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M. HINDEN

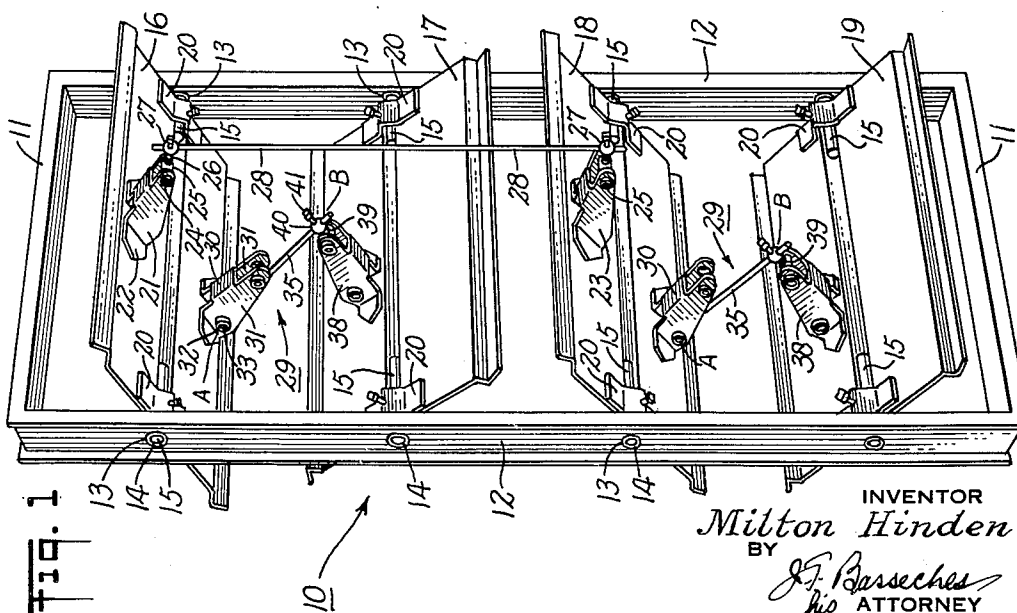
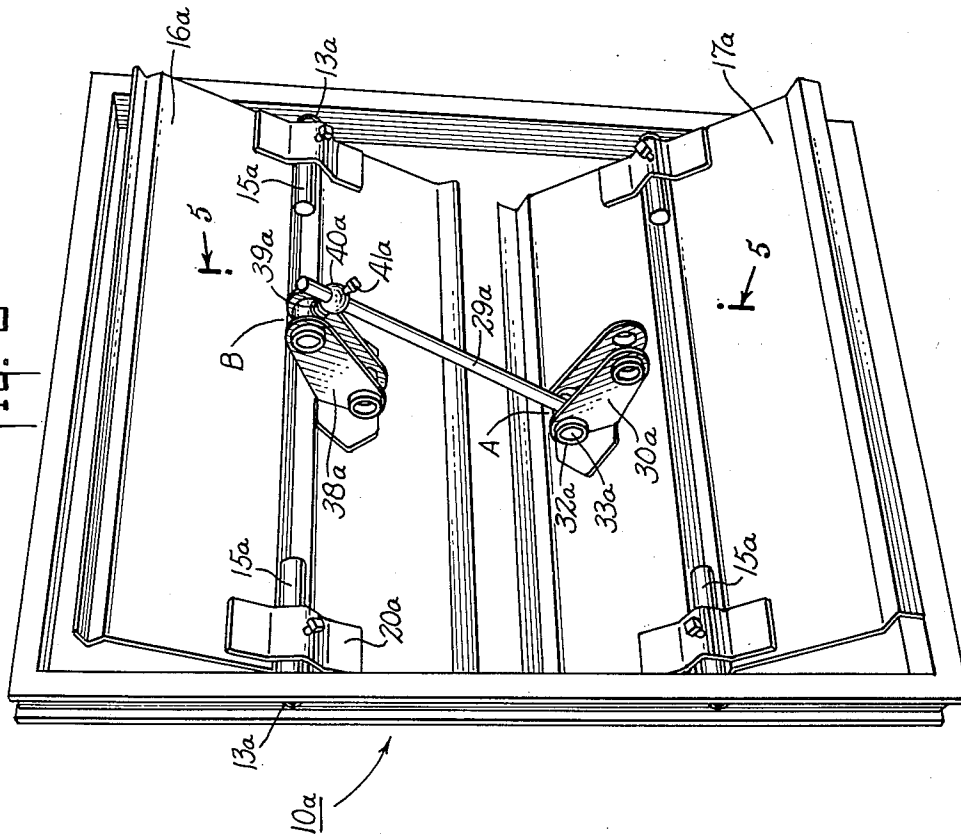
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DAMPER AND LINKAGE THEREFOR

