June 29, 1937. K. H. BOWEN 2,085,142

POLISHING WHEEL

Filed Aug. 31, 1936

Fig. 1.

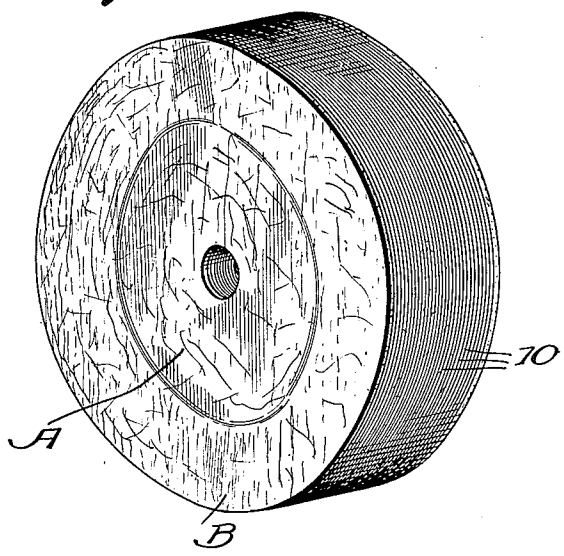


Fig. 2.

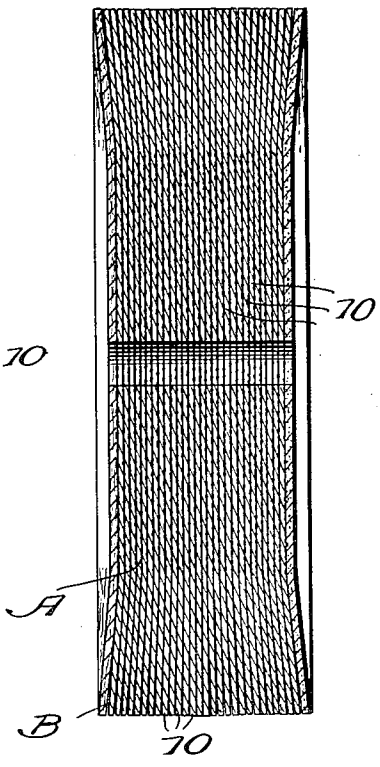


Fig. 4.

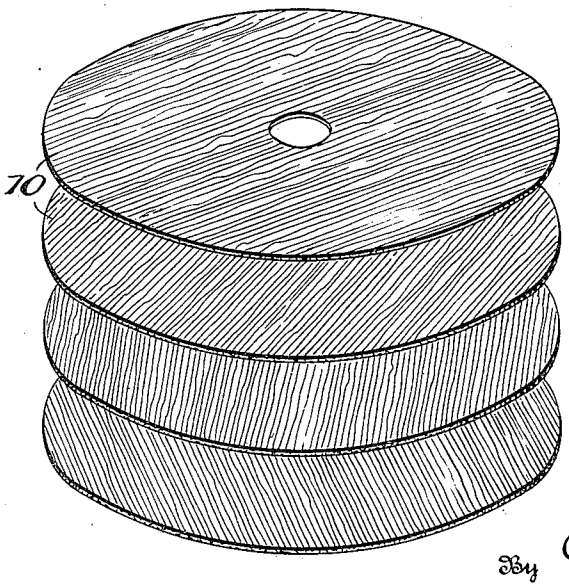
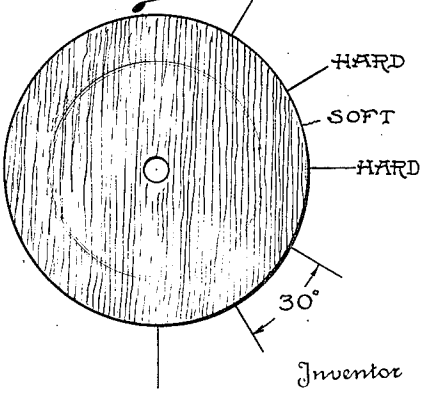


Fig. 3.



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Patented June 29, 1937

2,085,142

UNITED STATES PATENT OFFICE

2,085,142

POLISHING WHEEL

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Application August 31, 1936, Serial No. 98,808

2 Claims. (Cl. 51—193)

This invention relates to improvements in polishing wheels and particularly to that type of polishing wheel used for what is commonly known as rough polishing.

One object of the invention is to provide a polishing wheel of this type which is of economical design, and which can be made up by an exceedingly simple method, thus holding production costs down to a minimum.

Another object is to provide a polishing wheel of this type, which is capable of flexing laterally rather freely but which efficiently resists, so to speak, radial pressures imposed on its periphery during polishing operations.

A still further object of the invention is the provision of a polishing wheel of such construction that its resistance to radial pressures is uniform at all points from its center to its periphery, and circumferentially of its periphery.

More specifically, the invention contemplates a polishing wheel composed of a plurality of discs plied together, each disc consisting of a group of long staple vegetable fibers secured together by a resilient binder. The majority of the fibers of each disc or ply are arranged in parallelism with one another and extend the full diameter of the disc or wheel and the plied discs are so arranged that the fibers of adjacent discs are disposed at an angle to each other. The several discs or plies are also secured together by the resilient binder material, the extent of this bonding of the discs radially outward from the wheel center determinating the resiliency and flexibility of the wheel. In other words, if the discs are bonded together, say, from the wheel center to a point radially midway the periphery, the finished wheel will posses greater flexibility than would be the case if the discs were securely bonded together throughout the full diameter of the wheel.

