

Copy of letter
7/14/90
Mullman

Screw Engines for Canal and River Boats

I am directed to invite tenders for the supply of additional steam engines for use on our cargo boats

Such engines to be of the inverted, vertical, Compound, Surface Condensing type; having cylinders ~~at~~ side by side and cranks set for starting in any position, with ⁴/_{in} all usual fittings, mountings and sea connections with starting, reversing and controlling gear brought on deck. To be fully equal in power, workmanship and finish to the engine now working on board the "Pioneer" and to work at 120 lbs ^{sq} boiler pressure -

If you are prepared to compete for the supply of ^{the} engines ^(exclusive of Boilers), I shall be glad to receive your specifications with separate tenders not later than Thursday next as follows

- 1st Engines complete for 2 boats (now in course of construction) to be delivered and fixed within 3 months
- 2nd Engines complete for 4 additional boats to be delivered as required during the present year

The sum named in the tenders to include for the erection and fitting complete on board the boats at the Rockdale Basin and for a reasonable trial working free of all expense to this Company,

Yours truly

Wm. W. Mullman & Co. Limited
Engineers
Weymouth

Specification for Steam Barge Engines.

The Engines to be of the Vertical Inverted Surface Condensing Kind, Compound, with the Cylinders fixed side by side, fore & aft in the barge, and the Cranks fixed at an angle of 90 degrees with each other, so as to be in readiness for starting in all & any position.

The high pressure cylinder to be bored out to $5\frac{3}{4}$ " dia. and the low pressure one to 10" dia., each to have a piston stroke of 8 inches clear, and to be cast from a mixture of "Blancarton Cold Blast" - Hematite, Gleggarnock and good scrap iron, and fitted with the ordinary three ported slide valves with mild steel valve rods, and gun metal glands with the usual gland bolts, the slide valve boxes to be cast in one with the cylinders & fitted with cast iron planed covers & bolts.

Pistons, to be made from hammered scrap iron forgings, turned all over, the upper half to be removable for convenience of changing the packing rings, the latter to be of our improved & well tried form as exclusively used by the Leeds & Liverpool Canal Co. on their steam barges, the piston heads to be so constructed that there shall be no loose bolts, which are at all times liable to work out, & cause serious breakdowns in high speed engines.

Piston Rods, of Siemens Open Hearted Mild Steel $1\frac{1}{4}$ " dia. and $1\frac{1}{2}$ " dia. respectively, for high & low pressure pistons, secured to pistons by means of a nut & solid collar forged on rods.

Cross Heads, made from cleaned scrap iron forgings machined all over, of extra large wearing surfaces for guide bars, 6" long x 1 1/2" wide, the parts where working in contact with said guide bars to be fitted with gun metal guide slippers, piston rods to be attached to cross heads by means of steel collars.

Guide Bars, to be made from mild steel, and machined all over to 1/2" in width x 1" thick the top end of each bar to be recessed out, to form an oil receptacle, & fitted with trimmed pipes to give a continuous supply of oil to the guide bars & slippers.

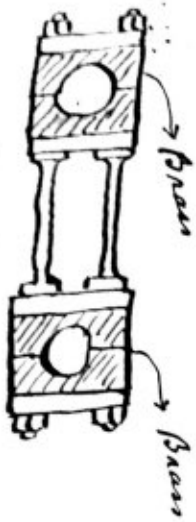
Connecting Rods to be made from same quality of materials as cross heads, of the short fork kind (at cross head end) fitted with wrought iron straps with steel gibs & collars, and new gun metal steps, the crank pin ends to have phosphor bronze steps bored out to 3/4" diameter x 3 inches long in the bearing, with wrought iron caps, and 7/8" dia steel bolts for adjustment, each bolt to have double nuts and safety pins. The rods to be machined all over.

Crank Shaft to be made from Siemens mild steel, and of the double sweep marine kind, turned & machined all over, diameter of crank pin journals 3 inches, diameter of main journals 2 3/4 inches, each crank web to be fitted with counterbalance weight made of a scrap forging machined all over & shrunk on web hot, these weights being particularly essential to prevent undue vibration which is so destructive to the life of all boats fitted with unbalanced engines.

The Cylinders to be carried by one main standard (cast iron) each, and two turned steel columns, each, the cast standard forming the surface condenser, and the wrought iron columns standing in front of engine, giving free access to all working parts for attention when running & repairs when needed.

Surface Condenser, to be fitted with Muntz's metal tube plates (Brass) $\frac{3}{8}$ " thick, and with 176 solid drawn Brass tubes each $\frac{3}{4}$ " dia, and so arranged that the tubes can be easily got at for cleaning & examination, & renewal, the exhaust pipe from low pressure cylinder to the Condenser to be of Copper $\frac{1}{8}$ " thick with strong flanges to suit; as also the intermediate pipe from High to Low pressure cylinder.

