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## (54) Optimized broom having sturdy brush moulded in elastomers.

(57) This invention concerns an improved broom having sturdy brush moulded in elastomers.

The base plate (2) of the broom has a long centre cavity (2a) and a peripheral series of spaced teeth (2b) which force the underlying brush carrier (1) to arch transversely when attached to the plate (2). Additionally, the broom features a splined, angled coupling (4) which permits a screw attachment of a broom handle to the adjustable tilting mechanism (3).

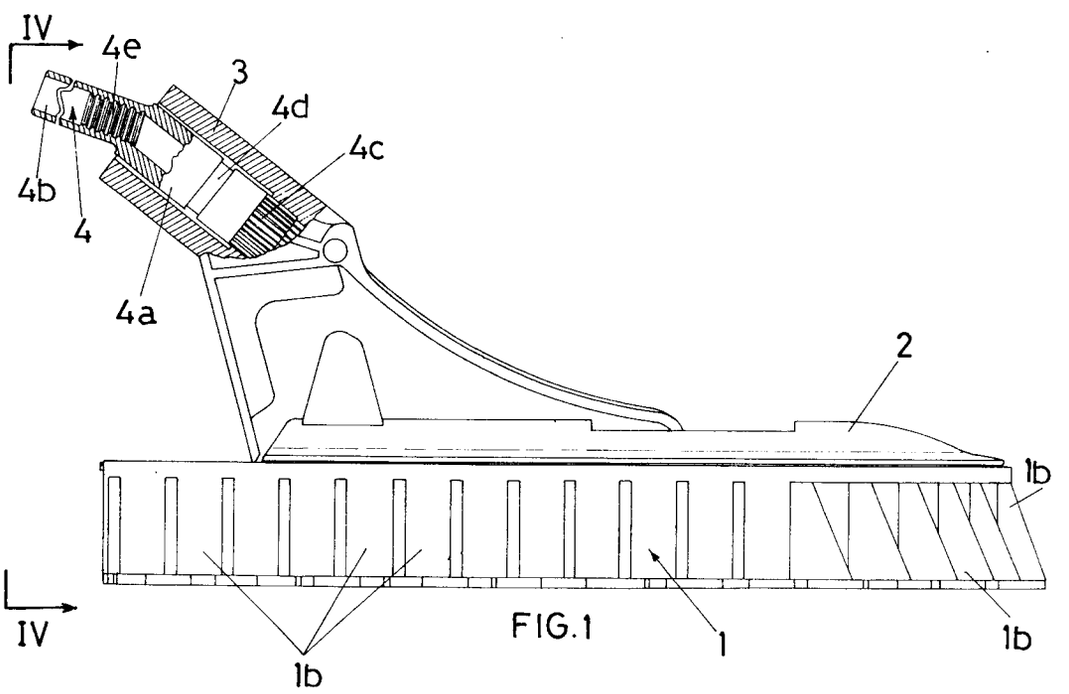


FIG.1

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This invention concerns an improved broom having sturdy brush moulded in elastomers.

The applicant holds patent rights for the Italian patent No. 214851 concerning a tool which may be used for raking, scraping and levelling ground thanks to the use of a special elastomer brush which features a set of sturdy and flexible elements at the bottom which are not only able to collect and gather sweepings of any kind but which can also break up even the hardest incrustations of dust, earth or debris.

Said brush fits into an elastomer moulded supporting plate, having an adjustable tilting attachment at the top into which a standard broom handle is fitted for holding and using the tool.

The most important features of the broom in question are undoubtedly the special shape and layout of the above elements which are arranged in two directions: some of the elements are arranged longitudinally while the remainder are arranged transversely.

Thanks to the double direction of the elements, it is obvious that regardless of whether the brush is used in alternating parallel movements with respect to its longitudinal axis or in alternating orthogonal movements with respect to its longitudinal axis, there will always be some elements under the brush which lie flat to collect and gather the sweepings while yet other elements, being orthogonal to the former, offer a cutting action to break up debris with a blade like action.

The scope of this invention is to make the above broom more practical and easier to use by introducing a number of improvements which on one hand make the raking and scraping action more efficient and on the other make the tool more versatile and practical to use.

For this purpose, the supporting plate of the brush and the actual brush have been made more flexible by providing under the supporting plate a wide hollow area and by providing on the brush a number of longitudinal rows of very fine cuts, which are staggered so as to increase the elastic bending capacity of the entire structure, which can in this way bend more easily and better adapt to the irregular shape of the surfaces on which the tool is used.

