

No. 607,834.

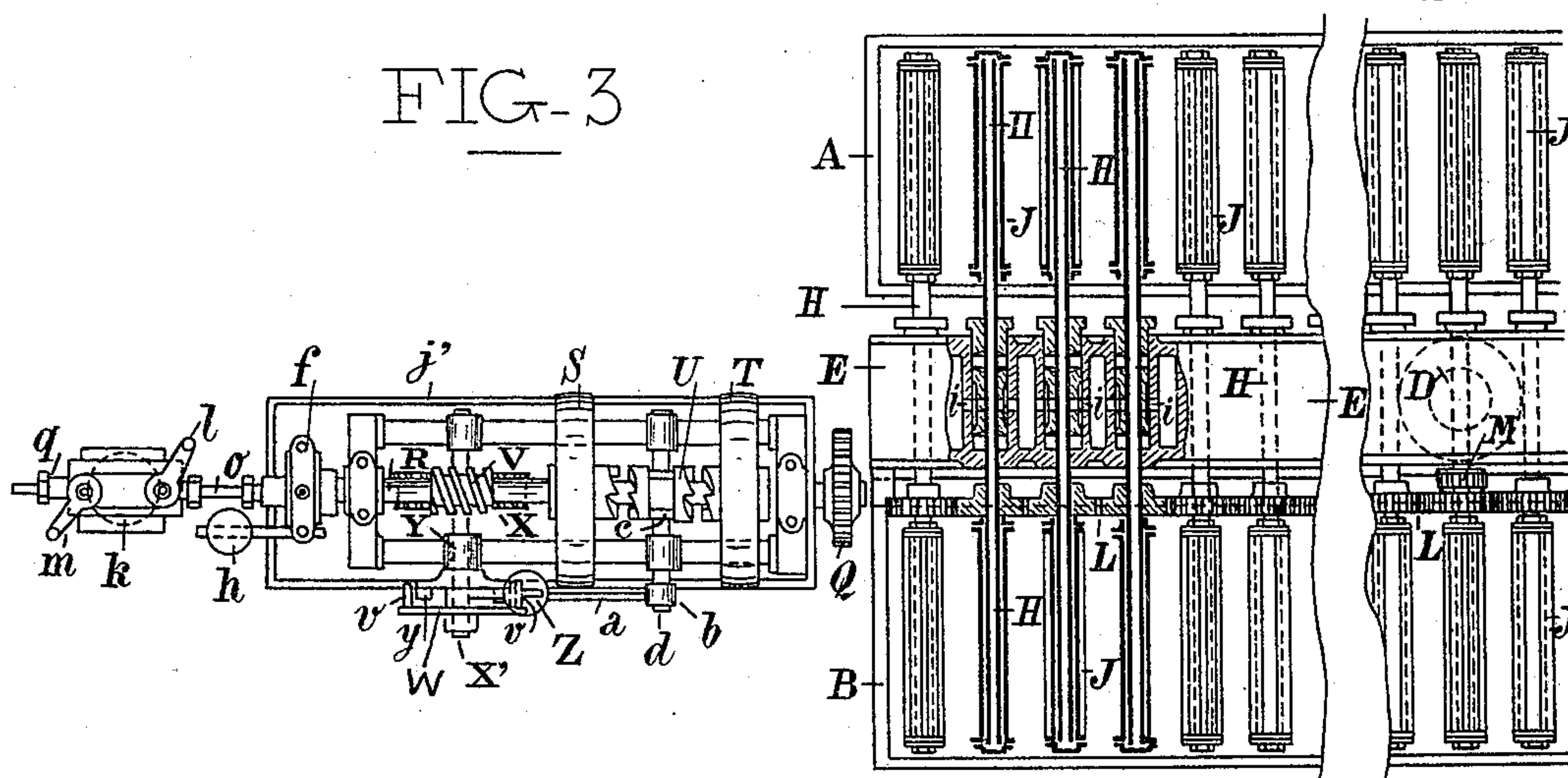
