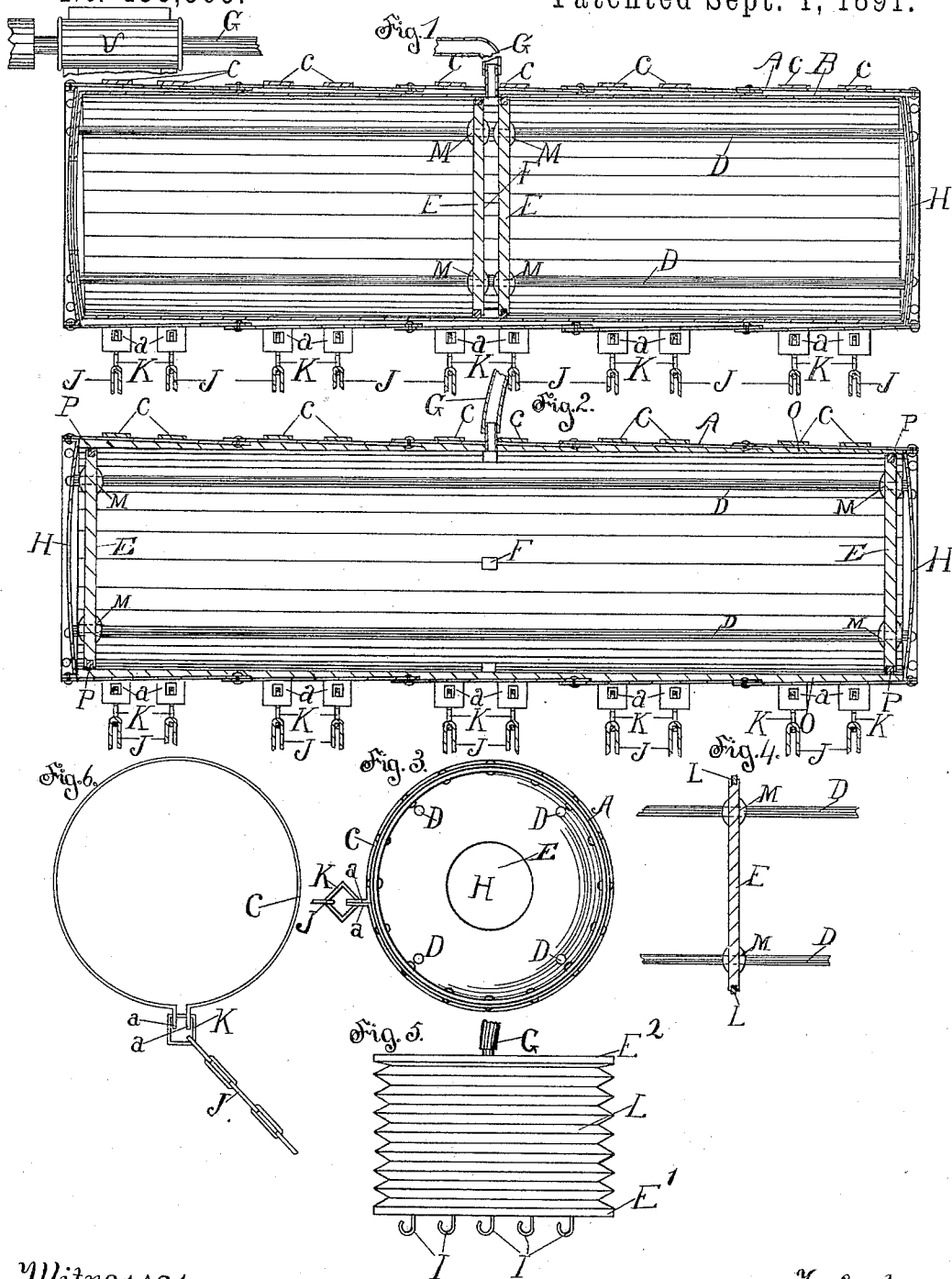


(No Model.)

J. G. ENKE.
APPARATUS FOR RAISING SUNKEN VESSELS.

No. 458,565.

Patented Sept. 1, 1891.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN G. ENKE, OF LOS ANGELES, CALIFORNIA.

APPARATUS FOR RAISING SUNKEN VESSELS.

SPECIFICATION forming part of Letters Patent No. 458,565, dated September 1, 1891.

