APPRATUS FOR POLISHING GLASS

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This invention relates to apparatus for the continuous polishing of glass strip, plates or sheets in which both the glass and the polishing runners travel, and has for its object to provide apparatus whereby the operative surface of the polishing runners, after these have completed their operative course on the glass, is washed and treated so as to bring it into a condition adapted to the polishing work of the next operative course.

In the process of polishing glass as customarily carried out, the operative surface of the runners is of felt, and this is caused to take up rouge by supplying the runner, while operating, with rouge and water. When the felt has taken up sufficient rouge, the supply of rouge is stopped, and the runner continues to operate with the supply of a small quantity of water only.

Now before a runner can effectively operate on its next course to polish the glass coming from the grinding and smoothing operations, the rouge embedded in its felts must be cleaned out, so that the felts are able to take up a fresh supply of rouge.

Hitherto this cleaning of the felts has been effected in one of two ways; either the felts are removed from the runner and replaced by clean felts, the felts removed being cleaned in an independent apparatus; or the felts are cleaned when the runner starts its polishing operation on the glass, by supplying the runner with a large amount of water.

When the first method is adopted, there is a considerable loss of time and labour in changing the felts; by using the second method, this loss of time is avoided, but, during the first period of operation in the polishing apparatus, the runner is not operating effectively, and the polishing apparatus therefore has to be larger than would otherwise be necessary.

According to this invention, the felts are cleaned while in position on the runner, and during the transit of the runner from the end of one operative course to the start of its next operative course. In this way the time and labour of changing the felts is avoided, and the runner starts on its operative course with its felts in the best condition for starting the polishing.

In the drawings:

Figure 1 is a diagrammatic side elevation of part of a polishing apparatus, showing the runner elevating and lowering apparatus;

Figure 2 is a half end view thereof;

Figure 3 is an end view on an enlarged scale of the runner lowering apparatus at the right-hand end of the polishing apparatus, showing details omitted from Figures 1 and 2;

Figure 4 is a vertical section along the line 4—4 of Figure 3; and

Figure 5 is a side view of the runner-pushing device.

Referring to the drawings, 1 is the series of tables of the continuous polishing machine, 65 and 2 are polishing runners. The details of these form no part of the present invention. Above the polishing machine is a superstructure 3 (Figures 1 and 2) carrying a plurality of rollers 4, constituting, and hereinafter regarded as, a runway for the polishing runners, which, after completing their operative course from right to left, are lifted up to the said runway and returned thereon to the start of their operative course.

For convenience of description the just-mentioned runway is hereinafter identified by the numeral 4.

The lifting apparatus at the left-hand end, for raising the runners on to the runway 4, is similar to that at the right-hand end shown in Figures 3 and 4 for lowering the runners from the runway on to the tables. Referring to Figures 3 and 4, the frame 5 (a double one in the construction illustrated) carries a crank shaft 6 driven by a gear wheel 7 and a pinion 8. This pinion is on a shaft 9 which is driven in any convenient way. The frame 5 also carries two toothed sectors 10 and 11 journalled at 12 and 13 respectively and engaging one with the other. The sector 10 is connected by a connecting rod 14 with the crank shaft 6 and this sector, and the sector 11 are thereby caused to oscillate on rotation of the crank shaft.

The sector 11 carries a lifting arm 15 to which is rotatably attached a girder 16 extending across the polishing machine. The whole of the above described lifting apparatus is duplicated at the other side of the polishing machine, the shaft 9 passing across to the duplicate apparatus and carrying a pinion corresponding to the pinion 8 which drives the apparatus. In this way, the movement of the girder 16 is controlled at its two ends.

The girder 16 carries two hooks 17 adapted to engage eyes 18 on the polishing runners 2.

In Figure 4 there are shown, in dotted lines, two polishing runners 2, one on the runway 4, in position to be lifted down, and one on the tables 1, after being lifted down. The end of the lifting arm 16 with the hook 17 is also...
shown in dotted lines in the position it occupies when about to lift the runner from the runway.

The movement given to the lifting arm 15 by the above described apparatus is a little more than that indicated in Figure 4 by the full and dotted lines, an extra movement being given at each end of the course sufficient to bring the point of the hook 17 below the eye 18 of the runner. The eye 18 of the runner can then be brought by the travel of the runner on the runway, above the hook 17, which then engages the eye when the arm 15 begins to lift. Similarly, when the runner has been deposited on the tables, the arm 15 moves sufficiently below the position shown in Figure 4, to bring the hook 17 below the eye 18, so that the runner is free to be moved to the left, by means to be described.

During the course of the arm 15 in taking a runner from the runway 4 to the tables 1, the weight of the runner first acts in opposition to the driving gear of the arm, but, after passing the dead point, it acts with it. To avoid the resulting variations of torque on the driving shaft 9, the weight of the runner 2, girder 16 and arms 18, is counterbalanced by two weights 19, 20, respectively, attached to ropes 19 and 20 which are attached to and pass round two cam pulleys 21 and 22 respectively, attached to the sector 11. These two pulleys are so shaped as to counterbalance the weight of the runner, girder and arms in all positions. Thus, in the position shown in Figure 4, the weight 20 on the rope 20 is acting at its minimum radius while the weight 19 on the rope 19 is acting at nearly its maximum radius. When the lifting arm is at its dead point, both weights act, in opposition, at their minimum radius, and, when the arm 15 is in position to lift the runner from the runway, the weight 19 on the rope 19 is acting at its minimum radius while that on the rope 20 is acting at its maximum radius to counterbalance the runner. The ropes 19 and 20 pass over idle pulleys 23 and 24 respectively, to bring them clear of the lifting apparatus; these idle pulleys are omitted from Figure 3 for the sake of clearness.

