

W. BIRCH.

APPARATUS FOR DYEING, &c.

No. 344,238.

Patented June 22, 1886.

FIG. 2.

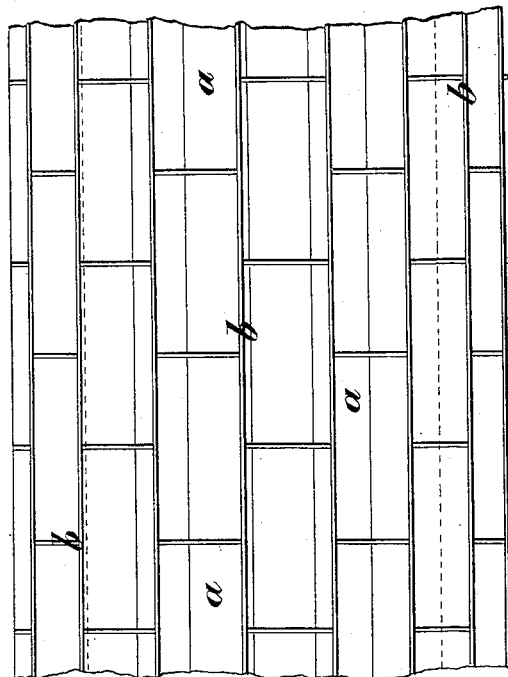
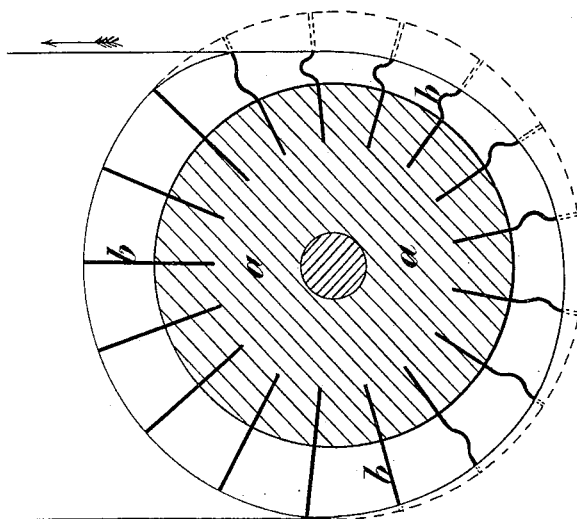


FIG. 1.



Witnesses
William F. Davis
John E. Parker

Inventor:
William Birch
by his Attorneys
Howell & Son

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FIG. 4.

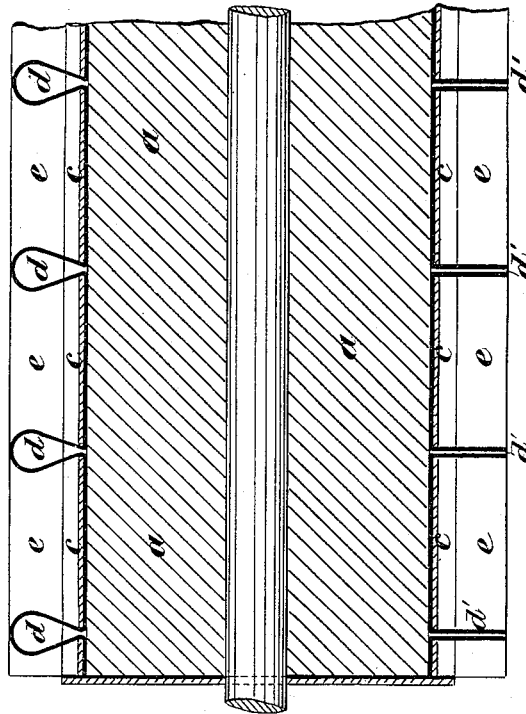
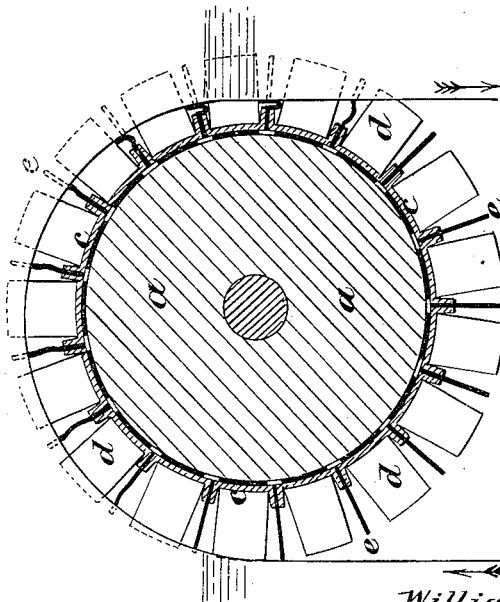


FIG. 3.



