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(54)

FLEXIBLE PAD FOR SANDING BODYWORK

- (57) Flexible sanding pad for sanding bodywork made by assembling a plurality of materials which create a layering suitable to give said pad both the rigidity necessary to support sanding and the flexibility necessary to facilitate the constant treatment of concave and convex surfaces of a generic bodywork; said flexible sanding pad comprising a plurality of knobs, installed on the upper surface, suitable to facilitate its grip by an operator, further conditioning its flexure; said flexure being further facilitated by a plurality of grooves, all longitudinally arranged, suitable to facilitate the grip of an operator by creating a softer and more flexible central area of said sanding pad; said flexible sanding pad being engaged, in its lower surface, with a velcro disk, for the purpose of applying common abrasive discs of different grits.

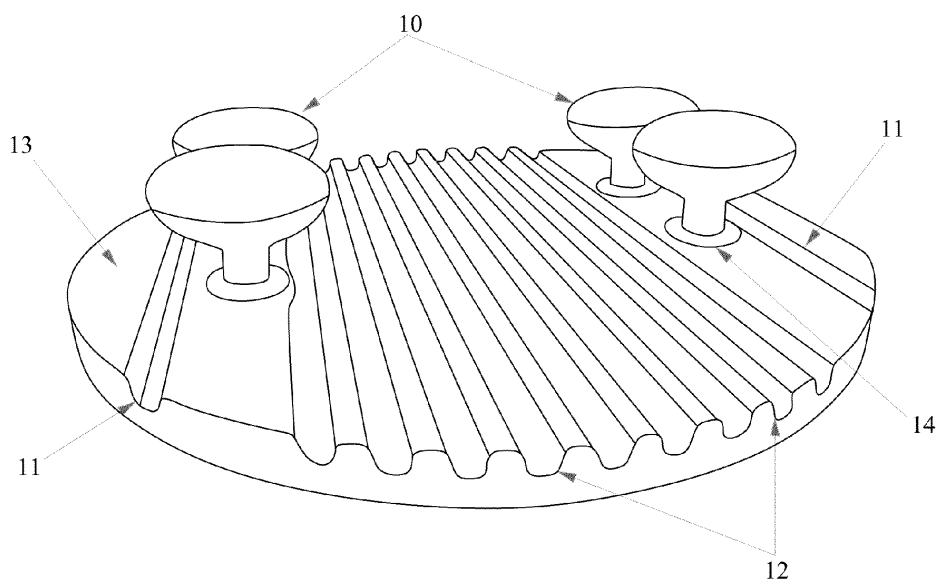


Fig.1

## Description

### Field of the art

[0001] The invention relates to an innovative flexible sanding pad, suitable to sand the most insidious points of a bodywork, characterised by concavities and convexities; more in particular, the present invention discloses a sanding pad suitable to facilitate sanding operations thanks to its structure which is easy to bend and grip, while remaining adherent to the treated surface.

### Known art

[0002] To date, sanding is a simple method for diagnosing paint defects more accurately and establishing the best recovery cycle. It consists of sanding the entire painting film at a damaged area until reaching the support (bare sheet or plastic). Thereby, the various layers and the products used in the painting cycle are identified, highlighting the related defect.

[0003] In the current state of the art, surface sanding, smoothing and polishing is carried out by hand or by means of sandpaper, occasionally exploiting the aid of common sanding machines.

[0004] However, said machines do not allow specialised operators to reach the most insidious points, often characterised by narrow concavities and convexities. To overcome this problem, the operators are forced to use abrasive papers and pads to manually treat the most insidious parts, causing a considerable waste of time for the industrial sectors.

[0005] In most cases, the pads are used for the treatment of the most delicate surfaces, which require more attention or which require a particular aesthetic factor.

[0006] For this reason, sanding with pads assumes a high importance in the bodywork field; however, in the current state of the art, rigid and bulky pads are still used. To date, the most widespread pads on the market are rigid, therefore unsuitable for the most demanding work, dedicated to surfaces characterised by pronounced concavities and convexities.

