Jan. 8, 1957 C. DOBELL 2,776,471

METHOD OF ERECTING PRESTRESSED FLOOR SECTIONS

Filed Jan. 9, 1952 5 Sheets-Sheet 1

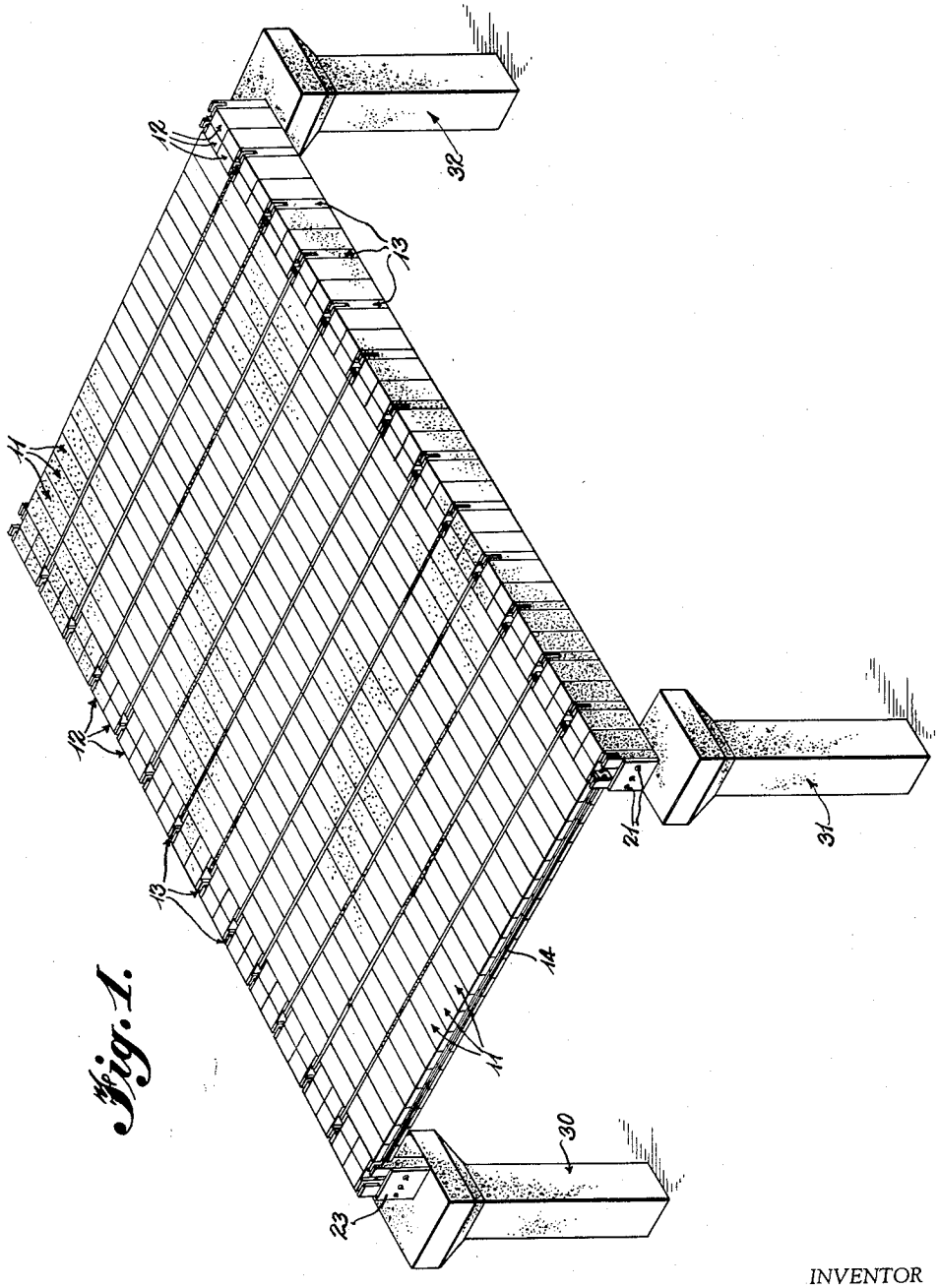


Fig. 1.

