

Sept. 19, 1944.

O. HAAS

2,358,707

METHOD OF MAKING HELICAL COILS

Filed July 9, 1943

Fig. 1.

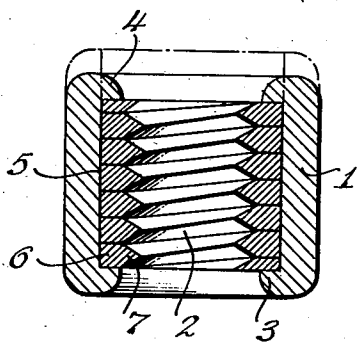


Fig. 2.

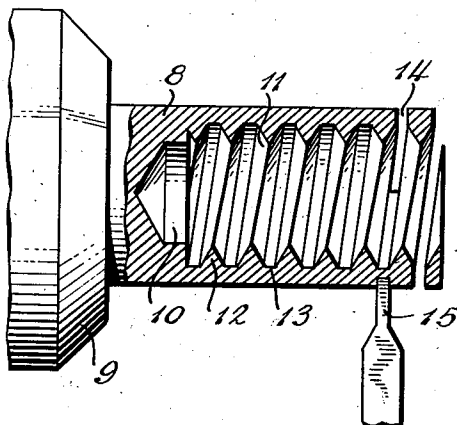


Fig. 3.

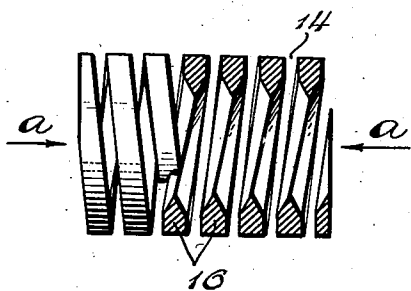
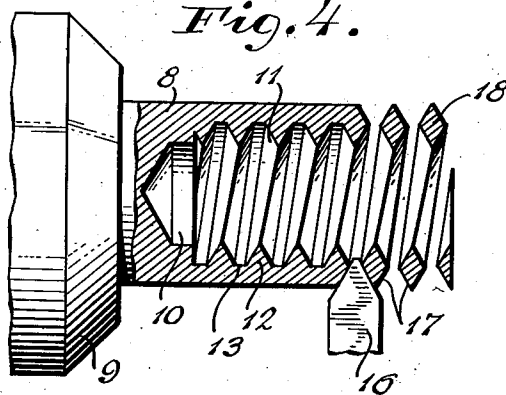


Fig. 4.



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2,358,707

METHOD OF MAKING HELICAL COILS

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Application July 9, 1943, Serial No. 493,968

2 Claims. (Cl. 10-1)

The present invention relates to helical coils and more particularly coils for use as screw thread inserts in the boss or nut members of screw connections, and aims to provide a method whereby such coils can be easily produced with great exactness. Hitherto, inserts of the type here in consideration have been wound or coiled of a wire. However, it has been found extremely difficult to produce coils in which the wire cross-section was exactly as desired within narrow tolerances. This is particularly so owing to the fact that the original wire cross-section changes owing to the stresses to which it is subjected during the coiling operation. In general extensive and expensive experiments had to precede the actual production in order to obtain satisfactory results. Even notwithstanding great care taken in this direction it frequently happens that wire coils do not turn out as desired or in sufficient uniformity. On the other hand the costs of long series of preceding experiments may be prohibitive where the required production is below a certain quantity. The invention contemplates therefore to provide a method whereby undesirable stresses tending to deform the material in a more or less uncontrollable manner do not occur or are at least greatly reduced during the production and which gives satisfactory results without requiring costly experiments.

The invention mainly consists in that the coil is made of a hollow cylinder which first is provided with an interior screw threading of a pitch larger than that of the desired coil but with flanks of the desired shape. The cylinder is then slitted from the outside to the bottom of the interior thread groove along a helix of a pitch equal to that of said threading so as to produce a coil of oversized pitch which, finally, is reduced to the desired pitch by compression in axial direction. The invention further consists in that simultaneously with the slitting operation, the flanks of the slit are shaped according to the flanks of the thread groove in which the produced coil is intended to be inserted.

Further objects and details of the invention will be apparent from the description given hereinafter and the accompanying drawing illustrating the application of the method and several products thereof by way of example.

In the drawing,

Fig. 1 is a cross-section of a nut with a coil insert produced by the method according to the invention;

Fig. 2 is a diagrammatic illustration of a step

of operation during the production of the coil shown in Fig. 1;

Fig. 3 is a side view partly in section of the finished coil prior to the insertion in the nut body of Fig. 2; and

Fig. 4 is a diagrammatic illustration similar to Fig. 2 of a coil of a different cross-section of the convolutions.

