(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 448 527 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91830096.3**

(51) Int. Cl.[5]: **B28D 1/18**, B08B 7/02

(22) Date of filing: **12.03.91**

(30) Priority: **13.03.90 IT 1965990**

(43) Date of publication of application:
25.09.91 Bulletin 91/39

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR LI LU NL SE

(71) Applicant: **TRIMMER S.r.l.**
Via Palmanova, 67
Milano(IT)

(72) Inventor: **Gaboardi, Berengario**
Via Europa, 5
Castelnuovo Bocca d'Adda (Milano)(IT)

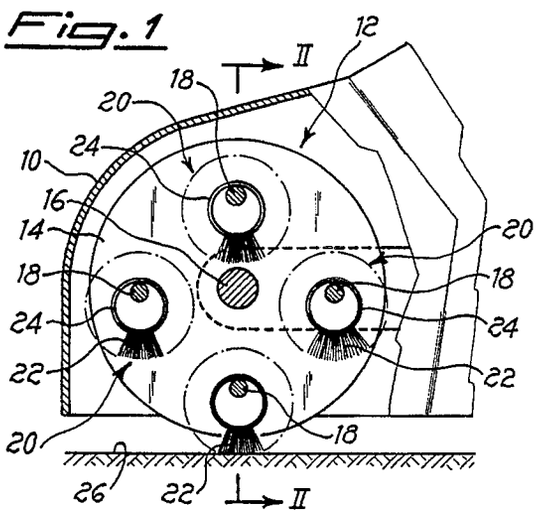
(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A. Via Carducci, 8
I-20123 Milano(IT)

(54) An apparatus for treating medium and wide breadth surfaces.

(57) The apparatus substantially comprises a rotating drum (12) carrying a number of spindles (18) mounted thereon, each of which carries loosely mounted thereon a plurality of tools (20) which, owing to the action of the rotating motion of the drum (12) and to the possibility of radially moving relative to the spindle (18), when coming into engagement with the surface (26) to be treated perform thereon an action which may be defined a hammering, thereby scratching the surface, in general with material removal therefrom.

According to this invention, said tools (20) are moderately deformable, or slightly yieldable members, such as brushes in the first case or nails (28) collapsibly carried by a support (30) mounted on one of the spindles (18) of said drum (12).

Fig. 1



EP 0 448 527 A1

This invention concerns an apparatus for performing, generally even though not necessarily, a cleaning or roughing treatment, on medium or wide breadth surfaces. Machines of the above type are already known and a first class includes those machines wherein means are provided for instance in the form of rotating blades, adapted to throw, under the action of centrifugal force, particulate abrasive material against the surface to be treated. Additional means are provided to recover the abrasive material for a further use thereof, and for the separation and disposal of the material removed from the surface. The machines of such type are extremely complicated concerning the complexity both of their own construction and of the structure of the means provided therewith, and also concerning their operation which requires higly skilled personnel.

Furthermore, the subject machines are highly space consuming and heavy, and therefore inconvenient and difficult to use.

Another type of known machine is provided with a drum rotating around a substantially central axis and carrying on the periphery thereof a plurality of support spindles, each of which loosely supports a number of tools which, due to the combined action of the drum rotation and of the possibility to radially move relative to the supporting spindle, when coming into contact with the surface to be treated perform thereon an action which may be defined a hammering, generally associated with material removal.

The tools used in this type of machine comprise various shapes and materials, which are all amenable to a single rigid material body such as, for instance, peripherally spiked discs, milling cutters of various shapes like toothed, star-shaped and the like, and the choice of using a tool rather than another depends upon the operations one intends to perform.

Typical examples, among the many possible, of usage of these apparatus, are the roughing and cleaning of concrete or black tar floor, for instance to remove road markings or a plastic coating.

Other typical examples comprise the removal of scales, paint layers, thin coatings and the like.

