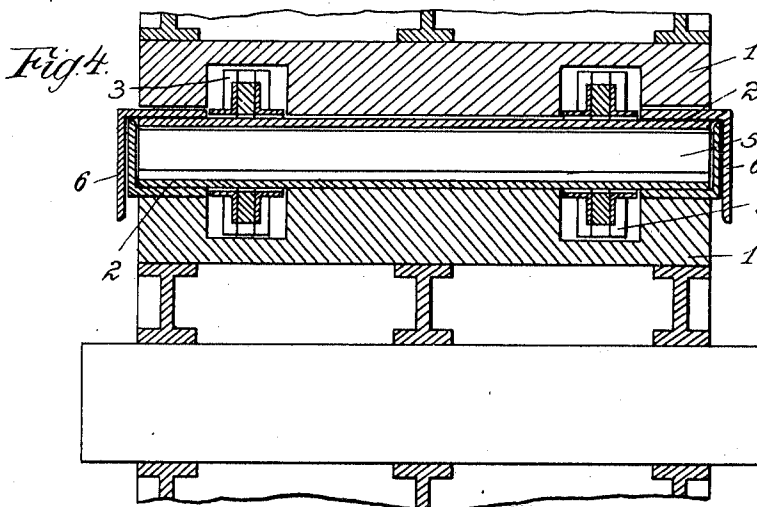
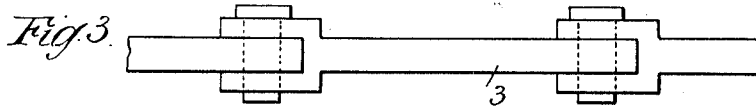
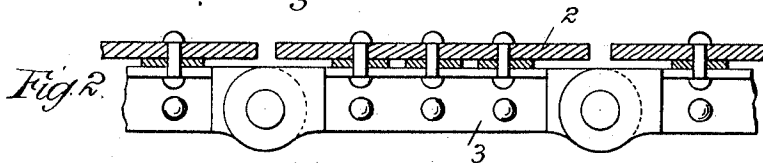
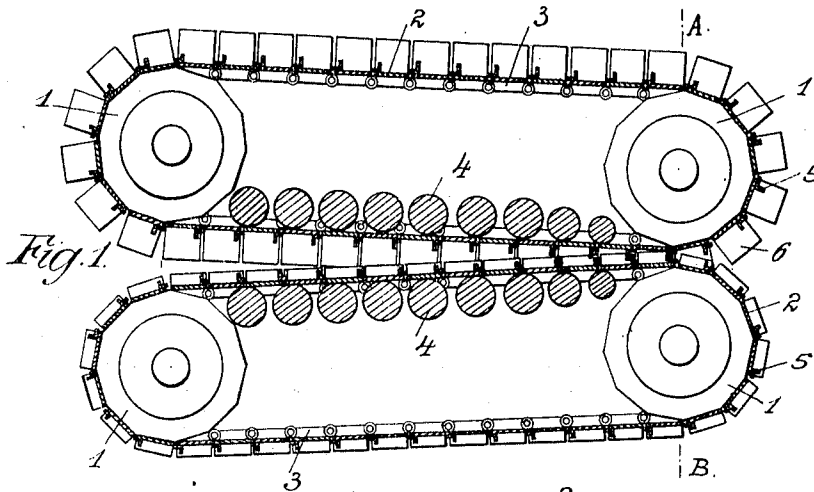


H. BRUNE & H. HORST.
BAND PRESS FOR DRYING VEGETABLE AND MINERAL SUBSTANCES.
APPLICATION FILED SEPT. 18, 1911.

1,055,384.

Patented Mar. 11, 1913.

2 SHEETS—SHEET 1.



Witnesses.
E. C. Schuermann.
T. C. Christ.

