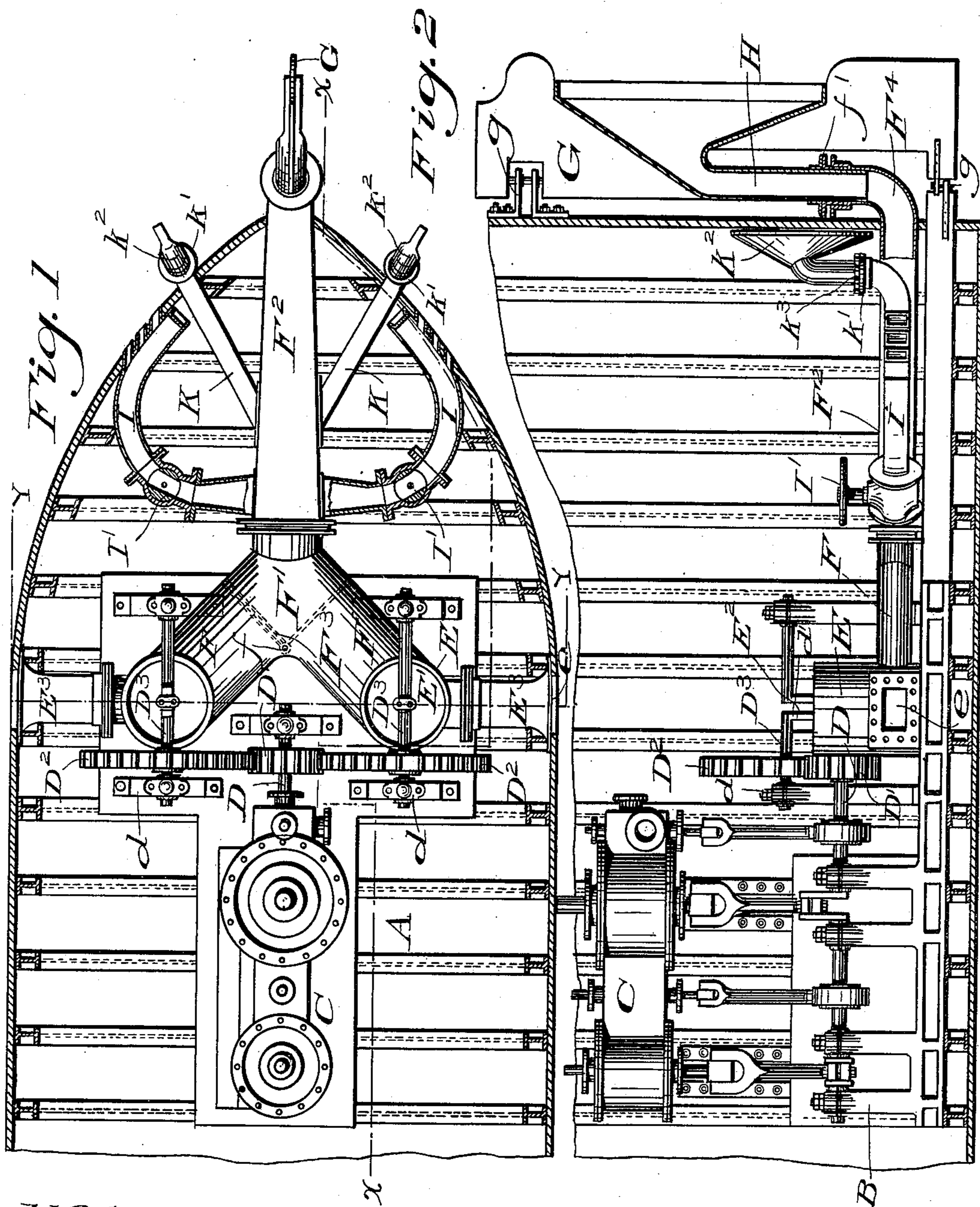


(No Model.)

