No. 887,189. PATENTED MAY 12, 1908.

M. O. BURNETT.

CONCRETE BRIDGE.

APPLICATION FILED DEC. 14, 1906. RENEWED MAR. 21, 1908.

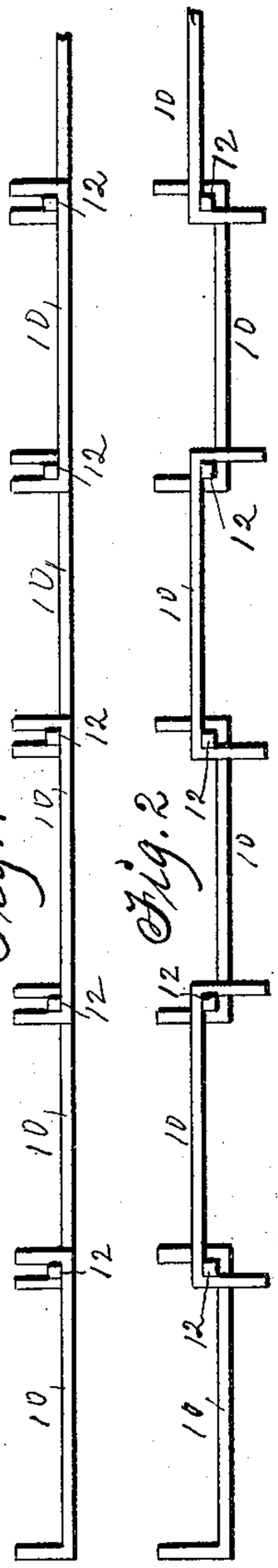

Fig. 1

Fig. 2

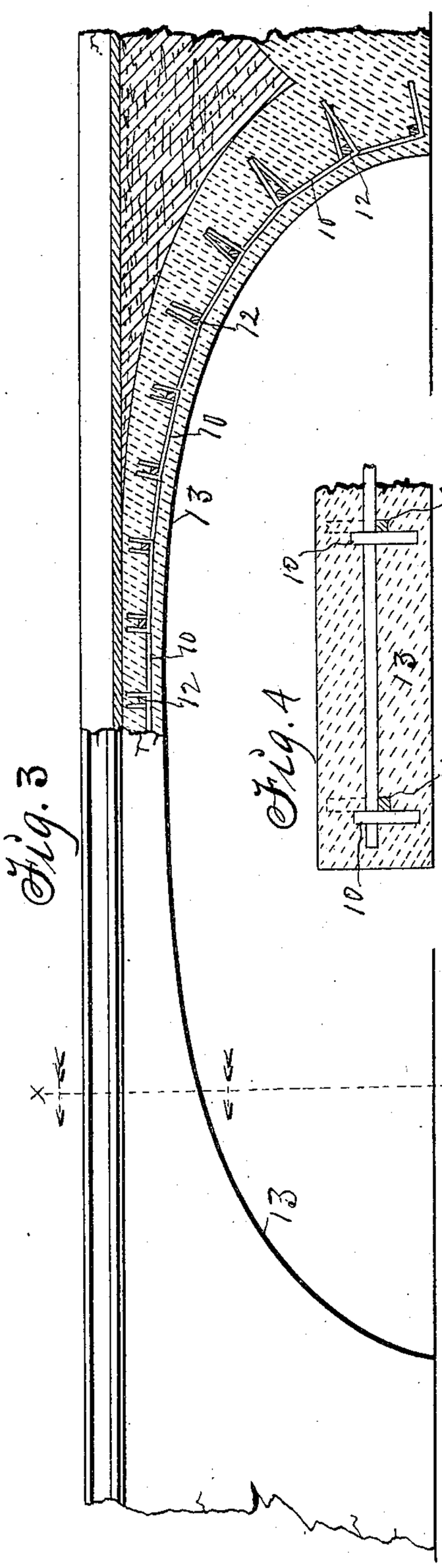

Fig. 3

Fig. 4

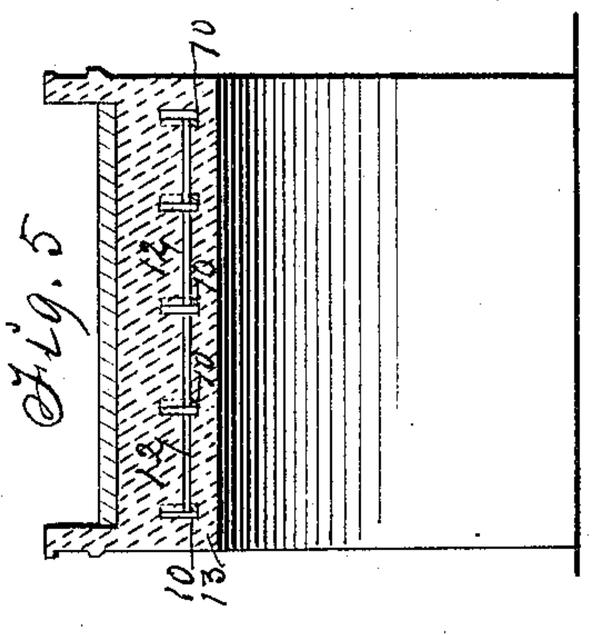

Fig. 5

Fig. 7

Fig. 6

Witnesses:
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UNITED STATES PATENT OFFICE.

