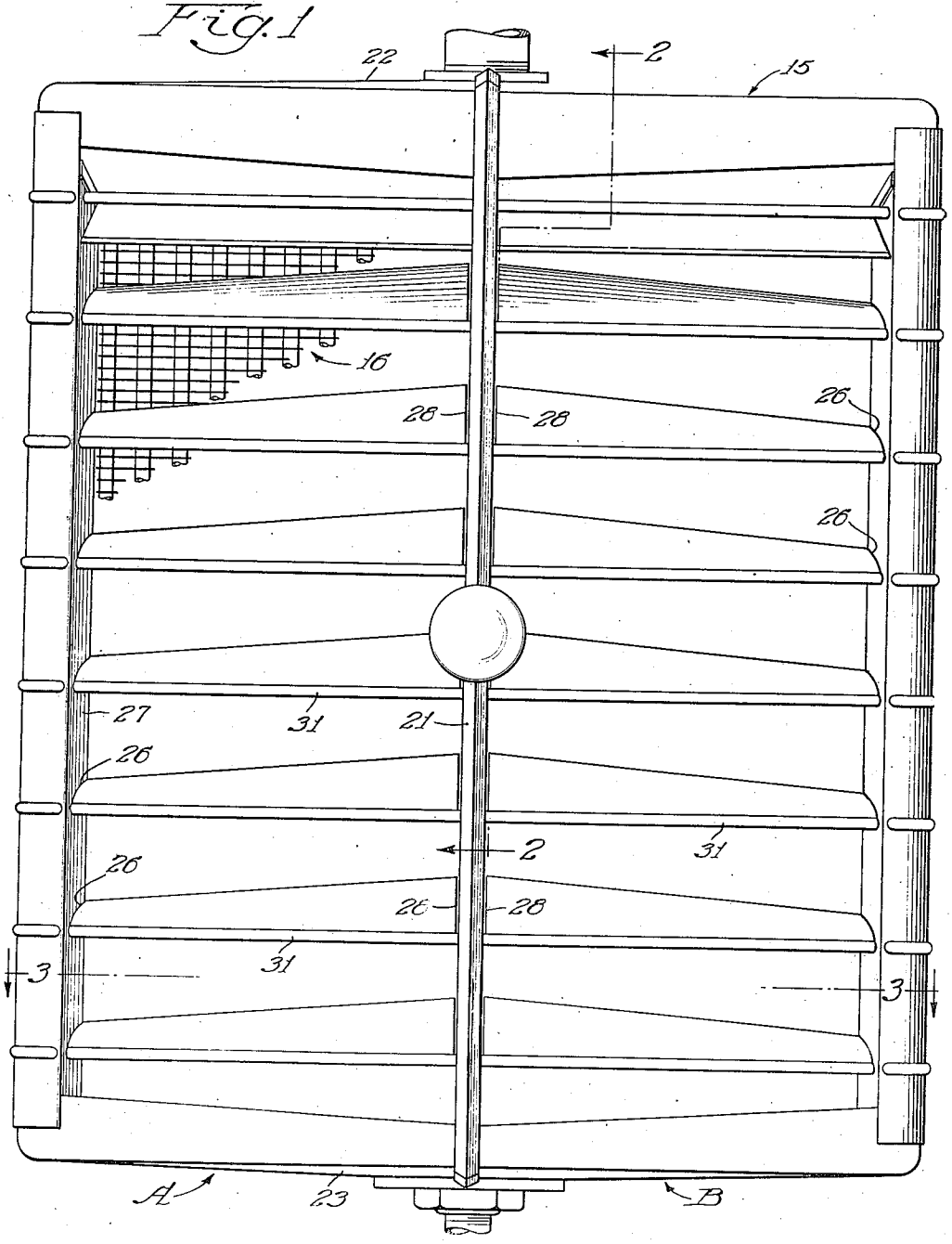
Sept. 2, 1941. C. T. PERKINS 2,254,258

HEAT EXCHANGE DEVICE AND DEFLECTOR THEREFOR

Filed June 16, 1938 3 Sheets-Sheet 1

Fig. 1



