MULTIPLE LAYER SURFACE WORKING PADS

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References Cited

UNITED STATES PATENTS
3,383,738 5/1968 Fox et al. 24/204 UX
3,274,616 9/1966 Russo 24/204 UX

ABSTRACT

Surface working pads formed of open non-woven three-dimensional web material, as typified by the so-called nylon floor pads, are releasably retained on a driving disk or brush block in a stack in which adjacent pads are held together by double face, flexible, pad holding material providing a multitude of projecting tiny adhering filaments. In a preferred embodiment the double faced pad holding material is attached to a sheet carrier.

4 Claims, 5 Drawing Figures
MULTIPLE LAYER SURFACE WORKING PADS

This invention relates to innovations and improvements in releasably retained surface working pads formed of open non-woven three-dimensional web material containing numerous interlaced randomly extending fibers as typified by the so-called nylon floor pads and conventional steel wool pads.

The present invention is particularly suited for use with floor maintenance machines such as those used for performing scrubbing, stripping and buffing or polishing operations on floor surfaces of various types. The present invention has particular utility in connection with the electrically operated, heavy duty machines used professionally in the maintenance of floors in non-residential buildings such as schools, office buildings, airports, hospitals, and the like.

Until a few years ago floor maintenance machines utilized pads formed of steel wool for performing scrubbing and stripping operations, and these machines utilized brushes or pads formed of felt for buffing and polishing. More recently the so-called nylon floor pads, which include the abrasive types for stripping and scrubbing, the non-abrasive type for buffing and polishing, and more recently, a type for spray-system maintenance, have come into extensive use.

These pads are formed of uniform lofty, open, non-woven, three-dimensional web or mat material of many interlaced randomly extending flexible, durable, tough, resilient plastic fibers, e.g., nylon fibers. The art of and equipment for making such floor pads of nylon or other synthetic resins or fibers are highly developed. Such floor pads can be made either with self-contained deposits of abrasive material having varying degrees of harshness or aggressiveness for scrubbing and stripping operations or without any abrasive for buffing and polishing operations. Nylon is a preferred material from which to form such floor pads because of its excellent resistance to wear, water resistance, and competitive cost. However, other synthetic materials may be used such as the polyester resins, and blends of resin fibers. Natural fibers such as cotton and horse hair may also be utilized. Synthetic floor pads of the type mentioned are commercially available from several sources and are described in several patents including: Maisel, U.S. Pat. No. 2,784,132; Hoover et al., U.S. Pat. No. 2,958,593; Haywood, U.S. Pat. No. 3,016,295; and Kamp et al., U.S. Pat. No. 3,020,139.

Various means have been used for releasably attaching such surface working pads to the driving discs of floor machines. In some instances pads with a center hole were required, in some other instances small diameter clamping discs would fit underneath the center of a steel wool or nylon floor pad and mechanially retain it in place by means of a center screw or other fastening means. In some other instances driving discs or plates for floor machines have been provided of the type comprising a flexible backing layer and a resilient layer having a multitude of resilient protruberances which penetrate into the steel wool or nylon floor pad under the weight of the floor machine. The penetrating action of these protruberances serves to drive the floor pads as long as the weight is maintained thereon. However, when it is desired to raise or elevate the floor machine for any reason, such as for transport to a different location in the building, or to skirt around furniture or other objects on the floor, the floor pads will shift off-center or fall off and have to be repositioned before the machine is put into operation again.

Such problems associated with heretofore available means for retaining and driving surface working pads were virtually eliminated by providing a driving disc having a facing surface or at least substantial areas of which have a multitude of preformed hook-shaped filaments which releasably attach themselves to fibers of a surface working pad with such firmness as to not only serve to drive or operate the pad but also retain the pad in place when the weight of the machine is completely transferred to the transporting wheels and the floor pad is lifted from the floor surfaces. The multitudinous hooks are resilient enough and flexible enough that the surface working pads may be readily stripped or peeled from the driving disc when it is desired to do so for any reason.

