Aug. 2, 1960 H. W. MOORE 2,947,427

ARMATURE WINDING AND TRANSFER MACHINE

Filed Sept. 27, 1954 4 Sheets-Sheet 1

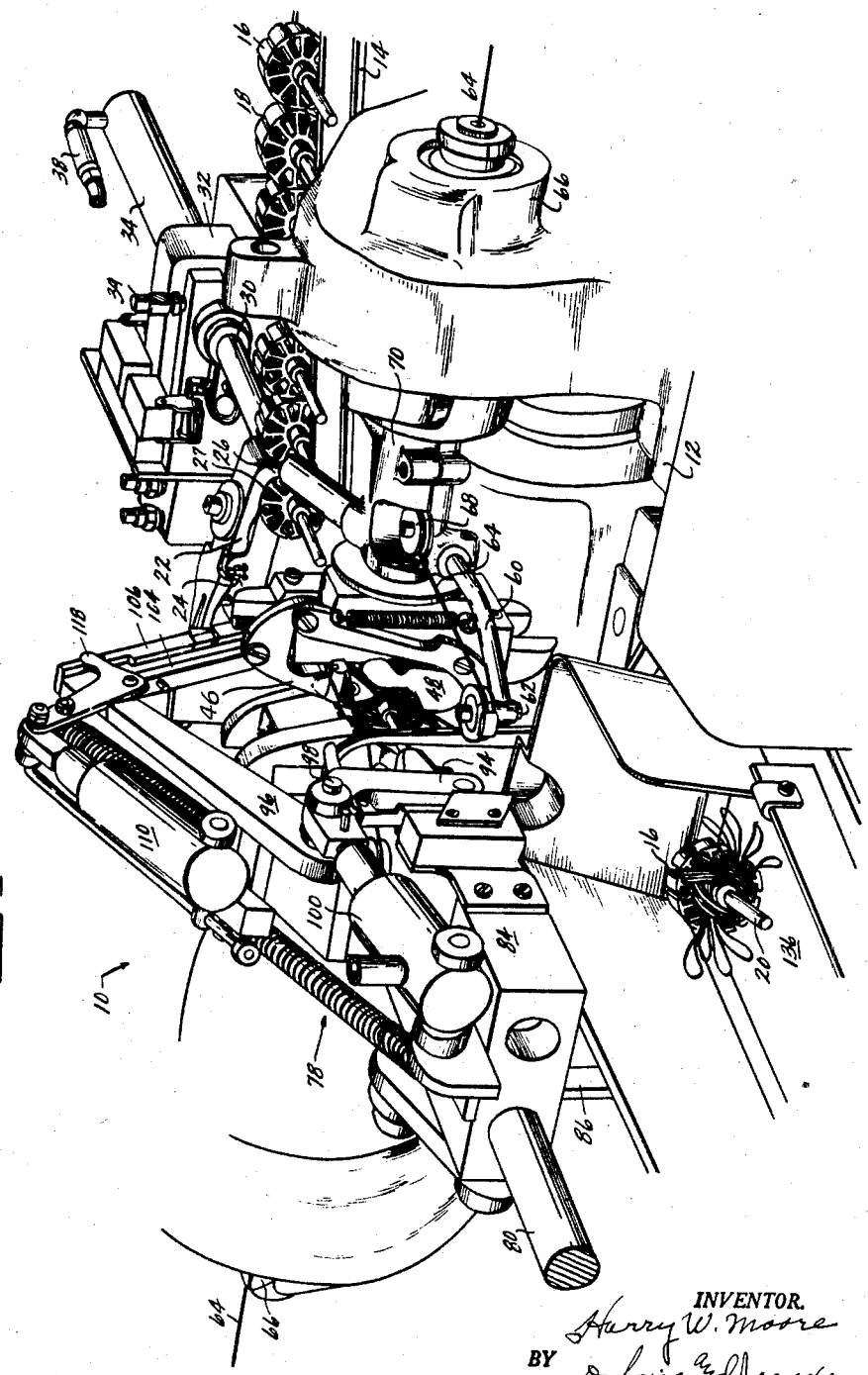


Fig 1

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ARMATURE WINDING AND TRANSFER MACHINE

