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BELTS FOR CONVEYING AND SUPPORTING FLAT PLATES IN GRINDING AND POLISHING MACHINES

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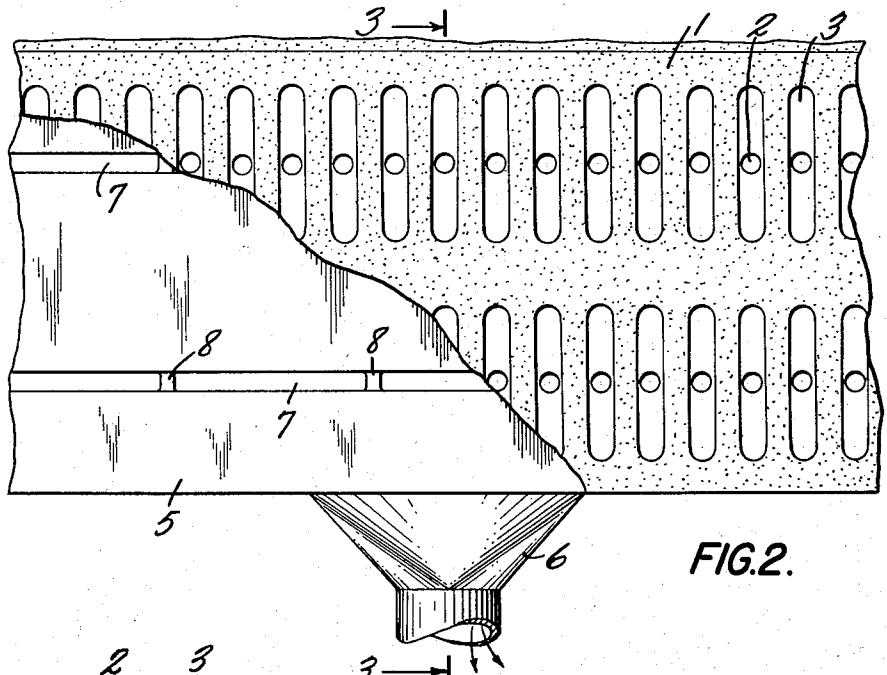


FIG.2.

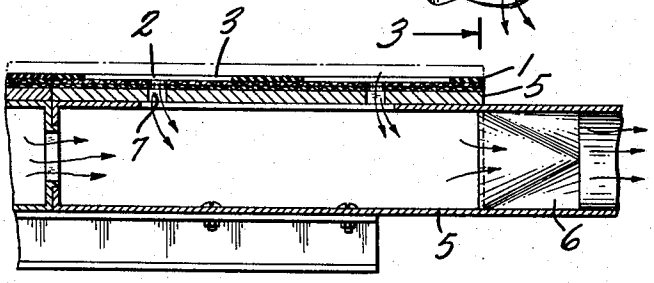


FIG.3.

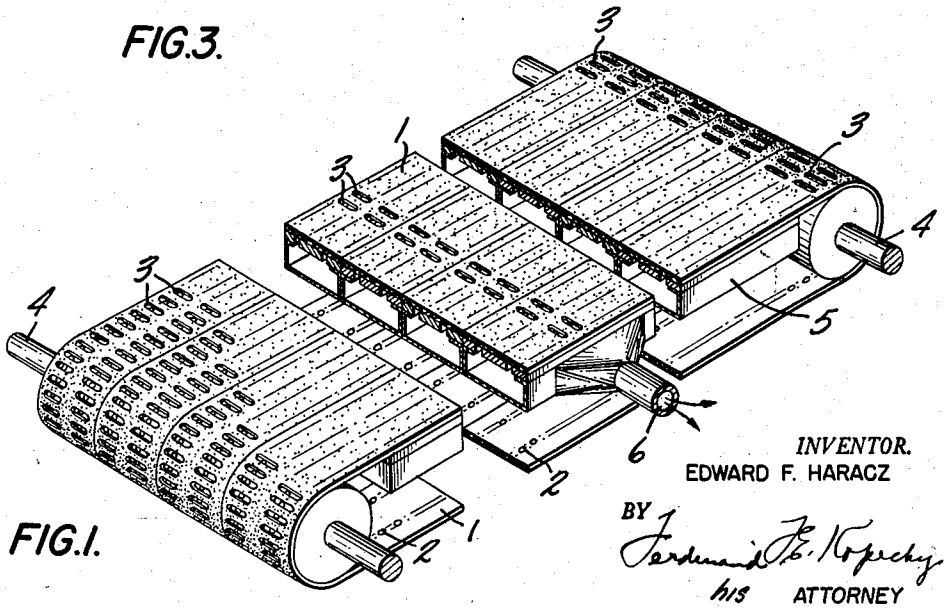


FIG.1.

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BELTS FOR CONVEYING AND SUPPORTING FLAT PLATES IN GRINDING AND POLISHING MACHINES

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3 Claims. (Cl. 51—235)

The present invention relates to machines for grinding and polishing the surfaces of plate glass and sheets or plates of similar solid materials and is directed particularly to a belt for firmly supporting and transporting or conveying such plates or sheets during the grinding and polishing operations in conventional machines of this type.

In the grinding and polishing of plate glass, the sheet is generally placed on a flat surface or table or on a belt of rubber or other plastic material and, while thus supported, is ground or polished by power-propelled wheels rotating on or across the top surface of the sheet. Abrasives are applied to the surface of the sheet when grinding is to be accomplished, while powdered rouge or other polishing particles are applied when the operation is to be polishing or finishing of the sheet.

