

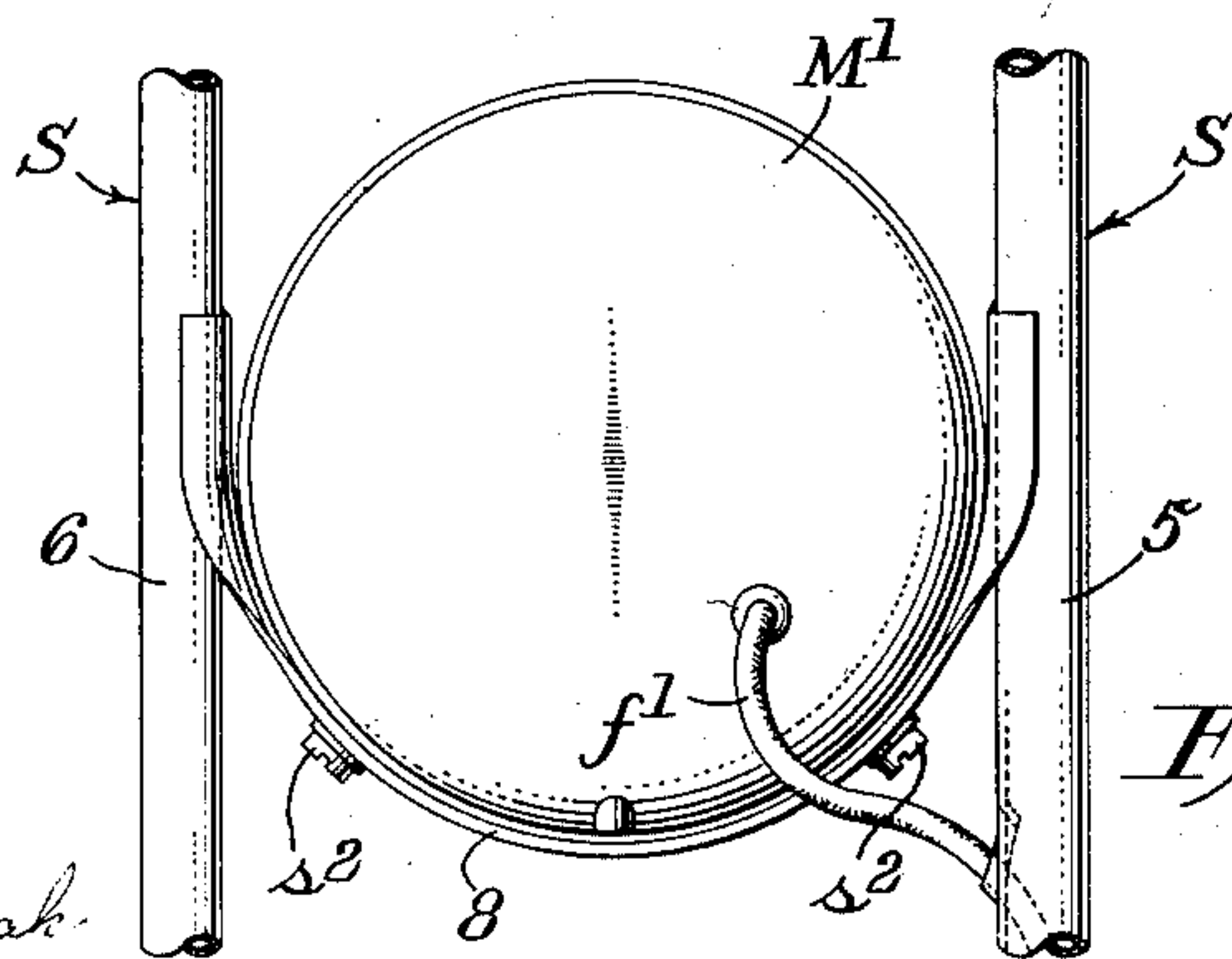