[0007] A second negative aspect is given by the short life of said pads which, if subjected to flexure, begin to reveal a plurality of cracks and ripples until they crumble, deteriorating after a few processes.

[0008] The pads widespread today also involve a waste of plastic material, which is dedicated to filling the structure of said pad, compensating for the flexibility with the robustness which is however inadequate given the type of work which the pad is suitable to carry out.

[0009] It is necessary to provide for the creation of a pad which can lead to a saving of materials used, obtaining advantageous impacts on production costs and pollution, providing a layered and optimised structure. In addition to this, said pad must be simple to use, even in the most insidious points of the bodywork, characterised by concavities and convexities, maintaining high durability.

[0010] Even patent KR20220126252, published on 15 September 2022, does not solve the above problems as it claims a pad comprising a plurality of reinforcements suitable to stiffen the structure; the pad proposed by KR20220126252 is potentially suitable to increase its life cycles while sacrificing its flexibility.

[0011] Other earlier patents which to date do not solve the technical problems detected are:

- patent JP 2011036929, which describes a monobloc polishing device;
- patent US 2007/155297, which defines a manual sanding tool;
- patent DE 102012212914, which proposes a sanding block with a variable geometry surface;
- patent JP H11288656, which claims a switching mechanism;
- patent WO 98/19831, which describes a simple sanding device, functional only for flat surfaces.

[0012] The object of the patent is therefore to claim a flexible sanding pad for sanding bodywork suitable to ensure a simpler and above all more practical grip for the type of machining which the operator must perform, modifying the flexure of the pad depending on the type of grip performed.

### Description of the invention

[0013] According to the present invention, a flexible sanding pad for sanding bodywork is created which effectively solves the aforementioned problems.

[0014] The flexible pad object of the invention is particularly suitable to sand the most insidious points of the bodywork, since it is adapted to exploit its advantageous flexure, given by a plurality of grooves.

[0015] Said grooves, located in the central section of said pad, are suitable to favour the flexure and therefore the adhesion of the pad on any three-dimensional surface characterised by concavities and convexities, achieving a uniform and constant machining on the treated surface.

[0016] The flexure of the pad, by means of the grooves, is regulated by means of the pressure exerted by the operator during the machining; in fact, thanks to a plurality of knobs, the operator can compress and then flex said pad.

[0017] A rubber layer is suitable to constitute the main structure of the present flexible pad, comprising an upper surface and a lower surface, suitable to engage with a plurality of components which facilitate the sanding of a generic bodywork characterised by concavities and convexities. Said rubber layer therefore represents the external structure which gives solidity to the structure of the flexible sanding pad object of the invention.

[0018] A pliable harmonic steel disc is installed inside said rubber layer, giving rise to a plurality of alternating rubber and steel layers, suitable to contribute both to the resistance of the pad and to its rigidity to increase the

resistance thereof to wear.

**[0019]** Said harmonic steel disc is perforated, for the purpose of reducing its weight, advantageously increasing the flexibility of the pad, while contributing to its rigidity.

**[0020]** A plurality of knobs is engaged on the upper surface of said rubber layer, suitable to allow the grip of the flexible pad by any operator; said knobs are arranged symmetrically with respect to the longitudinal axis of the pad, in order to be brought closer or further away from each other, obtaining a radius of curvature of the pad which is ideal for sanding the most difficult to treat areas of the bodywork. Each knob is fixed with a countersunk and threaded M4 screw which has the further purpose of keeping said steel disc aligned with said rubber layer.

**[0021]** By way of non-limiting example, said knobs are engaged with the upper surface of said rubber layer by means of an interlocking, which provides for the insertion of a tooth, placed inferiorly to each knob, inside a hole of smaller diameter than said tooth; the interlocking takes place thanks to the elastic properties of said rubber layer, which allows the tooth of the knob to engage internally with said hole.

