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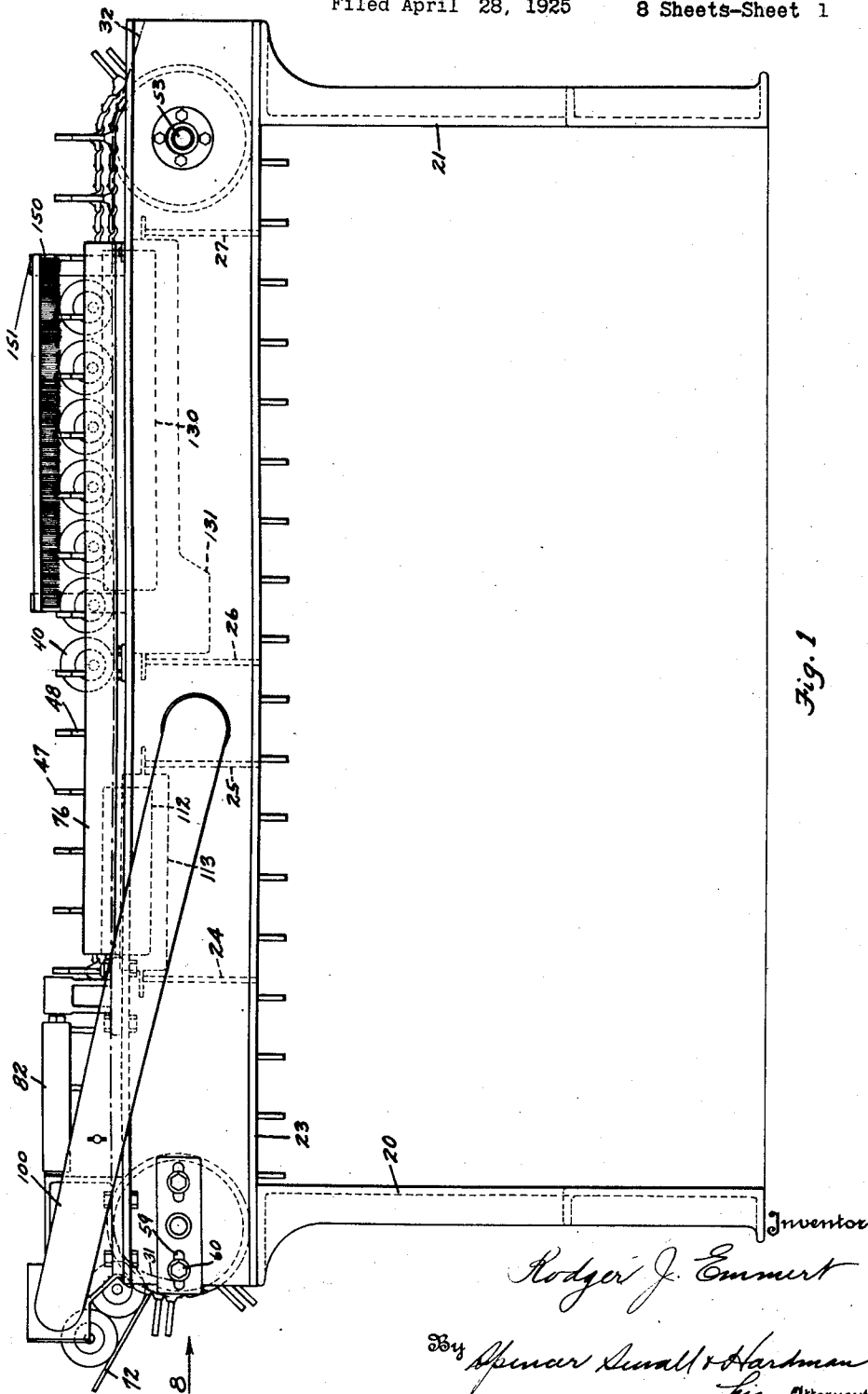
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1,619,406

ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

Filed April 28, 1925

8 Sheets-Sheet 1



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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

