

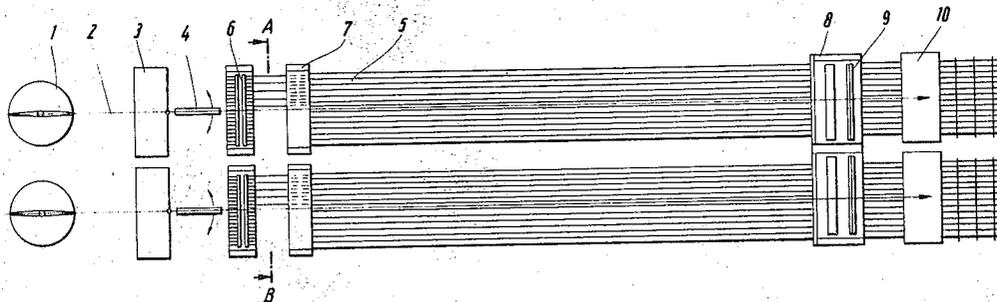
- [54] **APPARATUS FOR PRODUCTION OF CONCRETE REINFORCEMENT LATTICE** 3,604,091 9/1971 Martin..... 228/5 X  
3,647,131 3/1972 Hahne..... 228/5
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- [58] **Field of Search** ..... 228/4, 5, 6, 13, 228/15, 18, 47; 83/105, 106, 107, 219, 220
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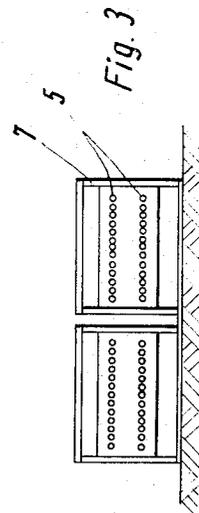
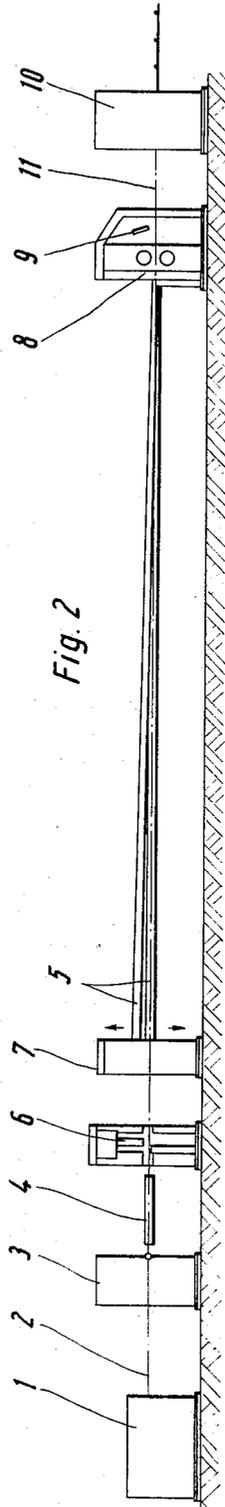
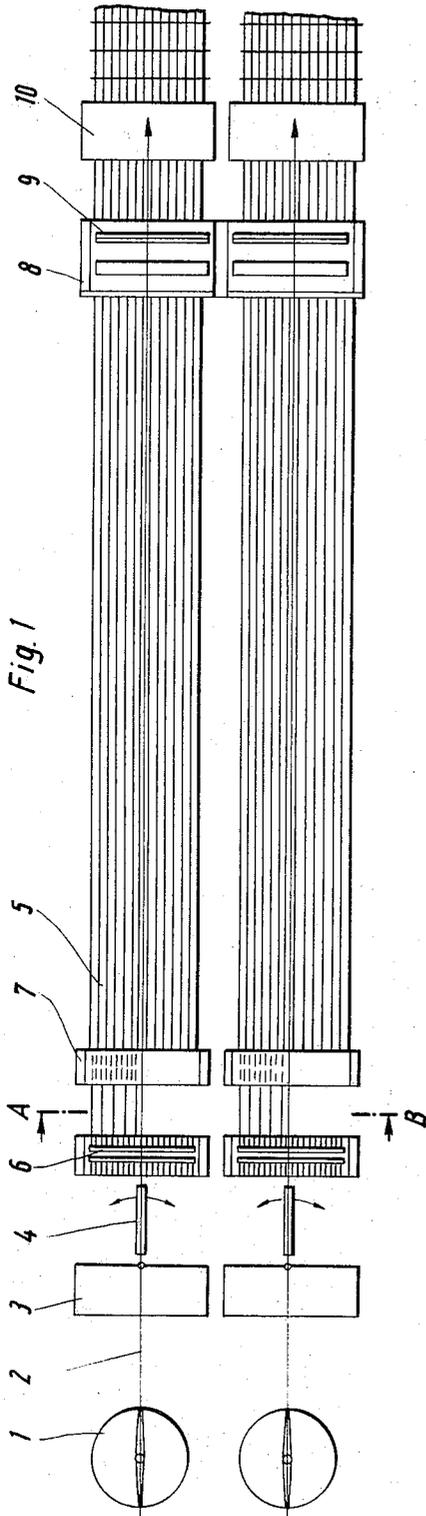
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[57] **ABSTRACT**

