Oct. 9, 1928. 1,686,742

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METHOD AND APPARATUS FOR SURFACING PLATE GLASS

Filed July 21, 1927 3 Sheets-Sheet 1

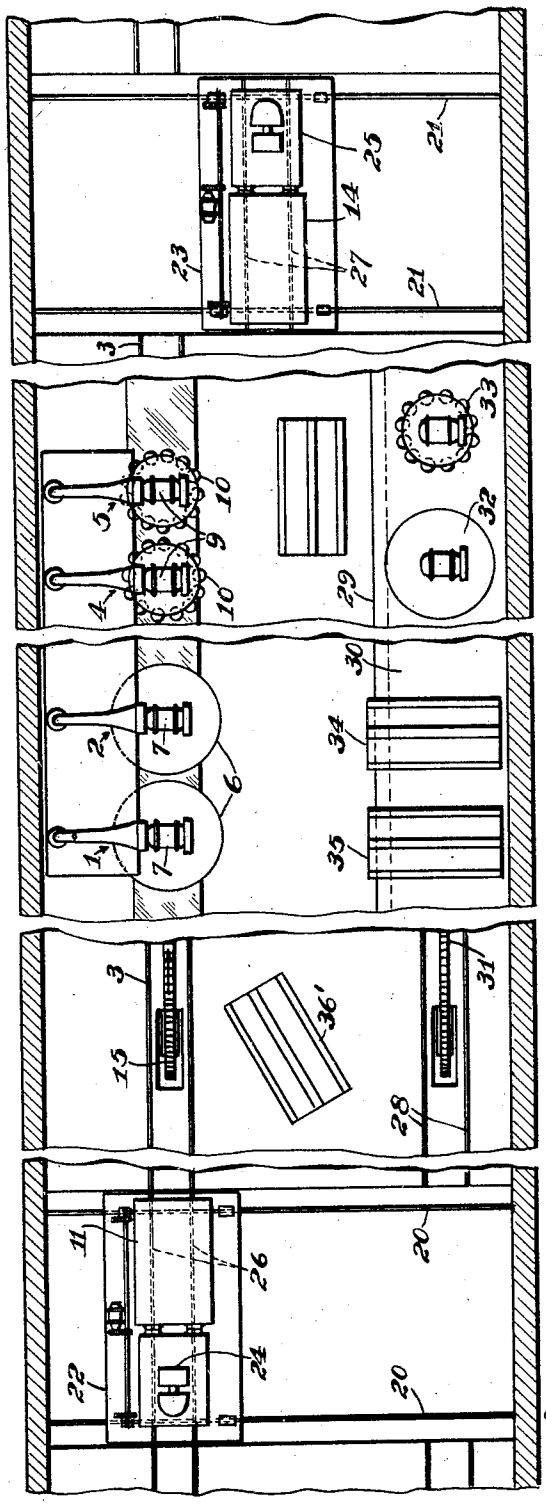


Fig. 1.

