

No. 812,521.

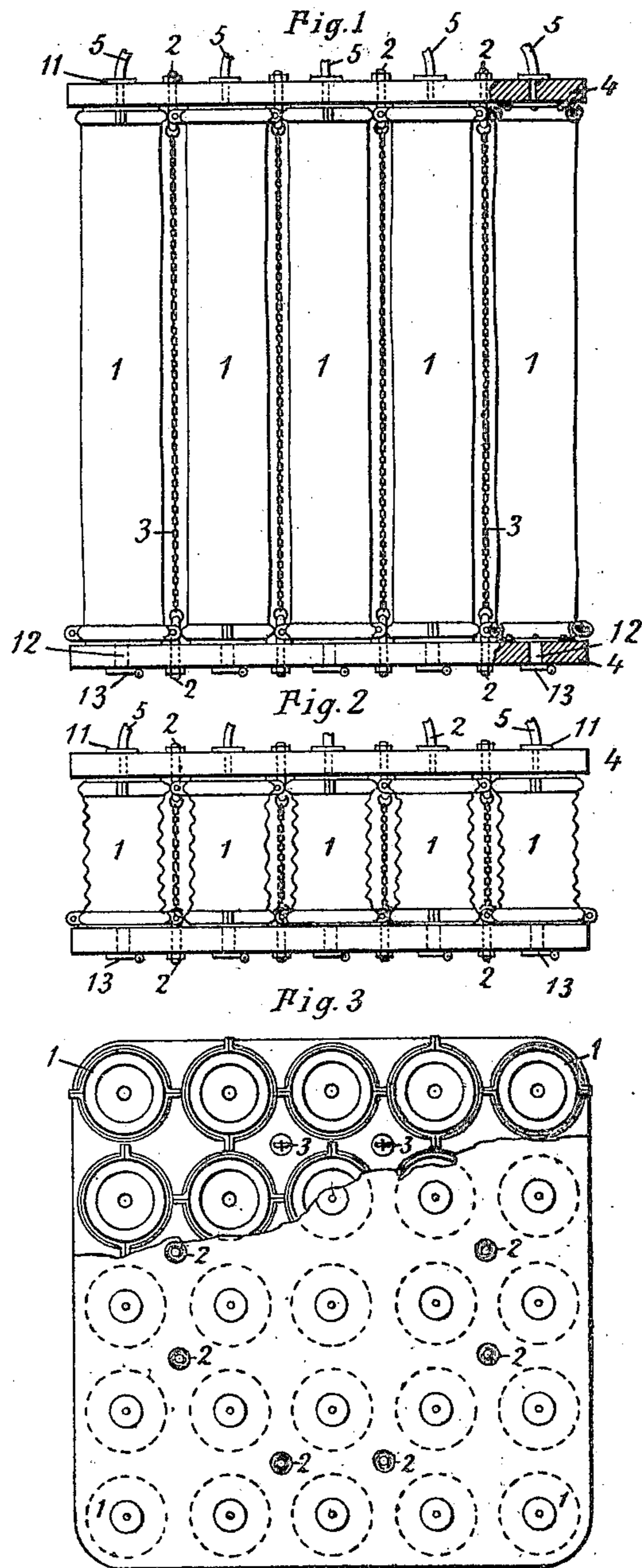
PATENTED FEB. 13, 1906.

C. PINO.

APPARATUS FOR RAISING SUBMERGED OBJECTS.

APPLICATION FILED JUNE 5, 1903.

2 SHEETS—SHEET 1.



WITNESSES:

Edw. W. Vaile Jr.

Chas. Bennett

INVENTOR

Caterina Pino
(Née Rossi)

by /s/ J. M. T. S.
Attorney.

