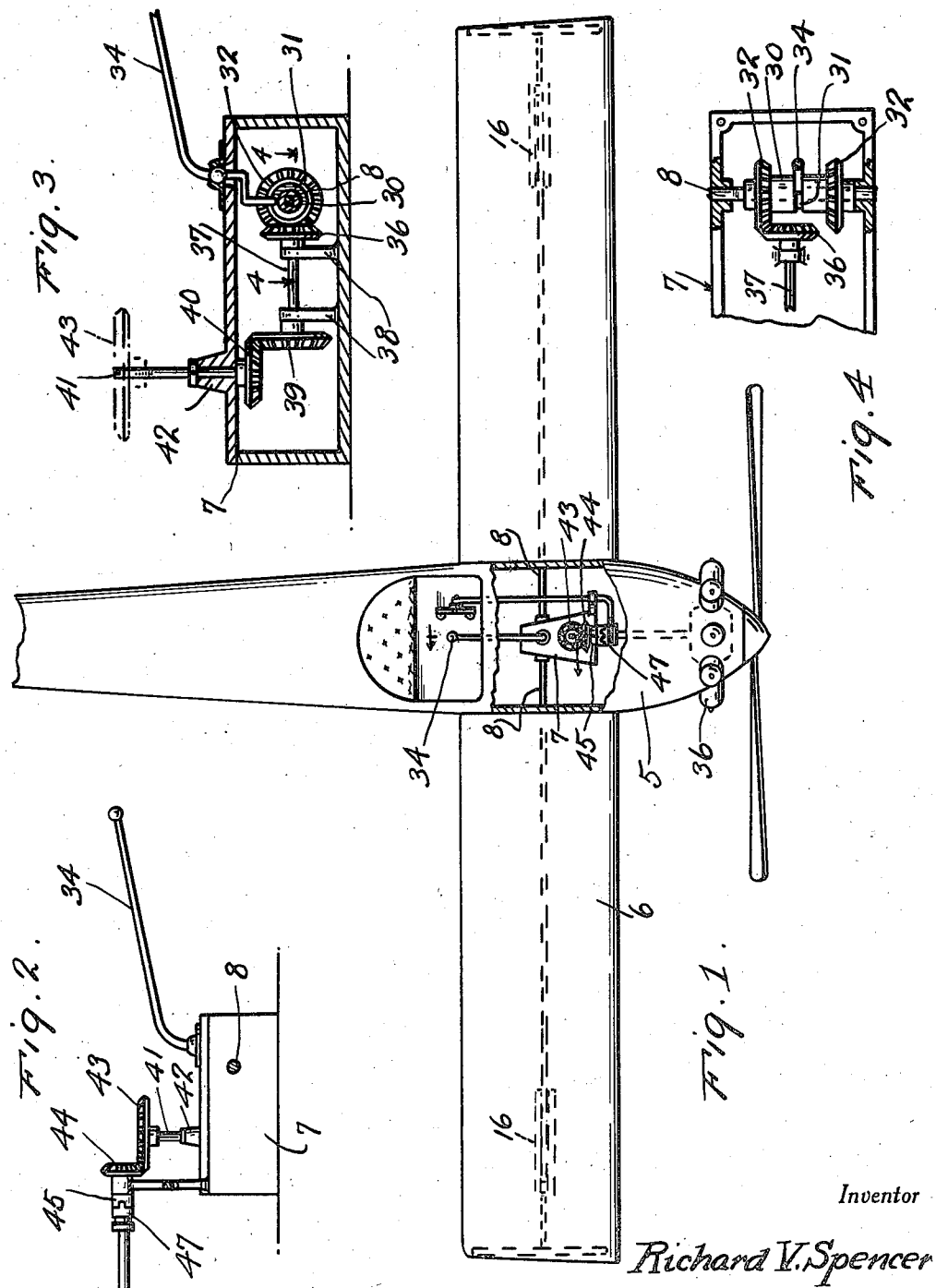
Nov. 19, 1929. R. V. SPENCER 1,736,226

AEROPLANE

Filed July 22, 1929 4 Sheets-Sheet 1



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AEROPLANE

