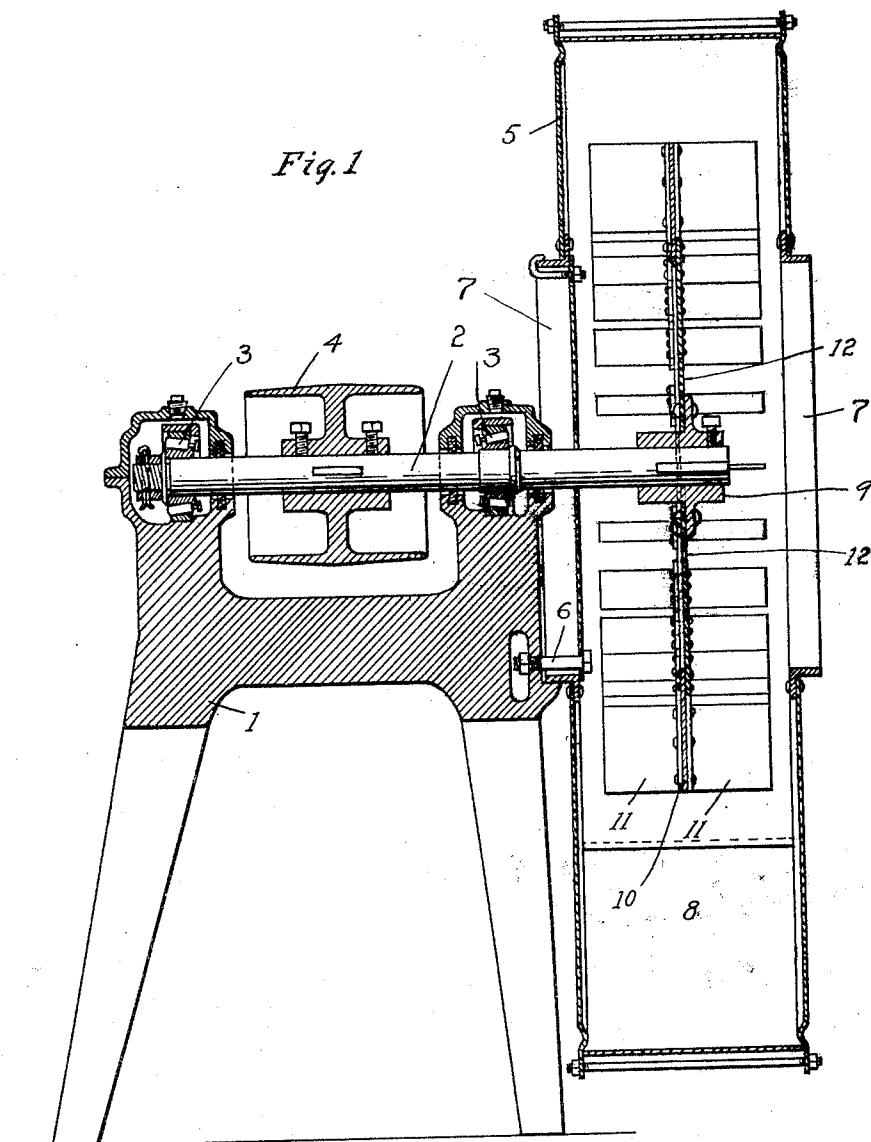


1,345,951.

M. F. PHELPS.
SELF ALINING FAN WHEEL.
APPLICATION FILED JAN. 20, 1920.

Patented July 6, 1920.
2 SHEETS—SHEET 1.



