March 29, 1938. H. F. SCHMIDT 2,112,608

SOUND ABSORBING STRUCTURE

Filed May 20, 1936 6 Sheets-Sheet 1

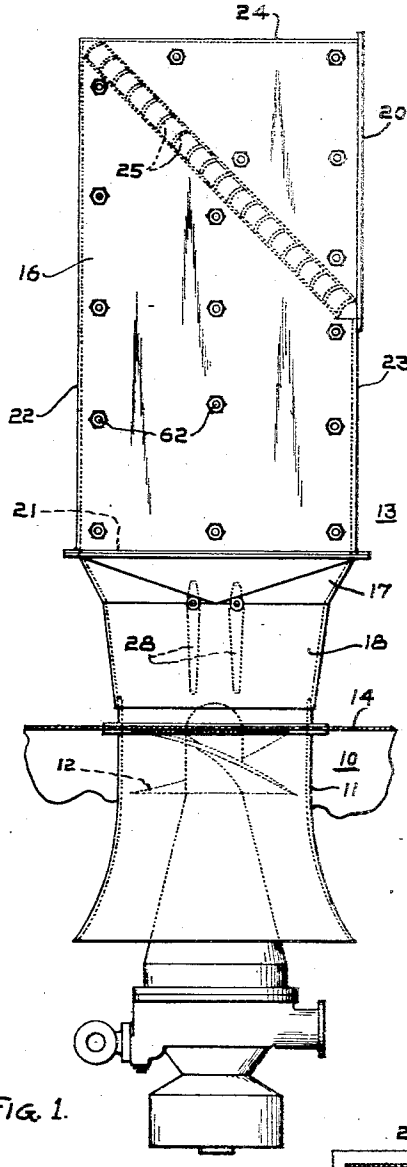


FIG. 1.

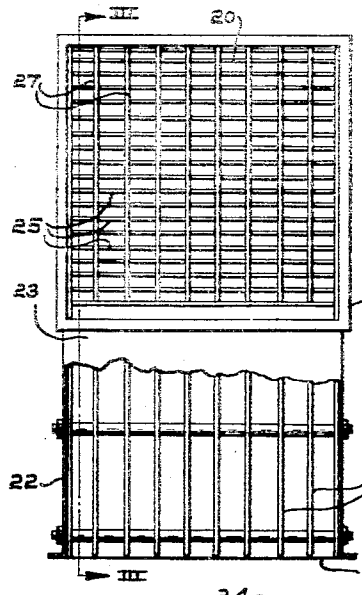


FIG. 2.

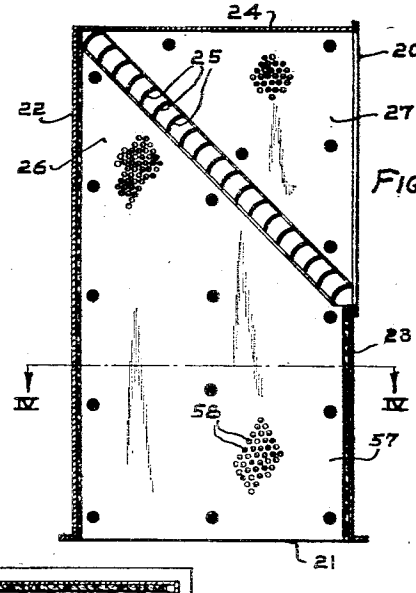


FIG. 3.

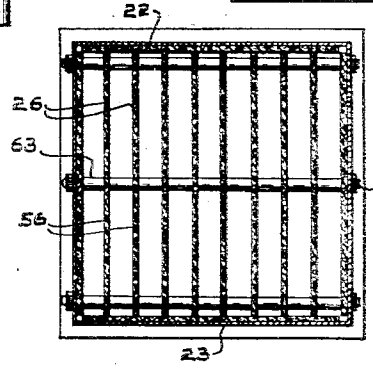


FIG. 4.

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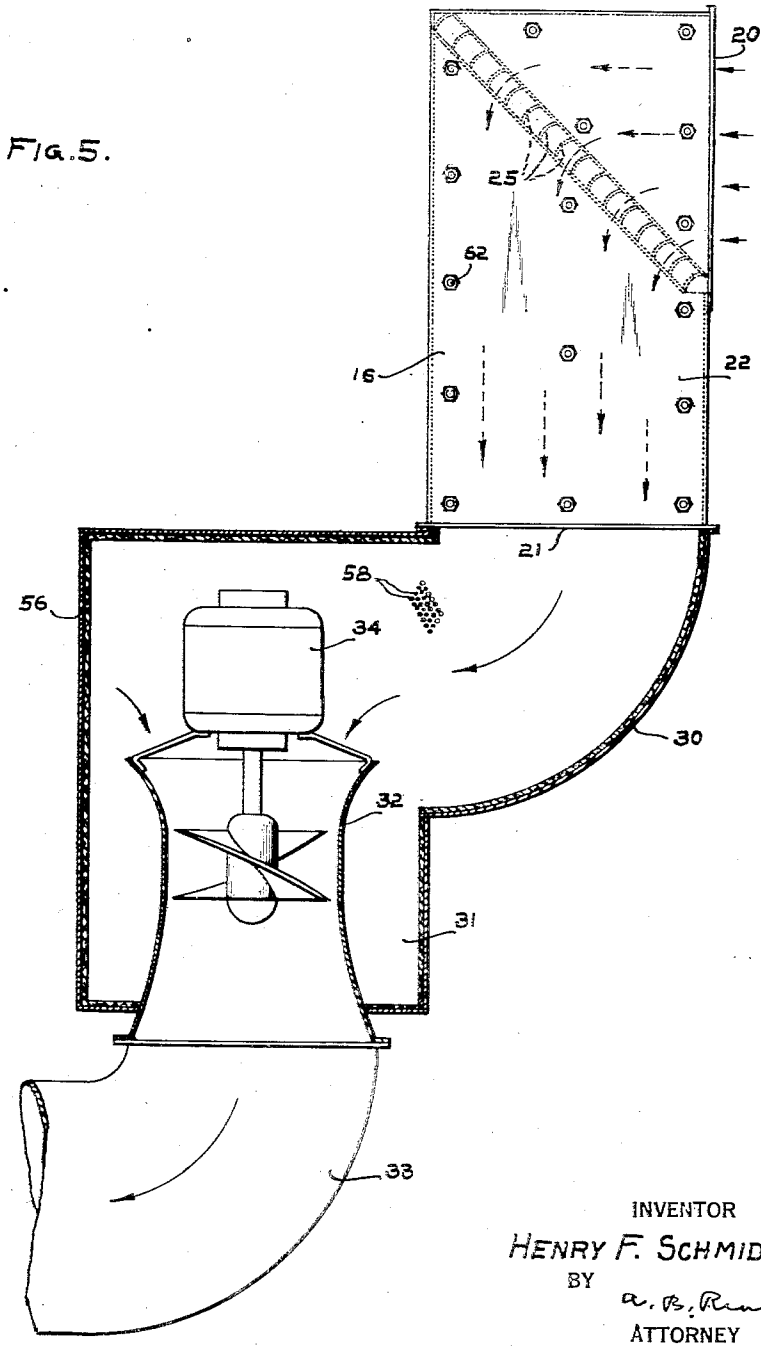
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SOUND ABSORBING STRUCTURE

