Dec. 26, 1939. L. HALE ET AL 2,185,027

ABRADING IMPLEMENT AND METHOD OF MAKING AND OF ASSEMBLING THE SAME

Filed April 16, 1937

FIG. 1

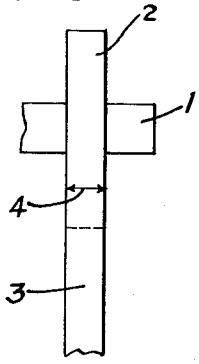


FIG. 2

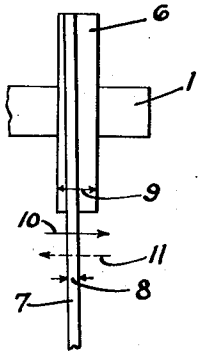


FIG. 3

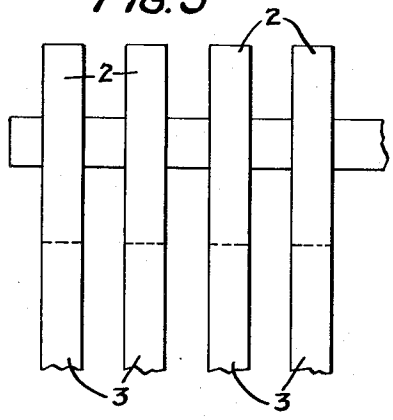


FIG. 4

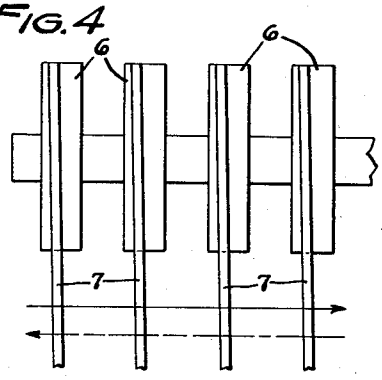


FIG. 5

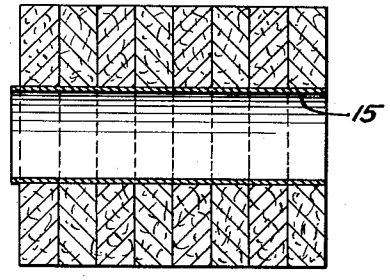


FIG. 6

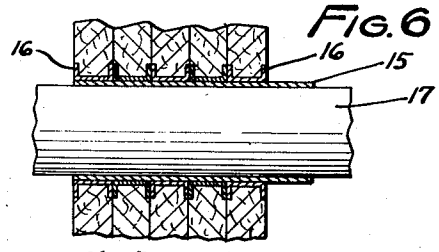


FIG. 7

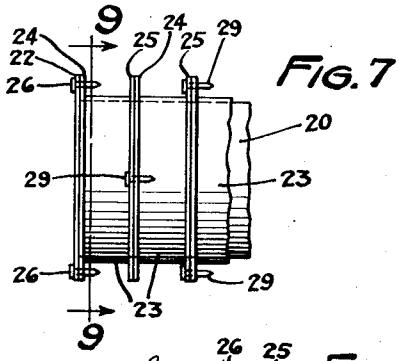


FIG. 8

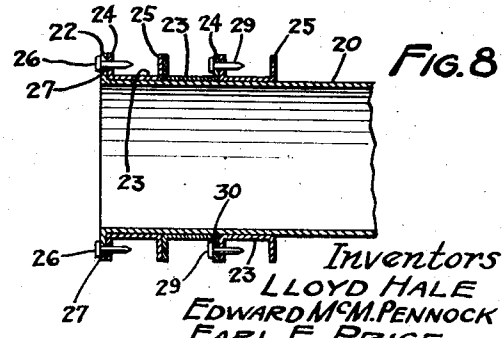
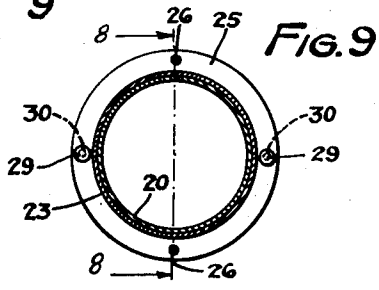


FIG. 9



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ABRADING IMPLEMENT AND METHOD OF MAKING AND OF ASSEMBLING THE SAME

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Application April 16, 1937, Serial No. 137,378

6 Claims. (Cl. 300—21)

This invention relates to abrading devices and methods of making the same. An object is to provide a method for winding filaments, ribbons, or threads of abrasive material for the formation of rotary abrading elements, in a manner to increase the number and area of the abrading surfaces and to render them more efficient and uniform in their abrading actions.

