

(No Model.)

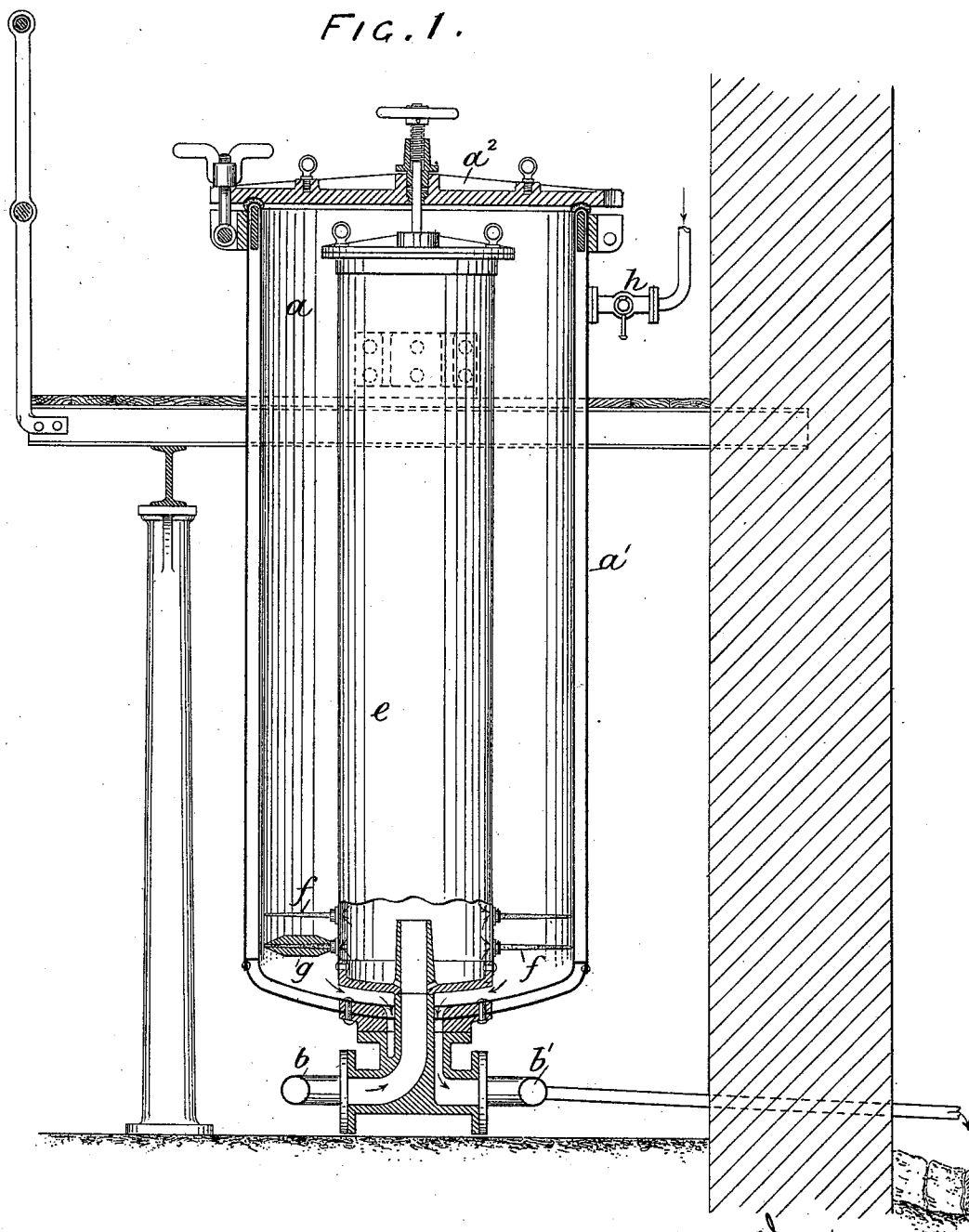
4 Sheets—Sheet 1.

M. H. SMALLWOOD.
APPARATUS FOR BLEACHING, &c.

No. 584,902.

Patented June 22, 1897.

FIG. 1.



Witnesses

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E. A. Scott

Inventor

Mark Hulme Smallwood

by *Richard R.*

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(No Model.)

