Dec. 10, 1940. B. A. BENSON 2,224,628

FAN STRUCTURE

Filed May 6, 1938 2 Sheets-Sheet 1

FIG. 1.

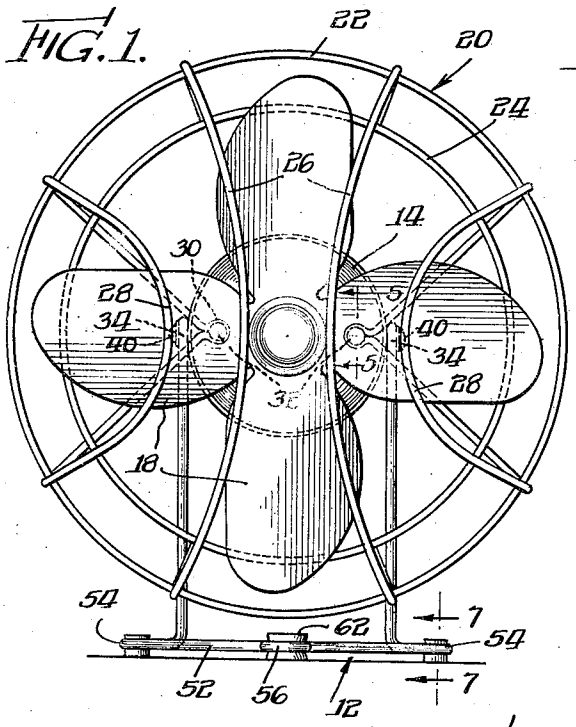

FIG. 2.

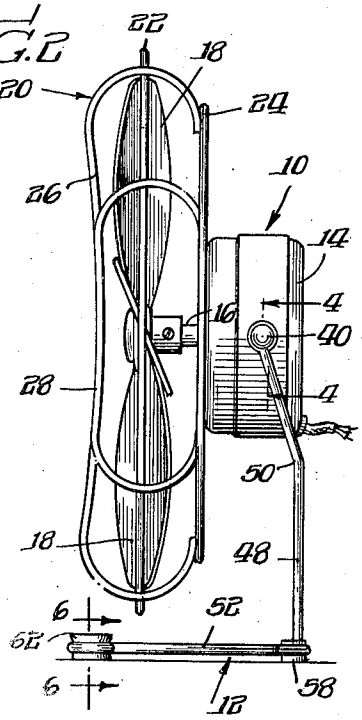

FIG. 3.

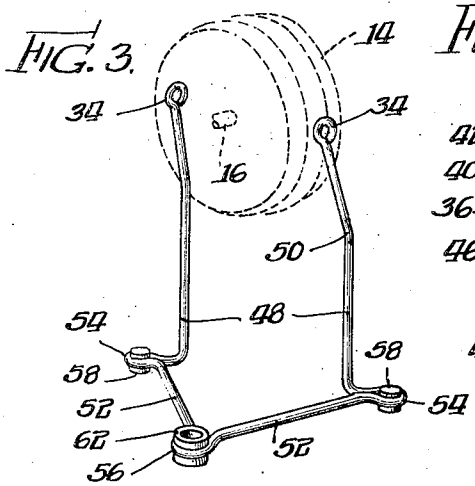

FIG. 4.

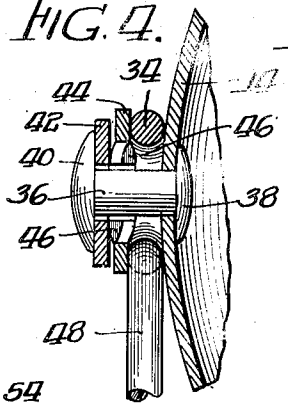

FIG. 5.

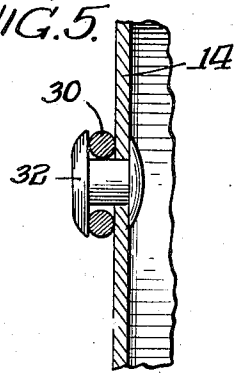

FIG. 6.

