EXPLORATORY FISHING VESSEL GEORGE M. BOWERS

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Part I - Description of Vessel

By Reidar F. Sand*

INTRODUCTION

The U. S. Fish and Wildlife Service commissioned the George M. Bowers at Miami, Fla., on January 7, 1956. It was built by Steam Ways Corporation of Tampa, Fla., to Service design specifications, with funds provided by the Saltonstall-Kennedy Act of 1954. This vessel will be used primarily in the Service's gear research and development projects and will assist in the program to investigate the fishery resources of the South Atlantic area. The vessel is operated by the Exploratory Fishing and Gear Development Section of the Service's Branch of Commercial Fisheries.

The George M. Bowers will first participate in exploration for new commercial shrimp and fishing grounds in the South Atlantic off the coasts of Florida, Georgia, North and South Carolina. Upon completion of this assignment the George M. Bowers will place emphasis on research in the field of fishing-gear development.

While substantially of shrimp-trawler design common to the Gulf and South Atlantic area, the vessel is modified for operation as a multipurpose fishing vessel capable of trawling, trolling, seining, long-lining, gill-netting, and live-bait fishing. Special equipment has been installed for research on fishing gear that is important to the commercial fisheries of the United States. For observing fishing gear in action, provisions have been made for installation of the Service's underwater television equipment. The vessel is equipped with a unique and versatile electrical system designed by Service technicians.

Fig. 1 - The George M. Bowers on a trial run.

The plans for the George M. Bowers were based largely on practical experience gained from operating other Service exploratory fishing vessels, and its design includes provisions for adaptation to the future needs of experimental and exploratory fishing. The operating area will be from Cape Hatteras, N.C., to the Gulf of Mexico and offshore waters. For this reason the George M. Bowers is

