

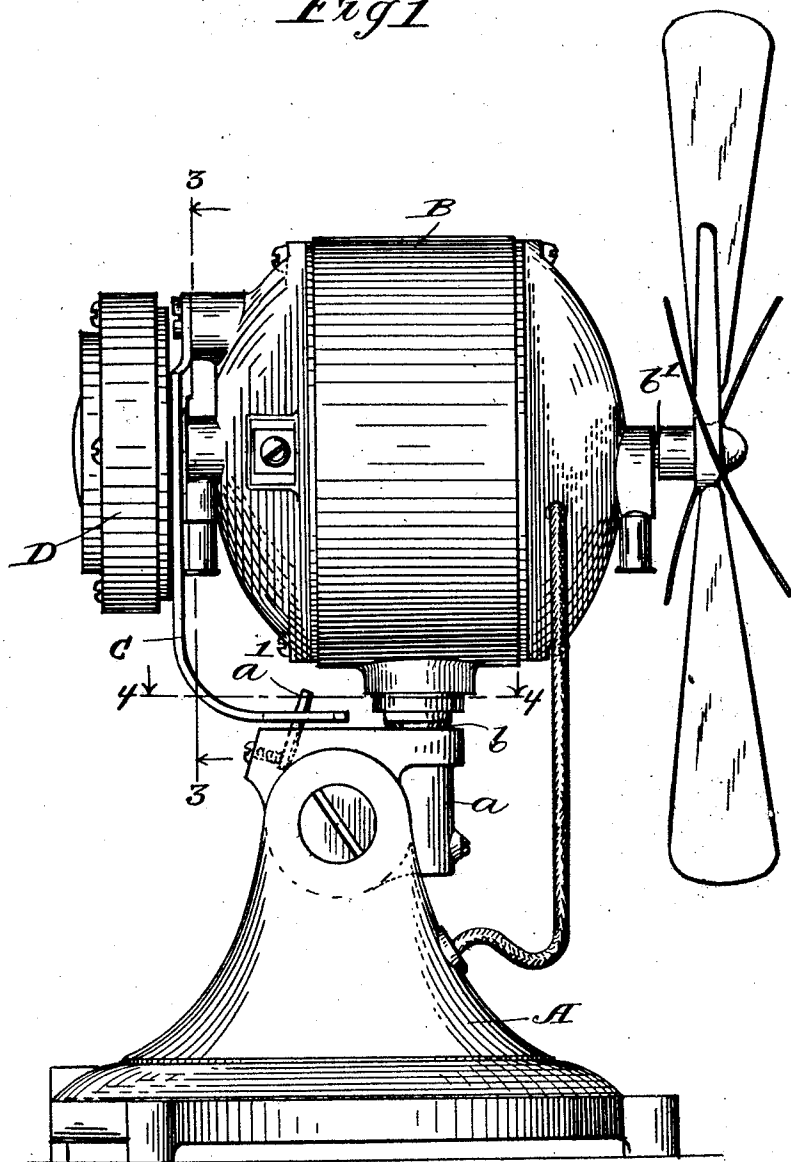
B. A. STOWE.
OSCILLATING FAN.
APPLICATION FILED APR. 18, 1910.

1,058,488.

Patented Apr. 8, 1913.

3 SHEETS-SHEET 1.

Fig 1



Witnesses
J. C. Turner
Robert M. S. S.

Inventor
Bernard A. Stowe
by *J. B. Fay*
Attorney

1,058,488.

Patented Apr. 8, 1913.

3 SHEETS—SHEET 2.

Fig. 2

Fig. 11.

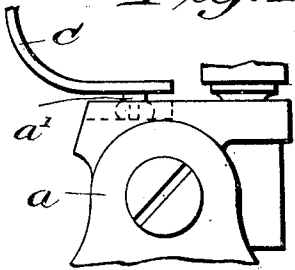


Fig. 12.

