

- [54] PRESTRESSED ROD LAYING MEANS AND METHOD

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- [51] Int. Cl. B23p 19/04

- [58] **Field of Search** 29/452, 433, 241, 200 A;
425/111, DIG. 17, DIG. 122, DIG. 130;
254/29 A

- [56]
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Primary Examiner—Charlie T. Moon

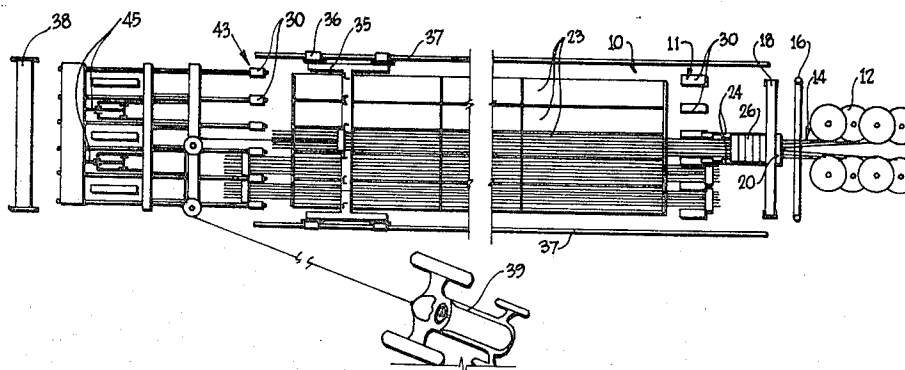
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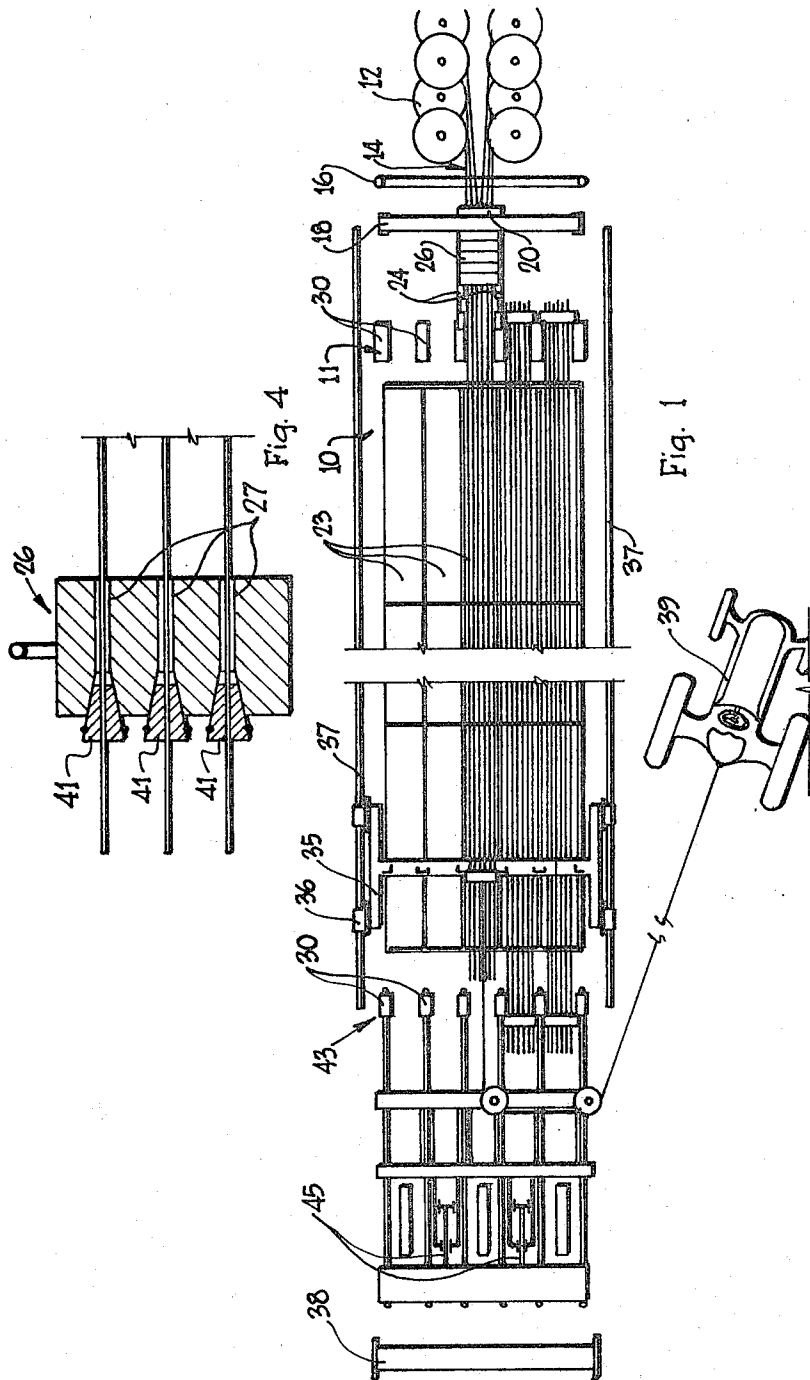
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ABSTRACT

