No. 666,301. Patented Jan. 22, 1901.

# W. K. CAMPBELL.

## FERTILIZER DRIER.

(Application filed May 8, 1900.)

(No Model.) 2 Sheets—Sheet 1.

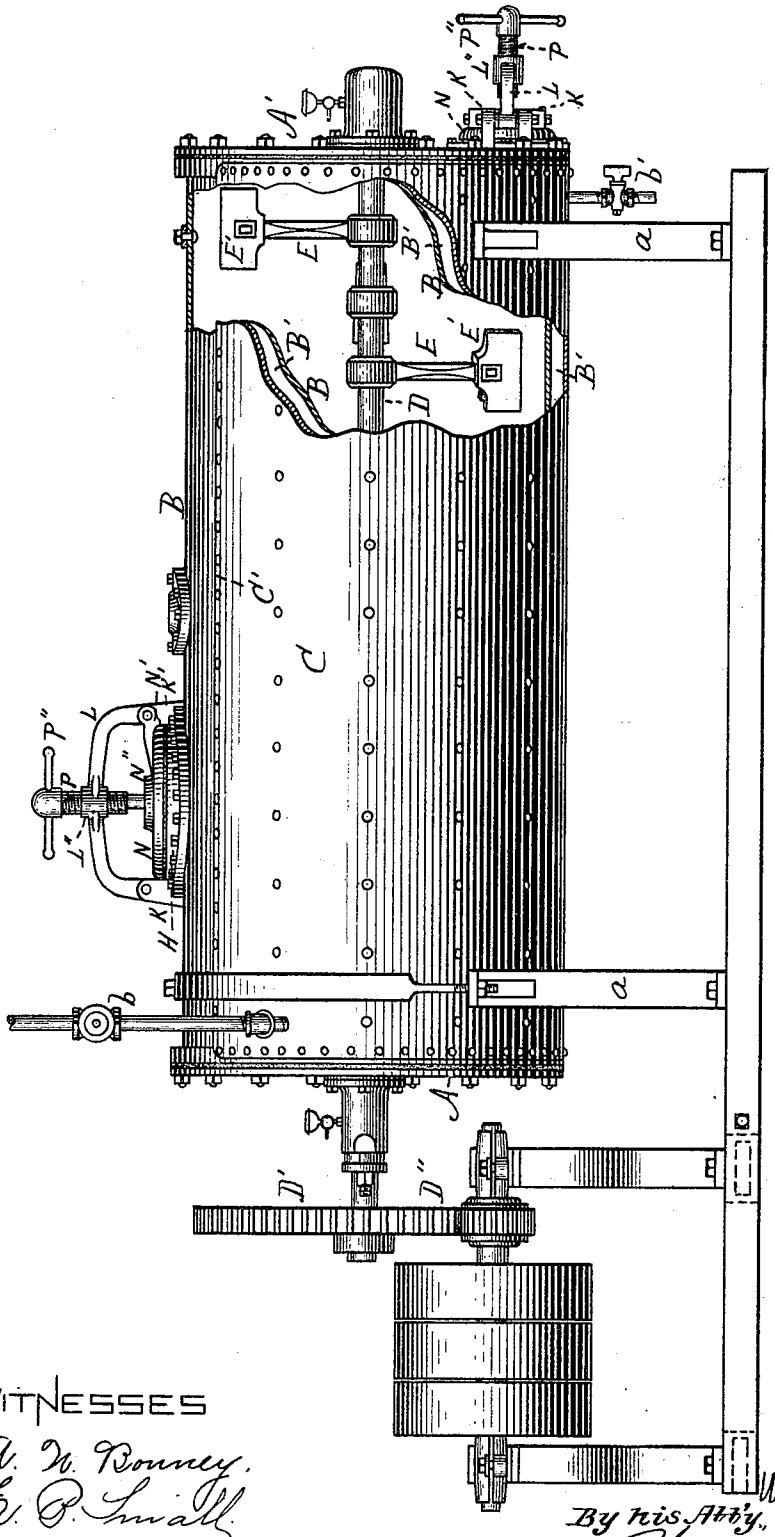


Fig. 1.

