M. HARRIS.

Wind Motors for Propelling Vessels.

No. 196,448. Patented Oct. 23, 1877.

Fig. 1.

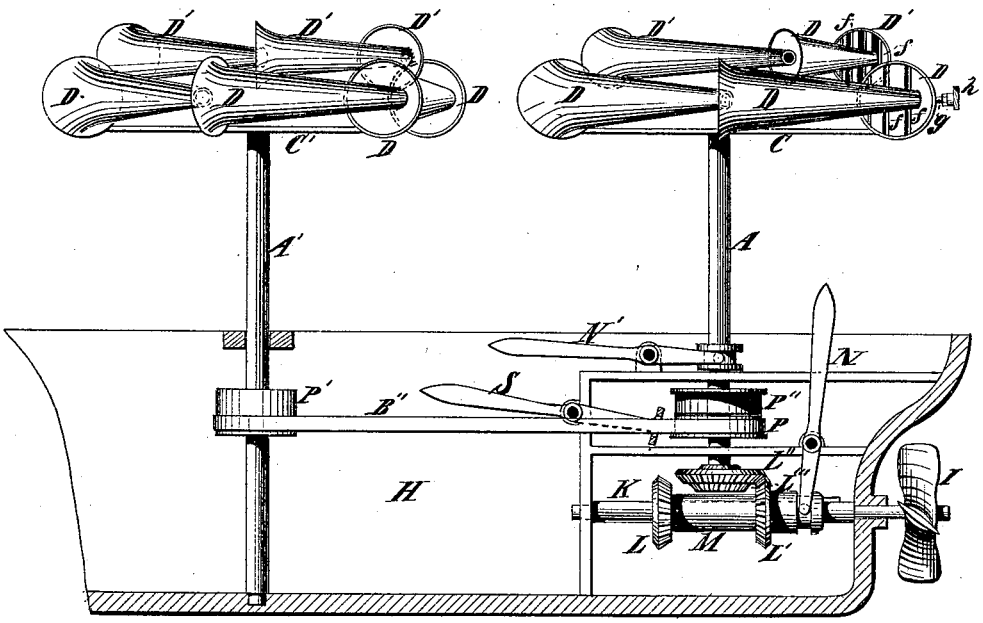


Fig. 2.

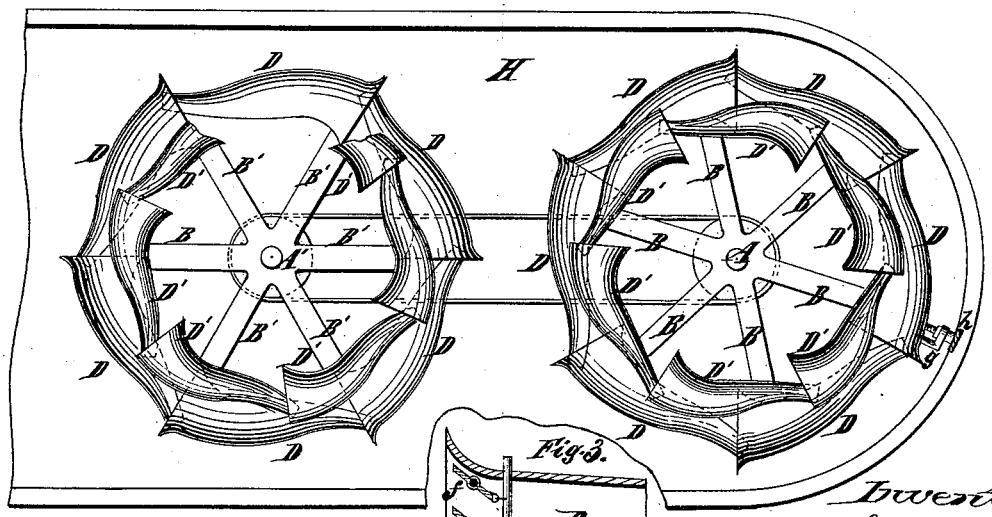
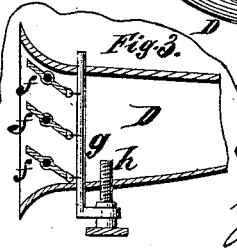


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

MAX HARRIS, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN WIND-MOTORS FOR PROPELLING VESSELS.

Specification forming part of Letters Patent No. **196,448**, dated October 23, 1877; application filed September 14, 1877.

To all whom it may concern:

Be it known that I, MAX HARRIS, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Wind-Motors for Propelling Vessels and other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

The invention relates to the construction of a novel wind-motor; and I herein describe it as applied to the propulsion of vessels, which will sufficiently illustrate its use.

