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(54) **DUST SHROUD WITH ADJUSTABLE MOUNTING MECHANISM**

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See application file for complete search history.

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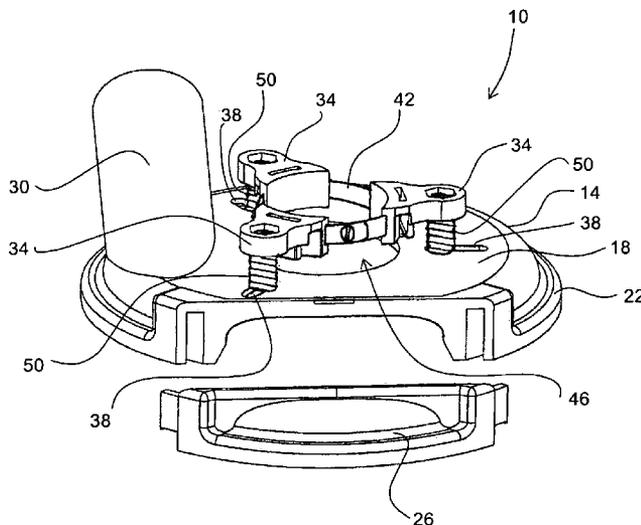
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(57) **ABSTRACT**

A universal dust shroud includes mounting brackets held above the shroud body by springs. The brackets move radially and vertically relative to the body to accommodate different angle grinders, and allow vertical movement of the shroud body relative to the grinding disk while using the grinder to allow the user greater control over the angle grinder.

19 Claims, 5 Drawing Sheets



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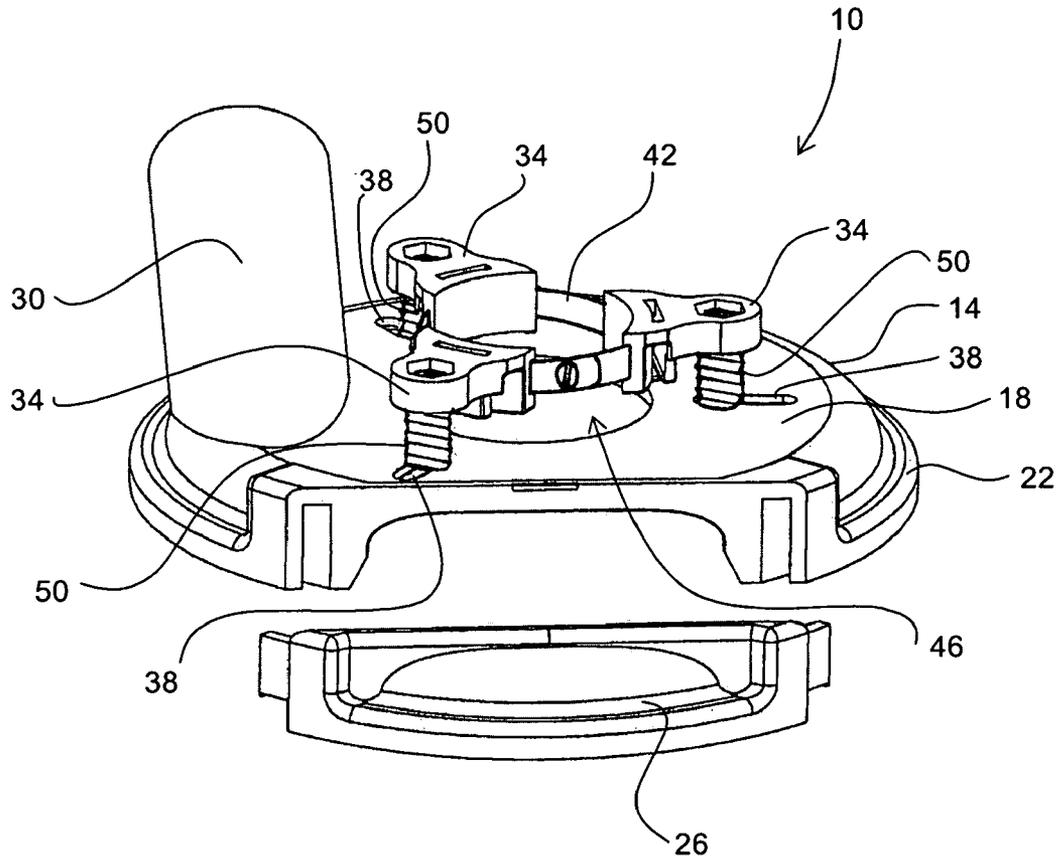


