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FLEXIBLE ABRASIVE PRODUCT

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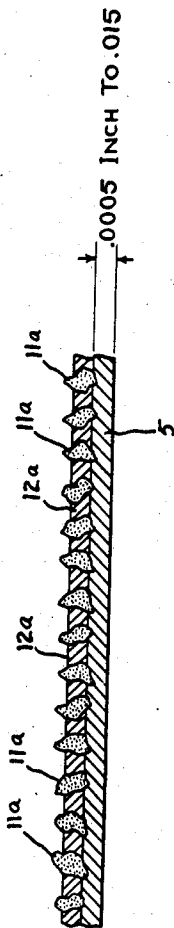


Fig. 2.

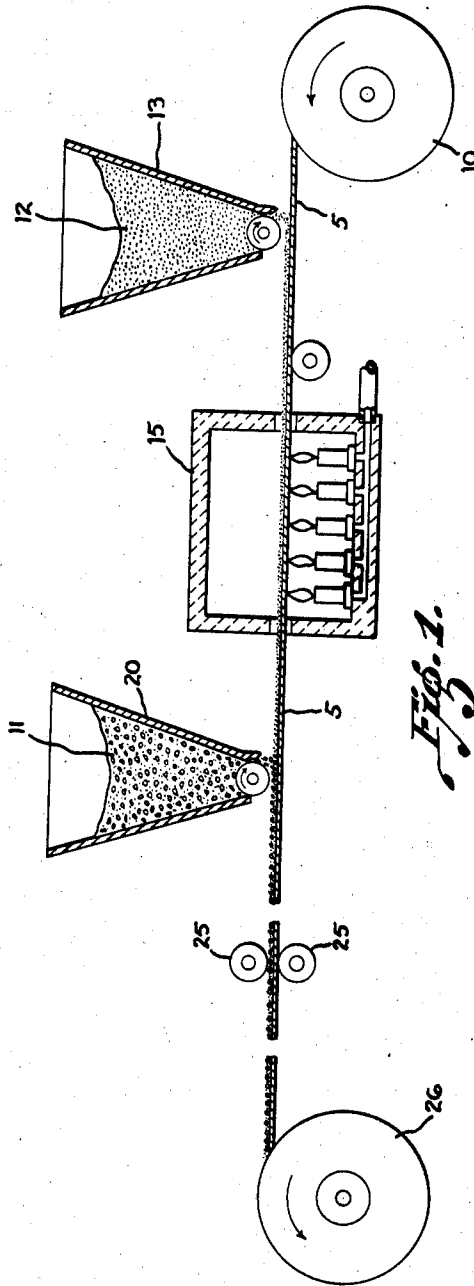


Fig. 1.

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FLEXIBLE ABRASIVE PRODUCT

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2 Claims. (Cl. 51—309)

The invention relates to flexible abrasive products.

One object of the invention is to provide a flexible abrasive product of great tensile strength. Another object of the invention is to provide a flexible abrasive product suitable for the manufacture of endless belts and the like. Another object of the invention is to affix abrasive grains to a metal sheet by a combined soldering and rolling process whereby the abrasive particles will be firmly retained on and in the sheet metal. Other objects will be in part obvious or in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements, arrangements of parts, and in the several steps and relation and order of each of said steps to one or more of the others thereof, all as will be illustratively described herein, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing illustrating one of many possible embodiments of the mechanical features of this invention,

Fig. 1 is a schematic view of apparatus for manufacturing the flexible abrasive product,

Fig. 2 is an enlarged sectional view of the flexible abrasive product.

I provide a quantity of sheet metal 5, preferably on a roll 10. I utilize soft metal into which the abrasive can be embedded. I also desire metal which has a low elastic limit, that is to say, which can be readily deformed. Soft steel, especially in thin sheets, is suitable. I may also use copper or aluminum sheets.

The sheet metal may be of any suitable width, for example a yard wide. Preferably the sheet metal is very thin, for example from half a thousandth of an inch to fifteen thousandths of an inch in thickness. A highly practical thickness is of the order of two to ten thousandths of an inch.

I provide a quantity of abrasive material 11 in comminuted form. I may use fused alumina, emery or corundum, silicon carbide, garnets, quartz or diamonds, boron carbide, tungsten carbide or other hard carbides or any other desired abrasive, for example crushed glass. The abrasive grain should have a thickness not much greater than that of the metal sheet and in some instances the largest dimension of the abrasive grains may be less than that of the sheet. When using metal five thousandths of an inch in thickness, abrasive grain of 200 mesh grit size and finer is preferred. A good combination is a copper

sheet five thousandths of an inch in thickness with 400 mesh grit size fused alumina abrasive.

I further provide a quantity of finely divided metal powder 12, selecting a metal or alloy which has a considerably lower melting point than the metal of which the sheet is formed. For example, with any of the kinds of sheet metal mentioned, I can use powdered tin, zinc, solder or similar low melting point metals or alloys. A practical example of a good metal powder, especially when using copper sheets, is tin powder.

The sheet is mounted on the roll 10 and a suitable feeding and guiding mechanism is provided. This it is not necessary to illustrate since the take-up and guiding rolls of the sandpaper manufacturing machine may be employed. The product of the invention may be made in the following manner: The sheet is drawn under a hopper 13 filled with a metal powder which is deposited in a steady stream upon the sheet. A hopper of the type used for abrasive paper manufacture may be employed in this case. The sheet then passes through an oven 15 and is heated to about 215° C., to melt the tin. As it leaves the oven, a second hopper 20 filled with abrasive delivers a waterfall of abrasive to the sheet. The sheet now moves beyond that point a distance sufficient to cool it to a lower temperature, for example of the order of 190° C. The sheet then passes between steel rollers 25 which press the abrasive grains into the sheet and compress the fused tin or other coating which was supplied in the form of powder. The sheet is then drawn a sufficient distance to allow it to cool considerably and is then wound up on a take-up roll 26. The product is thereby finished.

The product of the invention comprises a readily deformable thin sheet of metal 5 having a superimposed surface of a lower melting point metal 12a fused upon the sheet with abrasive grains 11a embedded partly in the sheet itself and partly in the added metal which is fused thereto. A high speed abrasive belt may be made from the product of the invention which will last for a very long time. The abrasive grains will be only with great difficulty removed from the belt. Consequently they will give substantially their full cutting life. The belt made with the product of the invention is not so easily torn as a paper or cloth belt. The abrasive may be diamonds, in which case their great hardness can be practically utilized. So far as I am aware, no one has heretofore commercially used diamonds on a flexible sheet backing because the diamonds would come off of the backing long before the end

of their effective abrading life. But according to the invention they may be so firmly attached to a metal sheet as to make use of their great hardness, the product being of long life.

It will thus be seen that there has been provided by this invention an article and a method in which the various objects hereinabove set forth together with many thoroughly practical advantages are successfully achieved. As various possible embodiments might be made of the mechanical features of the above invention and as the art herein described might be varied in various parts, all without departing from the scope of the invention, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A sheet abrasive product comprising a soft metal sheet of a thickness between .0005 and .015 inch, a coating of a soft metal which has a materially lower melting point than the metal of said sheet integrally fused to at least one side of said sheet, and abrasive grains embedded both in said sheet and said coating.

2. A readily deformable thin sheet of metal having a superimposed surface of a lower melting point metal fused upon the sheet, and abrasive grains embedded partly in the sheet itself and partly in the added metal.

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