**[0022]** Alternatively, said knobs are engaged with the upper surface of said rubber layer by means of an engagement inside two longitudinally oriented rails; said flexible pad thus comprising two parallel longitudinal rails, suitable to accommodate the knobs, allowing the movement thereof, in order to facilitate the grip of each operator, by further adjusting the curvature of the flexible pad.

**[0023]** A plurality of grooves are made on the upper surface of said rubber layer, all oriented longitudinally. Said grooves are suitable to favour the flexure of the pad, based on the force impressed by the operator on said knobs during sanding.

**[0024]** By way of non-limiting example, a different shade of point from the one applied to the rubber layer is applied inside the longitudinal grooves, in the furrows between one relief and the other, in order to provide an optical effect that can make the operator understand how much said pad is flexed during the sanding of the bodywork.

**[0025]** At least one velcro disk is engaged with said rubber layer on its lower surface, by means of gluing; said velcro disk is suitable to facilitate the coupling of the flexible pad with a generic abrasive disc, in order to sand, by means of said pad, a generic bodywork by through the use of different grits.

**[0026]** In an embodiment thereof, said velcro disk is suitable to engage with said rubber layer by means of the use of a magnet, magnetically attracted by the harmonic steel layer, making said engagement completely reliable, without the use of glues and resins which can cause a stiffening of the flexible sanding pad subject matter of the invention.

**[0027]** To facilitate the complete adhesion of said pad to the surface of the bodywork treated during sanding, in particular during the treatment of the convex areas, at

least two external satellite grooves are used. Said two external satellite grooves are made on the upper surface of said rubber layer but external to said knobs, located one for each external side of the knobs.

**[0028]** The advantages offered by the present invention are apparent in the light of the description set forth herein and will be further clarified by the accompanying figures and the detailed description.

## 10 Description of the figures

**[0029]** The invention will be described below in at least one preferred embodiment by way of non-limiting example and with the aid of the accompanying figures, in which:

- FIGURE 1 shows a perspective view suitable to explain the composition of the flexible pad in its upper surface 13.

**[0030]** In fact, a plurality of knobs 10 is engaged on the upper surface 13 of the rubber layer, suitable to allow a firm grip of the pad object of the invention.

**[0031]** The grooves 12 are oriented longitudinally and are suitable to make said pad more flexible, by adhering more to the surface of the sanded bodywork.

**[0032]** Two satellite grooves 11 are installed on said upper surface, but external to said knobs 10, for the purpose of following and keeping constant the radius of curvature of said pad; said radius of curvature is adjusted by means of the pressure exerted on the grip by the operator.

**[0033]** The grip is facilitated by the presence of a plurality of knobs 10, engaged internally to said upper surface 13 by means of countersunk M4 screws inserted inside some holes 14 made during the construction of said flexible pad. -FIGURE 2 shows a lower view of said flexible pad object of the invention.

**[0034]** A velcro disk 17 is engaged on the lower surface 15 of said pad which, in an embodiment thereof, comprises a magnet 18 suitable to fix the position of said velcro disk 17 by exploiting the magnetic attraction generated by the presence of a perforated harmonic steel layer 16, installed internally to the rubber layer which constitutes the external structure of said flexible pad.

**[0035]** In the present figure it is further possible to note the plurality of grooves 12 and one of the two satellite grooves 11, suitable to confer greater flexibility and adhesion on the surfaces of the bodies characterised by concavities and convexities.

## Detailed description of the invention

**[0036]** The present invention will now be illustrated by way of non-limiting or binding example, using the figures which illustrate some embodiments in relation to the present inventive concept.

**[0037]** With reference to FIG. 1, the flexible pad de-

scribed in the present patent application is illustrated, more in particular the upper surface 13 of the outer rubber layer is depicted, suitable to constitute the structure which supports a plurality of components; said outer rubber layer, however, confers a high flexibility, in order to facilitate the sanding of the areas of the body characterised by a high concavity and a high convexity.

