Jan. 1, 1952 G. A. DELF ET AL 2,580,663

VARIABLE-WIDTH WINDOW FAN ASSEMBLY

Filed Dec. 16, 1949

FIG. 1.

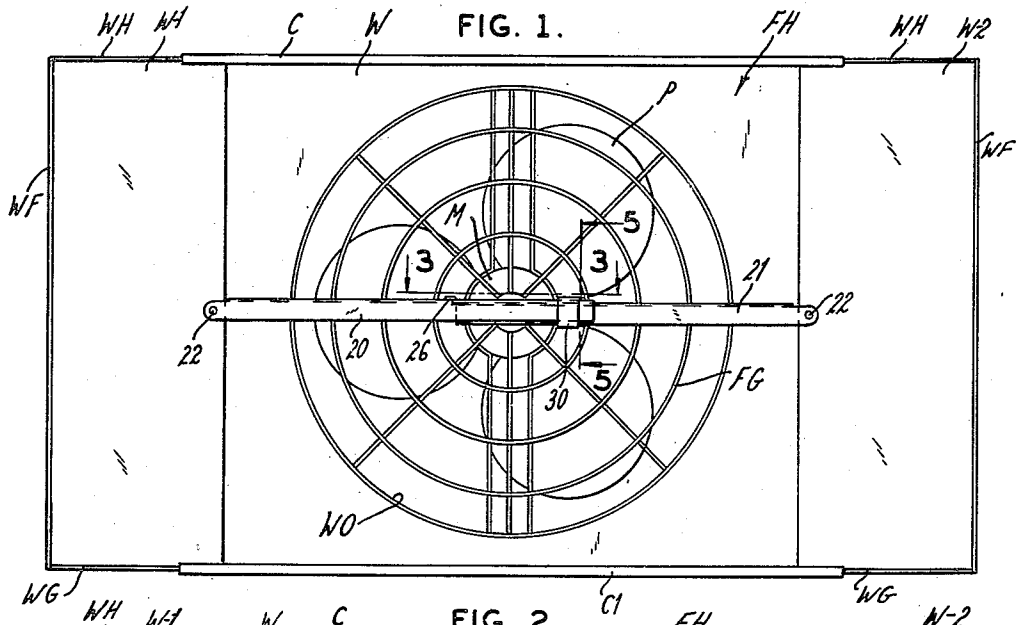


FIG. 2.

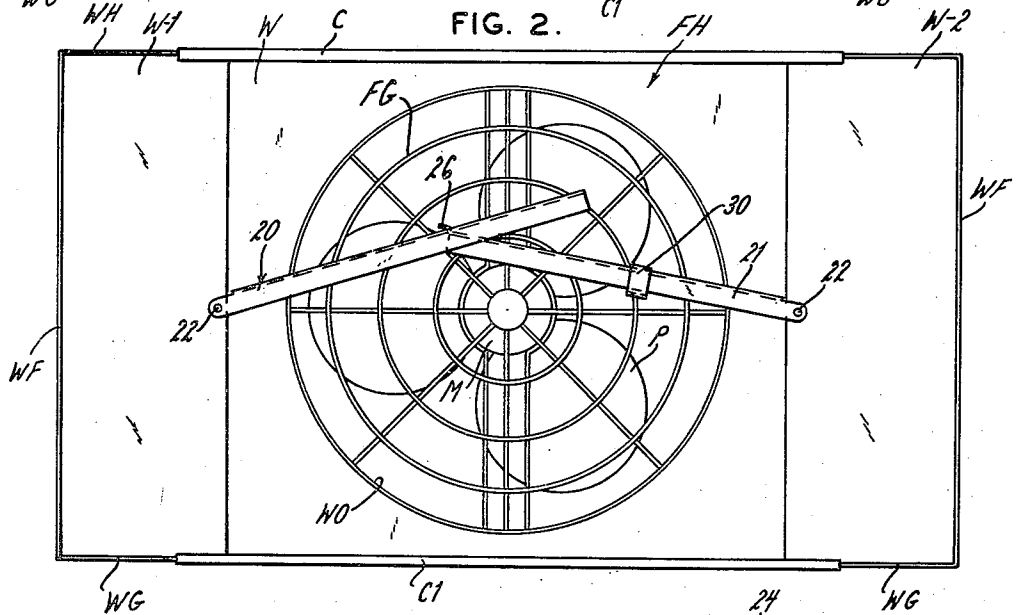
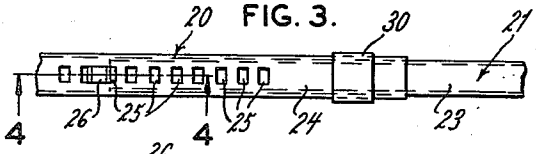


