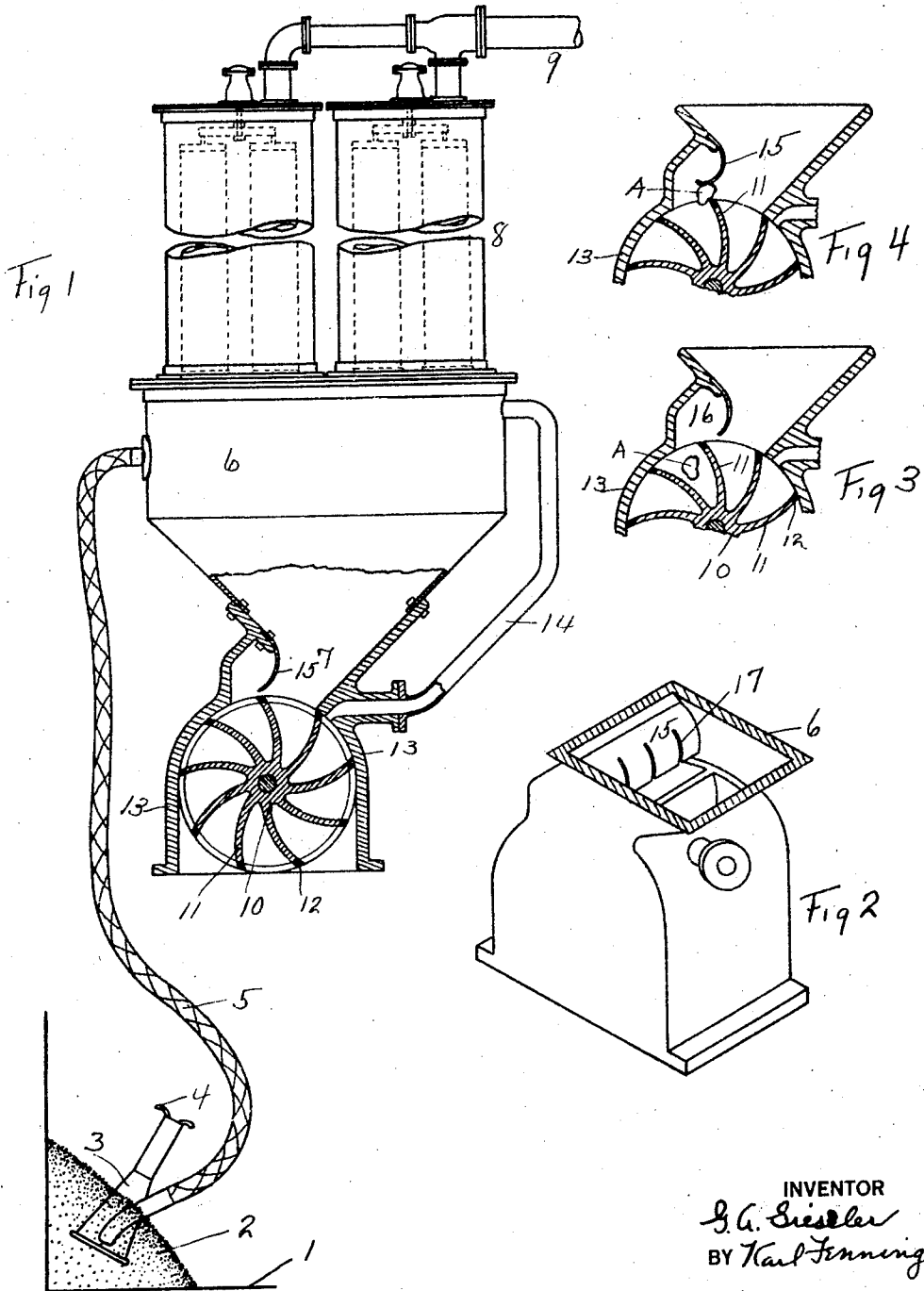


G. A. GIESELER.
PNEUMATIC CONVEYING.
APPLICATION FILED JULY 5, 1919.

1,385,870.

