

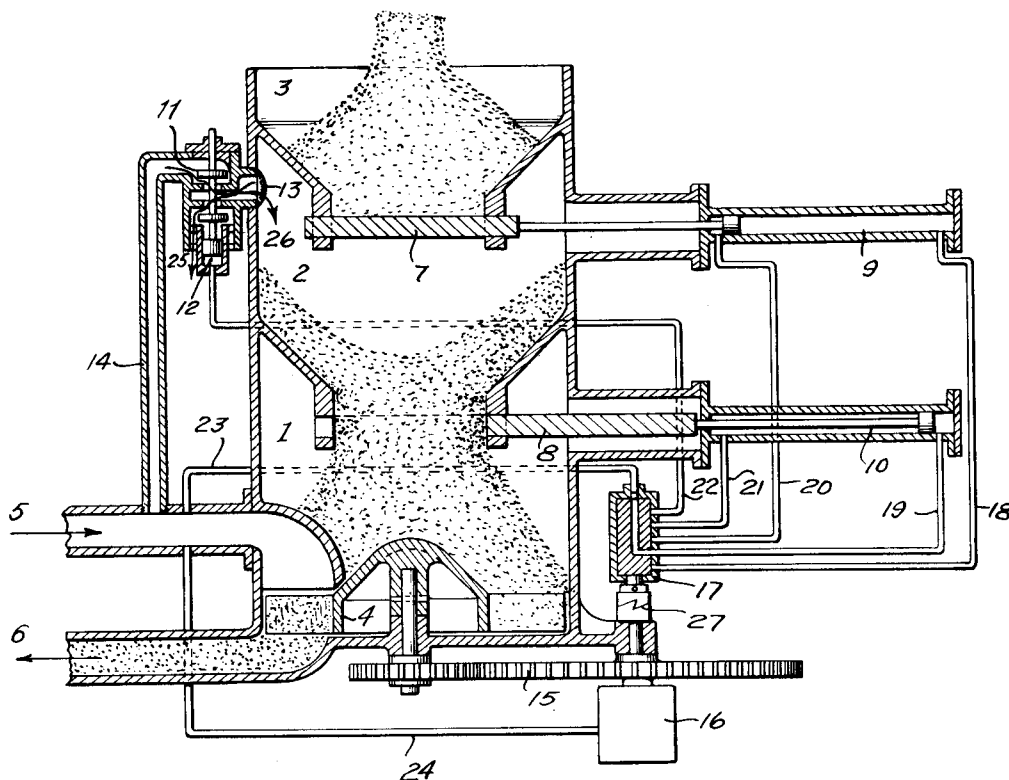
Jan. 16, 1934.

G. DOMINA

1,943,589

APPARATUS FOR BACKFILLING AND THE LIKE

Filed Aug. 26, 1933



INVENTOR
GEORG DOMINA
BY *Louis L. Ansard*
his ATTORNEY

UNITED STATES PATENT OFFICE

1,943,589

APPARATUS FOR BACKFILLING AND THE
LIKEGeorg Domina, Berlin, Germany, assignor to
Cement Gun Company, a company of Dela-
wareApplication August 26, 1933, Serial No. 687,021,
and in Germany August 16, 1932

3 Claims. (Cl. 302—55)

The present invention relates to apparatus for backfilling and the like and more particularly to apparatus of this character having double chamber charging means. By such apparatus
5 loose material supplied through the charging means is transported by compressed fluid, such as compressed air, to any desired point where it may be packed tightly if suitably confined. Such packing of material is of particular value in connection with backfilling in mines.

In double chamber charging devices of the class referred to, the two chambers are preferably arranged one above the other and at the top of each chamber is an air tight closure so
15 that at least one of these closures may be closed at all times, thus preventing undue loss of compressed air. It will be evident that before admitting the loose material into the upper chamber the pressure in that chamber must first be
20 relieved and before transferring material from the upper chamber to the lower the pressures in the two chambers are equalized.

