

### [54] ARTICLE ASSEMBLY EMPLOYING INTEGRATED, PREORIENTED DETAIL-DEFINING MEMBERS

- [72] Inventor: Edward G. McAuley, Wyoming, Ohio
- [73] Assignee: The Procter & Gamble Company, Cincinnati, Ohio
- [22] Filed: July 1, 1970
- [21] Appl. No.: 51,433
- [52] U.S. Cl. .... 46/93, 273/157, 46/17
- [51] Int. Cl. .... A63h 23/02
- [58] Field of Search ..... 46/91, 17, 92, 93, 94, 16, 46/17

### FOREIGN PATENTS OR APPLICATIONS

1,053,990 3/1959 Germany ..... 46/17

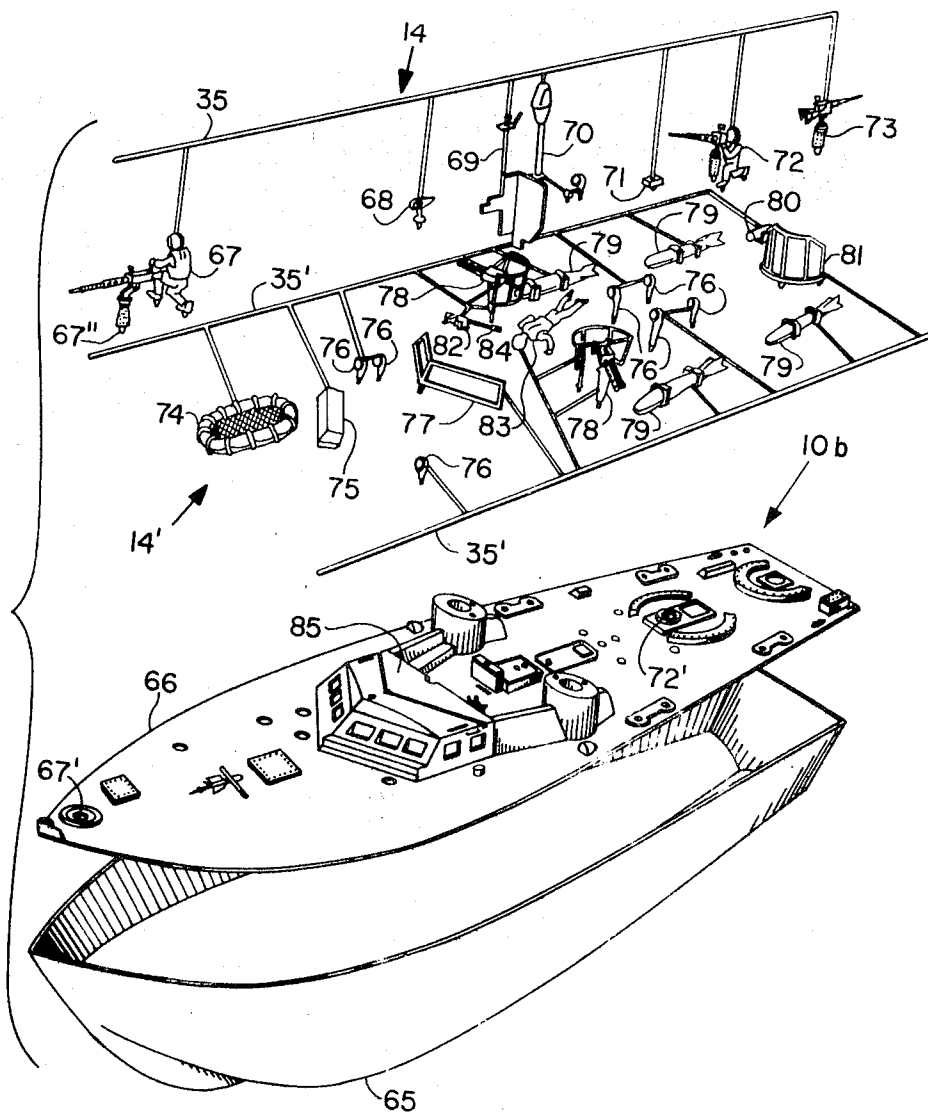
Primary Examiner—Louis G. Mancene  
Assistant Examiner—D. L. Weinhold  
Attorney—John V. Gorman and Richard C. Witte

### [57] ABSTRACT

Articles to be assembled such as plastic model toys which have a plurality of detail-defining members adapted to be secured in predetermined locations and attitudes to a structure-defining body are disclosed wherein assembly is simplified by integrally molding the detail-defining members on a runner in locations and attitudes matching the intermember spatial relationships of members of an assembled article. Thus, a plurality of preoriented detail-defining members can be simultaneously assembled to a structure-defining body without individually orienting or otherwise manipulating discrete members.

