(No Model.) 2 Sheets—Sheet 1.

S. MASON, Jr. & W. T. WHITEHEAD.

MACHINE FOR DYEING AND BLEACHING YARN.

No. 452,040. Patented May 12, 1891.

Fig. 1.

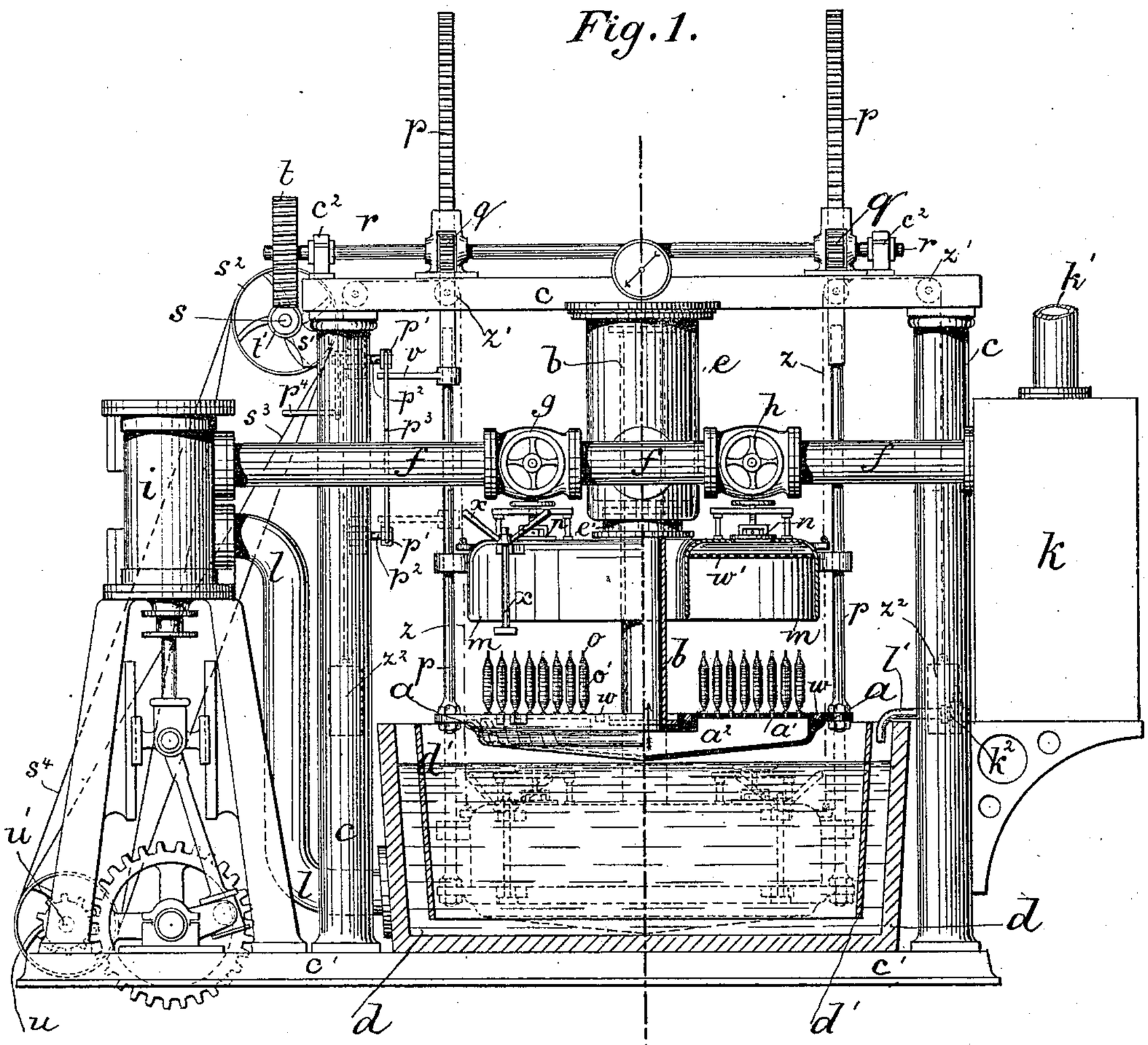
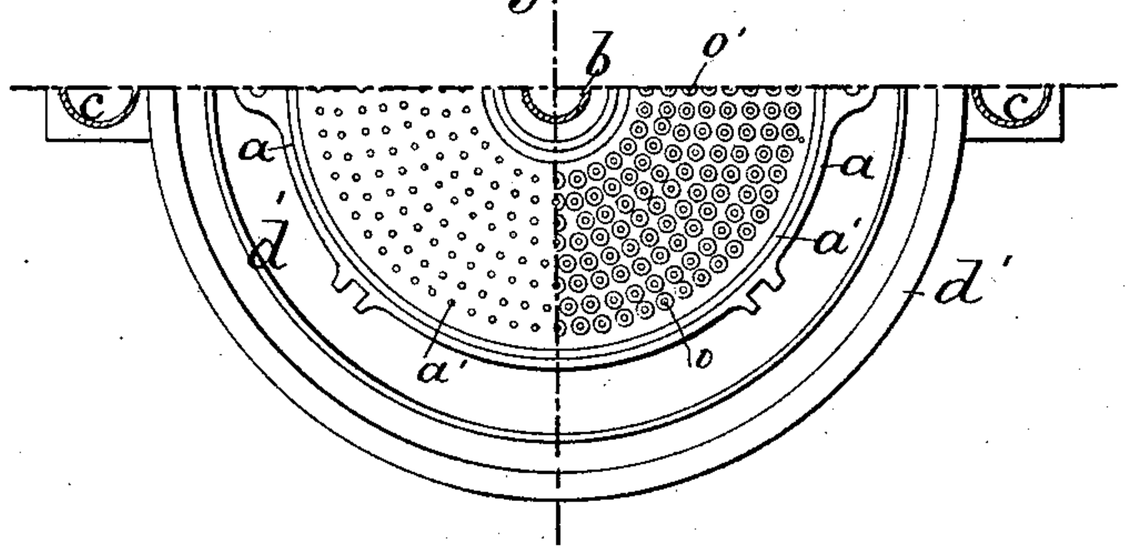


