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[54] **TOY AMPHIBIOUS BOAT**
10 Claims, 9 Drawing Figs.

[52] U.S. Cl. 46/96
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[50] Field of Search. 46/96

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ABSTRACT: A combination pull toy and boat having amphibious wheel structure driven by a motor contained in a watertight barnacle housing with socketed mounting means, and which is preferably also a music box and provides power for water and carriage propulsion with clutch means relieving the motor of counterdrive from the wheels when the toy is pulled.

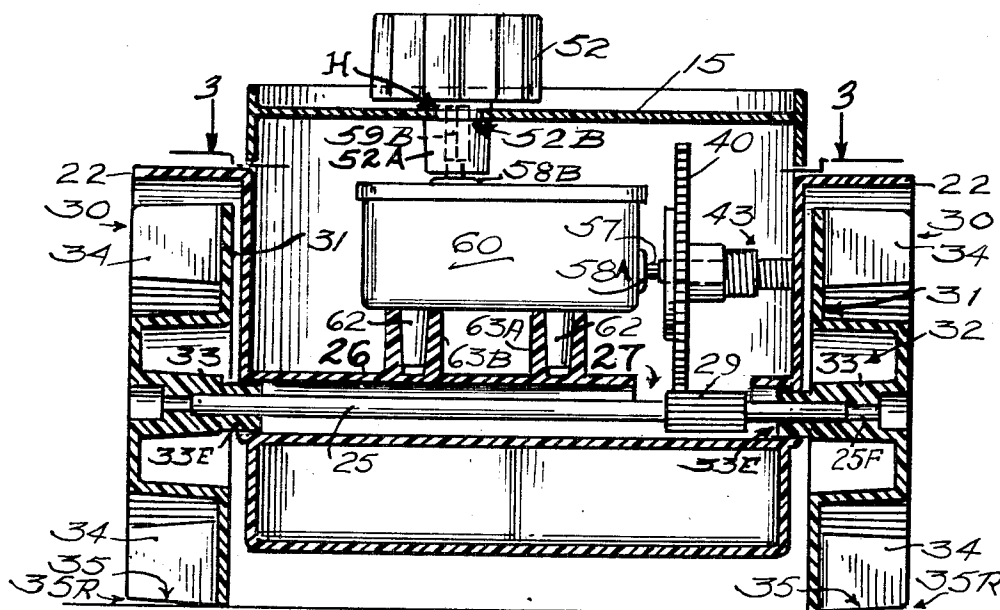


Fig. 1.

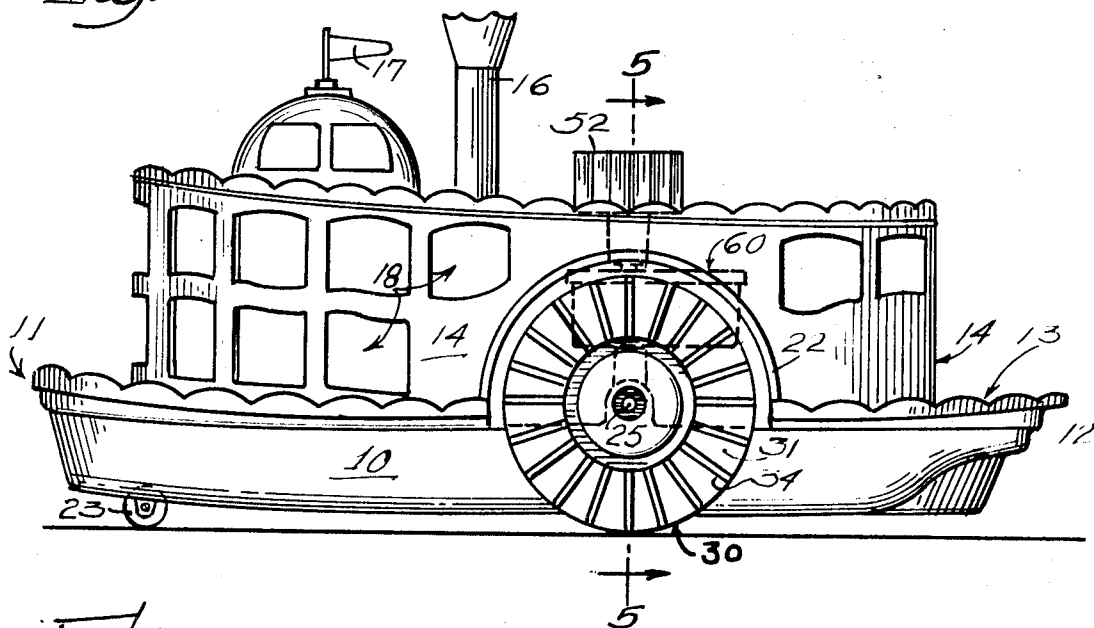


Fig. 2.