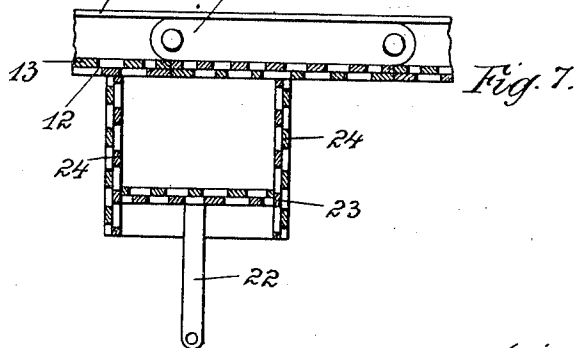
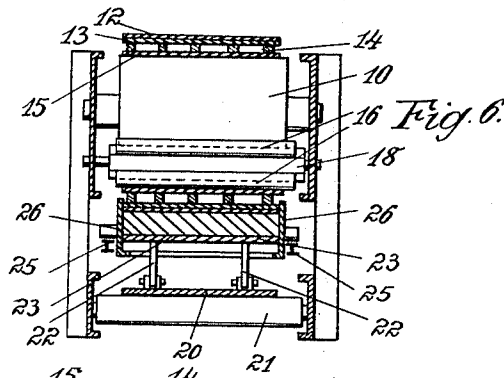
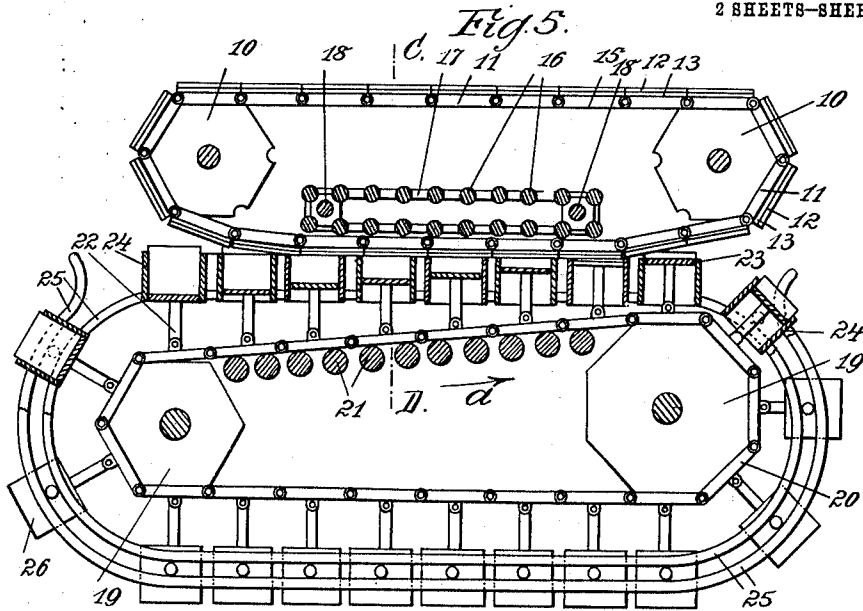
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Witnesses.

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UNITED STATES PATENT OFFICE.

HEINRICH BRUNE AND HEINRICH HORST, OF FRANKFORT-ON-THE-MAIN, GERMANY,
ASSIGNORS TO EUGEN ABRESCH, OF NEUSTADT-ON-THE-HARDT, GERMANY.

BAND-PRESS FOR DRYING VEGETABLE AND MINERAL SUBSTANCES.

1,055,384.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed September 18, 1911. Serial No. 650,017.

To all whom it may concern:

Be it known that we, HEINRICH BRUNE, D., engineer, and HEINRICH HORST, engineer, both subjects of the German Emperor, and residents of Frankfort-on-the-Main, Germany, with post-office address Taunusstrasse No. 1, have invented new and useful Improvements in Band-Presses for Drying Vegetable and Mineral Substances, of which the following is a specification.

This invention relates to a band press for drying vegetable and mineral substances which differs from known devices of the kind for this purpose in that it renders possible a continuously and gradually increasing pressure.

According to the invention the press consists of two continuously running bands which act simultaneously as presses and as conveyers, the distance between them in the direction of travel gradually diminishing.

In the accompanying drawings the invention is illustrated, Figure 1 being a longitudinal section through the band press; Figs. 2 and 3 detail in views drawn to an enlarged scale; Fig. 4 a section on line A—B of Fig. 1, drawn to an enlarged scale, these figures representing one form of the machine according to the invention. Figs. 5–7 illustrate a modification, Fig. 5 being a sectional side elevation, Fig. 6 a section on line C—D of Fig. 5 and Fig. 7 one of the compressing chambers drawn to an enlarged scale.

The two endless bands traveling around the rollers 1 consist of perforated plates 2 made of two perforated pieces of sheet metal laid one upon the other so that the perforated portions of one register only with a part of the perforated portions of the other similar to the construction shown in Fig. 7, in order that only small openings will be provided for the passage of fluid, the solid material being prevented from passing there-through. The plates are connected with each other by chain links 3 (Figs. 2 and 3). Between the lower and upper rollers 1 are arranged small pressure rollers 4, so that they lie in one plane and guide the band. On the plates 2 are mounted at certain dis-

tances apart angle irons or the like constituting cross rails 5, while at the sides of the plates 2 are provided plates 6, which also may consist of angle irons or the like. The vertical distance between the rollers 1 or 4 is such that the distance between the upper stretch of the lower band and the lower stretch of the upper band gradually diminishes. The height of the plates 6 is such that the compression chambers inclosed by them between the bands are completely closed laterally, while the height of the cross rails 5 is such that they only gradually come to overlap, so that only gradually is there a complete closing of the rear wall of each compression chamber.

The material to be pressed is fed in a continuous length into the compression space between the bands and is thus subjected to a continuously and gradually increasing pressure. Lateral extrusion of the material is directly prevented by the plates 6. At the beginning of the pressing operation a complete closure of the back wall is not necessary and at first there is only a partial rearward closure which increases with the increase of pressure. The cross rails enter into the material being pressed like spades and convey it forward until they cut the length of the material into sections separated from each other, which happens when the material is subjected to the highest pressure. Notwithstanding this, the compressed material issues in the form of a continuous length.

This band press is particularly suitable for drying raw peat, coke, brown coal or the like, but it is also applicable for any other vegetable or mineral material containing water.

In the form shown in Figs. 5–7 the band 11, which travels over the upper hexagonal rollers 10, consists of single plates which are composed of two superimposed perforated sheet metal plates 12, 13 laid together so that the perforations of one register only with a part of the perforated portions of the other. On these perforated plates are vertical stiffening rails 14 which are covered

each by a sheet metal plate 15, so that each of the combined plates constitutes a hollow carrier. The stiffening rails 14 also serve as links to connect the several combined plates. The pressure rollers 16 of the upper band are carried by an endless chain 17, which simultaneously with the band 11, travels over rollers 18. The lower band consists of an endless chain 20 traveling over hexagonal rollers 19 and over pressure rollers 21 situated beneath the upper stretch. On the endless chain 20 are mounted the piston rods 22 carrying the compressing pistons 23. The latter move in chambers 24 which move in a suitable guide 25 in such a manner that as the chain 20 travels the pistons 23 carry the chambers 24 with them. The side walls 26 of the chambers 24, which are parallel to the direction of movement of the band, are somewhat higher than the other sides. All the sides of the compression chambers, as well as the pistons, consist, like the upper band 11, each of two perforated plates placed one over the other so that the perforations of one register with the not perforated parts of the other. This construction works as follows: Before the compression chambers come in contact with the upper band 11, they are charged with the material to be compressed. As they move in the direction of the arrow α under action of the movement of the upper band 11 and the endless chain 20, there occurs, owing to the convergence of the chain and the band, a relative shifting of the compression chambers and the pistons as will be clear from an inspection of Fig. 5. In this manner the material contained in the chambers is gradually and continuously more strongly compressed, whereby the water is expelled through the perforated side walls of the chambers, the perforated pistons and the perforated upper band 11. The pressure can be raised to any degree that is desired by varying the convergence of the upper band and the endless chain 20. Theoretically indeed it is possible to compress the material originally charged into the compression chambers up to *nil*, practically the final pressure is selected so that it is that which is most advantageous for the material to be compressed. When the chambers leave the upper band, there is a still further relative movement of the pistons and the chambers until the pressing surface of the pistons is level with the upper edge of the chamber, whereupon the compressed cake falls out.

In the construction shown the pistons are positively conveyed by the endless chain, while the compression chambers are moved along by the pistons and slide in the guide 25. Obviously the compression chambers may be positively moved and the pistons carried along by them. The volume can be

diminished to any degree that is desired as is already stated. The length of material is in this case subdivided into several sections by the compression chambers so that more surfaces for the escape of the water are provided. It is possible in this arrangement to obtain in the press any suitable shaped blocks by appropriate formation of the compression chambers. The formation of the pressure surfaces each of two perforated metal sheets, the perforations of one registering with the not perforated portions of the other, has the advantage of easy and cheap construction, and that the material under pressure is only so far pressed into the perforations as is necessary for the filtration of the water to be expressed, it being impossible for the perforations to become stopped.

Now what we claim and desire to secure by Letters Patent is the following:

1. A press for drying vegetable and mineral substances, comprising two endless bands, the adjacent runs of which converge and travel in the same direction, means connected to and actuated by said bands to form completely inclosed receptacles, the convergency of said bands decreasing the capacity of said receptacles as they move toward the discharge end of the press.

2. A band press for drying vegetable and mineral substances comprising two endless bands the adjacent runs of which travel in the same direction and converge to form a wedge-shaped space between them, the narrower end of which is at the delivery end of the press, receptacle forming devices carried by both of said bands and adapted to gradually overlap as they approach the delivery end of the press.

3. A band press for drying vegetable and mineral substances comprising two endless series of plates the adjacent runs of which travel in the same direction and form a wedge-shaped space between them, the narrower end of which is at the delivery end of the press, longitudinal and transverse walls carried by said plates, the walls of the plates on one band adapted to gradually overlap the walls on the plates of the other band as they approach the delivery end of the press.

4. A band press for drying vegetable and mineral substances comprising two endless series of plates the adjacent runs of which travel in the same direction and form a wedge-shaped space between them, longitudinal and transverse walls carried by said plates, the walls on the plates of one band adapted to gradually overlap the walls on the plates of the other band as they approach the delivery end of the press, the longitudinal walls being adapted to overlap before the transverse walls overlap.

5. In a band press, a band composed of a

plurality of plates each of which is formed
of two perforated metal sheets placed to-
gether so that the perforations of one regis-
ter only with a part of the perforations of
5 the other.

In testimony, that we claim the forego-
ing as our invention, we have signed our

names in presence of two witnesses, this
fifth day of September 1911.

HEINRICH BRUNE.
HEINRICH HORST.

Witnesses:

JEAN GRUND,
CARL GRUND.