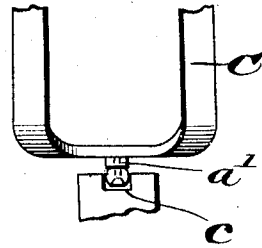


Fig. 5

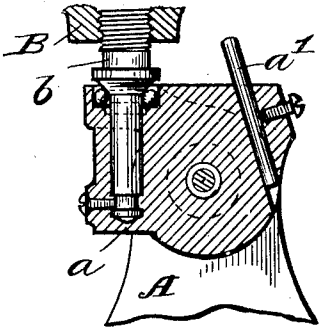


Fig. 4

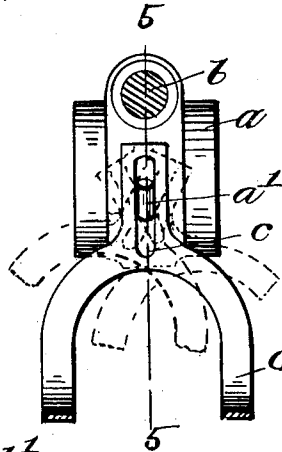
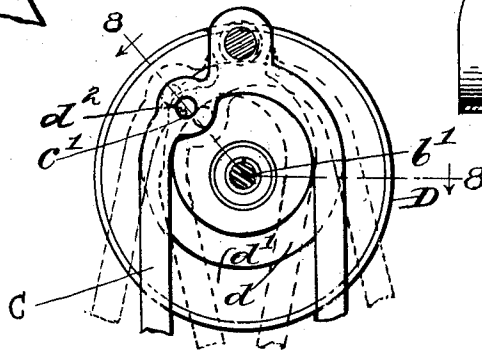


Fig. 3



Witnesses:
 Robert M. Sizer
 J. C. Turner

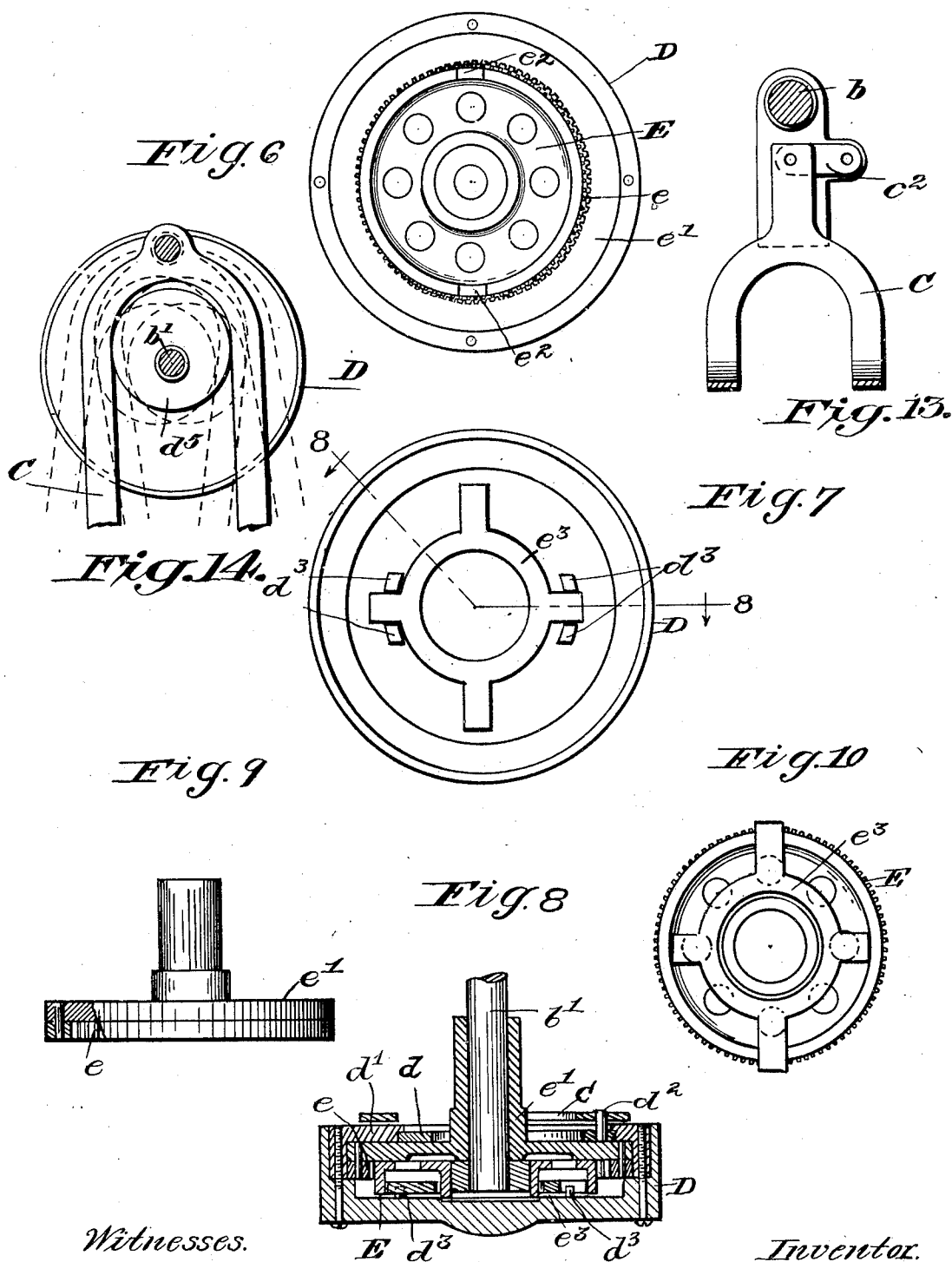
Inventor:
 Bernard A. Stowe
 by J. B. Fay
 Attorney.

