May 28, 1929. J. H. NORTON 1,715,303

AEROPLANE SAFETY DEVICE

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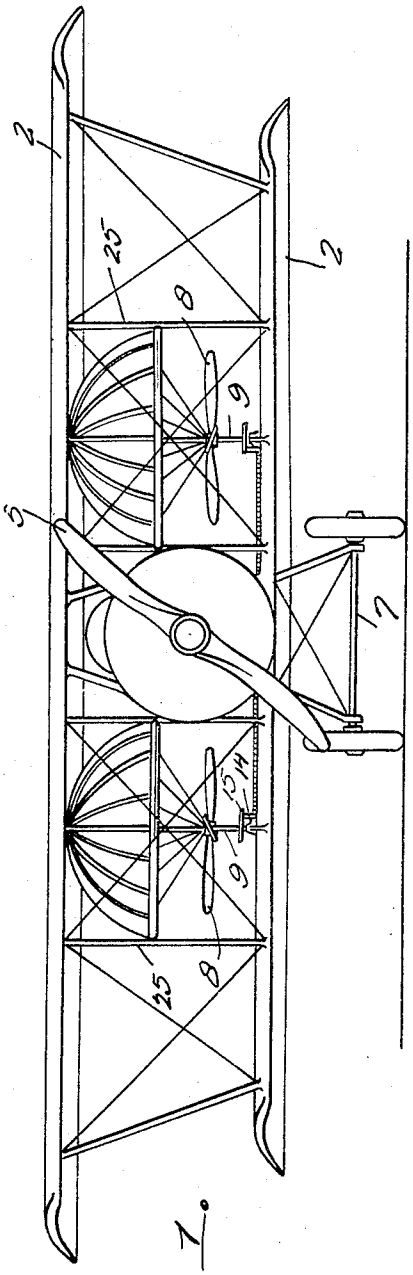


Fig. 1.

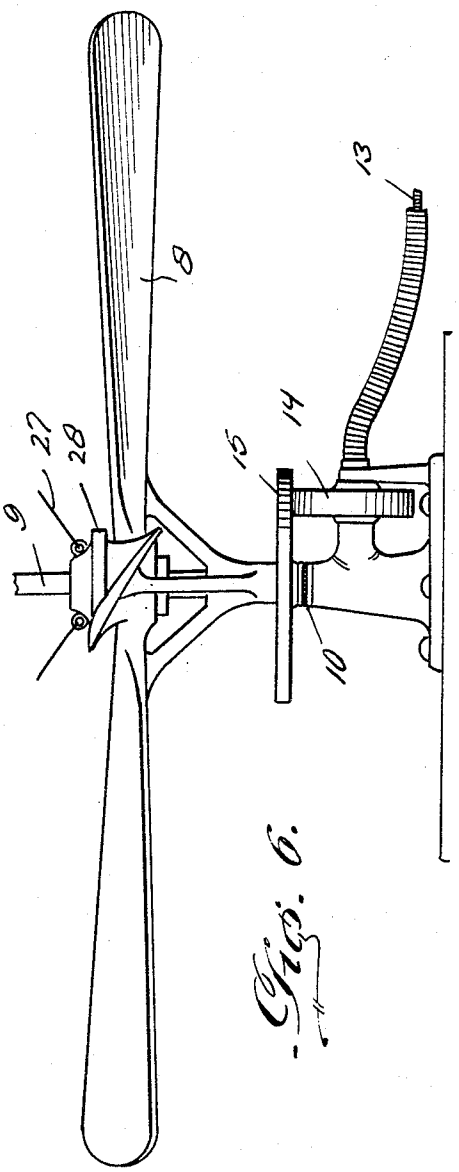


Fig. 6.