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Fig. 2



INVENTOR
Milton Hinden
BY
J. Barseches
ATTORNEY

July 17, 1962

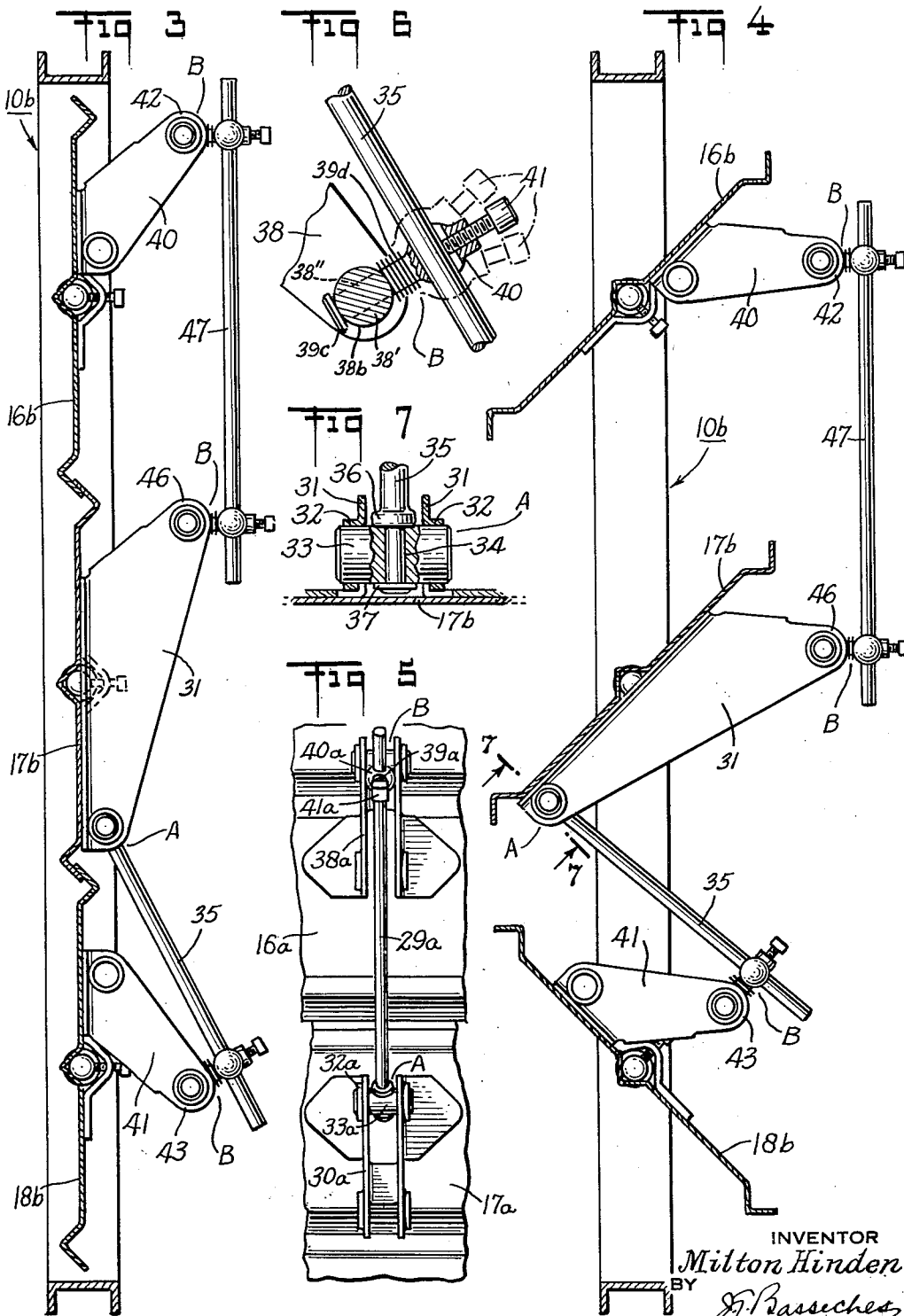
M. HINDEN

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INVENTOR
Milton Hinden
BY
J. Bassiches
his ATTORNEY

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DAMPER AND LINKAGE THEREFOR

Milton Hinden, 701 Blackstone Ave., East Meadow, N.Y.

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1 Claim. (Cl. 98—110)

This invention relates to a damper construction, and more particularly to damper linkage therefor.

