2 Sheets—Sheet 1.

J. EDSON.
Ship's Pump.

No. 201,336. Patented March 19, 1878.

Fig. 1.

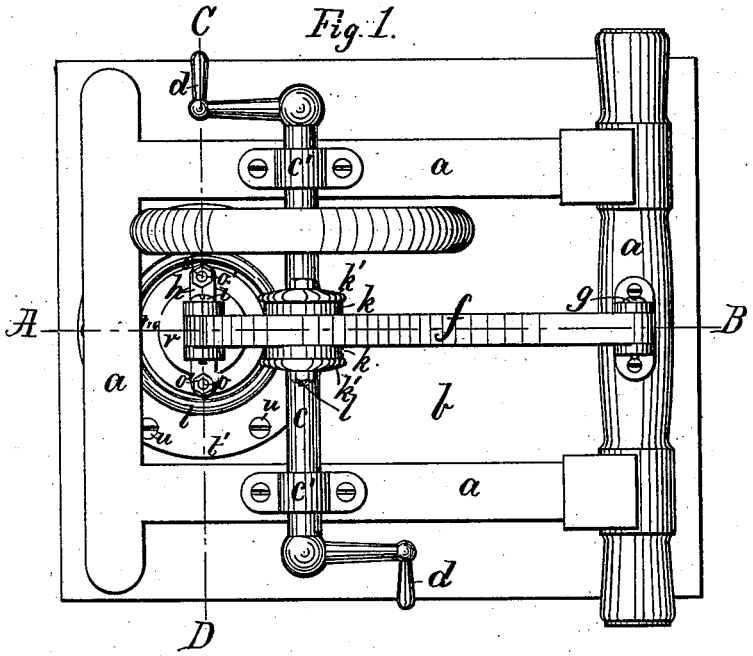
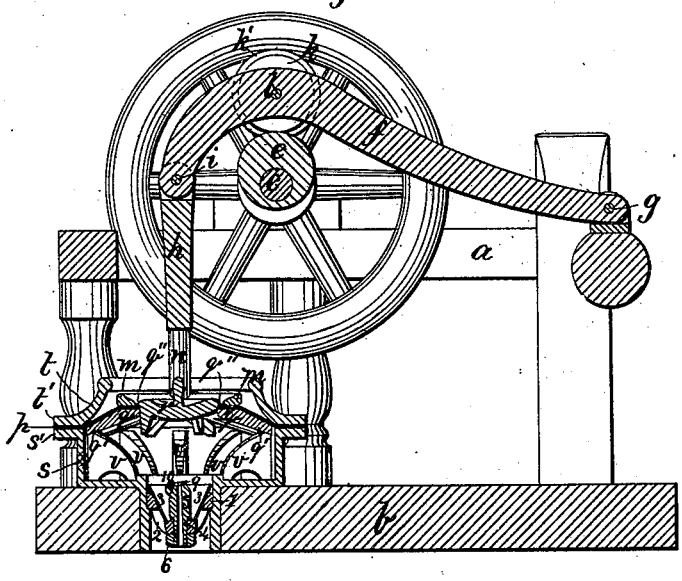


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

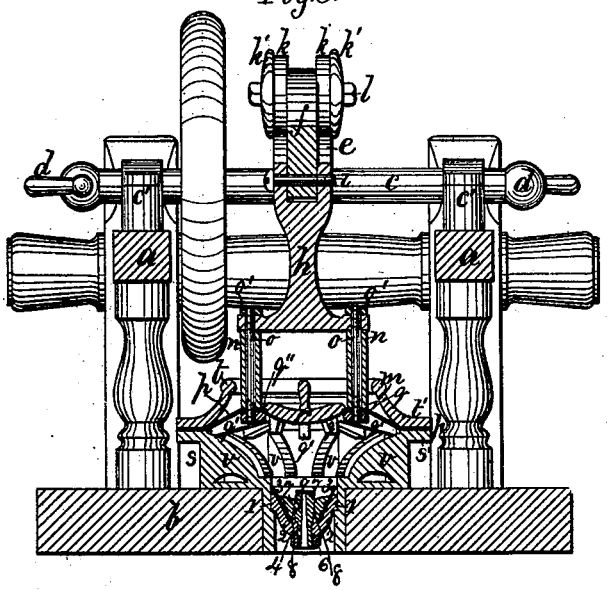


Fig. 4.

