June 2, 1964 R. M. GUNTERT ETAL 3,135,178

CONCRETE DISTRIBUTING ASSEMBLY FOR SLAB LAYING MACHINES

Filed March 18, 1960 4 Sheets-Sheet 1

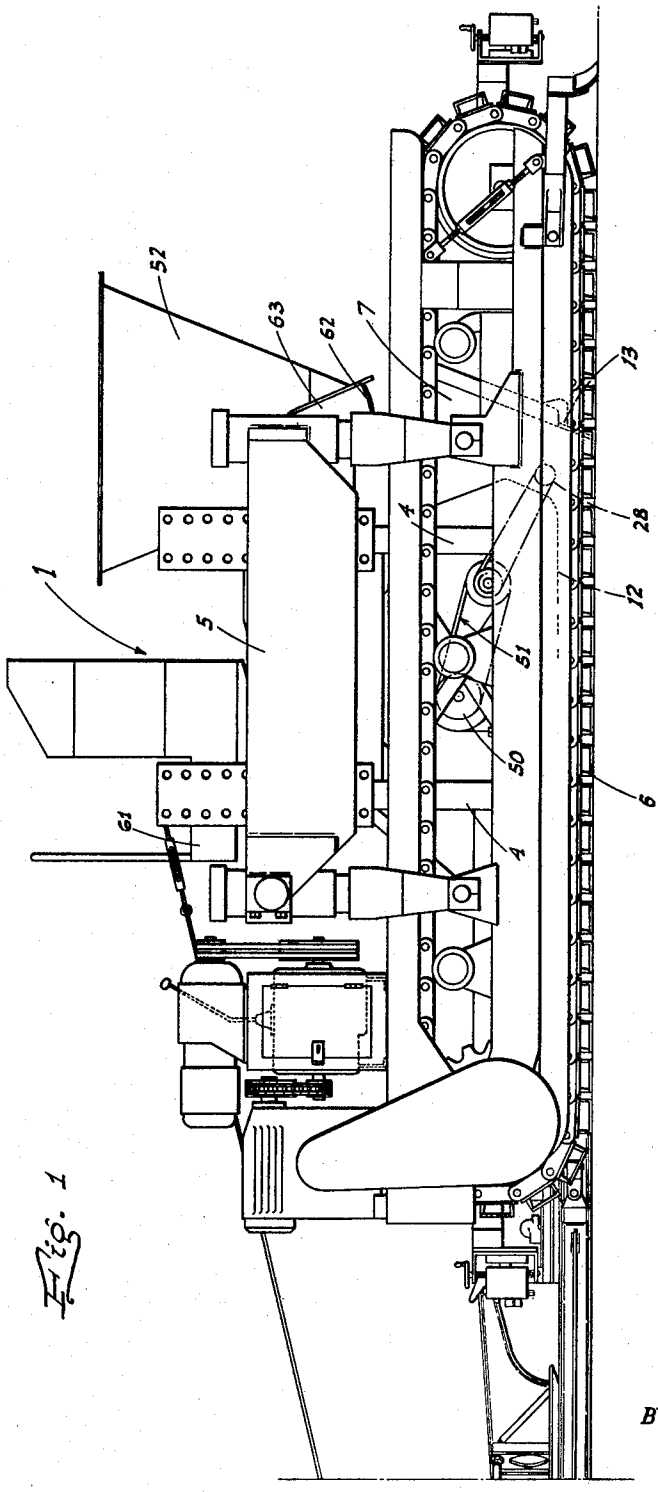


Fig. 1

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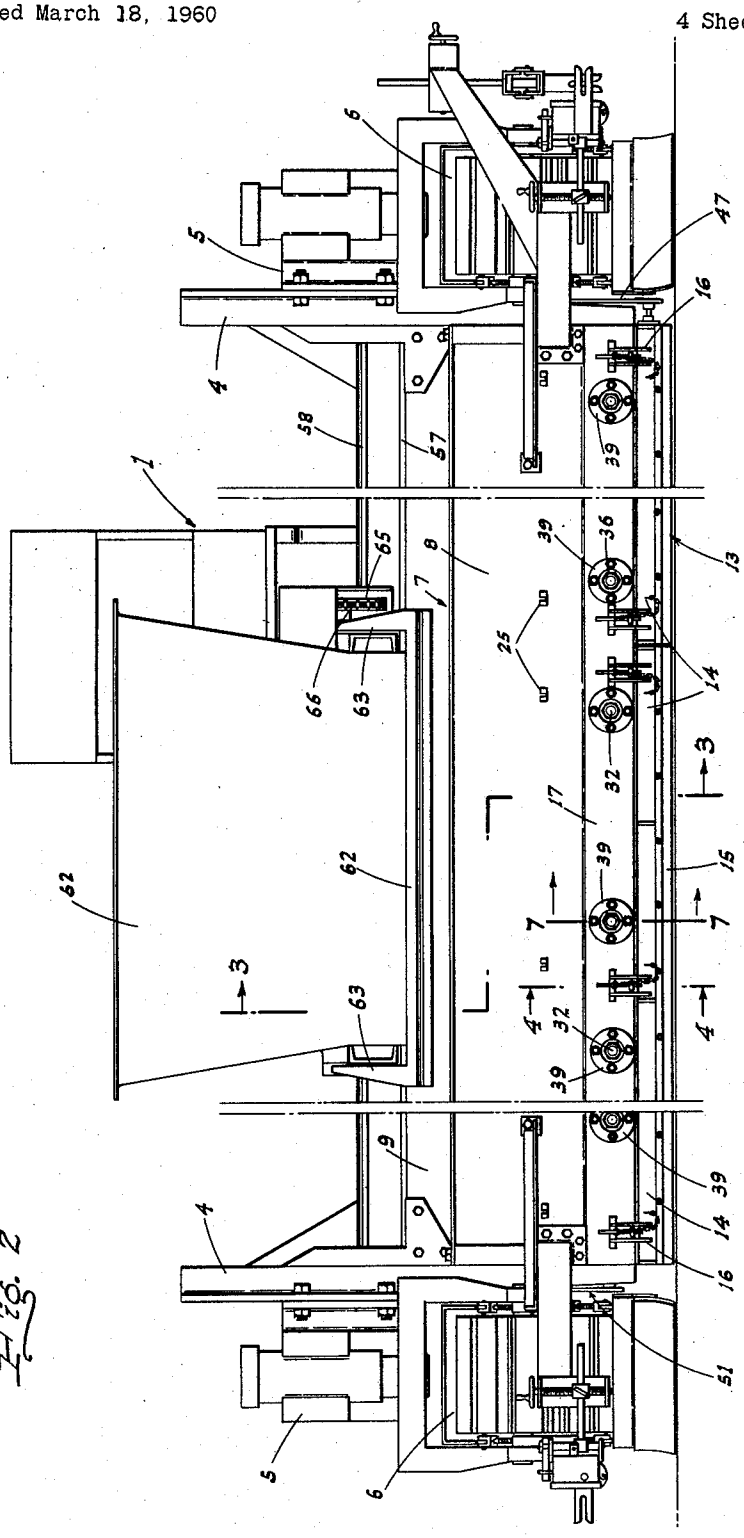


