(No Model.) 2 Sheets—Sheet 1.

L. SMITH.

FLOATING GRAIN SILO.

No. 446,027. Patented Feb. 10, 1891.

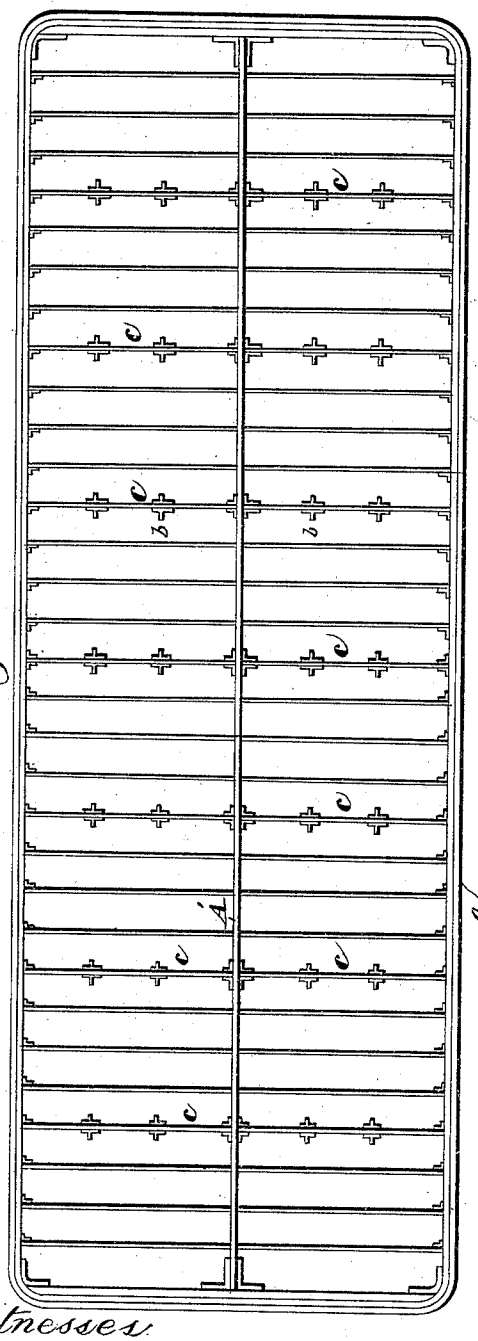

Fig 1

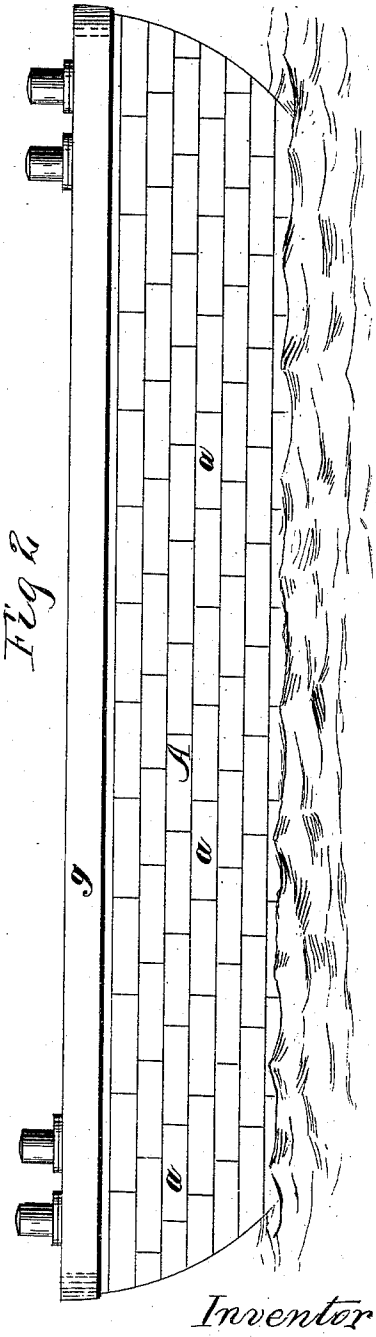

Fig 2

Witnesses.
C. C. Burdine
C. M. Wells

Inventor
Lymans Smith

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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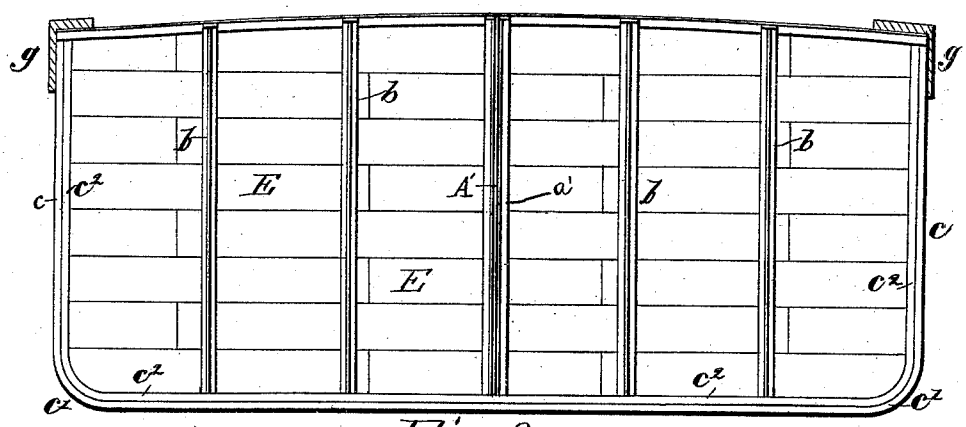
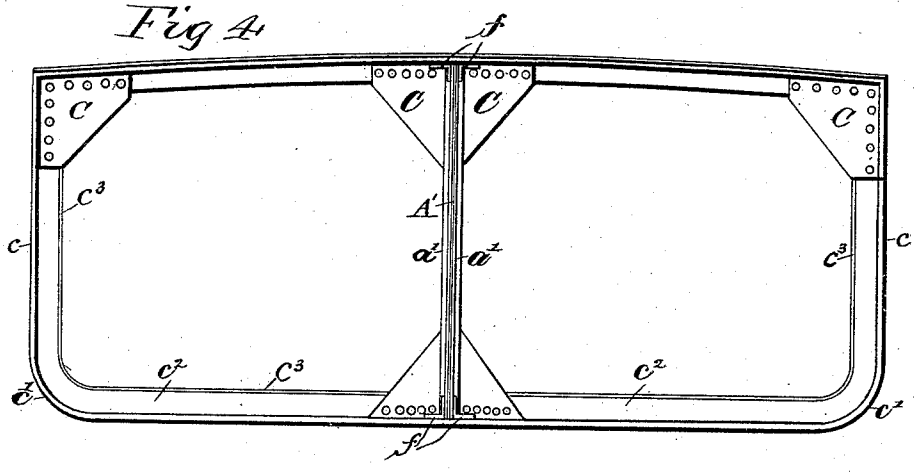


Fig 3

Fig 4



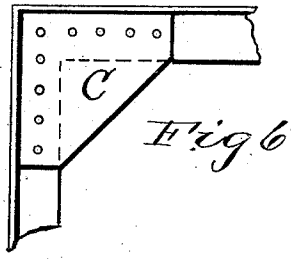
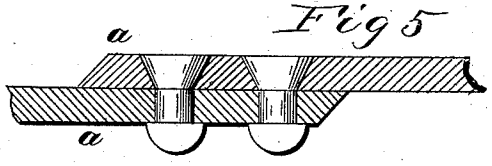


Fig 6

Fig 5



Witnesses.
C. C. Burdine
C. M. Wells

Inventor
Lyman Smith

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LYMAN SMITH, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE SMITH PNEUMATIC TRANSFER AND STORAGE COMPANY, OF WEST VIRGINIA.

FLOATING GRAIN-SILO.

SPECIFICATION forming part of Letters Patent No. 446,027, dated February 10, 1891.

Application filed May 3, 1890. Serial No. 350,495. (No model.)

To all whom it may concern:

Be it known that I, LYMAN SMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a Floating Grain-Silo; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figure 1 is a top plan view of a grain-silo embodying my invention, the deck being removed. Fig. 2 is a side elevation of a floating silo. Fig. 3 is a transverse section of Fig. 2. Fig. 4 is a detail view of one of the hull-frames. Fig. 5 is a detail view of a portion of the double-riveted steel plates, and Fig. 6 is a detail view of the connections or gussets of the frame.

The invention relates to the storage of food products, and more especially to the storage of grain, and is more particularly adapted to floating storage-chambers, though applicable to stationary storage-chambers as well.

