

Aug. 19, 1952

J. O. FORSTER

2,607,259

WIRE COIL SCREW THREAD INSERT

Filed April 29, 1950

FIG. 1.

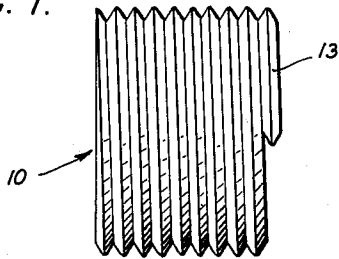


FIG. 2.

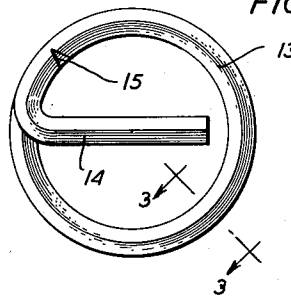


FIG. 4.

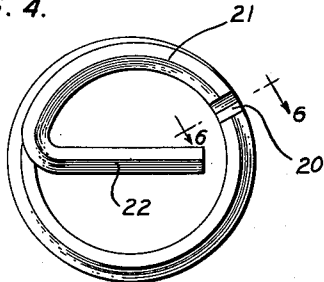


FIG. 3.

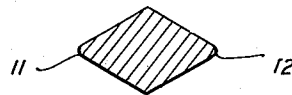


FIG. 5.

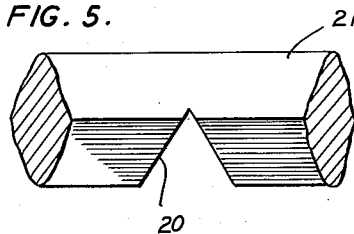


FIG. 6.

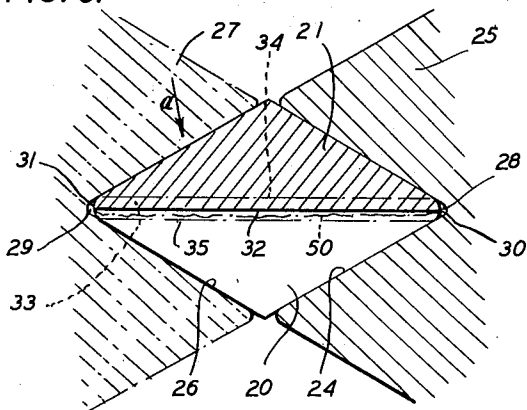


FIG. 7.

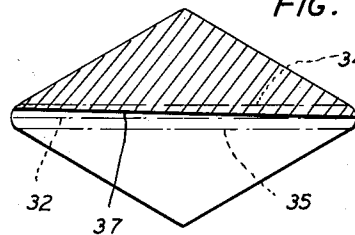
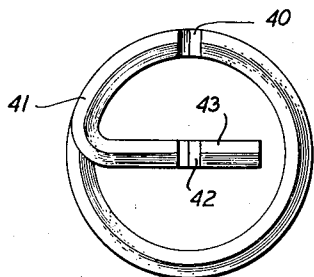


FIG. 8.



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WIRE COIL SCREW THREAD INSERT

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Application April 29, 1950, Serial No. 159,072

2 Claims. (Cl. 85—32)

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The present invention relates to a wire coil of a type used as a thread lining for a tapped hole. Frequently such coils are provided with a diametrical tang in continuation of the end convolution to be gripped by a tool for inserting the coil. In many instances the tang must be removed after the insertion of the coil where it would interfere with a member to be screwed into the insert. In order to facilitate the removal of the tang, usually a notch had been provided on the inside of the end convolution near the tang so that the latter could readily be broken off.

Such inside notch, however, had many drawbacks, a major one of which consists in the fact that the tang has to be turned back and forth in order to accomplish the break. It is the purpose of the present invention to provide a tanged coil of improved construction whereby the mentioned drawbacks will be avoided, and the break of the tang can be caused by a force acting in the axial direction of the coil.

Further objects and details of the invention will be apparent from the description given hereinafter, and the accompanying drawing illustrating an embodiment thereof by way of example.

In the drawing,

Figs. 1 and 2 are side and front elevations, respectively of a wire coil of the type to which the invention relates, in the conventional form of the notch,

Fig. 3 is a cross-section of the coil wire,

Fig. 4 is a front elevation of a coil according to the invention,

Fig. 5 is a side elevation of a portion of the coil of Fig. 4 with the notch therein,

Fig. 6 is a cross-section along line 6—6 of Fig. 4.

Fig. 7 is a cross-section, similar to Fig. 6 of a modification, and

Fig. 8 is a front elevation of another modification.

Referring now to the drawing, the conventional coil 10 is wound of wire, preferably of stainless steel or phosphor bronze. The wire is of substantially diamond-shaped cross-section as best seen in Fig. 3, i. e. the cross-section consists of two triangles placed base to base wherein the two opposite corners 11 and 12 of the triangles are slightly truncated or rounded off. The end-convolution 13 of the coil is provided with the diametrically directed tang 14, which, however, preferably is slightly shorter than the inner coil diameter. The tang 14 is needed for the purpose of inserting the coil in a tapped hole and constitutes the leading portion of the coil during the insertion. It will be clear, however, that the tang

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would interfere with a screw bolt if the latter is to be screwed through the entire length of the coil. For that reason it is customary to remove the tang after the insertion, and in order to facilitate the breaking off, the conventional groove or notch 15 is provided on the inside of the end convolution 13 as shown in Fig. 2. If, then, the torque applied to the tang for insertion is reversed or alternated in its direction a few times, the coil wire can be broken in the notch. However, the notch 15 has quite a number of drawbacks of which most essential are the following, viz., first, the alternation of the direction of the torque frequently causes a displacement of the coil end remaining after the break of the tang; and, second, the application of the inside notch requires great care and a difficult operation in order to avoid any damage to the other coil convolutions.

