

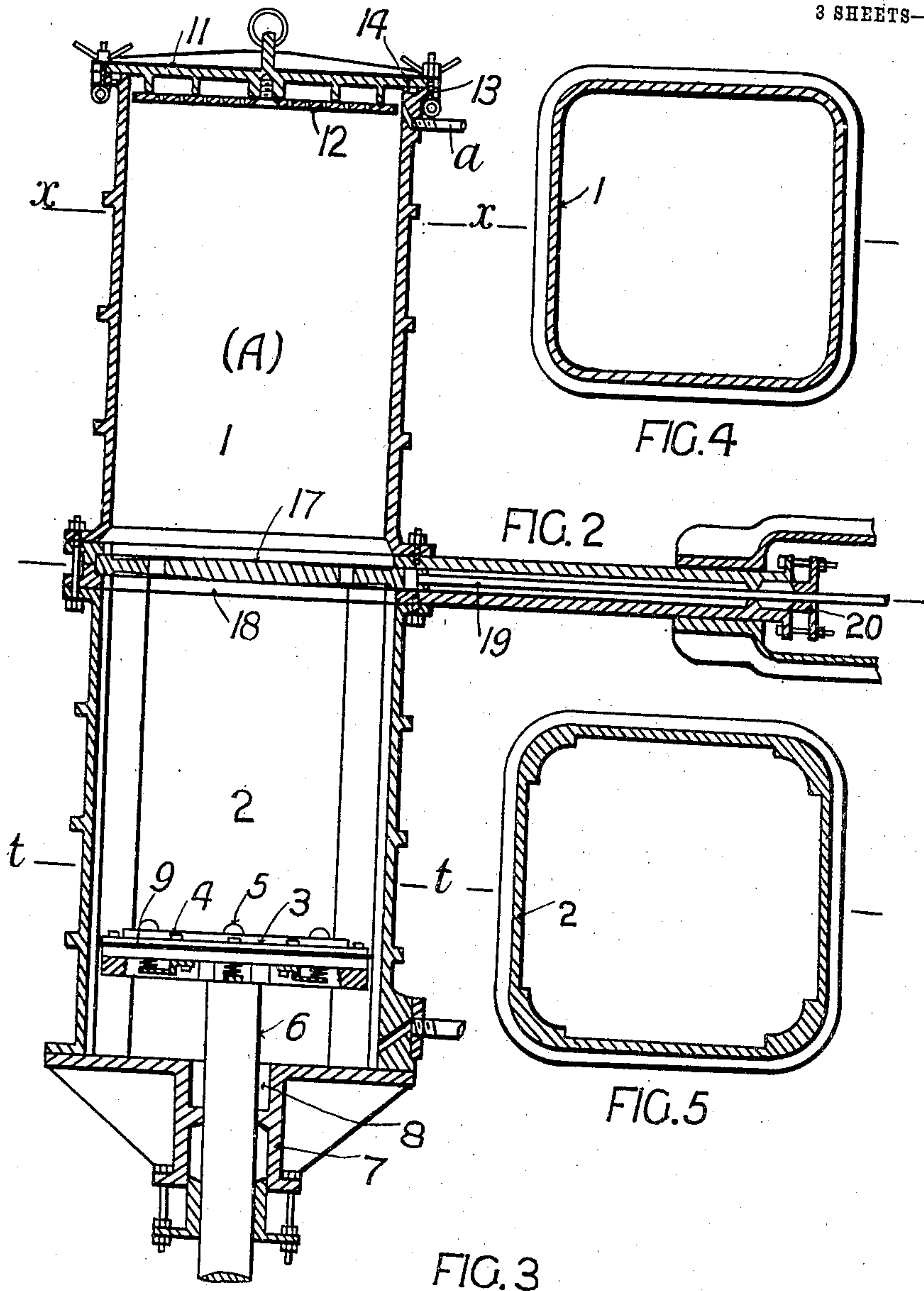
No. 829,764.

PATENTED AUG. 28, 1906.

A. H. BURT, H. JACKSON & C. A. FINCH.
EXTRACTION OF GREASE FROM WOOL.

APPLICATION FILED DEC. 8, 1905.

3 SHEETS—SHEET 2.



Witnesses
J. H. M. M. M. M.

