

T. INGARAMO.
LIFE SAVING APPARATUS.
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978,378.

Patented Dec. 13, 1910.

2 SHEETS—SHEET 2.

Fig. 5

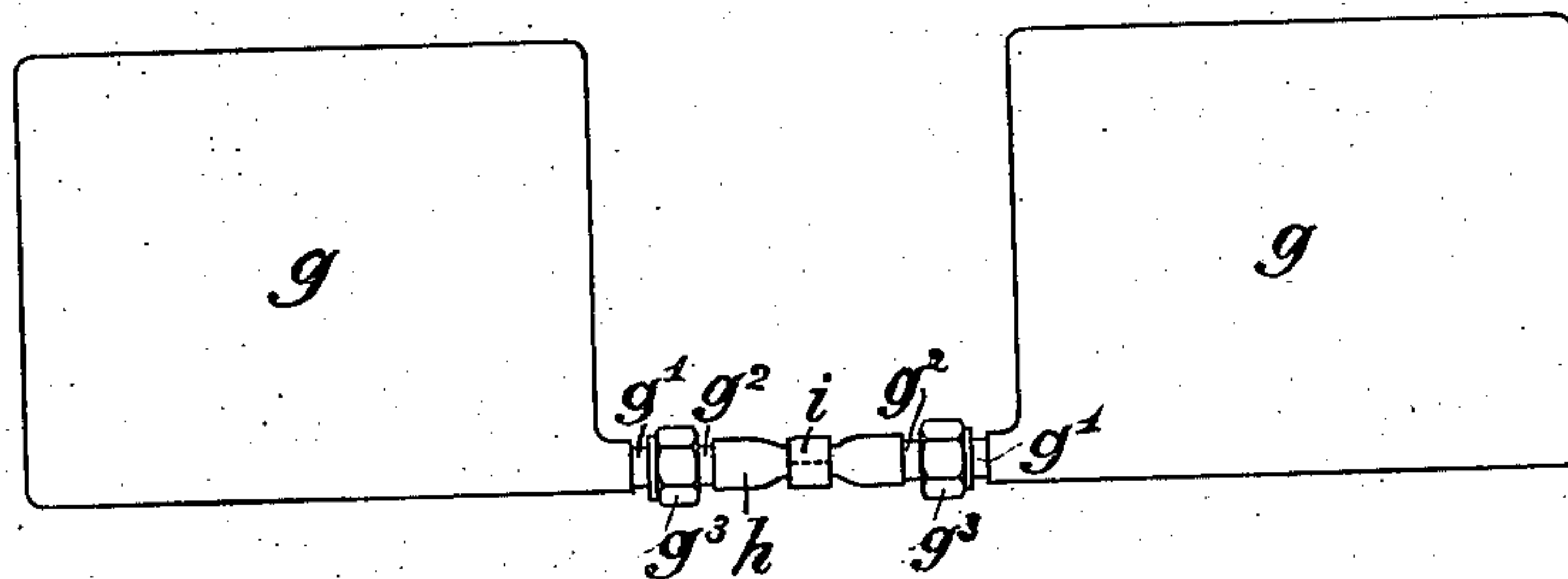


Fig. 6

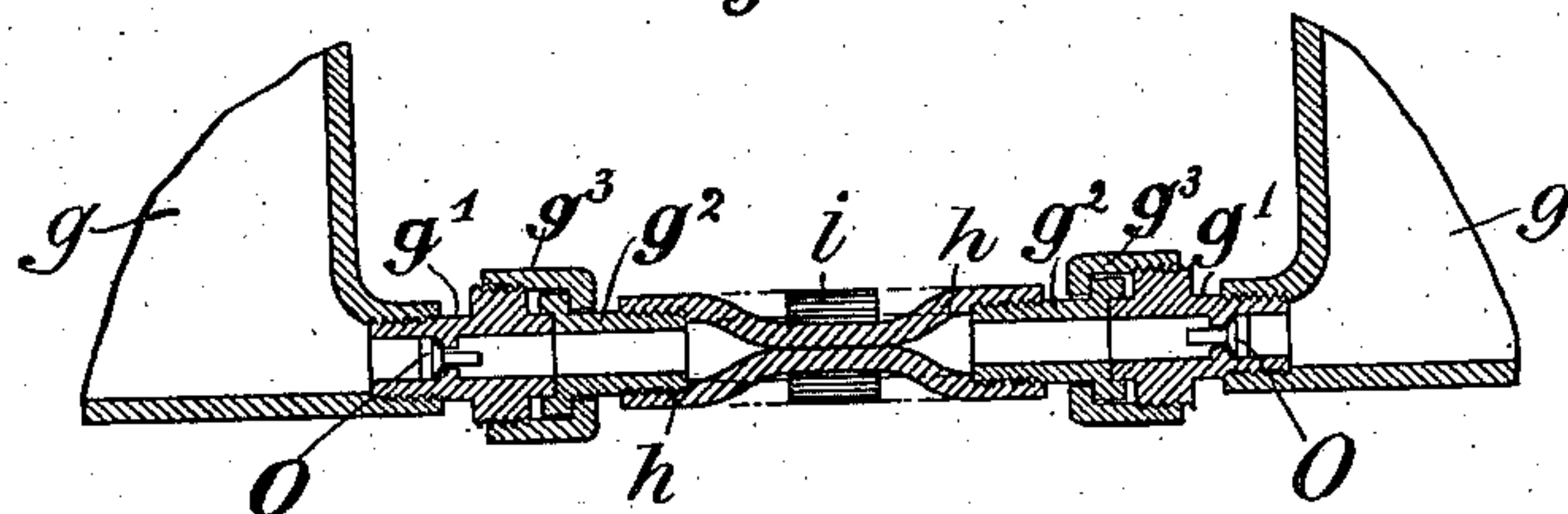


