Dec. 13, 1927.

1,652,434

A. N. GEORGE ET AL

CONCRETE LAYING MACHINE

Filed March 24, 1926

2 Sheets-Sheet 1

Fig. 1.

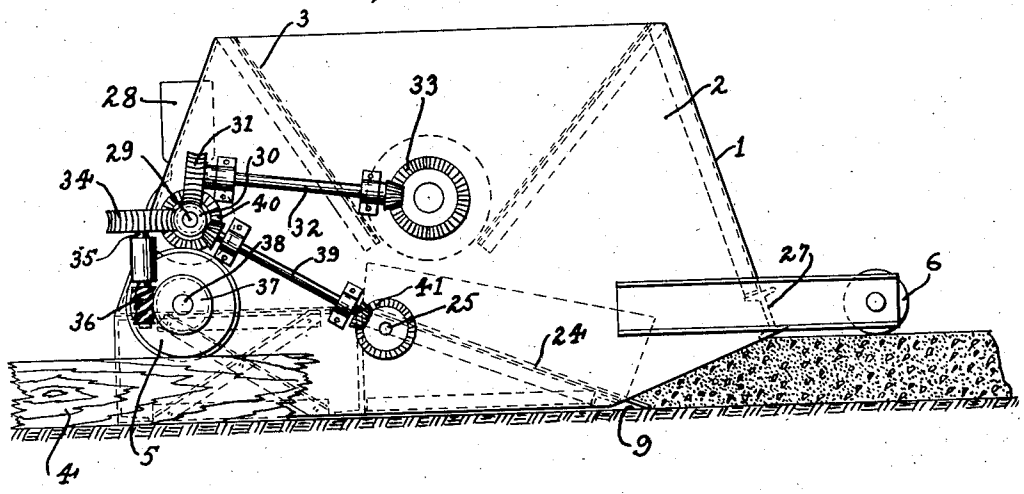
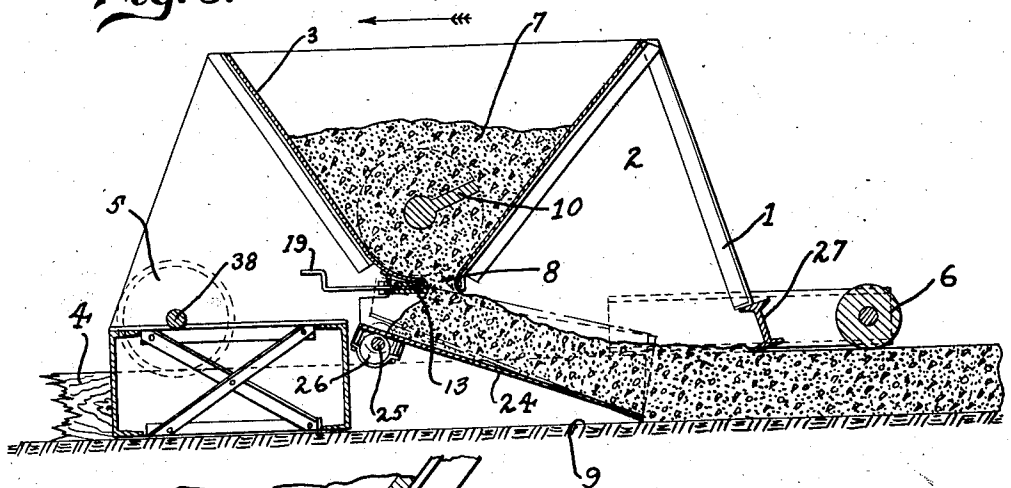


Fig. 3.



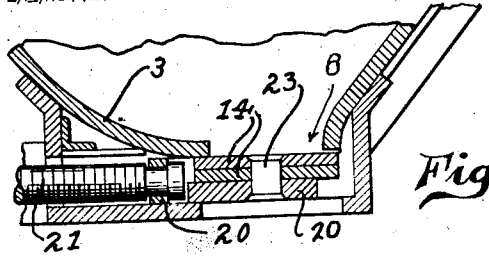


Fig. 5.

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Fig. 2.

