No. 653,047. Patented July 3, 1900.

L. A. WERNER.

APPARATUS FOR UTILIZING POWER OF THE WINDS.

(Application filed Oct. 30, 1899.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1

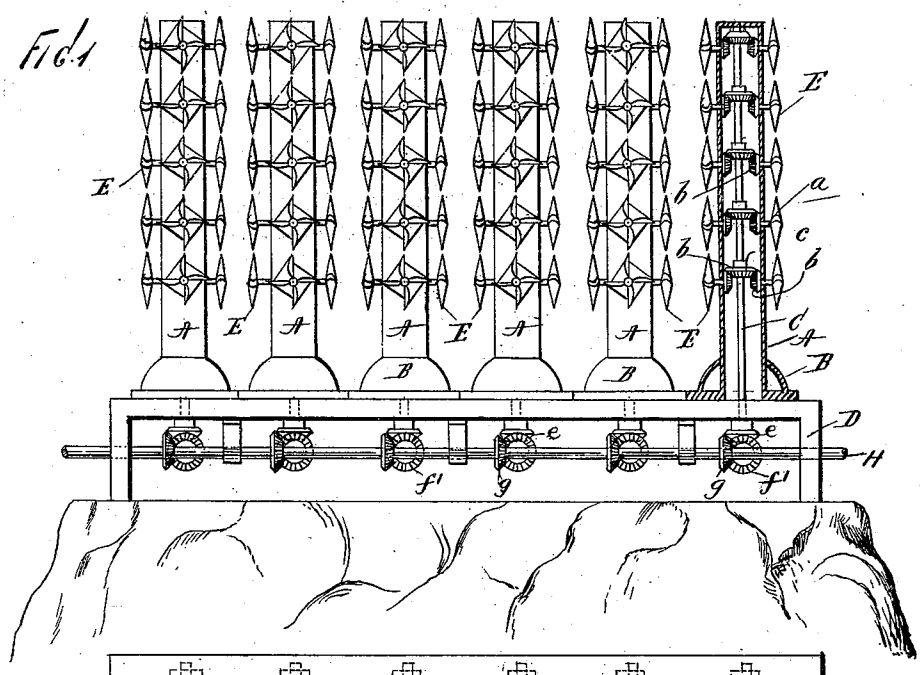


FIG. 2.

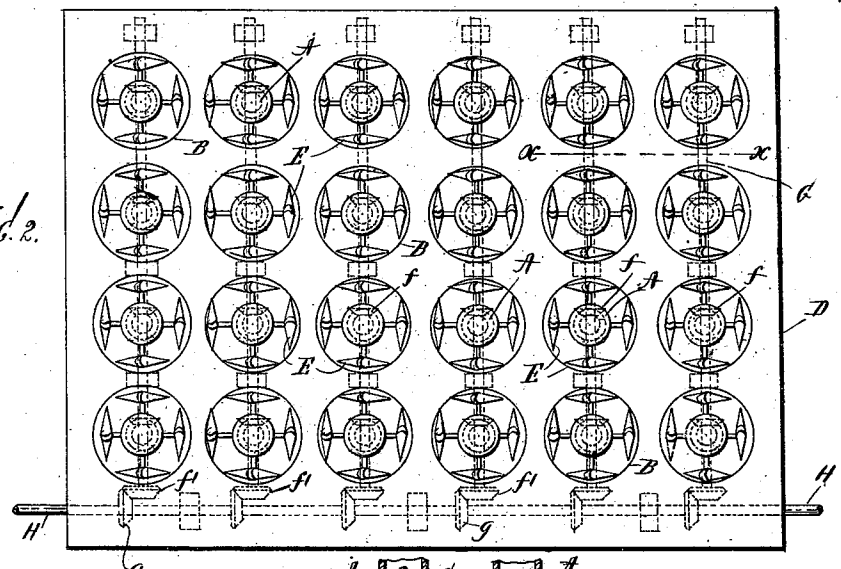
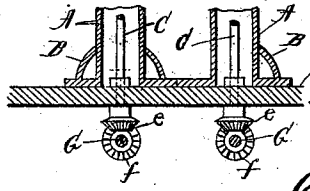


FIG. 3.



