Aug. 29, 1961 R. C. SNYDER ET AL 2,997,939

COOLING AIR FLOW ADJUSTABLE LOUVER FOR HEAT EXCHANGE HOUSING

Filed Aug. 7, 1958 3 Sheets-Sheet 1

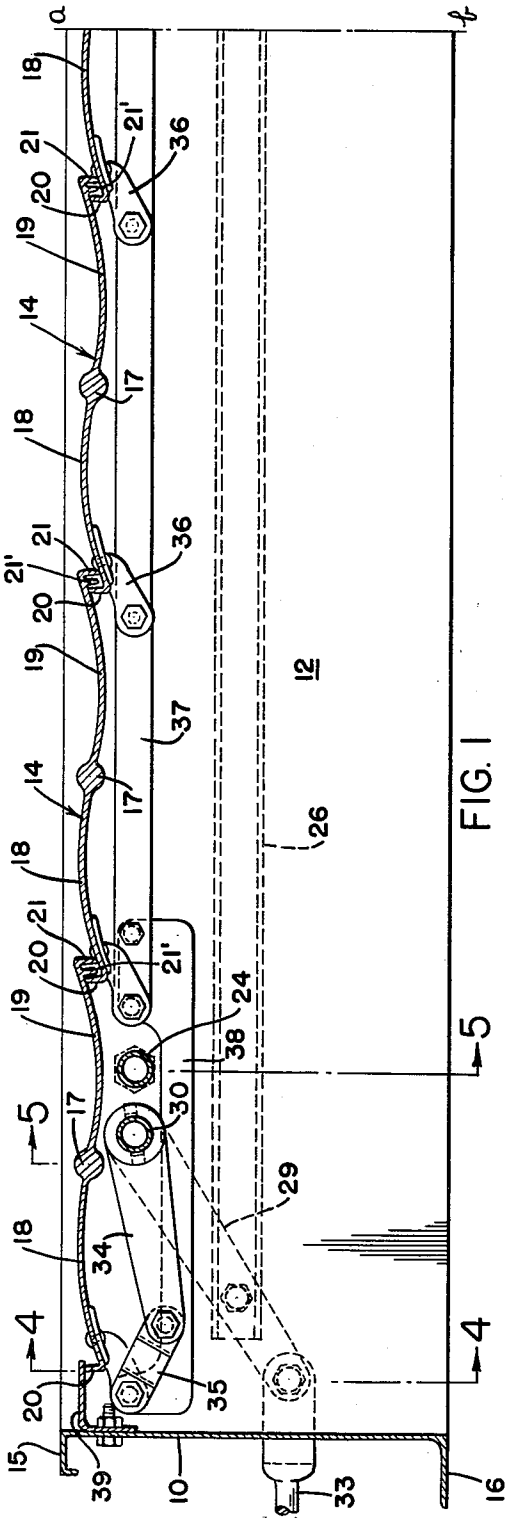


