

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 March 2006 (23.03.2006)

PCT

(10) International Publication Number
WO 2006/031236 A1

(51) International Patent Classification⁷: B27B 9/00,
B23D 45/16

(21) International Application Number:
PCT/US2004/038463

(22) International Filing Date:
18 November 2004 (18.11.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/939,440 14 September 2004 (14.09.2004) US

(71) Applicant and

(72) Inventor: MARTIN, Charles, B. [US/US]; 403 E. Hol-
land Street, Washington, IL 61571 (US).

(74) Agent: WEBER, Don, W.; 20A Edwardsville Prof. Park,
Edwardsville, IL 62025 (US).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,

PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

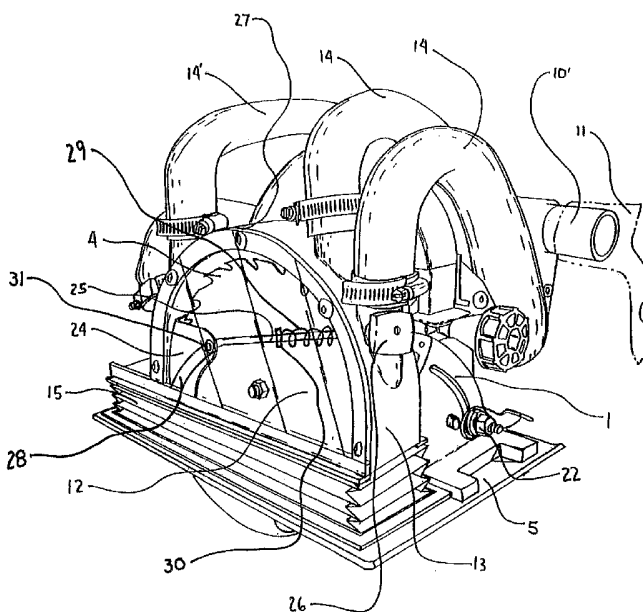
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE,
SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— as to the applicant's entitlement to claim the priority of the
earlier application (Rule 4.17(iii)) for the following desig-
nations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW,
BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ,
EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID,
IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU,
LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ,
OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY,
TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA,
ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ,
NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM,
AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,
BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR,

[Continued on next page]

(54) Title: SELF - CONTAINED VACUUM SAW



(57) Abstract: A self-contained vacuum circular saw is presented. The vacuum saw has a casing around the saw blade that includes an accordion type lower section attached to the lower platform of the saw. A number of vacuum tubes, preferably four, are attached to the side of the circular saw opposite the blade. The armature of the circular saw that turns the blade also turns the vacuum impeller on the side opposite the blade. An impeller vacuum chamber pulls in the dust and debris created by the saw blade and discharges the dust and debris into a disposable and removable vacuum bag. An important aspect of this device is that the motor that turns the saw blade also turns the impeller, thus making the self-contained vacuum Saw moveable from site to site.

WO 2006/031236 A1



*HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR),
OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG)*

— *of inventorship (Rule 4.17(iv)) for US only*

Published:

— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

SELF-CONTAINED VACUUM SAW

5

I. TECHNICAL FIELD

This invention relates to the field of carpentry and sawing. More particularly, a self-contained vacuum saw is presented which picks up dust and debris from a circular saw during the operation of the saw. The vacuum saw may be used in the art of carpentry, which will include sawing boards, drywall, plywood, wallboards and other building and construction materials. The vacuum saw may also be used in various other industries requiring cutting of various materials. The saw is used to cut wood, fiberglass, plastic, concrete and many other different types of building and construction materials. The vacuum saw may be marketed as a personal cutting device, as a device used in the construction or trades industry or may be adapted for use by manufacturers in the fabrication of building materials or in lumber yards.

20

II. BACKGROUND OF THE INVENTION

In the carpentry field, it has been commonplace to use saws of various types. From the first primitive hand saw, to tree saws, to electrically operated saws such as jigsaws or circular saws, the carpentry and building trades often utilize such mechanical devices. One major drawback of these saws during construction work is that much dust and debris can accumulate as a result of cutting wood, dry wall, or concrete. Particularly for inside work, the dust that can accumulate in a room often wood require hours of clean up after the initial construction phase and the sawing is completed.

30

During inside work, and particularly in areas where remodeling is being done, the dust problem poses quite a quandary for the workmen. In remodeling, the workmen are often required to remove and replace a door, window, or wall or to
5 install and cut dry wall in a closed room. These rooms often have furniture and electronic appliances sensitive to dust accumulation. Fine dry-wall dust accumulation can cause many problems. One approach to solving this problem would be to remove all of the furniture in the room or to cover the furniture or electronic appliances with tarps or plastic. This, of course, would require many
10 man-hours and would be an expensive proposition. It is an object of this invention to provide a self contained vacuum saw that would eliminate approximately ninety percent or more of the dust accumulated as a result of the construction process.

Although certain vacuum devices have been attached to circular saws or
15 concrete saws, these devices are not self contained and do not allow the workman to transport his circular saw to and around the worksite. For example, table saws at hardware stores may be attached to an in-house vacuum system. However, the table saw is stationary and cannot be transported to any other site. In addition, the vacuum system on such saws requires a separate power source to operate the
20 vacuum. It is another object of this invention to provide a self-contained circular saw that may be transported to the worksite. Another object of this invention is to provide a self-contained circular vacuum saw which may be transported to a worksite and which is powered from the motor of the circular saw itself.

25 Often, when a circular saw or other type of electrical saw is used outside, a power source such as an electric cord or gasoline electric generator is required in order to power the saw. It is a still further object of this invention to provide a self-contained vacuum saw that can be used utilizing only one electrical source of power to operate both the saw blade and the attached vacuum unit.

30

Other objects of this invention will become apparent upon reading the below described specification.

5

III. DISCLOSURE OF THE INVENTION

A self-contained vacuum saw has as its primary objective the collection of dust and debris from a cut being made with a power saw. While there are many types of power saws, the below described device is attached to a circular saw as an example. However, this attachment for a circular saw is an illustration only and is not meant to limit the scope of the disclosure. The invention disclosed herein has many applications to power saws.

A circular saw has a body containing a blade and a motor. The saw also has a lower platform for supporting the saw on the wood, wallboard, or other material being cut. In the preferred embodiment of this invention, a saw blade chamber encloses the circular saw cutting blade from the top of the blade to the lower saw platform. Vacuum hoses are attached to the saw blade chamber and are connected to the opposite side of the saw at an impeller vacuum chamber. The impeller of the vacuum chamber is run from the same armature that turns the saw blade. As the saw motor turns the saw blade and armature, the dust and debris created by the saw blade is pulled into the vacuum chamber and ultimately expelled into the vacuum bag. A clear cover over the outside part of the saw blade allows the workman to see the blade. Bellows are attached between the lower portion of the saw blade enclosure and a lower platform. These flexible bellows allow the workman to adjust the saw blade up or down or to pivot the saw blade to cut angles.

