal sectional view through a portion of a continuous grinding and polishing system showing my invention associated therewith.

Fig. 2 is a top plan view partially in horizontal section of the sheet handling device illustrated in Fig. 1.

Fig. 3 is an enlarged fragmentary sec-

tional view taken substantially on the plane indicated by line 3—3 in Fig. 2.

Fig. 4 is an end elevational view of the structure illustrated in Fig. 3.

Fig. 5 is a view similar to Fig. 1 but showing a somewhat modified type of handling device with the sheet in raised position.

Fig. 6 is a similar view showing the sheet in lowered position, and

Fig. 7 is a top plan view partially in horizontal section of the handling device illustrated in Figs. 5 and 6.

While obviously the present invention is capable of many and varied uses it finds particular utility when employed as a sheet glass handling device and may be employed to great advantage in the so-called continuous system of grinding and polishing. In such systems the sheets of glass are deposited upon movable members such as tables or the like and are successively carried to and presented under grinding and polishing machines where both surfaces of the sheets are ground and polished. One way of securing the sheets to the tables, which is now quite universally practiced, is to secure the sheet in place by means of a layer or bed of plaster of Paris. When such sheet fastening means is employed care must be taken to prevent the formation or accumulation of air pockets or bubbles between the sheet and the bed of plaster of Paris. It has been found that if the sheet is brought into engagement substantially simultaneously throughout its area with the bed of plaster of Paris, air is trapped thereunder which tends to force the sheet upwardly and prevents the same from being supported firmly upon the table through its entire area. While this is disadvantageous in any event, it is particularly so in continuous grinding and polishing systems where the sheets must be rapidly and accurately handled in order to mount the same upon the moving tables. Therefore it is in connection with such a continuous system that the invention finds particular utility and has been herein illustrated.

In Fig. 1 there is illustrated a plurality of movable supports or tables 10 moving, for instance, in the direction of arrow A, these tables being provided with wheels 11 mov-

able along tracks or guideways 12. Any suitable driving means (not shown) for the tables 10 may be provided. The sheets S are adapted to be secured to the tables 10 by means of plaster of Paris 13. It is customary to spread the plaster of Paris in a layer upon the table top and then to embed the sheet S therein and when the plaster of Paris has hardened the sheet is rigidly secured to the table.

One type of sheet handling means forming the particular subject of the present invention is illustrated in Figs. 1 to 4 inclusive and consists essentially of a plurality of sheet engaging or sheet holding members 14. While obviously any desired or required number of sheet engaging members 14 may be employed these members are preferably arranged in pairs, each pair being supported by a supporting or frame member 15. Each pair of members 14 is slidably suspended differential distances from their respective frame member 15 by means of supporting rods or members 16 slidably engaging apertures in the frame member. Each rod 16 has a headed or enlarged end 17 engaging the frame member 15 in the lowermost positions of the members 14. Each rod 16 is pivotally connected as at 18 to its respective sheet engaging member 14. It will be noted, particularly from an examination of Figs. 1 and 3, that the sheet engaging members 14 are suspended differential distances from the frame member 15 because the rods 16 are of different lengths. Thus the sheet S will be normally suspended or held in a tilted or angular position as shown by the full lines in Fig. 1.

While, as heretofore mentioned, any desired number of pairs of sheet supporting members 14 may be provided I have herein illustrated two pair of such members, the supporting frames 15 of which are connected by a cross frame member 19. Connected to the cross frame member 19 is a clevis or the like 20 engageable by a hook 21 or the like carried by the end of a cable 22 of the hoist or other means (not shown) by means of which the sheet handling device is raised, lowered and otherwise moved.

Each sheet handling device which has heretofore been indicated generally by the reference character 14 is herein shown as comprising a plate or back 23 provided with an annular resilient member or pad 24, preferably of rubber, rubber composition or the like. When the annular member 24 is brought into engagement with the sheet S a chamber or space 25 is provided the limits of which are defined by the sheet S, annular member 24 and back 23. A vacuum or suction tube or conduit 26 connects this space 25 with a suction device (not shown). The vacuum or suction tubes 26 may all be conveniently connected to a cross tube or manifold 27 which in turn is connected by a tube 28 to the suction device. Thus a vacuum or

partial vacuum may be simultaneously set up in the space 25 of each of the sheet engaging members 14. The suction may be controlled by any suitable valve device (not shown) whereby when the sheet engaging members 14 are first brought into engagement with the sheet suction may be set up in the conduits 26 to cause the sheet engaging members to grip the sheet and after the sheet has been deposited at the desired point the source of vacuum is cut off and the sheet consequently released.

With the herein described construction it will be apparent, particularly from an examination of Fig. 1, that the sheet S may be engaged by this handling device and suspended or supported in the manner shown in full lines in this figure, that is, in a tilted or angular position. This is because of the differential lengths of the rods 16 of the sheet engaging members 14 which, as heretofore mentioned, are slidably supported by their respective frame members 15 and in Fig. 1 are shown in their lowermost position with the heads or enlargements 17 thereof engaging the upper face of the respective frame member. Thus the sheet S may be brought into a position, for instance, over the table 10 which has its upper surface thereof covered with a layer of plaster of Paris 13.

