(No Model.) 2 Sheets—Sheet 1.

J. FARMER & A. LALANCE.

APPARATUS FOR WASHING, BLEACHING, AND DYEING FABRICS.

No. 318,888. Patented May 26, 1885.

FIG. 1.

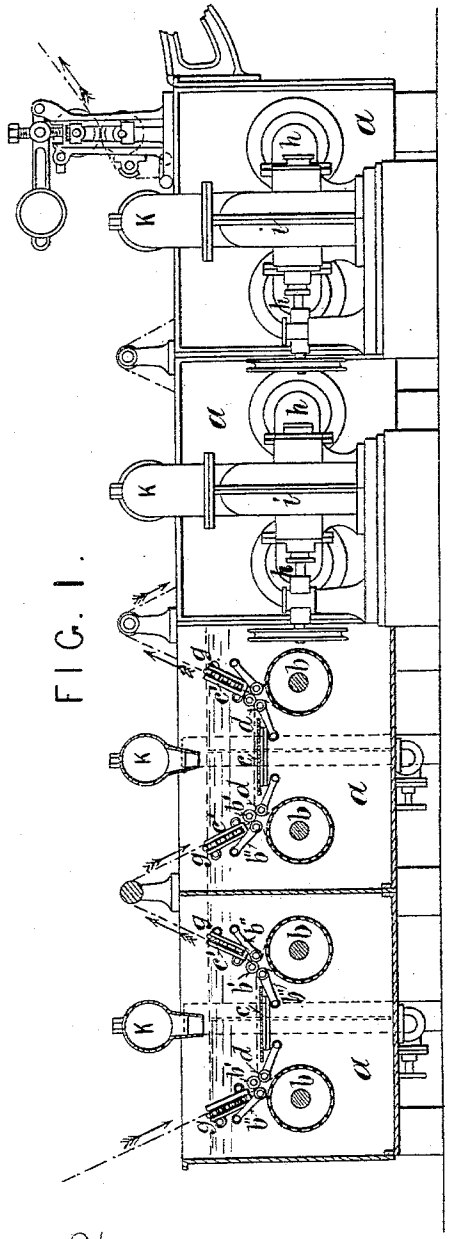
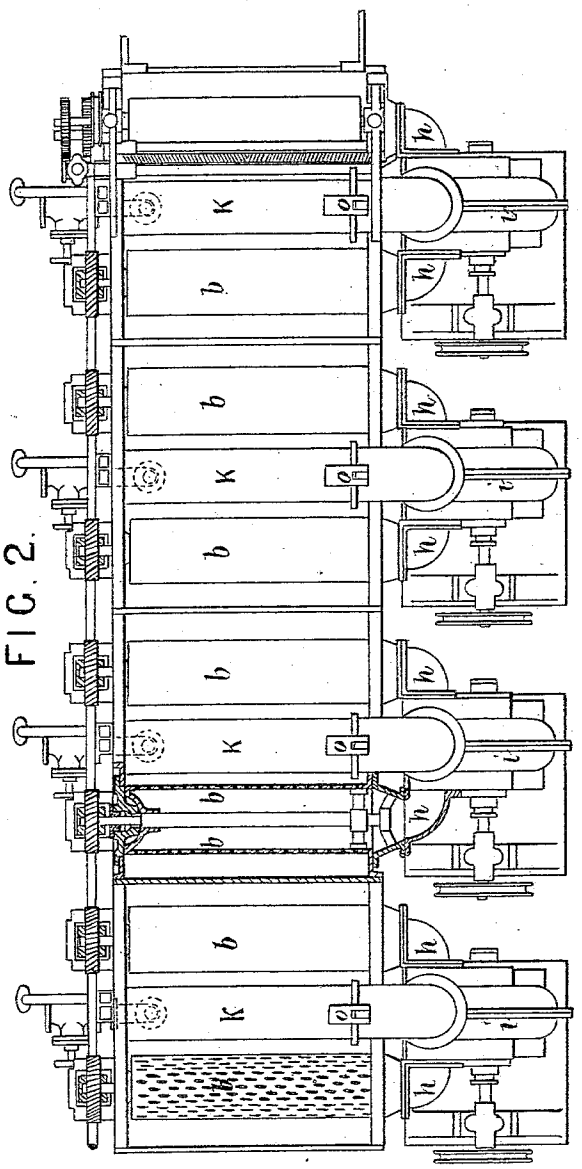


FIG. 2.



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Howson and Sons

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 6.

