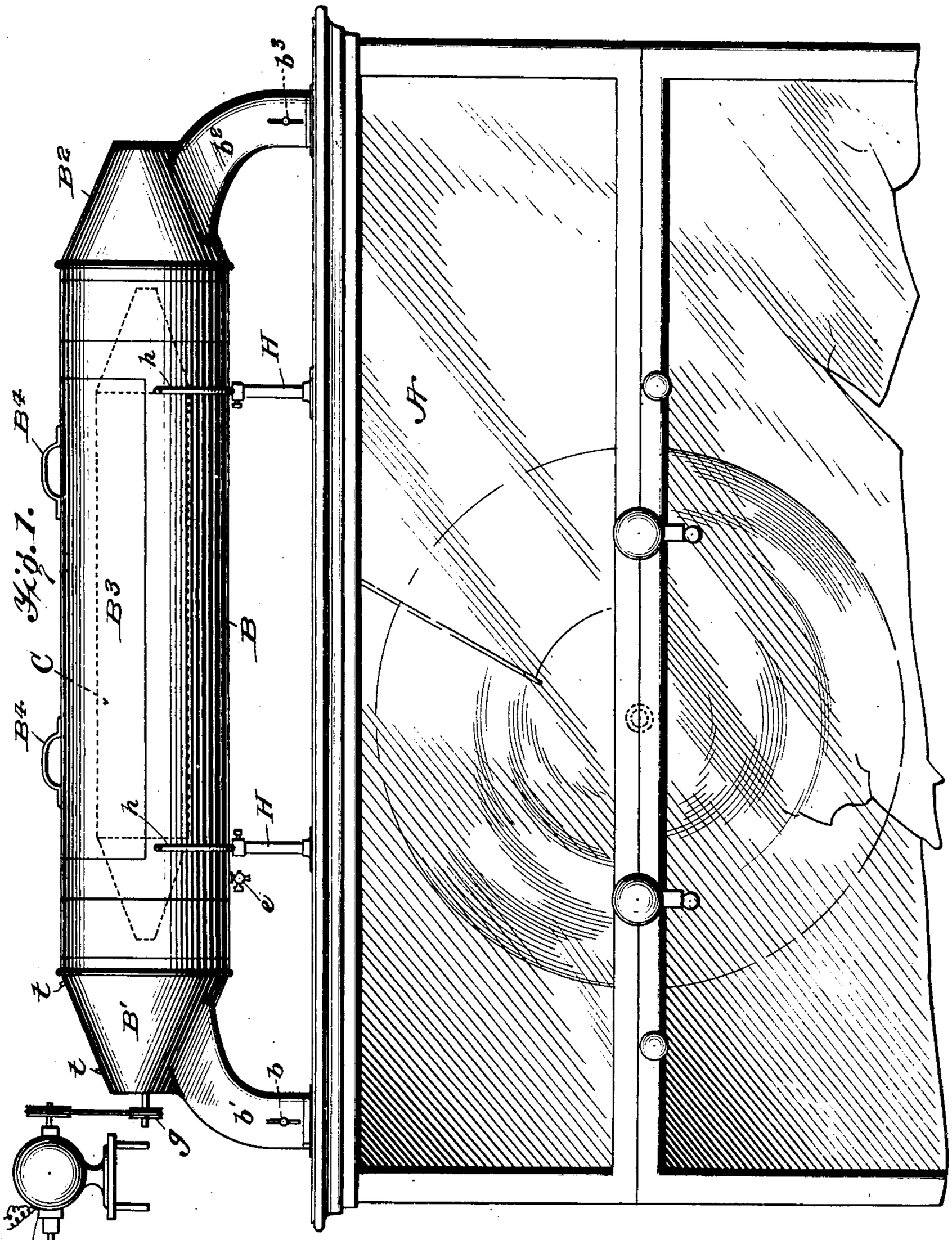
M. R. FARRAR.

AIR DRIER FOR STATIC ELECTRIC MACHINES.

APPLICATION FILED JUNE 29, 1908.

925,887. Patented June 22, 1909.

3 SHEETS—SHEET 1.



WITNESSES

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3 SHEETS—SHEET 2.