**[0038]** The flexibility of the present pad is increased by the presence of a plurality of grooves 12, made in the central part of said upper surface 13, oriented longitudinally. Said grooves 12 in addition to ensuring the elasticity necessary to keep said pad adherent on the sanded surface, allow a reduction in the overall weight of the pad.

**[0039]** To facilitate the grip and the gripping of said flexible pad, during the sanding operations, a plurality of knobs 10 are engaged on said upper surface 13, in an embodiment thereof engaged by means of their insertion inside a hole 14 each. Said knobs 10 are suitable to be brought closer to each other, depending on the force exerted by the operator during the machining, increasing the radius of curvature of the pad depending on the surface to be treated.

**[0040]** At least two external satellite grooves 11 are placed external to said knobs 10, one on each side, in order to increase the treated surface, uniformly distributing the load impressed by the operator who performs the grip of said pad by means of the knobs 10.

**[0041]** With reference to FIG.2, a view of the lower surface 15 of said pad is illustrated, where a velcro disk 17 is engaged, which is suitable to facilitate the application of any sheet of sandpaper to perform the sanding on the bodywork with different grits. A perforated harmonic steel layer 16 is comprised inside the rubber layer of said pad, suitable to contribute to the resistance and rigidity of the pad, while maintaining minimum weight values given its perforated structure.

**[0042]** Said perforated harmonic steel 16 therefore contributes to the rigidity of the pad, while respecting the elasticity given by the plurality of grooves 12 and the two satellite grooves 11.

**[0043]** Lastly, it is clear that the invention described up to now can be subjected to modifications, additions or variants obvious to those skilled in the art, without departing from the scope of protection outlined by the attached claims.

## Claims

1. Flexible sanding pad for sanding bodywork **characterised in that** it is made by assembling a plurality of materials which create a layering suitable to give said pad both the rigidity necessary to support sanding and the flexibility necessary to facilitate the constant treatment of concave and convex surfaces of a generic bodywork; said flexible sanding pad comprising a plurality of knobs (10), installed on the upper surface (13) of said sanding pad, suitable to facilitate

its grip by an operator, further conditioning its flexure; said flexure being further facilitated by a plurality of grooves (12), all longitudinally arranged, suitable to facilitate the grip of an operator by creating a softer and more flexible central area; said flexible sanding pad being engaged, in its lower surface (15), with a velcro disk (17), for the purpose of applying common abrasive discs of different grits; said flexible sanding pad for sanding bodywork further comprising:

- at least a rubber outer layer suitable for constituting the main structure of the present flexible sanding pad; said rubber outer layer comprising an upper surface (13) and a lower surface (15) suitable for engaging with a plurality of components suitable for facilitating the sanding of a generic bodywork **characterised by** concavity and convexity;
- at least a pliable harmonic steel disc (16), installed internally to said rubber layer; said harmonic steel disc (16) being perforated in order to reduce its weight, being more flexible while contributing to the rigidity of the flexible pad object of the invention, extending its life in terms of hours of use ;
- a plurality of knobs (10), engaged on the upper surface (13) of said layer of rubber by means of the use of a plurality of countersunk screws with M4 thread, suitable to allow an operator to grip the flexible pad; said knobs (10) being arranged symmetrically with respect to the longitudinal axis of the pad in order to be brought closer or further away from each other, thus obtaining the ideal radius of curvature for sanding the most difficult-to-treat areas of the bodywork;
- the plurality of grooves (12), made on the upper surface (13) of said rubber layer, all oriented longitudinally; said grooves (12) being suitable to favour the flexure of said pad, according to the force impressed by the operator on said knobs during sanding; within said longitudinal grooves (12), in the furrows between one relief and the other, a different shade of paint from the one applied to the rubber layer being applied, in order to provide an optical effect that can make the operator understand how much said pad is flexed during the sanding of the bodywork;
- the velcro disk (17), engaged with said rubber layer on its lower surface (15), by means of gluing; said velcro disk (17) being suitable to facilitate the coupling of the flexible pad with a generic abrasive disc, in order to sand, by means of said pad, a generic bodywork by through the use of different grits;
- at least two external satellite grooves (11), created on the upper surface (13) of said rubber layer but outside said knobs (10); said two satellite grooves (11) being located one on each

external side of the knobs (10), facilitating the complete adhesion of said pad to the surface of the treated bodywork, during sanding, in particular during the treatment of the convex areas.

