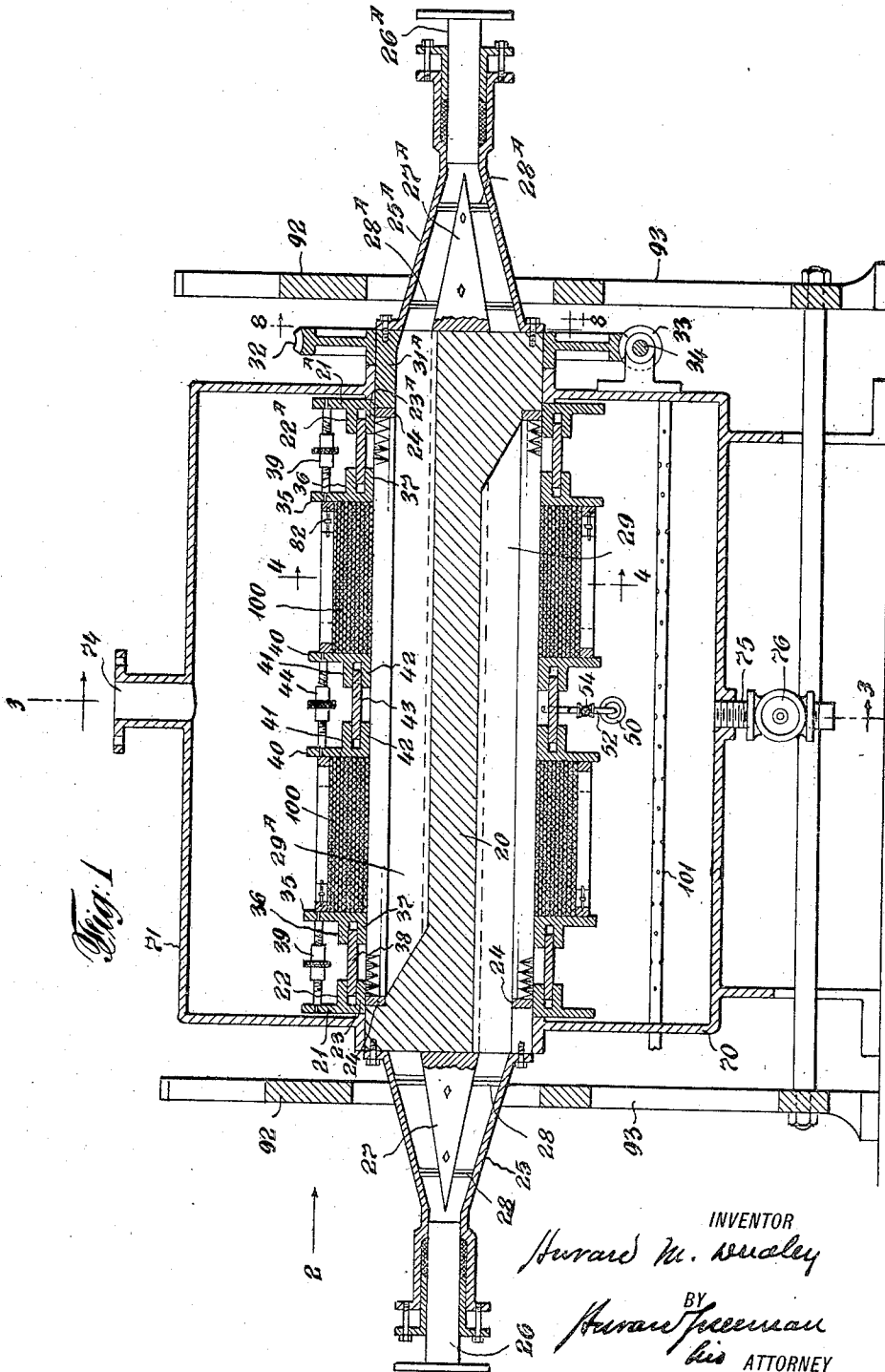


H. M. DUDLEY.
FABRIC DYEING MACHINE.
APPLICATION FILED SEPT. 19, 1917.

1,280,187.

Patented Oct. 1, 1918.
5 SHEETS—SHEET 1.