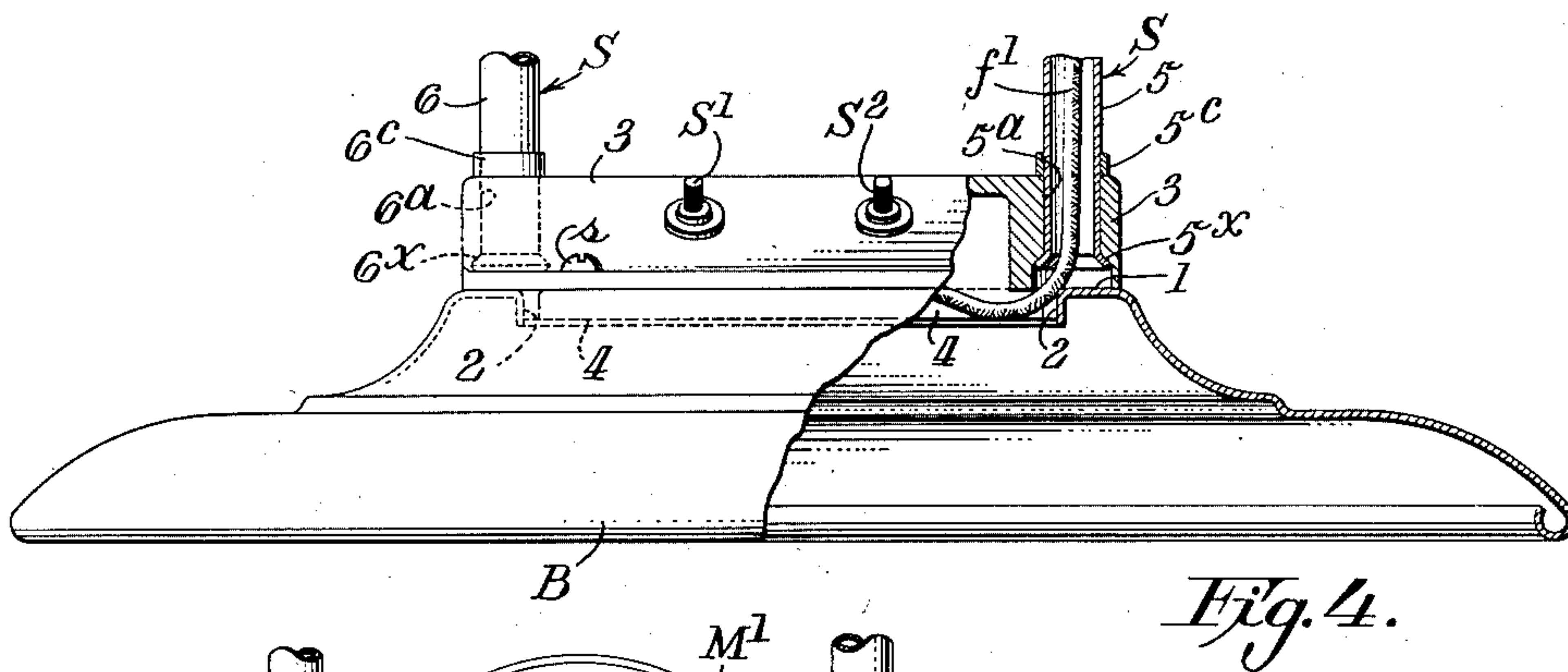
