March 5, 1935. P. JONES, JR., ET AL 1,993,670

TOY BOAT

Filed April 25, 1934

Fig. 1

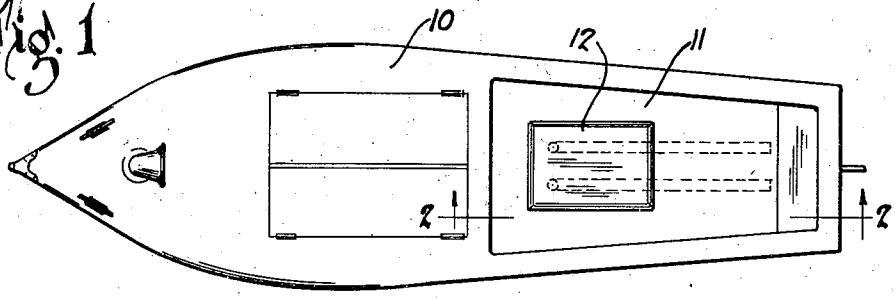


Fig. 2

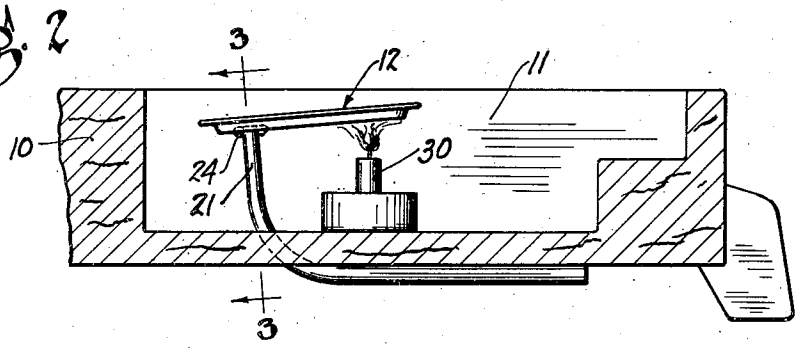


Fig. 3

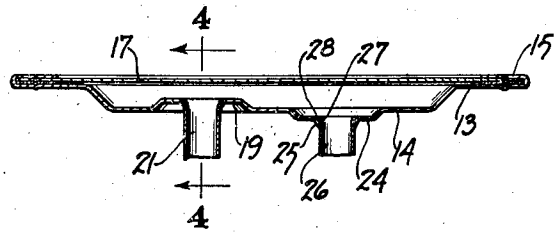


Fig. 4

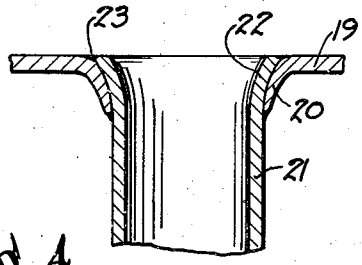
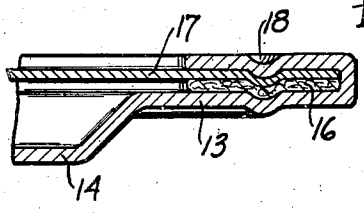


Fig. 5



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TOY BOAT

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7 Claims. (Cl. 46—37)

This invention relates to toy boats and similar articles adapted to travel on water, and particularly to means for propelling the same, the principal object being to provide an improved actuator or motor for such toys.

Another object is to provide an actuator for a toy comprising a casing, including a diaphragm having a different co-efficient of expansion and contraction than the the casing body, actuated by steam generated in the casing, and having a pair of spaced pipes leading from the casing body with their outer ends submerged in water during the operation of the toy.

Another object is to provide an actuator or steam generator adapted to propel a toy boat in which the bottom wall of the casing therefor has offset portions therein in which are mounted pipes having their ends substantially flush with the inner walls of the offset portions.

A further object is to provide an actuator or steam generator for propelling toy boats in which the intake and exhaust pipes connected therewith extend substantially perpendicular to the bottom wall of the actuator and then substantially parallel therewith along the bottom of the boat with their outer ends submerged in water during the operation thereof.

A further object is to provide an actuator or steam generator for propelling toy boats in which the intake and exhaust pipes are secured to the casing of the actuator within the body of the casing.

A further object is to provide an actuator or steam generator for propelling toy boats in which the bottom wall of the casing thereof has a depressed or offset portion extending inwardly from the face thereof and a spaced offset portion outwardly of the normal face thereof, each offset portion having a pipe attached thereto, the inner ends of the pipe being substantially flush with that portion of the casing to which the pipes are attached.

A further object is to provide an actuator for propelling toy boats in which the bottom wall of the actuator has an irregular contour because of offset portions therein, intake and exhaust pipes being attached to the offset portions of the casing.

Still another object is to provide an actuator for toy boats in which the diaphragm is attached to the casing body without the necessity of soldering those parts together.

Other objects and objects relating to details of construction and methods of manufacture will be apparent from the detailed description to follow.

In the drawing in which like reference numerals refer to like parts throughout the several views,

Fig. 1 is a top plan view of a toy boat showing our improved actuator mounted therein.

