

Dec. 2, 1947.

A. J. GARREAU

2,431,928

APPARATUS FOR FORMING WIRE COILS

Filed March 27, 1945

2 Sheets-Sheet 1

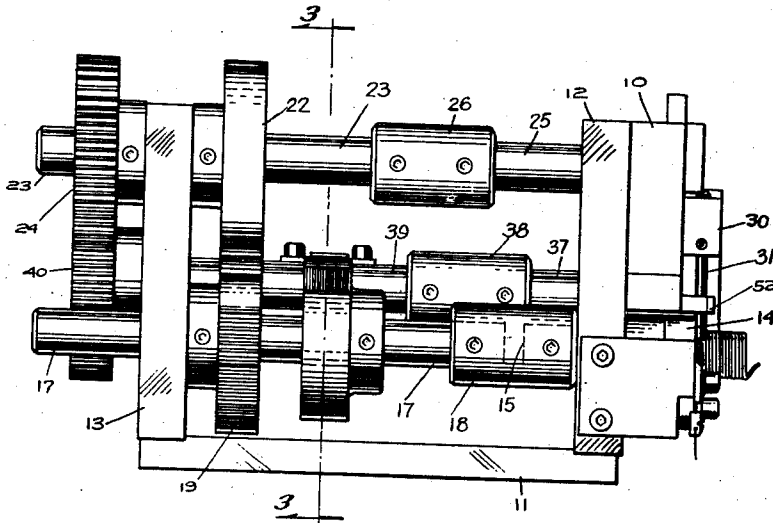


Fig. 1

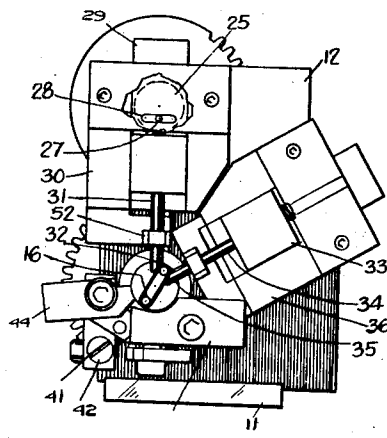


Fig. 2

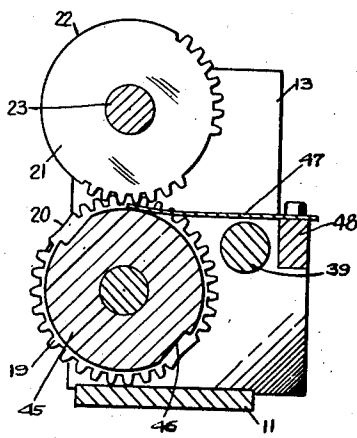


Fig. 3

INVENTOR.
Armand J. Garreau
BY Nathaniel Frucht
Attorney

Dec. 2, 1947.

A. J. GARREAU

2,431,928

APPARATUS FOR FORMING WIRE COILS

Filed March 27, 1945

2 Sheets-Sheet 2

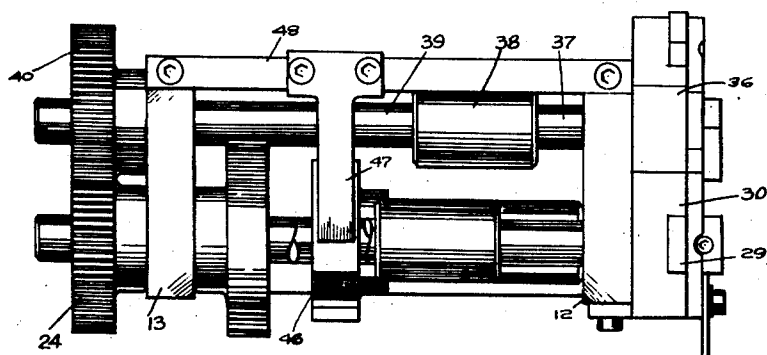


Fig. 1

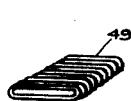


Fig. 5



Fig. 6



Fig. 7



Fig. 8

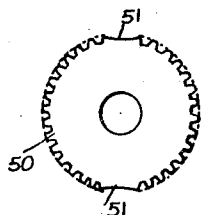


Fig. 5a

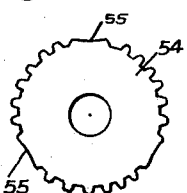


Fig. 6a

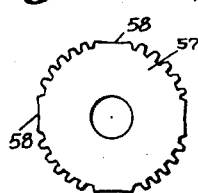


Fig. 7a

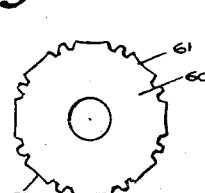


Fig. 8a



Fig. 9

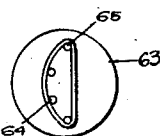


Fig. 10

INVENTOR.