The mentioned and other drawbacks are avoided by providing, according to the invention, a notch 20 as shown in Figs. 4 and 5 on the front face of the convolution 21 the end of which is formed by tang 22. The distance of the notch from the tang is not very material within limits.

It is preferred to arrange the notch as close as possible to the tang. However, if, as it is frequently the case, the end convolution 21 is of decreasing diameter, the notch may be applied as shown in Fig. 4, that means, substantially at the point where the diameter of the end convolution begins to decrease. If this is done, the coil will be of uniform diameter throughout after the removal of the tang.

The cross-section of the notch may be of any desired shape, however, a V-shaped cross-section as appearing in Fig. 5 is preferred because in that event the break will occur in a well-defined area starting from the inner corner of the V.

Whereas, the cross-section of the notch can be freely selected according to what just has been stated, there is a critical zone as to the depth to which the notch should be cut. This will be clear if Fig. 6 is considered. In this figure, the cross-section of the convolution 21 is shown between the interior thread 24 of a nut or boss member 25 and the exterior thread 26 of a bolt member 27. The exterior thread 26 is indicated in dash and dot lines, because as long as the tang is still connected with the coil as indicated by the hatching of the convolution 21 in Fig. 6, the tang would prevent the exteriorly threaded member to engage the notched portion of the coil. The contours of the thread 26 are merely shown to facilitate the understanding of the statements made hereinafter. The relative dimensions of the

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thread are according to the screw thread standards for federal services. It will be noticed that there are clearances 28 and 29 at the cross-sectional wire corners 30 and 31 which are determinative for the minimum and maximum coil diameters, respectively. According to the present invention, the base line 32 of the notch 20 is so located that it is within the narrow zone 33 which connects the wire corners 30 and 31 and is of a width equal to that of the clearances 28 and 29. The borderlines of that zone are indicated by dot and dash lines 34 and 35 in Fig. 6. According to the named standards, the minimum width of the truncated edges which appear in the cross-section as the corners 30 and 31, and accordingly the width of the clearances 28 and 29 is one-eighth of the thread pitch. The clearances at analogous points of screw thread standards of other systems are very similar to those for the federal service. Therefore, the mentioned zone is generally present.

In breaking the tang, the force applied will act on the notched portion of the coil approximately in the direction of the arrow *a*, and the break can occur because there will not be a member 27 to confine the coil on the left hand side of the drawing during that operation. If then the base 32 of the notch substantially coincides with the centerline of the zone 33 as shown in the drawing, due to the direction of the mentioned force, the occurring burr will extend from the base line towards the borderline 35 of the zone without, however, extending beyond the latter provided the coil material is of the hardness required in coils of the type and for the purpose here under consideration. The edge of the burr as it may occur is indicated by the dotted line 50. In consequence neither the boss thread 24 nor the thread 26 of a member screwed in after the removal of the tang can be materially damaged by the burr if the parts move relatively to each other.

The base 32 of the notch is shown in Fig. 6 as coinciding with the center of the zone 33 or in other words with the line of symmetry connecting the edges 30 and 31. If the base does not coincide with said line, it should be located closer to the borderline 34 than to line 35, that means, the notch should have a depth of rather more than less than half the thickness of the wire measured transversely with respect to the above-mentioned line of symmetry. Such location of the base line may even be preferred because it increases the safety against an extension of the burr beyond line 35. On the other hand the notch should not be still deeper because, then, a burr may start where it would engage the thread of the members 25 and 27, and also because a certain cross-section must not be notched, as required to transmit the force ap-

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plied during the insertion of the coil into the member 25. According to the foregoing, it is also possible to cut the notch with its base between the lines 32 and 34. That base line 37 in Fig. 7 may be parallel to or at an angle as shown with respect to the line of symmetry 32, or it may even be slightly curved.

In certain instances, particularly when the coil is applied to a blind hole, it is necessary that the tool used for breaking the tang holds the latter after the breaking so that the tang can be removed with the tool. In such an event it is desirable to prevent the tang from slipping from the tool. In order to avoid such happening, the tang of the coil may be provided with another notch, and for the purpose to simplify the production, this second notch may be provided in continuation of the first notch. Fig. 8 shows the front elevation of a coil having a first notch 40 in the end convolution 41 where the break is intended to occur and the second notch 40 in tang 43 for the purpose of providing a safe grip of the tang removing tool. Although in this modification both notches are in line with each other, it will be understood that this need not be necessarily so, nor is it necessary that notch 42 is of the same depth as notch 40.

I claim:

1. In a wire coil screw thread insert including a diametrically directed tang in continuation of its end convolution and having a wire cross-section of two truncated triangles on a common base, wherein the thread crest forming truncations are wider than the roots of the threads of an interiorly threaded member and an exteriorly threaded member between which the coil is intended to be inserted, the invention which consists in the provision of a substantially radial notch in the front face of said end convolution, the base of said notch being located in a zone of the coil wire cross-section which zone is of the width of and extends between said truncations of said triangles.

2. A wire coil screw thread insert as claimed in claim 1 further provided with a second notch across said tang and in line with said first notch.

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