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(71) Applicant: **S.I.T. Societa' Italiana Tecnospazzole S.p.A.**
40033 Casalecchio di Reno (Bologna) (IT)

(72) Inventor: **ACQUADERNI, Andrea**
40125 Bologna (IT)

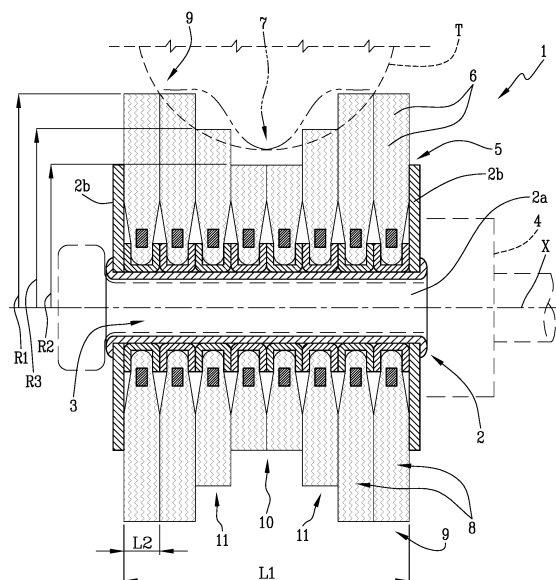
(74) Representative: **Casadei, Barbara Bugnion S.p.A.**
Via di Corticella, 87
40128 Bologna (IT)

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(54) **CIRCULAR BRUSH**

(57) Described is a circular brush (1) comprising a cylindrical frame (2) having a longitudinal axis (X) of extension and having an opening (3) configured for coupling with a motor-driven axis (4) positioned, in use, coaxial with the longitudinal axis (X) of extension; an abrasive annular tool (5) comprising metal wires (6) associated with the outer annular surface of the frame (2) in such a way as to protrude radially away from the longitudinal axis (X) of extension to form a circular operational surface having a first width (L1); the abrasive tool (5) comprises a plurality of disc-shaped clumps or sectors (8) arranged side by side; each of the disc-shaped clump sectors (8) comprises a plurality of metal wires (6) (but also of another type, for example synthetic and synthetic-abrasive); each clump sector (8) has a first annular end associated with the cylindrical frame (2) in such a way as to extend radially outwards relative to the longitudinal axis (X) of extension to define an operational surface having a second width (L2), with the relative second ends free, which is less than the first width (L1); at least one disc-shaped clump sector (8) is configured with a radius, referred to the axis (X), of variable extension in such a way as to define an operational surface with at least one curved stretch (7).

Fig.1



Description

[0001] This invention relates to a circular brush.

[0002] Reference is made in this description to a type of brush, of a generically circular type, the active operational portion of which may be of metal, synthetic material and/or abrasive synthetic material.

[0003] More specifically, this type of brush comprises:

- an annular central sleeve-like frame having a central hole to define a coupling seat for a motor-driven axis;
- an operational tool consisting of a plurality of wires made of metal (steel), or synthetic or synthetic/abrasive material, the wires being associated, in clumps or sectors, to the annular surface of the frame so as to project radially away from the coupling seat to form a circular disc-shaped surface with a limited width/thickness.

[0004] The width/thickness of the brush is defined by the annular axial end edges of the sleeve.

[0005] It should be noted that the shape of the active surface of the brush is obtained through the series of sectors of wires firmly associated with the sleeve by means of connecting operations, such as edging / crimping.

[0006] The ends of the sectors of wires extend along a circumference (better, according to a stretch of cylinder) and their corrugated shape allows, on the one hand, the deformability in both a radial and lateral direction, together with an intrinsic elasticity such as to return the brush, that is to say, the active filaments, to their radial position, at rest.

[0007] These brushes are used, associated with axially rotating shafts, for processing (usually cleaning or finishing) parts made of metal or other material, for example at welding or cutting zones, in order to finish, shape or clean the desired portions.

[0008] As mentioned, the thickness in the brush, that is to say, the width of the active peripheral zone, is not very great and this leads to the need, depending on the necessary and required processing, to place several units or several discs one after the other and supported by a single shaft which will therefore act both as an assembly element and as means of rotation.

