Nov. 10, 1936. O. J. F. JACOBSON 2,060,619

MECHANICAL PADDLE CANOE TOY

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Fig. 1,

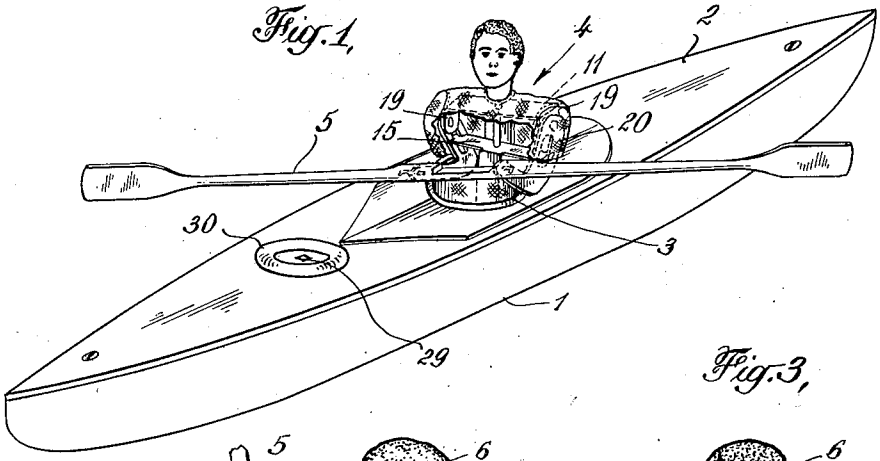

Fig. 3,

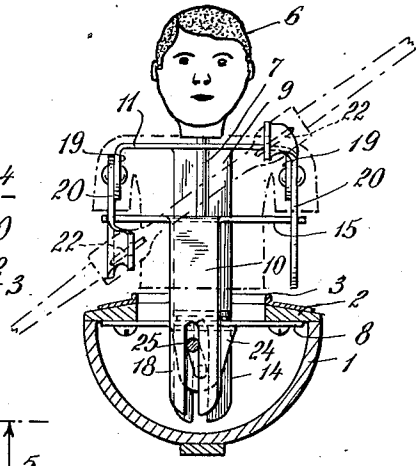

Fig. 2,

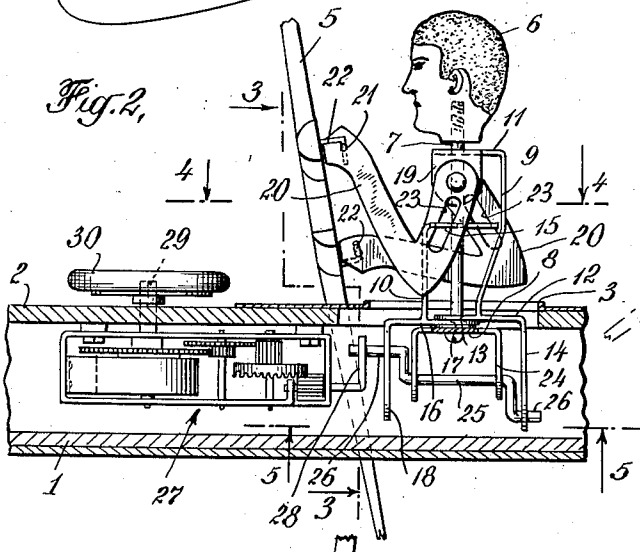

Fig. 4,

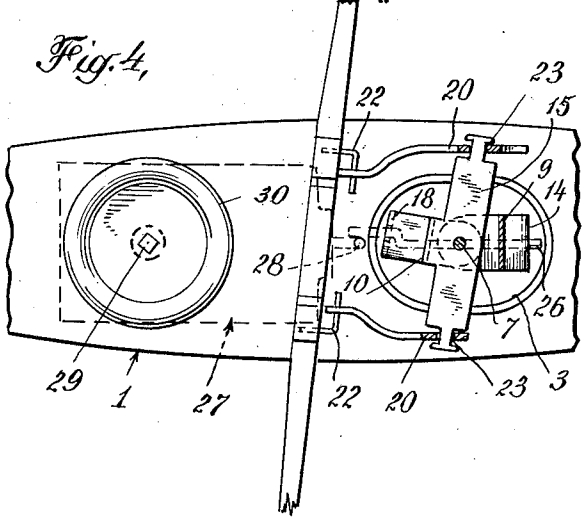

