United States Patent

Widman

[15] **3,701,194**

[45] **Oct. 31, 1972**

[54] TOOL FOR ASSEMBLING DUCTS HAVING PITTSBURGH TYPE JOINTS

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[22] Filed: **Dec. 18, 1969**

[21] Appl. No.: **886,076**

[52] **U.S. Cl.** **29/278**, 29/283

[51] **Int. Cl.** **B25b 27/14**

[58] **Field of Search** ..... 29/278, 283; 81/3.37, 3.46, 81/3.46 A, 90 S; 24/201 C, 81 B, 73 B

[56] **References Cited**

UNITED STATES PATENTS

2,260,584 10/1941 Schuck ..... 24/81 B

FOREIGN PATENTS OR APPLICATIONS

867,114 5/1961 Great Britain ..... 24/81 B

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[57] **ABSTRACT**

A tool for assembling sections of sheet metal duct. The tool includes a substantially flat body which is substantially vertically disposed during use and a horizontal top marginal edge in the form of a pair of vertically disposed reverse folds defining two laterally adjacent and longitudinally extending channels for receiving the respective parts of the duct being joined. A bottom marginal edge, parallel to the upper edge, is angularly disposed with respect to the body of the tool so that the forward and rearward ends of the tool body portion are spaced laterally away from the duct side wall to be conveniently grasped by the fingers when repositioning the tool along the length of the duct section as the assembly and joining procedure proceeds.

3 Claims, 4 Drawing Figures

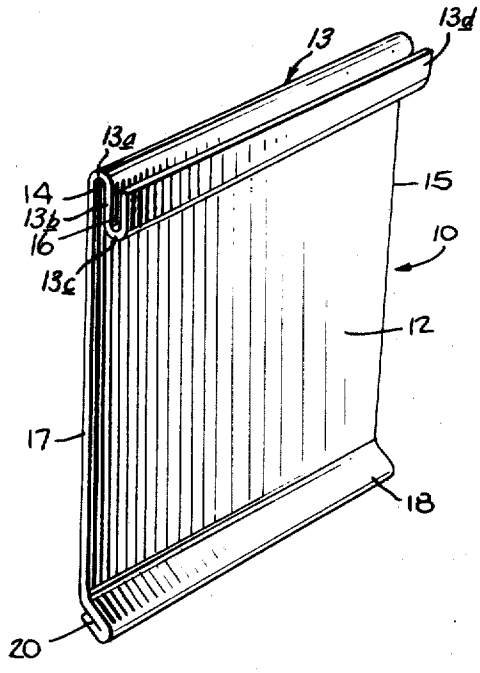

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Fig. 1.

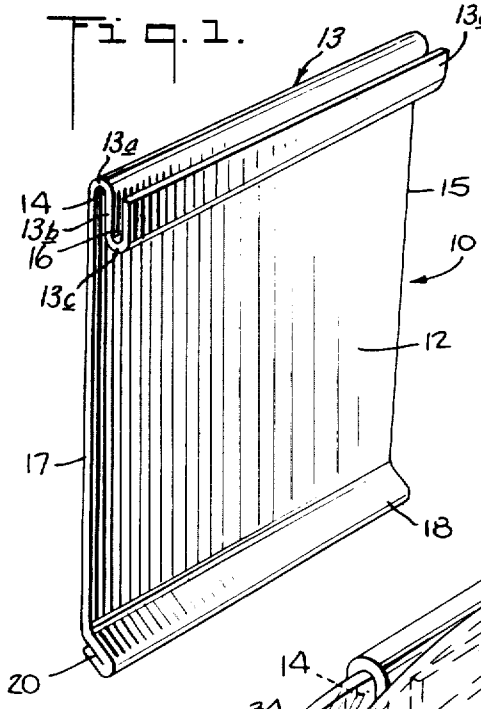
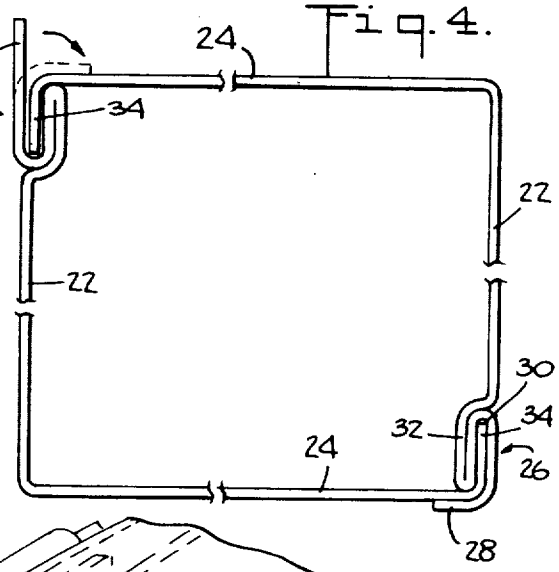


Fig. 4.



