Jan. 16, 1923.

1,442,155.

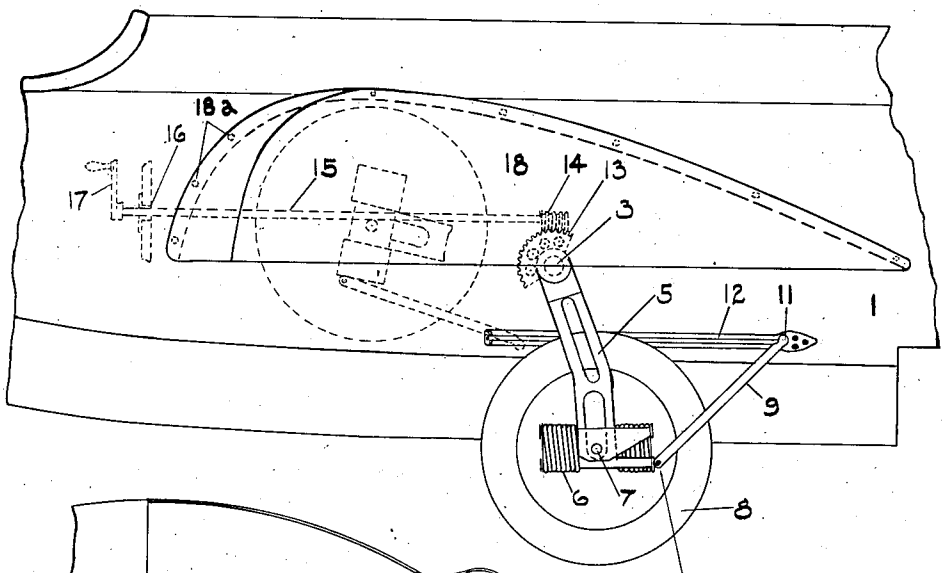
A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920.

6 SHEETS—SHEET 1.

FIG-1



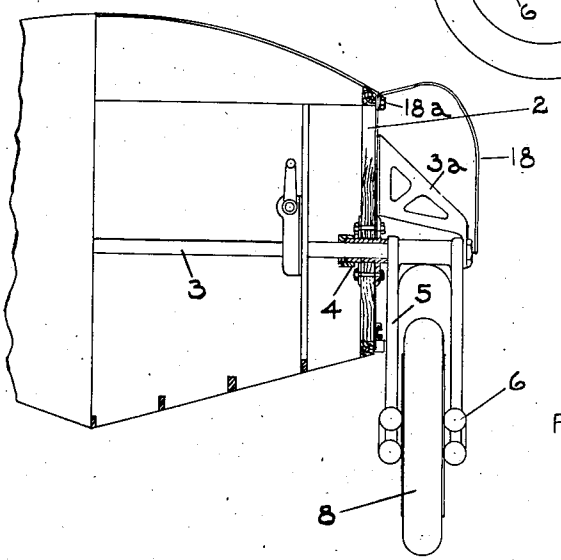


FIG-2

INVENTOR

Alexander Klemin

BY

ATTORNEY

Jan. 16, 1923. 1,442,155.

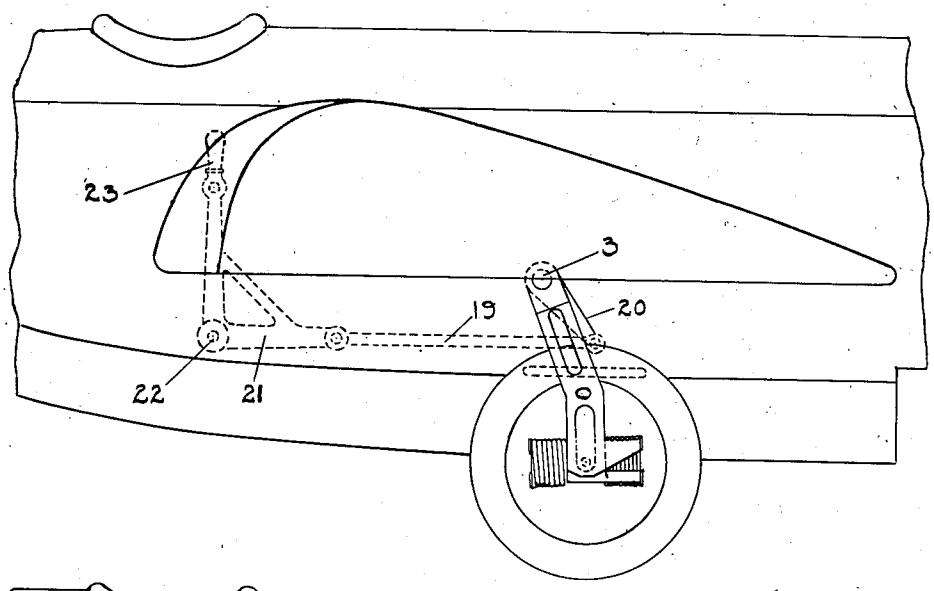
A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920.

