Aug. 22, 1933. G. FORTIER 1,923,303

COMBINATION CONCRETE MIXER AND PLACER

Filed April 21, 1931 2 Sheets-Sheet 1

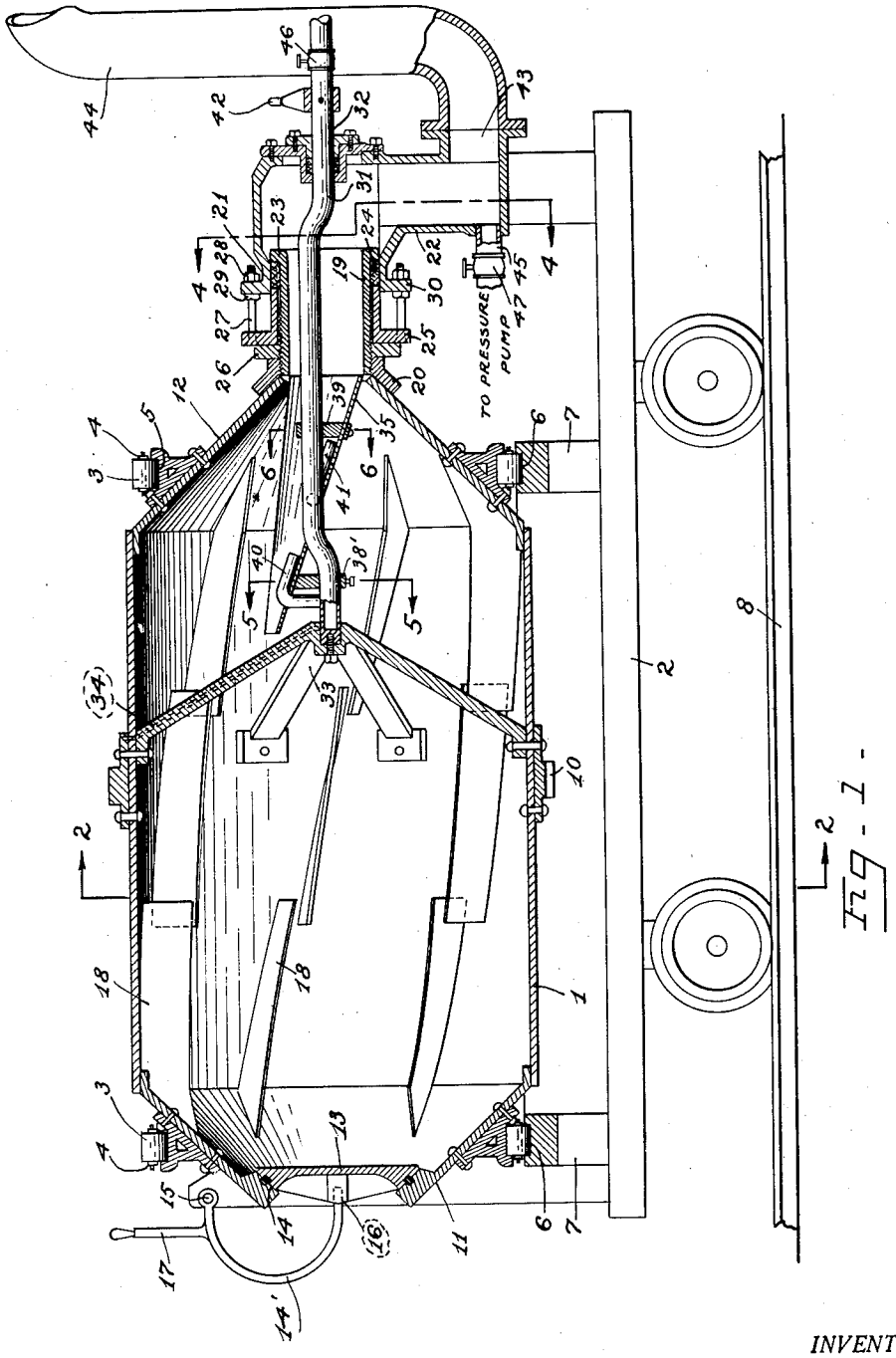


Fig. 1.