The invention has for its object an improved grain-silo for the storage of grain in large quantities and of such construction as to protect the contents against damage or loss by fire or water, as well as against damage or loss by fermentation or destruction by insects or other animal life.

The invention has for its further object to avoid the great expenses inherent to the erection of storage buildings and the construction of the transfer mechanisms, so-called "grain-elevators," as well as the expenses for labor usually required to prevent the destruction of grain when stored for any length of time.

As an incidental feature of economy, I construct the receptacle in the form of a floating silo, so as to avoid the usual expenditure of wharfage or the construction of wharves or piers, the grain being preferably brought to and taken from the silo by vessels, it being well known that the transfer of grain to or from a floating vessel is considerable easier than when such grain is taken from a dock or elevator, inasmuch as a number of vessels may load or unload at the same time, free access being had all around a floating storage-vessel, which is not the case with grain-elevators.

The invention consists in a vessel constructed entirely of metal and subdivided into a suitable number of storage-chambers and in structural features and combinations of parts, as will now be fully described, reference being had to the drawings.

In practice, for the storage of large quantities of grain, the hull A will have about the following dimensions: length, two hundred feet; width, fifty feet, and depth, twenty-five feet in the clear.

The interior of the hull will be subdivided into any suitable number of storage-chambers. For instance, a hull having a clear space of the dimensions given may be divided into two equal parts by a longitudinal partition A′, and the two longitudinal compartments may be divided each into eight compartments by means of cross-partitions, thereby forming sixteen storage-chambers, each of which will be of a capacity of about twelve thousand or twelve thousand five hundred bushels, the total capacity of the vessel being about one hundred and ninety-two thousand to two hundred thousand bushels of grain.

The skeleton for the hull is constructed of steel frames *c*, having round knuckles *c*′, said frames being arranged about three feet apart, so that the number of such frames required for a floating silo of the dimensions referred to will be sixty-six. Upon these frames are secured the bottom and side plates of sheet-steel *a* about one-fourth of an inch thick and double-riveted, as shown in Fig. 2. Before the steel plates are secured to the skeleton the longitudinal partition is fixed in place, as well as the cross-partitions or bulk-heads. The longitudinal partition A′ is constructed of suitable metal uprights *a*′, preferably of T shape in section, to which are riveted the partition steel plates. The bulk-heads E E, which are also put in position before the outer or shell plates are put on, are constructed of three-sixteenths double-riveted steel plates braced or stiffened by vertical T braces or bars *b b*, the fore-and-aft bulk-heads being pro-

vided with stringer-bars *f* at top and bottom for securing the longitudinal bulk-head to the deck-beams and bottom of the vessel.

The studding for the longitudinal partition and the studding for the cross-partitions or bulk-heads serve to support the deck, the steel plates composing the same being riveted together and to top and bottom cross-bars of the hull-framing. These frames *c* are strengthened by gussets C, as shown, and on the web c^2 of the frames *c* is laid an inner lining c^3, also preferably of steel plates, thus forming an air-space between the hull and storage-chambers to protect the grain against damage by water due to leakage or bilge-water, means being provided, as usual, for the removal of any water accumulating in the dead-air spaces or at the bilge. The gunwale *g* is constructed of angle-steel two by three and one-half by five-eighths.

A suitable man-hole (not shown) provided with a door adapted to hermetically close the hole is provided for each storage-chamber, which are thus rendered perfectly fluid-tight. Grain may therefore be stored and all air excluded therefrom, as when the chambers are filled with grain but little air is contained therein.

Grain in storage will evolve more or less carbonic-acid gas, and this will act as a preservative, the oxygen present being insufficient to cause fermentation.

If found advisable, carbonic-acid gas may be introduced into the storage-chambers after the grain has been introduced by any well-known or preferred means.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

A floating metallic silo or vessel for the storage of grain, comprising two series of steel tanks arranged in the hull lengthwise thereof, a central metallic partition forming the inner end wall of said tanks, to which the side partitions forming said tanks are secured, spaces formed by the bottom of the said tanks and the true bottom of the vessel, and interposed frames or ribs upon which said tank-bottoms rest, all substantially as and for the purposes hereinbefore set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LYMAN SMITH.

Witnesses:
L. LA RUE SMITH,
U. G. M. PERRIN.