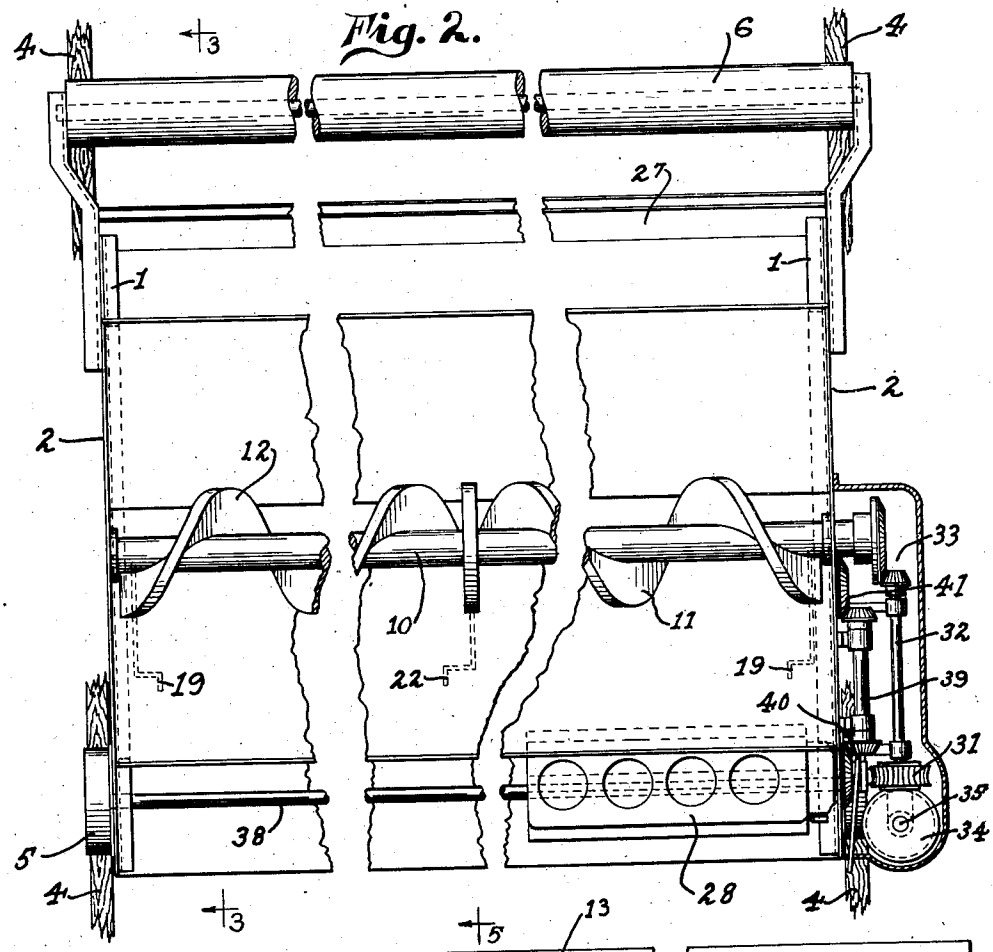


Fig. 4.

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UNITED STATES PATENT OFFICE.

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CONCRETE-LAYING MACHINE.

Application filed March 24, 1926. Serial No. 96,931.

This invention relates to a machine, the purpose of which is to facilitate the rapid laying and setting of concrete. While the invention may be utilized in various connections, it is especially useful as applied to a machine for laying concrete roadways.

It is the present practice in constructing concrete roadways to reduce as far as possible the proportion of sand and water used in the concrete, and in laying concrete it is desirable to have the pieces of aggregate as closely locked together as possible, thereby reducing the spaces between the pieces of aggregate which must be filled by the cement and sand. But where the "mix" is dry, it is found in practice that it requires considerable tamping to condense the concrete to insure that the spaces between the particles of aggregate are properly filled by the cement.

The general object of this invention is to produce a machine of simple construction which can be used to effect the laying of concrete in a comparatively dry state but which will operate in such a way as to insure the proper density of the concrete when laid, thereby avoiding the necessity for an extensive amount of tamping. In its construction the machine includes a delivery opening which extends transversely to the roadway and through which the concrete passes; one of the objects of the invention is to facilitate the delivery of a substantially uniform amount of concrete throughout the entire length of this opening and to provide means for regulating the size of this opening throughout its length.

A further object of the invention is to improve the general construction of machines of this type.

Further objects of the invention will appear hereinafter.

The invention consists of the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient concrete laying machine.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a side elevation of the concrete laying machine embodying our invention. In this view, a stringer, on which the machine is supported, is represented as broken away and the laid concrete is illustrated in sections, together with a portion of the ground in the road bed.

Figure 2 is a plan of the machine and showing the side stringers on which the machine may be supported; this view shows the machine broken away at intermediate portions of its length.

Figure 3 is a vertical section, taken about on the line 3—3 of Figure 2 and further illustrating details of the machine.

Figure 4 is a plan of the bottom opening of the hopper of the machine broken away and particularly illustrating the details of the construction of the gate for controlling the distribution of the concrete as it flows through the delivery opening.

