Jan. 13, 1942. W. F. TERRY ET AL 2,270,151

MEANS FOR COLLECTING DUST

Filed June 28, 1940

Fig. 1.

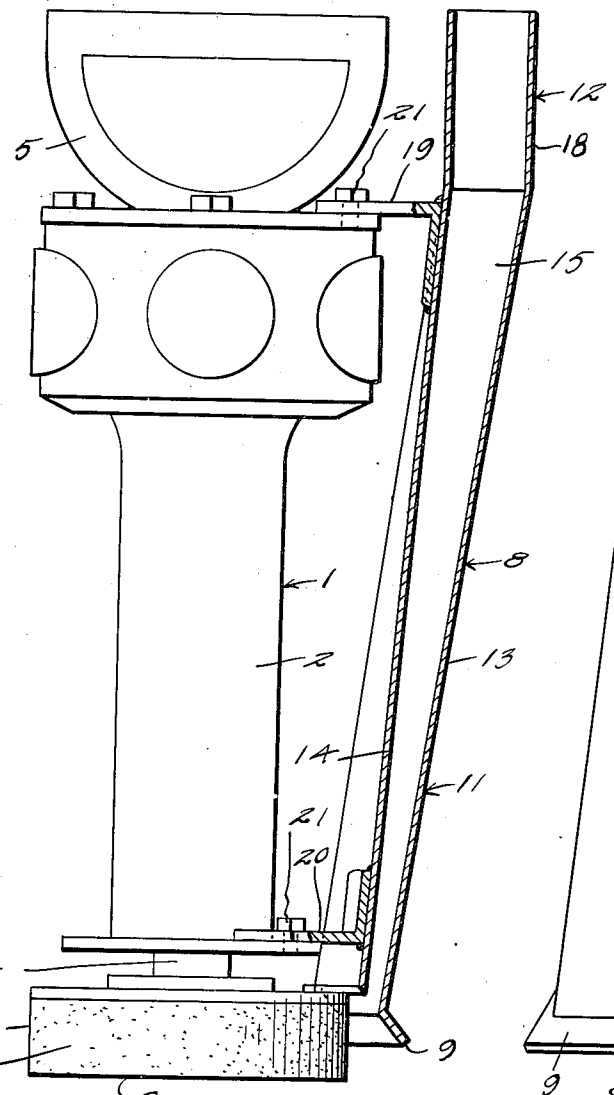


Fig. 3.

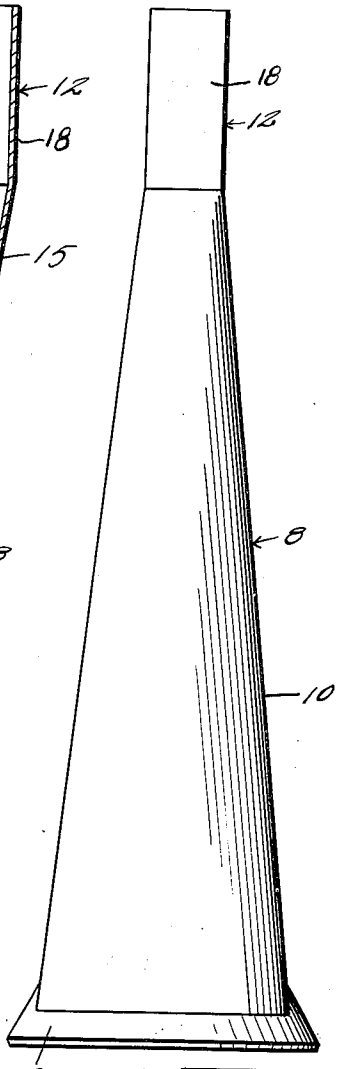


Fig. 2.

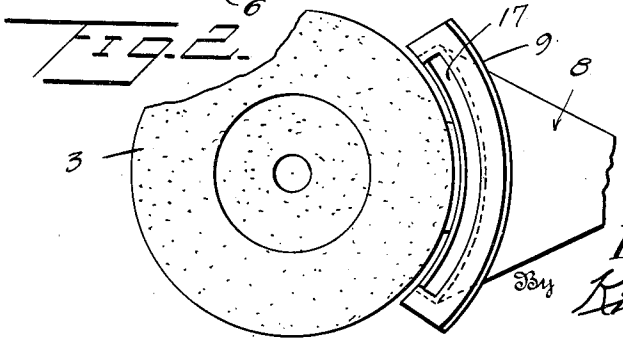
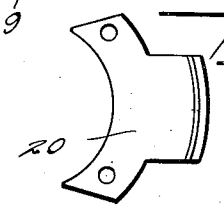


Fig. 4.



