

June 19, 1934.

C. FRISCH

1,963,196

WINDMILL

Filed July 6, 1932

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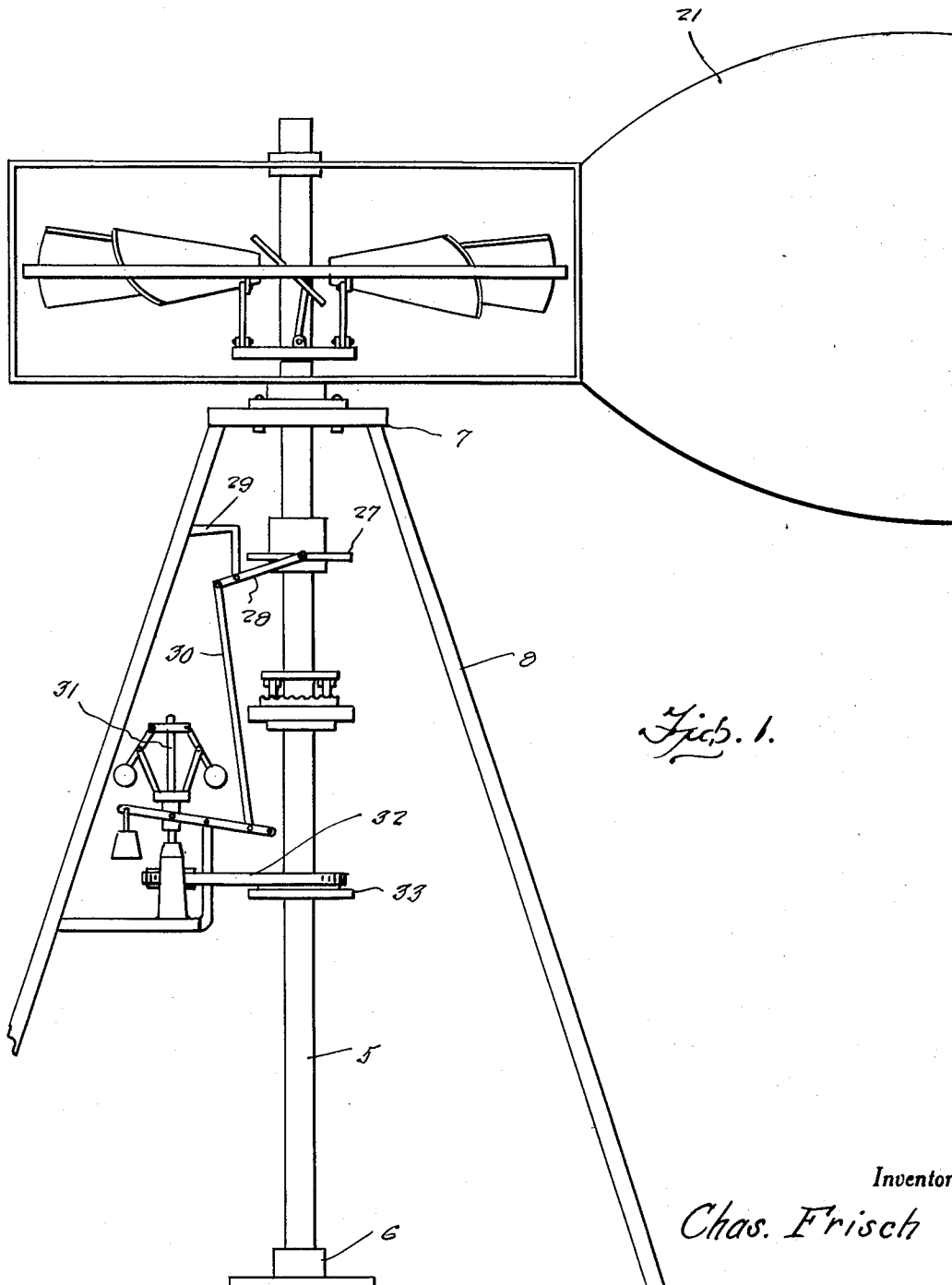


Fig. 1.