Generally, heretofore, the opening and closing of said closures, the relief of pressure in the
25 upper chamber, and the equalizing of pressure in the two chambers have been controlled by hand, the proper timing depending to a high degree upon the skill and attention of the workmen in charge. In connection with such manual
30 control especial care and attention were therefore necessary because errors in performing the operation in the proper sequence and timing led not only to loss of compressed air but to material interruptions of operation. However, means
35 for controlling the operation have been proposed, one form of which is disclosed in my copending application Serial No. 630,419, filed August 25, 1932.

An important object of the invention is to
40 provide improved apparatus of the general class described. An important feature of the present invention relates to the manner in which the pressure in the first or upper chamber is relieved and the pressure in the two chambers is equal-
45 ized.

According to one form of apparatus for carrying out the invention, the closure members or doors may be in the form of horizontally movable members or slides and these may be operated in timed relation with respect to a feed wheel
50 by which the material is fed into an air line and transferred to the desired position. The doors are opened and closed by air and the feed wheel is preferably operated by an air motor which
55 also drives the timing device for the doors so that

the opening and closing of the doors varies with the rate of rotation of the feed wheel. Also the connection between the motor and the control device for the doors is a one-way or snap connection so that the feed wheel may be reversed,
60 in case of obstruction, without operating the control device. In said copending application the equalizing of pressure between the two chambers is effected through a separate connection between the chamber and a controlling valve
65 for said connection controlled in turn by the door control device; and the relief of pressure in the upper chamber is effected by another valve also controlled by the door controlling device. According to the present invention, such relief and
70 equalizing are effected by a connection between the main air line and the upper chamber and a double valve controlled by the door-control device, which when operated in one way closes the connection from the main air line and connects
75 the interior of the upper chamber with the outside air and when operated in another direction closes the connection with the outside air and admits air from the main air line to the upper
80 chamber. Blowing of material from the upper chamber through this valve may be prevented by suitable means such as a screen.

Other objects will appear upon a consideration of the following description and of the drawing which illustrates diagrammatically one form of
85 apparatus embodying the present invention.

Referring to the drawing, there are superimposed lower and upper chambers 1 and 2, and on top of the chamber 2 is a hopper 3. Beneath the lower chamber is a charging mechanism 4, which
90 may, for instance, be a rotating feed wheel provided with pockets. Connected with the lower chamber 1 is a main air supply line 5 and a material-discharge line 6. The upper chamber 2 is closed at the top by a door 7, here shown as a
95 slide, and at the bottom by a door 8. Both doors or slides 7 and 8 are opened and closed by the compressed air cylinders 9 and 10 respectively. By the alternate closing and opening movements of doors 7 and 8, the material charged into the
100 upper chamber 2 can be delivered to the lower chamber 1 under maintenance of the working pressure and can from there be conveyed uniformly to line 6 by means of charging device 4 under supply of compressed air coming through pipe 5.
105

The drive of the revolving charging device is effected through the gearing 15 by the compressed air motor 16. This motor simultaneously drives control member 17 which communicates through compressed air lines 18, 19, 20, 21 and 22 with the
110

compressed air cylinders 9, 10 and 12. Control member 17 as well as compressed air motor 16 are connected by means of compressed air lines 23, 24 to the main air supply line 5.

5 In order to facilitate the opening and closing of doors or slides 7 and 8, the upper working chamber 2 must be exhausted prior to the opening of slide 7 and air must be admitted prior to the opening of the lower slide. This alternate
10 evacuation and admission of air is effected by double acting valve 11 actuated by the compressed air cylinder 12. This double valve 11 communicates through a filter 13 with the upper working chamber 2 and also through a connecting line 14
15 with the air supply line 5.

The operation is effected in the known manner, the material being supplied to the lower working chamber 1 with exclusion of outside air through the actuation of slides 7 and 8. In each complete
20 rotation of control device 17, the slides 7 and 8 are to this end once opened and closed and the double valve 11 is once so actuated that the upper chamber is exhausted (by the escape of air in the direction of arrow 25) and filled with
25 air (by the admission of the compressed air in the direction of arrow 26). The filter 13 interposed between the double acting valve and the upper working chamber 2 serves the purpose of preventing the admission of impurities into the parts of the double acting valve, and admission
30 of air from the main line automatically cleans the filter 13.

