C. L. SMITH.

APPARATUS FOR POLISHING PLATE GLASS.

APPLICATION FILED SEPT. 24, 1913.

1,125,751.

Patented Jan. 19, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

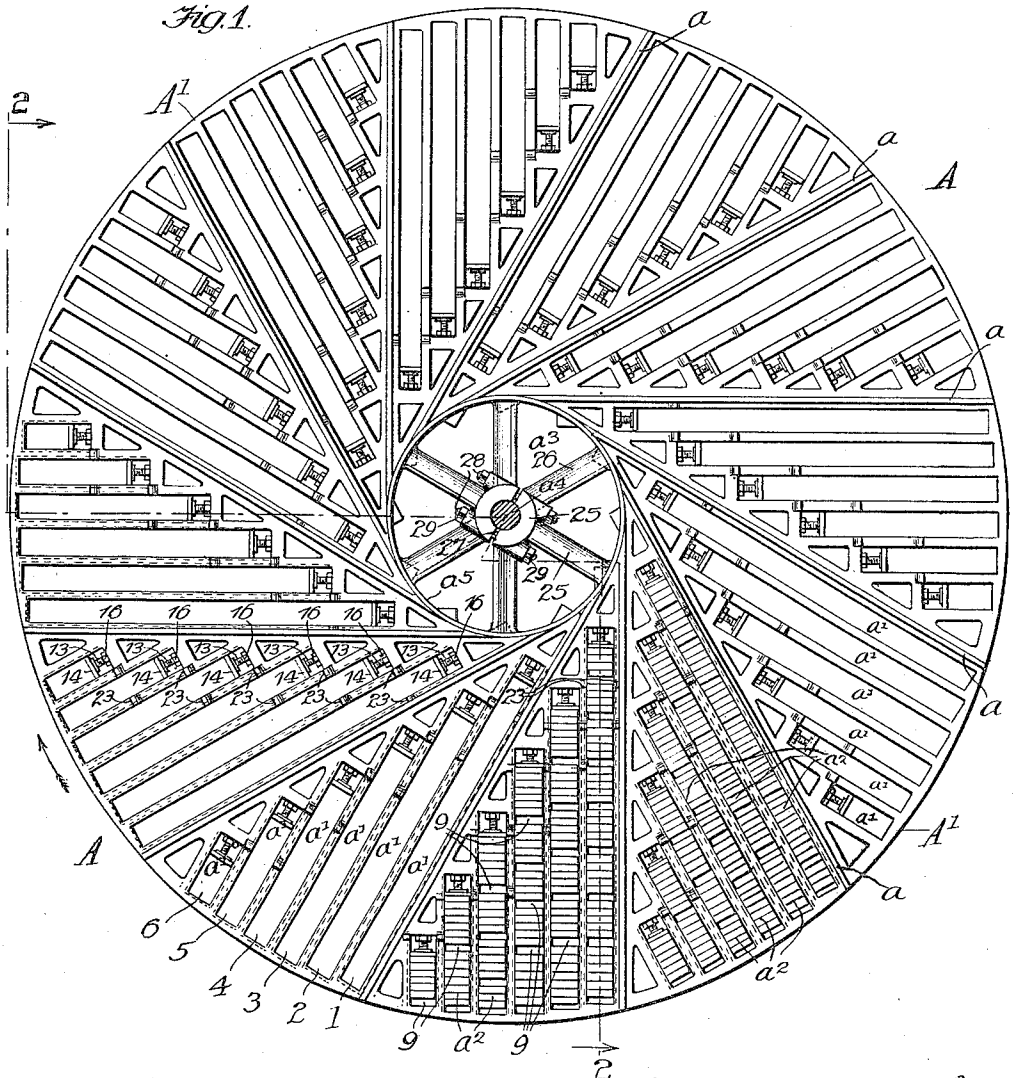
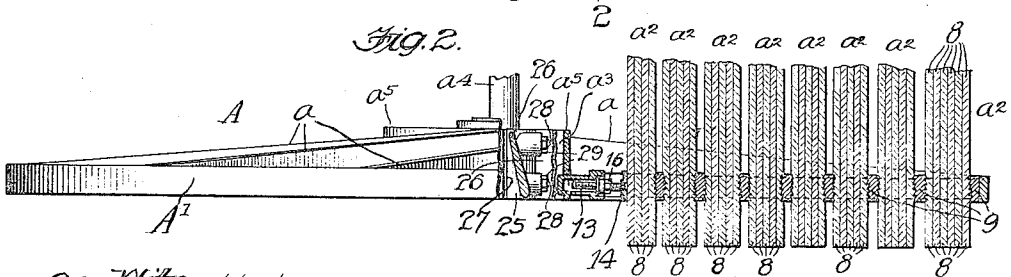