Filed July 22, 1929 4 Sheets-Sheet 2

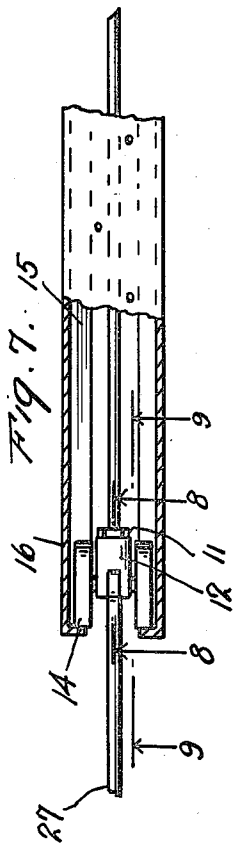


Fig. 7.

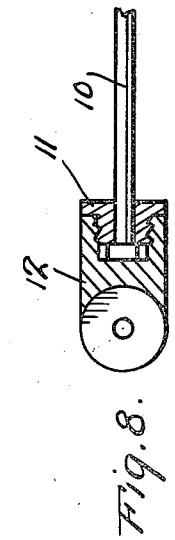


Fig. 8.

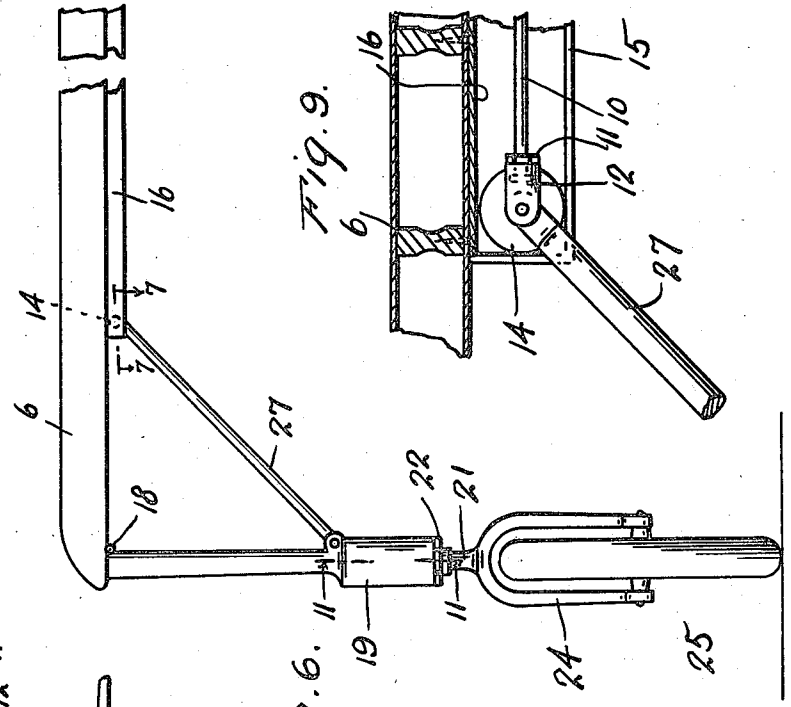


Fig. 6.