INVENTOR
Curzon Dobell

BY Stevens, Davis, Miller and Mosher
ATTORNEYS

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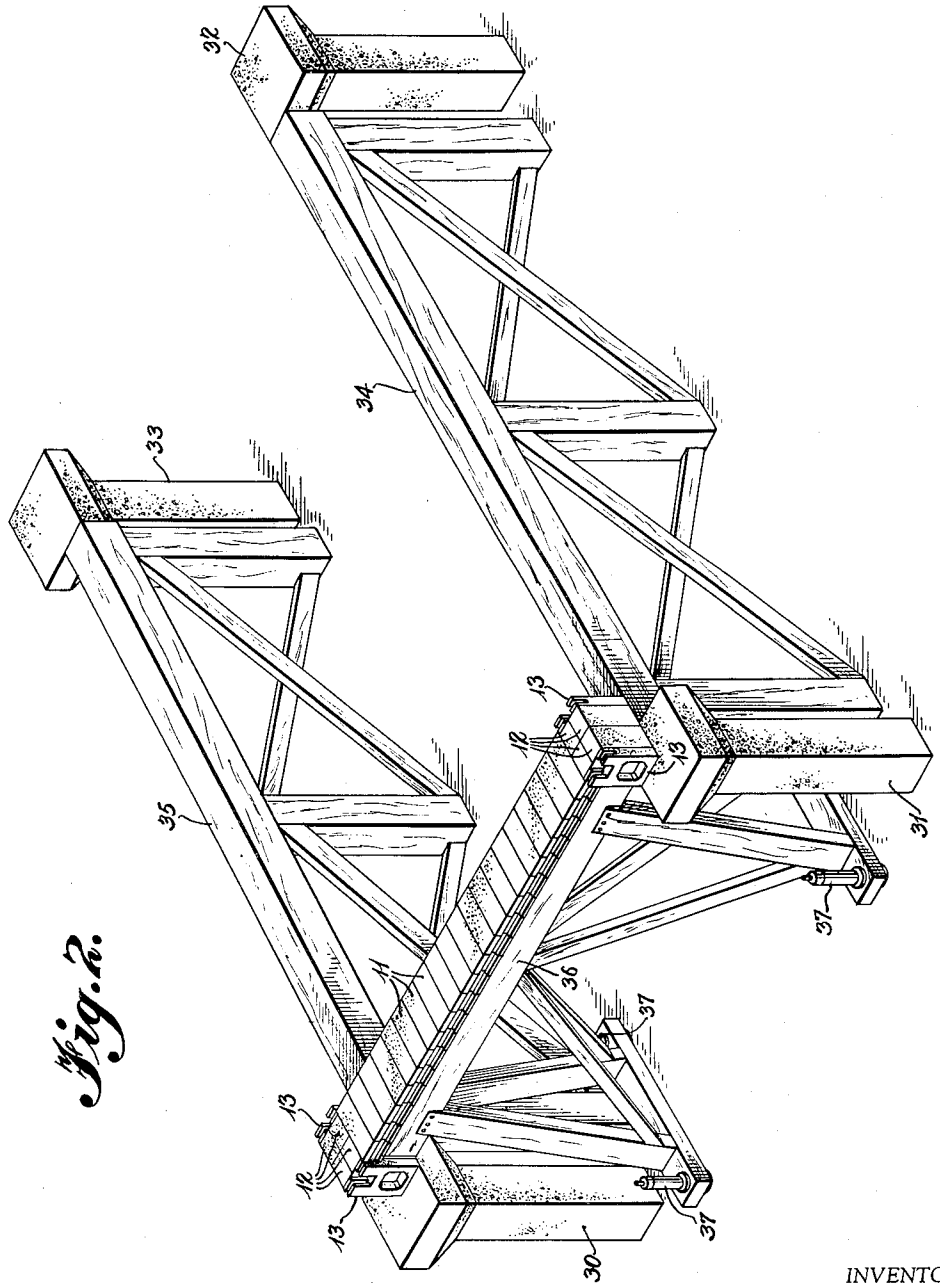


Fig. 2.

INVENTOR
Curzon Dobell

BY Stevens, Davis, Miller & Mosher
ATTORNEYS

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Fig. 3.

