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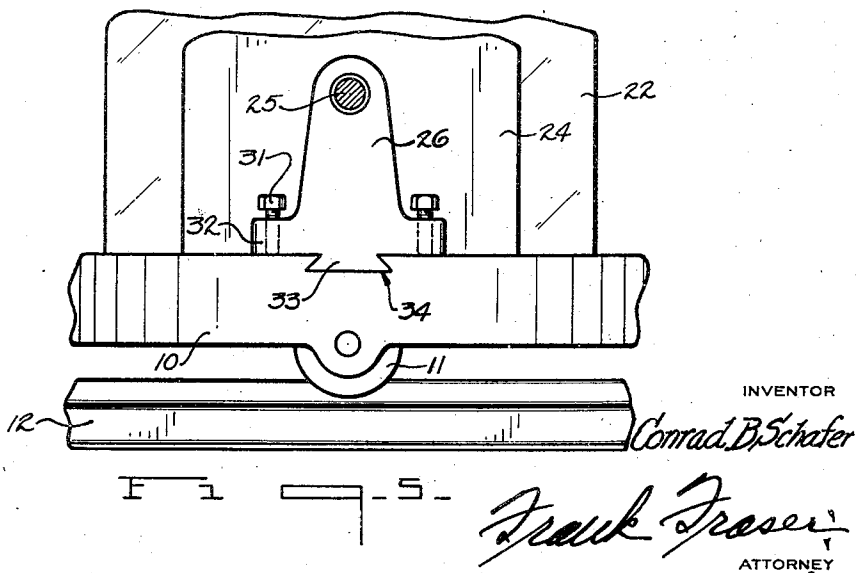
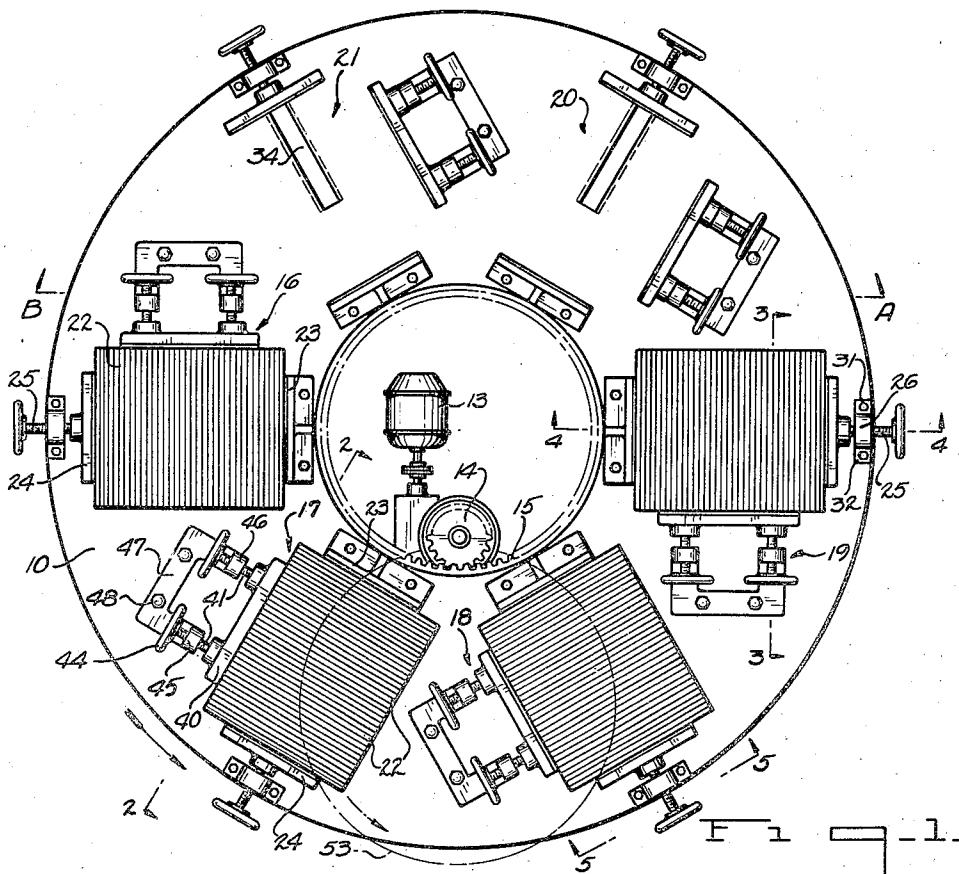
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1,990,002

