Oct. 6, 1959 W. R. WILSON, SR 2,907,366

PLATE BENDING AND SEAM SEALING MACHINE HAVING WORK ENGAGING ROLLER PIVOTED TO SWING ACROSS PORTION OF WORK TO BE BENT

Filed Sept. 24, 1954 2 Sheets-Sheet 1

Fig. 1

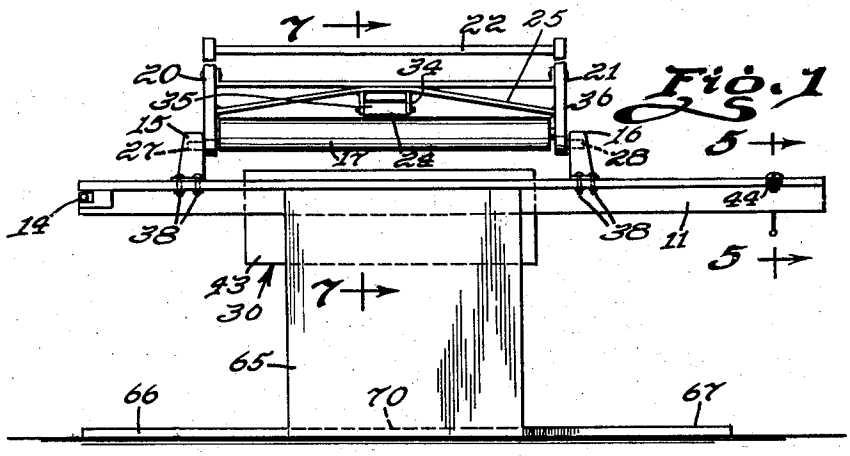

Fig. 2

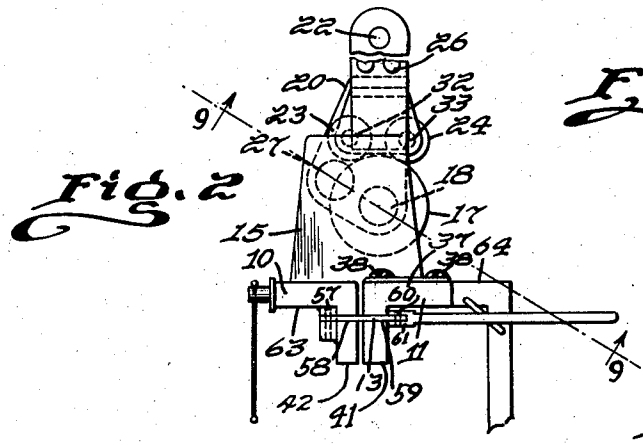

Fig. 9

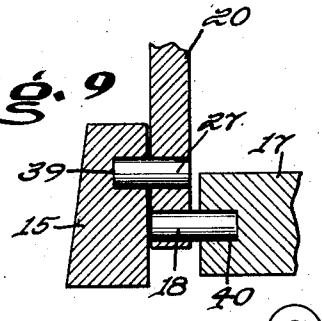

Fig. 8

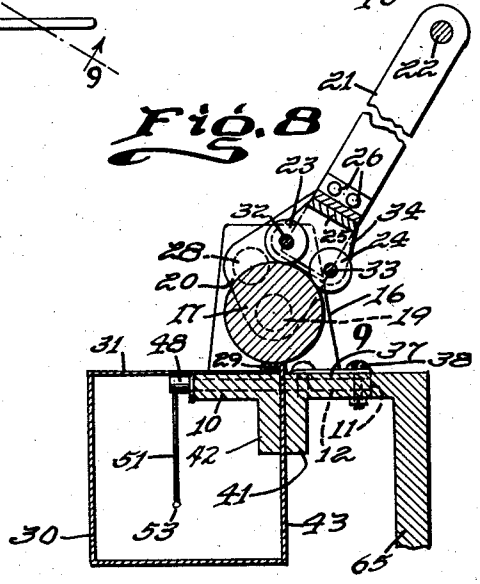

Fig. 7

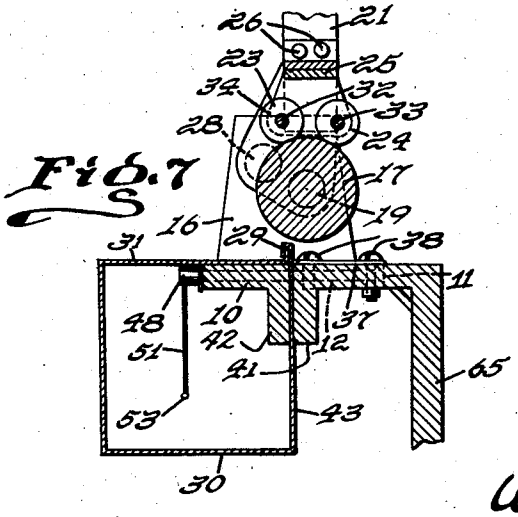

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Fig. 3

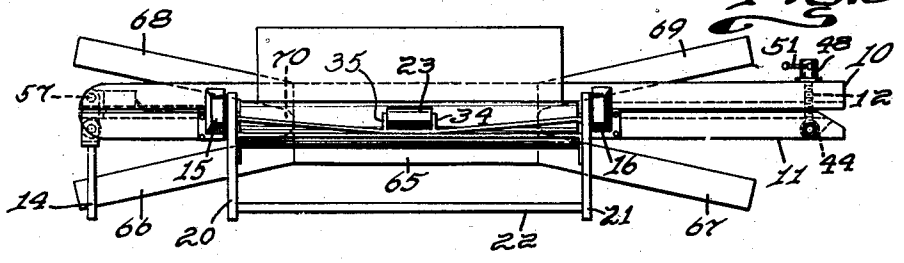

Fig. 4

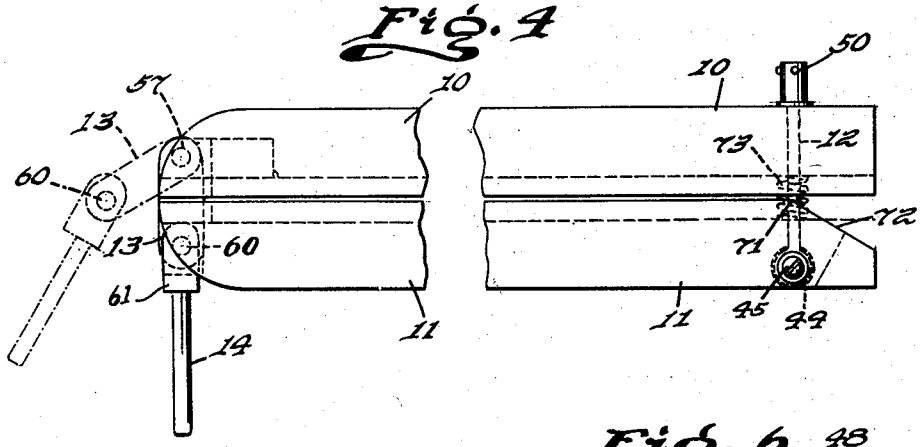

Fig. 5

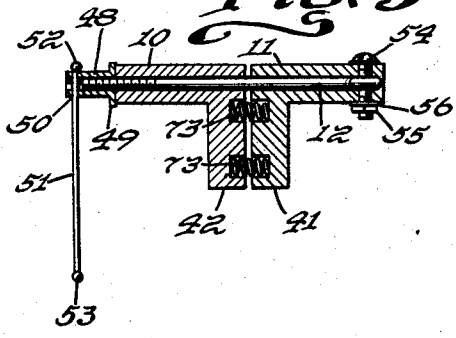

Fig. 6

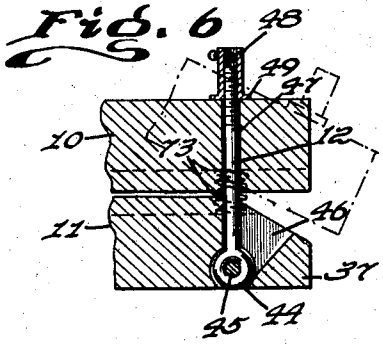

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PLATE BENDING AND SEAM SEALING MACHINE HAVING WORK ENGAGING ROLLER PIVOTED TO SWING ACROSS PORTION OF WORK TO BE BENT

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Application September 24, 1954, Serial No. 458,083

7 Claims. (Cl. 153—16)

This invention relates to a plate bending tool or brake, and in particular, a brake having a pair of anvils whereby a duct having a Pittsburgh joint or flange extended from one edge is adapted to be positioned between the anvils and the flange bent over or flattened by a roller carried by a pivotally mounted handle.

The purpose of this invention is to provide means for bending or crimping a Pittsburgh joint against a side of a duct, plate, or other object from which the joint extends whereby the bent-over joint presents a smooth and neat appearance.

