

C. BROSSMANN.
REINFORCEMENT FOR CONCRETE STRUCTURES.
APPLICATION FILED OCT. 8, 1908.

954,925.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

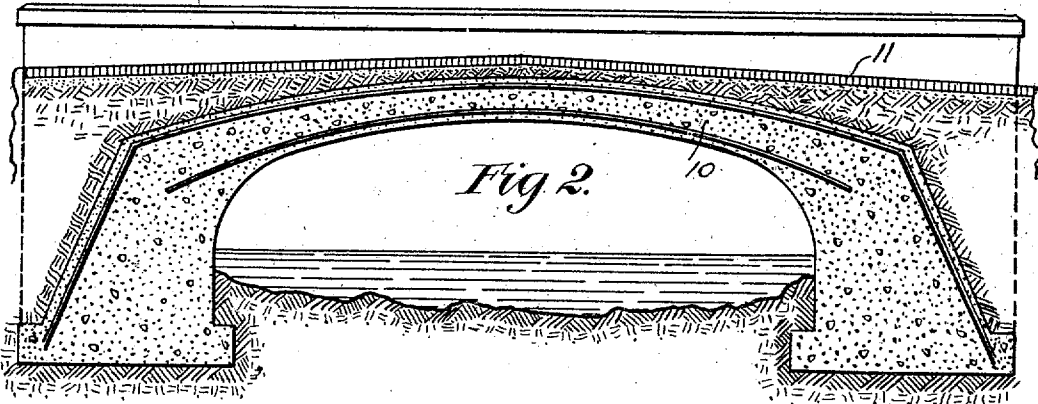
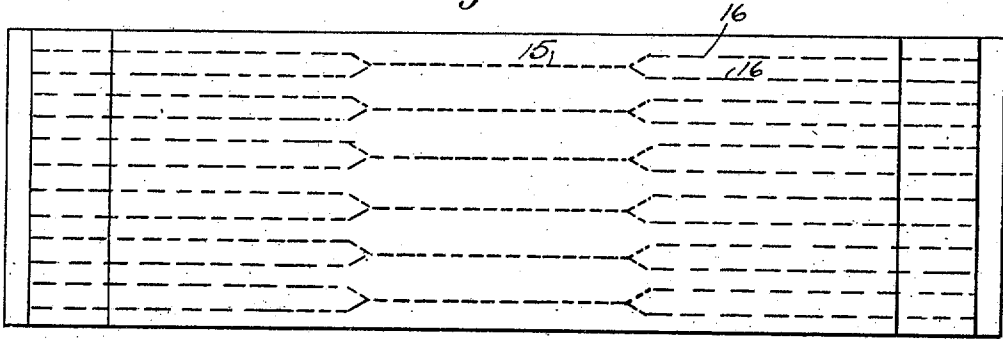


Fig. 3.

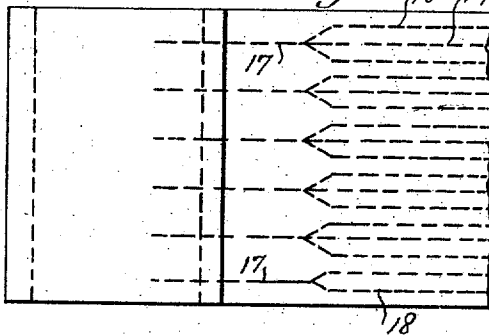
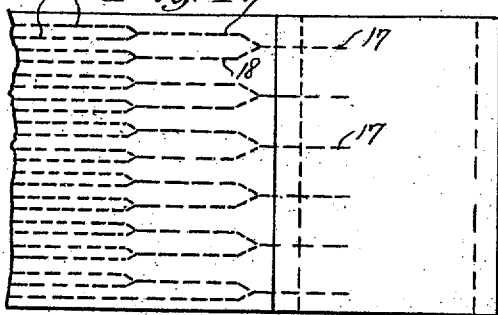


Fig. 4.



WITNESSES:
W. M. Guntle,
O. M. Greener.