Fig. 2.

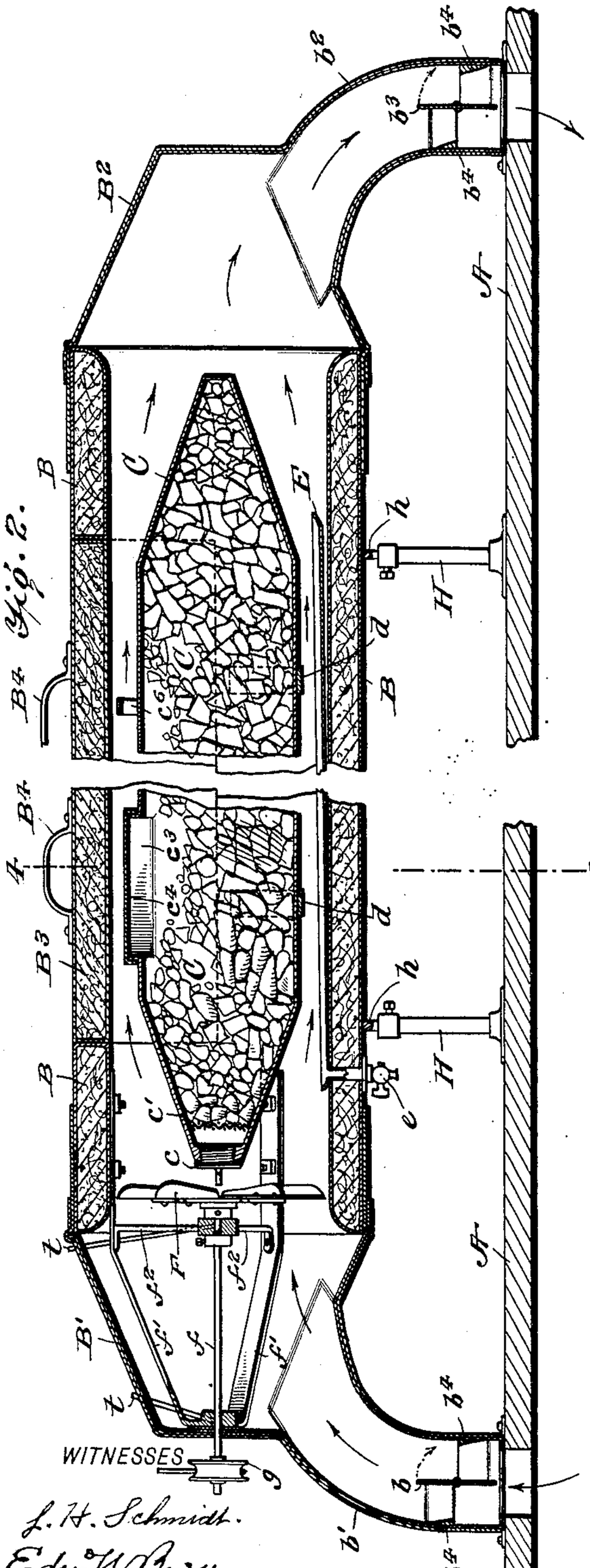

Fig. 3.