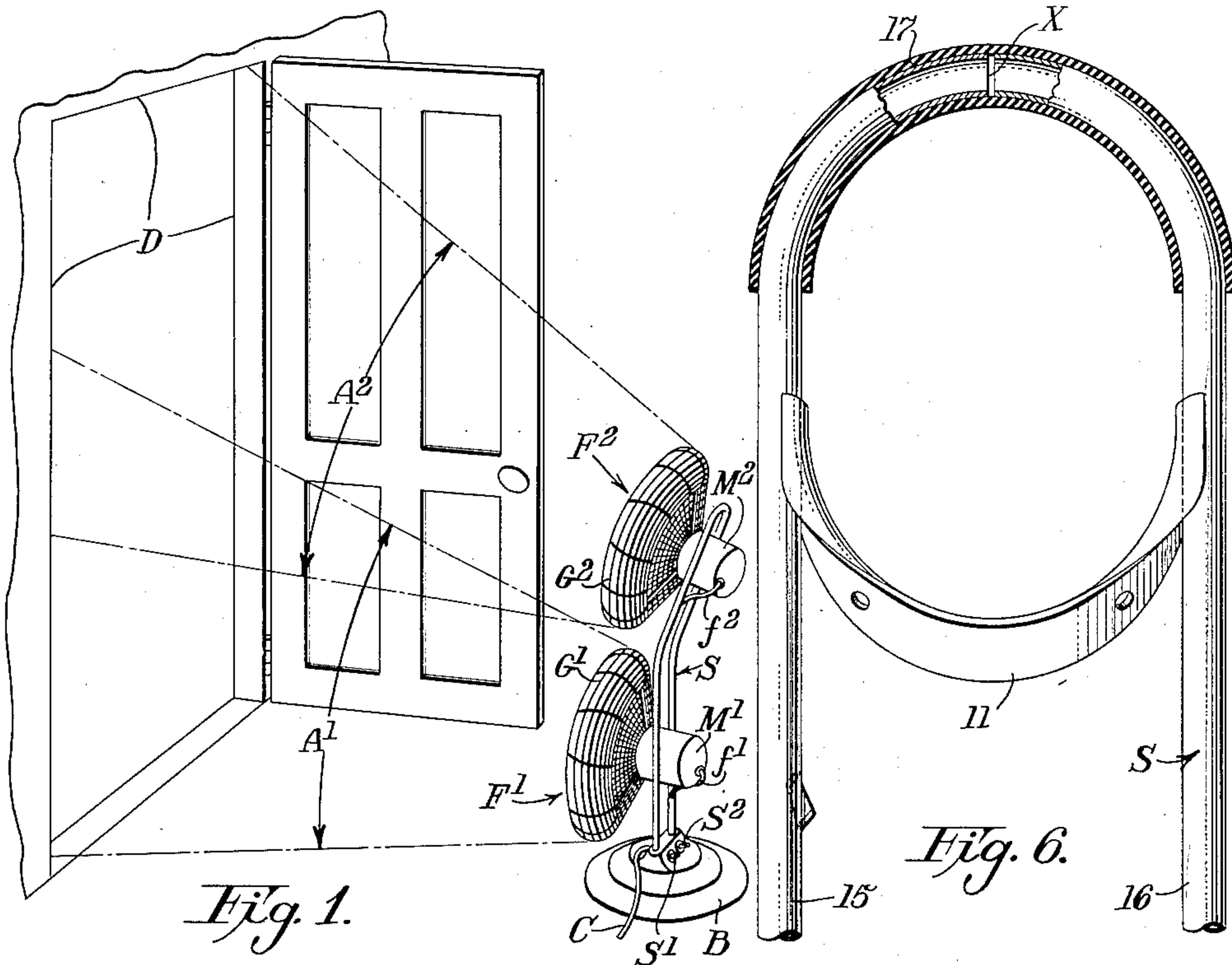
Jan. 27, 1953

