No. 783,952. PATENTED FEB. 28, 1905.

C. J. W. HAYES.

METHOD OF EXPANDING METAL.

APPLICATION FILED JUNE 9, 1904.

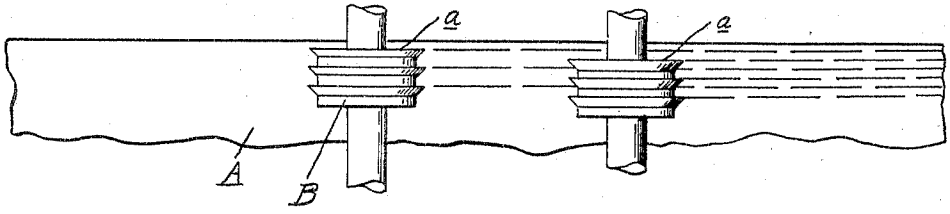

FIG. 1.

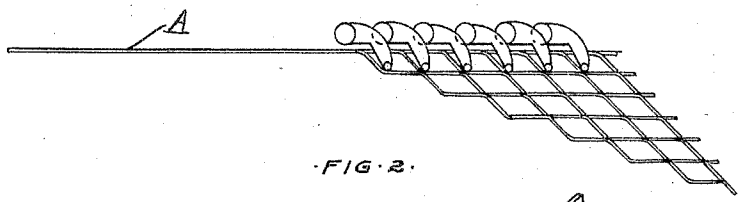

FIG. 2.

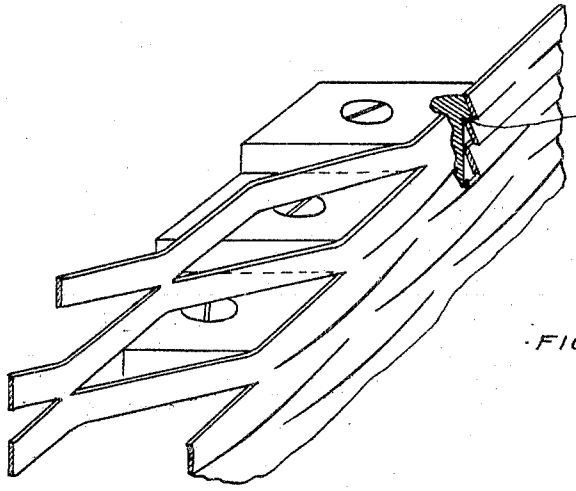

FIG. 3.

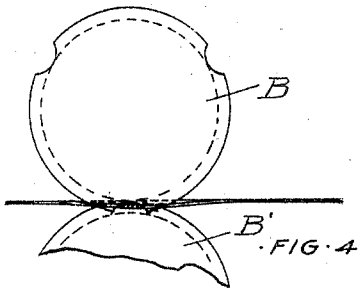

FIG. 4.

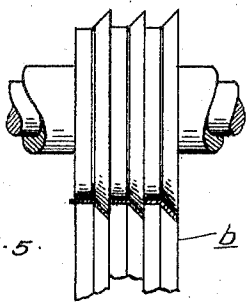

FIG. 5.

WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES J. W. HAYES, OF DETROIT, MICHIGAN, ASSIGNOR TO FRANK P. CLEVELAND, TRUSTEE, OF DETROIT, MICHIGAN.

METHOD OF EXPANDING METAL.

SPECIFICATION forming part of Letters Patent No. 783,952, dated February 28, 1905.

Application filed June 9, 1904. Serial No. 211,777.

To all whom it may concern:

Be it known that I, CHARLES J. W. HAYES, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of Expanding Metal, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to the manufacture of expanded metal; and it consists in the improved method of manufacture whereby the product is formed more expeditiously, with lesser expenditure of power, and with longer life of the machine employed.

Heretofore metallic sheets have been expanded by different methods, one of which is to first slit the sheet and subsequently to expand it by drawing the opposite edges of the sheet apart. Another method employed is to simultaneously cut and expand the sheet by dies and punches. Both methods have their peculiar disadvantages and objections, which it is the object of the present invention to overcome. In particular the method of expanding by drawing apart the edges of the sheet has the disadvantage that the sheet must be slitted in a peculiar manner, the different slits running at angles to each other instead of being arranged parallel. Moreover, the expanding is not as satisfactory by this method as where the metal is turned by mechanical pressure. The method of simultaneously cutting and expanding the sheets has the disadvantage that a considerable force is required to actuate the series of punches required for this operation. Furthermore, the length of the expanded sheet is dependent upon the number of punches in the usual type of machine where the sheets are fed across the machine and is therefore necessarily limited.