30

IV. BRIEF DESCRIPTION OF THE DRAWING FIGURES

Figure 1 is a front perspective view of the device.

5 **Figure 2 is a schematic view of the device showing key elements.**

Figure 3 is an exploded view of the saw blade chamber, showing the enclosure disassembled from the saw itself.

10 **Figure 4 is an outside perspective view of the saw blade enclosure and bellows.**

Figure 5 is a perspective exploded view of the vacuum chamber.

15 **Figure 6 is a side cut-away view of the vacuum chamber shown in Figure 5, showing the direction of airflow.**

Figure 7 is a partial perspective end view of the saw blade enclosure, showing the placement of the fourth tube at the back edge of the saw blade.

20

Figure 8 is a side schematic view of the embodiment shown in Figure 7, which details the separate bellows compartments for this embodiment.

25 **Figure 9 is a front view of the self-contained vacuum saw shown in Figure 1, particularly illustrating the mechanism used to change the pivot of the lower saw platform.**

Figure 10 is a schematic view of the lower saw platform shown in Figure 9 with the pivot being modified to the left side of the platform.

30

Figure 11 is a schematic representation of the device, showing a flexible impeller drive shaft attached to the motor and impeller.

5 Figure 12 is a schematic diagram illustrating the remote placement of the impeller using the flexible impeller drive shaft.

10

V. BEST MODE FOR CARRYING OUT THE INVENTION

A self-contained vacuum saw, shown in its full embodiment in Figure 1 is presented. The self-contained vacuum saw is a modification of the standard circular
15 saws currently being used in the building and construction trades. Such a standard circular saw has a body 1 that contains an electric motor 2, a saw handle 3, a circular saw blade 4, and a lower saw platform 5. The lower saw platform 5 is pivotably connected to the saw body and has an inner side near the motor and an outer side outside the saw blade. The circular saw of the preferred embodiment has
20 an electric motor and is powered through the saw cord 6. These well-known elements of the standard circular saw are best shown in Figures 1 through 3.

As shown schematically in Figure 2, the electric motor 2 turns a blade drive shaft or armature 7 that in turn is connected to the saw blade 4. The electric motor
25 in the instant device also turns a drive shaft vacuum extension 7' (the same armature) which is connected to a vacuum impeller 8. The vacuum impeller 8 may have a centrifugal clutch mechanism 32 attached at the drive shaft 7' so that the impeller 8 spins longer than the blade 4. This clutch mechanism 32 keeps the vacuum impeller moving so that the vacuum action of the device continues for a
30 short time period after the saw blade stops rotating.

A vacuum impeller housing 9 surrounds the vacuum impeller 8. The vacuum impeller and housing is best shown in Figure 5. The impeller 8 has a vacuum impeller main housing 9 attached to the saw body 1 and a vacuum impeller outer housing 9'. The outer housing 9' is removably attached to the permanently attached main housing 9.

The vacuum housing (9 and 9') contains a vacuum housing exhaust port 10. This exhaust port 10 is adapted to receive the dust and debris pulled into the vacuum housing by the impeller. This material is then discharged through the exhaust port 10.

Attached to the outer portion of the exhaust port 10 is a metal exhaust port tube 10'. Attached to the exhaust tube 10' is a vacuum bag 11. The type of vacuum bag 11 used on this particular device must be tighter than the normal bags on the market. The outside of the vacuum bag is preferably made of canvas and has a zipper that allows the user to change the inner disposable portion of the dust collection bag. A canvas outer bag will be effective when cutting wood and requires no liner.

Washable bags could be used for coarser work such as cutting materials like wood. However, inner, disposable bags should be used when cutting fine dust, such as is accumulated in drywall cutting. The type of bag used in shop vacuums has been found to be quite suitable for finer dust collection. Particular types of bags utilized to catch and collect fine debris such as that produced in drywall cutting are in common use in the industry and are well known in the art.

Turning now to Figures 2 and 3, the saw blade chamber is shown. The saw blade chamber creates an essentially sealed chamber around the saw blade. The upper blade housing of the saw blade chamber comprises a semi-circular saw blade outer enclosure plate 12 as shown in drawing Figures 3 and 4. The upper blade chamber includes a semi-circular inner enclosure plate 12'. A saw blade chamber

shoulder 13 connects outer 12 and inner 12' blade plates. The outer plate 12 is clear, as best shown in Figure 1. This clear outer plate 1 allows the workmen to see the blade and to trace the path of the blade as the cut is being made. The upper blade housing surrounds the upper portion of the blade 4.

5

Attached to the circular shoulder 13 of the saw blade chamber is a plurality of exhaust tubes 14 and 14', preferably in the form of vacuum tubes or hoses. These vacuum tubes 14 and 14' are connected between the blade chamber and the vacuum housing. The preferred embodiment shown herein has four hoses 14 and 14' that must be strategically positioned to allow for the most efficient collection of dust and debris. After much experimentation, it has been found that a single hose simply introduced at one part of the saw blade chamber is inefficient and would not be effective in gathering the amount of dust and debris accumulated during a saw cut.

10

In one embodiment of this device, the front two tubes 14' vacuum up most of the dust. However, these front hoses 14' must be strategically placed. In the preferred embodiment herein, the front two vacuum hoses 14' are located at approximately two o'clock and three o'clock on a twelve o'clock dial on the circumference of the shoulder 13, with reference being had to Figure 4. On Figure 4, if one places the twelve o'clock high position on the saw blade chamber at the apex 27 of the semi-circle, the front two vacuum hoses 14' would be located at the two o'clock and three o'clock position.

15

Other hoses should also be attached to the saw blade chamber. In one embodiment, as best shown in Figure 4, two additional vacuum tubes 14 would be located at the ten o'clock and nine o'clock position.

20

The vacuum tubes preferably have panels or other easy access portals to remove debris that may become clogged in the tubes. This clogging is particularly acute when wet cutting is performed.

25

It has also been found that moving the nine o'clock vacuum hose to an alternate position, as shown in drawing Figures 7 and 8 would be a beneficial placement of the vacuum hoses. This alternate placement of the nine o'clock vacuum hose will be described later in this specification.

5

In order to complete the saw blade chamber, a lower saw blade bellows 15 is attached to the bottom part of the saw blade chamber as best shown in Figure 4. The upper blade housing and lower bellows create the blade chamber.

10 The bellows 15 are an accordion-style flexible and bendable bellows as shown in the drawing figures. The bellows 15 need to be flexible and bendable in order for the adjustable saw blade to be maneuverable within the saw blade chamber to adjust for angles and depths of cut. A lower bellows attaching bracket 16, as shown in Figure 4, may be attached to the lower part of the bellows in order for the entire
15 bellows unit 15 to be attached to the saw lower platform 5. Suitable screw holes are provided in the lower bellows bracket 16. Corresponding holes are found in the saw lower platform 5.