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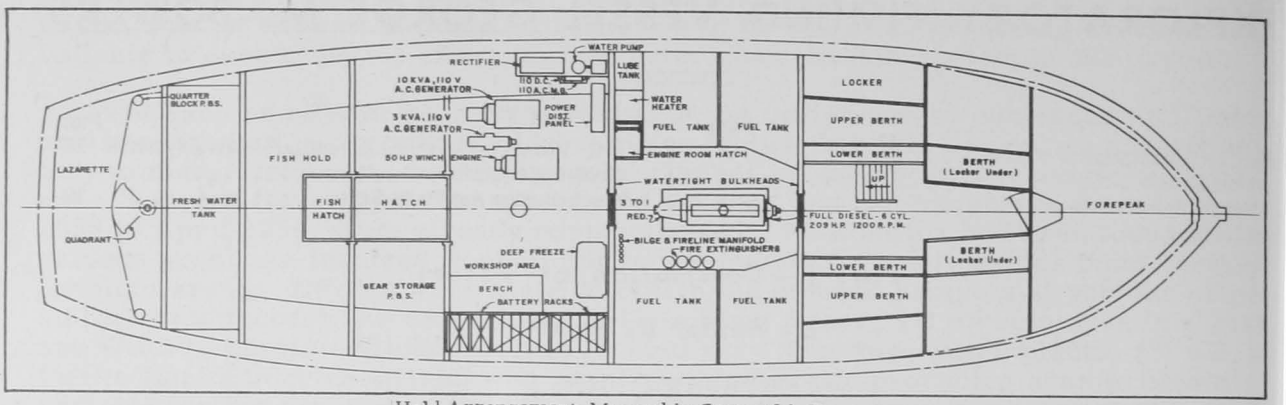
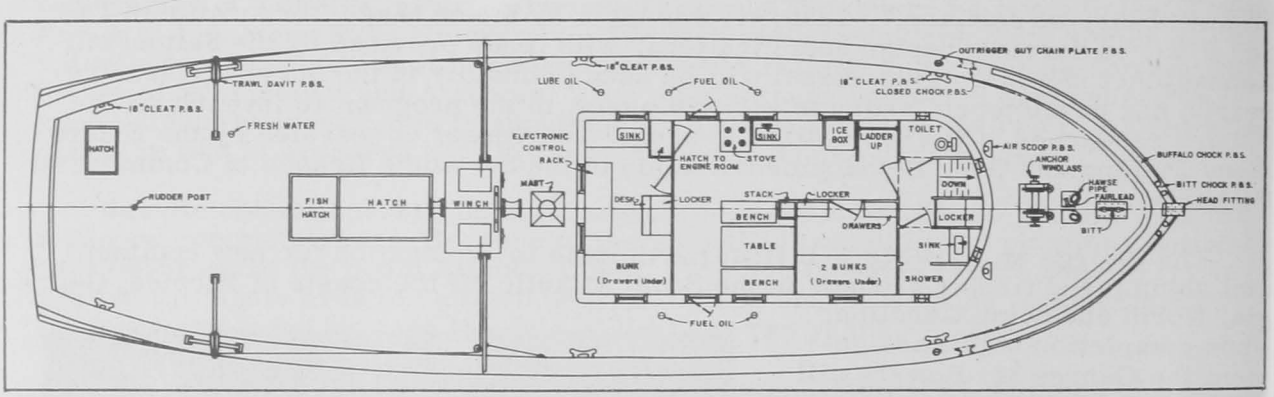
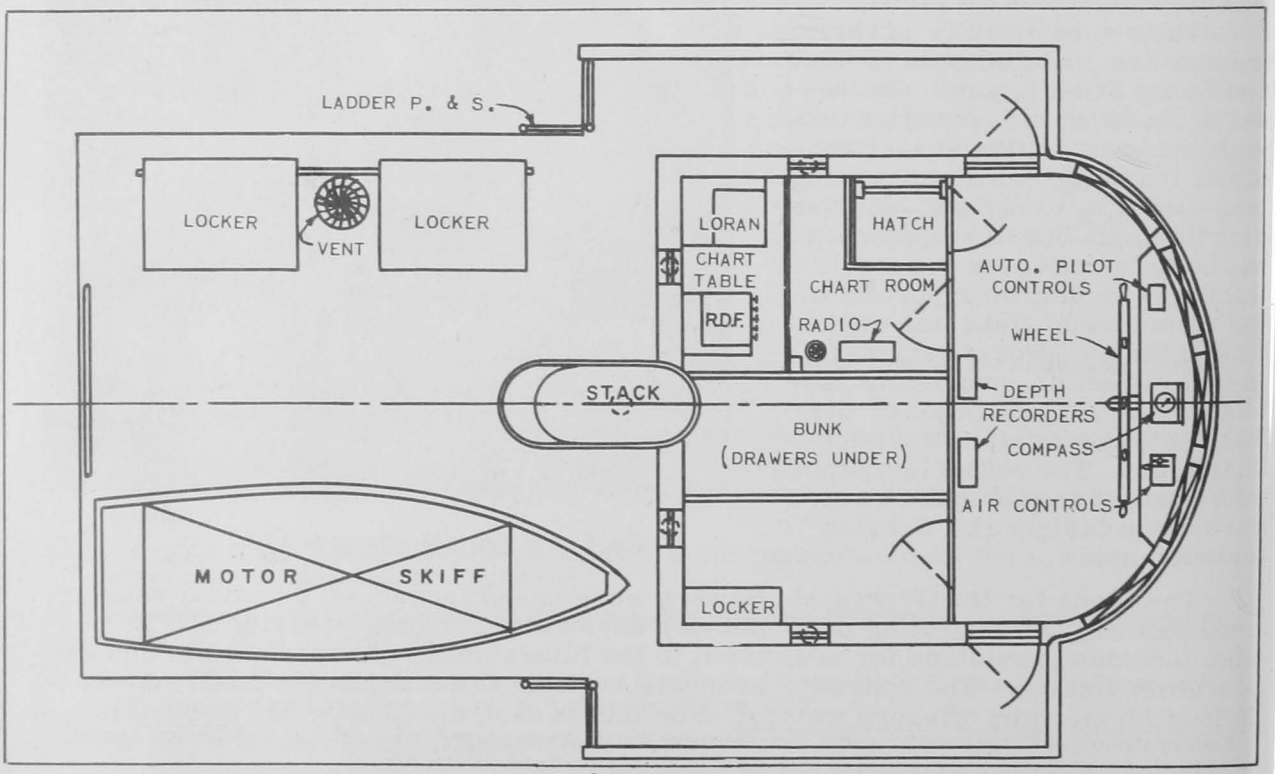


