

Oct. 4, 1949.

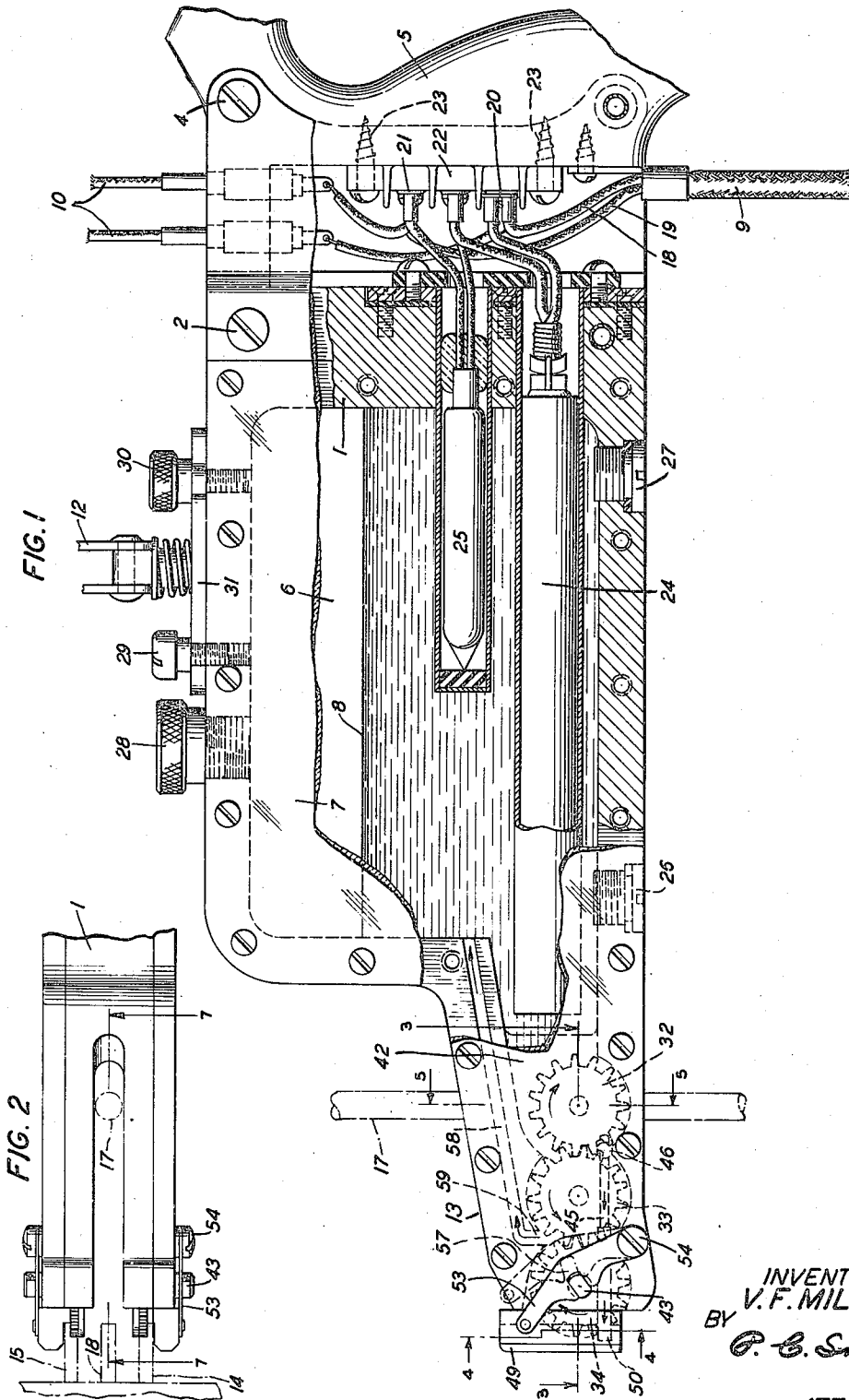
V. F. MILLER

2,483,733

SWITCH BANK COATING MACHINE

Filed Dec. 19, 1946

3 Sheets-Sheet 1



INVENTOR
V. F. MILLER
BY
P. C. Smith

ATTORNEY

Oct. 4, 1949.

