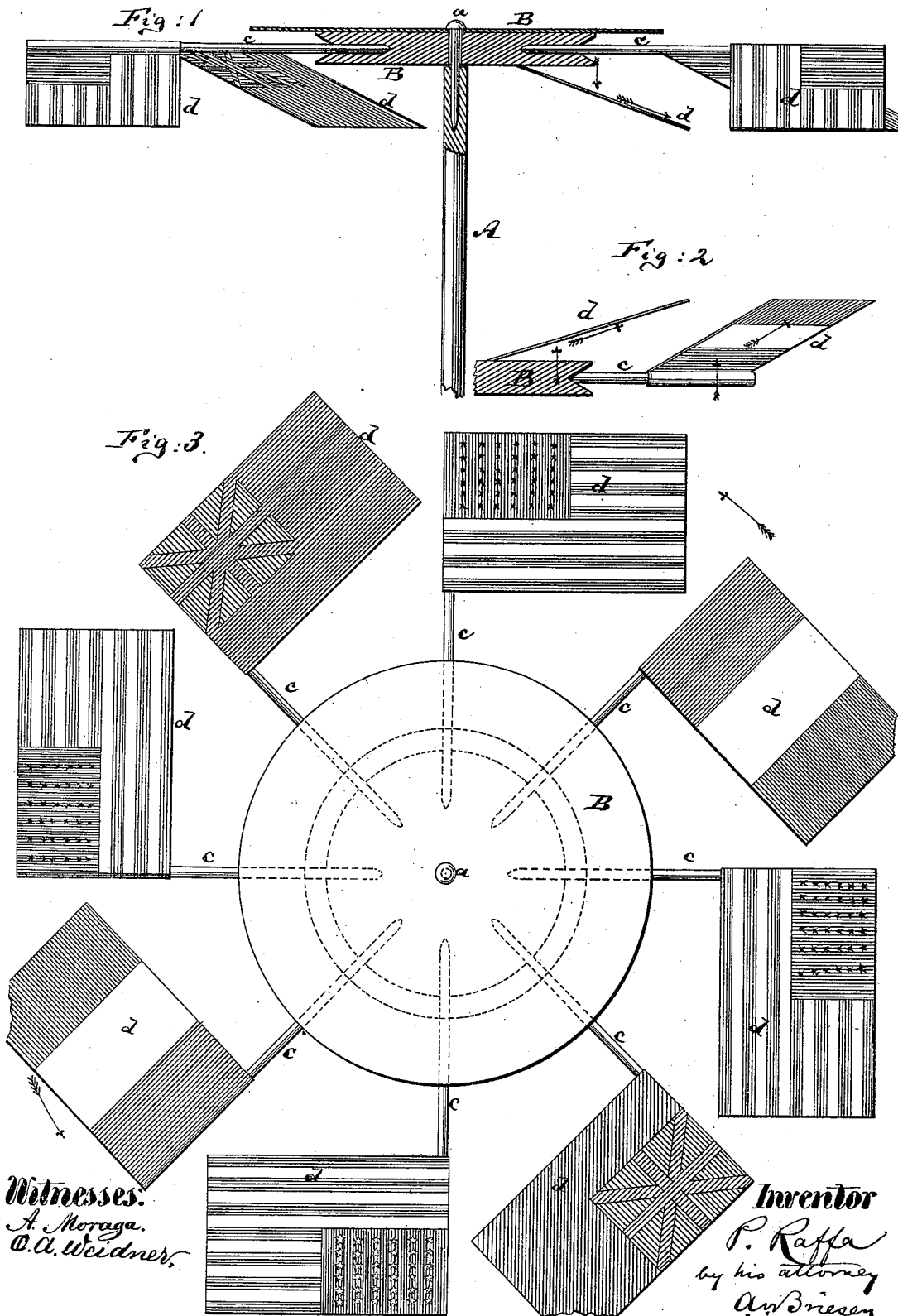


P. RAFFA.
TOY WIND WHEELS.

No. 177,155.

