Oct. 4, 1949. C. H. PATE 2,483,474

SEAPLANE LANDING RAMP

Filed June 24, 1947 3 Sheets-Sheet 1

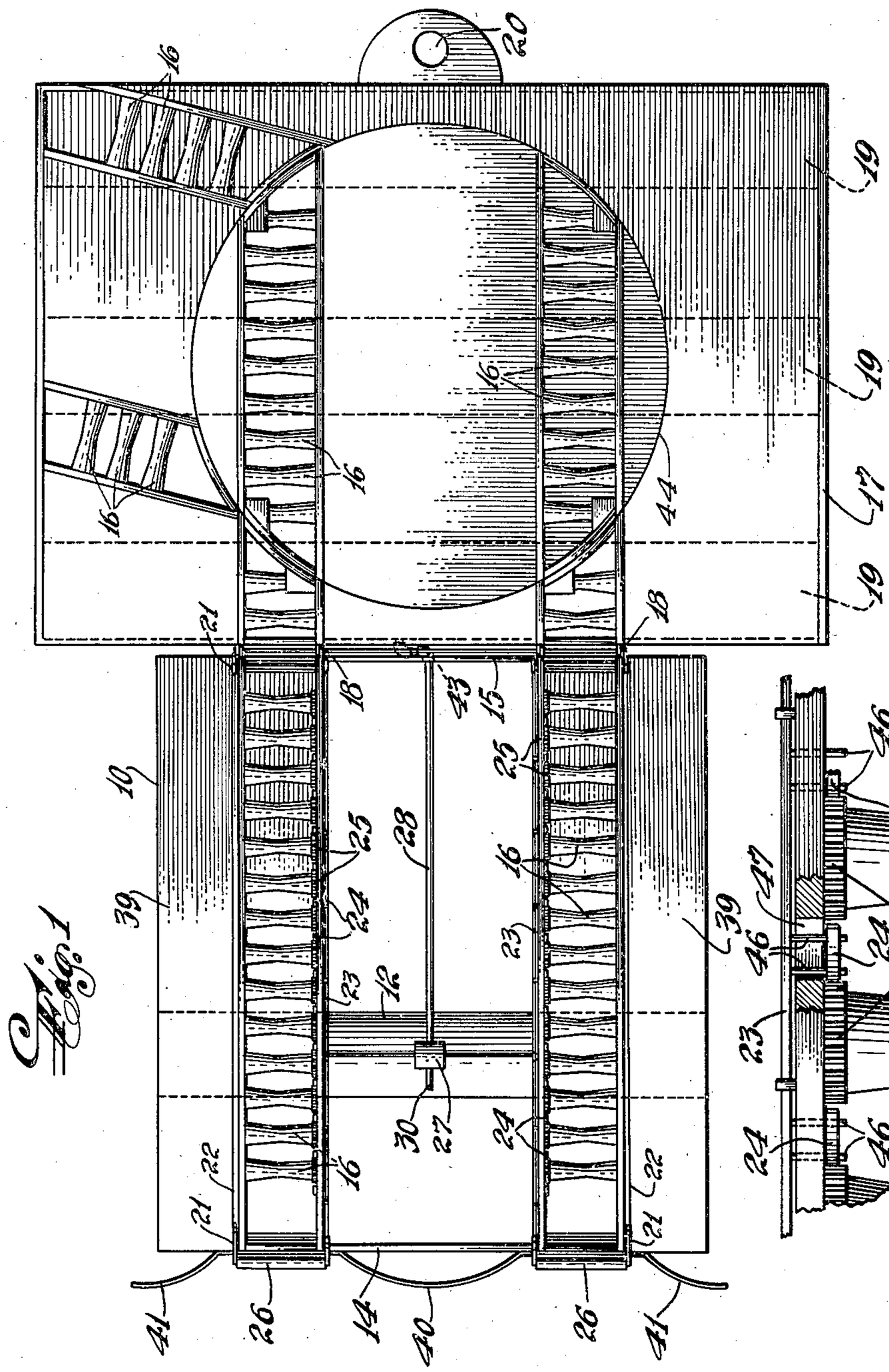

Fig. 1

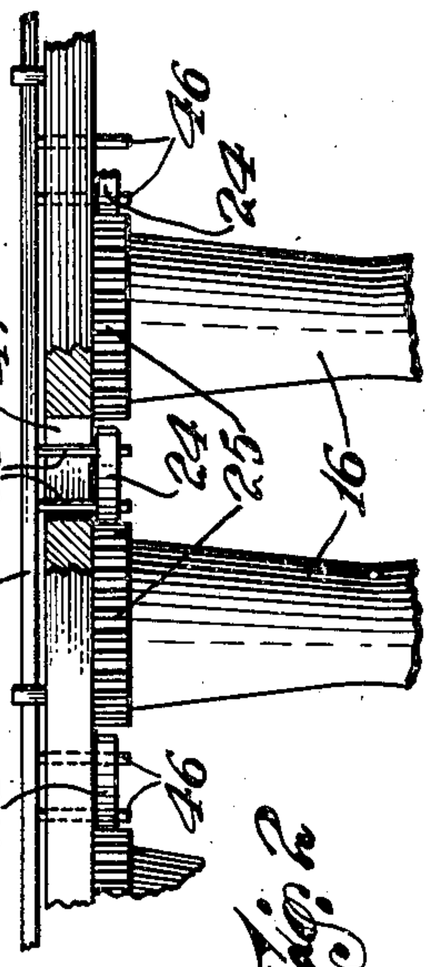

Fig. 2

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