J. W. CRUIKSHANK.

APPARATUS FOR GRINDING AND POLISHING PLATE GLASS.

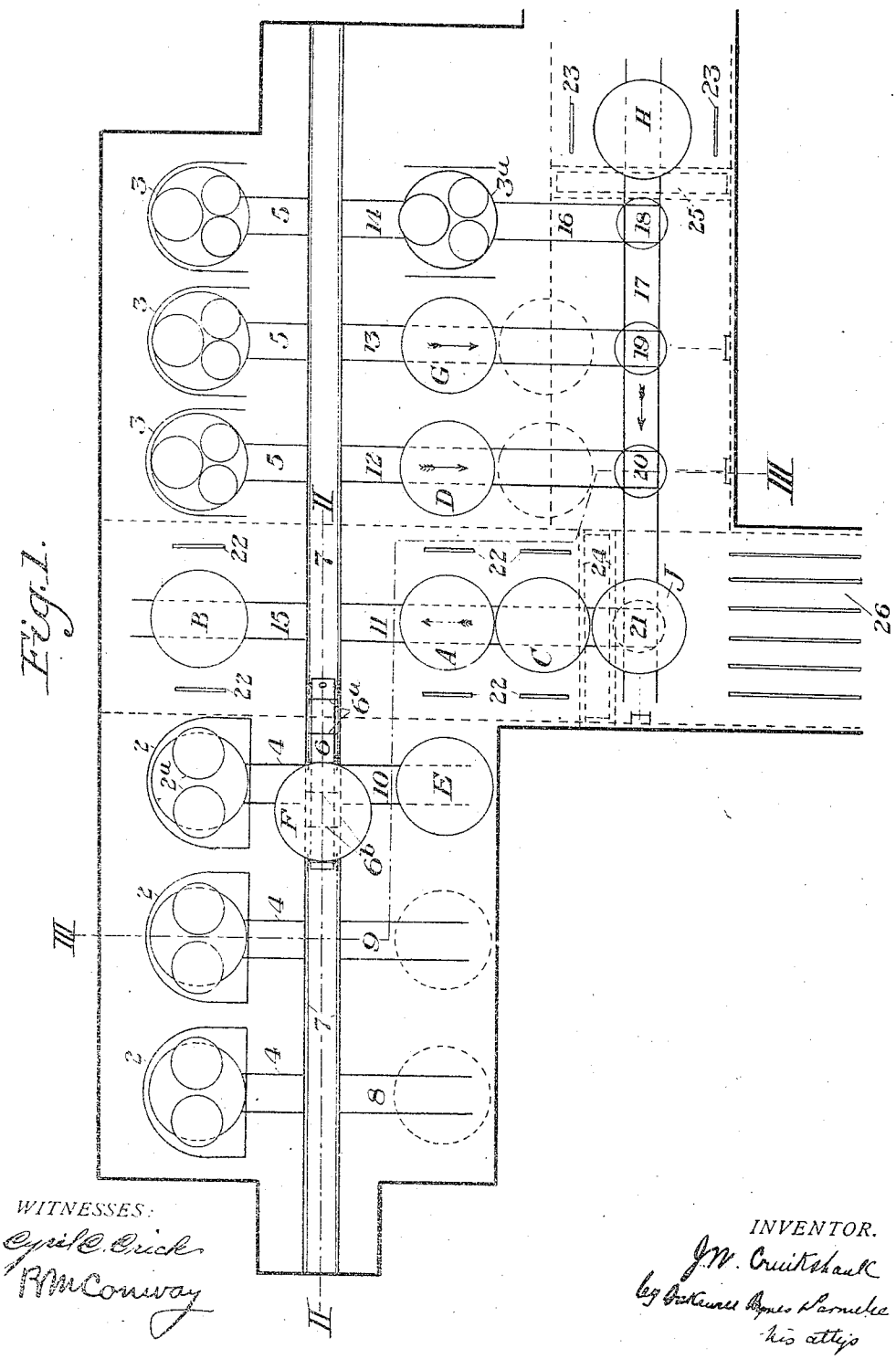
APPLICATION FILED MAY 1, 1911.

1,069,395.

Patented Aug. 5, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS-SHEET 2.

Fig. 2.

