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(54) Combined cutting and grinding tool

(57) The invention relates to an arrangement in connection with a tool, to be used for instance in an angle grinder. The arrangement comprises a spindle (2) rotated by a drive unit, a standard wheel (1) being arranged to the spindle by means of a spindle nut (4). To the spindle (2) is also arranged a separate grinding member smaller than the standard wheel (1), the grinding member having a grinding surface on its outer periphery. The arrangement can be used for instance in plumbing: the standard wheel (1) can be used for cutting the pipes and the grinding member for grinding the flash from the cutting point.

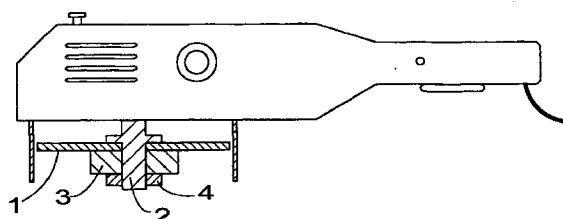


FIG. 1

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Description

[0001] The invention relates to an arrangement in connection with a tool, to be used for instance in an angle grinder, the arrangement comprising a spindle rotated by a drive unit, a standard wheel being connected to the spindle by means of a spindle nut.

[0002] When pipes are being cut in plumbing works, by using an angle grinder, a saw, by means of flame cutting, or by any means whatsoever, flash builds up at the point where the pipe is cut and it must be removed before welding and handling of the pipes. A good welding seam cannot be made if the flash is not removed. In installation works, plumbers typically use an angle grinder for cutting the pipe and for removing the flash outside the pipe. For removing the flash inside the pipe, they usually have a separate grinding machine, called 'squeak' in the jargon of this field, because often an angle grinder does not fit into the pipes and even if it would, it is fairly difficult to use. An angle grinder can, of course, be also used for cleaning flash inside large pipes, but then there is the drawback that the grinding result is not even. Particularly as regards TIG and gas welding, where filler material is not always used, it is important that the pipes fit accurately. A further drawback that exists is that the use of several grinding machines at a worksite causes inconvenience.

[0003] An object of the present invention is to provide a novel arrangement for an angle grinder to allow one and the same machine to be used for both cutting a pipe and for grinding the flash.

[0004] The arrangement of the invention is characterized in that on the outer periphery of a spindle nut is formed a grinding surface, which allows it to be used for grinding flash that builds up for instance when pipes are cut.

[0005] An essential idea of the invention is that in addition to the standard grinding wheel, the angle grinder spindle is provided with a separate grinding member, which has a diameter substantially smaller than the diameter of the standard grinding wheel, a grinding surface being formed on the outer periphery of the grinding member. An essential idea of a preferred embodiment of the invention is that the grinding member is a separate grinding wheel substantially smaller than the standard grinding wheel and it is arranged between the standard grinding wheel and the spindle nut. Further, an essential idea of a second embodiment of the invention is that a grinding surface is formed on the outer periphery of the spindle nut, either by knurling the outer periphery or by forming there abrasive teeth in another way, or the spindle nut comprises a metallic nut portion which has a ring-shaped grinding portion around it, the grinding portion being made of a grinding stone of a type known per se. Further, an essential idea of a third embodiment is that the spindle nut comprises a grinding pin which has a nut portion and a grinding portion on an extension part of the nut portion.

[0006] An advantage of the invention is that now plumbing can be performed by using a single grinding device, i.e. an angle grinder provided with an arrangement of the invention. When an angle grinder is provided with a cutting wheel and an arrangement of the invention, the cutting wheel can be used for cutting the pipes and, immediately thereafter, the flash can be conveniently ground off at the same time by means of a grinding member, both from the outer and inner surfaces of a pipe. This saves time and the work progresses well, because frustrating changing of machines and searching is avoided. The arrangement can also be used for removing protective grease from the inner surface of a pipe. An arrangement of the invention also allows the angle grinder to be better utilized. Yet another advantage is that the arrangement of the invention is inexpensive, which makes it available also to non-professional users. The arrangement does not in any way cause difficulties in the normal use of the machine. The arrangement can naturally be arranged to an angle grinder together with a grinding wheel or any other wheel.

