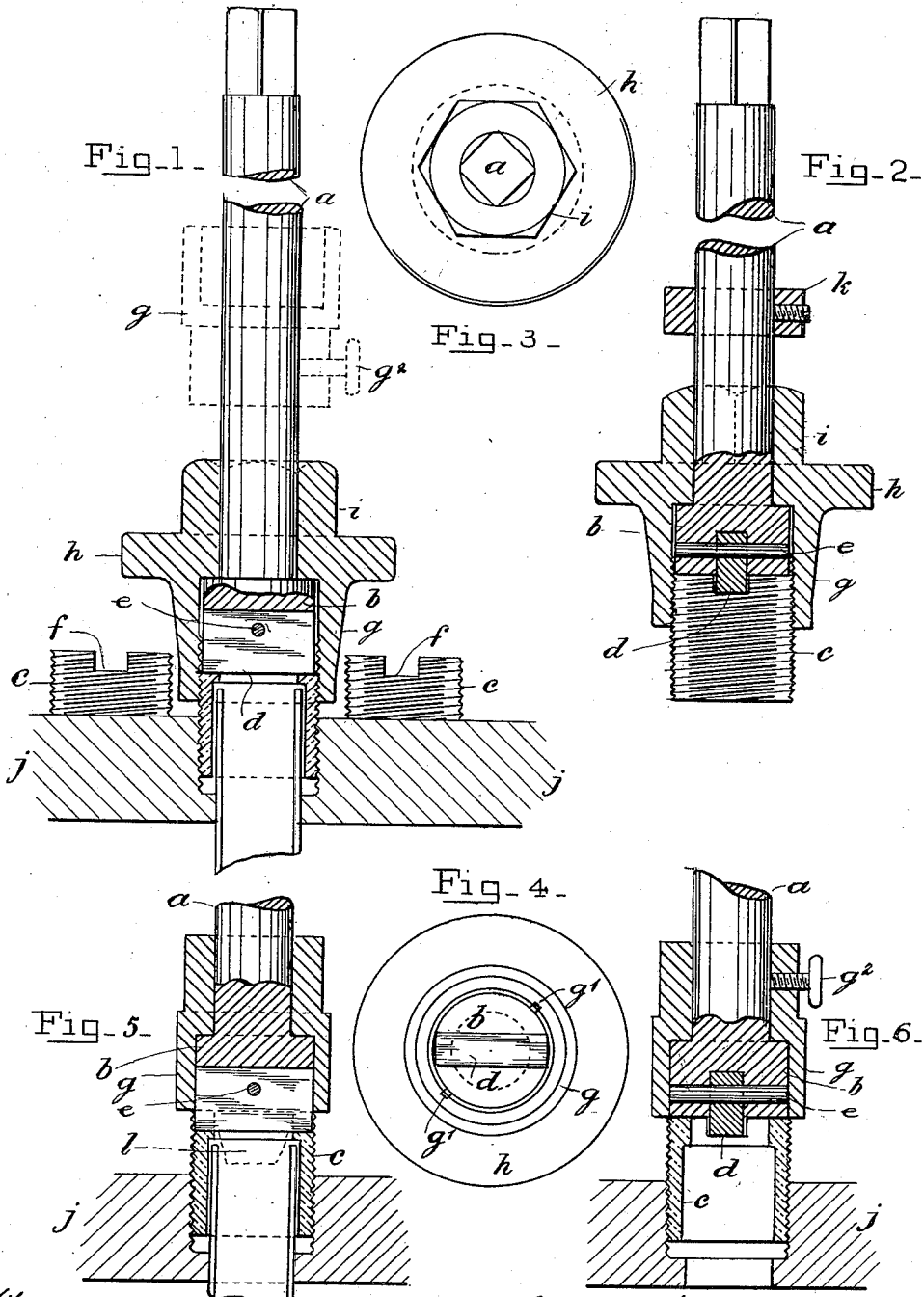


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 TOOL FOR WITHDRAWING AND INSERTING SCREWED FERRULES.
 APPLICATION FILED NOV. 3, 1910.

1,009,248.

Patented Nov. 21, 1911.



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UNITED STATES PATENT OFFICE.

EDWARD COTTRELL JENKINS AND JOSEPH JENKINS, OF BIRKENHEAD, ENGLAND.

TOOL FOR WITHDRAWING AND INSERTING SCREWED FERRULES.

1,009,248.

Specification of Letters Patent.

Patented Nov. 21, 1911.

Application filed November 3, 1910. Serial No. 590,591.

To all whom it may concern:

Be it known that we, EDWARD COTTRELL JENKINS and JOSEPH JENKINS, subjects of the King of Great Britain and Ireland, residing at Birkenhead, in the county of Chester, England, have invented Improvements in Tools for Withdrawing and Inserting Screwed Ferrules, of which the following is a specification.

This invention has for its object to provide simple hand tools or turnscrows suitable for screwing externally screw threaded tube ferrules out of tube plates such as are usual in surface condensers. The same tool or appliance may be slightly modified for screwing such ferrules into the tube plate; in this operation there is little difficulty in comparison with extracting a ferrule that has become set fast by being in use and subject to corrosion for a considerable time. The grooves or screw driver nicks cut in the opposite walls at one end of the ferrule are but shallow and the edges thereof quickly become damaged by the end of the usual extracting tool slipping out of the groove until finally there is no grip left for unscrewing the ferrule which has eventually to be chipped out.