Means for laying a series of wires in parallel array within a series of aligned moulds in a bay wherein concrete is to be poured while the wires are retained in a strained condition comprising bolster means at each end of the bay, a series of reels at one end having the wires thereon, a series of blocks each containing apertures arranged in the pattern of the wires to be laid, abutment members for supporting blocks on each bolster, a trolley straddling the moulds and movable along the bay over the moulds, and collets on the wires arranged to frictionally engage respective wires when the collets are driven into respective apertures in a block.

10 Claims, 4 Drawing Figures





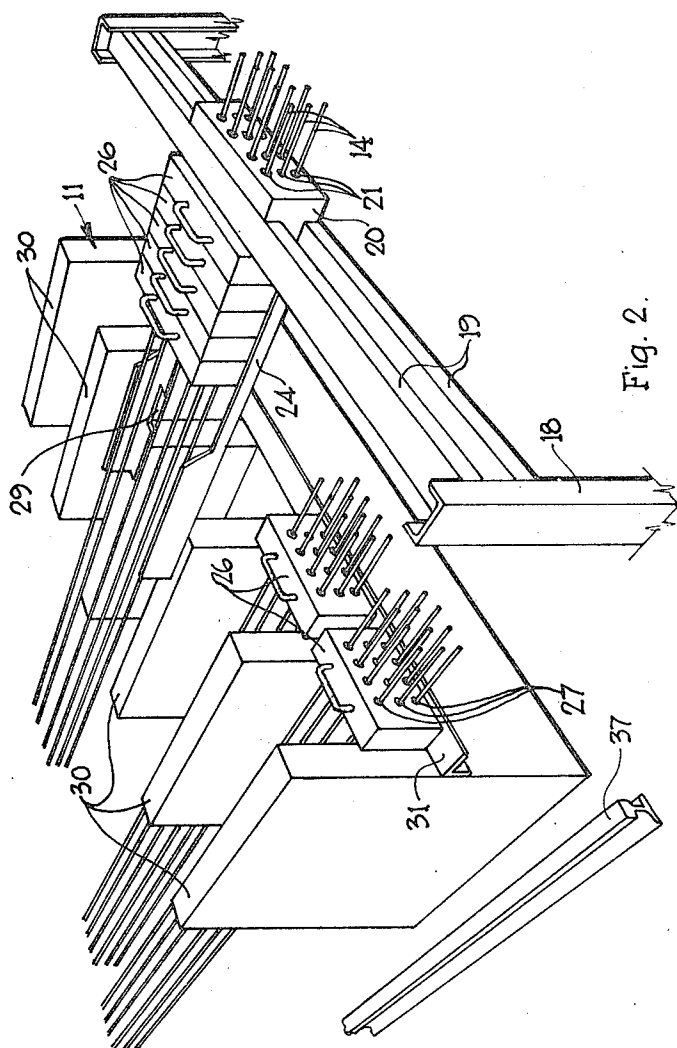


Fig. 2.

