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54 Suction housing for vacuum sanding devices.

57 A housing for a vacuum sanding device consists of a ring or plate spaced above a backup pad to define a chamber, the periphery of the housing is spaced slightly above the backup pad for the whole periphery of the housing and the outer edge of the housing is coterminous, or nearly so, with the edge of the backup pad.

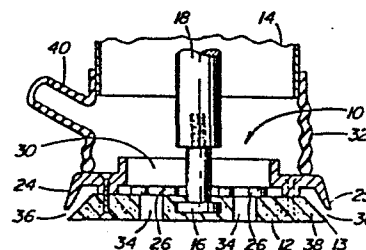


FIG. 1

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SUCTION HOUSING FOR VACUUM SANDING DEVICES

FIELD OF THE INVENTION

This invention relates to vacuum sanding devices and in particular to a housing for use with such sanding devices.

5 BACKGROUND OF THE INVENTION

Vacuum sanding devices have been known for sometime. They are usually rotary grinders or double action sanders although patents have also issued for vacuum sanders of a rectangular format. Examples of
10 such rectangular vacuum sanders are to be found in U.S. Patent 4,062,152 of December 13th, 1977 Mehrer, 3,123,946 of March 10th, 1964 Hoveland, 2,499,933 of March 7th, 1950 Smul. In circular vacuum sanding devices, examples may be found in Applicant's Canadian
15 Patent 1,080,477 August 1st, 1980, Canadian Patent 931,761 to Olmoen, U.S. Patents 3,785,092 Hutchins, 2,895,266 Statler, U.S. 4,164,101 Robert and 3,862,521 January 28th, 1975.

There are several disadvantages in the construc-
20 tion of the prior art patented devices. Many of them are complicated, incorporating too many moving parts and are therefore expensive to manufacture and maintain. Others do not provide adequate suction adjacent the immediate work area and, if they do, they sometimes
25 have upper housings that are spaced substantially outwardly of the backup pads or sanding blocks so that the sanding blocks can never reach deeply into corners or hard-to-get-at areas.

SUMMARY OF THE INVENTION

The present invention is constructed so as to overcome the many deficiencies of the prior art and to provide a very efficient, light and easy-to-use vacuum sander through the incorporation of a housing that
5 allows a sanding operator to get his sand paper close to if not right at corner portions and hard to get at areas. The housing of the present invention is adapted for use on numerous forms of sanders such as double
10 action or orbital sanders, rotary grinders, rectangular block sanders and hand block sanders. It is also usable on rectangular vibratory sanders.

According to a broad aspect, the invention relates to a housing for a vacuum sander of the type
15 that includes a backup pad. The housing comprises a plate having leg members on its lower surface for spacing the plate above the upper surface of the backup pad, a lip member on the periphery of the housing defining a relatively narrow peripheral opening between
20 the edge of the housing and the backup pad underneath it, the peripheral edge of the housing being coterminous or nearly so, with the peripheral edge of the backup pad.

In the embodiment of the invention used on
25 circular or rotary sanders, the peripheral portion of the housing reaches down close to the edge of the backup pad and therefore very close to the sanding surface. The housing is therefore instrumental in sucking up dust all around the rim of the operating
30 sander. The backup pads used with vacuum sanders normally have holes in the center part all the way through to an upper chamber formed by a flexible collar extending downwardly from the rotating mechanism to the housing. This combination of the vacuum hole
35 through the backup pad and the peripheral vacuum

inlet formed by the housing, forces the suction to draw the dust through the holes and all around the backup pad from the sanded surface. The edge of the suction housing is preferably flexible so that if an operator hits an edge, it gives and flexes back to its original position.