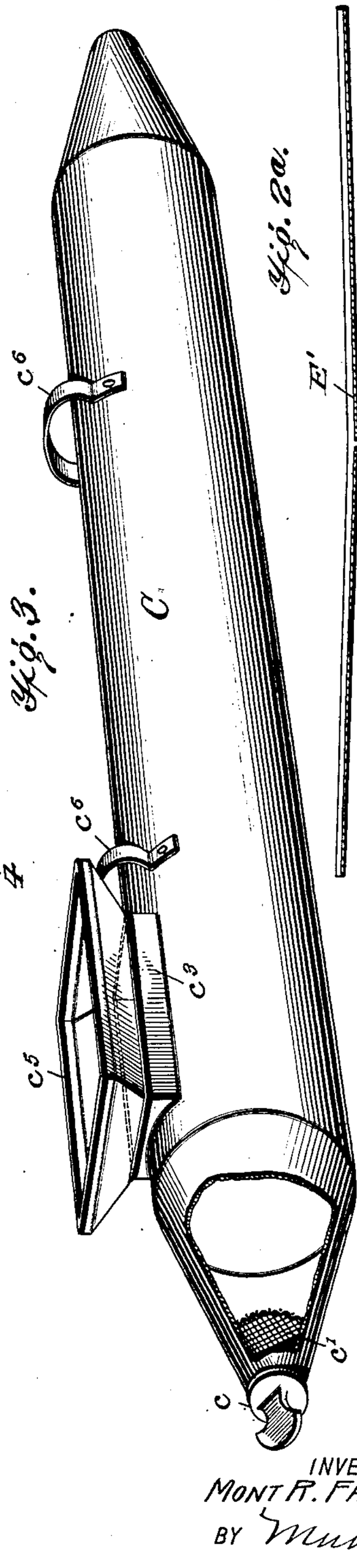

Fig. 2a.

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3 SHEETS—SHEET 3.

Fig. 4.