Hold Arrangement, Motorship George M. Bowers.



Main-Deck Arrangement.



Upper-Deck Arrangement.

strongly built, amply powered for a 5,000-mile cruising range, and equipped with the most modern navigational devices.

The vessel bears the name of the distinguished former United States Commissioner of Fisheries, George M. Bowers; he was Commissioner from 1898 to 1913, and in 1902-1903 was President of the American Fisheries Society. He was appointed to the House of Representatives from West Virginia in 1913 to fill an unexpired term and was re-elected, serving until 1923. Bowers died at Martinsburg, W. Va., December 7, 1925.

VESSEL SPECIFICATIONS

The vessel's construction is of wood with three transverse watertight bulkheads. Hull planking is of Douglas fir, and frames of oak are doubled and steam-bent. The deckhouse of cypress is standard double-side construction through-bolted to the deck. Interior deckhouse sheeting is of marine plywood. While the general design is that of the Florida shrimp trawler, there is considerable resemblance to the Pacific Coast combination seiner-trawler with deckhouse forward and clear deck space aft. To improve vessel handling qualities and trim under various fishing conditions, machinery spaces and tanks are disposed further aft than in conventional trawlers.

The vessel is built to the following dimensions:

Length over-all	- 73 ft.	Fresh water capacity	- 2,000 gals.
Beam over guards	- 21 ft., 6 in.	Lube oil capacity	- 125 gals.
Draft over keel	- 7 ft., 6 in.	Cruising speed	- 9.8 knots
Diesel fuel capacity	- 5,100 gals.	Maximum speed	- 10.2 knots.

Main propulsion power is supplied by a six-cylinder four-cycle Diesel engine built to American Bureau of Shipping Standards. The engine delivers 209 hp. at 1,200 r.p.m. through 3:1 reduction gear to a 50 x 40 four-blade propeller. A six-cylinder 50 hp. Diesel auxiliary engine is designed to drive the main trawl winch through a fluid coupling equipped with clutch and reverse gear. A four-cylinder Diesel engine-driven generator supplies 10 kw. for the vessel's electrical system of 110 and 220 volts a.c., and 32 and 110 volts d.c. A smaller 3 kw. Diesel generator supplements the 10 kw. generator. A main engine-driven high-pressure closed impeller-type pump delivers 100 gallons a minute at 80 pounds a square inch for bilge pumping, fire, and washdown services. A smaller auxiliary engine-driven low-pressure pump delivers 40 gallons a minute. The engine-driven pumps are supplemented by a three-inch hand pump located on deck.

