STARK & FISHER.

Grain Dryer.

No. 113,219. Patented Mar. 28, 1871.

Fig. 1.

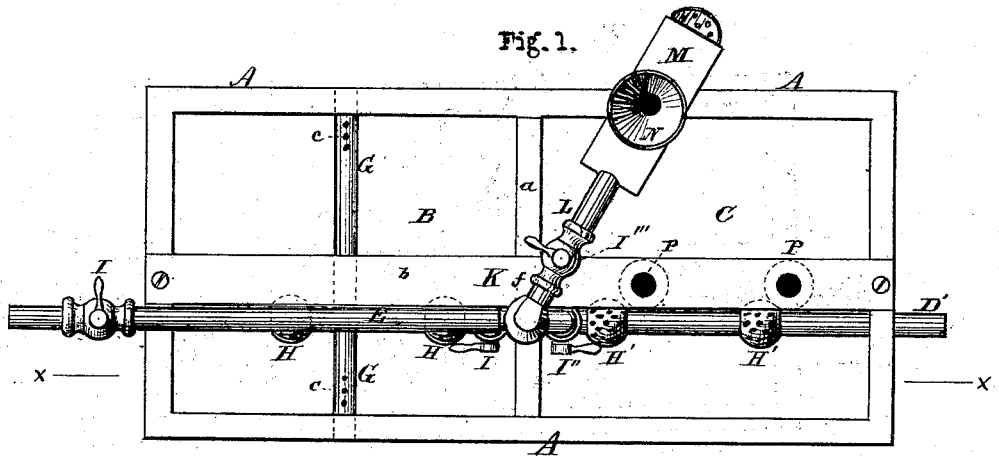


Fig. 2.

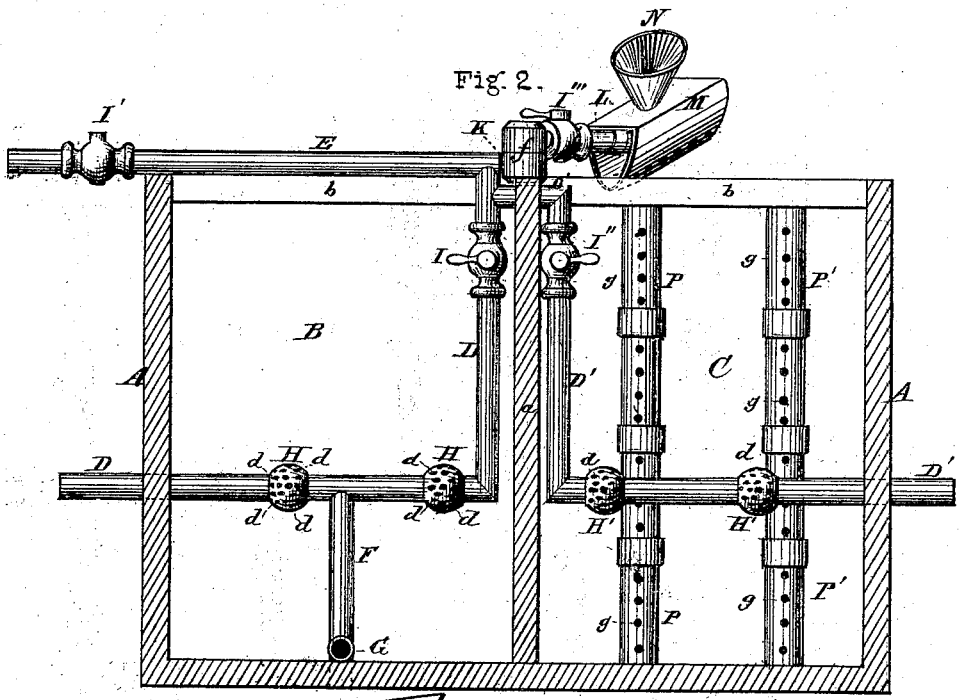


Fig. 3.

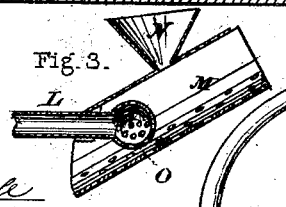
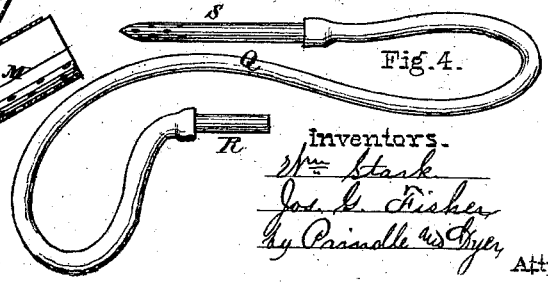


Fig. 4.