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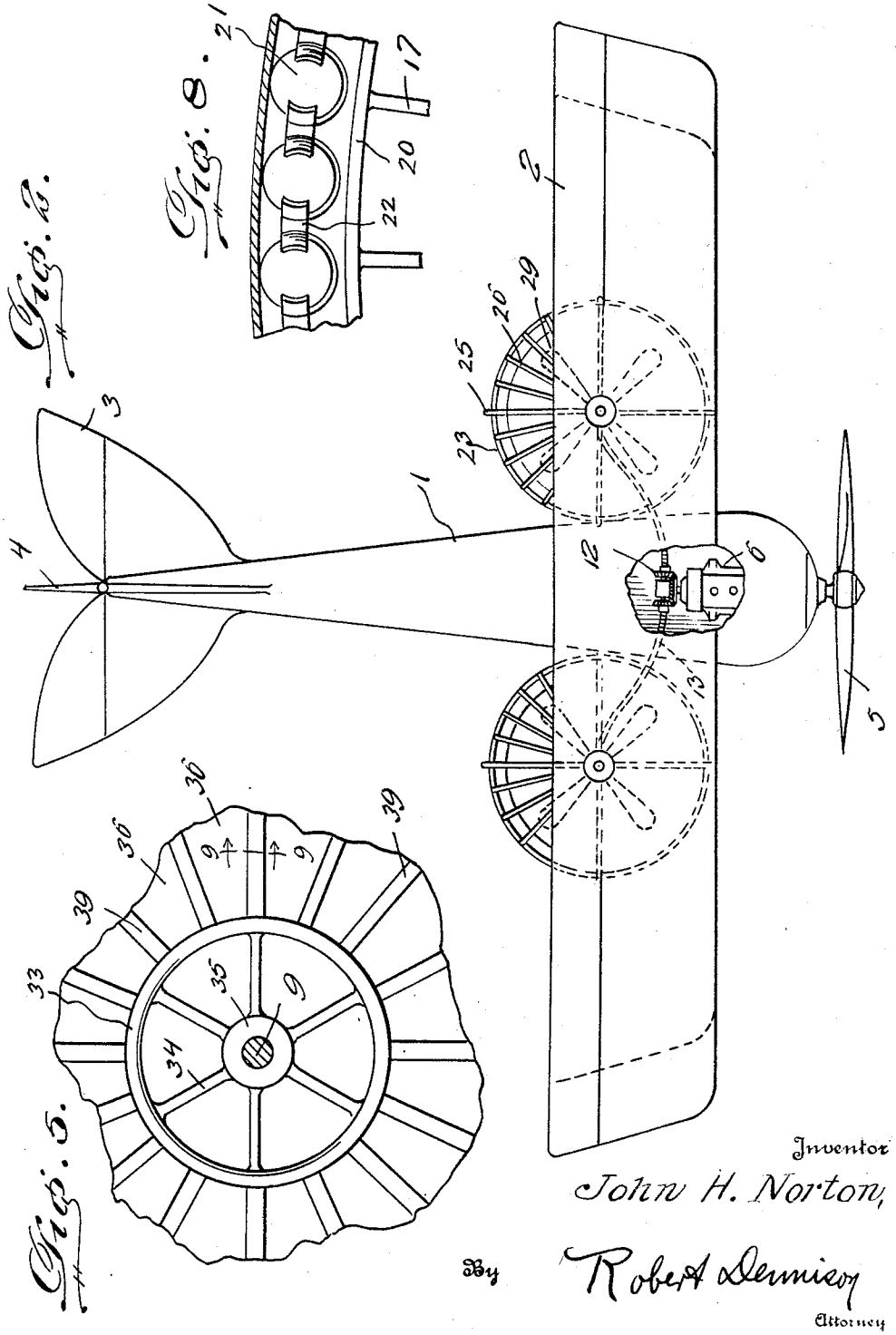
