A dust-removing attachment device for rotary disk power grinders or sanders is described wherein a continuous current of air is maintained over and around the grinding or sanding surface to capture and withdraw dust particles and the like into a vacuum chamber. Filtered and pressurized exhaust air from a vacuum cleaner tank is directed through a first plenum to discharge forcefully about the rotary disk at one side, and a vacuum plenum open at the other side of the disk and leading to the input of the vacuum cleaner serves to maintain a strong current of dust capturing circulating air.

10 Claims, 4 Drawing Figures
DUST-REMOWING ATTACHMENT DEVICE FOR POWER GRINDERS

This invention relates to attachment devices for power grinders or sanders, and is directed particularly to an attachment device for manually controlled grinders or sanders operative to continuously withdraw sanded or ground-away dust particles and the like into a collection chamber to substantially eliminate air pollution as a result of such sanding or grinding.

It is well known that motorized grinding and sanding tools, particularly those having high-speed rotary sanding or grinding elements, throw off large volumes of abraded, sanded or ground-away dustlike particles in their operation, under the influence of centrifugal force. Such particles generally spin out in all directions, so that the surrounding air quickly becomes heavily polluted. Depending upon what material is being worked upon in the grinding or sanding operation, such pollution presents a substantial health hazard to the operator of the grinding tool and even to others in the surrounding area. Gridding and sanding hazards are particularly evident, for example, in automotive body and paint shops wherein the grinding and sanding of paint, metals and synthetic filler resins constitutes a major part of the work being done. Various measures taken to alleviate the effects of such air pollution, for example the use of dust-filtering face masks, air blowers and the like, while of some value in reducing the pollution, have been found to be only partially effective.

It is, accordingly, the principal object of this invention to obviate the above-described deficiencies of antipollution measures heretofore resorted to in the use of power grinding tools. A more particular object of the invention is to provide a dust-removing attachment device for power grinders or sanders that provides strong, continuous current of air over and around a grinding or sanding surface in such a manner that substantially all of the particles being sanded or ground away will be captured and withdrawn into a vacuum chamber.

Still another object of the invention is to provide a dust-removing attachment device of the above nature which will be readily attachable to an ordinary manually controlled motorized disk sander or grinder, and which includes a pressure air plenum operative to discharge air under pressure through peripheral jet openings along one side of the rotary disk, and a vacuum plenum open at the other side of the disk and somewhat forwardly of the air pressure jets to recapture the discharged pressurized air after it has passed over and around the rotary sanding or grinding disk together with sanded or ground-away particles entrapped within the strong current of surrounding airflow thus provided.

Yet another object of the invention is to provide a dust-removing attachment device of the character described which can readily be operated with a remotely located commercial-type tank vacuum by the use of lightweight interconnecting vacuum and pressure hoses so as to minimize any inconvenience or inconvenience in the use of an associated manually controlled sander or grinder.

Still another object of the invention is to provide a dust-removing attachment device of the character described which will be simple in construction, inexpensive to manufacture, light in weight, durable in use, and readily adaptable to rotary disk sanders and grinders of various sizes and design.

Other objects, features and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

FIG. 1 illustrates, in side elevation, a typical, manually operated power grinder equipped with a dust-removing attachment device embodying the invention;

FIG. 2 is a bottom view of the power grinder and dust-removing device assembly;

FIG. 3 is a vertical cross-sectional view of the attachment device, taken along the line 3--3 of FIG. 2 in the direction of the arrows; and

