

S P E C I F I C A T I O N S

for

Repairing

UNITED STATES COAST GUARD CUTTER

S E M I N O L E

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August, 1922

U. S. Coast Guard Headquarters,
Fourteenth and E Streets, N. W.,
Washington, D.C.

Lieutenant Harvey F. Johnson

GENERAL SPECIFICATIONS FOR HULL AND MACHINERY.

Length, over all.....188' 1 $\frac{1}{2}$ "
Length, on water line.....172' 0"
Beam, molded..... 29' 6"
Depth, at side amidships, top of keel to main
deck sheer, molded..... 16' 6"
Displacement at about 12' 3" mean draft.....925 tons.

1. INTENT OF THE SPECIFICATIONS.

The intent of these specifications for the hull, machinery, and appurtenances is that the contractor shall remove, overhaul, repair, renew and install such structure and fittings as are covered and described in these specifications, shown on accompanying plans, and complete the vessel ready for service, including trials of the vessel.

It is the intent of these specifications to accomplish every item of work that is required to place the vessel in efficient service condition without the necessity for further major repairs for a period of at least ten years. In general, hull structure will be renewed where 30% to 40% deterioration has occurred.

The specifications and plans are not to be departed from, with a change in cost involved, except by authority of the Commandant.

Where phrase "as necessary" is used, it is intended the bidder shall make careful examination of existing conditions and definitely describe in his proposal the nature and extent of the work he proposes to accomplish, provided work is not structure to be renewed on a per pound basis.

Where the description of the work to be done is covered by one or any of the words "overhaul", "repair" or "renew", it is intended that their meaning shall be as given below:

Overhaul: To dismantle and examine, with a view to corrections or repairs, and again assemble.

Repair: To restore to a sound or good state after decay, injury, dilapidation or partial destruction.

Renew: To make new again, to restore to freshness, to rebuild.

Any dispute relative to the intent of the specifications or plans, or concerning any omissions or imperfections, may be referred to the Secretary of the Treasury, whose decision shall be final.

Delivery of the cutter to the successful bidder, and, when completed, to the Government, will be made at the contractor's works; any shifting of berth of the vessel at the yard will be done at the contractor's expense.

Responsibility for the protection, safe-keeping and storage of fittings, equipment, outfits, portable supplies, etc., on the cutter as delivered, or delivered by the Government to the works of the contractor for installation on the cutter, rests entirely with the contractor.

The reconditioning of hull and machinery must be complete in every particular and vessel ready to leave the contractor's works on or before November 10, 1922. Attention is invited to the proposal form to be used by bidders, appended to these specifications.

2. INSPECTION.

The Superintendent of Construction and Repair and the Engineer-in-Chief will each be represented by an assistant to supervise and inspect the work on the SEMINOLE. Every facility shall be afforded these assistants for the prosecution of their duties including office accommodations and equipment.

3. ARTICLES FURNISHED BY THE GOVERNMENT.

The following articles of outfits and supplies will be furnished by the Government, also material as mentioned in the machinery specifications.

Arms, armament and ammunition.
Boats, including outfits and canvas covers.
China, glass and silver ware.
Collision mat.
Compasses.
Covers, of linen, for furniture.
Flags.
Hammocks.
Hawsers and lines.
Hose, fire and deck.

Life preservers (belts).
Mattresses and pillows, of hair, felt, or similar material, with covers.
Navigator's instruments, and clocks.
All radio instruments and outfit (including aerial wire and insulators).
Rugs and curtains.
Safes.
Sounding machine.
Table linen and bed linen.
Taffrail log.
Tools and supplies, except as required of the contractor by the detail specifications.

Of the above listed articles, furnished by the Government, the contractor will fully and completely install the following:

Compasses.
Curtains.
Safes.
Sounding machine.
Taffrail log.

The remaining items shall have suitable stowage details arranged by the contractor, if conditions require.

The boats, or templates, as necessary, and samples of above items, will also be delivered to allow proper stowage details to be installed by the contractor.

4. CARE OF VESSEL.

All dirt and scrap shall be cleaned out of the vessel, in compartments where work is underway, by contractor; no water shall be allowed to remain in any part of the vessel. Finished work shall be adequately protected during the prosecution of the repairs. Injuries to hull, resulting from collision, grounding, docking, or other causes, while at the contractor's works, shall be made good by the contractor; adequate fire protection shall be furnished. Coast Guard officers and enlisted men, the number to be designated by Headquarters, will take care of vessel in all parts where contractor is not at work. Quarters must be arranged for these men to berth and mess on the cutter, or elsewhere, during the repairs.

5. DOCKING.

The vessel shall be docked, with lay days, for such period as may be necessary. There is no objection to the vessel going on and off the dock, to suit the contractor's program, provided the condition of the hull, as regards water-tightness and strength, permits this to be done.

6. INCLINING EXPERIMENT.

When the vessel is completed it shall be inclined to ascertain the center of gravity, at least two pendulums shall be used, with four inclination readings. The usual precautions necessary for the experiment shall be taken. A special report by the contractor, covering the calculated results of the inclining experiment, shall be promptly forwarded, in duplicate, to Headquarters. Data obtained from the inclining experiment shall determine the relocation of the present ballast and the amount to be retained.

7. TRIALS.

The trials shall be made by and at the expense of the contractor and to the satisfaction of the officers detailed to witness the trials and inspect the hull and machinery of the vessel before acceptance.

The official dock trial will consist of the operation of the machinery at the dock for two consecutive hours at full power without heating of bearings or necessity for adjustments; after the dock trial the underway trial may be made.

The full-power trials shall be carried out with the vessel in the following condition; hull and machinery complete, 70 tons of coal, 6000 gallons fresh water, and 12 tons of stores.

