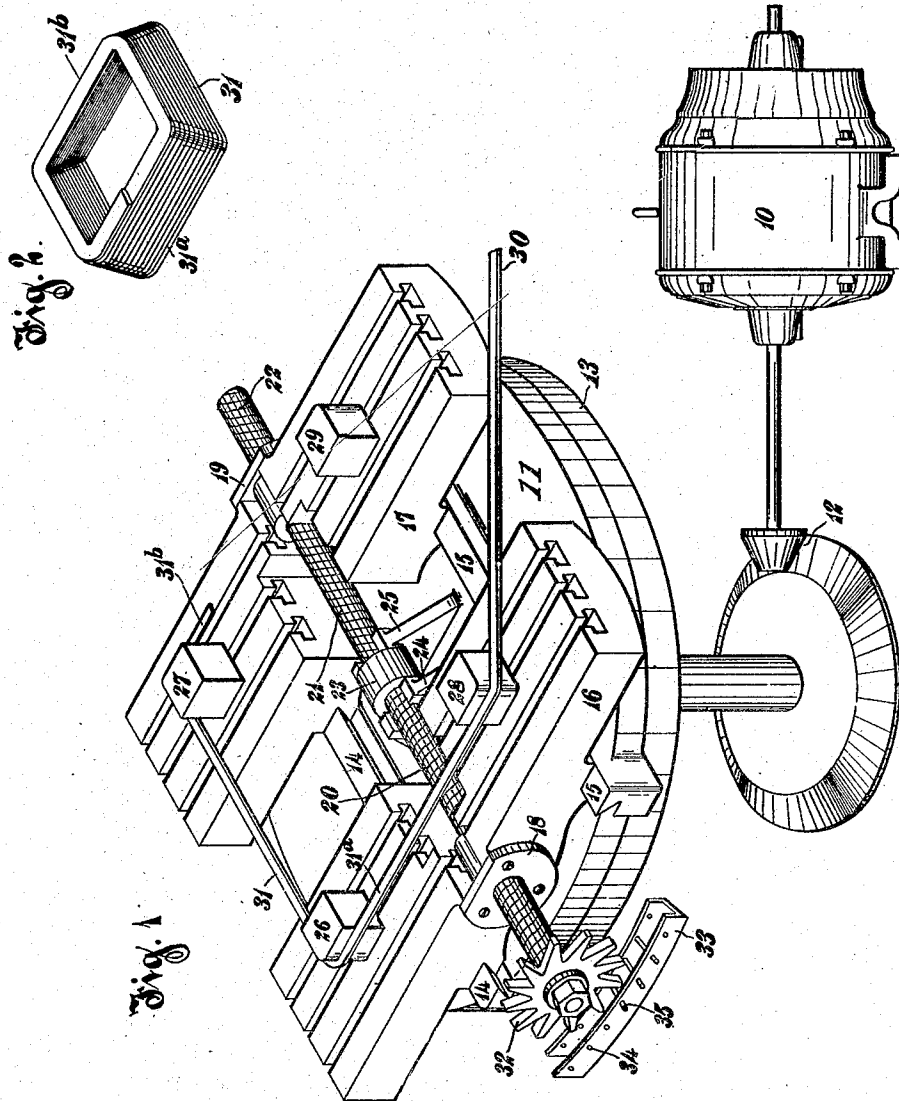


W. D. POMEROY.  
COIL FORMING MACHINE.  
APPLICATION FILED DEC. 31, 1906.

937,328.

Patented Oct. 19, 1909.



Witnesses

Olivier J. Hamann  
Fred J. Kinsey

Inventor  
William D. Pomeroy  
By

Chas. E. Lord  
Attorney

# UNITED STATES PATENT OFFICE.

WILLIAM D. POMEROY, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY,  
A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING  
COMPANY, A CORPORATION OF OHIO.