Filed Sept. 27, 1954 4 Sheets-Sheet 2

Fig 2

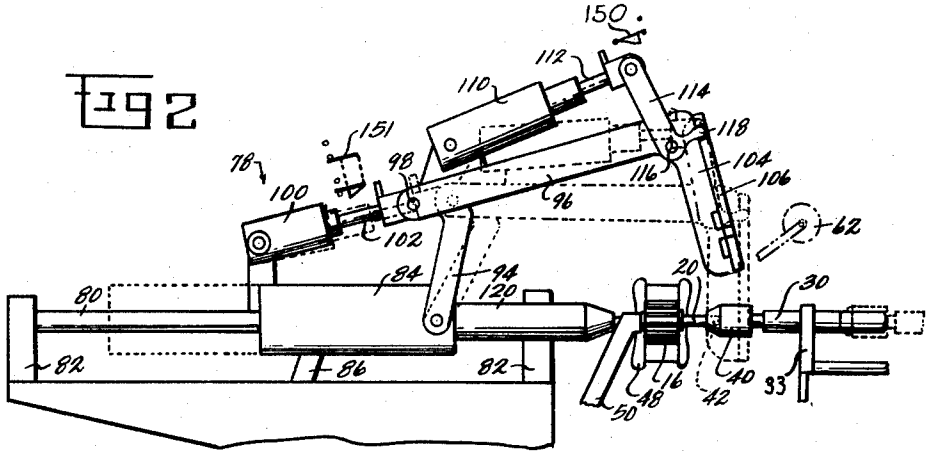


Fig 7

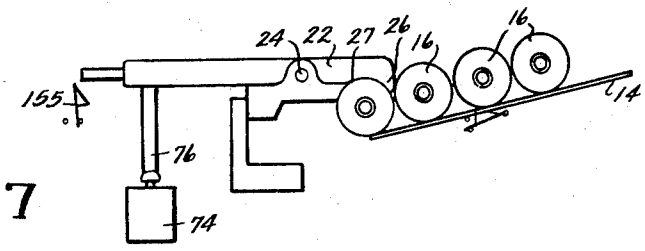


Fig 8

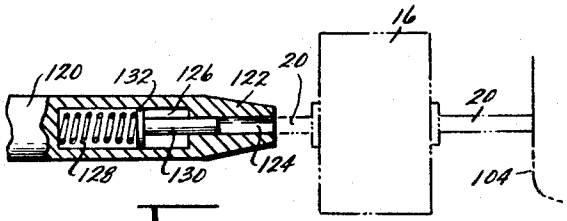
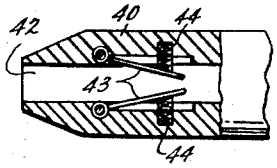


Fig 9



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ARMATURE WINDING AND TRANSFER MACHINE

Filed Sept. 27, 1954 4 Sheets-Sheet 3

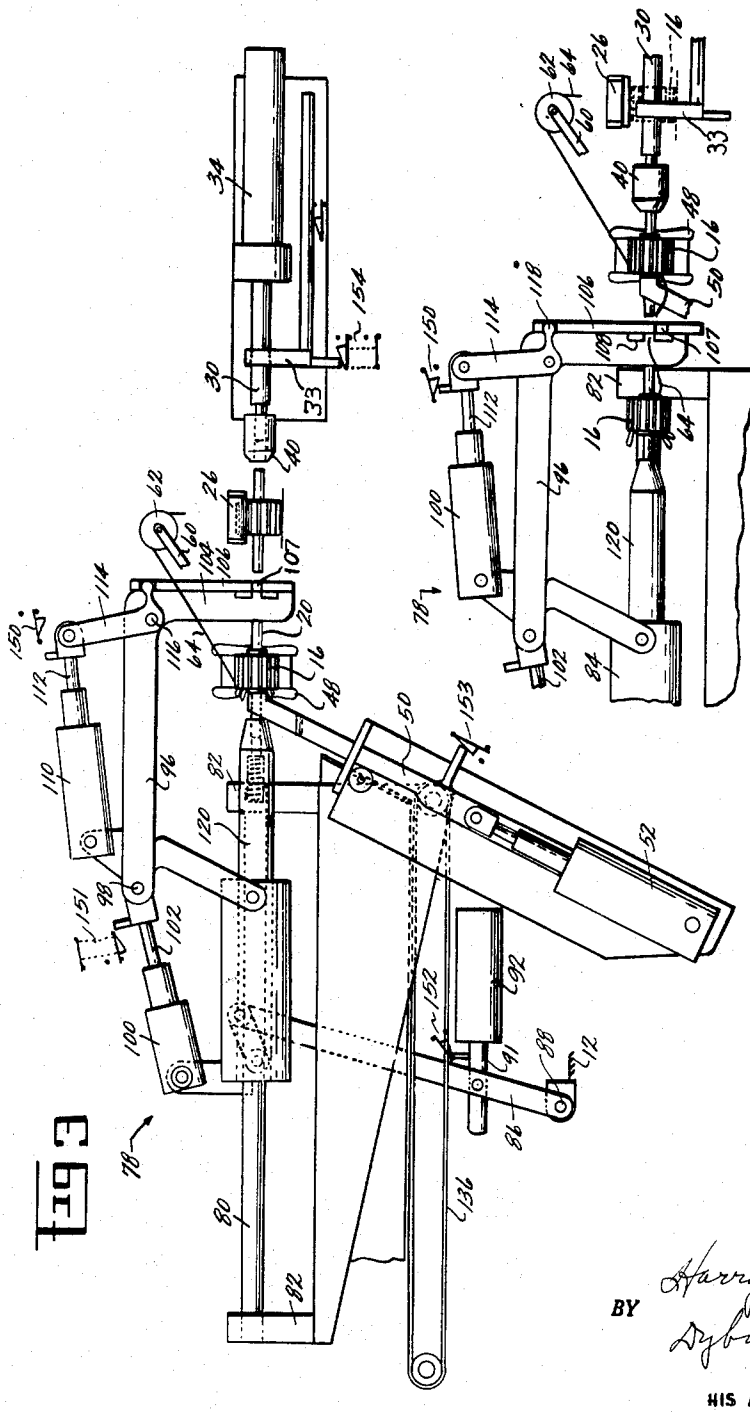


Fig 4

Fig 5

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ARMATURE WINDING AND TRANSFER MACHINE