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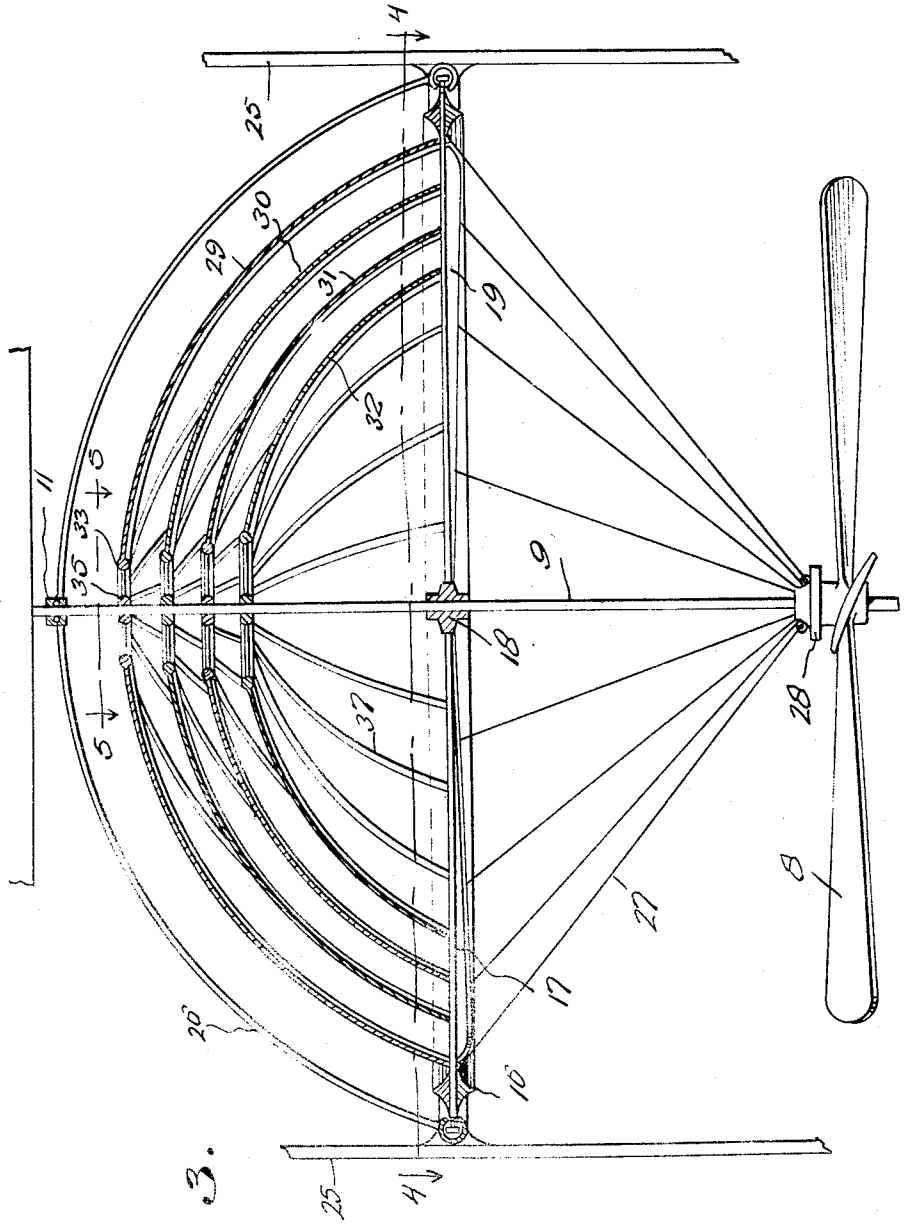


