

June 28, 1932.

G. R. RAYNER

1,864,616

ABRASIVE STONE

Filed Jan. 25, 1928

Fig. 1.

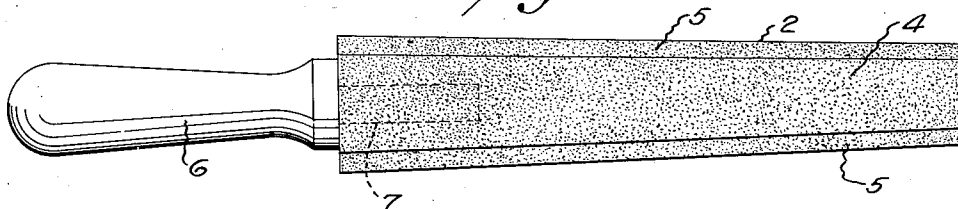


Fig. 2.

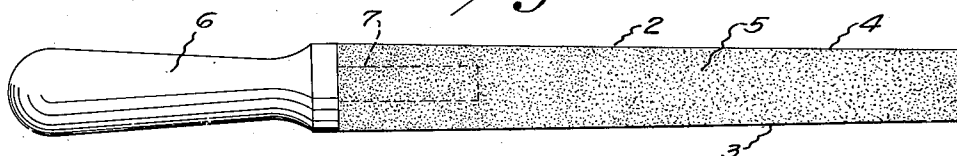


Fig. 4.

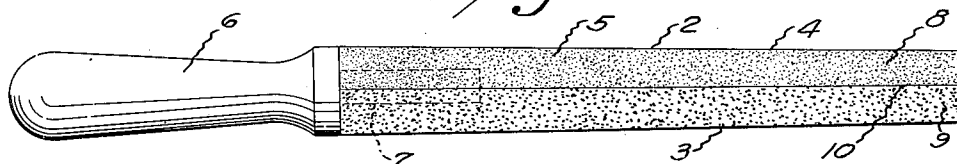


Fig. 5.

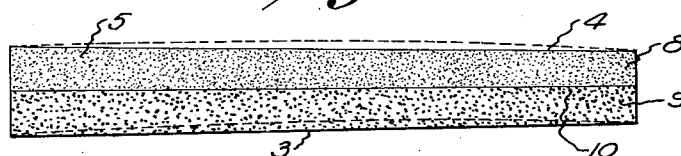
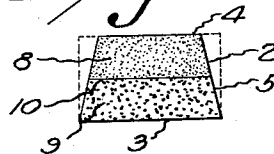


Fig. 3.



Fig. 6.



INVENTOR

George R. Rayner
by his attorneys
Rayner, Stettin & Kamelie

UNITED STATES PATENT OFFICE

GEORGE R. RAYNER, OF LEWISTON HEIGHTS, NEW YORK, ASSIGNOR TO THE CARBORUNDUM COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF PENNSYLVANIA

ABRASIVE STONE

Application filed January 25, 1928. Serial No. 249,329.

This invention relates to an abrasive or sharpening stone, and particularly to a formed abrasive article especially shaped to adapt it to various abrading and sharpening purposes where it can be used in the same way as a metal file.

The invention may be readily understood by reference to the accompanying drawing, in which:

Figure 1 is a top plan view of an abrading stone embodying my invention;

Figure 2 is a side elevation thereof;

Figure 3 is an end view;

Figure 4 is a view similar to Figure 2, showing a combination coarse and fine grit stone;

Figure 5 is a side elevation of a stone without the handle and showing the manner in which the combination coarse and fine grit stone is made; and

Figure 6 is an end view of the article shown in Figure 5, the dotted lines indicating the original form of the article prior to the final shaping process.

The stone, which is convenient for use as a file, and which I hereinafter term a file, comprises an elongated body 2 formed of bonded abrasive material having a flat bottom 3 which is parallel with the longitudinal axis of the body. The top 4 of the body tapers from one end toward the other, the top forming an angle of from 1° to 10° with the bottom. The two sides 5 form an angle with the bottom of from 65° to 85° , as clearly shown in the drawing. The cross section of the body at any point is trapezoidal, with the cross section gradually diminishing in area from one end to the other.

Secured to the larger end of the body is a handle 6. The handle 6 is preferably formed of wood with an extension 7 fitted and cemented into an axially extending socket in the body 2.