FIG. 1

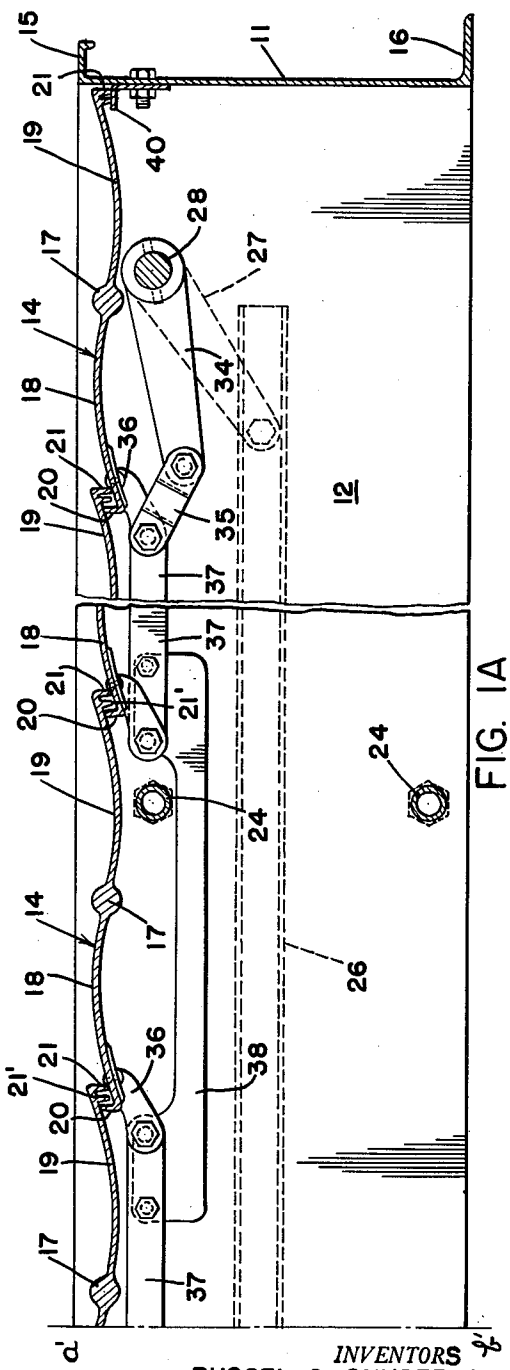


FIG. 1A

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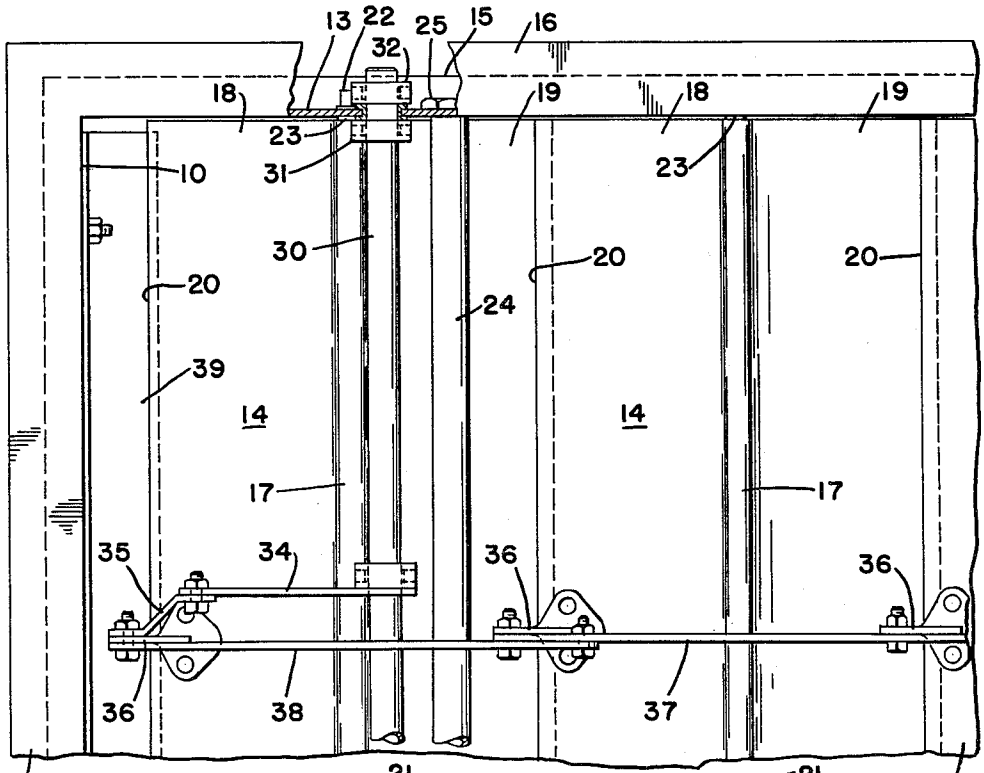


