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MADRAS RECORD OFFICE

GOVERNMENT OF MADRAS

Rew DEPARTMENT

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Not to be folded or roughly handled

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Extract from the Journal called
"Engineering" London
Friday, May 25-1878

Straw-burning portable Engine at the
Vienna Exhibition
Constructed by Messrs. Ransome, Sims,
and Head, Engineers, Ipswich,
Essex

On the extensive farms of the
prairies of North and South America,
Steam has hitherto been little employed
for agricultural operations - not
because its advantage over animal
power was disputed, but on account
of the impossibility of obtaining Coal
or wood as fuel for the Engines,
except at a cost which would
render their use almost prohibitive.

In South Russia, the United
Provinces of Moldavia and
Wallachia, and some parts of
Hungary, where a day's journey
may be accomplished without
seeing a tree, Steam machinery
has

has been employed for some time
for the purposes of thrashing and
grinding, in order to meet the demands
of the Export corn market; but the
operation has been carried on
at great cost to the farmer, most of
the wood for fuel being brought in
Carts for a long distance, or if coal
was used it was transported from
the nearest port, where it had
usually arrived from England.

Although Coal and wood
are not indigenous in these Countries,
yet many vegetable products abound,
such as straw, reeds, maize stalks, &c.,
which are capable of generating
sufficient heat to keep up steam
in the boiler, if a method was discovered
to feed them into the furnace in such
a manner that each separate piece
might be exposed to the action of the
fire, and a proper amount of
atmospheric

atmospheric air admitted to produce
continuous Combustion; and as such
fuel is always attainable on the
spot, at almost a nominal price,
it is self-evident that such a discovery
would greatly extend the use of
steam power in these districts.

In some parts of the West Indies
and in Egypt, sugar cane trash, or
megass, has been for some time
used as fuel, but usually mixed
with coal or wood, and in South
Russia and on the banks of the
Dnieper, straw has been burnt
in the portable Engines in various ways;
but the only one which can be admitted
to be successful was the following:-
The bars were taken out of the firebox,
and the Engine was placed on a brick
flue, running diagonally from the
ground to the floor of a pit about
10 feet deep, one end of which was
hermetically sealed to the bottom
of the firebox, and the other
terminated

terminated in a sort of oven, in which the straw was burnt. The heated gases passed up the flue, through the firebox and tubes of the engine to the chimney. This system was injurious to the lower part of the firebox, besides compelling the farmer to bring all his grain in carts to the place where the engine was fixed, instead of taking the thrashing machine alongside each stack, which is a great saving of labour and expense.

To obviate these difficulties, Mr. Schmitt, a Russian Engineer, conceived an idea that straw might be forced into the firebox, either a portable or fixed boiler, in the form of a fan by means of rollers, so that each separate piece would come under the action of the flame, allowing more rapid combustion to take place than

when

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When the straw was fed into the furnace in a compressed state, and burnt in a slow smouldering manner. He communicated his idea to Messrs. Ransomes, Sims, and Heath of Ipswich, who forthwith commenced to make experiments, and after about 15 months of continued trial, this form have at last produced the most perfect engine yet invented for burning straw and other vegetable products.

In some of the early experiments much trouble was experienced in obtaining sufficient atmospheric air through the bottom of the firebox, owing to a deposit of silicious matter which covered the bars with a sort of clinker, and after trying various schemes, the following simple method was found to be the most practical: the bars are placed about 4 in. apart, and between each pair is a blunt knife projecting about $2\frac{1}{2}$ in. above them.

Each

Each Knife is attached to a cross bar
sliding on two guides under the grate,
one end of this bar terminating in a long
handle extending beyond the ash pan.
When the bars require to be cleaned
the fireman moves the knives backwards
and forwards, giving them at the same
time a side action, which cuts out
the clinkers, these falling into the ash
pan, where they are immediately quenched
by a jet of cold water from the feed pump,
thus avoiding any danger from the escape
of the burning ashes in case of windy
weather.

The apparatus for feeding the
Engine is self-acting, and driven by
means of a strap, and steam may
be got up in the same way as with any
other combustible, by attaching a handle
to the feeding rollers and turning them
by hand instead of by steam power.
One man only is necessary to feed the
straw into the Engine, provided the
material is brought down and placed
alongside

alongside the feeding trough. The average
consumption is about four to five times
the weight of Coal, and according to
experiments made, about ten to twelve
sheaves of straw are required to thrash
one hundred sheaves of wheat.

On Monday last we had an
opportunity of witnessing at the makers'
works, at Ipswich, a trial of an Engine
fitted with the apparatus of which we
have been speaking. The Engine was one
of Messrs. Ransomes, Sims, and Head's
ordinary 10 horse power portables, but
that it was provided with a large
firebox than is used for coal burning,
and that the tubes were slightly smaller
diameter than those ordinarily employed.
The straw-burning apparatus was constructed
precisely as shown by our engravings
on the preceding pages, and the straw
burnt was in its natural condition,
and had not been subjected to any artificial
drying process. On first lighting up, the
rollers had of course to be turned by hand
to feed the straw into the firebox, but
this

This is very light labour and can easily
be performed by a boy. In thirty two
minutes from applying a light, the steam
had got up to 20 lbs pressure, and the
steam jet in the Chimney was then
opened. In eight minutes more, or
forty minutes from lighting up, the
steam pressure had reached 31 lbs,
and the engine was then started, the
steam jet being shut off, and the belt
put on to drive the straw-feeding rollers.
The steam pressure then began to rise
rapidly, and in eleven minutes more,
or a total time of fifty one minutes
from lighting up, a pressure of 60 lbs
was reached. Subsequently the pressure
was raised to 70 lbs, and a brake, applied
to the flywheel, was loaded so as to
cause the engine to develop 20 effective
horse power, the speed being 140 revolutions
per minute. With this load steam was
maintained steadily and with the
utmost ease, the whole of the arrangements
working admirably. The Combustion

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of the straw was thorough and complete,
only a very few stray particles of
unburnt material occasionally finding
their way into the ash pan, while
by an occasional use of the rake
or knives already mentioned, the
grate bars were readily kept clear.
The water jets in the ash pan also
thoroughly fulfilled their purpose
of preventing ignited particles from
flying about - an important matter
where thrashing is going on - and
altogether the trial was a most satisfactory
one in all respects.

