

June 18, 1929.

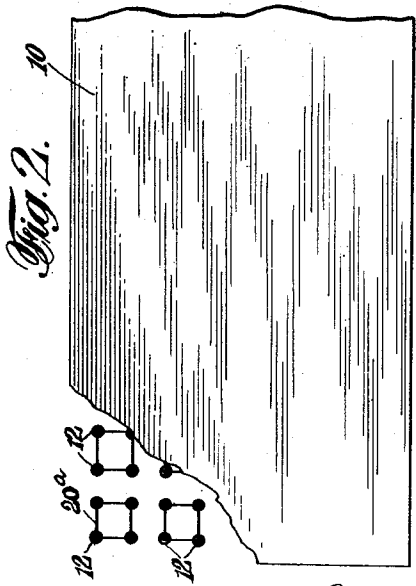
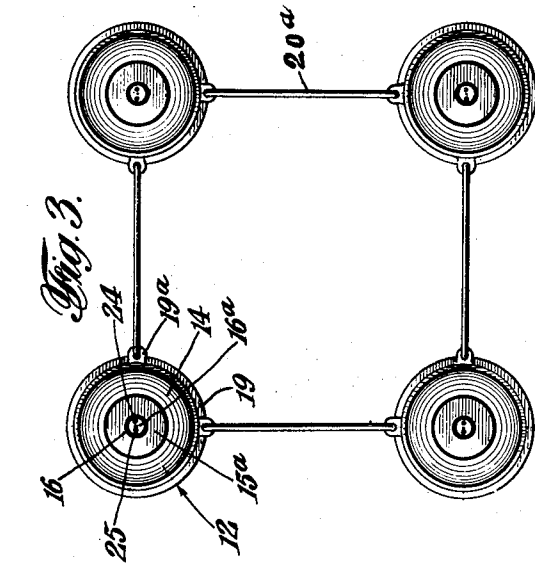
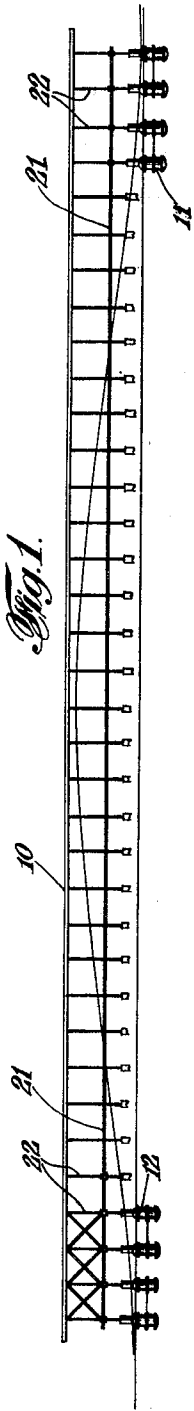
J. W. RENO

