Fluid distributing apparatus especially adapted for discharging copious quantities of cooling fluid on multiple grinding wheels and dressers comprises a tubular, distributing header connected between its ends to a source of fluid and closed at each of its opposite ends by removable caps. The header is provided with a plurality of openings spaced along its length and through which fluid may be discharged, each of the openings except those nearest the end of the header having deflectors at the downstream side for controlling the direction of fluid discharged therethrough. The header is adjustable about its own axis to any one of a number of selected positions.

8 Claims, 5 Drawing Figures
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FLUID DISTRIBUTING APPARATUS

The invention disclosed herein relates to apparatus for discharging cooling fluid on the wheel dressers of a multiple wheel grinder such as a crank shaft grinding machine. The grinding wheels of such a machine must be dressed frequently so as to enable them to effect proper grinding of the crank shaft or other workpiece. It is preferred that a large quantity of cooling fluid be discharged onto the dressers and grinding wheels during the dressing operation so as to carry away the ground material and to dissipate heat generated by the engagement of the dressing diamonds with the grinding wheels.

Heretofore, it has been conventional to utilize spray nozzles to direct coolant on the dressers and grinding wheels, but such nozzles have not been altogether satisfactory for a number of reasons. For example, the nozzles through which fluid is delivered to the dressing tools conventionally are positioned substantially below the axis of rotation of the grinding wheels so as to avoid interference with the workpiece during grinding operations. The nozzles, therefore, are subjected to the accumulation of considerable sludge which, in many instances, is sufficient to plug the nozzle orifices or restrict their size so as to prevent or reduce fluid flow therethrough. This problem is compounded in those instances in which the coolant fluid is recirculated because it is not possible to effect complete cleansing of the coolant. As a consequence, foreign matter entrained in the coolant fluid may clog the nozzle orifices. Another disadvantage of conventional apparatus employing discharge nozzles is the expense of manufacturing and maintaining the nozzles. The initial cost of a nozzle, together with its attachment fittings, can be quite high and the necessity of having to dismantle and clean such nozzles also is expensive, without even considering the cost involved in the loss of productive use of the grinding machine during the nozzle-cleaning operation.

An object of this invention is to provide a fluid distributing device or header for use in conjunction with multiple wheel grinding machinery and which overcomes the disadvantages of previously known apparatus for similar purposes.

Another object of the invention is to provide apparatus of the character referred to which is extremely simple and inexpensive to manufacture and service and which is not subject to diminution of fluid flow due to the accumulation of sludge in or around the fluid discharge openings.

A further object of the invention is to provide apparatus of the character described which includes self-contained sludge accumulating pockets which quickly and easily may be cleaned.

Other objects and advantages of the invention will be pointed out specifically or will become apparent from the following description when it is considered in conjunction with the appended claims and the accompanying drawing, in which:

FIG. 1 is an elevational view of apparatus constructed in accordance with the invention and illustrating one manner in which it may be associated with a conventional grinding machine;
FIG. 2 is a top plan view of the fluid distributing apparatus;
FIG. 3 is an enlarged, sectional view taken on the line 3—3 of FIG. 2;
FIG. 4 is an enlarged front elevational view of a portion of the fluid distributing header; and
FIG. 5 is an enlarged, sectional view taken on the line 5—5 of FIG. 2.

Apparatus constructed in accordance with the invention is adapted for use in conjunction with any one of a number of multiple wheel grinding machines having a frame 2 on which is supported for simultaneous rotation a plurality of spaced grinding wheels 3. Mounted on the frame 2 adjacent each wheel 3 is a fixture 4 in which is mounted a diamond or other wheel dressing tool 5. The dressing tools 5 are adapted to traverse the surfaces of the grinding wheels in a known manner.

Fluid distributing apparatus constructed in accordance with the invention comprises an elongate, tubular conduit or header 6 comprised of a pair of tubes 7 and 8 joined at corresponding ends to a T-fitting 9 located between the ends of the conduit 6. The end of each tube 7 and 8 that is joined to the fitting 9 is flared, as shown at 10 in FIG. 5, so as to receive a rounded nose 11 of the fitting 9 and the parts are maintained assembled by a threaded ring 12. The arrangement is such that the tubes 7 and 8 are rotatable about their longitudinal axes and may be fixed in any selected position of rotary adjustment by means of the rings 12.

Spaced along the length of each tube 7 and 8 is a plurality of openings 13, the spacing of the openings being such as to position one adjacent each dressing tool 5. The openings 13 are simply drilled through the walls of the respective tubes and may be of any desired size, subject to certain considerations which will be referred to hereinafter.

The free end of each tube 7 and 8 preferably is threaded for the removable reception of a cap 14 which closes the tube. The caps 14 are not positioned immediately adjacent the endmost openings 13, but instead, are spaced therefrom for a purpose subsequently to be explained.

