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C. M. ASHLEY

2,012,179

MEANS FOR INDUCING AND DISTRIBUTING AIR CURRENTS

Filed June 25, 1930

Fig. 1.

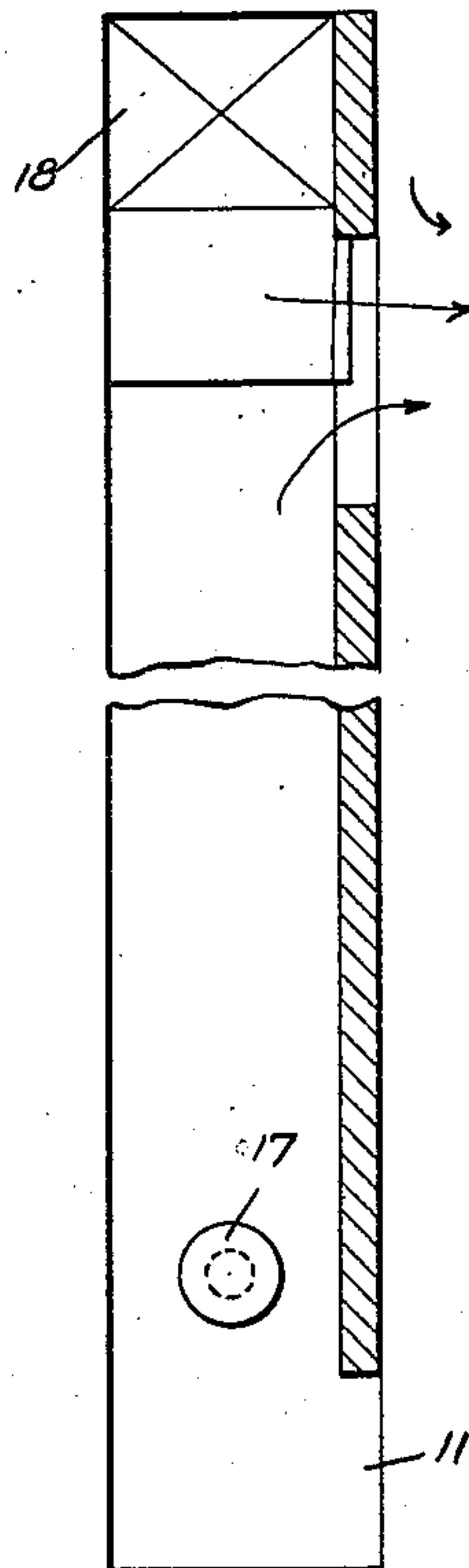


Fig. 2.

