Dec. 6, 1932. M. PFEIFFER 1,890,192

APPARATUS FOR APPLYING PAINT

Filed Nov. 24, 1930 2 Sheets-Sheet 1

Fig. 1.

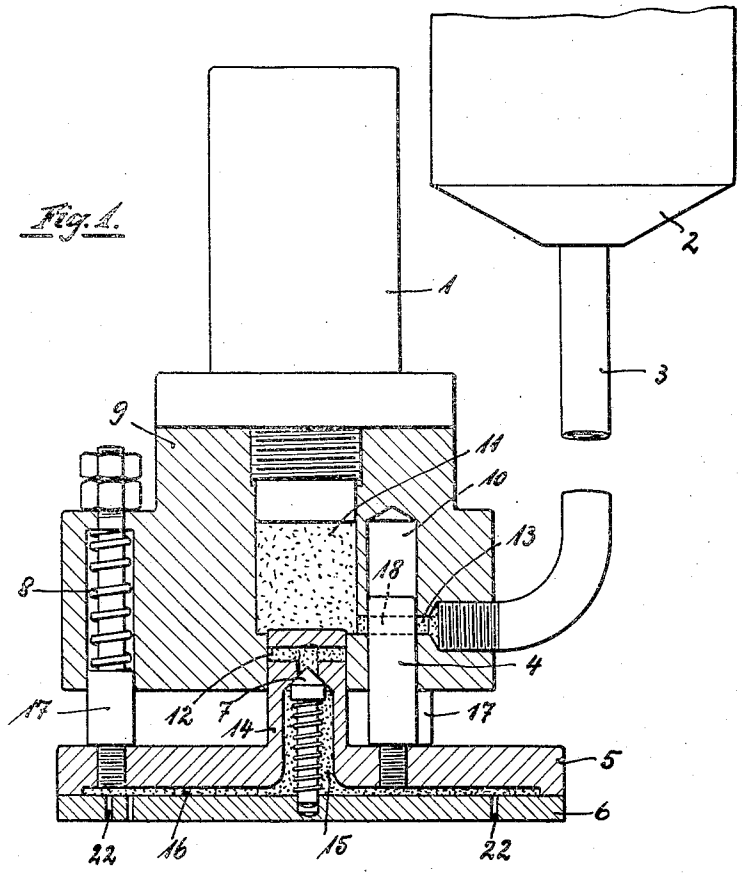
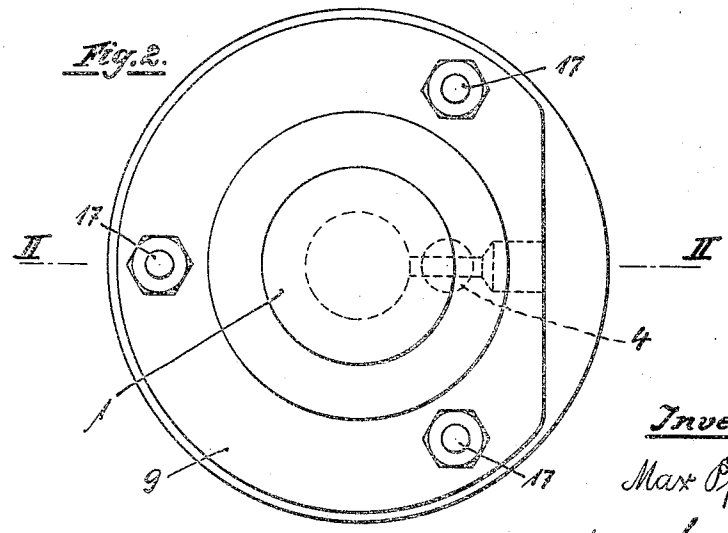


Fig. 2.



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Fig. 3.