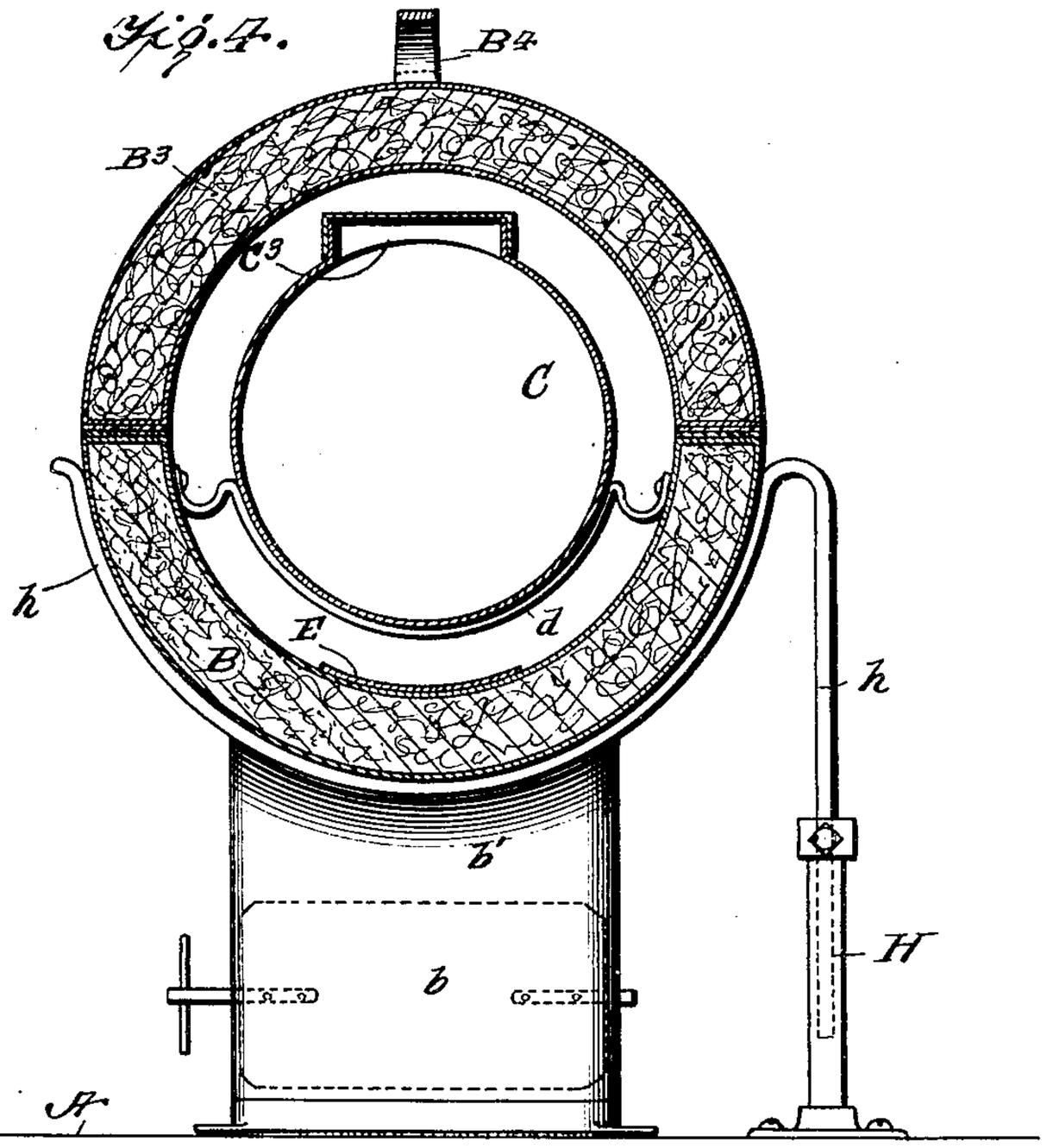
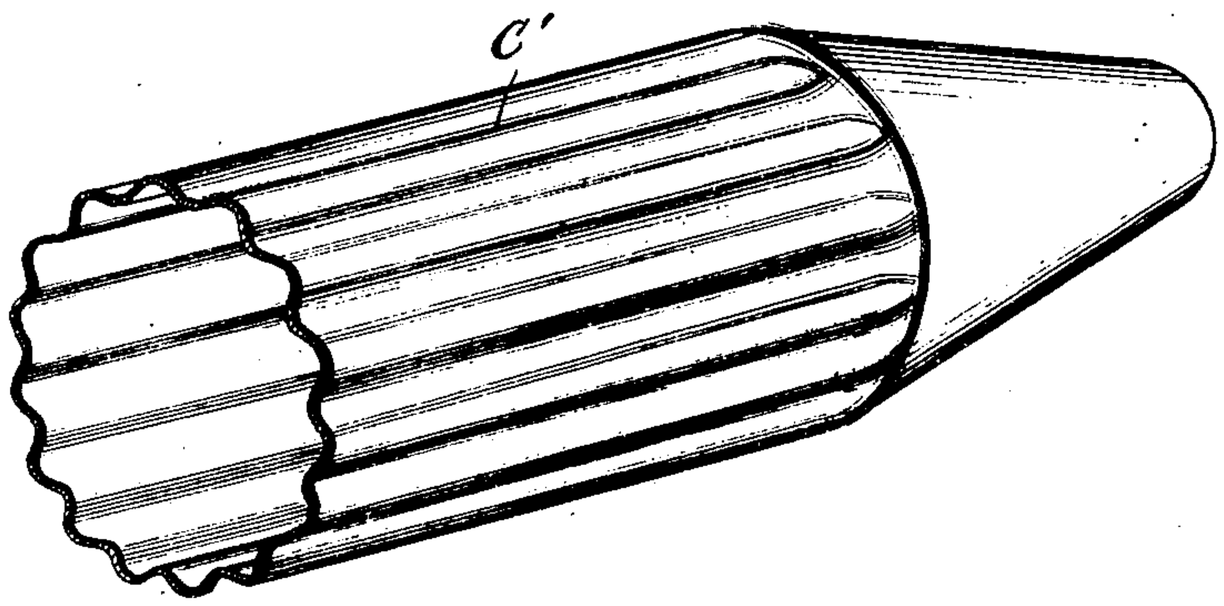


Fig. 5.



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UNITED STATES PATENT OFFICE.

MONT R. FARRAR, OF GREENSBORO, NORTH CAROLINA.

AIR-DRIER FOR STATIC ELECTRIC MACHINES.

No. 925,887. Specification of Letters Patent. Patented June 22, 1909.

Application filed June 29, 1908. Serial No. 440,886.

To all whom it may concern:

Be it known that I, MONT R. FARRAR, a citizen of the United States, and a resident of Greensboro, in the county of Guilford and State of North Carolina, have made certain new and useful Improvements in Air-Driers for Static Electrical Machines, of which the following is a specification.

In the operation of static electrical machines, such for instance as those of the Holz or Wimshurst type as commonly used in X-ray apparatus, it is very important that the interior of the case, containing the glass plates for exciting electricity, should be entirely desiccated of all moisture in the air, since the presence of moisture, by virtue of its conductivity, prevents or precludes to a certain extent the maintenance of the static charge.