Apparatus for forming wire mats for reinforced concrete in which wire is drawn from a reel and successively directed to parallel, adjacent support tubes, the wire being successively cut after a predetermined length of the wire has been deposited into a respective tube. The cut lengths of wire constitute the longitudinal wires of the mat, and these lengths are advanced from the tubes as a unit and fed into a welding machine where transverse lengths of wire are welded to the longitudinal wires at points of intersection.

**8 Claims, 3 Drawing Figures**





# APPARATUS FOR PRODUCTION OF CONCRETE REINFORCEMENT LATTICE

## BACKGROUND

### 1. Field of the Invention

The invention relates to apparatus for producing lattice mats for concrete reinforcement purposes consisting of longitudinal and transverse wire, in which a plurality of parallel wires, which are supplied from wire rints and which are pre-hardened and straightened before or after their being pulled from the rings, are assembled to the final length of the longitudinal wires in the lattice mat and then forward to a lattice welding machine in which the longitudinal wires are connected to the transverse wires so as to form a lattice mat.

### 2. Prior Art

In a conventional method for forming lattice mats, one wire rod ring is provided for each longitudinal wire. Prior to introducing the wire rod into the lattice welding machine, the wire is cold hardened in a wire stretching apparatus, and, subsequently thereto, is run through a straightening device. As a result of the simultaneous drawing of all longitudinal wires from the wire rod rings, there must be provided one wire stretching apparatus and one wire straightening device for each longitudinal wire. In case it is intended that the wires be additionally provided with ribs, an additional ribbing device must be provided for each longitudinal wire. As a result of the different tightness of winding in the wire rod rings, the method of simultaneous drawing of all longitudinal wires is prone to developing frequent breakdowns. Since the wire rod rings, as a rule, are not of exactly equal capacity, the production process must be stopped every time when one of the wire rod rings is consumed. The thus caused production losses are considerable, resulting from the large number of the wire rod rings needed for this method. In order to minimize the time needed for exchanging the wire reels, a crane must be always available in order to insert the new wire rod.

In another conventional method for production of lattice mats for concrete reinforcement purpose, the wire rod is first straightened and provided with ribs in a cold operation. The ribbed wire is then stored in rings until the time of its further processing to a lattice mat. It is necessary in the further processing of the wire into a lattice mat that the wire stored in rings be again straightened prior to its forwarding to the lattice welding machine.

## SUMMARY OF THE INVENTION

It is an object of the present invention to provide a relatively inexpensive apparatus which makes possible continuous production of lattice mats for concrete reinforcement purposes.

This objective is achieved according to the invention by an apparatus which operates in such a manner, that the assembling operation for the longitudinal wires pulled from a wire rod ring is effected such that the wire rod for the first longitudinal wire is forwarded to a position corresponding to its final place in the lattice mat and then it is cut to length whereafter the wire rod for every further longitudinal wire to be cut to length is subsequently forwarded to its final position parallel to and adjacent the longitudinal wire, which has previously been cut to length, and then cut to length, the longitudinal wires which have already been cut to

length being held in their final positions until all of the family of longitudinal wires for the lattice mat are in place.

The method conducted by the apparatus according to the invention has the advantage that only one signal drawing device (and possibly a cold deformation device) is needed for all of the longitudinal rods of a single lattice mat. The rod which has still to be drawn is always fed to a position adjacent a rod which is already in its final position. The rods which have already been drawn are retained in their final positions until the time when the entire family of longitudinal rods for a lattice mat is assembled. The method according to the invention does not require any transportation devices to transport the drawn longitudinal rods away in order to assemble them at another place in a family of longitudinal rods and to place them in a proper position therein so as to produce a lattice mat. The manufacturing process can be accomplished continuously, since the end of the wire rod ring can be connected to the beginning of the next wire rod ring during the drawing operation.