GLASS GRINDING APPARATUS

Filed April 11, 1931

2 Sheets-Sheet 1



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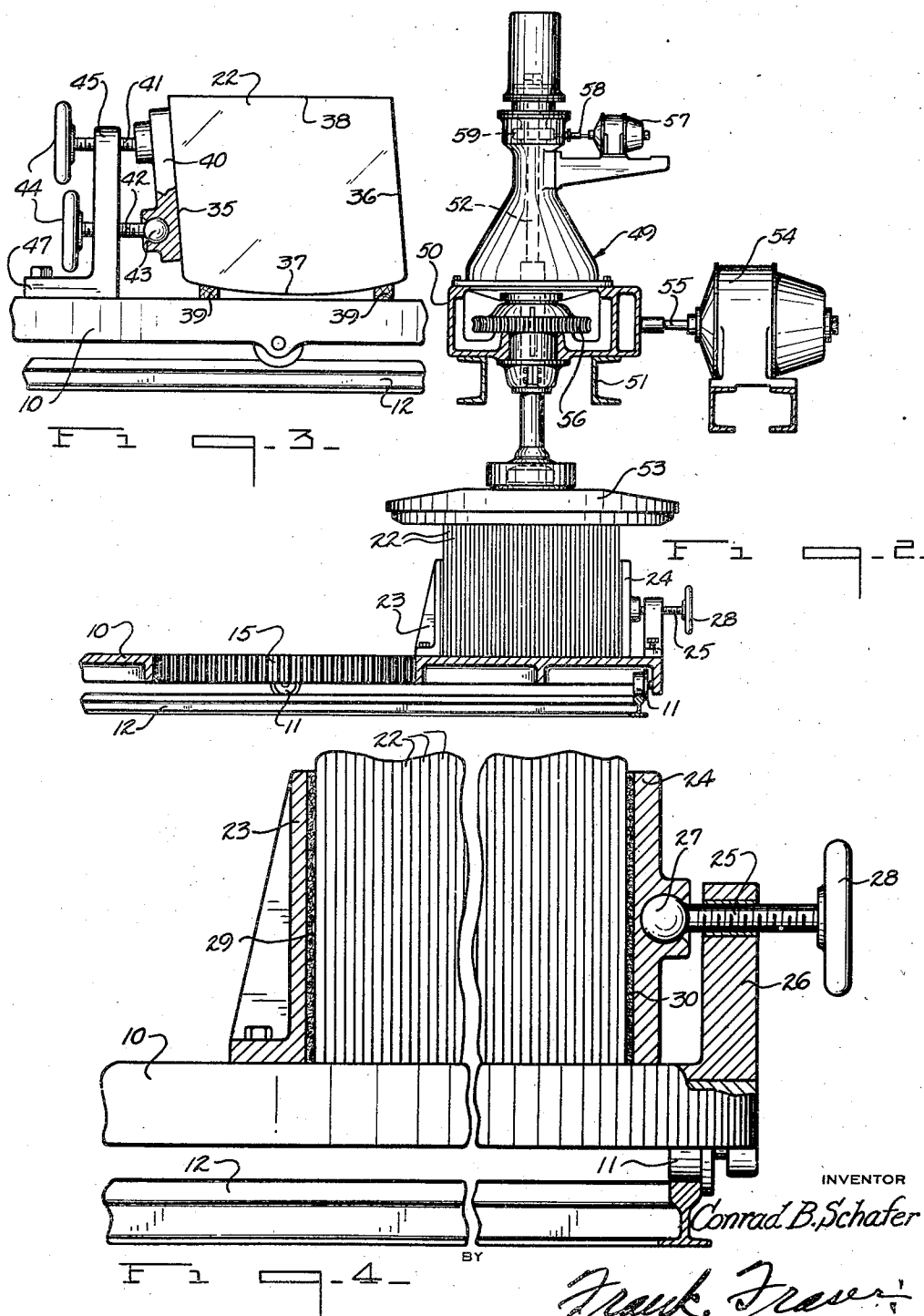
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2 Sheets-Sheet 2



