

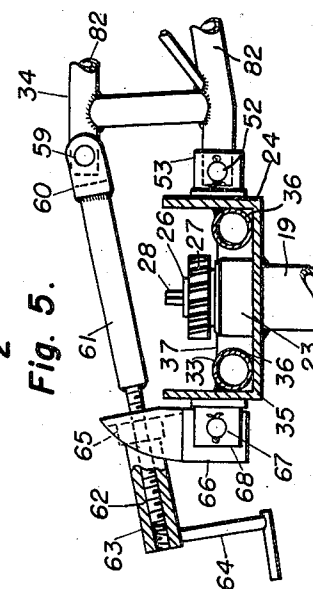
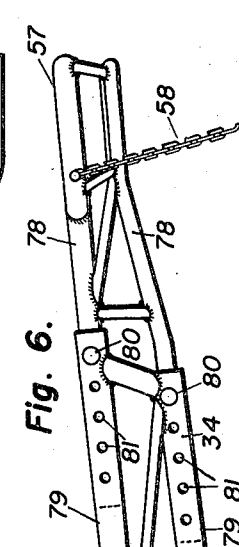
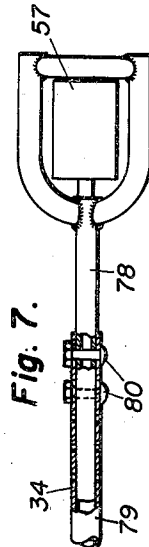
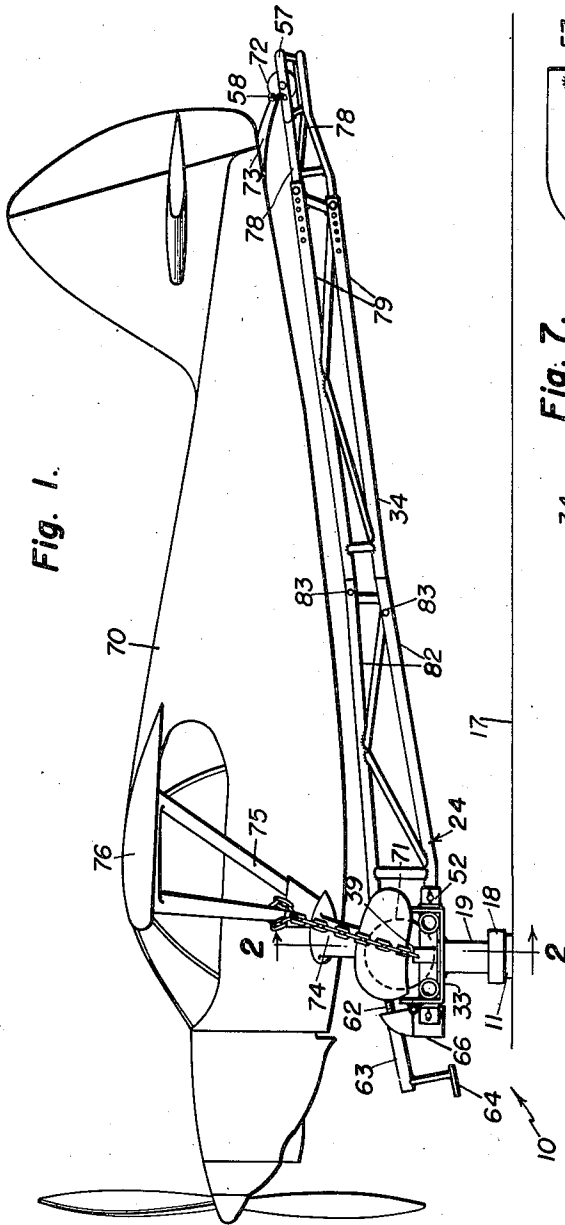
Sept. 27, 1949.

