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APPARATUS FOR POSITIONING REINFORCEMENT MESH IN CONCRETE

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2 Sheets-Sheet 1

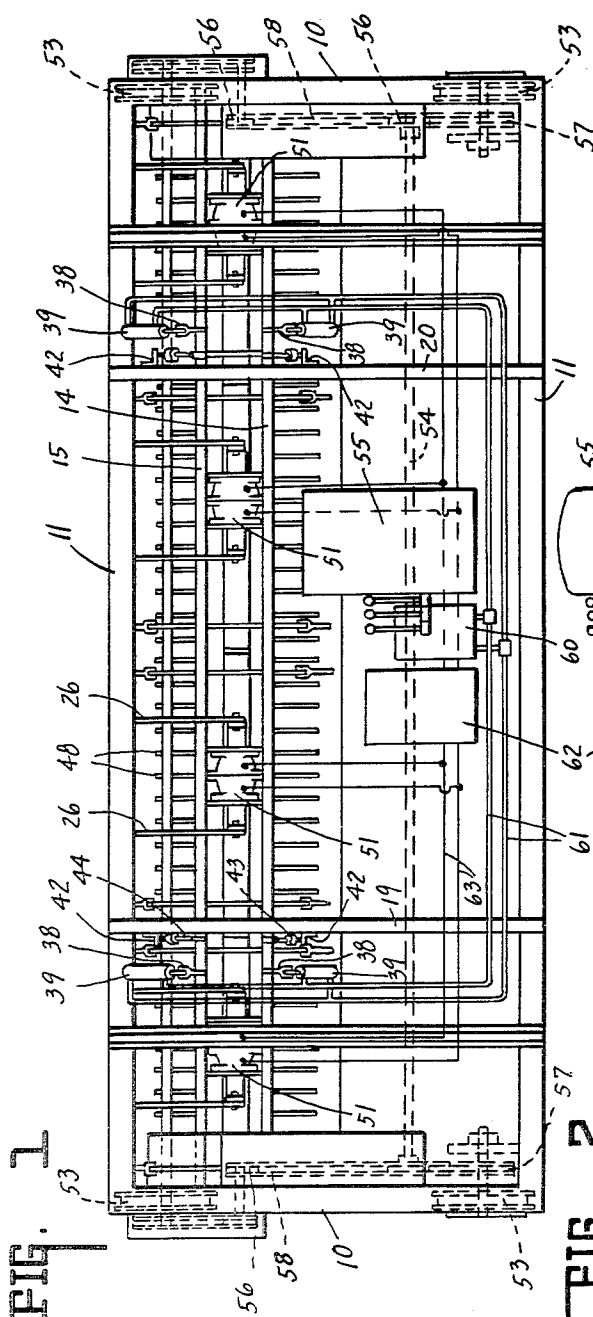


FIG. 1

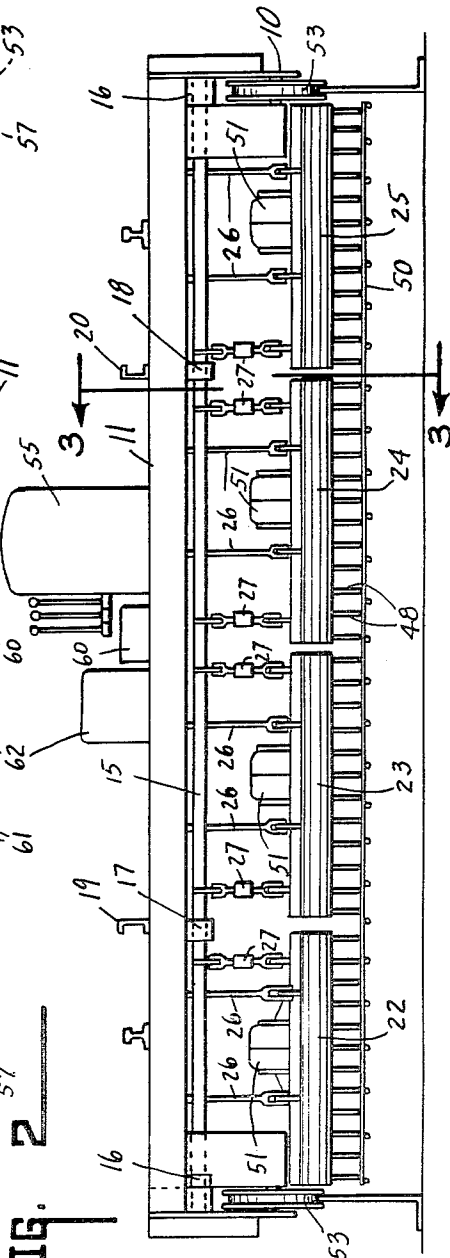


FIG. 2

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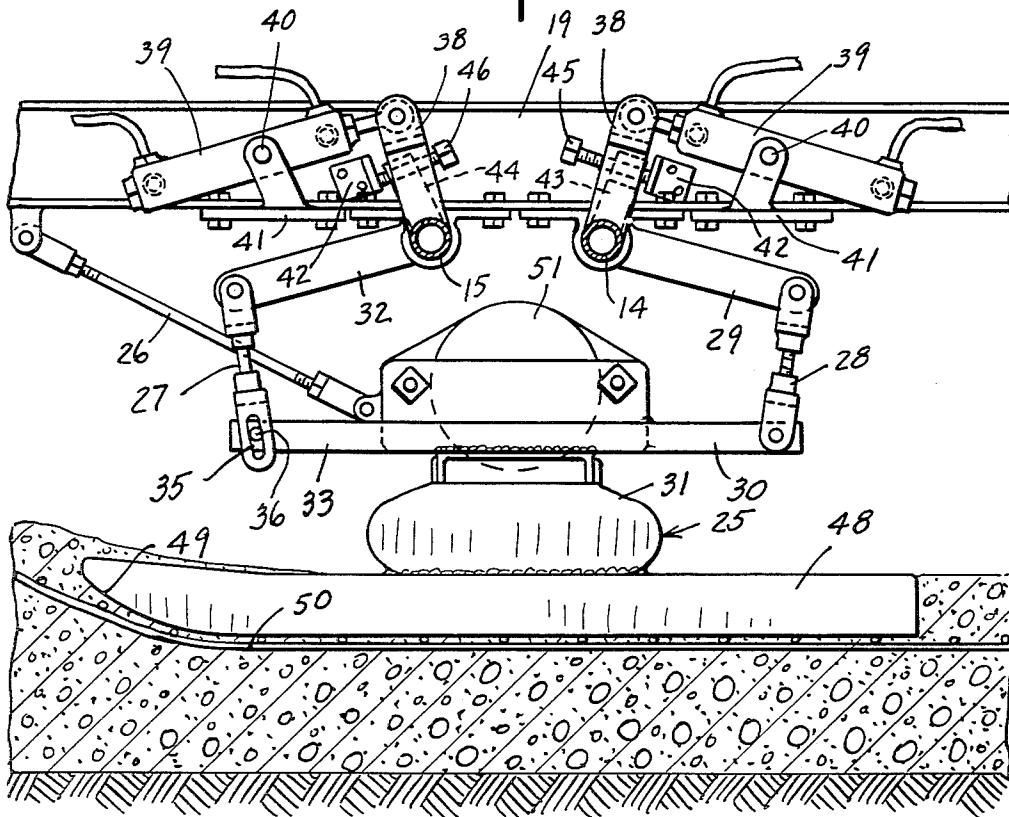
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FIG. 3



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APPARATUS FOR POSITIONING REINFORCEMENT MESH IN CONCRETE

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This invention relates generally to apparatus for placing reinforcement steel in concrete highway slabs and more particularly it relates to apparatus for positioning reinforcement mesh in concrete at a predetermined depth within concrete immediately after pouring thereof.