Filed Sept. 27, 1954 4 Sheets-Sheet 4

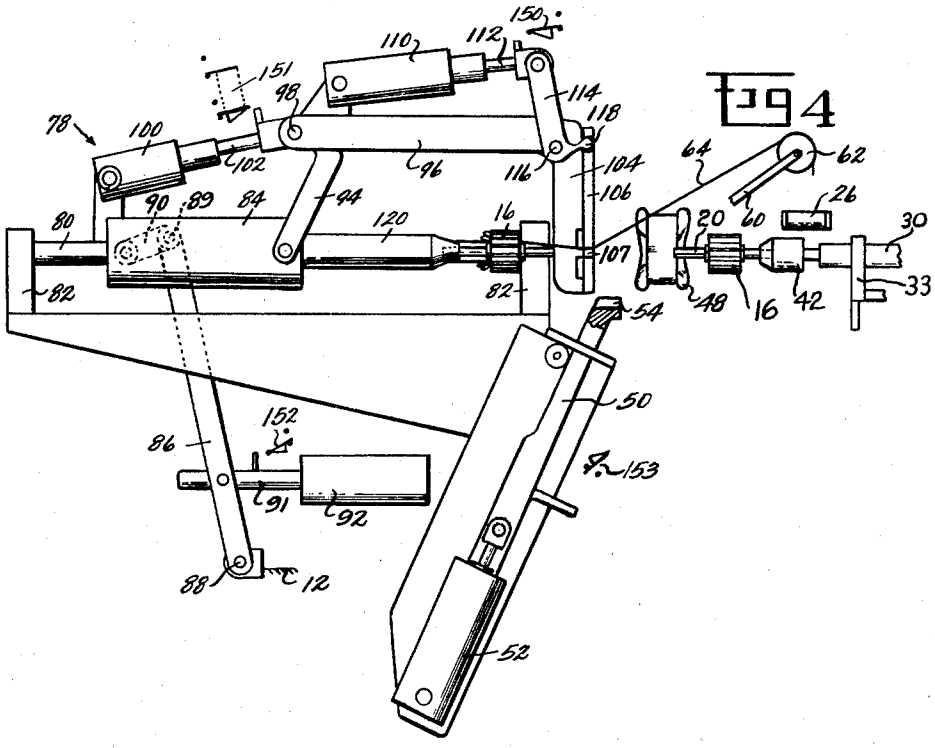


Fig 4

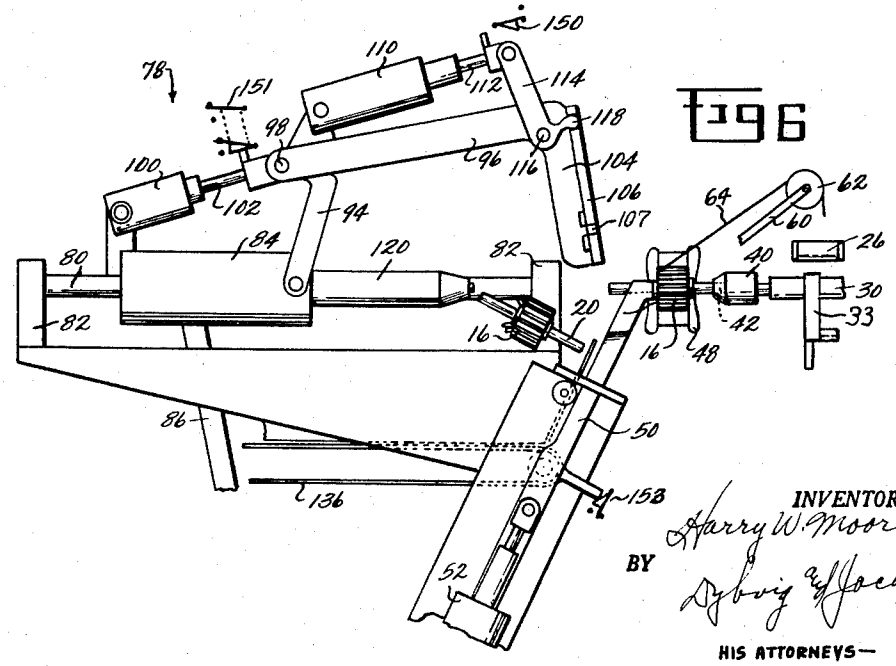


Fig 6

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Patented Aug. 2, 1960

2,947,427

ARMATURE WINDING AND TRANSFER MACHINE

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Filed Sept. 27, 1954, Ser. No. 458,606

7 Claims. (Cl. 214—1)

This invention relates to an armature winding and transfer machine. The invention relates more particularly to an automatic machine for winding coils of conductor wire into coil slots of armatures. This invention relates still more particularly to a machine for automatically inserting the armatures into a winding member and automatically dispensing the armatures from the machine after they are wound by the machine.