One of the problems which remain unresolved in connection with the use of these machines is the fact that the floor machine operator commonly must work on floor areas and locations ranging substantial distances from a central supply location. In doing so an operator may encounter several types of floor surfaces or floor conditions which require different operations, e.g., stripping, scrubbing, or buffing. In addition operators often need new or clean floor pads in order to work efficiently. Because of the wide ranging work areas, it is generally considered inconvenient and expensive to have operators walking back and forth to a central supply area for the purpose of exchanging pads in order to provide fresh working surfaces, or to deal with a different operating problem, e.g., stripping, scrubbing, or buffing. On the other hand it is considered undesirable for operators to carry around an assortment of pads because of the fact that the pads are bulky, frequently get in the way, get mislaid, etc. Moreover, a paid with a contaminated surface is apt to soil the operator's clothing, furniture fabric, curtains, or the like with which it may come in contact.

It is a general object of this invention to provide a novel combination of elements which makes available to floor maintenance machine operators a plurality of floor pad surfaces whereby the operators can have on hand, at all work locations, a selection of different types of surface working pads, or a plurality of each kind of surface working pad or both. It is also an object of this invention to provide means by which an operator can shift from pad to pad in a very convenient manner, and without the need of walking back and forth to a supply area, to either expose a fresh surface or utilize a different type of surface working pad. It is another object of this invention to provide a novel pad holder which permits the pads to be used while stacked without spacing therebetween.

These and other objects which will be apparent hereinafter are all achieved in accordance with this invention which is disclosed and described in general hereinafter, and which is described in connection with preferred embodiments in the accompanying drawings in which:

FIG. 1 is a partially cut-away elevational side view of a driving disc and stack of surface working pads in accordance with this invention;
FIG. 2 is a bottom view, partially cut-away, of the stack shown in FIG. 1 in which half of a lowermost pad is shown removed;

FIG. 3 is a plan view of a pad holding disc of this invention;

FIG. 4 is a cross sectional view taken approximately along the line 4—4 of FIG. 3; and

FIG. 5 is a greatly enlarged cross sectional view of the extreme right hand portion of the structure shown in FIG. 4.

Referring to FIGS. 1 and 2, a driving disc adapted for use with a floor machine (not shown) of known type is indicated generally at 10, and is shown in the position normally occupied in use. Driving disc 10 comprises a rigid backing plate 12 which may be cut, formed or molded of fiber, particle board, flake board, hardboard (e.g., Masonite) wood, plastic or metal. Hardboard or compressed board of the type commercially available under the proprietary name Masonite serves very well for the rigid backing support 12 and is inexpensive, thereby helping to minimize the cost of driving disc 10.

Preferably the entire undersurface of backing member 12 is covered with a layer of spongy or resilient material of appreciable thickness, e.g., % inch, as indicated at 14. Sponge rubber serves well as the spongy or resilient layer 14. Other resilient or spongy materials could be used such as various foams or expanded plastic materials which are commercially available. Preferably the surface of spongy layer 14 offers considerable friction so that the weight of the floor machine it to grip and help to drive the floor pad. The spongy layer 14 is suitably secured to the surface of the rigid backing member 12 by an appropriate adhesive of the permanent type.

