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[54] **TEMPERATURE COMPENSATING DAMPER STRUCTURE**
3 Claims, 2 Drawing Figs.

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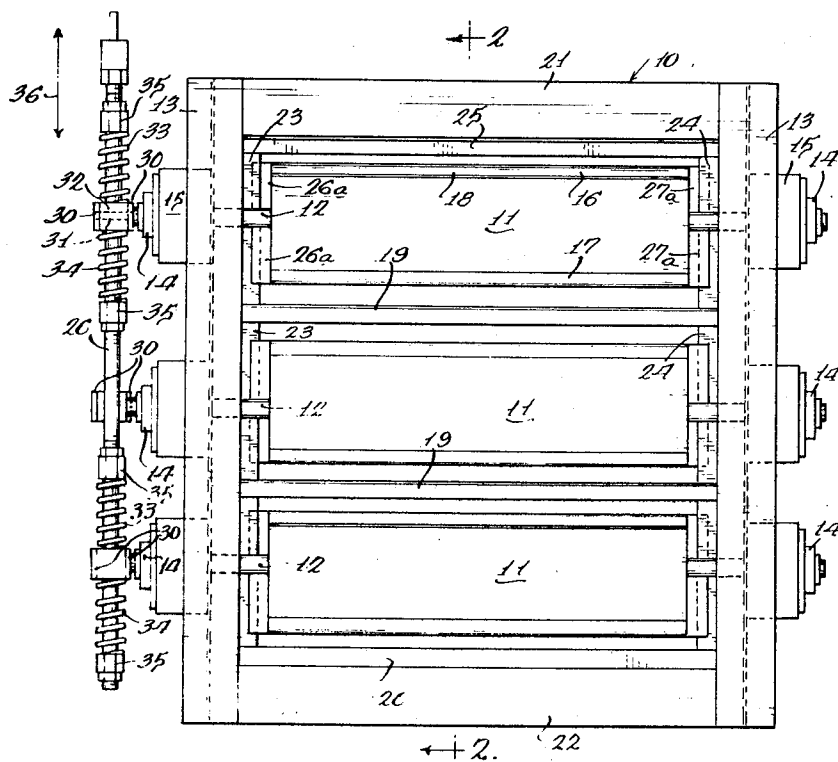
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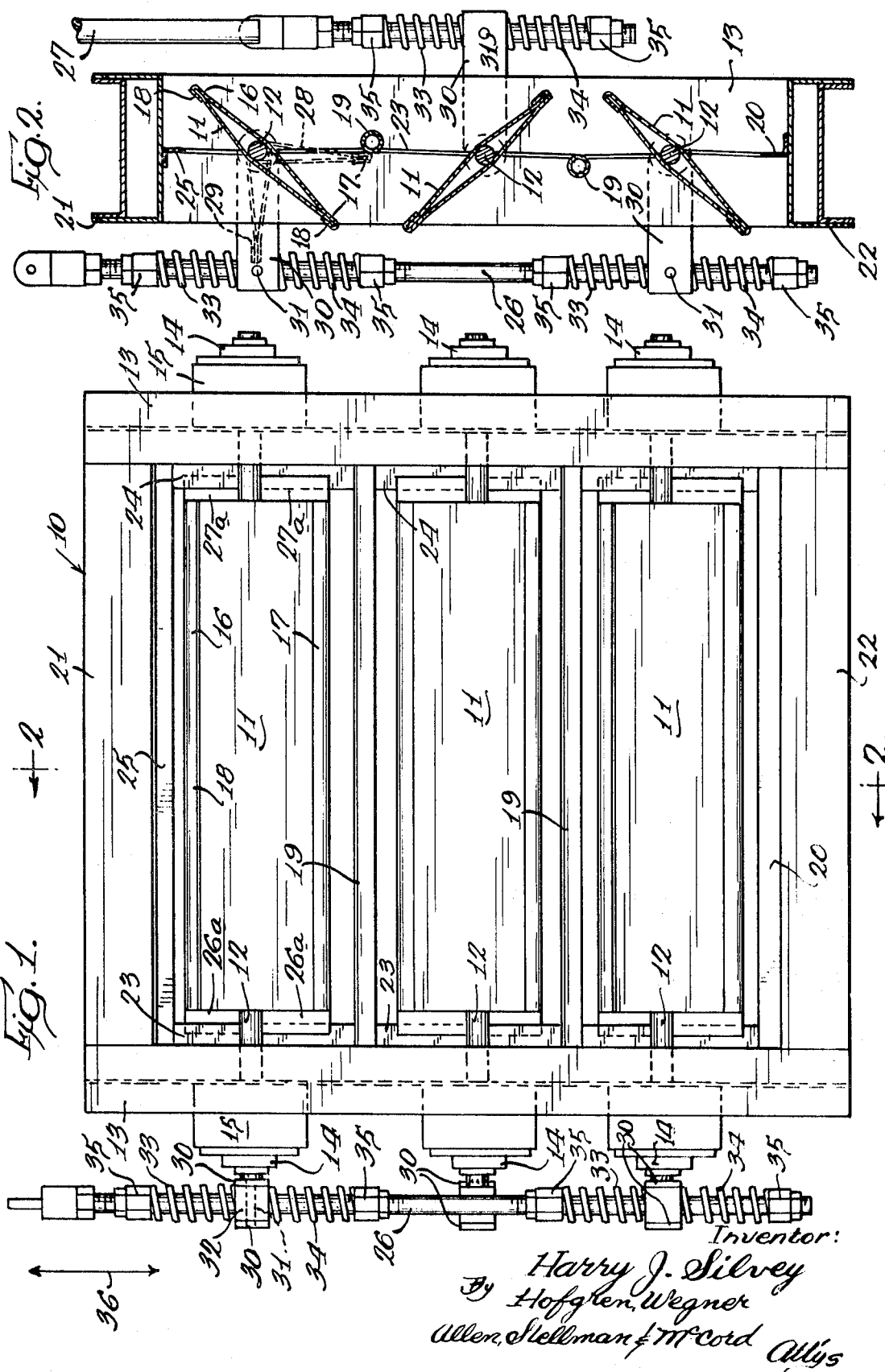
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ABSTRACT: A temperature compensating damper structure adapted to be used to control flow of fluid and subject to extreme temperature changes in which the structure comprises a fluid control damper means such as a plurality of dampers mounted in a frame and movable between open and closed position, stop means against which the damper means bear when in the closed position and yieldable operating means such as springs for moving the damper means to this closed position, the yieldable operating means having a path of travel extending beyond the corresponding closed position of the damper structure against the stop means regardless of expansion and contraction of the damper structure parts during temperature changes therein.





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TEMPERATURE COMPENSATING DAMPER STRUCTURE

One of the features of this invention is to provide an improved temperature compensating damper structure that is particularly applicable for the control of fluids subject to extreme temperatures in which yieldable operating means are employed for moving the dampers to closed position and with the yieldable portion being under stress when in this closed position with the result that expansion and contraction due to temperature changes will be taken up by the yieldable operating means without movement of the closed dampers themselves.

The invention will be described in conjunction with the single embodiment illustrated in the accompanying drawings. Of the drawings:

FIG. 1 is a front elevational view of a temperature compensating damper structure embodying the invention.

FIG. 2 is a vertical sectional view taken substantially along line 2—2 of FIG. 1.

In the damper structure of the drawings there is provided a generally rectangular frame 10 through which the fluid (not shown) flows to be controlled by the damper means. This damper means comprises a plurality of individual dampers 11, here shown as three, each mounted on bearing shafts 12 at the opposite ends of the damper with each shaft extending through a side frame member 13 and rotatably held in a bearing 14 that is mounted on an external bracket 15.

Each damper 11 has a pair of opposite longitudinal side edge portions 16 and 17 carrying a resilient edge covering 18. These longitudinal side edge portions 16 and 17 are adapted to bear against stop means comprising stop members when the dampers are in closed position. The stop members comprise intermediate transverse rods 19 extending between the frame sides 13, top and bottom flanges 25 and 20 attached to the top 21 and bottom 22 frame members and side flanges 23 and 24 attached to the inner surfaces of the side frame members 13. When the dampers 11 are in their closed position which will be approximately vertical the edge portion 16 of the top damper will bear against the right-hand side of top flange 25 as viewed in FIG. 2, the opposite edge portion 17 of this top damper will bear against the left side of the top rod 19, as shown in broken lines in FIG. 2, the corresponding edge portions of the intermediate damper 11 will bear against the transverse rods 19 and the bottom damper 11 will bear against its rod 19 and flange 20 in the same manner as the previously described top damper 11. Also, when in closed position, the opposite ends 26 and 27 of each damper 11 will bear at the portions above the shafts 12 at the rear of the side flanges 23 and 24, as viewed in FIG. 1, and in their bottom portions at the front of these flanges.