Fig. 2

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Fig. 3

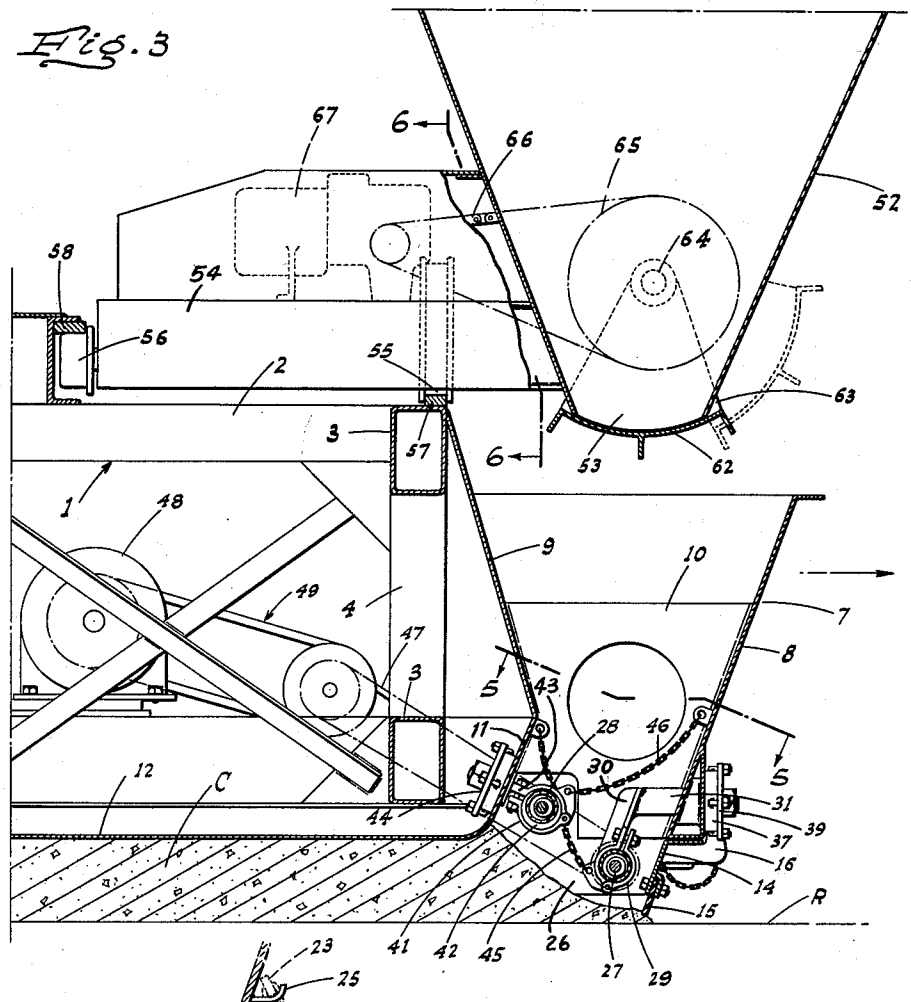


Fig. 4

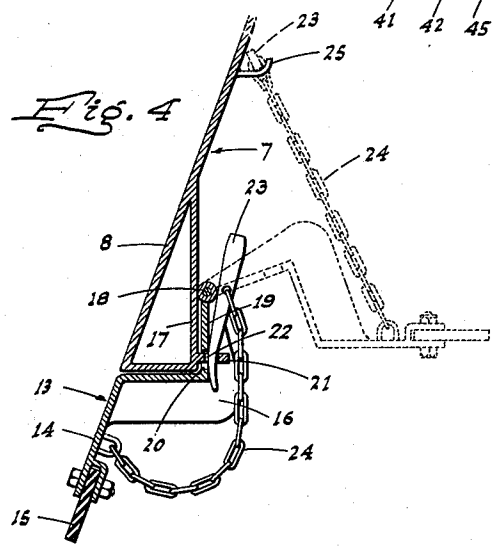
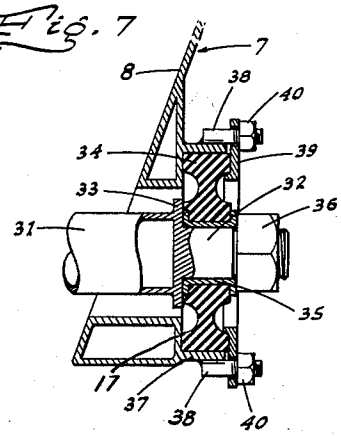


