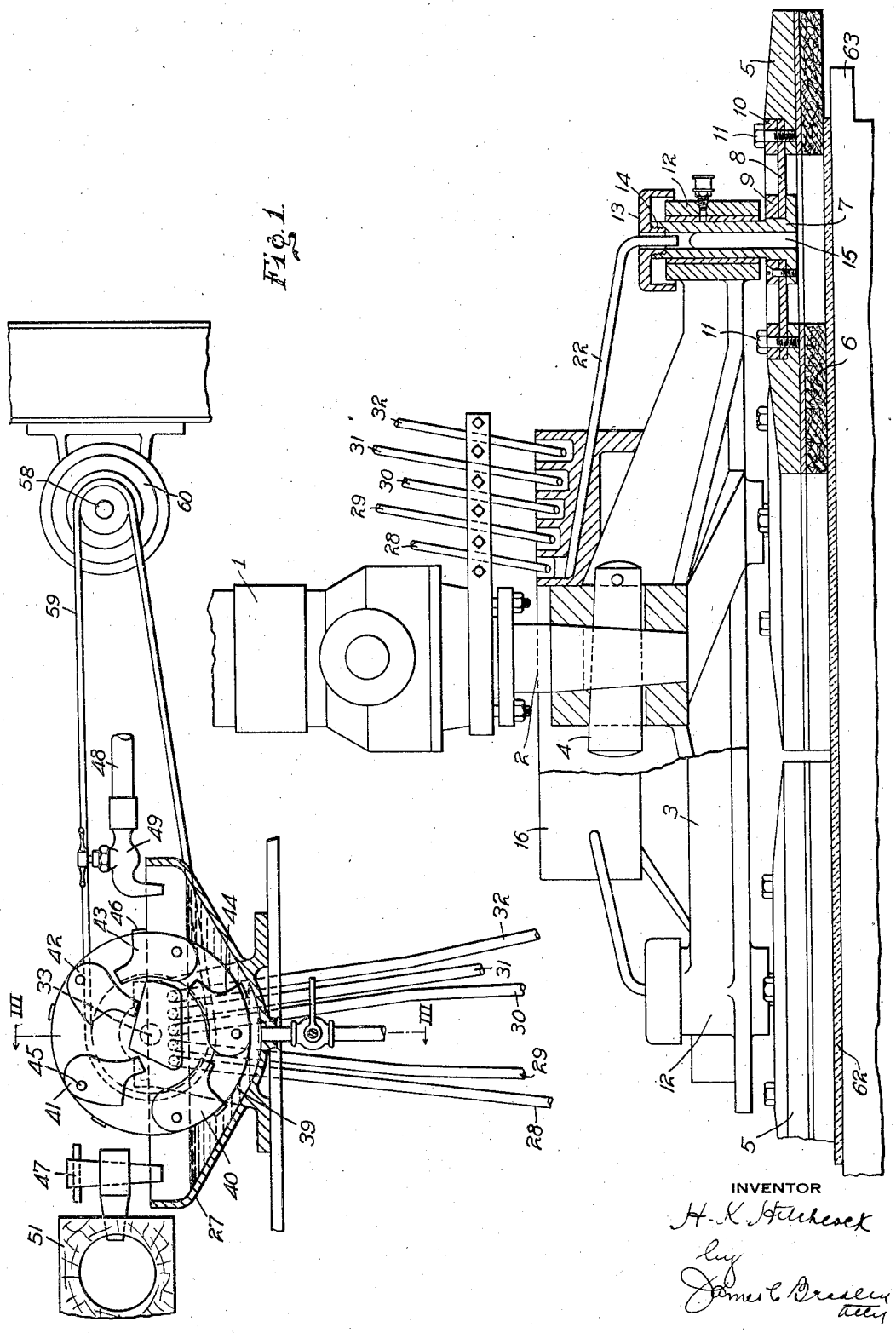
July 29, 1930. H. K. HITCHCOCK 1,771,408

