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THE MANUFACTURE OF ARCH CULVERT

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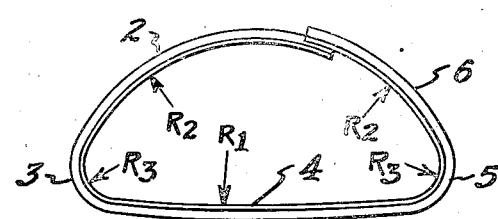
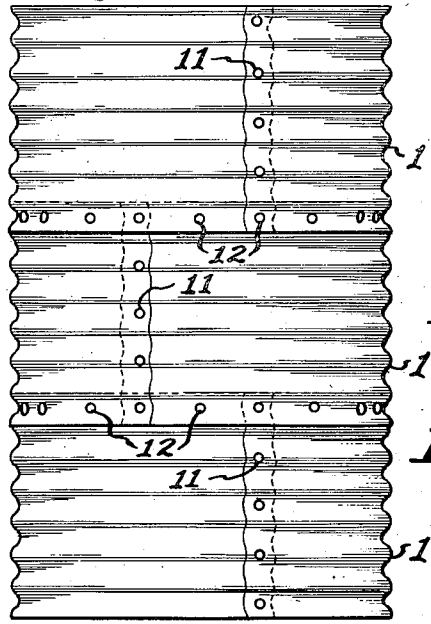
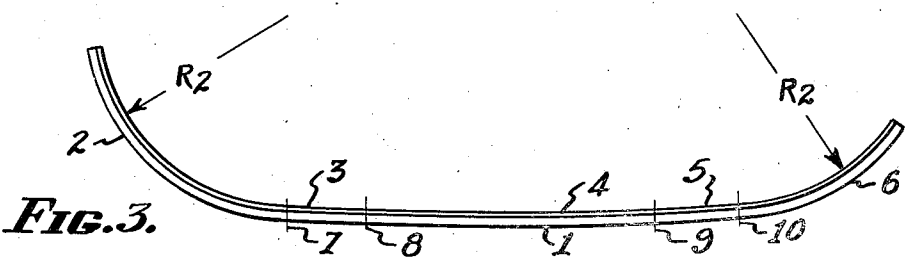
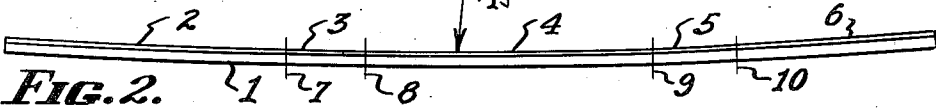
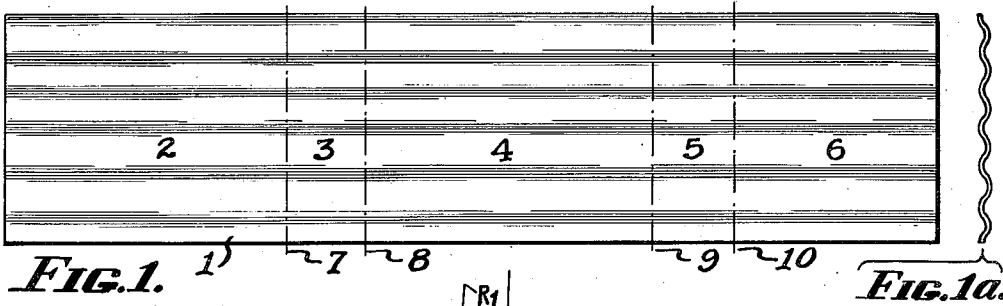


FIG. 6.

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MANUFACTURE OF ARCH CULVERTS

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3 Claims. (Cl. 113—33)

The field of utility of my invention and its principal object is the provision of a direct method for the manufacture of corrugated pipe, road drainage culvert and the like, characterized by a non-circular cross section. An example of such pipe, as shown in my drawing, is an arch shaped culvert such as that disclosed in the copending application of Howard S. Claybaugh entitled Pipe or culvert, Serial No. 303,846, filed November 10, 1939, which became Patent No. 2,286,197, patented June 16, 1942, and characterized by a bottom or base portion of generally outwardly convex form of large radius, an arch portion of generally smaller radius and connecting portions of very much smaller radius.

Hitherto the method of making such a structure has been to take corrugated metal culvert sheets, curve them, and rivet them together to make a circular, circumferentially corrugated pipe. The circular, i. e., cylindrical pipe is then placed in a press and by suitable dies is progressively deformed into the desired arch shape. This process requires two complete operations, i. e., the formation of the cylindrical pipe and the subsequent deformation thereof; and it requires two sets of tools, i. e., the pipe forming devices as one set, and the press and dies as another.