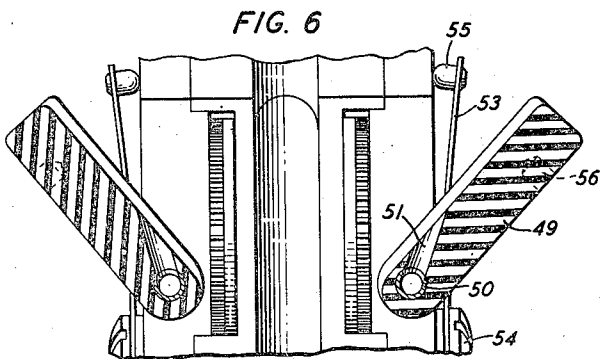
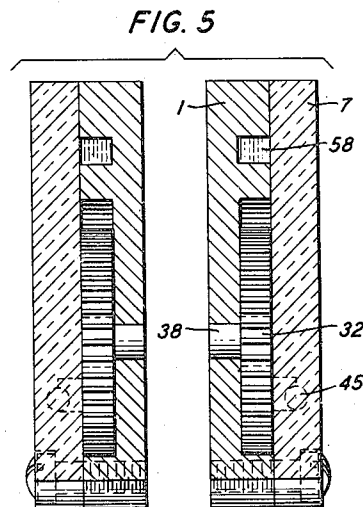
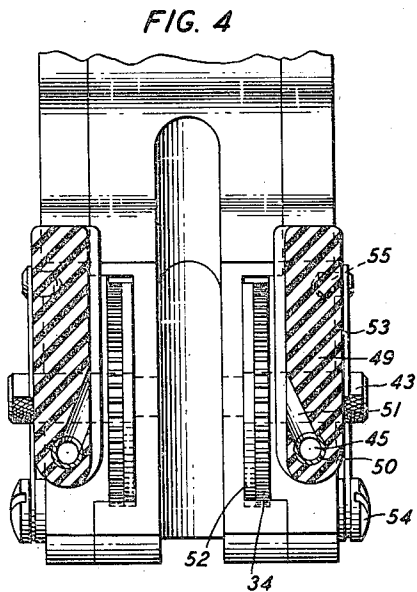
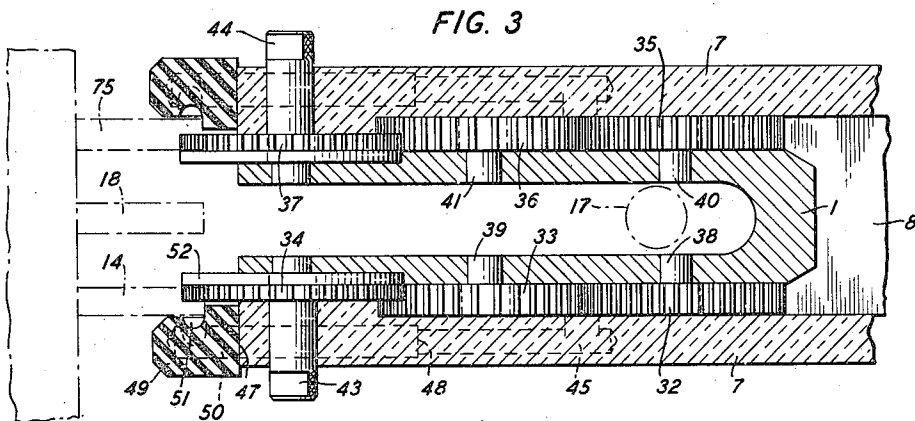
V. F. MILLER

2,483,733

SWITCH BANK COATING MACHINE

Filed Dec. 19, 1946

3 Sheets-Sheet 2



INVENTOR
V. F. MILLER
BY *P. C. Smith*
ATTORNEY

Oct. 4, 1949.