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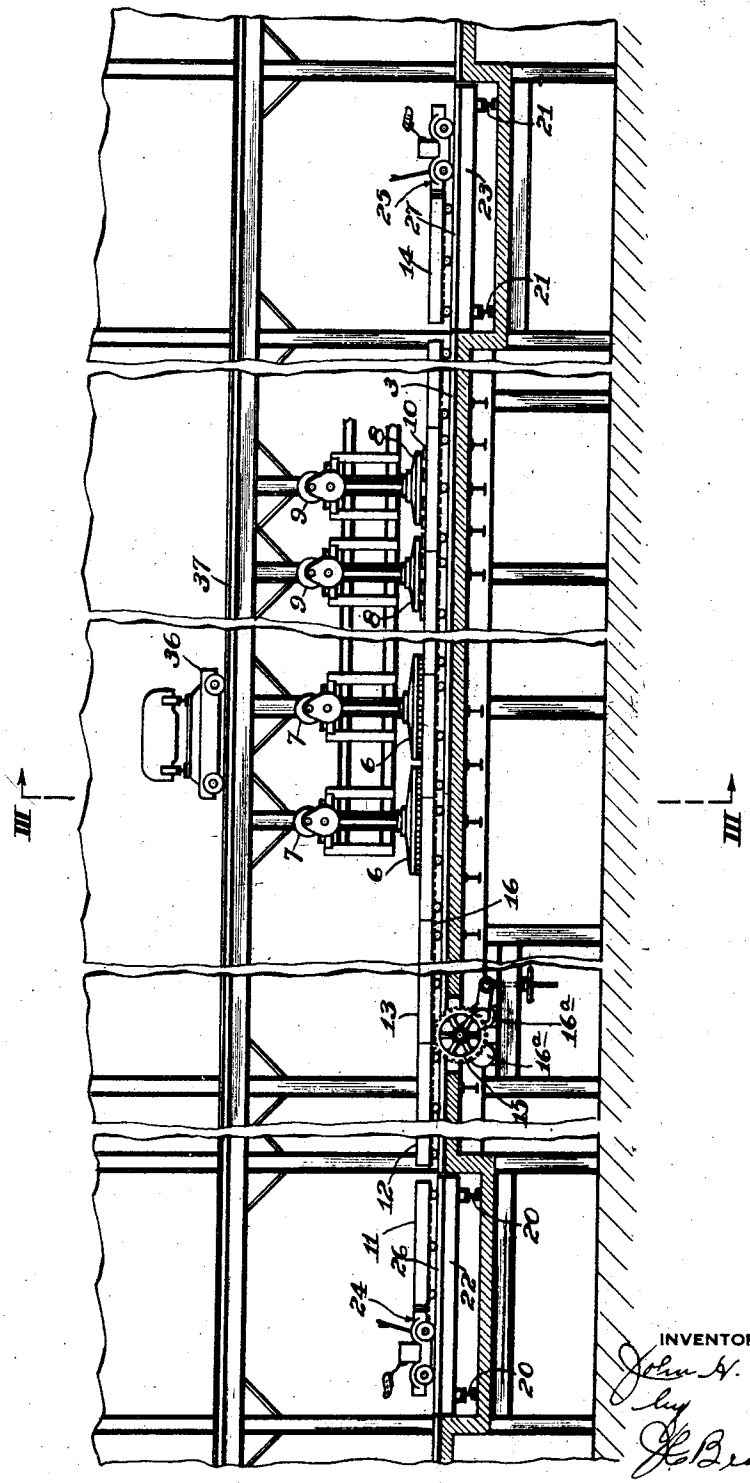
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Fig. 2.



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Fig. 3.

