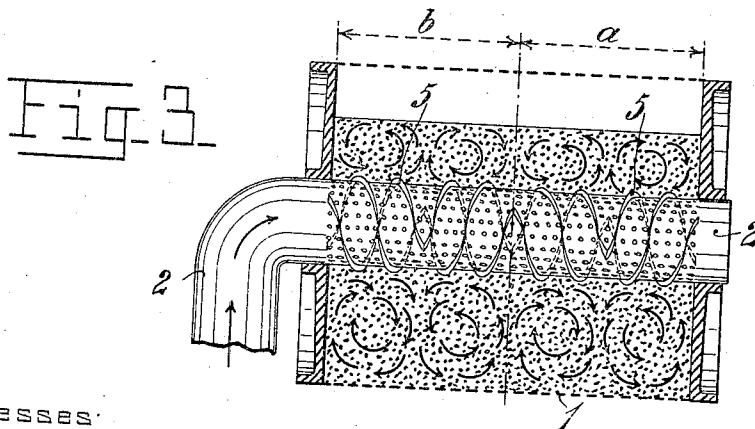
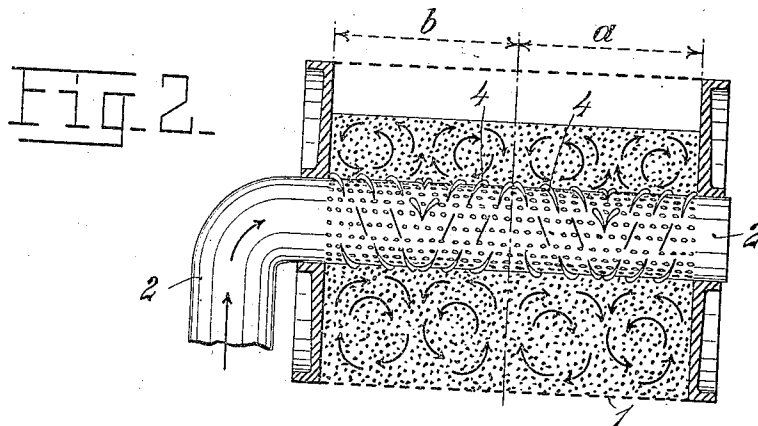
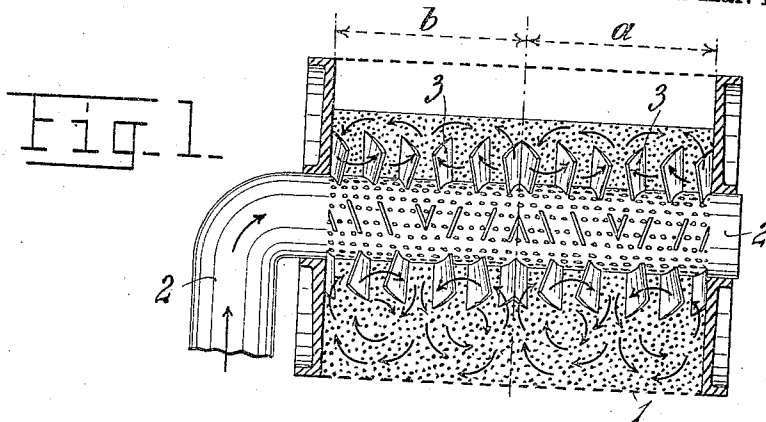


B. NISSEN.
 DRUM FOR MALTING OR DRYING GRAIN OR THE LIKE.
 APPLICATION FILED FEB. 11, 1909.

951,835.

Patented Mar. 15, 1910.



Witnesses:

W. H. Berrigan
A. Stearn

Inventor:

B. Nissen

by *Frank Deemuel*
 Attorney

UNITED STATES PATENT OFFICE.

BJARNE NISSEN, OF CHRISTIANIA, NORWAY.

DRUM FOR MALTING OR DRYING GRAIN OR THE LIKE.

951,835.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed February 11, 1909. Serial No. 477,329.

To all whom it may concern:

Be it known that I, BJARNE NISSEN, master of a brewery, citizen of the Kingdom of Norway, residing at Pilestredet 52, city of Christiania, Norway, have invented a new and useful improvement in Drums for Malting or Drying Grain and the Like, and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to devices for malting or drying grain and the like.

It relates further to a malting or drying drum provided with a central perforated tube, said drum and tube being rotatable in relation to each other.

It relates specifically to a malting or drying drum which is really a double drum, the stirring members facing in different directions in the two opposite ends thereof.

The ordinary malting drums are provided with a central perforated tube, through which cold moist air, or hot air is supplied, according as the operation is malting or drying. These drums, together with their contents, are slowly rotated, in order that the charge may constantly alter its position, and thereby be uniformly treated. It is, however, a fact that in this manner a uniform treatment is not attainable, because, for instance, in drying, the parts of the mass which are located nearest the central tube, and therefore least stirred, are found by experience to be more quickly dried than those portions located near the periphery of the drum. The degree of drying, consequently, decreases toward the periphery of the drum, because the movement, which is imparted to the charge during the rotation of the drum is not sufficient to provide a uniform treatment. The same defect is experienced in malting grain, or, in general, in using any drum in which the active medium is supplied through a perforated central tube, non-rotating, or rotating together with the drum. In view of this, attempts have been made to find means for stirring the mass in such a manner that the treatment takes place as uniformly as possible. The means heretofore adopted for this purpose may be divided into two classes. In the first class, projections or the like are attached to the central tube, and the charge is stirred to a certain extent, a sort of revolution being imparted thereto, preferably by means of radial longitudinal ribs. In such devices no axial movement of the mass is obtained, and the

parts of the charge located near the central tube are more or less undisturbed. Furthermore, the stirring effect decreases outwardly toward the drum periphery. Devices of this kind, therefore, give unsatisfactory results. A second class comprises the mechanically driven devices, of which the most to be preferred are those in which an axial movement is imparted to the material. The mechanical operation, however, offers serious disadvantages, which are to be avoided in breweries as far as possible. On the one hand, the necessary special driving makes the whole device unhandy and on the other hand, mechanically operated devices are not reliable in their action. Moreover, such devices are expensive and the usual long shafts located inside the drum have a very disturbing effect.