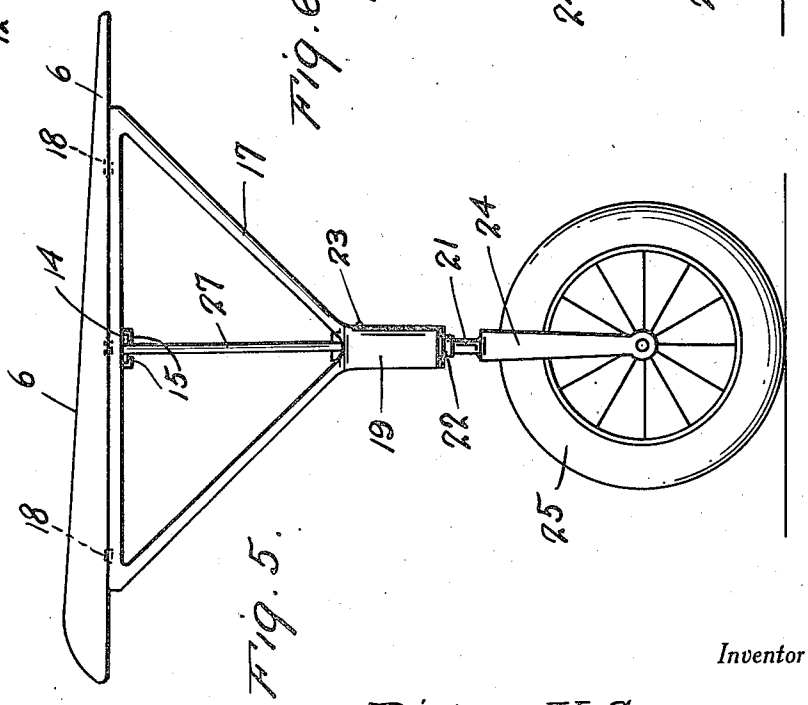


Fig. 5.

Fig. 9.

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Nov. 19, 1929. R. V. SPENCER 1,736,226

AEROPLANE

Filed July 22, 1929 4 Sheets-Sheet 3

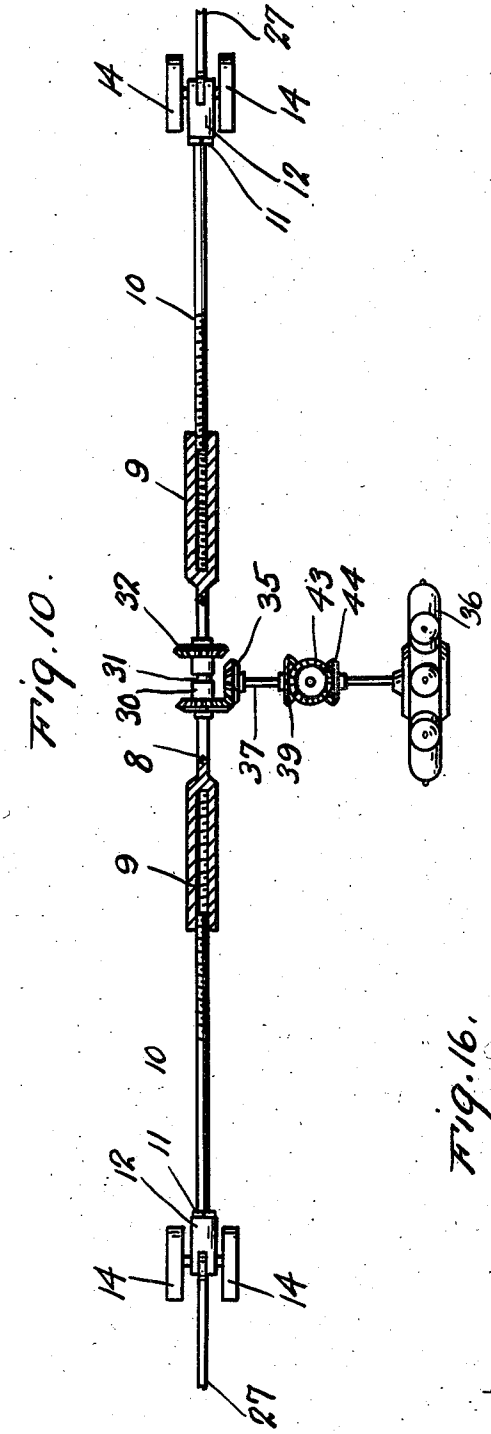


Fig. 10.