This application is substituted for the John M. Biddison application Serial No. 446,273, filed July 28, 1954 for Armature Winding and Transfer Machine now abandoned.

In the electrical manufacturing industry it is highly desirable to have a machine which is capable of automatically winding a plurality of armatures without manual operation of any type. Hence, an object of this invention is the provision of an automatically operating machine which receives a continuous series of armatures, automatically inserts an individual armature into a chuck or winding head member which retains the armature, the armature being held within the chuck while wire is automatically wound into the coil slots of the armature.

A further object of the invention is the provision of means for automatically removing the armature from the chuck or winding head after it is wound, the wound armature being retained by the removing means in spaced relation from the chuck while a subsequent armature is inserted into the chuck member and the winding operation is begun with unbroken lengths of the same wire.

Another object of this invention is the provision of an automatic transfer machine which is capable of high speed, efficient operation.

Other objects and advantages reside in the construction of parts, the combination thereof and the mode of operation, as will become more apparent from the following description.

In the drawings, Figure 1 is a general perspective view of the armature winding and transfer machine of this invention.

Figure 2 is a fragmentary side elevational view of the machine of this invention, showing one of the initial steps in its operation upon an armature.

Figure 3 is a fragmentary side elevational view of the machine of this invention, showing a subsequent step in the automatic operation upon an armature.

Figure 4 is a fragmentary side elevational view of the machine of this invention disclosing a subsequent step in the operation of the machine of this invention.

Figure 5 is a fragmentary side elevational view showing the operation in which a wire extending from a wound armature to an armature which is being wound is severed.

Figure 6 is a fragmentary side elevational view of the machine of this invention disclosing the manner in which the machine operates to discharge a wound armature therefrom.

Figure 7 is a diagrammatic view disclosing a plurality of armatures being received upon a receiving track of a machine of this invention and showing the retaining means for positioning one of the armatures in a position from which it is inserted into the chuck member of the machine of this invention.

Figure 8 is an enlarged fragmentary side sectional view showing the engagement rod member of the unloader member of the machine of this invention.

Figure 9 is an enlarged side elevational view with portions broken away of the sleeve member of the loader member of this invention.

Referring to the drawings in detail, an armature winding and transfer machine **10** of this invention comprises a support base **12**. An inclined delivery track or rail **14** is attached to the base **12** and supports a plurality of armatures **16** provided with coil slots **18**. Each armature **16** is also provided with a shaft **20**. The armatures **16** roll downwardly upon the inclined track **14** in seriatim from a source of supply.

As shown in Figures 1 and 7, the lowermost armature **16** positioned upon the inclined track or rail **14** is retained in its position upon the track **14** by means of a positioning arm **22** pivotally supported by means of a pin **24**. Adjacent the end of the positioning arm **22** is a finger member **26** formed by an arcuate recess **27** adjacent the end of the positioning arm **22**. The finger **26** acts as an abutment surface for the next adjacent armature **16** as clearly shown in Figures 1 and 7.

A reciprocally operable loader rod **30** is mounted upon a pedestal **32** at one side of the track **14** normal thereto and adjacent the end thereof. Attached to the rod **30** is a switch operator **33** which aids in indicating the position of the rod **30**. The loader rod **30** extends into a fluid motor **34** and is operable thereby. The reciprocal operation of the loader rod **30** may be actuated by a fluid introduced into the fluid motor **34** through either one of a pair of fluid inlets **38** and **39**.

At the end of the loader rod **30** is a sleeve member **40**, integral therewith, which is provided with a longitudinal cavity **42** extending a portion of the length thereof. As shown in Figure 9, the cavity **42** of the sleeve member **40** is provided with a plurality of clamping fingers **43** resiliently positioned by means of a plurality of spring members **44**.

The loader rod **30** is provided for transferring an armature **16** retained by the positioning arm **22** to a chuck member or winding head **46** which comprises a pair of clamping members **48**. The positioning arm or brake arm **22** loosely retains the lowermost armature **16** upon the track **14** in concentric alignment with the clamping members **48** of the chuck member **46**. Movement of the loader rod **30** toward the track **14** causes the sleeve member **40** to encircle one end of the shaft **20** of the armature **16** retained by the positioning arm **22** upon the track **14**. The end of the shaft **20** is thus retained within the recess **42** by the clamping fingers **43** within the sleeve **40**, and movement of the loader rod **30** toward the chuck member **46** carries the lowermost armature **16** from the track **14** into the chuck **46**.

The chuck **46** is then automatically actuated by any suitable means so that movement one toward the other of the clamping members **48** retains the armature **16** therein, as clearly shown in Figure 2.