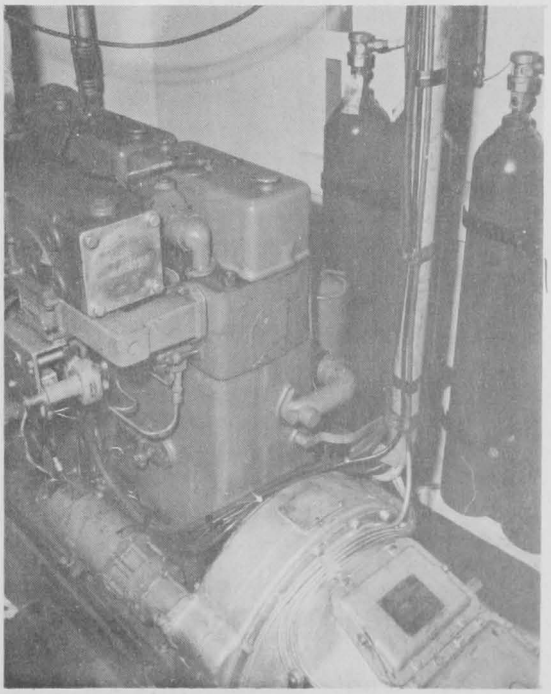


Fig. 3 - View of George M. Bowers' main engine and CO_2 system.

A 110-volt battery bank installed in the hold provides a quiet source of electrical power for underwater sound research on commercial species of fish. The vessel has a hold capacity for 10 tons of fish and ice because a large capacity was not thought to be necessary for experimental fisheries work. Machinery spaces below decks are protected from fire by automatic and manually-operated CO_2 systems. Guards are installed over all items of machinery where exposed moving parts may cause injury to personnel.

Deck machinery consists of an electrical motor-driven anchor windlass, and oceanographic winch, and a combination seine-trawl winch. The main double-drum trawl winch spools 500 fathoms of $\frac{7}{16}$-inch cable on each drum and may be modified

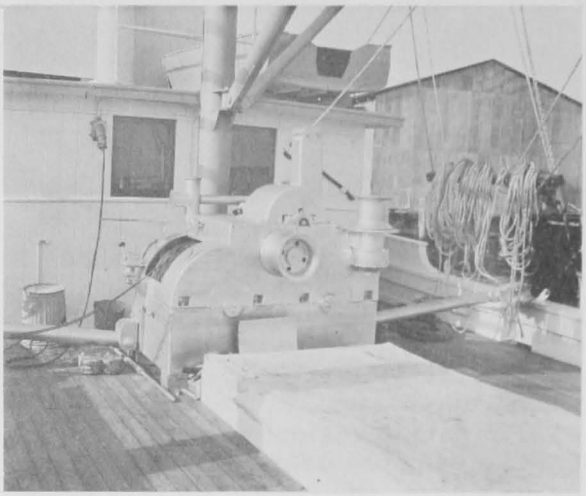


Fig. 4 - After deck showing main trawl winch.

Fig. 5 - After deck view showing trawl davits. Trawling may be done either with these davits or with the "Florida-type" trawling boom.

in a short period of time for seining, and long-line and gill-net hauling. An air ram-operated emergency stop control is a special feature of the main trawl winch installation.

The George M. Bowers may be rigged with various types of specialized fishing equipment which are readily portable. Among these are trolling poles, a bait tank, gallows frames for both the Florida-type and stern-set trawling rigs. The

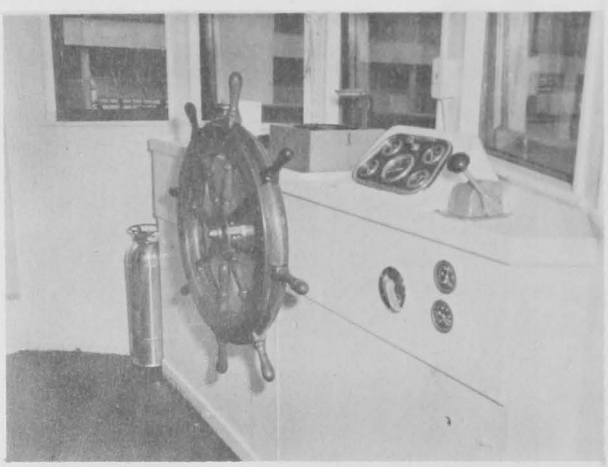


Fig. 6 - View of pilothouse showing wheel and engine controls.

