

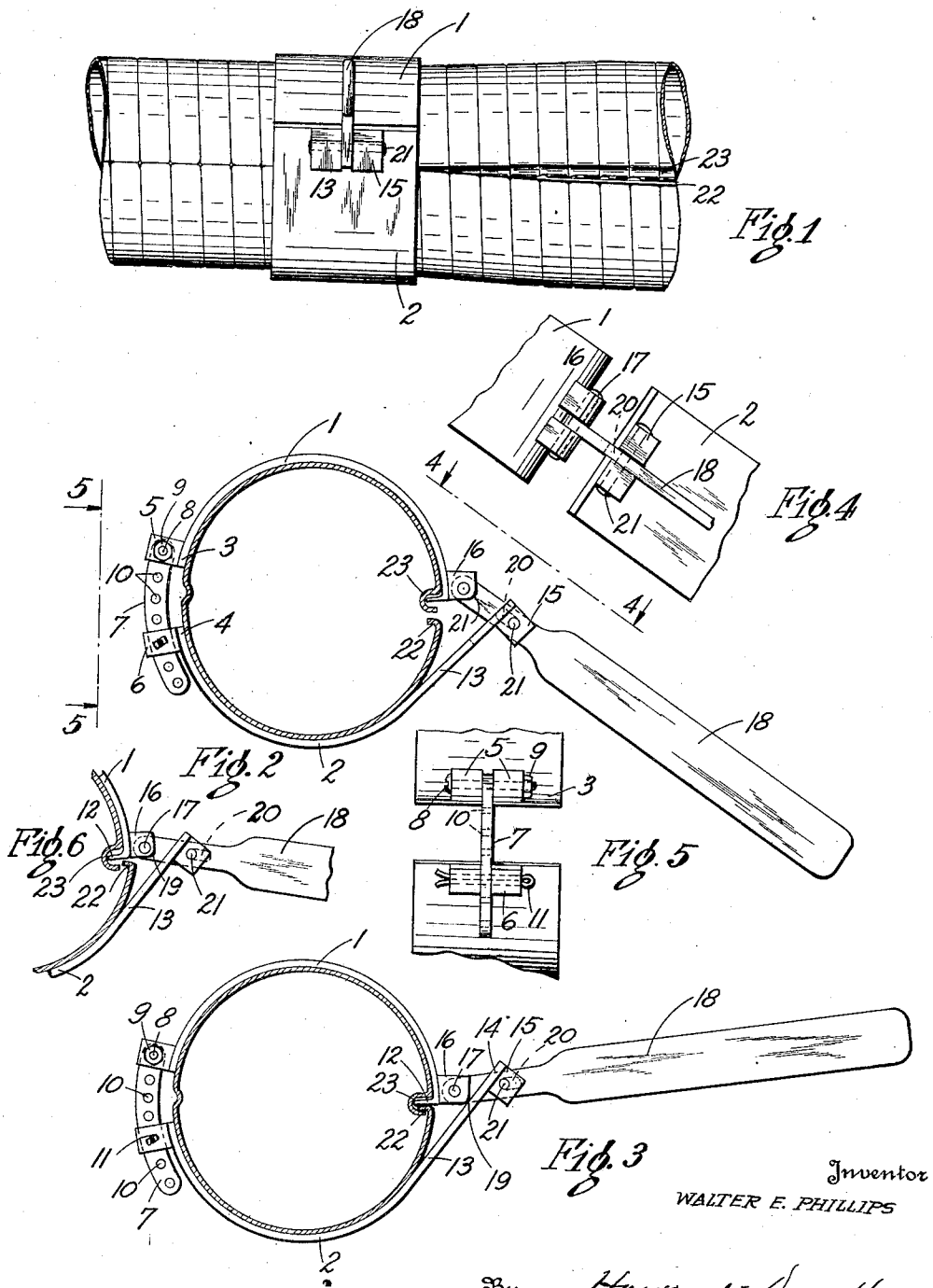
Nov. 29, 1932.

W. E. PHILLIPS

1,889,152

TOOL

Filed Aug. 14, 1931



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TOOL

Application filed August 14, 1931. Serial No. 557,128.

My invention is an improvement in closing tools and relates more particularly to such devices for use in connection with split flexible tubing or similar objects where the edges defining the splits are arranged so that they may be interlocked.

Although the present invention is particularly useful for closing and interlocking the adjacent edges of a longitudinal seam in split flexible metal tubing, it is to be understood that I do not limit the invention to such use, since its utility as a closing tool will be found to be very broad.

