(No Model.) 3 Sheets—Sheet 1.

W. BLACKBURN, R. E. BRAY & L. CLAYTON.

MACHINE FOR SCOURING AND DYEING YARN.

No. 455,854. Patented July 14, 1891.

Fig. 1.

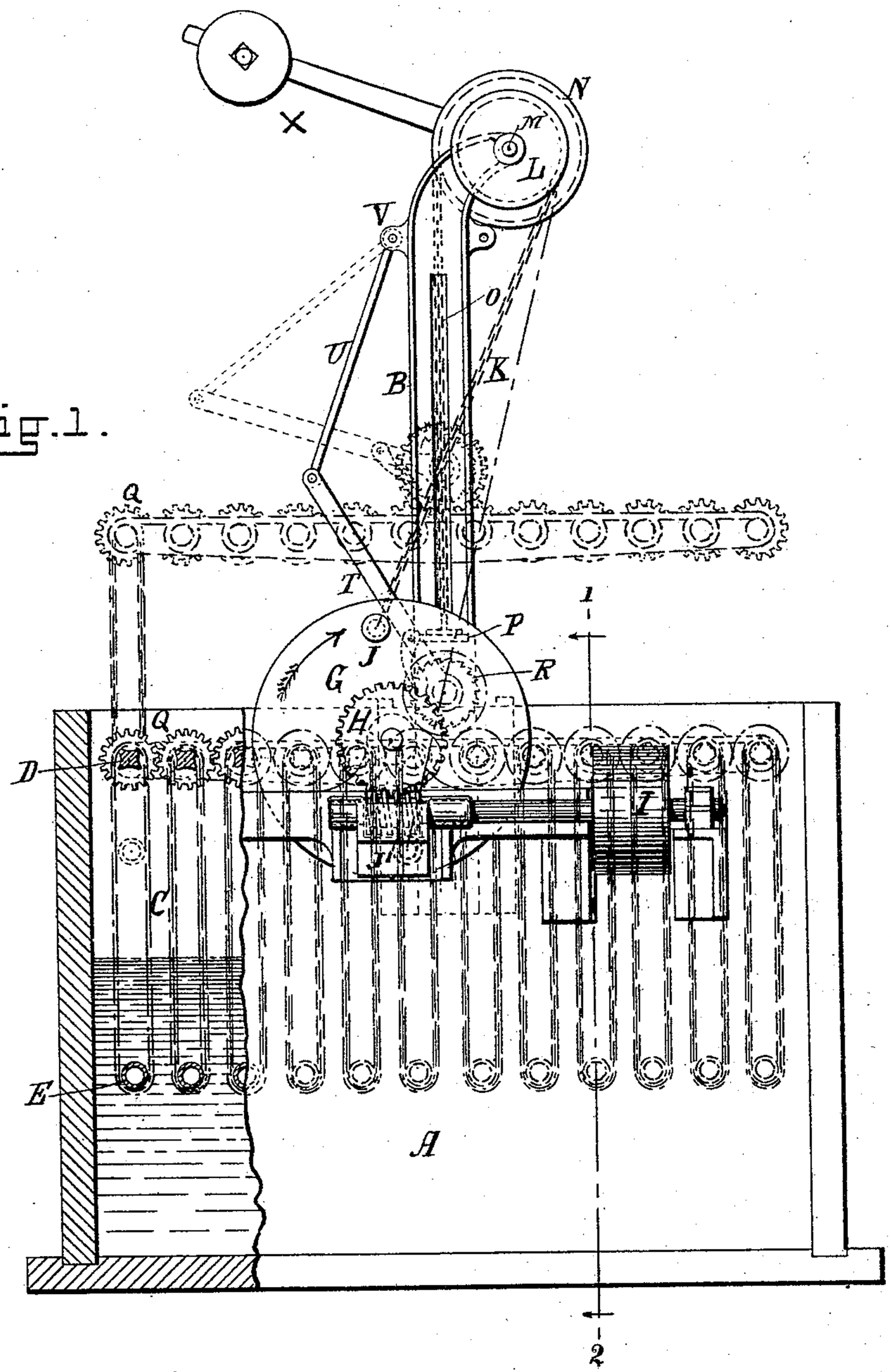

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Fig. 2.