[Signature]

Inventors:
Arthur Hazeldine Burt
Henshaw Jackson
Charles Allt Finch
by *[Signature]* Attorney

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UNITED STATES PATENT OFFICE.

ARTHUR HAZELDINE BURT, OF MOSMAN, NEAR SYDNEY, AND HENSHAW JACKSON AND CHARLES ALLT FINCH, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA.

EXTRACTION OF GREASE FROM WOOL.

No. 829,764.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed December 8, 1905. Serial No. 290,967.

To all whom it may concern:

Be it known that we, ARTHUR HAZELDINE BURT, residing at Mosman, near Sydney. HENSHAW JACKSON, residing in O'Connell street, Sydney, and CHARLES ALLT FINCH, residing in Elizabeth street, Sydney, in the State of New South Wales, Commonwealth of Australia, subjects of the King of Great Britain and Ireland, have invented new and useful Improvements in the Extraction of Grease from Wool, of which the following is a specification.

Our invention consists in the obtaining of wool-grease from sheep's wool by means of volatile solvents, such as benzene, without opening the bales or packs in which such wool is made up for transportation.

The extraction of wool-fat from baled wool without opening the packs is of much importance commercially, because by operating on it while contained in the unbroken packs the extraction may be effected at any convenient place during transit. It would be manifestly impossible to effect the extraction at the place of production of the wool, because the expense of operating a number of independent plants suitable for the purpose would involve prohibitive cost. The packs operate as filters which retain the greater portion of solid and non-soluble matter and are themselves freed of grease and rendered fit for reuse with scoured wool. The problem of obtaining wool-fat in large quantities at a marketable price depends for its solution not upon the technical efficiency, but rather upon the economical operation of the process used. The breaking of the bales no less than the treatment of relatively small quantities of wool at individual places of production would entail a cost which would make the value of the product too high to enable it to be sold in competition with other fats for which it may be substituted for manufacturing purposes.

According to our method the extraction is effected on a large and economical scale at shipping centers or rail junctions where large quantities of wool are handled without involving any change or serious delay in forwarding arrangements. Coincidentally a reduction is made in the gross weight of the bale, and a consequent saving in freight thereon is effected.

In carrying out our invention we use a connected series of apparatus in which the solvent is protected against atmospheric vaporization during the several steps of the process and is recovered for reuse and is re-used continuously.

In this apparatus the wool is placed in a close press-chamber provided with a piston or lifting false bottom operated by a ram which is worked by hydraulic or other power. A body of solvent liquid is introduced into this press-chamber as soon as the same has been closed. To insure complete penetration of the solvent into the heart of the bale, inspiring-needles (with button-heads to facilitate insertion and withdrawal) are driven downward into the bales. Complete saturation of the wool in the bale is effected by submitting the same to a number of successive compressions by reciprocating the piston, whereby the solvent is alternately squeezed out of and allowed to resoak the wool. The fat-charged solvent after withdrawal from the press-chamber is run through a filter in which wool may be used for a filter-bed, and the filtered liquid is thence conveyed to a still, wherein the volatile liquid is driven off to a condenser fitted with an air-pump, and is thence returned to the solvent-tank for reuse. After final pressing in the press-chamber to squeeze out the free liquor the wool is lifted into a closed drying-box, through which a draft of air is pumped or drawn by vacuum. This air takes up the absorbed solvent and carries it through the condenser in which it is extracted and whence it passes to the solvent-tank.

The semisolid residue in the still is treated by pressure and otherwise for the purification of the wool-fat according to known processes.

The piping and valve arrangements are so disposed that the same charge of solvent may at will be reused for two or more bales successively, or so that a second (rinse) charge of fresh solvent may be applied so as to more completely dissolve out the fat.

The press-chamber may be provided with an intermediate grating to sustain the top of the bale while pressure is applied to it below by means of the piston to effect the solution of the grease by regurgitating the solvent through the wool.

In the annexed drawings, Figure 1 is a diagrammatic figure explanatory of the general arrangement of the several parts of the apparatus; Fig. 2, a vertical section through the press-chamber; Fig. 3, a top plan; Fig. 4, a horizontal section through upper part of same on line *x x*; Fig. 5, a similar horizontal section through lower part of same on line *t t*; Fig. 6, a sectional horizontal plan on line *u u*. Fig. 7 is a side elevation of the press-chamber; Fig. 8, a detailed fragmental view showing section of piston; Fig. 9, a plan of the piston, and Fig. 10 an elevation showing the inspirator-needle.

