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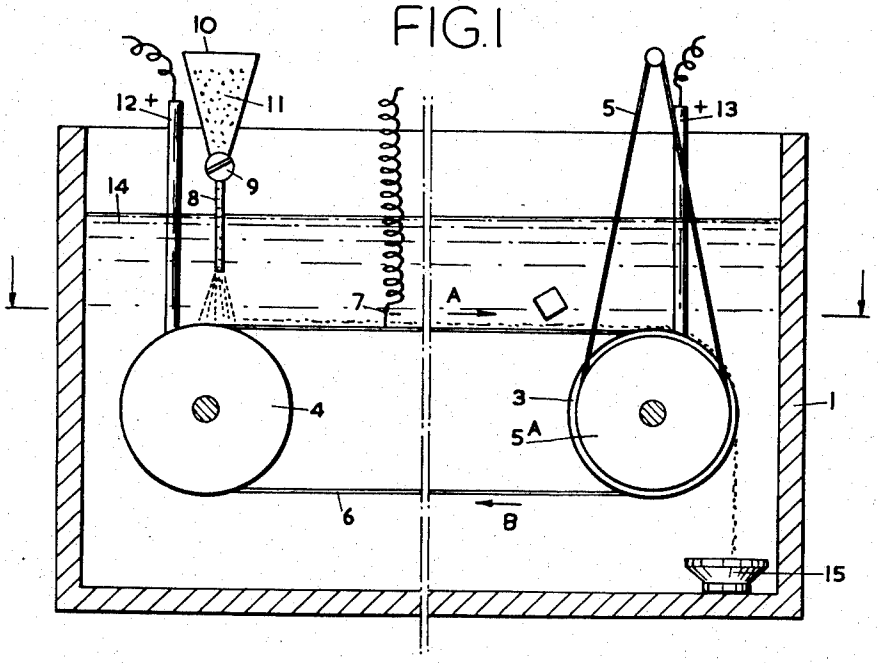
METHOD OF MANUFACTURING ABRASIVE SURFACES BY ELECTRO FORMATION AND THE PRODUCTS OBTAINED THEREBY

Filed Oct. 14, 1955

FIG.1



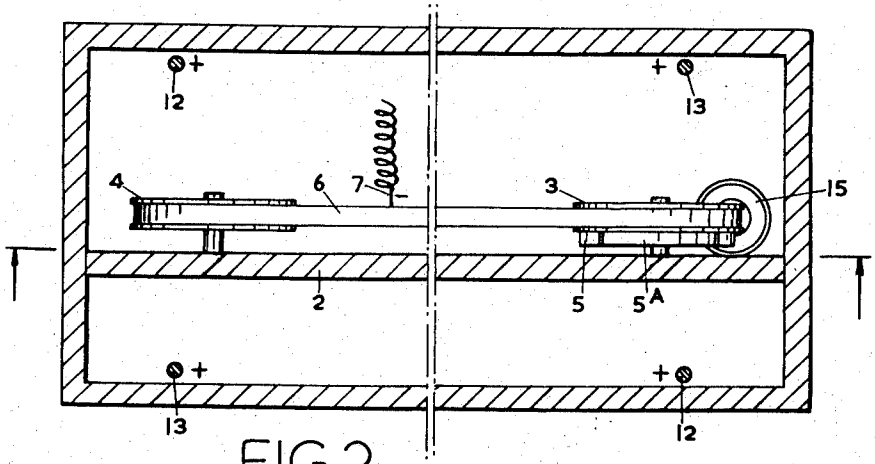


FIG.2

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2,878,171

METHOD OF MANUFACTURING ABRASIVE SURFACES BY ELECTRO FORMATION AND THE PRODUCTS OBTAINED THEREBY

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Claims priority, application France April 18, 1955

2 Claims. (Cl. 204—16)

Grinding wheels as well as the tools destined for their use, dressing, polishing the hardest materials, must be capable of treating a division of extreme fineness. When the substance to be worked on is of great value, it is necessary to be able to dress a surface without removing a too large amount of material.

Now the quality of the work depends on the thickness of the tool and upon its hardness. Abrasive surfaces are generally speaking secured on a support which increases their thickness whilst at the same time diminishing the utilisable sections.

The object of the invention consists exactly in the provision of a grinding wheel of which the mass itself comprises abrasive substances and which can for this reason be without a support, the latter consisting of the added metal itself in which the portions of abrasive are contained or mounted.

