March 18, 1924. 1,487,302

LE ROY F. WILLIS

MACHINE FOR PLACING WEDGES IN ARMATURE SLOTS

Filed July 22. 1921 2 Sheets-Sheet 1

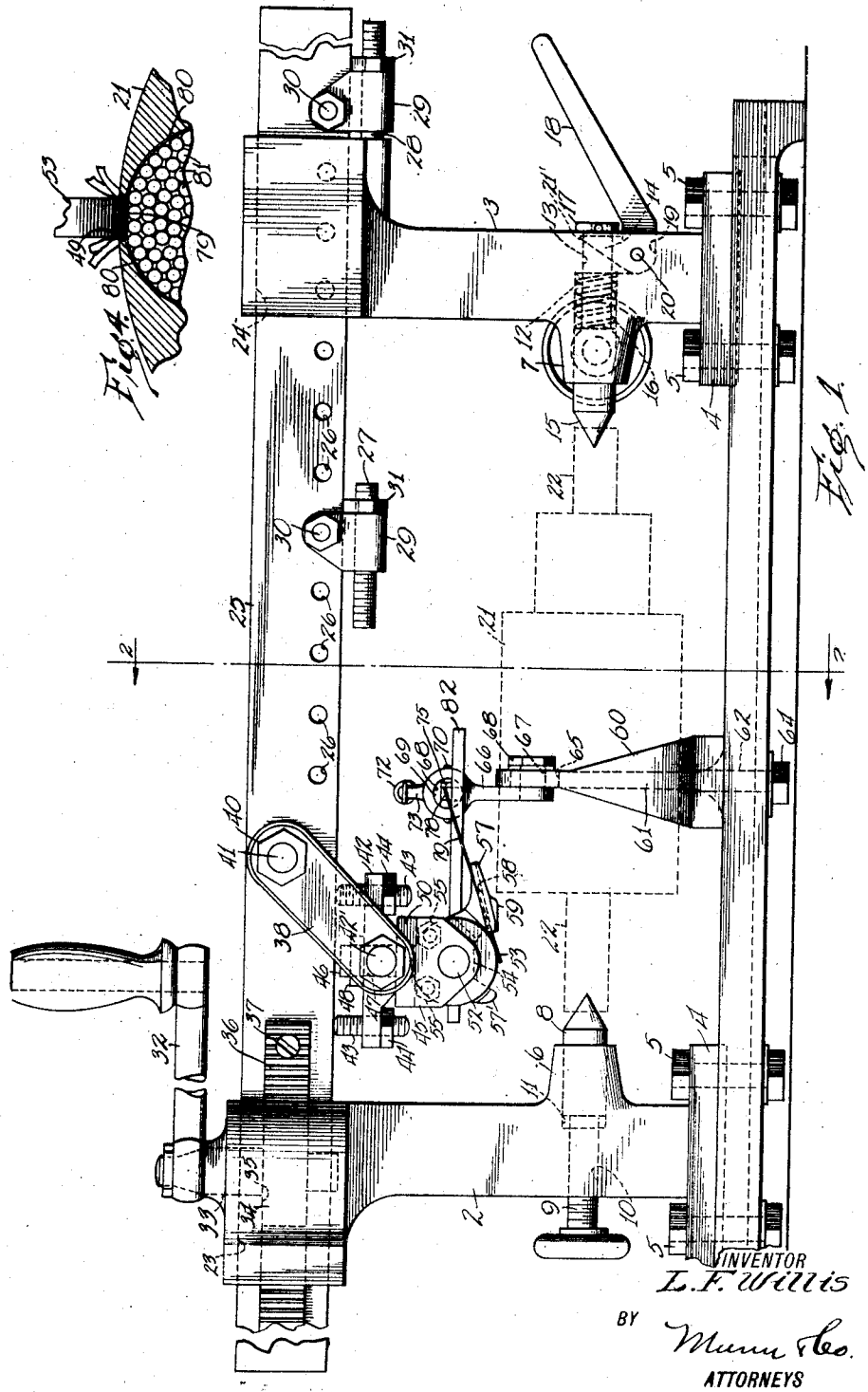


Fig. 1.

Fig. 2.

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Fig. 3.