Another object of the invention is to generally provide a steel wool roll which is made up of a plurality of abrading units, said units being capable of being assembled in greater or lesser numbers to produce rolls of greater or lesser axial length. Another object is to provide a roll made up of a plurality of sections with each section wound spirally or helically and with the sections so related that they cooperate to provide a cylindrical abrading surface.

Other objects are to provide a method in which a plurality of the abrading sections or discs are wound simultaneously on separate cores, removably mounted on a winding mandrel, driven from a suitable source of power, whereby a plurality of similar units are provided which may be reassembled to produce larger or smaller abrading implements as desired.

Features of the invention include all details of construction shown, along with the broader ideas of means inherent in the disclosure.

Objects, features and advantages of the invention will appear in the description of the drawing and in said drawing:

Figure 1 is a diagram illustrating the production of one of the units or discs by the spiral winding of a ribbon of suitable abrasive material, such as steel wool, the width of which ribbon is substantially the same as the axial length of the unit;

Figure 2 is a diagram showing a unit being produced by the helical winding of a ribbon or filament of abrading material the width of which is less than the axial length of the disc;

Figure 3 is a diagrammatic view showing simultaneous winding of a plurality of units spirally as in Figure 1, it being understood that units may be spaced (as shown for convenience) but are preferably arranged in abutting relation;

Figure 4 is a diagrammatic view showing the simultaneous production of a number of units by winding helically in the manner of Figure 2;

Figure 5 is a longitudinal section representing the units of either Figures 1 and 3, or of Figures 2 and 4, after completion in situ, or after being assembled;

Figure 6 is a section showing a modification in which the units are wound on cores, while such cores are on a sleeve or mandrel, or which are assembled on a mandrel or sleeve, after winding;

Figure 7 shows one means of detachably securing the cores on a sleeve or mandrel;

Figure 8 is a section on line 8—8 of Figure 9; and

Figure 9 is a section on line 9—9 of Figure 7.

Referring first to Figure 1 the numeral 1 represents any suitable support, such as a sleeve or mandrel, upon which the unit, indicated by numeral 2, is wound. In this instance, the unit 2 is formed by winding a ribbon 3 of steel wool upon itself, whose width is substantially equal to the axial length 4 of the unit, so that the ribbon is wound spirally as distinguished from helically. Although the use of steel wool, in the manner of this disclosure is claimed per se, the broader use contemplates other abrasive material, which can be made up in any way to provide unit abrading elements, which are combined to make a rotary abrading implement.

In Figure 2 as in Figure 1, the numeral 1 indicates the supporting sleeve, mandrel or shaft, and numeral 6 indicates a unit or disc which may be of any suitable axial length. This unit, however, is produced by the helical winding of a ribbon or filament or filaments 7 whose combined or single width 8 is less than the width 9 of the completed unit 6. The unit 6 is produced by helical winding accomplished by motion of the ribbon back and forth axially as diagrammatically indicated by the arrows 10 and 11.

The steel wool used in the construction of the novel abrading units herein disclosed, is preferably in the form of relatively long strands or filaments. These strands or filaments are arranged to form a ribbon or strip of steel wool which may be of any suitable length, and for storage purposes, is preferably loosely wound onto a small core and into a relatively large roll or bale of steel wool, not shown in the drawing. From this roll or bale, the steel wool may be conveniently wound onto the supporting core or mandrel 1 in the form of a flat ribbon, in which the strands run in a longitudinal direction and are loosely associated with one another. The inherent nature of the steel strands or filaments causes them to adhere more or less to one another, whereby the strands of steel wool may readily be handled and wound into abrading units, as shown in either Figure 1 or Figure 2.