In a rectangular form such as a pole sander or hand sander, again there is a gap between the peripheral lip of the housing plate and the upper surface of the backup pad and this causes the vacuum to suck the dust all around and through the edge of the sanding block as well as through apertures in the associated backup pad. The apparatus picks up dust in the front, sides and rear portions equally.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated in the accompanying drawings in which:

Figure 1 is a cross sectional view of a vacuum sander incorporating the present invention;

Figure 1a is a modified version of the embodiment of Figure 1;

Figure 2 is a fragmentary, perspective view of a portion of the housing of the present invention;

Figure 3 is a view similar to Figure 1 but showing a somewhat different arrangement of the housing;

Figure 4 is a plan view of another embodiment of the invention;

Figure 5 is a sectional view taken along the line 5-5 of Figure 4;

Figure 6 is a sectional view taken along the line 6-6 of Figure 5;

Figure 7 is a cross sectional view of another embodiment of the invention;

Figure 8 is a sectional view of another embodiment of the invention;

Figure 9 is a bottom view, partially cut away, of the embodiment of Figure 8;

Figure 10 is a sectional view of a portion of the Figure 8 embodiment; and

Figure 11 is a top view of Figure 10; and

Figure 12 is a sectional view similar to Figure 8 of a further embodiment of the invention.

Referring to Figures 1, 1a and 2, the housing 10

5 according to the invention is illustrated as being mounted on the backup pad 12 of a rotary grinder or orbital sander including a vacuum housing 14. The backup pad 12 is connected by a stud 16 to a motor shaft 18 which rotates the backup pad 12 and an abrasive disc mounted on its lower surface.

10 The housing 10 comprises an upper plate portion 20 of circular configuration having a central, upstanding flange 22 and a peripheral lip member 24 depending therefrom and extending outwardly and downwardly from the plate member. The lower surface of the plate member is provided with a plurality
15 of legs 26 which serve to space the housing plate 20 upwardly from the backup pad 12 as shown in Figure 1. This spacing can be varied in accordance with the length of the legs 26 used in the particular requirements of the operation. In any case, the spacing of the vacuum housing plate 20 above the
20 upper surface of the backup pad 12 defines a vacuum chamber which is in communication with a large vacuum exit or opening 30 defined by the flange 22. In the embodiment of Figure 1, a resilient seal ring 32 mounted on the body of the vacuum housing 14 extends downwardly and rests on the upper surface
25 of the housing plate 20. This serves to seal the vacuum chamber so that any air drawn into the chamber must come in either through apertures 34 in the bottom of the backup pad 12 or in through the peripheral opening 36 defined between the lip member 24 and the sloped surface 38 of the backup pad.

30 The flexible sealing ring 32 may include a conduit 40 for detachable connection to suitable vacuum means, not shown.

The embodiment of the invention shown in Figure 1a is basically the same as that in Figure 1 but the conduit 40 is taken off the side of the housing 14 and not the seal
35 ring 32.

The embodiment of the invention illustrated in Figure 3 is similar to that shown in Figure 1 but the backup pad 12 is of somewhat different configuration and the legs 27 spacing the plate 21 above the backup pad are longer than the legs 26 in the embodiment of Figure 1. Moreover, instead of having a circular opening as defined by the flange 22 in Figure 1, the plate 21 has a series of apertures 23 which allow passage of air upwardly through the apertures 34 in the backup pad and through the peripheral opening 36 into the chamber defined by the ring 32 and outwardly through the vacuum conduit 40.

It will be appreciated that in either the Figure 1 or Figure 3 embodiment, the peripheral edge 25 of the lip 24 and the peripheral edge 13 of the backup pad are coterminous or nearly so with one another so that an operator can move the sanding device right into hard-to-get-at areas such as corners, valleys, etc. The housing 10 can be manufactured from a flexible plastic material so that if the lip 24 contacts any part of the working surface, it will give and then return to its original location.

Turning now to the embodiment of the invention in Figures 4-6, the housing of the embodiment in Figure 4 consists of an elongated rectangular plate 42 having a series of depending legs 44 which serve to space the plate 42 above a base member 46 and to which is attached a sanding block or backup pad 48. As with the embodiment of Figures 1-3, the spacing of the plate 42 above the base member 46 defines a vacuum chamber 50 which is in communication with external vacuum means through a circular upstanding flange 52 to which one end of a flexible tube 54 is connected.

