

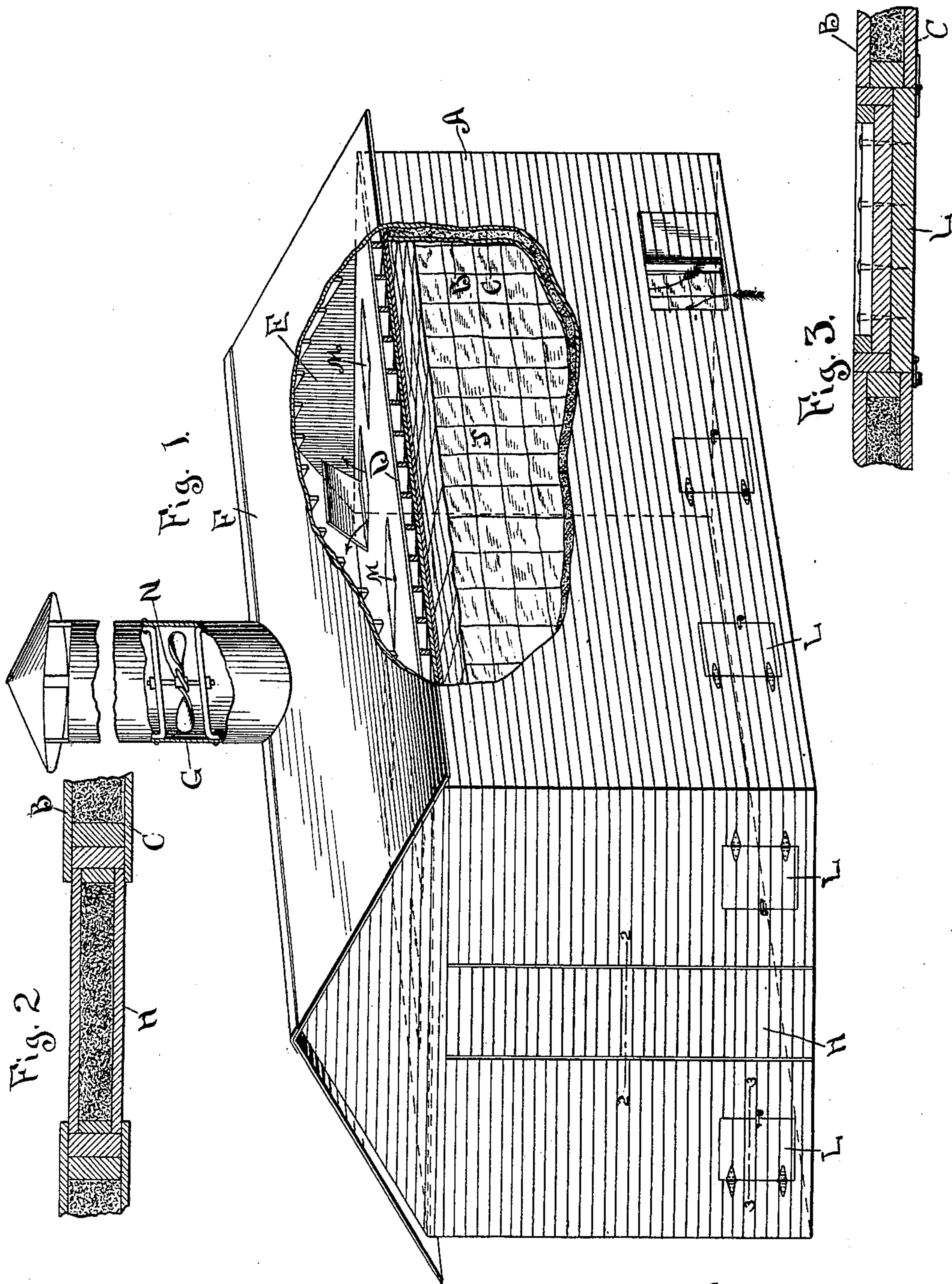
No. 654,148.

Patented July 24, 1900.

O. GUTHRIE.
ICE HOUSE.

(Application filed June 5, 1899.)

(No Model.)



Witnesses.
Ira W. Perry.
John B. Weir.

Inventor.
Ossian Guthrie
By *Brown & Darby*
Attys.

UNITED STATES PATENT OFFICE.

OSSIAN GUTHRIE, OF CHICAGO, ILLINOIS.

ICE-HOUSE.

SPECIFICATION forming part of Letters Patent No. 654,148, dated July 24, 1900.

Application filed June 5, 1899. Serial No. 719,410. (No model.)

To all whom it may concern:

Be it known that I, OSSIAN GUTHRIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Ice-House, of which the following is a specification.

This invention relates to ice-houses.

The object of the invention is to provide a construction and arrangement of ice-houses wherein advantage may be taken of drops in the atmospheric temperature to a point below the temperature of the stored ice to reduce the temperature of the stored ice, thus "storing up," so to speak, the cold in the ice-house, and hence enabling the ice to be preserved with less loss through meltage.

