

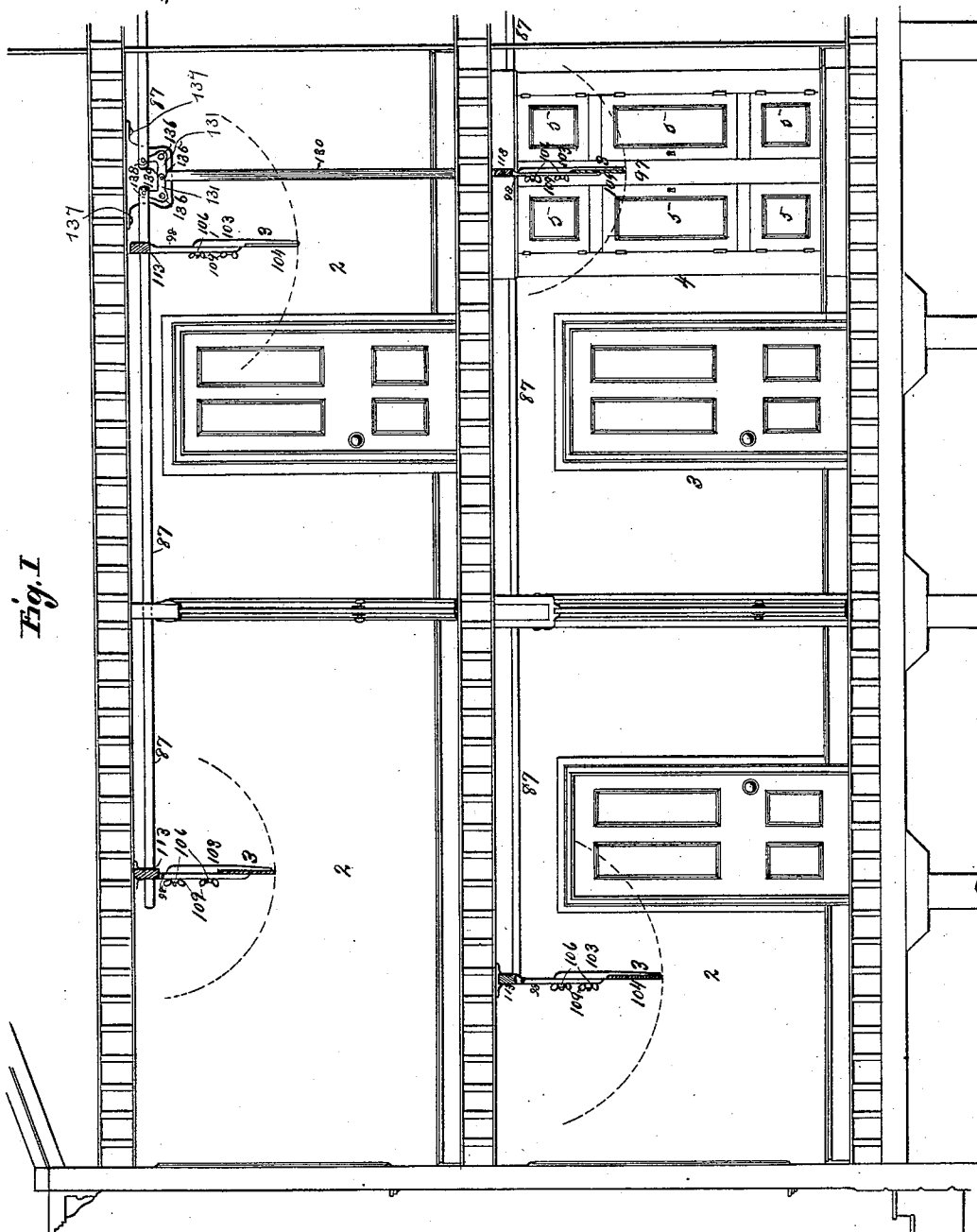
(No Model.)

3 Sheets—Sheet 1.

R. WEHRLE.
MEANS FOR OPERATING ROCK FANS.

No. 471,581.

Patented Mar. 29, 1892.



Attest;
E. Arthur
S. H. Knight.

Inventor;
Robert Wehrle.

