July 3, 1928. 1,675,522

C. WEIDINGER ET AL

DIVER TOY

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Fig. 1.

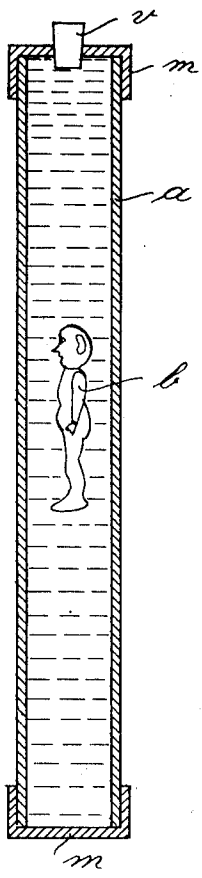


Fig. 2.

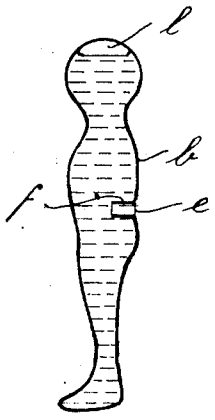
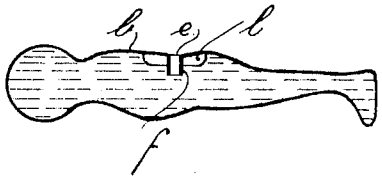


Fig. 3.



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DIVER TOY

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Fig. 4.

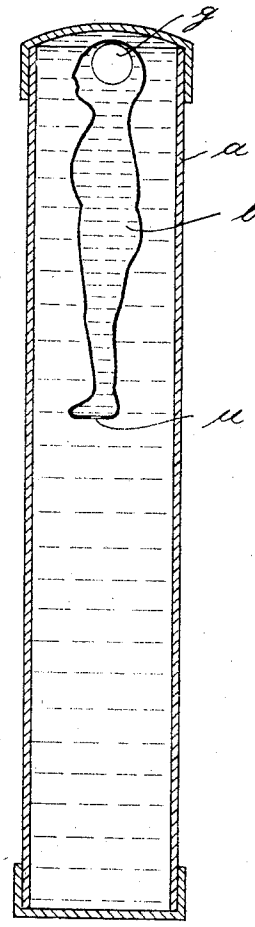
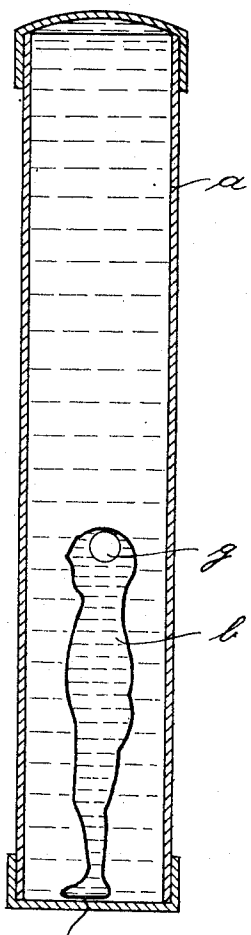


Fig. 5.



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DIVER TOY

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Fig. 6.

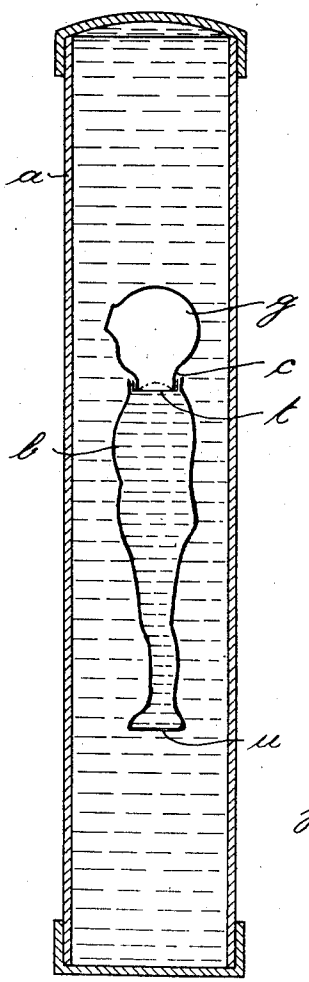


Fig. 7.