Fig. 2.



Witnesses
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2 SHEETS—SHEET 2.

Fig. 3.

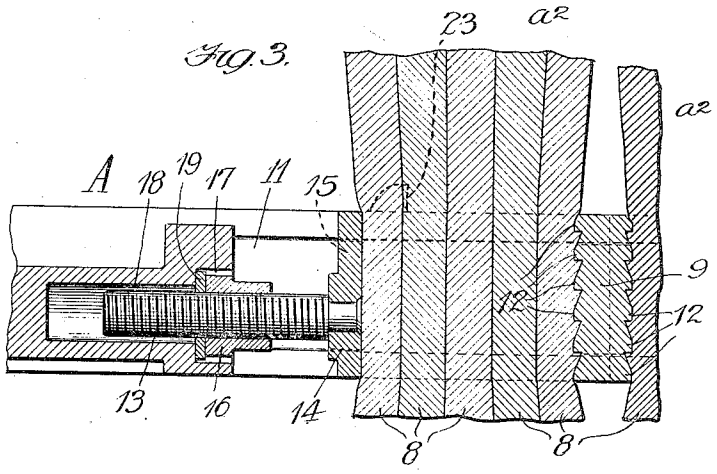


Fig. 4.

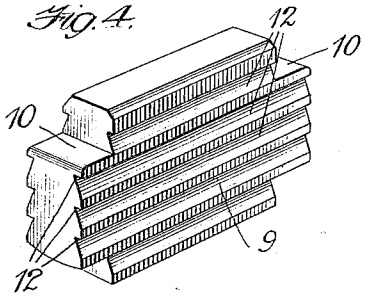


Fig. 5.

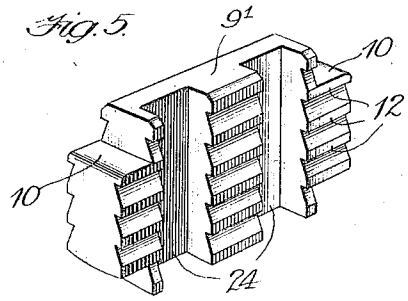


Fig. 6

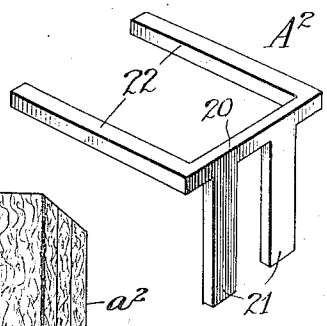
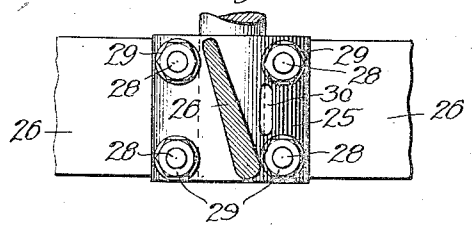


Fig. 7.



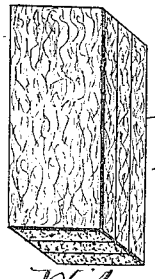
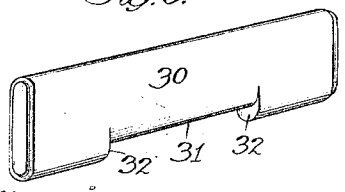


Fig. 9.

Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

CARLTON L. SMITH, OF SAGINAW, MICHIGAN.

APPARATUS FOR POLISHING PLATE-GLASS.

1,125,751. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed September 24, 1913. Serial No. 791,521.

