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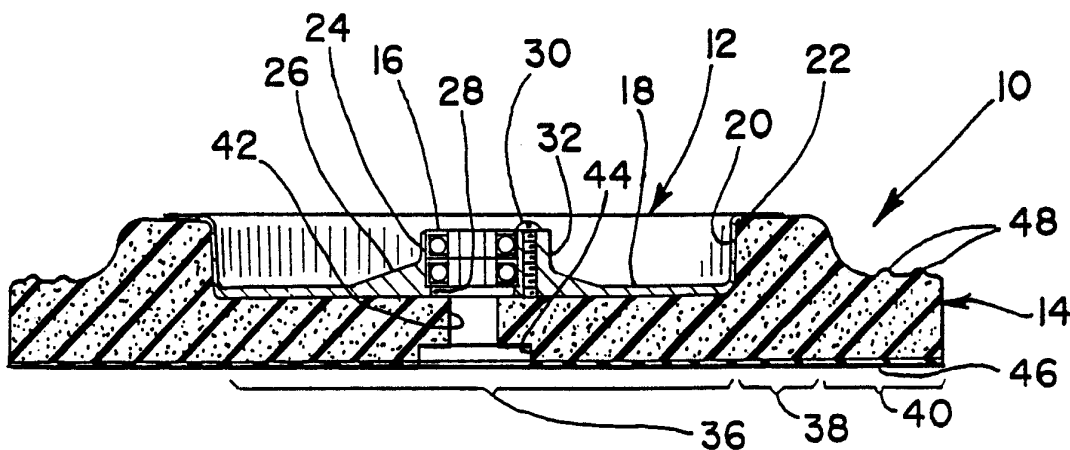
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With amended claims.*

(54) Title: MOLDED BUFFER PAD



(57) Abstract

Disclosed is a rotary buffer pad assembly (10) comprising a pan-like holder (12) to the outer surfaces of which a resilient pad (14) of foamed polyurethane is directly molded for better dynamic balance.

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-1-

MOLDED BUFFER PAD

This invention relates to powered buffers, and particularly to a buffer pad assembly for use in orbital buffers.

5

BACKGROUND OF THE INVENTION

Buffer pads as heretofore constituted for use in orbital buffers have consisted of a shallow pan-like pad holder, and a pad attached thereto, mounted for free rotation on the eccentric, orbiting axis of the buffer rotor. The pad, typically of foamed plastic material cut to size, was secured by adhesives to the outer surface of the pan-like pad holder. An illustrative buffing pad assembly is shown by United States Patent No. 4,188,682, issued February 18, 1980.

15

A problem associated with the fabrication of buffing pads by assembly from individual preformed components, viz., the preformed pan and the precut foam pads assembled with it by means of adhesives, is the difficulty of achieving and maintaining dynamic balance and the resulting greater difficulty of controlling the orbital polisher wielded free hand by the workman.

20

SUMMARY OF THE PRESENT INVENTION

The present invention overcomes the difficulty of achieving dynamic balance by the molding of the plastic foam pad directly to the outer surfaces of the preformed pad holder as an integral structure, rather than as an assembly of individual premanufactured parts.

25

BRIEF DESCRIPTION OF THE DRAWINGS

The buffer pad assembly of the invention is illustrated in the accompanying drawings, in which:

30

FIGURE 1 is a cross-sectional elevation of the pad assembly;

FIGURE 2 is a plan view of the assembly showing the section line along which FIGURE 1 is taken;

35 and

-2-

FIGURE 3 is an enlarged partial cross section of the pad assembly similar to FIGURE 1, and illustrating the flexibility of the pad lip.

DESCRIPTION OF THE PREFERRED EMBODIMENT

5 The buffing pad assembly 10 of the invention in preferred form is, as earlier noted, the integrated assembly of the two major parts, namely, a pan-like pad holder 12 and, molded directly thereto, a unitary pad 14 of foamed plastic material, preferably polyurethane.

10 The pan-like pad holder 12 is preferably die cast for the more precise distribution of material and the elimination of any necessity for further machining to prepare the pad holder to receive the additional parts assembled with it, principally the pad 14
15 subsequently to be molded to the pad holder and the anti-friction bearings 16 by means of which the pad assembly is journaled on the orbiting axis of the buffer rotor.

 The material used is zinc or a zinc alloy of
20 comparable, relatively low melting temperature suited to die casting and having an adequate strength to weight ratio to maintain the weight of the pad assembly within reasonable limits for a hand-held power tool of prolonged use. Rigid plastic may also be suitable to
25 the application with some revision of wall thicknesses, and appropriate selection of materials in view of the heat accumulation during prolonged use.