Another variation of the placement of the vacuum tubes of this device is
20 shown in Figures 7 and 8. In this variation, the lower chamber created by bellows 15 is divided into two chambers 17 and 18. A larger, front chamber 17, as best shown in Figures 7 and 8, has three vacuum tubes attached. A second, smaller, rear bellows chamber 18 has one vacuum tube, in this embodiment 19, to collect the dust and debris from the back end of the saw blade. A small, flexible separation wall 20
25 separates front 17 and rear 18 bellows chambers. This upper part of this separation wall 20 is connected to the saw blade chamber but is not connected to the lower saw platform 5. A small space between the lower part of the separation wall 20 and the lower saw platform 5 allows any remaining debris not already pulled up by the front hoses to be pulled into the rear bellows chambers 18 and discharged by the
30 rear bellows chamber vacuum tube 19.

Once the bellows are attached to the upper part of the saw blade chamber, the saw blade is almost completely enclosed. (Due to the fact that the saw blade must move and may not always be completely flush against the work piece, the chamber is not always one hundred Percent sealed. However, the chamber does provide a virtual seal for the saw blade.) The saw blade chamber is created by the upper semi-circular saw blade shoulder 13, the outer plate 12, the inner plate 12', the bellows 15 and the lower saw platform 5. In combination, these elements create a saw blade chamber.

When the blade 4 is turned by the electric motor and cuts the work piece, the dust and debris created is pulled up into the vacuum tubes 14 and 14' by the impeller and is deposited in the vacuum bag 11. This process is best shown in the schematic drawing Figure 2 and by the diagram shown in Figure 6. In Figures 2 and 6, the arrows show the direction of airflow and the direction of travel of the dust and debris.

As shown in Figure 6, the dust and debris created by the blade is vacuumed into vacuum housing 9 in the direction of the arrows. Each of the vacuum tubes 14 and 14' have their outlets at approximately, or as near as possible, to the center of the impeller 8. It has been shown through much experimentation that the introduction of the outlet end of the vacuum tubes near the center of the impeller is preferred. As the dust and debris is vacuumed by the impeller into the vacuum housing 9 the dust and debris is discharged through exhaust port 10 and into the vacuum bag 11. The vacuum bag is detachably attached to the device so that it may be emptied as necessary.

Another refinement to this device is illustrated in Figure 1. Each circular saw blade has a lower blade guard 24. This lower blade guard 24 rotates as the blade moves through the material to be cut and must be pushed out of the way before the blade engages the working piece. In this device, tight seals are preferably

placed around the lower blade guard 24 where it attaches to the saw behind the blade 4.

5 Normally, raising the lower blade guard is accomplished by means of a lever on the side of the lower blade guard. However, since the outer side of the blade 4 is now fully contained within the saw blade chamber, an alternate means of rotating the lower blade guard 24 is required. This is accomplished using a lower blade guard rod 25 that is contained within the blade chamber. The rod has a first end connected to the blade guard 24 as shown in drawing Figure 1. This lower blade guard rod 25 is also attached at a second end to lower blade guard lever handle 26, which is positioned on the outside of the saw blade chamber. By pulling handle 26, the lower blade guard 24 may be rotated so that the saw may be placed on the work piece for cutting.

15 The lower blade guard rod 25 may be attached at a fixed point, or may be slidably and rotatably attached to the lower blade guard 24 as shown in Figure 1. The lower blade guard 24 may have a semi-circular lower blade guard slot 28 cut into it. The lower blade guard rod 25 is rotatably attached to the lower blade guard by a pin 31. The pin 31 (and hence the attached end of the rod 25) is able to slide within the slot 28. The lower blade guard rod 25 may also have a stop 30 and a lower blade guard biasing spring 29. This stop and spring bias the rod 25 toward the closed position as shown in Figure 1.

25 When one starts the saw cut at a position in the middle of a workpiece, the lower blade guard rod 25 is pulled outwardly from the saw to pull the lower blade guard 24 forward and up from the workpiece. Once the cut is finished, the spring 29 acts to retract the rod 25 to the closed position shown in Figure 1.

30 However, when the saw cut is started at the outer edge of a workpiece, pulling the lower blade guard rod 25 outwardly is unnecessary. In that case, the lower blade guard rod 25 simply slides within the slot 28. The slot, stop, and spring

eliminate the need for the lower blade guard rod 25 to be pushed or pulled forward when the work piece cut begins at the end of the workpiece and keeps the rod 25 out of the way during actual cutting.

5 One important modification of the standard circular saw is shown in Figures 9 and 10. Figure 9 shows the standard construction of this circular saw, including the vacuum impeller housing 9, the vacuum tubes 14 and 14', the saw blade chamber and the bellows 15. This modification to the standard circular requires that the lower base 5 pivot point 21 be changed. In normal operation and
10 production, the lower saw platform 5 pivots by manipulating the lower base-adjusting handle 22. This base-adjusting handle (or bolt) 22 is loosened to allow the lower base platform 5 to pivot for angle cuts. Normally, the lower saw platform 5 pivots at pivot point 21.

15 However, as a modification of the standard saw pivot point, a circular saw of this alternate embodiment may pivot at outer pivot point 23 as best shown schematically in Figure 10. When the saw lower platform 5 pivots at the modified outer pivot point 23, the saw platform pivots from the outer side of the platform. While this modification of the standard circular saw is an alternate preferred
20 embodiment, the device described herein will also perform satisfactorily with standard, off the shelf circular saws that are commonly found and manufactured in the industry.

25 While the preferred embodiment of this device is suitable to be retrofitted to most off the shelf circular saws, providing a flexible drive shaft 7'' attached to the vacuum drive shaft 7' would allow placement of the vacuum bag 11 at a remote location. This remote bag embodiment is illustrated in Figures 11 and 12.

30 Figure 11 shows the circular saw with blade 4 driven by drive shaft 7 and impeller 8 driven by impeller drive shaft 7''. With the addition of a flexible impeller drive shaft 7'', rotatably attached to impeller drive shaft 7', the vacuum bag 11 and

collection chamber can be placed at varying remote locations from the circular saw. It is within the spirit and disclosure of this specification to have a flexible impeller drive shaft 7'' attached and driven by motor 4 to allow for attachment of the collection bag at allocation remote from the saw itself.

5

A key concept of this invention is utilizing the electric motor of a standard circular saw to run both the saw blade and the impeller. This modification of existing circular saws allows the saw to be self contained and moveable from site to site. Modifying the armature to support the impeller, along with the other structure necessary to create the saw blade chamber on the saw side and the vacuum chamber on the impeller side is an important and innovative part of this invention.

