Print Urgent

Public Works (1898) Department.

RAILWAY BRANCH.

G.O., No. 1142-43. Ry.

DATED 16th Septr 1898.

Urgent

PK

20 – + 1 to docket
3
20
36
1 docket & back

[Despatch Abstract.]

Cracked Tube Plates of the Heavy Compound Engines of the E. Ry.

Ordered that the report ~~on~~ by the Senior Govt. Inspector of Railways, Madras, on ___ be forwarded to the Govt. of India

Forwarding the report by the Senior Govt. Inspector of Rys. Madras, on ___

[P. W. 26.
250—24-3-98.]

Indexed.

BACK PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

RAILWAY

Government (1898) of Madras.

PUBLIC WORKS.

Recd. } 1898. *Enclosures*

Regd. *Spare copies*

G.O., Nos. 1142, 1143 Ry., 16th September 1898.

SEPTEMBER.

Cracked Tube Plates of the Heavy Compound Engines of the East Coast Railway

Forwarding the report by the Senior Government Inspector of Railways, Madras, on —.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Railway.

Read again the following paper :—

G.O., Nos. 290, 291 Ry., dated 21st February 1898.

Read also the following paper :—

REPORT ON CRACKED TUBE PLATES OF THE HEAVY COMPOUND ENGINES OF THE EAST COAST RAILWAY.

My first reference to this subject will be found in paragraph 16 of the Inspection Report of the East Coast Railway for the second half of 1897 which is incorporated in G.O., Nos. 206, 207 Ry., dated the 4th February 1898. I subsequently wrote a special report on the subject which issued under G.O. No. 290 Ry., dated 21st February 1898. During my half-yearly inspection in July last I received a report by the Locomotive Superintendent, East Coast Railway, on the subject, under cover of the Manager's letter No. 5350, dated the 2nd July 1898. I personally inspected what was being done about the tube plates at the Waltair shops, and wrote what I had then to say in paragraph 16 of my Inspection Report which accompanies G.O. No. 981 Ry., dated 2nd August 1898. My surmise that nothing was seriously wrong with the mechanical properties of the copper has since been to some extent confirmed by the accompanying report by Mr. A. Chatterton. The large variations between the figures of extension per cent. may probably be ascribed to the difficult conditions under which the specimens were cut out for testing.

2. I have been in demi-official correspondence on the subject with Mr. C. E. Cardew, Locomotive Superintendent of the Burma Railways, and he has told me that Mr. W. Stroudley, late Locomotive and Carriage Superintendent, London, Brighton and South Coast Railways, found that no relief was given by the bending of tubes unless they were bent at least a full diameter out of the straight. Mr. Cardew has also kindly referred me to much that has been written on the subject in the Proceedings of the Locomotive and Carriage Committee, India, and elsewhere.

3. All anxiety which may be felt as to loss of strength resulting from the omission of one, and possibly two, of the front rows of vertical side stays, may apparently be obviated by the use of either Wehrenfennig's or Leach's flexible stays. The former will be found described at pages 138–139 of Vol. VI, and the latter at pages 65–66 of Vol. II of the Locomotive and Carriage Superintendent's proceedings. Mr. Cardew tells me that the Rajputana-Malwa Railway had great trouble with their fire-boxes until they adopted Leach's stays. These latter are said to be an improvement on the older system, by Wehrenfennig sometime "Chief Engineer of traction and materials on the North-East State Railways of Austria," believed to have been described in *The Engineer* about November 1897. The pages above referred to in Vol. VI of the Proceedings of the Locomotive and Carriage Superintendents give the history of a locomotive fitted up on Wehrenfennig's system by Mr. Cardew on the Wardha Coal Railway, C.P., in 1882. In 1892 Mr. Cardew fitted two locomotives of the Burma Railway with Leach's system and they have run very well ever since. He however favours J. B. Stone & Co.'s new system rather than either of the above, because it is cheaper and needs only the ordinary holes in the plates as used for common stays, whereas both the other systems need large special holes for carrying bushes. Much valuable information on the subject of tube plate troubles will be found at pages 94—101 of Vol. V of the Proceedings, Locomotive and Carriage Committee, India.