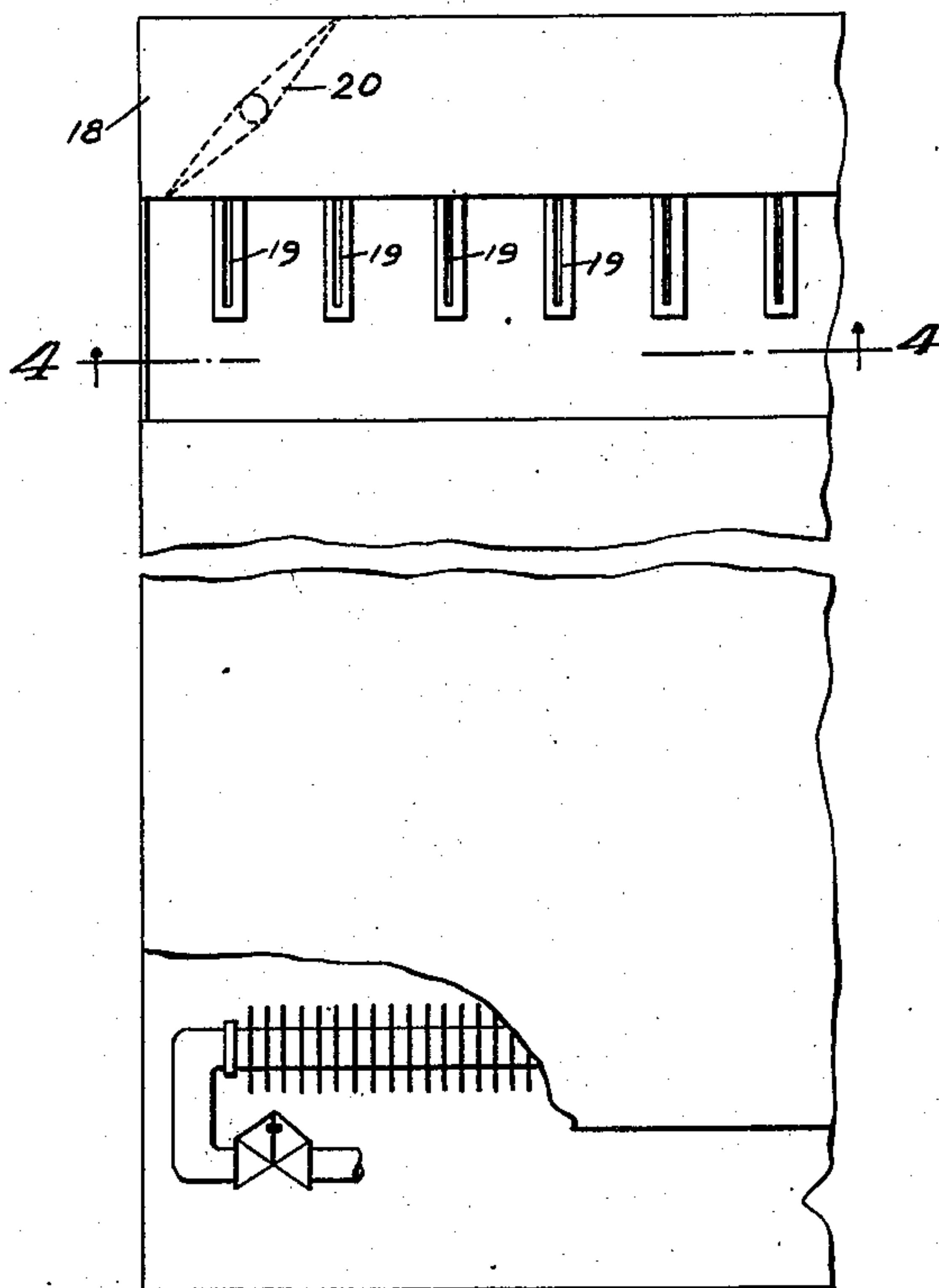


Fig. 3.

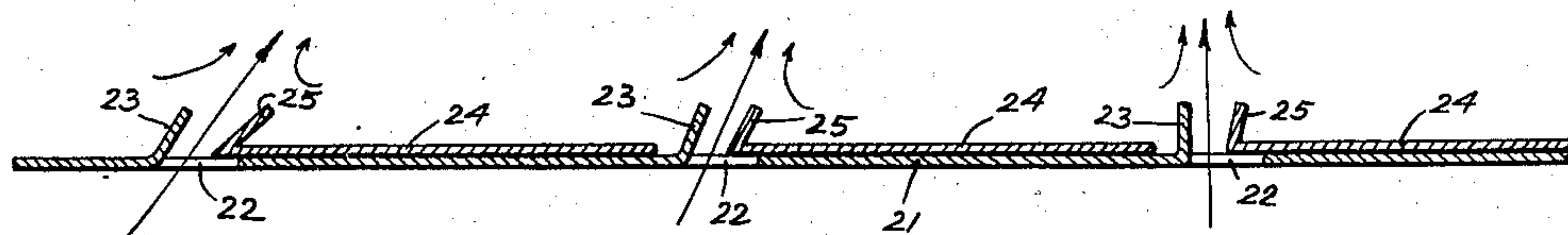


Fig. 4.