[0009] In this case, the brush will adopt a cylindrical form, in its final shape of use, in the sense that the active portion will have a great length, obviously according to the number of discs used and placed alongside each other.

[0010] This shape, whilst on the one hand it inevitably favours a greater processing speed on stretches of large surface areas, on the other hand it is less adaptable for processing curved stretches, that is, not mainly flat surfaces: this is because the active, linear generatrix, whilst it is able to support minor bending of the wires or of the sectors in a radial direction, cannot tolerate flattening of the cleaning bodies which would go beyond the elastic

limit.

[0011] The aim of this invention is to provide a circular brush which overcomes the above-mentioned drawbacks of the prior art.

[0012] More specifically, the aim of this solution is to provide a circular brush which is able to process both flat stretches of the parts being processed and curvilinear sections.

[0013] A further aim is to provide a circular brush which is able to perform the above-mentioned processing whilst fully maintaining the initial dimensions and shapes, that is to say, without undergoing permanent deformations which might adversely affect the correct use.

[0014] More specifically, the aim of this invention is to facilitate the operator in his/her work, reducing the processing times and with better effects on the processing itself.

[0015] These aims are fully achieved by the brush according to this invention as characterised in the appended claims.

[0016] This and other features will become more apparent from the following description of a preferred embodiment of the invention, illustrated by way of non-limiting example in the accompanying tables of drawings, in which:

- Figure 1 shows a side view and a cross section along an axis of rotation of a first embodiment of a circular brush according to this invention;
- Figure 2 shows a side view and a cross section along the axis of rotation of a second embodiment of a circular brush according to this invention. With reference to the accompanying drawings, a circular brush, labelled 1 in its entirety, is of the, precisely, circular type and is used by means of a rotational movement for the removal of material.

[0017] These brushes 1 are used, preferably, for finishing surfaces made of metal or another material previously processed.

[0018] The brush 1 comprises a cylindrical frame 2 having a longitudinal axis X of extension and having an opening 3 configured for coupling with a motor-driven axis 4 positioned, in use, coaxial with the longitudinal axis X of extension (the motor-driven axis 4 is illustrated by a dashed line).

[0019] The brush 1 also comprises an abrasive annular tool 5 comprising abrasive wires 6 associated with the outer annular surface of the frame 2 in such a way as to protrude radially away from the longitudinal axis X of extension to form a circular operational surface having a first width L1.

[0020] As illustrated, the abrasive tool 5 comprises a plurality of disc-shaped clumps or sectors 8 arranged side by side.

[0021] Each of the disc-shaped sectors 8 comprises a plurality of abrasive wires 6.

[0022] The expression abrasive wires may refer to met-

al wires, synthetic wires or abrasive synthetic wires.

[0023] Each disc-shaped sector 8 has a first annular end associated with the cylindrical frame 2 in such a way as to extend radially outwards relative to the longitudinal axis X of extension to define an operational surface.

[0024] Each disc-shaped sector 8 has a second width L2, with the relative second free ends, which is less than the first width L1.

[0025] At least one disc-shaped sector 8 making up the tool 5 is configured with a radius, referred to the axis X, of variable extension in such a way as to define an operational surface with at least one curved stretch 7.

[0026] In other words, one or more of the disc-shaped sectors 8 are configured with a variable radius in such a way as to define the operational surface of the brush in which the relative generatrix has the curved stretch 7.

[0027] In a first solution, the curved stretch 7 of the operational surface is concave in shape, that is, directed towards the longitudinal axis X of extension.

[0028] In a variant embodiment, the curved stretch 7 of the operational surface is convex in shape, that is, directed away from the longitudinal axis X of extension.

[0029] As illustrated in Figure 1, the operational surface is formed by at least two outer portions 9 comprising at least a corresponding disc-shaped sector 8 having a first radius R1 greater than a second radius R2 of at least one disc-shaped sector forming a central portion 10.

[0030] More specifically, the operational surface of the circular brush 1 is formed by:

- two outer portions 9 each comprising at least one disc-shaped sector 8 (a pair of sectors) having a first radius R1;
- two intermediate portions 11 each comprising at least one disc-shaped sector 8 positioned alongside a corresponding disc-shaped sector 8 of an outer portion 9; the disc-shaped sectors 8 of the intermediate portions 11 have a third radius R3 less than the first radius R1 of each disc-shaped sector (pair of sectors) of the outer portions 9;
- an inner central portion 10 formed by one or more disc-shaped sectors 8 (at least a pair of sectors) positioned between the intermediate portions 11 and having a second radius R2 less than the third radius R3.