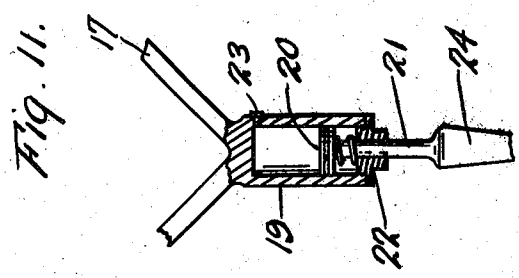


Fig. 11.

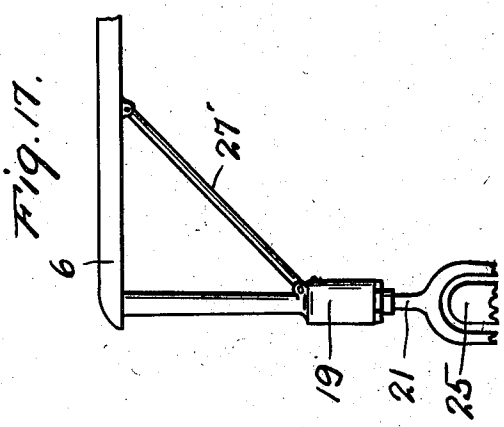


Fig. 17.

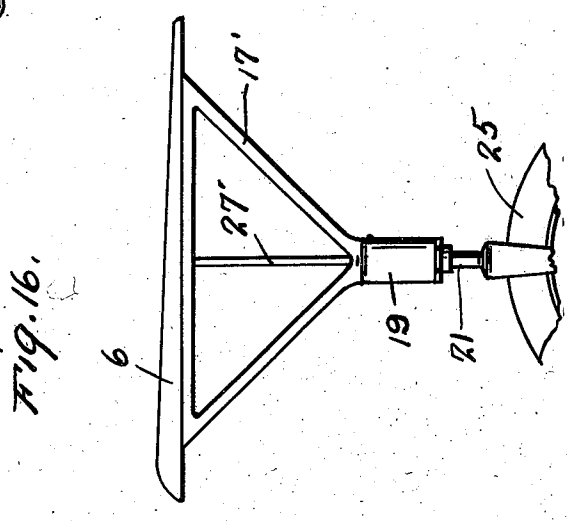


Fig. 16.

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AEROPLANE

Filed July 22, 1929 4 Sheets-Sheet 4

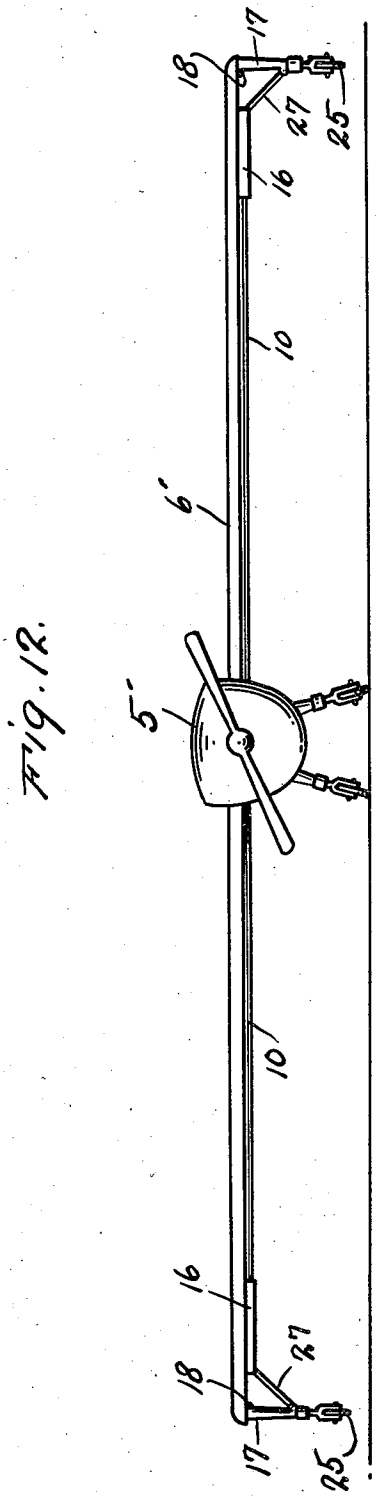


Fig. 12.

