July 26, 1966 C. J. HELTZEL 3,262,376

MESH PLACING MACHINE

Filed Sept. 23, 1963 4 Sheets-Sheet 1

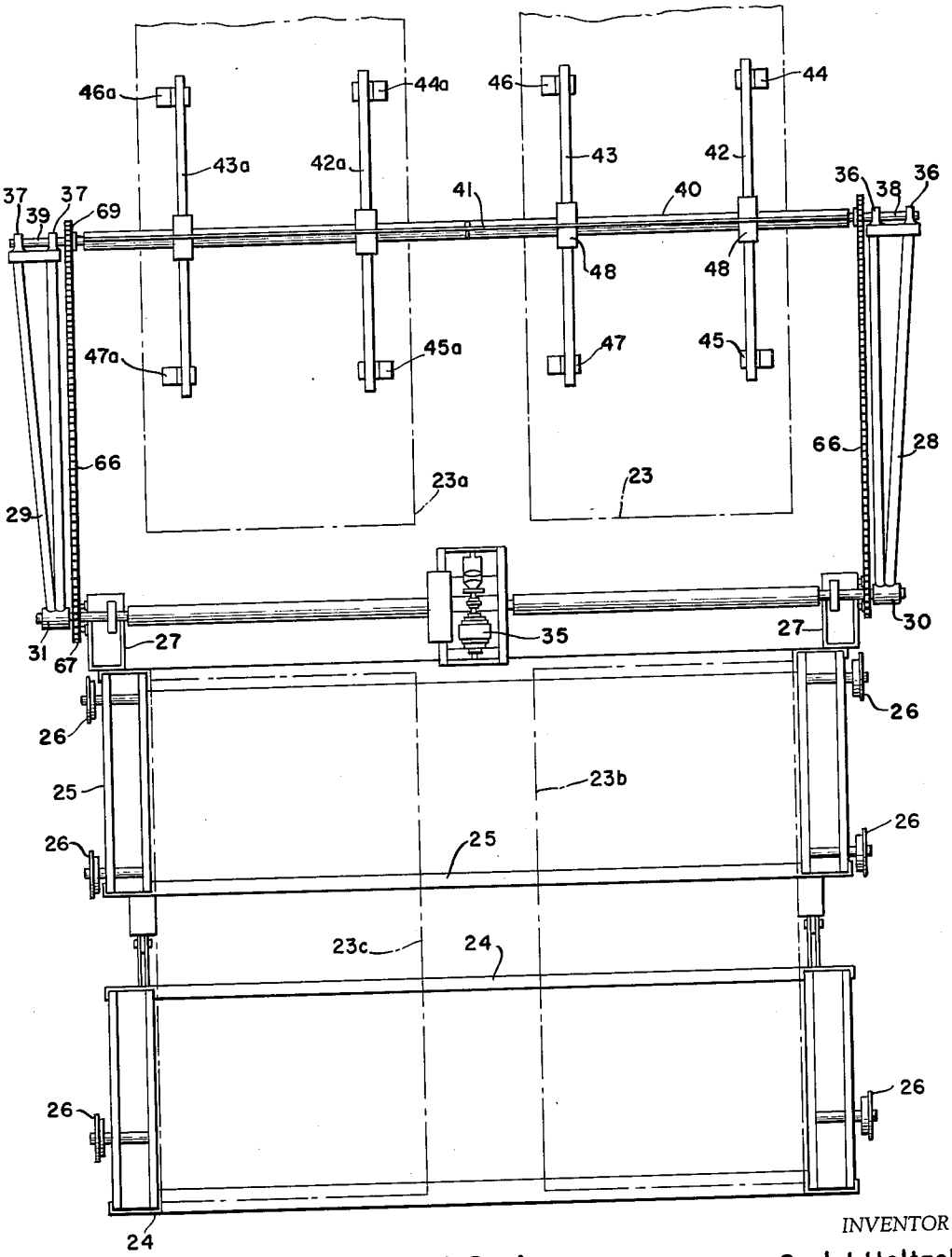


FIG. 1.

