This invention relates as indicated generally to a material applicator system and more particularly to a system whereby fluid compound may be accurately and precisely fed to the working face of a cylindrical rotary finishing tool such as, for example, a wire brush.

It is very common in finishing operations utilizing power driven rotary finishing tools to apply an abrasive compound to the outer peripheral surfaces of such tools. The rotating tool then applies such abrasive to the work. In perhaps the most common form, the abrasive is applied by means of a "grease stick" which is a cylindrical article formed of granular abrasives bonded together with materials such as tallow or wax, for example. The operator generally holds such grease stick against the face of the rotating tool or brush at intervals. Much of the material is frequently wasted and, of course, applied unevenly and at nonuniform time intervals. The action of the tool upon the work may accordingly be quite irregular in the finishing results produced.

It has been proposed to introduce abrasives in either dry granular form or in the form of a paste or with another fluid vehicle internally of a finishing tool. Reference being had to the Peterson Patent, 2,729,429 disclosing a brush designed for this purpose of a brush which consists of this type generally employs fluid seals in connection with the infeed of the fluid material and difficulty may be encountered in maintaining such rotating seal under conditions of high speed operation.

If the compound is not evenly distributed along the axial face of the brush in the proper metered amounts, a scallop-like surface juncture blend is obtained in the finished product. It is essential in finishing operations, especially such operations as aircraft finishing, to obtain uniformity of distribution of the abrasive all the way across the tool face.

Further, in right circular cylindrical face tools, a fluid entrained abrasive which is inserted through an end face of the tool must be distributed evenly along the entire axial face of the brush or tool. Such even distribution is extremely difficult to obtain especially at high brush or other tool speeds. Moreover, it is extremely difficult evenly to feed a calibrated amount of fluid mixture such as a coolant or a fluid entrained abrasive through the brush material in a manner uniformly axially to apply such compound to the face of the brush. Accordingly, a device or system which will evenly and accurately distribute a material axially across the face of a brush will solve many finishing problems and, moreover, will produce much more uniform results in the finished work.

It is accordingly a principal object of my invention to provide a material applicator system which will evenly and uniformly distribute a material along a rotary tool face.

It is yet another principal object of my invention to provide a material applicator system which will apply evenly and accurately to the face of a finishing tool a prescribed metered amount of such material.

It is still another principal object of my invention to provide a rotary finishing tool hub that may be employed with a finishing material evenly and effectively to distribute such material across the axial face of such tool.

It is yet another object of my invention to provide a material applicator system for rotary finishing tools in which the applicator has no physical contact with the finishing tool and which may readily be installed in most existing rotary finishing equipment.

It is a further object of my invention to provide a material applicator system for rotary finishing tools in which the amount of material applied to the finishing tool face will be proportional to the actual time the finishing tool is driven.

It is a still further object of my invention to provide a hub for a rotary finishing tool that will assure the proper distribution of compound along the axial face of such tool and moreover is adapted to have mounted thereon any of a plurality of different types of finishing tools effectively to produce the required finishing operation.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features herein described after fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

In said annexed drawings the

FIG. 1 is a schematic illustration of a material applicator system built in accordance with my invention;

FIG. 2 is a vertical section of one type of finishing tool that may be used in my invention;

FIG. 3 is an assembled vertical section taken generally on the line 3--3 of FIG. 5 of a hub for another such finishing tool having a longer cylindrical axial face;

FIG. 4 is a side elevational view of the hub shown in FIG. 3;

FIGS. 5, 6, 7 and 8 are fragmentary sectional views with the distributor plate removed taken on the lines 5--5, 6--6, 7--7 and 8--8, respectively, of FIG. 9;

FIG. 9 is an end elevation of my hub as seen from the left of FIG. 4 with the distributor plate inserted and partially broken away for clarity of illustration;

FIG. 10 is a schematic wiring diagram illustrating the manner in which my material applicator system can be applied to a multiplicity of finishing heads;

FIG. 11 is a fragmentary sectional view of a valve structure that may be employed with my invention; and

FIG. 12 is a fragmentary sectional view of my rotary hub employed with a porous material finishing tool.