Referring to Fig. 1 in the annexed sheet of explanatory drawings, A is the press-chamber; B, the ram-cylinder; C, the filter-box, and D a series of two or more drying-chambers. E is the air-heater; F, the still; G, the condenser; K, air-pump; L, solvent-tank; M, auxiliary solvent tank; N, the solvent-pump; O, vacuum-cylinder, and P grease-tank. If it be found convenient to place the condenser G and the solvent-tank L above the level of the press-chamber A, the solvent may be allowed to flow by gravity, in which case the solvent-pump may be dispensed with; but it is generally preferred to adopt the arrangement in which the solvent is moved positively by the pump N. The solvent is supplied from the pump N to the press-chamber A through the pipe *a*. The solvent-pump N draws its supply of solvent from the tank L through the pipe *l*. The solvent-pump N has also a connection through the pipe *m* with the auxiliary solvent-tank M, into which grease-laden solvent from the press-chamber A passes by the pipe *o*. *z z* represent valves in the pipes. The bottom end of the press-chamber A is connected by the pipe *c* to the filter C, which may be made to act either upwardly or downwardly.

f is a pipe for delivering filtered grease-laden solvent from the filter C to the still F, which latter is heated by a coil supplied with superheated steam.

g is a by-pass connection between the filter C and the pipe *l*, and *j* a pipe connection between the auxiliary tank M and the still F. The vaporized solvent passes by the pipe *p* to the condenser G. There are also pipe connections *d* from the several drying-boxes D to the pipe connection *p* between the still F and the condenser G. These drying-boxes have each a valve in the head through which atmospheric air may be admitted to them, and they are also provided with pipe-services *e* to convey heated air from the air-heater E, which is warmed by a steam-coil. The mixed air and the condensed vapor which pass from the condenser G enter the vacuum-reservoir O and thence pass to the air-pump K, which delivers the same to the air-heater E through the pipe *k* or to waste through the outlet N. The solvent con-

densed in the condenser G passes by the pipe *r* (which is fitted with a non-return valve) to the solvent-tank L, whence it is conveyed, as before stated, by the pipe *l* to the force-pump N, and thence for reuse to the press-chamber A. The one charge of solvent may be used repeatedly, if desired, by leaving it in the press-chamber until it becomes fully charged with grease by repeated treatment of successive bales of wool.

It will be observed that by operating the valves Z the same charge of solvent can be circulated through the press-chamber A and the filter C as often as may be found necessary and finally run into the still F through the pipe *f*, or, at the option of the operator, the first charge of solvent laden with grease may be run into the still F from the filter C through the pipe *f* and a rinse charge of fresh solvent then circulated by means of the pump N through the wool in the press-chamber A, and thence to the auxiliary solvent-tank M through the pipe *o*, whence it may be drawn through the pipe *m* to the pump N and used on another bale of wool in the press-chamber A.

The form of the press-chamber which we use in practice is shown in Figs. 2 to 9. It consists of two chambers superposed, of which the upper one 1 is of less area than the lower one 2, but in alinement therewith at the corners, so that the corner parts will form a continuous guide for the plunger or piston 3 throughout its stroke. This piston is covered on the face with grating-bars 4 and is fitted with two or more spring-sustained drop-valves 5, whose heads rise above the face of the grating-pieces 4, the object being that these valves shall be forced open by contact against the lower side of the bale of wool which is dropped into the chamber. The piston 3 is carried on a ram or rod 6, in the upper side of whose stuffing-box 7 a water-well 8 is formed to check escape of the volatile solvent through the packing. The piston is guided at its four corners by direct contact with the interior surface of the corners of the chambers, and it is provided with a leather lip-packing 9, carried by a junk-ring 10. This packing makes a vapor-retaining joint in the upper section 2 of the chamber, but leaves a gap at the four sides of the piston when the same is in the lower section 2 of the chamber. The top closure is a reinforced cap-plate 11 with a perforated false lining 12, the perforations being provided to allow free access and exit of solvent to and from all parts of the upper surface of the bale when it is under compression by the piston. The solvent-supply pipe *a* conveys the solvent to the cavity between the false plate 12 and the head 11. The head is secured, preferably, by pivot-bolts 13, whose wing-nuts take against lugs 14 on the head. 15 is a ring-pump leather inserted in an an-

nular cavity below the joint 16 to make said joint liquor and vapor tight.

