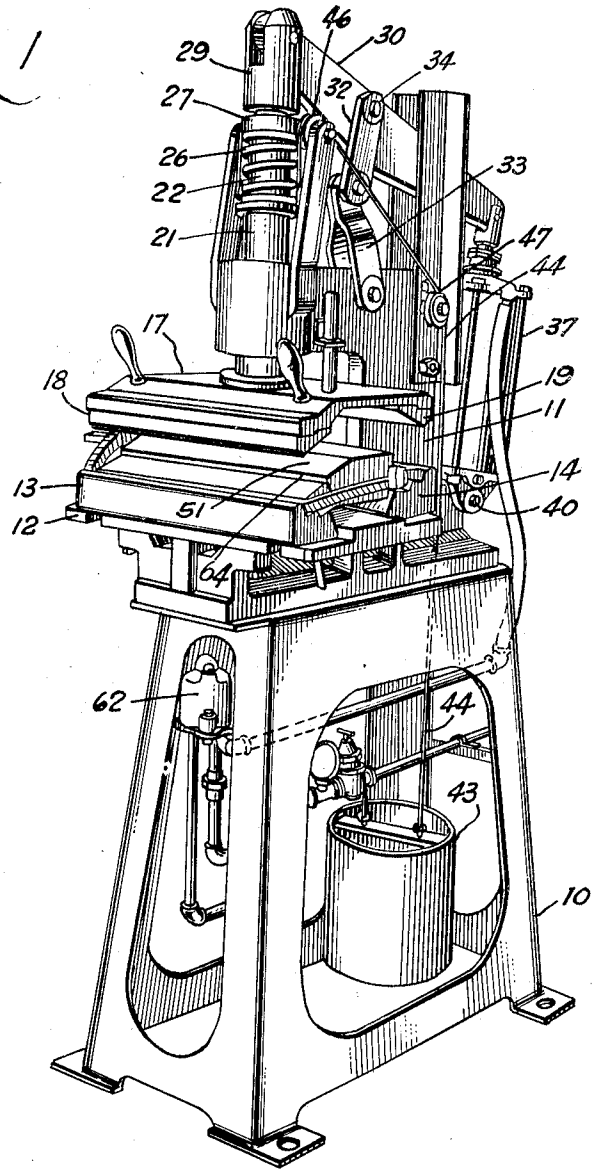
Nov. 4, 1941. F. J. WOOD 2,261,576

APPARATUS FOR FORMING COILS FOR ARMATURES

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Fig. 1



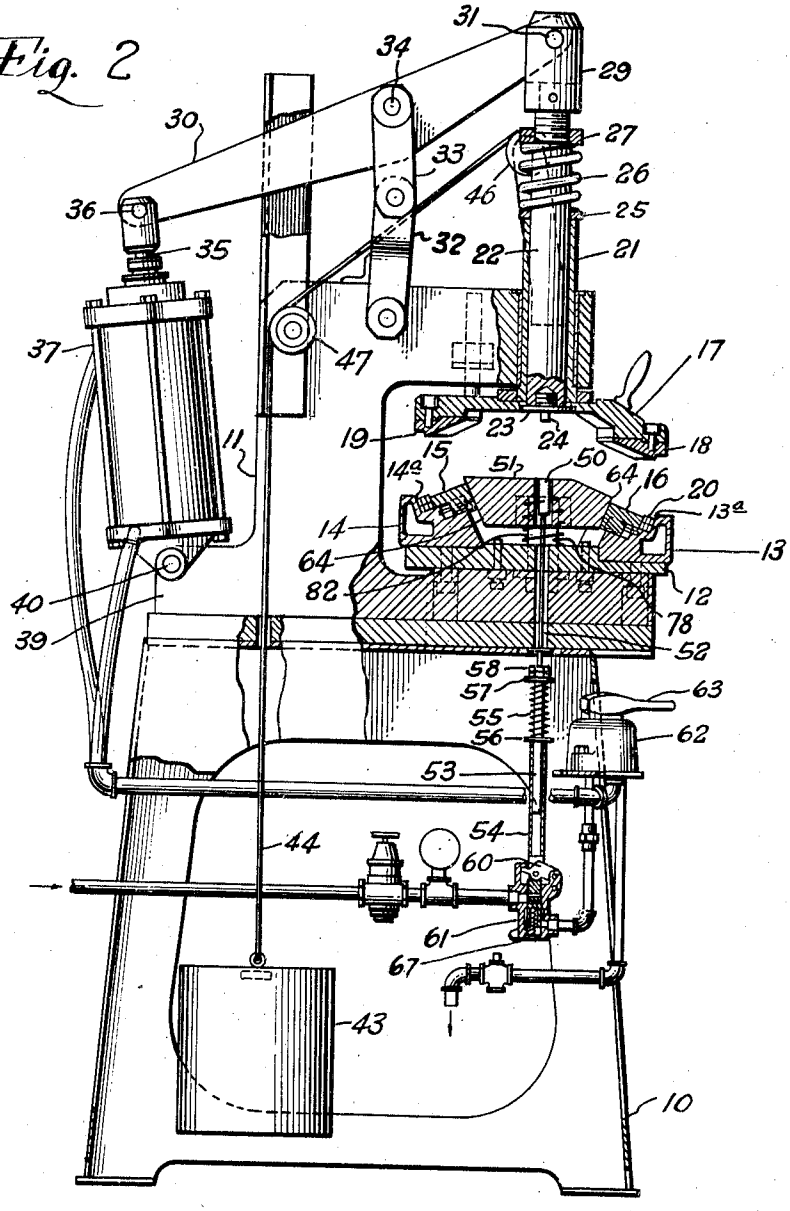
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APPARATUS FOR FORMING COILS FOR ARMATURES