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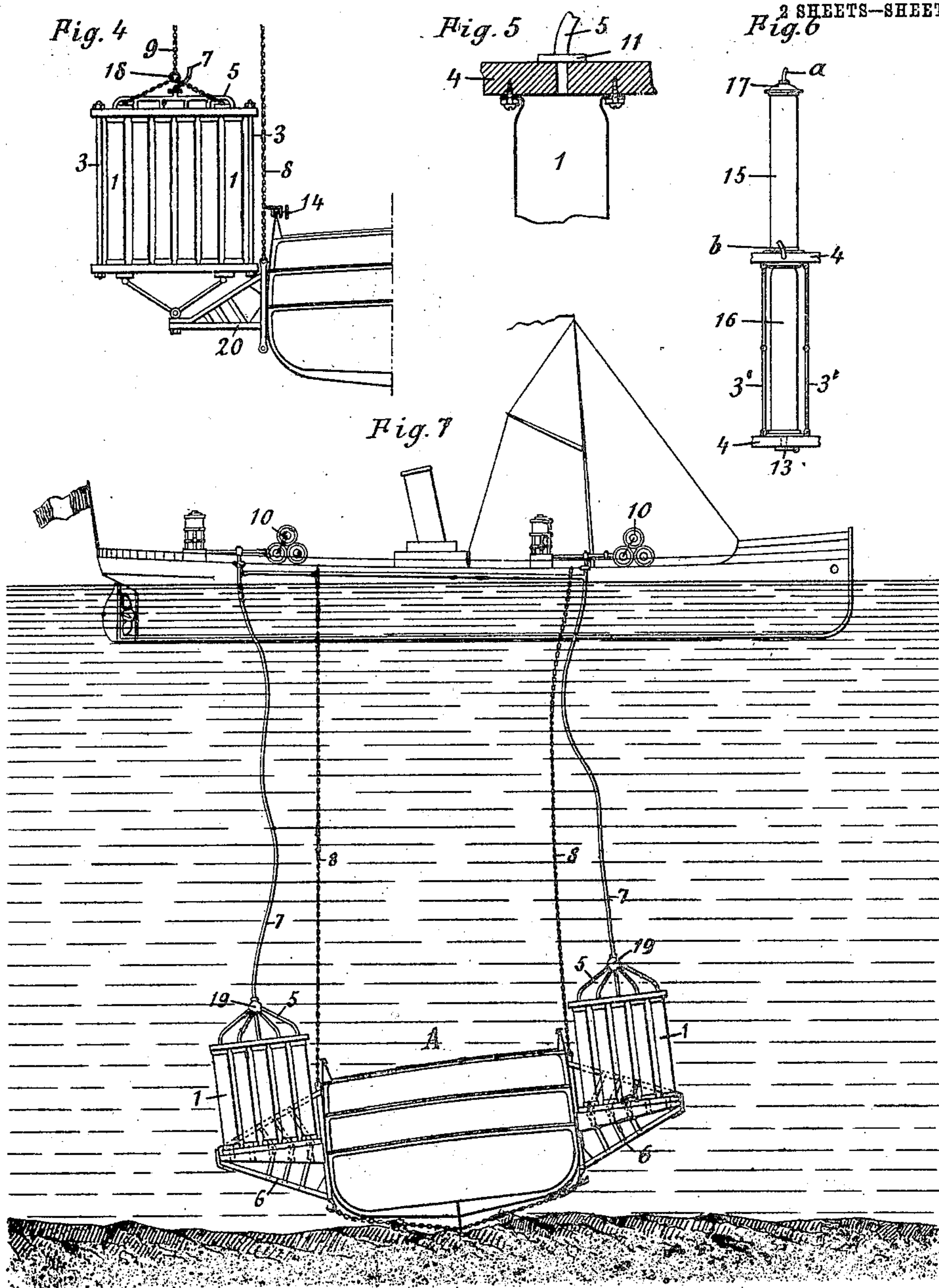
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INVENTOR

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(Née Rossi)

by Wm. Fellis,
Attorney.

UNITED STATES PATENT OFFICE.

CATERINA PINO, OF GENOA, ITALY.

APPARATUS FOR RAISING SUBMERGED OBJECTS.

No. 812,521.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed June 5, 1903. Serial No. 160,279.

To all whom it may concern:

Be it known that I, CATERINA PINO, (*née* Rossi,) gentlewoman, a subject of the King of Italy, residing at 7 Salita Montebello, Genoa, in the Kingdom of Italy, have invented a certain new and useful Improved Apparatus for Raising Submerged Objects, of which the following is a specification.

The object of this invention is the production of means for raising submerged objects from the sea or other bodies of water by the use of air or any other gas which is supplied to said means after the same has been attached to the submerged object, while at the same time said means are easily transported and require very little manipulation in placing the same in position, are not liable to be damaged, and may be operated quickly and efficiently. My means for raising submerged objects is in the nature of a float or inflatable device having platforms or heads to which flexible waterproof cells are attached, which when expanded or inflated separate said heads and form a series of buoyant tubes which may be connected with a vessel or other object at any desired point.

For a full, clear, and exact description of my invention reference may be had to the following specification and to the accompanying drawings, forming a part thereof, in which—

Figure 1 is an elevation of the float embodying a series of cells arranged in parallel side by side. Fig. 2 shows the float in a deflated or collapsed condition, in which condition the same is adapted to be attached to the object to be raised or floated. Fig. 3 is a plan view of the same, showing one of the heads as broken away to show the construction and arrangement of the inflatable cells. Fig. 4 is a view showing one form of my improved float attached to the side of a vessel. Fig. 5 is a detailed sectional view showing the means for attaching the cells to the heads and showing the supply-pipe connected with said head. Fig. 6 is a view showing a portion of a float comprising two series of superimposed cells. Fig. 7 is a view showing the manner of connecting the floats to a submerged vessel for raising the same.