10

The dimensions for the various elements can be varied according to the uses and designs of the power saws. For example, the saw blade chamber may be anywhere from two inches wide, as shown approximately in the drawing figures, to twelve inches wide. While the hoses are made of standard rubber, they can also be plastic fabricated hoses. Alternatively the entire shroud around the blade could be made of one piece, and the saw blade casing, impeller vacuum housing, and blade chamber could be manufactured as a one piece, unitary manufactured unit.

20

As additional enhancements of this invention, lighting inside the blade chamber could be provided. Further, laser guides could be incorporated in this device while still keeping within the spirit and disclosure of this invention. (Obviously, laser guides would be much more effective with the removal of the dust and debris from the normal work site by the vacuum system.) In addition, a peep site could be built into the clear outer plate on the blade side to allow the workman a better view of the blade and its cutting path. The peep site would allow the workman to see the work closer to the actual blade-cutting surface and work piece. Electric or hydraulic adjustments for blade depth, degree and angle could also be added to the instant device. These electric or hydraulic mechanisms could also be

25

30

utilized for raising or lowering the lower blade guard 24 in place of the rod 25 and spring 29.

5 The vacuum saw principle could be applied to different types of saws and cutting tools. For example, a concrete saw having a motor and a circular blade could also be fitted with a vacuum housing, hoses, impellor and vacuum tubes and still be within the keeping and disclosure of the invention herein. A table saw or other cutting tool could also be adapted to the disclosed concept. Shop saws, such as found in lumber yards, could be shrouded and have vacuum tubes attached to the shroud
10 to vacuum up the dust created by such saws.

The basic concept disclosed in this Specification includes at least two vacuum hoses or exhaust ports connected to a shroud over the cutting blade or band. An impellor is attached to the drive shaft of the saw. Dust or other debris created by the
15 cutting implement is vacuumed into a discharge container for disposal. The various vacuum saw devices are capable of cutting materials inside or outside and also collecting the dust and debris created.

20 VI. INDUSTRIAL APPLICABILITY

This invention is advantageously used in the building and construction trades. It will be manufactured by toolmakers and sold to the general public as
25 individuals for use in personal homes or shops. The device will also be sold to professional carpenters, drywall hangers, concrete finishers or other professionals within the building or construction trades. The vacuum saw concept disclosed herein would also find a use in lumberyards or other industries that need to make cuts in confined areas.

30

The device is capable of successful exploitation in the fields of construction, sale of building materials, remodeling and other building industries.

Having fully described my device, I claim:

Claim 1: A self-contained circular vacuum saw, comprising:

5

(a) a saw having a body [1] containing a motor [2] having a drive shaft [7], said drive shaft connected to and driving a cutting blade [4], and a lower platform having an inner and outer side pivotably connected to said body;

10

(b) an upper blade housing surrounding the upper portion of said blade;

(c) a lower bellows [15] connected to and beneath said blade housing wherein said housing and bellows create a blade chamber;

15

(d) a vacuum impeller [8] connected to and driven by said motor drive shaft;

(e) a vacuum housing containing said impeller;

(f) at least one vacuum tube connected between said blade housing and said vacuum housing;

(g) a bag connected to said vacuum housing;

20

wherein debris and dust produced by the cutting blade are vacuumed from the blade chamber into the vacuum housing and discharged into the bag by the impeller.

25

Claim 2: A self-contained circular vacuum saw as in Claim 1, wherein said lower bellows are flexible and bendable such that said saw blade can be adjusted for depth and angles.

30

Claim 3: A self-contained circular vacuum saw as in Claim 1, wherein said lower platform is pivotably connected to said saw body such that it pivots from the outer side of said platform.

5

Claim 4: A self-contained vacuum saw as in Claim 1, having four exhaust ports, wherein said upper blade housing has a shoulder [13], wherein said four exhaust ports are spaced at the nine, ten, two and three o'clock positions along the circumference of said shoulder.

10

Claim 5: A self-contained circular vacuum saw as in Claim 1, wherein said lower bellows is divided into a front and rear section.

15

Claim 6: A self-contained circular vacuum saw as in Claim 5, further comprising three exhaust tubes [14 and 14'] connected to the front portion of said bellows and having one exhaust tube [19] connected to the rear section of said bellows.

20

Claim 7: A self-contained circular vacuum saw as in Claim 1, further comprising a lower blade guard rod [25] contained within said blade housing, connected at one end to the lower blade guard [24] of the saw and at the other end to a handle [26] outside of said blade housing, wherein said rod may be pulled by said outer handle to rotate said lower blade guard.

25

Claim 8: A self-contained circular vacuum saw as in Claim 1, further comprising a light located within said blade chamber.

30

Claim 9: A self-contained circular vacuum saw as in Claim 1, further comprising a laser guide for said saw blade.

5 **Claim 10: A vacuum system for a circular saw having a body containing a motor having a drive shaft, said drive shaft connected to and driving a cutting blade, and a lower platform having an inner and outer side pivotably connected to said body, comprising:**

- 10 (a) an upper blade housing surrounding the upper portion of said blade;
- (b) a lower bellows connected to and beneath said blade housing wherein said housing and bellows create a blade chamber;
- (c) a vacuum impeller connected to and driven by said motor drive shaft;
- 15 (d) a vacuum housing containing said impeller;
- (e) a plurality of vacuum tubes connected between said blade housing and said vacuum housing;
- (f) a bag connected to said vacuum housing;

20 wherein debris and dust produced by the cutting blade are pulled from the blade chamber into the vacuum housing and discharged into the bag by the impeller.