Fig. 7



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Fig. 5

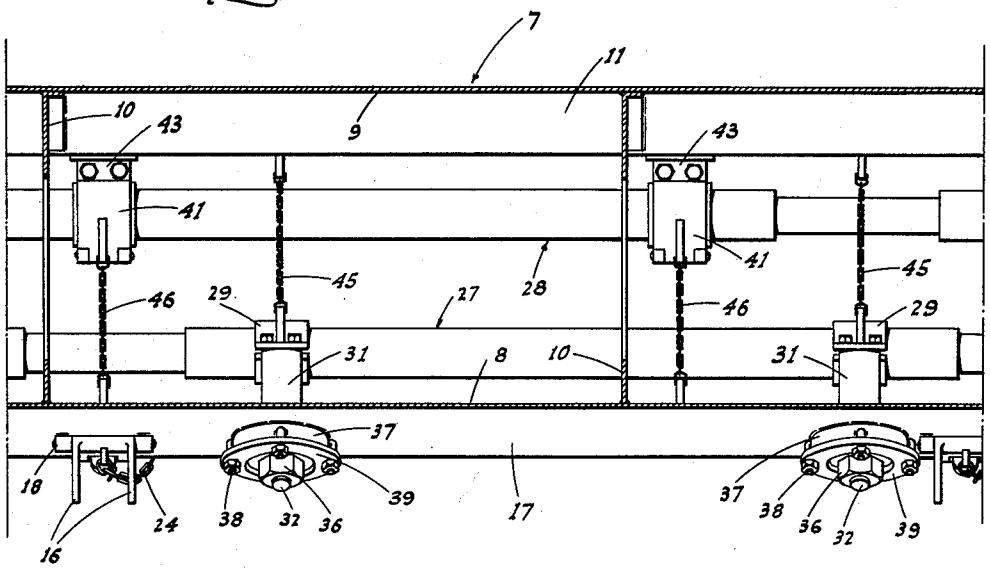
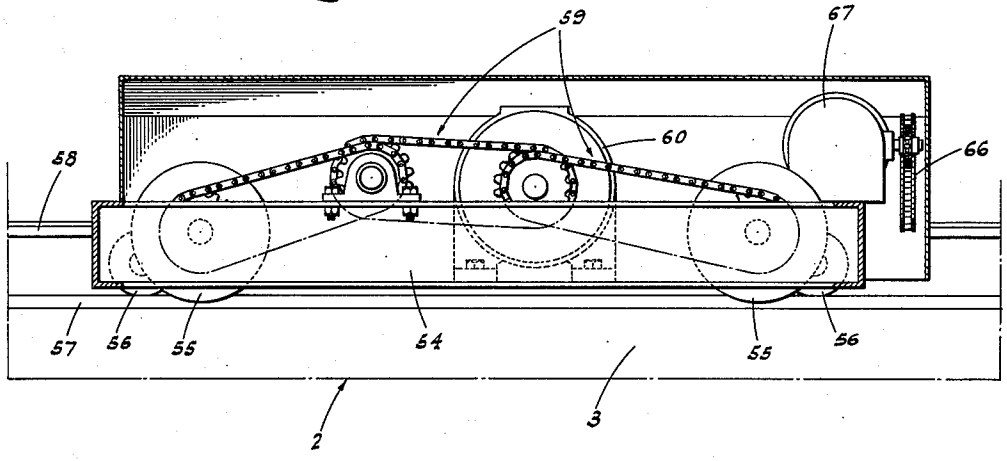


Fig. 6



United States Patent Office 3,135,178 Patented June 2, 1964

3,135,178

CONCRETE DISTRIBUTING ASSEMBLY FOR SLAB LAYING MACHINES

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Filed Mar. 18, 1960, Ser. No. 15,871
5 Claims. (Cl. 94—46)

This invention relates to concrete slab laying machines of the type designed to lay wide slabs, such as are required in highway and air-strip paving and similar operations; a machine for this purpose being shown in U.S. Patent No. 2,846,452, dated December 16, 1958.

A major object of the present invention is to provide such a machine with a full-width hopper which feeds the concrete directly under the concrete smoothing and depth limiting pan of the machine at the forward end of such pan, and a concrete supply receptacle mounted in connection with and above the hopper for movement along the same to feed the supply in the receptacle into the hopper in distributed amounts throughout the length of the hopper.

The receptacle is fixed on a carriage, and another object of the invention is to mount the carriage for movement lengthwise of the hopper in such a manner that the carriage and its supporting rails are maintained clear of the hopper, so that no concrete will drop on said rails, and the top of the hopper is left unobstructed, except for the receptacle, so that concrete may be dumped directly into the hopper if desired.

A further object of the invention is to provide a self-propelled carriage for the purpose, and the travel of which, in one direction or the other, may be controlled from a relatively remote point.

A still further object of the invention is to provide a novel form of concrete agitating means within the hopper disposed therein so that the concrete as discharging from the hopper is in a thoroughly homogenized condition.

An additional object of the invention is to provide a practical, reliable, and durable concrete distributing assembly for slab laying machines, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

FIG. 1 is a side elevation of a concrete slab laying machine as equipped with the improved hopper structure.