26th August 1898.

FRANCIS J. E. SPRING, M.I.M.E.,
Senior Govt. Inspr. of Railways, Madras.

ENCLOSURE No. 1 to above.

From—A. CHATTERTON, Esq., Professor of Engineering, College of Engineering, Madras.
To—The Consulting Engineer for Railways, Madras.
Dated—Madras, 24th August 1898, No. 102/W.

In reference to your No. 1847 of the 23rd June 1898, I have the honour to forward a statement* showing the results of a number of tensile tests which I have made on specimens cut from the copper tube plate of one of the East Coast Railway locomotives.

* See page 3.

2. Each specimen was carefully cut out of the plate by drilling a series of small holes and cutting through the intervening metal with a saw. The strips thus obtained were then put into a shaping machine and cut to a shape suitable for testing, with the exception of No. 4, which was turned in a lathe. The position from which each test piece was taken is clearly shown in the sketch attached.

3. In four out of the five tests the modulus of elasticity was measured, and in all the elastic limit was noted. Although there is a considerable variation in the values obtained from the different tests, they may all be considered satisfactory, whilst those from No. 4 are very good. Specimen No. 3 unfortunately failed at a minute flaw near one of the shoulders; but there is otherwise nothing in its behaviour to show that the quality of the metal was in any way inferior. The modulus of elasticity obtained for No 1 is very high This specimen was nearest to the line of fracture in the plate and the corresponding piece cut out on the opposite side of the plate has also a very high value of elasticity.

4. I am unable to undertake the chemical analysis of the copper plate, nor do I think it is necessary as the mechanical tests reveal no defect in the quality of the copper.

5 The broken test pieces are retained in the laboratory, also the copper tube plate, pending the receipt of instructions as to their disposal.

ORDER—No. 1142 Ry., dated 16th September 1898.

Ordered that a copy of the above report be forwarded to the Government of India in continuation of G.O. No. 290 Ry., dated the 21st February 1898.

[Here enter No. 1143 Ry., dated 16th September 1898.]

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Consulting Engineer for Railways.
,, the Manager, East Coast Railway.
,, A. Chatterton, Esq.

ENDORSEMENT—No. 1143 Ry., dated 16th September 1898.

Forwarded.

(By order.)

FRANCIS J. E. SPRING,
Joint Secretary.

Exd. T. K. Narayana Aiyangar.

COLLEGE OF ENGINEERING ;—WORKSHOPS, MADRAS.

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2	Do.	0·821	0·595	0·488	8·375	36	4,767	3·44	7·05	6·33	12·96	3·31	33·10	0·66	0·47	0·320	34·5	* In this case the extension was measured on a length of 8 inches.
2(a)	Do.	0·751	0·598	0·467	..	..	..	2·75	5·89	6·20	13·28	* 3·375	42·2	0 570	0·440	0 2506	46·3	
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4	Circular	Dia : 0·880		0·6082	8·39	24	5,745	4·88	6·58	8 25	13 57	4·35	43·5	Dia : 0·625		0·3068	49·6	

Tube plates

Urgent

This needs only
4 paras:
Send clean proof slips
& plans. for Govt. approval
FM
the blue print
need not go
in the G.O.
6/9

F MADRAS.

DEPARTMENT.

y.

1898.

For H.E. the Governor
for approval before issue
F.R.S.
12/9/98

ES OF THE HEAVY COMPOUND
COAST RAILWAY.

Appd.
A.E.H.
13.9.98

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Tube plates

This needs only 4 pages.

Send clean proof [illegible] for Govt. approval

JM

The blue print need not go in the G.O.

6/9

Urgent

No. 1142 Ry., 16th September 1898.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

For H.E. the Governor for approval before issue

F.R.S.

12/9/98

App.

J.S.H.

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issue

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R114/9/98

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Despatched on 22/9/98

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Proof for approval of R

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ORDER—No. Ry., dated September 1898.