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8 Sheets-Sheet 2

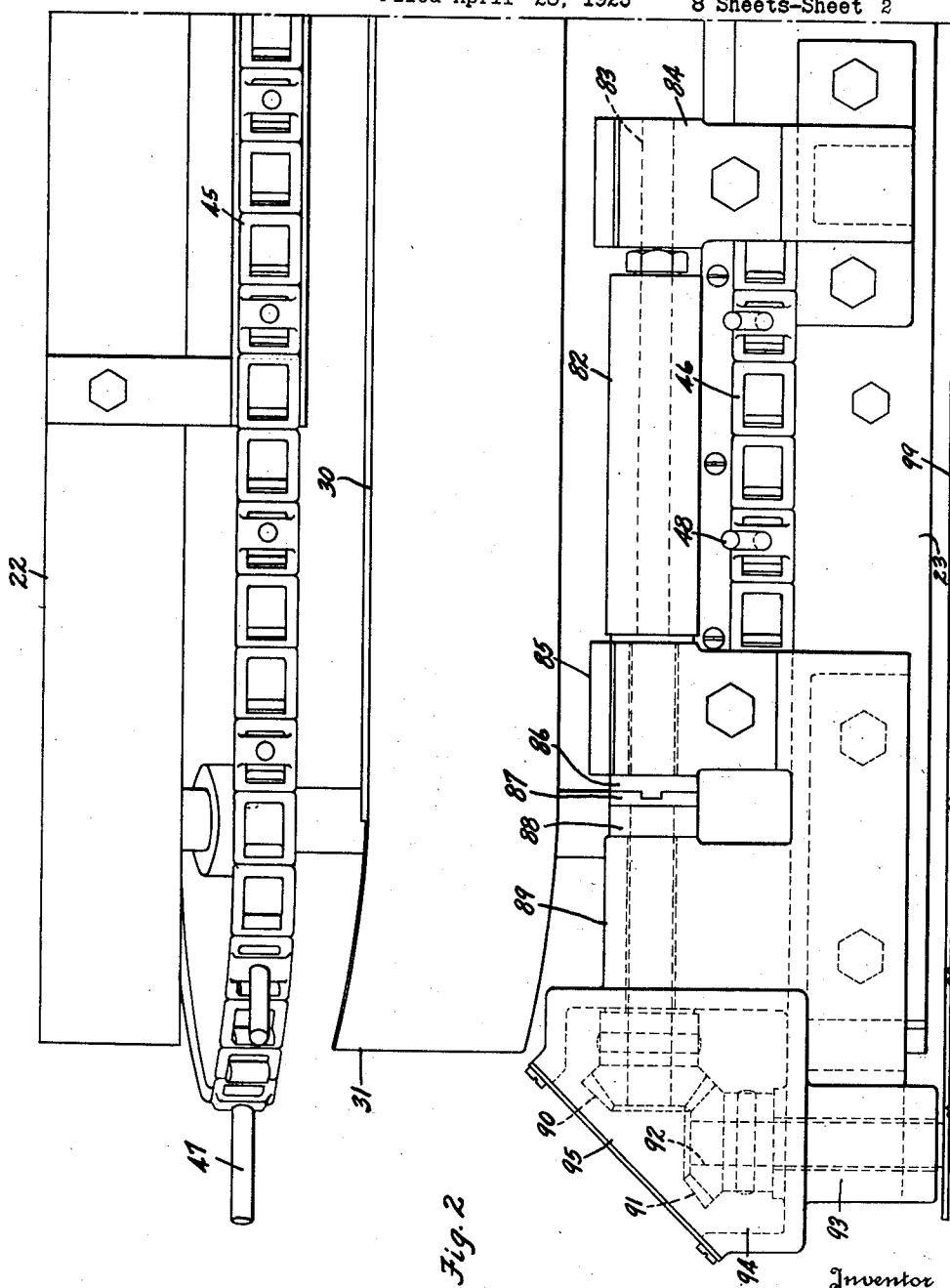


Fig. 2

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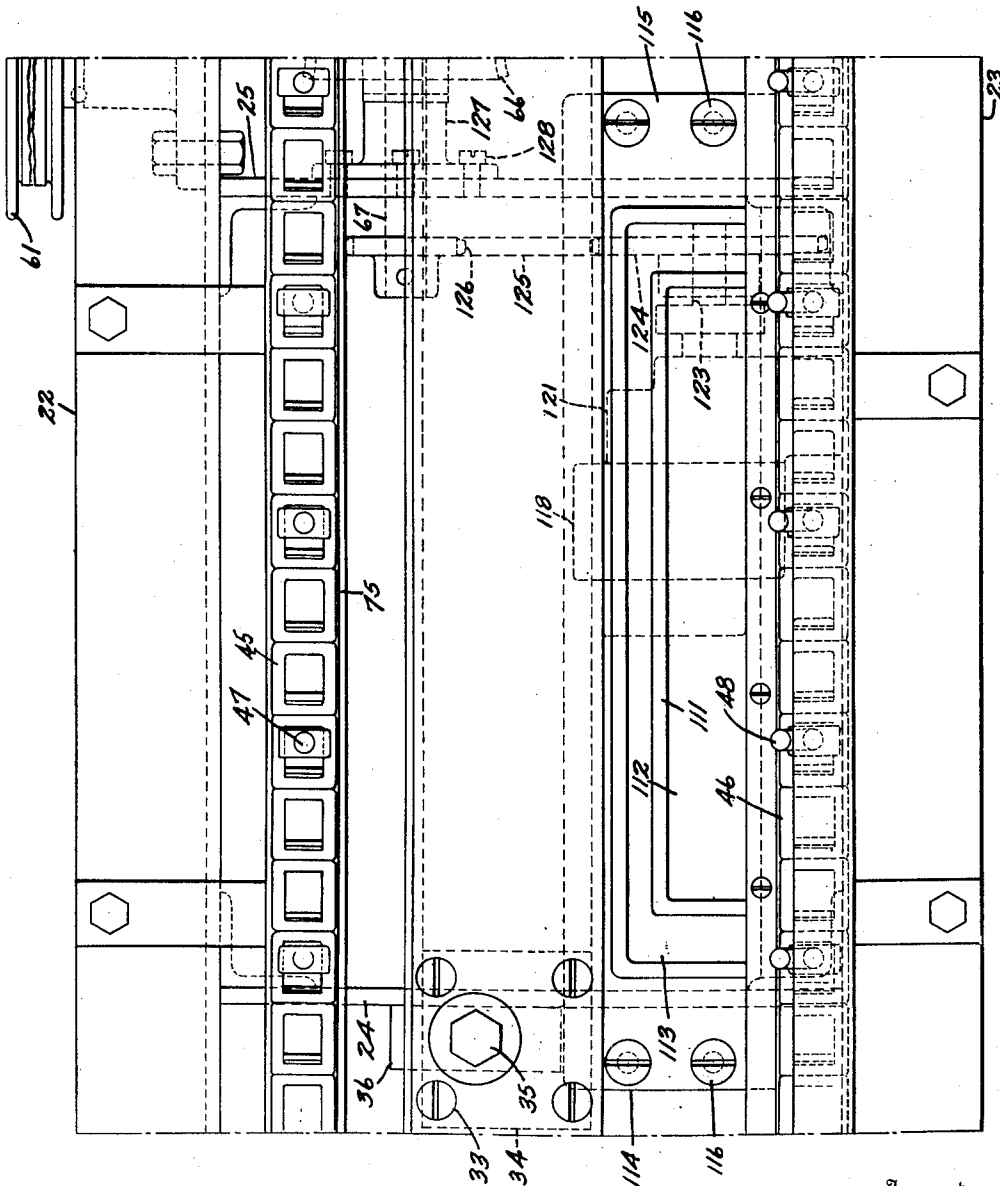
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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