FIG. 2 is a somewhat enlarged and foreshortened front elevation of the machine.

FIG. 3 is an enlarged fragmentary longitudinal section on line 3—3 of FIG. 2.

FIG. 4 is a similar view on line 4—4 of FIG. 2.

FIG. 5 is an enlarged fragmentary sectional plan on line 5—5 of FIG. 3.

FIG. 6 is a fragmentary transverse section on line 6—6 of FIG. 3.

FIG. 7 is an enlarged fragmentary section on line 7—7 of FIG. 2.

Referring now more particularly to the drawings, and to the characters of reference marked thereon, the concrete slab laying machine to which the improved structure is applied is indicated generally at 1. Such machine, which is essentially of the same general structure as shown in U.S. Patent No. 2,864,452, dated December 16, 1958, comprises a frame, indicated generally at 2, and which includes transverse beams 3 and uprights 4 at the ends of such beams, and which are adjustably and

removably secured to bolsters 5, as shown in the aforementioned patent, and which bolsters support self-propelled endless track units 6 as before.

The features of improvement dealing with the feeding of the concrete to the machine and the laying of the concrete onto the roadbed, and which form the subject matter of this invention, are arranged and constructed as follows:

Rigidly secured to the frame 2 of the machine just ahead of the foremost transverse frame beams 3 is a transverse concrete distributing hopper 7. This hopper, which is closed at its ends, includes front and back walls 8 and 9, respectively, stiffened at intervals by transverse orificed plates 10.

The main upper portions of the walls 8 and 9 converge downwardly somewhat relative to each other. The lower portion 11 of the back wall 9 however slopes rearwardly and substantially parallel to the wall 8, as shown in FIG. 3. The wall portion 11 is actually the front wall of the usual concrete confining and smoothing pan 12, which is mounted on the machine at a predetermined height above the graded roadbed R.

The upper rigid portion of the front wall 8 terminates at its lower edge substantially at the level of the pan, while the lower portion of said wall is in the form of a gate unit 13, preferably made as a number of separate sections 14 in the length of the pan, or transversely of the machine, and depending from the lower edge of the upper portion of said wall 8 substantially parallel thereto and in alinement therewith when in a normal position. Each gate section 14 includes a flexible depending lip 15 of rubber or the like which terminates in clearance relation to the roadbed, as shown in FIG. 3.

Each gate section 14 includes rigid mounting brackets 16 on its front side, which extend forwardly and then upwardly to clear a reinforcing angle 17 secured to the hopper wall 8, and to the front vertical face of which angle the brackets 16 are hinged at a level some distance above the lower edge of wall 8, as shown at 18.

Each gate bracket is formed with a lateral flange 19, normally disposed adjacent and parallel to the front wall of angle 17, and having openings 20 below the hinge and through which horizontal forwardly extending lugs 21 normally project; said lugs being rigid with angle 17 and being orificed, as at 22, in front of flange 19, as shown in FIG. 4.

A manually operable locking pin 23 of wedge form, for each lug, and normally projecting through orifice 22 from above and then engaging flange 19, prevents forward turning of the corresponding gate section about its hinge 18, as will be evident. The pin 23 is attached to one end of a flexible member, such as a chain 24, the other end of which is anchored to the front of the related gate section.

Upon lifting the pin 23 clear of the lug 21 the gate may be swung forward without interference, and it may then be held in a substantially horizontal or wide-open position, above the level of pan 12, by engaging the pin 23 in a horizontal position with supporting elements 25 projecting forwardly from the hopper wall 8; the chain 24 then taking the weight of the gate, as shown in dotted lines in FIG. 4.

When in its operative position the gate unit confines the concrete C as poured and prevents the same flowing freely from the front of the hopper, while at the same time providing for a certain degree of relief of the concrete being fed between the pan 12 and the roadbed with the slow advance of the machine.

The gate unit being capable of being raised and held at a level above that of the concrete, as above pointed out, the machine may be backed up if necessary to re-

pair a faulty slab, or to make a re-run, without interference from the gate unit. In this event, the front vibrator tube unit, later described, is first removed from the hopper.

