M.R.O. 1—77,006—8-6-37.

(1) Number of pages ....

(2) Date of repair ....

(3) Initials of the Reference ....

MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No. 1125	Press Mis.
310 - 311	
Dated 21 - 4 -	18 71.

Not to be folded or roughly handled

Read the following :—

No. 78.

No. 310. *Note by the Chief Engineer for Irrigation.*

PARTICULARS of the number and condition of the river steamers attached to the Godavery Delta have recently been laid before Government, and arrangements for ensuring their being maintained in a more efficient state have been sanctioned.* These steamers are all propelled by side paddles, and it was noticed that this mode of propulsion is not well adapted to canal navigation, and I stated that I hoped that before long the Government would obtain a much more serviceable and efficient steamer propelled probably by twin screws.

* G. O., No. 744, dated 13th March 1871.

2. Captain A. T. Fraser's letter, with its enclosures, has arrived opportunely, and, as I am about to proceed to England on furlough, I should like to take up the subject where he has left it, and to endeavour to get a river steamer designed and built to answer the purposes for which such vessels are required in the Godavery, namely, to tow in the river, sometimes against and across a considerable current, and to be handy canal boats. The principal conditions to be satisfied are—

(1.) Dimensions— { Length not exceeding 101 feet. Breadth 13½ to 14 feet, the lesser breadth being preferable.

(2.) Draught not exceeding 3 feet.

(3.) Speed should be 9 statute miles, at least, an hour in still-water, with wood fuel.

(4.) Power of towing should be considerable, as the steamer would be required to take two if not three barges, of about 50 tons capacity each, across the river in moderate freshes, and should at all times be capable of towing one such barge. The maximum current in the river may be taken as 5 miles an hour.

(5.) The boiler should be of very ample capacity for generating steam, and with the engines, which should be as simple as possible, should be of the very best manufacture, and fitted with such fuel-saving appliances as have been found to answer most effectually. The first cost of the engines and boiler is a matter of less importance than economy in working, and a minimum of wear and tear; and if high piston speed be provided for, good workmanship and well balanced moving parts are essential in the engines, as well as strength and rigidity in the framing.

(6.) Great steering power will be essential, for, with a barge or barges in tow and a cross current, any defect in this respect might result in the steamer being carried over the anicut.

3. It is not perhaps necessary to extend the specification here. I hope £2,000 would be sufficient for a steamer of the kind required; but if the Government are pleased to entrust to me the obtaining of a steamer, I think I may safely promise to look carefully into all the details, and that no arrangements involving additional cost will be adopted, without clear evidence of their advantage in securing proportionately increased efficiency. I would therefore name £3,000 as the

maximum cost to be allowed; this sum to be inclusive of all expenses and to provide for freight to Cocanada, insurance, etc. I should propose to take several months for ascertaining what has already been done in England, and perhaps elsewhere, of late years, in improving the construction of river steamers, and then to obtain, either from Messrs. T. B. Seath & Co. of Glasgow, or from some other firm, detailed plans and estimates, which would be submitted to the Secretary of State with a report. After this sufficient time would remain for building the vessel and having it fully tried, so as to ascertain that all conditions of efficiency had been secured.

FORT SAINT GEORGE, (Signed) J. MULLINS, Major, R.E.,
13*th March* 1871. *Chief Engineer for Irrigation.*

From Captain A. T. FRASER, R.E., to the Chief Engineer for Irrigation, Madras, dated 16, Dalhousie Street, Glasgow, 17th January 1871.