WITNESSES

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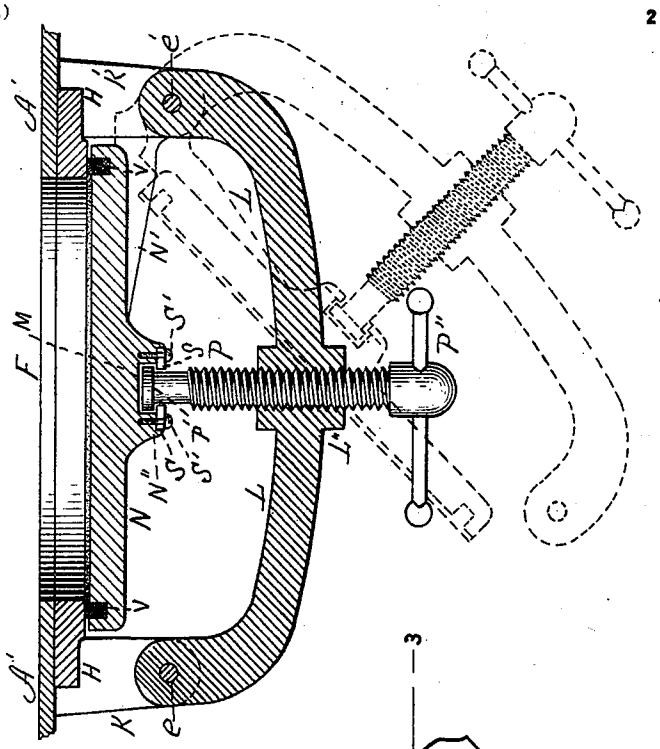



Fig. 1.

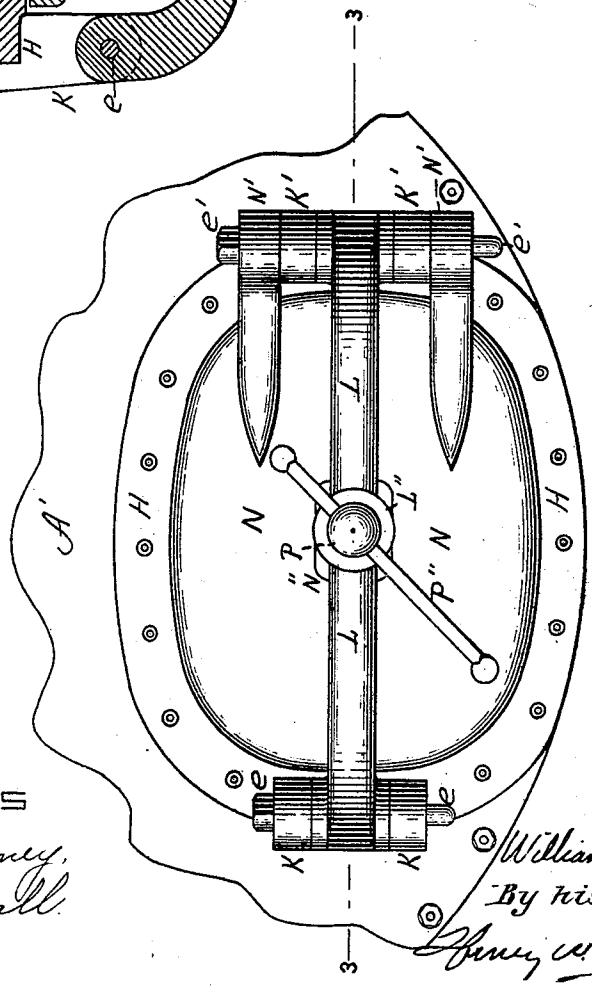



Fig. 2.

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# UNITED STATES PATENT OFFICE.

WILLIAM K. CAMPBELL, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR TO WILLIAM CAMPBELL & CO., OF SAME PLACE.

## FERTILIZER-DRIER.

SPECIFICATION forming part of Letters Patent No. 666,301, dated January 22, 1901.

Application filed May 8, 1900. Serial No. 15,950. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM K. CAMPBELL, a citizen of the United States, residing in Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Fertilizer-Driers, of which the following is a specification.

