

1,043,204.

A. P. CLARK.
CONCRETE REINFORCE.
APPLICATION FILED APR. 18, 1910.

Patented Nov. 5, 1912.

3 SHEETS—SHEET 1.

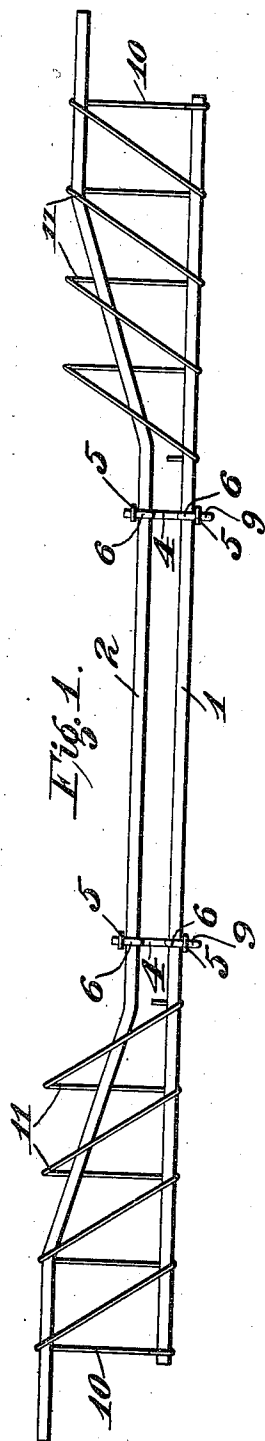


Fig. 1.

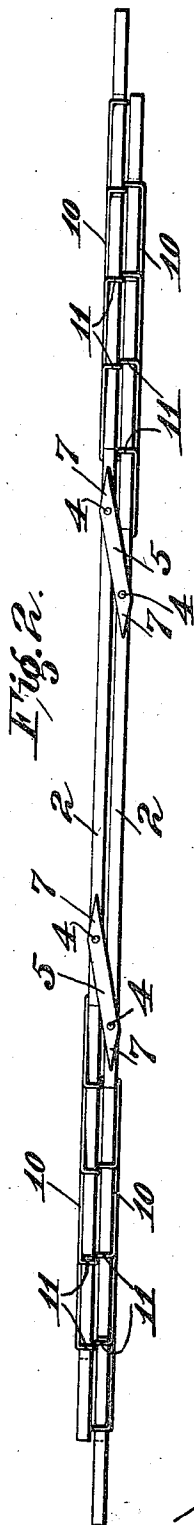


Fig. 2.

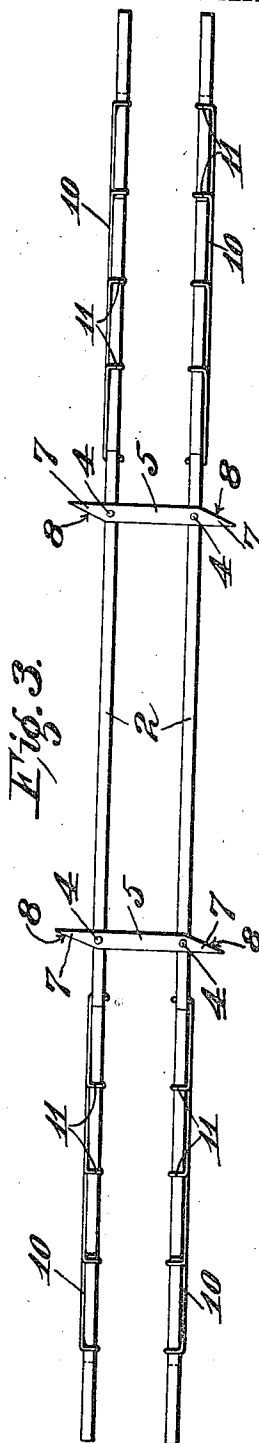


Fig. 3.

