

No. 638,429.

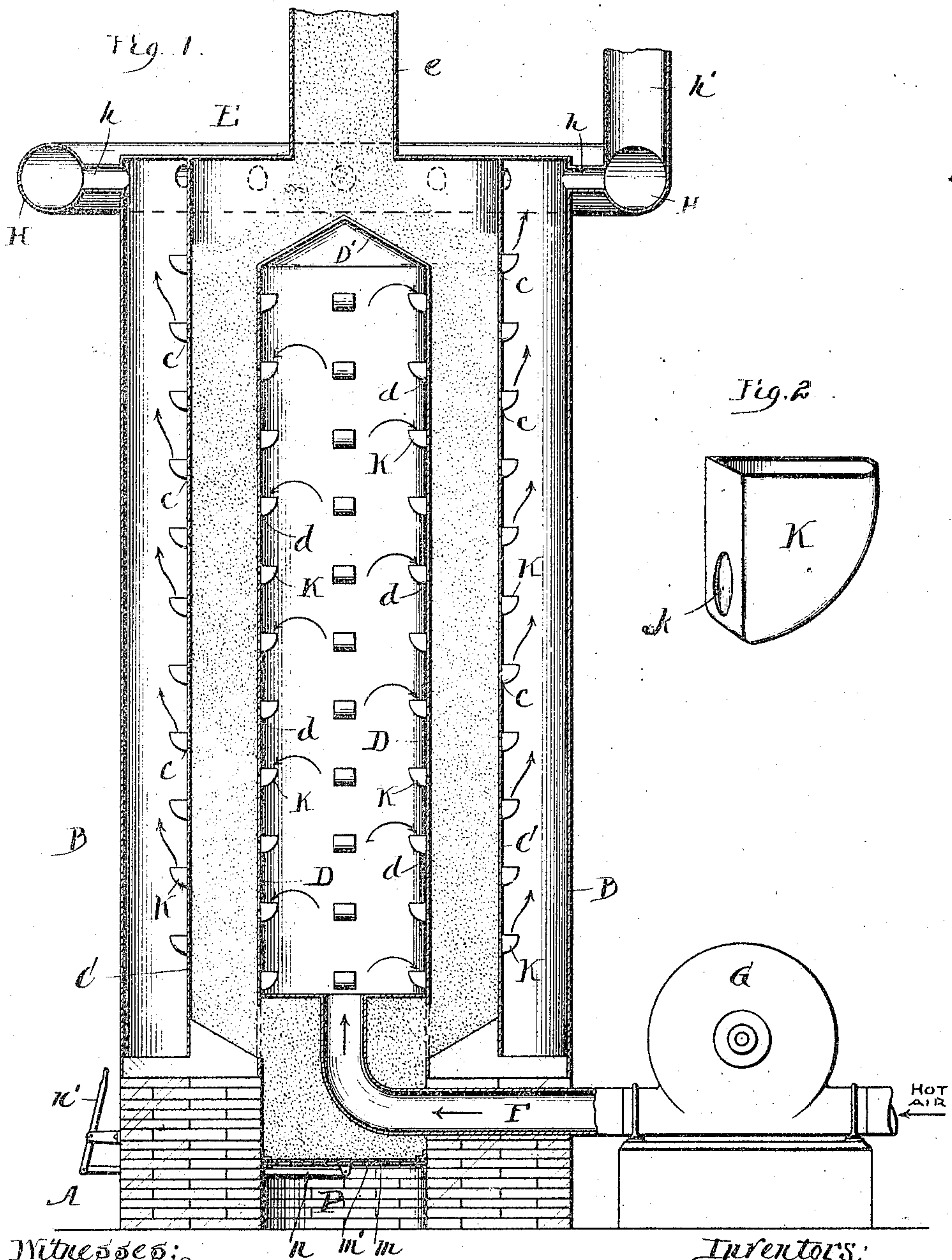
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W. TWEEDALE & W. L. HARVEY.

APPARATUS FOR DRYING GRAIN.

(Application filed July 12, 1899.)

(No Model.)



Witnesses:  
Oliver P. Dennis  
Alberta Adamick

Inventors:  
Wm. Tweedale & W. L. Harvey  
By Edwin V. Fisher  
his Attorney.



# UNITED STATES PATENT OFFICE.

WILLIAM TWEEDALE AND WILLIAM L. HARVEY, OF CHICAGO, ILLINOIS.

## APPARATUS FOR DRYING GRAIN.

SPECIFICATION forming part of Letters Patent No. 638,429, dated December 5, 1899.

Application filed July 12, 1899. Serial No. 723,548. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM TWEEDALE and WILLIAM L. HARVEY, residents of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Drying Grain, of which we declare the following to be a full, clear, and exact description.

The present invention has for its object to provide a simple, cheap, and effective apparatus whereby grain may be quickly and uniformly dried; and the invention consists in the features of construction hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claims at the end of this specification.

Figure 1 is a view in central vertical section through an apparatus embodying our invention. Fig. 2 is an enlarged detail view of one of the air-port guards.

Upon a suitable foundation A are mounted three walls or cylinders B, C, and D, preferably of sheet metal, concentrically arranged, these several cylinders B, C, and D being preferably formed of horizontal sections suitably united together. The outer wall or cylinder B and the intermediate wall C are united together by the top plate or cover E, from the center of which a grain-delivery spout *e* rises. The top of the cylinder D is closed by a cover D', preferably of conical shape, in order to better distribute the grain as it enters the drier. Into the bottom of the cylinder D leads a hot-air-delivery pipe F, through which pipe hot air will be forced by a suitable blower G. At convenient points from top to bottom of the cylinder D are formed air-discharge ports *d*, through which the hot air will be forced into the body of grain to be dried, this body of grain filling the annular chamber between the cylinders C and D. In like manner also a series of air-ports *c* will be formed in the wall or cylinder C, and the air passing through these ports *c* will escape through the short pipes *h* into the bustle-pipe H, whence it will be removed by the discharge-pipe *h'*. The bustle-pipe H, which is preferably of annular shape, will surround the top of the wall or cylinder B, and the short pipes *h* will connect this bustle-pipe with the cylinder B at convenient intervals around the top of such cylinder. As the grain to be dried will occupy the space be-

tween the walls or cylinders C and D, we provide the ports *c* and *d* with suitable guards K to prevent the passage of grain through these ports. The preferred construction of guard is that illustrated in detail in Fig. 2 of the drawings, and consists of a quadrant-shaped cup having an open top and having a hole *k* adapted to coincide with the corresponding ports *c* or *d*, over which the guard will be fastened. At the base of the wall or cylinder D is formed a series of openings through which the grain will pass downward to the base of the drier from the annular space between the cylinders C and D.

In order to regulate the passage of the grain, and consequently the extent of time during which it shall remain within the drier, we provide the base of the drier with a suitable valve mechanism, one convenient form of valve mechanism being that illustrated in the drawings. As shown, this valve mechanism consists of two corresponding grids *m* and *m'*, the grid *m* being fixed, while the grid *m'* is movable, so that the open space of one grid may be caused to coincide more or less with the open space of the other grid, the extent of such coincidence determining the rapidity of the discharge of the grain. To the grid *m* is connected a shifter-rod *n*, that will be operated by a hand-lever *n'*, pivoted at one side of the apparatus. The valve mechanism shown is of familiar construction, and it is obvious that any suitable form of valve mechanism may be employed in place thereof. The grain after being dried will descend into the space P at the base of the apparatus, from whence it will be removed by any convenient means.

From the foregoing description it will be seen that when a body of grain is to be dried it will be delivered through the spout *e* into the annular space between the walls or cylinders C and D. A blast of hot air will then be admitted through the air-delivery pipe F, and this air will be forced through the ports *d*, through the body of grain, through the ports *c*, and will finally escape by the bustle-pipe H and discharge-pipe *h'*. The arrangement of ports *c* and *d* is such as to insure a uniform drying of the grain, the body of grain being subjected not only to the hot air passing through it, but as well also to the heat of the walls of the cylinders C and D. The ar-



5 rangement of the bustle-pipe II and the air-pipes *h* around the top of the cylinder B also aids in securing the uniform withdrawal of the air, and consequently a more uniform passage of the heated air through the grain.

10 We are well aware that various forms of apparatus have been heretofore devised for drying grain; but we believe that no prior structure has attained the advantages incident to our present invention.

15 In prior constructions it has been proposed to force air through a combustion-chamber and pass the heated products of combustion under pressure through perforated vertical cylinders between which an annular column of grain was sustained, said cylinders being surrounded with a jacket. Such prior devices, however, are impractical for the drying of grain, first, because the passage of products of combustion from a furnace through the grain would so contaminate and injure the grain by reason of the odors, dirt, &c., as to ruin it even if it did not set fire thereto. Moreover, in such prior construction no provision was made for preventing the passage of grain through the perforations of the vertical cylinders. Consequently if the perforations of the cylinders were large enough to allow the passage of air therethrough without clogging up, such perforations would also permit the flow of grain through the cylinders, and thus defeat the operation of the apparatus. Our present invention overcomes all of the above objections. In our apparatus heated air free from products of combustion is delivered to the drier, and inasmuch as the perforations of the cylinders are provided with upwardly-extending guards these perforations can be made of sufficient size to permit the passage of air through the cylinders and through the grain without danger of the escape of grain through the walls of the cylinders.

45 While the above-described apparatus is more particularly designed for the drying of grain, it is obvious that it can also be used

for the purpose of cooling grain either after it has been dried or where no preliminary drying has been had. So, also, instead of employing a blower G for effecting a forced draft of air the suction fan or blower might be attached to the outlet-pipe to accomplish the same purpose.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A drying apparatus comprising a vertical outer wall or cylinder B, a vertical inner wall or cylinder D having a closed top, and an intermediate vertical wall or cylinder C, all of said walls being formed of thin metal, said inner and intermediate walls or cylinders being provided with air-ports, upwardly-extending guards secured to the inner wall of the inner cylinder and the outer wall of the intermediate cylinder opposite said air-ports to prevent the passage of grain through said ports, an air-delivery pipe leading to the bottom of said cylinder D, and an air-discharge passage for the escape of air from the top of the chamber formed by the cylinders B and C.

2. A drying apparatus comprising a vertical outer wall or cylinder B, a vertical inner wall or cylinder D having a closed top, and an intermediate vertical wall or cylinder C, all of said walls being formed of thin metal, said inner and intermediate walls being provided with air-ports, upwardly-extending guards secured to the inner wall of the inner cylinder and the outer wall of the intermediate cylinder opposite said air-ports to prevent the passage of grain through said ports, an air-delivery pipe for conducting air free from products of combustion to the bottom of said cylinder D, and a series of air-discharge ports for the escape of air from the top of the chamber formed by the cylinders B and C.

WILLIAM TWEEDALE.  
WILLIAM L. HARVEY.

Witnesses:

GEORGE P. FISHER, Jr.,  
ALBERTA ADAMICK.