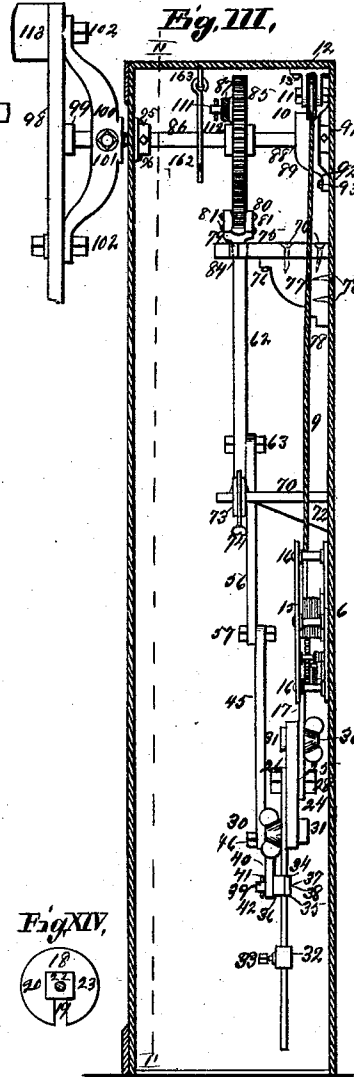
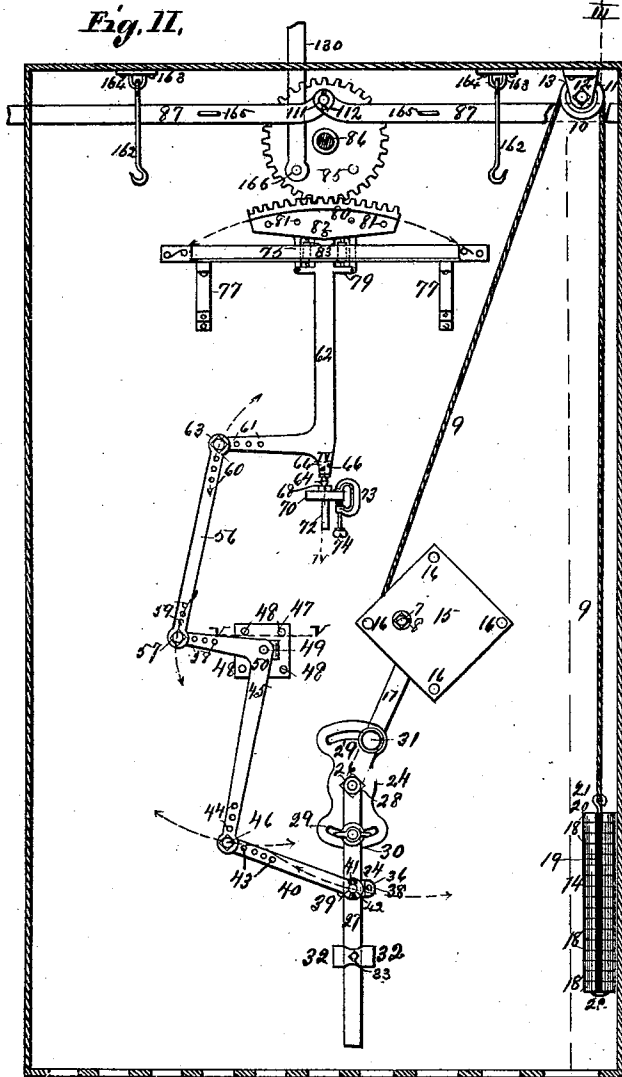
By Knight Bros.

Atty's.

R. WEHRLE.
MEANS FOR OPERATING ROCK FANS.

No. 471,581.

Patented Mar. 29, 1892.



(No Model.)