E. P. TURNER
VENTILATING DEVICE

2,626,742

Filed July 27, 1950

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

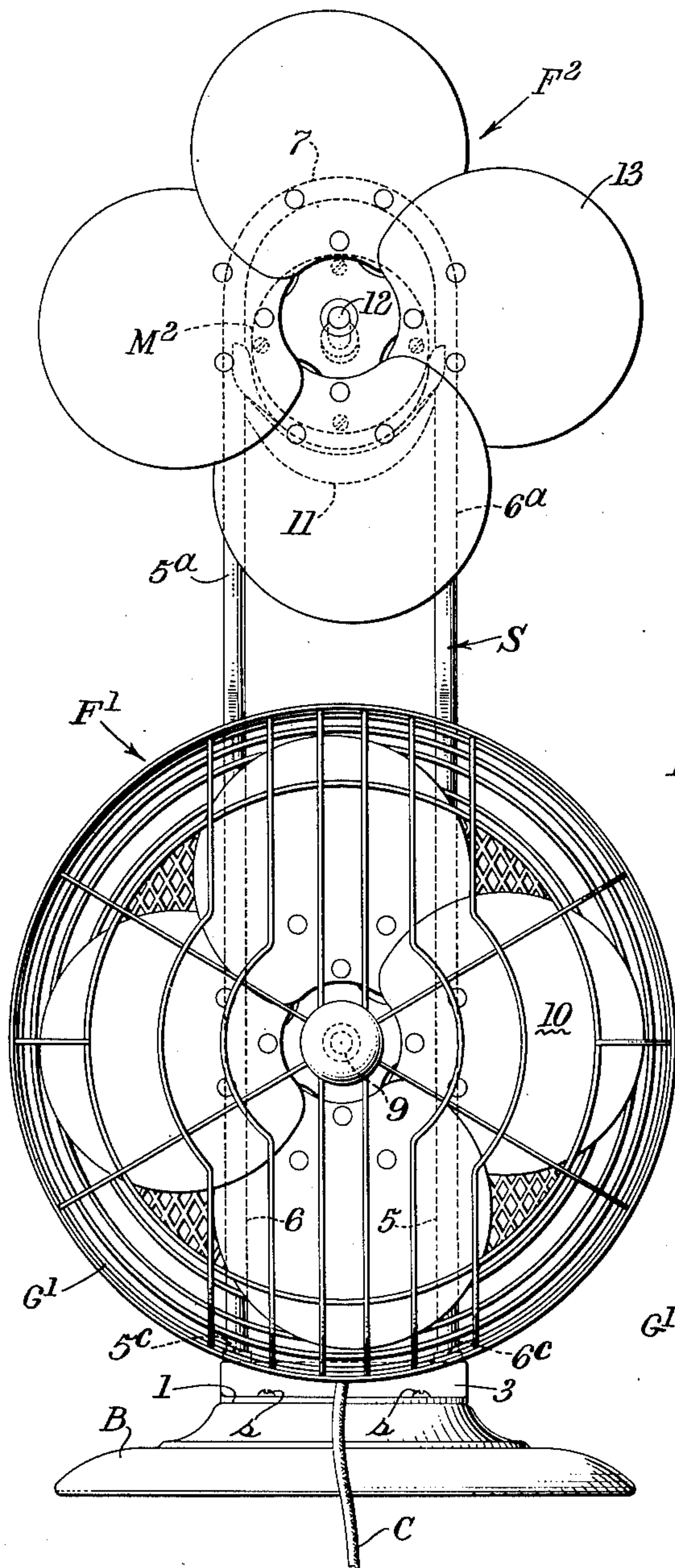


Fig. 3.