6 SHEETS—SHEET 2.

FIG-3



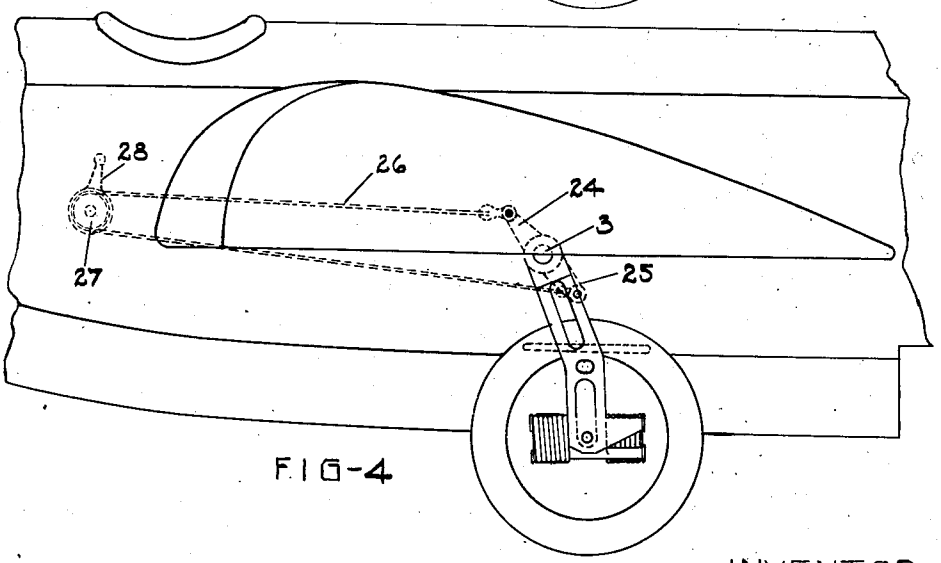


FIG-4

INVENTOR

Alexander Klemin

BY

ATTORNEY

Jan. 16, 1923.

1,442,155.

A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920.