3 Sheets—Sheet 3.

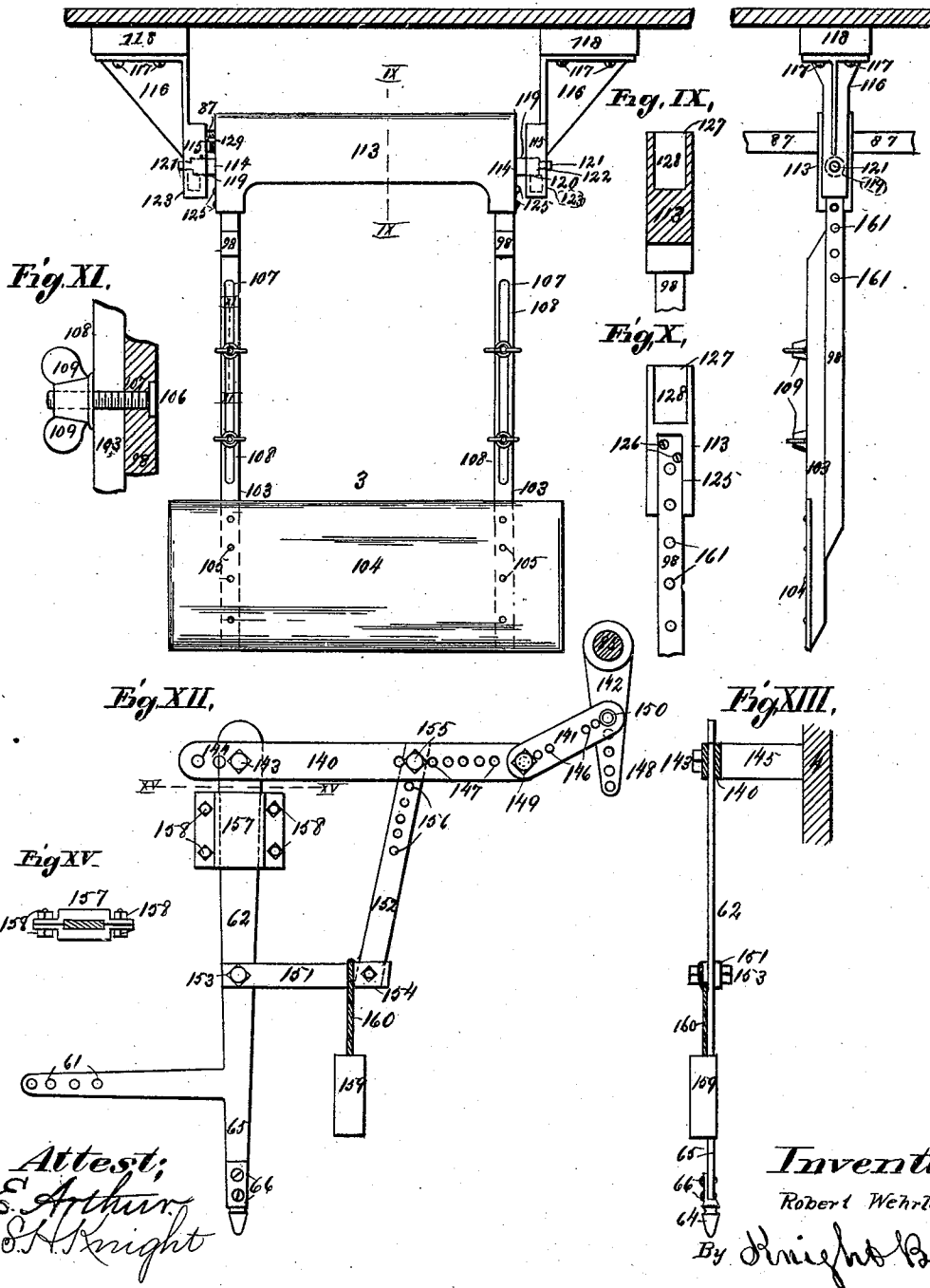
R. WEHRLE.
MEANS FOR OPERATING ROCK FANS.

No. 471,581.

Patented Mar. 29, 1892.

Fig. VII.

Fig. VIII.



Attest;
E. Arthur
S. Knight

Inventor,
Robert Wehrle.

By *Knights Bros.*

Attys

UNITED STATES PATENT OFFICE.

ROBERT WEHRLE, OF ST. LOUIS, MISSOURI.

MEANS FOR OPERATING ROCK-FANS.

SPECIFICATION forming part of Letters Patent No. 471,581, dated March 29, 1892.

Application filed September 28, 1888. Renewed August 29, 1891. Serial No. 404,085. (No model.)

To all whom it may concern:

Be it known that I, ROBERT WEHRLE, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Means for Operating Rock-Fans, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 This invention relates to devices for multiple automatic rock-fans that have co-operative movements to actuate the individual fans that operate in various rooms or compartments of a building; and the invention consists in 15 features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a vertical section of a house, showing arrangements of the fan and an outer view of the closet in which are inclosed the mechanical actuating devices. Fig. II is an enlarged 20 vertical longitudinal section taken on line II II, Fig. III, and shows the toggle bell-crank actuating gear of the shafts that operate the individual fans. Fig. III is an enlarged transverse vertical section taken on line III III, Fig. II, and gives a transverse view of the same with a detail of the mechanical movement that actuates the fans. Fig. IV is an 25 enlarged detail taken in vertical section on line IV IV, Fig. II, and shows the anti-friction foot-bearing of the major bell-crank lever. Fig. V is an enlarged detail horizontal section taken on line V V, Fig. II, and shows the anti-friction compound bearing of the minor 30 bell-crank lever. Fig. VI is an enlarged detail vertical section of the oil-box, rock shaft or pin, and its bearing. Fig. VII is an enlarged vertical front view of the adjustable fan. Fig. VIII is an enlarged end view of the 35 same. Fig. IX is an enlarged vertical section taken on line IX IX, Fig. VII, and shows the cross-head that acts as a counterpoise to the fan. Fig. X is an enlarged vertical detail of the cross-head and the pendent strip for the attachment of the fan. Fig. XI is an enlarged 40 vertical section taken on line XI XI, Fig. VII, and shows the thumb-screw that fastens the vertical adjustment of the fan. Fig. XII is an enlarged modification of the major bell-crank lever in which a pendent rock-arm and coupling toggle-links replace the rack-and-gear drive and effect their functions. Fig.