FIG. 1

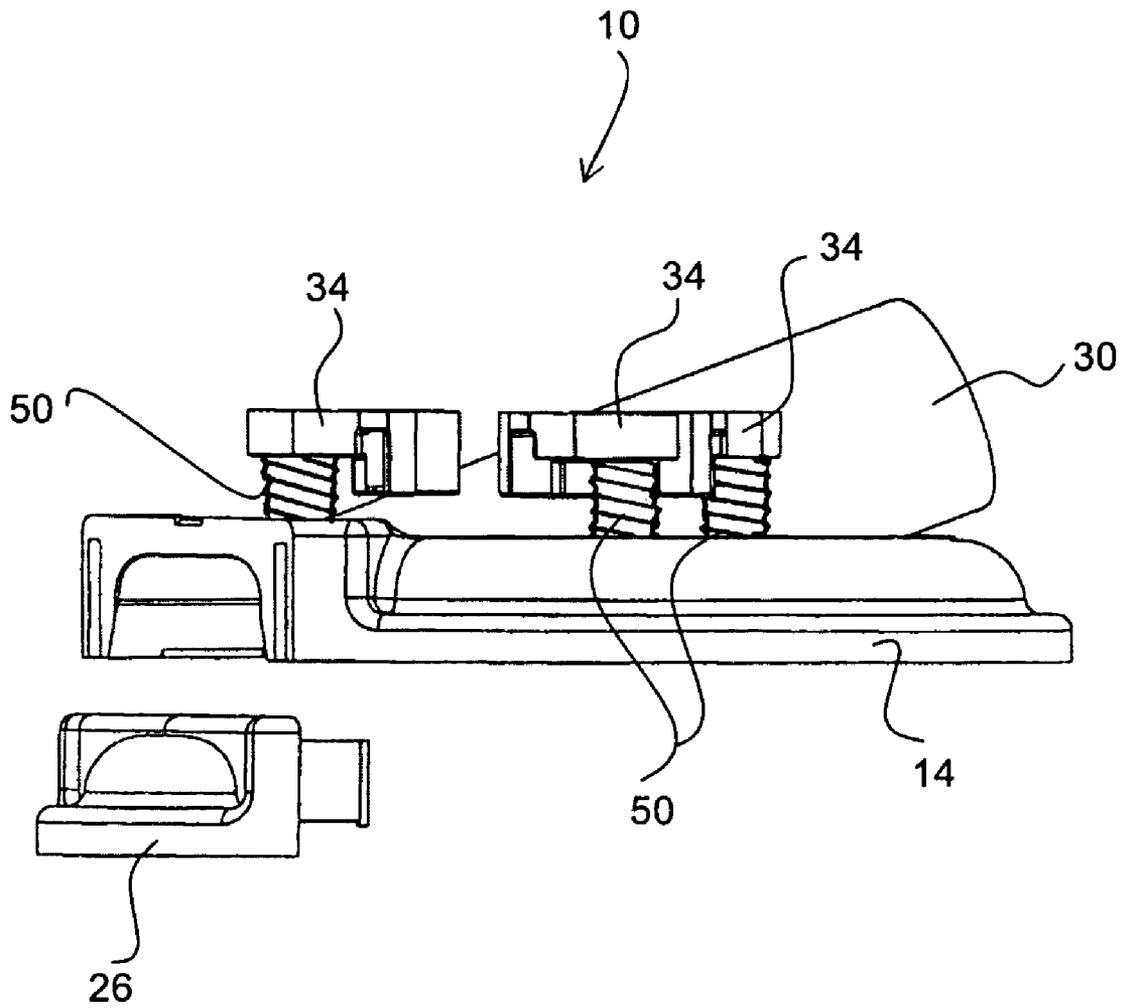


FIG. 2

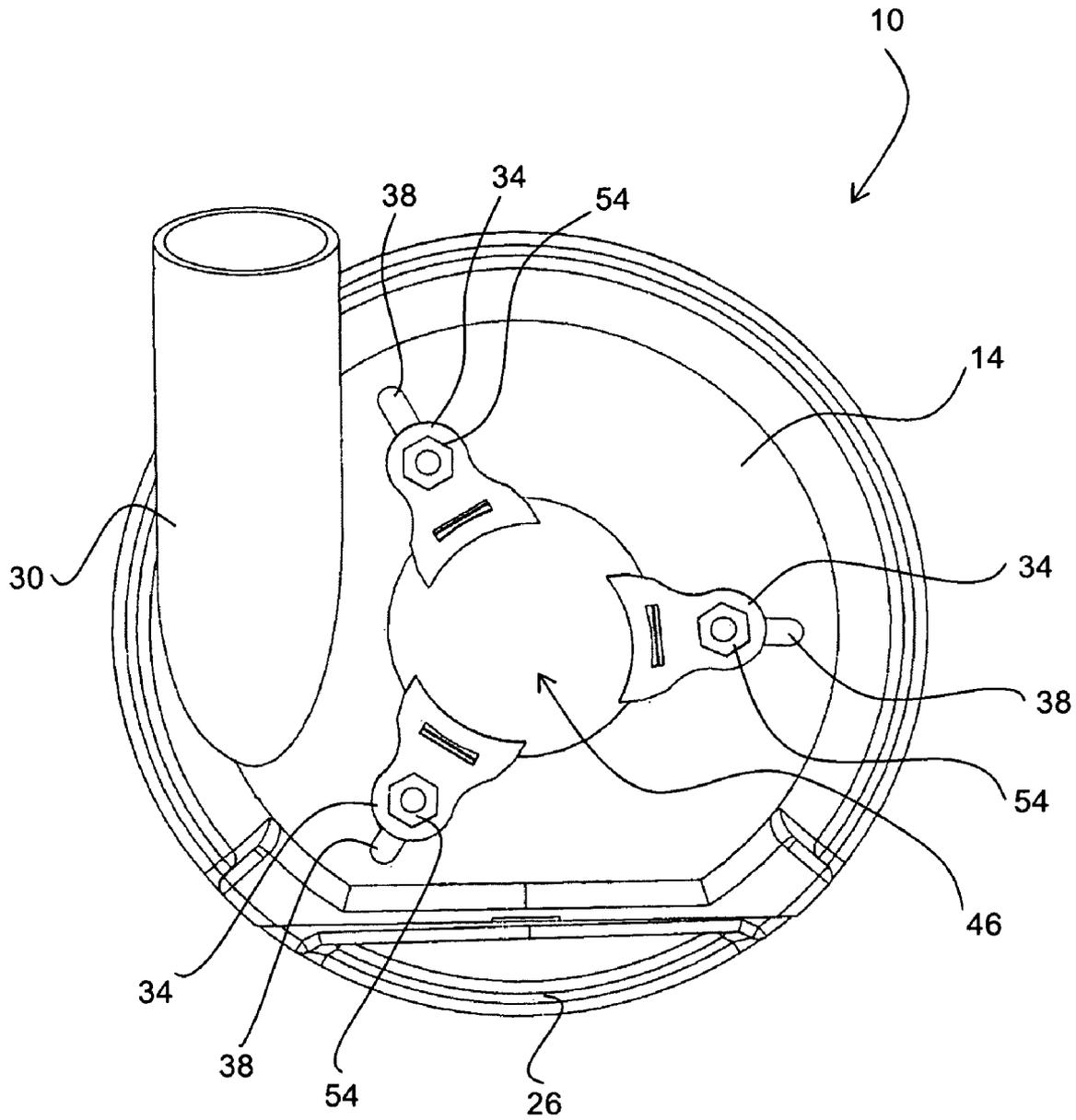


FIG. 3

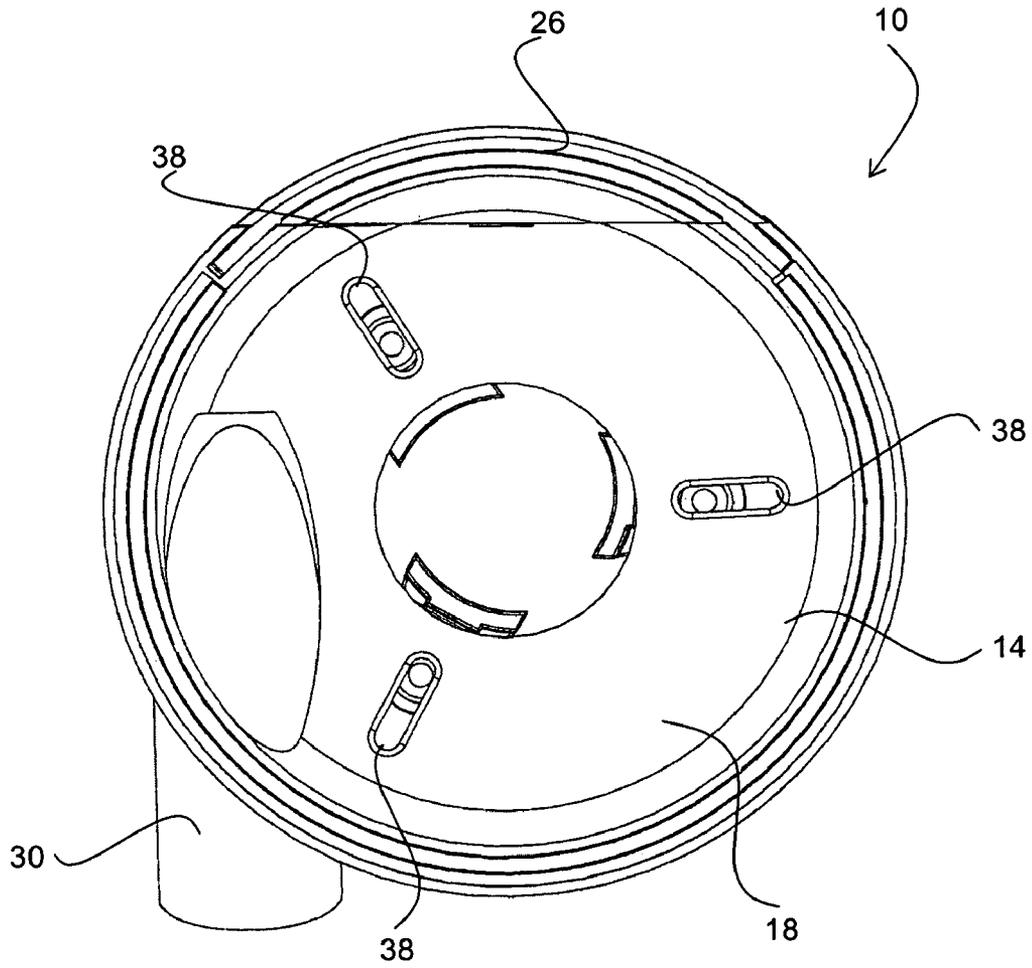


FIG. 4

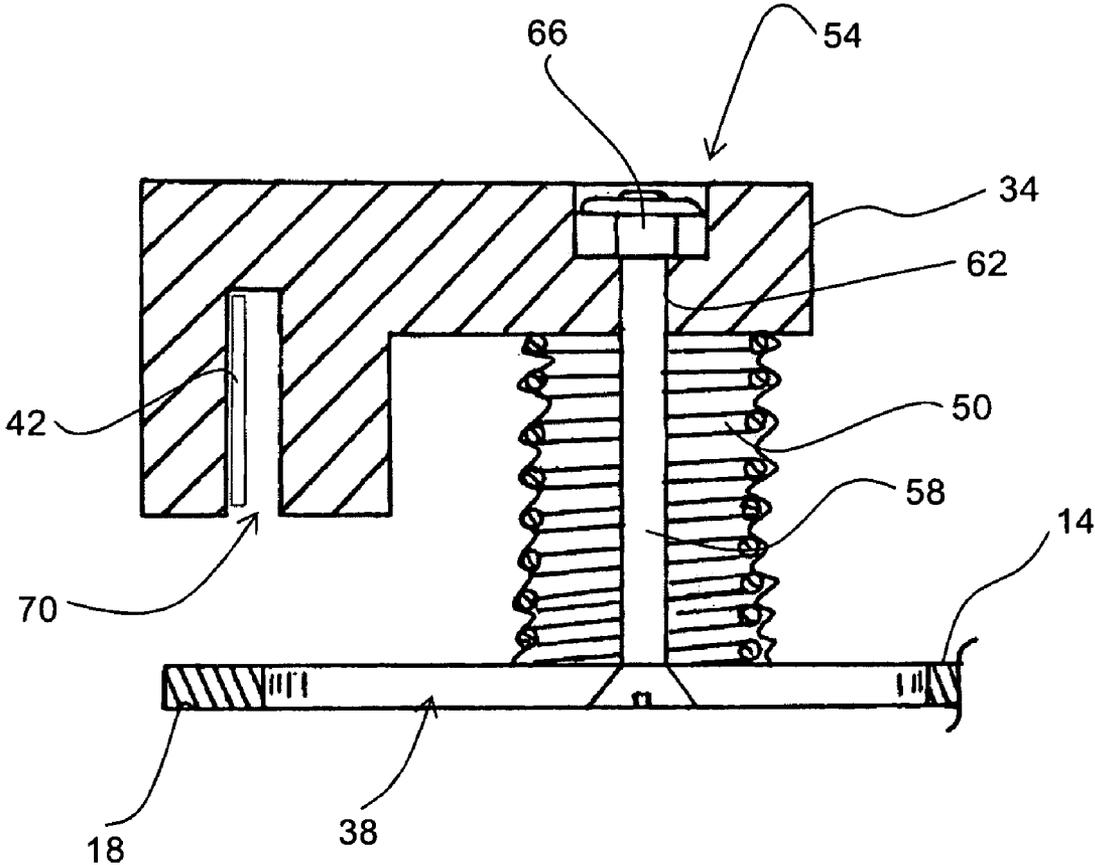


FIG. 5

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DUST SHROUD WITH ADJUSTABLE MOUNTING MECHANISM

RELATED APPLICATIONS

The present application claims the benefit of U.S. Provisional Application Ser. No. 61/021,322, filed Jan. 15, 2008, which is expressly incorporated herein in its entirety.

BACKGROUND OF THE INVENTION

1. The Field of the Invention

