

BADGER & SAMPSON.

2 Sheets—Sheet 1.

Grain Bin.

No. 24,424.

Patented June 14, 1859.

Fig. 1,

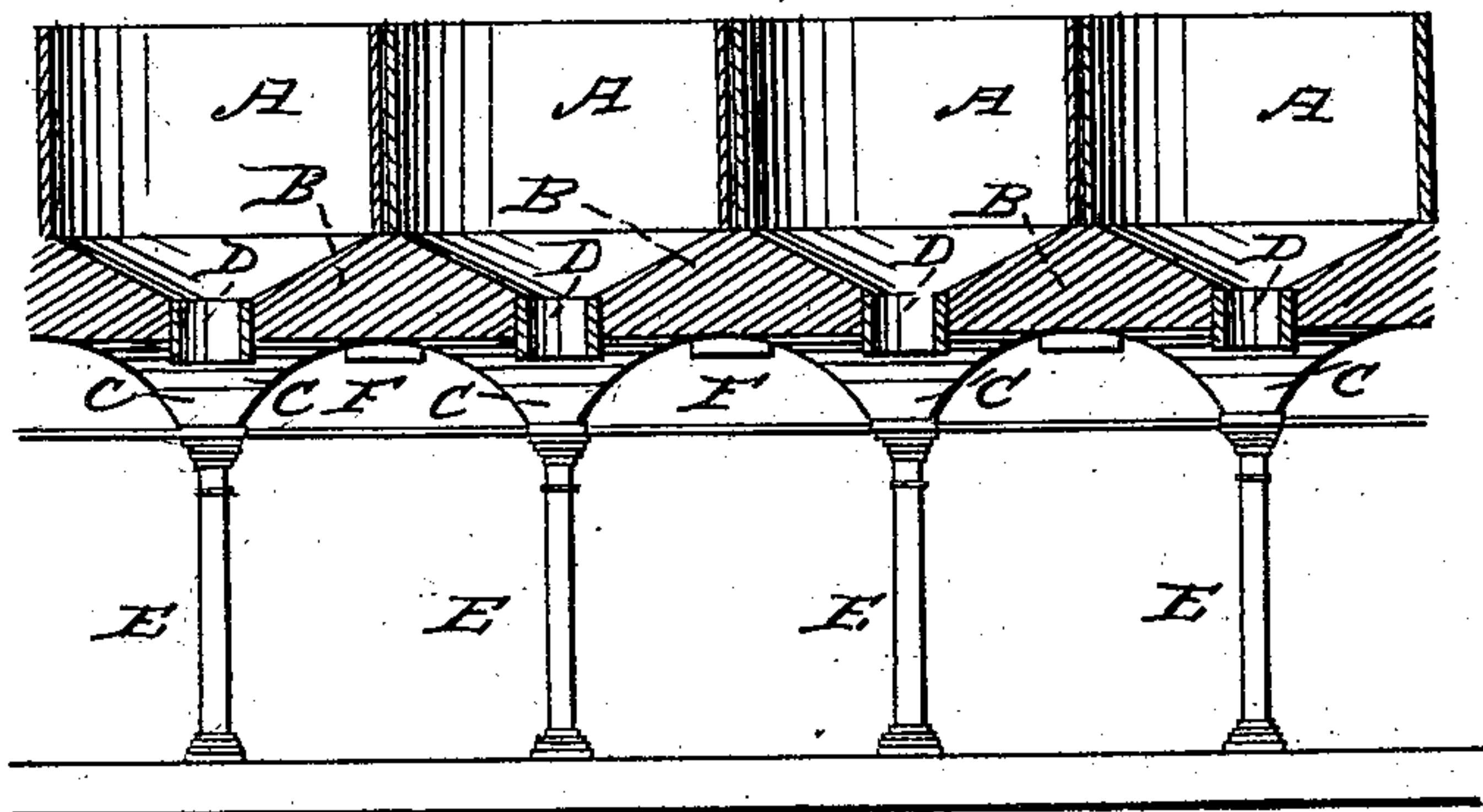