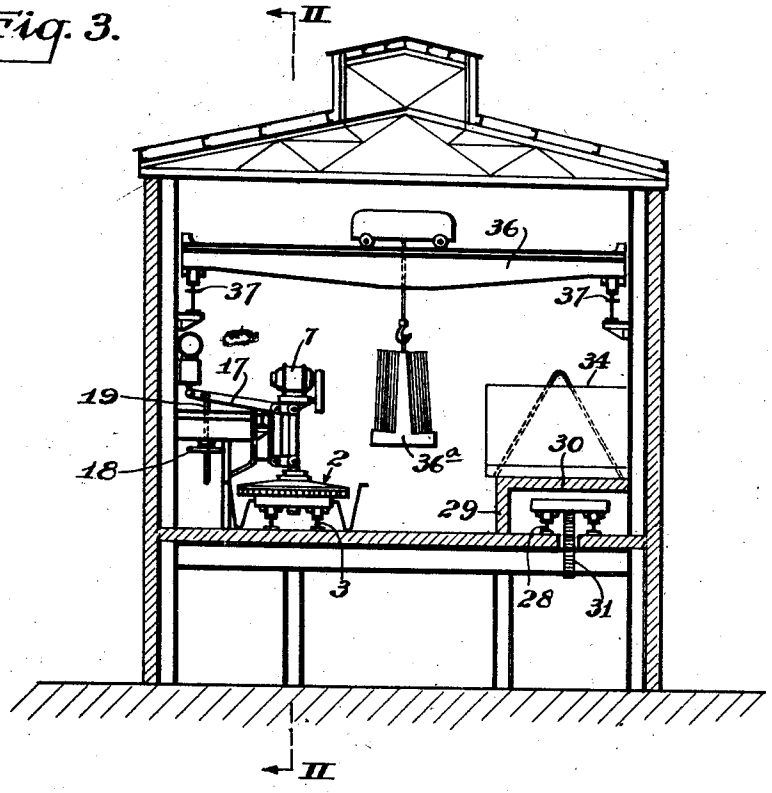
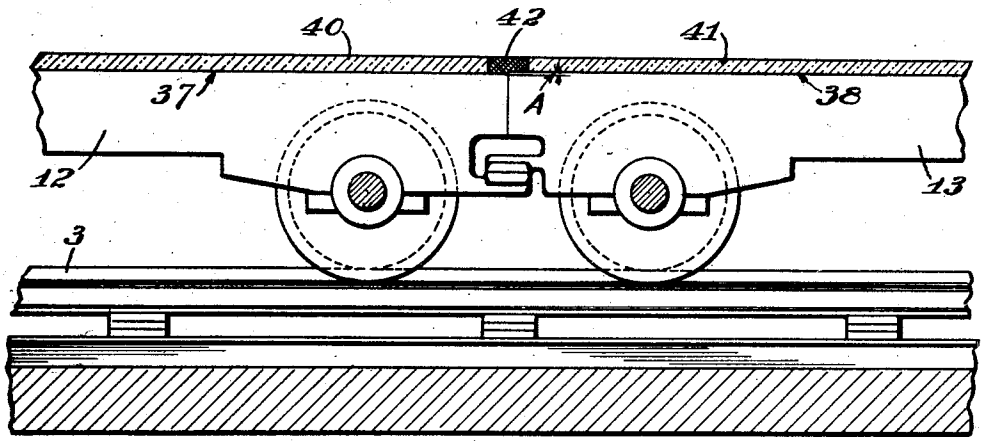


Fig. 4.



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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR SURFACING PLATE GLASS.

Application filed July 21, 1927. Serial No. 207,407.

The invention relates to an improvement in the so-called straight away or continuous system for grinding and polishing plate glass, wherein the sheets of glass carried upon the tops of a series of tables or cars are carried beneath a plurality of grinding and polishing machines. The invention has for its principal object, the provision of aparatus and procedure whereby the time and labor loss incident to the storing and handling of large quantities of plates at the starting end of the series of machines is avoided. With straight away surfacing apparatus, as heretofore proposed, it has been necessary to surface a large number of sheets on one side only, and then discontinue this procedure, and surface the accumulated plates on the other side. This has been necessary, because the sheets carried beneath the grinding and polishing runners must obviously be of substantially the same thickness, otherwise, the breakage would be excessive, due to the runners operating over a surface of varying level, and due to the fact that the grinding runners would exert an undue pressure on the thicker sheets. The present invention is designed to overcome this difficulty and permit the surfacing, at one and the same time, of sheets which have not been surfaced on either side and of sheets which have been surfaced on one side, so that the requirement for storing large quantities of either kind of sheets at the starting end of the series of machines is avoided.