6 SHEETS—SHEET 3.

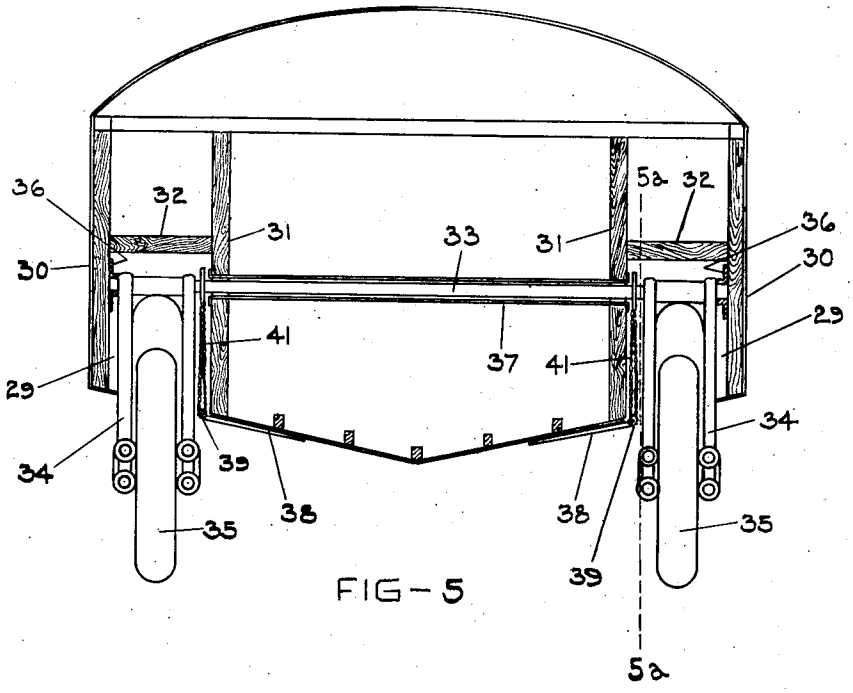


FIG-5

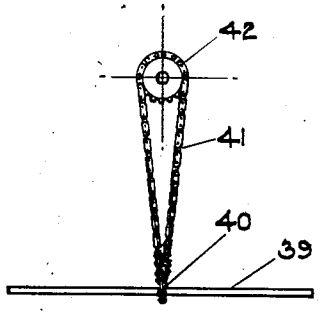


FIG.-5a

INVENTOR

Alexander Klemin

BY

ATTORNEY

Jan. 16, 1923. 1,442,155.

A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920. 6 SHEETS—SHEET 4.

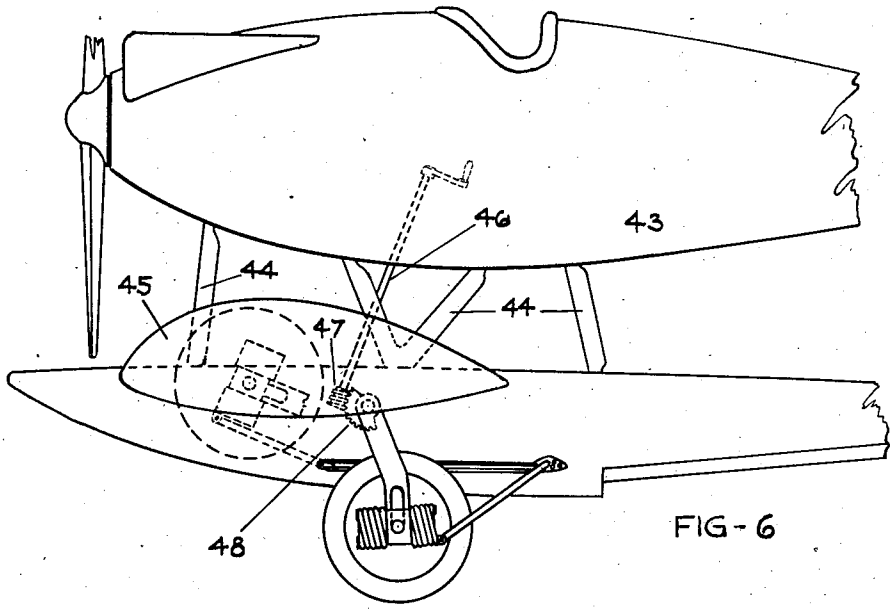


FIG-6

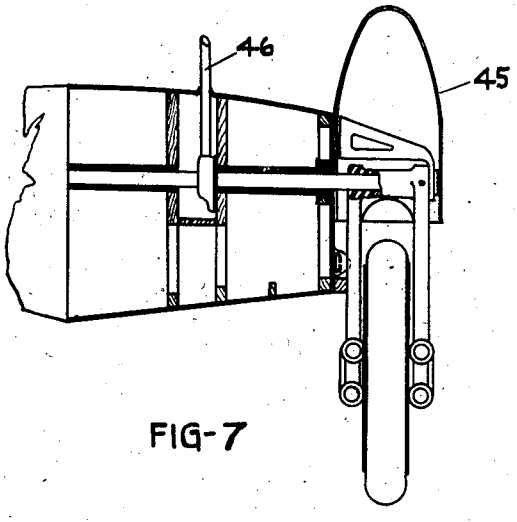


FIG-7

INVENTOR

Alexander Klemin

BY

ATTORNEY

Jan. 16, 1923. 1,442,155.

A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920.

