(No Model.)

W. E. BADGER.

POLISHING TOOL.

No. 342,493. Patented May 25, 1886.

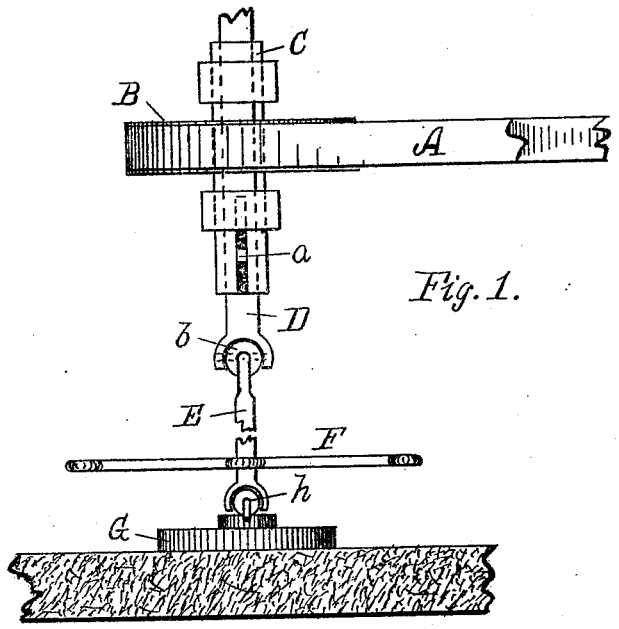
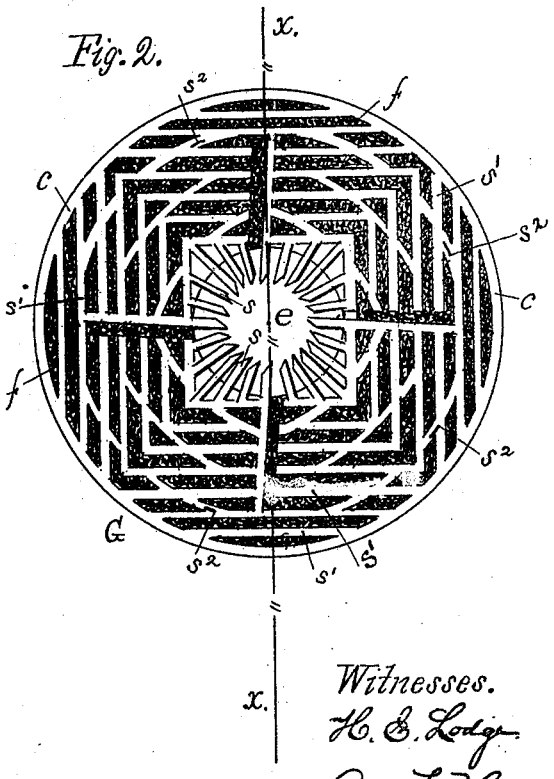


Fig. 1.

Fig. 2.



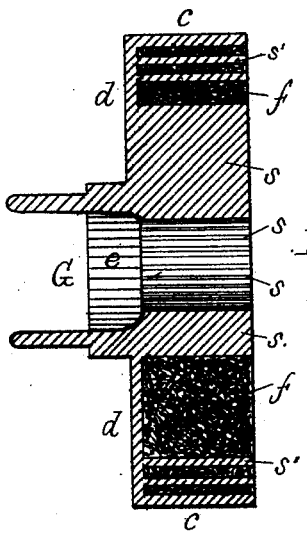


Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM EZRA BADGER, OF QUINCY, MASSACHUSETTS, ASSIGNOR TO BADGER BROS., OF SAME PLACE.

POLISHING-TOOL.

SPECIFICATION forming part of Letters Patent No. 342,493, dated May 25, 1886.

Application filed June 19, 1885. Serial No. 169,202. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EZRA BADGER, a citizen of the United States, residing at Quincy, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Polishing-Tools; 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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to machines for polishing hard material—such as marble, granite, and other analogous substances; and it consists, especially, in the peculiar and novel structure and composition of the parts forming the polishing-tool. This portion of the apparatus is generally circular in form, and is attached to the end of a rapidly-rotating shaft suitably connected to the prime motor. Furthermore, this rod has universal movements, and can be moved about and transferred to any portion of the surface which is to be polished.

In the drawings which accompany this specification, Figure 1 is a side elevation of a portion of a machine to which is attached a polishing-tool embodying my invention, while Fig. 2 is a plan of the active face of the tool, and Fig. 3 is a vertical section of said tool on line *x x* of Fig. 2.

Since these machines are constructed on the same general plan, I shall not illustrate or describe a complete operative device, but simply refer to those parts shown in Fig. 1, as necessarily connected with the polishing-tool.