O. E. WILLIAMS
AIRPLANE MOORING DEVICE

2,483,078

Filed Nov. 26, 1946

2 Sheets-Sheet 1



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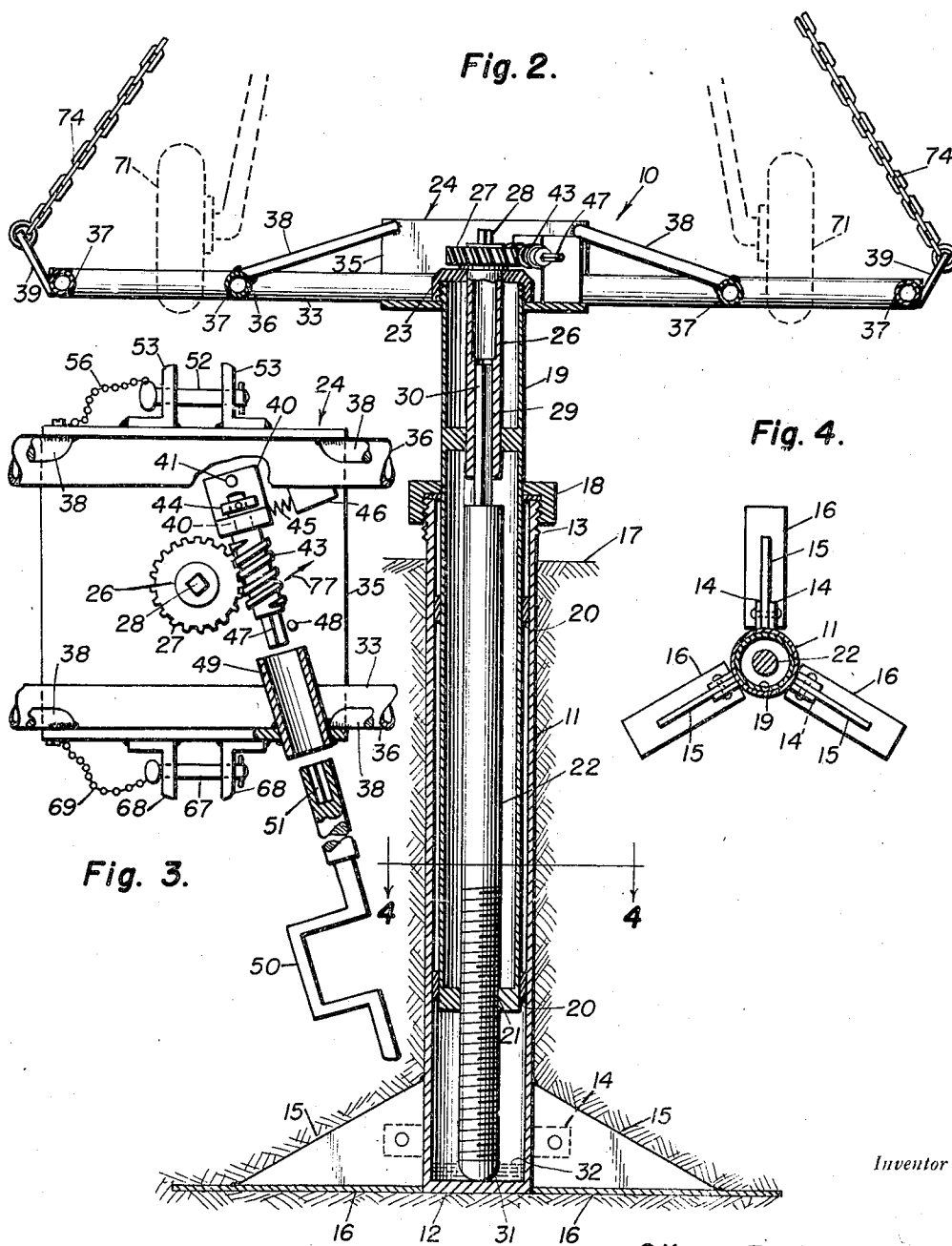
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UNITED STATES PATENT OFFICE

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AIRPLANE MOORING DEVICE

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7 Claims. (Cl. 244—115)

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This invention relates to new and useful improvements and structural refinements in airplane mooring devices, and the principal object of the invention is to provide a device of the character herein described, such as may be conveniently and effectively employed for the securing of airplanes to the ground, in order to prevent the same from becoming upset or otherwise damaged by wind.

A further object of the invention is to provide an airplane mooring device which will permit the airplane to be secured in such manner that the wings thereof will be disposed in plane parallel to the direction of the wind. It will be apparent that the wings will thus be prevented from offering resistance to the wind stream.