Referring now to FIG. 1, I illustrate schematically three rotary finishing tools or heads shown at 1, 2 and 3 respectively, which in the illustrated embodiment are shown as rotary brushes. Each tool is driven upon an arbor 4, 5 and 6 by a suitable drive motor 7, 8 and 9, respectively. Each rotary finishing tool is mounted on my especially built hub shown at 10, 11 and 12 respectively, hereinafter more fully described.

My system generally includes a reservoir or tank 13 which has thereon a suitable airtight lid or cover 14 adapted to enclose therein my to be applied material compound 15. The material 15 is generally in a fluid state and may, for example, be a coolant or a fluid entrained abrasive compound, as for example, a mixture of talc or soapstone and water. It will, of course, be understood that there is a multiplicity of commercially available abrading compounds for use with my material applicator system.

Situated within the reservoir 13, I provide a level probe 16 to actuate my liquid level control generally shown at 17. I provide a liquid level control for my reservoir as an interlock to prevent the operation of the rotary finishing tools without any feed thereto of the appropriate
material compound. In the case of a coolant, serious damage could result to both the tool and the work if such tool were permitted to operate without the proper infeed of coolant. The level control is electrically connected to my timer controls more generally shown at 39 in a manner which allows them to be functionally related. The timer controls generally comprise an on-timer 19 and an off-timer 20 controlling the energization of relay 21 which in turn controls respectively, solenoid air valves 22, 23 and 24 for each of the finishing tool heads.

The feed of the applicator material is controlled by means of air pressure supply source generally shown at 25. The air supply passes through a main conduit 26, a conventional air filter 27 and through conduit 28 passes into the reservoir 13 to pressurize the same at, for example, 30 lbs. per square inch. Within the conduit 28, I provide a conventional pressure regulator 29 and cutoff valve 30. The main air conduit 26 continues to a manifold 31 connected directly to each of the air valves 22, 23 and 24. From such valves, conduits 32, 33 and 34 extend to my fluid valves 35, 36 and 37, respectively, for each of the finishing tool heads.

The material is fed from the reservoir through inlet 38 in the bottom thereof and through conduit 39 which leads directly to the air operated valve 35 controlling the passage of fluid therethrough to nozzle or outlet 40 for admission of the compound to the interior of the hub 12 of the finishing tool 3. A suitable branch conduit 41 is connected to the air operated valve 37 for feeding such compound to the hub 10 in a like manner and a further conduit 42 feeds compound through air operated valve 36 to the hub 11 in the same manner.

In most existing finishing tool heads, there is provided adjacent such head, an outlet connected to the control circuit for such head for the installation of various accessories and it will be seen that my compound applicator system may simply be plugged into the existing circuits as indicated at 43, 44 and 45, respectively.

Referring again to the reservoir generally indicated at 13, it will be seen that an agitator 56 or 75 being driven through my air motor 51 in the top of the sealed cover 14. The air motor is driven from the source of air pressure 25 through a branch conduit 52 having a conventional regulator 53 and a cutoff valve 54 therein. If desired, a lubricator 55 may be provided in the main conduit 26 for the effective entrapment of the required lubricant within the air supply. In this manner, the compound agitator 50 will be revolved at the proper speed thoroughly to mix uniformly and to preclude the heavier abrasive compounds therein from settling out. It will, of course, be understood that an electric motor or other drive means may equally well be provided in place of the air driven agitator motor.