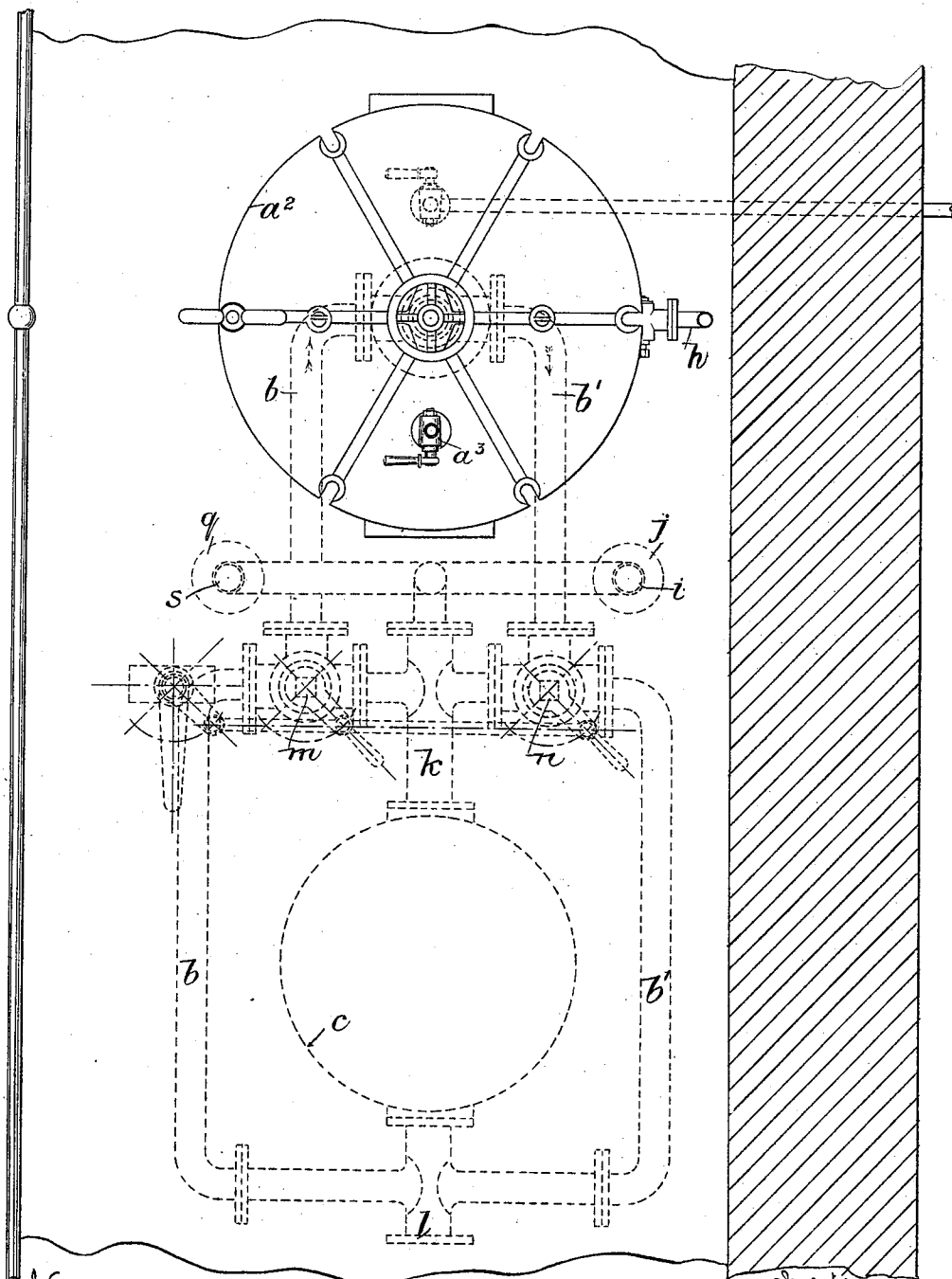
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FIG. 2.



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FIG. 7.