In such grinding and polishing operations, the glass sheet, resting on the table surface or on the belt, particularly if the bottom surface of the sheet is wet, or the table or belt surface have become wet, may not be held firmly against the rotating discs of the wheels and consequently is free to move or slip in various directions. This not only decreases the accuracy of the grinding but makes it necessary, because of this slippage, to maintain constant supervision of the grinding operation and, to prevent such slippage, resort to manual control or the use of confining strips or other means placed on the surface of the table or belt. When the glass is placed on a moving conveyer belt and is successively subjected to abrasion with a plurality of stationary but rotating wheels, the character of the resulting surface is consequently influenced by the amount of slippage or movement that has occurred during the grinding. The character will also be influenced by the different speeds at which the various wheels are each rotating.

The principal object of the present invention is to provide a surface for supporting a glass or other flat sheet firmly while it is subjected to grinding or polishing by superimposed rotating discs or wheels. A further object of my invention is to provide a moving belt on which a glass or other flat sheet may be supported and held firmly while being transported or conveyed under and in contact with one or more superimposed grinding and polishing wheels. Other objects and advantages of my invention, some of which are referred to hereinafter, will be apparent to those skilled in the art to which it pertains.

A preferred embodiment of my invention is illustrated in the drawing which accompanies this application, of which Figure 1 is a top view in broken sections of a supporting and conveyer belt in accordance with my invention. Figure 2 is a top sectional view cut away to show the plenum or suction chamber and channels over which the belt moves. Figure 3 is a section through 3—3 of Figure 2 of the plenum or suction chamber which shows the belt.

The conveyer belt 1 of my invention consists of an endless belt of fabric-reinforced rubber or other plastic

sheet material which is perforated or provided with a series of uniformly spaced opening or holes 2 which may be circular or of other suitable configuration. Only a portion of these openings are represented in the drawing. The preferred embodiment of these openings, as represented in the drawing, consists of a circular hole 2 extending completely through the thickness of the belt, together with a indented or recessed portion 3, surrounding the periphery of circumference of the hole, which does not extend completely through the thickness of the belt but forms a cup on its surface. The belt is of sufficient length to be capable of being fitted tightly over the rollers or drive wheels 4 at both ends. The belt is generally of such length and width as to support a plurality of sheets of glass or other plates that will be placed on its top surface in normal use and these will also be dependent upon the number of superimposed grinding and polishing wheels that are mounted on the machine. The roller or drive wheels 4 are rotated by manual or motor drive means and are mounted on a suitable support, preferably an adjustable support, in the usual manner, so that the tension on the belt may be varied at will.

Superimposed below the belt is a plenum or suction box or chamber 5, which is a boxlike structure having a duct and nozzle 6 through which air in the chamber can be exhausted by means of a suitable vacuum pump. The upper surface of this chamber, over which the belt passes and with which it is in direct contact, is provided with a series of channels 7 which are directly below the openings or holes 2 of the belt. These channels 7 are aligned in the direction of the movement of the belt and the openings 2 in the belt are in direct communication with the channel 7. At intervals along channel 7 are openings 8 which permit the flow of air between channels 7 and the plenum or suction chamber 5. Although few of these holes 8 are represented along the particular channel, it is obvious that the channel may be narrower and that a greater number of them may be required in different operations. The channel 7 is generally as wide as the diameter of the holes 2 in the belt 1.

In normal grinding and polishing operations, sheet glass plates are placed on the belt 1. The exhaust or vacuum pump is then started, withdrawing air from the suction chamber 5, from the channels 7 through holes 8, and through holes 2 and cups 3, when the latter are not covered by a plate or sheet, as represented by the arrows on the drawing. The glass plates are thereby held to the surface of the belt 1 by the suction thus created. The rotating grinding and polishing discs are then started and brought into contact with the surfaces of the glass plates and the roller or drive wheels 4 are started and set at such predetermined speed as to move the glass plates progressively under the respective grinding and polishing wheels. The plates are then removed from the end of the belt while it turns underside at the roller. Any water collected in the cups 3 or holes 2 or on the belt itself falls off as that section of the belt turns underside.

Although the foregoing description is directed especially to preferred embodiments of my invention, it is to be understood that variations and modifications may be made therein without departing from the invention, whose scope is to be limited solely by the appended claims.

I claim:

1. In a machine for polishing or grinding flat plates, a supporting structure for holding and progressively moving plates in such machine, which consists of a single continuous flat flexible endless belt that encircles two rotatable end rollers, a continuous suction chamber between the end rollers, the top surface of which is in contact with the inner surface of the top portion of the belt

and is provided with a plurality of continuous channels extending in the direction of movement of the belt, each of the said channels communicating directly through small openings with the said suction chamber, the said belt being provided with a series of regularly spaced small openings, each of which is aligned with one of the said channels, and means for exhausting the air in the suction chamber, thereby to hold the plates to the surface of the belt while the belt and plates are progressively moved by rotation of the rollers.

2. In a machine for grinding or polishing flat plates, a support as defined in claim 1, in which each of the communicating channels of the suction chamber has approximately the same width as the regularly spaced openings in the belt.

3. In a machine for grinding or polishing flat plates, a support as defined in claim 1, in which the openings in the belt are each surrounded with cuplike indentations on the contact surface of the belt.

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