## COIL-FORMING MACHINE.

937,328.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed December 31, 1906. Serial No. 350,254.

*To all whom it may concern:*

Be it known that I, WILLIAM D. POMEROY, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Coil-Forming Machines, of which the following is a full, clear, and exact specification.

My invention relates to coil-forming machines.

In building some types of dynamo-electric machines, it is necessary to have coils the opposite sides of which are not in parallel planes, *e. g.*, coils in the shape of a wedge. Such coils may also be necessary for other purposes. My present invention has for its object to provide a machine in which such coils may be formed, the distance between two opposite sides of the coil being varied as each turn of the coil is formed while the distance between the other two opposite sides remains constant.

With this object in view my invention in one of its aspects comprises the combination in a coil-forming machine, of coil-forming supports, and means for varying the relative position of said supports as a coil is wound to form a wedge-shaped coil.

In another aspect my invention comprises the combination of a rotatable frame, supports upon said frame, and means for automatically moving said supports toward or from each other upon rotation of the frame.

In a more specific aspect my invention comprises the combination in a coil-forming machine, of a rotatable table, two carriages upon said table, two bending blocks on each carriage, and means operated upon the rotation of the table for moving said carriages relatively to each other.

Many other features of my invention will appear from the following description and accompanying drawings and will be particularly set forth in the claims.

In the drawings Figure 1 is an isometric view showing my coil-forming machine as a whole; and Fig. 2 is a similar view showing a finished coil.

Referring now to the drawings, 10 is an electric motor or other source of power ar-

ranged to rotate the frame or table 11, as by means of friction cones or beveled gearing 12. The table 11 is here shown horizontal and resting upon a stationary support or bearing 13. This table is provided with ways 14 and 15 in which are slidable the carriages 16 and 17. The two carriages are provided with bushings 18 and 19 respectively, these bushings being threaded internally and meshing with the right and left handed screw-threads 20 and 21 on the operating screw or shaft 22. The shaft 22 is also provided with a thrust collar 23 engaging thrust blocks 24 and 25 on the table 11. By rotating the shaft 22 the carriages 16 and 17 may be made to approach or recede from each other.

Adjustably mounted on the carriages 16 and 17 are coil-forming supports or bending blocks 26, 27, 28 and 29, around which the wire ribbon or other material 30 may be bent by special bending levers or in any other desired way to form the desired coil, as 31. As the table 11 is rotated in a clockwise direction by motor 10 the wire 30 is unwound from a reel or its equivalent and bent around the coil-forming supports 26 to 29 inclusive. By mechanism to be explained, at each rotation of the table 11 the carriages 16 and 17 are advanced toward each other a predetermined distance, thus diminishing the distance between the sides 31<sup>a</sup> and 31<sup>b</sup> of the coil at each successive rotation and making the coil in the shape of a wedge.

On one end of the shaft 22 is mounted a notched wheel 32, here shown as having twelve teeth. The notched wheel 32 is arranged to pass through a channel 33 as the table 11 is rotated. The sides of this channel are provided with holes 34 in which may be placed removable pins or teeth 35, with which the teeth of the star wheel 32 engage. Any other form of rack may be used if desired.

As the table 11 is driven in a clockwise direction by the motor 10 the star wheel 32 engages with those pins or teeth 35 which are in place, each pin turning said star wheel, in this case, one twelfth of a rotation in a counter-clockwise direction. If for example

the pitch of the screw threads 20 and 21 is eight per inch, the carriages 16 and 17 are caused to approach each other one fourth of an inch for each complete rotation of the notched wheel 32, or one forty-eighth of an inch for each twelfth of a rotation such as is caused by each of the pins or teeth 35. This movement of the carriages 16 and 17 preferably takes place during the movement of the table 11 through one quadrant only, as shown, though if desired it may take place part in more than one quadrant, *e. g.*, in each of two opposite quadrants. By thus moving the carriages toward each other at each rotation of the table 11, each turn of the coil 31 is smaller in one dimension by a predetermined amount than the turn preceding it, the larger turns which have been completed dropping down upon the carriages 16 and 17 out of the way of the smaller ones which are being wound. Thus wedge-shaped coils are formed. By varying the number of pins 35, different amounts of movement of the carriages 16 and 17 may be obtained. Still further variations of this movement may be obtained by having star wheels 32 of different number of teeth and by substituting operating shafts 22 having screw threads of different pitches. With comparatively few star wheels and shafts almost any desired adjustment may be obtained.

