June 4, 1929. R. A. SKRIBA 1,715,574

ABRADING APPARATUS

Filed Sept. 30, 1925

Fig. 1.

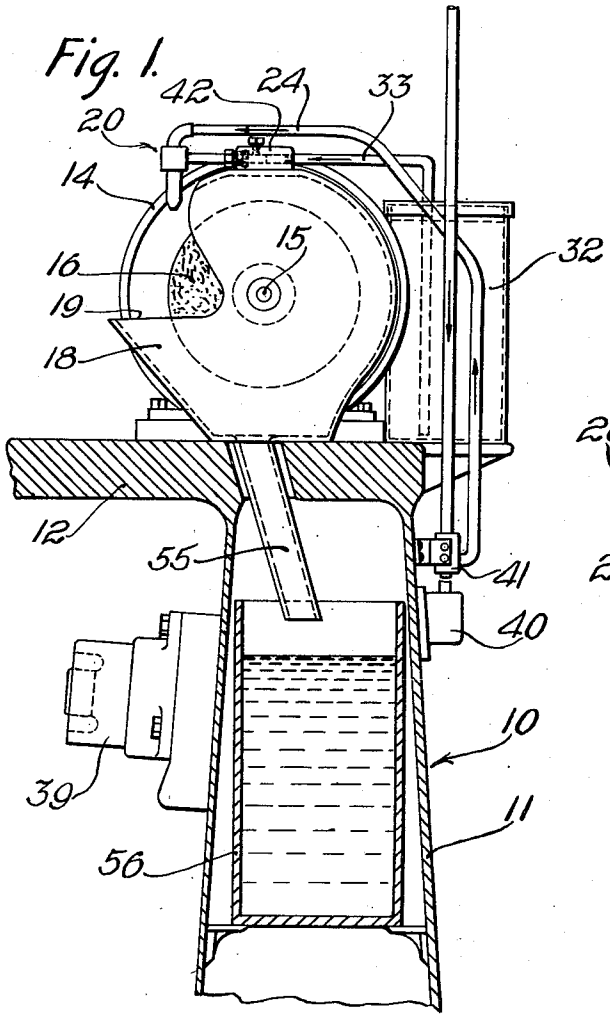


Fig. 2.

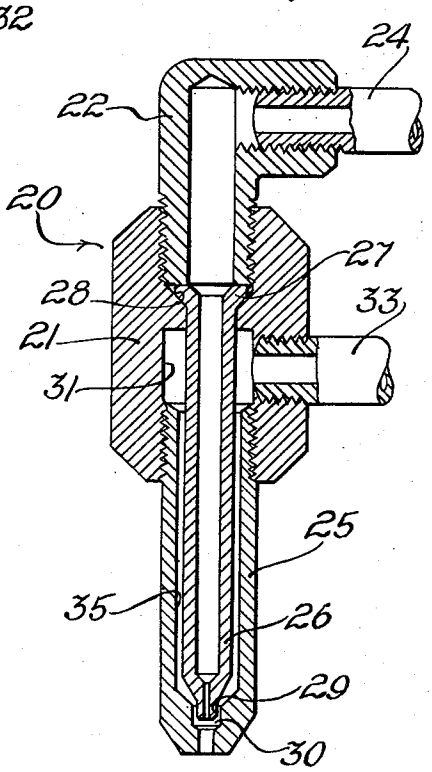
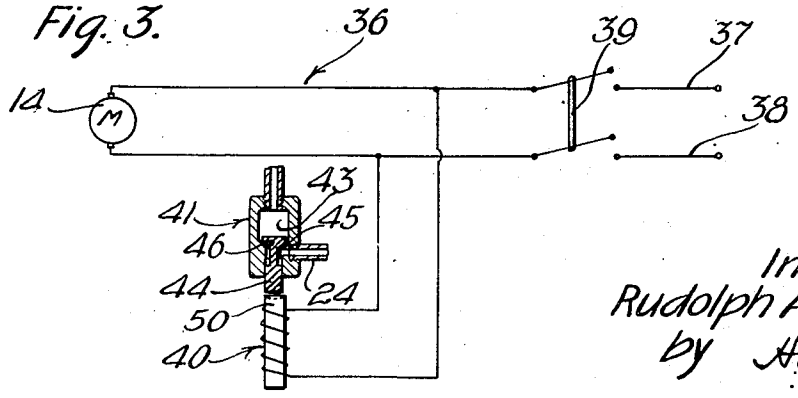


Fig. 3.