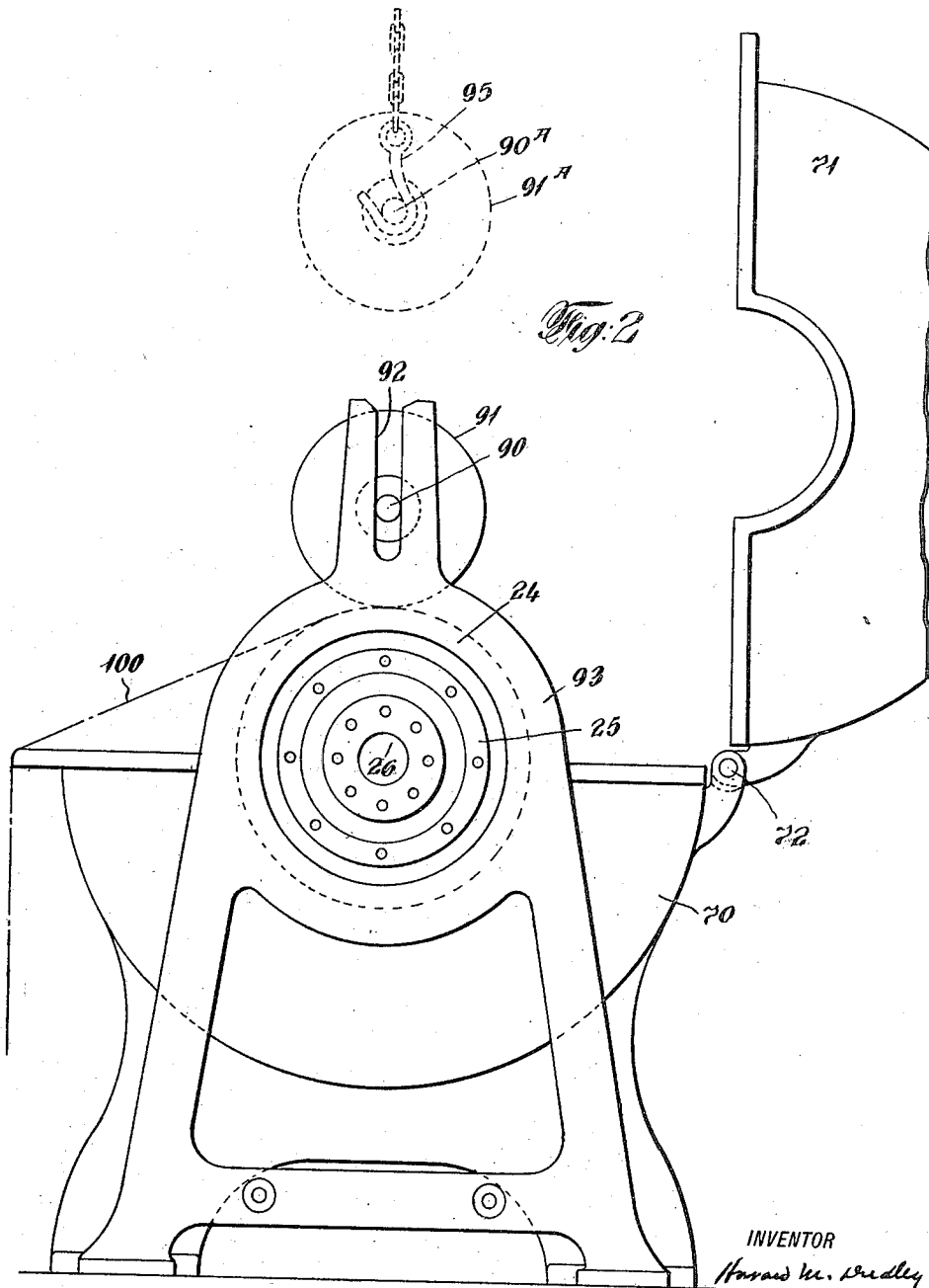


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