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Fig. 2.

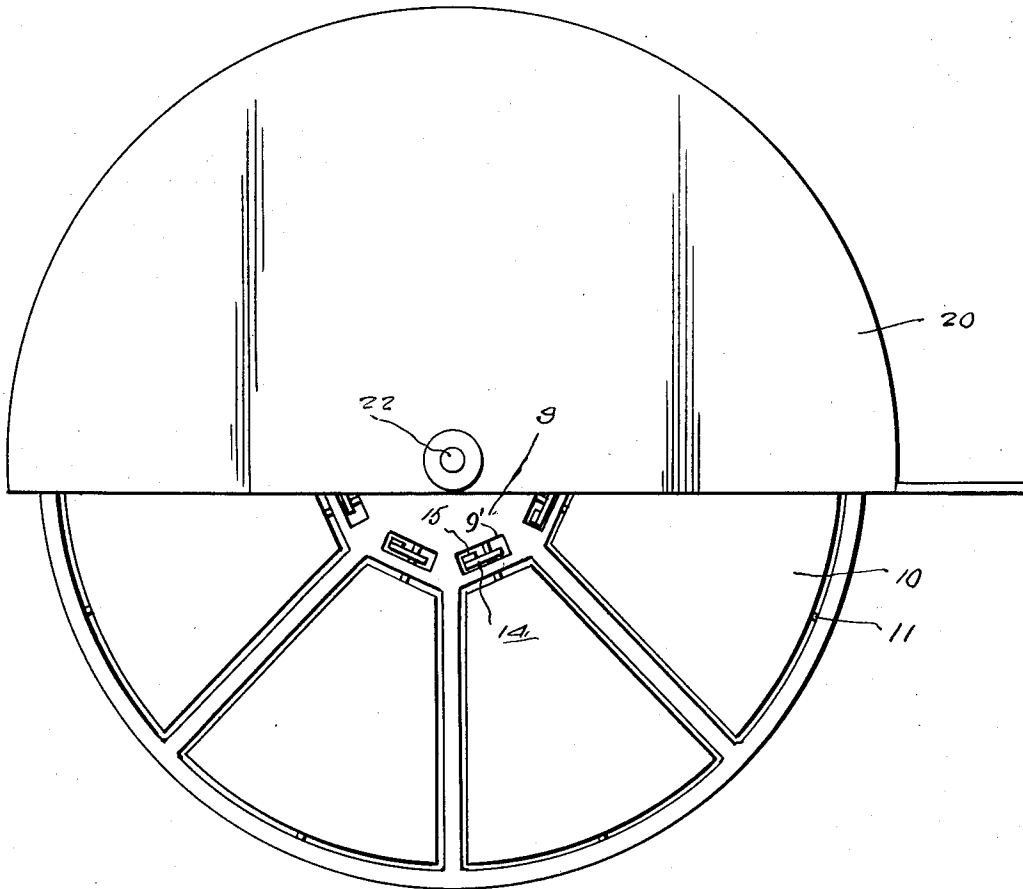
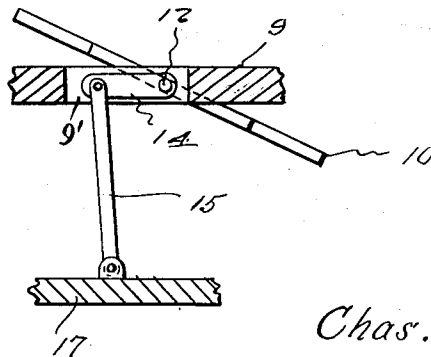


Fig. 6.



