(No Model.)

J. GRIME.

DYEING MACHINE.

No. 547,347. Patented Oct. 1, 1895.

Fig. 1.

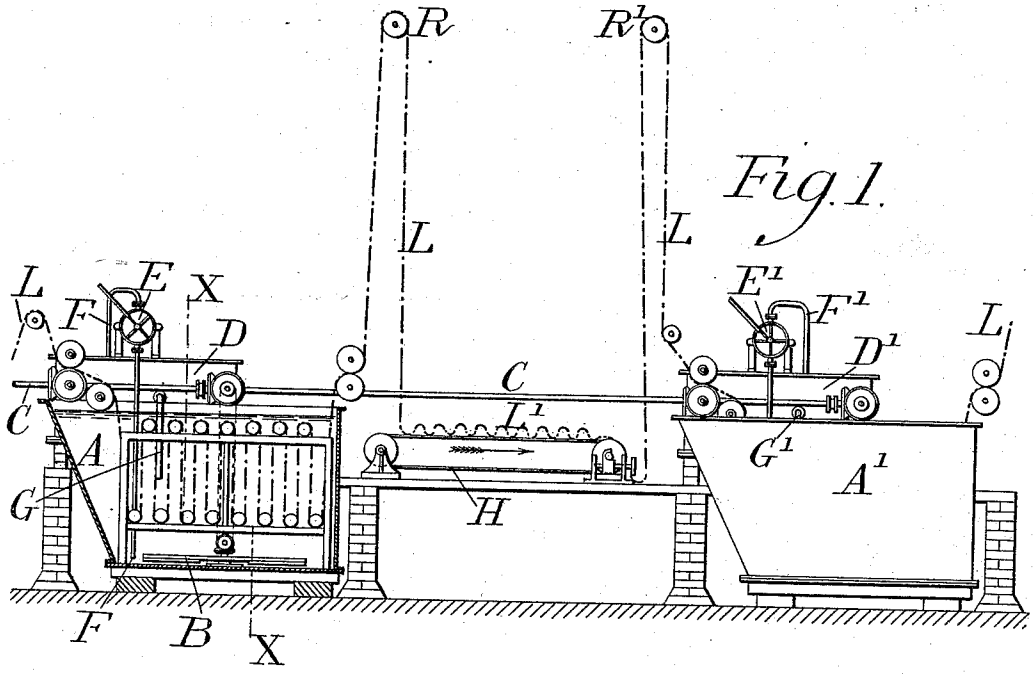
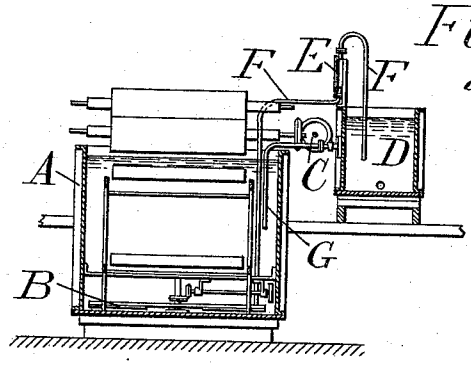


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

JAMES GRIME, OF BUSBY, SCOTLAND.

DYEING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,347, dated October 1, 1895.

Application filed February 19, 1895. Serial No. 538,994. (No model.) Patented in England June 20, 1893, No. 12,076, and March 21, 1894, No. 5,870.

To all whom it may concern:

Be it known that I, JAMES GRIME, a citizen of Great Britain, residing at Rosebank Cottage, Busby, in the county of Lanark, Scotland, have invented certain new and useful Improved Apparatus for Indigo Dyeing, (for which I have received Letters Patent in Great Britain, No. 12,076, dated June 20, 1893, and No. 5,870, dated March 21, 1894,) of which the following is a specification.

My invention relates to apparatus for indigo dyeing so arranged that the dye solution is freed from impurities and that the material which is being dyed is exposed for oxidation in its passage from each dye-vat to the next. For this purpose I provide each dye-vat with an agitator-pump and settling-tank for stirring up, drawing off, and depositing impurities, and between each dye-vat and the next I provide a slowly-traveling apron, on which the partly-dyed material is exposed in loose folds for oxidation.

Figure 1 of the accompanying drawings is a part longitudinal section and part elevation of a couple of dye-vats and adjuncts according to my invention, and Fig. 2 is a transverse section on the line X X of Fig. 1.

The dye-vat A is arranged in the usual way with upper and lower rollers immersed in the dye-liquor, over and under which passes the fabric or yarn to be dyed. At the bottom of the vat I provide an agitator B consisting of arms which are caused to revolve, when required, by bevel-gear connecting them to the shaft C, which works the feeding and drawing rollers. Near the dye-vat I provide a settling-tank D at such height that the upper portion of its liquid contents is above the level of the dye-liquor in the vat A. A rotary or other pump E has its suction-pipe F extended down nearly to the bottom of the vat A, and its delivery-pipe F turned down into the settling-tank D, from which a pipe G, provided with a stop cock or valve, leads into the vat A. On a stage between the vat A and the next vat in order A′ I mount a pair of slowly-revolving rollers carrying an endless apron H.

The apparatus operates as follows: The indigo and reducing agents usually employed are placed in the vat A, and the fabric or yarn L is passed through the liquor in the usual way, being led up to the guide-roller R, thence down to the apron H, on which, as it is slowly traveling in the direction of the arrow, the fabric or yarn becomes deposited in loose folds or loops L′. From the apron H the fabric or yarn is carried over the guide-rollers R′ and descends to the feed-rollers of the next vat A′, which is provided with an agitator-pump and settling-tank like those provided for A. In passing up and down from the guide-rollers R R′ and in moving in loose folds with the apron H a large surface of the fabric or yarn L is exposed for a considerable time to the oxidizing action of the atmosphere as it passes from one vat in a partly-dyed condition to the next vat in order. At certain intervals of time, such as once in twenty-four hours, I cause the agitator B of each vat to revolve for some time, such as fifteen minutes. When the contents of the dye-vat have settled—as, for instance, after the night's quiescence—I work the pump E, so as to draw from the bottom of the vat the muddy liquor and deliver it into the tank D, from which, after settlement, the clear liquor is returned into the dye-vat. From time to time, say at intervals of a month, the deposited impurities are withdrawn from the tank D and may be treated for recovery of dye in admixture with them.

Having thus described the nature of my said invention and in what manner the same is to be performed, I claim—

1. Indigo dyeing apparatus consisting of two or more dye-vats, each provided with an agitator, pump and settling vat, and each pair having between them a slowly traveling apron, substantially as and for the purpose set forth.

2. In dyeing apparatus, the combination with a pair of dye vats located opposite each other, an agitator for each vat, and means common to both agitators for operating the same, a settling tank located above and adjacent to each vat, a pipe affording communication between each tank and vat, and a pump for drawing the liquor from the dye vat and delivering it to the settling tank, substantially as described.

3. In dyeing apparatus the combination

with two or more pairs of dye vats, of a rotary agitator arranged in the lower portion of each vat, and means for operating the same, a settling tank located in close proximity to each dye-vat, a pipe between each vat and tank, a pump for drawing the liquid from the dye vat and delivering it to the settling tank, a slowly traveling apron located between each pair of vats and means for carrying the fabric to be treated from one vat to the other and over the belt, said apron being arranged to travel at less speed than the fabric carrying means, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnessess, this 4th day of February, A. D. 1895.

JAMES GRIME.

Witnesses:
JOHN BRYCE CLARK, Jr.,
ROBERT DONALD FERGUSON.