

Sept. 8, 1931.

W. E. WINCHESTER

1,822,074

SELF FREEING ELECTRIC SEPARATOR

Filed July 18, 1923

2 Sheets-Sheet 1

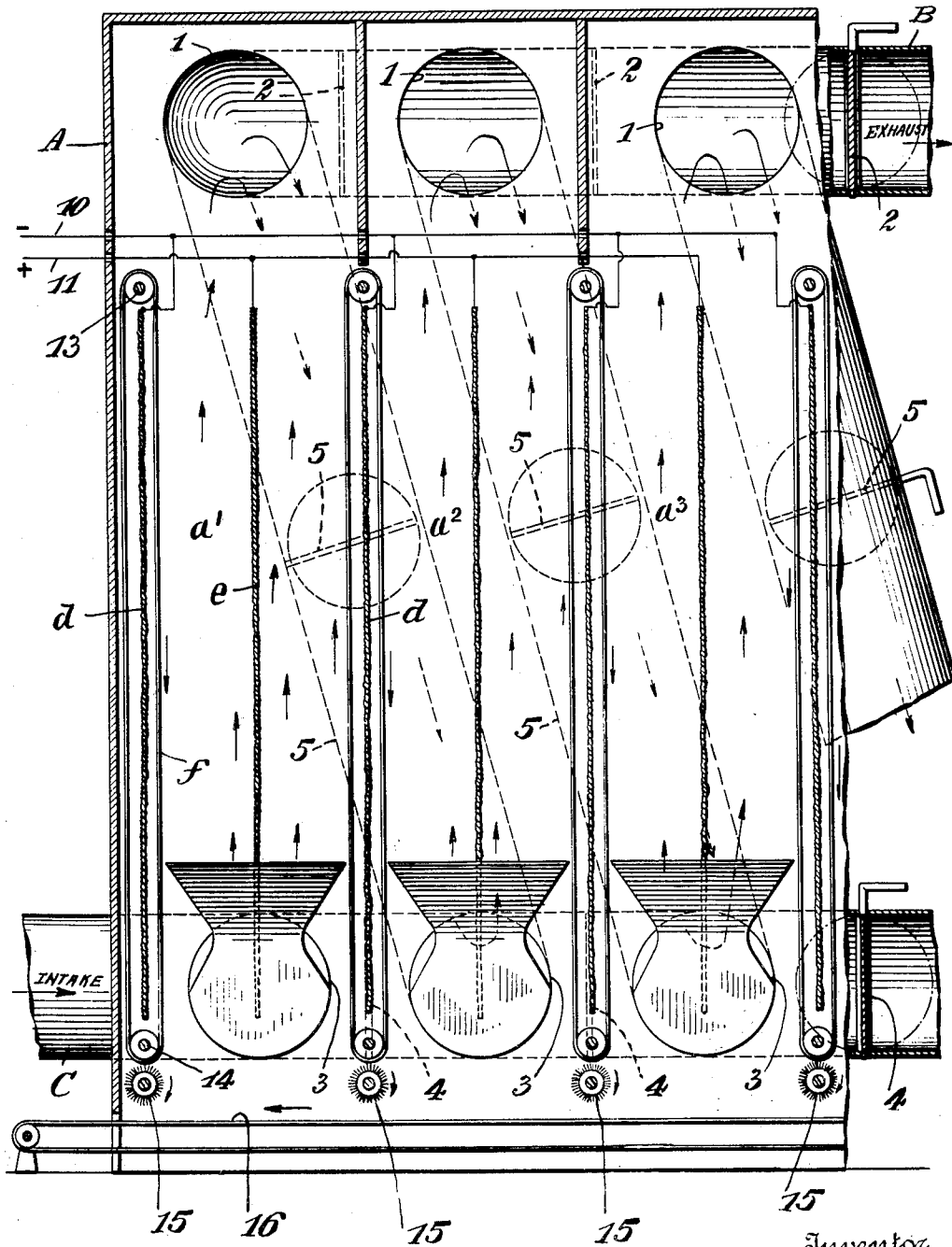


Fig. 1.

