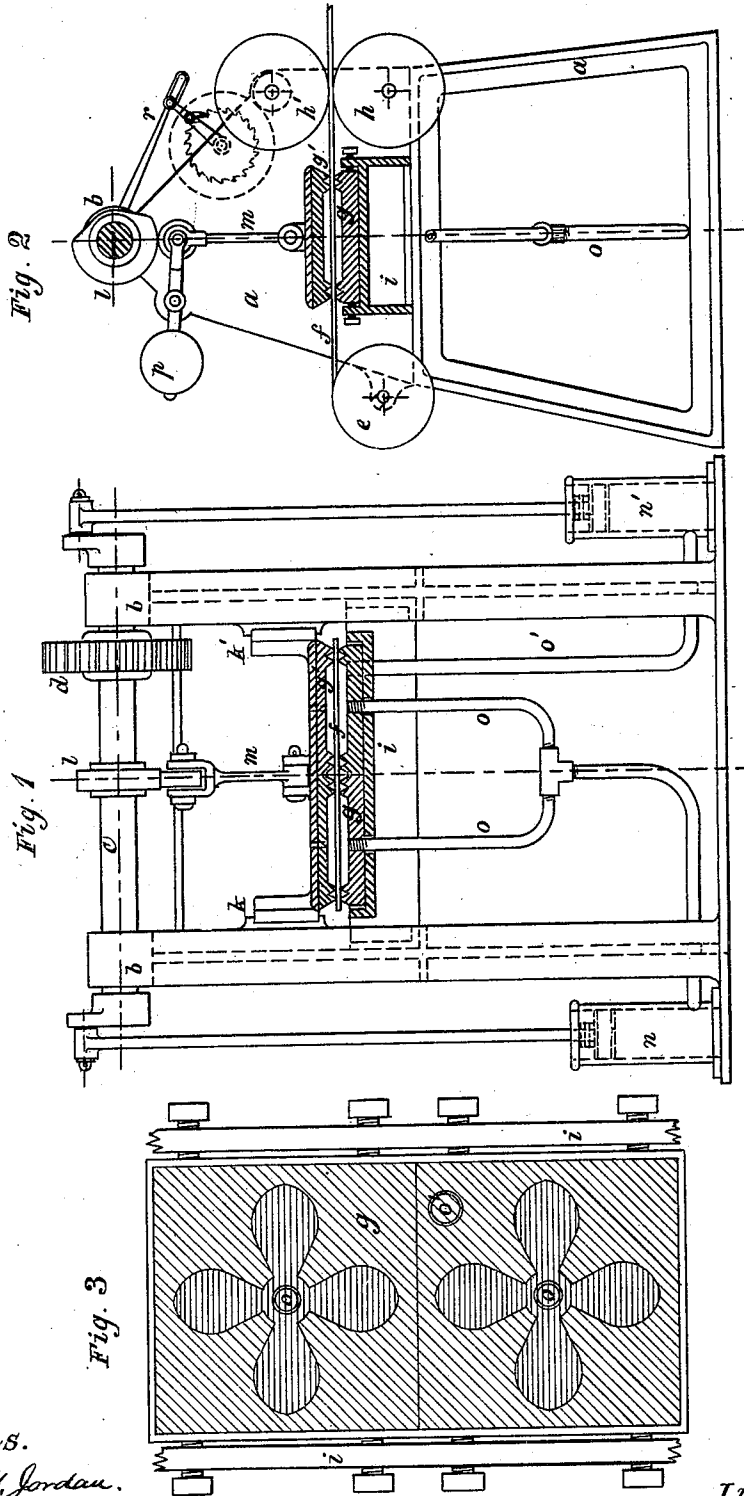


G. C. GIBBS.

APPARATUS FOR DYEING WOVEN OR POROUS FABRICS.

No. 178,921.

Patented June 20, 1876.



Witnesses.

Frank H. Jordan.

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per William Henry Clifford,
att'y.

UNITED STATES PATENT OFFICE.

GEORGE CANTRELL GIBBS, OF BRENTFORD, ENGLAND.

IMPROVEMENT IN APPARATUS FOR DYEING WOVEN OR POROUS FABRICS.

Specification forming part of Letters Patent No. **178,921**, dated June 20, 1876; application filed February 28, 1876.

