

GOLD COAST.

Contract

FOR THE BUILDING OF A TWIN SCREW STEAMER
FOR THE GOVERNMENT OF THE GOLD COAST;
AND FOR THE BUILDING AND FOR THE DELIVERY
THEREOF AT THE PORT OF ACCRA.

DATED 1st JUNE, 1886.

SUTTON & OMMANNEY,
3 & 4, GREAT WINCHESTER STREET,
LONDON, E.C.



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GOLD COAST.

This Indenture made the First day of June One thousand eight hundred and eighty-six BETWEEN SIR WILLIAM CHARLES SARGEANT, K.C.M.G., MONTAGU FREDERICK OMMANNEY, Esq., C.M.G., and ERNEST EDWARD BLAKE, Esq., all of Downing Street in the City of Westminster the Crown Agents for the Colonies (hereinafter referred to as the Crown Agents) acting for and on behalf of the Government of the Gold Coast (hereinafter called the Government) of the one part and THE BARROW SHIPBUILDING COMPANY LIMITED whose registered office is situate at Barrow-in-Furness in the County of Lancaster (hereinafter referred to as the Contractors) of the other part.

Whereas the Crown Agents some time since invited tenders for the supply and delivery to them according to the terms and conditions of these Presents and of the Specification and drawings hereinafter mentioned or referred to of a steel twin screw steamer of fully 500 indicated horse-power and 339 tons displacement required by them for the Government :

And whereas the Contractors have sent in a tender for the same and such tender has been accepted by the Crown Agents upon the terms and conditions hereinafter mentioned :

And whereas the said Specification and a list of the said drawings are respectively contained in the 1st and 2nd parts of the Schedule hereto :

And whereas the said drawings have been signed by the Naval Architect and Inspecting Engineer hereinafter referred to and the Contractors :

And whereas it has been agreed between the said parties hereto that these presents shall be entered into by way of Contract, and that the Contractors shall secure the due performance of this



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Contract by the joint and several bond of themselves and Lord Edward Cavendish M.P. and Sir James Ramsden in the sum of £2500 sterling and it is intended that such bond shall bear even date with these presents.

Now these Presents witness that the Contractors so far as the provisions of this Contract are to be performed and fulfilled by them do hereby for themselves their successors and assigns covenant with the Government and also as a separate covenant with the said William Charles Sargeant, Montagu Frederick Ommanney, and Ernest Edward Blake as such Agents for and on behalf of the said Government and each of them their and his successors and assigns and the said William Charles Sargeant, Montagu Frederick Ommanney and Ernest Edward Blake as such Agents as aforesaid and for and on account of the Government do hereby contract and agree with the Contractors their executors administrators and assigns in manner following that is to say—

Contractors to construct complete equip and deliver a twin screw Steamer in accordance with Specification, drawings, and this Contract.

1. The Contractors will construct complete and equip in every respect ready for sea in a skilful and workmanlike manner with the best materials within the time and at and for the price or sum and upon the terms herein contained a steel twin screw steamer (hereinafter referred to as "the vessel") of such dimensions power and tonnage as are herein mentioned together with all necessary and proper rigging sails boats engines boiler machinery and fittings in all respects in strict accordance with the true intent and meaning of the said Specification and drawings and of these Presents and subject to the provisions of Clause 18 will deliver the vessel safely afloat so completed and equipped at the Port of Accra into the charge of such person or persons as the Crown Agents may appoint to receive her.

Powers to Naval Architect and Inspecting Engineer to make alterations and additions to details of Specification &c.

2. The Contractors shall in all respects abide by and conform to the provisions of the said Specification and of this Contract and also by and to all such directions as shall be given during the progress of the work by the Naval Architect and Inspecting Engineer who may at any time make any alterations in or addition to the details provided by the said Specification and drawings and the Contractors shall execute the work according to such altered details in the same manner as if the altered details had been originally prescribed by the said Specification and drawings but no extra charge shall be allowed to the Contractors for such alterations or additions as the case may be except that any additional work which shall be expressly ordered in writing by the Naval Architect and Inspecting Engineer and claimed as such by the Contractors and allowed in writing by the certificate of the Naval Architect and Inspecting Engineer at the time the order is given shall be paid for by the Crown Agents. No such alterations or



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additions shall be carried out before the consent in writing of the Naval Architect and Inspecting Engineer shall have been obtained thereto. Such additional work shall be paid for according to the amount certified by the Naval Architect and Inspecting Engineer to be the value thereof who is also to certify in the same manner what sum is to be allowed the Crown Agents for any materials and works dispensed with by such alterations and additions.

Provision as to payment of such alterations and additions.

3. The engines boilers fittings spare gear duplicate parts of the engines and machinery connected therewith to be constructed for and fitted to the vessel shall be so constructed and fitted in strict accordance with the said Specification and drawings and the whole of the usual fittings in connection therewith whether provided for by the said Specification or not shall be provided by the Contractors.

Description of Engines Boilers Fittings and Machinery.

4. The Contractors shall and will at their own expense within fourteen days from the date hereof deliver to the Crown Agents drawings showing all pipes valves and connections sea cocks &c. of the vessel drawn to a scale of not less than $\frac{1}{2}$ inch to the foot together with a working drawing of the engines and boilers showing every detail with thickness of plates distinctly marked to a scale of one inch to the foot and as soon as the engines and boilers are completed the Contractors shall and will at the like expense deliver to the Crown Agents two complete copies (as fitted) of the drawings first above referred to together with photographs or coloured lithographs and a neat model of the vessel as she will appear when ready for sea.

Working and other plans &c. to be furnished by Contractors.

The following drawings are also to be supplied by the Contractors on the completion of the vessel.

A general drawing of the machinery as fitted drawn to a scale of $\frac{1}{2}$ -inch to a foot showing the complete arrangement for ventilating the engine and boiler rooms also the arrangement of pipes cocks and valves.

A general drawing of the vessel showing by figured dimensions the position of all the pipes valves &c. through the bottom of the vessel and their depths below the under side of rail. A clear drawing showing the position and lead of all pumps pipes cocks valves &c. connected with the fire-service flooding arrangements &c. accompanied by full directions for their respective use.

A drawing showing the arrangements of water-tight compartments (with their distinguishing marks and letters) sluice valves &c.

A drawing of the bottom plating showing the joints and butts with the exact thickness of each plate written thereon.

A drawing on a scale of $\frac{1}{2}$ -inch to a foot showing in profile only a general view of the water-tight compartments pumping and draining



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arrangements. The water-tight doors should also be shown with some indication as to the direction in which the doors open and shut. Each pipe in this drawing should be shown by a single strong line.

A drawing with figured dimensions of stern tube propeller shaft propeller and all details connected therewith.

A general set of drawings of the vessel as built and fitted.

The Contractors shall also as and when required so to do supply to the Naval Architect and Inspecting Engineer copies of all detail sketches sanctioned during the progress of the work.

Tools and Duplicate parts of Machinery &c. to be supplied by the Contractors.

5. All usual and necessary tools and duplicate parts of the machinery together with such spare gear as is usually supplied with engines boilers and machinery of a similar class and power for foreign service whether provided for in the said Specification or not shall be provided by the Contractors as part of the Contract sum hereinafter mentioned.

Quality of materials to be employed in the construction of works.

6. The materials employed in the construction of the whole of the works provided for by the said Specification and this Contract shall be the best of their respective kinds and the workmanship throughout shall be of first-class character and the same shall be constructed and completed in every respect equal to work of a similar description supplied to Her Majesty's Navy and shall be constructed generally to the entire satisfaction of the Naval Architect and Inspecting Engineer who shall have all such powers to examine the works in connection therewith at all stages of its progress and to reject any portion or portions thereof of which he may disapprove either in point of strength quality or workmanship or otherwise as hereinafter contained.

Definition of completion of Work.

7. No part of the work shall be considered as completed according to this Contract so as to entitle the Contractors to payment of all or any part of the Contract sum hereinafter mentioned unless certified by the said Naval Architect and Inspecting Engineer to have been completed to his satisfaction in all respects and this Contract shall not be considered as fully fulfilled until the Crown Agents shall have received from the representative of the Government such a certificate as hereinafter mentioned.

Certificates to be payable at the office of the Crown Agents.

8. Every certificate given under this Contract shall be paid to the Contractors or their Agents at the office of the Crown Agents for the Colonies Downing Street London within seven days next after the presentation thereof.

Contract sum.

9. The Crown Agents shall pay to the Contractors for the full and perfect completion of the vessel the sum of £13,000 such



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sum to be paid (subject to the deductions hereinafter mentioned) at the times and in manner following that is to say—

One-fourth of the contract sum for the vessel delivered in England when the whole of the frames and reverse frames are in place; one-half of the teak for the deck, and one-half of the outside plating are on the Contractors' premises; and when the main cylinders and condensers are cast.

To be paid by instalments.

One-fourth when the beams are in place and the outside plating is completed, the whole of the deck material is on the Contractors' premises, and the engines and boilers are half completed.

One-fourth when the vessel is launched in a suitable state of advancement, the engines are erected in the workshops, and the spare gear tried.

One-fourth when the vessel is fully and perfectly completed and equipped as aforesaid, has been found on trial at the measured mile to comply with all the conditions required by the said Specification and this Contract, and has been delivered up at the Port of Barrow. Provided always that should the mean speed on such trial fall short of $10\frac{1}{2}$ knots per hour, or should the designed mean water draught of water be increased by more than 3 inches, one half of the fourth payment will be withheld, and all claims for the payment thereof on the part of the Contractors shall cease, and the Crown Agents shall nevertheless, be entitled to claim delivery of the vessel.

10. The fourth payment to be made as last aforesaid on account of the Contract sum shall be subject to addition in respect of the value of alterations and additions made in accordance with the provisions of Clause 2 hereof and shall also be liable to deduction as well for any liquidated damages which may become payable by the Contractors as hereinafter mentioned, as for the retention thereof of the sum of £100 as provided in Clause 20 of this Contract and such further sum or the sum to which the fourth payment of the Contract sum shall be reduced as the case may be shall be paid in like manner as hereinbefore provided for payment of such sum.

Provisions as to deductions or additions to Contract Sum.

11. Upon payment of the first instalment of the said Contract sum the said vessel so far as then constructed and all machinery materials either wholly or partially constructed or in preparation and set apart from time to time for the purposes of this Contract shall become and the same and all additions thereto respectively shall continue and be considered as the property of the Crown Agents

Upon payment of instalment of Contract Sum Vessel &c. to become the property of Crown Agents.



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subject to the purposes of this Contract and the same shall not be taken away possessed or disposed of by any person whomsoever except for the purposes of this Contract without the written licence of the Crown Agents but the Crown Agents shall not be answerable for any loss or damage by theft or fire or accidental or other injuries by weather or otherwise howsoever. Provided always that upon the due completion of this Contract all such materials as aforesaid as shall not have been actually used for the purposes of this Contract shall become the property of and be relinquished to the Contractors.

Trial of
Vessel.

12. The Contractors shall and will at their own expense and risk in all things within the time within which the vessel is to be completed as next hereinafter provided (having previously sufficiently and substantially insured the vessel against all risks of loss or injury by launching, collisions, explosions, groundings, wreckage, and every other form of loss or injury in the names of the Crown Agents in such amount and in such office or offices as the Crown Agents may approve), cause the speed working of the machinery and the general powers and capabilities thereof to be tested in the presence of the Naval Architect and Inspecting Engineer, and of his agents by a trial trip or trips over the measured mile at Barrow, Liverpool, the Clyde, or such other place as may be approved of by the Naval Architect and Inspecting Engineer, and otherwise as he may direct, and until she has satisfactorily accomplished a mean speed of 11 knots an hour (all her ordinary service weights including coal on board and immersed to her designed load-waterline at the time) and is certified in writing by the Naval Architect and Inspecting Engineer to have been in all respects constructed fitted and completed in strict accordance with the said Specification and drawings and these Presents the vessel will not be considered by the Crown Agents to be fully and perfectly completed as aforesaid. Subject to the provisions of Clause 9, any defects which in the opinion of the Naval Architect and Inspecting Engineer may be apparent from this trial shall be rectified by the Contractors to the satisfaction of the Naval Architect and Inspecting Engineer without extra charge on the Contract sum and it shall be in the power of the Naval Architect and Inspecting Engineer to direct that a further trial or further trials shall be made after the said defects have been satisfactorily rectified so as further to test the vessel until the satisfactory working thereof in all respects shall have been proved to the satisfaction in all things of the Naval Architect and Inspecting Engineer.

