

G. A. GRISELL.
MACHINE FOR FORMING ARMATURE COILS.

No. 582,640.

Patented May 18, 1897.

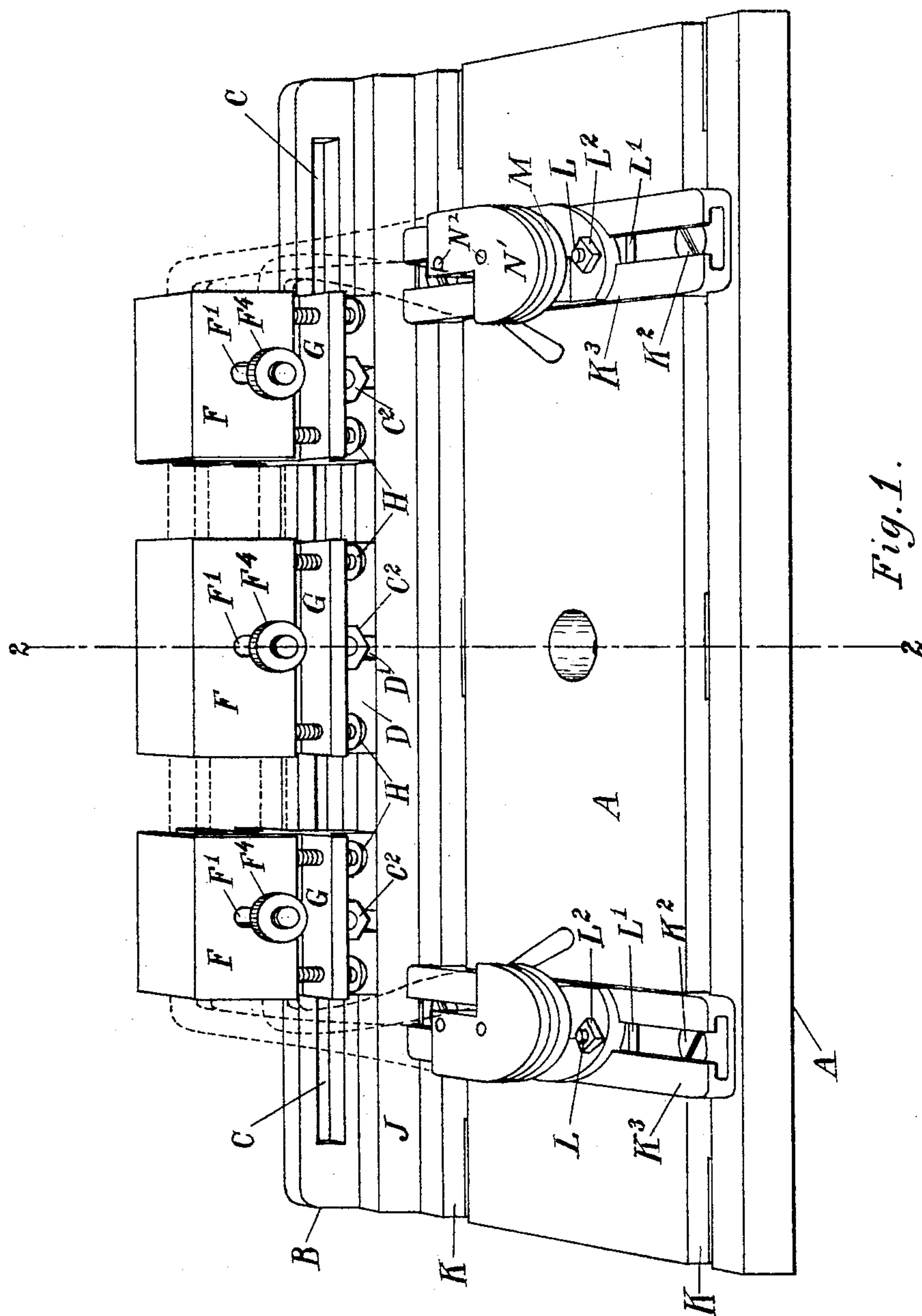


Fig. 1.

