

Oct. 31, 1939.

F. B. WALDRON ET AL  
GLASS POLISHING APPARATUS

2,178,504

Filed March 23, 1939

3 Sheets-Sheet 1

FIG. 1.

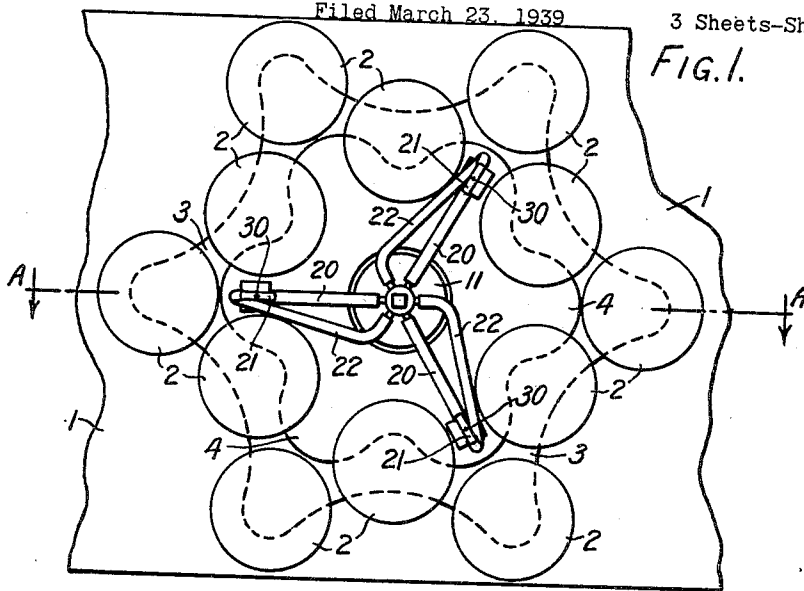


FIG. 3.

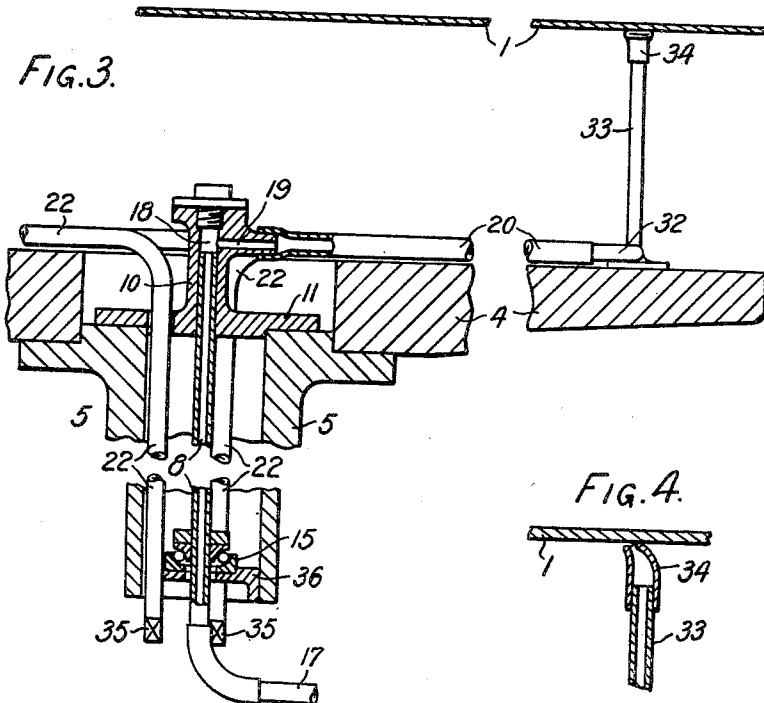
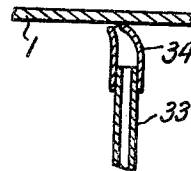


FIG. 4.



INVENTORS

Frederic Barnes Waldron  
James Harris Griffin  
By Morrison, Kennedy & Campbell,  
Attorneys.

Oct. 31, 1939.

