

G. E. SCOTT.

DRIER.

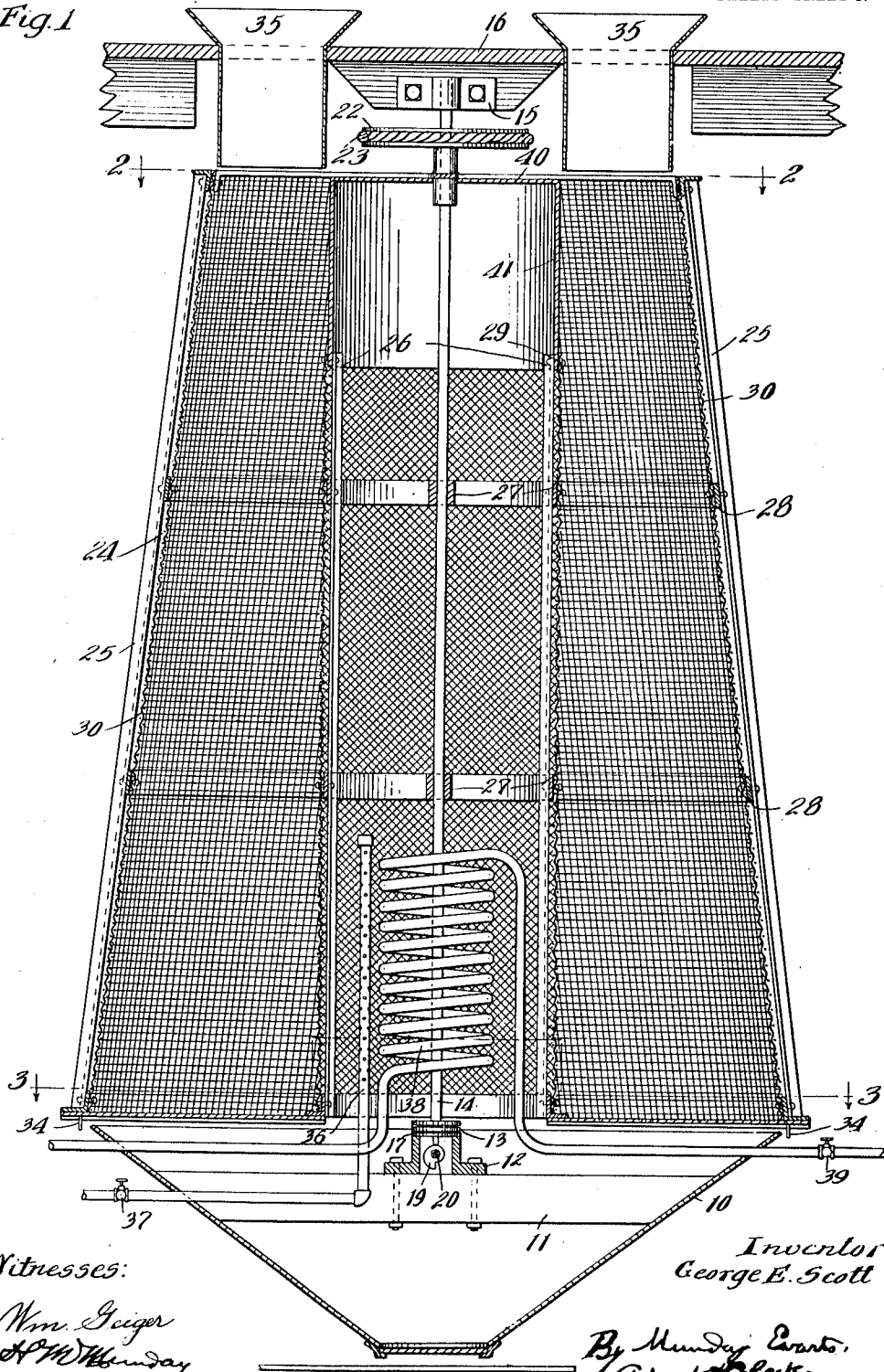
APPLICATION FILED JAN. 29, 1912.

Patented Sept. 24, 1912.

2 SHEETS—SHEET 1.

1,039,449.

