May 3, 1932. L. C. GOAD 1,856,757

ARMATURE COATING MACHINE

Filed March 8, 1929 3 Sheets-Sheet 1

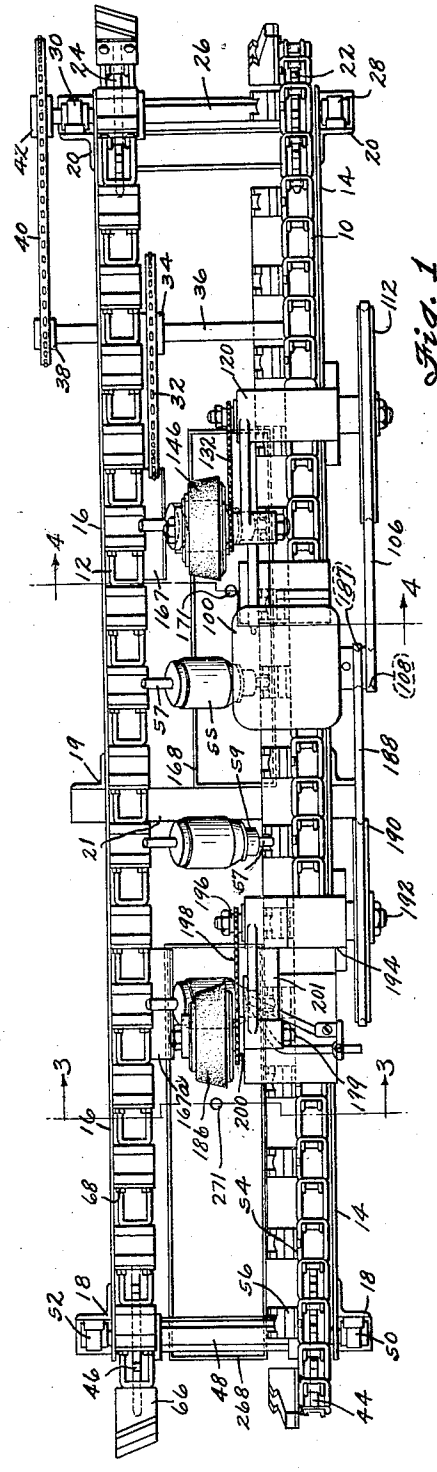


Fig. 1