Referring to the drawings, the numerals 1 indicate a series of cells consisting of impermeable waterproof fabric, leather, india-rubber, or any other suitable flexible material. These cells are preferably tubular in form, but may be of any preferred shape, according to the use and circumstances required in dif-

ferent instances. The cells 1 are preferably arranged in parallel relation to each other side by side and are attached to the heads or platforms 4 in any suitable manner—as, for instance, as shown in Fig. 5. The platforms 4 are preferably flat and are of such a shape and design to resist large lifting forces due to the inflation of the cells when submerged. The upper heads or platforms 4 are provided with metallic ajutages 11 for connecting the head 4 with supply-tubes 5, which communicate with the interior of said cells for supplying compressed air or other gases to the same. The lower heads or platforms are provided with openings 12, which are closed by suitable check-valves 13 to allow the escape of the water which is forced from the cells by the air-pressure, but which prevent the reentry of said water. The tubes or pipes 5 may radiate from a common union 19, which union is connected with suitable generators, accumulators, or compressors, as indicated at 10, which are preferably carried on a tug or other vessel which may be located above the sunken or submerged object. The heads 4 are preferably connected by means of flexible ties or spacers 3, which may consist of chains 3, as shown in Fig. 1, or jointed rods, as shown in Fig. 6, by the numerals 3', which are connected adjustably with the heads 4 by means of the adjustable bolts or nuts 2. These flexible connections limit the distance between the heads, but allow the heads to approach each other when the cells are deflated or collapsed for transportation or when sinking the same into position.

I preferably arrange the flexible ties or spaces between the rows of tubular cells in order to distribute evenly between the platforms the forces tending to keep the same from undue separation and to provide an arrangement which renders the floats compact both when in a deflated or in an extended condition.

The platforms 4, to which the cells are attached, are preferably provided or connected with bracket-supports 6 or 20, constructed in such a manner as to be capable of being adapted to the different objects to be raised.

Obviously by multiplying the number of platforms and providing a plurality of rows of cells, as shown at 15 and 16, the floats will have a much increased power of displacement, and consequently their capacity to raise would thereby be multiplied. Where two series of cells are used with only two plat-

forms, the arrangement may be such as shown in Fig. 6—that is, the upper series of elements may have independent heads 17, which are connected with the supply-tubes *a*. With this wide choice of arrangement of the cells it will be seen that the floats having a multiple of series of rows may be given any polygonal form which the circumstances may require, and therefore the heads are preferably provided with eyes or rings fixed at different convenient points. To these eyes or rings chains or other suitable connections may be attached, which may unite at a central point 18 and there connected with the guide cable or chain 9. For floats having a multiple series of rows of cells the air-conduits are preferably connected independently to each row, as indicated at *a* and *b*, Fig. 6.

In the use of my improved float it is obvious that the parts may be folded, so as to occupy a small space for transportation, and may be easily sunk to the object to be raised and fastened thereto. When secured in the requisite position, the cells are inflated by suitable means before mentioned, and great buoyant force is thereby asserted to raise the object to which the cells are attached.

I have shown two forms of my improved float; but it will be clearly understood that the parts may be varied in arrangement, number, and shape without departing from the spirit and scope of my invention; but

What I claim, and desire to protect by Letters Patent of the United States, is—

1. A float for raising submerged objects, comprising a series of flexible tubular cells, two platforms or heads to both of which each of said cells is attached, flexible connections for determining the distance between said heads when the said cells are extended, means attached to the upper head for guiding and holding the float in position and means for attaching said float to the submerged object.

2. A float for raising submerged objects comprising a top and a bottom platform, a series of cells of waterproof flexible material arranged in series of rows between said platforms, means arranged between said rows for determining the distance between said platforms when the cells are extended and means for inflating said cells.

3. A float for raising submerged objects, comprising a series of waterproof flexible tubular cells arranged in parallel rows, platforms or heads between which said cells are secured, flexible connections located between

said rows of cells for limiting the distance between said heads, when the cells are extended, each of said heads being provided with openings which communicate with the interior of said cells, the openings in the upper head being provided with means for connecting the supply-pipes and the openings in the lower heads being provided with check-valves for the discharge of water.

4. A float for raising submerged objects comprising dividing heads or platforms, means for securing a series of flexible inflatable tubular cells to said heads in parallel rows, flexible means arranged between said rows of tubular cells for limiting the separation of said heads, means for inflating said cells through openings in said heads, and a check-valve carried by said heads for allowing the water to be discharged.

5. A float for raising submerged objects, comprising heads or platforms, a plurality of flexible tubular cells of waterproof material having their open ends attached to said heads, flexible connections arranged between said heads or platforms and between said cells for limiting the said separation of the heads, means for forcing a fluid into said cells, and check-valves for allowing the escape of water from said elements.

6. A float for raising submerged objects, comprising a plurality of superposed series of parallel waterproof cells, platforms or heads between said series of cells, and to which the ends of said cells are attached, flexible connections for determining the distance between said heads when said cells are extended, means attached to the upper head for guiding and holding the float in position, and means connected to the lower head for attaching said float to a submerged object.

7. A float for raising submerged objects, comprising a plurality of superposed series of parallel waterproof cells, platforms or heads between said series of cells, and to which the ends of said cells are attached, flexible connections for determining the distance between said heads when said cells are extended, and separate air-conduits connected independently to each series of cells.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 4th day of January, 1905.

CATERINA PINO.

Witnesses:

CAMPO LUIGGI.

A. FERRARI.