This embodiment of Figures 4-6 is provided with a universal joint indicated generally at 56 and includes a pair of upright plate members 58 integral with or otherwise secured to the base member 46 and extending upwardly through the opening defined by the flange 52. Plates 58 support a roll pin 60 to which is attached a T-shape member 62 allowing

horizontal movement in one direction of that T-shaped member. The upper part of member 62 is provided with another roll pin 64 at right angles to pin 60 and it provides horizontal movement to a connector 66 attached to it. The connector in turn is adapted for detachable securement to the terminal end of a vacuum pipe 68 which may also serve the function of an elongated handle for actuating the sander.

Looking at Figures 5 and 6, it will be seen that the base member 46 is provided with a chamfered edge portion 70 and the housing plate 42 is, as in Figure 1, provided with a peripheral lip 72 extending outwardly and downwardly from the plate 42 so that the converging edges of the lip 72 and the chamfered edge of the base plate 46 define a peripheral opening 74. It will also be noted that the edge of the base member 46 and the terminal edge of the lip members 72 are coterminous with one another so that an operator can move the sanding device into corners and other hard-to-get-at locations during the sanding operation.

Turning now to Figure 7, the vacuum sander 76 has the same basic configuration as the sander in Figures 4 and 5 but instead of the plate 42 having a central opening for attachment to vacuum means, the housing plate 78 has an integrally formed handle member 80 and as the handle member 80 is of tubular construction, it provides communication between the chamber 82 defined between the plate 78 and the base 84 and external vacuum means, not shown, which is attached to the handle at a suitable outlet 86. As in the embodiment of Figure 5, the housing plate 78 is attached to the base 84 by suitable screws 88 extending through legs 90, the backup pad or sanding block 92 being attached to the lower end of the base. The peripheral lip 94 of the plate 78 is spaced somewhat from the chamfered edge 96 of the base 84 so that peripheral opening 98 is provided.

Turning now to Figures 8 and 9 a housing 9 has secured thereto a backup pad 11 that is provided with at least one circular suction channel 15, two such channels being illustrated. Depending on work requirements, diameter of the pad, etc. several concentric or one single channel would be used. As seen in Figure 8, the channels are preferably the same or somewhat greater in width than the diameter of the apertures 17 which are provided in the base of the pad 11. As shown in the bottom view of the pad in Figure 9, circular channel 15 interconnects apertures 17 while channel 15a interconnects apertures 17a.

It will be appreciated that with the provision of the suction channels 15, 15a it is unnecessary for an operator to line up suction holes in a sanding disc with the apertures 17 in the pad and, further, it is unnecessary to use a loading device with a centering pin for that purpose. With the circular suction channels the operator just sticks the paper to the backup pad using the outside diameter of the paper and backup pad as a guide and, while the holes in the paper may not align vertically with the apertures 17 in the pad 11, the holes in the paper will overlies an associated channel 15 or 15a so that, in operation, dust is sucked up through the channel 15, then through the aperture 17 and into the housing above. At the same time dust is also being drawn into the peripheral opening 23 between the housing lip and the edge of the pad 11.

It will be understood that sanding discs having one or two concentric rings of holes can be used on a pad according to Figures 8 and 9.

Looking to Figures 10 and 11, the inside surface of the frusto-conical skirt 28 of the housing may be provided with a series of shallow ribs 29, shown in phantom line in Figure 11. These ribs prevent the closing off of the space 31 between the inside of the suction skirt and the edge of the backup pad when the operator applies downward pressure on the edge of the pad against a work surface 33 as shown in Figure 10.