I HAVE the honour to send, as an accompaniment to this, a sketch drawn up by a builder here, at my suggestion, of a steam-boat suitable to the Madras canals. Having, with a view to seeing if they would answer, examined the small ferry-boats in use on the Clyde, and finding there were objections to their pattern, I applied for further information to the Engineer of the trust, who very kindly put me in communication with a practical man, a member of the small firm of Seath & Co., who appear to confine themselves almost exclusively to the building of iron boats and barges of light draught. My own experience of canals in the Madras Presidency has been chiefly in the Kistna District, and I told the builder that the conditions to be fulfilled were a draught not much exceeding 2½ feet; a breadth of beam not over 15 feet, to go through the locks; a speed of about 7 miles an hour in still or nearly still-water; and certain particulars in arrangement of the storage and passengers' accommodation which are more or less indicated on the plan. It was at once agreed that the best means of propulsion would be by "twin screws," as the limited breadth did not afford scope for side-paddle wheels. I remember that the small steamers at Bezwarah, constructed by Forrester & Co., failed in speed, especially against current, on account of the narrowness of the paddle floats, which were also much in the way in parts of the canal, which had partially silted up, continually striking the mud. The design has, therefore, a pair of screws, one on each side of the stern post, worked by direct acting engines of about 15-horse power. The builder said it would be necessary, on account of the light immersion, that the screws have a diameter of 4 feet to ensure the necessary bite in the water. Steering is performed either by the rudder, or an attachment which acts on the throttle valves connected with each of the screws. The engines would be fitted with expansion gear, so as to economize steam when going with a current and yield full power in the opposite case. Messrs. Seath state, in forwarding the tracing, that the boat "fitted up in frames, plates, etc., painted, marked, lettered, etc., taken down and delivered alongside a ship on the Clyde will cost £1,400." This, I presume, is a rough estimate, and that it would be subject to some variation according to the more detailed specification which would be sent from India, as I only gave leading points and dimensions. What very much induced me while here to take the matter of the best form of canal boat up was a discussion which took place in the Kistna District in 1860, when the Native Company began to engage in the navigation of the Masulipatam canal. This company had been in correspondence with English firms as to suitable steamers, and were recommended those with stern wheels, as on the whole the most likely model. However the great weight of the paddle wheel aft, the first cost of the steamers and expense of fuel, led them eventually to discard the idea of steamers and employ track boats that they built themselves. The Department Public Works, as you are aware, continued to use both at Bezwarah and Dowlaishweram the narrow paddle-wheel steamers of Messrs. Forrester. It seems to me that there is a field for properly adapted light draught steamers on the Godavery and

Kistna canals, when the Native Company were not at all unwilling to take up steam power as well as on other navigated canals in the Presidency, and that my having found a firm able to build, to whom I have described the requisite conditions, or at all events my ventilating the subject, may possibly be of service. Whilst writing this letter to-day, a Mr. Moodie of Glasgow, the Patentee of a very ingenious, feathering propeller, called upon me at the instance of Messrs. Seath & Co. to explain his invention, which he thought would be superior for my style of vessel to the twin screws. He also gave me his circular, which I send along with the tracing. The idea may be described as that of a feathering paddle laid on its side and fixed in the dead part of the stern, where a screw generally is but upon a verticle, axis. The novelty rests in the mechanism for feathering the floats which gives, it would appear, propulsion on one side and absolutely no resistance on the other. The inventor said he had submitted the principle to Professor Rankine who had pronounced the feathering mathematically perfect, and so it would appear from such rough test as I was able to apply to the model. The advantage claimed for this propeller over twin screws is entire immersion, and consequently maximum of power in cases of light draught, whilst, as its diameter is much the same as that of a screw, there is not the weight of a stern wheel of the ordinary kind. The patentee has had the difficulty experienced by all inventors of getting a capitalist ship-builder to give the horizontal propeller a fair trial, but it appears to me that it promises well, and is likely to overcome some of the impediments to free steam navigation of Madras canals or rivers, and I have no doubt that were builders here encouraged to think there would be a sale for canal boats, either to Government or private Companies, they would devote the requisite attention to their peculiar construction, taking more interest and trouble in the matter than as a mere chance speculation. Perhaps you would let Superintending Engineers and Secretaries of the Kistna and Godavery Navigation Companies see these papers, in case either the sort of steamer or mode of propulsion might be usefully introduced on the canals.

No. 311. ORDER THEREON, 21st April 1871, No. 1,125.

CIVIL WORKS, No. 20.

THE Government have no doubt that Major Mullins' leisure while on furlough might profitably be utilized in investigating the question of the description of river steamers best adapted to overcome the impediments to free steam navigation on the canals and rivers in this Presidency, but as the Secretary of State has distinctly prohibited local Governments from procuring stores or plant from England except through the intervention of the Home Government, His Excellency the Governor in Council regrets that he is precluded from empowering Major Mullins to procure a steamer of the kind required.

(True Extract.)