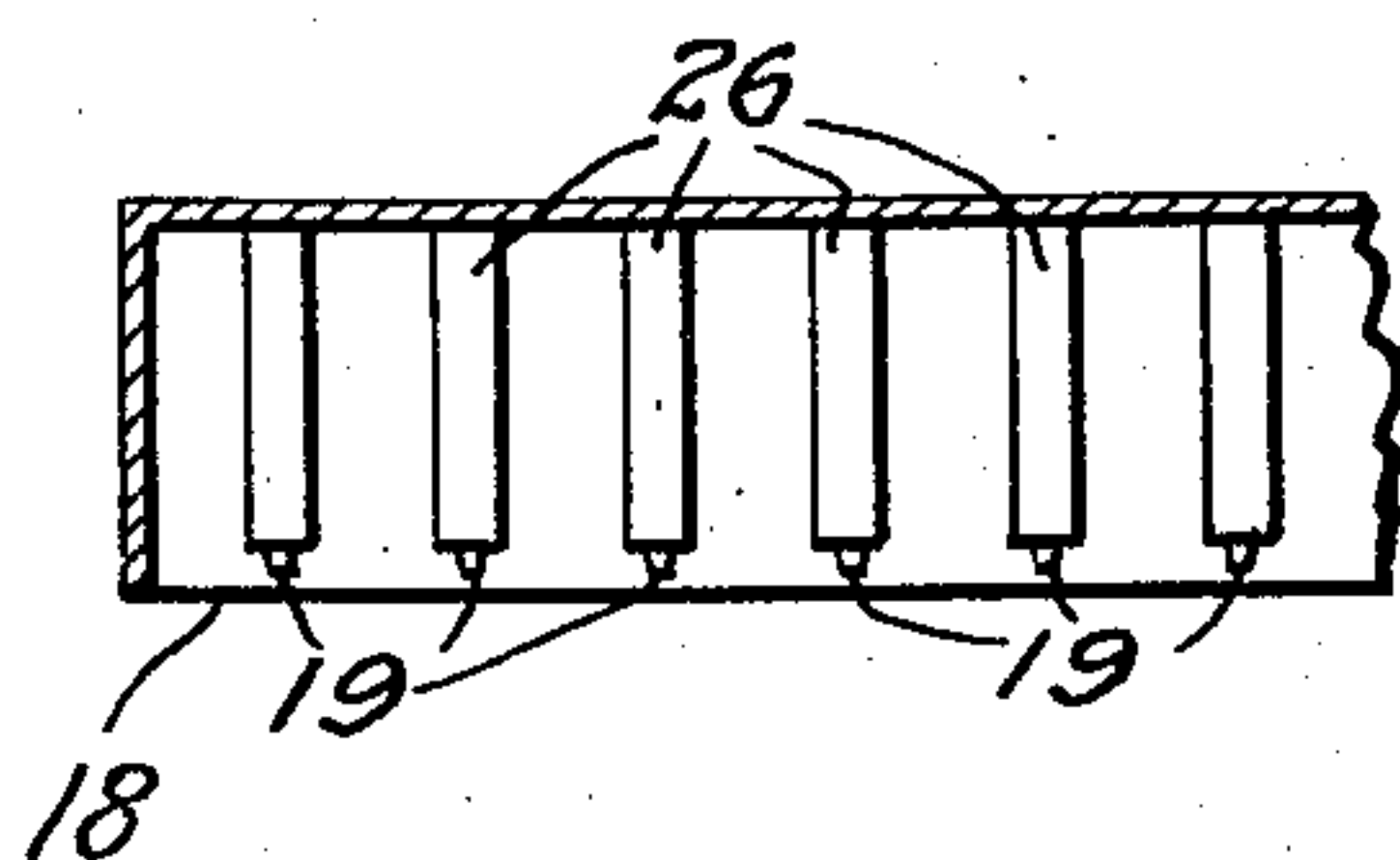