Ordered that a copy of the above report be forwarded to the Government of India in continuation of G.O. No. 290 Ry., dated the 21st February 1898.

[Here enter No. Ry., dated September 1898.]

(True Extract.)

FRANCIS J. E. SPRING,
Joint Secretary.

To the Consulting Engineer for Railways.
„ Manager, East Coast Railway.
„ A. [illegible] Esq.

ENDORSEMENT—No. Ry., dated September 1898.

Forwarded.

(By order.)

FJS
Joint Secretary.
6/9/98

Exd. T. K. Narayana Aiyangar.

RAILWAY.

Government {1898} of Madras.

PUBLIC WORKS.

Recd. } 1898. Enclosures
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G.O., Nos. , Ry., September 1898.

SEPTEMBER.

SERIAL
No. 48

No. 102/W

Print

College of Engineering Workshops,
Madras,
Dated 24th August 1898.

From
A. CHATTERTON, Esq.,
Professor of Engineering,
College of Engineering,
Madras,

3942
24.8.98

To
The Consulting Engineer
for Railways
Madras.

Enclosures. 2.

3 S/p

Sir,

In reference to your No. 1847 of the 23rd June 1898, I have the honour to forward a statement showing the results of a number of tensile tests which I have made on specimens cut from the Copper tube plate of one of the East coast Railway Locomotives.

2. Each specimen was carefully cut out of the plate by drilling a series of small holes and cutting through the intervening metal with a saw. The strips thus obtained were then put into a shaping machine and cut to a shape suitable for testing with

with the exception of No. 4, which was turned in a lathe. The position from which each test piece was taken is clearly shown in the sketch attached.

3. In four out of the 5 tests the modulus of Elasticity was measured and in all the elastic limit was noted. Although there is a considerable variation in the values obtained from the different tests, they may all be considered satisfactory, whilst those from No. 4 are very good. Specimen No. 3 unfortunately failed at a minute flaw near one of the shoulders, but there is otherwise nothing in its behaviour to show that the quality of the metal was in any way inferior. The Modulus of Elasticity obtained for No. 1 is very high. This specimen was nearest to the line of fracture in the plate and the corresponding piece cut out on the opposite side of the plate has also a very high value of Elasticity.

4. I am unable to undertake the chemical analysis of the copper plate nor do I

think it is necessary as the mechanical tests reveal no defect in the quality of the copper.

5. The broken test pieces are retained in the Laboratory, also the copper tube plate pending the receipt of instructions as to their disposal.

I have the honour to be
Sir
Your most obedient Servant
Alfred Chatterton
Professor of Engineering

EDUCATIONAL DEPARTMENT.

College of Engineering.

From

THE PROFESSOR OF ENGINEERING,
COLLEGE OF ENGINEERING,
Madras,

To

No.

Dated
Despatched
Received
189

ENCLOSURES.

Subject.

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2 3942/98
102/W 24. 8 98
Chatterton Esqre
Professor of Engg
College of Engg. Madras

5 B2

Colleg of Engineering – Wo shops – Madras.

Statement showing the results of Tensile Tests made on Specimens cut from the Copper Tube plate of one of the East coast Railway Locomotives –

Number	Section	Dimensions inches		Area	Length on which Elastic extension was measured	Extension in 1/10000 " for a load of one ton	Modulus of Elasticity in tons	Elastic Limit in tons	Elastic limit in tons per sqr inch	Maximum load in tons	Maximum load in tons per sqr inch	Extension in 10 inches	Extension per cent	Contracted dimensions inches		Contracted Area	Contraction of Area per cent	Remarks
		Breadth	Thickness											Breadth	Thickness			
1	Rectangular	0·731	0·305	0·226	8·387	42	8624	1·70	7·52	2·89	12·79	3·03	30·3	0·555	0·210	0·1165	48·5	
2	– do –	0·821	0·595	0·488	8·375	36	4767	3·44	7·05	6·33	12·96	3·31	33·10	0·66	0·47	0·310	34·5	
2.a	– do –	0·751	0·598	0·467	–	–	–	2·75	5·89	6·20	13·28	3·375 ·x·	42·2	0·570	0·440	0·2506	46·3	
3	– do –	0·756	0·228	0·1722	8·31	74	6528	1·18	6·86	2·071	12·03	1·781	17·81	0·670	0·180	0·1205	31·0	Broke at a slight flaw outside the guage points
4	Circular	Dr 0·880		0·6082	8·39	24	5745	4·88	6·58	8·25	13·57	4·35	43·5	Dr 0·625		0·3068	49·6	