Armand J. Garreau

BY

Nathaniel Frucht

Attorney

UNITED STATES PATENT OFFICE

2,431,928

APPARATUS FOR FORMING WIRE COILS

Armand J. Garreau, Newport, R. I.

Application March 27, 1945, Serial No. 585,136

2 Claims. (Cl. 153-64)

1

The present invention relates to the manufacture of wire in coil form, and has particular reference to an apparatus for the manufacture of coils of pre-determined non-circular shape.

The principal object of the invention is to provide an apparatus for winding wire into helical non-circular forms.

Another object of the invention is to provide an apparatus which may be readily changed or adjusted to provide different helical non-circular forms for wire coils.

Still another object is to provide an apparatus which is particularly suitable for winding wire coils into ornamental forms suitable for jewelry and for general ornamental use.

With the above and other objects and advantageous features in view, the invention consists of a novel arrangement of parts more fully disclosed in the detailed description following, in conjunction with the accompanying drawings, and more specifically defined in the claims appended thereto.

In the drawings,

Fig. 1 is a front elevation of an illustrative apparatus embodying the novel invention;

Fig. 2 is an end view thereof;

Fig. 3 is a section on the line 3-3 of Fig. 1;

Fig. 4 is a top plan view thereof, parts being broken away;

Figs. 5 to 8 are illustrative perspective views of different shapes of wire coils which may be formed with the novel apparatus;

Figs. 5a to 8a are plan views of the corresponding driven gears utilized to obtain the coils illustrated in Figs. 5 to 8;

Fig. 9 is a perspective view of a bow-shaped wire coil; and

Fig. 10 is a view of the rotating arbor for producing the coil of Fig. 9.

It has been found desirable to provide a simple and inexpensive machine for manufacturing wire coils having any desired non-circular shape. To this end, I provide a machine which receives wire from a source of supply, such as a reel, and winds the wire around spaced pins on a rotating arbor, the rotation of the winding arbor being intermittent to provide periodic dwells, and the wire being bent and formed around the arbor pins during the dwells of the arbor. Wire of any suitable material may thus be coiled into a non-circular shape, the individual coils being of uniform size and shape, so that the completed coil is suitable for use in jewelry items such as watch bracelets, straps, belts, and the like, or may be

2

used to form ornamental coils for display and similar uses.

Referring to the drawings, the wire forming apparatus 10 is illustrated in Figs. 1 to 4, and include a base 11 on which a front support plate 12 and a rear support plate 13 are mounted in spaced alignment. A winding arbor 14 is secured to the forward end of a stub shaft 15 which is suitably journaled in the front support plate, and is provided with a plurality of spaced winding pins 16, the shaft 15 being rotated by a spindle 17, through the medium of a detachable connector 18, and the spindle 17 having a driven gear 19 of special formation keyed thereto.

As illustrated in Fig. 3, the driven gear 19 has a number of arcuate slide portions 20 which are uniformly spaced around its perimeter, and is meshed with a drive gear 21 which has an arcuate portion 22 adapted to slide over the arcuate portions 20 of the gear 19, the drive gear 21 being keyed to a drive shaft 23 which is suitably journaled in the rear support plate, and is in turn driven by a power gear 24 keyed thereto. The drive shaft 23 is direct connected to a plunger 25 shaft 25 by a connector 26, the plunger shaft 25 being suitably journaled in the front support plate and having an off-center pin 27 at its forward end. The off-center pin moves in a horizontal slot 28 in a slide plate 29 to reciprocate the slide plate, which is housed within a slide support block 30 secured to the forward side of the front support plate. The lower end of the slide plate 29 is provided with a plunger 31, which has a terminal cam end 32 for periodically engaging the wire and bending it around the upper winding pin 16 as hereinafter described.

A second slide plate 33 which is similarly provided with a plunger 34 and a terminal cam end 35, is slidably mounted in a guide block 36 which is positioned on the forward side of the front support plate at an angle to the guide block 30, see Fig. 2, and is actuated by a transverse shaft 37 and similar slot and eccentric pin connection similar to the actuation of the first slide plate. The transverse shaft 37, see Fig. 4, is journaled in the forward support plate, and is actuated by a spindle 38 through a connection 39. The spindle 38 is journaled in the rear support plate and is rotated by a gear 40 keyed thereto and meshing with the power gear 24.

The two slide plates are thus reciprocated in timed relation to the rotation of the winding arbor, and the gears are set so that the two terminal cam ends engage and bend the wire around the upper arbor pin 16 each time the winding

3

arbor is at a stop or dwell interval, to thus obtain a positive bending forming of the wire into the desired shape. Fig. 2 shows the position of the cam ends at a dwell interval, the wire 41 being fed through a suitable passage in a guide member 42, then between the front bearing plate and a guide plate 43 which is mounted on and spaced from the front bearing plate, the wire then passing over the winding pins 16. The wire is preferably fed under a slight tension from a supply reel (not shown), in order to prevent over-running.