FIG. 2

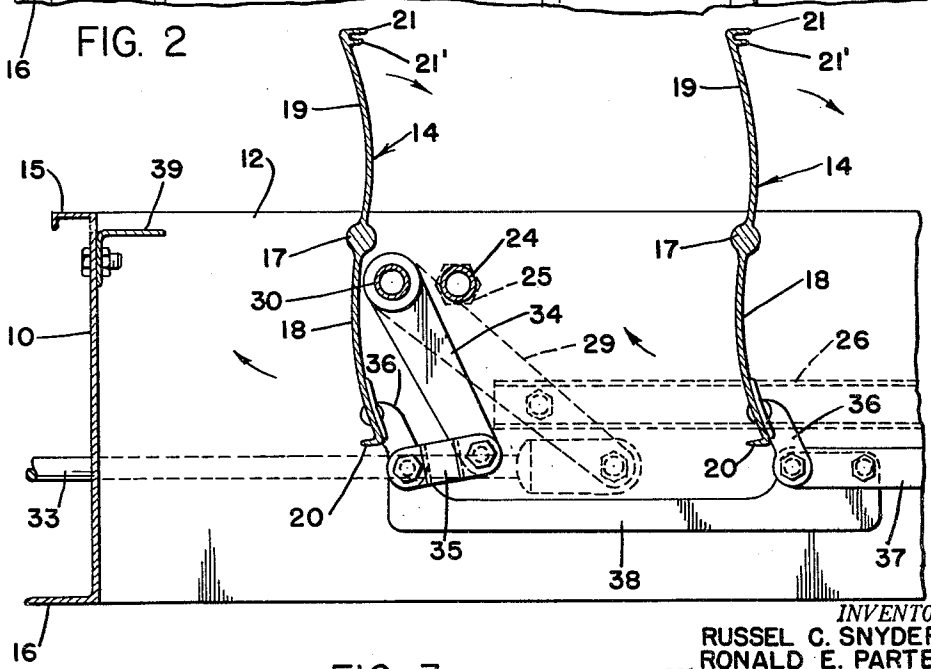


FIG. 3

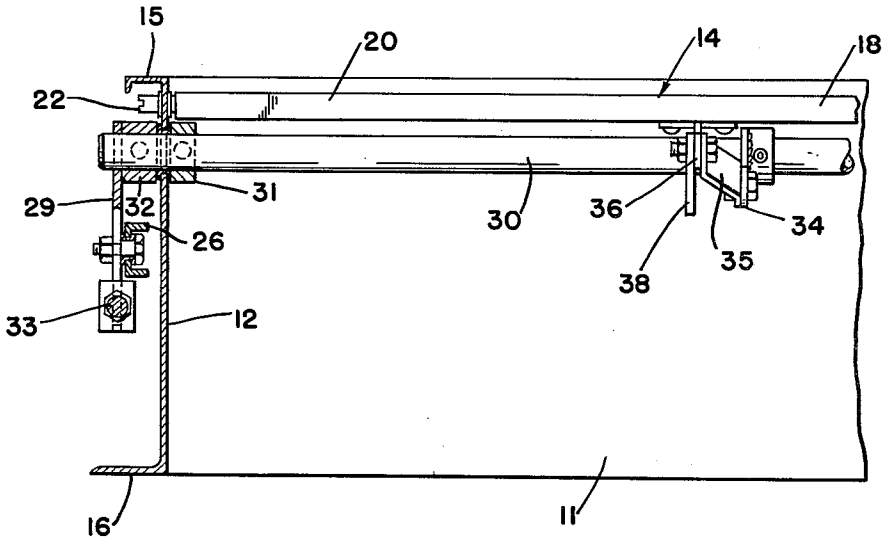
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FIG. 4



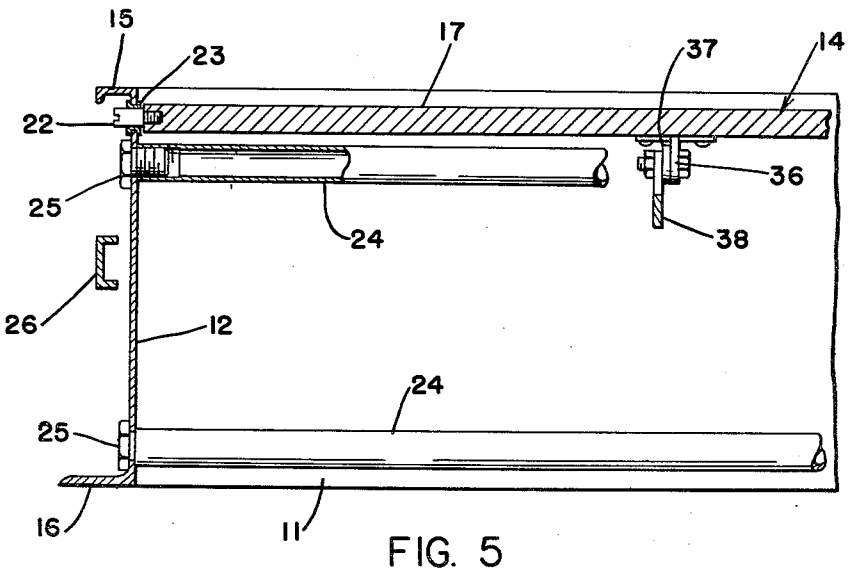


FIG. 5

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COOLING AIR FLOW ADJUSTABLE LOUVER FOR HEAT EXCHANGE HOUSING

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3 Claims. (Cl. 98—110)

The invention relates generally to housings having controlled air circulation for cooling compressors, engines and the like, and more particularly to housings having adjustable louvers for regulating the circulating air.

