(No Model.)

I. D. BOYER.

REVOLVING FAN.

No. 517,428. Patented Apr. 3, 1894.

Fig 1.

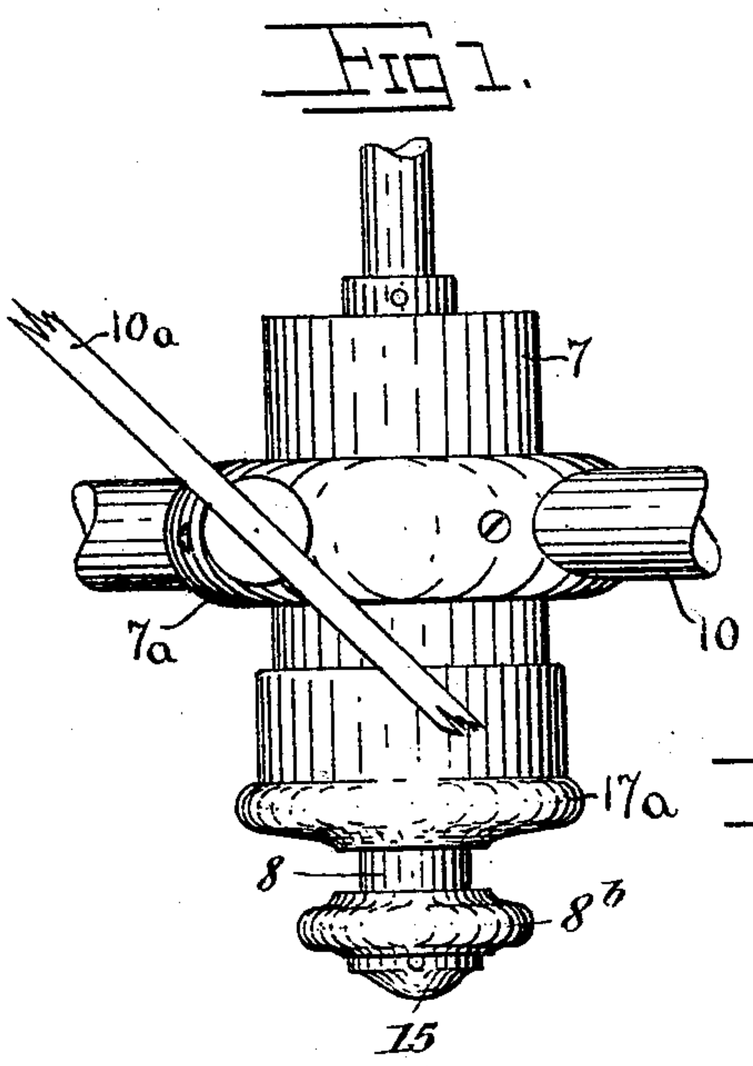


Fig 2.

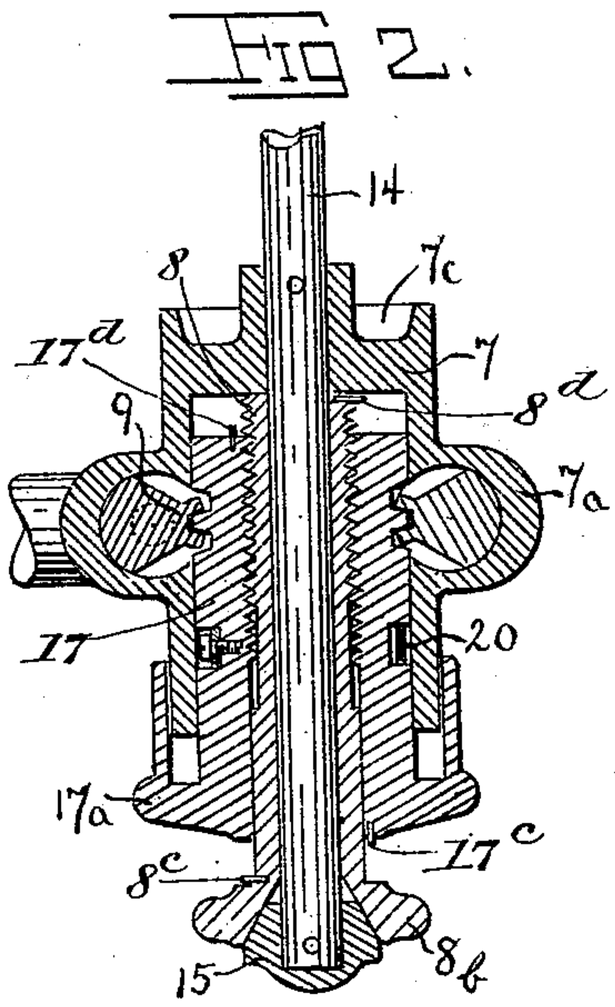
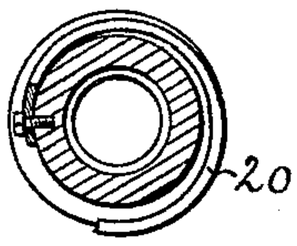