Fig. 7

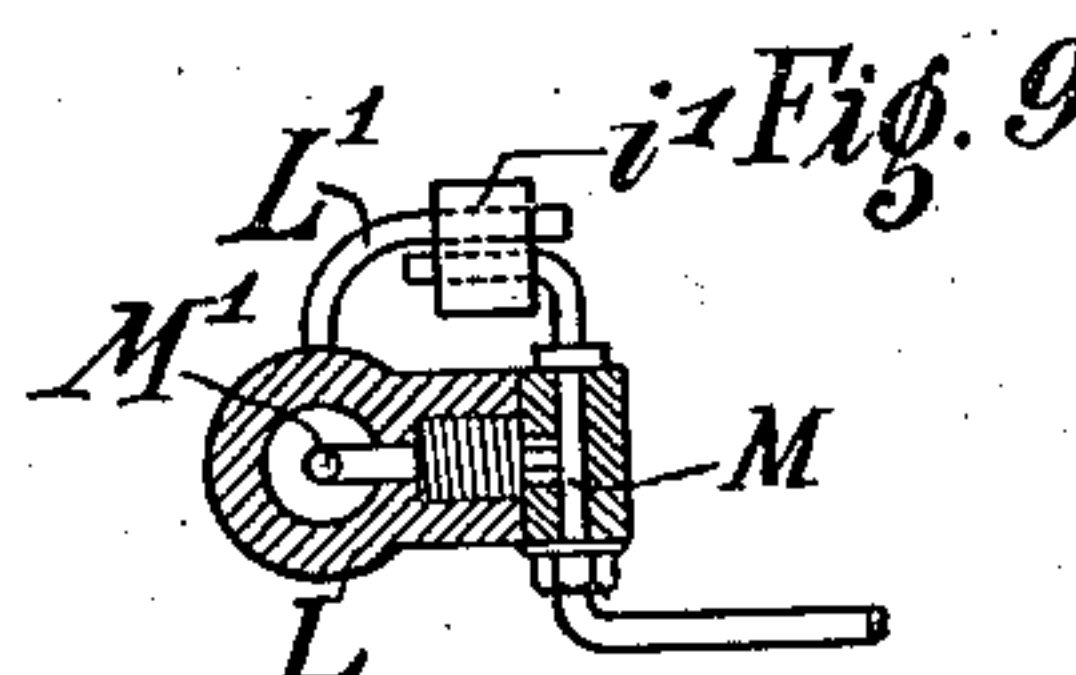
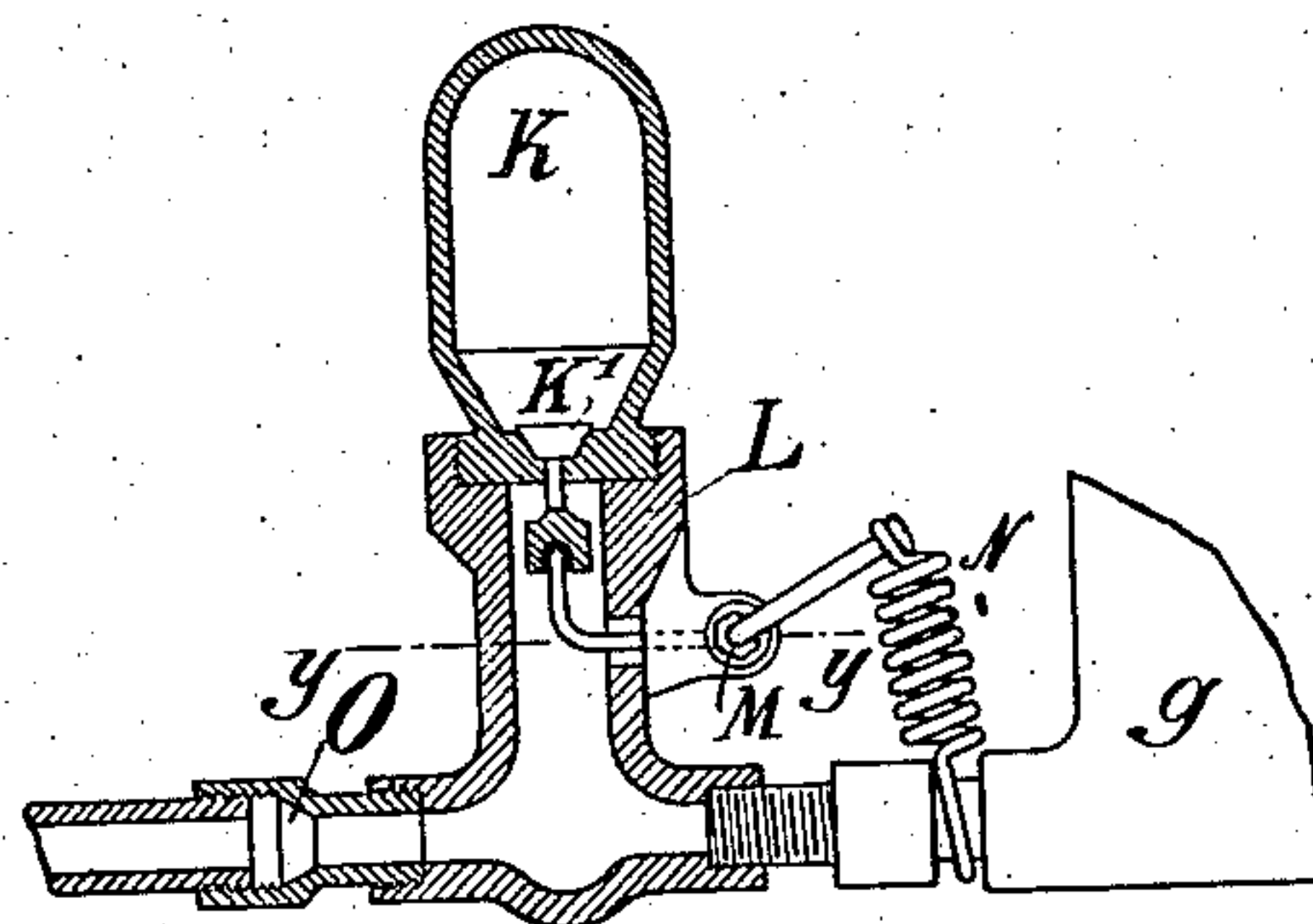