The present invention relates to dust shrouds. More specifically, the present invention relates to a universal dust shroud for angle grinders.

2. State of the Art

Dust shrouds have become more commonly used for multiple purposes. Angle grinders, for example, are commonly used for grinding cement or other similar tasks. Without a dust shroud, debris is scattered over a wide area. It is desirable to contain the dust which is created for several reasons. It is desirable to contain the dust and debris to keep the workplace cleaner and to minimize the time necessary to clean up afterwards. Fine dust is often created while grinding cement, for example, which spreads a large distance and can be quite difficult to clean up afterwards. It is also desirable to contain the dust and debris to keep the same from getting into the tool itself, causing premature failure of the bearings, motor, etc. Additionally, debris such as concrete dust poses a health risk to the machine operator and others who may breathe it. It is thus desirable to collect the dust to minimize any exposure to the dust.

One difficulty in providing dust shrouds is the fact that each particular tool will have different mounting requirements. For angle grinders, each grinder will typically have a collar which is concentric to the output shaft which may be used to mount a dust shroud. For each grinder, however, the collar may be a different diameter and may be a different height from the grinding disk. As such, the dust shroud must accommodate the particular mounting diameter and height of the desired tool. Another difficulty in providing dust shrouds is in providing a dust shroud which does not overly interfere with the use of the grinder itself.

