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2,981,189

FUZE WELL ASSEMBLY AND TOOL

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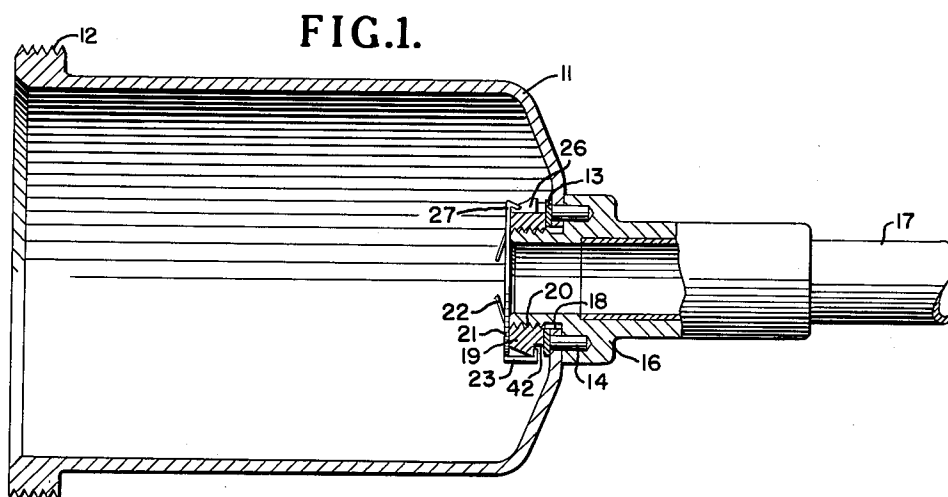


FIG.2.

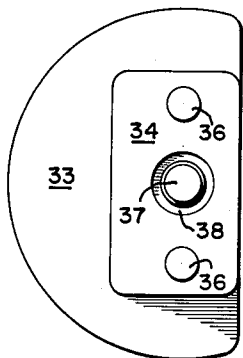


FIG.3.

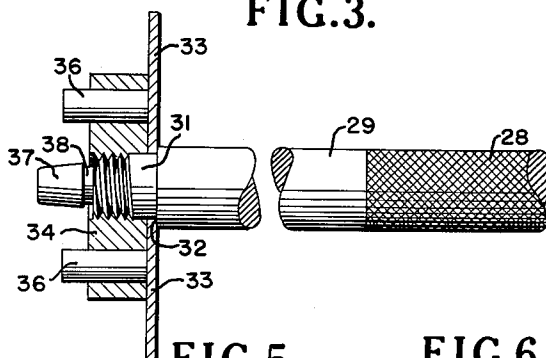


FIG.4.

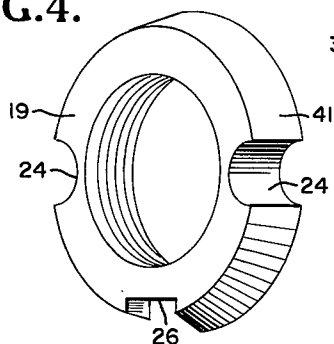


FIG.5.

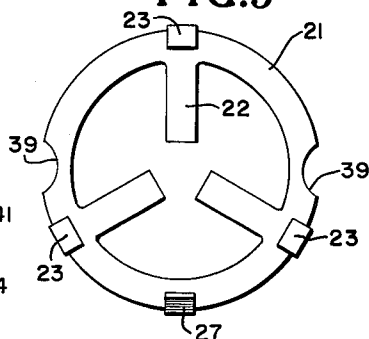
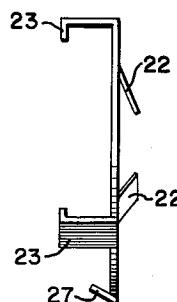


FIG.6.



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FUZE WELL ASSEMBLY AND TOOL

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3 Claims. (Cl. 102—70)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to an improved charging tube fitting for a fuze well in a bomb or weapon and to a tool for inserting a charging plug retaining clip into the fuze well.

The present fittings and tools for inserting and positioning the charging plug retaining clip on the fitting nut within the fuze well of a bomb or the like unavoidably require the exertion of a torque upon the charging tube with the result that this tube is sometimes deformed to such an extent that it cannot be functionally integrated into the bomb fuzing mechanism and must be replaced. This is annoying and time consuming, furthermore significant financial losses result in a large scale operation.