XIII is an enlarged end view of the same. Fig. XIV is an enlarged bottom view of the sectional clock-weight, showing its bottom section, with the screw-nut that engages on the 55 bottom of the weight-rod inlaid in a recess on the face of said section; and Fig. XV is a horizontal section taken on line XV XV, Fig. XII, and shows the upper counterbalance-weight 60 on the modified major bell-crank lever.

Referring to the drawings in which similar figures of reference indicate like parts in all the views, 1 represents a house, in the rooms 2 on both floors of which my rock-fans 3 are 65 located.

4 is a cupboard in one of the rooms on the ground-floor of said house, (but said cupboard may be placed in any room on either floor.) In said cupboard is housed the clock-work 70 mechanical movement that actuates the rock-fans throughout the house, and 5 are the doors of said cupboard that inclose said movement from view and from the contamination of dust.

6 represents the pulley-drum of the clock 75 mechanical movement, which clock operates the rock-fans. My said mechanical movement being the subject-matter of my patent, No. 409,082, issued August 13, 1889, the constructive parts thereof need not here be specified, with the exception of said drum, of its 80 key-arbor 7, on which the drum has tight bearings, the key-spindle 8 on the forward projection of said arbor, which provides the means for winding the same, the actuating- 85 cord 9, that winds around said drum, the pulley-wheel 10, over which said cord is carried, the arbor-pin 11 of said pulley, the pendent bracket 12, in which said pin has its bearings, the screw-bolts 13, that secure said 90 bracket to the top of the cupboard; the weight 14, that runs the works of the movement, the box 15, that incases the clock-work, the screw bolts or posts 16, that secure the plates of said case together, (and which may project 95 from the back of said case and secure it to the back of the cupboard, or it may be secured thereto by any other suitable means,) and the pulsating pendulum-bar 17, that actuates the toggle of the bell-crank rock-gear movement 100 of the fans.

The weight 14, that runs the clock mechanical movement, is constructed of removable sections 18 to adjust said weight in accordance

with the weight of the fan or fans to be actuated. The said sections have cut-aways 19, like the weights of a platform-scale, that pass inwardly from their peripheries sufficiently
 5 past the center to allow of their insertion, and a balanced seat on the rod 20, that holds said sections together, and which rod is secured to the actuating-cord 9, that supports it by the
 10 loop 21 at top of said rod, through which the cord is passed, and to which it is secured. A screw-nut 22 is engaged in the threaded
 bottom terminal of said rod to hold the sectional weight, and the bottom of the lower
 15 section of said weight is provided with a square recess or socket 23, in which the screw-nut on the lower terminal of the rod is seated. The said lower section when thus stationed
 on said rod supports the next superincumbent section, and so on, section after section
 20 is seated thereon until the weight is sufficiently heavy to work the fan or fans. This sectional weight is thus made to accommodate itself to the number and size of the fans it has to operate, which may vary largely
 25 in both respects in different buildings to accord with the number and size of the rooms in which the fans operate.

I will now proceed to describe the toggle bell-crank rock drive-gear that actuates the
 30 fans.

24 represents a yoke for the adjustable coupling which connects said pulsating bar to the rock-gear movement that it actuates. The yoke has a pivot-bearing 25 in its center, in
 35 which is seated a screw-bolt 26, which bolt passes through holes in the lower terminal of the pulsating bar and the upper terminal of the pendent counterpoise-bar 27, and thus
 40 couples the said two bars together and to the yoke in which they have pivotal bearings. The bars are located on the reverse sides of said yoke, and the bolt is secured in its seat by the nut 28.