Onto the exposed or unadhered surface of resilient layer 14 of the driving disc 12 a pattern of flexible facing material is adhered in the form of a number of substantially identical pieces 16. These flexible identical facing pieces 16 are formed so that the exposed surfaces thereof provide a multitude of projecting tiny resilient severed loop or hook-shaped filaments similar to those hooks 18, illustrated in FIG. 5. Flexible facing strips, tape, or material of this type are commercially available in various forms under the proprietary name "VELCRO". Various forms of such flexible facing materials and techniques of producing the same are disclosed in U.S. Pat. Nos. 2,717,437; 3,009,235; 3,083,737; 3,114,951; 3,136,026; 3,147,528; and 3,154,837. The protruding hooks or severed loops similar to hooks 18 are indicated as having a textile or fabric backing layer from which the tiny hooks or severed loops protrude. The hooks or loops are generally arranged in rows extending transversely across the pieces of tape or facing material 16. The loops are generally arranged in a row oriented in the same direction, each hook being cut from a loop. It is highly desirable that on an overall basis hooks or loops be oriented in a plurality of directions. The pieces 16 are suitably adhered or bonded to flexible layer 14 in a permanent manner. However, it is not essential that the filaments have hooks because any adhering configuration will be satisfactory for use in this invention. For example, a facing material having extending filaments with knobs or balls at the ends thereof will also serve to penetrate the open pads and to adequately engage the fibers thereof. Methods of providing knobs or balls at the tips of secured filaments, e.g., as in a brush, are known, and some include melting just the tips of the secured filaments to form a bead at the tip.

As shown in FIG. 1, in accordance with this invention, a number of surface working pads 20, 21, 22, 23 are stacked pancake fashion. Pads 20, 21, 22 and 23, in the illustrated embodiment, are nylon floor pads formed of uniform, lofty, open, non-woven, three-dimensional web or bat material formed of many interlaced, randomly extending, flexible, durable, tough, resilient nylon fibers. It is to be understood, however, that the pads 20, 21, 22, 23 can be any of the types described in the early part of this specification and can be specifically fabricated to provide varying degrees of harshness for scrubbing or stripping operations or without any abrasive for polishing of buffing operations. The respective pads can be identical to provide a maximum amount of surface area of the same type, or they can be dissimilar to provide an assortment of working surfaces. In accordance with this invention an operator can elect to use a stack which provides several pads having identical working surfaces and one or more of another kind of pad with a different working surface.

Conventionally, a single surface working pad 20 is directly adhered to facing material 16 and is held in place by the loop or hook-shaped filaments. The tiny loop or hook-shaped or other-shaped adhering filaments penetrate into the open lofty structure of floor pad 20 and serve to hook under or otherwise adhere to one or more of the various random interlaced fibers or filaments. The action of these filamentary hooks has been likened to that of a Burdock burl clinging to fabric or animal fur or hair. While the total force required to detach or shift a floor pad all at once in an axial direction from the multitudinal hooks provided by facing material 16 or to slide pad 20 in a direction which is parallel to the face of facing material 16 would be considerable, nevertheless it is possible to readily peel a floor pad off from one of the driving discs simply by starting at one edge and gently pulling just as a piece of adhesive tape is peeled off or removed from the skin.

In accordance with the preferred embodiment of this invention a pad holding disc generally indicated at 30 (see FIG. 3) is placed over the exposed face of surface working pad 20, as indicated in FIG. 1. Pad holding disc 30 includes a carrier 32 and a plurality of patches of facing material 34 can be substantially identical to facing material 16 and the description of facing material 16 can be referred to, making it unnecessary to repeat that description in connection with the description of facing material 34. In the illustrated preferred embodiment a concentric circular opening 36 is provided in the middle of pad holding disc 30. This is preferable for the purpose of carrying an extra disc on the handle of the machine, e.g., after it becomes necessary to discard a worn-out pad, should such an event ever occur.

In the preferred embodiment a pair of oppositely facing patches of facing material 34 (see FIG. 5) are secured opposite one another against opposite surfaces 38 of carrier material 32. A known stapler may be employed to staple the three elements consisting of the facing material 34 and carrier 32 together so that staple 40 serves to unite the elements permanently. As in-
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dicated in FIG. 3 it is preferred that at least three pairs of facing material patches 34 be employed. The result-
ing assembly therefore provides six bonding surfaces which are maintained in a fixed orientation with re-
spect to each other by carrier 32.