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8 Sheets-Sheet 3



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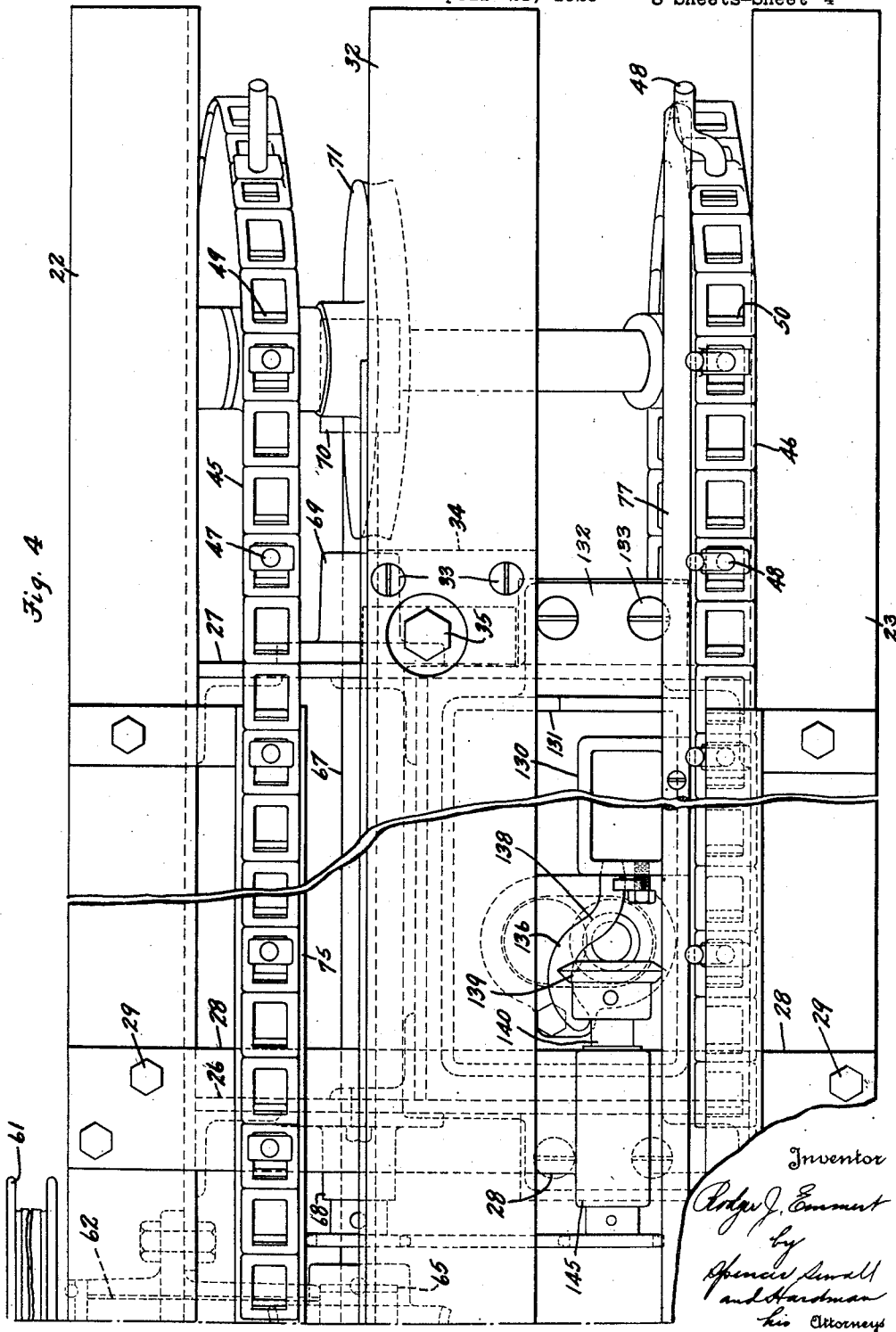
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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