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FIG. 5.

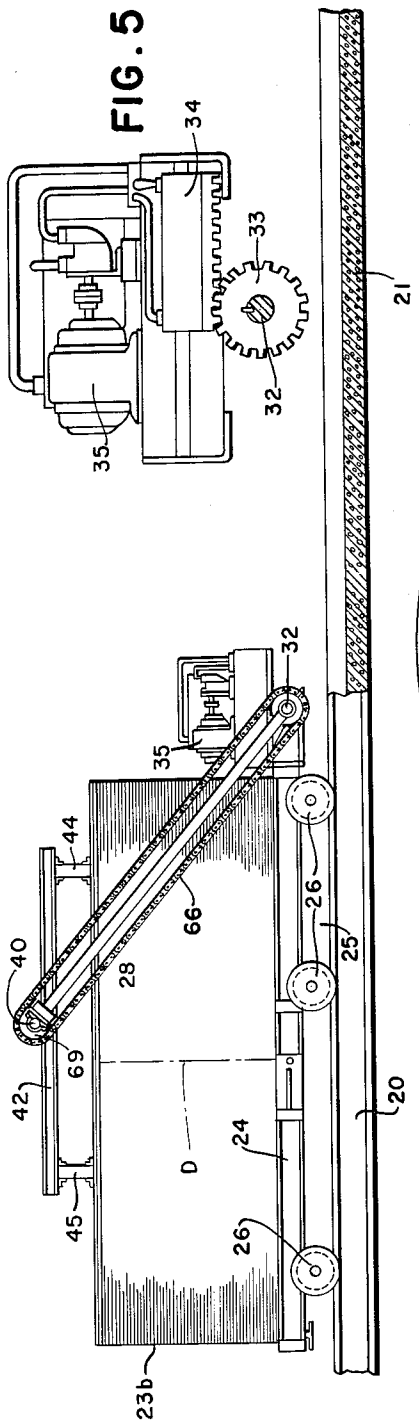


FIG. 2.

