(No Model.)

W. H. POWER.

HEAT INDICATING DEVICE FOR GRAIN BINS.

No. 304,279. Patented Aug. 26, 1884.

Fig. 1.

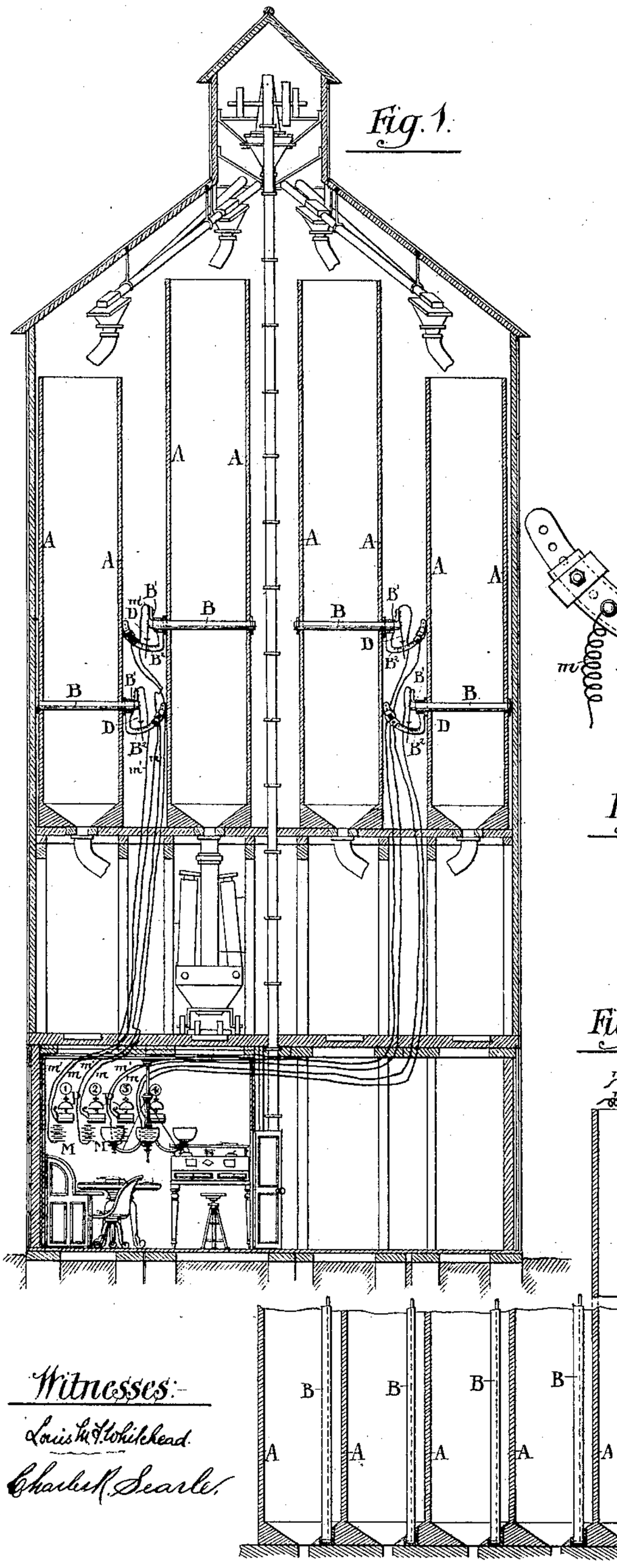


Fig. 2.

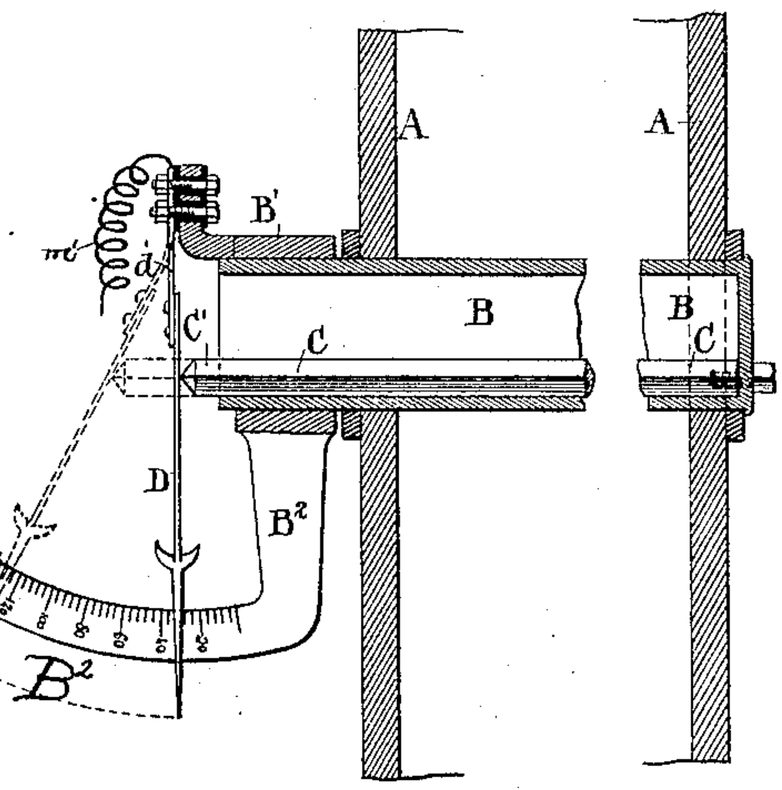


Fig. 3.

