

(No Model.)

2 Sheets—Sheet 1.

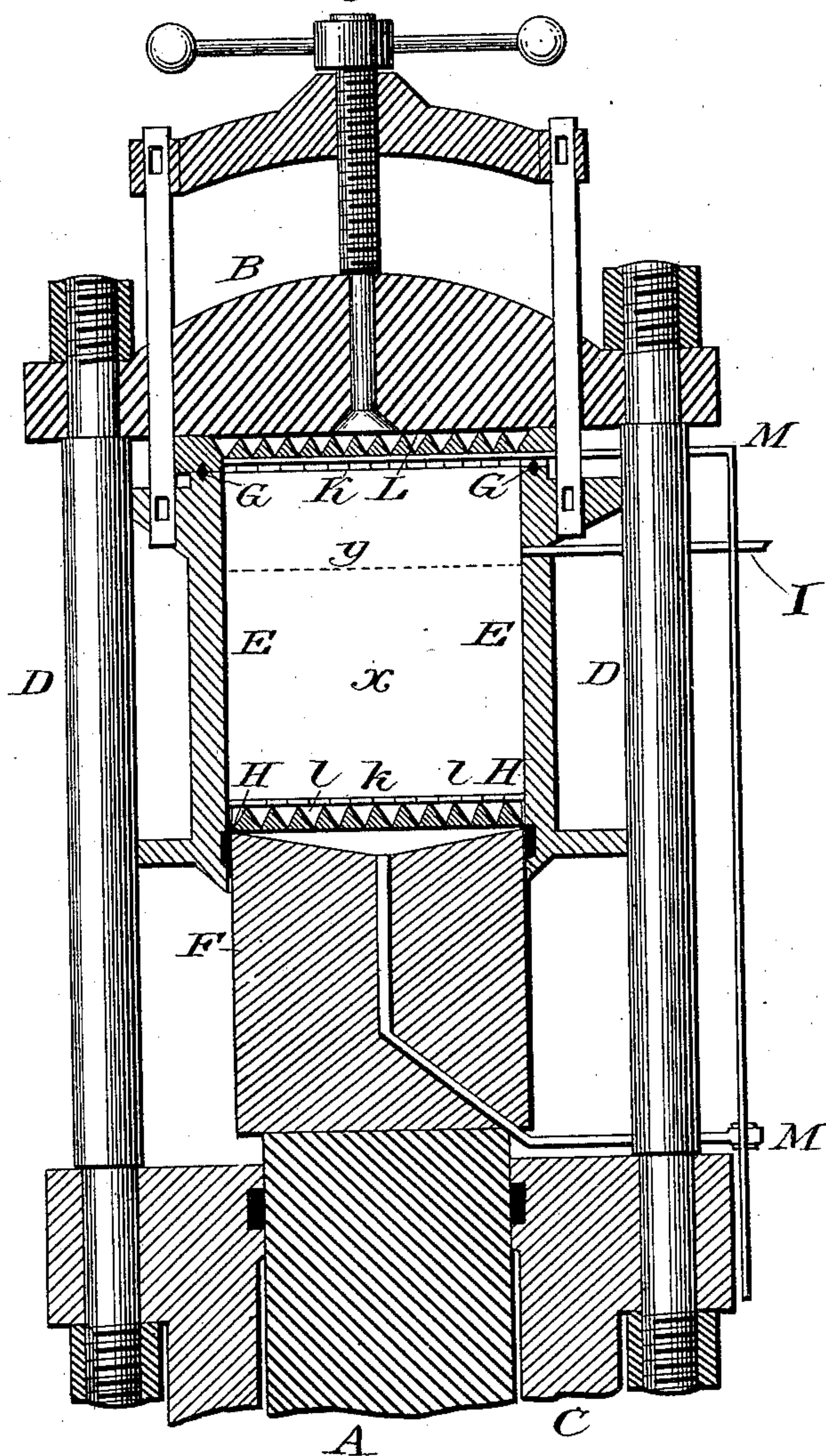
N. A. PRATT & G. W. BENSON.