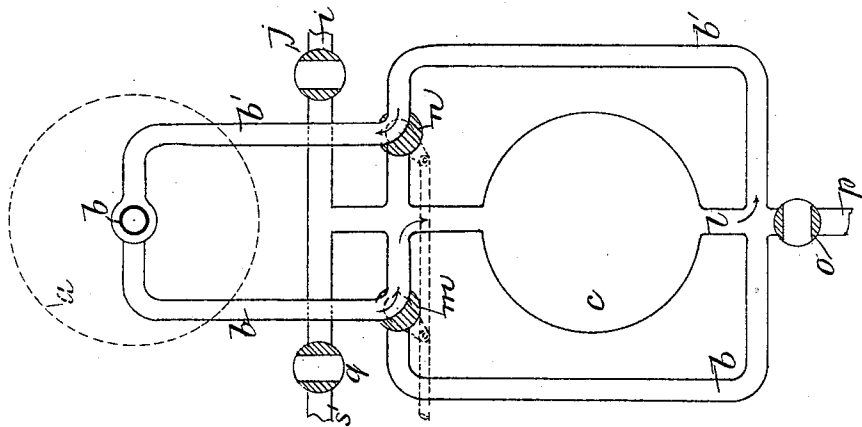


FIG. 5.

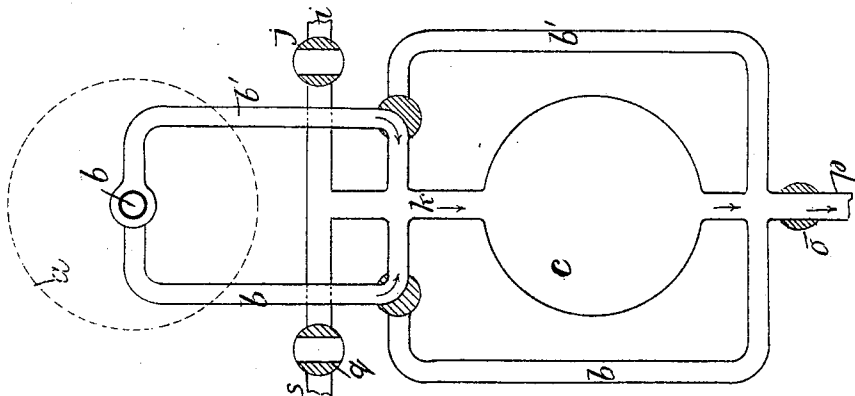
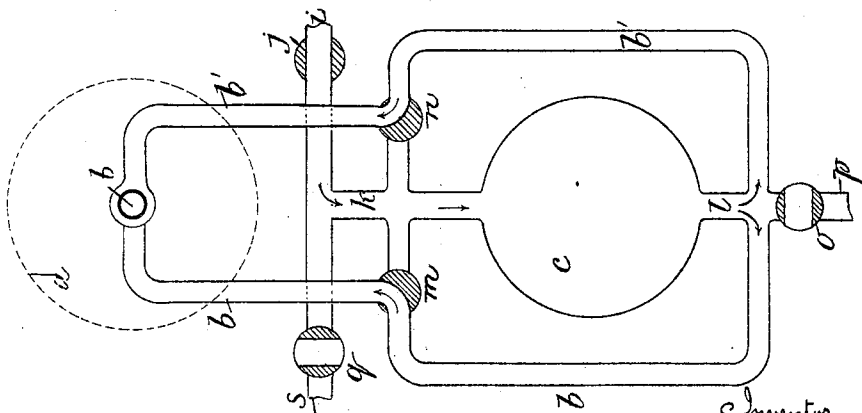


FIG. 3.



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4 Sheets—Sheet 4.

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FIG. 6.