[0031] As may be seen in Figures 1 and 2, each disc-shaped sector 8 comprises a plurality of abrasive wires 6 (combined as a clump) joined to each other (at the first end) by a mechanical processing, (normally by crimping).

[0032] In turn, each individual disc-shaped sector 8 is connected to the outer annular surface of the frame 2.

[0033] The brush 1 may, therefore, be formed by a number of sectors 8 which are able to engage the entire frame 2 over the axial extension X, as the sectors 8 have a width L2 equal to a sub-multiple of the width L1 of the frame 2.

[0034] In light of this, the frame 2 comprises a tubular

cylinder 2a which retains, at its ends, two annular flanges 2b defining the retaining walls of the disc-shaped sectors 8.

[0035] This constructional modularity, together with the variations in the radial dimension of the sectors 8, allows a multitude of profiles of the operational surface to be obtained.

[0036] As mentioned, the brush 1 in Figure 1 has the two outer portions 9 of radius greater than the central portion: we therefore have a centrally symmetrical solution with which it will be possible to finish and process curvilinear parts, such as, for example, a component with a circular T-shaped profile (illustrated partly with a dashed line).

[0037] This does not mean that the brush 1 can only be used in its end portions with a mainly cylindrical shape, in order to carry out the processing materials having a flat shape.

[0038] In Figure 2, the brush 1 has larger dimensions along the axis X in such a way as to allow the positioning of disc-shaped sectors 8 in which an undulating profile of the operational surface is formed which is repetitive between concavity and convexity, comprising at least two portions of smaller radius.

[0039] Therefore, thanks to this solution is possible to make brushes in which the arrangement of the disc-shaped sectors, with different radial dimensions, will result in shapes of the active operational generatrix (active surface) with curvilinear extension.

[0040] To obtain the above, the radiuses of the individual discs may adopt different values, with decreases or increases relative to the one positioned alongside.

[0041] The invention achieves the present aims since the curved shape of the operational surface (active processing generatrix) of the brush allows an exact positioning of the part to be processed relative to the active ends of the cleaning sectors: this as a function of the shape (linear or rounded) of the part to be processed.

[0042] All of this is achieved using a single tool and therefore obtaining a circular brush of high operational flexibility.

Claims

1. A circular brush (1) comprising at least:

- a cylindrical frame (2) having a longitudinal axis (X) of extension and having an opening (3) configured for coupling with a motor-driven axis (4) positioned, in use, coaxial with the longitudinal axis (X) of extension;
- an abrasive annular tool (5) comprising abrasive wires (6) associated with the outer annular surface of the frame (2) in such a way as to protrude radially away from the longitudinal axis (X) of extension to form a circular operational surface having a first width (L1),

characterised in that the abrasive tool (5) comprises a plurality of disc-shaped clumps or sectors (8) arranged side by side; each of the disc-shaped sectors (8) comprising a plurality of abrasive wires (6); each sector (8) having a first annular end associated with the cylindrical frame (2) in such a way as to extend radially outwards relative to the longitudinal axis (X) of extension to define an operational surface having a second width (L2), with the relative second ends free, which is less than the first width (L1); at least one disc-shaped sector (8) being configured with a radius, referred to the axis (X), of variable extension in such a way as to define an operational surface with at least one curved stretch (7).

2. The brush according to claim 1, wherein the curved stretch (7) of the operational surface is concave in shape, that is, directed towards the longitudinal axis (X) of extension.

3. The brush according to claim 1, wherein the curved stretch (7) of the operational surface is convex in shape, that is, directed away from the longitudinal axis (X) of extension.

4. The brush according to claim 1 or 2, wherein the operational surface is formed by at least two outer portions (9) comprising at least a corresponding disc-shaped sector (8) having a first radius (R1) greater than a second radius (R2) of at least one disc-shaped sector forming a central portion (10).