The full-power trial shall consist of a run underway for four consecutive hours, working off at 200 pounds pressure all the steam which the boilers make under forced draft.

After the underway trials are satisfactorily completed the machinery and boilers shall be examined; and all parts of the machinery installation shown to be in first-class condition.

DETAILED SPECIFICATIONS FOR HULL.

8. PLANS.

The following plans form a part of these specifications and indicate the nature of the work, in general.

- No. 6055 --- Lines.
- No. 6078 --- Berth Deck and Hold.
- No. 6079 --- Main Forecastle and Poop Decks and Tops of Deck Houses.
- No. 6041 --- Docking Plan.

Plans of the SEMINOLE, now on file, will be available at Headquarters for examination in preparing estimates and will be furnished the successful bidder in connection with the preparation of record plans.

9. BUILDER'S PLANS.

The contractor shall submit to Headquarters, for approval, general and detail plans, as described below:

- Boat davits and boat stowage details.
- Scuttles and Deck fittings where renewed or installed.
- Foundations; steering engine, etc.
- Hull structural details of new work, including bulkheads and bracket connections.
- Outboard fittings, covering rearrangements and new details on weather decks, boat stowage, hawse pipes and general arrangement of anchor handling, etc.
- Steering engine leads, with details.
- Other plans considered necessary by inspector or requested by Headquarters.

No plans, sketches, or other information shall be issued to the yard without approval of the work called for thereon, either by Headquarters or the inspector.

The SEMINOLE is now at Norfolk, Va. and full access and opportunity will be afforded representatives of any bidder for an examination of the vessel and for the preparation of estimates and plans.

10. RECORD PLANS.

The contractor shall furnish for the files at Headquarters a set of tracings in black ink on dull side of 30-inch cloth, as follows, views to be assembled as indicated:

	Scale (inches to the foot).
Displacement and Other Curves.	
Curves of Water Tank Capacities, calculated from dimensions checked from work.	
Docking Plan.....	1/4
Midship Section and Type Sections.....	1/2
Hold and Berth Deck.....	1/4
Main, Forecastle and Bridge Decks, and Tops of Deck Houses.....	1/4
Profile Inboard.....	1/4
Profile Outboard, full height.....	1/8
(Profile Inboard and Profile Outboard are to be combined).	

11. MATERIALS AND WORKMANSHIP.

Old structure where renewed on account of corrosion, or for other reasons, shall be at least up to original scantlings, or as specified below.

New structure and riveting shall come up to at least the general requirements of the Rules of the American Bureau of Shipping, or Lloyd's. All fitting, riveting and caulking shall be first-class; galvanized fittings where necessary.

Steel material for plates and shapes shall be medium steel; rivets to be good quality ship rivets, suitable for the purpose. Stock material at the contractor's works may be used where suitable.

Joiner work or fittings, removed to allow repairs to adjacent structure, may be utilized for reinstallation if material is undamaged.

Where specifications mention repairs it will be satisfactory if renewals are substituted. Good merchant practice shall be followed.

12. TESTS OF HULL AND FITTINGS.

The structure, auxiliaries, systems and fittings, specified to be overhauled, repaired, renewed or furnished shall be proved under appropriate tests to determine satisfactory operation, tightness or strength.

Reserve feed tanks shall be water-tight under a head of 4 feet above the berth deck; ship's fresh water tanks shall be water-tight under a head of 4 feet above the main deck. Tanks shall be tested while vessel is in the dock and before being painted or cemented. Bulkheads and flats must stand the test without serious deflection or permanent set; any weakness to be made good by and at the expense of the contractor. Magazine bulkheads shall be tested by filling the compartment inclosed.

13. PAINTING.

All faying surfaces of new structure before being riveted or otherwise fastened shall be coated with red lead and the faying surfaces of new wood decking and other new woodwork, such as furring strips, battens, back of ceilings, etc. shall be painted by the contractor. All other interior and exterior painting above the boot-topping, except in cabin and wardroom, will be done by the ship's force.

While on the dock the underwater body shall be scaled, cleaned, and together with the rudder, given two coats of anti-corrosive paint and one coat of anti-fouling paint; brands to be approved.

Steel structure, where scaled, repaired or new, will have a priming coat of red lead and in addition, three coats of color.

Compartments finished in red lead only will be given at least three coats in all. Areas finished in white or spar color will have three coats of the color in addition to a coat of red lead. Soft woods, in furniture and the like, shall have a coat of shellac, and where painted, shall have at least three coats of oil paint. Woodwork to be bright shall be filled, shellacked, varnished, and rubbed down to dull finish.

Overhead in reserve feed water tanks, the under side of berth deck plating, planking and deck beams, shall have two coats of asphaltum paint.

Care shall be taken that no paint is applied to surfaces which are to be covered with Portland Cement.

14. CEMENTING.

In ship at keel, around foundations, where necessary for forming water courses, and as a wash in ship's fresh-water tanks, and

reserve feed-water tanks, except overhead, a cement about one part Portland Cement and two parts sand shall be worked. Care shall be taken that surfaces are clean and not painted when cement is applied; perfect adherence of the cement shall be obtained.

15. STEM.

Present plate wrapper shall be removed to allow renewal of plating chafed by anchor. New wrapper will be fitted and stem and plating connections made water-tight.

16. STERN FRAME.

Gudgeon lignum-vitae bushings, shall be renewed and new zinc protectors, 1/2 inch thick, of standard Coast Guard design, fitted to the same extent as at present.

17. RUDDER.

Brass sleeves for pintles shall be furnished and fitted. Rudder side plates and solid wood filling shall be renewed.

18. TRANSVERSE AND LONGITUDINAL FRAMING.

Framing weakened by corrosion shall be renewed with details to suit conditions. Thorough examination should be made of all keelson plates and angles, framing and flooring in holds, engine room, boiler rooms, storerooms and framing above the main deck. Frames and brackets shall be worked to suit the extension of the forecastle deck and shell plating in way of the present turtle back. Curvature of turtle back shall be removed.