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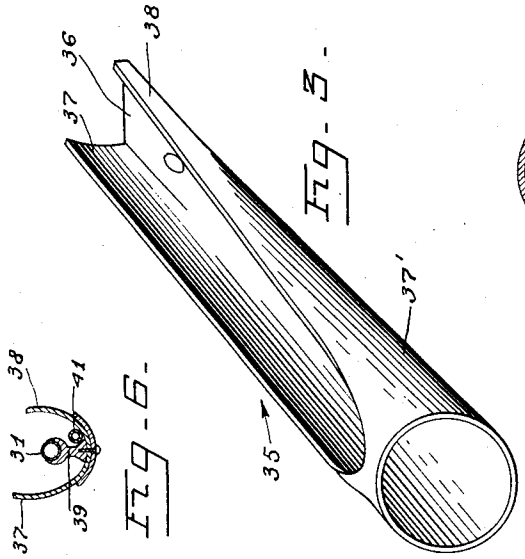


Fig. 3.

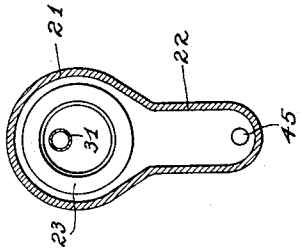


Fig. 4.

Fig. 6.

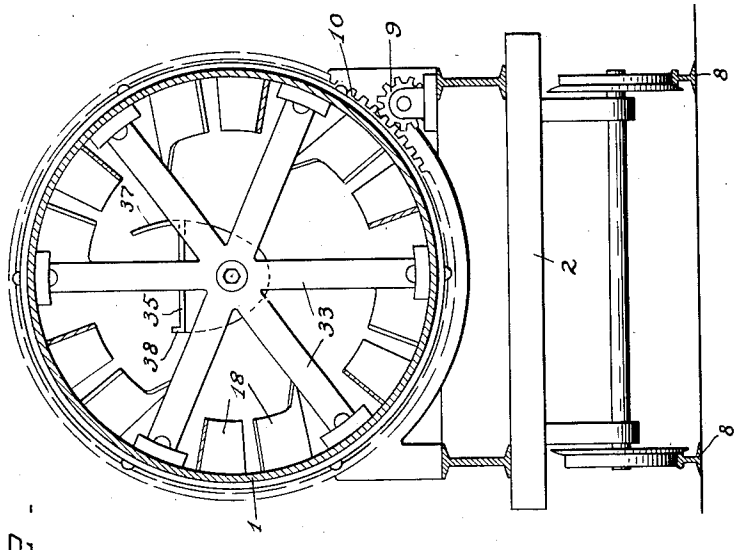


Fig. 2.

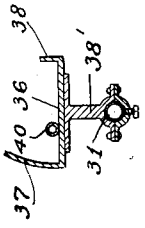


Fig. 5.

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1,923,303

UNITED STATES PATENT OFFICE

1,923,303

COMBINATION CONCRETE MIXER AND PLACER

George Fortier, Pittsburg, Calif.

Application April 21, 1931. Serial No. 531,830

4 Claims. (Cl. 83—73)

The present invention relates to improvements in a combination concrete mixer and placer, and the principal object of the invention is to combine with a concrete mixer means for discharging and placing the concrete wherever it may be desired.

More particularly it is the object of the present invention to combine a concrete mixer and a concrete placer into one unit whereby the handling of concrete is facilitated particularly in places difficult of access.

While my combination machine may be used in many different situations, it has been particularly developed for service in connection with the erection of a concrete lining for a tunnel, and it is particularly adapted for that purpose.