WITNESSES:

Aug. J. Buenzli
Walter W. Robins.

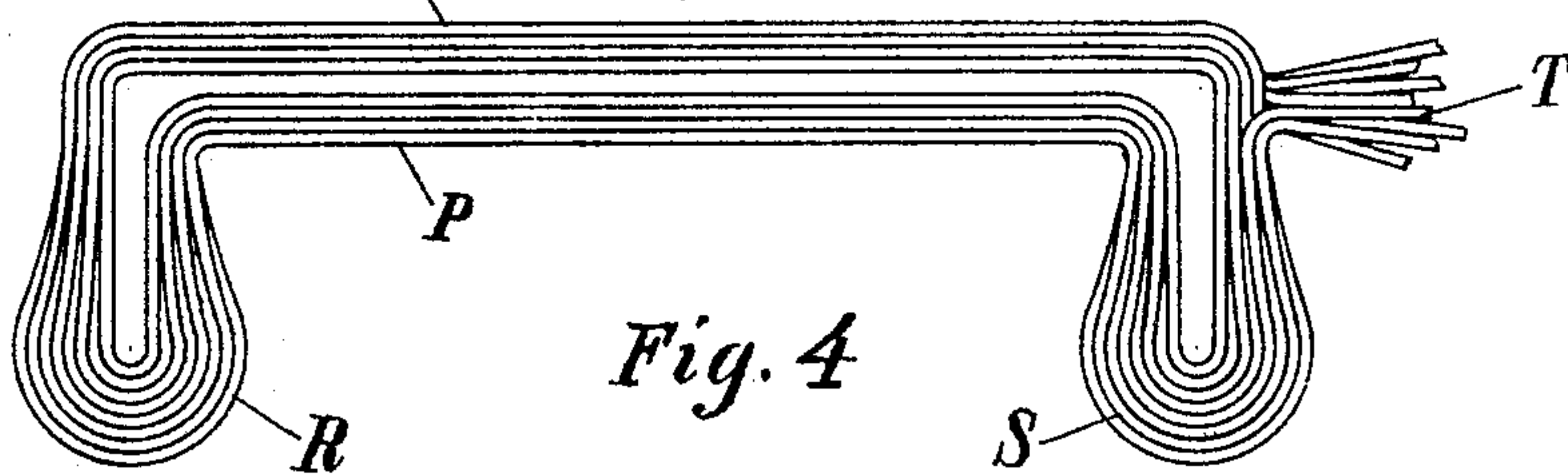