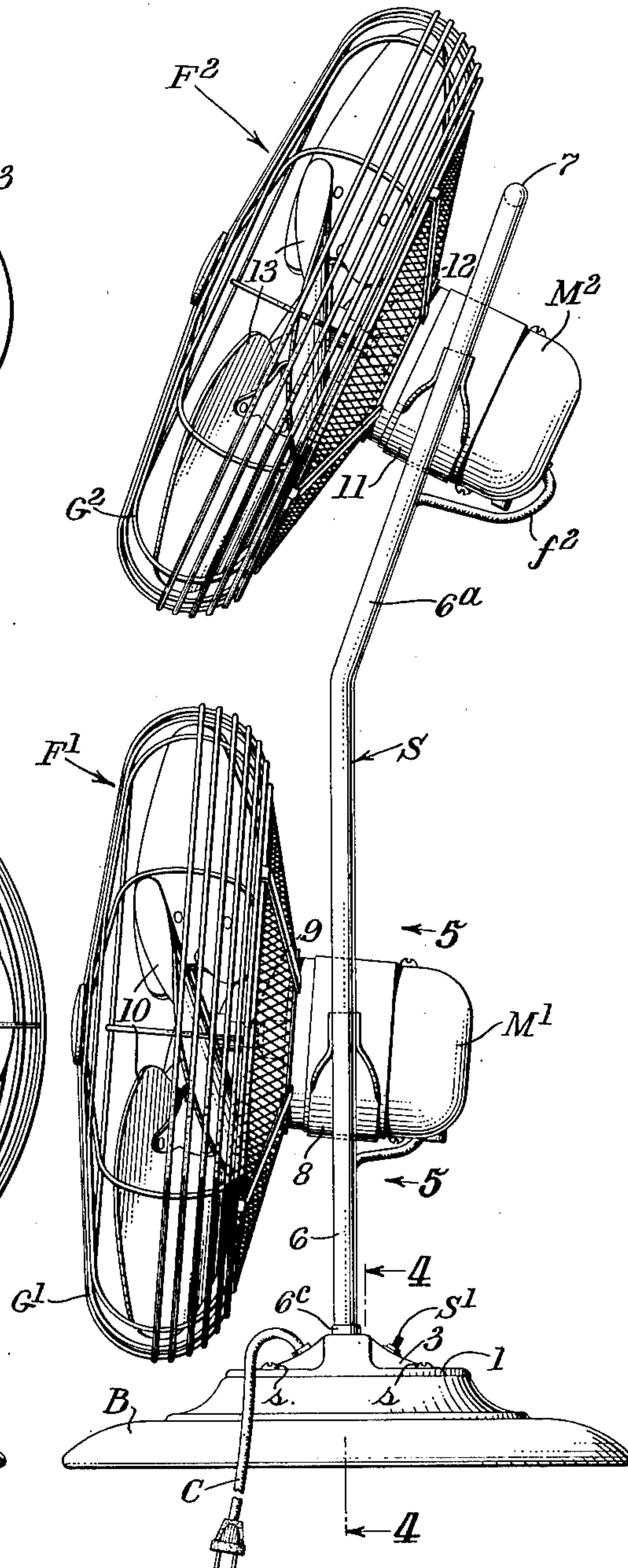


Fig. 2.

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UNITED STATES PATENT OFFICE

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VENTILATING DEVICE

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This invention relates to ventilating devices and it has as a primary object to provide a simple and inexpensive device capable of ventilating and cooling an entire residence.

In recent years there have been developed ventilating systems for homes, comprising large capacity ventilating fans designed to be permanently installed in the attic of the home and adapted to discharge to the outside air large volumes of air at a rapid rate. When so installed the fans are usually operated in the evening after the temperature of the outside air has dropped and serve to draw in, through the windows and doors of the rooms below, vast quantities of cool air and eject it from the attic, thereby carrying off the heated air from the rooms below and the attic and materially lowering the temperature within the home. Such installations, although expensive, are quite satisfactory for single dwellings where the occupant has control of the entire building, and especially in residences which are owner occupied and the installation is permanent and therefore the rather high cost thereof is justified. However, such systems have not been practical for apartment dwellers or for persons occupying rented houses.

This invention has as an object to provide a portable ventilating device capable of moving vast quantities of air at a rapid rate and so to construct and arrange the device that it will produce results equal or superior to the built-in attic type ventilating systems and which will be practical for apartment dwellers and others not desiring to assume the cost of attic installations.

Another object of the invention is to provide a ventilating device which is relatively quiet in operation and which, because of its portability, may be used in many ways other than as the equivalent of an attic ventilator and which, additionally, may be used as a conventional electric fan when desired.

These objects have been attained by the provision of a ventilating device comprising a pair of relatively quiet electric fans mounted on a single support and so arranged that their air streams will overlap and combine to produce a single blast of air which, in cross section, is materially higher than its width. When the ventilating device is placed at a distance from and facing a conventional doorway, the blast will completely fill the doorway. When placed in front of a doorway with the back of the fans open to a cooling atmosphere, the device will force cool

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air through the doorway and prevent any recirculation of air back through the doorway. Because of the velocity of the blast, pressure will be built up at the opposite side of the doorway and if windows or doors at that side of the doorway are open to the atmosphere the cool air from the fans will pass through the rooms and be discharged to the atmosphere, picking up and carrying with it the heat from the rooms.

A further object of this invention is to render available a device capable of providing in an average residence, a circulatory cooling system whereby a gentle flow of air may be effected through an entire floor of the residence without introducing any additional air from the outside. This is particularly desirable where the temperature of the air within the residence is lower than the temperature of the outside air and it is desired to create a movement of the air within the residence to obtain the cooling effect of moving air currents without the necessity of sitting in the direct blast of an air fan.