1,718,006

LANDING PLATFORM FOR AIRPLANES

Filed Aug. 15, 1928

3 Sheets-Sheet 1



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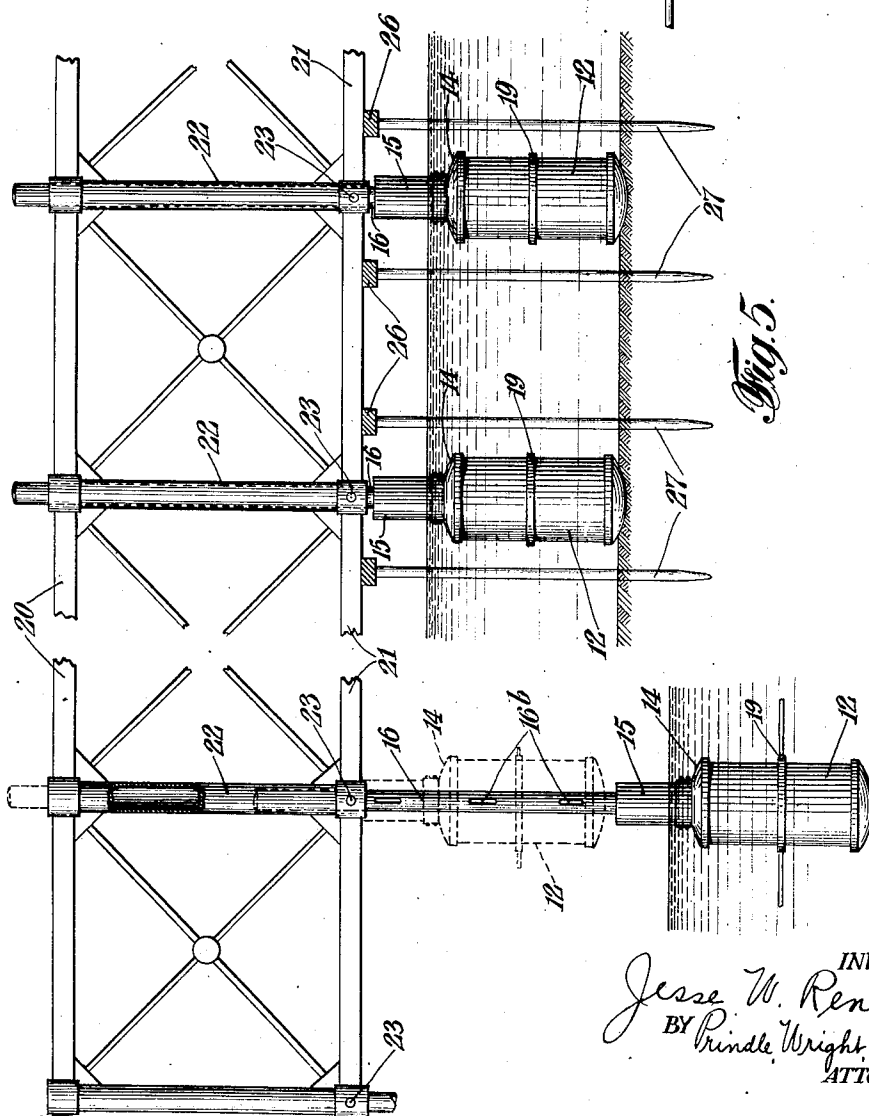
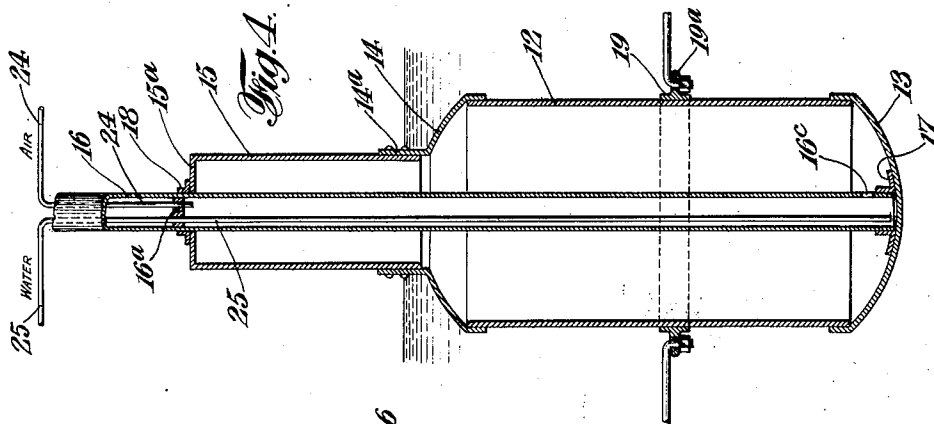
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3 Sheets-Sheet 2