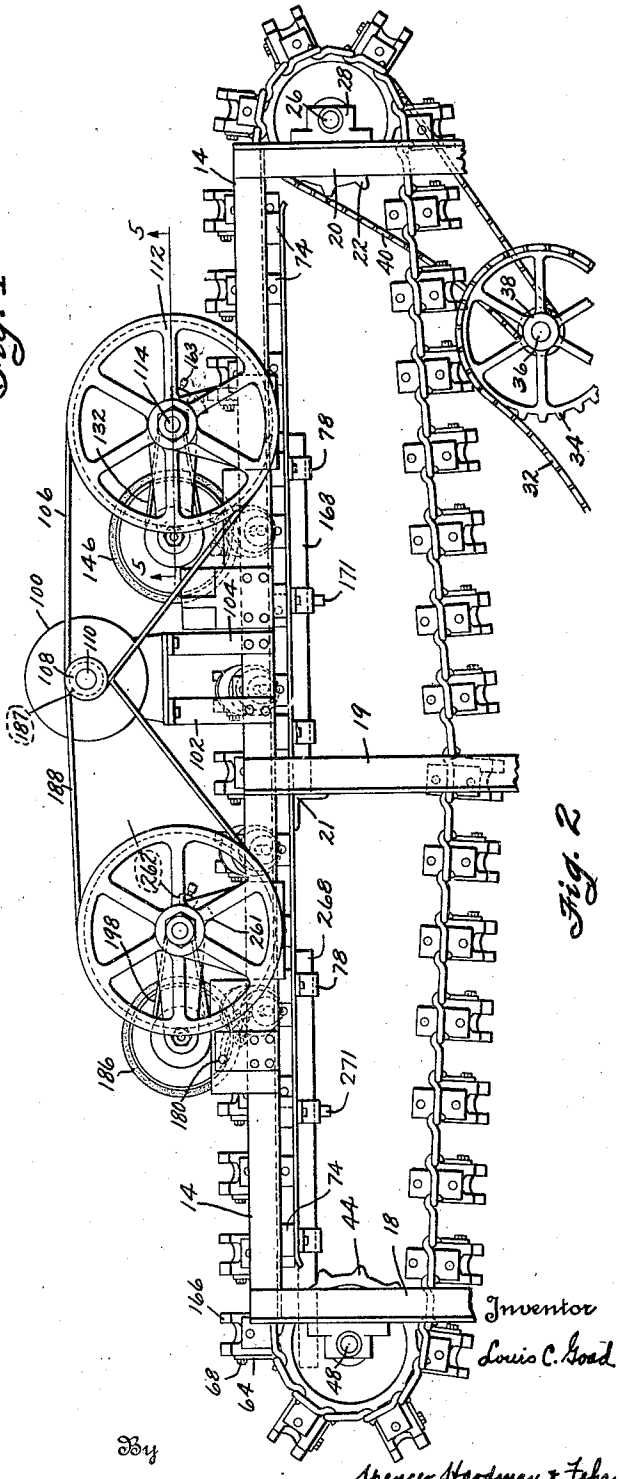


Fig. 2

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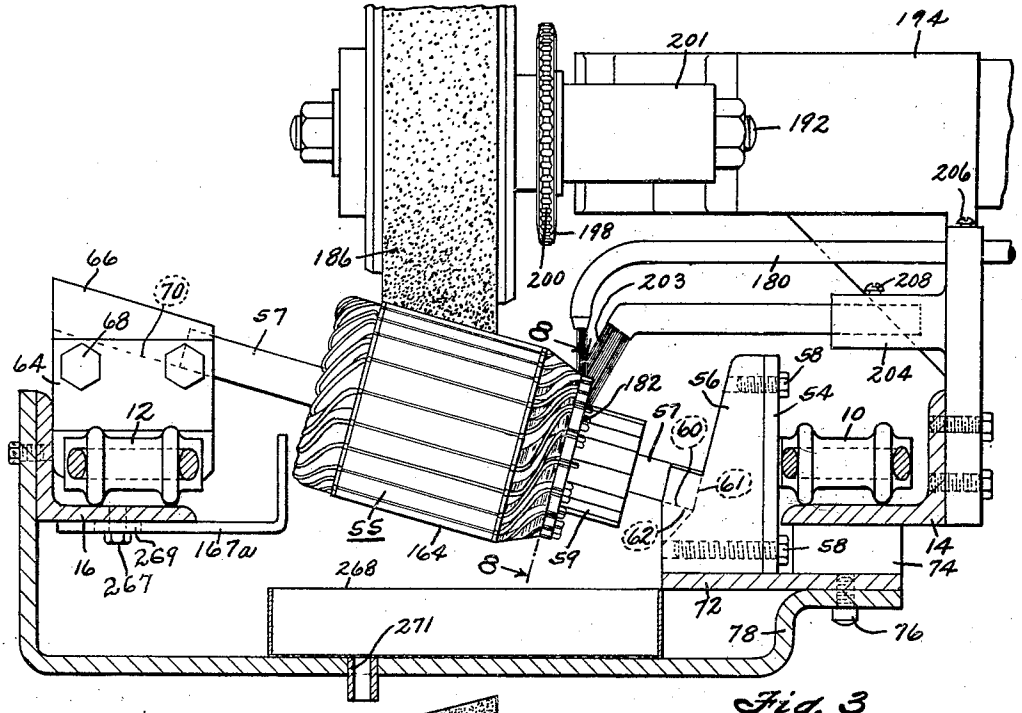