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3 SHEETS—SHEET 3.



Witnesses.
 J. C. Turner
 Robert M. Sizer

Inventor.
 Bernard A. Stowe
 by J. B. Fay
 Attorney.

UNITED STATES PATENT OFFICE

BERNARD A. STOWE, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
THE ADAMS-BAGNALL ELECTRIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

OSCILLATING FAN.

1,058,488.

Specification of Letters Patent.

Patented Apr. 8, 1913.

Application filed April 18, 1910. Serial No. 556,191.

To all whom it may concern:

Be it known that I, BERNARD A. STOWE, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Oscillating Fans, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relating as indicated to fans of the oscillating type has regard more particularly to a fan wherein the oscillation is secured by positive means, actuated from the same motor that rotates the fan proper. In the designing of my present improved fan, I have had the further object of rendering the structure as light and unobtrusive as possible both for the purpose of reducing the frictional losses involved in oscillating the fan, and in order that a compact enough structure might be provided to permit its use on desks or in similar situations where space is a desideratum.

Along with the foregoing features are involved various adjustments and details of gearing and bearings all of which will be hereinafter fully described, and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a side elevation of a fan embodying my present improvements; Fig. 2 is a rear elevation of the same with a portion of the mechanism whereby oscillation is produced, removed; Fig. 3 is an elevational view of the oscillating mechanism with other parts shown in section, the plane of which is indicated by the line 3—3 on Fig. 1; Fig. 4 is a sectional view taken on the line 4—4, Figs. 1 and 2; Fig. 5 is a sectional view taken on the line 5—5, Fig. 4; Fig. 6 is a plan view showing the interior arrangement of one part of the gearing constituting a feature of the oscillating mechanism; Fig. 7 similarly shows in plan view another part of such mechanism complementary to such first part; Fig. 8 is a sectional view of such

mechanism in assembled condition, the plane of the section being indicated by the lines 8—8 in Figs. 3 and 7; Fig. 9 is partly a side elevation and partly a sectional view of one of the elements of such mechanism; Fig. 10 is a plan view of one of the elements as illustrated in Fig. 6, but showing together therewith and in operative relation thereto one of the elements shown in Fig. 7; and Figs. 11, 12, 13 and 14 illustrate modified details.

As has been indicated, the particular embodiment of my present improvements chosen for illustrative purposes, is a small fan suitable for desk or analogous use. It will be understood, however, that the base A of the fan to which the leads for conducting the current to the fan motor are attached, and wherein is included a suitable switch device, may take on any form ornamental or otherwise that the fancy of the designer may direct, or that other situations may suggest as desirable. In said base A is pivotally mounted on a transverse axis, a block *a* constituting the support proper of the motor and fan, the motor casing B being provided with a spindle *b* that is adapted to be journaled in a suitable vertical aperture in such block. The details of the mounting of such spindle that thus supports the fan and motor, are fully shown in Fig. 5, from which it will be seen that the spindle *b* is threaded into a boss provided for this purpose on the under side of the casing B, and bears a shoulder that serves to retain in place in a run way encircling the aperture, a series of balls forming a ball-bearing. The spindle *b* is retained against chance dislodgment from its journal by a retaining screw that engages an annular recess in its lower end as will be readily understood.

