

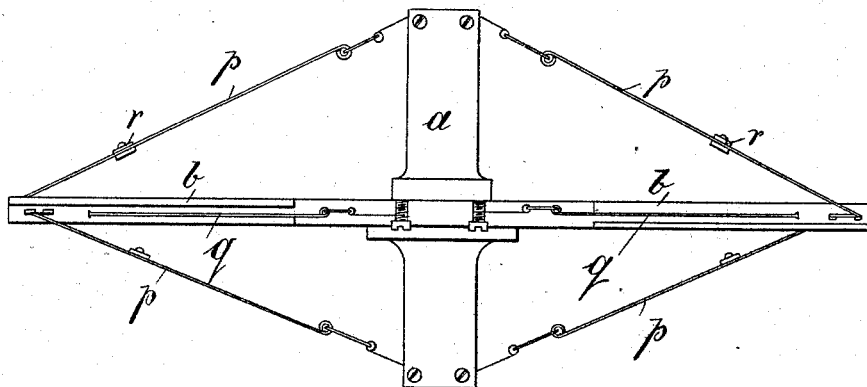
(No Model.)

H. GANSWINDT.  
PROPELLER FOR AERIAL VEHICLES.

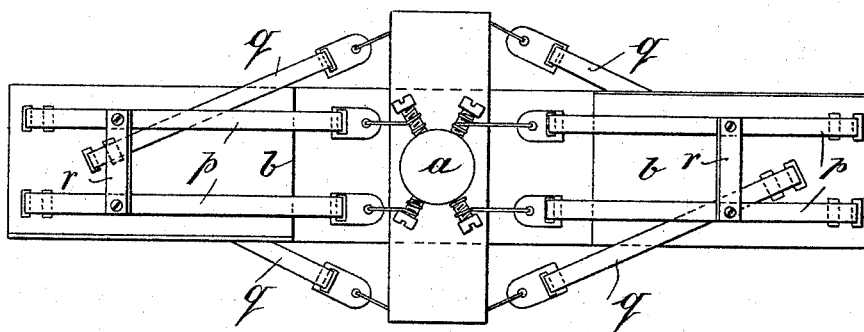
No. 526,700.

Patented Oct. 2, 1894.

*Fig. 1.*



*Fig. 2.*



Witnesses:

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*E. H. Sturtevant*

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# UNITED STATES PATENT OFFICE.

HERMANN GANSWINDT, OF SCHOENEBOURG, GERMANY.

## PROPELLER FOR AERIAL VEHICLES.

SPECIFICATION forming part of Letters Patent No. 526,700, dated October 2, 1894.

Application filed February 8, 1894. Serial No. 499,478. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN GANSWINDT, engineer, a subject of the Emperor of Germany, and a resident of Schoeneberg, near Berlin, in the Empire of Germany, have invented certain new and useful improved flat-metal strips as supporting and bracing means in connection with aerial vehicles, ship and balloon propellers, turbines, wind-wheels, and the like, of which the following is a specification.

This invention relates to improved flat metal or steel-strips, acting as supporting and bracing means in connection with aerial vehicles, ship and balloon propellers, turbines, wind-wheels, &c., the construction of such bracing means being based on the theory, that the resistance which mobile mediums, such as air and water, offer to bodies moving or traveling in same, is calculable according to the law of inertia, that is, according to the volume of the body of air or water agitated or set in motion by such moving body, and according to the acceleration with which such body of air or water is set in motion from a state of rest, by such body moving in same, and vice versa. The smaller the path or course is which air and water must traverse during acceleration or retardation, that is, the smaller the transverse section of the body in motion, the less power is required by such body for the separation and re-union of the mass of air or water.

By suitable constructions therefore, my invention can be adapted to; first, ropes or cords and braces for gondolas, and steering or guiding devices of aerial vehicles; second, blades or wings of balloon propellers; third, blades or wings of ship propellers; fourth, blades of turbines; fifth, exposed surfaces of wind-wheels. As will be hereinafter described, this is effected by suitable tension braces, for which flat metal-strips are employed.

In all the above instances, a far more important technical effect is attained by these improved strips than by any previous constructions employed, in that the transverse sections of these strips or braces presented to the line of motion are reduced to a minimum by employing material—metal or steel—which is as strong and whose form is as flat as possible, that is, by employing metal or

steel strips whose thickness is as small as possible. The requisite tensile strength of these metal strips must be regulated by their breadth. In consequence of such braces, in cases 2 to 5 inclusive, driving wings or blades and paddles may be made lighter in construction and thus meet with less resistance of air or water when in motion.

Referring to the drawings which form a part of this specification:—Figures 1 and 2 show in elevation and plan as an example arrangement in which an axle or shaft *a* is braced with plate-formed parts or wings *b b*. *p, p* represent braces, strips or bands arranged in pairs and parallel, which engage or are connected under an angle with the free ends of the plate or wings *b*, and are destined to traverse the resting medium with their edges. By means of this device the plates are prevented from yielding in an upward or downward direction.

The braces *p*, like the bands or strips *q*, provided to prevent displacement of the plates or wings, are arranged in such manner that each brace enters or leaves the medium with its narrow edge, and thus offers the least possible resistance. The employment of such bracing strips, when of considerable length, would be objectionable, since, in consequence of the resistance of the air or water during motion, they would vibrate, and, for the most part, present their broad sides to the line of motion. The purpose sought to be attained would thus be frustrated. I overcome this defect by arranging two or more bracing strips at certain distances apart, and connecting same at small intervals by transverse rods or wires, if they about coincide with the line of movement, or by flat metal-strips, if they form a greater angle to such line of movement. The transverse parts *r* shown in Figs. 1 and 2, (serving for thus connecting the braces *p, p*), retain the broad bracing-strips in the most advantageous position; that is, either with their sharp edges directly toward the line of movement, or, in connection with ship and balloon propellers, turbines and wind-wheels, in a position suitably inclined to the direction of movement, so that by their own surfaces they assist in the propulsion of such devices.

Having now described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the axle *a* and wings  
5 *b b*, the flat metal braces *p* connecting said  
wings and axle, the transverse strips *r* connecting the braces *p*, and the diagonally arranged bracing strips *q* also of flat metal, substantially as described.

2. In combination with the axle *a*, and wings  
10 *b*, the parallel flat metal strips passing through the extremities of the wings and having their

ends secured to the axle above and below the wings, and cross connecting pieces connecting said strips, substantially as described.

In witness whereof I have hereunto signed 15  
my name in the presence of two subscribing witnesses.

HERMANN GANSWINDT.

Witnesses:

ALFRED MEISTER,  
W. HAUPT.