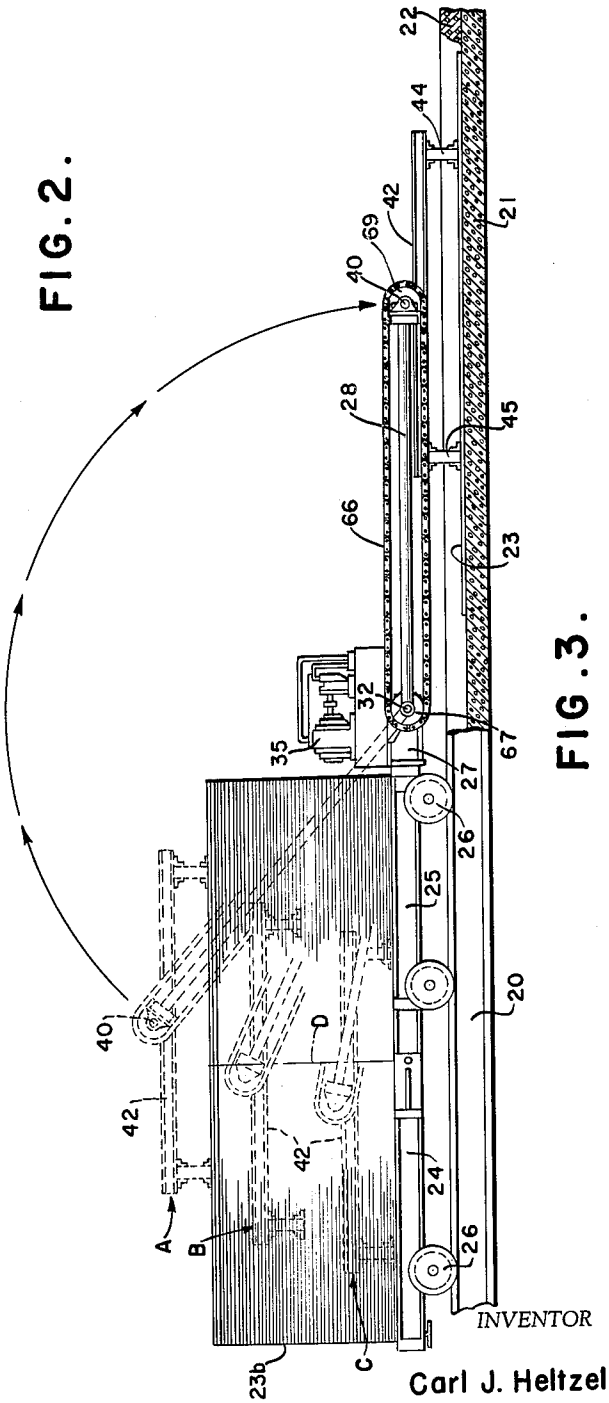


FIG. 3.

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MESH PLACING MACHINE

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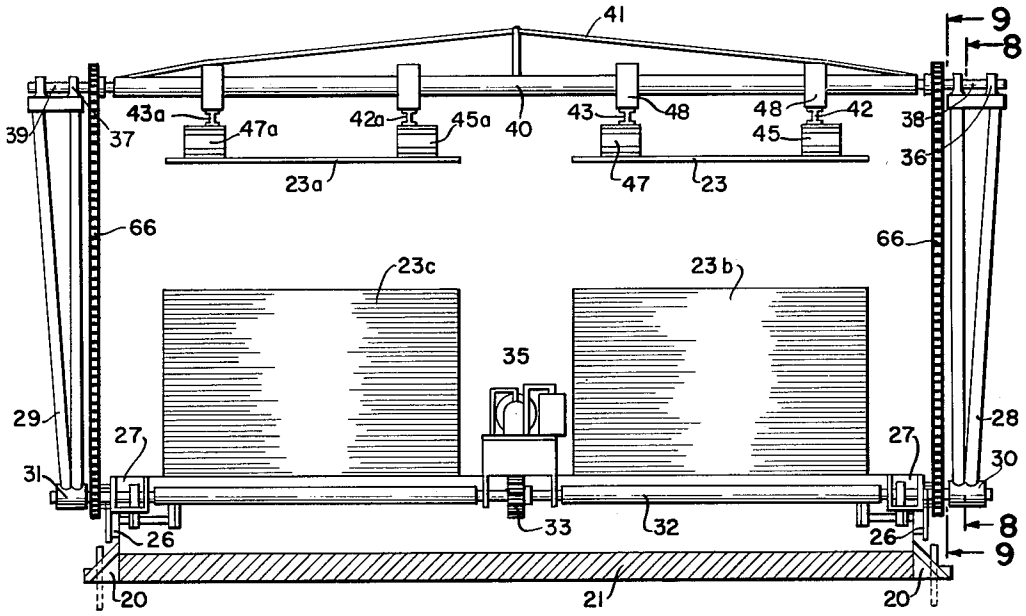


FIG. 4.

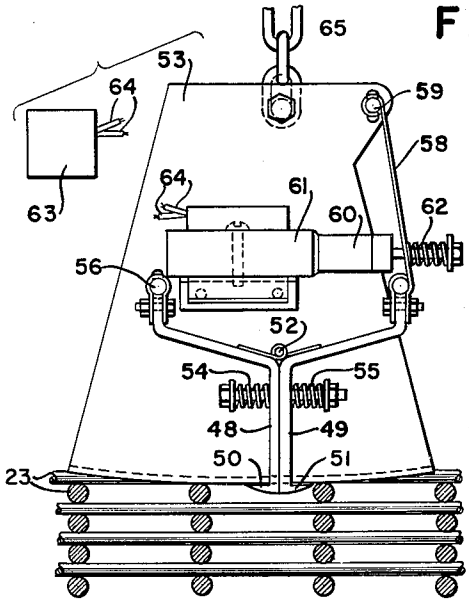


FIG. 6.

