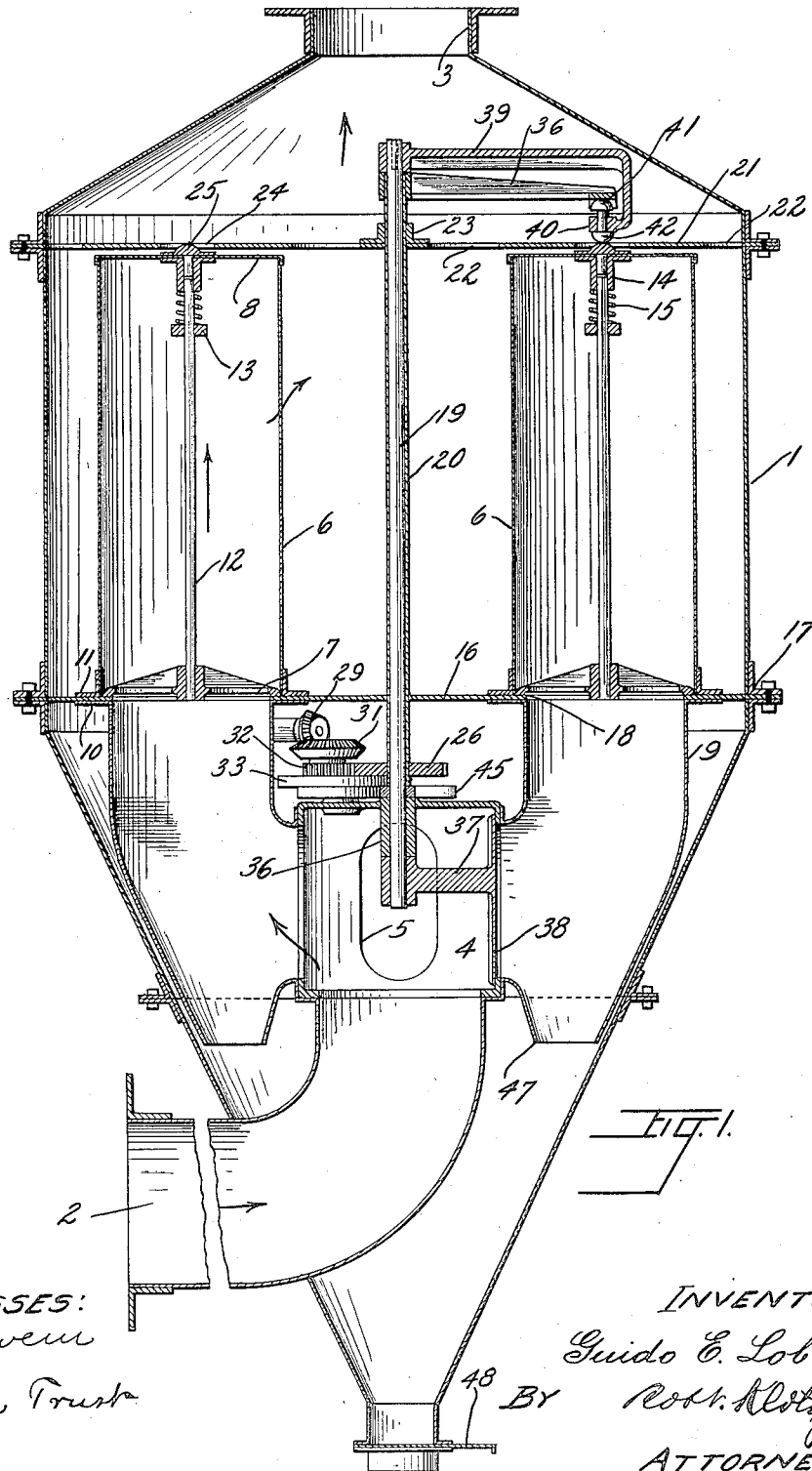


G. E. LOB.
AIR PURIFYING APPARATUS.
APPLICATION FILED MAY 27, 1912.

1,109,997.

