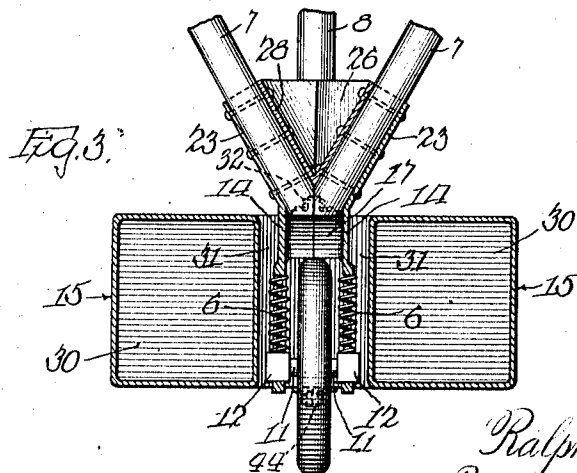
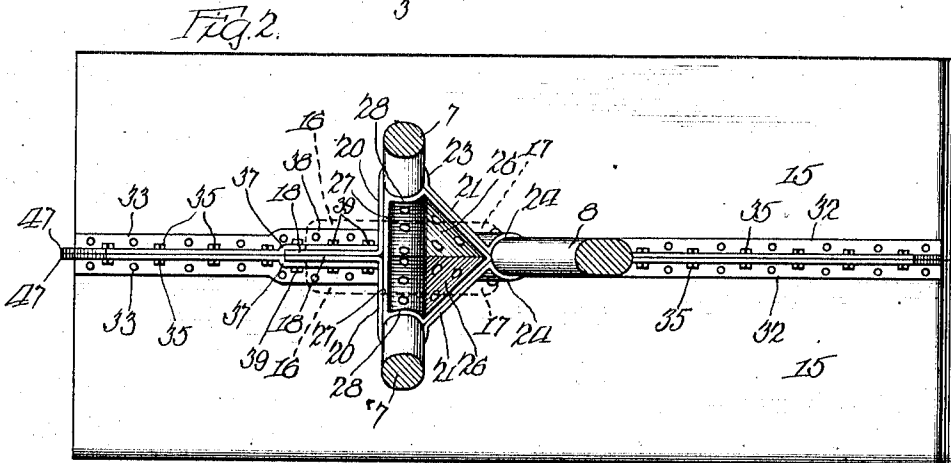
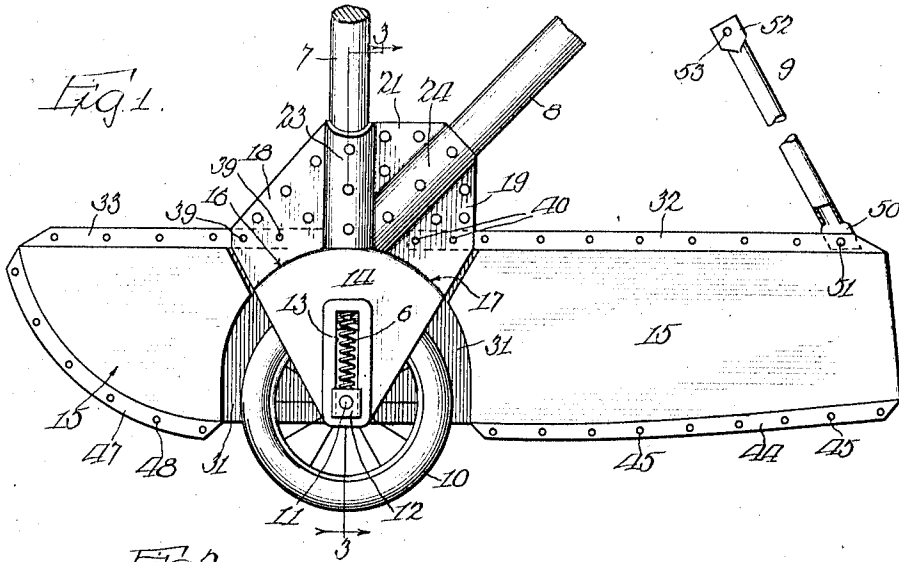


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LANDING GEAR FOR FLYING MACHINES.
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1,313,696.

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UNITED STATES PATENT OFFICE.

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LANDING-GEAR FOR FLYING-MACHINES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RALPH C. JOHNSON, a citizen of the United States, and resident of Chicago, Cook county, Illinois, have invented new and useful Improvements in Landing-Gear for Flying-Machines, of which the following is a specification.

My invention relates to landing mechanism for flying machines. Its principal object is to provide landing gear which enables the flier to make a successful landing both upon water and upon the land, and to rise successfully from either element. A further object is to provide a form of landing gear suitable for land operations to which may be readily secured a pontoon or pontoons adapting the machine for use as a hydro-aeroplane capable also of successfully landing on and rising from the land. A further object is to provide a landing gear having the combined advantages of land and water service in which the naturally greater air and water resistance due to the combining of the two forms of landing devices is rendered comparatively small and unobjectionable. It is also an object to provide a structurally simple, light-weight and strong device for the purposes set forth. Other objects and advantages will appear hereinafter.

In the accompanying drawings which form a part of this specification I have illustrated these improvements as applied, it is to be understood, to a flying machine of any of the well known types. In these drawings Figure 1 is a side elevation of the landing gear with one of the pontoon sections removed to show otherwise concealed parts; Fig. 2 is a top elevation of the device complete, except for the rear strut; and Fig. 3 is a vertical transverse section on the line 3-3 of Fig. 1.