Fig. 3

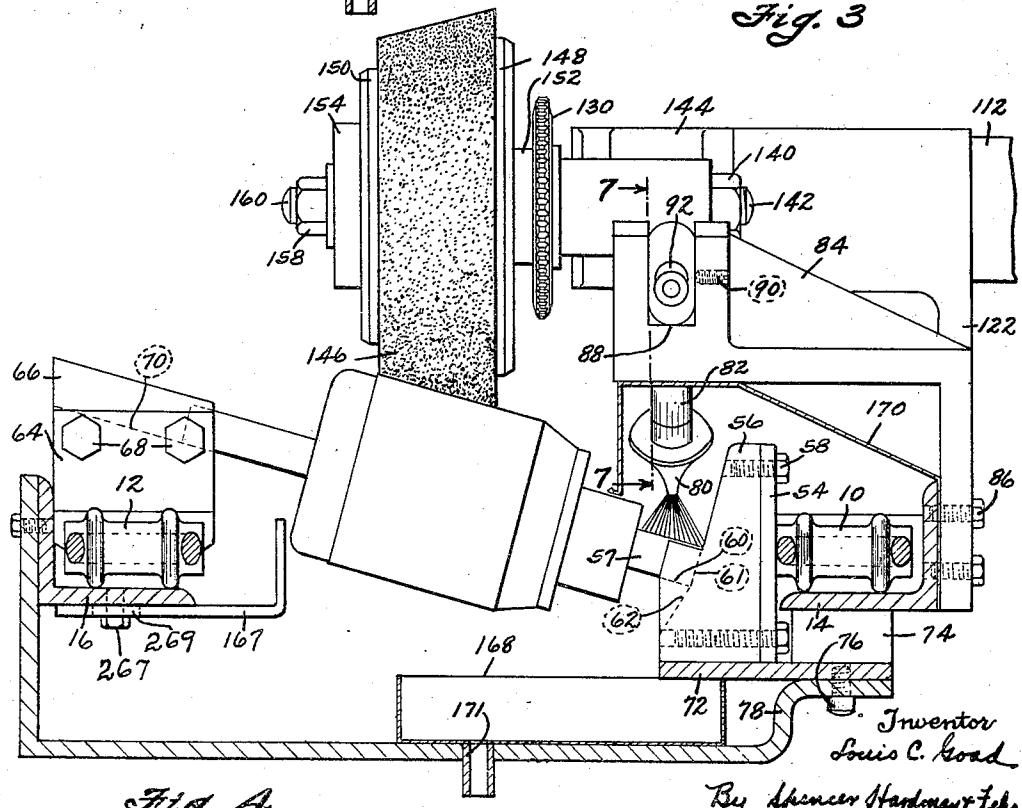


Fig. 4

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ARMATURE COATING MACHINE

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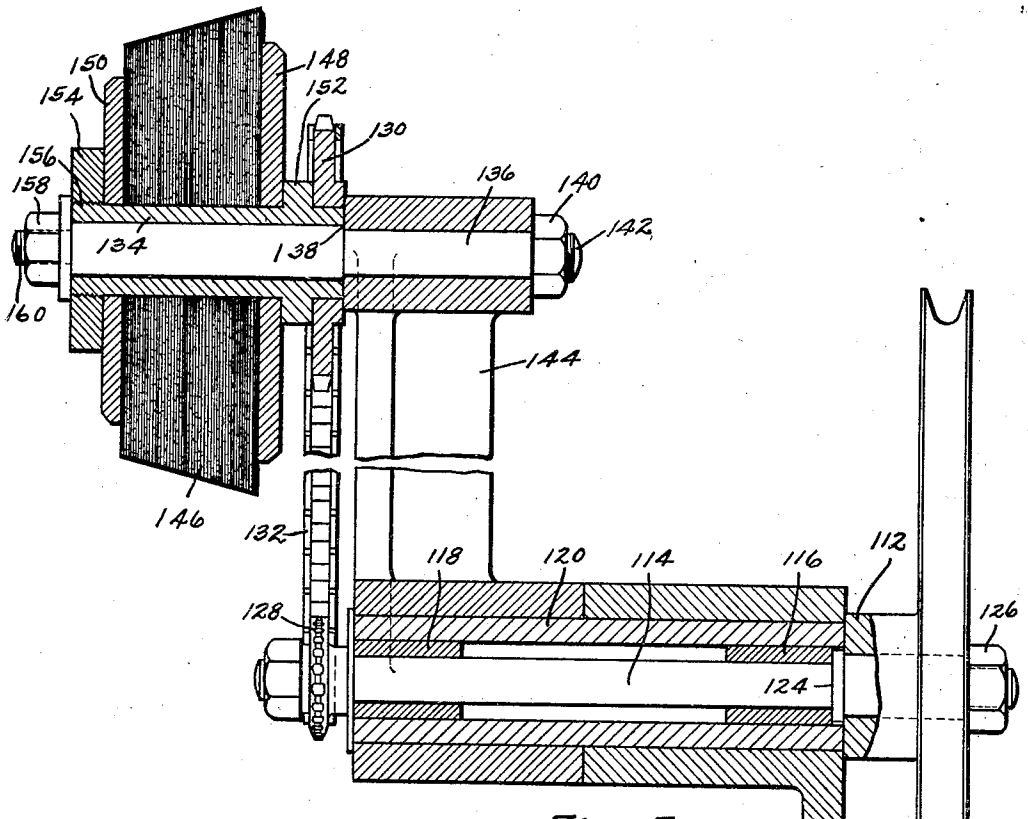


