T. D. DALLMEYER.

METHOD OF MAKING LADDERS.

APPLICATION FILED JULY 13, 1914.

1,196,667.

Patented Aug. 29, 1916.

2 SHEETS—SHEET 1.

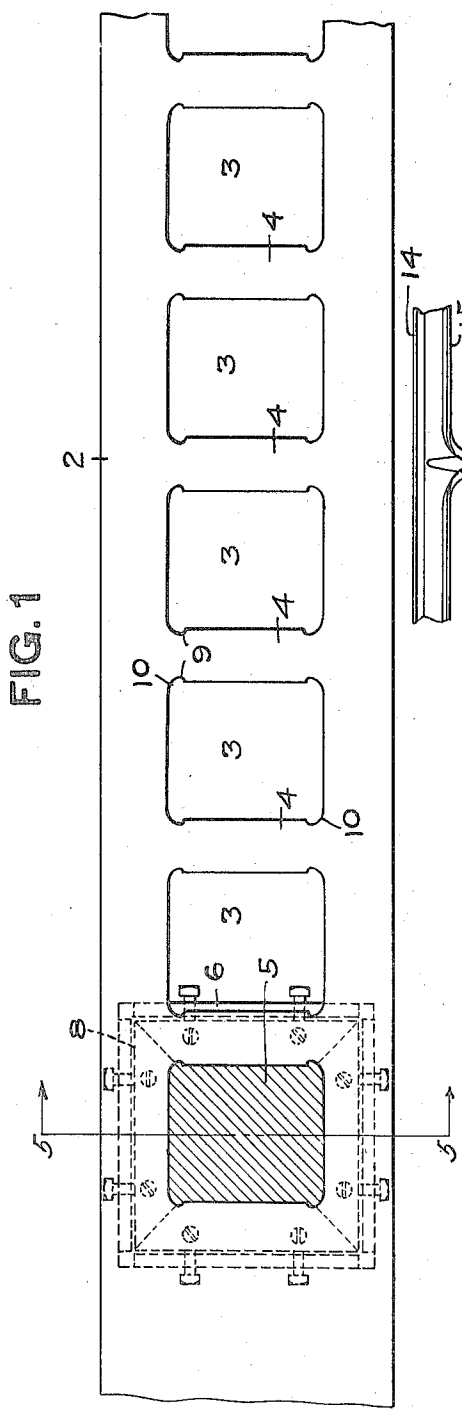


FIG. 1

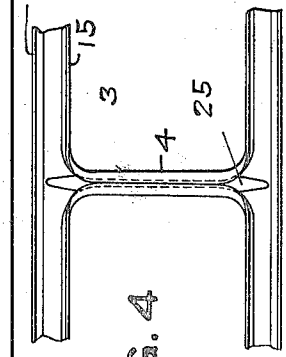


FIG. 4

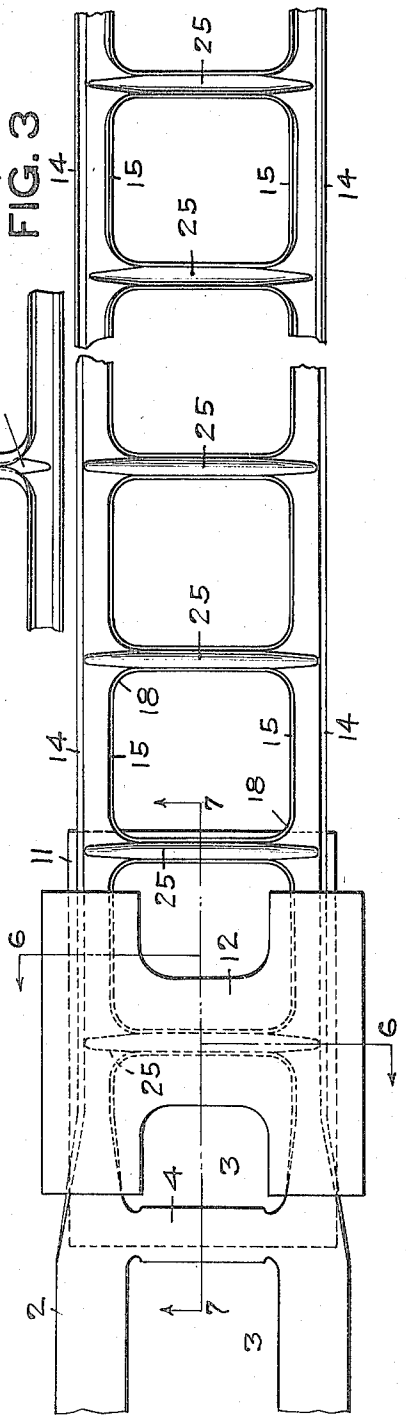


FIG. 3

FIG. 2

WITNESSES.