Fig 6.



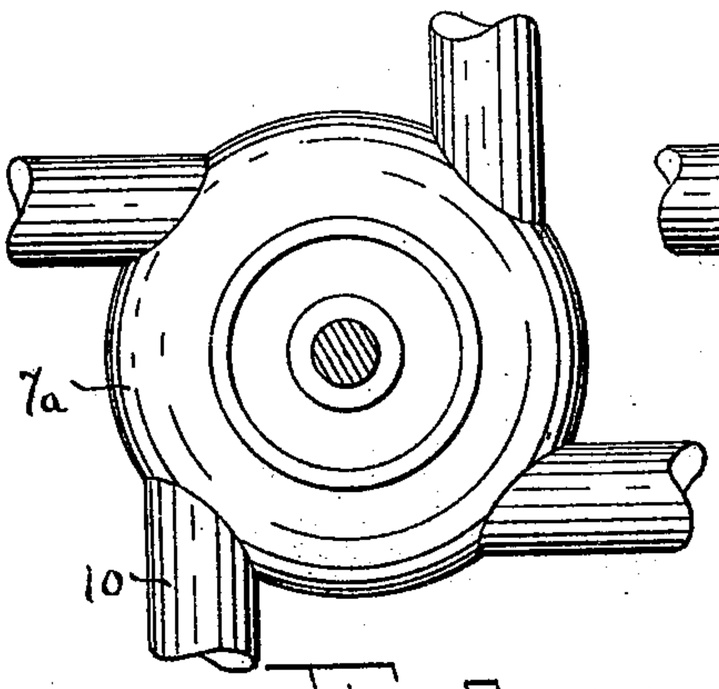


Fig 3.

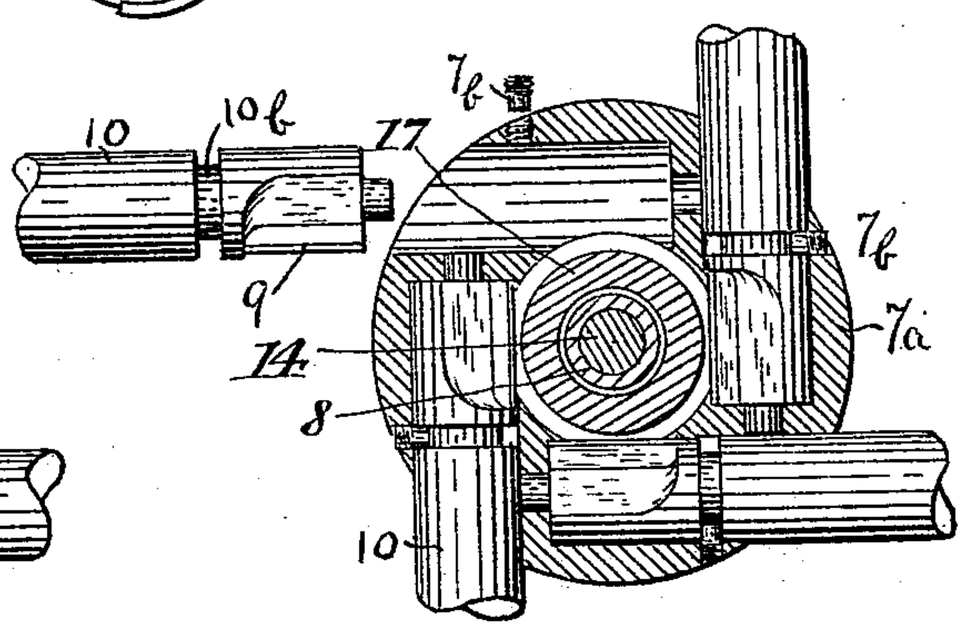


Fig 4.