Fig. 2.



Witnesses.
Alfred Bosshardt
Stanley Egerton Bramall

Inventors.
Samuel Mason, jun.
per William Thomas Whitehead.
Ferdinand Bosshardt
Attorney.

(No Model.) 2 Sheets—Sheet 2.

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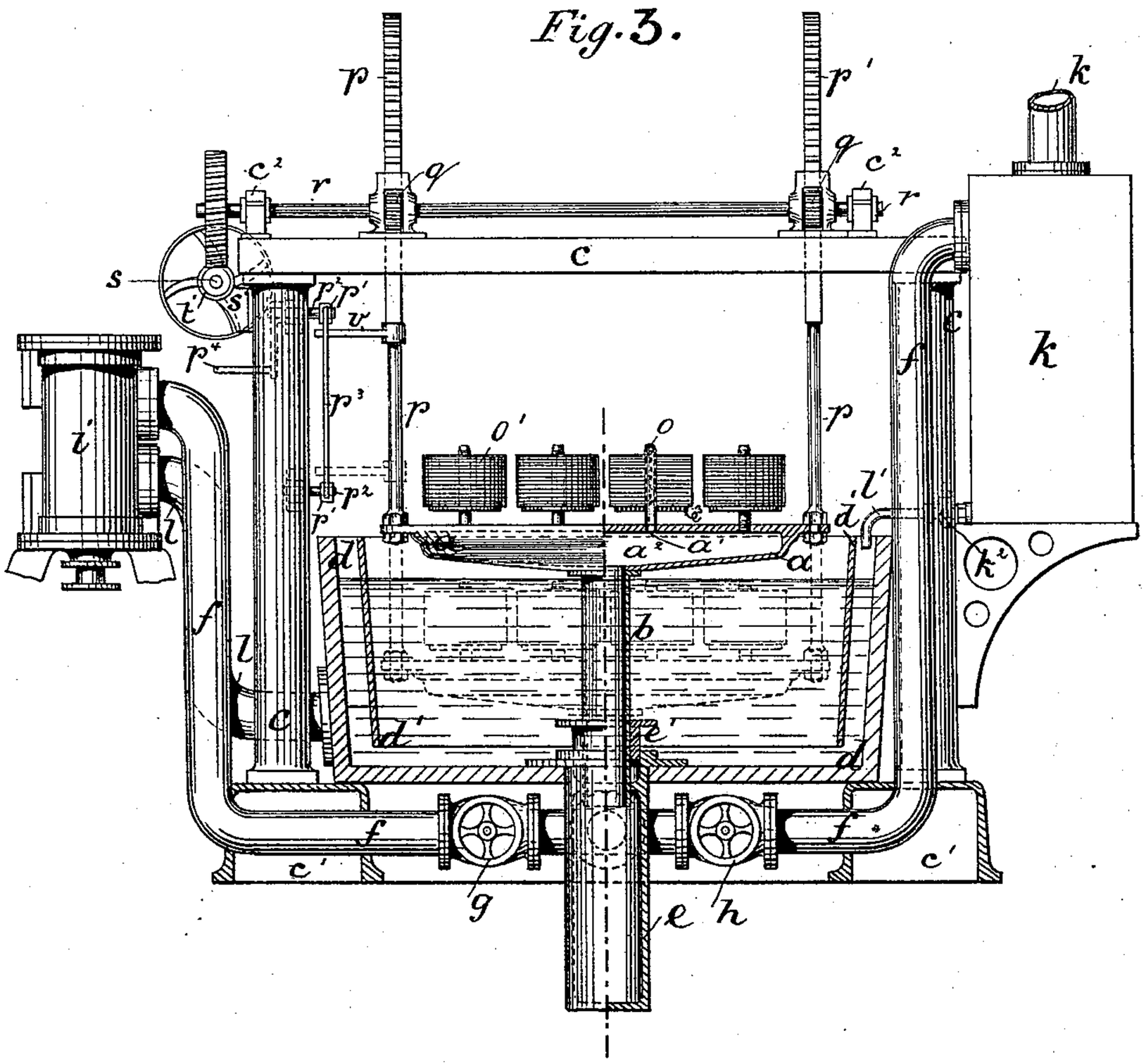
Fig. 3.