My invention consists in a special form of air drier for such static machines designed with a special reference for this use and combined with the machine as an integral part thereof, whereby the moisture is eliminated from the air within the casing by condensation and congelation on a refrigerating receptacle over which the body of air from the casing is continuously circulated in an endless cycle by means of a fan.

In the drawing—Figure 1 is a side elevation of my air drier shown applied to the top of a static machine. Fig. 2 is an enlarged longitudinal section through the drier on a larger scale, the middle parts being broken away. Fig. 2^a is a detail showing a modification of the drip pan. Fig. 3 is a perspective view in detail of the refrigerant receptacle detached. Fig. 4 is an enlarged transverse section through the air drier, and Fig. 5 is a detail showing a modified form of the refrigerant receptacle.

In the drawing, Fig. 1, A represents any of the ordinary types of static electrical machines provided with revolving plates or cylinders of glass with suitable frictional devices for exciting static electricity thereon. Such static machine is as usual inclosed in glass and upon the top of the same is applied my special form of air drier. This consists of a horizontal cylinder B with the middle upper portion of the same constructed as a detachable semi-circular covering B^3 provided with handles B^4, by which said cover may be removed to give access to the interior. The cylinder B and its cover B^3 are composed of a shell of metal, wood, papier mâché, or other material with a covering or lining of asbestos as seen in Figs. 2 and 4. The drier cylinder is supported upon the top, side, or underneath of the static machine by means of semi-circular arms h, h, whose vertical portions extend down into pedestals H and are held therein detachably by means of set screws. At the ends of the horizontal cylinder are arranged detachable end caps B', B^2, whose flanges telescope over the ends of the cylinders and whose outer portions are constructed as truncated cones from each of which extends an air duct, b' and b^2, which have at their lower ends flanges with screw holes by which they are made to connect with the top of the static machine through which are formed openings coinciding with these air ducts b' and b^2, as seen in Fig. 2. These air ducts are provided with sliding valves or rotating valves or dampers b, b^3, operated by suitable handles from the exterior as seen in Fig. 1, which valves or dampers are provided with seats b^4, b^4, fixed to the inner walls of the ducts b', b^2, which seats are composed of felt or other soft material for the purpose of making a tightly closed joint when the dampers are turned to contact therewith. The outer surface of the end caps B' and B^2 and their corresponding air ducts b' and b^2 are covered with some suitable heat insulating material, such as asbestos paper or the like.

C is an elongated cylindrical receptacle for containing a refrigerant, which may consist of a packing of ice and salt or any other freezing mixture. This refrigerant receptacle may be made of a plain cylindrical form as shown in Fig. 3, or for greater surface area it may be corrugated as shown at C′ in Fig. 5. Its ends are made conical as shown and it is provided with two handles c^6, c^6, by which it is inserted into and removed from the outer cylinder B through its detachable cover B^3. To support this receptacle within the cylinder two stirrups d d are connected to the bottom portion of the cylinder B and form seats which receive and sustain the receptacle C in a central position within the cylinder with an equal air space all around. The receptacle C is provided at a suitable point with a flanged opening c^3 provided with a tightly closing cover

c^4 and to promote the filling of this receptacle with ice and salt, a detachable funnel c^5, Fig. 3, is provided which closely fits the inlet opening c^3 of the refrigerant receptacle. This funnel is only employed in filling the receptacle and after it has been charged the funnel c^5 is removed and the tightly closing cover c^4 is applied as shown in Fig. 2. Near one end of the receptacle C is arranged a strainer c' and beyond this at the apex of the cone is arranged a detachable screw plug c. This latter forms a drainage outlet for the liquefied contents of the receptacle while the strainer c' holds back the ice and salt while the liquid is being drained away.

