Feb. 13, 1923. 1,444,803

L. RATNER ET AL

METHOD FOR TESTING MATERIALS

Filed May 16, 1921

Fig:1.

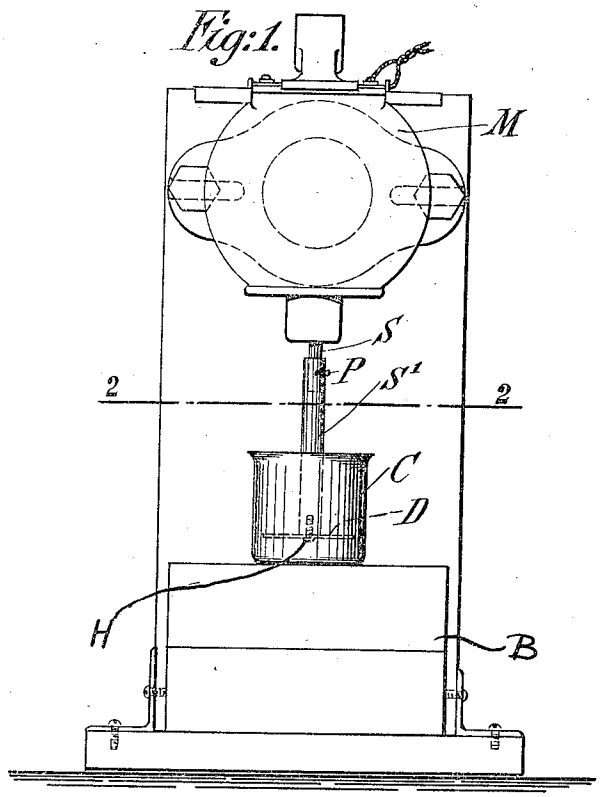


Fig:3.

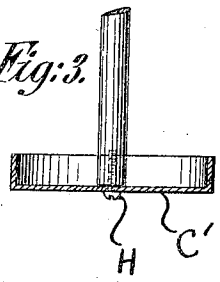
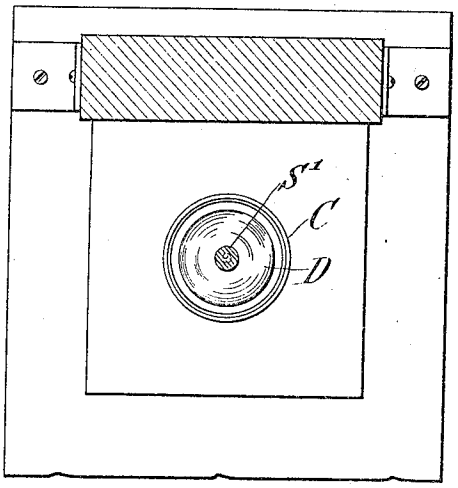


Fig:2.



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UNITED STATES PATENT OFFICE.

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METHOD FOR TESTING MATERIALS.

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To all whom it may concern:

Be it known that we, LEO RATNER and MAURICE SCHWARZ, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Methods for Testing Materials, of which the following is a specification.

Our invention relates to a new and improved method of testing abrasives and also materials which are subject to an abrading action.

Heretofore it has been impossible to accurately test abrasives or to accurately test the strength of materials to resist an abrading action. Abrasives have been sold largely on a basis of guess-work and it has been impossible for a purchaser to be able to test the abrasive in a convenient and economical manner.

One of the objects of our invention is to provide a method and mechanism whereby abrasives may be quickly and cheaply tested.

Another object of our invention is to provide a mechanism for quickly and economically carrying out the said method.

Other objects of our invention will be set forth in the following description and drawings which illustrate a preferred embodiment thereof.

Fig. 1 is a diagrammatic view largely in elevation.

Fig. 2 is a section along the line 2—2 of Fig. 1.

Fig. 3 illustrates a detail view.

A cup C is mounted upon a suitable base B. Above the base B an ordinary electric motor M of any suitable design is supported in any suitable frame. This motor M has a shaft S which is preferably vertical and this shaft S has a recessed extension S′ secured thereto by the pin P so that the extension shaft S′ can readily be removed at any time.