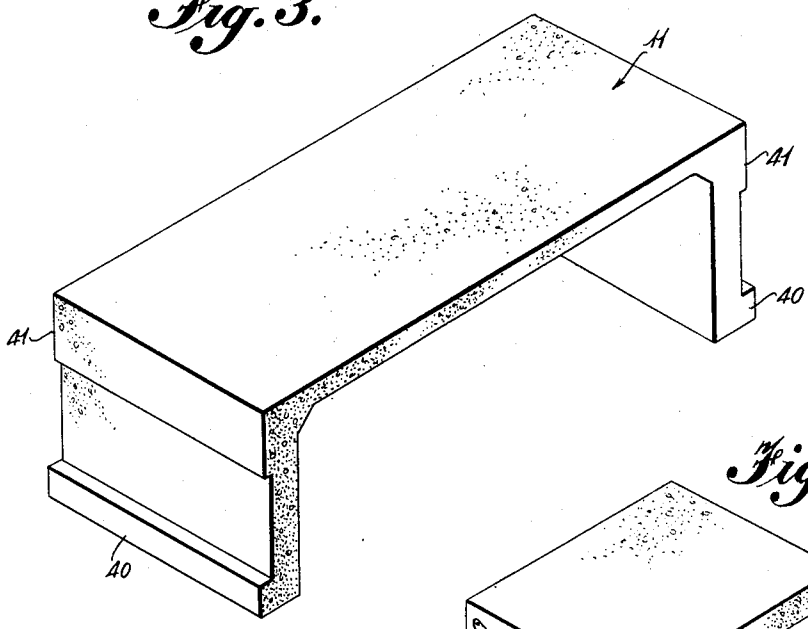


Fig. 4.

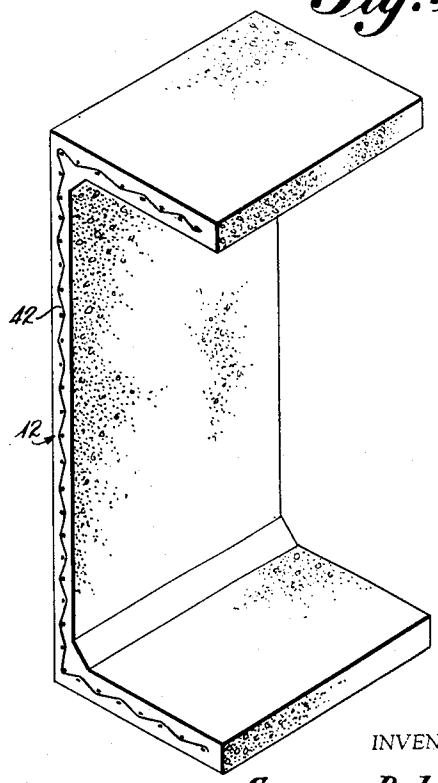
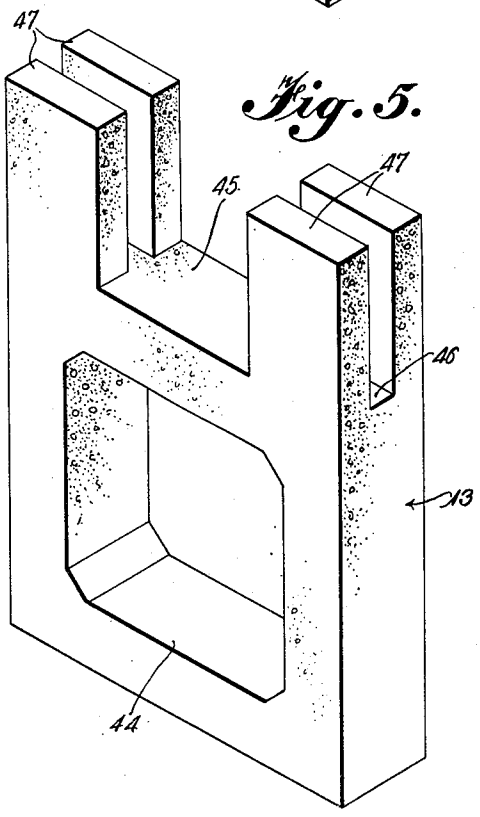


Fig. 5.



INVENTOR

Curzon Dobell

BY Stevens, Davis, Miller & Mosher

ATTORNEYS

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Fig. 6.