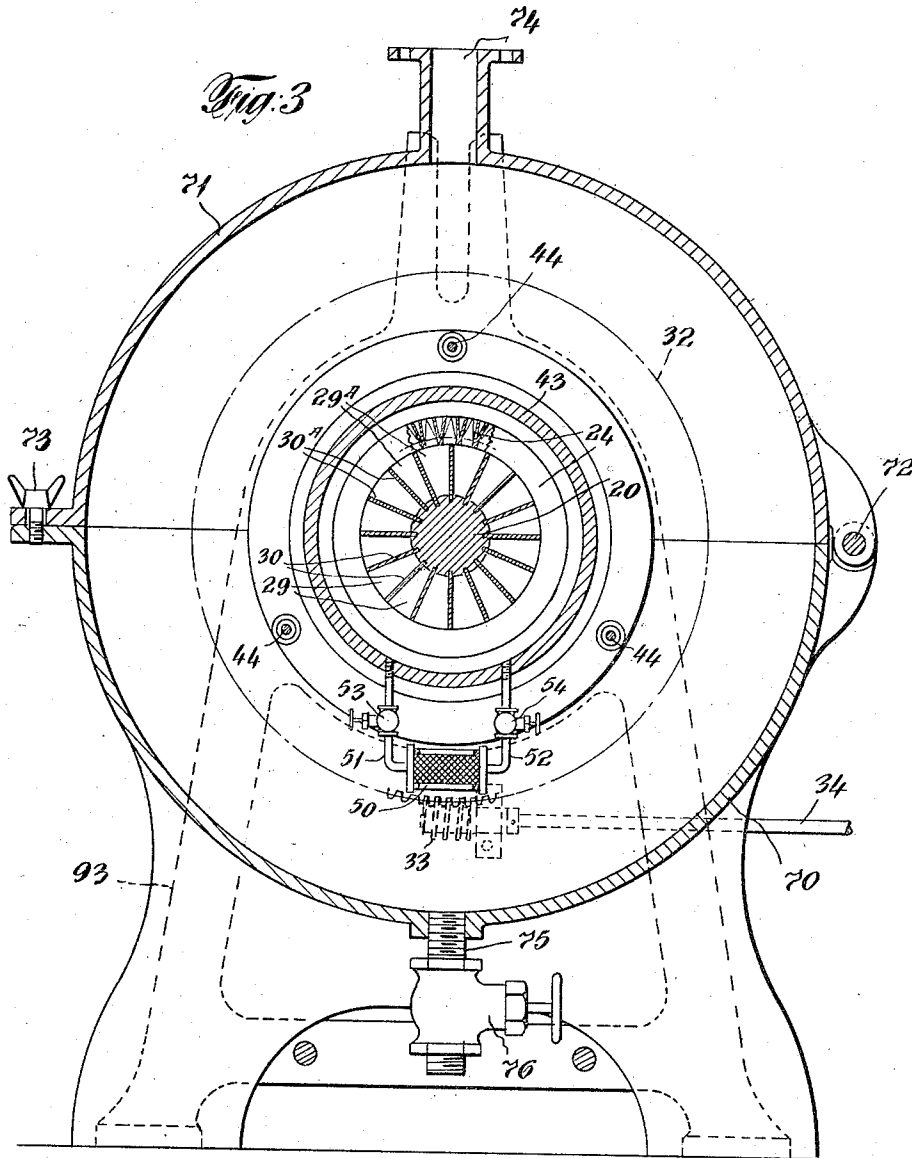