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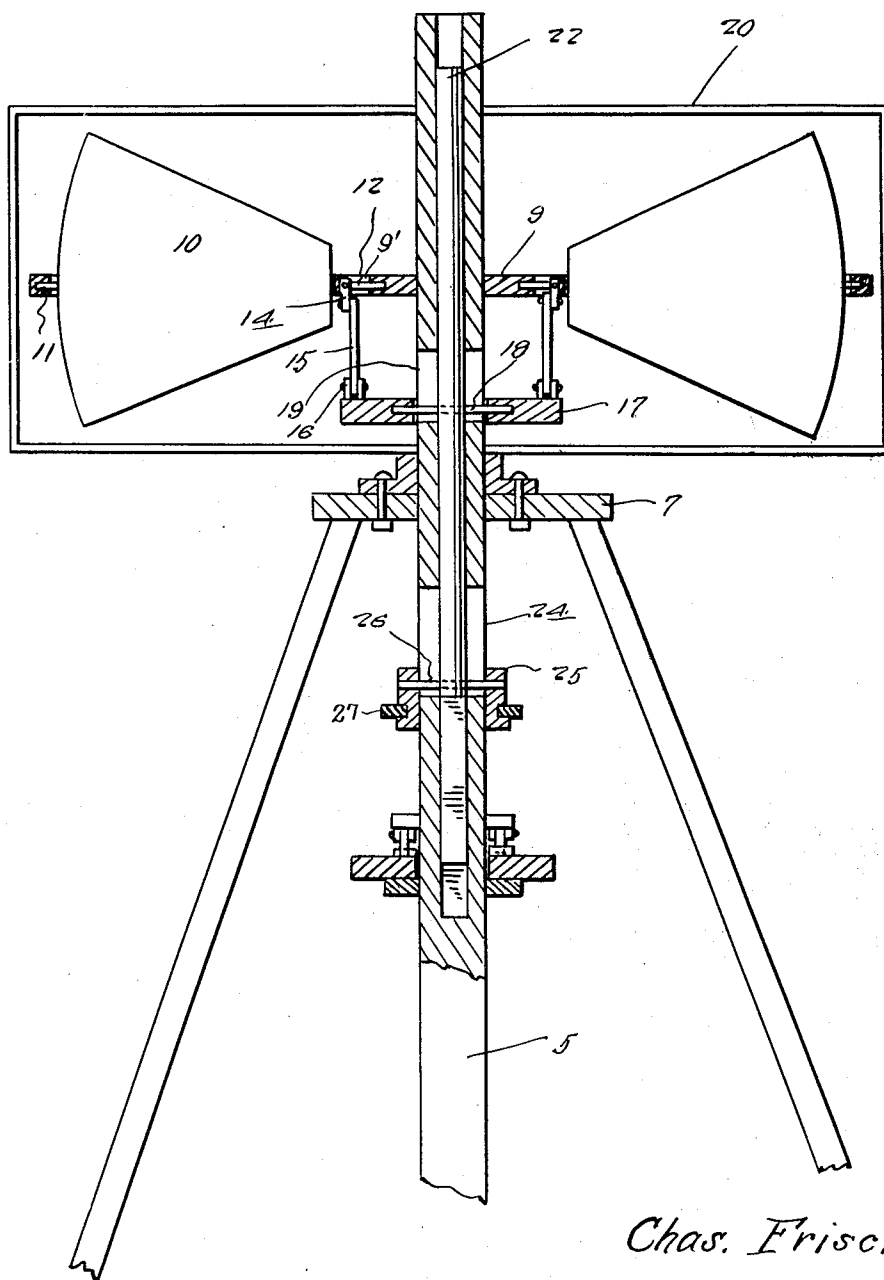
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Fig. 3.



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Fig. 4.