MILO O. BURNETT, OF DES MOINES, IOWA.

CONCRETE BRIDGE.

No. 887,189. Specification of Letters Patent. Patented May 12, 1908.

Application filed December 14, 1906, Serial No. 347,898. Renewed March 21, 1908. Serial No. 422,538.

To all whom it may concern:

Be it known that I, MILO O. BURNETT, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Concrete Bridge, of which the following is a specification.

My object is to facilitate the construction of a concrete bridge, save time, labor and expense in construction and improve its strength and efficiency by reinforcing it with straight metal bars that are flexibly connected with each other and securely retained together in position as desired to produce arches of different curvature by concrete and without any extraneous fastening devices.

My invention consists in the construction, arrangement and combination of parts as hereinafter set forth, pointed out in my claims and illustrated in the accompanying drawings, in which:

Figure 1 shows the arrangement and combination of a plurality of straight metal bars, elbow-shaped at their ends and a plurality of straight bars clamped fast between said elbow-shaped ends as required to produce a flexible reinforcement in the arches of bridges that may vary in degrees of curvature. Fig. 2 is a modification of Fig. 1 and shows the elbow-shaped ends of the straight bars alternately reversed in position to connect them to produce a flexible metal reinforcement in a concrete arch. Fig. 3 shows a concrete arch bridge, partly in section, to show the flexible metal reinforcement embedded in the concrete. Fig. 4 is an enlarged transverse sectional view of the concrete arch in which the elbow ends of the straight metal bars alternately project in reverse ways relative to the cross bars that connect them. Fig. 5 is an enlarged transverse sectional view on the line *x x* of Fig. 3 and shows all the elbow ends of the straight metal bars projecting upwards as in Fig. 1. Fig. 6 is an enlarged top view of a section of the flexible reinforcement in which the elbow shaped ends of the metal bars all project upwards relative to the straight metal bars that connect them. Fig. 7 is a view corresponding with Fig. 6 and the elbow ends of the bars alternately projecting up and down relative to the straight cross bars that connect them as required to produce a flexible reinforcement extending from end to end in an arch composed of concrete.

The numerals 10 designate straight metal bars that may vary in size, length and weight and that are bent into elbow shape at their ends as shown and adapted to be flexibly connected by means of straight metal bars 12 as shown in Figs. 1, 6 and 7 without any extraneous means of holding them securely together.

After the abutments of a bridge are made and a scaffold erected between them for producing an arch with concrete material and the base 13 of an arch produced on the scaffold, my flexible metal reinforcement composed of the parts 10 and 12, as shown in Fig. 1 or Fig. 2, is readily placed on the arched base, regardless of its degree of curvature, by successively placing the metal bars in proper position relative to each other to connect them. By then filling concrete on top of them they are embedded therein and concealed and immovably fixed to strengthen and uphold the arch and any weight that may pass over the bridge.

The end portions of the bars 10 that have elbows at their ends are in overlapping position and the cross bars 12 must be extended between the elbows or right-angled extensions at the ends of the bars 10 and in contact with said extensions to securely clamp them fast as required to connect them to produce a rigid frame by embedding the metal bars thus connected in concrete and without the need of rivets, bolts or any other fastening devices.

It is obvious that after the concrete arch is produced upon and supported by a scaffold the bars 10 can be readily placed, one at a time, in a row to extend horizontally across the concrete arch and then a second row of the bars 10 placed in parallel position to the first row and in this way a plurality of rows, as many as may be wanted and the rows as close together as desired. And when rows composed of bars 10 are thus placed upon and supported by the concrete arch a complete skeleton metal arch is produced by simply placing bars 12 between the right angled ends of the bars 10 as shown. No support but the concrete arch is required for the skeleton arch thus produced and no extraneous fastening devices are required for securely binding all the bars 10 and 12 together securely to prevent lateral or longitudinal motion of any one of the bars or the complete skeleton arch.

Having thus set forth the purpose of my

invention and the manner of its construction, the practical operation and utility thereof will be obvious.

What I claim as new and desire to secure by Letters-Patent, is:

1. In a concrete bridge and the like, a skeleton metal frame comprising a plurality of rows of straight bars having their ends bent at right angles to produce elbows and cross bars clamped fast between said elbows without any extraneous fastening device.

2. In a concrete bridge and the like, a plurality of metal bars elbow-shaped at their ends and placed in parallel rows and a plurality of metal cross bars placed between the said elbows and all the bars supported upon a concrete arch, as set forth.

3. In an arch for a bridge and the like, straight metal bars bent at right angles at their ends and placed in parallel lines and the said parallel lines of bars connected by placing straight cross bars between contiguous elbows of the bars in parallel lines and the skeleton metal frame thus constructed supported upon a concrete arch as set forth.

4. A complete arch in a concrete bridge comprising a concrete arch, a skeleton metal frame and reinforcement consisting of a plurality of metal bars elbow-shaped at their ends and a plurality of cross bars fastened between the elbows at the ends of said bars and embedded in the concrete placed on top of the skeleton metal frame and concrete arch, as set forth.

5. A concrete bridge comprising abutments, a concrete arch, a plurality of metal bars bent at right angles at their ends, a plurality of straight metal cross bars in direct contact with said bent ends and concrete on top of the metal bars, as set forth.

MILO O. BURNETT.

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