Witnesses.

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WILLIAM STARK AND JOSEPH G. FISHER, OF TOLEDO, OHIO.

Letters Patent No. 113,219, dated March 28, 1871.

IMPROVEMENT IN GRAIN-DRIERS.

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

To all whom it may concern:

Be it known that we, WILLIAM STARK and JOSEPH G. FISHER, of Toledo, in the county of Lucas and in the State of Ohio, have invented certain new and useful Improvements in Grain-Coolers and Driers; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification and to the letters of reference marked thereon, in which drawing—

Figure 1 is a top plan view of our grain-cooler and drier;

Figure 2, a vertical longitudinal section on the line *x x* of fig. 1;

Figure 3, a vertical longitudinal central section of the adjustable ventilated funnel detached; and

Figure 4, a sketch of the detachable flexible ventilating-pipe and nozzle.

Like letters denote like parts in each figure.

The object of our invention is the construction of bins for the cooling and drying of grain in a simple, cheap, and effective manner by the employment of currents of air; and

Our invention consists in the adjustable ventilated screen and funnel of novel construction, through which the grain passes before it enters the bin; in the construction and arrangement of the ventilating-pipes within the bin; in the construction and arrangement of the shell of the bin; and in the construction and arrangement of its several parts, all as more fully hereinafter described.

In the drawing—

A represents the shell of the bin, constructed of suitable materials, and separated, by a close vertical cross-partition, *a*, into two nearly equal parts, B and C. This shell A is inclosed upon all sides except the top, which is crossed centrally from end to end by a plank or beam, *b*.

A metallic pipe, D, enters one end of the wall of the shell at a point about one-third of the distance from the bottom to the top; thence proceeding, in the same vertical and horizontal planes, to a point near the partition *a;* thence turning at right angles and running directly upward by the side of said partition to the top of the bin, where it enters a similar pipe, E, which runs along the top of the bin in planes parallel to those of the pipe D.

From a point near the center of the pipe D a branch, F, runs directly downward nearly to the bottom of the bin B, where it enters the center of another pipe, G, which extends across the bottom of said bin from side to side at right angles with the line of direction of the pipe D. The ends of this pipe G are provided with perforations *c*. The pipe D is also provided with globular enlargements H on each side of the branch-pipe F, which enlargements are perforated on all sides with suitable openings *d*. The vertical portion of the pipe D is provided with a suitable adjustable valve, I, near its upper end, and the pipe E with a similar valve, I^1, near its outer end.

From a point near the top of the vertical portion of the pipe D, and between its valve I and the pipe E, another pipe, D′, extends over the top of the partition *a* into the bin C; then turns down at right angles, running by the side of said partition to a point within said bin coincident with the pipe D; then turns again at right angles, and in the same planes as those of the pipe D, and runs through the bin C and through the outer wall of its shell.

This pipe is, like the pipe D, furnished with a suitable adjustable valve, I^2, placed near the upper end of its vertical portion, and with globular perforated enlargements H′ placed upon its horizontal portion in similar positions to those placed on the pipe D.

Into the inner end of the pipe E a short pipe, K, attached to a hollow joint, *f*, enters, which joint is capable of lateral movement.

To the upper part of this joint a pipe, L, is attached, provided with a suitable adjustable valve, I^3. This pipe enters into and is secured to the screen M, upon which the funnel N is placed, and terminates within said screen in a globular perforated enlargement, O.

The screen M, which is hollow, open at each end, and provided with perforations in its bottom, is hemispherical in a cross-section, with the flat side uppermost, and is secured to the pipe L at an inclination of about thirty degrees from a horizontal plane, with its outer end elevated, and sloping inwardly toward the center of the bin.

Attached to the top of this screen is the funnel N, the bottom of which opens into the interior of the screen at a point a little outside of the globular end O of the pipe L.