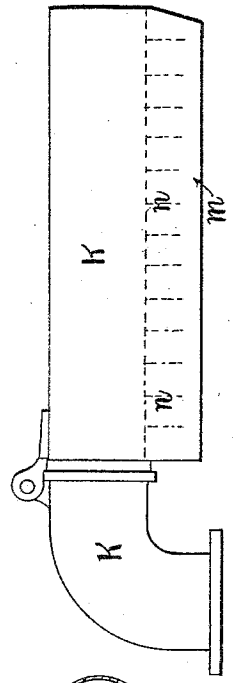


FIG. 7.

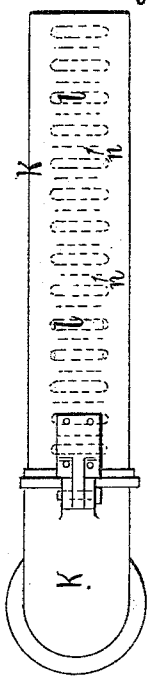


FIG. 5.

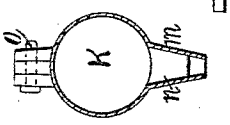


FIG. 4.

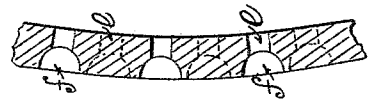
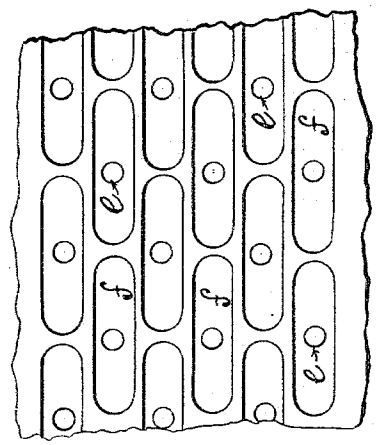


FIG. 3.



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UNITED STATES PATENT OFFICE.

JAMES FARMER, OF SALFORD, COUNTY OF LANCASTER, ENGLAND, AND AUGUSTE LALANCE, OF MULHOUSE, GERMANY.

APPARATUS FOR WASHING, BLEACHING, AND DYEING FABRICS.

SPECIFICATION forming part of Letters Patent No. 318,888, dated May 26, 1885.

Application filed August 28, 1884. (No model.) Patented in England July 31, 1884, No. 10,792; in France August 1, 1884, No. 163,502; in Belgium August 4, 1884, No. 65,913; in Germany August 6, 1884, No. 31,352; in Spain November 15, 1884, No. 4,412, and in Austria February 21, 1885, No. 3,272.

To all whom it may concern:

Be it known that we, JAMES FARMER, a subject of the Queen of Great Britain, and residing at Salford, in the county of Lancaster, England, and AUGUSTE LALANCE, a subject of the Emperor of Germany, and residing at Mulhouse, Germany, have invented Improvements in the Construction of Apparatus Employed for Bleaching, Washing, Chloring, Scouring, Soaping, Dunging, and Dyeing Woven Fabrics, of which the following is a specification.

This invention relates to the peculiar construction and combination of apparatus intended to perform the above operation in a quicker and more effective manner than formerly by drawing the liquor through the fibers of the cloth by a mechanical process.

In this improved machine the cloth is supported by hollow metallic cylinders or rollers perforated with holes all over their surface the whole width of the cloth, and corrugated to allow the liquor to pass freely through as much of the cloth as possible. Inside the hollow cylinders or rollers, which are closed at one end, a certain vacuum is produced at the other end to force the liquor to penetrate the cloth, which we find preferable to forcing the liquor outward through the cloth by pressure from the inside of the said hollow cylinders or rollers, which outward pressure has the tendency to displace the weft by forcing the cloth away from the surface of the said cylinders or rollers. The open ends of the said cylinders or rollers are so arranged that as much of their internal area is open to the action of the pump with as few obstructions as possible. Preferably two of the said cylinders or rollers are mounted in one cistern or vat, and are connected with the necessary pump, which we find most convenient to be made on the centrifugal principle. The liquor which is drawn through the cloth into the inside of the said cylinders or rollers by the said centrifugal pump is discharged back into the cistern or vat by a specially-constructed discharge-pipe, hereinafter described, placed, preferably, at the top of the machine, which discharge-pipe is so devised that the liquor, which is impelled with great force into it by the pump, is diverted so as to pour straight down into the said cistern or vat, thus preventing any eddies which could cause the cloth to wander from its right course. The cloth is supported to and from the said rollers or cylinders by perforated flat plates in such a manner that the force of the liquor from the discharge-pipe cannot "bag" or displace the threads of the cloth, and has at the same time an additional tendency to further penetrate the fibers of the said cloth. The said flat plates are so arranged that they can readily be removed, and the discharge-pipe is hinged so that it can be turned up out of the way when the cistern or vat requires cleansing out.

