

[54] **CONCRETE REINFORCEMENT**

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[21] Appl. No.: **425,627**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 93,822, Nov. 30,
1970, Pat. No. 3,778,951.

[52] U.S. Cl. **52/646, 52/652, 52/686,**
52/719

[51] Int. Cl. **E04c 2/42, E04h 12/18**

[58] Field of Search 52/630, 645, 646, 648,
52/650-652, 664, 694, 719

[56] **References Cited**

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Attorney, Agent, or Firm—Karl F. Ross; Herbert
Dubno

[57] **ABSTRACT**

A concrete reinforcement is formed from at least one pair of L-section reinforcing elements each comprising a plurality of transversely extending angle members interconnected by longitudinal bars, at least one of which is disposed at the bend of the transverse elements. The legs of the L interdigitate and a clip connects the longitudinal bar with a leg of a transverse bar to secure the two reinforcing sections in basket-shaped or U-section relation.

10 Claims, 9 Drawing Figures

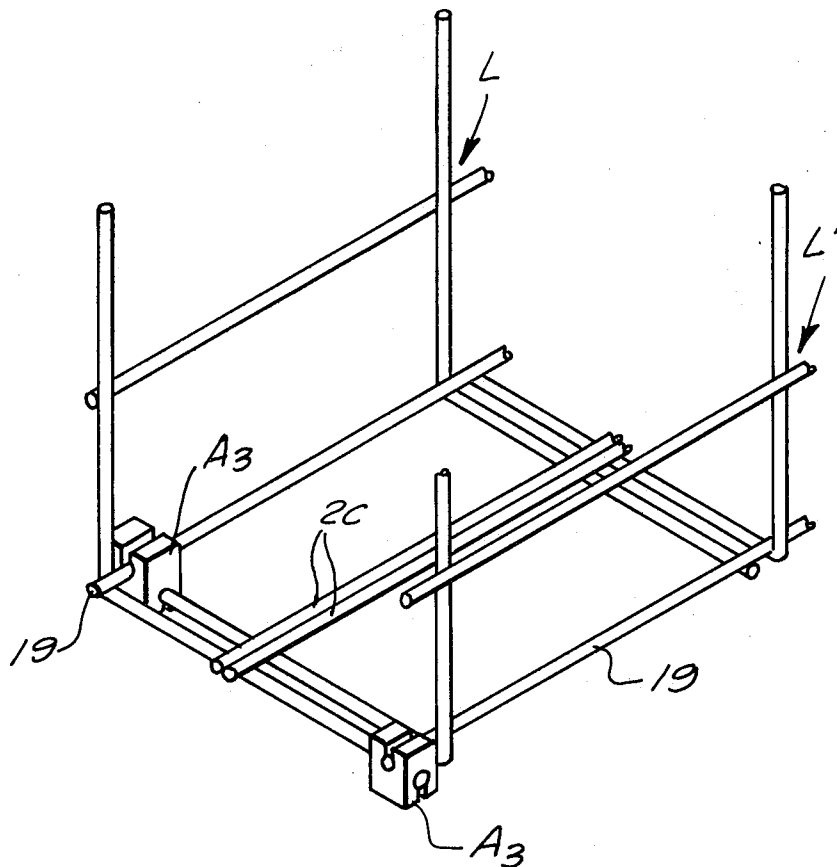


FIG. 1

