(No Model.)

L. W. ANDREWS.

GRINDING MACHINE.

No. 341,867. Patented May 18, 1886.

Fig. 1.

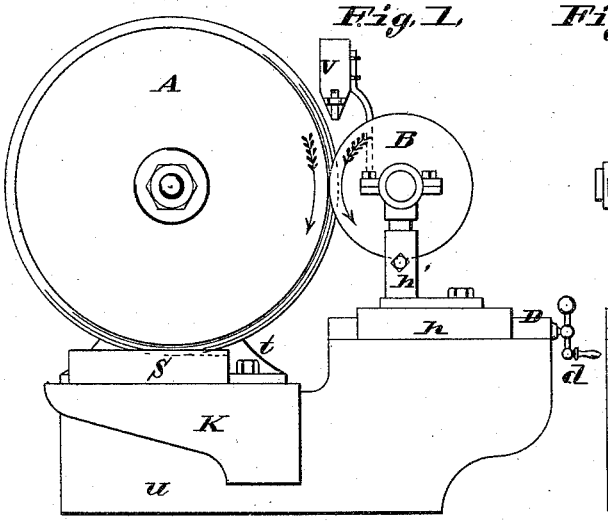


Fig. 2.

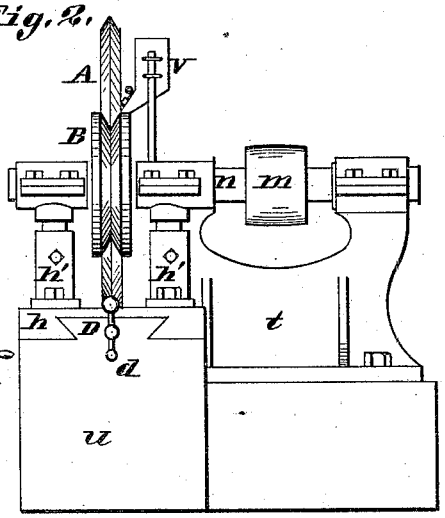


Fig. 3.

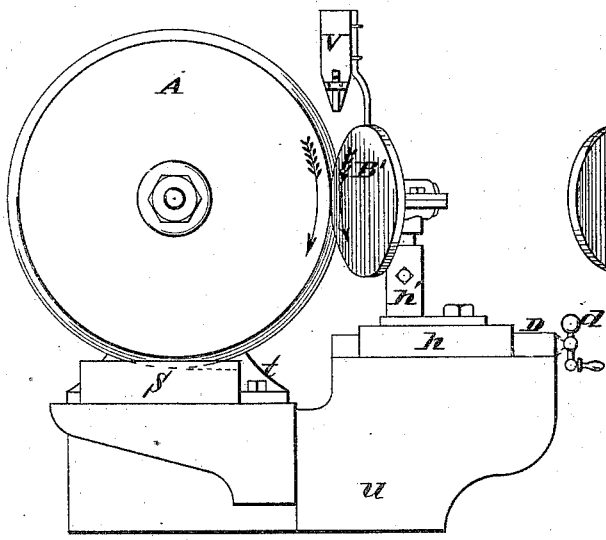
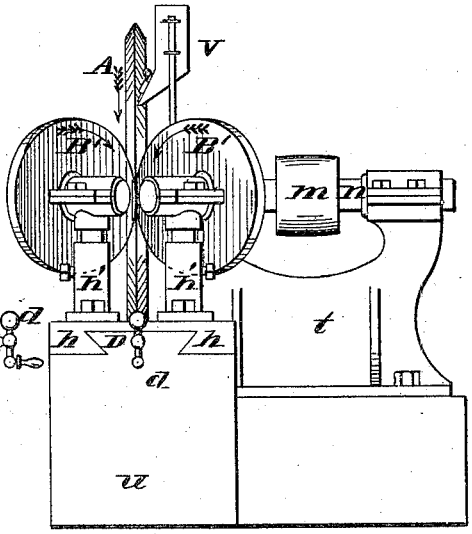


Fig. 4.



Attest;

L. S. Christiansen

R. E. Irwin

Inventor;

Lee W. Andrews

UNITED STATES PATENT OFFICE

LEE W. ANDREWS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO GEORGE K. ANDREWS, OF ST. LOUIS, MISSOURI.

GRINDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 341,867, dated May 18, 1886.

Application filed May 13, 1885. Serial No. 165,393. (No model.)