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Fig. 2



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APPARATUS FOR FORMING COILS FOR ARMATURES

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Fig. 4

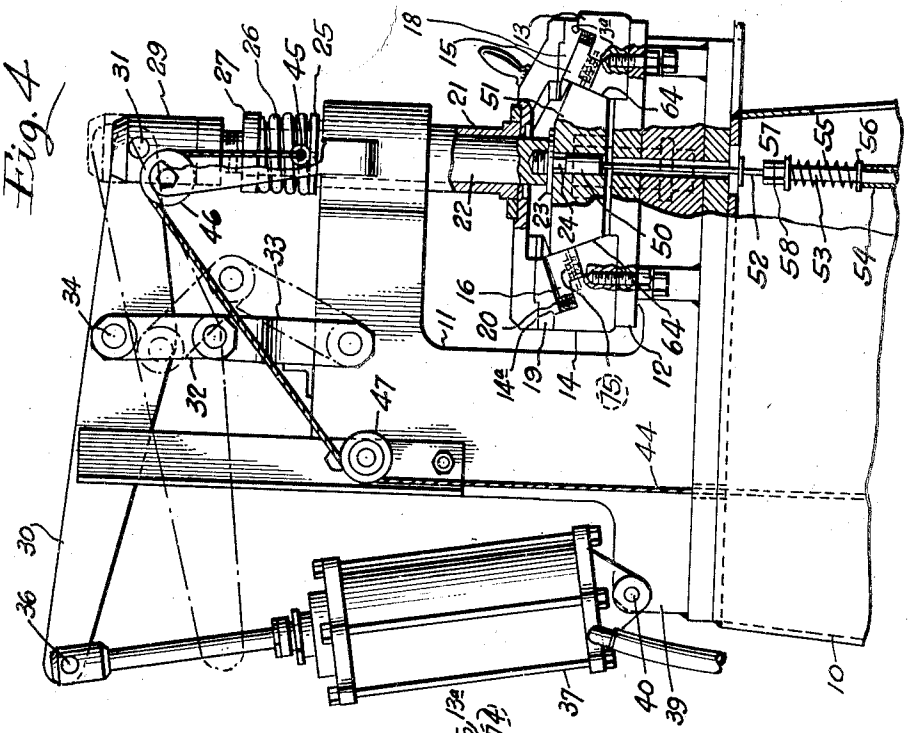
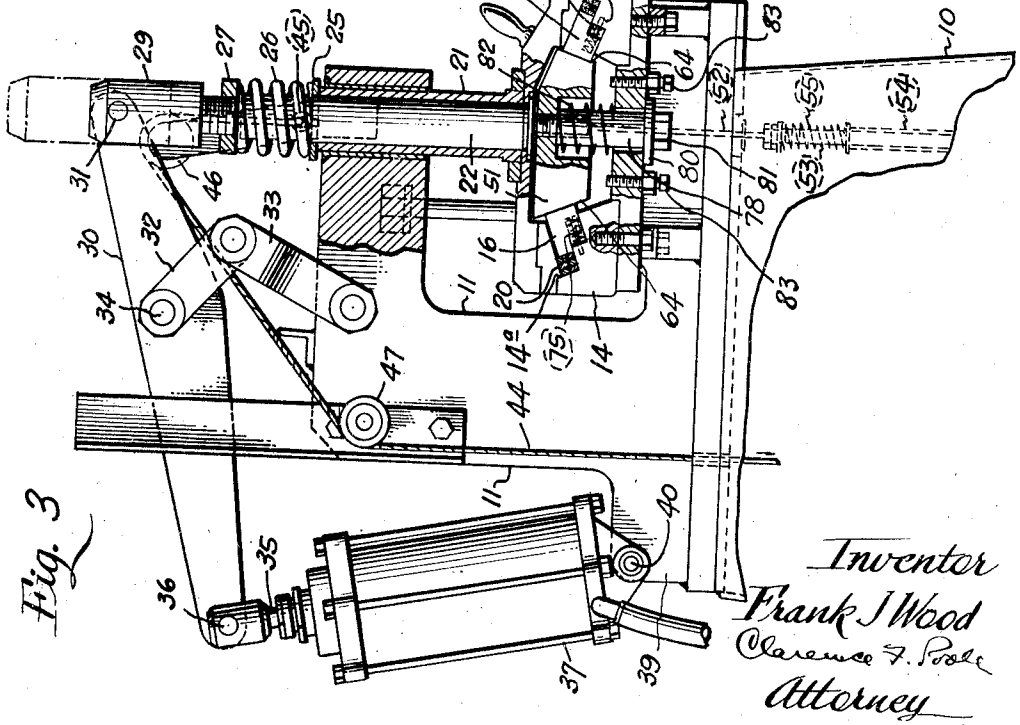