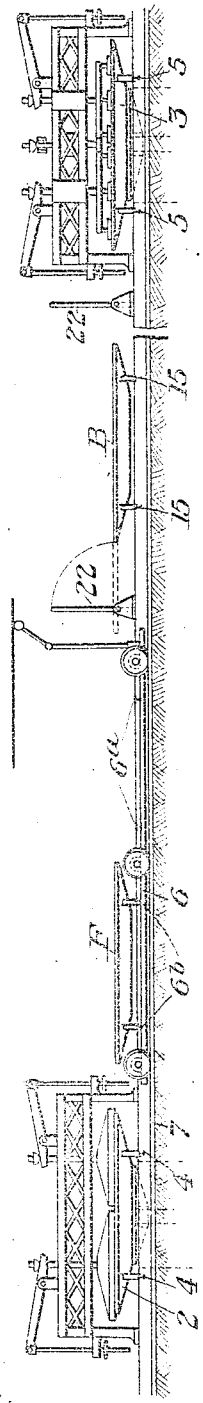
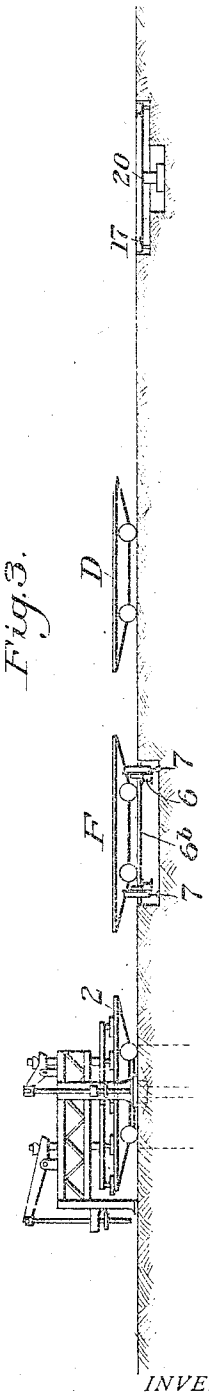


Fig. 3.



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APPARATUS FOR GRINDING AND POLISHING PLATE-GLASS.

1,069,395. Specification of Letters Patent. Patented Aug. 5, 1913.

Application filed May 1, 1911. Serial No. 624,420.

To all whom it may concern:

Be it known that I, JAMES W. CRUIKSHANK, a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Grinding and Polishing Plate-Glass, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, in which—

Figure 1 is a diagram showing a preferred embodiment of my invention. Fig. 2 is a partial sectional view on the line II—II of Fig. 1, and Fig. 3 is a sectional view on the line III—III of Fig. 1.

My invention has relation to apparatus for grinding and polishing plate glass. In the usual process of doing this work, the glass is first laid on a table in its rough state, and is thence carried to a grinder where it is ground smooth. After leaving the grinder, the joints between the pieces of glass must be cleaned, being full of sand from the grinding operation, the presence of which would destroy and prevent a perfect polish on the polishing machine. This operation of cleaning the joints is commonly known as "jointing." In this operation, the joints are scraped out and a layer of new plaster is put in, after which the table is taken to the polishing machine. The glass is first polished on one side, after which the table is moved to a track where the glass must be turned over so as to be ready to grind the other side thereof, this operation being commonly known as "turning." After turning, the table is again taken to the grinding machine, where the glass is ground on its other side, then again taken to one of the tracks, and is then again jointed. After jointing, the table is taken to the polishing machine to polish the glass upon the side last turned. The next operation is that of removing the glass from the table, known as "stripping." After stripping, the table is again ready to lay with rough glass to be taken to the grinder. These various operations are quite complicated, and it will be readily seen that unless the factory is properly arranged, there is likely to be considerable interference between the different tables, which are moving in opposite directions.

The main object of my invention is to provide an arrangement of apparatus, by which all interference between the tables may be prevented and they may be kept moving continuously in one direction.

Referring to the accompanying drawing, in which I have shown the preferred embodiment of my invention, the numerals 2 indicate a plurality of grinding machines arranged in line; and 3 designates a plurality of polishing machines also arranged in line. Both of these machines are of the usual type, having circular disks or tables on which the glass is ground and polished.

7 designates a longitudinally extending track upon which the grinding machines 2 and the polishing machines 3 all face. The track 7 is connected with the grinding machine by transverse tracks 4, and with the polishing machines by transverse tracks 5.