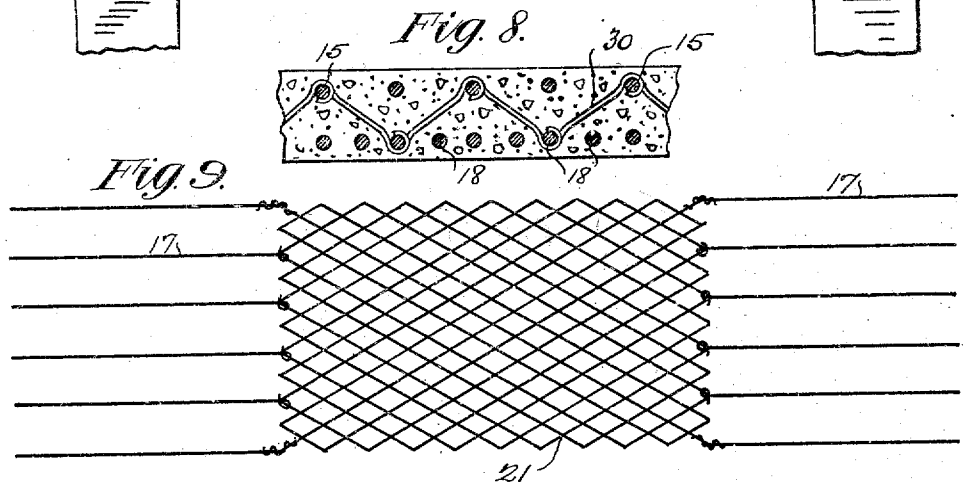
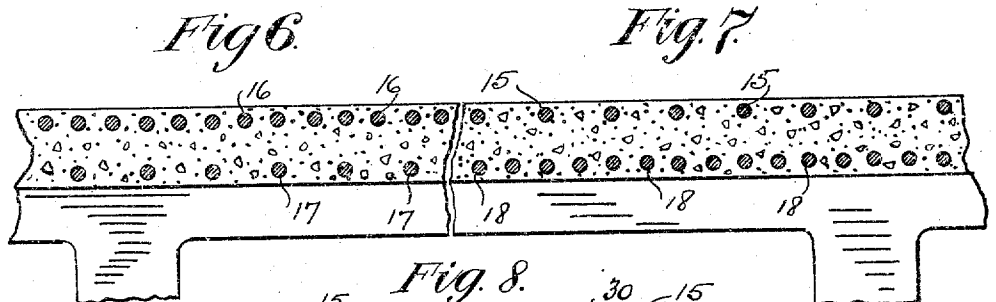
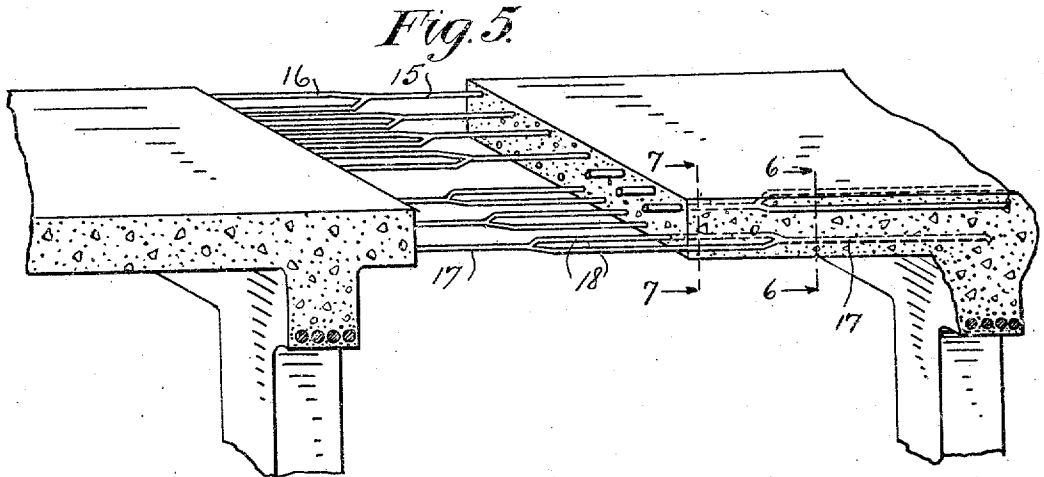
INVENTOR.
Charles Brossmann.
BY *V. H. Lockwood*
ATTORNEY.

C. BROSSMANN.
REINFORCEMENT FOR CONCRETE STRUCTURES.
APPLICATION FILED OCT. 8, 1908.

954,925.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 2.



WITNESSES:
W. M. Gentile,
O. M. Greener.

INVENTOR.
Charles Brossmann
BY
V. H. Foxwood,
ATTORNEY.

C. BROSSMANN.
 REINFORCEMENT FOR CONCRETE STRUCTURES.
 APPLICATION FILED OCT. 8, 1908.

954,925.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 3.

Fig. 10.