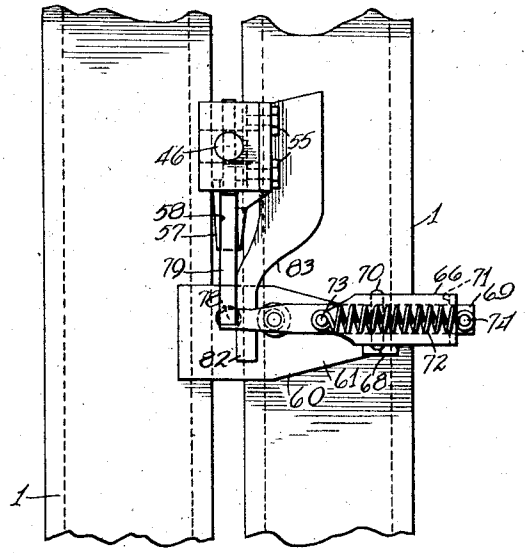
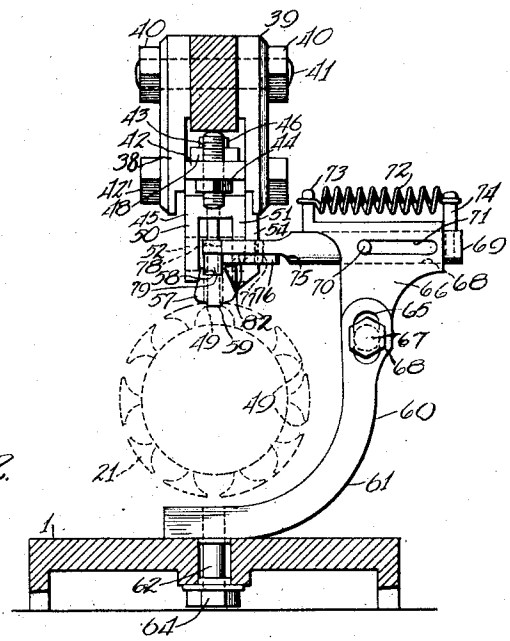


Fig. 2.



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UNITED STATES PATENT OFFICE.

LE ROY FLOREN WILLIS, OF ST. LOUIS, MISSOURI.

MACHINE FOR PLACING WEDGES IN ARMATURE SLOTS.

Application filed July 22, 1921. Serial No. 486,842.

To all whom it may concern:

Be it known that I, LE ROY F. WILLIS, a citizen of the United States, and a resident of St. Louis, in the State of Missouri, have invented a new and useful Improvement in Machines for Placing Wedges in Armature Slots, of which the following is a full, clear, and exact description.

My invention relates to improvements in machines for placing "wedges" in armature slots, and it consists in the combinations, constructions and arrangements herein described and claimed.

An object of my invention is to provide a device having means for pressing a coil into an armature slot, for shearing both the insulation of the slot and the fibrous material employed in forming a so-called wedge for closing the slot and for pressing the wedge into the slot at the same operation.

A further object of my invention is to provide a device of the character described that has means for shearing from a strip of fibrous material having a width greater than that of an armature slot, a strip or wedge of the proper width for closing the slot and for pressing the strip into the slot at the same operation.

A further object of my invention is to provide a device of the character described in which the means for accomplishing the pressing of a strip of fiber or the like into an armature slot is adjustable whereby the device is adapted for use in pressing the strips into slots of armatures of different sizes and having slots directed in various manners.

A further object of my invention is to provide a device of the character described that is relatively simple in construction and operation, not likely to get out of order easily, and thoroughly practical commercially.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which—

Fig. 1 is a side elevation showing the device in position for accomplishing the pressing of a strip or wedge into an armature slot,

Fig. 2 is a section along the line 2—2 of Fig. 1,

Fig. 3 is a plan view of a fragmentary portion of the device, and

Fig. 4 is an enlarged section through an armature, showing a portion of the device in adjusted position with respect to the armature.

Referring now to the drawings, 1 denotes a supporting base or table. Secured to the base or table 1 are spaced apart vertically extending parallel pedestals 2 and 3, each of which is provided with a base 4 attached to the base or table 1 by means of bolts 5 or like fastening means. The pedestals 2 and 3 are respectively provided with lateral extensions or bosses 6 and 7, and these bosses which are horizontally alined are arranged to face each other. A center 8 has a threaded shank 9 arranged to enter a horizontal bore 10 through the "embossed" portion of the pedestal 2. The bore 10 is threaded for engagement with the shank 9 and is enlarged at 11, as shown. A bore 12 through the embossed portion of the pedestal 3 is axially alined with the bore 10 and is reduced at 13 to receive the reduced portion 14 of the shank of a center 15 that is slidably disposed in the bore 12. A spring 16 mounted on the reduced portion 14 that is disposed in the bore 12 re-acts against the shoulders provided by the reduction of the shank of the center and of the bore 12 and thereby tends to move the center 15 toward the center 8. A disk 17 secured to the reduced portion 14 at its end abuts the pedestal 3 and limits the movement of the center 15 toward the center 8. An operating handle 18 is arranged with a portion thereof projected into a slot 19 in the wall of the pedestal 3 and maintained therein by means of a pivot pin 20. An extension 21′ is adapted to engage the inner wall of the disk 17, whereby the center 15 may be moved along the bore 12 against the action of the spring 16. An armature 21 is supported between the pedestals 2 and 3 when the centers 8 and 15 are relatively adjusted to engage the shaft 22 of the armature at its ends.