A couple of hollow tile-columns, P and P′, provided with suitable perforations *g*, extend vertically from the under side of the beam *b* to the bottom of the bin C, which has holes through its bottom corresponding with the openings in the bottoms of said tile-columns P and P′. The columns are placed at about equal distances from the center of the bin C, and from the partition *a* and the inner walls of the bin.

A flexible pipe, Q, provided with a metallic end, R, of a size proper to fit into the ends of the pipes D D′, E, G, and K, which are all alike in size, has at its outer end a perforated nozzle, S. The length of this pipe is sufficient to enable it to reach to any part of the bins B and C, and its nozzle is made as long as can be conveniently handled.

The length of the removable pipe L is such that it will permit the screen to rest upon the side walls of

the bins B and C, as shown in fig. 1, with the inner end of the screen upon the inside of said bins.

The pipes named should be of a size suitable for the bins in which they are employed, but in the bins ordinarily used in grain-elevators a diameter of three inches will be found sufficient. The same remark applies to the tile-columns P and P′, of which a diameter of eight or ten inches will be found suitable for such bins as those above named.

Having thus described the construction of our grain-drier and cooler, the uses and operation of its several parts are as follows, viz:

The object of two bins, B and C, is for the reception of grain of different degrees of heat or moisture, or of different descriptions of grain requiring different treatment in drying and cooling, the bin C being for the grain which is dampest. The screen M is so placed that its inner end shall project a little over the bin designed to be filled, while the remainder of it shall project over the outside of the bin. A suitable blower is employed, having a flexible pipe, which will fit into the ends of either of the pipes D D′, E, G, or K.

The grain for the bin is received through the funnel N. If the grain is dry, and simply dusty, the blast is received through the pipe E, and, passing through the screen M, causes all the grain, as it falls into said screen, to be submitted to a current of air, the force of which may be regulated by the valves I^1 and I^3, which blows all the dirt out through the outer open end of said screen, while the grain slides into the bin through the inner open end. In this operation the heavier particles of sand may fall through the perforations in the bottom of the screen.

When grain which is a little heated or damp is being received through the tunnel, as before described, the valve I^1 is closed, and the air-pipe is attached to the outer end of the pipe D, or to either end of the pipe G, (in which last instance the opening at the end of the pipe D should be closed in any suitable way,) and the current of air should be allowed to pass through the pipes G F D, a portion escaping through the perforations *d* and *c* in said pipes, and the remainder out through the pipe L and the screen M.

In like manner, when the grain is being received into the bin C, the air-pipe may be attached to the outer end of the pipe D, and the operation proceed as before.

When either bin is filled and it is desirable to dry and cool the grain still more, the valve I^3 should be closed, and the whole force of the blast expended in one or both of the bins, or in either alternately; and the blast may be applied at the open end of either of the pipes, all the other open ends being closed.

The object of the flexible tube Q is to apply it to the pipe E, so that the current of air passing through it may, by means of the nozzle S thrust into the grain, be directed into the corners of the bins, and into those places where there seems to be the greatest heat or dampness.

The object of the tubular columns P and P′ is, in part, to receive constantly some portion of the air from the outside through the openings in the bottom of the bin at the lower ends of said columns, but more particularly to receive and discharge the moisture from the grain.

When the screen and funnel are not in use in receiving grain they may be placed conveniently and securely upon the plank or beam *b*.

Having thus described the nature, construction, and method of operation of our device,

What we claim as new therein is—

1. The screen M, provided with funnel N and pipe L, substantially as described and shown, for the purposes set forth.

2. The arrangement within the bins B C of the pipes D D′ E F G, provided with valves I I^1 I^2, and globular enlargements H and H′, and perforations *c* and *d*, substantially as described and shown, for the purposes set forth.

3. The combination of the screen M and the pipe E, substantially as described and shown, for the purpose set forth.

4. The combination of the screen M and the pipes E, D D′, F, G, K, and L, substantially as described and shown, for the purposes set forth.

5. The arrangement of the bins B and C, the partition *a*, the beam *b*, the pipes D D′, E, F, G, and K, and the perforated tile-columns P P′, substantially as described and shown, for the purposes set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 22d day of October, 1870.

WILLIAM STARK.
JOSEPH G. FISHER.

Witnesses as to WILLIAM STARK:
MERRITT KING,
BENJAMIN STARR.

Witnesses as to JOSEPH G. FISHER:
J. K. HAMILTON,
ROBERT A. DURFEE.