Fig. 3

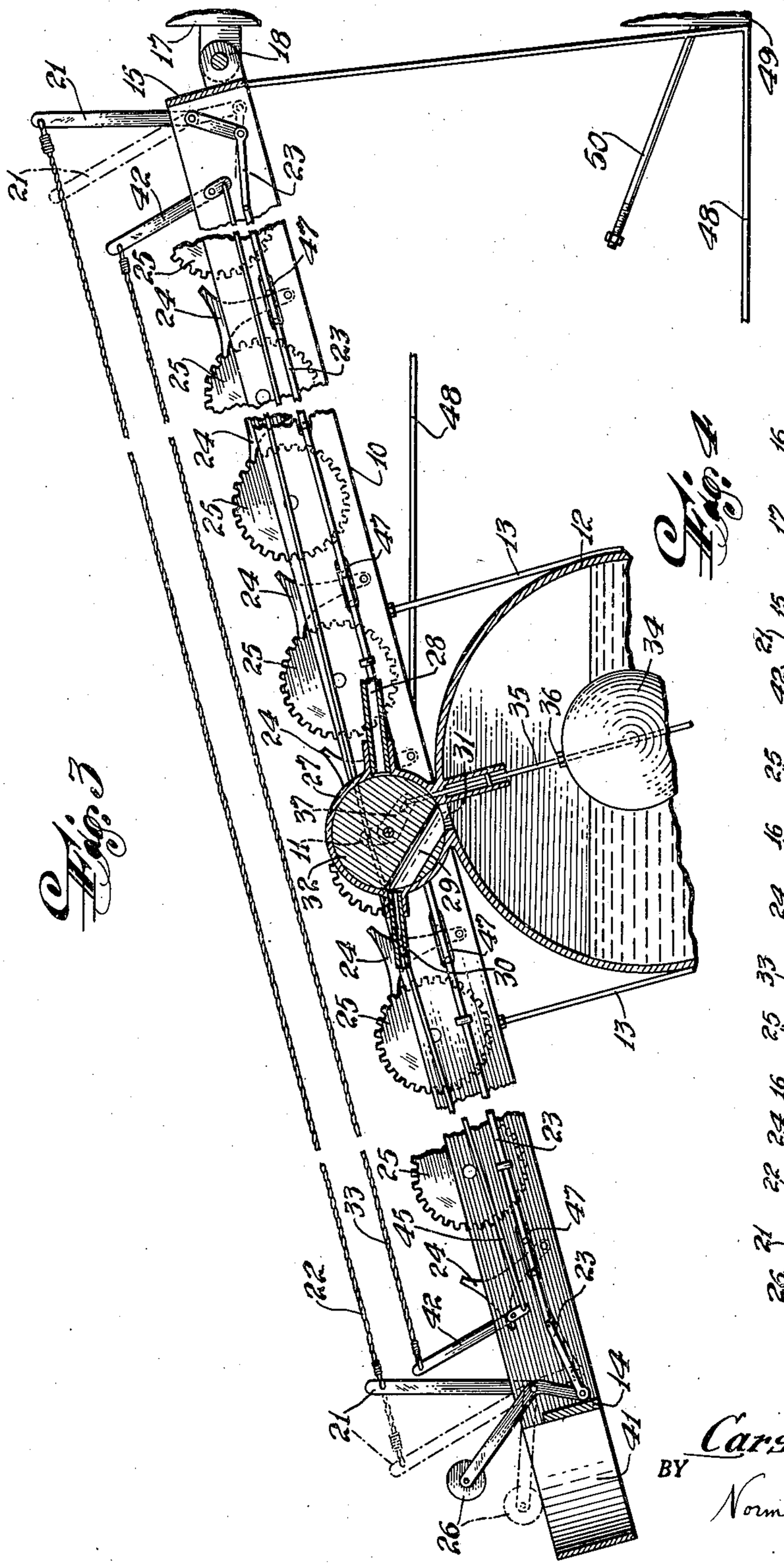
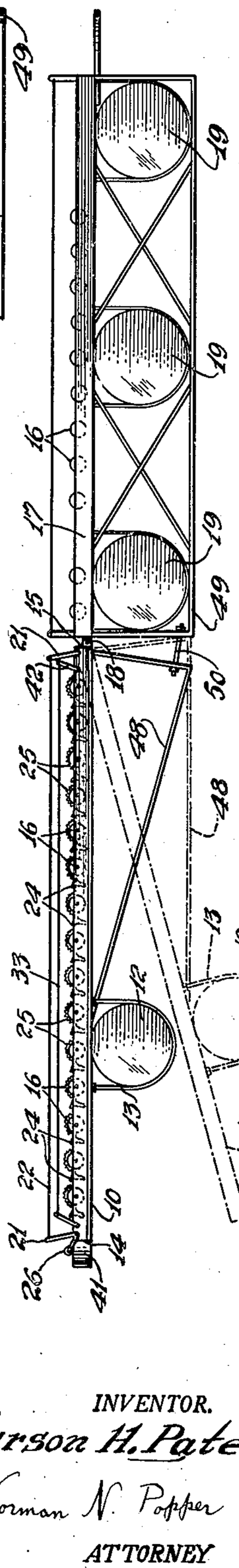