Fig. 3



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APPARATUS FOR FORMING COILS FOR ARMATURES

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Fig. 6

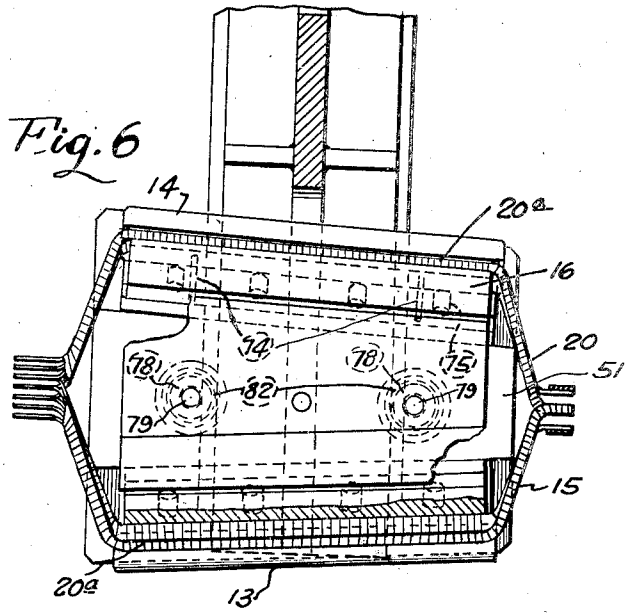


Fig. 5

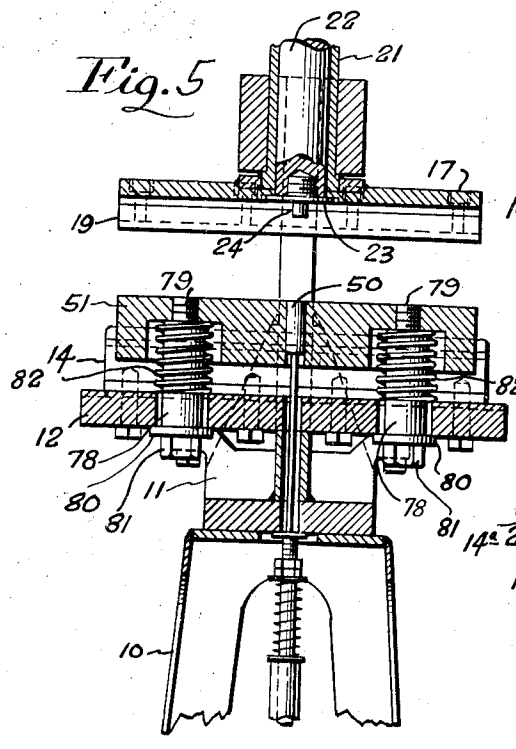


Fig. 8

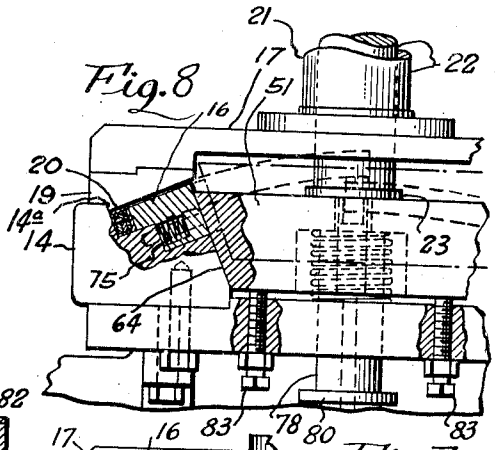
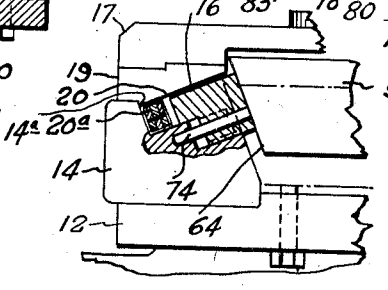


Fig. 7



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2,261,576

UNITED STATES PATENT OFFICE

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APPARATUS FOR FORMING COILS FOR ARMATURES

Frank J. Wood, Riverside, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application October 10, 1938, Serial No. 234,107

13 Claims. (Cl. 153—34)

This invention relates to improvements in apparatus for forming coils for armatures of electric motors.