Advantageously, two families of longitudinal wires are assembled alternately one after the other, wherein one family of longitudinal wires which has already been assembled is forwarded to the welding machine while the other family of longitudinal wires is being assembled. In this embodiment of the invention, the production of the lattice mats is achieved continuously, since there is no need for a waiting period after one family of longitudinal wires has been assembled to allow for the transportation of this family of longitudinal wires to further operational stages before the assembling operation of another family of longitudinal wires can be started.

The process effected by the apparatus according to the invention is particularly advantageous in manufacturing and technical respects, when the lattice mats are to be manufactured from shaped wire. In this case, according to a further embodiment of the invention, the wire rod is cold deformed after the drawing operation, for instance, provided with ribs by means of rolls. The drawing and the straightening operations in such case and using this method can be accomplished by means of a driven rib rolling device. The mutually welded beginnings and ends of the wire rod rings to be drawn subsequently to each other are equalized in the rib rolling device, so that they disappear in the final product.

An apparatus which is particularly suitable according to the invention comprises: a storage reel from which a single wire rod can be drawn by means of a drawing device provided with a straightening device; and a pivotable switching means which is located behind the drawing device and which guides the wire rod, the switching means having a front end facing the entrance funnels of guides adapted to receive the wires. The switching means introduces the front ends of the longitudinal wires into successive guides. The guides are generally straight and are located in parallel adjacent relation. A cutting apparatus is mounted between the guides and the switching means, and a transporting device is located behind the guides to feed the family of longitudinal wires to the welding machine.

Preferably, the drawing device is provided with means for cold deformation and/or ribbing of the wire rod.

According to still another embodiment of the invention, in order to ensure absolutely continuous produc-

tion of the lattice mats, two groups of parallel guides are provided and located above each other, and as a group their entrance funnels are alternately positioned adjacent the outlet end of the switching means.

The particular advantages of the invention are seen in the fact that the apparatus can be relatively inexpensive, since only one drawing device, and possibly one cold deformation device, are needed for the assembling operation of the longitudinal wires of a lattice mat from a single wire rod. Conversely, the conventional devices for production of lattice mats require one drawing and one cold forming device for every longitudinal wire. The breakdowns, in the production, which result from the different tightness of winding of the wire rod rings in the process of simultaneously drawing a large number of parallel extending longitudinal wires, are not encountered in the device according to the invention. The drawing of the wire rods for the longitudinal wires accomplished continuously in the method of the invention, since the end of one ring is attached to the beginning of the next ring. A crane does not have to be immediately available for the exchange operation of the empty reels, since the exchange operation may be accomplished any time during the drawing operation of the wire from the other reel, i.e., in the course of continuous production.

#### BRIEF DESCRIPTION OF THE DRAWING

The invention will be explained in greater detail with reference to an embodiment of the invention as illustrated in the accompanying drawing wherein,

FIG. 1 is a top plan view showing diagrammatically two adjacent devices for production of lattice mats for concrete reinforcement purposes according to the invention;

FIG. 2 is a side elevational view of the arrangement in FIG. 1; and

FIG. 3 is a diagrammatic illustration of the device according to FIG. 1 as seen in the direction of the arrows A-B.

#### DETAILED DESCRIPTION

Two devices are shown in FIG. 1 for forming longitudinal wires of reinforcement mats, each of the devices including a rotatable storage reel 1 which carries two rings of wire rod. The end of the first wire rod ring is welded to the beginning of the second wire rod ring in a butt weld. The wire rod 2 is drawn off from the first wire rod ring by means of a drawing device 3, and fed to a switching means 4, whose rear end is pivotally supported on the drawing device 3 in a position to receive the wire discharged therefrom. The switching means 4 is laterally tiltable so that the wire rod emerging from the switching means 4 can be guided in succession to the entrance of adjacent parallel tubes 5 which serve as guides for the wire. A cutting apparatus 6 is provided between the outlet of the switching means 4 and the entrances of the tubes 5, said cutting apparatus being provided with a cutter bar. The tubes 5 are arranged in two groups which are located above each other as seen in FIG. 3. The individual groups of tubes 5 can be raised or lowered by means of a threading device 7, so that the tubes can be positioned so as to be in alignment with the wire rod emerging from the cutting apparatus 6. A transporting device 8 is mounted at the exit openings of the tubes 5, the transporting device being provided with two rollers, behind which there is provided a stop

9 which is selectively tiltable out of the moving path of the longitudinal wires. It can be seen in FIG. 2 that the exit openings of the tubes 5 are located at the same elevation at the inlet of the transporting device 8. A welding machine 10 is mounted behind the transporting device 8, in which the family of longitudinal wires introduced into the same is welded to transversely introduced transverse wires. The family of longitudinal wires are fed by transporting device 8 into machine 10 and a transverse wire is fed across the longitudinal wires and is welded thereto at the points of intersection, whereafter a further length of the family of longitudinal wires are advanced by device 8 into machine 10 and the operation repeated. When it is desired to manufacture lattice mats with shaped longitudinal wire from heated rolled rods, the drawing device 3 is constituted as a ribbing device with driven shaped rollers. The wire is formed with ribs thereon by cold deformation in the ribbing device.