Patented July 26, 1921.



INVENTOR
G. A. Gieseler
BY *Karl Fenning*
his ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE A. GIESELER, OF CLEVELAND, OHIO.

PNEUMATIC CONVEYING.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE A. GIESELER, a citizen of Germany, residing at Cleveland, in the State of Ohio, have invented certain
5 new and useful Improvements in Pneumatic Conveying, of which the following is a specification.

My invention relates to that type of apparatus which is employed to convey or
10 move powdered or granular material by air pressure or suction. One important use of such apparatus is the unloading of cars involving the removal of granular or powdered material from railway or other cars
15 and the transportation of it to storage bins or the portion of the factory or other institution in which the material is employed. One thing greatly desired in such apparatus is to prevent the material getting free and blowing about in the cars, rooms, bins or in
20 the surrounding air. This is particularly important when the material, as frequently happens, is a very fine powder or dust or is of a poisonous character. Not only are the
25 men working with the material inconvenienced and injured by such free dust but the building and machinery and surrounding neighborhood generally is harmed. In addition the actual loss of material is frequently so great as to make the conduct of a
30 business unprofitable.

My invention provides apparatus which economically and conveniently conveys and handles granular or powdered or dust-like
35 material without freeing it in the air either at the point where it is received by my apparatus or at the point where it is delivered.

One embodiment of my invention includes a nozzle for attacking the material to be
40 conveyed to which is connected a flexible hose leading to a receiver from which the air is exhausted. I provide a suitable filter between the receiver and the air outlet to remove substantially all of the dust or conveyed material from the air before it is freed
45 into the atmosphere. The material is removed from the receiver by means of a rotary lock which is provided with curved partitions which form pockets between them
50 for the receipt of the material. In order to maintain the reduced pressure within the receiver the ends of the curved partitions are provided with fiber wearing strips which bear against, and make a substantially air
55 tight contact with, the frame carrying the rotary lock. In practice most materials to

be operated upon even though they may be powdered contain lumps or blocks made up of the material itself or of foreign material accidentally present. When such lumps are
60 engaged by the partitions of the rotary lock they may become caught between the partitions and the frame of the hopper. This might put undesirable strains upon the apparatus or cause an injury to it. In order
65 to avoid this, I provide a spring or series of springs across the outlet mouth of the receiver and so associated with the lock that the pressure may be relieved and lumps conveniently handled without injury to the ap-
70 paratus.

One specific form my invention may take is shown in the accompanying drawings in which Figure 1 is an elevation somewhat
75 diagrammatic and broken away to more clearly show the rotary lock. Fig. 2 is a perspective of the lower part of the receiver and the rotary lock and its casing. Figs. 3 and 4 are fragmentary sections showing the operation of the spring upon a lump or
80 rock.

1 is a diagrammatic representation of a car or bin containing material 2 in a granular or powdered state. A nozzle 3 is shown in position to operate upon the material and
85 is provided with a suitable valve 4 to regulate the air inlet. Air is drawn in through the valve 4 and draws the material 2 with it through the nozzle 3 and into a flexible hose 5 which is of a suitable length to convey the material to the receiver 6. Here the material settles toward the outlet 7 while the air rises through the filter 8 and when purified of dust passes into the exhaust pipe
90 9 which may be connected to a suitable fan 95 or blower or exhaust pump not shown. The dust which is removed from the air by the filter 8 drops into the receiver 6 and joins the main body of the conveyed material toward the outlet 7. Below the outlet 7 is
100 a rotary lock 10 provided with a plurality of partitions 11 each of which is provided at its tip with a wearing portion 12 which may be removable. The wearing portion 12 is preferably made of fiber such as the well known commercial indurated fiber made from paper or wood pulp. The rotary lock 10 is suitably supported in bearings so that it may be revolved by any suitable well known means (not shown) in such a way
105 as to cause the fiber bearing tips 12 to engage the curved portion of the frame 13 and