In carrying out my invention I provide a novel form of coil forming apparatus of the class described, arranged to form the coil to a uniform and accurate size in a simple and efficient manner without injury thereto, by first engaging the tops of the portions of the coil which fit in the armature slot with a die, in planes parallel to the tops of the slot portions thereof, and pressing the coil against a die block with this die to hold the coil in position on the block, and then engaging the insides of the slot portions of the coils with coil forming dies in planes parallel to the inner sides thereof and pressing these slot portions against a die block with a pressure sufficient to accurately form the width of the slot portions of the coil to a specified size.

The principle object of the present invention is to provide a novel form of coil forming apparatus of an improved and simplified construction, arranged with a view towards utmost safety to the operator and the elimination of injury to the coils during the forming operation.

Another object of my invention is to provide a new and improved apparatus for forming armature coils exactly to size against a die block, in a novel manner, by engaging the slot portions of the coil with forming dies in planes substantially parallel to the plane surfaces thereof with such a pressure that they will uniformly fit in the slots of the armature core.

Other objects of my invention will appear from time to time as the accompanying specification proceeds.

My invention may be more clearly understood with reference to the accompanying drawings wherein:

Figure 1 is a perspective view of a coil forming apparatus constructed in accordance with my invention;

Figure 2 is an enlarged side elevation of the device shown in Figure 1, with certain parts broken away and certain other parts shown in substantially longitudinal section in order to more clearly illustrate my invention;

Figure 3 is an enlarged detail fragmentary view in side elevation of the device shown in Figure 1, with the parts in a different position of adjustment than in Figures 1 and 2 and with certain other parts shown in longitudinal section;

Figure 4 is a view somewhat similar to Figure 3 with the parts in a different position than in Figure 3;

Figure 5 is an enlarged detail transverse sectional view taken through the upper and lower platens in order to more clearly show certain details of construction of the apparatus;

Figure 6 is a partial fragmentary plan view of the apparatus with the top platen broken away;

Figure 7 is an enlarged fragmentary end view of the dies and platens with the parts shown in one position of adjustment; and

Figure 8 is a view somewhat similar to Figure 7, with the parts in a different position than in Figure 7, showing the forming mechanism in a fully engaged position with respect to the coil.

Like reference characters refer to like parts throughout the several figures.

In the drawings, the embodiment of my invention illustrated includes generally a base **10** having a frame **11** of a substantially C-shaped formation mounted on the upper side thereof. A die block is mounted in the open portion of the frame **11**, which, as herein shown, includes a lower platen **12** having a pair of spaced die blocks **13** and **14** mounted on the upper surface thereof. Said die blocks have coil receiving portions **13***a* and **14***a* of a shouldered formation which, with movable die formers **15** and **16** respectively, form slots to receive an armature coil **20**. Said armature coil may be of any usual form and as herein shown is of the open coil type of coil having a pair of spaced diverging slot portions **20***a*, **20***a* adapted to fit in the slots of the armature core (see Figure 6). A movable die, including an upper platen **17** having a pair of spaced apart dies **18** and **19** mounted on the under surface thereof, is likewise mounted in the frame **11** in the open portion thereof for movement towards and from the die blocks **13** and **14**. Said dies are adapted to engage the tops of the slot portions **20***a*, **20***a* of the armature coil, for holding said coil in position on the die blocks **13** and **14** respectively.

The upper platen **17** is mounted on the lower end of a sleeve **21**, which is slidably mounted in the frame **11**, for movement towards and from the die blocks **13** and **14**. Said sleeve has a vertical shaft **22** slidably mounted therein. A flanged threaded member **23** is threaded on the lower end of said shaft. The flanged portion of said threaded member is adapted to engage an annular recess formed in the bottom of the upper platen **17** to hold said shaft from upward movement with respect to said platen beyond a

predetermined point. Said member is provided with a depending head 24 adapted to form a means to permit downward pressure to be exerted on the shaft 22, in a manner which will hereinafter more clearly appear as this specification proceeds.

A yieldable connection is provided between the shaft 22 and sleeve 21 so that downward movement of said shaft will yieldably engage the dies 18 and 19 with the slot portions 20a, 20a of the armature coil. Said yieldable connection includes a collar 25 secured to the upper end of the sleeve 21 and a compression spring 26 encircling the shaft 22 and interposed between said collar and a collar 27 threaded on the shaft 22.

