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TUBE BEND FORMER

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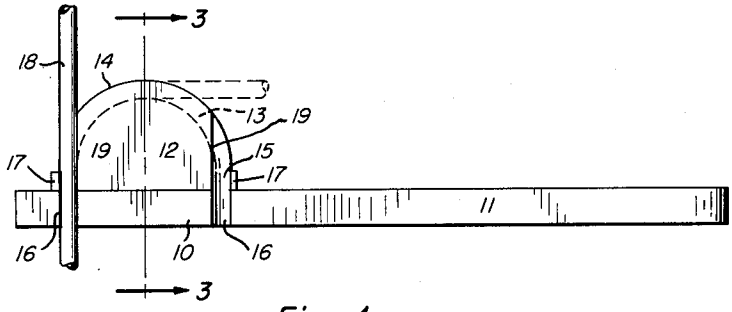


Fig. 1

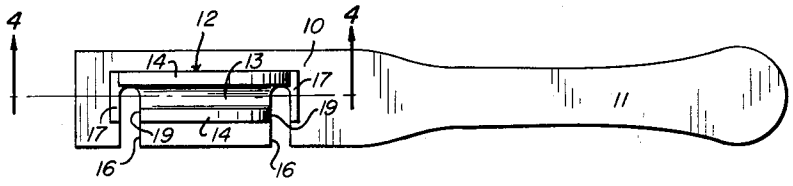


Fig. 2

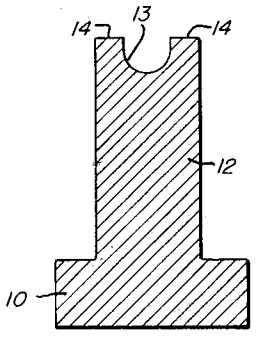


Fig. 3

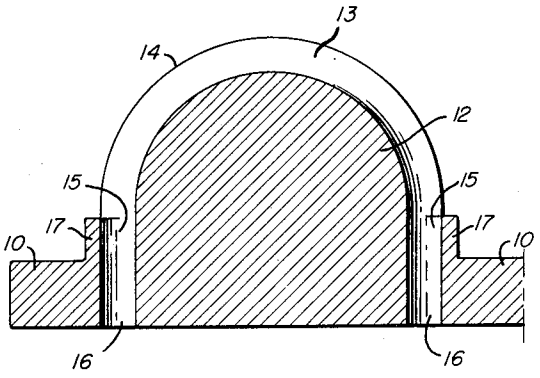


Fig. 4

INVENTOR.
FLOYD C. GRAZIER
BY Bowen & Sweet
ATTORNEY

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TUBE BEND FORMER

Floyd C. Grazier, 631 S. Sherman St., Denver 9, Colo.

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This invention relates to the practice and techniques of forming bends in tubing, and more particularly to the procedures applicable to effect desired bends in tubing during the installation thereof in position of intended use, and has as an object to provide a novel and improved tool employable to advantageously facilitate such operations.

A further object of the invention is to provide a novel and improved forming tool that is expedient of manipulation in coaction with tubing undergoing installation to further the production of desired bends therein.

A further object of the invention is to provide a novel and improved forming tool that is susceptible of diversely-positioned coaction with tubing undergoing installation to further the production of variously-directed desired bends therein.

A further object of the invention is to provide a novel and improved forming tool that is feasible and convenient of use in restricted spaces and areas difficult of access to promote the production of desired bends in tubing undergoing installation.

A further object of the invention is to provide a novel and improved tool employable for the production of desired bends in tubing that is appropriate for manufacture in a range of specific sizes suited for intended coaction with different sizes of conventional tubing, that is simple and economical of construction as a sturdy and durable integrated unit, and that is positive and efficient in attainment of the ends for which designed.

With the foregoing and other objects in view, my invention consists in the construction, arrangement, and operative combination of elements as hereinafter set forth, pointed out in the appended claims, and illustrated by the accompanying drawing, in which—

FIGURE 1 is a side elevational view of a practical embodiment of the invention as engaged in one position of use with a length of tubing to be bent in the manner and to the extent represented by broken lines in the view.

FIGURE 2 is a top plan view of the organization according to FIGURE 1 with the length of tubing omitted.

FIGURE 3 is a section, on a relatively-enlarged scale. taken transversely through and substantially on the indicated line 3—3 of FIGURE 1.

FIGURE 4 is a fragmentary section, on the same scale as FIGURE 3, taken longitudinally through and substantially on the indicated line 4—4 of FIGURE 2.

It is customary and wide-spread practice in many industrial and structural operations to utilize extensive, and frequently very complex, arrangements of moderately-pliant, small-diameter, metal tubing, or the equivalent. Such arrangements of tubing commonly are installed as may be expedient during fabrication of the associated equipment or structure and directed by means of suitable bends in the tubing to intended disposition and operative correlation with the features and elements to be served thereby. Incident to the practice just mentioned, considerations of economy, practicality, and operative efficiency favor development of the tubing array from long lengths of tubing adjusted by bending in place to desired disposition and arrangement. The bending in place of long lengths of tubing is attended by difficulties of access and space restriction complicated by the need for obtaining a smooth bend free from constriction or obstruction of the tubing bore, which factors establish the merit and practical advantage of a forming tool manipulable to diversely-positioned engagement with, and selectively along an exposed portion of a length of tubing to develop a

bend of preferred angular extent. The instant invention is hence directed to the provision of a novel and improved tube bend former possessed of the utility and advantages set forth.

