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(54) Wet-sanding tools.

(57) The present invention includes a wet-sanding tool (1) for abrading a work surface. The tool comprises a sanding head (7) having an outlet (17) for discharging a liquid onto the work surface to be abraded and an inlet (19, 21) to enable the discharged liquid and abraded material to be removed from the work surface. The present invention enables the liquid to be discharged onto the work surface at the location at which the abrasive tool is in contact with and acting against that surface. The discharged liquid is dispersed over the area being sanded to substantially reduce or eliminate the creation and spread of dust.

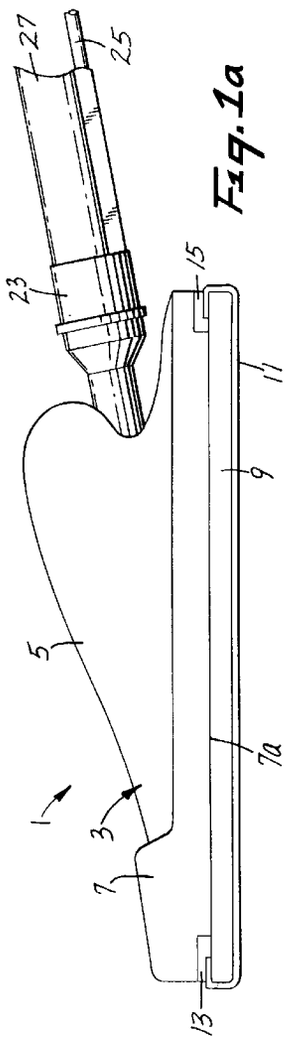

Fig. 1a

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TECHNICAL FIELD

This invention relates to wet-sanding tools.

BACKGROUND OF THE INVENTION

It is commonplace in both domestic and industrial applications to sand the surface of a work piece to achieve a desired finish. Conventional sanding operations are performed by the rotation or reciprocation of abrasive materials of various configurations, such as sheets, blocks and the like, against the surface to be finished. Dry sanding often leaves scratches and other surface blemishes on the work piece, as well as discharging considerable amounts of dust into the atmosphere, creating a health hazard for workers and, in certain instances, a fire hazard.

In many sanding operations, the efficiency of the abrading operation can be enhanced by maintaining the surface being abraded in a wet condition as it is sanded, referred to as "wet-sanding". Water or such other liquid is delivered to the work surface to cool and lubricate both the work surface and the sanding tool, as well as to flush away the abraded material. Wet-sanding is a common practice in the preparation of surfaces for finishing with a sealing or protecting finish or both, such as paint, and in some cases, the "finishing-off" processes involved in the molding of certain materials, such as fiber glass. For example, in vehicle repairs, wet-sanding is commonly used to smooth and prepare the vehicle body prior to refinishing and repainting.

Wet-sanding can be performed manually using a dry-sanding block and periodically dipping the block into water or periodically pouring water onto the surface being worked. However, for most industrial purposes this method does not deliver sufficient fluid to lubricate the surface continuously. Furthermore, there may be insufficient fluid to remove the abraded material to prevent build-up on the work surface, and in some instances on the sanding tool itself. It is also a tiring and somewhat laborious procedure.

Known manual wet-sanding tools comprise a sanding block having a channel or conduit extending therethrough and means for connection to an external source of liquid to allow greater quantities of liquid to be discharged directly onto the work surface. Hand wet-sanding tools are disclosed, for example, in Australian Patent Publication No. 89/46892 and U.S. Patent Nos. 4,320,601, 4,484,419 and 4,922,665.

Powered wet-sanding tools typically use electric, hydraulic or pneumatic power means to move a sanding head or other working unit bearing an abrasive material, such as an attached sheet or disc of sandpaper, over the surface to be finished. Water is directed through a passage or passages formed in the sanding head onto the surface of the work piece. Powered wet-sanding tools are disclosed, for example, in U.S. Patent Nos. 4,091,577, 4,102,084, 4,175,359, 4,184,291, 4,523,411 and 5,022,190.

Swiss Patent No. 666648 discloses a hand-held, powered wet-sanding tool comprising a housing defining a sanding head on which is mounted two rotary back-up pads supporting abrasive discs and driven by a common power source. The sanding head is provided with an outlet for connection to a water supply, through which water is discharged onto the work surface, and an inlet for connection to a vacuum pump, which removes particles of abraded matter, positioned between the abrasive discs. There is no disclosure of removing discharged water from the work surface.

There are a number of disadvantages associated with known methods of wet-sanding. The abraded material when mixed with water produces a slurry which runs across the work piece and dries to form streaks and discolorations thereon. By the time the sanding operation has been completed, these streaks can be so firmly attached to the surface of the work piece that they require a separate cleaning operation to remove them.

In addition, the uncontrolled discharge of large amounts of water necessitates the provision of expensive drainage facilities in the floor of the workshop. Moreover, in light of increasing environmental awareness, the disposal of waste water containing abraded paint and other such debris is becoming increasingly difficult as evermore stringent restrictions are placed on materials which can be disposed of in the national sewerage system.

The present invention seeks to provide improved wet-sanding tools which address the problems associated with conventional wet-sanding operations.

SUMMARY OF THE INVENTION

According to the present invention there is provided a wet-sanding tool for using a liquid during the abrasive removal of material from a work surface. The tool includes a housing defining a body to be held and manipulated by the user, the body comprising a sanding head having a back-up pad including a major surface adapted for carrying an abrasive member thereon and urging the abrasive member against the work surface to abrade material therefrom. The sanding head has a liquid outlet and a liquid inlet. Also provided are means for connecting the liquid outlet to a source of the liquid and means for connecting the liquid inlet to a suction source. The back-up pad includes at least one passageway therethrough in communication with at least one of (i) the liquid outlet to convey the liquid from the liquid source to the work surface, and (ii) the liquid inlet to enable the liquid and abraded material to flow from the work surface to the suction source.