29 represent curvilinear slots, relatively located near the upper and lower ends of the yoke, and 30 are thumb-screws, which are
 45 provided with conical winged heads, and which relatively pass through the corresponding slots in the yoke and through perforations
 50 relatively in the pulsating and counterpoise bars, and their screw-terminals are engaged in the screw-nuts 31. The curvilinear slots in the coupling-yoke, in conjunction with the
 55 thumb-screws, provide the means for adjusting and setting the pulsations of the toggle bell-crank gear-drive that actuates the fans.

32 is a counterpoise-weight which is adjustable vertically on the counterpoise-bar, and is there secured by the set-screw 33.

34 represents an adjustable clip that is constructed of a straight rear plate 35 and flanged front plate 36. The flanged plate provides a recess in which is seated the counterpoise-bar, against the back of which the
 60 straight plate is seated, and screws 37 pass through perforations in the flanged ends of the forward plate and engage in their thread-

ed perforate seats 38 in the straight plate, and when the clip is adjusted vertically to its required position on the counterpoise-bar
 70 the said screws are turned home in their screw-seats, so as to firmly clamp the adjustable clip. A journal-spindle 39 is brazed or otherwise secured to the forward face of the flanged section of the clip and projects out-
 75 wardly therefrom. This adjustable clip, besides having the advantage of being easily transferable from one part of the counterpoise-bar to another, obviates the necessity of weakening said bar by perforations or other
 80 cut-aways to aid the attachment of the journal-box.

40 represents a toggle-link whose lower perforated end is seated on the spindle 39 and there secured by the key 41, which is seated
 85 in the key-hole 42 in said spindle. The upper end of said toggle-link has a series of perforations 43, in which and in a like series 44 in the foot of the minor bell-crank lever 45 the pivot-screw bolt 46 engages and in the differ-
 90 ent holes in which it can be adjusted to lengthen or shorten the toggle connections of the drive-gear, and thus, also, the length of swing of the rock-fan.

The minor bell-crank lever works on a compound or double journal-bearing constituted
 95 of the block 47, which is secured by the screws 48 to the back of the cupboard. To the said block is bolted a clevis clip or bail 49, through a perforation in which is projected a journal-spindle 50 for a sufficient distance to form the
 100 inner member of the compound journal-bearing, forming an immovable journal thereto. A similar journal-spindle 51 projects inwardly from the joint angle of the minor bell-crank
 105 lever, or, if preferred, from an angle-block rigidly secured to the junction crank-arms of said lever, and said latter spindle passes inwardly through a perforation in the corresponding bail 52 to the one (numbered 49)
 110 which is rigidly secured to the block 47, that carries this compound journal-bearing.

Of the journal-spindles 49 is the stationary member of the compound journal, being, as stated, rigidly secured to the sustaining-block
 115 47 and to the stationary member of the corresponding bail-clips, and 52 is the movable member, being rigidly secured to the rocking minor bell-crank lever and to the rocking member of the corresponding bail-clips with
 120 which the latter spindle moves. With both spindles, each relatively, after passing individually through the member of the corresponding bail-clip with which it is rigidly
 125 connected also passes through the terminal angle-arm in the associate bail in which it has loose bearings 53 for the arm of the stationary bail provides loose bearings for the
 130 rocking spindle and the arm of the rocking bail-like bearings for the stationary spindle. Keys 54 engage relatively in their seats 55 near the terminal ends of said spindles and secure the compound journal-bearing from detachment.

It will be seen that the above-described compound bearing materially steadies the movements of the minor bell-crank lever and of the toggle-links with which it is associated.

5 The upper arm of the minor bell-crank lever engages with the toggle-link 56, to which it is pivotally connected by the screw-bolt 57, which is adjustably seated in such of the perforations 58 in the bell-crank lever and 59 in
10 the foot of the toggle-link as shall accord with the length of stroke it is required that the rock-fan shall give. Similar perforations 60 in the upper end of said toggle-link and 61 in the lower arm of the major bell-crank lever
15 62 form similar adjustable seats for the bolt 63, that connects said toggle-link to said bell-crank lever.

The major bell-crank lever is provided with an inverted conical foot 64, which should be
20 of metal, and in consequence when the bell-crank levers and toggle-links are of wood the said foot-point, being of metal, is provided with a surmounting flange or flanges, which are secured to the pendent leg 65 of the said
25 lever by screw-bolts 66; but when said levers are of metal the foot-cone bearing may be constructed integral therewith. The said foot of the major bell-crank lever rests and works in a conical cup or socket bearing 67
30 in a foot-boxing 68, and the inverted apex of the bearing is provided with an oil-cup 69. The box-bearing is adjustable within a flanged bed-plate 70, that rests on and is secured by screw-bolts 71 to the bracket 72, that projects
35 from and is secured to the rear wall of the cupboard by any suitable means. A screw-clamp 73, by the operation of its thumb-screw 74, firmly clamps the foot-boxing to its desired location on the bed-plate.

