M. RANDOLPH.

CONSTRUCTION AND VENTILATION OF BINS FOR WAREHOUSES, &c.

No. 183,069. Patented Oct. 10, 1876.

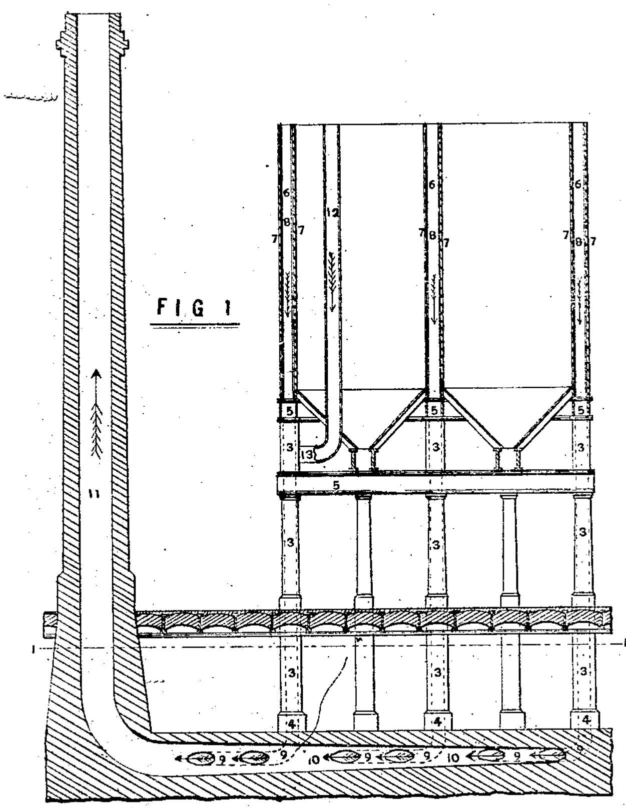

FIG 1

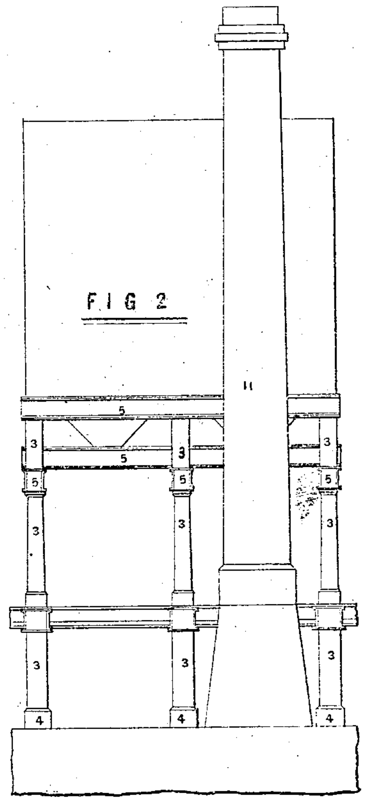

FIG 2

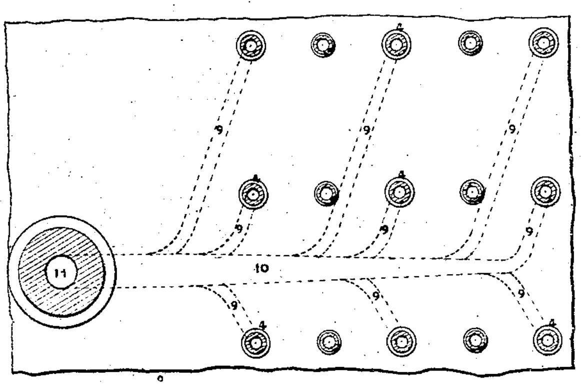

FIG 3

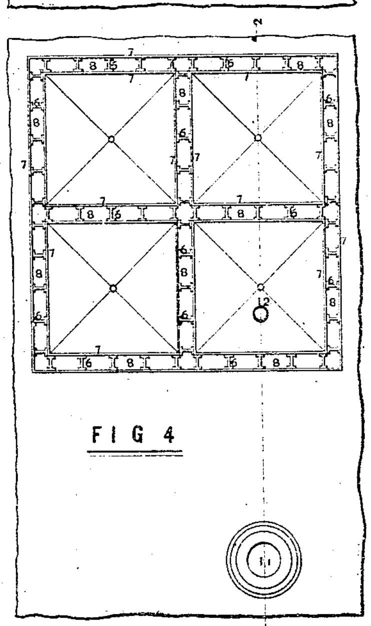

FIG 4

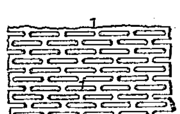

FIG 5

WITNESSES

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IMPROVEMENT IN CONSTRUCTION AND VENTILATION OF BINS FOR WAREHOUSES, &c.

Specification forming part of Letters Patent No. **183,069**, dated October 10, 1876; application filed September 21, 1876.

To all whom it may concern:

Be it known that I, MAHLON RANDOLPH, of the city, county, and State of New York, have invented a new and useful Improvement in the Construction and Ventilation of bins for Warehouses and Vessels for Storing and Transporting Grain in Bulk; and I hereby declare the following to be a specification of the said improvements.

The object of this invention is to construct bins for holding grain in bulk, either in warehouses or on shipboard, in such a manner as to allow a free circulation of air around and through the bin in which the grain is held, so as to prevent its heating or spoiling.