Patented Sept. 8, 1914.

2 SHEETS—SHEET 1.



WITNESSES:

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Ormar Trust

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Guido E. Lob

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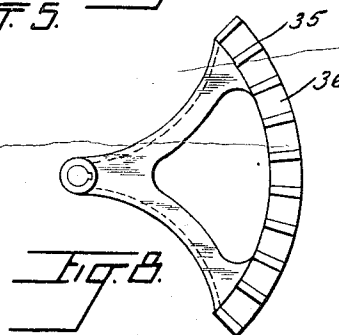
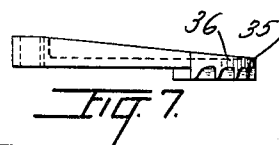
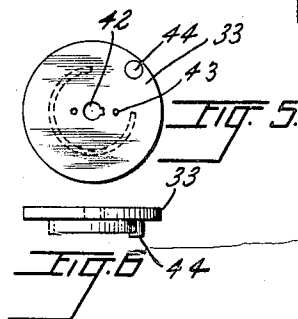
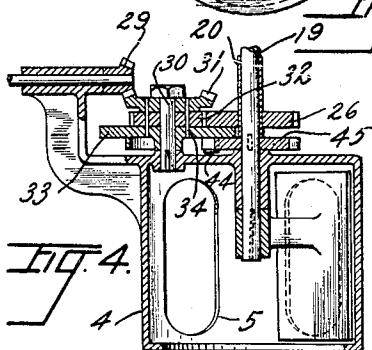
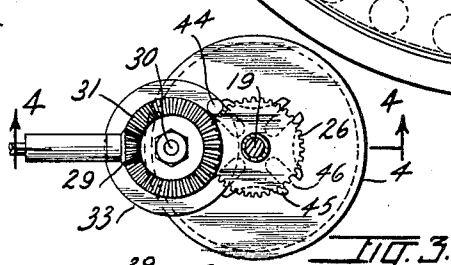
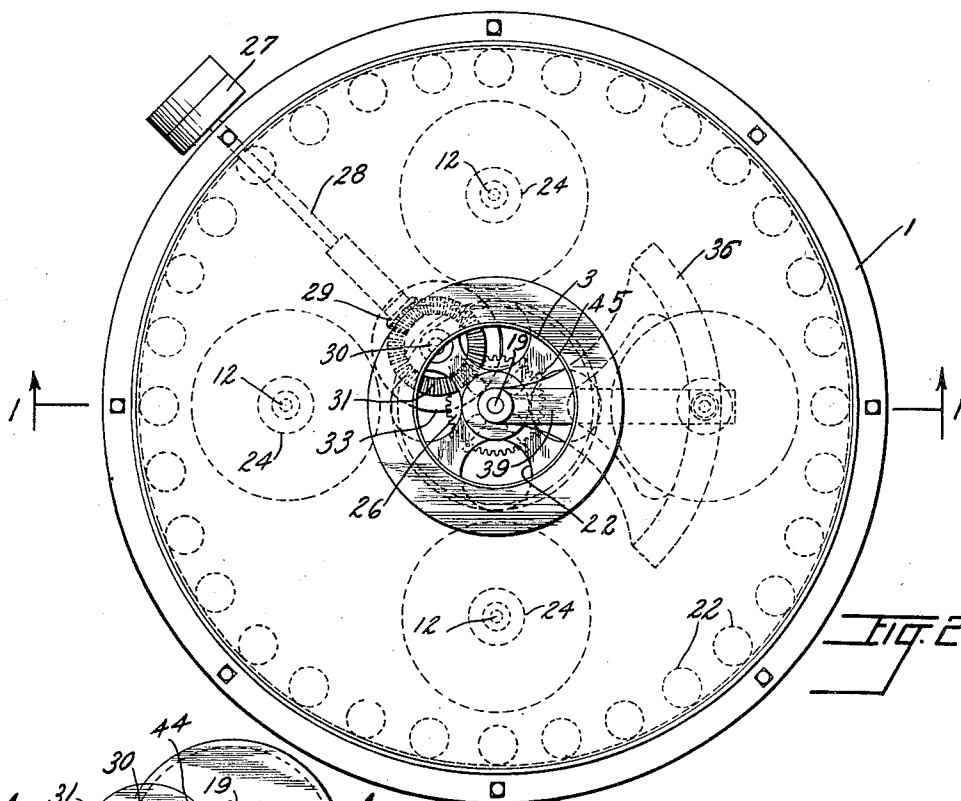
ATTORNEY