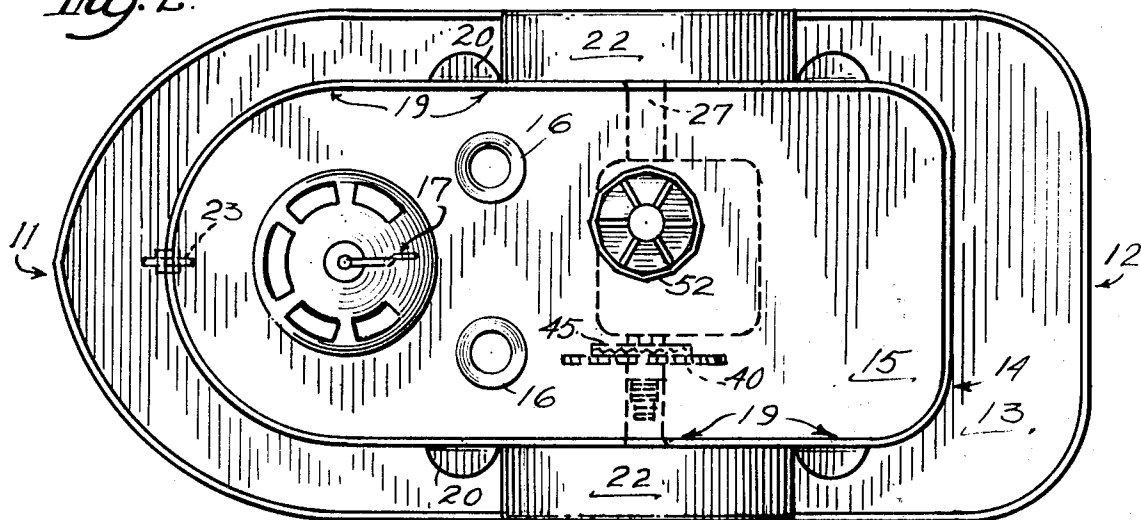


Fig. 3.