 The pan-like pad holder 12 comprises a circular bottom plate section 18 having an upstanding
30 annular wall section 20 at its periphery, and an outwardly extending ring flange section 22 at the upper end of the annular wall section. A cylindrical hub 24 rises from the center of the upper surface of the base plate section, which is stiffened by a plurality of
35 web-like ribs 26 which radiate equispaced from the central hub to merge with the upstanding annular wall section 20 of the pad holder. As seen in FIGURES 1

-3-

and 3, the ribs 26 become shallower as they radiate outwardly from their juncture with the hub.

The hub 24 itself is cored to provide a central opening for the anti-friction bearings 16, actually a pair of ball bearings stacked by their outer races upon a shoulder 28 at the bottom of the central opening and maintained in assembled relation with the pad holder by the overlapping engagement of the heads of three cap screws 30 with the outer race of the upper bearing. The cap screws are received in screw holes cored in three bosses 32 which are equally spaced about the periphery of the hub, each merging with one of the several radiating ribs 26, as seen in FIGURES 1 and 2. The bearing-retaining cap screws 30 are preferably of the self-tapping type and may, as shown, have round heads adapted to receive a Phillips screw driver.

As shown by dotted lines in FIGURES 1 and 2, the ring flange section 20 of the pad holder 12 is stabilized by a number of web-like braces or fins 34 on the underside of the ring flange integral therewith and with the annular wall section 20 down to its juncture with the base plate section 18. These fins 34, positioned in three equally spaced pairs, flank the axis of the ribs 26 radiating from the retaining screw bosses 32 of the central hub, stiffening the ring flange 20 against bending loads occasioned during normal use of the pad assembly, and also serving as a keying interlock between the pad holder 12 and the molded-on pad 14 to resist shear forces tending to separate them while the buffing pad is in use.

As earlier noted, the resilient polyurethane pad 14 is molded to the outer surfaces of the pad holder 12, which, before assembly with the central bearings 16, is inserted into the mold in which the pad itself is cast. To enhance the adhesion of the pad holder and the pad, the outer surfaces of the pad holder 12 are preferably slightly erose, a finish readily achievable

-4-

by etching those surfaces of the die-casting mold from which the outer surfaces of the pad holder take shape. With the pad holder inserted into and centered in the pad-casting mold, the intermixed liquid resin and isocyanate ingredients of the urethane pad material are poured into the mold, where the mixture is expanded by self-contained blowing agents released by the heat of polymerization as the molecular cross-linking proceeds, until the entire mass is pressed firmly against the walls of the mold. All surfaces of the mold excepting the pad holder are treated with a suitable release agent to confine the adhesion of the polyurethane to the pad holder.

As will be noted from the cross-sectional view of FIGURE 1, the buffing pad 14, molded as described onto the pad holder, comprises a central circular sole portion 36 of uniform thickness immediately beneath the base plate section 18 of the pad holder, a surrounding ring portion 38 of greater thickness determined by the depth of the annular wall section 20 of the pad holder, and, surrounding the ring portion, an outer annular lip portion 40 of lesser thickness than the ring portion, and whose upper surface merges with that of the ring portion 38 in a smooth S-curve configuration. The underside of all three portions of the pad collectively constitute a smooth, circular, plane working surface perpendicular to the central axis of the buffer pad assembly, at the site of which the integral pad is cored at 42 to receive the head of a cap screw, not shown, used to secure the inner races of the ball bearings to the eccentric buffer rotor to mount the buffer pad assembly on the orbiting axis of the rotor.

The constituents of the polyurethane foam are chosen in character and amount to result in a cellular foam structure which is predominantly closed cell in nature, and which has a density of approximately four pounds per cubic feet, viz., foam which is firm but not

-5-

rigid, and which is resilient enough to permit the resilient compression of its working undersurface to conform to convex contours and also to permit the upward bending of the peripheral lip portion 40 of the pad to
5 accommodate the working of the rotating pad into concave contours of an autobody, and close to its chrome trim, as well as simply to adapt itself to the professional buffer's technique of working with the working surface of the pad tilted a few degrees from parallel with the
10 surface being treated.