It is conventional practice to lay a concrete highway by running a concrete mixer along the highway and pouring the concrete on the roadbed in a continuous operation. When it is specified that steel reinforcement shall be introduced into the concrete, a first method comprises placing a single concrete mixer in a given position and a bottom course of concrete is spread and struck off over an area sufficient to permit the placing of sections of reinforcing mesh. After the mesh is placed in position, additional concrete is poured to obtain a slab of desired depth.

Another method consists in using a single mixer and moving it over an extended length of roadbed, pouring a bottom course of concrete over whatever length of roadbed may be deemed practical under existing conditions or as permitted by prescribed specifications. The reinforcement mesh can then be placed on the concrete and the concrete mixer may be moved back to the starting point and a second course of concrete may be poured over the reinforcement mesh.

Still another method consists in using two concrete mixers, the first being utilized to pour a bottom course of concrete, the second mixer being placed behind the first mixer a distance sufficient to permit the placement of the reinforcing mesh and being utilized to pour the second course of concrete.

Conventional methods of pouring concrete for reinforced concrete highways create substantial inefficiencies in the building of concrete highways. Where a stationary mixer is used, it is usually located to one side of the roadbed and causes all of the activities such as pouring the concrete, placing of joints, and placing of reinforcement mesh in a confined area. As a result, efficiency and speed are sacrificed.

Where a single mixer is utilized to pour a bottom course of concrete, it is necessary that a portion of this course of concrete be subjected to the effects of the sun while the setting process begins. This limits the amount of time within which the reinforcement mesh can be laid and the second course of concrete poured. Also, there is the additional hazard that the mixer may break down leaving a bottom course of concrete in the process of setting, without the addition of the final course of concrete. This means that the initial course of concrete may be lost and will have to be removed before the building of a highway can continue. The same type of loss can occur in the event of a sudden heavy rainfall. There

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is also time lost in shifting the mixer back to pour a final course of concrete.

When two mixers are used, the amount of customary equipment is doubled in that two concrete spreaders, two finishing machines, two longitudinal floats, twice as many forms, twice as much water supply, etc., are required to lay the same amount of concrete. Also, a long length of bottom course of concrete is exposed and subjected to the same breakdown and weather hazards as mentioned above in connection with the use of a single mixer.

Accordingly, the principal object of this invention is to provide apparatus adapted to permit the pouring of a concrete slab to its full depth and to insert reinforcing mesh therein to a predetermined depth within the poured slab.

Another object of this invention is to provide apparatus for placing reinforcement mesh at a predetermined depth within a poured and crowned slab of concrete.

Still another object of this invention is to provide vibratory apparatus adapted to place reinforcement mesh at a predetermined depth within a poured concrete slab, said apparatus comprising individual and separately supported elements which may be individually adjusted to conform with the crown of the slab.

In accordance with this invention, there is provided apparatus for positioning reinforcement mesh in a poured concrete slab comprising a wheel-supported frame which may be moved along the form structure, a plurality of aligned vibratory units having horizontal sliders mounted thereon and adapted to extend into a poured concrete slab to a predetermined depth, a rotatable lifting apparatus extending across said frame over said units, adjustable links suspending said units from said rotatable members for positioning said units to conform with the crown of said concrete slab and stop means operatively associated with the said lifting mechanism and said frame for determining the exact depth of penetration of said slider units within said concrete.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a top plan view of the apparatus embodying this invention;

Fig. 2 is a front elevation of the apparatus; and

Fig. 3 is a partial cross section taken on line 3—3 of Fig. 2 and illustrating the suspension mechanism for the vibratory mesh-placing units.

Referring to the drawings, the apparatus for placing reinforcement mesh in poured concrete comprises a rectangular frame having end members 10 and side members 11. Extending between the end members 10 are two spaced rotatable shafts 14 and 15, rotatably mounted at their respective ends in sockets 16. Intermediate supporting hangers 17 and 18 for shafts 14 and 15 are provided on the cross beams 19 and 20.