Referring now to FIGS. 2 through 9 inclusive, I have illustrated two forms of rotary finishing tool hubs which may be employed with my invention. FIG. 2 illustrates a keyed arbor 69 threaded at 61 whereby my hub element 62 may be secured therein. The end element 62 constitutes the end face of my rotary finishing tool and is provided with spaced threaded apertures 63 whereby the opposite end plate 64 may be secured on the threaded portion 61 of the shaft or arbor 69 and firmly locked thereon against rotation by means of screws 65. The end plate 64 is provided with an inwardly facing annular seat or shoulder 66 whereby the rotary finishing element shown, for example, as a circular rotary brush element 67, may firmly be clamped between the end retaining element 64 and the face of the end member 62 as shown at 68. The end member 62 is provided with a frusto-conical recess 69 and has circumferentially positioned at the base of such recess, a series of equally angularly spaced apertures 70 passing from the recess 69 outwardly through the opposite face 68. Firmly secured within these apertures 70 are small pieces of tubing 71 which may, for example, be seamless steel tubing having beveled ends. These beveled ends project within the brush material 72 of the brush element 67 thus to position the compound material centrally of the brush element to be forced radially outwardly to the face of the finishing element by centrifugal force when the finishing tool is rotated.

In operation, it will be seen that the mixture of fluid entrained abrasive will enter the cavity or recess 69 through the nozzle 40 to be forced centrifugally into the outer annular corner 73 thereof by the rotation of the finishing tool. The material will then pass outwardly through the tubing 71 to be distributed centrally within the brush material 72 effectively to be distributed radially outwardly toward the face thereof. It can now accordingly be seen that the hydrostatic balance of the fluid within the outer annular corner 73 of the cavity 69 may effectively evenly distribute the material through the plurality of apertures 70. In this manner, it will be understood that the number of apertures 70 equally angularly spaced about the portion 73 of the cavity may be varied to provide the required facial distribution of the compound material.

Referring now to the finishing tool hub illustrated in FIG. 3, the arbor 60 which is driven for rotation through suitable lathe apparatus 75 has placed thereon my hub generally shown at 76. The arbor 60 is provided with a keyslot 77 by which the hub 76 may be secured thereto through conventional keys. The hub 76 is provided with a tapering frusto-conical recess 78 suitable for a tapered insert 79 to be secured therein by means of locking screw 80 thus firmly to secure the hub 76 on the shaft 60 for rotation therewith. The tapered cavity terminates in an enlarged recess portion 81 opposite the threaded portion 61 of the arbor 60. Secured to the end face 82 of the hub 76 is an annular retaining plate 83. This plate may be secured to the hub by means of spaced screws 84. The retaining plate 83 is provided with an annular seat 85 to cooperate with the outer face 86 of the hub to provide an annular channel or flange portion 88 of the plate 83 retaining such tool on the hub face 86.

In my illustrated hub construction, the opposite end is provided with an integral retaining lip 89 similar in form to the retaining flange or lip 88 of the removable plate 85. In this manner, the finishing tool is firmly held between the flanges or lips 88 and 89, respectively. The finishing tool material 87 is illustrated as a brush comprising a series of axially spaced circular brush elements. It will, of course, be understood that any finishing tool or material may be employed as, for example, elongated brush strip spirally wound on the hub between the retaining lips. A further form of finishing tool will subsequently be described.

The end face of my hub 76 having the lip 89 thereon is provided with a suitable recess or cutout portion 90 into which the nozzle 40 of my material applicator system is adapted to extend. Secured at the bottom of the recess or cavity 90 is a filler or distributor plate 91 having a twenty point star-shape cutout more clearly shown in FIG. 9, cooperating with the retainer 92 having a frusto-conical interior surface providing a frusto-conical recess 93. Both the distributor plate and retailing ring may be secured to the plate 92 by means of screws 94. In this manner, a frusto-conical recess is formed in the end face of my hub in a manner similar to the frusto-conical recess formed in the tool embodiment shown in FIG. 2. Leading from the recess 93 through the apices A of the star-shape cutout of the plate 91, I provide a series of apertures or slots the recess directly to the face 96 of my hub 76. It is here noted that the use of the separate plates 91 and 92 simplifies the job of forming the recess 93 which, as will be noted, is of a rather complex configuration.