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FIG. 5.



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SOUND ABSORBING STRUCTURE

Filed May 20, 1936 6 Sheets-Sheet 3

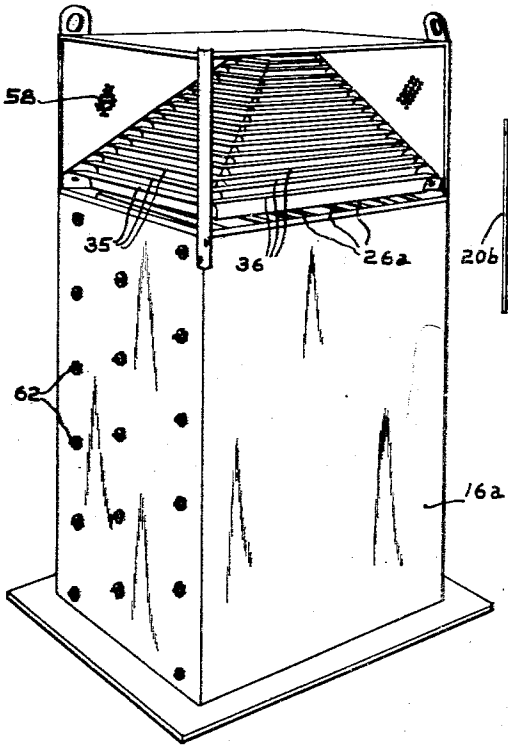


FIG. 6

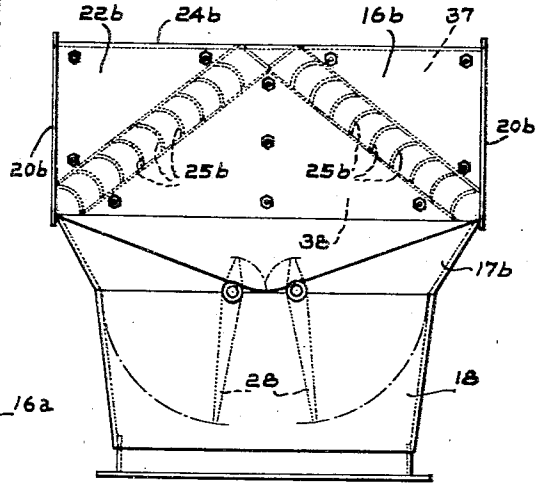


FIG. 7.

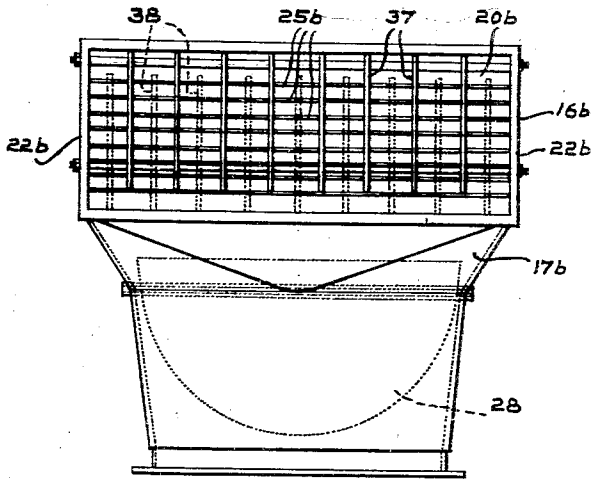


FIG. 8.