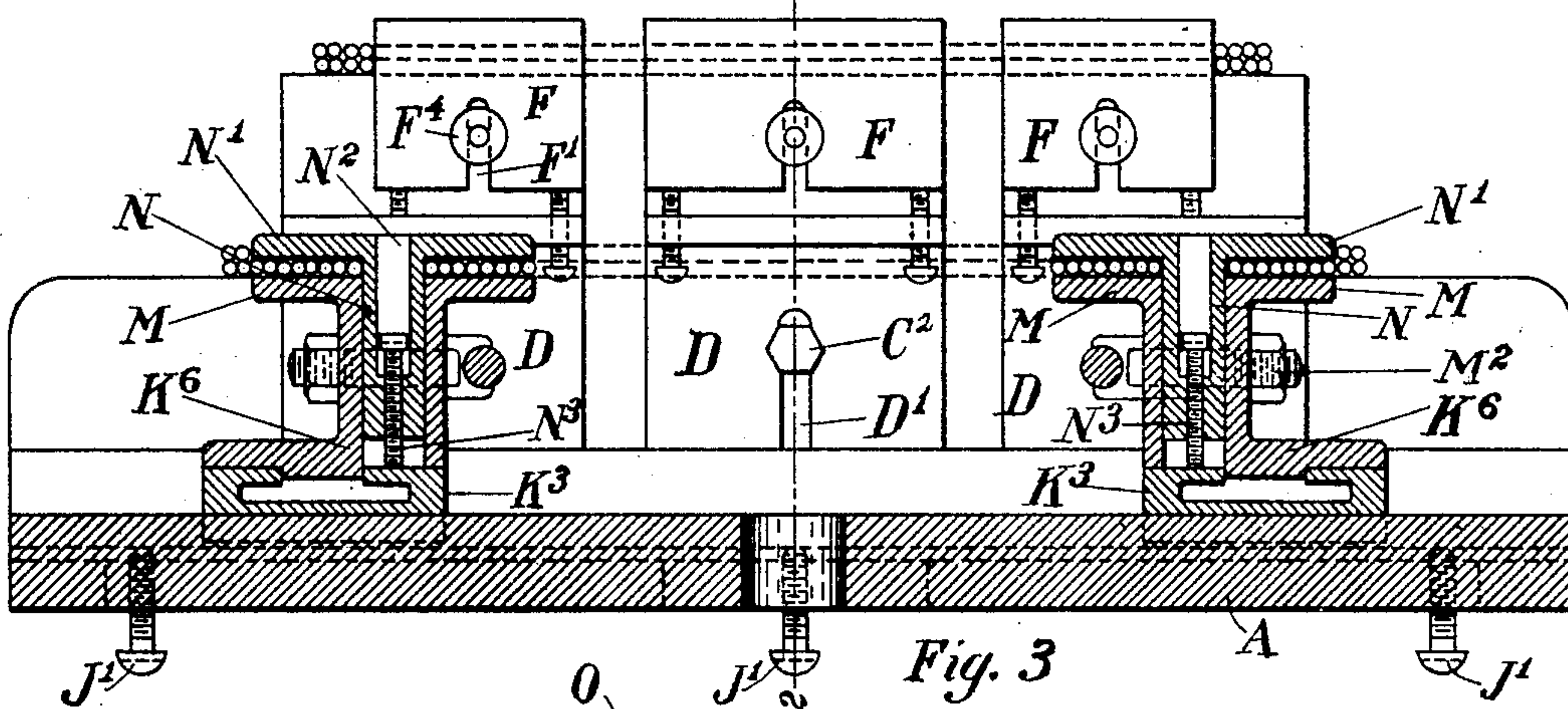
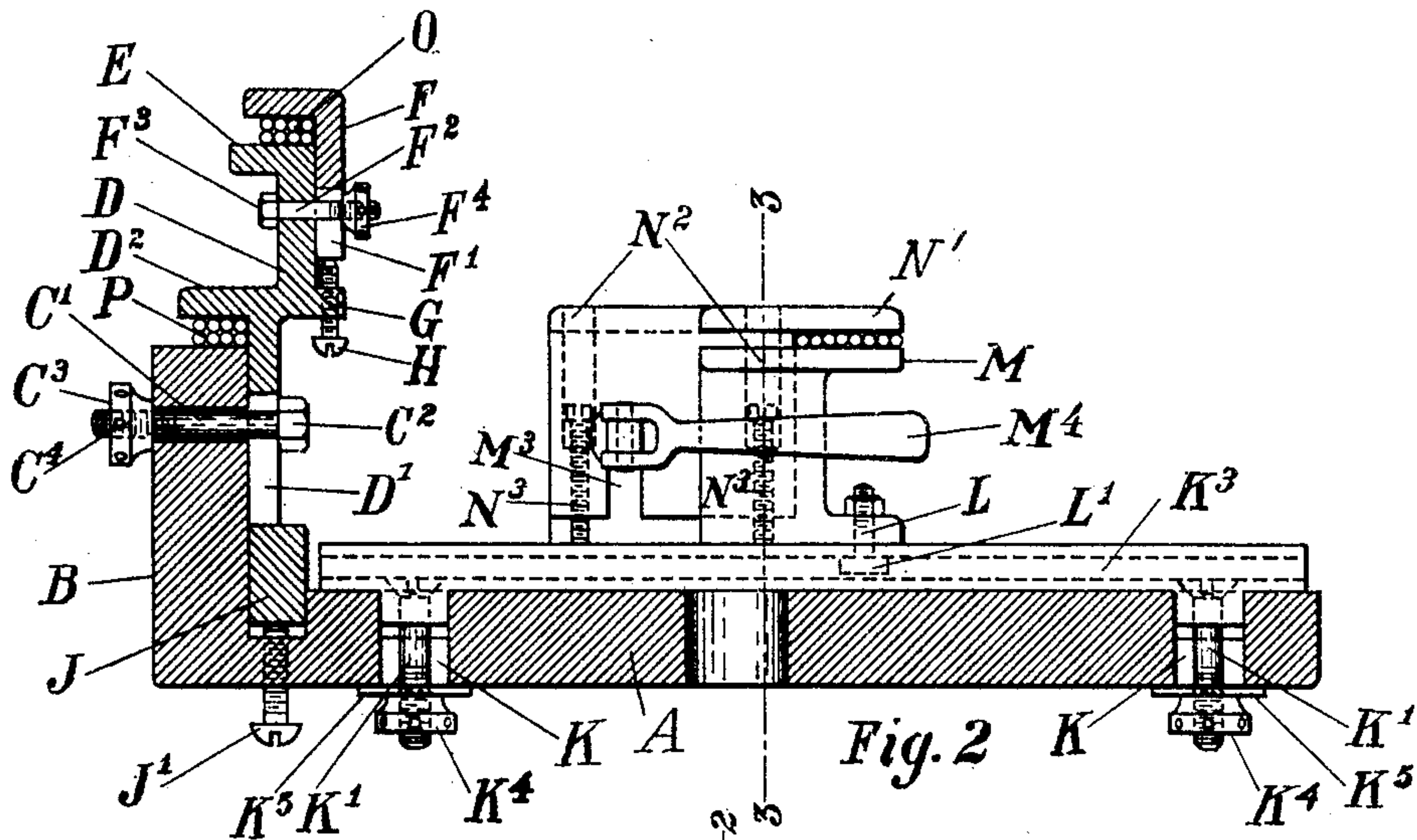
INVENTOR