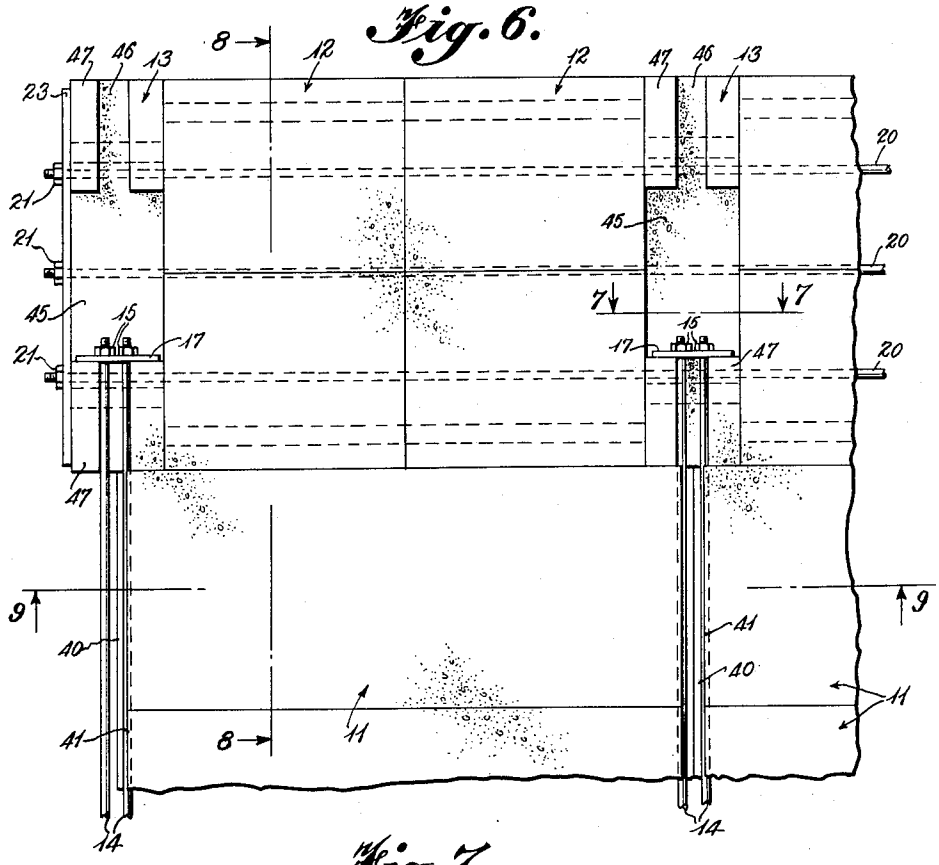
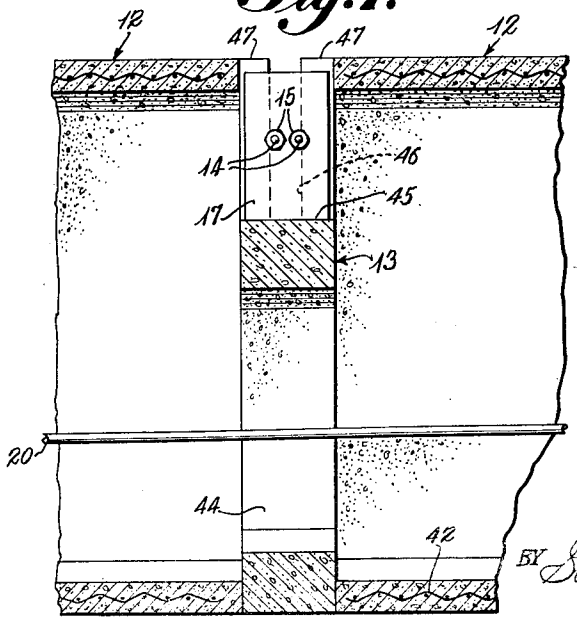


Fig. 7.



INVENTOR

Curzon Dobell

BY Stevens, Davis, Miller & Mosher

ATTORNEYS

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METHOD OF ERECTING PRESTRESSED FLOOR SECTIONS

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Fig. 8.