A plurality of individual vibrating units 22, 23, 24, and 25 are suspended from the shafts 14 and 15 by means of forward links 27 and adjustable rear links 28, the adjustable links comprising turnbuckles pivotally connected between levers 29, fixed to the rear shaft 14, and supporting arms 30 connected to the main body 31 of each vibratory unit. The forward links 27 are pivoted between the arms 32 fixed to forward shaft 15 and the supporting arm 33 fixed to the main body of each vibratory unit. The lower ends of each link 27 are provided with a slot

35 which receives a pivot pin or bolt 36, thereby providing a certain degree of play between the vibratory unit and the forward supporting link. Pull-rods 26 may be secured as illustrated in Fig. 3 between any suitable frame member and each end of each vibratory unit such as unit 25.

In order to lift and lower the vibratory units, the shafts 14 and 15 includes two pairs of crank arms 38 coupled in any suitable manner to hydraulic jacks 39, pivotally mounted as at 40 to supporting plates 41 bolted or otherwise fastened to the channels 19 and 20. When the hydraulic units 39 are operated, the cranks 38 rotate shafts 14 and 15 to lift or lower the vibratory units. The units may be adjusted upwardly or downwardly by means of the adjustable turnbuckles 28, each unit being adjusted in height to conform to a specified degree of crown in a highway being poured.

In order to provide lowering of the vibratory units to a pre-set depth, stop members 42 are fixed to channels 19 in a position to cooperate with lever members 43 and 44 mounted on and fixed to shafts 14 and 15, respectively.

Each lever arm 43, 44 is provided with adjustable screws 45 and 46 so that when the hydraulic units 39 are operated to lower the vibratory units, screws 45 and 46 move into engagement with the stops 42 to limit the downward movement. By adjusting screws 45 and 46, the lowermost position of the vibratory units can be established and this depends on specified crown of the slab and to some extent on the specified depth to which reinforcement is to be set within the poured concrete.

For pushing the mesh downwardly into the concrete, each of the vibratory units 22—25 is provided with a plurality of spaced slider elements 48, the forward ends 49 of which may have a curved profile adapted to engage the reinforcing mesh 50 for riding over the mesh and, pushing it downwardly.

Each vibratory unit includes a conventional electrically driven vibrator 51 so mounted as to provide vertical vibration to each unit.

In order to provide forward motion of the vibrating units, the frame 10—11 is provided with wheels 53 which are driven by means of a shaft 54 suitably connected to a driving engine 55 and to at least one pair of wheels 53 through the sprockets 56—57 and chain 58.

For operating the hydraulic lifting units 39 a hydraulic pump 60 may be connected to engine 55 and to the hydraulic units 39 by means of conventional hose connections 61.

The electrical vibrator units 51 may be coupled to a motor generator 62 by means of the conductors 63.

In operation, the adjustable vibrator unit supporting links 28 may be adjusted to support the ends of the vibratory units in such a way as to conform with the specified crown in a highway. Also, the screws 45 and 46 in the levers 43 and 44 may be adjusted to hold the vibrator units at the proper level such that the sliders 48 penetrate the concrete to the depth at which it is desired to place the reinforcement mesh 50.

After initial adjustment of the respective positions of the vibrating units, they may be lowered or lifted by means of the hydraulic units 39 controlled from the control levers of the hydraulic pump 60. With the motor 55 driving wheels 53 slowly in a forward direction and with the generator 62 operating the vibrator motors 51, a concrete reinforcement mesh 50 may be placed on top of poured concrete and vibrating action of each of the vibrating units 22—25 gradually moves the mesh 50 downwardly into the concrete to a predetermined level.

From the foregoing description, it will be apparent that this invention provides apparatus which materially reduces the number of machines required to construct a reinforced concrete highway. This is because of the fact that the concrete may be poured to its full depth by a single concrete mixer after which reinforcement mesh may be placed at a specified depth within the poured concrete.

This invention also provides apparatus for placing reinforcement mesh in poured concrete even though the concrete surface must have a crown. This result is obtained by providing adjustable supports for the mesh vibrating units which may be utilized for supporting each of a plurality of vibrating units at a predetermined level.