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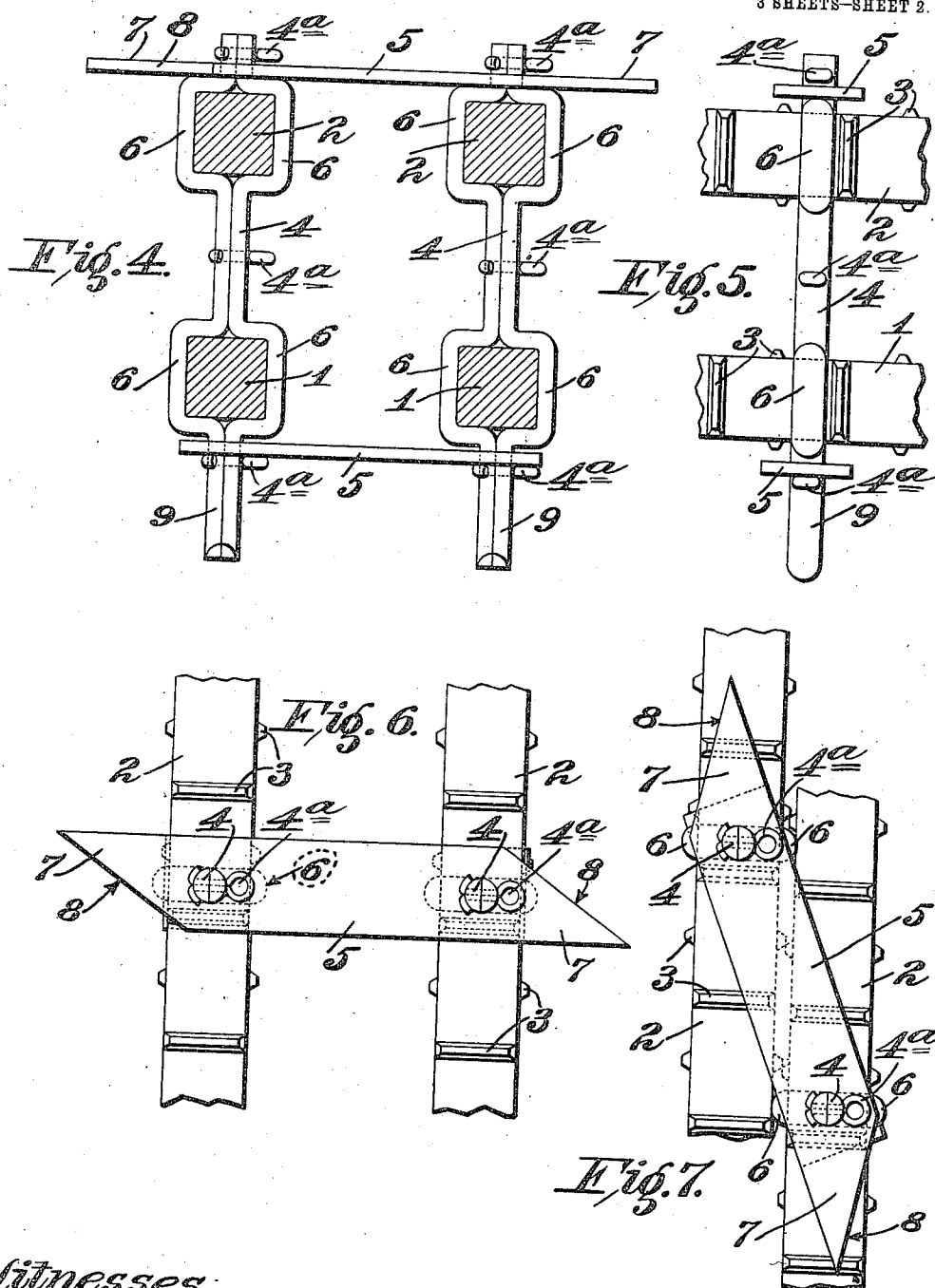
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3 SHEETS-SHEET 2.