A tool according to this invention comprises a shank having at one end a removable cross bar or turnscrow piece and a rotary socket encircling the said end of the shank. The cross bar or turnscrow piece after being inserted in the groove of a ferrule is securely held therein by the socket which may be internally screw threaded and be screwed onto a portion of the ferrule extending beyond the face of the tube plate, thus the shank of the tool is held firmly in position and the operator is free to apply thereto a suitable lever or handle for rotating the ferrule. The socket when screwed in place prevents the ferrule bursting or opening out when excessive pressure is required to move it from its fixed position.

Referring to the accompanying drawings Figures 1 and 2 are sectional elevations taken at right angles to each other showing a ferrule engaged by the improved tool and embraced by the socket. Fig. 3 shows the tool in plan. Fig. 4 is an inverted plan. Figs. 5 and 6 are similar views to Figs. 1 and 2 illustrating a tool in which the socket is not internally screw threaded but simply forms a binding hoop to strengthen the en-

larged end of the shank carrying the cross bar or turnscrow piece.

The upper end of the shank *a* of the tool is squared to receive an operating key or lever, and at its lower end *b* it is enlarged to practically the same diameter as the bottom of the thread on the tubular ferrule *c* which the tool is designed to remove. The enlarged lower end *b* is formed with a groove in which there is arranged a steel cross bar or turnscrow piece *d* held in position by a pin *e* and adapted to be readily removed when the pin *e* is withdrawn. The cross bar *d* projects beyond the end of the shank to an extent that corresponds to the usual depth of the groove *f* formed in the ferrule *c* and the width of the cross bar is slightly less than the width of the said groove.

Mounted to freely rotate on the shank *a* and embracing the enlarged part *b* is a socket *g* having a flange *h* the edge of which is milled so that the socket can be gripped for turning by hand. Above the flange *h* the socket is formed with a hexagon boss *i* to receive a spanner, and the lower portion of the socket is for a part internally screw threaded for screwing onto the projecting end of a ferrule to be removed from the tube plate *j*. The arrangement is such that in use the socket *g* is first slid up the shank *a* to a collar *k* thereon, see Fig. 2, the cross bar *d* being thus exposed is inserted into the groove *f* of the ferrule *c*. The socket *g* is then lowered and screwed by hand onto the end of the ferrule as far as possible and finally tightened down by a spanner until the cross bar *d* is prevented from leaving the groove, the parts being then in the positions shown in Fig. 1. Any convenient form of handle or spanner is then applied to the upper end of the shank *a* for unscrewing the ferrule *c*. It will thus be seen that while being unscrewed the grooved end of the ferrule *c* is encircled by the socket *g* and is thereby protected against damage.

To facilitate screwing the socket *g* on ferrules the screw-threads of which may be damaged or choked, the socket may be slightly larger than the ferrule in internal diameter and be formed with a groove or grooves, as at *g'*, Fig. 4, that cut across the internal screw-thread as in an ordinary screwing plate.

The tool shown in Figs. 5 and 6, is suitable for inserting similar ferrules into tube

plates. In this case the socket *g* extends to the end of the enlarged part *b* of the shank and forms a hoop that prevents the slotted end thereof becoming distorted or burst open when excessive turning pressure is exerted on the removable cross bar *d*. The socket is made as shown and is retained in position on the shank *a* by a small screw *g*². With this form of tool the cross bar *d* instead of being level on its under face may have a projection *l* thereon, as shown in dotted lines, to enter the end of the ferrule *c* and thus center itself therein.

When a single tool is required for both removing and re-inserting ferrules the socket *g* shown in Fig. 5 can, when not in use, be suitably secured on the shank *a* in position to form a stop collar *k*, as indicated in dotted lines in Fig. 1.

When the width of the groove *f* cut in ferrules *c* of the same diameter varies the pin *e* can be withdrawn, one cross bar *b* be removed and another cross bar *b* inserted of the desired width.

It is evident that the construction of the improved tool may be slightly varied without departure from the invention.

What we claim is:

1. A tool for extracting and inserting screwed ferrules, comprising a shank, a cross bar removably mounted in one end of said shank and adapted to engage grooves or screwdriver notches formed in the end of a ferrule, and an internally screw-threaded socket mounted to rotate and move endwise on said shank and adapted to embrace said cross bar.

2. A tool for extracting and inserting screwed ferrules, comprising a shank one end of which is squared and the other end of which is enlarged and formed with a groove, a cross bar removably mounted in the groove of said shank and projecting beyond the end of said shank, a transverse pin passing through said cross bar and said shank, and a socket mounted to rotate and

move endwise on said shank and adapted to embrace the enlarged end of said shank and said cross bar.

3. A tool for extracting and inserting screwed ferrules, comprising a shank one end of which is squared and the other end of which is enlarged and formed with a groove, a cross bar removably mounted in the groove of said shank and projecting beyond the end of said shank, a transverse pin passing through said cross bar and said shank, and an internally screwed socket mounted to rotate and move endwise on said shank and adapted to embrace the enlarged end of said shank and said cross bar.

4. A tool for extracting and inserting screwed ferrules, comprising a shank one end of which is squared and the other end of which is enlarged and formed with a groove, a cross bar removably mounted in the groove of said shank and projecting beyond the end of said shank, a transverse pin passing through said cross bar and said shank, an internally screwed socket mounted to rotate and move endwise on said shank and adapted to embrace the enlarged end of said shank and said cross bar, and a flange with a milled periphery on said socket.

5. A tool for extracting and inserting screwed ferrules, comprising a shank formed with a groove at one end, a cross bar removably mounted in the grooves of said shank and projecting beyond the end of said shank, and an internally screwed socket formed with grooves cutting across the screw threads thereof mounted to rotate and move endwise on said shank and adapted to embrace the said cross bar.

Signed at the American consulate, 401 Tower Buildings Water Street, Liverpool, this twenty-fourth day of October 1910

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Witnesses:

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