(Signed) CHARLES A. ORR, Colonel, R.E.,
Secretary to Government.

To Major J. Mulling, R. E.
,, the Acting Chief Engineer for Irrigation.

Exd. S. T. Augustin.

Govt. of India 1871 Mains.

PUBLIC WORKS.

To

MAJOR J. MULLINS, R. E.,

&c., &c., &c.

Dated April, 21st.

Recd. Encl.

G. O., 21st April 1871, No. 1125.

APRIL

Nos. 310-311

River Steamers.—Passing orders on the note by the Chief Engineer for Irrigation requesting permission to procure river steamers for the canals and rivers in this Presidency.

MEMORANDUM.

C&C Mullins

Requested for reference the under-mentioned papers

Re plan of Siam steamer

and

Forwarding enclosure to Capt C.

A. T. Fraser R.E. letter No 125 - 21 Apl 71

17 Aug 71 G.O. No 1125 - 21 Apl 71

Office of the Chief Engr. for Irrigation, P. W. Department, 17th Feb 1873.

Dir. Mullins

Head Clerk.

To

The Registrar of the Lyyy-Secy

No 78

Note by the Chief Engineer for Irrigation

Encl^re 3

Particulars of the number and condition of the River steamers attached to the Godavery Delta have recently been laid before Government, and arrangements for steaming them being maintained in a more efficient state have been sanctioned. These steamers are all propelled by side paddles, and it was noticed that this mode of propulsion is not well adapted to canal navigation and stated that hoped that before long the Government would obtain a much more serviceable and efficient steamer propelled probably by screw screws.

x GO. No 1744 dated 13 March 1871.

2 Captain A. T. Fraser's letter with its enclosures has perused appreciate, and, as I am about to proceed to England on furlough, I should like to take up the subject where he has left it, and to endeavour to get a River steamer designed and built & answered

such fuel saving appliances, as have been found to answer most effectually. The first cost of the engines & boiler is a matter of less importance than economy in working, and a minimum of wear and tear will be secured if the proportions for, & distribution and weight of parts are attended to in the engines, as well as strength and rigidity in the framing.

6. Great steering power will be essential, for with a large or large in low and deep vessels, any defect in this respect might result in the steamer being carried over the course.

3. We are not perhaps necessary to extend the specification here. 2 Hope & 2000 would be sufficient for a steamer of the kind required; but if the Government are pleased to entrust to me the obtaining of a steamer, I think I may safely promise to look carefully into all the details, and shall see arrangements involving additional cost will be adopted, without clear evidence of their advantage

an advantage in securing proportionately increased effi-
ciency. I would therefore name £300 as the
one maximum cost to be allowed; this sum to be in
clusive of all expenses & provide for freight to
Jamaica, insurance &c. I should propose a fur-
ther several months for ascertaining what has already
been done in England, & perhaps elsewhere, of late
years, in improving the construction of screw steamers,
and then to obtain, either from a Mess.rs [illegible]
Scott & Co. of Glasgow, or from some other firm,
detailed plans and estimates, which would be sub-
mitted to the Secretary of State with a report.
After this sufficient time would remain for launch-
ing the vessel and having it fully tried & ascer-
tained that all conditions of efficiency had
been secured.

