

J. T. RICE & D. A. ARNOLD.

MACHINES FOR COLORING COTTON, WOOL, &c.

No. 181,479.

Patented Aug. 22, 1876.

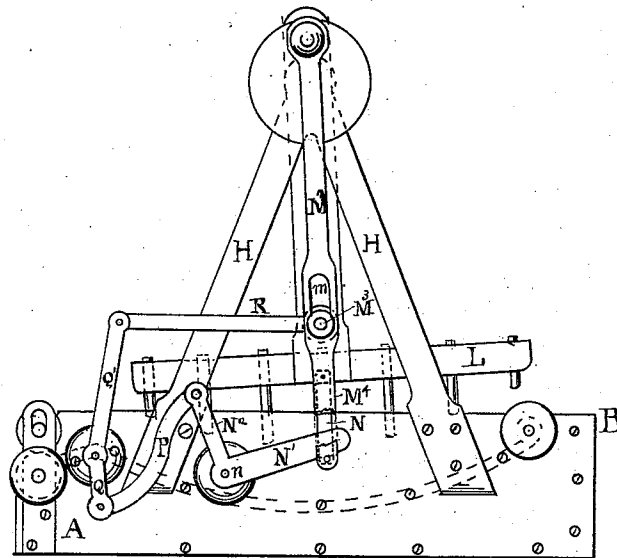


Fig. 1.

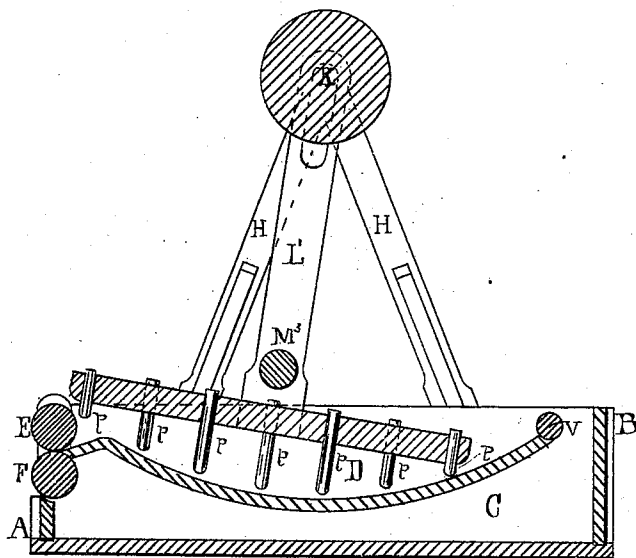


Fig. 2.

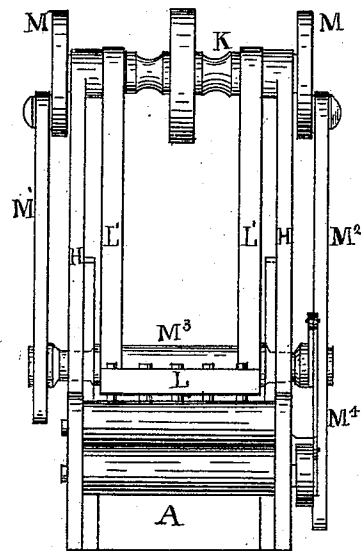


Fig 3

WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN T. RICE AND DAVID A. ARNOLD, OF PAWTUCKET, RHODE ISLAND.

## IMPROVEMENT IN MACHINES FOR COLORING COTTON, WOOL, &c.

Specification forming part of Letters Patent No. **181,479**, dated August 22, 1876; application filed June 26, 1876.

*To all whom it may concern:*

Be it known that we, JOHN T. RICE and DAVID A. ARNOLD, both of Pawtucket, in the county of Providence and State of Rhode Island, have jointly invented an Improvement in a Machine for Coloring Cotton, Wool, &c., of which the following is a specification:

The nature of our invention consists in combining with tanks suitably arranged a four-motion plunger, said plunger being provided on its under side with a series of teeth or projections, which, in the operation of the machine, engage with the mass of fiber to be colored and press it into the liquor, at the same time giving it motion toward the exit end of the tank, finally pressing it forward so that it may be caught by the wringing-rolls.