It is characterised by the means for carrying out the invention taken not only as a whole but separately and more particularly by the enveloping of the abrasive substance by the added metal on an endless movable support, polarised and immersed, which permits of the removal without tearing out the treated mass at the end of the operation.

On the accompanying drawings given by way of non limiting example of one of the forms of construction of the subject matter of the invention:

Fig. 1 shows the arrangement seen in longitudinal section;

Fig. 2 represents the apparatus in plan view.

The apparatus consists of a tank **1**, Figs. 1 and 2, which is watertight and comprises a framework **2** on which is mounted a driving pulley **3** and a loose pulley **4**. This assembly is immersed. The pulley **3** is driven by a driving mechanism **5** with juxtaposed groove **5***a*.

A belt of rustless steel **6** connects the two pulleys and comprises a cathodic contact **7** formed by a flexible wire soldered at a suitable point and moving with the endless travel of the belt. At one end of the belt on the upper horizontal plane, opens a distributing conduit **8** comprising an adjustable delivery **9** disposed at the base of the hopper **10** containing the abrasive material **11** such as diamond powder. The part of the belt which does not form a support and in contact with the pulley is covered with a protecting varnish.

On the faces of the tank are connected the anodes **12** dipping beneath the level **14** of the electrolyte.

The operation and advantages of this apparatus will then be understood.

When the current is transmitted to the tank **1** by the anodes **12**, **13** and the cathode **7**, the added metal is slowly deposited on the metallic belt **6** which moves in the direction of the arrow A by the movement transmitted to it by the driving pulley **3**. When the belt passes beneath the distributor **8** it is covered with a layer of abrasive powder the thickness of which varies according to the adjustment of the distributor **9**. The amount of this abrasive layer is likewise a function of the speed of movement of the belt.

During the first part of the passage situated in the upper plane of the driving pulleys supporting the belt, the grains are distributed and receive the added material which stabilises them. The excess quantities fall away when the support assumes the vertical position and are collected in the recuperation receptacle **15**.

During the lower return travel, arrow B, the abrasive dust is already fast and continues to receive the added material which effects the complete envelopment; this covering can be increased by allowing the electrolysis to continue for several rotations. The duration of the operation varies according to the thickness of the grains.

It is likewise possible to add several abrasive layers according to the thickness of the working surface which it is desired to obtain. The various layers combine together and form a texture without heterogeneous surfaces and of complete regularity. At the end of the operation the carrying belt **7** is removed and the abrasive tool is detached.

This abrasive tool without support then has the form of an endless band and can afterwards be used as a band saw. Its thickness is minimum and all its surfaces are utilisable. Nevertheless before putting it to use, its two faces are ground in order to free the abrasive.

The mounting of machine tools with these bands having abrasives in their mass permit of carrying out work of all dimensions and in all planes.

It is obvious that the carrying belt can likewise receive a series of shapes and can be used for the covering of all supports in the form of discs, blades or otherwise or again can form tools by electro formation with appropriate masks.

Nevertheless the shapes, dimensions and dispositions of the various elements can vary within the limit of their equivalents as likewise the materials used in their manufacture without thereby changing the general conception of the invention which has just been described.

I claim:

1. The method of producing abrasive tools, in the form of a continuous belt of bonding metal containing layers of even thickness of abrasive particles, including the steps of depositing successive layers of abrasive particles on a moving endless belt carrier in a cyclical process, and simultaneously and continuously depositing bonding metal on the carrier by electrodeposition at a rate such that particles of abrasive material deposited on the carrier become completely enclosed by bonding metal before the next succeeding deposition of abrasive particles on that portion of the belt occurs.

2. The method of producing abrasive tools, in the form of a continuous belt of bonding metal containing layer of even thickness of abrasive particles, including the steps of depositing successive layers of abrasive particles on a moving endless belt carrier in a cyclical process, and simultaneously and continuously depositing bonding metal on the carrier by electrodeposition at a rate such that particles of abrasive material deposited on the carrier become completely enclosed by bonding metal before the next succeeding deposition of abrasive particles on that portion of the belt occurs, any particles of abrasive material which have not commenced to be bonded after a certain interval, less than the period of rotation of the carrier, being caused to separate from the carrier by gravity.

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