Fig. 5

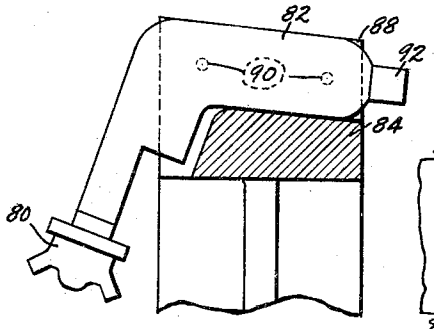


Fig. 7

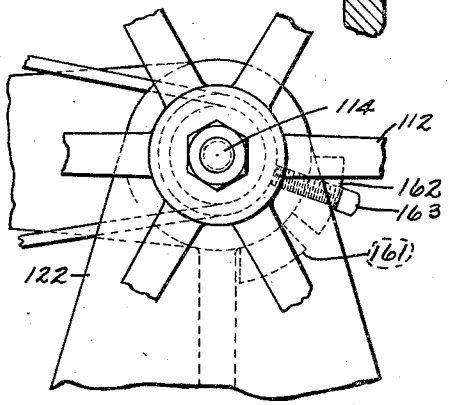


Fig. 6

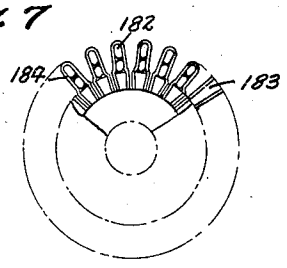


Fig. 8

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1,856,757

UNITED STATES PATENT OFFICE

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ARMATURE COATING MACHINE

Application filed March 8, 1929. Serial No, 345,435.

This invention relates to the manufacture of armatures for dynamo electric machines, and particularly to a machine for preparing the leads of armature conductors which are located in slots between riser bars provided by lead receiving portions of the commutator for soldering the leads to the lead receiving portions. This machine is especially adapted to prepare the armatures for the soldering operation disclosed in the application of Ollie V. Badgley, Serial No. 172,479, filed March 3, 1927.

The chief object of the invention is to reduce the cost of applying flux to the parts to be soldered and of reducing the cost of applying oil to the end of the shaft adjacent the commutator segments so as to prevent solder adhering to the end of the shaft. In order to accomplish this aim, the invention provides a machine upon which each of these operations may be done automatically. Preferably, the machine comprises chain conveyors carrying lugs for engaging the ends of the armature shaft. As the armatures are carried through the machine, the end of the shaft adjacent the commutator passes through an oil spray and while passing through this oil spray, it is rotated by a spinning mechanism; then it passes through a flux spray and by a brush for smearing the flux into the slots, the armature being rotated by another spinning mechanism when it passes through the flux spray and past the brush.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of the machine.

Fig. 2 is a side elevation with the lower part of the frame broken away.

Fig. 3 is a sectional view of the machine taken on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary, sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary, sectional view showing part of the spinning mechanism.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 4.

Fig. 8 is a sectional view of the armature taken on the line 8—8 of Fig. 3.

Figs. 1 and 2 are drawn to a smaller scale than are Figs. 3, 4, 7 and 8.

Figs. 5 and 6 are drawn to a larger scale than are Figs. 3, 4, 7 and 8.

The machine comprises a pair of conveyors for conveying the armatures through the machine, mechanism for applying the oil to the end of the armature shaft adjacent the commutator segments to be soldered, mechanism for applying the flux and a pair of spinning devices, one for spinning the armature during the application of the oil and the other for spinning the armature during the application of the flux.

The conveyors comprise a pair of conveyor chains 10 and 12 guided by a pair of angle iron beams 14 and 16 supported on pairs of legs 18, 19 and 20. The angle iron beams 14 and 16 are held in spaced relation by means of transverse member 21 and by braces in the ends which have not been shown. The chains 10 and 12 pass over the driven sprockets 22 and 24 respectively keyed to the driven shaft 26, journalled in bearings 28 and 30 which are secured to the legs 20. A sprocket chain 32 driven by an electric motor or any other source of power drives a spocket wheel 34 which is keyed to a shaft 36 mounted on a suitable support, not shown. Also keyed on the shaft 36 is a small sprocket wheel 38 driving chain 40 which drives the sprocket 42 mounted on the shaft 26.

The other ends of the chains 10 and 12 pass over a pair of sprockets 44 and 46 mounted on the shaft 48, journalled in bearings 50 and 52, secured to legs 18. Every other link of the chain 10 has a lug 54 to which is attached an armature shaft supporting member 56 by means of screws 58. The lug 56 has an inclined semi-cylindrical surface 60 which is designed to act as a bearing for one end of an armature shaft 57, and an inclined surface 61 which is designed to prevent endwise movement of the armature shaft. A notch 62

is provided in the bottom of this semi-cylindrical surface so as to permit oil, flux and other foreign substances to drain through this notch.

Every other link of chain 12 carries a lug 64 which has attached thereto a support 66 by means of screws 68. Member 66 has a semi-cylindrical inclined surface 70 which is designed to support the other end of the armature shaft 57. In Figs. 3 and 4, it may readily be seen that the supporting members for the armature 55 carried by the chains are so designed as to hold the armature 55 with the end of the shaft adjacent the commutator segments 59 much lower than the other end of the shaft. The supporting member 56 is moved along a guiding member 72 spaced from the angle iron beam 14 by members 74 attached thereto by screws 76 which also supports a transverse member 78. It can be readily seen that as the conveyor chains 10 and 12 are actuated by the driving mechanism already described, that the armatures mounted on the supports 56 and 66 will be conveyed through the entire machine. These armatures are placed on the conveyors 10 and 12 by the operator who is stationed to the right of the machine as viewed in Figs. 1 and 2.

After they are placed on the conveyor they are conveyed to an oil spray which is emitted from a nozzle 80 mounted on the end of a tubular member 82 supported by a bracket 84 which is attached to the angle iron beam 14 by screws 86. Member 82 is supported in the bifurcated end 88 of bracket 84 and retained in this position by screws 90. Oil under pressure is supplied by a suitable hose, not shown, connected to the tubular terminal 92 of member 82.

A motor 100 is mounted on a pair of brackets 102 and 104 attached to the angle iron beam 14. A belt 106, driven by a pulley 108 fixedly attached to the armature shaft 110 of the electric motor 100, drives a pulley 112 which is fixedly attached to a shaft 114 journalled in bearings 116 and 118 press-fitted into a tubular sleeve 120 fixed in a bracket 122 attached to the angle iron beam 14 as shown in Fig. 5. The shaft 114 has a collar 124 abutting the bearing 116 on one side and abutting the pulley 112 on the other side. The pulley 112 is held on the shaft 114 by a nut 126. On the other end of the shaft 114 is fixedly attached a sprocket wheel 128 which transmits motion from shaft 114 to a sprocket 130 by a chain 132 fixedly attached to a tubular member 134 mounted on a stub shaft 136.

A shoulder 138 on the stub shaft 136 cooperates with a nut 140 threadedly engaging the end 142 of the shaft 136 rigidly to secure the shaft 136 to a bracket 144 which is rotatably mounted on the tubular member 120.