To all whom it may concern:

Be it known that I, GEORGE CANTRELL GIBBS, of Brentford, in the county of Middlesex, England, have invented Improvements in Apparatus for Dyeing Woven or Porous Fabrics; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making part of this specification, in which—

Figure 1 is an end elevation of the apparatus, partly in section. Fig. 2 is a side elevation, partly in section. Fig. 3 is a plan of the lower dies upon a larger scale.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to novel arrangements of apparatus for dyeing in one or more colors, or for printing designs upon felt or other fibrous or porous fabrics.

In the annexed drawing, *a a* represent the frame-work of the apparatus, carrying the bearings *b b'*, in which the driving-shaft *c* revolves. The shaft *c* is driven by toothed wheels *d*, or by belts or other convenient means. *e*, Fig. 2, is a roller, round which the felt or other fabric *f* is rolled, and from which it is drawn forward at intervals between the dies or press-blocks *g g'* by means of the feeding-rollers *h h'*. The lower die *g* is supported by the frame *i*, which is fixed to the frame-work of the apparatus, and the upper surface of the die, which is made preferably of brass, has formed upon it the pattern or design which is to be dyed upon the felt, the parts representing the different colors being separated from each other by the raised part of the die. An upper die, *g'*, is a precise counterpart of the lower die, *g*, but is made capable of rising and falling vertically in the guides *k k'*. When the felt or other fabric has been passed into its proper position between the dies the upper one, *g'*, is brought forcibly down upon it by means of the cam *l* and connecting-rod *m*, and liquid dye is forced by means of the pumps *n n'* into the sunken parts of the lower die *g* through the pipes *o o'*; and thence through the substance of the felt or other fabric into the upper die *g'*, from which the air escapes through holes left for that purpose, and round which cisterns may be arranged to receive the

surplus dye. The pumps *n n'* are driven by cranks and connecting-rods, or by eccentrics or cams, from the driving-shaft *c*, and when the stroke of the pumps is reversed the liquid die is drawn back through the fabric into the pumps, and is followed by a current of air, by which the fabric is dried or partially dried. The upper die is then released from pressure, and is raised by the balance-weight *p*, and the fabric is fed forward to a sufficient distance by means of the feed-rollers *h h'*, which are actuated by toothed wheels, and an adjustable eccentric or cam, as shown at *r* in Fig. 2.

In the drawing dyes of two colors are shown, being used as illustrated in Fig. 3, in which two similar dies or blocks are shown arranged side by side in a frame adjusted by screws. The horizontal line represents dye of one color, which is forced into the dies through the pipes *o o*, and the diagonal lines the dye of the other color, which is forced through the pipe *o'*. If more than two colors are used a corresponding number of pumps must be used.

A sufficient number of dies may be arranged side by side to suit the width of the fabric which is being dyed; and instead of ornamental designs letters or words may be formed upon the dies or blocks. The upper die may be raised and lowered by an eccentric or crank, instead of by a cam and balance-weight, or spring arranged in the connecting-rod, in order to keep the die in contact with the fabric for a sufficient time; and instead of feeding-rollers, as shown in the drawing, jointed levers or forks may be used for feeding the fabric forward at the proper time.

Where the coloring-matter is held in suspension in the dye, so that it becomes less strong as the dye passes backward and forward through the fabric, it is advisable to arrange the pumps so that a separate quantity of dye is forced through the fabric at each stroke. In this case the upper part of the pump is closed, and when the piston is near the bottom of its stroke the dye is admitted above it through a valve which is opened by a cam upon the driving-shaft, and is closed when a sufficient quantity of dye has been admitted. The piston continues its upstroke, and forces the dye through the fabric by a

pipe. When the piston returns, it withdraws the dye through the fabric, as already described, and as it approaches the bottom of its stroke the tail of a valve contained in it strikes the bottom of the cylinder and allows the used dye to escape. As the piston rises this valve closes, and immediately afterward the supply-valve is opened by the cam, as already described, and a fresh quantity of dye is admitted above the piston, and so on continuously.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The lower dies *g* and the upper movable

perforated dies *g'* in combination with the pumps *n n'*, and the pipes *o o'*, substantially as and for the purposes described.

2. The combination, with the dies *g g'* and the pumps and pipes *n n' o o'*, of the feeding-rollers *h h'* and driving-gear *r*, all actuated from the driving-shaft *c*, substantially as and for the purposes explained.

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

GEORGE CANTRELI GIBBS.

Witnesses:

EDMUND EDWARDS,

CHARLES JAMES WINTERSGILL.