

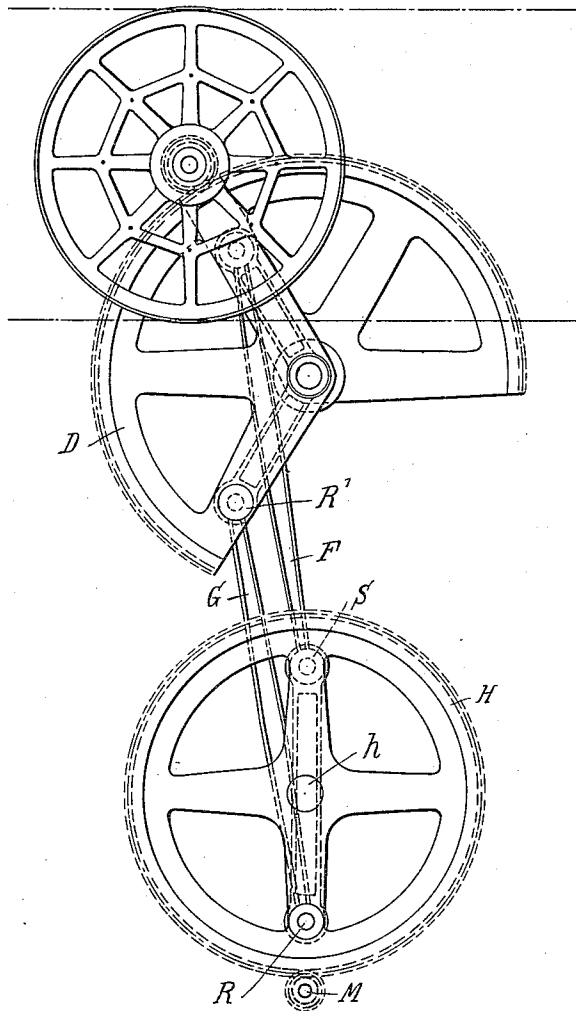
V. WIŚNIEWSKI.
DRIVING GEAR FOR RECIPROCATING PROPELLERS.
APPLICATION FILED JAN. 24, 1911.

1,032,169.

Patented July 9, 1912.

3 SHEETS—SHEET 1.

Fig. 1.

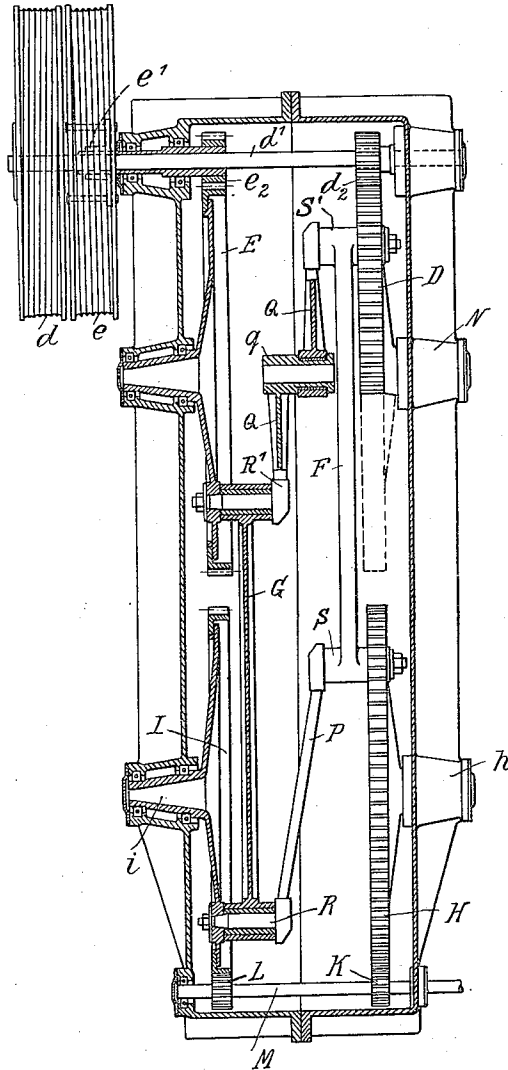


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1,032,169.

Fig. 2.



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3 SHEETS—SHEET 3.