40 75 represents a guideway-platform, which is secured by screws 76 to the brackets 77, which support it, and which brackets are secured by screws 78 to the back wall of the cupboard.

15 79 represents a cross-head rack-bearer, which, with its geared rack 80, that is secured to said cross-head by the screw-bolts 81, surmounts the major bell-crank lever, to which it is secured by the screw-bolts 82 when said
50 bell-crank lever is of wood; but when said lever is constructed of cast-iron or other metal the cross-head, and, if preferred, the geared rack also, may be cast or formed integral with said bell-crank lever. The frame of the cross-head carries two vertical anti-friction rollers
55 83, and when the major bell-crank lever and its surmounting cross-head and geared rack are rocked the cross-head, with its friction-rollers, works to and fro within the guideway
60 84 in the platform 75.

The cogs of the rack 75 mesh into those of the drive gear-wheel 85, which drive-wheel has tight bearings on the rock-shaft 86, and secured to said drive gear-wheel are the horizontal drive-shafts 87, that work the fans that
65 are on line with said bars in rooms on the same floor as the drive-power.

The rock-shaft 86 has a major rear bearing 88, of equal diameter to the shaft in the oil-cup 89, and a minor bearing 90, forming a terminal bearing within a journal-box 91, that is
70 housed within the bracket 92, which is secured to the back of the cupboard by the screws 93. The rock-shaft has a secondary bearing within the journal-box 95, that is secured by screws
75 96 to the front middle stile 97 of the cupboard inside the same between the doors, and said rock-shaft passes through a perforation in said stile and projects into the room in front
80 of the cupboard that contains the power for any desired distance for the right location of the fan. The said shaft is shown broken away immediately in front of the cupboard to indicate that its extension may be indefinitely
85 projected into the room. 98 represents the pendent carrier-bar of said rock-shaft fan as it is constructed for direct attachment to the rock-shaft 86 for operation in the power-room, where the machine-cupboard is located. This
90 carrier-bar, with its means for attachment, is in some particulars diverse from the fan attachments in the other rooms, in which said attachment is not direct to said rock-shaft, as will hereinafter be more particularly described. The said carrier-bar is provided with
95 a screw-socket collar 99 at its back, into which the screw-threaded projected terminal of said rock-shaft is made to engage, and thereby the fan that works in said power-room receives its rocking movement.

100 100 represents the brace-bracket, which is seated on the rock-shaft at the back of the pendent carrier-bar, and is there rigidly held to its adjusted seat by set-screw 101. Screw-bolts 102, above and below at the terminals of
105 the brace-bracket, secure said bracket to the carrier-bar, so that said bar is thus securely braced.

A cross-head 113, a detail of which is shown in Fig. III, (and which is fully shown in Figs. 110 VII, VIII, IX, and X in a somewhat different attachment as used in all except the power-room,) is secured by the upper brace-bracket screw 102 to the pendent carrier-bar 98 of the fan, a similar carrier-bar to which is securely
115 attached to the other end of said cross-head. The said cross-head and carrier-bars or their equivalents are shown in the above-named figures and hereinafter fully pointed out in the description of said parts as used in all
120 but the power-room. The other attachments of the fan being identical in all the rooms, I will now proceed to describe.

The fan-stems 103 are secured to the paddle or blade 104 of the fan by screw-bolts 105, and
125 the stems are themselves secured in their vertical adjustment to the carrier-bars by set-screws 106, that pass through the perforations 107 in said carrier-bars and the elongated slots 108 of the fan-stems, and when said fan
130 is vertically adjusted and the heads of the set-screws are seated in the countersinks in the carrier-bars the thumb-nuts 109 are screwed home on said set-screws and clamp the fan-

stems in their vertical adjustment to the carrier-bars. The fans in the other rooms than the one containing the power are operated by the aforesaid horizontal drive-shafts 87, which
 5 are pivotally secured to the drive gear-wheel 85 by the bolt 111, which passes through said wheel and both the right and left hand drive-shafts, and said bolt is secured in its seat by the spring-key 112. The drive-shafts pass
 10 through apertures in the partitions to the cross-head yokes of the fans, with which they are pivotally connected, as hereinafter described.

