

(1) Number of pages _____

(2) Date of repair _____

(3) Initials of the Referencer _____

MADRAS RECORD OFFICE

Government of Madras

public works

DEPARTMENT

G.O. No.	945 (2)	Press
B.P. No.	86, 87	Mis.
Dated	11-4-1874	195.

Not to be folded or roughly handled

*Proceedings of the Madras Government, Public Works Department,
11th April 1874.*

No. 86. Read the following letter from F. G. STONEY, Esq., to Lieutenant-Colonel J. MULLINS, R.E., Chief Engineer for Irrigation, dated 203, St. Vincent Street, Glasgow, 8th January 1874:—

I HAVE the honour to inform you that my large double-door valve for head-sluiice is now on its way to India, being shipped on board the S.S. *Tenedos* in Glasgow about the 29th December 1873, to sail from Liverpool on the 15th of this month, and due at Bombay about 20th February 1874.

2. Having waited some time to get a ship direct from Glasgow to Madras without success, I at last took the opportunity of the *Tenedos* of sending this first sluice *via* the Suez Canal and Bombay, hoping as the gross weight is small and each package convenient for transfer, the whole may be easily landed at Bombay and brought by rail to Madras at very little extra cost to the Government, and certainly saving considerable time.

3. I have the honour to enclose—

1. Policy of Insurance.

2. Bill of Lading.

3. List of Packages (copy to be re-copied.)

Also to state that I have forwarded per last Mail, *via* Southampton, a small roll containing four tracings and two large photographs of the sluice unmounted for the convenience of rolling with the tracings, but which may be carefully mounted in Madras.

4. Referring to your remarks in G. O., No. 457 of 12th February 1873, paragraph 3, (1st, 2nd,) No. 1 tracing is a vertical section through one vent-frame and shutter showing a simple means of securing the ironwork to the masonry by three iron bolts passing through the cut-stone lintels, also an arrangement of masonry which can be easily and securely carried out, and may be clearly understood from the tracing. I do not think it advisable to raise the lintel as it would expose the top of the vent-frame to lateral pressure which might cause leakage and otherwise derange the sluice, the frame of which at this point is necessarily thin as a beam. I may add that the castings were made at the time Government Order referred to reached me, and if the present arrangement does not meet your approval, I can modify it in future orders by raising the cut-stone lintel and putting a small cast-iron stiffening beam at the back of the vent-frame and under the lintel, but I would prefer the present arrangement if it suits in other respects.

5. In answer to the 3rd division of your paragraph 3 referred to, it will be seen from the photographs that the arrangements for lifting and working the sluice are now specially well provided for.

Your paragraph 4. On tracing No. 1 is a small plan showing how the masonry in the end sets of any number of these sluices may be arranged.

6. It will be seen from the photographs that the entire sluice is considerably altered and greatly improved as compared with my original plans, the action now being much better, while the parts are all far stronger and the whole more complete in detail.

7. The working faces of the shutter instead of being vertical and parallel are now converging towards the bottom, forming together a double wedge, both faces of which in shutting find a true bearing against the prepared inclined faces of the

...arrangement, giving a water-tight junction freely wedging tight, but having a sufficient amount of taper to prevent jamming; the amount of taper is so arranged that when the sluice is shut under a head of 20 feet above the sill the vertical component of the water pressure due to the wedge is as nearly as possible equal to the weight of the doors, so that starting to open the sluice under 20 feet of pressure there is hardly any weight to be lifted, but merely the force necessary to overcome the adhesion of the surfaces in contact, which cannot be much in excess of the amount of taper; supposing it to be about 1/16 of an inch which will cause the moment the doors start, and soon after the upward force of the water will diminish and disappear, leaving the actual weight of the doors and their connections to be lifted in all little more than one ton, which can be done by the power of the screw and gearing provided. I may here mention that I saw this sluice opened from being shut down tight (the lifting screw being operated by means of a common crane, which lifted the doors quite easily) the whole working smoothly on the ground, the frames not being in any way affected, and showing the least tendency to lift with the doors.

The doors, frames and guide-rod are now carried on framing rigidly secured to the main frames, so that the whole strains are confined within the main frame-work, leaving the lifting screw directly connected with the doors, and having complete control over their action.