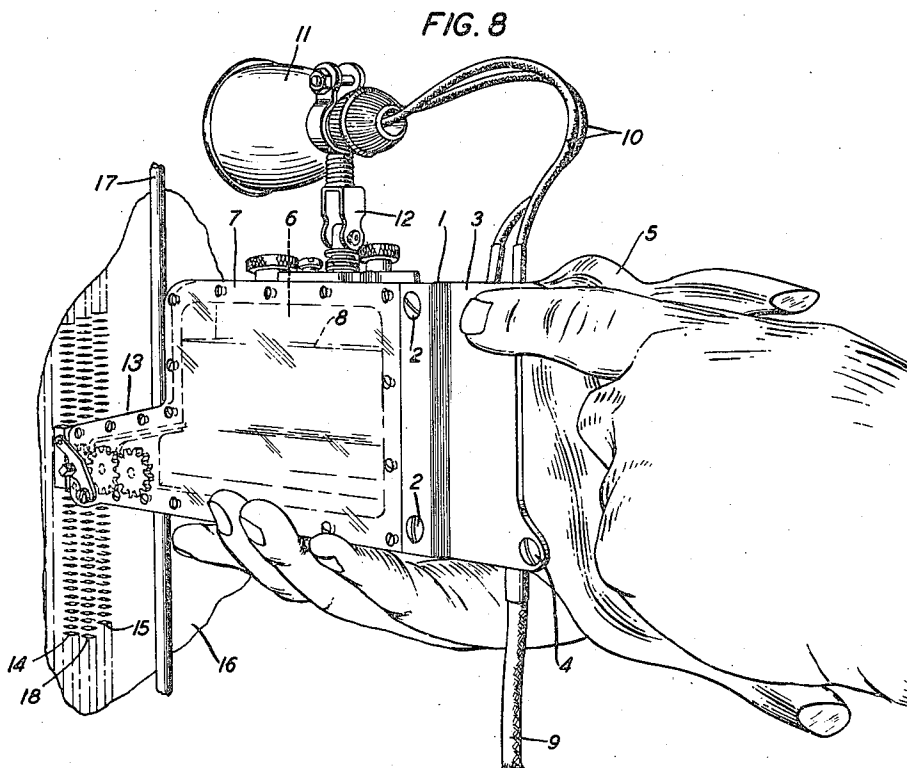
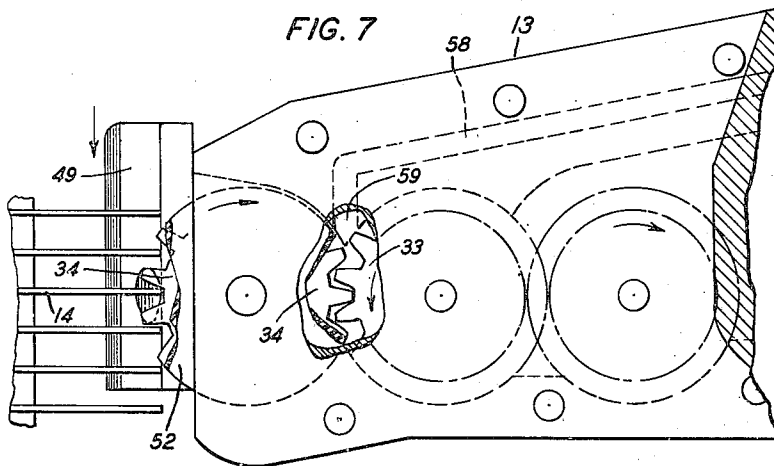
V. F. MILLER

2,483,733

SWITCH BANK COATING MACHINE

Filed Dec. 19, 1946

3 Sheets-Sheet 3



INVENTOR
V. F. MILLER
BY
P. C. Smith
ATTORNEY

UNITED STATES PATENT OFFICE

2,483,733

SWITCH BANK COATING MACHINE

Victor F. Miller, Queens Village, N. Y., assignor
to Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application December 19, 1946, Serial No. 717,179

7 Claims. (Cl. 91—62.5)

1

This invention relates to a machine for coating electrical terminals with a preservative and protective substance and is more specifically related to such a machine for applying such substances as petrolatum to terminals of panel telephone switching system terminal banks.

It has been known for some time that the talking circuits, tip and ring of telephone switching equipment may be more noisy than desirable due to unstable contact resistance between the terminals of said circuits and the contact brushes. Furthermore, it is well known that this unstable resistance is due largely to tarnish and dirt accumulation on the contacts of the terminal banks. Prior experimentation has shown that such substances as "Vaseline," commonly known as petrolatum, when used in mixture with small amounts of other substances to control flow and abrasive properties of the composite mixture, are suitable for application to selector bank terminals to inhibit the aforementioned undesirable tarnish and dirt conditions.