A locator rod **50** actuated by a fluid motor **52** has a bifurcated end portion **54** which aids in alignment of the armature **16** within the chuck **46**. Some armatures are provided with a loosely attached insulating collar upon the shaft thereof. The bifurcated end **54** also aids in retaining this insulating collar in proper position during the winding process. The locator rod **50** is automatically actuated by the fluid motor **52** to an upward position as the loader rod **30** moves the armature **16** into the chuck **46**. While the armature **16** is thus retained within the chuck **46**, the armature **16** may be

provided with a plurality of coils of conductor wire in the armature slots 18 thereof.

This winding process performed while an armature is retained by the winding head 46 may be automatically accomplished in a manner as disclosed in the Biddison copending application Serial No. 353,160, filed May 5, 1953 for Armature Winding Machine, now abandoned, or as disclosed in the Biddison patent No. 2,670,145.

As described in the aforementioned application and patent, a pair of flier rod members 60 are employed, each flier rod 60 having a wire guide wheel 62. The armature 16 is automatically indexed several times so that all of the coil slots of the armature are wound by the wires extending from one or more supply sources. A supply wire 64 for each of the flier rods 60 is provided from a separate spool and each wire 64 enters the machine 10 at the ends thereof through a tensioning device 66, as best shown in Figure 1. The tensioning device may be made according to the disclosure in the aforesaid patent. Each wire 64 after passing through its respective tensioning device 66 extends over an idler wheel 68 mounted upon a rotatable shaft 70 adjacent each tensioning device 66. The winding operation may, also, be performed by rotation of the chuck member or winding head 46 while the fliers 60 remain stationary. Thus, rotation of the fliers 60 with respect to the winding head or vice versa may be employed in the winding process.

After all of the slots 18 of the armature 16 are completely wound by coils of wire formed by the flier rods 60, the winding operation of the armature is completed and the rotation of the flier rods 60 comes to a stop. The supply wires 64 used in the winding remain uncut and these supply wires 64 extend from the armature 16 over the wire guide wheels 62, and to the tensioning device 66 which holds the strands of supply wire taut.

During the winding operation the loader rod 30 is retracted by the fluid motor 34 to a position as shown in Figure 3. The loader rod 30 is easily retracted from engagement with the shaft 20 due to the fact that as the armature 16 is retained by the chuck 46, the clamping fingers 43 of the sleeve 40 readily slide from the shaft 20.

Also, during the winding operation, following the retraction of the loader rod 30, the positioning arm 22 is pivotally operated by means of a fluid motor 74 through a piston rod 76 attached to the end of the positioning arm 22 opposite the finger 26. The positioning arm 22 pivotally operates allowing the next armature 16 to roll downwardly upon the track 14 and the positioning arm 22 again operates to hold this lowermost armature 16 in the position as shown in Figure 7. Thus, the lowermost armature 16 upon the track 14 is positioned for immediate movement into the chuck 46 after the winding operation and as the armature within the chuck is removed therefrom.

During the winding operation an unloader unit 78 operates to position itself for removal of the armature 16 from the chuck 46 immediately upon completion of the winding operation. The unloader unit 78 comprises a horizontally disposed stationary guide rod 80. The guide rod 80 is supported by a pair of pedestal members 82. Slidably supported by the guide rod 80 is a block or carrier member 84 which is operable by means of a link bar 86 pivotally attached at one end thereof to the support structure 12 by means of a pin 88. The other end of the link bar 86 is pivotally attached by means of a pin 89 and a link 90 to the slidable block 84. Intermediate the ends of the link bar 86 is operably attached a piston rod 91 which may be actuated by a fluid motor 92.

A support leg 94 is pivotally attached to the block 84 and extends upwardly therefrom. Pivotally carried at the end of the support leg 94 is an arm member 96. The arm 96 is pivotally operated by a fluid motor 100 having a piston rod 102 attached to a pin 98 which attaches the piston rod 102 and the support leg 94 to the arm 96.

At the end of the arm 96 opposite the pin 98 is a finger 104. The finger 104 of the arm 96 is provided with a cutter element 106 having a plurality of cutting notches 107 cooperable with notches 108 of the finger 104. Mounted upon the arm 96 is a fluid motor 110 provided with an actuator rod 112. The actuator rod 112 attaches to one end of a connector link 114 which is pivotally attached to the arm 96 by means of a pin 116. The pivotal movement of the connector link 114 operates to cutter blade 106 by means of a boss 118 which is disposed substantially normal to the connector link 114 at the end thereof adjacent the pin 116. The cutter blade 106 is slidably attached to the finger 104.

An unloader rod 120 is also attached to the block 84. The unloader rod 120 is positioned in substantial alignment with the center of the chuck 46. As best shown in Figure 8, the unloader rod 120 is provided with a tapered end 122. The tapered end 122 has a longitudinal bore 124 concentrically positioned therein. Joining the bore 124 is a larger cavity 126 in which is positioned a helical compression spring 128. Slidably movable within the bore 124 is a plunger rod 130 having an end extending within the cavity 126. Integral with the plunger rod 130 at the end thereof within the cavity 126 is a disc member 132, against which the compression spring 128 is resiliently positioned.