2 Sheets—Sheet 1.

F. KREFFT.
HYDROSTATIC VESSEL PROPELLING AND STEERING APPARATUS.
No. 602,224. Patented Apr. 12, 1898.



Witnesses:-

B. Kueper

C. H. Zabriskie

Inventor
Friedrich Krefft

By his Att'y. *O. D. Reichelt*

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3

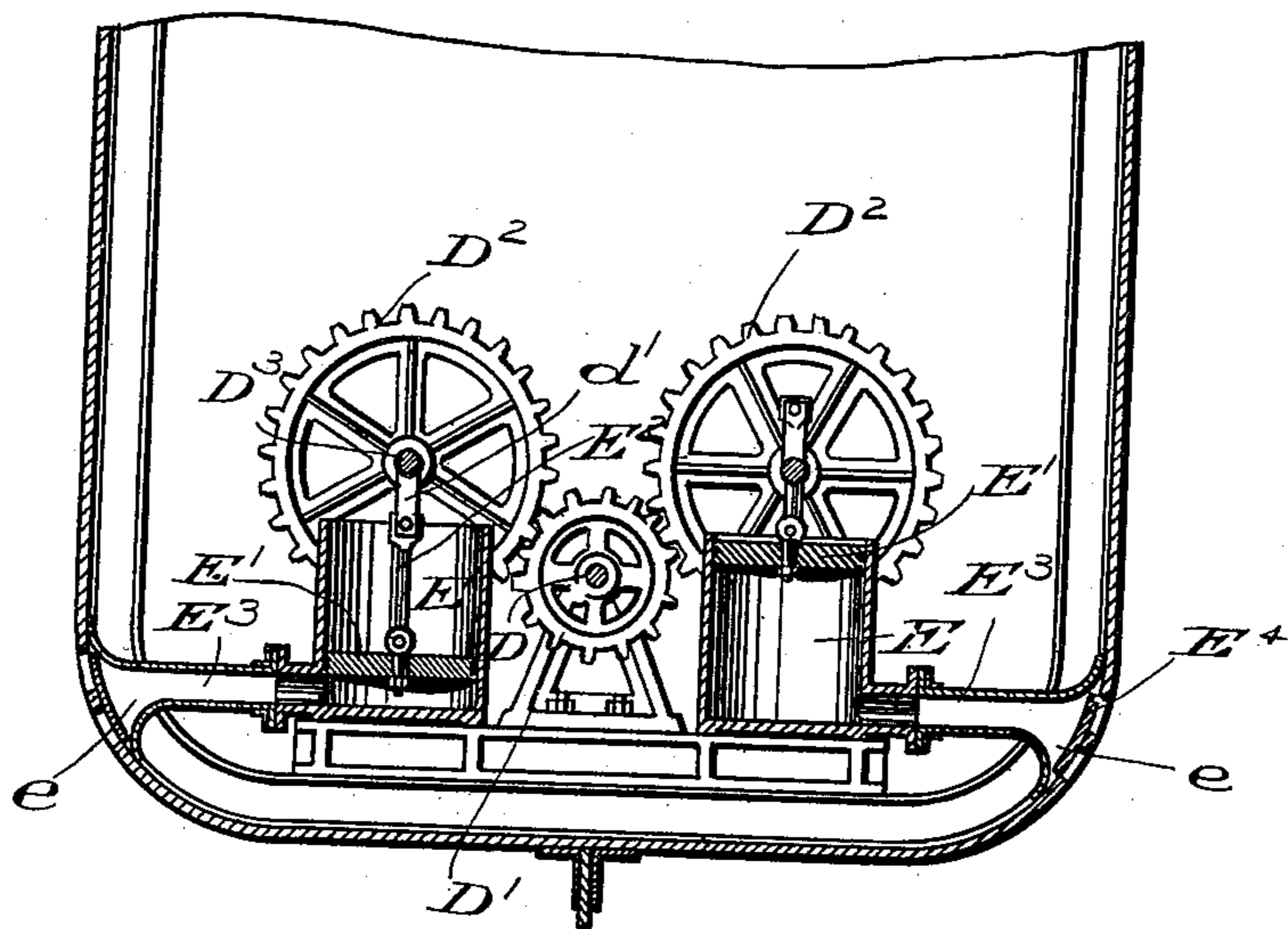
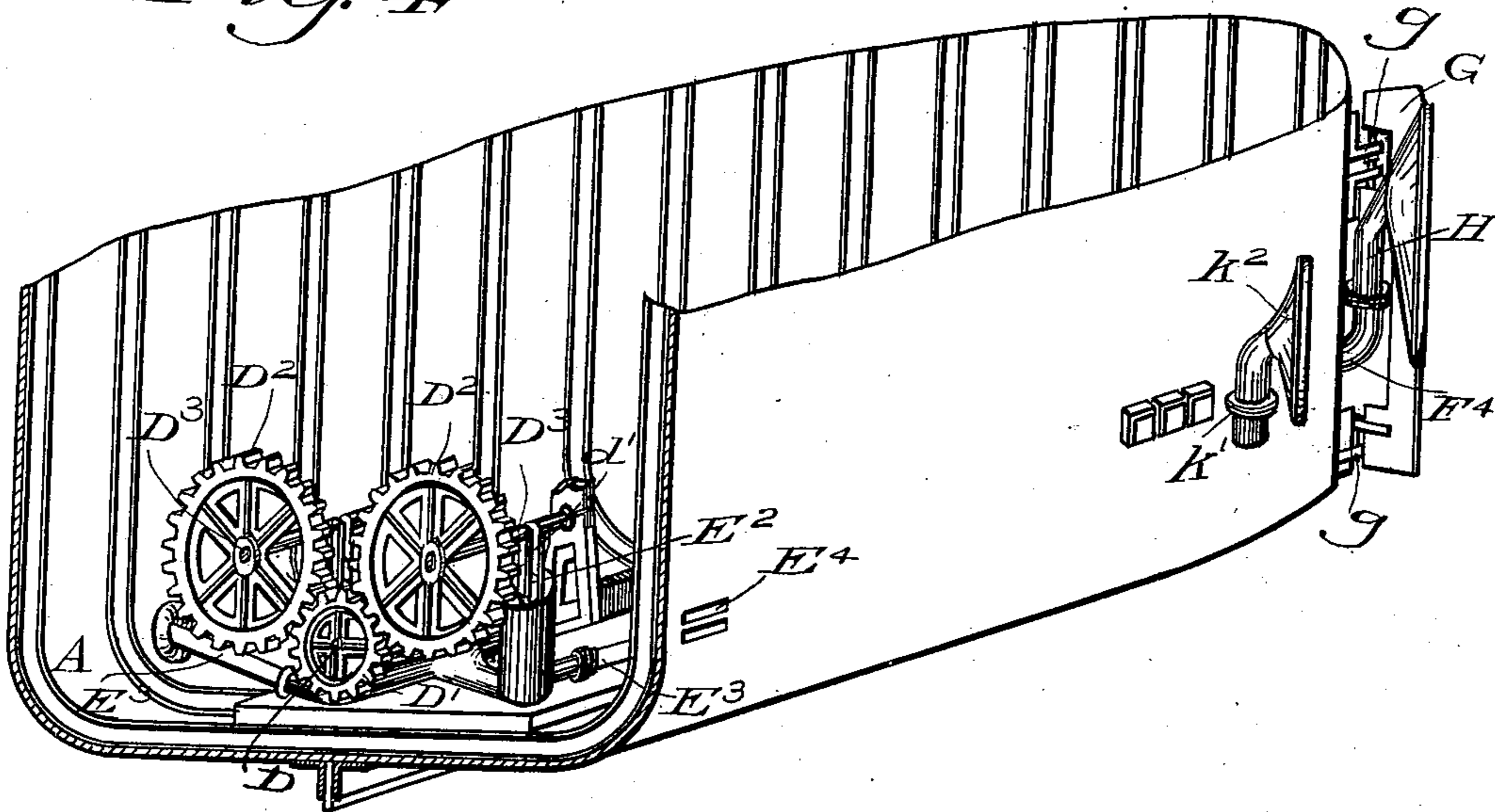