In said figure, A represents the driving-belt encompassing the pulley B, which is suitably mounted upon and actuates the vertical rotary sleeve-shaft C. This shaft is centrally bored and adapted to receive a shaft, D, fitted with a spline-and-groove connection at *a*. This mechanical device enables the operator to raise or lower the tool to suit the varying thickness of the stones to be polished. The lower end of the shaft D is connected with a second shaft, E, by a universal joint, *b*, and a similarly-constructed ball-and-socket joint unites this last shaft or rod E with the polishing-tool itself.

A hand or guide wheel, F, loosely secured upon the shaft E, enables the operator to guide the tool in any desired position and there maintain it, if necessary.

The construction of this polishing-tool, in which I consider is embodied the gist of my invention, is shown as an entirety at G in Figs. 2 and 3, as consisting of a cylindrical shell or cap, *c*, closed at one end, *d*, which is centrally bored at *e*, in order to admit of grinding or polishing material. The under and bottom side of the tool is open, and the interior of this shell of the polishing-tool is furnished with a series of radial and tangential vertically-disposed partitions or polishing-bars, *s s s' s' s² s²*, which are of the same depth as that of their inclosing-shell *c*, and preferably cast integral therewith. Now, it is well understood in all apparatus for polishing or abrading that it is generally necessary to support the bars, knives, or cutters by some substance, in order to maintain them in their proper relative positions, and, furthermore, that such supporting substance should be of a softer nature or composition than the bars or knives. Thus said supporting material shall be worn away more rapidly, and so not only serve to protect and support the knives, but guard them laterally; and as the softer and more yielding filling is worn away by the active operation of the machine a sharp abrasive or cutting edge is continually maintained upon the bars or knives. Hitherto in apparatus of this particular class this filling has consisted of wood, in which case it is very expensive fitting the same solidly into the interstices, and in order to render the task less expensive the polishing-bars have frequently been formed of a series of concentric circles, or else have been composed of straight bars all radially disposed; and in some cases the filling is entirely dispensed with. Now, in my improved polishing-tool I propose to use a filling of some plastic material or substance, *f*—such as plaster-of-paris—which may be easily run into the interstices, when in a liquid condition, and thereby completely fill the latter. When said substance has hardened, the bars are well support-

ed, and the tool is to all intents and purposes an integral piece. By this method of filling any arrangement of bars or polishing-surface may be obtained without a great expense, and, furthermore, the most efficacious form of such bars adopted, whereby the greatest efficiency and rapidity in polishing are obtained.

By the use of a plastic filling, as herein suggested, the shape of the spaces or cavities between the bars is immaterial to the cost, and I have united in combination three differently-disposed series of bars: First, the radial ones, *s s*, &c., which are to conduct the abrading material outwardly; second, the tangentially-arranged ones, *s' s'*, &c., consisting of a series of squares or lozenges so disposed that during active operation of the tool such cutting-bars shall act angularly upon the surface of the stone or material to be polished, and thus continually exert a sheering or wiping movement thereon; and, thirdly, the concentric circular bars adapted to unite and firmly hold together and strengthen the other bars. Again, by a construction of the tool in this way a saving in polishing material is effected, since in some of these polishing-tools, where no filling is employed, the interstices existing between the bars must be filled with polishing material before the tool will cut properly. The upper or closed end of the tool is centrally bored at *e*, as before premised, to enable the abrading material to be introduced, while the centrifugal force of the tool quickly carries out and properly distributes the same. In order the more readily to accomplish this speedy distribution of the abrading material, I have radially disposed those bars *s s*, &c., which are adjacent to the bore or central opening of the cap, and omitted the plastic material *f*. Thus upon introduction of the polishing material the series of radial bars *s s* sweep said material quickly and rapidly outward between the other bars of the series and the substance to be polished. By this arrangement of knives or polishing-bars much more rapid work is accomplished, since, as I have before premised, the tangentially-disposed series of bars *s' s'*, &c., are continually active.

I claim—

1. In a polishing-machine, a continuous rotary head open at one end and interiorly provided with a series of knives or polishing-bars, and between which bars is disposed plastic material, substantially as and for the purposes stated.

2. The combination, with the rotary sleeve-shaft C and secondary shaft D, vertically sliding therein, of the polishing-tool F, composed of the cup *c*, bars *s s s' s' s² s²*, cast integral therewith, and the plastic filling *f*, substantially as herein described.

3. In a polishing-tool, the combination, with the hollow shell *c* thereof, of a series of radial tangential and circular bars, *s s s' s' s² s²*, all co-operating substantially as herein described.

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

WILLIAM EZRA BADGER.

Witnesses:
H. E. LODGE,
A. F. HAYDEN.