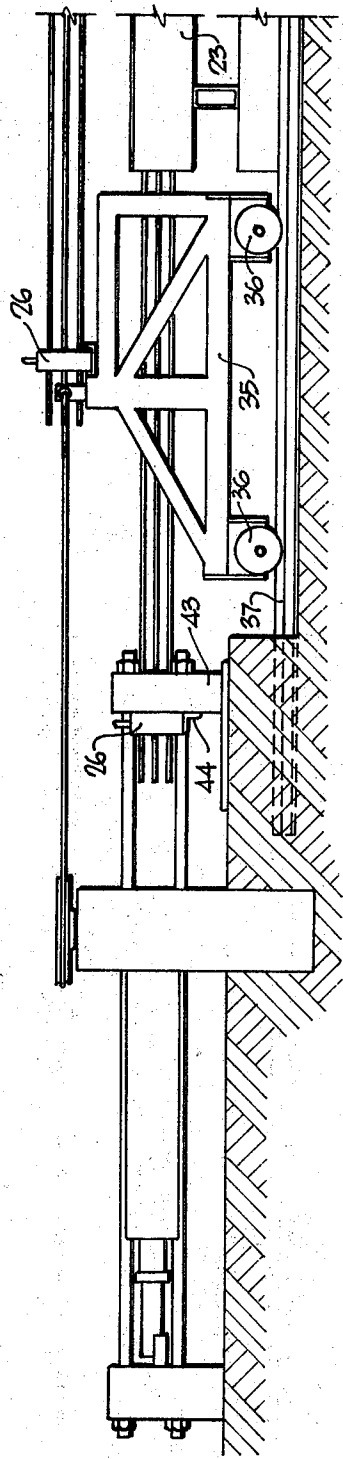


Fig. 3

PRESTRESSED ROD LAYING MEANS AND METHOD

This invention relates to means for and method of the laying of rods (wires) which are to be used in the prestressing of concrete articles.

Many concrete articles are produced by pouring concrete around rods which are under tension, the concrete is cured, and the rods are severed after the concrete has been cured, the rods then holding the concrete in a prestressed compression which enables the concrete to withstand heavier loadings than it would otherwise stand for the same dimensions of unstressed concrete and steel.

In the production of articles which need to be produced in large numbers, for example, railway ties (sleepers), it is usual for a plurality of wires to be run out simultaneously from large reels at one end of a pouring bay, the wires being retained in their correct locations within each of a series of moulds between the two ends of the bay, the wires being tensioned between bolsters at the ends of the bay, the concrete being poured, and after pouring and curing the wires being severed at the ends of the bay and between the adjacent moulds so as to form the reinforcing rods within the ties. However, for large production it is not feasible to pour concrete in one single row and frequently the concrete is to be poured in a series of rows simultaneously. This then provides optimum usage of the available equipment. However, one of the most time consuming portions of the entire operation is the laying out of the wires from which the reinforcing rods are formed, and typically there may be eighteen wires in each group and there may be five groups. It is not economical for the wires to be laid individually because of the time consumed, but on the other hand it is not regarded as being economically feasible to have say ninety reels of wire positioned at an end of a bay. Consequently, it has been the practice in the past to lay out a single group of wires at one time and in this example, eighteen reels are required and there are five operations of laying out the wires.

The main object of this invention is to provide improvements whereby the speed at which the groups of wires may be laid out can be increased, and the amount of labour can be reduced.

The means according to one form of the invention consists of means for the laying of a series of wires in parallel array within a series of aligned moulds in a bay wherein concrete is to be poured while the wires are in a strained condition, comprising:

- a. bolster means at each end of the bay of aligned moulds,
- b. a series of reels at one end of the moulds having said wires thereon,
- c. a plurality of blocks each containing a series of apertures arranged in the pattern of the wires to be laid at least two of said blocks having their apertures in alignment,
- d. spaced abutment members on each bolster, the space between the nearest edges of any pair of adjacent abutment members being less than the width of a said apertured block but greater than the width of said pattern, and each pair of abutment members having therebetween a block support for supporting a said apertured block,

e. a trolley straddling said moulds and being movable from one end of the bay of aligned moulds to the other, the trolley carrying on it block support means, and

f. a series of collets on respective wires each so constructed and arranged as to frictionally engage its wire when the collet is inserted in a respective said aperture in a block.

The method (according to a form of the invention) of laying a series of wires in parallel array within a series of aligned moulds, wherein the means are as defined above, comprise the method of laying a series of wires in parallel array within a series of aligned moulds in a bay, wherein the means are according to claim 1, and comprising the steps:

- a. aligning at least two said apertured blocks and passing said wires through said apertures,
- b. engaging a group of said series of collets on respective wires near their ends and inserting in respective said apertures of the last block through which the wires pass to thereby lock the wires in said last block,
- c. supporting said last block on the block support means of said trolley,
- d. moving the trolley from the reel end of the bay to the other end to thereby lay the wires within the series of aligned moulds,
- e. transferring the last block from the trolley to the block support of said abutment members at said other end,
- f. supporting the next last block on the block support of said abutment members at the reel end of said bay, and
- g. engaging a further group of said collets on respective said wires near the next last block and inserting in the apertures of the next last block through which the wires pass to thereby lock the wires in said next last block.