Figure 1 is a side elevation of our invention. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is an end elevation of the same.

We first provide a tank, A B, having two compartments—a lower one, C, Fig. 2, which serves as a reservoir from which the liquor is pumped into the working part D. The lower compartment C also serves as a drip-tank, into which the liquor that is pressed out by the wringing-rolls E F runs.

H H H are inclined standards, attached to the tank A, and serve to hold the shaft K, Figs. 2 and 3. The shaft K has at its ends two crank-disks, M M, to which pitmen M<sup>1</sup> and M<sup>2</sup> are attached. These pitmen M<sup>1</sup> and M<sup>2</sup> connect by slots *m m*, Fig. 1, to a cross-piece, M<sup>3</sup>, Fig. 3, so that, as they move up and down, they will transmit a part of their motion to said cross-piece M<sup>3</sup>, and through it to the plunger L. The plunger L is also connected to the uprights L' L', Fig. 3, which are slotted so as to embrace the shaft K, and thus serve to limit, and to some extent direct, the movement of the plunger L. The pitman M<sup>2</sup> has an extension, M<sup>4</sup>, Figs. 1 and 3, which carries a loop, N, Fig. 1.

The system of levers and links N<sup>1</sup> N<sup>2</sup>, P, Q Q', and R, Fig. 1, work as follows: The bent lever N<sup>1</sup> N<sup>2</sup> is pivoted at *n*, and its end N<sup>1</sup> is moved by the loop N attached to the pitman M<sup>2</sup> M<sup>4</sup>. P is a link, which serves to connect the lever N<sup>1</sup> N<sup>2</sup> with the lever Q Q', which is connected by the link R to the cross-piece M<sup>3</sup> of the plunger. As the pitman M<sup>2</sup> M<sup>4</sup> descends it acts, for a part of its stroke, on the lever N<sup>1</sup> N<sup>2</sup>, and through it and the

link P, lever Q Q', link R, and cross-piece M<sup>3</sup>, and causes the plunger to move forward. The upward stroke of the pitman M<sup>2</sup> M<sup>4</sup>, during a part of its stroke, reverses the motion of the above levers and links, and causes the plunger to move backward at the times when the parts of the strokes of the pitman M<sup>4</sup> do not act on the levers and links. Then the pitmen M<sup>1</sup> M<sup>2</sup> are lifting or depressing the plunger L. Thus the combination gives a four-motion action to the plunger—that is, the plunger, which is provided with teeth or studs *p p p p*, first moves downward onto the contents of the tank D; thence forward, taking the cotton or wool toward the wringing-rolls E F; then upward, free from the contents of the tank; then backward and down again, to act as before on the contents of the tank.

To use our invention, we proceed as follows: The tank D is filled with the liquor or dye with which it is desirable to saturate or color the articles to be worked upon, and the machine is set in motion. Then the cotton or other matter to be acted upon is passed over the roller V, or it may be fed in by rollers and an apron. The plunger comes down and presses the mass into the liquor, and then moves it along toward the exit or wringing-rollers E F. The amount of this forward movement may be limited by an adjustment of the loop N, so that it may act more or less on the lever N<sup>1</sup> N<sup>2</sup>. Then the plunger is withdrawn and passed back to repeat the operation.

Having now described the construction and operation of our invention, what we claim is as follows:

1. In a coloring-machine, the combination of a concave tank, D, the plunger L, the slotted uprights L' L', and the shaft K with the actuating mechanism, all operating together, substantially as described, and for the purpose set forth.

2. The combination of the pitman M<sup>2</sup>, the lever N<sup>1</sup> N<sup>2</sup>, link P, lever Q Q', and link R with the cross-piece M<sup>3</sup>, and plunger L, all operating substantially as described, and for the purpose set forth.

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Witnesses:

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