June 7, 1938. I. E. P. HUSE 2,119,916

REVOLVING DRYING OVEN

Filed Jan. 4, 1937 2 Sheets-Sheet 1

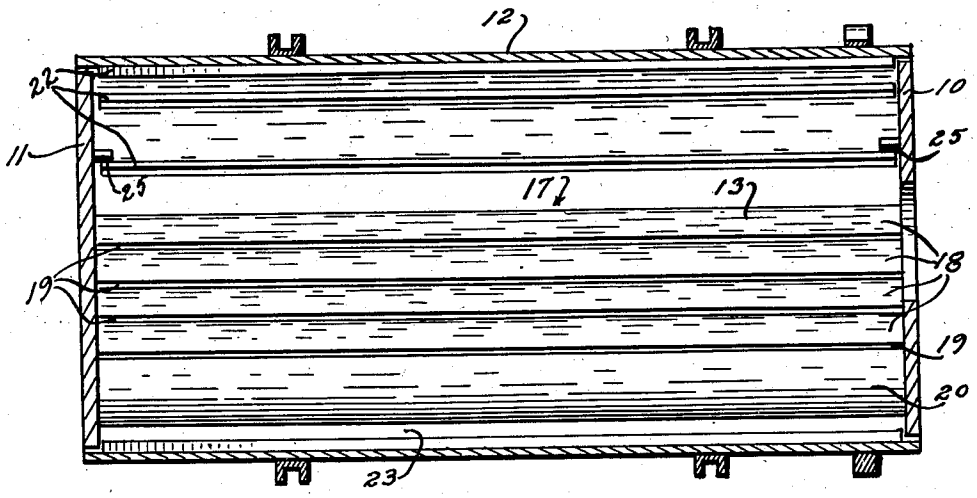


Fig. 1.

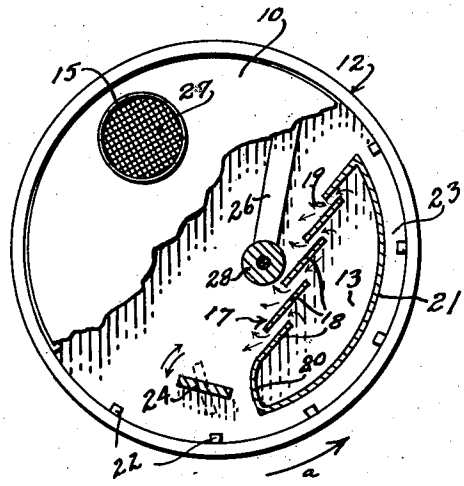


Fig. 2.

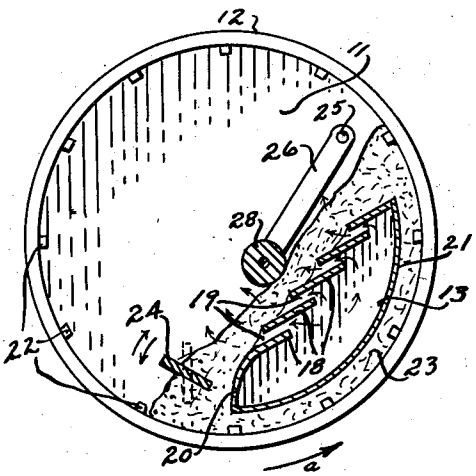


Fig. 3.

INVENTOR:
Ingebrigt E. P. Huse,
BY: Horace Sloocock
ATTORNEYS.

June 7, 1938. I. E. P. HUSE 2,119,916

REVOLVING DRYING OVEN

Filed Jan. 4, 1937 2 Sheets-Sheet 2

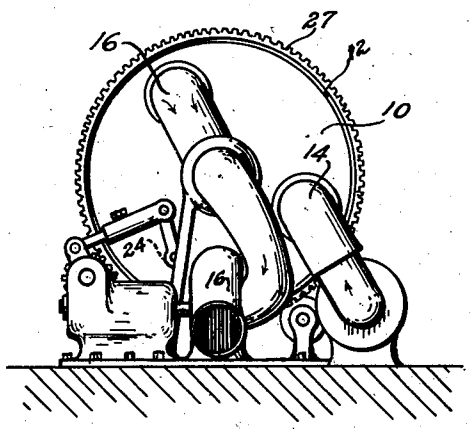


Fig. 4.

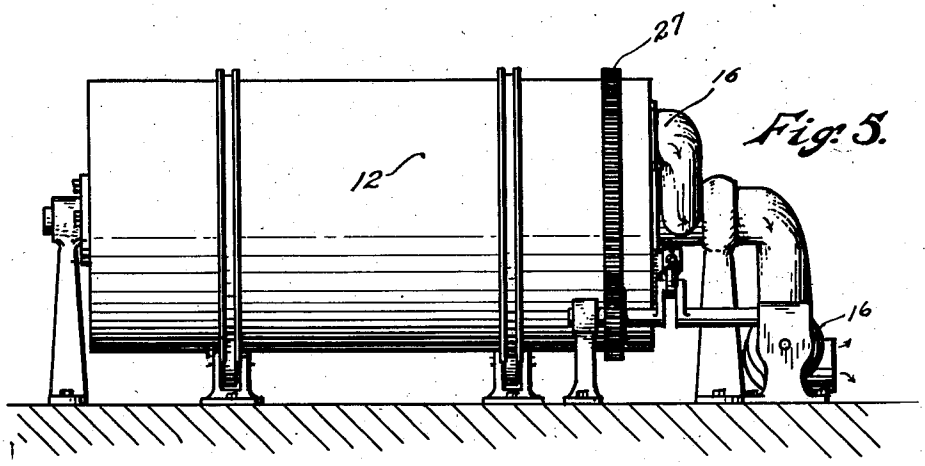


Fig. 5.

INVENTOR:
Ingebrigt E. P. Huse,
BY: Horace L. Woodward
ATTORNEYS.

Patented June 7, 1938 2,119,916

UNITED STATES PATENT OFFICE

2,119,916

REVOLVING DRYING OVEN

Ingebrigt Elias Paulsen Huse, Haroy, near Molde, Norway

Application January 4, 1937, Serial No. 118,987
In Norway January 4, 1936

5 Claims. (Cl. 34—5)

My invention relates to improvements in revolving drying ovens, and more particularly such ovens as are used for the drying of all kinds of fish meal or the like after it has been ground or pulverized in any of the approved manners. The drying in such ovens is effected by passing a current of gas through the mass to be dried, which gas may be hot air or the like.

Different constructions of such ovens are known. The difficulty in all such ovens is to give the mass to be dried the necessary circulation within the oven, so that the drying gas intimately may contact every particle of the mass. In order to obtain this effect, revolving barrels have been tried equipped with a gas conduit eccentric with respect to the axis of rotation of the barrel, which gas conduit is equipped with longitudinal ribs and holes, through which latter the drying gas is forced into the mass. This gas conduit is revolved in the same or the reverse direction as the barrel but with another speed and by the relative rotation of the barrel and the gas conduit, the mass to be dried is turned again and again at the same time as the drying gas is flowing through it.

Such ovens have, however, not been satisfactory, as it is only the interior of the mass which is turned and not the surface. As the mass has a high percentage of fat and before the drying also contains large quantities of water, there are on the surface formed balls of the mass and by the prior ovens it has been very difficult to break up these balls and obtain an even drying throughout the mass.

When the drying gas is passed through the mass it is of the greatest importance that the gas shall meet the most even resistance throughout the mass, as the gas will seek the easiest way through the mass and escape through the shortest paths, doing no good to the other parts of the mass. It is therefore of the greatest importance that the mass be continuously turned so that the drying may be even throughout the mass.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention, as will appear from the following description and the accompanying drawings, wherein:

Fig. 1 is a longitudinal vertical section of a drying oven of my construction.

Fig. 2 is a vertical cross section of Fig. 1, and

Fig. 3 is a similar view, showing different positions of the gas conduit.

Fig. 4 is an end elevation of a machine embodying the invention;

Fig. 5 is a side elevation thereof.

On the drawings the reference numbers 10 and 11 indicate the circular closing walls of a revolving cylindrical barrel or drum 12, which may be revolved in any of the conventional manners, for instance by toothed wheels or any other approved manner. The barrel is preferably mounted to rotate on its own axis, in the direction of the arrow *a* in Fig. 2.

The end walls of the barrel are stationary but adjustable rotatively on said axis, and between them is fixed an eccentric gas chamber or conduit 13, into which gas is fed through a pipe 14 through the end wall 10. The gas is exhausted through the opening 15 by a pump 16, the opening having a filter or screen for preventing the mass from being drawn out of the barrel. The gas chamber 13 is eccentric to the axis of the barrel. The side 17 of the gas chamber 13 facing the interior of the barrel is built up of narrow straps or lower slats of sheet iron 18 arranged in an inclined plane, and a lowermost terminal wall plate 20. Each slat overlaps the next lower one, as shown on Fig. 2, thereby forming narrow longitudinal openings or slots 19 in this side through which the drying gas is fed. It will be seen that this series of slats forms the major portion of the inner side of the gas chamber 13 and making this side of the chamber 13 nearly flat, but that the lower part or wall 20 has a definite curve downward from the lowermost slot 19. The other side 21 of the gas chamber 13 is concentric to the wall of the barrel and spaced a short distance from same, forming a passage 23 between the two, as in Fig. 2. It should, however, be understood that it is not absolutely necessary that this side of the gas chamber 13 be parallel to the wall of the barrel, but the best results will be obtained when so arranged. The inner side of the barrel is equipped with a number of longitudinal ribs 22 of suitable form fixed thereon at short intervals.

If so desired, this outer side of the gas chamber 13 may also be provided with holes for the gas to pass through into the mass of stock being lifted in the passage 23 between the wall of the chamber 13 and drum 12, but in the most cases this will be superfluous.

By the arrangement explained the greater part of the mass of stock in the barrel (as shown upon Fig. 2) lies over the inclined side of the gas chamber 13 and during the revolving of the barrel in the direction of the arrow a constant

flow of the stock is caused from the part of the mass accumulated in the lower part of the barrel and by the ribs carried upward through the passage 23 to the outer side 17 of the gas chamber 13. The part of the mass lying on the inclined side of the gas chamber 13 will constantly gravitate downward and by this constant circulation the mass will be evenly treated by the drying gas.

The gas chamber 13 can be arranged so that it may be adjusted rotatively for different positions in the barrel, as shown upon Fig. 3, still maintaining the passage 23 between its side 21 and the wall of the barrel.

I have discovered that there may be a tendency of the mass to accumulate in the lower part of the barrel and here become so hard that it takes fire. In order to prevent this I have arranged an agitator 24, of any convenient profile or cross section, revolubly mounted and extending longitudinally through the lower part of the barrel near the plate 20, which agitator during the revolving of the barrel is kept constantly rocking, thereby loosening the stock and overcoming any tendency of mass to accumulate and harden in the bottom of the barrel.

During the circulation of the stock through the passage 23 the mass is not only carried by the ribs, but also pulverized and turned, owing to the friction against the side 21 of the chamber 13.

To the upper parts of the side walls 10 and 11 swinging hanger arms 26 are pivoted as at 25, and on their lower ends a roller 28 of any suitable profile is journalled, the pivots being so located that the roller rests by gravity on the stock passing downwardly over the inner side of the chamber 13. This serves to prevent the cross section of the mass from being altered substantially by any sidelong movement of the oven. This will particularly be very useful on board ships, the ship rolling in the seas.

On the accompanying drawings I have only shown a schematic diagram of my invention. It should, however, be understood that my invention is not limited to this form only, but that any useful form within the scope of the invention may be chosen.

Having now particularly described and ascertained the nature of my said invention, I declare that what I claim is:

1. A drying oven consisting of a main drying chamber, a second chamber therewithin having one side disposed at such inclination that material to be dried will slide thereon by gravity, means to move material from below the lower part of the said inclined side on to the upper side thereof said inclined side having louvered openings therethrough, means to discharge heated gases through said openings, a roller extended horizontally adjacent said inclined side, hanger means therefor having a fixed pivotal axis above the second chamber positioned so that the roller wil tend to swing by gravity against the said inclined side.

2. The structure of claim 1 in which the first named chamber is a revolving drum, and the second chamber is fixed therein.

3. In a revolving drying oven, a revolubly mounted cylinder having cleats longitudinally therein, an elongated stationary chamber mounted eccentrically therein having an outer side concentric with the cylinder and an inner side inclined for stock to slide thereon by gravity, the last named side being louvered for discharge of gas therethrough, means to supply gas to the said chamber, means to rotate the cylinder, in a direction to engage and lift stock beside the outer side of said chamber, and an agitator device consisting of a rigid member pivoted at each end of the cylinder on an axis parallel to that of the cylinder and parallel to the said chamber, said agitator device being located close to the lower side of the cylinder and to the lower part of the said chamber, and means to operate the agitator device.

4. The structure of claim 3 in which said chamber and said agitator have a mounting adjustable rotatively on the axis of the cylinder.

5. The structure of claim 3 in which a roller is provided intermediately of the height of said inclined side, hanger arms having said roller revolubly mounted therein and pivoted in fixed relation to the said chamber, and the said chamber and pivots of the arms being rotatively adjustable on the axis of the cylinder.

INGEBRIGT ELIAS PAULSEN HUSE.