The handling device may then be lowered toward the table whereupon the lowermost edge of the sheet is first brought into engagement with the table or support. Then upon the continued lowering of the handling device the sheet is gradually brought into engagement or deposited upon the table top, the sheet engaging devices 14 partaking of a vertical sliding movement with reference to the frame 15 during this operation. When the sheet S has been finally deposited upon the table top the frame 15 is substantially parallel with the sheet and the members 14 are in substantially the same plane and also parallel with the sheet. The members 14, as the sheet is being deposited, rock about their pivots 18 as will be apparent. During the lowering of the sheet upon the table, the said table is adapted to be moving continuously in the direction of the arrow A.

By depositing the sheets S upon the table 10 in the manner just described the air which might otherwise be trapped thereunder to thus cause bubbles and the like is permitted to escape so that the sheet is firmly supported uniformly upon the plaster of Paris throughout its entire surface. Obviously after the sheet has been deposited upon the table as indicated in dot and dash lines in Fig. 1 the suction means is cut off so that the vacuum or partial vacuum in the chambers 25 is dissipated whereupon the handling device may be hoisted leaving the sheet in position upon the table.

In Figs. 5, 6 and 7 and of the drawings is illustrated a somewhat modified type of handling device. In this form of the invention instead of using a plurality of sheet

details of construction herein illustrated as may come within the purview of the accompanying claims.

I claim:

1. Sheet handling apparatus comprising in combination, a pair of spaced suction members for engaging a sheet, a supporting frame therefor, means for vertically slidably mounting said members for movement differential distances, and means connecting said suction members to a suction device.

2. Means for handling sheet glass comprising, a frame, a pair of sheet engaging members provided with supporting rods pivotally connected thereto and slidably supported by said frame, said rods being of different lengths whereby to normally suspend a sheet angularly with respect to said frame but movable into substantially horizontal alignment to deposit the sheet upon a table.

3. Sheet handling apparatus comprising in combination a supporting frame, a pair of spaced sheet engaging members carried by said frame, and means for mounting the sheet engaging members upon said frame for vertical sliding movement in a manner that some of said sheet engaging members will have sliding motion relative to the frame through a greater distance than certain of the other sheet engaging members.

4. Means for handling sheet glass comprising a frame, a pair of spaced suction members carried by said frame for engaging a sheet, supporting rods pivotally connected to said suction members and mounted for vertical sliding movement in said frame, said rods being of different lengths so that some of the suction members have sliding motion relative to the frame through a greater distance than certain of the other suction members, and means connecting said suction members to a suction device.

Signed at Toledo, in the county of Lucas and State of Ohio, this 21st day of January, 1928.

JOHN L. DRAKE.

engaging or sheet holding members only a single one is employed and is designated in its entirety by the numeral 29. This member 29 is constructed and adapted to operate in the same manner as the plurality of holding members 14 illustrated in connection with the preferred embodiment of the invention shown in Figs. 1 to 4 inclusive. The member 29 is pivotally connected as at 30 to the lower end of the supporting rod 31 and it will be noted that the pivot point 30 is eccentric to or off-center from the vertical axis of said member so that the same will be heavier at one side of the pivot point than at the other and the heavier side may be additionally weighted as at 32 if desired. Thus, when the member 29 is raised the unbalanced weight thereof will cause it to normally assume a tilted or angular position with respect to the tables 10 as shown in Fig. 5. When only a single sheet engaging or sheet holding member is used it is adapted to be preferably somewhat larger than when a plurality of members are employed.

In practice, the sheet S is adapted to be engaged by the sheet holding member 29 either at the center thereof or slightly off-center as desired and suspended or supported in the manner shown in Fig. 5, that is, in a tilted or angular position. The sheet, when lifted or held in this manner by the member, will automatically assume a tilted or inclined position due to the differences in the weight of said member at the two sides of the pivot point 30. The handling device is then adapted to be lowered toward the table whereupon the lowermost edge of the sheet is first brought into engagement with the table or support and upon continued lowering of the handling device the sheet is gradually brought into engagement with or deposited horizontally upon the table top, the member 29 being permitted to rock about its pivot 30 during such lowering. It will be apparent that the principle of operation of this type of handling device is substantially the same as that of the handling device illustrated in Figs. 1 to 4 inclusive and the objects and advantages to be gained thereby are also the same.

While the present device has been described for use in one particular connection it will be immediately apparent to those skilled in this art that the device is capable of numerous and varied other uses and may be employed to advantage wherever sheets of glass or other material are to be handled. However, one of the many uses of this invention has been illustrated herein so as to emphasize its universal utility. Accordingly reservation is made to make such changes in many of the essential and all of the non-essential

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