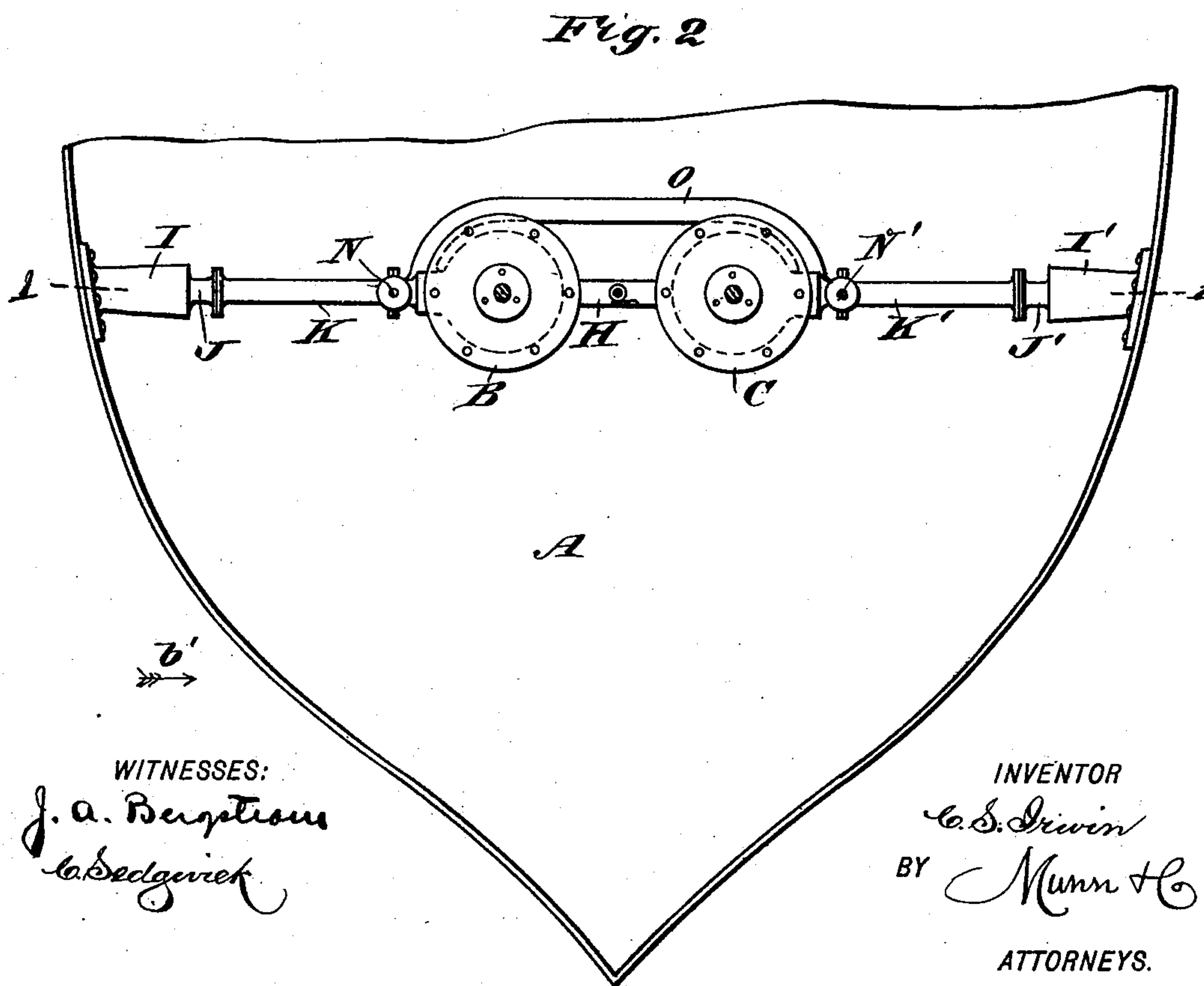