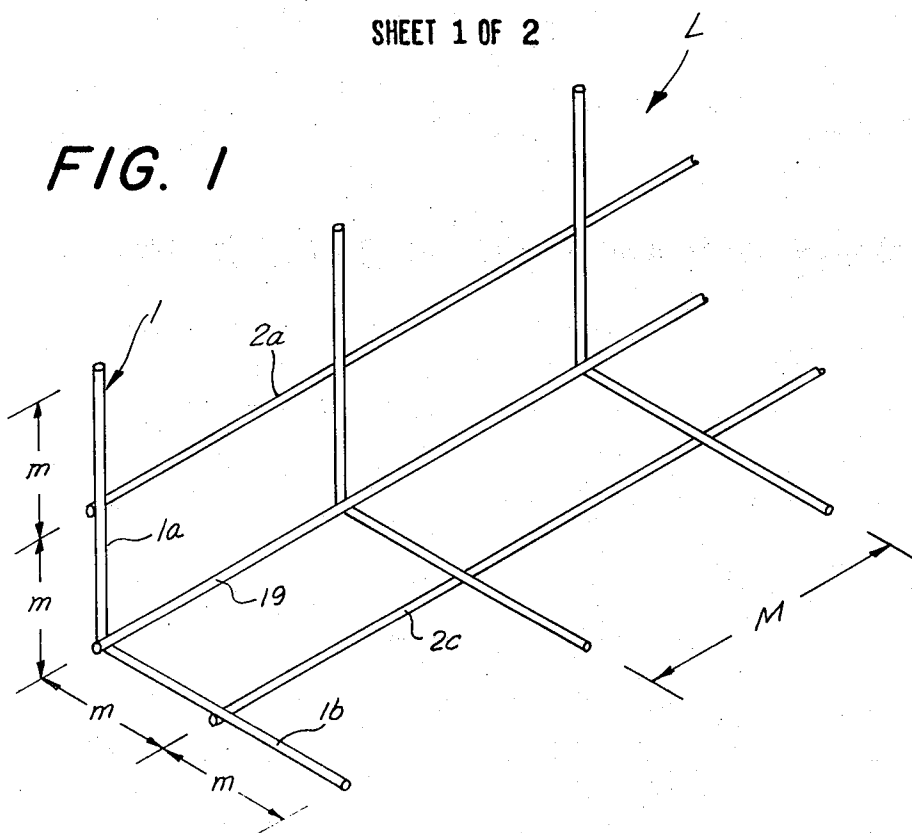


FIG. 3

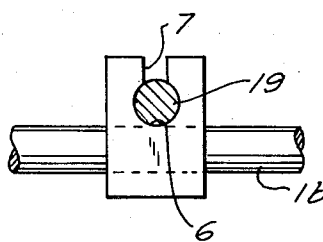


FIG. 2

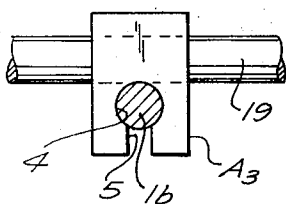


FIG. 8

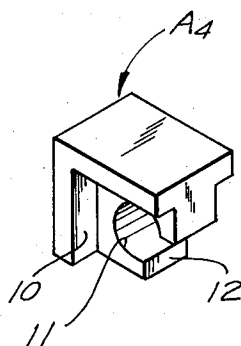


FIG. 4

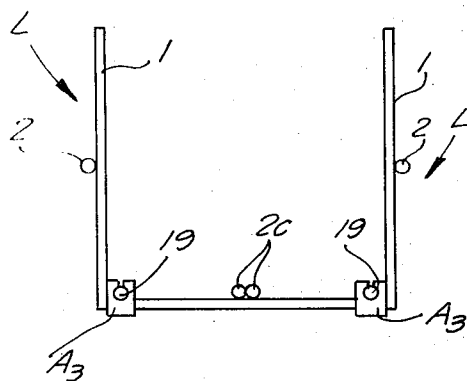


FIG. 5

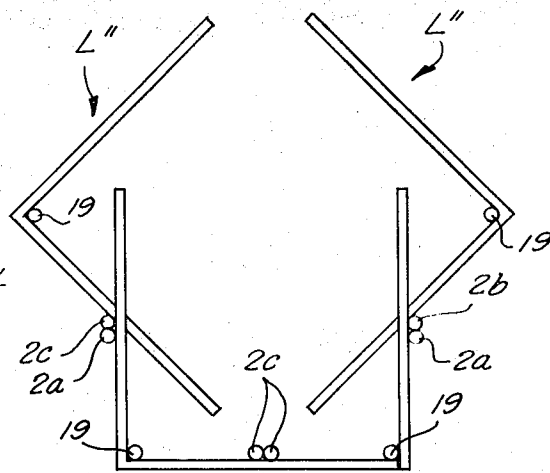


FIG. 6

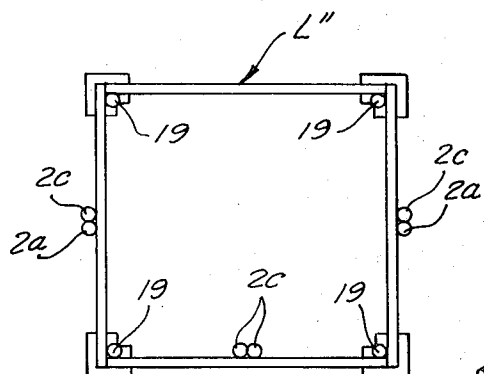


FIG. 7

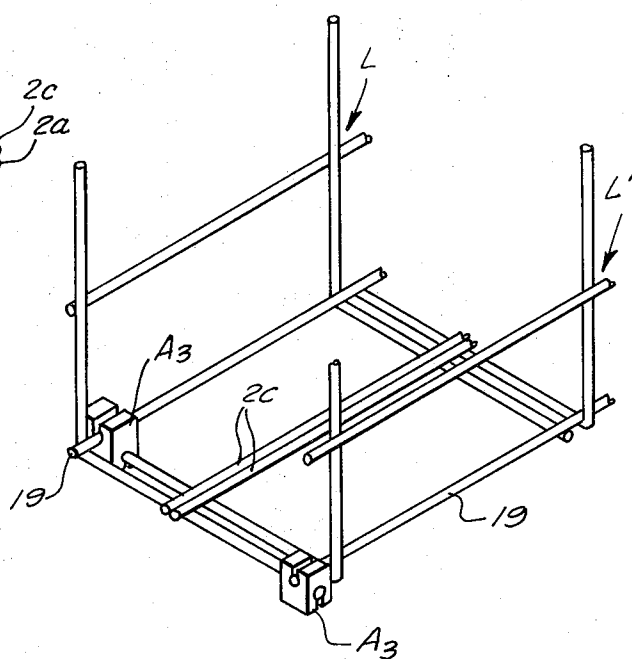
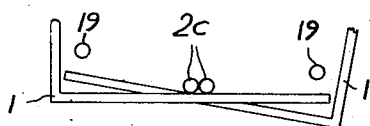


FIG. 9



CONCRETE REINFORCEMENT

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of application Ser. No. 93,822 filed Nov. 30, 1970 and now U.S. Pat. No. 3,778,951 and discloses subject matter originally disclosed therein.

FIELD OF THE INVENTION

The present invention relates to concrete reinforcements and, more particularly, to a concrete reinforcement for the fabrication of beams, girders, posts, columns and the like.

BACKGROUND OF THE INVENTION

The common method of assembling concrete reinforcements for the fabrication of beams, columns and the like is to tie a number of longitudinally extending reinforcing bars in mutually spaced parallel relation with some bars being located at corners of the column or beam. It has been proposed to prefabricate basket-like arrangements of such reinforcement and to erect them at the construction site and/or to assemble the reinforcements by tying together ladder-like arrangements having longitudinally extending bars transversely spaced by transverse bars welded or otherwise secured to the longitudinal bars. Such assemblies are of limited versatility and require complex tying arrangements to ensure a rigid basket-like or closed-section structure.

In the aforementioned application, I disclosed a system whereby L-section members can be interfitted by rotating one section about a longitudinal bar of another section and securing the two sections together by clips to form a basket-like or U-section structure which can, by the addition of similar L-sections be transformed into a C-section structure or even into a closed section. In that application, the claimed invention has clips secured in legs of the L's together.