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SOUND ABSORBING STRUCTURE

Filed May 20, 1936 6 Sheets-Sheet 4

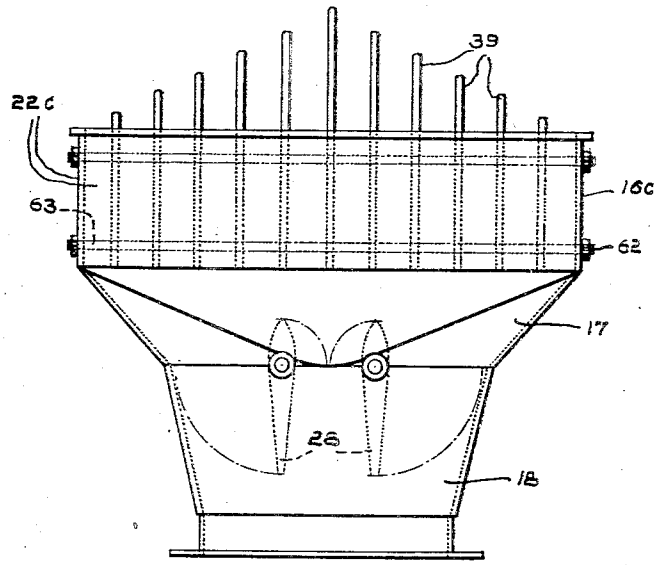


FIG. 9

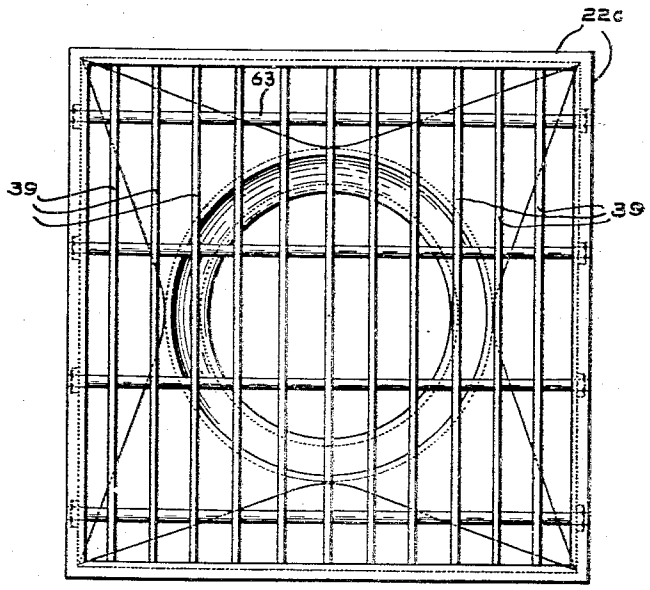


FIG. 10

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SOUND ABSORBING STRUCTURE

Filed May 20, 1936 6 Sheets-Sheet 5

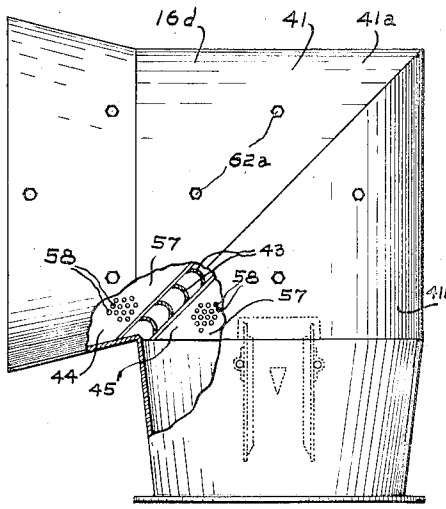


FIG. 11.

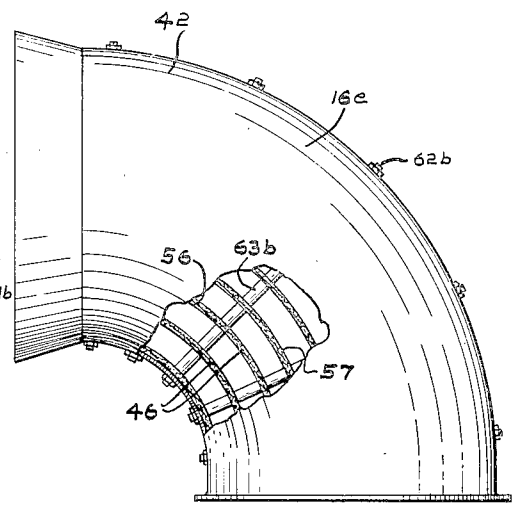


FIG 12.

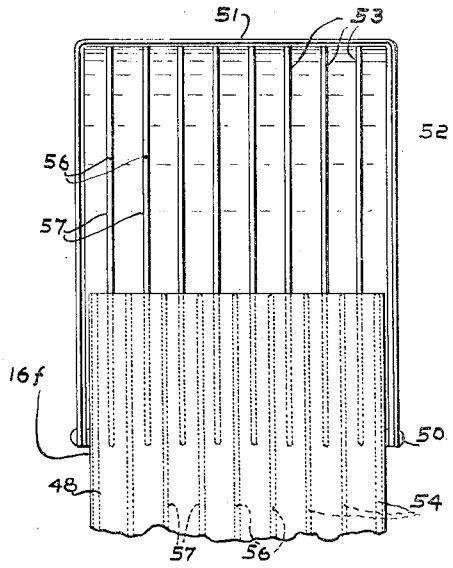


FIG. 13.

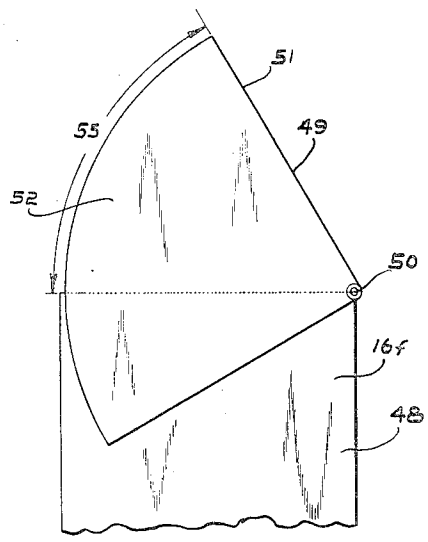


FIG. 14.

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SOUND ABSORBING STRUCTURE

Filed May 20, 1936 6 Sheets-Sheet 6

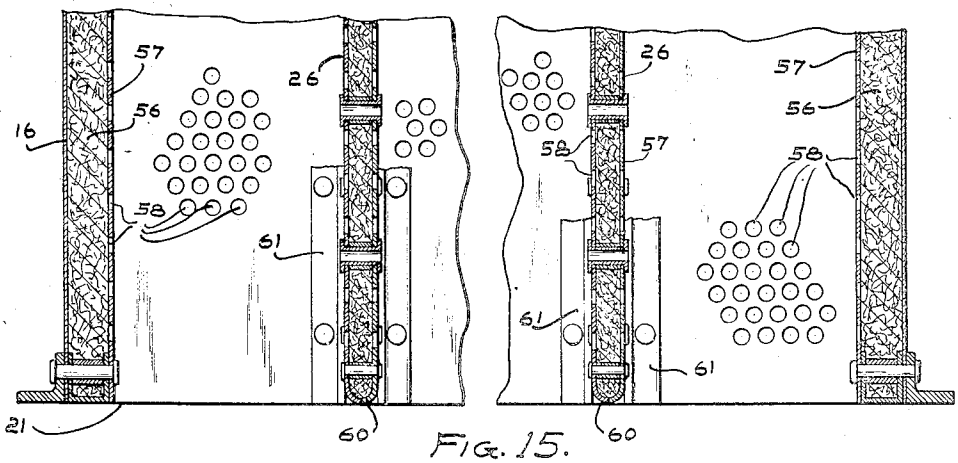


FIG. 15.