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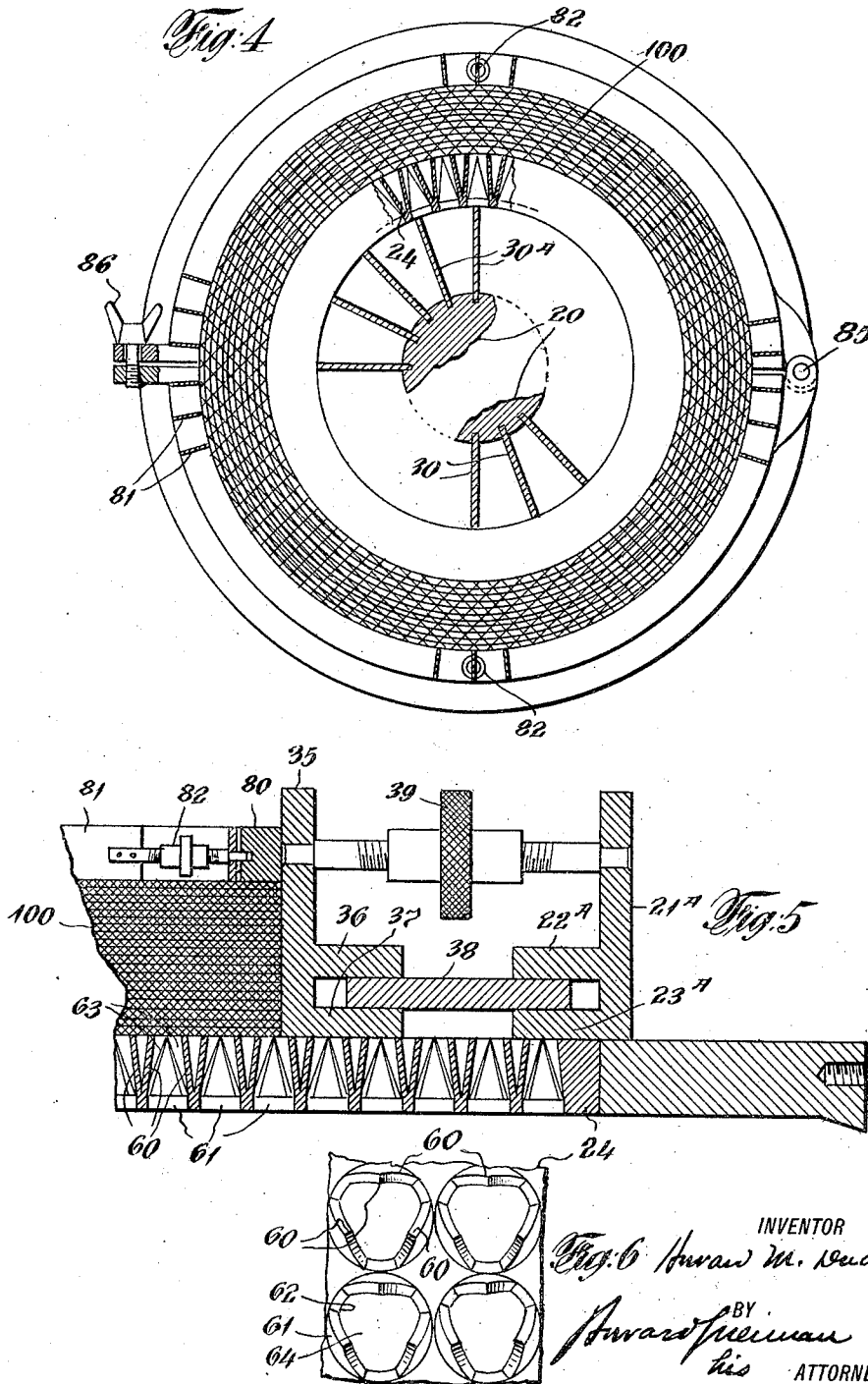


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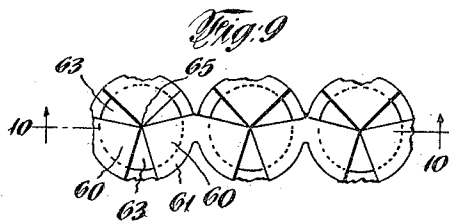
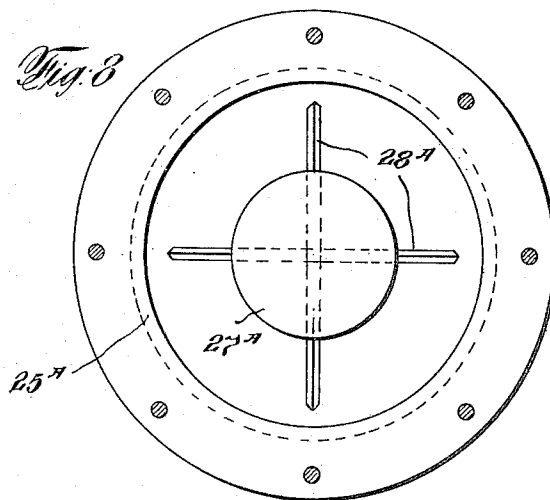
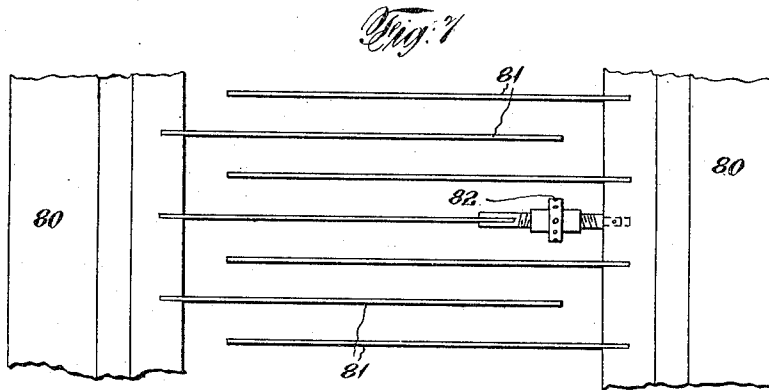
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5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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FABRIC-DYEING MACHINE.