The present invention enables the liquid to be dis-

charged onto the work surface at the location at which the abrasive tool is in contact with and acting against that surface. The discharged liquid is rapidly dispersed over the area being sanded to substantially reduce or eliminate the creation and spread of dust. The waste liquid containing particles of abraded material and other extraneous matter is simultaneously removed from the work surface, such that both the work surface and the sanding tool are kept free from the build-up of slurry deposits, thereby avoiding damage to the sanding tool, increasing the effective life of the abrasive material, and preventing the desired finish from being marred by loose particles abraded from the work surface. Moreover, the waste water can be filtered to remove particulate matter prior to its disposal. The filtered waste water may advantageously be recirculated to the liquid source to provide a "continuous" wet-sanding system, with little or no spillage of liquid, when compared with conventional wet-sanding operations.

The sanding tools of the invention are arranged such that at least one of the liquid discharge and removal is carried out through the back-up pad. Preferably, both discharge and removal of the liquid is carried out through the back-up pad, although this will depend to a certain extent on the type of sanding tool. For example, in the case of a rotary sander, where the back-up pad must be capable of rotation, usually at high speeds, then the liquid is preferably discharged from a central conduit through the back-up pad of the sanding head and removed at the periphery of the sanding head. The sanding head is advantageously provided with a skirt to protect the operator from spray and to direct the discharged water onto the work surface.

In one embodiment, the back-up pad comprises one or more first passageways, and the sanding head comprises at least one through passage communicating with one of the connection means and with the first passageway in the back-up pad to allow liquid to be discharged to or removed from the work surface. Preferably, the back-up pad is provided with a plurality of first passageways connected by one or more such through passages.

In a preferred embodiment, the back-up pad also comprises one or more second passageways, and the sanding head comprises at least one through passage communicating with the other connection means and the second passageways, such that both liquid discharge and removal is carried out through the back-up pad. Preferably, the back-up pad is provided with a plurality of second passageways connected by one or more such through passages.

The passageways in the back-up pad may have any suitable size, shape and pattern that allows for efficient discharge of liquid to or removal of the liquid from the work surface, or both.

The sanding head ordinarily comprises means for releasably securing an abrasive material, such as an abrasive sheet, disc, or block, over the back-up pad. Suitable securing means are well known in the art and include spring clips, mechanical jaws, hook and loop type fasteners, adhesives, and the like.

The abrasive material is formed with at least one opening corresponding to the at least one passageway in the back-up pad to allow for the entry or exit of water therethrough. The abrasive material is normally provided with openings equal in number to the first and, where present, second passageways. The openings in the abrasive material may be precut so as to be compatible with a given sanding tool or, alternatively, the operator may cut the openings manually. The openings may also be formed in the course of attaching the abrasive material to the back-up pad, the sanding tool being provided with appropriate means for cutting such openings.

The sanding tool may also be provided with valve means for controlling the flow of liquid to the work surface. The valve means may,be located at the liquid source, or at an,intermediate position on a feed line supplying liquid to the sanding tool. Preferably, the valve is located on the tool itself to allow the flow of liquid to be regulated by the operator without undue interruption of the abrading operation. The valve means ordinarily comprises a pinch or needle valve, each of which is known in the art.

Water is the liquid of choice for most wet--sanding operations, because it is the most convenient and commonly available liquid. Lubricants, surfactants, dispersing agents, grinding aids, rust inhibitors, antimicrobial agents, antifungal agents and such other additives may be added to the liquid to enhance certain abrading characteristics.

The present invention is equally applicable to both powered and hand (i.e. non-powered) sanding tools. In the former cases the housing ordinarily defines a body to be held and manipulated by the operator, !he sanding head being mounted on the body for movement relative thereto. The housing contains a motor which may be electrically or more preferably pneumatically driven to move the sanding head relative to the body to abrade the work surface. The present invention is applicable to both rotary and orbital type powered sanding tools. The housing preferably includes gripping means (e.g. a contoured handle) to allow the operator to hold and manipulate the sander.

The present invention is also applicable to known wet-sanding tools, such as those disclosed in Australian Patent Publication No. 89/46892 and U.S. Patent Nos. 4,091,577, 4,102,084, 4,320,601, 4,922,665 and 5,022,190.

Thus, in one embodiment of the present invention there is provided a hand held, power-operable wet-sanding tool of the type disclosed in U.S. Patent No. 4,102,084 comprising a handle structure having in connection therewith a motor housing including an air

motor therein, and a shaft extending outwardly of the housing and driven by the motor. A sanding head is carried on and driven by the shaft, and the sanding head has an outlet for discharging a liquid onto the surface to be abraded. An air line extends from the motor outwardly of the handle to an air supply. An axial bore is formed in the motor shaft and an axial bore is formed in the sanding head, and the bores communicating with each other. A liquid supply line extends through the handle to a liquid source, and the liquid supply line extends to the bore of the motor shaft such that liquid can be discharged through the sanding head onto a surface to be abraded.

A flow control valve structure is carried by the sanding handle. The liquid and supply lines have a pair of aligned vertical passages therethrough, and a valve core extends through the vertical passages and has a pair of passages therethrough to simultaneously obstruct, or to permit, the liquid and air to flow through the respective supply lines. An operating handle engaging the valve core may be used to shift the valve core between positions either obstructing or permitting fluid flow. The sanding head further comprises an inlet to enable the discharged liquid and abraded material to be removed from the work surface, and means for connecting the inlet to a suitable suction source.