113 represents the cross heads or yokes, from
 15 which hang the pendent carrier-bars 98, to which the adjustable fan-stems are secured, which cross-heads and carrier-bars, although slightly varied in their attachments to those used in the power-room, they themselves are
 20 equivalents and counterparts thereof and will not here be more fully described. The cross-heads are carried by trunnions 114, that are screw-seated in the perforate screw-sockets 161 in the carrier-bars 98. The trunnions have
 25 their bearings within the journal-boxes 115, that are suspended from hangers 116 and may be integral therewith. The said hangers are secured by screw-bolts 117 to attachment-beams 118, that are securely bolted to the ceiling-joists above. The trunnions 114 have similar
 30 double journals to that on the inner end of the rock-shaft 86 of the drive gear-wheel—viz., major journals 119 of the same or nearly the same diameter as the shaft, which run in
 35 bearings 120 of corresponding diameter in the inside of the journal-boxes, and minor journals 121, that run in bearings 122 of corresponding diameter in the outside of said journal-boxes. The oil-cups 123 in the lower part
 40 of said journal-boxes hold the lubricant for said bearings.

The pendent carrier-bars 98 are secured in boxings 125 in the ends of the cross-heads by screws 126, and provide the same means for
 45 the adjustable attachment of the fan-stems 103 as do their equivalents in use and for the same purpose in the power-room of the building. They, besides seating the trunnions, are provided with perforations 107, as stated, for
 50 seating the set-screws for securing the adjustment of the vertical position of the fans, and they have like fan-blades with their slotted attachment-stems with set and thumb screws for fastening said adjusted attachment, which
 55 are alike provided and alike numbered, as described in those of the power-room, as they are also in the rooms on the other floors of the building.

The cross-head is constructed of cast-iron
 60 or other metal, and is provided with a longitudinal boxing 127. In said boxing is seated a lead bar 128, which constitutes a counterpoise to balance the weight of the fan, and said bar may extend above the boxing in
 65 which it is seated to increase the balance-weight, when desired. The fan itself, with its constituent attachment parts, as stated,

have already been described in that of the power-room.

Pivot-pins 129 pivotally secure the drive-
 shafts 87 to the cross-heads, and as said shafts
 are moved longitudinally by the drive-wheel
 86 when actuated by the toggle bell-crank
 movement that is generated by the mechanical
 movement in the power-room they thus
 75 actuate the fan.

It will be seen that as the power is applied to the cross-head at but a short leverage above its journal-bearings and the fan is on the other hand suspended far beneath said cross-
 head in consequence a very slight reciprocating movement of the drive-shafts 87 results in an extensive rock movement of the fans.

130 represents a vertical drive-shaft that is pivotally secured to the drive gear-wheel 85
 and passes up through openings in the top of the cupboard, the ceiling of the room, and the floor of the room overhead and extend to a short distance beneath the ceiling of said
 room, and to the top of said vertical shaft
 90 twin bell-crank levers 131 are pivotally secured by the bolt which engages in its perforate seat therein. The said bell-cranks have their crank-bearings in the hanger 135, to which they have pivotal connection by the
 bolts 136, and said hanger is secured to the
 joints of the ceiling above by screw-bolts 137. The upper ends of said bell-crank levers are seated within the bifurcated ends 138 (not
 shown) of the corresponding drive-shafts 87,
 100 that operate in the rooms on said floor, and are pivotally connected to and between the forks of said shafts by the bolts 139. The said drive-shafts are alike pivotally connected with the cross-heads of the fans, which are alike
 105 supported by like hangers, and all such parts like numbered, as are the similar parts in other rooms. The drive-shafts also work through apertures in the partitions to pass from room to room, as on the floor below, as
 110 previously described. It will be seen that as the vertical shaft is alternately elevated and depressed by the rocking of the gear-wheel the bell-crank levers at the head of said shaft
 give a reciprocating movement to the drive-
 shafts that rock the cross-heads and their pendent fans, so that the fans are alike actuated
 as are those on the floor below.

Should there be more than two floors in the building, extensions of the vertical drive-
 shaft, with duplicated bell-crank and other
 actuating attachments, as described, for the
 second floor, will work the fans in any of the
 floors above.