Fig. 5,

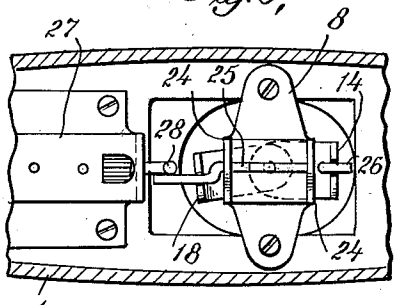

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Fig. 6,

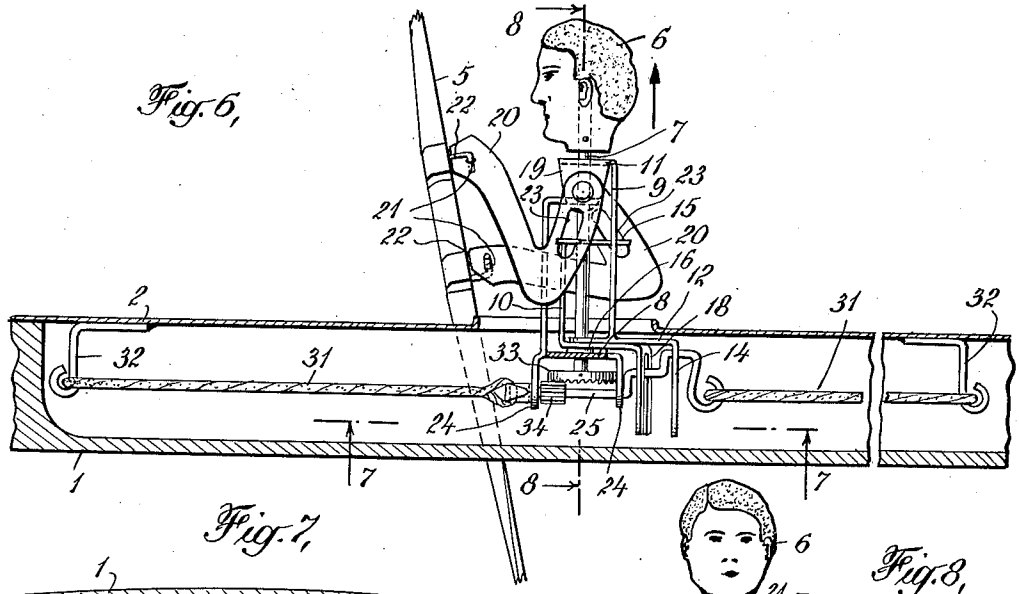

Fig. 7,

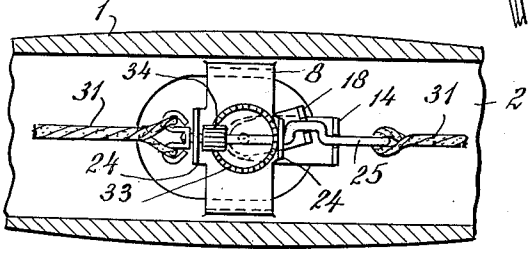

Fig. 8,

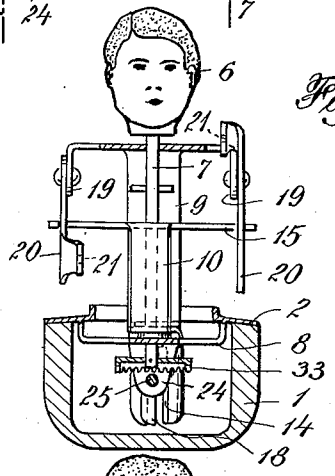

Fig. 10,

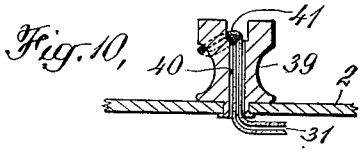

Fig. 11.

