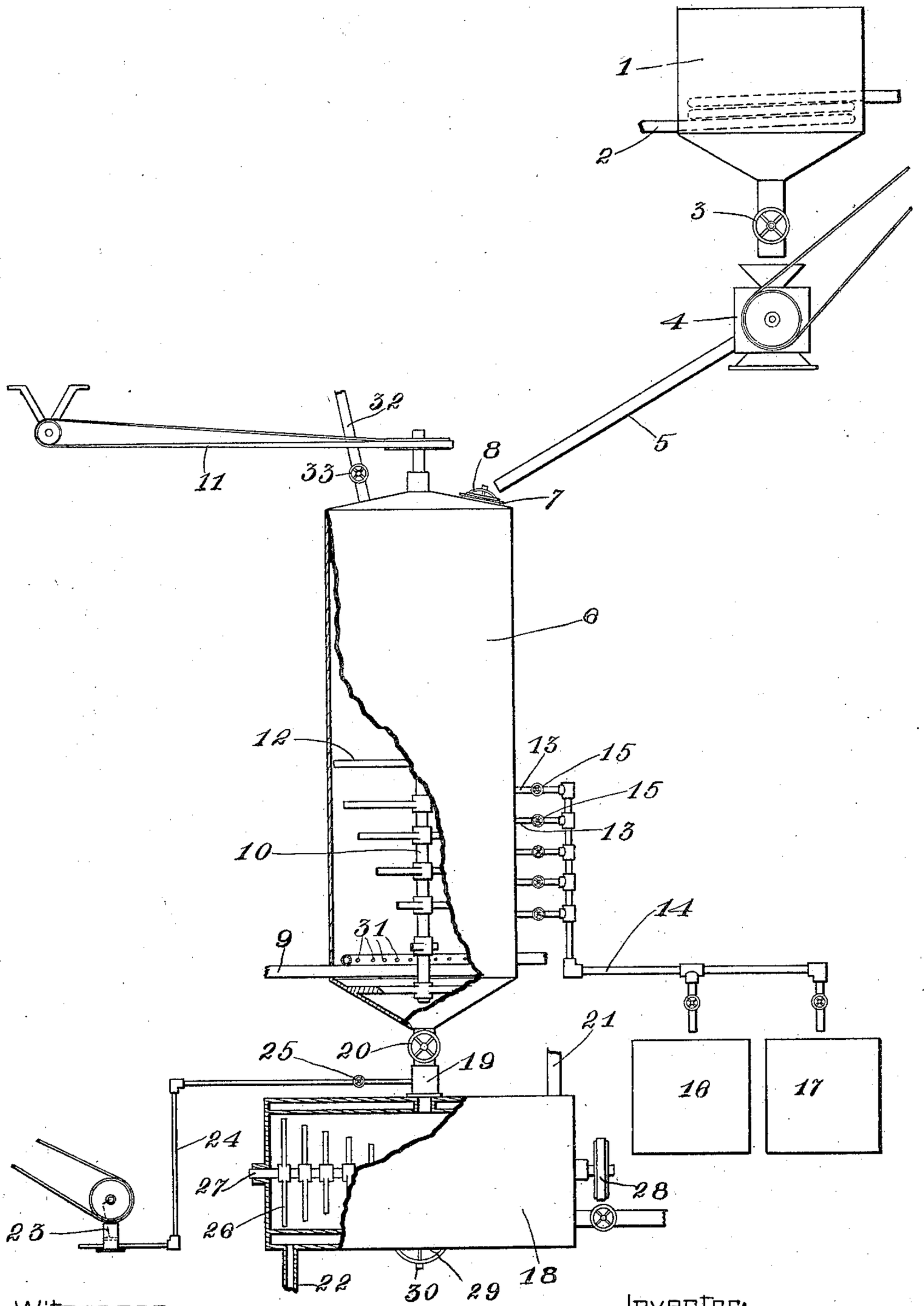
No. 705,033. Patented July 22, 1902.

D. CAMERON.

RENDERING APPARATUS.

(Application filed Feb. 10, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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RENDERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 705,033, dated July 22, 1902.

Application filed February 10, 1902. Serial No. 93,420. (No model.)