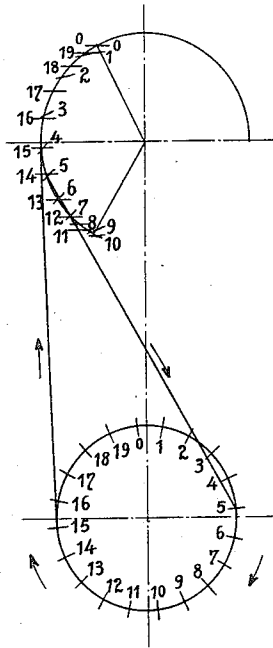
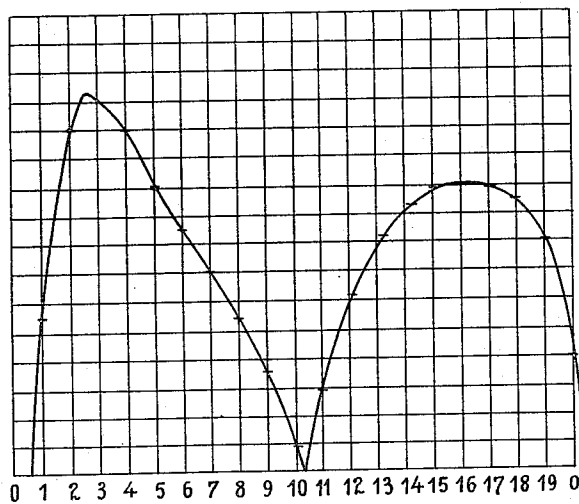


Fig. 3.

Fig. 4.

0-1	30.5° m
1-2	68.0° "
2-3	73.5° "
3-4	67.5° "
4-5	56.5° "
5-6	48.0° "
6-7	39.5° "
7-8	30.0° "
8-9	20.0° "
9-10	5.0° "
10-11	16.0° "
11-12	35.0° "
12-13	46.5° "
13-14	52.5° "
14-15	56.0° "
15-16	56.5° "
16-17	56.0° "
17-18	53.5° "
18-19	45.0° "
19-0	22.5° "

Fig. 5.



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VINCENT WIŚNIEWSKI, OF BERLIN, GERMANY, ASSIGNOR TO LUFTSCHIFFSANTRIEB-GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF BERLIN, GERMANY.

DRIVING-GEAR FOR RECIPROCATING PROPELLERS.

1,032,169.

Specification of Letters Patent.

Patented July 9, 1912.

Application filed January 24, 1911. Serial No. 604,460.

To all whom it may concern:

Be it known that I, VINCENT WIŚNIEWSKI, a citizen of the German Empire, residing at Berlin, in the Kingdom of Prussia, in said German Empire, have invented certain new and useful Improvements in Driving-Gears for Reciprocating Propellers, of which the following is a specification.

This invention relates to an improved driving gear for airships, water vehicles, and the like, in which propelling planes or wings arranged in the manner of a Venetian blind are reciprocated in the direction of travel.

The invention consists essentially in providing the sheaves of the cable with helical grooves and winding or unwinding the cable by the proper angular motion of the connecting-rods for the driving gear at a varying velocity or speed in such a manner that a greater velocity is imparted by the cable to the propelling planes or wings during the forward motion of the same with a maximum of velocity at the beginning of the forward motion, while during the backward motion of the propelling planes or wings a uniformly ascending and descending velocity is obtained in such a manner that the maximum velocity produced during the forward motion is not obtained during the backward motion of the planes or wings. These different velocities are obtained by means of driving gear-wheels and toothed segments, and connecting-rods between the gear-wheels and the toothed segments, the co-axial position of the same and their angular position relatively to the gear-wheels and toothed segments. The motion of the driving gear-wheels and toothed segments is transmitted by pinions to the shafts of the cable-sheaves so as to wind or unwind the cable in spiral convolutions on or from the sheaves and impart the desired reciprocating motion to the propelling planes or wings. In the driving gears heretofore employed in which different velocities during the forward and backward motion are obtained, the variable movements during the forward as well as the backward motion cannot be obtained so that the advantages obtained by the variable velocity of the propelling planes or wings cannot be secured in as high a degree as by the improved reversing-gear hereinafter described.

A gear of this novel type is exemplified in the accompanying drawing.

Figure 1 is a side view, and Fig. 2 a vertical section; Figs. 3 to 5 graphically depict the various processes during the travel.

The processes during the travel are best explained with reference to Figs. 3-5; Fig. 3 shows the reversing gear employed in a diagrammatical manner; Fig. 4 indicates the velocities of the various positions marked with the same figures in Fig. 3 and Fig. 5 graphically depicts the velocities given in figures in Fig. 4. As evident from the drawing the travels for the ahead motion of the sector and for the return motion from 0 to 10 and from 10 to 0 are equal. The maximum velocity of the ahead motion will, however, rise above 70, the maximum velocity of the return motion not exceeding 57.