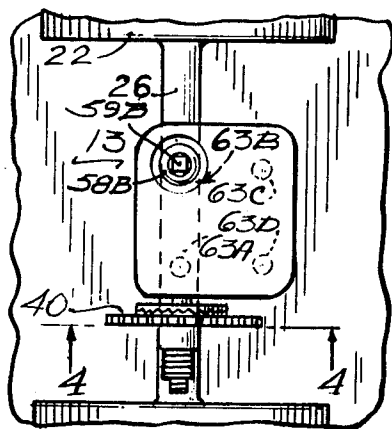
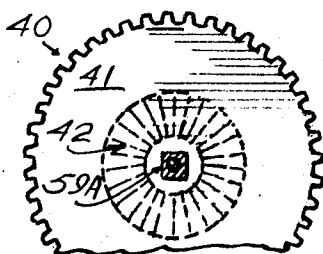
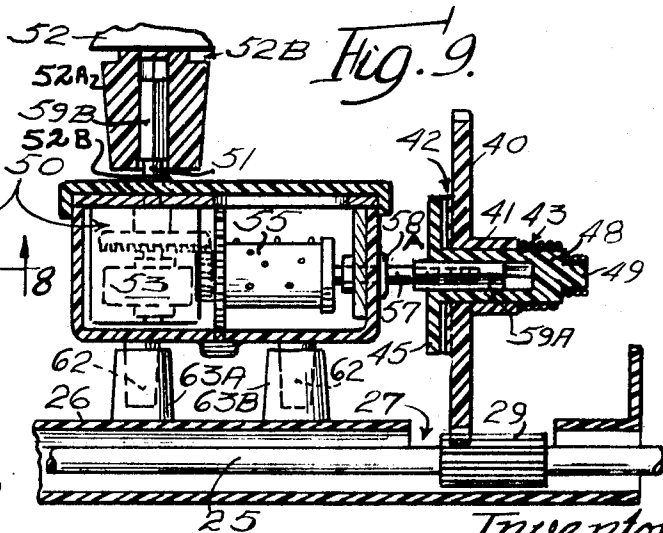
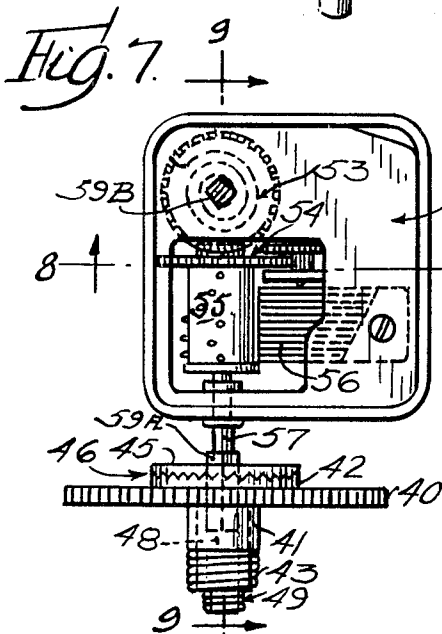
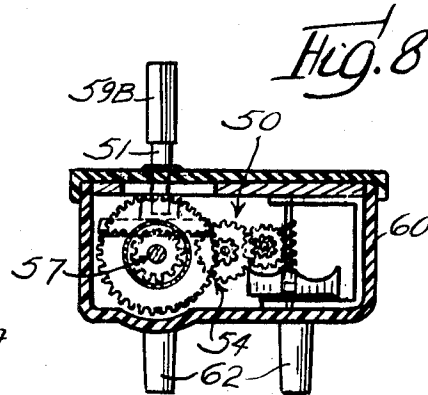
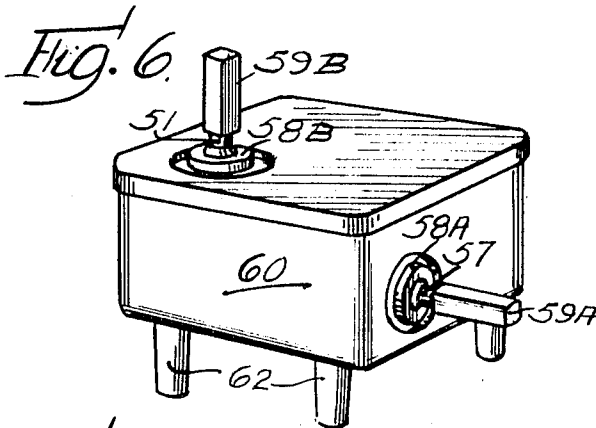
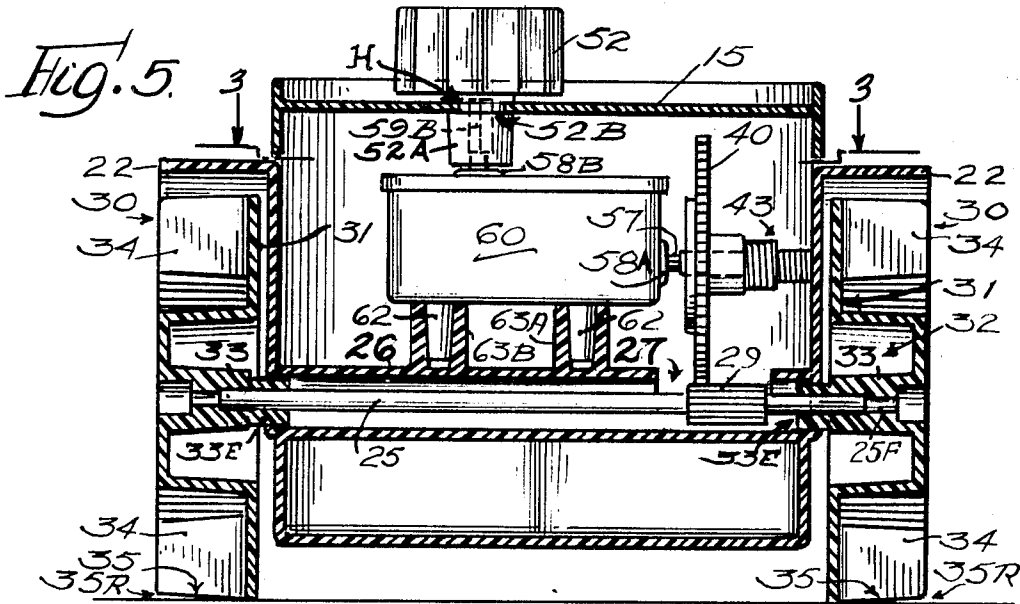