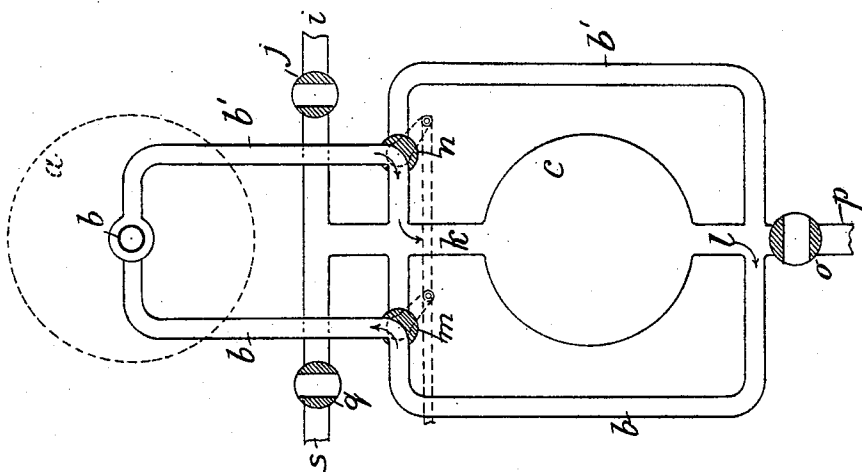
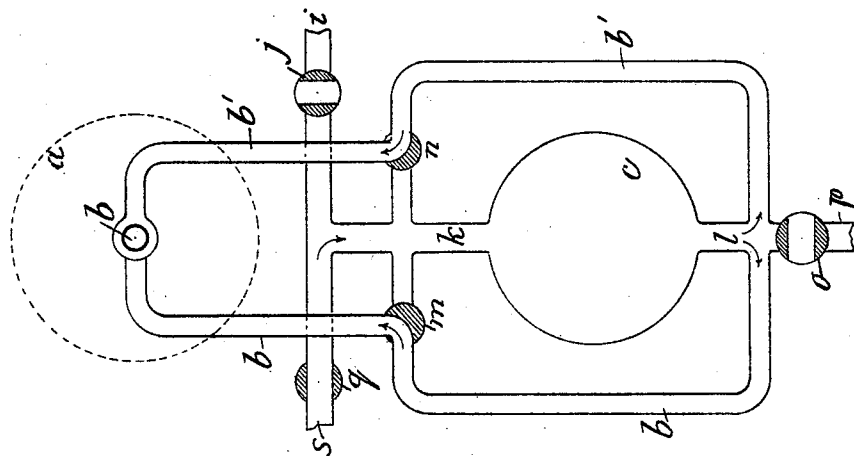


FIG. 4.



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UNITED STATES PATENT OFFICE.

MARK H. SMALLWOOD, OF MANCHESTER, ENGLAND, ASSIGNOR OF ONE-HALF TO GEORGE THOMAS, OF SAME PLACE.

APPARATUS FOR BLEACHING, &c.

SPECIFICATION forming part of Letters Patent No. 584,902, dated June 22, 1897.

Application filed September 2, 1896. Serial No. 604,648. (No model.) Patented in England November 21, 1895, No. 22,185.

To all whom it may concern:

Be it known that I, MARK H. SMALLWOOD, a subject of the Queen of Great Britain, and residing at 72 Albert Grove, Longsight, Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Apparatus for Bleaching, Washing, and Dyeing Yarn in the Cop, (for which I have obtained a patent in Great Britain, numbered 22,185, dated November 21, 1895,) of which the following is a specification.

My invention relates to improvements in apparatus for bleaching, washing, and dyeing yarn in the cop; and the object of my invention is to effect each operation in a more effectual manner than has hitherto been accomplished.

In the accompanying four sheets of drawings, Figure 1 is a sectional elevation, and Fig. 2 a plan, of an apparatus made according to my invention for bleaching, washing, and dyeing yarn in the cop; and Figs. 3, 4, 5, 6, and 7 are diagrams showing the arrangement of pipes and valves for controlling the admission and reversing the direction of the liquor and for emptying the apparatus.

In the drawings, *a* is a cylindrical vessel, with a steam-jacket *a'* and pipes *b b'* at the bottom, connected with a pump *c*. The vessel *a* is provided with a hinged cover *a²*, which is secured by swivel-bolts, as shown. A smaller cylindrical vessel *e*, also provided with a removable lid, is arranged to be placed in the large vessel, and in the sides of this vessel *e* are drilled and tapped rows of small holes, and into each hole is screwed a perforated tube *f*, on which a cop of yarn *g* to be treated is placed; or instead of screwing the tubes *f* into the holes they can be connected in any other convenient manner—as, for example, they might be fitted over nipples at the openings in the sides of the small vessel *e*. In like manner rovings may also be wound upon perforated bobbins, which have one end closed and are made to fit over nipples screwed into the holes in the small vessel.

In order to treat cops, tubes, or bobbins of yarn or roving, the small vessel is raised by a crane or otherwise (not shown) out of the vessel *a*, when the tubes *f* to receive the cops

of yarn are screwed into all the tapped holes in the vessel *e* or tubes or bobbins full of yarn or roving are secured to nipples over all the openings in the vessel *e*, which is then lowered into the vessel *a*, after which the lid or cover *a²* is closed and secured by the bolts. A valve *h* is then opened to admit steam into the jacket *a'*.