25

30

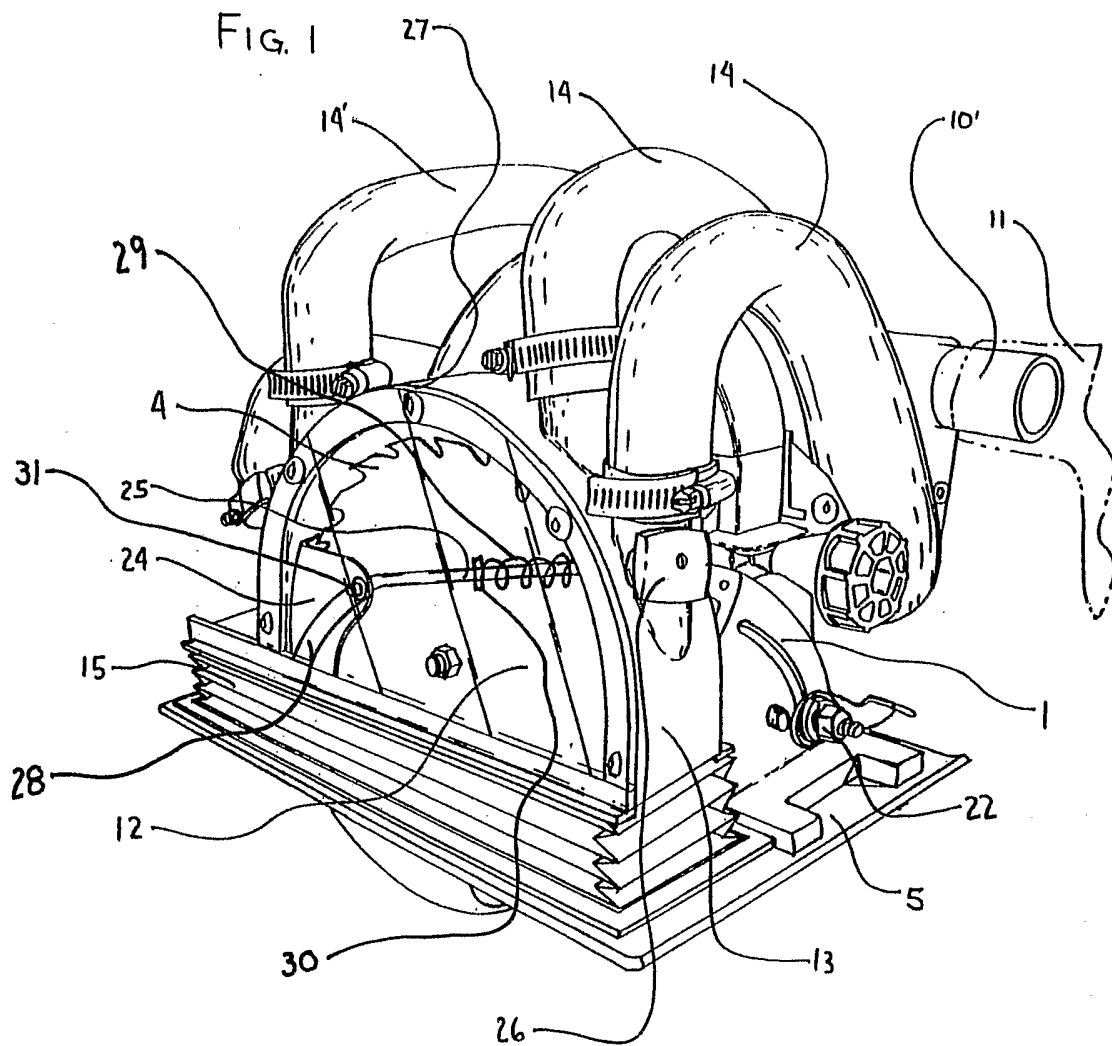


FIG. 2

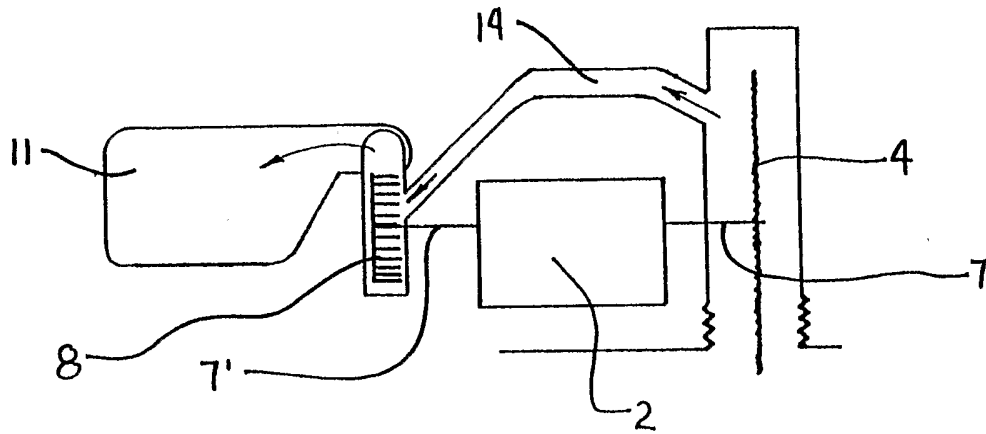
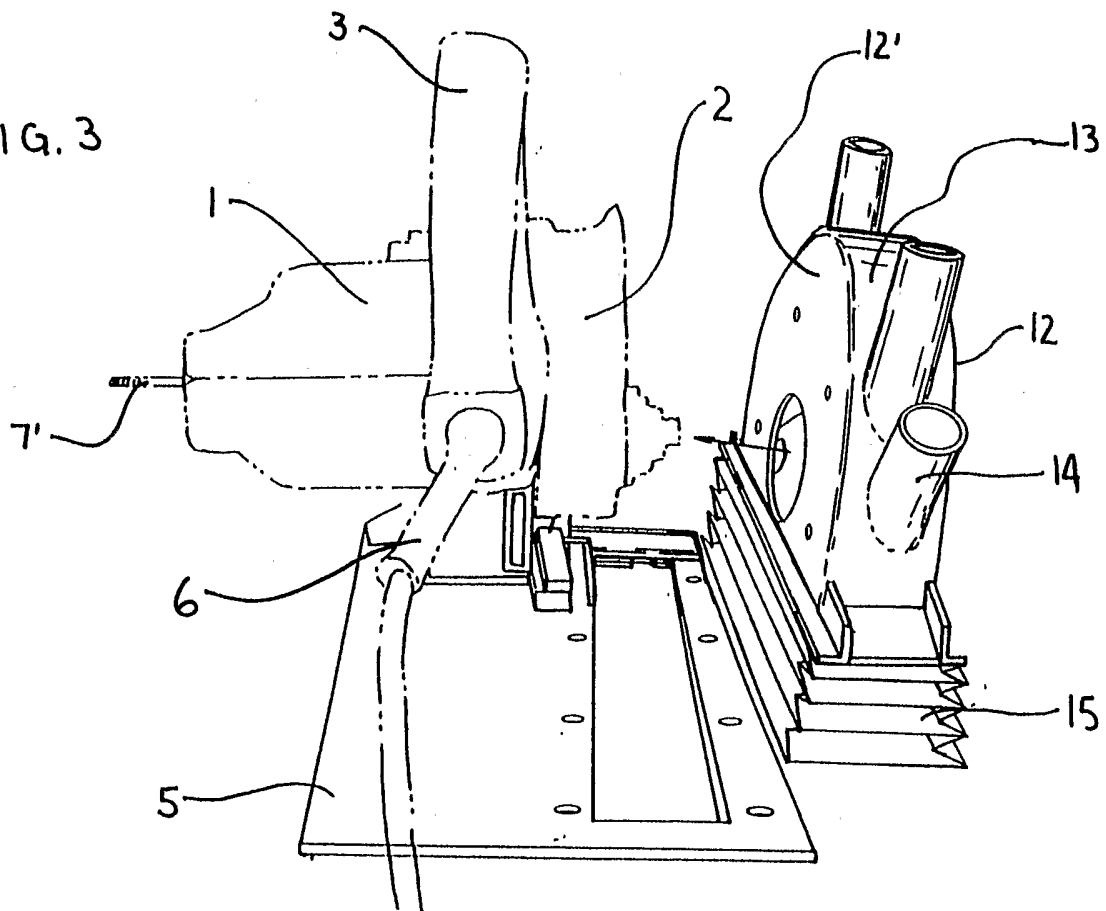