PROCESS AND APPARATUS FOR POLISHING PLATE GLASS

Original Filed Oct. 29, 1923 4 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

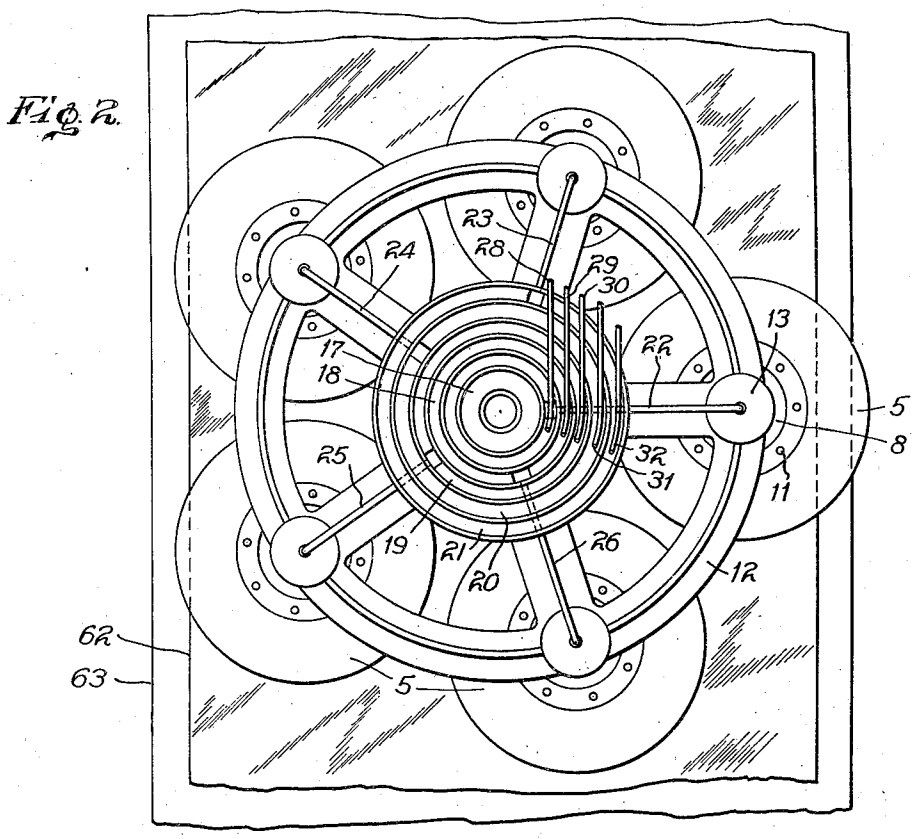
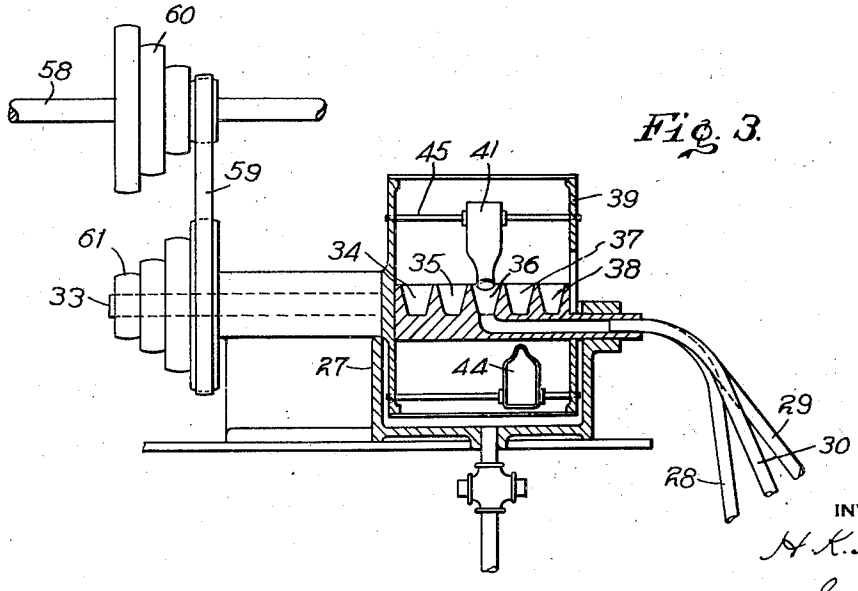


Fig. 3.