Time for com-
pletion.

13. The Contractors shall construct equip and fully and perfectly complete as aforesaid the vessel together with all proper engines boilers fittings machinery outfit stores and things in the said Specification or this Contract provided for fully completed and tried in manner in the last preceding clause hereof mentioned and ready in every respect for service at sea on or before the 30th day of November



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next. In the event of the vessel not so being completed the Crown Agents shall be at liberty to deduct from any sum or sums of money then due to the Contractors as and for liquidated damages and not as or by way of a penalty the sum of £10 per day on the total contract sum for each day that the completion of the said vessel shall be delayed beyond the date fixed by this Clause for completion. Provided always that if the Naval Architect and Inspecting Engineer shall certify in writing that such delay has arisen from a general strike or from causes which in his opinion were unavoidable and could not be foreseen or overcome by the Contractors then and in such case the said liquidated damages shall not be payable in respect of the period so certified to be due to such cause. Any delays which may occur in such delivery arising from the supply of materials to the Contractors will not be in any event allowed as a ground for the remission of such liquidated damages except so far as either of such causes may be certified as aforesaid to have arisen from general strikes accidents to machinery or other causes which could not be foreseen or overcome either by the Contractors or by the manufacturers or vendors of such materials as the case may be.

Penalties for delay in such completion.

14. The Contractors shall not assign lease or cede this Contract or the benefit thereof or any part thereof or any moneys payable hereunder or sublet the services to be rendered as aforesaid or any part thereof to any other person or company without the previous permission of the Government certified in writing under the hand of the Crown Agents or of the Naval Architect and Inspecting Engineer certified in writing under his hand and no assignment lease cession or subletting although so permitted shall exonerate the Contractors from their liability under these Presents and the Government shall not be bound or required to take notice of or give effect to any such assignment lease cession or subletting unless the same shall have been made with such permission as aforesaid.

Contract not to be assigned or sublet.

15. The Naval Architect and Inspecting Engineer shall at all times have free access to all premises where the construction fitting and completion of the vessel shall be carried on and for the purpose of inspecting the progress of the said works and the parts thereof and the materials provided therefor or otherwise for the purpose of exercising any authority or control under the said Specification or this Contract and the Naval Architect and Inspecting Engineer shall be entitled at the cost of the Contractors to test any material or workmanship in the manner stated in the said Specification or in any other way he may deem necessary or proper and the Contractors shall at the like cost supply such labour and machinery as may be required by the Naval Architect and Inspecting Engineer for the purposes of such tests and the Naval Architect and Inspecting Engineer shall be at liberty to object to the employment in or about

Power to Naval Architect and Inspecting Engineer to inspect Vessel during construction.



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the execution of this Contract of any foreman of workmen or other person who shall prove incompetent or insubordinate and of such his objection shall give one week's notice in writing to the Contractors and thereupon the Contractors shall not after the expiration of the said notice employ any such foreman of workmen or other person.

Provisions in case of Works not proceeded with; imperfectly executed, &c. &c.

16. In case the Naval Architect and Inspecting Engineer shall at any time during the progress of the said works be of opinion that any part of the said works is not being constructed and proceeded in with due diligence or that the said works or any part thereof are executed unsoundly or imperfectly or not with the proper materials or in any respect not in accordance with the Contract and not to his satisfaction the Naval Architect and Inspecting Engineer may thereupon give to the Contractors a notice in writing requiring them to cause such part of the said works to be proceeded in with due diligence or to be taken down and removed to be re-executed properly and with proper materials as the case may be according to this Contract. And the Contractors shall forthwith comply with such notice and do the several matters and things thereby required of them to the satisfaction of the Naval Architect and Inspecting Engineer without any extra charge and without any extension of the period for the completion of the said works in respect thereof notwithstanding that prior to the giving of such notice any payment may have been made by the Crown Agents on account of such works so objected to or for which any certificate may have been given by the Naval Architect and Inspecting Engineer of the due execution thereof and in case the Contractors shall not within seven days after the receipt of such notice have duly complied therewith and have duly proceeded with the work or have executed the work thereby required or have commenced and diligently proceeded with the same the Crown Agents shall be entitled at their option to cause the works objected to to be taken down and removed or to be re-executed properly and with proper materials and for that purpose to expend such sum as the Naval Architect and Inspecting Engineer may consider reasonable and proper and to retain the money so expended from the Contractors out of the said sum of £13,000 so payable by the Crown Agents to the Contractors as aforesaid and in case such sum shall not be sufficient for such purpose it shall be lawful for the Crown Agents at their option to recover from the Contractors such amount or the deficiency thereof as the case may be as a debt due from the Contractors to the Crown Agents or in any or either of such cases or if the Contractors shall in any way compound with their creditors or if any proceedings are taken or instituted either by themselves their creditors or others with a view either of winding them up voluntarily or compulsory or at any time before the completion of this Contract and after any payments shall have been made on account of the Contract sum if the Crown

Powers of Crown Agents in Bankruptcy &c. of Contractors



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Agents shall think fit and without prejudice and in addition to any other remedy they may have in the premises the Crown Agents may determine this Contract and thereupon all moneys (if any) due to the Contractors and all penalties and sums of money for non-fulfilment of Contract shall be forfeited to the Crown Agents and they may also thereupon sell and dispose of for their own benefit or take possession of and remove the vessel engines boilers fittings machinery and materials in its and their then condition or they may in any such case as aforesaid if they think fit (but without prejudice and in addition to such other remedies as aforesaid) enter upon and take and until the completion of the work retain possession of and use so much of the yard and workshops where the work shall be carried on and all plant machinery and materials of the Contractors necessary for the purpose and at the cost and expense of the Contractors provide and pay for the requisite materials machinery plant engines and workmen and therewith complete the vessel and provide for the trials thereof and the delivery of the same in like manner as the Contractors ought to do under this Contract and retain or deduct the costs and expenses incurred thereby out of any moneys due or to become due to the Contractors who shall also be liable for the amount thereof but the Crown Agents shall not be liable for any loss or injury which may happen to the said machinery workshops machinery or plant during such possession.

17. The Contractors shall and will at their own costs and charges insure in the names of the Crown Agents the vessel and also its engines machinery and fittings from loss or damage by fire in such office or offices as the Crown Agents may approve to such amount as hereinafter expressed that is to say when the vessel shall be so far advanced and such materials provided as to entitle the Contractors to payment of the first instalment of the Contract sum the vessel shall be insured for the full term of the Contract in amounts not less than the amount of the said first instalment and the Contractors shall and will previously to the payment to them of the said first instalment produce to and lodge with the Crown Agents the policy or policies of insurance effected in that behalf and shall and will pay or cause to be paid the premium or premiums in respect of every such policy or policies from time to time until the vessel and engines machinery and fittings shall be completed finished and delivered safely afloat ready for sea as hereinbefore mentioned and which policy or policies of insurance shall in the meantime remain with them as a security (in case of fire) for the several sums of money which shall have been advanced to the Contractors for or on account of the vessel engines machinery and fittings under these Presents. And when and as the works of the vessel engines machinery and fittings shall be so far advanced as to

Contractors
to keep the
vessel, &c.
insured.



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entitle the Contractors to payment of any of the subsequent instalments and previously to receiving the amount thereof the Contractors shall and will insure the works of and the materials provided for the vessel engines machinery and fittings for the full term of the Contract as aforesaid in the same names in manner and subject to the approval of the Crown Agents aforesaid in the additional amount of every such instalment and previously to the payment of every such instalment produce to and lodge with the Crown Agents the policy or policies effected in that behalf and pay or cause to be paid the several premiums of insurance in respect of such policies from time to time until the completion and delivery of the said vessel engines machinery and fittings in manner aforesaid. And if the Contractors at any time or times do not effect and keep in force any such insurance or insurances as aforesaid or do not produce to and lodge with the Crown Agents any such policy or policies as aforesaid or do not pay any such premium or premiums as aforesaid then and in any or either of such cases it shall be lawful but not imperative for the Crown Agents so long as they shall think fit to effect and keep in force any such insurance or insurances as aforesaid and to pay such premium or premiums as may be necessary for that purpose and the Contractors shall and will pay to the Crown Agents the amount or amounts which may at any time or times be expended by their direction for such purposes or the amount or amounts thereof may at their discretion be deducted from any money which may at any time or times be or become payable to the Contractors under this Contract. And it is also agreed that in case the vessel or the said engines machinery and fittings or any of them or any part thereof or the materials provided or any part thereof shall be destroyed or damaged by fire then the same shall at the costs and charges of the Contractors or by and out of the moneys to be received under or by virtue of such insurance or insurances with all possible speed be rebuilt or repaired and put in the same state and condition in every respect and with materials and workmanship of equal goodness as before the happening of such fire and the said materials re-provided without any charge or expense to the Crown Agents. And also that all or any such sum or sums of money as shall be receivable upon and under the said policy or policies shall be paid into the hands of the Crown Agents and the same shall be issued to the Contractors by such instalments as the Crown Agents shall think proper according to the progress made by the Contractors in rebuilding or repairing such vessel and in the re-providing of the said materials after the happening of such fire as aforesaid.

Contractors if
required so to
do to navigate
Vessel to Port
of Accra.

18. Within the space of fourteen days after the vessel shall have been fully and perfectly completed as aforesaid or within such extended time as may be agreed upon between the parties hereto the Contractors shall and will if required in writing by the Crown Agents so to do but not otherwise (having previously sufficiently



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and substantially insured the same against all sea risks in the names of the Crown Agents in such amount and in such office or offices as the Crown Agents may approve) forthwith in a proper and seamanlike manner at their own expense and risk in all things proceed to navigate or cause to be navigated the vessel to the port of Accra and there deliver over the same to the Government or their duly appointed agent in the place and position indicated by them or him in a good complete and satisfactory state and condition of repair any damages incurred or defects discovered during such navigation being made good by the Contractors at their own expense prior to such last-mentioned delivery. Provided always that until the granting by the Government of such a certificate as next hereinafter mentioned and the delivery of the vessel has been accepted by the Government the vessel shall not in anywise be deemed to be under the directions or control either of the Crown Agents or the Government except so far as may be necessary for the exercise by the Crown Agents of any of the powers conferred upon them by these Presents. All engineers' and all other necessary and usual stores are to be provided for the voyage by the Contractors at their own expense and all dock canal and harbour dues and charges to be paid by them. Should the Contractors if called upon so to do make default in navigating the vessel at the expiration of the period of fourteen days or on the expiration of the time to which such fourteen days may be extended the Contractors shall pay to the Crown Agents the sum of £10 per day as liquidated damages in respect of such default for each and every day that they shall make default therein as aforesaid.

19. In consideration of such services the Crown Agents shall and will pay or cause to be paid to the Contractors the sum of £1500 such sum to be paid at the times and in manner following (that is to say)—

Payments to be made Contractors for such navigation.

One half thereof when the vessel has left her last place of call in England six days.

The other half thereof when the Crown Agents have received from the Government a certificate that the vessel has been delivered over to them in the Port of Accra in such state of repair and in such condition as lastly hereinbefore mentioned.