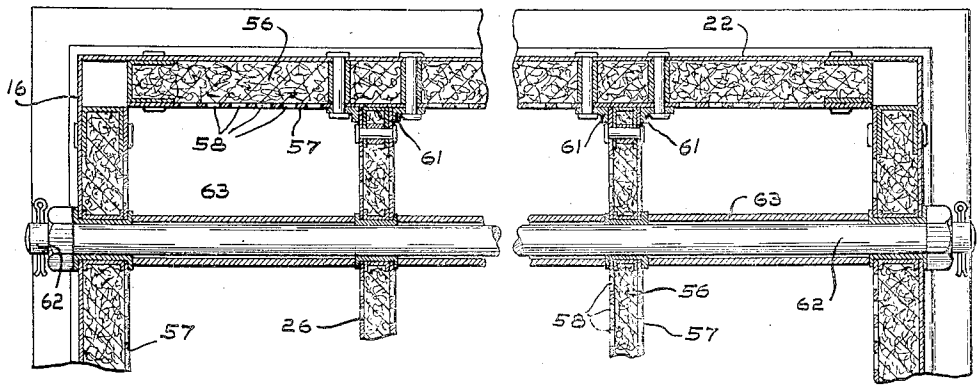
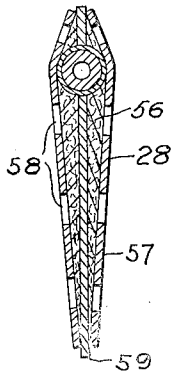


FIG. 16.

FIG. 18



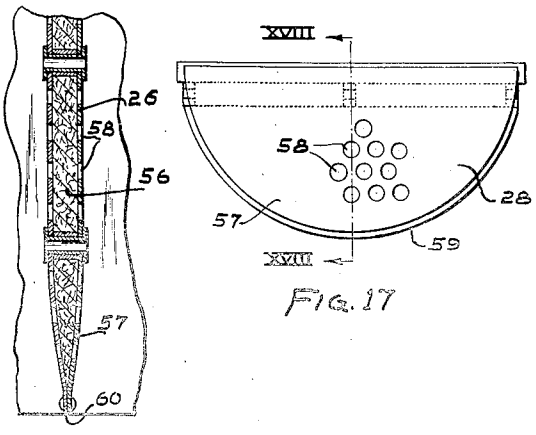


FIG. 17

FIG. 15a.

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UNITED STATES PATENT OFFICE

2,112,608

SOUND ABSORBING STRUCTURE

Henry F. Schmidt, Lansdowne, Pa., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application May 20, 1936, Serial No. 80,916

12 Claims. (Cl. 230—233)

My invention relates to fluid translating apparatus which develops sound waves incident to its operation and it has for an object to provide a duct or conduit therefor having means for dissipating the sound waves in order to minimize transmission of sound.

High speed blowers, for example, forced draft blowers, are occasionally objectionable on account of noise. Where such a blower is applied on board ship, either for ventilation or forced draft purposes, the blower casing usually discharges to an enclosure and the inlet duct usually extends above deck to provide for ingress of air from a region external to the enclosure, thereby resulting in an arrangement potentially capable of transmitting sound and noise to such external region in an objectionable manner. Accordingly, a further object of my invention is to provide the inlet duct for a high speed blower with sound-absorbent means to minimize the transmission of sound.

As a result of experiments conducted with marine blowers of the propeller type, it has been found that fibrous material held in place by perforated sheet metal having perforations distributed thereover and of the order of $\frac{3}{16}$ or $\frac{1}{4}$ of an inch in diameter and a large ratio of opening area to sheet area is highly effective. The relatively larger perforations than generally heretofore used for engine muffling or for the acoustic treatment of room interiors appears to be, not only more effective for the present purpose, but they are not so likely to clog, and the larger opening size coupled with the high ratio of opening area to sheet area provides for reduction in weight. Because of the relatively larger perforations and the relatively high opening area ratio, it is desirable to use a non-friable fibrous material or one which does not distintegrate when subjected to vibratory conditions. Any suitable fibrous material having this characteristic, such as cotton, hair-felt or any of the metallic wools may be used, the fibrous material perferably being treated, if necessary, so as to be resistant to fire and moisture and inert to chemical action, due for example, to salt water or air. Accordingly, a further object of my invention is to provide the inlet duct of a propeller blower with sound-absorbing means, such means comprising fibrous material of the character indicated held in place by metallic facing sheets having openings and an opening area ratio dimensioned approximately as pointed out.

A further object of my invention is to provide, in connection with fluid translating apparatus which develops sound waves incident to its operation, a duct, more especially the inlet duct, having a portion lined with sound-absorbing material and provided with sound-absorbing partitions for dividing a portion of the duct and including the lined portion into a plurality of parallel passages.

A further object of my invention is to provide an inlet duct for a blower having an inlet construction so arranged as to have an angular passage including a first part receiving air horizontally and discharging air into a second part for vertical passage therethrough, one or more of said parts being lined with sound-absorbing material and the lined part or parts having parallel sound-absorbing partitions extending in the direction of flow.

A further object of my invention is to provide an inlet construction for the inlet duct of a blower wherein the construction has an angular passage to afford a top horizontal part and an immediately adjacent vertical part, the construction including curved vanes for changing the direction of flow of air from that of the horizontal part suitably to that of the vertical part and at least one of said parts being lined with sound-absorbent material and provided with a plurality of parallel sound-absorbent partitions extending in the direction of flow.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a side elevation of a blower having one form of my improved inlet duct construction applied thereto;

Fig. 2 is a front elevation of the inlet construction of Fig. 1 with a portion of the front wall removed to show the vertical partitions;

Fig. 3 is a sectional view taken along the line III—III of Fig. 2;

Fig. 4 is a sectional view taken along the line IV—IV of Fig. 3;

Fig. 5 shows a different type of blower arrangement with the inlet construction of Fig. 1;

Fig. 6 is an isometric view of a second form of inlet construction;

Fig. 7 is a side elevational view of a third form of inlet construction;

Fig. 8 is an end elevational view of the apparatus shown in Fig. 7;

Fig. 9 is an end elevation of a fourth form of inlet construction;

Fig. 10 is a plan view of the apparatus shown in Fig. 9;

Figs. 11 and 12 are side elevational views with fragments of the casings broken away, showing fifth and sixth forms of inlet constructions;

Figs. 13 and 14 are detail views showing a seventh form of the invention;

Figs. 15, 15a and 16 are detail views showing outer wall and partition elements employed in the aforesaid inlet constructions; and,

Figs. 17 and 18 are detail views showing sound-absorbing dampers.

