(No Model.)

F. J. WEBER.

PNEUMATIC GRAIN MOVING APPARATUS.

No. 592,848. Patented Nov. 2, 1897.

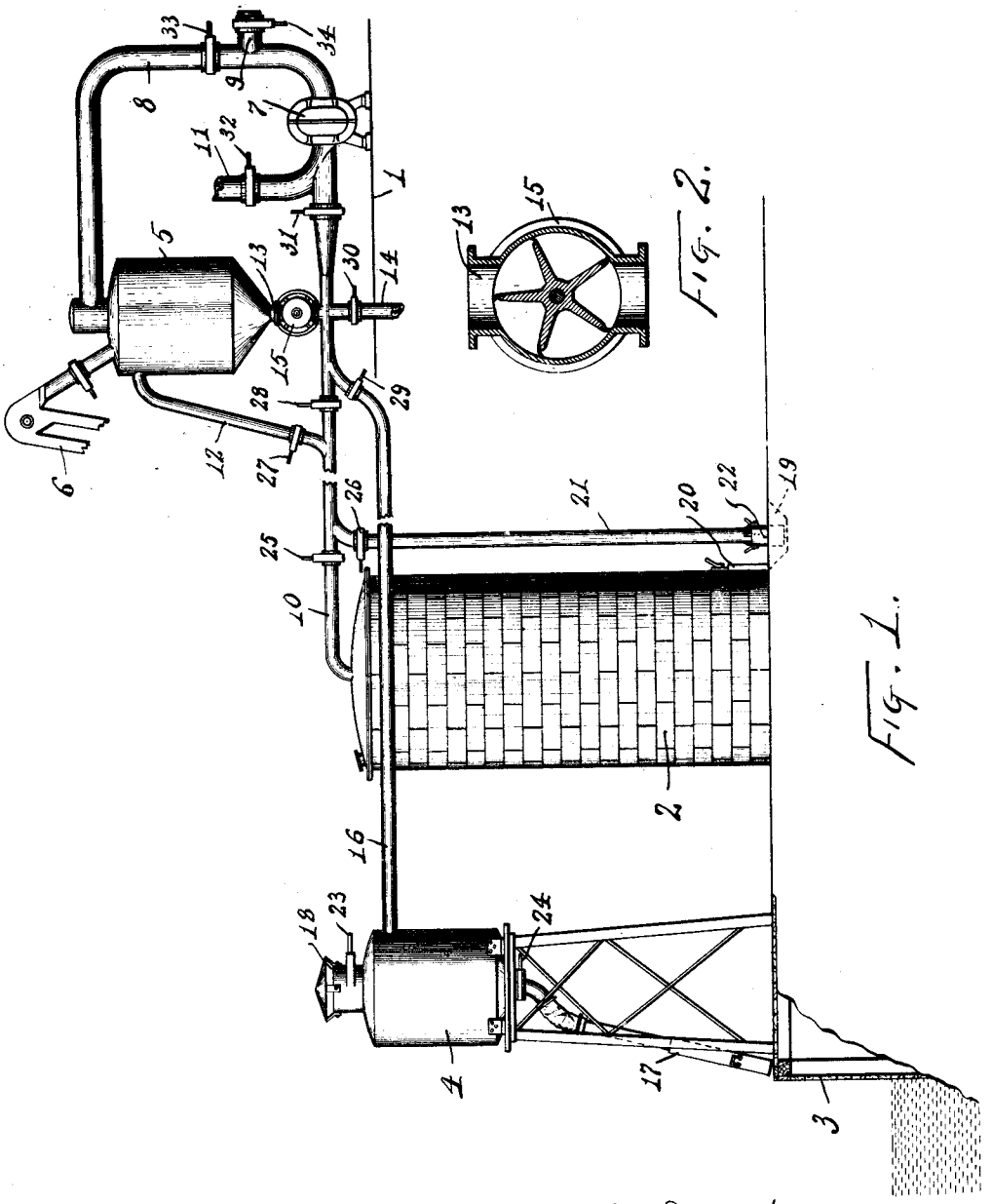


FIG. 1.

