

UNITED STATES PATENT OFFICE.

LEWIS F. BETTS, OF NEW YORK, N. Y.

METALLIC TUBE.

SPECIFICATION forming part of Letters Patent No. 656,241, dated August 21, 1900.

Application filed December 26, 1899. Serial No. 741,563. (No model.)

To all whom it may concern:

Be it known that I, LEWIS F. BETTS, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Metallic Tubes, of which the following is a specification.

The invention relates to the production of sheet-metal tubes, particularly such as are used in tubular lanterns for supplying air to the burner.

The object of the invention is to provide a construction whereby such tubes, with the bends or elbows therein, may be easily and cheaply made and the required tightness and strength secured without the labor and expense of soldering.

It consists of a sheet-metal tube of rectangular cross-section formed of two parts, each shaped from a blank and extending around the elbows, one portion forming the outer faces and sides of the tube and the other forming the inner face, the two portions being joined along the inner angles of the tube by pressure in suitable dies analogous to double-seaming.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is a face view of a finished tube with the usual elbows. Fig. 2 is a face view of a portion of a blank from which the main portion of the tube and elbow is formed. Fig. 3 is a corresponding section taken on the line 3 3 in Fig. 2. Fig. 4 is a sectional view showing the same portion at a further stage of the forming. Fig. 5 is a longitudinal section through the same after bending to shape the elbow. Fig. 6 is a face view of the blank for the inner face portion. Fig. 7 is a cross-section on the line 7 7 in the preceding figure. Fig. 8 is a corresponding view showing the same portion ready to be applied, and Fig. 9 is a longitudinal section through the bend at the elbow. The remaining figures are on a larger scale. Fig. 10 is a cross-section corresponding to Figs. 4 and 8, showing both portions in position for assembling. Fig. 11 shows the same parts assembled and ready for the dies to compress the joints. Fig. 12

is a corresponding section through the completed and finished tube.

Similar letters of reference indicate the same parts in all the figures.

A is a portion of a blank from which the main part of the tube is formed by bending at right angles along the lines $a a$ to produce a channel-shaped structure having the continuous back A' and sides $A^2 A^2$, offset slightly at $A^3 A^3$, and having the narrow fins or flanges $A^4 A^4$. At each elbow portion the sides are cut away by the blanking-dies to produce the notches $a^2 a^2$, shaped to form the curved wings $A^5 A^5$, which, when the back A' is bent on the line a' to form the elbow, lie one within the other and slightly lapped to make a close joint at the angle. The flanges A^4 are beveled at a^3 on an angle which will bring them into close contact when the bending is complete. The back A' , with the sides $A^2 A^2$ bent to form the elbows, is now ready to receive the portion comprising the inner face of the tube.

B is the blank for the inner face portion, having the continuous part B' and strips $B^2 B^2$, offset at B^3 and notched at b' to allow bending on the transverse line b to form the inner angle of the elbow. The strips B^2 are folded back upon themselves, as shown at B^4 in Fig. 8, and extend a little beyond the inside face of B' . It will be understood that the blank B is of such length and so notched at the two elbow-points as to match, when shaped as above described, to the open face of the main portion and complete the tube.

The parts are assembled by carefully matching the inner face B' to the offsets $A^3 A^3$, the fins $A^4 A^4$ being received within the folds B^3 . Both portions are then held in place against the edge of a flat mandrel plate or table M, matching the part B' and filling the space between the strips B^2 . The dies N N above and below the table are forced against the joint by suitably-applied power and the several thicknesses firmly compressed. The dies N N cover the whole length of the joint, so that one movement completes the joint along both lines, and as the parts to be acted upon are supported by the edge of the table no interior mandrels or formers are required. The dies carry each a slightly-thickened portion N' , serving to curl inward the edge of the

strip B², and thus smoothly finish the joint, as will be understood. The tube thus constructed is self-bracing and eminently strong. Strains tending to straighten the elbows are resisted by the metal of the inner face and the close grasp of the seams, and strains in the opposite direction tending to buckle the main portion are resisted by the stiffness of the channel construction.

When formed by accurately-cut dies, the parts match snugly together and are easily assembled and locked.

Modifications may be made in the forms and proportions within wide limits without departing from the principle of the invention or sacrificing its advantages. The blanks may be shaped to produce an elbow of any desired angle within certain limits, and the invention may be applied to the manufacture of tubes for other purposes than lanterns.

I claim—

1. The metal tube described of rectangular cross-section, consisting of a main portion bent to form the back and sides in channel form from a single piece of sheet metal, and an inner face portion formed from a single piece of sheet metal and having folded edge strips receiving and holding the free edges of said main portion and completing the tube, all combined substantially as herein specified.

2. The tubular sheet-metal elbow described, consisting of a main tube portion in one piece of channel form having a continuous back forming the outer angle of the elbow, and the sides cut away to allow bending at that point, and a continuous inner face portion bent to form the inner angle of the elbow and having folded edge strips receiving and holding the free edges of said main portion, all combined substantially as herein specified.

3. In a tubular sheet-metal elbow, the main tube portion in channel form of rectangular cross-section consisting of the continuous back A' common to both members of the elbow, the sides A² A² cut away at a² a² to allow said back to bend at such point and to form the wings A⁵ A⁵, the flanges A⁴ A⁴ on said sides having the offsets A³ A³, in combination with the inner face portion B' common to both members of the elbow, the strips B² B² and folds B³ thereon receiving said flanges, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

LEWIS F. BETTS.

Witnesses:

CHARLES R. SEARLE,
VINCENT L. COOK.