Fig. 4.



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TOY AMPHIBIOUS BOAT

The invention provides a toy in the form of a boat with side wheels which support it for traction and carriage action as a pull or push toy and also propel it in water in the manner of a side-wheeler, the construction being such that the main body may be a hollow plastic molding sealed off by a deck member to provide a floatable hull.

Among some of the novel and utilitarian features of the construction are the provision of a shaft tunnel as a part of the deck structure which houses the wheel shaft so that no water seals for the hull are necessary; and the provision of a sealed housing for a motor unit seated by a special socket means on the deck plate with locating members on and adjacent to the shaft tunnel where the motor unit may be accurately aligned with the shaft during assembly and thereafter maintained in such condition; together with clutch means and driving gear means intercoupling the motor with the shaft in the tunnel to drive the paddle wheels, which are contrived with relief formations on the paddle margins to afford a substantially continuous rolling circumference about the backwall of the wheels so that the latter do not turn upon the discontinuities of the successive paddles, the wheel hubs preferably having reduced end portions fitting into the open ends of the shaft tunnel in the manner of journals for rotative support and to align the shaft in an oversize tunnel.

Additional aspects of novelty will be made to appear as the following description proceeds in view of the annexed drawings in which:

FIG. 1 is a side elevation of the toy;

FIG. 2 is a top plan view of the same;

FIG. 3 is a fragmentary top plan view of a portion of the deck plate showing the motor unit and certain drive gearing;

FIG. 4 is an enlarged fragmentary elevation of the driving bull gear;

FIG. 5 is a vertical cross section taken along lines 5—5 of FIG. 1;

FIG. 6 is an enlarged perspective detail of the motor unit and housing;

FIG. 7 is an enlarged top plan view of the motor housing with the top removed and cooperative drive gearing and clutch means;

FIG. 8 is a vertical cross section through the motor unit taken along lines 8—8 of FIG. 7;

FIG. 9 is an enlarged fragmentary cross section of the motor means and drive gearing and parts of the shaft tunnel as seen in the direction of lines 9—9 of FIG. 7.

Referring to FIG. 1, the toy comprises a floatable body portion 10 preferably in the shape of a conventional boat structure having a prow 11 and a stern transom 12, and formed of molded plastic material with an open top portion closed by a deck plate 13, FIG. 2, with a watertight seal. Secured upon the deck is a cabin structure 14 of any desired configuration, preferably with open windows 18 for drainage, and fabricated as a molded member including a roof portion 15, this structure consisting of a single piece except for a winding knob 52, two stack members 16, and a decorative pennant 17, the latter and the stacks being separate assembly formations.

Shallow trough and socket portions indicated generally at 19 in FIG. 2 are formed in the deck member to receive the bottom rim and integral footing portions 20 of the deckhouse for permanent attachment to the deck therein, preferably by cementing.

Formed as an integral part of the hull body are arcuate wheel guards 22, FIGS. 1 and 2, within which are respectively received paddle wheels 30 affixed to the ends of a drive shaft 25 rotatable in a shaft tunnel 26, FIG. 3, formed as an integral part of the deck plate, and having, as seen in FIG. 5, an upwardly exposed side opening 27 through which a driven pinion 29, fixed on the shaft, is exposed for mesh with a bull or driving gear 40.

The wheels 30, FIGS. 1 and 5, are of molded construction, comprising an annular backplate or wall 31 with a hollow hub

cavity 32 in which is an axial hub section 33 projecting into the shaft tunnel and provided with a bore to receive the end of the shaft by press fit, the shaft end having a flattened portion keying with a similar flattening in said bore, as at 25F in FIG. 5.