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HEAT EXCHANGE DEVICE AND DEFLECTOR THEREFOR

Filed June 16, 1938 3 Sheets-Sheet 2

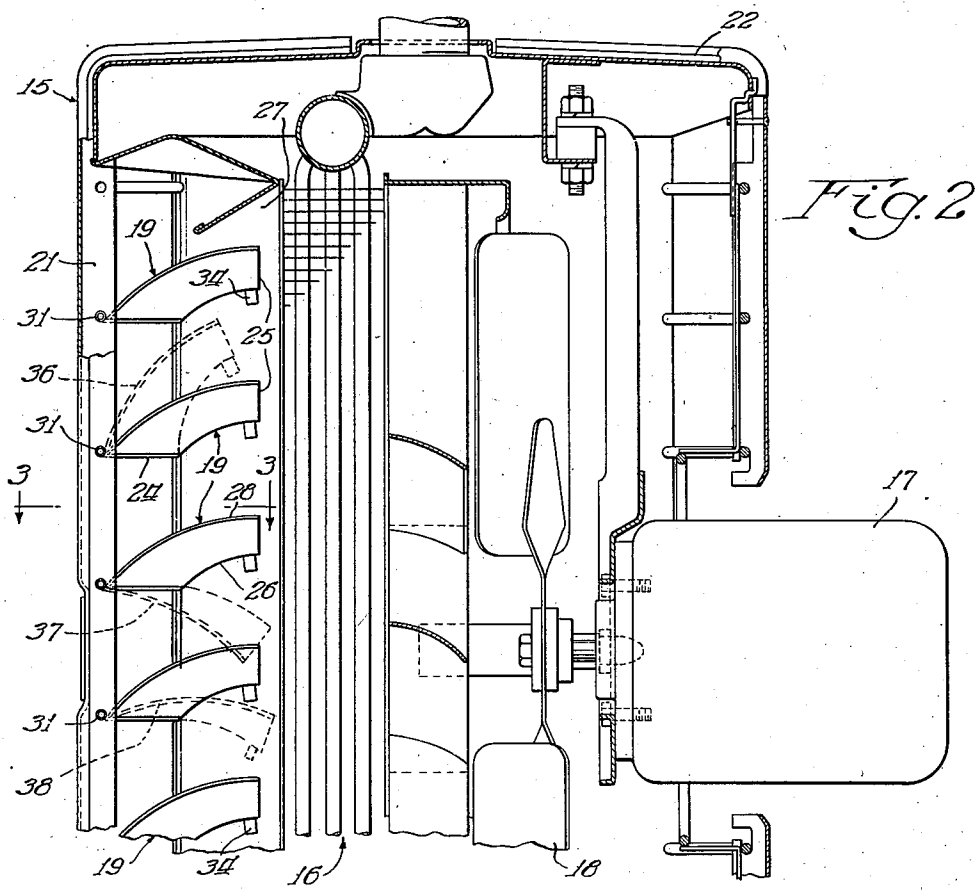
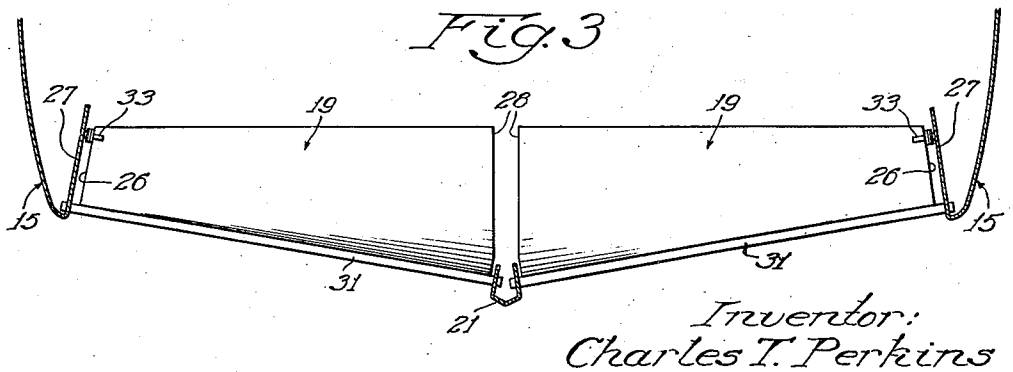