FIG. 4 is a transverse cross-sectional view taken along the line 4--4 of FIG. 3 in the direction of the arrows.
outer diameter of which will be approximately the same as or slightly greater than that of the disk support plate 20. The outer peripheral edge of the body portion 31 is integrally formed peripheral outer sidewall portion 34a. The peripheral outer sidewall portion 34 of the airfoil chamber 32 merges with opposed, tangentially convergent sidewall portions 35, 36 (see FIG. 2), which terminate in outwardly extending spaced, parallel, inlet opening sidewall portion 37, 38, respectively. The airfoil chamber 32 further comprises an annular rear wall portion 39 (see FIG. 3) which merges with a rear pressurized air chamber wall 40 extending between and enclosing the opposed, tangential, sidewall portions 35 and 36 and the spaced, parallel end wall portions 37, 38. Similarly, a front pressurized air chamber wall 41 extends between the outer end portion of the opposed tangential side portions 35, 36 and the spaced parallel sidewall portions 37, 38 to define therewith and with the back pressurized air chamber wall 40 a plurality of reception of pressurized air is as hereininafter more particularly described. In this connection the outer peripheral sidewall portion 34 of the airfoil chamber 32 does not extend beyond the zones of tangential merging of the sidewall portions 35, 36 with said peripheral sidewall portion so as to provide free passage of pressurized air entering the above-described air intake into the airfoil chamber 32. As illustrated in FIGS. 2, 3 and 4, the front wall portion 33 of the arcuate airfoil chamber 32 is provided along its length with a plurality of equidistantly spaced vent openings 42 inclined inwardly in substantially radial directions with respect to the rotational axis of the drive shaft 19. The vent openings extend approximately halfway about the outwardly extending portion of the airfoil chamber 32, but spaced thereby for the reception of pressurized air piston 48a. The outer end portions of the back and front air chamber walls 40 and 41, respectively, together with the end wall portions 37 and 38, define a substantially rectangular pressurized air inlet opening 43 for the reception and connection thereto of the pressurized air hose 11, as is hereinbelow more particularly described.

The opposed tangential sidewall portions 35, 36 together with their respective end wall portions 37 and 38 merge with like, forwardly extending, opposed sidewall portions 44, 45 the outer ends of which merge with a bridging vacuum chamber outer wall 46 in spaced parallel relation with respect to the pressurized air chamber wall 41. The inner end of the outer wall 46, as is best illustrated in FIG. 2, is provided with an arcuate access 48 lying along a circle substantially concentric with the rotational axis of the drive shaft 19 and having a radius slightly greater than that of the disk support plate 20. The vacuum chamber outer wall 46 together with the opposed sidewall portions 44, 45 and the front pressurized air chamber wall 41 define a vacuum chamber 46a having, directly to the front of the pressurized inlet air opening 43, a substantially rectangular vacuum chamber opening 47. With reference to FIG. 3, it will be noted that the pressurized air chamber 40a and its associated airfoil chamber 32 is disposed in spaced parallel relation to the rear of the outer face of the grinding disk support plate 20, whereas the vacuum chamber 46a is deep enough to encompass an arcuate zone at its inlet opening that extends from behind said grinding disk support plate to a substantial distance to the front or forwardly of said grinding disk support plate.

Means is provided for removably connecting the outer ends of pressurized air hose 11 and the vacuum hose 12 to their respective air inlet opening and vacuum outlet opening 43 and 47, respectively. To this end, the outer ends of said hoses are formed into such rectangular shape that they will fit snugly within their respective vertical openings, and said outer end portions are provided with laterally opposed detent opening pairs 49, 49 and 50, 50, respectively, for the reception of spring-pressed retainer pins 51 and 52 yieldably supported by leaf spring 53, 54 (see FIGS. 1 and 2), the remote ends of which springs are attached, as such, to opposed wall portions 44, 45 of the vacuum chamber 46a. It will be understood that removal of the hoses can be simply effected by pulling outwardly on the spring release knobs 56, 57 to simultaneously free the connected ends of the pressurized air and vacuum hoses 11 and 12, respectively.