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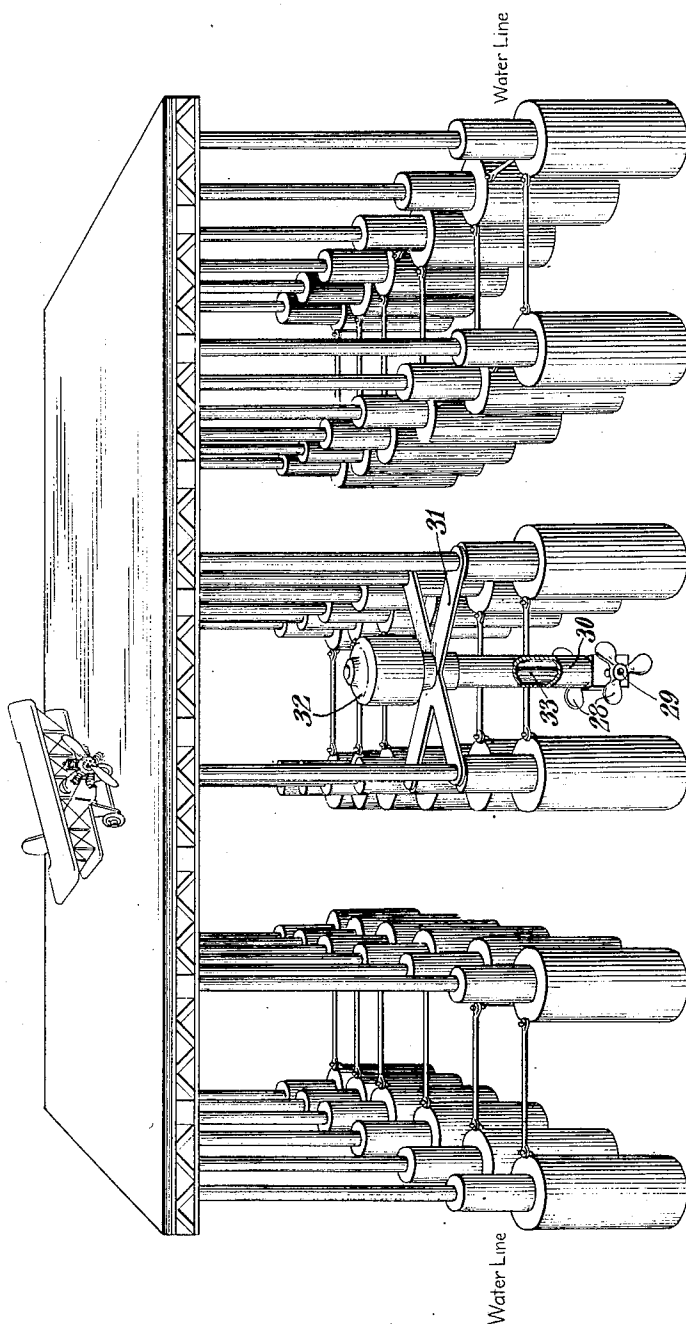
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LANDING PLATFORM FOR AIRPLANES

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Fig. 6.



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UNITED STATES PATENT OFFICE.

JESSE W. RENO, OF NEW YORK, N. Y.

LANDING PLATFORM FOR AIRPLANES.

Application filed August 15, 1928. Serial No. 299,764.

The object of my invention has been to provide a landing platform for airplanes which shall have, among other advantages, the following: that it can be floated on the surface of the sea; that it shall be comparatively free from disturbance due to the waves created by storms; that it shall combine, with ample strength and rigidity, sufficient flexibility so as not to be strained by motion of the water supporting it; that it shall be capable of propelling itself in any direction to counteract the tendency of the wind to carry it away from a fixed position in which it is desired to maintain it; and that it shall be capable of being easily assembled and erected and of having its individual pontoons and/or propelling mechanism raised above the water for repair and adjustment. To such ends, my invention consists in the landing platform for airplanes hereinafter specified.