[0007] The invention will be described in greater detail in the attached drawing, in which

Figure 1 is a schematic side view, partly in section, showing an arrangement of the invention arranged to an angle grinder;

Figure 2 is a schematic sectional view, in the direction of the spindle, showing another arrangement of the invention;

Figure 3 is a schematic sectional view showing a third arrangement of the invention;

Figure 4 is a schematic sectional view showing a fourth arrangement of the invention; and

Figure 5 is a schematic sectional view showing an auxiliary component of the arrangement of the invention.

[0008] Figure 1 is a schematic side view, partly in section, showing an arrangement of the invention arranged to an angle grinder. The arrangement comprises a standard wheel 1, which is arranged against collars of the spindle 2, and an auxiliary wheel 3 substantially smaller than the standard wheel 1, the auxiliary wheel 3 being arranged against the standard wheel 1. The two wheels 1 and 3 are attached by means of a spindle nut 4 in such a way that they rotate with the spindle 2. The auxiliary spindle 3 can be made for instance of an ordinary grinding stone used in wheel manufacturing, or a corresponding material can be used.

[0009] Figure 2 is a schematic view of another application of the invention; here the spindle nut 4 forms the grinding member, therefore no separate auxiliary wheel 3 is needed. On the outer periphery of the spindle nut 4 is formed a grinding surface for instance by knurling or cogging, or in another previously known manner not described in any detail here. The material of this kind of

a spindle nut could be for instance a suitable tool-making steel, which lasts fairly long in the application concerned. Because the spindle nut 4 has a right-hand thread exactly corresponding to a spindle nut thread of an ordinary angle grinder, grinding performed on its outer periphery 5 continuously tightens the nut, which ensures its safety. The spindle nut 4 also comprises fully normal means for tightening the nut.

[0010] Figure 3 is a schematic view of a third application, in which the grinding member is formed by the spindle nut 4, the inner portion of which is a nut portion 6 made of metal, a grinding portion 7 being formed on the outer periphery of the spindle nut. The grinding portion 7 and the nut portion 6 are attached together so as to form an entity. The grinding portion 7 can be manufactured for instance of a grinding stone material suitable for this purpose.

[0011] Figure 4 shows yet another application of the invention, the application comprising a grinding pin 8 arranged to the spindle, the grinding pin acting at the same time as a spindle nut. The grinding pin 8 comprises a nut portion 6, which allows it to be screwed to the spindle 2, and a grinding portion 7 formed on an extension of the nut portion 6. The diameter of the grinding portion 7 is usually smaller than the diameter of the nut portion 6, which allows the grinding pin 8 to be used for machining smaller pipes, too. Naturally the diameter of the grinding portion 7 can also be greater than the nut portion 6. When needed, the grinding portion 7 can be used for grinding in the axial direction of the spindle 2. When flash is removed from small pipes, the grinding pin is preferably conical, because then the grinding pin can be partly pushed into the pipe, in the axial direction of the pipe.

[0012] Figure 5 shows a protective washer 9 relating to the solution of the invention, the washer being meant to prevent undesired wear of the standard wheel 1 in the direction of the axis of the spindle 2. The protective washer 9 can be for instance a metal disc having in the center a hole of the size of the spindle 2, the hole allowing the disc to be arranged between the standard wheel 1 and the grinding member.

[0013] The drawing and the related description are only meant to illustrate the inventive idea. The details of the invention may vary within the scope of the claims. The use of an application of the invention is therefore not restricted only to angle grinders, but it can also be applied equally well for instance to drilling machines and milling machines, and to different grinding machines. The application of the invention can also be successfully applied to the straightening of pipe ends. The standard wheel is then pressed, in the direction of the spindle, against the pipe end, which produces a straight and an even pipe end, after which the arrangement of the invention is used for removing the flash that builds up. The arrangement can also be exploited in other operations than plumbing. The arrangement of the invention can be used for instance for making welding

bevels on plates by means of a conical grinding member. A cup wheel can also be arranged between the standard wheel and the spindle nut.