The pedestals 2 and 3 are enlarged adjacent to their upper ends and are provided with horizontally alined bores or openings 23 and 24, respectively. A beam 25 is projected through the alined openings 23 and 24 and is slidable in the direction of its length. The bar 25 is formed with a plurality of spaced apart openings 26 there-

through along its lower edge. Adjustable stop members 27 and 28 are carried by hangers 29. Each of the latter is formed with parallel arms adapted to straddle the beam 25 and is suspended from the latter by means of a bolt 30 projected through registering openings in the arms and through a selected one of the openings 26. Each of the stop members 27 and 28 has the form of an exteriorly threaded rod adapted to enter a threaded horizontal bore through the body of the hanger and is provided with a nut 31 for locking the stop member in adjusted position with respect to its hanger.

Movement of the beam or bar 25 is occasioned by means of a crank 32. The latter is secured to a shaft 33 that is journalled in the enlarged upper portion of the pedestal 2. A pinion 34 rigidly mounted on the shaft 33 is disposed in a recess 35 in the enlarged upper portion of the pedestal 2 and is arranged to engage a rack 36. The latter is secured to the beam or bar 25 by screws 37 or the like. The means for accomplishing the pressing of the strip or wedge of fiber or the like into the slots of an armature that is positioned betwen the centers 8 and 15 in the manner described is carried by links 38 and 39. The latter are arranged to straddle the beam 25 and are clamped to the latter by means of nuts 40 screwed on a threaded bolt 41 projected through the links or arms 38 and 39 and the intermediate bar or beam. A block 42 is disposed between the links or arms 38 and 39 adjacent their lower ends and is maintained in adjusted position with respect to the links or arms by means of a bolt 42′. The block 42 is provided with threaded adjusting rods 43—43, each of which is arranged to enter a threaded vertical opening through the block adjacent to an end of the latter. The adjusting members 43—43 space the block 42 from the bar or beam 25. A nut 44 screwed upon each of the threaded adjusting members 43 provides a means for locking the latter in adjusted position. A U-shaped frame 45 is formed with an integral stud or spindle 46 upstanding from the web thereof and this spindle is projected through a vertical opening 47 in the block 42 intermediate the length of the latter. The nut 48 screwing on the spindle 46 at the upper end of the latter provides a means for clamping the frame to the block 42, whereby the frame is secured in adjusted position with respect to the block 42 and in a desired position with respect to a slot 49 in the armature 21 as will more fully appear from the following. The frame 45 has integral spaced apart depending arms 50 and 51 in which are journalled a shaft 52 having a wheel 53 rigidly mounted thereon. The wheel 53 is both a pressing and shearing member as will be pointed out hereinafter. A plate 54 is secured to the arm 51 by bolts 55 which are projected through vertically elongated slots 56 in the arm 51, whereby the plate 54 is vertically adjustable with respect to the arm 51. The plate 54 is offset at its lower end to provide a work supporting lateral extension 57 at the forward end thereof and to provide a second lateral extension 57′ at the rearward end thereof. The work supporting extension 57 is positioned in alinement with the wheel 53 and is slightly inclined at its forward end as best seen in Fig. 1. The extension 57 is provided with a slot 58 in its upper surface and is formed with a depending extension 59 extending from a point intermediate its length to the rear wall thereof. A pedestal that is indicated generally at 60 is formed of a curved lower section 61 provided with a vertical stud 62 arranged to extend through a horizontally extending slot 63 in the base 1, being clamped to the latter in adjusted position by means of a nut 64. The section 61 has a slot or elongated opening 65 therethrough adjacent to its upper end and an upper section 66 is connected thereto by means of a bolt 67 projected through the slot 65, a nut 68 being used to clamp the two sections together in adjusted position. The section 66 is enlarged adjacent to its upper end and is provided with a horizontally extending bore 68 in which is disposed a slidable member 69. A pin 70 fast in the slidable member 69 projects through a guide slot 71 in the walls of the bore 68. A spring 72 secured at one end to a vertical extension 73 integral with the section 66 and at its other end to a pin 74 carried by the slidable member 69 tends to maintain the latter in the position best seen in Fig. 2 with respect to the section 66. The slidable member 69 is reduced at 75 adjacent to its outer end and carries a roller 76 that is mounted for rotation on a stud 77 depending from the reduced portion 75. The reduced portion 75 of the slidable member 69 has a recess 78 in its upper surface and a strip or "wedge" 79 that is to be pressed into the slot 49 of the armature is arranged with an end in the recess 78.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The wheel 53 is formed with a rim having a width equal to the width of each slot of the armature 21. The depending presser portion 59 of the lateral extension or foot 57 has a width equal to the width of the slot of the armature less two thicknesses of an insulating material 80 (see Fig. 4). that is to say, one ply of the insulating material is arranged along each edge of the slot 49. The presser portion 59 of the foot 57 has a height approximately equal to or slightly less than the distance the strip 79 is to be pressed into the armature slot 49. The extension 57′ to