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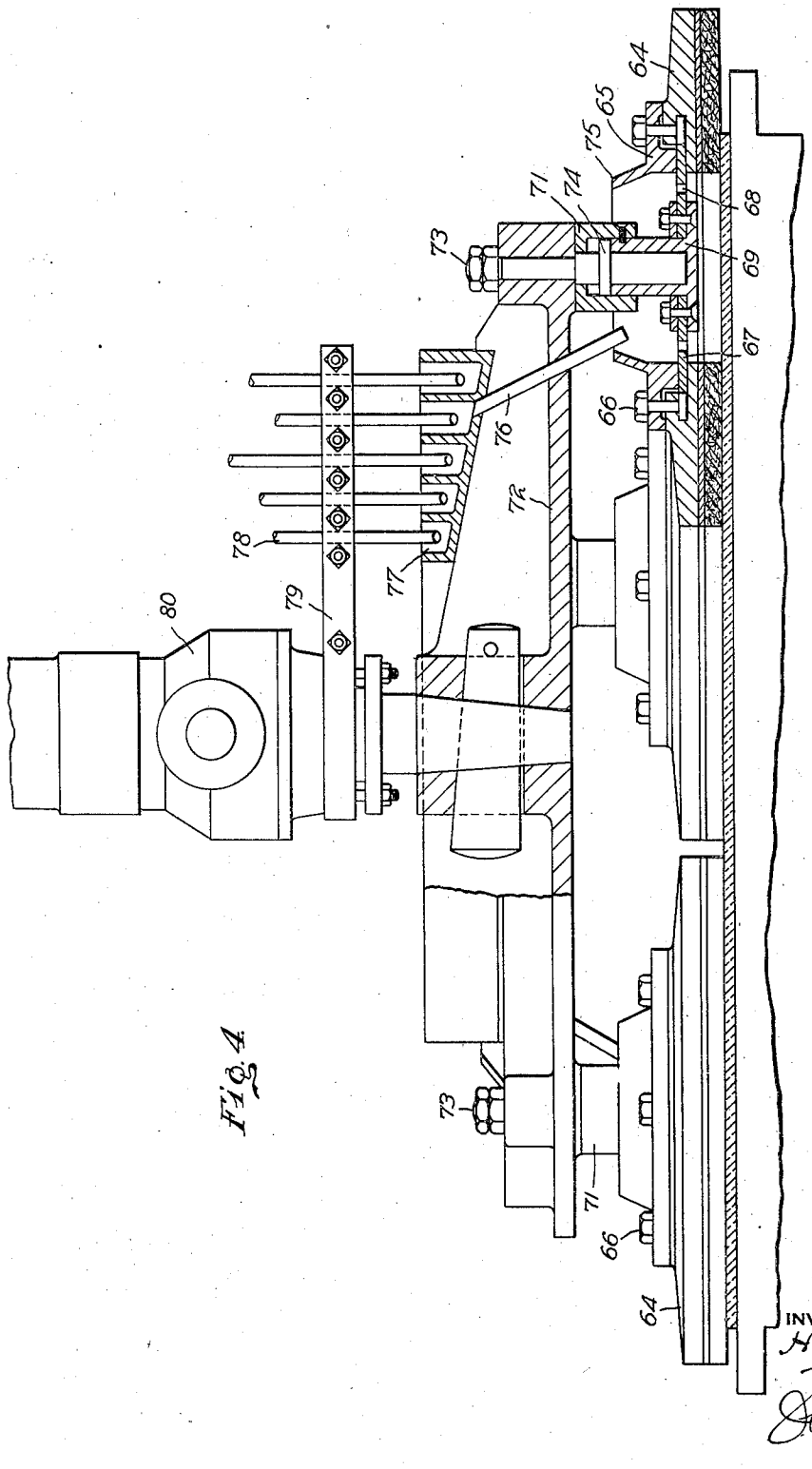