Fig. 2 is an enlarged fragmentary detailed sectional view taken on the line 2—2 of Fig. 1, showing further details of the actuator.

Fig. 3 is an enlarged sectional view taken on the line 3—3 of Fig. 2, particularly illustrating the intake and exhaust pipes attached to the casing.

Fig. 4 is a much enlarged view taken on the line 4—4 of Fig. 3, showing the method of attaching one of the pipes to the casing.

Fig. 5 is an enlarged detailed sectional view, showing the means for attaching the diaphragm to the casing, the size and thickness of the several parts being considerably exaggerated to better show the detailed construction thereof.

We are aware that heretofore toy boats and similar articles adapted to travel in water have been actuated by miniature steam generators but such devices have been frail, of short life, sluggish in operation and adapted to operate only a short time. Actuators having one pipe leading therefrom which have heretofore been used have been found to be sluggish and much slower in operation than applicants' device because when the steam is generated in the boiler, it exhausts through the single tube, then the vacuum in the boiler sucks up a new charge of cold water which must be heated and expelled before a new charge of water is admitted to the boiler. Thus, there is an exhaust of steam, an intake of cold water through the same pipe after the exhaust, and heating of the water into steam before the next exhaust, all of which makes for a relatively slow cycle of operation. It has also been found from experiment that if two tubes are used which have their ends projected into the boiler an equal amount that the action is the same as if only one tube was used. With this two-pipe system, there is an exhaust of steam through the pipes, an intake of cold water after the exhaust is completed and heating of the water into steam for the next exhaust, which like the single tube construction is a relatively slow cycle of operation so that the boat is propelled very slowly unless an actuator is used which is much larger than one proportionate to the size of the boat. Attempts have also been made at building actuators having pipes extending from the sides of the boiler to provide a

rotary circulation of the water and steam therein which gives a similar result to the actuators having one pipe or two pipes having their ends projecting into the boiler an equal distance so that there is an exhaust of steam, an intake of cold water after the exhaust, and heating of the water into steam before the next exhaust, all of which makes a slow cycle of operation and a sluggish actuator so that with this design of actuator a relatively large power plant is required for a given size of boat. Applicants have overcome these objections by spacing the ends of the tube or pipe so that the end of one pipe is closer to the diaphragm than the other pipe. By so doing, the instant the steam is expelled through the pipe offering the least resistance, a fresh supply of water will be drawn into the boiler so that the time interval between exhaust and intake is materially reduced, eliminating the gap between exhaust and intake and then between intake and exhaust, thus providing an actuator which will propel the boat more rapidly and with greater force than the types heretofore used. Our improved construction also permits the use of a smaller actuator in a given size of boat which is more economical to build, efficient in operation and which will operate for a relatively long time at a greater speed than the actuators having similar capacity heretofore used.

Referring to the drawing, we have illustrated a boat 10 which may be of any design, shape and size in which we have shown a cockpit 11 in which is mounted the actuator for the boat indicated generally by the numeral 12. The actuator comprises a pan-shaped casing 13 having a central depressed bottom 14 and inwardly directed flanges 15. In assembling the actuator, a rectangular-shaped gasket 16 of relatively thin material is placed on the pan 13 above which is mounted a diaphragm 17 of thin material and having a different co-efficient of expansion and contraction than the casing body 13, after which the flanges 15 are crimped over the diaphragm 17, as shown in Fig. 5. At the time the flanges 15 are crimped over the diaphragm 17, we preferably form a bead 18 therein so that the casing 13, the gasket 16, diaphragm 17 and the flanges 15 will be firmly held together to provide a water-tight seal and which will prevent the water or steam within the actuator from leaking around the diaphragm. Also, by forming the parts as heretofore described, it is not necessary to solder the diaphragm to the casing as a satisfactory and adequate seal therefor can be provided without that extra material and labor expense.

In the bottom wall 14, we provide an inwardly directed offset portion 19 having a downwardly directed flange 20 surrounding the aperture in which a pipe 21 is inserted, the inner end of the pipe being swaged or flared outwardly at 22 to firmly seat against the flange 20. We also solder or weld the edge face of the pipe 21 to the pan as shown at 23 to thereby prevent any possibility of leaking between the pipe and the pan. Spaced from the inwardly directed offset portion 19 is an outwardly directed offset portion 24 which has a flange 25 similar to the flange 20 in which is mounted a pipe 26 which also has its inner end flared outwardly at 27 and then soldered or welded at 28 in the same manner as the pipe 21 is secured into the pan. The pipes 21 and 26 are identical in shape both extending downwardly from the pan 13 substantially perpendicular thereto and are then curved and extend through the bottom wall of the boat 10 and then rearwardly along the bottom face thereof as shown in Fig. 2.

Mounted on the bottom of the boat is a candle 30, or any other suitable means which may be utilized to heat the water within the actuator, to generate the steam to propel the boat. With the parts in the assembled position as heretofore described, the operator will insert water in one of the pipes 21 or 26 to fill the same and the actuator, after which the candle 30 is lighted to heat the water in the actuator. As soon as steam is generated, the pulsations of the diaphragm 17 will act as a pump thus drawing water in the actuator 12 through one of the pipes 21 or 26 and discharging the same through the other pipe. The explosions from the exhaust pipe will cause the boat to travel along the water and the rapidity of the pulsations of the diaphragm will impart a relatively fast speed to the boat.