Fig. 3.

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Fig. 4.

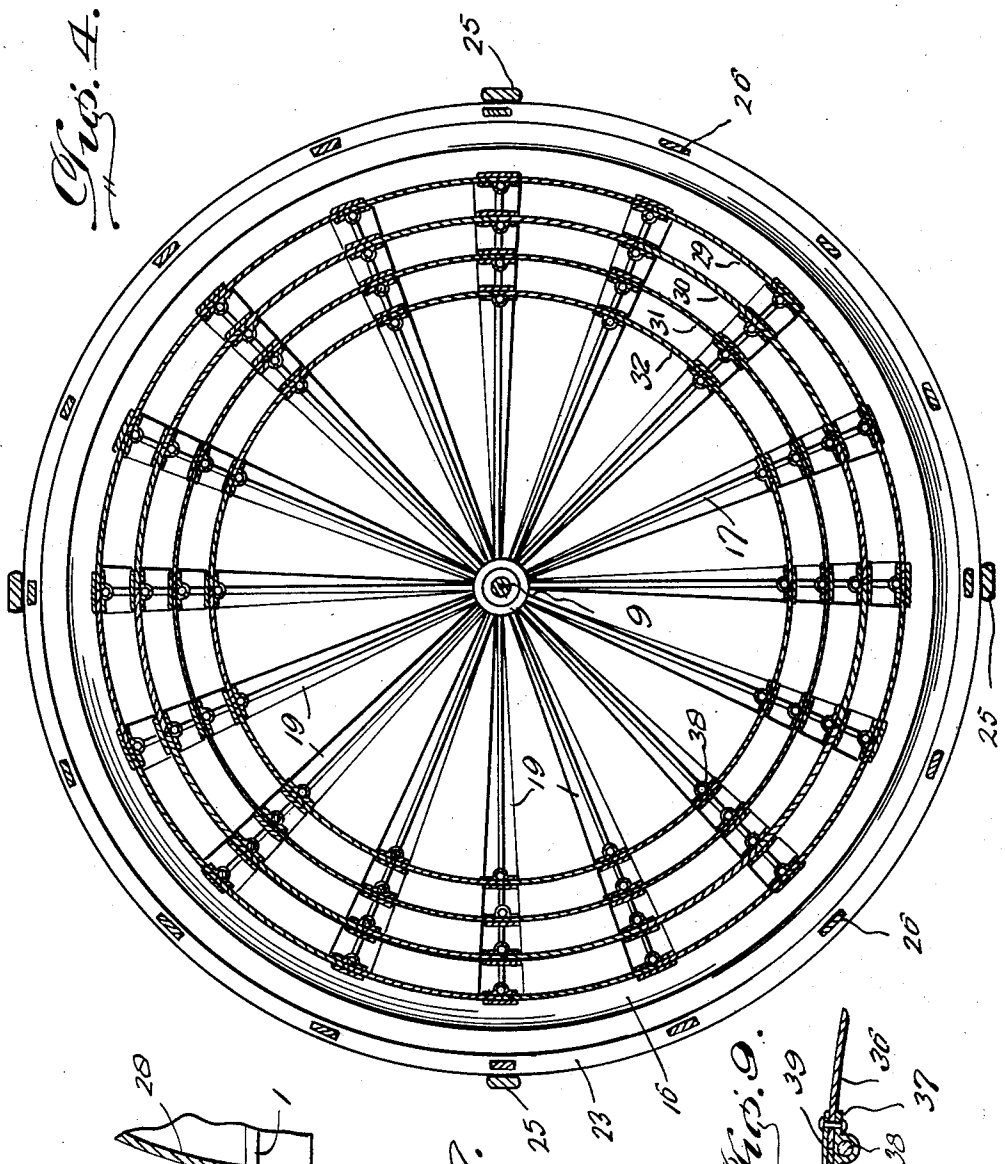


Fig. 7.

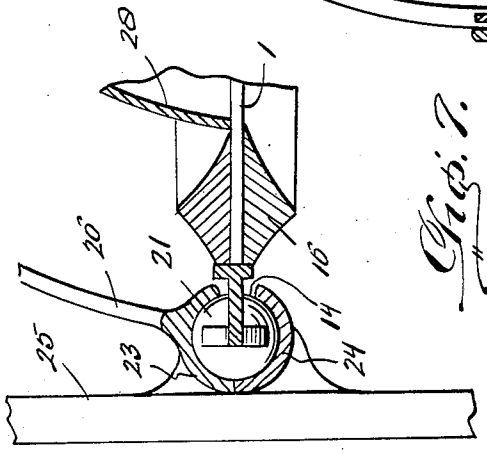


Fig. 9.

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Patented May 28, 1929. 1,715,303

UNITED STATES PATENT OFFICE.

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AEROPLANE SAFETY DEVICE.

Application filed February 11, 1928. Serial No. 253,638.

The present invention relates to aeroplanes of the heavier than air type, and has for its principal object to provide a flying machine which will be equipped with means for insuring safety of the aviator in case of accident to or disability of the air craft.

One of the important objects of the present invention is to provide an aeroplane having stabilizing means associated therewith whereby such craft is rendered stable in flight and easy to maneuver.

Another important object is to provide a means whereby an aeroplane is enabled to take off and alight with greater safety and facility and within a shorter time and from a smaller field than is required with the present types of air crafts.