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FIG. 4.

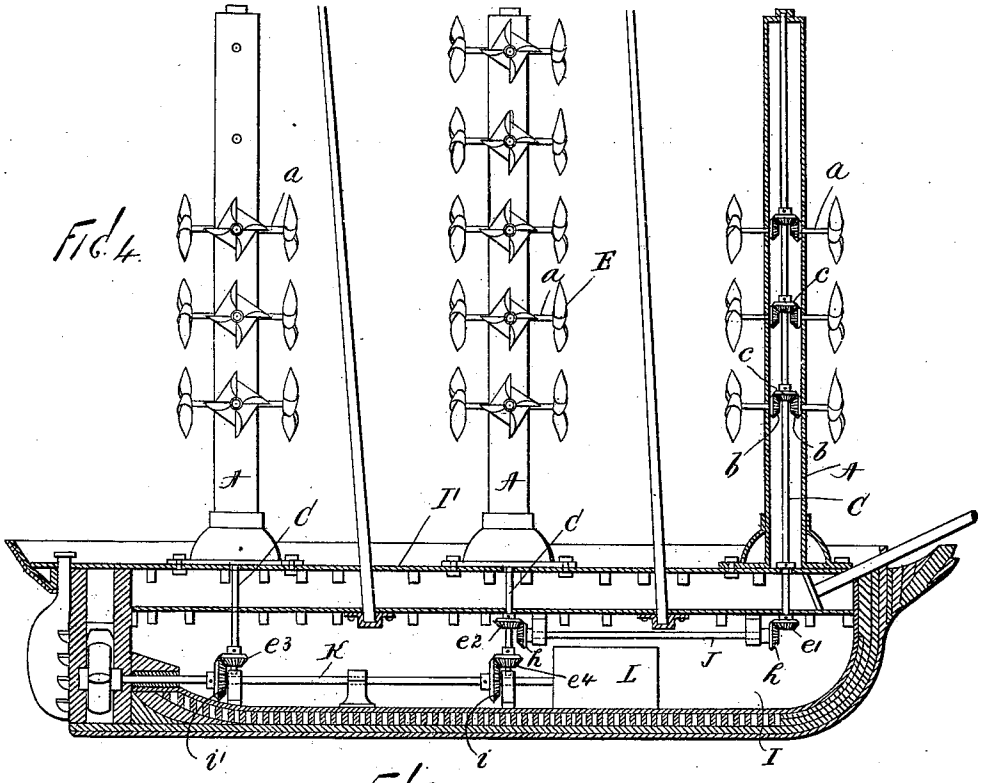


FIG. 5.

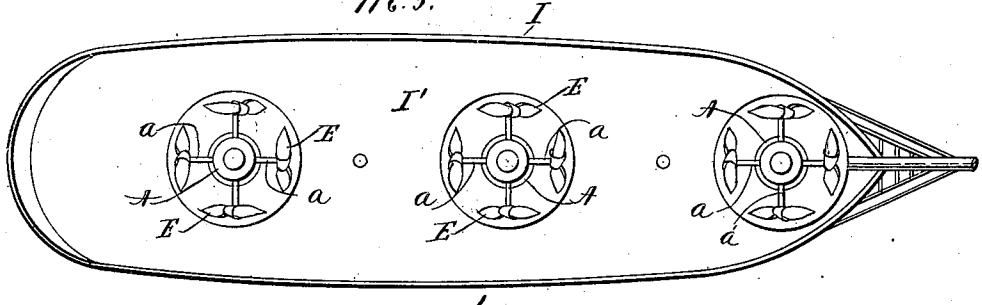
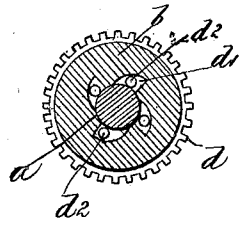


FIG. 6.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR UTILIZING POWER OF THE WINDS.

SPECIFICATION forming part of Letters Patent No. 653,047, dated July 3, 1900.

