A. V. JENSEN.

APPARATUS FOR CONVEYING AND PLACING CONCRETE.

APPLICATION FILED AUG. 18, 1913.

1,142,567.

Patented June 8, 1915.

2 SHEETS—SHEET 1.

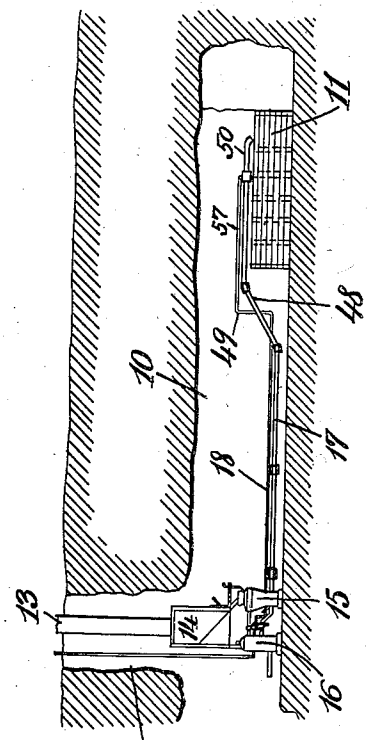


Fig. 1

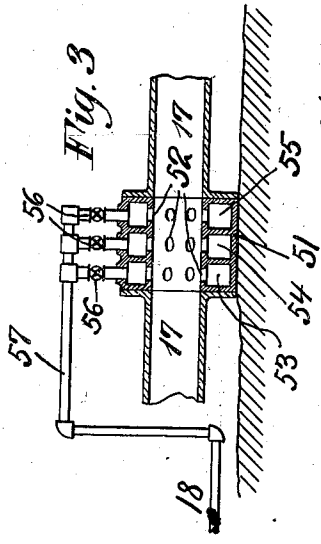


Fig. 3

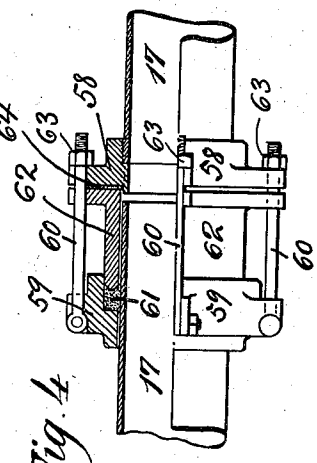


Fig. 4