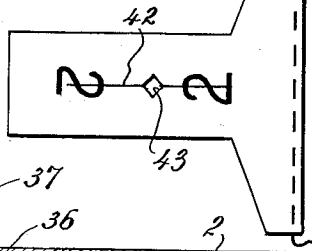

Fig. 9,

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UNITED STATES PATENT OFFICE

2,060,619

MECHANICAL PADDLE CANOE TOY

Oskar J. F. Jacobson, New York, N. Y.

Application August 24, 1935, Serial No. 37,615

20 Claims. (Cl. 46—92)

This invention relates to mechanical paddle canoe toys, particularly of the type in which a double paddle is employed, and has for its object the provision of improved and simplified mechanism for operating the paddle and simulating the natural bodily movements of a paddler.

In the accompanying drawings, I have illustrated a number of embodiments of my invention. In these drawings, Figure 1 is a perspective view of a toy canoe showing an automaton seated in the canoe and holding a double paddle; Figure 2 is a longitudinal, vertical section along a plane parallel to the keel of the canoe and showing the paddle-operating mechanism in side elevation; Figure 3 is a vertical, transverse section taken along line 3—3 of Figure 2; Figure 4 is a horizontal section taken along line 4—4 of Figure 2; Figure 5 is a horizontal section taken along line 5—5 of Figure 2 showing the bottom of the mechanism; Figure 6 is a view similar to Figure 2 showing a modified form of the mechanism; Figure 7 is a section taken along line 7—7 of Figure 6 showing the bottom of the mechanism shown in that figure; Figure 8 is a vertical transverse section taken along line 8—8 of Figure 6; Figure 9 is a view similar to Figures 2 and 6 showing a further modified form of the mechanism; Figure 10 is a detail of a further modification; and Figure 11 is a view of the shirt or jacket for the automaton in the canoe.

The toy shown in these drawings comprises a small skiff or canoe 1, provided with a deck 2, in the cockpit 3 of which is seated an automaton 4 whose arms hold a double paddle 5. The mechanism, which I shall presently describe, moves the arm extremities or hands of the automaton in ellipsoidal paths and in such phase relationship that the blades of the double paddle are dipped in the water, moved astern and lifted from the water in proper sequence, thus simulating the natural movements of a paddler propelling a boat forward.

In Figures 2, 3, 4, and 5, I have illustrated one form of mechanism for operating the paddle. As shown in these figures, the head 6 of the automaton is mounted upon the upper end of a vertical rod 7 secured at its lower end to a transverse plate 8 screwed to the underface of the deck. Mounted upon the plate 8 for oscillation about the rod 7 are a pair of uprights 9 and 10. The upright 9 carries at its upper end a horizontal transverse bar 11, which constitutes the shoulders of the automaton, and terminates at its lower end in a plate or offset 12, the forward end of which is pierced at 13 to receive the rod 7 and from the rear end of which depends a fork 14. Similarly the other upright 10 carries at its upper end a horizontal transverse bar 15 and terminates at its lower end in a plate 16 having at one end an aperture 17 for receiving the rod 7 and at its other end a depending fork 18. The outer ends of the bar 11 terminate in depending flanges 19 upon which arms 20 are pivotally mounted. These arms are permanently crooked at the elbow and are provided at their outer extremities with holes 21 for receiving pins 22 affixed to the paddle 5. The arms being of spring metal, the paddle is mounted and demounted by springing the arms inwardly to clear the inwardly extending ends of the pins 22. As clearly illustrated in Figure 4, the space between the pins 22 is sufficient to provide for variations in the spacing of the arms as they assume varying positions during the paddling operation. The upper parts of the arms 20 are provided with slots 23 through which project the ends of horizontal bar 15.

Mounted upon the underface of the plate 8 is a bearing bracket 24 in which is journaled a crankshaft 25 terminating in cranks 26, which extend within the slots of the forks 14 and 18. As shown in Figure 2, these cranks are angularly displaced relatively to each other. A spring motor 27 is mounted upon the underface of the deck just forward of the mechanism just described and through an angle arm 28 contacting with an extension of the forward crank 26, rotates the crankshaft 25. The motor 27 is provided with a winding stem 29 extending upwardly through the deck and terminating in a wheel 30 simulating a life-preserver.