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2 SHEETS-SHEET 2.



WITNESSES:

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GUIDO E. LOB, OF CHICAGO, ILLINOIS, ASSIGNOR TO PNEUMATIC CONVEYOR COMPANY, OF CHICAGO, ILLINOIS.

AIR-PURIFYING APPARATUS.

1,109,997.

Specification of Letters Patent.

Patented Sept. 8, 1914.

Application filed May 27, 1912. Serial No. 699,851.

To all whom it may concern:

Be it known that I, GUIDO E. LOB, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Air-Purifying Apparatus, of which the following is a specification.

The essential object of this invention is to provide an apparatus for removing dust from air, and is an apparatus in which the air to be purified is caused to pass through a sieve-like fabric which collects the dust and solid particles but which at the same time permits the air itself to pass through.

In the drawings Figure 1 is a vertical sectional view of the apparatus taken on the line 1—1, Fig. 2; Fig. 2 is a top plan view of the apparatus; Fig. 3 is a top plan view of part of the driving mechanism; Fig. 4 is a vertical sectional view taken at right angles to Fig. 3; Figs. 5 and 6 are companion views of one of the members comprising the operating mechanism; Figs. 7 and 8 are companion views of another member; and Fig. 9 is a top plan view of the member with which the member shown in Figs. 5 and 6 is adapted to co-act.

The air is filtered and all movable parts are retained within the shell or container 1, which is made hollow and air-tight and of any suitable size, shape, and strength. The dust-laden air enters into the casing 1 through the flue 2 and makes its exit through the sleeve 3. Preferably a vacuum-producing apparatus is connected to the sleeve 3, and the air is sucked from flue 2 through the casing 1 and out through sleeve 3; or the air may be blown through flue 2 and escape naturally through sleeve 3. The flue 2 terminates in a chamber or receptacle 4, which receptacle is a hollow shell preferably cylindrical in shape, the outer wall thereof being provided with apertures or perforations 5 through which the air is adapted to pass. Bags 6 are secured at the bottom to the spider 7 and at the top to the circular plate 8. Said bags 6 are preferably made practically cylindrical in shape and may be made of any suitable woven fabric or material which will catch and retain the dust but which is sufficiently porous to permit passage of air therethrough. A pipe or duct 9 extends to the spider 7 from the cylinder 4, the opening of each duct 9 being

in registration with one of the apertures 5. As best shown in Fig. 1, each duct 9 is provided with a flange 10 which is bolted or secured to the circular flange 11, the lower edge of bag 6 being held between the periphery of spider 7 and the inner wall of flange 11. In the drawings four bags 6 are depicted, which number, however, may be varied at will, but there must be a duct 9 and a perforation 5 for each bag 6.

Projecting upwardly from the spider 7 is a rod 12 which near its upper end has a cap 13 secured thereto. The plate 8 bears a hollow stud 14 within which the upper end of rod 12 is telescoped, and spring 15 is interposed between cap 13 and tube 14, said spring being adapted normally to press plate 8 to topmost position, and thus keep the bag 6 stretched taut.