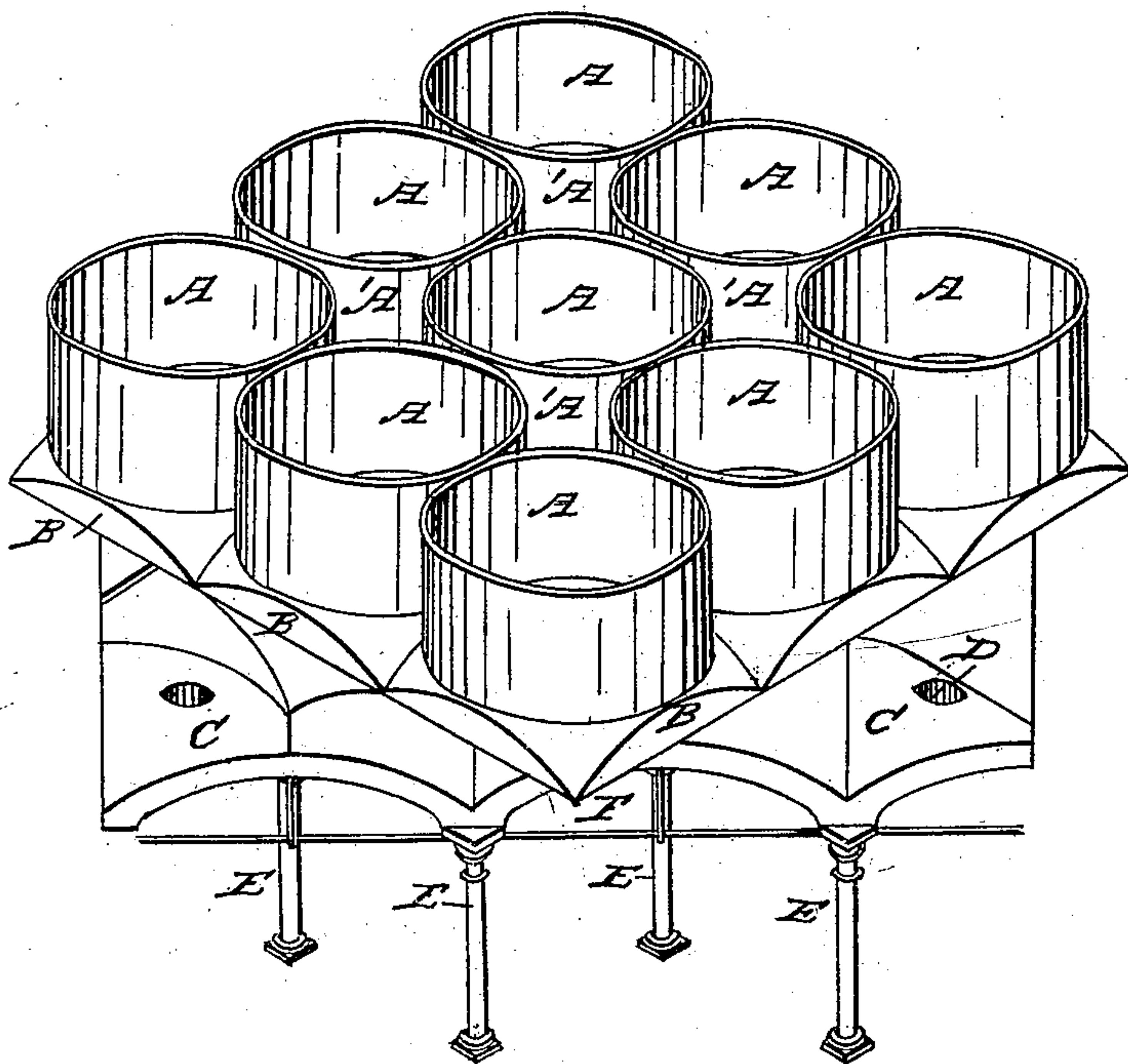


Fig. 2,



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BADGER & SAMPSON.