On top of the four frames are bolted standards connected above by a cross-beam in which is fixed the head of the lifting screw so actuated in brass bearings as to rotate round upwards and downwards; the brass fitting nut being permanently fixed in a similar cross-beam bolted to the doors, in which beam is also fixed a strong, turned, wrought-iron guide-bar which travels with the doors and passes freely through a bored hole in the upper cross-beam, and is connected at its upper end by means of a cross-head and adjustable tie-rods with the doors, so forming an easy and rigid guide; the lower end of the doors being guided by raised projections travelling on planed vertical guide ribs, so that in starting the length of guide is equal to the length from the top of the guide-rod to the bottom of the doors, and when fully open exceeds the extreme length of the doors, leaving them very free to move, while perfectly controlled to their legitimate motion.

The standards may be placed in position after the masonry and the main frames are set, there is an allowance of one inch between the masonry and the main frames to allow for hardwood or cement packing, but there is only half an inch on each side between the masonry and the standards, which may be filled up by a flat iron wedge between the walls and each end of the cross-beam so as to prevent lateral vibration above.

The sluice may be actuated from a platform, any required height, by means of the small column carrying a horizontal spindle with two handles, communicating motion through wire wheels to a light vertical shaft coupled with the head of the screw causing it to rotate as desired.

The lap or bearing surface on the doors and frames is 1 1/2 inches wide on each side, and 3 inches wide top and bottom; care should be taken when adjusting the doors to the frames when erected that they should form a hard bearing when the top and bottom bearing faces lap only say 1 1/2 inches, leaving the remaining lap for wear and tear before any re-adjustment becomes necessary.

13. The level of the induction passages in the masonry is on a level with the iron sill; but that of the eduction passage at the back of the sluice will now be three inches below the iron sill, which gives more freedom to the foot of the doors.

14. I have taken great care to consider every portion of this work so as to ensure a maximum strength with a minimum weight of materials; no unnecessary workmanship being expended for appearance, but no workmanship or skill being spared where the parts required fit or adjustment.

15. The doors are exceedingly strong and light, being each 8 cwt. as may be seen from the photographs and tracing No. 1. The door in cross section is a thin cast-iron arch tied by wrought-iron straps, securing great strength with little material, so saving work to be done in actuating the sluice.

16. I cannot see how in fair working these sluices can be set out of order, and because of their facility of action and range of adjustment I do not think that it is unreasonable to suppose that they will, with ordinary care, give at least forty years' satisfactory service without requiring renewal of parts.

17. Having now had a trial one made, the manufacturers have given me prices at which they can supply these sluices, which prices include all parts complete, same as one now sent, delivered T. O. B. in Glasgow, and including my percentage for their use.

18. Considering the high rates for materials and workmanship, with the increased strength and utility of the sluice as now constructed, I am inclined to think that although the prices are far in excess of my original ideas that the work is now proportionally cheaper, the prices being as follows:—

For an order of 20 sluices, £120 each.

"	"	30	"	£115	"
"	"	50	"	£110	"

19. I may point out that though the prime cost of these sluices may seem large as compared with the common sliding door of wood or iron, yet they will eventually be more economical and far more satisfactory because of their freedom from wear and tear ensuring small cost of maintenance, and their facility of action ensuring small cost in working. I trust that this sluice may have an early trial, and fully bear out what I anticipate.

20. I hope in a fortnight or so to write to you again and forward Bill of Lading, Insurance, and Bill of Costs of the pipes for my patent deep tank sluice, and perhaps for the sluice itself which is now being pushed forward. The Tracings 2, 3, and 4 refer to it, and I will write fully on this subject in my next.

No. 184A.

No. 80A.

Note by the Chief Engineer for Irrigation.

In his letter, dated the 8th January, Mr. F. G. Stoney reports the shipment to Bombay of the experimental set of equilibrium valves designed for trial in a head-sluice, and he forwards a tracing and two photographs relating to these, and three tracings of the equilibrium deep tank valves, one of which was sanctioned in G. O. of the 2nd June 1873, No. 1,407.

2. It is to be regretted that Mr. Stoney should have despatched the head-sluice valves to Bombay, as it would apparently have been easier to have sent

*Proceedings of the Madras Government, Public Works Department,
11th April 1874.*

them to some port in England, whence a vessel sailing to Madras could have been obtained, than to get them forwarded from Bombay to Madras. I have requested the District Engineer, Presidency, to arrange for the transmission of the packages to Madras, and the Bill of Lading, Policy of Insurance, and List of goods have been sent to that officer.

3. I have much pleasure in bringing to the notice of Government the care and attention bestowed by Mr. Stoney on the designs of the valves, as evinced by the improvements he has introduced since the original designs were prepared. The head-sluice valves are, judging from the photographs, remarkably well designed and very complete; while the arrangement of the minor opening for filling the tube of the deep tank valve is very effective and ingenious, and Mr. Stoney has introduced also improvements in the valve itself which appear to be likely to work satisfactorily.

4. As soon as the invoices are received, the remittance of the balance due to Mr. Stoney can be made through the Secretary of State, in accordance with recent orders received from the Government of India.

5. Measures will at once be taken for ascertaining practically the merits of the head-sluice valves.

CAMP AT CHEPAUK, (Signed) J. MULLINS, Lieut. Colonel, R.E.,
26th February 1874. Chief Engineer for Irrigation.

No. 87. ORDER THEREON, 11th April 1874, No. 945.

IRRIGATION, No. 2.

ORDERED to be recorded.

(True Extract.)

Colonel, R.E.,
Secretary to Government.

To the Chief Engineer for Irrigation.
,, Officiating Controller of Public Works Accounts.
To Mr. F. G. Stoney.

Exd. T. O'Connor.

Spare Copies

MEMORANDUM.

REQUESTED for reference the under-mentioned papers

*All original Enclosures sent with the
Chief Eng^r's Note N^o 1844 of 26 Feb/74.
printed in S.C. No 945-11 April 1874.*

OFFICE OF THE CHIEF
ENGR. FOR IRRIGATION,
P. W. Department,
20-4-1874.)

To

The Registrar of the

J. M. Mullins

Head Clerk.

per Secy

There is no occasion
to circulate
these papers -
They merely bore
witness to the fact.

C. M. M.

No. 184 A

9

Note by the Chief Engineer for Irrigation.

Encl 14

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2 It is to be regretted that Mr. Stoney should have despatched the head sluice valves to Bombay, as it would apparently have been easier to have sent them to some port in England, whence a vessel sailing to Madras could have been obtained, than to get them forwarded

from

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11-
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5 Measures will at once be taken for ascertaining practically the merits of the head sluice valves.

Camp at
Chepauk
26th February
1872.

Whitcomb Leitch Esq.

Chief Engineer for Irrigation

To,

The Secretary to Government
D. P. W.

P. W. 1874 Department.
P.W. 1874 April
No 1353.

From
The Chief Engr
for Irrigation
To The Secretary to Govt
P.W. D.
No 184 A.

Dated 25 Feb
Recd 7th March 1874.

Encls 14
1. Report on the
2. Report on the
3. Report on the
4. Report on the
5. Report on the
6. Report on the
7. Report on the
8. Report on the
9. Report on the
10. Report on the
11. Report on the
12. Report on the
13. Report on the
14. Report on the

Note on Mr. Ho-
ney's letter of Jan 74
reporting shipment
of the experimental
set of equilibrium
valves despatched for
trial in a head
sluice

No 945-11 April 74

945- P. W. Dept
13

Proceedings of the Madras Government
Read the following

From the Chief Engr for Irrigation No E No 184 A of 25 Feb 74

Ordered to be recorded.

md
19/3

md
26/4/74
L.M.M.

To The Chief Engineer for Irrigation. ✓
" — Controller Pub. Works Accounts ✓
" — Mr. F. G. Stoney & signed copy delivered to
Moththaswamy Pillay 16/4/74.

* This approach
is too large &
they should have
been cut in two

* Can be put
on tracing cloth

Mr. Harkness

The tracings and photographs
of Mr. Stoney's valves have been sent to
me so badly packed that they are
a good deal spoiled. The former are
to be copied (2 copies) and mounted
on cloth - The photographs can be
refixed and when again sent come
they should be enclosed in a small
tin case.

Mar. 23/74

I think the photographs can be
copied by the draftsman on
tracing cloth. If not you may
ask Mr. Harkness the photographer
in the Mount Road near York the
Charing Cross, ~~what~~ what he
would charge for taking copies

Mar. 26/2/74

1353

Pro. for April
Govt. of Madras.

PUBLIC WORKS.

The Chief Engineer
for Irrigation

Dated

Recd.

Encl 7

G. O. 11th April 1874 No. 945

Nos. 86487.

Equilibrium Valves

The Note by the
Chief Eng^r. for Des^r
reporting the shipment
of Mr. Stoney's experimental
set of Equilibrium valves
for sluices, recorded for