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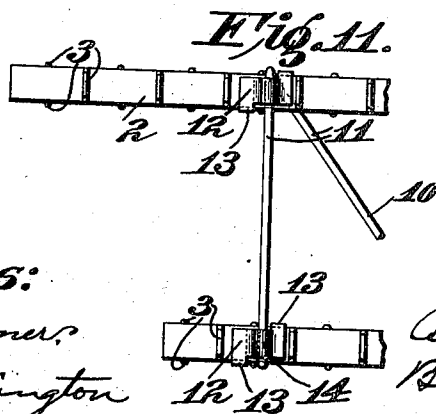
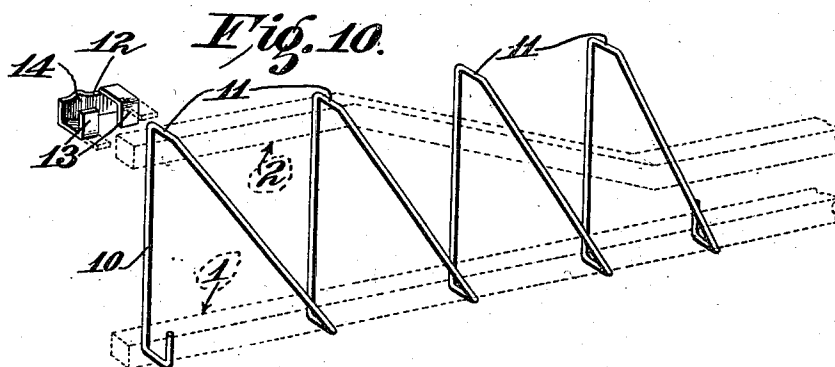
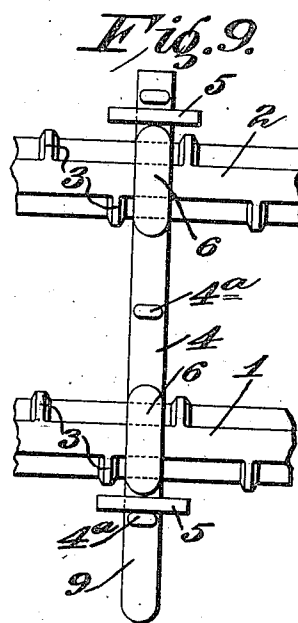
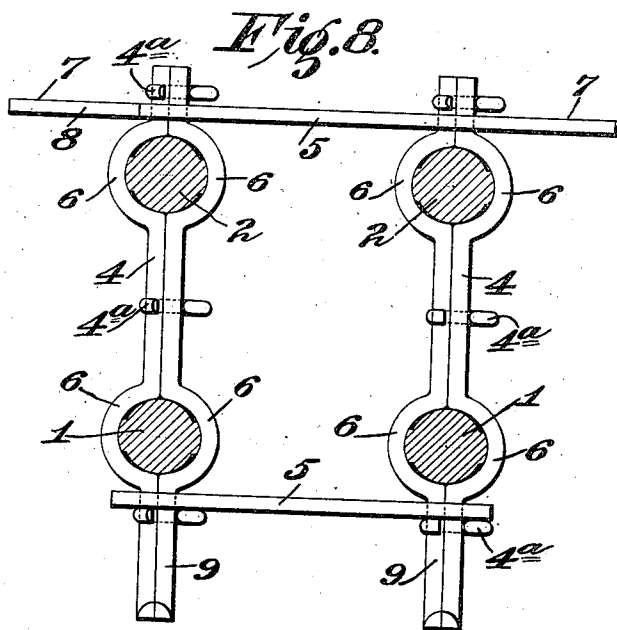
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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CONCRETE-REINFORCE.

1,043,204.

Specification of Letters Patent.

Patented Nov. 5, 1912.

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To all whom it may concern:

Be it known that I, ARTHUR P. CLARK, a citizen of the United States, and a resident of the city of St. Louis and State of Missouri, have invented a certain new and useful Improvement in Concrete-Reinforces, of which the following is a specification.

This invention relates to reinforces for concrete beams and the like.

The principal objects of the invention are to produce a simple and inexpensive collapsible unit frame construction which will not interfere with the flow of the concrete, to secure compactness when the frame is collapsed, to produce a continuous secondary reinforce which can be readily applied to the primary reinforcing members, so as to take care of the shearing stresses and diagonal tension stresses in the beam, and to attain certain other advantages hereinafter more fully appearing.

The invention consists in the parts and in the arrangements and combinations of parts hereinafter described and claimed.

In the accompanying drawings which form part of this specification and wherein like symbols refer to like parts wherever they occur, Figure 1 is a side elevation (omitting some details) of a collapsible reinforcing frame embodying my invention; Fig. 2 is a plan view showing the unit frame in its collapsed condition; Fig. 3 is a plan view showing the unit frame in its open or normal condition; Fig. 4 is a transverse vertical section through a preferred arrangement of unit frame comprising bars of square section; Fig. 5 is a fragmentary side elevation of the frame shown in Fig. 4; Fig. 6 is a fragmentary plan view showing the frame in open position; Fig. 7 is a fragmentary plan view showing the frame collapsed; Fig. 8 is a transverse vertical section similar to Fig. 4, showing a frame comprising bars of round section; Fig. 9 is a fragmentary side elevation of the frame shown in Fig. 8; Fig. 10 is a detail perspective view of a wire constituting a series of secondary reinforcing loops and also illustrating a fastening clip detached therefrom; and Fig. 11 is a fragmentary side elevation of the end portions of the primary members of a side frame, showing a portion of the secondary reinforcing wire secured thereto.

