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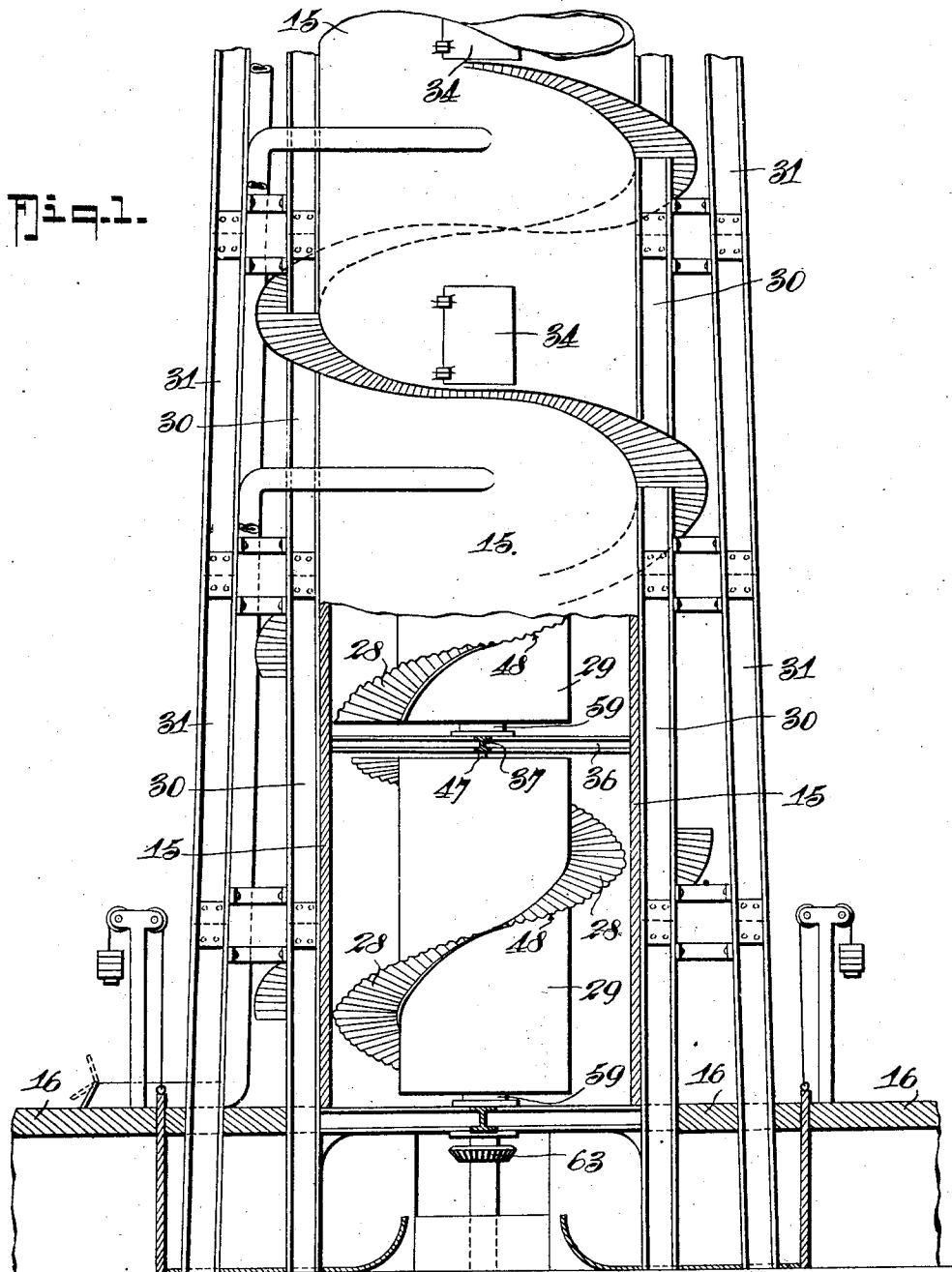
1,631,069