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per Ferdinand Bosshardt

Attorney.

UNITED STATES PATENT OFFICE.

SAMUEL MASON, JR., OF MANCHESTER, AND WILLIAM THOMAS WHITEHEAD,
OF RADCLIFFE, ENGLAND.

MACHINE FOR DYEING AND BLEACHING YARN.

SPECIFICATION forming part of Letters Patent No. 452,040, dated May 12, 1891.

Application filed December 2, 1889. Serial No. 332,262. (No model.) Patented in England September 29, 1888, No. 14,019; in France October 10, 1888, No. 193,454, and in Germany October 21, 1888, No. 48,051.

To all whom it may concern:

Be it known that we, SAMUEL MASON, Jr., of Manchester, and WILLIAM THOMAS WHITEHEAD, of Radcliffe, in the county of Lancaster, England, subjects of the Queen of Great Britain, have invented new and useful Improvements in Machines for Dyeing, Bleaching, and otherwise Treating Yarn in Cop, Bobbin, or other Compact Form, (for which we have obtained a patent in Great Britain, No. 14,019, dated September 29, 1888; in France, No. 193,454, dated October 10, 1888, and in Germany, No. 48,051, dated October 21, 1888,) of which the following is a specification.

Our invention relates to machines for dyeing, bleaching, scouring, and otherwise treating yarns of cotton, silk, wool, worsted, or other animal or vegetable fibers in cop, bobbin, top, or other similar compact form, in which the same are mounted on perforated injection tubes, skewers, or spindles, and the liquor is either drawn or forced through the same; and the objects of our improvements are, first, to provide a vertically-sliding hollow cop carrier or table adapted to be lowered into and out of a liquor-tank and to be brought into communication with a liquor-pump and vacuum chamber or source; second, to provide a cover furnished with valves and capable of being secured hermetically onto the vertically-sliding hollow cop carrier or table for the purpose of subjecting the cops to be treated to vacuum. We attain these objects by the mechanism illustrated in the accompanying two sheets of drawings, in which—

Figure 1, Sheet I, is a side elevation of the apparatus, showing the liquor-tank and one-half of the cop carrier or table and cover partly in section. Fig. 2 is a plan of the liquor-tank and cop carrier or table. Fig. 3, Sheet II, is a side elevation of a modification of our invention.