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GLASS GRINDING APPARATUS

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Application April 11, 1931, Serial No. 529,369

6 Claims. (Cl. 51-134)

The present invention relates broadly to improvements in grinding apparatus and has for its primary object the provision of a novel apparatus or machine for grinding the edges of glass sheets, plates, or the like.

Another important object of the invention resides in the provision of an apparatus or machine of the above character adapted for grinding the edges of a plurality of sheets or plates of glass simultaneously and in a rapid, convenient, and efficient manner whereby the said sheets or plates may be ground to a predetermined and accurate size.

Another object of the invention is the provision of a grinding apparatus or machine of the above character adapted for grinding the edges of sheets or plates of glass of different shapes and sizes.

A further object of the invention is the provision of grinding apparatus wherein the grinding of the edges of the glass sheets or plates may be accomplished in a substantially continuous manner by passing the said sheets in a definite predetermined path beneath and in engagement with one or more surfacing elements.

Other objects and advantages of the invention will become more apparent during the course of the following description when taken in connection with the accompanying drawings.

In the drawings wherein like numerals are employed to designate like parts throughout the same,

Fig. 1 is a top plan view of grinding apparatus constructed in accordance with the present invention,

Fig. 2 is a section taken substantially on line 2-2 of Fig. 1,

Fig. 3 is a section taken substantially on line 3-3 of Fig. 1,

Fig. 4 is a section taken substantially on line 4-4 of Fig. 1, and

Fig. 5 is a section taken substantially on line 5-5 of Fig. 1.

Referring now more particularly to the drawings, there is provided a circular or ring table 10 mounted upon wheels 11 running upon annular tracks 12. The table 10 may be continuously rotated about its center in any desired manner such as by means of a motor 13 which drives a pinion 14 meshing with a rack 15 carried around the inside of said table.

Mounted upon the top of table 10 at equidistantly spaced points around the same are a plurality of sheet supporting and holding units 16 to 21 inclusive, and while six of such units have

been illustrated in the drawings by way of example, it will of course be appreciated that any other number may be used as desired. Each supporting and holding unit 16 to 21 is adapted to support and retain upon edge a plurality of sheets or plates of glass 22 to be ground, which sheets are placed side by side and firmly clamped together between the stationary vertical plate 23 and the movable vertical plate 24 carried by the table, said last named plate being slidable horizontally by means of an adjusting bolt 25 threaded through the upper end of a vertical support 26 and having a ball and socket connection with said plate as at 27 and an operating hand wheel 28 at its opposite end. Due to this arrangement, it will be readily apparent that upon rotation of the adjusting bolt 25, the slidable plate 24 may be moved toward or away from stationary plate 23 so that any desired number of sheets of glass can be clamped therebetween. In order to protect the outer faces of the end sheets of glass from direct contact with the plates 23 and 24, the inner faces of said plates may be covered with a suitable sheet or layer of cushioning material 29 and 30 respectively.

The vertical support 26 is ordinarily securely held in a fixed position adjacent the outer edge of the table, as shown in Fig. 1, by means of screws 31 which pass downwardly through ears 32 and engage said table. However, in the event it is desired to grind only a few sheets of glass and the adjusting bolt 25 is not long enough to move the plate 24 inwardly a sufficient distance to clamp the sheets in place, the support 26 may be moved closer to the stationary plate 23, and to facilitate this movement, the said support is provided upon the bottom thereof with a dove-tail projection 33 received within a correspondingly shaped groove or channel 34 in the upper surface of the table. Thus, by being able to move the support 26 as well as clamping plate 24 inwardly or outwardly with respect to the center of the table either a small number or a large number of sheets may be accommodated. After the support has been moved to the proper position, it can be secured therein by tightening screws 31.