The members 10 and 11 are adapted to be secured to the circular diaphragm 16, which said diaphragm is a plate adapted to be bolted or secured between the flanges 17 which are secured to the outer wall of the casing 1. Said diaphragm contains as many perforations 18 as there are bags 6, each of said perforations being in registration with one of said bags. Said member 16 is also perforated to permit the passage therethrough of the shaft 19 and the hollow shaft 20 which encircles the same but otherwise is solid; hence, the air which enters through duct 2 cannot pass from the lower section of casing 1 to the upper section except through perforations 18 in the diaphragm.

Above the bags 6 is another diaphragm 21 which is similar in construction to diaphragm 16 except for the fact that diaphragm 21 contains numerous perforations, such as 22, in order to permit the air to pass freely through said diaphragm 21. Said diaphragm supports the journal 23 within which the hollow shaft 20 is adapted to revolve. Said diaphragm also is provided with a perforation 24 through which the stud 25 is adapted to project, said stud 25 being secured to the plate 8.

The hollow shaft 20 is, as just stated, journaled in the bearing 23 and also in the perforation provided therefor in the diaphragm 16. Adjacent the lower end of said hollow shaft 20 the gear 26 is fixed. Power is supplied to the apparatus by a belt passing over the pulley 27, thus driving the shaft 28 which, at its inner end, carries the

beveled gear 29. The casing 4 supports a shaft 30, which shaft 30 serves as a bearing for the beveled gear 31, the gear 32 and the wheel 33, said members 31, 32, and 33 being bolted together by bolts 34 so as to rotate in unison. Gear 29, which is driven by the rotating shaft 28, meshes with and drives the gear 31, and gear 32 meshes with and drives the gear 26 which is secured to the hollow shaft. Obviously, therefore, continuous rotary motion of the belt-driven shaft 28 is converted into continuous rotary motion of the hollow shaft 20. At its upper end, which is above the diaphragm 21, the ratchet member, best shown in Figs. 7 and 8, is secured to the hollow shaft 20, which ratchet rotates in unison therewith, the teeth 35 of the ratchet 36 being faced toward the bags 6.

The shaft 19 rotates within the hollow shaft 20 and is supported adjacent its lower end by the bearing 36 which is inside of the casing 4. Below the bearing 36 the arm 37 is secured to shaft 19. At its outer end, arm 37 bears the valve 38 which is adapted to engage the inner face of the circumferential wall of the casing 4 and which is of sufficient size and of proper shape to close the particular perforation 5 to which said valve 38 is presented. At its upper end shaft 19 carries an arm 39, the main body of which is above the ratchet 36, but which arm is provided with a finger 40 that projects inwardly beneath said rotatable ratchet. The finger 40 is perforated and the pin 41, which is provided at each end with a suitable head 42, is carried in said perforation.

The shaft 30 passes through the perforation 42 in the wheel 33 and bolts 34 fit into holes 43. Upon the under side of wheel 33 is stud 44. The plate 45, best shown in Fig. 9, is fixed to shaft 19, and motion is imparted to said shaft 19 through said member 45. By reference to Fig. 9 it will be seen that plate 45 is provided with radial recesses 46, and into one of these recesses the pin or stud 44 is adapted to ride each time that the wheel 33 completes a revolution. As the wheel 33 revolves the stud 44 will be carried into one of the recesses 46 and will bear against the wall of said recess, and thus, as the wheel 33 continues to revolve, the plate 45 will be rotated also while the pin 44 is within the recess 46. The size of the parts and their arrangement is such that each complete revolution of the wheel 33 will give a partial rotation to plate 45, and consequently to the valve 38 and the arm 39 which are borne upon said shaft 19. In the form of the invention most specifically shown in the drawings where four bags 6 are provided, the plate 45 will be so arranged that each complete revolution of wheel 33 will rotate shaft 19 for a distance of 90 degrees, and the wheel 33 and the plate

45 thus serve as a convenient means to translate the continuous rotation of the shaft 28 into intermittent rotation of the shaft 19.