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Patented Jan. 13, 1942 2,270,151

UNITED STATES PATENT OFFICE

2,270,151

MEANS FOR COLLECTING DUST

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Application June 28, 1940, Serial No. 342,984

1 Claim. (Cl. 51—273)

This invention relates to a means for collecting dust, gases, and atmospheric impurities created by rotating devices used in grinding, cutting, and polishing.

Hitherto dust, gases, and atmospheric impurities created by rotary grinding, cutting, and polishing devices have been collected or controlled by utilizing the effect of the centrifugal force imparted to such dust, gases and atmospheric impurities combined with a source of negative air pressure maintained within a hood causing such dust, gases, and atmospheric impurities to be drawn away from their source of creation into the confines of such a hood and subsequently conveyed to a suitable dust collecting system.

This involved the use of large volumes of air to maintain the necessary air velocity required to draw the dust, gases, and atmospheric impurities into such a hood which of necessity was often placed at a considerable distance from the source of dust creation or completely surrounded the rotary device. The presence of such a hood often reduced the effective working area of the rotary grinding, cutting, or polishing device, limiting this area to a very small portion of the total periphery. In many cases this proved detrimental to the efficient operation of the apparatus. In the case of portable or hand-operated rotary devices, large sized suction lines handling large volumes of air were required making the ventilating apparatus too heavy and cumbersome to be practicable.

The object of this invention is the development of a novel means for collecting dust, gases, and atmospheric impurities created by the use of rotary grinding, cutting, and polishing devices by locating air currents of small volume but of high velocity flowing through small pipe lines which may be either flexible, rigid, or a combination of both, terminating in a hood or nozzle, so located with respect to the source of creation of dust, gases or atmospheric impurities that these air currents pull such dust, gases, and atmospheric impurities in a direction at right angles to the action of centrifugal force and the air current set up by the rotating effect of the device used for grinding, cutting, or polishing at such a time and at such a location that the action of centrifugal force upon such dust, gases and atmospheric impurities is overcome and allows them to be drawn into the confines of a small hood or nozzle located as previously mentioned. By collecting this material at or near its source of creation only a small amount of air flow is required, allowing small hoods or nozzles, small pipes or suction hose, and small collectors requiring less air horse power to be utilized. This permits the above mentioned dust, gases, or atmospheric impurities created by rotating, grinding, cutting, and polishing machines to be successfully collected and controlled as soon as they are created without the use of large hoods and conveying pipes which up to the present time have never been successfully applied and have interfered with productive operation or portability.

Further objects of the invention are to provide, in a manner as hereinafter set forth, a means for the purpose referred to which is simple in its construction and arrangement, strong, durable, compact, thoroughly efficient in its use, readily installed in collecting position, and comparatively inexpensive to manufacture.

Embodying the objects aforesaid and others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically described and illustrated in the accompanying drawing, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a vertical sectional view of a collecting means, in accordance with this invention, showing the adaptation thereof in relation with a portable abrading device of the motor driven type,

Figure 2 is a bottom plan view, broken away of the structure shown by Figure 1,

Figure 3 is an elevation looking towards the outer side of the collecting means, and

Figure 4 is a detail in plan.

With reference to the drawing, a portable motor driven abrading machine or device is generally indicated at 1 and it includes a housing 2, an abrading wheel 3, an operating shaft 4 for the wheel 3 and a handle or grip 5. The outer face 6 of the wheel 3 is the operating surface of such wheel in certain operations whereas in other operations the periphery of the wheel 3 may be the operating surface. The edge of wheel 3 is indicated at 7. The wheel 3 is arranged in extended relation with respect to the housing 2. The foregoing construction of abrading machine is of known form.

There is to be correlated with and coupled to the machine 1, the collecting means in accord-

ance with this invention and such means is in the form of a combined deflector and suction nozzle structure, generally indicated at 8. The deflecting element of the structure 8 is indicated at 9 and the suction nozzle element of such structure is indicated at 10. The element 9 is at the lower or inner end of the element 10 and it is disposed at a downward and outward inclination with respect to the lower or inner end of the element 10. The manner in which the element 9 is arranged relative to the element 10 is clearly shown in Figures 1, 2 and 3. The element 9 is disposed at a downward and outward inclination with respect to the front and the sides of the element 10.

The element 10 is hollow, open at each end and it includes an intake or forward portion 11 and an outlet or rear portion 12. The portion 11 consists of an outer part 13 of convex contour in cross section throughout, an inner part 14 of concave contour in cross section throughout and a pair of oppositely disposed arcuate side parts 15, only one of which is shown. The outer part 13 and inner part 14 merge into the side parts 15. The outer part 13 and inner part 14 and side parts 15 merge at their rear ends into the front end of the rear portion 12. The latter is of uniform diameter. The arc of the outer part 13 gradually decreases from the front end of such part to the portion 12. The arc of the inner part 14 gradually decreases from the front end of said part to the portion 12. The arc of the side parts 15 gradually increases from their front to their rear ends. In elevation looking towards the outer part or the inner part of the forward portion 11 of the element 10, such portion will appear as of frusto-triangular contour. In transverse section the forward portion 11 is of arcuate contour. The portion 11 gradually decreases in width from its front to its rear end. The portion 11 is open at its front end and forms an intake 17 of arcuate contour. The portion 11 provides a tapered conduit 18 which leads from the intake 17 and opens into the portion 12.

The structure 8 includes a pair of spaced oppositely disposed angle-shaped couplers 19, 20, which are secured to the outer face of the inner part 14 of the forward portion 11. The couplers are secured to spaced points of the machine 1 by the holdfast means 21 and when so secured the structure 8 will be arranged relative to the machine 1 in a manner as shown in Figure 1. When the structure 8 is secured to the machine 1, the intake 17 is arranged in juxtaposition to the edge 7 of the wheel 3 and also in proximity to the operating face 6 of said wheel. The deflecting element 9, when the structure is secured to the machine 1, will be disposed below the intake 17 and extend downwardly and outwardly with respect to the latter, as is shown by Figure 1.

The portion 12 of the structure 8 constitutes an outlet for the element 10 which is to be attached to a small flexible hose, not shown, which is connected to a source of suction. Air flow produced by this suction enters the structure 8 through the intake 17. The latter is arranged at such a position around the edge of the wheel 3 that the centrifugal force imparted to the dust is rapidly diminishing. The dust is raised vertically from the horizontal plane of the bottom surface 6 of the wheel 3 and drawn to the element 10, which is shaped to conform to the contour of the wheel 3. The vertical lift imparted to the dust is assisted by having the inner edge of the element 10 nearest the edge of the wheel higher above the surface upon which the work is being done than the outer edge and as is shown in Figure 1. The dust is assisted in its vertical movement by the breaking off of air currents, which would ordinarily enter the element 10 along the back if it was not for the deflector 9. The deflector 9 further provides for all the air to enter the intake 17 in a more or less vertical direction.

In the use and operation of this abrading machine and the collector, the device may if desired be held by the operator grasping the handle 5 with one hand. However, in certain operations it is more convenient for the operator to dispose the fingers of one hand around the machine 1 and hold the handle 5 with the other hand. This will give an additional leverage which will facilitate holding the wheel in position against the work with less trouble from the wheel attempting to skid out of his control should too much pressure be applied.

With a device of this kind the suction drawing in the dust, gas fumes and other atmospheric impurities withdraws these materials at more or less right angles to the plane in which the materials are centrifugally thrown out under the action of the abrasive wheel. The deflector 9 being disposed on an angle, as shown in the drawing, will tend to serve as an abutment against which the centrifugally thrown out materials are adapted to strike and then be pulled upwardly into the suction nozzle.

We claim:

In a means for collecting dust or the like from an abrading machine having an abrading wheel, a suction nozzle attachment comprising a hollow nozzle body tapering from its intake end to its outlet end, the intake end being largest, the opposed walls of said intake end being concentric, and the outer one of said opposed walls being longer than the inner wall whereby the extended portion of said outer wall will confront a portion of the peripheral edge of said wheel, a downwardly and outwardly inclined deflector secured at its upper edge to the lower end of said extended outer wall portion and confronting the peripheral edge of said wheel, and means for securing said nozzle at one side of said machine and substantially in parallel relation to the longitudinal axis of the latter and at right angles to the plane of movement of the dust particles generated by the wheel, the lower edge of said deflector when the nozzle is in applied position being disposed in upwardly spaced relation to the working face of the wheel, and the inclination of said deflector being such as to provide an enlarged mouth whereby the incoming air below the nozzle will flow in a direction opposed to the direction of the dust particles generated by the working face of said wheel.

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