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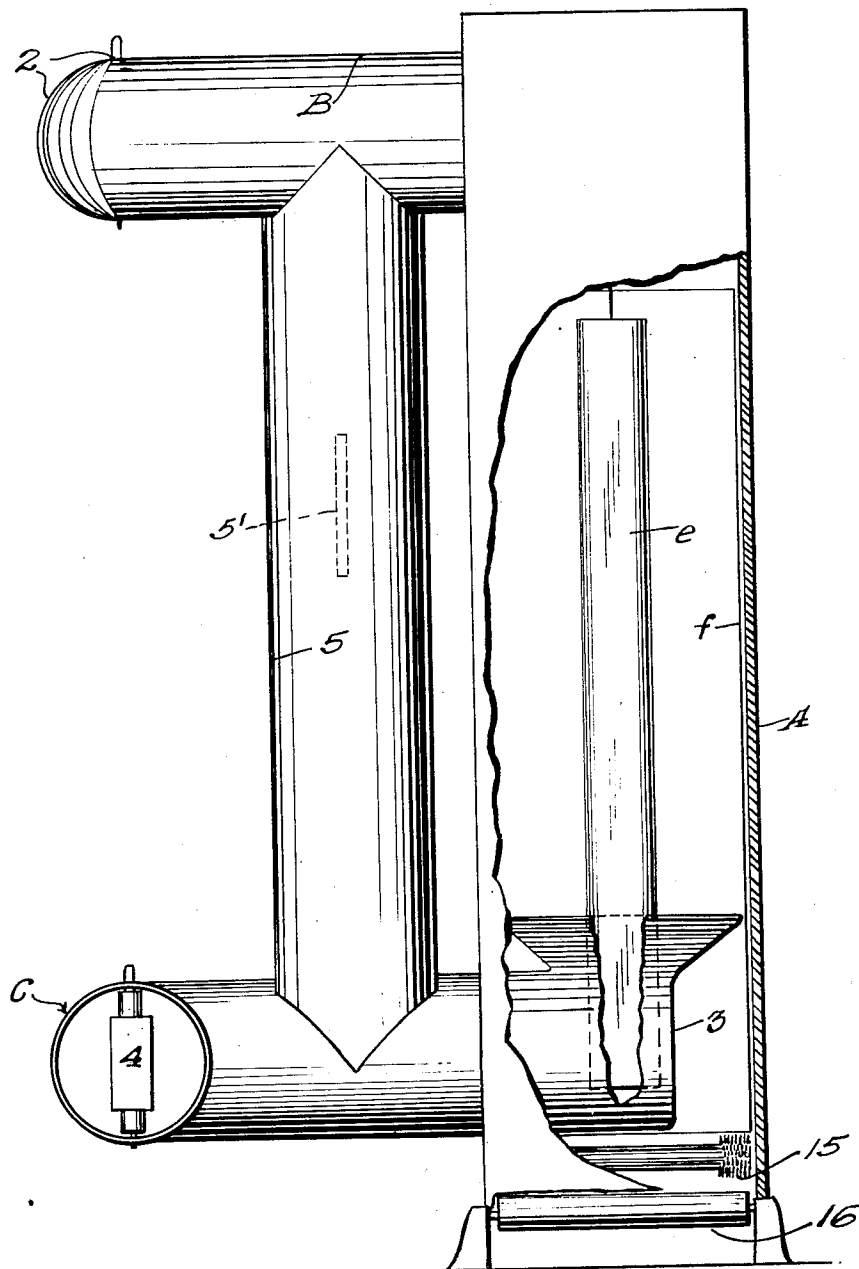


Fig. 2.

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SELF-FREEING ELECTRIC SEPARATOR

Application filed July 18, 1923. Serial No. 652,286.

This invention relates to desiccating apparatus and more particularly to the employment of electricity for the purpose of separating out and depositing the solid particles through the stream of dehydrating gas. There has been described by Frederick G. Cottrell in United States Patent No. 945,917 such employment of electricity in a general way.

10 The object of my invention, however, is to overcome the defects in the Cottrell process and apparatus, in the practice of which the collector plate or plates maintained under opposite electric potentials and tending to gather an accumulation of the desiccated solids, are inaccessible. In this aspect, it is an object of my invention to shield the charged conducting electrodes with a moving endless belt formed out of such material and so constructed as not to interfere with the separating action of the electric charge, but functioning mechanically to carry away any accumulation of solids directed towards the plate by electric charge. More broadly it is an object of my invention to screen an electrode of any apparatus for separating particles out of a gas by an electric or magnetic charge in such a way that the particles will collect on said screen and not the electrode, and so to arrange said screen that it may be moved into a position for the ready removal of the collected particles.

A further object of my invention is to so arrange and coordinate treating chambers provided with charged electric plates as to utilize what is essentially the part of one as a functioning element in a neighboring unit so that a gang or series of cooperating units may be built up with this economy in the functioning elements.

It is a further object of my invention so to connect the units of such a gang of treating chambers that I may operate them respectively to the stream of particle carrying gas either in parallel or in series, in a manner similar to that in which steam engines may be operated in parallel or in double or triple expansion.

The above and further objects of my invention will be pointed out more clearly in

the following claims which form a part hereof and which are directed to the illustrative embodiment of my invention described in the following specification in connection with the accompanying drawings but solely for purposes of illustration and not for limitation.