Figures 1, 2 and 3 show a stone of uniform grit. However, the file may be made of a composite structure as shown in Figures 4 to 6, inclusive. In Figure 4, the stone has two layers 8 and 9. The upper layer is preferably of fine grit abrasive material, such as silicon carbide of 100 to 150 mesh. The

lower part is composed of coarser grit, say from 70 to 90 mesh.

In the manufacture of the composite coarse and fine grit file, the mix, comprising the coarse grit and the bonding material, such as ceramic binder, is pressed in a straight-sided mold of the proper dimensions to the proper thickness, the top of this layer being pressed to a bevel equal to one-half of the bevel of the finished article. The line 10 on Figure 4 represents the surface of separation between the two layers, and it will be seen that this line 10 makes an angle with the line 3 which is half of the angle between the lines 3 and 4. After the bottom layer has been pressed, the mold is filled with the fine grit mix and another plunger is placed in the mold and the mass pressed to the desired thickness and the top bevelled, allowing a little over-size for shrinkage in burning and finishing operations. It has been found that by giving the bottom surface of the bottom layer a very slight concave curve longitudinally thereof, as indicated by the lower dotted line in Figure 5, and by giving the top surface of the top layer a slight convex curvature longitudinally of the body (as indicated by the upper dotted line in Figure 5) that these curvatures will counteract the uneven shrinkage of the two mixes during burning.

When the body is pressed, it is rectangular in cross section with the top of the body sloping from one end toward the other. A template is then placed on the top of this rectangular slab and the slab is cut away roughly with a knife and finally with a beveled scraper guided by the template, giving the sides the proper bevel. In Figure 6 the dotted lines show the original outline of one end of the pressed slab while the full lines show the cross sectional shape of the finished article. After the slab has been shaped, a metal guide is placed against the end thereof whose shape conforms to and is of the same dimension as the larger end of the block. An auger is run through a hole in this guide into the end of the slab and a hole bored into the end of the slab parallel to the bottom. The file is then packed with others in saggars and burned to No. 11 to 12 cone heat. After burning, the sides are

trued on a rotating iron disk fed with water and silicon carbide abrasive. After being finished, the file is fitted to the handle 6. The article shown in Figure 1 may be manufactured in the same way in so far as shape, burning, finishing, and applying the handle are concerned.

An abrasive file as thus constructed is a very convenient implement for quickly sharpening the edge of mower section knives of mowing machines where the space between the cutting edges is triangular. It is also a convenient implement for sharpening various other farm tools, such as scythes, grass hooks, spades, hoes, shovels and other implements around the farm.

The bevels given the three sides make it possible to give the file greater thickness without impairing the ability to use it in the triangular shaped space between mower section knives. The beveled sides also afford and effect the application of a progressively tapered cut between the strokes without changing either the angle at which the file is held or the pressure which is being applied. They also allow the file to follow the work as it is being cut away without resorting to a sawing up and down action which tends to make an irregular surface on the work and which also results in the more rapid and uneven wearing down of the abrasive. The shape therefore allows the stone to wear more regularly, retaining its shape as it wears down. Furthermore, the taper permits the file to be entered in an opening and the subsequent progressive widening of an opening by the continuous forward stroke.

By reason of the greater thickness which can be secured without decreasing the utility and which also provides greater advantages in the cutting, the file is longer wearing and less likely to be broken. Where combination grits are used, the coarse grit will give quicker cutting action while the fine grit will give a more even and smoother edge where needed. The file can be used in the working of the hardest steel and metals that ordinary steel files will not touch.

While I have specifically shown and described a preferred embodiment of my invention and a preferred method of manufacture, and have also given specific examples of the grits and angles which are used, it will be understood that this is merely by way of illustration and various changes and modifications may be made within the scope of the appended claim.

I claim:

The method of making a hand sharpening stone in the form of an elongated body of bonded abrasive material of trapezoidal cross-section, which body is continuously and gradually tapered from one end toward the other and the length of which is many times its width or thickness, and which is made up of

two layers of abrasive of different grit sizes, which comprises first pressing one layer of abrasive material in a mold, then pressing a second layer in contact with the first, and slightly curving the outer faces of the composite article to make the face of article on the fine grit size convex in longitudinal section and the face on the coarse grit size concave in longitudinal section, and then baking the article.

In testimony whereof I have hereunto set my hand.

GEORGE R. RAYNER.