The parts are so arranged that when the shaft 19 is at rest the valve 38 will close one of the perforations 5 and the arm 39 will be above the particular bag 6 which is connected to that perforation 5 which is then closed by the valve 38, and the pin 41 will rest upon the stud 25. As the ratchet 36 is caused to rotate, its teeth 35 will ride upon the upper head 42 of the pin 41, and, as each tooth of the ratchet rides over said pin, the pin will be depressed, which movement of the pin in turn will be communicated to the plate 8. The ratchet, therefore, will give a series of knocks to the plate 8 depressing the same, but the plate will immediately be returned to normal position by the spring 13. This series of sharp reciprocations of said plate 8 first loosens the bag 6 and then stretches the same taut, and said loosening and tightening of the bag shakes out all of the dust which has been collected upon the inner surface of said bag. It will be obvious that only one bag is agitated at any particular time, and that during the time that each bag is agitated the perforation 5, which allows communication between said bag and the duct 2, is closed by the valve 38.

When the suction apparatus (not shown in the drawings) that is connected to the sleeve 3 is in operation, a vacuum is created within the receptacle 1 and this draws the air in through the duct 2. The air which enters the duct 2 is, of course, laden with dust, and it is the function of the invention to remove the dust from the air. The path of the air is indicated by arrows in Fig. 1 and, as will be evident from the detailed description of parts, the dust-laden air passes, successively, through duct 2, chamber 4, perforation 5, and pipe 9, whence it will enter the space within the bag 6. The plate 8 being solid no air can pass therethrough and hence, the air must be forced through the fabric of which the bag 6 is made. The mesh of this fabric must be sufficiently fine so as to catch and retain all the dust, yet at the same time permitting the air to pass through the fabric. No air can pass out of sleeve 3 without passing through one of the bags 6 at some convenient point because the diaphragm 16 being solid, except for the perforations which are in registration with the bags, forces the air which may have entered that part of the receptacle 1 beneath diaphragm 16 to pass through the fabric before the air can make its exit at sleeve 3. As the pulley 27 and shaft 28 are given a continuous rotation the shaft 19 is given an intermittent rotation. Each time that said shaft 19 comes to rest one of the perforations 5 will be closed by the

valve 38. The bag 6 which is in connection with that closed perforation 5 will be agitated by the ratchet 36 and the dust which has collected upon the inner surface or in the fabric of the particular bag which is being agitated at any given time will drop downwardly through the funnel 47 into the bottom of the receptacle 1, and from thence it may be removed from time to time by opening the valve 48. After any bag 6 has been agitated and the dust shaken out, the shaft 19 is given another partial rotation. The bag next in the series is agitated and the dust shaken out, and so on, each bag 6 being successively agitated and shaken out, said agitation taking place at a time when the movable valve 38 prevents access of dust-laden air to the bag that is being agitated.

The bags 6 are shown and described herein as being substantially tubular in shape, open at each end. It should be understood, however, that although this is a convenient form to employ, it is by no means the only way in which the fabric can be arranged, for the fabric may be formed of any desired size and shape. It is desirable whenever any particular fabric is being agitated so as to shake out the dust that has already collected in or upon said fabric, to shut off the air from said fabric in order that the agitation of the fabric may be carried on at a time when no air is being drawn through the fabric, for were the fabric to be shaken when the strong current of air is passing therethrough it would be a difficult matter to clean out the dust. It is also desirable so to arrange the various pieces of fabric that no air can pass from duct 2 to sleeve 3 without being drawn through one of the pieces of fabric and any arrangement which will secure these ends will be a practical operative embodiment of the invention.

It will be observed that the edges of the plate 45 are circularly concave and that upon the under side of the wheel 33 is an arcuate member, the purpose of which is to fit into the concavities upon the outer surface of the plate 45 and thereby lock the plate against rotation. In this manner the shaft 19 is locked in place while each bag 6 is being agitated, and the parts which are carried upon said shaft are so held that each will perform its proper function and will not become displaced because of the vibration which is likely to occur when the ratchet is riding over the pin 41.

It is obvious that many changes in construction and arrangement of parts may be made without departing from the scope of the invention or of the various claims.