FIG. 3



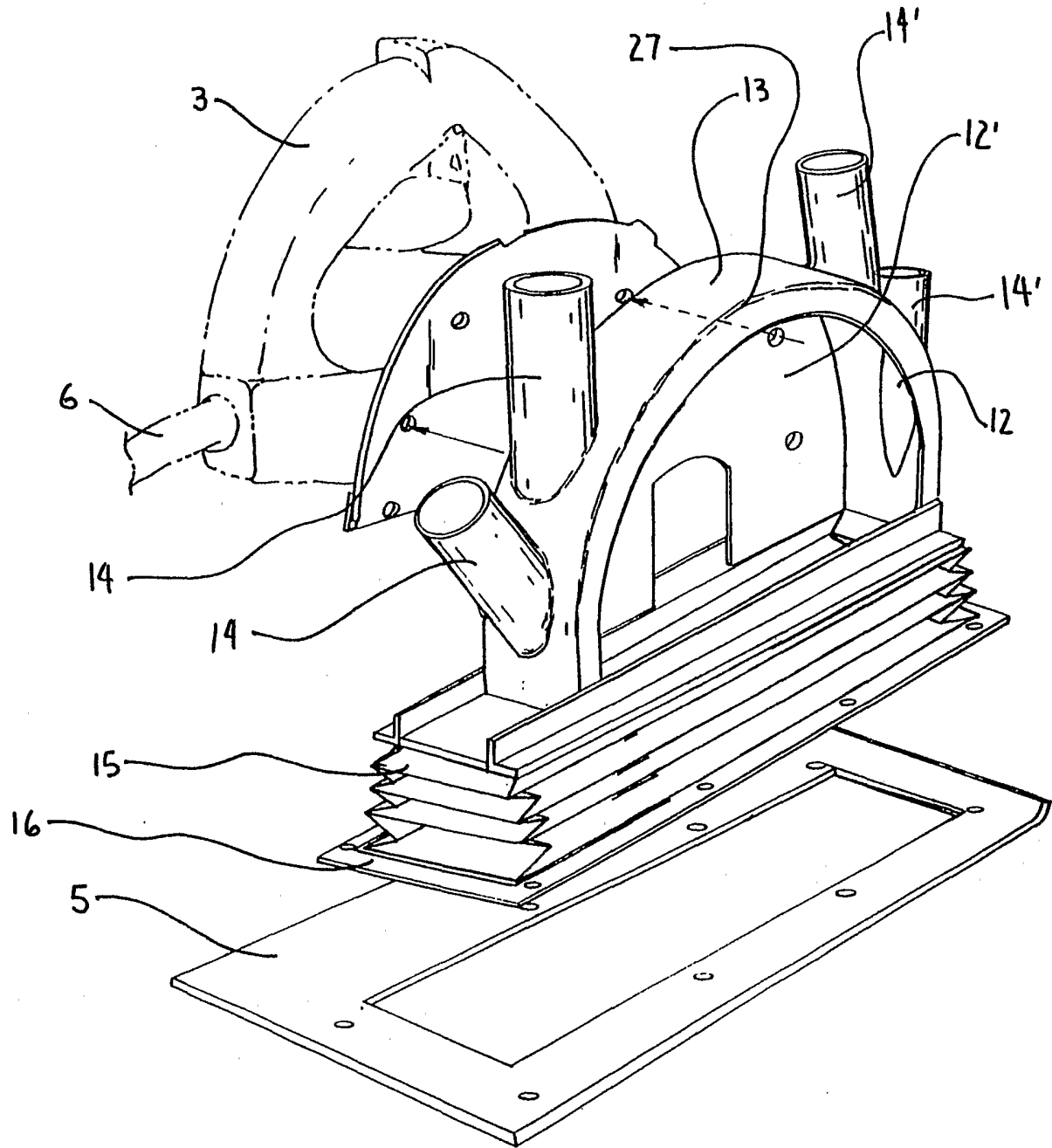
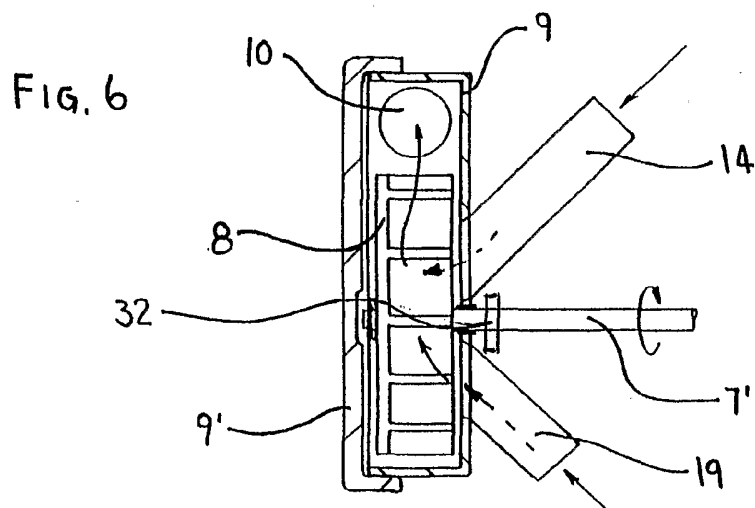
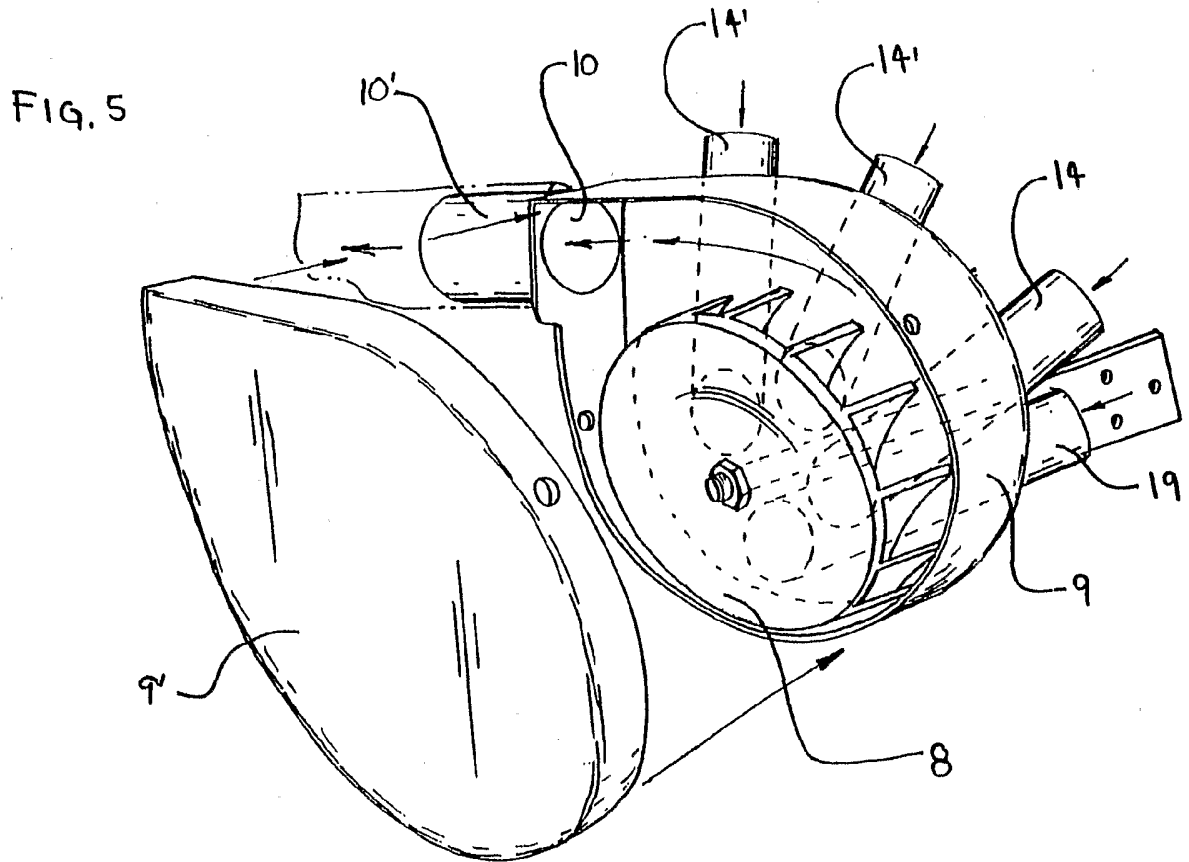