Fig. 1



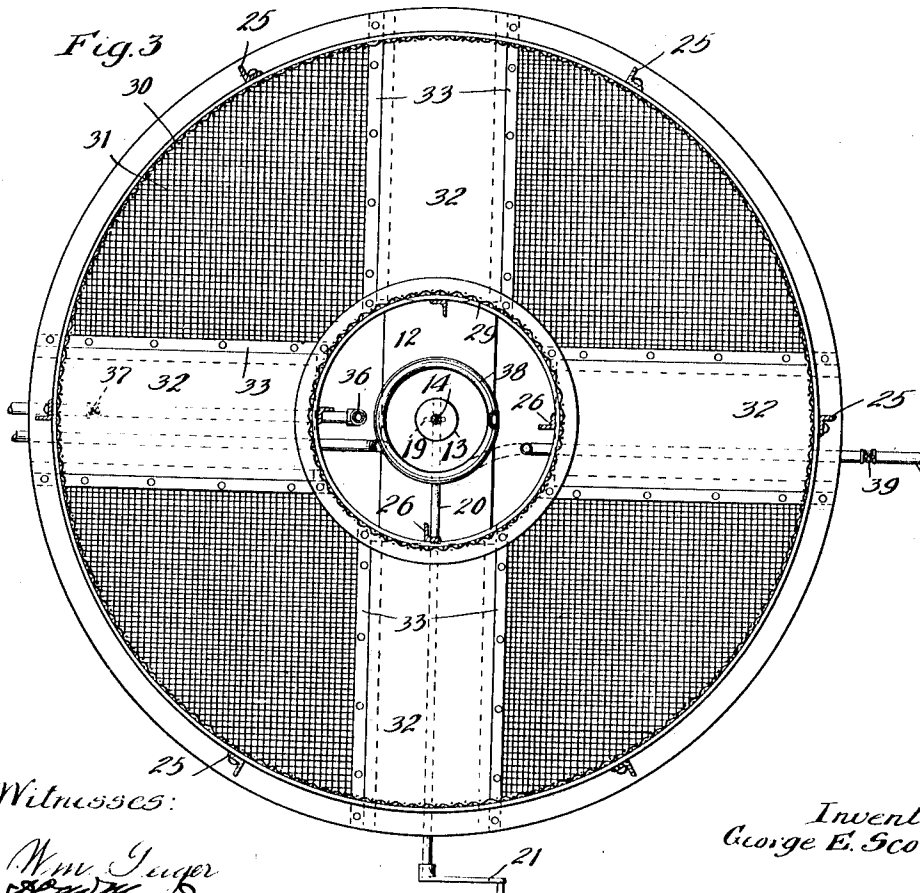
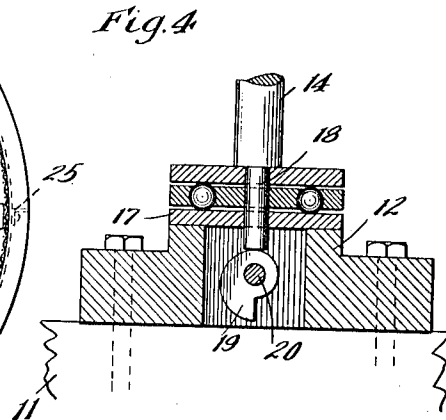
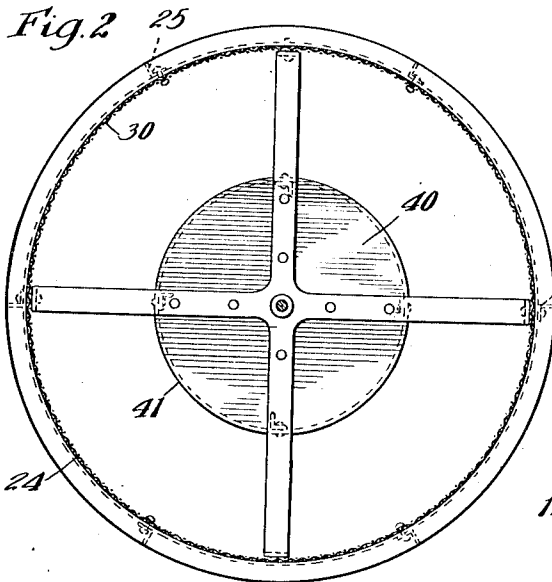
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Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE E. SCOTT, OF CHICAGO, ILLINOIS.

DRIER.

1,039,449.

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To all whom it may concern:

Be it known that I, GEORGE E. SCOTT, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Driers, of which the following is a specification.

This invention relates to improvements in driers which are particularly adapted for drying corn on the cob, grain, beans or similar articles.

The object of this invention is to provide a structure or device which will dry grain or similar articles by driving off the moisture which remains in the articles as the same are harvested, and which shall dry the materials or articles evenly without blistering and with great rapidity, and requiring only a minimum expenditure of energy.