19. FLAT KEEL AND OUTSIDE PLATING.

Outside plating shall be drilled to check thickness and such plates as may be determined by the inspector renewed; details of strength and water-tightness shall be adequately obtained. Plating in way of air ports, sea chests, and peak tanks shall be examined to ascertain necessity for repairs. Unsightly dents in plating shall be removed. Freeing ports shall be overhauled and parts, worn or missing, replaced. New plates shall be worked in way of present hawse pipe openings and where plating is badly chafed from anchor. Shell plating above the main deck in way of forecastle shall be extended aft with contour as indicated on the plans.

20. DECKS, STEEL STRUCTURE.

Berth deck structure over present forward and after peak

tanks, where weakened by corrosion, shall be renewed with details to suit conditions.

Berth deck stringer, forward under wood deck shall be renewed; within the boundary of the machinery space bulkheads, it shall be repaired. Aft the machinery space bulkheads, where watertightness is not essential, the berth deck stringer, where corroded, shall be neatly trimmed and flanged cover plates fitted between the deck beams with connections to the beams and deck. Plating, frames 61-65, shall be neatly trimmed where corroded.

Berth deck, frames 76-80, shall be plated over with 10 lb. plate and made water-tight.

Main deck structure, where weakened by corrosion shall be renewed, with details to suit conditions, and new arrangements of quarters. Extent of renewal of main deck structure, under deck covering abaft frame fifteen, will be determined after removal of decking.

Forecastle deck structure, where weakened by corrosion, shall be repaired. Curvature of present turtle back shall be removed, deck beams, side stringers and connecting angles extended to frame 38.

Deck houses on forecastle deck shall be raised and tie plates renewed.

Steel structure of flats and tops of deck houses, including gallows frames, shall be repaired or renewed.

21. DECK PILLARS AND GIRDERS.

Pillars and girders shall be relocated to suit the new arrangements. A wood ridge bar shall be worked on the center line under the compass platform. Pillars shall be worked under the windlass.

22. DECK COVERINGS.

Berth deck planking, forward of bulkhead No. 32, shall have new planks fitted as necessary and graving pieces worked where local areas are badly worn.

To support hood ends of planking at bulkhead No. 61 work a 10 by 2-inch yellow pine cover piece close against bulkhead on top of the berth deck and fitted thereto. Cover piece shall be fastened to margin and hood ends by through bolts spaced about 24 inches; each plank shall be fastened by a heavy brass wood screw through cover piece into plank.

Linoleum in the warrant officers quarters and in all spaces abaft bulkhead No. 65, where linoleum is now laid, shall be renewed with heavy-weight linoleum.

Planking extending over after reserve feed tanks shall be caulked.

Main deck planking shall be renewed from frame 15 aft to the present forward bulkheads under the poop deck and in new ship's office if necessary.

Forecastle and poop decks, throughout, shall have new planks, fitted as necessary and graving pieces worked where local areas are badly worn. Wood deck with proper margins shall be fitted where forecastle deck is extended.

all toilet spaces Deck covering in galley shall be renewed. Deck covering in galley and general mess pantry, shall be approved cement, about 2 inches thick, sloped for drainage, coved up about 6 inches at boundary bulkheads.

Canvas on top of all deck houses shall be renewed. Top of new wheel house shall be covered with canvas fitted similar to other deck houses. All safety treads shall be renewed and new treads of non-corrosive material placed where necessary.

23. WATER-TIGHT BULKHEADS.

The bulkheads, as indicated on plans, in hold and on berth deck, are worked water-tight and repairs shall obtain this result. In general, bulkheads, where renewed, extending below berth deck shall have a lower horizontal strake of 3/8-inch plating; upper strakes, worked either horizontally or vertically, shall be 1/4-inch plating throughout except peak tanks where 5/16-inch plating shall be used. Butts shall be lapped and double-riveted; seams shall be lapped and single-riveted except where double-riveting is necessary to insure water-tightness.

In general, single bounding angles shall be used, with lapped butts taking three rivets; angles to deck shall be 3 by 3 by 3/8 inch; angles to shell shall be 4 by 3 by 3/8-inch.

Stiffeners and brackets below berth deck, where renewed, shall come up to original scantlings.

Forward bulkheads under poop deck, shall be repaired and made water-tight.

24. NON-WATER-TIGHT STEEL BULKHEADS.

Swash bulkheads of 3/16-inch plate, suitably stiffened, shall be fitted, where indicated port and starboard, in the after reserve feed tanks.

Steel bulkheads for crew's toilet space and prison have 12 by 1/4-inch coaming plate and 2 1/2 by 2 1/2 by 1/4-inch angle to deck, worked water-tight; casing is No. 12, U.S.S.G. plate in vertical strakes stiffened by 2 by 2 by 1/4-inch angles spaced 24 inches.

25. WOOD BULKHEADS.

New wood bulkheads, to suit new arrangements, shall be tongue-and-grooved poplar or other similar soft wood, about 1-1/8-inch thick, in narrow strips about 2 inches wide; strakes run vertically with edges on both sides slightly bevelled, not beaded. Lower coaming shall be 4 inches high. New bulkheads shall extend up to under side of deck beams, without grille.

26. INSULATING SHEATHING.

Cold storage room and officers' and general mess refrigerators shall be framed of yellow pine studding with 7/8-inch tongue-and-grooved sheathing. Insulation for all sides, top, bottom, and doors shall consist of two thicknesses of 2-inch compressed cork slabs, with joints broken; heavy water-proof paper (not tarped paper) shall be worked between cork and sheathing. Doors shall be taper-rabbeted, with galvanized protecting strip at bottom.