In coaxial alinement with one end of the refrigerant receptacle C is arranged a rotary fan F having spirally arranged blades projecting from a shaft f journaled in bearings within a supporting frame f', f^2 bolted rigidly to the end of the cylinder B. The shaft f is extended through the end of the cap and is provided with a pulley g adapted to receive a belt from a small electric motor G, as seen in Fig. 1. To promote the lubrication of the bearings of the shaft f, two tubes t t extend from the outer portion of the cone through to the journal boxes of the shaft.

E is a drip pan arranged in the bottom of the cylinder and extending from one conical end of the receptacle C to the other in inclined position, and having at its lowest point an outlet tube extending through the bottom of the cylinder B and provided with a drainage cock e. As shown this drainage pan extends straight from one end to the other, but if desired it may be made with two inclines and the outlet pipe and cock arranged in the center as shown at E′ in Fig. 2^a.

The operation of my drier is as follows. The refrigerant receptacle C having been charged with a freezing mixture as hereinbefore described, is placed through the open door of the cylinder upon the supports d and the cover B^3 then applied to close in the outer casing. The dampers b and b^3 having been opened and motion imparted to the fan F, air will be drawn from the casing of the static machine up through the duct b' into the cylinder and passes in an annular stream around the refrigerant receptacle C to the other end and descending through the duct b^2 enters again the casing of the static machine. As the air comes in contact with the surface of the refrigerant receptacle C, the latter having been cooled to below the freezing point, the moisture in the air will immediately condense thereon and at first may drip in drops upon the pan E and is withdrawn through the outlet cock e. As the temperature becomes low enough the moisture freezes upon or is deposited upon the refrigerant receptacle C in the form of snow, and by continuing the circulation of air from the casing of the static machine through my drier and back into the static machine, in a short while all of the moisture in the air of the static machine becomes perfectly eliminated by condensation on the receptacle C so that the air of the static machine surrounding the excitation plates will be perfectly dry and an absolute non-conductor. When the air has become thus dried, the dampers b and b^3 are turned crosswise their respective ducts and the air within the casing of the static machine is thus maintained hermetically sealed during the operation of the machine.

In recharging cylinder C the valves b and b^3 are closed to prevent an interchange of air within the static machine when the cylinder B is opened, and when the latter is closed again the valves are not opened until sufficient time has elapsed for the moisture of the outside air, which has gained access to the cylinder B when it was opened, to condense on cylinder C.

It will be seen that my drier for the static machine is entirely extraneous to said machine, so that it may be conveniently manipulated and the water condensation drawn off from time to time and yet it is in such pneumatic connection with the static machine as to permit of the convenient and practical circulation of the air therethrough.

Although especially designed for the use of static machines, it will be understod that my invention may be applied to the drying of air in rooms or apartments, or in any other relation in which it is desired to extract the moisture from a given body of air, or for drying or cooling any other fluid medium in the laboratory or elsewhere.

I claim—

1. The combination with an inclosed casing, of a drier extraneous thereto and consisting of a non-conducting outer shell having a removable door, a refrigerant receptacle contained therein, means for forcing a fluid medium through said shell and a duct at each end of the shell communicating with the compartment whose air is to be dried.

2. A drier for a gaseous medium consisting of a non-conducting cylindrical casing having a semi-cylindrical removable door and conical ends with ducts, a refrigerant receptacle arranged within the cylindrical casing and having conical ends and a coaxially arranged fan for driving the gaseous medium through the cylindrical casing.

3. In a drier, the combination with a non-conducting outer casing, of a double conical refrigerant holder arranged concentrically within the casing and having a charging door in its side.

4. In a drier, the combination with a non-conducting outer casing, of a double conical refrigerant holder arranged concentrically

within the casing and having a charging door in its side, and a drainage plug at the conical end of said holder.

5. In a drier, the combination with a non-conducting outer casing, of a double conical refrigerant holder arranged concentrically within the casing and having a charging door in its side, a drainage plug at the conical end of said receptacle, and a strainer arranged to hold back the solid freezing mixture while draining away the liquids.

6. A drier for a gaseous medium comprising an outer casing of non-conducting material having at each end a detachable conical cap with an offsetting duct, a refrigerant receptacle arranged concentrically within said casing and formed with double conical ends and a coaxially arranged fan.

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Witnesses:
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H. J. THURMAN.