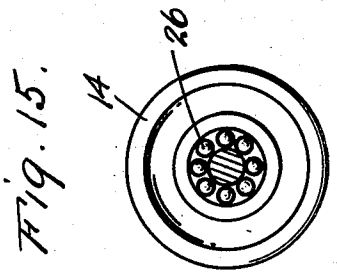


Fig. 15.

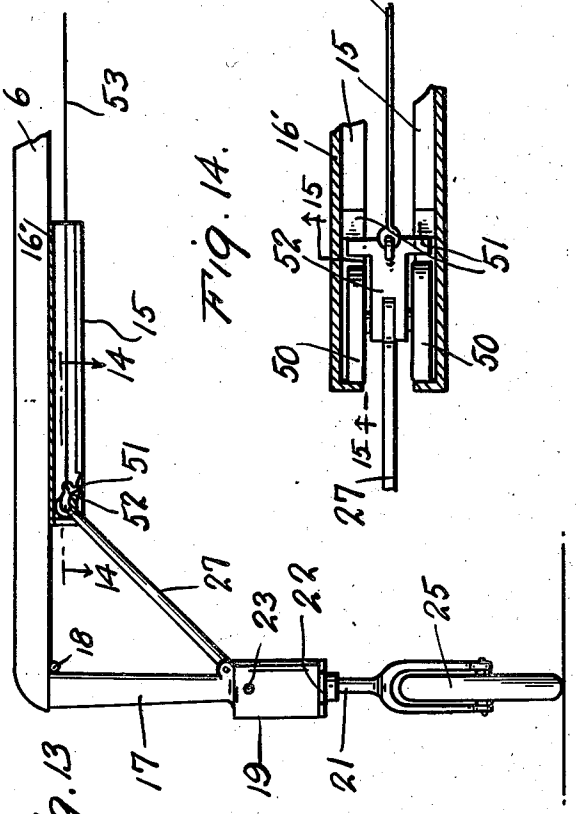


Fig. 13.

Fig. 14.

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UNITED STATES PATENT OFFICE

RICHARD V. SPENCER, OF LOS ANGELES, CALIFORNIA

AEROPLANE

Application filed July 22, 1929. Serial No. 380,085.

The present invention relates to an aeroplane and has for its prime object to provide means for preventing the ends of the wings from dragging when the aeroplane is taking off or landing.

Another very important object of the invention resides in the provision of such means which may be swung inwardly and under the wings in an out of the way position when not being used.

A still further very important object of the invention resides in the provision of an improved structure of this nature which is simple, strong, and durable, easy to manipulate, compact and convenient, thoroughly efficient and reliable in use and operation, and otherwise well adapted to the purpose for which it is designed.

With the above and numerous other objects in view as will appear as the description proceeds, the invention resides in certain novel features of construction, and in the combination and arrangement of parts as will be hereinafter more fully described and claimed.

In the drawing:

Figure 1 is a top plan view of an aeroplane embodying the features of my invention showing a portion of the fuselage broken away to illustrate the improved structure,

Figure 2 is a side elevation of the transmission housing,

Figure 3 is a longitudinal vertical section therethrough, taken centrally therethrough,

Figure 4 is a detail sectional view taken substantially on the line 4—4 of Figure 3,

Figure 5 is an end elevauon of one of the wings with the wheeled truck mounted thereon.

Figure 6 is a front elevation thereof,

Figure 7 is an enlarged sectional view taken substantially on the line 7—7 of Figure 6,

Figure 8 is a detail section taken substantially on the line 8—8 of Figure 7,

Figure 9 is a detail section taken substantially on the line 9—9 of Figure 7,

Figure 10 is a sectional elevation of the operating mechanism,

Figure 11 is a detail section taken substantially on line 11—11 of Figure 6,

Figure 12 is a front elevation of an aeroplane showing another embodiment of the invention,

Figure 13 is an enlarged front elevation of one end of the wing showing the trackway in section,

Figure 14 is an enlarged detail section taken substantially on the line 14—14 of Figure 13, and

Figure 15 is a sectional view taken substantially on the line 15—15 of Figure 13,

Figure 16 is a fragmentary end elevation of a wing showing another embodiment of the invention,

Figure 17 is a front elevation thereof.

