April 17, 1934. D. K. JETTE 1,955,501

FLYING MACHINE

Filed May 24, 1932 2 Sheets-Sheet 1

Fig. 1.

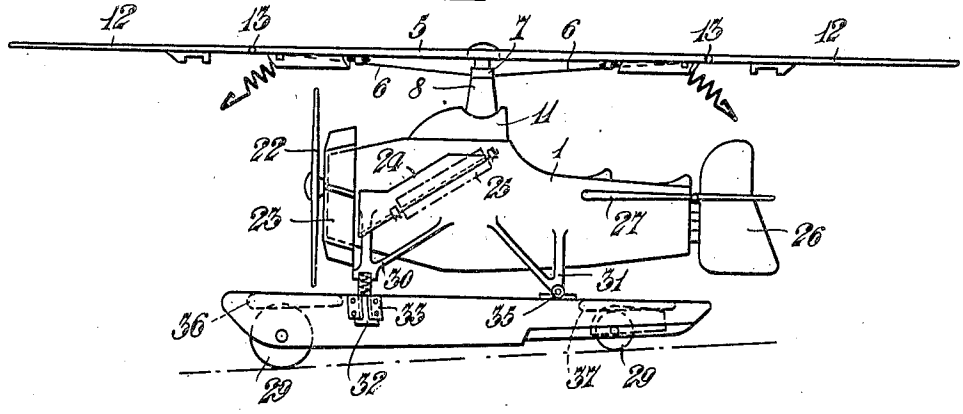
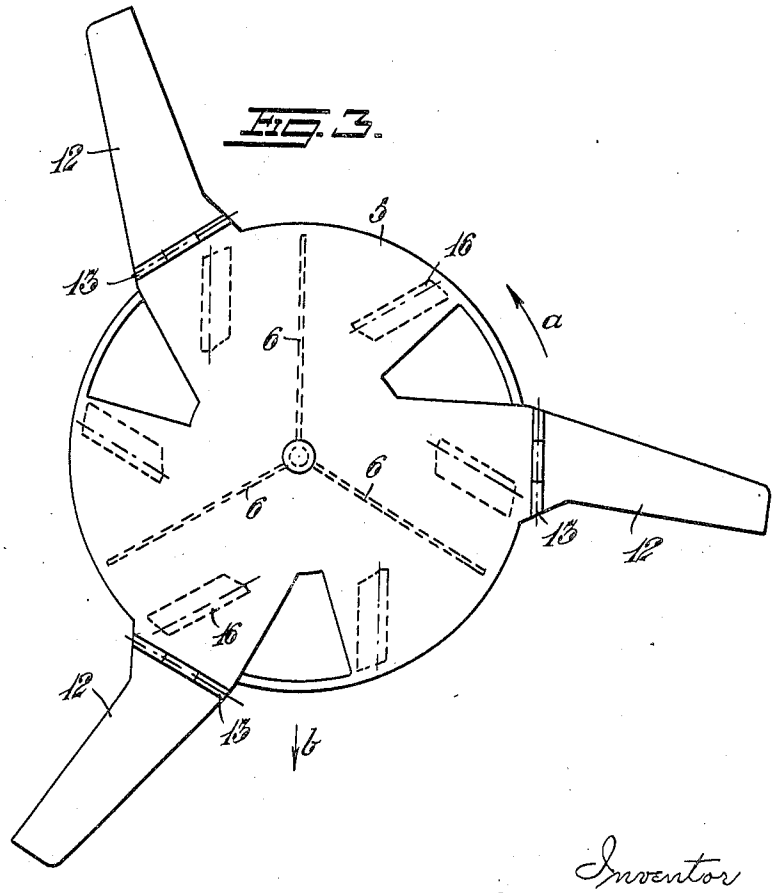


Fig. 3.



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Fig. 3.

