C. W. RICE & C. W. DAKE.

PROCESS OF FORMING EXPANDED RETICULATED CONSTRUCTIONS.

APPLICATION FILED APR. 12, 1915.

1,215,061.

Patented Feb. 6, 1917.

3 SHEETS—SHEET 1.

FIG 1

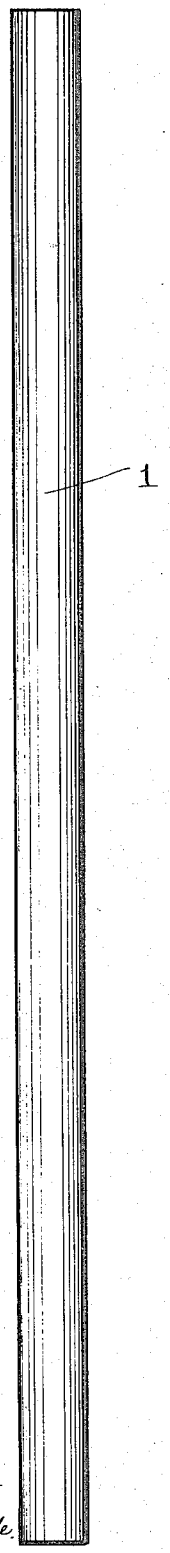


FIG 2

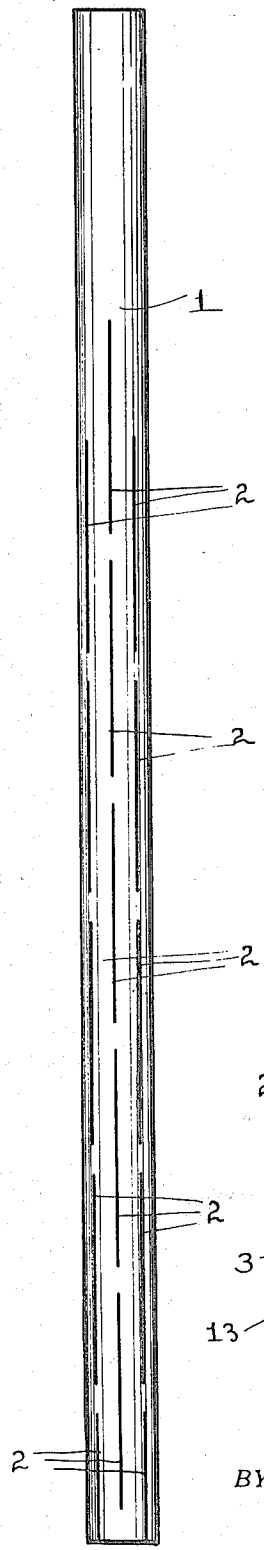
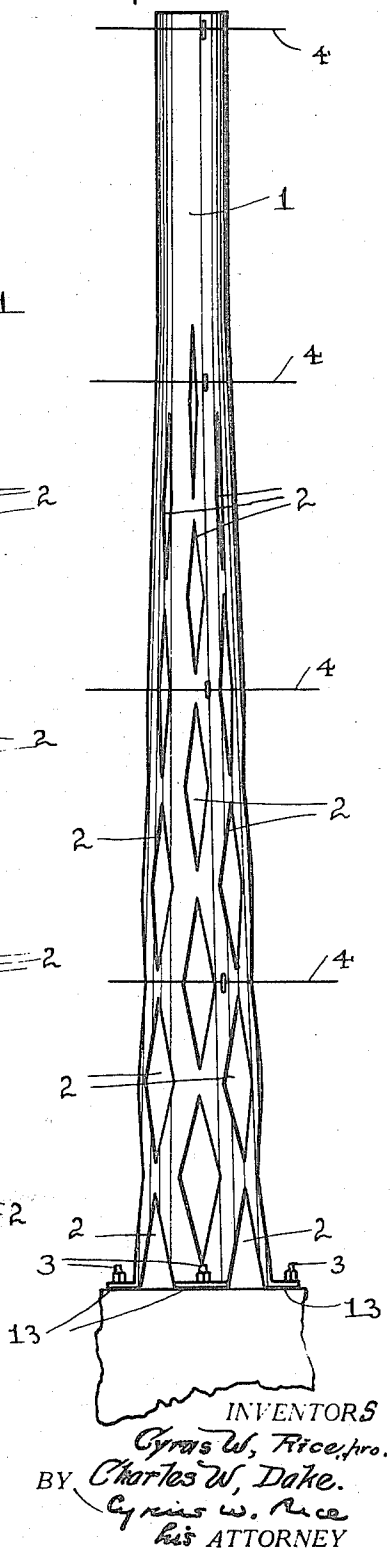


FIG 3



WITNESSES:
R. D. Grant
Garson Taggart
Henrietta Vander Myde.

