

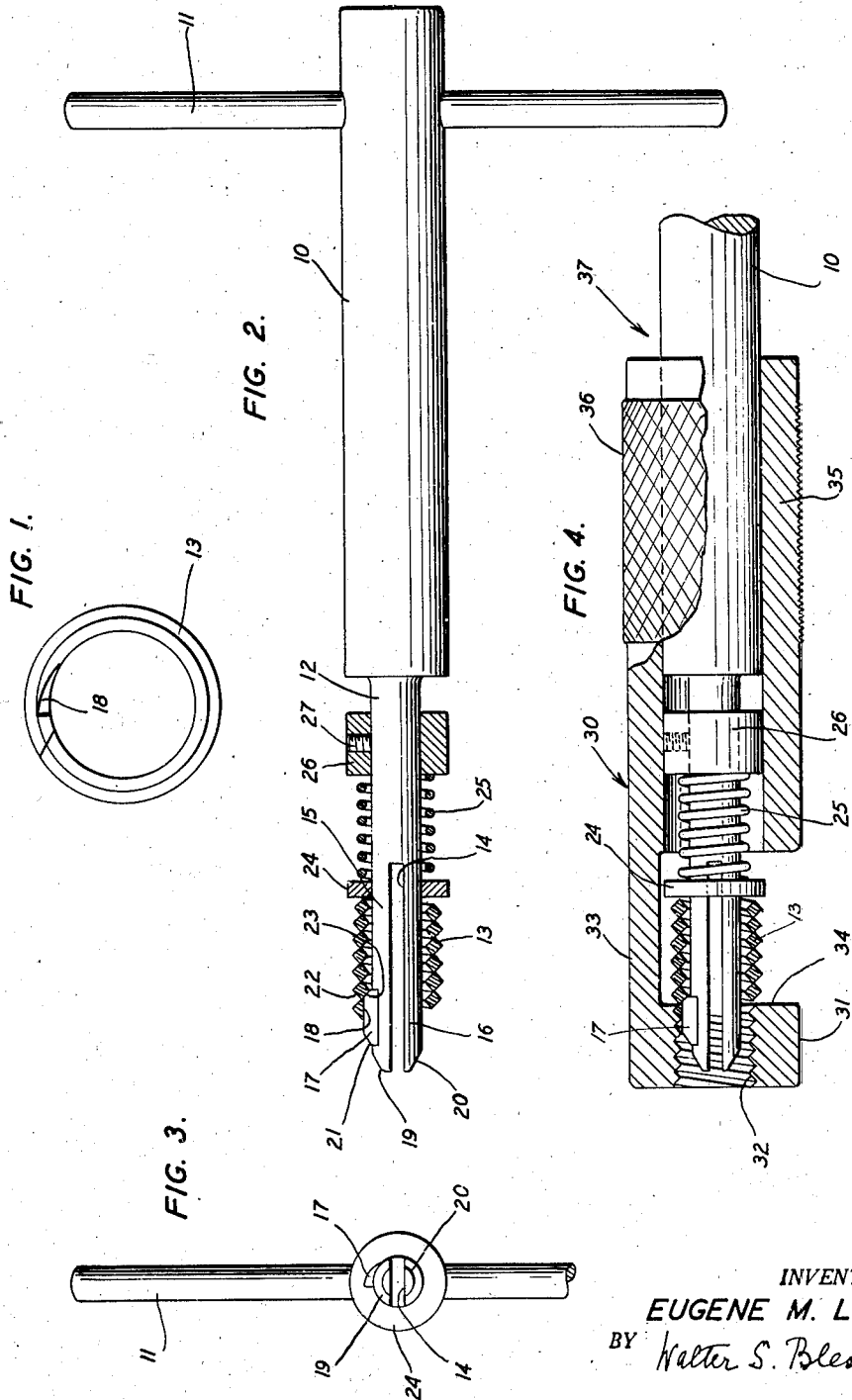
Dec. 11, 1945.

E. M. LANG

2,390,545

INSERTING TOOL FOR TANGLESS INSERTS

Filed Sept. 23, 1944



INVENTOR.
EUGENE M. LANG
BY *Walter S. Bleston*
ATTORNEY

UNITED STATES PATENT OFFICE

2,390,545

INSERTING TOOL FOR TANGLESS INSERTS

Eugene M. Lang, New York, N. Y., assignor to
Aircraft Screw Products Company, Inc., Long
Island City, N. Y., a corporation of New York

Application September 23, 1944, Serial No. 555,469

6 Claims. (Cl. 10-1)

The invention relates to a tool for contracting wire coils such as for instance serve as thread inserts for tapped holes. The tool according to the invention is, in particular, intended for use with wire coils provided with a recess in the inner portion of one of the coil ends e. g. to coils of the type described in U. S. patent application Ser. No. 514,438 filed by Otto Haas on December 16, 1943 (Issued as Patent No. 2,363,789, Nov. 28, 1944). The invention aims to provide a tool whereby such a coil can be securely gripped in order to apply thereto the torque required to insert the coil in a tapped hole and/or to contract it for such purpose.