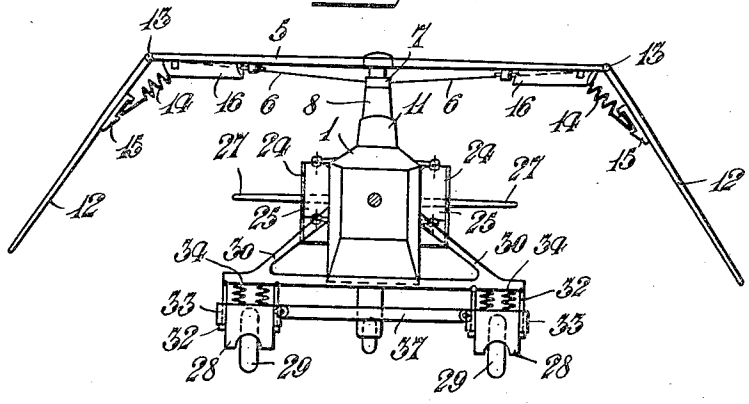


Fig. 8.

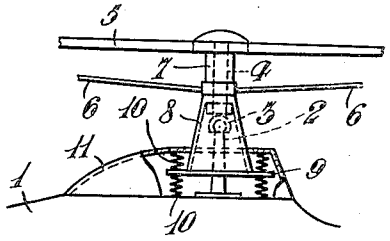


Fig. 4.

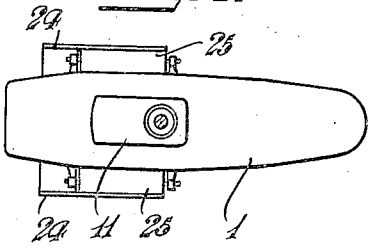


Fig. 5.

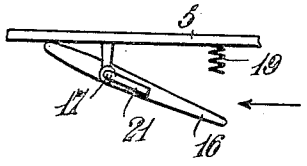


Fig. 6.

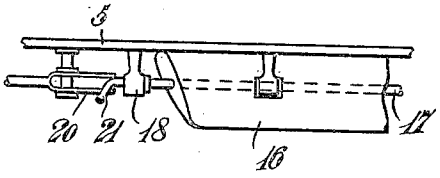
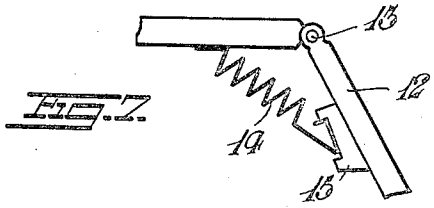


Fig. 7.



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1,955,501

FLYING MACHINE

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Application May 24, 1932, Serial No. 613,283
In Sweden April 18, 1932

4 Claims. (Cl. 244—19)

This invention relates to flying machines having a supporting plane rotatable on a shaft, which by means of an articulated joint is secured to the body of the flying machine, and more particularly to devices for rendering the starting and landing of such machines within a very limited space possible and for securing a stable and steady flight in the air.

One feature of the invention involves the provision at the periphery of the, preferably, circular rotating supporting plane of a set of lifting wings hinged to the supporting plane, so as to depend therefrom out of operation, when the plane is at rest or rotates slowly, but are caused to move to operative position in which the project beyond the periphery of the supporting plane under the action of the centrifugal force which is due to an increased speed of rotation of the supporting plane, thereby giving the latter a tendency of moving upwards.

In the accompanying drawings a flying machine embodying this invention is shown by way of example.

Fig. 1 is a side elevation of the flying machine with the lifting wings shown in operative position. Fig. 2 is a front view of the flying machine with the lifting wings out of operation and with the propulsive propeller and air distributing turbine removed. Fig. 3 is a top plan view of the supporting plane with the lifting wings shown in operative position, Fig. 4 is a top plan view of the body of the flying machine, with the supporting plane, the wings and the propeller removed. Fig. 5 is an end view of one of the driving wings of the supporting plane. Fig. 6 is a side elevation of a portion of the same wing with an associated retaining device. Fig. 7 shows a device to retain a lifting wing in depending or out of operating position. Fig. 8 is a side elevation of the universal joint between the supporting plane and the body of the machine.