A collapsible reinforcing unit is illus-

trated in the drawings. In this construction, the primary reinforcing members of each side frame comprise a straight horizontal bar 1 at the bottom and a second bar 2 located above it, both of which are preferably corrugated or provided with transverse ribs 3. The middle portion of the upper bar 2 is parallel with the first mentioned bar 1, and, at each end of the middle portion, said upper bar inclines upwardly and thence extends horizontally to each end in conformity with the common practice. In some cases, the ends of the upper bars extend beyond the ends of the bottom bars. The two bars thus constitute the primary reinforcing members of a side of the unit frame are firmly held together by suitable spacing members or distance pieces 4 and the side frames or members of the complete unit frame are connected by links 5 which are pivoted to said distance pieces.

The distance pieces 4 each comprise two oppositely-disposed bars or straps having counterpart offset portions 6 into which the respective bars 1, 2 are fitted. The two members of the distance pieces 4 may be secured together in any suitable manner but preferably by cotter pins 4^a which are inserted through alining transverse holes in the respective companion members. The members of the distance pieces are preferably semi-cylindrical in cross section, so that the end and intermediate portions which are brought together make the end and intermediate portions of the distance pieces cylindrical.

The links 5 are perforated and the end portions of the distance pieces are projected therethrough and secured by the cotter pins. The end portions of the upper links 5 are extended some distance beyond the sides of the collapsible unit as at 7 for the purpose of properly spacing the several units when a multiplicity of the same are employed in reinforcing a beam or floor. That is, the several collapsible units are opened as they are assembled in position and the adjoining units are brought together until the ends of the upper links 5 touch in the same longitudinal plane. To eliminate unnecessary projecting portions when the unit frames are collapsed as shown in Figs. 2 and 7, the end portions 7 of the top link 5 are mitered or beveled as at 8. By this arrangement, the opposite diagonal corners which would

otherwise project some distance beyond the sides of the bars are removed and the collapsed units are thereby rendered more compact so as to take up less space in storage and transportation.

The bottom end portions 9 of the distance pieces 4 extend some distance beyond the bottom links 5 so as to bear upon the centering or false work and thereby support the intermediate portions of the bars and prevent the same from sagging.

The secondary reinforce comprises a continuous wire 10 which is looped successively to provide a group of secondary reinforcing members. This wire is fastened near one end of the lower bar of a side frame of the primary reinforce and thence extends vertically upward and over the outer end portion of the corresponding upper bar and thence downwardly at an inclination to and around the lower bar; thence up again and over the upper bar and down at an inclination to the lower bar and so on. Preferably, the several loops 11 of the wire reach to the same height, the outermost loops being in contact at their tops with the upper reinforcing bar, while the remaining loops extend above the portions of the bar inclosed by them, respectively. The wire thus constituting a group of secondary reinforcing members is secured by any suitable fasteners 12 to the main reinforcing bars and is preferably of a kind that has suitable rigidity.

A suitable fastener or clip consists of a blank of pliable metal of a width less than the thickness of the bar and provided with elongated lateral projections 13 at diagonally-opposite corners. These projections 13 are of such length that when the body portions lie flatwise against one side of a bar and the projections are bent, they will reach around the opposite side. A transverse groove 14 in the body portion 12 receives the wire, which is thus firmly clipped to the bar. These clips are shorter than the distance between the ribs or corrugations with which my reinforcing bars are provided and therefore, while they may be positioned upon the bar at any point along its length, when once clamped upon the bar are securely held from slipping along the bar, and thus provide additional bonding means between the bar and the concrete. An important advantage of this construction is that the number, spacing and inclination of the loops may be varied as desired, and that the continuous wire and the main reinforcing bars cooperate in stiffening the side frames and thus mutually protect each other in transit.

By the construction herein set forth, there is little or no obstruction to the flow of the concrete, yet the parts are securely held intact. It is noted that by reason of the ar-

allel frames being pivotally linked together, the construction may be collapsed compactly for shipment, in which condition it is less bulky and less liable to injury. So, too, it is noted that the primary and secondary reinforcing members being secured together, the frames are stiffened and not liable to be accidentally sprung out of shape.

While the foregoing description relates to a collapsible unit frame and frames having double side members, it is obvious that the invention may be embodied in a single reinforce or a unit frame having but a single primary reinforcing member or more than two thereof. So, too, it is obvious that it is not necessary that the parallel frames or members of a collapsible unit should be counterparts of each other.

What I claim is:

1. A concrete reinforce comprising members located in parallel vertical frames, the members of said parallel frames being held in proper relation to each other by vertical spacing members, and parallel links collapsibly connecting said frames together, said links comprising flat plates which are pivoted to said vertical spacing members.