Fig. 8



WITNESSES

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UNITED STATES PATENT OFFICE.

TENEDOS INGARAMO, OF ZURICH, SWITZERLAND.

LIFE-SAVING APPARATUS.

978,378.

Specification of Letters Patent.

Patented Dec. 13, 1910.

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To all whom it may concern:

Be it known that I, TENEDOS INGARAMO, a subject of the King of Italy, residing in Zurich, in the Canton of Zurich, Republic of Switzerland, (whose post-office address is No. 51 Nordstrasse, Zurich,) have invented certain new and useful Improvements in Life-Saving Apparatus; and I 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

I have applied for patent in Germany on February 20th 1907, application I. 9745^{II}/65 a^2 and application I. 9746^{II}/65 a^2 ; in Switzerland on July 22nd 1907, Patent No. 38736; in Austria on October 24th 1907, two applications; and in Hungary on October 24th 1907, application No. 14927 and on October 25th 1907, application No. 15042.

The invention relates to life-saving apparatus for the use of persons who are in danger of drowning.

The object of the invention is to provide an effective form of this device and one which can be flung for short or long distances so that by its means persons who are even far from the shore or from a ship's side can be rescued.

The apparatus is in the form of a float consisting of several independent bags, so that if one of the bags should leak, the bag coupled thereto may continue efficient and only the former bag will need replacing.

In the accompanying drawings are illustrated different ways of carrying out the invention.

Figure 1 is an elevation of a spherical life-saving apparatus in its closed form and when not in use. Fig. 2 is a plan of same partly in section open or ready for use but on a smaller scale; Fig. 3 is an elevation of an elongated projectile form of life saving apparatus when not in use; Fig. 4 is a section on the line $x-x$ of Fig. 3; Fig. 5 is a plan of one of the floats; Fig. 6 is a longitudinal section on a larger scale, through the means for connecting one bag with another; Fig. 7 is a cross section through a pinch band in the center of Fig. 6; Fig. 8 is a vertical section through a connecting piece for the bag of a float, carrying a gas car-

tridge and Fig. 9 is a horizontal section on the line $y-y$ of Fig. 8.

Referring first to Figs. 1 and 2, and Figs. 5 and 6, the effective part b of the apparatus is placed in a divided metal sphere a , the halves of the sphere being connected together by bands c which are soluble in water and which may be of a material hereinafter referred to, these bands being wound around angular flanges d of the hemispheres and protected if desired in some suitable way from accidental detachment. The flanges d on one half may carry springs m for assisting the opening of the parts. Each hemisphere is provided with an eyelet e to which a cord f is attached. In the present instance the actual life saving apparatus b consists of a floatable belt comprising four airtight bags g , connected together in pairs. In the left hand pair of bags the communication between the two is normally shut off by means of a pinch band i , which is soluble in water and is lapped around the intermediate piece or connection h which is in the form of a flexible tube. The two bags are assumed to be charged with liquid or solid material which when mixed, generate gases that inflate the bags; one substance is placed in one of the two left bags in Fig. 2 and another substance in the other, which unite to form the gas. A narrow neck on each bag is connected in an airtight manner with a short length of pipe g^1 (Fig. 6) against which a short length of pipe g^2 is pressed by a flanged collar g^3 . The two lengths of pipe g^2 are connected together by the piece of the flexible tube h . The pinch band i which is lapped several times around the flexible tube h , is fastened to the flexible tube at one end and to itself at the other. The pinch band may consist of felt impregnated with sugar solution. Non-return valves O , which close under the influence of differential pressure, are provided in the lengths of pipe g^1 or g^2 . Should one bag of a pair become leaky, only the gas contained in the same escapes, the non-return valve O retaining the gas in the other bag, which is therefore still in position to discharge its functions and support a person above water. The valves O , Fig. 6, operate in the following manner: As long as the connection between the bags is interrupted by means of the pinch band i , there will be no pressure upon the valves O , which therefore will be opened and permit the substances to pass through