In the conventional manner of bending a Pittsburgh joint against an object or piece of material, the joint is bent over with a hammer or the like and even though the joint may be folded or bent flat against the side of a duct or plate the hammer marks will show and it is difficult to finish a joint with a smooth surface. With this thought in mind, this invention contemplates a brake in which a duct or object from which a Pittsburgh joint extends is adapted to be held between anvils as the extending joint is bent to a flat position against a plate or side wall of a duct with a continuous roller that forms the joint parallel to the plate or object with a continuous contacting surface.

The object of this invention is, therefore, to provide means for bending a Pittsburgh joint flat against an object or surface without the finished article having hammer marks therein.

A further object of the invention is to provide a brake for flattening a Pittsburgh joint, particularly on a duct in which the time required for bending the Pittsburgh joint against the surface of the duct is reduced to a minimum.

A still further object of the invention is to provide a tool for bending a Pittsburgh joint flat against the surface of a duct or the like in which the tool is of a simple and economical construction.

With these and other objects and advantages in view, the invention embodies a tool, such as a brake, having a pair of parallel anvils with means for clamping a sheet of material between the anvils in which both ends of the anvils are adapted to be drawn into clamping relation with the material and a roller eccentrically mounted in a pair of standards extended upwardly from the anvils and provided with a handle by which the roller may be actuated to flatten a flange extended above the surfaces of the anvils.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a front elevational view illustrating the improved Pittsburgh joint bending brake.

Figure 2 is an end elevational view of the tool.

Figure 3 is a plan view of the tool.

Figure 4 is a detail showing the brake with the parts shown on an enlarged scale and with parts broken away illustrating the anvils between which material to be bent is clamped, other parts of the device being omitted.

Figure 5 is a cross section taken on line 5—5 of Figure 1 with the parts shown on an enlarged scale, illustrating a clamping screw in the hinged end of the anvils.

Figure 6 is a detail showing a horizontal sectional view through the hinge connection illustrated in Figure 5.

Figure 7 is a cross section through the machine taken on line 7—7 of Figure 1 showing auxiliary rollers positioned against the plate bending roller.

Figure 8 is a cross section similar to that shown in Figure 7 showing the plate bending roller in the position of bending the Pittsburgh joint or flange against the wall of the duct.

Figure 9 is a vertically disposed longitudinal section on line 9—9 of Figure 2 through one end of the brake illustrating the eccentrically positioned pins for mounting the handle and roller in the standards.

Referring now to the drawings wherein like reference characters denote corresponding parts, the improved Pittsburgh joint bending machine of the invention includes a pair of angle bars providing anvils 10 and 11, a bolt 12 for connecting the anvils at one end, a link 13 actuated by a handle 14 for drawing the ends of the anvils together at the opposite end, standards 15 and 16 mounted on the stationary anvil 11, a roller 17 rotatably mounted by pins 18 and 19 in side bars 20 and 21 of a handle 22, and auxiliary rollers 23 and 24 connected by a truss member 25 to the ends of the side bars 20 and 21, for reinforcing the intermediate portion of the roller 17, the truss member being secured to the side bars 20 and 21, with bolts 26.

The side bars 20 and 21 which are secured to ends of the rod 22 providing a U-shaped handle, are pivotally mounted with pins 27 and 28, respectively, in the standards 15 and 16 and with the roller mounted by the pins 18 and 19 in the lower ends of the bars 20 and 21 the roller is adapted to engage a Pittsburgh joint or flange 29 at the corner of a duct 30 as the roller is actuated downwardly with the handle moving downwardly from the vertical position shown in Figure 7 to the angular position shown in Figure 8. By this means the Pittsburgh joint is flattened from the position shown in Figure 7 to that shown in Figure 8 wherein the joint is bent to a nested position against a side wall 31 of the duct.

Because of the excessive force required to bend an element of this type, the roller 17 has a tendency to bend at the center and for this reason the roller is trussed with the auxiliary rollers 23 and 24 which are rotatably mounted by shafts 32 and 33 in bars 34 and 35 secured to the sides of the truss member 25.

The standards 15 and 16 are secured to the horizontally disposed flange 37 of the stationary anvil 11 with bolts 38. The pins 27 and 28 of the side bars extend into openings 39 in the standards 15 and 16 and the pins 18 and 19 extend into openings of the side bars. The roller 17, which is provided with sockets 40 in the ends into which the pins 18 and 19 extend, is adapted to be forced downwardly with considerable force. It will be understood that the pins 18 and 19 may be integral with the roller or may be provided by the ends of a shaft extended through the roller.