W. M. SMITH

POWER GENERATOR

Original Filed Sept. 4, 1925

2 Sheets-Sheet 1



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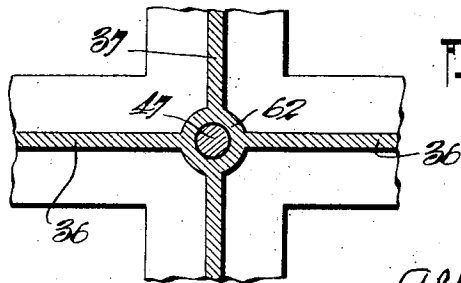
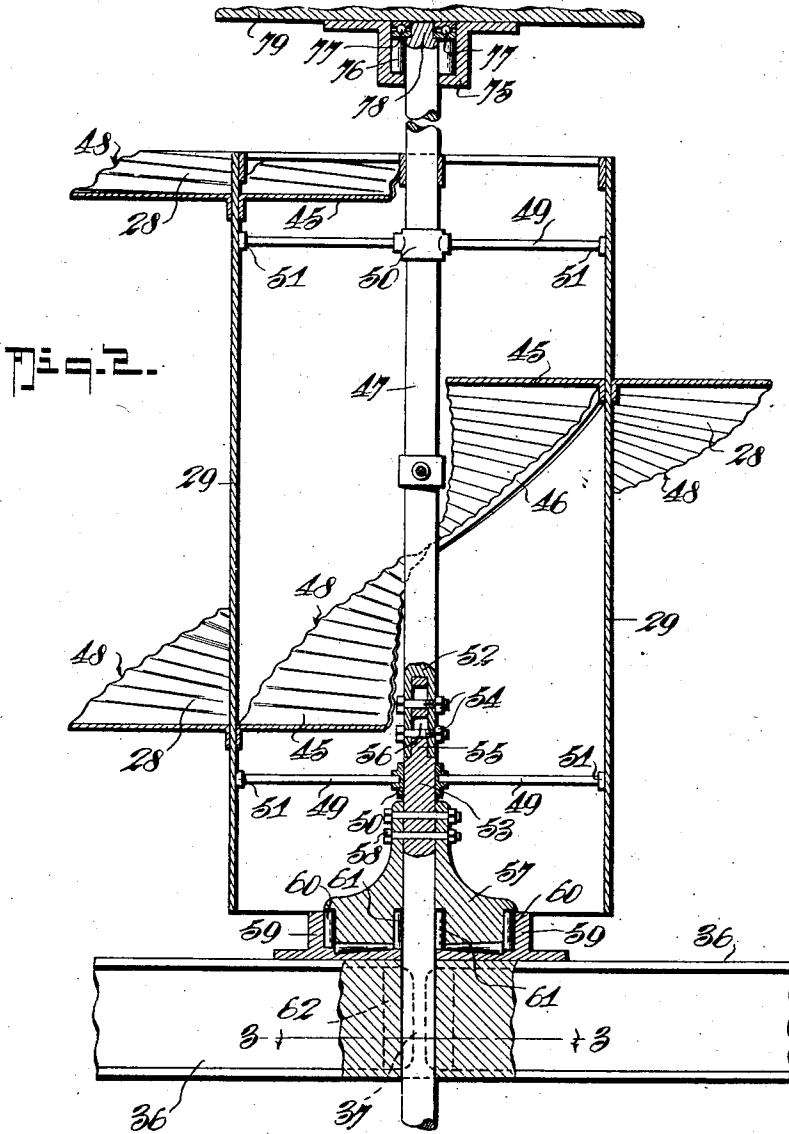
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Original Filed Sept. 4, 1925

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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POWER GENERATOR.

Original application filed September 4, 1925, Serial No. 54,492. Divided and this application filed June 2, 1926. Serial No. 113,301.

