May 10, 1955 P. KIRKMAN 2,707,856

SMOOTHING AND POLISHING RUNNERS

Filed March 5, 1952

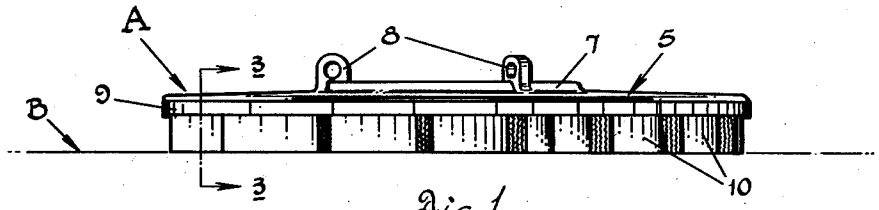

Fig. 1

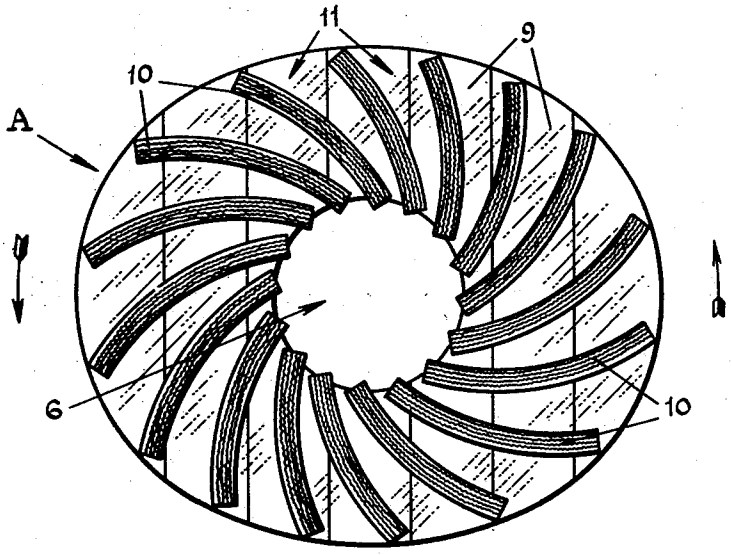

Fig. 2

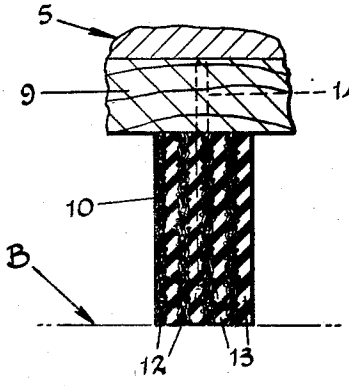

Fig. 3

Inventor

Peter Kirkman

By

Nobbe & Swope

Attorneys

United States Patent Office 2,707,856 Patented May 10, 1955

2,707,856

SMOOTHING AND POLISHING RUNNERS

Peter Kirkman, Ottawa, Ill., assignor to Libbey-Owens-Ford Glass Company, Toledo, Ohio, a corporation of Ohio

Application March 5, 1952, Serial No. 274,961

15 Claims. (Cl. 51—195)

This invention relates broadly to the surfacing of glass sheets or plates and more particularly to a novel and improved form of surfacing block or runner for use in the grinding, smoothing and/or polishing of plate glass blanks.

In the surfacing of plate glass blanks according to one process for producing plate glass, a plurality of rough blanks are mounted upon a series of cars or tables which are arranged in end to end relation and movable continuously along a predetermined horizontal path. During such movement, the blanks travel first through a grinding area, then a smoothing area, and finally a polishing area. As the blanks travel through these areas, they are subjected successively to a grinding action with sand and water, a smoothing action with pumice and rouge, and a polishing action with rouge. In each of these operations the grinding, smoothing and polishing agent is applied to the surface of the glass blanks and is moved over the glass by means of a rotating block or runner to effect the desired treatment thereof.