In particular the second type machines have a serious drawback deriving from the fact that the action performed by the tools on the surface to be treated is not easily adjustable, whereby frequently there is removed less material than it is desired or, on the contrary, the removal becomes excessive with an apparent damage to the treated surface.

A further drawback of the conventional second type machines derives from the limited number of tools among which it is possible to choose the ones to be used whereby, for some applications, it becomes compulsory to choose tools which are not perfectly suitable, with the drawbacks already mentioned above.

There has now been contrived, and it is the the subject of this invention, an apparatus for treating, in the fashion mentioned herein above, medium and wide breadth surfaces, which overcomes all the drawbacks of the conventional machines.

Therefore, it is one of the main objects of this invention to provide an apparatus of the type mentioned above, which does not require special adjustements in order to achieve a correct and satisfactory material removal, as required by the single treatments.

An additional object of this invention is to provide an apparatus for treating medium and wide breadth surfaces which is simple in construction, easy to operate, and which does not require any special maintenance.

The features as well as the advantages of the apparatus of this invention will become apparent from the following detailed description of two non limiting embodiments thereof, made in reference to the attached drawing, wherein:

Figure 1 is a schematic view of the operating portion of the machine of this invention, seen along line I-I of Figure 2;

Figure 2 is a schematic view of the operating portion of Figure 1, seen along section line II-II of said Figure;

Figure 3 is a schematic view showing how the tools of the apparatus are actuated when coming into contact with the surface to be treated;

Figure 4 is a side view, partially cut away, showing an embodimental variation of the apparatus according to this invention;

Figure 5 is a detailed view, in enlarged scale, showing the operating possibilities of the tools used in the alternate embodiment of Figure 4;

Figure 6 is a schematic detailed view showing how the members of the tools providing the material removal from the surface, are supported.

Referring first to Figure 1 to 3, the first embodimental form of the apparatus of this invention is described in the following.

As it is apparent in particular from Figures 1 and 2, said apparatus comprises in general a frame 10, shown partially and more particularly shown in the portion thereof where the operating tools thereof are mounted.

From the above Figures it appears that, within downwardly open frame 10 there is mounted a rotating drum shown in general at 12.

Rotating drum 12 comprises two substantially circular end flanges 14 having integrally fastened thereto, in a central position and at the ends thereof, a shaft 16, which will be connected, in any way not shown, to driving means, not shown as well,

comprising for instance an adjustable speed driving motor.

In addition, rotating drum 12 includes support spindles 18, four in the embodiment shown herein, which are fastened at the ends thereof to flanges 14, in a substantially peripheral position and at equally spaced angles from each other. Therefore, in the embodiment considered herein, support spindles 18 are spaced 90 degrees apart from each other.

On each support spindle 18 there is mounted a number of tools for working against the surface to be treated, said tools, in the embodiment considered herein, comprising substantially circular brushes 20.

Said brushes 20, which are partially shown in Figure 2, are loosely supported on spindles 18 in that, as it is shown in particular in Figure 1, bristels 22 thereof are carried by a substantially ring shaped body 24 having a diameter larger than that of spindle 18.

Because of the above arrangement, owing to the action of the centrifugal force deriving from the rotation of drum 12, on brushes 20, the latter will always be kept with a portion thereof in contact with spindle 18 and with the remaining portion thereof facing predominantly towards the outside of frame 10. In Figures 1 and 2 brushes 20 are shown in their rest position and the actuation thereof, particularly concerning their engagement with surface 26 to be treated, is shown in Figure 3 and described in the following.

The drawing in the above Figures shows, in an enlarged scale, the motion of a brush 20, shown schematically from the moment when it is in the process of coming into contact with surface 26, to the moment when it leaves said surface.