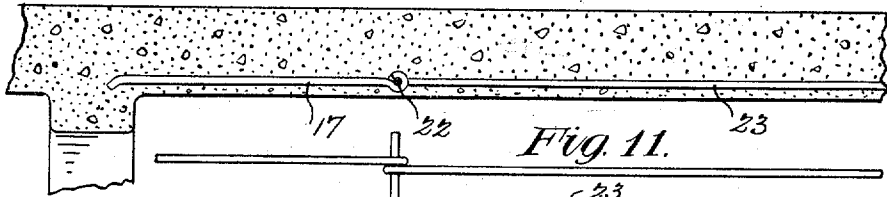


Fig. 11.

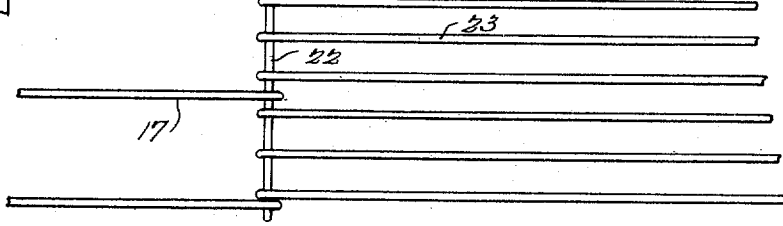


Fig. 12.

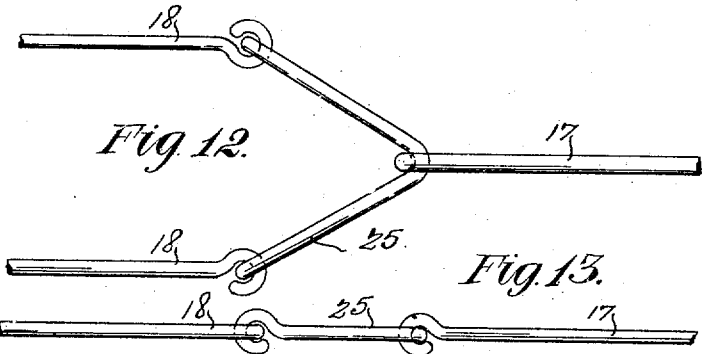


Fig. 13.

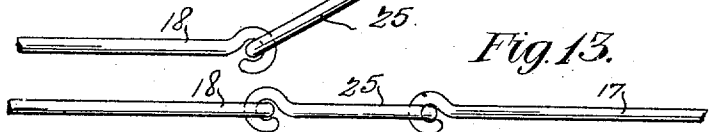


Fig. 14.

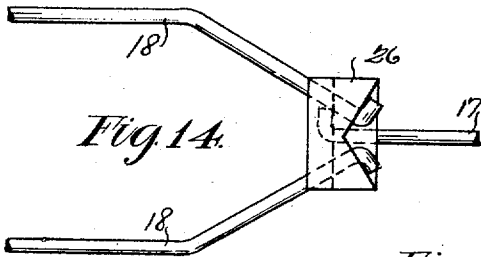
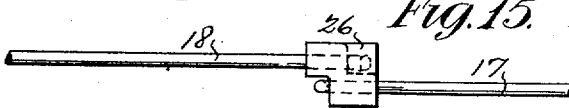


Fig. 15.



WITNESSES:
W. M. Gentile.
O. M. Greener

INVENTOR.
Charles Brossmann.
 BY *V. H. Lockwood,*
 ATTORNEY.

UNITED STATES PATENT OFFICE.

CHARLES BROSSMANN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO ISAAC E. SMITH, OF RICHMOND, INDIANA.

REINFORCEMENT FOR CONCRETE STRUCTURES.

954,925.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed October 8, 1908. Serial No. 456,837.

To all whom it may concern:

Be it known that I, CHARLES BROSSMANN, of Indianapolis, county of Marion, and State of Indiana, have invented a certain new and useful Reinforcement for Concrete Structures; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to provide improved means for reinforcing concrete spans, such as arches, flooring and the like, so that the number of reinforcing rods will be proportionate to the stresses in the different parts of the structure. In structures having concrete spans the stresses vary considerably at different points and instead of having an equal number of reinforcing rods extending through the parts of the structure, my invention consists in varying the number and the strength of the reinforcing rods so that where the stress is light they will be few in number and where the stress is great the strength of the reinforcing means will be increased. This becomes a problem when one considers that the reinforcing means must extend entirely through the structure, that is, be connected from one end to the other. This object is accomplished largely by employing reinforcing means a portion of which may consist of one single rod while another portion may be a number of branches from that rod, or a number of rods connected with one end of said single rod, so that the stress will be transmitted from the plurality of rods to the single rod and the reverse. Consequently, I have shown herein various forms of reinforcing means for carrying out and accomplishing the object of my invention.