Ernest Adolf Grisell

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UNITED STATES PATENT OFFICE.

GUSTAF ADOLF GRISELL, OF MADISON, WISCONSIN, ASSIGNOR TO THE
NORTHERN ELECTRICAL MANUFACTURING COMPANY, OF SAME
PLACE.

MACHINE FOR FORMING ARMATURE-COILS.

SPECIFICATION forming part of Letters Patent No. 582,640, dated May 18, 1897.

Application filed November 16, 1896. Serial No. 612,390. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF ADOLF GRISELL, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain Improvements in Machines for Forming Armature-Coils, of which the following is a specification.

My invention relates to formers or machines for forming coils for armature-winders.

The object is to provide a machine which shall be susceptible of all the various and necessary transformations or arrangements of the several parts, so as to permit coils of any size and shape to be formed thereon, at least so long as they are of the general nature of the coils illustrated in the drawings.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of the machine with a coil shown in dotted lines. Fig. 2 is a section on the line 2 2 of Figs. 1 and 3. Fig. 3 is a section on the line 3 3 of Fig. 2. Fig. 4 is a view of the coil.

Like parts are indicated by the same letters in all the figures.

A is the bed-plate, having at one side the upwardly-turned flange B. This flange is provided with a slot C, through which passes the bolts C', having the inner heads C² and the outer thumb-nuts C³. These nuts are preferably provided with holes C⁴, into which a nail or pin can be put so that they can be turned. On the inside of the flange B there are a series of slides D, having each a vertical slot D', through which passes the bolt C', and a flange D², which comes down in opposition to the top of the flange B, and an upper face or flange E. On each of the pieces D is mounted an angle-iron F, having a slot F', through which passes the bolt F², having the head F³ on one side and the thumb-nut F⁴ on the other side. Each piece D has an offset G, through which pass two adjusting-screws H, the upper ends of which bear against the lower extremity of the slotted angle-piece F. The upper portion of the angle-piece F overhangs and opposes the surface or flange E just as the flange D² overhangs the top or upper surface of the flange part B. All of the pieces D rest upon the bar J, which in turn rests upon

the screws J' J', which are threaded into the bed-plate A. The bed-plate A is provided with two slots K K, through which project the screws K' K'. Each of these screws has a head K², which is received in the T-shaped slot in the cross-bar K³, and such screw has a thumb-nut K⁴ at its outer extremity and a bearing-plate K⁵ between the nut and the bottom of the bed. On top of each of the cross-pieces K³ is placed a standard K⁶, having a downwardly-projecting part to be received into the upper neck of the T-shaped slot in the bar K³ and adapted to slide along it.

