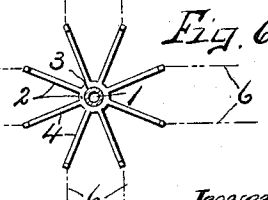
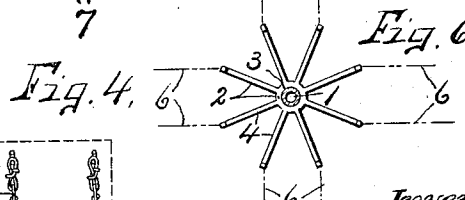
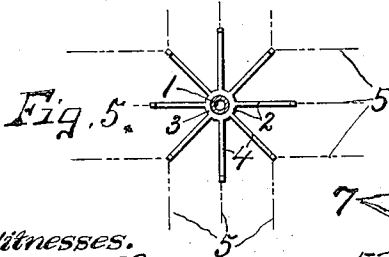
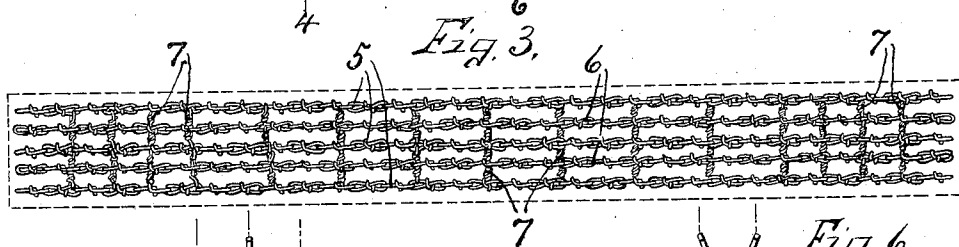
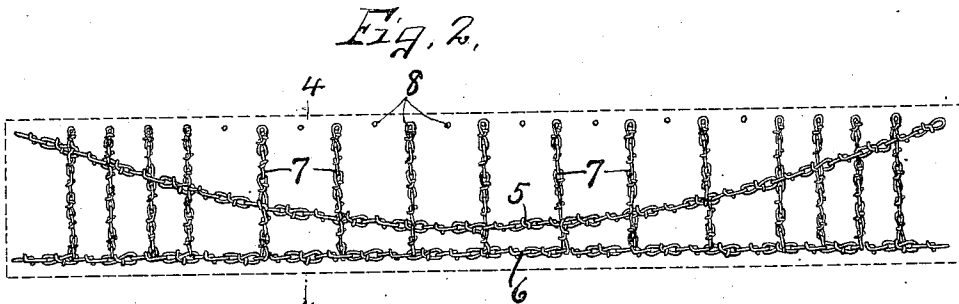
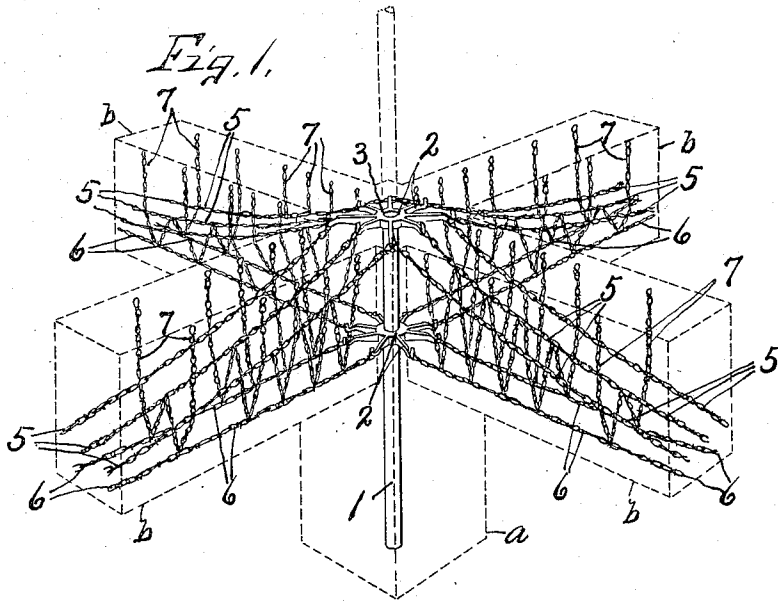


T. H. SKINNER.
 REINFORCEMENT FOR CONCRETE STRUCTURES.
 APPLICATION FILED JAN. 11, 1909.

1,046,117.

Patented Dec. 3, 1912.



Witnesses.
J. C. Thomas
W. E. Chase

Inventor.
Theodore H. Skinner
 By
Edward P. Brinson
 Attorney.

UNITED STATES PATENT OFFICE.

THEODORE H. SKINNER, OF ONEIDA, NEW YORK, ASSIGNOR TO ONEIDA COMMUNITY, LTD., OF ONEIDA, NEW YORK, A CORPORATION OF NEW YORK.