OBJECTS OF THE INVENTION

It is the principal object of the present invention to provide an improved reinforcement for concrete beams, columns, and the like and, in general, for the formation of concrete structures having sides or portions lying at right angles to one another.

Another object of the invention is to extend the principles originally set forth in the above-identified application.

SUMMARY OF THE INVENTION

According to the present invention, these objects are attained with a concrete reinforcement which comprises at least two L-section reinforcement elements each comprising a multiplicity of L-shaped transverse bars and longitudinally extending bars interconnecting corresponding legs of the L-shaped bars with at least one longitudinal bar lying at or close to the bend of the L-shaped transverse bars, the transverse bars being secured to (e.g., by welding) each of the equispaced L-shaped bars which lie in mutually parallel planes perpendicular to the longitudinal bars. According to the invention, legs of the two reinforcement elements are interdigitated so that they are coplanar and at least one leg of one element is secured to the longitudinal bar of the bend of the other section by a clip.

DESCRIPTION OF THE DRAWING

The above and other objects, features and advantages of the present invention will become more readily apparent from the following description, reference being made to the accompanying drawing in which:

FIG. 1 is a perspective view of an L-section element for reinforcement in accordance with the present invention;

FIG. 2 is a side-elevation view of a clip according to the invention;

FIG. 3 is a front view of the clips;

FIG. 4 is an end view of a basket-shaped reinforcement according to the invention;

FIG. 5 is a view similar to FIG. 4 illustrating how the basket-shaped structure may be converted into a box-shaped structure;

FIG. 6 is a view of the completed box-shaped structure seen in end elevation;

FIG. 7 is a view similar to FIG. 1 showing two interdigitated reinforcing elements forming the basket structure;

FIG. 8 is a perspective view of a clip for the system of FIG. 6; and

FIG. 9 is an exploded view showing the members of FIG. 7 prior to being joined by a clip.

SPECIFIC DESCRIPTION

In FIG. 1 I have shown the basic structural element in accordance with the present invention. This element is an L-section reinforcement L comprising a plurality of transverse bent right-angle L-shaped bars 1 having legs 1a and 1b and lying in planes which are mutually spaced and parallel to one another. The spacing between the bars may be a modular distance M or the product of this modular distance and an integer. Each of the transverse bars is secured at one leg 1a to a longitudinally extending bar 2a at the outside of the L, e.g., by welding, so that the center of the bar 2a is located at a modular distance m from either end of the leg or is spaced from this end by the product of an integer and this modular spacing.

Similarly, a longitudinally extending bar 2c is welded to the inside of the legs 1b and is likewise spaced from the ends of the legs by the distance m. At the crook of the L or the bend of the L-shaped bars 1 there is provided a further longitudinal bar 19 which lies at the elbow along the interior of the section.

Two such sections may be brought together by interdigitating the legs 1b and bringing the longitudinal bars 2c of the two sections into lateral abutment, whereupon the two sections are mutually rotated about the contact line of the bars 2c until the legs 1b of both sections are coplanar. This position has been illustrated in FIG. 7 for the sections L and L'.

FIG. 4 shows the two sections in their assembled positions. The two sections are rigidly fixed together by clips A3 as has been illustrated in FIGS. 2, 3, 4 and 7. More particularly, each clip A3 has a bore 4 opening at a slot 5 so that it may be pressed over the leg 1b of one of the sections and, at right angles to the bore 4, another bore 6 (FIG. 3) with a slot 7 adapted to be pressed over and receive the bar 19. The leg 1b and the bar 19 are thus received with a snap fit in the respective bores. The clips A3 are composed of a resilient synthetic resin. It will be apparent that, with clips A3 spaced along each of the rods 19 (FIG. 7), the U-

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section reinforcement will have considerable rigidity and will be self-supporting.