The invention consists, substantially, in the construction, combination, location, and arrangement, all as will be more fully herein-after set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in perspective, parts broken out, of an ice-house embodying the principles of my invention. Fig. 2 is a detail view in section on the line 2 2, Fig. 1. Fig. 3 is a similar view on the line 3 3, Fig. 1.

In the preservation of ice it is the common practice to store the ice in suitable buildings or the rooms thereof, the ice, in the form of cakes or blocks, after being harvested being stacked or piled up in the house or room until the house or room is filled. The house or room is then securely closed up until it is desired to withdraw the ice for shipment or use. It frequently happens, however, that after the ice is stored and the house or room is sealed up a cold wave occurs, which reduces the atmospheric temperature to a point below that of the stored ice. It is the purpose of my invention to provide an arrangement whereby advantage is taken of the drops in the atmospheric temperature to a point below that of the stored ice to reduce the temperature of the mass of stored ice, thus "storing up the cold," so to speak, and hence maintaining the temperature of the mass of stored ice at a point below the melting-point, thus preserving the ice and preventing waste thereof through

meltage. With this end in view I provide suitable openings in the walls of the building or rooms, and preferably at points near the ground, which are auxiliary to the usual door or entry way through which the ice is introduced or removed from the building or room. These openings serve to open direct communication between the interior of the house or room and the outer air. I also provide similar openings in the ceiling of the house or room, opening communication between the interior of the rooms or house and the space between the ceiling and roof, and I arrange a suitable chimney stack or flue in the roof. By this arrangement it will be seen that when a cold wave occurs after the ice is stored and the room or house is sealed up and which reduces the temperature of the outer air to a point below that of the stored ice by opening up the doors or other closures which close said openings in the walls and ceiling of the rooms or house a draft is created through the rooms or house and through and between the crevices and joints of the stacked or piled-up cakes or blocks of ice, the cold atmospheric air entering through the auxiliary openings in the walls of the house or rooms and ascending through the mass of ice, thereby reducing the temperature thereof and finally passing through the openings in the ceiling and out through the chimney stack or flue. In this manner the cold atmospheric air thus passed through the mass of stacked or piled-up ice gives up or yields its cold to the ice, which is correspondingly reduced in temperature to an equality with that of the outer air, and hence to a point far below that at which the stored ice is usually maintained. When the mass of ice has been thus reduced in temperature, the openings are again closed and sealed, and the ice at its reduced temperature is the better able to withstand the effect of subsequent rises of the atmospheric temperature, and hence can be preserved with comparatively-small loss or waste through meltage throughout the hot summer months. I have shown in the drawings an arrangement embodying these general principles, wherein reference-sign A designates an ice-house and which, if desired, may be partitioned off into one or more rooms in the usual manner. The house A may be con-

5 constructed in the usual or any well-known or
suitable manner, but preferably has the
double walls B C, (see Figs. 2 and 3,) with the
space between filled with a suitable non-con-
ductor of heat. This construction, however,
is not essential to the principles of my inven-
tion, but is mentioned as being the usual con-
struction of ice-houses. Reference-sign D
designates the ceiling of the room or rooms
10 of the house; E, the space between such ceil-
ing and the roof F, and G the flue or chim-
ney, which is arranged to communicate with
the space E. The doorway or entrance
through which the ice is carried or removed
15 in storing is indicated at H. This doorway
may be constructed in the usual or any con-
venient manner and at any desired point to
suit the convenience of the packers. The ice
is indicated by reference-sign J and is stacked
20 or piled up in the rooms or house. When
the house or rooms have been filled to the de-
sired point, the doorway H is permanently
closed in any suitable or well-known manner.

In carrying out my invention I provide a
25 number of small auxiliary openings, and I ar-
range the same to be closed air-tight by the
doors L. These openings are arranged at suit-
able or desirable intervals through the walls of
the house or rooms at points adjacent to the
30 ground, as shown, and when the doors L are
open said openings open direct communica-
tion between the interior of the rooms or
house at points near the base thereof and the
outer air. Similarly I arrange openings and
35 doors M at suitable points in the ceiling of
the rooms or house, and which when opened
up open communication between the interior
of the rooms or house and the space E. Now
should the atmospheric temperature fall be-
40 low that of the stored ice after the ice-house
has been sealed by opening up the doors L
M a draft is created through the mass of
stored ice, the cold atmospheric air being
drawn into the rooms or house through the
45 openings controlled by doors L, and which
yielding its cold to the ice becomes warmer,
and hence lighter, ascends through the mass
of ice and through the openings in the ceil-
ing controlled by doors M, and finally passes
50 off through the flue or chimney, as indicated
by the arrows. If desired and in order to ac-
celerate this draft, a suitable fan or blower
N may be arranged in the chimney to create
a forced draft. This blower or fan, however,
55 may be omitted and merely the natural draft
depended upon, the chimney being of suffi-
cient area and height to insure a proper and
suitable draft. After this draft has been
maintained a length of time sufficient to cause
60 the temperature of the mass of stored ice to
be reduced throughout the entire mass there-
of to that of the outer air the auxiliary doors
may be closed, thus again sealing up the
rooms or house, the stored ice being main-
65 tained at the reduced temperature.