Fig. 4



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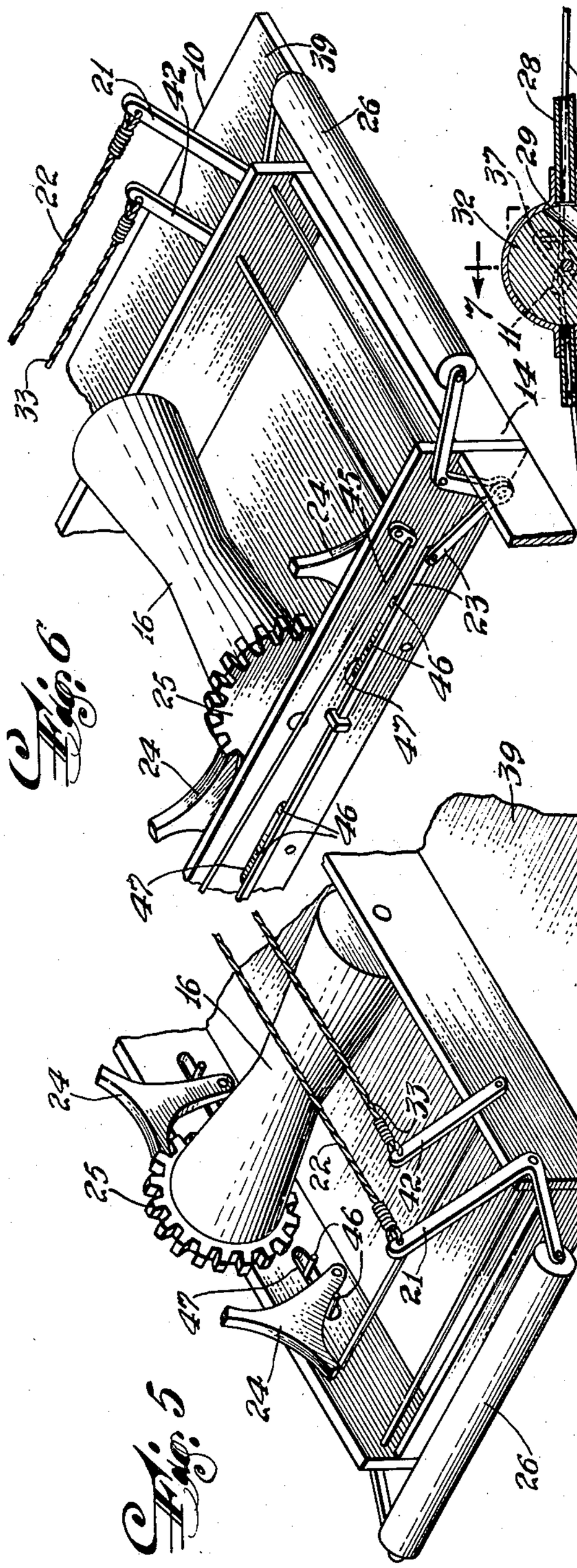