At the lower edge of the main-deck beams in the boiler room, frames 34 to 38, between the longitudinal bulkheads, and at the inboard edge of the stiffeners in the boiler hatch casing, on bulkhead 38, sheathing shall be worked, consisting of 1/16-inch galvanized steel plates and 1-1/2-inch asbestos fire felt. Sheathing shall be fastened to 1-1/2-by 1-1/8 by 3/16-inch angle clips on beams and stiffeners where necessary by 3/8-inch round-head brass screws, spaced about 6 inches. The asbestos blocks shall be suitably attached to the steel sheathing and the whole neatly arranged in readily portable sections.

27. CEILING IN QUARTERS AND STOREROOMS.

Ceiling, where broken or missing, shall be repaired or replaced. It is not intended, however, that any ceiling shall be worked in the crew space; except where berths are outboard on ship's side; side of ship shall be left clear for painting. Ceiling below main deck forward of bulkhead #7 shall be removed. Metal sheathing in

hold, frames 18-21 starboard side, shall be removed.

28. FOUNDATIONS.

Foundations under fresh water tanks in main hold shall be overhauled and repaired; the tanks being moved forward to allow thorough repair.

Windlass foundation under main deck shall be removed and suitable foundation fitted under forecastle deck for new windlass.

Foundations for boilers, stack and auxiliaries shall be repaired; care being taken in all cases to obtain adequate access for the care of structure.

Foundation structure carrying boiler room floor plates shall be renewed where corroded.

Mast steps and foundations shall be repaired.

29. DECK HOUSES.

Steel deck house shall be built on the main deck, frames 60-65, as indicated on the plans. Plating and stiffeners shall be of the same scantlings and worked similar to that of the present house forward of the engine room skylight.

New wood deck houses shall be built on the main deck aft and on top of present pilot house as indicated on the plan. Structure of these deck houses shall be adequate to stand impact of water which may come aboard under service conditions. Fittings shall be as indicated or otherwise specified.

30. WATER-TIGHT AND NON-WATER-TIGHT DOORS,

AND WATER-TIGHT MANHOLES.

Water-tight doors and manholes shall be overhauled and repaired. New manhole shall be fitted over reserve feed tank aft where indicated on the plans. In wardroom, details shall provide for flush surface level with top of linoleum. Scuttles shall be overhauled and repaired. Fit a 15-inch water-tight hawser scuttle on poop deck where indicated. Below this scuttle, shall be fitted a 15-inch galvanized pipe, extending to the main deck, for passing hawsers to stowage space. Chafing chocks shall be fitted as necessary.

Non-water-tight metal doors shall be overhauled and repaired; new doors fitted where indicated. Wire mesh doors, with angle frame, shall be fitted to mess pantry, issuing room and paint mixing room.

Exterior and interior wood doors shall be overhauled and repaired.

31. HATCHES, COMPANIONS AND SKYLIGHTS.

All hatches, skylights and fittings, shall be overhauled and repaired. Companion to warrant officers' quarters shall be moved to starboard as indicated on the plan.

New companion hatch, 5' 9" by 3' with round corners, shall be fitted on forecastle deck frames 17-20. Coaming shall be 5/16-inch plate, 15 inches high above deck with top horizontal athwartships and stiffened at inner top edge by 1-1/2 by 1-1/2 by 1/4-inch angle; coaming angles are 3 by 3-1/2 by 3/8-inch. Covers shall be of 1/4-inch plate with angle frame and stiffener, hinged at forward end, and fitted with flat rubber gaskets and rolled-brass dogs and nuts for clamping water-tight.

A hinged, portable, galvanized pipe frame is arranged at after end of this companion-hatch cover to fold over and form a support for the canvas canopy fitted around the companion. The cover is arranged to stand up at about 45 degrees with braces extending from the cover to the coamings; braces have toggle pins at lower end and have eyes to take the ladder manropes. Cover hinges and pipe frame have toggle pins. Small galvanized eyes on the coaming take stoppers for the canvas canopy.

Two new air-tight and weather-tight hatches shall be fitted in top of boiler hatch, with details to suit conditions.

32. BOILER AND ENGINE HATCH.

Boiler hatch shall be increased to 14'0" in width, with contour as indicated on plan. Top of hatch shall be level, with openings fitted with covers suitably stiffened, flanged down on edges and fitted air-tight and made water-tight. Hatch coamings, angles and other structure shall be repaired to suit conditions. Brass fittings for hatch covers shall be furnished only where required to prevent freezing of parts.

33. AIR PORTS, DEADLIGHTS, DECK LIGHTS AND WINDOWS.

Frame, fittings, cover and glass for ports and lights shall be repaired and replaced where damaged; new gaskets shall be fitted on all air ports. Bars shall be fitted over air port, frames 7-8. New air ports with covers shall be fitted where indicated.

Windows in deck houses shall be repaired and made to operate smoothly. Windows and air ports shall be fitted in new deck houses where indicated on plans.

Canvas vizer shall be fitted over wheel house windows.

Drippans for all windows shall be renewed.

34. BOAT DAVITS AND STOWAGE.

Davits, port and starboard, shall be removed and new davits, 6 inches diameter, 6 feet overhang, spaced as indicated, and of adequate height above the forecastle deck level to permit boat on davits to swing in clear of a boat stowed on forecastle deck installed. Bearings in each case shall be arranged to suit. Boat chocks shall be furnished and fitted.

35. ANCHOR AND ANCHOR HANDLING GEAR.

Two 2400 lb. cast-steel bower anchors of stockless type and two new 1-1/4-inch stud-link chain cables of 120 fathoms each shall be furnished. Each cable is fitted with a shackle every 15 fathoms, an anchor shackle at each end, a swivel 45 fathoms from the anchor and a swivel to come on the upper deck between the spring stopper and the windlass when the anchor is hove up. Cables shall be dipped in asphaltum. Two spare chain shackles, one spare swivel and one spare anchor shackle shall be furnished.