make a substantially air tight joint therewith. In handling some materials, particularly pulverized bauxite, I find that fiber is especially wear resisting and maintains a substantially air tight lock. The lower portion of the frame 13 is not shaped to engage the partitions 11 of the rotary lock 10 and may be open to a storage bin or other suitable place for the reception of the material, 5
 10 A pipe 14 connects the upper part of the receiver 6 with the curved portion of the frame 13. It will be seen that if the rotary lock 10 is rotated in a counter-clockwise direction the pockets between the partitions 11 will be brought one after another into engagement with the outlet of the pipe 14 so that the atmospheric pressure in the pockets may be relieved to the reduced pressure in the receiver 6. Each pocket after passing the outlet of the pipe 14 is directly under the outlet 7 of the receiver so that the material in the receiver may flow by gravity into the pocket from which it is dumped by gravity when the pocket is rotated so as to pass beyond the curved portion of frame 13. It will be noted that the partitions 11 are curved so as to form pockets curved on both sides in such a way as to conveniently and easily receive the material from the outlet 7 and subsequently discharge it efficiently at the bottom of the casing frame 13. 30

At the mouth 7 of the receiver 6 is a preferably curved spring or a series of springs 15 extending entirely across the outlet and projecting down so that its lower end lies close to the fiber tips 12 of the partitions 11 of the rotary lock 10. In Fig. 4 a lump A is shown engaged by one of the partitions 11 so as to press backward and upward the curved spring 15. It is obvious that if the lumps were forced by the partitions 11 against a rigid portion of the frame instead of the spring 15 there would be a tendency to stop the rotation of the rotary lock or to break some portion of the frame or the partitions 11. Of course, the lump might crumble but frequently the material to be handled includes very hard lumps and stones or other foreign material which are too hard to be crushed. By providing the spring 15 the lump is allowed to adjust itself against a resilient seat and finds its place in the pocket of the rotary lock to the left of the engaging partitions 11 in Fig. 4. If carried farther to the left than the position illustrated in Fig. 4 the rock or lump A 55

may pass beyond the spring 15 and rise and enter the pocket 16 from which it may subsequently fall without causing any harm or damage into the pocket to the right of the partition 11 by which it was engaged. 60

The spring 15 is rigidly mounted at its upper edge and is curved at its lower edge toward the left side of the casing 13 so that as the rotary lock 10 rotates in the counter-clockwise direction the spring 15 is properly disposed to relieve any pressure which may be caused by a rock or lump A. In Fig. 2 the spring 15 is shown as extending entirely across the outlet from the receiver 6 and it is cut at 17 so as, in effect, to be made up of a plurality of small springs. This makes it possible to use a heavy weight spring 15 and at the same time get practically the same resiliency as if each portion between the cuts 17 were a separate spring and indeed separate springs might be used. 70 75

Numerous changes may be made in the details of my apparatus which is shown in this specific form to illustrate but not limit my invention. 80

I claim as my invention:

1. In a pneumatic conveying device, a receiver, means for conveying material to the receiver, a filter above the receiver to remove dust from the outgoing air, an outlet from the receiver for the material, a rotary air lock for the material outlet, partitions in the lock forming pockets for the material, and a curved spring in the throat of the material outlet. 85 90

2. In a pneumatic conveying device, a receiver for material having an outlet, a rotary air lock at the outlet for delivering material, and a spring in the outlet cooperating with the lock to handle such irregularities as lumps. 95

3. In a pneumatic conveying device, a receiver for material having an outlet, a rotary air lock at the outlet for delivering material, a spring in the outlet, and a pocket cooperating with the lock and spring to handle such irregularities as lumps. 100

4. In a pneumatic conveying device, a receiver for the material having an outlet, a rotary air lock at the outlet for delivering material, partitions in the lock forming pockets between the partitions, and a curved spring in the outlet cooperating with the lock to handle such irregularities as lumps. 105 110

GEO. A. GIESELER.