A deflector 15 is associated with each opening 13, except the endmost openings, and each deflector 15 includes a flange 16 which may be welded or otherwise suitably secured to the associated tube in such manner as to position the deflector 15 at the outboard or downstream edge of its associated opening 13. Each deflector 15 preferably is formed from relatively thin metal stock so as to enable it to be bent readily from a position normal to the longitudinal axis of the associated tube as is indicated in dotted lines in FIG. 4.

Means is provided for coupling the header 6 to a source of fluid under pressure and comprises a coupling tube 17 normal to the conduit 6 connected at one end to the T-fitting 9 and connected at its other end to a similar T-fitting 18. One end of the fitting 18 is connected by a threaded ring 12 to a tube 19 that is parallel to the conduit 6 and closed at one end by a removable cap 20. The other end of the fitting 18 is connected by a threaded ring 12 to a fluid supply tube 21 forming a continuation of the tube 19 and being connected to a reservoir (not shown) of fluid which may be pumped from the reservoir under suitable pressure.

In the operation of the apparatus, fluid is pumped from the reservoir through the tube 21 to the fitting 18. Particles of debris entrained in the fluid, being heavier than the fluid, may enter the tube 19 and be collected therein. Fluid passes from the fitting 18 to the fitting 9.
whence it is diverted to the tubes 7 and 8. As the fluid moves downstream in opposite directions from the fitting 9, fluid will be discharged through each of the openings 13 onto the adjacent dressing tools 5. The tubes 7 and 8 may be rotated relatively to the fitting 9 and the deflectors 15 may be adjusted so as to deliver fluid from the respective tubes in the desired directions.

Particles entrained in the fluid, and which have not been collected in the tube 19 or discharged through the openings 13, will be collected in those portions of the tubes 7 and 8 which lie between the endmost openings 13 and the end caps 14. Whenever it is necessary or desirable, the caps 14 and 20 may be removed so as to enable the accumulated particles to be removed from the tubes 7, 8 and 19.

The size of the openings 13 will depend upon the pressure under which the fluid is delivered to the header 6 and upon the distance the header is positioned from the dressing tools 5. The greater the pressure and the shorter the distance, the greater the openings can be. In any event, the openings 13 are considerably larger than openings found in conventional nozzles and, therefore, are much less likely to become clogged with grinding sludge or other foreign matter.

The fluid and accumulated particles occupying those portions of the tubes 7 and 8 between the endmost openings 13 and the closure caps 14 make it unnecessary to provide deflectors for the endmost opening inasmuch as fluid will be discharged from such openings in a direction normal to the longitudinal axis of the tubes. If desired, however, deflectors similar to the deflectors 15 may be utilized for the endmost openings.

The grinding wheels of a crankshaft grinding machine are of different size with the result that the dressing tools may not lie along a straight line. Stated differently, some of the dressing tools may lie at different distances from the longitudinal axis of the T-fitting 9. In this event, either or both of the tubes 7 and 8 may be bent, as is indicated at 22 in FIG. 2 to assure proper positioning of the openings 13 with respect to the dressing tools.

The disclosed embodiment is representative of the presently preferred form of the invention, but is intended to be illustrative rather than definitive thereof. The invention is defined in the claims.

I claim:

1. Fluid distributing apparatus comprising elongate, tubular conduit means; coupling means connected to said conduit means at a position spaced from one end of said conduit means for coupling said conduit means to a source of fluid, said conduit means having a plurality of axially spaced, radial openings therein between said coupling means and said one end through which fluid may be discharged; and a plurality of deflectors carried by said conduit means, each of said deflectors extending substantially normal to the length of said conduit means and being positioned adjacent the downstream side of its associated opening and between the latter and the next one of said openings.

2. The apparatus set forth in claim 1 including closure means for closing said one end of said conduit means.

3. The apparatus set forth in claim 2 wherein said closure means is spaced longitudinally from the opening nearest said one end of said closure means whereby that portion of said closure means between its said one end and said nearest opening forms a receptacle for debris.

4. The apparatus set forth in claim 3 wherein said closure means is removable to permit access to said receptacle from said one end of said conduit means.

5. The apparatus set forth in claim 1 wherein said one end of said conduit means is closed and wherein there is one of said deflectors adjacent each of said openings between said coupling means and said one end except that opening nearest said closed end.

6. The apparatus set forth in claim 1 wherein said coupling means is adjustable for coupling rotary adjustment of said conduit means to locate said openings in a selected one of a number of different positions about the axis of said conduit means.

7. The apparatus set forth in claim 1 wherein said coupling means is connected to said conduit means between the ends thereof and wherein said conduit means has a plurality of said openings on each side of the connection of said coupling means, there being one of said deflectors adjacent the downstream side of each of said openings except for the openings at the opposite ends of said conduit means.

8. The apparatus set forth in claim 1 wherein said coupling means comprises a supply tube for connection at one end to a source of fluid and extending substantially parallel to but spaced from said conduit means, a coupling tube establishing communication between said supply tube and said conduit means and being substantially normal thereto, said supply tube extending beyond said coupling tube; and removable closure means at the other end of said supply tube to provide an accessible chamber for the collection of debris.  

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