No. 702,309. Patented June 10, 1902.

W. W. L. LISHMAN, T. W. HAUGHTON & J. J. KIRKPATRICK.

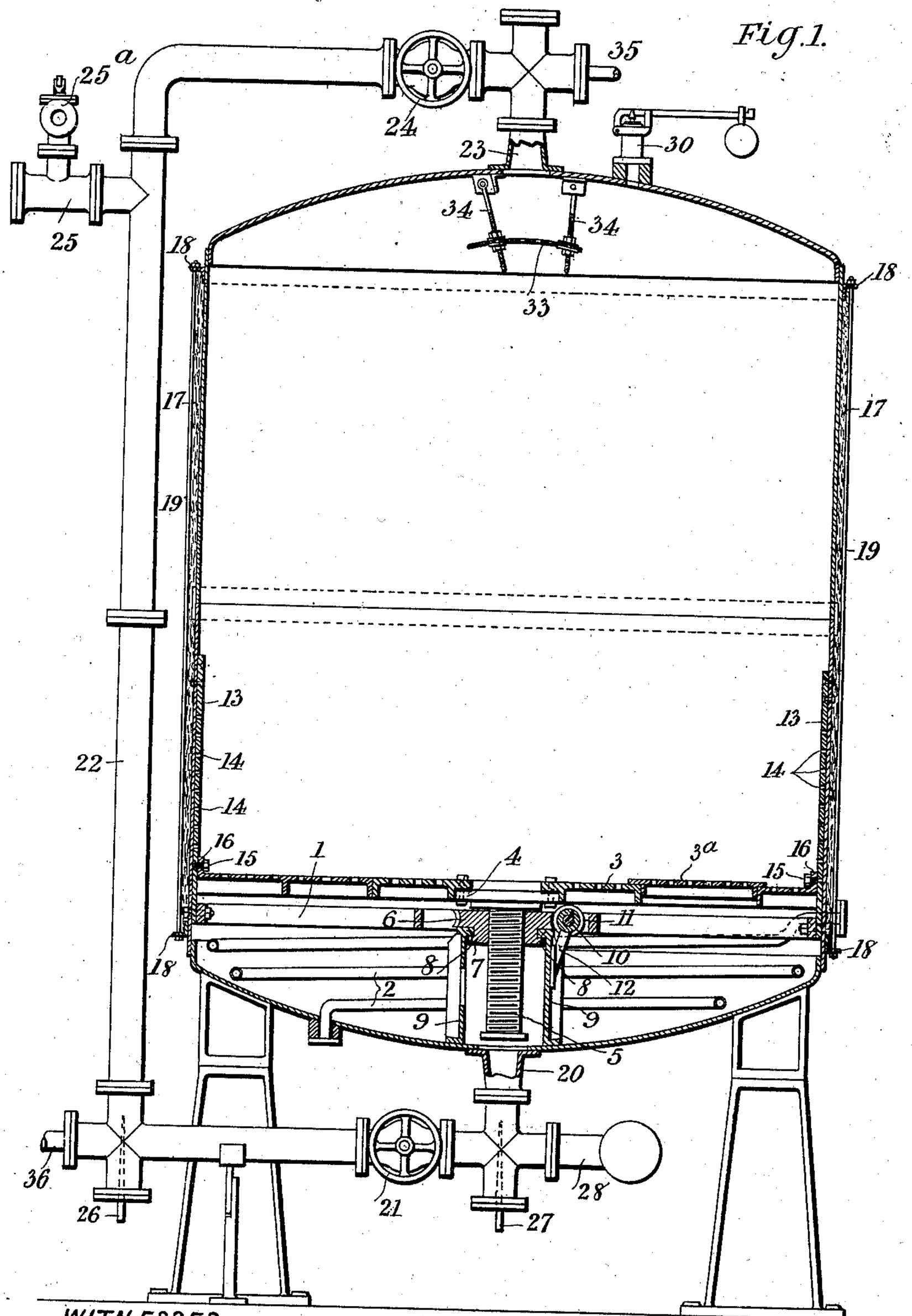
KEIR FOR BLEACHING, &c.