I have discovered that one of these complete sets of operations and its attendant tools can be eliminated, and that corrugated pipe or culvert of other than circular cross section and cylindrical shape can be made from corrugated culvert sheets direct, and by the use of standard culvert equipment, by the process hereinafter outlined.

The principal object of my invention and others which will be apparent to one skilled in the art I accomplish by that certain procedure of which I shall now describe an exemplary embodiment. Reference is had to the drawing wherein:

Figure 1 is a plan view of a corrugated metal culvert sheet at the start of my process.

Figure 1a is an end view thereof showing its corrugated character.

Figure 2 is an edge elevation of the sheet after the first forming operation of my process.

Figure 3 is an edge elevation of the sheet after the second forming operation of my process.

Figure 4 is an edge elevation of the sheet after the third forming operation of my process.

Figure 5 is a cross sectional view of the completed arch-shaped culvert.

Figure 6 is a plan view of the completed structure.

In following my process I take a straight or flat corrugated metal culvert sheet as shown at 1 in

Figure 1. The sheet is then divided into areas 2, 3, 4, 5 and 6 preferably by marks 7, 8, 9 and 10, which areas, in the finished structure are to have different radii of curvature, indicated in the various figures as R_1 , R_2 and R_3 . As will be evident from other figures, the area 4 is to form the bottom or base of the arch-culvert, areas 2 and 6 are to combine to form the arch, and areas 3 and 5 are to form the connecting portions between the arch and the base. The areas will be proportioned accordingly.

Employing the standard culvert forming equipment, which comprises bending or forming rolls which can be adjusted to bend the corrugated sheet to different radii as is well known, I first pass the corrugated sheet through the forming rolls to curve it slightly, or to a large radius R_1 as shown in Figure 2. The radius R_1 is the desired radius for the bottom or base as shown in Figure 4.

Next, I curve the end portions of the sheet, i. e., the areas 2 and 6 to a smaller radius R_2 , which is the radius desired for the arch, as will be clear from Figure 4. The sheet now has the shape shown in Figure 3.

Next, I curve the intermediate areas 3 and 5 to a much smaller radius R_3 , which is the radius desired for the base-and-arch-connecting portions. This causes the areas 2 and 6 to meet and overlap as shown to form the arch, and the structure is as shown in Figure 4.

The overlapping edges of areas 2 and 6 may be riveted as shown at 11 in Figures 5 and 6.

Sections of culvert formed as above described may be joined together to form the elongated pipe of Figure 6, by telescoping in the usual way and riveted together as at 12 in that figure. It will be seen that I prefer so to proportion areas 2 and 6 that the overlap does not occur in the center or apex of the arch. In forming an elongated pipe I am thus able to stagger the overlapped portions as shown in Figure 6.

Modifications may be made in my invention without departing from the spirit of it. It will be clear that other cross sectional shapes may be made following the principles of my invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A process of producing non-circular corrugated pipe which comprises taking a longitudinally corrugated sheet, dividing it into five contiguous areas, passing the sheet through forming rolls and curving it generally to a large radius as desired for an outwardly convex base, then curving end areas to a smaller radius as desired for

an arch, then curving areas intermediate the end and base areas to still smaller radii to cause the end sections to meet at their edges above the base to form an arch, and attaching said edges.

2. In a process of producing arch-shaped circumferentially corrugated pipe, the steps of taking a longitudinally corrugated metal sheet and curving it in corrugated curving rolls, by passing it into the said rolls while the rolls are adjusted in such manner as to curve end portions of the sheet to a radius desired in the arch portion of the pipe, the length of the end portions so curved being additively equal to the circumferential length of the arch portion with allowance for overlap, then with appropriate adjustment of the curving rolls, curving short, inwardly adjacent portions of the sheet to a very much smaller

radius whereby to cause the previously curved arch portions of the pipe to come together and lap forming the arch itself, and thereafter attaching the lapped portions.

3. The process claimed in claim 2 including an initial curving step of passing the sheet through the curving rolls set to curve it to a radius substantially larger than the radius of the arch, the subsequent curving operations for the arch portions constituting recurving operations practiced upon end portions of the sheet, the said initial curving operation serving to configure the central portion of the sheet so as to provide an outwardly convex base portion for the ultimate arch-shaped pipe.

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