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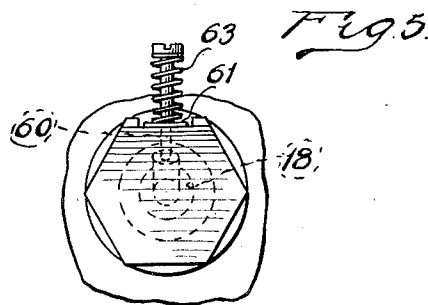
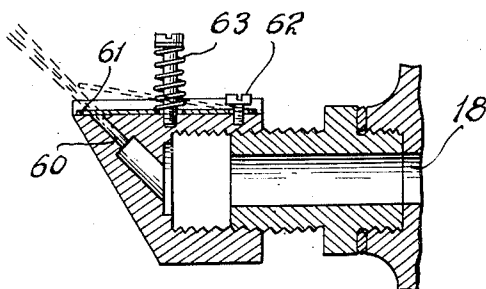
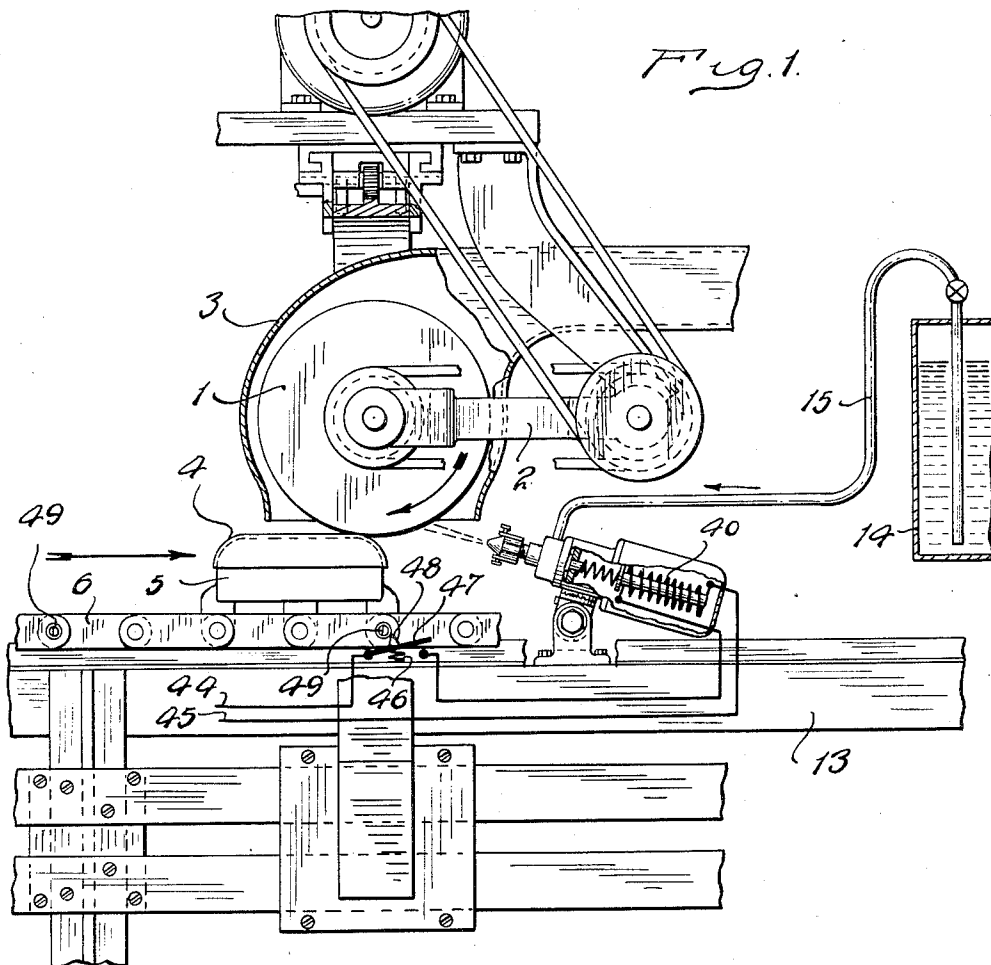
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2,332,992