6 SHEETS—SHEET 5.

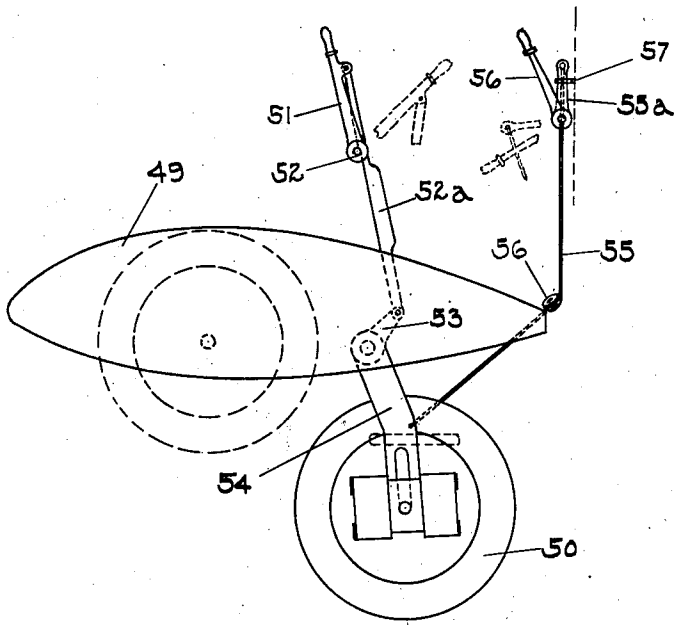


FIG. 8

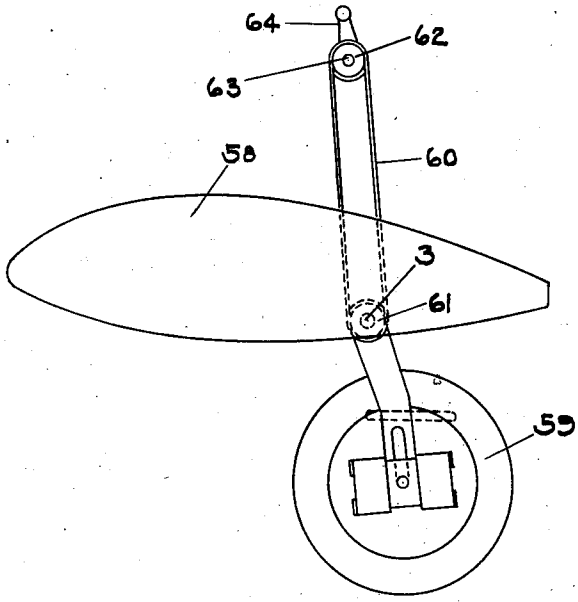


FIG. 9

INVENTOR

Alexander Klemin

BY F. W. Barker

ATTORNEY

Jan. 16, 1923.

1,442,155.

A. KLEMIN.

AIRCRAFT.

FILED MAR. 19, 1920.