As noted above, the present invention is readily adaptable for the grinding of sheets or plates of glass of different shapes and sizes, the only requirement being that the upper edge of the sheet to be ground be straight and disposed in a substantially parallel relation with respect to the upper surface of table 10. For instance and by way of example only, the sheet of glass 22, illustrated in Fig. 3, is provided with the parallel side

edges 35 and 36, a curved lower edge 37, and a straight upper edge 38. Although it will be seen that the edge 38 of the sheet is not disposed at exact right angles with respect to the side edges 35 and 36, yet in order to properly grind the same, it is necessary that this edge be disposed horizontally and in substantially parallel relation with respect to the upper surface of the table as shown. To permit and facilitate the proper positioning of the sheets and especially those having curved lower edges, there are provided the spaced transverse strips 39 upon which the glass sheets are stood on edge, and it will be evident that the sheets can be rocked upon the said strips until the upper edges 38 are in proper position for the grinding operation.

Then, in order to maintain the sheets in such position, the side edges 35 thereof are adapted to be engaged by an adjustable plate 40, said plate being carried upon four bolts including an upper pair 41 and a lower pair 42, each bolt having a ball and socket connection 43 with plate 40 and carrying at its outer end an adjusting hand wheel 44. The bolts 41 and 42 are threaded through spaced upstanding portions 45 and 46 of a substantially U-shaped bracket 47 secured to the table by fastening elements 48. As best shown in Fig. 3, upon proper adjustment of the upper and lower sets of bolts 41 and 42, the plate 40 can be moved so that its inner surface is parallel with the adjacent edges 35 of the glass sheets 22 and in engagement therewith. When sheets of different shapes are adapted to be ground, the plate 40 can be accurately adjusted so as to correspond to the angle of the adjacent edges of the sheets. Obviously, in the event the sheets are provided with straight lower edges, strips 39 having flat upper surfaces may be employed, or if preferred, the sheets could be permitted to rest directly upon the upper surface of the table.

The grinding of the glass sheets may be performed by one or a plurality of surfacing units, one only being illustrated in the drawings and designated in its entirety by the numeral 49. Each surfacing unit is mounted above the table 10 and includes a housing 50 carried upon the supporting beams 51. Journaled vertically through the housing is a drive spindle 52, to the lower end of which is connected an annular grinding runner 53 adapted to engage the upper edges of the glass sheets as the said sheets are carried therebeneath. The drive spindle 52 may be driven from a motor 54 mounted to one side of the machine and the shaft 55 of which carries a worm (not shown) meshing with the worm gear 56 keyed to the spindle within housing 50. The present invention also includes means for raising and lowering the grinding runner 53, and this may be accomplished by the provision of a motor 57, the shaft 58 of which also carries a worm (not shown) meshing with a worm gear 59 threaded upon the upper end of spindle 52. Since the worm gear 59 is prevented from moving vertically, the rotation thereof will cause the spindle to be threaded upwardly or downwardly therethrough to raise or lower the grinding runner.

In the operation of the apparatus above described, a plurality of sheets of glass 22 are first secured in proper position upon the table 10 in the manner above described, after which the said sheets will be carried by said table, due to the rotation thereof, beneath the grinding runner 53 of one or more surfacing units 49, and the said runners acting upon the upper edges of the glass will function to grind the same, and thereby re-