20. The Contractors do hereby guarantee the proper and efficient working of the said engines boilers and fittings and of all machinery in connection therewith for the period of six calendar months from the date of the sailing of the vessel from England to the Port of Accra and the Crown Agents shall be at liberty to deduct and retain

Machinery guaranteed by Contractors.



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from the amount of each of the certificates to be given by the Naval Architect and Inspecting Engineer as hereinbefore mentioned the sum of £100 making together the sum of £400 such sum to be retained by them until they shall have received from the Government a certificate that the said engines boilers fittings and machinery have in all respects been found to work efficiently and in accordance with the terms and conditions of the said Specification and this Contract during the said six calendar months. Should any defects in such working be discovered the same shall be forthwith made good by the Contractors at their own expense failing which the Government may make good the same and the Crown Agents may deduct any moneys expended by them in so doing from the said sum of £400 and subject to such deduction the said sum shall on receipt by the Crown Agents of such Certificate from the Government as last aforesaid be paid to the Contractors.

To pay all royalties &c.

21. The Contractors shall pay all royalties and other sums of money which shall be due or payable in respect of any patented articles or designs which shall be provided and used by them in or about the construction of the Vessel.

To indemnify the Government against penalties &c.

22. The Contractors shall indemnify the Government against all penalties fines and payments whatsoever which the Government shall be legally required or compelled to pay or make by reason of the non-performance or non-observance of all or any of the engagements herein contained on the part of the Contractors and if at any time the Government shall be called upon to pay any sum or sums of money by way of penalty fine compensation or otherwise for or in respect of or on account of the breach non-observance or non-performance by the Contractors of any of the covenants herein on their part contained or on account of any misfeasance or neglect on their part or liability of their incurring or which may arise in carrying out the works the Contractors shall thereupon on demand repay to the Government the full amount of all such penalties fines and payments with all costs charges damages and expenses attending the settling and ascertaining the amount thereof or of defending any action suit or other proceedings in respect thereof. Provided nevertheless that no such payment shall be made or action defended without reasonable notice where practicable being given beforehand to the Contractors to the intent that they may have the opportunity of resisting compromising or settling the same.

Provisions in case of difference between figured dimensions and scaling.

23. In case the figured dimensions in the drawings shall disagree with the scaling or in case there shall be any discrepancy between the said Specification and drawings or any ambiguity in them such occurrence shall not invalidate the Contract but the same shall be rectified by the Naval Architect and Inspecting Engineer if



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thought requisite and deductions and allowances which shall in the opinion of the Naval Architect and Inspecting Engineer be fair and reasonable shall be settled and determined by him. The written dimensions in the drawings shall be taken in all cases in preference to the scale attached and all the drawings to a large scale shall be taken in preference to those to a small scale and anything contained either in the said Specification or drawings shall be equally binding on the Contractors as if it were contained in all.

24. The Naval Architect and Inspecting Engineer may from time to time delegate to assistants to be named by him such of the powers and authorities vested in him other than the powers conferred on him by Clause 25 of this Contract as he with the consent of the Government or Crown Agents may think fit and the Contractors shall recognise such assistants on written notice from the Naval Architect and Inspecting Engineer of their appointment and of the powers and authorities respectively delegated to them as lawfully exercising for the purposes of this Contract the powers and authorities so delegated.

Naval
Architect and
Inspecting
Engineer may
delegate
powers.

25. In case and so often as any difference or dispute shall arise between the Government and the Crown Agents and the Contractors or between the Naval Architect and Inspecting Engineer and the Contractors or any of his or their assistants concerning or relating to the works or any part thereof or any covenant engagement matter or thing herein contained or the construction hereof the subject of every such difference or dispute shall in every case on the demand in writing of either party be referred to the sole arbitration and award of the Naval Architect and Inspecting Engineer and any such arbitration shall be deemed to be and proceeded with as if it were an arbitration under the provisions of "The Common Law Procedure Act, 1854" or any statutory modification thereof in force in reference to settlement of disputes by arbitration and the decision and award of the Naval Architect and Inspecting Engineer shall be binding final and conclusive on both parties hereto.

Differences to
be decided
by Naval
Architect and
Inspecting
Engineer.

26. The expression "The Naval Architect and Inspecting Engineer" as used herein and in the said Specification shall mean Sir Edward J. Reed, K.C.B. so long as he shall continue in the employ of the Crown Agents as such Naval Architect and Inspecting Engineer or if he shall cease to be in such employ then any person or persons who may be appointed by the Crown Agents to fill such office.

Interpretation
Clause.

In witness whereof the Crown Agents have hereunto set their hands and seals and the Contractors have caused their Common Seal to be hereunto affixed the day and year first above written.



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The Schedule hereinbefore referred to.

THE FIRST PART.

SPECIFICATION TO BE OBSERVED IN THE
CONSTRUCTION OF THE VESSEL.

PRINCIPAL DIMENSIONS.

	Ft.	ins.
Length between perpendiculars	135	0
Breadth, moulded	23	0
Depth of hold	9	0
Draught of water (forward)	6	0
" " (aft)	6	0
Displacement, about	339 tons.	

GENERAL DESCRIPTION.

The hull of the vessel is to be well and strongly built of steel throughout with such exceptions as are hereinafter described fitted and made complete in all respects and in yacht-like manner with saloon cabins &c. and with mess rooms magazines and store rooms as shown upon the drawing. All drainage pumping and ventilating arrangements suitable for a tropical climate are to be supplied and fitted as hereinafter described or as may be directed.

The masts spars including spare and all the fittings necessary for fixing the rigging whether attached to the masts and spars or to the hull to be provided fixed and completely fitted by the Contractors.



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The vessel is to be rigged as shown upon the drawing the canvas to be very light and of the very best description. The rigging and sails including spare rigging and spare sails are to be supplied and fitted by the Contractors who are also to provide blocks attached or unattached to the hull and to the masts and spars as well as spare blocks. All blocks to be fitted with patent sheaves. She is also to be supplied and fitted with a double set of awnings.

The boats are to be supplied and fitted complete with all tackle &c. by the Contractors.

Steam windlass on the fore-castle together with a small crane anchor seatings and other appliances and gear of every description necessary for working stowing and securing the anchors and cables including spare fittings are to be provided and completely fitted by the Contractors. The anchors and cables are also to be provided and fitted complete with all spare gear.

A donkey boiler about 3 feet high for supplying the fresh water condenser is to be provided and fitted immediately before the machinery space and to be connected to the steam windlass.

The condenser Kingston's valves and cocks through the bottom connected with the distilling apparatus to be supplied fitted and made complete by the Contractors with suitable pipe leading from the condenser to the fresh water tanks.

All water provision oil and other tanks including the tanks for engineers' stores and everything needful for receiving the provisions and stores to be provided and fitted complete with all necessary appliances by the Contractors.

The vessel is to be fitted with direct acting inverted compound twin screw surface condensing engines of light construction and fitted with all modern improvements to be of sufficient power to drive the vessel at a mean speed of not less than 11 knots per hour when on trial at the measured mile.

She is to be very carefully built finished in accordance with the general arrangement plans herewith and is to have a deck house forward of the machinery constructed with a double roof and divided into cabins saloon &c. together with suitable accommodation for the captain and chief engineer of the ship. The saloon is to be handsomely built furnished upholstered and decorated. The whole deck house is to be glazed and fitted with sliding panels and also with jalousies. Ample additional ventilation is to be provided. A chart house is to be built above the deck house where shown on the drawing.

Suitable davits for a surf boat and steam pinnace are to be provided and fitted abreast the engine and boiler hatches.

Davits are also to be provided and fitted for a six-oared and a four-



oared gig these boats to be properly stowed upon and at the after end of the top of the deck house.

The lower deck is to be fitted for the conveyance of troops or stores or for other like purposes.

Cabins and mess room for the first officer and second engineer and lamp and boatswains' lockers are to be built and fitted under the forecastle deck. A poop is to be built aft as shown on the plans and fitted with all necessary accommodation for the crew. Flush skylights are to be fitted over their mess tables.

The armament is to consist of two 7-pounder R. M. L. guns and two Nordenfelt guns of 1 inch calibre. The guns themselves are to be portable and will be supplied by the Crown Agents but the Contractors are to provide and fit all the necessary arrangements for stowing them including pivots ring and eyebolts &c. and also suitable magazines for each type of gun and all magazine fittings.

The details of the vessel's construction are to be as follows—

Keel. To be a single flat plate keel $\frac{1}{2}$ inch thick for three-fifths the length amidships tapering to $\frac{3}{8}$ inch thick at the ends.

Stem. To be of best scrap iron forged in one piece 6 inches by $1\frac{1}{2}$ inch at the head properly scarpld to the keel and well rivetted thereto.

Stem post. To be of the best hammered scrap iron $6\frac{1}{2}$ inches by $2\frac{1}{4}$ inches welded in one piece properly scarpld to the keel and well rivetted thereto. To have braces for the rudder pintles welded on solid (a stem and stern frame &c. of cast steel may be proposed if preferred).

Shaft tubes and stern brackets. Tubes for the reception of the propeller shafts to be constructed on each side of the ship formed of steel plates 15lbs. per square foot. To be well connected to the framework of the ship at the forward end the frames being bossed out in a suitable manner for the purpose. The after end of the tubes to be supported by struts of the best hammered scrap iron or of cast steel of such a form as to offer but little obstruction in passing through the water (of pear shape section). Between the tubes and the bottom plating of the ship at the forward end of the tubes thin fashion plates are to be fitted as may be found necessary.

A detail sketch showing the whole arrangement is to be prepared by the Contractors and submitted for approval.

Transverse frames. The transverse frames are to be formed of angle bars 3 inches by $2\frac{1}{2}$ inches by $\frac{5}{8}$ inch placed 21 inches apart and of reverse angle bars $2\frac{1}{2}$ inches by $2\frac{1}{2}$ inches by $\frac{4}{8}$ inch. The reverse frames are to extend to the upper turn of the bilge and are to be doubled



under the engines and boilers and in the wake of keelsons stringers &c.

The floor plates are to be worked on every frame extending from bilge to bilge in one piece. To be $\frac{9}{16}$ inch thick in engine and boiler room and $\frac{5}{16}$ inch thick to half length and $\frac{4}{16}$ inch at ends. They are to be 12 inches deep at the middle line tapering to 3 inches at the upper turn of the bilge. The floor plates are to be worked deeper towards the extremities of the vessel as may be required.

Floor plates.

To be $\frac{9}{16}$ inch and $\frac{7}{16}$ inch in thickness alternately from the keel plate to the lower edge of sheer strake worked lap jointed reduced in thickness to $\frac{5}{16}$ inch and $\frac{6}{16}$ inch at the extremities of the vessel. The sheer strake is to be 30 inches wide amidships and $\frac{8}{16}$ inch thick for at least one-half the vessel's length but it is to be tapered to $\frac{7}{16}$ inch thick at the ends. This strake and all above water plating to be worked very fair and to present a smooth and yacht like surface. The plates are to be in lengths of not less than 12 feet the butts are to be worked flush and are to be as nearly as possible in the middle of the openings between the frames. There must be in all cases two plates at least between the butts vertically over each other.

Bottom plating.

Alternate strakes to be fitted close on the frames the remainder to be fitted wholly outside them the spaces between the outside plates and the frames to be filled in solid with liners of the same thickness as the adjacent plates. The liners in wake of watertight bulkheads are to extend on each side of the frame angle iron so as to take two additional rows of rivets on each side.

The plating connected to the keel stem and stern post and all butts of outside plating and horizontal joints from keel to upper turn of bilge and the sheer strake to be double rivetted from upper turn of bilge to sheer strake to be single rivetted. The butt straps on the inner plates are to extend the whole breadth of the plates and those on the outer plates to be carefully fitted between the edges of the inner plates.

All butt straps are to be cut off at the shipyard from plates of the same strength as the plates they will have to connect.