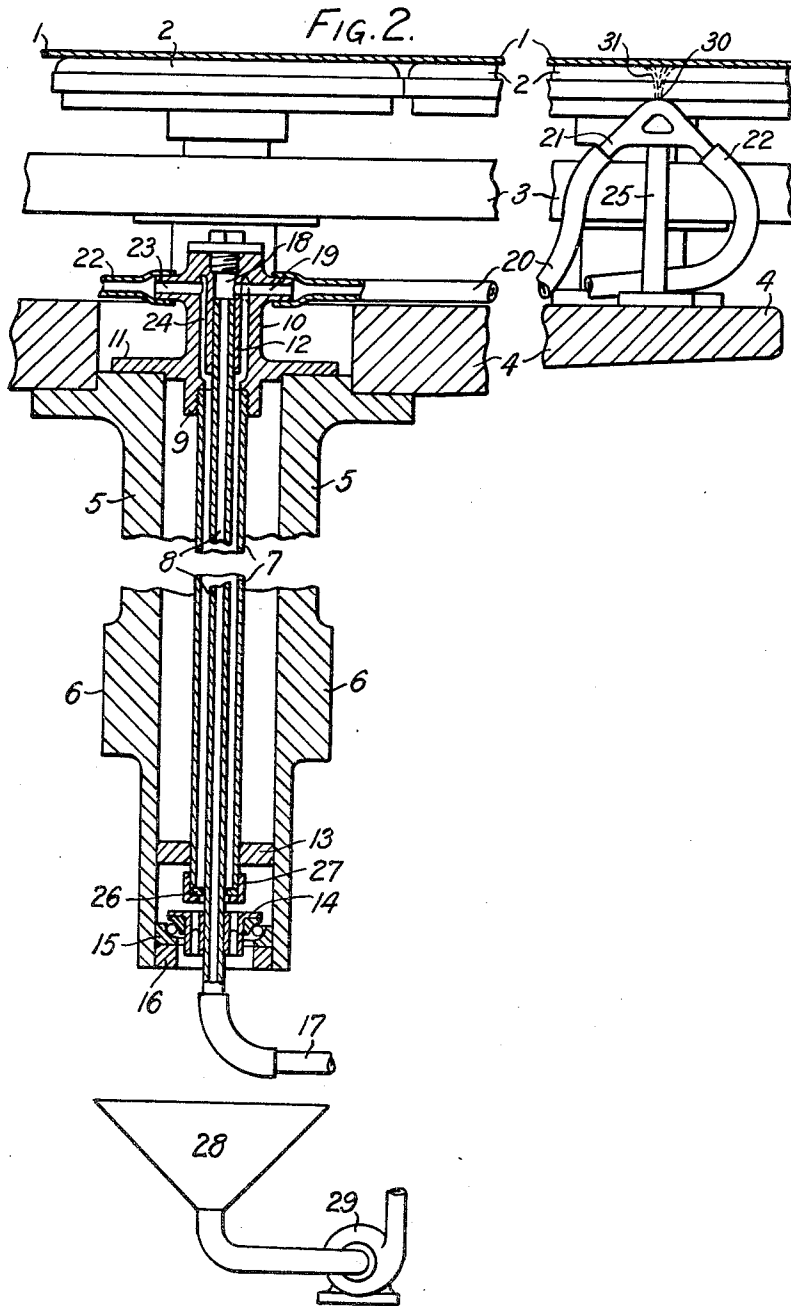
F. B. WALDRON ET AL

2,178,504

GLASS POLISHING APPARATUS

Filed March 23, 1939

3 Sheets-Sheet 2



INVENTORS

Frederic Barnes Waldron  
James Harris Griffin  
By Morrison, Kennedy, Campbell,  
Attorneys.

Oct. 31, 1939.