An embodiment of the invention is described hereunder in some detail with reference to and is illustrated in the accompanying drawings, in which:

FIG. 1 is a diagrammatic plan view of a bay containing a series of aligned moulds,

FIG. 2 is a fragmentary perspective view which illustrates inter alia, aligned apertured blocks, a bolster and block support means at the reel end of the bay, and

FIG. 3 is a fragmentary elevation which illustrates inter alia, the trolley, bolster and abutment means at the other end of the bay, and

FIG. 4 is a section through an apertured block, showing wires secured thereto by collets.

In this embodiment a bay 10 for the pouring of concrete into a series of aligned moulds is provided with a bolster 11 at each end. At the first end there is provided a plurality of reels 12 (in this embodiment 18) each carrying a spool of wire which will eventually become reinforcing rods, the reels 12 being arranged so that the wires designated 14 can be drawn out in close proximity to one another, that is, in the pattern in which they are to be embedded in concrete ties.

A trestle 16 is positioned inwardly of the reels 12 and supports the wires 14 above the ground so that the wires do not become contaminated with dust. A steel frame 18 (FIG. 2) is erected at the first end of the bay but inwardly from the reels 12, the steel frame having a pair of second transverse guide members 19 positioned one above the other, the guide members guiding a pattern plate 20 for transverse movement, the pattern plate 20 containing a plurality of apertures 21 which

determine the pattern of the positioning of the reinforcing wires for any one row of a series of aligned moulds designated 23. The pattern plate 20 can be moved from one location to another across the transverse guide means 19 as the successive rows of wires are to be laid out.

The pattern plate 20 has projecting forwardly therefrom a pair of spaced parallel angle members 24 which rest upon the bolster 11 at a point spaced inwardly from the frame 18, and the arrangement is such that as the pattern plate 20 is moved across so the angle members also move across from one side of the bay 10 to the other. The angle members constitute guide means, and support a plurality of blocks 26, there being the same number of pairs of blocks as there are rows of moulds 23. The blocks 26 are load bearing members, and each is provided with a pattern of apertures 27 corresponding exactly to the apertures in the pattern plate 20, so that the wires from the reels may be passed through the pattern plate 20 and simultaneously through all the blocks 26. The angle guide members 24, however, have cut-out portions 29 in their horizontal flanges at the inner end, so that the innermost block 26 may be dropped through the cut-out portions to abut the bolster 11, the bolster 11 having a series of upstanding abutment arms 30 and a block support 31 extending across the bolster 11 and below the arms 30 to support the blocks 26. The bolster 11 is anchored to a concrete slab in the ground.

The last of the blocks 26 through which the wires 14 pass is positioned onto a trolley 35 which is carried by wheels 36 which run on tracks 37 positioned one on each side of the bay 10, and the trolley 35 is coupled with a hauling winch 38 or a tractor so that it can be moved to the other end of the bay 10. The tractor 39 is also arranged to return the trolley.

In operation the wires 14 are fed from the reels 12 and through the pattern plate 20 and then through all the blocks 26 simultaneously, (the blocks 26 being retained in alignment on the angle guide members 24), the wires being secured to the last block through which they pass by means of tapered collets 41 (FIG. 4). The last block 26 is then positioned onto the trolley 35 which is beyond the bolster 11, and the trolley is hauled outwardly by the hauling winch or tractor until that block is positionable against the tensioning bolster 43 at the other end of the bay 10, and is supported by a support 44 in like manner to the other end. The block is positioned on the bolster as shown in FIG. 3 and the trolley is returned (above the rods which have been laid out in this manner). The next last block 26 is then moved forwardly, the locking collets are secured to it and the block is dropped through the cut-out portions 29 in the angle guide members 24 to abut the bolster 11 at the reel end of the bay. The wires are then cut, but at a point between the remaining blocks 26 and the bolster 11. The pattern plate and guide means are then moved transversely in the transverse guide means of the steel frame, until aligned with the next pair of bolsters, and the operation is repeated. After the wires have been positioned, the tensioning bolster 43 is moved by hydraulic cylinders 45 to which it is secured so as to stress the wires, and a wet mix of concrete is then poured into the moulds to thus form the ties.

A brief consideration of the above embodiment will indicate that the labour saving is very considerable when compared with previously proposed methods,

and accordingly much greater utilisation of equipment is achieved by means of this invention.