Referring now to FIG. 9, it will be seen that there are 24 such apertures in my hub 76 of varying diameters.
and lengths. At the four corners of my hub construction, I provide two each of such apertures, one 95 leading directly to the face 86 and extending normal thereto and the other 96 leading to the opposite side of the face 86 and being of a much larger diameter. In this manner, equal amounts of fluid within the annular trough or recess portion of the cavity 93 will be forced outwardly through the apertures 95 and 96. As shown more clearly in FIG. 9, I provide a hub having twenty-four apertures extending from the recess 93 to the brush face. The slopes or angles of these apertures or passageways with respect to the face 86 of the hub 76 are clearly seen in FIGS. 3, 5, 6, 7 and 8. The sloped or angled passageways extend from the apices A of the star chamber formed by the distributor plate 91. Thus the plate 91 will centrifugally trap equal amounts of the compound to be distributed through the apertures.

As seen in FIG. 5, passageway 97 is provided at an angle of approximately 65° with respect to the face 86. There are four such angled passageways 97 equally spaced about my hub 76. As seen in FIG. 6, a passageway 98 of slightly larger diameter is provided at an angle of approximately 29° with respect to the tool face 86 and there are also four such equally spaced apertures which are identical in form. As seen in FIG. 7, I provide four passageways 99 at an angle of approximately 18° with respect to the tool face 86 which are slightly larger in diameter to the passageways 98. As seen in FIG. 8, a further passageway 100 of yet a slightly larger diameter is provided with approximately an angle of 18° with respect to the tool face. It can now be seen that the passageways 98 through 100 inclusive will evenly and effectively distribute the compound material deposited within the chambered recess 93 across the axial length of the tool face. The distributor plate 91 and the retainer ring 92 are thus required to provide the chambers that will have the apex portions thereof coincident with the infeed openings of the apertures 95 through 100. It is noted that the same amount of fluid flows through both passageways 95 and 96 as flows through passageway 98, for example. These being near the ends of the tool face require generally less fluid. Thus there are a total of twenty-four passageways fed from a total of twenty chambers in the recess evenly effective to distribute the fluid deposited therein throughout the tool face.

The elongated apertures must be constructed so that the proper angle may be obtained for the elongated passageway 96 feeding material to the opposite end of the tool face. It is noted that the diameter of the passageway is inversely proportional to the angle the passageway makes with the tool face and directly proportional to the length thereof. Accordingly, the smallest passageways are passageways 95 extending normal to the tool face, the largest passageways 96 extending at an angle of approximately 13° to the tool face. It will be understood that the control of the feeding of the compound may readily be varied by replacing the distributor ring 91 and the retainer ring 92 with other dividers for the chamber 90 of a different configuration and in this manner changing the hydrostatic feed characteristics for each of the passageways 95 through 100 inclusive. By merely changing the shape of the reservoir or recess 93, it is entirely possible to obtain a variety of feed characteristics, some of which may well be more desirable for certain finishing operations.

Referring now to FIG. 4, it will be seen that the face 86 of my hub structure is provided with a series of angled grooves 101 interconnecting the openings of the passageways into the tool face and in this manner, more evenly distributing the compound throughout the tool. In the FIG. 3 embodiment, the illustrated finishing tool is a brush made up of sections which are axially displaced so that the compound may be fed between such sections whereas in the single brush section illustrated in FIG. 2, the compound is introduced to the middle of the brush material effecting a natural parting of the fill material permitting the required flow of abrasive. In the multiple brush section illustrated in FIG. 3, there is created a natural passageway without making any undesirable changes in the fill material density that permits the flow of compound directly to the tool face. Further, no changes in the viscosity of the compound employed would have to be made to get the compound to the work as would generally be required if the tool were to be operated in the middle of the fill material as shown in FIG. 2. Spacing the concentric brush sections further eliminates the necessity of cleaning out the brushing tool preparatory to shut-down and, moreover, eliminates the necessity of running the tool without the work presented thereto for considerable time to make the mixture feed or filter outwardly through the material to be applied to such work. In this manner, the system is capable of immediate start and stop and requires accordingly no maintenance during or before shut-down periods.