In another embodiment of the invention, a hand held, power operable wet-sanding tool of the type disclosed in U.S. Patent No. 5,022,190 is provided, comprising a tool body to be held and manipulated by a user. A sanding head is mounted to the body for movement relative thereto, and a motor is carried by the body and adapted to move the sanding head relative to the body to abrade a work surface. The sanding head includes a deformable back-up pad having an essentially flat undersurface against which a sheet of abrading material is held and through which force is applied to the sheet for pressing it against a work surface. The sanding head includes a backing plate that is more rigid than the backup pad and which extends across an upper side thereof and contains a first opening and a second opening. An orbital drive mechanism is provided and is powered by the motor, and projects downwardly toward the sanding head. The orbital drive mechanism includes a first element driven rotatively by the motor about a first axis, and a second element connected eccentrically to the first element for relative rotation about a second axis offset from the first axis to produce orbital movement of the second element. A boot having a flexible essentially tubular side wall extends downwardly between the body and the head and is disposed about the orbital drive mechanism. The boot has a bottom wall extending generally horizontally at a location vertically between the backing plate and the second element of the orbital drive mechanism. A fastener extends upwardly through the first opening in the rigid backing plate and through an opening in the bottom wall of the boot, and is connected to the second element of the orbital drive mechanism to attach the head to the second element and the bottom wall of the boot for orbital movement of the head and the bottom wall of the boot with the second element.

The sanding head contains a pattern of water passages leading through the different sides of the fastener, and leading to a plurality of spaced passageways in the undersurface of the back-up pad at different sides of the fastener to communicate with spaced openings in the abrasive sheet. Means for delivering water under pressure is provided, and is adapted to deliver water into the passages in the sanding head for flow therethrough to the plurality of spaced openings in the undersurface of the back-up pad. The means includes a water inlet line connected to the backing plate at the exterior of the boot to deliver water under pressure through the second opening in the plate into the passages for flow through the passages to the work surface. The boot forms a seal preventing access of the water to the drive mechanism. The sanding head further comprises an inlet to allow discharged liquid to be removed from the work surface, and means for connecting the inlet to a source of suction.

The present invention also relates to the combination of a sanding tool of the invention, means for supplying liquid to and from the sanding tool and a source of liquid.

The liquid source is preferably portable and may include means for generating a positive pressure in the liquid supplied to the sanding tool.

The supply means may comprise any suitable pumping and vacuum extraction system known in the art.

The system preferably includes means for filtering the liquid removed from the work surface so as to remove abraded and other particulate matter from the liquid prior to its disposal. The filtered liquid may advantageously be recirculated to the liquid source for subsequent re-use.

DESCRIPTION OF THE DRAWINGS

The present invention will be described with reference to the accompanying drawings, in which:

Figures 1a, 1b, and 1c illustrate one embodiment of a hand sanding tool in accordance with the invention, wherein Figure 1a is a side view of the sanding tool, Figure 1b is a bottom view of the sanding tool, and Figure 1c is a bottom view of the sanding tool with the back-up pad removed;

Figures 2a, 2b, and 2c illustrate one embodiment of a powered sanding tool in accordance with the invention, where Figure 2a is a side view of the sanding tool, Figure 2b is a bottom view of the sanding tool, and Figure 2c is a bottom view of the

sanding tool with the back-up pad removed;

Figure 3 is a cross-sectional view of a liquid reservoir suitable for use with the sanding tools of the invention; and

Figure 4 is a cross-sectional view of a portable reservoir system that allows recycling of the liquid.

DETAILED DESCRIPTION

Figures 1a, 1b, and 1c illustrate a wet-sanding tool (1) in accordance with the present invention. Sanding tool (1) comprises housing (3), typically constructed from a solid, relatively stiff piece of rubber, although other suitably rigid materials, such as plastic, metal, and wood may be used. Sanding tool (1) includes a contoured handle (5) allowing the user to grasp and hold the tool (1) and a sanding head (7) having a bottom surface (7a). The bottom surface (7a) of the sanding head (7) supports a back-up pad (9), typically formed from a durable, cushioning material (e.g. rubber) to provide a frictional surface to prevent slippage of a sheet of abrasive material (11).

The sanding head (7) is provided with means (13 and 15) for holding the sheet of abrasive material (11) securely over the back-up pad (9). For example, mechanical jaws or spring-biased clips located at either end of the sanding tool (1) may have utility. Other means for securing the abrasive material can also be used, including the use of a pressure-sensitive adhesive on one side of the abrasive sheet for removably attaching the same over the back-up pad (9), or hook and loop type fastening means.

Referring to Figure 1c, the sanding head (7) is provided with an outlet, in the form of a single conduit (17) which allows for the discharge of liquid from an external source (not shown) through the back-up pad (9) and an inlet in the form of twin conduits (19 and 21) interconnected by transverse passageways (19a and 21a) and chamber (20) for the removal of discharged liquid containing abraded material from the work surface (also not shown). An adaptor (23), typically swivel-mounted so as to facilitate manipulation of the tool (1) by the operator, is used to connect a pipe (25) between the external liquid source and the outlet conduit (17). A pipe (27) is used to connect the source of suction (not shown) to the inlet conduits (19 and 21).

Referring to Figure 1b, the back-up pad (9) is provided with a plurality of passageways through which the liquid is discharged and removed from the work surface. In the embodiment shown, a single central passageway (29) is provided for discharge of the water and a plurality of peripheral passageways (31) are provided through which the liquid and abraded material is removed. The abrasive material (11) is, in turn, provided with a plurality of openings (not shown) complementary in size, shape and pattern to the passageways (29 and 31) formed in the backup pad (19).

The flow rate of liquid through the sanding tool can be controlled without the need of mechanical regulators or valves by passing the liquid from a relatively high flow rate or pressurized external source through a relatively small diameter outlet to limit the maximum flow rate. Preferably, the tool is provided with valve means (not shown) (e.g. a needle or pinch valve), to control the liquid flow rate. Such valve means are well known in the art and disclosed in, for example, U.S. Patent Nos. 4,320,601 and 4,922,665 in relation to known wet-sanding tools. The valve means may be conveniently located on the tool itself, or on the liquid supply line to the tool.

Figures 2a, 2b, and 2c illustrate a power driven orbital sander (33) having a housing (35) including a handle (37) to be grasped by the user for holding the tool (33) and moving it along a work surface (not shown) to sand or polish the work surface. An air driven motor (not shown) contained within the housing (35) drives a sanding head (39) orbitally around an axis generally perpendicular to the work surface. Air from a suitable air source flows through a passage in the handle (37) to the motor. A valve (not shown) actuated manually by a lever (41) controls the delivery of air to the motor, thereby starting or stopping operation of the tool (33).