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Fig.12 illustrates a further embodiment of the invention. The nylon suction ring 28 is attached to the backup pad 11 as in Fig.8. Additionally, however, a further flexible cone 100 or skirt is secured at its upper end to the suction housing (not shown) and extends all the way down to the surface to be sanded and over the nylon seal ring 28. The flexible cone or skirt has inwardly projecting dimples or projections 104 which spaces the skirt from the surface of the plastic ring 28 and the skirt 102 is flexible enough that it allows the backup pad and skirt 28 to vibrate and rotate under the skirt without wearing the pad away.

With this additional flexible skirt, it is not necessary to have apertures 15 or 17 in the bottom of the backup pad and sanding disc as all of the sanded material and dust is drawn up into the housing between the peripheral surface of the backup pad, suction ring 28 and flexible collar or skirt 102.

It will be appreciated in all embodiments of the present invention that the peripheral opening allows efficient vacuuming of dust that accumulates anywhere around the periphery of the sanding device whether it is circular or horizontal. The dust can be drawn in through the back, sides or front of the device to provide a much more efficient unit than is available in the prior art. The arrangement of the present invention can be used on all rectangular vibrators, hand sanders, pole sanders and disc sanders or long body files. The housing can be made out of various materials such as nylon, fiberglass or various alloys.

The invention is effective either using the peripheral suction alone or in combination with suction apertures such as 34 in Figures 1 and 3 or 45 in Figures 5 and 7 which extend through the backup pad and or base from the work surface to the vacuum chamber.

While the present invention has been described in connection with specific embodiment thereof and specific uses, various modifications will occur to those skilled in the art without departing from the spirit and scope of the invention as set forth in the appended claims.

1 The terms and expressions which have been employed in this
specification are used as terms of description and not of limitation
and there is no intention in the use of such terms and expressions
to exclude any equivalence of the features shown and described or
5 portions thereof. It is recognized that various modifications are
possible within the scope of the invention claimed.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A housing for a vacuum sander of the type including a backup pad, said housing comprising a plate having leg members on its lower surface for spacing said plate above the upper surface of said backup pad, a lip member on the periphery of said housing defining a relatively narrow peripheral opening between the edge of said housing and a backup pad, the peripheral edge of said housing being coterminous, or nearly so, with the peripheral edge of the backup pad.
2. A housing according to Claim 1 wherein said leg members are integral with said plate, said lip member being directed outwardly and downwardly from the plate to define the narrow peripheral opening between said lip and the edge of the backup pad.
3. A housing according to Claims 1 or 2 including an exit from said housing plate for connection to a vacuum source.
4. A housing according to one of the preceding Claims wherein said plate is circular and adapted for mounting on the upper surface of a circular backup pad.
5. A housing according to Claim 1 wherein said plate is rectangular and includes a lower, base member spaced from said plate by said leg members, said base being adapted to receive a backup pad on its lower surface; and means on the plate member for connecting the housing to a vacuum source.

6. A housing according to one of the preceding Claims wherein said plate incorporates a tubular handle having an interior in communication with the peripheral opening and chamber.

7. A housing according to Claims 1 and 5 including a central opening in said plate with an upstanding flange for attachment to a vacuum source, and an universal joint located in said opening and secured at its lower end to said base member, the upper end of the joint being connectable to a handle member and a flexible collar secured to the plate flange and enclosing said universal joint.

8. A housing according to one of the preceding Claims wherein the pickup pad is provided with at least one circular concentric channel, and apertures in the channel extending through the pad.

9. A housing according to one of the preceding Claims including a plurality of ribs on the inside of the lip member to space the latter from the surface of the backup pad.

10. A housing according to one of the preceding Claims wherein a further lip member is applied over the lip member and is preferably spaced from the lip member by preferably dimple-like projections.