F. B. WALDRON ET AL

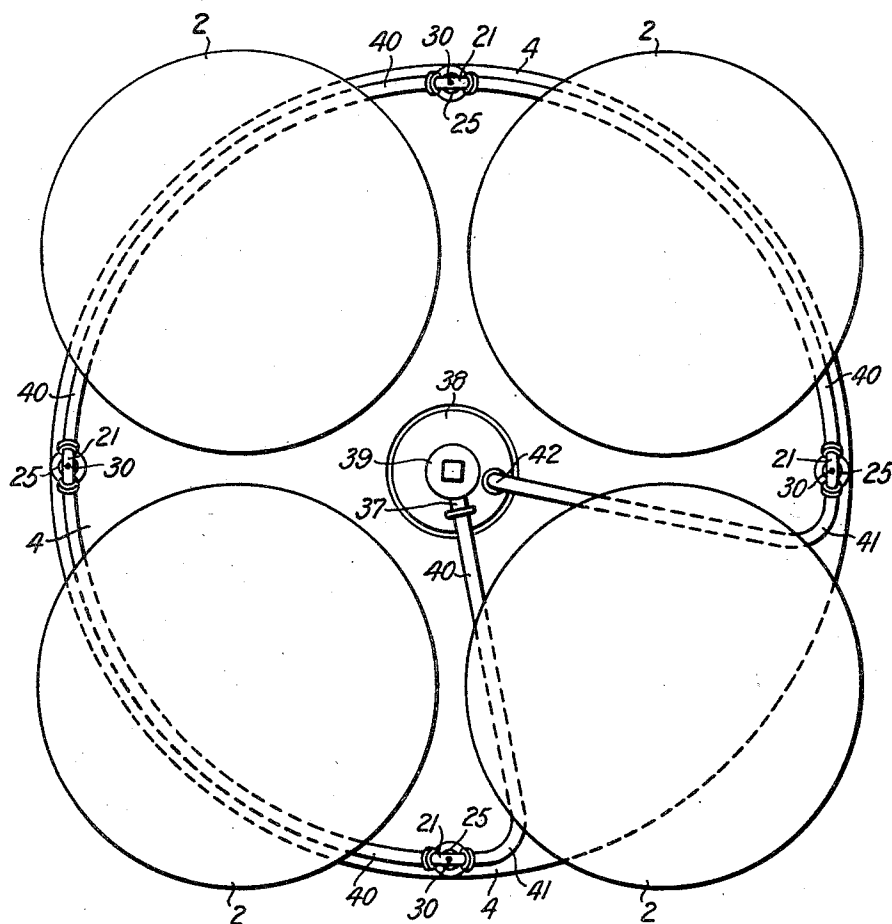
2,178,504

GLASS POLISHING APPARATUS

Filed March 23, 1939

3 Sheets-Sheet 3

FIG. 5.



INVENTORS

Frederic Barnes Waldron  
James Harris Griffin  
By Harrison, Kennedy & Campbell,  
Attorneys.

## UNITED STATES PATENT OFFICE

2,178,504

## GLASS POLISHING APPARATUS

Frederic Barnes Waldron, Prescott, and James  
Harris Griffin, St. Helens, England, assignors to  
Pilkington Brothers Limited, Liverpool, Eng-  
land, a British company

Application March 23, 1939, Serial No. 263,622  
In Great Britain March 24, 1938

6 Claims. (Cl. 51-263)

This invention relates to glass polishing apparatus operating on the underside of glass, and has for its object apparatus for supplying polishing medium to rotating polishing tools.

The polishing medium commonly used is rouge and water and in this specification the word rouge will be used to designate any suitable polishing medium. Each rotating polishing tool comprises a plurality of discs rubbing on the glass, and the rouge and water has to be supplied to the glass in the spaces between the polishing discs.

Rouge tends to settle in the water with which it is mixed, and is then liable to choke up any pipe or conduit unless the flow of water is rapid enough to keep the rouge in suspension.

According to the invention, rouge and water is continuously passed through a conduit system which comprises a main supply pipe passing up the shaft of the polishing tool and from the main supply pipe a supply pipe extends to each point at which rouge and water is to be supplied and continues as a return pipe to return rouge and water to the bore of the shaft. An aperture is formed in each supply pipe at each said point and pressure is maintained in each supply pipe whereby rouge and water is forced out of each aperture to reach the glass.

In the accompanying drawings:

Figure 1 is a plan view of a polishing tool seen through the glass strip above it;

Figure 2 is a vertical section through the polishing tool along the line A-A of Figure 1;

Figure 3 is a similar section showing an alternative form of the invention, the polishing discs being omitted;

Figure 4 is a section through the form of nozzle shown in Figure 3 on an enlarged scale; and

Figure 5 is a plan view showing an alternative form of the invention.

Referring to Figures 1 and 2, the underside of the glass strip 1 is polished by the felt covered discs 2 on the frame 3, which is attached to the disc 4, carried on the hollow shaft 5. The shaft 5 is supported and rotated by means attached at 6 which are not shown. Two concentric tubes, an outer 7 and an inner 8, pass through the shaft 5. The outer tube 7 is screwed into the lower part 9 of a distributing box 10, which is fixed to the shaft 5 by the flange 11. The outer tube 7, therefore, is fixed to and rotates with the shaft. The inner tube 8 is stationary and fits in the inner sleeve 12 of the box 10, which can turn about it. At the lower end of

the shaft 5, the outer tube 7 is supported laterally by the ring 13, while the inner tube 8 carries a spider 14 supported on a ball bearing 15 carried on a ring 16 within the shaft. The inner tube 8 which is the main supply pipe, is connected with a pipe 17 from which rouge and water are supplied.