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8 Sheets-Sheet 4



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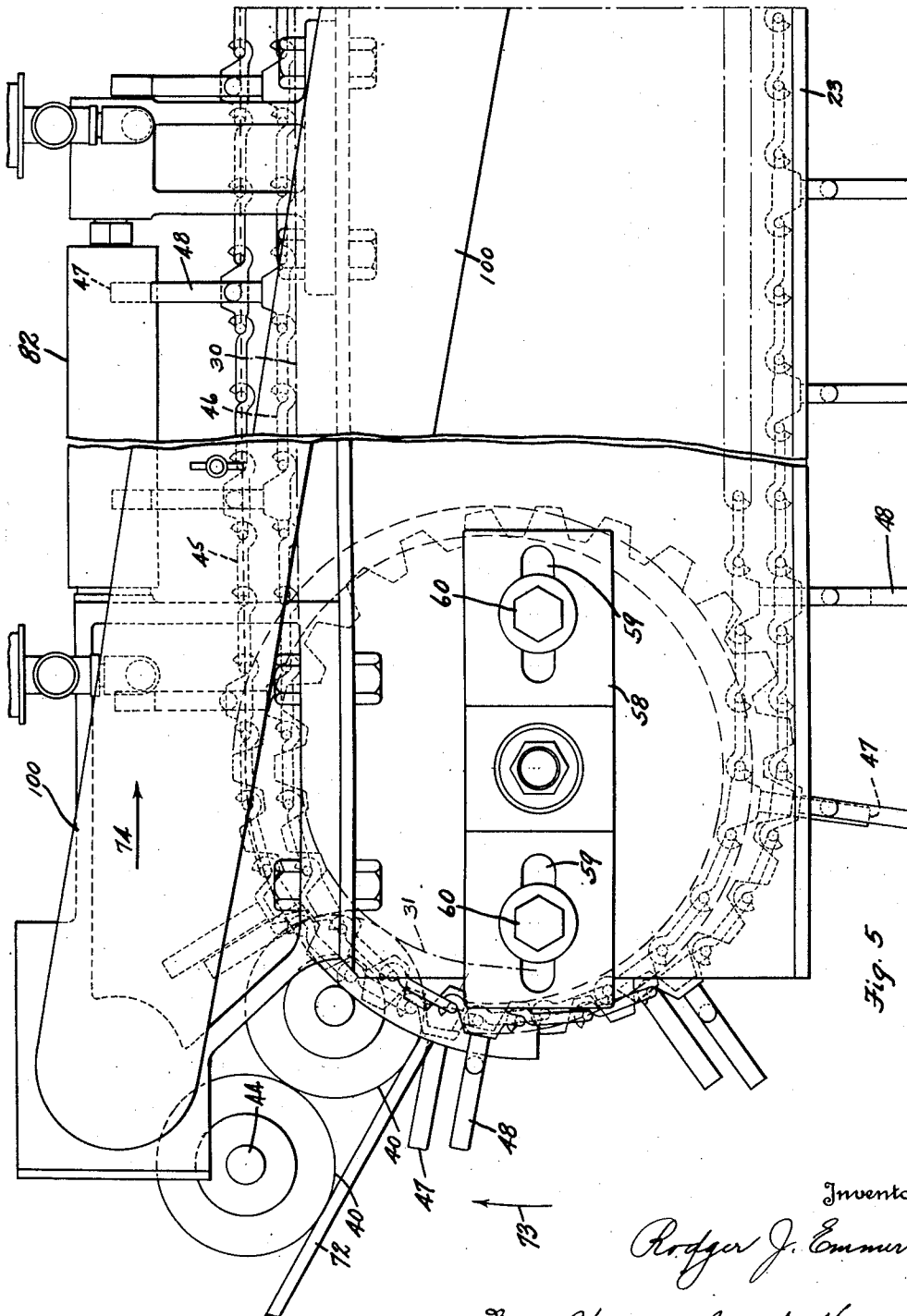
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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