As a specific instance of the use of my invention, I contemplate providing a landing platform for airplanes at a point in the Atlantic Ocean midway between the American shore and the Azore Islands. This would enable an airplane to cross the Atlantic without being compelled to make a longer non-stop flight than 1,200 miles, which would be about the distance between New York and Chicago, which is constantly made by the airplane mail service in one flight. At my landing platform, the airplane could take on fuel and other supplies necessary for a flight of 1,200 miles to the Azores, from which another flight of similar length would take it to the coast of Spain or Portugal.

While I have chosen for illustration the best embodiment of my invention known to me, my invention is capable of embodiment in many different forms, and the illustrated embodiment is, therefore, to be regarded only as typical, and my invention is not to be confined thereto.

In the accompanying drawings:—

Fig. 1 represents a side elevation of a landing platform embodying my invention;

Fig. 2 is a portion of a plan view of the platform, with one corner of the platform broken away, to show my arrangement of the supporting pontoons in groups (in this instance, of 4 pontoons) which are coupled together as with tie rods;

Fig. 3 is an enlarged plan view of one of

the said pontoon groups showing a reinforcing ring attached to the middle of the cylindrical side of each pontoon, which rings are connected by tie rods to form the pontoons into a group;

Fig. 4 is a vertical sectional view of one of my improved pontoons showing the method of attachment of the supporting column to the pontoon, and also showing the air and water pipes by which the pontoon may be filled with or emptied of water;

Fig. 5 is an elevation showing the supporting truss of the platform in process of erection upon a pile foundation, and also illustrating the manner of using the pontoons so as to lift the truss off the pile foundation when it has been completed; and

Fig. 6 is a perspective view of a portion of one of my landing platforms with propelling mechanism for maintaining the platform in a desired position against the pressure of the wind.

As I desire to produce a landing platform which shall be capable of supporting itself entirely in the water, independently of the depth, my landing platform consists of a platform proper, supported on pontoons.

I have conceived that it is practicable to design a pontoon for floating such a platform of comparatively light steel construction which will be strong enough to resist the external pressure of water to a head of, say, 100 feet. I prefer to use a relatively large number of small pontoons instead of comparatively large pontoons, because a pontoon of large diameter has much greater tendency to distort and, therefore, to collapse under external pressure than a smaller one. I, therefore, as shown in Fig. 1, support my landing platform upon a large number of relatively small pontoons 11.

In the use of pontoons to support an airplane platform above the surface of the sea, the conditions are complicated by the difference of water pressure due to the great height of waves in severe storms. This difference of hydraulic "head" may amount to 60 feet measured from the trough of the sea to the crest of the wave. This might cause an excess of pressure on the outside of the pontoon of about two tons per square foot, as compared with the pressure when it is located below the trough of the wave. On the

outside cylindrical area of a pontoon having a diameter of 12 feet and a length of 24 feet, the said excess press due to a wave would amount to 1,750 tons. I, therefore, so construct and reinforce my pontoons as to enable them to withstand said severe requirements.

As illustrated in Fig. 4, my pontoons consist of a cylindrical shell 12, having a preferably spherical-shaped bottom 13. There is also a spherical-shaped cap 14, having an annular flange 14^a, in which is secured a reduced cylindrical extension 15, having a head 15^a. A column or pipe 16 is secured to the bottom 13, as by a flanged ring 17, and to the head 15^a, as by a flanged ring 18, so as to form a brace between the upper and lower ends of the pontoon. The pontoon is also provided with one or more reinforcing rings 19 mounted on its shell 12, and these rings are provided with eyes 19^a, which by the use of rods 20^a enable the pontoons to be arranged in groups, in this instance of four each, so that said groups will act as a unit. The platform, of which Fig. 6 shows only a small portion, is preferably supported by truss work, consisting in the present instance of upper and lower stringers 20 and 21, which support and are connected by posts 22, which are adapted to receive the upper ends of the columns 16 where they extend above the pontoons. Within the column at the top of the pontoon is a diaphragm 16^a, for the purpose of making the interior of the pontoon air-tight. The portion of the column extending above the pontoons is provided with slots 16^b, to permit access of water to the interior of the column, so that the column will not be rendered buoyant by the passage of a wave. The columns 16 extend into the post 22, as stated, which permits the pontoon to be raised and lowered for purposes later to be referred to, and the pontoon may be fastened at any desired elevation in the post, as by a pin 23 mounted in the post and which may be passed through any one of a series of holes in the column.