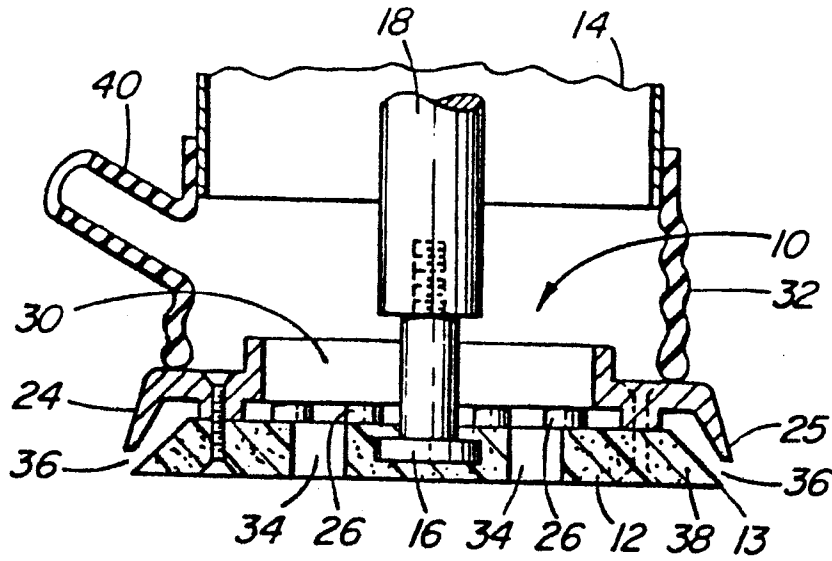


FIG. 1

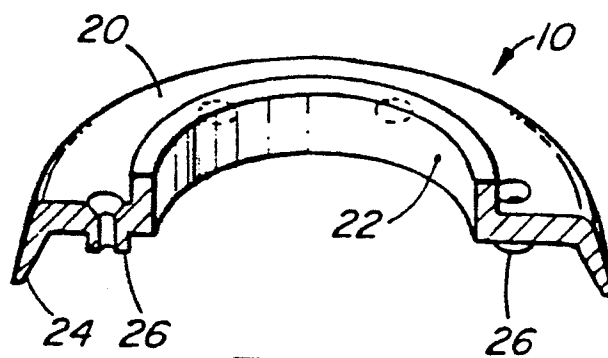


FIG. 2

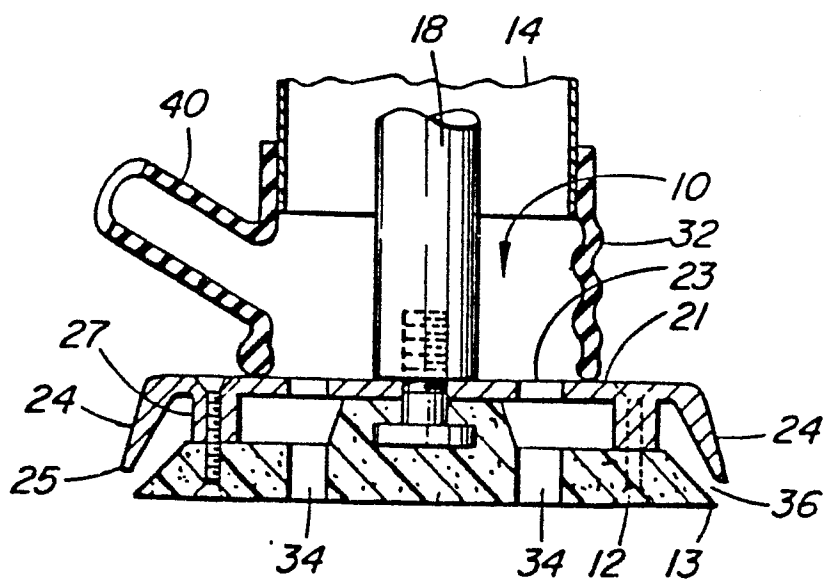