If desired the shaft 22 may be operated manually in any amount desired instead of being operated automatically upon rotation of the table 11.

Many modifications may be made in the precise arrangements here shown and described and all of these which come within the spirit and scope of my invention I aim to cover in the claims.

What I claim as new and desire to secure by Letters Patent is:—

1. In combination, a rotatable frame, supports upon said frame, and means for automatically moving said supports toward or from each other upon rotation of the frame.

2. In combination, a rotatable frame, supports upon said frame, means for moving said supports relatively to the frame, and an automatic device for operating said moving means.

3. In combination, a rotatable frame, supports upon said frame, means for moving said supports relatively to each other, and means whereby said moving means is automatically operated a predetermined amount upon each rotation of the frame.

4. In combination, a rotatable frame, supports upon said frame, means for moving said supports relatively to each other, and means whereby said moving means is automatically operated a predetermined amount upon each rotation of the frame through a predetermined angle.

5. In combination, a rotatable frame, extensions from said frame, means for moving said extensions relatively to each other, and mechanism for automatically operating said moving means during part of the rotation of the frame.

6. In combination, a rotatable frame, supports upon said frame, means for moving said supports relatively to the frame, and means for automatically operating said moving means step-by-step.

7. In combination, a rotatable frame, supports upon said frame, means for moving said supports toward or from each other, and means automatically operated upon the rotation of the frame for operating said moving means step-by-step.

8. In combination, a rotatable frame, extensions from said frame, means for moving said extensions relatively to the frame, and means intermittently operated by the rotation of the frame for operating said moving means.

9. In combination, a rotatable frame, extensions from said frame, means for moving said extensions toward or from each other, and means for automatically operating said moving means an adjustable predetermined amount upon each rotation of the frame through a predetermined angle.

10. In combination, a rotatable frame, extensions from said frame, means for moving said extensions relatively to each other, and means for automatically operating said moving means step-by-step a variable number of steps upon each rotation of the frame through a predetermined angle.

11. In combination, a rotatable frame, supports upon said frame, a shaft in the frame for relatively moving said supports, a notched wheel for turning said shaft, and a plurality of removable teeth arranged when in place to be engaged by said notched wheel to turn the latter.

12. In combination, a rotatable frame, supports upon said frame, a shaft in the frame for moving said supports toward or from each other, and means for automatically turning said shaft.

13. In combination, a rotatable frame, supports upon said frame, a shaft in the frame for moving said supports toward or from each other, and means automatically operated upon the rotation of the frame for turning said shaft.

14. In combination, a rotatable frame, supports upon said frame, a shaft in the frame for moving said supports toward or from each other, and means for automatically turning said shaft through an adjustable predetermined angle upon each rotation of the frame.

15. In combination, a rotatable frame, supports upon said frame, a shaft in the frame

for moving said supports toward or from each other, and a wheel connected to said shaft, said wheel being automatically turned an adjustable amount upon each rotation of the frame through a predetermined angle.

16. In a coil-forming machine, a rotatable table, two carriages upon said table, two bending blocks on each carriage, and automatic means for moving said carriages relatively to each other.

17. In a coil-forming machine, a rotatable table, two carriages upon said table, a plurality of bending blocks on each carriage, and means operated by the rotation of the table for moving said carriages relatively to each other.