To all whom it may concern:

Be it known that I, CARLTON L. SMITH, a citizen of the United States, and a resident of Saginaw, in the county of Saginaw and State of Michigan, have invented a certain new and useful Improvement in Apparatus for Polishing Plate-Glass, of which the following is a specification.

This invention relates to machines or apparatus for polishing plate glass and relates particularly to polishing runners for such machines.

In machines of the type to which my invention relates, the glass plates to be polished are laid flat upon a large deck or table, mounted above which, so as to be rotatable upon a vertical axis, is a skeleton frame or spider, provided with bearings which extend substantially parallel with the axis of said frame or spider, and which are adapted to receive the spindles of the polishing disks, which are made of cast iron and have their lower faces covered with felt pads which, in the operation of the machine, rest and slide upon the glass to be polished. Preferable means for thus securing the felt to the polishing disks consist of clamping rings loosely fitted to the sides of the polishing disks between which and the edges of said polishing disks the corners of said felt are clamped. In the operation of the machine, the deck or table on which the glass is supported is rotated positively by driving connection with a source of power, the frictional engagement of the polishing disks with the glass operating to impart rotation to said disks and also to the frame or spider in which they are mounted, on their respective axes. The polishing disks are of considerable size, usually about eighteen inches in diameter, and the felt covered faces thereof lie flat upon the glass upon which they are operating. In the operation of the machine, the water and abrasive are delivered upon the glass outside of said polishing disks, and owing to the considerable size of said disks and the centrifugal action thereof in operation, considerable time is required for the water and abrasive to work from the outer edges of said polishing disks to their centers, thus correspondingly impairing the efficiency thereof. The efficiency of the machine is further impaired by the limited area of felt which is in contact with the glass, which is due to the manner of spacing said polishing disks. Polishing machines of this type, as at present constructed, are objectionable for the further reason that the glass, while being polished, sustains the full weight of said polishing disks during the entire polishing operation, whereas, it is recognized that with a pressure, varying from the full pressure of the polishing disks at the beginning of the operation to a very light, delicate pressure at the end of the operation, the machine will do more and better work.

The object of the present invention is to overcome the foregoing objectionable features, first, by providing one or more, preferably two, polishing disks or runners of different diameters, both of which are relatively much larger than the polishing disks heretofore generally used, secured in and projecting from the under face of which is a multiplicity of relatively very small felt pads, which are separated from each other both radially and circumferentially of said runners, thus forming channels or passageways between said pads which will give the water and abrasive used in the polishing operation free access to all parts of the polishing surface of said runner and to all of said pads. Also, owing to the small size of said pads, the water and abrasive will reach all parts thereof in contact with the glass in a very short time, thus developing the full efficiency thereof practically from the beginning of the polishing operation.

A further object of the invention is to provide a disk or runner for polishing plate glass so constructed that the felt will be presented to the glass edgewise instead of flatwise. By "edgewise" as used herein, I mean crosswise of the fiber, so that, in use, the fibers of the felt, to as great an extent as possible, will be presented to the glass endwise instead of flatwise as heretofore. In this manner, the pads will operate on the glass with what may be described as a

"brush" action, which, I have discovered, greatly increases the efficiency of the felt in the polishing operation, and also very greatly increases the durability and life of the felt.

To effect the foregoing objects, a polishing machine or apparatus of my invention comprises the various features, combinations of features and details of construction hereinafter described and claimed.

In the accompanying drawings, in which my invention is fully illustrated—Figure 1 is a bottom plan view of a polishing runner embodying my invention, showing pads secured in the slots of two segments only thereof. Fig. 2 is a sectional plan view thereof on the line 2—2 of Fig. 1. Fig. 3 is an enlarged fragmentary sectional view on the line 2—2 of Fig. 2, taken adjacent to the inner end of the line of section. Figs. 4 and 5 are perspective views on an enlarged scale showing different forms of separator blocks. Fig. 6 is a perspective view of the blocking dog for maintaining the pads in a slot temporarily under compression. Fig. 7 is a fragmentary detail view on the line 7—7 of Fig. 1; and Fig. 8 is an enlarged perspective view of the key for securing the runner to the runner shaft. Fig. 9 is a perspective view of one of the pads detached from the runner.