1,280,187.

Specification of Letters Patent.

Patented Oct. 1, 1918.

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To all whom it may concern:

Be it known that I, HOWARD M. DUDLEY, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Fabric-Dyeing Machines, of which the following is a specification.

My invention relates to dyeing machines and refers particularly to a device suitable for the dyeing of piece goods.

One object of my invention is a device whereby at the same time several pieces of woven fabric may be dyed evenly and equally.

Another object of my invention is a device whereby the conditions incident to the dyeing of several pieces of woven fabric at the same time, may be uniform.

Another object of my invention is a device whereby the several pieces to be dyed may be severally wound upon the device prior to dyeing, and may be unwound therefrom after dyeing.

Another object of my invention is a device whereby several pieces of fabric of different widths may be dyed uniformly at the same time.

Another object of my invention is a device whereby several pieces of woven fabric may be simultaneously treated to a uniform amount of dye liquor forced therethrough, while revolving within a dye liquor.

Another object of my invention is a device whereby the width of the foraminous plate around which a fabric is wound and through which a dye liquor is forced, can be changed to agree with the width of a fabric wound thereon.

Another object of my invention is a device whereby the dyed condition of each of several lengths of cloth may be accurately measured without disturbing the cloth being dyed.

These and other objects of my invention will be evident upon a consideration of my specification, drawings and claims.

The dyeing of piece goods presents many difficulties, especially in those processes in which the dye liquor is forced through the rolled goods. In this method of dyeing con-

siderable difficulty is met in endeavoring to produce even results, as all portions of the goods must receive absolutely equal treatments, as regards penetration, amount and strength of dye liquor and time of operation.

Another difficulty in the dyeing of goods of this character is that it is almost impossible to maintain exactly the same conditions in successive dyeings, and unless this is accomplished the several pieces of goods will not be of the same shade or strength and hence will not be matches for each other.

Another difficulty is the time and labor necessary in the rolling, handling and dyeing of the several pieces of goods.

Another difficulty is that in order to test the dyed condition of the fabric, it is necessary, in the present employed methods, to tear off a piece of the dyed fabric, thus causing a considerable waste of goods and a disturbance of the rolled fabric.

The device of my invention overcomes all of the above, and many other difficulties incident to the dyeing of piece goods, and presents a method whereby this may be accomplished readily, economically and perfectly.

My device comprises in a broad way a device in which several rolls of woven fabric of the same or different widths may be dyed and washed simultaneously and equally with a maximum of speed and a minimum expenditure of time, labor and dyes.

One form of the dyeing machine of my invention is shown in the accompanying drawings in which similar parts are designated by similar numerals.

Figure 1 is a vertical cross-section of one form of a device of my invention.

Fig. 2 is an end view in the direction of the arrow 2 of Fig. 1, with the cover raised and showing the wrapping roller in operative position and raised into inoperative position.

Fig. 3 is a cross-section on the line 3—3 of Fig. 1.

Fig. 4 is a cross-section on the line 4—4 of Fig. 1.

Fig. 5 is an enlarged broken vertical cross-

section showing the means for covering a portion of the foraminous cylinder to agree with the width of the cloth.

Fig. 6 is a top view of a portion of the foraminous cylinder.

Fig. 7 is a top development of the foraminous cover.

Fig. 8 is a cross-section on the line 8—8 of Fig. 1.

Fig. 9 is a top plan view of a portion of a modified form of the foraminous cylinder.

Fig. 10 is a cross-section through the line 10—10 of Fig. 9.

The device as illustrated comprises a revoluble reel having the central member 20, to which is fixedly attached the two outwardly extended annular flange members 21, 21^A, the flange members having the extended arms 22, 23, 22^A, 23^A. Fixedly attached to the central member 20 is the foraminous cylinder 24. Fixedly attached to the two ends of the central member 20 are the outwardly divergent hollow conical members 25, 25^A, the outer extremities of which connect with and are revoluble around the pipes 26, 26^A, connected with a source of dye liquid supply and of fresh water not shown. Within the conical members 25, 25^A are the cones 27, 27^A fixedly attached to the central member 20, and supported by the cross bars 28, 28, 28^A, 28^A. Within the reel between the central member 20 and the foraminous cylinder 24 are two conduits 29, 29^A leading from the pipes 26, 26^A to the inner face of the foraminous cylinder 24, and carrying a series of plates 30, 30, 30^A, 30^A. Fixedly attached to the portion 31^A of the reel is a gear wheel 32 meshing with the gear worm 33 carried by the shaft 34 which is connected with a source of power.