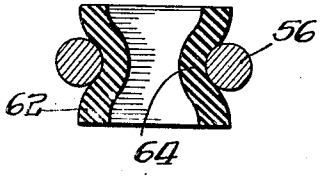

FIG. 7.

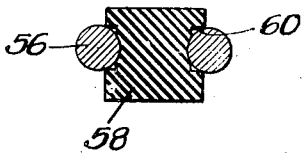

FIG. 8.

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FIG. 9.

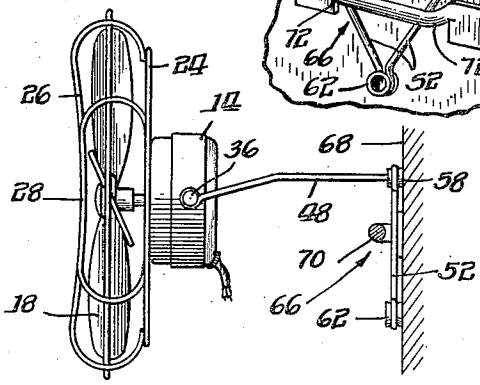


FIG. 10.

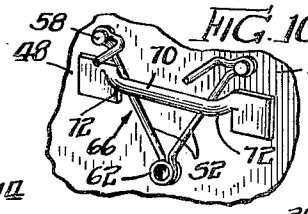


FIG. 11.

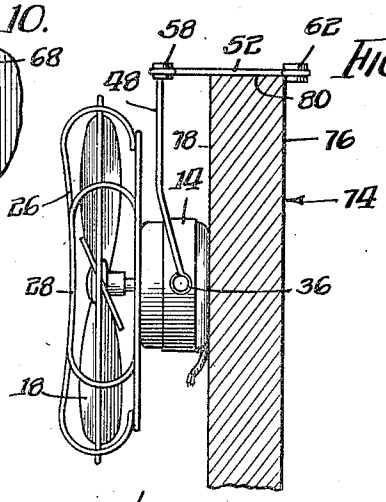


FIG. 12.

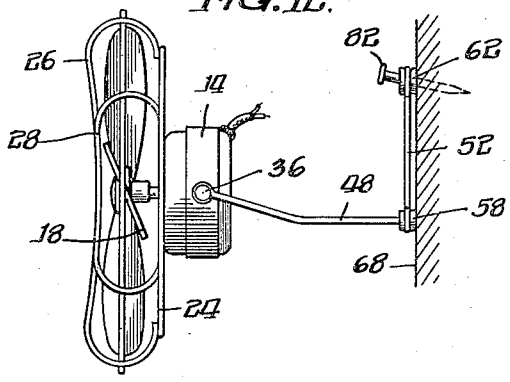


FIG. 13.

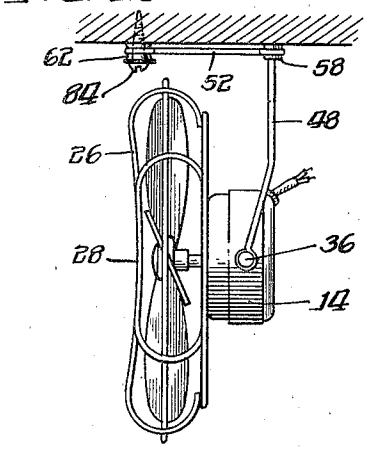


FIG. 14.

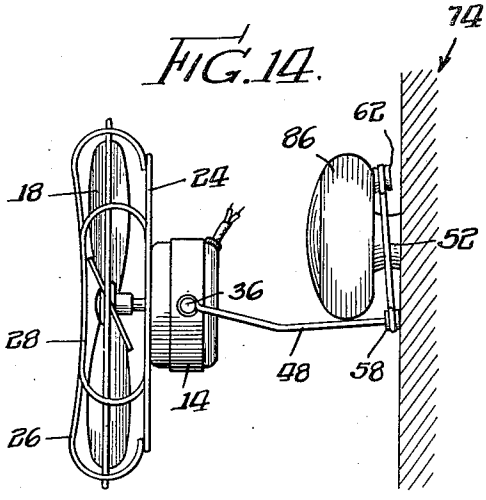
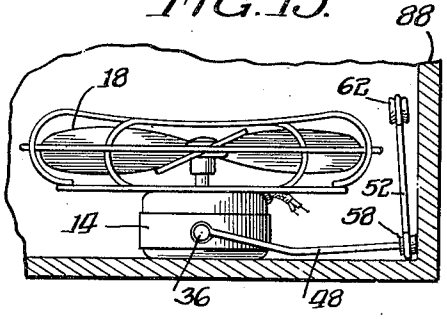


FIG. 15.