In certain instances of the application of wire coils to tapped holes it is necessary to contract the coil prior to inserting it, and to keep the coil contracted during the insertion. A tool for such purpose in connection with coils provided with a diametrical tang of one end convolution is described in U. S. Patent 2,316,231 to Evans of April 13, 1943. It is another object of the present invention to combine certain features of such tool with new means to render the tool useful for application to tangleless coils with a recessed end convolution.

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:

Fig. 1 is a front elevation of a coil of the type for which the tool is destined;

Fig. 2 is a side elevation, partly in section of an embodiment of the invention;

Fig. 3 is a front elevation thereof;

Fig. 4 is a side elevation of the tool in combination with a prewinder device shown in section.

Referring now to the drawing, the tool according to the invention comprises a substantially rod-shaped element 10 with means such as a grip 11 whereby a torque can be applied thereto. The forward end portion 12 has a diameter according to the inner diameter of a coil 13, to which the tool is to be applied, will have when in its contracted state. That means the diameter of the portion 12 is somewhat smaller than the inner coil diameter prior to the application of the tool. The portion 12 is longitudinally slotted at 14 so that two prongs 15 and 16 are formed of sufficient resiliency to allow for compression of the prong ends without undue resistance. It is of course possible and, depending on the size of the tool, it may even be advisable to provide more slots than shown so as to form a larger number of prongs of

the desired resiliency and yield. One of the prongs, i. e. prong 15 of Fig. 2, has a lateral projection 17 near the free prong end. The projection is so shaped that it will fit into a recess 18 in the inner portion of an end convolution of the coil 13, the recess 18 being clearly shown in Fig. 1. If now the tool is inserted into the coil from its non-recessed end, while the prongs are pressed together, the projection 17 will engage into the coil recess 18 when the tool is far enough advanced and the pressure on the prongs sufficiently released. In this position, connection between the tool and the coil is so established that a torque can be applied by the tool to the recessed coil end in order to contract the coil.

In order to facilitate the insertion of the tool and simultaneously cause the compression of the prongs, the ends 19 and 20 of the latter are tapered, and the taper of the prong 19 is preferably continued in the front face 21 of the projection 17. Thus, if the tool is pushed in axial direction into the coil, the prongs will be automatically compressed, until the projection 17 springs into the recess 18 when the projection has cleared the convolution 22 adjacent the recess. Should the projection 17 be out of registry with the recess 18, the coil may be turned relatively to the tool or vice versa until engagement is accomplished. When the tool is to be removed after the insertion of the coil in a tapped hole, it is only necessary to pull the tool backward in axial direction whereupon co-action of the rear face 23 of the projection 17 with the convolution 22 will cause a compression of the prongs to permit the withdrawal. For this purpose it is advisable to shape the rear flank 23 of the projection according to the inner flank of the coil convolution 22 or to taper it. It is also advisable to make the projection 17 slightly longer than the pitch of the coil in order to prevent it from entering between two adjacent coil convolutions during the axial movement of the tool. However, if the depth of the hole into which the coil is to be inserted does not permit the use of a tool appreciably projecting from the recessed coil end, a shorter length of the projection 17 may be selected. The only disadvantage in that event will be that the prongs will be repeatedly compressed and slightly released during the insertion of the tool into the coil and its withdrawal therefrom.

Means may be provided in order to facilitate the engagement of the projection 17 in the recess 18. For this purpose a stop collar 24 is provided so as to freely shift on the portion 12 of the tool in axial direction, and a compression spring 25

is arranged between an abutment on portion 12 and collar 24 so that the latter is located between the spring and the projection 17. The abutment may be integral with the tool body. However, in order to make the tool applicable to coils of different lengths it is preferred to form the abutment as a second collar or ring 26 adjustable in axial direction and to provide it with means such as set screw 27 whereby the collar 26 may be secured to the tool in an adjusted position. Now in its application, the tool portion 12 may be pushed through the coil so far that the projection 17 is entirely in front of the recessed coil end while collar 24 bears against the other coil end and spring 25 is compressed. If, then, the tool is permitted to shift relatively to the coil in axial direction, the spring 25 will cause the rear face 23 of the projection 17 to contact the recessed coil end and engagement of the projection and the recess can be accomplished by turning the tool relatively to the coil if such turning is necessary to cause the parts to register. In order to insure correct operation of the tool, the spring 25 should be so selected and dimensioned, that the spring is still slightly compressed when the tool and coil are in the engaged position of Fig. 2. The spring force, however, should not be sufficient to retract the tool beyond that position in which the rear face 23 of the projection bears against the flank of the convolution 22. It will be clear that the spring can be readily adjusted for this purpose by shifting collar 26 and securing it in a proper position.