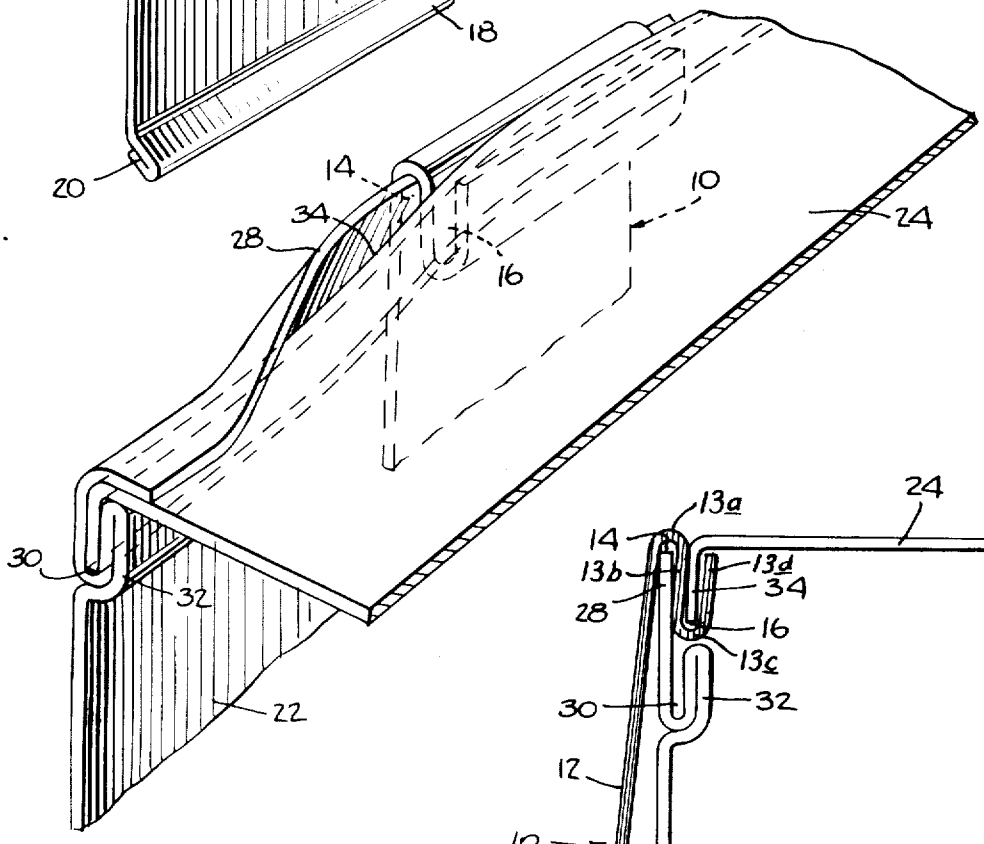


Fig. 3.

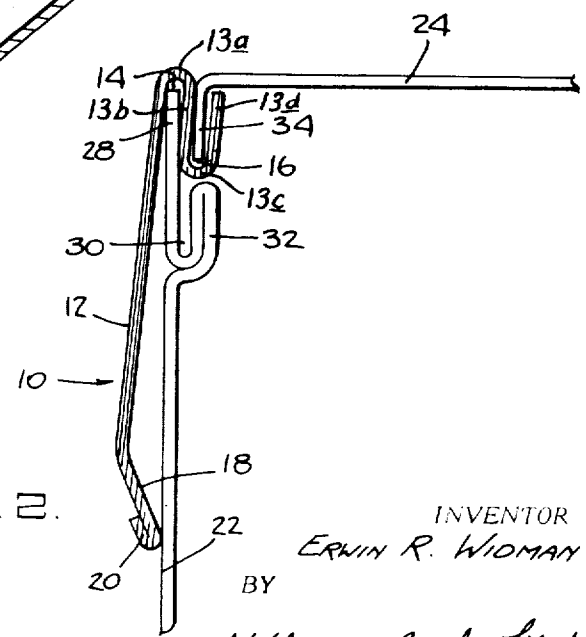


Fig. 2.

