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R. B. JAMES
SLOT HOLDER

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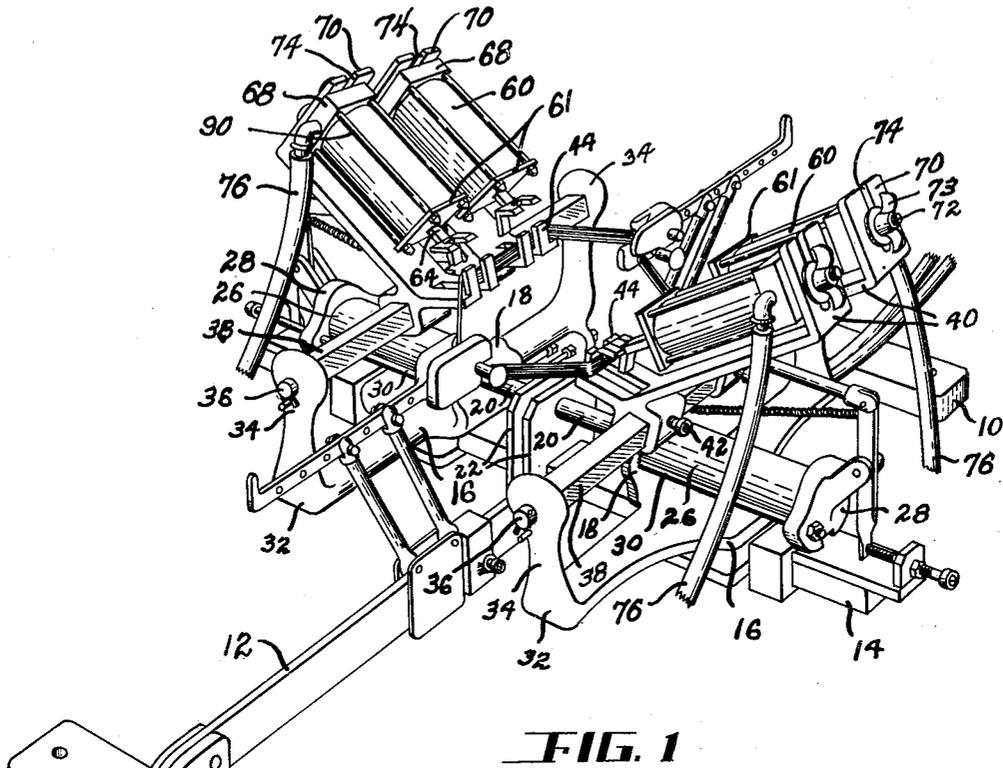


FIG. 1

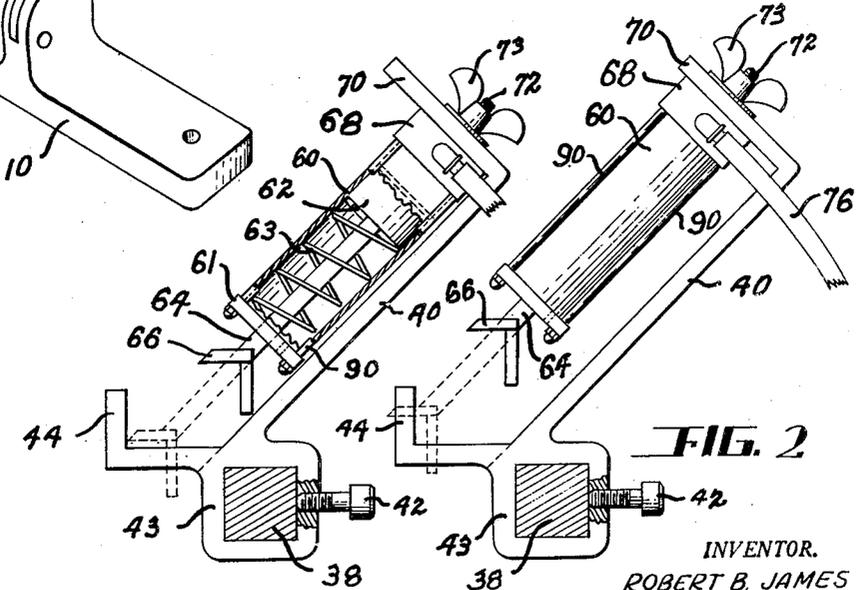


FIG. 2

FIG. 3

INVENTOR.
ROBERT B. JAMES

BY *Dybrig & Dybrig.*
HIS ATTORNEYS

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SLOT HOLDER

Robert E. James, Huntington Park, Calif.

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6 Claims. (Cl. 153-11)

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This invention relates to a coil forming machine and more particularly to a machine having improved means for holding the coil during the coil forming operation.

This invention represents an improvement over the arrangement shown in my copending application, Serial Number 694,934, filed September 5, 1946, (Patent No. 2,451,222, granted Oct. 12, 1948).

An object of this invention is to provide a pneumatically operated coil former that spreads the coil to the proper width and twists the sides of the coil so as to have the proper curvature to fit radially disposed slots.

Another object of this invention is to provide a coil holder which is inexpensive to make, reliable in operation, and easy to operate.