Another object of the invention is to provide a mooring device which will permit the airplane to swing with the wind, that is, which will enable the airplane to automatically adjust its position, so that its longitudinal center line is substantially parallel to the direction of the wind.

An additional object of the invention is to provide an airplane mooring device which, as a whole, may be readily raised or lowered with respect to the ground.

A still further object of the invention is to provide an airplane mooring device which is simple in construction and operation, which will not easily become damaged and which is otherwise well adapted for the purpose for which it is intended.

With the above more important objects in view, and such other objects as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of the invention, showing the same in use.

Figure 2 is a cross sectional detail taken substantially in the plane of the line 2—2 in Figure 1.

Figure 3 is a fragmentary top plan view of the subject shown in Figure 2.

Figure 4 is a cross sectional view, taken substantially in the plane of the line 4—4 in Figure 2.

Figure 5 is a fragmentary, elevational detail taken in the direction of the arrow 5 in Figure 3.

Figure 6 is a fragmentary, elevational detail of the right-hand portion of the subject shown in Figure 1, and

Figure 7 is a fragmentary top plan view, taken in the direction of the arrow 7 in Figure 6.

Like characters of reference are used to des-

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ignate like parts in the specification and throughout the several views.

Referring now to the accompanying drawings in detail, the invention consists of an airplane mooring device designated generally by the reference character 10, the same embodying in its construction an upright, cylindrical casing 11, closed at the lower end thereof as at 12 and provided at its upper end with an externally threaded portion 13.

The lower end portion of the casing 11 is equipped with pairs of lugs 14, each pair of these carrying a gusset 15, which, in turn, is provided at the lower edge thereof with a foot plate 16. The casing 11 is partially embedded in the ground (the ground level being indicated at 17) and it will be noted that the casing, together with the gusset and foot plate structure described, constitutes what may be referred to as a base.

The threaded portion 13 of the casing carries an internally threaded cap 18, this forming what may be referred to as a bearing for a sleeve 19 which is slidably and rotatably positioned in the casing.

The sleeve 19 projects upwardly from the casing 11 and the inner portion of the sleeve is provided with a plurality of rings 20 which serve to guide the movement of the sleeve in the casing. The lower end of the sleeve is closed and is formed with a screw threaded aperture 21 which operatively engages a screw shaft 22 hereinafter to be more fully described.

The upper end of the sleeve is screw threaded to receive a cap 23, this in turn, being rigidly secured to a carrier designated generally by the reference character 24.

A tubular shaft 26 is rotatably journaled in the cap 23, the upper end portion of the shaft projecting above the cap in order to carry a worm wheel 27 and terminating in a square shank 28. The lower end portion of the shaft 26 extends into the sleeve 19 and forms a square socket 29 which slidably receives a complementary shank 30 provided at the upper end of the aforementioned screw shaft 22. It will be noted that the lower end 31 of the latter is of a substantially semi-spherical configuration and bears against the closed end 12 of the casing 11. A bath of oil indicated at 32 may be provided in the lower end of the casing, to minimize the friction of the shaft portion 31 upon the casing portion 12.

The aforementioned carrier 24 consists generally of a platform 33 and an extension 34, the platform comprising a substantially U-shaped plate 35 to which the aforementioned cap 23 is

secured. The plate 35, in turn, carries a pair of spaced parallel tubes 36, these also being secured together by a plurality of cross tubes 37 and the entire assembly being reinforced by a series of struts 38.

The outer of the cross tubes 37 are equipped with a pair of eyes or loops 39, these being hereinafter more fully described.

An L-shaped bracket 40 is pivotally secured to the plate 35 by means of a suitable pin 41, the upstanding portion of the bracket 40 providing a bearing for a shaft 42 which carries a worm 43. The shaft 40 is retained in position by a suitable collar 44 and it will be noted that the worm 43 is normally urged into engagement with the aforementioned worm wheel 27 by a compression spring 45 which is interposed between the upstanding portion of the bracket 40 and a lug 46 provided on one of the tubes 36.

The free end portion of the shaft 40 is squared as at 47, and the plate 35 is formed with an aperture 48 disposed adjacent the portion 47 as will be clearly understood.