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Patented Dec. 10, 1940 2,224,628

UNITED STATES PATENT OFFICE

2,224,628

FAN STRUCTURE

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Application May 6, 1938, Serial No. 206,385

9 Claims. (Cl. 230—273)

The present invention relates to a household or commercial appliance and more specifically to supporting and mounting means for a structure of the type exemplified by an electric fan.

It is an object of the present invention to provide an improved and simplified portable fan structure which is adapted to be mounted upon substantially any convenient supporting member found in the usual building and to permit wide adjustment of the fan for directing a draft of air, while so mounted.

The present invention more specifically contemplates the provision of a lightweight fan or other appliance having a supporting base which is relatively movable with respect to the fan proper and which is adapted to provide means for supporting or hanging the fan in any desired operative position or interengaging it with supports of various kinds.

Appliances of the instant class have heretofore normally comprised relatively heavy, bulky structures ill-adapted for portability and demanding a firm, flat surface for support thereof. Such structures are unsuitable for use by travelers, not only due to difficulties in transportation, but for the reason that the necessary type of supporting surface may not be available at the point where it is desired to set up the appliance.

It is, accordingly, an object of the present invention to obviate the above disadvantages by providing a fan support formed of elongated material of light weight which is adapted to fold or collapse with respect to the fan proper and to occupy a small space for transportation.

A further object of the present invention is to provide a fan structure as above wherein the supporting base is adapted to provide a sub-support or hanger interengageable with such structures as, for example, supporting ledges, walls, window handles and projections of numerous types found in and about the ordinary dwelling structures, the supporting base being adapted to engage firmly with the supporting member at a plurality of points for effecting rigid positioning of the appliance against displacement in use.

An additional object of the present invention is to provide a frame-like supporting base having a plurality of spaced foot portions projecting from the plane thereof and adapted both to provide supporting feet, as well as to interengage with edges of supports to lock the base in operative position, said base defining interiorly, at least partially enclosed spaces adapted to accommodate and engage about suitable supporting projections.

Numerous other objects and advantages will more fully appear during the course and progress of the following specification.

Referring to the drawings:

Figure 1 is a front elevational view of a fan constructed in accordance with the present invention.

Figure 2 is a side elevational view of the fan shown in Figure 1.

Figure 3 is a detail perspective view of the supporting base shown in Figures 1 and 2, the same being represented in dotted lines.

Figure 4 is a detail sectional elevation on the line 4—4 in Figure 2.

Figure 5 is a detail sectional elevation on the line 5—5 in Figure 1.

Figure 6 is a detail sectional elevation on the line 6—6 in Figure 2.

Figure 7 is a detail sectional elevation on the line 7—7 in Figure 1.

Figure 8 is a perspective view of the foot member shown in Figure 7.

Figure 9 is a side view of the fan structure shown mounted upon a surface comprising a handle or a bracket.

Figure 10 is a perspective view showing in detail the interengagement between the base of the fan and the bracket.

Figure 11 is an elevational side view of the fan shown in Figure 9 mounted upon a supporting ledge.

Figure 12 is another side elevational view of the fan shown in Figures 9 and 11, shown supported with respect to a vertical wall by means of a projecting pin or nail.

Figure 13 is a side elevational view showing the fan in Figure 12 mounted upon a ceiling surface.

Figure 14 is a side elevational view of the fan above, shown mounted upon a doorknob.

Figure 15 is a side elevational view of the fan folded for transportation.