In compressor stations for gas pipe lines, for example, cooling towers are provided for housing cooling fin units for the compressors, and these housings have adjustable louvers for admitting a controlled amount of outside air. Similarly, cooling units for diesel engines are provided with louvered housings admitting outside air, and the louvers are operated by means of thermostatic controls to adjust the air flow because it is very important to maintain a substantially constant temperature within the housing.

In certain prior constructions, the linkages for operating the louvers have been located on the exterior of the housing where they are exposed to the weather, and corrosion results, interfering with efficient operation of the louvers. Moreover, maintenance of the louvers has involved frequent painting to prevent corrosion, and this inevitably results in dropping paint on the fins of the housed cooling units which reduces their cooling efficiency.

An important object of the present invention is to provide an improved louvered housing construction in which the operating linkages are substantially enclosed and protected by the housing.

Another object is to provide a lightweight louver construction which offers a minimum of resistance to air flow.

A further object is to provide a simple and economical cooling housing which is easily operated, requires little maintenance, and overcomes the disadvantages of prior constructions.

These, and other objects which will appear from the following description, are accomplished by the improvements comprising the present invention, a preferred embodiment of which is shown by way of example in the accompanying drawings and described in detail herein. Various modifications and changes in details of construction are intended to be included within the scope of the invention as defined in the appended claims.

In the drawings:

FIGS. 1 and 1A are sectional views through a louvered housing embodying the invention, FIG. 1A being a continuation of FIG. 1 from the line *a*—*b*, and the louvers being shown in closed position.

FIG. 2 is a fragmentary bottom plan view thereof.

FIG. 3 is a view similar to FIG. 1, showing the louvers in full open position.

FIG. 4 is a transverse section on line 4—4 of FIG. 1.

FIG. 5 is a transverse section on line 5—5 of FIG. 1.

The housing shown in the drawings has end walls **10** and **11** and side walls **12** and **13** forming a rectangular frame which is arranged to be closed on one side by a series of louvers **14**. Preferably, the side and end walls **10, 11, 12** and **13** are substantially channel-shaped in cross section, having outturned flanges **15** adjacent the louvers, and flanges **16** on the side of the frame opposite to the louvers for mounting the housing on the exterior of a cooling tower and the like (not shown).

The louvers **14** are preferably of extruded aluminum and extend transversely of the frame in overlapping relation when closed. Each louver has a central hub **17** which extends the entire length of said louver, and reversely curved vanes **18** and **19** extending in opposite directions therefrom. The vane **18** has an upturned angular flange **20** along its outer edge, and the vane **19** has a downturned flange **21** along its outer edge for overlapping the flange **20** of the adjacent louver in closed position. As shown, a second flange **21'** may be provided parallel to and spaced a short distance from flange **21** for mounting a conventional sealing strip of felt or the like (not shown) between flanges **21** and **21'**.

The combination of the hub and the reverse curve construction of the vanes **18** and **19** extending in opposite directions from the hub provides a rigidified construction which enables the use of lightweight aluminum with edge flanges **20** and **21** of minimum width, thus presenting a minimum overall thickness and resistance to air flow when the louvers are in open position.

At each end the hubs **17** of the vanes are pivotally mounted in the side walls **12** and **13** of the frame by means of pivot pins **22** screwed in the ends of the hubs and journaled in sleeve bearings **23** preferably of nylon set in the side walls, as shown in FIG. 5. The side walls **12** and **13** are rigidly connected together in spaced relation by tubular upper and lower cross braces **24** having screw studs **25** extending through the walls and threaded into said tubular braces.

The mechanism for controlling the opening and closing of the louvers in unison preferably includes a control bar extending lengthwise of the frame along the exterior of one side wall, and may be a channel bar **26** extending along the outside of frame side wall **12**. Adjacent to the frame end wall **11**, the control bar **26** is pivotally connected by means of a lever arm **27** to the end of a torque shaft **28** extending transversely through the frame under the louvers and journaled in the frame side walls.