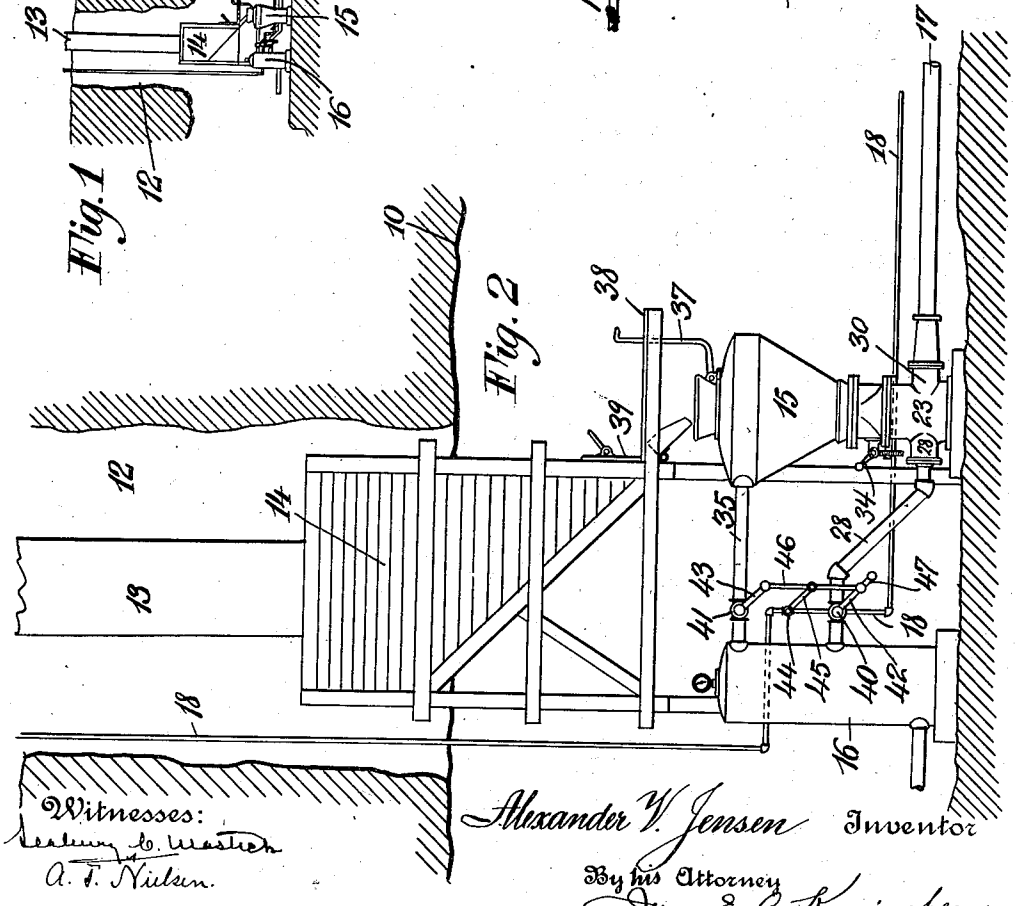


Fig. 2

Witnesses:
Leaburn b. Wastich
A. F. Nielsen.

Alexander V. Jensen Inventor

By his Attorney
Ivan E. A. Konigsberg

A. V. JENSEN.

APPARATUS FOR CONVEYING AND PLACING CONCRETE.

APPLICATION FILED AUG. 18, 1913.

1,142,567.

Patented June 8, 1915.