Fig. 6

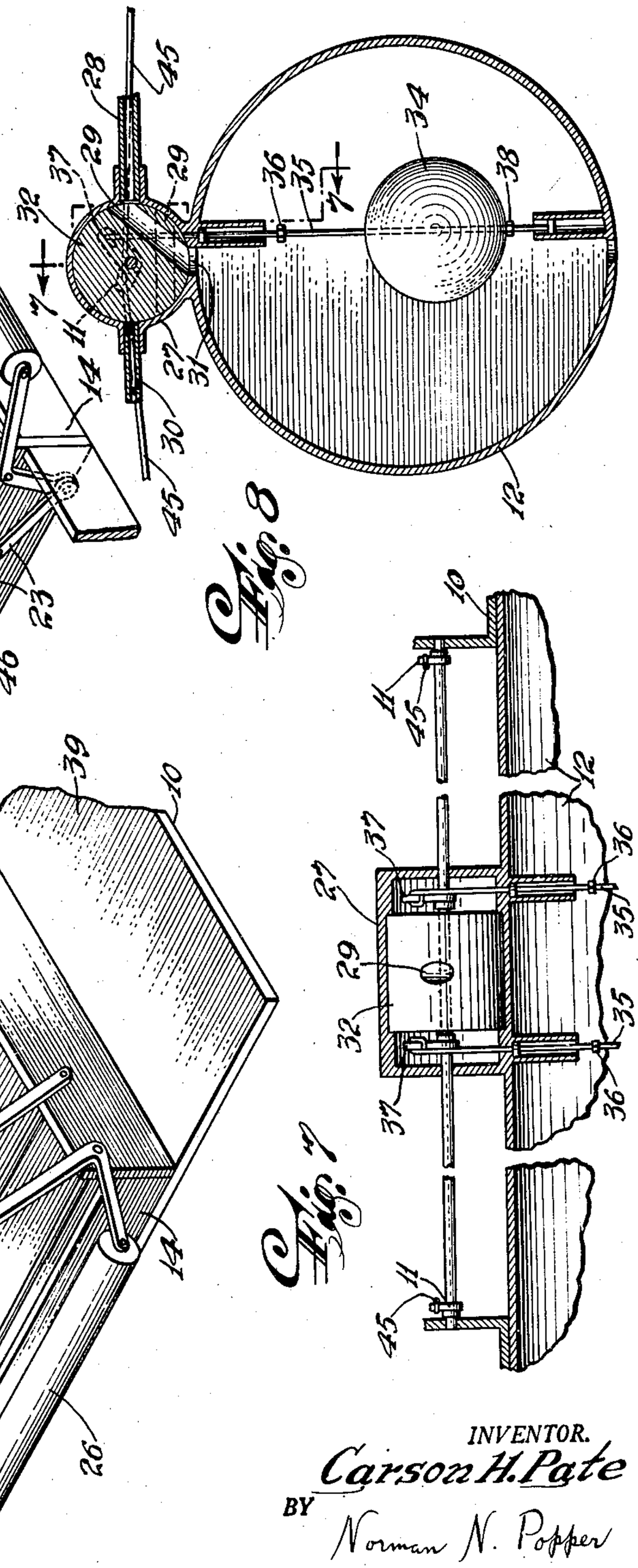

Fig. 8

Fig. 5

Fig. 7

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SEAPLANE LANDING RAMP

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4 Claims. (Cl. 114—43.5)

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My invention relates generally to a sea-plane landing ramp, and specifically to sea-plane landing ramps which may effect removal of a sea-plane from the water to shore without the intervention of any human agency other than that of the pilot.

It is an object of my invention to provide a landing ramp for sea-planes on to which the sea-plane may proceed by its own power, and which will raise the sea-plane from the water where it may be withdrawn on to land for service, safekeeping, storage, or the like.

It is another object of my invention to provide a means for sea-planes for raising them from, or lowering them into, water which is operable from the plane by the pilot, and needs no attendants.

It is another object of my invention to provide a landing ramp for sea-planes which will affirmatively position the sea-plane thereon against movement until the desired time has been reached and the ramp is in the correct position.

It is yet another object of my invention to provide a ramp which is adaptable to all conditions of wind and tide.

Still another object of my invention is to provide an economical and efficient means of launching or lifting from water, sea-planes.

These objects and advantages will appear from a consideration of the drawings which represent one embodiment or illustration of my invention.

Figure 1 is a top view of the submergible ramp and landing stage;

Figure 2 is a partial top view of the rotative members, ratchet-wheel and pawl assembly;

Figure 3 is a side elevation of the submergible ramp in lowered position;

Figure 4 is a side elevation of the submergible ramp and landing stage with the ramp in raised position and with lowered position indicated;

Figure 5 is a view in perspective showing the control assembly;

Figure 6 is another view in perspective showing the control assembly;

Figure 7 is a cross-section of the valve and valve controls taken on the line 7—7 in Figure 8; and

Figure 8 is a cross-section of the valve and float assembly.

Referring now to the drawings in detail, my invention supplies a submergible ramp 10. The ramp 10 is made buoyant by a float 12 which is associated with the frame by appropriate struts 13. The frame has a landing side 14 and a stage side 15. Extending from the landing side

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14 to the stage side 15, a plurality of rotative members 16 are consecutively arranged. These rotative members 16 may be in the shape of equal double conic frustra placed with the smaller plane surfaces together. This construction is especially adapted to receive the twin floats of the conventional float type sea-plane. However, my invention may also be made with a single series of rotative members disposed between the rotative members 16 shown. This permits the use of the invention by sea-planes not having twin floats, but which are waterborne by reason of having a watertight fuselage which is boat shaped. The rotative members 16, shaped as aforesaid, are adapted to receive the twin floats or the fuselage of a sea-plane.