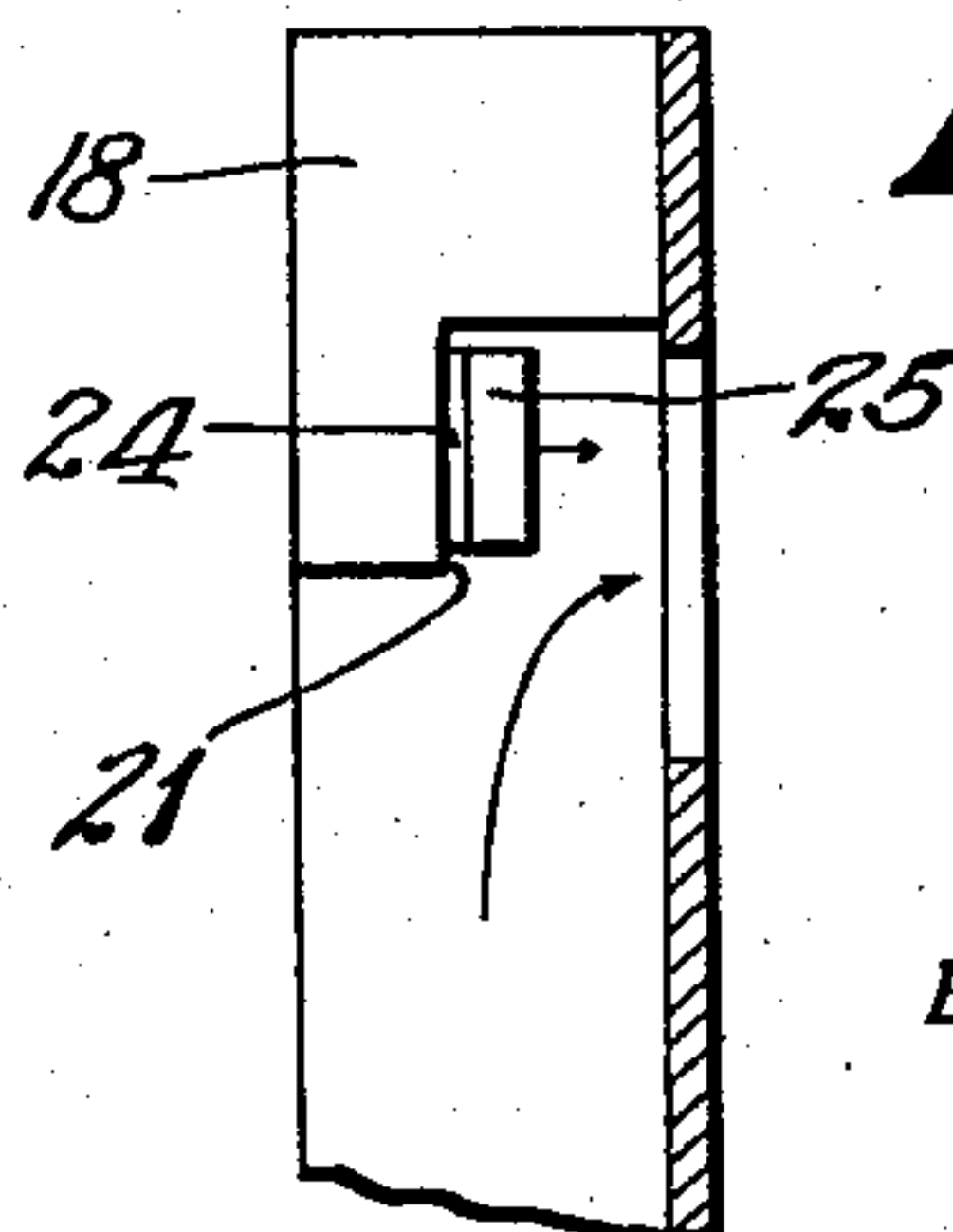


