April 30, 1968 F. R. WILSON 3,380,285

SWEDGING TOOL

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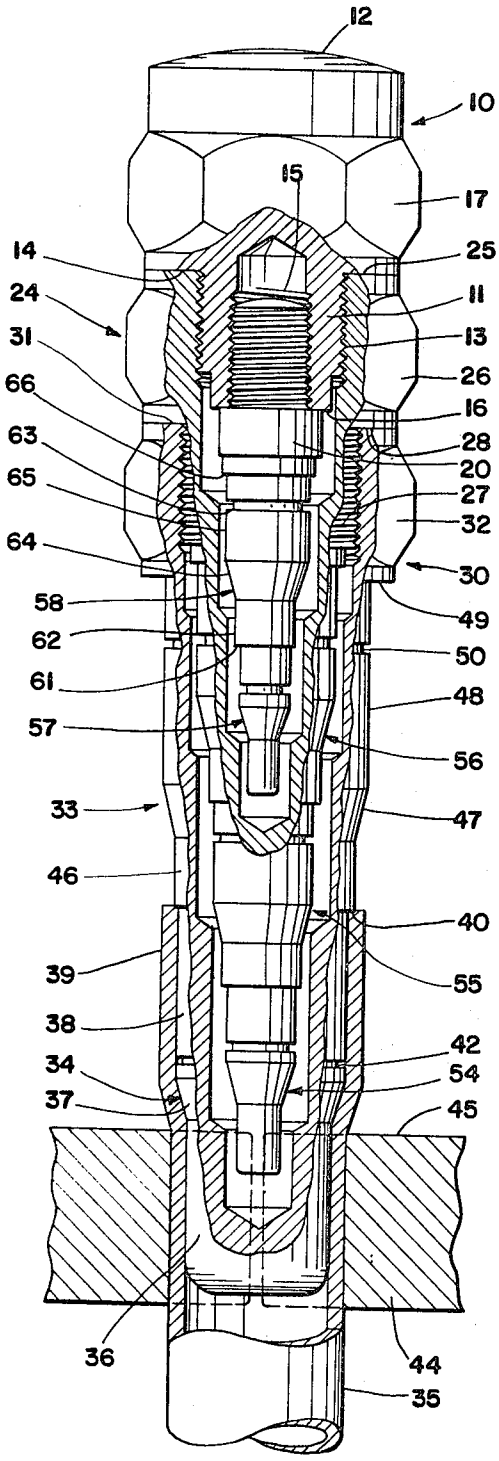


Fig. 1

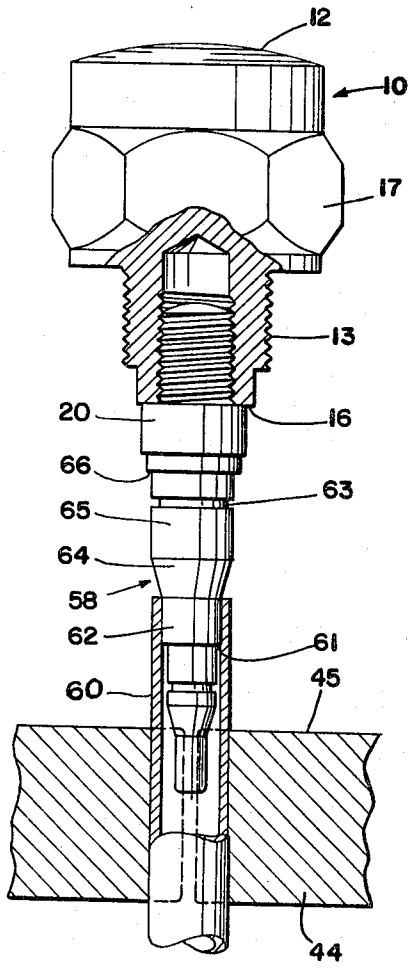


Fig. 2

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SWEDGING TOOL

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ABSTRACT OF THE DISCLOSURE

A tool for swedging tubes comprising a body for receiving hammer blows and one or more die sections removably attached directly to the body and having anvil portions for expanding the ends of tubes.

This invention relates to swedging tools for expanding the end of a piece of tubing, and more particularly, to a tool having a multiple of anvils of different sizes for swedging tubes of various sizes.

Heretofore it has been the practice to have a separate complete swedging tool for each size of tubing. The present invention provides a tool having a plurality of punches providing various sized anvils, the punches being capable of assembly into a single unit in which the larger size anvils are exposed for use and with the punches selectively removable from the assembly to expose smaller size anvils for use. The invention provides a very compact arrangement in which a single head member is utilized for receiving hammer blows regardless of which punch and anvil is being used.

An object of the invention is to provide a compact swedging tool for swedging tubes of various sizes.

Another object is to provide a swedging tool of the type described in which a series of punches providing swedging anvils of varying sizes can be attached to a single body or head member for receiving hammer blows for swedging the tubes.

Other objects of the invention will be apparent from the following description and from the drawing in which:

FIGURE 1 is a side view, partly in section, showing the completely assembled tool, and

FIGURE 2 is a side view of the tool with two of the punches carrying larger size anvils removed so as to expose a punch for use that has smaller size anvils.

The tool includes a body **10** having a threaded section **11** at one end and a rounded surface **12** at its other end. Threaded section **11** has an external thread **13** with a transverse shoulder **14** adjacent its inner end and has an internal thread **15** with a transverse shoulder **16** at its outer end. Intermediate its ends body **10** has a non-circular portion **17** to provide a wrench gripping surface.