Moreover, a shaped tubular coupling has been provided to fix the handle to the supporting plate of the brush; said coupling can be adjusted in any direction with respect to the supporting plate thereby making it possible to place the broom handle at the most convenient angle with respect to the height of the user and according to whether the same is left or right handed.

The possibility of regulating the broom handle is extremely useful for example in the case of telescopic handles, since as the handle length varies, so must the angle of the same be varied in order to prevent the brush from working in a position which is not the ideal position for obtaining the best results.

For major clarity, the description of the invention continues with reference to the enclosed tables which are intended for purposes of illustrating and not in a limiting sense, whereby:

- fig. 1 is a side view of the broom (supporting plate and brush) improved according to the invention;
- fig. 2 is a cross-section of only the supporting plate of the brush on a longitudinal centre plane;
- fig. 3 is a cross-section of only the supporting plate of the brush on a transverse plane;
- fig. 4 is a back view of the brush in question, that is in direction IV-IV in fig. 1;
- fig. 5 is a view of the bottom face of the brush.

With reference to the above figures, it can be observed that the brush (1) fits under a supporting plate (2) whose horizontal profile is shaped like that of the brush (1) which is rectangular in shape terminating at the front with a tip.

The bottom of the plate has a cavity (2a) extending for almost its entire length; the cross-section of the plate (2), which has a transverse plane, has a vault profile whose concavity faces downwards, as shown in fig. 3.

The bottom face of the supporting plate (2) has a series of regularly spaced teeth (2b) along the perimeter which force the underlying brush (1) into an arched position in which its segments are fanned outwards as-shown in fig. 4.

With particular reference to fig. 5, attention is drawn to the fact there are a series of very fine longitudinal cuts on the brush (1) which allow it to arch transversely.

More specifically, the base (1a) of the brush (1) from whose bottom the segments (1b) project, has numerous rows of longitudinal cuts (1c) which are interrupted and separated along each row by welding beads (1d) obtained during the same working phase and with the same moulding material as that of the brush (1).

Attention is drawn to the fact that the cuts (1c) are of the same length and that the cuts of one row are staggered with respect to those of the two adjacent rows.

As mentioned previously, the series of cuts (1c) on the brush (1) and the cavity (2a) under the supporting plate (2) very considerably improve the possibility of transversely arching the broom and bending it in general with respect to standard brooms, so that the tool according to the invention can be used more effectively even in very small spaces or on irregular surfaces.

The supporting plate (2) features an adjustable tilting attachment (3) at the top into which, according to this invention, a tubular coupling (4) is fitted and in which the handle of the broom in question is in turn fitted.

This coupling (4), moulded in a single piece of plastic material, has two sections positioned at different angles:
one at the front (4a) which fits into the attachment (3) and the other at the back (4b) which houses the end of the handle, which is not illustrated in the figures.

The front section (4a) has an external mouthpiece having an splined profile (4c) which couples with the internal terminal section (3a), which is also splined, of the attachment (3).

Along the centre of the front section (4a) of the coupling (4) there is an annular undercut (4d) into which the tip of a screw (5) fits and screws radially to the attachment (3).

Having fitted the section (4a) of the coupling (4) into the attachment (3) and having screwed the screw (5), the coupling will be firmly fixed in that its rotation is prevented by the teeth of the engaging splined profiles, while its extraction is prevented by the screw (5) which is fitted in the undercut (4d).

The back section (4b) of the coupling (4) has an internal threading (4e) for screwing the broom handle, which generally has a threaded end.

Attention is drawn to the fact that the external diameter of the back section (4b) of the coupling (4) allows a tubular type handle to be pressed into place, in that these broom handles are today available in standardised dimensions.

## Claims

1. An improved broom having a sturdy brush moulded in elastomers, consisting of a brush (1) with a series of moulded elastomer segments (1b) at the bottom, which fits into a supporting plate (2), also moulded in elastomer, having an adjustable tilting attachment (3) at the top in which a standard broom handle fits; a broom characterised in that the bottom of said plate (2) has a long centre cavity (2a) and a peripheral series of regularly spaced teeth (2b), which force the underlying brush (1) to arch transversely.