duce the sheets to an accurate predetermined size. The table 10 and grinding runner 53 may be driven in the same direction as indicated by the arrows in Fig. 1, or the runner may be rotated in a direction opposite to the direction of rotation of the table if preferred. In order to facilitate the grinding operation, a suitable abrasive material may be supplied in any well known manner between the operative face of the grinding runner and the edges of the sheets being ground. After the sheets 22 of each group have passed beneath the surfacing runner, they are removed from the table and another group secured thereupon, the space between the points A—B being reserved for the removal of the finished sheets and the mounting of new sheets to be ground. However, due to the relatively slow rotation of the table, the removal of the finished sheets and the mounting of the new sheets can be effected without the necessity of stopping the rotation thereof. From the above, it will be seen that there has been provided a grinding apparatus or machine embodying various novel features of construction and operation by which a large amount of glass may be ground in a relatively short time whereby to accelerate production and reduce the cost of the grinding operation.

It is to be understood that the form of the invention herewith shown and described is to be taken as the preferred embodiment of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. In grinding apparatus of the character described, a table movable in a definite, substantially horizontal path, a plurality of sheet supporting and holding units carried thereby and each being adapted to maintain a plurality of glass sheets upon edge in a substantially vertical position, each unit including means for clamping a plurality of sheets against one another and adjustable means engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting said last mentioned means to correspond to the angle at which the adjacent sheet edges are disposed, and means mounted above the table for grinding the upper edges of the glass sheets as they are moved therebeneath.

2. In grinding apparatus of the character described, a table movable in a definite, substantially horizontal path, a plurality of sheet supporting and holding units carried thereby and each being adapted to maintain a plurality of glass sheets upon edge in a substantially vertical position, each unit including spaced vertically disposed fixed and movable plates between which a plurality of sheets are adapted to be clamped and a second movable plate engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting the angle of said second movable plate to correspond to the angle at which the adjacent sheet edges are disposed, and a surfacing element mounted above the table for grinding the upper edges of the glass sheets as they are moved therebeneath.

3. In grinding apparatus of the character described, a horizontal table movable in a definite, substantially horizontal path, a pair of spaced substantially parallel strips supported upon the table and upon which a plurality of glass sheets are stood on edge in a substantially vertical position, vertically disposed fixed and movable plates between which the plurality of sheets are adapted

to be clamped while supported upon said strips, a second movable plate engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting the angle of said second movable plate to correspond to the angle at which the adjacent sheet edges are disposed, and a surfacing element mounted above the table for grinding the upper edges of the glass sheets as they are moved therebeneath.

- 10 4. In grinding apparatus of the character described, an annular table movable in a definite substantially horizontal circular path, a plurality of sheet supporting and holding units carried by the table at substantially equi-distantly spaced points around the same, and each being adapted to maintain a plurality of glass sheets upon edge in a substantially vertical position, each supporting and holding unit including a plurality of spaced substantially parallel strips supported upon the table and upon which a plurality of glass sheets are stood on edge in a substantially vertical position, fixed and movable plates between which the plurality of sheets are adapted to be clamped while supported upon said strips, a second movable plate engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting the angle of said second movable plate to correspond to the angle at which the adjacent sheet edges are disposed, and a surfacing element mounted above the

table for grinding the upper edges of the glass sheets as they are moved therebeneath.

5. In grinding apparatus of the character described, a table, a sheet supporting and holding unit carried thereby and adapted to maintain a plurality of glass sheets upon edge in a substantially vertical position, said unit including means for clamping a plurality of sheets against one another, and adjustable means engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting said last-mentioned means to correspond to the angle at which the adjacent sheet edges are disposed, and means mounted above the table for grinding the upper edges of the glass sheets.

6. In grinding apparatus of the character described, a table, a sheet supporting and holding unit carried thereby and adapted to maintain a plurality of glass sheets upon edge in a substantially vertical position, said unit including spaced vertically disposed fixed and movable plates between which a plurality of sheets are adapted to be clamped and a second movable plate engaging one edge of the glass sheets to assist in maintaining them in place, means for adjusting the angle of said second movable plate to correspond to the angle at which the adjacent sheet edges are disposed, and a surfacing element mounted above the table for grinding the upper edges of the glass sheets.

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