Fig. 4

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PROCESS AND APPARATUS FOR POLISHING PLATE GLASS

Original Filed Oct. 29, 1923 4 Sheets-Sheet 4

Fig. 5.

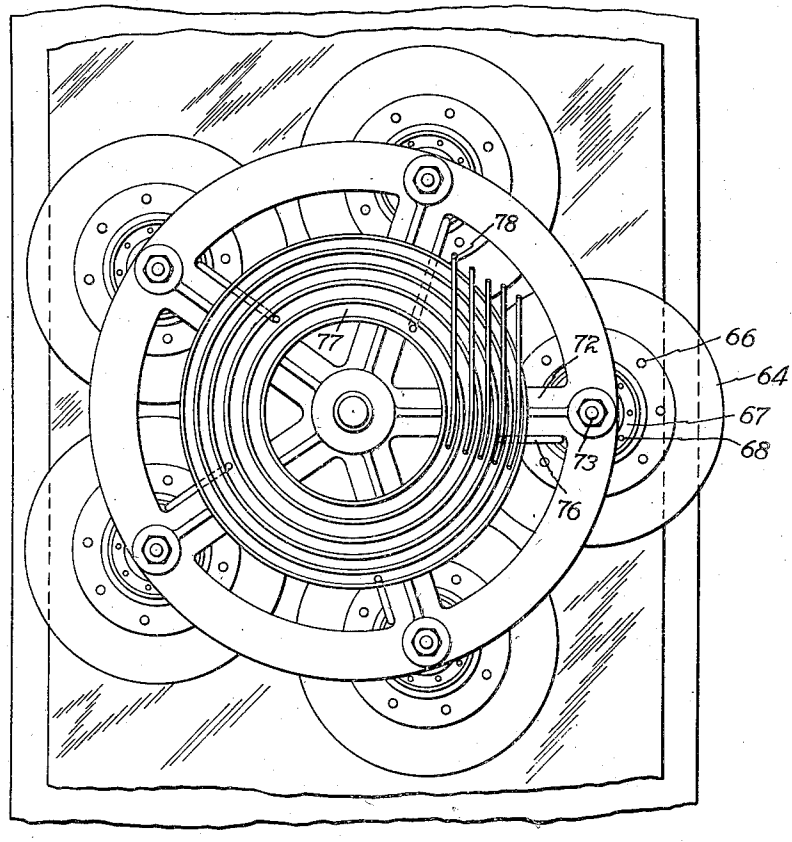
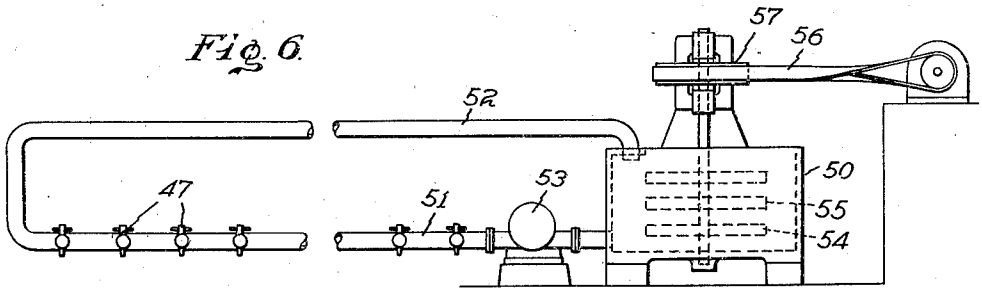


Fig. 6.