From the above Figure it appears that spindle 18, mounted on circular flanges 14, moves along a circular arc shown at A-A, while brush 20, owing to its loose mounting on spindle 18, is free to move relative to the latte r. Assuming that drum 12 rotates clockwise, i.e. according to the direction of arrow F of Figure 3, brush 20, considering the first two positions thereof at the right hand side of this Figure, will be projected predominantly downwards owing to the centrifugal force acting on brush 20 because of the rotation of drum 12. In the second position shown in figure 3, bristels 22 of brush 20 come into engagement with surface 26 and said impact takes place, owing to the high rotational speed of drum 12, with a non disregardable intensity and that causes brush 20 to temporarily move away from surface 26, as it is shown in the third position starting from the right in Figure 3, wherein brush 20 is lifted all the way until it goes to stop against spindle 18.

Subsequently, always due to the centrifugal force, the brush goes back to its lowered position, which is the fourth from the right in figure 3, then moving away from surface 26.

It should be understood that the actuation described hereinabove referring to Figure 3 should be taken only as schematic, in that brush 20 may perform more than one of the motions described above which, in time, go to add up to the motion of brushes 20 mounted on the remaining spindles 18. Such continuous hammering and/or rubbing action of bristels 22 against surface 26 is very effective as far as the material removal therefrom is concerned. It should be noted that, each time bristles 22 impinge against surface 26, they will be subjected to a deformation, even though limited, while performing an intense and effective abrasive action. This makes it possible to achieve the desired results very quickly and effectively. Bristles 22 of brushes 20 will predominantly be made of metal and with a suitable shape, but it should be understood that they may be made of a different material, depending upon the material of surface 26 to be treated. Referring now in particular to Figures 4 to 6, there is described therein the embodimental variation of the inventive apparatus different from the one described above only concerning the particular type of tool used. Therefore, the following description will be made referring in particular to said tool, the remaining portions of the apparatus having a construction substantially identical to that of the first embodiment and, under this assumption, similar members will be shown with the same reference numbers.

Referring to the Figures mentioned above, as it is shown therein the tool used in this case is substantially comprised of a number of nails having a head 28 but a blunted tip, only some of them being shown in these Figures, only for clarity of illustration.

In particular Figure 6 shows that an array of nails 28 (only one is shown in this Figure), is supported by a pair of ring shaped members 30 shrunk on spindle 18, at such a distance that they can retain nails 28 at the heads thereof. The distance between two ring shaped members will be kept such that nails 28, and in particular their heads may move in a substantially ring shaped cavity 32 of members 30. Actuation of nails 28 will be provided either as the one shown for nails 28a which, being a member substantially and relatively yieldable of the tool, move back towards spindle 18 along substantially sloping and converging directions, or, as shown for nail 28b, relatively yieldable as well, which moves back towards spindle 18 along a substantially radial path.

The combination of said various motions of nails 28, considered also as repetitious, as it has been described above for brushes 20, will result in

an operation of the apparatus substantially similar to that of the first embodiment, making it possible to achieve quickly and effectively the desired results.

In this case as well there will be said bouncing effect of a single nail or of at least two adjacent nails which makes it possible to subject surface 26 to the desired hammering action.

It should eventually be understood that variations and/or modifications may be made to the apparatus according to this invention, without exceeding the scope of protection thereof.

Claims

1. An apparatus for treating medium and wide breadth surfaces, including a rotating drum connected to drive means for rotation thereof, carrying fastened thereon a plurality of support spindles whose longitudinal axis is substantially parallel to the axis of rotation of the drum, each spindle carrying a number of tools mounted thereon for treating said surface, said tools being carried in a relatively loose fashion by said spindles, in such a way that, owing to a combined effect of the rotational motion of the drum and of the possibility to move transverse to their support spindle, said tools, when coming into engagement with said surface perform a substantially hammering action thereon, characterized in that said tools comprise moderately deformable members (20) or slightly yieldable members (28).

2. The apparatus of claim 1, characterized in that said moderately deformable members substantially comprise brushes (20) whose bristles (22) are carried by a substantially ring shaped body (24) having an inner diameter larger than the diameter of support spindle (18).