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2. Flexible sanding pad for sanding bodywork, according to the preceding claim 1, **characterised in that** said knobs (10), suitable to allow the flexible sanding pad to be gripped by an operator, are engaged with the upper surface (13) of said rubber layer by means of an interlocking, which provides for the insertion of a tooth, placed inferiorly to each knob (10), inside a hole (14) having a diameter smaller than said tooth; the interlocking takes place thanks to the elastic properties of said layer of rubber, which allows the tooth of said knob (10) to engage internally with said hole (14).
 

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3. Flexible sanding pad for sanding bodywork, according to the preceding claim 1, **characterised in that** said knobs (10), suitable to allow the flexible sanding pad to be gripped by an operator, are engaged with the upper surface (13) of said rubber layer by means of an interlocking, which provides for the insertion of a tooth, placed inferiorly to each knob (10), within two longitudinally oriented rails; said flexible pad thus comprising two parallel longitudinal rails, suitable to accommodate the knobs (10), allowing them to be moved, in order to facilitate the grip of each operator, by further adjusting the curvature of the flexible pad.
 

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4. Flexible sanding pad for sanding bodywork, according to any one of the preceding claims, **characterised in that** said velcro disk (17) is suitable to engage with said rubber layer through the use of a magnet (18), magnetically attracted by the harmonic steel layer (16), making said engagement completely reliable, without the use of glues and resins which can cause a stiffening of the flexible sanding pad subject matter of the invention.
 

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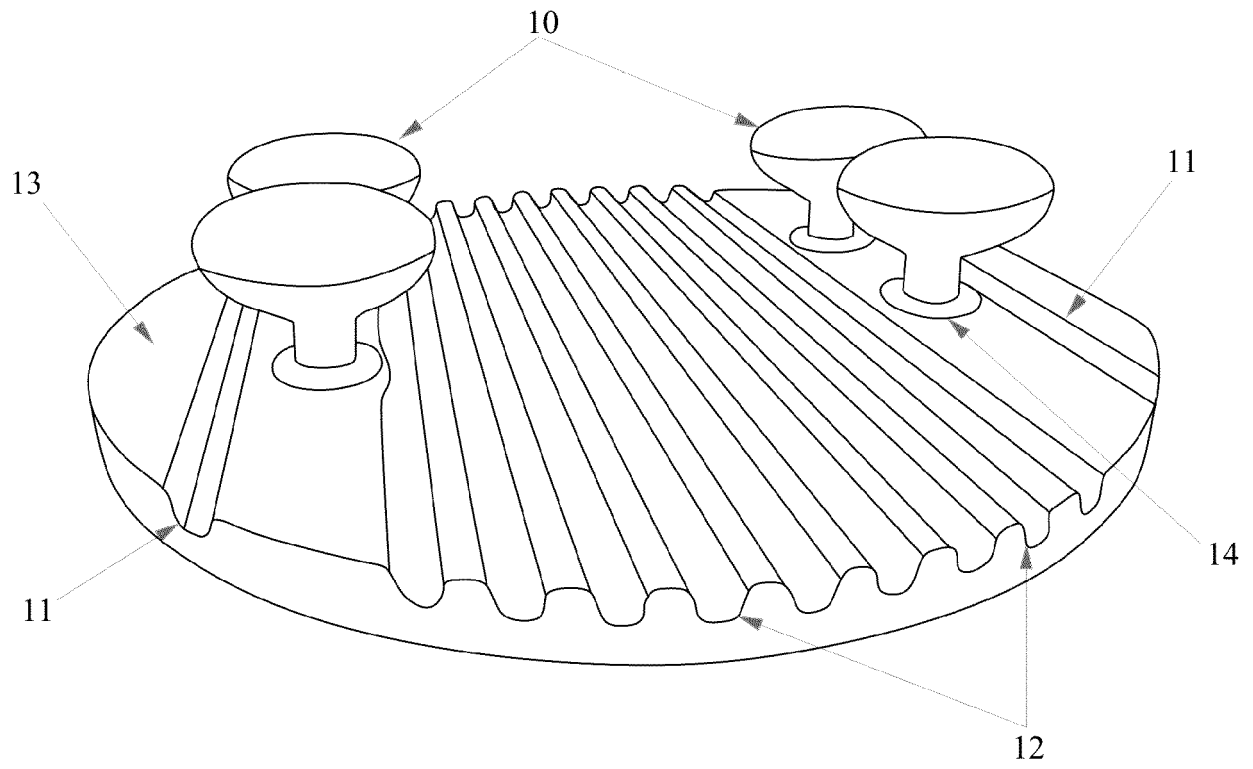