Disposed about the hub portion of the wheel are a plurality of paddle vanes 34 formed as an integral part of the molded wheel structure, these vanes having an outer margin 35, FIG. 5, pitched slightly inwardly away from the peripheral rolling surface or margin of the backwall or plate portion 31 toward the wheel axis to provide a substantially smooth rolling relief, as at 35R, when the toy rolls upon a surface, so that the wheel is equally a water-propulsion paddle wheel and a surface rolling carriage wheel.

As seen in FIG. 1 a small idler wheel 23 is disposed on the bottom of the body member and near the prow to support the forward end of the vessel to prevent abrasion in this area when the toy is pushed or pulled.

As viewed particularly in FIGS. 4, 7, and 9, the bull gear 40 is provided with a bored hub 41 projecting outwardly from one face thereof, and the opposite face is provided with clutch teeth 42 adapted to coact with the teeth 46 formed on the inner face of a coacting clutch disc 45 having a stud spindle 48 (FIG. 9) fitting into the bore of the gear hub and upon which is fixed a two-section coil spring 43 the smaller outer end portion 44 of which is of reduced diameter to seize the reduced end portion 49 of the clutch stud spindle, the spring being wound in a manner to draw the smaller clutch disc toward the bull gear and intermesh the respective clutch teeth of these parts, as in FIG. 7, said teeth having symmetrical flat pitch such that they can slip in either direction of rotation of the bull gear.

The clutch disc stud spindle is bored square in cross section, FIG. 4, to key onto a squared adapter 59A threaded onto the drive shaft 57 of the motor, FIGS. 7 and 9, whereby the disc member 45 of the clutch assembly is driven to impart drive to the bull gear and the driven shaft pinion 29 until a predetermined resistance from the wheel load causes the clutch to slip, so that when the toy is held down and pushed on the floor or drives into an obstacle sufficient to stop its progress, the motor shaft can continue to turn and will not overdrive the motor.

The motor means employed in the toy is preferably a conventional spring windup music box mechanism 50, such as depicted in FIGS. 7, 8 and 9, the latter view showing the winding spindle 51 which is rotated by the knob 52, FIG. 5, to tension the usual drive spring 53 (not detailed) which in turn drives a gear system 54 and a tone drum 55 to sound tone reeds 56 in the known manner, the motor shaft 57 continuing through a housing sidewall and a water seal 58A therein for engagement with the squared keying adapter 59A, coupling it to the clutch spindle. The motor windup spindle 51 emerges through another water seal 58B in the top of the motor casing to engage another squared adapter 59B which keys into a complementary squared bore in the hub portion 52A of the winding know, said hub portion also having a circumscribing groove 52B (FIG. 9) to interfit with the margins of a hole H in the cabin top 15, as in FIG. 5, whereby the know is secured in position but free to rotate.

The motor comprises a subassembly which is watertight and encased in a sealed-housing structure 60, such as depicted in FIG. 6, comprising a molded rectangular plastic receptacle having an open top and an opening in one sidewall into which the drive shaft seal 58A is fitted, the top being closed by a cover plate cemented in position and provided with an opening in which another windup shaft seal 58B is fitted.

A unique mounting arrangement is provided for the motor subassembly permitting it to be simply placed in aligned operative position to dispose and maintain the driving and driven gears in mesh, such mounting means comprising FIGS. 6 and 8, the provision as integrally molded parts of the bottom of the casing, of four pendant stubs or pins 62 each situated in proximity to one of the four corner portions of the casing and each slightly tapering down at its end for easy entry but ultimately firm final interfit with the bore in a complementary

socket formation 63, generally and individually, indicated at 63A...B...C...D, FIG. 3, two of these sockets 63A, 63B (FIG. 3, 5 and 9) being a part of the shaft tunnel structure, FIG. 3, while the other two sockets 63C, 63D, stand from the deck surface, as seen in dotted lines in FIG. 3.