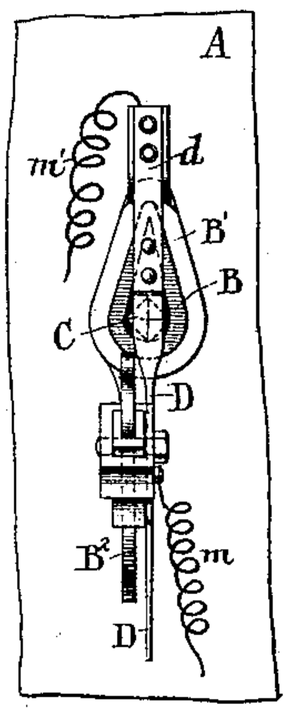


Fig. 4.

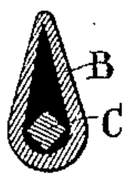
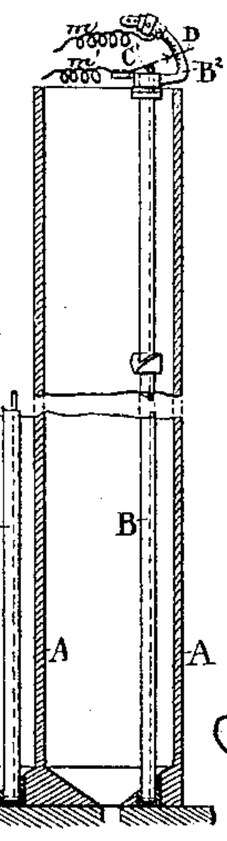


Fig. 5.



Witnesses:-

Louis W. Whitehead.

Charles F. Searle.

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UNITED STATES PATENT OFFICE.

WILLIAM H. POWER, OF MONTCLAIR, NEW JERSEY.

HEAT-INDICATING DEVICE FOR GRAIN-BINS.

SPECIFICATION forming part of Letters Patent No. 304,279, dated August 26, 1884.

Application filed February 14, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. POWER, of Montclair, Essex county, in the State of New Jersey, have invented certain new and useful Improvements relating to Heat-Indicating Devices for Grain-Bins, of which the following is a specification.

The object is to detect any heating of the grain at an early stage in order to take measures promptly to remedy the mischief when such occurs.

I construct the bin with one or more tubes extending across the interior, which tubes are peculiarly formed and equipped to indicate on the exterior of the bin the temperature at the central portion. Each tube is of a greater height than breadth, and is sharpened at the top and bottom. Its vertical depth gives stiffness to resist the downward movement of the grain, and its little width and the form of its upper and lower edges cause it to be but slightly influenced by the slow movement of a mass of grain under heavy pressure.

The following is a description of what I consider the best means of carrying out the invention.

The accompanying drawings form a part of this specification.

Figure 1 is a vertical section of an elevator, showing four bins with sufficient spaces between them to allow the tubes and expansion-bars to extend horizontally with the exterior devices of each bin out of sight. Figs. 2, 3, and 4 represent parts of the same on a larger scale. Fig. 2 is a vertical section in the plane of one of the tubes. Fig. 3 is an end elevation of one of the tubes and the connected mechanism. Fig. 4 is a cross-section through one of the tubes and its contained copper rod. Fig. 5 is a vertical section on a small scale, showing the application of my invention to a set of bins arranged in the ordinary manner with no spaces between them.

To adapt my invention to bins under these conditions the tubes and contained rods are extended up and down, and the mechanism actuated by the difference of expansion is above the top of each bin.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

Referring to Figs. 1, 2, 3, and 4, A A represent the walls of a grain-bin, which may be of any ordinary or suitable construction, and equipped with any suitable provisions for introducing grain at the top and discharging it at the bottom.

B is a tube of iron, or preferably steel of medium grade, reduced by treatment between suitable swages or rollers to an approximately wedge-shaped form, mounted edge uppermost. It extends across the bin, being strongly supported with one end extending out through the wall.

C is a bar of copper fitted loosely within the tube B, and it extends out at one end and is immovably connected to the tube at the opposite end. The end which extends out is marked C′, and the bar is supported on the bottom of the tube B, with liberty to expand and contract, its free end sliding freely backward and forward as the changes of temperature acting on the different materials of the steel tube B and the inclosed copper bar C may require.