·x· In this case the extension was measured on a length of 8 inches

Alfred Chatterton

Professor of Engineering

Madras

24 August 1898

A.R. Get
the [illegible]
in Saran Shops
[illegible] G.O's
J.R.
26/10

18

Read again G.O. No. 290/91 Ry. dated 21st Feb. 98.
Read also the following paper.

Cracked Tube plates of the heavy compound engines of the East Coast Railway.

My first reference to this subject will be found in para 16 of the Inspection Report of the E.C.Ry. for the 2nd half of 97 which is incorporated in G.O. No. 206, 207. R. dated the 4th Feb. 98. I subsequently wrote a special Report on this subject which issued under G.O. No. 290. Ry. dated 21st Feb. 98. During my half yearly inspection in July last I received a report by the Loco. Supdt. E.C.R on this subject, under cover of the Manager's letter No. 5350 dated the 2nd July 98. I personally inspected what was being done about the tube plates at the Waltair shops, and wrote what I had then to say in para 16 of my Inspection report which accompanies G.O. No. 981. Ry. dated 2nd Aug. 98. My surmise that nothing was wrong with the copper has since been confirmed by the accompanying report of Mr. C. Chatterton, at least so far as its mechanical properties go.

I have been in demi official correspondence on the subject with Mr. C.E. Carde Loco. Supdt of the Burma Railway, and he has told me that Mr. W. Stroudley late Loco. & Carriage Supdt. London Brighton & South Coast Ry. found that no relief w given by the bending of tubes unless they were bent at least a full diameter ou of the straight. Mr. Cardew also kindly referred me to much that has been written on this subject in the Proceedings of the Locomotive & Carriage Committee, India, an elsewhere.

All anxiety which may be felt as to loss of strength resulting from the omis of one, or possibly two, of the front rows of vertical side stays, may be obviate by the use of either Wehrenfennig's or Leach's flexible stays. The form will be found described at pages 138-139 of Vol. VI, and the latter a

2 P

pages 65–66 of Vol II of the Locomotive and Carriage Supdt's proceedin

Mr Carden tells me that the Rayapetam Madras Railway had great trouble with their fireboxes until they adopted Leach's stays. These latter are said to be an improvement on the older system of Wehrenfennig sometime "Chief Engineer of Traction and Materials on the N.E. State Ry. of Austria," believed ~~stated~~ to have been described in "The Engineer" about Nov. 97. The pages above referred to in ~~Vol~~ Vol. VI of the Proceedings of the L & C Supdts. give the history of a Locomotive fitted up on Wehrenfennig's system by Mr Carden on the Wardha Coal Railway. C.P. in 18 In 1892 Mr Carden fitted the locomotives of the Burma Ry. with Leach's system and they have run very well ever since. Mr Carden however favours J. B. Stone & Co's new system rather than either of the above, because it is cheaper and needs only the ordinary holes in the plates as used for common stays, whereas both the other systems ~~#~~ need large special holes for carrying washers. Much valuable information on the subject of tube plate trouble will also be found at pages 94–101 of Vol. V of the Progs. L & C. Committee

26 August 98

Francis J.E. Spring M.I.M.E.
Senior Govt. Inspr. of Railways

Enclosure.

Letter from A. Chatterton Esq. Professor &c. —
" To The Con. Engr. for Rys. Madras
Dated Madras. 102-W. Aug 24th 98.
with its enclosure. Print

Order. ~~[illegible]~~ No — 1142 Ry dated the 16. 9. 98.

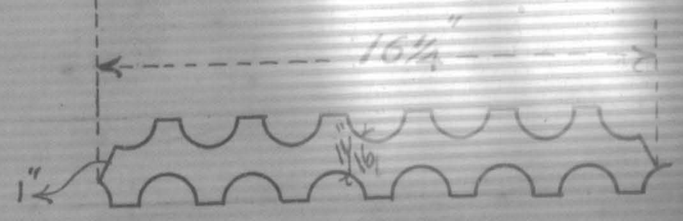
Ordered that a copy of the above report be forwarded to the Govt. of India in continuation of G.O. No. 290. Ry. dated the 21st Feb. 98.

Forwarded

H.E. no: 1143 Ry of 16. 9. 98.

To Con Engr &
2. Manager S.C. Ry &
A. Chatterton Esqr &

No. 3.



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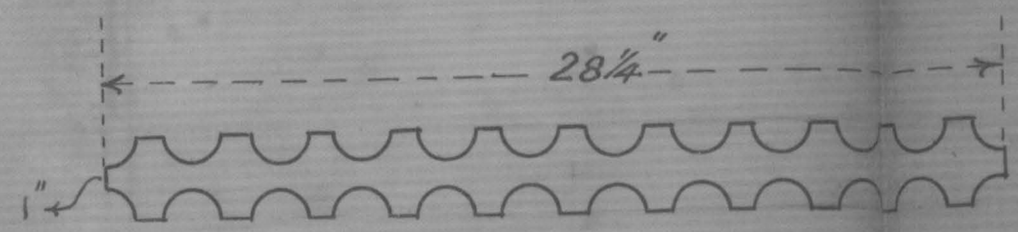

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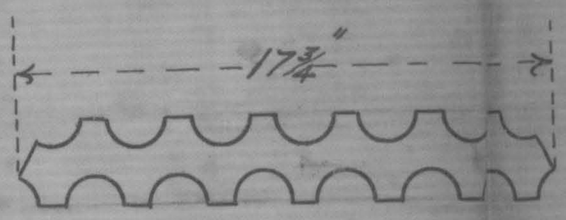

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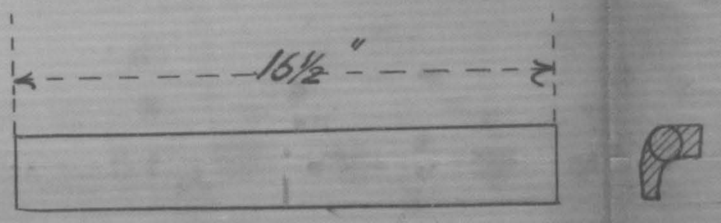
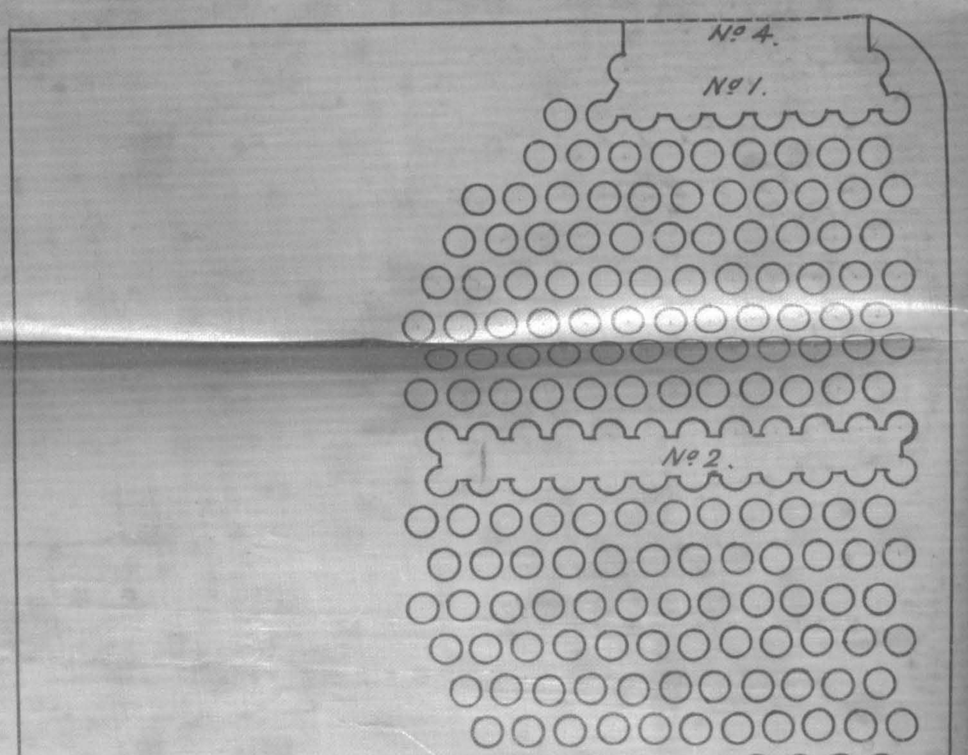
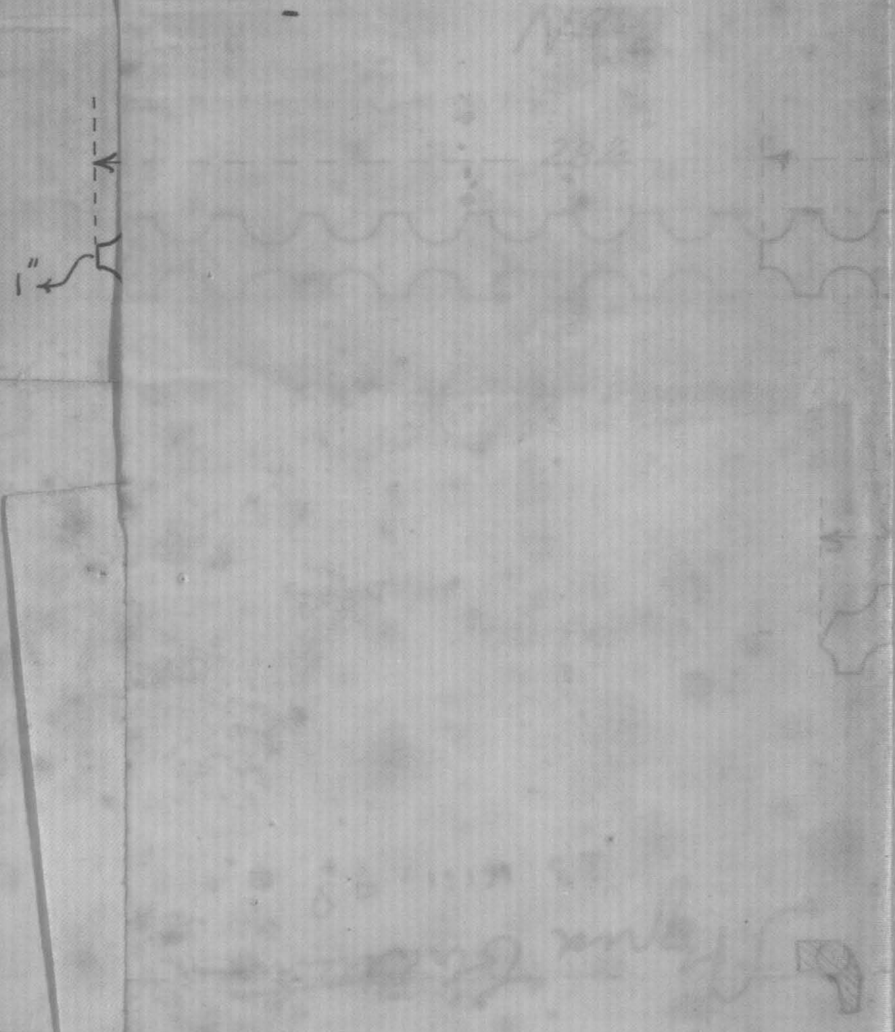


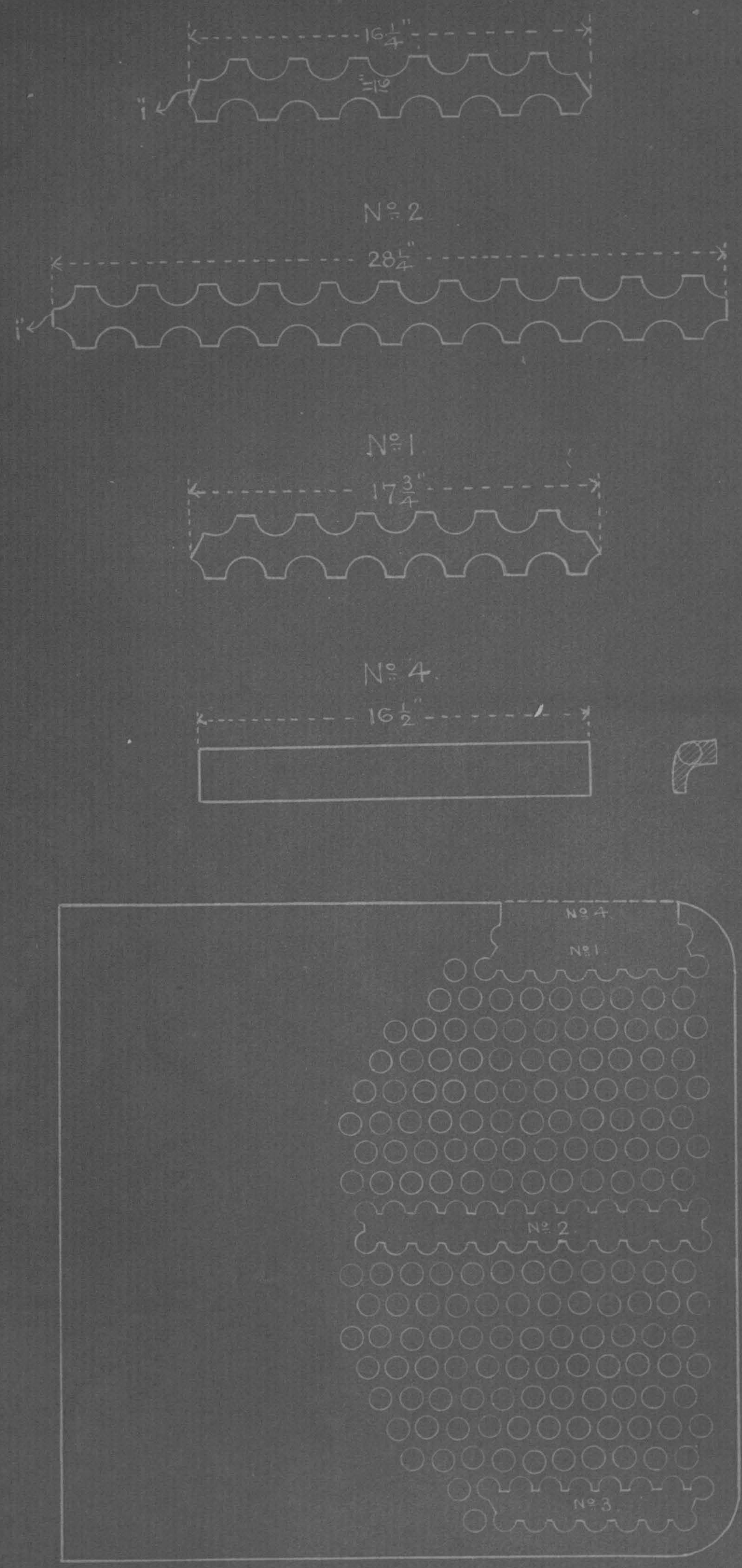


Alfred Chatterton
23. VIII. 98.



3942/98
24-8-98
6 pr: Professor
Engg:
Engg: Madras

Enclosure



(Sd) ALFRED CHATTERTON
23-8-98