Patented May 9, 1876.



Witnesses:
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UNITED STATES PATENT OFFICE.

PASQUALE RAFFA, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN TOY WIND-WHEELS.

Specification forming part of Letters Patent No. **177,155**, dated May 9, 1876; application filed March 16, 1876.

To all whom it may concern:

Be it known that I, PASQUALE RAFFA, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Toy Wind-Wheel, of which the following is a specification:

This invention relates to an improved toy wind-wheel, which is caused to rotate in the one direction in relation to its axis, from whatever direction and at whatever angle currents of air may strike it.

The invention consists in attaching to arms that project radially from the revolving disk of the wind-wheel the ends of flexible vanes, which, when the wheel is stationary or in un-moving air, will be in about the same plane with the disk; but when the toy is rapidly moved in either direction, or struck by the wind from either side, will be vibrated into an oblique position, according to the direction of the current, and will thereby enable the current to revolve the wheel, so that the radial arms will travel in advance of the vanes, that are respectively attached to them.

In the toy wind-wheels heretofore made the vanes were rigidly secured, during operation, in an oblique position to the revolving disk. This caused the disk to revolve in one direction when the wind struck its face, and in the opposite direction when the wind struck its back.

In the accompanying drawing, Figure 1 is a vertical longitudinal section of my improved toy wind-wheel, showing the vanes inclined by a current of air that strikes them on the face. Fig. 2 is a similar view of part of the same, the wind striking the backs of the vanes. Fig. 3 is a top view of the wind-wheel.

Similar letters of reference indicate corresponding parts in all the figures.

The letter A represents the handle of the toy, being a suitable stick or pole, to one end or part of which is secured the pivot or spindle *a* of a revolving disk or drum, B. This disk or drum B is of suitable diameter, and may be made of pasteboard, wood, or both, or of other fit material, and is hung upon the spindle *a*. To the edge or circumference of this disk or drum are fastened, in suitable manner, a series of radially-projecting arms, *c c*, as clearly shown. To each of these arms *c c* is fastened one end of a flexible vane, *d*, as shown. These vanes *d d* are made of paper or other light and flexible material, and

may be made to represent flags, or be otherwise ornamented in suitable manner.

All the vanes *d d* extend in the same direction from the respective arms *c c*, to which they are fastened.

When the toy is at rest or in un-moving air the vanes *d d* will be in about the same plane as the disk B; but when the toy is rapidly moved, say up and down, forward or backward, or exposed to a current of air, the current caused by the rapid motion of the toy or otherwise will, on striking the faces of the vanes, vibrate said flexible vanes on their stems, and throw their loose ends in the direction of the current. The current is thus, in its effect on the vanes, caused to glide from their fastened ends on the stems *c* toward their deflected free ends; and thus the wheel will be turned in the opposite direction, as shown by the arrows in Fig. 3—that is, with the stems *c c* traveling in advance of their respective vanes.

The toy is thereby very amusing, as it will continue to revolve in the same direction, though its handle is rapidly moved backward or forward, up or down, or exposed to contrary currents.

When exposed to two or more opposing currents at the same time, the wheel will be chiefly influenced by the stronger current.

I am aware that flags have heretofore been attached to the spokes of wheels or toy hoops for ornamentation, but in such cases the wheels could not, nor were they intended, to be used as wind-wheels, as their weight was too great in proportion to the area of the flags to be turned by the force of the wind or air striking the flags.

My invention relates strictly to toy wind-wheels in which the area of the flexible wings is so extensive that the force of the wind striking the wheel will preponderate over the weight of the said wheel sufficiently to cause the same to be revolved; and

I therefore claim—

In a toy wind-wheel, the flexible vanes *d d*, attached with their ends to the radial arms *c c* in such a manner that the force of the wind striking either side of the vanes will cause the wheel to revolve in one direction, substantially as set forth.

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