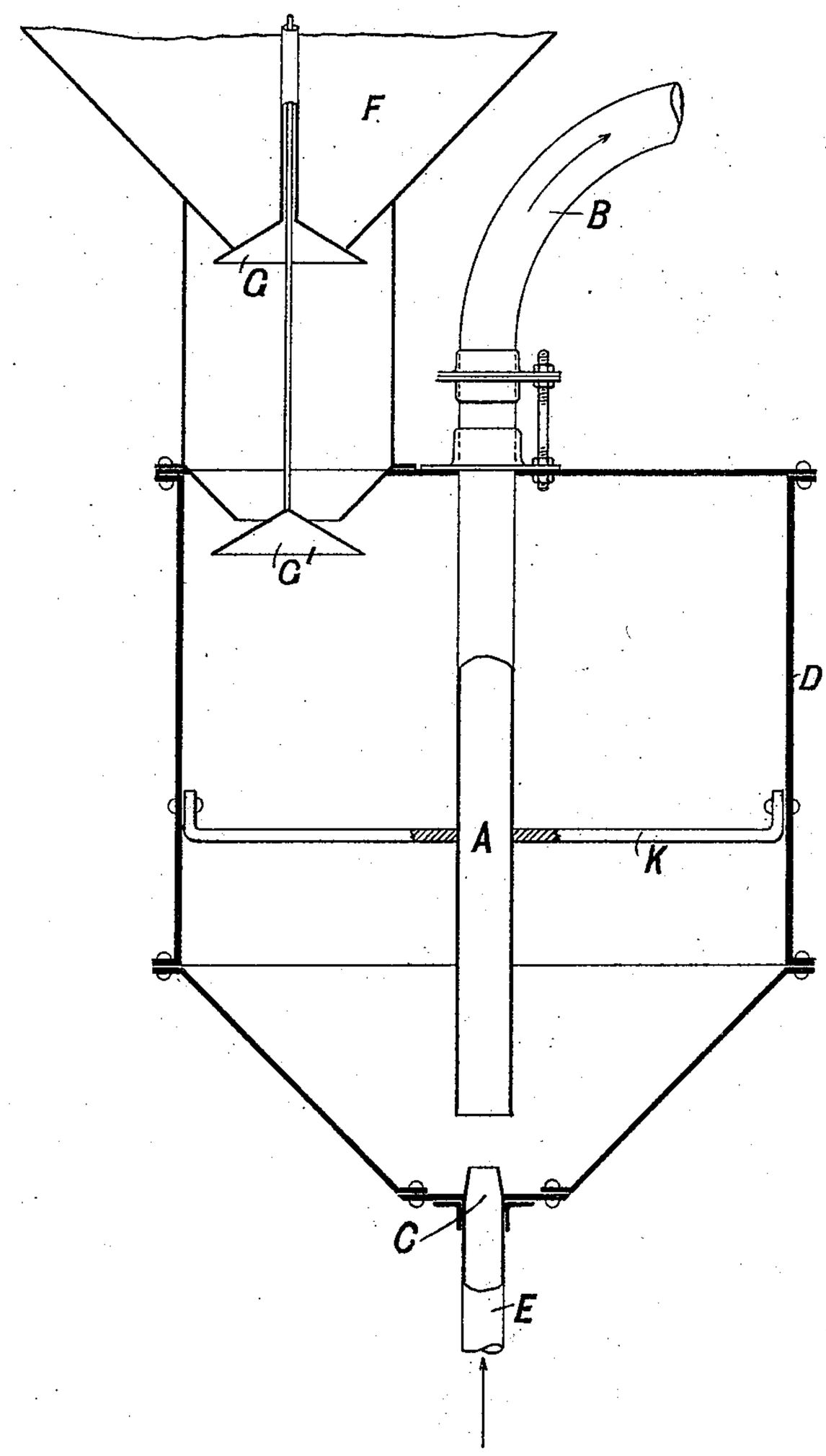
(No Model.)

F. E. DUCKHAM.

PNEUMATIC GRAIN CONVEYER.

No. 528,419. Patented Oct. 30, 1894.