and to fill up the pipes g^2 and the flexible tube h until the substances reach the contracted portion of the tube h . When the connection between the portions of the tube h is established, the substances pass, unite and generate the gas, which inflates the bags. The pressure exercised upon the two sides of the valves being equal the valves have no tendency to close. But if one of the bags should leak, the gas escapes therefrom and the gas in the other bag closes the adjacent valve O , so that no gas escapes from this bag, which therefore continues efficient.

An alternative arrangement is shown on the right hand side of Fig. 2 and in Figs. 8 and 9 there being a carbon dioxid capsule K with valve K^1 for the source of gas for inflating the bags. The opening of the valve K^1 is effected by means of a spindle M , which is mounted in a T-connection L , has its two ends bent in opposite directions, and is provided with a lifting arm M^1 . At one end of the shaft a spring N exerts a pull tending to open the valve K^1 . The other end of the spindle is attached to a fixed arm L^1 by means of a band i^1 that is soluble in water, so that in ordinary circumstances the spring N is unable to turn the spindle M or the arm M^1 to open the valve K^1 . As soon, however, as the band i^1 gets into the water it dissolves and sets free the spindle M , the influence of the spring N thus at once opening the valve K^1 and inflating the bags. In this case, also, non-return valves O maintain the pressure in one bag if the other one becomes leaky.

The bags are inclosed in an elastic or flexible envelop k which holds them together in the form of a belt. The envelop k is attached to the hemispheres a a by means of cords l .

In use the apparatus is held by the cord f and flung at the person in the water. As soon as it reaches the water, the sealing bands c loosen automatically and the halves a are forced apart by the pressure of the springs m . The belt b now comes in contact with the water, and the pinch band i loosens automatically so that the materials hitherto stored apart in the two bags of the left hand pair, mix together and generate gas, which inflates the left hand pair of bags. In the arrangement employed in the right hand pair of bags the band i^1 , restraining the operating lever M for the valve K^1 of the gas cartridge K would also be automatically loosened, so that the valve K^1 would be opened and the compressed gas contained in the cartridge K would inflate the two bags. The person to be rescued holds on to the belt or places it around him. By pulling the cords f the person can then be drawn ashore or on board ship.

In order that the life belt may assume a circular form when inflated a strip of inelas-

tic material is affixed to one side of the envelop k .

The apparatus when closed as in Fig. 1 and in the form of a hand grenade can be flung a distance of about a hundred yards. For longer distances up to 1100 yards, the rocket projectile type of life saving apparatus shown in Figs. 3 and 4 is applicable. In this type the actual life saving apparatus, for example a life belt as shown in Fig. 2, is inclosed in a cylindrical casing a^4 , made of millboard for example and divisible longitudinally into three parts. The three cylindrical parts a^1 , a^2 , a^3 of the casing a^4 are bound together by means of girths n fastened on to a wooden bar o and are thus held firmly together and to said bar o . The part a^2 is nailed on to the bar. Each girth n is provided with a coupling formed of two bows p and a binding strip q which holds them together and is of some material that is soluble in water. A cap r , of wood for example, is placed on the upper end of the casing a^4 and a base S with dome shaped cavity in its bottom, is put on the lower end of same. A rope holder t , consisting of a bent rod turning on a pivot u , is fastened on the bar o , and a pin v is also fixed on this bar, the rope holder t and pin v being ordinarily coupled together by a binding strip w of some material that is soluble in water the rope holder t being normally pressed outward at this end by a spring t^1 . To the rope holder t is attached a life line x on which is suspended the end of the line f^1 fastened to the life belt contained in the casing a^4 . The bar o is attached in some suitable way to the rod z of a rocket z^1 , the head of the rocket fitting into the domed under surface of the base S .