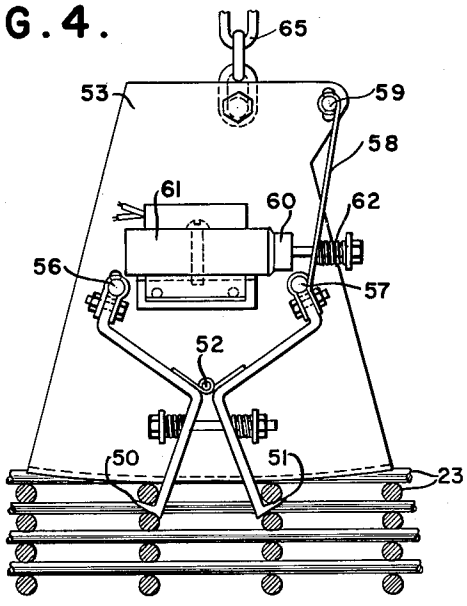


FIG. 7.

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MESH PLACING MACHINE

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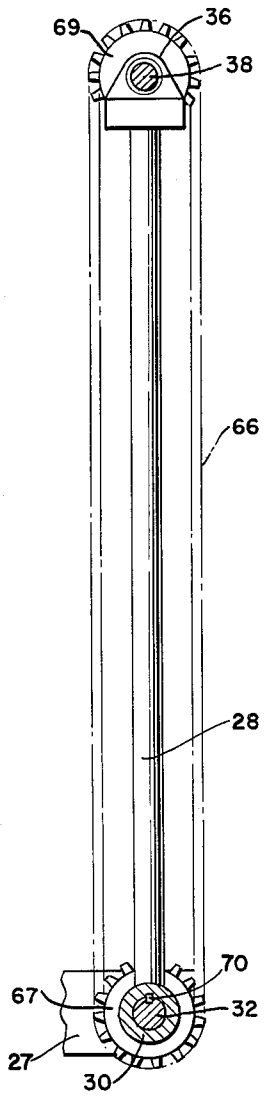


FIG. 8.

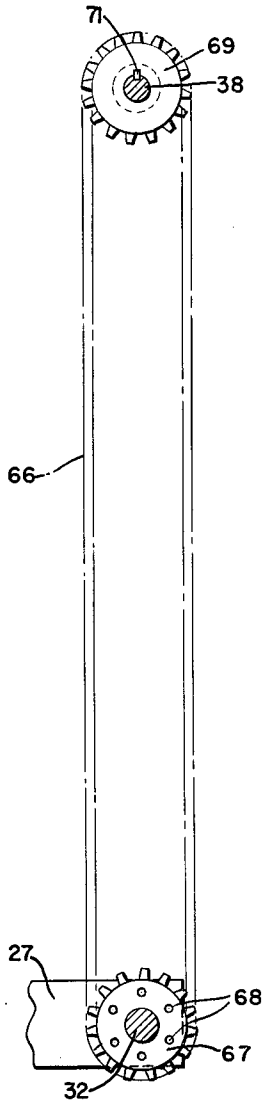


FIG. 9.

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3,262,376

MESH PLACING MACHINE

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Filed Sept. 23, 1963, Ser. No. 310,731
15 Claims. (Cl. 94—39)

The present invention relates to mesh placing machine and more particularly to a machine for picking up reinforcing mesh sheets from a stack on a carrier and depositing the same on road material at the site of operations involving the making of concrete or other roads.