FIG. 4



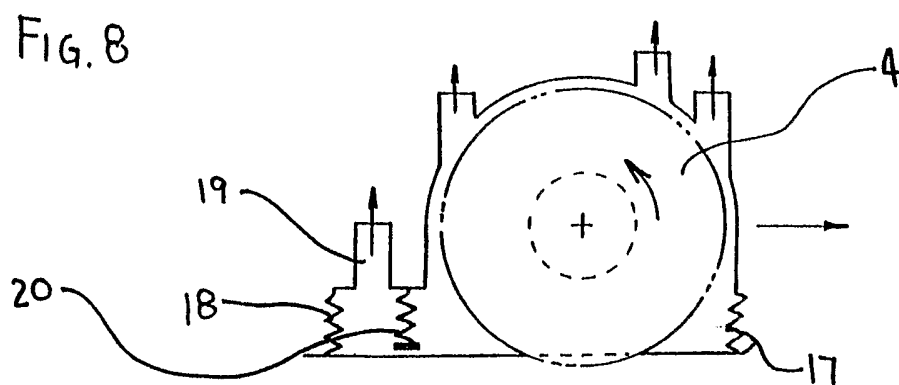
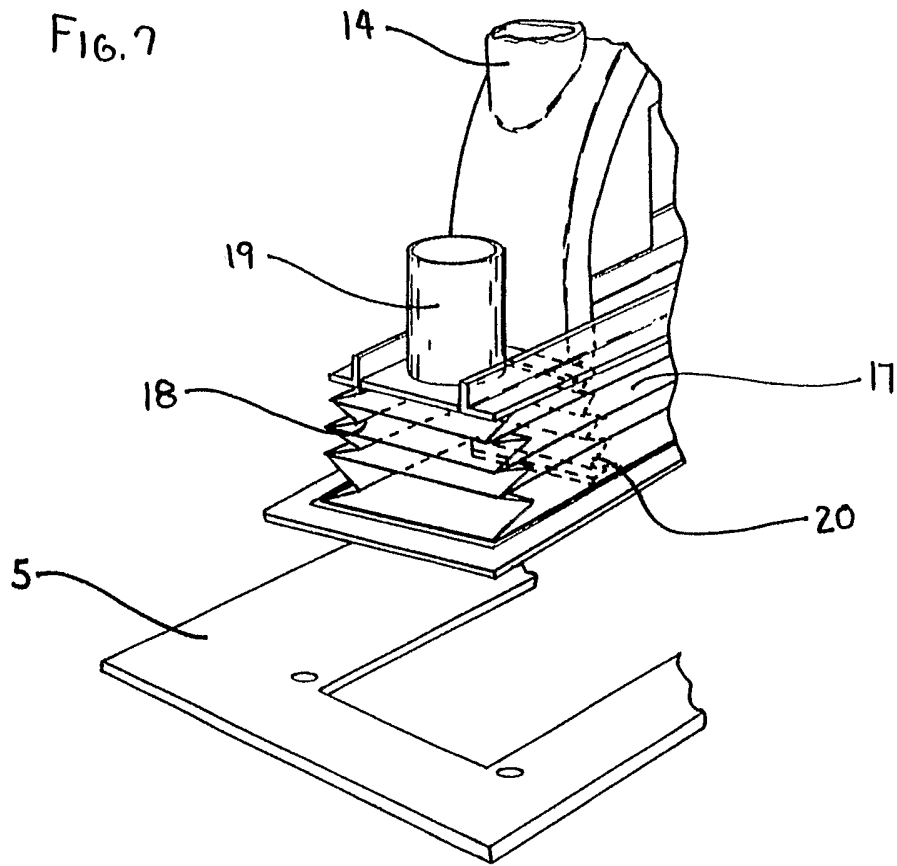


