

No. 669,923.

Patented Mar. 12, 1901.

E. GRAUERT.
GRINDING AND POLISHING DEVICE.

(Application filed Apr. 11, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

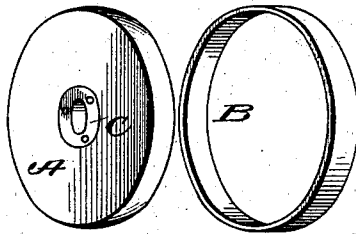


Fig. 2.

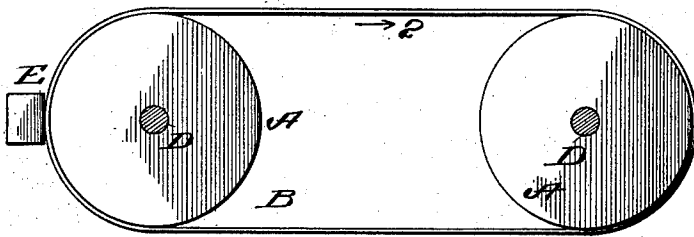


Fig. 4.

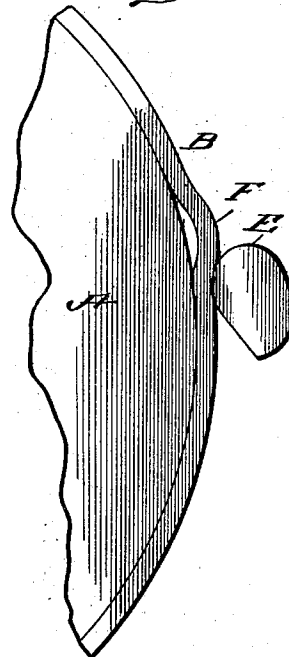


Fig. 3.

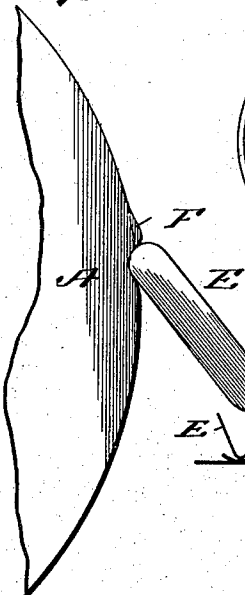


Fig. 6.

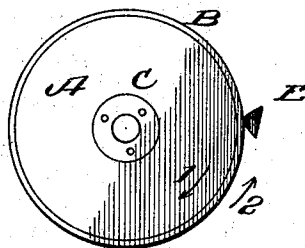
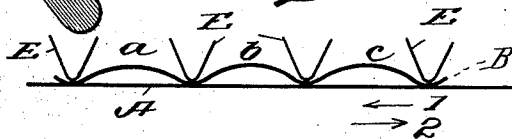


Fig. 5.



Witnesses

J. C. Anderson

Eagar. Grauert

Ymer C. S. S. S.

Inventor

Attorney

No. 669,923.

Patented Mar. 12, 1901.

E. GRAUERT.
GRINDING AND POLISHING DEVICE.

(Application filed Apr. 11, 1900.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 7

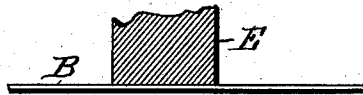


Fig. 8

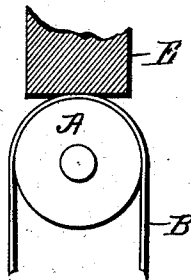
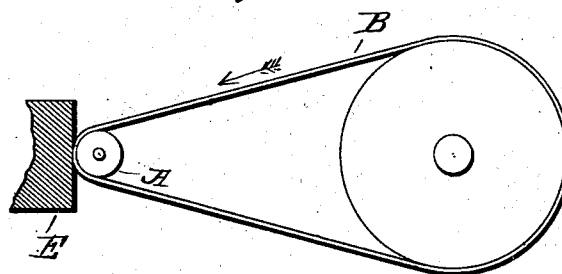


Fig. 9



Witnesses

Jas. Irvine
Walter Williams

E. Grauert Inventor

Ymerus Enters Attorney

UNITED STATES PATENT OFFICE.