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UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR POLISHING PLATE GLASS

Original application filed October 23, 1923, Serial No. 671,374. Divided and this application filed April 7, 1928. Serial No. 268,147.

The invention relates to a process and apparatus for polishing glass, the present application constituting a division of my application, Serial No. 671,374. It is designed for use in connection with the so-called straight-away surfacing operation and has for its primary objects, the provision of a process and apparatus whereby the consistency of the rouge mixture is varied the length of travel of the glass to be polished, and whereby the felts are satisfactorily cleaned without interfering with or interrupting the polishing operation. One form of the apparatus is shown in the accompanying drawings, wherein:

Figure 1 is a vertical section through one form of apparatus. Fig. 2 is a plan view of the apparatus of Fig. 1. Fig. 3 is a section on the line III—III of Fig. 1. Fig. 4 is a vertical section through a modified form of the apparatus. Fig. 5 is a plan view of the apparatus of Fig. 4. And Fig. 6 is a diagrammatic side elevation view partially in section showing the method of circulating and mixing the rouge and water.

Referring to the construction of Figs. 1, 2 and 3, 1 is the spindle housing in which is mounted the spindle 2 which projects from the lower end of the housing and is secured to the runner frame 3 by means of the key 4. The runner frame is preferably a steel casting of the skeleton form indicated in Fig. 2 and carries five runner blocks 5, although this number may be varied to suit requirements, it being preferred, however, to use runner blocks of relatively large diameter as compared with those ordinarily used so that a less number are used than if smaller runner blocks were employed.

The runner blocks are of annular form, as indicated in Fig. 1 and carry upon their lower sides the annular discs 6 of felt or other yielding material suitable for use with rouge or other polishing material, such felt being preferably secured to the runner blocks by means of water proof cement. The runner blocks are provided with hollow shafts 7 which are secured to such blocks by means of rubber diaphragms 8 clamped at their inner edges to the flanges of the shafts by means of the collars 9 held in place by screws or bolts and at their outer edges by means of the collars 10 held in place by the bolts 11. The shafts are journaled in the bearings 12, provided with suitable bushings, and disengagement of the shafts from the bearings, when the runner frame is raised, is prevented by means of the caps 13 which are screwed down into the ends of the shafts as indicated at 14. The perforations 15 through the centers of the shafts provide conduits for the passage of a polishing mixture to the spaces at the centers of the blocks, and the diaphragms 8 prevent any splashing or loss of the polishing mixture.

Mounted upon the top of the runner frame is a casting 16 provided with the five annular troughs 17, 18, 19, 20 and 21 which communicate with the passages 15 through the runner block shafts by means of the pipes 22, 23, 24, 25 and 26. These annular troughs are supplied from the container 27 by means of the pipes 28, 29, 30, 31 and 32.

Secured in fixed position in the container 27 is a transverse box 33 divided up into five compartments 34, 35, 36, 37 and 38, each of which communicates with one of the pipes as indicated in Fig. 3 which shows the connection of the compartment 36 with the pipe 30. The compartments are supplied intermittently with the rouge mixture in the container 27 by means of the wheel 39 mounted for rotation and provided with the five buckets 40, 41, 42, 43 and 44 mounted to swing freely on the rods 45 extending between the sides of the wheel, these buckets being arranged in different vertical planes, so that each one supplies one of the compartments 34, 35, 36, 37 and 38. The swinging movement of the buckets in one direction is stopped by means of the stop members 46 on the periphery of the wheel, so that upon the rotation of the wheel in the direction indicated by the arrow in Fig. 1, each bucket scoops up a quantity of the polishing mixture, and when it arrives at the position of the bucket 42 in Fig. 1, the contents is dumped into a compartment in the box 33.