At each end of the reel is a device for closing a portion of the foraminous cylinder in order that all of the liquid may pass through the fabric. These devices comprise an outwardly extended annular flange 35 having the two arms 36 and 37, and an annular member 38, slidable between the arms of the flanges 21, 21^A and the arms of the members 35, 35. The arms 23, 23^A of the flanges 21, 21^A rest upon the outer face of the foraminous cylinder 24, and the arms 37, 37 of flanges 35, 35 rest upon and are slidable over the outer face of the foraminous cylinder 24. Between the flanges 21 and 35 and 21^A and 35 are right and left threaded turn-buckles 39, 39 for moving the two flanges with respect to each other and maintaining them in position.

Within the center of the reel is a similar device for closing a portion of the foraminous cylinder comprising the two flange members 40, 40, having the arms 41, 41, 42, 42 spaced from each other, the slidable member 43 and a series of right and left turn-

buckles 44, 44, the arms 42, 42 resting upon the face of, and slidable over, the foraminous cylinder 24.

Attached to the reel is a testing device (Fig. 3) comprising a hollow foraminous cylinder 50, the ends of which are connected with the pipes 51, 52, the other ends of which are connected with the interior of the reel. The pipes 51, 52 carry the valves 53, 54.

The foraminous cylinder 24 comprises a series of outwardly extended members, consisting of divergent leaves or members 60, 60, extending outwardly from a base 61 carrying a central opening 62. Liquid forced through the opening 62 finds its way through the openings 63, 63 between the leaves 60, 60 and also outwardly through the opening 64 between the extremities of the leaves 60, 60. The extremities of the leaves 60, 60 serve to support the fiber in such a manner as to allow free access of liquor to all parts of the surface thereof.

In the modification shown in Figs. 9 and 10, the leaves 60, 60 of each device converge to a common point 65, the device then having the form of a hollow cone with triangular openings in the sides thereof.

A foraminous cover for placement around the fabric 100 is shown in Figs. 4 and 7 and comprises the two flexible end members 80, 80 hinged at 85, connected by a series of staggered vertical plates 81, 81 the two end members 80, 80 being movable with respect to each other by a series of right and left turn-buckles 82, 82. By this means the width of the foraminous cover can be varied to agree with the width of the fabric.

The revoluble reel with its attached parts is contained in a receptacle comprising the bottom 70 and the top 71 hinged at 72, and capable of being clamped together by means of the thumb screws 73, 73. The top 71 carries the pipe 74 and the bottom 70 carries the pipe 75 having the valve 76.

A removable roller for employment in winding the fabric evenly upon the foraminous cylinder is shown in Fig. 2. The shaft 90 of the roller 91 is capable of placement within the opening 92 of the support 93 and roller 91 rests upon the foraminous cylinder 24 when there is no fabric wound thereon. The proper temperature is maintained in the receptacle by means of the steam pipe 101.

The operation of the device is as follows:

The top 71 is raised, the end of the fabric 100 is placed upon the foraminous cylinder 24, the roller 91 lowered thereon and the reel revolved by means of the shaft 34, the worm gear 33 and the gear wheel 32. When all of the fabric is wound thereon, the roller 91 is raised to the position 91^A, Fig. 2, by means of the hook 95. The same operation

is performed on the second portion of the foraminous cylinder. By turning the turnbuckles 39, 39, 44, 44, the flanges 35, 35, 40, 40, 35, 35, will be brought into contact with the sides or edges of the rolled fabric, at the same time closing all of the openings in the foraminous cylinder 24 with the exception of those immediately within the rolls, thus causing all of the liquid to pass through the fabric. The foraminous covers are then placed around the rolled fabric, the width of the covers being made to fit the width of the cloth and clamped thereon by means of the thumb screws 86, 86. Fabric is wound upon the foraminous cylinder 50 of the testing device, and the top 71 lowered and clamped to the bottom 70. All of the valves with the exception of valve 76 are opened, the reel revolved and the dye liquid forced through the pipes 26 and 26^A. The liquid thus passes through the conduits 29, 29^A, the foraminous cylinder 24, the fabric 100, and the foraminous cover into the receptacle from which it passes out through the pipe 74. At the same time the liquid passes through the foraminous cylinder 50 and the fabric wound thereon in the testing device. The temperature is maintained at the proper point by means of the steam pipe 101. From time to time, the reel is stopped, valves 53 and 54 closed, and the fabric in the testing device examined to determine the condition of the dyeing. When the dyeing operation is furnished, the introduction of dye liquid is interrupted, the liquid in the receptacle withdrawn by opening the valve 76, the valve 76 closed and clear water forced through the pipes 26, 26^A and the device in order to wash the fabric, and when properly washed, the wash water is withdrawn through the valve 76 and the fabric removed.