Concrete as fed into the hopper is vibrated just before it is passed under the pan, by the following devices:

Extending lengthwise of the hopper, in the discharge mouth 26 thereof, are front and rear vibrator units 27 and 28, respectively. These units, which are cylindrical and of generally shaft-like form, are here shown diagrammatically for simplicity of illustration, since they are known as vibrator tubes, and as constructed are well known and can be purchased in the open market.

The front vibrator unit or tube 27, which is opposite the gate and below the level, is journaled at intervals in split bearing members 29. Each member 29 is rigid with an upstanding arm 30 having a forwardly projecting portion 31 which terminates in a stud 32 threaded on its outer end.

The arm portion 31 passes in clearance relation through the hopper wall 8 and the front wall of the reinforcing angle 17, and at its junction with the stud 32 carries a fixed enlarged plate or similar element 33.

An enlarged heavy-duty circular block 34 of rubber or similar resilient material surrounds the stud 32, and is provided with a metallic hub bushing 35 which engages the stud, and which is held against the plate 33 by a nut 36 on the outer end of the stud. The block 34 is peripherally confined in a collar or ring 37 secured on the angle member 17, and which is of somewhat shorter axial extent than that of block 34.

Studs 38 project forwardly from the outside of the collar 37 at intervals, and pass through a disc 39 which bears against the forward face of the block 34 adjacent its periphery and against which it is clamped by nuts 40 on the studs.

By thus mounting the vibrator-tube bearings, the vibrations imparted to said bearings by the operation of the vibrator tube are not transmitted to the hopper wall itself, and which would be undesirable, but are taken and abstorbed by the rubber blocks 34.

The rear vibrator tube 28 is disposed at a somewhat higher level than the tube 27, and slightly above the level of the pan 12. Said tube 28 projects through split bearing members 41, which are disposed in staggered relation to the bearing members 29, as shown in FIG. 5. The tube 28 is actually engaged by an eccentric bushing 42 in each member 41, and which is adjustably clamped against rotation therein. By this means, the actual operating level of the vibrator tube 28, relative to the pan, may be altered by loosening the clamping means of the various members 41, rotating the bushings to the necessary extent, and reclamping the bushings in their adjusted position.

One part of each member 41 is provided with a short rearward extension or arm 43 which is connected to the same type of vibration-absorbing mount as that used in connection with the bearing members 29, as previously described. Such mounts are secured on the back side of the pan and hopper wall 11, and are indicated generally at 44.

A chain 45, to which vibration is of course imparted, is connected at one end to each bearing member 29 and at the other end is anchored to the rear wall of the hopper at a point some distance above the rear vibrator tube 28. A similar chain 46 is connected at one end to each bearing member 41 and at the other end is anchored to the forward wall 8 of the hopper some distance above the level of the rear end of such chain, as shown in FIG. 3.

These chains being of course embedded in the concrete, and being connected at one end to the vibrating bearings, will also be vibrated and so have the desired homogenizing effect on the concrete.

The lower forward vibrator tube 27 is driven at one end by an endless belt drive 47 or the like, connected in driving relation with a motor 48 mounted on the frame 2 of the machine; there being a conventional variable-speed unit 49 between the motor and the drive 47. Similarly, the rear vibrator tube 28 is driven at the opposite end by another motor 50 mounted on the machine at the corresponding side thereof, and connected to the tube 28 by an endless drive arrangement which includes a variable speed unit 51 (see FIG. 1).

Mounted on the machine to receive concrete from the mixer and feed the same into the hopper 7 is a receptacle 52. This receptacle has downwardly sloping sides which provide a full-length mouth 53 disposed directly over the hopper 7 a short distance above the same. The receptacle is fixed with a carriage 54 projecting rearwardly from the same and provided with front and rear pairs of flanged wheels 55 and 56, respectively; the terms "front" and "rear" designating the relationship of the wheels to the paving machine lengthwise thereof. The front wheels 55 ride on rails 57 mounted on the frame 2 of the machine 1 and extending transversely of the machine, or lengthwise of the hopper 7 parallel thereto and disposed just back of and above the top of the rear wall 9 of the hopper, as clearly shown in FIG. 3.

The rear wheels 56 ride against similar rails 58 mounted on the frame of the machine above said wheels 56. By so mounting the carriage, it cannot tip forwardly and downwardly with the weight of the receptacle and its load, while at the same time the rails are out of the way of concrete being dumped into the hopper, and there is no danger of any concrete being deposited on the rails. Also, since the rails are clear of the hopper and the receptacle 52 may be moved clear of any portion of the hopper at the option of the operator, concrete may be dumped directly into the hopper at any point in its length.