With these and other objects in view, the invention consists in certain details of construction and combinations and arrangements of parts, all as will hereinafter be more fully described, and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawing—

Figure 1 is a perspective view of a wheel produced in accordance with the present invention;

Fig. 2 is a cross-sectional view of a plied fiber disc polishing wheel with the discs bonded together for only a portion of the wheel, the discs or plies being shown as flexed to more clearly illustrate the invention;

Fig. 3 is a side elevation of a wheel, legends being used to denote the peripheral characteristics of the wheel; and

Fig. 4 is a view illustrating a number of discs spaced somewhat apart to illustrate the relative disposition of fibers of adjacent discs.

The wheel is composed of a plurality of layers of discs 10, of vegetable fiber, the majority of the fibers of each disc being arranged parallel to each other. Discs of this character can be formed up, so to speak, by a very inexpensive method. Preferably, Java sisal fibers, in sliver formation, are first passed through the usual carding machine commonly found in the so-called preparation rooms of rope factories. This operation causes the fibers to arrange themselves in approximate parallelism in tape-like formation, and they are then passed through, or treated with, a resilient binder, for instance, a latex cement, squeeze rolls being used to remove excessive deposits of binder from the fiber tape. After being dried and cured, then discs 10 are formed by cutting them from the tape, preferably with clicker dies. Any number of discs, depending upon the thickness of the wheel to be produced, are then assembled or plied together on a suitable assembling fixture.

Different effects may be secured by varying the angular disposition of the fibers of juxtaposed layers or discs. Preferably, successive discs are assembled with their fibers disposed at approximately a 30° angle to each other. This arrangement results in a better distribution of the fiber ends at and around the periphery of the wheel, presenting a substantially uniform surface throughout.

The several laminated discs are secured together with the elastic or resilient binder, the plied discs being pressed together. The resiliency of the binder material lends, of course, to the flexibility of the finished wheel, but this characteristic may also be readily varied by varying the extent or area over which the discs of the wheel are bonded together. That is, if the discs are bonded together throughout the wheel, a comparatively solid structure is obtained, but, if they are bonded together from the center only a portion of the distance toward the periphery, as illustrated, the peripheral portion of the wheel is much more resilient and flexible and when a piece of work is pressed against the periphery, the annular portion of the wheel extending radially inward from the periphery will spread laterally or mushroom out, as is sometimes said. In the present illustration, the bonded area is indicated at A and the unbonded portion at B.

Likewise, the density of the wheel can be varied by the use of thicker tape or discs, a wheel of thin discs yielding more than one made of thick discs.

Preferably, a long staple vegetable fiber is used, the majority of the individual fibers in each disc being of such length as to extend the full diameter of the disc. This increases the wearing resistance of the wheel and is also an important factor in the flexing properties of the wheel. The parallel disposition of a majority of the fibers in each disc; the long, staple fiber used; and the use of resilient binder in discs and assembly, combine to make a wheel having unusual flexing and wear-resisting properties. Regardless of the relative disposition of fibers of adjacent discs in the wheel, only the ends of the fibers are presented at the periphery. There is practically a total absence of fibers disposed circumferentially of the wheel on which a rubbing or chafing action can be imposed and, as before mentioned, the presentation of fiber ends only greatly increases the life of the wheel.

The fiber discs are much more inexpensive than discs of woven materials, such as canvas and muslin, and the use of the resilient bonding material not only adds to the flexibility of the finished wheel, but it eliminates the stitching or sewing together of the discs in groups as is done where a material such as muslin is used. The costs of the present wheel are, therefore, minimized by reason of the use of less expensive materials and simple manufacturing methods. In this connection, it should also be mentioned that the sewing together of the plies in the muslin and similar wheels and the use of glue practically eliminates flexibility or lateral flexing, whereas the present wheel has a rather high degree of flexibility which is, of course, desirous, particularly in polishing wheels.

It will be understood that a suitable abrasive material may be applied to the peripheral surface of the wheel, but such material is not illustrated in the present drawing, in order to more clearly illustrate the construction of the wheel proper. It has been definitely determined that the present wheel holds its abrasive head, i. e., retains the abrasive coating, much better than the ordinary woven fabric wheel under many conditions.

While the invention has been disclosed primarily in connection with, so-called, rough polishing wheels, it also possesses merit in connection with finishing and possibly other types of wheels. Also, while the use of a resilient binder has been indicated as preferable, other types of binder may be used without departing from the spirit of the invention as defined in the appended claims.

What I claim is:

1. In a polishing wheel of the type described, a plurality of fiber discs, the fibers of each disc being arranged in substantial parallelism with one another, the ends only of the fibers being exposed to wear at the periphery of the wheel, the fibers of adjacent discs being disposed at an angle to each other.

2. In a polishing wheel of the type described, a plurality of discs formed of long staple vegetable fibers and a binder for securing the fibers together, the major portion of the fibers of each disc being disposed substantially parallel to each other and extending full diameter of the wheel, and the fibers of adjacent discs being disposed at an angle to each other.

KENNETH H. BOWEN.