The primary object of this invention is to provide a rotating runner for use with surfacing apparatus for glass sheets or plates which will distribute the surfacing agent more uniformly over the faces of the said sheets or plates.

Another object of the invention is to provide a runner of the type described which will, upon rotation thereof, tend to prevent the surfacing agent from being thrown prematurely outwardly therefrom and thus conserve the amount of agent used.

A still further object of the invention is to provide a runner of the type described which is both inexpensive in construction and highly resistant to wear.

Other objects and advantages of the invention will become more apparent during the course of the following description when taken in connection with the accompanying drawings.

In the drawings wherein like numerals are employed to designate like parts throughout the same:

Fig. 1 is a side view of a surfacing runner constructed in accordance with the invention;

Fig. 2 is a bottom view of the runner; and

Fig. 3 is an enlarged fragmentary sectional view taken substantially on line 3—3 of Fig. 1.

Briefly stated, this invention contemplates a surfacing runner having its operative surface composed of a plurality of runner bars emanating radially from the center of the runner in such a manner that the smoothing or polishing agent used is distributed more uniformly over the surface of the glass. More particularly, these bars are arranged in spiral formation and extend from a central opening in the runner outwardly to substantially the outer edge thereof. In this manner, the tendency of the particular surfacing agent used to be thrown prematurely outwardly from the periphery of the runner during the rotation thereof will be substantially lessened, and instead the tendency will be for it to be thrown back towards the center of the runner to obtain maximum use thereof.

The spirally arranged runner bars are also of a novel laminated construction consisting of alternate layers of rubber and canvas vulcanized together to form a unitary structure, the layers being arranged longitudinally of the bars and transversely of the supporting members for said bars. When so constructed and arranged, the bars not only result in a very efficient distribution of the surfacing agent in the abrading process, but also are highly resistant to wear. For example, there is no tendency for the surfacing agent to become embedded in the working surface of the bar as is the case when felt surfaces are used on the runners.

Referring now more particularly to the drawings, there is illustrated a surfacing runner A embodying the novel features of this invention. This runner comprises a supporting member 5 preferably, though not necessarily, of substantially oval shape as shown in Fig. 2. The supporting member 5 is of a heavy material such as iron to give the runners substantial weight, and has formed centrally thereof a circular opening 6 through which the surfacing agent may be introduced to the faces of the glass sheets B. Surrounding the opening 6 on the upper surface of the supporting member 5 is a lip 7 carrying lugs 8 which are disposed in such a manner as to accommodate interlocking members (not shown) of a spindle or other means for supporting and imparting rotative movement to the runner A.

Secured to the underside of the support 5 in any suitable manner are a plurality of wooden members 9 forming a base for the runner bars 10 which constitute the surfacing elements. As best illustrated in Fig. 2, a plurality of the runner bars 10 are arranged spirally from the opening 6 with their inner ends terminating substantially circumferentially of said opening and their outer ends substantially flush with the periphery of the supporting member to form substantially triangular pockets 11 between adjacent bars. Each bar is continuously curved in the intended direction of rotation of the disk, which in this case is counter-clockwise as indicated by the arrows in Fig. 2.

It will be noted that the inner ends of the bars 10 are equidistantly spaced from each other. Also, that the inwardly convergent portion of each of the bars is angularly disposed an equal amount with respect to a radial line from the center of opening 6 to the inner end of the respective bar. As well, each bar is curved to the same radius. Thus, the apices of the outwardly divergent pockets 11 disposed between adjacent bars are equal so that were supporting member 5 of a circular construction, the areas of pockets 11 would also be equal. However, in the embodiment shown in which the member 5 is oval-shaped, the areas of the pockets adjacent the wide portions of the oval are proportionately larger than those adjacent the narrow portions.