A disc D can be removably secured to the extension shaft S′ by means of the bolt or screw H.

To carry out our invention, the parts are assembled in the manner shown in Fig. 1 and Fig. 2 and the cup C is filled with the abrasive which of course is in powdered form, to a level above the top of the disc D.

When the motor is started, the abrasive which rests upon the top of the disc D, which is made of brass or some other suitable material which is slowly ground or abraded by the action of the abrading material, is set into rapid motion. This motion is of the vortex type as the particles of abrasive seem to move in regular closed paths relative to the top of the disc D. This is because the revolution of the disc D, which may be called the test disc, imparts a tangential motion to the particles of abrasive and at the same time the centrifugal force tends to move them outwardly in a radial direction. This tendency to move from the center to the side of the cup causes the abrasive material to be heaped up at the side of the cup and depressed in the center. After the angle of repose of the abrasive has been reached particles move inwardly from the side of the cup to the center to take the place of the particles which are forced centrifugally from the center. It is therefore evident that the particles of abrasive above the level of disc D are continually active; that is to say they are at all times either moving outwardly under centrifugal action (thus abrading the surface of the test disc) or moving inwardly under gravitational action.

After the motor has been operating at the same speed for a definite period of time, the test disc D which has been weighed before it was secured to the extension shaft S′ is again weighed and the loss of material of the test disc D indicates the power of the abrasive. By comparison with some standard abrasive, the efficiency of the material tested can be easily determined. It is desirable that the uniformity of the speed of rotation of the shaft S be tested from time to time by means of a revolution counter.

The embodiment shown in Fig. 3 is intended to test the power of a material, like that of a given grade of leather for example, to withstand a rubbing or abrading action. For this purpose, the cup C is filled with some abrasive of known abrasive quality, and the motor is operated in the same way as before, except that in this case the loss of weight of the test disc is a measure of the resistance of the material.

Since the main action is on the top of the test disc, it is preferred to provide a cup C′ of the same diameter, depth and contour as the test disc D of the material to be tested, so that the said cup C′ shall cover all parts of the test disc, save its top and abrading action shall be entirely confined to the top of the test disc.

In the embodiment shown in Fig. 3, the cup C′ can be made of metal, such as brass

or the like so as to thoroughly protect the test disc D except at the top thereof. In this embodiment, the test disc is fitted within cup C′, and both are then secured to member S′ by bolt H. In the embodiment of Fig. 1, the disc is not protected.

The above method is valuable not only for determining the relative abrasive qualities of different materials, but also of different sizes of the same material or of mixtures of different sizes of the same or unlike materials.

We have shown a preferred embodiment of our invention but it is clear that numerous changes and omissions could be made without departing from its spirit.

What we claim is:

1. A method of testing the action of an abrasive which consists in revolving a body of a material which can be acted upon by the said abrasive, below the top of a mass of particles of the said abrasive, so that the particles of said abrasive which are adjacent the said disc will be moved away from the periphery of the said disc, the said particles being restrained from further outward movement at a definite distance beyond the periphery of the said disc, so that the pressure of the upwardly moving particles upon the particles which are prevented from further upward movement produces a vortex-like movement of the said particles.

2. A method of testing the action of an abrasive which consists in revolving a body of a material which can be acted upon by the said abrasive, below the top of a mass of particles of the said abrasive, so that the particles of said abrasive which are adjacent the said disc will be moved away from the periphery of the said disc, the said particles being restrained from further outward movement at a definite distance beyond the periphery of the said disc, so that the pressure of the upwardly moving particles upon the particles which are prevented from further upward movement produces a vortex-like movement of the said particles, the said particles being permitted to only act upon the top of the said test body.

3. A method of testing the action of an abrasive on a material which consists in causing the movement of a mass of fine particles of said abrasive relative to a body of said material and in contact with said body so that said particles move in substantially horizontal paths, and determining the loss in weight of said body.

4. A method of testing the action of an abrasive which consists in revolving a body of material around a substantially vertical axis, in a mass of fine particles of the said abrasive, and determining the loss in weight of the said body.

In testimony whereof we hereunto affix our signatures.

LEO RATNER.
MAURICE SCHWARZ.