In FIG. 5 I show how the U-section of FIG. 4 may be converted into a C-section or box structure. A similar L-section element L'' is placed with its longitudinal bar 2c upon each longitudinal bar 2a and rotated in the direction of the arrows for mutual interdigitation. The legs of these elements may also be held with the clips A3 when they are rotated into coplanar relationship with the legs of the U-section or may abut a flange 10 of a clip A4 whose bore 11 and slot 12 enable it to be clipped on to the longitudinal bar 19. The flange 10 is L-shaped so that the legs of each reinforcement section may rest against the inner surface of one of the shanks of the flange. The completed box-like structure has been illustrated in FIG. 6. The reinforcement elements L'', as shown, may have their longitudinal bars 2c located along the exterior of the L and may omit the bars 2a.

In FIG. 9 the bar 19 is separated from the L-shaped transverse bars 1 and, after the two sections have been interdigitated, the bar 19 is introduced and connected by clips to the transverse bars of both sections.

I claim:

1. A concrete reinforcement for beams, columns and the like, comprising a pair of L-section reinforcement elements each comprising a plurality of longitudinally spaced L-shaped transverse bars lying in respective parallel planes, a first longitudinal bar secured to said transverse bars at the bends thereof and extending perpendicular to said planes, and a second longitudinal bar secured to codirectionally extending legs of the transverse bars and spaced from said first longitudinal bar, said elements having said codirectionally extending legs interdigitating and lying in a common plane parallel to said longitudinal bars with said second longitudinal bars of the two elements laterally abutting, and clips interconnecting the first longitudinal bar of one element and a leg of the other element.

2. The reinforcement defined in claim 1 wherein the second longitudinal bar of each element lies along the interior of the L-section formed by the element and each element further comprises another longitudinal bar interconnecting the other legs of said transverse bars and parallel to said first and second longitudinal bars of each element.

3. The reinforcement defined in claim 2 wherein said

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clips each have a pair of bores extending at right angles to one another and are formed with slots communicating with said bores to enable said legs and said first longitudinal bars to be thrust into the respective bores.

4. The reinforcement defined in claim 2 wherein said clips are formed with bores and slots enabling said clips to receive said first longitudinal bars and are further provided with flanges forming stops for said legs.

5. The reinforcement defined in claim 2, further comprising another L-section element having L-shaped transverse bars and longitudinal bars with legs interdigitated with legs of one of the first-mentioned pair of elements whereby said reinforcement has a box-like cross-section.

6. The reinforcement defined in claim 2 wherein said second and another longitudinal bars are spaced substantially mid-way along the length of the respective legs.

7. The reinforcement defined in claim 2 wherein said longitudinal bars are welded to said transverse bars.

8. A concrete reinforcement for beams, columns and the like, comprising a pair of L-section reinforcement elements each comprising a plurality of longitudinally spaced L-shaped transverse bars lying in respective parallel planes, and a longitudinal bar secured to codirectionally extending legs of the transverse bars at an intermediate location thereon, said elements having said codirectionally extending legs interdigitating and lying in a common plane parallel to said longitudinal bars with said second longitudinal bars of the two elements laterally abutting; another longitudinal bar lying along the bends of the transverse bars of one element and at the ends of the interdigitated legs of the other element; and clips interconnecting said other longitudinal bar to legs of said elements.

9. The reinforcement defined in claim 8 wherein each element further comprises another longitudinal bar interconnecting the other legs of said transverse bars and parallel to the previously mentioned longitudinal bars.

10. The reinforcement defined in claim 8 wherein said clips each have a pair of bores extending at right angles to one another and are formed with slots communicating with said bores to enable said legs and said first longitudinal bar to be thrust into the respective bores.

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,863,416
DATED : 4 February 1975
INVENTOR(S) : Georgi OROSCHAKOFF

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading, after line 21 insert:

-- 30 Foreign Application Priority Data

28 November 1969 Austria A 11166/69 -- .

Signed and Sealed this
thirtieth Day of March 1976

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks