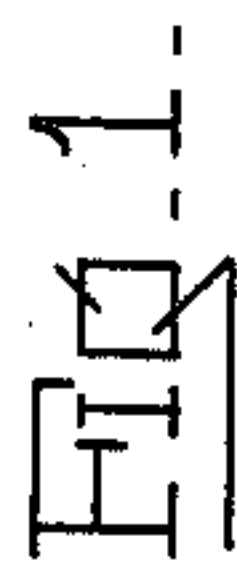


AIR PURIFYING APPARATUS.  
APPLICATION FILED JAN. 27, 1910.

Patented Nov. 15, 1910.

3 SHEETS—SHEET 1.



WITNESSES:  
Belle Turney  
Theresa Sueml.

INVENTOR.  
John H. Kincaid.

J. H. KINEALY.  
AIR PURIFYING APPARATUS.  
APPLICATION FILED JAN. 27, 1910.

976,081.

Patented Nov. 15, 1910.

3 SHEETS—SHEET 2.

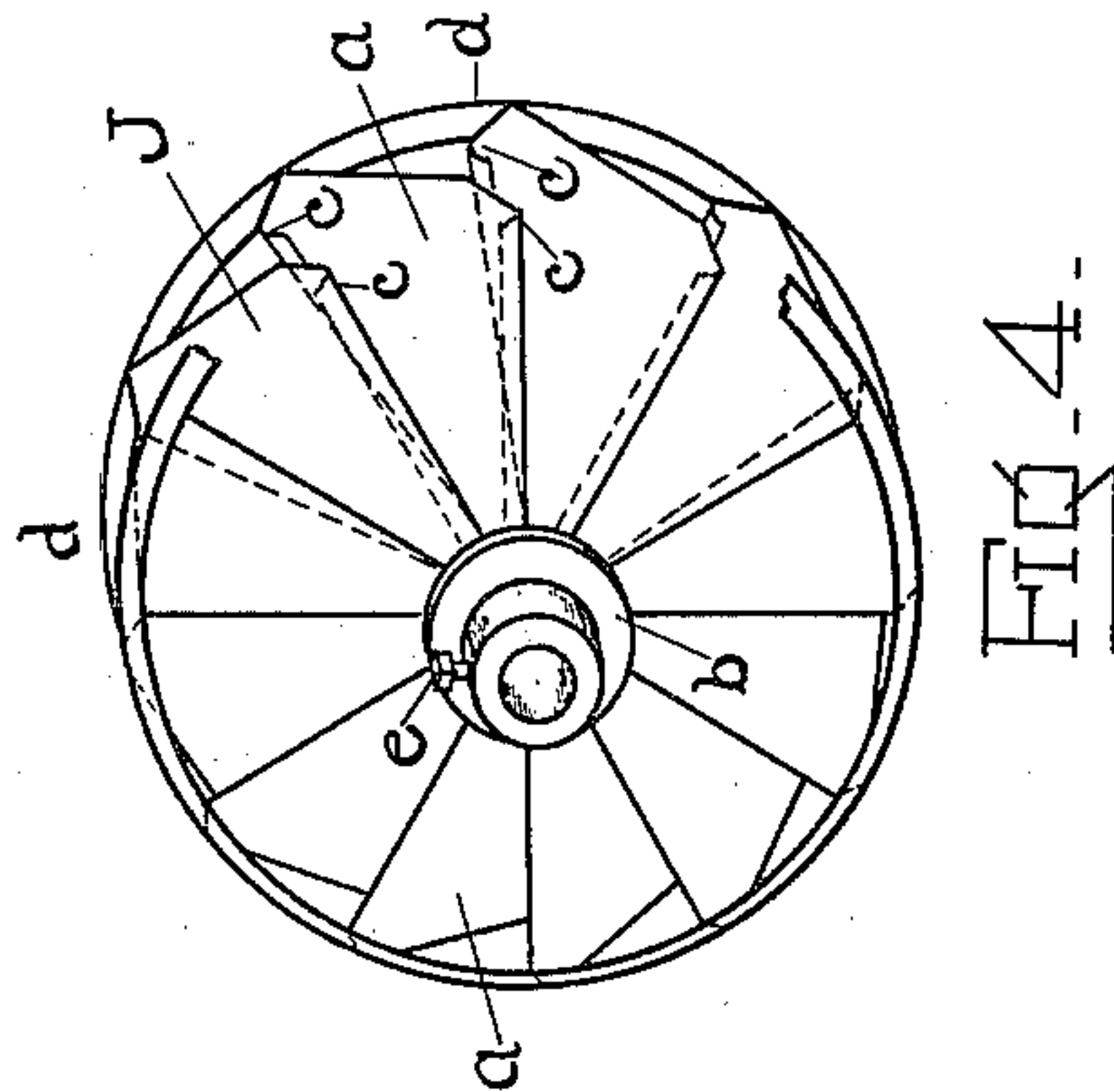


FIG. 4.

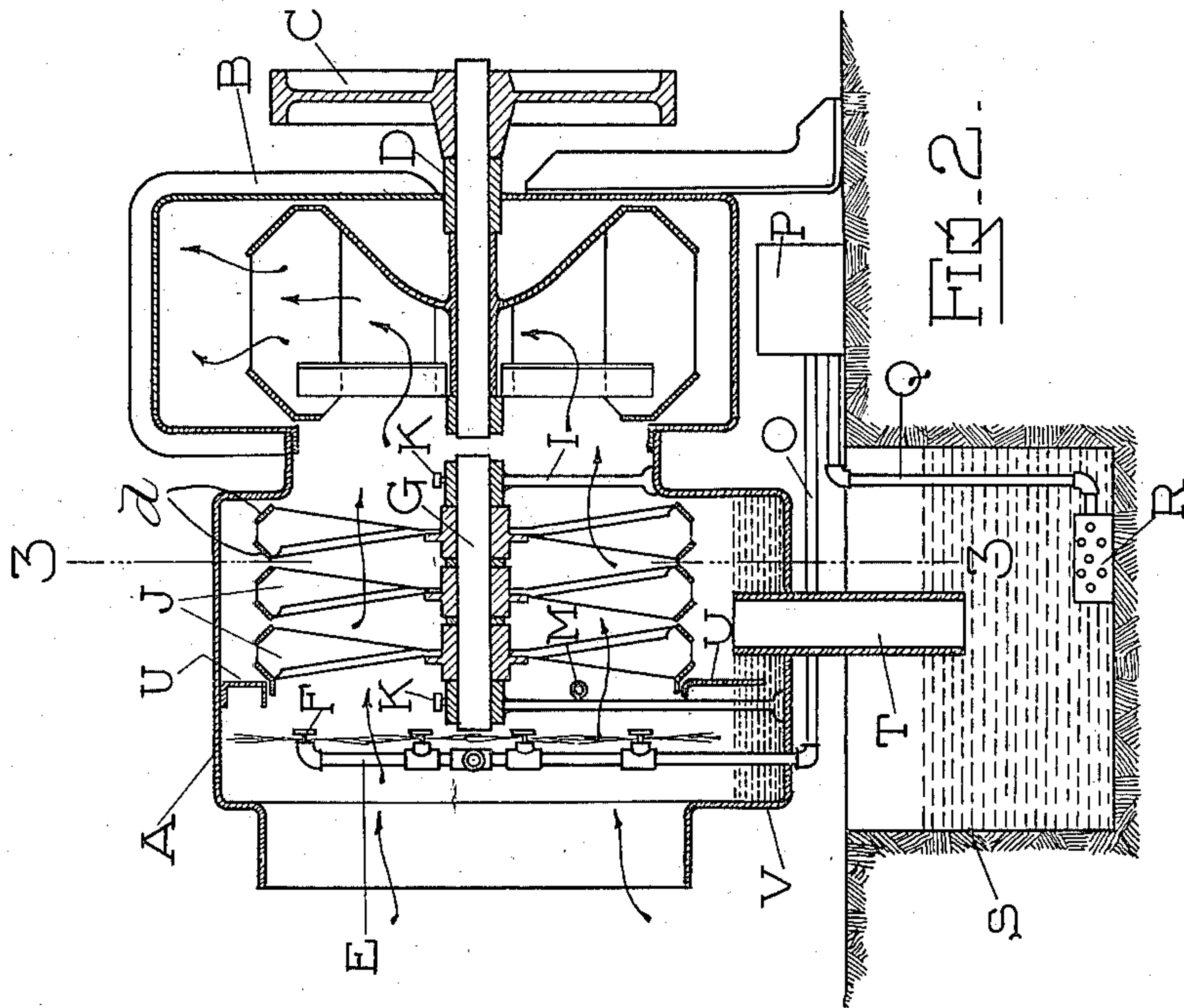


FIG. 2.

WITNESSES:  
*Bella Tierney*  
*Theresa Suem*

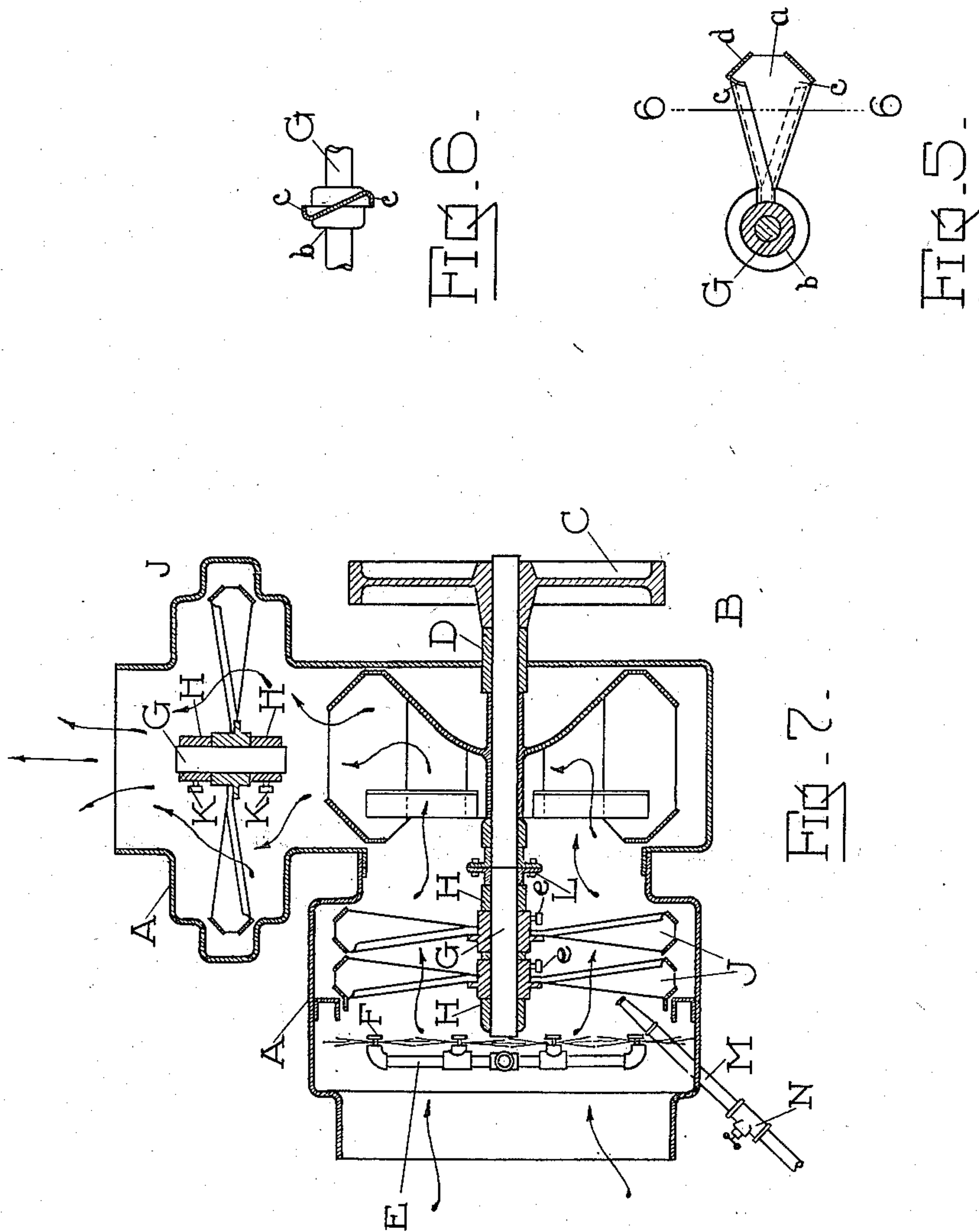
INVENTOR.  
*John H. Kinealy.*

J. H. KINEALY.  
AIR PURIFYING APPARATUS.  
APPLICATION FILED JAN. 27, 1910.

976,081.

Patented Nov. 15, 1910.

3 SHEETS—SHEET 3.



WITNESSES:  
Belle Tierney  
Theresa Quinn

INVENTOR.  
John H. Kinealy.



# UNITED STATES PATENT OFFICE.

JOHN H. KINEALY, OF FERGUSON, MISSOURI.

## AIR-PURIFYING APPARATUS.

976,081.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed January 27, 1910. Serial No. 540,419.

*To all whom it may concern:*

Be it known that I, JOHN H. KINEALY, a citizen of the United States, residing at Ferguson, in the county of St. Louis and State of Missouri, have invented a new and useful Improvement in Air-Purifying Apparatus, of which the following is a full, clear, and exact specification, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to air purifying apparatus whereby the air supplied to buildings for heating and ventilating purposes is washed and made pure and clean by removing therefrom dust and dirt and other impurities.

In air purifying apparatus used at the present time, the air is made to pass through a washer where it comes in contact with water in a more or less finely divided condition by which the heavy particles of dirt are washed away and the finer particles are carried forward in contact with drops of water mechanically held in suspension in the air. After the air leaves the washer it comes in contact with an eliminator comprising a number of baffle plates by which the water mechanically held in suspension by the air and the finer particles of dust and dirt are removed from the air. The particles of water with the dust and dirt are deposited on the baffle plates of the eliminator and are thus prevented from being carried with the air into the rooms to be heated or ventilated. For the successful operation of these purifiers it is necessary that the air be made to pass through them at a comparatively low velocity so that the apparatus is large and expensive to construct and occupies a great deal of space.

The object of my invention is to provide an air purifying apparatus that will be of low cost to construct, and one that will occupy a comparatively small space and which will work successfully when the air passes through it at a high velocity.

My invention is fully shown in the accompanying drawings where similar letters are used to designate similar parts.

Figure 1 shows a view of the apparatus looking at it in the direction of the flow of the air therethrough; Fig. 2 is a view of a vertical section along the line 2—2 of Fig. 1; Fig. 3 is a view of a vertical section along

the line 3—3 of Fig. 2; Figs. 4, 5 and 6 are views of details of the eliminator; Fig. 7 is a horizontal sectional view of a form of apparatus which differs in its details from the form of apparatus shown in Figs. 1, 2 and 3.

Referring to the figures, A is a thoroughfare for the air.

B is a fan by which the air is made to move through the thoroughfare A and which is supported by a suitable shaft D and driven by a suitable motor connected to the shaft D by means of a belt passing over the pulley-wheel C or in any other proper manner.

E is a system of water pipes having suitable spray heads or nozzles F by means of which water for washing the air is injected into said air as it flows through the thoroughfare A. Any form of nozzle F may be used, but in the drawings I have shown a construction whereby the water issuing from the pipes E through the nozzles F is made to form a sheet of water and spray of water in a finely divided condition.

G is a shaft or rod supported by bearings H which are held in place by suitable supports such as I in Fig. 3.

J represents a disk fan of peculiar construction which is shown in detail in Figs. 4, 5 and 6. Each of these disk fans J consists of a number of blades *a* attached to a hub *b* and bound together at their outer ends by circumferential strips *d*. Each blade *a* is provided with gutters *c* along its radial edges which extend outwardly from the hub *b* to the circumferential strips *d*. In the drawings the blades are shown as having two gutters, one on each radial edge, although this is not always necessary. The blades are set in planes making an angle with the axis of the hub and should preferably be of such a number and size as to partly overlap, leaving however a space between adjacent blades through which the air can pass. The hub *b* of these disk fans J are bored to fit the shaft or rod G so that the fans J will turn easily on the shaft G. The hubs *b* of the disk fans J are provided with set-screws *e* by means of which the disk fans may be fastened to the shaft G when desired. The bearings H are also provided with set-screws K whereby the shaft G may be held rigid in the bearings when desired. These disk fans J may be placed in front of



the inlet to the fan B, as shown in Fig. 2; or they may be placed either in front of the inlet or in front of the discharge, as shown in Fig. 7. In Fig. 2 the shaft G is at rest in the bearings H and the disk fans J are free to revolve on the shaft G. In Fig. 7 the shaft G in front of the inlet of the fan B is free to revolve in the bearings H and is connected to the shaft D of the fan B by means of a coupling L, so that this shaft is driven by the shaft of the fan B. The shaft G of the disk fan J in front of the discharge of the fan B in Fig. 7 is held fast in the bearings and the disk fan J is free to revolve about this shaft G.

M is a nozzle by means of which a jet of water may be made to impinge upon the first of the disk fans J, that is to say upon that disk fan which the air strikes first in passing through the apparatus.

N is a valve by which the flow of water through M is controlled.

O is a pipe leading from a pump P through which water is supplied to the spray heads F, and Q is a pipe through which water is drawn to the pump P from a sump S through a suitable strainer R.

U is a partition in the thoroughfare A by which the air is prevented from passing around the outside of the disk fans J. There is a space between the lower end of this partition U and the bottom of the thoroughfare A.

V is a tank in the lower part of the thoroughfare A beneath the spray heads F and extending wholly or partly below the disk fans J.

T is a drain-pipe or overflow pipe extending upwardly above the bottom of the tank V and leading downwardly into the sump S. The upper part of the pipe T extends above the lower part of the partition U so that water will always stand in the tank V above the lower part of the partition U so as to form a water-seal and thus prevent air from passing below the partition U. The pipe T extends below the surface of the water in the sump S so as to prevent air from passing through said pipe into the apparatus. The pump P may be any desired form and the strainer R may be of any suitable shape.

The operation of the device is as follows: The fan B being set in motion air is made to pass through the thoroughfare A and as it comes in contact with the water from the spray heads F of the washer the heavier particles of dust and dirt are carried down with the falling water and thus separated from the air. Finer particles of dust and dirt are carried forward with some water and come in contact with the first of the disk fans. The blades of this fan are made wet by the water carried by the air and the finer particles of dust and dirt come in con-

tact with these wetted blades and are caught. The first of these disk fans is made to revolve either by the action of the air passing through the thoroughfare or by the impact of the jet of water from the pipe M on the blades, or by being attached to the shaft G which may be driven by the fan shaft D as shown in Fig. 7; or the first of these disk fans may be driven by the combined action of the air and the jet of water from the pipe M. In any case, however, water and dirt or dust that strike the blades of this disk fan will be prevented from leaving the blades at their sides by the gutters *c* and will be made to move radially outwardly along the blades by the centrifugal force due to the rotation of the disk fan. The water moving outwardly along the blades will carry with it the dust and dirt that may be caught thereon and will be thrown off from the ends of the blades into that part of the thoroughfare surrounding the disk fans, and this water with the dirt and dust with it will eventually find its way into the tank V. Such water as may not be caught by the first disk fan will be caught by some of the succeeding disk fans and will be thrown therefrom by centrifugal force and will eventually find its way into the tank V. The gutters *c* of the blades *a* of the disk fans J prevent water from passing sidewise from the blades and guide it radially outwardly to the ends of the blades from which it is thrown by centrifugal force. The disk fans form an eliminator by which water held in mechanical suspension in the air is removed and the air thereby dried, that is freed of entrained water.

It is evident that the disk fans may be made to revolve by the action of the air alone, as is the case for all the disk fans of Figs. 1 and 2 except the first, and as is also the case of the disk fan in front of the discharge opening of the fan B shown in Fig. 7; or the disk fans may be made to revolve by means of the action of the air and the jet of water from the pipe M as is the case of the first disk fan shown in Fig. 2; or the disk fans may be made to revolve by some other means such as the shaft of the fan B as shown for those disk fans except the first in front of the inlet of the fan B in Fig. 7.

The water that collects in the tank V passes away through the overflow pipe T into the sump S and from there it may be drawn by means of the pump P and used over and over again until it has become too dirty for further use. The pipe M may be connected to any suitable source of supply of water.

In some cases it is not necessary to use the pipes E with the spray heads F, but a sufficient amount of water may be made to pass from suitable jets like M to properly wet the blades of the first disk fan. Some



of the water passing from the pipe M will be thrown off by contact with the blades of the first disk fans and will serve to wash the air of heavier particles even before they come in contact with the disk fans.

It is evident that the form and shape of the various parts of the apparatus may be varied to suit the requirements of different conditions without departing from the spirit of my invention; and the number of disk fans used and their size may be varied to suit the requirements of each case.

What I claim as new and desire to secure by Letters Patent, is:

1. An air purifying apparatus comprising a thoroughfare for the air, a plurality of disk fans adapted to revolve in said thoroughfare and having blades with a gutter formed on a radial edge, and means whereby the blades of the first of said disk fans are wetted, substantially as described.

2. An air purifying apparatus comprising a thoroughfare for the air, a plurality of disk fans adapted to revolve in said thoroughfare and having blades with a gutter formed on a radial edge, and means whereby a jet of water is made to impinge on the blades of the first of said disk fans, substantially as described.

3. An air purifying apparatus comprising a thoroughfare for the air, a washer, and an eliminator consisting of a disk fan adapted to revolve in said thoroughfare and having blades with a gutter formed on a radial edge, substantially as described.

4. An air purifying apparatus comprising a thoroughfare for the air, a washer, and an eliminator consisting of a disk fan adapted to revolve in said thoroughfare and having

blades with gutters formed on their radial edges, substantially as described.

5. An air purifying apparatus comprising a thoroughfare for the air, a washer, an eliminator consisting of a plurality of disk fans adapted to revolve in said thoroughfare and having blades with gutters formed on their radial edges, and means whereby one or more of said disk fans may be made to revolve independent of the action of the air passing through said thoroughfare, substantially as described.

6. An air purifying apparatus comprising a thoroughfare for the air, a washer, a plurality of disk fans adapted to revolve in said thoroughfare and having blades with a gutter formed on a radial edge, and means whereby a jet of water is made to impinge on the blades of the first of said disk fans, substantially as described.

7. An air purifying apparatus comprising a thoroughfare for the air, a washer, a plurality of disk fans adapted to revolve in said thoroughfare and having blades with a gutter formed on a radial edge, means whereby a jet of water is made to impinge on the blades of the first of said disk fans, and means whereby said disk fans after the first may be made to revolve independent of the action of the air passing through said thoroughfare, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. KINEALY.

Witnesses:

BELLE TIERNEY,  
THERESA SUEME.