Fig. 5.



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MEANS FOR INDUCING AND DISTRIBUTING
AIR CURRENTSCarlyle M. Ashley, South Orange, N. J., assignor
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Application June 25, 1930, Serial No. 463,636

1 Claim. (Cl. 98—37)

This invention relates to improved methods and apparatus for air conditioning and ventilating enclosures, and is more particularly directed to means for distributing air volumes and effecting desired air circulation.

The general object of the invention is to provide systems wherein induced currents of air will be effectively mixed with conditioned air, or air from any desired source, and discharged in one or more streams directionally controlled.

A feature of the invention resides in the provision of a nozzle in combination with a restricted passage, whereby the discharge of air from the nozzle will produce related air currents. The passage may be constricted at one or more points and its interior conformation may be arranged to impart a desired directional effect to an air mixture discharged from the passage. So also, the nozzle or nozzles may be variously positioned within the passage so that air emission from the nozzles may be carried on at varying angles within the passage. As a result, the combination of differently shaped constricting passages and variously positioned nozzles, make possible the production of currents of air whose velocity and directional effect will differ to meet varying requirements of air volume and air distribution.

A further feature embraces the use of an adjustable nozzle whose discharge orifice may be enlarged or restricted, and whose enclosing sides may be adjusted to control the angle of discharge of a volume of air from the nozzle. Consequently, by adjusting the nozzle opening, the velocity through the nozzle may be varied, and by regulating the interposition of the adjustable members forming the nozzle, the angle of discharge may also be controlled.

Another feature covers the use of a plurality of openings individually adjustable and adjustable with respect to one another. In consequence, a plurality of streams of air may be simultaneously discharged from a single passage to serve a given area, each of the streams pursuing a different direction to effect a circulation of air having a desired relation with respect to the circulation of air in an adjacent zone or area. Drafts and streaks, as well as other uneven conditions in the atmosphere served, may thus be avoided or eliminated by proper adjustment of the related openings. Further, direct discharge may be carried on from a source of conditioned air, without creating a turbulent atmosphere, in that the arrangement of openings permits an adjustment of each of the openings, in size, as well as in capacity for directional dis-

charge control. Thus, a plurality of streams of air are controlled both in volume, velocity, and directional capacity, to effectively regulate conditions within an area or within different parts of the same area.

Other features and objects covering advantages in design and structure will further be noted from the following description or illustrative forms of the invention, to be read in connection with the accompanying drawing, in which

Fig. 1 is a fragmentary side view, in section, of a unit shown in Fig. 2,

Fig. 2 is a fragmentary view, diagrammatic in form, showing a unit having ports,

Fig. 3 illustrates an arrangement of discharge ports of the character used in the unit of Fig. 5,

Fig. 4 is a plan view of the unit shown in Fig. 2, looking upwardly on the line 4—4 thereof,

Fig. 5 is a fragmentary side view, in section, illustrating a modified form of the upper part of the unit of Fig. 1. The construction is substantially the same, except that the discharge ports of Fig. 3 are shown as used in the unit.

In Figs. 1 and 2, a unit, made of wood or steel and adapted to be variously positioned within an enclosure to be ventilated, is employed. This unit may include a heater coil 17 for tempering induced air drawn through opening 11. This coil may be of any suitable type and positioned within the unit in any desired manner. Duct 18 supplies air from any desired source to a series of slots or slotted openings 19. The duct or supply header may be provided with a damper 20 for controlling the air volume supplied to the discharge openings. By the use of these openings, conditioned air, for example, supplied from duct 18 will be discharged in a plurality of streams and induced air will be discharged between said streams. Also, the discharge from the slots will induce currents outside of the unit which will mix with those discharged from the unit. The effectiveness of distribution is increased by having the width of the slots or slotted openings much less than the space between the slots or slotted openings. This space will permit air induced within the unit to pass between the streams discharged from the openings and mix with them. Consequently, cold, dehumidified air may, for example, be discharged through the slotted openings directly within the audience zone of a theatre or the like. This discharge through slotted openings will not create streaky or turbulent air conditions in that the induced air dis-

