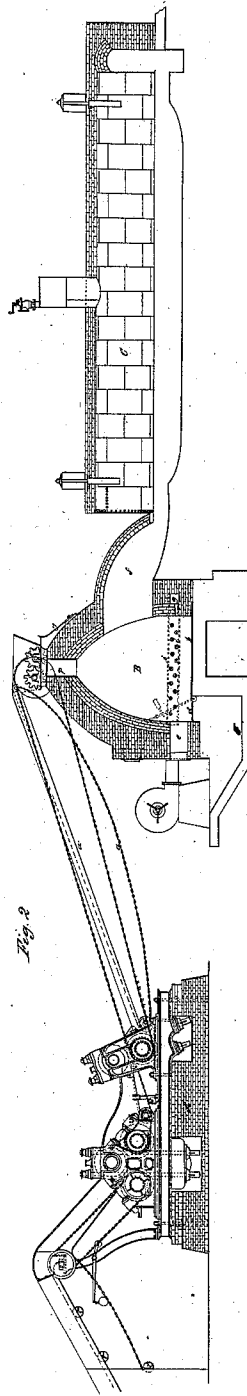
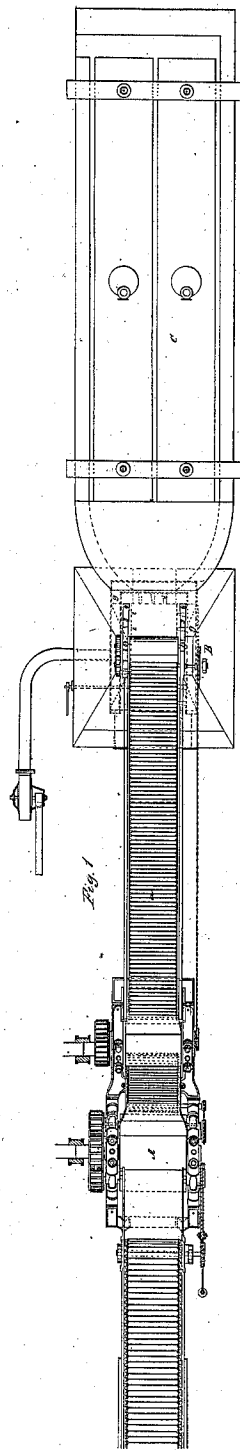


A. Stillman.

Steam-Boiler Furnace.

N^o 12,807.

Patented May 1, 1855.



UNITED STATES PATENT OFFICE.

ELIZABETH A. STILLMAN, OF NEW YORK, N. Y., ADMINISTRATRIX OF ALFRED STILLMAN,
DECEASED.

FURNACE FOR BURNING BAGASSE.

Specification forming part of Letters Patent No. 12,807, dated May 1, 1855; Reissued November 9,
1858, No. 619.

To all whom it may concern:

Be it known that ALFRED STILLMAN, late
of the city, county, and State of New York,
deceased, did invent certain new and useful
5 Improvements in Employing Bagasse as
Fuel in Sugar - Works; and I, ELIZABETH
ANN STILLMAN, administratrix of the goods
and estate of the said deceased, do hereby
declare that the following is a full, clear,
10 and complete description of his said inven-
tion and of the operation thereof, reference
being made to the annexed drawings, mak-
ing a part of this specification, in which—

Figure I is a top view or plan, Fig. II is
15 an elevation partly in section, and similar
letters indicate similar parts in both the
figures.

This invention consists in a new arrange-
ment and mode of constructing and operat-
20 ing a plantation sugar-mill, whereby the
bagasse, without being handled, dried or
otherwise prepared, is at once utilized as
fuel, and consumed as fast as it is deprived
of its saccharine juice.

25 From the commencement of the manufac-
ture of sugar in this country, attempts have
been repeatedly made to accomplish the de-
struction of the refuse cane and at the same
time to make it valuable as fuel. In fact,
30 merely to get rid of it from the plantations
without expense would be a matter of great
advantage, yet up to this time even that has
not been accomplished.

It is now the custom, and is indeed nec-
35 essary, to construct and keep in repair vast
buildings in which to store this material for
drying before it can be consumed, and this
storing can only be done by the expensive
process of hand labor, which must be spared
40 too at a time when all the force is required
in the sugar house.

The fact that bagasse contains much sili-
cious matter, and also that it leaves much
ashes in the process of combustion, renders
45 a peculiar furnace necessary in order to burn
it, especially when green. Such furnace
must be so constructed that the blast can be
maintained freely, and also that the deposits
or ashes may be collected without choking
50 up the blast. With a blast through grate-
bars this cannot be accomplished with suffi-
cient certainty of being able to maintain the
operation, since the ashes accumulate so
rapidly as to choke them, and in addition to

this the silex melting upon them often closes 55
them permanently. Neither will the cone-
shaped-perforated bottom, such as is some-
times employed in the tan or saw-dust stoves
answer, for a like reason. The furnace
herein described as invented for the purpose 60
performs the operation perfectly.