APPARATUS FOR THE EXTRACTION OF OILS AND FATTY MATTERS
FROM ANIMAL, VEGETABLE, AND MINERAL SUBSTANCES.

No. 305,224.

Patented Sept. 16, 1884.

Fig. 1.



Witnesses:
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(No Model.)

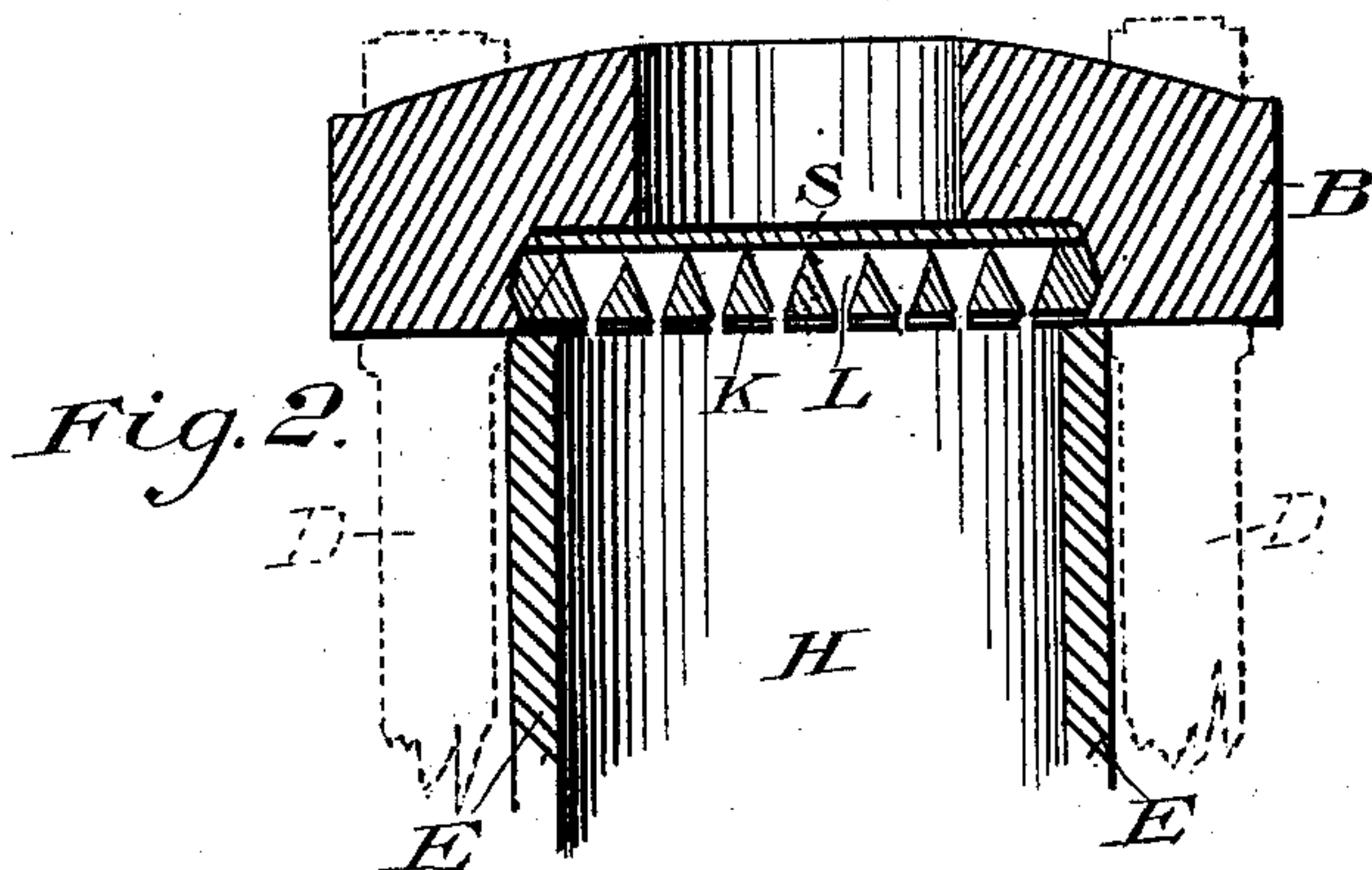
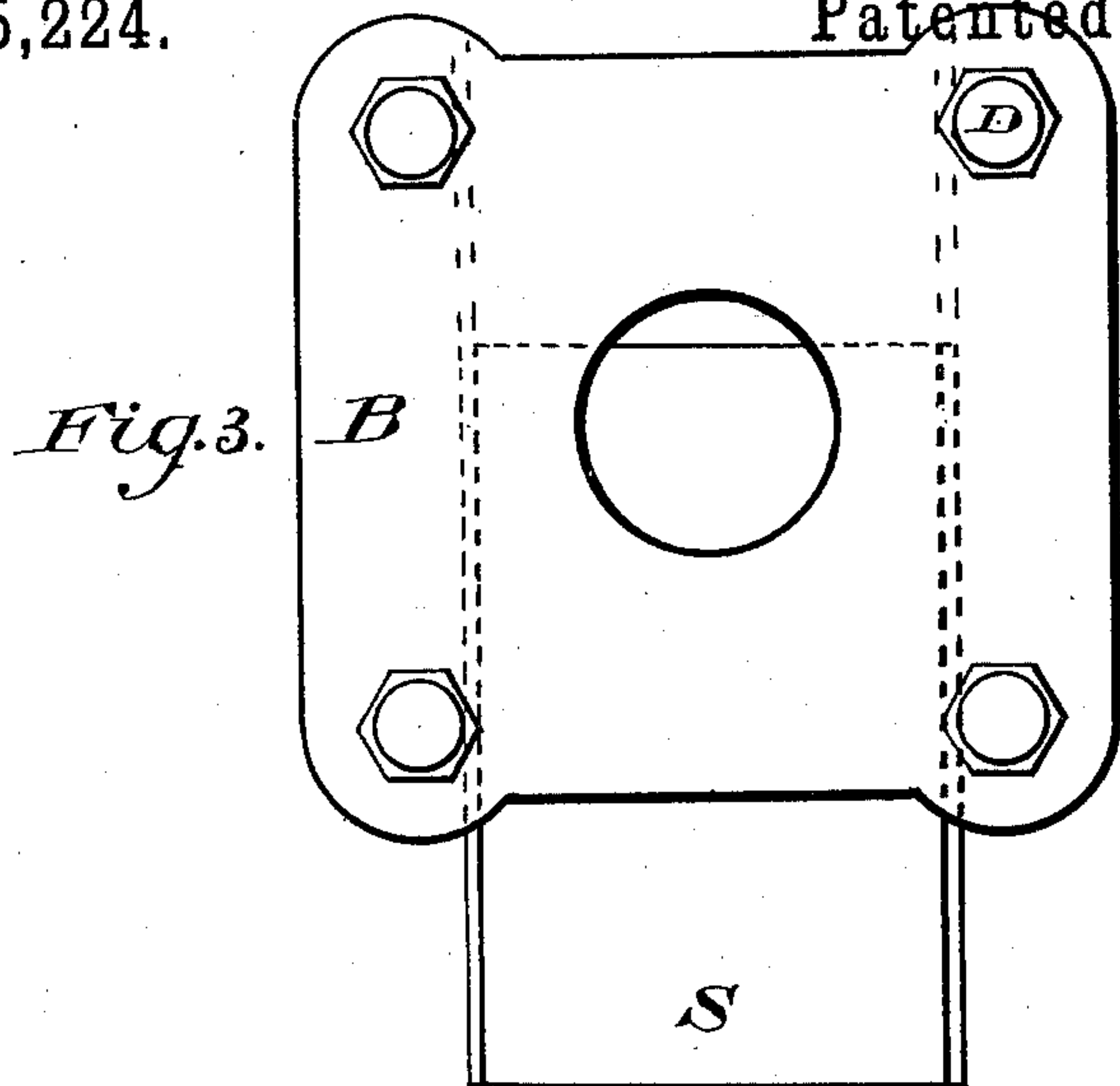
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Witnesses;