All butt straps and faying surfaces of the plates are to be cleaned from rust before being worked. The plates are to be truly fitted at the edges and butts and all the joints are to be caulked in the most careful manner, and no canvas red lead paint or other substance is on any account to be inserted in the seams but all to be caulked throughout metal to metal.

The plating in the wake of the anchors is to be increased in thickness or doubled as may be required.



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A sketch showing the whole arrangement of butts thickness of plates &c. including the doubling plates is to be prepared by the Contractors and submitted for approval before the work is commenced.

- Bulwarks.** To be formed of plates $\frac{5}{16}$ inch thick properly supported by stanchions and angle bars. The rail to be made of teak 8 inches by $2\frac{3}{4}$ inches to be made portable or to hinge where required.
- Middle line keelson.** To be formed of two angle bars $3\frac{1}{2}$ inches by 3 inches by $\frac{5}{16}$ inch worked continuously on top of the floor plates and connected to the keel by intercostal plates $\frac{5}{16}$ inch thick. The intercostal plates are to be connected to the keel on each side by short angle bars 3 inches by 3 inches by $\frac{5}{16}$ inch worked between the transverse frames.
- Side keelson.** To be formed of intercostal plates $\frac{5}{16}$ inch thick extending from the bottom plating to 3 inches above the floors to be connected to the bottom plating and floors by short single angle bars 3 inches by 3 inches by $\frac{5}{16}$ inch and to the reverse frames by continuous angle bars 3 inches by 3 inches by $\frac{5}{16}$ inch. To be in total length about three-fifths the length of the vessel amidships.
- Bilge keelsons.** To be formed by double angle bars 3 inches by 3 inches by $\frac{5}{16}$ inch placed back to back and worked as far forward and aft as practicable.
- Bilge keels.** A bilge keel is to be fitted on each side of the vessel clear of the edges of the outside plating formed of bulb **T** steel 9 inches deep and continuous angle bars extending about two-thirds the vessel's length amidships. All butts to be kept well clear of the butts of the outside plating.
- Beams.** The beams to the upper deck to be formed of bulb $5\frac{1}{2}$ inches by $\frac{1}{4}$ inch with double angle bars 2 inches by 2 inches by $\frac{1}{4}$ inch with suitable knees. To be placed on alternate frames and well connected to the stringers tie plates and transverse frames.
The beams to the lower deck and elsewhere to be formed of angle bars 3 inches by 4 inches by $\frac{1}{4}$ inch with welded knees.
Half beams and carlings to be worked where required.
- Stringer plates.** The upper deck stringer plates to be 34 inches wide and $\frac{7}{16}$ inch thick firmly connected to the sheer strake by continuous longitudinal angle bars 3 inches by 3 inches by $\frac{5}{16}$ inch. Where the continuity of the deck is broken near the extremities of the vessel suitable means are to be adopted for making good the longitudinal strength.
The lower deck stringer plate is to be 15 inches wide and $\frac{5}{16}$ inch

thick secured to the reverse frames by continuous angle bars 3 inches by $2\frac{1}{2}$ inches by $\frac{5}{16}$ inch.

The plating under the forecastle to be worked in a similar manner.

The poop deck stringer is to be formed of plates 15 inches wide and $\frac{1}{2}$ inch thick.

The forecastle stringer plate to be 15 inches wide and $\frac{1}{2}$ inch thick.

Longitudinal tie plates 7 inches by $\frac{6}{16}$ inch to be worked all fore and aft on the upper deck beams. Additional plating to be worked in wake of deck house masts hatchways &c. as required. Tie plates.

To be worked where shown on the drawing also a stuffing box bulkhead as required by engineers to be bounded by the outside plating and the upper deck having double transverse frame angle bars worked continuously round their edges. The plates forming the bulkheads to be $\frac{3}{16}$ inch thick worked lap jointed lap butted and single rivetted supported by stiffeners of angle bar $2\frac{1}{2}$ inches by $2\frac{1}{2}$ inches by $\frac{4}{16}$ inch spaced 30 inches apart. The whole to be caulked and made perfectly water-tight and to be tested to the satisfaction of the Naval Architect and Inspecting Engineer. Transverse watertight bulkheads.

Suitable angle bars to be fitted to take the ends of the lower deck.

A sluice valve is to be fitted to each bulkhead except stuffing box bulkhead complete with levers and rods for opening and shutting them which are to work from the upper deck. Sluice valves, &c.

Sluice valves are also to be fitted wherever necessary and means are to be taken for indicating on the upper deck whether the sluice valves are open or shut. A sounding tube is to be fitted to each water-tight compartment.

The upper deck to be of teak $2\frac{1}{2}$ inches thick and $4\frac{1}{2}$ inches wide. Decks.
The deck to be thickened where necessary.

The forecastle deck to be of teak $2\frac{1}{2}$ inches thick and $4\frac{1}{2}$ inches wide.

The lower deck to be of yellow pine 2 inches thick and 5 inches wide.

The deck over the deckhouse to be of teak $1\frac{1}{2}$ inches thick and $4\frac{1}{2}$ inches wide.

The whole of the material for the deck flats to be well seasoned free from knots worm holes and other defects.



The deck flats to be secured to the beams and plating with galvanised iron screw bolts and nuts as may be directed to be planed on all their surfaces and such parts of them as may be in contact with iron to be thickly coated with red lead or other approved material.

The butts are to be on the beams and are to be supported and fastened to pieces of plate attached to the beams.

The upper deck flat to be lined with lead on the under side immediately over the boilers.

The decks to be thoroughly but very carefully caulked and made water-tight. The seams of the upper deck which is to present a yacht-like appearance are to be payed with Jeffreys' marine glue pitch and those of the lower deck with pitch.

Waterways to be of teak in exposed parts, remainder of pitch pine.

Ceiling
between lower
and upper
decks and in
forecastle and
poop.

To be of $\frac{3}{8}$ inch yellow pine tongued and grooved and secured to the reverse frames by suitable galvanised iron nut and screw bolts as may be directed. To be worked in short lengths or panels so as to be easily removed for painting or cleaning the frames if required.

Ceilings in
hold store
rooms &c.

To be $1\frac{1}{4}$ inch pine tongued and grooved and secured to the reverse frames by suitable galvanised iron nut and screw bolts as may be directed. To be worked in short lengths or panels so as to be easily removed for painting or cleaning the frames or battens may be substituted if directed.

Watertight
doors and
scuttles.

Sliding doors to be fitted in the coal bunkers in order to provide access for trimming &c.

Engine boiler
and shaft
bearers.

To be fitted as directed and of the form and dimensions required to suit the machinery and boilers. Additional frames or floor plates to be introduced if required by Engineers and care is to be taken that all places underneath the engines and boilers and elsewhere are as far as possible to be made accessible to view. To be of light construction. Holes are to be cut through the bearers for water courses where required.

Coal bunkers.

To be fitted where shown on the drawings of plates $\frac{3}{8}$ inch thick properly stiffened with angle bars.

Pillars.

To be fitted on every beam where practicable for half length amidships on alternate beams at ends of vessel and sufficiently numerous below the deck house to give it ample support. Additional stronger pillars are to be fitted in the engine and boiler rooms where necessary.



The anchors and cables are to be supplied by the Contractors and all appliances necessary for the proper working of the same. To be tested and fire-proved as is usual and necessary.

2 bower	5 $\frac{3}{4}$ cwt.	} Of approved pattern without stock	As per Lloyd's Rules.
1 stream	1 $\frac{1}{2}$ "		
1 kedge	$\frac{3}{4}$ "		
Bower 2 $\frac{1}{2}$ -inch		165 (together) fathoms.	
Stream 1 $\frac{1}{2}$ -inch		45	"
Steel wire hawser 1 2 $\frac{1}{2}$ -inches		45	"
Hempen hawser 1 6 $\frac{1}{2}$ -inches		75	"
Hempen hawser 1 4-inches		90	"

The anchors and cables to be fitted complete with all necessary mooring swivels shackles pins slips hand-nooks forelocks punches joining shackles hammers nippers chisels for clearing holes &c.

To be formed of plates $\frac{1}{20}$ -inch thick placed where shown on the drawing. Provision to be made for securing the clench of cables by forgings plates or otherwise. Means to be provided for draining the water from the lockers into the bilge.

Patent steam vertical windlass by first-class maker suitable for $\frac{1}{2}$ -inch chain to be supplied and fitted. The Contractors are to fit the necessary steam pipe and stop cocks from the boiler to the engine of the windlass.

To be fitted aft as may be directed.

Mooring
bollards.

To have two pairs of wrought iron davits on each side of the Vessel fitted complete with iron bound swivel blocks chain guys cleats &c. The Contractors are also to supply crutches and other supports chain and other appliances for raising lowering stowing and securing the boats with blocks and falls &c. Two pairs of these davits to be extra strong the upper blocks to be treble of iron with patent sheaves.

Boats' davits.

Circular coaling scuttles 18 inches in diameter in the clear fitted with suitable castings covers and gratings where required.

Coaling
scuttles.

To be fitted with every requisite for hoisting the ashes and discharging them overboard.

Ash hoists and
ventilators.



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- Thermometer tubes. To be fitted through the deck into the coal bunkers as shall be directed.
- Lumber irons &c. To be fitted under the upper deck and where necessary for the stowage of hawsers hoses lumber blocks and tackles of whatever kind.
- Guard rails to hatchways &c. To be fitted as may be required.
- Hammock hooks. To be fitted in the upper deck beams where necessary.
- Galley. To be built where shown on the drawing. To be fitted with a European cooking apparatus with all the necessary utensils lockers drawers dresser chopping block and shelves. A butler's pantry is also to be provided with all the necessary fittings. The cooking apparatus to be of an approved pattern.
- Fresh water tanks. Iron tanks for fresh water to contain 2500 gallons to be supplied stowed fitted and secured where shown on the drawing.
- Ship's bell. Of suitable size and pattern with the name of the vessel engraved thereon to be provided and fitted where required.
- Locks and keys. Locks keys and other fastenings including space to be provided and fitted complete. All keys to have brass tallies with distinguishing marks engraved on them.
- Awning stanchions. Stanchions suitable for double awnings are to be provided and fitted as required. To be of galvanised iron properly stepped in sockets.
- Gangway ports. To be handsomely fitted in an approved manner and sheathed with copper or brass corrugated plates.
- Accommodation ladders. To be fitted with all necessary stools davits with blocks and falls galvanized stanchions suitable man ropes and gratings complete. To be well finished.
- Masts and spars. To have two pole masts and bowsprit of pine fitted with all necessary ironwork chain plates dead eyes &c. The masts spars including spare with all blocks and other fittings necessary for fixing the rigging whether attached to the masts and spars or to the hull to be fitted complete by the Contractors. The masts to be stepped



wedged and fitted complete with mast coat &c. also leather and copper funnels on spars where required and as directed. The fore yard to be fitted to hoist from the deck.

To be rigged as shown on the drawing with the best steel wire Rigging &c. rigging served where required.

The vessel to be rigged by the Contractors and all blocks fairleads cleats eye bolts &c. for the proper working of the vessel to be fitted as required.

The Contractors are to supply and fit the following sails in Sails &c. accordance with the drawing. The canvas and other material to be suitable numbers and of the very best description namely—

- One fore gaff topsail and one trysail.
- One main topsail and one spanker.
- Two jibs and one fore course.
- One fore staysail.
- One set of sail covers complete to be supplied and fitted.
- Two sets of awnings all fore and aft with ridge poles and all necessary gear for setting up.
- Two sets of awning curtains fitted as required.
- Two sets of side awnings in wake of deck houses to be fitted as required.
- Two tarpaulins for each hatchway.
- One cover for each skylight.
- Four windsails.
- Two smokesails.
- Covers for steering wheels and binnacles.

The fore course to be of a very light description of canvas or duck.