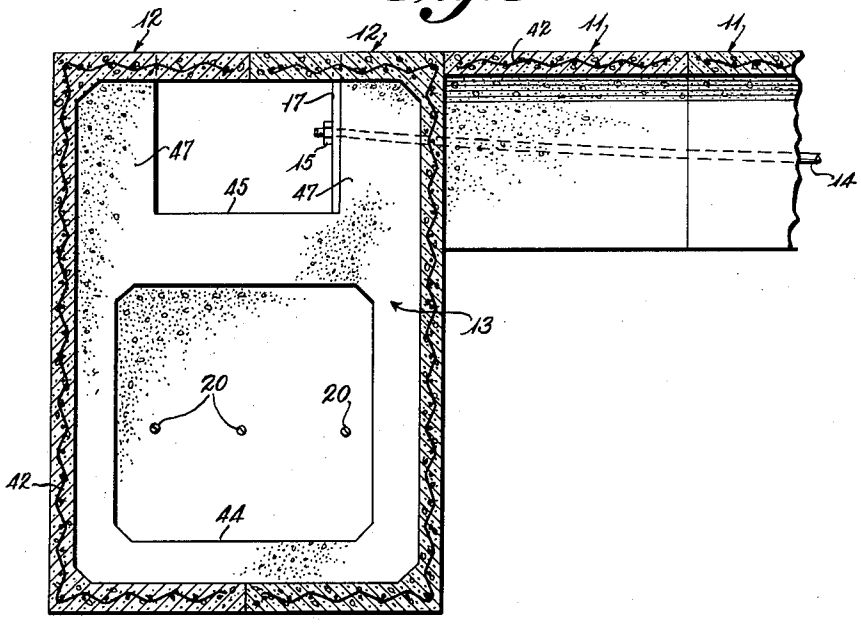
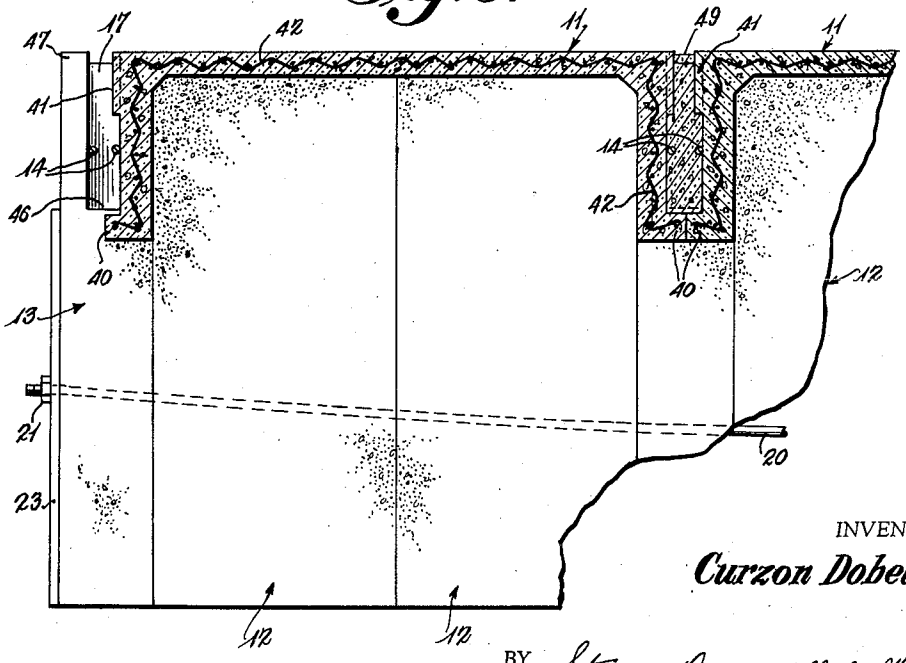


Fig. 9.



INVENTOR
Curzon Dobell

BY Stevens, Davis, Miller & Mosher
ATTORNEYS

United States Patent Office

2,776,471

Patented Jan. 8, 1957

2,776,471

METHOD OF ERECTING PRESTRESSED FLOOR SECTIONS

Curzon Dobell, Bronxville, N. Y., assignor to The Preload Company, Inc., New York, N. Y., a corporation of Delaware

Application January 9, 1952, Serial No. 265,597

1 Claim. (Cl. 29—452)

This invention relates to reinforced concrete constructions and more particularly to a floor section for buildings, bridges or the like, which section does not require steel or preformed concrete beams.

In this application reference will be made to floor sections and this is intended to mean not only the sections of floors of buildings but also the sections of floors of bridges, sections of roofs and other construction sections involving similar problems.

Prior to this invention, it was common practice to start with four corner supports for a floor section, place two longitudinal beams on these supports, place a series of transverse beams at relatively close spacing across the longitudinal beams and cover this network of beams with a concrete slab or slabs. Either the beams were manufactured separately and transferred to the final position or, if they were manufactured in situ, they had to be supported by relatively tremendous amounts of scaffolding.