FIG. 3.



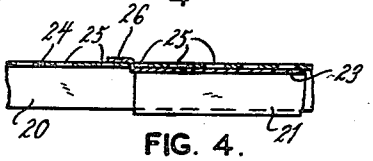


FIG. 4.

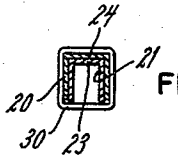


FIG. 5.

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VARIABLE-WIDTH WINDOW FAN ASSEMBLY

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Application December 16, 1949, Serial No. 133,391

1 Claim. (Cl. 98—94)

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This invention relates to improvements in variable-width window fan assemblies, and more particularly to a simplified, positively-acting provision for adjusting, laterally of a fan supporting frame, one or more wing elements or side panels movably attached to or forming a part of the frame, whereby to extend the fan assembly fully across the window opening.

The present applicants are aware that numerous attempts have heretofore been made to attain a simplified yet positive assembly either as a part of, or as accessory to window fan assemblies, for the purpose noted. However, those thus far offered to the trade for such purpose present one or more of the shortcomings of excessive costs, unwarranted complication, or the necessity for skill in effecting proper width adjustments, to mention but a few such heretofore prevailing difficulties. It is accordingly a major and general objective of the present improvements to simplify and to render foolproof, a window fan assembly embodying width-adjusting provisions so as to enable same quickly and readily to be brought to an adjusted position such that the assembly fully bridges the window opening.

Reference is directed to a copending application, filed concurrently herewith by George A. Delf and Robert E. Kortum, on related subject matter. The copending application entitled "Window Fan Assemblies with Width Adjustment Provisions" was filed December 16, 1949, and bears Serial No. 133,392.

The present invention may be summarized by reference to the selected disclosed embodiment thereof, as including in a complete and operative assembly, a window fan and driving motor together with a supporting frame which will usually but not necessarily consist of a housing or casing about the fan and motor, together with one or more horizontally adjustable, normally vertically disposed panel or wing elements slidably connected to the frame, and a simplified two-link toggle mechanism the elements of which are operatively connected to the one or more adjustable wings, and with which is provided a simple form of clamping means for maintaining the links or arms of the toggle assembly, in centered or aligned relation following the desired width adjustment.

A further important advantage and object of the present improvements is realized in the provision of a pair of variably interfitting arm elements provided with a preferably integral tongue and slot connection serving the dual purpose of a toggle hinge incident to adjusting movements

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of the arms, and when adjusted, serving to maintain the adjusted relation of the wing elements of the housing as well as the arms, against casual extending or retracting movements, and at the same time providing assurance against any loosening effects due to vibration of the fan-motor assembly.

Yet another important object of the invention is attained in a device of the general nature above noted and which may be formed for the most part of stock materials with but a minimum of forming operations, and with a minimum of tooling expenditure.