Reference is made more specifically to the drawings wherein there is illustrated a preferred form of appliance constructed in accordance with the present invention, comprising an electric fan motor and blade structure 10 and a supporting base or mounting 12. The electric fan proper comprises a motor contained in a casing indicated generally by the reference numeral 14, the casing being somewhat cylindrical and having an axially extending shaft 16 projecting from one end thereof. A fan blade 18 of conventional form and structure is mounted on the end of the shaft 16 and enclosed by a protecting guard or

cage 20. The cage 20 consists of a pair of parallel rings 22 and 24, the former being positioned just outwardly of the tips of the fan blade 18 and the latter ring 24 being positioned slightly rearwardly of the blade. The rings 22 and 24 are interconnected by means of curved wire members 26 and 28 configurated as shown in the figures.

The connecting members 26 extend across the face of the cage, being secured as by welding or brazing to the ring 22 and terminating at the point of connection with the ring 24. The wire connecting members 28 are formed of a continuous piece of material extending across the face of the cage and being welded to the rings 22 and 24 but extending generally radially inwardly on the rear side of the fan and terminating in loops 30. The loops 30 form almost a complete circle and are engaged, as clearly shown in Figure 5, by a rivet 32 which passes through the loop and through an aperture in the adjacent front wall of the casing 14 enclosing the electric motor. This arrangement permits simple yet rigid and secure interconnection between the fan guard and the motor housing so that these elements are securely joined together as a unit.

The supporting base or mounting 12, shown in the drawings for the purpose of illustrating the present invention, is formed in general from a single length of wire configurated as shown clearly in Figures 1, 2 and 3. It will be noted that the length of wire at either extremity terminates in a ring or loop 34 for pivotally mounting the supporting base upon the motor housing. To this end pivot members, shown more clearly in Figure 4, extend through an alined aperture in the motor housing, the pivots having their axes arranged transversely to the axis of the drive shaft 16. Each of the pivots is mounted on either side of the motor 10 and comprises in general a rivet 36 having its head 38 engaged within the motor casing and a spaced upset portion 40 retaining the loop 34 in position with respect thereto.

It is contemplated, in accordance with the present invention, that the supporting base 10 be selectively pivotal to any of a plurality of positions about the pivots and that the parts be capable of being relatively frictionally retained in any of these adjusted positions. To this end the pivot structure further comprises a washer 42 and a frictional member 44 rotatably arranged upon the body of the rivet 36. The frictional member 44 has substantially the same configuration as a locking washer of known type and comprises an outer annular body portion supporting a plurality of inwardly extending, spaced locking prongs 46. The locking prongs are each canted or twisted through a small arc, as clearly shown in Figure 4, about its radial axis so that one radially extending corner tends to interengage with the inner face of the washer 42.

Attention is particularly directed to the fact that the diameter of the circular loops 34 on the base member is such as to cause the side of each loop to be engaged by the continuous annular body portion of the lock washer. It will, accordingly, be apparent from the above disclosure that, with the parts arranged as shown in Figure 4 and being maintained under some compressive tension by the rivet 36, the lock washer 44 will produce a resilient pressure against the loops 34, maintaining them frictionally against the adjacent wall of the motor housing 44. This resilient pressure will in effect result from the resiliency of the prongs or fingers 46 pressing against the inner face of the washer 42. It has been found effective to permit rotation of the loops 34 with respect to the remainder of the fan assembly against a predetermined frictional resistance or, in other words, so that the loops will be retained frictionally in any desired relative rotational position against unauthorized displacement.

The wire forming the base portion 12 extends radially away from the region of the pivots to provide a pair of spaced supporting legs 48. Each of these legs is slightly bent at 50 through a small angle for a purpose which will hereinafter appear more in detail and both are joined adjacent their lower ends by an integral loop, shown more clearly in Figures 1, 2 and 3. The loop comprises a pair of straight converging arms 52, each arm being joined to its respective leg 48 at the lower portion thereof, as viewed in the figures, through the agency of smaller looped portions 54 which are formed by doubling the wire upon itself, as clearly shown in Figure 3. The two arms are joined by means of the redoubled portion 56 forming a third small loop for a purpose to be hereinafter defined in detail.