It is thus appreciated that the requirements for a dust shroud varies according to the particular angle grinder with which the dust shroud is being used. Many stores, however, do not wish to stock many different models of dust shrouds. It is similarly not desirable for a manufacturer to make many different models of dust shrouds, as it increases the tooling and production costs. Individual consumers do not wish to special order a dust shroud and wait for weeks for it to arrive. There is thus a need for universal dust shrouds which allow a single shroud to be used with many different brands of tools while still performing properly. Such a universal dust shroud should safely and securely mount to a wide variety of angle grinders while effectively collecting dust and debris and without interfering with the use of the angle grinder.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved universal dust shroud.

According to one aspect of the invention, a dust shroud is provided which is adjustable to fit varying diameters of mounting collars on different tools. The mounting brackets which attach to the collar are movable inwardly or outwardly to accommodate different tool sizes.

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According to another aspect of the invention, the distance between the mounting brackets and the shroud body is adjustable to properly position the shroud around the grinding disk.

According to another aspect of the invention, the shroud body is vertically movable relative to the mounting brackets during use so as to allow the operator to contact a surface with the grinding disk as desired.

These and other aspects of the present invention are realized in a universal dust shield as shown and described in the following figures and related description.

BRIEF DESCRIPTION OF THE DRAWINGS

Various embodiments of the present invention are shown and described in reference to the numbered drawings wherein:

FIG. 1 shows a perspective view of a shroud according to the present invention;

FIG. 2 shows a side view of the shroud of FIG. 1;

FIG. 3 shows a top view of the shroud of FIG. 1;

FIG. 4 shows a bottom view of the shroud of FIG. 1; and

FIG. 5 shows a partial cross-sectional view of the shroud of FIG. 1.

It will be appreciated that the drawings are illustrative and not limiting of the scope of the invention which is defined by the appended claims. The embodiments shown accomplish various aspects and objects of the invention. It is appreciated that it is not possible to clearly show each element and aspect of the invention in a single figure, and as such, multiple figures are presented to separately illustrate the various details of the invention in greater clarity. Similarly, not every embodiment need accomplish all advantages of the present invention.

DETAILED DESCRIPTION

The invention and accompanying drawings will now be discussed in reference to the numerals provided therein so as to enable one skilled in the art to practice the present invention. The drawings and descriptions are exemplary of various aspects of the invention and are not intended to narrow the scope of the appended claims.

Turning now to FIG. 1, a perspective view of a shroud 10 is shown. The shroud 10 is designed for use with an angle grinder. The shroud includes a body 14 which has a generally flat top 18 and a skirt 22 which will enclose the top and sides of a grinding disk. The body 14 may include a removable hatch 26 which exposes a side of the grinding disk for grinding into a corner, such as grinding a floor against a wall. A vacuum port 30 is used to connect a conventional 1.25 inch vacuum hose (although other sizes of hoses could be used) to the shroud to capture the dust created while grinding.

In order to accommodate a variety of different angle grinders with a single shroud 10, the shroud includes three mounting brackets 34 which are attached to the body 14. The mounting brackets 34 are attached to the body 14 via slots 38, and can slide inwardly and outwardly to adjust the space between the mounting brackets. A worm drive hose clamp 42 is held in slots in the brackets 34 and is used to securely fasten the brackets to an angle grinder so that the output shaft of the angle grinder passes through the hole 46.

The brackets are typically attached to the body 14 by bolts which pass through the slots 38 and springs 50 and are secured to the brackets 34. While the present invention describes the use of springs 50, it will be appreciated that many biasing elements such as a resilient foam or elastomeric tubing such as vinyl, silicone, or latex tubing will provide the

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desired amount of flexibility and movement. Thus, although described primarily as springs **50**, the biasing element **50** may be a flexible tube or piece of foam and such is intended to be included in the definition of biasing elements or springs as used herein. The springs **50** allow some compression between the brackets **34** and the body **14**, allowing the operator flexibility in choosing which part of the grinding disk contacts the work surface and in choosing how much pressure to apply while grinding.

Turning now to FIG. 2, a side view of the shroud **10** is shown. The clamp **42** is omitted for clarity. It can be seen how the brackets **34** float above the body **14**, and how compression of the springs **50** allow for movement there between.