A further object of the invention is to provide, in combination with a revolving concrete mixer, a pneumatic means for discharging the concrete therefrom and for placing the latter. A further object of the invention is to arrange the mixer and the placer into a simple and economical unit, which takes up little space and which is adapted for handling where only limited space is available.

Further objects and advantages of my invention will appear as the specification proceeds.

The preferred form of my invention is illustrated in the accompanying drawings, in which

Figure 1 shows a vertical longitudinal section through my device;

Figure 2 a transverse section taken along line 2—2 of Figure 1;

Figure 3 a perspective detail view of a discharge trough used in my device;

Figure 4 a transverse section taken along line 4—4 of Figure 1; and

Figures 5 and 6 transverse sections taken along lines 5—5 and 6—6 of Figure 1, respectively.

While I have shown only the preferred form of the invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

In its preferred form my invention comprises a mixing drum 1 of conventional form revolvably mounted on a truck 2 by means of rollers 3, having chain links 4 connecting the same and being mounted in grooves 5 of the drum, and adapted to ride in registering grooves 6 provided in standards 7 rising from the platform of the truck. The truck may be made to ride on rails 8 or may be suspended from a rail by means of a traveling crane. Rotary motion may be imparted to the drum by any suitable means as, for instance, by a pinion 9 engaging with a ring gear 10 encircling the drum.

The drum is preferably tapered at both ends as shown as 11 and 12, and may be closed at its rear end by means of a gate 13 circular in form and adapted to be seated against a frusto-conical seat 14. The gate, which is frusto-conical in form, may be held against its seat by pressure prevailing within the drum and is manipulated by means of a curved rod 14' pivoted to a fixed support as at 15, and engaging the gate by means of a swivel joint 16. A handle 17 rises from the rod 14' and allows the same to be manually operated for throwing the gate inward when it is desired to fill the drum, the gate normally falling back into closing position.

The drum is equipped on its inside with spiral vanes 18 adapted to aid in the mixing of the concrete in the drum when the latter is revolved, and also tending to carry the concrete forward during the mixing period.

At its front end the drum terminates in a sleeve 19 which is threaded into a flange 20 fastened to the front end of the drum. By means of this sleeve the drum is connected to the horizontal end 21 of a vertical discharge chute 22, the sleeve extending into the discharge chute and having an exterior flange 23 fitting the chute opening and forming a packing chamber 24 therewith. Packing may be forced into this chamber by means of a gland 25 slidable on the sleeve 19 and a nut 26 threaded on the sleeve. The gland 25 is fastened to the chute body by means of bolts 27 and nuts 28, which prevent separation of the gland from the chute housing under influence of inside pressure. On the other hand, the drum and the chute housing are prevented from being drawn together under the influence of negative inside pressure by nuts 29 bearing on the inside of the flange 30, and the further fact that the heads of the bolts 27 are covered and held against sliding movement by the nut 26.

A pipe 31 is axially supported in the forward end of the drum, the pipe having bearing in the wall of the chute housing as at 32 and inside of the drum in a spider 33 adapted to be oiled through an oil line 34. This pipe 31 has a slanting trough 35 fastened thereto. The trough is of the shape indicated in Figure 3, starting with a flat bottom 36 at its upper end, and gradually changing into annular form as at 37' at the other end. The flat bottom 36 has two sides 37 and 38 rising therefrom, the side 37 being much higher than the side 38 so as to allow concrete to be

discharged into the trough by the vanes of the drum in a spiral direction, the side 38 being low to allow the concrete to enter the trough and the side 37 being high to prevent the concrete from running off. This trough may be fastened to the pipe 31 in any suitable manner and is preferably fastened by means of two brackets indicated at 38' and 39, and shown in detail in Figures 5 and 6. The pipe 31 is connected at its outer end to a source of compressed air and is provided at its inner end with two branch pipes 40 and 41 arranged to discharge air under pressure along the bottom of the trough so as to force concrete discharged thereon downward and through the sleeve 19 into the chute 22. The pipe 31 may be turned from the outside by means of a handle 42 whereby the trough may be turned through an angle of substantially ninety degrees so as to be inactive during the initial part of the mixing period.