In order to operate the dampers 11 there is provided a pair of longitudinally movable bars 26 and 27 arranged at one side of the frame 10 and spaced from the front and rear of the frame. The bar 26 is movable linearly vertically as shown and operates the top and bottom dampers 11 in the illustrated embodiment between fully closed position, illustrated at 28, and fully open position, illustrated at 29. Thus during this movement between fully closed and fully open position each top and bottom damper rotates approximately 90°. The intermediate damper 11 is similarly moved between open and closed position by its bar 27.

In order that linear movement of the bars 26 and 27 will cause corresponding arcuate movement of the dampers 11 there is provided for each damper 11 a pair of parallel operating arms 30 attached to the end of each damper shaft 12 on one end thereof and beyond its bearing 14. Thus each pair of operating arms 30 is attached to an end shaft 12 so that arcuate movement of the pair of arms about the axis of the shaft 12 will cause corresponding arcuate movement, as described, of the dampers 11.

The outer ends of each pair of arms 30 are rotatably connected by pins 31 to opposite sides of a collar 32 positioned between the outer ends of these arms and about the bar 26 or 27. Thus, in effect, each collar 32 "floats" on its corresponding shaft.

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For each collar 32 there is provided a pair of yieldable force applying means in the form of helical springs 33 and 34. The springs 33 and 34 have adjacent ends bearing against the opposite sides of the collar 32 and the other end of each spring bearing against an adjustable nut 35 threaded to the bar 26 or 27 to provide adjustable stops.

The combination of operating bars 26 and 27, springs 33 and 34 and floating collars 32 comprise yieldable operating means for moving the damper means to the closed position previously described. This yieldable operating means has a path of travel, as indicated by the arrow 36, that extends beyond the corresponding closed position 28 of the dampers in order that the yieldable means will apply a yieldable closing force caused by compression of the springs 33 to hold the dampers against the stop means during temperature changes that would otherwise cause the dampers to move relative to each other and the frame. Furthermore, any movement due to temperature changes in the operating arms 30 and other parts of the structure will be absorbed by either the springs 33 or 34 of the pairs of springs. Thus, when the bars 26 and 27 are "overstroked" in moving the dampers to their closed position by moving the bars 26 and 27 downwardly, as shown in the drawings, the top springs 33 are compressed while the bottom springs 34 are relaxed. However, when the frame 10 expands on heating the opposite occurs.

I claim:

1. A temperature compensating damper structure for controlling flow of fluid, comprising: fluid flow control damper means comprising a plurality of dampers; means for mounting said damper means for movement between open and closed positions; stop means against which each said damper of said damper means bears in said closed position; yieldable operating means for moving said damper means to said closed position having a path of travel extending beyond the corresponding closed position of each said damper of said damper means, thereby applying a yieldable closing force holding said damper structure against said stop means during temperature changes in said structure; a frame through which said fluid flows and across which said damper means extends, said yieldable operating means being located externally of said frame to be out of substantial contact with said fluid; and bearings in which said plurality of individual dampers are rotatably held in said frame, said external yieldable operating means comprising an arm operatively attached to each said damper and arcuately movable therewith, a longitudinally movable bar and yieldable force applying means between said bar and each said arm, said yieldable force applying means comprising a pair of springs on said bar operatively bearing against opposite sides of each said arm and extending between a stop on said bar and its arm.

2. The structure of claim 1 wherein each said damper comprises longitudinal side edge portions, and said stop means comprises stop members between said dampers against which said edge portions bear in said closed position.

3. A temperature compensating damper structure for controlling flow of fluid, comprising: fluid flow control damper means; means for mounting said damper means for movement between open and closed positions; stop means against which said damper means bears in said closed position; yieldable operating means for moving said damper means to said closed position having a path of travel extending beyond the corresponding closed position of said damper means, thereby applying a yieldable closing force holding said damper structure against said stop means during temperature changes in said structure; and a frame through which said fluid flows and across which said damper means extends, wherein said yieldable operating means is located externally of said frame to be out of substantial contact with said fluid and wherein said damper means comprises a plurality of individual dampers rotatably held in bearings in said frame, and said external yieldable operating means comprises an arm operatively attached to each said damper and arcuately movable therewith, a longitudinally movable bar and individual yieldable force applying means between said bar and each said arm.