In the constructional form shown in the drawing the sheaves or driving wheels *d* and *e* are arranged close to each other, as the pulling elements are intended to act on the wings in the axis of the center of gravity and the driving pulling elements are situated within the same horizontal plane. The pulling element is wound several times around the same sheave, for which purpose each sheave is provided with a screw thread. The sheave *d* is secured to shaft *d'*, which passes freely through the hub *e'* of sheave *e*. The hub *e'* of sheave *e* carries a pinion *e²* and the shaft *d'* carries a pinion *d²*. With each pinion engages a toothed segment D and E respectively. These segments are driven by means of connecting rods F and G the one head of which is linked to the respective segment, while the other head is linked to the respective driving wheel H and I. The wheels H and I are toothed along their whole circumference and engage with the respective pinion K and L. The latter are secured to the same motor shaft M, which is continuously rotated by the motor. The wheels H and I are journaled in the sides of the frame at *h* and *i*, so that the wheels H and I are coaxial. The connecting rods F and G are alternated by 180° with regard to this common axis, so that when the one sector is actuating its sheave ahead, the other is actuating its sheave astern, as the connecting rods are simultaneously linked in such a manner to the sectors, that when the one linked point is in its

highest position, the other is in its lowest position. The one sheave serves to drive the one driving plane, while the other sheave drives the other driving plane. It is obvious that the number of sheaves may be increased according to the number of driving planes or several driving planes may be actuated from the same sheave. The sectors D and E are journaled in the sides of the frame at N and O and the longitudinal axes of these journals are likewise coaxial. For the purpose of relieving the wheels H and I or their pins journaled on one side only against bending stresses without impairing the free action of the connecting rods F and G the pins R and S of the connecting rods F and G are coupled by a link P. For the same reason the other pins R' and S' of the connecting rods are coupled by a link Q, which link must, however, consist of two members hinged together at q, as the pins R' and S' have each an independent reciprocating motion.

The operation is as follows: By the continuous rotation of the motor shaft M the two gear-wheels H and I will be continuously rotated by the pinions K and L. The pins R and S of the two wheels will be constantly traveling in a circular path, while the pins R' and S' of the connecting rods F and G will reciprocate the respective sectors D and E. Owing to the angular position of the connecting rods the ahead motion of the sectors D and E will be faster than the astern motion. The sectors D and E will then by means of the respective pinions d^2 and e^2 drive the respective sheaves alternately in one and the other direction, and with the ratio between the diameter of the sector and the diameter of the pinions d^2 and e^2 shown in the drawing each sheave will be turned twice or more times forward and as many times backward at each stroke of the sector.

I claim:

1. In a driving gear for the propellers of airships, water vehicles, and the like, the combination of a driving-shaft having a driving-pinion, a gear-wheel intermeshing with said pinion, a toothed sector, a connecting-rod pivoted ex-axially to said gear-wheel and toothed sector, a cable-sheave, and a pinion on the shaft of said cable-sheave intermeshing with said toothed sector so that different velocities are obtained for the forward and backward movement of the sheave and the propelling planes connected therewith with a maximum velocity during the forward motion of said planes.

2. In a driving-gear for the propellers of air-ships, water vehicles, and the like, the

combination of a driving-shaft having pinions, driving gear-wheels intermeshing with said pinions, toothed sectors, connecting-rods pivoted co-axially to the driving-gears and toothed sectors for reciprocating the latter, cable-sheaves arranged sidewise of each other and having concentric shafts, and pinions on the shafts of the sheaves intermeshing with the reciprocating sectors.

3. In a driving-gear for the propellers of airships, water vehicles, and the like, the combination of a driving-shaft having pinions, driving gear-wheels intermeshing with said pinions, toothed sectors, connecting-rods pivoted ex-axially to the driving-gears and toothed sectors for reciprocating the latter, a connecting link interposed between the pivots of the driving gear-wheels, cable-sheaves arranged sidewise of each other and having concentric shafts, and pinions on the shafts of the sheaves intermeshing with the reciprocating sectors.

4. In a driving-gear for the propellers of airships, water vehicles, and the like, the combination of a driving-shaft having pinions, driving gear-wheels intermeshing with said pinions, toothed sectors, connecting-rods pivoted ex-axially to the driving-gears and toothed sectors for reciprocating the latter, a connecting link interposed between the pivots of the driving gear-wheels, a connecting-link formed of two hinged members between the driving-pivots of the toothed sectors, cable-sheaves arranged sidewise of each other and having concentric shafts, and pinions on the shafts of the sheaves intermeshing with the reciprocating sectors.

5. In a driving-gear for the propellers of airships, water vehicles, and the like, the combination of a driving-shaft having pinions, driving gear-wheels intermeshing with said pinions, toothed sectors, connecting-rods pivoted ex-axially to the driving-gears and toothed sectors for reciprocating the latter, a connecting link interposed between the pivots of the driving gear-wheels, a connecting-link between the driving-pivots of the toothed sectors, said link being composed of two hinged members, cable-sheaves arranged sidewise of each other and provided with helical grooves, concentric shafts for said cable-sheaves, and pinions on said shafts intermeshing with the reciprocating sectors.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

VINCENT WISNIEWSKI.

Witnesses:

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WOLDEMAR HAUPT.