Attention is particularly directed to the fact that the bottom or supporting portion formed by the configuration of the wire to provide the converging arms 52 and redoubled portions 54 and 56, is arranged in a flat plane and, in accordance with the present invention, it is contemplated that this so-called supporting portion be so formed as at all times to project generally transversely to the leg portions 48; that is, to extend at an angle to the plane of the leg portions. Each of the redoubled or looped portions 54 or 56 encloses a supporting foot member.

Referring more specifically to the redoubled portions of the wire indicated by the reference numeral 54, it will be seen that the supporting foot portions enclosed therein comprise a generally cylindrical element 58 having an annular groove 60 adapted to accommodate a portion at least of the body of the engaging loop. It is contemplated, in accordance with the present invention, that the supporting foot members 58 be formed of some relatively soft plastic or resilient material so that, in the process of manufacture, they may be either forced into the central space in the loop 54 or may have the wire of the loop wrapped therearound during assembly and in either case will be retained securely in the position shown.

A third supporting foot member arranged in the redoubled portion 56 of the wire base comprises a length of cylindrical tube 62 which is firmly engaged by the section 56 of the wire, as shown in Figure 6, so as to force the intermediate portion of the tube inwardly to provide an annular, depressed portion as at 64. Here, likewise, the supporting foot member may preferably comprise a relatively plastic or resilient material and, under the circumstances, it will be apparent from the above disclosure that this member will be retained positively in position against possibility of inadvertent disassembly.

Attention is specifically directed to the fact that all of the supporting foot members project normally outwardly of the plane of the loop formed by the arms 52 and the associated redoubled portions of the wire and, accordingly, extend downwardly after the manner of a tripod to space the loop with respect to the particular supporting surface upon which the appliance is mounted. In view of the fact that the supporting foot members are triangularly spaced, they

form a secure and adequate mounting for the entire fan assembly with respect to any desired supporting surface and at the same time, when formed of resilient or plastic material, tend to absorb any vibration ensuing from operation of the motor and to frictionally engage the supporting surface against displacement.

The projecting foot members, moreover, as will hereinafter appear more in detail, are particularly adaptable to interengagement with various supporting means conventionally available in locations wherein such an appliance would normally be employed. The bend 50 in the spaced supporting legs 48 of the wire supporting base serves, as will be apparent from a consideration of Figure 2, to locate the article to be supported so that its center of gravity is in the preferred position with respect to the supporting feet and it will be apparent that the degree or character of this bend may be varied within wide limits in accordance with the desired use.

Figures 9 and 10 disclose more specifically one preferred use of the present supporting base for mounting the present fan structure rigidly upon a vertical surface comprising a handle. The handle is indicated more particularly by the reference numeral 66 and is fastened to the vertical surface 68 by means (not shown). The handle 66 comprises a transversely extending portion 70 spaced from the vertical surface by means of the outwardly extending portion 72. It will be noted that the transversely extending portion of the supporting base comprising the arms 52 and the redoubled portion 56 has been inserted interiorly of the transversely extending portion 70 of the handle member to a position where the arms 52 engage therewith while all three of the supporting foot members 58 and 62 reside flatwise against the surface 68.

It will be obvious from the above disclosure that this method of mounting the base is particularly facilitated due to the fact that the arms 52, generally converging toward their point of juncture, may be inserted to the point where they engage a desired portion of the inner surface of the handle 66. In other words, when attaching the appliance to supports of this character, there will normally be a relative position wherein the arms 52 will engage a portion of the interior side of the support 66 while all of the supporting foot members engage the surface 68 and this relative positioning may normally be attained regardless of the configuration of the particular support due to the wide range of spacing of points upon the said arms. It is to be noted that, while in the position shown, the fan may be adjusted to any of a plurality of positions with respect to the supporting arms 48 by merely rotating it manually about the pivots 36.

Figure 11 shows the aforementioned fan mounted in operative position upon a support comprising a structural ledge or ridge formed by the upper edge of a door, a portion of which is indicated by the reference numeral 74. The door comprises spaced, vertical side surfaces 76 and 78 and a top surface 80. Attention is directed to the fact that, for arrangement in this position, the legs 48 of the supporting base have been adjusted with respect to the pivots 36 so that they extend upwardly, the transversely extending arms 52, accordingly, resting on the top surface of the door 80. In this position the projecting portion of the supporting foot member 62 engages behind the edge or corner formed by the surfaces 76 and 80 of the door to prevent the supporting base from becoming disengaged from its support in spite of any normal vibration.