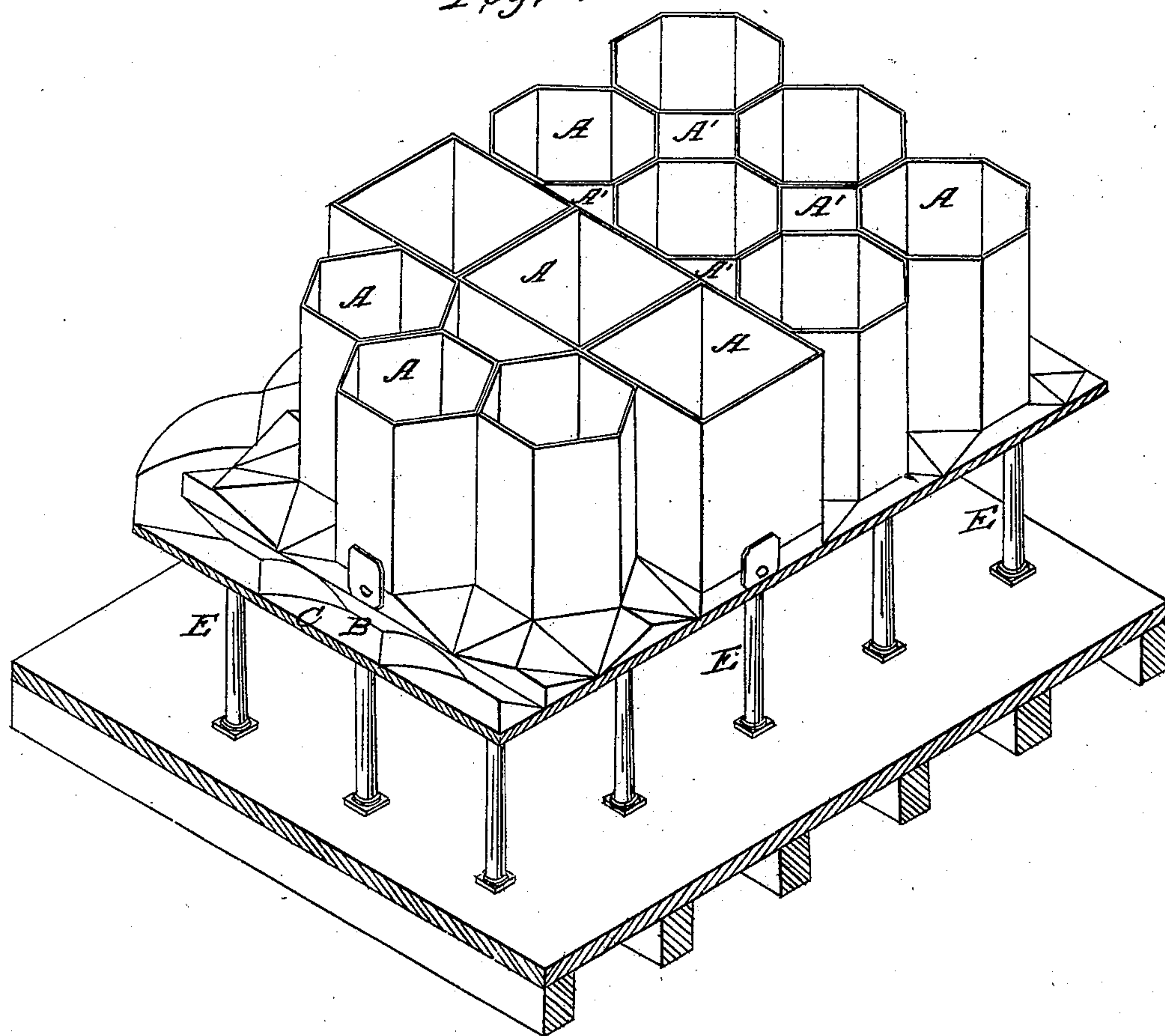
2 Sheets—Sheet 2.

