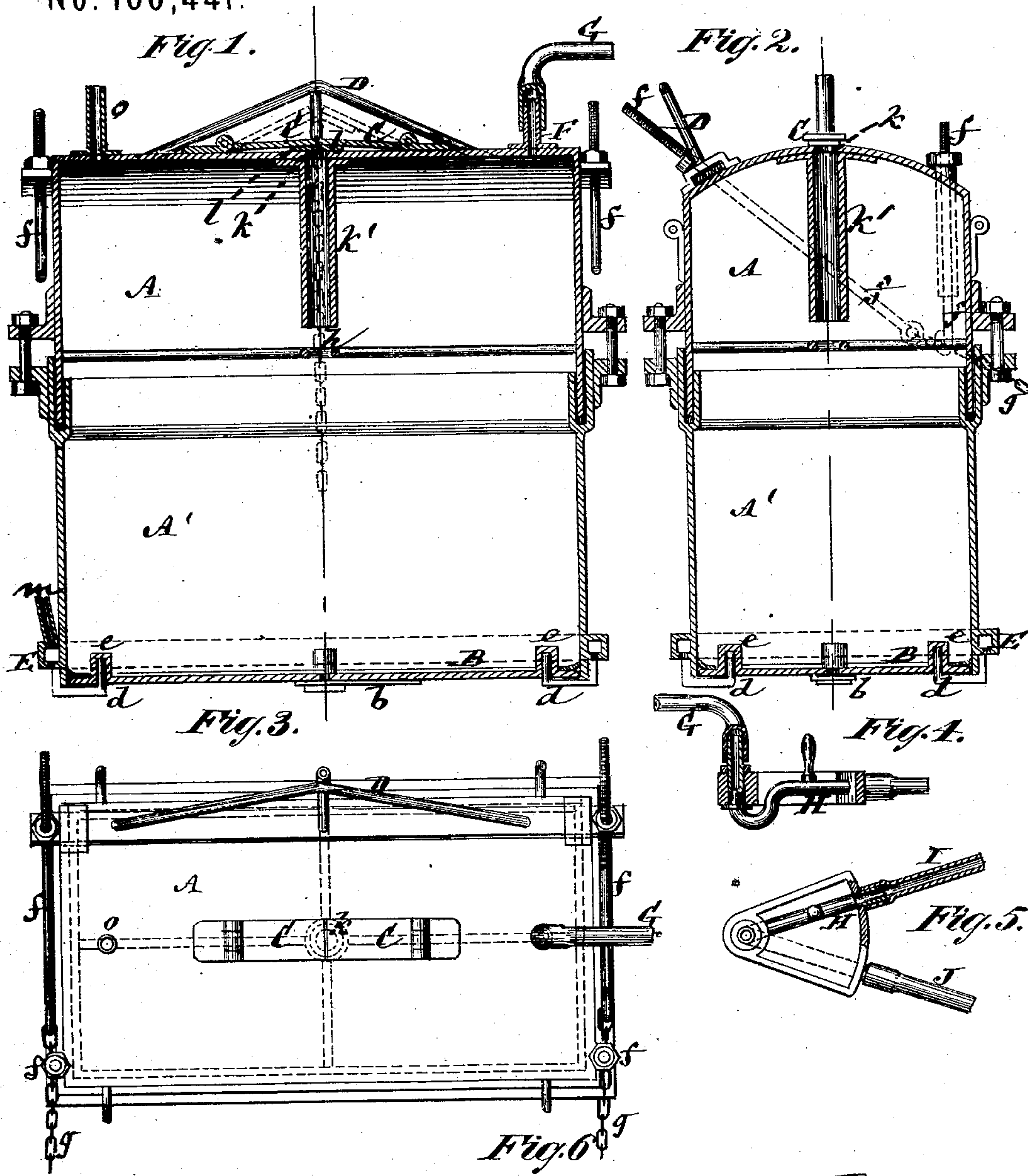


H. F. KNAPP.

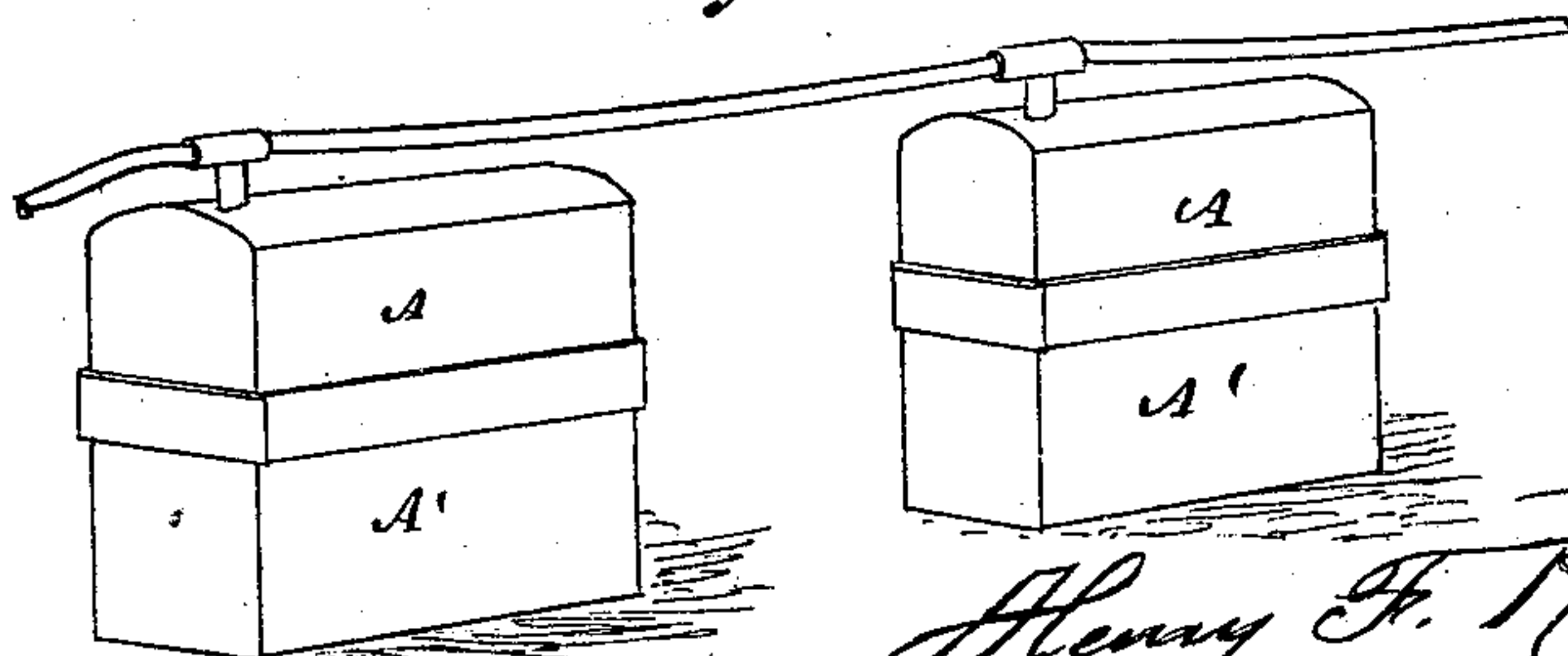
Means for Raising Sunken Vessels, &c.

No. 160,441.

Patented March 2, 1875.



Witnesses  
*John Becker*  
*Fred. Haynes*



*Henry F. Knapp*  
*by his Attorneys*  
*Brown & Allen*



# UNITED STATES PATENT OFFICE.

HENRY F. KNAPP, OF NEW YORK, N. Y.

## IMPROVEMENT IN MEANS FOR RAISING SUNKEN VESSELS, &c.

Specification forming part of Letters Patent No. **160,441**, dated March 2, 1875; application filed May 12, 1874.

*To all whom it may concern:*

Be it known that I, HENRY F. KNAPP, of the city, county, and State of New York, have invented an Improvement in Means for Raising or Floating Wrecks and Stranded or Sunken Vessels, of which the following is a specification:

This invention relates to that method or means for raising or floating wrecks and stranded or sunken vessels described in Letters Patent No. 148,714, which were issued to me March 17, 1874, and in which what I term hydro-pneumatic jacks having full open bottoms are used, said jacks being sunk or deposited alongside the vessel, with the edges of their full open bottoms resting on the sand or mud, and the air or water being exhausted from them to insure the projection of the jacks into the sand, and so that, after the same have been suitably secured by lifting devices to the wreck or vessel, they are made to lift the latter by air being compressed or forced into the jacks, which, at least in their early operation, have the sand or mud for their fulcrum or necessary resistance.

This invention consists in a novel construction of the hydro-pneumatic jacks with a rising and falling or movable bottom to prevent the escape of compressed air within the jacks through the sand or mud on which they rest when lifting; also to prevent the escape of air when floating or carrying the wreck in a rough or undulating sea. Said movable bottom may be provided with a relief or safety valve.

The invention also consists in the construction of the jacks in upper and lower sections, bolted or clamped to each other externally, and the one or both of which may be used accordingly as it is required to operate in shoal or deep water.

The invention furthermore consists in a combination, with the movable jack-bottom, of under supports and pins or guides operating to brace the sides of the jack.

Again, the invention consists in a combination, with the jacks or tube connected therewith, of a slide-valve constructed to alternate communication, as described, with the exhaust and inlet branches or hose attached to the operating-pump, for the purpose of chang-

ing the direction of the current to and from the jacks.

The invention also embraces a perforated water-distributor arranged around the bottoms of the jacks, for the purpose of softening the sand or mud to facilitate the embedding of the jacks.