This invention relates to fertilizer-driers in which the fertilizer is placed in a drier to which steam heat is applied by means of a space between the inner wall of the drier and a jacket, the fertilizer being stirred during the heating process by means of paddles or agitators extending radially from a shaft turned by a suitable driving mechanism.

The invention consists in certain novel constructions and arrangements of parts fully described below, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a fertilizer-drier embodying my invention, a portion being represented as broken out. Fig. 2 is an enlarged elevation of the door at the discharge-opening or manhole at the end. Fig. 3 is a horizontal section taken on line 3, Fig. 2.

Similar letters of reference indicate corresponding parts.

A A′ represent the two end walls of a cylinder containing or constituting the drying-chamber. These end walls are connected by a cylindrical wall B, which is provided externally with a jacket C, having its edges C′ on opposite sides bolted to the inner jacket or wall B. By this means a steam-space B′ is produced between the inner and outer jackets, such space extending from lines near the top of the cylinder around the sides and bottom thereof. Thus the portion of the drier in which the fertilizer lies—that is to say, the lower and central portions—is directly heated, while the upper portion has no heating-space, but is formed with a single thickness. The cylinder is provided with suitable supports *a*, to which it is bolted in the ordinary manner, and with a steam-inlet pipe *b* and outlet-pipe *b′*.

The usual shaft D is mounted longitudinally in the drier and operated by gears D′ D″, driven by suitable pulleys communicating with the power. The shaft D is provided with radial agitating-arms E, terminating in paddles or shoes E′.

The two manholes—viz., the one at the top and that at the end A′—are provided with doors and mechanism for operating the same which are substantially alike and are illustrated in detail in Figs. 2 and 3. Referring to these figures, the end wall A′ has bolted to it, around the discharging-opening or manhole F, a ring or plate H. Secured to said plate or to the end wall, or both, are two pairs of horizontally-extending ears K, located on opposite sides or at the opposite edges of the opening. L represents an arm or yoke whose opposite ends lie between the ears K of each pair and are pivotally secured in such position by the bolts or pintles *e e′*. The pintle or bolt *e′* is long enough to extend through the ears N′, extending from the cover or door N, said ears constituting, with the pintle *e′* and ears K′, a hinge. The door N is formed up centrally into a thickened portion N″, which is recessed, as shown at M, to receive the flanged end P′ of a screw P, said end being retained in the recess by means of a ring or overlapping flange S, secured in place by screws S′. This screw P extends through a correspondingly-threaded central portion L″ of the arm or yoke L and is provided with a suitable rod or handle P″. The inner face of the cover or door N is grooved to receive suitable packing V. By means of this construction the door may be screwed perfectly tight and easily loosened and is enabled to swing from the opposite side and open in the opposite direction by removing the pintle *e′* from the ears K′ and inserting it in the ears K and placing the pintle *e* in the ears K′. The door can then be reversed and swung from the left side instead of from the right. Moreover, if desired, the door can be swung from either side without reversing it, inasmuch as by removing the pintle *e* the door can be swung from the pintle *e′*, or by removing the pintle *e′* the door can be swung from the pintle *e*. As above stated, the doors at the charging and discharging openings are the same, with the exception, of course, that the plates or rings H are formed to fit the curved and flat portions around the manholes.

Having thus fully described my invention,

what I claim, and desire to secure by Letters Patent, is—

In a fertilizer-drier, in combination with the cylinder provided with charging and discharging openings or manholes; the ring or plate H secured around the opening, the pairs of ears K, K′ at opposite sides or edges of the opening, the arm or yoke L pivotally secured at its opposite ends to said ears by removable and interchangeable pivots or pintles *e*, *e′*, the door N formed up centrally into the recessed thickened portion N″ and provided with the ears N′, said door being reversible end for end, and the screw P extending through a correspondingly-threaded opening in the arm or yoke and with its inner end held loosely in engagement with said recessed thickened portion, substantially as and for the purpose set forth.

WILLIAM K. CAMPBELL.

Witnesses:
HENRY W. WILLIAMS,
A. N. BONNEY.