Application filed October 30, 1899. Serial No. 735,210. (No model.)

To all whom it may concern:

Be it known that I, LEOPOLD A. WERNER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Apparatus for Utilizing the Power of the Winds, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for utilizing the power of the wind, and has for its object to provide novel and improved means operative upon either a stationary or moving surface whereby the force of the wind regardless of its direction may be caused to drive a power-shaft.

The invention consists in the construction and arrangement of parts hereinafter fully described.

In the accompanying drawings, forming a part of this specification, in which like letters of reference denote corresponding parts in the several views, Figure 1 is a side elevation of an apparatus embodying my invention mounted upon a land-surface or eminence diagrammatically represented. Fig. 2 is a plan view of the same. Fig. 3 is a section upon the line X X, Fig. 2. Fig. 4 is a central section of an apparatus embodying my invention and mounted upon a vessel, parts of the apparatus being in elevation. Fig. 5 is a plan view of the same; and Fig. 6 is a vertical detail section on an enlarged scale, showing one of the gears embodying part of the mechanism.

My invention comprises a plurality of suitably-arranged vertical towers or shafts A, rigidly mounted in bases B and preferably open at the bottom and closed at the top. Through the center of each of these columns extends a vertical shaft C, the upper end of which is journaled in the top of the column, and the lower end of which passes downwardly through and beneath the base B and is journaled in a suitable common support D, on which the various bases B and columns A are mounted. The columns are preferably cylindrical in form and have mounted radially therein a number of short shafts *a*, preferably arranged as shown in the drawings, in which four of these shafts project from equidistant faces of the column a certain distance above the base B, while corresponding sets of such shafts are similarly arranged at equal successive heights above the first set of shafts, there being, as shown in Fig. 1, five of such sets, or twenty shafts in all for each column. Each of these shafts *a* has securely mounted upon the outer end thereof a fan-wheel or wind-turbine E, of any approved type or form, but essentially one which, as shown in the drawings, is peculiarly adapted to receive the force of the wind in such manner as to turn it constantly in one direction, such fan-wheels of course being well-known in the art to which my invention appertains. Upon the inner ends of each of the shafts *a* are mounted beveled pinions *b*, meshing with registering bevel-gears *c*, fixed horizontally upon the vertical shafts C at suitable heights, whereby one of the said gears will mesh with each of the four beveled pinions *b* of the adjacent set of radial shafts *a*, whereby accordingly any revolution of the various fan-wheels E will be communicated to the vertical shafts C with which they are connected. In Fig. 6 I have shown a clutch or means of fastening the beveled pinions *b* upon the inner ends of the radial shafts *a* in such manner that while the shafts when turning in a direction corresponding to the direction of rotation of the fan-wheels will correspondingly turn the beveled pinions, the latter, on the contrary, will not operate to communicate the motion of the vertical shaft to the radial shafts *a*. This connection comprises a plurality of tangential slots *d*, opening into the bore of the pinion *b*, which slots range outwardly in a direction opposite to the direction of rotation of the radial shafts *a* and terminate in radial faces *d'*. In each of these slots is mounted a friction-ball d^2, which when the shafts *a* rotate in operative direction will engage the tangential faces of the slots *d* to turn the pinions thereof, but which friction-balls when the pinions are rotated by engagement with the gears of the vertical shaft will no longer engage the tangential faces of the slots, but will lie against the radial faces *d'* thereof, whereby the shafts *a* are not actuated by the pinions. Of course any other suitable means may be employed for preventing the actuation of the fan-wheels by the vertical shaft.