The front wheels 55 are reversibly driven by chain drive units 59 connected to a reversible motor 60 mounted on the carriage; operation of the motor being controlled by the operator of the machine from his seat 61 on said machine by means of suitable electrical connections of a conventional type.

By means of the above described arrangement, the receptacle may be moved back and forth from one end to the other of the hopper so as to receive concrete from either side of the machine and feed the concrete in evenly distributed amounts along the hopper.

An arcuate gate 62 normally closes the mouth 53 of the receptacle 52; said gate having end ears 63, each of which overlaps the adjacent end wall of the receptacle and is pivotally connected thereto, as at 64. A sprocket wheel 65 is connected to one ear axially of the pivot 64, and is engaged by an endless chain 66 driven by a reversible motor and reduction gear unit 67 mounted on the carriage; said unit being controlled in the same manner as the motor 60.

The gate may thus be opened to any degree desired for the proper regulated discharge of the concrete therefrom as the receptacle moves along the hopper.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations therefrom may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. In a concrete slab laying machine having a slab engaging pan extending lengthwise thereunder, and a concrete distributing hopper mounted on the machine and extending the full width of the pan and including

front and rear walls spaced apart; the front wall terminating below the level of the pan and the lower portion of the rear wall extending with a rearward slope to a junction with the pan at its forward end, and front and rear vibrator tube units extending lengthwise of and mounted within the hopper, the rear unit being adjacent and above the level of the pan and the front unit being below the level of the pan and adjacent the front wall.

2. A structure, as in claim 1, with bearing members for each vibrator unit supported from the hopper and engaging such unit at intervals in the length of the hopper, the bearing members for the front and rear vibrator units being disposed in relatively staggered relation lengthwise of the hopper, and a normally slack flexible element connected between each bearing member and the wall of the hopper opposite thereto at a point thereon above such member.

3. In a concrete slab laying machine having a slab engaging pan extending lengthwise thereunder, and a concrete distributing hopper mounted on the machine and extending the full width of the pan and including front and rear walls spaced apart; the lower portion of the rear wall extending with a rearward slope to a junction with the pan at its forward end, a vibrator tube unit extending lengthwise of the hopper and disposed adjacent and above the level of the pan, bearing members for the unit supported in the hopper, eccentric bushings rotatably supported in the members and in which bushings the unit is turnable, and means included with the bearing members to clamp the bushings in different positions of adjustment in said members.

4. In a concrete slab laying machine having an elongated concrete distributing hopper mounted thereon, the hopper including spaced apart side walls extending transversely of the machine, a vibrator tube unit in the hopper parallel to said walls in spaced relation thereto, bearing members for the unit engaging the same at intervals in the length thereof, and means mounting each member separately on one hopper wall for vibrating movement with the unit without such movement being transmitted to said wall; said mounting means comprising an arm rigid with the member and projecting in clearance relation through an opennig in said hopper wall

at right angles thereto, an enlarged plate on and rigid with the arm intermediate its ends smaller than and within the opening and disposed substantially in alinement with said wall, a heavy-duty resilient block disposed outwardly of said wall and through which the arm outwardly of the plate projects, one face of the block engaging the outer face of the plate and the outer face of the wall, means on the arm holding the adjacent portion of the block against the plate, a band secured on the wall and engaging the periphery of the block in confining relation, and an endless clamping element mounted on the band and engaging the outer face of the block adjacent the periphery thereof in pressing relation to clamp the portion of the block adjacent its periphery between the element and the outer face of said wall.

5. In a concrete slab laying machine having an elongated concrete distributing hopper mounted thereon, the hopper including spaced apart side walls extending transversely of the machine, a vibrator tube unit in the hopper parallel to said walls in spaced relation thereto, bearing members for the unit engaging the same at intervals in the length thereof, means mounting each member separately on one hopper wall for vibrating movement with the unit; the vibrator unit and the bearing members being relatively close to said one wall, and a normally slack flexible element extending between and connected to each bearing member and to the other wall at a predetermined point above the member.

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