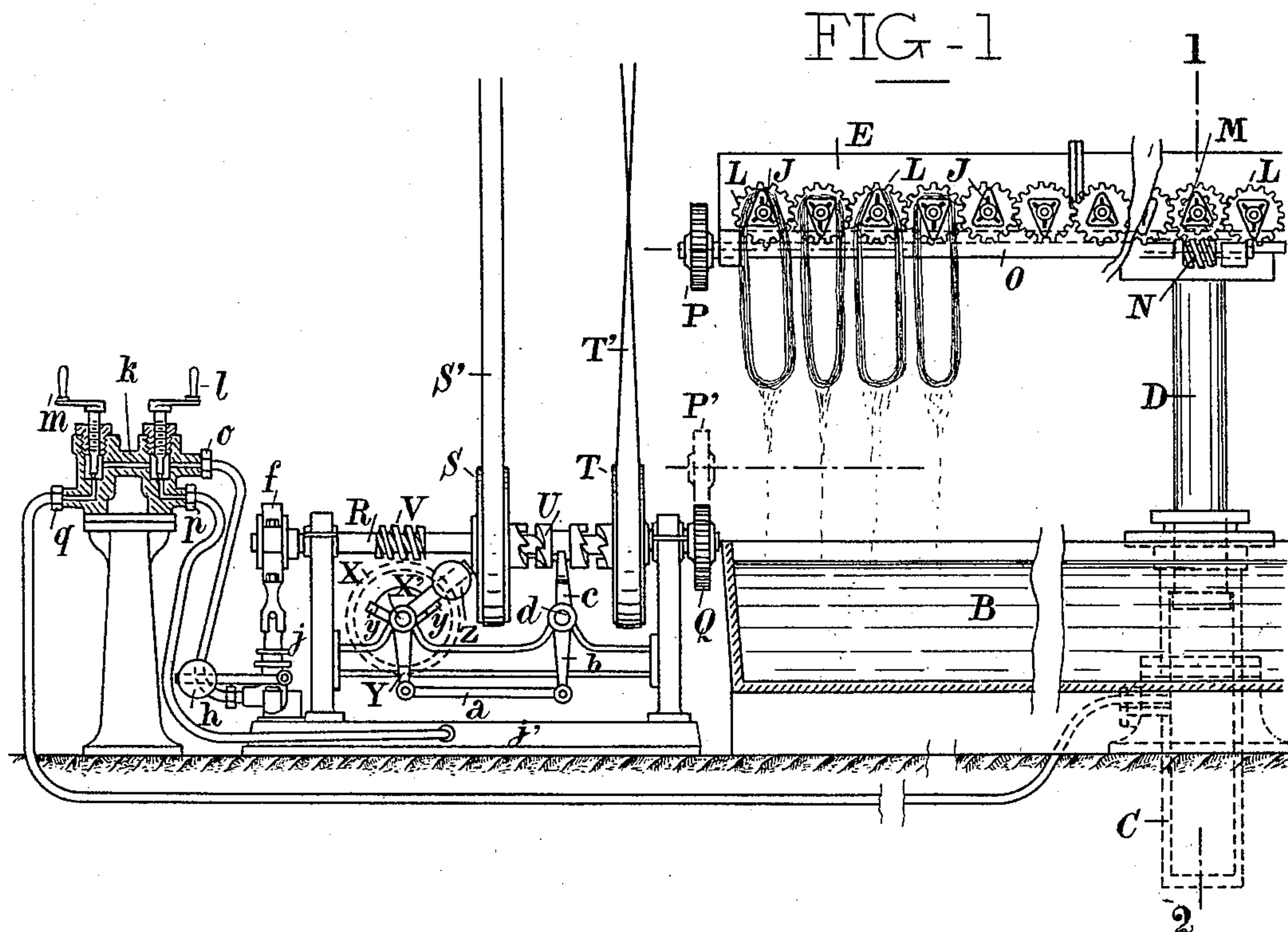
Patented July 26, 1898.