To all whom it may concern:

Be it known that I, LEE W. ANDREWS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Grinding-Machine; and I do hereby declare that the following is a full, clear, and exact description of my invention.

My invention relates to improvements in that class of grinding-machines in which a revolving disk or cylinder of soft metal is used as a vehicle to carry emery or other abrading material on its surface for the purpose of grinding or abrading articles.

The objects of my improvements are, first, to provide an effective method of attaching the abrading material used to the surface of the grinding-disk; second, to provide means for shaping and retaining the shape of the grinding-disk. The manner in which I attain these objects is illustrated in the accompanying drawings, in which—

Figure 1 is an end view of the machine. Fig. 2 is a side view of Fig. 1. Fig. 3 is an end view of a modification of Figs. 1 and 2. Fig. 4 is a side view of Fig. 3.

A is a circular grinding-disk, constructed of soft metal, such as lead or other suitable material which will serve as a vehicle to carry abrading material on its surface for the purpose of cutting or abrading substances, and which will admit of being shaped by less pressure than would crush the abrading material used. The grinding-disk A is fastened on a shaft, *n*, which revolves in bearings in the stand *t*, and is driven by a belt running on the pulley *m*. The stand *t* is attached to a bed-piece, *u*.

B is a circular roller, constructed of hard metal—such as iron or steel—and is mounted on a spindle or shaft, which revolves in bearings in the stands *h'*. The stands *h'* are attached to a carriage, *h*. The carriage *h* is adjustable on the bed-piece *u*, and slides on the guiding-ways D by means of a screw, the handle of which is shown at *d*, and is adjusted to cause the former B to roll in contact with the cutting-surface of the revolving grinding-disk A with sufficient pressure thereon to cause the surface of the soft-metal disk A to conform to the shape of the harder former, B.

The abrading material, in the form of powder, is delivered to the grinding-disk A at its point of contact with the former B, so as to be carried through between them, and is supplied from a receptacle, V, having a sliding gate or other suitable means of regulating its supply. The former B, being caused to revolve by contact with the revolving disk A, thus operates by rolling pressure thereon to continually maintain or restore the shape of the cutting-surface of the grinding-disk A, and also operates to attach the abrading material to such restored surface by embedding it thereon.

The article S to be cut or ground is placed on a suitable table or support, K.

As represented in Figs. 1 and 2, a single former is used to shape the grinding-disk A and attach the abrading material thereto, the former having a V-shaped groove turned in its face, which will form the reverse shape on the grinding-disk A, and cause the disk A to cut a V-shaped groove in the article to be ground, S. The same object may be attained by using a former made in two parts, as represented in Figs. 3 and 4, the parts B' being set at an angle to the plane of the grinding-disk A, each part operating as a forming and embedding roller on the section or part of the surface of the grinding-disk A with which it rolls in contact. The angle at which each part is set to the plane of the grinding-disk A may be varied, and they may be made of different shape from those illustrated in the accompanying drawings, and may be used for the purpose of forming the cutting-surface of the grinding-disk A to the proper shape to cut grooves or surfaces of other shapes from that illustrated.

I am aware that prior to my invention revolving soft-metal disks coated with abrading material have been used for grinding or abrading purposes in which the abrading material was embedded on the grinding-disk by frictional or rubbing contact with the article to be ground. I therefore do not claim as new the use of soft-metal disks having abrading material embedded on their surfaces for grinding purposes.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a grinding-machine, the combination

of a soft-metal grinding-disk and a hard-metal former mounted with its forming-surface in contact with the cutting-surface of the grinding-disk, whereby the cutting-surface of said disk is formed into and retained in the desired shape by said former, all substantially as shown and described.

2. In a grinding-machine, the combination of a soft-metal grinding-disk, a hard-metal former mounted with its forming-surface in contact with the cutting-surface of the grinding-disk, and a receptacle for delivering an abradent to the grinding-disk at its point of contact with the former, whereby the cutting-face of the grinding-disk is formed into and retained in the desired shape and the abrading material embedded therein by said former.

3. The combination, in a grinding-machine, of a soft-metal grinding-disk and an adjustable former, arranged and operating substantially as and for the purpose set forth.

4. The combination, in a grinding-machine, of a soft-metal grinding-disk and a grooved former mounted on an adjustable support, substantially as set forth.

LEE W. ANDREWS.

Witnesses:
L. P. CHRISTIANSEN,
R. E. IRWIN.