I have referred to the storing and preserva-
tion of harvested ice. It is apparent, how-

ever, that the principles of my invention may
be equally well applied to the preservation of
stored artificial ice.

70 In the storing of ice a loss amounting to
ten per cent. of the amount stored through
meltage is usually calculated upon. The loss,
however, from meltage is but a small part of
the actual loss sustained through the effects
75 of meltage. For instance, the trickling of
meltage through and between the cakes of
stored ice through regelation causes the cakes
of ice to freeze solidly together into one solid
mass, necessitating the time and expense of
80 sawing or cutting the solid mass into blocks
when required for shipment or use. The loss
incurred through this source is usually calcu-
lated at twenty per cent. of the amount of the
stored ice. Moreover, when the meltage oc-
85 curs at the bottom of the pile of stacked ice
undermining of the stack takes place, caus-
ing the pile or a considerable portion thereof
to lurch or to fall against the wall of the build-
ing, thereby frequently injuring the building
90 and opening up cracks or seams, through
which the hot air of the summer is admitted,
thereby rapidly destroying and melting the
stored ice, and the loss from this source is a
matter of material consequence. In the prac-
95 tical operation of an ice-house embodying my
invention, wherein the temperature of the en-
tire body of the mass of stored ice is reduced in
extremely-frigid weather to a point far below
that of the stored ice when originally housed,
100 the loss through meltage is entirely saved,
as well as the loss above noted, and which
results from the effects of the meltage. This
saving is an important feature and is due to
the fact that the cold outer air, the tempera-
105 ture of which is far below that of the stored
ice, is admitted at points close to the ground
through the auxiliary openings through the
walls of the ice-house and circulates through
the entire mass of stored ice, through the
110 openings in the ceiling of the rooms into the
space in the room, and out through the chim-
ney, this arrangement maintaining a draft of
cold air through the mass of stored ice, thereby
reducing the temperature of such mass to
115 that of the outer air. When this point is
reached, the auxiliary doors are closed and
the openings through the ceiling are closed,
thereby "storing up the cold," so to speak, and
enabling the stored ice to resist the melting
120 effect of the heat during the summer months
or during subsequent rises of the atmospheric
temperature.

Having now set forth the object and nature
of my invention, and an arrangement embody-
125 ing the principles thereof, what I claim as new
and useful and of my own invention, and de-
sire to secure by Letters Patent, is—

1. In an ice-house for storing ice, and having
one or more rooms, a ceiling arranged to ex-
130 tend over such room or rooms, and a roof, and
the usual doors and entrance-ways, a flue or
chimney arranged to communicate with the
space between the ceiling and room, a series

of auxiliary openings through the walls of
said house, said openings located adjacent to
the base thereof, and opening direct commu-
nication between the outer air and the inte-
rior of said rooms at the base, and auxiliary
openings in said ceiling, whereby the outer
air admitted to the rooms at the base thereof
circulates through the mass of stored ice,
through the auxiliary openings in the ceiling,
into the space in the roof, and out through
the chimney, thereby reducing the tempera-
ture of the entire mass of stored ice to that
of the outer atmosphere, and means for clos-
ing said auxiliary openings in said walls and
ceiling, as and for the purpose set forth.

2. In an ice-house for storing ice, and having
one or more rooms, a ceiling for said rooms,
a roof, and the usual entrance or door ways
adapted to be permanently closed when the
room or rooms are filled with ice, a flue or
chimney arranged to communicate with the
space between said ceiling and roof, a series
of auxiliary openings through the walls of
said house, said openings located adjacent to

the base thereof and opening direct commu-
nication between the outer air and the inte-
rior of said rooms, auxiliary openings through
said ceiling, whereby when said auxiliary
openings in the walls and ceiling are opened,
atmospheric air is admitted to said rooms at
points adjacent to the base thereof, and cir-
culates through the mass of stored ice, through
the openings in the ceiling into the space in
said roof, and out through said chimney, there-
by reducing the temperature of the entire
mass of stored ice to the atmosphere of the
outer air, means for closing said auxiliary
openings, and means for creating an artificial
draft through said chimney, as and for the
purpose set forth.

In witness whereof I have hereunto set my
hand this 2d day of June, 1899, in the pres-
ence of the subscribing witnesses.

OSSIAN GUTHRIE.

Witnesses:

E. C. SEMPLE,
S. E. DARBY.