(No Model.)

A. BORNHOLDT

PNEUMATIC PRESS.

No. 489,409. Patented Jan. 3, 1893.

FIG. 1.

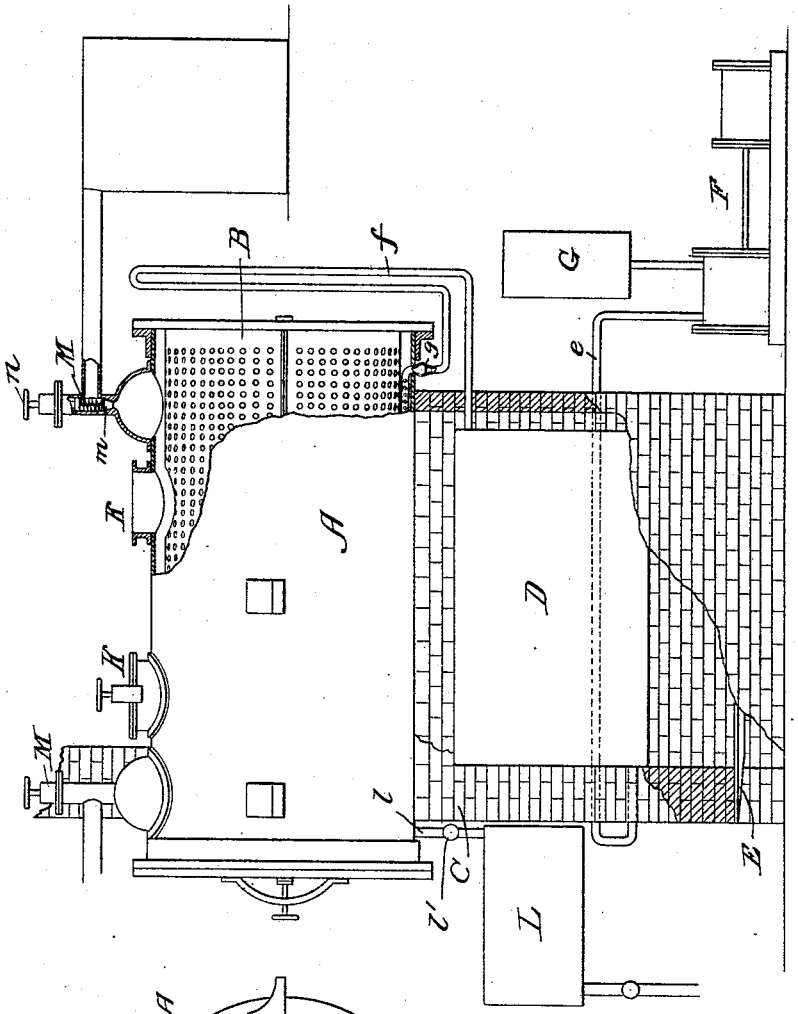
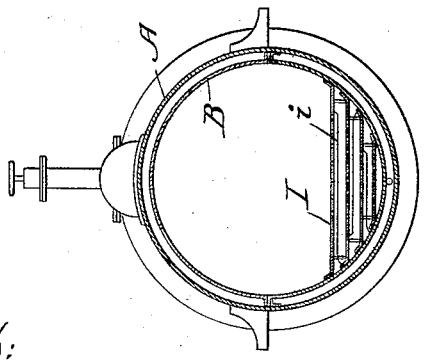


FIG. 2.



Attest:
Geo. T. Smallwood
Jonathan Tilley

Inventor:
Adolph Bornholdt,
by Pollock & Maura
his Attorneys:

UNITED STATES PATENT OFFICE.

ADOLPH BORNHOLDT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THE NATIONAL VACUUM DRYING AND AIR DISTILLING COMPANY, OF SAME PLACE.

PNEUMATIC PRESS.

SPECIFICATION forming part of Letters Patent No. 489,409, dated January 3, 1893.

Application filed February 26, 1892. Renewed December 16, 1892. Serial No. 455,369. (No model.)

To all whom it may concern:

Be it known that I, ADOLPH BORNHOLDT, a resident of Brooklyn, in the State of New York, have invented a new and useful Improvement in Presses, which improvement is fully set forth in the following specification.

This invention relates to the construction of presses for drying, extracting, separating and like purposes.

The construction and operation of ordinary presses are well understood. In a cider-press, for example, the apples reduced to small pieces are placed in a cylinder or vessel, and squeezed or compressed by a movable disk or platen fitting in said vessel and operated by a screw, lever or other suitable means. Innumerable modifications or special adaptations of this form of press have been heretofore devised, but the principle and mode of operation are substantially alike in all. It is not possible, by presses of this sort, to extract all the fluids of a mass, for the reason that the interior parts thereof are not subjected to the same compression as the superficial portions, the elasticity of the mass opposing and diminishing the actual pressure. Moreover, as the surfaces of the mass become hard and compact, the escape of juices from within is impeded. It follows that the interior parts of the mass are never so well dried as the exterior portions. Moreover, the power required to compress the mass increases greatly toward the end of the operation, and it follows that fibers or small particles of the solid mass are expressed with the liquids. If these be fermentable liquids the presence of such fibrous particles is very objectionable, in that they tend to set up rapid fermentation. It is, of course, an incident of the use of an ordinary press, that the mass treated is, after the liquids are expelled, left in the form of a compact cake. In many cases this is not desirable because of the difficulty that attends removal of such a compact cake from the press, and for other reasons.

The object of my invention is to produce an efficient press in which the compression is effected by air under high pressure, acting directly upon the mass to be treated. In such an apparatus the separate pieces or particles are not squeezed or compressed together, but each piece or particle is in effect acted upon separately and individually, and all portions of the mass are subjected to the same degree of compression. As a consequence, a complete drying, extracting or separating of fluids is effected.

The improved press comprises as its essential elements, a pump or air compressor adapted to furnish the degree of compression required (which for some purposes may advantageously be as high as one thousand pounds, or even more), and a compression chamber capable of withstanding a high internal pressure and having an inner perforated cylinder through which the air can find ready access to every part of the contents of the press.

The invention can be most conveniently explained in connnection with the accompanying drawings in which

Figure 1 is an elevation, partly in section, of an apparatus constructed in accordance with the invention, and Fig. 2 is a cross-section of the press proper.

The said press consists of a strong tank or vessel A, adapted to withstand a high pressure. Within this vessel is a perforated cylinder B, somewhat smaller than the interior diameter of the vessel A, so that an annular space is formed between them.

The press is supported upon a foundation of masonry C, which incloses an air-storage and heating chamber D, beneath which is the grate E.

F represents an air pump having sufficient power to supply the necessary compression. The pipe *e* leads from the pump into the chamber D, and pipe *f* from the latter to the lower part of the press, between the inner and outer cylinders. Pipe *e* is provided with a check valve *g*. G represents a purifier of any suitable kind through which the air is drawn by pump F.

The perforated cylinder B of the press contains a series of perforated shelves I of which there may be any desired number. Beneath each shelf is a drip pan or tray *i* which catches

the liquid flowing through the perforations of the shelf and conducts it to one side of the cylinder.

K K represent man-hole openings for giving access to the interior of the cylinders to charge them or remove the residues. L is a receptacle for the liquids which are drawn off by pipe *l* provided with a cock *l'*.

M M are the air and vapor discharge pipes provided with an adjustable pressure retaining valve *m*, which can be regulated by the screw *n* to maintain any desired pressure in the cylinders A B.

The substances which are to be subjected to compression are introduced through the man-hole openings into the inner cylinder, the pressure valves set to the proper point and the outer cylinder closed. The pump is then put into operation and air forced into the storage chamber D, and thence into vessel A. If the operation requires warm air, which is preferable in some cases, a fire is maintained under the chamber D. The air entering vessel A is distributed through the whole mass contained in cylinder B exerting equal pressure upon all parts thereof, so that the fluids or juices are extracted with uniformity.

From what has been already said it will be understood that the invention is susceptible of wide industrial applications, and that modifications and special adaptations for particular purposes may be made without departing from the spirit of the invention.

I claim as new and desire to secure by Letters-Patent:

1. A pneumatic press for extracting and separating the fluids from the solid portions of a mass, said press comprising in combination, an outer cylinder or vessel adapted to withstand a high pressure, an inner perforated cylinder or vessel, and an air-compressor connected by a pipe with the interior of the outer vessel, so that the air acts by direct contact on the mass to be treated substantially as described.

2. A pneumatic press comprising in combination an outer cylinder or vessel capable of withstanding high pressure, and provided with a pressure-retaining valve, an inner perforated cylinder or vessel, an air supply pipe leading into the space between the two vessels, and an air-compressor, substantially as described.

3. The combination in a pneumatic press, of the outer cylinder or vessel, the inner perforated cylinder or vessel, having a series of perforated shelves each with a drip pan beneath, the air pipe entering the space between the two cylinders, and the air compressor, substantially as described.

4. The combination of the outer cylinder or vessel, provided with a pressure retaining valve, the inner perforated cylinder, the air compressor, the storage chamber provided with means for heating the air therein, and pipes leading from the compressor to the storage chamber, and from the latter to the outer cylinder or vessel, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

A. BORNHOLDT.

Witnesses:
JOS. GLATZ,
H. N. MEEKER.