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2 SHEETS—SHEET 2.

FIG. 5

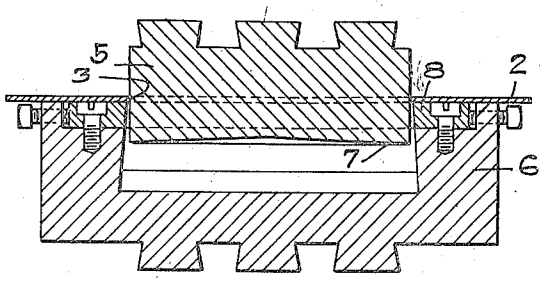


FIG. 6

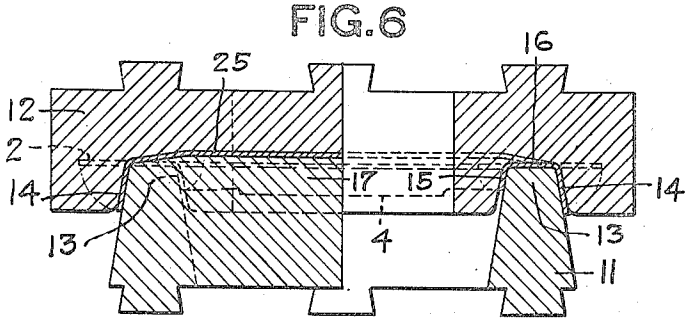


FIG. 7

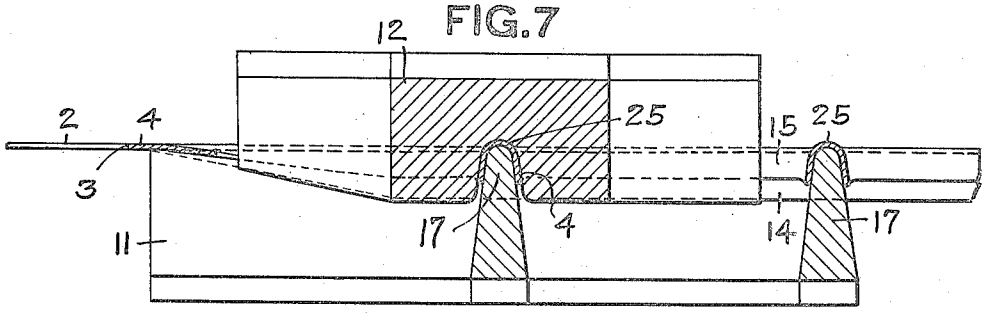
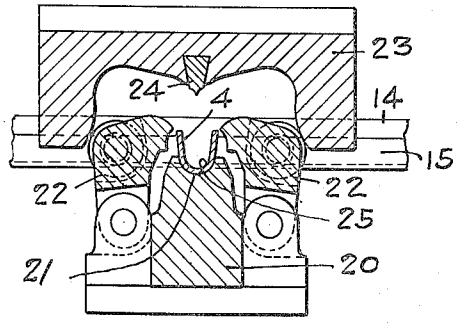


FIG. 8

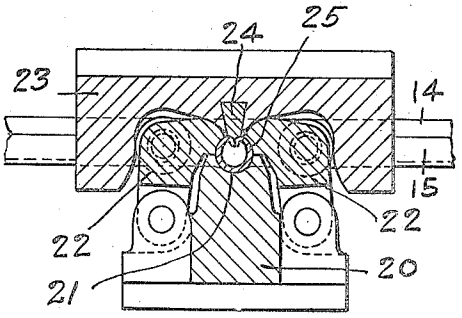


WITNESSES.

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FIG. 9



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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING LADDERS.

1,196,667. Specification of Letters Patent. Patented Aug. 29, 1916.

Application filed July 13, 1914. Serial No. 850,782.

To all whom it may concern:

Be it known that I, THOMAS D. DALLMEYER, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Methods of Making Ladders; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to method of making metallic ladders.

The object of my invention is to provide a simple method of forming from sheet metal ladders which are strong and rigid in construction and adapted particularly for use on freight cars.