INVENTORS
Cyrus W. Rice, pro. se.
BY Charles W. Dake.
Cyrus W. Rice
his ATTORNEY

C. W. RICE & C. W. DAKE.

PROCESS OF FORMING EXPANDED RETICULATED CONSTRUCTIONS.

APPLICATION FILED APR. 12, 1915.

1,215,061.

Patented Feb. 6, 1917.

3 SHEETS—SHEET 2.

FIG 5

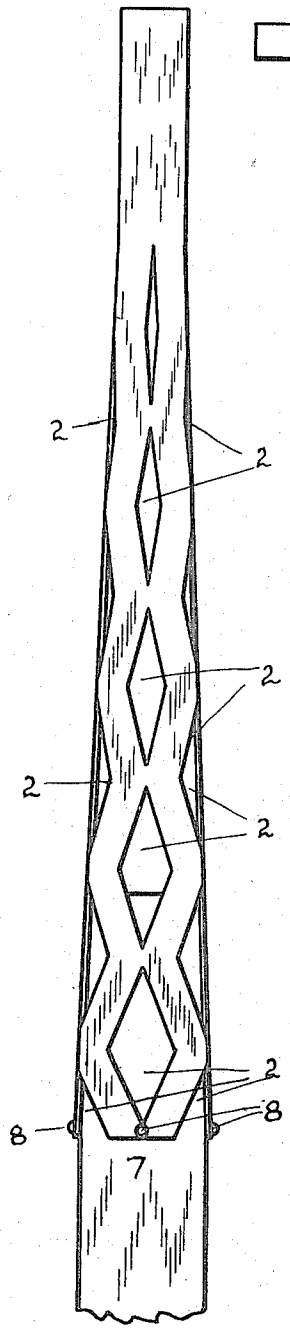


FIG 4

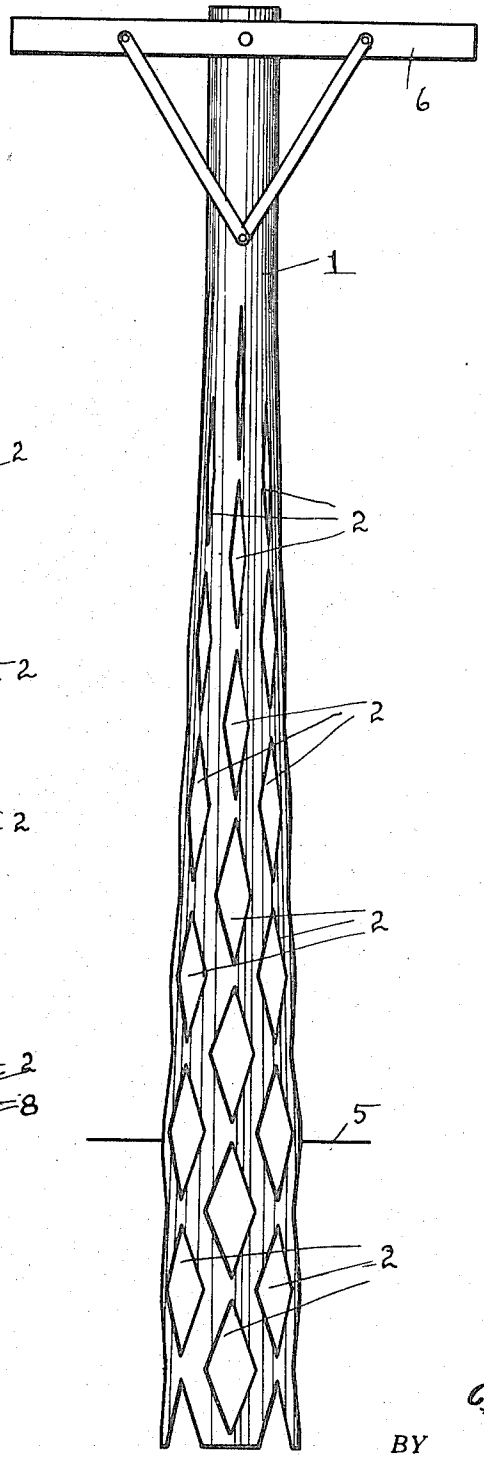


FIG 7

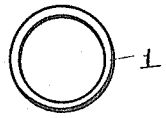


FIG 8

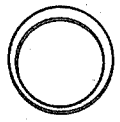


FIG 9



FIG 10

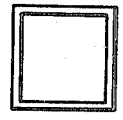


FIG 11

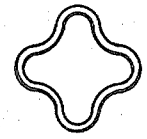
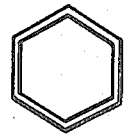