In the distributing box 10, the inner tube 8 terminates in a space 18 having three outlets 19, to each of which a rubber supply pipe 20 is connected. Each pipe 20 leads to one branch of an inverted V tube 21 supported on the disc 4 by a column 25, and from the other branch a rubber return pipe 22 leads back to an inlet 23 into the distributing box 10. The three inlets 23 communicate with an annular space 24 in the box 10, which leads into the space between the inner tube 8 and the outer tube 7.

The rouge and water supplied by the pipe 17 thus passes up the main supply pipe 8 to the distributing box 10, and from there through the three supply pipes 20, the three V tubes 21 and return pipes 22 to the space 24 in the distributing box and thence into the space between the outer tube 7 and inner tube 8 which forms the main return pipe. The lower end of the tube 7 carries a washer 26, held to it by a screw cap 27, the washer leaving a restricted annular space outside the inner tube, through which the rouge and water issues and then passes through the spider 14 into a sump shown diagrammatically at 28 from which it can be circulated by the pump 29 back to the pipe 17.

At the point of each inverted V tube 21 a jet hole 30 is formed, through which rouge and water passing through the tube can issue in the form of a jet 31 to strike against the underside of the glass 1.

In operation the rouge and water is kept in continual circulation through the pipes and distributor box at a rate sufficient to prevent any deposition of rouge and a sufficient pressure is maintained in the V tubes 21 to produce jets of rouge which strike against the underside of the glass. The pressure at these points can be adjusted by varying the size of the outlet at the bottom of the tube 7, that is to say, by varying the annular space between the washer 26 and the inner tube 8. Also for a given size of outlet, the pressure can be varied by varying the rate of circulation of the rouge and water. By these means, therefore, the amount of rouge and water issuing from the jet holes 30 can be adjusted.

The rouge and water can be supplied by the

invention at any desired points between the polishing discs, and at any desired number of points. When supplied as shown, at points close to polishing discs, there is no waste of rouge by reason of the rouge and water dripping off the glass, because the rouge and water splashed on to the glass by the jets is immediately caught by a polishing disc and spread over the glass and felt.

The construction avoids the use of any gland on the return tube 7 and of any gland which has to be kept leakage-proof on the main supply tube 8, because any leakage between the inner tube 8 and the sleeve 12 is into the return pipe, and is harmless. The inner tube 8 may, however, be fixed to the distributor box so as to rotate with the tool, and then a gland must be provided to afford a supply connection at its lower end.

Figure 3 shows an alternative arrangement of the return pipes and an alternative form of nozzle for supply of rouge and water to the glass, Figure 4 being a section of the nozzle to an enlarged scale. This form of nozzle is equally applicable to the arrangement of Figure 2. The supply pipes 20 and the return pipes 22 are connected to a bent pipe 32 fixed to the disc 4. A vertical branch pipe 33 rises from the pipe 32 and terminates in a rubber nozzle 34 (Figure 4) which rubs against the glass and has its outlet restricted to a narrow slot by pressure against the glass.

Each return pipe 22 is carried down the bore of the shaft 5, passing through holes in the flange 11 of the distributor box, and terminates in a valve 35, by which the pressure in each pipe may be adjusted. The ball bearing 15 supporting the inner tube 8 is then carried on a spider 36 fixed to the shaft 5, provided with holes for the return pipes 22.

Alternatively, the bore of the shaft 5 may be used as the main return pipe, the ball bearing 15 being protected by a cap, and in this case the return pipes 22 may terminate at any point in the bore, or may terminate in a trough about the distributor box. The radius of the trough, however, must not be so great that the centrifugal force on the rouge and water equals the force of gravity tending to carry the rouge and water into the bore of the pipe.

Figure 5 shows an alternative arrangement of supply and return pipes applied to a polishing tool with a different arrangement of polishing discs 2. The main supply pipe passing up the shaft of the tool terminates at a box 39 attached to the shaft by the flange 38. From a side tube 37 on the box a supply pipe 40 passes round the periphery of the disc 4 and is connected with a return pipe 41, which passes down the shaft at 42. The rouge and water is circulated through this conduit system as in the previously described arrangements.

At points between the polishing discs, where rouge and water is to be supplied to the glass, the supply pipe 40 is connected to inverted V tubes 21, as in Figure 2, which are supported on the disc 4 by columns 25, so that the points of the V tube are close below the glass. At the point of each V tube is an aperture 30 through which a jet of rouge and water is forced against the glass. If the resistance to the flow of rouge and water through the return pipe is made large (as by the valve 35 of Figure 3) compared with the resistance in the supply pipe 40, the pressure in this pipe at each of the four V pipes 21 will be substantially the same.