The mechanism just described operates as follows: Rotation of the crankshaft 25 acts through cranks 26 and forks 14 and 18 to oscillate the horizontal bars 11 and 15 through limited arcs about the vertical axis of rod 7. As the cranks are angularly displaced relative to each other the bars 11 and 15 oscillate out of phase, the exact phase relationship being determined by the angular displacement of the cranks. The oscillating bar 11 carries the arms 20 with it, and as the bar 15 is oscillating at the same time, and as the ends of this bar make a sliding contact with the arms through the slots 23, the arms are made to oscillate about their pivots, and these oscillations are also out of phase. As a result of these horizontal and vertical oscillations, the forward ends of the forearms or hands of the automaton describe ellipsoidal paths and swing the paddle 5 to propel the canoe.

For most satisfactory operation the paddle blades should be in a substantially vertical plane when dipped into the water, during the stroke, and when lifted from the water. To this end the rear face of the paddle handle adjacent the pins **22** is made flat and the ends of the arms have straight edges disposed at an obtuse angle to each other so as to bear on these flat areas on opposite sides of the median line of the paddle when a blade is in the water. Figure 2 illustrates the paddle with one blade immersed and the other elevated. The end of the upper arm bears against the lower side of the flat area adjacent its pin **22** while the end of the lower arm bears against the upper side of the flat area adjacent the other pin **22**. Thus the blades are held in vertical position when in the water.

In the modified form of apparatus shown in Figure 6 the mechanism extending above the deck of the canoe is substantially the same as that just described. In the mechanism below the deck, however, I have made certain changes, notably in the motor and its winding mechanism and the location of the forks **14** and **18**. The fork **14** which oscillates the horizontal bar **11** remains as before, but the fork **18**, which oscillates the bar **15**, is placed at the rear closely adjacent the fork **14**. Thus both forks are on the same side of the axis of vertical oscillation and on the side opposite the forearms of the automaton and hence of the paddle. A better balance of the mechanism is thus effected. This change involves necessarily a change in the position of the cranks both of which are mounted on the same end of the crankshaft.

Instead of the ordinary spring motor **27**, as shown in Figure 2, I have here provided a motor in the form of two rubber bands **31** each of which is secured at one end to a bracket **32** depending from the deck, and at their other end to a hooked extremity of the crankshaft. Rotation of these rubber bands about their common axis, when under torsion, rotates the crankshaft and cranks, and through the forks operates the paddle as described previously. By using two rubber bands I get the propulsion effect of a single long band but with the advantage of balance, the longitudinal pull of each band on the operating mechanism being equal and opposite.

I have provided the following mechanism for winding this motor; the vertical rod **7** which supports the head **6**, instead of being fixed at its lower end upon a transverse plate, is journaled within that plate and is provided at its lower end with a crown gear **33** meshing with a pinion **34** upon the crankshaft. To twist the rubber bands and thus wind the motor, the head **6** of the automaton is turned. In order to prevent untwisting of the rubber bands during the winding operation when fingers are temporarily removed from the head to secure a new grip, the crown gear **33** is mounted so that its periphery makes frictional engagement with one wall of the bearing bracket **24**. This frictional engagement is sufficient to prevent unwinding of the rubber bands until the torsion created by the winding operation has reached a predetermined point. After this point is reached rotation of the crown gear **33** is reversed until the torsion of the rubber bands and the friction between the crown gear and the bearing bracket reach equilibrium. Thus overwinding and consequent breakage of the rubber band motor is improbable. At the same time I have simplified and cheapened the mechanism by doing away with a ratchet. In order to permit the torsion motor to perform its intended function after it has been wound I withdraw the crown gear from engagement with the pinion by pulling upward on the head **6**. When this disengagement has taken place the rubber bands are free to rotate the crankshaft and operate the paddle.