In the drawings, Fig. 1 is a cross sectional view through the device illustrating a gang of three desiccating units with the method of connection for the particle carrying gas indicated; and Fig. 2 is a diagrammatic end-elevation looking towards the left of the showing in Fig. 1.

A gang A of desiccating chambers $a-1$, $a-2$, and $a-3$ (three being indicated, although the number may be increased or diminished) are formed out of suitable material of a preferably rectangular horizontal section. Each chamber is to be understood as provided with an individual spray nozzle either at the top or the bottom, the chambers in the present embodiment being vertical in their mounting. The top of each chamber is connected with an exhaust duct B through port 1. A controllable valve 2, operating to close or leave open the entire exhaust duct B, is provided between each two contiguous ports 1.

A gas intake duct C is connected by means of a port 3 with the bottom of each chamber $a-1$, $a-2$, etc. A valve 4, serving to open or close the entire intake duct between each two contiguous chambers such as $a-1$ and $a-2$, is provided. A by-pass duct 5 is also provided to connect each exhaust port 1 with each succeeding intake port 3 and these by-pass ducts are likewise provided with controllable valves 5'.

Arranged parallel to the direction of gas movement through the chambers $a-1$, $a-2$, etc. are two sets d and e of parallel electrodes of conducting material having suitable electrical connections with charging mains 10 and 11. It is to be understood that these electrodes are suitably insulated and receive charges to operate in accordance with the general functioning described by Frederick G. Cottrell in his aforementioned patent. In addition, however, the plates d operate in common between contiguous desiccating

chambers, for example, in common between the chambers $a-1$ and $a-2$.

As many electrodes as it may be found convenient to screen with my special carriers, I embrace with endless belts f , which belts are carried upon motor-driven rollers 13 and 14. I prefer that these belts be formed of non-conducting material and that they be carried down into the bottom of the apparatus where they may or may not be out of the electrified zone and where they are subjected to the action of grounded brushes 15 to discharge electrically and remove the collected solids which fall upon the removal conveyor 16 to be removed from the apparatus into suitable receptacles. Although I have shown my screen as endless belts f limited to the plates d , I do not limit the provision of movable screens solely to the plates d . A further reason for my employment of carrier belts solely for one set of the plates is that I may so charge the desiccated particles that there is no tendency for them to collect upon the centrally positioned plates e , the particles being driven entirely towards the plates d where they are intercepted by the covering belts f and are continuously conveyed to the removal conveyor.

The inventive thought may have a variety of expressions, as is contemplated in what I claim and desire to secure by United States Letters Patent as follows:

1. In dehydrating apparatus, a desiccating chamber adapted to accommodate the passage therethrough of a stream of desiccating gas with a charge of sprayed liquid to be desiccated; two sets of conducting plates arranged lengthwise of the passage through said chamber; means for oppositely charging said sets of plates; an endless belt having a lap paralleling and overlying one of said plates; and means for driving said endless belt to prevent the collection of desiccated solids upon said plate and to convey said solids away from said plate.

2. In apparatus for separating particles suspended in a gas, a plurality of contiguous chambers arranged for the passage there-through of a stream of particle carrying gas; an independent duct, one for each chamber; conducting electrodes cooperatively arranged electrically to charge the particles in said gas passing through said chambers, one of said electrodes functioning in common for at least two of said chambers and comprising moving portions for conveying collected particles.

3. In apparatus for collecting particles from suspension in a gas, a charging electrode; a movable screen mounted to overlie and shield at least a part of the surface of said electrode; means for moving said screen into a relatively more accessible position for the removal therefrom of collected particles while said electrode remains in position.

4. In apparatus for separating particles for a carrying gas, a chamber adapted to accommodate the passage therethrough of a stream of said gas with a charge of said particles to be separated; two sets of conducting electrodes arranged to cooperate with the passage through said chamber; means for oppositely charging said sets of electrodes; an endless belt having a lap overlying one of said electrodes; and means for driving said endless belt to prevent the collection of said particles upon said electrode and to convey said particles away from said electrode on said belt.

5. In apparatus for collecting particles from suspension in a gas, a charging electrode; an endless movable collection screen in part only overlaid by said charging electrode; and means for causing said endless screen to move out of and again into cooperative relation with said charging electrode.

6. In apparatus for collecting particles of matter from gaseous suspensions thereof, which comprises a relatively extended passageway for the gaseous suspension, an active electrode mid-positioned in said passageway and a pair of movable endless collection belts forming a part of the walls of said passageway and extending through and out of the field created by said active electrode, and means for driving said belts to carry particles collected by said belts in said field into a locality out of said field.

In witness whereof, I have signed my name to this specification this 7th day of April, 1923.

WILLIAM E. WINCHESTER.