(Application filed Mar. 15, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.



WITNESSES.

J. R. Howard

Gervase Appleyard.

INVENTORS.

Walter William Lancaster Lishman

Thomas Wilfred Haughton.

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Fig. 2.

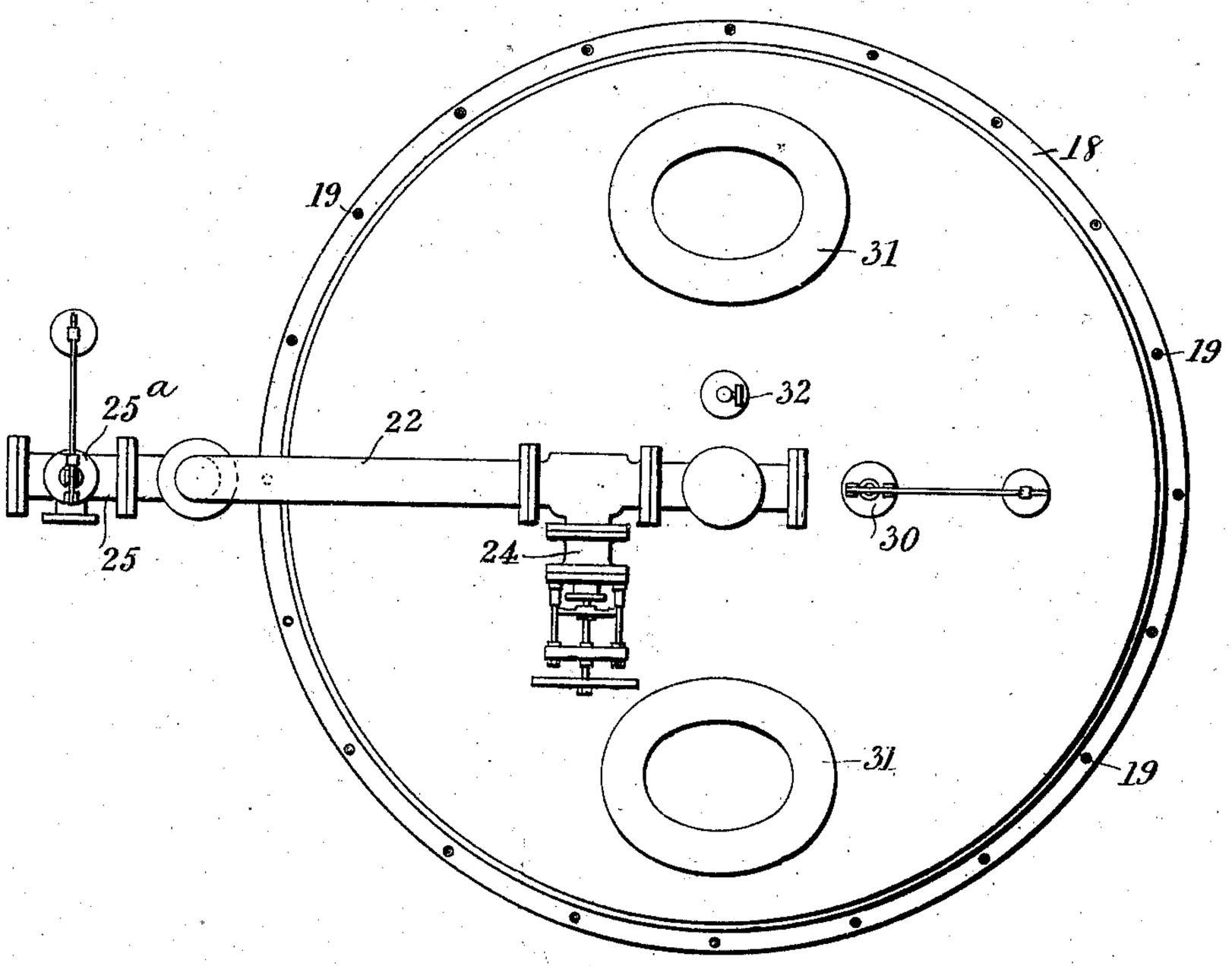

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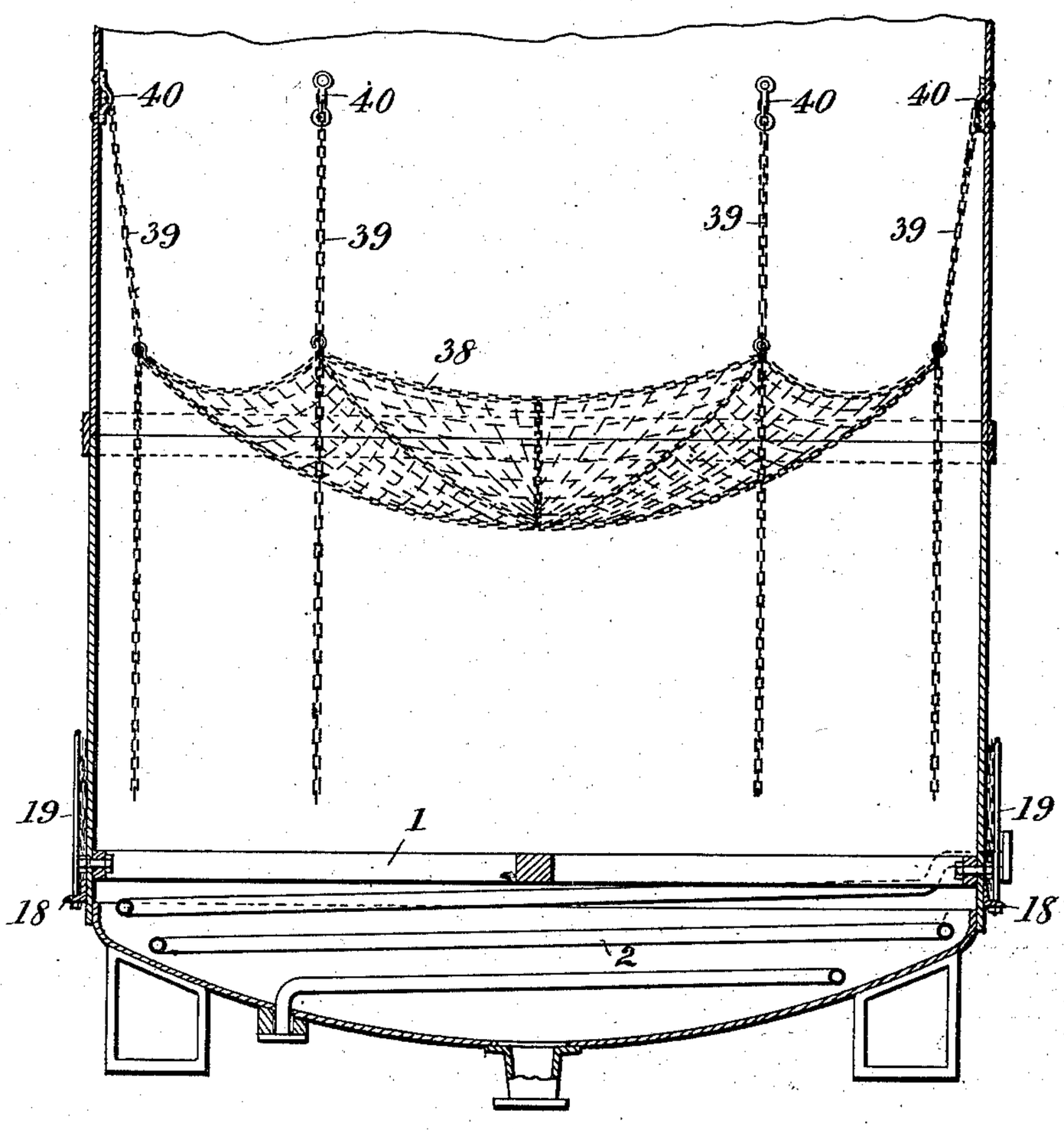
Fig. 3.