Attention is further directed to the fact that the configuration of the legs 48 permits the rear surface of the motor casing 14 to contact the vertical surface 78 of the door so that the whole assembly is engaged upon its supporting member by contact with both vertical surfaces 76 and 78 while its weight is being supported by the upper flat surface 80.

The present appliance may be alternatively mounted upon any desired surface through the agency of projecting or fastening means, as shown in Figures 12 and 13. Referring to the former of these figures, there is disclosed a supporting nail or pin 82 driven in the upstanding wall 68 and passing through the central aperture in the tubular supporting foot member 62. When mounted upon a supporting wall in the manner shown in Figure 12, it is preferred that the supporting base be adjusted relatively with respect to the pivots 36 so that the apertured supporting foot member 62 is above the other supporting foot members 58. In this position it will be apparent that the weight of the fan structure will cause all three of the supporting feet to reside flatwise against the wall 68 for the purpose of effecting a three-point contact therewith. When arranged as shown in Figure 13, it is normally necessary to employ a headed fastener such as the wood screw 84 to retain the supporting base in the position shown.

A yet further use of the present invention is illustrated in Figure 14 wherein the numeral 86 represents a conventional doorknob mounted upon the door 74. It will be seen that the wire arms 52 extend on either side of the central shaft of the doorknob and rest thereon with their point of juncture positioned above. In situations such as that illustrated in Figure 14, it is merely necessary to position the transversely extending loop formed by the arms 52 about the support and, since this so-called loop portion is open at one side, it may be arranged in the position shown by the simple procedure of placing it over the support.

The present fan structure is particularly adaptable to transportation in a conventional piece of luggage and when folded, as shown in Figure 15, occupies a relatively small space in the container. In this figure the numeral 88 represents a portion of a suitcase or other piece of luggage in which the fan is located for carrying purposes.

The present invention provides a fan structure which is extremely light and portable. The particular supporting base comprises a relatively short piece of wire having no appreciable weight and occupying very little space and, when combined with a light fan motor and with a protective cage or guard of the present type, may be carried from one place to another with substantially no difficulty. The present invention is, accordingly, of great utility to travelers, for example, who will be assured of adequate ventilation and comfort wherever they may be.

The present invention furthermore provides an assembly which may be mounted upon any of a variety of supports conventionally found in dwelling structures and buildings. Although numerous examples have been given of various methods of arranging the present fan structure upon these supports, these are merely disclosed for the purpose of illustrating a wide variety of numerous additional adaptations which will be at once obvious to the user.

While the supporting base structure illustrated herein comprises a wire frame, the invention is not so limited but is intended to include the use of any equivalent materials of construction capable of resulting in the novel advantages hereinabove defined. In general the present invention prefers the employment in this respect of some suitable lightweight, elongated material which may be readily shaped to the configuration disclosed.

Changes may be made in the form, construction and arrangement of the several parts without departing from the spirit or scope of the invention, or sacrificing any of its attendant advantages, the form herein described being a preferred embodiment for the purpose of illustrating the invention.

The invention is hereby claimed as follows:

1. In an appliance of the class described, an electric fan structure and a supporting base for the fan, said supporting base comprising a pair of spaced legs pivotally mounted upon the fan structure and extending therefrom, said legs being joined adjacent their ends by a transversely extending portion formed of elongated material, said transversely extending portion projecting outwardly in a plane generally transverse to the plane of the legs and providing a loop said elongated material being shaped into a plurality of spaced smaller loops formed adjacent the periphery of said first named loop and comprising spaced foot portions associated with said first named loop and adapted to coact with a supporting surface for maintaining the fan in operative position.