The shaft 22 and sleeve 21 are moved with respect to the frame 11 to engage the die blocks 13 and 14 and die formers 15 and 16 with the slot portions 20a, 20a of the coil 20 by means of a cylinder 37 and lever 30. Said lever is pivotally connected to the upper end of the shaft 22, at one of its ends, by means of a pivotal pin 31 extending through said lever and a connecting member 29 threaded to the upper end of said shaft. Said lever is connected at its opposite end to a piston rod 35 extensibly mounted in the cylinder 37. Said cylinder extends upwardly from, and is pivotally mounted to, an outward projection 39 of the C-frame 11 by means of a transverse pivotal pin 40 extending through a bifurcated bracket 41 depending from the head end of said cylinder. Said lever is fulcrumed intermediate its ends to said C-frame by means of a pair of links 32 and 33 pivotally connected together. The link 33 is pivoted to said C-frame, and the link 32 is pivotally connected to the lever 30 by means of a pivotal pin 34.

It will be seen from the foregoing that the joint between the links 32 and 33 may break to permit the shaft 22, sleeve 21, upper platen 17, and dies 18 and 19 to be lowered by hand to engage the top of the slot portions 20a, 20a, of the armature coil, and that when said dies are engaged with the armature coil and fluid under pressure, such as air, is admitted to the head end of the cylinder 37, the piston rod 35 will first move the lever 30 about its axis of connection to the pivotal pin 31 to extend the links 32 and 33 and then fulcrum said lever about its axis of connection to the pivotal pin 34, to exert a downward pressure on the shaft 22 and on the sleeve 21 and upper platen 17 through the compression spring 26, to yieldably hold the dies 18 and 19 in engagement with the top sides of the armature coil.

A counterweight 43 is provided to aid in returning the dies 18 and 19 to an inoperative position. Said counterweight is operatively connected with opposite sides of the collar 25 on the upper end of the sleeve 21, by means of a pair of parallel spaced flexible cables 44, 44. Said cables are secured at one of their ends to opposite sides of the collar 25 by an eye member 45, and extend upwardly from said eye member over sheaves 46, 46 and downwardly and rearwardly from said sheaves over sheaves 47, 47 to the counterweight 43, to which they are connected.

Means are provided to prevent the admission of fluid under pressure, such as air, to the head end of the cylinder 37 until the dies 18 and 19 have been fully engaged with the top of the armature coil 20, to prevent injury to the fingers of the operator. Said means, as herein shown, includes a plunger 50 adapted to be engaged by the head 24 of the flanged member 23 and slidably mounted in a wedge member 51 (see Figures 2 and 4), the function of which wedge member will clearly appear as this specification proceeds. A rod 52 is secured to and depends from the lower end of said plunger and is secured at its lower end to a plunger 53 slidably mounted in a tube or cylinder 54. Said cylinder is pivotally connected at its lower end to an operating lever 60 of a valve 61. A compression spring 55 is provided to yieldably move the cylinder 54 in a downward direction against a compression spring 67 of said valve, upon downward movement of the rod 52 (see Figure 2). The compression spring 55 is interposed between a collar 56 on the upper end of said cylinder and a collar 57 at the lower end of said rod and abutted by a pair of lock nuts 58, 58. The valve 61 is thus opened when the depending head 24 of the flanged member 23 engages the plunger 50, which cannot happen until the dies 18 and 19 are engaged with the tops of the slot portions of the armature coil 20. When the valve 61 is opened, fluid under pressure is admitted to a hand operated valve 62, and the admission of fluid under pressure to the head end of the cylinder 37 may be controlled by means of a hand lever 63 of said valve in a usual manner.

With reference now in particular to the function of the wedge member 51, and the means for positively engaging the die formers 15 and 16 with the inner sides of the slot portions 20a, 20a of the coil 20, and several other novel features of my invention, said die formers are slidably mounted on the inner upper sides of the die blocks 13 and 14 respectively. The inner faces of said die formers are slidably engaged with opposite inwardly inclined faces 64, 64 of said wedge member, so that downward movement of said wedge member will positively move the engaging faces of said die formers transversely of said die blocks and engage them with the inner sides of the slot portions of the coil 20 in planes parallel to the sides of said slot portions, to form said portions of said coil against the shouldered portions 13a and 14a of the die blocks 13 and 14. Said die formers are held from lateral movement with respect to said die blocks by means of a plurality of pins 74, 74. A plurality of springs 75, 75 are provided to tend to hold said die formers in a disengaged position with respect to the slot portions of said coil (see Figures 7 and 8).

