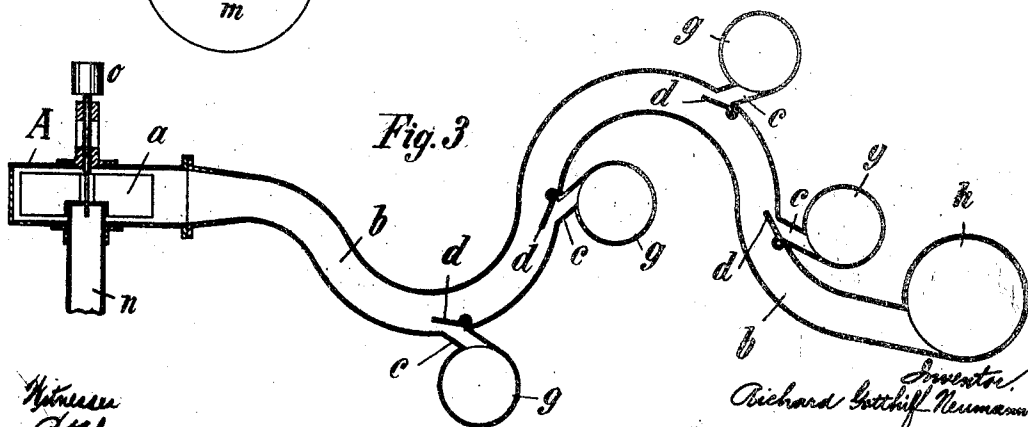
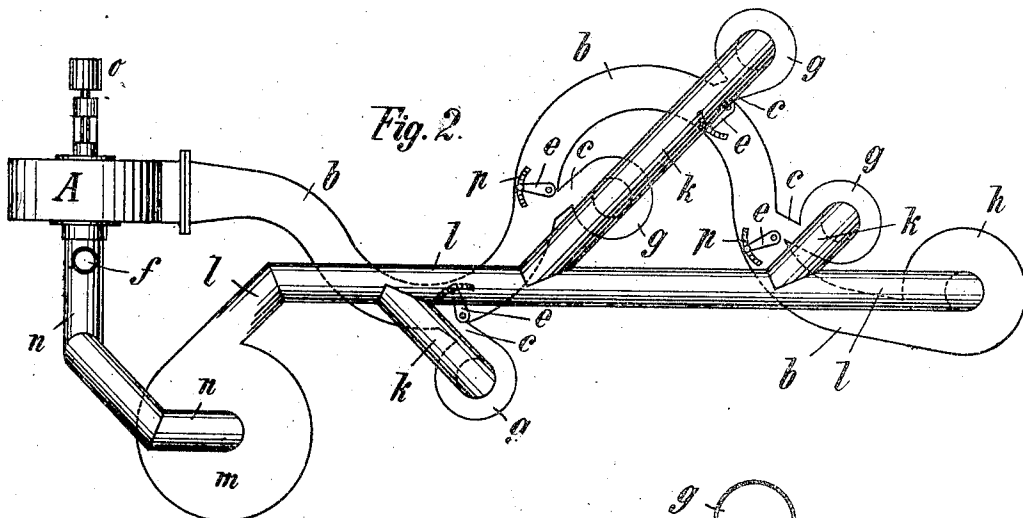
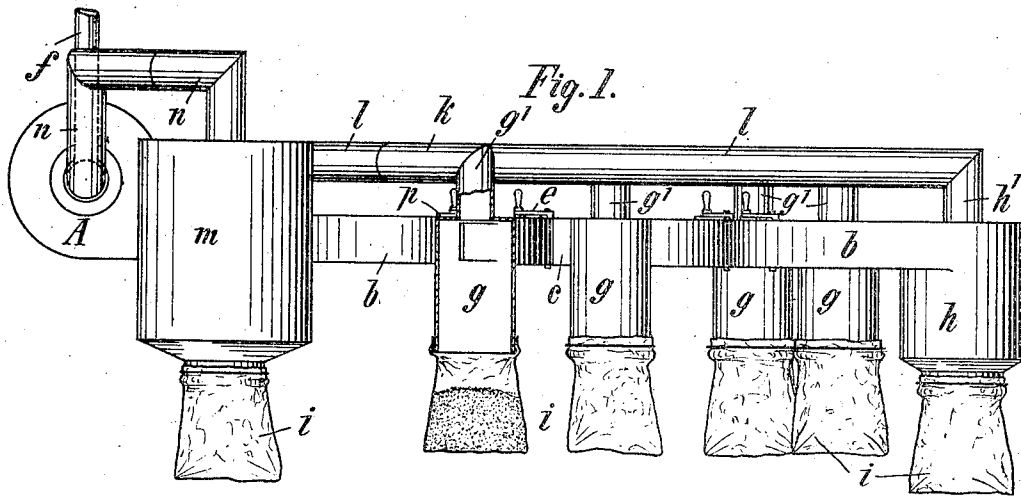