FIG 12



WITNESSES:
P. D. Grant
Garson Taggart
Henrietta Vandervyde

INVENTORS
Cyrus W. Rice. pro se
Charles W. Dake.
BY
Cyrus W. Rice
his ATTORNEY

C. W. RICE & C. W. DAKE.

PROCESS OF FORMING EXPANDED RETICULATED CONSTRUCTIONS.

APPLICATION FILED APR. 12, 1915.

1,215,061. Patented Feb. 6, 1917.

3 SHEETS—SHEET 3.

FIG 6

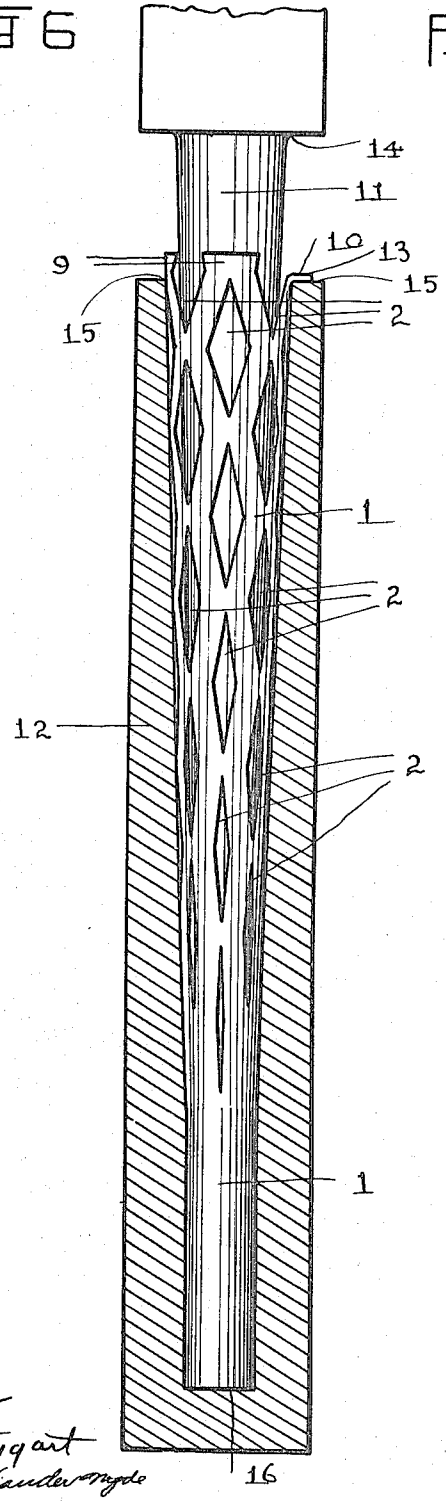
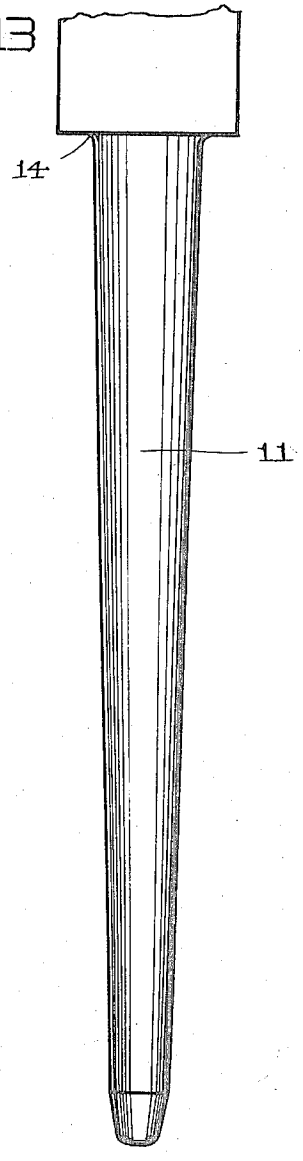


FIG 13



WITNESSES:

R. D. Grant

Garson Taggart

Henrietta Vanderwyde

INVENTORS

Cyrus W. Rice, pro. se.

Charles W. Dake.