A still further object is to provide an aeroplane safety device that will permit the aeroplane to land safely upon the failure of its motors to cooperate.

A further object is to provide an aeroplane having greater strength and increased lift, the safety device being at all times positive and efficient in its operation as well as simple in construction, inexpensive, strong and durable and further well adapted to the purpose for which it is designed.

Other objects and advantages of the invention will become apparent from the following description when taken in connection with the accompanying drawings.

In the accompanying drawings wherein like reference characters indicate corresponding parts throughout the several views:

Figure 1 is a front elevation of an aeroplane showing my improved safety device mounted thereon.

Figure 2 is a top plan view thereof, a portion of the top plane being broken away.

Figure 3 is a enlarged vertical sectional view of the stabilizing and safety device.

Figure 4 is a horizontal section taken approximately on the line 4—4 of Figure 3.

Figure 5 is a similar section taken substantially upon the line 5—5 of Figure 3.

Figure 6 is an enlarged detail side elevation of the lifting propeller and the driving mechanism therefor.

Figure 7 is an enlarged detail view of the ball race and the support for the rotary stabilizing member.

Figure 8 is a detail view of the ball race support, and

Figure 9 is a section taken substantially upon the line 9—9 of Figure 5, showing the manner in which the adjacent edges of the sections of the inverted cup shaped members are secured together.

In the drawings wherein for the purpose of illustration is shown the preferred embodiment of my invention, the numeral 1 designates the fuselage of an aeroplane having the biplanes 2. The tail elevator is shown at 3, while 4 designates the vertical rudder. The tractor propeller is shown at 5 and is driven by the motor 6 in the manner well known in the art. The chassis which is more clearly shown in Figure 1 is designated by the numeral 7.

Lifting propellers 8 are provided on opposite sides of the fuselage 1, and these propellers are adapted to be mounted on the vertical shafts 9 for rotation therewith. These shafts 9 are journaled in suitable bearings 10 and 11 respectively, located adjacent the upper and lower planes respectively.

The lifting propellers 8 are driven by the motor 6 by means of a gearing 12 shown more clearly in Figure 2, the flexible driving means 13 which operates the vertically disposed wheel 14 that frictionally engages the horizontally disposed discs 15 secured on the lower end of each shaft 9 in the manner as more clearly illustrated in Figure 6.

Forming a salient part of the safety device is the ring-like stabilizing member 16 which may be constructed of complementary sections or may be solid and of any particular shape in cross section. This heavy metallic ring-like stabilizing member 16 is mounted on a series of radial spokes 17 that radiate from the hub 18 and through which hub the vertical shaft 9 extends as more clearly illustrated in Figure 3. A pair of these stabilizing rings is arranged on opposite sides of the fuselage any desired distance therefrom.

Auxiliary lifting planes 19 are mounted on the spokes 17 for rotation with the stabilizing rings.

Carried by the outer ends of the radial spokes 17 and beyond the stabilizing ring 16 is the ball race support 20 in which is mounted a series of ball bearings 21. Suitable ball re-

taining members 22 are arranged in this annual ball race support 20 and the manner in which the retaining members 22 engage with the respective balls for properly spacing the same with respect to each other is clearly shown in Figure 8 of the drawings. The ball race support 20 is arranged between a pair of upper and lower circular track members 23 and 24 respectively, and these track forming members are carried by vertical struts 25.

A series of arcuate ribs 26 extend from the circular tracks, these ribs converging toward their upper ends and being connected to a bearing 11, to provide a support for the latter and this bearing is in turn adapted for cooperation with the upper end of each vertical shaft 9. These arcuate ribs 26 constitute a frame for each of the safety devices arranged on opposite sides of the fuselage. Additional bracing members 27 extend from the stabilizing ring 16 to the hub 28 provided for the lifting propeller 8 and this feature is clearly illustrated in Figures 1 and 3 of the drawings.