Fig. 4



Witnesses

B. Krueper
C. H. Zabler

Inventor
Friedrich Krefft

By his Att'y. *O. P. Reichelt*

UNITED STATES PATENT OFFICE.

FRIEDRICH KREFFT, OF BERLIN, GERMANY.

HYDROSTATIC VESSEL PROPELLING AND STEERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 602,224, dated April 12, 1898.

Application filed September 28, 1896. Serial No. 607,246. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH KREFFT, a subject of the Emperor of Germany, and a resident of Berlin, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Hydrostatic Vessel Propulsion and Steering Apparatus, of which the following is a specification.

My invention relates to certain improvements in means and apparatus for propelling vessels in which the water is drawn into the vessel and then driven out by a steam-pump.

Heretofore certain practical difficulties were met with in the operation of the apparatus employed. It was found difficult to manage the vessel, and the outflow of water from fixed nozzles or apertures would interfere or counteract the force of the rudder.

The object of my invention is to provide a vessel with a hydrostatic vessel-propulsion apparatus which will draw the water through the sides of the vessel and discharge it at the stern end thereof either in the central line or at either side thereof.

My invention consists in certain constructions, combinations, and arrangements of parts to facilitate the above-named and other objects, which will hereinafter more fully appear.

In the accompanying drawings, which illustrate my invention, Figure 1 is a sectional plan of the rear end of a vessel provided with my improved apparatus; Fig. 2, a vertical longitudinal section in line xx of Fig. 1; and Fig. 3, a transverse section in line yy of Fig. 1 through the pumps, looking forwardly. Fig. 4 is a perspective view of the hull, showing the pump-cylinder gear-wheels and the discharge-pipe.