Carrier 32 can be cloth, plastic, treated paper, or any other flexible material which will withstand the in-
tended use. Plastic, or plastic-treated paper are preferred materials since advertising and/or instruc-
tional information can be conveniently printed on those materials. As indicated hereinbefore a first pad-
holding disc 30 is placed on pad 20 and a second pad 21 is superimposed thereon as indicated in FIG. 1. A
second pad holding disc 41 identical to pad holding disc 30 is placed on the resulting exposed face of pad
21 and another pad 22 is placed thereover. A third pad
holding disc 42 which is also identical to disc 31 is
placed on the resulting exposed face of pad 22 and a
fourth pad 23 is placed thereover. In each instance the
exposed surfaces of the resilient open webs are
penetrated by hooks 18 which hook under one or more
of the various random interlaced fibers or filaments to
secure adjacent pads 20, 21, 22, 23 to each other.
These pads are held together well enough to permit the
machine to be tipped or elevated for transport to a dif-
ferent location or to skirt around furniture or other ob-
jects without shifting or falling, and without need for
repositioning when use is resumed.

As indicated hereinbefore pads 20, 21, 22, 23 can be
alike or dissimilar. For example, pads are available in
several thicknesses, e.g., in 3/4 inch nominal thickness,
and 1 inch nominal thickness, and respective pads are
manufactured specifically for stripping, or scrubbing,
or buffing. Other pads are manufactured at 3/4 inch
nominal thickness, specifically for use in spray cleaning
and buffing.

In its broadest concept this invention comprises ad-
hering a stack of pads of the type described in face-to-
face relationship by double-faced adhering means
providing a multitude of projecting filaments of adher-
ing configuration at each face thereof. In the preferred
illustrated embodiment the adhering means comprises a
pad holding disc which includes a plurality of op-
positely faced back-to-back patches of facing material
having at the exposed surfaces thereof a multitude of
projecting tiny severed loop or hook-shaped filaments.
The pad holder need not be a disc, however, and may
be square, for example.

In use of a stack of pads, in accordance with this in-
vention, the particular pads employed can be all alike,
or all different, or any combination which, in the
judgment of the operator, is necessary or desirable. For
example, upon being assigned to a large stripping job,
an operator can stack a plurality of identical surface
working pads specifically designed for stripping opera-
tion as shown in FIG. 1. From time to time, in order to
provide a fresh working surface, an exposed pad 23, for
example, can be peeled from the next adjacent pad 22
and reversed so that the formerly exposed surface 50 is
now engaged by pad holding disc 42. When it becomes
necessary or desirable to provide another fresh working
surface, pad 22 can be peeled from pad 21 and the
removed pad comprising pads 22 and 23 can be
reversed so that the last-exposed surface is engaged by
pad-holding disc 41. Thus, it is apparent that the opera-
tor during the entire job has available eight fresh work-
ing surfaces without the need of making trips to a
supply room, and without the inconvenience of carry-
ing a number of fresh and soiled working pads.

Although in the embodiment illustrated in FIG. 1,
four surface working pads 20, 21, 22, and 23 are
shown, it is to be understood that it is not essential, in
accordance with this invention, that four such pads be
employed in the manner illustrated. For example, an
operator may find it necessary or desirable to have
available at least one pad of each of the three types
referred to above, e.g., for stripping, scrubbing or
buffing, and hence can, in accordance with this inven-
tion, provide a stacked array of three pads, one pad
being specifically designed for each of the three respec-
tive purposes. An operator faced with a large scrubbing
and buffing job can prepare a stack of a number of
scrubbing pads and buffing pads as illustrated in FIG. 1
herein. Since manufacturers can color-code the pads
according to intended use, e.g., black pads for
stripping, green pads for scrubbing, and brown pads for
buffing, it is an easy matter to determine the relative
position of a particular pad in stacked array of color-
coded pads in this invention.