Air and Circulating pumps to be made from New Gun Metal throughout, and fitted with gun metal pistons, with best Rubber Valves with brass Valve guards, The delivery valves also gun metal, with Rubbers & brass guards, the two pumps each to be 6" dia, standing side by side, and worked from one cross head common to both, with a gun metal boiler feed pump exactly central between them, worked from the same cross head, all these pumps standing behind the Condenser on Starboard side of boat, The air pump & Circulating pump to be driven by two double web rocking levers, with main gudgeon bearings, $1\frac{3}{4}$ " dia & $3\frac{3}{8}$ " long, fitted with gun metal bushes, each end of said levers to have steel bearing pins (fixed) $1\frac{1}{4}$ " dia & 2" long in bearing to receive the connections between Cross heads of Cylinder & Air pumps, each cross



cross head to be connected by means of a double pillar link (see margin) on each side of lever each link to have two pairs of gun metal steps with steel caps & steel distance pillars, so as to be readily adjusted for wear, and to prevent any knocking or thumping in air & circulating pumps. The delivery pipe from circulating pumps to the surface condenser to have a wrought iron air vessel (vertical) $2\frac{1}{2}$ dia \times 12" high, to prevent the undue concussion of the water due to the high speed of the pump, said pump also to be fitted with a gun metal foot valve, with regulating screw, to regulate the quantity & temperature of the injection water, the air pump to have hot well fitted from which the central feed pump shall take its supply, all connections between air pump & feed pump & hot well to be fitted by us complete, Valve Reversing gear, to be made from mild steel and case hardened (by furnace, not prussiate of potash) in the most thorough manner $\frac{1}{16}$ th of an inch deep in all working parts.

Both engines, and air & circulating pumps to be self-contained on one bed plate which shall also carry the propeller shaft "thrust bearing" this latter to be fitted with phosphor bronze steps, bored out to receive three thrust collars, this bearing to be fitted with four fine threaded adjusting screws for taking up end wear of collars due to thrust of shaft in propelling barge.

Reversing lever with expansion quadrant & its gear to be fixed on quarter deck, also steam stop valve handle, both in convenient position for Helmsman. All necessary connections between engines and water outside of barge.

to be provided, and protected from the entrance of Wreckage & Debris by perforated steamier plates, also overflow pipe from Condenser to sea to be provided & fixed by us,

Vacuum Gauge with necessary pipes and Stop Cock to be attached to Condenser,

Double cock Tallow Cap to be fixed on main Steam pipe,

Gun Metal steam Stop Cock to be attached to high pressure cylinder with pintable lever handle brought on deck near reversing lever,

Gun Metal Drain Cocks to be affixed to the two cylinders, fitted with unions & drain pipes,

One Screw propeller 3.0 dia x 3.6 or 4.0 pitch, bored & keyed, also one tail shaft with feather key, Nut & safety Cotter, and one intermediate shaft (if room for one) to be supplied, all couplings to be of the face plate or disc kind of wrought iron, shrunk on shafts hot, turned true and fitted with four turned steel bolts each, fitting in bored holes,

The whole to be of the highest class of workmanship, equal to the best sea going Marine & Locomotive practice, and all materials to be as herein specified, and delivered at Rockdale Yard, and fitted on board barge there, you to ~~provide the necessary assistance (labourers)~~ to assist our Engine fitters, and also to provide all carpenters work, we to conduct any trial that may be reasonable, at our own expense as far as our own staff of men are concerned, you to provide the necessary fuel & stores & crew during such trial, The Machinery to be open & subject to your engineers inspection at all reasonable times, at our works during construction.

April 16th 1890

Signed) Wm Wilkinson.

for W.M. WILKINSON & CO. LIMITED.

Cont reduce further




 Home House Foundry
 Wigan April 16th 1890

The Rochdale Navigation Co.

Gentlemen,

Enclosed herewith we beg to hand you our specification for Marine Engines in accordance with your letter of the 14th April.

You will find it a very complete one, & should we receive your order, the same would have the special personal attention of the writer, both during construction & erection on board the Barges, and who has had a good sixteen years practical experience of steam propulsion on inland navigations, & consequently knows the requirements of same.

The engines we specify are the same diam of Cylinders, and piston stroke as the "Pioneers", and will stand in a "fore & aft" space of 3.6 -

but you will never get as good results from them as from the "Pioneers" Tandem Engines, although theory says you ought to do, practice has proved the contrary.

To do the same duty, the Cylinders would necessarily have to be increased in diam, which consequently means burning more Coals, to get the same revolutions per minute.