Application filed March 14, 1891. Serial No. 384,995. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. ENKE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented a new and useful Apparatus for Raising Sunken Vessels, of which the following is a specification.

My invention relates to apparatus for raising sunken vessels by the buoyant force of air.

The object of my invention is to provide apparatus whereby any sunken vessel may be raised, and also to provide means for conveniently attaching such apparatus to the vessel in such a manner as to evenly distribute the strain upon such vessel and apparatus.

The accompanying drawings illustrate my invention, in which—

Figure 1 is a longitudinal mid-section of my improved apparatus ready to be lowered to the sunken vessel. Fig. 2 is a longitudinal mid-section with its parts in position to make the apparatus buoyant. Fig. 3 is an end view of my invention, showing my improved adjustable tightening-band in position tightened. Fig. 4 is a cross-section of my improved piston-head with two of the guides passing therethrough. Fig. 5 is a view of a modified form of my invention. Fig. 6 is a view of my improved tightening band and attachments opened to allow the band to be adjusted.

In manufacturing my improved apparatus I design to make use of any old discarded steam-boilers that are of no further service, because of weak spots therein. In order to provide a smooth surface inside, I introduce an inner tube B, of thin sheet metal, into the outer stronger boiler A, which braces the inner tube and produces a strong shell which can withstand a very great pressure without bursting.

CC are the attaching-bands which encircle the shell and are provided with the perforated end lugs *a a*. The lifting-cables J are attached to their respective bands by means of the rectangular link K, which, when there is no strain upon the cable, may assume the position shown in Fig. 6, thus allowing the band to be sprung open to slip it along the shell, if it is so desired; but when the cable is drawn taut the sides of the link K draw the end lugs *a* together, thus tightening the band and preventing it from slipping upon the shell.

This causes the band to bind tightly the entire apparatus, as well as forming an attachment for the lifting-cables J. Within the shell, extending from end to end thereof, and secured to such ends I provide four guides D, upon which are mounted the piston-heads E, which fit tightly inside the inner shell B and are each adapted to slide therein. At a point near the mid-length of such shell are provided the stops F, which are arranged to prevent the piston-heads E from passing the mouth of the air-pipe G. The air-pipe G opens into the inner shell B between the two piston-heads. In practice the air-pipe is connected with suitable means V for forcing the air into the shell. Both the outer and inner shells are provided with end ports or openings H at each end thereof to permit the water to pass freely into and out of such shells.

In Fig. 4 I have shown a modified form of my apparatus, in which I have connected the piston-heads *E' E'* by means of a flexible canvas shell or other collapsible cylinder L, and have provided the lifting-hooks I, attached to the bottom plate *E'*, while the air enters through the top plate *E'*. When the bottom plate has been secured firmly to the vessel, the apparatus may be filled with air and its buoyancy be exerted to raise the sunken vessel.

In Fig. 2 I have shown the outer boiler provided with a lining of soft metal O instead of providing an extra inner shell. The main object is to provide a smooth inner surface for the piston-heads to traverse, so the air will not escape from between them. I provide these piston-heads with a packing P, of rubber or other expansible material, so that it will conform to the inner surface of the shell and pass over small inequalities in such surface without permitting the air to escape from between the piston-heads. These pistons are provided with hubs M or thickened portions to present a long bearing against the guiding-rods D, in order to prevent cramping or binding thereagainst and consequent friction.

The operation is as follows: The apparatus is filled with air, the heads E being substantially in the position shown in Fig. 2, and is floated over the sunken vessel. The air is then permitted to escape, and the water rush-

ing in through the openings H causes the heads to slide inwardly upon the guide-rods until they strike against the stops F. The apparatus is permitted to sink until it rests
5 upon the sunken vessel and the cable, which may consist of ropes, chains, or other attaching means, are secured to the sunken vessel. In case the adjustable bands are used their position along the apparatus may be varied
10 to permit the lifting chains or ropes being attached to convenient portions of the vessel.

Now, having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

15 1. The combination of the shell provided with the end ports, the guides secured to and extending between the ends of the shell, the

piston-heads E E, mounted upon such guides, and means for forcing air into the shell between the piston-heads.

2. The combination of the shell, the attaching-band C, encircling such shell and provided with the end lugs *a a*, the angular link K, passed through such lugs, and the chain.

3. An apparatus for raising sunken vessels, comprising the combination of a water-tight shell provided with two movable heads and means for forcing the heads apart and supplying the cylinder with air.

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Witnesses:

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