6 Claims, 6 Drawing Figures

- [56] **References Cited**  
**UNITED STATES PATENTS**  
2,777,248 1/1957 Hirsch et al. .... 216/95



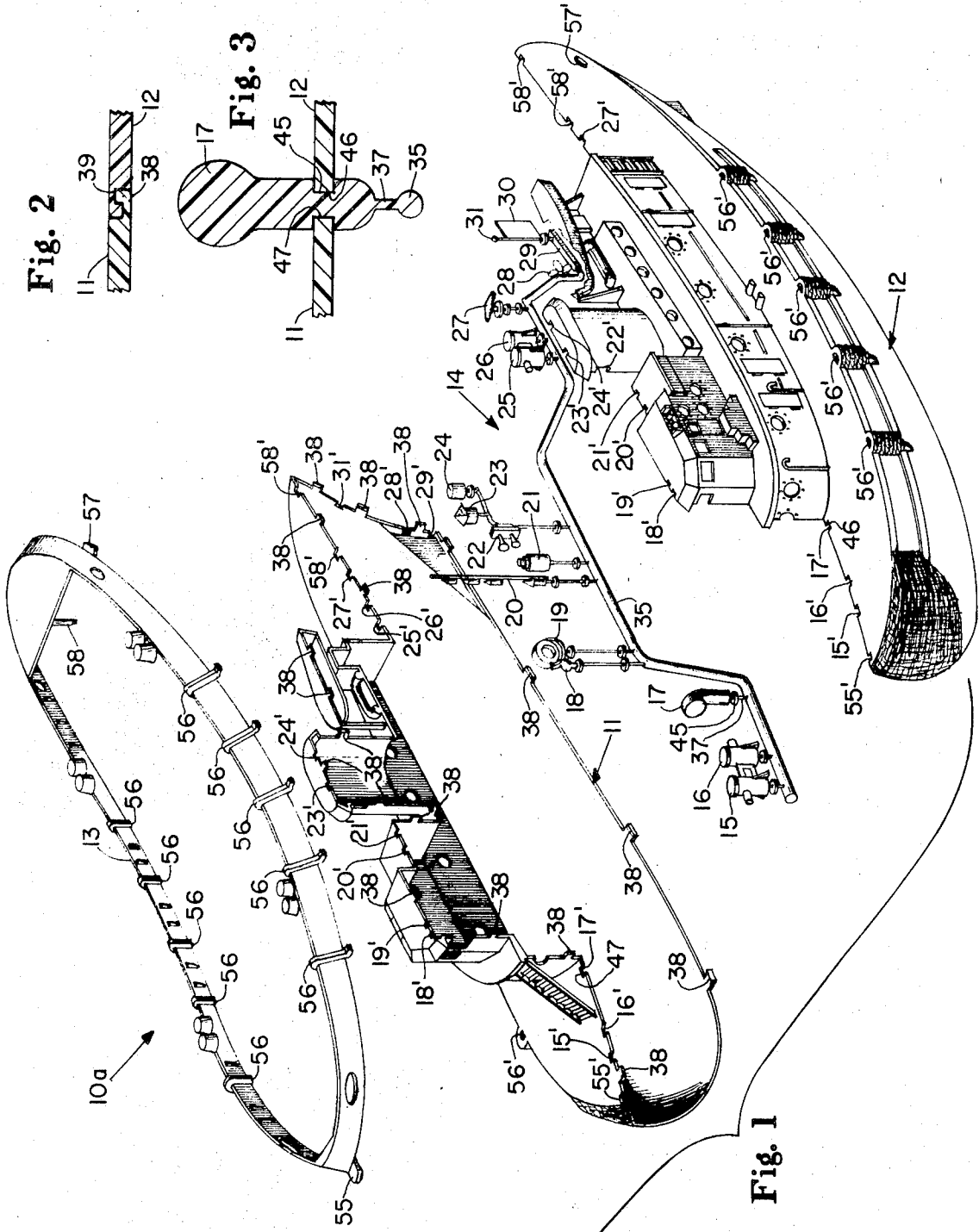


Fig. 2

Fig. 3

Fig. 1

INVENTOR.  
Edward G. McAuley

BY *John V. Brown*

ATTORNEY

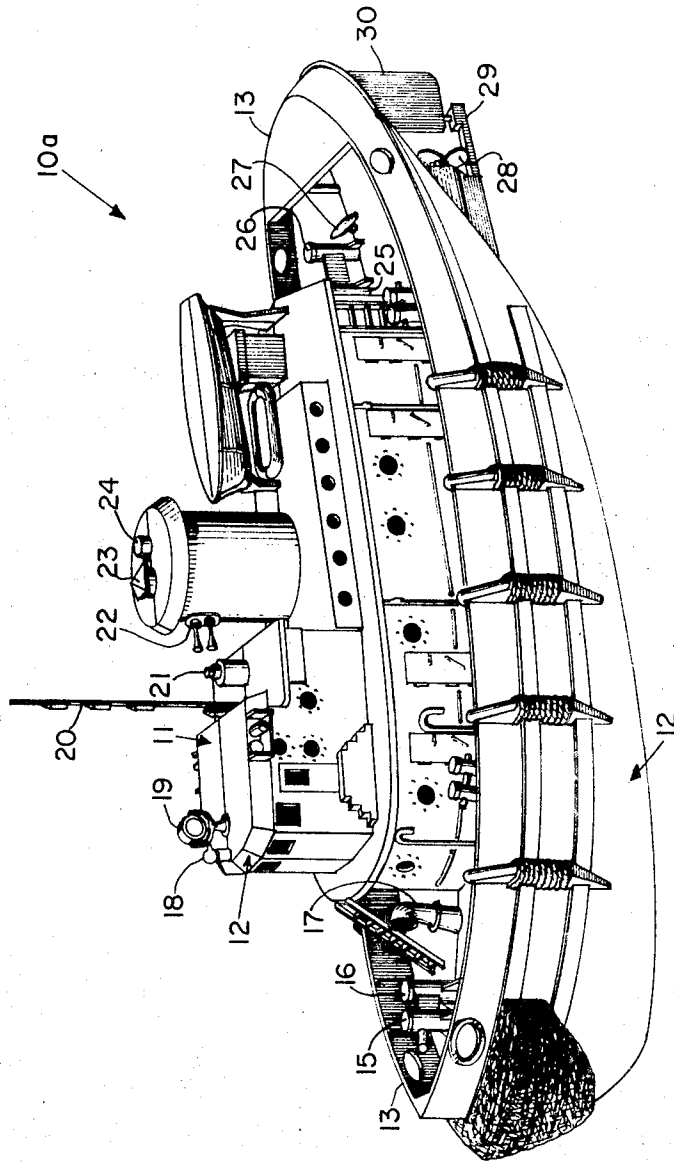


Fig. 4

INVENTOR.  
Edward G. McAuley

BY *John V. ...*