L is a bolt having the head L', which projects into the slot, and the nut L², which engages the projection on the standard. This standard is shaped as shown, having the upper table M forming part of a circle. It has a vertical oblong slot therethrough, into which drops the shank N, associated with the circular flange-like part N'. Two holes N² are formed through these parts, and down into them the screws N³ N³ are let, being screw-threaded into the shank portion and bearing against the upper surface of the bar K³.

The several portions of the coil are indicated as follows: The longer straight portion of the wires is marked O, the shorter straight portion P, the flattened end portions R and S, respectively, and the terminals T. The bolts M² pass through the standards K⁶ and the shanks N, connected with the parts N'. The shank N is slotted at M³, so as to allow the plate or part N' to be removed when the bolt is loosened. The plate N' and the shank N may be held in place by means of a nut or similar device—as, for example, by means of the cam-lever M⁴. This lever when used takes the place of the nut, the parts being bound together by moving the lever in one direction and loosened by moving the lever in the opposite direction.

The use and operation of my invention are as follows:

In the effort to form a coil such as is indicated in the drawings, particularly in Fig. 4, a good deal of difficulty is experienced because the coils have to be formed quite accurately and with smoothness and regularity. Moreover, the coils have to be varied in size

and shape frequently to accommodate the different styles of machines, and in view of the different kinds of wire used, and in view of the variations in the castings of machines of substantially the same size and form. Moreover, in the economical employment of workmen it is necessary that a workman should pass from the making of one kind of coil to another at comparatively frequent intervals. These several circumstances, together with others, call in shop practice for a machine which shall be entirely general for the manufacture of coils, so that any sort of coil within the limits suggested may be made upon any machine.

To vary the form of the part O of the coil—and its size will be determined by the number of wires, the number of layers, and the thickness of the wire used—I loosen the nut F⁴ and raise or lower the angle-bar by adjusting the screw H, and then clamp the parts in position again by operating the nut F⁴. Thus by having a series of these angle-bars I can determine at will the arrangement or form of the part O. If this part is to be varied, so as to be entirely straight or set at an angle to the part P of the coil, I may raise or lower either of the pieces D by loosening the nut C³ and raising or lowering the bar J at either end by means of the screws J' J'.

I can determine the length of the parts P by bringing the pieces D close together or removing one or more of them entirely, the remaining ones being locked in proper position by the bolt C'. To determine the thickness of the part P of the coil, I may raise or lower the part or parts D, again setting such part in position by operating the nut C³.

Turning now to the remainder of the coil, it is clear that if the parts O P are to be lengthened or shortened the parts R and S must be brought nearer together or separated farther from each other, as the case may be, and this can be done by loosening the nuts K⁴ and moving the bars K³ toward or from each other and then tightening the nuts again. It may also be desired to lengthen that portion of the coil which extends from O or P to the middle of the part R or S or to shorten the same. This is accomplished by moving the standards K⁶ along the bars K³, the same being loosened or locked in position by operating the nuts L² on the bolts L whenever required. The thickness of the parts R and S being dependent upon the number of layers and the gage of the wires used is determined by operating the screws N³, thus raising or lowering the part N' with reference to the part M. When the parts are all in proper position, the coil is wound thereon by carrying it successively about. For instance, beginning at one end, I may carry a single wire around between the parts F and E, then between one of the sets of parts M and N', then back between the parts B and D², then back around the other set of parts M and N' to the starting-point, whence the circuit is con-

tinued until the coil is completed. The table may be supported on a proper standard, for which I have left a hole in the middle of the bed A. To remove the coil, it is necessary to release the plate N' from its engagement with the standard, which is done by means of the handle. The plate N' can then be lifted off, whereupon the coil can be easily removed from its position. It may then be properly taped or coated, as the case may be.