Fig.1

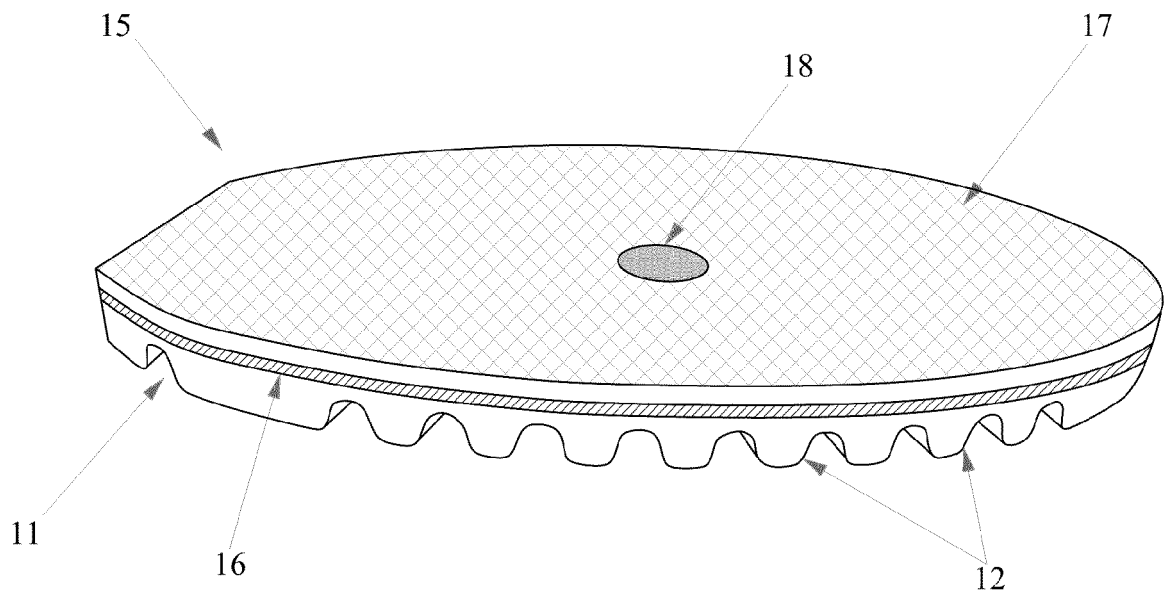


Fig.2



## EUROPEAN SEARCH REPORT

Application Number

EP 23 21 3833

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EPO FORM 1503 03.82 (P04C01)

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A	US 1 175 245 A (DENNIS GEORGE A [US]) 14 March 1916 (1916-03-14) * figure 1 *	1	TECHNICAL FIELDS SEARCHED (IPC) B24D B24B
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>27 March 2024</b>	Examiner <b>Bermejo, Marco</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category 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	

# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 23 21 3833

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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