2. An improved broom having a sturdy brush moulded in elastomers, according to claim 1), characterised in that the base (1a) of the brush (1) from whose bottom the segments (1b) project, has a number of parallel rows of longitudinal cuts (1c); the rows being interrupted and separated by welding beads (1d) obtained during the same working phase and with the same moulding material as the brush (1); the length of the cuts (1c) being the same and the cuts of one row being staggered with respect to those of the two adjacent rows.

3. An improved broom having a sturdy brush moulded in elastomers, consisting of a brush (1) with a series of moulded elastomer segments (1b) at the bottom, which fits into a supporting plate (2), also moulded in elastomer, having an adjustable tilting attachment (3) at the top in which a standard broom handle fits; a broom characterised by an attachment (3) housing a coupling (4), moulded in a single piece of plastic, and having two sections positioned at different angles: one at the front (4a) which fits into the attachment (3) and the other at the back (4b) for housing the end of the broom handle; said front section (4a) features an external splined mouthpiece (4c) for coupling with the internal end section (3a), also having a splined profile of the attachment (3); along the centre front section (4a) of the coupling (4) there is an annular undercut (4d) into which the tip of a screw (5) fits and screws radially to the attachment (3); moreover, the back section (4b) of the coupling (4) has an internal threading (4e) into which the broom handle is screwed.

4. A coupling for connecting brushes to the broom handles, characterised in that the same consist of a tubular coupling (4), moulded in a single piece of plastic, having two sections positioned at different angles: one at the front (4a) which fits into the brush attachment, and the other at the back (4b) which houses the end of the broom handle; the front section (4a) featuring an external mouthpiece having a splined profile (4c) and an annular centre undercut (4d); the back section (4b) of the coupling (4) also being characterised by internal threading (4e) to screw on the broom handle.