In each of the embodiments illustrated there is shown an inlet construction for the inlet duct of fluid translation apparatus, for example, a propeller blower, the inlet construction having features which serve to break up and absorb sound waves transmitted by the column of air moving along the duct to the blower, the sound-absorbing features preferably including a sound-absorbent lining for a portion of the duct together with sound-absorbing partitions for sub-dividing a part at least of the lined portion into a plurality of parallel passages. Where the duct extends above deck so that the sound-absorbent inlet construction is exposed to outside atmospheric conditions, I prefer to arrange such inlet construction in such manner that a cover is provided, this entailing the entrance of air horizontally and turning of the air to flow vertically downward. Accordingly, in several of the embodiments, there are illustrated forms of inlet constructions which not only include sound-absorbing features of the character indicated but also means, such as turning vanes, to facilitate the turning of air from the first or horizontal part of the inlet construction flow passage to the second or vertical part thereof. In some of the embodiments, there are shown means which are effective partially to dissipate sound waves independently of the use of sound-absorbing, fibrous material, such means comprising structure providing a plurality of vanes or partitions for dividing the inlet portion of the duct into a plurality of parallel passages of varying lengths and which are so arranged that the duct provides free intercommunication between the passages at the inlet ends thereof considered in the sound-traveling direction, the latter being opposite to the direction of air travel or translation. The present invention, therefore, contemplates the use of either or both of these physical means of sound absorption or dissipation.

Referring to Fig. 1, I show fluid translating apparatus, for example, a blower, at 10, including the usual encompassing casing or housing 11 and propeller or translating device 12. An inlet duct arrangement, at 13, is provided for supplying air to the blower. Where the blower is applied on board ship, it is supported from the deck 14, as shown, the arrangement being such that the enlet duct, at 13, has its inlet end exposed for the ingress of air. The duct, at 13, is especially constructed and arranged to minimize the transmission of sound developed incident to operation of the blower, and features contributing to the attainment of this result will now be described.

The duct, at 13, shown in Fig. 1, includes an inlet portion or construction 16 connected by an adapter coupling 17 to a tubular portion 18, the lower end of the latter communicating with the upper end of the blower housing 11. The adapter 17 is employed in order to connect the inlet portion 16, which may for convenience be rectangular in cross-section, to the tubular portion 18, which is preferably circular in cross-section, because it connects with the necessarily circular section of the blower casing enclosing the propeller.

The inlet portion or construction 16 has an inlet opening 20 for the ingress of air and an outlet opening 21 which is coincident with the inlet to the adapter portion 17, the inlet portion 16 providing an angular passage having a first horizontal part to which air is supplied by the opening 20 and a second vertical part discharging air through the outlet opening 21. As shown in Fig. 1, the passage between the inlet and outlet openings is formed by vertical walls 22 and 23, arranged in rectangular formation and by the top wall 24, the vertical wall 23 being shorter than the vertical walls 22 to provide the inlet opening 20. The walls 22, 23 and 24 have sound-absorbing linings.

Turning vanes 25 extend transversely of the flow passage in the inlet portion 16 and serve to change the direction of flow of that corresponding to the inlet opening to that corresponding to the outlet opening.

The capacity of the walls of the inlet portion 16 to absorb sound is aided by vertical sound-absorbing partitions 26. The partitions 26 extend from the outlet opening 21 and have their upper ends arranged contiguously to the leaving edges of the turning vanes 25, the partitions being arranged in parallel relation and sub-dividing the flow passage of the inlet portion.

While the inlet portion lined with sound-absorbing material, ahead of the turning blades is effective without partitions, if sufficient surface to obtain the desired reduction in sound intensity can not be obtained by the partitions 26, additional triangular partitions 27 may be added. If the desired area is obtained without spacing the partition 27 as closely as partition 26, they may advantageously be spaced wider apart, thus providing a slightly larger flow area ahead of the turning blades which tends to reduce the turning loss.

A further reason for placing partitions in the inlet suctions of intakes is that sound-absorbing partitions on edge are the most effective means of preventing the reflection and projection of sound from the inlet openings.

In addition to the features of construction of the inlet portion contributing to dissipate the sound waves and to absorb the energy thereof, the transition portions 17 and 18 also preferably have sound-absorbing linings. As the tubular portion 18 ordinarily includes dampers 28, the latter are also preferably made so as to have capacity for sound-absorption.

From the structure so far described, it will be apparent that sounds emanating from the vicinity of the propeller would ordinarily be transmitted through the inlet duct, at 13, by means of the entering air serving as a medium of transmission unless the special means already described were employed for dissipating the energy of sound waves. Sound waves travel upwardly from the vicinity of the propeller and are dissipated by the sound-absorbing character of the duct walls including the walls of the portions 18, 17, and 16, such dissipation being also aided by the sound-absorbing character of the dampers 28. However, since the effectiveness of a unit area of sound-absorbing material is a function of the mean distance of the flow area of the passage from the surrounding sound-absorbing walls, the subdivision of the duct by sound-absorbing partitions, not only acts by virtue of the increase in sound-absorbing area, but each unit of area be-

comes more effective because of the reduced distance of the cross-sectional area from the absorbing surfaces.

Also, the effectiveness of a given absorbing area is a function of the ratio of the length of the passage divided by the space between the surfaces, so that the addition of partitions further increases the effectiveness of the surface by increasing the length-width ratio.

In Fig. 5, I show an inlet construction having an inlet portion **16** similar to that already described, but the duct portion **30**, into which the inlet portion discharges, is modified to provide a chamber **31** within which a different type of blower **32** is partially arranged, the blower having a discharge conduit **33** going to any suitable discharge point, such as the combustion apparatus for a boiler.

A blower of the type of blower **32** is disclosed and claimed in my application Serial No. 23,342, filed May 25, 1935, now Patent No. 2,050,385 of August 11, 1936, assigned to Westinghouse Electric & Manufacturing Company and it is characterized by such an arrangement of parts as makes feasible the incorporation of the blower in a closed system, the principal feature permitting of this being the location of the motor device or prime mover **34** for the blower above or ahead of the propeller instead of after the latter.

