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MADRAS RECORD OFFICE

Government of Madras

Public Works DEPARTMENT

G.O. No.	3464	Press
B.P. No.		Mis.
Dated	10 - 12 - 1954	

Not to be folded or roughly handled

No. 186. Read the following letter from Colonel H. DRUMMOND, R.E., Deputy Secretary to the Government of India, Public Works Department, (Railway,) to the Governments of Madras and Bombay, Chief Commissioners of Central Provinces and British Burmah, Consulting Engineers, Calcutta, Lahore and Lucknow, and the Director of State Railways, dated Fort William, 11th November 1874, No. 2,823—30 R. :—

I AM directed to forward copies of a memorandum, specification and lithographed drawings of a patent ratchet dredger designed by Mr. Molesworth for excavating sand, clay, etc., from deep wells, and to state that in all Government works the dredger may be made up as required under the usual rules for Tools and Plant. I am to add that Mr. Molesworth permits the right of using his dredger to the various Guaranteed Railway Companies in India without any payment for royalty.

Molesworth's Ratchet Dredger.

THE Ratchet dredger has been designed to remedy a defect that has been found to exist in dredgers of that class in which the cutting edges or jaws are, after excavation, at the bottom of the machine. In such dredgers (if the complete closing of the jaws is prevented by nodules of kunkur, by grass, or by any other obstacles) the sand, or liquid mud, that has been excavated will run out with the water, during the operation of hoisting the dredger from the well; and it is a very common occurrence to find the dredger, when brought to the surface, either empty, or containing a mere handful of material.

In the Ratchet dredger this defect is remedied by causing the jaws to move after excavation to a horizontal position, or nearly so, thus securing all the material that has been excavated.

The action of the dredger is simple; it is lowered in the position shown in the diagram Figure 1, and on reaching the surface to be excavated, motion is given to the jaws by alternately raising and lowering the lifting chains until the scoops have reached the position shown in Figure 2. A self-acting detent at this juncture throws out of gear one of the pawls; but the action of the other is continued until the scoops reach the position shown in Figure 3, and, as there are no more teeth of the ratchet to be taken up by the pawl, the action ceases, and the dredger is hoisted in this position to the surface.

The emptying of the dredger is made self-acting as shown in Figure 4 by two hooks which are inserted between the jaws. The weight of the dredger as it is lowered causing the scoops to be restored to their original position with relation to each other. Those who use the dredger should familiarize themselves with its action by a few trials on dry ground before they use it in deep wells.

A patent has been obtained for this invention merely with the view of securing its use to the Government of India; and all Government Departments, as well as Guaranteed Railway Companies in India, may use it free of royalty. A more detailed description of the dredger, and the method of using it, is given in the following specification.

Specification of Molesworth's Patent Ratchet Dredger for dredging or excavating materials from deep wells.

The Ratchet dredger is shown in the accompanying drawing. It consists of two scoops, or buckets of convenient form marked J and K; both scoops revolve on the same centre, but the outer scoop revolves freely on the axle or shaft L, whilst the inner scoop is keyed, or otherwise firmly fixed to the shaft.

On the scoop J is fixed the ratchet M, and on the square portion of the axle L is fitted the ratchet N, so that the scoop J must revolve with the ratchet M; and the scoop K must revolve with the ratchet N.

The dredger is lifted by means of chains or ropes P P attached to two pairs of lever-arms R R; each pair of lever-arms being formed of a bent bar. These arms revolve freely on the axle L, and studs on them hold pawls S and T, which gear into the ratchets M and N, respectively; each pawl is formed with a projection marked s and t, respectively, for throwing the pawls out of gear.

Proceedings of the Madras Government, Public Works Department,
10th December 1874.

On the outer scoop is a detent V, so fixed, that, when the cutting edges of the scoop approach each other, it comes into contact with the projection t, and throws the pawl T out of gear.

The inner scoop is furnished with a catch W, so formed as to prevent any rotation of the scoop when in gear, but when the cutting edges rest on the ground, the catch W falls out, leaving the scoops free to revolve. The arms are furnished with a stop Z, which does not allow them to be raised more than 45° from the horizontal line.

Two hooks A and B are provided for opening and discharging the dredger; the hook A is attached by a rope to the shackle of the lifting chains, whilst the hook B is attached at a convenient height by means of a rope which passes round and below the outer scoop and then up to a fixed point in the hoisting derrick or scaffolding.

The mode of using the dredger is as follows: the chains P P are raised until the arms are at about an angle of 45° from the horizontal line, the catch W is put in position; then, the outer pawl T, and, afterwards, the inner pawl S, are thrown into gear; the dredger is then ready to be lowered.

When the dredger reaches the bottom of the well, the cutting edges rest on the material to be excavated; the catch W falls out, leaving the scoops free to revolve, and at the same time the arms fall by their own weight to the horizontal position, taking up a couple of teeth in each ratchet; the lifting chain should then be raised and gently lowered four or five times in succession, gradually increasing the lift each time; the first lift being about 1 foot; the second 1½; the third 2 feet; the fourth 3 feet; and the cutting edges as they close excavate the material between them. On the second lift, the outer pawl T will probably be thrown out of gear by the detent V, and the remaining lifts will act only on the inner ratchet S, so that the outer scoop will revolve, pushing back before it the inner scoop, until the pawl S reaches the last tooth of the ratchet. The dredger must then be hoisted up with the materials excavated; the outer scoop being beneath with its two edges nearly on a level, and the inner scoop nearly in the position it occupied when the catch W was released.