Similar letters refer to similar parts throughout the several views.

a is the cop carrier or table, *c* is the frame-work, *c'* the base, *d* the liquor-tank, *i* the circulating-pump, and *k* the vacuum-chamber, of the machine.

In connection with the liquor-tank *d*, the inside of which is furnished with a division *d'* to prevent the liquor from being agitated by the returning liquor, a cop carrier or table *a*, which in Fig. 1 is shown charged with cops, is employed and adapted to be lowered into and raised out of the same. This cop carrier or table *a* is cast hollow and its face formed with perforations *a'*, into which are fixed the perforated injection tubes, skewers, or spindles *o*, carrying the cops *o'* to be treated either directly by providing the lower end of the perforated tube, skewer, or spindle *o* underneath its flange with an india-rubber ring to insure a tight fit, or indirectly by fitting hollow nipples into the perforations, on which nipples the perforated tubes, skewers, or spindles *o*, carrying the cops *o'*, are placed. The said cop carrier or table *a* we form or furnish with a conduit or pipe *b*, which is in connection with the hollow part a^2 thereof and a cylinder *e*, depending from the frame-work *c*, as shown in Fig. 1, Sheet I, or from the bottom of the liquor-tank *d* of the machine, as shown in Fig. 3, Sheet II, where the carrier or table *a* is shown charged with wool tops. In each case the conduit or pipe *b* is permitted to slide in the cylinder *e* through the stuffing-box *e'*, formed on the latter.

The lowering and raising of the cop carrier or table *a* in and out of the liquor-tank *d* we effect preferably by means of the racks *p*, fixed to the cop carrier or table *a*, suitably guided and sliding in the frame-work *c* and in gear with pinions *q*, keyed on a shaft *r*, mounted in bearings c^2 on the frame-work *c* of the machine. Rotary and reversible motion are imparted to the aforesaid shaft *r*, preferably, from the driving-shaft *s* of the circulating-pump *i*, mounted in bearings *s'*, fixed to the frame-work *c* of the machine by means of a worm-wheel *t*, fixed on the shaft *r*, to which is geared the worm *t'*, fixed on the driving-shaft *s*. Motion is imparted to the latter reversibly by means of pulleys s^2, fixed thereon, and pulleys *u*, fixed on the second-motion shaft *u'* of the circulating-pump *i*, and crossed and open straps s^3 and s^4.

The reversing or stoppage of the rotation of the shaft *r* and descent or ascent of the cop

carrier or table a are effected automatically by means of an arm v, fixed adjustably onto one of the said racks or rods p, which at the desired time and alternately comes into contact with two levers p', fixed onto studs p^2, mounted on the frame-work c. The levers p' are connected together by means of a rod p^3, the stud p^2 of the upper one having attached a strap-fork p^4, which actuates the aforesaid open and closed straps s^3 s^4.

To the cylinder e is connected a conduit or pipe f, which is furnished on each side of its connection therewith with a valve g and h, leading, respectively, to a circulating-pump i and vacuum-chamber k. The latter may either be connected to a vacuum-pump or the condenser of a steam-engine, where such is convenient, or other vacuum source by means of a pipe k', fitted to its top, the bottom thereof being furnished with a pipe l' and tap k^2, in communication with the liquor-tank d, the vacuum-chamber k serving also to receive any liquor drawn from the cops at intervals and return the same to the liquor-tank d.

To enable the cops to be treated under vacuum, a cover m is used in connection with the cop carrier or table a. This cover m preferably consists of a hollow body provided at the top with valves n and made in shape to correspond with the configuration of the cop carrier or table a, the edges being formed V-shaped to drop and fit into grooves w, formed in the face of the cop carrier or table a and fitted with rubber rings, by means of which and the use of wing nuts and bolts x the said cover m can be fixed hermetically onto the cop carrier or table a.

Inside the cover m, below its valves n, a perforated disk w' is employed, which serves to distribute the liquor over the cops on entering the cover m when secured to the cop carrier or table a and in the liquor-tank d on the valves n being opened. The cover m is arranged to be raised from and lowered onto the said cop carrier or table a, preferably by, means of chains z, running over pulleys z', fitted to the frame-work c and provided with balance weights z^2. When treating wool-tops o', (see Fig. 3, Sheet II,) the perforated injection-tubes o are provided with a perforated plate e^3, on which they are placed.