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8 Sheets-Sheet 5



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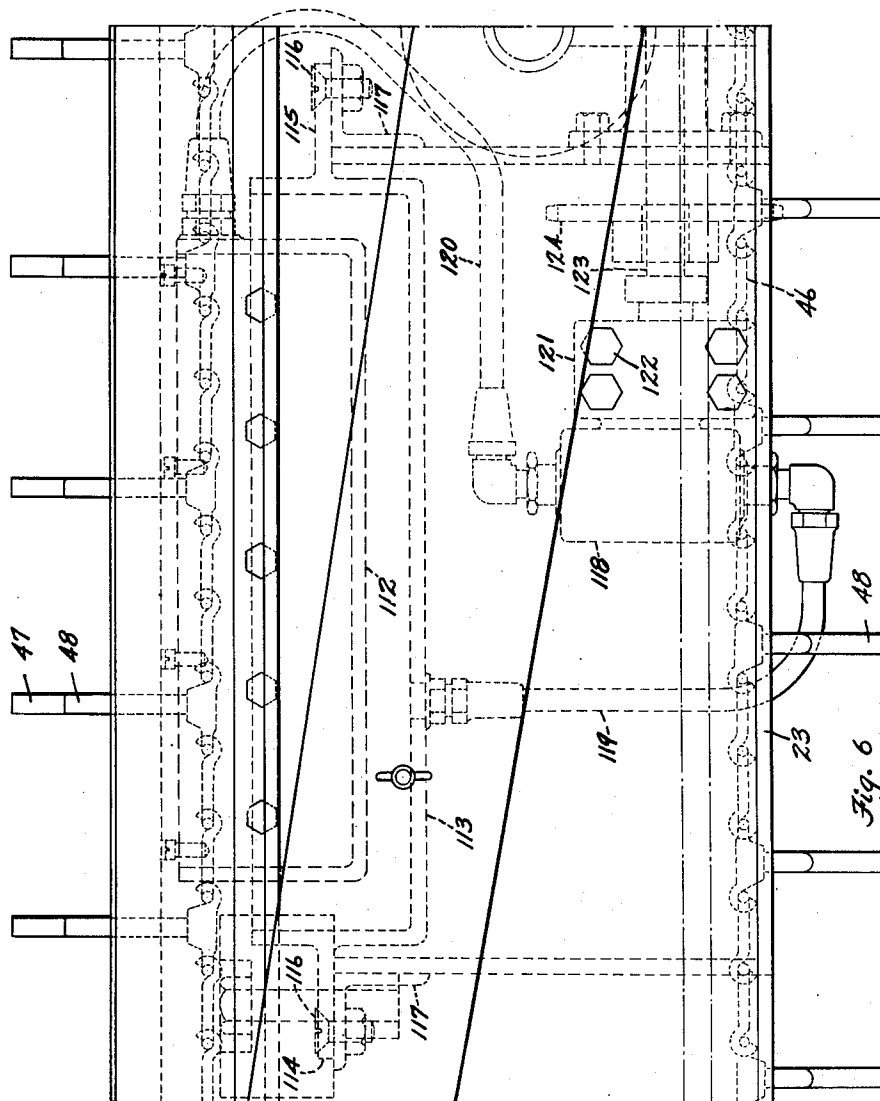
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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

Filed April 28, 1925 . 8 Sheets-Sheet 6



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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