Heretofore the particular compound used was applied to terminals by means of a paddle similarly to the method of applying putty with a putty knife or by means of a fiber member having a groove adapted to be filled manually with compound and having a handle by means of which the filled groove was made to fit over a row of terminals and moved so as to wipe the compound on said terminals or by means of a reservoir having a valved opening in a groove thereof whereby upon moving of said reservoir over a row of terminals, the valve being opened, compound from the reservoir was deposited on said terminals. In each of the above apparatus no means has been present for control of the quantity of compound deposited on the terminals except whatever control the operator exercises by his skill. The amount of compound deposited has depended upon the speed with which the applying device was moved. Considerable compound was wasted by applying an excessive amount in some instances. A skilled operator was required to operate the applying device. Furthermore, frequent refilling of the applying machines or tools was necessary. In general, the prior means for applying such compound were expensive in labor and wasted material and costly in time consumption and relative work accomplished.

It is therefore the object of the present invention to provide a coating tool which is simple in construction, easy to operate and which is effective to apply exactly the desired amount of coating compound to the article to be coated.

2

To attain this object the present invention, a preferred embodiment of which is disclosed herein, comprises an applying tool having a reservoir therein for containing compound to be applied, and a special operating tip or head to insure a uniform application of compound regardless of speed with which the tool is moved over the article to be coated, the operation of the tool being requisite of no particular skill on the part of the operator.

Briefly, the applying tool comprises a reservoir for the compound, the forward end of which is bifurcated to enable this end to straddle the brush rod of a switch. Each forward portion of the bifurcated end is provided with a flanged gear and a shoe, both of insulating material. The forward end of the tool is adapted to engage a double row of contact terminals, the terminals of each row meshing with the particular gear located in position therewith. The row or rows of terminals engaging the gear or gears in either or both of the forward portions of the bifurcated end is confined laterally by the shoe on one side and the flange of the gear on the other. Each gear when rotated by movement of the tool over a row of terminals drives other gears of a gear pump to thereby force compound from the reservoir, deposit it on the edges of the terminals and return excess compound to the said reservoir. The tool is further provided with means for maintaining the compound in a fluid state.

The following is a detailed disclosure of my invention discussed in connection with the drawings forming a part thereof of which drawings the following are brief descriptions:

Fig. 1 illustrates a cut-away elevation view of a preferred embodiment of the invention;

Fig. 2 shows a plan view of the forward end of the device in operational position relative to a panel switch terminal bank;

Fig. 3 is an enlarged view taken along the lines 3—3 of Fig. 1 and showing in section some detailed features of the forward end of the applying tool;

Figs. 4 and 5 are enlarged views taken respectively along lines 4—4 and 5—5 of Fig. 1 and are sectionalized to facilitate subsequent discussions with reference to details shown;

Fig. 6 illustrates an operational step and relates closely to the structure of Fig. 4 from which figure it was developed;

Fig. 7 is a cut away view taken along the lines 7—7 of Fig. 2 and is enlarged to assist in clarifying the cooperation between the parts shown and the terminal bank; and

Fig. 8 illustrates the preferred manner of using the applying tool to coat tip and ring terminals of

3

a line finder or selector terminal bank of a panel system.

Referring first to Fig. 8, the applying tool is seen to comprise in general a body portion 1 of aluminum having attached thereto by means of screws 2, a frame member 3 to which is attached by means of screws 4, a handle 5 adapted to be grasped as shown. The body member 1 has a reservoir 6 therein and transparent Lucite side plates 7 attached thereto to provide confining means to permit the reservoir to contain compound 8.

Cord 9 from a source of electrical energy is connected to the tool as shown. By means of interconnections within the frame member 3, as will hereinafter be described, conductors 10 are connected from cord 9 to lamp 11 situated on a universal swivel 12.

A forward end 13 is provided for this tool to enable it to engage the row 14 of tip terminals and the row 15 of ring terminals of a panel terminal bank 16. It is to be noticed that the end 13 of the tool is bifurcated to enable it to straddle the brush rod 17 and that the center row 18, or row of sleeve terminals, is not engaged by the forward end 13 of the tool. The latter features are more readily understood by referring to Figs. 2 and 3 and to the special end 13 as fully described in subsequent disclosure with reference to Figs. 1 through 7, inclusive.

Referring now to Fig. 1, cord 9 is composed of conductors 18 and 19 which are connected to terminals 20 and 21 respectively on terminal strip 22 attached to handle 5 by means of wood screws 23 as shown. The interconnection from conductors 10 to the lamp 11 are made over terminals of terminal strip 22 as are the interconnections for the electrical heater 24 and thermostat 25 which are seen to be connected in series between terminals 21 and 23. The heater 24 and thermostat 25 are encased for protection from the compound 8.