Another object of this invention is to provide a novel arrangement for adjusting the coil holder to accommodate various shaped coils.

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 drawing;

Figure 1 is a perspective view of the coil forming machine showing a coil in the process of formation;

Figure 2 is a fragmentary elevational view showing the construction of the coil or slot holder; and

Figure 3 is a fragmentary elevational view with parts broken away showing the coil holder adjusted for a different shaped coil.

Referring now to the drawing wherein I have shown a preferred embodiment of my invention, reference numeral 10 designates a pair of brackets which are adapted to be rigidly secured to a work table, work bench, or any other suitable stand or support. The brackets 10 support a rail 12 forming the main support for the coil forming device. This rail 12 supports a transversely disposed bar or rail 14. The bar 14 is attached to the rail 12 in any suitable manner, as for example, by welding. The rail 12 and the bar 14 cooperate to form the frame structure for the coil forming device. The coil forming device includes means for expanding the size of the wire and for twisting the size of the wire into proper angular relation. In addition thereto, the coil forming device includes a pair of end-supporting floating devices that hold the ends of the coil in proper angular relation. The coil-expanding means will now be described and includes a pair of bracket members 16 mounted for reciprocatory

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movement upon the bar 14 which forms guides. One bracket 16 is mounted on one side of the rail 12 and the other bracket 16 is mounted on the other side of the rail 12. Each bracket is provided with an upwardly directed cylinder head portion 18 provided with a suitable opening for a piston rod 20. The piston rods 20 extend from one side to the other and are fixedly secured to the brackets 22, one on either side, supported in any suitable manner upon the rail 12 and the bar 14. Reciprocation of the bracket 16 is controlled by pneumatic means which comprises a pneumatic cylinder 26 which is closed by a cylinder head 28 secured to the cylinder head portion 18 by suitable bolts 30. The arrangement of the pneumatic operating means is such that when it is desired to form the coils, the bracket members 16 are spread apart by means of pneumatic power. The construction and arrangement of the means for spreading the bracket members may be varied without departing from the spirit of my invention. For a more detailed description of the coil spreading mechanism, reference is hereby made to said copending application.

Each of the brackets 16 is also provided with a pair of laterally disposed arms 32 terminating in upwardly directed extensions or arms 34. The upwardly directed extensions 34 have been shown as provided with apertures or holes receiving the round ends 36 of square rods or bars 38. Angle irons could be substituted for the square bars 38, if desired.

Each of the rods 38 has adjustably mounted thereon a pair of expansion brackets 40. When the expansion brackets have been adjusted into position, they are held in such position by any suitable means such as set screws 42 which pass through the wall of the rod engaging projection 43 formed on the bottom side of the brackets 40, as shown. The shape of the projection 43 would be made to correspond to the shape of the rods 38 on which the brackets are supported. A bifurcated coil engaging extension or furcation 44 projects from each of the brackets 40 toward the center of the machine and constitutes a first jaw of a coil holding device. The brackets 40 are so shaped that they may be made from flat pieces of heavy sheet metal welded together or they may be made in any other suitable manner.

Each of the expansion brackets 40 supports a cylinder 60 within which a piston 62 operates. The piston 62 is connected to a piston rod 64 which supports at its outer end a coil engaging jaw 66, as best shown in Figures 2 and 3. The piston rod 64 is rectangular in cross section and

passes through a correspondingly shaped hole in the cylinder end wall 61 whereby the coil engaging jaws 66 are prevented from rotating. A spring 63 biases the piston inwardly so as to open the jaws when the piston operating pressure is released. The jaw 66 is provided with suitable bifurcated coil engaging extensions which are arranged in staggered relationship relative to the corresponding extensions provided on the relatively stationary coil engaging jaw 44, with the result that the jaw 66 can be moved toward the relatively stationary jaw 44 so as to engage even the smallest type of coil.

The upper end of the cylinder 60 is provided with a head 68 which is fastened to the slotted projection 70 (formed as an integral part of the bracket 40) by means of the bolt 72 and thumb nut 73. The bolt 72 is slidable within the slot 74 of the projection 70. By virtue of this arrangement, it is possible to shift the cylinder 60 sidewise in the direction of the spread of the V-shaped jaws 44 and 66 and thereby vary the distance between the axis of the cylinder 60 and the main portion of the bracket 40 so as to adjust the coil holder for coils of different shapes. Figure 2 shows the coil holder adjusted for a coil of one shape, whereas Figure 3 shows the holder adjusted for a coil of another shape.

Fluid under pressure, such as air, is supplied to the upper end of the cylinder 60 through the fluid line 76. By controlling the pressure of the fluid supplied to the upper end of the cylinder 60, it is possible to adjust the pressure with which the jaw 66 engages the coil. Thus the coil holder will work with coils of various sizes without the need for any adjustment in the clamping mechanism. The only time when adjustment is necessary is when it is necessary to adjust for changes in the geometric cross sectional shape of the coil. If the device is to be used for coils having different geometric cross sectional shapes, it is possible to adjust for the differences in the geometric shapes merely by loosening the nut 75 which holds the cylinder 60 in adjustment relative to the bracket 40.