Grain Bin.

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Fig. 3,



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UNITED STATES PATENT OFFICE.

DANIEL D. BADGER AND WM. S. SAMPSON, OF NEW YORK, N. Y., ASSIGNORS TO DANIEL D. BADGER, AFORESAID.

GRAIN-BIN.

Specification of Letters Patent No. 24,424, dated June 14, 1859.

To all whom it may concern:

Be it known that we, DANIEL D. BADGER and WM. S. SAMPSON, both of the city, county, and State of New York, have invented a new and useful Improvement in Agricultural or Grain Bins; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a side sectional elevation of our improvement. Fig. 2 is a perspective view thereof. Fig. 3 is a perspective view of a series of modifications of our improvement.

Similar letters of reference denote like parts in all the figures.

The exterior shell of the "elevator" or building in which grain bins are placed is usually constructed of wood or brick; but the grain is generally stored in large bins of square form composed wholly of wood. These bins extend from the first floor of the building to the roof; the entire inside of the structure being filled with them. In size they are generally made 12 feet square, and from 20 to 60 feet high. It is evident that the safe keeping of grain within such immense bins requires that the wood of which they are made shall be arranged in the strongest manner; and in practice this is the fact. Each bin requires for its corner support four upright beams in size usually 16 inches square, four sills of same dimensions, four plates of same size, while these are stiffened by about 30 joists, each 6 inches square, placed at the sides and bottom. These are lined or sided with two-inch plank. The interior of a storehouse having bins constructed on this plan presents the appearance of an immense network of wood.

In our improvement, the bins A, are composed of iron and made in circular or tubular form, as shown in the drawings. They may be made of cast iron, if desired, but we prefer to construct them of plate iron riveted in the usual manner. The lower parts of the bins A, rest upon arches B, C, composed of brick or stone or iron, which arches are placed one above the other, as

shown in Fig. 2; the upper surface of the upper arches B, being so fashioned as to form conical bottoms for the bins A, and also conical bottoms for the spaces A', between the bins. The centers of these conical bottoms are provided with apertures D, through which the contents of the bins A, and spaces A', are discharged; the apertures being provided with suitable valves for that purpose. The arches B, C, are supported on iron columns E, and the latter are steadied by rods F. But the columns, rods, foundation of the building, &c., may be constructed and arranged to suit the builders.

Figs. 1 and 2, show only the lower part of our bins. They can, of course, be made of any desired length, diameter or height. No framing or bracing of any kind is required. The bins are tubes, each supported independently of the others; and being circular, they present the strongest possible resisting form. Their great superiority over the square wooden bins will be obvious. The circular bins A, when combined as shown in Figs. 1, 2, leave a space A', between each set of four bins. This space A' forms a smaller bin, of the same utility and strength as the others. Indeed, the smaller bins will oftentimes prove of very great convenience for the reception and storage of small quantities of grain, in separate lots from others, &c.

There are several very striking advantages that attend the use of our improvement.

1st. All the heavy framing required for each bin under the old plan is done away with, and the space occupied by said framing is made available for storage of grain, &c.

2nd. The sides of the bin in our plan may be made much thinner than under the old wooden bin plan; we thus effect a further saving of available space. The comparative smallness of the bulk of the material composing our bins is such that we estimate that 25 per cent. more grain can be stored in a granary built on this plan than in the ordinary storehouse with wooden bins; both buildings covering the same ground space.

3rd. Our bins being of tubular form, made in plates, without any framing, are self-

strengthening and independent. It is not essential to their safety or stability that the surrounding bins shall be filled with grain. But the wooden bins are in a measure dependent for strength and safety upon each other. If the grain from one bin is withdrawn, the outward or lateral pressure of the grain in the adjoining bins tends to cause their planking and framework to bulge outward into the vacant space. But the circular form of our bins present an unbroken arch to resist such pressure.