2 SHEETS—SHEET 2.

Fig. 8

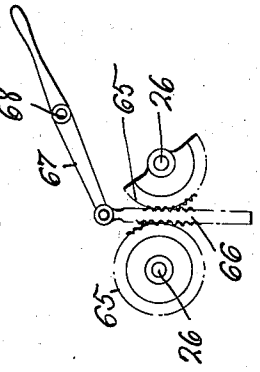


Fig. 7

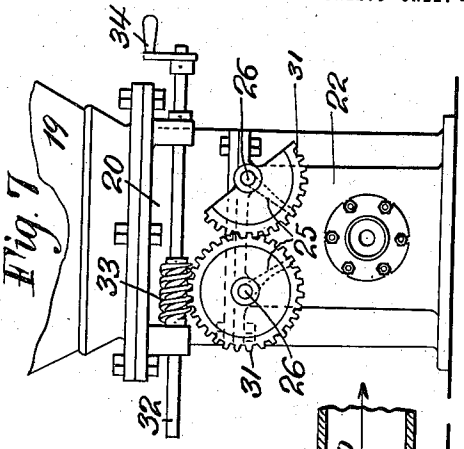


Fig. 6

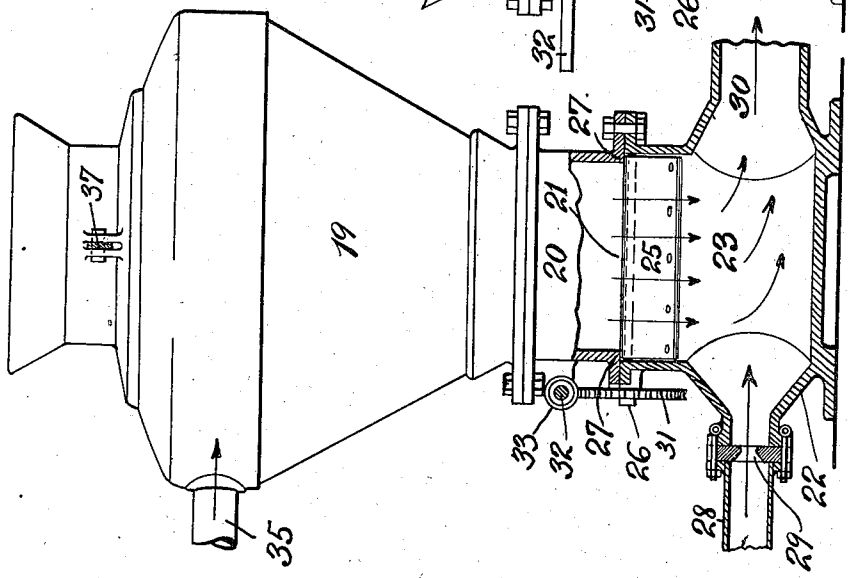
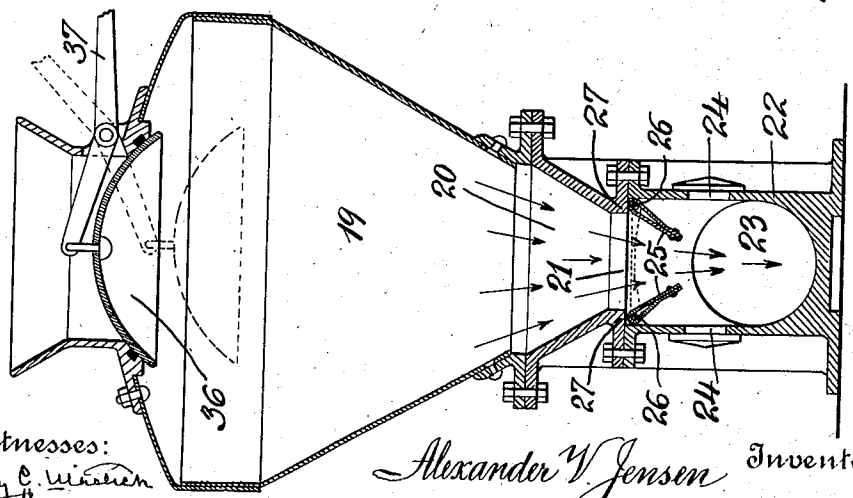


Fig. 5



Witnesses:

Seaburn C. Wisken

A. T. Wilson.

Alexander V. Jensen Inventor

By his Attorney

Ivan E. A. Konigsberg

UNITED STATES PATENT OFFICE.

ALEXANDER V. JENSEN, OF ELIZABETH, NEW JERSEY.

APPARATUS FOR CONVEYING AND PLACING CONCRETE.

1,142,567. Specification of Letters Patent. Patented June 8, 1915.

Application filed August 18, 1913. Serial No. 785,445.

To all whom it may concern:

Be it known that I, ALEXANDER V. JENSEN, a citizen of the Danish Monarchy, and a resident of Elizabeth, Union county, New Jersey, have invented certain new and useful Improvements in Apparatus for Conveying and Placing Concrete, of which the following is a specification.

This invention relates to improvements in apparatus for conveying and placing concrete and similar material. An apparatus for this purpose usually comprises a hopper for receiving the material and which is provided with an air chamber into which the material is fed from the hopper. From the air chamber the material is conveyed by air pressure through a pipe line to the point of delivery, water being added usually in or adjacent the hopper.

It is the object of this invention to improve in general the construction and arrangement of the apparatus and the operation thereof.

More particularly one object of the invention is to simplify and improve the construction of the mechanism for controlling the feed of the material from the hopper to the air chamber.

Another object is to arrange the means for supplying water in such a manner that the water is added near the point of delivery.

Still another object is to provide novel means for controlling the admission of the air and water.