I prefer to make the vertical height of the truss-work sufficiently limited so that my platform, which will of necessity be many hundreds of feet long, can yield somewhat to the lifting power of great waves. Such flexibility will not only enable the platform to be made lighter, but decrease the danger of injury from severe storms. The arranging of my pontoons in independent groups (as of 4) instead of connecting all the pontoons by strut rods permits the limited, but desirable bending of the platform. Flexibility may be obtained in other ways than by the means which I have described.

In order to raise and lower my pontoons, I provide each of them, as shown in Fig. 4, with an air pipe 24, which extends through the diaphragm 16^a into the upper portion of the column 16, and with a water pipe 25,

which extends through said diaphragm to near the bottom of the pontoon. The column is provided with an aperture 16^c near its foot, so that water may flow from the pontoon into the column, and vice versa. When it is desired to sink an individual pontoon, water is admitted through the pipe 25 and air permitted to escape through the pipe 24. When it is desired to raise the pontoon or to make it buoyant, air is forced through the pipe 24, expelling water through the pipe 25. Moreover, the water pipe 25 may be used for determining from time to time whether the pontoon is water-tight. The removability and adjustability of the pontoon from the airplane truss frame greatly facilitates the fabrication of the landing platform, and will save much time and money in the erection and launching of this great structure, as will now be described.

As illustrated in Fig. 5, the truss frame is here shown as supported upon wooden stringers 26 supported upon piles 27, the lower chord of the truss resting on the stringers. Two pontoons 12 are shown in place between the supporting piles, the pontoons resting freely on the bottom of a river or bay, which is shallow enough for that purpose, and the pontoon columns 16 are shown in place within the hollow posts 22. The pontoons have been partially filled with water and, therefore, have no buoyancy. When the steel framework of the air plane landing has been completed, being supported upon the piles, the removal of the structure from the supporting pile foundations is accomplished by forcing air into the pontoons. This expels the water from the latter, and the pontoons become gradually buoyant up to the necessary lifting power, but no more. The effect is to lift the entire truss frame gently off its pile foundations and to make it water-borne, thus permitting it to be drawn out into deep water, the pontoons passing between the rows of piles. When the platform has reached deep water, the pontoons can, one at a time, be lowered into the final position, as shown in Fig. 6, and secured in such position by means of the pins 23.

My use of pontoons which are located substantially below the level of the trough of large waves generated by storms, and supporting the platform from such pontoons by comparatively slender columns, results in a construction in which surface exposed to storm waves is reduced to a minimum. I have designed the pontoons proper, that is, the cylindrical portions 12, to provide sufficient buoyancy to support the platform itself. For the purpose of taking care of the live load on the platform, such as supplies of gasoline, buildings, working force and airplanes, the extensions 15 in the upper portions of the pontoons have been provided. These extensions being of reduced diameter will offer relatively little

resistance to the passage of storm waves, and yet they are sufficient to adequately take care of all live loading.

It will therefore be seen that my landing platform has adequate buoyancy and yet offers a minimum resistance to storm waves.

The construction which I have described will enable any individual pontoon or group of pontoons to be raised above the level of the water, as shown in the lefthand portion of Fig. 5 for purposes of inspection and repair, and this without necessity for going to land or shallow water, since the remaining pontoons need not be disturbed, and will maintain the platform in normal position. In order to do so, it is necessary to disconnect the column and pontoon which are pressing against the truss of the platform with a buoyancy of many tons. For this purpose I force water into the pontoon through the pipe 25 until the pontoon has lost all its buoyancy and is ready to sink. I then remove the bolt 23, which allows the upper end of the column to slide easily in the hollow post 22 of the truss frame. Having previously attached a wire rope through holes in the side of the column, the end of the rope will then be wound on a suitable winch located on the truss frame of the platform, and the pontoon and column hoisted up until the pontoon is entirely out of the water, as shown in dotted lines. In this position the pontoon can be repaired, cleaned, etc., after which it is lowered into the water by pumping water into it until the hole in the upper end of the column registers with the hole in the sleeve 22 and the pin 23 can be driven into place. Air is now forced into the pontoon through the airline until all the water is forced out, and the pontoon restored to full buoyancy.