Turning now to FIG. 3, a top view of the shroud **10** is shown with the clamp **42** omitted. The brackets **34** may be formed with a hexagonally shaped recess **54** on the top to receive a nut, such as a nylon lock nut. The bolt which connects the brackets **34** to the body will pass through the body **14**, through the bracket, and thread into the nut. It will be appreciated that the bolt may thread directly into the brackets **34**, but using a nut will help prevent damage to the bracket and will allow for replacement of the engaging threads if they become damaged.

Turning now to FIG. 4, a bottom view of the shroud **10** is shown. The slots **38** are better seen. The slots **38** may have beveled edges on the bottom side so as to allow a flat-head bolt to fit flush with the underside of the body **14**. Although the bolts are omitted for clarity, they would pass through the slots **38** so that the head of the bolt is adjacent the top **18** of the body **14**. It can be seen how the vacuum port **30** is open to the space which is enclosed by the body **14** so as to collect the dust created by a grinding disk.

Turning now to FIG. 5, partial cross-sectional view of a bracket **34** and body **14** is shown. A single bracket **34** is shown, and the portion of the body **14** near the slot **38** is shown. The bracket **34**, body **14**, and spring **50** are shown in cross section. A bolt **58**, preferably a flat head bolt, is used to attach the bracket **34** to the body **14**. The bolt **58** passes through the slot **38**, the spring **50**, a hole **62** in the bracket **34**, and is secured to a lock nut **66**. The lock nut **66** is placed in the hexagon shaped recess **54**. It can be seen how tightening the bolt **58** will move the bracket **34** closer to the body **14** and allow a user to adjust the position of the shroud as mounted to a grinder. The bolt **58** can move back and forth laterally in the slot **38**, allowing the size of the opening between brackets **34** to be adjusted. In this manner, the shroud **10** will fit many different angle grinders. Thus, a single shroud may fit virtually any angle grinders which use a particular size of grinding disk.

While described primarily as a bolt **58** and nut **66**, the brackets **34** may be attached to the body **14** with other fasteners such as a metal pin or the like. Bolts **58** and nuts **66** are preferable as they are adjustable in length and commonly available. Thus, if the bolts **58** or nuts **66** become damaged or worn they may be easily replaced. The length of the bolt **58** extending from the nut **66** may be easily adjusted to adjust the height of the brackets **34** relative to the body **14**, allowing a user to better fit the shroud to a particular angle grinder or to a particular grinding disk or pad which is taller or thinner.

In use, the shroud body **14** will often extend slightly below a grinding disk and the user will press on the shroud in order to press the grinding disk into the work surface. The springs **50** allow the shroud to move upwardly relative to the grinding disk and allow a grinding disk to be pressed against the work surface while keeping the shroud body **14** against the work surface to collect the dust and debris. Thus, the user may set the resting position of the shroud **10** relative to the angle grinder so that the shroud extends around the grinding disk

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and encloses it. While using the grinder, the user would press the grinder downwardly towards a surface, typically causing the shroud **10** to first contact the surface, causing one or more of the springs **50** to compress to thereby allow the shroud to move upwardly relative to the angle grinder and grinding disk, and allowing the grinding disk to contact the work surface as desired.

The bracket **34** has a slot **70** which receives the clamp **42**. When the brackets **34** are not fastened to an angle grinder via clamp **42**, the brackets **34** are able to move back and forth in the slots **38** to adjust to the size of the opening between the brackets **34**. The opening is adjusted to find a desired angle grinder, and the angle grinder is placed into the opening. The clamp **42** is then tightened to hold the brackets **34** securely against the angle grinder. The arrangement of the slots **38** prevent movement of the body **14** relative to the brackets **34** once the shroud **10** is installed on the angle grinder, preventing accidental contact between the shroud body **14** and a grinding disk.

The shroud **10** is significantly easier to install than available universal dust shrouds and fits a greater range of sizes of angle grinders. Other designs require the operator to tighten multiple band clamps and screws to attach the shroud to a grinder where the present shroud only requires the user to tighten a single band clamp **42**. Additionally, the shroud provides increased adjustability in mounting the shroud to the angle grinder, and allows the mounted shroud skirt to move relative to the grinding disk while the grinder is in use, allowing the operator greater flexibility in using the grinder while still properly collecting the dust and debris generated by the grinder.