EDGAR GRAUERT, OF LINCOLN, NEW JERSEY.

GRINDING AND POLISHING DEVICE.

SPECIFICATION forming part of Letters Patent No. 669,923, dated March 12, 1901.

Application filed April 11, 1900. Serial No. 12,459. (No model.)

To all whom it may concern:

Be it known that I, EDGAR GRAUERT, a citizen of Germany, residing at Lincoln, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Grinding and Polishing Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in devices for grinding and polishing.

In the art to which my invention pertains grinding and polishing devices involving the use of an emery surface have universally consisted of wheels composed of felt or other suitable material (according to the desired flexibility or hardness) having the emery surface superimposed upon the periphery and secured thereto by glue or else superimposed upon a band or strap of suitable material and said band or strap secured to the periphery of a suitable wheel by means of glue and pegs or other means for preventing the movement of the band relatively to the wheel. In cases where the work could not be reached by an ordinary wheel it has been customary to provide an endless band or belt having an emery surface and to stretch said band or belt over two pulleys or wheels to secure the proper tension of the band and to apply the work to be operated upon at a point between the axes of the two pulleys or wheels, one of which constitutes a driver, while the other operates as an idler. In the case of the single wheel with a peripheral grinding or polishing face the work to be operated upon is pressed upon the periphery of the wheel, and in exact proportion to the pressure exerted the work is embedded in the grinding or polishing surface and the latter is lifted or raised, as it were, in advance of the plane of contact between the work and the polishing or grinding surface, and in the case of the band-polisher experience has rendered it necessary to provide a table or arm intermediate of the driving and idler pulleys to control and limit the pressure on the band, and thus protect it against rupture; but it has been found that the loosened emery is liable to interpose be-

tween the under surface of the belt or band and the supporting table or arm, and the travel or movement of the former over the latter, with the interposed particles of emery, causes a rapid destruction of the table and band. Besides this, the belt-machine was not designed to be used with the table. The table is merely a makeshift to eliminate the objectionable features of the machine. The table is seldom used and is not intended for general use. Where a single wheel is employed, if it be one in which the body of the wheel is made of some suitably flexible or elastic material, such as felt, with a surface of emery incorporated therewith, the pressure of the work upon the periphery of such a wheel raises the surface in advance of the plane of contact between the work and the wheel, as heretofore stated, and the rapid revolution of the wheel, and consequently the rapid and continuous change of location of this raised point, results in a rapid destruction of the wheel, and where a non-elastic wheel is armed or provided with an independent band or rim having grinding and polishing properties and secured in position, as heretofore explained, the pressure of the work against the peripheral surface has the effect of lifting said band or rim in advance of the work, and under the rapid revolution of the wheel and the constantly and advancing change in the plane of such lifting action the effect is to separate the band or rim from the wheel, and, as is well known to those familiar with the use of such a device, the band frequently separates at the juncture of its ends, and leaving the wheel is liable to fly against the face of the workman with injurious effects.

My invention has for its object to provide a grinding or polishing device which shall overcome all of the disadvantages referred to and which shall embody, among others, the following advantages, to wit: economic and durable construction, the ability to provide a polishing-surface having any desired combination of elasticity and hardness, to secure all the advantages of felt wheels without the wasteful expense due to wear, to provide a surface upon which design-work may be polished with better results, owing to the ability to provide a very flexible foundation or support for the polishing surface or material, the

ability to exert a greater pressure of the work against the grinding or polishing surface, thus removing more stock in less time than heretofore and at the same time avoiding excessive heating of the polishing or grinding surface, permitting the smallest work to be done by the polishing-surface by simply changing the diameter of the supporting-wheel without altering the polishing-surface, securing the absolutely true running of the polishing-surface, which is especially necessary in machine-polishing, and, lastly, permitting the use of large and small carrying-wheels ranging in diameter, as I have found from experience, from twenty-four inches to one and one-half inches and at the same time securing the proper speed to obtain the best working effect of the emery surface and without any change in machinery. These and many other advantages will result from the use of my invention, as will appear hereinafter.