Therefore, it is an object in this invention to provide a charging tube fitting assembly for use on the fuze well of an ordnance device which assembly avoids transference of undue torque to the charging tube during insertion and removal of the fitting.

It is another object of this invention to provide a tool for inserting a plug retaining clip in a fuze well without applying torque to the charging tube.

These and many other objects will become more readily apparent when the following specification is read and considered in conjunction with the attendant drawing wherein like numerals designate like or similar parts throughout the various views and in which:

Fig. 1 is a section of a fuze liner and charging tube fitting assembly;

Fig. 2 is an end view of the tool;

Fig. 3 is an elevation of the tool partly in section;

Fig. 4 is a perspective view of the nut;

Fig. 5 is a plan view of the fitting clip; and

Fig. 6 is a side elevation of the clip shown in Fig. 5.

Referring now with greater particularity to the drawing, Fig. 1 shows a conventional fuze liner 11 having a threaded end 12 adapted to screw into an appropriate receptacle in the ordnance device (not shown). Liner 11 is open at the threaded end while at the opposite end thereof a bore 18 is formed to receive the charging tube fitting. An annular plate 13 is disposed within the liner surrounding the bore 18 and has a plurality of projecting dowels 14 thereon which extend through the liner 11 and engage appropriate recesses in the charging tube fitting 16. A conventional charging tube 17 is disposed within the charging tube fitting 16 coaxial therewith. The fitting 16 projects interiorly of the liner and a charging tube fitting nut 19 engages a threaded end 20 of the fitting so that by threading the nut onto the end 20 of the fitting it may be held securely in place in the liner. Disposed about nut 19 is a charging plug retaining clip 21 having a plurality of inwardly extending resilient fingers 22 which serve to engage and retain the charging plug (not shown) when it is inserted through the charging tube and into the interior of liner 11.

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The clip 21 also has a plurality of tabs 23 which are folded back upon themselves and serve to engage the underside of nut 19 when the clip is in position upon the nut, thereby preventing movement of the clip with respect to the nut. The nut 19 has a pair of diametrically opposed recesses 24 formed at its outer edges and extending the entire length of the nut while a third recess 26 is positioned intermediate the recesses 24 and serves to align a projecting finger 27 of clip 21 so that the clip may be inserted properly on the nut.

Reference should now be had to Fig. 2 for a more complete understanding of the tool which is specially adapted for use with this fuze liner and charging tube fitting assembly. The tool consists of a handle 29 which is knurled at one end 28 and has formed a partially threaded reduced portion 31 at the opposite end so as to provide a shoulder 32 on the tool handle. A plate 33 is disposed about the reduced end 31 of the handle in engagement with shoulder 32 while a block 34 is threadedly secured to the reduced end 31 of rod 29 and abuts plate 33. Plate 33 takes the shape of a sector of a circle of diameter slightly smaller than the internal diameter of liner 11 to aid in guiding the tool into the liner. A pair of locating pins 36 are fitted within pin block 34 and project a substantial distance from the surface of the block. At the extreme end of the reduced portion 31 a tapered end 37 is formed while an annular groove 38 is formed between tapered end 37 and the thread of the reduced portion 31.

When it is necessary to tighten the nut 19 on the charging tube fitting, the tool is inserted into the open end of the fuze liner 11 so that the projecting pins 36 engage recesses 24; thus by rotating the tool the nut may be threaded onto the fitting, in the same manner as a conventional spanner wrench tightens a spanner nut. It will be seen that the dowels 14 prevent rotation of the fitting 16 and the charging tube 17 as the nut is rotated thereby preventing undue torque on the charging tube at its remote end which is fixed within the bomb in any conventional manner.

After the nut is secured into place the tool is withdrawn and the clip 21 is inserted on the tool by positioning a pair of locating recesses 39 formed in the clip against the locating pins 36 to properly position the clip on the tool. The clip is disposed on the tool so that the prongs 23 project away from the tool and the internal projecting resilient fingers 22 may be pushed down over the tapered end 37 of the tool until they snap into place in groove 38. The tool is inserted in the liner, the locating pins 36 are positioned in recesses 24 and the tool is pressed against nut 19 causing the prongs 23 to slide along the tapered side 41 of the nut and spring into engagement with the shoulder 42 thereof. The locating prong 27 on the clip 21 slides downwardly in recess 26.