As the winding arbor spindle rotates, the wire is wound over the pins 16 until a dwell point is reached, at which time the arbor stops and the slide plungers move downwardly to bend and form the wire around the upper pin. As the coil is progressively formed, it is pushed clear of the pins by the finger of an adjustable screw plate 44 and the finished coil passes clear of the machine and to a storage receptacle (not shown), through any suitable guide, such as for example a tubular or trough shaped channel.

When the winding arbor is in dwell position it is preferred to provide an arresting means for holding the winding arbor spindle in dwell position and against backward rotation. An illustrative construction is shown in Figs. 3 and 4, and includes a friction drum 45 which is keyed to the winding arbor spindle and has stop notches 46; a leaf spring 47 is mounted on a suitable transverse bar 48 secured to the front and back plates, the forward end of the spring resiliently resting on the friction drum in position to engage the stop notches and thus to hold the winding arbor spindle during the dwell period.

It is clear that a flat coil such as shown at 49 in Fig. 5 is formed when two diametrically opposed arbor pins are used, the driven arbor gear 50 being shown in Fig. 5a, and having two dwell portions 51, and the friction drum having two stop notches. The distance between the arbor pins determines the width of the formed coil, and the slide plate plungers each are provided with chucks guided in bosses or the like 52 and are removable to permit the use of different lengths and shapes of terminal end cams.

If it be desired to form a triangular coil such as indicated at 53 in Fig. 6, then a driven gear 54 such as illustrated in Fig. 6a having three dwell points 55 is utilized, the winding arbor being changed to an arbor having three pins, and the friction drum being changed to a drum having three stop notches. Similarly, a square coil 56, see Fig. 7a, having four dwell places 58 and an octagonal coil 59, see Fig. 8, is formed by using a drive gear 60 having eight dwell portions 61 as shown in Fig. 8a. The other operating parts such as the number of pins on the winding arbor and the friction drums with the appropriate number of stop notches, are correspondingly changed in the apparatus. If a special shape for the spring coil is desired, such as for example a bow-shape such as designated 62 in Fig. 9 is desired, the winding arbor 63, see Fig. 10, is provided with spacing pins 64 in addition to the two winding pins 65, and the slide plate terminal end cams are correspondingly shaped so as to accurately form the desired coil shape.

4

Although I have described a specific constructional embodiment of my invention and have disclosed how changes in the operating parts may be readily made to obtain different coil shapes, it is obvious that other coil shapes may be readily obtained by suitable modifications of the forming parts and by changing the timing of the bending plungers with respect to the arbor rotation and with respect to each other, thus producing unusual coil shapes such as progressive spirals, and that the apparatus may be adapted to shape any type of wire, such as solid, tubular, ribbon, or the like, and may be utilized to form coils of any material which will retain a permanent set after bending and forming, such as lucite and other non-metallic substances, without departing from the spirit and the scope of the invention as defined in the appended claims.

I claim:

1. In a coil forming apparatus, a rotatable arbor having spaced wire guide pins extending therefrom, means for feeding a wire to wind over said pins, means for rotating the arbor, and for periodically stopping the arbor rotation to provide dwell intervals, reciprocable plunger mechanism having cam ends adapted to move into engagement with the wire at one pin and to bend the wire about said one pin, and means for reciprocating the plunger mechanism in timed relation to the arbor rotation to contact the cam ends with the wire and produce the wire bending during the dwell intervals.

2. In a coil forming apparatus, a rotatable arbor having spaced wire guide pins extending therefrom, means for feeding a wire to wind over said pins, means for rotating the arbor, and for periodically stopping the arbor rotation to provide dwell intervals, reciprocable plunger mechanism having cam ends adapted to move into engagement with the wire at one pin and to bend the wire about said one pin, and means for reciprocating the plunger mechanism in timed relation to the arbor rotation to contact the cam ends with the wire and produce the wire bending during the dwell intervals, said reciprocable plunger mechanism including two plungers angularly positioned to engage the wire at each side of said one pin.

ARMAND J. GARREAU.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
426,386	Kelly	Apr. 22, 1890
1,585,905	Madden et al.	May 25, 1926
1,715,046	Rogan	May 28, 1929
1,807,892	Brindle	June 2, 1931
1,896,670	Garst	Feb. 7, 1933
2,205,171	Kile et al.	June 18, 1940

FOREIGN PATENTS

Number	Country	Date
189,732	Switzerland	Aug. 16, 1937