To all whom it may concern:

Be it known that I, DANIEL CAMERON, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented a certain new and useful Improvement in Rendering Apparatus, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to rendering apparatus, and has for its object the provision of an improved apparatus of this kind whereby it is possible to readily extract oil or grease from waste materials—for instance, hog or cattle products—or any ordinary form of grease-carrying product which contains oil or grease.

I have found that it is advisable in extracting oils or greases from products containing the same to subdivide the same, after which pressure may be exerted upon the subdivided material to remove the oil or grease therefrom.

My invention contemplates in the preferred embodiment thereof improved means whereby the subdivision of the product is simplified and aided, after which subdivision the material is brought within the influence of a pressure apparatus or separator in which suitable means are employed to agitate the contents thereof. After the pressure has been sufficiently applied, which in my improved apparatus is preferably done through the agency of steam admitted thereto, oil which has collected in the apparatus may be withdrawn and more thoroughly purified, if desired, after which the residue is removed into a drier to which heat may be supplied and from which air may be exhausted to facilitate this drying process. My improved construction thus provides a greatly-simplified rendering apparatus requiring very little attention and extracting the oil in a most thorough and efficient manner and at the same time reducing the waste material to a dry pulverized substance, all of which operations may be carried on without creating too offensive odors.

I will explain the preferred application of my invention more fully by reference to the accompanying drawing, illustrating one embodiment thereof.

The apparatus, as shown in the drawing, comprises a hopper 1, into which the products which are to be operated upon by the machine may be deposited. The materials when deposited in the hopper are subjected to heat, which is supplied thereto by a coil of steam-piping 2. This heating of the grease-carrying product aids the grinding process to which said material is subjected before it is placed in the separator. After a sufficient heating of the grease-carrying products within the hopper 1 a valve 3 may be opened to admit the same into a grinder 4 of any suitable construction, within which the products are subdivided and passed therefrom by the chute 5 into the pressure-chamber or separator 6. A suitable manhole is provided in the upper portion of the separator 6, which is closed by a lid 7, suitable means—such, for instance, as a locking-bar 8—being employed to retain the lid in place against the pressure which is exerted within the separator. After the process of heating and grinding to which the products have been subjected in their passage through the hopper 1 and the grinder 4 the products are subjected to heat and pressure to have the oils extracted therefrom in a most thorough and efficient manner. I extract the oil from the grease-carrying products deposited in the separator by subjecting them to a pressure, which is done through the agency of steam admitted to the interior of the separator by a coil of steam-pipe 9, to which steam may be supplied from any suitable source. The heat and pressure exerted upon the product extract the oil therefrom and allow the same to gather in the separator. The steam-pipe 9 is provided with little jet-openings 31, so that steam may enter from said pipe into the separator.

In order to more thoroughly extract the oil, means are employed to agitate the contents, which means preferably consist of a centrally-located rotary shaft 10, driven by means of a belt 11 in a suitable manner. The central shaft is provided with arms 12 12, secured thereto, which I arrange in spiral fashion about the said shaft, as well illustrated in the drawing, so that a most thorough agitation of the material is secured.

I am enabled to secure the extraction of

the oil from the products in the separator at a much reduced temperature and under more favorable conditions and in less space than by means heretofore used, as said material is supplied to the separator in a finely-subdivided partly-heated condition, in which condition it is readily susceptible to the action of the steam under pressure as supplied to the separator.

The oil is carried away from the separator by means of eduction-tubes 13 13, which are all united with a common conveying-pipe 14. The eduction-tubes 13 are placed in communication with the conveying-pipe 14 by valves 15 15, placed in said eduction-tubes, so that either one of said eduction-tubes 13 may, as desired, convey the oil or grease from the separator. The advantage of eduction-tubes placed at different heights is that by this means oil can be drawn off without the necessity of admitting water to float the oil up to a single outlet. In the rendering process there is a certain amount of sediment in the separator. This is called "tankage" and consists of refuse, which rests upon the bottom of the separator. Above this is the oil, the lighter and purer oil being at the top. The oil becomes heavier as the tankage is approached until finally just above the tankage there is a heavy black oil, which has to be subjected to retreatment for removing impurities. Heretofore the oil has been led out by means of an outlet, and as the amount of the tankage and the black oil in a charge varies it has been necessary to admit water to raise the oil to the outlet, the outlet being high enough to be above the tankage and black oil in any case. The admission of the water served to agitate the contents, which prolonged the operation of settling. The water also had to be removed from the refuse by the final process of drying. By means of the different outlets with their valves I am able to lead out the lighter and purer oil without disturbing or drawing the black oil or tankage, and I thus save time and trouble of admitting water and the agitation of the contents resulting therefrom, and I also avoid the necessity of extracting the water again from the refuse after it is passed to the drier.