Other objects of the invention will appear as this specification proceeds, while reference is had to the accompanying drawings in which—

Figure 1 is a view of the entire apparatus in operation, details being omitted. Fig. 2 is a view of the apparatus together with the air reservoir. Fig. 3 is a detail view of the means for supplying and controlling the water. Fig. 4 is a detail view of a pipe coupling for permitting quick detachment of a pipe section. Fig. 5 is a vertical sectional view of the apparatus. Fig. 6 is a view at right angle to Fig. 5 and partly in section. Fig. 7 is a view of the operating means for the feeding mechanism, and Fig. 8 shows a modification of said operating means.

Referring first to Fig. 1 the reference numeral 10 represents a tunnel which is to be lined with concrete. 11 represents the usual wooden form. 12 is a shaft leading to the tunnel from the surface. 13 is a chute for receiving the dry mixed material and from which it passes into a wooden bin 14 from whence it passes into the receiver or tank 15 of the apparatus itself. 16 is the air reservoir. 17 represents the pipe line for conveying the material and 18 is the water supply pipe. The apparatus itself comprises a receiver or tank 19 joined to a throat 20 having a discharge opening 21. 22 is a base forming an air chamber 23. 24, 24 are peepholes or openings to permit ready cleaning and inspection. The discharge opening 21 may be closed by two trapdoors 25, 25 pivoted on shafts 26. The casting 22 is offset under the throat 20, the latter having an overhang 27, which makes the door opening larger than the discharge opening to prevent wedging of material behind the doors. 28 is the air supply pipe leading to the air chamber 23 from the reservoir 16 and provided with a suitable nozzle 29 and 30 is the delivery opening leading from the air chamber and through which the material passes into the pipe 17. The trap doors 25 are operated by means of gears 31 fast on the shafts 26. 32 is an operating shaft suitably supported on the machine and which carries a worm 33 which meshes with one of the gears. The shaft 32 has a handle 34. 35 is a pipe leading from the air reservoir 16 to the upper part of the receiver 19. This latter is further provided with an air lock 36 operated by a lever 37 in the usual manner.

The apparatus is preferably arranged as shown in Figs. 1 and 2 in which 38 represents a working platform for the operator who operates the door 39 through which the material passes from the hopper into the receiver 19. The air supply to the receiver through the pipes 28 and 35 is controlled by valves 40 and 41 having operating arms 42 and 43. The water supply through pipe 18 is controlled by a valve 44 having an operating arm 45. The said three valve operating arms are connected by a link 46 provided with a handle 47.

The situation illustrated in Fig. 1 is one in which the concrete has been placed behind the form to about half way up in the tunnel and it will be understood that as the work progresses, the delivery end of the pipe 17 is raised by means of a suitable section as 48. It is a feature of my invention

that the water through pipe 18 is admitted to the pipe 17 near the delivery end and above the pipe 17. Consequently the water pipe will also be raised as the work progresses and whereby it is insured that the water will always stand in the pipe 18 as high as the point 49 in Fig. 1 and at a corresponding height above the delivery end 50 of the delivery pipe 17 irrespective of the position of the latter. The water is admitted to pipe 17 by means of a sleeve or jacket 51 which communicates with the pipe 17 by means of the apertures 52. These latter are arranged in three chambers 53, 54 and 55. The water supply to each chamber is controlled by a valve 56.

By referring to Fig. 3 it will be seen that at the beginning of the work when the delivery end of pipe 17 is not raised at all above the floor of the tunnel, there is still a water head of a height equal to the difference in level between the water pipe 18 and its delivery end 57. By this means a quick supply of water is assured, because when the water valve 44 is opened it is not necessary for the water to travel through the entire length of the pipe 18 before reaching the delivery end. In order to be able to detach a section of pipe quickly the following means are provided. Each section of the pipe 18 carries at its one end a flange 58 secured thereto as for instance by screwing. Another flange 59 is mounted to slide on the opposite end of the pipe section and carries swing bolts 60. A stuffing box is formed between the two flanges by means of a gasket 61 and a gland 62. By moving the parts together as shown in Fig. 3 and tightening the nuts 63, the gland 62 is forced against the gasket 61 and causes the latter to grip the pipe 17. A second gasket 64 may be provided if desired. By this means there is provided a tight and at the same time easily detached coupling between adjacent pipe ends.