At its lower end the chute terminates in a horizontal discharge port 43 which connects with a pipe 44 leading to the particular place where the concrete is to be placed, and opposite the discharge port 43 is arranged an intake port 45 for compressed air which forces the concrete through the conduit 44.

My invention is used as follows: Assuming that a tunnel is to be lined and a frame or form has been erected against the wall of the tunnel, my device is placed in convenient proximity to the place where the concrete is to be applied and the conduit 44 is shaped to discharge the concrete at the top of the form so that the concrete may roll downward along the sides of the tunnel in both directions. The drum is then filled with gravel, sand and cement through its rear end by any suitable means, as for instance by a conveyor or a charging hopper. A measured quantity of water is admitted in any suitable manner not shown in the drawings, and after the ingredients have been introduced the gate 13 is allowed to fall back into position and the drum is revolved by means of the pinion 9 engaging the ring gear 10. During the initial period of the revolving motion the pipe 31 is turned by means of the handle 42 so as to place the trough with its bottom in an upright position, the side 37 of the trough being on top and serving as a hood to prevent concrete from entering the trough. After the mixing operation has proceeded, say for a minute and a half, or whatever time is required, the pipe 31 is turned to bring the trough into active position and the concrete now is discharged gradually on the trough, the low side 38 allowing of free access of the concrete from vanes 18, while the side 37 prevents the concrete from rolling or flowing over the other edge of the trough. At the same time suitable valves 46 and 47 in the pipes 31 and 45 are opened so that air under pressure may enter through the same. The compressed air passing through the pipe 31 is discharged parallel with the bottom of the trough through the branch pipes 40 and 41, and maintains the trough clean by urging the concrete into and through the sleeve 19 from which it drops through the chute 22. At the bottom of this chute, it is taken up by the air blasts coming through the pipe 45 and is forced through the conduit 44 and discharged at the end of this conduit.

During the discharge process considerable pressure is built up throughout the drum, and holds the gate 13 tightly to its seat so that no pressure may escape at the rear end of the drum. The inner pressure has a tendency to separate the drum from the chute housing but this tendency is counteracted by the bolts 27 and the nuts 28. Toward the end of the operation the sudden turning off of the valves 46 and 47 may produce a temporary negative pressure in the inside of the drum and the chute, which might have a tendency to force the sleeve 19 into the chute housing, and this tendency is counteracted by the nuts 29 and the fact that the heads of the bolts 27 are held against outward movement by the nut 26.

I claim:

1. In combination, a revolvable concrete mixer, a discharge chute for the same, a pipe extending axially into the mixer, a trough supported on the pipe and having communication with the chute, means for feeding the contents to the trough and means utilizing the pipe for blowing air along the trough for urging the contents into the chute.

2. In combination, a revolvable concrete mixer, a discharge chute for the same, a pipe extending axially into the mixer, a trough supported on the pipe and having communication with the chute, means for feeding the contents to the trough and means utilizing the pipe for blowing air along the trough for urging the contents into the chute, the pipe being supported with freedom of revolvable adjustment whereby the trough may be turned into inactive position during the initial mixing period.

3. In combination, a revolvable concrete mixer, means for revolvably supporting the same, a stationary chute, an axial outlet for the mixer communicating with the chute, a member having bearing in the mixer and in the chute and extending through the outlet and a trough supported on the member and adapted to discharge into the outlet.

4. In a device of the character described, a revolvable concrete mixer terminating in a neck at one end thereof, a trough having a cylindrical end adapted to register with the neck, a member extending through the neck and the bottom of the trough and means for fastening the trough to the member.

GEORGE FORTIER.