Referring now to the drawings, A designates, as a whole, a polishing runner of my invention, the body portion A^1 of said runner being made of suitable cast metal, preferably cast iron. The lower face of the runner A is plane, and on its rear side is preferably reinforced by ribs *a*.

Formed in the body portion A^1 of the runner and extending through the same from front to back are slots or openings a^1, the sides of which, respectively, are substantially parallel and which extend from points adjacent to the rim of the runner inwardly.

While my invention contemplates any desired arrangement of the slots a^1, I prefer the arrangement shown in the drawings, in which said slots are arranged in a plurality of similar series, each series comprising a slot 1 which extends tangent to a circle adjacent to the center of the runner, and which divide said runner into angular sections or segments, and said slots a^1 also comprising slots 2, 3, 4, 5, 6, and 7, arranged in the angular sections or segments defined by said slots 1 and which extend parallel with the slots 1 at the front sides of said angular sections or segments, respectively. The word "front", as here used, has reference to the direction of rotation of said runner when in operation. The slots 1 are preferably arranged with their inner ends in advance of their outer ends, relatively to the direction of rotation of the runner in operation, a desirable "set" of said slots 1 being about fifteen degrees to radial lines extending centrally through the outer ends thereof.

Secured in the slots a^1 are felt pads, designated, as a whole a^2, pads in adjacent slots being separated from each other by substantially the space between said slots, and those in the same slots being secured in said slots and spaced apart by separator blocks in a manner presently to be described.

In this manner spaces or channels will be formed between said pads a^2 which will permit the water and abrasive used in the operation of the machine free access to all of the pads a^2, and which, owing to their relatively very small size, will very quickly become impregnated with water and abrasive, thus insuring the maximum efficiency of said runner practically from the beginning of the operation.

In the preferable construction shown, the felt pads a^2 consist of felt strips 8 of suitable size, a desirable size being about 16 inches long by 4 inches wide by 1 inch thick, and each of said pads comprising four of said strips. The strips of felt 8, forming the different pads a^2, are inserted endwise through the slots a^1 with their lower ends projecting a desired distance, say from 4 inches to 6 inches below the under face of the runner and with their sides extending crosswise of said slots. Different pads in the same slot are secured therein and are also spaced apart by blocks 9 inserted between the pads a^2 and which are secured in the slots a^1 so as to be movable lengthwise thereof. Said pads a^2 are firmly clamped in position between said separator blocks 9 by means presently described. As shown, said separator blocks are secured in the slots a^1 by projections 10 on the lateral edges thereof which engage guide grooves 11 formed in the sides of said slots a^1. Preferably, also, the sides of the separator blocks 9 which contact with the felt pads a^2 are serrated transversely, as shown at 12, said serrations forming teeth or ridges which will bite into the sides of said felt pads when said separator blocks are clamped upon said pads, thus operating to hold the same firmly and positively in position.

In the preferable construction shown, the means for clamping the separator blocks 9 upon said pads consists of what may be conveniently described as jack screws, which consist of screws 13, secured to the ends of which are caps 14, which are provided with projections 15 on their lateral edges similar to the projections 10 on the lateral edges of the separator blocks, and which engage the guide grooves 11 in the sides of the slots a^1 in the same manner as said projections 10 on said separator blocks. The screws 13 are secured in screw-threaded engagement with nuts 16, which are adapted to turn freely

and which bear against rigid shoulders or surfaces formed at the inner ends of the slots a^1. As shown, said nuts bear against the bottoms of recesses 17 formed at the outer ends of holes 18 at the inner ends of said slots a^1, the relation being such that said nuts 16 will project into said slots a^1 a sufficient distance to be conveniently grasped by a wrench when it is desired to turn same. Preferably, also, washers 19 are inserted between the inner ends of the nuts 16 and the bottoms of the recesses 17, in order to reduce the frictional resistance to the turning of said nuts.