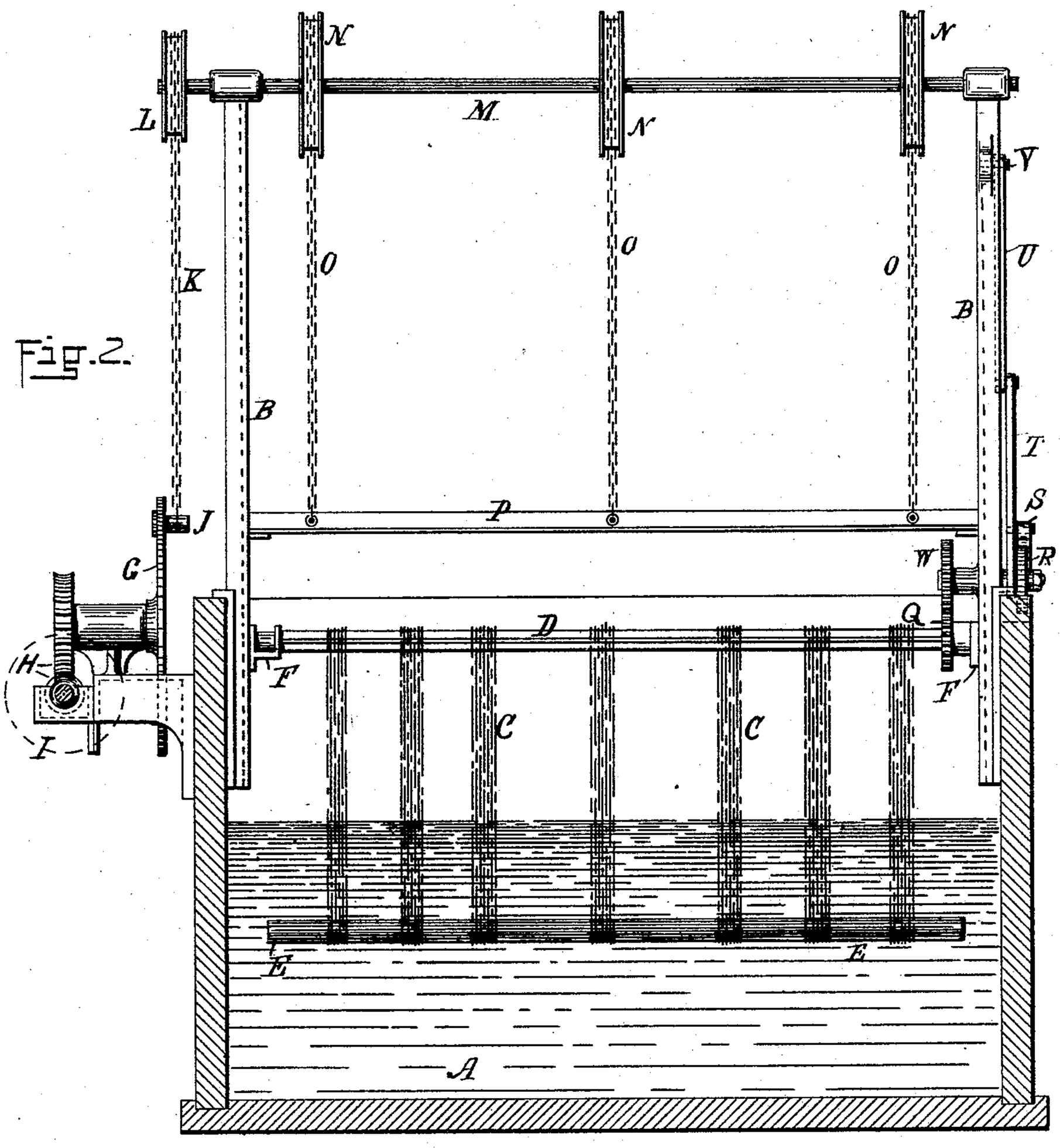

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Fig. 3.