6 SHEETS—SHEET 6.

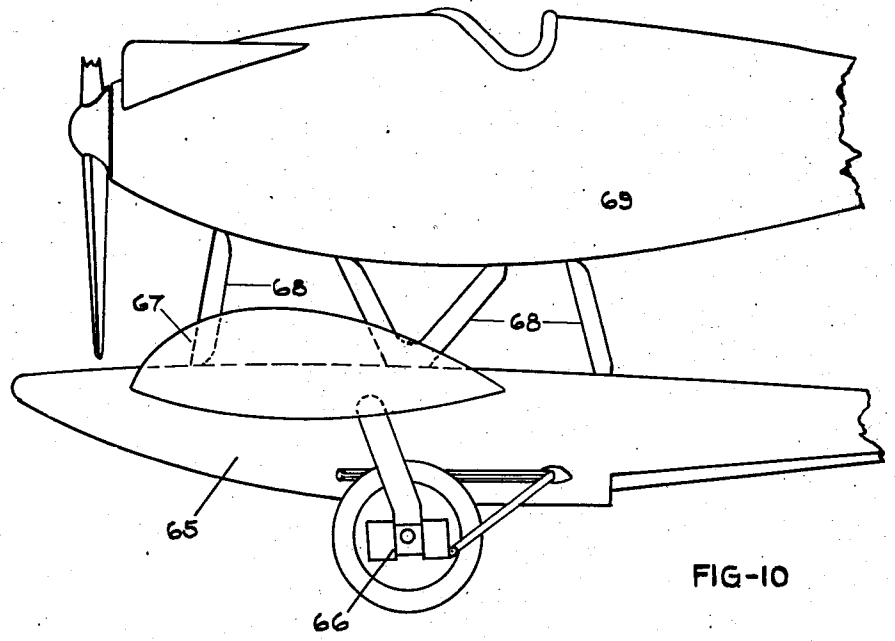


FIG-10

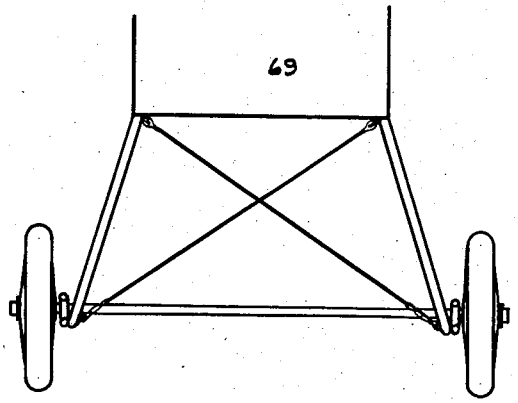


FIG-11

INVENTOR

Alexander Klemin

BY

ATTORNEY

Patented Jan. 16, 1923. 1,442,155

UNITED STATES PATENT OFFICE.

ALEXANDER KLEMIN, OF NEW YORK, N. Y.

AIRCRAFT.

Application filed March 19, 1920. Serial No. 367,098.

To all whom it may concern:

Be it known that I, ALEXANDER KLEMIN, a citizen of the United States, and resident of the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Aircraft, of which the following is a specification.

This invention relates to the landing gear of heavier-than-air flying machines, and my improvements are particularly directed to novel means for mounting traction wheels upon hydroairplanes, both of the flying boat and pontoon types, in order that such craft may be adapted for operation upon land and ice as well as on water.

Therefore my invention comprises the employment of wheels whose attachment to a boat or pontoon is of such adjustable character that they can be used for traction purposes, in which instance they are extended below the bottom surface of the boat or pontoon with which they are connected, whilst also being capable of withdrawal to an elevated position, relatively to the boat or pontoon, to be above such bottom surface and in non-interfering relation with the flotation and water travel of the craft.

A further feature of invention comprised in this application consists in the provision of housings for the reception of the wheels in their elevated positions, said housings being of stream-lined conformation, to constitute fairings, so that the wheels, when elevated, will by means of said fairings offer a minimum of head resistance both when the craft is speeding upon the surface of the water and in flight.

Various forms of mechanical control whereby the traction wheels for aircraft may be shifted to and from their operative and inoperative positions are exemplified in this application, without prejudice to such other modifications as may fall within the spirit and scope of my invention, but as indicative of its structural versatility for the equipment therewith of different types and models of aircraft.

My invention with other features and advantages thereof will be found more completely described hereinafter.

In the drawings:—

Figure 1 is a partial side elevation of a flying boat provided with my improved displaceable wheels, removable housings therefor, and worm gear control means.

Fig. 2 is a rear, partially sectional view thereof.

Fig. 3 is a similar view to that of Fig. 1, but showing linked control means.

Fig. 4 is a like view, showing cabled control means.

Fig. 5 is a rear cross-sectional view of a flying boat hull, having recesses formed therein to receive the wheels, and covering means to render the recesses water tight.

Fig. 5ª is a side sectional view on the line 5ª—5ª of Fig. 5.

Fig. 6 is a partial side elevation of a hydroairplane whose pontoon is provided with removable housings for the reception of the displaceable wheels.

Fig. 7 is a rear, cross-sectional view of Fig. 6.

Fig. 8 is a detail side elevation of a housing, wherein a linked control is employed, in a pontoon craft, for the displaceable wheels.

Fig. 9 is a similar view wherein the control is of cabled character.

Fig. 10 is a side elevation of a pontoon machine equipped with my improvement, and

Fig. 11 is a partial front elevation thereof, with the amphibious feature removed and a land chassis substituted therefor.

Referring to that example of my invention illustrated in Figs. 1 and 2, let 1 indicate the flotation member of a flying boat, having the side wall structure 2. It being one of the purposes of my invention to provide means for displaceably mounting traction wheels upon the flotation member, a shaft 3 is shown as journalled in bearings 4 in each side of member 1 (although the bearing at one side only is shown), each end portion of said shaft, projecting outside the flotation member, having bracing 3ª, and carrying the pendent fork members 5, which, at their lower ends, are fitted with a usual form of cushioned bearing 6 for the axle 7 upon which wheel 8 is journalled.