In securing the felt pads a^2 into the runner A, they are inserted into the slots a^1 between the separator blocks 9 until a slot is filled. The nut 16 is then turned so as to force the clamping screw 13 and its cap 14 outwardly so as to exert a pressure against the inner separator block 9. After the felt pads a^2 have thus been inserted into all of the slots a^1, the runner is ready to use. I have found in practice that only a slight initial pressure is necessary, as the swelling of said pads as they become wet in use, causes them to expand, thus increasing the pressure to a desired operative pressure.

My invention contemplates the use of any desired or approved means for inserting the felt pads a^2 into the slots a^1 under a desired initial pressure with said slots practically filled. Simple means for this purpose consists of what, for purposes of convenient reference, may be designated as a blocking dog, designated, as a whole, A^2, consisting of an angular structure, comprising a cross-bar 20 adapted to extend across the slots a^1 with its ends resting upon the sides of said slots, depending projections 21 thereon which are adapted to extend downwardly into said slots, and projections 22 at the ends of said cross-bar 20 which extend substantially at right angles to said cross-bar and also to the depending arms 21 thereon, the relation being such that when said blocking dog is adjusted in operative position in one of the slots a^1, the projections 22 thereon will lie flat upon the back of the body portion A^1 of the runner at the sides of the slots a^1 therein. Formed on the back of the body portion A^1 of the runner at the sides of the slots a^1 and adjacent to the inner ends thereof, are lugs 23 which form stops against which the cross-bar 20 is adapted to rest, with the projections 22 thereon extending outwardly, and formed in the rear sides of the inner separator blocks, designated 9^1, are vertical slots or grooves 24 which are adapted to receive the projections 21, said slots or grooves 24 being slightly deeper and wider than the thickness and width of the projections 21.

Having inserted felt pads a^2 into a slot a^1, between adjacent separator blocks 9, until said groove is substantially entirely filled, the nut 16 at the inner end of said slot is turned until the screw 13 and the cap 14 thereon are forced outwardly so as to exert a desired compression upon the felt pads a^2, and until the inner separator block 9^1 has passed the stop shoulders 23 at the inner end of said slot a sufficient distance to permit the cross-bar 20 to be inserted between the rear side of said inner separator block and said shoulders 23. Said blocking dog is then inserted behind said inner separator block with the cross-bar 20 thereon bearing against the stop shoulders 23, the arms 21 in engagement with grooves 24 in the rear side of said inner separator block and the projections 22 resting flat against the rear surface of a runner A at the sides of said slot and extending outwardly from the stop shoulders 23. With this relation, it is obvious that the projections 22 on said blocking dog will prevent turning of the depending arms 21 under the pressure of the compressed felt pads when the pressure of the screw 13 is released. The nut 16 is then turned to release the pressure of the screw 13 and to retract said screw and the screw cap 14 thereon to the rear end of said slot a^1. An additional felt pad a^2 is then inserted between the rear side of the inner separator block 9^1 and the screw cap 14, whereupon the screw 16 is again turned to force the screw 13 and the screw cap 14 thereon outwardly to subject the inner pad a^2 inserted between said screw cap and inner separator block to a sufficient pressure to force the inner separator block 9^1 outwardly so as to release the blocking dog A^2 which is thereupon withdrawn, and the nut 16 further turned, if necessary, to subject the felt pads in such slot to a desired final pressure. All of the slots of the runner will be filled in this manner in succession. Obviously, by providing more than one separator block having grooves 24 in its rear face, any desired number of felt pads a^2 can be inserted at the inner ends of said slots by means of the blocking dog A^2.

A desirable vertical dimension for the slots a^1 is approximately 4 inches. Thus, when the felt pads a^2 are formed from strips 16 inches long, as assumed, and said strips are secured in the body portion A^1 of the runner so as to project 4 inches from the lower face thereof, said strips will extend 8 inches above the tops of said slots. Provision is thus made for re-setting said pads, as they become worn in use, until they are substantially entirely worn out.

When said pads are worn down until the strips 8 are only one inch in length, they may be turned and placed side by side, the four pieces thus forming a pad 4 inches wide, 4 inches long and one inch thick, which may be adjusted or re-set downwardly suc-

cessively in the manner heretofore described until the strips forming said pad are only one inch by one inch by one inch, said pieces representing the total loss of felt in the operation of the machine.