REINFORCEMENT FOR CONCRETE STRUCTURES.

1,046,117.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed January 11, 1909. Serial No. 471,745.

To all whom it may concern:

Be it known that I, THEODORE H. SKINNER, of Oneida, in the county of Madison, in the State of New York, have invented new and useful Improvements in Reinforcements for Concrete Structures, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in reinforcement for concrete building structures and refers more particularly to the means for reinforcing concrete beams and their intersections with columns.

I am aware that it is common to employ various forms of continuous bars or rods as reinforcements for concrete beams, girders and columns and that it is not uncommon to extend or continue such rods or bars through the intersections of the girders or beams with each other and with the columns but in order to render the concrete structure safe against all loads or strains to which it may be subjected it is necessary to position such rods or bars one at a time with great care during progressive building and necessitates a great deal of expensive hand labor or fitting on the job. Another disadvantage in the use of these continuous bars particularly in long spans or girders or beams or in continuous concrete work is the necessity for breaking the continuity of the bars by reason of their limited length thereby making it necessary to carefully break joints and frequently introducing excessive thicknesses of metal where the rods overlap or extend one beyond the other. In the use of these reinforcements in intersecting beams or girders or at the intersections of beams or girders with each other or with columns, it frequently happens that a considerable number of reinforcing rods or bars will be brought together in more or less irregular form at the intersections to such an extent as to break the continuity of the concrete and prevent close knitting of the concrete through the interstices and around all parts of the intersecting rods or bars. This leaves more or less air spaces or cavities and produces a honey comb effect which is not visible from the exterior but materially weakens the structure where the compression strains are most severe.

One of the main objects of my present invention is to provide an all chain hammock

or basket reinforcement for each beam or girder span and when used in connection with intersecting beams or beams and columns to anchor the meeting ends of the hammocks or baskets to a common anchorage thereby establishing a systematic and complete skeleton system of reinforcement for each floor during progressive building which is at once light, strong and effective in resisting strains to which it may be subjected and is continuous throughout the system.

Another important object is to enable the concrete to be firmly knitted together in and around all parts of the reinforcement and particularly at the intersection of the girders or beams with each other and with the columns.

Other objects and uses relating to the system of anchorage for the hammocks and to the specific relation of the chains of which each hammock is composed will be brought out in the following description.

In the drawings—Figure 1 is a perspective view of a portion of a system of reinforcement for intersecting beams or girders and a supporting column therefor, said girders and columns being shown by dotted lines. Fig. 2 is an enlarged longitudinal sectional view of the greater portion of one of the chain hammocks or basket reinforcement for one of the beams. Fig. 3 is a top plan of the reinforcements shown in Fig. 2. Fig. 4 is a transverse sectional view taken on line 4—4, Fig. 2. Figs. 5 and 6 are top plan views respectively of the upper and lower anchor plates or spiders seen in Fig. 1.

My invention may be clearly understood in that I have shown a column —a— and intersecting beams or girders —b— resting at their intersections upon the column —a—, said column and girders being made of concrete in suitable forms during progressive building. Prior to the construction of the concrete column —a— and before or after the form is placed, a comparatively small rod or pipe —1— is placed in an upright position centrally in the spaces to be subsequently filled by the concrete for the column, said pipe or rod being extended vertically to the full height of the column or to the last beams or girders which are to be supported thereon and at each floor or other position where the girder or girders are to be supported are placed a plurality

of in this instance two anchor plates or columns —2— which are fitted upon and secured to the vertical rod or bar —1— some distance apart depending upon the depth of the beam or girder but usually just within the plane of the lower and upper surfaces of such beam or girder so as to be entirely concealed within the concrete after construction. Each anchor plate preferably comprises a comparatively central hub —3—, a series of in this instance eight radial arms —4— of uniform length and spaced equi-distant apart leaving ample space between them for the reception of the concrete and permitting the latter to be worked or tamped thoroughly around and against all parts of the anchor plate and interposed portion of the upright support —1— leaving a solid and firmly cemented body of concrete between the anchor plates firmly tying the adjacent portions of the girders and column together in a homogeneous mass. These anchor plates are preferably made of wrought steel and are adjustable vertically and separately upon their respective supporting rods or pipes —1— so to be properly positioned for the girder or beams during progressive building and are preferably held in their adjusted positions by set screws or other suitable fastening means during progressive building. Where girders or floor beams are to span the distance from one column to another, anchors of one column are connected to the corresponding anchors of the other column by chain hammocks or baskets consisting of a plurality of in this instance three catenary chains —5— and a plurality of in this instance two horizontal chains —6— which are connected at intervals throughout their length by chain stirrups —7—, the latter being disposed in vertical planes extending downwardly around the sides and under the bottom of the catenary chains transversely of the catenary and horizontal chains and are tied thereto at the intersections to hold them the desired distance apart when adjusted for use. These chain hammocks may be manufactured in various standard lengths comprising a greater or less number of catenary or horizontal chains and stirrups according to the strains or loads which they are required to carry and may be kept in stock or transported in knock down condition ready to be installed without special fitting or extra labor. In adjusting these chain spans or hammocks for use in the building, the links at the ends of the catenary chains are hooked upon the outer ends of corresponding arms of the upper anchors —2— and the ends of the lower horizontal chains are similarly hooked upon the corresponding arms of the lower spider which in this instance is adjusted so that each pair of arms for each girder or beam will lie directly under the