Fig. 2

Fig. 3



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HEAT EXCHANGE DEVICE AND DEFLECTOR THEREFOR

Filed June 16, 1938 3 Sheets-Sheet 3

Fig. 5

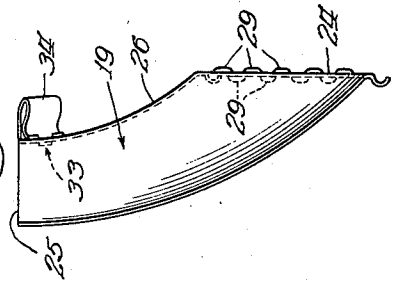


Fig. 7

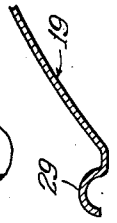


Fig. 8

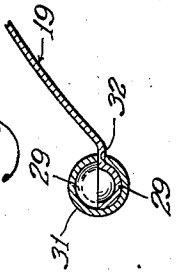


Fig. 4

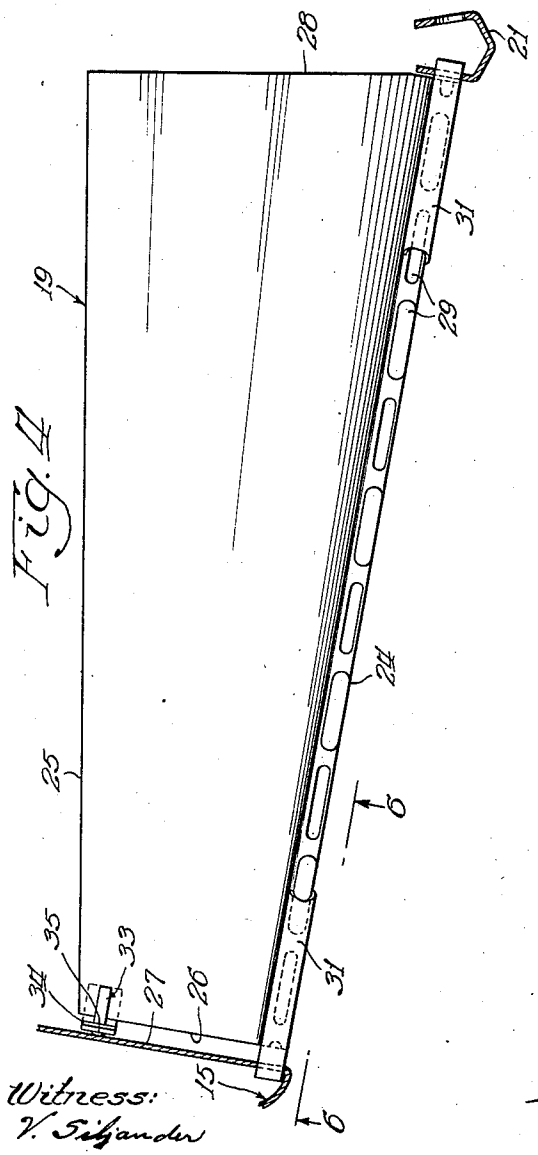
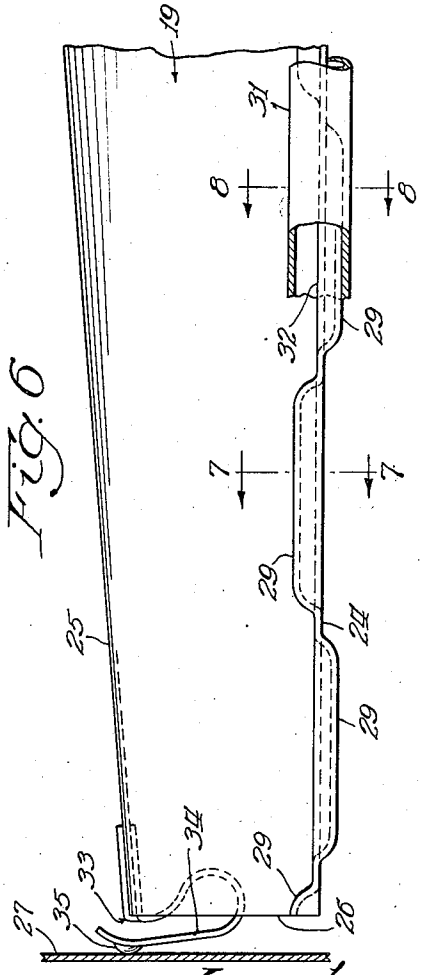


Fig. 6



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UNITED STATES PATENT OFFICE

2,254,258

HEAT EXCHANGE DEVICE AND DEFLECTOR THEREFOR

Charles T. Perkins, Racine, Wis., assignor to Modine Manufacturing Company, Racine, Wis., a corporation of Wisconsin

Application June 16, 1938, Serial No. 213,971

8 Claims. (Cl. 98—40)

This invention relates to heat exchange devices, and particularly to a device having a fluid conducting core open to the circulation of air therethrough, and having an air circulating fan and motor therefor operatively related to said core, and wherein a plurality of deflector blades are provided for directing air currents from the device to produce an efficient distribution thereof.

One object of the present invention is to provide a novel construction and arrangement whereby the air currents passing through the core may be directed from the device at various angles.

Another object of the invention is to provide a novel construction and arrangement of deflectors whereby the air currents may be directed from various portions of the device and at various angles with respect thereto.