Forming an important part of the present invention is the provision of a series of spaced nested inverted convex planes or parachute members 29, 30, 31 and 32, respectively. Each of these parachute members is mounted at the base thereof on the radial spokes 17 and terminate at the top in an annular ring like member 33 from the inner peripheral edge of which extends in an inward direction the radial spokes 34, the inner ends of the spokes terminating in a hub 35 that provides a spider construction, and the hub 35 is keyed or otherwise secured to the vertical shaft 9 so that each of the parachute members will rotate in unison with the vertical shaft of each of the safety devices.

This so called spider construction provides an air release at the top of each of the inverted cup-shaped parachute members to permit the passage of air therethrough from below to above each parachute member or plane at the central portion thereof. As is more clearly illustrated in Figure 3, it will be observed that the annular rings 33 gradually decrease in diameter from the innermost cup-shaped member to the outermost one.

Each of the inverted convex planes or parachute members comprises a series of segmental metallic panels or sections 36 and the adjacent edges of these sections are riveted or otherwise fixedly secured to the flanged rib carrying member 37 that is disposed against the bottom faces of the sections.

The rib carrying members 37 are of arcuate formation and the manner in which the rib 38 is arranged in each member 37 is more clearly shown in Figure 9. Arcuate strips such as are shown at 39 are secured to the outer faces of the sections or panels 36 over the abutting edges of the adjacent sections as also clearly shown in Figure 9. These segmental sections or panels are made preferably from aluminum or duralumin to provide a light but strong construction, while each stabilizing ring 16 is formed from heavy metal. Suitable bracing means may be interposed between the various spaced nested inverted cup-shaped parachute members if desired.

The stabilizing ring 16 as well as the series of nested convex planes or parachute members 29 to 32 inclusive rotate in unison with the vertical shaft 9 of each of the safety devices. The major vertical thrust of each unit is carried on the upper track ring or bearing 23 through the ball bearings 21. The number of parachute members may be varied as desired and the diameter increased to suit the type of aeroplane as related to the degree of stability necessary and the weight of the air craft. The speed of rotation of the units will vary from 100 to 2000 revolutions per minute. The degree of stability due to the stabilizing ring members 16 will be greater and in proportion to the speed of the tractor propeller 5. The relative direction of rotation of the pairs of propellers 8 and 19 as well as the convex plane or parachute members 29 of 32 inclusive, and the stabilizing ring members 16 will be opposite. The stabilization due to the members 16 will furthermore be gyroscopic in action.

One function of the inverted convex planes or parachute members to catch the air and react thereon during a lateral rolling of the aeroplane around its fore and aft axis whereby the lateral stability is increased. These planes function also to prevent a nose dive or tail spin of the air craft, the tendency of which may occur in normal operation or when a failure of the motive power occurs. An aeroplane equipped with this safety device is not affected by the presence of air pockets on account of its increased lateral stability.

When a failure of the motor 6 occurs, the speed of descent is retarded by the joint parachute action of the series of nested parachute members and thus a serious crash is averted.

The provision of an air vent at the central top portion of each parachute member increases the stability of each nested unit. The rapid flow of air between the adjacent parachute members in the direction of the air outlets provides a direct lift on each concave lower surface and a partial vacuum on each convex upper surface and these forces are additive to increase the lift of the aeroplane.

In operation, as the motor 6 is brought up to speed, the lifting propellers 8 and 19 function to raise the air craft. For this reason, the aeroplane is enabled to take off from a relatively short field and within a relatively short time. Each series of parachutes or inverted convex planes coact with the asso-

ciated stabilizer 16 as above explained to facilitate the maneuvering of the aeroplane and to increase the degree of safety as well as to aid in the stabilization.

In case of failure of the motor 6 to properly function, the descent of the aeroplane is retarded by the parachute members.

During the landing of the aeroplane, the speed of the motor is reduced gradually but the lifting effect of the propellers 8 and 19 aids in checking the descent even though the forward speed is reduced. As a result, a safe landing may be made at low speed and within the bounds of a very small landing field.

A safety device of the above mentioned character may be readily and easily installed on aeroplanes without neecssitating any material alterations of the parts of the planes with which the safety device is associated and furthermore the present invention will at all times be positive and efficient in carrying out the purposes for which it is designed.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of the invention and the scope of the appended claims.