One form of my invention which attains these objects consists in providing an upright, rotatable annular drum having interior and exterior wire mesh walls, said drum being mounted on a vertical shaft adapted to be driven by a pulley from any suitable outside source of power, the drum being open at its top end and being provided at its bottom with a plurality of movable doors or gates; and a source of compressed air adapted to be heated by any suitable means such as a steam coil, the source of compressed air and steam coil being located within the interior of the drum. Further improvements in connection therewith consist of a hopper below the drum adapted to catch the materials as they are dropped from the drum, and an endless conveyer below the hopper onto which the dried materials are dropped and conveyed to other parts of the factory, means for reciprocating the shaft and the drum therewith, and a solid metal band and cap located on the interior and top of the drum.

The invention furthermore consists in the improvements in the parts and devices and in the novel combinations of parts and devices herein shown, described or claimed.

In the drawings forming a part of this specification, Figure 1 is a vertical, diametrical section of an apparatus embodying my improvements. Fig. 2 is a section taken on the line 2—2 of Fig. 1, looking in the direction of the arrows. Fig. 3 is a horizontal

sectional view, taken on the line 3—3 of Fig. 1, looking in the direction of the arrows, 55 and Fig. 4 is an enlarged detail view, illustrating the bearing for the vertical shaft and the cam for oscillating the same.

In the drawings, 10 denotes any suitable form of hopper and adapted to support a joint or other form of supporting member 11, on which is mounted a block 12, adapted to support a thrust ball bearing 13 and sustain a vertical, rotatable shaft 14, the upper end of the shaft 14 being slidably mounted 65 in a bracket or bearing 15 secured to any suitable portion of the flooring 16. Mounted on the block 12 is a plate 17 through which the reduced end 18 of the shaft 14 is adapted to loosely slide up and down and 70 operated as by means of a cam 19, rigidly attached to a shaft 20 in any suitable manner, having a crank or handle 21 at its outer end, whereby the shaft 20 may be rotated and reciprocate the shaft 14 up and down 75 whenever it is found necessary to shake the contents of the drum in order to loosen the same and assist in the removal of the contents through the bottom. Secured to the upper end of the shaft 14 is a suitable pulley 22 adapted to be driven as by means of 80 a belt 23. Secured to the shaft 14 and rotatable therewith is an annular drum 24, which is shown in the form of a frustum of a hollow cone, but which may be of any 85 other suitable shape, the same comprising a frame composed of a plurality of vertically extending exterior angle irons 25, interior, vertically extending angle irons 26, interior and exterior bands or rings 27 and 28, the same being secured together by any 90 suitable means, such as rivets. Mounted on this structural iron framework are inner and exterior walls 29 and 30, the same being composed of wire mesh of heavy stock. The 95 inner wall 29 is cylindrical, whereas the outer wall 30 is conical so that the annular drum tapers from the bottom toward the top, whereby, when the material is to be let out of the drum, the same will be prevented 100 from jamming and will readily fall through the openings in the bottom of the drum. The bottom of the drum is also covered with wire mesh 31, and is provided with a plurality of doors 32, the same being slidably 105 mounted in suitable guides 33, each of said

doors being provided with a handle 34, whereby the same may be drawn out when desired. The upper end of the annular drum is open, and the material or articles to be dried are adapted to be fed into the drum through this open end from chutes 35 mounted in the floor 16. Located within the inner or interior wall 29 of the annular drum is a perforated pipe 36, the same being connected with any suitable source of supply of compressed air or other gas, and adapted to have the supply regulated as by means of a valve 37. Adjacent the air pipe 36 and surrounding the shaft 14 is a coil of steam pipe 38 also connected to any suitable source of steam supply and adapted to be regulated by the valve 39.

In practice, I have found, if the hopper when started is completely filled with the grain or other articles, that as the moisture is gradually driven off, the bulk of the material decreases or shrinks and leaves an unfilled space at the upper end of the hopper. In order, therefore, to prevent the heated air or gas from passing out through this unfilled space, instead of being forced through the inner and outer porous walls of the drum and thereby through the material, I have provided a plate 40 which extends over and covers the inner open end of the drum, and a band of metal 41 extending down a short distance from the top along the interior of the drum.

In operation, the drum, with all the bottom doors closed, is filled with the corn on the cob, or other materials or articles to be dried from the chutes 35, and the drum then rotated at a speed approximating fifty revolutions per minute. The air or other gas coming from the pipe 36, upon being heated, rises and is forced out through the porous inner wall of the annular drum, and then circulates between the articles or materials in the hopper, and finally passes out through the outer porous wall of the drum or through the open top or porous bottom thereof. The heated air in passing from the interior to the exterior of the drum gradually becomes surcharged with moisture and hence its weight becomes gradually greater, and due to the centrifugal action of the rotating drum, is thrown or forced out through the wall of the drum. The mechanism which I have devised has, in practical operation, proved extremely efficient, and by actual experiment, has dried in twenty-four hours the same quantity of material which in former devices has required ninety-six hours, and has produced a more uniform and satisfactory product, and does not blister the materials in the drum at any point.

I have shown my invention as applied to one form of structure which is merely illustrative, and it is obvious that many changes

and modifications may be made without departing from the spirit of my invention, and all such changes and variations are contemplated as fairly fall within the scope of the appended claims.

I claim:—

1. In a drier, in combination, a vertical, annular, rotary drum having portions of its interior and exterior walls porous, through which are adapted to pass gases, a gas-heating device located within said drum, and means for rotating the drum.

2. In a drier, in combination, an annular drum having porous walls, and provided with an opening at each end thereof through which the articles or material being dried may be admitted and taken out, and gas-heating means located within said drum.

3. In a drier, in combination, a rotary drum adapted to allow gases to pass there-through, means for supplying a heated gas to said drum, and mechanism for giving said drum a reciprocating movement transverse to its plane of rotation.

4. In a drier, in combination, an annular drum having portions of its interior and exterior walls porous and through which gases are adapted to pass, and a gas-heating device, said drum being provided with a non-porous plate extending over one end of the inner wall of the drum.

5. In a drier, in combination, a rotary, hollow, vertically disposed drum having one of its walls cylindrical, and the other conical, said walls having portions thereof porous, whereby gases are adapted to pass therethrough, and means for supplying a heated gas to said drum.

6. In a drier, in combination, a rotary, hollow, vertically disposed drum having its interior wall cylindrical and its outer wall conical, said walls having portions thereof porous, whereby gases are adapted to pass therethrough, and gas-heating means located within said drum.

7. In a drier, in combination, an annular, vertically disposed, rotary drum having porous walls through which are adapted to pass gases, a gas-heating means located at the lower end of said drum, and a plate extending over and closing the upper end of the central, hollow portion of the drum.

8. In a drier, in combination, a vertically disposed, rotary drum, a shaft on which said drum is mounted, said shaft being slidably mounted in bearings, means for supplying a heated gas to said drum, and mechanism for reciprocating said shaft.

9. In a drier, in combination, an annular, vertically disposed drum having porous walls through which gases are adapted to pass, and means for rotating said drum, the area of the annular section at the bottom of the drum being larger than the area of the annular section at the top, whereby the

grain or other material is prevented from clogging in its passage from the top to the bottom of the drum.

10. In a drier, in combination, an annular, vertically disposed drum having porous walls, means for rotating said drum, said drum being provided with a non-porous band along the inner wall thereof near the top, and means for supplying a heated gas to said drum.

11. In a drier, in combination, a tapered, annular drum adapted to rotate about a vertical axis, said drum being provided with a non-porous cap extending over and closing the upper end of the inner wall portion, and having also a non-porous band along the inner wall thereof near the top, and gas-heating means located at the lower end of the drum.

12. In a drier, in combination, a rotatable drum having spaced interior and exterior porous walls through which gases are adapted to pass, means for supplying a heated gas to said drum, mechanism for rotating said drum, a movable door at one end of the drum, and a hopper.

13. In a drier, in combination, a vertically disposed rotatable drum, having wire mesh interior and exterior spaced walls, means for supplying a heated gas to said drum, said means being located at the lower end of the drum, a shaft upon which said drum is mounted, and means for reciprocating said shaft.

14. In a drier, in combination, a rotatable drum having wire mesh walls through which are adapted to pass gases, an air supply, and air heating means, said drum hav-

ing a movable door in the bottom thereof and being tapered from bottom to top.

15. In a drier, in combination, a rotatable, vertically disposed, annular drum having wire mesh walls, and having an opening in the top thereof and provided with a door at the bottom end, a non-porous plate extending over and closing the inner portion of the drum at the top thereof, a non-porous band forming a portion of the interior wall of the drum and disposed at the top portion thereof, a hopper, air supply means and air heating means.

16. In a drier, in combination, an annular, rotatable drum, a vertical shaft upon which said drum is mounted, said drum being provided with interior and exterior porous walls through which gases are adapted to pass, and being tapered from bottom to top, said drum being provided with an opening at the top thereof, and having a movable door in the bottom, an air supply, air heating means, and mechanism for reciprocating said shaft.

17. In a drier, in combination, a vertically disposed, hollow, annular rotary drum having foraminous inner and outer walls, the outer wall being exposed freely to the atmosphere, and means for supplying a heated gas to the interior of the said drum, whereby the gas will pass first through the inner wall, then through the material being dried between the walls, and at last through the outer wall to the atmosphere.

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Witnesses:

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