Fig 5.

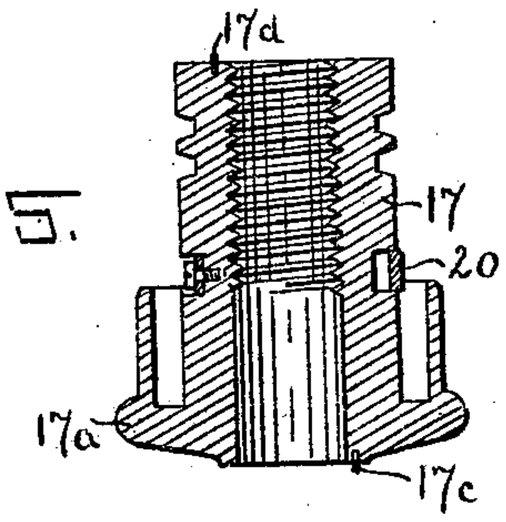
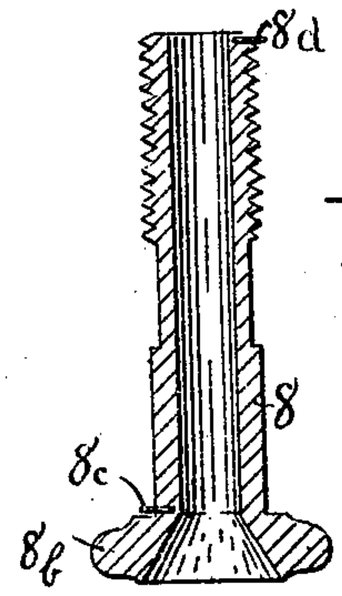


Fig 7.



Witnesses
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REVOLVING FAN.

SPECIFICATION forming part of Letters Patent No. 517,428, dated April 3, 1894.

Application filed April 26, 1893. Serial No. 471,962. (No model.)

To all whom it may concern:

Be it known that I, ISRAEL DONALD BOYER, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented a new and useful Improvement in Revolving Fans, of which the following is a specification.

The object of my invention is to provide certain improvements in the method of adjusting the blades of revolving fans so as to cause them to make more or less breeze as required.

Specifically it consists of sundry modifications of and additions to my previous invention, for which United States Letters Patent No. 491,006 were issued to me on January 31, 1893.

The essential parts, while modified in shape, are all substantially the same as those illustrated in Fig. 3 of the above cited patent, and as in this specification I designate like parts by the same reference numbers as in the former patent, there will be no difficulty experienced in referring from the one to the other. For parts which do not appear in the earlier patent I have introduced some new numbers, but these are very few.

In the drawings accompanying this specification, Figure 1 is an exterior side elevation of the fan hub with the blade shafts projecting and represented as broken off. Fig. 2 is a central longitudinal section of Fig. 1. Fig. 3 is a plan view of Fig. 1. Fig. 4 is a sectional plan view of Fig. 1 showing three of the blade shafts with their pinions in position and a third as just removed from its socket. Fig. 5 is a longitudinal central section of the external grooved sleeve 17. Fig. 6 is a transverse sectional view of Fig. 5 showing spring 20 in its groove. Fig. 7 is a longitudinal central section of the internal threaded sleeve 8.

Referring to my previous patent: the construction illustrated in Fig. 1 requires the use of but one hand to effect the adjustment of the blades, but it has the disadvantage of being comparatively complicated and expensive. The construction shown in Fig. 3 is much simpler and cheaper, but it necessitates the use of two hands. Since I have in that patent given a complete detailed description of the construction and operation of the mechanism, I do not deem it necessary to repeat here anything which has been said there but will confine myself to explaining the nature and operation of the improvements.