This invention relates to certain new and useful improvements in power generators and the present invention particularly has for its object to provide certain improvements in the motor used in such power generators.

The present invention relates to that class of power generators in which is provided a stack and a motor located on a vertical axis within the stack operated by the passage of air through the stack, and the present application is a division of my application filed September 4, 1925, Serial No. 54,492.

In its general nature the present invention resides in the provision of an improved motor consisting of a series of open ended cylinders located on a sectional shaft within the stack and having internal and external vanes by which the cylinders are turned to impart their rotation to the shaft.

In its more detailed nature the invention resides in those novel features of construction, combination and arrangement of parts, all of which will be first fully described, then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:

Figure 1 is a view in elevation of a stack with my improved motor located in the same.

Figure 2 is an enlarged detail vertical longitudinal section and part elevation of one of the motor units.

Figure 3 is a detail horizontal section on the line 3—3 of Figure 2.

In the drawings like numerals of reference indicate like parts in all the figures and the same numerals of reference are employed for the same parts as are employed in my original application aforesaid. This is done for convenience of cross referencing.

In the drawings 30 and 31 represent the steel supports for the stack 15 which is mounted on the hollow base 16, from which base the air passes up through the stack 15. As the construction of the stack, the base, and the means for accelerating the air passage through the stack constitutes no part of this application further description thereof is thought to be unnecessary.

Referring more particularly to Figure 2 it will be seen that the motor consists of a series of open ended cylinders 29 each having a spiral vane 28 secured to the outer wall and a spiral vane 45 secured by means of a flange 46 to the inner wall. The vanes

28 and 45 are so arranged that they appear to form a single spiral connected with a vertical shaft 47, and the vanes are provided with a plurality of corrugations 48 located transversely of the vanes in order to present a more effective surface to the air circulating through the cylinder 29 and the stack 15. The inner edges of the vanes 45 are spaced slightly from the shaft 47 while the outer edges of the vanes 28 are spaced slightly from the inner wall of the stack 15.

The cylinders 29 and likewise the vanes 28 and 45 are connected to the shaft 47 by means of radially disposed rods 49 having their inner ends secured to sleeves 50 which are rigid with the shaft 47 while their outer ends are secured in any approved manner in bosses 51 formed upon the inner wall of the cylinders 29. The rods 49 are carried in spaced relation with each other along the inner wall of each cylinder 29, certain of the rods being located in planes which are at right angles to the planes passing through the other rods.

The shafts 47, as are the cylinders 29, are formed in sections and are connected together at their adjacent aligned ends 52 and 53 by means of bolts 54. The end 52 is hollow as shown and is adapted to receive the reduced portion 55 of the upper end of a second aligned section of the shaft. This reduced end is provided with elongated slots 56 where the bolts 54 pass through the connected ends of the shafts so that the ends of the shafts may be moved towards each other in case of wear.

The upper end of each section 52 of the combined shaft passes through a bearing 57 and is secured at 58 to said bearing. Said bearing is supported in a flanged race 59 and a plurality of rollers 60 and 61 are adapted to aid in the elimination of friction between the parts. The race 59 is carried by the horizontal beams 36 and 37 so that each individual cylinder 29 together with its vanes 28 and 45 and section 47 of the shaft is supported entirely by the bearings 57 and the race 59, and each of these bearings is carried at spaced points along the vertical stack 15 by means of a spider formed of eye beams 36 and 37. At the central portion of each web and where the beams 36 and 37 are connected together is provided a hollow boss 62 through which a section 47 of a shaft is passed and adjacent the bearing 57.

As shown doors 34 are located adjacent the beams 36 and 37 in the stack and adjacent the bearings 57 so that when desired the bearings may be inspected and repaired without any inconvenience.

At the extreme lower end of the shaft 47 which projects into the hollow base member 16 there is provided a gear 63 from which power can be taken in any desired way as for instance the manner shown in Figure 2 of my original application, but as such specific mechanism for taking off the power constitutes no part of the present application further disclosure thereof in this case is thought to be unnecessary.