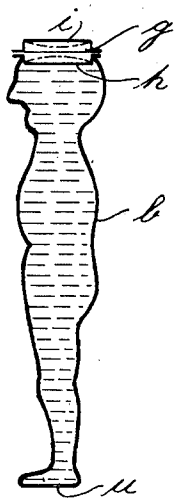


Fig. 8.

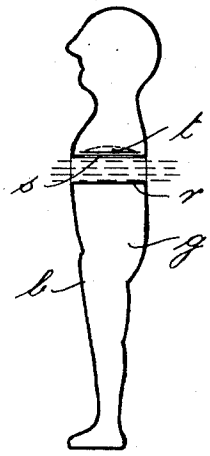


Fig. 9.

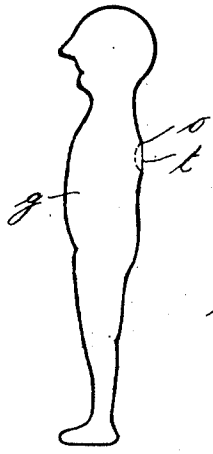


Fig. 10.

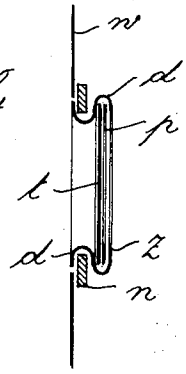
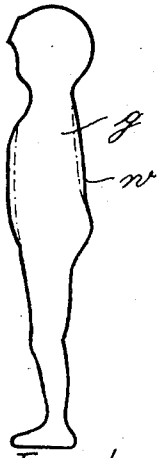


Fig. 11.



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UNITED STATES PATENT OFFICE.

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DIVER TOY.

Application filed January 6, 1926, Serial No. 79,594, and in Germany June 22, 1925.

This invention relates to a toy consisting of a receptacle filled with water and of a figure floating in the water and which, after the manner of a Cartesian diver, can be made to dive by a pressure exerted upon an elastic portion of the receptacle. This effect is produced by the compression of an air bubble in the hollow figure caused by the outer pressure so that water penetrates through a hole into said figure. The figure becomes heavier and sinks until the outer pressure ceases, then the figure ascends again as it gets lighter owing to the expansion of the air bubble.

The devices of this kind of known type consist of a glass tube containing the figure; a diaphragm is stretched over the mouth of the tube. Such devices serve usually only for explaining physical phenomena but they cannot be used as toys as the manipulation is too difficult for children. The glass tube breaks easily and the child could be injured. An inconvenience of the known devices of this kind is further that they become inoperative after a short time. The reason for this is that the quantity of air contained in the figure is reduced in the course of time as it either escapes directly through the hole or is absorbed by the surrounding water.

This invention has for its object to improve the construction in such a manner that the device can serve as toy for children and remains permanently operative. With this object in view the receptacle is entirely made of elastic material, for instance celluloid. The child can grip the tube at any point and exert a more or less strong pressure on the tube. Arrangements are further made to prevent the escape of air from the figure or to prevent this air from being absorbed by the water.

An embodiment of the invention is shown, by way of example, in the accompanying drawing in which:

Fig. 1 shows the toy, the tube being in vertical section and the figure in elevation.

Fig. 2 shows in vertical section the figure contained in the tube.

Fig. 3 is a similar view as Fig. 2 the figure being in another position.

Figs. 4 and 5 show in vertical section the toy and the figure; the air in the figure is enclosed in a little hollow body.

Figs. 6 to 11 show forms of construction of the figure according to which the air in the figure is separated from the water in other manners than those shown in the Figs. 1 to 5.