The submergible ramp 10 is associated with a landing stage 17 by a hinge 18. The landing stage 17 is maintained afloat by a plurality of floats 19, 19. The landing stage 17 is pivotable about the point 20 to suit the prevailing wind, current and tide conditions.

The ramp 10 is provided with a lever 21 at either end. A cable or rope 22 connects these levers together. The lever 21 is operatively associated by link bars 23 with a plurality of pawls 24.

With the lever 21 drawn to the extent of its motion toward the landing side, the pawls 24 will engage ratchet-wheels 25 which are associated with the rotative members 16. This engagement will be with the ratchet-wheels 25 on the side of the pawl 24 nearest the stage side 15. This engagement permits only clockwise motion of the rotative elements 16. Thus, a plane in motion toward the submerged ramp will ride up on the rotative members 16, but since the pawls only permit clockwise rotation, the plane, having once lost forward motion, cannot slip back off the rotative members 16 because they are not free to revolve counter-clockwise. The positioning of the pawls 24 in this way is accomplished either: by the hand manipulation of the cable 22 by reaching out from the cabin of the plane, or by the floats of a plane hitting and depressing the trip roller 26. When the lever 21 is thrown to the extreme position toward the stage side 15, the pawls 24 are disengaged from the ratchet-wheels 25 on their stage side 15 and engaged with the ratchet-wheels 25 on their landing side 14. This permits only a counter-clockwise rotation of the members 16, whereby a sea plane may move off the ramp 10 until it is waterborne. While the pawls 24 are still engaged with the ratchet-wheels 25 on their landing side, clockwise

motion of the rotative members 16 is prevented, and the plane engine may be warmed up without danger of forward motion of the plane, which is then positioned facing the stage side 14 of the ramp 10. Launching takes place backward, when the ramp 10 is lowered.

The raising and lowering of the ramp 10 is controlled by the buoyancy of the float 12. The buoyancy of the float is affected by the quantity of air in the float 12. This factor is controlled by the valve 27 which has three positions. In open position (Figure 8) air under pressure in the feed line 28 may enter the valve 27 and proceed into the float. In exhaust position (Figure 3) the passage 29 permits the air in the float 12 to vent through the exhaust port 30 and the ramp submerges for lack of buoyancy. There is the third or closed position (see Figure 8 dotted) of the valve wherein the passage 29 is not connected to either the feed line 28 or the exhaust port 30. The opening 31 in the float is closed by the rotating member 32.

The valve 27 is controlled by the cable or rope 33 which is attached to the levers 42. It is thrown to either exhaust or open position depending upon which way the cable 33 is manipulated. Link bars 45 connect the lever 42 to the valve 27 through the control arm 11. Regardless of which of these two positions is taken, the check float 34 will restore the valve to closed position. When the air is vented and the ramp 10 sinks, the check float 34 rises on the shaft 35 until it hits the stop 36 which pushes the shaft upward until the arm 37 moves the rotating member 32 so that the passage 29 assumes the closed position. On the other hand, when the passage 29 is in open position and air is vented into the float 12, the ramp 10 rises, the check float 34 falls until it reaches the stop 38. Then it pulls the shaft 35 down, turning the arm 37, which shifts the passage 29 to closed position. To insure positive action, double check float structure is shown in Figure 7, but this is merely a matter of choice as a single check float will operate equally as well.

The ramp 10 has a catwalk 39 on either side of the rotative members 16. At the landing side 14, a central fender 40 and side fenders 41 are provided to guide the pontoons of a sea-plane onto the rotative members 16. The valve 27 is connected by a feed line 28 which joins a swivel coupling 43 where it passes under the landing stage 17. The landing stage may be provided with a turntable 44 with a plurality of rotative members 16 disposed across its surface at appropriate intervals.