In addition to the inlet portion **16** having the sound-absorbing features already described, the duct **30** of Fig. 2 may have the walls thereof also treated so as to be sound-absorbent.

Fig. 6 shows an arrangement which is generally similar to Fig. 1 except that the inlet construction **16***a* has the air entrance opening at two sides of the boxlike housing and adjacent to the top thereof; and, because of this arrangement of entrance opening, a special arrangement of turning vanes is employed so as to be effective in directions at right angles. Accordingly, the turning vanes include rows of vanes **35** and **36** which intersect so as to define substantially the quarter-section of a regular pyramid.

Comparing Figs. 1 and 6, it will be noted that, while the arrangement of Fig. 6 has a larger angle for air entrance, yet the arrangement of turning vanes makes it more difficult to provide vertical partitions, corresponding to the partitions **26**, having their upper edges contiguous to the leaving edges of the vanes. Accordingly, in Fig. 6, the upper edges of the sound-absorbing partitions **26***a* are shown at the horizontal plane immediately adjacent to the lowermost of the turning vanes **35** and **36**. On the other hand, with the first form shown in Figs. 1 to 4, inclusive, because of the single row of turning vanes, it is possible to shape the sound-absorbing partitions **26** and **27** so as to fit against, or be contiguously arranged with respect to, the edges of the turning vanes, the partitions **27** being made triangular for this purpose and the partitions **26** having upper angular portions which serve the same end.

In Figs. 7 and 8, there is shown a third form of inlet construction **16***b* having opposed inlet openings **20***b*, there being a row of turning vanes **25***b* for each inlet opening so as to change the direction of the entering air from that suitable to the inlet opening to that suitable for discharge to the transformation section **17***b*. As before, the inlet portion **16***b* is preferably constituted by a boxlike structure which is rectangular in horizontal cross-section in order to better accommodate the turning vanes as well as the vertical and parallel sound-absorbing partitions. The cover **24***b* as well as the side walls **22***b* of the inlet portion preferably have sound-absorbent linings and triangular sound-absorbing partitions **37** and **38** are employed. The triangular partitions **37** fit the triangular spaces between the top wall **24***b* and the inlet edges of the turning vanes **25***b* and the partitions **38** being arranged in the triangular space between the leaving edges of the turning vanes and the outlet of the inlet construction. As in the form shown in Fig. 1, the triangular partitions **37** and **38** are shown as staggered.

In the fourth form shown in Figs. 9 and 10, the inlet portion **16***c* is made up of vertical walls **22***c* forming a boxlike structure which is rectangular in cross-section, and the structure contains sound-absorbing partitions **39** which sub-divide the passage formed by the enclosing vertical walls but are each of varying lengths so as to provide variable columns to prevent resonance of the blower passage as a whole and to prevent reflection of sound at the upper ends of passages, as one wall of each of the latter is higher than the other. As shown, the partitions **39** preferably increase in height from the sides toward the center.

This modification illustrates another type of sound-dissipator. In the various forms heretofore described, reliance has been placed mainly upon absorption for sound-dissipation; however, in addition to absorption, Figs. 9 and 10 make use of other physical factors in securing sound dissipation, namely, sub-dividing the passage into sub-passages varying in length and providing for sound wave interference ahead of adjacent sub-passages. By having variable length passages forming a continuation of a common passage, a common resonant condition is avoided; and, by providing inter-communication ahead of the variable length passages, interference of sound waves, of different wave lengths induced by the passages of different lengths, occurs with the result that a portion of the sound energy is dissipated. While sound-absorbing partitions are used in Figs. 9 and 10 to provide for dissipation by avoiding a common resonant condition and by providing for sound wave interference, it will be apparent that these physical phenomena are quite independent of the character or material structure of the partitions. Any kind of partitions would be effective, if passages of different lengths having up-stream inter-communication were provided. In several of the views, turning vanes are shown and which have the effect of providing variable length paths which would be effective to avoid common resonance and to provide for sound wave interference.

In Figs. 11 and 12 there are shown further embodiments wherein the inlet portions **16***d* and **16***e* include elbow housings **41** and **42**, respectively, which are circular in cross-section.

Referring to Fig. 11, the elbow housing **41** includes horizontal and vertical miter portions **41***a* and **41***b*. A row of turning vanes **43** is arranged interiorly of the housing at the vicinity of the miter plane. Vertical and parallel sound-absorbing partitions **44** and **45** are arranged in the housing portions **41***a* and **41***b*, respectively, such partitions extending chordally of the circular sections of the housing portions and having the edges thereof adjacent to the turning vanes arranged at an angle so as to be contiguous to the edges of the vanes.

In Fig. 12, the elbow housing **42** is constituted by an arcuate tube, the housing containing arcuate sound-absorbing partitions **46**, which are sub-

stantially concentric with the center of curvature of the housing.

The form shown in Figs. 13 and 14 has for its object obtaining a given surface area of sound-absorbing area in the least possible space without seriously increasing the pressure drop through it at maximum air capacity and by interleaving the sound-absorbing partitions when the blower is operated at reduced capacity. By thus reducing the mean distance between partitions and increasing the length-width ratio, the absorbing efficiency is further increased.

In these views, the inlet construction **16***f* has a main body portion **48**, which is rectangular in cross-section, as in Fig. 1, and a cover portion **49** hinged to the body portion at the top edge of one side of the latter, as indicated at **50**. The cover portion includes a top plate **51** and quadrant side plates **52**. Quadrant-shaped sound-absorbing partitions **53** are connected to the top wall **51** and are arranged parallel to the quadrant side walls **52**. The main body portion **48** has parallel sound-absorbing partitions **54** arranged therein, and the latter partitions are so positioned that the partitions **53** interfit therebetween to provide for adjustment of the cover porion to define an entrance opening of suitable size, whereby the cover serves its purpose as such as well as accomplishing the function of a damper with preservation of good sound-absorption qualities. In addition to the partitions **53** and **54** serving to absorb sound waves, the walls of the main housing portion **48** as well as the top and side walls of the cover portion **49** preferably have sound-absorbing linings.

With the arrangement shown in Figs. 13 and 14, it will be apparent that the cover portion **49** may be adjusted about the hinge connection **50** so as to define an entrance opening whose vertical dimension, as indicated at **55**, may be varied.