The wedge member 51 is yieldably mounted in the lower platen 12 for movement towards or from said platen on a pair of vertical shafts 78, 78 depending from said wedge member and secured thereto by means of studs 79, 79 (see Figure 5). Said shafts extend through suitable apertures formed in said platen, and a collar 80, mounted on the lower end of each of said shafts, abuts the underside of said platen. Said collars are held to said shafts by means of machine screws 81, 81. A compression spring 82 encircles each of the shafts 78. Said springs are interposed between the top of the platen 12 and the underside of the wedge member 51. Downward movement of said wedge member is limited by means of a pair of adjusting screws 83, 83 and the pressure with which said die formers engage the sides of the coil may be varied by variation in pressure in the cylinder 37. Thus when said wedge member is engaged by the flanged member 23 on the lower end of the shaft 22, it will be moved downwardly by said shaft to engage said

die formers with the inner sides of the coil in an obvious manner (see Figure 4).

It may be seen from the foregoing that when the upper platen 17 is raised and the armature coil 20 is placed in the slots formed between the shouldered portions 13a and 14a of the die blocks 13 and 14 and the engaging faces of the die formers 15 and 16, that the platen 17 may be lowered by hand to permit the dies 18 and 19 to engage the top sides of the slot portions of the coil, at which time the depending head 24 of the flanged member 23 engaging the plunger 50 will open the valve 61 to permit air to be admitted to the valve 62. Admission of air to said valve by manipulation of the handle 63 will positively hold the dies 18 and 19 in engagement with the tops of the slot portions of the armature coil to hold the coil in position on the die blocks 13 and 14 and move the shaft 22 downwardly to engage the wedge member 51 and move it in a downward direction to positively engage the engaging faces of the slot portions of the coil with the die formers 15 and 16, and thus straighten and accurately form the slot portions of said coil.

It may also be seen that the width of the slot portions of the coils may be regulated by the adjusting screws 83, 83, and pressure exerted on the sides of the coils may be regulated by pressure in the cylinder 37 controlled by the hand lever 63 of the valve 62 to insure the forming of the coil to precision limits.

It may further be seen that a new and improved coil forming apparatus of a simple and novel construction has been provided which is arranged with a view towards utmost safety to the operator and to prevent injury to the coil by first permitting the tops of the slot portions of the coil to be engaged by the forming dies by manual manipulation of the dies and then by positively engaging the slot portions of the coil with the die formers in planes parallel to the top and inner faces thereof, in a simplified and improved manner.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting myself to the specific embodiment illustrated, excepting as it may be limited in the appended claims.

I claim as my invention:

1. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a movable die, means for engaging said movable die with the tops of the slot portions of said coil including a shaft, means engaged by said shaft for slidably moving said die formers along said die block, a lever having pivotal connection with said shaft for moving said shaft and die with respect to the coil, extensible means for actuating said lever, and means forming a fulcrum for said lever so arranged as to permit said die to be manually moved towards said die block while said extensible means is stationary including a pair of links pivotally conected together and pivotally connected to said lever, intermediate the ends thereof.

2. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a movable die, means for yieldably engaging said movable die with the top sides of the slot portions of said coil including a sleeve, a shaft mounted within said sleeve for movement with respect thereto, means engaged by said shaft for slidably moving said die formers along said die block, a yieldable connection between said shaft and sleeve, a lever having pivotal connection with said shaft at one of its ends, an extensible member having pivotal connection with the other end of said lever, and means forming a fulcrum for said lever, so arranged as to permit said die to be manually moved to engage a coil on said die block while said extensible means remains stationary including a pair of links pivotally connected together and pivotally connected to said lever intermediate the ends thereof.

3. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a movable die, means for engaging said movable die with the top sides of the slot portions of said coil including a shaft, means engaged by said shaft for slidably moving said die formers along said die block, a lever having pivotal connection with said shaft for moving said shaft and die with respect to said coil, extensible means for actuating said lever, a pair of links pivotally connected together and pivotally connected to said lever intermediate the ends thereof, said links forming a fulcrum for said lever so arranged as to permit said die to be manually moved to engage said die block while said extensible means is stationary, means to prevent operation of said extensible means except when said die is in engagement with the top of said coil, and other means actuated by said shaft and having engagement with said first mentioned means, to permit operation of said extensible means after said die has been engaged with the top of the coil by manual manipulation.

4. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a movable die, means for yieldably engaging said movable die with the top sides of the slot portions of said coil including a sleeve, a shaft mounted within said sleeve for movement with respect thereto, a yieldable connection between said shaft and sleeve, a lever having pivotal connection with said shaft at one of its ends, an extensible member having pivotal connection with the other end of said lever, means forming a fulcrum for said lever, so arranged as to permit said die to be manually moved to engage a coil on said die block while said extensible means remains stationary including a pair of links pivotally connected together and pivotally connected to said lever intermediate the ends thereof, and means actuated by said shaft for positively engaging said die formers with the insides of the slot portions of an armature coil including a member engaged by said shaft and having surfaces having slidable engagement with said die formers.