Because of the greater density of foam experienced in the area immediately surrounding the cored central opening through which the pad assembly is mounted on the orbiting axis of the buffer rotor, the
15 central opening of the pad is preferably countercored, as at 44, so that the stiffer foam surrounding the cored central opening 42 is elevated from the sole plane of the buffing pad 14 to avoid a local hard spot at the center of the working surface of the pad.

20 Because it may be difficult to achieve a uniform, closed-cell foam at the working surface of the buffing pad 14, it may be desirable to insert in the pad mold a plastic film 46 of polyethylene or the like, to seal the working surface of the pad against the
25 intrusion of an unbalancing accumulation of polishing materials which migrate to the pad surface through its covering bonnet during normal use of the pad.

In use, of course, the pad is encased in a bonnet, not shown, of material of suitable buffing
30 texture, typically a circular section of terry cloth having an endless elastic band enclosed within a peripheral seam to draw the textile material into bonnet form, and to maintain the bonnet assembled with the pad. To assist in maintaining that assembly, the peripheral
35 lip portion 40 of the pad 14 is provided on its upper surface with a series of upwardly protruding retainer rings 48 which provide successive barriers or gripping

-6-

ridges for cooperation with the elastic retaining band of the removable and replaceable bonnet.

The pad assembly 10 disclosed herein is an improvement over preexisting pad assemblies for similar
5 service because its principal constituent parts are precision molded in sequence, i.e., first the die cast pad holder 12 and then the resilient foamed plastic pad 14, molded directly to the pad holder in a manner which permits the inherently balanced precision die cast pad
10 holder 12 to be accurately positioned as a central insert within the mass of the foam pad 14 to which it becomes intimately united in the pad forming process.

The features of the invention believed new and patentable are set forth in the appended claims.

-7-

What Is Claimed Is:

1. A buffer pad assembly for use in treating the exterior surfaces of automobiles or the like, comprising:

a pad holder of pan-like configuration
5 comprising a circular plate section having an upstanding central hub, an annular wall section rising from the plate section at the periphery thereof, and an annular flange section extending radially outwardly from said wall section, said several sections and hub being molded
10 integrally of the same material as a unitary body;

an integral circular pad of resilient plastic material molded onto the outer surfaces of said pad holder concentrically therewith, said pad having a sole portion of constant thickness beneath the plate section
15 of the pad holder, a thicker ring portion radially outwardly of said annular wall section and sole portion and beneath said annular flange section, and an annular lip portion of lesser thickness than said ring portion at the periphery of the pad, all portions of the pad
20 collectively presenting a circular working surface in a plane perpendicular to the axis of said hub; and

means within said hub for mounting said pad assembly in driving relation to a buffer.

2. The buffer pad assembly of Claim 1 wherein
25 said mounting means within said hub comprises anti-friction bearing means seated in said hub axially thereof for mounting said pad assembly on the orbiting axis of an orbital buffer.

3. The buffer pad assembly of Claim 1 wherein
30 said annular wall section of the pad holder is cylindrical, the annular flange section is a flat ring defining a plane parallel to the plate section, and the annular flange section is braced to said wall section a plurality of fins connected to and molded integrally
35 with the outer surface of said annular wall section and the underside of said flange section.

-8-

4. The buffer pad assembly of Claim 1 wherein said plate section is provided on one of its surfaces with a plurality of plate-stiffening radial ribs equispaced about the center of the pad holder.

5 5. The buffer pad assembly of Claim 4 wherein said ribs are molded on the upper surfaces of said plate section and radiate outwardly from said hub.

6. The buffer pad assembly of Claim 1 wherein the resilient plastic pad is foamed polyurethane foamed
10 in place about the exterior surfaces of the pad holder.

7. The buffer pad assembly of Claim 6 wherein the exterior surfaces of the pad holder contacted by the foamed polyurethane are erose to enhance the adhesion of the foamed plastic pad to the pad holder.

15 8. The buffer pad assembly of Claim 6 wherein the resilient plastic pad is foamed about a central core to provide a central opening on the axis of the pad-holder hub, and countercored to elevate the locally densified plastic material surrounding said central
20 opening above said working surface of the pad.

9. The buffer pad assembly of Claim 6 wherein the foamed polyurethane pad has an average density of four pounds per cubic foot, and said working surface is covered by an adhering liquid-impervious plastic film.

25 10. The buffer pad assembly of Claim 9 wherein the liquid-impervious plastic film is adhered to the foamed polyurethane during the foaming process.