This may be effected by the present device by opening the doors connecting the various rooms, closing all windows, placing the ventilating device at the proper distance from one of the doorways with the combined blasts of the two fans passing through and completely filling the area of the doorway. Thus air will be drawn from the room containing the device, discharged into the adjoining room from which it flows through the open doorways and other rooms back to the first named room to be recirculated. While this use may not be possible in every residence due to the arrangement of rooms, it will be found practicable in many homes and in such homes will create a gentle flow of air through the rooms and a feeling of comfort without the annoying effects of air blasts.

It is recognized that it is not broadly new to mount two electric fans with their air streams blowing in substantially parallel paths but it is believed to be new to provide a ventilating device employing two electric fans arranged one above the other and so arranged that their air streams will overlap and combine and produce a single blast of air capable of completely filling a doorway and preventing any back flow of air through the doorway.

As used in this specification, the term "doorway" is intended to mean an average doorway as found in the average residence, such, for example, as one measuring in the neighborhood of three feet in width and seven feet in height.

The term "at a distance," as referring to the

spacing of the ventilating device from a doorway, is intended to mean in the neighborhood of five or six feet.

The fact that the ventilating device is set at a distance from the doorway, it permits normal passage of persons through the doorway without interference.

Drawings depicting a preferred form of my invention are annexed as a part of this disclosure, and in such drawings, Fig. 1 is a diagrammatic perspective view illustrating the improved ventilating device placed before a doorway and showing how the air streams from the two fans overlap and combine to produce a single air blast filling the entire doorway.

Fig. 2 is a side elevation of the improved ventilating device.

Fig. 3 is a front view thereof, with the guard for the upper fan omitted.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2, with a portion thereof shown in elevation.

Fig. 5 is a detail view looking in the direction indicated by the arrows 5, 5 in Fig. 2, showing the means for supporting one of the fan motors.

Fig. 6 is a detail view of the upper portion of the standard showing a modified construction designed to reduce vibration and noise during the operation of the device.

Referring more specifically to the drawings, and first to Figs. 1 to 5, inclusive, the invention is disclosed as embodied in a portable ventilating device comprising a base B, a standard S secured to and rising from said base and a pair of electric fans F^1 , F^2 mounted on the standard with their axes at an angle to each other. Inasmuch as it is desirable to have the device of minimum weight, so as to be readily portable, the base is preferably made of a first spun sheet metal member of circular form having an upper flat surface 1 and a central opening 2. A second cast aluminum base member 3 rests upon the surface 1 and has a depending portion 4 fitted within the opening 2. Screws s secure the two base members together. The base member 3 also serves as a terminal box for housing motor control switches S^1 and S^2 and for connecting a current conductor C, adapted to be connected to any suitable source of current, to leads f^1 and f^2 which, in turn, are connected, respectively, to electric motors M^1 and M^2 comprising the driving means of the fans F^1 and F^2 .

The standard S is preferably of inverted U-shape and is made of hollow tubing comprising substantially vertical lower leg portions 5 and 6, which are spaced apart and fitted into bores 5^a , 6^a in the base member 3, and upper portions 5^b , 6^b which, as shown most clearly in Fig. 2, are inclined rearwardly at an angle of about twenty degrees to the lower vertical portions. A rounded portion 7 connects the upper portion 5^b , 6^b . The legs 5 and 6 have secured thereto collars 5^c and 6^c , respectively, which rest upon the base member 3. The legs are secured in the member 3 by having their lower ends flared outwardly below the bores 5^a , 6^a as illustrated at 5^x , 6^x in Fig. 4.

Mounted between the vertical leg portions 5 and 6 of the standard and secured thereto by any suitable means, such for example, as by welding, is a sheet metal cradle 8 in which is secured, as by screws s^2 , the casing of the electric motor M^1 . This motor is mounted with its axis substantially horizontal and the rotary shaft 9 thereof has secured to its projecting end, fan blades 10 which, in their rotation, produce a conical

blast of air forwardly of the fan F^1 . Likewise secured between the rearwardly inclined upper portions 5^b , 6^b of the standard is a similar cradle 11 which supports the motor M^2 . This motor is mounted with its axis substantially normal to the upper portion of the standard and its rotary shaft 12 carries fan blades 13 which, in their rotation, produce a conical blast of air forwardly of the fan F^2 . The blades 10 and 13 are enclosed within suitable guards G^1 and G^2 supported by the motor casings.