The container 27 is supplied with a mixture of rouge and water or other polishing mate-

rial through the spigot 47, and a water pipe 48 is also provided to give an independent supply of water, such pipe being controlled by means of the valve 49. The method of supplying the mixture to the pipe 47 is illustrated diagrammatically in Fig. 6 in which 50 is a mixing tank or laxivator provided with a circulation main 51 leading from the bottom and having its other end leading back into the top of the tank as indicated at 52. A circulation of the mixture is secured by means of a pump 53. Proper proportions of rouge and water are supplied to the tank and the mixture is kept agitated and thoroughly mixed by means of paddles 54 carried by the shaft 55, such shaft being driven by the belt 56 passing around a pulley 57 on the upper end of the shaft, or by any other suitable means. Leading from the main 51 are the spigots 47 which go to the various polishing machines. This method of circulation and mixing insures that the water and rouge will be thoroughly mixed and that the mixture furnished to all of the polishing machines through the spigots 47 will be the same. The main 51 is preferably made of wood as are also the spigots 47 in order to resist the action of the rouge composition, which is acid in character, although corrosion resisting metal might be used. The main is preferably carried along over the various machines so that the spigots can discharge directly into the containers 27. There is thus little danger of the mixture clogging in its passage from the main to the container, and if this occurs, the difficulty may be quickly removed by removing the spigot and inserting a new one. The wheel 39 is driven from the countershaft 58 by means of the belt 59 (Fig. 3), the step pulleys 60 and 61 being employed so that the speed of rotation of the wheel may be regulated to give any desired interval of feed and to regulate the amount of feed. The amount of feed may also be varied by varying the level of the liquid in the container 27.

As indicated in Fig. 2, the glass sheet 62 which is being polished is carried upon a table or car 63, and the width of the glass is such that the runner blocks overhang the edge of the glass when the runners are in their side positions. This arrangement of overhang provides a means for cleaning the blocks which, in a continuous operation such as this, would otherwise cake up with rouge and with particles of glass and become ineffective in the course of time. By means of the feed arrangement as heretofore described, a mixture of rouge and water is supplied to each runner at separated intervals, and when a discharge of this mixture occurs to a runner block, its surface is so softened that the rouge is readily scraped off as the runner passes over the edges of the glass sheet. The interval of feed is so arranged that this cleaning effect is secured only when necessary so that the rouge is not scraped off before it has had an opportunity to do the amount of polishing work which it should do. If it is necessary to give the felts a more thorough cleaning than is afforded by the intermittent discharge of rouge and water, this may be accomplished by diluting the mixture in the container 27 so that it is very thin or by using only water in the container for a short time.

The discharge of the rouge mixture to the centers of the runners is advantageous, since there is no waste and the rouge in order to escape from beneath the felt must pass between the felt and the glass. The annular felt thus acts somewhat as a brush distributing the rouge mixture over the surface of the glass so that there is a minimum amount of waste incident to the mixture flowing off of the side of the table. This feature and the supplying of the rouge beneath the diaphragms 8 promotes economy in the use of polishing material and assists in preventing an accumulation of rouge over the surface of the runner frame and blocks and protecting the bearings and other parts from the corroding action of the rouge mixture. In this connection, the hollow shafts 7 are preferably made of some acid resisting composition so that they will last for a long period despite the corroding action of the rouge mixture.

The method of feed, including the arrangement illustrated in Fig. 6 is also of advantage since it permits all of the machines of a series to be fed from the container or tank 50. The various machines of a series require a mixture containing a less and less proportion of rouge as the polishing progresses, and this condition may be readily secured in the apparatus as above described by supplying a rouge mixture of the same character to all of the containers 27 by means of the spigots 47 and then utilizing the water pipes 48 to dilute the mixture to the proper consistency for the particular polishing stage for which the machine is being used.