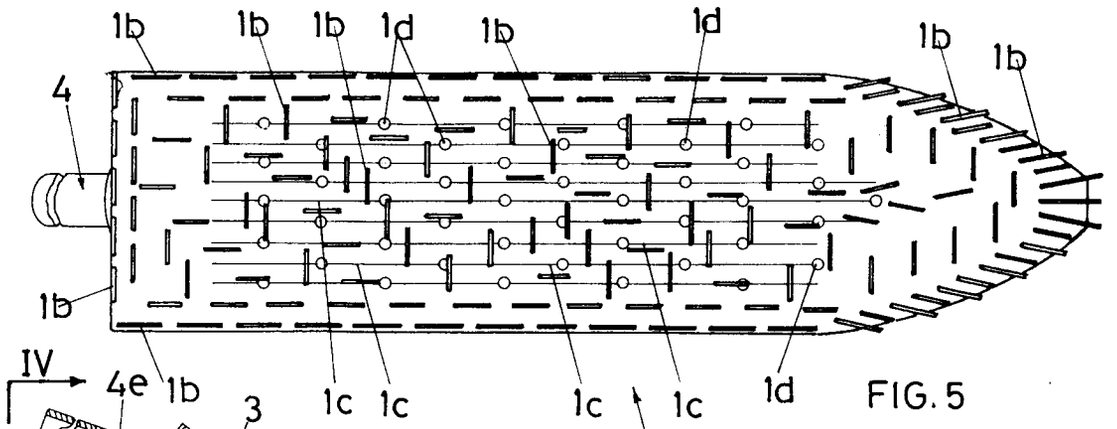


FIG. 5

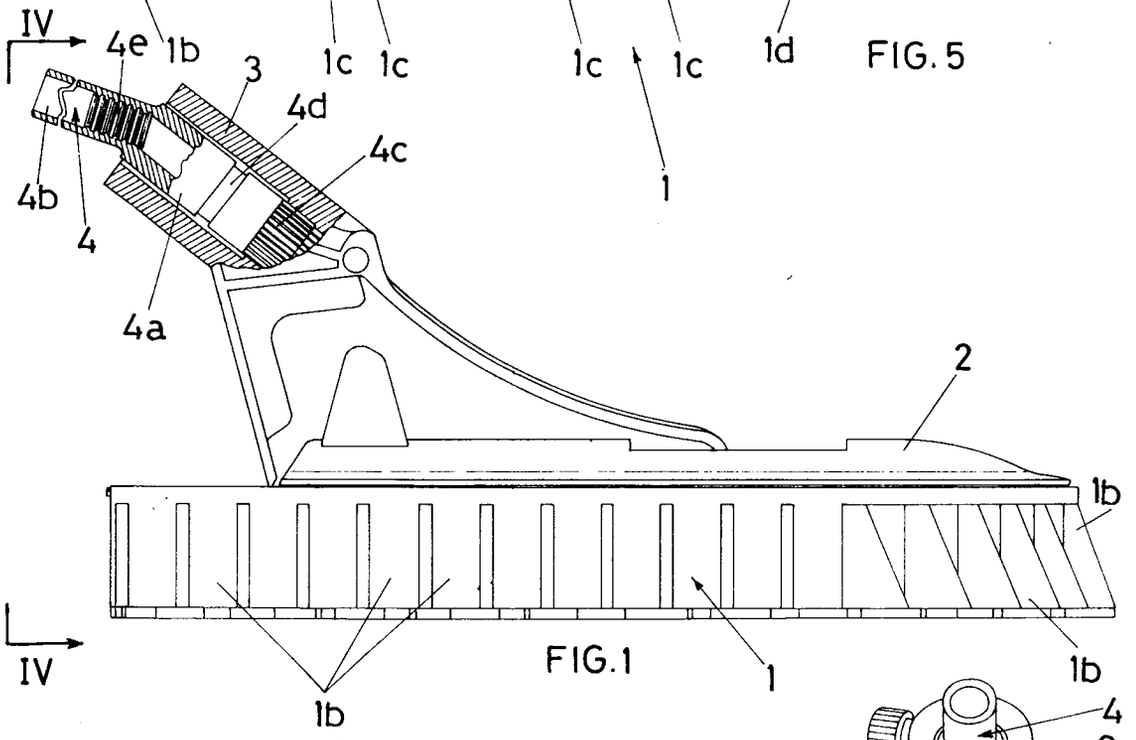


FIG. 1

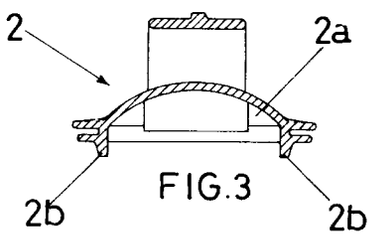


FIG. 3

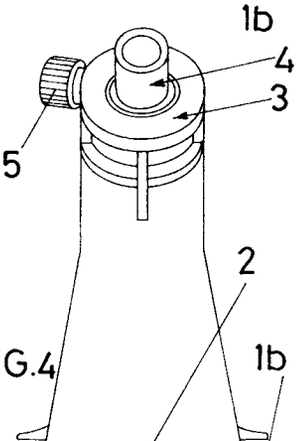


FIG. 4

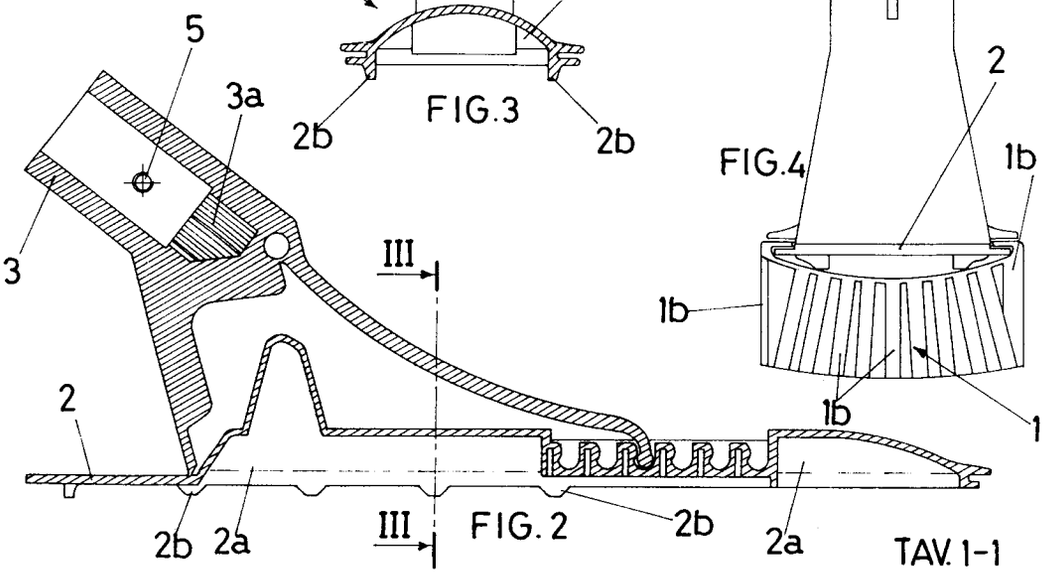


FIG. 2

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