This furnace consists of a chamber having
a flat solid hearth with an opening at the
top to receive the bagasse, and having the
blast admitted in numerous jets around the 65
sides at a suitable distance above the hearth
to allow of the accumulation of ashes; the
necessity of providing for such accumula-
tion arising from the fact that the operation
of the mill must be as continuous as possible, 70
day and night, for a considerable period of
time. Several rows of such jets may be ar-
ranged one above the other so that as the
ashes accumulate upon the hearth and reach
the lower row, the blast may be shut off from 75
it and transferred to the next above, and so
on until it is time to clear out the whole.
By combining such a furnace with the boil-
ers and the cane-mill, the green or wet ba-
gasse may be burned as fuel for the boilers, 80
and without preparation or handling, thus
converting a material hitherto a cause of
expense and trouble, into a source of advan-
tage and profit.

Figs. I and II represent the method of 85
constructing and arranging a sugar-mill as
above mentioned. At A is the cane mill for
expressing the juice. At B is the bagasse
burning furnace. And at C is the range of
boilers. 90

The cane-mill represented at A is after the
plan of "Stillman's patent" but any other
kind of mill is also applicable. From the
last pair of rollers, or where the cane has
received the last compression and is ready to 95
be discharged, an endless carrier is con-
structed so as to receive the same and convey
it to the furnace in the order and as fast as
delivered, said carrier being represented at
(a). The carrier terminates at the top of 100
the furnace, where there is a peculiar feed-
ing apparatus constructed so as to take the
bagasse and discharge it into the furnace,
and yet keep the aperture closed. At (o, o,) 105
are two rollers situated at the top of the
furnace and immediately upon the square
aperture (p) leading down into it as shown.
The boxes of one of these rollers are made

so as to play back and forth horizontally, while those of the other are permanently fixed. Motion is communicated to the fixed one by an endless chain passing over a pulley and leading to and passing over another pulley at the cane-mill, a pair of gear wheels of equal size causing like rotation of the rollers.

The reason for having the rollers capable of moving apart is to allow them to yield when passing thicker pieces of cane, or in case of excessive feeding, or when some should present themselves crosswise, and were they not permitted to yield, the chain or some other part of the machine would be endangered.

The movable roller is pressed against the other by the force of springs, or other equivalent power, acting on the outside, so that by these means not only does it yield to the passage of unequal pieces of bagasse, but the moment they are through it closes up against the other roller, and thus keeps the feed aperture shut.

Many different ways may be adopted for making the rollers self-adjusting. As represented, the boxes (*o'*) are set upon guide-pieces or slides, the ends of which project beyond the hopper, as shown; on the ends of these, powerful feather springs (*s*) act to force the boxes inward toward the stationary roller. Thus the necessary play is permitted, while the surfaces of the rollers are kept as closely together as possible, seizing the bagasse as it falls into the hopper from the carrier and depositing it within the furnace. The furnace as represented at B consists of a large arched or dome-shaped chamber, having a tight and solid floor or hearth, as seen at (*b*). At the front there is an ash-pit (*c*), covered by a trap-door (*d*) operated from the outside and opposite to which in the side is a raking-hole (*e*), to haul off the ashes and dirt from the hearth. The gaseous products of combustion are discharged through the flue (*f*) and thence pass beneath the range of boilers C to the final discharge place or chimney. The neces-

sary quantity of air to maintain combustion is admitted by means of a blast-pipe or air-channel running around the sides of the furnace and near the floor, as shown at (*g*), and from this channel a series of fine jets is projected into the furnace, similar to the action of twyers, as seen at the letters (*i*), the blast being produced by a fan-blower or other like means.

The operation is as follows: As soon as a proper fire is built upon the hearth (*b*), the cane mill A may be set in motion and the cane fed to it as usual. According to the construction of the mill A the cane receives impressions from a second pair of rollers in order to express all the juice possible. From these last the bagasse is delivered upon the endless carrier (*a*) and conveyed along to the top of the furnace B, where it is received by the feed apparatus and discharged into the furnace. The blast is so regulated as to maintain such intensity of combustion as will effect the consumption of the bagasse as fast as delivered from the mill. The flame and hot gases are discharged by the aperture (*f*) and pass along the flue under the boilers as represented. The walls of the furnace B it is proper to make thick and substantial in order to prevent as far as possible the loss of heat by radiation.

Although the furnace is herein shown as a distinct construction it may yet be so far varied as to be more intimately combined with the boilers by building it lower and placing it beneath them.

What is claimed as the invention of the said ALFRED STILLMAN and which it is desired to secure by Letters Patent of the United States is—

The herein described furnace for employing bagasse, without previous drying, as fuel for generating steam.

ELIZABETH ANN STILLMAN,
Administratrix.

Witnesses:

J. P. PIRPON,
S. H. MAYNARD.