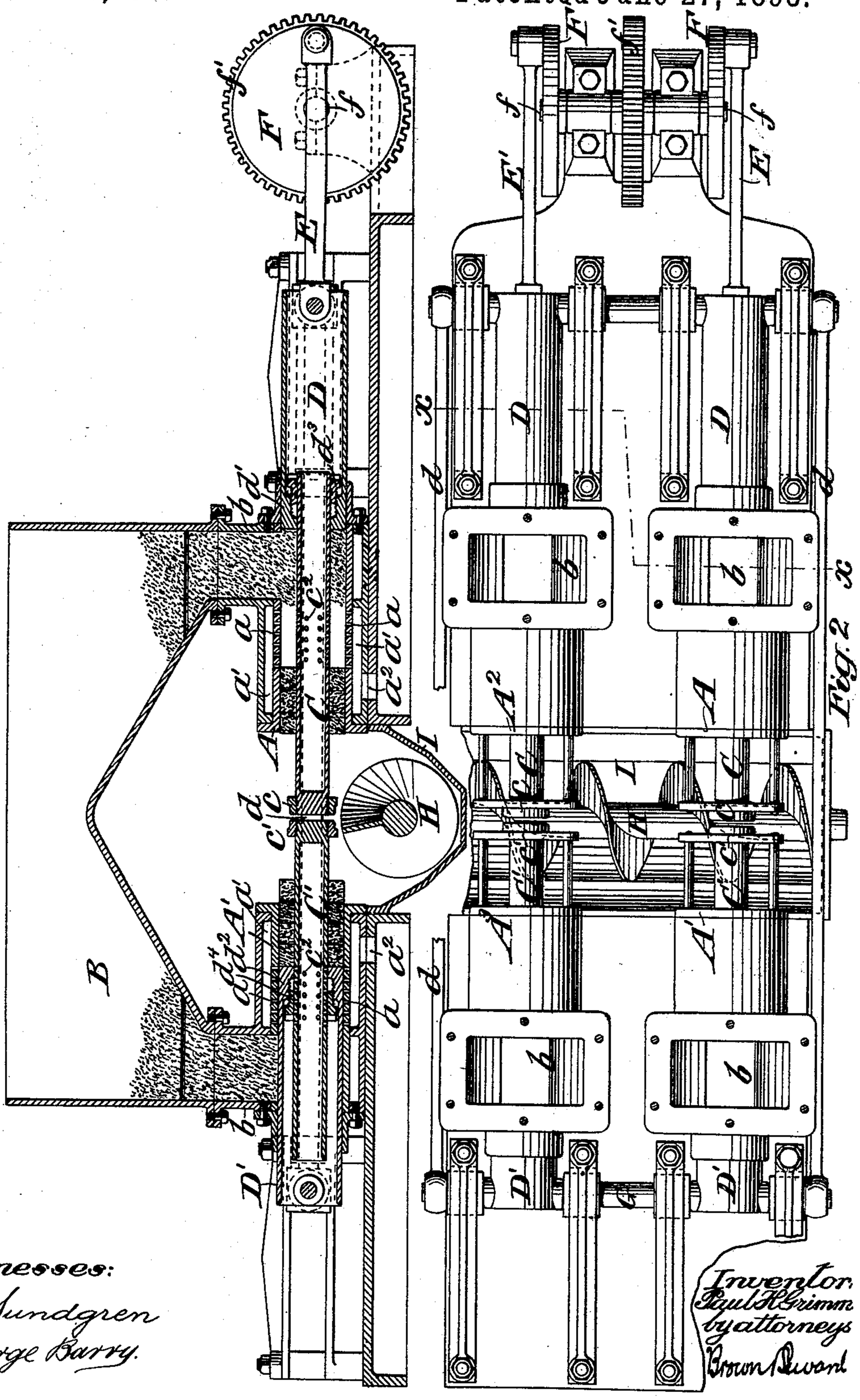
(No Model.) 2 Sheets—Sheet 1.

# P. H. GRIMM.

## PRESS FOR EXPRESSING MOISTURE.

No. 500,490. Patented June 27, 1893.




Witnesses:
C. L. Sundgren
George Barry.

Inventor:
Paul H. Grimm
by attorneys
Brown & Ward

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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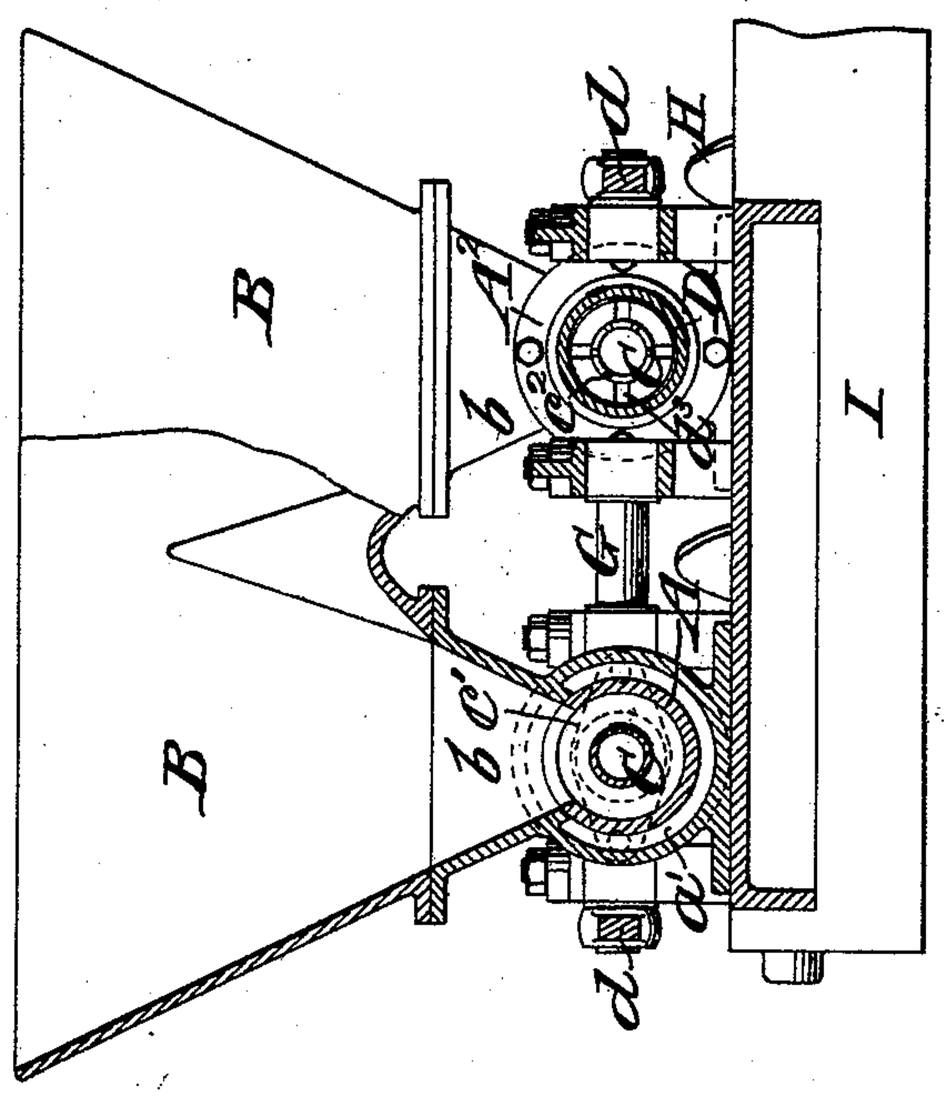
Fig. 3.

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# UNITED STATES PATENT OFFICE.

PAUL H. GRIMM, OF GLEN COVE, NEW YORK, ASSIGNOR OF ONE-HALF TO EDGAR E. DURYEA, OF SAME PLACE.

## PRESS FOR EXPRESSING MOISTURE.

SPECIFICATION forming part of Letters Patent No. 500,490, dated June 27, 1893.

Application filed June 6, 1892. Serial No. 435,601. (No model.)

*To all whom it may concern:*

Be it known that I, PAUL H. GRIMM, of Glen Cove, in the county of Queens and State of New York, have invented a new and useful Improvement in Presses for Expressing Moisture, of which the following is a specification.

My invention relates to an improvement in presses for expressing moisture and more particularly to presses for expressing the moisture from the refuse in the manufacture of starch.

My invention contemplates the compression of successive charges of the refuse under the successive movements of a reciprocating plunger which forces each successive charge against one or more previously compressed charges which are thereby advanced at each stroke toward the exit, the walls of the casing within which the material is compressed being provided with perforations to permit the escape of the moisture during the compression of the mass.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the press in vertical longitudinal section. Fig. 2 is a top plan view, and Fig. 3 is a transverse vertical section through the line $x$, $x$ of Fig. 2, showing the feed hopper partly in elevation and partly in section.

I have shown the press herein as working in duplicate, this being the form which I find advantageous for my present purposes, but I wish it to be understood that I do not limit myself to the duplicate form, as it may be operated either as a single press or three or more presses may be connected to and operated by a single shaft, either in unison as shown or with their operating rods connected at right angles with the shaft.

Two casings A and A′, shown in the present instance as open end cylinders, are placed in alignment and spaced apart to admit of the discharge of compressed material between their adjacent ends. A feed hopper B is provided with outlets $b$ common to the two cylinders A and A′ to feed the material to the cylinders, and, when the presses are coupled in duplicate, shown in Fig. 2, the feed hopper B may be arranged common to the four cylinders.

The cylinder A is provided with perforations $a$ extending through its wall for the escape of the moisture from the material while the latter is being compressed. The portion of the cylinder which is perforated is preferably of a length corresponding to the length occupied by a charge of the material to be compressed before it has been acted upon by the plunger. From the perforated portion to its exit the said cylinder is preferably provided with a closed wall.

A jacket $a'$ surrounds the cylinder A and is spaced therefrom to form a chamber for the reception of the moisture which is expressed from the material and passes through the perforations $a$, and an outlet $a^2$ is formed at the lower portion of the jacket $a'$ for the escape of the moisture from said chamber.

The cylinder A′ forming the other member of the couplet of the one press, as well as the cylinders $A^2$ and $A^3$ forming the couplet of the companion press are quite similar in their structure to that of the cylinder A hereinabove described.

The discharge ends of the cylinders A and A′ are arranged to face each other and hollow stationary cores C and C′ are located centrally within the cylinders. The adjacent ends of the cores C and C′ are secured to yokes $c$ and $c'$ secured to the main frame. In the present instance I have shown the cores C and C′ screwed into the yokes $c$ and $c'$, the yokes being located in proximity to each other intermediate of the discharge ends of the cylinders. The ends of the cores which are screwed into the yokes are preferably closed and their opposite ends open and the said hollow cores are provided with perforations $c^2$ along that portion of the core which lies opposite the perforations $a$ in the cylinder.

Hollow plungers D and D′ are connected by a rod $d$ to move in unison and are provided with heads $d'$ and $d^2$ adapted to embrace the hollow cores C and C′ with a snug sliding movement.

In practice, I provide the heads with stuffing boxes $d^3$ and $d^4$ to close the joint between

the plunger heads and the cores. The plunger heads are so located with respect to the cylinders that when drawn to the limit of their movement in one direction, as for example that shown in Fig. 1, the plunger head $d^2$ will have advanced toward the discharge end of the cylinder past the perforated portion and the plunger head $d'$ will be in position to allow the discharge of the material to be compressed to enter within the cylinder A. At the limit of the movement of the plunger in the opposite direction, the plunger head $d'$ will have passed the perforated portion of the cylinder A and the plunger head $d^2$ will be in position to permit the material to be compressed to enter the cylinder A′ in advance of the plunger head. The plungers D and D′, as they advance past the discharge outlets $b$ of the hopper, form cut-offs to prevent the material from entering the cylinder until the plunger head has been withdrawn. One of the plungers, in the present instance D, is connected by a pitman E with a crank wheel F on an operating shaft $f$. In the form in which I have herein shown the press, a second pitman E′ connects with the crank wheel F′ also secured to the shaft $f$ and the driving power is transmitted to the shaft $f$ by a spur wheel $f'$ secured on the shaft intermediate of the crank wheels F and F′. I have also shown the crank wheels F and F′ arranged to operate in unison and have connected the plungers of the two cylinder couplets by a cross bar G so that the two companion presses operate as one, compressing a charge in one cylinder of each couplet upon each advance and return stroke.

In the present instance, it is intended that the friction upon the several compressed charges located in that portion of the cylinder between its perforated portion and its discharge end shall be sufficient to resist the charge being compressed with sufficient force to reduce it to about one-third of its original size and the stroke of the plunger is made to terminate at the point where the perforated portion of the cylinder terminates, so that after compressing the material to about one-third its original volume, it will move it, together with the compressed charges, in advance of it along the closed portion of the cylinder, a distance equal to the thickness of one of the compressed charges and thereby discharge one of the compressed cakes each time the plunger advances toward the discharge end of the cylinder. As the material is forced against the previously compressed cakes, the liquid escapes therefrom through the perforations $a$ in the cylinder and also through the perforations $c^2$ in the hollow core, the former finding its way out through the opening $a^2$, and the latter finding its way out through the open end of the hollow core into the hollow plunger and thence out through its open end. As the pressed cakes are discharged from the cylinders, they are removed by means of an endless screw H working in a trough I below and between the adjacent ends of the cylinders. The screw H may be driven from any suitable source of power, not shown.

What I claim is—

1. In combination, an open ended casing having a perforated portion, a core extending centrally within the casing a feed hopper in communication with the interior of the casing, a jacket surrounding the casing and spaced therefrom forming a chamber in communication with said perforated portion of the casing, a reciprocating plunger adapted to travel back and forth along within the casing and means for operating the plunger, substantially as set forth.

2. In combination, open ended casings arranged in alignment with each other, cores extending centrally within the casings, plungers the heads of which are adapted to embrace the cores and slide within the casings, conduits for the escape of the moisture, means for feeding the material to be compressed to the casings and means for operating the plungers, substantially as set forth.

3. In combination, casings arranged in alignment with their discharge ends toward one another, hollow perforated cores extending within the casings, plungers the heads of which are adapted to reciprocate within the casings, the heads of the plungers being arranged to surround the hollow cores, means for feeding the material to the cylinders and means for operating the plungers in unison, substantially as set forth.

4. In combination, casings arranged with their discharge ends toward one another, plungers arranged to reciprocate within the casings, conduits for the discharge of the expressed moisture, a trough for receiving the compressed cakes of material as they leave the ends of the casings, a screw for removing the material from the trough, means for feeding the material to be compressed to the casings and means for operating the plungers, substantially as set forth.

PAUL H. GRIMM.

Witnesses:
FREDK. HAYNES,
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