There is thus disclosed an improved universal dust shroud. It will be appreciated that numerous changes may be made to the present invention without departing from the scope of the claims.

What is claimed is:

1. A dust shroud for an angle grinder comprising:

a body which encloses the top and sides of a grinding disk, and

a plurality of brackets, each of the plurality of brackets being attached to the body so as to be disposed above the body and so as to allow independent vertical movement of each of the brackets relative to the body, the brackets being attachable to an angle grinder so as to attach the shroud to the angle grinder so as to place the body around the grinding disk.

2. The dust shroud of claim 1, further comprising a compressible biasing element disposed between each bracket and the body.

3. The dust shroud of claim 2, wherein the compressible biasing element is a spring.

4. The dust shroud of claim 2, wherein the compressible biasing element is a piece of flexible tubing.

5. The dust shroud of claim 2, wherein each bracket is connected to the body by an attachment member which passes through the body, compressible biasing element, and bracket.

6. The dust shroud of claim 5, wherein the attachment member is a bolt.

7. The dust shroud of claim 5, wherein the attachment member and compressible biasing element allow for vertical movement of the bracket relative to the body.

8. The dust shroud of claim 1, further comprising a clamp configured for securing the brackets around the output shaft of an angle grinder.

9. The dust shroud of claim 8, wherein each of the brackets has a slot formed therein for receiving the clamp.

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10. The dust shroud of claim 9, wherein the clamp is a band clamp.

11. A dust shroud for use with an angle grinder comprising: a shroud body having an upper surface and a skirt extending downwardly therefrom so as to generally enclose a grinding disk, the upper surface having an opening formed in the center thereof for allowing the shaft of an angle grinder to pass therethrough, the shroud extending horizontally from a central axis;

a vacuum port attached to the shroud body, the vacuum port being in fluid communication with the interior of the shroud body; and

a plurality of brackets resiliently attached to the shroud body around said shroud body opening and extending upwardly therefrom, the plurality of brackets being attachable to an angle grinder to secure the dust shroud to the angle grinder, and wherein the plurality of brackets are movable in a direction perpendicular from said central axis so as to adjust the distance between the plurality of brackets and wherein the plurality of brackets are individually movable in a direction parallel to the central axis so as to adjust the distance between the shroud body and the plurality of brackets.

12. The shroud of claim 11, wherein the plurality of brackets are biased away from the shroud body along said direction parallel to said central axis.

13. The shroud of claim 11, wherein the shroud body comprises slots formed therein, and wherein each of the plurality of brackets is mounted in a slot and is movable along said slot to adjust the distance between the plurality of brackets.

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14. The shroud of claim 11, wherein each of the plurality of brackets is mounted to a slot via a bolt passing through the slot, through a biasing element, and through the bracket.

15. The shroud of claim 11, further comprising a clamp passing through the plurality of brackets and configured for securing the plurality of brackets to an angle grinder.

16. A dust shroud for an angle grinder, comprising: a plurality of brackets attachable to an angle grinder; a shroud body having an upper surface and a skirt extending therefrom so as to generally enclose a grinding disk; a vacuum port attached to the shroud body and being in fluid communication with a cavity defined by the shroud body; and

wherein the plurality of brackets are resiliently attached to the shroud body so as to permit vertical movement of the shroud body relative to the plurality of brackets.

17. The shroud of claim 16, wherein the shroud body has slots formed therethrough, and wherein the plurality of brackets are each mounted to a slot to allow for adjustment of the space between the plurality of brackets to accommodate differing sizes of angle grinders.

18. The shroud of claim 16, wherein each of the plurality of brackets further comprises a bolt which passes through the shroud body, through a spring, and through the bracket such that the spring biases the bracket away from the shroud body, the bolt limits the movement of the bracket away from the shroud body, and the bracket may be moved towards the shroud body against the bias of the bolt.

19. The shroud of claim 18, wherein the bolt may be adjusted to vary the maximum distance between the bracket and the shroud body.

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