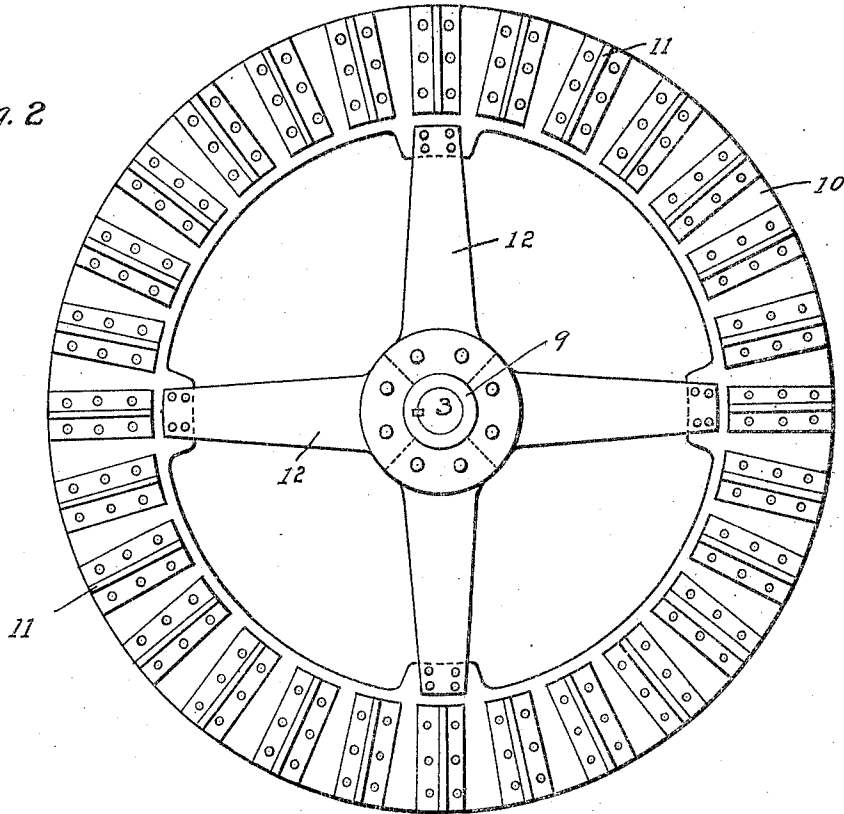
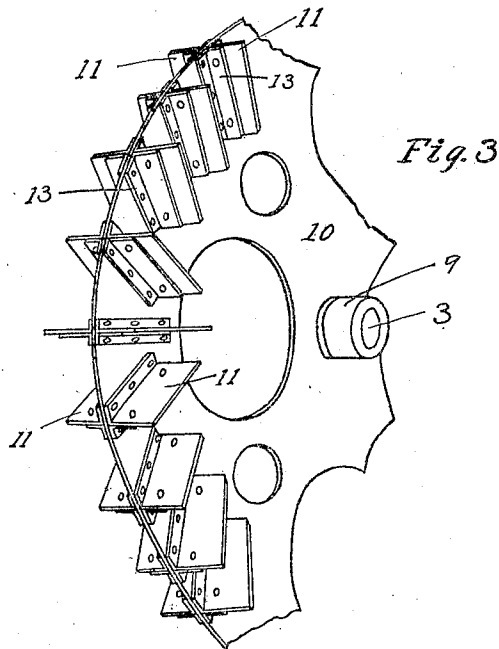
Inventor
MORTON F. PHELPS
By *Paul Haul*
His Attorneys.

M. F. PHELPS.
SELF ALINING FAN WHEEL.
APPLICATION FILED JAN. 20, 1920.

Patented July 6, 1920.
2 SHEETS—SHEET 2.

1,345,951.

Fig. 2



Inventor
MORTON F. PHELPS.
By *Paul & Paul*
His Attorneys.

UNITED STATES PATENT OFFICE.

MORTON FRANK PHELPS, OF LITTLE ROCK, ARKANSAS, ASSIGNOR TO PHELPS MANUFACTURING COMPANY, LIMITED, OF LITTLE ROCK, ARKANSAS, A COPARTNERSHIP CONSISTING OF FRANK PHELPS AND MORTON F. PHELPS.

SELF-ALINING FAN-WHEEL.

1,345,951.

Specification of Letters Patent.

Patented July 6, 1920.

Application filed January 20, 1920. Serial No. 352,821.

To all whom it may concern:

Be it known that I, MORTON F. PHELPS, a citizen of the United States, resident of Little Rock, in the county of Pulaski and State of Arkansas, have invented certain new and useful Improvements in Self-Alining Fan-Wheels, of which the following is a specification.

This invention relates to improvements in fan wheels, and the object of the invention is to provide a fan wheel having a flexible spider permitting the wheel, when in operation, to aline itself and thereby prevent any vibrations in the wheel.

The invention consists generally in a fan wheel having a flexible or movable spider, capable of permitting the fan blades to be automatically brought into a running balance when the fan is being driven.

The invention consists further in the constructions and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification,

Figure 1 is a vertical section, lengthwise of the shaft, of a fan embodying my invention,

Fig. 2 is a front view of the fan.