The receptacle *a* in which the figure *b* is enclosed is tube-shaped and made preferably of transparent celluloid possessing sufficient elasticity to yield under pressure from the outer side. The tube *a* is closed at the upper and lower ends by caps *m*, *m*. In the upper cap a hole is provided which is closed by a stopper *v* so that the tube can be filled with water. The figure *b* is hollow and filled with water as shown in Figs. 2 and 3, with the exception of an air bubble *l*. A narrow hole *e* is in the wall of the figure through which hole the pressure of the surrounding water is propagated to the water in the figure. A short tube *f* inwardly projecting from the hole *e* serves to prevent the bubble *l* from escaping through the hole *e* in whichever position the figure may be. If the figure stands upright in the water, as shown in Fig 2, the air bubble is in the head of the figure. If the figure stands on the head or if it is lying on the back the air bubble is either in the foot portion of the figure or in the stomach. If the figure is however lying on the stomach, as shown in Fig. 3, the air bubble surrounds the tube *f* and can also not escape through the hole *e*.

In order to prevent the air being absorbed by the water in the course of time it is enclosed in a hollow body of elastic material, said hollow body being of any desired shape.

As shown in Figs. 4 and 5 the hollow body *g* has the shape of a ball made of rubber. The ball *g* maintains the figure permanently floating in the upper portion of tube *a*, a hole *u* being provided in the foot of the figure. When the tube *a* is compressed the volume of the air ball decreases as shown in the drawing and the figure sinks to the bottom.

According to Fig. 6 the head of the figure *b* is formed by the hollow body *g* filled with air. The neck *c* of the head *g* is covered at its lower end with a rubber diaphragm

t, the edge of which is airtightly clamped between the neck and the upper end of the body of the figure. The body of the figure is filled with water and the narrow hole u is in the sole of the foot of the figure. A pressure exerted from the outer side upon the tube a makes the rubbed diaphragm t bulge upward as indicated in dotted lines so that the volume of the air filled space is reduced and more water is sucked into the body of the figure which becomes heavier and sinks to the bottom of the tube.

Fig. 7 shows a figure the hat of which forms the hollow air body g. In an opening of the top portion of the head of the figure a shallow cup h is inserted. On this cup h a second cup i turned upside down is placed. The two cups are airtightly connected the one with the other. The bottom of both cups or the bottom of one of the cups is so thin that it yields easily under the increased pressure of the surrounding water.

As shown in Fig. 8 the whole figure b serves as air reservoir g. In the body of the figure a tube r is mounted which has a slot s, covered by a diaphragm t. When the water pressure in the tube r increases the diaphragm t is bulged inwardly into the figure which is filled with air.

According to Fig. 9 an opening o in the wall of the figure is covered by a diaphragm t, the edge of which is clamped in a metal mounting which is either soldered or cemented on the wall of the figure according to the material of which the figure is made. If the figure is made of celluloid the fixation shown in Fig. 10 is preferably used. The metal mounting d is of S-shaped cross section. The diaphragm t is located in the inner groove of the mounting. In order that the diaphragm t be not damaged by the sharp edge z of the mounting a strip p of celluloid or other suitable material is inserted which serves further to tightly pack the diaphragm. In the outer groove of the mounting a celluloid ring n is placed which projects over the edge of the mounting and is cemented on the wall w of the figure.

The figure shown in Fig. 11 differs from the figure shown in Fig. 9 in that there is no separate diaphragm, the wall w of the figure being elastic so that, as shown in dotted lines, it yields to the increased water pressure.

We claim:—

1. A toy of the character set forth, comprising a sealed container, substantially filled with liquid, and a pressure-responsive diving member floatable therein, the wall material of the body of the container being of inherently elastic character so as to be readily yieldable under squeezing compression for diametric contraction of said body of the container to cause the same to exert sufficient pressure on the contained liquid to operate the diving member.

2. A toy of the character set forth, comprising a sealed tubular transparent container, substantially filled with liquid, and a pressure-controllable diving member floatable therein, the body of said container being of elastic material diametrically contractible to a degree to cause the same to exert sufficient pressure in the contained liquid to operate the diving member.

3. A toy of the character set forth, comprising a container sealed at its ends and substantially filled with liquid, and a pressure-responsive diving member floatable therein, the body of said container being of elastic material and diametrically compressible between its ends to a degree to cause the same to exert pressure on the contained liquid for operating the diving member.

In testimony whereof we affix our signatures.

CHRISTIAN WEIDINGER.
LUDWIG GRADL.
MARTIN SCHÖNNER.