BY Cyrus W. Rice

his ATTORNEY

UNITED STATES PATENT OFFICE.

CYRUS W. RICE AND CHARLES W. DAKE, OF GRAND RAPIDS, MICHIGAN.

PROCESS OF FORMING EXPANDED RETICULATED CONSTRUCTIONS.

1,215,061. Specification of Letters Patent. Patented Feb. 6, 1917.

Application filed April 12, 1915. Serial No. 20,613.

To all whom it may concern:

Be it known that we, CYRUS W. RICE and CHARLES W. DAKE, citizens of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented new and useful Improvements in Processes of Forming Expanded Reticulated Constructions, of which the following is a specification.

The present invention relates to expanded reticulated construction, and its object is generally, to provide improved processes for forming the same; and more particularly, improved processes for forming such construction in cross section bodily deflecting or deviant from a straight line (and preferably tubular), thus to better sustain transverse stress.

A further general object is to provide improved processes for forming such a construction combining lightness, strength and rigidity and especially adapted for use as telegraph, telephone, trolley and flag poles, fence posts, beams and the like. These objects are attained in and by the processes hereinafter set forth; and examples of such construction formed by such processes and of means for carrying out such processes are illustrated by the drawings, in which:—

Figure 1 shows a tubular body 1 from which the tubular reticulated construction may be formed;

Fig. 2 shows the same slitted at 2 in order to be expanded;

Fig. 3 shows a finished construction mounted on a base (as by threaded bolts 3), and adapted for use as a fence post and carrying fence wires 4;

Fig. 4 shows a finished construction set in the ground (whose surface is indicated by the line 5), and furnished with a cross arm 6 for carrying telegraph wires and the like. The embedded portion of this construction is shown as not tapering;

Fig. 5, shows a finished construction, right-angled in cross section and mounted on and around a base or post 7 to which it may be secured as by nails or bolts 8;

Fig. 6 shows (partly in longitudinal central section), means or mechanism for forming a reticulated construction and for carrying out the process thereof. The parts are shown in their position after the operation on the construction in such mechanism has been performed, but the extremities of the legs 9 appear as they were before being bent by the mechanism's said operation to form or shape a transverse flange, such as that shown on the leg 10;

Figs. 7, 8, 9, 10, 11 and 12 are end views of some of the various tubular bodies from which the reticulated construction may be formed: Fig. 7 shows a tube circular in cross section, like that in Fig. 1; Fig. 8 shows a similar tube, but having its wall thicker on one side, thus to better withstand transverse stress in one direction; Fig. 9 shows a tube oval in cross-section; Fig. 10, square; Fig. 11, fluted or corrugated; and Fig. 12 hexagonal in cross-section;

Fig. 13 shows a mandrel adapted to be thrust or driven into the end of the tubular body to expand the same.

Our reticulated construction is formed from a slitted hollow body of suitable material (as metal), by what is commonly called "expanding" it transversely, and the finished construction is so shaped as to present in cross section a deflection or deviation of its body from a straight line, whereby the construction is adapted to sustain transverse stress.

Such construction may exist in various forms, some of which forms appear in the drawings; preferably however, our construction is formed from a tubular body of desired size, thickness and cross sectional form, and prepared in any suitable manner, as in the ordinary way, or by rolling or bending a metal sheet, etc. The portion of such tubular body (as that shown in Fig. 1) to be expanded is slitted longitudinally in proper form, as in the form shown at 2 in Fig. 2. The tubular body (or its slitted portion) is now "expanded" transversely, as by spreading means inserted thereinto and operating against the inner surface thereof. Preferably, such means comprises a mandrel 11 whose forward end is pointed as shown to permit such insertion; and preferably, this mandrel is tapering as shown, in order to impart to the finished construction a symmetrical form and a correspondingly tapering form, as well as to obviate too abrupt expansion of such body at any point.

It will be seen that this mandrel on being driven into the tubular body suitably fixed

in position, as within a form 12, operates to expand such body to correspond internally to the mandrel, and externally (where such form is employed) to the inner surface of the form, the said body being compressed between mandrel and form, whereby any burs at the ends of the slits as well as other distortions incident to the expanding are pressed out.

It will be seen that the mandrel in being driven, as illustrated in the drawings, into the tubular body, initiates the expanding of successive portions thereof progressively in the longitudinal direction of said body; *i. e.* that end of such body into which the mandrel is inserted first begins to expand, and expanding begins in successive portions of the tubular body progressively as the mandrel is driven farther in. It will also be seen that, in the operation illustrated in the drawings, the mandrel's action is not only to expand the material by transverse or outward pressure against its inner surface, but also, and simultaneously, to shorten the material (or contract it longitudinally) by the frictional engagement of the mandrel—in its driven sliding movement,—with the inner surface of the material; said expanding and contracting being thus in such different directions, that each mutually assists the other.

