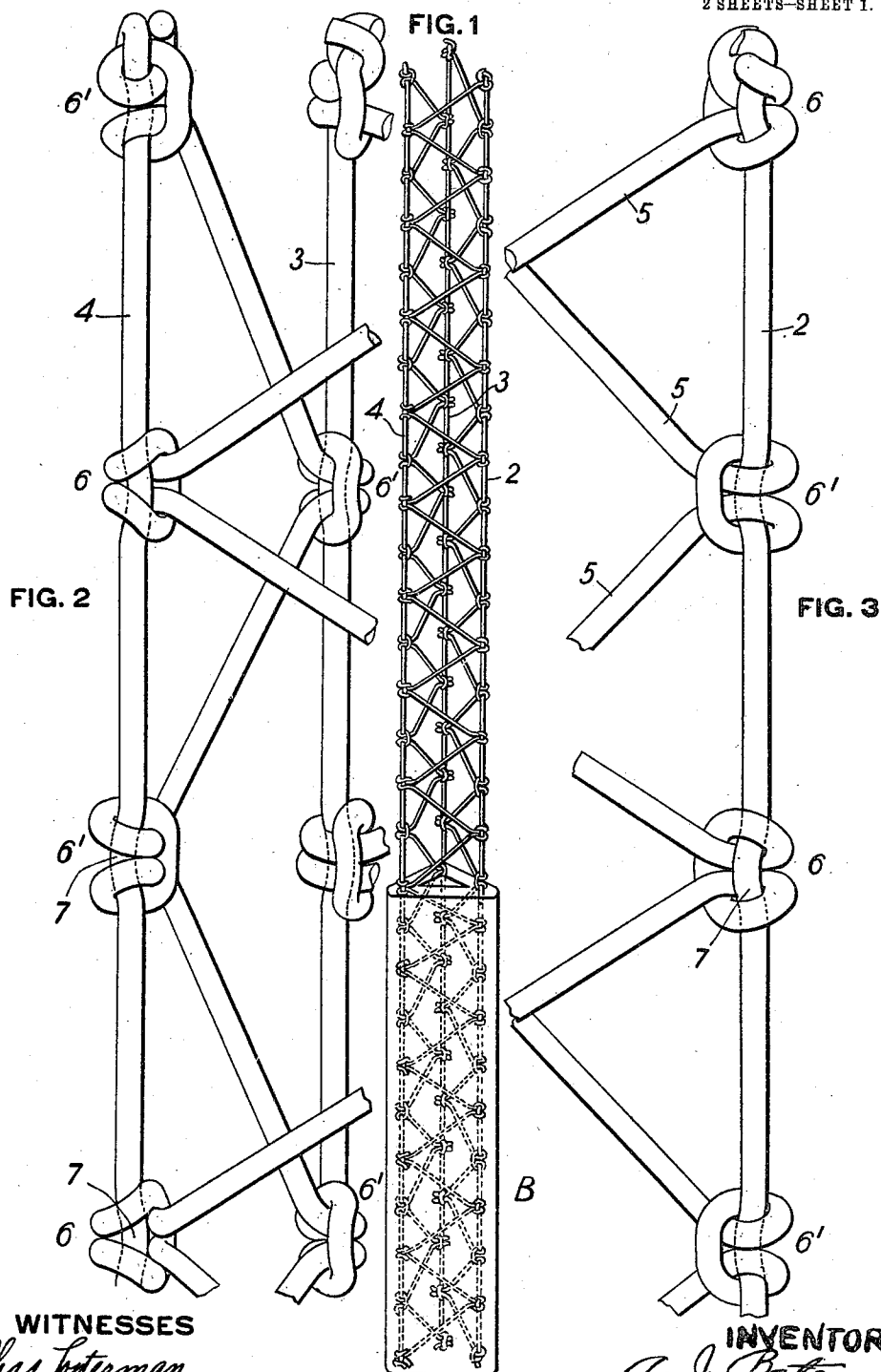


A. J. BATES.
METHOD OF FORMING METAL STRUCTURES.
APPLICATION FILED AUG. 2, 1911.

1,011,104.

Patented Dec. 5, 1911.