Anchors and chains shall be inspected and tested under the rules of an approved classification society, and appropriate certificates furnished.

New steam windlass, with engine and windlass self-contained on the forecastle deck, shall be arranged as indicated on the plan. Windlass and engine will have capacity for hoisting a 2400 lb. anchor and 30 fathoms chain at a rate of at least 4 fathoms per minute without heating, chain being led through hawse and chain pipes under service conditions. The working steam pressure will be 100 lbs. per square inch but engine and all parts must be able to withstand full boiler pressure. Engine will be provided with reverse gear and control, gear to be operated at the engine. Spare set of bearing brasses and piston rings shall be furnished. Windlass wildcats shall fit the chain furnished. Warping gypsy heads shall be mounted on both ends of wildcat shaft. Present chain stoppers shall be overhauled and repaired. Two cast-steel hawse pipes shall be fitted with location about as shown on the plan. Hawse pipes shall be designed to snugly stow the type of stockless anchor supplied. Hawse pipes shall be

1-1/4-inch thick in the thinnest part and at least 1-3/4-inch in wake of the bolster. A 1/4-inch portable slotted plate cover, with dogs as necessary shall be fitted at the top of each hawse pipe.

Chain pipes shall be worked to suit new location of windlass.

Gypsy capstan aft shall have overhaul and repairs. Worm gear and bearing should be carefully examined to determine extent of renewals.

36. STEERING ENGINE AND GEAR.

New steering engine will be furnished and installed in engine room as directed. Engine will be of approve type capable of putting the rudder from hard-over to hard-over in 20 seconds with the vessel at full speed ahead and from hard-over to hard-over with the vessel at full speed astern. Engine and gear shall be designed with working steam pressure 100 lbs. per square inch but all parts must be capable of withstanding full boiler pressure. Speed reduction for hand steering will be made at the engine. Spares consisting of bearing brasses and piston rings will be furnished. New steering gear leads shall be installed from the steering engine to quadrant, with leads to suit new installation. Casing over the leads, through the quarters, shall be repaired and relocated to suit new leads. New sheaves shall be of the roller bearing type properly housed. Proper lubrication of all working parts shall be obtained. Turnbuckles or other means shall be provided for taking up the slack in the ropes. Composition steering stand of approved design shall be fitted in wheel house; stand to have two wheels, one about 3-foot diameter for control of steering engine valves; and one about 4-foot 9-inches diameter, for hand gear drive. Wheels will be of light but strong construction. Steam steering wheel will make about four turns from hard-over to hard-over, and hand steering wheel about twenty turns.

Steering stand shall connect with steering engine by shaft lead, run as directly as possible and with as few bevelled gears, universal joints and bearings as practicable. Bearings shall be of the roller type. Details of stand shall permit of either wheel being placed in operation, as desired, but under no conditions can both wheels be connected at the same time. Rudder indicator shall be fitted on the stand. Maximum rudder angle shall be determined from the rudder and the stops as at present fitted.

37. COMPASSES.

Compasses and binnacles furnished by the Government shall be installed by the contractor as directed, the standard compass being

on the compass platform over bridge and the steering compass on the bridge. The standard compass shall be installed as far as possible from movable magnetic material.

38. PIPING SYSTEMS, SOUNDING TUBES AND AIR ESCAPES.

In laying out leads; at least 6 feet 2 inches headroom is maintained wherever possible in passages, quarters, and other spaces where comfort and convenience make it desirable. Piping is out of the way where practicable, but care is taken in bilges and elsewhere to simplify the system and also allow access to all parts of the ship's structure for cleaning and painting; if necessary, special sections of piping are fitted readily portable. Piping in new reserve feed tank shall be removed, where possible, and new leads run to suit new arrangements.

Lagging of present water-piping shall be repaired or renewed and new leads lagged with hair, felt and canvas, or their approved material, to prevent sweating where condensation would be objectionable.

Pipe leads, in general, except for marking bands, are painted the same color as the surrounding compartment.

Water-tight stuffing boxes shall be fitted where steam and water pipes pass through decks.

39. DRAINAGE SYSTEM, DECK SCUPPERS AND PLUMBING DRAINS.

Drainage system, piping, and pumps shall be as required by the machinery specifications. Fittings unnecessary for the new arrangements shall be removed; the remaining compartment drains, sluice valves and docking plugs shall be overhauled and repaired.

A water-tight coaming is worked on the main deck completely enclosing the ice machine and around sanitary drinking terminal; deck drains being fitted for area inside coaming.

Deck scuppers and drains shall be overhauled and repaired. Flap valves in scupper outlets from weather decks may be omitted.

New scupper leads and water-closet discharge pipes for commissioned officers' and warrant officers' and crew's toilet spaces, shall be of cast iron or lead pipe.

A vertical galvanized air pipe shall be worked in connection with plumbing drains and located where practicable, to prevent air from being forced through traps when vessel is rolling.

Fit deck drain in cabin bath, aft bulkhead 87, port and starboard.

40. FLOODING AND FIRE SYSTEM.

The fire system, piping and pumps, are as required by the machinery specifications. Midship fire plugs on main deck, port and starboard shall be removed. Hose connections and leads of piping shall be overhauled, repaired and fire plugs renewed.

41. FRESH-WATER AND RESERVE-FEED SYSTEM.

The fresh water and reserve feed pumps are described by the machinery specifications.

Part of systems not necessary for new arrangements shall be removed. All water tanks in engine room and cabin bath shall be removed.

Piping, valves, hand pumps, strainers and fittings shall be overhauled, repaired and renewed as necessary. New hand pump shall be fitted in the galley.

