M.R.O. 1—10,006—28-2-50.

(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. 2427-28 Press
B.P.—No. Mis.—

Dated 13-9-C876 —195—

Not to be folded or roughly handled

No. 163. Read the following letter from Captain G. P. SKIPWITH, R.E., Assistant Secretary to the Government of India, Public Works Department, (Civil Works—Miscellaneous), to Major-General G. W. WALKER, R.E., Secretary to the Government of Madras, Public Works Department, dated Simla, 29th August 1876, No. 276-M.:—

In compliance with the request made in your letter, No. 16, of the 4th ultimo, I am directed to forward herewith copy of the specification of Mr. Bradford Leslie's patent roof.

Specification of Improvements in the construction of Arches applicable to Roofs, Floors, and Bridges, or other Arched Buildings.

This invention consists in the formation of arched roofs, floors, and bridges, &c., by a combination of iron, tiles, or stones, in such a manner that the usual centring required for building masonry arches is dispensed with, at the same time that strength, lightness, and economy are attained in a very high degree.

2. Arched ribs of bar-iron are fixed at regular intervals across the area to be covered or spanned. The ends of these ribs may be built into masonry or brickwork, or may be secured to wall-plates of timber or iron by bolts or rivets, or in any other manner that may be convenient, such wall-plates resting upon piers, abutments, walls, or arcades, or fixed to the top of columns of metal, timber, stone or brick.

3. The inventor recommends the adoption of bar-iron of the section of an inverted letter (T) thus (⊥), but double angle-iron rivetted back to back, or single angle-iron with a flat bar rivetted on the bottom of it to form a (⊥) shaped section or single angle-iron placed like an inverted letter (L) thus (⅂), or in small spans, flat bar-iron may be used. In short, the section of iron to be used depends greatly on the description of iron available.

4. To keep the ribs straight and parallel during construction, and to preserve the proper interval between them, inner longitudinal ridge pieces or purlins of bar-iron or timber may be fixed temporarily or permanently to the underside of the arched ribs at the crown of the arch, and at the haunches if required; and in arches of large span, these ridges or purlins may be temporarily supported on props to preserve the correct versed sine or rise of the arch during construction.

5. In arches of very large span, simple ribs of bar-iron would not of themselves afford a sufficient degree of vertical stiffness. In this case the necessary amount of vertical stiffness may be obtained by introducing, at intervals of from 6 feet and upwards, a stiffening rib of increased vertical depth formed by combining top and bottom angle or ⊥ irons with a vertical web-plate or lattice bracing. The ridge pieces or purlins being secured to such stiffening ribs, will afford the necessary amount of support to the ordinary intermediate ribs.

6. Tie-bars are required at intervals to prevent the abutment walls or columns from spreading outwards, unless these latter are strong enough to resist the thrust of the arch, or the thrust may be counteracted or neutralized by adjoining arches, floors, or roofs.

7. Upon that surface of the (⊥) iron or other bar-iron used for the ribs, which is horizontal in transverse section and starting either side from the wall or wall-plates as an abutment, stones or tiles spanning the interval between each pair of adjoining ribs are laid in close contact with each other until they meet in the centre. The arch of stones or tiles so formed is set in cement or mortar.

8. If the arch is intended for a roof, a second layer of tiles or stones set in cement or mortar, or a thickness of well-beaten concrete may be laid on top of the first layer, or any of the ordinary methods may be adopted to make the roof water-tight.

9. If the arch is intended for a floor, the spandrils may be closed in by building spandril walls over the iron-ribs; the intervals between the spandril walls being covered by tiles or stones, forming a level floor or terrace.

10. If the arch is intended for a bridge to carry heavy moving loads, one or more arched rings of masonry or brick-work may be built on top of the first layer of tiles or stones, and, if necessary, the spandrils may be filled up with a backing of concrete. By this means arches of great strength may be built without the ordinary centring being required.

11. The inventor does not claim as part of this invention the application of ⊥ iron or other bar-iron to support by its transverse strength the covering of roofs or floors, as bergers or purlins carried by beams, joists, or rafters are used in ordinary flat or trussed roofs or floors.

12. That which the inventor does claim is the application of materials of the scantling ordinarily used for bergers or purlins to form arched ribs, spanning the total width to be covered or bridged, thereby affording a convenient means of erecting a thin arch of tiles, stones, or brick-work without the centring usually required.

13. It is an essential feature of this invention that while the iron-ribs by themselves, in some cases, might not possess sufficient lateral stiffness to resist the thrust due to their arched form, and, in the same manner, the arch of tiles or stones alone would be deficient in the vertical stiffness necessary to support unequal strains, the combination of the iron-ribs with the tile or stone panelling between them presents a structure of extraordinary strength and stiffness.

14. Thus the deficiency of lateral stiffness in the arched iron-ribs is perfectly obviated by the confinement of the vertical web of the ⊥ iron between the panelling of stones or tiles on either side; and the want of vertical stiffness in the stone or tile arch is supplied by its combination with the arched iron-ribs. On this account, if a joint or joints are unavoidable in the arched iron-ribs, the vertical flanges or webs should be scarfed with a long lap, or the joint should be covered by a piece of ⊥ iron ar angle-iron rivetted to the underside of rib, so as to preserve the vertical stiffness as much as possible.

15. This system of arching, when applied to roofs and floors, has many advantages, among which are strength, durability, lightness, facility for drainage, security in case of settlement in the supporting walls, economy in the saving of the main beams, joists, or rafters required for ordinary floors or roofs, and in saving the centring required for ordinary arches, and it has the advantage of being very expeditiously constructed.

BRADFORD LESLIE,
Patentee.

No. 164 & 165. ORDER THEREON, 13th September 1876, No. 2,427.

CIVIL WORKS, No. 11.

ORDERED that the following letter be sent:—

(Here enter No. 2,428, dated 13th September 1876.)

(True Extract.)

(Signed) G. W. WALKER, Major-General, R.E.,
Secretary to Government.

Exd. E. C. Shunker.

Spare Copies

PUBLIC WORKS DEPARTMENT,
FORT ST. GEORGE, 13*th September* 1876.

No. 166.

No. 2,428.

FROM

MAJOR-GENERAL G. W. WALKER, R.E.,
Secretary to the Government of Madras,
Public Works Department,

To

THE SECRETARY TO THE GOVERNMENT OF INDIA,
Public Works Department.

CIVIL WORKS, No. 12.

SIR,—With reference to circular from the Government of India, No. 31, dated 1st June 1876, I have the honor to state that the method of roofing patented by Mr. Bradford Leslie does not appear to have been attempted in the Madras Presidency.

I have the honor to be,
Sir,
Your most obedient servant,

Colonel,
Offg. Under Secy. to Govt., P.W.D.,
for *Secretary to Government.*

Exd. E. C. Shunker.

Spare Copies

58

No. 276 M.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

Civil Works.

Miscellaneous.

All communications should be addressed to the Secretary.

To,

The Secretary to the Govt. of Madras.

Public Works Department.

Simla, 29th August 1870.

Sir,

In compliance with the request made in your letter No. 16 of the 4th ultimo, I am directed to forward herewith copy of the Specification of Mr. Bradford Leslie's patent roof.

I have the honor to be,

Sir,

Your most obedt. servant.

Jas. Thompson Capt. R.E.

Offg. Secy. to the Govt. of India.

Ed 4-7-76 No 416 misc

P.W.D.
4 SEP 76
No 1404

No 163

Ed Dept. Rec'd 13-9-76
Despd 6 dt 7-9-76

No 2427 Public Works Department. 724

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the 13th Septr 1876

Read the following :—

From
The Govt of India - (M&E No 276 Md/29th Augt 1876)

Ordered that the following letter be sent.

(M&E No 2428 d/13th Sept 76)

To The Secretary to the Government India P. W. Dept.

Sir, With reference to Circular from the Government of India No 31 d/1st June 1876, I have the honor to state that the method of dropping patented by Mr Bradford Leslie

does not appear that
been attempted in
the Madras Presidency.

Desp 28/9/18

163/68

6404

Govt. of {1876} Madras.

PUBLIC WORKS.

To

the Secy to the Govt of India

Dated

Issued

Read *Encl.*

G. O., 13th Septr 1876, No. 2427
2428

Nos. 163–165
167

Mr Bradford Leslies Patent roof – Passing orders on letter from the Govt of India forwarding copy of the correspondence ——

Ent. in Reg.
29-9-76

Statins that the method of roofing patented by Mr. Bradford Leslie does not appear to have been attempted in the Madras Presidency –

Secret.