6 indicates a transfer car mounted on the track 7, and carrying the cross tracks 6^a and 6^b, upon which the tables stand while they are being transferred.

8, 9, 10, 11, 12, 13, and 15 designate cross tracks on which the tables are placed for the various operations hereinafter described, these tracks all connecting with the longitudinal track 7 at one end.

14 is a cross track which leads to a polisher 3^a, located at the opposite side of the track 7 from the polishers 3, and 16 is a track leading away from the opposite side of the polishing machine 3^a to a second longitudinally extending track 17, with which the tracks 11, 12 and 13 also connect.

The track 17 is provided with a plurality of turn tables 18, 19, 20 and 21, by means of which a table can be transferred from the track 17 to either one of the cross tracks 11, 12, 13 and 14.

22 and 23 designate laying frames of the usual character and which, in practice, are pivoted so that they can be moved into a horizontal plane level with the table top.

24 and 25 designate in dotted lines and diagrammatically overhead traveling cranes for handling the glass.

26 designates storage racks for rough glass.

In order to enable the operation to be more readily understood, I have shown a plurality of tables standing on the various cross tracks and have lettered these tables as follows: A designates a table which is laid with glass ready for the grinders; B a table in position for the turning operation; C a table in position to be laid with glass; D a table ready to turn; E a table

moved away from the grinder and ready for jointing; F a table jointed and ready to be moved to one of the polishing machines; G a table having finished glass ready for stripping; H a table in position to be stripped; and J a table stripped and ready for laying with rough glass.

The operation is specifically as follows: The table F, which is on the transfer car 6, is jointed and ready to go to one of the polishers, having been removed from one of the cross tracks 8 or 9. At the same time, one of the polishers 3 has a finished table which is ready to be removed. The transfer car is brought into position so that its track 6ª registers with one of the tracks 5 of one of the polishing machines 3, from which the table is to be taken. This table is then pulled out on to the transfer car, and the car is then moved so that the table F is opposite one of the polishing machines 3. The table F is then pushed off and moved on to the polishing machine in the usual manner. The table now on the transfer car having glass with a polished surface is moved to one of the tracks 12, 13, or 15, according to whether both sides of the glass have been polished or only one side. If both sides have been polished, and the glass is ready to be stripped, the table is moved on to the track 13 into the position G, from whence it is brought forward on to the turn table 19, which is turned and is moved down on the track 17 to the position indicated at H, where the finished glass is removed with the aid of the overhead traveling crane 25. If only one side of the glass has been polished, however, the table is put on to either the track 12 or the track 15. On track 15, the glass is turned ready to be ground on the reverse side. If it is moved on to track 12 to the position D, it will be moved forward on to the turn table 20, and then along the track 17 to the position J, where it is again turned and brought down the track 11 into the position C or A. In one of these positions, the glass is turned in the same way as on track 15. It is a matter of convenience into which of these positions the table is brought, depending mainly upon whether the track 15 has a table already in position thereon.

If the polishing operation will be completed by the polishing machine 3ª, the table on that machine is first pushed through the polisher on to track 16, and then the already jointed table F is shoved in from the transfer car 6. If the glass has been polished on both sides, the table from the polisher 3ª is moved to position H, as before; but if it has been polished on one side only, it is moved to position J, for turning, as before described. It will now be assumed that one of the grinders is ready to be changed, and that the table A is already laid with glass having the rough side uppermost, ready to be ground. This table A will then be moved on to the transfer car 6, and the latter brought opposite one of the grinding machines 2. The table A is then introduced into the machine from the car. The table withdrawn from the machine and left on the car is then placed in the position E on any one of the tracks 8, 9, and 10, to be jointed and prepared for the polishers.

Rough glass is taken from the storage room 26 to the laying frames 22, by means of the overhead traveling crane 24, and is removed to one of the tables on the track 11 upon which it is laid in plaster. After the table H has the glass removed from it, it is brought down to the track 17 to the position J, where it is turned on the turn table 21 and moved into the position A or C, ready to receive rough glass to be taken to the grinding machine.