To make use of the rocket projectile type of life-saving apparatus, the rocket and apparatus are laid on a sloping track and the rocket is fired, and flies to the desired spot carrying the life saving apparatus with it. As soon as the apparatus falls into the water, the coupling bands q are released automatically, so that the parts of the casing a^4 open out or fall apart and the life belt contained therein is freed. The pinch bands i of this belt or the strips i^1 on the valve lever M in the case of gas cartridges K then loosen automatically in the water and the bags are inflated by the generated or stored up gases as in the case of the first form. The cap r and base S are also set free when the casing a^4 falls apart. The strip w is also dissolved, and the rope holder t is moved away from the pin v by the pressure of the spring t^1 . The life line x is thus released from the holder t , and the rescued person, after grasping hold of the life belt, can be drawn into a place of safety by the line.

Several life belts may be inclosed in the one casing a^4 .

If desired, the binding strips *i* or corresponding pieces can be detached by any one wearing the life saving apparatus, and the bags inflated, before entering the water.

5 What I claim is:—

1. In a life-saving apparatus and in combination a divided projectile-like receptacle, automatically releasable means responsive to the action of water for holding together the
10 parts of the receptacle, one or more floatable bodies inclosed in the receptacle, and means operating to inflate the floating bodies on their leaving the receptacle falling into the water.

15 2. In a life-saving apparatus, and in combination a divided projectile-like receptacle, automatically releasable means responsive to the action of water for holding together the parts of the receptacle, one or more float-
20 able bodies inclosed in the receptacle, and bands soluble in water for separating the interiors of the bodies, said bodies containing substances which when united form a gas.

25 3. In a life-saving apparatus and in combination a divided projectile-like receptacle, bands soluble in water for holding together the parts of the receptacle, one or more float-
able bodies inclosed in the receptacle, and means for automatically inflating said float-
30 able body on its falling into water.

4. In a life-saving apparatus, the combination of several bags, means for automatically shutting off communication between the bags when one of them becomes leaky, a
35 detachable intermediate piece for connecting the bags together and a pinch band, soluble in water, for obstructing the intermediate piece.

40 5. In a life-saving apparatus, the combination of several bags, means for automatically shutting off communication between the bags when one of them becomes leaky, a

gas capsule and an intermediate piece for connecting the bags with one another and with said gas capsule.

45 6. In a life-saving apparatus, the combination of several bags, means for automatically shutting off communication between the bags when one of them becomes leaky a
gas capsule a detachable intermediate piece 50
for connecting the bags with one another and with said gas capsule, and means for automatically opening the gas capsule when the bag falls into water.

7. In a life-saving apparatus the combination of a divided receptacle, felt bands im-
55 pregnated with sugar solution for holding together the parts of the receptacle, and one or more floating bodies inclosed in the receptacle. 60

8. In a life saving apparatus, the combination of several bags, means for automatically shutting off communication between the bags when one of them becomes leaky, a piece of
flexible tubing to connect the bags together, 65
and a band of felt impregnated with sugar solution for pinching the flexible tube.

9. In a life-saving apparatus, the combination of several bags, means, for automatically shutting off communication between 70
them when one of them becomes leaky, a gas capsule, a valve for same, a detachable intermediate piece for connecting the bags together and with said gas capsule a spring
actuated lever controlling said valve and a 75
band of felt impregnated with sugar solution, for locking said lever.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

TENEDOS INGARAMO.

Witnesses:

CHRESCENTINE STEFANO,
A. FERRARI.