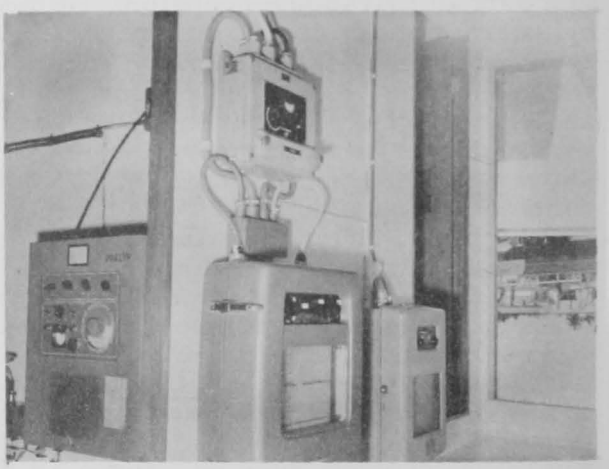


Fig. 7 - View of sonic depth recorders in pilothouse and radio in chartroom.

vessel will also be outfitted with such hydrographic gear as bathythermographs, bottom-sampling devices, and reversing thermometers. A laboratory space with sink is provided in the after section of the deckhouse.

Electronic equipment aboard includes:

1. Sonic depth recorder, 0 - 200 fathoms
2. Sonic depth recorder, 0 - 700 fathoms
3. Radiotelephone, 70 watts
4. Radiotelephone, 75 watts
5. Radio-direction finder
6. Direct-reading loran receiver.

In addition to manual steering, the vessel is equipped with a nonhunting-type automatic pilot. An emergency tiller may be quickly attached with removal of a deck flange above the rudder post. In tests and trials the vessel exhibited fine qualities of maneuverability and seaworthiness. A separate chart and instrument room has been provided because of the need for these facilities. Quarters are provided for four scientists in addition to crew space for six.

Six berths are located in the forecastle, two in the deckhouse, and one in the laboratory space. Separate quarters are provided for the captain adjacent to the wheelhouse.

A desirable feature of the George M. Bowers not usually found in fishing vessels of this size is the provision for inside access to working areas, quarters, and storage spaces. This provision for crew comfort is a definite advantage to the multipurpose fishing or exploratory vessel, and was accomplished without loss of space or special arrangements.

Part II - Vessel's Electrical and Auxiliary-Drive Systems

By Richard L. McNeely*

ELECTRICAL SYSTEM

The design of the electrical system of the George M. Bowers fulfills a variety of requirements and makes provision for future possible needs. Of particular note in the installation are features of economy both to the initial cost of the installation and to operational and maintenance expenses.

The larger of the generating plants is 110-volt a.c. single-phase and is rated at 10 kv.-a. The unique design and installation features of the system permits, without overload, intermittent operation of:

Galley range	220 v. a. c. -	200 to 10,000 watts
Thirty-gallon hot-water heater	110 v. a. c. -	1,800 watts
Galley refrigerator	110 v. a. c. -	90 watts
Fourteen cu.ft. deep-freeze unit	110 v. a. c. -	100 watts
Deck flood lights	110 v. a. c. -	600 watts
Deckhouse lighting and wiring circuits	110 v. a. c. -	250 watts
The air compressor	110 v. a. c. -	75 watts
Battery-charging rectifiers	.110 v. a. c. to 110 v. d. c. -	500 watts
Ventilation blower	110 v. a. c. -	100 watts
Fresh-water pump	110 v. a. c. -	80 watts
Anchor winch	110 v. a. c. -	3,000 watts
Navigational aids	110 v. a. c. -	250 watts

and other minor equipment.

Additional auxiliary power is furnished by a 3-kv.-a. 110 volt a.c. generator and 32-volt battery charger. The battery-charging unit is tapped off of a 32-volt generator field exciter.

The main propulsion engine drives one 1,500-watt 32-v. d.c generator and one 3,000-watt 110-v. d.c generator. A motor generator set allows power conversion

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