C. CORRON.  
APPARATUS FOR DYEING, &c.

(Application filed Feb. 23, 1898.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

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3 Sheets—Sheet 2.

FIG-1<sup>a</sup>

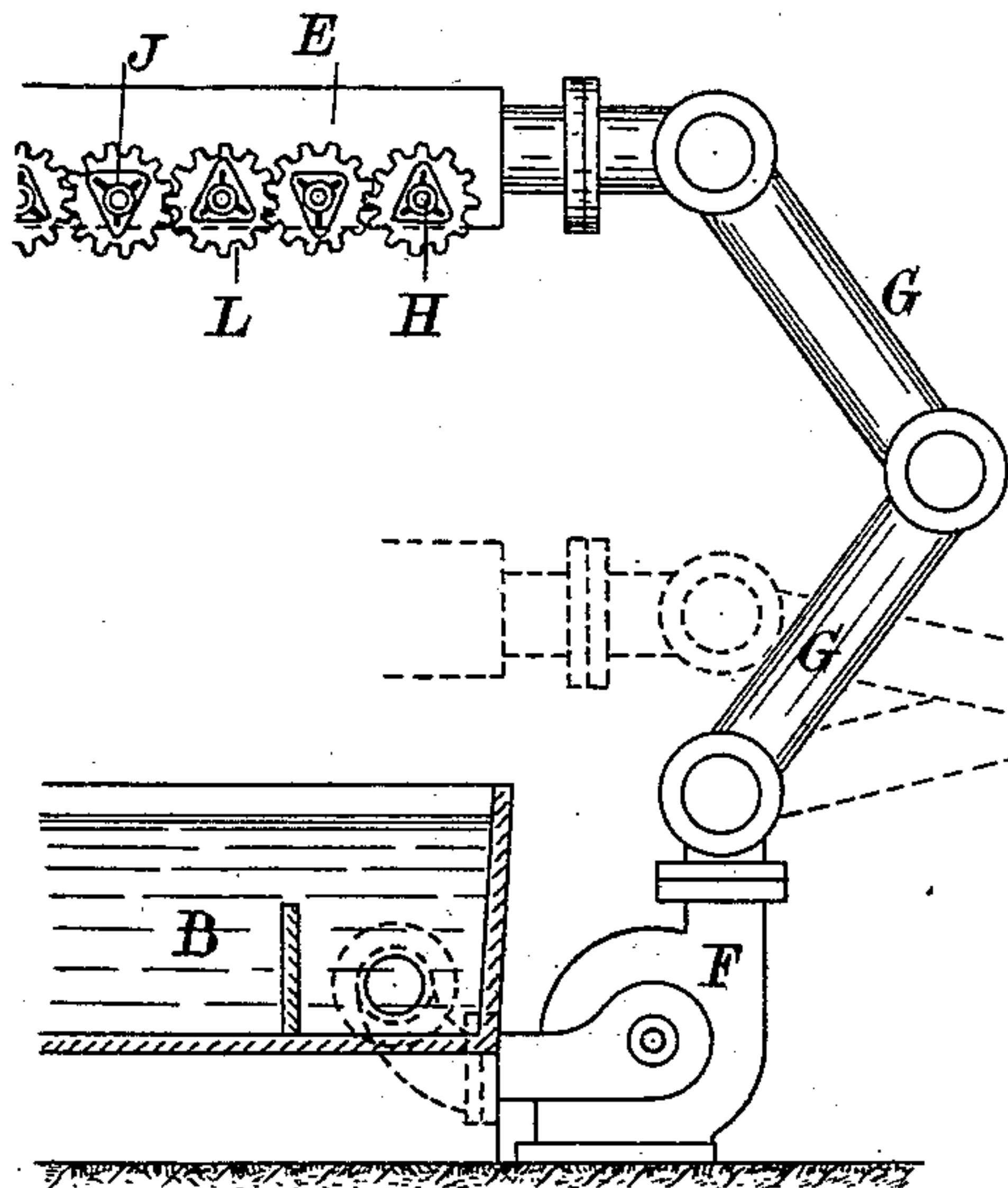


FIG-2

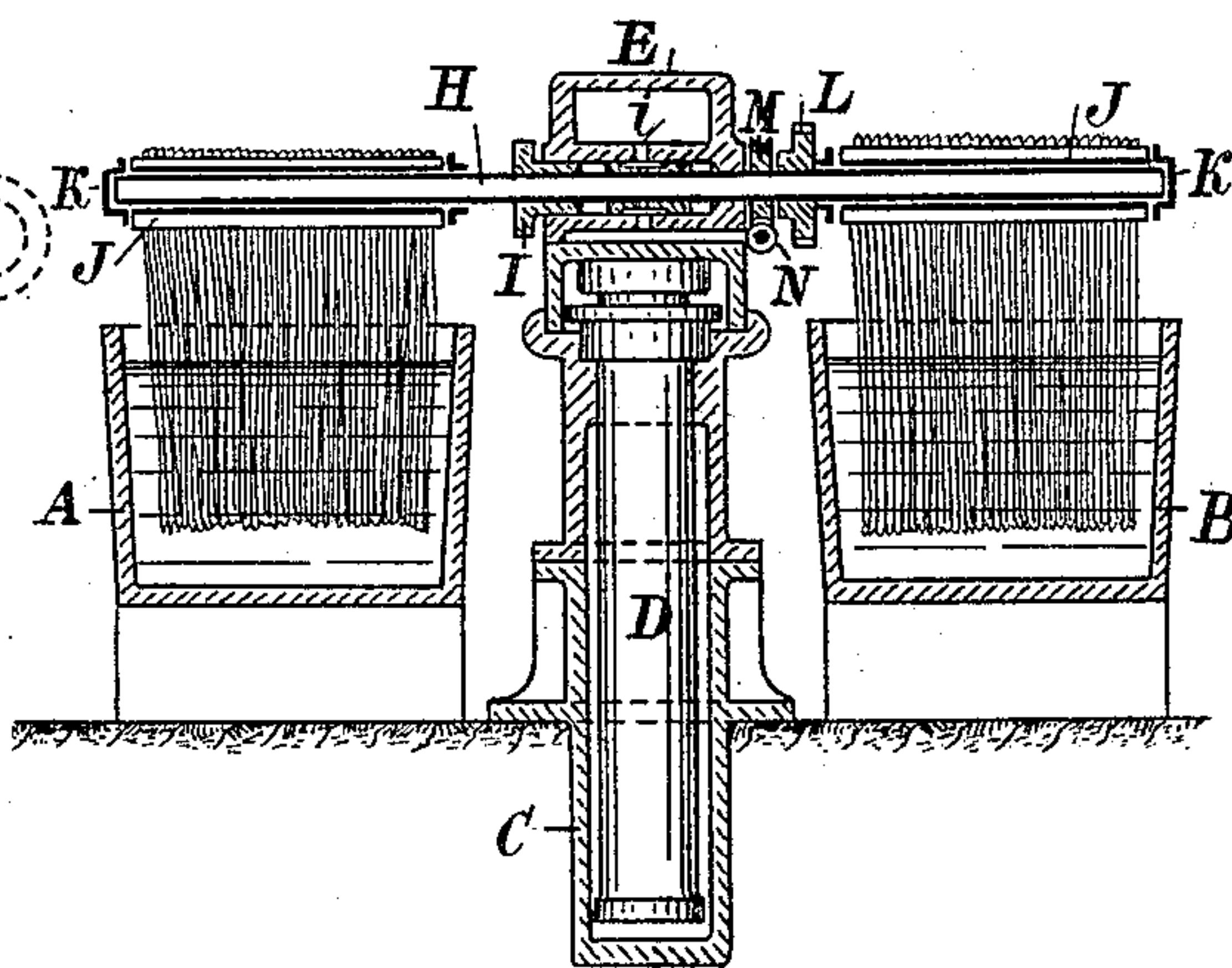


FIG-3<sup>a</sup>

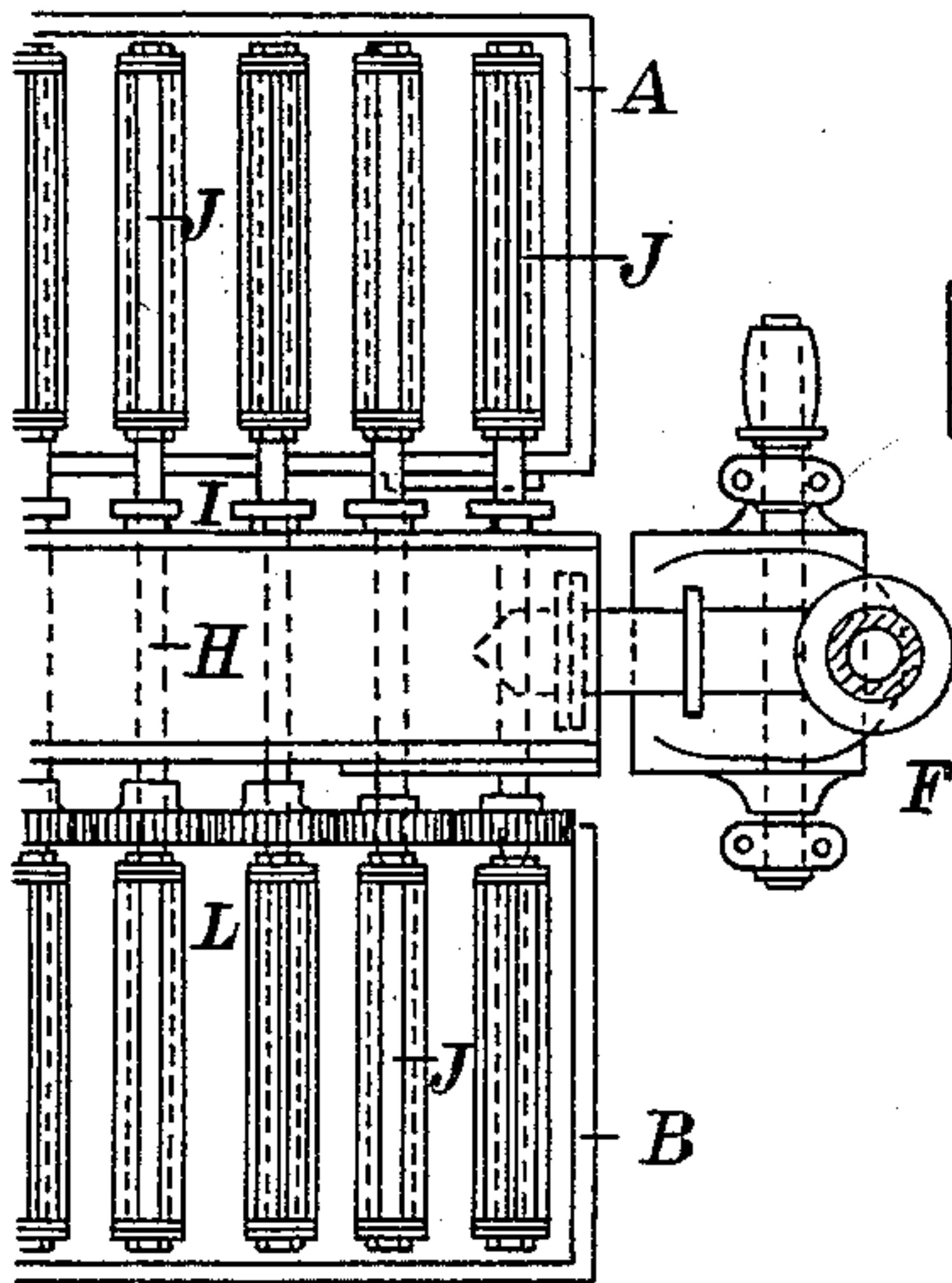