Fort St. George 13 March 1871

(Signed) J. A. Mullins Major RE
Chief Engineer for Irrigation
&c &c &c

To
The Secretary
Govt. of Madras

Rec'd 13 March 71 R. 319 - 322

Ans 30

Ent 28 March 71 R. 314

that the Screws have a diameter of 6 feet to ensure the necessary
pitch in the water. Steering is performed either by the Builder's
an attachment which acts on the throttle valves connected with the
of the Screws. The Engines would be fitted with Expansion Gear
so as to economize Steam when going with a current and with
full Power in the opposite case. Mess.rs Seaton state in their
letter leaving that the Boat "fitted up in frames plates & paint
marked lettered & taken down and delivered alongside a Ship in
the Clyde will cost £1600." This Specimen is a rough Estimate
that approved by Capt.n Denham vacation according to the Specification which would be sent from India as only part be adapted
to Vessels & dimensions. What very much induced the Hon.ble Court
matter of the best form of Canal boat up was a discussion which took
place in the Revenue District in 1860 when the Native Company began
to engage in the Navigation of the Masulipatam Canal. This Company
was in Correspondence with English Firms as to suitable Steamers & Builders here
recommended three with Stern Wheels as on the whole the most Eligible
Vessels. However the great weight of the Paddle Wheel apts, the first cost &
the Steamers & Expence of fuel led them eventually to discard the idea &
of Steamers & Employ Track boats that they built themselves. The S.P. would let
us Tow on Canal Continued to use both at Bezwarah & Bordaisheed
the Screw Paddle Wheel Steamers of Mess.rs Binnie. It seems they
Were a field for properly adapted Light draught Steamers on the
Godavery & Kistnah Canals when the Native Company were sent
in unwilling to take up Steam Power unless on the Navigation
Canals in the Presidency & that they having found a Steamer
from Ceylon described the requisite Conditions or at all Events may
facilitating the subject may possibly be of service. Whilst writing
this letter to-day a Mr Moodie of Ryson the Patentee of a very
ingenious feathering Propeller called upon me at the instance of
Messrs Seaton and Co to explain his invention which he thought would
be superior for my Style of Vessel to the Archimedes. He also gave me
his Circular which I send along with the Tracing. The idea may be

described as that of a feathering paddle each on its side and placed at
dead part of the Stern or where a Screw generally is but upon a vertical
axis. The novelty rests in the Mechanism for feathering the floats which gives
would appear Propulsion on one side and absolutely no resistance on
other. The inventor said he had submitted the Principle to Professor
Rankine who had pronounced the feathering Mathematically perfect
It would appear from such tough test as could be applied Either model
advantage Claimed for this Propeller over Archimedes Screws is Entire immunity
consequently maximum of Power in cases of Light draught Vessels as
Steamer is much the same as that of a Screw there is not the weight of
Item which often ordinary kind. The Patentee has had the difficulty
experienced by all inventors of getting a Capitalist Ship Builder to give
horizontal Propeller a fair trial, but it appears to me that it promises
and is likely to overcome some of the impediments to free Steam
navigation of Madras Canals or Rivers & Should I be encouraged to think there would be a Sale for Canal
Vessels with Engines & Screws I would attend to their peculiar Construction taking more
attention to their peculiar Construction taking more
than as a mere Chance Speculation. Perhaps you
Superintending Engineers & Secretaries of the Kistnah & Godavery
Companies can study papers in case either the sort of Steamer
mode of Propulsion might be usefully introduced on the Canals.

I have the honor to be
Sir
Your most obt. Servant
A Thacker
Capt R.E.

Tracing & Circular by Boat Post.

From
Capt. A. T. Fraser R.E.
16 Belsize Street
Glasgow

Rec'd the 18th Engs for Instn

Dated 17th January
Rec'd 21st Feb 1871

Encls 2 Letters
No 1349/71

Forwards a sketch
of a steam boat suitable
to the Madras Canals
& a Circular from Mr
Inventor patentee of
a new Feathering Pro-
peller for steam vessels
No 1125 - 21st April/71

The Secretary to
Govt Pub. Wks

Public Works Department
No 1125
Proceedings of the Madras Government
Under date the 21st April 1871.
Read the following

From Lieut Col Chief Engineer for Irrigation &c &c &c No 783 of 13th March 1871

To Government

Forwarding two sketches
of a steam boat suitable
for the Madras Canals
& a Circular from Mr
Inventor patentee of
a new Feathering Pro-
peller for steam vessels
with a request that
the Government may
be moved to direct that
a model of the boat
& propeller be sent
to this Presidency for
the observation of the
Canal Authorities

&c &c

local Governments from
procuring stores or Coals
from England except
through the intervention
of the Home Government,
His Excellency the Governor
in Council begs to state that
he is precluded from
entertaining Your
Application to procure at
steamers of the Fixed
Registered.

87

Eg. Augs. Millins / Sent to England
Pte. A.S.C. Lagoon
for Bregn. /
Dec. 20th & April 1871.

Off 7349

Govt of India Madras

PUBLIC WORKS.

To Major J. Sullivan &c &c

Dated 5

Rec'd 8

21 Shts 1125

Nos 310 & 311

Sir

I have the honor to be
Sir
Your most obedient
humble Servant
Jas Caldwell
Secy to Govt

Fort St George