D is a light lever connected by a piece of hoop-skirt spring, *d*, to a fixed bracket, B′, carried on the tube B. A graduated and figured arc, B^2, is also connected rigidly to the projecting end of the tube B. So long as the interior of the bin and consequently the main portion of the steel tube B and of the copper bar C are at ordinary temperatures, the end of C presses gently against the lever D, the point at which it is held indicating 60 or 70 on the graduated and figured arc B^2, those figures meaning approximately those degrees Fahrenheit; but when, through any unfavorable conditions, the grain in the interior of the bin commences to heat, the increased temperature, being communicated to the tube B and its inclosed bar C, is manifested by a greater expansion of the bar C than of the tube B, and consequently a change of position of the lever D, so as to indicate 90, 100, or more.

M is a Leclanché or other suitable battery situated in the office or at any other convenient point where it can be readily attended to. From the positive pole of this battery an insulated wire, *m*, extends from an ordinary magnetic vibrating-bell apparatus, P, in the office to a point on the scale B^2. Another insulated

wire, m', extends from the lever D back to the battery and connects to the negative pole thereof. The end of the wire m is held in the path of the lever D, and is adjustable at any desired point on the arc B^2. When the heat in the bin has, by the difference of expansion between the bar C and the tube B, forced the lever D into contact with the wire m, a complete circuit will be formed, and the vibrating bell P will produce a loud sound in the office, calling attention to the condition of the grain in the bin. Proper steps will then be immediately taken to discharge the bin or to cool the grain by the means set forth in the patent to Edward Annan, dated May 16, 1882, No. 257,997.

In elevators having a large number of bins there may be a corresponding number of the wires m, and a corresponding number of the vibrating bells P. All the levers D may connect with a single wire m'. The adjustability of the position of the contact end of m enables me to allow for the ordinary high temperature of summer without inducing an alarm. The same temperature in the winter would indicate an approaching bad condition of the grain and require prompt measures for its avoidance. The adjustment should be made to give the alarm at a low point—say 60°—in the cool months, and a higher point—say 80°—in July and August.

When the apparatus is applied to the Annan grain-bin, set forth in the patent to Edward Annan, above referred to it, it is of service in indicating to what extent the required low temperature has pervaded the mass of grain, and for what length of time it is maintained. It is important for the destruction of weevil to lower the temperature to about 25° Fahrenheit, and to keep it at that temperature for some hours. The arrangement shown in Fig. 5 may be adopted with the Annan or any other ordinary bins. The tube B and its inclosed rod, having a different rate of expansion and contraction with heat, should be mounted as near the center of the bin as is practicable. There may be an occasional cross-bar of iron or other material at intervals to aid in supporting the tube against a lateral pressure of the grain.

In the upright arrangement the mechanism may be the same as in the other, and it will operate in a similar manner. The tube B and the inclosed rod C may be of the section shown in Fig. 4, and fastened rigidly together at the lower end, and allowed to change their positions relatively to each other at the upper ends. The upper end of the tube and its contained rod may be steadied by a cross-timber at the top.

Modifications may be made in the details. The spring d may be made in one with the lever D, or may be dispensed with altogether, and the gravity of the lever D depended on to induce it to follow the bar C as the temperature is reduced from time to time.

I attach importance to the fact that the expansible rod C is protected from mechanical deflection by being inclosed in a strong tube, and also to the fact that the tube is of pear-shaped section, thus dividing the grain easily. The tube protects the rod C from being deflected by the motion of the grain. If the rod were subject to the action of the grain, it would be curved to variable extents, according to the varying pressure of the grain, as the quantity above is increased or diminished, and the varying adhesion of the grain as the latter varies in dampness, and consequently in adhesion. The tube, by taking all the transverse strain, allows the rod to remain practically straight and free from strain. Its expansion and contraction easily operate the index.

I claim as my invention—

1. In a grain-bin, substantially as described, the combination, with the tube B, formed of greater transverse dimensions vertically, and with the thermostatic appliances C B^2 D, as shown, of the battery M, an alarm, connections m m', and means for adjusting the connections m, so that the alarm will be given when the lever D indicates any desired predetermined point, as set forth.

2. In a grain-bin, substantially as described, and in combination with the structure A and thermostatic appliances, as C D B^2, &c., the tube B, formed of greater transverse dimensions vertically than horizontally, and having its sharper portion extending upward to withstand the friction of the descending grain, and to facilitate its passage, as herein specified.

In testimony whereof I have hereunto set my hand, at New York city, this 13th day of February, 1884, in the presence of two subscribing witnesses.

WM. H. POWER.

Witnesses:
R. A. CARTER,
THEO. C. KOBBE.