When raised to the surface, the dredger must be hoisted to such a height that the two hooks A and B may be inserted between the cutting edges; a small tipping truck may then be run under the dredger, and the pawl S put out of gear by a blow on the projection s, and thrown back. The dredger must then be slowly lowered, and, by the act of lowering, the hook B will draw back the outer scoop into its original position, thus throwing out the materials into the tipping truck. When the dredger has been lowered so as to bring the catch W sufficiently near to the outer scoop, it is put into gear, the hook A released, the outer pawl T is then thrown into gear, the hook B released, then the inner pawl S is thrown into gear, and the dredger is again ready to be lowered; the tipping truck having been pushed away to allow it to descend. (If preferred, the tipping truck may be dispensed with, and the dredger hauled out sideways to a platform to be discharged as with ordinary dredgers.)
August 19th, 1874.

No. 187.

ORDER THEREON, 10th December 1874, No. 3,464.

RAILWAY, No. 31.

COMMUNICATED to the Chief Engineer for Irrigation, Consulting Engineer for Railways, and all District Engineers.

(True Extract.)

(Signed) G. W. WALKER, Colonel, R.E.,

Secretary to Government.

To all District Engineers.
To the Chief Engineer for Irrigation.
.. Consulting Engineer for Railways.
.. Executive Engineer, Wynaad.

Exd. E. C. Shunker.

Spare Copies

No. 7:1 I.

GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

CIVIL WORKS.

Irrigation.

All communications
should be addressed to
the Secretary.

To,

The Chief Secy to the Government
of Madras, Public Works Department,
Irrigation Branch.

Fort William, 18th December 1874.

Sir,

I am directed to forward, for
information, copies of a Memo. Specifi-
cation, and lithographed drawings of a
patent ratchet dredger, designed by Mr.
Molesworth, for Excavating Sand, Clay,
&c. from deep wells, and to state, that
in all Government works the dredger
may be made up as required under
usual rules for Tools & Plant.

I have the honor to be,
Sir,
your most obedt. Servant
W. J. P. W. P. W. P.
Capt. J. P. W. P. W. P.
Capt. J. P. W. P. W. P.

W. J. P. W. P. W. P.

Office for order No 7364
GOVERNMENT OF INDIA.

PUBLIC WORKS DEPARTMENT.

RAILWAY.

To
THE GOVERNMENTS OF MADRAS AND BOMBAY,
CHIEF COMMISSIONERS OF THE CENTRAL PRO-
VINCES AND BRITISH BURMAH; CONSULT-
ING ENGINEERS, CALCUTTA, LAHORE AND
LUCKNOW; AND THE DIRECTOR OF STATE
RAILWAYS.

Nos. 2823—30 R.

Dated November 11, 1874.

Received — a — 23-11

Enc. 4. ✓

3 Plans ✓

Al. No. 3464-10-12-74.

Forwards copies of a memorandum, specifica-
tion and lithographed drawings of a patent
ratchet dredger designed by Mr. Molesworth for
excavating sand, clay, &c., from deep wells, and
states that on all Government works the dredger
may be made up as required under the usual
rules for Tools and Plant. The dredger may
be used by Guaranteed Railway Companies
without any payment for royalty.

P. W. D. Press.—11-11-74—458.

With Rules

Communicated to the Chief Engineers for Construction, and all District Engineers.

To All District Engineers
" Chief Engineer for Madras
" Chief Engineer for Mysore
" Chief Engineer for Bangalore
" Chief Engineer for Hyderabad

Recd. with drawings to all 11/12/74.

From
No: 7354
The Govt of India
The Joint Secretary to
Govt. P.W.D.

No 7510

Dated 18th of Dec. 74
Recd. 30th of Dec. 74
Recd. 23rd Nov. 74

Forwards copies of memorandum
specifications and lithographed
drawings of a patent ratchet
dredger designed by Mr. Molesworth
for excavating sand, clay &c. from
deep wells & shafts. That on all
Govt works the dredger may be
made up as required under the
usual rules for Tools & Plant.

communicated to all Super-
District Engineers & to the
Chief Engineer for Construction

11/5/75

Wm. J. ...

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Govt. of 1874 Madras.
PUBLIC WORKS.

All Dist. Engrs

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Recd.

Encl. 1

G. O. 10. 10. 1874, No. 444

Nos. 186-187

the usual rules for Tools
and Plant, ^{and adding that} The dredger may
be used by Guaranteed Ry.
Companies without any pay-
ment for royalty, Comm.
to the Chief Engr for Engrs,
Engrs for Ry and all
District Engineers

Molesworth's Patent-
Dredger

Letter from the Govt of India
forwarding copies of a memoran-
dum, specification and litho-
graphed drawings of a patent
patented dredger designed by
Mr. Molesworth for excavating
sand, clay &c. from deep wells,
and stating that on all Govt.
works the dredger may be
made use of as required under