It is understood that the units 2 and 6 shown in Figures 1 and 2 respectively, may be made directly on a shaft, and thereafter transferred to a sleeve or core where with other units it forms

a complete abrading implement, or it can be formed on a sleeve or core which is thereafter slipped over a shaft or mandrel to form with a plurality of such units a complete implement. Figure 5 shows somewhat diagrammatically how the units may be wound simultaneously on a sleeve or core 15. Figure 6 shows how separate sleeves 16 may be introduced over a mandrel 17 or sleeve 15 thereon, either for the purpose of simultaneous winding or after separate or simultaneous winding on another mandrel or shaft of a winding machine. It will be understood that the sleeves 16 may be mounted on the mandrel sleeve 15 or directly on mandrel or shaft 17, and that the abrading units may be wound, according to the scheme shown in Figure 1 or 3, and according to the scheme shown in Figures 2 and 4.

Referring to Figure 3, although the units 2 are shown in spaced relation, it is understood that winding is ordinarily accomplished so that one unit is built up against or in contact with the other, as in Figures 5 and 6. Of course the units may be removed after formation and then strung along a sleeve or shaft in abutting relation, as shown in Figures 5 and 6, to form a relatively solid, firm cylindrical abrading unit.

It will of course be understood that a plurality of elements 16 or 23 may be abuttingly arranged as in Figure 6 and then have the abrading elements built up thereon or they may be separately wound, as in Figures 1 and 2, and later assembled as in Figure 6 or 8. It is also understood when wound separately as in Figure 1, suitable side plates, not shown, are provided and laid against the outer sides of the flanges of element 16 shown in Figure 6, in a manner to confine and guide the material while winding progresses to give the desired final diameter.

Referring to Figure 4 the same remarks apply as to spacing. Although the elements 6 are shown spaced, it is understood that the windings are preferably made or built up while in contact with one another to make for compactness. The sleeves 16 may have been previously assembled in abutting relation as shown in Figure 6. Or they may be separately wound and then strung along a shaft, or along a mandrel.

When winding the ribbon of steel wool onto the core or sleeve 16, a suitable pressure roll, not shown, is applied to the periphery of the abrading unit, as the winding progresses, whereby the strands of the steel wool are firmly pressed together to provide a unit of uniform density. When the unit has been wound to the desired diameter, the ribbon or strip 3 of steel wool is severed, and the free end thereof pressed firmly into contact with the periphery of the unit, whereby the loose strands of the severed end become united to the strands of the periphery of the roll with sufficient security to prevent said end from unwinding, because of the inherent nature of the steel wool. Thus, it will be seen that no separate securing elements or means are required to prevent the end of the ribbon or strip of steel wool from unwinding, when the abrading unit has been completed. From actual experience, we have found that after the abrading unit has been used for a short period, it may be rotated in either direction on the work without danger of the steel wool unwinding.

Passing now to Figures 7, 8 and 9, the numeral 20 indicates a mandrel sleeve as adapted to be attached to rotate with an outboard shaft of a floor machine, for example, or to the shaft of a hand tool. This sleeve 20 has a circumferential flange 22 at one end and has removably secured on it, a plurality of flanged sleeves 23 like the sleeves 16 in Figure 6. To secure these sleeves 23 against rotation, the end of the flange 22 and the flanges 24 and 25 of the sleeves 23 have openings and pins. In this instance the flange 22 has pins 26 passing through openings 27 in the flange 24. Flanges 25 have pins 29 passing through openings 30 in the flange 24. There is of course no intention to be limited to the particular number or arrangement of the pins, so long as one flange has openings to receive the pins of a flange of another sleeve. In this way the elements 23 can be made of different diameters according to the size of the mandrel or sleeve 20, and the elements 23 form cores upon which steel wool units are formed. Preferably there are two pins diametrically placed, see Figure 9.

We believe ourselves the first to conceive of the unit idea for building up abrading devices, whatever the kind of material used for forming the abrading units. However, this building up idea has particular advantage when steel wool is used as an abrading material because of the uniformity of density which can be obtained. This allows of standardization as to size, quality and density.