Figure 5 is a section taken about on the line 5—5 of Figure 4 and further illustrating details of the gate.

In practicing our invention, we provide a hopper supported on the frame of the machine for carrying the wet concrete and we provide means for directing the concrete from the hopper to the place where it is to set and we preferably provide means for agitating the concrete as it passes down so as to separate the water from it.

The machine illustrated is constructed to be used for laying concrete in a roadway and comprises a frame 1 which may be built of angle irons and side-plates 2, the construction being such as to enable the frame to support a relatively large hopper 3 which extends transversely to the roadway. The machine is constructed so that it is movable along the roadway. For this purpose we prefer to provide a pair of stringers 4 of wood which are laid at the sides of the excavated road-bed and the machine is supported on wheels 5 and the ends of a roller 6, which roll on the stringers. Within the hopper 3, we provide a quantity of already mixed concrete 7 and as the machine moves along slowly, this concrete passes down through an opening 8 at the bottom of the hopper from which point it is directed down onto the road-bed 9. We provide means for effecting a substantially uniform distribution of the concrete as it passes through this opening, and for this purpose we provide a distributing device 10 which is in the form of a duplex or double feed-screw (see Figure 2), which extends along the bottom of the hopper. This feed-screw includes the section 11

at the right and the section 12 at the left and these sections are of opposite characters to each other, that is to say, one is a right-hand screw and the other is a left-hand-screw, so that when the feed-screw is rotated, the material at the middle of the hopper is constantly being moved out toward its ends.

In order to regulate the width of the opening 8 throughout its length, we provide an adjustable gate 13, (see Figures 3 and 4). This gate extends transversely across the opening through which the concrete passes and is preferably constructed of two gates or slides 14 which are in the form of plates, each plate having its own corresponding adjusting device adjacent the end of the opening. For this purpose, the end of each gate-plate is provided with a slot 15 which receives a pin 16 on an adjustable slide 17 which may be adjusted by means of an adjusting screw 18 formed with a crank 19 for rotating the same. This construction is duplicated at each side of the machine. We provide means for adjusting the inner ends of gate-plates 14. For this purpose, we provide an adjustable slide 20 at this point which is controlled by an adjustable screw 21 with a crank 22.

The gate-plates 14 are movably attached to the slide 20, for example, by a common pivot-pin 23. In order to effect a uniform distribution of the concrete, it is usually necessary to have the opening wider toward the ends than at the middle.

Figure 5 shows the details of this construction. Below the delivery opening 8, we provide means for receiving the concrete and laying it in the roadway. For this purpose, we prefer to provide an inclined chute 24, the lower edge of which rests on the roadbed 9 and the rear end of which is supported on an agitating device. In the present instance, we provide a transverse shaft 25, carrying a pair of eccentrics 26 which are strapped into a rudimentary socket on the underside of the chute. In other words, this shaft 25 supports the chute and at each revolution of the shaft it imparts an up and down vibration to the receiving end of the chute. This chute extends throughout the full width of the slab of concrete which is being laid. We prefer to have it extend across the entire width of the roadway.

In the operation of the machine, it proceeds slowly in the direction of the arrow indicated in Figure 3. As the concrete is laid, it passes under a transverse beam, such as the I-beam 27 which operates as a scraper or leveler for the laid concrete. A little to the rear of this scraper, the roller above referred to is located. This roller presses the face of the concrete which has been laid and smooths its surface. If desired, this roller can be mounted so as to put some slight pressure on the face of the concrete as it rolls upon it.

The machine may be propelled by power from a motor, such as a gas engine 28, (see Figures 1 and 2). The shaft 29 of this engine may be provided with a worm 30 to drive a worm-wheel 31 on a shaft 32 which extends over to a point near the end of the distributor screw, at which point bevel gearing 33 is provided for driving the screw. Another worm-wheel 34 may be provided which is attached to a short shaft 35 which extends downwardly and is provided with a worm 36 for driving a worm-wheel 37 on an axle 38 which carries the wheels 5 running on the stringers. The agitating shaft 25 may be driven by an inclined shaft 39 which is driven from the shaft 29 by bevel-gears 40 and which drives the shaft 25 through bevel gears 41 (see Figures 1 and 2).