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

1. In apparatus for polishing the underside of horizontal flat glass the combination with a rotatable polishing tool with hollow shaft and a plurality of polishing discs mounted thereon, of a conduit system and means for circulating rouge and water therethrough, comprising a main supply pipe passing up the bore of the shaft of the tool, at least one distributing pipe therefrom extending to a radius at which rouge and water is to be supplied to the glass, the said distributing supply pipe being connected with a return pipe to return rouge and water to the bore of the shaft, at least one aperture in the distributing supply pipe at the point at which rouge and water is to be supplied and means for maintaining pressure in the supply pipes to force rouge and water through the aperture towards the underside of the glass.

2. In apparatus for polishing the underside of horizontal flat glass the combination with a rotatable polishing tool with hollow shaft and a plurality of polishing discs mounted thereon, of a conduit system and means for circulating rouge and water therethrough, comprising a main supply pipe passing up the bore of the shaft of the tool to a central space in a distributing box at the upper end of the shaft, a plurality of distributing supply pipes connected with the central space in the distributing box, each distributing supply pipe extending to a radius at which rouge and water is to be supplied to the glass, and continuing as a return pipe to return rouge and water to the bore of the shaft and being provided with an aperture at a point at which rouge and water is to be supplied, and means for maintaining pressure in the supply pipes to force rouge and water through each aperture towards the underside of the glass.

3. In apparatus for polishing the underside of horizontal flat glass the combination with a rotatable polishing tool with hollow shaft and a plurality of polishing discs mounted thereon, of a conduit system and means for circulating rouge and water therethrough, comprising a main supply pipe passing up the bore of the shaft of the tool to a central space in a distributing box at the upper end of the shaft, a plurality of distributing supply pipes connected with the central space in the distributing box, each distributing supply pipe extending to a radius at which rouge and water is to be supplied to the glass, and continuing as a return pipe to return rouge and water to the distributing box, an annular space in the distributing box to which each return pipe is connected, and a main return pipe connected with the annular space and passing down the bore of the shaft, outside and concentric with the main supply pipe, an aperture in each distributing supply pipe at a point at which rouge and water is to be supplied and means for maintaining pressure in the supply pipes to force rouge and water through each aperture towards the underside of the glass.

4. In apparatus for polishing the underside of horizontal flat glass the combination with a rotatable polishing tool with hollow shaft and a plurality of polishing discs mounted thereon, of a conduit system and means for circulating rouge and water therethrough, comprising a main supply pipe passing up the bore of the shaft of the tool to a distributing box at the upper end of the shaft, a plurality of distributing supply

5 pipes connected with the distributing box, each  
distributing supply pipe extending to a radius  
at which rouge and water is to be supplied to  
the glass and continuing as a return pipe pass-  
5 ing into and down the bore of the shaft, and  
being provided with an aperture at a point at  
which rouge and water is to be supplied, and  
means for maintaining pressure in the supply  
pipes to force rouge and water through each  
10 aperture towards the underside of the glass.

5 10 15 20 5. In apparatus for polishing the underside of  
horizontal flat glass the combination with a ro-  
tatable polishing tool with hollow shaft and a  
plurality of polishing discs mounted thereon, of  
a conduit system and means for circulating rouge  
and water therethrough, comprising a main sup-  
ply pipe passing up the bore of the shaft of the  
tool, at least one distributing pipe therefrom  
extending to a radius at which rouge and water  
is to be supplied to the glass and upwardly to  
a level close below the glass, the said distribut-  
ing supply pipe continuing as a return pipe to  
return rouge and water to the bore of the shaft,

an aperture in the distributing supply pipe where  
it is close below the glass, and means for main-  
taining pressure in the supply pipe to force a  
jet of rouge and water through the aperture to  
strike the underside of the glass.

5 10 15 20 6. In apparatus for polishing the underside of  
horizontal flat glass the combination with a ro-  
tatable polishing tool with hollow shaft and a  
plurality of polishing discs mounted thereon, of  
a conduit system and means for circulating rouge  
and water therethrough, comprising a main sup-  
ply pipe passing up the bore of the shaft of the  
tool, a distributing supply pipe therefrom ex-  
tending to a radius at which rouge and water is  
to be supplied to the glass, and continuing as a  
return pipe to return rouge and water to the bore  
of the shaft, a plurality of apertures in the dis-  
tributing supply pipe, and means for maintain-  
ing pressure in the supply pipes to force rouge  
and water through each aperture towards the  
underside of the glass.

FREDERIC BARNES WALDRON.  
JAMES HARRIS GRIFFIN.