

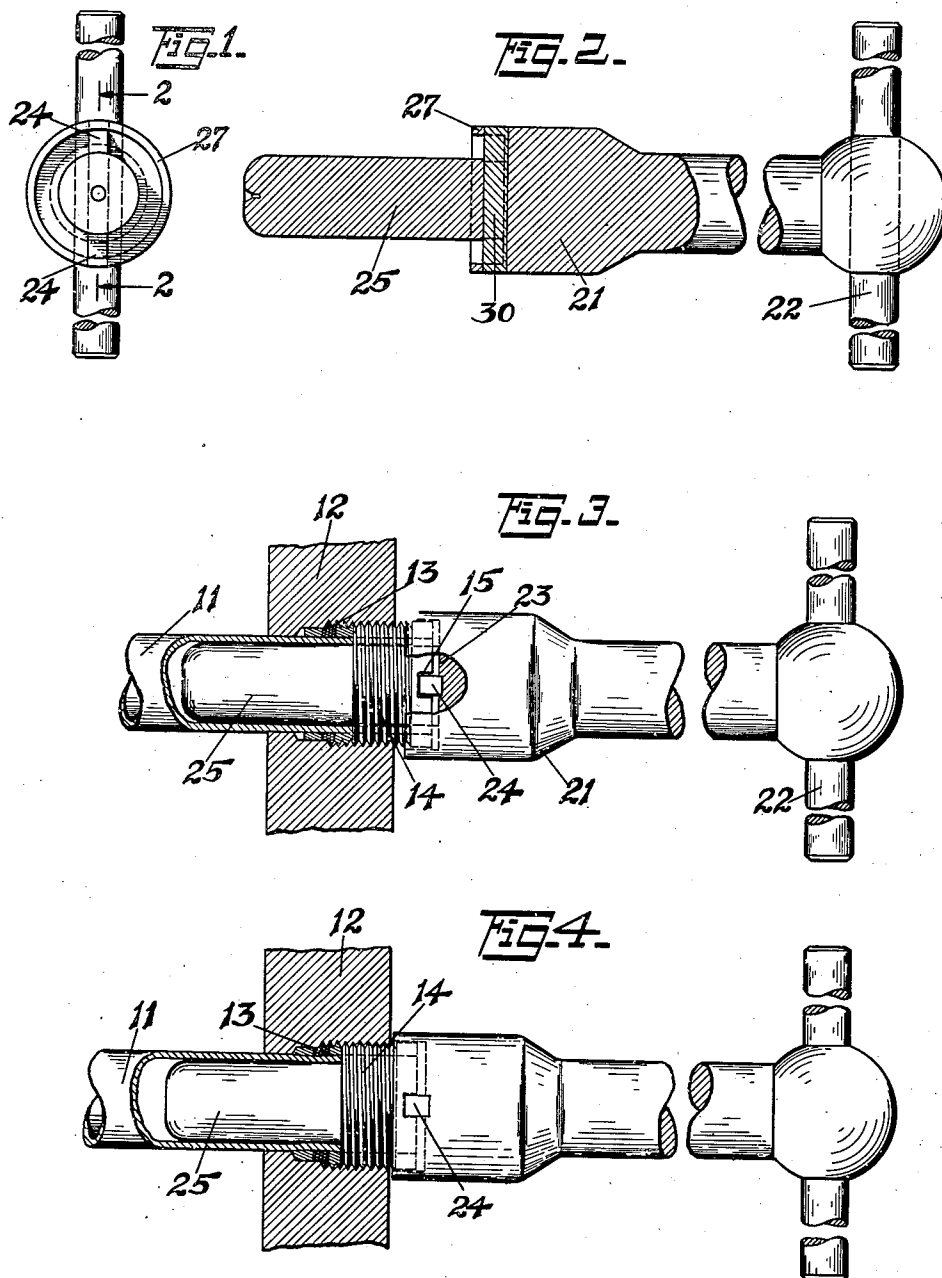
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WRENCH LIKE TOOL

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UNITED STATES PATENT OFFICE

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WRENCHLIKE TOOL

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This invention relates to wrench-like tools.

In assembling water tube condensers it is common practice to anchor the ends of the water tubes in the tube plates by ferrules which are threaded into tapped holes in the plate and bear against packing material. These ferrules are screwed into place by means of a wrench. It sometimes happens that a workman screws the ferrule down so tight that the compressed packing bears against the hollow tube with excessive force, causing collapse of the tube or other damage thereto.

In removing a ferrule, which often has to be done to replace a tube, the force necessary to loosen the ferrule sometimes causes its projecting end to break off at the face of the tube plate. It then becomes extremely difficult to remove the stump of the broken ferrule.