Instead of making pinions 9 separate and attaching them to the blade shafts as heretofore, I now make them smaller and cut them directly on the blade shafts as may be seen in Fig. 4. The hub 7 has a swell 7^a in which are drilled four tangential holes for the reception of the blade shafts, which being properly inserted and the retaining screws 7^b set into the grooves 10^b, are free to rotate as far as necessary, but cannot come out of their sockets. In a peripheral groove of external sleeve 17 lies a spring 20. One end of this spring is firmly attached to sleeve 17 while the other end springs outward so as to bear against the inside of the hub 7 for the purpose of creating sufficient friction to cause the sleeve 17 to continue to revolve with the hub while the internal sleeve 8 is held stationary. See Figs. 5, 6 and 2. In order to cause the internal sleeve to continue to revolve while the external one is held stationary, I form a conical friction surface on the upper side of collar 15 and a corresponding concavity in the bottom of sleeve 8. See Figs. 2 and 7.

In the popular and usual acceptation of terms, the internal sleeve 8 may be said to have no longitudinal motion; but, strictly speaking it is capable of an infinitesimal endwise movement which is sufficient to cause it to bind hard or to be relieved from the conical friction surface of collar 15. This small endwise motion is due to the natural looseness which exists between all such moving pieces and does not have to be specially provided for. Hence, in the language of the claim it is considered as *nil*.

The operation is as follows: If the sleeve 17 be held stationary by means of its grasping handle 17^a, sleeve 8 will still continue to revolve because of the friction between its conical surface and the corresponding conical surface on collar 15 which is pinned to the shaft 14. This motion of the two sleeves relatively to each other causes the outer sleeve 17 to descend, thereby turning the blade shafts as explained in my previous patent. At the same time that the handle 17^a is being held against revolving, a slight downward pressure is exerted upon it. By virtue of the

screwed connection between the two sleeves, this downward pressure on handle 17^a is transmitted to sleeve 8 and causes its conical friction surface to embrace more tightly the corresponding surface of collar 15. This downward pressure, while not absolutely essential, is employed to create a greater friction between sleeve 8 and the collar 15 so as to prevent any tendency for the one to slip upon the other. The operation just explained causes the fan to make a blast of increasing intensity. When it attains the desired strength the handle 17^a is released and all parts again revolve as a unit. If now, it be required to diminish the breeze, the handle 8^b is grasped and a slight lifting pressure exerted upon it to loosen the frictional engagement with collar 15. The external sleeve 17 will continue to revolve with the hub 7 because of the friction exerted by spring 20. When the blades assume the desired angle, the handle 8^b is released and all parts remain as set and revolve together. The internal sleeve 8 is in reality a screw for which the external sleeve 17 is the nut. When the screw is held stationary the nut continues to revolve and, vice versa, when the nut is held stationary the screw continues to revolve. Thus by the use of a single hand any desired adjustment of the blades may be effected while at the same time the construction is not a complicated one.

It is obvious that the conical surface on collar 15 is not an essential feature as there are many equivalents which would be equally effective. For instance, a flat surface could be used, or a leather washer or spring contact. Similar remarks apply to spring 20. I do not limit myself to the contrivances shown, but remain free to use any method of creating a suitable friction, firstly between the sleeve 17 and the driving power, secondly between the sleeve 8 and the driving power. I have, however, illustrated the construction which I at present prefer. From the bottom of sleeve 17 projects a small pin 17^c. Its purpose is when the sleeve 17 reaches the lower limit of its travel, to strike against a radially projecting pin 8^c in sleeve 8. This stops the relative motion of the two sleeves by direct contact and not by a wedging contact as would be the case if the sleeves were to strike shoulder to shoulder. Two similar pins, 8^d and 17^d perform the like function at the other limit of travel. The annular depression 7^c in the top of the hub serves as a drip cup to catch the oil which escapes from the bearings above.

Having thus described my invention, what I claim is—

In a revolving fan, a frictionally driven screw and a frictionally driven nut, either capable of being held stationary while the other continues to revolve with the fan; the screw confined against longitudinal motion; the nut capable of a limited longitudinal movement; connection between the nut and the fan blades whereby the longitudinal motion of the nut changes the inclination of the blades; the whole in combination substantially in the manner and for the purpose specified.

ISRAEL DONALD BOYER.

Witnesses:

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