FIG. 3

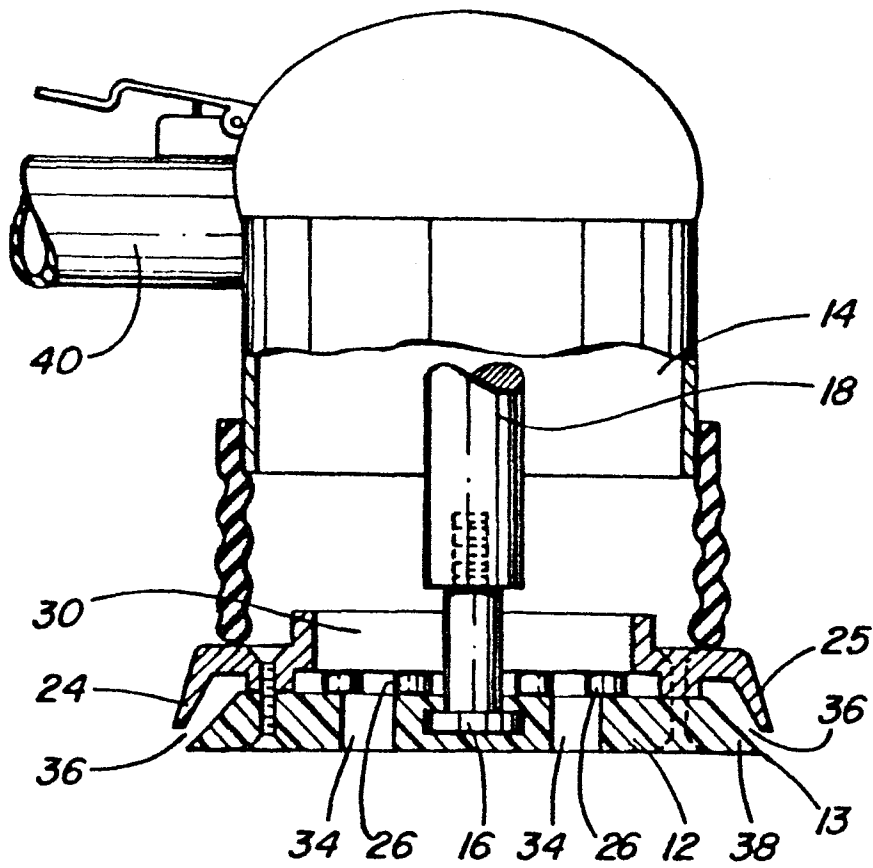


FIG. 1a

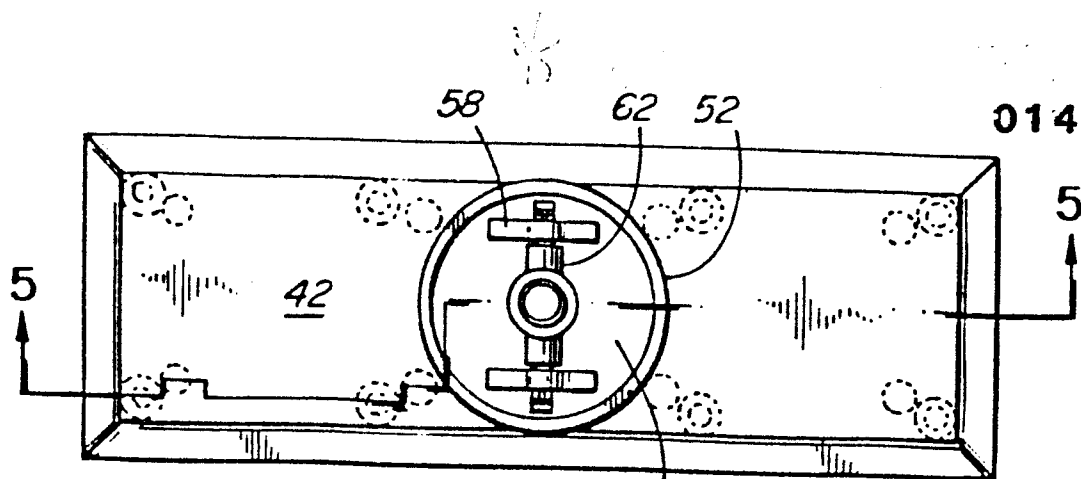


FIG. 4

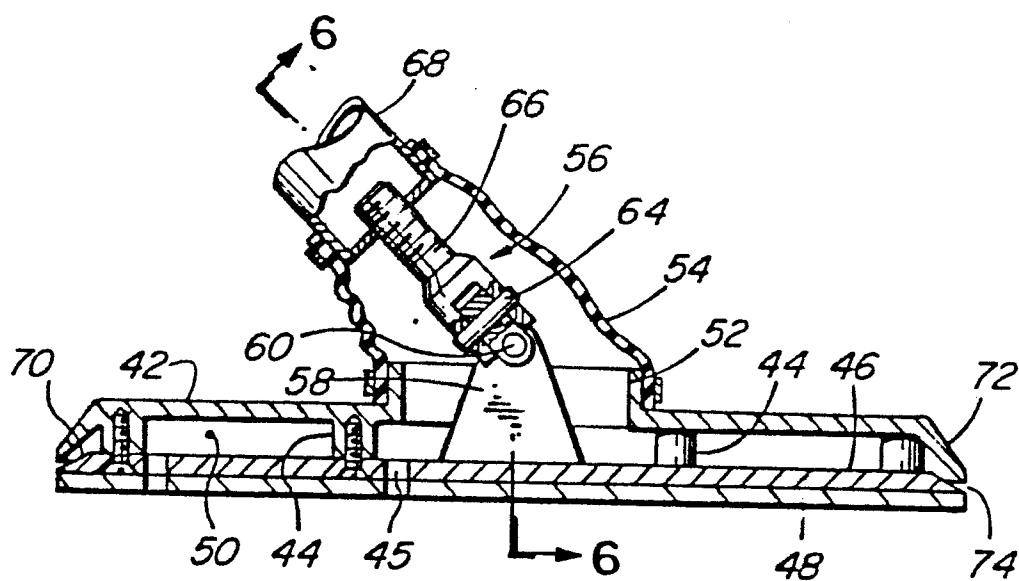


FIG. 5

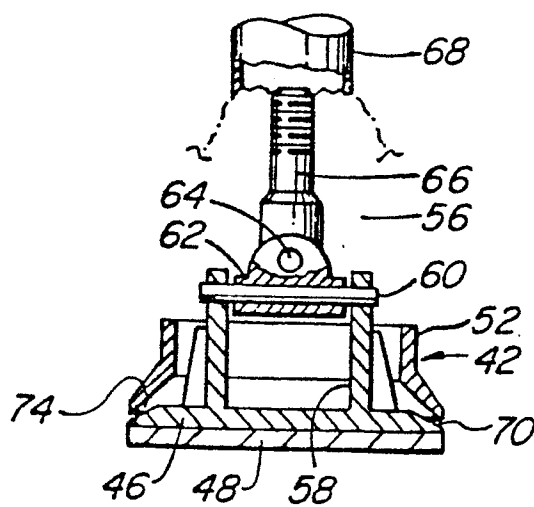
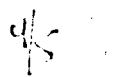
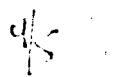