The sanding head (39) comprises a rigid, preferably metal, backing plate (43), in the embodiment shown, of rectangular horizontal section, and a back-up pad (45) over which is secured a sheet of abrasive material (47). The back-up pad (45) is typically formed of a deformable material (e.g. rubber), such that force can be applied to the sheet of abrasive material (47), in a manner cushioning contact of the material (47) with the work surface.

Referring to Figures 2a, 2b, and 2c, the sanding head (39) is provided with twin outlets (49) through which liquid from a suitable external source (not shown) is discharged via passageways (51) in the back-up pad (45) onto the work surface. The sanding tool (33) is connected to a suitable exterior source of liquid via feed line (53). The feed line (53) is provided with a valve (55) that controls the flow of liquid to the sanding head (39).

The sanding head (39) further includes an inlet in the form of a conduit (57) that communicates via interconnecting longitudinal (59) and transverse (61) passageways with a plurality of passageways (63) provided in the back-up pad (45) to allow for the removal of liquid and entrained particles from the work surface. The housing (35) is provided with an outwardly extending portion (65) which connects the conduit (57) to a suitable source of suction (not shown) to allow the discharged liquid and entrained particles to be removed from the tool (33).

The abrasive material (47) is provided with a plurality of openings (not shown) complementary in size, shape and pattern to the passageways (51 and 63)

formed in the back-up pad (45).

To use the device (33), the operator first adjusts the valve (55) in the feed line (53) to provide a sufficient flow of liquid through the device (33). The device (33) is then held in the conventional manner by the grip type handle (37) with the thumb of the operator upon lever (41) to open the line for the passage of air to drive the motor. At any time that the operator pauses in the sanding operation, the release of his thumb from the lever (41) immediately cuts off the flow air. The suction source may be operated independently of the sanding tool or it may be operated by depression of lever (41).

Figure 3 illustrates a liquid reservoir (indicated generally by (67)) suitable for use with sanding tools of the invention. The reservoir (67) comprises a pressure vessel (69) containing an appropriate quantity of liquid (71) and having means for generating sufficient pressure within the vessel (69) to cause the liquid (71) to flow via feed line (73) to the sanding tool (not shown). In the embodiment shown, the pressure vessel (69) is provided with a hand pump (75), although any suitable pumping system may be employed. Bulk liquid (71) flow is controlled by a master tap (77) with the rate of flow adjusted by appropriate valve means (79), such as a needle valve or pinch valve. The vessel (69) may also be provided with a pressure release valve (81) to prevent the build-up of excess pressure.

The reservoir (67) optionally comprises a collection vessel (83) which receives the liquid removed from the work surface by the sanding tool via hose (85). The collection vessel may include a filtration/liquidextraction system (not shown) to remove the particles of abraded matter and other debris from the liquid prior to its disposal. Suitable filtration/liquid-extraction systems are known in the art. The filtered liquid may advantageously be recirculated to the pressure vessel, either continuously during the course of the abrading operation with the sanding tool continuing to operate throughout, or at periodic intervals by halting the sanding operation and releasing the pressure in the vessel. In the former case, suitable valve means must be provided to allow movement of the liquid held at a low pressure in the collection vessel to the higher pressures of the pressure vessel.

Figure 4 of the accompanying drawings illustrates a portable reservoir system that allows recycling of the liquid. The apparatus is supported on a frame (100) having mounted thereon two pairs of wheels (102, 104) and a handle (106). The frame supports a housing (108) the lower portion of which defines a reservoir (110) for the liquid. An outlet for liquid from the reservoir (110) is provided by a dip tube (112) that is positioned within a cylindrical fine filter (114). Thus any liquid extracted by the dip tube (112) must pass through the fine filter (114), thereby trapping any particulate matter. The dip tube (112) is connected via conduit (116) to pump (118), which pumps liquid to the wet-sanding tool generally shown at (120), via conduit (122). The pressurized air supply for operation of the sanding machine is supplied by air line (124).

In addition to the liquid supply conduit (122) and air line (124), the sanding machine (120) is connected to extraction pipe (126) for collecting liquid removed from the work surface. The three lines (122, 124, and 126) are conveniently combined in a flexible harness (128) to protect the multiple lines. For example, the three lines may simply be secured together with the supply lines (122, 124) contained within the larger extraction line (126).

The extraction pipe (126) is connected to the housing (108) to provide an inlet (130) for collected water and entrained solids. The air flow for extraction is provided by extraction motor (132), which is protected from extracted debris by filter (134). Extracted water and entrained solids enter the apparatus via inlet (130) and pass to the reservoir (110) via a pre-filter (136) that extracts the larger particles entrained in the liquid. Thus, the extracted liquid will be filtered by both the pre-filter (136) and the fine filter (114), as shown by the arrows (141). An overflow pipe (138) is provided as a second inlet to the reservoir (110) to prevent build-up of liquid in the upper portion of the vessel in the event the pre-filter (136) is blocked. The apparatus additionally comprises a float (140) that acts as a cut-out switch if the level of liquid in the upper portion becomes too high.

Another advantageous feature of the present invention is that the apparatus may be arranged such that the extraction motor (132) is automatically switched on when there is an airflow in the air line (124) and the machine is in operation. This can readily be effected, such as by a pressure switch in the air line, or by incorporating a switch for the extraction motor with the switch for the sanding machine. The pump (118) is preferably arranged such that liquid is supplied to the sanding machine only when there is sufficient vacuum in the extraction line to extract the liquid. This prevents the liquid from flowing to the sanding machine in situations where the liquid would flood the work area without being extracted (e.g. if the sanding machine were projecting over an edge of a surface). Control of the pump in this manner may be effected by use of a pressure switch positioned in the extraction line (e.g. in the head of the sanding machine).

The present invention has now been described with reference to several embodiments thereof. It will be apparent to those skilled in the art that many changes can be made in the embodiment described without departing from the scope of the present invention. The scope of the present invention should not be limited to the structure described in this application, but only be structures described by the language of the claims and the equivalents of those

structures.