APPLICATOR FOR POLISHING AND BUFFING COMPOSITIONS

Filed March 3, 1941

2 Sheets-Sheet 1



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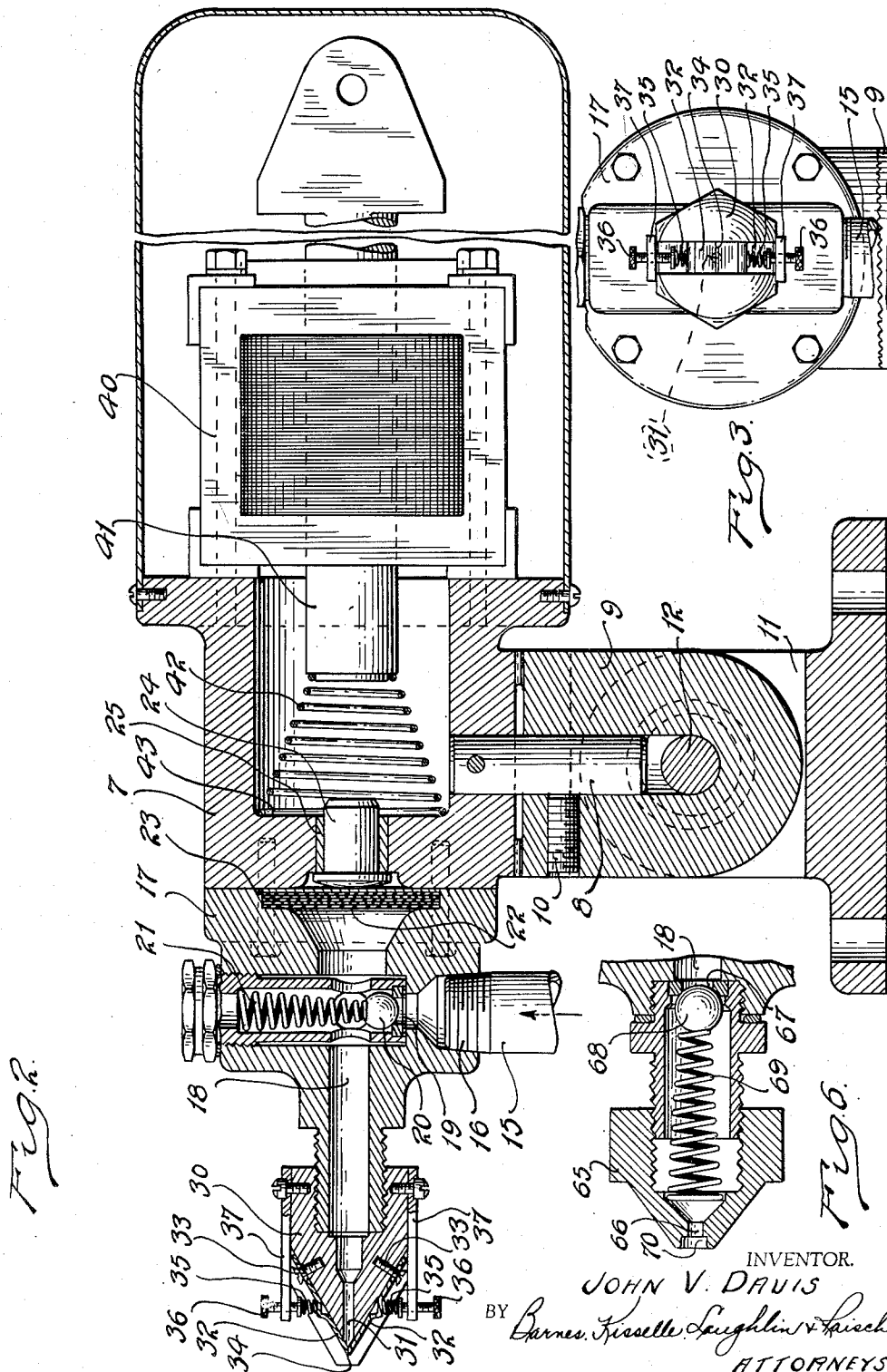
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,332,992

APPLICATOR FOR POLISHING AND
BUFFING COMPOSITIONSJohn V. Davis, Detroit, Mich., assignor to The
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8 Claims. (Cl. 51-263)

This invention relates to an applicator for polishing and buffing compositions.