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TOOL FOR ASSEMBLING DUCTS HAVING PITTSBURGH TYPE JOINTS

This invention relates to sheet metal duct fabrication, and more specifically to a tool for facilitating such fabrication.

In my issued U.S. Pat. No. 3,225,432 there is shown a tool for facilitating the assembly and joinder of a top wall to a pair of vertically disposed sidewalls of a sheet metal duct section having Pittsburgh joints extending along all of the four longitudinal corners.

In fabricating lengths of rectangular sheet metal duct it is also common practice to pre-form two right angled half-sections of the sheet metal and to join the two using only two Pittsburgh joints which respectively extend along each of the diagonally opposed longitudinal corner edges. The so-called "Pittsburgh" duct seam construction is formed by inserting the simple turned down marginal flange which extends along one wall section into a pocket formed by a pair of folds extending along the comating edge of the other wall section. The projecting free edge of the latter is then folded over and hammered down against the first mentioned wall section, thus locking the wall sections together. That wall section which carries the flange is called the "cheek part", and that wall which carries the pocket is called the "wrapper part". In the referred to assembly of two right angled half-sections, each half-section is a mirror image of its counterpart. In this connection, each half-section has a cheek part and a wrapper part. Thus, the completed rectangular duct section is formed by securing the cheek part of each half-section with the comating wrapper part of the other half-section in the indicated manner. The duct assembly tool provided by this invention is especially useful in assembling duct sections formed by joining two such right-angled half-sections using "Pittsburgh" joints and therefore will be described in connection with such use.

For air conditioning duct work and the like, it is common to assemble the duct in sectional lengths, which at times are of substantial length. Moreover, the elongated duct sections may be quite high and wide when finally assembled and thus considerable difficulties have been encountered heretofore when attempting to assemble and temporarily hold the duct half-sections in interlocked relation so that the referred to free edge can be hammered down to close the joint. In this connection, the tendency is for the duct pieces to bend under their own weight and to otherwise misalign or spring apart during the joining operation. Even when assembling relatively short duct sections, or those which do not have particularly great height or width, the work of two men has heretofore been required, one to hold the duct sections in interlocking relation and the other to hammer the projecting edge of the wrapper part down on to the cheek wall. However, by using the tool provided by this invention, it is found that, in most cases, only one man is required to completely assemble and fabricate the duct section. In addition, it is found that duct sections can be assembled by the one man in less time than previously required by the two men.

The invention is primarily intended for commercial use where such saving in man-hours required to assemble duct sections or lengths will, in the aggregate, substantially reduce the cost of sheet metal fabrication operations. Furthermore, and as will be described, the tool can be made by folding but a single piece of sheet metal. It is therefore economical to make.

Briefly describing the present invention, a tool is provided for receiving the downwardly turned flange of the cheek part of the aforementioned "Pittsburgh" joint and positioning it in vertical alignment with the comating pocket of the wrapper part in such manner that the joint may be worked and closed without the necessity of constant realignment of the two right-angled half-sections of duct from which the completed duct section is being made. The tool has a plain and flat body portion which is normally vertically disposed during use. Laterally adjacent folds, in generally S-shaped configuration, extend along its upper marginal edge to form an upwardly facing cheek receiving channel and a downwardly facing wrapper engaging channel. When joining either of the diagonally opposite edge seams, the wrapper part of the "Pittsburgh" is positioned vertically upright for receiving the downwardly turned flange of the comating cheek part which is horizontally disposed. The tool is hung on the upper edge of the upstanding wrapper part by means of the first or downwardly facing channel which engages the wrapper edge. The flange of the cheek part is then placed within the second or upwardly facing channel of the tool. The tool is initially placed at a convenient distance back from that end of the duct at which the folding and securing of the Pittsburgh will be started. By such spaced disposition of the tool from the starting location of the Pittsburgh, it is possible to position the flange of the cheek part within the above-described pocket of the wrapper part edge in conventional manner. The tool which holds the cheek part and wrapper part in an orientation for fabrication is repositioned from time to time along the wrapper edge to locations further downstream as the length of the upstanding free edge of the wrapper part is progressively turned down and hammered against the cheek part. This repositioning of the tool is facilitated by the provision that the lower marginal edge of the tool projects angularly of the body of the tool thereby to be spaced laterally away from the vertical wall section on which the tool is hung. Thus, the tool is easily repositioned by grasping the forward or rearward end of the tool using the fingertips and sliding it along the edge of the wrapper part on which it rests.