In Steam Barges space occupied fore & aft has always been a consideration, and although we have compressed these engines into a fore & aft length of 3.6 - the "Pioneers" only require about 2.0 -

We have two pairs just approaching completion for the Leeds & Lpool Canal Co. at our works, which we should have pleasure in shewing you, they are the same as the "Pioneers" with many improvements, and are "Surface Condensing" the "Pioneers" being the "Jet Condensed" - You will perhaps pardon

as in pointing out to you that, size for size, the Tandem engine gives at least 20% better results than the separate Compound, with the Cranks at Right Angles, the Consumption of fuel being the same,

The only apparant difficulty with the Single Tandem being its liability to stop in a position that it will not start "astern" when required to take the way off the Barge, but this matter we have got over, with a simple appliance which we are fitting to the engines now in hand

Our price for the Engines as per specifications would be Three Hundred pounds per pair, on board, with steam up, for two sets, and if the whole six sets were ordered for delivery over the current year, our price would be the sum of Two Hundred & ninety pounds per pair, complete as above,

Yours Respectfully.

Wm Wilkinson

WM. WILKINSON & CO. LIMITED.

for,

Mersey & Liverpool Canal Company.

GENERAL MANAGER'S OFFICE.

Ball Mall.

Liverpool. 25 Apr 1890.

Dear Sir

The contract price for our ^{new} Engines & boilers is £410, this includes Iron Rudder, stem post & propeller.

The engines are vertical, two cylinders, & surface condensing. There is also an arrangement for reversing which increases the cost a little.

Yours truly

W. Worswick
C. D. & Co. Eng.

you will note that Williamson
says that he can get over the difficulty
of dead centering in tandem engines by
a simple contrivance, if this is so it
would be well to inspect his method
as a considerable saving in cost may
be thereby effected

Yours truly
H. Thornber

CR Dykes Esq



Manchester 17 April 1890

TELEGRAMS: ROCHCAN

Enquiry for new Steam Boilers

Sir,

I have examined Messrs Williamson's
order and specification for proposed
engines.

The specification is a good one and
such engine constructed will without
doubt be in every way satisfactory.

The price (£300) however seems high
and I think it would be well to see

Mr Williamson and ascertain if some
could not be made.

I think that before deciding on an
engine it would be well to see the

engines that he is now constructing
at Wigan for the Leeds & Liverpool Canal.

C2



Please address all Letters
to The Firm

Wm. Wilkinson & Co. Limited
ROCHDALE CANAL ENGINEERS
23528
MANCHESTER
Began April 21st 1890.

Prices and Conditions of Payment for
Proposed Steam Barge Engines for the
Rochdale Navigation.

2 Engines with Cylinders side by side, each - £300.0.0
6 do " do " do " " - 285.0.0

2 Engines (Tandem) Leads & Lpool Box pattern - 260.0.0
6 do -- do -- do -- do --- 250.0.0

2 Steam Deck Winches, each, 30.0.0
6 do -- do --- " 28.0.0

Stem Tubes (Gun Metal) Complete, each 5.0.0
Bilge Water Ejectors each 2.10.0

Labour, any assistance given to our fitters at Rochdale
Bain, during erection, to be charged against us at the
labourers net rate of wages per hour.

If two engines ordered, price to be £300, and if followed
up immediately by the order for the other four, the total
deduction of £90 to be made from the four last ordered.

and the same arrangement to apply in the
Case of the Deck Winches also,

If declined, we would build one engine (of the
first two ordered) on the "Tandem" and the other
on the "Side by Side" type,

Time, first engine 10 weeks, Second 12 to 13 weeks
from date of order, but cannot submit to any
penalty in present state of labour market,

Trusting you will find the foregoing quite
in order with your Mr. Thornber's report of his
interview with us on Saturday,

We are,

Faithfully yours

WM. WILKINSON & CO. LIMITED.

per Wm. Wilkinson.



Please address all letters to the Firm



19919

3
The House Foundry
Glasgow April 21st 1890.

Messrs The Rochdale Navigation.
Gentlemen.

In reply to a letter received this day from your engineer, Mr Skonker, we beg to say, that we do not see any objection to being inspected by Lloyd's, as far as our Workmanship in the engines is concerned, provided there is no attempt at interference with our designs therefore, on these terms, we are willing to agree to their inspection.

"Steam Tube" - This, in the "Pioneer" was included in the Barge builders (Woodcocks) tender, consequently presuming such would be the case again, we have not included it in our estimates, We would supply it in Gun Metal like "Pioneer", Complete, for the sum of Five pounds -

Connections from Boiler to Engines &c -
These we are not prepared to tender for, but should advise you to get a local Copper smith to give an estimate when engine & boiler is on board, when it can be seen exactly what would be required, and the writer would arrange the details and superintend the work without

making any charge against you for so doing.
You would then get the work done cheaper than if we did it, inasmuch as workmen in our business receive some 40 per cent additional to their rate of wages when away from home.

We herewith enclose outline tracings, to scale, of the two types of engines as promised, not having sufficient time to make more elaborate ones, we trust that for the present, these will be sufficient for your purpose.

We also enclose letter confirming our general terms as per the interview between the writer and your Mr Skonker on Saturday the 19th instant.

We are,
Faithfully yours.

WM. WILKINSON & CO. LIMITED.

per Wm Wilkinson