Feb. 7, 1950 B. D. BROWN 2,496,773

FOLDING STAIRWAY

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Fig. 1

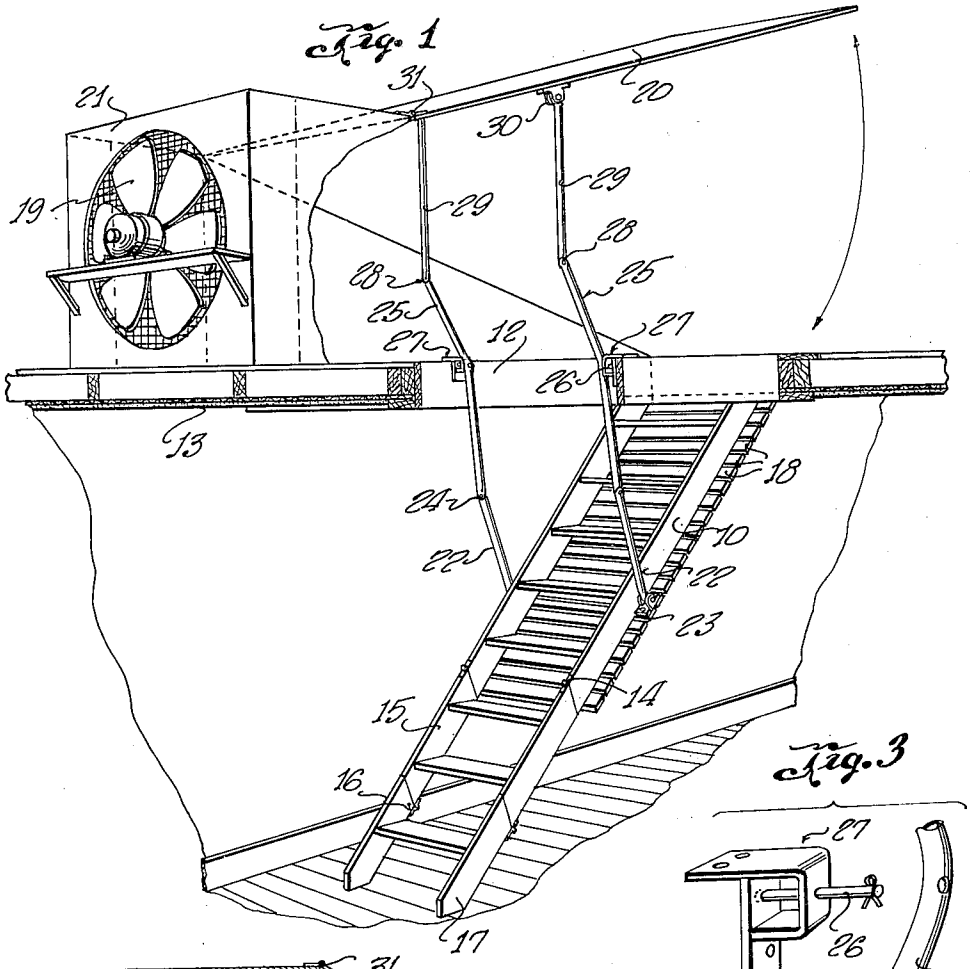
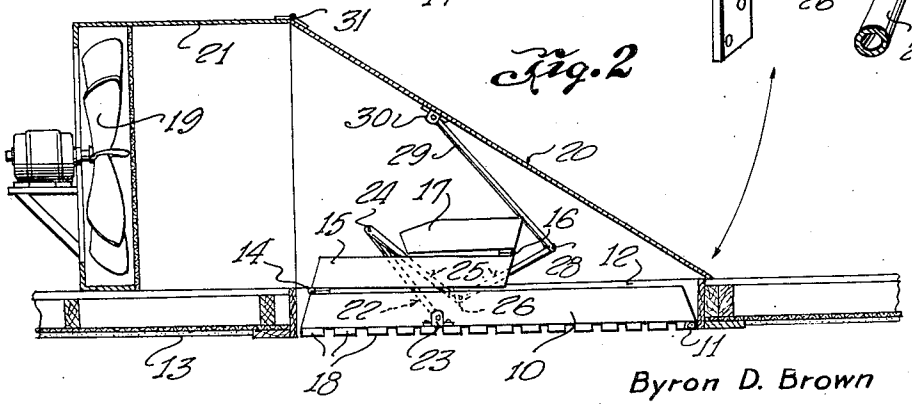