It will be noted that nothing projects above the deck except the torso of the automaton, thus giving an effect of naturalism. The motor is started, stopped and wound through means controlled by the head of the automaton, and the head may be left in any desired angular position thus adding another naturalistic touch.

The form of apparatus shown in Figure 9 represents a still further simplification of the mechanism. In this apparatus I have but one bearing for the crankshaft **25** and but a single rubber band **31**. I have also eliminated all gears and pinions and have provided a simplified means for winding the torsion motor. The forward end of the rubber band **31** is connected to a string or other similar flexible connection **35**. This string extends upwardly through a tube **36** and terminates in a knob **37** mounted on the upper side of the deck and held in frictional engagement therewith by means of a spring **38**. When holding the paddle, the rubber band can be twisted by turning the knob **37**, the frictional resistance of the string **35** in the tube **36** being sufficient to permit this. Overwinding, however, is prevented by slippage of the string when the torsion of the band has reached a predetermined value.

In Figure 10 I have illustrated a modified form of winding knob and connections. The knob **39** is rotatably mounted on the deck of the boat and is provided with a bore **40** and a transverse slot **41** across its top face. The end of the rubber band extends upwardly through the bore, divides in the slot, and the loop extends under the head of the knob. Two bands might be used if desired. With this form of winding knob it is a simple matter to replace a broken rubber band.

In Figure 11 I have illustrated the jacket or shirt with which the automaton is clothed. This garment is substantially T-shaped, the stem of which is provided with a slot **42** and a hole **43** for receiving the head of the automaton and the cross bar which encircles the waist of the figure and is provided with a draw-string **44**.

I claim:

1. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a horizontal bar, means for oscillating the bar in a horizontal plane about a vertical axis, arms pivotally mounted on the bar and supporting the paddle, and means for oscillating the arms about the bar out of phase relative to each other as the bar is oscillated about its vertical axis.

2. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a horizontal bar, means for oscillating the bar about a vertical axis, arms pivotally mounted on the bar and supporting the paddle, a second bar, means for oscillating the second bar about the same vertical axis but out of phase with the first bar, and means connecting the second bar with the arms.

3. In a mechanical paddle canoe toy, comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of vertically spaced hori-

zontal bars mounted for oscillation about a vertical axis, arms pivotally mounted on the upper bar and supporting the paddle, a sliding connection between the arms and the lower bar, forks connected to each bar, cranks in each fork angularly displaced relative to each other, and a crankshaft for revolving the cranks, whereby the bars and arms are oscillated out of phase with each other.

4. In a mechanical paddle canoe toy, comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of vertically spaced horizontal bars mounted for oscillation about a vertical axis, arms pivotally mounted on the upper bar and supporting the paddle, a sliding connection between the arms and the lower bar, supporting uprights for each bar, an offset at the base of each upright, a fork depending from each offset, cranks in each fork angularly displaced relative to each other, and a crankshaft for revolving the cranks, whereby the bars and arms are oscillated out of phase with each other.

5. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of vertically spaced horizontal bars, mounted for oscillation about a vertical axis, arms pivotally mounted on the upper bar and supporting the paddle, and having forwardly extending forearms for supporting the paddle, sliding connection between the arms and the lower bar, forks connected to each bar on the side opposite the forearms, cranks in each fork angularly displaced relative to each other, and a crankshaft for revolving the cranks, whereby the bars and arms are oscillated out of phase with each other.

6. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of vertically spaced horizontal bars, mounted for oscillation about a vertical axis, arms pivotally mounted on the upper bar and supporting the paddle, a sliding connection between the arms and the lower bar, forks connected to each bar, cranks in each fork angularly displaced relative to each other, a crankshaft for revolving the cranks whereby the bars and arms are oscillated out of phase with each other, a rubber band connected to the crankshaft, and means for twisting the rubber band to rotate the crankshaft.

7. A mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, a motor for driving the mechanism, means for winding the motor, and friction means preventing unwinding of the motor during the winding operation until the torsion of the motor reaches a predetermined value.