FIG. 9

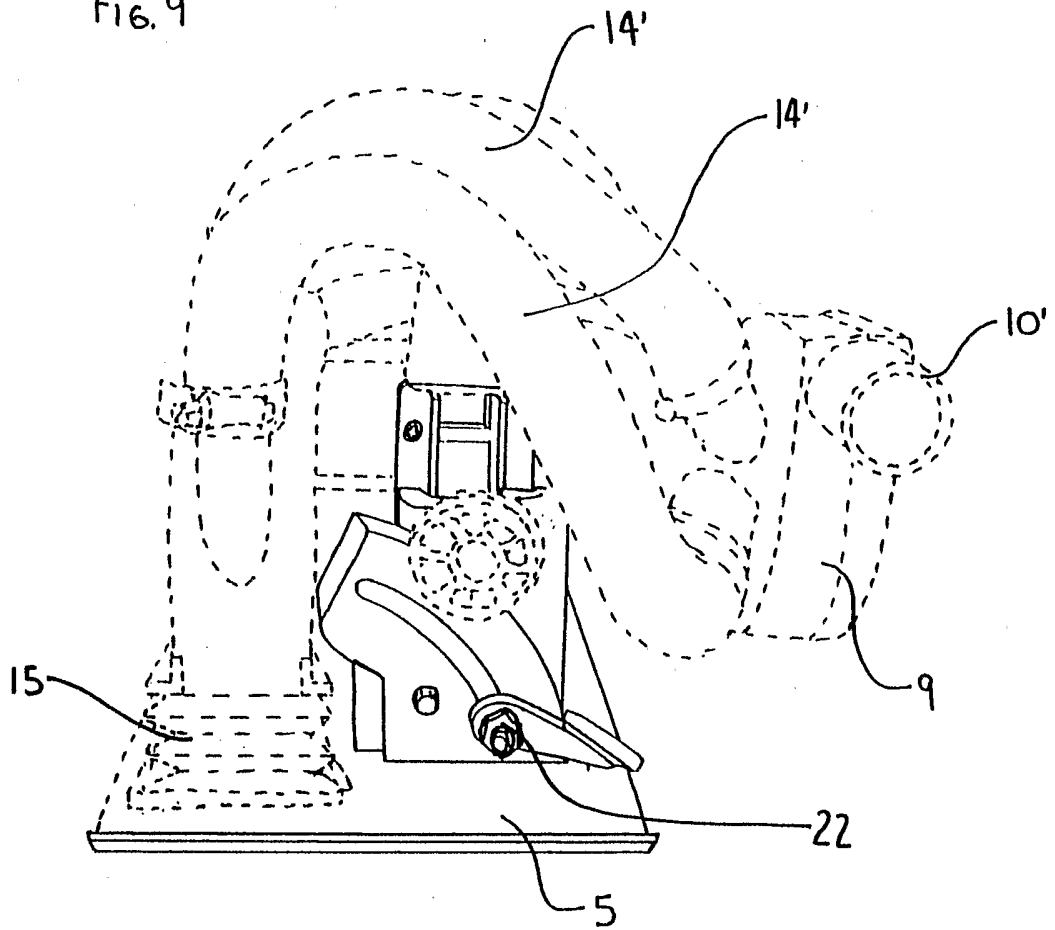


FIG. 10

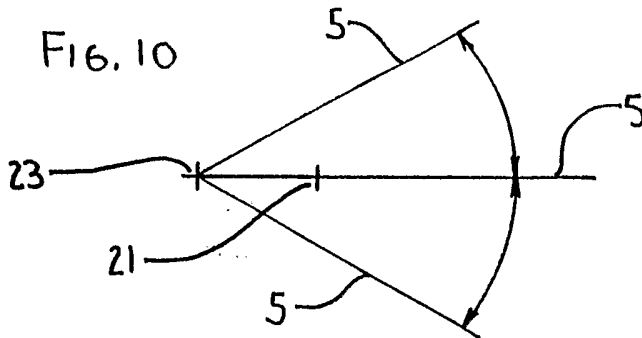


FIG. 11

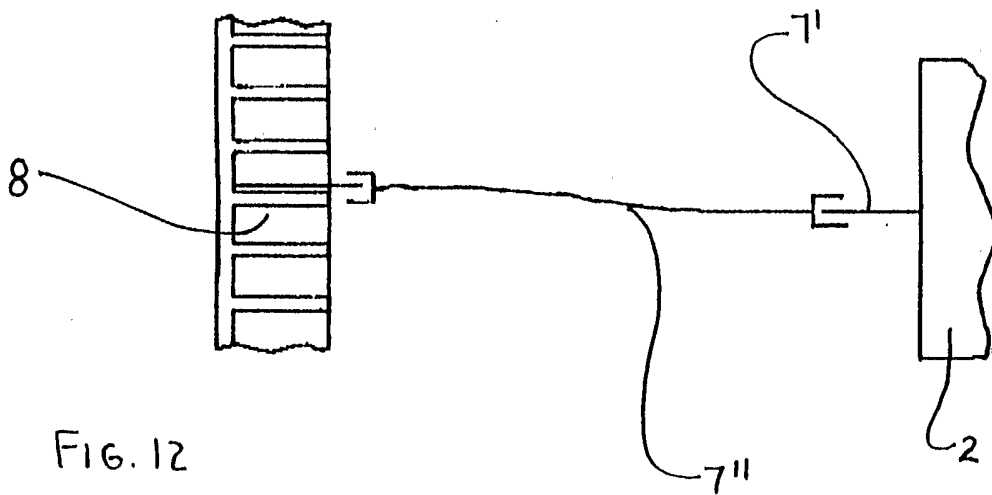
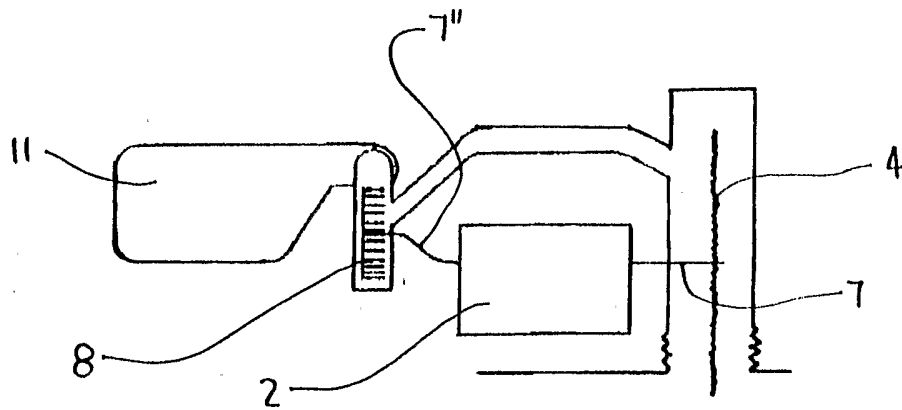


FIG. 12

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/38463

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : B27B 9/00; B23D 45/16 US CL : 30/124, 390 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S. : 30/124, 390, 389, 391 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,241,505 A (Bodycomb, Jr. et al.) 30 December 1980 (30.12.1980) see entire document.	1-10
A	US5,327,649 A (Skinner) 12 July 1994 (12.07.1994) see entire document.	1-10
A	US5,445,056 A (Folci) 29 August 1995 (29.08.1995) see entire document.	1-10
A	US5,774,992 A (Lindenmuth) 07 July 1998 (07.07.1998) see entire document.	1-10
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.		
* Special categories of cited documents:		
"A"	document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E"	earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O"	document referring to an oral disclosure, use, exhibition or other means	"Z" document member of the same patent family
"P"	document published prior to the international filing date but later than the priority date claimed	
Date of the actual completion of the international search		Date of mailing of the international search report
31 March 2005 (31.03.2005)		13 APR 2005
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230		Authorized officer Allen Shoup Telephone No. (703) 308-1078