charged between the streams from the unit and induced outside the unit by reason of the discharge will cause a mixture at a comfortable temperature. The use, therefore, of a plurality of slotted openings at prescribed spaced intervals from each other enables the direct discharge of cold, conditioned air without reheating. Any number of slotted openings may be used, and while they are illustrated as positioned in line with one another, no limitation is made with respect to their number or their positioning with respect to one another. In Fig. 3 is illustrated one arrangement of slotted openings of the character adapted to be used in the unit of Fig. 5. In this arrangement, a main plate or element 21 is provided with a plurality of openings 22. At each of the openings is provided an extension or baffle 23. Thus, air discharged through openings 22 will be controlled in direction by the inclination of baffles 23. As shown, these baffles may be at different angles to the main plate and hence cause the discharge of air in different directions. Supplementary plates 24, slidably positioned with respect to the main plate, may be moved to restrict or enlarge the openings 22. As a result, each of the openings may be individually regulated in size. Furthermore, each of the plates 24 has an extension or baffle 25 similar to baffle 23. These baffles 25 may also be variously shaped and at different angles with respect to plates 24. As a result, baffles 23 and 25 at each of the openings will control the direction of air discharge as well as volume. It may be noted that by moving any of plates 24, individual openings may be adjusted, whereas by moving the plate 21, all of the openings will be simultaneously adjusted.

Fig. 4 shows in detail the manner of feeding air from duct 18 to slotted discharge openings 19 illustrated in Figs. 1 and 2. The view is on line 4—4 of Fig. 2 looking upwardly, and it may be noted that the air feeds from duct 18 downwardly into a series of distributing channels 26, each channel being provided with a slotted discharge opening 19. The spaces between the distributing channels 26 are for the passage of recirculated air entering the unit at 11, as illustrated, the recirculated air being induced within the unit by the discharge of primary air through slotted discharge openings 19. The re-

circulated air passes out of the unit in a plurality of streams alternating with the streams discharged from the slotted openings, with the result that a mixture of primary air and recirculated air is formed and discharged within the room.

Fig. 5 shows one way of applying the discharge ports of Fig. 3 to the unit shown in Fig. 1. When the arrangement of Fig. 3 is employed, the duct 18 will extend downwardly into the unit as illustrated in Fig. 5 and present a face for accommodating the arrangement of ports shown in Fig. 3. Thus, the face of the unit itself provides the main plate or element 21 having a plurality of openings 22. Supplementary plates 24 having extensions or baffles 25, are slidably positioned on the main plate 21. The discharge of air through the openings 22 induces a current of recirculated air which enters the unit through opening 11. The primary air discharged through openings 22 mixes with the recirculated air to form a mixture of primary and recirculated air, which enters the area served by the unit. As already noted, the baffles at each of the openings 22 will control the direction of air discharge and by adjusting the position of supplementary plates 24 with respect to main plate 21, the volume of air discharged will also be controlled.

The arrangements shown in the drawing are intended to be illustrative only of applicant's invention, and any analogous means capable of carrying out the objects hereof are intended to be within the purview of the specification and scope of the claim.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

In combination with a conduit, a nozzle member for controlling the volume and direction of discharge of a fluid from said conduit comprising a plate provided with openings, a lip projecting outwardly from one side of each opening, a series of plates closely adjacent to the first mentioned plate, a lip extending from one end of each plate of the series and positioned adjacent one side of each opening opposite said first mentioned lips, the plates of said series being slidably adjustable with respect to the first mentioned plate and with respect to each other.

CARLYLE M. ASHLEY.