

(No Model.)

DE WITT C. KING & R. A. BOUTILIER.
FOG SIGNALING APPARATUS.

No. 546,163.

Patented Sept. 10, 1895.

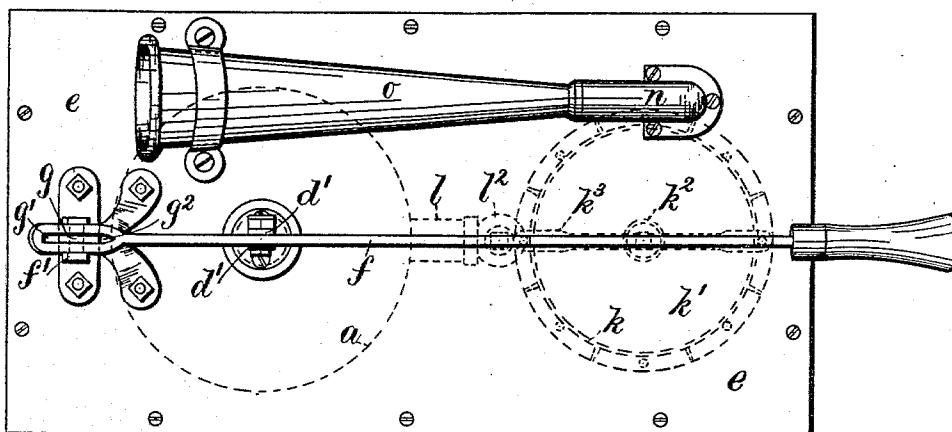


Fig. 1.

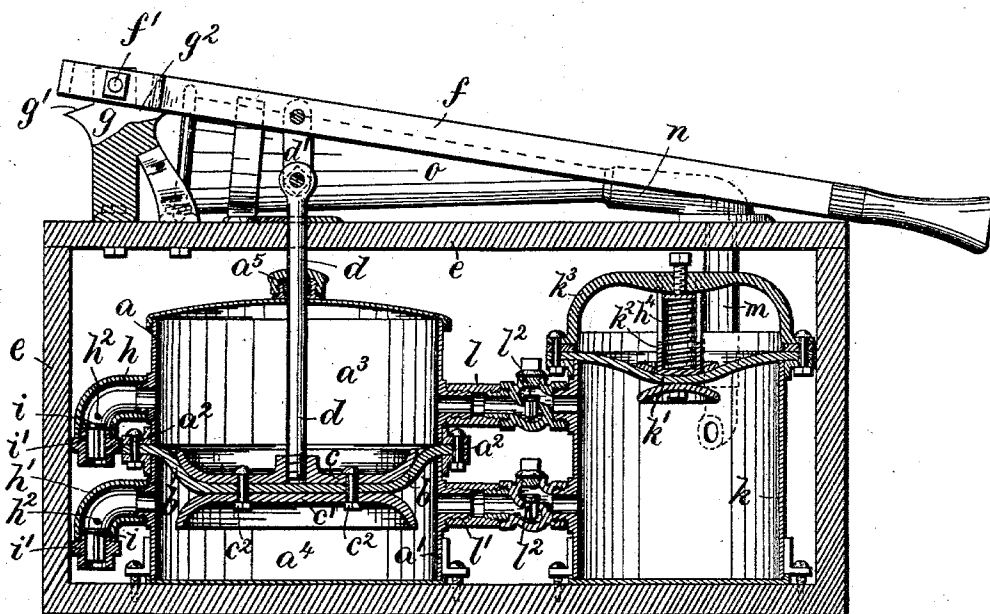


Fig. 2.

Witnesses

Charles H. Jones.

May F. Fuller.

Inventors

De Witt C. King

and

Robert A. Boutillier

by
Henry Chadbourne
their Atty.

UNITED STATES PATENT OFFICE.

DE WITT C. KING AND ROBERT A. BOUTILIER, OF BOSTON, MASSACHUSETTS,
ASSIGNORS TO THE EDSON MANUFACTURING COMPANY, OF SAME PLACE.

FOG SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 546,163, dated September 10, 1895.

Application filed November 30, 1894. Serial No. 530,366. (No model.)