The construction of our improved apparatus will be readily understood on reference to the annexed drawings and the following explanation thereof.

Figure 1 is a side elevation, shown partly in section, of an apparatus constructed according to our invention and showing four cisterns or vats, *a a*, each containing two perforated cylinders, *b b;* but we wish it to be understood that we do not intend to limit ourselves to this number, as a larger or a smaller number of cisterns may be combined in one machine, according to the requirements of the case, or more or less than two rollers in each cistern or vat. Fig. 2 is a plan view of the same, shown also partly in section.

In addition to the two perforated cylinders *b b* each cistern or vat is fitted with a horizontal perforated plate, *c c*, two inclined perforated plates, *c' c''*, and four guide-rollers, *d d d d*. Two guide-rollers *d d* are provided to each perforated cylinder to cause the cloth to envelop nearly the whole circumference of the cylinder, and the space between these guide-rollers *d d* is closed by a third roller, *b' b'*, to prevent suction through that part of the perforated cylinder *b b* which is uncovered. The rollers *d d* are mounted in arms *b'' b''*, which are connected to the side of the vat by a joint which is sufficiently stiff to hold the rollers in place during the ordinary work, but in the event of the cloth becoming lapped on

the cylinder the joint will give way, and thus prevent a breakdown.

The cylinders we prefer to groove and perforate in the manner illustrated (full size) at Figs. 3 and 4, each perforation *e e* being combined with a countersunk elongated groove, *f f*, that being the form which we have found most suitable to support the cloth firmly and at the same time to afford a means of rapid suction of the liquor through the cloth; but we do not confine ourselves to this particular plan, as the perforations may be combined with longitudinal or circumferential grooves or countersunk in a circular form round each perforation.

The plate *c* rests upon angle-iron supports and the plates *c'* and *c''* are supported in grooves in diagonal guides *g g*, fixed to the side of the vat, so that they can be readily removed when required.

Each perforated cylinder *b b* is closed at one end, *b'*, (see section of same on Fig. 2,) and open at the other end, where it is connected by a duct or passage, *h h*, with a centrifugal or other suction-pump, *i i*, which draws the liquor from the vat through the cloth and through the perforations into the interior of the cylinder *b b*, and then forces it into the discharge or distributing pipe *k k*, through which it is discharged again into the vat. This pipe *k k* we make of the form shown at Figs. 5, 6, and 7, having in its lower side a row of elongated openings, *l l*, on each of which is a cheek, *m m*, and between each two openings a lip, *n n*, so as to cause the liquor to pour straight down into the cistern or vat. The pipe is also hinged at *o o*, so that it can be turned up out of the way at any time when required.

We claim as our invention—

1. The combination of the vat and a hollow cylinder having perforations and recesses on the outside about said perforations, with conduits for supplying the liquid to the tank and discharging it from the interior of the cylinder, substantially as set forth.

2. The combination of the vat and hollow cylinders having perforations and recesses on the outside about said perforations, with one or more perforated plates for supporting the cloth, and supply and discharge conduits for the liquid, substantially as described.

3. The combination of the vat and supply-conduit for the liquid, with a hollow cylinder having a discharge-outlet from the interior thereof, and having perforations *e*, and about each perforation on the outside a countersunk elongated groove, *f*, substantially as specified.

4. The combination of the vat, a hollow perforated cylinder and inlet and outlet conduits, with two guide-rollers, *d d*, and a third intermediate roller, *b'*, adapted to be in contact with the other two adjacent to the cylinder, substantially as described.

5. The combination of the tank, two perforated cylinders, *b b*, and guide-rollers, with an intermediate perforated plate, C, and inclined perforated plates *c'*, substantially as set forth.

6. The combination of the tank with a supply-pipe, K, having cheeks *m m* and lips *n n*, substantially as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAS. FARMER.
AUG. LALANCE.

Witnesses to the signature of James Farmer:
J. SALTER FARMER,
JN. SPEULE.

Witnesses to the signature of Auguste Lalance:
E. A. KAUFMANN,
CHS. A. RICHTER.