Some operators prefer to work with relatively thick
pads, e.g., 1 inch nominal thickness, and of course, the
available working surface per inch thickness is propor-
tionately less for relatively thick pads than the working
surface available per inch thickness of a number of
thinner pads. For example, approximately four times
the fresh working surface is available when a stack of
four relatively thin, e.g., 3/4 inch, surface working pads
are employed in accordance with this invention than is
available when a relatively thick pad, e.g., one inch
nominal thickness, is employed by itself. Nonetheless,
it is not essential that only thin pads be used in ac-
cordance with this invention since a stacked array of
relatively thick pads (e.g., each one inch nominal
thickness) is also eminently satisfactory in accordance
with this invention.

It will be appreciated that a number of changes may
be made in the foregoing construction without depart-
ing from the spirit and scope of the invention. For ex-
ample, the patches of hook-providing material 34 may
be made in other shapes and may be otherwise pat-
terned or arranged than shown. Furthermore the driv-
ing disc 10 may be non-circular in shape, e.g., rectan-
gular or square, in which case it is usually referred to as
the driving plate and may be used on oscillating or
vibrating machines instead of a machine which rotates
the driving disc. It may also vary in cross sectional
shape and thickness as in a molded or formed piece.
Although the driving discs or plates and surface work-
ing pads of the present invention have their greatest
utility in connection with floor maintenance machines,
it will be appreciated that they can be used for other
tools such as tools for manual operation for carrying
out various surface working operations. It will also be
understood that the driving means of the present inven-
tion may be utilized either on commercial of profes-
sional type machines of the heavy duty variety or they
can be utilized in connection with lighter machines for
residential use. In the case of the latter machines, the
brush blocks themselves may be used as the rigid
backing members and a layer of sponge rubber or other
resilient material may be directly attached thereto. Other changes and modifications will be apparent to those skilled in the art. For example, a variety of patterns of the facing material can be used other than the square pattern shown. A circular pattern could be used in a series of parallel rows.

What is claimed as new is:

1. For use with a floor maintenance machine having a floor pad driving arbor, a pad support plate mounted on said arbor and means for attaching a floor pad to said support plate, a composite floor pad comprising a stack of individual floor pads and interposed between opposing floor pad surfaces in said stack, relatively thin pieces of adhering material, the opposite faces of which have a multitude of hooking elements which penetrate the surfaces of floor pads and releasably secure one individual pad to another in supporting drawing relationship.

2. In an apparatus adapted for scrubbing, stripping, buffing or polishing and comprising a driven working member which includes an axially extending shaft, a plane-faced support member fixed with respect to said shaft and substantially perpendicular to said shaft, and having pad means for working a surface fixed with respect to said support plate, the improvement wherein said pad means comprises a plurality of separate pads formed of uniform, lofty, open, non-woven, three-dimensional material formed of many interlaced randomly extending, flexible, durable, tough, resilient fibers, and wherein the plurality of pads is arranged in a stacked array in which each of said pads is adhered to a next adjacent pad by respective adhering means including a relatively thin carrier and a plurality of oppositely facing providing a multitude of projecting tiny hooked-shaped elements for engaging said fibers.

3. A pad holder comprising a thin circular flexible carrier having two sides and having a circular opening at the center thereof, and having a plurality of substantially uniformly spaced-apart adhering members on each of said sides thereof, and wherein each of said adhering members includes a flexible support material providing a multitude of projecting tiny hooking filaments projecting from the exposed surfaces thereof, wherein respective adhering members on one side of said carrier disc are back-to-back with respect to respective adhering members on the other side of said carrier disc, to provide a plurality of oppositely facing pairs of adhering members, and wherein each respective pair is maintained attached to the carrier and together by a staple.

4. A pad holder comprising a thin circular flexible carrier having two sides and having a circular opening at the center thereof, and having a plurality of substantially uniformly spaced-apart adhering members on each of said sides thereof, and wherein each of said adhering members includes a flexible support material providing a multitude of projecting tiny hooking filaments projecting from the exposed surfaces thereof, wherein respective adhering members on one side of said carrier disc are back-to-back with respect to respective adhering members on the other side of said carrier disc, to provide a plurality of oppositely facing pairs of adhering members, and wherein each respective pair is maintained attached to the carrier.

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