The hull A of the vessel may be built in any well-known or preferred manner and supports the frame B of a steam-engine C amidships, the driving-shaft D of which carries a gear-pinion D' , which engages upon either side with spur gear-wheels D^2 upon shafts D^3 , adapted to revolve in bearings d , bolted securely to the said bed-plate. Pump-cylinders E , fitted with pistons E' , driven by pitmen E^2 from cranks d' of shafts D^3 , serve to operate the twin single-acting pumps at each side of the vessel. Water-induction pipes E^3 connect each pump-cylinder separately with ap-

ertures e , covered by valves E^4 , opening inwardly upon opposite sides of the vessel, and discharge-pipes F connect each of said pump-cylinders with a Y -section F' of a main discharge-pipe F^2 , which latter extends centrally and longitudinally to the stern end of the vessel.

A valve F^3 at the junction of the Y -section F' is hinged upon a pin f thereon and prevents the backflow of water to the pump-cylinders from the discharge-pipe F^2 , and the outer end of the discharge-pipe is turned upwardly or provided with an elbow F^4 , axially coincident with the hinges g of a rudder G , and is connected by a stuffing-box f' with the lower end of a discharge-spout H , the upper end of which is made fan-shaped and is secured to and constitutes a part of the rudder G to swing therewith and discharge the water of propulsion from the pumps in a sheet, which may be turned in any required direction and will serve not only to propel but direct and steer the vessel with great force in any required direction. When the rudder has been placed at the required angle, the stream of water issuing constantly from it will with an uninterrupted force act in the same direction and without the backlash of the rudder effect the movement of the vessel in any required direction with great rapidity. This result is also greatly augmented by shutting off the water to the pumps from one side, thus allowing the vessel to move with less displacement or pressure of water against its moving side.

The discharge-pipe F^2 has two curved branch discharge-tubes I , one at each side thereof, which are connected at their ends to the stern of the vessel upon each side of the rudder and through which apertures therein open communication from the said pipes to the free water at the stern of the vessel, the water discharged therefrom serving to aid materially in the propulsion of the vessel. The discharge-tubes I each have a valve I' , which may be closed when the vessel is backing and may be opened separately to assist in steering the vessel. Supplemental discharge and backing tubes K extend at an angle rearwardly from the discharge-pipe F^2 back of the discharge-tubes I and have upturned ends outside the shell of the vessel, which are con-

5 nected by stuffing-boxes k' with the pipes of
 fan-shaped discharge-spouts k^2 . The latter
 may have suitable gear-wheels connected to
 suitable pinions and shafts, which may be op-
 10 erated from the deck or from the interior of
 the vessel to move said discharge-pipes, as in
 the rudder discharge-spout H, to aid in steer-
 ing the vessel. The spouts k^2 may be turned
 forwardly to discharge the water toward the
 15 bow of the vessel, and thus provide means for
 the backward as well as for the forward prop-
 ulsion of the vessel. The spouts k^2 will serve
 effectively to aid in steering the vessel, as
 well as for propelling it.

15 It is evident that the several parts of the
 apparatus herein described may be employed
 for steering purposes or for auxiliary propul-
 sion in connection with the ordinary mechan-
 20 ical means driven by steam, such as paddle-
 wheels and screw-propellers, and that electric
 pumps or steam vacuum-pumps may be used
 instead of the steam-engine connections here-
 in described.

25 War vessels thus constructed are practi-
 cally safe from being totally disabled and
 may be handled most effectively in close quar-
 ters. Submerged vessels and torpedo-boats
 may be fitted with propelling-pumps operated
 by electricity, and ferry-boats thus construct-

ed may be easily operated by a cable-conduit 30
 and trolley properly supported.

The rudder may be operated by steam or
 other suitable gearing and holds the hollow
 fan-shaped discharge-nozzle pivoted coinci-
 35 dently therewith in a secure manner to swing
 it from side to side to enable it to resist ef-
 fectively the entire propelling power of the
 apparatus should it be required, and thus
 hold the vessel under complete control.

I claim as my invention and desire to secure 40
 by Letters Patent—

A vessel propelling and steering apparatus,
 comprising a pump-cylinder, a water-induc-
 tion pipe, a rudder-blade pivotally supported
 in the usual manner to the stern of the ves- 45
 sel, a discharge-pipe and a fan-shaped rud-
 der discharge-nozzle journaled to the outer
 end of the discharge-pipe by flexible joints
 coincident with the pivotal axis of the rud-
 der-blade, substantially as described. 50

In testimony that I claim the foregoing as
 my invention I have signed my name in pres-
 ence of two subscribing witnesses.

FRIEDRICH KREFFT.

Witnesses:

WM. HAUPT,
 HENRY HASPER.