One of the illustrations which
we give on the preceding page, represents
a perspective view of one of these engines
getting up steam, showing the position
of one man feeding and the other turning
the rollers by hand. The other engravings
consist of a section of the firebox and
an end view. In these views, *a a* are the
rollers fitted with malleable teeth, and
connected with the engine by means
of a pulley, *b*, driven by a strap from the
crankshaft. These rollers make

48 revolutions per minute, and can
be turned by hand when getting up
steam. The movable sliding bluish
knives or rake, cc, attached to a
cross bar, d, slide on guides, ee, below
the grate, as already explained. This
rake can be moved with a forward
and side motion by the stoker by
means of the handle, f, thus breaking
up the silicious crust deposited
on the grate bars, g, while a perforated
pipe, h, is provided for injecting water
upon the burning coals. A shoot, i, carries
any small pieces of ignited straw
back into the ash pan, and j is a wooden
trough to contain the straw which is to
be fed into the furnace, and which can
be removed when the engine is travelling.
The whole apparatus swings on a hinge,
k, and can be taken off in a few minutes,
and the ordinary fire-door substituted
when coal or wood is burned.

A very fine specimen of one of these
Engines is exhibited at the Vienna Exhibition
at Messrs. Ransomes, Sims, and Head's Stand,
where

25/10
where it has attracted great attention.
We consider this to be one of the most
important steps that has been made
in the construction of portable Steam
Engines since their introduction, as they
can now be used in any country where
Vegetable produce be raised, instead
of heretofore being practically restricted
to those countries where coal or wood
can be procured, and a wider extension
is thus given to the opportunities for the
employment of steam power than would
at first sight be thought possible.

(True copy)

R. G. Rose
for the Secretary

W. H. H. H.

PROCEEDINGS OF THE BOARD OF REVENUE.

Dated 24 July 1873.

Read the following

From

No 475
The Superintendent
Government Found.

To

The Secretary to the Board of Revenue

Sir,

Messrs. Ransomes, Sims, and
Head of Ipswich, England, have just invited
my attention to an improvement they
have effected in Steam Engines, whereby
ordinary Portable Engines are enabled
to burn straw and similar material,
as fuel; a very important advantage,
in districts, in which fuel of the
ordinary kind is, either too expensive,
or, altogether absent. With Engines,
as ordinarily constructed it was
impossible with such fuel as Straw,
when used alone to keep up a regular
pressure of steam; the combustion
was so irregular and imperfect, these
difficulties

Enclosed in
Proceedings of the
Board of Revenue,
24 July 1873.
No 4659
The Secretary to the
Board.
12 2258/13

Copy of Extract
from the Journal
"Engineering" about
the Steam Engine
machinery.

difficulties seem to have been overcome
in the new Straw-burning Engine, now
brought out by this firm.

There are certainly very few
localities in this Presidency, in which
the agriculture of the District can
afford to part with its straw as fuel;
but in the large Cotton Districts in
Bellary, Cuddah, &c. there are
vast quantities of Cotton stalks, only
fitted (until some economical means
of separating the fibre of the stalk
has been devised) for use as fuel,
and, it is in these Districts with
their vast plains of deep heavy
soils, that the Steam Plough will
really be of use.

This new Engine is referred
to in the "Engineer" of the 23^d of May
last (Copy of which I forward) at
pages 357 and 358. And one of the
first mounted is now on

Exhibition

Exhibition at Vienna. 5/6

Government Farms Office } I have been
Sd apts } (Sd) W.R. Robertson
2^d July 1878 }

The Board have read with
interest the account of Ransomes,
& Sims' Strawburning Engine. There
is reason to hope that it might be
profitably employed on the plateau
of the Deccan or in the Ceded Districts.

The Ct. of "Engineering" sent by
Mr. Robertson is returned herewith.

(Enclosure in touch)

(Sd) H.E. Stokes
Acting sub Secretary

The Superintendent Govt. Farms
(Enclosure)

H.E. Stokes

Acting sub Secretary

The Acting Secretary to Government
Revenue Department
with Extract from the "Engineering"
of 23^d May 73.

W. R. Robertson

R. P. D. S. S. S. S. S.

PROCEEDINGS OF THE BOARD
OF REVENUE.

June 1873
102258

Dated 21st 1873
Despatched 22nd 1873

STREET.

Expressing opinion

that the above business
being conducted by
Messrs. Rouse, Davis
& Co. of London might
be profitable and
the Board of Revenue in
an order dated 11th 1873
has directed that the
Board should be kept
informed of the progress
of the business.

*It is desired the fact should be
the purchase of a steam engine & engine
the business referred to by the Board,
the S. & C. order to work in
the present state of affairs in
the Board is ~~the Board~~ then providing
it is likely that such a business would
have in any respect profitable
but in work
but in work
but in work*