If desired, the excess water to give the necessary dilution may be supplied to the stream of rouge mixture anywhere along its line of travel to the table or may be supplied to the table, itself, the result being the same in all cases. The volumes of rouge mixture which are intermittently supplied to the polishing felts are of relatively large volume somewhat in excess of that required for polishing and well spaced apart in period of time, so that each time the mixture is applied, the felts are well soaked throughout, resulting in the washing away or loosening of used rouge, which tends to become caked on the surfaces of the felts, so that the formation of a relatively hard surface is avoided. This is desirable, as any hard particles caught by

the felts will scratch the glass if the surfaces of the felts are hard and glazed, but will not do so if the surfaces are relatively soft as the hard particles will sink into the soft surface. In intermittent polishing operation, the formation of the hard glazed surfaces are avoided by applying quantities of water either at the beginning or end of the operation, but this is not feasible in a continuous operation, as the application of water alone at intervals sufficient to clean the felts would result in an underpolish of that portion of the glass passing beneath the polishers at the time the water is applied. The present procedure of applying the rouge mixture at intervals in relatively large volumes keeps the rouge coating on the felts soft, so that it is not necessary to remove and clean them. The old rouge is either washed off by the volumes of mixture or else so loosened that it becomes detached, and a fresh, relatively soft coating or surface is reestablished.

Figs. 4 and 5 illustrate a modification, such modification relating to the runner block construction and the method of supplying the rouge mixture from the annular troughs to the blocks, the other parts of the apparatus being the same as described in connection with the apparatus of Figs. 1 to 3, and being similarly numbered. In this type of construction, the runner block 64 is provided with an annular clamp 65 held by the bolts 66, and between this clamp and the block is secured a rubber diaphragm 67 corresponding to the diaphragms 8 of Fig. 1, but provided with perforations 68, the inner edge of the diaphragm being clamped to the sleeve 69 by means of the bolts 70. The upper end of the sleeve 69 is threaded to a cap 71 and this cap is secured against the lower side of the runner frame 72 by means of the bolt 73 which has a collar or shoulder 74 fitting between the top of the sleeve 69 and the flange on the cap 71. The lower portion of the bolt 73 acts as a spindle or pivot, the sleeve 69 serving as the bearing therefor. The clamp 65 is provided with a splash wall 75 and the space inside of this wall is fed with a rouge mixture from the pipe 76 leading from one of the annular troughs or grooves 77, such troughs or grooves being fed by means of the pipes 78 corresponding to the pipes 28 to 32 of the Fig. 1 construction. In this construction as in that of Fig. 1, the diaphragm which connects the runner block to the spindle is relatively flexible so that the runner block can adjust itself to the surface of the glass. Also in this construction as in that of Fig. 1, the lower ends of the pipes leading to the annular troughs are supported by means of a bracket 79 clamped around the lower end of the spindle housing.

What I claim is:

1. Process of supplying a polishing mixture to the felts of a plurality of polishing machines arranged in series for a straight away operation, which comprises mixing a body of water and polishing material, agitating the mixture, and withdrawing volumes of the mixture in excess of the amount required for polishing at predetermined intervals and supplying such volumes in a heavy flow to the separate machines so as to soften and wash away the coating of old or used rouge caked on the felts and then to reestablish a new coating on the felts from the mixture thus supplied.

2. Apparatus for supplying a polishing mixture to a plurality of polishing machines arranged in series for a straight away operation, which comprises a container for a mixture of polishing material and water, means for agitating the mixture, means for continuously circulating the mixture through a conduit extending along the series of machines and returning to said container, means for withdrawing the mixture from a plurality of points along the conduit, means for diluting the mixture drawn from said points to varying degrees of density, and means for supplying the mixtures to the successive polishing machines, the mixture of greater density being supplied to the first of the series of machines, and the mixtures of less and less density to the succeeding machines.

In testimony whereof, I have hereunto subscribed my name this 13th day of March, 1928.

H. K. HITCHCOCK.