Similarly, the other end of the control bar is pivotally connected by a lever arm **29** to a torque shaft **30** extending transversely through the frame under the louvers. The shafts **28** and **30** are journaled in conventional nylon sleeve bearings (not shown) in the side walls and have shaft collars **31** and **32** on opposite sides of the bearings, as shown in FIGS. 2 and 4. The lever arm **29** extends beyond the control bar **26** and is pivotally connected to an operating rod **33** which may be actuated by changes in temperature within the cooling units in a well-known manner so as to automatically open and close the louvers regulating the air flow into and out of the housing.

The torque shafts **28** and **30** are connected to one edge of the end louvers which lie immediately above the respective shafts by lever arms **34** secured to the shafts and links **35** pivoted to the arms **34**. The links **35** are preferably angled and pivoted to bracket ears **36** on one edge of the end louvers. Similar bracket ears **36** on intermediate louvers are pivoted to operating bars **37** for operatively connecting the intermediate louvers, and offset links **38** pass around the upper braces **24** and operatively interconnect the operating bars **37** and the link **35** which is adjacent wall **10**. Thus, when the torque shafts **28** and **30** are rotated by movement of the control bar **26** all of the louvers **14** are moved in unison between the closed position of FIG. 1 and the open position of FIG. 3.

Accordingly, all of the louver operating linkage including the lever arms **34**, links **35**, and bars **37** and **38**, is located under the louvers **14** in closed or partly closed position so as to be protected from the elements, and minimize corrosion and maintenance. End closure plates **39** and **40** are secured to the end walls **10** and **11**, respectively, to cooperate with the end louvers in closed position and completely close the frame opening. Moreover, the use of aluminum louvers eliminates the need for painting to prevent corrosion with consequent elimination of dropping paint on the cooling fins within the housing to reduce their efficiency. The use of nylon bearings for

the torque shafts and louvers eliminates the need for lubrication and maintenance at those points.

As clearly shown in FIG. 3, the design of the louvers, with their reverse curves and shallow flanges, provides a minimum of restriction of air flow while providing a structurally strong louver which can be made out of lightweight aluminum.

What is claimed is:

1. Air flow control construction for cooling housing having an open frame provided with a pair of spaced apart opposed side walls, a series of overlapping louvers mounted in the opposed side walls of the frame and adapted for opening and closing movement, transverse torque shafts extending between said side walls, lever arms on said shafts, a control bar, additional lever arms on said shafts operatively connected to said control bar, linkage means within said frame operatively connecting the first said lever arms to the undersides of said louvers for operating them in unison, each of said louvers having a central hub extending the entire length thereof, reversely curved vanes extending in opposite directions from said hub, reversely turned flanges on the outer edges of said vanes for overlapping similar flanges on adjoining louvers in closed position and means pivotally mounting said hub.

2. Air flow control construction for a cooling housing having an open frame provided with a pair of spaced apart opposed side walls, a series of overlapping louvers pivotally mounted at their ends in said side walls and adapted for opening and closing movement, transverse torque shafts mounted for rotation between said side walls under said louvers, lever arms on said shafts, angled links operatively connecting the end louvers of said series to said lever arms, operating bars connected to intermediate louvers of said series and to said angled links, offset links interconnecting said operating bars, a control bar operatively connected to said torque shafts exteriorly of said frame for rotating said shafts in unison to pivotally move said louvers, and means for operating said control bar.

3. Air flow control construction for a cooling housing having an open frame provided with a pair of spaced apart oppositely disposed side walls, a series of overlapping louvers mounted in said side walls and adapted for opening and closing movement, transverse torque shafts mounted for rotation between said side walls under said louvers, cross braces extending between said side walls under said louvers, lever arms on said shafts, angled links connecting the end louvers of said series to said lever arms, operating bars connected to intermediate louvers of said series and to said angled links, offset links passing around said cross braces and interconnecting said operating bars, said louvers each having a central hub, means pivotally mounting said hub in said opposite side walls, reversely curved vanes extending in opposite directions from said hub, reversely turned flanges on the outer edges of said vanes for overlapping similar flanges on adjoining louvers in closing position, a control bar operatively connected to said torque shafts exteriorly of said frame for rotating said torque shafts in unison to pivotally move said louvers, and means for operating said control bar.

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