The device according to the invention operates as follows:

The wire rod 2 is drawn off from the storage reel 1 by means of the drawing device 3 and is inserted in the tubes 5 under the control of the switching means 4. In the position of both tube groups as shown in FIG. 2, the wire rod is inserted in the lower group of tubes. The filling of the various tubes 5 is accomplished in such a manner, that the wire rod is inserted in a first tube until it abuts against the stop 9. Then it is cut off by means of the cutting apparatus 6. The switching means 4 is then indexed by being tilted laterally and the wire rod is inserted in the next tube adjacent the now filled tube in the same manner. The family of the longitudinal wires is assembled in this manner. At the left end of FIG. 1 there is diagrammatically shown five wire lengths placed in the tubes, the switching means 4 being positioned to place the sixth wire. After the entire family has been assembled, the entire family of longitudinal wires is forwarded to the welding machine (after the stop 9 has been lifted) by means of the rollers of the transporting device 8. After the first group of tubes has been filled with wires, the other group of tubes, which is empty, is aligned with the switching means 4 by being raised or lowered and filled in a similar manner while the already assembled family of longitudinal wires in said first group of tubes is being fed to the welding machine. At the right end of FIG. 1, there is diagrammatically shown the discharge of the mat from the welding machine 10.

The arrangement according to the invention of two devices adjacent one another is advantageous with respect to the stacking of the completed mats insofar that the mats can be so manufactured in respect to the longitudinal and transverse wires as to be mirror images of each other, so that they can be easily stacked by a simple superposition so as to require minimum space.

The indexing control of the switching means 4 can be manually achieved under visual control by an operator or it can be effected automatically in a manner wholly obvious to those skilled in the art of automatic control devices of this sort. Similarly, the feed of the family of wires 11 to the welding machine can be achieved by manually controlling initiation of the drive of the rollers in the transporting device 8 when all the tubes 5 are filled with wires, or this can be effected automatically.

What is claimed is:

1. Apparatus for producing lattice mats for reinforced concrete structures, the mats being composed of longitudinal and transverse wires, said apparatus comprising a storage reel for wire for a lattice mat, drawing means for drawing wire from said reel, cutting means for cutting the wire into successive lengths, support means for supporting a plurality of lengths of wire in parallel adjacent relation, switching means between said drawing means and said support means for feeding wire to successive, parallel, adjacent locations in said support means, said cutting means successively cutting each said length of wire after the same has been placed in its respective location in the support means, and transport means for feeding the lengths of wires as a unit from the support means to a station where the lengths of wires are welded to transverse lengths of wire to form a mat.

2. Apparatus as claimed in claim 1 wherein said switching means comprises a pivotable member having an inlet end connected to the drawing means and an outlet end which faces said support means to direct the wire to the successive locations.

3. Apparatus as claimed in claim 2 wherein said support means comprises a plurality of parallel guides each for a respective length of wire, said pivotable member undergoing successive pivotal movement to face the guides in succession.

4. Apparatus as claimed in claim 3 wherein said cutting means is disposed between said pivotable member

and said guides.

5. Apparatus as claimed in claim 1 wherein said drawing means includes means for cold deforming the wire before it is fed to the switching means.

6. Apparatus as claimed in claim 1 wherein said support means comprises two groups of parallel guides located one above the other, said switching means feeding wire to the two groups in succession, the transport means feeding the wire from one group to the welding station while wire is being cut to length and placed in the other group of guides.

7. Apparatus as claimed in claim 6 comprising means for enabling each group of guides to be individually positionable in registry with said switching means.

8. Apparatus as claimed in claim 1 comprising abutment means located downstream of the transport means and against which the wire is abutted to fix its length in the respective location in the support means before it is cut by the cutting means, said transport means comprising a pair of spaced rollers located between the support means and the abutment means, the wire being passed through the open rollers when the wire lengths are being placed in the support means, said rollers being brought towards one another to grip and advance the wires when they all have been cut to length and placed in their respective locations in the support means.

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