I do not wish to be limited to the precise construction of these several parts, as some of them can be used without others while yet containing the substance of my invention, and many of them, if not all, may be more or less modified without departing from the spirit of my invention.

It will be noticed that the several forming parts are arranged in different horizontal planes and that they are also arranged in different vertical planes, the two sides of the coil when in position being in different horizontal and also in different vertical planes.

I claim—

1. In a machine for forming armature-coils, a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, the several parts adjustable each with reference to the size of its forming-aperture and each separately adjustable with reference to its position relative to the others.

2. In a machine for forming armature-coils, a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, the several parts adjustable each with reference to the size of its forming-aperture, and each separately adjustable with reference to its position relative to the others, said forming parts for the sides of the coil having a vertically-moving piece having a ledge to oppose a fixed surface in combination with a vertically-moving piece having a ledge to oppose a surface on the first-mentioned piece.

3. A machine for forming armature-coils, comprising a bed or plate provided at one side with an upwardly-projecting part, a series of movable slides connected with said upwardly-projecting part and provided with a projecting ledge which extends over the edge of said projecting part so as to form a space between the ledge and the part, an angle-iron adjustably connected with each of said movable parts or slides, one part of which projects over the upper edge of said movable parts or slides so as to form a space between the angle-irons and the slides for the wire, and two forming parts adjustably connected with said plate and adapted to receive the ends of the coil.

4. In a machine for forming armature-coils, a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, the several parts adjustable

each with reference to the size of its forming-aperture, and each separately adjustable with reference to its position relative to the others, the forming parts arranged in different horizontal planes.

5. In a machine for forming armature-coils, a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, the several parts adjustable each with reference to the size of its forming-aperture, and each separately adjustable with reference to its position relative to the others, the forming parts arranged in different vertical planes.

6. A device for forming armature-coils, comprising a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, said latter parts comprising standards provided with a table having a slot therethrough, a second table provided with a shank adapted to fit in said slot and a connecting device adapted to connect said shank and standard together.

7. A device for forming armature-coils, comprising a forming part to receive one side of the coil, another forming part to receive the other side of the coil, two forming parts to receive the ends of the coil, said latter parts comprising standards provided with a table having a slot therethrough, a second table provided with a shank adapted to fit in said slot, a connecting device adapted to connect said shank and standard together, and adjusting devices whereby the distance between them may be regulated.

8. A device for forming armature-coils, comprising a plate having an upwardly-pro-

jecting flange or part connected therewith, a series of slides adjustably connected with said flange and having coil-forming slots or openings associated therewith, a bar beneath said slide or parts adapted to support the same, said bar provided with adjusting-screws for adjusting its position, and two end-forming parts adjustably connected with said plate, substantially as described.

9. A machine for forming armature-coils, comprising a plate having an upwardly-projecting flange or piece connected therewith, a series of slides or pieces adjustably connected with said flange, said slides provided with projecting parts which project over the edge of said flange, each slide provided with a top piece provided with a projecting flange which extends over the edge of the slide, two end-forming parts adjustably connected to cross-bars associated with said plate, said cross-bars being adjustably connected with said plate, substantially as described.

10. In a machine for forming armature-coils, the combination of a series of forming-pieces mounted so as to be all simultaneously vertically adjustable, a series of attaching devices whereby each of said forming-pieces is independently vertically adjustable, overhanging ledges on each of such pieces to oppose a fixed surface, vertically-adjustable angle-irons on each of such pieces having an overhanging ledge to oppose a relatively-fixed surface on the forming-piece.

Signed at Madison, Wisconsin, November 4, 1896.

GUSTAF ADOLF GRISELL.

In presence of—

AUG. J. BUENZLI,
F. L. STAGG.