Referring now to FIG. 10, there is illustrated a typical installation circuit for the material applicator system whereby it may readily be installed on finishing tool heads. As shown in FIG. 1, the system is applied as, for example, to three rotary finishing heads, 1, 2 and 3 driven by motors 7, 8 and 9 respectively. These motors may be operated on a conventional three phase, 220 volt, 60 cycle setup and the operation thereof may be controlled by suitable across-the-line starters 110, 111 and 112, respectively. My control system may be derived from such three phase system through a suitable step-down transformer illustrated at 113 to produce a system having a conventional 110 volt, 60 cycle current. The control system comprises mains 114 and 115 with the electrical components connected therethrough.

For the motor 9, I provide a relay 116 to actuate the motor starter 112. This relay also actuates switch 117 to provide a conventional holding circuit for the push button starter 118. The relay 116 also actuates a switch 119 in series with solenoid operated valve 22 supplying air to the valve 35 to supply the compound to the brush or rotary finishing head driven by the motor 9. A relay 120 operates starter 111 for motor 8 in the same manner that relay 116 operates starter 112 for motor 9. The starter relay 126 further operates a switch 121 to complete a holding circuit around starter button 122 and also operates switch 123 in series with the valve 23 controlling the supply of compound to finishing tool 2. In a similar manner, relay 124 operates starter 110 for motor 7 as well as switch 125 completing the holding circuit for starter button 126 and further operates switch 127 in series with solenoid valve 24 controlling the feeding of compound to head 1. Suitable emergency stop buttons 128, 129 and 130 for each motor may be provided in a conventional manner. A level switch 132 actuated by the probes 16 is employed to operate a relay 133 to open normally closed switch 134 and close normally opened switch 135. In this manner, when fluid is placed within the reservoir 13, the switch 132 closes energizing relay 133 to cause switch 134 to turn off low pilot light 136 and cause switch 135 to illuminate high pilot light 137. The closing of normally opened switch 135 also energizes relay 138 closing normally open switches 139, 140 and 141. FIG. 5, which is in series with motor starter relays 124, 129 and 116 respectively. In this manner, the motors are incapable of being energized unless and until there is sufficient fluid in the reservoir 13 to close switch 132 to energize relays 133 and 138.

In series with each of the solenoid air valves 22, 23 and 24, I provide switches 150, 151 and 152 operated by relay 21. In series with the relay 21, I provide a switch 153 operated by my on-timer 19. In series with such on-timer, I further provide a switch 154 operated by my off-timer 20. In series with such off-timer, I provide a manual selector switch 155. The on and off tim-
ers are conventional in nature and may, for example, be those manufactured by the Eagle Signal Corporation under the trademark of "Cyl-Flex Reset Timer." These timers may be set to actuate at time intervals as small as 1/2 of a second or as long as 18 minutes. Accordingly, it will be seen that the interval of material application as well as the interval of no material application can practically infinitely be varied.

Referring again to FIG. 10, I provide a series of manual override switches 160, 161 and 162 in series with the solenoids 22, 23 and 24 respectively, which are each in series and all three of which are in parallel with the normally open switch 135 closed by level relay 133. In this manner, when all of the switches 160, 161 and 162 are positioned to close the parallel circuit bypassing switch 135, the level control is effectively bypassed thus permitting operation of the heads without my material applicator system.