3. The apparatus of claim 1, characterized in that said moderately yieldable members are nails (28) mounted in a substantially circumferential arrangement around support spindle (18) and supported with a possibility to move in a substantially radial direction towards said spindle (18), by substantially ring shaped bodies (30) fastened on spindle (18), between which, in a substantially ring shaped cavity (32) thereof, there is received the head of nails (28), free to move within said cavity (32).

4. The apparatus of claim 3, characterized in that, while the heads of nails (28) move within said cavities (32), the body of said nails may move both radially and circumferentially relative to said ring shaped members (30).

Fig.1

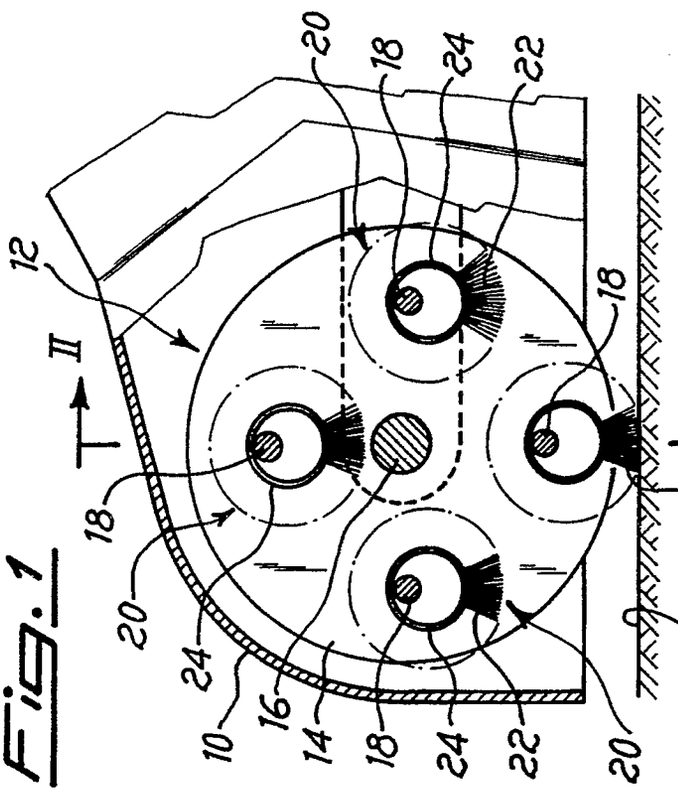


Fig.2

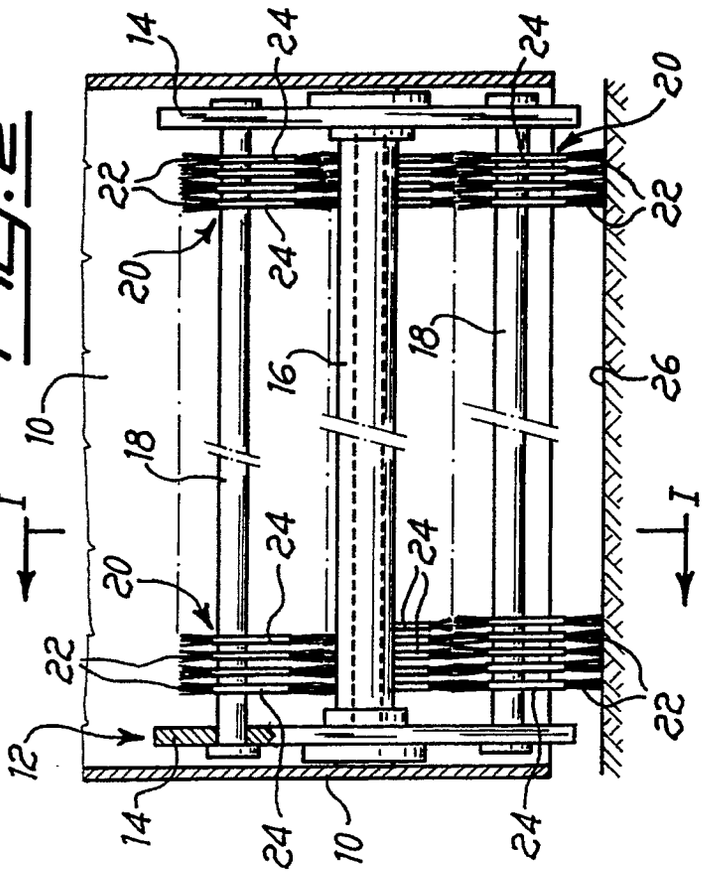
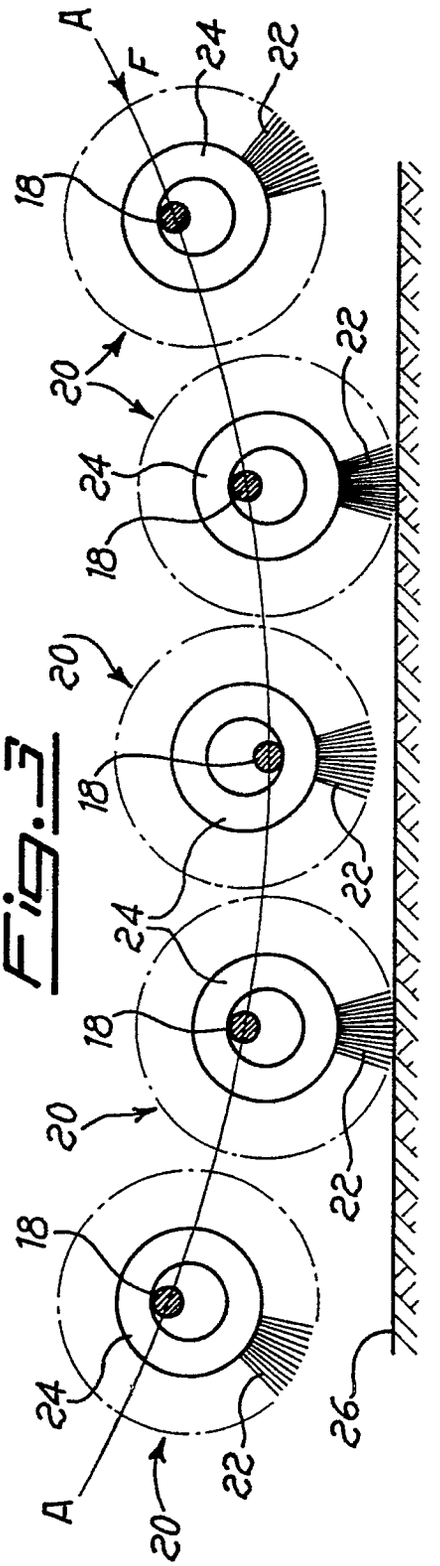