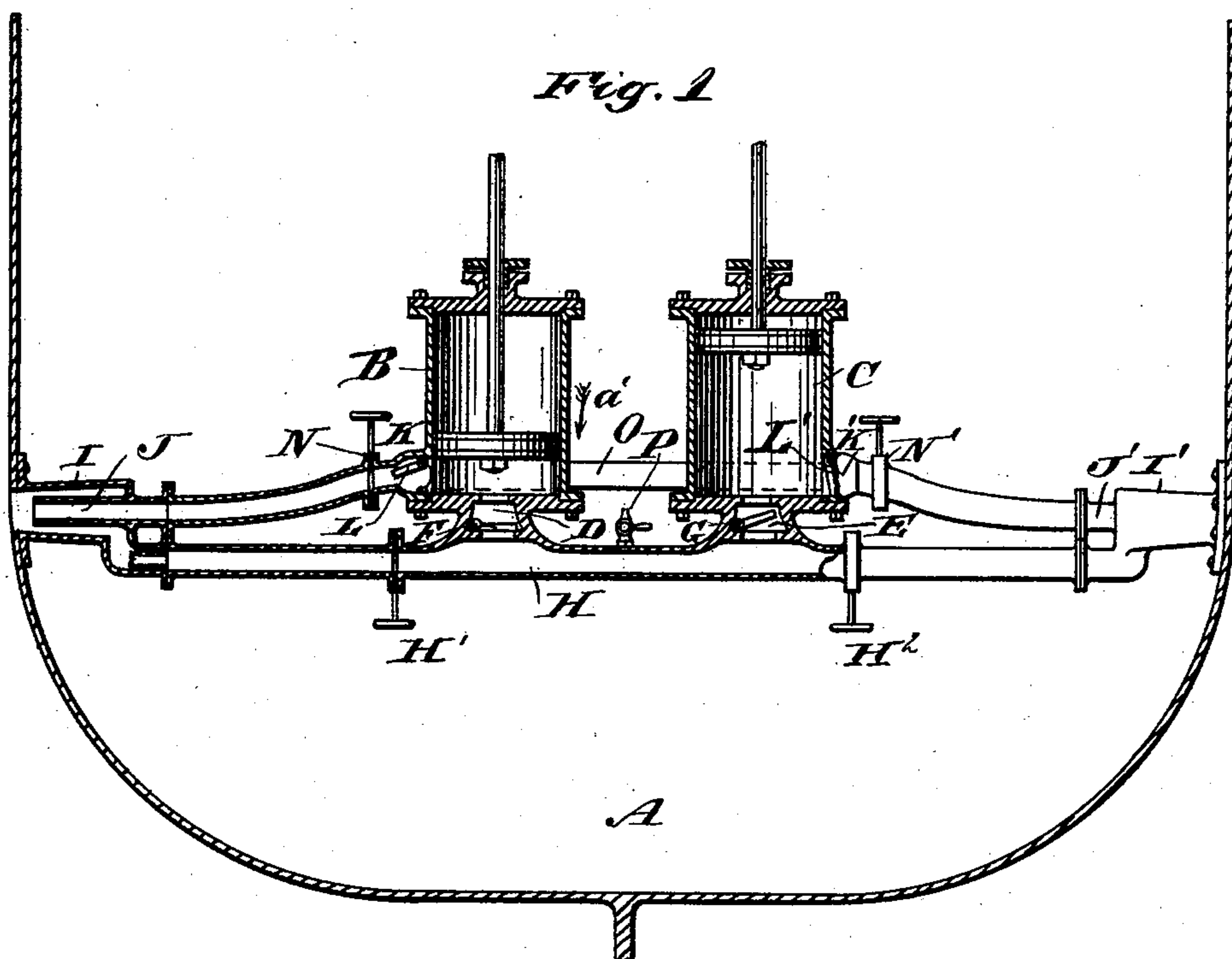