It is to be noted that the pawls 24 are actuated by pins 46 which extend through slots 47. The pins are carried by the link bars 23.

A brace 48 is provided for the underside of the ramp 10. When the ramp 10 is at its lowest submerged point as shown by the dotted lines in Figure 4 or as shown in Figure 3, the brace bears on the undercarriage 49 of the landing stage 17. When the ramp 10 is raised as indicated by the solid lines of Figure 4, the brace 48 is held in spaced relationship to the landing stage 17 by the stop 50, which prevents the ramp 10 from rising beyond the plane of the landing stage 17.

The operation of the sea-plane landing ramp is as follows. With the ramp 10 in submerged position indicated in Figure 3, a waterborne float plane taxis in until its floats hit the trip roller 26 and ride up on the rotative members 16. The trip roller 26 actuates the link bars 23 so that the pawls 24 engage the ratchet-wheels 25 against

counter - clockwise motion. Gravity cannot, therefore, cause the plane to ride back off the rotative members 16 and again become waterborne. The pilot may then reach from the cabin and pull the cable 33. This actuates the valve 27 to permit air to enter the float 12 until it rises to the level of the landing stage 17. At this point, the pilot may manually close the valve or the check float 34 does it. The pilot may then step out onto the ramp 10 and push his plane over the rotative members 16 onto the turntable 44.

When it is desired to launch a plane, the ramp 10 is brought to float position as indicated in Figure 4. The cable 22 is manipulated so that the pawls 24 are engaged with the ratchet-wheels to permit the rotative members 16 to revolve counter-clockwise and the plane is pushed out onto the ramp 10 facing shoreward, the cable 22 having been manipulated to engage the pawls 24 with the ratchet wheels 25 to prevent clockwise motion. The motor may then be warmed up and the plane cannot move forward. When the plane's engine is warmed up, the cable 33 is manipulated to turn the valve channel 29 to exhaust position shown in Figure 3. The ramp 10 then submerges and the pilot may reach from the cabin to check the submerging at any desired point, or the check float 34 will do it automatically. Gravitationally, the plane will ride backward on the rotative members 16 until it is waterborne. The ramp 10 is then ready for the next plane.

The foregoing description is intended to illustrate one embodiment of my invention. Many changes in the construction, selection and arrangement of the various parts may be made within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. A sea-plane landing ramp comprising a landing stage, a ram pivotally attached thereto, a plurality of rotative members disposed across the top of the ramp, ratchets connected to the rotative members, double pawls positioned between the ratchets and engaging the ratchets on one side of the pawls against clockwise movement, a trip-roller attached to the end of the ramp in the float path of a landing plane, means actuated by the trip-roller whereby the pawls are shifted to engage the opposite ratchets against counter-clockwise movement.

2. A sea-plane landing ramp comprising a landing stage, a ramp pivotally attached thereto, a plurality of rotative members disposed across the top of the ramp, said rotative members being longitudinally tapered toward their center point, ratchets connected to the rotative members, and means for engaging the ratchets against rotation clockwise or counter-clockwise.

3. A sea-plane landing ramp comprising a landing stage, a ramp pivotally attached thereto, a float means for maintaining the ramp afloat or with one end partially submerged, a plurality of rotative members disposed across the top of the ramp, ratchets connected to the rotative members, and means for engaging the ratchets against rotation clockwise or counter-clockwise.

4. A sea-plane landing ramp comprising a landing stage, a ramp pivotally attached thereto, floats attached to the ramp, means for admitting or discharging water from the floats, a plurality of rotative members disposed across the top of the ramp, ratchets connected to the rotative members, double pawls positioned between the ratchets and engaging with the ratchets on one side of the pawls against clockwise movement,

a trip-roller attached to the end of the ramp in the float path of a landing plane, means attached to the trip-roller whereby the pawls are shifted to engage the opposite ratchets against counter-clockwise movement.

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