The fork members 5, in the normal, extended position of wheels 8, for landing and traction purposes, are arranged with a rearward inclination relatively to their shaft 3, in order that under service conditions shocks and strains may be communicated lengthwise rather than angularly of said forks to shaft 3. Further the fork for each wheel forms in effect a strut-like member of a bracing couple that is convergent from about the

wheel axis to the boat structure, as for a land chassis, the other member being in the form of a strut 9, shown as pivotally connected at 10 to the bearing 7 and extended upwardly and rearwardly to its point of engagement 11 with the boat structure. At said point of engagement 11 the strut 9 is entered within a longitudinal slot 12 provided at the side of the boat, and, with the wheel extended for service, as shown in full lines in Fig. 1, strut 9 is at the rearward limit of its movement in slot 12. Also in Fig. 1, in dotted lines, I have shown the retracted or displaced position of wheel 8 and the struts 5 and 9, wherein strut 5 has been swung forwardly by its shaft 3, and strut 9 has by sliding in slot 12 and swinging upon its pivotal connection 10, moved to its retracted position where it is limited as to its further forward movement by engagement with the front end of slot 12.

As means for effecting the extended and retracted movements of wheel 8 and its struts 5 and 9, I provide a gear segment 13, fast upon shaft 3, and in mesh with a worm 14, carried by a rod 15, that is journalled as at 16 and provided as with a crank 17 for manual operation.

In its retracted position the wheel 8 is located at the side of the boat structure, free and clear above the water line, so as to be in noninterfering relation with the boat in its operation on water.

Also I provide a housing 18, attached to the side of the boat structure, in position, and arranged with a bottom opening to receive the wheel, or the major portion thereof, when retracted. Said housing is streamlined, to constitute a fairing and thus to diminish the head resistance of the housing structure.

Housing 18 is secured to the side of the boat structure as by bolts 18^a, to be readily removable in case it is desired to dispense therewith; and also the shaft 3, with forks 5, wheels 8 and strut 9, may be readily removed in the event the craft is to be employed solely as a flying boat.

In the modification illustrated in Fig. 3 the control mechanism whereby the wheeled landing gear of the structure shown in Figs. 1 and 2 is moved between its two positions is seen to consist of the pivotal links 19, 20, wherein link 20 is fast on the shaft 3, and link 19 has pivotal engagement with a bell-crank-lever 21, that is fulcrumed at 22, and is provided with a manipulating handle 23. Still other control means are shown in Fig. 4, wherein the shaft 3 is provided with a rocker having the oppositely extending arms 24, 25, which each engage the respective ends of a flexible connector 26, that extends rearwardly and is wrapped about a drum 27, having a handle 28, whereby said drum may be oscillated and, thus serve to rock the shaft 3 oppositely, to move it and the wheeled landing gear into and out of service position.

In the structure of Fig. 5 I have shown, in the sectional view there given a hull structure for a boat having side recesses or compartments 29, each bounded by the outer side walls 30 of the hull and inner partitions or walls 31, said recesses or compartments each having an upper bracing 32 in the form of a transverse member for said recess or compartment. The shaft 33, that carries the forks 34 in which wheels 35 are mounted, is journalled in bearings 36 carried respectively by the outer walls 30, and is enclosed by a sleeve 37 that extends between the inner walls 31.

In this form of my invention, control mechanism corresponding with the forms thereof previously described and illustrated in other figures of the drawings, may be employed, whereby the wheels 35 may be swung upwardly into recesses 29 when not in service, and downwardly to their operative position.

The recesses 29 are each provided with a movable cover, whereby they may be closed to render them watertight, when the wheels are encased therein, and also to avoid the creation of suction retarding influence in flight, such as would be induced if the recesses were left open.

As here shown these covers consist each of a flap 38, pivotally mounted or hinged to the lower outer edge of partitions 31, and having engagement with a rotatable member 39, having a pinion 40, with which is engaged a chain 41 that also meshes with a sprocket wheel 42 upon shaft 33, to thereby cause the member 39 and flap 38 to be rotated in closing and opening respectively with the raising and lowering movements of wheels 35.