Another object of the invention is to provide a novel form of deflector blades operatively related and adjustable with respect to each other for directing air currents in various directions.

Another object of the invention is to provide a plurality of disconnected, independently operated deflector blades having means associated therewith for maintaining the blades in various positions of adjustment with respect to each other and to the housing in which the blades are mounted.

Another object of the invention is to provide novel means for movably mounting the deflector blades within the device.

A still further object of the invention is to improve heat exchange devices of the character described in sundry details hereinafter referred to and particularly pointed out in the appended claims.

One embodiment of the present invention is shown for illustrative purposes in the accompanying drawings, in which:

Fig. 1 is a front elevational view of a heat exchange device embodying features of the present invention;

Fig. 2 is a fragmentary sectional elevational view taken substantially as indicated by the lines 2—2 of Fig. 1;

Fig. 3 is a fragmentary plan sectional view taken substantially as indicated by the line 3—3 of Fig. 1;

Fig. 4 is an enlarged plan view of one of the deflectors forming a part of the present invention and illustrating the manner of mounting the deflector in the housing of the heat exchange device illustrated in Figs. 1 and 2;

Fig. 5 is an end view of the structure illustrated in Fig. 4;

Fig. 6 is an enlarged side elevational view of a portion of the structure illustrated in Fig. 4, and viewed substantially as indicated by the line 6—6 thereof; and

Figs. 7 and 8 are fragmentary transverse sectional views taken substantially as indicated by the lines 7—7 and 8—8, respectively, of Fig. 6.

The present invention is shown, in the present instance, in conjunction with a heat exchange device commonly known as a unit heater comprising a housing, indicated as a whole, by the numeral 15, and having a fluid conducting radiator core 16 open to the circulation of air therethrough mounted in said housing.

Mounted also in the housing 15 is a motor 17 having a fan 18 operatively related thereto and positioned at one side of the radiator core for circulating currents of air therethrough, while at the opposite side of the core are a plurality of pivotally mounted, independently movable deflector blades indicated, as a whole and respectively, by the numeral 19, the blades being shown in Fig. 1 as arranged in series A and B at opposite sides of a strut 21 positioned adjacent the central vertical plane of the housing and extending between the upper and lower portions 22 and 23 thereof, respectively.

It will be noted by reference to Figs. 2, 4, and 5, that the blades 19 are of elongated construction formed preferably of sheet material, and having elongated relatively inclined front and rear edge portions 24 and 25, respectively, the blades being curved transversely from one to the other of the longitudinal front and rear edge portions, as illustrated in Fig. 5, the narrow end portion 26 of the blade 19 being shown, in the present instance, as extending substantially at a right angle to the front edge portion thereof and substantially parallel to a wall portion 27 forming a part of the housing 15 at the outer sides thereof, while the relatively wider end portion 28 extends transversely and substantially at a right angle to the rear edge portion 25.

As clearly illustrated in Figs. 2 and 5, the blades 19 are curved transversely from the front to the rear edge thereof and on various radii between said end portions, the curvature of least radius being adjacent the narrow end portion 26 of the blade, while the radii of the remaining curvature are progressively increased toward the wide end thereof to provide a blade of scoop-like form having a curvature of varying radii at vari-

ous points of cross section throughout the length of the blade.

For pivotally mounting the blades 19 in the housing at opposite sides of the strut 21, the respective blades are provided adjacent their front edge portions with a plurality of spaced elongated protuberances 29 extending laterally from the edge portion and alternately at opposite sides of the blade, as clearly illustrated in Fig. 6, the protuberances being adapted to fit snugly within a tubular member 31 having a slot 32 formed therein adapted to receive the portion of the blade adjacent the protuberances, as clearly illustrated in Figs. 6 and 8, the end portions of the tubular member 31 being rotatably mounted, respectively, in the strut 21 and wall portion 27 of the housing in a manner to position the pivotal axes of the blades on opposite sides of the vertical central plane of the housing in parallel relation and at an angle inclined to said plane, as clearly illustrated in Figs. 1, 3, and 4.

For retaining the respective deflector blades 19 in various positions of adjustment with respect to each other and to the housing 15, each of the blades 19 is provided preferably adjacent its relatively narrow end portion with a clip indicated, as a whole, by the numeral 33 having a spring finger 34 formed thereon provided adjacent its free end portion with a protuberance 35 adapted to engage the wall portion 27 of the housing 15 under tension of the spring finger 34, as clearly illustrated in Figs. 3 and 6, and in a manner to provide a frictional engagement between the protuberance 35 and wall portion 27 of the housing. By such an arrangement, it will be apparent that the respective deflector blades may be adjusted independently of each other and placed in various positions with respect to the housing, and retained in such adjusted positions by the protuberance 35 engaging the wall portion 27 of the housing.