Referring now to FIG. 11, I illustrate a fragmentary sectional view of a valve of the type that may be employed with my invention. The valves 35, 36 and 37 are constructed generally in this manner and comprise a valve housing or body 163 having a tubular passageway 164 therethrough in which a flexible tube is received. Referring to the applicator nozzle 40 is positioned. A transverse passage 166 houses a plungers 167 operated by an air piston 168. Air pressure is fed to the piston through passageway 32 to push downwardly the plunger 167 against the force of a suitable spring to pinch the flexible tube 165 effectively to halt the passage of coolant or abrasive mixture therethrough. As long as an effective air pressure is maintained in the blind end of cylinder 169, the valve will be kept in closed position. This valve has been found to be extremely effective and of a long useful life in dealing with abrasive mixtures in that there are no closely mating parts or valve seats which can be worn down so that a subsequent leaking will be found after but a short period.

Operation

Referring specifically to FIG. 10, it will be seen that my material applicator system operates generally in the following manner. I have illustrated three finishing tool heads driven by separate drive motors 7, 8 and 9, but it will be understood that my applicator system is equally well adaptable to any number of heads employed in a finishing operation. Each of the motors 7, 8 and 9 is controlled by starter relays 124, 120 and 116, respectively. These motors are energized through conventional starter buttons 125, 122 and 118, respectively. It will be understood that such energization of the motors may be controlled by a programming device wherein the start buttons are actuated automatically in a prescribed sequence.

In series with each of the motor starters, I provide a liquid level responsive relay 138 so that if the manual switches 160, 161 and 162 are set to apply fluid to the respective brush heads, the motors will be incapable of being energized if insufficient fluid is within the reservoir to cause switch 132 to energize relay 133 closing switch 135. As soon as the fluid has been inserted within the reservoir, the relay 138 prepares the circuits for the energization of the respective drive motors.

I provide further interlock in that each one of the motor starter relays controls a switch in series with my solenoid valves 22, 23 and 24. In this manner, the heads will be supplied with compound only during the time that the head is actually in use. Therefore, even though one head may be finishing or operating for only 10 seconds, the second head for 30 seconds and the third head for 1 minute, each will receive a calibrated amount of compound during the length of time equal to its running time. In this manner, the compound is not applied when the finishing tool is inactive and the deposit of excess fluid in a stationary finishing tool is thereby avoided.

The timers 19 and 20 energize the relay 21 at preselected intervals for a preselected length of time, the relay 21 controlling switches in series with each of the solenoid valves 22, 23 and 24. In order for the valves to be actuated, there are three switches in each line that must be closed, manual switches 160, 161 and 162 entered, starter relay switches 119, 123 or 127; and the time controlled relay switches 150, 151 and 152. Selector switch 155 may be employed to deenergize both timers whenever desired.

The admission of fluid to the reservoir will cause the closing of switch 132 to energize relay 133, opening normally closed switch 134 to deenergize the low pilot light 136. Simultaneously, switch 135 is closed, energizing pilot light 137 indicating sufficient fluid within the reservoir. In this manner, for most applications, a filling of the reservoir approximately once a day will be sufficient, depending, of course, upon the amount of fluid required for any individual application.

It can now be seen that I have provided a material applicator system which will readily and accurately distribute the prescribed amount of material to the working face of a finishing tool. By making my hub or chuck reusable, it will be understood that any finishing tool or material may be employed therewith. Thus, referring to FIG. 12, it can be seen that a porous sponge material 5 as, for example, foamed polyurethane may be employed and the abrasive fluid entrained compound will be even and accurately centrifugally distributed through such material to the working face thereof.

The operation of this system requires that the abrasive mixture be dropped into a confined or restricted recess or reservoir in the hub where centrifugal force can be applied to build up the hydrostatic pressure needed. The pressure of the fluid, of course, causes it to seek a position of maximum displacement to feed the material into the various feed passageways. Its rate of feed is, of course, inversely proportional to the resistance of flow which is variable depending upon the whole size and its slope as measured by the number of degrees with respect to the hub face. The slope is, of course, largely determined by the distance the feed hold has to reach to feed that part of the finishing tool face in question. It will further be understood that the change or variance in the shape of the reservoir in the end face of the hub can further effect the distribution of the fluid and hence can minimize the influence of the slope on the feed rate.