It is to be noted that, for the sake of clearness, all such parts, as are not required to explain the present invention are not illustrated in the drawings.

With reference to the drawings, the body 1 of the flying machine which may be of any appropriate shape carries a nonrotary shaft 2, Fig. 8, which is vertical when the flying machine is at rest. By means of a universal joint 3 said shaft is connected to another shaft 4 carrying a, preferably, circular or substantially circular supporting plane 5. Said plane is loosely mounted on the shaft 4 and is stayed by a set of stays 6 extending from the periphery of the supporting plane to the lower end of the hub 7 of said plane surrounding the shaft 4. The universal joint has for its object to prevent violent vibrations of the supporting plane from being imparted to the body 1. In order normally to keep the shaft 4 in alinement with the fixed shaft 2 and thus to keep the supporting plane horizontal, when the flying machine is in its normal position, the hub 7 of the supporting plane rests on a preferably conical housing 8 surrounding the universal joint. Said housing is provided at its lower end with a laterally projecting bottom or flange 9 acted on at its upper and lower surfaces by two oppositely acting springs 10 of equal strength which are clamped between the lower and upper surfaces of said flange and the body 1 and a separate casing 11 provided on the top of the body 1, respectively. Thus, said springs act to maintain the flange 9 in its normal position at right angles to the shaft 2, in which position the shafts 4 and 2 are in alinement with each other.

Provided at the periphery of the supporting plane 5 is a set of wings 12, hereinafter termed "lifting wings", which are pivotally or hingedly connected to the supporting plane by means of tangentially extending journals 13 so as to be capable of turning from the upper or operative position shown in Figs. 1 and 3 to the depending or inoperative position shown in Fig. 2. Said wings are of such a shape as to tend to lift the supporting plane when in the said first mentioned position, provided the plane rotates in a given direction. Springs 14, see especially Fig. 7, are provided on the supporting plane 5 in order to hold the lifting wings in their depending position with a certain power. To this end the wings 12 are provided with projections 15 to cooperate with said springs 14 when in their lowered position. The springs 14 also serve as flexible stops to prevent the lowered wings from engaging the body 1 or associated parts.

Provided at the lower surface of the supporting plane is a set of wings 16, hereinafter termed "driving wings". Said wings are carried by shafts 17 which are parallel to the under surface of the plane but oblique in relation to radii of the supporting plane. The shafts 17 are rotatably journalled in bearings 18 secured to the lower surface of the plane 5 so as to allow the wings 16 to swing from a position parallel to the under surface of the plane 5 to the oblique position shown in Figs. 5 and 6, in which last-mentioned position the wings may be actuated by air currents from one side (i. e. in the direction of the arrow in Fig. 5) so as thereby to cause the supporting

plane 5 to rotate about shaft 4. On one half of the supporting plane the air resistance will thus keep the wings 16 in the operative position shown in Fig. 5, while on the opposite half of the supporting plane the wings 16 are pressed by the air resistance to a position parallel to the supporting plane so as to exert a minimum resistance to the rotation thereof. In order to prevent the wings 16 from swinging up beyond said parallel position springs 19 are provided at said under surface to cooperate with the wings 16. In order to retain the wings 16 in their inoperative position, i. e. parallel to the plane 5, for instance, when it is desired to move the flying machine on the ground or on the sea level, without lifting, a retaining device is provided, which as shown comprises for each wing a fork 20 rotatable about a shaft fixed to the plane 5 so that it may be caused to embrace an arm 21 laterally projecting from the shaft 17 of the respective wing 16, thereby maintaining the wing in the above said parallel position or releasing it, as the case may be, to allow the wing automatically to adjust itself under the action of the air resistance during the flight of the machine, by the wind pressure, or by the air current from the propulsive propeller.