5. The brush according to claim 1 or 2, wherein the operational surface is formed by:

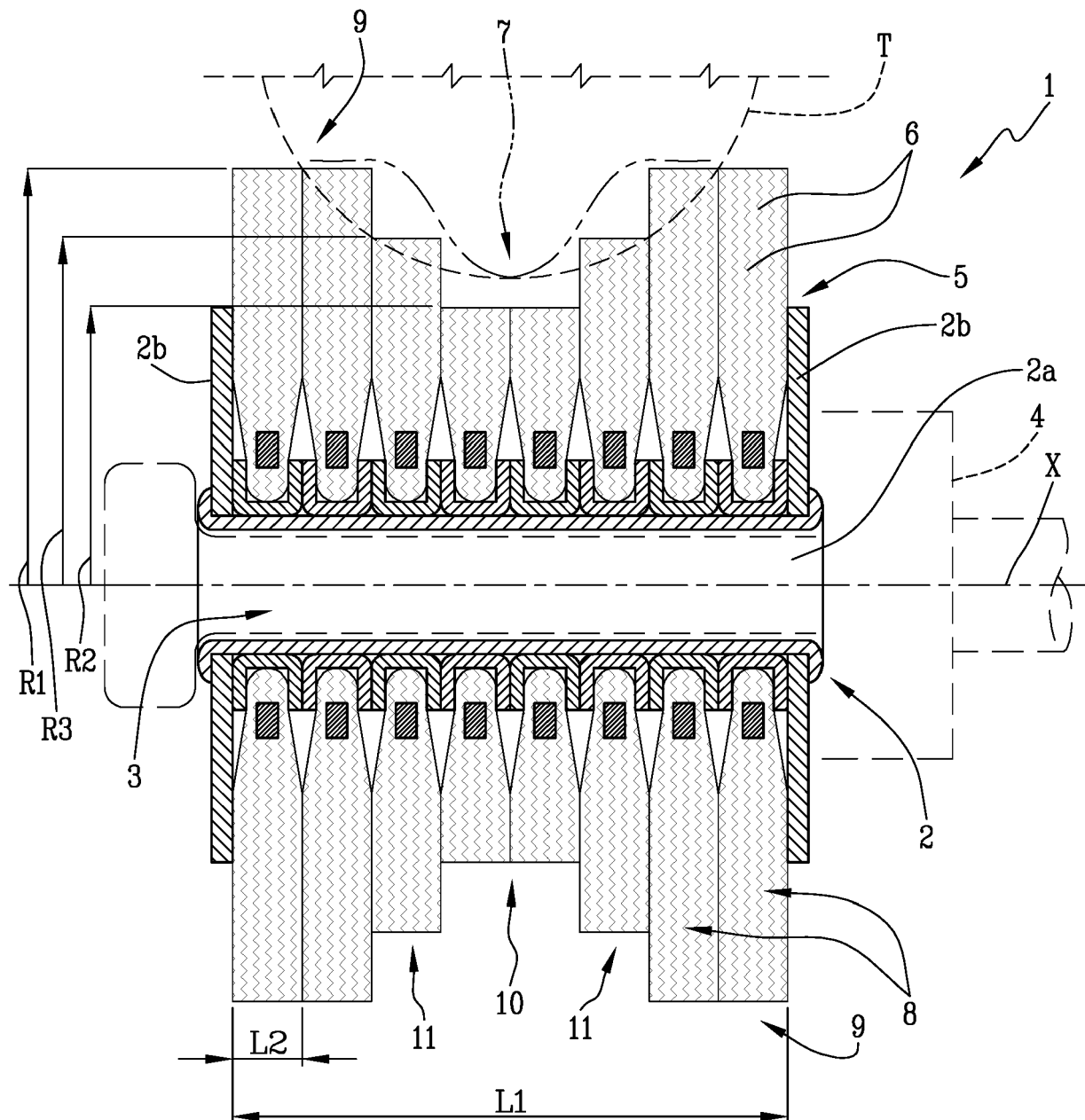
- two outer portions (9) each comprising at least one pair of disc-shaped sectors (8) having a first radius (R1);
- two intermediate portions (11) each comprising at least one disc-shaped sector (8) positioned alongside a corresponding disc-shaped sector (8) of an outer portion (9) and having a third radius (R3) less than the first radius (R1) of each pair of disc-shaped sectors of the outer portions (9);
- an inner central portion (10) formed by at least one pair of disc-shaped sectors (8) positioned between the intermediate portions (11) and having a second radius (R2) less than the third radius (R3).

