

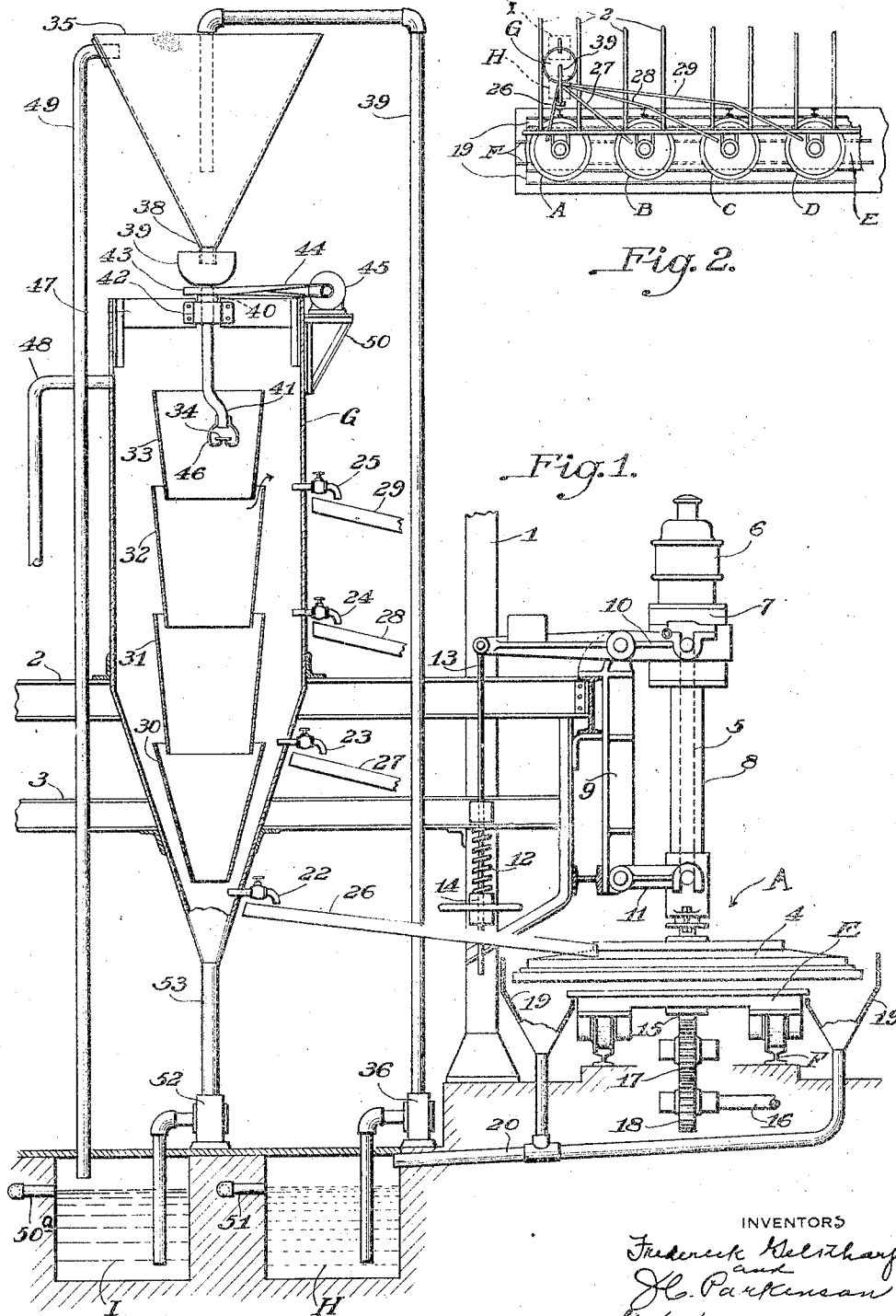
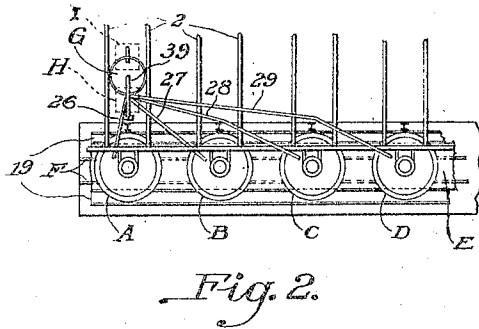
Feb. 1, 1927.

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1,615,833

GLASS GRINDING PROCESS AND APPARATUS

Filed Dec. 31, 1924



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GLASS-GRINDING PROCESS AND APPARATUS.

Application filed December 31, 1924. Serial No. 759,122.