Since there is no mechanical interconnection between the nozzle 40 and the brushing or finishing tool heads, it will be understood that my system is readily applicable to a variety of finishing tools and that my system presents no parts to preclude complete flexibility and adjustment of the finishing tool head.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described provided the features stated in any of the following claims or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

1. An elongated hub for rotary finishing tools and the like comprising a generally cylindrical body having a cylindrical workface adapted to be mounted on a rotatable arbor, a recess in one end face of said body having a restricted opening, a plurality of fluid passageways leading from the interior of such recess to the work face of said body at axially spaced regions thereof, the diameter of said passageways varying inversely as their slope with respect to such workface to distribute such fluid evenly along such workface.

2. A hub or rotary finishing tools and the like comprising a generally cylindrical body adapted to be mounted on an arbor for rotation, a recess in an end face of said body and a plurality of passageways extending from such recess to different axially distributed areas of the cylindrical face of said body, the openings from such recess to
said passageways lying generally in the same plane normal to the axis of said body, said recess being divided into a plurality of chambers to trap fluid therein to be centrifugally forced outwardly through such passageways.

3. A hub as set forth in claim 2 wherein the passageways feeding the face of such hub on the opposite end of the hub from the recess slope at a small angle with respect to said face.

4. A hub as set forth in claim 3 wherein the diameter of said respective passageways varies inversely as the slope of such passageways with respect to the face of said hub.

5. A hub as set forth in claim 2 including end portions firmly to secure on the face thereof a porous finishing element.

6. A hub as set forth in claim 5 wherein said porous finishing element is a multiple section rotary brush, the individual sections being displaced from each other whereby fluid may readily pass from such passageways through the brush sections to the working face thereof.

7. A hub as set forth in claim 5 wherein said finishing element is a porous resiliently deformable spongelasticomer.

8. A system for applying fluid to rotary finishing tools comprising a reservoir for such fluid, means to pressurize said reservoir to force the fluid therefrom, manifold means to distribute such fluid to finishing tool heads and valve means for each finishing tool head automatically to control the flow of such fluid to respective heads, and timer means controllably operating the open and closed time intervals of said valve means.

9. A system as set forth in claim 8 wherein said porous finishing element is a multiple section rotary brush, the individual sections being displaced from each other whereby fluid may readily pass from such passageways through the brush sections to the working face thereof.

10. A system for applying fluid to rotary finishing tools comprising a reservoir for such fluid, means to pressurize said reservoir to force the fluid therefrom, manifold means to distribute such fluid to finishing tool heads and valve means for each finishing tool head automatically to control the flow of such fluid to respective heads, and timer means controllably operating the open and closed time intervals of said valve means.

11. A system for applying evenly to the face of a rotary finishing tool a fluid entrained abrasive comprising a reservoir for such fluid entrained abrasive, pressure means to force said fluid entrained abrasive from the reservoir to a plurality of rotary finishing tools, respective valve means controlling the flow of such fluid to respective rotary heads, means to control said valve means to force a calibrated amount of said fluid to each respective rotary head, and means whereby said fluid will be fed to said respective rotary heads only during rotation thereof.

12. A system as set forth in claim 11 wherein the period that the valve means is opened to permit flow of fluid to such heads is adjustable and the period that the valve means is closed to preclude such flow of fluid to such heads is also adjustable.

13. A system as set forth in claim 12 wherein said system includes rotary hub members for said rotary heads having recesses in the end faces thereof, tube means projecting into said heads, a plurality of passageways extending from said recesses to the axial faces of said hubs and a distributor plate in each said recess adapted to trap the fluid and force equal amounts of said fluid outwardly through said respective passageways.

14. A system as set forth in claim 13 wherein each said recess has a restricted opening therein, said tube means extending through said restricted opening.

