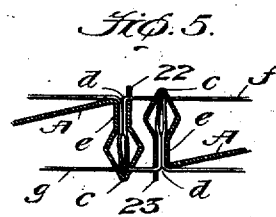
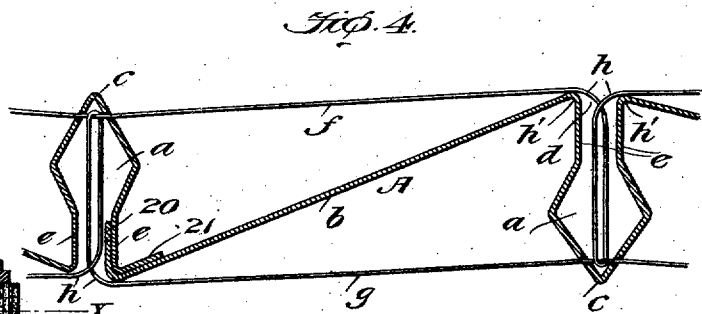
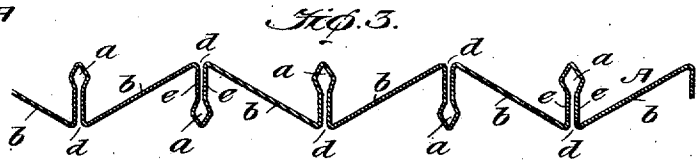
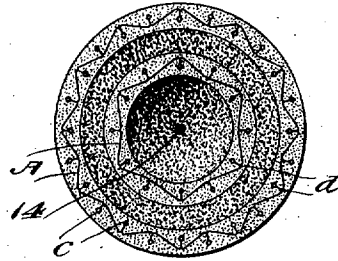
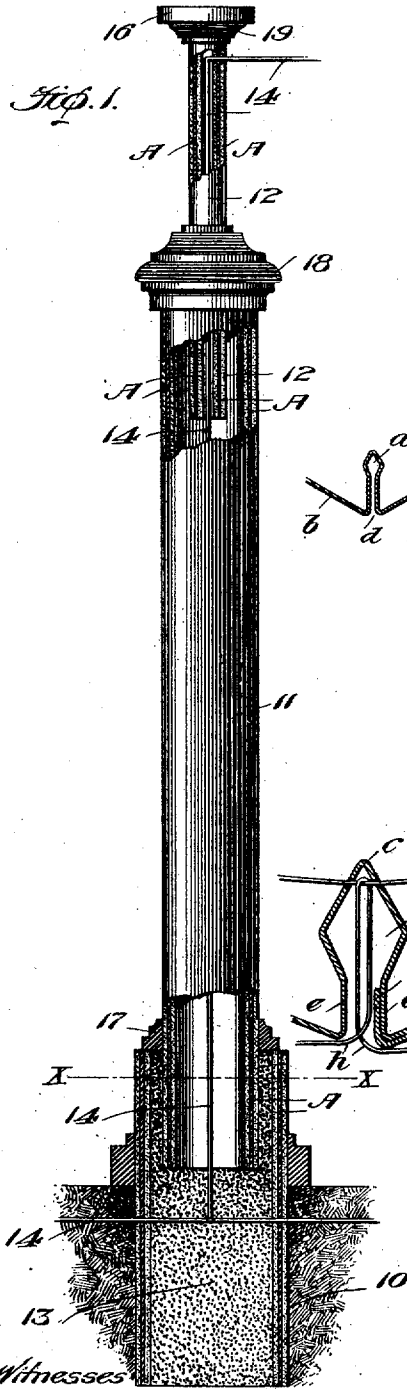


H. L. LEWEN.
 REINFORCED CONCRETE CONSTRUCTION.
 APPLICATION FILED DEC. 6, 1910.

986,474.

Patented Mar. 14, 1911.



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REINFORCED CONCRETE CONSTRUCTION.

986,474.

Specification of Letters Patent.

Patented Mar. 14, 1911.

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To all whom it may concern:

Be it known that I, HENRY L. LEWEN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Reinforced Concrete Construction, of which the following is a specification.

This invention relates to a reinforced concrete construction and it has particular reference to a novel reinforcing element and means for tying together several of such elements to make a rigid reinforcement for concrete.

The invention further relates to a special form of hollow ribbed structure wherein the ribs are perforated at their apices for the reception of spaced wires, one of the wires being linked or otherwise bent to connect with an opposite wire, whereby when the structure is embedded in the mass of concrete, it may be successfully employed in a wall, partition, arch, chimney, tank, pipe, post, launch or other curved, cylindrical or analogous circular or substantially circular hollow or solid device.