It is the purpose and object of this invention to provide a simple, efficient and easy method of erecting floor sections, and to produce a simple, efficient, and relatively light weight floor section, and yet a floor section that has adequate strength for all purposes.

The method and floor section of this invention will be most quickly and easily understood by reference to a specific preferred embodiment illustrated in the drawings, but it is to be understood that numerous modifications may be made in what is specifically shown by the drawings, without departing from the principles of the method herein disclosed or from the basic construction of the floor section, or elements of the floor section, herein disclosed.

In a general way, the floor section of this invention consists of a series of similar blocks tied together by reinforcing material under tension and at the same time tied at each end to an end construction consisting of additional similar blocks used in a somewhat different way and some different blocks used to supplement the other end blocks. This construction forms a cross-support for floor section in one direction and reinforcing which passes through a series of these assembled elements at their ends and ties the series of these assembled elements into a completed floor section which is under tensioned reinforcement in both directions.

In a general way, the method of this application consists in the formation of one transverse sub-section of floor at a time which is then prestressed to make it self-supporting between its ends, followed by the tying together of a number of these sub-sections to make a completed floor section. Under certain circumstances the process may be reversed and the end elements of the sub-sections may be tied together first to make longitudinal beams, after which the sub-sections may be assembled and tied together to complete the structure. It should be also understood that reference is made to longitudinal and transverse simply as a matter of convenience and that the sub-sections may either lie across the narrow dimension of the floor section or across the longer dimension.

In the drawings:

Figure 1 is a perspective view of a completed floor section resting on four corner columns;

Figure 2 is a similar view of four columns that are to support a floor section, but with the scaffolding and one sub-section of flooring in place, instead of a completed floor section;

Figure 3 is a perspective view of one of the surface blocks of which the floor sections is comprised;

Figure 4 is a perspective view of a similar block modified for use as one of the girder blocks at the end of a sub-section of flooring;

Figure 5 is a perspective view of one of the anchor blocks that is used as a part of the girder construction;

Figure 6 is a detailed plan view of one corner of the floor sections shown in Figure 1;

Figure 7 is a detailed view taken on line 7—7 of Figure 6;

Figure 8 is a detailed view taken on line 8—8 of Figure 6; and

Figure 9 is a detailed view taken on line 9—9 of Figure 6

As illustrated in Figure 1, the floor section of this invention consists of a plurality of blocks **11**, shown in perspective in Figure 3 and forming the main part of the floor, a plurality of blocks **12** shown in Figure 4 and put together as shown in Figure 8 to form a box-shaped girder. The blocks **12** are separted by anchor blocks **13** shown in perspective in Figure 5 so that the blocks **13** are also a part of the box-shaped girders extending along the longitudinal edges of the floor section.

When assembled the construction is held together transversely by a series of tensioned reinforcing wires or rods **14** shown in Figures 6, 7, 8 and 9 and as shown in these figures, these reinforcing wires or rods are held at their ends by nuts **15** threaded thereon and resting against a load bearing plate **17**, this plate in turn resting against an inner face of the anchor blocks **13**. The blocks **12** and **13** are tied together to form a girder by tensioned reinforcement **20** which passes longitudinally therethrough and is secured by nuts **21** at their ends. The nuts press against a load bearing plate **23** that in turn rests against the end anchor block **13**.

In constructing a floor section in accordance with this invention, it is preferred to start with the series of columns or supports **30**, **31**, **32** and **33** as shown in Figure 2 and to construct relatively strong scaffolding **34** and **35** extending longitudinally between the two pairs of longitudinally aligned pillars. A temporary movable and adjustable scaffold **36** is then positioned transversely between the two sets of pillars and scaffolding at one end thereof. This temporary adjustable scaffolding **36** is arranged to be wide enough to support one transverse subsection of flooring and may have jacks **37** at its corners so that it can be readily adjusted to the proper height and level to support the blocks of one sub-section of flooring. After one sub-section of flooring has been assembled and prestressed, the temporary scaffolding **36** is moved one step towards the other end of the structure and another sub-section of flooring is assembled thereon.