During the winding operation upon the armature 16 retained by the chuck 46, the carrier member 84 is moved by the link bar 86 toward the chuck 46, the tapered end 122 of the unloader rod 120 encloses the end of the shaft 20 of the armature 16 which is retained by the chuck 46, and the end of the shaft 20 forces the plunger rod 130 a greater distance within the cavity 126 compressing the spring 128. Thus, one end of the shaft 20 is retained by the unloader unit 78.

After the loader rod 30 has been retracted, as described above, the fluid motor 100 is actuated to pivotally operate the arm 96, thus moving the finger 104 downwardly to slidably engage the other end of the shaft 20 as shown by dotted lines in Figure 2. Therefore, while the armature 16 is held by the chuck 46 and while the armature 16 is being wound, the shaft 20 of the armature 16 within the chuck 46 is firmly grasped by the unloader unit 78, as shown in Figure 3. Hence, the unloader unit is positioned for immediate transfer of the armature 16 from the chuck member 46 upon completion of the winding operation.

After the armature 16 within the chuck 46 is completely wound, the locator rod 50 is retracted downwardly by the fluid motor 52, as shown in Figure 4.

Following the retraction of the locator rod 50, the clamping members 48 of the chuck 46 are automatically opened by movement of both of the clamping members 48 one from the other. This releases the armature from the retention by the chuck 46 and the armature 16 is then retained only by the unloader unit 78. The fluid motor 92 then causes the carrier unit 84 to slidably move upon the guide rod 80. Thus, the unloader unit 78 transfers the armature 16 to a position in spaced relation to the chuck member 46, as shown in Figure 4. Retraction of the locator rod 50, as discussed above, to a position as shown in Figure 4 permits the armature 16 held by the unloader unit 78 to pass over the bifurcated end 54 of the locator rod 50.

When the unloader unit 78 moves the armature 16 from its position within the chuck 46, each of the supply wires 64 disposed between the armature 16 and the flier guide wheels 62 remain uncut. The supply wires 64 from each of the flier guide wheels 62 to the wound armature 16 is extended in length as the armature 16 is moved from the chuck member 46 by the unloader unit 78. Each of the wires 64 thus remains taut between the wound armature 16 and the flier guide wheel 62 as shown in Figure 4.

As discussed above, during the winding operation a subsequent armature 16 is moved upon the track 14 to axial alignment with the chuck 46. As the wound armature 16

is removed by the unloader unit **78** from the chuck **46**, this next subsequent armature positioned in axial alignment with the chuck **46** is moved toward the chuck member **46** by the loader rod **30**, as shown in Figure 4.

The clamping members **48** of the chuck member **46** then operate to engage the next armature **16**, as shown in Figure 5, and the winding operation thereon begins from the supply wires **64**, which extend between the wound armature **16** and the wire guide wheels **62** of the flier rods **60**.

Hence, the winding process begins upon the armature held by the chuck member **46**. The wires **64** are maintained taut. During the first revolution of the winding fliers **60**, as wire is placed in the coil slots of the armature **16** retained by the chuck **46**, each of the wires **64** is caught within one of the notches **107** of the knife **106**. These wires extending between these two armatures within the machine are then in a position to be severed by the cutting knife **106** of the finger **104**. After several revolutions of the winding flier rods **60** are completed, this cutting action occurs. The cutting notches **108** of the finger **104** and the cutting notches **107** of the cutting knife **106** cooperate in cutting the wires extending between the two armatures. The cutting operation is actuated by the fluid motor **110** which slidably moves the cutting knife **106** with respect to the finger **104**.

As shown in Figure 5, the severing operation by the knife **106** occurs while the winding operation upon the armature **16** retained by the chuck member **46** is in progress. As shown by dotted lines in Figure 5, which represent the next subsequent armature on the track **14**, this next subsequent armature remaining upon the receiving track **14** is held by the finger **26** of the positioning arm **22** from movement into a position in alignment with the loader rod **30**. Naturally, the positioning arm **22** is not actuated to permit a subsequent armature **16** to come into loading position within the arcuate portion **27** of the brake arm **22** until the loader rod **30** has been retrated to loading position.

After the supply wires **64** extending between the wound armature and the armature being wound are severed, the unloader unit **78** operates to discharge the wound armature **16** therefrom as shown in Figure 6. In order to discharge the wound armature **16** from the unloader unit **78**, the fluid motor **100** is so controlled as to actuate pivotal movement of the arm **96** upwardly, thus causing upward movement of the finger **104** which has been engaging the end of the shaft **20**. The other end of the shaft **20** is located within the unloader rod **120**. When the finger **104** is raised upwardly disengaging the end of the shaft **20** by pivotal movement of the arm **96**, the spring member **128** forces the plunger **130** outwardly from the bore **124** causing the shaft **20** of the armature **16** to be thrust outwardly from the unloader rod **120** as shown in Figure 6.

As shown in Figure 1, an armature **16** which has been wound and discharged from the unloader unit **78** falls upon an endless moving belt **136**, which carries the wound armature away from the armature winding and transfer machine of this invention.