A spinning wheel 146 is fixedly attached to the tubular member 134 and clamped by a pair of washers 148 and 150 which are held in spaced relation between a collar 152 integral with member 134 and a nut 154 threadedly engaging an end 156 of member 134. The tubular member 134 and the parts mounted thereon are held on the stub shaft 136 by a nut 158 threadedly engaging the end 160 of the shaft 136. The spinning wheel 146 may be made similar to a buffing wheel or for that matter a discarded buffing wheel has been found to give very satisfactory results. A detent 161 on the bracket 144 engages a lug 162 attached to the tubular portion of member 122 by screws 163, only one of which is shown. The lug 162 limits the rotation of the bracket 144 in a counterclockwise direction as viewed in Fig. 2 so that the spinning wheel 146 cannot drop down in the path of the armature core 164 so as to obstruct the passage of the armature. This detent 161 and lug 162 are so arranged however that the friction wheel 146 is permitted to engage the periphery of the armature core 164.

As the armature is conveyed under the spinning wheel 146 it is rotated by the spinning wheel so that the entire peripheral surface of the end of the armature shaft 166 will be completely lubricated by the oil spray from the nozzle 80. A bracket 167 attached to the angle iron beam 16 prevents movement of the armature towards the left in Fig. 4 caused by the inclined surface of the spinning wheel 146.

A cover 170 has been provided for preventing the oil from splashing. Any surplus oil which may be applied to the end of shaft 57 is drained through the notch 62 into a pan 168 supported on the members 78. The oil in the pan 168 is drained from the pan through a drain 171 into a suitable receptacle not shown. After the armature shaft end has been coated with oil or any other suitable coating material, which will prevent solder from adhering to the end of the shaft when it is dipped into a solder bath as disclosed in the application for patent, Serial No. 172,479, supra, it is conveyed to a flux applying mechanism now to be described.

Flux is supplied by a tubular member 180 which may be connected to a supply of flux under pressure not shown. Member 180 directs a small jet of flux upon the ends of armature conductor leads 182 which have been placed in the slots 183 formed between the metal riser bars 184 as shown in Fig. 8. The armature while passing under this jet is rotated by a spinning wheel 186 which is mounted and driven in a manner identical to the spinning wheel 146. Power from the electric motor 100 is supplied to this spinning wheel 186 by a belt 188 passed around a pulley 187 integral with the pulley 108 and driving a pulley 190 mounted on a stub shaft 192 in a bracket 194 attached to angle iron

beam 14. Rotary motion is transmitted by shaft 192 to the sprocket 196 which drives a sprocket chain 198 which drives the sprocket 200 fixedly attached to the spinning wheel 186. Wheel 186 and sprocket 200 are rotatable upon a stub shaft 199 attached to a bracket 201 which is pivotally supported by bracket 194. Counterclockwise rotation of the bracket 201 about the bracket 194 is prevented by a detent 261 on the bracket 201 engaging the stop 262 on bracket 194.

As the armature passes under a jet of flux, it is rotated by the spinning wheel 186 which distributes the flux around the entire periphery of the part of the armature to be soldered. This flux is smeared into and between the parts to be soldered by a brush 203 adjustably attached to a bracket 204 which also adjustably supports the tube 180 and which is attached to the angle iron beam 14. Endwise movement of the armature is prevented by stop 167*a*. Flux which is emitted from the jet when there are no armatures under the jet and surplus flux which drips from the parts to be soldered falls into a pan 268 which has a drain 271 which permits the flux to drain from the pan into a suitable receptacle, not shown.

This machine can be set for various sizes of armatures, the oil spray being adjusted by raising or lowering member 82 mounted in the bracket 84 by means of the screws 90. Screw 206 permits the flux tube 180 to be adjusted outwardly or inwardly in order to suit the needs of the particular size of the armature to be treated; and the screw 208 permits adjustment of the brush 203 inwardly or outwardly as required. The screws 267 passing through slots 269 in brackets 167 and 167*a* permit the adjustment of the brackets 167 and 167*a* towards and away from the chain 12 thereby permitting various sizes to pass through the machine.

Operation

After the machine has been set in motion, the jet supplying the oil spray opened and the flux jet opened, the armatures to be treated are manually placed on the supports 56 and 66 from whence they are conveyed to the left by the conveyors 10 and 12 as viewed in Figs. 1 and 2 to the oil spray. While passing under this oil spray, they are rapidly rotated by wheel 146 to completely cover the end of the shaft 57 with oil and from here they are conveyed through the flux jet where they are rotated by the spining wheel 186 so as to completely cover the portions of the armature to be soldered with a flux, the flux being smeared into the crevices by means of the brush 203 from whence they are moved to the left end of the machine where they may be removed manually or where they may be permitted to drop down into a suitable conveyor for conveying the armatures to the machine for performing the soldering operation. It will be readily seen that when the armatures are dipped into a flux bath as disclosed in application for patent Serial No. 172,479, no solder will cling to the end of the shaft for the reason that the oil protects this. Very little solder will adhere to the commutator segments excepting the portions which have been fluxed, that is, the ends of the leads 182, and the risers 184 will be completely soldered. This machine for applying the oil and the flux reduces the amount of labor required, saves on the amount of material needed and produces a more uniform product than has heretofore been attainable. From this it can be seen that the cost of production is reduced by eliminating labor, saving material, and reducing the number of defective pieces.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device to coat the end of the armature shaft adjacent to the commutator with a liquid to prevent solder from adhering thereto; a device for spraying the flux only on the portions to be soldered; and means for conveying the armature to said devices.

2. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device to coat the end of the armature shaft adjacent to the commutator with a liquid to prevent solder from adhering thereto; a device for spraying the flux only on the portions to be soldered; means for conveying the armature successively to each of said devices; and means for rotating the armature while the lead receiving portions of the communtator are being sprayed by the flux.

3. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutators for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device to coat the end of the armature shaft adjacent to the commutator with a liquid to prevent solder from adhering thereto; a device for spraying the flux only on the portions to be soldered; means for conveying the armatures successively to each of said devices; means for rotating the armature while being coated with

oil; and means for rotating the armature while being fluxed.

4. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bar, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the portions to be soldered; and a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions.

5. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bar, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the portions to be soldered; a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions; and means for spinning the armature while the flux is sprayed on the lead receiving portions.

6. A machine for preparing the leads of the armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bar, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the lead receiving portions; a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions; and means for spinning the armature while in contact with the brush so as to cause relative movement between the brush and the lead receiving portions, thereby causing the flux to be smeared into the slots.

7. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the portions to be soldered; a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions; means for spinning the armature when the oil is applied to the end of the armature shaft; and means for spinning the armature while the flux is sprayed on the lead receiving portions.

8. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the lead receiving portions; a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions; means for spinning the armature while the flux is sprayed on the lead receiving portions; means for spinning the armature while being sprayed with the flux and while the flux is being smeared into the slots by the brush.

9. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising, in combination, a device for applying oil to the end of the armature shaft; a device for spraying flux only on the lead receiving portions; a brush for smearing the flux so as to cause the flux to coat the slots provided by the lead receiving portions; means for spinning the armature while the oil is sprayed on the end of the shaft; and means for spinning the armature while it is being sprayed with the flux and while the flux is smeared into the slots.

10. A machine for preparing the leads of armature conductors which are located in slots provided by the riser bars of the commutator for soldering the leads to the lead receiving portions of the riser bars, comprising in combination, a device to coat the end of the armature shaft adjacent the commutator with a liquid so as to prevent solder from adhering thereto; a device for fluxing only the portions to be soldered and means for causing a relative movement of the armature and each of said devices.

11. A machine for treating armatures to be soldered, comprising in combination, a pair of conveyors, a pair of lugs having semi-cylindrical recesses for supporting the ends of the armature shaft, said lugs being carried by each conveyor, an oil spraying device aligned with one of the lugs for coating the end of the shaft carried therein, and a flux spraying device disposed between said lugs for spraying flux on the parts to be soldered.

In testimony whereof I hereto affix my signature.

LOUIS C. GOAD.