Referring now to the features of construction contributing to sound absorption, the inlet duct or conduit has inlet opening or openings disposed in the various ways illustrated. The duct has a sound-absorbing lining and parallel sound-absorbing partitions are arranged therein and extend in the direction of flow. In addition, where the transition member **17**, the tubular member **18**, and the dampers **28** are emloyed, as in Fig. 1, these parts also preferably receive treatment to render them sound absorbent. The sound-absorbing characteristic is imparted by means of fibrous material indicated generally at **56** held in place or faced by metallic sheets **57** having perforations **58** distributed thereover. Where the duct includes a tubular body of rectangular cross-section, which is advantageous from the point of view of assembly and replacement of the sound-absorbing partitions, lining of the walls thereof preferably takes the form of pads comprised by fibrous material engaging the walls and held in place by perforated metallic facing sheets. Each of the partitions is preferably comprised by a pair of perforated sheets connected together in spaced relation in any suitable manner with sound-deadening fibrous material arranged between the sheets. In like manner, the dampers **28** (see Figs. 17 and 18) are each formed of a pair of outer perforated metallic facing sheets **57** with sound deadening material held in place back of the sheets.

Where the partitions have edges exposed to approaching high velocity air, such edges preferably have rounded or pointed elements **60** protecting the sound-deadening material and providing for streamline entrance of the air.

The sound-absorbing partitions may be held in place with respect to the duct in any suitable manner. Where the end portion of the duct is of rectangular cross-section, opposed walls preferably have parallel angle members **61** (see Figs. 15 and 16) forming guides for opposed side edges of the partitions. While the guides serve to hold the partitions in spaced relation, rods **62** extend through the partitions and are connected to the opposite side walls of the end construction so as to hold the partitions in position, the rods preferably having spacing sleeves **63** thereon to hold the partitions in spaced relation. The rods and the guides provide for ready assembly and replacement of the partitions. The partitions **44** and **45** of Fig. 11 are preferably held in place by rods **62***a*. In like manner, the radially-extending rods **62***b* of Fig. 12, in cooperation with the spacing sleeves **63***a*, serve to hold the arcuate partitions **46** in properly spaced relation.

From the foregoing, the operation of apparatus made in accordance with my invention will be apparent. The fluid translating apparatus, such as a blower, has a duct; and, as the apparatus develops sound waves incident to its operation, such waves would be transmitted by the column of air in the duct and communicated to the outside unless special measures were taken to break up such waves and absorb the energy thereof. The duct, therefore, embodies sound-absorbing features serving this purpose, the features comprising a sound-absorbing lining for at least a portion of the duct together with sound-absorbing partitions for sub-dividing the duct, the partitions and the lining providing a plurality of parallel passages which serve to break up the wave front and to absorb effectively the energy of broken up portions of the wave. Where dampers are employed, they also are preferably arranged to absorb sound. Where the inlet end of the duct is exposed to outside conditions, as is frequently the case with marine blowers, such end should have a cover to minimize the entrance of media such as spray or rain. Accordingly, in several of the embodiments, the inlet end has a protecting cover over the inlet opening providing for the horizontal entrance of air, the duct being arranged to provide an angular passage for air. In addition to sound-absorption by the use of sheets having openings distributed thereover, another means may be employed and which is effective to dissipate sound independently of absorption, the last-named means including physical structure for dividing the inlet portion of the duct into a plurality of parallel passages of varying lengths with a common space ahead of the passages considered in the sound travelling direction.

While I prefer to use metallic facing sheets for the fibrous material having perforations distributed thereover, as hereinbefore pointed out, it will be apparent that any metallic structure of sheet-like and net-like form may be used as long as it satisfies the objective of confining the fibrous material, exposing the latter for sound-absorption and serves itself to offer resistance to transmission and reflection of sound waves. Hence, I use the term "metallic facing sheet having openings distributed thereover" as generally descriptive of a metallic structure suitable for this purpose.

While I have shown my invention in several forms, it will be obvious to those skilled in the

art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. The combination with an enclosure and a blower arranged to discharge air into the enclosure, of a vertically extending inlet conduit for supplying air from a region external to the enclosure; said inlet conduit having a top wall closing the top thereof, an inlet opening in one side adjacent said top wall, a row of turning vanes extending obliquely from adjacent the bottom of said inlet opening to adjacent the top wall remote from the inlet opening, and the interior of said inlet conduit being lined with sound-absorbing material for at least a portion of the length thereof.

2. The combination with an enclosure and a blower arranged to discharge air into the enclosure, of a vertically extending inlet conduit for supplying air from a region external to the enclosure; said inlet conduit having a top wall closing the top thereof, an inlet opening in one side adjacent said top wall, a row of turning vanes extending obliquely from adjacent the bottom of said inlet opening to adjacent the top wall remote from the inlet opening, and means for resisting the transmission of sound from the blower and through the inlet conduit to the external region, said last-named means including said turning vanes, sound-absorbing lining secured to the interior of the conduit for at least a portion of the length thereof and sound-absorbing partitions for sub-dividing at least a part of said lined portion into a plurality of sound-absorbing passages.

3. The combination with an enclosure and a vertical propeller blower including a propeller and a tubular casing arranged to discharge into the enclosure, of an inlet conduit for supplying air from a region external to the enclosure to the upper end of the casing; said conduit including a tubular portion in communication with the upper end of the casing, an inlet construction of rectangular cross-section and having its inlet area in direct communication with said external region, a coupling portion for connecting the rectangular lower end of the inlet construction to the adjacent end of the tubular portion, and dampers arranged within the tubular portion and adjacent to the coupling portion; and means for rendering the inlet construction, the coupling portion, the dampers, and at least a part of the tubular portion having the dampers sound-absorbent; said last-named means including sound-absorbing covering for interiors of the inlet construction, the coupling portion, and the tubular construction and for the dampers and a plurality of vertical and parallel sound-absorbing partitions arranged within the inlet construction for sub-dividing the latter into a plurality of parallel sound-absorbing passages.