In use of the dust-removing attachment device 10, the pressurized air hose 11 will be connected with a source of air under pressure, which may conveniently be the exhaust port of an ordinary commercial vacuum tank T, and the vacuum hose 12 will be connected with the inlet or vacuum port of the tank. It will be understood that the hoses 11 and 12 will be of a highly flexible and lightweight material, and long enough to permit full freedom of use of the grinding tool to which the dust-removing device is attached. With references to the dust-removing device is attached. With references to FIGS. 2 and 3 it will be noted how pressurized air outlet openings 42 both over and under the inner faces of the forward arcuate opening 48 of the vacuum chamber 46a. The forced airflow through the inwardly directed vent openings 42 in its passage around, behind and in front of the rotating grinding or sanding disk 25 is given added impetus by the reduced air pressure in the vicinity of the arcuate front opening of the vacuum chamber 46a, and serves to maintain the integrity of the circumferential air passage and around the rotating grinding or sanding disk 25 when the grinding G is in operation so as to capture and withdraw through said vacuum chamber 46a and the vacuum hose 12 substantially all of the sanded or abraded dust particles being removed from the workpiece. It is to be noted that while the rotating grinding disk support plate 20 and its associated grinding or sanding disk will have a strong tendency to throw off such particles and dust under the impetus of centrifugal force, the velocity of air flow enveloping the grinding disk support plate as described above can readily be made strong enough to entrain and carry such outwardly projected dust particles into the vacuum chamber 46a for removal and collection in the vacuum tank T. While I have illustrated and described herein only one form in which my invention can conveniently be embodied in practice, it is to be understood that this form is presented by way of example only and not in a limiting sense. For example, although the attachment device is illustrated and described herein for use with a rotary grinder, the inventive concept is applicable as well to other types of grinding or sanding tools such as motorized reciprocating, brushing, grinding or cutting tools. The invention, in brief, comprises all the modifications and embodiments coming within the scope and spirit of the following claims.

What I claim as new and desire to secure by Letters Patent is

1. A dust-removing attachment device for a rotary disk power grinder tools and the like comprising, in combination, a pressurized air chamber, means for removably securing said pressurized air chamber to a disk or similar tool, an air foil chamber means extending arcuately about one side of the tool rotary disk, said pressurized air chamber means being fixed with respect to the tool, and said pressurized air chamber means being fixed with respect to and communicating with said airfoil chamber means, a plurality of vent openings in said airfoil chamber means for directing air forcefully outwardly at one side of the tool rotary disk, a vacuum chamber means for providing means for supplying air pressure to said pressurized air chamber means and having an opening at the other side of the tool rotary disk, and means for supplying air pressure to said pressurized air chamber means.

2. A dust-removing attachment device as defined in claim 1, wherein said means for supplying air pressure comprises a flexible pressurized hose and means for removably con-
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5. A dust-removing attachment device as defined in claim 2, wherein said opening at said other side of said rotary disk tool is arcuate in shape and wherein said plurality of vent openings are operative to direct the pressurized air substantially in radial directions with respect to the axis of rotation of said rotary disk tool.

6. A dust-removing attachment device as defined in claim 5, wherein said outer peripheral edge of said frustoconical body portion. 7. A dust-removing attachment device as defined in claim 6, wherein said vacuum plenum extends rearwardly of said outer peripheral edge of said frustoconical body portion.

8. A dust-removing attachment device as defined in claim 7, wherein said opening at said other side of said rotary disk tool is arcuate in shape and wherein said plurality of vent openings are operative to direct the pressurized air substantially in radial directions with respect to the axis of rotation of said rotary disk tool.

9. A dust-removing attachment device as defined in claim 8, wherein said means for removably connecting said one end of said pressurized airhose to said pressurized air plenum, and said means for removably connecting said one end of said vacuum hose to said vacuum plenum comprise opposed sidewall openings in each of said hose ends and spring-pressed retainer pins yieldingly fixed with respect to said vacuum plenum and operative to fit in said opposed sidewall openings.

10. A dust-removing attachment device as defined in claim 9, wherein said means for supplying under pressure to said pressurized air plenum and to produce a vacuum in said vacuum plenum comprises a vacuum cleaner having a vacuum input port connected with the other end of said vacuum hose and a pressurized exhaust air output port connected with the other end of said pressurized air hose.

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