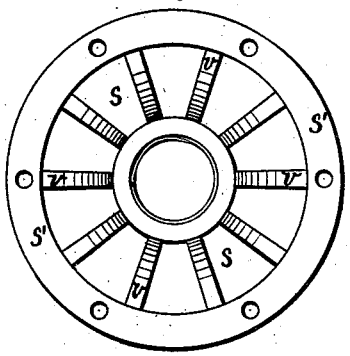


Fig. 5.

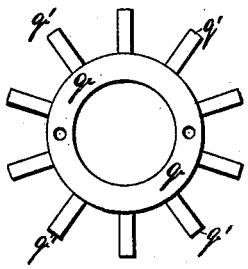


Fig. 6.

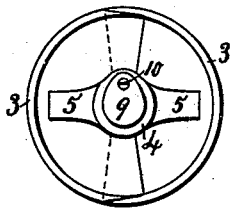
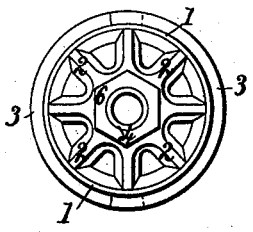


Fig. 7.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN SHIPS' PUMPS.

Specification forming part of Letters Patent No. **201,336**, dated March 19, 1878; application filed December 20, 1877.

To all whom it may concern:

Be it known that I, JACOB EDSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Ships' Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ships' pumps, and it is carried out as follows:

The pump is operated by means of a rotary shaft, provided with cranks or other driving mechanism, in the usual way. Upon the shaft is secured a cam or eccentric, upon which a pair of anti-frictional rollers are resting, and rotated as the cam is turned around its axis; and these rollers are made to rotate freely upon a pin or bolt inserted through a curved lever, one end of which is hinged to the frame of pump-fixture or other stationary part, and the other end of said curved lever is jointed to the pitman of the pump. The anti-frictional rollers, located upon the pin or bolt on two opposite sides of the aforesaid curved lever, are provided with flanges similar to railroad-car wheels, the flange of each roller projecting outside of the rotary cam or eccentric, by which arrangement the curved lever is prevented from moving sidewise in the direction of the axis of the rotary driving-shaft; and by so constructing a driving mechanism for pumps, they may be operated with very little power and without shocks or jars.

The pump is of that kind in which a flexible diaphragm is used instead of a piston, and it is constructed as follows:

The upper end of the suction-pipe is attached to the lower part of a chamber, having a detachable valve-box located therein, which valve-box consists of a number of sustaining-bars, forming an annular ring, projecting downward, for the conical packing that is located within the box, and which packing is held in place by means of a holding device, consisting of a headed bolt, having a screw-thread in its lower end, that projects through the bottom of the box, where it is provided with a screw-threaded nut. Steady-pins are fixed in the interior of the box, fitting into perforations of the holding-bolt, for the purpose of preventing it from turning around its axis when the holding-nut is turned off or on the lower screw-threaded part of the holding-bolt.

For the purpose of easily removing the said box from its place in the chamber, I provide it centrally with a handle or flat piece of leather, or suitable material attached in one part to the head of the holding-bolt, and located so as to cover a hole in the center of said holding device, by which the pump-chamber can easily be emptied of its contents by simply lifting up said handle, when the water in the chamber escapes downward through the suction-pipe, and the box can now be easily lifted upward, being relieved of the water-pressure.

The annular pump-chamber is open at the top, to which the flexible diaphragm is secured by means of an annular open ring or cover, that is bolted or otherwise secured to the flange of the pump-chamber. In the aforesaid pump-chamber a number of ribs are located, at the junction of the side and bottom of said chamber, for the purpose of sustaining the flexible diaphragm during its downward motion. In a similar manner and for a similar purpose I provided the ring, that is attached to the lower end of the pitman, with a number of ribs or bars, each one of which is located between the ribs of the pump-chamber, by which the flexible diaphragm is sustained during its upward motion. The inner surface of the said flexible diaphragm is secured between said ribbed ring and an upper ring, forming a part of the pitman, by means of suitable holding-screws, and an ordinary valve is arranged centrally to cover the open space in the center of the flexible diaphragm, which latter projects inward far enough to serve as a packed seat for the said valve, which packed seat is supported upon the annular lower ribbed ring that is attached to and made to move with the pitman, as the latter is set in motion by means of the rotary shaft, anti-frictional rollers, and curved lever.