One of the objects of my invention is to provide means for closing and locking together adjacent edges of a split object in which the said edges are formed for interfitting or interlocking engagement.

Another object of the invention is to provide a tool of the above named character which will enable the user to operate the same in places which are ordinarily inaccessible and inconvenient to the hands of the operator.

Another object of the invention resides in constructing a closing and locking tool for split objects, which is capable of adjustment to objects of different sizes, and which is extremely simple of construction and inexpensive to manufacture.

Other objects and advantages of the invention will more readily appear from the following description of one embodiment thereof, reference being made to the accompanying drawing in which like reference characters are employed to designate like parts throughout the same.

In the drawing:—

Figure 1 is a plan view of one form of my invention shown applied in use for closing and locking a length of split flexible metal tubing along the split interlocking edges.

Figure 2 is a transverse section through the tool and section of flexible metal tubing, in which the tool is illustrated in position for operation to close the split.

Figure 3 is a view similar to that of Figure 2 and shows the portion of the tool encompassing the tube, in contracted position

to bring the interlocking edges of the split into interlocking engagement.

Figure 4 is a fragmentary plan view of a portion of the tool engaging the material of the tube adjacent the edges defining a split, looking in the direction of the arrows 4—4, Figure 2.

Figure 5 is a fragmentary plan view of another portion of the tool and illustrates one method of adjusting the tool to objects of different sizes. This view is in the direction of the arrows 5—5, Figure 2.

Figure 6 is a fragmentary view similar to that of Figure 3, and shows the positions of the parts when the lever is in an intermediate position.

As stated above, it is to be understood that, although I have illustrated the invention applied in use for closing and interlocking the adjacent edges of a split flexible metal tube, I do not intend to limit the invention to this use alone.

In carrying out my invention the tool includes a split contractible work engaging member which is adapted to be slipped over the end of the work or which may be separated so that the tool may be applied at any point along the length of the work, suitable means being provided for contracting the work engaging member. My invention also contemplates the provision of an adjustment whereby the split contractible work engaging member may be adjusted to work of various sizes or diameters. The tool is particularly adapted as a closing and interlocking device for use with longitudinally split flexible metal tubing in which the material of the tube along the edges defining the slits is formed so that the edges may be removably interlocked. Such tubing may be split longitudinally in one or more places as illustrated in my copending applications Serial Number 426,542, filed February 7, 1930, and Serial Number 423,605, filed January 27, 1930. In the former application I have illustrated a flexible metal tube split longitudinally in which the material of the tube adjacent the edges is formed so that the edges may be removably interlocked. Substantially opposite these interlocking edges

the tube is formed with a depression or other flexible portion extending longitudinally of the tube so as to facilitate spreading of the tube when applying to or removing it from an object. In the second copending application the tube is illustrated as having been split into a plurality of segments or sections which may be likewise removably interlocked along their respective adjacent edges.

10 With this particular use in view, I will proceed to describe in detail the present invention and its operation.

In the form illustrated the invention includes a tube engaging ring or band comprising the complementary sections 1 and 2. Each of the sections is provided near the respective ends 3 and 4 thereof with suitable lugs 5 and 6 respectively, and are removably and hingedly connected together by means of a segment 7. The segment 7 may be loosely pivoted to the lug 5 by means of a bolt 8 extending through the lug and an opening in an end of the segment 7. A nut 9 is provided on the bolt 8 to prevent accidental displacement thereof. The segment 7 is provided with a series of spaced openings 10 which extend in a series throughout substantially the length of the segment as illustrated more clearly in Figures 2 and 3. The ends 3 and 4 of the clamping or work engaging sections 1 and 2 respectively may thereby be hingedly connected together in any desired spaced relation as determined by the adjustment of the segment 7 lengthwise in the lug 6.

35 When the desired spacing of the ends 3 and 4 is accomplished this adjustment may be maintained by inserting a cotter pin 11 or the like through a longitudinal opening in the lug 6 and through the selected opening 10 in the segment 7. The segment 7 is thus loosely and hingedly connected to the respective ends 3 and 4 through the lugs 5 and 6 respectively.

The segments 1 and 2 are preferably arcuate in cross section as illustrated in Figures 2 and 3. The opposite end of the section 1 terminates in an inwardly and substantially radially extending tooth or projection 12 for engagement with a depressed portion of the material of the tube for purposes which will be described more fully hereinafter. The opposite end 13 of the section 2 comprises a portion which is substantially flat and extends tangentially to the remaining portion of the section 2. The portion 13 terminates in its free end 14 in a lug 15. A similar lug 16 is formed on the adjacent end of the section 1 and is provided with a pin 17 for pivotally connecting and operating the lever or handle thereto. It will be noted that one portion of the lug 16 is rounded as at 19 since in contracting the split closing member the lug 16 is brought into engagement with the inner surface of the portion 13 of the section 2. The portion of the lug 16 which thus engages the portion 13 is preferably

rounded to provide a bearing surface at the point of contact.