Today mesh is principally laid by hand. A frequent procedure is to distribute mesh sections along the berm from which they are carried into place by men as the paving progresses. At the present time whenever mesh is used two-pass construction is generally the procedure; the mesh being placed on top of the first pass and then covered on the second pass. Alternatively where vibrating grids are used to vibrate the mesh into place, the mesh is placed directly on top of the completed slab whereby only one pass of the paving equipment is required.

Conventionally mesh in horizontal sections or sheets is arranged in one or more stacks on one or more mesh carriers which are flat-platform wheeled vehicles rolling along the side forms. The use of two coupled carriers distributes the load over the side forms. These mesh carriers are towed behind the spreader. Men, known as mesh handlers, drag the top pieces of mesh off the stacks and drop them into the roadway between the forms as the paving progresses.

An object of the invention is to eliminate a certain amount of this hand labor.

Another object of the invention is to assure delivery of the mesh sheets to the road site in a plane substantially parallel to the ground which is the normal attitude to be assumed by the mesh in its final embedded locus in the concrete plastic material.

A further object of the invention is to assure an orientation of the load support at the receiving end of its traverse such that, on assuming mesh sheet lift, the sheets will be held to the same horizontality obtaining in the stack irrespective of the changing positions of the pick-up units relative to the transverse center line of the mesh sheets indicident to the constantly diminishing height of the stack as mesh sheets are removed therefrom.

Another object of the invention is to keep workmen from walking in the fresh concrete carrying foreign materials, mud, etc., into the fresh concrete and in many cases walking on the mesh, bending and deforming it and otherwise disrupting operations.

A still further object of the invention is to avoid incidental haphazard uncontrolled rocking motion of the load during transit between the receiving station and the road site.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

FIGURE 1 is a top plan view of a mesh placing machine constructed in accordance with the present invention with the oscillatable frame and its load support in delivery position and illustrating a form of the invention embodying two load supports for simultaneously transferring mesh sheets from the two stacks on the carriers.

FIGURE 2 is a side elevational view of the mesh placing machine with the oscillatable frame and its load support in load receiving position.

FIGURE 3 is a similar view with the frame and load support in delivery position and illustrating in dotted lines in progressive positions the varying shifts in the pick-up units of the load support relative to the diminishing height of the mesh stack on the carriers.

FIGURE 4 is a transverse sectional view of the machine with the frame and load support in a raised position having just received and lifted top sheets of mesh material from the two stacks.

FIGURE 5 is a side elevational view taken on an enlarged scale of a form of frame oscillating means.

FIGURE 6 is a side elevational view on a magnified scale of a form of pick-up unit or grab poised in contracted condition above a stack of mesh sheets shown in section.

FIGURE 7 is a similar view showing the expanded condition of the pick-up unit in lifting engagement with the top sheet.

FIGURE 8 is a vertical sectional view taken on the line 8—8 in FIGURE 4.

FIGURE 9 is a similar view taken on the line 9—9 of FIGURE 4.

Referring more particularly to the drawings, **20** designates side forms staked to the subgrade between which plastic concrete or other material is poured and spread in one or more passes, and **21** in FIGURES 2 and 3, designates a first pass or course and **22** an overlying or second pass or course.

In FIGURE 3, **23** designates a sheet of reinforcing mesh material as laid on the first course **21**, after which, when the load support is removed the second covering course **22** is deposited and spread over the mesh and the first course **21**.

As appears from FIGURE 4, the sheet **23** was recently the top mesh sheet of a stack 23^b of such sheets, while 23^a designates a second sheet just lifted from the top of a second stack 23^c of such mesh sheets; the stacks containing the sheets in horizontal attitudes on the platform or platforms **24** and **25** of one or more mesh carriers mounted on rollers **26** to travel along the side forms **20**, being moved by manual labor or towed by a spreader or other machine.