FIG. 2.

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PNEUMATIC GRAIN-MOVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 592,848, dated November 2, 1897.

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To all whom it may concern:

Be it known that I, FREDERICK J. WEBER, of Connersville, Fayette county, Indiana, have invented certain new and useful Improvements in Pneumatic Grain-Moving Apparatus, of which the following is a specification.

This invention relates to improvements in apparatus for moving grain by pneumatic means, and the improved system will be readily understood from the following description, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a grain-moving apparatus exemplifying my invention, and Fig. 2 a vertical section of the feeder.

In the drawings, 1 indicates an upper floor of a grain warehouse or elevator; 2, a storage-tank for grain, the same resting upon the ground and being thus lower than floor 1; 3, a dock; 4, a loading-tank in elevated position at the dock; 5, an air-tight receiver in the upper story of the warehouse corresponding with floor 1; 6, an ordinary elevator in the grain-warehouse arranged to take grain from any suitable point in the warehouse below floor 1, the head of this elevator being arranged to discharge into the upper portion of receiver 5; 7, an ordinary rotary blower typifying means for producing a suction and blast of air; 8, a pipe placing the top receiver 5 in communication with the suction side of blower 7; 9, an inlet to said pipe at some point between the receiver and the blower; 10, a pipe leading from the discharge side of the blower to the upper portion of storage-tank 2; 11, an air-discharge pipe connected with pipe 10 near the blower, the intention being that this pipe shall be extended to such point as to avoid objection due to the discharge of any dusty air from it; 12, a pipe leading to the upper portion of receiver 5 from pipe 10 at some point between pipe 11 and storage-tank 2; 13, a pipe leading from the base of receiver 5 into pipe 10 at a point between pipes 11 and 12; 14, a pipe leading downwardly from pipe 10 in prolongation of pipe 13, the intention being that pipe 14 shall be extended to such point or points at which it may be desired to effect delivery of grain from the receiver, the pipe going, for instance, to the grain-bins in the warehouse; 15, a feeder in pipe 13, the same consisting of a cylindrical chamber containing a rotary paddle-wheel forming pockets which successively become filled by grain flowing from the receiver 5, the pockets emptying successively into pipe 10 over pipe 14; 16, the pipe leading to the upper portion of loading-tank 4 from pipe 10 at a point between the blower and pipe 12; 17, a flexible loading-pipe leading from the base of loading-tank 4 and adapted to be employed in discharging the contents of that tank into the hold of a vessel at the dock; 18, a top opening in loading-tank 4, such opening being properly protected from the weather by a hood; 19, a sink at the foot of storage-tank 2 exterior to the tank; 20, a gate at the base of storage-tank 2 in position to enable grain in the tank to flow out into sink 19; 21, a pipe leading from the sink into communication with pipe 10 at a point between pipe 12 and tank 2; 22, a mouthpiece on the lower end of pipe 21 in the sink 19, this mouthpiece being of any suitable construction usually employed in feeding grain to a suction-pipe; and 23 to 34, inclusive, valves or gates in the various pipes.

The blower produces a partial vacuum in pipe 8, resulting in the production of a partial vacuum in receiver 5 if valve 34 be closed and valve 33 be open, or resulting in an inflow of air at pipe 9 if valve 34 be open and valve 33 closed. The air entering the blower is blasted out at its discharge side, going to pipe 10 if gate 32 be closed and gate 31 be open, or going out through pipe 11 if gate 31 be closed and gate 32 be open.

Assume receiver 5 to contain grain regardless of the source from which the receiver obtained the grain. If it be desired to deliver that grain to storage-tank 2, then, assuming all gates in the system to be closed, gates 25, 28, 31, and 34 are to be opened and feeder 15 is to be in motion. The blower will receive air through pipes 9 and 8 and will blast that air in a current through pipe 10 to storage-tank 2, the feeder 15 delivering grain from the receiver into the current of air through pipe 10, which current carries the grain to the storage-tank. If at the same time it be desired to deliver some of the grain down to

bins through pipe 14, then gate 30 may be more or less opened, grain then going down pipe 14 from the feeder by gravity, aided by the blast. If all of the grain is to go down pipe 14, then valve 28 may be closed, the grain going down from the feeder through pipe 14 by gravity, aided by the blast, or, if gravity be sufficient, the blower may be stopped or its action on pipe 14 may be stopped by closing gate 31 and opening gate 32. If the grain in the receiver is to be sent to loading-tank 4, then gate 28 will be closed and gate 29 will be opened, the air-blast then carrying the grain to the loading-tank.