The inner edge of the horizontal portion 37 of the stationary anvil 11 is provided with a depending flange 41 and a similar flange 42 which extends from the inner edge of the anvil 10 is positioned to coact with the flange 41 for gripping a wall, such as the wall 43, of the duct 30 whereby the wall is adapted to be rigidly held as the Pittsburgh joint is formed from the position shown in Figure 7 to that shown in Figure 8.

The anvils are clamped at both ends whereby even and continuous pressure is applied to the wall 43 and, as illustrated in Figures 4, 5 and 6, the hinged bolt 12, which is provided with an eye 44, is pivotally mounted by a pin or bolt 45 which extends through the eye in a

slot 46 in one end of the horizontally disposed section 37 of the anvil 11. The opposite end of the bolt, which extends through an opening 47, is provided with an elongated cylindrical nut 48 having a flange 49 on the inner end and having transversely disposed openings 50 through which a rod 51 having knobs 52 and 53 on the ends extends. By this means the nut 48 is adapted to be rotated by the rod 51 to adjust the position of the anvil 10 in relation to the anvil 11. As illustrated in Figure 5, the pin 45 may be in the form of a bolt having a head 54 at one end and a nut 55 and a washer 56 on the opposite end.

The ends of the anvils at the opposite side of the brake are adjustably clamped together by the link 13 that is pivotally mounted by a pin 57 in the anvil 10 and extended through slots 58 and 59 to the handle or lever 14 and, as shown in Figure 4, with the handle 14 pivotally connected to the extended end of the link 13 by a pin 60 which is eccentrically positioned in a bifurcated cam 61 on the handle 14, whereby, with the link 13 in the slots 58 and 59 of the vertically disposed flanges 41 and 42 of the anvils, and with the end surfaces of the cam 61 bearing against the flange 42 the anvils may be drawn together against the wall 43 of the duct.

With this clamping, or locking means in combination with the adjustable bolt 12, the wall of the duct is adapted to be positively gripped continuously throughout the length thereof.

The brake is mounted on a stand 65 which extends downwardly from the stationary anvil 11 and, as illustrated in Figure 3, the lower end of the stand is provided with supporting arms 66 and 67, positioned at one side, and similar arms 68 and 69 that extend from the opposite side and that are connected to the lower end of the stand with a plate 70.

By this means a brake is provided whereby an object, such as the duct 30, in which edges are joined with a Pittsburgh joint, is adapted to be inserted in the brake with one wall between the flanges 41 and 42 of the anvils and with the Pittsburgh joint extended upwardly and upon downward movement of the handle the roller 17 is forced against the Pittsburgh joint simultaneously bending the entire joint downwardly to a nested position against a wall of the duct or other device.

In inserting material in the brake, the anvils, at one side, are adapted to be separated by releasing the latching elements 13 and 61 whereby the bolt 12 forms a hinge permitting the anvil 10 to swing about a point 71 and with the anvil 11 provided with a beveled edge 72 the anvils are adapted to be opened to facilitate inserting materials therein. At the same time, the anvils are adapted to be readily closed with the latching elements 13 and 14, and with this construction, both ends of the anvils are adapted to be adjusted to bring the inner surfaces of the flanges 41 and 42 thereof into frictional contact with material positioned between the anvils.

With the material in position and with the Pittsburgh joint extended upwardly, the handle is moved downwardly so that the roller 17 bends the flange or Pittsburgh joint with a comparatively simple operation.

Springs 73 are provided between the anvils so that these anvils automatically open when the locking devices have been released and the duct can be inserted. The present invention includes the previously described mechanism for holding the seam while the sealing is being done by the roller. Thus, the seam is sealed and while the duct is being sealed the duct is held in its proper position.

It will be understood that modifications, within the scope of the appended claims, may be made in the design and arrangement of the parts without departing from the spirit of the invention.

What is claimed is:

1. A brake including a pair of elongated horizontally disposed angle bars, the angle bars having parallel meeting and coacting edges, a U-shaped handle pivotally mounted on one of said angle bars, the axis of the pivotal mounting of the handle being on one side of a vertical plane extended between the angle bars, a roller rotatably mounted in the handle, the axis of the roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the handle is positioned, the distance of the pivotal mounting of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of said roller, whereby pivotal movement of the handle swings the roller across the meeting point of the angle bars bending a plate gripped between the angle bars to a flat position upon one of the angle bars.

2. A brake including a pair of elongated horizontally disposed angle bars, the angle bars having parallel meeting and coacting edges, means for actuating one of said angle bars for clamping a sheet of material between the bars, a U-shaped handle pivotally mounted on one of said angle bars, the axis of the pivotal mounting of the handle being on one side of a vertical plane extended between the angle bars, a roller rotatably mounted in the handle, the axis of the roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the handle is positioned, the distance of the pivotal mounting of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of said roller, whereby pivotal movement of the handle swings the roller across the meeting point of the angle bars bending a plate gripped between the angle bars to a flat position upon one of the angle bars.