AMENDED CLAIMS

[received by the International Bureau on 14 September 1992 (14.09.92);
original claims 1-10 replaced by amended claims 1-3 (2 pages)]

1. A buffer pad assembly for use in treating
the exterior surfaces of automobiles or the like,
comprising:

a pad holder of pan-like configuration
5 comprising a circular plate section having an upstanding
central hub, an annular wall section rising from the
plate section at the periphery thereof, and an annular
flange section extending radially outwardly from said
wall section, said several sections and hub being molded
10 integrally of the same material as a unitary body;

an integral circular pad of resilient plastic
material molded onto the outer surfaces of said pad
holder concentrically therewith, said pad having a sole
portion of constant thickness beneath the plate section
15 of the pad holder, a thicker ring portion radially
outwardly of said annular wall section and sole portion
and beneath said annular flange section, and an annular
lip portion of lesser thickness than said ring portion
at the periphery of the pad, all portions of the pad
20 collectively presenting a circular working surface in a
plane perpendicular to the axis of said hub;

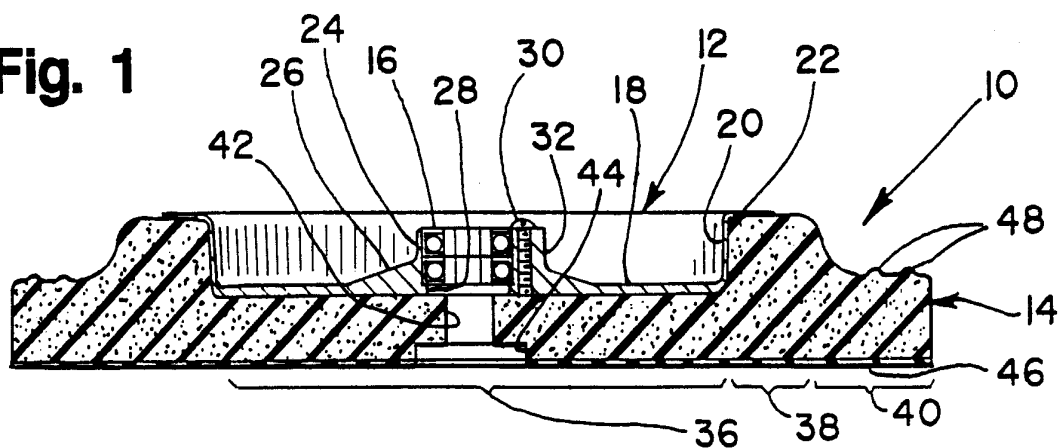
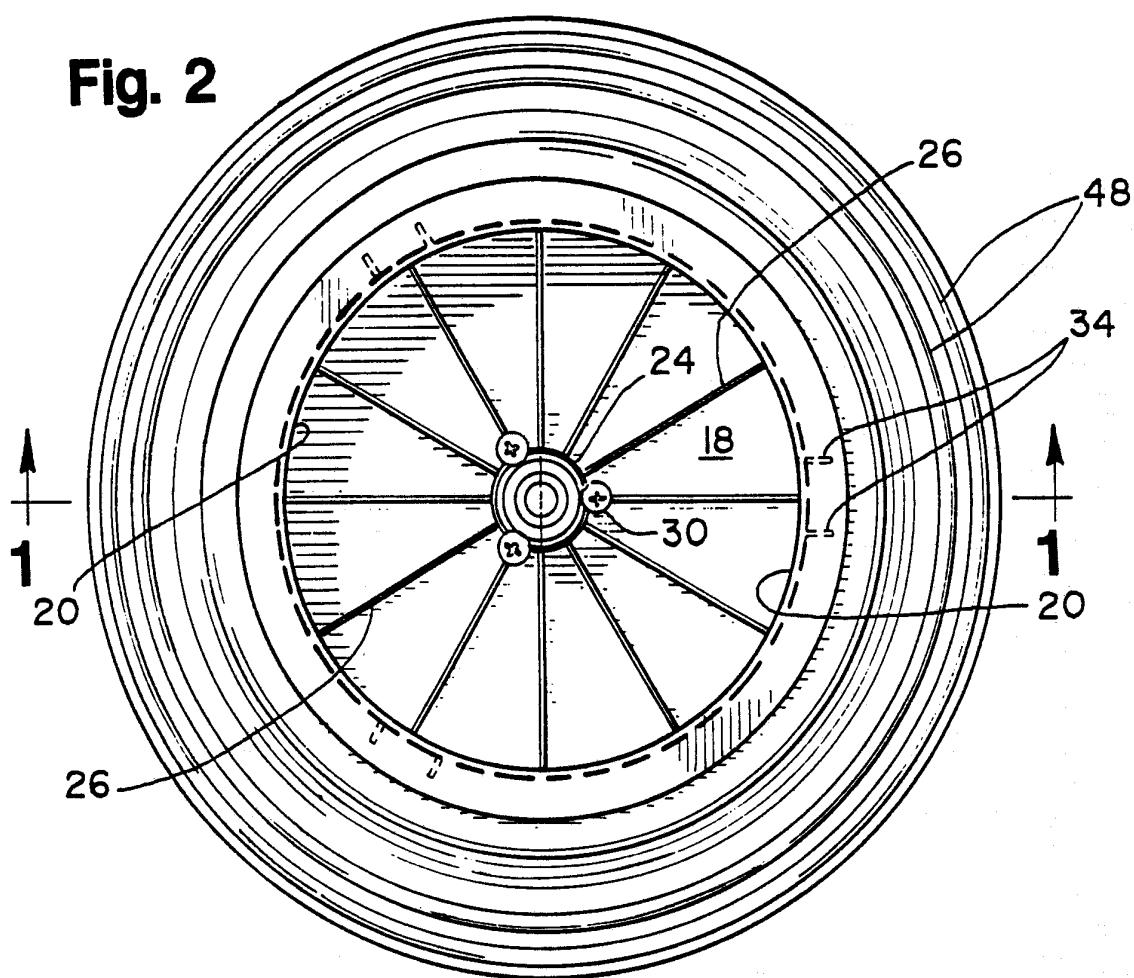
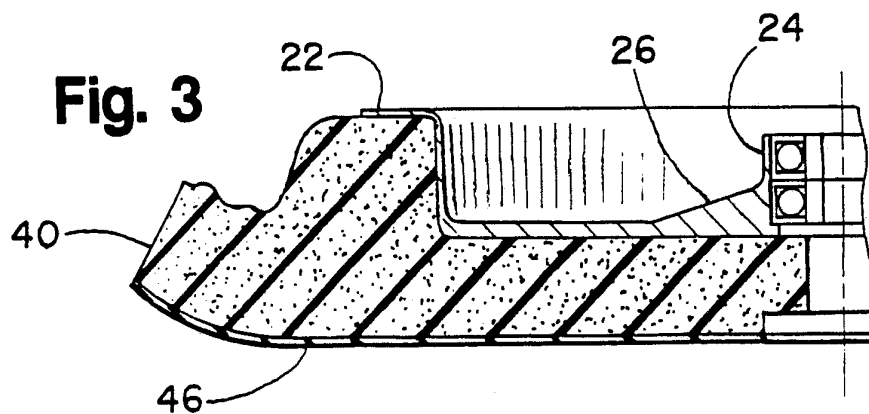
said resilient plastic pad being formed of
foamed polyurethane foamed in place about the exterior
surfaces of the pad holder and about a central core to
25 provide therein a central opening on the axis of the pad
holder hub, said pad also being countercored to elevate
the locally densified plastic material surrounding said
central opening above said working surface of the pad;
and