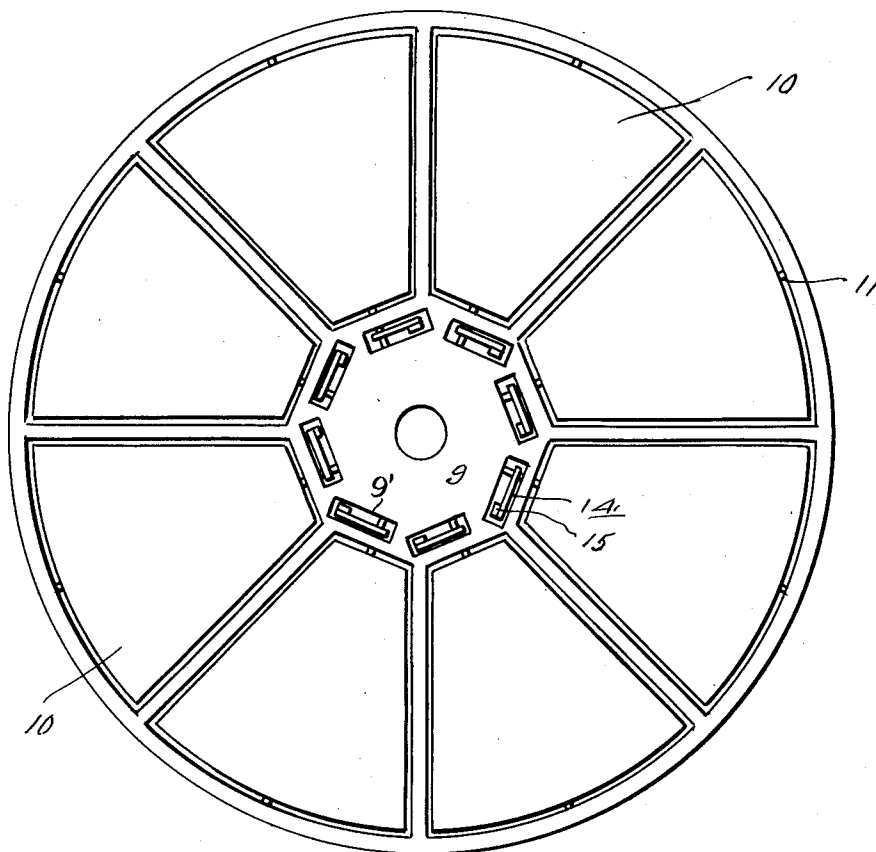
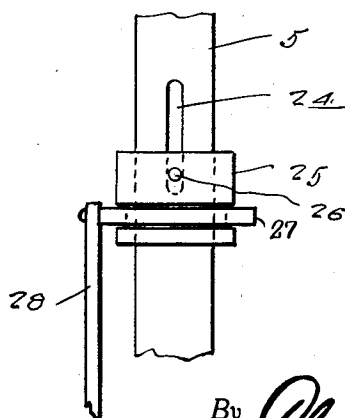


Fig. 5.



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UNITED STATES PATENT OFFICE

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WINDMILL

Charles Frisch, Milwaukee, Wis.

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2 Claims. (Cl. 170—67)

The present invention relates to windmills and has particular reference to a windmill wherein the wings revolve about a vertical axis.

An important object of the invention is to improve the general construction of devices of this character.

Another very important object of the invention resides in the provision of means for adjusting wings in an easy and convenient manner.

10 A still further very important object of the invention resides in the provision of a windmill of this nature which is simple in its construction, inexpensive to manufacture and construct, thoroughly efficient and reliable in use and operation, 15 and otherwise well adapted to the purpose for which it is designed.

With the above and numerous other objects in view as will appear as the description proceeds, the invention resides in certain novel features of 20 construction, and in the combination and arrangement of parts as will be hereinafter more fully described and claimed.

In the drawings:

Figure 1 is a side elevation of a windmill embodying the features of my invention.

Figure 2 is a top plan view thereof.

Figure 3 is a vertical section therethrough.

Figure 4 is a plan view of the wings,

30 Figure 5 is a detail view of a portion of the vertical shaft showing the slidable collar thereon, and

Figure 6 is a detail sectional view through the wing structure.

Referring to the drawings in detail it will be 35 seen that the numeral 5 denotes a vertical shaft the bottom end of which is journaled in a bearing 6 and the upper portion thereof is journaled in a plate 7 supported by props 8 or the like. Numeral 9 denotes a disk or rotor on the upper 40 part of the shaft 5 and having formed therein a plurality of openings in which are mounted wings 10. Each wing 10 comprises an outer journal or trunnion 11 journaled in the disk 9 and an inner trunnion or journal 12 journaled in the 45 disk 9. The inner trunnion 12 is provided with a crank 14 with which is engaged by a link 15. As will be seen, the holes in which the outer and inner trunnions are rotatably received, are formed in the disk and as will be seen in Figures 50 2, 4 and 6, the inner trunnions 12 pass through small openings 9' in the disk, these small openings being spaced slightly inwardly of the inner end of each wing receiving opening, and each crank 14 is located in said small opening when 55 the crank is in horizontal position. This ar-

angement eliminates projecting parts on the disk which would form an air resistance to the rotary movement of the disk.