While I contemplate delivering the abrasive and water to the glass to be polished in any manner desired, I prefer to deliver said water and abrasive to said runner through an opening a^3 formed substantially at the center of said runner. This construction possesses an important advantage in the respect that it greatly facilitates washing the runner A and the glass being polished, particularly in connection with the described arrangement and "set" of the rows of felt pads a^2 formed by the pads secured in the different slots a^1.

These advantages are clearly described and are claimed in an application for U. S. Letters Patent filed by me concurrently herewith for an improved runner for plate glass grinding machines, which said application is numbered serially 791,522, and to which reference is made for a description thereof without repetition in the present application. Furthermore, I desire it to be understood that, as regards this feature, the claims of said other application, Serial No. 791,522, cover the polishing runner which forms the subject-matter of the present application, and for that reason said construction is not claimed herein.

The runner A is designed and adapted to be rotatably mounted on a suitable upright shaft or axle a^4. In the preferable construction shown, the bearing for said shaft consists of a hub 25 supported within the opening a^3 by spokes or arms 26, said spokes or arms being preferably set at an angle with their upper edges in advance of their lower edges, whereby, as the rotation of the runner A causes the front sides of said spokes or arms 26 to strike the water and abrasive delivered to the runner through the opening a^3, the inclination of said spokes or arms 26 will operate to throw said water and abrasive downwardly onto the glass being polished.

While I contemplate securing the runner A to its shaft in any suitable manner, I prefer to secure said runner to its shaft in the following manner. The hub 25 is split by a transverse slot 27, which extends entirely through the same, and said split hub is adapted to be clamped upon the runner shaft by means of bolts 28 which extend through holes formed in said hub 25 at opposite sides of the shaft bearing therein, threaded to the projecting ends of which are nuts 29. This construction greatly facilitates removing the runner from the runner shaft where, as almost always happens, the hub 25 becomes rusted to the shaft a^4, the spring of the parts operating to break the connection between said hub and shaft when the bolts 28 are loosened. Also, said runner is preferably keyed to said shaft by a key 30, thus positively connecting said runner and shaft so that they will turn together and also so that the runner may be adjusted vertically and supported in adjusted position by means of its shaft. The key 30 extends through a transverse key way formed in said hub and which is adapted to register with a corresponding key way formed in the runner shaft, the key 30 being of such length that it will extend entirely through said shaft and hub. To prevent accidental loosening or disengagement of the key 30 from its key way, said key is preferably cut away or notched on its under side where it engages the runner shaft, as shown at 31, the weight of the runner operating to force said key downwardly so that the shoulders 32 at the ends of the notch 31 therein will interlock with the sides of the runner shaft at the lower end of the key way therein, thus effectually preventing the removal of said key 25 until the runner is raised relatively to its shaft a sufficient distance to release said key.

Formed around the opening a^3 in the runner A is a flange a^5 to which the inner ends of the reinforcing ribs or flanges a and the outer ends of the spokes or arms 26 are attached, being preferably formed integral therewith.

I claim:—

1. A runner for glass polishing machines, comprising a body portion having numerous openings extending through it, pads extending through said openings, their lower ends projecting below the under-face of the body and their upper ends projecting above the body, and means for adjustably clamping said pads by lateral compression in said openings, whereby the pads are rendered adjustable down through said body.

2. A runner for glass polishing machines comprising a body provided with numerous adjacent slots extending through it, a series of elongated pads extending through each of said slots, and means in each slot for laterally compressing and holding the group of pads therein, whereby the pads are rendered capable of adjustment down through said body.

3. A runner for a glass polishing machine comprising a body portion and a large number of relatively very small felt pads secured thereto and which project from the under face thereof, said pads being spaced from each other, in all directions, substantially as described, the number and arrangement of pads being such that a line drawn radially from the center of the body portion to its outer edge may cut through a plurality of the pads, whereby the entire polishing surface is divided up into small areas, each of

which is isolated from its neighbor by channels which permit free distribution of the water carrying the polishing agent.