One or more forwardly projecting portions of the forward platform **25** may conveniently serve as a base **27** about which a frame is pivoted to oscillate about a lower portion thereof with its upper end portion adapted to describe an arc of traverse, as indicated by the broken lines in FIGURE 3, between the source of mesh material and the laying site in the concrete road. This frame may be caused to swing between these two positions by manual labor but preferably by machine.

A form of frame includes arms **28** and **29** spaced apart sufficiently to straddle the mesh sheet stack 23^b or both stacks 23^b and 23^c, such arms having at low points bearings **30** and **31** which may be affixed to a rock shaft **32** journaled in the base members **27**. At an intermediate point, as appears in FIGURE 5, a pinion **33** may be affixed to the shaft **32** driven by a reciprocating rack **34** actuated by a hydraulic or other motor **35** under usual forms of controls.

The upper ends of the frame arms **28** and **29** have smooth internally circular bearings **36** and **37** which rotationally receive therein the externally round smooth journals **38** and **39** of a load support member **40**, which for strength is preferably tubular and trussed as indicated at **41**.

Where there are more than one stack of mesh sheets the support member **40** spans all stacks and carries as further parts of the load support means pairs of laterally spaced bars **42** and **43** and 42^a and 43^a extending preferably substantially symmetrically to opposite sides of the member **40** and carrying pick-up units of any desired form which will readily engage and disengage the mesh sheets. These units are thus preferably four in number, namely

44, 45, 46 and 47 and 44a, 45a, 46a and 47a, for each stack. A form of such units is illustrated in FIGURES 6 and 7.

At the central points of the bars 42, 43, 42a, 43a are bearings 48 affixed to the load support member 40 to prevent any relative angular or rotational movement between the member 40 and the said bars. The bars and pick-up units depend from the member 40 opposite the upstanding truss 41.

Referring to FIGURES 6 and 7, a form of pick-up unit is illustrated in which 48 and 49 designate jaws having outturned teeth 50 and 51 pivoted together at 52 and biased to a collapsed position by coil springs 54 and 55. One jaw 48 is pivoted to the unit frame 53 at 56 while the other end is floatingly pivoted at 57 to a swing member 58 pivoted at 59 to the unit frame 53. The swing member 58 is entrained to move with a plunger 60 of a solenoid, hydraulic motor 61 or the like cushioned by a coil spring 62.

In FIGURE 6 a connector 63 mounted on the carrier or other suitable location has wires or fluid conduits 64 to the motor 61 for supplying current or fluid pressure.

The unit frames 53 may be affixed to end portions of the bars 42, 43, 42a, 43a to partake of the rigidity of the load support means but short chains or flexible connections 65 may conceivably be employed for always holding a plumb line incident to load assumption of the mesh sheets.

The four pick-up units 44, 45, 46 and 47 for each stack are spaced apart longitudinally and laterally for engaging the mesh sheet preferably at four points to suspend the sheet so that it will tend to seek by gravity a generally horizontal position and a condition of stable equilibrium. This is true so long as the load member 40 intersects the lateral median line D of the sheet. However, for position A of FIGURE 3 the axis of load member 40 is shown to be forwardly of the stack transverse center line D and as the stack is depleted the axis of load member 40 will pass rearwardly of such center line D as indicated by successive positions B and C. Thus in position A the greater mass of the mesh sheet as it is picked and raised from the stack being rearwardly of the axis of member 40 will tend to rotate member 40 in a counterclockwise direction as viewed in FIGURES 2 and 3, while in positions B and C clockwise rotation will be induced. If such gravitational action were permitted the horizontality of the suspended sheet would be lost and at delivery the sheet would not be parallel to the ground and hence not in an attitude most favorable to laying.

In other words, as the center of potential oscillation of the load support member 40 shifts forward and aft of the transverse center line D of the stack, the load characteristic of the suspended mesh sheet, so far as it affects or tends to affect rotational movement of the load support means, changes so that to achieve horizontality at all positions of the load support means throughout its arc of travel the load support member 40 and its entrained pick-up unit carrying bars must resist any turning movement relative to the frame arms 28, 29 and the bearings 36, 37 thereof.