Referring now to the drawing, the nut of Fig. 1 consists of a body 1 and a thread coil 2. The body 1 has a bottom flange 3 projecting inwardly not beyond the threading. A similar top flange 4 is formed after the insertion of the coil 2 by swaging or turning down the top rim the original form of which is shown in dash lines, upon the top convolution of the inserted coil. The interior surface 5 of the body is cylindrical. Accordingly, the outer surface of the coil is also cylindrical, and the cross-section of the coil convolutions constitutes in the example of Fig. 1, a rectangular or square base 6 with a triangle 7 erected thereon so that the sides of the triangle form the flanks of the convolutions of the interior threading of the nut.

Now, in order to produce the insert 2, I first make a cylinder of a diameter equal to the outer diameter of the coil to be produced and preferably also with a bore of a diameter equal to the desired inner diameter of the coil. This is shown in Fig. 2 where a cylindrical piece 8 is held e. g. by a chuck 9 of a lathe, and provided with an axial bore 10. Into cylinder 8 a threading 11 is cut or tapped the convolutions 12 of which correspond to the triangles 7 of the coil of Fig. 1.

However, it will be noticed that the convolutions 12 are spaced wider than in Fig. 1 and that the helical groove between the convolutions has a narrow straight-lined bottom 13. The cylinder so interiorly threaded is then slitted from the outside to the groove bottom 13 in a helix of a pitch equal to that of the threading 11. In Fig. 2 a portion of the slit is indicated at 14 and a cutting tool 15 is shown opposite the bottom 13 of the thread groove. The cutting edge of the tool has the same width as the bottom 13 so that the cross-section of the resulting coil convolution has the same shape as that of the coil 2 in Fig. 1. The interior threading 11 and the helical slit 14 can be made on the same

machine and with the same lead, so that the desired cross-section can be cut with very great exactness. When the resulting coil is severed from the remainder of the cylinder 8 it has the shape illustrated in Fig. 3, where the individual convolutions 16 are spaced from each other ac-

cording to the slit 14. The so produced coil has a larger pitch than that shown in the nut of Fig. 1 and for that reason may be compressed in the axial direction of the arrows *a* so that the convolutions 16 bear closely upon each other. The so compressed coil may then be inserted into the nut body 1 of Fig. 1 and the rim 4 turned down as hereinbefore described. Of course, it is also possible to insert the coil with spaced convolutions into the nut body 1 and then to compress it and simultaneously turn down the top rim 4. If in this event the coil was originally made with its outer diameter equal to the inner diameter 5 of the nut body 1 then the compression will tend to expand the coil convolutions with the result that a radial pressure is set up and in consequence also a very appreciable and desirable friction between the coil and the nut body.

If the nut is intended to be used with a stud having lands between the stud convolutions no axial compression of the coil with spaced convolutions 16 may be necessary or only an axial compression or extension in order to make the space 14 corresponding to the size of said lands of the mentioned stud threading.

In a very similar manner a coil of diamond shape can be produced which would be useful as an insert into the conventional V-threaded groove of a standard or other nut. This is illustrated in Fig. 4 where first a cylinder 8 is provided with an inner threading 11, triangular inner thread convolutions 12 and groove bottom 13 in the same manner as described with respect to Fig. 2. Instead, however, of a straight-faced cutting tool 15 a tool 16 with triangular cutting edge is used in order to cut from the outside to the groove bottom 13. Owing to the triangular shape of the tool the outer faces 17 of convolutions 18 of diamond cross-section will be shaped simultaneously with the slitting. In other respects the so produced coil is similar to the coil of Fig. 3. The coil may be compressed in axial direction so that the coil convolutions contact each other or the coil with originally spaced convolutions may be screwed into a conventional female threading whereby an axial compression of the coil will occur owing to the interengaging

faces of the coil convolutions and of the nut threading.

Although I have described my invention in relation to only two different cross-sections it will be clear to those skilled in the art that coils of other cross-sections may be produced by the method hereinbefore described and that alterations and modifications of such method may be made without departing from the spirit and essence of the invention which shall be limited only by the scope of the appended claims.

I claim:

1. A method of producing a screw thread insert coil comprising the steps of making a hollow cylinder with an outer diameter according to that of the desired coil, providing the cylinder with an inner helical groove of a flank form according to the desired screw thread and with a groove bottom of selected width and pitch, slitting the cylinder from the outside to the bottom of said groove along a helix of a width and pitch equal to that of said groove bottom, severing the so produced coil from the remainder of the cylinder, and compressing it in axial direction to bring the coil convolutions into engagement with each other.

2. A method of producing a screw thread coil for insertion into the thread groove of an interiorly screw threaded body which comprises making a cylinder of a diameter substantially equal to the bottom diameter of the thread groove of the body for which the coil is destined, providing said cylinder with an inner helical groove of desired flank form and selected pitch and width of its groove bottom, slitting the cylinder from the outside to the bottom of said last mentioned groove along a helix of a pitch equal to said selected pitch and with a width of the slit substantially equal to that of said last mentioned groove bottom, simultaneously shaping the flanks of said slit according to the flanks of the thread groove of the body for which the coil is destined, severing the so produced coil from the remainder of the cylinder, and changing the selected pitch to that of the threading of said body by subjecting the coil to the action of a force applied in an axial direction.

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