Claims

1. A wet-sanding tool (1) for using a liquid during the abrasive removal of material from a work surface, comprising:
   (a) a housing (3) defining a body to be held and manipulated by the user, the body comprising a sanding head (7) having a back-up pad (9) including a major surface adapted for carrying an abrasive member (11) thereon and urging the abrasive member against the work surface to abrade material therefrom, the sanding head having a liquid outlet (17) and a liquid inlet (19, 21);
   (b) means (23) for connecting the liquid outlet to a source of the liquid;
   (c) means (27) for connecting the liquid inlet to a suction source;
   wherein said back-up pad includes at least one passageway (29) therethrough in communication with at least one of (i) said liquid outlet to convey the liquid from the liquid source to the work surface, and (ii) said liquid inlet to enable the liquid and abraded material to flow from the work surface to the suction source.

2. The wet-sanding tool (1) of claim 1, wherein said back-up pad (9) has at least one first passageway (29) therethrough in communication with the inlet to enable the liquid to flow from the liquid source to the work surface, and at least one second passageway (31) therethrough in communication with the outlet to enable the liquid and abraded material to flow from the work surface to the suction source.

3. The wet-sanding tool (1) of claim 2, wherein said back-up pad (9) has a plurality of first passageways (29) and a plurality of second passageways (31).

4. The wet-sanding tool (1) of claim 1, further comprising means (13, 15) for releasably securing an abrasive member (11) over the back-up pad (9).

5. The wet-sanding tool (1) of claim 4, wherein said tool further comprises an abrasive member (11) carried on and releasably secured to the major surface of the back-up pad (9).

6. The wet-sanding tool (1) of claim 5, wherein the abrasive member (11) has one opening formed therein corresponding to and aligned with each of said passageways (29, 31) in the back-up pad (9).

7. The wet-sanding tool (1) of claim 1, wherein the tool includes motive means for moving said sanding head relative to the body.

8. The wet-sanding tool (1) of claim 7, wherein the sanding head is adapted for orbital movement relative to the body.

9. The wet-sanding tool (1) of claim 1, wherein the tool includes means for filtering the liquid after removal from the work surface.

10. The wet-sanding tool (1) of claim 9, wherein the tool includes means for recirculating the liquid to the liquid source.

11. The wet-sanding tool (1) of claim 1, further comprising valve means adapted to enable fluid flow when the suction source is activated to remove liquid from the work surface, and to prevent fluid flow when the suction source is deactivated.

12. A wet-sanding tool (1) for using water during the abrasive removal of material from a work surface, comprising:
   (a) a housing (3) defining a body to be held and manipulated by the user, the body comprising a sanding head (7) having a back-up pad (9) including a major surface adapted for carrying an abrasive member (11) thereon and urging the abrasive member against the work surface to abrade material therefrom, the sanding head having a water outlet (17) and a water inlet (19, 21);
   (b) means (23) for connecting the water outlet to a source of the water;
   (c) means (27) for connecting the water inlet to a suction source;
   wherein said back-up pad includes at least one first passageway (29) therethrough in communication with said water outlet to enable water to flow from the water source to the work surface, and at least one second passageway therethrough in communication with said water inlet to enable water and abraded particles to flow from the work surface to the suction source;
   (d) means for filtering the water to remove said abraded material; and
   (e) means for recirculating the water to the water source after the water has been filtered by said filtering means.

13. The wet-sanding tool (1) of claim 12, further comprising valve means adapted to enable water flow when the suction source is activated to remove water and abraded material from the work surface, and to prevent water flow when the suction source is deactivated.