It is an object of the invention to provide a wrench for assembling and removing condenser ferrules and the like, such that damage to the tubes and breaking of the ferrules are avoided.

It is a further object of the invention to provide a wrench of the type referred to in which the parts most liable to wear are readily replaceable at small cost.

With these general objects in view the invention consists in the features, combinations, details of construction and arrangements of parts which will first be described in connection with the accompanying drawing and then more particularly pointed out.

In the drawing:

Figure 1 is an end view of a wrench constructed in accordance with the invention;

Figure 2 is a sectional view taken on the line 2-2 of Fig. 1;

Figure 3 is a view partly in side elevation and partly in section, with parts broken away, of the wrench applied to a condenser tube ferrule in tightening the same; and

Figure 4 is a similar view showing somewhat exaggeratedly, the ferrule screwed down.

Referring to the drawing, 11 represents a condenser tube, its end extending into a tube plate 12. Tapped into the plate is a threaded hole somewhat larger than the tube.

In this hole, and embracing the tube, is a packing 13. Threaded into the hole and telescoping the tube is a tubular ferrule 14. Formed in the rim of the ferrule are two diametrically located sockets or notches 15.

To anchor the tube and compress the packing, the ferrule is screwed down, its inner end bearing against the packing. This is done by a wrench.

The wrench here illustrated as an embodiment of the invention comprises a body portion 21 provided with a cross handle or lever 22. Projecting from the end face 23 of the body portion are two diametrically located key portions 24, shaped and arranged to enter the square sockets of the ferrule. When the wrench is thus applied, as illustrated in Figs. 3 and 4, the ferrule is screwed in or out by turning the wrench in one direction or the other.

The invention in its entirety includes means by which the operator can ascertain when he has tightened the ferrule to a point that is the desired limit, and for preventing undue collapse of the tube. In the embodiment here illustrated as an example, extending forwardly from the front face of the body portion of the wrench is a mandrel-like portion 25 shaped and arranged to have an easy fit inside the condenser tube.

Figure 3 illustrates the wrench applied to a ferrule in process of assembly. The keys 24 are engaged in the ferrule sockets and the mandrel portion 25 of the wrench is inserted in supporting position in the tube.

As the operator tightens the ferrule, the tube packing is compressed into its recess and radially against the tube. The mandrel-like portion of the wrench receives any inward collapsing bend of the tube wall. This causes a certain amount of binding action on the mandrel which at once becomes apparent to the operator, indicating that he should not apply any further tightening force. And in any event the mandrel serves to support the tube against undue collapse.

Fig. 4 illustrates the parts in tightened position. The packing has been compressed and is forcing the tube wall inwardly against the mandrel. It is noted that Fig. 4 has been

exaggerated in order to illustrate this action clearly. In practice, it requires only a slight radial pressure of the packing on the tube to make the binding effect on the mandrel evident to the operator and this takes place before the tube can be collapsed sufficiently to do any material damage.

The invention in its entirety includes means for preventing the projecting end of the ferrule from breaking off during disassembly. This may be accomplished by a wall or sleeve arranged to embrace or telescope the end of the ferrule. In the embodiment here illustrated as an example, the forward end of the wrench body is dished or recessed to form a wall 27 extending outwardly from the outer edge of the front face 23. When the wrench is applied to remove a ferrule, as illustrated in Fig. 4, the wall 27 embraces the projecting portion of the ferrule in the manner of a sleeve. Even if the applied force in loosening the ferrule should crack the wall thereof, breakage at the face of the tube plate is prevented as the sleeve supports the ferrule radially and prevents any tendency of the ferrule to spread or open out.

In constructions embodying the invention to what is now considered the best advantage, the key elements are so arranged as to be readily replaceable. In the present exemplification, the two keys are formed as part of a common plug 30 which is driven into a suitable hole extending crosswise of the wrench. The remainder of the wrench, disregarding the lever 22, is formed in one solid piece. It will be apparent that the keys are more liable to wear than any other part. By means of a suitable tool a worn plug can be punched out and a new plug replaced. Moreover, with a separate element forming the keys, the keys may be readily made of hardened stock without the necessity of hardening the wrench as a whole.

What is claimed is:

A wrench for acting on ferrules in water-tube condensers and the like, comprising a body portion adapted to be turned and having ferrule-engaging key elements, a mandrel-like portion extending forwardly from the body portion and dimensioned to fit so closely within the tube with which the ferrule is associated that inward divergence of the tube will bind on such mandrel portion, and a sleeve-like wall extending forwardly from said body portion and so spaced from said mandrel portion that said space may receive both the ferrule and its associated tube.

In testimony whereof, we have hereunto set our hands.

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