The links 15 are pivotally engaged as at 16 with a plate 17 slidable on the shaft 5 and having 60 a pin 18 extending through a slot 19 in the shaft 5 so as to rotate with the shaft 5.

Obviously the vertical movement of the disk or plate 17 will change the pitch of the wings 10. A semi-circular hood 20 is disposed on the upper 65 portion of the shaft 5 and houses the wing structure just described so that approximately one half thereof projects outwardly therefrom to be engaged by the wind. In order that it may have a proper position according to the direction of 70 the wind the hood is provided with a tail 21 or vane which will automatically swing the hood half into the wind so that one half of the winged rotor will be acted upon by the wind.

The pin 18 is extended through a rod 22 slidable 75 in a bore in the upper portion of the shaft 5, it being noted that the lower end of this rod is of square formation to correspond with the lower end square formation of the bore so that the rod rotates with the shaft 5. Now below the 80 plate or disk 7 the shaft 5 is provided with a slot 24. A collar 25 is slidable on the shaft and has a pin 26 extending through the slot 24 and through an opening in the rod 22 so that vertical movement of the collar 25 carries the shaft 5 and 85 the plate or disk 17 upwardly.

A ring 27 is rotatable in a groove of the collar 25 and has pivotally engaged therewith a rocker arm 28 mounted on a bracket 29 and operable by a link 30 which is operatively connected with a 90 governor mechanism 31, the governor mechanism 31 being operated by a belt and pulley mechanism 32 from the shaft 5 and the pulley 33 of this mechanism may be used for taking off power from the apparatus for operating any suitable 95 mechanism.

The governor mechanism 31, of course, is adjusted to cause a change in the pitch of the wings 10 according to the velocity of the wind so that a substantially constant speed of the shaft 5 as 100 far as is possible depending, of course, upon the velocity of the wind.

It is thought that the construction, operation, utility and advantages of this invention will now be clearly understood by those skilled in this 105 art without a more detailed description thereof.

The present embodiment of the invention has been described in considerable detail merely for the purposes of exemplification since in actual practice it attains the features of advantage 110

enumerated as desirable in the statement of the invention and the above description.

It will be apparent that changes in the details of construction, and in the combination and arrangement of parts may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed or sacrificing any of its advantages.

Having thus described my invention, what I claim as new is:

1. In a windmill, a vertically arranged shaft, a horizontally arranged disk connected to the shaft and having a plurality of radially arranged openings therein, a vane in each opening having trunnions at its inner and outer ends, the end walls of each opening having holes therein for rotatably receiving the trunnions, said disk having a plurality of small openings therein, each of which is spaced slightly inwardly from the inner end of the vane receiving opening, each inner trunnion passing through a small opening, a crank connected to that portion of each inner trunnion which is located in the small opening, and means connected with the cranks for changing the pitch of the vanes.

2. In a windmill of the class described, a vertically arranged rotatably supported shaft having a longitudinally extending bore in its upper part and upper and lower vertically arranged slots intersecting the bore, a portion of the bore being of rectangular shape in cross section, a small shaft located in the bore and having a portion of rectangular shape in cross section to slidably fit the rectangular shaped portion of the bore, upper and lower pins passing through the second shaft and through the slots of the first shaft, a collar encircling the first shaft and slidably arranged thereon and connected to the lower pin, a small disk having a hole therein receiving a part of the first shaft and to which the upper pin is connected, means for imparting vertical movement to the collar to raise and lower the second shaft and the small disk, a vane carrying disk connected with the first shaft above the upper slot, vanes carried thereby, each provided with a crank, and links connecting the cranks with the small disk.

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