The runners 2 are deposited in succession on the tables 1 at a point where they are clear of the gear employed to traverse it, and each is pushed from this point into engagement with its gear by means of an arm 25 (Figures 3, 4 and 5). This arm with the gear operating it, is employed only at the right-hand end of the apparatus, but it is duplicated at the other end of the runner. Projecting from each end of the runner is a bar 29 adapted to be engaged by the respective arm 28 when this is moved counter-clockwise (as viewed in Figure 4). The arm 25 with its operating gear is shown in Figure 5 from the same view-point as in Figure 4 but with the frame 5 and other apparatus omitted for the sake of clearness.

The arm 25 is fast on a shaft 26 on which is also fast a second arm 27 (Figures 3 and 5). Through a slot in the end of the arm 27 slides a rod 28 carrying a collar 29 and a spring 30 which latter, when the rod 28 is moved to the left, acts to press the arm 27 and with it the arm 25 to the left. The rod 28 is reciprocated by a crank 30 to which it is pivotally attached at 31, the crank 30 being in a shaft 32. This shaft is rotated by the driving shaft 33 through a train of gears shown diagrammatically on shafts 33, 34 and 35. By the rotation therefore of the driving shaft 33 the arm 25 is oscillated leftward under the pressure of the spring 29 and rightward by the collar 28, and its motion is timed so that, as soon as a runner is deposited on the tables, it presses it forward sufficiently to bring it into engagement with its traversing mechanism.

The runners 2 are traversed along the runway 4 by means of a driving chain 36 (Figures 1 and 4) which is duplicated on the other side of the apparatus and constitutes a conveyor. The chain 36 is provided with projections 37 that engage the bars 29 projecting from the runners. The chain 36 passes over a chain wheel 38 on a shaft 39, which is driven from the shaft 9 by a chain 40 and chain wheels 41 and 42 (Figure 3 and, diagrammatically, Figure 4).

The felt of the polishing runners are cleaned during the passage of the runners on the runway 4 by cleaning devices of any convenient form. Preferably these consist of water supply pipes 43, delivering jets of water against the surfaces of the felts, and rotating brushes 44, adapted to brush the surface of the felts, preferably under spring pressure.

The apparatus is preferably operated continuously, the speed of the shaft 9 being coordinated with that of the runner-traversing mechanism, and it operates automatically, each runner, at the end of its course, being lifted up and deposited on the runway and traversed along this over the cleaning apparatus which cleans its felts, to the starting end of the apparatus, where it is lifted off the runway, deposited on the tables and pushed into engagement with its traversing mechanism.

The invention is not confined to the apparatus shown and described, but may be carried out by different forms of lifting and conveying devices. Its essential feature is a lifting, conveying and cleaning apparatus, of which the cleaning apparatus operates during the travel of the runners on the conveying apparatus.

Having described my invention, I declare that what I claim and desire to secure by Letters Patent is:

1. In apparatus for the continuous polishing of glass in which both the glass carrying tables and the polishing runners travel, a conveyor located above the polishing apparatus
and adapted to convey the runners from the finish to the start of their operative course, a lifting device at the finishing end adapted to lift each runner off the tables and deposit it on the conveyor, a lifting device at the starting end adapted to lift each runner off the conveyor and deposit it over the tables and a felt cleaning device adapted to clean the felts of each runner during its travel on the conveyor.

2. In apparatus for the continuous polishing of glass in which both the glass carrying tables and the polishing runners travel, a conveyor located above the polishing apparatus and adapted to convey the runners from the finish to the start of their operative course, a lifting device at the finishing end adapted to lift each runner off the tables and deposit it on the conveyor, comprising a pivoted lifting arm which is oscillated from a position on one side of its upper dead centre to a position on the other side thereof, a similar lifting device at the starting end adapted to lift each runner off the conveyor and deposit it over the tables and a felt cleaning device adapted to clean the felts of each runner during its travel on the conveyor.

3. Apparatus as in claim 2 comprising two counterweights acting in opposition to each other at radii varying with the position of the arm and counterbalancing the weight of the lifting arm and runner.

4. Apparatus as in claim 1, comprising means whereby each runner is yieldingly pushed from the position in which it is deposited over the tables in the direction of its travel.

5. In apparatus for the continuous polishing of glass in which both the glass carrying tables and the polishing runners travel, a continuously working conveyor located above the polishing apparatus and adapted to convey the runners from the finish to the start of their operative course, a continuously operating lifting device at the finishing end adapted to lift each runner off the tables when the runner reaches the end of its course and deposit it on the conveyor, means whereby each runner is automatically engaged with and disengaged from the said lifting device, a continuously operating lifting device at the starting end, adapted to lift each runner off the conveyor when the runner reaches the end of its course thereon and deposit it over the tables, means whereby each runner is automatically engaged with and disengaged from the said lifting device and a felt cleaning device adapted to clean the felts of each runner during its travel on the conveyor.

6. Apparatus as in claim 5 comprising a continuously operating pushing device whereby each runner is yieldingly pushed from the position in which it is deposited over the tables in the direction of its travel.

In witness whereof I have affixed my signature hereunto.

CHARLES HEUZE.