The invention relates to a process and apparatus for grinding glass sheets in the manufacture of plate glass, and particularly to the application and grading of the abrasive employed. The apparatus and process has its principal use in connection with the straight away grinding or surfacing operation, in which the glass sheets to be surfaced are carried upon a train of cars or tables, which are carried slowly beneath a series of grinding machines provided with suitable runners engaging the glass sheets. It is necessary in this operation, to supply the machines with a series of grades of abrasive, ordinarily sand, the machines beneath which the sheets are first passed receiving the coarsest grade of abrasive, and finer and finer grades being supplied, as the sheets progress beneath the succeeding machines and are gradually smoothed. The apparatus and process comprising the present invention have for their objects the provision of an apparatus and process by whose use; (1) a greater economy in the use of abrasive is secured as compared with processes and apparatus heretofore employed, (2) the abrasive is separated into clean, distinct grades with a minimum admixture of the finer grades with the coarser grades, and (3) a maximum accumulation of the finer grades of abrasive for the finer grinding is secured, which is particularly important, inasmuch as there is a scarcity of the finer grades of abrasive in the processes as heretofore employed. One form of apparatus for practicing the invention is illustrated in the accompanying drawings wherein:

Figure 1 is a partial side elevation and partial vertical section. And Fig. 2 is a diagrammatic plan view showing the relation of the grader to the series of grinding machines.

Referring to the general arrangement of the apparatus as indicated in Fig. 2, A, B, C, D, etc. are a series of grinding machines arranged in series over a train of cars E mounted on the track F; G is a grading tank which supplies the series of grinding machines, of which the ones shown are only a part; and H and I are a pair of sumps from which the grading tank G is supplied.

The grinding machines may be of any approved type, but as illustrated, they comprise a supporting framework made up of

the channels 1, 2, 3, etc., which serve also to support the grading tank G; a grinding runner 4; a spindle 5, which carries the runner; an electric motor 6 operating through suitable reducing gearing in the casing 7 to drive the spindle, the tubular bearing member 8 in which the spindle is journaled; the casting 9 secured to the framework; and the arms 10 and 11 pivotally supported upon the casting 9 and engaging trunnions carried by the bearing member 8, the arm 10 which supports the weight of the runner and the parts which drive it being counterbalanced by means of the spring 12 carried by the connecting rod 13 and adjustable in tension by means of the nut 14.

The cars or tables E upon which the glass to be ground is carried may be of any approved type and are preferably given a movement of translation along the track F by means of the rack 15 secured to the bottoms of the cars and driven from the shaft 16 through the intermediary of the spur gears 17 and 18.

Extending along the sides of the series of cars are the drainage troughs 19—19 connected to the pipe 20 which discharges into the sump 21. The used abrasive and water from the grinding machines are thus collected and supplied to the sump for grading and reuse as hereinafter described.

The tank G is provided with a plurality of outlets 22, 23, 24, 25, etc., leading from different levels and emptying into troughs 26, 27, 28, 29, etc. for carrying mixtures of abrasive and water to the various grinding machines A, B, C, D, etc. The grader is illustrated as supplying four grinding machines, but it will be understood in practice a grader will ordinarily supply a much larger number of machines and that in some cases the same grade will be supplied to several machines, the drawings being merely designed to illustrate the invention in one of its simplest forms.

Mounted at the center of the tank by means of brackets attached to the walls of the tank and not shown is a casing made up of the series of tapering sections 30, 31, 32 and 33, the ends of such sections preferably coming opposite the outlets 22, 23, 24 and 25. Located above the tank is a de-watering cone 35 to which the mixture of used abrasive and water from the sump H

is supplied by means of the rotary pump 36 and the piping 37. The cone 35 has an outlet 38 at its lower end, which discharges into the cup 39, such cup 39 having an outlet 5 spout 40 with its extreme lower end turned laterally as indicated at 41. The spout 40 is journaled in a bearing 42 and carries the pulley 43 by means of which it is rotated by a belt 44 extending around the driving pulley 45 of a motor 45. A baffle plate 34 carried 10 by a pair of straps 46 receives the discharge from the spout 40, and the rotation of such spout serves to distribute the mixture of abrasive and water over the tank area below 15 the level of the liquid therein. The bearing 42 is preferably carried by means of a transverse plate 47 secured to the walls of the tank G, while the motor 45 is preferably carried upon a bracket 50 rigidly secured to the wall of such tank.

The overflow from the grading tank G passes through the pipe 48 leading from the upper end of the tank to the sewer, such overflow serving to carry off any mud or 25 sand which is too fine for use. The excess water supplied to the dewatering cone 35 is withdrawn through the overflow pipe 49 leading to the sump I. Some very fine sand and mud from the cone is also carried from the pipe 49 to the sump I, but the major portion of this is eliminated from the system by an overflow 50^a from such sump leading to the sewer. Similarly, the sump H is provided with an overflow 51 for carrying to 30 the sewer mud and sand which is too fine for use. The water which collects in the sump I is supplied under pressure to the bottom of the grading tank G by means of the rotary pump 52 and the pipe connection 53. 35 This serves to give a grading flow of water upward through the tank, so that the different grades of abrasive in the tank are collected at different levels, the coarsest abrasive being located at the bottom and the grades 40 being finer and finer at increasing distances from the bottom of the tank.