Pivotally secured to a boss on the rear plate of the motor casing B, so as to be oscillatory in a transverse plane, is an angled yoke C constituting in effect a lever, the lower end of which is provided with an elongated aperture *c* adapted to engage a pin *a'* secured in the same block *a* on which the motor casing B is pivotally mounted, such pin *a'* inclining forwardly as shown in Figs. 1 and 5, and being held in adjusted vertical position by a set screw. Oscillation of the lever or yoke C about its point of pivotal attachment to the motor casing B will serve to

oscillate such casing B as should be apparent, the pin a' forming a sliding bearing for the lever C. The several positions of the lower end of the lever C with respect to such pin a' fully appear in Fig. 4. As has been observed, the pin a' extends upwardly from the support and is inclined forwardly toward the vertical axis of the motor casing. As the motor casing oscillates on its vertical axis, the yoke C oscillates transversely on the pivot which attaches it to the motor casing. Consequently during movement from the central position of the yoke, shown in full lines in Fig. 4, to the positions shown in dotted lines, the lower end of the yoke inclines in a transverse direction so that when it reaches the limit of its movement, it is at right angles to the inclined pin. The inclination of the pin therefore renders it much more effective as a bearing point for the apertured yoke. Such movement of the lever C and consequent oscillation of the motor casing B is derived from the armature shaft b' of the fan motor through suitable actuating mechanism, the details of the construction of which appear in Figs. 6 to 10 inclusive, while the manner in which the lever or yoke C is connected therewith, is shown in Fig. 3. Such mechanism includes a relatively movable element in the form of a casing D which incloses the operative parts of the mechanism, and the rotative movement which is communicated to it by gearing presently to be described is translated into the oscillatory movement of the lever C by an eccentric connection therewith, comprising an annulus or ring d loosely mounted within a member d' secured to the front face of the casing D and which has its inner periphery of eccentric formation, the ring d bearing a pin d^2 that engages a suitably disposed aperture c' in the lever C. The shaft b' of the motor, as stated, constitutes the driving member of this mechanism, the end of such shaft extending into the casing D thus seen to constitute the driven member. The gearing connecting the armature shaft with the casing D forms in itself the subject matter of Letters Patent No. 988,043, issued to the Adams-Bagnall Electric Co. as the assignee of Bernard A. Stowe, on March 28th, 1911. Such end of the shaft has rotatably mounted on an eccentric secured to the shaft a gear E that has epicyclic engagement with an annular gear e borne on the rear face of a flanged relatively fixed member e' , the tubular portion of which is secured to the motor casing B and that, in a sense, forms a bearing for such outer end of the motor shaft. Rotation of the shaft b' will effect the rotation of such epicyclic gear E in the opposite direction and at a reduced rate of speed depending upon the ratio between the number of teeth thereon and the number of teeth on said annular gear e , as

will be readily understood. By making the epicyclic gear E very nearly the size of the annular gear e , as in the case illustrated, a very considerable reduction can be effected; thus if the annular gear has 128 teeth and the other 127 teeth, the latter will only make one complete rotation during 127 revolutions of the shaft.

Connection between the epicyclic gear E and the driven member D is secured by providing sets of lugs d^3 on the inner face of the member and notches e^2 on the rear face of the gear, wherewith the oppositely extending arms of a member e^3 preferably cruciform in shape are respectively adapted to slidably engage. As a result of this form of connection, it will be seen that the driven member D is non-rotatably secured to the epicyclic gear E but that the latter is permitted free movement with respect to the former in rectangularly related directions and an evenly and continuously rotative movement of the driven member is thus secured irrespective of the displacement of the epicyclic gear about the center of the driving shaft owing to its eccentric relation thereto. Such movement in turn causes a transverse reciprocatory movement of the ring d eccentrically held on its front face, and thereby the oscillating lever C is alternately swung in opposite directions. The effect of such swinging of the lever has been previously explained.

The above described construction of mounting and oscillating mechanism affords a simple and compact fan structure particularly desirable for use in the connection noted where small space is available, but also susceptible of use in larger fans of the general type in hand.

It is finally to be noted that certain detailed connections may be constructed differently than has been already described without departing at all from the spirit of my invention. For instance, the pin and slot connection a', c between the yoke C and the support a may be reversed. This is illustrated in Figs. 11 and 12, wherein the pin a' is secured to the yoke and is provided with a roller which works in a groove c in the support a .