With this arrangement it can be seen that there will be needed only three types of blocks, namely, block **11** shown in Figure 3, block **12** shown in Figure 4 and block **13** shown in Figure 5. Block **11** will normally have an overall length of about 4 foot six inches and an overall width of about 1 foot ten and a half inches and an overall thickness of about one foot six inches. It will preferably carry a flange **40** extending outwardly about an inch and a quarter along each lower edge and a second flange **41** extending outwardly about a half inch along its upper edge.

The block **12** shown in Figure 4 will be exactly like the

block **11** shown in Figure 3 except that it will not have any flanges. Thus, both blocks may be made in the same mold by simply inserting a liner in the mold to prevent the formation of flanges as blocks of the type of block **12** are being made. In both of these blocks there will normally be wire reinforcement, preferably a wire mesh **42**, such as is shown in Figure 4. This wire mesh however is normally embedded in the block and can not be seen unless the block is cut away.

The only other shape of block that is used in the preferred construction is the anchor block **13** shown in perspective in Figure 5. This block has an enlarged opening **44** through the lower part thereof and it is through this opening that the longitudinal reinforcement passes to bind together and strengthen the edge girders. The top of the block **13** is slotted both longitudinally at **45** and laterally at **46**. This provides four upstanding lugs **47**, adapted to receive and hold the anchor plate **17** against the pull of the reinforcement **14** as shown in Figures 6, 7 and 8. The anchor block **13** is also appropriately reinforced by having wire or wire mesh embedded therein.

When floor sections are to be built, blocks corresponding to the three types shown in Figures 3, 4 and 5 can be manufactured in quantity and easily transported to the site. An assembly of blocks **11**, **12** and **13** is then made on the scaffold **36** as shown in Figure 2, reinforcement **14** is placed alongside of the block **11** and anchored in the anchor blocks **13** as shown in Figures 6, 7, 8 and 9, on both sides of the sub-sections and this completes the assembly of the sub-section so that it will support itself. The temporary scaffolding **36** is then moved one step down the construction and another sub-section is assembled. This is continued until all of the sub-sections are assembled, at which time they are all self-supporting in a transverse direction but are not self-supporting in a longitudinal direction. The reinforcement **20** is then passed through the openings in the blocks **12** and **13** which are to form the girders, the anchor plates **23** are placed into position and the rods are tightened thus forming self-supporting girders along the longitudinal edges of the construction. Thereafter the scaffolding **34** and **35** may be removed. Grout will be applied to the cavities **49** as shown in Figure 9, to seal the reinforcing wires **14** in place in the construction and present a smooth surface.

It is possible, although definitely not preferred, to assemble all of the blocks **12** and **13** at the beginning and place the reinforcement **20** in these blocks and tighten the reinforcement to form these blocks into the original girders. This has the advantage of lightening the load on the supporting scaffolds **34** and **35** but it also makes much more difficult the fitting of the blocks **11** into the space between the end blocks and often makes necessary the cutting of blocks or the filling of space at the ends of the blocks **11**. For this reason, the method first described is preferred.

It is also possible to change the shapes of the various blocks in many minor respects without departing from the spirit of this invention and still other changes will be apparent to those skilled in the art. It is intended therefore that the scope of this invention be limited only as indicated by the appended claim.

What is claimed is:

A method of constructing a generally rectangular, generally horizontal, concrete floor upon four spaced corner supports, that comprises erecting a supporting scaffold extending between two adjacent supports and having an upper load-bearing surface which, together with the load-bearing surfaces of the corner supports, forms a continuous support for one edge of said floor, erecting a second, similar, supporting scaffold between the other two spaced corner supports, erecting a third supporting scaffold extending crosswise between the edge supports and having an upper load-bearing surface which, together with the load-bearing surfaces of the edge supports, forms a continuous support for a transverse section of said concrete floor, forming a transverse section of said concrete floor by aligning a series of concrete blocks upon said transverse support and the adjacent portions of the edge supports, combining said blocks into a transversely extending, self-supporting beam by means of prestressed reinforcement extending longitudinally of said beam, moving the transversely extending supporting scaffold longitudinally of the edge supports so as to remove it from under the formed transverse section, forming a second transverse section thereon in the same manner, continuing the process until a series of adjacent transverse sections have been formed, placing prestressed reinforcement through the ends of the transverse concrete sections, said prestressed reinforcement overlying the edge supports so as to tie the adjacent ends of the transverse concrete sections together to form concrete beams overlying the edge supports, and removing the scaffolding.

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