Inventor
Rudolph A. Skriba
by Habbattons
Att'y.

Patented June 4, 1929. 1,715,574

UNITED STATES PATENT OFFICE.

RUDOLPH ANTHONY SKRIBA, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

ABRADING APPARATUS.

Application filed September 30, 1925. Serial No. 59,500.

This invention relates to abrading apparatus, and more particularly to machines for wet grinding.

The principal object of the invention is the provision in abrading apparatus of means actuated by the motive power control for the abrading element for automatically controlling the application of a medium to said element.

Mechanisms embodying this invention are particularly well adapted for use with grinding machines wherein it is necessary to apply a liquid to the grinding element in order to eliminate dust and other foreign particles produced during grinding operations. It should be understood, however, that the invention is capable of other applications and should be limited only by the scope of the appended claims.

One embodiment of the invention comprises a grinding machine wherein a liquid is supplied to the grinding element by an air operated nozzle. The application of compressed air to the nozzle, which also serves to withdraw the water from a source of supply, is controlled by means included in an electrical operating circuit for the grinding element.

Other features and advantages of the invention will become apparent in the following detailed description, reference being had to the accompanying drawings, wherein—

Fig. 1 is a schematic end view, partly in section, of a portion of a grinding machine embodying the features of the present invention;

Fig. 2 is an enlarged detailed section of the air operated spray nozzle, and

Fig. 3 shows a diagram of an electrical circuit for the grinding element and for controlling the application of compressed air to the nozzle.

Referring now to the drawing in detail and more particularly to Fig. 1 thereof, the reference numeral 10 indicates, generally, a main supporting frame comprising a hollow pedestal 11 upon which is supported a table 12. Suitably supported on the table 12 is an electric motor 14 having keyed to its shaft 15, a grinding wheel 16. A guard 18 substantially enclosing the grinding wheel 16 is partly cut away as indicated at 19 whereby a portion of the working face of the grinding wheel is exposed to the operator.

Associated with the grinding wheel 16 is a spray nozzle 20 which is positioned to direct a spray of water at the point of grinding (Figs. 1 and 2) and comprises a coupling or sleeve-like member 21 which is connected, at one end, to an elbow 22 through which the nozzle 20 is connected with a compressed air line 24. Connected to the member 21 at the end opposite the elbow 22 is a pipe section 25 within which is concentrically disposed a suitable piece of tubing 26. Formed at one end of the tube 26 is a flanged portion 27 whereby the tube is rigidly secured between the end of the elbow 22 and a shoulder 28 formed in the member 21. The end of the tube 26 is slightly pointed, as indicated at 29, and terminates in a chamber 30 formed in the pipe 25. A chamber 31 provided in the member 21 and encircling the tube 26 immediately above the pipe 25 is connected with a local water supply tank 32 by a pipe 33. The pipe 33 is composed of two sections which are interconnected by a stuffing-box 42 whereby the position of the spray nozzle may be changed to accommodate variations in the diameter of the grinding wheel. The outer diameter of the tube 26 is smaller than the inner diameter of the pipe 25 (Fig. 2) thereby providing a cylindrical passage 35 between the chambers 30 and 31 through which the water contained in the tank 32 is drawn by the action of the air emerging from the end 29 of the tube 26, as will hereinafter be described.

The driving motor 14 is connected in and operated by an electrical circuit 36 (Fig. 3). A switch 39 positioned within convenient reach of the operator (Figs. 1 and 3) serves to connect and disconnect the circuit 36 from leads 37 and 38 which may be connected with any suitable source of electrical current (not shown).

Connected in the circuit 36, in parallel with the motor 14, is the winding of a solenoid 40 which operates an air valve 41 in the air line 24, thereby controlling the supply of compressed air passing into the nozzle 20. The valve 41 is provided with a chamber 43 within which a plunger 44 is suitably mounted. The plunger 44 is provided with a shouldered portion 45 which makes an air tight engagement with a corresponding valve seat 46 formed in the valve 41.

The operation of the above described mechanism is as follows: The driving motor is started by closing the switch 39 which serves

to connect the circuit 36 with the leads 37 and 38, as hereinbefore described. The grinding wheel 16 is thus set into motion and simultaneously therewith the solenoid 40 is energized causing its plunger 50 to be projected upwardly (Fig. 3) thereby opening the valve 41 thus permitting the passage of air through the pipe 24 and elbow 22 into the tube 26. The air passage in the end portion 29 of the tube 26 is reduced in order to increase the velocity of the air as it enters the chamber 30. The air in the chamber 30 directly in front of and surrounding the discharge opening of the tube 26 is caught and carried by the rapidly moving air emerging from the tube 26 thereby creating a partial vacuum in the passage 35 and chamber 31. This vacuum lifts the water from the supply tank 32 into the chamber 30.

Upon reaching the chamber 30, the water is broken up into small particles by the air emerging from the end 29 of the tube 26 causing a fine spray to emerge from the tip of the nozzle which is directed on the grinding wheel at the point of grinding thereon. This is an important feature of the invention, especially when used with high speed grinding wheels, since a minimum amount of water is used in order to maintain the grinding wheel wet at the point of grinding to thereby eliminate the greater portion of dust particles produced during grinding operations. Also, due to the downward direction and velocity of the spray, any particles of dust which may be floating in the surrounding air are driven downwardly to the bottom of the housing 18 from which the waste water together with the dust particles passes through a drain pipe 55 into a suitable collecting receptacle 56 removably supported within the pedestal 11.

The driving motor is stopped by opening the switch 39 which also causes the solenoid 40 to become de-energized and thereby retract its plunger 50, thus allowing the valve 41 to be automatically closed by the pressure of the air on the top of the plunger 44. By shutting off the air, the vacuum in the passage 35 and chamber 31 is discontinued and the flow of water from the tank 32 automatically ceases, since the water level in the latter is below the discharge opening of the spray nozzle. The functioning of the spray ceases instantly upon opening the electrical circuit of the switch 39, while the inertia of the motor armature and grinding wheel keep these in motion for a short period of time, thus causing any water that may be left on the surface of the grinding wheel to be thrown off whereby the wheel is substantially dry when it comes to a stop. Due to this arrangement the possibility of the grinding wheel becoming weakened by the action of the water on the binding element of the wheel is very largely eliminated. Furthermore, this arrangement prevents unbalancing of the grinding wheel due to water draining to the lower section thereof when at rest.

Although the construction of the spray nozzle and control mechanism illustrated in the drawing and hereinbefore described may be used to advantage in connection with the present embodiment of the invention, it should be understood that the invention is not to be limited to the particular construction shown, except as defined by the appended claims.

What is claimed is:

1. In an abrading apparatus, a dust control means comprising means for directing tangentially an atomized spray on an abrading element at the point of abrading, and an electrical operating circuit for driving the abrading element, said circuit including a solenoid operated valve to control the spray.

2. In an abrading apparatus, an abrading element, an atomizer for producing a spray of water and directing the spray upon the element at the point of abrading, a receptacle for a supply of water, means for conveying compressed air to the atomizer to withdraw water from the receptacle to the atomizer, a valve for controlling the supply of compressed air to the atomizer, and an electrical operating circuit including means for driving the abrading element, and means for controlling said air valve.

In witness whereof, I hereunto subscribe my name this 17th day of September, A. D. 1925.

RUDOLPH ANTHONY SKRIBA.