Fig. 3

Fig. 2



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FOLDING STAIRWAY

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5 Claims. (Cl. 228—50)

1

This invention relates to folding stairways and it has particular reference to a new and improved mounting for folding or disappearing stairs.

The principal object of the invention is to provide a mounting and counterbalance for stairs of the type usually employed to gain access to the attic of a building or more especially used in connection with attic ventilation and wherein a hinged section of the attic fan intake housing constitutes the counterbalance for the sectional stairway, the latter being connected to the counterbalance through the medium of a pair of arm assemblies affording a compound leverage effective to assume the weight of the stairway, enabling it to be raised and lowered with little effort.

Another object of the invention is to provide a disappearing stairway in foldable sections, the major section constituting a closure for the attic opening but which is latticed or louvered to permit passage of air influenced upwardly by the action of the attic fan. Moreover, the fan housing, being located adjacent to the attic opening, an inclined and hinged section thereof constrains the air to pass only through the louvered section of the stairway when the latter is in raised position but when the stairway is lowered, the hinged housing section is raised, thereby allowing headroom for one entering the attic by way of the stairs.

With the foregoing objects in view, the invention has further reference to certain features of accomplishment which will become apparent as the description proceeds, taken in connection with the accompanying drawings wherein:

Figure 1 is a perspective view partly in section showing an attic fan, housing and a disappearing stairway constructed according to the invention as well as the arm assembly connecting the stairway to a hinged section of the fan housing.

Figure 2 is a side elevational view of the stairway in raised position, and

Figure 3 is a combined view showing the complementary parts of the stairway suspension arm fulcrum in perspective.

Continuing with a more detailed description of the drawing, reference numeral 10 denotes the upper or major section of a sectional stairway and which is hinged at 11 to one end of an opening 12 in the ceiling 13 which separates the attic from the lower part of a building. To the lower end of the section 10 is hinged at 14 an intermediate section 15 and to the latter, in turn, is hinged at 16 a lower section 17. When the sections 10, 15 and 17 are extended to form a stairway, they appear as shown in Figure 1 but in

2

folded position, the relationship of the sections is as shown in Figure 2.

The major stair section 10 is of a length and width suitable to cover the ceiling opening 12 which also serves to admit air to the attic and to permit such passage of air, slats or louvers 18 are affixed to the stiles of the major section 10.

Suitably mounted at one end of the opening 12 is a conventional ventilating fan 19 of any desirable construction, under whose influence, air is constrained to pass from rooms below into the attic through the opening 12. However, such movement of air is not entirely confined to the opening 12 while the stairway is lowered due to the fact that a section 20 of the housing 21 of the fan 19 serves as a counterbalance for the stairway and when the latter is in operative position, the section 20 is in inoperative position to direct air into the housing 21 but instead, it is elevated, as shown in Figure 1.

To connect the housing section 20 to the stairway, a pair of relatively pivoted arms is provided, each consisting of a straight lower arm 22 whose lower end is pivoted between the ears of a plate 23, the latter being affixed to one side of the major stair section 10 opposite an identical companion plate thereon. To the upper end of the arm 22 is pivoted at 24, the lower end of an arm 25, bent at its approximate midsection at an obtuse angle and at its midsection or vertex of the angle, the arm 25 is oscillatable on a fulcrum consisting of a pin 26, anchored in a strap metal mounting 27, as shown in Figure 3. Obviously, this mounting may be substituted by any other suitable device but as such, the mounting is affixed to the sides of the opening 12 in the manner shown, to rockably support the arm 25.