Referring to the drawing in detail and first to the embodiment of the invention shown in Figures 1 to 10 inclusive it will be seen that numeral 5 denotes a fuselage with wings 6 projecting laterally therefrom in the usual well known manner.

In the fuselage 5 there is located a transmission casing 7 which has a shaft 8 journaled transversely therethrough the ends of which are hollow and internally and oppositely threaded as at 9. Rods 10 are threadedly engaged in the sleeve like ends 9.

The outer ends of the rods 10 are attached by suitable means 11 to truck bodies 12 each of which has a pair of wheels 14 riding on rails 15 of trackways 16 extending under the wings 6. Frames 17 are hingedly engaged as at 18 with the extremities of the wings 6 includes cylinders 19 with pistons 20 movable therein and having shanks 21 formed thereon and slidable through removable heads 22 in the bottoms of the cylinders.

Air escapes 23 are provided in the upper end of the cylinder. Forks 24 are mounted on the lower ends of the shanks 21 and have journaled therein wheels 25 having ball bearings 26 incorporated therein.

From the above description it is obvious that by turning the shaft 8 in one direction the trucks 12 may be moved outwardly and through their link connections 27 with the frames 17 may swing the frames to the position shown in Figure 6 or by moving the trucks inwardly by the opposite rotation of

the shaft 7, the frames 17 may be drawn up under the wings.

On the shaft 8 within the casing 7 there is splined a sleeve 30 with a central groove 31 and end bevel gears 32. An operating lever 34 mounted in the casing is engageable with the groove 31 for sliding the sleeve 30 so as to mesh either of the gears 32 with a gear 35 operatively connected with engine 36.

This connection is formed by a shaft 37 on which the gear 36 is mounted, said shaft 37 being journaled in bearing standard 38 rising from the bottom of the casing. A gear 39 is fixed to the shaft 37 and meshes with a gear 40 fixed to a shaft 41 journaled in a bearing 42 in the top of the casing.

A beveled gear 43 is mounted on the upper end of the shaft 41 and meshes with a beveled gear 44 formed on a sleeve 45 mounted on shaft 46 and a suitable clutch structure 47 is associated therewith. The shaft 46 is connected with the engine 36. Obviously by operating the lever 34 to mesh the desired gear 32 with the gear 35 depending upon the desired rotation of the shaft 8, the clutch mechanism 37 may be let in thereby driving the shaft 8 from the engine 36 to swing the frames 17 outwardly to relatively vertical position or inwardly to relatively horizontal position.

In Figures 12 and 14 another operating mechanism has been shown wherein links 27 are connected with wheeled trucks 50 ridable in trackways 16′, the rails 15 of which are provided with notches 51 so that a pawl 52 may be engaged therewith and lifted out of engagement by means of cables 53 operated from the fuselage 5′.

The trackways 16′ are mounted under the end portions of the wings 6′ as shown clearly in Figure 12. The frames, of course, will gravitate normally to a vertical position but may be pulled up to a horizontal position by pulling inwardly on the cable or wires 53. When the frames are in vertical position the pawls 52 prevent them from swinging inwardly accidentally because these pawls will engage with the notches 51.

In Figures 16 and 17 I have shown frames 17′ which are rigidly mounted on the ends of the wings to be disposed in vertical position and braced by means of links 27′ attached to the lower ends of the frame and to the wings.

From the above detailed description it will be seen that when an aeroplane lands and tends to tilt to one side or the other, the wheels 25 will engage the grounds thereby preventing any injury to the aeroplane and prevent the same from toppling over. The same action occurs when the aeroplane is running along the ground for take off.