Witnesses:
William F. Davis
John E. Paver

Inventor:
William Birch
by his Attorneys
Howson & Sons

UNITED STATES PATENT OFFICE.

WILLIAM BIRCH, OF MANCHESTER, COUNTY OF LANCASTER, ENGLAND.

APPARATUS FOR DYEING, &c.

SPECIFICATION forming part of Letters Patent No. 344,238, dated June 22, 1886.

Application filed March 30, 1886. Serial No. 197,146. (No model.) Patented in England February 1, 1886, No. 1,424.

To all whom it may concern:

Be it known that I, WILLIAM BIRCH, residing at Broughton, Manchester, in the county of Lancaster, England, have invented improved apparatus to be employed for washing, soaping, dyeing, and dunging woven fabrics, (for which I have applied for a patent in Great Britain, dated February 1, 1886, No. 1,424,) of which the following is a specification.

This invention relates to the construction of the rollers employed for conveying the woven fabric through the cisterns or vessels containing the liquids employed in such or similar operations, the object of my said invention being to cause the said liquids to be forced through the woven fabric under treatment by the operation of the rollers themselves, without the use of pumps or other similar external means usually employed for producing pressure or vacuum, so as to force or draw the liquid through the fabric.

The invention which I propose to employ for this purpose will be readily understood on reference to the annexed drawings and the following explanation thereof.

Figure 1 on the drawings represents in transverse section one of my improved rollers, and Fig. 2 is a partial elevation of the same. Figs. 3 and 4 are transverse and longitudinal sections illustrating modifications thereof.

For the purposes of my invention I propose to cover the exterior surface of the rollers under which the woven fabric passes (and which are immersed in the liquor) with a series of cells, such cells or the walls thereof being made of a substance or composition—such, for example, as india-rubber or thick felt—which is easily collapsible or compressible with moderate pressure and is also resilient, so that on the pressure being removed it will return again to its original form and position.

On the drawings, *a a* represent the body of the rollers, in the surface of which long notches or grooves are cut longitudinally, and also at intervals short notches or grooves at right angles thereto. Into these notches are inserted and fixed, with cement or otherwise, strips *b b*, of india-rubber or other suitable compressible and resilient material, so as to form a series of cells all over the surface, as seen at Fig. 2. These cells being immersed in the liquid be-

come filled therewith, and as the rollers revolve the liquid is inclosed thereby between the rollers and the woven fabric which passes round the same. The tension of the woven fabric (which is represented by the dark line in Fig. 1) as the roller revolves compresses the walls of the cells on the lower side of the roller, as shown at Fig. 1, and by thus reducing the capacity of the cells causes the liquid to be forced outward through the woven fabric, which thus becomes thoroughly penetrated by the liquid, without the use of pumps or other ordinary means of obtaining pressure or suction.

The dotted circle on Fig. 1 shows the circumference of the cellular roller when there is no pressure exerted thereon by the tension of the woven fabric. Another way of making these cellular rollers is illustrated in transverse section at Fig. 3 and longitudinal section at Fig. 4.

I take a number of strips of copper, *cc*, of a trough-like section, through the base of which I form slits in a transverse direction. I then take a long strip, *d d*, of india-rubber, of the width of the base, and I thread and loop it through these slits, as shown at the upper part of Fig. 4, or I take short pieces and thread them through, as shown at *d' d'*, at the lower part of the same figure. These strips form the transverse walls of the cells, and for the longitudinal walls I employ long strips of rubber, *ee*, which are held between the sides of the copper strips, the latter being nailed close together onto the wooden roller *aa*, as shown at Fig. 3, so as to form a copper-covered roller with collapsible cells. The ends of the roller may also be covered by copper plates with a lining of india-rubber.

I would here remark, although for the sake of illustration I have shown the cells in a rectangular form, I do not wish to limit myself to that or any other particular shape, nor to confine myself to the use of india-rubber for the formation of the walls thereof, as they may be made of any other suitable material which possesses the requisite amount of compressibility, together with the amount of elasticity or resiliency required to return it on the removal of the pressure to its original form and position.

I am aware that cloth-brushing rolls have

been constructed with longitudinal strips of rubber; but they do not perform the function of the cells described above.

I claim as my invention—

- 5 1. The herein-described apparatus for washing, soaping, and dyeing or otherwise treating woven fabrics, said apparatus comprising a vessel having rollers provided on their surfaces with cells, the walls of which are compressible and resilient, substantially as described.
- 10 2. The herein-described roller for apparatus

for washing, soaping, and dyeing or otherwise treating woven fabrics, said roller being provided on its surface with cells, the walls of which are compressible and resilient, substantially as described. 15

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM BIRCH.

Witnesses:

CHARLES DAVIES,
JNO. HUGHES.