The full nature of my invention will be understood from the accompanying drawings and the following description and claims.

In the drawings Figure 1 is a plan view of a reinforced concrete arch, with the top reinforcing rods shown by dotted lines. Fig. 2 is a central vertical longitudinal section through such an arch with the roadway thereupon and showing both the upper and lower series of reinforcements in side elevation. Fig. 3 is a bottom view of the left hand end of the arch shown in Fig. 2, with the reinforcing rods shown by dotted

lines. Fig. 4 is a modified form adapted for the right hand end of the arch. Fig. 5 is a perspective view of a flat or floor span with the connecting rods and also some of the reinforcing rods centrally broken away. Fig. 6 is a transverse section on the line 6—6 of Fig. 5. Fig. 7 is a similar section on the line 7—7 of Fig. 5. Fig. 8 is a transverse section of a part of a span showing a modified form, that is, with transverse connections between some of the longitudinal reinforcing rods. Fig. 9 is a plan view of a modified arrangement of the reinforcing rods in the form of a wire net with rod connections at each end. Fig. 10 is a transverse section of a part of a span showing a modified form of the reinforcing means. Fig. 11 is a plan view of the reinforcing means in Fig. 10. Figs. 12, 13, 14 and 15 are details of different means for connecting the reinforcing rods.

In detail there is shown herein a connecting arch or span 10 with a roadway 11 thereupon. The arch or span shown in Figs. 2 and 5 have two series of reinforcing means, one embedded in the upper portion and the other in the lower portion of the arch or span. The central part of the upper part of the arch or span when under load is under compression while the end portions are under tension, whereas the opposite is true of the lower portion of the arch or span, namely, the central portion is in tension and the end portions are under compression.

A set of reinforcing rods for the upper portion of the arch or span is shown in Figs. 1 and 5 where the central portion of each reinforcement is a single rod 15 which at its two ends is connected with two rods 16. A form of reinforcement for the lower part of the arch or span is shown in Fig. 5 where at each end there is a single rod 17 and centrally there is a pair of rods 18 connected together. A slightly modified form is shown in Fig. 3 for the lower part of the arch or span where the end rods 17 are connected with three intermediate rods, 18 and 19. A still further modification is shown in Fig. 4 where the end rod 17 is connected with a pair of rods 18 and each rod 18 is again connected with a pair of rods 20. This latter arrangement where the central portion of the reinforcing means is considerably increased and multiplied is provided for comparatively long spans or arches.

There are various possible ways of forming either of these two arrangements of reinforcing means. For instance, besides the three forms so far described, another form is shown in Fig. 9 where the central portion is formed of wire fabric 21 and the end portions by wires 17 connected therewith and in Fig. 11 the end rods 17 are connected with transverse rods 22 that are in turn connected with an intermediate series of rods 23.

Various means may be employed for connecting the single rods with a plurality of rods. Two of said means are shown herein, particularly in Figs. 12 to 15. There the single rods 17 are connected with a pair of rods 18 by an intermediate V-shaped connection 25, which catches over a hook on the rod 17 and is in hooked engagement with the ends of both rods 18. In Fig. 14 the connection is effected by a casting 26 provided with openings therethrough for the rods 17 and 18 and the ends of said rods are bent to prevent their escape. Instead of these forms of connections the ends of the rods may be welded together, as shown in Fig. 5, or when the reinforcement is light, as for instance when wire is used, as in Fig. 9, the wires may be coiled or knotted together to unite them.

If desired, the reinforcing rods in the upper and lower series may be connected by

links 30 or other means, as shown in Fig. 8, for holding the rods in position laterally.

What I claim as my invention and desire to secure by Letters Patent is:

1. A concrete span or arch including a concrete structure, and a series of reinforcing rods in the central portion thereof and a smaller series of reinforcing rods in the end portions thereof that are connected with the central series said rods extending longitudinally of the arch in substantially the same plane.

2. A concrete span or arch including a concrete structure, and a series of reinforcing rods extending longitudinally thereof and embedded in the central part thereof near the upper surface with a larger number of reinforcing rods connected to each end of said central series, and a series of reinforcing rods embedded in the structure near the lower surface thereof with a smaller number of rods connected with each end of said lower rods.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

CHARLES BROSSMANN.

Witnesses:

O. M. GREENER,
V. H. LOCKWOOD.