As discussed above, the loader rod **30** is retracted during the winding operation so that it is positioned to immediately insert another armature into the chuck **46** as an armature is being withdrawn by the unloader unit **78**. Likewise, after the unloader unit **78** has discharged an armature upon the endless moving belt **136**, the unloader unit **78** immediately moves toward the chuck **46**. The unloader rod **120** engages one end of the shaft **20** of the armature **16** held by the chuck **46** before the loader rod **30** is retracted. Then after the loader rod **30** is retracted, the finger **104** of the unloader unit **78** engages the end of the shaft **20** opposite the unloader rod **120**. Thus, during the winding operation, the unloader unit **78** and the loader rod **30** are positioned to transfer armatures immediately following the completion of the winding operation upon the armature **16** held by the chuck **46**.

Thus, it may be readily understood that the machine of this invention automatically receives armatures upon the inclined track **14**. The armatures are automatically inserted into a chuck member or winding head, while a wound armature is being transferred therefrom. Each armature is retained within the chuck member while it is automatically wound by a pair of winding fliers. After the completion of the winding operation upon the armature which is retained by the chuck member, the armature is unloaded from the chuck member and moved to another portion of the machine while a subsequent armature is moved into the chuck from the receiving track of the machine.

The wire which is used to wind the coils in the coil slots of the armature comprises one or more separate continuous lengths of wire which are brought into the machine through tensioning devices. These continuous lengths of wire are not severed at the completion of the winding process upon an armature but these lengths of wire are held taut while the armature which has been completely wound is moved to another portion of the machine and another armature is inserted into the chuck member. The armature within the chuck member is partially wound by these continuous lengths of wire before these lengths of wire are severed. Hence, during the winding process upon the armature which is retained within the chuck, the armature which has been wound and which is retained by the unloader unit is discharged from the machine; this wound armature drops upon a conveyor belt which carries the wound armature from the winding and transfer machine of this invention and the unloader unit returns to grasp the armature retained by the chuck member.

A high rate of operational speed and efficiency is obtained with a machine of this invention due to the fact that various functions of the machine may be carried on simultaneously. The transfer elements may move and operate during the winding operation. The transfer elements may be positioned in contact or in grasping engagement with two different armatures during the winding operation so that immediately following the winding operation one armature is removed from the chuck while another armature is moved into the chuck. Furthermore, no time is lost by having to sever wires from a wound armature and by having to restart wires in another armature. In this invention wires are not severed from a wound armature until the winding operation is begun on a subsequent armature.

Automatic control of the operation of the elements of this invention may be carried out by any suitable means. A control circuit provided with means for proper actuation of the sequence of operations may include a plurality of indicating switches such as switches **150**, **151**, **152**, **153**, **154** and **155**, shown in the drawings. These switches may be of an electrical, mechanical or fluid type. The control system which determines the proper sequence of operation may also be of an electrical, mechanical or fluid type.

This invention may be used in cooperation with and as part of the combination set forth in the Biddison copending application for automatic transfer mechanism, Serial No. 378,099, filed September 2, 1953, now Patent No. 2,865,484.

The transfer machine of this invention may be also employed for operation upon various articles which are different from armatures. Other functions may be performed upon such articles other than that of winding coils of wire upon them while such articles are retained by a chuck member. Various functions may be performed upon such articles during the transfer process. The automatic transfer machine of this invention may be

used for the automatic movement of articles of various types from one position to another position.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described my invention, I claim:

1. An armature handling machine for armatures of the type provided with a shaft, the combination comprising support structure, an elongate inclined receiving track rigidly attached to the support structure for supporting a plurality of armatures, a positioning arm member pivotally mounted adjacent the receiving track and engageable with one of the armatures to retain the position thereof, a reciprocally operable horizontally movable loading member supported adjacent the positioning arm and engageable with one end portion of the shaft of an armature for axial movement of the armature, a clamping member for retaining an armature, the loading member being operable to engage the shaft of an armature retained by the positioning arm and to transfer the armature in axial movement from the receiving track to the clamping member, an unloader member movably carried by the support structure, the unloader member being provided with means abuttingly engageable with opposite ends of the armature shaft for movement thereof from the clamping member, the unloader member moving the armature from the clamping member in the same direction as the movement of the armature to the clamping member by the loading member, the armature thus moving axially in a substantially straight line from the receiving track to the clamping member entering the clamping member at one portion thereof and leaving the clamping member from an opposite portion thereof.

2. In a transfer machine for articles of manufacture of the type having a shaft, the combination comprising support structure, a chuck member attached to the support structure, an elongate inclined rail carried by the support structure for supporting a plurality of articles of manufacture in seriatim relation, the rail having a lower portion thereof adjacent the chuck member, the shaft of each article of manufacture carried by the rail being normal to the rail, a loading member adjacent the rail and movably operable to a position adjacent the chuck member, the loading member including means engageable with on end of the shaft of an article of manufacture for moving the article of manufacture axially from the rail to the chuck member, an unloader member including a pivotally operable arm member engageable with one end of a shaft and abutment means engageable with the opposite end of the shaft for movement of an article of manufacture from the chuck member, means carried by the unloader member for pivotally moving the arm member for engaging and disengaging the shaft, and means carried by the support structure for reciprocally moving the unloader member for moving an article of manufacture from the chuck member in the same direction as the movement of the article to the chuck member by the loading member.