Owing to the fact that the usual music box motor construction locates the tone drum and driving shaft therefor near the corner of a casting constituting the harp for the tone reeds, the motor shaft is not situated symmetrically in relation to the four sidewalls of the casing or housing as would be desirable, with the result that since the bull gear 40 is mounted upon an extension of this drum shaft, two of the socket footings 63A, 63B are formed on the shaft tunnel and bull gear in accurate alignment with the driven shaft pinion, it being understood that the molded plastic construction, otherwise very advantageous, does not assure such an alignment because of possible warpage and flexure.

Thus, the socket means 62-63, by which the motor subassembly is operatively located, serves the purposes of automatically and accurately aligning the unit in driving relation to the wheel shaft, not only during assembly, but for the life of the toy, barring misuse and other destructive causes. In conjunction with this feature, the construction of the windup knob is cooperative in that the fixation of the know hub by the grooved interfit at 52B serves as a holddown to maintain the motor unit in the socketed seating arrangement aforesaid.

The clutch spring serves to maintain the clutching gear parts in releasable driving engagement, and also to hold the clutch disc in assembly with the bull gear, and is so contrived that the smaller diameter coil portion 44 fits very tightly on the reduced end portion 49 of the disc spindle and grabs the latter, while the larger diameter portion 43 has its coils loosely disposed about the bull gear hub and biased in a manner to draw the clutch disc toward the bull gear, such that a push of the disc spindle inwardly, toward the motor, and therefore away from the bull gear, such as occurs when the clutch teeth disengage or slip in clutch action, will be countered with spring action tending always to draw the disc back into clutching engagement with the bull gear. Thus, said spring releasably biases the clutch into driving condition and also secures the clutch parts in assembly run and permits the wheels to turn reversely without driving the music box motor, since the clutch gear teeth will cam apart and slip when the toy is forcibly pulled over a floor.

In order to facilitate manufacture of the toy with respect to economical mold design, ease of assembly, and broad tolerances in anticipation of possible warping of the synthetic molding plastic for various reasons, the diameter of the tunnel 26 is made substantially larger than that of the wheel shaft, and alignment of the latter with the wheel, and disposition of the pinion 29 in easy but substantially permanent driving engagement with the bull gear, and alignment of the wheels relative to the hull body and wheel guards, is achieved by providing reduced bushing portion 33E at the ends of the respective wheel hubs to fit for free rotation into the corresponding ends of the tunnel formation, the wheels having a substantial press fit onto the ends of the shaft and being in this manner properly located in an assembly operation which drops the shaft, with one wheel and the pinion already positioned thereon, easily into the tunnel and the remaining wheel pressed onto the remaining shaft end far enough to leave the wheel hub bushing portions freely rotatable in the tunnel but with minimal longitudinal play in the shaft. Such an arrangement is in furtherance of the previously described aligning and assembly functions of the tunnel and motor mounting structure.

I claim:

1. A combination pull toy and boat having a floatable hull body, a shaft tunnel extending crosswise of said body housing a shaft projecting from the body to engage a wheel at each of the opposite ends thereof; a combination carriage and water-propulsion wheel fixed upon said shaft at each of said ends, said tunnel having a side opening between its ends exposing a drive pinion on said shaft to mesh with a driving bull gear con-

stituting part of driving gear means; motor means including a housing therefor from which projects a driving spindle supporting part of said gear means including a bull gear; coaxing means on said housing and body seating said housing in a predetermined position thereon a predetermined alignment with said tunnel to align the motor spindle and bull gear for driving mesh with said driven pinion, said body being water tight and said shaft tunnel being substantially unsealed at its opposite ends and at said side opening but excluding water from entry into said hull body.

2. The construction set forth in claim 1 wherein said body is a hollow member having a deck portion sealing the same from entry of water and said shaft tunnel is disposed on the outer side of the deck with open ends at the corresponding opposite sides of the hull body, and said motor means housing is mounted as aforesaid on said outer side of the deck.

3. A construction according to claim 1 wherein the bull gear is coupled to said motor spindle through a slip clutch for pull-toy operation, said clutch comprising the formation of gear teeth on one side of the bull gear, a bored hub portion on the opposite side of the bull gear, a clutch disc having complementary gear teeth thereon and an extended spindle portion projecting from the side of the disc on which said teeth are formed and freely rotatably fitted into the bull gear bore with the respective teeth of the gear and disc meshing; spring means urging the disc toward the bull gear to mesh said teeth, and means keying the disc structure to said motor spindle, said teeth being adapted to permit slippage in case the wheels are over driven against the resistance of the motor spindle, as when the toy is pulled or pushed on a supporting surface.