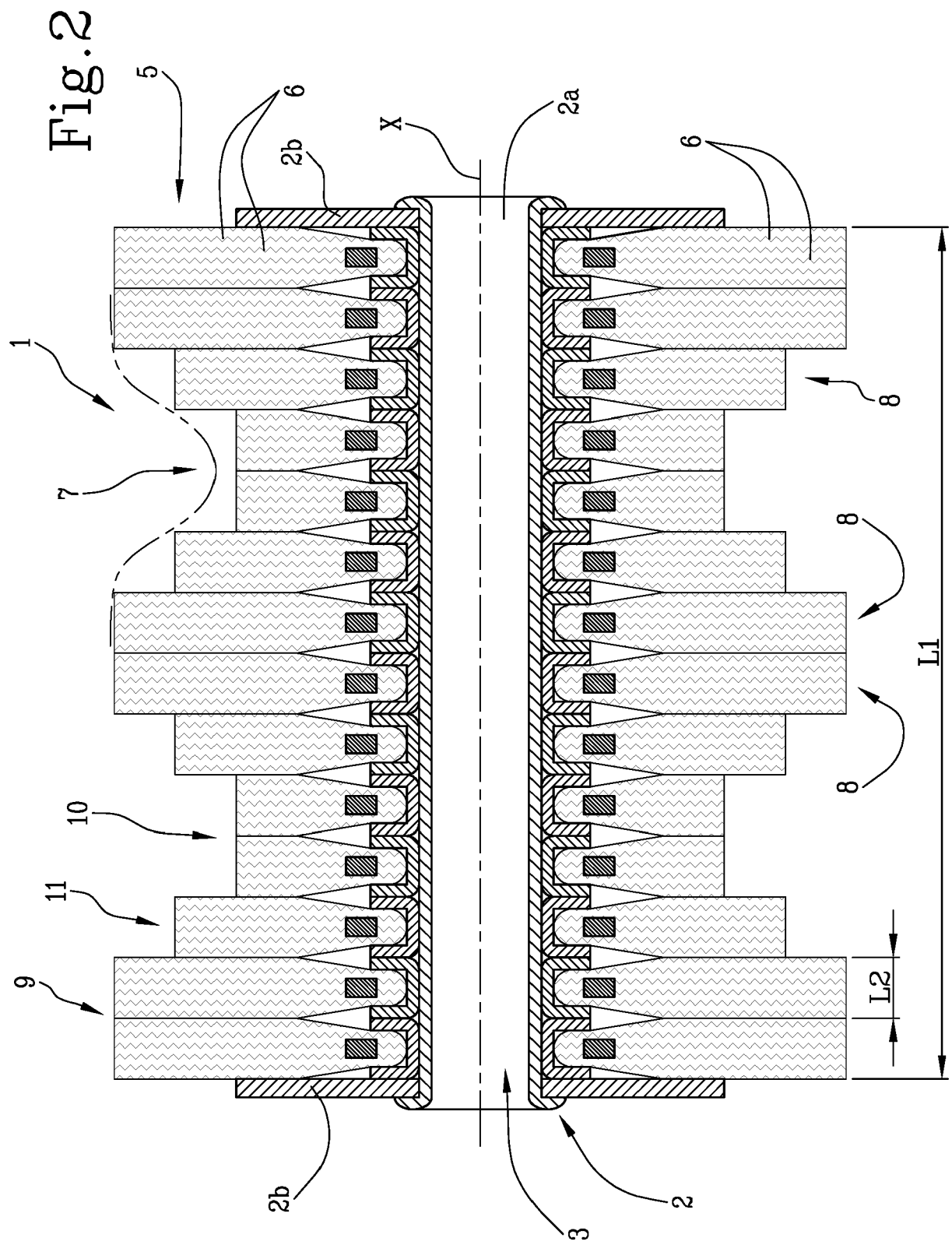
6. The brush according to any one of the preceding claims, wherein the wires (6) are made of metallic material.

7. The brush according to any one of claims 1 to 5, wherein the wires (6) are made of synthetic material.

8. The brush according to any one of claims 1 to 5, wherein the wires are made of synthetic abrasive material.

Fig.1







EUROPEAN SEARCH REPORT

Application Number
EP 17 15 5585

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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