In accordance with and to give effect to the principles of the present invention, the elements and features characterizing the improved tube bend forming tool are unitarily incorporated in and with an expediently-straight, flat, rigid bar **10** of appropriate size and suitable deformation-resisting material, such as metal. Desirably rectangular in transverse section, the bar **10** is proportioned to a width substantially greater than its thickness and to a length several times the multiple of its width with one end thereof formed to provide a handle portion **11** convenient for grasp and manipulation by one hand of an operator. Inwardly adjacent the end of the bar **10** remote from the handle portion **11**, a semi-cylindrical, rigid boss **12**, fixed to or integral with the bar, extends perpendicularly from the width plane at one side of said bar with its axis of curvature transverse of and moderately above the conjoint surface of the bar and its arcuate end planes consequently paralleling the side margins of the bar. The axial length, or thickness, of the boss **12** exceeds the maximum diameter of the tubing wherewith the tool is designed to coact and is correlated with the width of the bar to space the arcuate end planes of the boss inwardly from the side margins of the bar which they respectively parallel. The arcuate crown of the boss **12** directed away from the bar **10** is provided with a peripheral channel **13** of transverse U-shaped sized to freely accommodate the outside diameter of the tubing to which the tool is applicable. The channel **13** is of a depth equal to the outside diameter of the tubing to be worked by the tool and the diametrically-opposite ends of said channel **13** register tangentially with, and are continued by short throats **15** which extend to the plane of the bar surface supporting the boss. At their intersection with the bar surface the throats **15** register with the rounded inner ends of like open-ended slots **16** in spaced parallelism from one side margin of the bar **10**. Spanning the thickness of the boss **12** at each side of its conjunction with the bar **10**, a straight, flat web **17** fixedly or integrally upstands from the bar and is connected at one end to the adjacent margin of the flange **14** at the side of the boss remote from the open ends of the slots **16** and extends along the edge of the associated slot outward with respect to the boss. So disposed, the web **17** is a projection from and perpendicular to the bar **10** at the diametric plane of the boss **12** parallel to the width plane of the bar. Completing the tool for its intended use, the slots **16** provide shoulders **19** for the selective reception of, and for individual coaction with, a length **18** of tubing, as represented by FIGURE 1. Said shoulders are perpendicular to the width plane of the bar **10** formed in spaced parallelism tangent to the opposite ends of the channel **13** at the side of the boss **12** adjacent the open ends of the slots. The shoulders **19** extend in coplanar relation with the side walls of said slots opposed to the webs **17**.

Sized and proportioned as above set forth for coaction with tubing receivable in its slots **16**, the improved bend forming tool is practical and convenient of use in the manner exemplified by FIGURE 1. Given occasion to effect a bend in a length **18** of the tubing, wherever and however installed, manipulation of the tool in the grasp of an operator is directed to engage one of the slots **16** thereof fully and embracingly over and about the tubing with the boss **12** at the intended inner arc position of the contemplated bend, whereafter manual pressure is applied to the tubing projecting through the bar **10** and past said boss to roll the same in and along the channel **13** with consequent smooth bending effect of desired ex-

tent. Obviously, detachment of the tool from the completed bend requires but simple displacement of the tool laterally away from the tubing; the provision of the complementary slots 16 at opposite sides of the boss 12 accommodates the production of bends in either direction longitudinally of the tool; and the compact, integrated character of the tool adapts the same for expedient, one-hand manipulation in an advantageous diversity of positions and situations.

Since changes, variations, and modifications in the form, construction, and arrangement of the elements shown and described may be had without departing from the spirit of my invention, I wish to be understood as being limited solely by the scope of the appended claims, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention:

1. A tube bend former comprising a flat, rigid bar having one end portion formed as a manipulating handle, a semi-cylindrical boss fixed on one side of said bar inwardly adjacent the end thereof remote from the handle portion with the axis of said boss transverse of and spaced moderately from said one side of the bar, a channel formed in and opening radially outwardly of the arcuate periphery of said boss, throat continuations perpendicularly intersecting said bar in tangential registration with the ends of said channel, and an open-ended slot extending laterally from one side edge of the bar in communicating registration with each said throat continuation.

2. The organization according to claim 1, wherein said bar is transversely rectangular in a width substantially exceeding its thickness, said boss is of a thickness less than the width of the bar, and said boss is fixed to a width face of the bar with the end planes of the boss spaced inwardly from the respectively-adjacent side margins of the bar.

3. The organization according to claim 1, wherein said channel is transversely U-shaped and of a width and depth to freely and fully received the diameter of a length of the tubing to be bent.

4. The organization according to claim 1, wherein said channel is transversely U-shaped and of a width and depth to freely and fully receive the diameter of a length of the tubing to be bent, and said slots cannect laterally of the bar with the throat continuations in a corresponding width of opening freely receptive of the tubing.

5. The organization according to claim 1, wherein said channel defines complementary arcuate flanges marginally of the boss, and a web fixedly spans the thickness of the boss along the outward side of each slot, said web being connected at one end with the flange of the boss at the closed end of the slot to form an abutment on the outward side of the contiguous throat continuation of the channel.

6. The organization according to claim 1, wherein said channel defines complementary arcuate flanges marginally of the boss, a web fixedly spans the thickness of the boss along the outward side of each slot, said web being connected at one end with the flange of the boss at the closed end of the slot to form an abutment on the outward side of the contiguous throat continuation of the channel, and the flange of the boss adjacent the open ends of the slots is defined between parallel marginal areas tangent to the base of the channel where it is joined with the throat continuations and each coplanar with the inward side of the contiguous slot.

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