In the operation of the machine, it should be understood that it will be driven along slowly by the wheels 5 which make about one-half of a revolution per minute. The agitator shaft should be driven at a relatively high speed, for example, four hundred revolutions per minute. The speed of driving the feed-worm 10 would depend upon the pitch of the screw. As the machine moves along, the concrete moves down the opening 8 and the distribution of the concrete is regulated by rotating the cranks 19 and 22 to adjust the gate-plates 14. As the concrete passes down the chute 24, the agitation jogs the aggregate into a proper "lock," that is to say, it condenses the concrete as it is laid. The scraper 27 levels off the top of the concrete and the roller 6 smooths it off or rolls the same with slight pressure.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and we do not wish to be limited to the practice of the invention, nor in the claims, to the particular embodiment set forth.

What we claim is:

1. In a concrete laying machine, the combination of a frame, a hopper supported on the frame for carrying wet concrete, means for supporting the concrete from below and directing it from the hopper to the place where it is laid, and an agitating device for subjecting said supporting means to a rapid succession of vibratory movements to condense the same.

2. In a concrete laying machine, the combination of a frame, a hopper supported on the frame for carrying wet concrete, a chute for receiving the concrete from the hopper and for laying the concrete, and means for subjecting the chute to a rapid succession of vibratory movements to condense the concrete.

3. In a machine for laying concrete in a roadway, the combination of a pair of

stringers disposed respectively at the side of the roadway, a frame movably supported on the stringers, a hopper supported on the frame and extending transversely across the roadway, a chute for receiving the concrete from the hopper and for laying the same in the roadway, and means for subjecting the chute to a rapid succession of vibratory movements to condense the concrete.

4. In a machine for laying concrete in a roadway, the combination of a pair of stringers disposed respectively at the sides of the roadway, a frame with wheels supporting the same to move along the stringers, a transversely disposed hopper supported on the frame and having a delivery opening extending across the roadway, feeding means in the hopper for moving the concrete toward the edges of the roadway, a chute for receiving the concrete from the delivery opening, and means for subjecting the chute to a rapid succession of vibratory movements to condense the concrete.

5. In a machine for laying concrete in a roadway, the combination of a movable frame, a transversely disposed hopper carried thereby extending substantially completely across the roadway and having an elongated delivery opening extending substantially throughout its length, a gate extending across the opening and transversely to the direction of movement of the concrete down the chute for controlling the opening, means for controlling the gate to regulate the opening past it, and a chute extending substantially throughout the length of the delivery opening for receiving the concrete from the delivery opening and for laying the same.

6. In a machine for laying concrete in a roadway, the combination of a pair of stringers disposed respectively at the sides of the roadway, a frame with wheels running on the stringers, a transverse hopper carried by the frame with a delivery opening at its bottom, a pair of gates for the delivery opening, means corresponding to each gate for regulating the position of the same, and a chute for receiving the concrete from the delivery opening and for laying the same.

7. In a machine for laying concrete in a roadway, the combination of a pair of stringers disposed respectively at the sides of the roadway, a frame with rollers running on the stringers, a transverse hopper carried by the frame with a delivery opening at the bottom thereof, a pair of gates for the delivery opening, means corresponding to each gate for regulating the position of the same, a chute for receiving the concrete from the delivery opening and for laying the same, and means for agitating the chute to condense the concrete.

8. In a machine for laying concrete in a roadway, the combination of a chute extending substantially the width of the roadway, means for delivering concrete onto the chute, said chute being inclined and operating to lay the concrete in the roadway, and means for agitating the chute to condense the concrete.

9. In a machine for laying concrete in a roadway, the combination of a transverse hopper having an opening extending across the roadway, feeding means in the hopper above the opening, a shoe near the middle of the opening with means for adjusting the same across the opening, a pair of gates attached to the shoe and extending longitudinally of the opening, means for moving the gates adjacent their outer ends to regulate the size of the opening past the gates, and a chute for receiving the concrete from the opening and for laying the same.

10. In a concrete laying machine, the combination of a frame, means for supporting a quantity of the concrete from below and directing it to the place where it is laid, and an agitating device for subjecting said supporting means to a rapid succession of vibratory movements to condense the concrete.

11. In a machine for laying concrete in a roadway, the combination of a movable frame, a transversely disposed hopper carried thereby extending substantially completely across the roadway and having an elongated delivery opening extending substantially throughout its length, a gate for controlling the opening, means for controlling the gate to regulate the opening past it, a chute extending substantially throughout the length of the delivery opening for receiving the concrete from the delivery opening and for laying the same, and means for subjecting the chute to a rapid succession of vibratory movements to condense the concrete as it moves down the chute.

Signed at Los Angeles, Calif., this 3 day of March, 1926.

ABRAM N. GEORGE.

Signed at San Diego, California, this 17th day of March, 1926.

VINCENT BRESSI.