In operation, the cycle of grinding, collecting the used abrasive from the tables, grading it, and re-supplying it to the various machines is conducted in a continuous 50 cycle, the abrasive being used over and over again and those portions automatically eliminated which become too fine for service. New sand is added to the system from time 55 to time to take the place of the sand which has become too fine for use, such sand being preferably supplied to the sump H. Additional water to take the place of that which passes to the sewer through the overflows 60 48, 50^a and 51 is supplied by the water which is directed onto the tables or cars to wash them after the glass has passed one grinding runner and preliminary to its passage beneath another one employing a finer grade of 65 abrasive. The elimination of a portion of

the water preliminary to its return to the tank G by means of the dewatering cone 35 serves to give a thicker mixture in the tank G, and at the same time this surplus 70 water which is eliminated is not wasted, but is utilized in giving the upward grading flow through the tank by means of the pump 52 as heretofore explained. The rotation of the spout 40 assists in distributing the abrasive 75 across a larger area of the tank than would be the case if the spout discharged at one point, which tends to prevent the abrasive from moving downwardly through the tank due to a massing or concentration which 80 would tend to carry the finer abrasives clear to the bottom of the tank or in any event to too a level. The use of the casings 30 to 33 serves to give much cleaner grades of abrasive as withdrawn from the outlets 22 to 25 than would be the case if these casings 85 were not employed, since they serve to prevent a lateral movement of the coarser abrasive as it moves downward through the tank in seeking its proper level. With the arrangement as shown, any coarse abrasive, for 90 instance, which belongs belows the level of the casing 33, cannot find its way to the outlet 25 since in order to do so, it would have to move upward along the path indicated by the arrow in Fig. 1 and there is 95 little chance of this occurring as these particles of coarse abrasive are of such weight that they must move downward under the conditions of flow in the grader as it is adjusted for service. The arrangement also 100 has a corresponding advantage over those systems in which all of the abrasive and water are introduced at the bottom of the tank from the sump, since under these conditions a great deal of the fine sand is 105 diverted laterally through the various outlet passages before it reaches its proper level. The present arrangement insures that there is no wastage of the fine abrasives, since by no chance can these finer abrasives get 110 to a point below their proper level. This is important since there is a scarcity of the finer abrasives in systems such as those here illustrated, so that they must be conserved for use with the machines which are designed 115 to carry out the finer grinding operations. This is also particularly important in a continuous grinding operation, as opposed to an intermittent one, such as is conducted with circular grinding tables, since in a continuous operation, there is no opportunity to 120 collect the finer grades while the coarse grinding is being carried on as is the case in an intermittent operation, so that it is essential that none of the finer grades should 125 be allowed to be carried out of the grader with the coarser grades, in which latter connection, they interfere with the coarse grinding operations rather than assist them, as is well known in the art. 130

It will be understood that the invention is not limited to the details of construction shown either as to the grading mechanism or as to the grinding machines. Also that the terms "tank" and "sump" are used in their broad sense to mean any sort of a receptacle whether located above the ground or below it, the term "sump" having the functional significance that it acts as a collector of drainage liquids or mixtures, such as water or abrasive and water. The segregating casing is preferably made up of the sections 31 to 34 secured in relative position by means of brackets, not shown, but such section might be made in other ways, all that is necessary being that there shall be outlets at a plurality of different levels. The form illustrated is preferred because of the fact that the overlapping ends of the sections reduces the tendency of any grades which are too coarse for use at these levels to escape laterally without also moving upwardly, which practically prohibits any such improper lateral escape of the coarse abrasive.

What we claim is:

1. A process of grading and applying abrasive to a grinding machine, which consists in collecting the used abrasive and water from the grinding machine, separating a portion of the water from such mixture and causing it to flow upward through a body of water, introducing the remainder of the mixture into the top of such body and simultaneously withdrawing a mixture of water with the desired grade of abrasive from said body and supplying it to the grinding machine.

2. In combination with a grinding machine, a sump arranged to receive the mixture of used abrasive and water from said machine, a grading tank, a dewatering receptacle located above the tank and discharging into the top thereof, an overflow conduit leading from the upper portion of said receptacle, a second sump for receiving said overflow, means for continuously lifting the mixture of water and abrasive from said first sump and discharging it to said receptacle, means for supplying the water from said second sump upwardly to the lower portion of said grading tank to provide a grading flow upwardly therethrough, and means for withdrawing a mixture of water and abrasive of the required grade from the tank and supplying it to the grinding machine.

3. In combination with a grinding machine, a sump arranged to receive the mixture of used abrasive and water from said machine, a grading tank, means for separating a portion of the water from said mixture, means for supplying such water to the lower portion of the grading tank under pressure to provide an upward grading flow therethrough, means for supplying the rest of said mixture to the top of the grading tank, and means for withdrawing a mixture of water and the desired grade of abrasive from the tank and supplying it to said grinding machine.

In testimony whereof, we have hereunto subscribed our names this 27 day of October, 1924.

FREDERICK GELSTHARP.
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