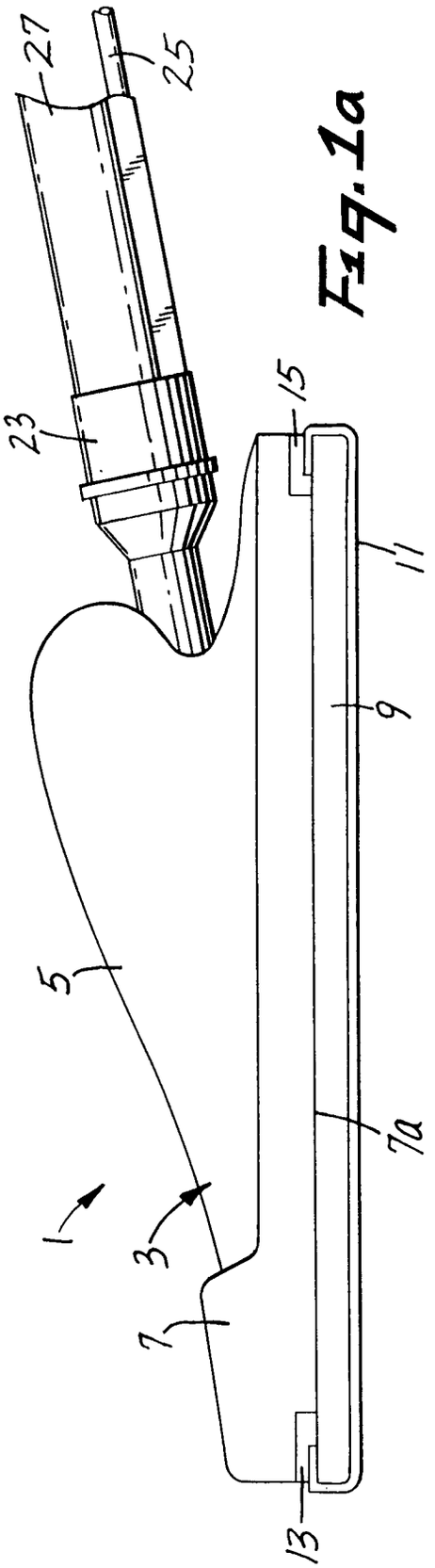

Fig.1a

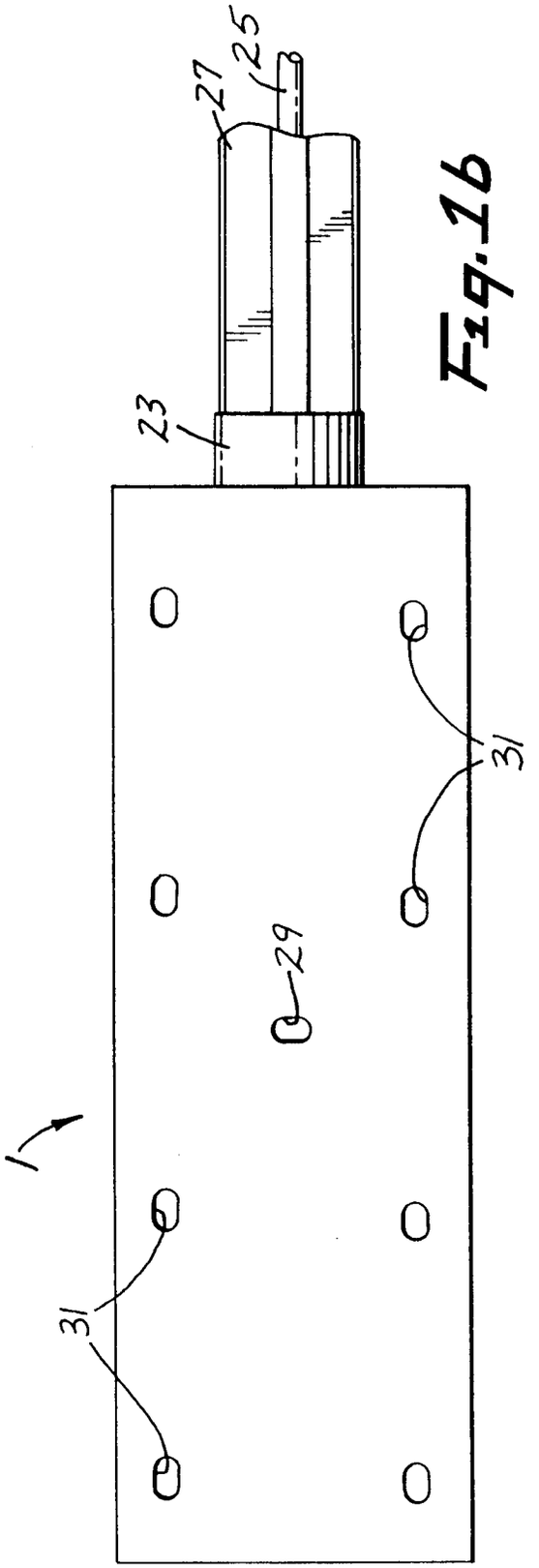

Fig.1b

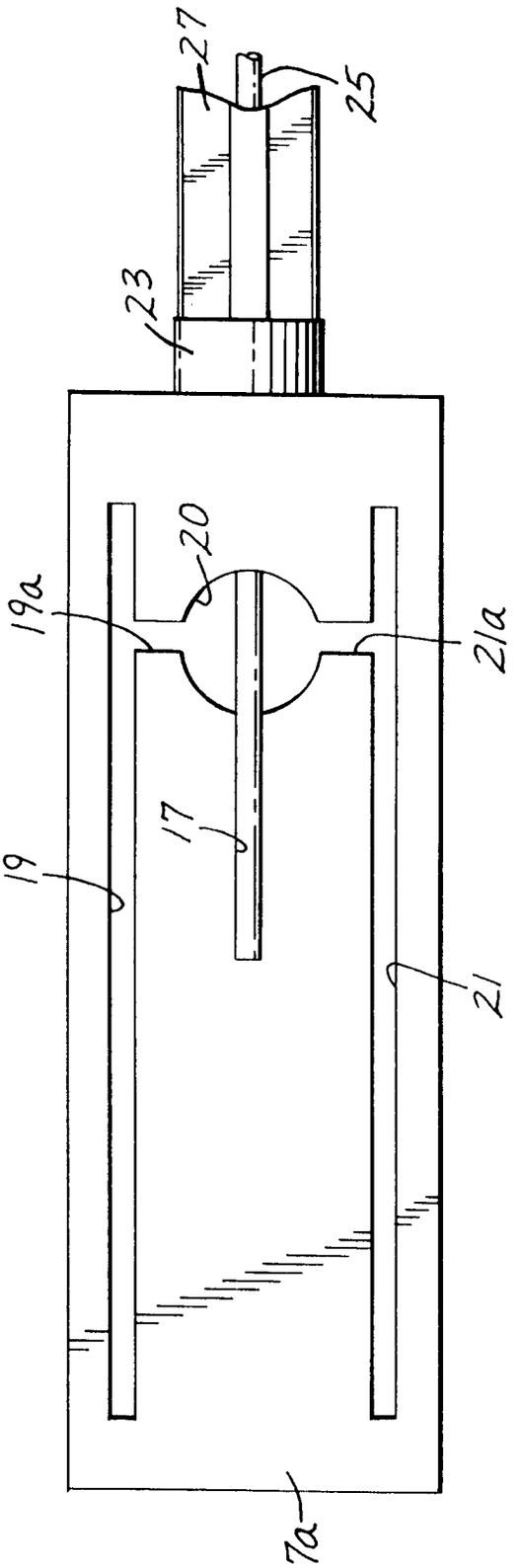

Fig.1c

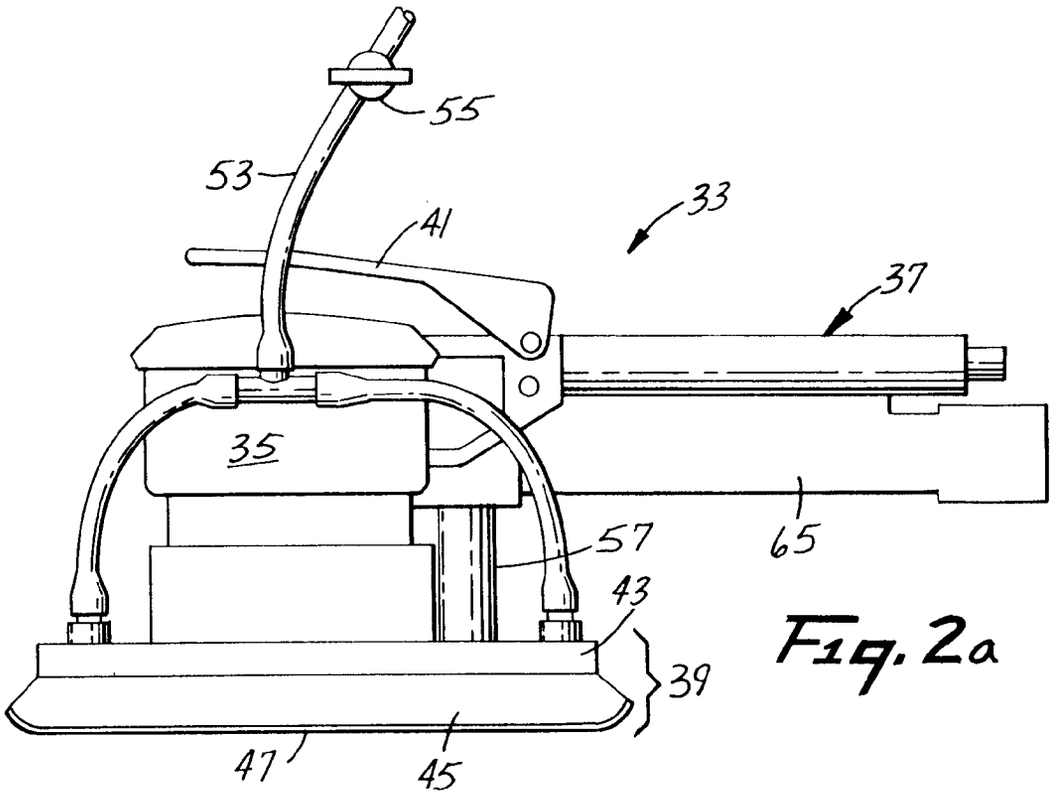

Fig. 2a

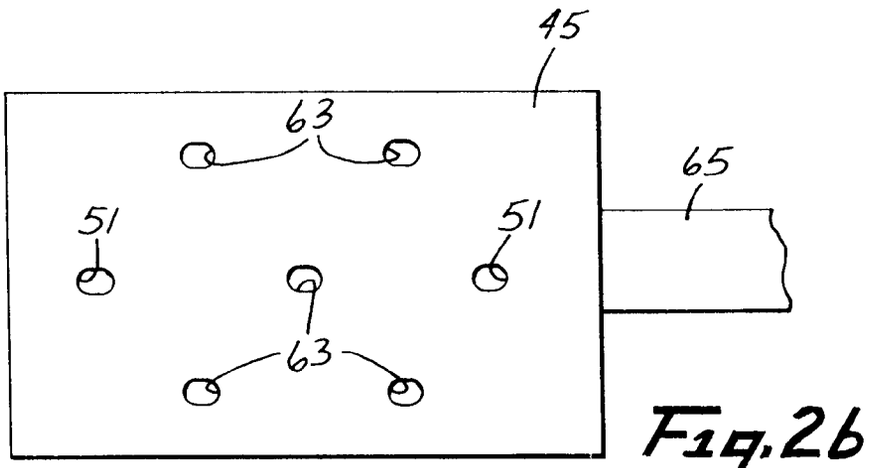

Fig. 2b

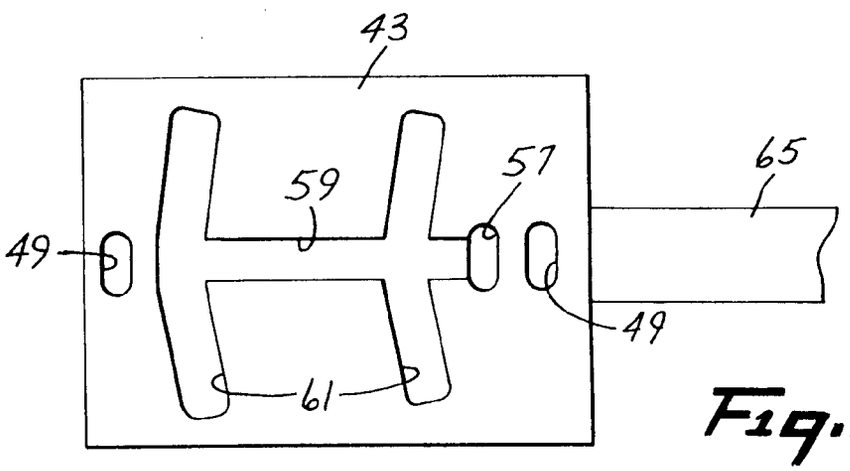

Fig. 2c

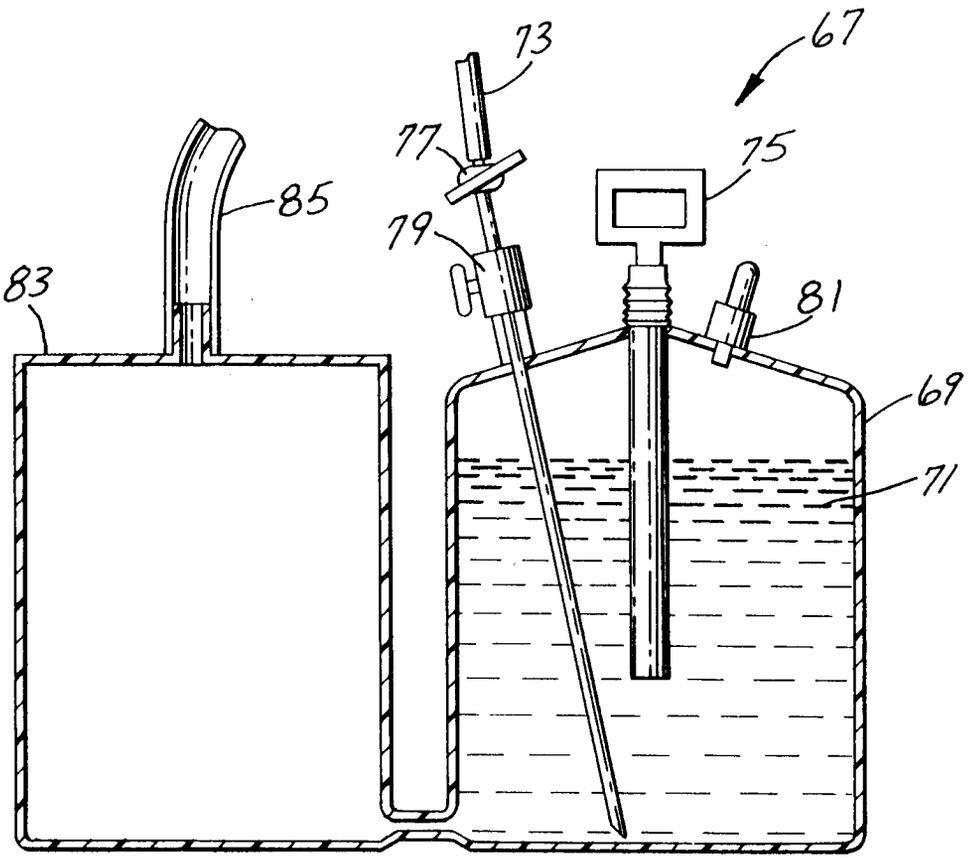