Intermediate of the upper and lower chambers 1 and 2 is a divisional grating 17, which may be formed of slotted or drilled plate, adapted to run in a carrier-guide 18. This plate 17 is manipulated by a spindle 19, which is carried through a stuffing-box 20 and is operated by a hand-screw 21 or by other suitable means.

The inspiring-needles shown in Fig. 10 are tubular stems formed with sharp points. They are perforated at many points with fine holes to permit flow of solvent through them into the wool and conversely exit of greasy solution. Button-heads through which the bore is continued are fitted to these needles to facilitate their insertion and withdrawal.

In operation the rack-plate 17 being retired the bale of wool is dropped into the press-chamber and the head 11 closed down. Solvent is then run through the pipe *a*, completely immersing the bale and soaking the same by direct absorption through its exterior surface and also through the inspiring-needles, which are driven into it from the top end before it is inserted into the press-chamber. The piston 3 being drawn down to the lower end of the chamber and the grating 17 closed in over the top of the bale, which is now completely submerged in the solvent liquor, pressure is applied to the ram 6 two or three times or oftener, so as to cause the solvent to surge through the wool in the bale and dissolve the wool-fat contained therein. Finally, the grating 17 is retired and the bale is put under pressure against the head 11 in order to squeeze out the free solvent. The solvent is run off through the pipe *c* either to the filter C or to the auxiliary solvent-reservoir M. The head 11 is now removed and the bale raised up by exerting pressure on the ram 6 and lifted into one of the drying-boxes D, which is closed down on it, and the hot-air *e* and exhaust *d* services opened. The remaining solvent is thus evaporated out of the bale and recondensed in the still G for reuse. The inspiring-needles are not withdrawn until after the dried-out bale is taken from the drying-box, as they serve to convey air into and vapor out of the bale.

The provision of the intermediate grating 17 and accessory parts is not essential, as it is practicable to press the bale directly against the false head 12, provided that the solvent has freedom to surge past the piston. The leather packing-ring of the piston is provided only to prevent vaporization of solvent

when the piston is raised up near the top of the chamber and the head 11 opened while the bale is being inserted and lifted out.

The leather packing does not fill the clearance between the sides of the chamber 2, and the piston and the solvent is therefore free to surge past the piston during the operation of repeatedly compressing the wool and relieving the pressure thereon to effect solution of the grease by regurgitating the solvent through the wool. When a press-chamber of identical form throughout its length is used and the wool pressed directly against the head of the chamber, the leather packing must be made sufficiently flexible to permit the solvent to flow past it to and from the space below the piston, while when there is no pressure it must close up to the chamber-walls to prevent vaporization of the solvent contained in the chamber. The automatic valves 5 are kept open by the weight of the wool thereon, but when the wool is lifted out of the press they are closed by their supporting-springs, and thus seal the space below the piston and prevent loss of solvent by evaporation.

Novelty is not claimed for the distillation of the filtrate to separate the grease and recover the solvent nor for the recovery of the absorbed solvent by treatment with hot air.

It may also be said that no novelty, broadly, is claimed for the extraction of grease or oil from substances contained in bags or wraps by pressure of the package or bale.

What we claim as our invention, and desire to secure by Letters Patent, is—

The herein-described method of extracting the fat from wool by means of liquid, volatile solvents, which consists in immersing an unopened transportation pack or bale of wool in the solvent, then alternately and repeatedly pressing said pack and allowing it to expand by its own resiliency, thereby causing the solvent to flow repeatedly through the wool in the pack, then removing the pack from the solvent and placing it in a closed chamber, and then forcing air through said chamber in order to take up and remove the volatile solvent from the pack.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

ARTHUR HAZELDINE BURT.

HENSHAW JACKSON.

CHARLES ALLT FINCH.

Witnesses:

N. RILEY,

W. J. DAVIS.