The following boats to be supplied and fitted by the Con- Boats. tractors complete with all necessary appliances including spare gear viz.—

- One 30-feet gig.
- One 20 „ „

The boats to be built of cedar and copper fastened. To be complete including masts sails and rudders tillers or yokes



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awning stanchions (metal for gig) breakers scoops bailers fenders and travellers.

A set of oars for each boat boat hooks &c. Spare oars boat hooks sails travellers rudder gear side fenders (leather) flag staves crutches (brass) &c. one set to each boat also awnings and cover for each boat.

The lifeboat to be fitted with an approved boat disengaging gear.

Pumps sea-cocks &c.

The Contractors to provide and fit complete two $4\frac{1}{2}$ -inch diameter "Downton" pumps of the best description for fire wash deck and bilge purposes and to be provided with all the necessary galvanized iron and lead suction pipes metal screw-down valves non-return valves sea cocks and all other necessary fittings. Each pump is to be fitted to draw from each watertight compartment in the vessel.

Also the necessary number of small brass lift and force pumps for general purposes connected with fresh water and other tanks galley cisterns to water closets &c.

All fresh water pipes to be galvanized iron throughout.

A sketch showing the position and direction of pipes &c. is to be submitted for approval before the work is commenced.

The pumps to be fitted with all necessary pipes for extinguishing fire and for wash deck purposes as may be directed.

Leather discharge hoses (100 feet) to be supplied.

The threads of unions for both "Downton" pumps to be interchangeable.

Scuppers.

To be of lead 5 inches by 3 inches in the clear four in number on each side of the vessel with metal flaps outside.

Condenser.

An approved condenser capable of supplying not less than 1250 gallons of fresh water daily to be supplied and fitted complete with all necessary pipes for connecting it to the main boilers the donkey boiler fresh water tanks &c.

Watertight recesses to be formed on each side of the vessel in the coal bunkers immediately before the boiler room bulkhead for the purpose of receiving the donkey boiler and fresh water condenser respectively.

Ventilating arrangements.

The ventilating arrangements are to be ample and sufficient for a tropical climate and are to be in accordance with a detailed sketch which is to be submitted by the Contractors.



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Circular scuttles for light and ventilation the glasses to be $10\frac{1}{2}$ inches in diameter in the clear to be fitted to the lower deck forecandle and poop where shown. Strong metal deadlights to be fitted to lower deck lights. Side lights.

To be properly framed and fitted to the satisfaction of the Naval Architect and Inspecting Engineer. Mast steps.

To be of teak, skylights glazed with the best plate glass and fitted with brass guards &c. Proper security to be made for lashing down in heavy weather. Skylights and companions.

All necessary ladders of a suitable description are to be fitted where shown on the drawings and as may be directed. Ladders.

To be fitted where required and as is usual. Signal lockers.

One to be fitted each side as may be directed to suit Trade Regulations. Board of Light boxes.

To be built where shown on the drawings and fitted with a double roof. The windows to be of plate glass $\frac{1}{2}$ inch thick in sliding frames. Jalousies also to be fitted. All the fastenings to be copper. Chronometer box and all fittings required for navigating purposes together with a writing table racks bookshelves chart tables rack for charts gratings chairs and other suitable furniture to be supplied and fitted complete by the Contractors. Chart house.

The rudder to be of the best hammered scrap iron. The head to be $3\frac{3}{4}$ inches diameter heel $2\frac{1}{4}$ inches. The pintles to be $2\frac{1}{4}$ inches diameter forged solid on the frame, the frame to be 5 inches by $1\frac{1}{4}$ inches tapered at the back to $2\frac{1}{2}$ inches by 1 inch. Covered with plates $\frac{3}{8}$ -inch thick. The space between the plates to be filled in with wood. Rudder and steering apparatus.

Rudder stops to be fitted.

Proposals for a cast steel rudder frame may be submitted if the builders desire it.

To have tiller blocks chains rods rudder chains and pendants screw bolt in the head of rudder or other means for unshipping and suitable means for locking the rudder with such other fittings as are required to complete the steering apparatus.

An approved steering apparatus to be supplied and fitted forward where shown on the drawings. Also steering wheel aft.

To steer by an iron quadrant tiller to be fitted complete with



wheels wheel stanchions metal slide boxes blocks including hand tiller and all necessary spare gear.

Cabins mess
rooms &c.
forward.

To be built of yellow pine and fitted for the first officer and second engineer. The berths to be so fitted as to form an extra berth if required. The cabins and mess-room to have suitable furniture. Both cabins and mess-room to be thoroughly ventilated. Lamp and boatswain's lockers to be built in the fore-castle as shown on the drawings complete with all necessary fittings.

An officers' bath room to be built of iron (doors of teak) where shown on the drawings on one side of the ship and w.c.'s also built of iron for use of officers on the other side. The w.c.'s to be of suitable pattern fitted with all necessary cisterns pipes &c.

Deck houses.

To be built of teak with a double roof (inner roof of 2 inch yellow pine) where shown on the drawings to be glazed and fitted with jalousies in order to insure perfect ventilation throughout and to be fitted with sliding shutters. Ample accommodation is to be provided for a person of high rank and his staff and cabins also provided for the captain and chief engineer and a steward's pantry. Bulkheads to be of yellow pine.

The saloon and state cabins are to be handsomely decorated upholstered and furnished complete bed places tables wash-stands and basins looking-glasses water bottles receivers drawers under the beds or in chests tables with legs and hanging tables sideboards dining table pier-glass mirrors &c. The tables and sideboards to have the usual fittings of fiddles dumb waiters &c. Battens and swinging trays glass racks brass rods coat and hat pegs book and other shelves punkahs suitable seats and sofas (some portable) and others fitted with lee-boards and lockers stuffed with horsehair and covered with an approved material. Curtains to run on brass rods over the cabin doors. Hand-holds to the saloon cabin bulkheads.

The furniture of the doors to the cabins bath rooms lavatories w.c.'s &c. is to be of porcelain of the very best description. The w.c.'s throughout are to be of suitable pattern complete with all necessary fittings. Double bulkheads to be fitted to separate the w.c.'s from cabins &c.

The baths are also to be of suitable pattern with all necessary fittings for filling and discharging them.

The whole of the material and workmanship throughout the saloon to be well finished and of the best description.

The fittings and upholstery in the cabins for the captain and chief engineer are to be of a good description and the whole of the



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fittings &c. throughout the vessel to be to the entire satisfaction of the Naval Architect and Inspecting Engineer.

The poop to be fitted up with the necessary lockers mess racks tables and stools berths hammock hooks &c. for the accommodation of the crew part of the space to be divided off for the firemen. Crew space.

The space forward of coal bunkers to be fitted with lockers mess tables stools and racks bath and w.c. for use of troops. Hammock hooks to be fitted as required. Part of this deck to be divided off for bath room and w.c. as may be directed. Lower deck.

The holds where not occupied by chain lockers magazines &c. to be fitted up with store and provision rooms &c. with the necessary bins lockers racks &c. Holds.

Magazines for the 7-pounder and machine guns respectively are to be built forward on each side of the vessel. Powder magazine.

To be of plates $\frac{1}{4}$ inch thick and made perfectly watertight. They are to be lined with teak and fitted with the necessary flooding arrangements.

Light boxes to be built where directed.

To have a head as shown on the drawing. Head and stern rails mouldings and ornaments to be fitted in accordance with designs to be furnished by the Contractors and submitted for approval. Head and stern fittings.

To be fitted if required. Boom crutch.

To be fitted complete with clasp and tumbler. Ensign staff.

To be Portsmouth cement worked so that there will be good drainage to the pumps and extending to the upper turn of bilge. A sketch showing the mode of working with the estimated weight is to be submitted for approval. Cement or composition on inside of bottom.

All the usual and necessary plumbers' work to be supplied and fitted including all water-closets baths cisterns &c. service and soil pipes and wherever necessary. All cocks and unions to be of gun-metal. Plumbers' work.

All iron and steel work to be carefully scraped and cleaned before being painted and each portion of it as it is turned out of hand is to have a coat of linseed oil thin red lead or other substance as may be directed as soon as it is sufficiently completed to receive it in order to prevent as far as possible the iron and steel work from becoming in any degree oxidized during the building of the ship. Painting.

All iron awning stanchions guard stanchions and rails gratings



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bolts coal scuttle frames and lids rubbing plates and all other iron fittings exposed to the weather or to damp to be carefully galvanized as may be directed also all fastenings for decks inside ceilings &c. as may be required by the Naval Architect and Inspecting Engineer.

The bottom plating and screw propellers are to be coated with four thick coats of an approved composition as may be directed.

In addition to the foregoing the whole of the steel and iron work of the ship both inside and out except the bottom and all steel or iron surfaces covered with wood are to have at least three coats of best oil paint.

All the woodwork is to be painted in the best manner with at least three coats of the best oil paint of such a colour and with such portions varnished and grained as the Naval Architect and Inspecting Engineer may direct.

Caulking. The whole of the caulking in the ship is to be performed as is usual and necessary and to the entire satisfaction of the Naval Architect and Inspecting Engineer.

Rivets. The rivets are everywhere to be of steel and supplied in general accordance with the present practice of the British Admiralty.

Tests. All plates angle-bars beams rivets &c. to be tested in accordance with the present requirements of the British Admiralty.

Weight of hull. The greatest possible care is to be observed that no unnecessary weight is added to the hull in building in order to keep the weight as low as possible. Provision is to be made for carrying water ballast forward and sufficient pig iron ballast is to be provided for assisting the trim of the vessel.

General fastenings quality of material and workmanship. The breadths of edge strips butt straps and laps where not specified and the size form and pitch of rivets to be as usual in Her Majesty's service.

The riveting is to be executed in a careful and workmanlike manner the rivets thoroughly fitting the holes and the greatest care is to be taken in punching to prevent unfair holes all such holes to be rimed out before riveting. The counter-sinking is also to be carefully done.

Where required holes are to be drilled and bolts turned for them bolts substituted for rivets and other small changes of this kind made without additional charge.

The names of the makers of whom it is proposed to purchase the steel to be submitted for approval to the Naval Architect and Inspecting Engineer.



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The whole of the steel to be attested by the certificates or invoices of the firm supplying the same if required and to have the maker's name stamped in a legible manner upon each bar or plate.

Teak is in all cases to be used where practicable for the exposed woodwork throughout the ship.

The Contractors are to prepare all sketches for the several details of the work which the Naval Architect and Inspecting Engineer may deem necessary to be submitted for approval. Preparation of sketches &c.

A neat model of the vessel as she will appear when ready for sea also to be made and supplied.

The centre of gravity of the ship to be found by inclining experiment at the expense of the Contractors after the machinery and boilers are fixed on board.

Marks on the stem and stern-post to denote the draught of water are to be cut in an accurate and legible manner before the ship is launched as may be directed. Marks on stem and sternpost.

All machinery &c. of whatever kind required in building the ship and engines is to be supplied by the Contractors. Machinery required in building.

The ship is to be launched or if built in a dock floated by the Contractors at their own risk and cost and placed whilst receiving her machinery &c. and being completed in a berth to be approved of beforehand by the Naval Architect and Inspecting Engineer and with the distinct understanding that until the ship is complete according to the Contract and delivered into the charge of such officers as may be appointed to receive her and accepted by them the Contractors are to pay all dock and harbour dues and charges notwithstanding that works not included in the Contract may be in progress at the same time as the works and fittings which are included in the Contract. Launching and docking.

If the final survey cannot then be made to the satisfaction of the Naval Architect and Inspecting Engineer the ship is to be docked again before delivery for the final survey the whole of the expense and risk on each occasion of placing the ship in a dry dock to be borne by the Contractors.

The following articles and stores to be supplied by the Contractors— Stores &c.

- 1 liquid steering compass and binnacle.

Compass
binnacle &c.



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1 standard compass and binnacle fitted as an azimuth compass, with stand &c. complete (Sir William Thomson's).

~~2~~ ordinary boats' card compasses.