The fresh water for ship's use is carried in the four tanks in the main hold, the piping for drinking water being separate from that for reserve feed. Fresh water tanks shall be overhauled, and repaired.

New gravity tank of about 200 gallons capacity, lagged to prevent freezing, shall be fitted to give head for fresh water supply to fixtures; overflow leads back to fresh water tanks. One self-closing sanitary drinking terminal shall be installed, location as indicated on the plans; drain to lead to feed tank.

42. SALT-WATER SYSTEM.

Salt-water pumps and pressure regulating valve are described by the machinery specifications, pressure on system being about 20 pounds.

Valves, piping and fittings of salt-water system shall be overhauled, repaired and renewed as necessary.

Piping shall be fitted to suit the new arrangements. Water-closet in cabin bath shall be connected to present sanitary system, valves and fittings to suit.

43. PLUMBING FIXTURES AND ACCESSORIES.

Plumbing fixtures not specified to be renewed shall be overhauled and repaired.

New plumbing fixtures, consisting of water-closet and shower head with heater attachment, shall be fitted in commissioned officers' and warrant officers' toilet spaces. New shower head shall be fitted in cabin bath with connections to present heater. Water-closets shall be siphon-jet type with heavy, vitro adamant, oval flushing rim pedestal bowl with heavy base. Showers shall be of heavy brass, nickel-plated head, about 6 inches diameter. Water heaters shall consist of inner and outer tube arranged for heating a film of water by steam. Suitable valves shall be provided properly marked. Crew space shall have two showers and heaters similar to those described above. Crews' water-closet trough shall be an open, washout, range type of copper, tinned inside; flushed from forward end and by a 1 1/4 inch diameter brass pipe, perforated on under side and extending around top of trough. Heavy ash seats are fitted, number as indicated on plans.

New lavatories and fixtures shall be fitted in warrant officers' quarters; these lavatories drain direct into vitro-adamant waste receptacles.

Lavatories are vitro-adamant, oval front, with basin slab, and back in one piece; supported entirely from bulkhead; basin about 14 by 11 by 5 inches deep inside, with overflow; overlap slab with ledge around edge and two bosses; back 6 inches high; all corners rounded; other fixtures shall be of high grade marine type.

New sinks shall be installed in the warrant officers' quarters, galley and general mess pantry. Sinks shall be about 18 by 14 by 10 inches deep of 60-ounce copper, brazed or riveted and soldered; inside of sinks is finished smooth and heavily tinned, and top edge is flanged 1 inch outward for securing to dresser.

Sink drains have brass lever-operated gate valve fitted convenient for use. All sinks have open-end silent-type heaters, arranged to swing clear for cleaning sinks.

44. HEATING.

Steam-heating system shall be overhauled, as described in the machinery specifications and wall-type radiators adopted where new radiators are required by new arrangements.

45. VENTILATION.

Present forced ventilation installation forward shall be removed.

Cowls, trunks, covers, fittings and stowage details of ventilators shall be overhauled and repaired.

Two 15-inch cowl ventilators and trunks, on forecastle deck, shall be relocated and trunks extended for delivery of air to the quarters below the main deck; height about as at present. Ventilator trunks shall have outlet below main deck, arranged to take a Sturtevant, Type C, or similar portable ventilating set; short ventilating ducts to be fitted.

Fire room cowl ventilators shall be raised and trunks extended so that bottom of cowl is about on a level with the top of the new wheel house.

46. VOICE TUBES.

Present fire control voice tube leads shall not be removed; all other leads shall be removed.

New voice tubes of 2 inches diameter brass tubing shall be arranged from the bridge to the cabin, bridge to engine room, bridge to radio room, bridge to emergency cabin, and engineer's stateroom to engine room.

47. CALL-BELL SYSTEM.

Present call-bell system shall be removed and new annunciators with drops installed as follows: one in galley, connected to bridge, cabin and pantry, and wardroom and pantry; one in cabin pantry, connected with cabin, cabin stateroom and galley; and one in wardroom pantry, connected with wardroom, staterooms, bathroom, toilet and galley. Annunciators shall be of heavy marine type, with durable black finish. Wiring and fittings for quartermaster's call bell shall be renewed throughout.

Furnish and install storage battery operating all call-bell systems.

48. GENERAL ALARM.

General alarm system will be renewed throughout, old fittings being used only where found to be in perfect condition.

49. ENGINE TELEGRAPHS AND BELL PULLS.

Engine telegraphs and bell pulls, together with gong and jingle in engine room are to be overhauled and repaired, new bronze-wire leads installed, and sheaves and bearings placed in efficient operating condition or renewed where worn.

New engine telegraph stand of approved type shall be installed in wheel house.

50. ELECTRIC INSTALLATION.

Electric wiring and outlets throughout shall be tested, overhauled and repaired. Electric portables, clusters and other electric fittings, shall be overhauled and repaired. Motor generator at present in the radio room shall be removed and relocated in engine room; wiring leads worked to suit.

New leads shall be fitted in quarters rearranged. New wiring and wiring replaced after removal, shall be armored water-proof cable, with corresponding details and fittings.

New electric apparatus to be installed consists of the following:-

2 Portable Ventilating Sets.
Refrigerating Machine.

51. ELECTRIC LIGHTING FIXTURES AND LAMPS.

Fixtures, where renewed in the boiler and engine rooms, and other compartments below the waterline, in plumbing spaces and on weather decks are of water-tight type, with globes and guards; elsewhere the water-tight feature is omitted, protecting guards only being fitted around the lamps. Fixtures shall be of high-grade marine type.

52. ELECTRIC RUNNING LIGHTS AND NIGHT SIGNAL SETS.

Masthead, towing, range, side, stern and anchor lights and night-signal sets, shall be overhauled and repaired.