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE EXTRACTION OF OILS AND FATTY MATTERS FROM ANIMAL, VEGETABLE,
AND MINERAL SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 305,224, dated September 16, 1884.

Application filed June 2, 1884. (No model.)

To all whom it may concern:

Be it known that we, NATHANIEL A. PRATT, of Decatur, De Kalb county, and GEORGE W. BENSON, of Marietta, Cobb county, State of Georgia, have invented new and useful Improvements in Apparatus for the Extraction of Oils and Fatty Matters from Animal, Vegetable, and Mineral Substances, which improvements are fully set forth in the following specification and accompanying drawings.

The object of our invention and process is to provide efficient and sufficient mechanical device or devices to use with safety and economy mechanical pressure, combined with chemical percolation and diffusion of solvents, whereby fatty substances may be operated upon for the extraction of their oils and fatty matters.

We are aware that many mechanical devices for pressure, as well as the use of chemical solvents for extracting fatty matters, have been heretofore separately used; but we claim as new the combination of mechanical pressure with solvents for the extraction of oils and fatty matters from fatty substances. It is also known that perforated plates have been used for certain purposes in like processes; but we claim as new the combination of a perforated plate connected with inclosed and concealed cavities for the passage, without exposure, of fatty matters combined with solvents from a pressed mass. It is known that danger attaches to the use of solvents in almost all such processes, which danger is mainly chargeable to exposure of the material while under operation for extraction or recovery. It may be seen that our devices and combinations avoid exposure of the material at any period of operation while the solvent is in combination with the oily substance or the fatty matters, except the trace of solvent left in the hard cake after pressure, and while it is being taken from the press, and the cake is then so nearly exempt from oil or solvent as to be entirely free from danger by reason of inflammability. Another object is that, when desirable to do so, we may extract the fat without the application of heat to the material, and thus produce "cold-pressed oil." A sequence of our

process is leaving in the pressed mass all albuminoids heretofore partly pressed out with the oil, and, finally, the production of an oil with body firm at 66°.

We will now describe our treatment of cotton-seed for the extraction of its fatty matters, which will demonstrate our process and invention.

Figure 1 represents a vertical section of any press with our adjuncts and mechanical devices, the latter only shaded. A designates the ram, B the head-block, C the base or pot, and D the pillars, of any hydraulic or other press. E designates the movable cylinder. F designates the plunger. G designates the packing on edge of movable cylinder E. H designates the hydraulic packing in cylinder E. I designates the "solvent" injection-pipe. K & k designate the perforated plates. L & l designate the concealed cavities. M designates the discharge-pipes.

Decorticated or undecorticated cotton-seed kernels are charged into cylinder E, which for that purpose has been lowered from head-block B. The ram, upon which is mounted plunger F, is set in upward motion. The cylinder E, with contents, is raised by mechanical appliance to its position for pressure, when packing G contacts with head-block B. The usual hydraulic packing, H, is in cylinder E, against which plunger F acts, and thus both packings make space X, containing the charge, leak-proof. The ram, with its surmounted plunger F, continues its upward motion, now, exerting pressure upon the charged mass. At this period of the process our charge of solvent is injected into the mass through pipe I, connected with cylinder E for that purpose, when percolation and diffusion combine with mechanical pressure, and their united agency accomplishes the most thorough and attainable extraction possible. These combined powers force the fatty matter from the mass both upward and downward through the perforated plates K and k into their connected inclosed and concealed cavities L and l, and thence through pipes M, &c., they are conducted to a still, where, by low heat applied by means of steam-pipe surfaces, the solvent is evaporated