Fig.3



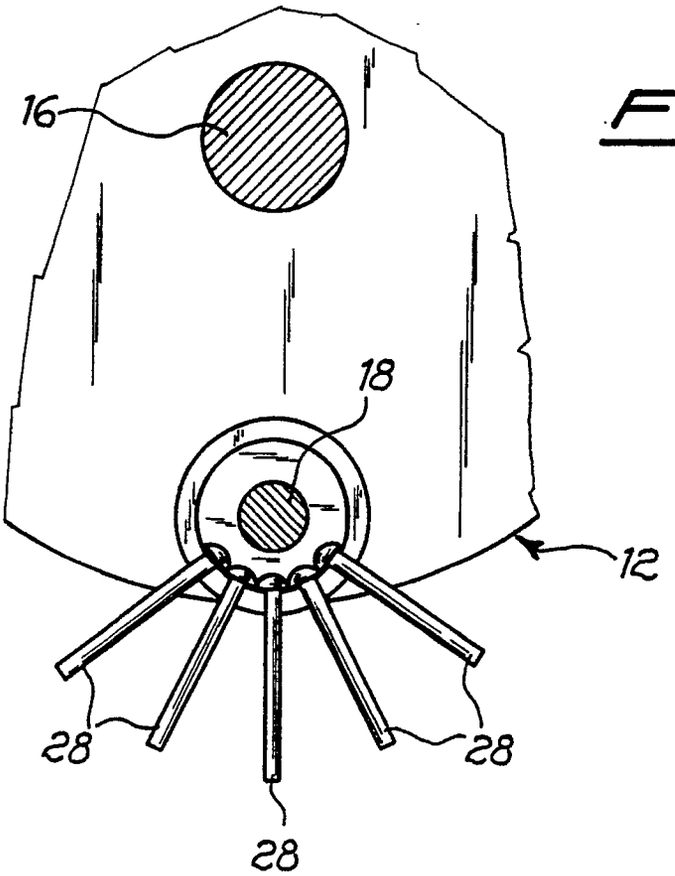


Fig.4

Fig.5

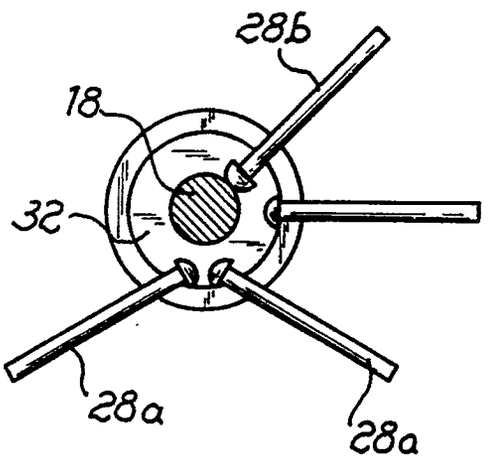
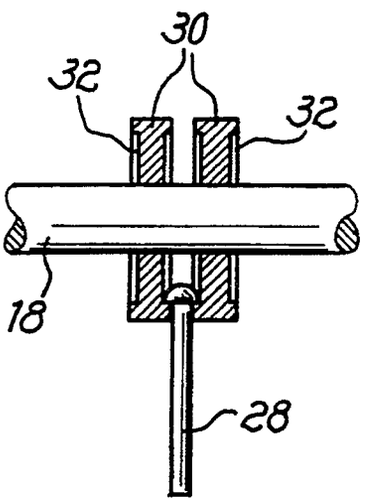


Fig.6



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0096

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-3 036 324 (C.T. ASBURY) * Column 2, lines 16-19,48-65; column 3, lines 15-21; figures 1-5 *	1,2	B 28 D 1/18 B 08 B 7/02
A		3,4	
X	DE-C-7 363 62 (H.M. COLDITZ) * The whole document *	1,2	
A		3,4	
X	FR-A-7 684 07 (R.T. MICHEAU) * The whole document *	1,2	
A		3,4	
A	US-A-3 754 296 (G.N. TALBERT) * Column 2, lines 14-67; figures 1-6 *	3,4	
A	FR-A-8 972 77 (B. FESTINI) * Page 2, lines 72-84; figure 4 *	1	
A	US-A-2 324 272 (W.A. ANDERSON) * Page 1, right-hand column, lines 25-26; figure 2 *	1,2	
A	US-A-2 740 980 (C.T. ASBURY) * Column 2, lines 8-22; figures 1,2 *	1,2	TECHNICAL FIELDS SEARCHED (Int. Cl.5) B 28 D B 08 B B 24 B B 24 D B 23 D A 43 D F 28 G
A	DE-C-8 078 47 (P. REINHEIMER) * Claim 1; figures 1-4 *	3,4	
A	US-A-1 929 650 (R.W. RANDALL et al.)		

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	18 June 91	MOET H.J.K.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited for other reasons

&: member of the same patent family, corresponding document