Having thus described the invention. what I claim as new and desire to secure by Letters Patent is:—

1. In an aeroplane, in combination, a fuselage, planes extending from said fuselage, a stabilizing unit mounted on said planes at each side of the fuselage, each of said units comprising a vertical shaft, a stabilizing ring mounted on the shaft for rotation therewith, a series of spaced nested inverted convex planes secured on the shaft for rotation therewith, and means for rotating the shaft.

2. In an aeroplane having a fuselage and planes extending laterally therefrom, stabilizing units mounted on said planes on opposite sides of the fuselage, each unit comprising a vertical shaft, an inverted convex plane extending substantially horizontally around said shaft, a heavy ring shaped stabilizing member fixedly mounted on the lower edge of each convex plane, and means to rotate said shafts in opposite directions.

3. In an aeroplane, in combination, a fuselage having a tractor propeller, and planes extending laterally from the fuselage, vertical shafts mounted on each plane, a lifting propeller mounted on each shaft above the lifting propeller, an inverted convex plane mounted on each of said shafts, a stabilizing ring mounted on each of said shafts, and means to simultaneously rotate said propellers, the convex planes and said ring.

4. In an aeroplane having a fuselage and planes extending laterally therefrom, a stabilizing unit mounted on each plane, each unit comprising a plurality of spaced nested inverted convex planes, and means to rotate the planes in unison.

5. In an aeroplane having a fuselage and planes extending laterally therefrom, a stabilizing unit mounted on each plane, each unit comprising a plurality of spaced, nested, inverted convex planes, a vertical shaft for supporting said planes, a ring shaped stabilizing member on said shaft, and means to rotate the convex planes and the stabilizing member as a unit.

6. In an aeroplane having a fuselage and planes extending laterally therefrom, a stabilizing unit mounted on each plane, each unit comprising a plurality of spaced nested inverted convex planes, a vertical shaft for supporting said planes, a ring shaped stabilizing member mounted on said shaft, a lifting propeller mounted on said shaft, and means to rotate the convex planes, stabilizing member, propeller and shafts in unison.

7. In an aeroplane having a fuselage and planes extending laterally therefrom, a stabilizing unit mounted on each plane, each unit comprising a plurality of spaced nested inverted convex planes, each of said planes having an air vent at the upper central portion, and means to rotate the convex plane as a unit.

8. In an aeroplane having a fuselage and planes extending laterally therefrom, a stabilizing unit mounted on each plane, each unit comprising a plurality of spaced, nested inverted convex planes, a vertical shaft for supporting said planes, a stabilizing ring mounted on said shaft, a lifting propeller mounted on the shaft in the plane of said ring, a second lifting propeller mounted on said shaft below said ring, and means to rotate the shaft and the aforesaid elements secured thereon.

9. A stabilizing unit for an air craft comprising a plurality of spaced nested inverted convex planes, and means to rotate the unit in a horizontal plane and around a vertical axis.

10. A stabilizing unit for an air craft comprising a plurality of spaced, nested, inverted convex planes, a vertical shaft for supporting the planes, a heavy ring shaped stabilizing member mounted on the shaft, and means to rotate said convex planes, vertical shafts and stabilizing member in unison.

11. In air craft, in combination, a body portion, a stabilizing member rotatably mounted on each side of said portion, said member comprising a bearing member extending radially from the stabilizing member, a circular bearing member mounted in fixed relation with respect to the body portion, an anti-friction means engaging each of said bearing members.

12. In an air craft, in combination, a body portion having lifting planes extending laterally therefrom, a series of spaced nested

inverted cup-shaped planes rotatably mounted on each lifting plane, each of said cup-shaped planes being provided with an air vent at the top portion thereof whereby to provide an air passage axially through the series of nested plates.

13. In an air craft, in combination, a body portion having lifting planes extending laterally therefrom, a series of spaced nested inverted cup-shaped planes rotatably mounted on each lifting plane, each of said cup-shaped planes being provided with an air vent at the top portion thereof whereby to provide an air passage axially through the series of nested planes, said air vents gradually decreasing in size from the innermost cup-shaped plane to the outermost one.

In testimony whereof I affix my signature.

JOHN HENRY NORTON.