It has been found that by providing the offsets 19 and 24 in the bottom wall of the actuator whereby there is at one point a relatively small distance between the pan and the diaphragm and at another point a relatively greater distance between the pan and the diaphragm, the operation of the actuator is materially improved. Also, it has been found that it is of material advantage to position the inner ends of the pipes 21 and 26 substantially flush with the bottom wall of the pan at the point where they are attached thereto to thus eliminate any obstruction within the actuator and thus permit a free flow of water and steam through the actuator. By attaching the pipes to the actuator in the manner illustrated in Fig. 4 and as previously described, any heat directed against the pipes by the candle 30, or other heating means, will not melt the solder at the connections and even should the solder or welding as indicated at 23 or 28 become damaged for any reason, the flared ends 22 and 28 of the pipes 21 and 26 will prevent disengagement of the pipes from the actuator so that there is little likelihood of the parts separating or breaking even should there be excessive heat, or if for any reason the water should fail to circulate through the pipes and actuator, as previously described.

It will also be noted that by mounting the actuator in the manner illustrated in Fig. 2 in which we are permitted to set the same at a slight angle to the bottom of the boat, that we are enabled to use the relatively large heating unit without in any way destroying the efficiency of the actuator and also from experiments we have found that greater speed of the boat may be obtained by so doing.

The actuator illustrated and described may, of course, be used in toy boats and similar articles of various sizes and shapes so that the model which we have illustrated is for the purpose of illustration only and in no way limiting the scope of the invention. Also, we have shown the hull of the boat as made of wood but it will, of course, be understood that any suitable material may be used without in any way affecting our invention.

Although we have shown the actuator as rectangular in shape, it will also be understood that the shape, size and proportion of the same may be varied as found necessary or desirable for use in boats of different sizes or shapes so that those changes which will occur to those skilled in the art are contemplated as coming within the scope of our invention.

Although we have illustrated and described only one embodiment of our invention, it will be understood that various changes in materials, con-

struction and method of assembly are contemplated as coming within the scope of our invention and the same is limited only by the subjoined claims.

What we claim is:

1. A device of the class described comprising, a pan-shaped body having spaced oppositely directed offsets therein, a pipe attached in each of said offset portions having its end substantially flush with the inner face thereof, and a diaphragm secured to said body in spaced relation to the bottom wall of said body.

2. A device of the class described comprising, a body having a depressed bottom wall, oppositely directed apertured offset portions in said bottom wall, pipes inserted in said offset portions with their inner ends substantially flush with the inner faces of said offset portions whereby the end of one pipe extends above the normal plane of said bottom wall and the end of the other pipe below the normal plane thereof, and a diaphragm secured to said body in spaced relation to said bottom wall.

3. A device of the class described comprising, a body having a depressed bottom wall and inturned flanges, a diaphragm forming a cover for said body between said wall and flanges, a bead in said flanges providing a water-tight seal between said body and diaphragm, oppositely directed apertured offset portions in said bottom wall, and pipes inserted in said offset portions with their inner ends substantially flush with the inner faces of said offset portions whereby the end of one pipe extends above the normal plane of said bottom wall and the end of the other pipe below the normal plane thereof.

4. A device of the class described comprising, a body having a depressed bottom wall, oppositely directed apertured offset portions in said bottom wall, pipes inserted in said offset portions having their ends swaged against the walls thereof, the end of one pipe extending above the normal plane of said bottom wall and the end of the other pipe below the normal plane thereof, sealing means between said pipes and offset portions, and a diaphragm secured to said body in spaced relation to said bottom wall.

5. A device of the class described comprising, a body having a depressed bottom wall, oppositely directed apertured offset portions in said bottom wall, pipes inserted in said offset portions with their inner faces substantially flush with the inner faces of said offset portions, said pipes being joined and sealed to said offset portions at the inner faces thereof, and a diaphragm secured to said body in spaced relation to said bottom wall.

6. In a toy boat, an actuator therefor comprising, a body having a depressed bottom wall, a diaphragm forming a cover for said body secured thereto, oppositely directed apertured offset portions in said bottom wall, pipes inserted in said offset portions having their ends substantially flush with the inner faces of said offset portions whereby the end of one pipe extends above the normal plane of said bottom wall and the end of the other pipe below the normal plane thereof, said pipes each having a portion extending substantially perpendicular to said bottom wall and a portion extending outside of and substantially parallel with the bottom of said boat.

7. In a toy boat, an actuator therefor comprising, a body having a depressed bottom wall, a diaphragm forming a cover for said body secured thereto, oppositely directed apertured offset portions in said bottom wall, and pipes inserted in said offset portions so that the end of one pipe extends above the normal plane of said bottom wall and the end of the other pipe below the normal plane thereof, each pipe having its end secured to said bottom wall at its inner face thereof and each having a portion extending substantially perpendicular to said bottom wall and a portion extending rearwardly outside of said boat along the bottom thereof.

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