The arrangement of valves and pipe connections is shown clearly in Figs. 3 to 7. In Fig. 3 a pipe *i* is connected to a reservoir of dye or other liquor, (not shown,) controlled by a valve *j*, placed between the reservoir and a passage *k*, leading to the pump *c*. When the pump is set in motion, the liquor is drawn from the reservoir down the pipe *i* and passage *k* through the pump *c*, along a passage *l*, and into and along the pipe *b* through a two-way valve *m*, which delivers it into the pipe *b*, leading into the vessel *e* inside the vessel *a*.

When both vessels are fully charged with liquor, the valve *j* is closed and the valve *n* turned, as shown in Fig. 6, so as the liquor is forced from the inner vessel *e* through the tubes *f* and cops into the outer vessel *a* it flows from it through the pipe *b'* back to the pump *c* and the circulation through the inner vessel *e* is maintained through the pipe *b*.

Fig. 7 shows the position of the valves *j*, *m*, and *n* as turned to reverse the direction of the liquor and force it from the outer vessel *a* through the cops, tubes, or bobbins into the inner vessel *e*. To accomplish this, the valve *m* is turned to open communication between the pipe *b* and the passage *k* to the pump *c*, and the valve *n* is turned back to the position shown in Fig. 3, so that when the pump is set in motion the liquor is forced through the pipe *b'* and valve *n* into the outer vessel and through the cops or rovings into the inner vessel *e* and out of the latter through the pipe *b* and passage *k* into the pump, which forces it back through the valve *n* and pipe *b'* into the outer vessel, and this operation can be continued as long as required.

In order to empty the apparatus, a let-off cock *o* below the pump is opened, as shown in Fig. 5, and air is admitted at the top of the vessel *a* through an air-valve *a³*, and all the liquor is drawn off through the pipes *b b'* and passages *k* and *l* into a waste-pipe *p*.

If further treatment of the yarn is necessary, such as washing, a valve *q* on a pipe *s*, connected to a water-supply, is opened, as shown in Fig. 4, and when the pump is set in motion the water is drawn from the pipe *s* through the pump *c* and is forced up the pipe *b* through the valve *m* into the inner vessel *e* and through the perforated tubes *f* and the cops *g* into the outer vessel *a*. The valve *q* is then closed and the water flows out of the vessel *a* through the pipe *b'* back to the pump *c*, the circulation being maintained through the inner vessel *e*, with valves turned as shown in Fig. 6, and to circulate the water in the reverse direction the valves are turned into the positions shown in Fig. 7, when the pump will force water from the outer vessel through the cops into the inner vessel *e*, from which it will flow through the pipe *b* to the pump and back through the pipe *b'* into the outer vessel *a*. After washing the apparatus is emptied by turning the valve *n* to connect the pipe *b'* to the passage *k* and pump *c*, and the let-off cock *o* is opened, as shown in Fig. 5. After the cops or bobbins of roving have been treated and are ready to be dried a supply of air is admitted to the outer vessel *a* through a valve, and the air heated by the steam-jacket *a'* is caused to circulate through the cops or bobbins of roving by the pump *c* in either direction, as required, by manipulating the valves *m* and *n*, as previously described.

It is obvious that the yarn or roving could be steamed in the apparatus to brighten and fasten the colors after dyeing.

A crane or other suitable lifting-tackle is employed to lift the vessel *e* into and out of the vessel *a*, and the vessel *e* may be moved to and from the apparatus upon trucks running on rails.

I declare that what I claim is—

1. In combination, the outer cylindrical vessel having a removable cover, the inner cylindrical vessel removably seated therein and having also a removable cover, radiating perforated tubes seated in perforations in said inner vessel, inlet and discharge pipes connecting with both said cylinders and a pump for effecting the flow of the liquid, substantially as described.

2. In combination, the outer cylindrical vessel having a steam-jacket, the inner cylindrical vessel removably held therein, the perforated radiating tubes seated in perforations in said inner cylinder, the inlet and discharge pipes communicating with both said cylinders, and the pump for effecting the flow of the liquid, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

MARK H. SMALLWOOD.

Witnesses:

S. W. GILLET,
 HERBERT R. ABBEY.