Filed April 28, 1925

8 Sheets-Sheet 7

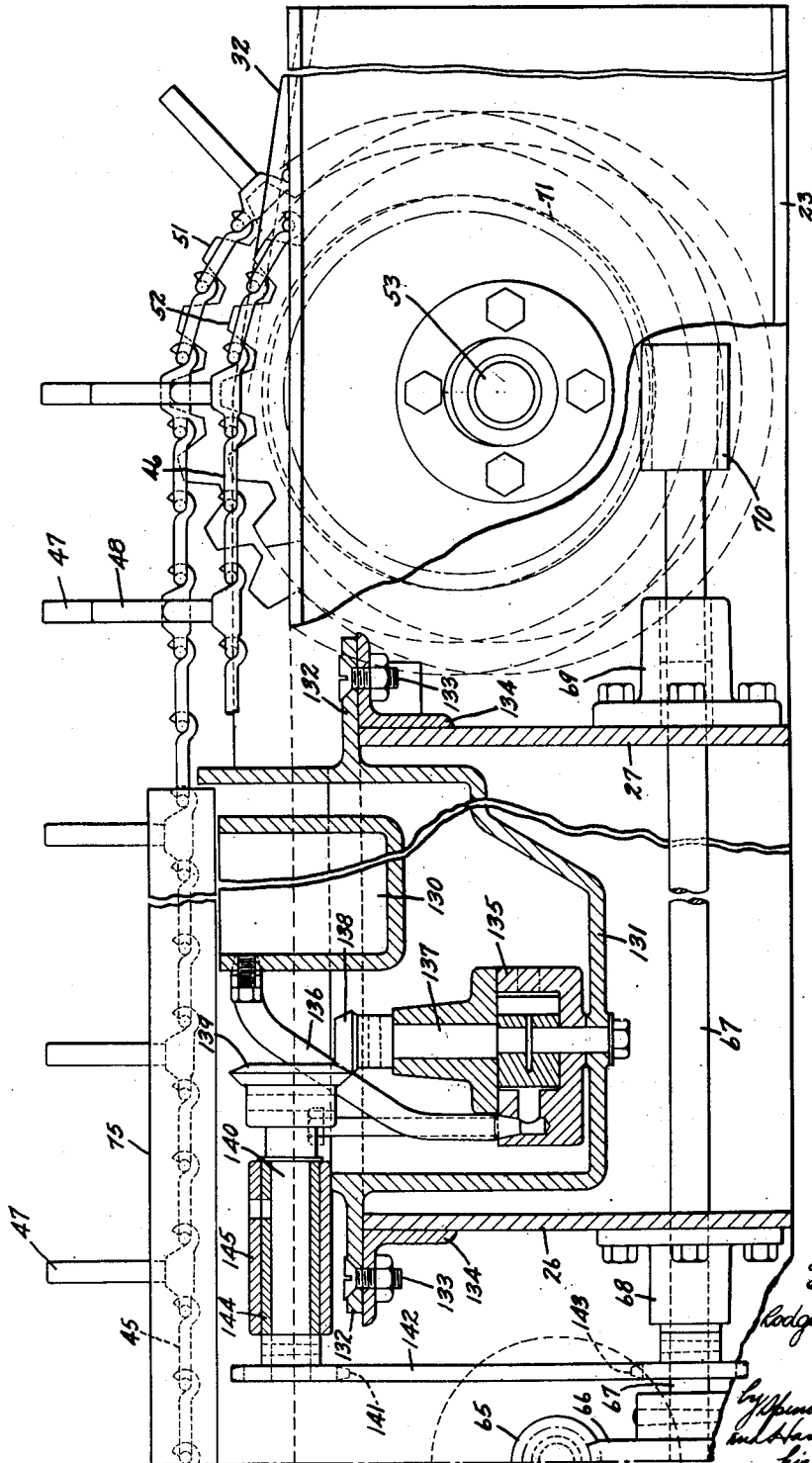


Fig. 7

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ARMATURE COMMUTATOR LEAD SOLDERING MACHINE

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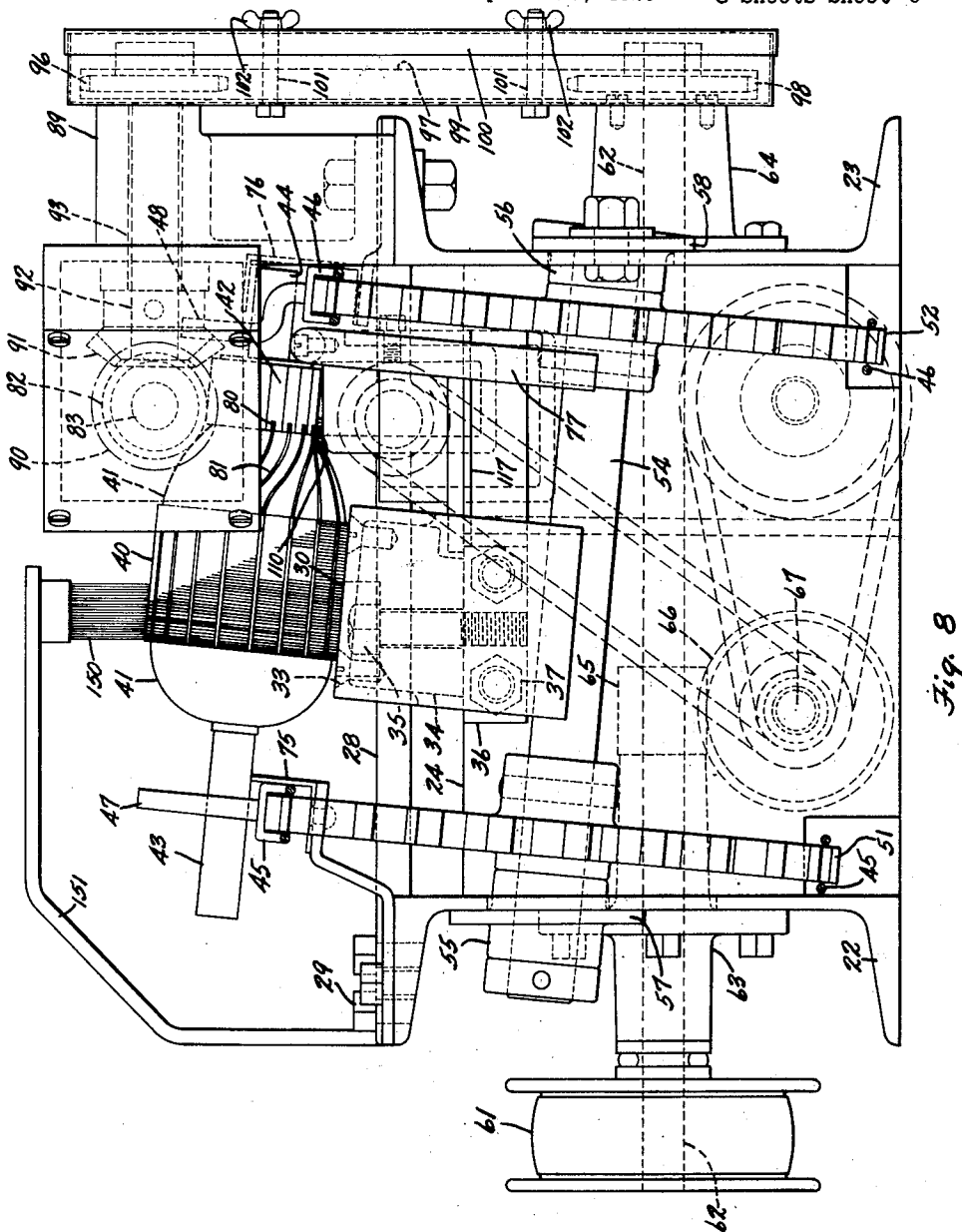


Fig. 8

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UNITED STATES PATENT OFFICE.

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ARMATURE-COMMUTATOR-LEAD-SOLDERING MACHINE.