Briefly stated, this is acomplished by using tables of two different heights, one kind of tables having their top surfaces at a level different from that of the other kind of table by an amount equal to the average thickness of glass which is cut away during the passage of the glass beneath the series of grinding and polishing machines. For instance, if the average amount of glass which is cut away by the surfacing operation is one-thirty-second of an inch, the tables which are to carry the sheets which have been surfaced on one side will have their upper surfaces one-thirty-second of an inch higher than the tables which are to carry the glass which is rough on both sides. The two kinds of sheets with their appropriate tables may alternate in the train of tables, or they may be mixed indiscriminately, all that is necessary being to make sure that the tables each receive the glass for which it is designed, the table being suitably marked to avoid mistakes. The requirement for any extensive storage space at the starting end of the system is thus avoided. One form of apparatus for practicing the method is shown in the accompanying drawings, wherein:

Figure 1 is a plan view showing the general arrangement of the apparatus. Fig. 2 is a longitudinal section on the line II—II of Fig. 3. Fig. 3 is a section on the line III—III of Fig 2. And Fig. 4 is an enlarged vertical section through two of the cars or tables at their meeting ends

Referring to the drawings, 1 and 2 are two of a series of grinding machines, all located above the track 3, and 4 and 5 are two of a series of polishing machines, also located above the track 3. The grinding machines comprise the runners 6, 6 faced with iron grinding surfaces and driven from the motor 7, 7 through the intermediary of suitable reduction gearing. Similarly, 8, 8 are the runners of the polishing machine driven from the motors 9, 9 through the intermediary of suitable reduction gearing. The polishing runners carry the series of polishing pads 10 of ordinary construction. In operation, the grinding runners are supplied with a mixture of abrasive and water, while the polishing runners are supplied with a mixture of rouge and water.

Mounted for movement beneath the series of grinding and polishing machines are the tables or cars 11, 12, 13, 14, etc., such tables or cars being supported upon the track 3. These tables or cars are coupled tightly together at their ends so as to form a continuous train and are driven from the spur wheel 15, which engages the racks 16 on the bottoms of the cars. The spur wheel 15 is driven from one of the electric motors 16^a, 16^a through the intermediary of suitable reduction gearing, the two motors being employed in order to guard against a failure of the driving apparatus in case of accident to one of the motors. The tables or cars carry upon their upper surfaces the glass sheets which are to be ground and polished. The pressure of the grinding runners upon the glass is regulated by the levers 17 which support the grinding units, the construction following that shown in the Evans Patent No. 1,577,457 dated Mar. 23, 1926. The position of the levers is regulated by means of the wheels 18 which are threaded on to the rods 19 pivoted to the lever 17 at their upper ends.

Extending transversely of the track 3 at each end thereof are the transfer tracks 20 and 21, upon which are mounted the transfer cars 22, 23. These cars are provided with the locomotives 24 and 25 mounted for movement along the tracks 26 and 27 extending transversely of the transfer cars. When the transfer cars are brought into alignment with the track 3, the grinding tables or cars may be moved on to and off of the transfer cars, the table 11 being shown in position upon the transfer car 22 and the table 14 being shown in position upon the transfer car 23. Also extending between the transfer tracks 20 and 21 and parallel to the work track 3 is the return track 28. The transfer cars are adapted to be brought into alignment with this track 28, thus providing for the return of the work tables to starting position.

The return track is preferably enclosed by the side and end walls 29 and 30 and the cars are carried through the chamber, thus provided by means of an endless chain 31 provided with suitable means for engaging the cars and moving them to the left (Fig. 1). The top wall 30 above the return track provides a convenient storage space for the extra grinder and polisher runners 32 and 33 and for the glass storage racks 34 and 35. The storage racks are preferably handled by an overhead crane 36 mounted upon the track 37 (Fig. 3), such crane being shown as transporting the rack 36ª. Rough glass which is to be ground and polished is brought into position adjacent the left hand end of the track 3 by means of this crane. The racks 34 and 35 serve as a storage means for glass which has been ground and polished upon one side or upon both sides, the glass which has been ground upon both sides being carried away to the storage room by means of the crane 36.