The invention applies some of the features of the construction more specifically set out in my Patent No. 2,863,374. In the aforesaid patent, there is disclosed and outlined damper hardware, and particularly a bracket construction whereby a plurality of damper blades are assembled in louver fashion to control the flow of air or like medium in the duct assembly of an air conditioning or like circulating system, and includes bracket means whereby damper blades may be installed in the field and secure the requisite quiet sliding, pivotal movement without the necessity for employing special jigs and tools for assembly.

Known to me is the provision of an arrangement of blades in a louver assembly overcoming the problem of objectionable air flow stratification by correlating the pivoted louver blades in opposed angular relationship. While such construction is desirable and makes possible calculatable installations in the shop, the inability to assemble the same in the field without special tools or jigs has heretofore confined the assembly to factory installed units.

While the foregoing damper hardware as outlined in my patent aforesaid permits full assembly of louver arrangements of dampers in a parallel blade assembly, such construction has not been adaptable to the problems of damper control to minimize stratification of the air flow in ducts under such control without expensive accessories and tools and the use of the costly labor of skilled mechanics, not always available in the field.

Still further objects of the invention reside in the provision of a coupling whereby the pivoted blades of a louver assembly may be coupled in opposed angular relationship to secure quickly and efficiently a relationship of angular position of blades to effect opposed damper construction in the field, to meet a wide variety of operating conditions and operate efficiently without the necessity for special jigs or tools to effect the assembly.

To attain these objects and such further objects as may appear herein or be hereinafter pointed out, I make reference to the accompanying drawing, forming a part hereof, in which—

FIGURE 1 is a perspective view showing a multiple blade louver assembly;

FIGURE 2 is a perspective view showing linkage in accordance with my invention mounted on a two blade assembly wherein the blades move in opposed relationship;

FIGURE 3 is a longitudinal, sectional view of another embodiment of my invention;

FIGURE 4 is a view similar to FIGURE 3, with the assembly in the open position;

FIGURE 5 is a fragmentary end elevation of a two blade assembly in accordance with my invention in the closed position thereof;

FIGURE 6 is a fragmentary detail;

FIGURE 7 is a section taken on the line 7—7 of FIGURE 4.

Making reference to the drawings, in one embodiment thereof shown in FIGURES 1, 3 and 4, a rectangular frame 10, arranged to fill a duct is illustrated and is composed of horizontal channel members 11 and vertical channel members 12 arranged to conform to a predetermined duct. Bearing portions 13 are fitted with bushings 14 serving as bearings for pins 15 for pivotally supporting blades 16, 17, 18 and 19, passing through bearing straps 20 carried by each of the damper blades 16,

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17, 18 and 19. Blades 16 and 18 are coupled in parallelism, and for this purpose blade 16 is provided with a bracket 21 having a base 22 for affixing the same to the blade by suitable affixing means, such as rivets or like fastening elements. Blade 18 likewise is provided with a similar bracket 23. Each of the brackets 21 and 23 terminates in bearing portions 24 through which trunnions 25 are directed, which trunnions support reach rods 26 carrying eyes 27 for fixedly coupling to the connecting rod 28. A construction for making such parallel coupling of the blades 16 and 18 is in accordance with my patent aforesaid.

To correlate the blades 17 and 19 with the blades 16 and 18, to relate the same to each other in opposed relationship, I provide a linkage coupling 29. This arrangement consists of a bracket 30 having spaced arms 31, between which bearings 32 are disposed, supporting a trunnion 33.

The trunnion 33 has a transverse boring 34 (see FIG. 7) into which extends the connecting rod 35, headed by flanges or washers at 36 and 37 staked to the rod 35 for positive driving movement, while retaining a pivotal axial coupling A of the connecting rod 35 in relation to the trunnion 33. For convenience, this coupling may be termed a pivotal coupling.

The terminal portion of the connecting rod 35 is coupled to the bracket 38 which is provided with reach rod 39, in accordance with the construction of my patent aforesaid, the eye 40 thereof having a set screw 41 for adjustably holding the reach rod in relation to the connecting rod 35.

As noted in said patent and indicated in FIGURE 6 herein, trunnion member 38' is slidably carried in opposed bearing apertures 38b in bracket 38, the said trunnion member thus being slidable laterally and pivotable within said apertures 38b. The reach rod 39 is slidably secured within transverse bearing 38' formed through the trunnion member 38' and is prevented from retraction therethrough by headed end parts 39c. A spring 39d is biased between trunnion 38' and eye 40, normally to urge the eye and rod 35 away from trunnion 38'. The eye 40 of the coupling B which is shown in FIGURE 6 may be moved in three dimensions, namely pivotally in a vertical plane, laterally or in a horizontal plane by the sliding movement of trunnion 38' in bearings 38b, and axially toward and away from the trunnion against the biasing influence of spring 39d. The coupling B being thus movable in three planes will, for convenience, be termed a "universal" coupling.