~~1~~ tell-tale compass.

~~2~~ barometers (viz.)—~~1 aneroid, 1 mercurial.~~

1 telescope.

2 clocks of superior quality.

3 thermometers similar to those in use in H. M.'s service.

~~1~~ binocular glass.

2 half-hour glasses.

4 fifteen-second glasses.

1 patent log.

Adjustment
of compasses.

The ship is to be swung under proper inspection at the expense of the Contractors and a written report furnished that the compasses have been duly adjusted.

Lamps.

2 bow and 1 mast-head and 1 anchor lights as supplied to the Admiralty vessels (one complete set).

1 set of signal lanterns.

2 large hanging lamps with glass shade and argand burner.

4 small argand brackets-lamps in gimbles Pillow lamps as fitted in H. M.'s service.

8 large size candle-lamps hung in gimbles with heavy feet and made to unship easily. 12 spare globes.

2 hanging lamps.

6 glass globe oil lamps for crew's galley, forecastle, &c.

4 deck lanterns for officers' use.

1 dark lantern.

6 glass lanterns for store rooms, hold, &c.

2 dozen spare chimney glasses for argand lamps.

200 wicks for argand lamps.

12 balls of cotton for wicks.

All lamps and candlesticks to have spare globes and glasses supplied to them, one to each lamp.

6 large brass-backed side lanterns with argand burners for engine room and tunnels or as may be required.

2 glass globe oil lamps, stokehole.

6 bunker lamps, tin.

6 copper hand lamps for engineer.

Ship's stores,
&c.

Canadian axes ~~2~~

Blocks, spare, 1 of each size, viz. 9, 8, 7, 6, 5 and 4 inches.



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Blocks—

Single, thin	1 of 8 inches	
Clump	1 " 7 "	} Or as adapted for the rig.
"	1 " 6 "	
Double thick	1 " 8 "	
" " ...	...	1 " 7 "	
" " ...	...	1 " 6 "	
" " ...	...	1 " 5 "	
Snatch ...	...	1 " 8 "	
Brooms ...	...	20	
" hair ...	...	4	
" coir ...	...	8	
Brushes, scrubbing, coir ...	...	12	
" whitewash ...	...	6	
Buckets, wash-deck ...	...	8	
Bunting ...	...	20 yards.	
Buoys, small life ...	...	12	
" " nun ...	...	2	
Belts, life ...	...	12	
Beeswax ...	...	1½ lbs.	
Casks, harness ...	...	2	
Cordage—			
Buoy rope ...	...	3½ inches	40 fathoms.
Hemp rope ...	...	3 "	1 coil.
" " ...	...	2½ "	1 "
" " ...	...	2 "	1 "
" " ...	...	1½ "	1 "
" " ...	...	1 "	1 "
" " ...	...	¾ "	1 "
" " ...	...		1 "
Signal halyards ...	...		150 fathoms
Worm for lashing ...	...	
Cots, canvas ...	...		<i>4 2 1</i>
Cot, frames ...	...		<i>4 " 1</i>
Chalk ...	...		14 lbs.
Copper, sheet ...	...		28 "
Clasps and staples ...	...		4
Fearnought ...	...		6 yards
Fenders coir, (2 feet long 1 foot diameter) ...	...		4 No.
Grappels (hand with chain) ...	...		1 "
Grindstone and trough ...	...		1 "
Hammocks, complete ...	...		20 " <i>20</i>
Handspikes ...	...		6 "
Hatchets ...	...		2 "
Horns, fog (on bellows principle) ...	...		1 "

Hoops, wood, windsails	...	...	6 No.
Kersey	...	...	8 yards
Awls	...	...	2 No.
Thread	...	...	1 lb.
Wax	...	...	2 ozs.
Iron, new, of sorts 12 bars, assorted			
12 eye-bolts, assorted			
Leg and hand irons			
Lime	...	...	3 bushels
Oakum	...	...	$\frac{1}{2}$ cwt.
Varnish, bright	...	...	1 small cask
„ copal	...	...	4 gallons
Whitening	...	...	1 bushel
Leads, deep sea	...	...	2 No.
„ hand...	...	...	4 „
Leather, licquored	...	...	$\frac{1}{2}$ back
„ tanned	...	...	20 lbs.
Lines, deep sea (113 fathoms, of $1\frac{1}{2}$ inches)			1 No.
White, for hand lines (113 fathoms each, of $1\frac{1}{4}$ inches)	...	...	2 „
Log	...	...	250 fathoms
Cabin, white (20 fathoms, weighing $2\frac{1}{2}$ lbs.)			2 No.
„ „	...	...	1 „
Marline	...	...	1 „
Spunyarn	...	...	1 coil
Locks, hanging	...	...	6
Log slates, double	...	...	2 /
Machine cordage, with loper	...	...	$\frac{1}{2}$ cwt.
Sounding, ordinary	...	...	1
Medicine chest, and bottles complete.			
Mooring swivels	...	...	1
Nails—			
Copper...	...	...	6 lbs.
Rove and clinch...	...	...	5 „
Tacks	...	...	4 „
Metal sheathing	...	...	20 „
Iron boat	...	...	10 „
Brads	...	...	2 „
Deck	...	...	8 „
Pump	...	...	3 „
Paint materials—			
Pots with hooks	...	...	6

Pitch	...	...	...	1 small barrel
Pitch pot	...	...	...	1
Pegs (hat and clothes, brass)	...	...	...	12
Rings and forelocks	...	...	...	6
Rosin	...	...	...	10 lbs.
Reels—				
Deep sea	...	...	...	1
Log	...	...	...	1
Swivels, zinc'd, for signal halyards	...	...	...	2
Scrapers	...	...	...	6
Screen canvas, coaling	...	...	...	1
Shovels, iron	...	...	...	6
Shackles, for courses	...	...	...	2
Rigging	...	...	...	4
Screws, brass, for locks and hinges	...	...	...	$\frac{1}{2}$ gross
Squeegees, with handles	...	...	...	2
Solder	...	...	...	2 bars
Staples	...	...	...	24
Skeets	...	...	...	4
Shives, for wheel ropes	...	...	...	2
Stones (hand)	...	...	...	20
Slop pails	...	...	...	2
Soft soap	...	...	...	1 cwt.
Soda	...	...	...	56 lbs.
Tools (sailmaker's)—				
Mallets, serving	...	...	...	2
Marline spikes	...	...	...	6
Needles, bolt rope	...	...	...	6
,, sail	...	...	...	12
Palms	...	...	...	4
Tools (caulker's)—				
Beetles, reeve hooks, caulking iron, crooked ditto, hoisting ditto, meeking ditto, reaming ditto, sharp ditto, spike ditto, treenail ditto, ladle with spout, mallet, 1 of each.				
Tools (carpenter's)—				
Adze	...	...	...	1
Augurs, assorted	...	...	...	4
Axes	...	...	...	1
Saw files	...	...	...	2
Cold chisels	...	...	...	1
Claw hammers	...	...	...	2
Hand hatchets	...	...	...	2



Soldering iron	...	...	...	1
Chalk-lines	...	...	...	2
Double maul	...	...	...	1
Pin	„	...	...	1
Solder pot	...	...	...	1
Hand saw	...	...	...	1
Hack saw	...	...	...	1
Cross-cut ditto	...	...	...	1
Squares, iron	...	...	...	1
Rag stone	...	...	...	1
Oil stone	...	...	...	1
Feeders for oil	...	...	...	2
Chest for tools	...	...	...	1
Tallow	...	...	...	25 lbs.
Tar, Stockholm	...	...	...	1 small barrel
Memel	...	...	...	10 gallons
Thimbles, welded, &c.	...	...	...	20 No.
Thread	...	...	...	1 lb.
Twine	...	...	...	20 „
Toggles	...	...	...	10 No.
Vane, spare	...	...	...	1 „
Worsted	...	...	...	1 lb.
Weather cloth for bridge				
Wood—				
Deal, ordinary	...	...	...	4
Teak, plank 3 ins.	...	...	...	20 ft.
„ „ 2 „	...	...	...	10 „
„ „ 1½ „	...	...	...	10 „
Wedges	...	...	...	10
„ iron	...	...	...	4

Miscellaneous
articles.

- 2 parallel rulers.
 3 log books.
 2 8 slates.
 12 hair beds.
 16 24 feather pillows.
 2 4 dozen pillow cases.
 18 24 bed sheets.
 5 12 white counterpanes.
 24 blankets.
 All sofas, benches, and lounges with suitable mattresses of
 Russian leather.
 12 water cans.
 36 hand towels.
 24 bath towels.



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- 36 dinner napkins.
 24 dusters.
 12 glass cloths.
 7 ~~6~~ large table cloths.
 4 ~~6~~ small table cloths.
 1 soup tureen.
 4 curry dishes, convertible into 8.
 2 dozen large forks.
 2 „ small forks.
 2 „ soup spoons.
 2 „ dessert spoons.
 2 „ tea spoons.
 2 soup ladles.
 6 salt spoons.
 2 ~~2~~ carvers and forks.
 2 sharpening steels.
 4 large gravy spoons.
 4 plated nut crackers.
 3 pairs sugar tongs.
 2 butter knives.
 2 ice tongs.
~~1 large ice bowl.~~
 2 claret jugs.
 1 coffee pot.
 1 tea pot.
 1 cream jug.
 1 sugar bowl.
 1 butter bowl.
 1 fish slice (plated).
 12 egg spoons.
 6 cork screws.
 6 patent corks for wine bottles.
 6 pie dishes.
 3 dozen soup plates.
 3 „ hot water plates.
 3 „ dinner plates (large).
 3 „ „ (medium).
 3 „ cheese plates.
 3 „ small plates.
 2 „ dessert plates.
 4 dessert stands or dishes.
 4 large dishes (joint).
 4 medium „
 2 sauce bowls.
 1 fish platter.

- 3 dozen cups and saucers of approved pattern.
 2 dozen small coffee cups.
 18 S. W. tumblers.
 2 dozen tumblers.
 3 „ sherry glasses.
 2 dozen cut glasses.
 6 wine decanters and stoppers.
 3 dozen claret glasses.
 1 „ liqueur glasses.
 1 „ egg cups.
 6 hot water jugs.
 24 pantry cloths.
 4 floor brushes.
 4 carpet brushes.
 6 spittoons.
 12 chamber p.
 12 slop basins.
 4 dust pans and brushes.
 1 box of lamp materials viz. scissors wick oil feeders &c.
 1 candle box.
 3 gross matches (Bryant & May).
 Brass hooks to hang things on as required shelves &c.
~~12 mosquito curtains.~~
 1 box for plated ware.
 1 plated water jug.
~~Large iron chest.~~
 24 dinner knives.
 24 small dinner knives.
 Knife board.
 Plate brushes.
 Plate powder &c.
 10 scrubbers.
 2 oil tanks galvanized.
 6 fishing lines and hooks.
 Flags—1 Commercial Code complete also ~~2 ensigns 2 Union~~
~~Jacks 1 Burgee and 1 Blue Peter also 1 colonial flag as required.~~
 Signal halyards 4 skeins.
 2 deck tubs.
 2 hen coops.
 24 rockets.
 24 blue lights.
 6 dozen pens.



6 bottles of ink.
 6 paper weights.
 6 blotting pads.
 2 inkstands.
 Letter paper.
 Foolscap.
 Envelopes for 10 quires of each.
 3 blank books.
 1 plated cruet stand 6 bottles.
~~1 pickle stand for 3 bottles.~~

Kitchen utensils viz.—

Copper tank.	}	All made of copper.
Stock pot.		
2 kettles.		
3 saucepans.		
3 stewpans.		
4 small pots.		
2 frying pans.		
6 baking dishes.		
2 tormenters.		
3 large forks.		
2 spoons or ladles.		
2 cleaver knives.		
2 choppers.		
2 large rice pots for crew.		
Chopping block roller &c.		