3. A brake including a pair of elongated horizontally disposed angle bars, the angle bars having parallel meeting and coacting edges, adjustable means for connecting the angle bars together at one end, latching means for clamping the angle bars together at the opposite end of the brake, spaced standards extended upwardly from one of the angle bars, a U-shaped handle pivotally mounted in the standards, the axis of the pivotal mounting of the handle being on one side of a vertical plane extended between the angle bars, a roller rotatably mounted in the handle, the axis of the roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the handle is positioned, the distance of the pivotal mounting of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of said roller, whereby pivotal movement of the handle swings the roller across the meeting point of the angle bars bending a plate gripped between the angle bars to a flat position upon one of the angle bars.

4. A brake including a pair of elongated horizontally disposed angle bars, the angle bars having parallel meeting and coacting edges, a U-shaped handle pivotally mounted on one of said angle bars, the axis of the pivotal mounting of the handle being on one side of a vertical plane extended between the angle bars, a roller rotatably mounted in the handle, means for reinforcing the intermediate part of the roller, the axis of the roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the handle is positioned, the distance of the pivotal mounting of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of said roller, whereby pivotal movement of the handle swings the roller across the meeting point of the angle bars bending a plate gripped between the angle bars to a flat position upon one of the angle bars.

5. A brake including a pair of elongated horizontally

disposed angle bars, the angle bars having parallel meeting and coacting edges, a U-shaped handle pivotally mounted on one of said angle bars, the axis of the pivotal mounting of the handle being on one side of a vertical plane extended between the angle bars, a roller rotatably mounted in the handle, a reinforcing roller also rotatably mounted in the handle and positioned with the peripheral surface in contact with the peripheral surface of the former roller rotatably mounted in the handle, the axis of the roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the handle is positioned, the distance of the pivotal mounting of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of said roller, whereby pivotal movement of the handle swings the roller across the meeting point of the angle bars bending a plate gripped between the angle bars to a flat position upon one of the angle bars.

6. In a brake, the combination which comprises a mounting stand, a pair of elongated horizontally disposed angle bars, mounted on the stand, the angle bars having parallel meeting and coacting edges, one of said angle bars being stationary and the other movable, means for adjustably connecting the movable angle bar to the stationary angle bar at one end of the brake, latching means for connecting the movable angle bar to the stationary angle bar at the opposite end of the brake, a pair of standards mounted on and extended upwardly from the stationary angle bar, side bars pivotally mounted on the standards, a plate roller rotatably mounted in the side bars, a handle mounted on said side bars, the axis of the pivotal mounting of the side bars of the handle on the standards being on one side of a vertical plane extended between the angle bars, the axis of the plate bending roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the side bars of the handle are positioned, the distance of the pivotal mounting of the side bars of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of the plate bending roller, whereby, pivotal movement of the handle swings the plate bending roller across the meeting point of the angle bars bending a plate gripped between said angle bars to a flat position upon the movable angle bar.

7. In a brake, the combination which comprises a mounting stand, a pair of elongated horizontally disposed angle bars, mounted on the stand, the angle bars having parallel meeting and coacting edges, one of said angle bars being stationary and the other movable, means for adjustably connecting the movable angle bar to the stationary angle bar at one end of the brake, latching means for connecting the movable angle bar to the stationary angle bar at the opposite end of the brake, a pair of standards mounted on and extended upwardly from the stationary angle bar, side bars pivotally mounted on the standards, a plate bending roller rotatably mounted in the side bars, a handle mounted on said side bars, the axis of the pivotal mounting of the side bars of the handle on the standards being on one side of a vertical plane extended between the angle bars, the axis of the plate bending roller being positioned on the side of the vertical plane extended between the angle bars opposite to the side on which the pivotal mounting of the side bars of the handle are positioned, the pivotal mountings of the side bars of the handle including pins extended from the side bars and pivotally mounted in the standards and the rotatable mounting of the plate bending roller including pins extended from the side bars into ends of the rollers, the distance of the pivotal mounting of the side bars of the handle to the meeting edges of the angle bars being slightly greater than the distance of said pivotal mounting to the periphery of the plate bending roller, whereby, pivotal movement of the handle swings the plate bending roller across the meeting point of the angle bars bending a plate gripped between said angle bars to a flat position upon the movable angle bar.

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