No. 821,819.

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R. G. NEUMANN.
CONCENTRATOR FOR PULVERULENT MATERIALS.

APPLICATION FILED APR. 2, 1902.



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CONCENTRATOR FOR PULVERULENT MATERIALS.

No. 821,819.

Specification of Letters Patent.

Patented May 29, 1906.

Application filed April 2, 1902. Serial No. 101,086.

To all whom it may concern:

Be it known that I, RICHARD GOTTHILF NEUMANN, a subject of the German Emperor, and a resident of Wandsbek, near Hamburg, in the German Empire, have invented certain new and useful Improvements in Concentrators for Pulverulent Materials, of which the following is a specification.

The present invention relates to concentrators for pulverulent materials of that class in which the pulverulent or finely-divided material is carried by a moving body of air or its equivalent through a zigzag-shaped or undulated pipe-conduit or incasement provided with discharge-channels, and more particularly refers to means whereby the concentration or separation of the constituent particles of the material is controlled, the moving air freed from its admixtures, dust, &c., and supplied back as pressureless air to the centrifugal ventilator, or any other suitable means for forcing the air through the said concentrator, so that the same bulk of air may be used over and over again.

With this end in view my invention consists in certain novel features of construction and combinations of parts, as will be hereinafter fully described, with reference to the accompanying sheet of drawings, in which—

Figure 1 is a side elevation, partly in section, of a concentrator constructed in accordance with and embodying my invention. Fig. 2 is a plan or top view of my improved concentrator, and Fig. 3 is a horizontal longitudinal section of the undulated concentrator-incasement of the casing for the centrifugal ventilator and of the collecting vessels for the concentrated material.

Similar letters refer to similar parts throughout the several views.

The concentrator, as disclosed by Figs. 1 to 3 as example, comprises a centrifugal ventilator *a*, mounted in a suitable casing *A*, to which latter is attached a proportionately-long casing or pipe-conduit *b*, having a rectangular cross-sectional area and being with respect to its horizontal plane of an undulated or serpentine form, whereby a horizontal serpentine passage is provided throughout the length of the pipe-conduit *b*. The latter is provided with a plurality of lateral discharge-channels *c*, capable of being closed

or shut up by swing-doors or turn-flaps *d*, hinged inside the serpentine casing *b* and operated by outside handles *e*. The said handles, and consequently the flaps *d*, may be secured in the proper position by means of serrated segments *p*, fastened on the top plate of the serpentine casing, as this is evident from the drawings without further detailed explanation. When the concentrator is in operation, the turn-flaps are so placed that their vertical free edges are oppositely directed to the direction of motion of the material forced through the concentrator-casing *b*. This position of the turn-flaps is shown in Fig. 3.

The material fed through a supply-pipe *f* is forced by the action of the centrifugal ventilator *a*, to which rotation may be imparted by a pulley *o* through the serpentine casing *b*, whereby the material is thrown alternately against the curved vertical side walls of the casing or conduit *b*. The constituent particles of the material are according to their relative gravity and size driven by the air-blast for a more or less greater distance through the serpentine casing *b*, and as the turn-flaps *d* are directed opposite to the direction of motion or path of the said particles the latter are deflected or directed by the said turn-flaps into the corresponding lateral discharge-channels *c*. The heavier or larger particles are thus discharged into the channels *c* nearest or nearer to the ventilator, while the lighter and finer or lightest and finest particles are carried and driven into the more remote and remotest channels *c*. The air-blast carrying the dust enters at the exit of the serpentine conduit *b* into a suitable, preferably cylindrical, collecting vessel *h*. The discharge-channels *c* lead into similar collecting vessels *g*. Within the vessels *g* and *h* the particles, dust, &c., forced therein are deposited and collected at the lower ends of these vessels into bags *i* or the like, while the air more or less freed from the particles, dust, &c., of the respective material escapes by vertical pipes *g'* and *h'* and connecting-pipes *k*, respectively, into a main pipe *l*, through which the said air passes into a similar but somewhat larger collecting vessel *m*. In this latter vessel the air is freed from the last particles of dust, &c., and relieved from any