Assume loading-tank 4 to be full of grain or as being charged with grain by blast through pipe 16 and assume that the grain from the loading-tank is to go into a vessel at the dock through pipe 17, properly adjusted in the hold of the vessel. Gate 24 being opened, the grain goes to the vessel through pipe 17 by gravity, aided by the pressure produced in tank 4 by the blast from pipe 16, which blast may be employed in simultaneously producing such pressure and bringing grain to tank 4 or be employed solely in producing the pressure. The loading of the vessel may be carried on with great rapidity, but eventually as the hold of the vessel becomes filled the blast may scatter too much grain, in which case gate 23 may be more or less opened, thus relieving the pressure, and as the loading proceeds gate 23 may be eventually fully opened, so as to entirely relieve the pressure and allow the finishing of the loading process by the action of gravity alone.

Assume that grain is to be transferred from storage-tank 2 to the receiver for the purpose of being ultimately transferred through pipes 16 or 14. All the gates in the system being closed, gates 33, 32, 27, and 26 are to be opened and gate 20 is to be opened sufficiently to keep sink 19 supplied with grain. The blower now discharges air through pipe 11 and produces a partial vacuum in receiver 5, the grain passing into the mouthpiece and upward and on into the receiver. While the receiver is thus taking grain from the storage-tank it may be taking grain from elevator 6, elevator 6 and pipe 12 thus illustrating a plurality of receiving connections to the receiver adapted for separate or simultaneous use, while pipe 14 and pipe 16 and the connection of pipe 10 to the storage-tank serve to illustrate a plurality of discharges from receiver 5, capable of separate or simultaneous use. Thus the receiver may be receiving grain through one or more of its receiving connections and at the same time be discharging grain by blast to one or more points of discharge, the blower requiring no reversal of motion in any of the operations.

I claim as my invention—

1. The combination, substantially as set forth, of an elevated loading-tank having a top opening, a gate at such top opening, a loading-pipe connected with the base of the tank, a gate in such pipe, a blast-pipe connected with the upper portion of the tank, and air-forcing and grain-supplying devices connected with said blast-pipe.

2. The combination, substantially as set forth, of an air-tight receiving vessel, a pipe connected to the upper portion thereof for the delivery of grain thereto, a pipe from the base of the receiving vessel for the discharge of grain, a pipe from the top of the receiving vessel to the suction side of a blower, an inlet branch to said last-mentioned pipe, a pipe from the discharge side of the blower connected to said discharge-pipe leading from the receiving vessel and provided with an inlet branch, and gates for the control of said pipes.

3. The combination, substantially as set forth, of a receiving vessel, a blower, a suction-pipe connecting the receiving vessel with the blower and having an inlet branch, a discharge-pipe from the blower to a point of delivery for grain, a pipe to the upper portion of the receiver from said discharge-pipe between the blower and the delivery end of the discharge-pipe, a second discharge-pipe connected with the first-mentioned discharge-pipe between the blower and its delivery end, a pipe connecting the base of the receiving vessel with the first-mentioned discharge-pipe, and gates for the control of the pipes.

4. The combination, substantially as set forth, of a receiving vessel, a blower, a pipe from the top of the receiving vessel to the blower and having an inlet branch, a discharge-pipe from the blower to a point of grain delivery, a feeding-pipe from the base of the receiving vessel to said discharge-pipe, an air-outlet pipe connected to the discharge-pipe between the blower and said feeding-pipe, a pipe to the upper portion of the receiving vessel from said discharge-pipe between said feeding-pipe and the delivery end of the discharge-pipe, and gates for the control of the pipes.

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