In the first two embodiments of the invention, the frames may be easily swung inwardly to an out of the way position when the aeroplane is flying. In all embodiments the cylinders 19 and pistons 20 function as shock absorbers as will be quite apparent.

It is thought that the construction, operation, utility and advantages of this invention will now be quite apparent to those skilled in this art without a more detailed description thereof. The present embodiments of the invention have been disclosed in considerable detail merely for the purposes of exemplification since in actual practice they attain the features of advantage enumerated as desirable in the statement of the invention and the above description.

It will be apparent that changes in the details of construction, and in the combination and arrangement of parts may be resorted to without departing from the spirit or scope of the invention as hereinafter claimed or sacrificing any of its advantages.

Having thus described my invention, what I claim as new is:

1. In combination with the wing of an aeroplane, a frame mounted on the outer end of the wing, a cylinder mounted on the bottom of the frame, air escape means in the upper portion of the cylinder, a head in the lower portion of the cylinder, a shank slidable through the head, a piston on the upper end of the shank and slidable in the cylinder, a fork on the lower end of the shank, and a wheel journalled in said fork, means for hingedly connecting the frame with the wing, and means for swinging the frame in respect to the wing, the last mentioned means comprising a link pivotally engaged with the frame, a trackway under the wing, a truck ridable in the trackway with which said link is engaged, a rod attached to said truck, a shaft having a hollow end threadedly engaged over the rod, and means for turning the shaft for moving the rod in and out and thereby moving the truck for swinging the frame.

2. In combination with the wing of an aeroplane, a frame mounted on the outer end of the wing, a cylinder mounted on the bottom of the frame, air escape means in the upper portion of the cylinder, a head in the lower portion of the cylinder, a shank slidable through the head, a piston on the upper end of the shank and slidable in the cylinder, a fork on the lower end of the shank, and a wheel journaled in said fork, means for hingedly connecting the frame with the wing, and means for swinging the frame in respect to the wing, the last mentioned means comprising a link pivotally engaged with the frame, a trackway under the wing, a truck ridable in the trackway with which said link is engaged, a rod attached to said truck, a shaft having a hollow end threadedly engaged over the rod, and means for turning the shaft for moving the rod in and out and thereby moving the truck for swinging the frame, said

last mentioned means being operatively connected with an engine.

3. In combination with the wing of an aeroplane, a frame mounted on the outer end of the wing, a cylinder mounted on the bottom of the frame, air escape means in the upper portion of the cylinder, a head in the lower portion of the cylinder, a shank slidable through the head, a piston on the upper end of the shank and slidable in the cylinder, a fork on the lower end of the shank, and a wheel journaled in said fork, means for hingedly connecting the frame with the wing, and means for swinging the frame in respect to the wing, the last mentioned means comprising a link pivotally engaged with the frame, a trackway under the wing, a truck ridable in the trackway with which said link is engaged, a rod attached to said truck, a shaft having a hollow end threadedly engaged over the rod, and means for turning the shaft for moving the rod in and out and thereby moving the truck for swinging the frame, said last mentioned means being operatively connected with an engine, transmission and clutch mechanism incorporated in said operative connection.

4. In combination with the wing of an aeroplane, a frame mounted on the outer end of the wing, a cylinder mounted on the bottom of the frame, air escape means in the upper portion of the cylinder, a head in the lower portion of the cylinder, a shank slidable through the head, a piston on the upper end of the shank and slidable in the cylinder, a fork on the lower end of the shank, and a wheel journalled in said fork, means for hingedly connecting the frame with the wing, and means for swinging the frame in respect to the wing, the last mentioned means comprising a link pivotally engaged with the frame, a trackway under the wing, a truck ridable in the trackway with which said link is engaged, a rod attached to said truck, a shaft having a hollow end threadedly engaged over the rod, and means for turning the shaft for moving the rod in and out thereby moving the truck for swinging the frame, said trackway having notches, a pawl on said truck engageable with said notches, and means for releasing said pawl.

In testimony whereof I affix my signature.

RICHARD V. SPENCER.