G. W. Fulton.

Hydraulic Propeller.

No. 4,716. Patented Aug. 26, 1846.

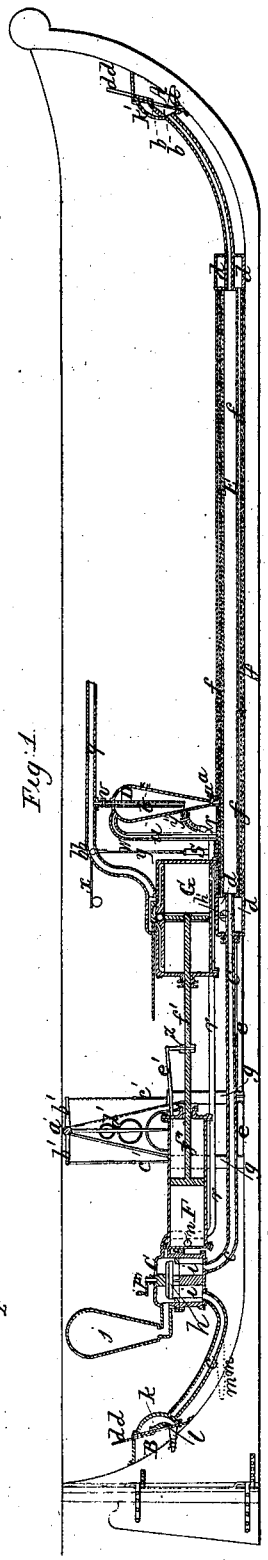

Fig. 1.

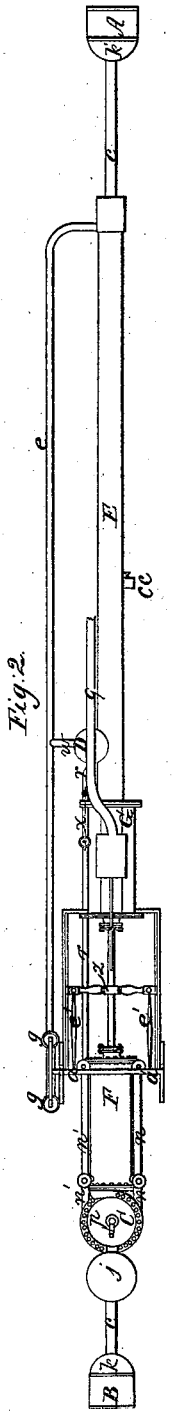

Fig. 2.

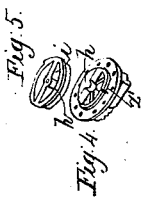

Fig. 4

Fig. 5.

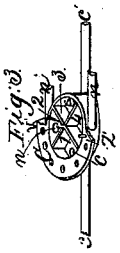

Fig. 3

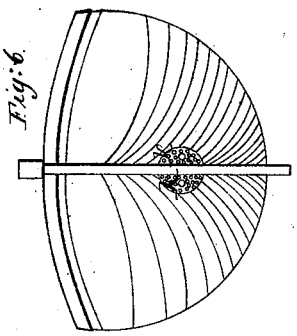

Fig. 6.

UNITED STATES PATENT OFFICE.

GEORGE W. FULTON, OF BRAZORIA COUNTY, TEXAS.

IMPROVEMENT IN PROPELLING VESSELS.

Specification forming part of Letters Patent No. **4,716**, dated August 26, 1846.

To all whom it may concern:

Be it known that I, GEORGE W. FULTON, of the county of Brazoria and State of Texas, have invented sundry new and useful improvements in the manner of propelling vessels by a current of water drawn in at the bow and forced out at the stern by the power of steam, and in connection therewith an improved manner of condensing the escape steam from the engine and supplying the boilers with pure distilled water; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making a part of this specification.

Figure 1 is a vertical longitudinal section through the center of a steam-engine, double-acting force-pump, still-water pipe, condenser, &c., as I arrange them in the hold of a vessel. Fig. 2 is a top view of the same, detached from a vessel. Figs. 3, 4, and 5 are perspective views of a water-chamber C, by which I connect the main water-pipe leading from bow to stern with the force-pump. Fig. 6 is an end elevation of the stern of a vessel showing gratings, &c.

The steam-engine G and double-acting force-pump F employed by me are constructed and operate in the usual manner. Their pistons *f* are connected to each other, causing the pump to be acted upon by the direct reciprocating motion of the engine.