With my improved method the metallic sheet is first slitted longitudinally and in any length desired, and is subsequently expanded by lateral pressure upon the individual strands. During the slitting operation the sheet is simultaneously intended to deflect one edge of each strand, and in the subsequent operation of expanding these deflected strands form shoulders for holding the unexpanded portion of the sheet during the operation on another portion of the sheet.

In the drawings, Figure 1 is a diagrammatic plan illustrating the first step in the manufacture of the expanded metal. Fig. 2 is a plan view illustrating the second step in the process. Fig. 3 is a perspective view illustrating the manner of holding the slitted sheet during the operation of expanding. Fig. 4 is a longitudinal section through a portion of Fig. 1. Fig. 5 is a cross-section through the cutter.

In the first step of the process a sheet of metal, such as A, is slitted. This is preferably accomplished by passing it between pairs of rollers B and B′, which are formed of a series of cutting-disks *a* and *b*. These disks are formed to simultaneously slit the metal and to depress one edge of the slitted portion, as illustrated in Fig. 5. The length of the individual slits corresponds to the length of the strands in the meshes of the expanded sheet, and, if desired, the periphery of the disks *a* may be divided into a plurality of sections, each corresponding in length to the strands. Thus the sheet A may be fed between the rolls B and B′, with the result that it is uniformly slitted and indented. In the second step of the process the slitted sheet is expanded by lateral pressure upon the individual strands. This is preferably accomplished by intermittently feeding the slitted sheet to project beyond the stepped abutment and then simultaneously applying pressure to the strands adjacent to the several steps in the abutment. This is preferably applied at substantially the center of each strand and has the effect of forming an angular bend at the point of bearing and also bending the strand over the end of its respective abutment. As the metal has already been slitted, it is obvious that the slightest pressure is required to bend the strands. To hold the slitted sheet during this expanding operation, the stepped abutment is preferably formed with a series of shoulders *c*, each of which is adapted to engage with a

projecting edge of a strand immediately adjacent to the one that is being operated upon. Thus the strands are held in accurate alinement with an abutment, which insures accurate bending.

From the description above given it will be understood that the expanding of the sheet is accomplished by successive steps, in each of which an oblique series of strands is operated upon. It is further to be observed that for each succeeding operation of expanding the sheets longitudinally thereof the detents equal the length of one strand. Thus the length of the sheet is unlimited, being determined merely by the number of successive expanding operations.

Another advantage of this method of expanding is that the meshes may be bent to a small or great extent, as desired, by merely changing the degree of movement of the expanders or lateral pressure.

What I claim as my invention is—

1. The process of forming expanded metal which consists in first slitting the sheet to form a parallel series of strands, and inducting a portion of each strand and subsequently expanding a successive series of strands transversely to the plane of the slitted sheet.

2. The process of expanding metal which consists in first slitting the sheet to form parallel series of strands, and indenting a portion of each strand and in subsequently expanding successive oblique series of strands transversely to the plane of the slitted sheet.

3. The process of forming expanded metal which consists in first slitting the sheet to form parallel series of strands and in subsequently expanding by lateral pressure applied transversely to the plane of the slitted sheet to each individual strand at a point intermediate to the ends thereof.

4. The process of forming expanded metal which consists in first slitting the sheet to form parallel series of strands and in subsequently expanding successive oblique series of strands by lateral pressure applied to each individual strand transversely to the plane of the slitted sheet at a point intermediate to its ends, whereby an angular bend is formed in the strand at the point at which the pressure is applied.

5. The process of forming expanded metal which consists in slitting a continuously-fed sheet to form parallel series of strands, and indenting a portion of each strand, and subsequently expanding said sheet in successive steps.

6. The process of forming expanded metal which consists in slitting and indenting a sheet to form parallel series of strands and having one edge of each form a projecting shoulder and in subsequently expanding said strands by lateral pressure applied to each, and in holding the adjacent unexpanded strands by engagement with its said projecting shoulder.

7. The process of forming expanded metal which consists in slitting the sheet to form parallel series of strands and indenting a portion of each strand and in subsequently intermittently feeding said sheet longitudinally and in successively expanding the strands alternately with the feeding movement.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES J. W. HAYES.

Witnesses:

JAS. P. BARRY,

H. C. SMITH.