By landing gear or landing mechanism as used herein I means either a wheel for land service, a pontoon for water service or both. The struts 7, 8 and 9 constitute one form of means for securing the landing gear operatively to the rest of the flying machine.

The device illustrated comprises a wheel 10 mounted on a short shaft 11 having its projecting ends mounted in oppositely disposed blocks or bearing members 12 which are slidably mounted in slot-like ways 13 in the wheel supports 14. Coiled compression springs 6 between the blocks 12 and

the upper end of the ways 13 respectively provide a cushion or shock-absorbing means intermediate the wheel and the body of the machine.

The wheel supports 14 are shown as of flat metal construction unitary with the supports for the struts 7 and 8 and those for the pontoon or pontoon sections 15. This unitary supporting structure comprises cover-like parts at 16 and 17, upwardly extending forward flanges 18, upwardly extending rearward flanges 19 (of the same formation as the flanges 18) upwardly extending front walls 20, diagonally rearwardly extending side walls 21, and recessed or channel portions 23 between the front walls 20 and the side walls 21, the rear end portions of the side walls 21 having a recessed or channel-like construction shown at 24. These recessed parts at 24 cooperate with each other in forming a socket for the strut 8, and rivets hold the strut in position there. An interior unitary locking part is also provided having the side walls 26 lying against the outer side walls 21, a front wall 27 lying against the outer front walls 20, and recessed portions at 28 cooperating with the recessed parts 23 to form channels for the struts 7 respectively. These struts are also held in place by rivets, as shown in the drawings. Rivets are also provided for holding the walls 21 and 26 together, and other rivets bind the front plates 20 and 27 in rigid association with each other. Rivets are also provided for securing to each other respectively the front flanges 18 and the rear flanges 19, and thus the integral inner and outer supporting structures respectively become one unitary device which carries the wheel 10 by the struts 7 and 8.

This unitary structure also carries the pontoon or pontoon sections 15. These pontoons are of sheet metal and are shown as a pair of similar water-tight hollow sheet metal structures adapted to be secured together forming a single pontoon having two water-tight compartments 30. Each pontoon is recessed intermediate its ends at 31 to accommodate the wheel 10 and its supports 14. A strip of angle iron 32 is secured at the top inner edge of each pontoon section 15 rearward of the wheel supporting mechanism, and similar angle irons 33 are similarly secured to the pontoon sections at the same relative positions forward of the

supporting mechanism. The bases of these angle irons are secured, as by riveting, to the top walls of the pontoon sections respectively, and their webs lie face to face along most of their extent whereby they may be secured rigidly together by bolts 35.

The angle irons 33 are bent laterally at 37 and then rearwardly so that the parts 38 have their webs spaced from each other, as is well seen in Fig. 2. The riveted-together flanges or forward extensions 18 of the supporting member interfit with the recess between the webs at this place, and bolts 39 passing through the webs and the flanges secure the pontoon rigidly to the holding member of which the flanges 18 are a part. Exactly the same construction as to the flaring outwardly and forwardly of the webs of the rear angle irons 34 occurs at the rear flange 19, and bolts 40 hold this part of the pontoon rigidly upon the flange 19. A top view of the angle iron construction in this respect at the rear flange 19 would be the same as that shown in Fig. 2 for the spaced-apart ends 38, except that the end opening between the webs of the angle irons 32 would be directed forward. The pontoon sections 15 are thus secured rigidly together at the top and to the flanges 18 and 19.

In order to hold the pontoon sections 15 together more securely I provide angle irons 44 at the inner rearward bottom edges of each section having their webs facing each other and secured by bolts in the bolt holes 45. I also provide forward angle irons 47 at the inner bottom and forward portions of the pontoon sections 15 held together by bolts in the holes 48. This construction provides for the ready separability of the two pontoon sections should the flying machine be intended strictly for land use, and for their connection with the flying machine for land and water use.

The strut 9 is a readily removable member, being provided with a yoke at 50 straddling the web of the angle iron 32 and held by the bolt 51. The upper end 52 has a bolt

hole 53 for securing it to a relatively fixed part of the flying machine frame.

I have thus provided a highly useful landing gear in which the wheel for land use has but a comparatively small portion of it presented to the air when combined with the pontoon structure, being well housed largely within the general area of the pontoon. Its resistance to the water is similarly slight and unobjectionable.

The pontoons may be made of sheet metal in accordance with practices well understood. The supporting members including the parts 14, 18, 19, 21 may be in the form of a casting of metal, or it may be stamped up out of sheet metal in part with auxiliary welding operations according to practices well understood. Similarly the inner holding member comprising the walls 26 and 27 may be a casting or formed from flat metal according to well known means.

I claim:

1. A leading gear for flying machines comprising a wheel for land use, supporting structure for said wheel, a pair of pontoon sections formed to fit together and constitute a single pontoon, each section having its inner wall formed with a recess, said recesses facing each other and constituting a partial housing for said wheel, means for securing said sections readily removably to each other, and means for securing the pontoon as a whole readily removably to said supporting structure.

2. A supporting member for a landing gear comprising a yoke structure, a wheel pivotally mounted between the arms of said yoke, an outer upwardly extending frame structure carried by the yoke and having a channel-like recess therein for a strut, an inner frame member secured to said outer frame member, said inner frame member having a channel-like recess facing said other recess, said two recesses forming a socket for the strut.

RALPH C. JOHNSON.