The foregoing and numerous other objectives and advantages of the invention will more clearly appear from the following detailed description of a currently preferred embodiment, particularly when considered in connection with the accompanying drawing, in which:

Fig. 1 is a rear view of an adjustable-width window fan assembly embodying the present improvements, and showing a pair of toggle arms or links and the slidable wing elements in adjusted position;

Fig. 2 is a view similar to Fig. 1, but showing the adjusted arms or links in a divergent relation as same would appear in the course of effecting adjustment of the arms and wings;

Fig. 3 is a fragmentary top or plan view taken in the zone of attachment or connection of the inner ends of the arms or toggle links, and particularly as viewed from line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view, taken in a vertical plane through the zone of connection of the ends of the arms or toggle links, and

Fig. 5 is a transverse section through the arms when in operative relation, particularly as viewed along line 5—5 of Fig. 1.

Referring now by characters of reference to the drawing, those parts of the assembly which are or may be of conventional construction include a propeller or fan of rotary type, and indicated at P, for which a driving motor M is provided, the latter being supported by hangers (not shown), in any suitable manner from the frame or housing generally indicated at FH. A planar rear wall element W of the frame or housing proper is provided with a circular opening WO, and a fan guard FG is provided either or both forwardly and rearwardly of the fan P, as desired.

The vertical wall element W or other frame member usually formed of sheet steel or the like, is provided with a channel formation C along its

upper horizontal margin, and a companion such channel C1 along its lower margin.

As will be well understood, the housing, casing or frame such as FH, is usually constructed in fixed dimensions, and over a minimum width such as to occupy the smaller sizes of windows generally encountered by the trade. For the purpose of enabling the fan assembly fully to bridge the window opening as between the vertical pulley stiles or other side frame elements of the window structure, there is provided at least one, but usually a pair of extensible and retractible wing elements, the pair of which are indicated respectively at the left (Fig. 1) as W1, and at the right a similar panel being indicated as W2. Each of the wings is provided with a right angular flange WF along its free vertical margin, and similar such flanges WG at the bottom and WH along its top horizontal margin. These flanges are so proportioned as to be guidedly movable within the channel flanges C and C1 incident to width adjustment of the assembly.

It is assumed for brevity of description that a single toggle adjustment assembly will adequately serve the purpose of extending and retracting the wings W1 and W2, although in larger sizes a plurality thereof may be employed. A single such assembly as shown, consists of a hinged or pivoted arm generally indicated at 20 and connected for example to the wing W1, together with a companion such arm 21 pivotally connected to the opposite wing W2. A pivot pin or rivet such as 22 serves hingedly to connect each arm to the vertical midpoint of the inner marginal part of the adjacent wing.

It is preferred, for lateral rigidity and for the purpose of limiting the movement of arms downwardly to a horizontal centered relation, to form each thereof of a downwardly-open U shape or channel section, as best seen from Fig. 5. The cross sections of the respective channels are so selected that, for example, the channel 21 will normally snugly interfit without projection, the channel constituting the arm 20 so that, when centered following adjustment the upper wall 23 of the channel constituting arm 21, will firmly abut and lie closely parallel to the upper wall or bridge portion 24 of the channel constituting the arm 20.

The upper wall of arm 20 is provided with a linear series or row of slots being rectangular apertures indicated at 25, these being adapted selectively to receive an upwardly and axially extended, preferably integral tongue portion 26, best seen in Fig. 4, formed on the extreme upper portion, at the innermost or free end of the arm or link 21.

As a clamping or holding provision for maintaining the toggle arms or links in an aligned or centered relation once the proper adjusted position of the wings W1 and W2 has been attained, there is provided a slidable clip or ring member of a rectangular section and indicated at 30. The inside dimensions of clamp ring 30 are such that it will rather snugly fit, and thus be frictionally retained in the position to which it is manually moved along the arm or link 20, it being noted that it is a preference for ring 30 fully to embrace the innermost end region of arm 20, which is left free of the slots 24.

