

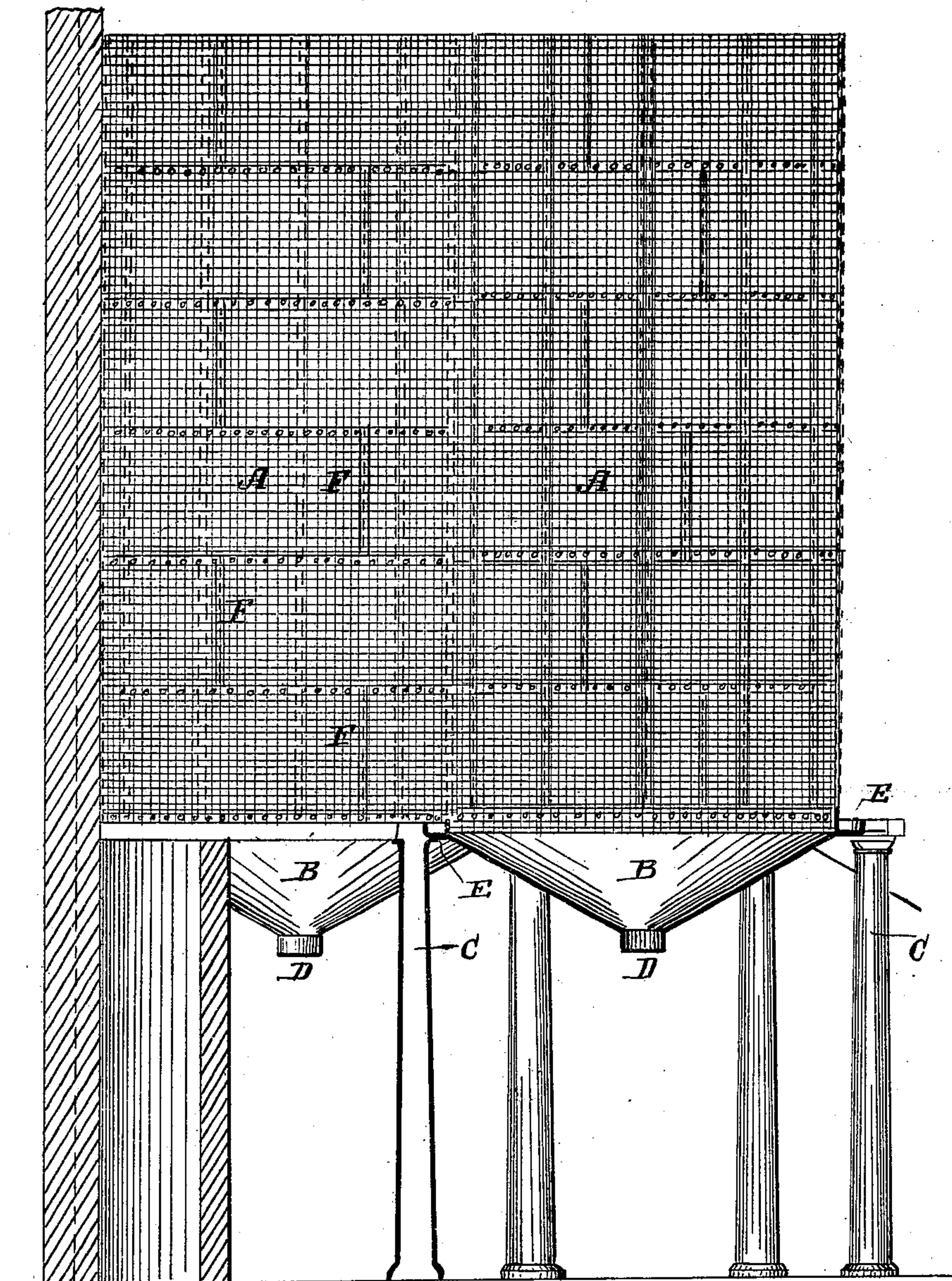
W. S. SAMPSON.

Grain Bin.

No. 93,352.

Patented Aug. 3, 1869.

Fig. 1.



Witnesses:

Edward Wilhelm
Geo. J. Bonner

Inventor:

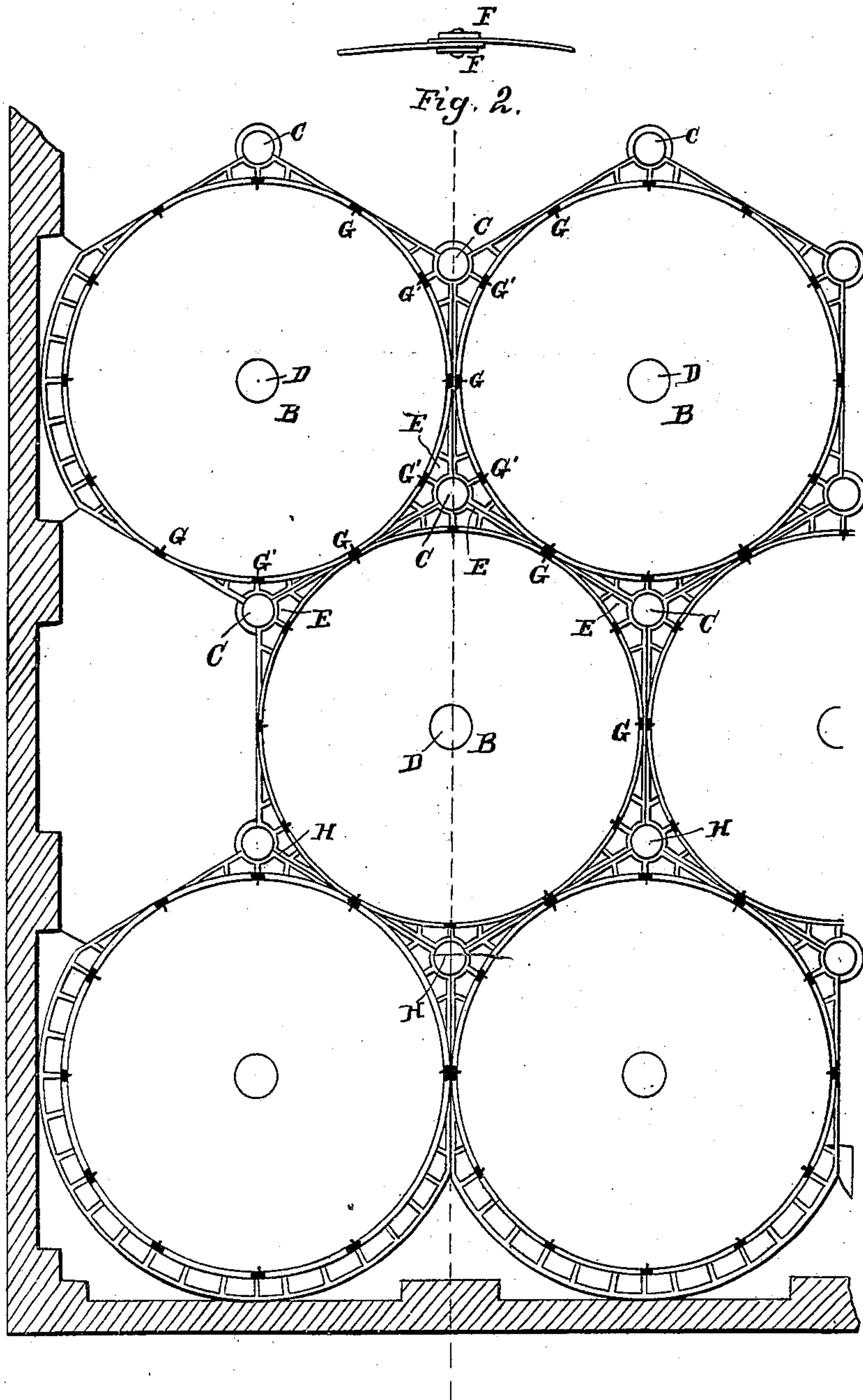
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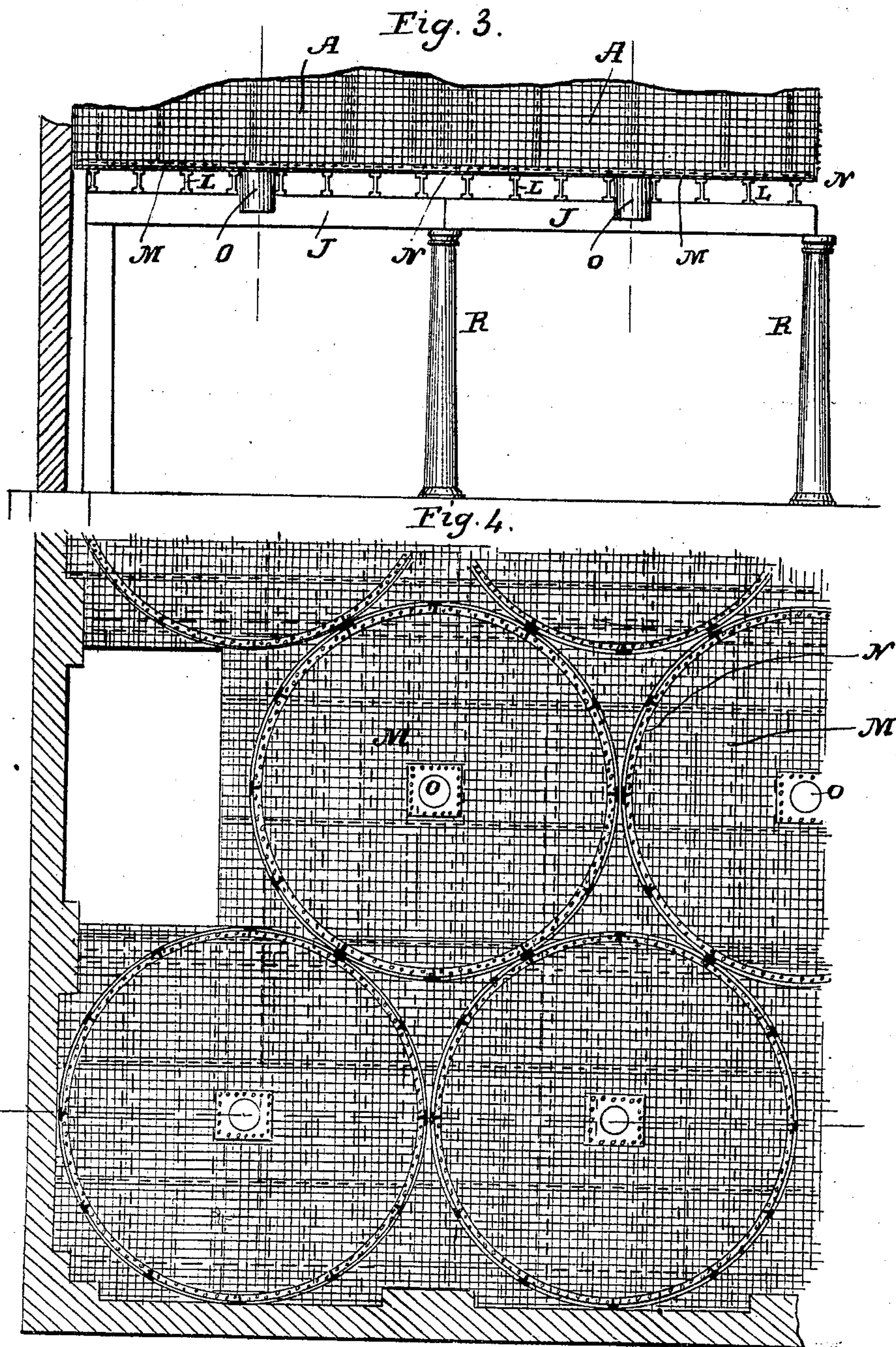
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3 Sheets—Sheet 3.