10 suitable Russian leather dining chairs ~~2 arm chairs to match~~
~~plain chairs as required:~~

4 water breakers for boats.
 6 teak brass-hooped buckets.
 2 50-gallon water casks.
 1 water filter.
 2 punkahs.
 Imperial measures 1 set.
 1 dozen camp stools.
 1 flash lamp.

The whole of the materials to be provided the arrangements to be made and the works to be executed in accordance with this Specification are without exception to be subject to the approval of the Naval Architect and Inspecting Engineer.



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Specification of Compound Twin-Screw Engines.

General description.

To be direct acting inverted diagonal compound engines having two cylinders capable of developing 500 indicated horse-power on trial at load draft.

Each engine to be independent of the other and all principal parts where possible to be interchangeable and either engine to be capable of running continuously with the other one stopped or disabled.

Cylinders.

Each engine to have one high pressure cylinder of not less than 16 inches diameter and one low-pressure cylinder of about 32 inches diameter placed side by side both having a stroke of about 20 inches. Cylinders to be of hard close grained cast iron and to be fitted at each end with escape valves the dome so fitted as to obviate any danger of scalding the attendants. Drain cocks to be fitted to each cylinder and slide casing with pipes leading into bilges also to be fitted with indicator cocks and pipes. Each engine to be fitted with auxiliary starting valves on L.P. cylinder. The casing of the low pressure cylinder to be fitted with an escape valve loaded to approval. The cylinders to be chamfered at ends and to be tested with steam before being lagged. The whole of the cylinders to be covered with at least one thickness of felt and neatly cased in with well-seasoned tongued and grooved mahogany sheathing secured by brass hoops and screws. H. P. slide valve to be on the fore side of cylinder.

Cylinder covers.

To be of cast-iron turned and polished, with strong internal ribs and perfectly sound. Covers of cast iron to be fitted on top of cylinder covers with intervening space between them filled in with felt.

Pistons.

To be hollow of cast iron with strong internal ribs and perfectly sound each one having a cast iron packing ring Cameron's springs or other arrangement approved by the Naval Architect and Inspecting Engineer properly tongued and carefully fitted steam tight and held down by a cast iron junk ring fitted and faced steam tight on piston and packing ring. Junk ring bolts to have gun-metal nuts in body



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of piston capable of renewal without removing the piston and bolts to be prevented from slacking back by well-fitted guard rings.

To be of wrought steel. Crossheads to be fitted with cast iron shoes, and with oil combs and brasses for connecting rod pins. To be fitted into pistons with a good taper and secured by a single nut. A split pin through the rod immediately above the nut or through the nut if required. Piston rods and cross-heads

To be interchangeable and to be carried through steam chest covers as a guide to the valves. To be of wrought steel and to have guides below the glands bushed with phosphor bronze to take the thrust of reversing. H.P. steam chest to be on fore side of cylinder. Slide valve rods.

Valves to be of hard and close-grained cast iron and faced steam tight on the cylinder faces. Valve spindle eyes made oval to give sufficient clearance at back of valve spindles for the valves to follow up their wear and provide for refacing. Valves to be secured to spindles by collars underneath and double nuts on top. High pressure valve to be balanced for back pressure if required. Slide valves.

Crossheads and guides to be fitted with necessary lubricators. To have large wearing surfaces. To be capable of adjustment and to have oil boxes on front at bottom ends. Guides.

Of wrought steel having solid double eyes at top end and gun-metal brasses of good surface at the bottom secured to the foot of rods with wrought iron bolts and keeps with locking arrangements. To be not less than two strokes in length centre to centre. Liners for adjustment at bottom ends to be fitted to be removable without removing bolts. Connecting rods.

Of wrought steel to be made adjustable as approved. Links to be in two halves and fitted with steel blocks. All pins to be of steel hardened and the links to be hung in the centre so that when working in full gear ahead or astern the eccentric and slide valve rod shall work true and the slips of the block be reduced to a minimum. All working parts to be fitted with adjustable brass bushes and provided with proper means for lubrication. Link motion.

To be of gun-metal secured together and to the eccentric rods with bolts and double nuts. Top half to be of very ample thickness. Eccentric straps sheaves and rods.



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Eccentrics to be of cast iron carefully bored and turned a good fit to shaft and keyed on by one key. Keyway in shaft to be cut. Rods to be forged solid of wrought steel the feet to be secured to the eccentric straps by studs screwed into strap. The end of the stud to be of sufficient length to admit of liners being placed under the rod and to have double nuts.

Starting and
reversing gear.

Each engine to be fitted with a neatly arranged starting gear worked by lever or hand-wheel and quick-acting screw as may be necessary. The throttle valve auxiliary starting valve drain cock and all other requisite handles for starting or stopping both engines to be brought into as close proximity as possible.

A governor of approved pattern to be fitted and arranged to govern both engines.

Crank shafts.

Of wrought steel of approved diameter, and machined all over. To have double cranks at right angles forged in one piece with three bearings in bed plate not less in length than one and a half times the diameter of shaft and the crank pins not less than one and a quarter times their diameter in length. To be carefully bedded down and fitted with a thrust of three collars on fore end of next intermediate length. Crankshafts to be interchangeable for each set of engines to be without flaw and in every way to the approval of the Naval Architect.

Bed plates.

Of sound cast iron formed hollow and of ample strength with square recesses to receive main brasses.

The brasses to be made with a good bearing surface carefully bedded down and held by suitable keeps. Bolts fitted with feathers to prevent turning and arrangements to prevent dropping out when caps are lifted of ample strength and with lock nuts keeps to have brass oil boxes attached. Bed plates to be securely bolted to the engine seats and packed efficiently.

Surface
condensers.

The surface condenser to be made of cast iron and is to be so arranged that the tubes may be readily packed at each end and taken out without removing any part of the engines which cannot be removed and replaced with facility. Manholes are to be provided to admit of the interior of the condenser and the condition of the tubes being examined and of the deposit being cleaned out from all parts. Cocks also to be fitted for the purpose of clearing condenser of the circulating water when the engines are stopped. Suitable pipe



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connections with shut off valves are to be made between the main steam pipes in the engine room and condenser to be used as silent blow off when the engines are suddenly eased or stopped. Fittings are to be provided for the purpose of admitting an alkaline solution into the exhaust passages. Directing plates are to be fitted to cause the circulating water to pass over the whole of the tube surfaces.

No iron to be used in the internal fittings of the condenser. A compound gauge and an ordinary vacuum gauge to be fitted to condenser. A small valve and pipe is also to be fitted to condenser to admit water from the circulating chamber to the condenser or hot well to make up loss from leakages &c.

The tubes to be of solid drawn brass 0.05 inch in thickness. There must be at least 70 per cent. of best selected copper in their composition and samples of them of at least 4 lbs. weight will be subjected to the same test and analysis as brass boiler tubes. The tube plates to be of brass and supporting diaphragms of brass to be fitted if necessary. The tubes are to be secured to plates by screwed glands and tape packing and approved means are to be adopted to prevent the tubes slipping through the tube plates. The total area of cooling surface of condenser to be not less than 1100 square feet.

To be of steel properly secured to weigh shafts. Gudgeon bearings to be close up to the levers and crossheads journals to be as far apart as possible. Pump levers.

To be not less than 13-inch diameter by 9-inch stroke and to be worked by levers off the crossheads. To be of gun-metal smoothly bored and bolted to the back of the condenser and fitted with head bucket and foot valves of gun-metal. Air pumps to be fitted with suitable hot wells on delivery and overflow to engine room. Air pumps.

Each engine to have one feed and one bilge pump. Each feed pump to be of gun metal and capable by itself of supplying the boilers with a sufficient quantity of water with the engines working at their full power. The pump barrels to be bored $\frac{1}{8}$ inch larger than the plungers all the way down. To be fitted on each side of air pumps and worked from the same levers to have gun-metal plungers and metallic valves with doors to obtain easy access to valves. Air vessels to be fitted to the pumps' discharges. Feed and bilge pumps.

Bilge pumps to be of the same capacity as the feed pumps. Valves to be arranged so that those of either pump may be overhauled while the other is at work. A plan of all pumping arrangements to be submitted for approval. Feed pumps to have cocks on delivery side and spring escape valves loaded slightly in excess of boiler pressure.



- Circulating pumps.** A centrifugal pump of approved size driven by independent engine to be provided for circulating water through condenser and arranged to draw from sea and bilges.
- Fire pump.** To have an approved fire engine in engine room in convenient position with suitable suction and discharge pipes suction to be led to sea and bilges discharge to be led on deck and there to have a reducing socket that pump may be used either for delivering a large quantity of water at a small speed or a lesser quantity at high velocity to be arranged to supply two hoses.
- Kingston valves.** Two separate inlet Kingstons to be of gun-metal and fitted in an approved manner. All cocks and valves through ship's side to have naval brass bolts and double nuts, to be easy of access and fitted with zinc protectors to the entire satisfaction of the Naval Architect and Inspecting Engineer.
- Cran's shaft bearings.** To be of hard gun-metal square on outside to sit into recesses in bed plate and to be thoroughly bedded down with flanges on outside over lapping bed plate to prevent lateral movement—to be cleared for one-sixth surface each side. To be fitted on top with syphon oil boxes of brass fitted so as to be easily removed for cleaning and overhaul.
- Boilers.** To have two circular boilers entirely of steel each about 7 feet 9 inches diameter and about 13 feet 6 inches long.
The total heating surface to be sufficient to develop the necessary indicated horse-power to drive the vessel at a mean speed of 11 knots per hour. Boiler tubes to be of iron. Stay tubes to be of steel or of iron equal in quality to Lowmoor and not less than $\frac{1}{4}$ inch in thickness. Tubes to be so arranged as to be easy of access for cleaning.
The longitudinal seams of the shells are to be butt-jointed with double butt straps and treble riveted. The remainder of the shells to be double riveted and other parts single riveted. The seams of the furnaces (if any) to be below the line of fire bars. The furnace bars to be of wrought iron and made in two lengths. The plates angles &c. may be drilled or punched but if punched the holes must be $\frac{1}{8}$ inch less in diameter than the rivets and enlarged to the proper size by riming. Zinc plates to be suspended in each boiler as may be required.
Manhole and mudhole doors to be cut where required and to have rings of same section of material as shell with countersunk rivets and to be provided complete with all necessary fittings.
- Proving.** The design of boilers to be approved by the Naval Architect and Inspecting Engineer to work at a pressure of 100 lbs. and to be proved by hydraulic pressure to 200 lbs. per square inch.



All stayholes to be drilled. In all fore and aft stays the threads Staying. are to be larger than the body of the stay so as to have nuts inside and out. Stays to be arranged for a working pressure of 100 lbs. The whole of the shell and dome to be covered with approved nonconducting composition covered by iron plating.

Chimneys to be of approved size and fitted with dampers shackles Mountings. and stays funnel and ash-pit. Boilers to be provided with all necessary dead plates bridges fire bars in two lengths fire doors smoke box with shield plates and doors scum pipe &c. To be generally of steel.

Suitable donkey boiler to supply steam for fresh water condenser Donkey boiler. and windlass to be provided.

Boilers to be fitted with two safety valves of an approved type Safety valves. fitted with means for easing the pressure from starting platform.

Copper waste steam pipe to be properly secured to funnel and a drain pipe from the bottom of the valve chest to be fitted to drain the water into tank in stokehole.

A suitable steam whistle to be provided and fitted in convenient Steam whistle. position. Separate cocks to be fitted on boilers to shut off steam when required. To be arranged to work from either boiler.

Reply telegraph for each engine to be fitted to bridge with night Telegraph. lamp and stand to both.

To be fitted to boilers and arranged to open and shut as may be Stop valves. approved and so that each boiler can be used separately.

Steam for windlass to be led from cocks in domes that either boiler may be used as desired.