The invention consists in forming the bins for holding grain of hollow partitions and walls by using thin perforated metal plates riveted to vertical **I**-beams, used as posts or studs. The hollow partitions thus formed rest on tubular iron beams, which are constructed so as to be used as air-ducts, and these tubular beams, in the case of buildings, rest upon cylindrical iron posts, that are also used as air-ducts. The air for ventilation is drawn down through the hollow walls of the bins by a powerful suction-draft, and passes through the tubular girders, on which the bins rest, and thence down through the supporting-columns, through the collecting-ducts in the substructure to an upcast shaft, through which it escapes into the open air. The upcast shaft is heated by steam-coils, or otherwise provided with artificial means to produce a suction-draft through the air-passages of the bins. The collecting-ducts in the substructure are constructed with gradually-enlarging sectional areas, from remote portions of the building toward the upcast shaft, so as to cause an equal air-current from all parts of the building or vessel.

A building constructed on this improved plan will be practically fire-proof, so far as the elements of destruction by fire rest within itself, and at the same time there will be none of that danger of spoiling grain while in these bins by the dampness of condensed moisture on the metal plates usually attendant on the use of iron for similar purposes, for the system of ventilation used will not only carry off the dampness inherent in a building constructed of iron, but also the superabundant humidity of the grain itself.

The invention will be readily understood by reference to the accompanying drawings, of which—

Figure 1 is a sectional elevation of a bin-warehouse, taken on the line 2 2 of Fig. 4, showing the improved form of construction. Fig. 2 is a side elevation of the same. Fig. 3 is a sectional plan taken on the line 1 1 of Fig. 1. Fig. 4 is a general plan, showing the tops of the bins and the walls forming their sides. Fig. 5 is a detail of the side plating used in the construction of the bins.

The building rests on posts 3, that stand on cast-iron base-blocks 4, which are placed below the principal floor. The posts 3 are constructed hollow, as is customary, and the ends of them are so formed as to fit them for use as air-ducts. The base-blocks 4, that support the posts 3, are constructed with curved air-ducts, that form a curved elbow, connecting the air-passage of the column with the lateral ducts of the substructure.

The base-blocks are to rest upon solid piers of masonry, and are to be so designed as to afford the requisite strength to support the superstructure, as well as to form the curved air-passage.

On top of the posts 3 there will be placed iron tubular girders 5, so constructed as to permit the use of the interior chamber of them for air ducts or passages, which will be in open communication with the air-passages of the columns 3.

Upon the girders 5 will be erected the frame-work of the bins, which said frame-work will consist of vertical posts or studs 6, the said posts or studs being formed of iron **I**-beams. To the flanges of these posts or studs there will be riveted thin perforated metal plates 7, in a similar manner to that described in an application for a patent of even date herewith. In the present instance, however, the one air-passage, formed between the plates 7 and supports or studs 6, is used for two adjacent bins, and not for a single bin, as in the case above mentioned. In the present case, however, the plates 7 will require to be increased in thickness toward the bottom of the bin, or strengthened by a strong backing, as described in my

other specification, above alluded to. The detail of the construction of plate 7 is shown in Fig. 5.

The air-passages 8, formed between the vertical supports 6 and the perforated plates that constitute the sides of the bins, will not be open at the bottom, as in my other specification, but will be in communication with the air-ducts in the girders, on which the bins are supported. The air-ducts 9 in the substructure, that lead from the base-blocks 4 to the principal duct 10, may be built of iron, tile, or masonry, and they should be constructed with curved angles, so as to avoid eddies and cross-currents in the air-passages, which would necessarily result from the use of angular elbows or turns.

The principal duct 10 will be built, as shown in Figs. 1 and 3, with gradually-enlarging sectional area, from the remote end of it toward the upcast shaft 11, so as to afford to each of the incoming ducts 9 proper sectional accommodation in the assembling duct. The principal duct 10 will turn up into the upcast shaft 11 with a curved elbow, for the reason already explained with reference to the angles of the smaller ducts. The upcast shaft 11 will be heated by a steam-coil within its base, or by the passage through its vertical axis of the smoke-stack, or by some such suitable means, so as to produce a strong suction-blast down through the air-passages 8 between the bins, and thence through the connecting-ducts or air-passages in the beams 5, posts 3, base-blocks 4, lateral ducts 9 and 10, and the upcast shaft 11.

To provide the necessary ventilation for the interior of the bins, I introduce cylindrical tubes 12, similar to those described in another specification of even date herewith. These tubes are formed of perforated plating, similar to that used for building the sides of the bins, and the cylindrical form of the tubes will secure the requisite strength without any reenforcement of the tube. The said ventilating-tubes 12 are dispersed through the interior parts of the bin, as may be required by the size of the bin and other circumstances. They will be open at the top end, and placed vertically in the bin, and their bottom ends will be connected by air tubes or ducts 13 with the air-passages in the posts 3, or some other convenient and suitable air-duct connected with the structure.

In the use of these ventilated bins on board of vessels, the posts 3 would be dispensed with; but in all other respects the construction of the bins and air-passages would be substantially the same.

Having described my invention, I claim—

1. The ventilating-ducts 8, formed between the perforated side plates 7 and the posts or studs 3, the air-ducts in girders 5 and posts 3, and the lateral ducts 9 and 10, and the upcast shaft 11, the whole combined and arranged so as to form a complete system of ventilating-bins, either in buildings or vessels, substantially as described and set forth.

2. The base-blocks 4, constructed with an interior air-passage for connecting the duct within the column 3, that rests upon the said block 4, with the lateral duct 9, substantially as shown and described.

3. The lateral receiving-duct 10, constructed with a regularly-increasing sectional area as it proceeds toward the upcast shaft 11, substantially as and for the purpose set forth.

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Witnesses:

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