2. A concrete reinforce comprising parallel tension members and rigid parallel links collapsibly connecting said members together, said links comprising flat plates which are pivoted inwardly from their opposite ends to said tension members so that their opposite end portions extend beyond the outer sides of said tension members when the same are in open position.

3. A collapsible reinforcing unit for concrete beams comprising parallel reinforcing bars and rigid parallel links collapsibly connecting said tension members together, said links comprising flat plates which are pivotally connected to said tension members and have their end portions extended beyond their pivotal points, so that said end portions project beyond the outer sides of said tension members when the same are in open position, and the diagonally-opposite corners of said links being mitered so that no portions of the links project beyond the outer sides of said tension members when the unit is collapsed.

4. A concrete reinforce comprising reinforcing bars located in parallel vertical frames, spacing members adapted to hold said bars in proper relation to each other, said spacing members comprising vertical bars arranged in pairs and having oppositely-disposed offset portions in which said reinforcing bars are seated, and rigid parallel links comprising flat plates which are perforated and pivotally fitted over the ends of said spacing bars.

5. A collapsible concrete reinforce comprising reinforcing bars secured together in parallel vertical frames, spacing members

for holding said reinforcing bars in proper relation to each other, said spacing members comprising pairs of bars having oppositely-disposed counterpart offset portions in which said reinforcing bars are seated, means for securing said spacing bars together, and rigid parallel links connecting said frames together, said links comprising flat plates which are perforated and have the opposite end portions of said spacing bars pivotally fitted therein, the opposite end portions of said links being extended beyond their pivotal points, so that said end portions project beyond the outer sides of said frames when the same are in open position.

6. A collapsible concrete reinforce comprising reinforcing bars secured together in parallel vertical frames, the bars of each frame being held in proper relation to each other by spacing members comprising pairs of bars of semi-circular cross section placed together flatwise and having oppositely-disposed counterpart offset portions in which the reinforcing bars are seated, means for securing said spacing bars together, and rigid links pivotally connecting the side frames together, said links comprising flat plates which are perforated to receive the end portions of said spacing bars.

7. A collapsible concrete reinforce comprising reinforcing bars which are secured together in parallel vertical frames, said bars being held in proper relation to each other by spacing members comprising pairs of bars of semi-circular cross section placed together flatwise and having oppositely-disposed counterpart offset portions in which the reinforcing bars are seated, means for securing said spacing bars together, and rigid parallel links pivotally connecting the side frames together, said links comprising flat plates which are perforated to receive the end portions of said spacing bars, and the opposite end portions of said plates extending beyond their pivotal points, so that said end portions extend beyond the side frames when the same are in open position.

8. A collapsible concrete reinforce comprising bars which are secured together in parallel vertical frames, said bars being held in proper relation to each other by spacing members comprising pairs of bars of semi-circular cross section placed together flatwise and having oppositely-disposed counter-

part offset portions in which the reinforcing bars are seated, means for securing said spacing bars together, and rigid parallel links pivotally connecting the side frames together, said links comprising flat plates which are perforated to receive the end portions of said spacing bars and the opposite end portions of said plates being extended beyond their pivotal points, so that said end portions extend beyond the side frames when the same are in open position, and the diagonally-opposite corners of said plates being mitered so that no portions of said plates project beyond the outer sides of said frames when the same are collapsed.

9. In a concrete reinforce, a reinforcing bar having transverse ribs thereon, and loops constituting shear members, said loops passing around said bar and secured thereto by clips seated on said bar and substantially fitting between successive ribs.

10. A concrete reinforce comprising a horizontal lower bar, an upper bar, members for permanently positioning said bars with relation to each other, a wire looped continuously around said bars, and clips for securing said wire to said bars, said clip consisting of a flexible blank having diagonally-opposite lateral extensions bent around the bar and a groove in the body portion to receive said wire.

11. A collapsible concrete reinforce comprising a plurality of frames and links pivotally connecting them together, each frame comprising a horizontal lower bar, an upper bar whose end portions are offset upwardly, members for permanently positioning said bars with relation to each other, and a wire secured to and looped continuously around the outer portions of said bars, said links being pivotally mounted on the positioning members of their respective frames.

12. A concrete reinforce comprising members located in parallel frames, the members of said parallel frames being held in proper relation to each other by spacing members, and parallel links collapsibly connecting said frames together, said links comprising flat plates which are pivoted to said spacing members.

St. Louis, Mo., April 15th, 1910.

ARTHUR P. CLARK.

Witnesses:

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