To all whom it may concern:

Be it known that we, DE WITT C. KING and ROBERT A. BOUTILIER, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Fog-Horns to be Sounded by Mechanical Means; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in fog-horns to be sounded by mechanical means and adapted to be used on vessels, and more particularly to that class of fog-horns in which the horn is sounded by working a suitable handle or lever, which lever operates a suitable air-pump forcing air into an air-storage chamber from which it is supplied to the horn.

The object of the invention is to produce a simple, compact, and efficient device, one easily repaired and not liable to get out of order.

The invention consists of improvements in the air-pump, the air-storage chamber, the connections between said parts, and in minor details of construction, as will be fully described hereinafter.

Heretofore in fog-horns of this class the air-pumps have been provided with pistons requiring frequent renewal of the packing in said pistons; and the connections between the pump-cylinder, the air-storage cylinder, and the horn have been made by lead, tin, or other metal pipes soldered in their places, which required the services of a tinsmith when they needed repairs and therefore rendered useless if broken while a vessel was at sea. On account of the rigid nature of the material used for such connections and the hard usage they receive such connections are very liable to become leaky at the joints and therefore useless. Thus the primary object of our invention is to overcome these objections.

The invention is carried out substantially as shown on the accompanying drawings, in which—

Figure 1 represents a plan view of our improved fog-horn. Fig. 2 represents a central

longitudinal section through the air-pump, the air-storage chamber, and the casing which surrounds said parts.

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

The air-pump cylinder is made with an upper portion *a* and a lower portion *a'*, joined together by means of suitable flanges on said portions and screws or bolts *a²*, which pass through said flanges, or they may be joined in any other suitable manner. An internal chamber *a³* is contained within the upper portion *a*, and a similar internal chamber *a⁴* is contained within the lower portion *a'* of the air-pump cylinder. A flexible concaved diaphragm *b* separates the two internal chambers, the concaved side of said diaphragm preferably being toward the upper chamber. This diaphragm is held by its edge between the flanges on the upper and lower portions of the pump-cylinder.

Convex plates *c* and *c'* are secured respectively to the upper and under sides of the diaphragm *b* by means of the bolts *c²* *c²*, substantially as shown, and for the purpose of supporting said diaphragm during its operations, as will be described hereinafter. To the plate *c* is secured the pump-rod *d*, which extends upward through a stuffing-box *a⁵* in the head of the upper portion of the pump-cylinder and through the top of the outer casing *e*. The upper end of the rod *d* is connected to the operating handle or lever *f* by means of the link or links *d'*. This handle or lever is fulcrumed at *f'* to the bracket or standard *g*, which standard is secured to the top of the casing *e*, and is provided with the surfaces *g'* and *g²*, which limit the movements of the lever in either direction.

The upper and lower portions of the pump-cylinder are provided, respectively, with the inlets *h* and *h'*, which inlets are each provided with the check-valve *i*, having its seat upon the upper end of the thimble *i'*, screwed into the inlet, substantially as shown, said valves being limited in their movement up from their seat by means of the bar *h²* extending across the inlets, substantially as shown. By con-

structing the valves *i* as described and shown on the drawings they are made at a very low cost and are easily removed and replaced.

An air-storage cylinder *k* is contained within the casing *e* and is in communication with the upper and lower chambers in the pump-cylinder respectively by means of the tubes *l* and *l'*, each tube being provided with the check-valve *l²* to prevent air from returning to the pump-cylinder from the air-storage cylinder after it has passed the check-valve. Thus it will be seen that the air-pump is a double-acting pump causing the drawing and forcing of air by either movement of the handles or lever *f*, and when the lever is moved upward and downward on its fulcrum it will cause the diaphragm *b* to raise and lower, which action will cause air to alternately enter the chambers in the pump-cylinder through the inlets *h* and *h'* and be discharged into the air-storage cylinder *k* through the tubes *l* and *l'*, the check-valves *l²* and *l'²* preventing the return of the air.