Either of the switches S^1 and S^2 may be closed independently of the other when it is desired to use either fan F^1 or F^2 separately, as an ordinary electric fan, or they may both be closed to cause simultaneous operation of both fans as when the device is used for ventilating purposes.

Fig. 6 illustrates a modification of the standard S. In the construction shown in this figure the general outline of the standard is the same as above described but the spaced legs 15 and 16 thereof are separated at their upper ends by a space designated as X. This separation of the two legs breaks up vibrations set up by the motors M^1 , M^2 and thereby reduces the noise normally caused by such vibrations. A covering of vibration dampening and sound deadening material, such, for example, as a rubber tube 17 is placed over the adjacent upper end portions of the legs 15 and 16 to maintain those portions in fixed relation to each other and to dampen such vibrations as may be set up in the legs.

Fig. 1 illustrates my improved device as used to ventilate a residence or other building. The device is placed on the floor at a distance, in the neighborhood of five or six feet, in front of an open doorway D and both fans are started. It will be seen that the lower fan F^1 creates a blast of air A^1 which is of conical shape and which completely fills the lower half of the doorway from the floor to above the center of the doorway. A similar conical blast of air A^2 , from the upper fan F^2 , completely fills the upper half of the doorway and overlaps and combines with the blast of air A^1 . Thus the combined air streams completely fill the entire area of the doorway and in passing therethrough prevent any back flow or recirculation of air through the doorway.

It is to be understood that when using the device to expel heated air from a residence it will be so set up relative to the doorway and to the outside air that the air stream forced through the doorway and into the residence will be at a lower temperature than the air within the residence beyond the doorway. Thus, by opening the doors and windows within the residence beyond the doorway D, the air stream may quickly force the heated air out of the house and replace it with air at a lower temperature.

As an example, when employing sixteen inch fans driven by one-fortieth horsepower motors, the combined output of the fans F^1 and F^2 , plus the air that will be induced into the air stream by the pressure differential will be approximately 4000 cubic feet per minute. Thus a two story house, thirty feet by forty feet, having 8 ft. 6 in. ceilings and containing approximately 20,000 square feet of air space may, with the use of this ventilating device, have a complete change of air every five minutes.

After the heated air has been driven from the building and the flow of cool air has sufficiently cooled the walls and the contents of the rooms, it may be desired to reverse the flow of air so that a constant inward flow of cool air will be

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had through bedroom windows throughout the night. This may readily be effected by replacing the ventilating unit on the opposite side of the doorway so that the air stream will flow through the doorway in the opposite direction. Then if the windows on the lower floor behind the unit are closed, and there be an opening to the outside forwardly of the device, cool night air will be drawn in through the open windows on the upper floor and down the stairwell to replace the air discharged from the lower floor.

Thus, in the morning, the temperature of the air in the house and the entire contents of the house will be substantially the same as the temperature of the cooler night air. The windows and doors may then be closed to keep out the warmer outside day air and the house will remain cool for hours. Even though the temperature within the house may be well within the comfortable range there may arise a feeling of mugginess due to the stillness of the air. This feeling may be dispelled by causing the ventilating device to set up a circulation of air within the house, as above described.

From the foregoing, it will be perceived that not only is the construction of this ventilating unit important but also important is its arrangement relative to a doorway so that the combined blasts of the two fans and the air induced into the air stream will completely fill the area of the doorway thereby preventing any back flow of air through the doorway and creating a reduced pressure behind the unit and an increased pressure beyond the doorway. It is by reason of these variations in pressure that this device may be used in the several ways hereinbefore described.

Having thus set forth the nature of the invention, what I claim herein is:

1. A ventilating device comprising a base; an upright standard rising from said base and including spaced legs having their lower ends secured to said base, said legs having upper transverse portions projecting toward each other but spaced apart slightly to prevent metal-to-metal contact therebetween; a covering of sound-deadening material enclosing said transverse portions and maintaining them in spaced relation; and a fan including an electric motor mounted between the spaced legs of said standard.