The body member 1 is here shown with a portion removed therefrom and constitutes the reservoir 6 when the side plates 7 are attached. Plugs 26 and 27 are available for removal in case it is necessary to flush out and clean the tool. Plug 28 is available for removal to permit filling the reservoir 6 with compound 8. The screws 29 and 30 are provided to secure plate 31 to body member 1 and the plate 31 in turn has attached thereto the lamp swivel 12.

The forward end of the body member 1 terminates in a bifurcated end member 13, each portion of which houses a gear pump. Figs. 2 and 3 indicate the nature of the bifurcation of this end of the tool to permit it to engage rows 14 and 15 of terminals and to straddle the brush rod 17 in so engaging these rows of terminals. Along the outside of the aluminum body member 1, and between the said body member 1 and the side plates 7 is a slot-like extension 42 of the reservoir for conducting compound 8 to the end of each of the forward portions of the bifurcated end 13. These slot-like extensions 42 house gears 32, 33 and 34 on one side and gears 35, 36 and 37 on the other side. Gears 32, 33, 35 and 36 are held in bearing pins 38, 39, 40 and 41 respectively situated in body member 1 and are confined within the slot-like extensions 42 by side plates 7. The nature of the circumferential clearances available to these gears 32, 33, 35 and 36 within the slot-like extensions 42 is shown by Figs. 1 and 7.

Gears 34 and 37 are of insulating material and are flanged as indicated. These gears are held to the body member 1 by means of removable pin

4

bearings 43 and 44, respectively. When assembled as shown by Figs. 1, 3 or 7 the gears form two meshed trains, one on either side of the bifurcated end 13 of the tool of Fig. 8.

5 Confined within each side plate 7 is a passageway such as 45 which extends for example from the compression area 46 of Fig. 1 between gears 32 and 33 to the outermost end of one side of the bifurcated end 13 to the point designated 47 in Fig. 3. This passageway 45 is enlarged from point 43 to the point 47. An insulating shoe 49 is provided with a hollow shaft 50 as a bearing pin and is provided with an upturned slot 51 connecting the hollow shaft 50 with the space between the shoe 49 and the gear 34. This space is seen to be occupied by terminal 14 in Fig. 3, terminal 14 being confined laterally between the flange 52 of gear 34 and the inner surface of shoe 49 and is confined within the area adjacent the opening in slot 51 as shown in Figs. 4 and 7. The hollow shaft 50 is inserted into the enlarged portion of passageway 45 and thereby fixes the shoe 49 in its correct operating position.

Referring to Figs. 1, 2, 4 and 6 a resilient latch arm 53 is pivotally fixed to the tool by screw 54. Arm 53 is provided with a knob 55 on the end thereof which is adapted to engage in a depression 56 in shoe 49 and is also provided with a slot 57 adapted to lock the removable bearing pin 43 as shown in Figs. 1, 4 and 8. Fig. 6 illustrates that the knob 55 of arm 53 may be removed from depression 56 of shoe 49 and rotated to the dotted position of Fig. 1, whereby the shoe 49 with its integral hollow shaft bearing 50 may then and only then be removed from the enlarged portion of passageway 45. At the same time bearing pin 43 of Figs. 3 and 4 may be removed to permit removal of insulator gear 34 for replacement or other reasons such as cleaning.

40 Another passageway is provided in each of the forwardly extending portions of body member 1 and is designated as 58 on Figs. 1, 5 and 7. This passageway 58 extends from the compression area 59 between gears 33 and 34 back to the reservoir 6.

45 A further feature of interest is that the gears 34 and 37 are of approximately one half the thickness of the gears 33 and 36 mating therewith.

A description of the operations of the tool is set forth at this point based upon a knowledge of the structure described hereinbefore.