18. In a coil-forming machine, a rotatable table, a plurality of carriages upon said table, a plurality of bending blocks on each carriage, and automatic means for moving said carriages relatively to one another.

19. In a coil-forming machine, a rotatable table, two carriages upon said table, two bending blocks on each carriage, and automatic means for moving said carriages relatively to each other upon each rotation of the table through a predetermined angle.

20. In a coil-forming machine, a rotatable table, two carriages upon said table, a plurality of bending blocks on each carriage, and automatic means for moving said carriages relatively to each other an adjustable predetermined amount at each rotation of the table.

21. In a coil-forming machine, a rotatable frame, a plurality of groups of bending blocks upon said frame, and automatic means for moving said groups relatively to one another.

22. In a coil-forming machine, a rotatable frame, a plurality of groups of bending blocks upon said frame, and means for automatically varying step-by-step the distance between said groups.

23. In a coil-forming machine, a rotatable frame, a plurality of groups of bending blocks upon said frame, and means for automatically varying the distance between said groups a predetermined amount upon each rotation of the frame through a predetermined angle.

24. In a coil-forming machine, a rotatable frame, a plurality of groups of bending blocks upon said frame, and means for automatically varying the distance between the groups an adjustable predetermined amount at each rotation of the frame.

25. In a coil-forming machine, a rotatable frame, two pairs of bending blocks upon said frame, and automatic means for varying step-by-step the distance between said pairs.

26. In a coil-forming machine, a rotatable table, two pairs of bending blocks thereon

and means for automatically moving said pairs relatively to each other.

27. In a coil-forming machine, a rotatable frame, two bending blocks upon said frame, and means for automatically varying the distance between said blocks.

28. In a coil-forming machine, a rotatable frame, two bending blocks upon said frame, and means for automatically varying the distance between said blocks during part of the rotation of the frame.

29. In a coil-forming machine, a rotatable frame, a plurality of bending blocks, and means for automatically varying the distance between certain of said blocks.

30. In a coil-forming machine, a rotatable table, a plurality of bending blocks upon said table, and automatically operated means for varying the distance between said blocks upon a predetermined movement of the table.

31. In a coil-forming machine, a rotatable table, a plurality of bending blocks thereon, and automatic means for moving said blocks toward or from each other an adjustable predetermined amount upon each rotation of the table.

32. In a coil-forming machine, a rotatable frame, two bending blocks upon said frame, a threaded shaft for varying the distance between said blocks, a notched wheel connected to said shaft, and a plurality of separately removable teeth arranged to be engaged by said notched wheel to turn it as the frame is rotated.

33. In combination, a shaft rotatable about longitudinal and transverse axes, means for rotating it about the transverse axis, a toothed wheel connected to said shaft, and teeth arranged to be engaged by said toothed wheel during each complete rotation of the shaft.

34. In combination, a rotatable frame, supports upon said frame, and automatic means for progressively moving said supports relatively to each other.

35. In combination, a rotatable frame, supports upon said frame, and automatic means for intermittently advancing said supports toward each other as the frame is rotated.

36. In a coil-forming machine, coil-forming supports, and automatic means for varying the distance between said supports.

37. In a coil-forming machine, coil-forming supports, and means for automatically varying the distance between said supports after each turn of the coil is made.

38. In a coil-forming machine, coil-forming supports, and automatic means for so varying the relative position of said supports as a coil is wound thereon that the coil is wedge-shaped.

39. In a coil-forming machine, coil-forming supports, and automatic means for vary-

ing the distance between some of said blocks as each turn of the coil is formed while leaving the distance between others of said supports constant.

- 5 40. In combination, a rotatable frame, two sets of supports thereon, and means for automatically varying the distance between said two sets of supports as the frame is rotated.

In testimony whereof I affix my signature, in the presence of two witnesses.

WILLIAM D. POMEROY.

Witnesses:

GEO. B. SCHLEY.  
FRED J. KINSEY.