Now, in order to obtain an effective stirring, the goods must be given an axial movement, and it is the object of the present invention to furnish a means for imparting such axial movement. According to the present invention, this axial movement is obtained by means of projections attached to the central tube, and which are so inclined to and distributed over the tube periphery, that the said projections during the rotation of the drum, constantly and uniformly convey the charge wherever located near the central tube in an axial direction, and, on account of the accumulation of the mass which takes place at one end of the drums, the charge is here forced outwardly in a radial direction, while at the other end of the drum the mass is sucked in toward the center, so that the charge—without any use of mechanically operated devices—is caused to circulate in the manner necessary for uniform treatment.

In the drawings hereto attached, Figure 1 shows a section of the drum, and a central tube in elevation, with one kind of stirrers; Fig. 2, a similar view of the same device, with a modified stirrer, and Fig. 3, shows still the same view of the same device, in which the stirrers are united to form more or less continuous ribs. These are however all detailed modifications of the same device, and the mode of operation is precisely the same.

Referring to the drawings, 1 is the drum, 2 the perforated central tube to which are attached the stirrers 3, 4 or 5. The drum and tube are really divided into two or more sec-

tions *a* and *b* within which the action on the charge is in opposite directions, as is seen from the pitch of the shovels, 3, 4 and 5, and shown by the arrows in all the figures.

- 5 As shown, the central tube 2, is provided with inclined shovels, or stirrers, 3, 4, 5, which during the rotation of the drum impart a displacement in an axial direction to the goods located next to the central tube.
- 10 In order to thoroughly utilize this principle, the drum is formed in two parts *a* and *b*. In the left half of each section all the shovels, or stirrers are arranged in such a manner that they convey goods to the right, whereas
- 15 in the right half, all the shovels convey the goods to the left, as shown by the arrows on the drawings. In the middle, at the meeting of the two sections the goods are hereby obviously compressed, and therefore forced
- 20 outward, while at each end the goods are sucked inwardly toward the central tube. The drum therefore contains two circulating charge sections.

As said above, the shovels 3 of Fig. 1 may be replaced by the small inclined projections 4 illustrated in Fig. 2, or by the more or less continuous ribs 5 of Fig. 3. These latter preferably follow helical lines, as indicated.

30 The invention is applicable not only to breweries, but everywhere where granular materials are to be heated in drums in which the active material is supplied through a central perforated tube.

35 Having now described my invention, what I claim is:

1. In a device for malting grain, the combination with an outer drum of an inner perforated tube through which the treating medium is supplied, the drum and tube being relatively rotatable and forming substantially a double drum, the central tube in each of its two halves being provided with two sets of projections facing at an angle

40 to each other, and adapted when rotation takes place to force the material radially outward from the central tube, substantially as set forth.

2. In a device for malting grain, the combination with an outer drum of an inner perforated tube through which the treating medium is supplied, the drum and tube being relatively rotatable and forming substantially a double drum the central tube

50 being provided in its two halves with projections facing in different directions in the two opposite ends thereof, in such a manner that one set of projections convey the material to the right and the other ones convey

55 the material to the left, substantially as set forth.

3. A perforated drum for treating grain or similar material by means of a gaseous

medium in combination with a perforated central tube, said drum and tube being rotatable in relation to each other and through which tube is supplied the medium used for the treatment, and inclined projections attached to the outer periphery of the central tube, said projections being arranged in a plurality of sections each comprising two sets of inclined projections, which in one set are located at one half of the section and arranged at an inclination which is symmetrical to the inclination of the projections

65 70 75 80

in the other set located at the other half of said section in such a manner, that the projections being on the left half of each section convey the material to the right and those being on the right half convey the material to the left.

4. A perforated drum for treating grain or similar material by means of a gaseous medium in combination with a perforated central tube, said drum and tube, being rotatable in relation to each other and through which tube is supplied the medium used for the treatment, and two sets of inclined continuous projections forming ribs attached to the outer periphery of the central tube the projections in one set being attached at one half of the tube and arranged at an inclination which is symmetrical to the inclination of the projections in the other set attached to the other half of the tube in such

85 90 95

a manner, that the projections being on the left half convey the material to the right, and those being on the right half convey the material to the left.

5. A perforated drum for treating grain or similar material by means of a gaseous medium in combination with a perforated central tube, said drum and tube being rotatable in relation to each other and through which tube is supplied the medium used for the treatment, and inclined continuous projections forming ribs attached to the outer periphery of the central tube, said projections being arranged in a plurality of sections each comprising two sets of inclined projections, which in one set are located at one half of the section and arranged at an inclination which is symmetrical to the inclination of the projections in the other set located at the other half of said section in such a manner, that the projections being on the left half of each section convey the material to the right and those being on the right half convey the material to the left.

100 105 110 115

Signed at Christiania Norway this twenty-sixth day of January A. D. 1909.

BJARNE NISSEN.

Witnesses:

AXEL LAHN,
MOGUES FRAAS BUGGE.