Bolts 90 hold the cylinders 60 and end walls 61 in assembled relationship relative to the cylinder head 68. Thus the clamping device is very inexpensive and requires a minimum amount of adjustment and may be operated automatically.

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. In a coil spreading device, a support, a cylinder carried by said support, a piston operable within said cylinder, a piston rod connected to said piston, a first coil engaging jaw carried by said support and including a portion having two coil engaging surfaces arranged substantially at right angles to one another for engaging two sides of said coil, a second complementary coil engaging jaw operatively connected to said piston rod and having surfaces arranged substantially at right angles to one another for engaging the two opposite sides of said coil, and means for adjusting the alignment of said jaws so as to compensate for differences in the shape of the cross sectional areas of different coils to be en-

gaged by said jaws, said last named means comprising means for adjustably shifting one of said jaws in a direction substantially perpendicular to the plane which bisects the angle formed between the coil engaging surfaces of the other of said jaws, the arrangement of said jaws being such that said second jaw moves in a direction parallel to the line bisecting the angle of the V of said first named jaw.

2. In a coil spreading device, a support, a cylinder carried by said support, a piston operable within said cylinder, a piston rod connected to said piston, a first coil engaging jaw carried by said support and including a portion having two coil engaging surfaces arranged substantially at right angles to one another for engaging two sides of said coil, a second complementary coil engaging jaw operatively connected to said piston and having surfaces arranged substantially at right angles to one another for engaging the two opposite sides of said coil, and means for adjusting the alignment of said jaws so as to compensate for differences in the shape of the cross sectional areas of different coils to be engaged by said jaws, said last named means comprising means for adjustably shifting said cylinder relative to said first jaw in a direction substantially perpendicular to the plane which bisects the angle formed between the coil engaging surfaces of said first jaw, the arrangement of said jaws being such that said second jaw moves in a direction parallel to the line bisecting the angle of the V of said first jaw.

3. In a clamp, a support, a first V-shaped jaw carried by said support, a cylinder carried by said support, a piston operable within said cylinder, a piston rod attached to said piston, a second V-shaped jaw complementary to said first V-shaped jaw and connected to said piston rod for movement toward and away from said first named jaw in response to movement of said piston, said second jaw having its vertex extending in the opposite direction from the vertex of said first named jaw and the arrangement of said second jaw being such that the line bisecting the angle of the V is parallel to the direction of movement of the piston and the arms thereof are substantially parallel to the arms on said first jaw, and means for adjustably shifting the cylinder in the direction of the spread of the jaws.

4. In a clamp, a support, a first V-shaped jaw carried by said support, a cylinder carried by said support, a piston operable within said cylinder, a piston rod attached to said piston, a second V-shaped jaw complementary to said first V-shaped jaw and connected to said piston rod for movement toward and away from said first named jaw in response to movement of said piston, said second jaw having its vertex extending in the opposite direction from the vertex of said first named jaw and the arrangement of said second jaw being such that the line bisecting the angle of the V is parallel to the direction of movement of the piston and the arms thereof are substantially parallel to the arms on said first jaw, and means for adjustably shifting the cylinder in the direction of the spread of the jaw, said jaws having interlacing fingers.

5. In a coil spreading device, a support having a slotted projection adjacent its one end, a cylinder, a piston operable within said cylinder, a piston rod connected to said piston, a first coil engaging jaw carried by said support and including a portion having two coil engaging surfaces arranged substantially at right angles to one another for engaging two sides of said coil, a

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second complementary coil engaging jaw operatively connected to said piston rod and having surfaces arranged substantially at right angles to one another for engaging the two opposite sides of said coil, and means for adjusting the alignment of said jaws so as to compensate for differences in the shape of the cross sectional areas of different coils to be engaged by said jaws, said last named means comprising a mounting bolt secured to said cylinder and adjustably supported within said slot for shifting said cylinder in a direction substantially perpendicular to the plane which bisects the angle formed between the coil engaging surfaces of the other of said jaws, the arrangement of said jaws being such that said second jaw moves in a direction parallel to the line bisecting the angle of the V of said first named jaw.

6. In a clamp, a support, a first V-shaped jaw carried by said support, jaw operating mechanism carried by said support, a second V-shaped jaw complementary to said first V-shaped jaw and connected to said jaw operating mechanism for movement toward and away from said first named

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jaw in response to operation of said mechanism, said second jaw having its vertex extending in the opposite direction from the vertex of said first named jaw and the arrangement of said second jaw being such that the line bisecting the angle of the V is parallel to the direction of movement of the piston and the arms thereof are substantially parallel to the arms on said first jaw, and means for adjustably shifting said jaw operating mechanism as a unit in the direction of the spread of the jaw, said jaws having interlacing fingers.

ROBERT B. JAMES.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
440,051	Naylor -----	Nov. 4, 1890
676,292	Wigtel -----	June 11, 1901
1,393,035	Morris -----	Oct. 11, 1921
1,430,226	Goodreaw -----	Sept. 26, 1922
2,451,222	James -----	Oct. 12, 1948