the plate 54 constitutes a guide, which is positioned in alinement with the wheel 53.

The armature 21 is first adjusted between the centers 8 and 15 in the manner described. The threaded adjusting members 43—43 are then manipulated so that a horizontal plane tangent with the lower edge of the wheel 53 will also be tangent to the upper part of the periphery of the armature 21. The frame 45 is then adjusted with respect to the block 41 so that the presser portion 59 of the foot 57 is arranged in position to enter a slot of the armature. The frame 45 is then secured in adjusted position by means of the nut 48. The strip 79, which has a width greater than the width of the armature slot, is then arranged with one end thereof disposed in the recess 78 and with the portion thereof adjacent to its other end disposed in the guide groove 58 of the foot 57. The crank handle 32 is then manipulated to occasion a movement of the beam 25 toward the pedestal 3. The wheel 53 will contact the edges of the armature slot and will cooperate with such edges in shearing from the strip having a width equal to that of the armature slot. The presser portions 59 of the foot 57, which is in advance of the wheel 53, will press the wires 81 into the slot 49. The wheel 53 will then shear the insulation 80 and the fiber 79. The guide 47 deflects the strips sheared from the "wedge" that is to be pressed into the slot. As the bar 25 is moved toward the pedestal 3, an arm 82 that is integral with the plate 54 or may be made separately and secured thereto is moved in advance of the foot 57 and is in constant engagement with the roller 76. The arm 82 is formed with the curved or cam surface 83 and as the bar 25 is moved toward the pedestal, the engagement of the cam surface 83 with the roller 76 occasions a slidable movement of the member 69 along the bore 68 against the action of the spring 72. The strip 79 is supported at one end by the member 69 and is guarded at its other end between the rim of the wheel 53 and the periphery of the armature 21. In consequence, a strip having a length equal to that of the armature slot may be supported to register with the slot in length and the member 69 will then prevent a movement of the strip in the direction of its length when it is first engaged by the wheel at one end of the slot. The member 69 is moved laterally out of the path of the wheel and out of engagement with the strip 79 as soon as the latter is engaged by the wheel at one end of the slot. The stop 27 is adjusted to limit the movement of the bar 25 so that the wheel 53 will not be moved out of engagement with the slot of the armature 21 but only to the end of the latter. The crank 32 is then rotated in the reverse direction to occasion a return movement of the wheel 53 along the slot 49. It is to be further noted that the shearing and pressing wheel 53 has another function. The armature 21 is of course made of a soft metal, and when the shearing wheel 53 engages the edges of the slot 49, such edges are upset or swaged inwardly and downwardly to secure the fiber strip in place. When the "wedge" has been pressed into one of the slots of the armature, the latter is rotated until another slot is in a desired position with respect to the presser portion 59 of the foot 57. The device provides a relatively simple, easily operated means for accomplishing at one operation work which has heretofore required a number of separate and distinct operations.

I claim:

1. A device of the character described comprising a reciprocable member and means carried thereby for engaging an armature to shear a strip of a desired width from a wider piece of material placed between said means and the armature.

2. A device of the character described comprising a reciprocable member and means carried thereby for engaging an armature to shear a strip of a desired width from a wider piece of material placed between said means and the armature and for pressing the strip into a slot of the armature.