As shown in FIGURE 6, the reach rod 40 may be secured to the connector rod 35 in a plurality of angular orientations with respect thereto. This angular connection is made possible through the use of a relatively soft metal connecting rod 35, and a relatively hard metallic set screw 41. When the hardened screw 41 is tightened down on the rod 35 in angularly oriented position with respect thereto, the rod becomes indented at the point of contact with the screw, and the parts 39, 35 are thus maintained in angularly oriented position, see dotted lines FIGURE 6.

Similarly, a linkage assembly may be employed to couple the blades 18 and 19, as more clearly shown by the linkage coupling 29, thereby coupling the four blades 16, 17, 18 and 19 in opposed relation—that is, the first and third blades, 16 and 18, and the second and fourth blades, 17 and 19, in parallelism while the first and second blades, 16 and 17, and the third and fourth blades, 18 and 19, are in opposed relation.

By the assembly shown, particularly in view of the flexibility occasioned by the reach rod extending from the trunnion 39, angular correlation of the blades 16 and 17 may be made without the use of especially accurate

tooling, avoiding the necessity for building up of stands or platforms, which operation must be accomplished with great accuracy to prevent binding.

The spaced positions of the bracket arms provide great economy in permitting the use of metal stampings since bearing orifices may be located along the length of the arms at spaced points, thereby permitting changes in the leverage factors of the opposed brackets.

Such a construction is illustrated in FIGURE 2 wherein the louver assembly 19a is shown provided with a blade 16a coupled to a blade 17a by a linkage assembly, previously described, wherein bracket 30a is joined to the bracket 38a by a connecting rod 29a in which a pivotal coupling A of the connecting rod is made to the base of the bracket 30a and an adjustable universal coupling B is made between the connecting rod 29a and the bracket 38a.

Further arrangements of the combined link assembly having a pivotal coupling A and an adjustable universal coupling B in various leverage ratio are illustrated in FIGURES 3 and 4, whereby combined parallel and opposed damper actuation may be secured. In this construction the frame 10b has pivotally mounted louver blades 16b, 17b and 18b. Affixed to the blades 16b and 18b are brackets 40 and 41, terminating at their ends 42, 43 in the adjustable universal coupling B previously described. The blade 17b has an extended bracket 31. This bracket spans the pivotal support for the blade and has one end formed with a pivotal coupling A, to which the connecting rod 35 is coupled.

The terminal portion 46 of the bracket 31 is installed with the adjustable universal coupling B for coupling to the connecting rod 47 which, in turn, is coupled to the bracket 40 by the adjustable universal coupling B.

By the construction described, the common bracket 31 serves to couple alternating blades in parallel or in opposed relation, with the ability for field installation, securing actuation without requiring skilled labor for assembly or costly jigs to hold the parts in relation to each other, as any inaccuracy in alignment or axial positioning of the blades to each other or the positioning of the brackets to the blades will be corrected by self-adjustment.

By my construction, ready installations of multiple blade louvers may be made in opposed or parallel relationship, quickly and efficiently.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is—

An opposed damper assembly comprising a frame, a pair of blade members pivotally mounted on said frame in a manner permitting the blades to be rotated in opposed directions to a mutually, substantially parallel open position and an aligned closed position, first and second bracket members, respectively, secured to said blades, said bracket members each having at least one bearing aperture, trunnion means supported in said bearing apertures, said bearing aperture of said first bracket member lying in substantially close adjacency to the plane of one said blade, and said bearing aperture of said second bracket member lying in spaced relation from the plane of said other blade, a connector rod of relatively soft material secured in said trunnion means of said first bracket member, a reach arm having one end secured to said trunnion of said second bracket member and having its other end radially spaced from said trunnion, said spaced end including adjustable connector rod clamp means comprising an aperture defined by the walls of said reach rod, the dimensions of said aperture being greater than the cross-sectional dimensions of said connector rod, thereby permitting a range of angular movement of said reach rod to said connector rod when said connector rod is inserted through said aperture, said clamp means including a set screw member of relatively hard material as compared with said connector rod threaded into the end of said reach rod and arranged, upon rotation, to be projected into said aperture, said set screw member being effective, upon tightening, to secure said connector rod within said aperture in an angularly oriented relationship to said reach rod.

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