In order to avoid such swinging and to check any free oscillations of the sheet and its load support means during transit, a check means is provided to prevent rotary movement of the load member 40 in the frame. A form of such means comprises an endless chain 66 having its lower loop engaging the teeth of a sprocket 67 made non-rotatable by affixation as by fastenings 68 to the stationary base 27 and fitted loosely about the rocker shaft 32 with the center of the fixed sprocket 67 coincident with the center of oscillation of the frame, that is with the center of the rock shaft 32. The upper loop of the chain 66 is trained about the teeth of an upper sprocket 69 which is affixed to the load support member 40. The center of the upper sprocket 69 is coincident with the center of the load support member 40 and its trunnions 38. The centers of both sprockets 67 and 68 coincide with the radius of oscillating motion of the swing frame. The arms 28, 29 are on the same radius. Additional chains and sprocket wheels may be duplicated at the opposite arm 29.

In the use of the device the load support member 40 will be oriented rotationally to a position where the truss 41 will be vertically above the center line of the load support member 40 and the bars 42, 43 hung from the bearings 48 directly below such center line. In this orientation the chain 66 is trained about the sprockets 67 and 69 and as the lower sprocket 67 is affixed against rotation to the base the longitudinal runs of the chain cannot move. The upper and lower loops of the chain will simply wrap and unwrap about portions of the sprockets incident to oscillating movement of the frame between the positions of FIGURES 2 and 3 without any function except to exercise restraint upon any rotational movement of the member 40. On the other hand the bearings 36 and 37 at the upper end portions of the arms 28, 29 may turn on the trunnions 38, 39 of the load support member 40 incident to oscillating motion of the frame.

The frame is an open frame to permit the mesh sheets to move between the arms 28, 29. From the receiving position of FIGURE 2 the frame swings upwardly lifting the one or two top pieces of mesh from the one or two stacks and finally delivering the mesh to the road site as shown in FIGURE 3, maintaining during transit the horizontality of the transported mesh sheet to the ground line. On arriving at the approximate position shown in full lines in FIGURE 3, the operator releases the catches in the pick-up units and the springs 54, 55 snap the jaws 48, 49 shut dropping the mesh to the freshly poured concrete surface. The frame then recycles by swinging once again through the arc back to the mesh carrier to pick up the next one or two pieces of mesh.

In FIGURE 8 the bearing 30 to which the frame arm 28 is rigidly affixed is keyed to the rock shaft 32 by a spline 70. At the upper portion of this same figure the bearing 36 affixed to the upper end of frame arm 28 has a smooth internal bore capable of turning on the trunnion 38 of the load member 40.

In FIGURE 9 the lower sprocket 67 is shown as affixed as by welding or fastenings 68 to the fixed base 27 while the rock shaft 32 is free to rotate without affecting the fixed sprocket. At the upper portion of FIGURE 9 the upper sprocket 69 is keyed as by spline 71 to the trunnions 38 of the load member 40.

The pick-up member shown in FIGURES 6 and 7 is not a part of the invention and the same is not claimed per se herein.

The drawings illustrate only one form of which the invention is susceptible, which is the best form known at the present time.

Although I have disclosed herein the best form of the invention known to me at this time, I reserve the right to all such modifications and changes as may come within the scope of the following claims.

What is claimed is:

1. A mesh placing machine comprising
(a) a base,
(b) an arcuately oscillatable frame on the base,
(c) mesh pick up and transfer means carried by the frame in a location displaced from the center of oscillation, and
(d) mesh attitude control means associated with drive means on said base for restraining the latter from a non-horizontal attitude of transfer during oscillation of said frame.