4. The combination with an enclosure and a vertical propeller blower including a propeller and a tubular casing arranged to discharge into the enclosure, of an inlet conduit for supplying air from a region external to the enclosure to the upper end of the casing; said conduit including a tubular portion in communication with the upper end of the casing, an inlet construction of rectangular cross-section and having its inlet area in direct communication with said external region, a coupling portion for connecting the rectangular lower end of the inlet construction to the adjacent end of the tubular portion, and dampers arranged within the tubular portion and adjacent to the coupling portion; and means for rendering the inlet construction, the coupling portion, and at least a part of the tubular portion having the dampers sound-absorbent; said last-named means including sound-absorbing covering for interiors of the inlet construction, the coupling portion, and the tubular construction and a plurality of vertical and parallel sound-absorbing partitions arranged within the inlet construction for sub-dividing the latter into a plurality of parallel sound-absorbing passages.

5. The combination with fluid-translating apparatus which develops noise incident to its operation, of an inlet conduit for the apparatus and having an inlet portion constructed and arranged to provide a flow passage comprised by angularly disposed first and second parts, turning vanes carried by said inlet portion and arranged transversely of its flow passage in order to change the direction of flow from that of said first part suitably to that of said second part, a plurality of partitions supported interiorly of said inlet portion and within the second part of the flow passage for sub-dividing said second part into a plurality of parallel passages, said partitions having angular portions so as to provide edges thereof arranged contiguously to the turning vane leaving edges, and means for rendering at least that part of the inlet portion encompassing said second flow passage part and said partitions sound-absorbent by the provision of a covering of fibrous material confined and faced by sheet-like metallic structure having openings distributed thereover.

6. The combination with fluid translating apparatus capable of producing noise, of an inlet conduit for the apparatus and including an inlet portion constructed and arranged to provide a flow passage comprised by angularly disposed first and second parts, turning vanes supported interiorly of the inlet portion and disposed so as to change the direction of flow from that of said first part suitably to that of said second part, parallel partitions supported interiorly of said inlet portion and within said first and second flow passage parts and extending in the direction of flow in the first and second parts for sub-dividing the latter each into a plurality of passages, said partitions being arranged contiguously of the turning vanes and having angular portions so as to provide edges thereof arranged contiguously to the turning vane edges, and means for rendering the interior of said inlet portion and said partitions sound absorbent by provision of sound-absorbing covering including fibrous material confined and faced by metallic sheet-like structure having openings distributed thereover.

7. The combination with fluid translating apparatus capable of producing noise, of an inlet conduit for the apparatus and including an inlet portion constructed and arranged to provide a flow passage comprised by angularly disposed first and second parts, turning vanes supported interiorly of the inlet portion and disposed so as to change the direction of flow from that of said first part suitably to that of said second part of the inlet portion flow passage, first and second groups of parallel partitions supported interiorly of said inlet portion and within the first and second flow passage parts and extending in the direction of flow therein, the partitions of the

first and second groups being arranged transversely of the turning vanes and having angular portions to provide edges thereof which are contiguous to the turning vane edges and the partitions of the first group being staggered with respect to the partitions of the second group, and means for rendering the interior of the inlet portion of the conduit and said partitions sound-absorbent by the provision of sound-absorbing covering including facing sheets having openings distributed thereover with fibrous material confined back thereof.

8. The combination with a blower which generates sound incident to its operation and having an inlet passage, of means for minimizing propagation of sound from the blower and through the inlet passage comprising a sound-absorbing inlet structure of rectangular cross-section and providing a portion of said passage, a sound-absorbing tubular element of circular cross-section providing a portion of said passage, a sound-absorbing transformation member joining the discharge end of the inlet structure and the inlet end of the tubular element and providing a portion of said passage which joins the first two portions, and a plurality of parallel sound-absorbing partitions supported by the inlet structure and extending in the direction of flow in the passage portion thereof for subdividing such passage portion.

9. The combination with a blower which generates sound incident to its operation and having an inlet passage, of means for minimizing propagation of sound from the blower and through the inlet passage comprising a sound-absorbing inlet structure of rectangular cross-section and providing a portion of said passage, a sound-absorbing tubular element of circular cross-section providing a portion of said passage, a sound-absorbing coupling member joining the discharge end of the inlet structure to the inlet end of the tubular element and providing a portion of said passage which joins the first two portions, a plurality of parallel sound-absorbing partitions carried by the inlet structure and extending in the direction of flow of the passage portion thereof for sub-dividing such passage portion, and sound-absorbing damper means carried by said tubular element for restricting flow through the passage portion thereof.

10. An inlet device for fluid-translating apparatus including a sound-absorbing inlet portion discharging into a sound-absorbing conduit portion; said inlet portion including a multiplicity of flat walls defining a passage and one or more of said walls including an outer imperforate plate, an inner plate having openings distributed thereover, and sound-absorbing material between the plates; a plurality of parallel partitions supported from some of said walls and extending in the direction of flow for sub-dividing the passage; each of said partitions including a pair of parallel plates secured to each other, each of which has openings distributed thereover, with sound-absorbing material between the plates; means for supporting the partitions from some of said walls; said conduit portion including an outer wall, an inner wall having openings distributed thereover, and sound-absorbent material between the walls; and one or more dampers carried by the conduit portion for controlling the flow therethrough, each of said dampers including a pair of facing sheets having openings distributed thereover and confining sound-absorbing material.

11. The combination with fluid translating apparatus capable of producing noise, of an inlet duct for the apparatus and including an inlet construction said inlet construction comprising a vertical tubular portion which is rectangular in cross-section and a cover portion hinged to one side wall of the tubular portion, said cover portion having top and side walls cooperating with the top edge of the tubular portion side wall, which is opposite to the side wall hinged to the cover portion, to provide a rectangular opening of variable area for the horizontal admission of air to the inlet construction, a sound-absorbing lining for the tubular portion, and vertical interleaving, sound-absorbing partitions carried by the tubular and cover portions.

12. The combination with an enclosure and a blower arranged to discharge air into the enclosure, of an inlet conduit for supplying air from a region external to the enclosure, said inlet conduit having an end wall closing the end remote from the blower, inlet openings in two contiguous sides adjacent said end wall, a row of turning vanes extending from the side of each opening remote from the end wall obliquely across the conduit to the side of the end wall remote from the opening, said vanes terminating at the intersection of the two rows so as to define substantially a quarter-section of a pyramid, and sound-absorbing lining secured to the interior of the conduit for at least a portion of the length thereof.

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