(No Model.)

C. S. IRWIN.
HYDRAULIC STEERING APPARATUS.

No. 507,135.

Patented Oct. 24, 1893.



WITNESSES:

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CHARLES S. IRWIN, OF ST. JOSEPH, MISSOURI.

HYDRAULIC STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 507,135, dated October 24, 1893.

Application filed August 12, 1892. Serial No. 442,850. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. IRWIN, of St. Joseph, in the county of Buchanan and State of Missouri, have invented a new and Improved Hydraulic Steering Apparatus, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved hydraulic steering apparatus, which is simple and durable in construction, very effective in operation, and arranged to facilitate the handling of a marine vessel in a very simple and economical manner.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both figures.

Figure 1 is a transverse section of the improvement as applied, on the line 1—1 of Fig. 2; and Fig. 2 is a plan view of the same.

The improved hydraulic steering apparatus is preferably arranged in the bow of a vessel A, as is plainly shown in Fig. 2, and is provided with two single-acting pumps B and C, provided in their outlets D and E respectively with valves F and G respectively, opening into an inlet pipe H extending transversely in the vessel and opening at its ends into the suction nozzles I and I', opening to the outside, on the sides of the vessel, as is plainly shown in the drawings.

Within the suction nozzles I and I' are arranged the discharge nozzles J and J' respectively, connected with the outlet pipes K and K' respectively, leading from the pumps B and C respectively. Outlet valves L and L' are arranged at the inner ends of the discharge pipes K and K', the said valves closing on the upward stroke of the plungers or pistons in the respective cylinders and opening on the downward stroke of the same. Valves N and N' are also arranged in the outlet pipes K and K' respectively, to cut off the respective nozzles J or J' from the pipes K and K' respectively. The latter are connected with each other by a pipe O between the valves L, N, and L', N', respectively. In the suction pipe H between the nozzle I and valve

F and the nozzle I' and valve G are arranged gates H' and H² for controlling the inlet of the water to the said pumps, and in the middle of the said pipe H is arranged an air cock P to let in air for the discharge of the water when it is desired to drain the pipe H.

The arrangement of valves N and N' permits of discharging the water from both pumps B and C to one side of the vessel; for instance, if the valve N is closed and N' open then the discharge of the water from pump B passes through valve L into pipe O and past valve N' into discharge nozzle J'. The discharge of the water from pump C then passes directly into the said nozzle J' through the said valve N' so that a continuous stream of water passes through the nozzle J' when the pumps are working. In a like manner a discharge can be had through nozzle J and for this purpose the valve N is opened and N' closed so that the water discharged by pump C passes through pipe O and then to nozzle J.

The arrangement of the valves H' and H² in the suction pipe H permits suction for both pumps B and C through either nozzle I or I', it being understood that one valve H' or H² is open, while the other is closed.

The operation is as follows: When the plunger in the pump B is on the up-stroke then the plunger in the pump C is on the down stroke, and vice versa; both pumps discharging on their down stroke in either nozzle J or J' the suction taking place correspondingly through either nozzle I' or I². When the valves N' and H' are closed and valves N and H² open, and the plunger in the pump B moves downward, in the direction of the arrow a', as shown in Fig. 1, then the valve F seats itself and the water in the lower end of the cylinder B passes through the outlet pipe K into the discharge nozzle J and through the same on one side of the vessel, thus exerting a pressure against the water so as to move the bow of the vessel sidewise in the direction of the arrow b', shown in Fig. 2. At the same time the plunger in the pump C is on the up-stroke and water is sucked in on the other side of the vessel through the nozzle I' by the action of the said plunger, thus assisting the discharge to move the bow of the vessel in the direction of the arrow b',

thereby increasing the steering capacity of the apparatus, as the ejection on one side as well as the suction of the water on the opposite side of the vessel will tend to steer the same in one direction, as described. When the plunger in the other pump C moves downward and the plunger in the pump moves upward, then the above described operation is repeated in the said nozzles I' and J; that is, water is ejected through the nozzle J and sucked in through the nozzle I', so that the pressure and suction on opposite sides of the vessel serve to steer the latter in the direction of the arrow *b'*. When the position of the valves N, H² and N' H' is reversed the pressure will take place on the side of the vessel containing nozzles J' and I' while the suction is on the opposite side and the vessel will steer in the inverse direction of arrow *b'*. As shown at the left in Fig. 1, a strainer is inserted in the suction pipe H, to prevent floating material from passing into the pumps B and C.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A hydraulic steering apparatus, comprising two single acting pumps mounted on the boat, and having inlet and discharge pipes leading to common openings in opposite sides of the boat, one pump discharging on one side while the other is drawing in water from the opposite side, substantially as described.

2. A hydraulic steering apparatus provided with a combined discharge and suction nozzle, arranged in the sides of a vessel, the discharge nozzle extending into the suction nozzle

and connected with the outlet of the pump and the suction nozzle connected with the inlet of the pump, substantially as described.

3. In a hydraulic steering apparatus, the combination with two single-acting pumps located between the sides of a vessel and having their plungers moving in unison but in opposite directions, of combined discharge and suction nozzles arranged in the sides of the vessel and connected with the inlets and outlets of the said pumps, substantially as shown and described.

4. In a hydraulic steering apparatus, the combination with a boat, and single-acting pumps thereon, of suction nozzles in the sides of the boat and connected with the inlets of the pumps, discharge nozzles connected with the outlets of the pumps and projecting into the suction nozzles, and a pipe connecting the discharge nozzles, substantially as described.

5. In a hydraulic steering apparatus, the combination with a boat, and single acting pumps thereon, of suction nozzles in the sides of the vessel, a valved pipe connecting the nozzles with each other and with the inlets of the pumps, discharge nozzles projecting into the suction nozzles, valved pipes connecting the discharge nozzles with the outlets of the pumps, and a pipe connected with the pipes which lead from the outlets of the pumps, substantially as herein shown and described.

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Witnesses:

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