Fig. 13 illustrates still another modification in which the pin and slot are dispensed with and a link c^2 is substituted.

Fig. 14 illustrates a modification of the means disclosed in Fig. 3 for oscillating the yoke C. A raised eccentric d^5 is straddled by the yoke C, and obviously rotation of the casing D and hence of the eccentric d^5 secured thereto will serve to oscillate the yoke C.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, 130

provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. An oscillating fan, comprising a support, a casing oscillatorily mounted on said support on a vertical axis, an upwardly extending pin secured to said support and inclined toward the axis of the casing, a member rotatably mounted on said casing, a second member pivoted to said casing and provided with a horizontally elongated aperture engaging said pin, and a reciprocable non-rotatable member connecting said first-named and second members.
2. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, another gear eccentrically mounted upon said shaft and having epicyclic engagement with said annular gear, a member non-rotatably connected with said epicyclic gear, and connections between said member and support whereby rotation of said member serves to oscillate said casing.
3. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said gear, connections between said member and support whereby rotation of said member serves to oscillate said casing, another gear eccentrically mounted upon said shaft and having epicyclic engagement with said annular gear, and means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions.
4. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said annular gear, said member bearing both on the circumference and on the respective faces thereof, connections between said member and support whereby rotation of said member serves to oscillate said casing, another gear eccentrically mounted upon the end of said shaft and having epicyclic engagement with said annular gear, and means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions.

5. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said annular gear, said member bearing both on the circumference and on the respective faces thereof, connections between said member and support whereby rotation of said member serves to oscillate said casing, another gear eccentrically mounted upon the end of said shaft and having epicyclic engagement with said annular gear, and a cruciform member having rectangularly related pairs of arms, one such pair of arms slidably engaging said driven member and the other pair similarly engaging said epicyclic gear.
6. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said gear, another gear eccentrically mounted upon said shaft and having epicyclic engagement with said annular gear, means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions, and a second member pivoted to said support and to said casing and adapted to be oscillated by said first member.
7. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said annular gear, said member bearing both on the circumference and on the respective faces thereof, another gear eccentrically mounted upon the end of said shaft and having epicyclic engagement with said annular gear, means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions, and a second member pivoted to said support and to said casing and adapted to be oscillated by said first member.
8. An oscillating electric fan, comprising a support, a casing oscillatorily mounted thereon, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted upon said annular gear, said member bearing both on the circumference and on the respective faces thereof, another gear eccentrically mounted upon the

end of said shaft and having epicyclic engagement with said annular gear, a cruciform member having rectangularly related pairs of arms, one such pair of arms slidably engaging said driven member and the other pair similarly engaging said epicyclic gear, and a second member pivoted to said support and to said casing and adapted to be oscillated by said first member.

9. An oscillating electric fan, comprising a support provided with a pin, a casing oscillatorily mounted on said support, a fan motor in said casing, an internal annular gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted on said gear, another gear eccentrically mounted upon said shaft and having epicyclic engagement with said annular gear, means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions, and a second member pivoted to said casing and adapted to be oscillated by said first member, said second member being provided with an aperture engaging said pin.

10. An oscillating electric fan, comprising a support provided with a pin, a casing oscillatorily mounted on said support, a fan motor in said casing, an internal annular

gear fixedly mounted on said casing, the armature shaft of said motor extending centrally within said gear, a member rotatably mounted on said gear, another gear eccentrically mounted upon said shaft and having epicyclic engagement with said annular gear, means non-rotatably connecting said member with said epicyclic gear but permitting movement of the latter with respect to the former in rectangularly related directions, a ring eccentrically mounted on said member and rotatable relatively thereto, and a second member pivoted to said casing and connected with said ring, said second member being provided with an aperture engaging said pin.

11. An oscillating fan, comprising a support, a casing oscillatorily mounted on said support on a vertical axis, an upwardly extending pin secured to said support and inclined toward the axis of the casing, a member rotatably mounted on said casing, and a second member pivoted to said casing and adapted to be oscillated by said first member, the second member being provided with a horizontally elongated aperture engaging said pin.

Signed by me this 11 day of April, 1910.
BERNARD A. STOWE.

Attested by—
C. L. ESHLEMAN,
J. C. BELL.