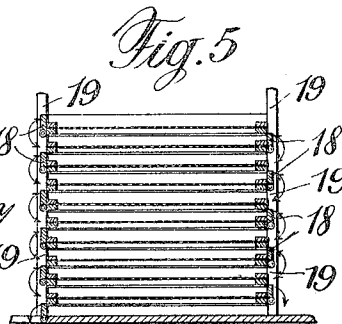
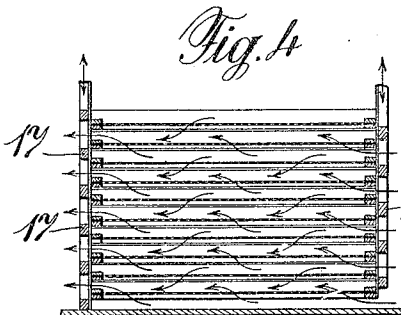
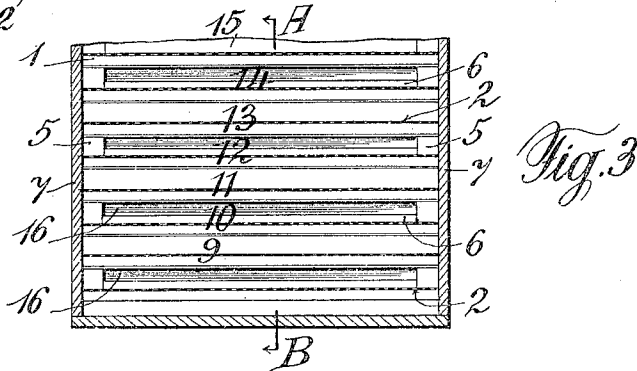
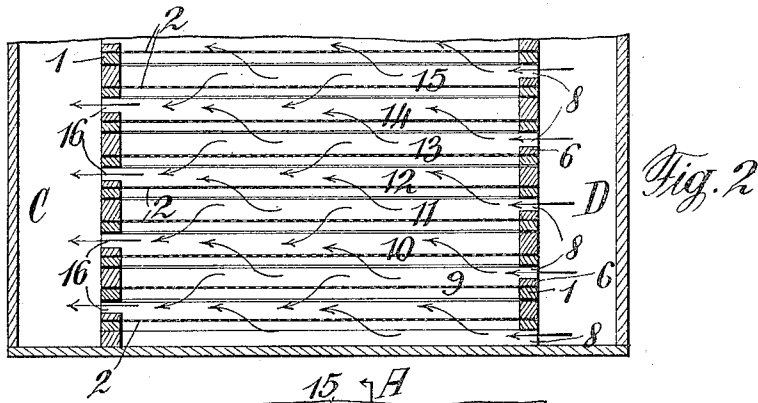
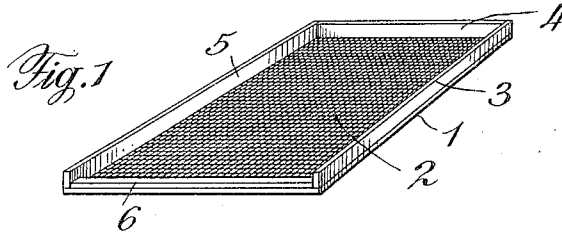


C. GRAU.
 DRYING APPARATUS.
 APPLICATION FILED SEPT. 23, 1912.

1,107,294.

Patented Aug. 18, 1914



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DRYING APPARATUS.

1,107,294.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CURT GRAU, a subject of the Emperor of Germany, residing at Niederuzwil, Switzerland, have invented new and useful Improvements in a Drying Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

As is well known, granular, thready, band-like or similar shaped material, as well as dough, starch, vegetables, textiles fabric, chemicals, etc., are dried in the quickest and most uniform manner, if the drying air is forced to pass positively through the goods spread over drying trays or the like. Usually the air blast flows simply over the material to be treated. In the first mentioned case an even drying is obtained, the material to be dried presenting in accordance with the theoretical requirements the largest possible surface to the current of air.

The method of forcing air positively through the material to be treated is not new and this principle has been applied to apparatus used for drying different kinds of materials. The means used for this purpose were, however, difficult to handle, besides being too complicated and the results obtained were unsatisfactory. According to one construction already proposed, the material to be dried was spread over drawer-like cases open at the top and provided with a sieve at their bottom. A number of such drawers were arranged one upon another and side by side in a closed receptacle, a current of air being then forced vertically from the top to the bottom or from the bottom to the top through each pile of said drawers. This arrangement has, however, the drawback, that the material in the drawers coming first in contact with the air blast is dried in less time than the material in the following drawers, because the air passing through these latter drawers has already taken up a certain quantity of moisture and has therefore less drying power. But a drying of the material either too quickly or too slowly,

makes it impossible to obtain good results. In order to overcome this drawback, it has been proposed to arrange the drawers one upon the other and to provide a space between each pair of these drawers so that the air is led separately to and from each drawer at its front or rear end, so that an even drying is obtained in a vertical row or pile of drawers. In this construction, however, there have to be provided dividing bottoms or walls between the single drawers, so that the construction of the apparatus becomes complicated and expensive and as the spaces to be provided between the different drawers take up much room, the whole apparatus becomes very bulky.

The object of this invention is to provide a drying apparatus in which said drawbacks are overcome.

The invention is illustrated by way of example in the accompanying drawing in which:

Figure 1 is a perspective view of a single drying receptacle. Figs. 2 and 3 show several receptacles arranged one upon another, Fig. 2 being a longitudinal section on line A—B of Fig. 3, and Fig. 3 a view seen from C in Fig. 2. Figs. 4 and 5 are vertical sections of two other forms of constructions.

Each drying receptacle or drawer consists of a base frame 1 (Fig. 1) on which a netting 2, of wire, hemp, or a perforated iron plate, or the like is fastened, said netting being adapted to admit of the passage of air therethrough. On three sides of this base frame are secured, immediately above the netting, closing ledges 3, 4 and 5, while only a low covering ledge 6, which prevents the goods from falling off the receptacle is secured to the fourth side of the frame.

For the purpose of positively forcing the air through the goods to be dried, the receptacles carrying the latter are arranged one upon another in such manner that the open sides 6 and the opposite closed sides 4 of these receptacles are situated alternately at the front and rear ends of a housing 7.

The side ledges 3 and 5 of the frames 1 closely contact with the side walls of the housing (Fig. 3), while spaces C and D are formed between the ends of the frames and the end walls of the housing. If a difference

of pressure is produced in any suitable manner for example by means of fans, exhausters, blowing engines or similar blowers, between the space C and the space D, a current of air equalizing the pressure in the spaces C and D will pass through the bottoms and the material spread thereon. If, for instance, the pressure is lower in the space C than in the space D, the air flows from D to C through the frames and the goods on these frames (Fig. 2). The air passes through slots 8 formed by the open sides of the superposed frames and enters into the spaces between the bottoms 9 and 10, 11, and 12, 13 and 14, etc., said spaces being closed at three sides by the ledges 3, 4, and 5. As said spaces are closed laterally by the ledges 3, 4, and 5, the current of air must pass through the sieves 2 and through the goods strewn over them and at the same time the currents of air entering at 8 will be divided flowing partly through the upper and partly through the lower sieves. The current of air entering into the space provided between the sieves 11 and 12 passes for example partly through the sieve 11 and partly through the sieve 12. After the air currents entering at 8 have passed through the sieves and the materials strewn over them, they flow into the spaces provided between the bottoms 10, and 11, 12, and 13, 14 and 15, etc., which spaces are also closed on three sides, but instead of being open toward the space D, as is the case with the spaces provided between the bottoms 9 and 10, 11 and 12, etc., they are open toward the other side, viz, toward C. The air is discharged from the spaces provided between the bottoms 10 and 11, 12 and 13, 14 and 15, etc., through the openings 16. It is evident, that according to this construction the drying air is caused, by very simple means, to pass through the materials strewn over the bottoms whereby the goods are quickly and uniformly dried as well in each receptacle as in the whole pile of receptacles.

The same effect as by the arrangement shown in Figs. 2 and 3 is obtained if the superposed receptacles are provided only with lateral ledges 3 and 5, *i. e.*, with frames open at two sides. These receptacles are piled one upon another in a similar manner as the receptacles open only at one side, whereby every second receptacle is closed at the open side by a closing member which is independent from the frames, the closing of the single receptacle being performed in such manner that a receptacle, closed at the front end remains open at the rear end and vice versa. The closing members at the front end of the pile are displaced the height of the receptacle with regard to the closing members at the rear end of the pile.

According to Fig. 4 the receptacles are closed at two ends by means of grids 17 pro-

vided with openings. The grid on the rear end of the pile can be fixedly mounted, while the grid on the front must be detachable for the purpose of inserting the receptacle into the housing. If these separate closing members are so formed, that they can be displaced in vertical direction to an amount corresponding to the height of a receptacle, so that either the odd or the even receptacles can be closed, it being always understood that the receptacles which are open on the front are closed on the back and vice versa, it is possible to change by means of these grids the direction of the air blast with regard to the goods, notwithstanding the fact that the direction of said blast in the blower, or the like remains the same. By a periodical reversing of the direction of the air currents, an absolute uniform drying is obtained. The closing of the receptacles may also be performed in the manner shown in Fig. 5 by means of flaps 18 pivotally mounted at the rear and front end of the pile to fixed and detachable frames 19 respectively. By turning said flaps 180° the direction of the air current is changed with regard to the goods spread over the nettings.

I claim—

1. In a drying apparatus, an air tight housing, receptacles therein for the goods to be dried, each comprising a frame, a sieve like member stretched across the frames, two closing ledges secured to opposite sides of the frames and closely in contact with the walls of the housing, each frame being open at one end and so arranged one upon another, that their open ends are at different ends of the housing and each frame being directly supported by the ledges of the frame immediately underneath.

2. In a drying apparatus, an air-tight housing, a plurality of receptacles therein, each consisting of frames of rectangular form, a sieve like member stretched across each frame, three closing ledges secured to the sides of each frame, two of these ledges on opposite sides of the frame being closely in contact with the walls of the housing, each frame being further provided with a fourth ledge of less height than the three first mentioned ledges and said frames being so arranged one upon another, that the fourth ledges of two succeeding frames form an air passage with the bottom of the frame immediately above on opposite sides of the pile.

3. In a drying apparatus, an air-tight housing, a plurality of receptacles for the material to be dried, each consisting of a frame of rectangular form, a sieve like member stretched across each frame, closing ledges secured to the frame, two of said ledges on opposite sides of the frame being closely in contact with the walls of the housing, each frame being open at one end, said

frames being so arranged one upon another that on each side of the pile of frames at least two open sides are always succeeded by an equal number of closed sides, and each of said frames being directly supported by the ledges of the frame immediately underneath.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

CURT GRAU.

Witnesses:

EUGENE NABER,
D. I. MURPHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."