I do not limit myself to the particular size, shape, number or arrangement of parts as shown and described, all of which may be varied without going beyond the scope of my invention as described and claimed.

What I claim is:—

1. In a dyeing machine, in combination, a receptacle, a foraminous cylinder revoluble within the receptacle and capable of having a series of strips of fabric wound thereon forming a series of rolls of fabric thereon, means whereby the members of the series of rolls of fabric may be separated from each other and the openings in the cylinder between the rolls of fabric may be closed, means for revolving the cylinder and means for forcing a liquid through the foraminous cylinder and the series of rolls of fabric wound thereon.

2. In a dyeing machine, in combination, a receptacle, a foraminous cylinder revoluble within the receptacle and capable of having

a series of strips of fabric wound thereon forming a series of rolls of fabric thereon, means at each end of the cylinder whereby a predetermined number of openings in the cylinder may be closed, means intermediate of the ends of the cylinder whereby a predetermined number of openings in the cylinder may be closed, means for revolving the cylinder and means for forcing a liquid through the cylinder and the series of rolls of fabric wound thereon.

3. In a dyeing machine, in combination, a receptacle, a foraminous cylinder revoluble within the receptacle and capable of having a series of strips of fabric wound thereon forming a series of rolls of fabric thereon, a series of annular members abutting upon and slidable over the cylinder, closing the openings in the cylinder between the rolls of fabric whereby all of a liquid forced through the cylinder will be passed through the series of rolls of fabric wound thereon, means for revolving the cylinder and the annular members and means for forcing a liquid through the cylinder and the series of rolls of fabric wound thereon.

4. In a dyeing machine, in combination, a receptacle, a foraminous cylinder revoluble within the receptacle and capable of having a series of strips of fabric wound thereon forming a series of rolls of fabric thereon, means whereby the members of the series of rolls of fabric may be separated from each other and the openings in the cylinder between the rolls of fabric may be closed, an adjustable foraminous cover capable of placement around each of the rolls of fabric, means for revolving the cylinder and means for forcing a liquid through the foraminous cylinder and the series of rolls of fabric wound thereon.

5. In a dyeing machine, in combination, a receptacle, a foraminous cylinder revoluble within the receptacle and capable of having a series of strips of fabric wound thereon forming a series of rolls of fabric thereon, means whereby the members of the series of rolls of fabric may be separated from each other and the openings in the cylinder between the rolls of fabric may be closed, a chamber within the foraminous cylinder, means for introducing a liquid into the chamber, means for revolving the cylinder and means for forcing a liquid through the foraminous cylinder and the series of rolls of fabric wound thereon.

6. In a dyeing machine, in combination, a receptacle, a reel having a foraminous cylindrical body and imperforate flanges revoluble within the receptacle capable of having a series of strips of fabric wound thereon, forming a series of rolls of fabric thereon, a series of members slidable over the face of the cylindrical body closing the openings

in the cylinder between the fabric rolls and
 revolvable therewith whereby the members of
 the series of rolls of fabric wound upon the
 cylinder will be maintained separate from
 5 each other and whereby all of the liquid
 passed through the cylinder may be im-
 pinged upon the inner faces of the fabric
 rolls, means whereby a liquid may be forced
 into the reel from both ends thereof and
 10 means for revolving the reel during the pas-
 sage of the liquid.

7. In a dyeing machine, in combination, a
 receptacle, a foraminous cylinder having
 outwardly extended members revolvable with-
 15 in the receptacle and capable of having a
 series of strips of fabric wound thereon
 forming a series of rolls of fabric thereon,
 means whereby the members of the series of
 rolls of fabric may be separated from each
 20 other and the openings in the cylinder be-
 tween the rolls of fabric may be closed,
 means for revolving the cylinder and means
 for forcing a liquid through the foraminous
 cylinder and the series of rolls of fabric
 25 wound thereon.