Upon the lower ends of each of the vertical shafts C are bevel-gears *e*, which engage with similar gears *f*, mounted upon horizontal shafts G, which are suitably supported in the

support or frame D. The number of these shafts is equal to the number of sets or rows of the columns or towers A, and each of the shafts connects by the gears *e* and *f* with the several vertical shafts C, beneath which it extends. In Figs. 1 and 2 of the drawings, I have shown a system comprising twenty-four of these towers arranged in six rows of four towers each. In Fig. 2 there are accordingly six of the shafts G, each provided with four of the bevel-gears *f* at equidistant points, directly under and in engagement with the gears *e* of the vertical shafts. At one end each of these shafts G is provided with an additional beveled gear *f'*, by means whereof the various shafts G connect with a single power-shaft H, journaled longitudinally in the support D at right angles to the shafts G and provided with beveled gears *g*, engaging the various beveled gears *f'* upon the ends of the shafts G. By this arrangement it will be observed that whatever the direction of the wind a considerable number of the fan-wheels E will be caused to revolve by the wind always in a constant direction, their motion being transmitted to the vertical shafts C through the bevel-gears *b* and *c*, the motion of the latter being transmitted to the horizontal shafts G through the bevel-gears *e* and *f* and the motion of these horizontal shafts being communicated to the ultimate power-shaft H through the gears *f'* and *g*. As hereinbefore stated, the connection of the radial shafts *a* with their pinions *b* is such that the motion of the vertical shafts C will not cause a useless rotation of all of the fan-wheels E, but these shafts C will be driven by all of the fan-wheels E which lie in the path or paths of the wind. It is evident that a considerable power will thus always be imparted to the main power-shaft H and that should the various shafts C be driven by different numbers of fan-wheels, as must necessarily happen from the varied positions of the towers or columns relatively to the wind, the speed of all of the various shafts will be reduced to an equality by reason of their common connection, as hereinabove described, while yet no power will be lost in rotating all of the fan-wheels by reason of the connection or mode of attachment of the radial shafts *a* with the beveled pinions *b*. I may, however, use this connection for each of the beveled gear-wheels of all of the shafts forming part of this device, whereby none of the shafts will turn the engaging shaft from which it normally receives its power.

In Figs. 4 and 5 I have shown a modification of my invention in which it is adapted to a vessel for the purpose of assisting the propulsion thereof through the water. In this form of the device I mount three or any desired number of the towers or columns A upon the deck I' of the vessel I. The vertical shafts C of these towers extend downwardly through the decks of the vessel into the hold thereof, each being provided with beveled gears e', e^2, and e^3, respectively. Connecting the beveled gears e' and e^2 of the forward and the central shafts is a longitudinal shaft J, provided with bevel-gears *h*, engaging with said gears e' and e^2. Upon the central shaft C is also mounted an additional beveled gear e^4, which engages with a beveled gear *i* upon the propeller-shaft K of the vessel, a similar gear *i'* upon said propeller-shaft engaging with the gear e^3 of the stern or after shaft C. By this arrangement the force of the wind revolves the fan-wheels and causes them to drive the propeller-shaft K through the medium of the shafts C and the several gearings which connect them with said propeller-shaft. It is understood that the propeller-shaft may be operated by the usual engine or motor of the vessel (shown diagrammatically at L) and that the fan-wheels will practically assist or augment the revolution thereof, whereby the vessel will be driven through the water at a greater speed than through the instrumentality of the engine alone. I am aware that the power of the wind may upon steam vessels be measurable utilized by employing sails and that this is at present done; but it is practically impossible to get any power from these sails which will materially assist the propulsion of the vessel over its normal rate of steam speed except where the vessel is going wholly or partially before the wind, whereas by my invention as applied to vessels winds coming from all directions are utilized, even the adverse winds, the relative force of which is augmented by the normal motion of the vessel under its steam propulsion.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

An apparatus for utilizing the power of the winds, which comprises a plurality of towers or columns, vertical shafts mounted centrally of each of said columns, a plurality of series of fan-wheels journaled in different sides of the columns, whereby a plurality of the same will be turned by the wind or winds, said fan-wheels being adapted to turn in but one direction, gearing connecting the same with the vertical shafts in such manner as to cause said shafts to be turned by said fan-wheels, but not to be capable of turning the same, whereby such of the fan-wheels as do not lie in the path of the wind or winds will remain stationary; a power-shaft mounted in relative proximity to the said vertical shafts; and gearing connecting the said vertical shafts thereto, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 28th day of October, 1899.

LEOPOLD A. WERNER.

Witnesses:
F. A. STEWART,
V. M. VOSLER.