The tool hereinbefore described may be designed for operation by hand or as part of a machine tool. It is also possible to combine it with other tools as for instance the prewinder shown in Fig. 4. The prewinder comprises a substantially tubular body 30, one end portion 31 of which is interiorly threaded at 32 according to the outer shape, diameter and pitch to which the coil 13 is to be contracted. The portion 33 adjacent the portion 31 has an inner diameter according to the outer diameter of the coil prior to its being contracted, and portion 33 is laterally recessed at 34 so that a coil may be charged into it. The other end portion 35 is provided with means whereby it can be held stationary. If the tool is destined for hand operation it may be knurled as shown at 36, or if it is part of a machine tool the member 30 may be part of or attached to the stationary machine structure. The inner diameter of the portion 35 and the outer diameter of the portion 30 of the tool described with reference to Fig. 2, and denoted in general by 37 in Fig. 4, are such that the tool 37 can be freely shifted and turned within member 30. Also, the collars 24 and 26 and the spring 25 are so dimensioned that the tool 37 can be projected with its pronged end forward of the member portion 31 at least a distance equal to the length of the coil to which the tool is to be applied. On the other hand, the tool 37 with the collars and the spring thereon, must be retractable so as to clear the portion 33 sufficiently to permit the charging of the coil into member 30. The tool 37 in connection with the prewinder may be designed for hand operation, as herebefore described or it may be adapted for connection to a machine part which is rotatable and axially shiftable.

In applying the combined tool the part 37 is first retracted to clear the portion 33 for the insertion of a coil 13. While the latter bears against the threaded portion 31, the part 37 is

to be pushed through the coil, and the projection 17 caused to engage the coil recess, as hereinbefore described. When in this position the coil may be screwed through the prewinder threading 32 so as to be contracted.

It will be apparent to those skilled in the art that many alterations and modifications of the tool described and illustrated are possible within the spirit and essence of the invention which shall be limited, therefore, only by the scope of the appended claims.

I claim:

1. A tool of the type described for contracting a wire coil, comprising a rod-like member including a forward gripping end substantially of a diameter according to the inner diameter to which said coil is to be contracted, said forward end being longitudinally slitted so as to form resilient prongs, one of said prongs including, near its forward end, a lateral projection adapted to engage a recess in the inner side of an end convolution of the coil the tool is intended to contract, and the free forward ends of said prongs being slightly tapered on their outsides, so that upon insertion of the tool into said coil from the non-recessed end of the latter said prongs will be compressed, and said projection when having passed the coil convolution adjacent the recessed coil end may spring into said recess.

2. A tool as claimed in claim 1, wherein the rear end of said projection is shaped according to the flank of the inner portion of a convolution of a coil to which the tool is intended to be applied.

3. A tool as claimed in claim 1, wherein the rear end of said projection is tapered.

4. A tool as claimed in claim 1, further comprising a compression spring on said slitted portion of said member and bearing with its rear end against an abutment thereof, and a slidable collar intermediate said spring and said projection and adapted to bear against the non-recessed coil end under the action of said spring.

5. A tool as claimed in claim 1, further comprising an axially adjustable collar on said member, a compression spring surrounding said member and bearing with its rear end against said collar, and a second collar freely shiftable on said slitted member portion and intermediate said spring and said projection.

6. In a tool of the type described for contracting a wire coil and including a first substantially tubular member adapted to receive therein a coil to be contracted, the combination of a second member rotatable and axially shiftable in an axial direction interiorly of said first member, said second member including a forward end substantially of a diameter according to the inner diameter to which said coil is to be contracted, said forward end being longitudinally slitted so as to form resilient prongs, one of said prongs including, near its forward end, a lateral projection adapted to engage a recess in the inner side of an end convolution of said coil, a compression spring on said member and bearing with its rear end against an abutment thereof, and a slidable collar intermediate said spring and said projection and adapted to bear against the non-recessed coil end under the action of said spring, said coil and said collar being of such outer diameters as to pass through the interior of said first member.

EUGENE M. LANG.