For the purpose of enabling my landing platform to be maintained in approximately the desired geographical position during a storm, I provide my platform with a propeller or propellers 28, which are preferably mounted on a horizontal shaft 29 which is mounted in a vertical casing 30 which can be turned on its axis to cause the reaction of the propellers to act in any desired direction—as for instance, in direct opposition to the wind. The casing 30 is preferably mounted on a framework or spider 31 which can be raised or lowered on vertical guides such as the columns 16 of a group of pontoons and which spider carries a motor 32 for driving the propellers through a shaft 33. When it is desired to repair the propelling mechanism, the whole mechanism with the spider may be raised above the level of the water, where it can conveniently be gotten at. The said propelling mechanism makes the airplane landing self-propelling and thus independent of anchorage in deep water. Moreover, it enables the airplane landing to be maneuvered so that the length of the airplane platform

shall point up into the wind, thus reducing the stress on the structure due to the storm waves, and also permitting airplanes to land along the length of the platform when they are headed up into the wind.

Another important feature of my invention relates to provision for quieting the sea sufficiently to permit an airplane to alight upon the water on the lee side of my landing platform, in which use my pontoons are very useful.

It has been proven by actual test that the outer end of piers extending into the ocean can be protected from destruction by storm waves if compressed air is released into the water through which such waves would have to travel in order to reach the pier. I accordingly provide connections between my pontoons and a pipe suspended from the lee side of my platform, said pipe being provided with a large number of holes through which jets of air may escape, breaking up into numerous small bubbles on their way to the surface. This produces a curtain or barrage of air bubbles, which has the effect of destroying the wave action, and the surface of the sea in the neighborhood is flattened out and made harmless.

By the use of the great storage capacity in my pontoons, amounting to nearly a million cubic feet, it would be possible during a storm to flatten out the waves as they pass under the plane landing structure, so that the wave as it comes out of the leeward end of the structure would be harmless. With this system in operation, seaplanes could safely land on the lee of the airplane landing and then could be raised to the deck of the landing by suitable davits. Since the compressed air would only be needed when an airplane was ready to land, a comparatively small pumping plant working steadily would accumulate a supply from which a large amount of air could be used intermittently to effect such landings.

I claim as my invention:

1. A landing platform for airplanes comprising the combination of a platform having posts or guides vertically secured to said platform, pontoons for supporting said platforms, and columns attached to said pontoons and adapted to be received in said vertical posts or guides, and means for adjustably securing said columns in said posts or guides.

2. A landing platform for airplanes comprising the combination of a platform having posts or guides vertically secured thereto, pontoons having columns attached thereto, said columns being adapted to be secured in said posts or guides, said columns having openings therein above said pontoons, whereby water may flow in or out of said columns.

3. A landing platform for airplanes comprising the combination of a platform, a plurality of pontoons, columns supporting said platform from said pontoons and means

whereby said pontoons may be separately raised above the water independent of each other. said propelling mechanism and said pontoons may be separately raised above the water.

4. A landing platform for airplanes comprising a platform, pontoons, columns supporting said platforms and said pontoons, a propelling mechanism, and means whereby

In testimony that I claim the foregoing, I have hereunto set my hand this 10 day of August, 1928.

JESSE W. RENO.

CERTIFICATE OF CORRECTION.

Patent No. 1,718,006.

Granted June 18, 1929, to

JESSE W. RENO.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 3, for the word "press" read "pressure"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of July, A. D. 1929.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.

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