3. An armature handling apparatus comprising a chuck member, an elongate rail member having a portion adjacent the chuck member, the rail member being adapted to support a plurality of armatures, a loader member adjacent the rail member and reciprocally operable to engage an armature for movement thereof in an axial direction from the rail member to the chuck member, a reciprocally operable unloader member movable adjacent the chuck member and engageable with an armature retained by the chuck member for movement of the armature from the chuck member, the movement of the armature from the chuck member being in the same direction as the line of movement of the armature to the chuck member, the unloader member including a rod member, the unloader member also including a pivotally mounted arm, the rod member and the arm being operable to cooperably grasp an armature retained by the chuck member at opposite portions of the armature.

4. In a machine for performing work upon articles of manufacture the combination comprising support structure, a receiving rail for supporting articles of manufacture, a chuck member carried by the support structure in spaced relation from the receiving rail, a pivotal positioning arm operable about an axis normal to the receiving rail and in substantial alignment therewith, the positioning arm being engageable with an article of manufacture to retain the article of manufacture upon the receiving rail in alignment with the chuck member, a reciprocally movable loader member carried by the support structure and operable to engage an article of manufacture to transfer the article of manufacture in straight line movement from the receiving rail to the chuck member, and an unloader member engageable with an article of manufacture for straight line movement thereof from the chuck member in a direction opposite the receiving rail, the line of movement of the article of manufacture from the chuck member being along a line which is substantially an extension of the line of movement of the article of manufacture of the chuck member.

5. An armature handling machine for use with winding apparatus of the type provided with support structure and a receiving track, the combination comprising a chuck member carried by the support structure adjacent the receiving track, a pivotally operable positioning arm adjacent the receiving track and in substantial alignment therewith, the positioning arm being provided with an abutment finger engageable with an armature to retain the armature upon the receiving track in substantial axial alignment with the chuck member, the abutment finger of the positioning arm also being engageable with an armature supported by the track to retain the armature against movement into alignment with the chuck member, a movable loader member carried by the support structure in axial alignment with the chuck member and operable to engage an armature upon the receiving track to transfer the armature from the positioning arm to the chuck member, an unloader member for axially moving an armature from the chuck member, the unloader member carrying the armature in the same direction as the armature is carried by the loader member.

6. For armature winding apparatus, an armature handling mechanism comprising support structure, an inclined delivery track carried by the support structure, a pivotally operable stop member adjacent the delivery track and engageable with an armature carried by the delivery track, a chuck member carried by the support structure in spaced relation from the delivery track, the chuck member having means for grasping the core of the armature, a reciprocally operable axially movable loader rod carried by the support structure adjacent the delivery track for movement of an armature from the track to the chuck member, the loader rod being provided with a recess in the end thereof into which a shaft of an armature loosely fits, a locator rod supported by the support structure and reciprocally operable adjacent the chuck and along a line angular with respect to the line of movement of the loader rod, the locator rod being adapted to engage an armature shaft intermediate the ends thereof for alignment thereof, a reciprocally movable unloader member supported by the support structure, the unloader member including an engagement rod concentric with the chuck, the engagement rod being provided with an elongate longitudinal cavity adjacent the end thereof adapted to receive an end portion of an armature shaft, resilient

means within the cavity engageable by a shaft within the cavity, the resilient means urging the shaft in a direction from the cavity, the unloader member also including a movable engagement finger, the loader rod engaging the shaft of an armature positioned on the track moving the armature into the chuck member, the chuck member retaining the armature, the finger and the engagement rod of the unloader member engaging opposite ends of an armature shaft for removing the armature from the chuck member, the unloader member moving the armature from the chuck member, the unloader member moving the armature from the chuck member in substantially the same direction as the loader rod moves the armature to the chuck member followed by movement of the engagement finger of the unloader member releasing one end of the shaft of the armature retained thereby and the resilient means within the cavity of the engagement rod urging the shaft outwardly thus discharging the armature from the mechanism.

7. A transfer machine for armatures comprising support structure, a receiving track, a chuck member adjacent the receiving track, a pivotally operable positioning arm adjacent the receiving track and in substantial alignment therewith, the positioning arm being provided with a finger to retain an armature upon the receiving track in substantial alignment with the chuck member, the finger of the positioning arm also being adapted to retain armatures supported by the track out of alignment with the chuck member, a movable loader member carried by the support structure in alignment with

the chuck member and operable to transfer an armature from the positioning arm to the chuck member, a locator member engageable with an armature for alignment of an armature within the chuck member, and an unloader member in alignment with the chuck member and at an opposite portion theerof from the loader member for removing an armature from the chuck member, the direction of movement of an armature carried by the unloader member from the chuck member being in substantially the same direction as movement of the armature to the chuck member carried by the loader member.

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