

(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.	457	Press
255 to 257,		Mis.
Dated	12 — 2 — 1873.	

Not to be folded or roughly handled

Handwritten: *Handwritten note*

No. 334.

Note by the Chief Engineer for Irrigation.

IN G. O. of the 11th April 1870 the Government sanctioned the construction of experimental sluice shutters and gearing for a head sluice and for a tank sluice at a cost of £200, under arrangements whereby Mr. F. G. Stoney, the designer, was in the first instance to forward his matured designs for approval, upon which an advance of £100 would be authorized.

2. Mr. Stoney was prevented by illness from completing his designs as soon as he had anticipated, but he forwarded them on the 12th July 1871, and they appear to have reached this office on the 7th August following, and on my return to Madras I found that they had not been disposed of.

3. For the valves adapted for a moderate head of water, or for conditions such as those usually found at head sluices, Mr. Stoney has forwarded a design illustrated by seven plans. This design has been carefully worked out, but there are a few points which appear to me to require modification:—

1st.—The shutter frame is to be put together and lowered into its place in the masonry, and ~~are~~^{is} to be packed with a cement described in the postscript to the specification. This cement is the only means of holding down the frames in their places, but, however smoothly the shutters may work, it would not be advisable to trust to this alone, and I think that some arrangement should be made for preventing the possibility of the frames moving with the shutters. This might be done by putting an iron bar over each vent frame after it had been lowered into its place, the ends of the bars being entered in recesses left for this purpose in the masonry.

2ndly.—It will be seen, on referring to the transverse section, Drawing No. 1, and to the section on line A B, Drawing No. 2, that one end of the cut-stone lintel rests on the arch of the vent on the upper (river) side of the valves, and that it cuts into that arch too much, or approaches too near the intrados to be adequately supported. This lintel it is which with the filling of the segment of the arch over the divided passage, renders the valve water-tight when the shutter is down, and it will require to be firmly fixed and well supported at the end noticed. This can be done only, so far as I can see, by placing the lintel sufficiently high to rest on the extrados of the arch at the lower corner furthest from the frame, and this would entail the lengthening of the frame vertically to meet the lintel.

3rdly.—It seems doubtful whether, with a frame so little in excess of the length (height) of the shutter, the latter would be sufficiently held by the former when the vent was fully opened.

4thly.—Whatever gearing be used, *i. e.*, whether separate for each shutter or connected for several, the beams carrying the gear will need to be secured by holding down bolts about 6 feet in length with a plate for each pair of bolts.

4. It will be noticed that this form of sluice entails piers 7 feet in thickness, but they need not be built solid, though so shown in Drawing No. 1. Mr. Stoney

has not indicated the general arrangements of the end vent of a set of sluices, which on the river or front side will only be half the span of the other vents.

5. With regard to the shutter details shown in Drawing No. 3, Mr. Stoney intimates in the postscript to the specification that instead of the four square distance bars adjustable by cottars, he will substitute six round bars with screw adjustments.

6. In Drawings Nos. 6 and 7 alternative arrangements for lifting gear are shown: that in the former drawing, or the separate gear for each vent, is to be preferred.

7. There are four illustrative drawings of the deep tank valves. They are on the same principle as those already noticed, but the arrangement of the passages leading to the valves is somewhat different. The details have been carefully worked out, and I think that the valve will be likely to answer the purpose intended. It will be advisable to secure the shutter frames by a cross bar and not to depend entirely on the packing, and similarly the gear should be modified slightly as it would not do to rely upon the shutters falling entirely by their own weight, for that weight in water would be but moderate. With lifting rods of great length the downward pressure exerted by the gear can, as arranged, be only slight, but each length* of the rods might pass through guide frames and then with

* About 12½ feet.

holding down bolts for the top gear, the case would be altogether different. These remarks will show Mr. Stoney where, I think, some improvements of detail may be effected. It is not likely that every requirement in novel arrangements of this kind can be foreseen and fully provided for. The valves are experimental, and a trial with a moderate head of water will alone show conclusively of what these valves are capable and what further modifications, if any, will be required. With regard to the last paragraph of the postscript to the specification, it may be noticed that, as simultaneous gear is not desired for the head sluice valves, one man will be able with facility to raise or lower the shutters of each vent.

8. It will be observed from the specification and its annexed tender that Mr. Stoney estimates the cost of the valves as follows:—

For head sluice, arranged for lifting each set separately	£48
Do. deep tank sluice, complete with lifting gear	47

but it must be remarked, with reference to this gentleman's letter of the 3rd October last, that the exact price would depend upon the price of iron and cost of production for the time being, and that since these drawings were made and submitted, both these elements in the calculation have greatly changed, and it will only be fair that the rates should be revised accordingly. Mr. Stoney was to receive £200 for the two sets of valves, and he should be allowed in his account to increase this sum to the extent due to the difference between prices in July 1871 and those which may rule when the work is actually given out by him for execution.