8. In a dyeing machine, in combination, a
 receptacle, a hollow foraminous cylinder
 having outwardly extended members, a series
 of extensible members slidable over the
 30 outer face of the cylinder and capable of
 separating a series of rolls of fabric wound
 thereon and of causing all of a liquid forced
 through the cylinder to impinge upon the
 inner face of the fabric rolls, a series of
 35 conduits within and adjacent to, the cylinder
 connecting the cylinder with a source of
 liquid supply, means for removing a
 liquid from the receptacle after it has passed
 through a roll of fabric wound upon the
 40 cylinder, means for revolving the cylinder
 and means for forcing a liquid through the
 conduits, the chamber, the cylinder and the
 series of rolls of fabric wound upon the
 cylinder.

9. In a dyeing machine, in combination,
 45 a receptacle, a hollow foraminous cylinder
 having outwardly extended members, a series
 of extensible members slidable over the
 outer face of the cylinder and capable of
 50 separating a series of rolls of fabric wound
 thereon and of causing all of a liquid forced
 through the cylinder to impinge upon the
 inner face of the fabric rolls, an adjustable
 foraminous cover having inwardly extended
 55 members capable of placement around a
 fabric roll, a series of conduits within and
 adjacent to the cylinder connecting the cylinder
 with sources of liquid supply at
 60 both ends thereon, means for removing
 the liquid from the receptacle, means for
 heating a liquid within the receptacle, means
 for revolving the cylinder and means for
 forcing a liquid through the cylinder during
 its revolution.

10. In a dyeing machine, in combination, 65
 a receptacle, a foraminous cylinder revolv-
 ble within the receptacle and capable of hav-
 ing a series of strips of fabric wound there-
 on forming a series of rolls of fabric wound
 thereon, means whereby the members of the 70
 series of rolls of fabric may be separated
 from each other and the openings in the
 cylinder between the rolls of fabric may
 be closed, means for revolving the cylinder,
 a small testing device comprising a forami- 75
 nous cylinder capable of having a fabric
 wound thereon, means connecting the inter-
 iors of the two foraminous cylinders for
 the passing of a liquid, means whereby the
 passage of a liquid through the smaller de- 80
 vice may be interrupted without interrupt-
 ing its passage through the larger device,
 means whereby the smaller device may be
 removed to allow of examination of the fab-
 ric thereon and means for forcing a liquid 85
 through the two devices.

11. In a dyeing machine, in combination,
 a receptacle, a foraminous cylinder revolv-
 ble within the receptacle and capable of
 having a series of strips of fabric wound 90
 thereon forming a series of rolls of fabric
 thereon, a series of annular members abut-
 ting upon and slidable over the cylinder,
 closing the openings in the cylinder between
 the fabric rolls whereby all of a liquid 95
 forced through the cylinder will be passed
 through the series of rolls of fabric wound
 thereon, means for revolving the cylinder
 and the annular members, a smaller testing
 device comprising a foraminous cylinder ca- 100
 pable of having a fabric wound thereon,
 means connecting the interiors of the two
 foraminous cylinders for the passage of a
 liquid, means whereby the passage of a
 liquid through the smaller device may be 105
 interrupted without interrupting its pas-
 sage through the larger device, means where-
 by the smaller device may be removed to
 allow of examination of the fabric thereon
 and means for forcing a liquid through the 110
 two devices.

12. In a dyeing machine, in combination,
 a receptacle, a reel having a foraminous
 cylindrical body and imperforate flanges
 revolvable within the receptacle capable of 115
 having a series of strips of fabric wound
 thereon forming a series of rolls of fabric
 thereon, a series of members slidable over
 the face of the cylinder closing the openings
 in the cylinder between the fabric rolls and 120
 revolvable therewith whereby the members
 of a series of rolls of fabric wound upon the
 cylinder will be maintained separate from
 each other and whereby all of the liquid
 passing through the cylinder will be im- 125
 pinged upon the inner face of the fabric
 rolls, means whereby a liquid may be forced
 into the reel from both ends thereof, a

smaller testing device comprising a foraminous cylinder capable of having a fabric wound thereon, means connecting the interiors of the two foraminous cylinders for the passage of a liquid, means whereby the passage of a liquid through the smaller device may be interrupted without interrupting its passage through the larger device, means whereby the smaller device may be removed to allow of examination of the fabric thereon and means for forcing a liquid through the two devices.

Signed at New York, in the county of New York and State of New York, this 27th day of August, 1917.

HOWARD M. DUDLEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."