The invention consists, of the parts and the constructions arrangements and combinations of parts which I will hereinafter describe and claim.

In the accompanying drawings forming part of this specification, and in which similar reference characters indicate like parts in the several views;—Figure 1 is a vertical sectional view of a telegraph or electric light pole embodying the salient features of my invention. Fig. 2 is an enlarged horizontal sectional view of the same on the line X—X of Fig. 1. Fig. 3 is a detail showing a section of the metal plate before being bent into circular form. Fig. 4 is a view similar to Fig. 3, but enlarged and showing the spaced wires which tie to the plates and to each other.

In a former application filed July 13, 1910, Ser. No. 571,743, I have disclosed as building elements sheet metal plates rolled or otherwise formed with hollow ribs, which are made to project at right-angles from one side only of the plate, the outer edges of these plates being each bent to lie in a plane substantially parallel with that of the body of the plate, to form fastening flanges and strengthening webs, said plates being designed to be embedded in concrete to form flat slabs which may be completed as a fin-

ished product before setting into a wall or other part of a building, therefore, not requiring specially skilled labor in the construction of a building. The former application also discloses single truss-rods passed through alternate of the hollow ribs and over intermediate ribs.

The present invention which is applicable for all the purposes for which the former structure was designed, is especially provided for the construction of curved surfaces which are usually found in the devices heretofore mentioned; and in order that the present invention may be fully understood, I will now fully describe the same together with some of its intended uses.

As in the aforesaid former application, the sheets used in the present instance are composed of sheet metal and are represented at A, in Figs. 2, 3 and 4. I prefer to use thin sheet metal plates from six (6) to thirteen (13) feet long and from twenty-four (24) to thirty-six (36) inches wide and from fourteen (14) to thirty (30) gage thick. Plates of this description have heretofore been used in the making of metal lathing and when bent into desired form are found to possess but little inherent rigidity, but when embedded in concrete they constitute a rigid reinforcement therefor. I do not limit my invention to the sizes before given or to any particular size, as it is quite evident that the size of the plates as also the thickness will be determined largely by the height of the wall, post, chimney, tank, etc., and the length of the tunnel, pipe, launch or other object. Before being shaped for its intended position, the sheet may be generally flat and imperforate, except for certain perforations in the apices of the hollow ribs, which I will now describe.

Each sheet, A, is rolled or otherwise formed in each side with longitudinal corrugations which produce hollow ribs, *a*, which stand out from the plain faces of the plate, and contiguous portions of said plate are so bent as to form inclined portions, *b*, which diverge from the base of one rib to the bases of adjacent ribs on each side thereof, as shown in Figs. 3 and 4. That this arrangement may be produced it will be observed that the ribs project alternately in opposite directions, certain of the ribs projecting from one side of the plate and the intermediate ribs projecting from the opposite side of said plate; the arrangement is

also such that the bases of one series of ribs will be substantially in the same plane with the apices of the ribs of the other series. Each rib is hollow and open along one side; its other side is formed with an enlarged head or portion, *c*, which may be many-sided in cross section or may be given any desired shape. The bending of the plates to form the ribs, leaves a throat, or opening, *d*, formed between the parallel walls, *e*, of the rib, and it is through this throat that a tie-wire is passed after the plate is bent into form, as I will presently describe. Each rib has a perforation formed transversely through substantially the apex of its closed side, for the reception of a suitable tie-wire.

The tie-wires, *f* and *g*, or equivalent rods, are inserted after the plate is bent into cylindrical or curved form and said wires are passed transversely across the ribs and through the perforations thereof and which perforations may be spaced suitable distances apart according to the number of wires which it may be desired to use. Each wire is passed through the perforations of the ribs projecting from one side of the plate and over the bend or angle, *b*, at one side of the throat or open side of the adjacent ribs, a portion of the wire being looped or bent at, *h*, and passed into the hollow of the adjacent rib and is thence returned on itself and carried outside this rib and over the bend or angle *h'* at the other side of the throat or open side thereof, and thence extends through a perforation in the next succeeding rib. This arrangement is carried out by the wires, *f* and *g*; one of these wires being passed through the bight of the folded portion of the other wire, as shown in Fig. 5, thereby tying the wires together and connecting the plates from end to end in series. The plates heretofore described may be readily fashioned in to a cylindrical or other columnar form for use as a reinforce for concrete telegraph, electric-light or trolley wire poles, pipes, tanks, chimneys, etc., also for the curved surfaces, tunnels, launches, bridges, and the like. When used in the pole construction, mentioned, as shown in Fig. 1, the ribbed plates may be used as the reinforce for the base, 10, as well as for the superposed columns, 11, 12, of varying diameters, and in each case the ribbed plates are embedded in the concrete while the outer surface of the concrete may be finished with any desired ornamentation. The base, 13, may also be filled with coarse concrete as shown in Figs. 1 and 2. The pipe, 14, for the electric conductor is shown in Fig. 1 as entering the base and extending up through the hollow columns, 11 and 12, the pole in this figure, 1, having a cement base, 10, a cement cap, 16, and suitable cement molding, 17, 18 and 19 to give a pleasing finish to the pole. The plastic material may