When the duct section is extremely long, it may be preferable to utilize several such tools at spaced apart locations along the overall length of the duct section.

These and other objects, features and advantages of the invention will become more fully apparent from the following detailed description thereof, when taken with reference to the accompanying drawings in which:

FIG. 1 is a perspective view of the assembly tool in accordance with the present invention;

FIG. 2 is an end elevational view of two sheet metal duct members and the assembly tool of FIG. 1 being supported by one duct member and supporting a further duct member prior to fabrication of the duct section;

FIG. 3 is a fragmentary perspective view to an enlarged scale of a partially fabricated duct section and illustrating the manner of use of the assembly tool of FIG. 1; and

FIG. 4 is an end elevational view of a typical assembled duct section, illustrating diagonally opposite "Pittsburgh" type joints.

The sheet metal duct assembly tool, in accordance with the present invention, may be seen to best advantage in FIG. 1. In the Figure, as well as throughout the several Figures, the assembly tool is generally indicated by the reference numeral 10. The assembly tool is substantially plain and flat within a body portion 12, bounded at the top and bottom by marginal edge structure which facilitates the fabrication of the sheet metal duct to be described in detail below when considering FIGS. 2–4.

The horizontally extending upper edge of the body portion is generally indicated by reference numeral 13, and is formed by a first return bend 13*a* thereof forming a downwardly facing inverted U-shaped, open-ended channel 14. A second return bend 13*c* provides an upward extension 13*d* of the leg portion 13*b* which is also substantially parallel to the body portion 12, and is spaced away from the leg portion 13*b* to define an upwardly facing, U-shaped, open-ended channel 16 laterally adjacent to, and having width substantially equal to that of the channel 14. It will be noted that the leg portion 13*b* and its extension 13*c*, and the channels 14 and 16 are located on the same side of the tool 10, and that reference to "downwardly" and "upwardly" is with respect to the normally vertical disposition of the tool during use as shown in FIGS. 1–3. As illustrated, the channels 14 and 16 extend throughout the distance between the forward and rearward tool ends 15 and 17, so that the assembly tool may be supported on the wrapper part and support the cheek part. The width of each channel is such as to accommodate, respectively, the upstanding end projection and the flanged end of these parts. Thus, the width of the channels will be in part dependent upon the thickness or gauge of the sheet material used in the duct construction.

The bottom marginal edge structure is formed by a lip 18 which, in operative disposition of the assembly tool, angularly projects from the body portion 12 and toward the side of the wrapper section of the sheet metal duct (FIG. 2). The lip 18 normally rests upon a side of the wrapper section, and, as will be brought out below, spaces the assembly tool from the duct being fabricated so that it may be easily grasped for movement. Since the movement will be primarily a sliding movement of the assembly tool, it is desirable that no sharp edge be presented to the side of the duct section. In this connection, a portion of the lip 18 is doubled back upon itself, as illustrated at 20. Sliding movement is therefore enhanced.

In a preferred form, the assembly tool may be generally rectangular in configuration. The tool, further, as will be understood more fully from the discussion of the operation, should be of relatively sturdy construction, thereby to be capable of supporting the various duct sections relative to one another during the formation of the "Pittsburgh" seam. Although the tool may be formed from various materials shaped as described, thereby to function in the desired manner and employment with similar benefit, it is preferred that the assembly tool be of sheet metal and such a tool has been used successfully. The gauge or thickness of the sheet material stock should permit folding of the same, yet at the same time provide the necessary support strength.

FIGS. 2–4 of the drawing generally illustrate an operative sequence in the fabrication of sheet metal ducts through implementation of the assembly tool of the present invention. In this connection, and as shown, it is possible to assemble a sheet metal duct by connecting a pair of right angled half-sections of sheet metal, and joining one to the other, by a so-called "Pittsburgh" duct seam. As illustrated in the Figures, the wrapper part 22 (the side walls) is assembled and joined to the cheek part 24 (the top and bottom wall) by a "Pittsburgh" seam 26, along diagonal edges of the duct section. The assembly tool of the present invention, however, may be with similar facility employed in the fabrication of ducts wherein each duct wall is separate and there is a "Pittsburgh" joint or seam at each corner.