2 SHEETS—SHEET 1.



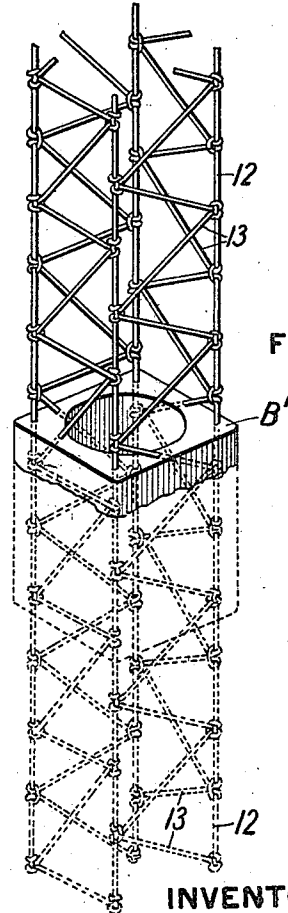
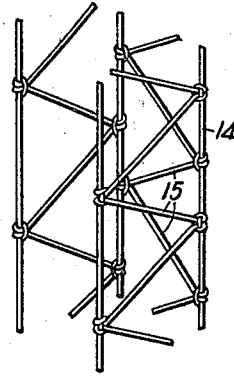
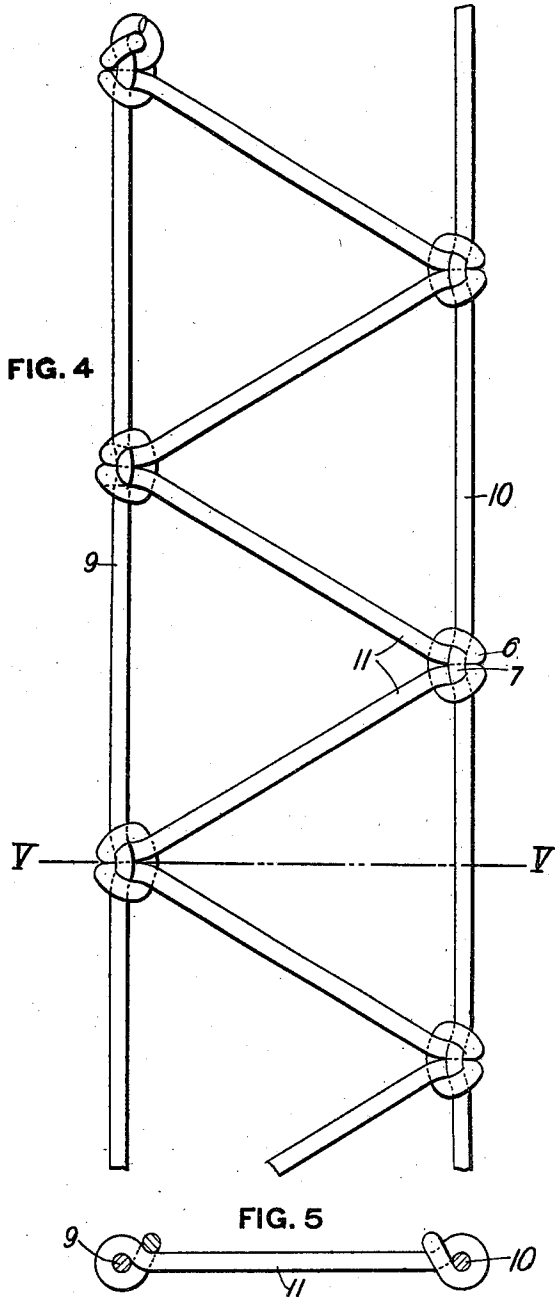
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UNITED STATES PATENT OFFICE.

ALBERT J. BATES, OF CHICAGO, ILLINOIS.

METHOD OF FORMING METAL STRUCTURES.

1,011,104.

Specification of Letters Patent.

Patented Dec. 5, 1911.

Original application filed July 17, 1909, Serial No. 508,199. Divided and this application filed August 2, 1911. Serial No. 642,020.

To all whom it may concern:

Be it known that I, ALBERT J. BATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Method of Forming Metal Structures, of which the following is a specification.

My invention relates to the manufacture of metal structures usable as fence posts, telegraph, telephone, electric light, and other poles, and also as a reinforcement for concrete and for various other purposes, as set forth in my co-pending application, Serial No. 508,199, filed July 17, 1909, for metal structure, of which this is a divisional application; and the object of this invention is to provide an improved method of forming structures of this character having great strength and rigidity in proportion to the weight of the metal used whereby an efficient structure can be obtained at a cost not exceeding that of wood, and consequently permitting the use of such metal structures as a substitute for wood.

The nature of my invention will be best understood by reference to the accompanying drawings in which I have shown a number of different metal structures as made in accordance with my improved method, it being premised, however, that the method forming this invention is adapted for use in forming other articles within the spirit and scope of the appended claims.

Referring to the drawings forming part of this specification, Figure 1 is a perspective view showing a post or pole structure constructed in accordance with my improved method. Figs. 2 and 3 are detail views of portions of the structure shown in Fig. 1. Fig. 4 is an elevation showing a modified form of structure made in accordance with my improved method. Fig. 5 is a section on the line V—V of Fig. 4. Figs. 6 and 7 are perspective views showing portions of two other forms of structures made in accordance with my improved method.

In forming a fence post like that shown in Figs. 1, 2 and 3, the post is in the form of a frame, triangular in cross section, and having three parallel longitudinal metal rods 2, 3 and 4. These parallel rods are bound together so as to form panels by means of truss rods which extend in zig-zag fashion back and forward between each adjacent pair of parallel rods. The diag-

onal or zig-zag truss rods are preferably continuous from end to end, although complete continuity is not essential when broadly considered. Each truss rod 5 in the apices of the angles is bent into the form of a double loop 6 of the shape shown in the drawings and the longitudinal rods 2, 3 and 4 are passed through the respective loops thus formed.

In constructing the post in accordance with my improved method, the truss rods are first prepared by bending in zig-zag form and providing the loops in the apices as above described, and the parallel rods are then threaded through the eyes of the loops.