enter the hollow ribs of the plates and in the completed structure, the plates, their ribs and the tie-wires become firmly embedded and thus constitute a strong reinforce for the various devices herein mentioned, and for any other like device, or slab or other shape requiring internal reinforcement. The meeting edges, 20, 21, of the plates may be bent to overlap as shown in Fig. 3, or they may be formed and positioned as shown in Fig. 4, the space between the terminal edges, 22, 23, of the plates in said Fig. 4 being useful for tying or securing the ends of the wires and which space is subsequently filled with the concrete material to make a smooth or level surface.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A building element comprising a metal plate with projecting ribs running lengthwise of the plate, said ribs being perforated and projecting in opposite directions from both sides of said plate and having plane portions of substantial width intermediate of and connecting adjacent ribs, and truss-wires laced through the perforations in the ribs.

2. A building element comprising a metal plate with projecting ribs running lengthwise of the plate and projecting alternately in opposite directions from the sides of the plate, said ribs being perforated, said plate having, also, plane portions of substantial width intermediate of and connecting adjacent ribs, and truss-wires laced through the perforations in the ribs and being tied one to the other.

3. A building element comprising a metal plate with projecting ribs running lengthwise thereof, and projecting alternately in opposite directions, said plate being bent so that adjacent ribs are connected by inclined portions, said ribs being hollow and open along one side, and spaced wires on opposite sides of the plate each extending from one rib to the other, one of said wires having portions looped and entering the open sides of certain of the ribs and connecting with the opposite wire at points interior of the ribs, said ribs having transverse perforations for the passage of the wires.

4. A building element comprising a sheet metal plate having projecting ribs running lengthwise thereof and alternately projecting from opposite sides of the plate, said ribs being open along one side and closed on the other and having perforations near the apices of the closed sides, said plates having, also, plane portions of substantial width intermediate of and connecting adjacent ribs, a truss-wire at one side of the plate passing through the perforations of the ribs on that side of the plate, and into the open sides of the intermediate ribs, and a second wire on

the other side of the plate passing through the perforations in the ribs on that side and into the open sides of the intermediate ribs, said plates with their ribs and wires adapted to be embedded in concrete.

5 5. A building element comprising a plate having hollow ribs projecting alternately therefrom in opposite directions, said ribs being open on one side and closed on the
10 other, and having perforations in their closed sides, said plates having, also, plane portions of substantial width intermediate of and connecting adjacent ribs, and truss-wires on opposite sides of the plate each of
15 said wires passing through the perforations in the ribs on the same side of the plate and into the open sides of the intermediate ribs or those ribs which project from the opposite side of the plate, said wires being connected together, and the plates and wires
20 forming an internal reinforce for concrete construction.

6. A building element comprising a plate having hollow open-sided ribs projecting alternately in opposite directions from its opposite sides, said plate being bent so that the
25 bases of adjacent ribs are connected by inclined portions, truss-wires on opposite sides

of the plates having portions passing transversely through the ribs on one side of the plate and into the open sides of the ribs on the other side of the plate, one of said wires passing through the other at a point interior to each of the hollow ribs.

7. A building element comprising a plate having hollow open-sided ribs projecting alternately in opposite directions from its opposite sides, said plate being bent so that the bases of adjacent ribs are connected by inclined portions passing transversely through the ribs on one side of the plate and into the open sides of the ribs on the other side of the plate, one of said wires passing through the other at a point interior to each of the hollow ribs, said plate adapted to be bent into a curved or circular form and the plate with its ribs and the wires adapted to be embedded in concrete to form an internal reinforce for a columnar form.

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

HENRY L. LEWEN.

Witnesses:

HUGO P. VON WEIDENFELD,
JAMES A. GOBEL.