This process of mechanically shortening the material simultaneously with mechanically expanding it,— neither such operation being merely consequent upon or the effect of the other—is claimed as broadly patentably novel.

The tendency of the material to break or tear is lessened by this simultaneous transverse expanding and longitudinal contracting.

Our reticulated construction may have at its end a transverse flange 13 whereby it may be attached to a base as shown in Fig. 3: this flange is shown in the views as formed on the several legs of the construction, and may be so formed or shaped by a suitable shoulder 14 of the mandrel, operating to bend the extremities of such legs on the edge 15 of the mouth of the form.

Where the quality of the material, its size or thickness, or the desired degree of its expansion requires or makes it advisable, such material (as the tubular body) should before expanding, be heated sufficiently to stand or facilitate the process.

It will be seen that the bottom 16 of the form constitutes an abutment or support for the tubular body during the expanding thereof by the mandrel.

The slits may be of any shape or cross sectional form permitting or facilitating the expansion of the material, and may or may not extend entirely through the material.

Our invention being intended to be defined in and by the claims only, we do not propose to confine ourselves to details described above or illustrated in the drawings.

We claim:

1. The process of forming a reticulated construction of the character described, which consists in slitting a hollow body and transversely expanding and forming the same bodily deflecting in cross section in the plane of the direction of the expanding.

2. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body and expanding the same transversely by spreading means operating against the inner surface of said body.

3. The process of forming a reticulated construction of the character described, which consists in slitting a hollow body, heating the same sufficiently to render it reformable and thereupon transversely expanding and forming the same bodily deflecting in cross section in the plane of the direction of the expanding.

4. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body and heating the same sufficiently to facilitate expanding and thereupon expanding the body transversely by spreading means operating against the inner surface of said body.

5. The process of forming a reticulated construction of the character described, which consists in slitting a hollow body and transversely expanding and forming the same bodily deflecting in cross section in the plane of the direction of the expanding, such expanding being initiated in successive portions of the body progressively in the longitudinal direction of the body.

6. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body and expanding the same transversely by spreading means operating against the inner surface of said body, such expanding being initiated in successive portions of the body progressively in the longitudinal direction of the body.

7. The process of forming a reticulated construction of the character described, which consists in slitting a hollow body, heating the same sufficiently to render it reformable and thereupon transversely expanding and forming the same bodily deflecting in cross section in the plane of the direction of the expanding, such expanding being initiated in successive portions of the body progressively in the longitudinal direction of the body.

8. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body and heating the same sufficiently to

facilitate expanding and thereupon expanding the body transversely by spreading means operating against the inner surface of said body, such expanding being initiated in successive portions of the body progressively in the longitudinal direction of the body.

9. The process of forming a reticulated construction of the character described, which consists in slitting the material and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

10. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body, and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

11. The process of forming a reticulated construction of the character described, which consists in slitting the material, heating the same sufficiently to render it re-formable, and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

12. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body, heating the same sufficiently to render it re-formable, and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

13. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body, expanding the same transversely, and thereupon compressing the wall of such expanded body in the direction of such expanding.

14. The process of forming a tubular reticulated construction of the character described, which consists in slitting a tubular body, heating the same sufficiently to render it re-formable, expanding the same transversely, and thereupon compressing the wall of such expanded body in the direction of such expanding.

15. The process of forming a hollow reticulated construction of the character described, which consists in slitting a hollow body, expanding the same transversely, and thereupon compressing the wall of such expanded body in the direction of such expanding.

16. The process of forming a hollow reticulated construction of the character described, which consists in slitting a hollow body, heating the same sufficiently to render it re-formable, expanding the same transversely, and thereupon compressing the wall of such expanded body in the direction of the expanding.

17. The process of forming a hollow reticulated construction of the character described, which consists in slitting a hollow body, and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

18. The process of forming a hollow reticulated construction of the character described, which consists in slitting a hollow body, heating the same sufficiently to render it re-formable, and thereupon expanding the same transversely and simultaneously contracting it longitudinally, the expanding and contracting forces being in such different directions as to be mutually assistant.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

CYRUS W. RICE.
CHARLES W. DAKE.

Witnesses:
HENRIETTA K. VANDER MYDE,
GANSON TAGGART.