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United States Patent Office.

WILLIAM S. SAMPSON, OF NEW YORK, N. Y.

Letters Patent No. 93,352, dated August 3, 1869.

IMPROVEMENT IN GRAIN-BINS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, WILLIAM S. SAMPSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Grain-Bins; and I do hereby declare that the following is a full, clear, and exact description thereof.

The common method of storing grain in wooden bins, while open to the very serious objections of great fire-risk, the attack of vermin, and want of durability, seems still to meet the wants of grain-storers more fully than any other system heretofore presented. This is due principally to the fact of the preservative qualities of the wood, which, by absorbing the moisture and heat from the grain, prevents the same from deterioration. The cheapness of wooden bins has also been a very strong point in their favor.

A patent was granted Badger and Sampson in 1859 for an arrangement of metallic bins, designed to remedy the defects of wood bins by giving perfect security against fire and vermin. Experience proved, however, such metallic bins to be defective in the essential feature of preserving the grain from the effects of its own heat and moisture, by reason of their incapacity to absorb and carry off the same.

A patent was granted to Sampson and Johnson, as assignees of Sampson, in 1862, for a mode of constructing grain-bins of brick, in combination with metallic bond-plates and tie-rods. This invention was designed, by employing the absorbing qualities of the brick, to overcome the defects of the metallic bins in respect to their non-absorption of the heat and moisture from the grain, retaining the qualities of security against fire and vermin.

This plan of construction, although a great improvement on the metallic bins, has very serious defects of its own. These defects are—

First, the great quantity of material necessary to be employed to obtain the requisite strength;

Second, loss of storage-space due to such great bulk of material; and

Third, consequent greatly increased cost of structure.

It is the object of my invention to produce grain-bins, which, while they are fire and vermin-proof, allow the free escape of the heat and moisture from the grain by a system of ventilation, and which shall at the same time be built with the least weight of material, and the least loss of storage-space, and the least cost of construction when compared with other fire-proof bins.

My invention consists—

First, in constructing grain-bins of wire cloth in cylindrical form; the meshes of the cloth giving the required ventilation; the cylindrical form giving the greatest strength with the least material; and the metallic nature of the cloth, its security against fire and vermin.

Second, in securing the wire-cloth shell against vertical strain, by means of longitudinal battens or plates riveted thereto.