It will be apparent that the operation is perfectly continuous; that is to say, that the tables with the polished product are moved on to track 13 to position G, are then brought forward, turned and carried to position H, from which they are moved along track 17 to the track 11, where they are laid and go back to the grinders. The tables, after having the glass turned on one side, are put onto track 12, where they follow on in continuous operation to have the glass turned over on the track 11. The auxiliary track 15 is also for turning the glass, this being a convenient position underneath the traveling crane 24.

An important advantage of my invention is the compactness of the arrangement of a factory in which the apparatus is thus fixed. A still further advantage is the continuous operation, so that there is no interference between the movements of the tables. Another advantage is that the tables laid with glass first, are always those last to be taken to the grinders. This is more especially true when the track 11 is of greater length, so as to allow more tables to push down in a continuous line. This not only gives the plaster time to set, but it also prevents a blockade. For instance, in the usual factory arrangement, if an empty table is shoved from the transfer car on to a track corresponding to the track 11, and partially laid, there is perhaps no space for another table, which, of necessity, has to be pushed in on the same track. This blocks the first table and the second table must be laid before either one of them is available. A further advantage of my invention is the extensibility of the factory, since any desired number of the grinding or polishing machines can be added at either side of the longitudinal transfer track, the building being, of course, extended for that purpose.

All of the tables to be laid and turned

over are underneath the traveling crane, which takes the glass from the rough storage racks and brings it to the tables or to the laying cranes.

It will be readily understood that various changes may be made in the embodiment of my invention herein shown and described, without departing from the spirit and scope as defined in the appended claims. Thus, extra tracks may be put in for laying, or the line of machines may be extended, as stated, and the machines may be re-arranged in different ways.

It will also be obvious that instead of employing the turn tables 18, 19, 20 and 21, any other suitable means may be employed for transferring the tables from the track 17, to the cross tracks connecting therewith.

I claim:

1. A railway for industrial plants, having a plurality of machines for finishing work pieces, comprising a longitudinally extending track, transverse tracks extending from the longitudinally extending track to each of the machines, the longitudinally extending track being below the level of the transverse tracks, a transfer car on the longitudinally extending track having transverse tracks thereon in the same horizontal plane as the transverse tracks, a second longitudinally extending track in the same horizontal plane as the transverse tracks, and transverse tracks extending from one longitudinally extending track to the other; substantially as described.

2. A railway for industrial plants, having a plurality of machines for finishing work pieces, comprising a longitudinally extending track, transverse tracks extending from the longitudinally extending track to each of the machines, the longitudinally extending track being below the level of the transverse tracks, a transfer car on the longitudinally extending track having transverse tracks thereon in the same horizontal plane as the transverse tracks, a second longitudinally extending track in the same horizontal plane as the transverse tracks, transverse tracks extending from one longitudinally extending track to the other, and turn tables at the junctions between the transverse tracks and the second longitudinal track; substantially as described.

3. A railway for industrial plants, having a plurality of machines for finishing work pieces, comprising a longitudinally extending track, transverse tracks extending from the longitudinally extending track to the machines, said transverse tracks being on a higher horizontal plane than the longitudinal track, a transfer car on the longitudinal track, transverse tracks on the transfer car on the same horizontal plane as the transverse tracks, trucks adapted to be movable over the transverse tracks on the transfer car and to the machines, a plurality of transverse tracks extending from the longitudinal track to receive trucks from the transfer car, a second longitudinally extending track on the same horizontal plane as the transverse tracks, a plurality of transverse tracks extending from one longitudinal track to the other; substantially as described.

4. A railway for industrial plants, having a plurality of machines for finishing work pieces, comprising a longitudinally extending track, transverse tracks extending from the longitudinally extending track to the machines, said transverse tracks being on a higher horizontal plane than the longitudinal track, a transfer car on the longitudinal track, transverse tracks on the transfer car on the same horizontal plane as the transverse tracks, trucks adapted to be movable over the transverse tracks on the transfer car and to the machines, a plurality of transverse tracks extending from the longitudinal track to receive trucks from the transfer car, a second longitudinally extending track on the same horizontal plane as the transverse tracks, a plurality of transverse tracks extending from one longitudinal track to the other, and turn tables at the junctions between the second longitudinal track and the transverse tracks extending therefrom; substantially as described.

In testimony whereof, I have hereunto set my hand.

J. W. CRUIKSHANK.

Witnesses:

S. AUL,

A. M. WOODWORTH.