In the accompanying drawing, which forms part of this specification, Figure 1 represents a longitudinal sectional elevation of a double or two-section jack having my improvements applied to it. Fig. 2 is a transverse vertical section of the same. Fig. 3 is a plan thereof. Fig. 4 is a side sectional view of the slide-valve used to change the direction of the current through the jack. Fig. 5 is a plan of the same. Fig. 6 is a diagram in illustration of a mode of working a series of jacks by means of a hose or tube common to all.

A A' is the jack, made in sections, the one arranged above the other; but the single upper section A only may be used, if desired, accordingly as it is required to operate in shoal or deep and smooth or rough water; but when the two sections A A' are used, then the same are connected externally by clamps or screw-bolts and packing, substantially as represented in Figs. 1 and 2 of the drawing. Said jack is fitted with a loose or rising and falling bottom, B, which, when the jack is sunk or deposited to its place, rests on the sand or mud, while the edges of the jack cut or enter into the sand, and which prevent the air compressed into the jacks from escaping through the sand or mud when the jacks are making the lift; also prevent the air from escaping through the water when the jacks are floating or carrying the wreck in a rough sea.

Said movable bottom B may be fitted with a safety-valve, *b*, controlled by a spring or otherwise, to provide for any escape of compressed air over and above the pressure the jacks are calculated to bear. Likewise it is desirable to combine with the movable or rising and falling bottom B under supports and pins or projections *d* attached to the body of the jack, and arranged to enter pockets *e* in the bottom B, whereby the movable bottom is not only sustained when the jack is charged with compressed air, but the sides of the jack



are braced by the pins or projections *d* hooking or fitting into the pockets *e*. Attached to the jacks at their sides or ends are adjustable screw tugs or bolts *f*, provided with eyes, through which the lifting-chains *g* pass, said adjusting devices preferably being arranged vertically and obliquely at both or opposite ends of each jack.

By means of these adjustable screw-tugs or bolts increased facility is afforded for manipulating the lifting chains or cables, and for equalizing or properly distributing the weight or lifting strain thrown upon the jacks.

For operation, in combination with these outside lifting-chains *g*, or even alone in deep water, there may be used an internal or central lifting-chain, *h*, arranged to pass through a hole, *k*, in the lid or cover of the jack, and it may be through a downwardly-extending socket, *k'*, but which passes through a hinged or otherwise suitably-constructed clamp, *C C*, provided with rubber or other water-tight packings *l l*, and which, as draft is made upon the chain *h* in a downward direction to effect the lift, causes the clamp and their packings to hermetically close or seal the hole *k*, but which, on a reverse action or adjustment of the chain *h* taking place, readily admits of said chain being drawn up through or between the clamp *C C*, which acts, in a measure, like the socket *k'*, to prevent the escape of air from inside of jacks when making the lift.

*D* is a removable brace-lift, for dividing the strain when the jacks are used in raising or floating the wreck. *E* is a perforated water-distributor, arranged around the bottoms of the lifting-jacks, and connected with a pump above by means of a pipe, *m*, for the purpose of softening the sand or mud, in which the jacks are required to be embedded, to facilitate the embedding of the same. *F* is the pipe, with attached hose *G*, by which the air is alternately exhausted and compressed into the jack, the several jacks used to effect a lift either being connected by branches *o* and connecting hose, or by a general hose communicating with the several jacks, as represented

in Fig. 6. Connected with the hose *G*, by which the exhausting or forcing current is transmitted to or from the jacks, is a vibrating or oscillating tubular slide-valve, *H*, capable of adjustment by hand, so as to establish connection either with the inlet-pipe or hose *I* of the pump used to work the jacks, or the exhaust-pipe or hose *J* thereof, thus providing in a very simple manner for the exhaustion of the jacks and compression of the air therein to produce a lifting force, as required.

When the water is not over twenty-five feet depth, or thereabout, a steam-jet injector or ejector may be substituted for the pump to operate the jacks.

When the jacks are used to lift a vessel entirely out of the water, as in the case of a dry-dock, they should be built of larger size and in compartments.

What I claim as new, and desire to secure by Letters Patent, is—

1. The jacks constructed of upper and lower sections *A A'*, fitted together and forming a single structure, substantially as described, and for the purposes specified.

2. The full open bottom jacks, constructed with rising and falling or movable bottoms *B*, essentially as shown and described.

3. The combination, with the open bottom jacks and their movable bottoms *B*, of the lower supports or pins *d*, and the holes or pockets *e* in the movable jack bottoms, substantially as and for the purpose herein set forth.

4. The combination, with the hydro-pneumatic lifting-jacks, of the attached perforated water-distributor *E* arranged around the bottoms of the jacks, essentially as described.

5. The slide-valve *H*, in combination with the inlet and exhaust pipes or hose *I J*, and tubular connection *G* of the jack, substantially as described.

HENRY F. KNAPP.

Witnesses:

MICHAEL RYAN,  
FRED. HAYNES.