I claim as my invention:

1. An air-purifying apparatus comprising a plurality of movable members, a fabric member supported from each of said mov-

able members, an arm adapted to be presented, successively, to each of said movable members, a ratchet adapted to co-act with said arm and agitate said movable members, said arm and said ratchet being mounted upon concentric shafts, and means for driving one of said shafts continuously and the other of said shafts intermittently.

2. An air-purifying apparatus comprising a plurality of movable members, a fabric member supported from each of said movable members, an arm adapted to be presented, successively, to each of said movable members, a stud upon said arm adapted to engage said movable members, a ratchet adapted to engage said stud and thereby agitate said movable members, a shaft upon which said ratchet is carried, a shaft upon which said arm is carried, one of said shafts being disposed within the other, a continuously-driven power shaft, means to convert rotation of said power shaft into intermittent motion of said arm-bearing shaft, and means to convert motion of said power shaft into continuous rotation of said ratchet-bearing shaft.

3. An air-purifying apparatus comprising a container, a diaphragm therewithin provided with perforations, a plurality of members also therewithin each formed of fabric and each in registration with one of the perforations in the diaphragm, a chamber also provided with perforations, channels connecting the perforations in the chamber with the perforations in the diaphragm, means within the chamber for predeterminedly closing the perforations therein, and an exit in each of said channels below said diaphragm.

4. An air-purifying apparatus comprising a container, a diaphragm therewithin provided with perforations, a plurality of members also therewithin each formed of fabric and each in registration with one of the perforations in the diaphragm, a chamber also provided with perforations, channels connecting the perforations in the chamber with the perforations in the diaphragm, means within the chamber adapted predeterminedly to close the perforations therein, an exit in each of said channels below said diaphragm, and a shaft adapted to produce actuation of the fabric members.

5. An air-purifying apparatus comprising a container, a diaphragm therewithin provided with perforations, a plurality of members also therewithin each formed of fabric and each in registration with one of the perforations in the diaphragm, a chamber also provided with perforations, channels connecting the perforations in the chamber with the perforations in the diaphragm, means within the chamber adapted predeterminedly to close the perforations therein, an exit in each of said channels below said

diaphragm, and a shaft adapted to produce actuation of the fabric members, said means within the chamber being actuated also by said shaft.

- 5 6. An air-purifying apparatus comprising a container, a diaphragm therewithin provided with perforations, a plurality of fabric members also therewithin, each in registration with one of said perforations, 10 a chamber provided with perforations, channels connecting the perforations in the chamber with the perforations in the diaphragm, a valve within the chamber for predeterminedly closing the perforations there- 15 in, a shaft by which said valve is operated, an arm carried by said shaft adapted to agitate said fabric members, and means for driving said shaft intermittently.

7. An air-purifying apparatus comprising 20 a container, a diaphragm therewithin provided with perforations, a plurality of fabric members each in registration with one of said perforations, a chamber provided with perforations, channels connecting the 25 perforations in the chamber with the perforations in the diaphragm, means within the chamber for predeterminedly closing the perforations therein, a shaft by which said

means is actuated, a continuously-driven shaft, and means intermediate said first-mentioned shaft and said second-mentioned shaft, adapted to translate the continuous rotation of said second-mentioned shaft into intermittent movement of said first-men- 30 tioned shaft. 35

8. An air-purifying apparatus comprising a container, a member therein provided with perforations, a plurality of members also therewithin each formed of fabric and each in registration with one of said perforations, 40 a chamber also provided with perforations, channels which connect said chamber and said perforated member, a valve within the chamber adapted predeterminedly to close the perforations therein, a shaft by which 45 said valve is operated, means for driving said shaft intermittently, and means for agitating each fabric member.

In testimony whereof I have hereunto affixed my name in the presence of two wit- 50 nesses.

GUIDO E. LOB.

Witnesses:

ROBT. KLOTZ,
SOPHIA KNOLE.