Figure 1 is a side view of the invention as applied to a propelling-screw for vessels. Fig. 2 is a top view of the same, and Fig. 3 a sectional detail.

A and A′ respectively represent shafts, each carrying the improved wind-wheel constituting my invention. B and B′ respectively represent the arms of said wheels. Said arms are preferably strengthened by bands or rims C C′, Fig. 1, which connect the outer extremities of the said arms; but said arms may be otherwise supported, braced, or strengthened.

To the said rims C C′, or to the outer part of the arms of the wheels, are attached hollow conoid sails D D′. Said sails are open at both ends, and are arranged concentrically in series, as shown, and in such manner that the smaller open end of each enters a short distance into the larger open end of the next in order of the series to which it belongs.

Said sails are, moreover, preferably made trumpet-mouthed at their larger ends, and they are curved in their plan or horizontal cross-section, in such manner that air passing through any one of them in a direction from the larger to the smaller end will issue from the smaller end and be directed against the inside of the large end of the next hollow conoid sail in the series, the air striking the wall of the hollow sail into which it is so directed on that side farthest from the center of the wheel.

One or two or more concentric series of conoid sails may be employed on each wind-wheel, according to its size and the purpose to which it is to be applied, and any suitable number of the sails may be employed in each concentric series.

In the large end of each of the conoid sails I preferably place a series of parallel adjustable pivoted slats, *f*, which, by an attached bar, *g*, and screw *h*, may be inclined to any desired angle with the direction in which the wind is blowing; but any other means of adjusting said slats may be employed.

The wind in entering the hollow conoid sails acts not only upon the inclined slats, but also on the inside of the sail itself, expending thereon a portion of its force. The wind then passes out of the smaller end of the sail into the larger end of the next sail in the series, and, being directed against the side of said sail farthest from the center of the wheel, there expends its residual force.

This wheel, when set to rotate horizontally, is always properly presented to the wind in whatever direction it blows, and requires no setting to the wind like an ordinary windmill. I prefer, therefore, to place the wheel in position for horizontal rotation, although it will work in other positions.

The action of the wheel may be illustrated by describing it as applied to marine propulsion. I place the shafts A A′ in proper relation with the hull H of the vessel to be propelled, as indicated in the drawings. If such vessel is propelled by a screw, I, I place on the shaft K of said screw bevel-gears L L′, attached to a sleeve, M, splined to said shaft. On the shaft A of one of the wind-wheels I also place a bevel-wheel, L″, which, when it propels the vessel forward, engages the bevel-wheel L′, and which, in backing the vessel, engages the bevel-wheel L, the motion of the wind-motor being in the direction indicated by the arrows in Fig. 2.

The reversing is performed by a lever, N, acting upon the sleeve M by a collar pivoted to said lever. By attaching to the shaft A another bevel-gear L‴, Fig. 1, directly below the gear L″, said gear, L‴ having a smaller diameter than the gear L″, and by making both the said gears vertically adjustable, the gears L and L′ may be made to engage either of the gears L″ and L‴, to enable the wind-wheel to act with greater or less purchase on

the screw-shaft K; and by using still other gears of lesser diameter on the shaft A, in like manner the purchase of the wind-wheel on the shaft K may be still further varied, to suit the varying force of winds.

The said bevel-gears L″ L‴, &c., on the shaft A may be attached to a sleeve splined to said shaft; or they may be rigidly attached to the said shaft, and the shaft may be made vertically adjustable in its bearings, and actuated for such adjustment by means of a lever, N′.

Two or more of the motors may be coupled together, and their united power utilized.

A convenient means of accomplishing this is to place on the shafts of the wheels the pulleys P P′, and use a belt, B″, for the transmitter of power.

A belt-shifter, S, and a loose pulley, P″, may be employed for stopping the transmission of power, when desired.

Although I have described my improved motor as applied to the propulsion of vessels, it is evident that all the description relating to such application is equally pertinent to an application of the motor to impelling any kind of machinery, except such part as relates to the reversing of the screw.

I claim—

1. In a wind-wheel, the conoid sails, the smaller end of each opening into the larger end of the next in the order of rotation, substantially as and for the purpose set forth.

2. The combination, with the conoid sails D, of the inclined slats *f*, placed in the larger ends of the said conoid sails, substantially as and for the purpose specified.

3. A wind-wheel constructed with two or more concentric series of conoid sails on one and the same shaft, the smaller end of each sail opening into the larger end of the next in the same series, substantially as and for the purpose described.

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Witnesses:

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