The manner of manipulation of the adjusting elements of the toggle linkage, together with the wings and associated parts, is thought now to have become fully apparent from the preceding description of parts, but it may be noted for completeness that, incident to normal initial installation, the fan assembly including the frame or housing FH, will be substantially centered within the lower part of the window opening, with the sash raised, and with the wings W1 and W2 retracted as far as possible, the clamping clip 30 having been moved to a position free of the end of bar 20 as is shown by Fig. 2. The arms 20 and 21 may if desired or necessary, be entirely separated incident to full retraction of the wings. The wings or panels W1 and W2 are now manually shifted, to an approximate equal extent, such that the vertical flanged margins WF thereof, will firmly abut the vertical pulley stiles or other relatively smooth vertical elements of the window framing structure. In such relation of parts, it will now be obvious that actuation of the fan by the motor will compel a movement of the stream of air by the fan through the fan circle, rather than with any possibility of by-passing or shunting the air, outside the intended path of circulation. It is further noted that the sash will be brought downwardly so as firmly to engage the upper flange C of the assembly in order to complete the closure of the window by the sash, the frame FH and the wings.

The wing adjustment now attained is maintained by insertion of the tongue 26 and the adjacent end of the arm 21 within the channel of the arm 20, and with the tongue 26 in engagement with that one of the slots 25 which, upon trial, is found to keep the wings tightly against the pulley stiles with the arms or links of the toggle centered in horizontal position. This effect is most desirably realized by selecting such a slot 25 that the arms and wings will be kept under at least a slight compression, thus minimizing any vibration effects which might be due to looseness of the wings, and at the same time conducing to the most effective possible seal between the wings and window frame elements. The arms 20 and 21 having been brought downwardly to horizontal or centered relation as shown by Fig. 1, the parts being thus limited in their downward movement as above noted, the clip 30 is moved to the left from the position of Fig. 2 to its holding position of Fig. 1, in which position the end of the arm 21 is firmly telescoped and retained to a variable axial extent within the end of the arm 20.

Once the proper slot 25 is selected for the tongue 26, to fit a given window, it will now be obvious that it is a simple matter to release the toggle arms, retract the wings incident to seasonal removal, and that it is an equally expeditious operation to reinstall the fan either in the same or a different window, following seasonal storage and incident to re-use.

It will now have appeared that the assembly as described will serve fully to attain each of the objectives hereinabove expressed, as well as numerous others implied from the later description. Although the invention has been described by detailed reference to a single embodiment, the detail of description should be understood as instructive rather than in any limiting sense, inasmuch as numerous variants are possible within the intended scope of the claim hereunto appended.

We claim as our invention:

In a window fan assembly, a rotary fan and motor therefor, a casing of fixed dimensions enclosing the fan and motor, a pair of horizontally movable, normally vertically disposed wings, one at each side of said casing, companion flanges on

the upper and lower margins of the casing and similarly located flanges on said wings, the flanges coacting to guide the wings and constrain same to an even horizontal travel incident to their adjusting movements, a two-part toggle or distance arm normally bridging the wings, a pivot pin at the outer end of each part of said arm through which the arm parts are each pivotally connected to an associated wing, each of said arm parts being of an inverted channel section, but one such part being of smaller dimensions such as slidably and snugly to interfit the other said part, said one arm part being provided with an upwardly extended tongue having a flat, normally horizontal terminus, and said other part provided with a linear series of tongue-receiving slots, the said two parts of the arm being adapted for movement, each about its pivot, so as to enable insertion of the tongue of the one arm part in one of the slots of the other part with the flat terminus of the tongue overlying and abutting the top surface of the companion arm part whereby to limit the divergent toggle movement of the arms to a centered or aligned relation thereof, the inside upper surface of the slotted portion of said other part serving as an internal

abutment for the one arm, further to prevent relative movement of the arm parts below horizontal incident to their interconnection, and a slide piece in the form of a rectangular ring, fully embracing one of said arms and slidable over the other said arm when the arms are interconnected, whereby to maintain them in a rigid aligned relation and thus fix the distance adjustment of said wings.

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