Claims

1. An arrangement in connection with a tool, to be used for instance in an angle grinder, the arrangement comprising a spindle (2) rotated by a drive unit, a standard wheel (1) being connected to the spindle by means of a spindle nut (4), **characterized** in that on the outer periphery of the spindle nut (4) is formed a grinding surface, which allows it to be used for instance for grinding flash that builds up when pipes are cut.
2. An arrangement according to claim 1, **characterized** in that a spindle nut (4) acts as a grinding member, the spindle nut having on its outer periphery a grinding surface formed for instance by knurling or cogging.
3. An arrangement according to claim 1, **characterized** in that a spindle nut (4) acts as a grinding member, the spindle nut having on its outer periphery a ring-shaped grinding portion (7) formed of grinding stone, the grinding portion being attached to a standard nut portion (6).
4. An arrangement according to claim 1, **characterized** in that a spindle nut (4) acts as a grinding member, the spindle nut comprising a nut portion (6) and a grinding portion (7) formed on its extension.
5. An arrangement according to any one of preceding claims, **characterized** in that between the standard wheel (1) and the grinding member is arranged a protective washer (9) to prevent undesired wear of the standard wheel (1) in the direction of the spindle.

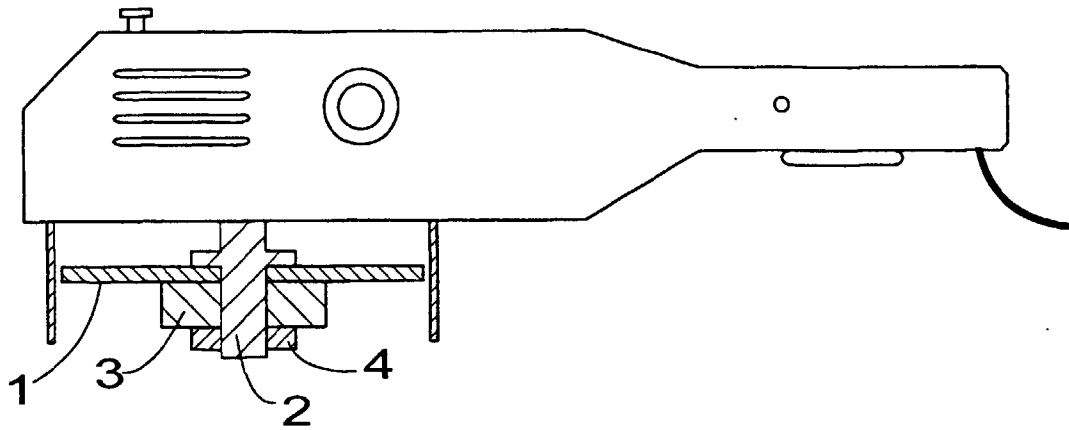


FIG. 1

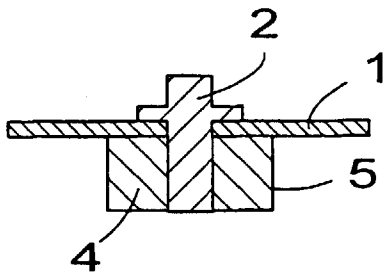


FIG. 2

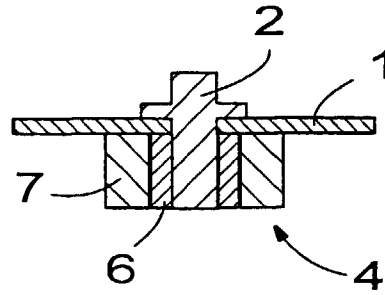


FIG. 3

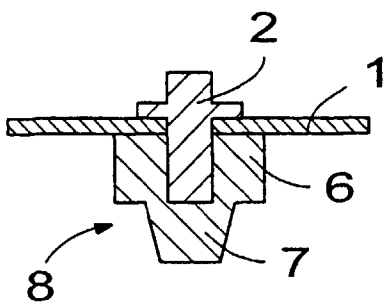


FIG. 4

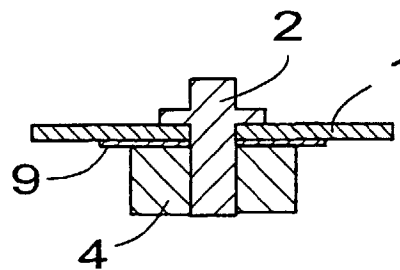


FIG. 5