53. MASTS AND SPARS.

Mast bands and eyes to take rigging shall be overhauled and repaired.

54. STANDING RIGGING.

Rigging for masts and spars including turnbuckles and eyes shall be renewed throughout.

55. RUNNING RIGGING AND BLOCKS.

Blocks and tackles shall be overhauled, repaired and renewed as necessary. Sheaves repaired shall have Tobin bronze roller bushings, except sheaves for snatch blocks, anchor and deck tackle, which shall have metalline bushings.

56. ENSIGN AND JACK STAFFS AND BOAT BOOMS.

Ensign and jack staffs and boat booms shall be repaired, scraped and refinished; fittings for these items shall be overhauled and repaired.

57. RAIL AND AWNING STANCHIONS, AND RAILS.

Wood rail at top edge of bulwark shall be repaired and attachments repaired to prevent running of rust.

Pipe rails and stanchions shall be repaired and straightened.

Towing rail shall be extended about as indicated on plans. Two 2 by 5/8-inch galvanized half ovals shall be fitted on to p of towing rail to take chafe of lines.

Awning stanchions of extra heavy 2 1/2-inch W.I. pipe, galvanized, are fitted for the forecastle and poop decks. Stanchions are portable and ship and lock into substantial galvanized sockets at gunwale; sockets are of ample strength to keep stanchions plumb without attachment to rail.

58. LADDERS AND GRABS.

Present access ladders and fittings shall be overhauled and repaired, new ladders being fitted where conditions or new arrangements require; new side rails or manropes being fitted where required. New metal ladders shall be furnished and installed in the peak tanks where required. Treads of built-in steps shall be overhauled and repaired. Ladder from main to forecastle deck, in way of boiler hatch shall be fitted about as indicated.

59. LIGHTNING CONDUCTORS.

A lightning conductor is provided on each mast; conductor is of 3/8-inch copper wire rope, fitted complete with tip, fairleads, etc. It is secured at the truck, and follows the shrouds; lower end attached to the shell plating with a good electrical connection of substantial design.

60. RUNNING-LIGHT FIXTURES.

Fixtures and boxes shall be overhauled and repaired.

61. MISCELLANEOUS.

The following items shall be overhauled, with repairs or renewals where required; draft figures; zinc protectors; vegetable lockers; cork ring life preservers; bucket racks; fly screens for air ports and living quarters; air port scoops; bulletin boards. Hammock berthing shall be repaired, corroded plating and framing renewed.

Deck chests and lockers for boat gear shall be overhauled, repaired or renewed and additional chests or lockers fitted to adequately care for boat gear. Lockers shall be fitted as indicated for boatswain's locker and scrub deck gear; fittings to suit.

New hose racks of the saddle type, shall be fitted near fire hydrants.

Canvas tie ties shall be worked at side of ship outboard of the galley. Bag racks of pipe shall be fitted where directed; hammock hooks for about 32 hammocks shall be fitted to suit the new arrangements.

Stowage details shall be arranged for portable fittings and outfit furnished. Stowage fittings are on bulkhead or have details such that articles do not rest on the deck.

62. BERTHING AND MESSING FOR CREW.

Berths are arranged about as indicated in crew's and petty officers' quarters. They shall be an approved type of portable folding berth supported from stanchions or side of ship as indicated. Present berths shall be utilized where conditions will allow.

63. CLOTHES LOCKERS.

New galvanized metal lockers, 18 by 18 inches, two high, shall be installed in the crew's space as indicated, to suit new arrangements.

64. FURNITURE.

Furniture, lockers, mirrors, cushions and upholstery in officers' quarters will be overhauled, repaired and refinished; all to present a thoroughly satisfactory appearance on the completion of the work.

Emergency cabin shall be arranged and fitted with transom berth, drawers under, as indicated on the plans and similar to the furniture, fittings, etc., in the present staterooms.

Slat seats shall be fitted on main deck about as indicated, 18 inches wide and 18 inches high, supported by brackets from ship's frames. Tops and backs of seats are slat type with fore-and-aft battens; curved and shaped for comfort.

Substantial brass curtain rods of approved design shall be fitted for all air ports, where missing, in cabin, wardroom and warrant officers' staterooms and countries and elsewhere as conditions require.

65. HARDWARE.

Hardware throughout the vessel shall be repaired. New hardware, fitted for new arrangements, shall be best quality marine type, of cast metal.

66. JOINER WORK.

Sheathing, inside of deck house plating and against shell plating in quarters, where removed for any purpose, need not be replaced in deck houses, and may be replaced only up to lower edge of air ports in quarters.

New joiner bulkheads installed shall extend up only to the under side of deck beams, no grille work to be fitted.

67. COMPARTMENTS IN GENERAL.

Where repairs or alterations are made, new work shall correspond to other details in the same compartment. Compartments shall be located and assigned as indicated on Headquarters' design plans. New arrangements shown on the plans, shall be equipped with the fittings indicated.

Finish of joiner work in all quarters shall be as at present; number of coats of paint or varnish will be as already specified.

Ship's office shall be relocated and fitted with three desks, shelves, drawers, and lockers for stationery, books, blanks, suitable filing arrangements and key locker. Suitable stowage shall be provided for the ship's safe.

The furniture and fittings provided in the chart room are a desk, chest of drawers with table top for chart stowage and use, book racks, small shelves and lockers, chronometer stowage, etc.

Wheel house and bridge shall have fittings and be arranged as indicated on the plans. Appliances installed as conveniently as possible in the wheel house are steering wheel stand; compass and binnacle; engine telegraph; bell, whistle, and siren pulls; voice-tube terminals; return sound tube from engine room; binocular stowage; megaphone stowage; mountings for clock, barometer and thermometer; rocket stowage, etc.