ATTORNEY

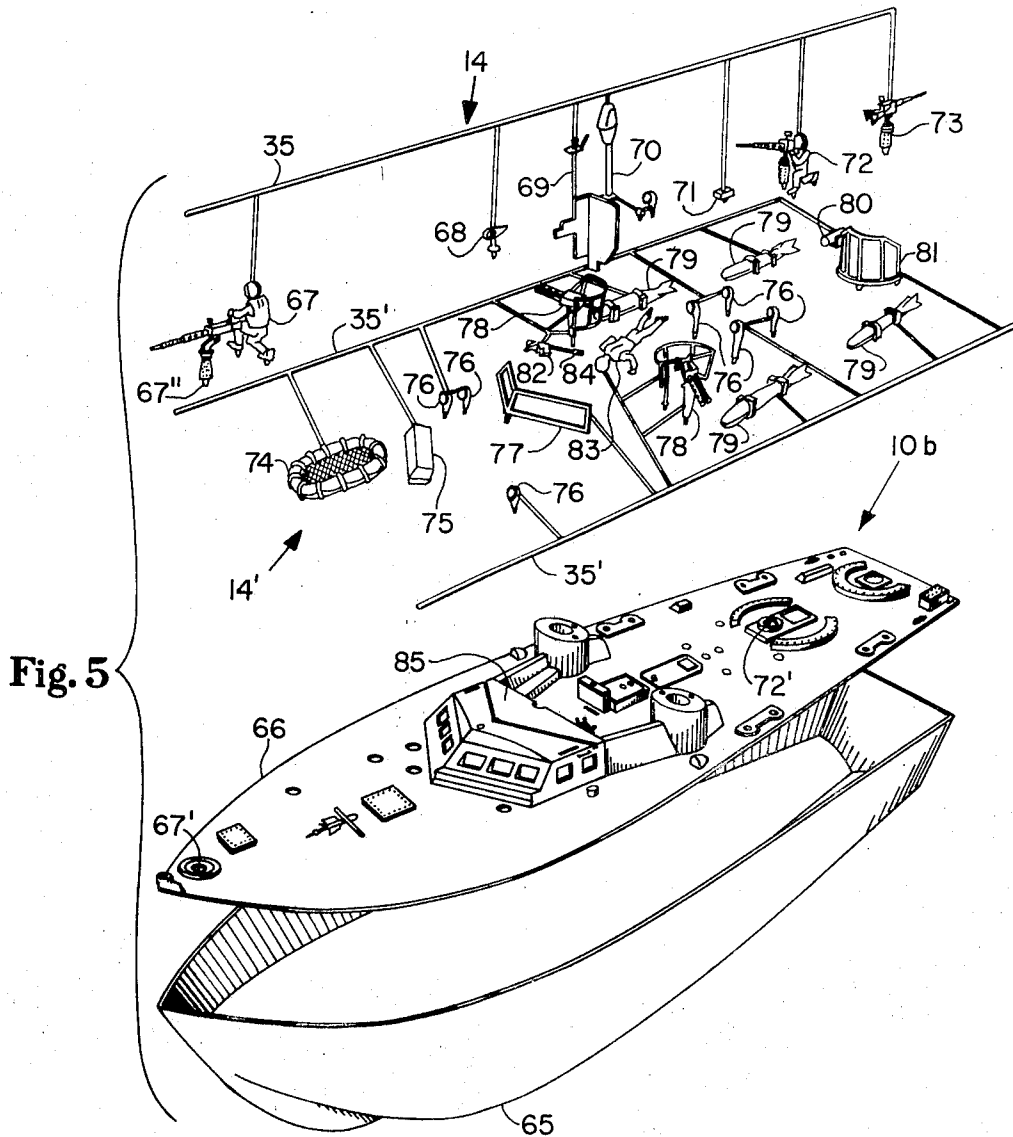


Fig. 5

INVENTOR.  
Edward G. McAuley  
BY *John V. ...*  
ATTORNEY

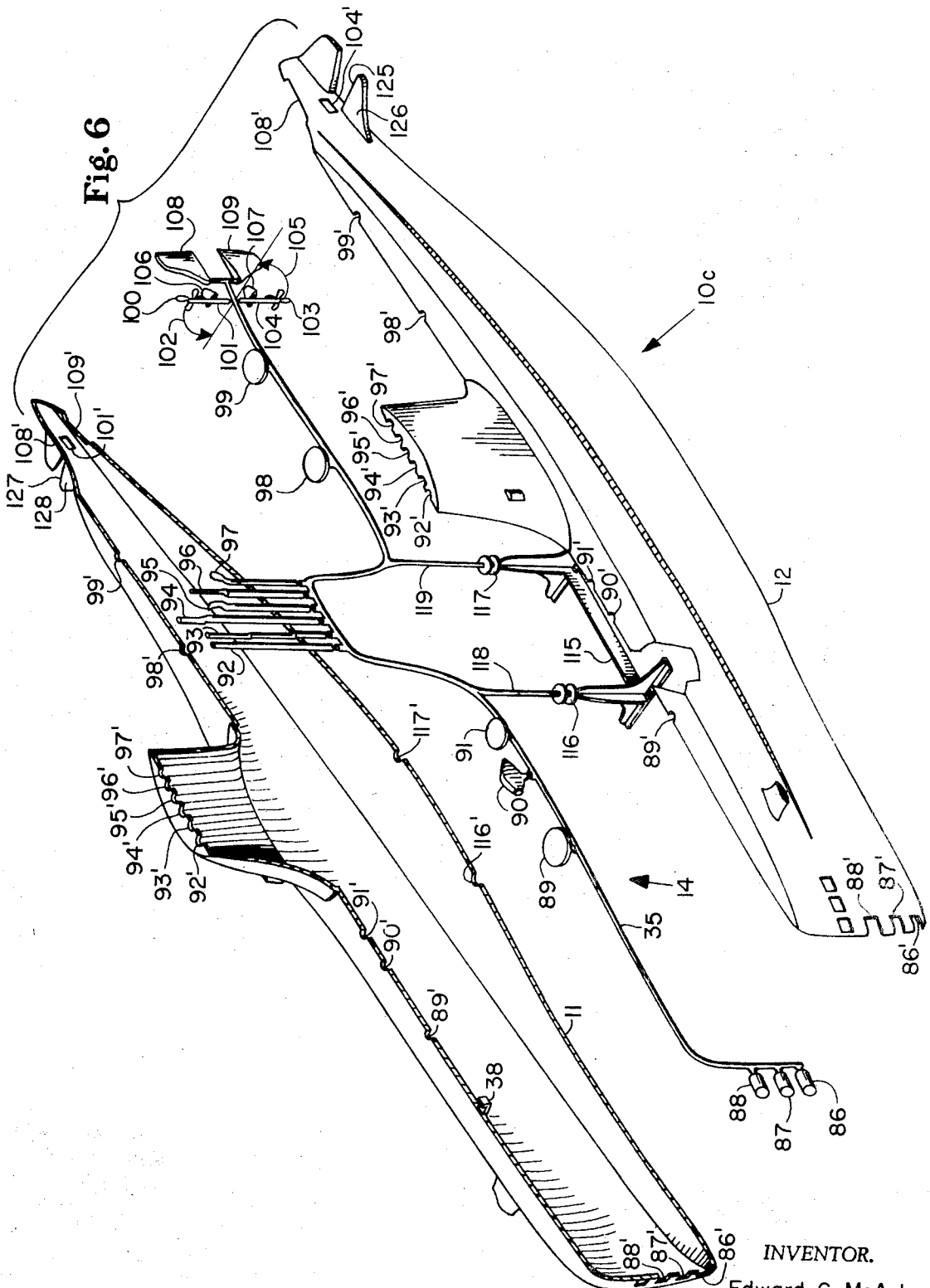


Fig. 6

INVENTOR.  
Edward G. McAuley

BY *John V. Cowman*

ATTORNEY

## ARTICLE ASSEMBLY EMPLOYING INTEGRATED, PREORIENTED DETAIL-DEFINING MEMBERS

### FIELD OF THE INVENTION

This invention relates to articles adapted to be assembled from a plurality of components and more particularly to such articles provided with a plurality of detail-defining members adapted to be attached to a structure-defining body at predetermined locations and attitudes. A familiar example of such an article is an injection molded plastic toy model adapted to be assembled from a kit.