The operation of my device is as follows:

A circulation of air is maintained in the stack 15 from the hollow base to the upper extreme end. The air passing upwardly through the stack 15 impinges upon the spiral blades and causes a rapid rotation of the cylinders 29. The corrugated blades together with the close association of these blades with the shaft 47 and the inner wall of the stack 15 will aid in maintaining a predetermined air pressure in the stack for the most efficient operation of the motors.

The topmost section of the shaft 47 is journaled in the bearing box 75 in which are located roller bearings 76 and a ball bearing 77, the ball bearing being mounted upon the reduced end 78 of the shaft. The bearing box is carried by a spider 79 secured to the top of the stack 15.

From the foregoing description, taken in connection with the accompanying drawings, it is thought the complete construction, operation and advantages of my invention will be clear to those skilled in the art to which it relates.

What I claim is:

1. In a power generator of the kind wherein is provided a stack and means for delivering air to the bottom of said stack; an air motor in the stack, said air motor comprising a plurality of sections in vertical alignment, each section consisting of a shaft, an open ended cylindrical member secured to and spaced from the shaft and also spaced from the inner wall of the stack, a spiral vane secured to the outer wall of the cylindrical member, and a spiral vane secured to the inner wall of said cylindrical member.

2. In a power plant of the kind wherein is provided a stack and means for delivering air to pass through said stack; an air motor in the stack, said air motor comprising a plurality of sections in vertical alignment, each section consisting of a shaft, an open ended cylinder secured to and spaced from the shaft and also spaced from the inner wall of the stack, a spiral vane secured to the outer wall of the cylindrical member and a spiral vane secured to the inner wall of said cy-

lindrical member, said vane secured to the outer wall of the cylindrical member being aligned with the vane secured to the inner wall of the cylindrical member.

3. In a power generator of the kind wherein is provided a stack and means for delivering air to the bottom of said stack; an air motor in the stack, said air motor comprising a plurality of sections in vertical alignment, each section consisting of a shaft, an open ended cylindrical member secured to and spaced from the shaft and also spaced from the inner wall of the stack, a spiral vane secured to the outer wall of the cylindrical member, and a spiral vane secured to the inner wall of said cylindrical member, said spiral vanes being corrugated transversely.

4. In a power plant, a stack, a motor mounted longitudinally of the stack and comprising a plurality of sections, each section consisting of an open ended cylinder mounted concentrically in the stack, a shaft located centrally of the cylinder and provided with a plurality of spaced sleeves, bars connecting the sleeves with the inner walls of the cylinder, a spiral vane secured to the outer wall of the cylinder and having its outer free edge terminating adjacent the inner wall of the stack, a vane secured to the inner wall of the cylinder and spirally aligned with the external vane, spiders located in spaced relation in the stack and between the adjacent ends of the cylinders, a bearing carried by the spider and connected to the upper end of a shaft in a cylinder, the lower end of the shaft in the cylinder being connected with the upper end in an adjacent cylinder.

5. In a power plant, a stack, a motor mounted longitudinally of the stack and comprising a plurality of sections, each section consisting of an open ended cylinder mounted concentrically in the stack, a shaft located centrally of the cylinder and provided with a plurality of spaced sleeves, bars connecting the sleeves with the inner walls of the cylinder, a spiral vane secured to the outer wall of the cylinder and having its outer free edge terminating adjacent the inner wall of the stack, a vane secured to the inner wall of the cylinder and spirally aligned with the external vane, spiders located in spaced relation in the stack and between the adjacent ends of the cylinders, a bearing carried by the spider and connected to the upper end of a shaft in a cylinder, the lower end of the shaft in the cylinder being connected with the upper end in an adjacent cylinder, said connections between the ends of the shaft permitting play whereby slack is taken up in the shaft because of wear.

WILLIAM M. SMITH.