On the accompanying drawings, Figure 1 represents a plan view of my improved pump. Fig. 2 represents a longitudinal section of the same. Fig. 3 represents a vertical cross-sec-

tion of the same, at a right angle to the one shown in Fig. 1. Fig. 4 represents a separate plan view of the annular pump-chamber. Fig. 5 represents a plan view of the ribbed ring, to which the inner part of the flexible diaphragm is secured. Fig. 6 represents a plan view of the box; and Fig. 7 represents a bottom view of said box.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a a a represent the frame-work of the pump, and *b* represents the deck or floor, to which the frame-work is secured in the usual manner. *c* represents the rotary driving-shaft, with its bearings *c' c'*, cranks *d d*, and cam or eccentric *e*. *f* is the curved lever, hinged in its rear end to the frame *a* by means of the hinge-pin *g*, and jointed in its forward end to the pitman *h* by means of the pin or bolt *i*, as shown. *k k* represent the anti-frictional rollers on two opposite sides of the curved lever *f*, located on a pin or bolt, *l*, inserted through said curved lever, around which pin or bolt the said anti-frictional rollers are made to turn freely when they are rotated by the cam or eccentric *e*. Said rollers are provided with flanges *k' k'* projecting on the outside of the cam *e*, by which the curved lever *f* is prevented from a lateral side motion during its up-and-down reciprocatory motion. *h* is the pitman, having a ring, *m*, in its lower end that is secured to the pitman by means of hollow ports *n n* and bolts *o o*, with screw-threaded nuts *o' o'*. *p* is the flexible diaphragm, having its inner edge secured firmly between the ring *m* and a secondary ring, *q*, provided on its under side with a number of ribs or sustaining-bars, *q' q' q'*, for the purpose set forth. The rings *q* and *m* are held together, with the flexible diaphragm between them, by means of the bolts *o o*, hereinbefore described.

The lower ring *q*, as well as the inner end of the flexible diaphragm *p*, projects farther toward the center than the ring *m*, by which a packed seat, *q''*, is provided for the valve *r*, as shown.

The outer circumference of the diaphragm *p* is confined between the flange *s'* of the pump-chamber *s* and the flange *t'* of the annular cover *t* by means of screw-threaded bolts *u u u*, as shown. *v v v* represent the sustaining-ribs connecting the side and bottom of the pump-chamber *s*, and these ribs are each located between each of the sustaining ribs or bars *q' q' q'* on the ring *q*, by which arrangement the flexible diaphragm is sustained and supported alternately on the ribs *q' q'* and *v v* during the up-and-down motion of the pitman.

The lower valve-box is fully shown in Figs. 6 and 7, in which 1 is the annular ring, with its tapering sustaining-bars 2 2 2.

3 3 represent the conical packing, preferably made in two parts, that overlap each other, as shown, which packing is held in its proper position within the box by means of the holding-bolt 4, having a tapering head, 5, in its upper end, and provided in its lower end with a screw-threaded nut, 6, as shown, by which the packing is held firmly in position. 7 7 represent the steady-pins in the inside of the valve-box, which pins are made to fit in the recesses 8 8 on the under side of the head 5, for the purpose set forth. The holding-bolt 4 is shown as being hollow from end to end, and provided in its upper end with the valve-handle 9, by means of which the said box can easily be lifted out of the pump-chamber, when required. The handle 9 is attached in one of its ends to the head 5 by means of a pin or screw, 10, as shown.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent, and claim—

1. The herein-described pump-driving mechanism, consisting of the curved lever *p*, with its pin or bolt *l* and anti-frictional rollers *k k*, the rotary shaft *c*, with its cam or eccentric *e*, located between the fulcrum *g* and pump connecting-rod *h*, substantially as and for the purpose set forth.

2. In combination with the flexible diaphragm *p*, the pump-chamber *s*, with its ribs *v v v*, the holding-ring *q*, with its bars or ribs *q' q' q'*, as and for the purpose set forth.

3. The holding-ring *q*, with its supporting-bars *q' q' q'*, the flexible diaphragm *p*, having its inner edge *q''* projecting inside of the ring *m*, and resting upon the ring *q*, in combination with the valve *r*, as and for the purpose set forth.

4. The herein-described box consisting of annular ring 1, sustaining-bars 2 2 2, and the conical packing 3 3, as and for the purpose set forth.

5. The combination of the annular ring 1, sustaining-bars 2 2 2, conical packing 3 3, and the holding-bolt 4 with its head 5, nut 6, and steady-pins 7 7, with their recesses 8 8, as and for the purpose set forth.

In testimony that I claim the foregoing as my own invention I have affixed my signature in presence of two witnesses.

JACOB EDSON.

Witnesses:
ALBAN ANDRÉN,
HENRY CHADBOURN.