In Fig. 8 I have shown a modified form of the operating means for the trap door shafts 26. In this instance the gears 65 on the shafts 26 are smaller and operated by a double rack 66 actuated by a lever 67 pivoted to the machine at 68. This provides for a quicker opening of the doors but lack the locking feature which is obtained by using the worm 33 to turn the gears 31 as in Fig. 7. During the operation the mixed dry material is delivered by any usual means to the top of the chute 13 and falls into the bin 14 from which it is periodically discharged in predetermined measures into the receiver or tank 19. The arrangement illustrated enables one man to operate the bin door 39 and the air lock 36 from the platform 38. Another man operates the apparatus itself, the latter and the air reservoir being preferably placed so close to one another that the operator can reach the handle 34 to the one side of the handle 47 to the other side.

In operation a batch of material is delivered to the receiver and falls upon the trap doors 25 which at that moment are closed as shown dotted in Fig. 5. Immediately thereafter the handle 34 is operated to open the trap doors as wide as conditions require and simultaneously therewith the handle 47 is operated and the air under a pressure of probably ninety pounds, more or less, passes into the receiver above the trap doors and into the air chamber 23. In other words, the dry mixed material is dropped in the form of a sheet—as indicated by the arrows in Figs. 5 and 6—into the traveling air blast or stream of air which carries the material through the pipe and shoots it out through the delivery end 50. In practice it has been found that the material will be shot through a length of pipe about six hundred feet long in about ten seconds time. During the travel a further and finer mixing of the material takes place due to the difference in specific weight and consequent difference in speed. Simultaneous with the opening of the air, the water valve 44 is opened and the water flows through pipe 18 and out through the openings 52 through one or more of the chambers 53, 54 and 55 in the water jacket 51 and as a result a mixture of water and rock, sand and cement, or other materials, is shot out through the pipe 17 and into the form 11, where preferably a man is employed to scrape the material away from the pipe and thoroughly fill the form. By means of the valves 56 the amount of water may be regulated to a nicety. The moment the wet mixed material passes out of the pipe 17, the air pressure falls in the apparatus and a fresh batch may be shot out and so on.

It will be seen that by means of the arrangement illustrated it needs but few men to operate the apparatus. There is very little possibility of clogging the pipe, because dry material only passes through it except at the delivery end and a thorough mixture is obtained because of the fact that the material travels through the pipe dry. The operator can send as much or as little material through the pipe as is deemed desirable and has at all times the trap doors 25 under perfect control. The air pressure above the doors prevents back pressure and rising of the material and of course the air lock is kept locked while the concrete is being shot out.

The pipe coupling shown in Fig. 4 permits quick detachment of a pipe section in case it should become clogged or plugged.

The illustration of the use of the apparatus is of course an example only and concrete may be placed with advantage in other

places besides tunnel work. In the latter there is the additional advantage that no tracks or wagons or other means are necessary to carry the material to the place of delivery but only the pipes are placed in the tunnel.

I do not wish to be limited to the exact construction shown otherwise than as demanded by the scope of the appended claim.

I claim:

The combination of a receiver adapted to receive dry mixed material and having a discharge opening, a casing forming an air chamber below said opening, a first air supply pipe for admitting air under pressure to the said container at the top thereof, a discharge pipe connected to said air chamber at the bottom thereof, a second air supply pipe in substantial alinement with said discharge pipe for supplying air under pressure to said air chamber to convey the material from the latter through said discharge pipe which is provided with a discharge opening, a water distributer connected to said discharge pipe near the said discharge opening, a water supply pipe connected to said water distributer, a valve in said water supply pipe, a valve in each of the said two air supply pipes and means for simultaneously operating said valves.

Signed at New York, N. Y. this 13th day of August, 1913.

ALEXANDER V. JENSEN.

Witnesses:

IVAN KONIGSBERG,

A. PSCHIERER.