from the oil, and, being condensed, flows into the solvent-receiver ready for use again, while the oil is left pure to be drawn off into its tank. The mass in space X having been thus pressed
 5 into a cake, *y*, and the last portion of fatty matter being in process of final withdrawal, cylinder E is forced down by mechanical means, as represented on the drawings, or otherwise, from around the periphery of the cake *y* to a
 10 point a little below the lower face line of the cake, ram and plunger F being meanwhile held at the pressure-point, thus retaining the cake firmly between plunger F and head-block B while cylinder E is slid down. The pressure on the ram is then sufficiently relieved to
 15 release the cake, when it may be pushed out into its container, where it may also be subjected to a low surface steam-heat for the recovery of any trace of solvent which may remain in the cake. The ram is finally lowered to its original position, while cylinder E, already lowered, is then ready for another charge.

Two or more movable cylinders with intervening platens over one ram, or a double-acting ram, may be operated with similar mechanical arrangements, and thus increase capacity.

If it is deemed desirable to charge through a hole in the head-block, the combined perforated plate and concealed cavity may be
 30 made in a slide covering the aperture in the head-block while the press is being made, and other similar slides may be used in the base-block upon it or in the platens, and these
 35 slides may contain the combined perforated plates and inclosed and concealed cavities.

The slide S, Fig. 2, is to be shoved into the head-block or base-block when a pressure is to be made, and is sufficiently large in area on
 40 its face to more than cover the outer edge of the cylinder E, in which has been charged the mass to be operated upon, and after the injection of solvent and pressure has been made, and the oil and fatty matters have thus been
 45 extracted, the ram-pressure is then relieved, and the slide withdrawn far enough to admit of forcing the caked mass from the cylinder out through the opening in the block, and the slide remains withdrawn while another charge
 50 of material is made through the opening into the cylinder.

In the accompanying drawings, Fig. 1 represents a cross-section of a press with our mechanical devices. Figs. 2 and 3 represent a
 55 modification.

Having thus described our process and invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The process of extracting oil or fatty matters from animal, vegetable, or mineral substances by percolation and diffusion of chemical solvents in or through the mass, operated upon while the said mass is under mechanical pressure.

2. The process of extracting oil or fatty matters from animal, vegetable, or mineral substances by chemical solvents acting upon a mass while it is undergoing pressure, with the mechanical adjuncts and parts, substantially as shown and described.

3. The movable cylinder E, in a press for extracting oil and fatty matters from animal, vegetable, or mineral substances, substantially as shown and described.

4. In a press for extracting oil or fatty matters from animal, vegetable, or mineral substances, the cylinder E, movable or stationary, in combination with the perforated plates K and *k*, provided with the inclosed and concealed cavities L and *l*, through which the oil or fatty matters may pass from the mass under treatment, and be conveyed through pipe M and other conduits without exposure.

5. In a press for extracting oil or fatty matters from animal, vegetable, or mineral substances, the slide S, containing the perforated plates K and *k*, provided with the inclosed and concealed cavities L and *l*, for the purposes and substantially as shown and described.

6. The movable cylinder E, in combination with a head or base block, platen, plunger, or slide in a press for extracting oil or fatty matters from animal, vegetable, or mineral substances.

7. In a press for the extraction of oil or fatty matters from animal, vegetable, or mineral substances, a cylinder having a perforated head-plate, in combination with a plunger provided with a perforated face-plate, a ram for actuating said plunger, suitable induction-pipes for introducing the solvent, and education-pipes, all constructed, combined, and operated substantially as herein set forth and described.

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