Fittings in galley shall be entirely overhauled and repaired. A new hot water tank, with proper fittings, shall be installed. Pantries shall be overhauled and repaired, and arranged as indicated. Mess issuing room and mess pantry shall be arranged as indicated; fittings to suit. Sanitary features should be given special consideration in these spaces. Coffee urn shall be furnished and located in crew space.

Prison shall be arranged with one hinged wood berth.

Fittings, such as shelving and lockers, shall be installed in the clothing room, paint and oil mixing room, and lamp locker. Stowage for towing hawser to be arranged as indicated.

68. REFRIGERATOR SPACES.

The refrigerator compartments are constructed with insulation and details as specified elsewhere. Cold storage compartment shall be provided with flat bar hangers and galvanized hooks. Officers' refrigerator spaces shall be separate compartments, with shelves to provide separate stowage for cabin and wardroom messes; each section to be locked. General mess and warrant officers' ready-service space is in the vestibule to the cold storage space, and will be fitted with wire mesh lockers of suitable size, with shelves to provide stowage. The doors to refrigerator compartments have heavy galvanized hinges, with dogs, handles, hasps and brass padlocks with chain. The refrigerating coils are suitably protected in the various compartments.

The compartments are lined on the bottom and flashed 12 inches up the sides with 4-pound sheet lead and lined above this point with No. 20 U. S. S. G. sheet zinc; the lining throughout is soldered and made water-tight.

The refrigerating machine is located as indicated, inclosed in wire-mesh bulkheads with racks for wrenches and tools, and suitable provision for the ice-making tank. Inclosing bulkheads shall have hinged sections for access to ice machine apparatus.

69. COAL BUNKERS.

Coal bunker shall be as at present; necessary repairs being made to structure ceiling, etc.

70. RESERVE FEED TANKS.

These are the forward and after tanks, as indicated on the plans; access holes shall be provided to all parts of the tanks. The forward reserve feed tanks have a capacity of about 3500 gallons, and the after feed tanks a capacity of about 4500 gallons; total about 8000 gallons.

71. SHIP'S FRESH-WATER TANKS.

These are separate tanks located in the main hold with a combined capacity of about 3200 gallons, and the gravity tank about 200 gallons; total about 3400 gallons.

SPECIFICATIONS FOR MACHINERY REPAIRS.

MAIN ENGINE

1. Valve Stems.

The H.P., I.P. and L.P. valve stems will be removed and trued up. New bushings will be fitted. New metallic packing similar in design to that now used or of approved type will be furnished and fitted by the contractor.

2. Lubricators.

The present lubricators will be removed and lubricators of similar or approved type will be furnished and fitted by the contractor.

3. Eccentrics.

The H.P., I.P. and L.P. eccentric straps will be removed, the old white metal taken out and replaced by metal composed of 88 to 89.5 parts tin, 6 to 8 parts antimony, and 3 to 4.5 parts copper. The eccentric sheaves will be trued up. The eccentric straps and sheaves will be re-assembled and fitted.

4. Tail Shaft.

The tail shaft will be removed for examination of the shaft and bearings. The stern tube lignum vitae staving will be removed and new staving fitted, in the same manner as present staving.

PIPING

5. Steam Piping.

All steam piping over two inches (2") will be removed, annealed, tested, and made tight at 400 pounds per square inch, hydrostatic pressure. The piping will be replaced, tested, and made tight under steam pressure of 200 pounds per square inch. The piping will be covered with magnesia block and lagged with canvas and painted as approved.

BOILERS.

6. Surface and Bottom Blow Valves.

New surface and bottom blow valves will be furnished by the Government for both boilers and fitted by the contractor.

AUXILIARY MACHINERY.

7. Fresh Water Pump.

A new pump will be furnished by the Government and installed by the contractor with suction from the ship's service fresh water tanks and discharge to the gravity tank.

8. Sanitary Pump.

The present sanitary pump is a Blake, simplex, $4\frac{1}{2}$ " X 6" X 6". This pump will be removed and a new pump similar in design, or as approved, will be furnished and installed by the contractor. State kind of pump proposed ____.

9. Bilge Pump.

The present bilge pump is a Blake, simplex, $4\frac{1}{2}$ " X 6" X 6". This pump will be removed and a new pump similar in design, or as approved, will be furnished and installed by the contractor. State kind of pump proposed _____.

10. Steering Engine. SEE HULL SPECIFICATIONS

The present steering engine was manufactured by Williamson Brothers. Diameter of cylinders 5", stroke of pistons 6", diameter of drum 10", size of chain 11/16". The present engine will be removed and a new engine similar in design, or as approved, will be furnished and installed by the contractor. The location of steering engine will be as approved. (See Hull specifications. State kind of engine proposed _____).

11. Circulating Pump.

The cylinder will be rebored and made true. New piston will be manufactured and fitted. New crosshead and crankpin brasses will be manufactured and fitted.

12. Windlass. SEE HULL SPECIFICATIONS

The present steam windlass was manufactured by the Hydro Windlass Company. Diameter of cylinders 6" and stroke of pistons 9". The present windlass will be removed and a new windlass of similar design or as approved, will be furnished and installed by the contractor. State type and size of engine proposed _____.

13. Steam Heating System.

The present steam heating system will be thoroughly overhauled and new radiator valves of approved design will be furnished and fitted by the contractor throughout the system.

14. Refrigerating Machine.

A $\frac{1}{2}$ ton refrigerating machine of the dumbbell type with brine coils will be furnished and installed by the contractor. Electric leads, circulating motor, and necessary piping will be provided by the contractor.

Where during the course of repairs, the existing machinery and piping systems are disconnected or disarranged the contractor will restore such parts to good condition.

Materials and Workmanship.

All material used in the repairs must be of the best quality. All work will in every respect, be of the first quality, executed in a workmanlike and substantial manner.