A tubular guide 49 is secured to the platform 33, this guide being in longitudinal alignment with the axis of the shaft 40 when the latter is in such position that the worm 43 engages the wheel 27. The guide 49 is adapted to rotatably receive a hand crank 50, the latter being provided with a square socket 51 adapted to receive the squared shank 47 as well as the shank 28.

The structure of the aforementioned extension 34 will be clearly apparent from the accompanying drawings, one end of the extension being hinged by means of a pin 52 to a pair of brackets 53 provided on the plate 35. The pin 52 is removable and is loosely attached to the plate 35 by a length of chain 56.

The free end of the extension 34 is formed to provide what may be referred to as a cradle 57, the general structure of which will be clearly understood. It will be observed that a length of chain 58 is attached to the cradle, the function thereof being hereinafter more fully explained.

The extension 34 is also provided adjacent the hinged end thereof with a pin 59, this engaging a yoke 60 associated with a shaft 61, which in turn, carries a screw threaded extension 62. The latter operatively engages a threaded bore formed in the boss 63 of a hand crank 64, the boss 63 being rotatable in and bearing against a block 65 secured between a pair of spaced side plates 66.

The latter are pivotally connected by means of a pin 67 to a pair of brackets 68 provided on the plate 35 and the pin 67 is loosely attached to the plate 35 by a length of chain 69. It will be noted that this arrangement is similar to the aforementioned pin 52, bracket 53 and the length of chain 56.

Having thus described the construction of the invention, its method of operation will now be presented.

When it is desired to moor the airplane 70, the spaced parallel tubes 36 of the platform 33 will effectively receive the landing wheels 71 as is best shown in Figures 1 and 2. Similarly, the auxiliary wheel, that is, the tail wheel 72 will be effectively received in the cradle 57.

The aft portion of the airplane may be firmly secured to the carrier 24 by means of the chain 58, which may be conveniently passed around the fork 73 which carries the tail wheel. Suitable lengths of chain 74 may also be employed

for securing the wing strut 75 to the aforementioned eyes 39.

By rotating the hand crank 64, the extension 34 may be raised or lowered with respect to the ground level 17 through the medium of the shaft 61. The raising or lowering movement of the extension takes place, of course, about the hinge pin 52, and it will be noted that in this manner, the airplane 70, as a whole, may be adjusted to such position that the wings 76 thereof are disposed substantially in a plane parallel to the ground 17. By this token, the wings will be effectively prevented from offering resistance to a stream of air, such as wind of high velocity which would otherwise tend to upset the airplane.

It will be also noted that by virtue of the sleeve 19 which is rotatable with respect to the casing 11, the carrier 24, as a whole, together with the airplane, will be permitted to swing with the direction of the wind, and will thereby automatically adjust itself so that the longitudinal axis of the airplane will remain substantially parallel to the wind stream at all times.

To facilitate the positioning of the airplane upon the carrier 24 and the subsequent removal of the airplane therefrom, the carrier, as a whole, may be raised or lowered with respect to the ground 17. This is accomplished by simply inserting the crank handle 50 in the guide 49 and engaging the socket 51 with the shank 47, whereupon the crank handle may be rotated, which in turn, will result in a corresponding rotation of the shaft 22 and the sliding of the sleeve 19 in the casing 11. It should be understood that suitable approach blocks (not shown) may be employed for enabling the wheels 71 and 72 to surmount the platform 33 and the cradle 57 respectively. In relatively small airports, the invention may be installed so that the entire carrier 24 is normally disposed below the ground level 17. The excavation required for such installation may, of course, be suitably covered when the anchoring device is not in use and the space saving factor of such arrangement can be readily appreciated.

In such instances, the invention is manipulated in the manner already described, with exception that the crank handle 50 will not be accessible when the carrier is disposed below ground level. To overcome this condition, the handle 50 may be readily removed from the shank 47 and the socket 49, and the handle may then be readily manipulated in a substantially upright position, by being applied directly to the shank 23. To avoid interference of the wheel 27 with the worm 43, the latter may be swung in the direction of the arrow 77 and may be temporarily retained in such position by means of a suitable pin inserted in the aforementioned aperture 48.