The propulsive propeller 22 is conventionally positioned at the front end of the body 1. Rotatably mounted immediately behind the propeller 22 is an air turbine 23 adapted when caused to rotate under the action of the air current from the propeller to suitably distribute said air current. In order to still more control this air current in the desired way there is provided on each side of the body 1 an inclined air guiding channel 24. Said channel is provided with a movable bottom 25 extending along a more or less great part of the length of the channel. Said bottom 25 may, for instance, be rotatable about a shaft extending in the longitudinal direction of the channel, so that the channels may either pass the air current from the propeller up to the under side of the supporting plane or allow it to pass freely backwards, according as the bottom is closed or open.

Provided at the rear end of the body 1 is the rudder 26. Said rudder is, preferably, provided with both horizontal and vertical steering surfaces and may be journalled in a universal joint for use as a horizontal and vertical rudder simultaneously. The horizontal steering surfaces of the rudder may, preferably, be in alinement with rigid steering surfaces 27 of the body 1.

The body 1 is connected with a pair of floats 28 which may be provided with supporting wheels 29, as shown. The connection between the body 1 and said floats comprises front stays 30 and rear stays 31 both of which are rigidly connected to the body 1. The front stays are slidably connected to the floats, for instance, by means of sliding blocks 32, slidably engaging guide-ways 33 provided on the floats. Clamped between the stays 30 and the floats are springs 34 in order to render the connection elastic. The rear stays 31 are connected to the floats by transversally extending pivots 35 about which as a centre the relative movement of the front stays and the floats will take place. The floats are hingedly connected to each other by means of transverse links 36, 37, which may, preferably, be formed as supporting surfaces, as indicated in Fig. 1.

The operation of the flying machine described is as follows:

When the wings 16 on the under side of the supporting plane 5 are released from their engagement with the retaining devices 20 and are actuated by air currents, caused, for instance, by the air resistance at the propulsion of the machine, by wind pressure, or by the action of the propulsive propeller 22, they will cause the supporting plane 5 to rotate, and at this rotation the wings 12 are lifted to operative position under the action of the centrifugal force and will then give the plane 5 a tendency of rising, as above mentioned. Thus, the flying machine can rise more rapidly than a machine having fixed supporting planes.

When the flying machine moves downwards the supporting plane 5 is caused to rotate at high speed under the action of the air current moving upwards and thus retards the downward movement, because the supporting plane 5 has a tendency of moving upwards, when so rotated. Starting as well as landing may, therefore, be made within a narrower area than that necessary for a flying machine having fixed supporting planes.

When the flying machine is moving ahead, a tendency of tilting to one side is generated by the different action of the air resistance on the lifting wings 12 on the left and right hand side of the machine. This tendency is neutralized or counteracted by the wings 16. Assuming, for instance, that the plane 5 rotates in the direction of the arrow *a* in Fig. 3 and that the machine is moving forwards in the direction indicated by the arrow *b* in Fig. 3, then the elevating action caused by the air resistance action on the wings 12 on the left hand side of the plane 5 is stronger than that resulting from the air resistance on the wings 12 on the right hand side of the supporting plane and, consequently, the plane tends to tilt to the right in Fig. 3. On the wings 16 located on the right hand side of the plane 5 the air resistance (due to the rectilinear motion) acts in the direction of the arrow in Fig. 5 and, therefore, keeps the respective wings in their oblique position, as shown in Fig. 5. The air resistance acting on the left side (Fig. 5) of the wings 16 as result of the rotation of the plane 5 then tends to raise said wings and, consequently, aids in elevating the right side of the supporting plane 5. On the left hand side of the plane 5, however, the air resistance (due to the rectilinear motion) is so strong as to cause the wings 16 to assume a horizontal position, in which position they cannot exert any raising action on the left half of the supporting plane 5. Consequently, the supporting plane is automatically stabilized in the manner described.

If, however, a strong head-wind blows, so that the wings 12 exert a tilting action which cannot be balanced by the stabilizing action of the wings 16, then the balance required may be obtained by the aid of the air guiding channels 24 and their adjustable bottoms 25. This is due to the fact that part of the air current originating from the propulsive propeller 22 and the air turbine 21 is passed through the channels 24 up to the under side of the supporting plane 5. This air current may now be utilized to stabilize the supporting plane, and to this end the bottom 25 on that side of the body 1 to which the supporting plane tends to tilt, is held in closed state, whereas the bottom at the opposite side is in open state. It is thus seen that at the said first-mentioned side the air current passing through the respective channel 24 will act on the under side of the supporting plane to lift same, whereas at the opposite of the body 1 the air may freely pass

backwards through the channel and its open bottom.

It is to be noted that the wings 12 due to their mounting on pivots will tend to swing downwards, as soon as the speed of rotation of the supporting plane sinks below a certain value or the machine is at rest. As soon as, after the starting of the machine, the plane 5 begin to rotate and attains a sufficient speed, then the wings 12 will lift themselves under the action of the centrifugal force and will hold themselves in their lifted or operative position, as long as the speed of rotation of the supporting plane is sufficiently high. In landing, when the rotation of the plane 5 is retarded or stopped, the wings 12 will drop to their lowered position due to the action of their weight, till they are held up by the springs 14 which will then maintain them in their lowered position with a certain power, at the same time preventing the wings from coming into contact with the body 1 or associated parts. Due to the pivotal mounting of the wings 12 the machine, when moving on ground or on the sea level, will require but a little space as compared with the space that would be required, if the wings 12 were in their lifted state constantly.

What I claim is:—

1. In a flying machine having a body and a motor-driven, propulsive propeller, a shaft connected with said body by means of an articulation, a supporting circular plane rotatably journalled on said shaft, driving wings mounted on said supporting plane so as to be capable of assuming an inclined position with relation to the supporting plane in which position they may be operated by the air resistance at the motion of the flying machine, by wind pressure, and by the air-current from the propulsive propeller to cause the supporting plane to rotate, and lifting wings hingedly connected to the periphery of the supporting plane.

2. In a flying machine having a body and a motor-driven, propulsive propeller, a shaft jointed to said body by means of an articulation, a supporting circular plane freely rotatable on said shaft, driving wings mounted on shafts on the under side of said supporting plane to cause said plane to rotate, lifting wings hinged to the periphery of the supporting plane so as to depend therefrom out of operation, when the plane is at rest or rotates slowly, but are caused to move to operative position in level with the supporting plane under the action of the centrifugal force which is generated as result of an increased speed of rotation of the supporting plane, said lifting wings being of such shape as to give the plane a tendency of moving upwards when thus rotating, and resilient means to maintain the lifting wings in depending position with a given power and to prevent the depending wings from touching the body of the machine or associated parts.

3. In a flying machine having a body and a motor-driven, propulsive propeller, a shaft jointed to said body by means of an articulation, a supporting circular plane freely rotatable on said shaft, driving wings mounted on shafts on the under side of said supporting plane so as to be capable of assuming either an inclined position with relation to the supporting plane in which position they may be operated by the air resistance at the motion of the flying machine, by wind pressure, and by the air-current from the propulsive propeller to cause the supporting plane to rotate, or an inoperative position substantially parallel to the under side of the supporting plane, lifting wings hinged to the periphery of the supporting plane so as to depend therefrom out of operation, when the plane is at rest or rotates slowly, but are caused to move to operative position in level with the supporting plane under the action of the centrifugal force which is generated as result of an increased speed of rotation of the supporting plane, said lifting wings being of such shape as to give the plane a tendency of moving upwards when thus rotating, and a locking mechanism to retain the driving wings in their inoperative position when rotation of the supporting plane is not desired.

4. In a flying machine, having a body and a motor-driven propulsive propeller, a shaft jointed to said body by means of an articulation, a circular supporting plane freely rotatable on said driving wings mounted on shafts on the under side of said plane to cause same to rotate, lifting wings hingedly connected to the supporting plane at the periphery thereof to cause the rotating plane to lift, channels at both sides of the body to pass the air current from the propeller up to the under side of the supporting plane, and movable bottoms in said channels to allow the air entering the channels to freely pass backwards.

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