The operating lever or handle 18 is provided with an opening 20 through which extends a pin 21 carried by the lug 15. The opening 20 may be in the form of an elongated slot to permit relative movement of the pin 21 lengthwise of the lever 18 for a limited distance. In this manner it will be seen by especially referring to Figures 2 and 3 that the respective removably interlocking portions of the tube may be moved relative to each other in a plane extending transversely of the tube so that the split portion of the tube provided with the inwardly extending locking flange 22 may be forced slightly outwardly while at the same time the seating portion of the tube 23 may be forced inwardly and in the path of the flange 22 to permit the flange to seat therein when the closing tool is again released.

In Figures 1, 2 and 3 I have illustrated the tool in use and it will be noted that the sections 1 and 2 thereof are sufficiently wide so that the tool may be effective in operation throughout a desirable area of the tube. In use the tool may be slipped over the end of the tube so that the projection 12 extends into the portion of the tube 23. When the tool is properly adjusted by selecting the proper opening 10 in the segment 7 and inserting the cotter pin 11 through the lug 6 and the selected opening, the handle or lever 18 may be moved to contract the complementary sections 1 and 2 about the tube as illustrated in Fig. 3. In so doing the portion of the tube thus contracted is joined together along the slit in removable interlocked relation throughout an area substantially that covered by the width of the members 1 and 2. When this portion of the slit is thus interlocked the handle or lever 18 is moved in the opposite direction to expand the tool whereupon the tool may be slipped axially along the tube for a short distance and the operation repeated as often as desired at progressive intervals along the tube. In this manner it will be seen that the tube may be quickly and easily closed in removable interlocked relation. Another manner of applying the tool is to slip the same over the tube transversely by first removing the cotter pin 11 and spreading the sections 1 and 2 about the pivots 17 and 21. When the tool is fitted on the tube in this manner the segment is again replaced in the lug 6 and the desired opening 10 selected. The cotter pin 11 may then be replaced and the tool split in a manner as above described. It will therefore be seen that by my invention I have provided a closing tool which is extremely simple of construction and inexpensive to manufacture and which eliminates considerable labor in closing longitudinally split interlocked flexible metal tubing, especially where such tubing is used in places

where it can not be closed by hand due to limited spreading space. One instance where such a tool is particularly desirable and useful is in applying longitudinally split interlocked flexible tubing as a part of automobile heaters which is to be assembled on the exhaust manifold or exhaust pipe of an automobile engine. It is well known that in actual practice such tubing as herein described is very difficult to apply by hand and it is often impossible to properly apply it by hand without removing the exhaust pipe or manifold. With the present tool, however, the user is given access to places which are ordinarily impossible to reach by hand.

with the tube material along one of its interlocking edges.

In testimony whereof, I hereunto affix my signature.

WALTER E. PHILLIPS. 70

Various changes in the details of construction and arrangement of parts may be made without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. A tool of the class described comprising a split contractible work engaging member having a work engaging projection near one end thereof, and means for contracting the said member about the work, said means including a lever having pivotal connection to each end of the split member. 75

2. A tool of the class described comprising a split contractible work engaging member having a work engaging projection near one end thereof, and means for contracting the said member about the work, said means including a lever carried by one end of the split member and having a pivotal connection with another portion of the lever. 80

3. A tool of the class described comprising a split contractible work engaging member having a work engaging projection near one end thereof, and means for contracting the said member about the work, said means including a lever having pivotal connection to each end of the split member, and means for initially adjusting said split member to fit objects of predetermined size. 85

4. A tool of the class described comprising a split contractible work engaging member having a work engaging projection near one end thereof, and means for contracting the said member about the work, said means including a lever carried by one end of the split member and having a pivotal connection with another portion of the lever, and means for initially adjusting said split member to fit objects of predetermined size. 90

5. A tool for closing split tubular objects having interlocking edges defining the split including a contractible band for receiving the object, and means for contracting the band whereby the interlocking edges of the object are caused to overlap in interlocked relation, said means including a lever having connection with the band for contracting the same when the lever is rocked in one direction, said band having a projection extending inwardly thereof for engagement 95

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