The invention claimed is:

1. Apparatus for positioning reinforcement mesh in a poured concrete slab comprising a supporting vehicle movable over said slab, a front and a rear rock shaft mounted in spaced parallelism transversely of and supported by said vehicle, a vibratory unit disposed beneath said shafts, horizontally disposed sliders extending downwardly from said unit in alignment with the direction of travel of the vehicle to project into said slab, front linkage means pivotally connected between the front portion of said vibratory unit and said front rock shaft, said linkage means including a free floating connection for permitting vertical movement of said vibratory unit, a rear linkage means pivotally connected to the rear portion of said vibratory unit and said rear rock shaft, said rear linkage means establishing a pivot for vertical rocking of said unit, means for rocking said shafts to elevate and lower said vibratory unit within predetermined limits, and draft means connected at one end to said vibratory unit and at its opposite end to said supporting vehicle forwardly of said unit, whereby said vibratory unit rocks on said rear linkage means in a vertical direction.

2. Apparatus for positioning reinforcement mesh in a poured concrete slab comprising a supporting vehicle movable over said slab, a front and a rear rock shaft mounted in spaced parallelism transversely of and supported by said vehicle, a pair of arms projecting laterally and forwardly from said front shaft, a pair of similar arms projecting laterally and rearwardly of said rear shaft, a vibratory unit disposed beneath said shafts, horizontally disposed sliders extending downwardly from said unit to project into said slab and aligned with the longitudinal axis of said vehicle, a pair of adjustable supporting links pivoted at their upper ends to said rearwardly projecting arms and pivotally connected at their opposite ends to the rear portion of said vibratory unit, a pair of links pivotally connected at their upper ends each to one of said forwardly projecting arms, a free floating connection between the lower ends of said forward links and the forward end of said vibratory unit to permit the said forward end to move vertically, means for rocking said shafts, adjustable elements to limit the rotative movement of each of said shafts in one direction, and a longitudinally adjustable pull rod pivotally connected at one end to the forward portion of said vibratory unit and at its opposite end to said supporting vehicle forwardly of said unit.

3. Apparatus for positioning reinforcement mesh in a poured concrete slab comprising a supporting vehicle movable over said slab, a front and a rear rock shaft mounted in spaced parallelism transversely of and supported by said vehicle, a lever projecting radially of each rock shaft, a pair of arms projecting laterally and forwardly from said front shaft, a pair of similar arms projecting laterally and rearwardly of said rear shaft, a vibratory unit disposed beneath said shafts, horizontally disposed sliders extending downwardly from said unit to project into said slab and disposed in parallelism with the longitudinal axis of said vehicle, a pair of adjustable supporting links pivoted at their upper ends to said rearwardly projecting arms and pivotally connected at their opposite ends to the rear portion of said vibratory unit, a pair of links pivotally connected at their upper ends each to one of said forwardly projecting arms, a pin and slot connection between the lower ends of said forward links and the forward end of said vibratory unit, means for rocking said shafts, a stop element in the path of movement of each said lever to limit the rotative move-

ment of each of said shafts in one direction, and a longitudinally adjustable pull rod pivotally connected at one end to the forward portion of said vibratory unit and at its opposite end to said supporting vehicle forwardly of said unit.

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References Cited in the file of this patent

UNITED STATES PATENTS

2,029,659 Greiner ----- Feb. 4, 1936 10

2,042,156
2,077,356
2,094,910
2,245,426
2,254,743
2,259,110
2,430,816
2,695,552
2,723,608

McCrery ----- May 26, 1936
Day ----- Apr. 13, 1937
Baily ----- Oct. 5, 1937
Baker ----- June 10, 1941
Jackson ----- Sept. 2, 1941
Jackson ----- Oct. 14, 1941
Jackson ----- Nov. 11, 1947
Baltes ----- Nov. 30, 1954
Jackson ----- Nov. 15, 1955