50 A compound which has been found to be satisfactory for use in the tool previously described is a petrolatum compound composed of approximately 67 per cent "Vaseline," 30 per cent mineral oil (nujol), 1 per cent oleic acid, 2 per cent tetrodecanol and in some applications 1/2 per cent of fine emery powder with a suitable 1/2 per cent reduction of some other constituent. "Vaseline" is used as a cohering agent which has a somewhat solid consistency at room temperature and whose purpose is to keep oxidizing agents from attacking bank terminals and dirt from accumulating thereon. The mineral oil controls the flow properties of the compound to insure its reaching all surfaces to be covered. Tetrodecanol is a wetting agent and the oleic acid acts to disperse attempted caking of wear products. Emery is used when abrasion is one of the purposes of the application. Of course, if no abrasive property is desired emery is not included among the compound constituents. This compound, as previously intimated, has a somewhat solid consistency at room temperature so that, in order to facilitate the application of such to terminals, it is necessary to heat the compound to fluidity

5

and then fill the applying tool with same. The heater 24 and thermostat 25 will keep the compound at the proper fluid state while in the applying tool.

The tool is applied to or made to engage the terminal bank as shown in Fig. 8. The gears 34 and 37 engage the terminals 14 and 15 as shown in Fig. 7. No force is required to operate the tool since its weight alone will move it down the bank under guidance of the operator. As the tool is moved down the bank the various gears will rotate in the directions indicated by the arrows in Figs. 1 and 7. Each train of gears comprises a gear pump such that coating material, or petrolatum compound or the like, is forced from area 46 through passageway 45 into the hollow shaft bearing 50 of shoe 49 and against the terminals such as 14 via slot 51 in shoe 49. The flange 52 of gear 34 assists in confining the material to the terminals. At the same time some of the compound is carried by the various gears to each other and by this means the application thereof to the terminals is further augmented. By employing gears 34 and 37 of reduced thickness relative to the other gears, a control is realized over the amount of material applied to the terminals. Also, as is well known, the gear pump will apply a quantity of material to the terminal 14 via passageway 45, dependent on the speed at which the pump is driven. Thus a uniform quantity will be deposited at all speeds at which the tool is moved over the row of terminals. In addition, gears 34 and 37 will carry excess material back to area 59 at which point the gears will force same back through passageway 53 to the reservoir where it may be reused.

The purpose in providing insulator shoes such as 49 and insulator gears such as 34 is to enable use of this tool regardless of possible energized conditions of the terminals such as 14 and to prevent short circuits from terminals such as 15 under any conditions of energization or otherwise of said terminals. It will be seen from the drawings that the terminals such as 14 do not engage any part of the tool except insulation.

It is evident that the applying tool enables the application of compound to the terminals uniformly independent of the speed with which the tool is moved down the bank of terminals. In addition, by virtue of the gear sizes chosen for the particular purpose, an unskilled operator may do an efficient job in a short time.

In order to employ this tool on terminal banks having different dimensions as to terminal spacing, etc., it is obvious that the number of gear teeth and gear and housing dimensions may be changed within the spirit of my invention as may other variations and embodiments of my invention. Furthermore, it is to be understood that the prior description of the petrolatum compound considered preferable for use of the invention is not to be considered as in any way limiting the scope of the invention, since, as will be obvious, there are probably innumerable such compounds which could be so applied to switch terminals. Consequently, the following claims are appended which alone define the scope of the invention.

What is claimed is:

1. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating

6

material positioned adjacent said shoe and adapted to be meshed with the row of terminals with said flange in engagement with the other edge of said row of terminals, and a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby, for drawing material from said reservoir and for depositing it on the teeth of said flanged gear whereby the said teeth of said flanged gear may deposit said material on the edges of said terminals.

2. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating material positioned adjacent said shoe and adapted to be meshed with the row of terminals with said flange in engagement with the other edge of the said row of terminals, a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby for drawing material from said reservoir, and a passageway interconnecting a pressure point in said gear pump with the terminal contacting area of said flanged gear whereby the said gear pump may transmit material to the edges of said terminals.

3. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating material positioned adjacent said shoe and adapted to be meshed with the row of terminals with said flange in engagement with the other edge of the said row of terminals, a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby for drawing material from said reservoir, a first passageway interconnecting a pressure point in said gear pump with the terminal contacting area of said flanged gear whereby the said gear pump may transmit said material to the edges of said terminals, and a second passageway interconnecting a pressure point of said gear pump and the said reservoir whereby the said gear pump may return excess material from said flanged gear to said reservoir.

4. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating material positioned adjacent said shoe and adapted to be meshed with the row of terminals with the said flange in engagement with the other edge of the said row of terminals, and a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby for drawing material from said reservoir, for effecting the deposit of said material on the edges of said terminals and for effecting the return of excess material from said gear to said reservoir, the said gear pump drawing compound from said reservoir by having one gear of said gear pump exposed to the material in said reservoir and transferring material to succeeding gears of said pump through the meshed teeth of said gears and effecting the deposit of said material on the edges of said terminals by means of

7

a first passageway located in the wall of said reservoir and connecting a pressure point in said gear pump with an orifice in the forward end of said reservoir adjacent the said edges of said terminals and effecting the return of excess material from said insulating gear to said reservoir by means of a second passageway located in the wall of said reservoir and connecting a pressure point between the said insulating gear and the said reservoir.

5. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating material positioned adjacent said shoe and adapted to be meshed with the row of terminals with the said flange in engagement with the other edge of the said row of terminals, and a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby for drawing material from said reservoir, for effecting the deposit of said material on the edges of said terminals and for effecting the return of excess material from said gear to said reservoir, the said gear pump drawing material from said reservoir by having one gear of said gear pump exposed to the material in said reservoir and transferring material to succeeding gears of said pump through the meshed teeth of said gears and effecting the deposit of said material on the edges of said terminals by means of a first passageway located in the wall of said reservoir and connecting a pressure point in said gear pump with an orifice in the forward end of said reservoir adjacent the said edges of said terminals and effecting the return of excess material from said insulating gear to said reservoir by means of a second passageway located in the wall of said reservoir and connecting a pressure point between the said insulating gear and the gear of the gear pump with which it meshes and the said reservoir, said first passageway including a hollow bearing shaft fixed in said insulating shoe and located within the said first passageway in the wall of said reservoir, said shaft terminating in said shoe at an orifice therein adjacent the edges of the said terminals engaged by said shoe, the said shaft adapting said shoe for removal thereof from said forward end of said reservoir, the said shoe and shaft fixed thereto being held in position in the forward end of said reservoir by spring means to prevent removal of said shoe from the said forward end of said reservoir during operation of said applying tool.

6. A tool for applying coating material to the terminals of a panel switch bank comprising a reservoir for the material, a shoe of insulating material connected to the forward end of said reservoir for engagement with one edge of a row of bank terminals, a flanged gear of insulating material positioned adjacent said shoe and adapted to be meshed with the row of terminals with the said flange in engagement with the other

8

edge of the said row of terminals, and a gear pump operable by said gear when said gear is rotated by the movement thereof over the row of terminals engaged thereby for drawing material from said reservoir, for effecting the deposit of said material on the edges of said terminals and for effecting the return of excess material from said gear to said reservoir, the said gear pump drawing material from said reservoir by having one gear of said gear pump exposed to the material in said reservoir and transferring material to succeeding gears of said gear pump through the meshed teeth of said gears and effecting the deposit of said material on the edges of said terminals by means of a first passageway located in the wall of said reservoir and connecting a pressure point in said gear pump with an orifice in the forward end of said reservoir adjacent the said edges of said terminals and effecting the return of excess material from said insulating gear to said reservoir by means of a second passageway located in the wall of said reservoir and connecting a pressure point between the said insulating gear and the gear of the gear pump with which it meshes and the said reservoir, said first passageway including a hollow bearing shaft fixed in said insulating shoe and located within the said first passageway in the wall of said reservoir, said shaft terminating in said shoe at an orifice therein adjacent the edges of the said terminals engaged by said shoe, the said shaft adapting said shoe for removal from said forward end of said reservoir, the said shoe and shaft fixed thereto being held in position in the forward end of said reservoir by spring means to prevent removal of said shoe from the said forward end of said reservoir during operation of said applying tool, said reservoir including thermostatically controlled heating means for maintaining said material in a fluid state, including means for filling and emptying said reservoir and including means for indicating the amount of material therein.

7. A tool for applying coating material to the terminals of a panel bank as described by claim 6 wherein the said forward end of the reservoir of said tool is bifurcated to enable the said forward end to straddle a brush rod of the switch mechanism associated with said panel bank, each branch of said bifurcated forward end containing said arrangement of gear pump, flanged insulating gear, insulating shoe and passageways and said bifurcated forward end adapted to engage two rows of said terminals to enable application of material simultaneously thereto.

VICTOR F. MILLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
417,093	Robison	Dec. 10, 1889
1,991,355	Alexander	Feb. 19, 1935