2. A mesh placing machine comprising
(a) a base,
(b) mesh pick up and transfer means,
(c) a frame pivoting about the base and having bearings supporting said mesh pick up and transfer means and turnable about the latter incident to arcuate oscillating movement of the frame, and
(e) attitude control means operatively associated with

the base and mesh pick up and transfer means for controlling rotation of the latter incidental to the arcuate oscillating movement of the frame.

3. A mesh placing machine comprising
(a) a base,
(b) mesh pick up and transfer means adapted to be positioned to support sheet mesh substantially horizontal during transfer,
(c) an oscillatable frame rotatably carrying said mesh pick up and transfer means in a substantially arcuate path from a source of mesh sheets on said base, and
(d) mesh attitude control means associated with the base and said mesh pick up and transfer means for retaining the latter in the angularly oriented position irrespective of variations in weight imposition of the sheets.

4. A mesh placing machine comprising
(a) a base,
(b) a frame pivoted at a lower end portion to the base for travel in a substantially arcuate path from a source of sheet mesh to a road laying site and having
(c) bearings in an upper portion of the frame,
(d) mesh pick up and transfer means having journals about which the bearing may turn incident to arcuate travel of the frame, and
(e) attitude control means between the base and mesh pick up and transfer means for checking rotary motion of the latter throughout the arcuate travel of the frame.

5. A mesh placing machine as claimed in claim 4 in which the effective line of action of the check means is substantially through a radius of the arcuate path of the pivoted frame.

6. A mesh placing machine comprising
(a) a base,
(b) a frame pivoted at its lower end portion to the base and having an upper end portion movable through a curved path from a closely adjacent source of sheet mesh to a mesh laying site,
(c) load-support means mounted rotatably in the upper portion of the frame and partaking of the curvilinear movement thereof, and
(d) check means operatively associated with the base and load-support means for holding the latter against rotation while such load-support means is bodily translated back and forth between the mesh sheet source and the mesh laying site.

7. A mesh placing machine as claimed in claim 6 in which the check means comprises
(e) a sprocket fixed to the base,
(f) a second sprocket fixed to the load-support means, and
(g) a chain meshing with the teeth of the two sprockets.

8. A mesh placing machine as claimed in claim 7 in which the chain is
(h) endless and
(i) the centers of the two sprockets are substantially coincident with a radius passing through the center

of oscillation and the center of rotation between the load-support means and the frame.

9. A mesh placing machine as claimed in claim 8 in which the frame comprises
(j) at least two spaced arms between which the sheets are moved incident to the oscillation movement,
(k) said arms defining a generating radius of the said curved path of movement of the upper end portion of the frame.

10. A mesh placing machine as claimed in claim 6 in which the load-support means comprises
(e) a support member,
(f) laterally spaced bars affixed at intermediate portions thereof to the support member in substantially horizontal planes, and
(g) pick-up units on end portions of the bars adapted to detachably engage the mesh sheets at spaced longitudinal and lateral points.

11. A mesh placing machine as claimed in claim 6 in which said frame has
(e) smooth circular bearings, and said load-support means has
(f) smooth round trunnions fitted to the circular bearings and constituting the rotatable mounting by which the bearing will turn relatively to the non-rotatable trunnions incident to oscillating movement of the frame.

12. A mesh placing machine as claimed in claim 6 further comprising
(e) at least one mesh carrier supporting at least one vertical stack of mesh sheets constituting the source of sheet mesh, and carrying said base.

13. A mesh placing machine as claimed in claim 6 in which said load-support means includes
(e) pick-up units for detachably engaging the mesh sheets and holding the sheets in substantially parallel position relative to the ground line.

14. A mesh placing machine as claimed in claim 6 further comprising
(e) a rock shaft journalled in the base affixed to the frame and constituting the pivotal connection of the frame to the base, and
(f) means connected to drive the shaft angularly back and forth.

15. A mesh placing machine as claimed in claim 6 further comprising
(e) a truss for the load-support means oriented to a substantially vertical position above such means and maintained at all times in such position by the check means.

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