To the opposite end of the arm 25 is pivoted at 28 a straight arm 29 whose upper end is pivoted between the ears of a plate 30, not unlike the plate 23 to which the lowermost arms 22 are joined. The plates 30 are affixed to the underside of the fan housing section 20 which latter is hinged at 31 to the top edge of the fan housing 21 nearest the opening 12.

It is apparent from the foregoing and from the drawing that when the stairway is folded into the attic opening 12, a pull upon the end of the major section 10 opposite the hinge 11 will exert a pull upon the end of the bent arm 25 at its pivotal point 24, which will place the arm 29 under compression and will thereby exert an upward thrust on the housing section or counterbalance 20. Obviously, the leverage imposed through the articulated arm assembly because

of the peculiar pivotal relationship of the arms and their positions with respect to the stairway and counterbalance **20** will reduce to practically nil the effort which would otherwise be required to manipulate the stairway. A great deal depends however on the particular location of the connections between the arms and the stairway section **10** and the counterbalance **20**, it being pointed out that in the latter case the connection is positioned to dispose the greater part of the weight of the counterbalance at the free end of the latter. While not shown, the connections **30** may be made adjustable longitudinally on the counterbalance **20** for obvious reasons.

When the stairway is lowered, the counterbalance **20** is raised so that one ascending the stairway will have head room upon entering the attic. On the other hand, when the stairway is folded into the opening **12**, the counterbalance **20** becomes a part of the fan housing to close all openings except the opening **12**, thus constraining air influenced by the fan **19** to enter the opening between the slats **18** of the major stair section **10**.

Manifestly, the construction as shown and described is capable of some modification and such modification as may be construed to fall within the scope and meaning of the appended claims is also considered to be within the spirit and intent of the invention.

What is claimed is:

1. In a folding stairway, a series of step supporting sections hinged in end to end relationship, the upper of said sections being louvered and hinged in a ceiling opening, a ventilating fan and housing above the ceiling, a hinged section on said housing, a pair of articulated arm assemblies, each consisting of a lower arm pivotally connected to the upper stairway section, an upper arm pivotally connected to said housing section, an intermediate bent arm pivotally connected at its ends to the ends of said upper and lower arms and pivoted at its midsection to the sides of said ceiling opening whereby said housing section will counterbalance said stairway and will constrain air influenced by said fan to pass upwardly through said ceiling opening when said stairway is folded therein.

2. A folding stairway including step supporting sections hinged in end to end relationship, the upper of said sections being louvered and hinged in a ceiling opening, a ventilating fan and housing adjacent said opening, a member hinged at one end to said fan housing, an articulated arm assembly on each side of said stairway the lower ends being connected to the sides of said upper stairway section, the upper ends being connected to said hinged member whereby the latter will counterbalance said stairway in its opening and closing movements and to close said fan housing to air except through said louvered stairway section in closed position thereof.

3. A folding stairway including a plurality of step supporting sections the upper of which is reticulated and hinged in a ceiling opening, a fan housing above and adjacent to said opening, a fan in said housing, a housing section hinged to said housing, articulated and relatively pivoted means for pivotally connecting the upper stairway section and said housing section whereby the latter will counterbalance the raising and lowering movements of said stairway and will, in closed position of the latter, constrain air influenced upwardly by said fan to enter solely through said ceiling opening.

4. A folding stairway including sections hinged in end to end relationship, the upper of said sections having louvers on one side and hinged at one end to a ceiling opening, a fan housing adjacent said opening, a member constituting a part of and hinged to said fan housing adapted to overlie said opening and means effecting articulated connection between the upper section of said stairway and said hinged member whereby the latter will counterbalance said stairway and confine the intake of air influenced by said fan to said ceiling opening when said stairway is in folded position.

5. A stairway as set forth in claim 4, further defined in that the articulated means consists of two sets of arms each comprising three arms, the upper and lower arms being pivoted at their upper and lower ends to the counterbalance and stairway respectively and an intermediate arm pivoted at its ends to the ends of said upper and lower arms and bent to define an obtuse angle, said intermediate arm being pivoted at its vertex to a side of the ceiling opening.

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No references cited.