FIG-4

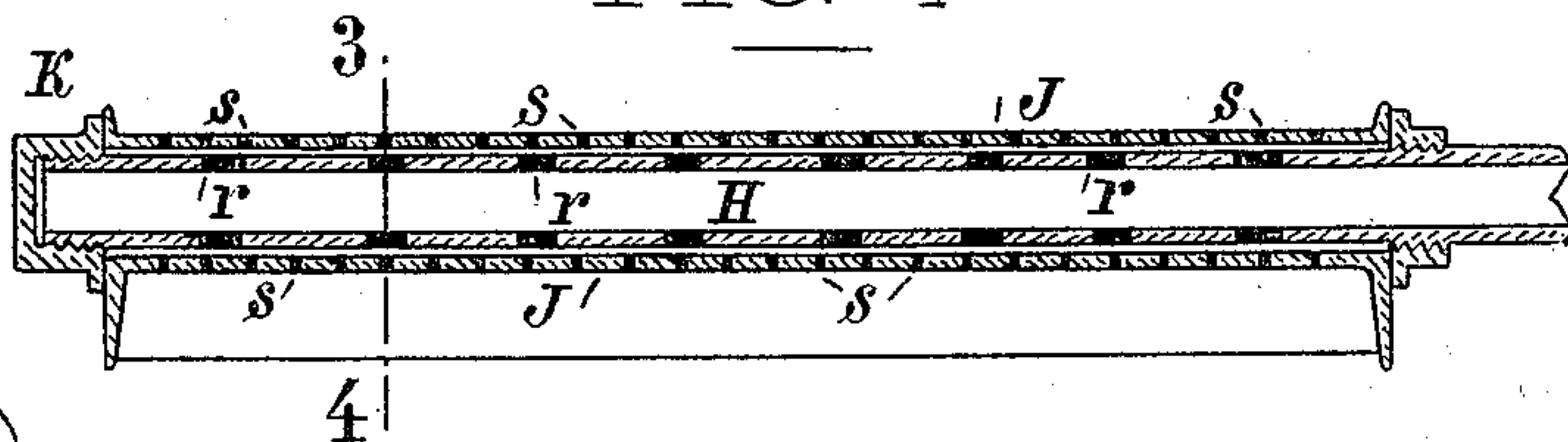
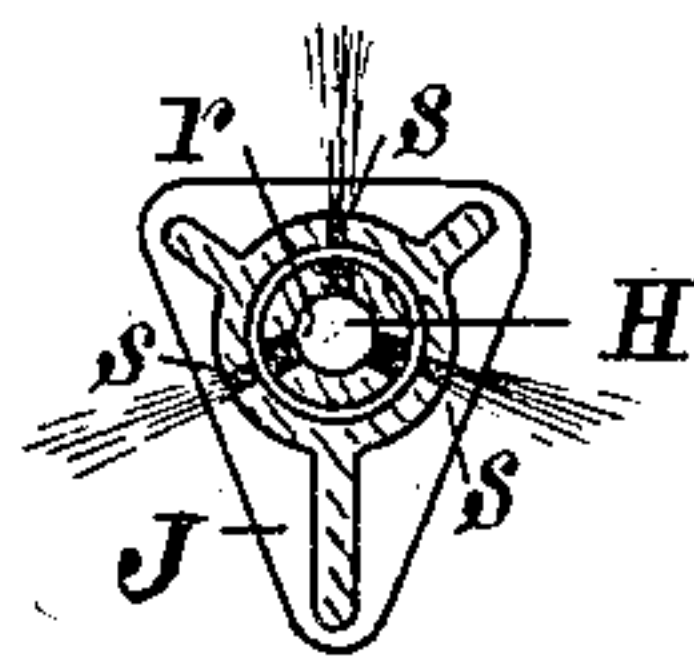


FIG-5



Witnesses

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3 Sheets—Sheet 3.

FIG-7

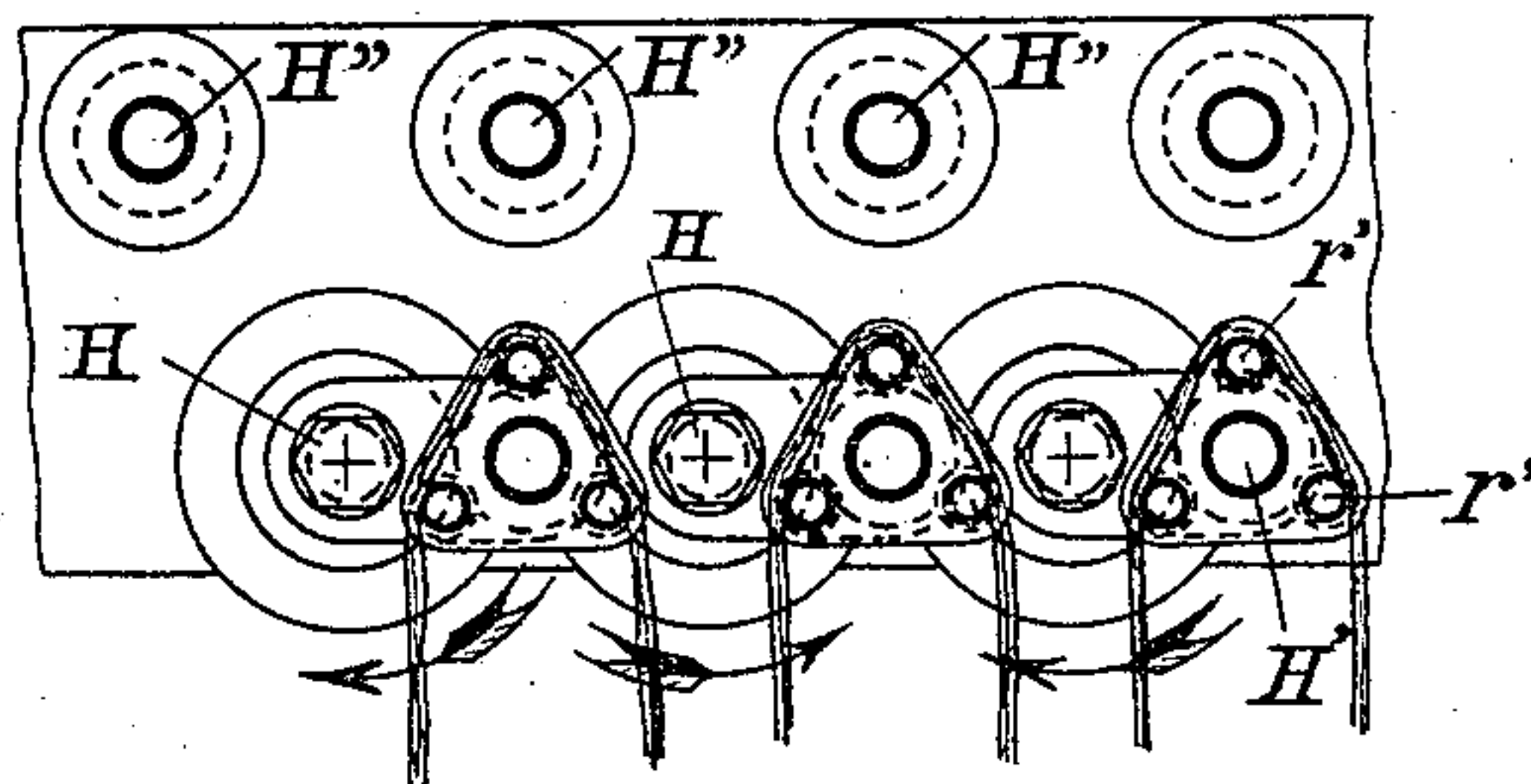
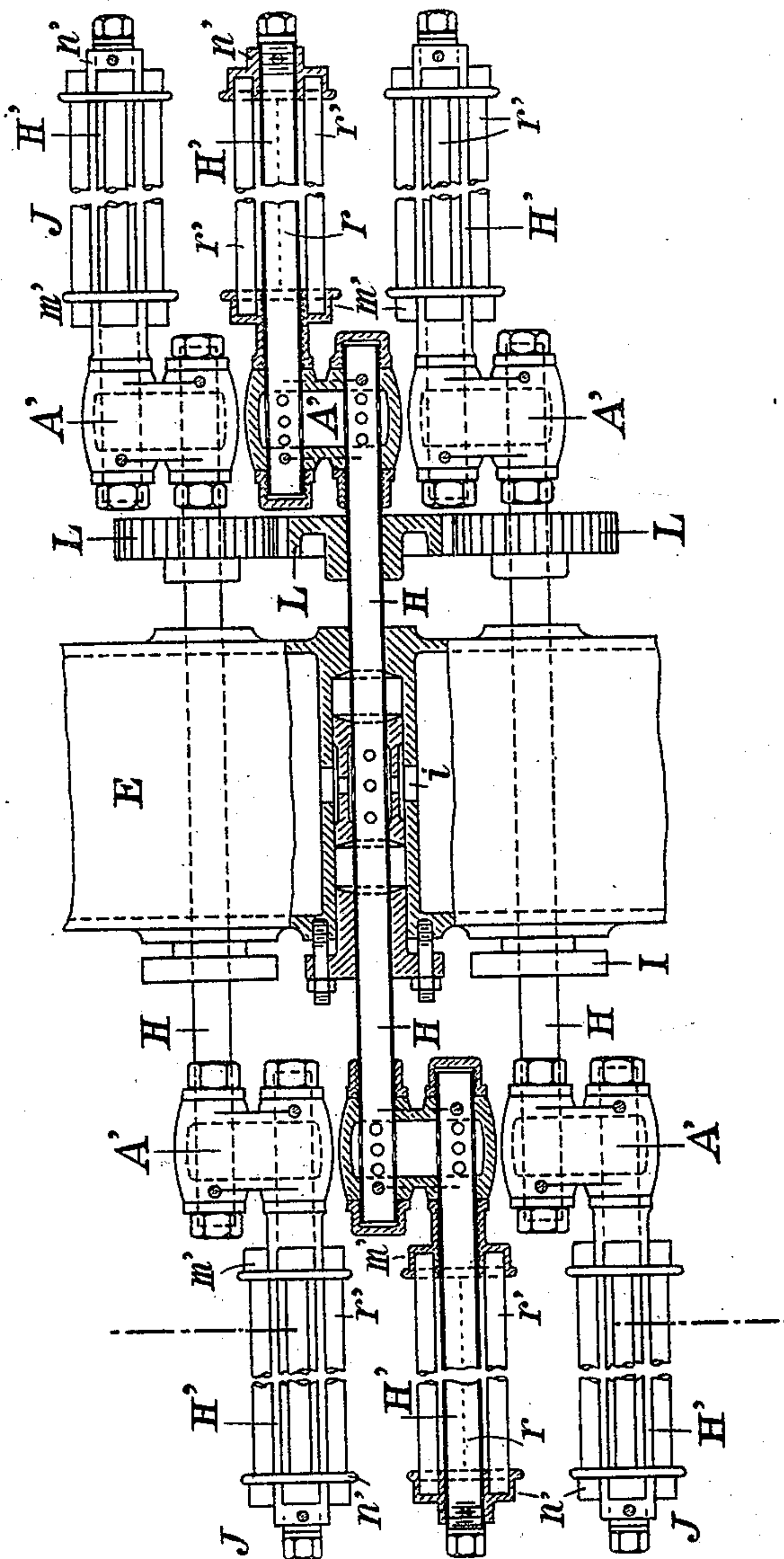


FIG-6



Witnesses

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# UNITED STATES PATENT OFFICE.

CÉSAR CORRON, OF LYONS, FRANCE.

## APPARATUS FOR DYEING, &c.

SPECIFICATION forming part of Letters Patent No. 607,834, dated July 26, 1898.

Application filed February 23, 1898. Serial No. 671,300. (No model.)

*To all whom it may concern:*

Be it known that I, CÉSAR CORRON, chevalier of the Legion of Honor, a citizen of the Republic of France, residing at Lyons, in the Republic of France, have invented certain new and useful Improvements in Apparatus for Dyeing, Finishing, Mordanting, Washing, and Steaming Yarns, Threads, and the Like in Hanks, (for which I have received Letters Patent in France, No. 269,400, filed August 6, 1897; in Switzerland, filed December 1, 1897, and in Germany, filed December 4, 1897,) of which the following is a specification.

This invention relates to improvements in apparatus for dyeing, finishing, mordanting, washing, and steaming yarns, threads, and the like in hanks. The apparatus which forms the object of the invention introduces to the dyeing industry the realization of an improved method which permits of the interior of the yarn, thread, or the like being opened by the liquid or products employed being projected onto the hanks and which enables all the operations of dyeing to be successively continued over vats placed under the apparatus by the hanks being moved mechanically by a combined opening and reciprocating movement. This improved method has the advantage of presenting to the trade a thread prepared in a very special manner, whereby it assimilates perfectly mordants, catechu or cutch, sumacs, and, speaking generally, all products employed in black dyeing, color dyeing, and finishing.

The apparatus will now be described, with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal elevation, partly in section, of the left-hand portion of the apparatus; Fig. 1<sup>a</sup>, a longitudinal elevation, partly in section, of the corresponding right-hand portion; Fig. 2, a transverse section on the line 1 2 of Fig. 1; Fig. 3, a plan view of the left-hand portion shown in Fig. 1; Fig. 3<sup>a</sup>, a plan view of the corresponding right-hand portion shown in Fig. 1<sup>a</sup>; Fig. 4, a detail view on an enlarged scale, showing in longitudinal section the construction of the hank-carriers employed in this apparatus; Fig. 5, a transverse section on the line 3 4 of Fig. 4; Fig. 6, a plan view, partly in section,

showing a modification of construction of the hank-carriers shown in the preceding figures; and Fig. 7, a transverse section of another modification of the arrangement of eccentric hank-carriers enabling the liquids or other products employed to be simultaneously projected into the interior and onto the exterior of the hanks.

The same letters of reference refer to similar parts in the different figures.

The apparatus is composed of two vats A and B, in which there are placed liquids of a suitable nature or other products forming baths in which the hanks must be immersed. Between these two vats and in the center of the apparatus is placed a hydraulic lift C, the plunger D of which supports a longitudinal reciprocating tank or collecting-chest E, which by means of a centrifugal pump F and suitable flexible pipes G, communicating therewith, receives at the right-hand side the liquid or other product from the vats intended for the operations.

Instead of causing the liquid from the vats to flow into one end of the reciprocating tank or collecting-chest E it may also be caused to enter at its center or near its center, which has then the advantage of producing a better equilibrium of pressure over the length of the chest E.

The chest E, as may be seen in Fig. 2, supports tubes H, engaged in stuffing-boxes I, which form a joint at each side. The liquid from the collecting-chest enters these tubes H by openings *i*, which are formed in the center of these tubes and spreads in their interior at each side up to their ends.