Threaded into internal thread **15** is a first punch **20** having an upper transverse shoulder **21** in engagement with shoulder **16**.

Telescoped over first punch **20** is a hollow second punch **24** threaded onto external thread **13** with its upper end surface **25** in contact with shoulder **14**. Punch **24** also has a non-circular wrench gripping portion **26** and an external threaded extension **27** terminating in a transverse shoulder **28**.

A third hollow punch **30** is telescoped over punch **24** and threaded onto extension **27** with its upper end surface **31** in contact with shoulder **28**. This punch also has a non-circular wrench gripping portion **32**.

As illustrated, each of the punches has two or more swedging sections, each section being for a tube of a particular size. Punch **30** has two swedging sections generally designated **33** and **34**, **33** being for the largest size tube that the tool is designed to accommodate and section **34** being for the second largest.

The swedging sections on all of the punches are similar except for size. Thus, swedging section **34** on punch **30** is for use with a tube **35** of a particular inside diameter and a particular outside diameter. Swedging section **34** includes a cylindrical pilot portion **36** having a diameter approximately the same as the inside diameter of tube **35**, a tapered forming portion **37** and a cylindrical anvil or sizing portion **38** whose diameter is a few thousandths of an inch larger in diameter than the outside diameter of tube **35** so that the inside diameter of the expanded portion **39** of the tube will be just large enough to snugly receive the unexpanded end of another tube having the same outside diameter as tube **35**. Anvil portion **38** terminates at a transverse shoulder **40** that serves as a stop to limit the amount which die section **34** may enter tube **35**.

Anvil **38** has a shallow narrow groove **42** therein that is located from the lower end of pilot portion **36** the same distance that tube **35** should project above a split tube holding block **44** prior to the swedging operation. The manner of utilizing gauging groove **42** for this purpose is more fully disclosed and claimed in Patent 2,915,107.

Die section **33** of punch **30** is for a tube larger than tube **35** and it has a cylindrical pilot portion **46** whose diameter is substantially the same as the inside diameter of the larger tube, a tapered forming portion **47** and a cylindrical anvil **48** that terminates as a transverse stop surface **49** and has a gauging groove **50** spaced from shoulder **40** the proper distance that the larger tube should project from holding die **44**.

Punch **24** has three die sections generally designated **54**, **55** and **56** and punch **20** has two die sections generally designated **57** and **58**. These die sections are similar to those on punch **30** except for size.

To utilize the tool for expanding the end of a tube **35** having a diameter as shown, the tool parts are assembled as shown in FIGURE 1 and the lower end **40** of die section **34** is placed on the upper surface **45** of holding block **44**. Tube **35** is then inserted in the holding block until its upper end is in alignment with gauge groove **42** and then split blocks **44** are tightened against the tube to hold it firmly in place. Pilot portion **36** is then inserted into the end of tube **35** and hammer blows are applied to end surface **12** to drive die section **34** into the end of the tube until the end of the tube contacts shoulder **40** to limit the amount which die member **34** may enter the tube. In driving the tool into the tube in this manner, the tapered forming section **37** expands the end of the tube and cylindrical anvil **38** sizes the expanded portion as aforesaid. As the tool is driven into the tube, the hammer blows on surface **12** are first transmitted to punch **24** by shoulder **14** and then to punch **20** by shoulder **28** of punch **24**.

When it is desired to expand a tube **60** of a size corresponding to die section **58** of punch **20**, punches **24** and **30** are removed from the tool by unthreading punch **24** from threaded extension **11** so that punch **20** is exposed as shown in FIGURE 2. Punch **20** is then placed so that the lower edge **61** of pilot section **62** is on the upper surface of holding block **44** and the tube is extended through the latter until its end is in alignment with gauge groove **63**. The lower portion of punch **20** is then inserted into the tube until pilot portion **62** has completely entered the same, as shown in FIGURE 2. Hammer blows are then applied to surface **12** for driving punch **20** into the tube so that tapered surface **64** and anvil **65** expand and size the same and until the end of the tube contacts shoulder **66** to prevent further entry of the tool into the tube.

Similarly, when it is desired to expand a tube corresponding to the size of either die sections **54**, **55** or **56**, only punch **30** is removed from the completely assembled

tool so as to expose punch **24**. The tool is then used in the manner already described.

In one modification of the tool, die member **20** may be formed integrally with body **10**, thus eliminating the threaded connection **15** therebetween. Other changes may also be made in the detail construction of the tool without departing from the scope of the invention as defined by the claims.

I claim:

1. A swedging tool for expanding the ends of tubes comprising a body having a surface at one end for receiving hammer blows and having a first punch at the other end, said first punch having a die section for expanding a tube of predetermined diameter when driven thereinto, a hollow punch telescoped over the first punch to completely enclose the same and removably attached directly thereto, said hollow punch having a die section for expanding a tube of a larger size than said predetermined size when driven thereinto, said hollow punch being attached directly to the first punch and removable therefrom to expose the latter for use.

2. The tool of claim **1** in which the body carries a third punch completely enclosed by the first punch, said first punch having a detachable connection with the body whereby said first punch and hollow punch are removable as a unit from the body to expose the third punch for use.

3. The tool of claim **2** in which the connection between the first punch and body is by means of an internal thread on the first punch engaged with an external thread on the body, and the third punch is detachably connected to the body by an external thread on the third punch engaged with an internal thread on the body.

References Cited

UNITED STATES PATENTS

2,915,107	12/1959	Wilson	72—461
3,164,045	1/1965	Kennedy	72—477

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