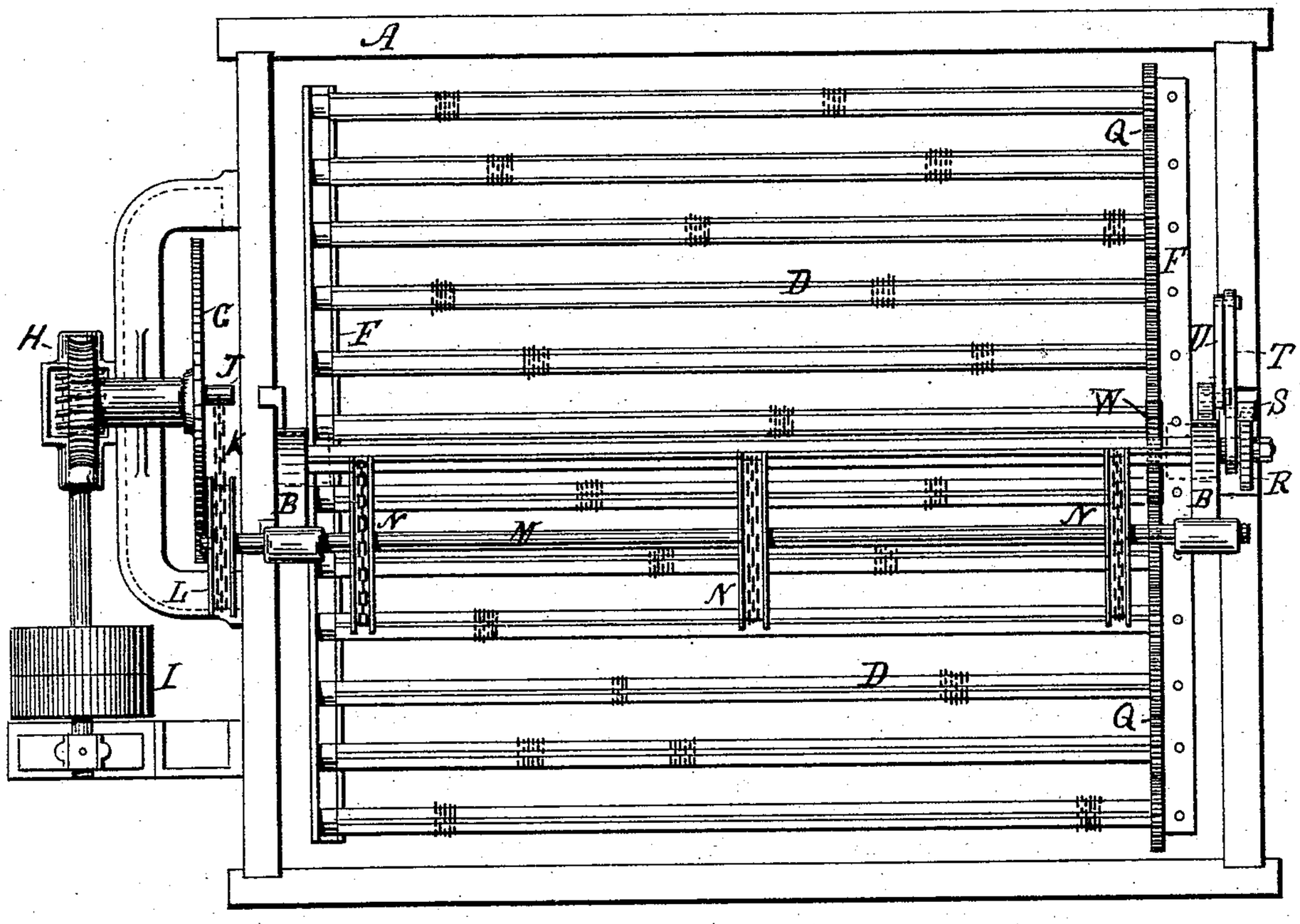
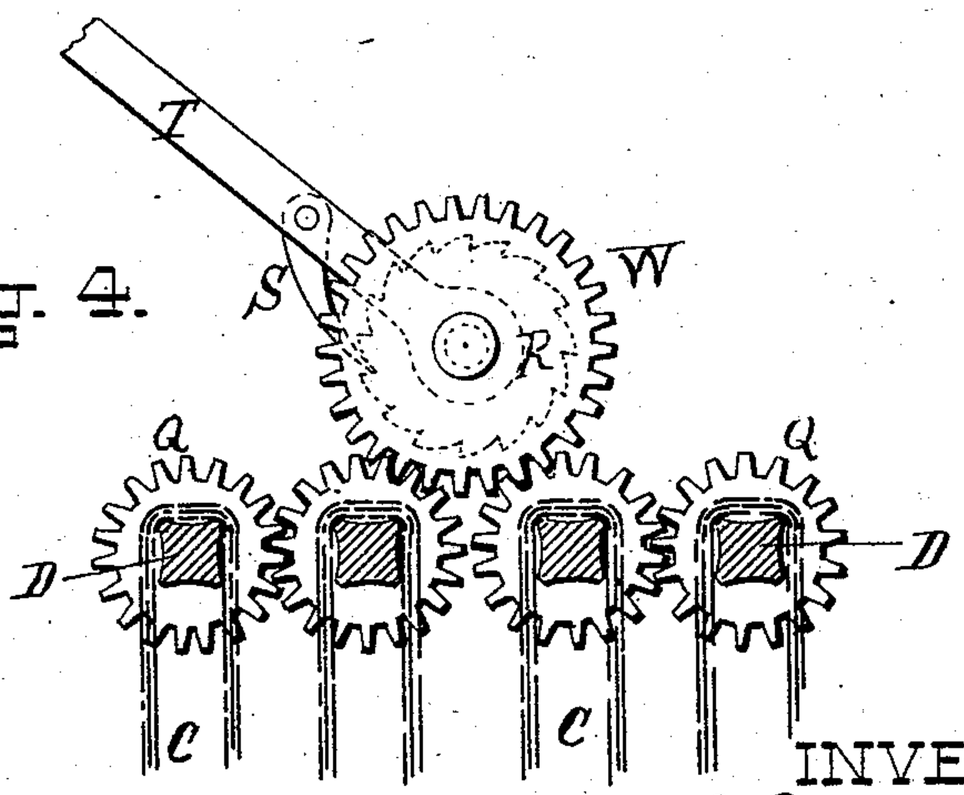