The making of a steel wool roll composed of a plurality of units cooperating to produce a cylindrical abrading surface of the required axial length, allows of a very desirable stock and order system. There is considerable advantage in making a roll in this manner because the elements can be separately and simultaneously wound in situ and used directly or they can be strung along a mandrel to give the desired axial length, or detachable rings can be mounted on a mandrel and the material can be wound on these rings to build up a roll, in situ, and in such manner that the axial length of the roll can be decreased or increased at will by removing or adding one or more of the rings and steel wool thereon.

Another advantage is that the use of narrow dislike elements gives a better and more uniform abrading and individual formation of the units permits of better control of the material, and therefore more uniformity in density than is obtainable in any other manner known to us.

The advantages in producing relatively narrow individual units or discs, or in simultaneously winding a plurality of strands, ribbons or filaments of any suitable abrading material on a core either helically or spirally only are several; a better control of winding is had with a resultant uniformity of the density of the material as wound; the units or discs can be united to form a roll of any length by using a predetermined number of discs of given width or axial length; the units can be simultaneously produced in large numbers and used without transfer to another base, and the discs of various density and diameter can be produced on sleeves or rings, and then these can be slipped over mandrels or other sleeves, and such ring units of various kinds can be given identifying stock numbers, and can be obtained by customers on order, with the assurance of a uniform abrading implement, when assembled by them.

It is desirable in this art to utilize to the maximum extent the abrasive area of whatever material may be used, and the problem has been to produce a roll of uniform density wherein the entire abrasive surface of each strand or of

each ribbon face is utilized to the maximum degree.

In the present case a plurality of filaments of various abrading substances or a plurality of ribbons of these various substances, are simultaneously wound either spirally only or helically only or spirally and helically. The winding being so accomplished that each unit so produced may be side by side and in contact with another. Each unit can be spirally wound back and forth and the windings of the unit may overlap and intermingle with the windings of another, thus obtaining axial bond between the units, without however sacrificing uniformity for a given density.

The gist and broad feature of the invention is the use of any filamentous or ribbon-like material which can be used for abrasive purposes in which a number of the filaments whether of the same kind or different kinds of material are wound to form units in situ, or units which can be assembled.

We claim as our invention:

1. A process for producing abrasive rolls which consists in winding upon a core simultaneously a plurality of filaments or ribbons of abrasive material in such manner that a plurality of substantially separate spiral coils are produced, the lateral faces of which abut one another during the winding.

2. An abrading device comprising a core, having a plurality of separate sleeves removably mounted thereon, each sleeve having secured thereon a substantially cylindrical element composed of steel wool ribbon wound spirally into a series of laminations, the outer peripheries of said elements acting together to provide a cylindrical abrading surface.

3. An abrading device comprising a mandrel core having thereon a series of rings, each having thereon a wrapping of steel wool, the lateral faces of said wrappings being engaged and their peripheries cooperating to provide an elongated cylindrical abrading surface.

4. An abrading roll comprising a plurality of independent substantially cylindrical disc-like elements, each composed of steel wool ribbon spirally wound into a series of laminations and presenting a peripheral abrading face, and a common supporting core adapted to be connected to a driving shaft upon which the disc-like elements are removably secured one against the next, with their lateral steel wool faces abutting each other in mutual supporting relation, so that the peripheral faces of the individual elements present an uninterrupted cylindrical abrading surface which may be renewed in any part thereof by the substitution of other similar elements, or lengthened or shortened by varying the number of elements.

5. A process of producing abrasive rolls which consists in spirally winding steel wool filaments or ribbon upon a core to form a substantially cylindrical abrasive unit, and forming a further substantially cylindrical abrasive unit by spirally winding upon an adjacent area of said core other steel wool filaments or ribbon in contact with the lateral face of the first-mentioned unit.

6. A process of producing abrasive units adapted to be employed together as parts of a sectional abrading roll, which consists in spirally winding filaments or ribbon of steel wool into a series of laminations at one area of a core to form a substantially cylindrical abrasive unit, and forming a similar abrasive unit of similar size and density by spirally winding other steel wool filaments or ribbon upon a further area of said core of the same width as the first core area simultaneously with the windng of the first unit.

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