pressure. The thus cleaned or purified and pressureless air is led back to the ventilator or ventilator-casing, respectively, through a pipe-conduit *n*, so that the same bulk of air may be used over and over again.

In the example shown the feed-pipe *f* discharges into the air-conduit *n* in front of the ventilator, so that the supplied material is sucked together with the air coming from the vessel *m*.

Although it is preferred to employ for materials which are subject to spoiling—such as flour, grits, finely-ground cacao, and the like—concentrator-casings having an undulated or serpentine form, in some cases, however, when materials less liable to spoiling—such as coloring-matters, brick-dust, &c.—are to be concentrated, concentrator-casings having a zigzag-shaped form may be used with equally good results.

Having fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a concentrator, the combination with an air-blast, of a horizontal serpentine conduit connected at one end to the delivery end of said blast and at the other end to the suction end of the blast to form a closed air-blast circuit, discharge-passages from the conduit and receptacles connected thereto to receive separated material, substantially as described.

2. In a concentrator, the combination with an air-blast, of a closed horizontal serpentine conduit rectangular in cross-section and having discharge-ports in its vertical walls, channels leading from said ports in the direction of the flow of air in the conduit, doors mounted at said ports adapted to extend into the path of the current of air, collecting vessels in communication with said channels, and air-passages leading from the collectors to the air-blast, substantially as and for the purpose specified.

3. In a concentrator, the combination with an air-blast, of a serpentine conduit having vertical sides, connected at one end to the delivery end of the air-blast and a pipe connection between the other end of the conduit and the suction end of the air-blast, thereby forming a closed circuit, a dust-collector connected to the said pipe and closed receptacles connected to the conduit to receive the separated material, substantially as described.

4. In a concentrator, the combination with an air-blast, of a closed horizontally-arranged serpentine conduit rectangular in cross-section, a plurality of lateral discharge-channels leading from the ports in the vertical walls of the conduit and mounted in the

direction of the flow of air, doors hinged at the mouths of said channels, means for adjusting said doors into the path of the air-current, a collecting vessel communicating with each of said channels, an air-passage leading from each collector and communicating with a main passage for the return of air to the blast, and an air-collecting vessel interposed between the main return-passage and the blast, substantially as and for the purpose specified.

5. In a concentrator, the combination with an air-blast, and a feed-pipe, of a horizontally-arranged serpentine conduit rectangular in cross-section, a plurality of lateral discharge-channels leading from ports formed in the vertical side walls of said conduit, said channels being mounted in the direction of the flow of air in the conduit, doors mounted at the receiving end of said channels, handles for positioning and locking said doors into the path of the current of air in the conduit, a collecting vessel for each discharge-channel, an air-passage leading from the top of each collecting vessel, a main passage communicating with the aforesaid air-passage, and an air-collector interposed between said main passage and feed-pipe, substantially as described.

6. In a concentrator, the combination with an air-blast, of a horizontal serpentine or sinusoidal conduit having ports in the sides thereof and connected at one end to the air-blast, a pipe connection between the other end of said conduit and the suction side of said air-blast, a plurality of lateral discharge-channels leading from the ports, and means to individually control the opening of said ports, whereby the particles following first one side then deflected to the other side of said conduit will be separated in the order of their gravities, the heavier and larger particles passing into the discharge-channels nearer the air-blast.

7. In a concentrator, the combination with an air-blast, of a serpentine conduit having a continuous bottom and serpentine or zigzag side walls having openings therein, adjustable doors to control said openings, and means connected to the conduit at the openings to receive the separated material, whereby the heavier particles will pass through the openings nearest the air-blast, being moved first against one wall and then against the other in a substantially horizontal direction as described.

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