In order that those skilled in the art to which my invention appertains may fully understand the same and to fully differentiate it from the devices at present in use, and in order, further, that my claim hereinafter made may be broadly construed, I will proceed to describe in detail the features of my invention, referring to the accompanying drawings, in which—

Figure 1 is a perspective view of a wheel and a rim embodying my invention, the rim and wheel being shown separated for the purpose of accentuating the novelty of my invention, as hereinafter explained. Fig. 2 is a side elevation of a device illustrative of a modification of my invention; and Figs. 3, 4, 5, 6, 7, 8, and 9 are diagrammatic views, which I will hereinafter refer to in describing the differences between my invention and what has preceded it in the art to which it relates.

Similar letters of reference denote like parts in the several views.

By reference to Fig. 1, A represents a wheel which may be composed of any suitable elastic or non-elastic material, with a suitable hub C for securing the same upon the usual spindle or driving shaft. B is an endless band, rim, or tire, composed of leather, canvas, felt, or other suitable material and having its outer face provided with emery or equivalent material incorporated therein or secured thereto. The rim B is made with an interior diameter substantially equal to the diameter of the wheel A and is adapted to be placed thereon. The rim B may be of the same width as the face of the wheel A or it may be wider than the same, for the purpose hereinafter explained, and the face of the wheel A should be imperceptibly convex or crowned in order that the lateral movement of the band or rim B may be guarded against.

In Fig. 2, A represent two wheels of any suitable or desired material and both adapted to be placed upon parallel shafts or spindles D D at any suitable distance apart. One of said wheels is rigidly secured to its support-

ing spindle or shaft, while the other is loosely mounted upon its spindle or shaft in order that it may operate as an "idler" and to take up the slack.

In Fig. 2, E represents a piece of work being operated upon, and in each of the diagrammatic views the work is represented by the same letter of reference.

Referring now to the diagrammatic views of the drawings, Fig. 3 illustrates a side view of a part of an ordinary felt emery-wheel. E represents the work being operated upon, and, as will be seen, the work E under the pressure exerted upon it is slightly embedded in the grinding or polishing face of the wheel, and as a consequence the grinding or polishing surface is humped or lifted, as indicated at F, above the true arc. (Represented by the dotted line.) Now, as will be readily seen, the rapid revolution of the wheel A will result in a constant and recurring raising of the face of the wheel, and as a consequence said face is broken from a true circle into an ever-changing wave-line, causing the rapid destruction of the same.

Fig. 4 represents a side view of a part of a composite wheel composed of a body A and a rim or band B, secured rigidly and fixedly thereto. E represents the work, the pressure of which against the rim causes the outer surface to raise, as shown at F, in the same manner as explained with reference to Fig. 3; but as the wheel A and rim B are separable under such action the raising of the rim and the constantly advancing and changing of such raised point will eventuate in the ultimate entire separation of the rim or band B from the wheel A and likewise the separation of the lapped or joined ends of the rim or band B, and the latter is then free to leave the wheel and fly into the face of the workman, as heretofore stated. This action is exemplified fully by the diagrammatic view Fig. 5, which represents the face of the wheel A and the band B laid out in a flat or horizontal plane and moving in the direction of arrow 1. The pressure of the work E causes the belt or rim to lift slightly, as represented by the short wave or arc *a*, and as the wheel and rim continue to travel in the direction of the arrow 1 a series of short arcs or waves *b c* are successively made, as each preceding one is flattened down by travel under the contact-plane of the work E, and as a consequence it will be clearly seen that while the wheel and rim travel in the direction stated the rim has a contraverted movement, (indicated by the arrow 2,) and consequently where the rim is secured by glue and pegs or otherwise to the wheel the action described will result in the separation of the rim from the wheel and the destruction of the lap-joint of its ends.