### BACKGROUND OF THE INVENTION

Heretofore plastic model toys, to be assembled by the user, as for instance by a child, have been supplied with several detail-defining members molded integrally on a runner in rather random positions compared to the intermember spatial relationships they will have when assembled to the body of the model. To assemble such a model, the several detail-defining members are normally individually detached from the mold runner and subsequently positioned and secured on the body of the model in its predetermined location and attitude according to directions. Implicit in such a scheme is the requirement for the assembler to comprehend and follow relatively complex written and pictorial directions, and to have sufficient dexterity to manipulate discrete members as required.

### OBJECTS OF THE INVENTION

It is an object of this invention to reduce the time required to assemble an article comprising a structure-defining body and several detail-defining members.

It is another object of this invention to reduce the skill level required of assemblers of assembled articles.

It is yet another object of this invention to improve the appearance of assembled articles through the use of precisely preoriented detail-defining members.

It is a further object of this invention to increase the ruggedness of assembled articles.

It is a still further object of this invention to reduce the painting required to finish an assembled article.

### SUMMARY OF THE INVENTION

This invention relates to an improvement to facilitate assembly of articles, such as injection molded thermoplastic model boats, having a plurality of detail-defining members which are secured in predetermined locations and attitudes on a body-forming component. Thus secured, the detail-defining members have fixed intermember spatial relationships on the assembled article. A runner is provided to which the plurality of detail-defining members are attached in positions providing the same fixed intermember spatial relationships. The runner must be so configured that the plurality of detail-defining members attached thereto and the body-forming component can be simultaneously juxtaposed for assembly. Individual orientation and manipulation of discrete detail-defining members is thus obviated.

### BRIEF DESCRIPTION OF THE DRAWINGS

While the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which is regarded as forming the present invention, it is believed that the invention will be better understood from the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a preassembly perspective view of the components comprising a preferred embodiment, a model tugboat, of the instant invention;

FIG. 2 is a partial cross-sectional view illustrating the body interlocking arrangement of the model of FIG. 1;

FIG. 3 is an enlarged partial cross-sectional view illustrating the means of interlocking detail-defining members of the model of FIG. 1;

FIG. 4 is a perspective view of the assembly of the model of FIG. 1; and

FIGS. 5 and 6 are preassembly perspective views of further embodiments of the instant invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, and particularly to FIG. 4, there is illustrated a model tugboat 10a embodying the instant invention in a preferred manner. FIG. 1 is a preassembly, exploded view of model 10a, an assembly of four primary components or parts including right half 11, left half 12, rail 13, and rack 14. These components are provided with interlocking means for snap-together assembly. It will be apparent to those having ordinary skill in the art that the primary components can be molded of materials containing different colorants so that postassembly painting is obviated. For instance, molding halves 11, 12 of cherry-red-colored material, rail 13 of black material and rack 14 of brass-colored material will yield an assembly having a colorful appearance hallmarked by precise lines of demarcation between colors without skillfully painting it.

It will also be apparent to those having ordinary skill in the art that the material from which the primary components are made can be any suitable moldable plastic material such as, polystyrene, polyethylene, or methyl methacrylate.

Right half 11 and left half 12 are essentially thin-walled, conventionally injection molded plastic units. The exterior of each half 11, 12 is configured to represent the corresponding portion of a tugboat, including portholes, cabin, lifeboat and the like. Because halves 11, 12 cooperate to form the major structural body of the model, they are individually and jointly referred to as body-forming components.

Halves 11, 12 are provided with cooperating interlocking means spaced along the portions thereof which abut upon assembly. Although such interlocking means can comprise any of many well-known forms, FIG. 2 shows that the illustrated embodiment as constituting interlocking integral tabs 38 of half 11 engaged with grooves 39 in half 12.