Through the use of the gearing 15 it is possible to obtain for instance 5 revolutions of the charging
35 device 4 during a single rotation of the control member 17, during which period the quantity of material delivered to the pipe line 6 is equal to the quantity of material going through the upper machine chamber 2 into the lower working chamber 1.
40

In view of the fact that in general in a machine with long conveyor lines (6) for instance of a length of more than 500 meters less material is conveyed and greater power must be applied than
45 in shorter lines, of for instance 200 meters length. It is substantially indispensable to have a control device which automatically controls the relation between the slide-controlling device and the output of the charging device 4. When greater conveying efficiency is obtained by a more rapid revolution of the charging device 4, the delivery to
50 chamber 1 is more rapid. It may happen that, as a result of the admission of foreign bodies into the machine, the rotation of the charging device 4 is stopped. In accordance with the present invention this interruption of operation can be easily overcome by reversing the motor 16 where-
55 by the direction of rotation of the charging device 4 is reversed and the charging device cleared. Since in case of such interruption of operation no new material can be delivered to the lower working chamber 1, the driveshaft of the control device 17 is provided with a one-way coupling 27,
60 serving to disconnect the control member when the direction of rotation is reversed.

It should be understood that various changes may be made in the construction and arrangement of parts and that various features may be used without others without departing from the true spirit and scope of the invention.
70

Having thus described my invention, I claim:—

1. In backfilling apparatus and the like for transporting loose material by a high pressure air current, an upper chamber, a lower chamber, an upper door to close the top of the upper chamber, a lower door to separate the upper chamber
80 from the lower, a feed wheel provided with pockets and located beneath the lower chamber, a main air supply pipe having an outlet across which said pockets pass in succession, an air duct
85 connecting the main air line with the upper chamber, controlling means in said air duct operable for connecting said upper chamber with the main air line to equalize the pressure in the two chambers before charging the lower chamber or for shutting off the upper chamber
90 from the main air line and connecting it with the outside air for venting purposes before charging the upper chamber, air operated devices for said doors and the controlling means in said air duct,
95 an air control device connected with said air operated devices to control the supply thereto of compressed air, and an air motor for operating said feed wheel and said air control device.

2. In backfilling apparatus and the like for
100 transporting loose material by a high pressure air current, an upper chamber, a lower chamber, an upper door to close the top of the upper chamber, a lower door to separate the upper chamber from the lower, a feed wheel beneath the lower chamber provided with pockets, a main air line having
105 an outlet across which said pockets pass in succession, air-operated means for venting the upper chamber before opening the upper door and for supplying compressed air to the upper chamber before opening the lower door, air operated
110 devices for opening and closing said doors, an air control device connected with all of said air operated devices, a reversible air motor for operating said feed wheel and said air control, and a
115 one way connection between the air motor and the air control device so as not to disturb the air control device when the motor is reversed to clear the feed wheel.

3. In backfilling apparatus and the like for
120 transporting loose material by a high pressure air current, an upper chamber, a lower chamber, an upper door to close the top of the upper chamber, a lower door to separate the upper chamber from the lower, a main air line, means for feeding
125 material from the lower chamber to the main air line while restraining passage of air from said main air line to the lower chamber, an air duct connecting the main air line with the upper chamber, controlling means in said air duct
130 operable for connecting said upper chamber with the main air line to equalize the pressure in the two chambers before charging the lower chamber or for shutting off the upper chamber from the main air line and connecting it with
135 the outside air for venting purposes before charging the upper chamber, air operated devices for operating said doors and the controlling means in said air duct, an air control device connected with said air operated devices to control the supply of compressed air thereto, and means for operating the material feeding means and the air control device in timed relation.
140