In the construction shown in Figs. 1, 2 and 3 of the drawings, there are three panels, each made up of a single zig-zag truss rod constructed as above described, and in assembling the several panels, each parallel rod passes through the eyes of two sets of loops of the truss rods and the eyes or loops of these respective rods alternate with one another, as shown at the eyes 6, 6'. After the parts have been thus assembled in manufacturing the posts in accordance with this method, a strong outward pull is then exerted on the longitudinal rods in a direction at right angles to their length, the pull being applied at the eyes of the truss rods. The effect of this is to form in the parallel rods at the eyes of the truss rods, short kinks or bends 7 and also to stretch the metal of the truss rods somewhat so as to straighten them and set the loops tightly on the longitudinal rods.

The stretching is carried somewhat beyond the elastic limit of the truss rods so that they are made very rigid and are bound firmly upon the parallel rods so as to effectually prevent their being displaced, the whole structure in this way being formed into a rigid and practically unitary device.

The so-formed post is triangular in cross section and each of the panels formed by the truss rods is composed of triangular sections thereby making a structure which is not only triangular in its general outline, but which is composed wholly of triangularly arranged elements. The truss effect thus produced contributes greatly to the rigidity of the structure since all these elements are subjected only to tension and compression strains, and the structure therefore possesses great resistance to any change in

its form, the principle involved being the use of triangles, which, as is well known, cannot change their shape without a change in length of at least one of their members.

5 The act of stretching the truss rods beyond their elastic limit puts a permanent set in them which leaves the bodies of the truss rods perfectly straight and the form given the loop knots by which they are engaged with and secured to the longitudinal rods is such, (as will be seen from Fig. 1 of the drawings) that the axes of the truss rods intersect the axes of the longitudinal rods. By reason of this construction it will
10 be readily seen that the strains are in direct lines without any tendency to distort the structure.

When such structure is employed as a fence post, telegraph pole, or other structure which is to be fixed in the ground, it is desirable in some cases to provide it with a base formed of concrete or other plastic material, such, for example, as is shown at B in Fig. 1. This base is shown as consisting of a hollow triangular shell in which the diagonal truss rods are embedded. The provision of this shell does not add greatly to the weight of the structure, while it increases very largely the surface area of the buried portion of the structure which is effective as a resistance bearing for the earth. The shell also protects the metal of the post from corrosion. This shell may, however, be dispensed with, when desired
20 and, instead of extending the shell entirely to the lower end of the structure as shown in Fig. 1, it may, as shown at B' in Fig. 7, surround only a part of the buried portion of the structure.

40 In Fig. 4 I have shown another form of construction in which only two parallel longitudinal rods 9 and 10 are employed, these two rods being connected by a truss rod 11 which is arranged and is connected to the longitudinal rods in the same manner as the truss rods 5 shown in Figs. 1, 2 and 3. This form of construction is well adapted for use as a metal reinforcement of concrete constructions and it may also be used as a
45 fence post, the rods employed being heavier when found necessary or desirable than those used in the construction shown in Figs. 1, 2 and 3.

55 In the construction illustrated in Fig. 7, four parallel longitudinal rods 12 are employed which are connected by truss rods 13 of the same character and arrangement as in the preceding figures. The so-formed structure is in the form of a hollow rectangle composed of four panels, the loops
60 connecting the truss rods with the longitu-

dinal rods being in staggered relation to form triangles.

In the construction shown in Fig. 6, longitudinal truss rods 14 are employed as in Fig. 7, but the truss rods 15 are omitted in one side of the structure, this side being left open.

It will be readily understood that structures employing the basic features of the method forming this invention may be made having more than four longitudinal rods, each adjacent pair of such rods being connected by truss rods in the manner herein described.

75 The advantages of my invention will be appreciated by those skilled in the art. By employing my improved method, posts and other structures can be manufactured at a comparatively low cost, it being possible to use rolled metal products entirely.

The structure can be made of various sizes or lengths according to the purpose for which it is desired to use it, and the weight is exceedingly low in proportion to the
85 strength and rigidity of the structure.

I claim:—

1. The method of making metal structures, which consists in forming zig-zag truss rods with loops at the apices of the angles of the rods, threading longitudinal rods through the loops, pulling the longitudinal rods outwardly and stretching the truss rods.

2. The method of making a metal structure, which consists in connecting longitudinal rods with cross rods, applying outward pressure to the longitudinal rods to stretch the cross rods and set them upon the longitudinal rods.

3. The method of making a metal structure, which consists in applying looped cross rods to longitudinal rods, applying outward pressure to the longitudinal rods adjacent to the loops of the cross rods, thus tightening the loops and setting them upon the longitudinal rods.

4. The method of making metal structures, consisting in forming zig-zag truss rods with loops in the apices of the angles, threading longitudinal rods through the loops, pulling the longitudinal rods outwardly and stretching the truss rods beyond the elastic limit of the material forming the rods to thereby tighten the loops upon the longitudinal rods.

In testimony whereof, I have hereunto set my hand.

ALBERT J. BATES.

Witnesses:

F. B. LEYNS,
A. TUTTLE.