Third, in congregating a number of cylindrical bins of equal diameters, to constitute a grain-storehouse by arranging them in parallel contiguous rows, so that the centre of a bin in one row will be equidistant from the centre of the two adjacent bins in the contiguous row; said arrangement giving the greatest economy of material and storage-space.

To enable others skilled in the art to make and use my improvements, I will now proceed to describe the same by reference to the accompanying drawings, making a part of this specification, in which—

Figure I is a vertical sectional elevation of grain-bins, embodying my said improvements;

Figure II is a sectional plan of same;

Figure III is a sectional elevation; and

Figure IV, a sectional plan of the mode of forming the bin-floors or bottoms.

Like letters designate like parts in each of the figures.

A A represent the grain-bins made of wire cloth, and cylindrical in form.

B B represent the hopper-bottoms resting upon the columns C C. These hopper-bottoms are conical in form, made of cast or wrought-iron, and are provided with a cylindrical flange round the upper base, from which the bins A A start.

A central nozzle, D, provided with proper valve, controls the exit of the grain from the bin.

A lateral flange, E, projects from the upper base of the hopper; said flange being of hexagonal contour; the diameter of the bin being that of the inscribed circle.

The columns C C are located at the intersection of the hexagonal flanges, so that each column supports a portion of the weight upon three contiguous bottoms.

The wire cloth employed in the construction of the bins A A is composed of sheets of convenient width, and of a length equal to the circumference of the bin. The union of the sheets in the vertical seams is effected by lapping the ends and applying washer-plates F F on each side, and riveting or bolting through said plates.

Experience has proved that by means of these plates the joints may be made equal in strength to the body of the cloth.

The horizontal seams may be riveted up after the manner of a common lap-joint, washer-heads being employed for the rivet.

The strength of the sheets may be gradually decreased from the base upward, and made to suit the actual strains to which they are to be subjected.

G and G' represent the longitudinal ribs or stiffening-plates. They may be made of flat bar, T, or angle-

iron. The bars G are applied to the points of tangential contact of the contiguous cylinders, and the rivets or bolts extend through and through, so that at these points the cylinders are rigidly secured, one to the other, and the stability of the structure as a whole thereby attained, which is of the greatest importance when the structure is unloaded of grain.

The arrangement of the bins, so that the centre of a bin in one row shall be equidistant from the centres of the two adjacent bins in the contiguous row, is clearly shown in Fig. II. This arrangement has a threefold object:

First, the triangular spaces (shown at H) left between the bins are rendered of the least possible area, so that the loss of storage-space is reduced to the minimum.

Second, the bins are all of the same size, and cylindrical in form, so that the pressure of the grain when they are filled subjects the material of the shells to tensile strain only, thus enabling the bins to be made with the least weight of material, and consequent cost.

Third, the triangular spaces are made to serve the important, and in fact, essential function of surrounding each bin with air-flues, to receive and carry off the heat and moisture from the grain as it escapes through the meshes of the wire cloth.

The greater uniformity of fibre in the wire, and the better quality of the material employed in its manufacture, give to the wire cloth an advantage over plate-iron in point of cost for equivalent strength, while the plate-iron is, for other reasons before stated, rendered unfit for this purpose.

No special saving here in storage space is claimed in favor of the wire cloth as compared with the plate-iron.

In comparing with the brick bin, I find great advantages in favor of the wire cloth, viz:

First, the saving in storage-space, due to the great difference in the thickness of the bin-walls, amounting to from fifteen to twenty per cent.;

Second, great reduction in the weight of bins, the ratio being about as one to twenty;

Third, less cost of construction; and

Fourth, more perfect preservation of the grain.

I propose to employ galvanized-wire cloth, so as to secure the bins against rust and corrosion from the moisture in the grain. The galvanizing being effected after the cloth is woven, adds materially to the strength thereof.

I will now describe the wire-cloth floor, shown in Figs. III and IV.

J represents longitudinal girders resting on the posts R, and L represents joists spanning from one line of girders to the other.

M represents the sheets of wire cloth lying upon the joists, and running at angles thereto, as shown.

Angle-iron rings N, laid upon the wire-cloth floor, constitute the bases from which the bins start.

Central nozzles O are provided, for the discharge of the grain.

The flatness of the bin-bottom will require a small amount sweeping or shovelling when the bin is to be fully drawn off.

The principal advantage of this form of floor, and the one which may make its use in some cases preferable to that of the hopper-bottoms, is the freedom it affords to the influx of air into the grain, to assist the ventilation thereof.

Having thus described my improvements,

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The grain-bin, constructed of wire cloth, substantially as herein described.

2. The longitudinal battens or ribs G, applied to the bin-cylinders, as and for the purpose set forth.

3. The congregation of equal cylindrical wire-cloth bins and intervening triangular spaces, to constitute a grain-storehouse, when arranged as shown and described.

WM. S. SAMPSON.

Witnesses:

EDWARD WILHELM,
JNO. J. BONNER.