Fig. 3

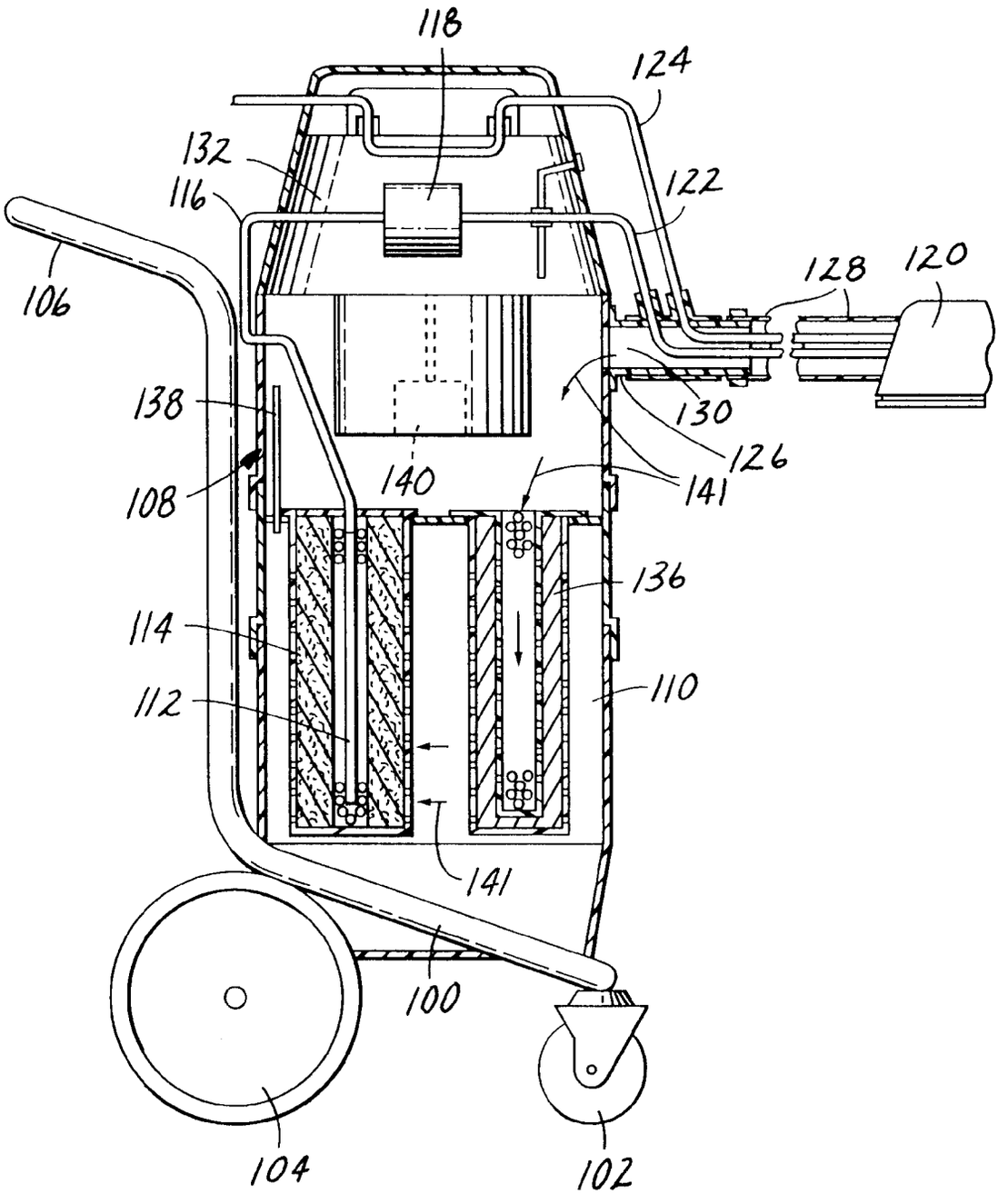
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Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 92 31 1282

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X A	EP-A-0 191 563 (NOVUS INC.) * abstract; figures * ---	1 12	B24B55/03 B24B55/10 B24B55/12
A	DE-A-3 643 286 (KÖRNER R.) * abstract; figure * ---	1	
A	US-A-1 487 398 (MOORE R.A.) 18 March 1924 -----		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B24B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06 APRIL 1993	ESCHBACH D.P.M.

CATEGORY OF CITED DOCUMENTS

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