In the bow of a vessel, below the water-line, I secure a water-tight chest A, from the front of which apertures pass out through the planking of the vessel each side of the cut-water for the free admission of water. These apertures are protected by gratings K for preventing any foreign substances that may be in the water from entering the water-chest. In the rear of the water-chest A is a smaller water-tight chest *k'*, which communicates with the main forward chest by a valve *b* opening rearward into the rear chest *k'*. There are conical tubes *a* passing from the rear chest *k'* through the main forward chest and out through the bow on both sides of the cut-water, or may be carried out directly from the water-pipe *c'*, as represented by the dotted lines *a a*. The water-pipe *c'*, passing along the bottom of the hold of the vessel by the side of the keel or on the top of the same from the bow to the force-pump, communicates with the rear water-chest *k'*. When a vessel is propelled by the power of the force-pump the water is drawn through the pipe *c'* from the chest A through the valve *b* to the force-pump, and forced out through the pipe *c* at the stern. When the motion is reversed and it is desired to back the vessel, the valve *b* closes and the water is drawn in at the stern and forced out at the bow through the conical tubes *a*. The after part of the water-tube *c*, leading from the force-pump to the stern of the vessel, is connected to the stern in the same manner that the front end of the forward part of the pipe *c'* is to the bow of a vessel—viz., by two water-tight chests below the water-line—connected to each other by a valve *l*.

B is the main or after chest, and *k* is the forward smaller chest. *m* is a conical tube communicating with the smaller chest *k*, and passing through the main after-water chest B and out through the stern of the vessel. There are two conical tubes *m*, one passing through the stern-planking on each side of the rudder; or they may be carried directly from the pipe *c*, as represented by the dotted lines *m m*. There are apertures passing from the main water-chest B out through the stern of the vessel on each side of the rudder, protected by gratings.

When a vessel is propelled, the valve *l* is closed, and the propelling stream of water is forced out through the conical tubes *m* on either side of the rudder. When the vessel is backed, the valve *l* opens and the water is drawn from the main water-chest through the stern to the pump and forced forward and out at the bow, as before described. The forward and after parts of the water-pipe *c* are connected to the side pipes of the force-pump by means of the circular water-chamber C in such a manner that the pilot can reverse the motion of the water in the water-pipe from front to rear or rear to front, or can prevent a current of water from flowing through the pipe in either direction and partially shut off the steam from the engine by the action of a valve *h* in the chamber C without calling upon the engineer, as hereinafter set forth.

The chamber C is divided into four equal apartments, numbered 1, 2, 3, and 4. Apartment No. 1 is connected to the after part of the water-pipe *c*. Apartment 3 is connected

to the forward part of the water-pipe c'. Apartment 2 is connected to the induction side pipe n' of the force-pump, and apartment 4 is connected to the eduction side pipe n of the same.

In the center of the water-chamber C, at the intersection of the divisions of the apartments of the same, there is a projecting pin or axle v', upon which a semicircular valve h is secured and revolves. The valve h has a semicircular recess i secured to a ring of metal. The recess i exactly covers and connects two of the apartments of the water-chamber. The valve h can be turned so as to connect the forward portion of the water-pipe c with the induction side pipe of the force-pump and the after portion of the water-pipe c' with the eduction side pipe of the pump or the reverse, at will.

z' is a pin on the side of water-chamber for regulating the motion of the valve h when the valve is turned and arrives at its proper position for inclosing two of the apartments of the water-chamber. There are shoulders on the ring of the same, which strike against the pin z' and secure the valve in its proper position. The valve h revolves between the top of the divisions of the apartments of the water-chamber C and the cap which incloses the same.

P is a crank attached to the axle of the valve h, which passes through the center of the cap of the water-chamber. The valve h is placed under the direction of the pilot or steersman of the vessel in any convenient manner or by any means thought best. When the valve h is turned so as to embrace and connect the apartments 2 and 3, the induction-pipe n' of the force-pump is brought in connection with the forward part of the water-pipe c', and the eduction-pipe n of the pump is in connection with the after part of the water-pipe c, leading to the stern. Consequently the motion of the pump will draw the water in at the bow of the vessel through the forward part of the water-pipe and force it out at the stern through the after part of the water-pipe, thereby propelling the vessel.

When it is desired to check the headway of the vessel or reverse its motion, the valve is turned so as to embrace the apartments 1 and 2, which will connect the induction-pipe of the force-pump with the after part of the water-pipe c. The motion of the pump when the valve is thus arranged will draw the water in at the stern and force it out at the bow of the vessel. When the valve h is turned so as to half inclose the apartments 1 and 3, the forward and after portions of the water-pipe will be brought into communication with both the induction and eduction pipes of the force-pump at the same time, consequently there will be no propelling action caused by the currents of water in either part of the water-pipe. Water will be drawn in and discharged at both ends of the water-pipe c by the action of the pump, the one counteracting the effects of the other.