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM BLACKBURN, RALPH E. BRAY, AND LEMUEL CLAYTON, OF HALIFAX, ENGLAND.

MACHINE FOR SCOURING AND DYEING YARN.

SPECIFICATION forming part of Letters Patent No. 455,854, dated July 14, 1891.

Application filed April 4, 1891. Serial No. 387,707. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM BLACKBURN, RALPH EAGLAUD BRAY, and LEMUEL CLAYTON, citizens of Great Britain, residing at Halifax, in the county of York, England, have invented certain new and useful Improvements in a new or Improved Machine for Scouring and Dyeing Yarn, either in the Hank or Warp, and also Piece Goods; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention consists in constructing and arranging a new form of machine, whereby yarn, either in the hank or warp, and piece goods may be automatically scoured and dyed, thereby dispensing with considerable manual labor at present employed to effect the same purpose.

In carrying out our invention we use any suitable form of vessel or cistern to contain the scouring or dyeing liquor. Above the cistern is mounted on rising and falling frame-work a series of horizontal rollers or rods, upon which the hanks, sections of warp, or piece goods are placed, a copper or other suitable form of roller being employed at the bottom of the hank for the purpose of keeping such yarn or piece goods at a suitable state of tension. The frame-work carrying the rollers and yarn or fabric has an upward and downward motion given to it by crank-and-rod or other suitable form of mechanism for the purpose of dipping the materials in the scouring or dyeing liquor. Each time the materials are withdrawn from the cistern the liquor drips or runs down the whole length of the yarn or fabric, thoroughly scouring or dyeing every particle of fiber. When the yarn or fabric has been sufficiently dipped, the operator revolves the rollers carrying the said yarn or fabric, so as to permit that portion thereof to be immersed which had previously been raised above the liquor, so that all parts of the yarn or fabric are subjected to its action; but the yarn or fabric may be made to continuously or intermittently revolve self-actingly by means of pinion-wheels on the ends of the rollers carrying the yarn gearing with each other and receiving their motion from a pinion and ratchet-wheel set in motion by the upward and downward movement of the frame to perform the dipping operation, or other mechanical equivalents may be employed for giving rotary or intermittent motion to the hanks.

Such being the nature and object of our invention, we will now proceed to describe the same with reference to the annexed sheets of drawings illustrative thereof, wherein—

Figure 1 is an end elevation, partly in section, of our machine for scouring and dyeing hanks of yarn. Fig. 2 is a cross-section through the line 1 2 of Fig. 1, showing the interior of the machine. Fig. 3 is a plan view, and Fig. 4 is a detail, of one of the parts.

A represents the vessel containing either the scouring or dying liquor, to which are fixed stationary standards or frame-work B. The hanks to be operated upon are represented at C, and they are supported on rollers or rods D, the lower part of the hanks receiving a copper or other suitable rod E, employed for the purpose of keeping the hanks in a distended state in the liquor. The rollers or rods D are supported or carried at each end by the frame F, which is made to rise and fall for the purpose of dipping the hanks in the liquor and for withdrawing them.

The means we employ for causing the frame-work, together with the hanks, to rise and fall consists of a disk or face-plate G, driven by a worm and a wheel H, made to revolve by the driving-pulleys I. On the face-plate G is a stud J, to which is connected one end of the chain K, the other end of such chain passing around a grooved pulley L, to which it is also connected. The grooved pulley L is mounted upon the horizontal shaft M, which also carries other grooved pulleys N, to which are connected other chains O, the opposite ends of such chains being connected to cross-rail P, which is capable of rising and falling within grooves or slots made in the standards or frame-work or brackets B. It will be apparent that as the face-plate G revolves—say in the direction of the arrow indicated thereon—and while traveling upward between point J′ and J, the chain K will be slackened and taken up

around the pulley L, fixed on the shaft M, such said shaft being caused to revolve in that particular direction when the chain K is slackened by the pull or weight of the rail P, frame F, rods D, and hanks, causing the hanks to be submerged in the dye-liquor; but on the continued rotary motion of the face-plate G, which will take the stud J down to the position J′, the chain K will be tightened and drawn downward, causing the shaft M to revolve in the opposite direction, in doing which the rail P and frame F, together with the hanks, are raised so as to withdraw them from the liquor, and this dipping of the hanks and the withdrawing of them continues to take place at every revolution of the face-plate. It will therefore be understood that on the upward movement of the chain K the hanks descend into the liquor, but on the downward movement of the said chain K the hanks are lifted out of the liquor, a counterbalance-weight X (see Fig. 1) being employed to assist in the rocking motion of the shaft M.

In order that every portion of the hanks may be dyed or scoured without requiring any attention on the part of the workman, we cause the said hanks to travel vertically in the dyeing or scouring liquor, and this is effected in the following manner, namely: We fix a pinion-wheel Q on the end of each roller or rod D, the pinions being made to gear with each other, and we impart to the said pinions an intermittent motion by means of a ratchet-wheel R and pawl S, the latter being connected to an arm or rod T, hinged to another rod U, attached by pin to a fixed part of the frame-work at V. Therefore when the frame F and rods D are raised out of the machine, as shown in dotted lines in Fig. 1, the two arms T and U assume the positions shown in dotted lines; but when the frame-work is descending the ratchet R is descending and the two arms T and U follow with the frame-work. Then the pawl S turns over the ratchet-wheel a few teeth, in doing which the pinion W (see Fig. 4) imparts intermittent rotary motion to the various pinions on the ends of the horizontal rods, thereby causing the hanks to traverse in the liquor, and this happens every time the hanks are dipped in the liquor. Consequently the positions of the hanks are constantly being changed; but the traversing of the hanks may be timed to be moved when they are rising out of the liquor.

By the use of a machine constructed and operated as herein described hanks can be evenly and perfectly scoured and dyed, and the felting or entanglement of the hanks at present experienced is avoided. Each hank is also left in a free and open state, and as the liquor drips down the hanks every time they are lifted out of the said liquor the loose fiber projecting from the yarn is smoothed down.

Although we have referred in this specification to the scouring or dyeing of hanks of yarn, it is evident that endless sections of warp or fabrics may be treated in the same machine.

We claim as our invention—

1. The combination, with the dye-vat, of the standards B, the shaft M, journaled in the said standards and provided with pulleys L and N, the revoluble crank-plate, and the chain K for actuating the pulley L, the yarn-roller D, and the chains O, operatively connected with the pulleys N and with the said yarn-roller and adapted to raise and lower the yarn, substantially as set forth.

2. The combination, with the series of yarn-rollers provided with intergearing toothed wheels, of the toothed wheel W for revolving all the said wheels, a ratchet-wheel for revolving the wheel W, the pivoted rods U and T, and the pawl pivoted to the rod T and adapted to turn the said ratchet-wheel intermittingly when the series of yarn-rollers is reciprocated vertically, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

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