2. A ventilating device comprising a base; an upright standard rising from said base and having a substantially vertical lower portion and a rearwardly inclined upper portion, said standard comprising spaced leg members having their lower ends secured to said base and upper transverse portions projecting toward each other but spaced apart slightly to prevent metal-to-metal contact therebetween; a covering of sound-deadening material enclosing the upper transverse portions of said leg members and maintaining them in fixed positions relative to each other; a first fan including an electric motor mounted between the substantially vertical portions of said leg members; and a second fan including a second electric motor mounted between the rearwardly inclined portions of said leg members with its axis at an angle to the axis of said first electric motor.

3. A domestic ventilating device comprising a flat-bottomed base adapted to rest upon a horizontal floor at a distance from a conventional doorway; a standard rising from the base; and a pair of fan units each including a fan and a fan-driving motor, said fan units being substantially similarly trained and mounted one above

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the other upon said standard with the axes of rotation of said fans being located in a single plane disposed at right angles to the plane defined by the under surface of the flat-bottomed base and with the axis of rotation of the upper fan being inclined relative to such latter plane so that the blasts of air produced by said two fans will combine to produce a continuous flow of air through the entire area of the doorway.

4. A domestic ventilating device comprising a flat-bottomed base adapted to rest upon a horizontal floor at a distance from a conventional doorway; a standard rising from the base; and a pair of fan units each including a fan and a fan-driving motor, said fan units being substantially similarly trained and mounted one above the other upon said standard with the axes of rotation of said fans being located in a single plane disposed at right angles to the plane defined by the under surface of the flat-bottomed base, and with the axis of rotation of the lower fan being disposed in substantial parallelism with and the axis of rotation of the upper fan being inclined relative to such latter plane so that the blasts of air produced by said two fans will combine to produce a continuous flow of air through the entire area of the doorway.

5. A domestic ventilating device comprising a flat-bottomed base adapted to rest upon a horizontal floor at a distance from a conventional doorway; a standard rising from the base and having a lower portion disposed substantially at right angles to the plane defined by the under surface of said base and an upper portion inclined relative to such plane; and a pair of fan units each including a fan and a fan-driving motor, said fan units being substantially similarly trained and mounted one above the other upon said standard with the axes of rotation of said fans being located in a single plane disposed at right angles to the plane defined by the under surface of the flat-bottomed base, the upper and lower fan units each being respectively mounted upon the upper and lower portions of said standard with the axis of rotation of each fan being disposed substantially at right angles to its associated portion of said standard so that the blasts of air produced by said two fans will produce a continuous flow of air through the entire area of the doorway.

6. A domestic ventilating device comprising a flat-bottomed base adapted to rest upon a horizontal floor at a distance from a conventional doorway; an inverted U-shaped standard rising from and having its two end portions secured upon said base, the lower portion of said standard being disposed at right angles to the plane defined by the lower surface of said base while the upper portion of said standard is inclined relative to such plane; and a pair of fan units each including a fan and a fan-driving motor, said fan units being substantially similarly trained and mounted one above the other between the two legs of said standard with the axes of rotation of said fans being located in a single plane disposed at right angles to the plane defined by the under surface of the flat-bottomed base, the upper and lower fan units each being respectively mounted upon the upper and lower portions of said standard with the axis of rotation of each fan being disposed substantially at right angles to its associated portion of said standard so that the blasts of air produced by said two fans will produce a continuous flow of air through the entire area of the doorway.

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7. A domestic ventilating device comprising a flat-bottomed base adapted to rest upon a horizontal floor at a distance from a conventional doorway; an inverted U-shaped standard rising from and having its two end portions secured upon said base, the lower portion of said standard being disposed at right angles to the plane defined by the lower surface of said base while the upper portion of said standard is inclined at approximately twenty degrees from the lower portion; a pair of semi-circular cradle straps each respectively mounted upon the lower and upper portions of said standard with its two end portions each secured to a respective one of the two standard legs; a pair of fan units each including a fan and a fan-driving motor, said fan units being substantially similarly trained and mounted one above the other between the two standard legs and with each motor secured directly to one of the two cradle straps so that the axes of rotation of the fans are located in a single plane disposed at right angles to the plane defined by the under surface of the flat-bottomed base and so that each of such axes is

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disposed at right angles to its associated portion of said standard whereby the blasts of air produced by said two fans will produce a continuous flow of air through the entire area of the doorway.

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