8. In a mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, and a rubber band connected to the mechanism, the combination of winding means for twisting the rubber band, friction means preventing untwisting of the rubber band during the winding operation until the torsion of the rubber band reaches a predetermined value, and means for disengaging the winding means from the rubber band to permit the twisted rubber band to untwist and drive the mechanism.

9. In a mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe and a rubber band connected to the mechanism, the combination of a winding stem, a crown gear on the stem, a pinion connected with the rubber band and designed to mesh with the crown gear during the winding operation, means for urging the periphery of the crown gear into frictional engagement with a fixed part of the mechanism during the winding operation, thereby preventing untwisting of the rubber band during winding until a predetermined torsion is reached, and means whereby the crown gear may be disengaged from the pinion to permit the twisted rubber band to untwist and drive the mechanism.

10. In a mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, and a rubber band connected to the mechanism, the combination of a longitudinally slidable winding stem, the head of the automaton being mounted on the upper end of the stem, and a crown gear on the lower end, and a pinion connected with the rubber band and designed to mesh with the crown gear during the winding operation, disengagement of the crown gear and pinion being effected by pulling upward on the head of the automaton.

11. A mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, a rubber band connected at one end to the mechanism and at its other end to a flexible element, a tube at an angle to the axis of the rubber band through which the flexible element passes, and a rotatable member at the outer end of the tube and connected to the flexible element.

12. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of spaced pivoted arms, means for oscillating the arms out of phase relative to each other, and means for pivotally mounting the paddle on the ends of the arms about a longitudinal axis, the ends of the arms being so shaped that the raised arm bears on the paddle below the pivotal axis and the lowered arm above the pivotal axis whereby the blade of the paddle is held in vertical position while in the water.

13. A mechanical paddle canoe toy comprising a canoe, an automaton in the canoe, a pair of oscillating spring arms on the automaton, and spaced supports on the paddle for engaging the arms, the spacing of the supports and the arms requiring that the arms be sprung to engage the supports.

14. A mechanical paddle canoe toy comprising a canoe, a pair of oscillating arms, a paddle carried by the arms, mechanism for moving the arms to propel the canoe, rubber bands attached to opposite sides of the mechanism and means for twisting the bands to actuate the mechanism.

15. In a mechanical paddle canoe toy comprising a canoe and a paddle, the combination of means for operating the paddle to propel the canoe comprising a pair of vertically spaced horizontal bars, mounted for oscillation about a vertical axis, arms pivotally mounted on the upper bar and supporting the paddle, a sliding connection between the arms and the lower bar, forks connected to each bar, cranks in each fork angularly displaced relative to each other, a crankshaft for

revolving the cranks whereby the bars and arms are oscillated out of phase with each other, two rubber bands, one attached to each end of the crankshaft, and means for twisting the rubber bands to rotate the crankshaft.

16. A mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, a motor for driving the mechanism, and means for winding, starting and stopping the motor, all operated by moving the head of the automaton.

17. A mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, mechanism for moving the arms to propel the canoe, a winding knob having a bore and a diametral slot in its upper face, and a rubber band connected at one end to the mechanism, its other end extending through the bore of the winding knob and looped through the slot and under the head of the knob.

18. In a mechanical paddle canoe toy comprising a canoe, an automaton paddler in the canoe, a paddle carried by the arms of the automaton, and mechanism for moving the arms to propel the canoe, the combination of a garment for the automaton substantially T-shaped with a slot in the stem of the T for receiving the head of the automaton, the cross bars of the T encircling its waist.

19. A mechanical canoe toy comprising a canoe, a paddle, an automaton having arms which support the paddle, means for moving the arms to dip the paddle, the distance between the outer ends of the arms varying during the stroke, means for loosely mounting the paddle on the outer ends of the arms to allow for said variation, and means for holding the blade of the paddle vertical while in the water.

20. A mechanical paddle canoe toy, comprising a canoe, an automaton paddler in the canoe, a horizontal bar forming the shoulders of the automaton, means for oscillating the bar in a horizontal plane about a vertical axis, arms pivotally mounted at opposite ends of said bar, a paddle carried by said arms, and means for oscillating the arms about the bar out of phase relation to each other as the bar is oscillated about its vertical axis.

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