4. A runner for a glass polishing machine comprising a body portion provided with slots, and felt pads secured in said slots, said pads being spaced apart both from those in adjacent slots and also from those in the same slot, substantially as described.

5. A runner for a glass polishing machine, comprising a body portion provided with slots, and felt pads secured in said slots, said pads consisting of strips of felt inserted endwise through said slots and which project from the under face of said runner, substantially as described.

6. A runner for a glass polishing machine, comprising a body portion provided with slots, separator blocks mounted in said slots and movable endwise thereof, felt pads secured between said separator blocks, and means for subjecting said separator blocks and pads to a pressure whereby said pads will be clamped between said separator blocks, substantially as described.

7. A runner for a glass polishing machine, comprising a body portion provided with slots, separator blocks mounted in said slots and movable endwise thereof, felt pads secured between said separator blocks, and means for subjecting said separator blocks and pads to a pressure whereby said pads will be clamped between said separator blocks, said means comprising jack screws at the inner ends of said slots, substantially as described.

8. A runner for a glass polishing machine, comprising a body portion provided with slots, separator blocks mounted in said slots and movable endwise thereof, felt pads secured between said separator blocks, and means for subjecting said separator blocks and pads to a pressure whereby said pads will be clamped between said separator blocks, said separator blocks being provided with serrations in the faces thereof which contact with said pads, substantially as described.

9. A runner for a glass polishing machine comprising a body portion provided with slots, separator blocks, projections on the lateral edges thereof which engage guide grooves formed in the sides of said slots, felt pads secured between said separator blocks, and means for subjecting said separator blocks and pads to a pressure whereby said pads will be clamped firmly between said separator blocks, substantially as described.

10. A runner for a glass polishing machine comprising a body portion provided with slots, felt pads secured in said slots, means for subjecting said pads to pressure, and means for maintaining said pads under pressure independently of said pressure means, substantially as described.

11. A runner for a glass polishing machine comprising a body portion provided with slots, separator blocks, projections on the lateral edges thereof which engage guide grooves formed in the sides of said slots, felt pads secured between said separator blocks, means for subjecting said separator blocks and pads to pressure whereby said pads will be clamped firmly between said separator blocks, and means for maintaining said pads under pressure independently of said pressure means, said means comprising stop shoulders on the rear side of said runner adjacent to the inner ends of the slots therein, a blocking dog comprising a transverse bar adapted to rest against said shoulders, depending arms thereon adapted to engage corresponding slots formed in the inner sides of the inner separator blocks, and rigid projections on said blocking dog adapted to rest against the rear side of the runner and extending outwardly from the stop shoulders thereon, substantially as described.

12. A runner for a glass polishing machine of the type described comprising a body portion provided with a central opening, a flange which surrounds said opening, a bearing hub supported in said opening by arms or spokes which connect same with the flanges surrounding said opening, said arms or spokes being inclined relatively to the direction of rotation of said runner, the relation being such that their upper edges will be in advance of their lower edges, substantially as described.

13. A runner for a glass polishing machine of the type described comprising a body portion provided with a central opening, a bearing hub supported in said opening by arms or spokes which connect the same with the body portion of said runner, a key adapted for connecting said hub to the runner shaft, said hub being split, and bolts for clamping said hub upon said runner shaft, substantially as described.

14. A runner for a glass polishing machine of the type described, comprising a body portion provided with a central opening, a flange which surrounds said opening, ribs on the rear side of said runner which extend outwardly from said flange, and a hub supported within the opening in said runner by arms or spokes which connect said hub with the flange surrounding said opening, substantially as described.

15. A runner for glass polishing machines, comprising a body portion having numerous openings extending through it, pads extending through said openings, their lower ends projecting below the under-face of the body and their upper ends projecting above the body, and means for adjustably

clamping said pads by lateral compression in said openings, whereby the pads are rendered adjustable down through said body, each of said pads consisting of a plurality of separable felt strips.

In testimony that I claim the foregoing as my invention, I affix my signature in presence of two subscribing witnesses this 3rd day of September, 1913.

CARLTON L. SMITH.

Witnesses:
ARTHUR B. CRANE,
A. C. BORDEN.