It should be apparent that this tool is peculiarly adapted for use with the particular nut shown and described herein and assures proper speedily and fool-proof installation of the clip on the nut. After the prongs 23 snap into place, the tool is withdrawn, the fingers 22 sliding over the tapered end 37 of the tool to permit more facile removal.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A charging plug retaining clip in combination with a tool for installing said charging plug retaining clip onto a nut having sloping outer walls including a pair

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of diametrically opposed notches and an annular groove formed therein, while the nut is secured to a charging tube fitting within a substantially cylindrical fuze liner, said clip comprising; an annular member having a pair of diametrically opposed aligning recesses formed therein, a plurality of resilient fingers integral with said member and projecting interiorly thereof, said fingers being bent in a direction away from the plane of said annular member to define a charging plug engaging portion, a plurality of exteriorly projecting nut engaging prongs integral with said member and bent oppositely to the direction of the bend of said fingers, and an exteriorly extending aligning prong formed integral with said ring, said tool comprising; a shaft having a tapered end, a threaded reduced portion disposed in adjacency to said tapered end and together therewith defining a finger receiving groove at one end of the reduced portion, said reduced portion together with said shaft also defining a plate receiving shoulder at its opposite end, a tool aligning plate disposed about said reduced portion, said plate being shaped generally as a sector of a circular disc of diameter slightly less than the diameter of the fuze liner to align the tool within the liner, a pin block threadedly secured to the reduced portion of said shaft and urging said plate into positive contact with the shoulder on said shaft, a pair of aligning pins fixed into said block for engagement with the notches in the nut, whereby the plug retaining clip may be positioned on the tool preparatory to installing the clip on the nut, and said clip may be sealed onto the nut within the fuze liner.

2. A process for seating a charging plug retaining clip onto a nut within a fuze liner and employing a peculiar nut, a peculiar charging plug retaining clip and a peculiar installation tool, said clip comprising an annular member having a plurality of diametrically opposite aligning recesses formed therein, a plurality of resilient fingers integral with said member and projecting interiorly thereof, said fingers being bent in a direction away from the plane of said member to define a charging plug engaging portion, a plurality of exteriorly projecting nut engaging prongs integral with said member and bent opposite to the direction of the bend of said fingers, and an exteriorly extending aligning prong formed integral with said member, said tool comprising a shaft having a tapered end, and a threaded reduced portion in adjacency to said tapered end and together therewith defining a finger receiving groove at one end of the reduced portion, a pin block threadedly secured to the reduced portion of said shaft, a pair of aligning pins fixed into said block and adapted to cooperate with the aligning recesses in said clip; said nut having a tapered outer surface and provided with an annular groove at the base thereof to receive the nut engaging prongs of said clip, a pair of diametrically disposed notches formed in said

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nut and adapted to coincide with the aligning recesses of said clip, and a longitudinal slot formed in said nut to receive the aligning prong of said clip to orient the clip with respect to the nut said process comprising; inserting the pins of said tool into the aligning recesses in said clip while the nut engaging prongs of said clip are extended in a direction away from said tool, springing said resilient fingers into said finger receiving groove, inserting the tool into the liner, aligning the pins with the diametrically opposed notches in the nut while simultaneously positioning the aligning prong on said clip within the longitudinal slot in said nut and moving the tool axially toward said nut, sliding the nut engaging prongs along the tapered exterior surface of the nut, snapping the prongs into engagement with the annular groove in said nut, and backing off the tool to remove the aligning pins from the aligning notches in the nut and withdrawing the tapered end of said tool past the resilient fingers of the clip.

3. A tool for installing a charging plug retaining clip including a ring portion having a pair of diametrically opposed aligning recesses formed therein, a plurality of resilient fingers integral with said ring portion and projecting interiorly thereof to define a charging plug engaging portion, a plurality of exteriorly projecting nut engaging prongs integral with said ring and bent away from the plane of said ring, and an exteriorly extending aligning prong formed integral with said ring; onto a nut within a fuze liner, said nut being of a truncated conical exterior configuration and provided with an annular groove at the base thereof to receive the nut engaging prongs of said clip, a pair of diametrically opposed notches formed in said nut adapted to coincide with the aligning recesses of said clip, and a longitudinal slot formed in said nut to receive the aligning prong of said clip thereby orienting the clip with respect to the nut, which tool comprises; a shaft having a tapered end, a reduced portion in adjacency to said end and together therewith defining a finger receiving groove at one end of the reduced portion, a pin block secured to the reduced portion of said shaft, a pair of aligning pins secured to said block for insertion into the opposed notches in the nut.

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