What we claim is:

1. Means for the laying of a series of wires in parallel array within a series of aligned moulds in a bay wherein concrete is to be poured while the wires are in a strained condition, comprising:

- a. bolster means at each end of the bay of aligned moulds,
- b. a series of reels at one end of the moulds respectively having said wires thereon,
- c. a plurality of blocks each containing a series of apertures arranged in the pattern of the wires to be laid, at least two of said blocks having their apertures in alignment for receiving wires fed therethrough,
- d. spaced abutment members on each bolster, the space between the nearest of any pair of adjacent abutment members being less than the width of (a) any said apertured block but greater than the width of said pattern, and each pair of abutment members having therebetween a block support for supporting a said apertured block,
- e. a trolley straddling said moulds and being movable from one end of the bay of aligned moulds to the other, the trolley carrying on it block support means for moving the wires across the mould, and

f. a series of collets on respective wires each so constructed and arranged as to frictionally engage its wire when the collet is inserted in a respective said aperture in a block.

2. Means according to claim 1 wherein the abutment members of each bolster comprises a plurality of spaced upstanding arms, and each bolster further comprises a transversely extending block support beneath the arms.

3. Means according to claim 2 further comprising a pair of vertically spaced transversely extending guide members positioned between the reels and the bolster which is at the reel end of the bay, a pattern plate supported for transverse movement by the guide members and containing apertures arranged in said pattern and of diameter to allow respective said wires therethrough, and guide members arranged to support said blocks with corresponding block apertures aligned with one another and also aligned with the apertures of the pattern plate.

4. Means according to claim 2 wherein the bolster means at the reel end of the bay is secured to a concrete footing while the bolster means at the other end of the bay is carried on the movable elements of a pair of hydraulic cylinders.

5. Means according to claim 1 further comprising hauling means for the hauling of said trolley along the bay.

6. Means according to claim 5 wherein said means for hauling the trolley comprises either winch means or a tractor.

7. The method of laying a series of wires in parallel array within a series of aligned moulds in a bay wherein concrete is to be poured, and having bolster means at each end thereof; a series of reels at one end of the moulds respectively having said wires thereon; a plurality of blocks each containing a series of apertures arranged in the pattern of the wires to be laid; spaced abutment members on each bolster, the space between

the nearest edges of any pair of adjacent abutment members being less than the width of any said apertured block but greater than the width of said pattern, and each pair of abutment members having therebetween a block support for supporting a said apertured block; a trolley straddling said moulds and carrying on it block support means; and a series of collets on respective wires;

the method comprising the steps:

- a. aligning at least two said apertured blocks and passing said wires through said apertures;
- b. engaging a group of said series of collets on respective wires near their ends and inserting in respective said apertures of the last block through which the wires pass to thereby lock the wires in said last block,
- c. supporting said last block on the block support means of said trolley,
- d. moving the trolley from the reel end of the bay to the other end to thereby lay the wires within the series of aligned moulds,
- e. transferring the last block from the trolley to the block support of said abutment members at said other end,
- f. supporting the next last block on the block support of said abutment members at the reel end of said bay, and
- g. engaging a further group of said collets on respective wires near the next last block and inserting in the apertures of the next last block through which the wires pass to thereby lock the wire in said next last block.

8. The method of aligning a series of wires in parallel array in a series of aligned moulds in a bay which further comprises a pair of vertically spaced transversely extending guide members positioned between the reels and the bolster which is at the reel end of the bay, a pattern plate supported for transverse movement by the guide members and containing apertures arranged in said pattern and of diameter to allow respective said wires therethrough, and guide members arranged to support said blocks with corresponding block apertures aligned with one another and also aligned with the apertures of the pattern plate,

comprising the further steps of positioning all said blocks on said guide members with corresponding apertures of said blocks in alignment with one another and also in alignment with the corresponding apertures of said plate, passing the wires through respective said aligned apertures, and then performing steps (b), (c), (d), (e), (f) and (g) of claim 7.

9. The method according to claim 8 comprising the further step of severing the wires between guide members and the pattern plate after step (g), moving the pattern plate together with said guide members and said blocks remaining thereon transversely to be in a position of alignment with a further series of aligned moulds.

10. The method according to any one of claim 7 comprising the further step of moving said abutment members at said other end to thereby position the wires.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,827,132 Dated August 6, 1974

Inventor(s) Robert Lyndon Bratchell

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

Column 3, line 41, "ries" should be --wires--.

Column 3, line 64, "tO" should be --to--.

Signed and sealed this 5th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents