

- (1) பக்கங்களின் எண்ணிக்கை 12
 (2) புதுக்கித் திருப்பிய நாள் 10-90
 (3) ஆதாரங்குறிப்பவர் சுருக்கொப்பம் 100

தமிழ்நாடு ஆவணக் காப்பகம்.

(19)

தமிழ்நாடு அரசு

P.W.D. துறை

அரசாணை எண். மு. கோப்புத் தாள் எண்.	2441	அச்சகம் பலவகை
நாள் :	4-9-1889	198

மடிக்கவோ கண்டபடி கையாளவோ கூடாது

6 sheets 57 1/2 sheets

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Enclosure to P. W. D. letter No. 1110 G., dated the 18th April 1889.

A new system of punkah pulling by hand machines, patented by Mr. Charles Ewing, has recently been introduced in the Offices of the Comptroller-General and Accountant-General, Bengal, in Calcutta. It is thought that the system may be usefully employed in large Offices, Barracks, Hospitals and other buildings, where a large number of punkahs swing together simultaneously.

2. The following description of the machine and of the manner in which it is worked was published in *The Indian Engineer* of the 28th July 1888:—

The machine is adapted for use in connection with ordinary pole punkahs, but as one machine can pull four times as many punkahs as a coolie is usually employed upon, it is necessary to pay a little attention to the means of suspension and connection. In the Treasury Buildings, the number of punkahs pulled by one machine is sixteen, and if these sixteen punkahs were connected in the usual manner with rope, the slack and spring would have to be taken out of fifteen connections before the 16th punkah would be moved. To avoid this Mr. Ewing uses wire connections, in which there is no appreciable spring or slack, and to ensure the whole of the sixteen punkahs swinging backwards and forwards regularly with a full swing, three of the number are suspended by means of gas tubes, bent into the form shewn in our illustration (see diagram). These hangers rest upon knife edges, and at their upper ends, carry a solid bar of the same length as the punkah pole, fitted with two eyes which permit of its being slid into position upon the hangers, where it is clamped with set screws. A light stay is added, as shewn, to stiffen each hanger. The object of this counter-weight will be readily perceived on reference to the accompanying diagram, and its effect can be modified, according to the number of punkahs in use, by altering its position upon the hangers.

The punkahs being hung, connected together with wire, and provided with a sufficient number of the regulating hangers to ensure a full and regular swing, we will examine the method in which the machine imparts the necessary motion. As shewn, the machine consists of a pair of A frames braced and tied together, forming a substantial framing, which can be attached to the floor by means of angle brackets and wood screws. Upon this frame are fixed two plain bearings carrying a $1\frac{1}{2}$ inch diameter shaft, rotated by means of a crank and wooden handle as shewn. At one end of the shaft, is keyed, eccentrically, a cast-iron pulley 2 feet 3 inches diameter, by means of which the pulling rope of the punkahs is actuated. The rim of the pulley is not of equal width for the whole of its circumference, and varies from 4 inches in the widest to $\frac{1}{2}$ an inch in the narrowest part, and, moreover, the face is "drunken." The action of the wheel is as follows:—The pulling rope from the punkahs being led over a suitable pulley, is attached to the rim of the drunken eccentric at its widest part by means of the thimble shewn in detail. The punkah hangs in a normal position at the point marked A in the diagram, and when in that position the handle of the machine is at A. While in this position the pulling-rope from the punkahs is fixed to the wide part of the rim of the eccentric wheel. Upon rotating the latter, the rope coils itself upon the rim of the wheel, moving the punkah to the position C, and at the same time a lead weight, D, fixed upon that position of the rim of the wheel which was uppermost at the commencement of the stroke, descends, and by its weight assists to overcome the resistance of the punkahs. By the time the punkahs have reached the point C, the handle of the machine has arrived at the point C, and the weight D, which was formerly at the top of the wheel, is now at the bottom, and the rope in coiling itself upon the rim has reached the edge of the narrowest portion, aided by the bevel of the "drunken" part of the wheel, and falls off. The punkahs immediately commence to swing backward, until they reach the point A, and the wheel continuing to be rotated, the Weight D again reaches its highest position, and all is in readiness for another stroke. The handle can be turned by an ordinary coolie, and while it is continuously rotated, the punkahs are compelled to swing regularly to the full extent that their suspensions admit of.

3. There are altogether thirteen machines working in the Offices above-mentioned: the following statement shows the distribution of the machines, the size of the punkahs pulled, and the number of coolies which used to be

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employed before Ewing's punkah machines were introduced and the number now employed :—

Distribution Statement.

	Office of	Situation.	NUMBER OF MACHINES.		Number of Punkahs.	Each measuring in length.	NUMBER OF COOLIES.		
			Class A.	Class B.			Formerly employed.	Estimated to be required	
								Now.	Later on.
First storey	Accountant-General, Bengal	South	1	...	9	5 of 16 feet 4 of 22 "	5	3	2
Second storey	Comptroller-General	East	1	...	16	10 feet	7	3	3
	Forests Savings Bank		1	...	15	10 "	7	3	3
	General and Book	South	...	1	10	10 "	5	3	2
	Comptroller, India Treasuries	West	...	1	20	10 "	8	3	3
	Book and Account Current		...	1	20	10 "	8	3	3
	Treasury Accounts	East	...	1	16	10 "	9	3	3
Third storey	Accountant-General, Bengal—	South	...	1	15	10 "	6	3	3
	Budget Section		...	1	12	10 "	7	3	2
	T. M. and Record	West	...	1	12	10 "	7	3	2
	T. A., T. B. and	East	1	...	15	13 of 10 feet 2 of 9 "	6	3	3
	T. C. Sections		1	...	14	12 of 10 " 2 of 9 "	5	3	3
	T. D. and contingent Section	East	...	1	18	16 of 10 " 2 of 9 "	6	3	3
	Record	North East	1	...	10	9 of 10 " 1 of 9 "	3	3	2
	Local Fund		1	...	11	9 of 10 " 2 of 9 "	3	3	2
			7	6	181	...	77	39	34

The coolies were formerly paid Rs. 4 a month each, but it will probably be necessary to pay the men working the machines a rather higher rate.

It is estimated that when the men are accustomed to the work, it will be necessary to employ 34 men at Rs. 5 a month. So that the monthly charge will be Rs. 170, as compared with Rs. 303, which was the cost of 77 men at Rs. 4. The saving in these offices will therefore be Rs. 133 monthly.

4. The machines have cost :—

	Rs.
Royalty on each to Patentee	100
Manufacturing charge	130
Total	230

or Rs. 2,990 for the whole number erected. So that, if the punkahs are worked for seven months in the year, the capital cost will be saved in about four years after making some allowance for maintenance.

EWING'S PATENT PUNKAH-PULLING MACHINE.

Reprinted from The Indian Engineer, 25th July, 1888.

In our issue of 31st March last, we briefly noticed this invention, concerning which we have since received fuller information, and the drawing published herewith. We have, moreover, had an opportunity of seeing the machine at work in Treasury Buildings, and can testify to its practical usefulness.

The machine is adapted for use in connection with ordinary pole punkahs, but as one machine can pull four-times as many punkahs as a coolie is usually employed upon, it is necessary to pay a little attention to the means of suspension and connection. In Treasury Buildings, the number of punkahs pulled by one machine is sixteen, and if these sixteen punkahs were connected in the usual manner with rope, the slack and spring would have to be taken out of fifteen connections before the sixteenth punkah would be moved. To avoid this Mr. Ewing uses wire connections in which there is no appreciable spring or slack, and to ensure the whole of the sixteen punkahs swinging backwards and forwards regularly with a full swing, three of the number are suspended by means of gas tubes, bent into the form shewn in our illustration (see diagram). These hangers rest upon knife edges, and, at their upper ends, carry a solid bar of the same length as the punkah pole, fitted with two eyes which permit of its being slid into position upon the hangers, where it is clamped with set screws. A light stay is added as shewn, to stiffen each hanger. The object of this counterweight will be readily perceived on reference to the accompanying diagram, and its effect can be modified, according to the number of punkahs in use, by altering its position upon the hangers.

The punkahs being hung, connected together with wire, and provided with a sufficient number of the regulating hangers to ensure a full and regular swing, we will examine the method in which the machine imparts the necessary motion. As shewn, the machine consists of a pair of A frames braced and tied together, forming a substantial framing, which can be attached to the floor by means of angle brackets and wood screws. Upon this frame are fixed two plain bearings carrying a 1½-inch diameter shaft rotated by means of a crank and wooden handle as shewn. At one end of the shaft is keyed, eccentrically, a cast-iron pulley, 2 feet 3 inches diameter, by means of

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which the pulling rope of the punkah is actuated. The rim of the pulley is not of equal width for the whole of its circumference, and varies from 4 inches in the widest to $\frac{1}{2}$ an inch in the narrowest part, and, moreover, the face is "drunken." The action of the wheel is as follows:—The pulling rope from the punkahs being led over a suitable pulley, is attached to the rim of the drunken eccentric at its widest part by means of the thimble shown in detail. The punkah hangs in a normal position at the point marked, A in the diagram and when in that position the handle of the machine is at A. While in this position the pulling-rope from the punkahs is fixed to the wide part of the rim of the eccentric wheel. Upon rotating the latter, the rope coils itself upon the rim of the wheel, moving the punkah to the position C, and at the same time a lead weight, D, fixed upon that position of the rim of the wheel which was uppermost at the commencement of the stroke descends, and by its weight assists to overcome the resistance of the punkahs. By the time the punkah has reached the point C, the handle of the machine has arrived at the point c, and the weight D, which was formerly at the top of the wheel, is now at the bottom, and the rope in coiling itself upon the rim has reached the edge of the narrowest portion, aided by the bevel of the "drunken" part of the wheel, and falls off. The punkahs immediately commence to swing backward, until they reach the point A, and the wheel continuing to be rotated, the weight D again reaches its highest position, and all is in readiness for another stroke. The handle can be turned by an ordinary coolie, and while it is continuously rotated, the punkahs are compelled to swing regularly to the full extent that their suspensions admit of.

It will be seen, therefore, that Mr. Ewing converts the oscillating movement of the punkah into a continuous rotatory motion, and, instead of lazily exerting a pull of a few inches, the punkah coolie is obliged to give the punkahs a full and regular swing. To those who do not trouble themselves with the mechanical points of the machine, it will be doubtless considered that this compulsion of the coolie, to perform his work efficiently, is the main point of the invention. So in effect it is. A punkah as ordinarily suspended hangs perpendicularly, and beyond this perpendicular position the punkah coolie rarely, if ever, allows the punkah to go in its backward swing. But for the resistance of the air, a punkah would, of its own weight, if allowed to do so, swing nearly as far in a backward direction as it is pulled in a forward direction by a coolie, and making due allowance for the air resistance

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it would certainly swing one-half or two-thirds of this distance. This knowledge is, however, beyond the comprehension of the ordinary coolie, possibly owing to the reason, that the longer reach required by his arm in letting the punkah swing back, would necessitate a standing instead of a sitting posture, a change which would interfere with the somnolent habits of such coolies as are unable to sleep while standing. Mr. Ewing's invention, however, compels the coolies to give a regular and sufficient swing to the punkahs, and the advantages and disadvantages of the Bengal and Bombay sides of the punkah need no longer be considered.

Another feature of Mr. Ewing's invention is, that it secures the "jerk" which is so necessary a feature in punkah pulling. The weight of the punkahs when released by the sudden falling of the rope from the face of the eccentric pulley, aided by the counterweights upon the regulating hangers, compel the punkahs to swing backwards with a sufficient jerk.

In barracks and large offices it would, no doubt, be found advantageous to apply a small motor and dispense altogether with coolies, effecting a still greater saving over the present mode.

The amount expended in pulling soldiers' punkahs during the hot season of 1886, in the Military Presidency of Bengal alone, is stated on page 27 of the Bengal Military Budget Estimate for 1886-87 to have been Rs 3,16,000. What the total would be for the whole of India, not only for soldiers' punkahs, but for public offices and institutions, is a matter for conjecture; but now that a means is at hand whereby this expense can be reduced by, say, 75 per cent., there can be little doubt that a prosperous future awaits the inventor of the Patent Punkah-pulling Machine. The Government, the Military Authorities, and others interested in this important reduction of public expenditure, move with the gravity, which is the birthright of their high office; but it is, however, a fact that the original machine has been working steadily and satisfactorily since the 17th March last in the Treasury Buildings, and that on the 15th May sanction was received from the Government of India to the purchase and erection of other 12 machines in the same building.

We understand that Mr. Ewing is engaged upon the construction of a self-acting punkah for domestic use, which will pull a four-feet punkah for eight hours. The success this gentleman has achieved in his present invention, warrants reasonable hope for the advent of the self-acting machine.

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No 2054 Mr. A. J. 30. VII. 89.

Punkhas: Letter to the
Government of India
forwarding letter from
Captain Baddeley R.E.
reporting on the
invention of Mr. J. D.
Sil as compared with
mechanical contrivances
in use at Madras for
working -

can

Mr. Ewing's Patent
for working Punkhas
does not appear to
have been seen
before
this machine
has been used
J. D.
28. VIII. 89

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RM

This is quite a
different thing to the
known apparatus
referred to in the
G.O. quoted or else.
but I think we
have already seen
a circular similar
to this from
Swings & Co.
from Michigan
Anderson & Co.

See
Paul
Papers from
up D.T. 30-8-89

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EWING'S PATENT PUNKAH-PULLING MACHINE.

FIG. 1.
SECTION THROUGH A. B.

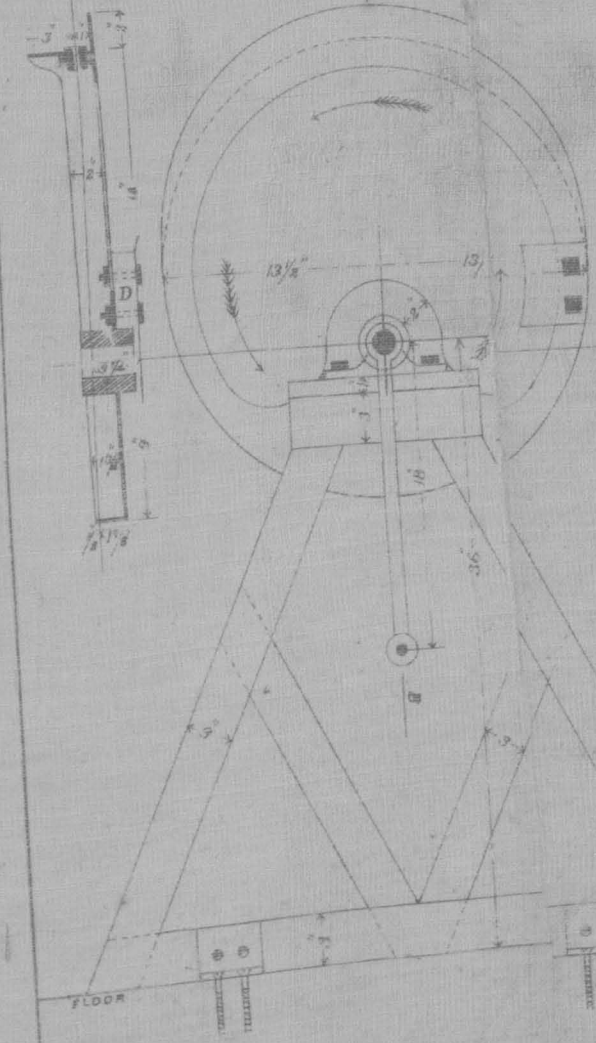


FIG. 2.
SIDE ELEVATION.

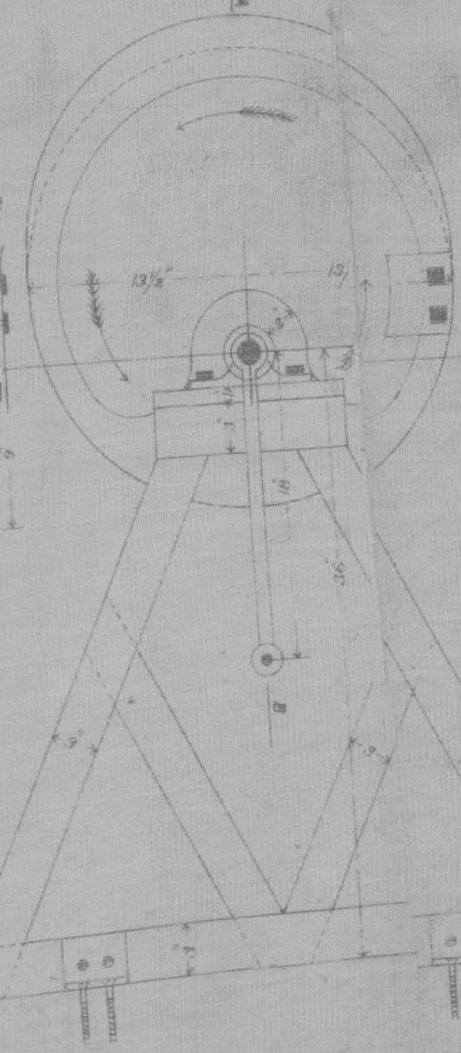
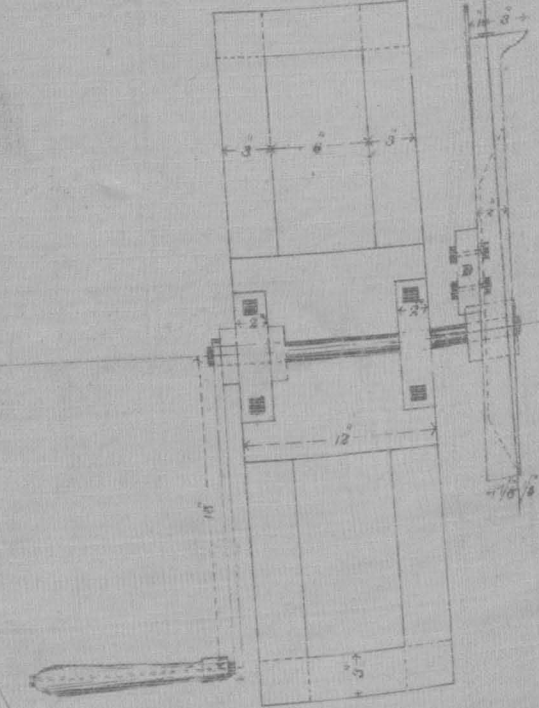


FIG. 3.
PLAN.



SCALE.
1 Inch = 1 Foot.

Note.—Travel of punkah-rope = $\frac{1}{2}$ circumference of eccentric (42.5 ins.) + length of long arm (15 ins.) or 60.5 ins. D.O.D.D. Lead weight to suit number of punkahs to be pulled.

FIG. 4.
FRONT ELEVATION.



DIAGRAM

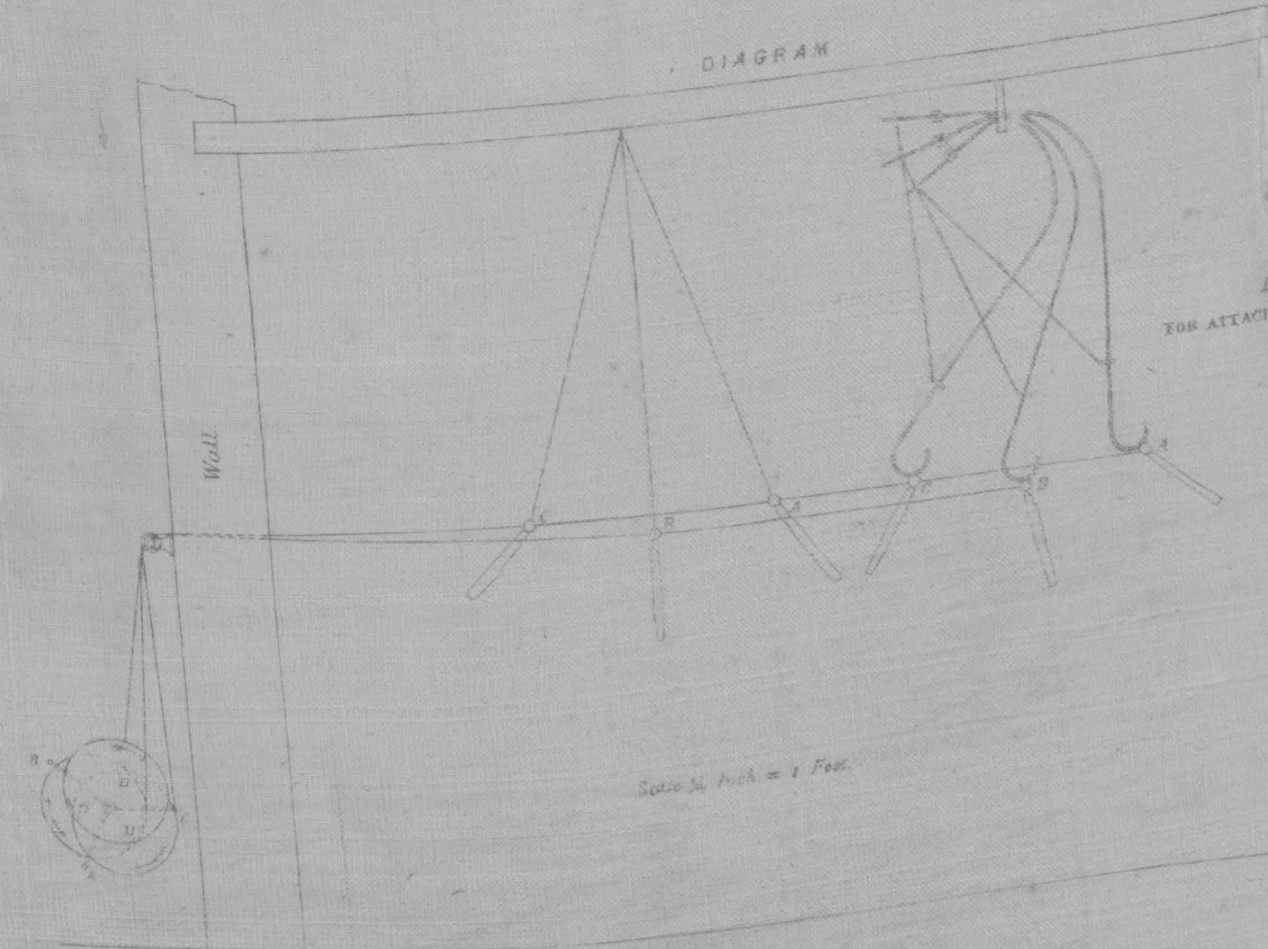
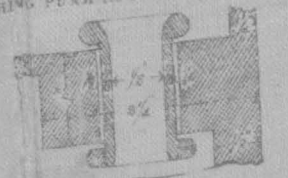


FIG. 5.
LOOSE THIMBLE C.
FOR ATTACHING PUNKAH-ROPE TO ECCENTRIC



SCALE.
Half full size.

- A.A.A. Position of handle and punkahs at commencement of pull.
- B.B.B. Ditto when punkahs have fallen to a vertical position.
- C.C.C. Ditto when punkahs have been pulled up to their furthest extent and rope is falling off drunken eccentric.
- D.D.D. Lead weight being raised by punkah cozie when punkahs are swinging back and which doubles his power when punkahs are being pulled up.

MACKNIGHT, ANDERSON & CO.,
Agents for
Charles Ewing's Patent
PUNKAH-PULLING MACHINERY.



Sir,

In continuation of our communication, dated 7th June last, we have now the pleasure to hand you a copy of the circular letter therein referred to as issued to the Local Governments, &c., by the Hon'ble Sir Charles Elliott, Public Works Member of Council, together with the drawings to which he directs attention.

We have the honour to be,

Sir,

Your obedient Servants,

Macknight, Anderson & Co.

No. 1110 G.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

GENERAL.

To

THE GOVERNMENTS OF MADRAS, BOMBAY, BENGAL, THE NORTH-WESTERN PROVINCES AND OUDH, AND THE PUNJAB.

THE CHIEF COMMISSIONERS OF THE CENTRAL PROVINCES, BURMA AND ASSAM.

THE RESIDENT AT HYDERABAD.

THE AGENTS TO THE GOVERNOR-GENERAL FOR CENTRAL INDIA, RAJPUTANA AND BELUCHISTAN.

THE ACCOUNTANT-GENERAL, PUBLIC WORKS DEPARTMENT.

THE DIRECTOR-GENERAL OF RAILWAYS.

THE CONSULTING ENGINEERS TO THE GOVERNMENT OF INDIA FOR RAILWAYS, CALCUTTA, CENTRAL DIVISION, AND LUCKNOW.

THE DIRECTOR-GENERAL OF TELEGRAPHS.

Calcutta, the 18th April 1889.

SIR,

I am directed to forward for information a description, with a plan, of a punkah-pulling machine patented by Mr. C. Ewing of Barrackpore. It will be observed that the machine has been introduced with success in the Treasury Buildings in Calcutta, and it may be possible, on the ground of economy and convenience, to use it more extensively, if found to be suitable.

I have the honour to be,

SIR,

Your most obedient Servant,

J. H. SADLER, Captain,

Asstt. Secy. to the Govt. of India, Legislative Dept.

In charge, P. W. Dept.

Documents accompanying.

Description of punkah-pulling machine with plan.

No. 1111 G.

Copy forwarded to the several Departments of the Government of India.

J. H. SADLER, Captain,

Asstt. Secy. to the Govt. of India, Legislative Dept.

In charge, P. W. Dept.

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S. C. No. 2128 W. 257
8th August 1897
8th August 1897.

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