5. In a coil forming apparatus for armature

coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said block forming a pair of slots for receiving an armature coil, a movable die, means for yieldably engaging said movable die with the top sides of the slot portions of said coil including a sleeve, a shaft mounted within said sleeve for movement with respect thereto, a yieldable connection between said shaft and sleeve, a lever having pivotal connection with said shaft at one of its ends, an extensible member having pivotal connection with the other end of said lever, means forming a fulcrum for said lever, so arranged as to permit said die to be manually moved to engage a coil on said die block while said extensible means remains stationary including a pair of links pivotally connected together and pivotally connected to said lever intermediate the ends thereof, means actuated by said shaft for positively engaging said die formers with the insides of the slot portions of an armature coil including a member engaged by said shaft and having surfaces having slidable engagement with said die formers, and other means to prevent operation of said extensible member until said die has been manually engaged with the top of the coil, said means benig actuated by said shaft to permit operation of said extensible member after engagement of said die with the top of the coil.

6. In a coil forming apparatus for armature coils, a frame, a stationary platen mounted on said frame, a die block mounted on said platen and formed to receive the slot portions of an armature coil, a pair of die formers movably mounted on said die block adapted to engage and form the sides of the slot portions of the coil, a sleeve mounted on said frame for slidable movement with respect thereto, a platen on said sleeve having a die mounted on the under side thereof, said die being adapted to engage the top sides of the slot portions of said coil, means for yieldably engaging said movable die with said coil including a shaft extending through said sleeve and a yieldable connection between said shaft and sleeve, means engaged by said shaft for positively engaging said die formers with the inner sides of the slot portions of said coil comprising a member mounted for movement towards and from said stationary platen and having inclined sides having engagement with the inner sides of said die formers, and means for positively moving said shaft including an extensible member, a lever pivotally connected to said extensible member at one of its ends and to said shaft at its opposite end, and extensible and collapsible means pivotally connected between said frame and lever, to form a fulcrum for said lever upon movement of said extensible member in one direction only, to permit said die to be manually engaged with said die block while said extensible member remains stationary.

7. In a coil forming apparatus for armature coils, a frame, a stationary platen mounted on said frame, a die block mounted on said platen and formed to receive the slot portions of an armature coil, a pair of die formers movably mounted on said die block and adapted to engage and form the sides of the slot portions of the coil, a sleeve mounted on said frame for slidable movement with respect thereto, a platen on said sleeve having a die mounted on the under side thereof, said die being adapted to engage the top sides of the slot portions of said coil, means for yieldably engaging said movable die with said coil including a shaft extending through said sleeve and a yieldable connection between said shaft and sleeve, means engaged by said shaft for positively engaging said die formers with the inner sides of the slot portions of said coil comprising a member mounted for movement towards and from said stationary platen and having inclined sides having engagement with the inner sides of said die formers, means for positively moving said shaft including an extensible member, a lever pivotally connected to said extensible member at one of its ends and to said shaft at its opposite end, and a movable fulcrum for said shaft adapted to permit manual engagement of said die with said die block while said extensible member remains stationary including a pair of links pivotally connected together, one of said links being pivotally connected to said frame and the other of said links being pivotally connected to said lever intermediate its ends.

8. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block, said die formers together with said die block forming a pair of parallel spaced slots for receiving the slot portions of an armature coil, a die adapted to engage the top sides of the slot portions of an armature coil, means permitting said die to be manually engaged with the top sides of the slot portions of said armature coil, and power operated means operable after said die has been manually engaged with the top sides of the slot portions of the armature coil, for yieldably engaging said die with the top sides of the slot portions of the armature coil and, at the same time, positively moving said die formers towards the outer sides of said die block a predetermined distance to form the sides of the slot portions of the armature coil to a predetermined size including a lever arm, a yieldable connection between said lever arm and said die, an engaging connection between said lever arm and said die formers for positively moving said die formers towards the outside of said die block, operating means for pivotally moving said lever arm about a fulcrum disposed intermediate its ends, said fulcrum for said lever arm being collapsible to permit said die to be manually moved in a downward direction to engage the tops of the slot portions of the armature coil while said power operating means remains stationary, but to form a fulcrum for said lever arm upon operation of said operating means therefor in one direction.

9. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block, said die formers together with said die block forming a pair of parallel spaced slots for receiving the slot portions of an armature coil, a die adapted to engage the top sides of the slot portions of an armature coil, means permitting said die to be manually engaged with the top sides of the slot portions of said armature coil, and means operable after said dies have been manually engaged with the top sides of the slot portions of the armature coil for yieldably engaging said die with the top sides of the slot portions of the armature coil and, at the same time, positively moving said die formers towards the outer sides of said die block a predetermined distance to form the sides of the slot portion of the armature coil to a predetermined size including a lever arm, a yieldable connection

between said lever arm and die, an engaging connection between said lever arm and said die formers for positively moving said die formers towards the outside of said die block, operating means for pivotally moving said lever arm about a fulcrum disposed intermediate its ends, and an extensible or collapsible member forming a fulcrum for said lever arm upon operation of said operating means in one direction only, but permitting said die to be manually moved in a downward direction when said operating means is stationary.

10. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a member engaging said die formers for positively moving said die formers in engagement with the slot portions of the armature coil, a shaft for actuating said member, a sleeve mounted on said shaft for slidable movement therealong, a die on the lower end of said sleeve, a yieldable connection between said shaft and sleeve to engage said die with the top sides of the slot portions of the armature coil, fluid pressure means for positively moving said shaft towards said die block to actuate said member including a cylinder and piston, said fluid pressure means being arranged to permit said die to be manually engaged with said die block while said fluid pressure means remains inoperative, a manually operable valve for controlling the admission of fluid under pressure to said cylinder, another valve for controlling the admission of fluid under pressure to said valve, a plunger for operating said second mentioned valve, and a connection from said shaft to said plunger to open said second mentioned valve after said die has been manually engaged with said armature coil, to prevent actuation of said shaft by said fluid pressure means until said die has been fully engaged with the top sides of said armature coil.

11. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said die block forming a pair of slots for receiving an armature coil, a sleeve mounted for slidable movement towards and from said die block and having a die on the lower end thereof, means for yieldably engaging said die with the top sides of the slot portions of said coil including a shaft extending through said sleeve and a yieldable connection between said shaft and sleeve, means engaged by said shaft for engaging said die formers with the inner sides of the slot portions of said coil comprising a member disposed between said die formers and having a pair of spaced apart oppositely inclined engaging surfaces adapted to engage the inner sides of said die formers, power operated means for positively moving said shaft into engagement with said member, to positively move said die formers towards the outer sides of said die block, other means adapted to prevent operation of said power operated means, and a plunger slidably mounted in said operating member for said die formers and adapted to be engaged by said shaft, when said shaft and sleeve have been moved to a position to engage said die with the top sides of the slot portions of the armature coil, and be moved by said shaft to a position to cause said means for preventing operation of said power operated means to be moved to a position to permit operation of said shaft by power.

12. In a coil forming apparatus for armature coils, a frame, a stationary platen mounted on said frame, a die block mounted on said platen and formed to receive the slot portions of an armature coil, a pair of die formers on said die block, adapted to engage and form the sides of the slot portions of the coil, a sleeve mounted on said frame for slidable movement with respect thereto, a platen on said sleeve and having a die mounted on the under side thereof, said die being adapted to engage the top sides of the slot portions of said coil, means for yieldably engaging said movable die with said coil including a shaft extending through said sleeve and a yieldable connection between said shaft and sleeve, means engaged by said shaft, for positively engaging said die formers with the inner sides of the slot portions of said coil comprising a member mounted for movement towards and from said stationary platen and having a pair of spaced apart oppositely inclined sides having engagement with the inner sides of said die formers, power operated means for positively moving said shaft into engagement with said member, to positively move said die formers towards the outer sides of said die block, other means adapted to prevent operation of said power operated means, and a plunger slidably mounted in said operating member for said die formers and adapted to be engaged by said shaft, when said shaft and sleeve have been moved to a position to engage said dies with the top sides of the slot portions of the armature coil, and be moved by said shaft to a position to cause said means for preventing operation of said power operated means to be moved to a position to permit operation of said shaft by power.

13. In a coil forming apparatus for armature coils, a die block, a pair of die formers slidably mounted on said die block for slidable movement towards and from the outer sides thereof, said die formers together with said block forming a pair of slots for receiving an armature coil, a movable die, means for yieldably engaging said movable die with the top sides of the slot portions of the coil including a sleeve, a shaft mounted within said sleeve, for movement with respect thereto, a yieldable connection between said shaft and sleeve, a lever having pivotal connection with said shaft at one of its ends, an extensible member having pivotal connection with the other end of said lever, for actuating said lever, extensible and collapsible means, forming a fulcrum for said lever when moved by said extensible member in one direction only and having pivotal connection therewith, intermediate the ends thereof, so arranged as to permit said die to be manually moved to engage an armature coil mounted on said die block while said extensible member remains stationary, and means actuated by said shaft for engaging said die formers with the insides of the slot portions of a coil including a member having a pair of spaced apart oppositely inclined surfaces having slidable engagement with said die formers.

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