Steam is conveyed from the boilers to the engine through the pipe q, in the usual manner. The steam escapes from the engine through the aperture h' into the condenser d d, placed in an enlargement E of the forward portions of the water-pipe c'.

The condenser is composed of two chambers d d d d, united by small tubes f f, around which the water in the enlargement of the water-pipe circulates. The steam escapes into the after condensing-chamber, and is condensed in its passage from that to the forward chamber of the same through the condensing-tubes f f. The water of condensation is drawn out of the forward chamber of the condenser through the pipe e by the pumps g g, which convey the same to the boilers in the usual manner. The pumps g g are connected to the engine by the cross-head z, connecting-rod e', pendulum d', vibrating levers b' b', and rock-shaft a', in any well-known or usual manner.

D is a still for making up any deficiency of the condenser of pure distilled water for supplying the boilers. The bottom of the still is in the form of an inverted cone, and is connected with the enlargement E of the water-pipe c'.

a a is a stop-cock, through which any deposit made in the bottom of the still may be blown off.

Water for distillation is admitted to the still through the pipe r from the water-chamber C or air-vessel j'.

y' is a stop-cock for regulating the admission of water into the still.

The water in the still is evaporated by a jet of steam conveyed into the same through the pipe t from the steam-pipe q.

v is a stop-cock for regulating the admission of steam into the still through the pipe t.

u is a pipe for conveying the vapor from the top of the still into the condenser or pipe e, leading from the condenser to the pumps g g for supplying the boilers.

b b is the throttle-valve placed in the steam-pipe q, which is operated as follows: On the top of the pipe r, leading from the water-chamber C to the still, there is secured a short open cylinder s, the bottom of which communicates with the pipe r. In this cylinder a plunger is placed, which is attached to the lower end of the rod y. The upper end of the rod y is connected with the lever x of the throttle-valve b b in any convenient manner. As there is but a very small quantity of water permitted to flow from the pipe r into the still there will be great pressure of water in the pipe and cylinder s, when the engine and force-pump are in motion. This pressure raises the plunger in the cylinder s, attached to the rod y, which enlarges the opening in the throttle-valve b b and permits an increased quantity of steam to the engine

When the valve *h* is turned so as to partially connect both ends of the water-pipe *c* with both side pipes of the force-pump, as represented in Fig. 4, so that the pump will draw in water from both bow and stern water-pipes at the same time, and expel through both at the same time, causing the water to be nearly stationary in the water-pipe, there will be but little or no pressure in the pipe *r*. Consequently the rod *y* will fall in the cylinder *s* and allow the weight on the lever *x* to close the throttle-valve *b b*, thereby shutting off the steam from the engine. In this manner the admission of steam to the engine is perfectly self-governed and regulated to its wants and requirements and placed under the entire control of the pilot or helmsman, who can by the action of the valve *h* increase or diminish the quantity of steam admitted to the engine at will. In case a vessel should spring a leak from any cause, I can remove the water from the hold by the force-pump F, and propel the vessel by the water as it is discharged in the following manner, to wit: In the first place I close the communication between the front end of the main water-pipe *c* and the water-chest A in the bow of the vessel by closing in the orifice between the water-chests A and *k'* by a slide-valve *d d*. I then open a communication between the hold of the vessel and the main water-pipe *c* by opening a valve in the lateral pipe *c c*, communicating with the enlargement E of the same. The action of the force-pump F when thus connected with the main water-pipe *c* and the hold will remove the water from the hold of a vessel and discharge it at the stern.

Having thus fully described the construction and operation of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The manner in which I connect the main water-pipe *c* with the bow and stern through the medium of the double water-chests A *k* and B *k'* connecting valves *b* and *l*, apertures or strainers K K, and conical nozzles *a* and *m*, combined and operating substantially in the manner and for the purpose herein set forth.

2. The manner of reversing the current of water in the main water-pipe *c* from front to rear and from rear to front, and otherwise regulating the same while the engine and pump are in motion by means of the water-connecting chamber C and valve *h* combined and operating with the side pipes of the pump F, substantially in the manner and for the purpose herein set forth.

3. The manner of regulating and stopping the issue of steam through the throttle-valve *b b*, by means of the pipe *r*, cylinder *s*, and plunger-rod *y*, combined and operating with the water-chamber C and valve *k*, substantially as herein set forth.

G. W. FULTON.

Witnesses:
Z. C. ROBBINS,
H. H. SYLVESTER.