2. In an appliance of the class described, an electric fan structure, a supporting base for the fan, said supporting base being formed with a length of wire and having a lower portion comprising a loop, parts of the loop being arranged in a generally flat plane, spaced portions of said loop being formed about an embracing cylindrically shaped supporting foot members with their axes extending generally transversely to the said plane of the loop and projecting out of the plane thereof, and spaced legs extending from the loop portion and pivotally secured adjacent their upper ends to the fan.

3. In an appliance of the class described, an electric fan structure, a supporting base for the fan, said supporting base having a lower portion comprising a loop of wire,, the loop being arranged in a generally flat plane, spaced portions of said loop being provided with relatively small loops formed from a portion of the large loop and embracing supporting foot members projecting substantially equal distances out of the plane thereof in a transverse direction, and spaced legs extending from the plane of the loop portion and pivotally secured adjacent their upper ends to the fan, at least one of said foot members being apertured, said aperture extending generally transversely to the plane of the loop to permit securement of the loop adjacent a wall or the like.

4. In combination with a supporting surface, an appliance of the class described comprising an electric fan, a supporting base therefor having spaced legs pivotally mounted upon the fan adjacent one extremity thereof, a transverse supporting surface engaging portion on the supporting base being arranged adjacent the other end of the legs and comprising converging arms extending from said legs on one side of the plane of said legs, and said converging arms being provided with relatively small loop portions formed from a portion of the converging arms and engaging supporting foot members having a generally cylindrical exterior configuration with their axes extending transversely to the plane of said transverse portion and engaging the supporting surface at a plurality of spaced points for support thereof.

5. In combination with a supporting surface, an appliance of the class described comprising an electric fan, a supporting base therefor having spaced legs pivotally mounted upon the fan adjacent one extremity of the legs, and a transverse supporting surface engaging portion on the supporting base being arranged adjacent the other end of the legs and comprising converging arms of wire extending on one side of the plane of said legs and being arranged in a generally transverse plane, said converging arms being joined at a point remote from said legs by means comprising a relatively small loop, said loop being formed from a portion of the wire material of said arms and being adapted to engage projecting supporting means for mounting the appliance on any desired supporting surface.

6. An appliance of the class described comprising an electric fan, a supporting base for said fan comprising a single length of wire and having spaced legs pivotally mounted on the fan, a transverse supporting surface engaging portion on the supporting base, being arranged adjacent one end of the legs and comprising integral arm portions of wire extending from the legs on one side of the plane thereof, said arm portions being joined together and having a loop portion formed therein, and a supporting foot member mounted in said loop portion and comprising a generally cylindrical member extending through said loop with its axis generally transverse to said supporting surface engaging portion.

7. In an appliance of the class described, an electric fan structure, a supporting base for the fan, said supporting base being formed of a length of elongated material and having a lower portion comprising a loop, parts of the loop being arranged in a generally flat plane, said loop portion mounting spaced supporting foot members projecting out of the plane thereof, said foot members being mounted within embracing portions formed from a part of said loop portion and integral spaced legs extending from the loop portion and pivotally secured adjacent their upper ends to the fan, at least one of said foot members on one side of the plane of said legs and at a point remote from said legs being apertured to permit securement of the loop portion flatwise in adjacent relationship to a supporting wall or the like.

8. A fan of the class described having driving motor means and supporting means therefor, said supporting means comprising a pair of spaced legs of elongated material pivotally secured to the motor means adjacent either side thereof, said legs being spaced in the vicinity of said pivots sufficiently to permit accommodation of said motor means therebetween, said legs being joined at a point spaced from said pivoted portion by a transversely extending integral wire portion arranged outwardly in a plane generally transverse to the plane of the legs and providing a loop and a foot portion associated with said loop comprising a second loop portion formed from a part of said first-named loop.

9. A fan base structure for an electric fan formed of a single, continuous length of wire or

elongated material and comprising a loop arranged in a predetermined plane, spaced supporting legs of said wire extending from said loop and being adapted for connection to an electric fan for support thereof, the wire of said loop being configurated at spaced points in said loop to provide a plurality of relatively small peripheral loops, each of said peripheral loops embracing and operatively supporting a transversely extending foot member adapted to extend out of the plane of said loops, and providing spaced foot portions for said supporting base.

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