WITNESSES.

C. Sedgwick

F. H. Hammond.

INVENTOR:

F. E. Duckham

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

FREDERIC ELIOT DUCKHAM, OF LONDON, ENGLAND.

PNEUMATIC GRAIN-CONVEYER.

SPECIFICATION forming part of Letters Patent No. 528,419, dated October 30, 1894.

Application filed January 30, 1894. Serial No. 498,484. (No model.)

To all whom it may concern:

Be it known that I, FREDERIC ELIOT DUCKHAM, civil engineer, of Millwall Docks, London, England, have invented a new and useful Pneumatic Elevating and Conveying Apparatus for Grain or other Matters, of which the following is a full, clear, and exact description.

This invention relates to improved apparatus for elevating and conveying grain and other granular or pulverulent matters, by a current of compressed air and it consists in the combination, with an exit nozzle having its mouth opening downward, of an upwardly-directed air blast nozzle in substantially axial alignment with the said exit nozzle, and located near the lower part of a closed chamber containing the mass of grain or other material, in the midst of which the said nozzles are immersed, the said nozzles being separated by such an interval that the grain, &c., can flow by gravity beneath the exit nozzle directly into the path of the blast, as hereinafter described.

Reference is to be had to the accompanying drawing, forming part of this specification, wherein I have represented the apparatus in vertical section.

A is the exit nozzle having its mouth directed downward, the nozzle leading upward in a more or less vertical direction and being connected to a conveying pipe B leading to the place where the grain, &c., is to be conveyed and delivered.

C is the blast injecting nozzle in substantially axial alignment with the nozzle A and opposed in direction thereto so as to direct the blast upward directly into the exit nozzle. The blast nozzle C is connected by a blast supply pipe E to a blowing engine or air compressor.

D is a closed chamber wherein the nozzles are contained, the point at which the blast acts on the grain, &c., being situated a short distance above the bottom of said chamber and wherein the nozzles are immersed in the midst of the mass of grain, &c., contained in said chamber. The chamber D is charged with grain, &c., by hand or any suitable apparatus, through the charging hopper, F, communicating with the chamber, D, through the medium of a suitable air lock; such, for example, as that formed by independently-operated valves G, G′, and an intervening chamber, whereby to permit the entry of the solid matters without allowing the air to escape.

The blast and exit nozzles are separated by such an interval, having regard to the diameters of the nozzles and the angle of repose of the grain or other matters, that a radial line touching the lower edge of the nozzle A and parallel to the angle of repose will intersect the blast at a point above the orifice of the nozzle C so that there will be a constantly renewed mass of grain, &c., interposed in the path of the blast and which must be carried by it into the exit nozzle. The distance between the two nozzles depends upon the angle of repose of the grain or other matters (which varies for different matters or for the same matters under different physical conditions) and on the amount of air pressure used and other variable conditions of working, and may be regulated by making the exit nozzle adjustable in height with regard to the blast nozzle by means of adjusting screws and nuts or by equivalent means.

Any air which may percolate through the mass will establish an equilibrium of pressure at the upper and lower parts of the chamber D.

The exit pipe is guided in chamber D by one or more cross-bars K.

I claim—

In apparatus for the pneumatic elevation and conveyance of grain and other matters by compressed air, the combination, with a closed chamber provided with an air lock charging device, of an exit nozzle within said chamber having its mouth opening downward and of an upwardly-directed air blast

nozzle in substantially axial alignment with the exit nozzle, the nozzles being located near the bottom of the chamber and the chamber containing a mass of grain or other matters in which the nozzles are immersed, the exit nozzle leading upward and being connected with a conveying pipe while the blast nozzle is connected with a supply of compressed air, the two nozzles being relatively adjustable and separated by an interval such that the grain can flow by gravity beneath the exit nozzle directly into the path of the air blast, substantially as specified.

FREDERIC ELIOT DUCKHAM.

In presence of—
THOMAS LAKE,
17 *Gracechurch Street, London, Notary's Clerk.*
W. M. HARRIS,
17 *Gracechurch Street, London, Notary Public.*