It is common practice in polishing and buffing to apply to the wheel a lubricating and/or abrasive composition to assist in the buffing or polishing. This composition usually comes in paste or cake form. The paste is daubed on the part to be finished whereas the cake is applied to the wheel manually or by a cake applicator in an automatic finishing machine. Both of the above arrangements for applying composition to the buffing or polishing wheel are inefficient and wasteful of the composition.

In an automatic polishing and buffing machine the cake applicator must be fastened to the arm which supports the wheel. This arm is usually spring floated. The weight of the cake applicator reduces the sensitivity of the floating wheel support arm. The cake applicator also interferes with the ventilating hood over the wheel.

Another difficulty with the above methods of applying the composition is that the angle at which the composition is applied and the places to which it may be applied are limited.

It is an object of this invention to obviate the above defects and produce a composition applicator which will shoot the composition at any point desired and with sufficient force or impact to penetrate the air blast near the wheel.

The invention contemplates an applicator which is automatic in operation and applies a metered amount of composition at regularly timed intervals to the wheel at any point desired. Ordinarily best results are obtained when the composition is applied to the wheel near the point of contact with the work.

The applicator is efficient in operation, requires attention only at relatively long intervals of time and applies the composition at whatever time interval the work requires.

Another advantage of the instant applicator is that it can be mounted upon a fixed part of the finishing machine and does not interfere with either the hood or the floating arm arrangement for the wheel.

In the drawings:

Fig. 1 is an elevation showing the composition applicator mounted on an automatic buffing and polishing machine.

Fig. 2 is a vertical section through the composition applicator.

Fig. 3 is an end elevation of the applicator looking at the nozzle.

Fig. 4 is a sectional view of a modified form of nozzle.

Fig. 5 is an end elevation of this modified form of nozzle.

Fig. 6 is a sectional view of a second modified form of nozzle.

Referring more particularly to the drawings there is shown a finishing wheel such as buffing wheel 1 rotatably supported on the pivoted arm 2 provided with a ventilating hood 3. The direction of rotation of the buff is indicated by the arrow. The work, which may be a metal part, is referenced 4. The work 4 is mounted on a support 5 on conveyor chain 6 and travels in the direction of the arrow.

The applicator comprises a housing 7 fixed on a pin 8. Pin 8 is journaled in a support member 9 whereby the housing 7 and pin 8 can be rotated about a vertical axis on member 9 and held in any position of adjustment by the set screw 10. Member 9 is pivoted to swing on support member 11 about a horizontal axis by means of pin 12. Support 11 is bolted or otherwise affixed to the stationary frame 13 which may be attached to the buffing machine as shown in Fig. 1, or may be mounted on a separate stand. Thus, the housing 7 and the applicator are universally adjustable.

The composition, which takes the form of a liquid or paste, is carried in reservoir 14 under pressure. The composition is forced under pressure from the reservoir 14, through hose or flexible pipe line 15 to the applicator. The pressure in reservoir 14 can be varied appreciably. Ten pound per square inch has been found to be a suitable pressure.

Hose 15 is connected as at 16 to the head 17. Head 17 is provided with a chamber 18. The composition passes from hose 15, through orifice 19 into chamber 18. Orifice 19 may, if desired, be controlled by check valve 20 backed up by spring 21. Spring 21 acts against ball check valve 20 which tends to keep orifice 19 closed. However, spring 21 is purposely made weak enough so that ball 20 will not close orifice 19 against the flow of composition from hose 15. Between operations chamber 18 is always filled with buff composition under the same pressure as the composition in hose 15.

One end of chamber 18 takes the form of a flexible diaphragm 22. The flexible diaphragm 22 can be made from any suitable material. As shown, diaphragm 22 comprises a plurality of layers of rubber 23. Diaphragm 22 is clamped about its periphery between head 17 and housing 7. A plunger 24 is slidably mounted in bushing 25 fixed

in the housing 7. The large end of plunger 24 normally rests against flexible diaphragm 22.

A nozzle 30 is fixed to the end of head 17. Nozzle 30 is provided with an outlet orifice 31 which is continuously in communication with chamber 18. Outlet 31 is controlled by a pair of valves 32. Valves 32 preferably take the form of elongated flat strips of resilient material, such as spring steel, secured to the nozzle 30 by screws 33. The outer free ends of the valves 32 come together or close as at 34. The valves 32 are backed up by coil springs 35, the tension of which can be adjusted by set screws 36 carried on brackets 37.