Rack 14, of the preferred embodiment of the instant invention illustrated in FIG. 1, is an integrated component having bits 15, 16, 25 and 26, funnel 17, antenna 18, searchlight 19, mast assembly 20, instrument 21, horn assembly 22, vent 23, stack exhaust 24, cleat 27, propeller 28, rudder support 29, rudder 30, and shaft 31 molded integrally with a runner 35. These members are located and oriented on runner 35 in the fixed spatial relationship required on an assembled model. For example, if bit 15 is to be parallel to and spaced from bit 16 by one-fourth inch on the assembled model, they would be parallel and spaced by one-fourth inch on the rack 14. Similarly, if horn assembly 22 is located at a certain distance above funnel 17 and spaced therebehind by a particular measurement on the assembled model, the same relationships are found between those members on the rack. Members having the same intermember spatial relationships when attached to a runner as when secured in their respective predetermined positions on an assembly as hereinabove described are hereby designated "preoriented."

Runner 35, alternately referred to as a secondary structural member, is so configured that all of the detail-defining members delineated above and halves 11 and 12 can be simultaneously juxtaposed for assembly.

The rack 14 can be injection molded of any suitably moldable plastic or polymeric material, to which a colorant can be added or left out, as desired. In this preferred embodiment, there is provision to interlock each detail-defining member of rack 14 with halves 11, 12. For example, FIG. 3 is a view of a partial transverse section taken through the attachment joint of funnel 17 to halves 11, 12 of assembled model 10a. A substantially horizontal annular groove 45 in the base of funnel 17 cooperates with notches 17', 17' in halves 11, 12 to lock funnel 17 in its assembled position when halves 11, 12 are joined. As halves 11, 12 are joined edges 46, 47 adjacent to notches

17', 17' enter annular groove 45 in funnel 17. Each member except rudder 30 (because it is not immediately adjacent to half 11 or half 12) is similarly provided with interlock means.

Also illustrated in FIG. 1 is rail component 13 which includes provision for snap-assembly with halves 11, 12. The rail is sized to embrace the assembled halves 11, 12 and is equipped with means to interlock therewith. In this connection, it will be seen that the bow portion has a tab 55 extending therefrom, the sides each have a plurality of depending tabs 56 and the stern or fantail has a pair of fantail supports 58, 58, only one of which is visible. When rail 13 is assembled to halves 11, 12, tab 55 will extend through the aperture formed by notches 55', 55', the tabs 56 will be fitted through corresponding apertures 56', and the two fantail supports 58, 58 will enter apertures formed by notches commonly identified as 58'.

To assemble model 10a, rack 14 is juxtaposed with half 11 or 12 so that all of the detail-defining members enumerated hereinbefore are simultaneously aligned with the selected half with the annular groove in the base of each member engaged by the edge of the corresponding notch in the selected half 11 or 12. Such notches are identified by reference numerals identical to those of the corresponding members except for the addition of a prime symbol. Then, the second half (11 or 12) is juxtaposed with the aligned first half and rack described above and tabs 38 of half 11 are snapped into grooves 39 of half 12. Assembly of model 10a is then completed by snapping rail 13 into place as indicated above, by interlocking in the aperture formed by notches 55', by interlocking tabs 56 with apertures 56', and inserting supports 58, 58 into apertures formed by notches 58'.

It will readily be perceived by those having ordinary skill in assembly art that individual detail-defining members may be secured to the body of an assembly by means other than the interlocking described herein without departing from the spirit of the present invention. For instance, each could be secured by gluing. It is also apparent that the runner may be detached from the detail-defining members if they are thus independently secured to one of the halves 11 or 12. However, if retained and finally enclosed by hollow body-forming components such as halves 11, 12, the runner's innocuous presence inside an assembled model would enhance the structural integrity of a finished model. If the runner is so configured that it will not be enclosed within an assembled opaque model, nor otherwise shielded from view, it must be removed at an appropriate point in the assembly operation in order to not detract from the realistic effect sought. And, it should further be apparent the practice of the instant invention is not limited to molded components or members, but could be practiced with cast or otherwise fabricated components or members without departing from the spirit of the instant invention.

Referring now to FIG. 5, a hybrid alternative embodiment of the instant invention, a model PT boat, is shown in preassembly perspective. It is termed hybrid because in addition to a plurality of detail-defining members formed integrally with a runner in preoriented positions, some detail-defining members are attached to a runner in locations near their assembled intermember spatial positions but requiring some manual reorientation on the runner in order to achieve the ultimately desired intermember spatial attitudes. Such members requiring preassembly reorientation are herein termed "nearly oriented."

Nearly oriented members will be recognized as having some, but not all, of the advantages of preoriented members. It is apparent that higher skill level will be required of the assembler to cope with the required manual reorientation of nearly oriented members than with pure, preoriented members. However, where a choice can be made between relatively high-priced deep dies or dies having more elements than conventional two element dies (as may be required to produce racks having preoriented members exclusively) and more modestly priced dies (sufficient to produce hybrid racks

dominated by preoriented members but having some nearly oriented members) the more modestly priced dies may be the choice dictated by overall considerations. For instance, rack having all members oriented with their longest dimensions in substantially one plane could generally be formed in a relatively shallow, two element die whereas a deeper die of three or more elements might be required (by parting line considerations) to mold a rack having the same members but having the longest dimensions of most members oriented in a plane substantially different from the corresponding plane of the balance. In most instances the former die would be considerably less expensive than the latter.