It is not necessary in my improved apparatus to withdraw gases, steam, or volatile matter from the separator; but the oil therefrom may be withdrawn as it condenses by the eduction-tubes 13, the whole material being allowed to condense, if desired, within said separator 6. The oils as withdrawn from the separator 6 may be deposited selectively in two tanks 16 and 17, one of which may serve as a receiver for the pure light oils as withdrawn by means of the upper eduction-tubes 13 and the other of which may serve as a receptacle for the grease withdrawn from the separator by the lower eduction-tubes. After substantially all of the oils or g ease have been withdrawn from the product within the receiver 6 the residue is admitted into a drier 18 through a pipe 19, provided with a suitable valve 20.

The amount of material which may be acted upon at one time may be quite large, as the size of the separator may be almost anything desired, a separator which I have in practical operation and from which the drawing in the present application has been prepared being sixteen feet in height.

The drier 18, which receives the residue from the separator 6, is suitably steam-jacketed, inlet and outlet tubes 21 22 for admitting and withdrawing steam from the steam-jacket being indicated. The steam-jacket, to which steam may be supplied at a suitable pressure, sixty pounds being a fair value, serves to dry the material. In order to aid the drying action in the steam-jacket, I provide means for exhausting the air from the interior of the drier 18, which means consist of a suitable air or vacuum pump 23, united with the pipe 19 by a tube 24, having a valve 25 therein. The drying action may be carried on until the material is sufficiently dried, during which time the material in the drier is agitated by fan-blades 26 26, spirally arranged about a central rotatable shaft 27, driven in any suitable manner, as by a belt 28. The material by virtue of the agitation to which it is subjected is pulverized to a large degree and may be withdrawn from the separator through a manhole 29, provided with a lid 30, which is placed at the bottom of said drier.

In order to permit the gases to be blown off from the separator, I provide an exit-tube 32, having a valve 33, which may be led to some suitable condensing apparatus, if desired, as is well understood.

The great advantage of treating products with my new rendering apparatus will be readily apparent to those skilled in the art. The products may be operated upon at a reduced temperature and under more favorable conditions than has hitherto been possible, and the apparatus occupies less space. The apparatus which is required to perform all of the operations upon the grease-carrying product is reduced to a minimum and greatly simplified.

The process herein disclosed is made the subject-matter of my application, Serial No. 93,421, filed February 10, 1902.

While I have herein shown and particularly described one embodiment of my invention, I do not wish to limit myself to the precise construction and arrangement of parts herein set forth; but,

Having thus described my invention, I claim as new, and desire to secure by Letters Patent, the following:

1. In an apparatus for separating grease or oils from materials containing the same, the combination with a hopper provided with means for heating the contents thereof, of a grinder adapted to receive and grind the contents of said hopper, a closed separator adapt-

ed to receive the subdivided material from the hopper, an agitator for stirring the contents of said separator, means for heating the contents of said separator and for creating a pressure therein, oil-eduction tubes associated with said separator, and a drier for drying the residue, substantially as described.

2. In an apparatus for separating grease or oils from materials containing the same, the combination with a hopper provided with means for heating the contents thereof, of a grinder adapted to receive and grind the contents of said hopper, a closed separator adapted to receive the subdivided material from the hopper, an agitator for stirring the contents of said separator, means for heating the contents of said separator and for creating a pressure therein, oil-eduction tubes associated with said separator, a steam-jacketed drier for drying the residue, an agitator for said drier, and means for exhausting the air therefrom, substantially as described.

In witness whereof I hereunto subscribe my name this 5th day of February, A. D. 1902.

DANIEL CAMERON.

Witnesses:

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