It will be observed from the foregoing description, that by reason of the curvature of the respective blades and the inclination of the pivotal mounting thereof with respect to the central vertical plane of the housing, the adjusting of the blades at various positions about their pivotal mountings, will cause the air currents passing through the core 16 to be directed at various angles in an outwardly and downwardly direction and also laterally or horizontally with respect to the housing. For example, with the blades occupying the full line position shown in Fig. 2, air currents will be deflected downwardly and outwardly or laterally from the housing, whereas if positioned as indicated by dotted lines shown at 36 in Fig. 2, the air currents will be directed in a more pronounced downward direction, and by reason of the inclination of the blades with respect to the central vertical plane of the housing, the air currents will be directed inwardly toward said plane or in a manner to concentrate the air currents at a particular point as may be desired. By positioning the blades as indicated by the dotted lines shown at 37 of Fig. 2, the air currents may be directed in an upwardly and lateral direction, and by positioning the blades as indicated by dotted lines shown at 38, the air currents may be discharged from the housing in substantially the direction at which they pass through the core 16.

It will be apparent that with the construction and arrangement shown and described, the air currents, after passing through the core 16, may be directed at various angles and in various directions as may be found desirable and, if desired, the deflector blades of the respective series A and B may be adjusted independently of each other in a manner to direct the air currents passing through the respective series toward or away from each other or in a common direction toward the right or left of the housing, as viewed in Fig. 1 of the drawings.

It will be observed from the foregoing description that the present invention provides a novel construction and arrangement of deflector blades whereby a relatively wide or restricted distribution of air currents may be obtained, and also a novel construction and arrangement whereby the blades are pivotally mounted in their support and retained in relatively fixed positions with respect to said support and to each other.

Obviously, the present invention is not limited to the precise construction and arrangement shown and described as the same may be variously modified. Moreover, all the features of the invention need not be used conjointly as the same may be used to advantage in various different combinations and sub-combinations.

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

1. A deflector for heat exchange device comprising an elongated blade having oppositely disposed, relatively inclined edge portions, one end portion of the blade extending transversely and at substantially a right angle to one of said edge portions, the opposite end portion of the blade extending transversely and at substantially a right angle to the opposite edge portion thereof.

2. A deflector for heat exchange device comprising an elongated blade having oppositely disposed, relatively inclined front and rear edge portions and having relatively wide and narrow end portions, the narrow end portion of the blade extending transversely and at substantially a right angle to said front edge portion, the wide end portion of said blade extending transversely and at substantially a right angle to the rear edge portion thereof.

3. A deflector for heat exchange device comprising an elongated blade having front and rear edge portions and relatively narrow end portions, said blades being curved transversely from one to the other of said edge portions and on various radii between said end portions.

4. A deflector for heat exchange device comprising an elongated blade having relatively inclined front and rear edge portions and relatively wide and narrow end portions, said blades being curved transversely from one to the other of said edge portions and on various radii between said end portions.

5. A deflector for heat exchange device comprising an elongated blade having relatively inclined front and rear edge portions and relatively wide and narrow end portions, said blades being curved transversely from one to the other of said edge portions and on various radii between said end portions, the curvature of least radius being adjacent the narrow end portion of said blade.

6. A deflector for heat exchange device comprising an elongated blade having relatively inclined front and rear edge portions and relatively wide and narrow end portions, said blades being curved transversely from one to the other of said edge portions and on various radii between said end portions, the curvature of least radius being adjacent the narrow end portion of said blade, and the radii of the remaining curvature

progressively increasing towards the wide end thereof.

7. A deflector for heat exchange device comprising a pivotally mounted blade having elongated edge portions and being transversely curved from one to the other of said edge portions, and having a plurality of longitudinally spaced, elongated, transversely curved protuberances formed adjacent one of said longitudinal edge portions and extending laterally from said blade alternately at opposite sides thereof.

8. A deflector for heat exchange device comprising a pivotally mounted blade having an elongated edge portion, and a plurality of elongated, transversely curved protuberances formed adjacent and spaced longitudinally of said elongated edge portion, said protuberances extending laterally from said blade alternately at opposite sides thereof, and a circular hollow tubular member adapted to snugly receive said protuberances and having a slot formed in one side of said tubular member adapted to receive the portion of said blade adjacent one side of said protuberances, said tubular member extending beyond the ends of said blade to provide a pivotal mounting therefor.

CHARLES T. PERKINS.