The embodiment illustrated in FIG. 5, toy PT boat 10b, includes hull 65, deck 66, and racks 14, 14'. Parts having similar functions to parts of model 10a are hereinafter identically numbered.

Hull 65 is essentially a thin-walled shell formed by injection molding from a suitable thermoplastic material or other suitable process or material consistent with the spirit of the invention. It can include interlocking means if desired to provide snap-together cooperation with deck 66 to be assembled thereto as hereinafter described. Alternatively, solvent or adhesive affixment of the two components can be relied upon. The portion of the interlocking means embodied in the PT's hull, not visible in FIG. 5, can, for example, have a groove in its inside surface situated near the top edge of the hull and running substantially parallel thereto around the entire perimeter thereof.

Deck 66 is a substantially planar component including details such as cockpit 85 and receptacle 67' which are adapted to enhance the model's realism and to provide mounting means for detail-defining members. Deck 66 can further include tabs, not visible in FIG. 5, depending from the peripheral portions thereof which will snap into the groove provided in the hull as hereinbefore described to interlock hull 65 and deck 66 on assembly. It will be understood that hull 65 and deck 66 are flexible enough to snap together yet rigid enough whereby they may be considered permanently assembled when juxtaposed and snap-locked together.

Rack 14 of the PT embodiment of the instant invention is an integral component formed, for instance, by injection molding of styrene plastic. It includes runner 35, and detail-defining members including machine gunner 67, siren 68, armor plate and mast assembly 69, radar mast assembly 70, box 71, gunner 72 and machine gun 73. Members 67-73 are preoriented as hereinbefore defined for simultaneous assembly to deck 66.

Rack 14', which can also be injection molded, is constructed of a plastic material having sufficient flexibility to permit attitude adjustment of the members without fracture. It includes runner 35', preoriented members including raft 74, chest 75, ventilators 76, windshield 77, gun tubes 78, torpedoes 79, smoke generator 80, and shield 81, and nearly oriented members including searchlight 82 and man 83.

It will now be apparent to those having ordinary skill in the art of die making that the dies for rack 14' would be more complicated and probably more costly if man 83 were preoriented rather than nearly oriented.

Each member can have means associated therewith for securing it independently to deck 66. For instance, that of machine gunner 67 comprises machine gun base 67'' which mates with receptacle 67' in deck 66. Means and details for securing the other members will be readily understood without redundant explanation. The members can be secured to deck 66 on assembly by snap-lock, gluing or by other well-known means familiar to those skilled in the art.

Provision is made but not illustrated to permit separation of individual detail-defining members from their respective runners (without damaging the members) by cutting, breaking or other suitable means. For instance, this may be effected by providing a reduced area, runner cross section such as a "V" notch or peripheral groove located at the intended parting point for each member.

It is to be noted, in particular, that base 84 of nearly oriented searchlight 82 must be moved downwardly before inserting base 84 in its receptacle (not shown or identified in FIG. 5 because it is hidden behind the cockpit 85) whereby searchlight 82 is properly oriented in a substantially vertical position. In a similar manner, the feet of man 83 must be moved downwardly in order to mount him in a standing position in cockpit 85. Although nearly oriented members such as searchlight 82 and man 83 must be individually positioned to properly orient them for assembly, their mounting locations are easily determinable in the vicinity of their relative locations on the rack when rack 14' is juxtaposed with deck 66 in assembly position rather than having to look from bow to stern and from port to starboard to find their respective mounting positions.

Although the instant invention will not be compromised by a broad variety of individual digressions from the description of this embodiment, assembly of PT model 10b is preferably accomplished by: securing deck 66 to hull 65 by snapping them together as described; then by securing by interlocking, gluing or other suitable means as hereinbefore described, substantially simultaneously, all members on rack 14' to deck 66 followed by removal of runner 35' by cutting or breaking or by other suitable means of wholly severing individual members from the runner at their intended parting points hereinbefore described; and finally by similarly securing, substantially simultaneously, all members on rack 14 to deck 66 followed by removal of runner 35.

FIG. 6 shows an exploded perspective of another alternative embodiment, submarine 10c, of the instant invention quite similar functionally to the tugboat embodiment shown in FIGS. 1-4 and described hereinbefore. However, this embodiment comprises detail-defining preoriented members, nearly oriented members, and members which must be detached from runner 35 before they can be properly oriented. Members that must be detached from their respective runners prior to assembly are hereinafter termed "unoriented."