My invention consists, generally stated, in punching or cutting out a series of spaced openings in a metal sheet, bending the metal between the openings to form the rounds, and so bending the sides as to form a strong and rigid construction.

In the accompanying drawings, Figure 1 is a plan view of a portion of a ladder blank showing the die for cutting the openings in section; Fig. 2 is a like view showing the rounds bent up and the die for forming same together with the bending of the metal along the sides; Fig. 3 is an inside view of a portion of the ladder showing the manner in which the metal is bent to form the rounds and the strengthening ribs; Fig. 4 is the inside view of portion of the finished ladder; Fig. 5 is a cross-section on the line 5—5, Fig. 1; Fig. 6 is a cross-section on the line 6—6, Fig. 2; Fig. 7 is a section on the line 7—7, Fig. 2; Figs. 8 and 9 are sectional views showing the manner of bending the rounds to finished shape.

In the drawings, the numeral 2 designates a sheet of metal of suitable gage to give the required strength and rigidity, and said sheet has the openings 3 cut therein at intervals leaving the webs 4 between the several openings. These openings are cut in by suitable dies, the numeral 5 indicating the upper die and the numeral 6, the lower die. The upper die has the knife portion 7, and the lower die has the knives 8 secured thereto. The openings 3 are cut with the slight recesses 9 at the corners, and the corners are also rounded as at 10.

The next step of the operation is the bending of the web-portions 4 into U-shape as indicated in Fig. 2. This is done by suitable dies, the lower die being indicated by the numeral 11, and the upper die by the numeral 12. The lower die has the projecting portions 13, which bend the metal along the sides to form the outer flange 14 and the inner flange 15, as clearly indicated in Fig. 6. Fig. 6 is the section on the line 6—6, Fig. 2, and to the right is shown the manner in whch the flanges 14 and 15 are formed, the upper die having the recessed portion 16 to receive the projection 13 of the lower die. To the left of Fig. 6, the section is taken through that portion of the die which forms the round into U-shape, and for this purpose the lower die has the projection 17 at right angles to the projection 13, as clearly indicated in Fig. 7. By the lowering of the die 12, the metal is forced to take the position indicated in Fig. 6, and this is shown in plan view in Fig. 2. The corners are likewise rounded by these dies as at 18, and at the same time, the strengthening ribs 25 are struck up by the dies 11 and 12 during the bending of the web-portions 4 to U-shape. When the metal has been bent in this manner, the final operation of bringing the rounds to finished shape is accomplished by the dies illustrated in Figs. 8 and 9. The lower die 20 has the seat 21 to receive the U-shape portion, and said die is provided with the movable formers 22, which are adapted to be moved toward each other in the position indicated in Fig. 9 so as to bend the metal into a substantially round form in cross-section; and in order to turn in the ends so that there will be no rough parts or projections to injure or cut the hands of the person using the ladder, the upper die 23 is provided with the projection 24 which is adapted to engage the metal and bend the ends inwardly as clearly indicated in Fig. 9. In this way, I provide a simple and efficient method of forming from a single piece of sheet metal a ladder which is strong and rigid, and at the same time, neat in appearance, the round being formed in such a manner as to present a perfectly smooth surface to the hand, and at the same time, the metal is so bent and shaped as to increase the rigidity and neatness of appearance. These ladders are particularly adapted for use on

freight cars, and being formed from one piece of metal, there is no liability of the parts working loose.

What I claim is:

1. The method of forming ladders consisting in cutting out and removing sections of metal thereby forming a series of spaced openings in a sheet of metal, leaving web portions between said openings, bending the web portions into U-shape, and finally bending said web portions until the edges meet, and turning in said edges.

2. The method of forming ladders consisting in cutting a series of spaced openings in a sheet of metal, leaving web-portions between said openings, bending the web-portions into U-shape, and at the same time striking up ribs extending beyond said web-portions, and then bending said web-portions until the edges meet, and turning in said edges.

3. The method of forming ladders consisting in cutting spaced openings in a sheet of metal, leaving web-portions between said openings, bending the sides of said sheet to form an outer flange and an inner flange surrounding said openings, and simultaneously bending said web-portions into U-shape, bending said U-shape until the edges meet, and finally turning in said edges.

In testimony whereof, I the said THOMAS D. DALLMEYER, have hereunto set my hand.

THOMAS D. DALLMEYER.

Witnesses:

ROBT. D. TOTTEN,

JOHN F. WILL.