In summary then, runner bars 10 constitute arcuately shaped vanes or blades which define therebetween the substantially triangular pockets 11. The surfacing agent is received by the pockets as it is introduced through opening 6 and is worked over the faces of the glass sheets B by rotation of said runner bars. Upon said rotation, the bars will tend to counteract the normal tendency of the surfacing agent to be thrown outwardly from the center of the runner. That is, the spirally arranged bars will oppose the radially directed components of centrifugal force resulting from rotation of the runner. As a matter of fact, the curved bars will tend to throw the agent back towards the opening 6 and as well to collect the agent on portions of the glass sheets surfaces, as runner A moves over said portions, and similarly direct the same toward the center of the runner.

Of course, in this respect the bars 10 should not be curved so sharply that none of the surfacing agent is permitted to escape outwardly from under runner A.

That is, the particular surfacing agent used is intermittently fed to the surfaces of the glass sheets and after extended use it will tend to lose its effectiveness and at such time should be permitted to escape. Thus, optimum surfacing conditions for different operations may be obtained by varying the degree of curvature of the runner bars. For example, in the smoothing operation, as a surfacing agent of pumice and rouge is fed to an oval runner 41 by 48 inches which is rotated at approximately 55 R. P. M., very satisfactory results have been obtained by curving a runner bar 18 inches long, 3 inches wide, and 1½ inches thick to a radius of about 21 inches.

As shown in Fig. 3, each runner bar **10** is of laminated construction consisting of alternate strips of canvas **12** and rubber **13** arranged longitudinally of said bar and vulcanized to one another to produce a composite structure. The bars are arranged on edge against the wooden base members **9** and secured thereto by nails **14** or the like, such that the working edges of the alternate strips **12** and **13** are disposed transversely of said base members and the faces of the glass sheets B.

It has been found satisfactory to use for this purpose strips of scrap rubber belting which together with the strips of canvas are vulcanized together to form a cohesive surface on the bottom edge for operative contact with the glass sheets or plates. Although this invention contemplates using rubber in other forms, the use of scrap rubber belting is particularly desirable in that its cost is only a fraction of that of the conventional type of felt used as a working surface for smoothing and polishing runners.

It will be seen upon reference to Fig. 3 that the substantial weight of the supporting member **5** permits the bottom working edge or length of each of the runner bars **10** to rest evenly in compression upon the faces of the glass sheets B. In operation, the surfacing agent may be introduced through the opening **6** or may be fed upon the glass sheets in advance of the runners and carried beneath the runners by the said sheets. In either case, the surfacing agent will be distributed substantially uniformly over the surfaces of the glass sheets by runner bars **10**.

The surfacing runner of this invention has been found of particular utility in actual commercial use. It has been found that the use of runner bars consisting of alternate strips of rubber and canvas laminated together provides a working surface which may be used for extended periods of time. There is no tendency for the surfacing agent to "dig into" the rubber and canvas strips as is the case, for example, with felt surfaces. That is, the agent does not adhere to the bar to form a slick surface thereon in contact with the glass, which slick surface has a minimum action on the glass. Thus, the surface provided by the alternate strips of rubber and canvas produces a longer lasting abrading action. While the surfacing agents ordinarily used will not tend to adhere to the rubber, at the same time the canvas provides a sufficiently rough surface to facilitate the abrading action.

It has been found that the abrading agent adheres to felt runners and becomes embedded in the minute openings in the surface thereof. The result is that the agent becomes "caked" onto the felt surface so that the abrading action is adversely affected. The combination of rubber and canvas bar provided by this invention provides a surface of sufficient compressibility as well as adequate roughness to accomplish the abrading action in a simple and effective manner. By this improved action, the life of the runner bars is lengthened and there is consequently less need for replacement thereof. Actually, it has been found that rubber and canvas bars of this type need only be replaced after approximately 100 days of continuous use. On the other hand, it was found necessary to replace the conventional felt surfaces aforementioned on an average of every 11 days.