15. A system for evenly distributing fluid entrained abrasive to the face of a plurality of cylindrical rotary finishing tool heads comprising a reservoir, pressure means to force said fluid from the reservoir to respective rotary finishing tool heads, valve means for each respective finishing tool head electrically energized to control the flow of air from said pressure means to block the passage of fluid to said respective rotary heads, and means to control the periods of energization and deenergization of said valve means.

16. A system as set forth in claim 15 wherein said valve means control the flow of fluid through conduits terminating in tube means extending within recesses in the end faces of said rotary finishing tool heads and means responsive to the deenergization of said power means operative to activate a relay in series with the means to energize said respective valve means, whereby such relay is actuated to energize said said means and whereby energization of said power means is precluded when insufficient material is present in said reservoir.

17. A system as set forth in claim 16 wherein each said head includes a plurality of internal passageways leading from said recess to the cylindrical face of said tool.

18. A system as set forth in claim 17 wherein the diameter of such passageways is directly proportional to their length.

19. A system as set forth in claim 18 wherein the cylindrical head includes an annular porous elastomeric finishing element.

20. A system as set forth in claim 18 wherein said cylindrical rotary finishing head includes a plurality of axially displaced circular brush sections.

21. A rotary brushing tool comprising a rotatable hub, a frusto-conical recess in one end face of said hub, a plurality of equally circumferentially spaced passageways leading from the inner enlarged end of such recess to said brushing tool centrally to force fluid deposited in such recess outwardly to the tool face, said passageways terminating in tubes projecting into the brushing material.

22. A rotary brushing tool as set forth in claim 21 wherein said hub includes end plates threaded on the same arbor and locked together for rotation as a unit, said plate having an annular shoulder thereon seaming and clamping a circular brush section against said other face, said tubes extending through one of said plates and terminating in the center of said brush section.

23. A hub for rotary finishing tools and the like comprising a generally circular body adapted to be mounted on a rotatable Arbor, a recess in an end face of said body having a restricted axial opening therein, a plurality of passageways leading from the interior of such recess to the face of said body, and divider means within such recess proportioned and arranged to force equal amounts of fluid through each passageway to the face of said body.

24. A system for applying fluid to rotary finishing tools comprising a reservoir for such fluid, means to pressurize said reservoir to force the fluid therefrom, manifold means to distribute such fluid to respective finishing tool heads and valve means for each finishing tool head automatically to control the flow of such fluid to said respective heads, timer means controllably operating the open and closed time intervals of said valve means, power means operative to drive said rotary heads, and system responsive to the deenergization of said power means operative to preclude opening of said respective valve means, said means responsive to the deenergization of said power means comprising a motor starter relay actuated switch in series with the means to energize said respective valve means, said reservoir including level responsive means operative to actuate a relay in series with said means to energize said power means, whereby energization of said power means is precluded when insufficient material is present in said reservoir.

25. A system for applying fluid to rotary finishing tools comprising a reservoir for such fluid, means to pressurize said reservoir to force the fluid therefrom, manifold means to distribute such fluid to respective finishing tool heads and valve means for each finishing tool head automatically to control the flow of such fluid to said respective heads, timer means controllably operating the open and closed time intervals of said valve means, power means operative to drive said rotary heads, and means responsive to the deenergization of said power means operative to preclude opening of said respective valve means, said means responsive to the deenergization of said power means comprising a motor starter relay actuated switch in series with the means to energize said respective valve means, said reservoir including level responsive means operative to actuate a relay in series with said means to energize said power means, whereby
energization of said power means is precluded when insufficient material is present in said reservoir; said power means driving respective rotary hubs and finishing tools and the like, said hubs each having a generally cylindrical body mounted on an arbor driven for rotation by said respective power means, a recess in an end face of said body and a plurality of passageways extending from such recess to the cylindrical face of said body, and nozzle means extending within said recess to distribute fluid therein in calibrated amounts through such valve means.

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