spaces between the three arms to which the adjacent ends of the catenary chains are attached so that the horizontal chains —6— will lie in vertical planes substantially midway between the catenary chains as best seen in Fig. 4.

The chain stirrups —7— are secured at intervals throughout their length to the catenary and horizontal chains —5— and —6— with their ends extending upwardly or vertically at the sides of the hammock and secured to a superposed floor reinforcing fabric —8— which forms the reinforcement for the floor slabs not necessary to herein illustrate or describe, the upper ends of the stirrups being preferably provided with hooks by which they may be readily attached to the floor reinforcements —8—. This floor reinforcement —8— is preferably made of cross chains secured together at their intersections although so far as my present invention is concerned, other forms of floor reinforcements adapted to be used in connection with the stirrups may be employed.

What I claim is:

1. As a new article of manufacture, a reinforcement for concrete, comprising upright supports spaced apart, separate anchoring devices adjustably mounted on each support, one above the other, a catenary chain attached to the upper anchoring device, a horizontal chain attached to the lower anchoring device, and cross chains intersecting the catenary and horizontal chains and tied thereto at the intersection.

2. As a new article of manufacture, a reinforcement for concrete, comprising upright supports spaced apart, separate anchoring devices adjustably mounted on each support, one above the other, catenary chains attached to the upper anchoring devices, horizontal chains attached to the lower anchoring devices, and cross connections between said chains.

3. A reinforcement for concrete, comprising an upright support, separate anchors adjustably mounted upon the support and spaced some distance apart one above the other, catenary chains connected to and leading in different directions from the upper anchor, horizontal chains connected to and leading in different directions from the lower anchor, and cross connections between the catenary and horizontal chains.

4. An all chain reinforcement for concrete beams embedded therein and comprising a plurality of catenary chains, and chain stirrups having their intermediate portions connected to the catenary chains and their ends extending upwardly therefrom and embedded in the concrete beam, and floor reinforcements attached to the upper ends of the stirrups and also embedded in the concrete beams.

5. A reinforcement for concrete columns and beams comprising upright column reinforcements, anchoring elements on the supports and embedded in the concrete at the junctions of the beam with the columns, and an all chain beam reinforcing hammock having its ends attached to said anchoring elements and comprising a plurality of parallel catenary chains, and transverse chain stirrups secured thereto at intervals throughout their lengths and embedded in the concrete beam.

6. A reinforcement for concrete columns and beams comprising upright column reinforcements, anchoring elements on the supports and embedded in the concrete at the junctions of the beam with the columns, and an all chain beam and reinforcing hammock having its ends attached to said anchoring elements and comprising a plurality of parallel catenary chains, and transverse chain stirrups having their intermediate portions secured to the catenary chains and their other ends extending upwardly therefrom and embedded in the concrete beam, and a floor reinforcement attached to the upper ends of the stirrups.

7. A reinforcement for concrete columns and beams comprising upright column supports each provided with a pair of relatively adjustable anchoring elements spaced apart one above the other and embedded in the concrete at the junctions of the beam with the columns, a chain beam reinforcing hammock embedded in the concrete beam and comprising a plurality of parallel catenary

chains having their ends attached to the upper anchoring elements and parallel horizontal chains having their ends attached to the lower anchoring elements and transverse chain stirrups having their intermediate portions attached to the catenary chains and also to the horizontal chains and their opposite ends extending upwardly above the catenary chains.

8. A reinforcement for concrete columns and beams comprising upright column supports each provided with a pair of relatively adjustable anchoring elements spaced apart one above the other and embedded in the concrete at the junctions of the beam with the columns, a chain beam reinforcing hammock embedded in the concrete beam and comprising a plurality of parallel catenary chains having their ends attached to the upper anchoring elements and parallel horizontal chains having their ends attached to the lower anchoring elements and transverse chain stirrups having their intermediate portions attached to the catenary chains and also to the horizontal chains and their opposite ends extending upwardly above the catenary chains, and floor reinforcements attached to the upper ends of the stirrups and also embedded in the concrete beam.

In witness whereof I have hereunto set my hand this 8th day of January 1909.

THEODORE H. SKINNER.

Witnesses:

H. E. CHASE,

C. M. McCORMACK.