Submarine 10c includes body-forming halves 11, 12 and hybrid rack 14. Hybrid rack 14 includes: runner 35; preoriented members 86-99, top vertical fin 108, and bottom vertical fin 109; nearly oriented members including right propeller 100 mounted on support 101 and left propeller 103 mounted on support 104; unoriented components including plugs 106, 107 which must be wholly severed from the balance of the rack before assembly; and preoriented stand 115. The materials and manner of forming the components, it will be understood, can be the same as previously described in connection with the embodiments of FIGS. 1-5.

Although the instant invention embodied in model submarine 10c also permits a broad latitude of assembler's discretion, a preferred order of assembly would first entail wholly severing plugs 106, 107 from rack 14. Then, without detaching support 101 from runner 35 and enabled by the flexibility of the material forming the joint therebetween, support 101 should be moved through arc 102 whereby support 101 assumes a substantially horizontal position. Similarly enabled and executed, support 104 having propeller 103 secured thereto is moved through arc 105 until the longitudinal dimension of support 104 is substantially horizontal and extends leftwardly from runner 35 when viewed from behind submarine 10c. Next, rack 14 is mated with right half 11 by passing propeller 100 and support 101 through aperture 101' in right half 11 and seating each preoriented member hereinbefore delineated in their respective notches in right half 11. For instance, stand 115 has two substantially horizontally oriented annular grooves 116, 117 which engage notches 116' and 117' in halves 11, 12. Similarly, each member has provision for engaging mating notches in halves 11, 12 identified by the prime of the members reference numeral.

After rack 14 and right half 11 are mated as described hereinabove, left half 12 is juxtaposed therewith by passing propeller 103 on support 104 through aperture 104' in the rear portion of left half 12. Tabs 38 located on right half 11

(only one of a plurality is shown) similar to tabs 38 in FIGS. 1 and 2, are configured and spaced to engage corresponding grooves 39 (not shown in FIG. 6 but representatively depicted in FIG. 2) in right half 12 to provide snap-lock assembly of halves 11, 12. Thus, rack 14 is sandwiched between halves 11, 12 as the halves are snap-locked together by engaging tabs 38 in grooves 39.

To complete the assembly of the model, the leading edge of support 104 must be secured to the rear edge 125 of left horizontal stabilizer 126 by gluing or by other suitable means. Similarly, the leading edge of support 101 must be secured to the rear edge 127 of right horizontal stabilizer 128. Finally, plug 106 is installed to close aperture 101' in right half 11 and plug 107 is installed to close aperture 104' in left half 12.

It will be realized that while the instant invention is shown in connection with injection molded, plastic, toy models, it will be equally applicable to other assemblies wherein a plurality of detail-defining or other minor members are to be secured to structural-defining body-forming or other major components. Neither is the present invention restricted to injection molding nor to detail-defining members formed integrally with a runner. It may be desirable, in some instances, to preassemble a rack from a plurality of discrete detail-defining members and a pseudorunner in order to subsequently simultaneously mate the plurality of members to the body-forming component of an assembly.

Many other modifications of the above invention may be devised and used and it is not intended to hereby limit it to the embodiment shown or described. The terms used in describing the invention are used in their descriptive sense and not in terms of limitation, it being intended that all the equivalents thereof be included within the scope of the appended claims.

What is claimed is:

1. In an article comprising parts for assembly wherein said parts comprise at least one body-forming component which substantially defines the structure of the assembled article and a plurality of detail-defining members including means for securing same to said body-forming component in predetermined locations and attitudes defining fixed intermember spatial relationships, the improvement comprising a runner having said plurality of detail-defining members integrally molded therewith, said detail-defining members being spaced and oriented on said runner in said fixed intermember spatial relationships, said runner being so configured that each of said detail-defining members can be juxtaposed simultaneously for assembly in its ultimate location and attitude on said body-forming component.

2. The article of claim 1 wherein said detail-defining members and said body-forming component are provided with cooperative interlocking means whereby said members can be secured to said body-forming component in said predetermined locations and attitudes and by the orientation-maintaining support of said runner.

3. The article of claim 1 wherein said detail-defining members include means for being independently secured to said body-forming component after being simultaneously juxtaposed in said predetermined locations and attitudes whereby said runner becomes structural surplusage.

4. The article of claim 3 wherein said runner includes a parting point for each detail-defining member, said parting points being of reduced cross-sectional area so that said runner may be detached from said detail-defining members after said detail-defining members have been independently secured to said body-forming component.

5. The article of claim 1 further comprising a flexible joint intermediate a nearly oriented detail-defining member and said runner, said nearly oriented member requiring preassembly repositioning relative to said runner to precisely orient said detail-defining member in its respective location and attitude relative to other detail-defining members, said movement being enabled and accommodated by said flexible joint.

6. The article of claim 5 wherein said detail-defining members include means for being independently secured to said

body after being simultaneously juxtaposed in said predetermined locations and attitudes whereby said runner may be detached from said detail-defining members leaving said assembly unencumbered by said runner.

\* \* \* \* \*

5

10

15

20

25

30

35

40

45

50

55

60

65

70

75