Application filed April 28, 1925. Serial No. 26,420.

This invention relates to the manufacture of armatures for dynamo electric machines, and particularly to armatures having the ends of the armature coils received by notched members connected to or integral with the commutator segments.

The chief object of the invention is to reduce the cost of soldering the armature leads to the commutator bars, and to secure a more uniformly perfect soldering operation. In order to accomplish this aim, the invention provides a machine upon which the soldering operation can be carried out automatically. Preferably the machine comprises a platform over which the armatures are rolled by a chain conveyor carrying lugs for engaging the ends of the armature shaft. As the armature rolls along, the portion of the commutator or extension therefrom which receives the bared leads of the armature coils is engaged by a rotating brush for cleaning the commutator where the leads are joined on. After being cleaned, the lead-receiving portion rolls over a pad which is kept soaked with flux, and then over the surface of a bath of molten solder.

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 side elevation on a smaller scale than the remaining figures, showing a form of the invention;

Figs. 2, 3 and 4 together constitute a plan view of the machine shown in Fig. 1;

Figs. 5, 6 and 7 constitute a side view partly in section; and

Fig. 8 is an end view in the direction of arrow 8 in Fig. 1.

The frame of the machine includes standards 20 and 21 which support the ends of channel members 22 and 23 which are connected in spaced relation by cross plates 24, 25, 26 and 27 which are attached by angle bars to the webs of channels 22 and 23. The top flanges of channels support cross plates 28 secured by screws 29. A platform 30 is located between channels 22 and 23 and extends parallel thereto. The platform is

provided by the back of the web of a channel iron, the flanges being cut away at the ends 31 and 32 which are downwardly inclined. The platform 30 is attached by screws 33 to blocks 34 which in turn are attached by screws 35 to brackets 36. Brackets 36 are attached by screws 37 to the cross plates 24 and 27. As viewed in Fig. 8, the platform is oblique to the plane of the flanges of the channels 22 and 23. The platform 30 is adapted to receive a plurality of armatures, one of which is shown in Fig. 8 and comprises a core 40, coils 41, commutator 42 and a shaft, the ends of which are shown at 43 and 44.

In order to cause the armatures to roll along the platform 30, there are provided two conveying chains 45 and 46 provided with lugs 47 and 48 respectively for engaging the shaft ends 43 and 44, respectively, of the armatures which are placed on the platform 30. The chains 45 and 46 mesh with driving sprockets 49 and 50, respectively, and idle sprockets 51 and 52, respectively. Sprockets 49 and 50 are carried by a shaft 53 which is rotatably supported by bearings attached to the channels 22 and 23, the bearings being oblique to the webs of the channels. The sprockets 51 and 52 are connected with a shaft 54 supported by bearings 55 and 56 which are oblique to the webs of the channels and which are carried by bearing adjusting plates 57 and 58. As shown in Fig. 5, these plates are provided with slots 59 for receiving screws 60 having threaded engagement with the webs of the channels. By shifting the plates 58 horizontally the chain can be tightened. The conveyor is driven by any suitable power device having belt connections with a pulley 61, attached to a shaft 62 supported by bearings 63 and 64 attached to the channels 22 and 23 respectively. The shaft 62 carries a gear 65 meshing with a gear 66 attached to shaft 67 which is supported by bearings 68 and 69 attached to cross plates 26 and 27. Shaft 67 carries a gear 70 which meshes with a gear 71 carried by the shaft 53.

As the armatures roll down a feed chute 72 they fall successively into engagement with the cylindrical and downwardly inclined portion 31 of the platform 30 and

are conveyed over the platform by virtue of the engagement of the lugs 47 and 48 with the ends of the armature shaft, the direction of travel of these lugs being indicated by arrows 73 and 74 in Fig. 5. The chains 45 and 46 are guided laterally by angle 75 and channel 76 respectively. The top flange of channel 76 is located above the armature shaft ends 44 so as to limit the separation of the shaft ends 44 from a rod 77 which supports these shaft ends as the armatures roll along the platform 30. The rod 77 is also engaged by the end face 42^a of the commutator of each armature in order to limit the endwise movement of the armature in one direction.

Each segment of the commutator 42 is notched at 80 to receive the bared ends of certain armature leads 81 which have previously been wedged into the notches. As the armature rolls along the platform 30 the notched portion of the commutator is engaged by a revolving wire bristle brush 82 which thoroughly cleans the lead receiving portion of the commutator so that it will be thoroughly acted upon by the flux and will receive a uniform quantity of solder. The bristles of the brush will engage also the ends of the armature leads which are accessible through the notches. The cleaning brush 82 is supported by shaft 83 which is mounted on brackets 84 and 85 which are supported by the channels 23. Shaft 83 is connected by coupling members 86 and 87 with a shaft 88 supported by a bracket 89 carried by channel 23. Shaft 88 carries a gear 90 meshing with gear 91 carried by shaft 92 journaled in the bearing 93 provided by bracket 89. Bracket 89 provides a gear housing 94 having a cover 95. Shaft 93 carries a sprocket 96 engaging a sprocket chain 97 which engages a sprocket 98 carried by shaft 62. The sprockets 96 and 98 and the chain 97 are enclosed by a chain casing 99 and cover 100 which are clamped together by bolts 101 and wing nuts 102. The casing 99 is supported by the bearing 64 and the bracket 89.

After the commutator is cleaned by the brush 82 it rolls over a pad 110 of acid resisting felt material. The pad is mounted on the top edge of the wall 111 of a flux pot 112 which is supported within a flux supply vat 113. The pot and vat are formed preferably integrally and the walls of the vat are provided with flanges 114 and 115 which are attached by screws 116 to angle brackets 117 which are attached to the cross plates 24 and 25. Liquid flux is pumped from the supply vat 113 to the flux pot 112 by a gear pump 118 (see Fig. 6). Pump 118 is connected by an inlet pipe 119 with the vat 113 and by an outlet pipe 120 with the pot 112. As the flux overflows the pot 112, it is absorbed by the felt strip 110 which operates

as a wick to feed flux to the lead receiving portion of the commutator.

The pump 118 is carried by a bracket 121 which extends over the chain 46 and is attached to the channel 23 by screws 122. Pump 118 is driven by shaft 123 which carries a gear 124 connected by a chain 125 with a gear 126 which is connected with the shaft 67. A bearing 127 attached by screws 128 to the cross plate 25 provides an additional support for the shaft 67.

After being thoroughly fluxed the commutator 42 rolls into contact with the surface of a bath of molten solder which fills to overflowing a solder pot 130. Pot 130 is supported within a solder vat 131 provided with arms 132 which are secured by screws 133 to angle brackets 134 which are attached to the cross plates 26 and 27. Solder is continually pumped from the vat 131 to the pot 130 by a gear pump 135 which is connected with the pot 130 by a discharge pipe 136. The pump 134 is operated by a shaft 137 carrying a gear 138 meshing with a gear 139 which is attached to shaft 140 which carries a gear 141 connected by a chain 142 driven by a gear 143 which is connected with shaft 67. Shaft 140 is journaled in a bearing 144 carried by a bracket 145 which is formed integrally with the cross bar 28.

A wire bristle brush 150 is located for engagement by the armature core 40 while the commutator is rolling through the solder bath. The frictional engagement between the bristle brush 150 and core 40 is sufficient to retard movement of the core 40 in order to cause the armature to roll at a uniform speed while the commutator is in contact with the solder. In this way all of the commutator segments will receive the required amount of solder as the result of being in the solder bath for equal lengths of time. After the armatures have been rolled past the solder pot, they are brought into contact with the inclined portion 32 of the platform, and they leave the conveyor and roll into a suitable receptacle.

As only the lead-receiving portion of the commutator is cleaned and fluxed, very little solder will cling to and solidify upon the brush-engaging portion of the commutator, although the entire exposed surface of the commutator rolls over the solder bath.

It is readily apparent from the foregoing description that an armature may be soldered very quickly by the present machine and that practically no attention is required by the operator. The conveyor is loaded and unloaded automatically and the steps of wire brushing, fluxing and soldering are carried on successively by the automatic operation of the machine.

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:

5 1. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator, comprising in combination, a device for fluxing only the lead receiving portions, a device for applying solder thereto, and means for conveying the armature successively to said devices.

15 2. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator, comprising in combination, a device for cleaning the lead receiving portions, a device for fluxing only the lead receiving portions, a device for applying solder thereto, and means for conveying the armature successively to said devices.

20 3. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator, comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, and devices adjacent the platform respectively for successively applying flux and solder to the lead receiving portions of the commutator of the armature.

25 4. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator, comprising, in combination, a platform, means for causing the core of the armature to roll in contact with the platform, and devices adjacent the platform respectively for successively cleaning the lead receiving portions of the commutator of the armature; and applying flux and solder thereto.

30 5. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, a cylindrical, wire bristle brush rotating with its axis at right angles to the axis of the armature for cleaning the lead receiving portions of the commutator, and devices adjacent the platform respectively for successively applying flux and solder to the lead receiving portions of the commutator of the armature.

35 6. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator comprising in combina-

tion, a platform, means for causing the core of the armature to roll in contact with the platform, a flat liquid absorbing strip engaged by the lead receiving portions of the commutator as the armature rolls over the platform, means for supplying flux to the strip, and means for applying solder to said portions after leaving the flux applying strip.

40 7. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, means for applying flux to the lead receiving portions of the commutator, and means providing a bath of molten solder through which said portions revolve as the armature core rolls over the platform.

45 8. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, a flat liquid absorbing strip engaged by the lead receiving portions of the commutator as the armature rolls over the platform, means for supplying flux to the strip, and means providing a bath of molten solder through which said portions revolve as the armature core rolls over the platform.

50 9. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, devices adjacent the platform respectively for successively applying flux and solder to the lead receiving portions of the commutator of the armature, and means tending to cause the armature to rotate at a uniform speed while the commutator is in contact with the solder bath.

55 10. A machine for soldering the leads of armature conductors which are located in notches provided by lead receiving portions of the commutator, comprising in combination, a platform, means for causing the core of the armature to roll in contact with the platform, and means providing a bath of molten solder through which said portions revolve as the armature core rolls over the platform.

In testimony whereof I hereto affix my signature.

RODGER J. EMMERT.