30 means within said hub for mounting said pad
assembly in driving relation to a buffer.

2. The buffer pad assembly of Claim 1 wherein
the foamed polyurethane pad has an average density of
four pounds per cubic foot, and said working surface is
covered by an adhering liquid-impervious plastic film.

3. The buffer pad assembly of Claim 2 wherein the liquid-impervious plastic film is adhered to the foamed polyurethane during the foaming process.

1 / 1

Fig. 1**Fig. 2****Fig. 3**

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US92/02355

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC IPC(5): B60S 3/06 U.S. CL. 15/97.1, 97.3 230		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
U.S.	15/97.1, 97.3, 230, 230.12, 230.17 51/170T, 177	
Documentation Searched other than Minimum Documentation to the extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	U S ,A, 4,188,682 (BURGLIN ET AL) 19 FEBRUARY 1980	1-3, 6&7
Y	U S ,A, 3,418,675 (MEGUIAR ET AL) 31 DECEMBER 1968	4 & 5
Y	U S ,A, 4,791,694 (ITAYA ET AL) 20 DECEMBER 1988	9 & 10
Y	U S ,A, 4,965,905 (KITAHATA ET AL) 30 OCTOBER 1990	9 & 10
A	U S ,A, 3,395,417 (MATOUKA) 06 AUGUST 1968	
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
30 JUNE 1992		17 JUL 1992
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