FIG. 6



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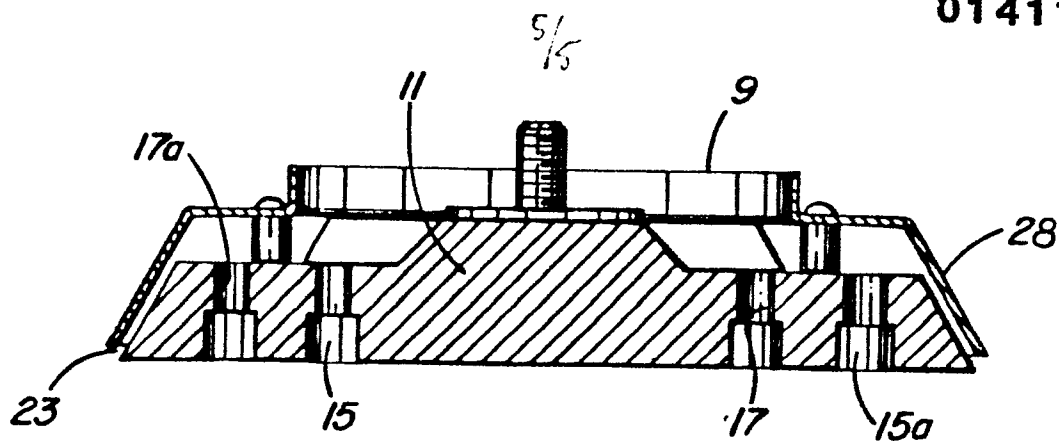


FIG. 8

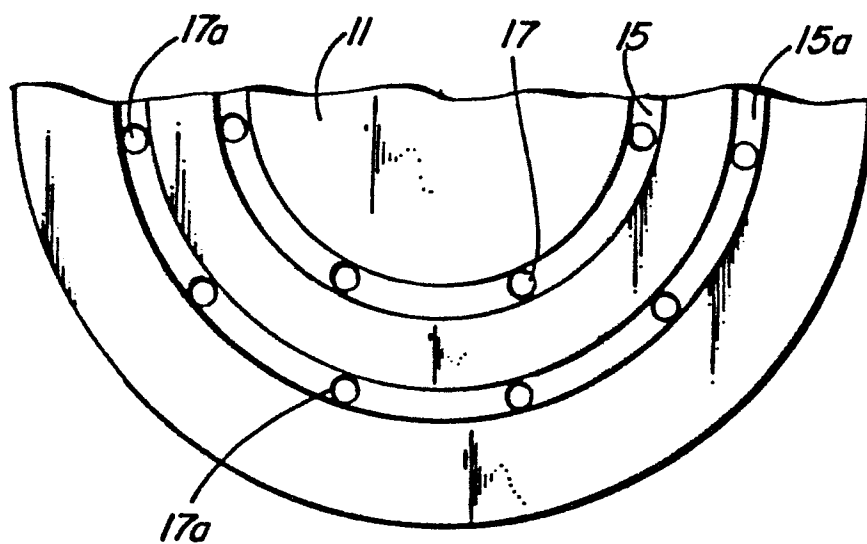


FIG. 9

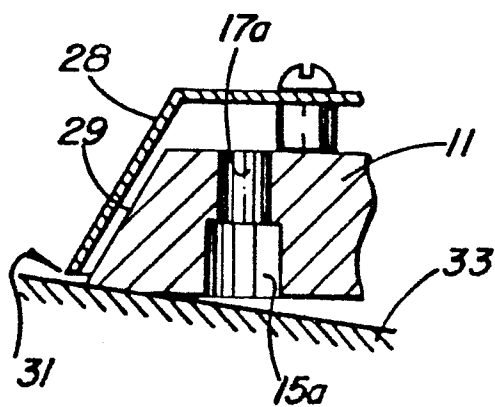


FIG. 10

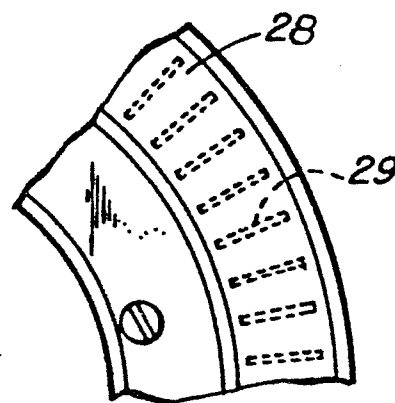


FIG. 11