9. With the letter to which I have just referred Mr. Stoney transmitted to me an entirely new design, which he has patented, for an equilibrium deep tank sluice, and he has suggested that this should be substituted for the former

design, a valve for a two feet pipe being first selected for trial. This design, as will be seen from the drawings, involves but a comparatively small outlay for masonry and concrete; and, though the iron work will be more expensive, the total cost of a tank sluice would be less. It has this further advantage that it can be readily tried at any one out of several existing tanks in the neighbourhood of Madras, without any great outlay for setting it up. The arrangements consist of an iron pipe laid in concrete under the tank bund, the regulating valve being placed outside the bund, but the end of the tube inside the tank being likewise provided with a valve for occasional use during the repair of the equilibrium valve, or otherwise. The design exhibits much ingenuity in transferring the pressure of the water to fixed iron work, leaving the moving parts nearly free. Some of the details are, from the extensive use of brass, more costly than seems to be necessary for tank purposes in this country. If the arrangement is to be at all extensively used it must be equal to the ordinary conditions of the reservoirs, and it should not be liable to injury from anything that would pass through a guard grating with 6-inch square openings, which I would place at the upper end of the pipe in lieu of the great cage with a close screen. I am inclined therefore to advise that the valve seat and lower edge of valve cylinder should be of chilled cast iron, and that the screw for opening and shutting the valve should be of wrought iron. By this alteration nearly half the brass work would be saved. I should myself be inclined also to do away with brass for the surface of the moving cylinder, and the bushing in which it works, but with these remarks it may be better to leave it to Mr. Stoney to make the first valve just as he considers most likely to secure its efficient working at first and its maintenance in good order thereafter. A slight modification of the small opening in the clack valve would, I think, be an improvement. I would make this opening a little larger, say, 2 inches in diameter, and close it by a valve (clack would do very well) which should be opened to an angle of 45° by a chain attached to the quadrant chain, and having the length so adjusted that this small valve would be opened fully on the quadrant chain being brought home while it would shut down by water pressure on releasing the chain.

10. Mr. Stoney was not able, when he wrote in October, to state the cost of these new patented valves, but no doubt this information can now readily be supplied, and it would be well for him to mention what difference the reductions in brass work, which I have suggested, would make. There is no deep reservoir which is likely to be brought forward for construction immediately, and so, while it will be beneficial to practically test the design as early as may be convenient, a few months delay will not be of consequence. About 120 feet of piping would be requisite in connection with the valves, to enable them to be inserted as a sluice in one of the large tanks, and the cost of this length, bored and turned as recommended by Mr. Stoney, should be reported. In order to provide for variations in the price of iron, the estimate might show what the cost of the work would be at any given price within the ordinary variations to which this material is subject.

11. Mr. Stoney further states, in his letter of the 3rd October 1872, the terms which he proposes for the use of his inventions. These are 5 per cent. on the total cost of each set of valves complete, that is on all the iron work which alone would

be furnished by him. This is quite reasonable as regards the head sluice valves and those for deep tanks on the design submitted in July 1871; but I do not think it should be allowed on the pipes connected with the patented design of equilibrium valves. Indeed, Mr. Stoney says

• Explicative description.

that this valve can be applied to a masonry pipe or culvert, and it does not seem necessary to pay the same per-centage on pipes having no special features as is asked for the distinctive portions of the invention. Two per cent. would perhaps be a reasonable allowance therefore on the pipes.

12. I would now recommend that, in accordance with the terms agreed on,

G. O., 11th April 1870, No. 1,007.

the Controller, Public Works Accounts,

be authorized to remit to Mr. Stoney

the sum of £100 as an advance, and that this gentleman be requested to construct a set of canal or head sluice iron work of the design approved, with such minor modifications as have been suggested in this Note, or as are alluded to in his letter of the 3rd October last, and that he be requested to send in a statement of the increased cost of these valves consequent upon the difference between the data of the time (July 1871) when his estimate was prepared, and those of the date on which he may give out the work for execution. Also that he be asked to submit an estimate for the patented valve for deep tanks when it can be decided whether this should be substituted for the earlier design as suggested by him.

FORT ST. GEORGE,

20th December 1872.

W. L. L. L.

Lieut.-Colonel, R.E.,

Chief Engineer for Irrigation.

To the Secretary to Government, Public Works Department.

Submitted to Government in continuation of the papers forwarded with the note by the undersigned dated 20 December last.

2 In this letter Mr. A. G. Stoney states that the cost of the patented equilibrium Valve for the sluices of deep tanks, referred to in paras 9 and 10 of the above note, would be about £60 when made in any number, but that when made for the first time it would be nearly three times that sum or £150.

3 Mr. Stoney further submits a tracing of a design for a self-acting weir head to be placed on a weir to raise the water. This design it is believed is a consequence of a conversation with the undersigned on the subject of the Western Amicable, where a means of raising the effective level of

be furnished and those fit it should be
masonry pipes on pipes have invention. the pipes.
12. I
G. O.,
the sum of set of can modification of the 3rd increased time (July he may estimate this should

Fort St
20th Dec

To the S

Pro 11 April 1876

P. J. 1873 Dep. Atty
The Chief
for Migration
The Secretary
N. H. D.

N. 336

Dec 20 Dec 72
Dec 18 Jan 73
Dec

Encls 18

Recommends that
the Controller of Works
be authorized to permit
to Mr. Stoney £100
as advance to construct
a set of canal or
head sluice iron work
of design approved
N. 457-12 Feb 73

N. 256

16/11/73

of the crest on the Subsidence of
the heavy freshes has long been desired.
A necessary condition however is that
the flow of water over the present mason-
ry crest should be entirely unobstruct-
ed when the apparatus is not in use,
and this condition the design does not
fulfil. For other positions, where obstruction
of waterway would not be of so much
importance, the design might possibly
be unobjectionable in an Engineering
point of view, but it is costly and
the undersigned is not aware of any
work on which its value would justify
the expense. Under these circumstances
it is not proposed that any trial of this
design should be sanctioned.

4. Leaving then the selfacting weir
head out of account, Mr. Stoney proposes
to send out

a set of head Sluice Valves for, say, £150
a trial deep sluice equilibrium valve, say £150;
with regard to the former, the undersigned
does

5
does not think that any modification
of the recommendations made in his
note are necessary, and that all that
is requisite is to allow such an addition
to the remuneration formerly agreed to,
as Mr. Stoney may show in his account
to be due to the increase of prices since
July 1871.

As regards the equilibrium valve for
deep tanks, it is very probable that the
modifications of material suggested
will lower its cost materially, and, as the cost of
piping required in connection with the valve has
to be reported, it will be advisable to wait until
an estimate for the valve and piping, after the
design of the former has been reconsidered, has
been received, before deciding definitely in its
favour.

Fort Saint George
9 January 1873

W.S.A.

W. Mullins Lt Col R.E.
Chief Engineer for Irrigation.

The Secretary to Govt
P.W.D.

MEMORANDUM.

REQUESTED for reference the under-mentioned papers

Mr. Stoney, letter dated 25 Oct 72 with 3 tracings
+ 1 memo. 12 July 71 with 12 encls.

1 Tracing encls to Mr. Stoney, letter 8 Dec 72

might have been
The above may be put up with G.O.
No. 457-12 Feb 73.

OFFICE OF THE CHIEF
ENGR. FOR IRRIGATION,
P. W. Department,

29-4 1873
To

The Registrar of the

D. M. Hawthorn

Head Clerk,

P. W. Secretariat.

P. W. 1873 Defect
of type of Stoney
from 21/11/72

The Chief

for irrigation

To The Secretary

8 Dec 1907

12/6

Letter 9/3 Jan 73

12/6

+ 26. Letter to Mr. Stoney to
be sent to Mr. Stoney to
be sent to Mr. Stoney to
be sent to Mr. Stoney to

from Mr. Stoney regarding
cost of the expenditure
incurred in construction
of the works for the
water works at the
water works at the
water works at the

See last No 334.

No 457-12 "Feb 73."

No 255

10/1/1907

reconsidered

Public Works Department
No. 57
Proceedings of the Madras Government
1850
Read the following

From The Chief Engineer } H.E. No. 167/9th Jan 4/51
for Irrigation }
From S^r ————— S^r ————— / ————— 334
20th Decr 1/51

The Government
approve of the recommenda-
tions made by the Chief
Engineer for Irrigation in
the foregoing note, and
they authorize the remittance
to Mr. Stoney of £ 100,
the value of the bill for that
amount being met from such
source as the Controller may indicate.
2. The receipt of a revised
estimate of the cost of the
patented equilibrium valve,
after the design has been
reconsidered

reconsidered as regards the
materials to be used in its con-
struction, and an estimate for
the pipes required in con-
nection with this valve, will
be awaited, before the

Government decide on sanc-
tioning its substitution for
the original design for
a deep tank sluice.

14-12-1

G.M.W.

To the Chief Engineer
in Charge
at the
Residence
Decr 17/2/73