As heretofore pointed out, the work tables 11, 12, 13, 14, etc. are made in two sets, one of which has their tops at a slightly lower level than the tops of the other set. This is illustrated in Fig. 4, wherein the table 12 has its top surface 37 at a slightly lower level than the surface 38 of the car 13. The glass sheet 40 on the table 12 is one which has not been ground upon either side, while the sheet 41 upon the table 13 has been ground upon its lower side and is, therefore, slightly thinner than the sheet 40. This difference in thickness of the two sheets is represented by the dimension A, which indicates the difference in the height of the two tables. Therefore, when the glass sheets are secured to the tables by means of a thin layer of plaster which is of substantially the same thickness in both cases, the upper surfaces of the two sheets 40 and 41 lie at the same level. The space between the adjacent ends of the sheets is filled by the plaster of Paris 42, so that the train of cars carry the sheets of glass as a continuous unbroken surface. By the expedient, as above indicated, glass sheets which have not been ground upon either side may be surfaced in the same operation with sheets which have been ground upon one side without disturbing the continuity of the upper surface of the series of sheets. The sheets of different thickness may alternate, or there may be a number of sheets all of rough glass upon successive tables followed by a series of sheets ground upon one side upon another series of tables. All that is necessary is that the workmen who lay the glass shall place the all rough glass upon the lower tables and the glass surfaced upon one side upon the higher tables. In order to avoid mistake, the two sets of cars may be painted different colors, or may be indentified in any other suitable manner.

In operation, the rough glass is brought into position adjacent the left hand end of the track 3 by means of the racks 36ª and the cranes 36 and applied to the cars or tables 11, 12, 13, etc. by setting them in plaster, as heretofore referred to. They are then carried beneath the series of grinding and polishing machines, thus surfacing the glass upon its upper side, each table being moved onto the transfer car 23 at the right hand end of the track 3. From this point, the tables are transferred to the return track 28 and brought back to the left hand end of this track. Here the glass is stripped from the tables and stored upon one of the racks 34, 35, the table then being placed upon the transfer car 22 and moved over to the position shown in Fig. 1, at which time the table is in position to be attached to the rear end of the train of cars upon the track 3. At this point, the table is supplied with another sheet of rough glass. The glass sheets from the racks 34 and 35, which have been ground upon one side are removed from these racks and placed upon the higher type of cars, such as the car 13 (Fig. 4) which are also brought into position along the return track 28, or along one of the tracks 42, 42, 42, 42, which are adapted to deliver new cars to the transfer cars 22 and 23. It will be seen that this system provided for the handling of both the rough glass and the glass ground upon one side, as it arrives at the left hand end of the track 3, so that if this supply is properly timed, only a limited amount of glass storage is required. In fact, it is not even necessary to store the glass which is finished upon one side upon the racks 34 and 35, as the glass may be taken directly from the tables on the left hand end of the return track 28 and applied directly to the tops of the tables on the work track 3.

What I claim is:

1. Apparatus for surfacing plate glass comprising a series of driven grinding and polishing runners, a track therebeneath, and two

sets of cars or tables adapted to form a continuous train and carry on their upper surfaces the sheets of glass to be surfaced, said tables or cars being divided into two sets of fixed levels, with the level of the top surfaces of one set lying at an elevation which is less than that of the level of the top surfaces of the other set by a predetermined distance corresponding to the thickness of glass which is removed from the sheets by the surfacing operation.

2. The method of surfacing plates of glass of two different thicknesses in the same straight away operation which consists in providing two sets of cars or tables adapted to form a continuous train and carry on their upper surfaces the plates of glass to be surfaced, said cars or tables being divided into two sets with their upper surfaces at fixed levels, with the level of the upper surfaces of one set lying at an elevation which is less than that of the level of the upper surfaces of the other set by a predetermined distance corresponding to the thickness of glass which is removed from the plates by the surfacing operation, placing the plates of glass having one side surfaced on the cars or tables having their upper surfaces at the higher level and plates of glass which have both sides unsurfaced on the cars or tables having their upper surfaces at the lower level, and passing the two sets of cars thus provided with glass plates in a continuous train beneath a series of grinding and polishing runners.

In testimony whereof I have hereunto subscribed my name this 18th day of July, 1927.

JOHN H. FOX.