A tube *m* extends from the air-storage cylinder to a casting *n*, screwed on the casing *e*, and the horn proper *o* is secured to said casting, being screw-threaded on its end and screwed into a screw-thread in the casting, which screw-thread, however, is not shown in the drawings. The tube *m*, casting *n*, and horn *o* form an outlet for the air from the storage-cylinder, said outlet being open at all times. Thus it will be seen that when air is forced into the air-storage cylinder under pressure it will escape through the horn and cause the horn to be sounded.

In order to cause an uninterrupted blast of the horn the air-storage cylinder *k* is provided with the concaved flexible diaphragm *k'*, secured at its edge to the flange on the cylinder. To the upper side of the diaphragm *k'* is secured the tubular post or projection *k²*, which projection is slotted and extends upward on either side of the yoke *k³*, secured to the top of the cylinder *k*. A spring *k⁴* is placed within this tubular projection and a plate *k⁵* rests upon the spring. A screw is screwed through the yoke *k³* and presses against the plate *k⁵*, causing the spring within the tubular projection to exert a pressure on the diaphragm, which pressure is adjusted by means of the screw.

As the capacity of the air-pump is greater than the amount of air which can escape through the tube *m* and the horn, air will be stored within the cylinder *k* and a continuous movement of the lever *f* will cause sufficient air to be supplied to the cylinder *k* to cause a pressure in said cylinder, which will raise the diaphragm against the spring-pressure exerted thereon. This will cause a continuous blast of the horn.

The tubes *l l'* and *m* are preferably made of rubber hose or other flexible tubing and forced over suitable thimbles secured to the parts

with which the tubes are to communicate, so that they may be easily removed and renewed at low cost; also, by making the air-pump cylinder in two portions, joining them together by screws or bolts and the diaphragm held between such portions, said diaphragm is easily removed for repairs. The same is the case with the diaphragm for the air-storage cylinder. Thus it will be seen that when any part of our improved horn which is liable to be injured is injured it can easily be replaced by a perfect part at small expense without employing skilled labor to do it.

Having thus fully described the nature, construction, and operation of our invention, what we wish to secure by Letters Patent and claim is—

1. In a fog horn to be sounded by mechanical means, an air pump having an upper flanged casing, a lower flanged casing, valved inlet and outlet for each casing, a flexible diaphragm held between the flanges on said casings forming upper and lower chambers therein, an operating rod attached to said diaphragm and projecting upward through the upper casing, and an operating lever attached to said rod to operate said diaphragm to cause air to enter said chambers and to be forced therefrom, combined with an air receiving cylinder in communication with the outlets from the pump chambers having a spring pressed flexible diaphragm, and a horn connected to and in open communication with the air receiving cylinder, for the purpose set forth.

2. In a fog horn to be sounded by mechanical means, an air pump, a horn and connections between the pump and horn combined with an air storage chamber within said connections having a flexible diaphragm, a yoke above said diaphragm, a slotted tubular projection on the diaphragm extending on either side of the yoke and a spring interposed between the diaphragm and yoke for the purpose set forth.

3. An air storage cylinder having inlet and outlet, an air supply communicating with the inlet, a flexible diaphragm, a yoke above said diaphragm, a slotted projection on the diaphragm extending on either side of the yoke and a spring interposed between the diaphragm and yoke, for the purpose set forth.

4. In a fog horn to be sounded by mechanical means, an air storage cylinder having a flexible diaphragm, a yoke above said diaphragm, a slotted tubular projection on the diaphragm extending on either side of the yoke and a spring interposed between the diaphragm and yoke, combined with an air supply, a horn and connections between the air storage cylinder and the horn and air supply for the purpose set forth.

5. In a fog horn to be sounded by mechanical means, an air storage cylinder having a flexible diaphragm, a yoke above said dia-

phragm, a slotted tubular projection on the diaphragm extending on either side of the yoke, a spring interposed between the diaphragm and yoke and a screw adjustable
5 within a perforation in the yoke and acting upon said spring to vary the amount of pressure exerted on the diaphragm by said spring, for the purpose set forth.

In witness whereof we have hereunto signed our names, in the presence of two subscribing witnesses, this 21st day of November, 1894.

DE WITT C. KING.

ROBERT A. BOUTILIER.

In presence of—

HENRY CHADBURN,

HERBERT L. CHAPIN.