Now looking at Fig. 6 and assuming that it represents the wheel and rim or band shown at Fig. 1 put together as contemplated by my invention, it will be seen that as they travel in the direction of arrow 1 the move-

ment of the rim under the pressure of the work E and as illustrated by Fig. 4 will be in the direction of arrow 2, while at the same time the rim is held in frictional contact with the wheel at the plane of contact of the work E with sufficient tenacity to carry the rim under the work and perform its function of grinding or polishing and allowing the upspring of the waving action a free movement backward, as heretofore explained, and consequently protecting it from the rapid destruction which would otherwise ensue. From this described action follows the suggestion of the modification shown at Fig. 2, in which the arrow 1 illustrates the direction of the bodily movement of the band or rim and the arrow 2 the contraverse movement of the slack or wave made by the contact of work E against the rim and wheel. In this modification the same grinding or polishing effect is produced as that secured by the use of the construction shown at Figs. 1 and 6, and according to the distance between the axes of the wheels A A in Fig. 2 time is given for the rim or band B to give up the heat generated by the frictional contact of the work E. In this modification it must be kept in mind that the wheels A are devoid of all flanges, and that consequently the rim or band may be as much wider than the face of the wheel as may be desired in order that such projecting portion of said rim or band may be used.

I desire to call attention to the fact that in all strap-polishers the pulleys which support and carry the polishing-band are so constructed and their bearings so arranged that the strap or band is held under tension, while in my device the band is comparatively loose upon the main supporting-wheel and is perfectly free to travel in a contraverse direction to relieve the polishing-surface from the plowing or disintegrating action, as hereinbefore described.

By reference to diagrammatic view Fig. 7, which is intended to represent the ordinary strap-polisher with the work in contact therewith, it will be seen that the entire surface of the work E is in contact with the band B, while in Fig. 8, which is intended to represent my improved construction, the plane of contact between the work and the polishing-surface is reduced to the minimum, and hence the grinding or polishing action may be rendered more effective by applying to the work a greater degree of pressure than could be successfully done with the form shown at Fig. 7.

As the supporting-wheel of my improved device and the one upon which the work is done may be of any diameter and any material, as heretofore stated, it will be seen by reference to Fig. 9 that I may reduce the diameter of the same to the minimum—say one

and one-half inches—and still have substantially the same working capacity that I would have in a very much larger wheel.

As hereinbefore stated, either wheel may be the driver and the other the idler; but I prefer to make the rear wheel the driver in order that the band or rim will be kept taut between the lower quarterly segment of the work-wheel and the lower quarterly segment of the driving-wheel, while the remaining portion of the band or rim will be comparatively slack and capable of taking up the wave produced by the contact of the work. The first action of the first wave upon the rim or band will be to slightly increase or add to the slackness of the upper part thereof; but at the next impulse this will be taken up by the rim-band and finally end in a simple and very slight deduction from the speed in the direction of arrow 1.

I desire to state the broad proposition that with my improved device the work is performed at a plane tangent to a supporting or operating wheel, and at said point the working face is disconnected at all times from the carrying-wheel, except to the extent of frictional contact induced by the weight of the band when the work is not in contact therewith and when the work is in contact by the weight of the band plus the pressure exerted upon it by the work, thus permitting the wave or lifted portion of the polishing-surface to recede or travel away from the work without in any manner affecting the durability or effectiveness of the polishing-surface, while in all polishing devices as at present constructed and used in which the work is presented against the periphery of the wheel the polishing or grinding face of said wheel is glued or otherwise secured to the face of the wheel, or in case of band polishers the band is designedly kept under such high tension as to counteract any contraverse movement of it with reference to the wheel, and in both wheel and band polishers as at present constructed and operated no provision is made by which the polishing-surface may move relatively to the wheel or wheels upon which it is supported.

What I claim is—

A polishing or grinding device consisting of a circular rotative and flangeless support carrying an endless separate and separable grinding and polishing band, held in operative relation with the revoluble support by its weight alone plus the pressure of the work substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of three witnesses.

EDGAR GRAUERT.

Witnesses:

JONATHAN B. PARDOE,
ADDIE F. OPDYKE,
ROBT. T. BRAMPTON.