In Figs. XII and XIII are shown a modification of the driven attachments of the major
 bell-crank lever that operates on the rock-
 shaft 86 by means of a double gallows-arm
 140, connecting toggle-links 141 and a pendent rock-arm 142, that is rigidly secured to
 said rock-shaft. This modification dispenses
 130 with the cog-gear combination of the rack and drive-wheel. The said bell-crank lever, which itself is substantially the equivalent of the

major bell-crank, already described, with its metal foot-point 64, heel-piece 65, and the crank-arm having like adjusting perforations 61, instead of being surmounted by a cross-head frame-rack and gear drive-wheel, is secured by a screw-bolt 143 to the double gallow's-arm 140, the bolt passing through adjusting perforations 144 in said double arm and through its perforate seat at the head of the bell-crank into the horizontal stud 145, that projects from and whose farther end is secured to the back of the cupboard. The toggle-links 141 are provided with adjusting perforations 146 at each end of the links, which, in conjunction with the perforations 147 in the outer ends of the double gallow's-arm and the perforations 148 in the pendent rock-arm and the pivotal screw-bolts, relatively 149 and 150, that secure said links to said gallow's-arm and said rock-arm, provide the means, in conjunction with like take-up arrangements, already described, by the arrangement of the bolts in their relative adjustable seats, as described, to vary the rock of the drive-shaft and consequent rock of the fans.

151 represents the horizontal, and 152 the inclined, arm of a sectional brace that adjustably upholds the outstretched double gallow's-arm. The said two sections are secured together by the bolt 154, to the bell-crank lever by the bolt 153, and to the arms above by the bolt 155. Perforations 156 in the upper end of the inclined arm provide the means for changing the presentation of the outstretched double arm 140 to accord with those of the pendent rock-arm, to which at the time the toggle-links connect.

157 represents a counterpoise-weight that is made of two cast sections whose flanges meet around the edge of the modified form of my major bell-crank lever, and 158 are set-screws or screw-bolts that are seated in perforations of said flanges and tightly clamp the section-plates of the counterpoise-weight together.

159 represents another counterpoise-weight that hangs from a cord 160, that is secured to the sectional brace of my modified form of the major bell-crank lever just back of the knee at the junctions of the sections of said brace.

162 represents hooks that hang from staple-brackets 163, which are secured by screw-bolts 164 to the top of the cupboard. These hooks are used when it is desired to cut off the action of the power on any particular fan, which is effected by detaching the horizontal drive-shaft 87, that actuates said fan, at the bolt 111 and hooking said hook relatively either in the bolt-hole 110, vacated by said bolt, or in the slot 165 in the drive-shaft, according as it is desired either to hold the fan elevated or allow it to hang pendent while idle.

It will be seen that the drive gear-wheel 85 can be readjusted when the cogs in use get worn, and an additional perforation is provided for changing the attachment (in such case) of the horizontal and vertical drive-shafts.

I claim as my invention—

1. The combination of the slotted yoke, the adjustable bell-crank lever, the links, the cross-head 79, that surmounts the major bell-crank lever, the guideway-platform that guides the cross-head in its rock movements, and the anti-friction rollers 83, that run in said cross-head, substantially as and for the purpose set forth.

2. The combination of the yoke 24, the bell-crank levers and links for transmitting the power, the cross-head 83, the rack that surmounts said cross-head, and the drive gear-wheel with which said rack meshes, substantially as and for the purpose set forth.

3. The combination of the bell-crank rack-gear that operates the drive-shafts, the vertical drive-shaft 130, the twin bell-crank levers 131, and the hanger that provides the bell-crank bearings for said levers, substantially as and for the purpose set forth.

4. The combination of the bell-crank rack-gear that operates the drive-shafts, said drive-shafts, the rock-shaft 86, that carries the drive gear-wheel, the double journal, and compound bearings, substantially as and for the purpose set forth.

5. The combination of the bell-crank rack-gear and drive-shafts, the block 47, secured to the back of the power-cupboard, the compound bearings carried by said block, which provides a double-bail-braced journal-bearing for the minor bell-crank lever 45, the cone-socket box which provides the foot-bearing of the major bell-crank lever 62, the flanged bed-plate 70, in which said box is adjustably located, and the clip set-screw that secures said adjustment, substantially as and for the purpose set forth.

6. The combination of the bell-crank rack-gear and drive-shafts, the hooks 162, and the staple-brackets from which said hooks are suspended, the said hooks arranged to engage in the slots 165 in the horizontal drive-shafts when they are unshipped from their drive attachment-bolt, substantially as and for the purpose set forth.

7. The combination of the bell-crank rack-drive-gear, the rock-shaft 86, the brace-bracket 100 for bracing the fan attachment in the power-room, and the set-screw by which it is clamped to said rock-shaft, substantially as and for the purpose set forth.

ROBERT WEHRLE.

In presence of—

BENJN. A. KNIGHT,
EDW. S. KNIGHT.