In Figs. 6 and 7 the operative elements of my invention shown in Figs. 1 and 2 are repeated as applied to a pontoon machine. In this example, however, a body portion or fuselage 43 is shown as supported above one or more pontoons (one only being shown) as by struts 44. Also in this example the housing 45 is attached to the pontoon, and the wheel actuating mechanism differs from that shown in Figs. 1 and 2 in that the control rod 46, whose worm 47 meshes with the sector 48, is extended upwardly into the cockpit of the fuselage, for operation by the pilot.

The detail view of Fig. 8 shows only a housing 49, and the wheel 50 in its two positions. But the acuating mechanism is here represented as comprising a lever 51, pivoted at 52, and carrying a pitman 52^a which is in pivotal engagement, through a link 53, with the wheel fork 54. A flexible connector 55, passed over a pulley 56, connects the fork 54 with a rearwardly mounted link 55^a, said

link having pivotal engagement with a lever 56 that is movable forwardly to release link 55^a from a spring lock 57 when the wheel 50 is to be swung forwardly upward, but said link 55^a, when in its normal position indicated in full lines in Fig. 8, serving to hold the wheel locked in its downwardly extended position.

In Fig. 9, a similar detail view, a housing 58 for wheel 59 is shown, and the wheel is movable into and out of said housing by means of a cable 60 which engages sheaves 61 and 62 respectively on the shaft 3 and a shaft 63, the sheave 62 being manipulable by a handle 64.

My invention still further contemplates the adaptation of support means for an aircraft in such wise that the craft may be utilized as an amphibious structure, or solely as either a water machine or a land machine.

Thus, in Fig. 10, I have shown, in side elevation, a pontoon machine provided with my displaceable wheels, wherein the pontoon 65, which is intended to be representative of one or more pontoons, has the displaceable wheels 66, housings 67 therefor, manipulable means (not shown) as in the other illustrated forms of my invention, and struts 68 removably connecting the pontoon with body portion 69. But the struts 68 can be readily removed, and then an ordinary type of land chassis, like that shown in Fig. 11, can be removably attached to the body portion 60.

Variations may be resorted to within the spirit and scope of my said invention and parts thereof used without others.

I claim:—

1. In a heavier-than-air flying machine, in combination, flotation means for water use, a shaft journaled in said flotation means, forks carried by said shaft for rotation therewith, traction wheels mounted in said forks and movable through a vertical arc with the rotation of said shaft, housings for said wheels located in the arcuate path of said wheels to receive them when displaced, a hinged cover for each housing, and means for communicating the movement of said shaft to said covers whereby the latter are caused to close said housings as the wheels enter therein, and to open said housings as the wheels are extended therefrom to their traction positions.

2. In a heavier-than-air flying machine, in combination, flotation means for water use, a shaft journalled in said flotation means, forks carried by said shaft for rotation therewith, traction wheels mounted in said forks, said forks being rearwardly inclined toward their wheel axes in the extended traction position of said wheels, complementary rear struts, in V relation with said forks in said wheel extended position, to comprise a wheel bracing couple for landings, and longitudinal guides in said flotation member for the upper ends of said rear struts, whereby the latter are forwardly slidable in the rotation of said shaft which serves to carry said forks upwardly and remove said wheels from their traction position.

3. In a heavier-than-air machine, in combination, flotation means for water use, a shaft journalled in said flotation means, hangers carried by said shaft for rotation therewith, traction wheels carried by said hangers, said hangers being rearwardly inclined toward their wheel axes in the traction position of said wheels, complementary rear struts, in angled relation with said hangers in the traction position of said wheels, to comprise a wheel bracing couple for landings, longitudinal guides in said flotation member for the upper ends of said rear struts, whereby the latter are forwardly slidable in the rotation of said shaft which serves to carry said hangers upwardly and remove the wheels from their traction position, and engaging means to limit the rearward movement of said rear struts.

4. In a three service heavier-than-air flying machine comprising a body portion, and a removable flotation element therefor, a revoluble shaft journaled in said flotation element, hangers carried by said shaft and wheels mounted in said hangers to be movable through a vertical arc, for displacement, in the rotation of said shaft, whereby said machine may be operable either upon land or water, housings located in the arcuate path of said wheels to receive the latter when displaced, and said body portion, when the flotation element is removed therefrom, being adapted for the removable attachment thereto of a land chassis.

Signed at the borough of Manhattan, in the city, county and State of New York, this 17th day of March, A. D. 1920

ALEXANDER KLEMIN.