It is essential to efficient operation that all the composition ejected from the nozzle 31 should strike against and be forced into the surface of the buff 1. If the composition drips from the nozzle 30, this would cause undesirable waste. To achieve this end, namely, that all the composition ejected from the nozzle should reach the buff, it is essential that the composition be ejected from chamber 18, through the nozzle with considerable force or impact. In other words, plunger 24 must be struck a strong, instantaneous or sharp blow. Any source of power may be used for striking plunger 14 a sharp or instantaneous blow which will cause but an instantaneous deflection of diaphragm 22.

By way of description rather than for purposes of limitation, the source of power for striking plunger 24 is shown as a solenoid 40 provided with a plunger 41. A spiral compression spring 42 is mounted between the end of the plunger 41 and wall 43 in housing 7. Solenoid 40 is connected by wires 44 and 45 with any suitable source of electricity. A switch in the form of a pivoted contact arm 47, backed up by a spring 46, is mounted in the electrical circuit in line 44. Switch arm 47 is provided with upstanding lug 48 which may be arranged to contact with suitably spaced cam lugs 49 on endless conveyor chain 6 or with any conventional timing device. As the conveyor chain travels in the direction of the arrow, lugs 49 consecutively strike lug 48 on switch arm 47 to momentarily close switch 47 and complete the circuit through solenoid 40.

Momentary energization of solenoid 40 causes the plunger 41 to move rapidly toward the left against compression spring 42. As the plunger 41 reaches the end of its leftward stroke it strikes plunger 24 an instantaneous but powerful blow. This flexes or deflects diaphragm 22 which, bearing in mind that chamber 18 is filled with the buff composition, causes a slug of the composition to be shot out of orifice 31 on to the wheel 1 or on to the work 4 in whatever place desired. The momentary pressure of the composition in chamber 18, due to the deflection of diaphragm 22, acts against the ends of valves 32 to spring them back about screws 33 and against the compression springs 35. Valve 20 at this time acts to close orifice 19 and prevent the composition from being forced out of chamber 18 back into line 15.

Valve 20 is not essential. If valve 20 is omitted, some of the composition, when diaphragm 22 is struck by plunger 24, will be forced back into line 15 thereby cutting down the amount of composition ejected through orifice 31 and decreasing the force with which it is shot against buff 1. The force with which the composition is ejected from the nozzle 30 is sufficient so that all of it will be shot on to the work or the buff and very little, if any, will fall on the conveyor or frame of the

machine. Spring valves 32 close the instant pressure is released in chamber 18 and thereby prevent any dripping of the composition from the nozzle.

The pressure in the chamber 18 before the blow is struck by plunger 41 against plunger 24 and diaphragm 22, the force of this blow, and the tension of the spring valves 32, are all factors effecting the velocity of the composition discharged from the nozzle. These factors must be correlated so that the velocity of the slug of composition discharged through the orifice is great enough to carry the composition through the air blast surrounding the buffing wheel.

The amount of composition applied per stroke can be made more or less by increasing or decreasing, respectively, the length of the stroke of plunger 24; in other words, by increasing or decreasing the amount that the diaphragm is flexed by each stroke of plungers 24 and 41. The strokes per minute of the applicator can also be varied to suit the job by proper spacing of the cam lugs 49 when used along the chain 6 and correlating the spacing of these lugs with the speed of the chain.

It will be seen that as the plunger 41 moves leftward on its power stroke, spring 42 is placed under compression. After the plunger 41 has expended its energy by striking plunger 24, spring 42 recoils and instantaneously moves plunger 41 to the right on its return stroke. This arrangement nicely provides for an instantaneous blow against plunger 24 which is highly desirable. It can be readily seen that if continuous pressure were applied to plunger 24, diaphragm 22 would be flexed, the composition would be ejected from chamber 18 through nozzle 31 with little or no force and simply drip from the nozzle.

In the modified form of nozzle shown in Fig. 4, the outlet passageway 60 extends at an acute angle to chamber 18 and is controlled by a single valve 61 of strip spring metal. Valve 61 is secured to the nozzle by screw 62 and backed up by compression spring 63. Valve 61 yields to the pressure of the buff composition to permit ejection of the composition by diaphragm 22. Valve 61 closes outlet 60 against the normal pressure in chamber 18 which is substantially the same as the pressure in flexible metal hose 15.