Fig. 3 is a perspective view of a modified form of the flexible spider and blade supporting ring.

It has been found in practice that no matter how carefully fan wheels are constructed and how accurately they are balanced, when standing idle, it is very difficult to construct and assemble them so that they will be in balance when running. Unless such wheels are in practically exact balance there is certain to be considerable vibration when the fan is driven at a high speed. This interferes with the operation of the fan to a considerable extent; causes the bearings to heat; requires more power for operation, and also causes the fan to make considerable noise.

I overcome these objections by the means herein described.

In the drawings, 1 represents a suitable frame or support, and 2 a fan shaft mounted in said frame preferably by anti-friction bearings 3, 3. 4 is the driving pulley, and 5 the fan casing which is preferably supported upon the frame 1 by suitable bolts

6. The casing is provided with the usual open centers 7, 7 and with an exit or discharge opening 8.

The fan wheel to which my present invention relates is preferably provided with a suitable hub 9 mounted upon and secured to the shaft 2. A ring 10 has secured to its opposite sides a series of fan blades 11, 11. Any desired number of blades 11 may be employed, and these blades may be of any preferred length and width. I provide a series of thin metal arms 12 connecting the hub 9 with the ring 10. Being formed of thin sheet metal these arms are flexible, in the direction of the length of the shaft.

Any suitable number of the flexible arms may be employed and said arms may be of any suitable material and of any desired degree of flexibility.

In Fig. 3 of the drawings I have shown a perspective view of a spider having the ring and flexible arms formed integrally. As here shown these parts are formed by cutting out portions of a single sheet producing a skeleton frame having the ring and the series of flexible arms formed integrally.

In constructing these fan wheels the parts are arranged to produce a wheel that is as nearly balanced as possible, when the fan is standing still. The flexibility of the arms of the spider in the direction of the length of the shaft causes the wheel to automatically assume a perfect running balance when the fan is driven at a high speed.

It will be noted that the ring 10 is in the center of the wheel with the blade projecting therefrom in opposite directions. The same number of blades will be arranged on each side of the wheel, and these blades may be secured by any suitable means. I have here shown each blade provided with flanged plates 13 riveted to the blades and also to the ring 10. The ends of the blades, as here shown, are not connected together, but are entirely free from one another. By having the ends of the blades 11 disconnected, no dead air spaces are formed between the sides of the fan wheel and the side walls of the casing, as occurs when rings or plates are provided connecting the outer ends of the blades.

By employing the continuous centrally arranged ring 10, with the blades secured

thereto, I may employ as many blades suitably fastened to the ring and projecting from each side thereof as may be desired. The ring may be of any suitable rigid material or it may be of thin material having considerable flexibility substantially the same as the spokes. Where preferred the ring and the spokes may be formed from a single thin sheet, as illustrated in Fig. 3 of the drawings.

The details of the construction may be varied in many particulars without departing from the scope of my invention as expressed in the following claims.

I claim as my invention:

1. The combination, in a fan wheel, with a suitable hub, of a series of spokes projecting from said hub, and flexible laterally of the plane of the wheel, a ring supported by the said spokes, and fan blades secured to said ring, in pairs, and projecting therefrom in opposite directions, for the purpose set forth.

2. The combination, in a fan wheel, with a suitable hub, of a circumferentially arranged ring having fan blades arranged in pairs and projecting in opposite directions therefrom, and a series of spokes connecting said ring and said hub, said spokes being

arranged to yield in either direction transversely to the plane of the wheel, to automatically bring said wheel into running balance.

3. The combination, in a fan wheel, with a suitable rim, and fan blades secured thereto, of laterally yielding spokes having their outer ends connected to said rim, and means supporting the inner ends of said spokes, for the purpose set forth.

4. The combination, in a fan wheel, with an outer ring and a series of fan blades secured thereto, of a series of independent, laterally yielding spokes having their outer ends connected to said ring, and a suitable hub supporting the inner ends of said spoke, for the purpose set forth.

5. The combination, in a fan wheel, with a suitable hub, a series of spokes projecting from said hub, each spoke being arranged to yield laterally of the plane of the wheel, a ring supported by said spokes, and fan blades secured to said ring, for the purpose set forth.

In witness whereof I have hereunto set my hand this 12th day of Jan., 1920.

MORTON FRANK PHELPS.

Witness:

J. B. BRITTON.