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UNITED STATES PATENT OFFICE.

WALTER WILLIAM LANCASTER LISHMAN, OF CORNHOLME, ENGLAND, AND THOMAS WILFRED HAUGHTON, OF CULLEYBACKEY, AND JOHN JOHNSTONE KIRKPATRICK, OF BALLYCLARE, IRELAND, ASSIGNORS TO THE LISHMAN PROCESS BLEACHING COMPANY, LIMITED, OF CORNHOLME, ENGLAND.

KEIR FOR BLEACHING, &c.

SPECIFICATION forming part of Letters Patent No. 702,309, dated June 10, 1902.

Application filed March 15, 1901. Serial No. 51,360. (No model.)

To all whom it may concern:

Be it known that we, WALTER WILLIAM LANCASTER LISHMAN, a resident of Cornholme, in the county of Lancaster, England, and THOMAS WILFRED HAUGHTON, a resident of Culleybackey, and JOHN JOHNSTONE KIRKPATRICK, a resident of Ballyclare, county of Antrim, Ireland, all subjects of His Majesty the King of Great Britain, have invented a certain new and useful Improvement in Keirs for Bleaching, Dyeing, and Like Purposes, of which the following is a specification.

This invention relates to an improvement in keirs of the class adapted for the boiling, bleaching, dyeing, and like processes carried on in the dyeing and bleaching trade, the object being to provide a keir in which the boiling, bleaching, dyeing, or like liquors may be thoroughly circulated and the boiling or dyeing liquors be brought to the boiling-point or other desired temperature more quickly than heretofore.

In the accompanying drawings, Figure 1 is a vertical section of a keir with its circulating-pipes, the latter being in elevation. Fig. 2 is a plan of same, and Fig. 3 is a vertical section of a part of a keir to show a modification.

The keir is provided with the usual false bottom 1, consisting of an open grating bolted or otherwise secured at a suitable height inside the same and beneath which is the steam-heating coil 2, having the necessary inlet and outlet. In addition to this bottom 1 we provide the keir according to our invention with an adjustable bottom 3, on which the goods to be treated are placed, such bottom 3 being situated above the bottom 1, its adjustability enabling the size of the keir to be regulated according to the amount of goods to be treated. The bottom 3 may be formed of perforated plates, as shown, which preferably have a manhole 3^a therein, and is carried by the head 4 of a screw 5, surrounded by a worm-wheel 6, the interior opening of which is threaded to correspond with the screw, so as to form a nut for it. Such worm-wheel has a groove which forms a collar 7 beneath it, the groove being engaged by the heads 8 8 of brackets 9 9, of which there may be two, three, or more, secured to the actual bottom of the keir and forming supports and bearings in which the wheel may revolve. A worm 10 engages the worm-wheel. It is carried by a suitable shaft 11, which is supported in a bearing on an arm 12, carried by one of the brackets 9, said shaft being operated as required from outside the keir, so that the worm-wheel may be revolved and the bottom 3 raised or lowered, as required, for the goods being treated. It will be obvious that a rack and pinion could be employed in place of the worm and wheel and the screw.

To hold the bottom 3 securely in the position in which it is placed, the keir is provided on its inside with plates 13 13, secured to same and having a series of holes 14, with which the plain end of screws 15 15 can engage, said screws being carried by flanges 16 of the bottom 3. By inserting these pins in the desired holes the bottom is retained in the position in which it has been set. In place of this arrangement the bottom can be locked by means of levers engaging with catches or projections in the side of the keir.

The keir is provided outside with a jacketing, which may consist of lagging 17, of wood or other suitable material, held between angle-iron rings 18 18, secured to the sides of the keir, and to further retain same in place, as some of the keirs may be of a great height, bolts 19 are employed to connect the angle-irons 18 outside of such lagging, which prevents the latter falling outwardly. The angle-iron rings inclose the lagging sufficiently at top and bottom to prevent water finding its way between the vessel and the lagging.

At the bottom of the keir is an inlet-pipe 20, controlled by a valve 21 and communicating by a circulating-pipe 22 with another inlet-pipe 23 at the top of the keir. In the pipe 22 is a valve 24 and a connection 25 with a supply-tank for the liquors and also a pipe 26 for steam injecting, while in the inlet-pipe 20 is a similar pipe 27 for steam injecting and a connection 28, forming a discharge-pipe for

returning the liquor to the supply-tank. This pipe 28 is also provided at some point with a suitable valve. The connection 25 may have a safety-valve 25ª to relieve excess pressure in the circulating-pipes and a suitable valve to stop the liquor-supply beyond same. 30 is a safety-valve to relieve pressure in the keir, and 31 31 are manholes for obtaining access to the interior for filling the keir, and 32 is an air-tap for allowing the keir to be exhausted of air. 33 is a perforated spreader supported by rods 34 from the top of the keir over the inlet of pipe 23, so that the liquor when entering from the top may be dispersed over the goods. 35 36 are steam-inlet pipes, which are controlled by suitable valves for passing larger bodies of steam into the keir than the injectors 26 27 can do.

When the valves 21 and 24 are open, a complete circulation can be obtained through the keir and the pipes 20, 22, and 23 by starting the steam-injector 26. When the valves 21 and 24 are closed, the goods in the keir can be steamed through from top to bottom by steam from pipe 35 if the discharge-pipe 28 is opened, or if the tank is full of liquor it can be blown through with steam at its back after the boiling or other operation has been concluded. Hot or cold water for rinsing purposes can also be injected over the goods with or without pressure, or the water can be run in and then a head-pressure of steam be added before discharging again.

If the valve 24 is closed and the valve 21 opened, steam can be forced in from pipe 36, so that the pressure at both top and bottom of the keir can be equalized in a few moments, or the goods before the liquor is applied to them can be steamed through from the bottom upward.

The injector 27 will effect a circulation of the contents of the tank in the opposite direction to that effected by the injector 26.

When used for dyeing and bleaching with non-boiling liquors, a centrifugal pump is employed instead of the injectors, or the keir can be used with the adjustable bottom without the high-pressure arrangement described.

In the arrangement illustrated in Fig. 3 the keir is provided with the usual false bottom 1 and steam-coil 2; but the adjustable bottom is composed of a number of chains or a netting 38, of metal links or rings, which are hooked at the required point to chains 39, suspended from eyelets 40 on the inside of the keir. In this way a bag-like bottom can be provided which is adjustable in the keir at the required height.

What we claim is—

1. In a keir, and in combination, an open false bottom, means for securing it therein, a further movable open false bottom situated over it, a screw carried by the movable bottom, a worm-wheel forming a nut for such screw, means for holding the nut and allowing it to rotate, and a worm for rotating the nut to raise and lower the screw and bottom.

2. In a keir, a fluid-inlet pipe 20, 23 respectively at either end of same, a circulating-pipe 22 connecting such inlet-pipes, valves for each inlet-pipe, a connection 25 in such circulating-pipe communicating with a source of liquid-supply, a steam-injector 26 in circulating-pipe 22 for moving the liquid therein in one direction, a steam-injector 27 in inlet-pipe 20 for moving the liquid in the other direction, a steam-pipe 35 communicating with inlet-pipe 23 for introducing a large body of steam into one end of the keir, a steam-pipe 36 communicating with the circulating-pipe 22 and inlet-pipe 20 for introducing a large body of steam into the other end of the keir, and a discharge-pipe 28 communicating with the inlet-pipe 20.

In testimony whereof we have hereunto set our hands in the presence of the subscribing witnesses.

WALTER WILLIAM LANCASTER LISHMAN.
THOMAS WILFRED HAUGHTON.
JOHN JOHNSTONE KIRKPATRICK.

Witnesses to the signature of Walter William Lancaster Lishman:

J. B. HOWARD,
GERVASE APPLEYARD.

Witnesses to the signatures of Thomas Wilfred Haughton and John Johnstone Kirkpatrick:

ADAM KIRKWOOD,
JOHN STOTT.