In Fig. 6 a second modified form of nozzle is shown. In this form the nozzle 65 is provided with a composition outlet 66 which communicates with chamber 18 through orifice 67. Orifice 67 is controlled by a check valve 68 backed up by coil spring 69. Check valve 68 closes orifice 67 against the normal pressure in chamber 18 but opens under increased pressure whenever diaphragm 22 is deflected by plunger 24. Orifice 66 is preferably countersunk as at 70 to form a type of venturi opening thereby reducing the drip. In this form of the invention the nozzle 65 between outlet 66 and valve 68 is always loaded with composition.

It will be noted that in the above invention the solenoid plunger 41 builds up considerable momentum before striking the diaphragm plunger 24. This energy is dissipated instantly. It should also be noted that the polishing composition is forced into chamber 18 by the pressure existing in reservoir 14 and hose 15. The pressure existing in chamber 18 will assist or return the diaphragm 22 to its initial position.

It should be noted that on the power stroke of plunger 41 that wall 43 acts as a stop against which the plunger 41 may abut to arrest the

power stroke of the same preparatory to the recoil of spring 42 and return stroke of the plunger 41.

I claim:

1. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber whereby said material is present in said chamber and in contact with said diaphragm, a check valve between said chamber and said source of material arranged to prevent the flow of said material from said chamber to said source, an outlet for said chamber, and impact means for striking said diaphragm whereby said diaphragm directly displaces the material in contact therewith and some of the material within the chamber is ejected through said outlet.

2. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber, an outlet for said chamber, impact means for striking said diaphragm whereby some of the material within the chamber is ejected through said outlet, and a valve normally closing said outlet but opening in response to the pressure applied to the material in said chamber by said impact means.

3. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source for the material to be dispensed under pressure connected to said chamber whereby said chamber is always filled with said material, an outlet for said chamber, impact means for momentarily dissipating its energy against the diaphragm to flex the same inwardly of the chamber, a valve normally closing said outlet and opening momentarily in response to said impact means whereby a portion of the material within the chamber is shot through said outlet.

4. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a displaceable wall for said chamber, a source of the material to be dispensed connected to said chamber whereby said chamber is always filled with said material, a check valve between said chamber and said source of material arranged to prevent the flow of said material from said chamber to said source, an outlet for said chamber, and impact means for striking said displaceable wall to displace the same momentarily whereby said wall directly displaces said material and some of the material within the chamber is ejected through said outlet.

5. An applicator for dispensing pasty or semi-

liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber, an outlet for said chamber, a plunger normally in contact with said diaphragm, a stop adjacent said plunger, said plunger projecting beyond said stop, a power plunger spaced from said first mentioned plunger, means for throwing said power plunger against the first mentioned plunger to momentarily flex said diaphragm, said power plunger abutting said stop to arrest the power stroke of the same, and means for returning the power plunger to its initial position immediately upon flexing the said diaphragm.

6. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber, an outlet for said chamber, a plunger normally in contact with said diaphragm, a stop adjacent said plunger, said plunger projecting beyond said stop, a power plunger spaced from said first mentioned plunger, a solenoid coil energizable to throw said power plunger against the first mentioned plunger to momentarily flex said diaphragm, said power plunger abutting said stop to arrest the power stroke of the same, and a spring for returning the power plunger to its initial position immediately upon flexing the said diaphragm.

7. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber, an outlet for said chamber, impact means for striking said diaphragm whereby some of the material within the chamber is ejected through said outlet, a valve in the form of a flat strip of spring material for normally closing said outlet but opening in response to the pressure applied to the material in said chamber by said impact means.

8. An applicator for dispensing pasty or semi-liquid material comprising in combination a housing having a chamber therein, a flexible diaphragm for said chamber, a source of the material to be dispensed connected to said chamber, an outlet for said chamber, impact means for striking said diaphragm whereby some of the material within the chamber is ejected through said outlet, and a valve in the form of a pair of flat strips of spring metal positioned one on each side of said outlet and meeting centrally of said outlet for normally closing said outlet but opening in response to the pressure applied to the material in said chamber by said impact means.

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