It will of course be appreciated that the novel runner of this invention may be used in any one of the grinding,

smoothing, or polishing operations. Although it has been found that in commercial use this runner is of particular utility in the smoothing operation, this invention is clearly not limited to such use.

It is to be understood that the form of the invention disclosed herein is to be taken as the preferred embodiment thereof, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the following claims.

I claim:

1. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces, each bar comprising alternate layers of rubber and canvas arranged longitudinally of said bar and transversely of said support.

2. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces, each bar comprising alternate layers of rubber and canvas arranged longitudinally of said bar and transversely of said support and vulcanized together as a composite structure to present a cohesive working surface.

3. A rotatable runner of the character defined in claim 2, in which an edge surface of said composite structure constitutes the working surface.

4. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged spirally in outwardly diverging relation from a central area of said support, each bar comprising alternate layers of rubber and canvas.

5. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged in outwardly diverging relation from a central area of said support, the inner ends of said bars adjacent said central area being spaced substantially equidistantly from each other to provide substantially triangular pockets therebetween in which the apices of said pockets are substantially equal to each other, each bar comprising alternate layers of rubber and canvas.

6. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged spirally in outwardly diverging relation from a central area of said support, each bar comprising alternate layers of rubber and canvas arranged longitudinally of said bar and transversely of said support, said layers being vulcanized together as a composite structure to present a cohesive working surface at an edge thereof.

7. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged in outwardly diverging relation from a central area of said support, the inner ends of said bars adjacent said central area being spaced substantially equidistantly from each other so as to provide substantially triangular pockets therebetween in which the apices of said pockets are substantially equal to each other, each bar comprising alternate layers of rubber and canvas arranged longitudinally of said bar and transversely of said support, said layers

being vulcanized together as a composite structure to present a cohesive working surface at an edge thereof.

8. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces, each bar comprising adjacent layers of rubber and canvas arranged longitudinally of said bar and transversely of said support.

9. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces, each bar comprising laminated layers of rubber and canvas arranged longitudinally of said bar and transversely of said support.

10. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged spirally in outwardly diverging relation from a central area of said support, each bar comprising adjacent layers of rubber and canvas.

11. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged spirally in outwardly diverging relation from a central area of said support, each bar comprising laminated layers of rubber and canvas.

12. A rotatable runner for rubbing a surfacing agent over glass sheets or the like as the agent is independently applied to the surfaces of the sheets comprising, a support, and a plurality of bars secured to said support to contact with said glass surfaces and arranged spirally in outwardly diverging relation from a central area of said support, each bar comprising alternate layers of rubber and canvas arranged longitudinally of said bar and transversely of said support, said layers being laminated together as a composite structure to present a cohesive working surface at an edge thereof.

13. A rotatable runner for rubbing a surfacing agent over glass sheets or the like comprising, a support and a plurality of bars secured to said support to contact with said glass surfaces, each bar comprising alternate layers of a material to which the surfacing agent is substantially non-adherent and also alternate layers of a different type material than said first-named material, said second-named material being rough and serving to promote the abrading action of said surfacing agent upon the glass sheets when said bars are moved in contact with said sheets.

14. The apparatus as defined in claim 13, in which each bar is composed of alternate layers of canvas and a material which is resistant to the abrading effect of said surfacing agent and to which the surfacing agent is substantially nonadherent.

15. The apparatus as defined in claim 13, in which each bar is composed of alternate layers of rubber and a rough material which promotes and facilitates the abrading action of said surfacing agent upon said sheets.

References Cited in the file of this patent

UNITED STATES PATENTS

159,031	Laird	Jan. 26, 1875
277,325	Morse	May 8, 1883
797,427	Harris	Aug. 15, 1905
1,622,942	Chase	Mar. 29, 1927
1,670,780	Mills	May 22, 1928
1,688,378	Ditmar	Oct. 23, 1928
2,083,749	Sword	June 15, 1937