The operation of the machine is conducted as follows: The cop carrier or table a, when out of the liquor-tank d, is supplied with cops and then lowered into the liquid necessary for the intended treatment contained in the tank d. The valve g, leading to the circulating pump i, is opened and the latter set in motion. The liquor is then drawn through the cops into the hollow part a^2 of the cop carrier or table a, up its conduit or pipe b, through the cylinder e in communication therewith, and its conduit or pipe f, leading to the circulating-pump i, and returned by the latter and pipe l connected therewith to the liquor-tank d. The operation is now finished. The aforesaid valve g is closed, the cop carrier or table a raised out of the liquor-tank d by means of the said racks p and pinions q, and the valve h, leading to the vacuum-chamber k, is now opened and the vacuum-pump set in motion to extract the liquor from the cops, after which the machine is ready for another charge of cops to be treated.

If desired to treat under vacuum, the operation is conducted as follows: The cop carrier or table a is charged with cops and the aforesaid cover m lowered and secured thereto, as described. The valve h, in communication with the vacuum-chamber k, is then opened and the vacuum-pump set in motion. After obtaining a vacuum the said valve h is closed and the covered cop carrier or table a lowered into the liquor in the tank d. The valves n of the said cover m are then opened, and the liquor is immediately permitted to flow into the same onto the aforesaid disk w', which distributes the liquor onto the cops and so saturates the same. Simultaneously with this operation the valve g, leading to the circulating-pump i, is opened, the latter set in motion, and the treatment continued as before described.

In treating wool-cops the cop carrier or table may be raised and lowered as often as required until the desired shade is obtained.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a machine for dyeing, bleaching, and otherwise treating yarn in cop, bobbin, or other compact form, the combination, with a liquor-tank d, having a return-pipe l, leading to a circulating-pump i, of a hollow perforated cop carrier or table a, adapted to be lowered into and raised out of the liquor-tank d, and having a conduit b, the lower end of which is in communication with the hollow part a^2 of the cop carrier or table a, and the upper end, by medium of the cylinder e, with a suction-pipe f, leading to the circulating-pump i and vacuum-chamber k, and having two valves g and h, the valve g being adapted to establish communication between the circulating-pump i and liquid in the tank d while the cop carrier or table a is in the same, and the valve h to cut off communication with the vacuum-chamber k for the purpose of circulating the liquid through the cops o' and thereby impregnating the same, substantially as set forth.

2. In a machine for dyeing, bleaching, and otherwise treating yarn in cop, bobbin, or other compact form, the combination, with a liquor-tank d, having a return-pipe l, leading to a circulating-pump i, of a hollow perforated cop carrier or table a, adapted to be lowered into and raised out of the liquor-tank d, and having a conduit b, the lower end of which is in communication with the hollow part a^2 of the cop-carrier or table a, and the upper end, by medium of the cylinder e, with a suction-pipe f, leading to the circulating-pump i and

vacuum-chamber *k*, and having two valves *g* and *h*, the valve *h* being adapted to establish communication between the vacuum-chamber *k* and the hollow part a^2 of the cop carrier or table *a* while out of the liquid-tank *d*, and the valve *g* to cut off communication with the same and the circulating-pump *i* for the purpose of exhausting the superfluous liquor from the cops *o'*, substantially as set forth.

3. In a machine for dyeing, bleaching, and otherwise treating yarn in cop, bobbin, or other compact form, the combination, with a hollow perforated cop carrier or table *a*, having a conduit *b*, in communication with a suction-pipe *f*, furnished with valves *g* and *h*, and leading to a circulating-pump *i* and vacuum-chamber *k*, of a cover *m*, with valves *n*, adapted to be lowered and raised and hermetically secured onto the face of the cop carrier or table *a* for the purpose of exhausting the air from the cops *o'* through the medium of vacuum-chamber *k* on the valves *g* and *n* being closed and the valve *h* opened and of giving the liquid access to the cops *o'* when in the tank *d* by opening the valves *n* for the purpose of impregnating the cops *o'* with liquid, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 5th day of November, 1889.

SAMUEL MASON, JR.,
WILLIAM THOMAS WHITEHEAD.

Witnesses:
ALFRED BOSSHARDT,
STANLEY EGERTON BRAMALL.