4th. It is a well-known fact that grain has a peculiar action upon the fibers of wood, which causes it soon to rot or turn into a dry powder. The grain is said by those engaged in the grain trade, to "take the life" of the wood. To check this decay of the wood, grain-storers are in the habit of boring the timbers of the bin frames to admit air through the pores of the wood. This boring is generally commenced within 3 years after the erection of the storehouse. This boring, however, is only a temporary expedient; for at the end of 10, 15 or 20 years, the whole mass of framing and bins becomes rotten and of no value. During the whole period above-named, many extensive repairs are necessary, in addition to the boring, to preserve the bins in proper condition. Our improvement obviates the above troubles, for the grain has no injurious action upon iron, like that described; and there is no known reason why our bins will not be just as serviceable at the end of a century's use as they were on the day of their erection. It is evident that no costs for repairs will be occasioned by any of the causes above-mentioned, and which form a heavy item of expense connected with all the wooden bins of the present storehouses.

5th. The decay of the wood mentioned is supposed to be occasioned much in the same manner that the common "dry-rot" is produced, viz. by slight moisture or dampness and confined atmosphere. A decomposition of the wood, therefore, ensues which must injuriously affect the grain placed next to the wood, causing fermentation in the grain and which when once begun will continue to progress until special treatment is employed to bring it to an end. It is supposed that the heating and fermentation of grain sometimes exhibited after removal from the storehouses, occasionally has its origin by contact with the decomposing wood of the bins. Our improved bins are free from all such objections, for the iron of which they are composed is not known to become weakened or decomposed under the circumstances above-named, and therefore cannot impart decomposition to the grain.

6th. Our improvement also enables us to

cool off any loaded bin, if the contents have become heated. For this purpose the spaces A' need only to be emptied when currents of cold air may be driven up them by a blower, thus surrounding any particular bin with a cold atmosphere; and owing to the good conducting power of the metal of the tubes, the grain is soon cooled. If kiln-drying is desired, all that is necessary is to introduce hot air. A portion of the storehouse may be used for the purpose of "treating" wet grain, if necessary. When wooden bins are used, the grain cannot be readily cooled off or "treated" as in our improvement, for as the material composing the bins is not a conductor of heat, the passage of air through adjoining empty bins would have little or no useful effect.

7th. Grain stored in our improved bins is comparatively safe from fire, which is not the case with the wooden bins. The interior of a storehouse furnished with wooden bins presents a forest of dry wood as fuel for a conflagration, to which the grain itself is an addition. By the use of our improvement every bin constitutes a fireproof shield and protection for the grain within its own walls, and it also assists to the extent of its size in protecting the adjoining bins. It is believed that the contents of a granary constructed on our plan would be safe from the ravages of fire, even though exposed on all sides to the heat of burning buildings. The importance of our improvement as a safeguard for grain against the calamity of fire is very great, and also as a protection from injury by storage.

8th. Our improvement permits the taking down and removal of the bins to any other locality, when desired. For obvious reasons this is hardly possible when the wooden bins are used.

9th. In the use of the wooden bins, the higher the building the stronger and more bulky must be the framing timbers and siding for the bins. But under our improved plan, the building and bins may be carried up to a far greater height—without any change in the size of the parts—than it would be possible to erect them of wood. Again: if, for any reason, after a granary designed to accommodate a certain quantity of grain, is erected, it becomes desirable to enlarge the bins, this may readily be done, under our improvement, by placing additional sections upon the bins. But no such addition to the capacity of the wooden bins can be made, because the whole framing would have to be made larger in order to support the increased weight.

Fig. 3, represents the arrangement of the bins in octagonal, quadrilateral and hexagonal form, all of which plans we regard as

inferior modifications of the circular form heretofore described.

Having thus described our invention, we claim and desire to secure by Letters Patent,
5 ent,—

The arrangement and combination of the metallic bins A, in the manner and for the

purposes substantially as herein shown and described.

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Witnesses:

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