4. The construction of claim 1 wherein said motor housing means comprises a casing for the motor including a sidewall and a bottom wall, said motor spindle projecting from said sidewall for driving coaxion with the driving gear means as aforesaid, and means for seating said housing with said motor spindle in alignment with said wheel shaft and said bull gear meshing with said pinion, said seating means comprising a plurality of interfitting pin and socket pairs respectively situated on said bottom wall and said deck, at least, and arranged in predetermined locating relationship with said shaft tunnel to dispose the housing in the condition of alignment aforesaid.

5. The construction set forth in claim 4 wherein seating means is further characterized in that at least one of said paired members is disposed on said shaft tunnel to constitute at least one fixed point of alignment for the housing relative to the tunnel the shaft therein and said pinion on the shaft, and at least one other of said paired members on said deck at a side of said shaft tunnel to fix the location of the housing in the predetermined relationship set forth.

6. The structure defined in claim 5 wherein said housing including said bottom wall is substantially rectangular and one of the interfitting members of each said pair is situated in adjacency to one of the four corners of the housing on said bottom wall, and there are two of said interfitting members, each complementary to one of the members on said bottom wall, situated in spaced relation along the length of said shaft tunnel, and another two of said interfitting members, respectively complementary to the like members remaining on said bottom wall, spaced apart on said deck at one side of the shaft tunnel, the axis of said motor spindle being thereby disposed above the wheel shaft in parallelism therewith and with a line connecting said interformations on the shaft tunnel.

7. In a toy vehicle, a member having a bottom and upstanding sidewall portions defining a substantially hollow vehicle body; a joined to said sidewall portions and constituting a closure for said body; a tubular formation integral with said top member and extending crosswise thereof to define a shaft support; a shaft rotatably received in said tubular formation and having opposite end portions disposed at respective opposite sides of the body, each said end portion having a wheel element engaged therewith to support the body for rolling motion.

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8. A construction according to claim 7 wherein each said wheel element has a hub portion concentric with the axis of rotation thereof and fitting freely into the proximate end of said tubular formation to support the appertaining wheel element for rotation in rolling motion as aforesaid.

9 In a toy construction, a body member having wheeled support and adapted to be fabricated by molding from synthetic plastic materials, said body having shaft-supporting means formed as an integral part of the molded material of one side of the body with hollow portions extending crosswise of the body and having a shaft member freely disposed therein with opposite ends exposed at respective opposite sides of said body; and a wheel member carried by each of said shaft ends and each wheel member having a hub portion fitting freely into the said body hollow portions at the appertaining side of the body to support the wheel member for rotation and dispose the shaft in a predetermined rotative clearance with respect to said hollow portions.

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10. In an amphibious-type vehicle construction, a closed off substantially hollow vehicle body having at least one side affording a substantially flat wall portion merging with opposite side margins of said body; a drive shaft disposed to extend crosswise of said wall portion and body between said margins; a propulsion member carried at each of the opposite ends of said shaft for rotation therewith adjacent said body margins; tubular formations conformed integrally with said wall portion and situated at least adjacent said shaft end to surround portions of the shaft thereat and retain the shaft in operative position for rotation; a driving member for rotating the shaft carried thereon and located and exposed between said tubular portions in condition for driving engagement with a rotatable driving member adapted to be situated externally of the said hollow body, whereby the shaft does not penetrate the hollow portions of the closed body and the driving means can be disposed externally of the hollow parts of the body.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,600,847

Dated August 24, 1971

Willis M. Lakin

It is certified that error appears in the above-identified Letters Patent and that said Letters Patent are hereby corrected as shown below:

The drawings - sheets 1 and 2 - are to be read to include all reference characters as specified in the file of the application;

Column 2, lines 56 and 58, in each instance, for "know" read "--knob--"; column 3, line 3, for "FIG. g" read "--FIG. 9--"; and column 4, line 68 (claim 7), before "joined", insert "--top member--".

Signed and sealed this 17th day of October 1972.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents