No. 643,891. Patented Feb. 20, 1900.

J. F. BUSSELLS.

EXTRACTING PRESS.

(Application filed July 19, 1899.)

(No Model.)

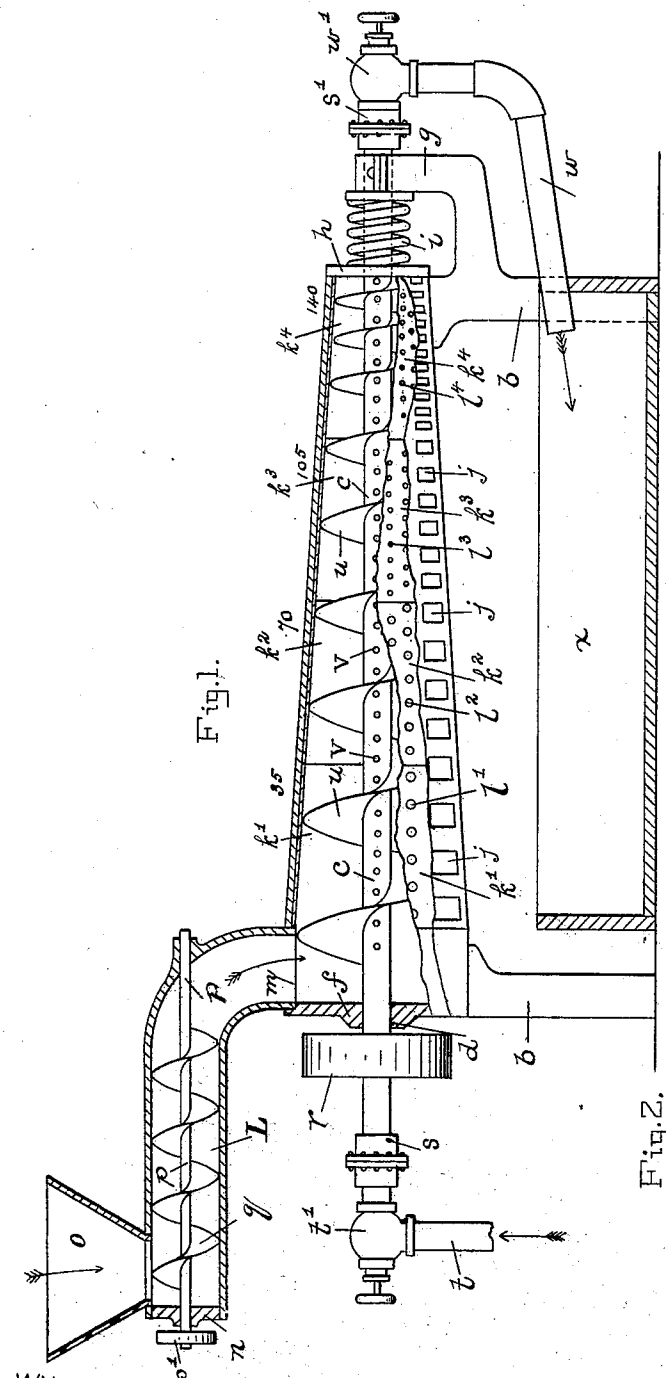

Fig. 1.

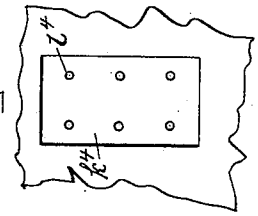

Fig. 5.

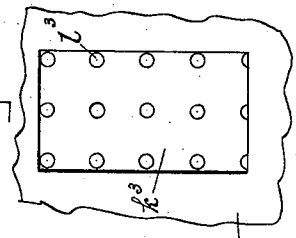

Fig. 4.

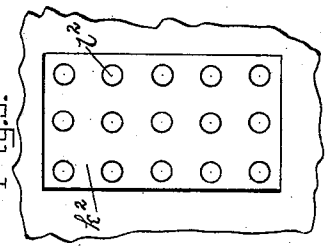

Fig. 3.

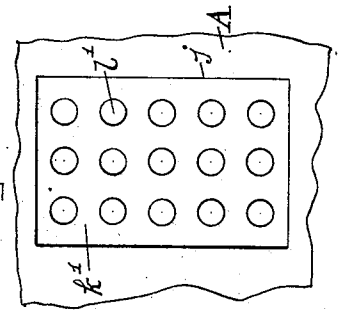

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPHUS F. BUSSELLS, OF IRVINGTON, VIRGINIA.

EXTRACTING-PRESS.

SPECIFICATION forming part of Letters Patent No. 643,891, dated February 20, 1900.

Application filed July 19, 1899. Serial No. 724,339. (No model.)

To all whom it may concern:

Be it known that I, JOSEPHUS F. BUSSELLS, a citizen of the United States, residing at Irvington, in the county of Lancaster and State of Virginia, have invented certain new and useful Improvements in Pressing Apparatus, of which the following is a specification.

This invention relates to improvements in that class of pressing apparatus wherein a tapered case and tapered compressing-screw are employed.

The object of this invention is to provide a construction that will produce better results than any heretofore obtained from presses of this character.

Referring to the drawings, Figure 1 is an elevation in section, showing the construction of the machine. Figs. 2, 3, 4, and 5 are views illustrating the progressive diminution in the size of the strainer-holes from the large to the small end of the tapered case.

The case or shell A is tapered and supported on legs *b*. A pipe or hollow shaft *c* extends through the case. At the large end this shaft turns in a hole or bearing *d* in the closed head *f*, and near the small end the shaft turns in a bracket *g*, attached to the legs and projecting off from the small end. The small open end of the case is kept normally closed by a movable disk or plate *h*, loose on the shaft *c*, and a spring *i* bears against this disk or plate and presses it to the small open end. In operation when the pressure of the material in the case is sufficient to overcome the resistance of the spring *i* this plate *h* will be forced away from the small end and allow the material to discharge.

The shell or wall of the case has slots or holes *j* regularly placed and extending all along and around the shell. These slots are rectangular in shape.

A lining of sheet-copper is within the case and contacts with the shell or wall A. This lining is made in several sections or parts—in the present instance four, k' k^2 k^3 k^4, one after the other, extending from the large end to the small end of the tapered case. Each section of the lining has strainer-holes, those in the first section k' at the large end of the case being largest and designated l'. These strainer-holes in practice should be twelve sixty-fourths of an inch. The strainer-holes l^2 in the second section are next in size smaller and should be ten sixty-fourths. Those, l^3, in the third section should be eight sixty-fourths, and the smallest strainer-holes l^4 in the fourth section at the small end of the case should be seven sixty-fourths of an inch. By thus graduating the size of the strainer-holes and gradually making them smaller from the large end to the small end of the tapered case a very desirable action or operation is produced, which will be presently explained.

A feeding-in device of improved construction is provided and attached to the topmost cylinder and consists of a horizontally-placed tube L, whose curved end connects with an opening *m* in the case-wall. The other end of the feed-tube is closed by a head *n*, and near this end the tube has on top a funnel-mouth or hopper *o*, and a shaft *p* extends horizontally within the feed-tube and projects through the head *n* and on the outside has a pulley *p'* to be driven by a belt or chain. A compressing-screw *q* is on the shaft *p*. This construction of horizontal tube with its end closed and its other end connecting with the case on the top insures that a supply of the matter may be continuously fed into the case under conditions that will keep the feed-tube so choked or jammed full of matter as to prevent escape of steam-pressure from the case. This construction and arrangement for horizontally feeding will operate satisfactorily whether the mass of matter that is being fed be either slightly wet or in a very wet condition.

The hollow shaft *c* has on its outside end a pulley *r*, and both ends of this shaft connect with suitable boxes *s s'*. A steam-pipe *t* connects with one box and has a valve *t'* to govern the flow of steam that passes from a boiler (not shown) to the hollow shaft *c*. This shaft within the case A has a tapered spiraled flange or screw *u*, which fills the case and in revolving just clears the lining of sheet-copper. The shaft also has perforations *v* extending along the entire length of the shaft, so that at the large end of the case, where the compression of the material is very slight, steam will readily pass from the perforations *v* and enter the mass of the material. As the material advances toward the small end it gradually but rapidly becomes more and more com-

pacted by the action of the tapered screw. This gradually-increasing pressure to which the material is subjected may be expressed, as an illustration, by the following figures: If the pressure at the terminal end of the first section of lining k' be thirty-five pounds per square inch, that at the terminal end of the second section k^2 would be about seventy pounds, that at the terminal end of the third section k^3 would be one hundred and five pounds, and that at the end of the fourth section k^4 (discharge end) would be, say, one hundred and forty pounds. A drain-pipe w leads from the valve w', and the open end of said pipe discharges into a tank or receptacle x.

Now the operation of this organization is as follows: Supposing the boiler to be furnishing steam at, say, seventy pounds pressure, the valve w' must be very slightly opened—just cracked. The steam would pass into the case from the perforations v in the hollow shaft c as far along as the first two lining-sections k' k^2 extend. This steam would penetrate the mass of material in the large end of the case and would heat the material and at the same time subject it to compression. The hot steam would change the congealed condition of particles of fat to an oily or liquid condition. Some of the oil and watery liquids would be expressed or forced from the case through the largest strainer-holes l' and second-size holes l^2. As this heated mass in the large end is forced forward into the smaller diameter of the case the mass will be gradually condensed or compressed in bulk. The steam in the hollow shaft being at seventy pounds pressure would pass the perforations v and force its way into the mass of material wherever the material has been condensed to a degree less than seventy pounds. As already stated, this would be where the first two lining-sections k' k^2 are. Where the material in its forward movement reaches a degree of condensation exceeding that of the steam-pressure, then at such point the steam will no longer issue from the perforations v and penetrate the mass. In the case here discussed this condition would exist along the third and fourth lining-sections k^3 k^4. This condition produces a changed effect. The mass of material now being greatly condensed, the limpid oil and water will be forced not only from the case outward through the smaller strainer-holes l^3 and l^4, but also forced from the case inward through the perforations v into the hollow steam-shaft c. The oil and water thus entering the shaft will be forced by the steam through the cracked or slightly-opened valve w' and then flow down the drain-pipe w to the tank or receptacle x. This operation insures an extraction of a very large percentage of moisture, and the result is attributable to progressively reducing the size of the strainer-holes from the feeding-in end of the press to the discharge end. As the pressure on the mass of material increases the size of the strainer-holes decreases. The slots j in the wall of the case afford free outlet for the oil and water, but leave the case-shell sufficiently strong to withstand the pressure.

It is obvious the strainer-holes of progressively-reduced size may be made direct in the wall of the case instead of in the lining.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of a shell or case having a feeding-in device at one end, a pressure-plate normally closing the discharge end, and the wall or shell of the case provided with strainer-holes which are reduced in size progressively from the feeding-in end to the discharge end; and a hollow shaft within the case carrying a tapered spiral flange or screw.

2. The combination of a tapered case having strainer-holes reduced in size progressively from the large end to the small end; a revoluble hollow steam-shaft extending through the case and provided with perforations; and a tapered spiral flange on the hollow shaft.

3. The combination of a tapered shell having slots, j, regularly placed and extending all along and around the shell; a lining of sheet metal within the shell and in contact therewith—said lining covering the said slots and the lining provided with holes which are reduced in size progressively from the large end to the small end; a hollow shaft through the shell and provided with perforations opening into the shell; and a spiral flange on said shaft.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPHUS F. BUSSELLS.

Witnesses:

THOS. C. BAILEY,

CHARLES B. MANN, Jr.