(No Model.)

J. M. CHARNOCK.

DRIER FOR DRYING SUGAR, GRAIN, &c.

No. 423,671. Patented Mar. 18, 1890.

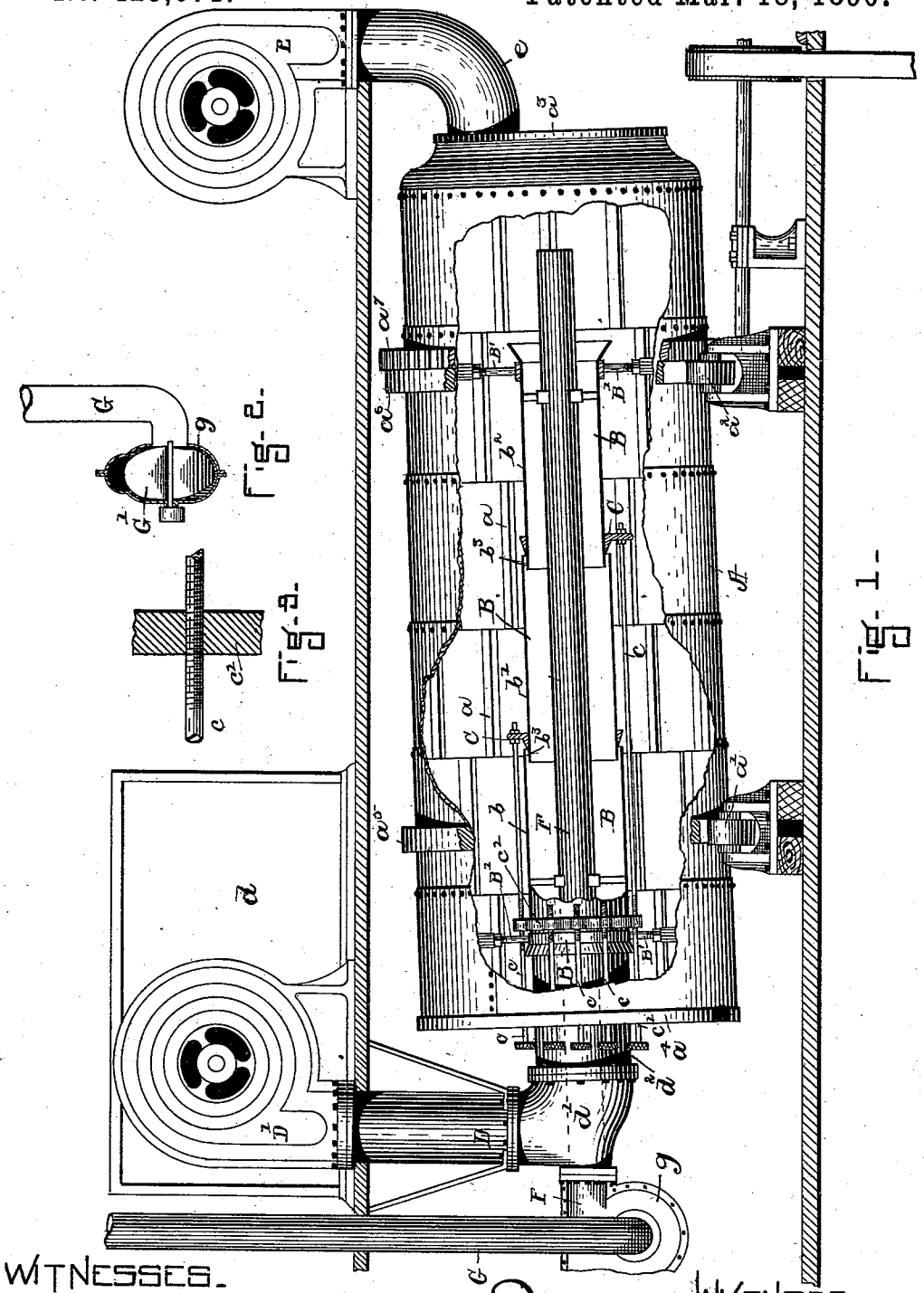

Fig. 1.

Fig. 2.

Fig. 3.

WITNESSES.
J. M. Dolan
A. B. Merrill

INVENTOR.
John M. Charnock
by his attys
Clarke & Raymond

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN M. CHARNOCK, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO HERSEY BROTHERS, OF SAME PLACE.

DRIER FOR DRYING SUGAR, GRAIN, &c.

SPECIFICATION forming part of Letters Patent No. 423,671, dated March 18, 1890.

Application filed April 8, 1889. Serial No. 306,427. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CHARNOCK, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Driers for Drying Sugar, Grain, Meal, and other Materials, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

This invention was originally described in my application for Letters Patent of the United States, filed November 20, 1888, Serial No. 291,324, and removed therefrom by amendment.

In the drawings, Figure 1 is a view, principally in side elevation, of the machine embodying the features of my invention, a portion of the casing being broken out to better illustrate the construction. Fig. 2 shows the fan for forcing the material through the supply-pipe; and Fig. 3 is a detail view of one of the valve-adjusting rods and the ring through which it passes.

In the drawings, A is the drum. It is preferably made of iron or steel, and has arranged to extend from its inner surface the lifting-shelves *a*. It is mounted upon the trucks a' a^2, the trucks a^2 being somewhat higher than the trucks a', cause the drum to be somewhat inclined from its upper or receiving end a^3 to its lower or discharging end a^4. The drum has suitable bearing rings or sections a^5 a^6, to bear upon the rolls of the trucks a' a^2. It also has the gear a^7, with which a pinion, (not shown) meshes and by which it is slowly rotated. There is arranged in the drum A an air conducting and distributing conductor or conduit B, composed of a number of short sections b b' b^2, preferably of different diameters, the section b having the largest, the section b' being slightly smaller and having its end extending slightly within the section b, and the section b^2 having the smallest diameter and having its end extending slightly into the section b'. This construction supplies the outlets b^3 at the junction of the various sections, and through which air introduced into the conductor or conduit escapes or is forced into the cavity of the drum. The sectional conductor or conduit is supported within the drum by means of braces B'.

For regulating the size of or closing the escape passages or outlets b^3, I use an annular valve C, one for each outlet, and each of which is arranged to slide upon its respective section of the conduit or conductor, and each of which has a tapering section to enter said outlet and a flange to which the operating-rods *c*, extending to the points c' at the lower end of the drum, are fastened, the rods passing through a ring c^2 upon the lower section b of the conduit or conductor, and either screwing in holes therein or fitting the same with sufficient friction to hold the valve in any desired position in relation to the outlet.

D is the pipe through which the air is fed to the lower end of the conduit or conductor, and D' is the fan for forcing air through said pipe, and which is represented as inclosed in a box or chamber *d*, into which the air, heated, cool, moist, or dry, is introduced. The pipe D has the elbow d' and the extension d^2, which latter enters the drum, and the lower section b of the conduit or conductor is of a size to extend around the inner end of this section of the pipe, and there may be at this point, between the lower end of the said section b and the pipe, an escape passage or outlet.

E is an exhaust-fan, and *e* is the exhaust-pipe connecting the upper end of the drum-chamber with the fan.

F is a pipe for supplying the material to be dried or otherwise treated to the upper end of the drum. It passes through the elbow d' and pipe and extension thereof and through the conduit or conductor, and its end extends beyond the end of the section b^2 of the conduit. The material is forced through said pipe by a supply-pipe G and forcing-fan G', contained in the casing *g*, by which it is fed through the supply-pipe F. By this organization the material is caused to be partly treated by the warm or cool air as it passes through the conductor before it is discharged into the upper end of the drum.

In operation, the material to be fed to the drum is caused to be forced through the feed-pipe F and discharged into the upper end of

the drum, and the drum is supplied through the conductor or conduit with heated, cold, moist, or dry air, according to the purpose for which the drum is used, and which is discharged into the drum at various points in its length as well as from its upper end and through and upon the material or substance which is being treated in the drum. The said material or substance, of course being lifted by the shelves, falls upon the conduit or conductor and gradually works by gravity to the lower end of the drum, from which it is discharged. The exhaust assists in the aerating of the contents of the drum by maintaining a current of air in the drum and drawing the air through the falling contents thereof.

The apparatus is adapted for a variety of purposes. It may be used as a drier, in which case heated air is caused to be fed into the drum and exhausted therefrom, as above specified, or as a cleaner or duster, in which case air, either cool or at ordinary temperature, or heated, may be employed, or as a cooler, in which case cool air is introduced into the drum, and the air may be dry or moistened according to the use to which the drum is put.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination, in an apparatus of the character specified, of a rotary drum, the conductor or conduit contained in said drum, and an escape passage or outlet in said conductor, formed by the lapping of a section of the conductor of one diameter upon the end of a section of the conductor of smaller diameter to form a circular passage between the lapping ends of the two sections, with a valve arranged to slide longitudinally upon one of the two sections and having a beveled entering section, as and for the purposes described.

2. The combination, in an apparatus of the character specified, of a rotary drum having lifting-buckets, the air conductor or conduit B, and a feed-pipe for the material to be dried, extending through said conductor from one end thereof to and beyond the other end thereof and opening into the upper end of the drum, substantially as described.

3. The combination, in an apparatus of the character specified, of the slightly-inclined rotary drum having lifting-shelves upon its inner side, the air conductor or conduit, an air-supply pipe connected with the lower end thereof, and a fan for forcing air through said pipe and conduit, a feed-pipe for the material to be dried, extending through said conduit and opening beyond the upper end thereof, and a supply-fan for forcing the material to be operated upon in said drum through said pipe, substantially as described.

4. The combination, in an apparatus of the character specified, of the slightly-inclined rotary drum having lifting-shelves upon its inner side, the air conductor or conduit, an air-supply pipe connected with the lower end thereof, and a fan for forcing air through said pipe and conduit, a feed-pipe for the material to be dried, extending through said conduit and opening beyond the upper end thereof, a supply-fan for forcing the material to be operated upon in said drum through said pipe, and an air-exhausting apparatus connected with the upper end of said drum, substantially as described.

JOHN M. CHARNOCK.

Witnesses:
H. C. WHITE,
A. T. COMPSON.