Referring to FIG. 2, the assembly tool 10 is shown supported by means of the first channel 14 on an end edge extension 28 of the wrapper part 22. The end projects upwardly from a pocket 30 formed by a double fold 32. The pocket, which forms a part of the "Pittsburgh" joint, is internally of the side wall surface of the wrapper part and is disposed in substantial vertical alignment with the second channel 16 in the assembly tool 10. In this manner, the downward flange 34 of cheek part 24, which is received by the channel 16, is disposed in substantial alignment with the pocket 30. As indicated above, the width of the channels should be such both to slidingly and guidingly receive the extension 28 and flange 34. Therefore, width considerations will generally be determined by the gauge or thickness of the material to be used.

The depth of each channel generally will be dependent upon the width of the projecting flange 34 formed in the cheek part and the height of the extension 28 formed in the wrapper part. In this connection, each channel should be of a depth such that necessary stability and supporting functions are achieved. Further, the depth of the first or downward channel 14 will be substantially equal to the height of the extension 28. By this consideration, not only is the assembly tool supported in a stable manner by the extension, but it, in turn, then supports the flange 34 immediately above the pocket 30 into which it is to be received.

The assembly tool, referring to FIG. 3, is initially spaced a distance from the point from which the seam begins. This spacing, while adequately supporting the downstream length of the section, allows entrance of the flange 34 into the pocket 30, due to the natural flexure of the unsupported upstream length. Thereafter, the projecting extension 28 of the wrapper part 22 may be turned down over the top surface of the cheek part, such as by hammering, to complete the "Pittsburgh" joint or seam.

As progressively more of the projecting extension of the wrapper part is turned down over the surface of the cheek part, it will be necessary periodically to relocate the assembly tool at positions farther downstream. Therefore, a further length of the flange 34 may be flexed into the pocket 30, while the downstream length of the cheek part continues to be supported in alignment for completion of the seam. The positioning of the flange 34 within the pocket 30 so that the projecting portion 28 of the wrapper part may be turned down is illustrated in FIGS. 3 and 4

As generally discussed, the lower marginal edge **18** of the assembly tool is angularly disposed relative to the body portion **12**. This permits a lateral spacing between the side wall surface of the wrapper part and the tool portion **12** (FIG. **2**) so that the operator may grasp the assembly tool between his fingers to push, pull, or otherwise slidingly move the tool from position to position as the "Pittsburgh" joint is formed.

From the foregoing discussion, it is seen that the objects of the invention are carried out and that the advantages, as well as other advantages as will now be apparent to those skilled in the art, are carried out by the described tool for fabricating sheet metal duct section having a "Pittsburgh" type joint.

Having described my invention, I claim:

1. A tool for assembling a sheet metal duct section or the like, said tool comprising a substantially flat body portion which is normally vertically disposed during use, said body portion having a horizontally extending upper edge, and a lower edge spaced away from said upper edge, a return bend of said upper edge forming a leg portion extending downwardly from said upper edge and substantially parallel to said body portion, said leg and body portions together defining a downwardly facing, inverted U-shaped open-ended channel therebetween, a second return bend of said upper edge forming an upward extension of said leg portion which is substantially parallel to said leg and body portions, said upward extension and said leg portion together defining a substantially U-shaped upwardly facing open-ended channel which is laterally adjacent to said downwardly facing open-ended channel on the same side of said tool, each of said open-ended channels having substantially equal width slightly greater than the sheet thickness of said sheet metal duct for slidably receiving an edge of the sheet metal in each channel.

2. A tool according to claim **1** which further comprises means on said body portion for grasping said tool for slidably moving the same along an edge of said sheet metal duct.

3. A tool according to claim **2** wherein said means for grasping said tool comprises a lip portion formed by a bend of said lower edge of the body portion, said bend being towards that side of said tool on which both of said channels are located whereby, when said tool is slidably received on an edge of said sheet metal duct, said lower edge of said body portion engages said duct to space said body portion away from said duct for grasping to slide said tool along said duct edge.

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