Mountings to include main and donkey feed check valves scum Gauges &c. blow off and salinometer cocks of brass. Glass water gauge and three test cocks. One 7 inch pressure gauge in engine room and one in stokehole. Compound gauges and vacuum gauges of Bourdon's make on each engine as may be arranged in convenient positions. All valves and mountings generally to be of gun metal and to the satisfaction of the Naval Architect and Inspecting Engineer.

To be fixed to pump from sea and bilges and to deliver on deck Donkey pumps. overboard or through the condenser and to feed main and donkey boilers. Mud boxes to be placed where required.

Pumps to be arranged for working by hand and to exhaust both into the condenser and overboard.

To be of steel cased in gun-metal where required. To be in Shafting short lengths to facilitate removal.

The gun-metal casings to be carried into recesses in propeller



bosses made to receive them. All lengths to be capable of being brought through the engine room if possible. To have a gland on engine room bulkhead of cast iron in two halves bolted together.

Tunnels. To be to engine requirements and as small as possible fitted with water service to each carriage strongly secured and used as a hand rail.

Two water tight doors in bulkhead of approved pattern to be fitted. Limbers and pump suction rose to be easily accessible.

Thrust blocks. The thrust blocks and covers to be cast hollow to admit of water passing through and to be fitted with movable brass collars and to be so arranged as to be capable of adjustment fore and aft without removing holding down bolts (see "Crank shaft").

Stern tubes. To be of cast iron secured to plating of ship and having stuffing boxes on inner end and outer end lined with lignum vitæ. Cocks to be fitted on inner end for cooling glands (see "Shaft Tubes" in ship Specification).

Propellers. To be made of steel two in number four bladed and of sufficient diameter pitch and surface to drive the vessel at a mean speed of 11 knots per hour. To be fitted in an approved manner.

Pipes. All steam and water pipes to be of copper of suitable diameter and thickness and the bilge pipes of galvanized iron.

Lubrication, &c. The engines to be provided with all necessary grease cups lubricators and cooling pipes for water service. An impermeator to be fitted on high pressure steam chest. Ladders platforms and handrails to be supplied where required. Lubrication for top and bottom ends of connecting rods to be self acting by means of oil boxes on top of rods fed from syphon boxes in convenient position.

Turning motion. To be arranged in both cases by strong worm wheel with pinion worked by a powerful ratchet and capable of turning engines either way.

Tools and spanners. To be supplied as per annexed list.

Painting. The engines and auxiliary steam pumps to have two coats of good red lead and one coat of oil paint with two of varnish to be finished in a first-class manner.

The engine room to have two coats of paint and one of varnish or to be grained as may be directed.

All the boilers and boiler work funnels &c. to have one coat of good red lead in the works and when in place together with the bunkers boiler room and all iron work to receive one coat of good red lead and one of oil paint of approved colour.



This specification is intended to include all that is reasonably and usually required to fit the engines for sea and everything so required to be fitted free of extra charge. General.

LIST OF SPARE GEAR.

- Principal items of spare gear to be fixed and neatly strapped.
- 2 top end connecting-rod brasses.
 - 2 bottom " "
 - 2 top halves for eccentric straps.
 - 6 coupling bolts.
 - 2 mainbearing bolts.
 - 2 safety valve springs.
 - 1 spare spring for each escape valve.
 - 6 piston bolts.
 - 50 condenser glands and 10 lbs. cotton cord.
 - 2 connecting-rod bolts.
 - 1 worm for turning-gear.
 - 4 piston gland studs.
 - 4 valve gland " "
 - 1 valve for feed-check.
 - 1 escape valve and dome.
 - 12 boiler tubes.
 - 12 condenser tubes.
 - 1 set of spare piston springs.
 - 1 " furnace bars and pattern.
 - 1 " circulating pump valves.
 - 1 " air " "
 - 1 " feed " "
 - 1 " bilge " "
 - 1 spare donkey slide valve spindle.
 - 1 " bilge or feed pump plunger.
 - Oil service tanks with cock and key as may be approved.
 - 1 tallow tank.
 - 1 tin dish and drainer.
 - 2 iron ash buckets.
 - 2 iron water pails.
 - 1 spanner for each size nut used, and a close ended one for cylinder and steam chest nuts.
 - 1 spanner rack.
 - 1 large shifting spanner.
 - 1 small " "
 - 4 packing drawers.
 - 4 " sticks.

2 Repellers



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- 6 oil feeders.
- 1 engine room clock.
- 2 bulkhead lamps for backs of engines.
- 2 telegraph lamps.
- 1 brass globe lamp placed so as to light gauges.
- 2 brass engine room lamps.
- 2 tube lamps.
- 1 water gauge lamp.
- 4 trimmer's lamps.
- 1 gallon measure.
- 1 quart "
- 1 funnel.
- 1 copper tallow kettle and tray.
- 1 tin " " " "
- 1 syringe.
- 1 vice and bench.
- 1 pair copper vice grips.
- 1 pair lead "
- 6 cold chisels (assorted).
- 12 files (assorted).
- 1 German silver salinometer and copper pot.
- 2 hand hammers.
- 2 coal "
- 2 scaling "
- 1 copper hammer.
- 1 lead "
- 4 trimming shovels.
- 4 firing "
- 2 long rakes.
- 2 short "
- 2 pricker bars and 6 blades for ditto.
- 3 tube brushes with handles.
- 2 long slices.
- 2 short "
- 3 tube scrapers.
- 1 emery cloth box.
- 1 lamp wick "
- 1 pair scissors.
- 1 coal measure (1 cwt.).
- 4 boiler caulking tools.
- 12 gauge glasses.
- 6 steel wedges.
- 1 india-rubber hose for cooling ashes.
- 1 set eye bolts for each heavy object. Sets of 3 for cylinder covers.
- 1 tube drawer.



- 1 swedge.
- 6 file handles.
- 6 patent tube stoppers.
- 1 soft soap tin.
- 1 blacklead canister.
- 4 scouring tins.
- 1 set soldering irons and bottle of spirit.
- 2 pairs callipers.
- Zinc plates fitted in place to approval.
- 1 pair pliers.
- 1 save-all for oil cans and lamps.
- 1 hand vice.
- 2 screwdrivers.
- 1 forge (portable).
- 1 small anvil.
- 1 indicator in case with grid square cock and springs $\frac{1}{16}$, $\frac{1}{10}$, $\frac{1}{8}$
and scales for ditto.
- 1 ratchet brace and set of 12 drills.
- 1 tube expander (approved).
- 1 set of blocks and falls (3 sheave).
- 2 tallow jugs.
- 1 set scaling tools.
- 2 thermometers.
- $\frac{1}{2}$ cwt. nuts and bolts (assorted) $\frac{1}{4}$ inch to $\frac{3}{4}$ inch.
- 6 feet bar iron each size from $\frac{1}{4}$ inch to 1 inch.
- 1 cwt. $\frac{5}{16}$ inch steel plates.
- 1 small plane.
- 2 chisels.
- 1 large hand saw.
- 1 20 feet cooling hose of 2 ply rubber fitted with union and
nozzle.
- 1 hose spanner for cooling hose.
- 1 " " fire engine hose.
- 1 chain sling for cylinder covers of approved size.
- 1 condensed water cistern 50 gallons fitted in stokehole with cock
and wastepipe.
- 4 tube slices.
- 1 spring balance 1 cwt. (Salter's).
- 1 set gun-metal collars for thrust block.

The whole of the materials to be provided the arrangements to be made and the works to be executed in accordance with this specification are without exception to be subject to the approval of the Naval Architect and Inspecting Engineer.



The Schedule hereinbefore referred to.

THE SECOND PART.

LIST OF DRAWINGS REFERRED TO.

No. 1.—Sheer Drawing.

No. 2.—General Arrangement.

Signed sealed and delivered by the
above named Sir William Charles
Sargeaunt, Montagu Frederick
Ommanney, and Ernest Edward
Blake in the presence of

C. H. OMMANNEY,
3 & 4, Gt. Winchester St.,
London, E.C.,
Solr.

W. C. SARGEAUNT.  L.S.

M. F. OMMANNEY.  L.S.

E. E. BLAKE.  L.S.

The Common Seal of the above-named
Barrow Ship Building Company
Limited was hereunto affixed in
the presence of

JOHN FELL,
Director.

WM. CHARLTON,
Secretary.



BOND REFERRED TO IN CONTRACT.

Know all men by these Presents "THE BARROW SHIP-BUILDING COMPANY LIMITED" whose registered office is situate at Barrow-in-Furness in the County of Lancaster and Lord EDWARD CAVENDISH of Devonshire House No. 78 Piccadilly in the County of Middlesex M.P. and Sir JAMES RAMSDEN of Abbot's Wood Furness Abbey in the County of Lancaster Knight are held and firmly bound to Sir WILLIAM CHARLES SARGEANT K.C. M.G., MONTAGU FREDERICK OMMANNEY C.M.G. and ERNEST EDWARD BLAKE Esq. all of Downing Street in the City of Westminster the Crown Agents for the Colonies in the penal sum of Two thousand five hundred pounds of lawful money of Great Britain such sum to be paid to the said Crown Agents for the Colonies their attorneys or attorney for which payment to be well and truly made we bind ourselves and each of us and any two or more of us and the heirs executors and administrators of us and each of us and of any two or more of us jointly and severally by these presents. Sealed with our seals.

Dated the First day of June 1886.

Whereas by a Contract bearing even date with the above written Bond and made between the said Crown Agents for the Colonies of the one part and the above bounden Barrow Shipbuilding Company Limited of the other part the said Barrow Shipbuilding Company Limited have contracted and agreed with the said Crown Agents for the Colonies that the said Barrow Shipbuilding Company Limited will in such manner with such materials within such period and to such satisfaction as in that behalf therein mentioned and in accordance with such Specification and drawings as are in the said Contract mentioned or referred to build complete and deliver to the said Government a steel twin-screw vessel. And whereas the original of such Contract duly executed by the said Barrow Shipbuilding Company Limited is for better identification annexed to and bound up with these presents. And whereas before and at the time of entering into the said contract it was expressly agreed between the parties thereto and the said Lord Edward Cavendish M.P. and Sir James Ramsden that the said Barrow Shipbuilding Company Limited and the said Lord Edward Cavendish M.P. and Sir James Ramsden as sureties for the said Barrow Shipbuilding Company Limited should enter into the above written bond conditioned as hereinafter mentioned.



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Now the condition of the above written bond or obligation is such that if the said Barrow Shipbuilding Company Limited or other the persons in the said Contract referred to by the expression "the Contractors" do and shall well and truly observe perform fulfil abide by and keep the several conditions agreements and stipulations in the said recited Contract contained expressed or referred to and on their part to be observed fulfilled abided by and kept and shall unless and until the said contract shall be determined as in the said Contract mentioned and also do and shall from time to time and at all times hereafter at their own cost and charges save harmless and keep indemnified the said Crown Agents for the Colonies from all actions suits losses charges damages and expenses which the Crown Agents for the Colonies shall or may bear sustain incur or be put unto for or by reason of the non-observance or non-performance or breach of any of the clauses stipulations conditions and agreements in the said Contract contained or referred to and on the part of the said Barrow Shipbuilding Company Limited their successors or assigns or other the persons in the said Contract referred to by the expression "the Contractors" to be observed performed fulfilled and kept and if the said Contract shall not be wholly determined by the Crown Agents for the Colonies under the provisions in that behalf in the said Contract contained then the above written bond or obligation shall be void or otherwise shall remain in full force and effect.

Signed sealed and delivered by the above-named James Ramsden in the presence of

JAMES RAMSDEN.

(L.S.)

WM. CHARLTON,
2, Michaelson Villas,
Barrow-in-Furness.

Signed sealed and delivered by the above-named Lord Edward Cavendish, in the presence of

EDWARD CAVENDISH.

(L.S.)

C. HERBERT CURREY,
14, Great George Street,
Westminster, S.W.



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