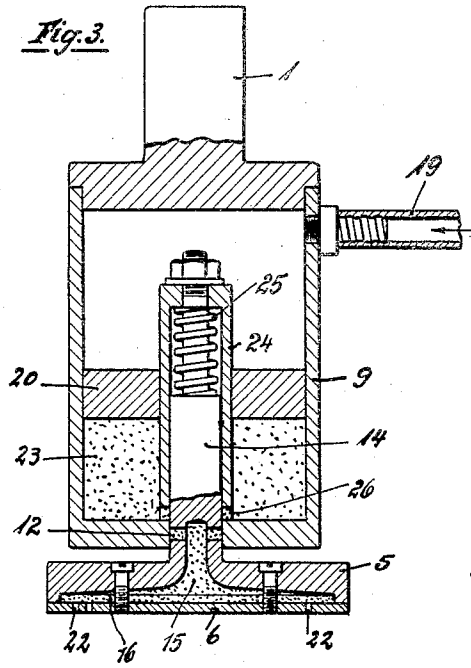
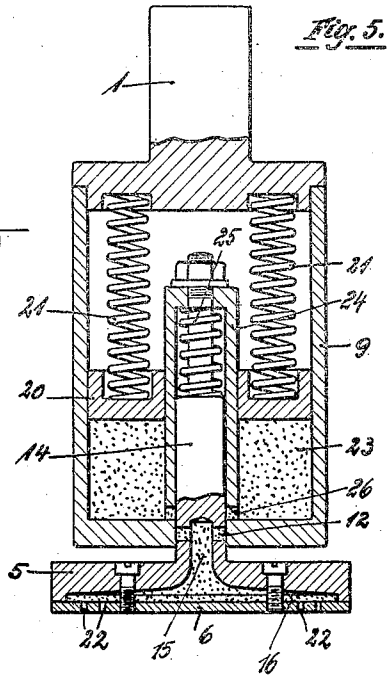


Fig. 5.



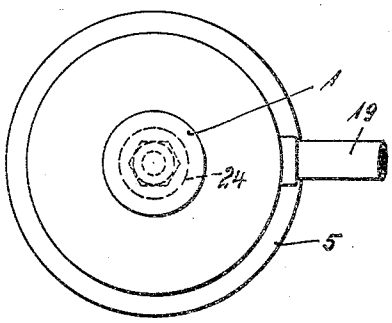


Fig. 4

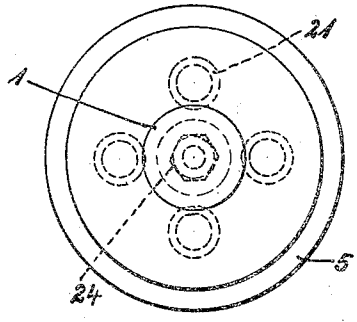


Fig. 6.

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1,890,192

UNITED STATES PATENT OFFICE

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APPARATUS FOR APPLYING PAINT

Application filed November 24, 1930, Serial No. 497,807, and in Germany April 28, 1930.

My invention relates to apparatus for applying paint which is particularly suitable for applying luminous (so-called radioactive) substances to clock and other dials, posters, and the like.

It is an object of my invention to provide means for applying such or any other substances to a surface with a view to avoiding soiling of the operator's hands which is undesirable under all conditions, and dangerous in the case of luminous substances which are poisonous, and also to avoiding waste of material.

To this end I provide a cylinder and a plunger. To the cylinder a supply of material is admitted, in combination with a stencil on and a conduit in the plunger which supplies material to the stencil from the cylinder and is controlled by the relative movement of the plunger and the cylinder so that it is admitted to the stencil only in a definite relative position of the cylinder and the plunger.

It is another object of my invention to control the supply of material to the cylinder of the press in conformity with the relative displacement of the cylinder and the plunger, and to this end I connect the supply-controlling means to the plunger so as to reciprocate therewith.

Heretofore, the luminous (so-called radioactive) substances referred to were applied by hand with a brush or a spraying nozzle or by mechanical means in combination with a stencil, or printed or applied by a smoother.

All these methods are inconvenient, or even dangerous, to the operator as it is practically impossible to avoid contact of the material with the operator's hands. They are also uneconomical, because a certain, not unconsiderable percentage of the expensive material is inevitably lost. Finally these methods require considerable skill and attention on the part of the operator.

All these drawbacks are eliminated by the use of my new apparatus in which the material is applied by mechanical means in an economical, clean, uniform, rapid and exact manner. All that is required is to fill the apparatus with a supply of material and it may then be used without interruption until the supply is exhausted, without soiling the operator's hands, and without any waste or loss of material.

An apparatus according to my invention is preferably so designed that it may be fitted to a press, such as a cam press, like any other tool, and finishes a dial, a poster or the like at every stroke, so that the output is very much increased as compared with the old methods.

In the drawings affixed to this specification and forming part thereof three types of apparatus embodying my invention are illustrated diagrammatically by way of example.

In the drawings

Fig. 1 is a section on the line II—II in Fig. 2, and

Fig. 2 is a plan view of an apparatus having a separate supply of material connected to its cylinder.

Fig. 3 is an axial section, and

Fig. 4 is a plan view of an apparatus in which the supply of material is carried in the cylinder itself, and the plunger is fitted to slide in a separate cylinder, a medium under pressure serving for extruding the material from the supply cylinder.

Fig. 5 is an axial section, and

Fig. 6 is a plan view of an apparatus designed substantially like the apparatus illustrated in Fig. 3, but with springs replacing the medium under pressure.

Referring now to the drawings and first to Figs. 1 and 2, 1 is a member adapted to be chucked in the ram of a cam press or the like, not shown, 9 is a cylinder which is secured to a flange at the lower end of the support 1, 11 is the cavity of the cylinder, 2 is a reser-

voir containing a supply of material, for instance, luminous substance 3 is a pipe connecting the reservoir to the cylinder 9, and 13 is a passage extending from the lower end of the pipe 3 to the cavity 11 of the cylinder. 14 is a plunger which is fitted to slide in the lower reduced end of the cavity 11, 5 is a stencil holder on the free end of the plunger, 6 is a stencil on the holder, 22 are perforations in the stencil, 16 is a clearance between the stencil holder and the stencil, 15 is a central passage which extends upwardly in the plunger, 17 is a spring-controlled check valve at the upper end of the passage 15, and 12 is a transverse passage in the plunger 14 to which the central passage 15 is connected under the control of the check valve 7.

4 is a slide valve which is fitted to slide in a bore 10 of the cylinder 9, and secured to the holder 5 so that it reciprocates with the plunger 14. The bore 10 intersects the passage 13, and the valve 4 has a bore 18 which in the lower final position of the plunger connects the two ends of the passage 13.

17 are pins which are secured in the stencil holder 5 with their threaded lower ends, and are fitted to slide in bores of the cylinder 9, and 8 are springs in the bores which tend to move the holder 5 away from the cylinder 9, the relative movement of the two parts being limited by nuts on the threaded upper ends of the pins engaging a shoulder on the cylinder 9.

The object to be printed, which may be a sheet of paper, of celluloid, metal, or the like is placed on the table, not shown, of the press below the stencil 6. When the press is started the springs 8 on the pins 17 are compressed, the stencil 6 is moved into engagement with the object to be printed and, as the cylinder 9 continues its downward stroke the plunger 14 penetrates into the cylinder and compresses the material in its cavity 11. At the same time the valve 14 penetrates into the bore 10 and interrupts the connection of the passage 13 with the cavity 11 of the cylinder. Thereupon the transverse passage 12 is connected to the cavity 11 and the material is extruded through the transverse passage 12, past the check valve 7 through the central passage 15, the clearance between the holder 5 and the stencil 6, and the perforations 22 of the stencil. Luminous substances are mixed with a colloidal binder and stick to the surface to be printed.

The stroke of the press cam is adjusted so that at every operation only the exact quantity required is extruded. When the ram starts for its upstroke the springs 8 of the pins 17 extend and the pressure on the material in the cavity 11 is relieved. The transverse passage 12 in the plunger 14 is closed, as shown in Fig. 1 so that the flow through the stencil 6 ceases, and finally the bore 18 in the slide valve 4 moves into registering relation with the passage 13 so that the supply of material in the cavity 11 is made up from the reservoir 2 under the suction in the cylinder.

Referring now to Figs. 3–6, the reservoir 2 is here replaced by a chamber 23 in the cylinder 9, and a piston 20 is mounted to reciprocate in the cylinder and to bear on the material in the chamber 23. The plunger 14 is here arranged in a separate cylinder 24 in the axis of the cylinder 9 and equipped with a spring 25 which tends to force it out of its cylinder 24, like the springs 8 on the pins 17, Figs. 1 and 2. 26 are passages at the lower end of the inner cylinder 24 through which the material from the chamber 23 is admitted to the passages 12 and 15 of the plunger when the cylinder 9 performs its downward stroke.

Referring now particularly to Figs. 3 and 4, 19 is a pipe for supplying medium under pressure, for instance, compressed air, to the space above the piston 20.

Referring to Figs. 5 and 6, springs 21 are inserted between the piston 20 and the flange of the member 1. The function of the springs 21 is equal to that of the medium under pressure from the pipe 19, Figs. 3 and 4.

In the types illustrated in Figs. 3—6, the plunger 14 only controls the flow of material from the chamber 23 to the stencil 6 while the extrusion of the material is effected by the piston 20.

The check valve 7, Fig. 1, is not indispensable and has been omitted in the pipes illustrated in Figs. 3—6.

While I have described an apparatus for applying luminous (radio-active) substance to a surface, it is to be understood that I may employ such apparatus also for printing with any other substance of a suitable character.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

In the claims affixed to this specification no selection of any particular modification of the invention is intended to the exclusion of other modifications thereof and the right to subsequently make claim to any modification not covered by these claims is expressly reserved.

I claim:—

1. An apparatus for applying paint comprising a cylinder and a plunger, means for supplying paint to said cylinder, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from said cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

2. An apparatus for applying paint comprising a cylinder and a plunger, means for

supplying paint to said cylinder, means operatively connected to said plunger for controlling the supply in conformity with the relative displacement of said cylinder and said plunger, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from said cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

3. An apparatus for applying paint comprising a cylinder and a plunger, said cylinder having a passage for supplying paint to said plunger, a slide valve in said cylinder operatively connected to said plunger for controlling said passage, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from said cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

4. An apparatus for applying paint comprising a cylinder and a plunger, means for supplying paint to said cylinder, a stencil on said plunger, said plunger having a transverse passage adapted to be controlled by the relative movement of said plunger and said cylinder, and a conduit connecting said passage to said stencil.

5. An apparatus for applying paint comprising a cylinder and a plunger, means for supplying paint to said cylinder, a stencil on said plunger, and means for automatically moving said plunger into its final position in said cylinder, said plunger having a conduit for supplying paint to said stencil from said cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

6. An apparatus for applying paint comprising a cylinder adapted to receive a supply of paint, a piston in said cylinder, means acting on the side of said piston which is opposite said supply for displacing said piston in said cylinder, a second cylinder within said first-mentioned cylinder on which second cylinder said piston is mounted to slide, a plunger in said second cylinder, said second cylinder having a passage for admitting paint from said first-mentioned cylinder to said second cylinder, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from the passage in said second cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

7. An apparatus for applying paint comprising a cylinder adapted to receive a supply of paint, a piston in said cylinder, means for supplying a pressure medium to the side of said piston which is opposite said supply, a second cylinder within said first-mentioned cylinder on which second cylinder said piston is mounted to slide, a plunger in said second cylinder, said second cylinder having a passage for admitting paint from said first-mentioned cylinder to said second cylinder, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from the passage in said second cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

8. An apparatus for applying paint comprising a cylinder adapted to receive a supply of paint, a piston in said cylinder, a spring acting on the side of said piston which is opposite said supply for displacing the piston in said cylinder, a second cylinder within said first-mentioned cylinder on which second cylinder said piston is mounted to slide, a plunger in said second cylinder, said second cylinder having a passage for admitting paint from said first-mentioned cylinder to said second cylinder, and a stencil on said plunger, said plunger having a conduit for supplying paint to said stencil from the passage in said second cylinder, which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

9. An apparatus for applying paint comprising a cylinder and a plunger, means for supplying paint to said cylinder, a stencil on said plunger and means for automatically moving said plunger into its final position in said cylinder, said plunger having a conduit for supplying paint to said stencil from said cylinder which conduit is adapted to be controlled by the relative movement of said plunger and said cylinder.

10. An apparatus for applying paint comprising a reciprocating cylinder adapted to receive a supply of paint and closed at one end, a plunger inserted in the open end of said cylinder, a stencil at the outer end of said plunger having a cavity and a passage extending from said cavity to the outer face of said stencil, said plunger having a passage connected to the cavity of said stencil, and a shoulder in said cylinder adapted to control the connection of said passage to its interior.

11. An apparatus for applying paint comprising a reciprocating cylinder adapted to receive a supply of paint and closed at one end, a plunger inserted in the open end of said cylinder, a stencil at the outer end of said plunger having a cavity and a passage extending from said cavity to the outer face of said stencil, said plunger having a passage connected to the cavity of said stencil, a shoulder in said cylinder adapted to control the connection of said passage to its interior, and a check valve in said passage which is arranged to open when paint flows from said cylinder to the cavity in said stencil.

12. An apparatus for applying paint comprising a reciprocating cylinder, a paint reservoir connected to said cylinder by a passage, said cylinder being closed at one end,

a plunger inserted in the open end of said cylinder, a stencil at the outer end of said plunger having a cavity and a passage extending from said cavity to the outer face of said stencil, said plunger having a passage connected to the cavity of said stencil, a shoulder in said cylinder adapted to control the connection of said passage to its interior, and means operatively connected to said stencil for opening and closing said passage.

In testimony whereof I affix my signature.

MAX PFEIFFER.