3. A device of the character described comprising a horizontally reciprocable member, means for engaging an armature to support the latter with its axis parallel with the reciprocable member, and means carried by the reciprocable member for engaging the armature at its periphery to shear a strip of a desired width from a sheet placed between said means and the periphery of the armature and to press the strip into a slot of the armature.

4. A device of the character described comprising a horizontally reciprocable member, means for engaging an armature to support the latter with its axis parallel with the reciprocable member, and adjustable means carried by the reciprocable member for engaging the armature at its periphery to shear a strip of a desired width from a sheet placed between said means and the periphery of the armature and to press the strip into a slot of the armature.

5. A device of the character described comprising a horizontally reciprocable member, means for engaging an armature to support the latter with its axis parallel with the reciprocable member, adjustable means carried by the reciprocable member for engaging the armature at its periphery to shear a strip of a desired width from a

sheet placed between said means and the periphery of the armature and to press the strip into a slot of the armature, and means for operating the reciprocable member.

6. In a device of the character described, a frame, a pressing and shearing wheel supported by the frame for rotation about a horizontal axis, said wheel having a width at its rim equal to the width of an armature slot, means for supporting the frame for adjustment vertically and rotatably and for reciprocation horizontally, and means for guiding a strip of fiber or the like between the rim of the wheel and the periphery of the armature as the wheel is moved in one direction across the periphery of the armature.

7. In a device of the character described, a frame, a pressing and shearing wheel supported by the frame for rotation about a horizontal axis, said wheel having a width at its rim equal to the width of an armature slot, means for supporting the frame for adjustment vertically and rotatively and for reciprocation horizontally, and a plate carried by said frame and formed to provide a presser foot positioned in advance of the wheel, said presser foot being provided with a slot in its upper side adapted to receive an end portion of a strip of fiber or the like and to guide the latter between the rim of the wheel and the periphery of the armature as the wheel is moved forwardly.

8. In a device of the character described, a frame, a pressing and shearing wheel supported by the frame for rotation about a horizontal axis, said wheel having a width at its rim equal to the width of an armature slot, means for supporting the frame for adjustment vertically and rotatively and for reciprocation horizontally, a plate carried by said frame and formed to provide a presser foot positioned in advance of the wheel, said presser foot being provided with a slot in its upper side adapted to receive an end portion of a strip of fiber and to guide the latter between the rim of the wheel and the periphery of the armature as the wheel is moved forwardly, and auxiliary means for supporting the strip of fiber at its other end.

9. In a device of the character described, a frame, a pressing and shearing wheel supported by the frame for rotation about a horizontal axis, said wheel having a width at its rim equal to the width of an armature slot, means for supporting the frame for adjustment vertically and rotatively and for reciprocation horizontally, a plate carried by said frame and formed to provide a presser foot positioned in advance of the wheel, said presser foot being provided with a slot in its upper side adapted to receive an end portion of a strip of fiber and to guide the latter between the rim of the wheel and the periphery of the armature as the wheel is moved forwardly, said presser portion being formed with an integral depending portion of less width than the width of the wheel, and auxiliary means for supporting the strip of fiber at its other end.

10. In a device of the character described, a frame, a pressing and shearing wheel supported by the frame for rotation about a horizontal axis, said wheel having a width at its rim equal to the width of an armature slot, means for supporting the frame for adjustment vertically and rotatively and for reciprocation horizontally, a plate carried by said frame and formed to provide a presser foot positioned in advance of the wheel, said presser foot being provided with a slot in its upper side adapted to receive an end portion of a strip of fiber and to guide the latter between the rim of the wheel and the periphery of the armature as the wheel is moved forwardly, said presser portion being formed with an integral depending portion of less width than the width of the wheel, an auxiliary member for supporting the strip of fiber at its other end initially, means for movably supporting the auxiliary member in a desired position with respect to the periphery of the armature, and a cam member carried by the plate and engaging the auxiliary member to move the latter laterally as soon as the wheel is moved forwardly, whereby the strip disengages the auxiliary member and the latter is moved out of the path of movement of the wheel.

11. A device of the type described comprising a frame adapted to rotatably support an armature, and a strip carrying means reciprocably supported by said frame and having a portion thereof adapted to enter and be guided by the slot in the armature, said means also being adapted to engage with the armature to shear a strip of a desired width from a wider strip of material carried by said means, the strip being disposed between said means and the armature, and for pressing the strip into a slot of the armature.

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