Finally, it should be explained that the invention will also accommodate aircraft equipped with so-called "tricycle" landing gear, this being accomplished by removing the cradle 57 from the extension 34. As is best shown in Figures 6 and 7, the cradle 57 is equipped with a pair of supporting rods 78 which are removably receivable in the free ends of tubular outer members 79 of the extension. The rods 78 are retained in position by suitable bolts 80, these being selectively receivable in a series of apertures 81 provided in the members 79. This arrangement not only facilitates the adjustment of the cradle 57 with respect to the extension 34 to compensate for varying distance of the tail wheel 72 from the landing

wheels 71 on different aircraft, but will also fa-

facilitate the separation of the cradle from the extension, as aforesaid.

The extension 34, in addition to the members 79, also includes inner members 82, the forward ends of the members 79 being provided with suitable supporting rods (not shown) similar to the aforementioned rods 78, whereby the members 79 may be separably connected to the members 82 by means of further bolts or screws 83.

To accommodate the tricycle landing gear, the members 79 are separated from the members 82 and the cradle 57 after being separated from the members 79, is connected directly to the members 82, as will be clearly understood. It will be found that the cradle 57 will then suitably accommodate the nose wheel of the aircraft and the position of the latter will be reversed with respect to that shown in Figure 1.

It is believed that the advantages and use of the invention will be clearly understood from the foregoing disclosure and accordingly, further description at this point is considered unnecessary.

While in the foregoing there has been shown and described the preferred embodiment of this invention it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

What I claim as my invention is:

1. A mooring device for an airplane having landing wheels and an auxiliary wheel, comprising in combination, an upright casing partially embedded in the ground and forming a base, a sleeve slidably and rotatably positioned in said casing, means for sliding said sleeve, a carrier comprising a platform secured to the upper end of said sleeve and adapted to receive said landing wheels, and an extension hinged to said platform and forming a cradle for said auxiliary wheel, means for securing said airplane to said carrier, and further means for raising and lowering said extension with respect to said platform.

2. A mooring device for an airplane having landing wheels and an auxiliary wheel, comprising in combination, an upright casing partially embedded in the ground and forming a base, a sleeve slidably and rotatably positioned in said casing and projecting at the upper end therefrom, said sleeve being formed with an internally threaded portion, a screw-shaft rotatably positioned in said sleeve and operatively engaging said portion, means for rotating said shaft, a carrier comprising a platform secured to the upper end of said sleeve and adapted to receive said landing wheels, and an extension hinged at one end thereof to said platform, the remaining end portion of said extension forming a cradle

for said auxiliary wheel, a plurality of flexible elements for securing said airplane to said carrier, and screw actuated means for raising and lowering said extension with respect to said platform.

3. The device as defined in claim 2 wherein said first mentioned means includes a worm wheel secured to the upper end of said screw shaft and a worm rotatably mounted on said platform, said worm engaging said wheel.

4. A mooring device for an airplane having landing wheels and an auxiliary wheel, comprising in combination, an upright casing closed at the lower end thereof, said casing being partially embedded in the ground and forming a base, a sleeve slidably and rotatably positioned in said casing and protruding at the upper end therefrom, said sleeve being formed with an internally threaded portion, a screw shaft rotatably positioned in said sleeve and operatively engaging said portion, the lower end of said shaft bearing against the closed end of said casing, a worm wheel secured to the upper end portion of said shaft, a carrier comprising a platform secured to the upper end of said sleeve and adapted to receive said landing wheels, and an extension hinged to said platform, the remaining end portion of said extension forming a cradle for said auxiliary wheel, a worm rotatably mounted on said platform and operatively engaging said worm wheel, a plurality of flexible elements for securing said airplane to said carrier, and screw actuated means for raising and lowering said extension with respect to said platform.

5. The device as defined in claim 4 wherein said worm is swingable in and out of engagement with said worm wheel, together with an actuating crank, said crank being operatively engageable selectively with said worm and with the upper end of said shaft.

6. The device as defined in claim 4 together with means for varying the distance of said cradle from said carrier.

7. The device as defined in claim 4 wherein said extension includes inner and outer sections separably connected together, said cradle being attachable selectively to said inner and outer sections.

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