At each end and outside the reciprocating tank or collecting-chest E the tubes H, which are perforated with a certain number of holes *r*, (see Figs. 4 and 5,) support triangular hank-carriers J, fixed on the said tubes H by nuts K, which also form joints at the ends. These hank-carriers J receive into their interior, by means of the pipes H, the products of the vats A and B and project such products energetically onto the hanks by means of three series of small holes *s*, distributed longitudinally along them.

The pipes H and the hank-carriers J are revolvable and are actuated by gear-wheels L, which communicate to them successively and



alternately a rotary movement to right and left. The movement is imparted to these tubes H and the hank-carriers J by a worm-wheel M, placed on the tube H which lies in the center of the machine, the said wheel being actuated by an endless screw N, mounted on a longitudinal shaft O, supported by the collecting-chest E. At the end of this shaft O a gear-wheel P (see Fig. 1) is mounted, which engages with a similar gear-wheel Q of the reversible driving-gear only when the chest E is in its lowermost position, which is shown in Fig. 2 and indicated at P' in Fig. 1, in which position the hanks are immersed in the contents of the vats A and B.

The driving apparatus for reversing the movement of this machine or apparatus is composed of a shaft R, on which are placed two belt-pulleys S T, revolving in opposite directions and operated, respectively, by a straight belt S' and a crossed belt T'. These pulleys actuate the shaft R by means of a clutch-sleeve U, mounted on the shaft R by means of a spline, so that the clutch may be displaced longitudinally along said shaft, while both must rotate together. According as the sleeve is engaged with one or the other of the pulleys S and T the shaft R and the wheel Q will revolve in one direction or the other. On this shaft R an endless screw V is mounted, actuating a wheel X, mounted and keyed on a transverse shaft X'. A lever Y, carrying two stop-catches *y*, is mounted on this shaft X', and a counterweighted lever Z, also mounted on the shaft X', engages alternately the two catches *y*. This lever Z is actuated by a plate W, carrying two pins *v*. The lever Y, by means of a link *a*, actuates a lever *b*, mounted on a transverse shaft *d*, carrying a fork *c*, which actuates the clutch-sleeve U. In this manner, the sleeve U being engaged with one pulley, the endless screw V will cause the wheel X to rotate, and with it the plate W, keyed on the same shaft X'. This plate, by means of one of the pins *v*, then raises the counterweighted lever Z, and the latter when it has passed beyond the vertical (after about eight revolutions) falls down itself onto the other catch *y* and carries it with it, thus causing the lever Y to shift in the opposite direction, thereby actuating the clutch-sleeve U and causing it to engage with the other pulley. This fresh engagement of the sleeve then produces a change in the movement of the shaft R and the wheel Q, and consequently of the whole apparatus. Any other suitable arrangement for reversing the movement may of course be employed. An eccentric *f*, actuating a pump *j*, is also mounted on the said shaft R, said pump *j* being mounted on the same frame as the driving-gear, and the base *j'* of this frame serving as a tank for the pump *j*. This pump, which is provided with a safety-valve *h*, forces water into a distributing-box *k*, provided with two valves *l* and *m*, the valve *l* closing the return to the tank of the pump *j* and the valve

*m* closing the passage to the hydraulic lift C. In this arrangement a pipe connection *o* communicates with the pump *j*, and a pipe connection *p* communicates with the tank *j'* of the pump *j*, and a pipe connection *q* communicates with the cylinder of the hydraulic lift C.

When the valve *l*, which closes the return to the tank, is open, the pump sends the water from the tank to the distributing-box *k* whatever may be the position of the valve *m*, (whether open or closed.) Inversely, if the valve *m* of the lift be opened and the valve *l* (the return to the tank) be closed the pump will send water from the tank to the cylinder of the hydraulic lift C, and consequently raise the plunger D and the whole hank-carrying apparatus. The said plunger stops after having described its complete course, which position is shown in Figs. 1 and 1<sup>a</sup>, and the safety-valve *h* of the pump then comes into play. The valve *m* is then closed in order to keep the apparatus raised, and the valve *l* is opened in order that the pump may return the water to the tank by the connection *p*. In order to cause the apparatus to descend, the valve *l* being open, it is sufficient to open the valve *m*. The water of the pressure-cylinder C will then return to the tank *j'* and the apparatus will descend to the position shown in Fig. 2. The apparatus having been supplied with all its hanks and started, it will be readily understood that the hanks will successively descend and rise under the action of the plunger D, while undergoing simultaneously an opening (lisage) operation—that is to say, they will revolve intermittently in one direction or the other on their hank-carriers J, and they will also receive projected into their interior during such movement jets of the bath or solution contained in the vats A and B, which is supplied to them through the pipes H under pressure by means of the centrifugal pump F and the connecting-pipes G, which place the longitudinal collecting-chest E in communication with the centrifugal forcing-pump. This vigorous projection in a divided form of the liquids or other products into the hanks introduces more directly and efficaciously and in a shorter time the mordants, catechu or cutch, sumacs, and other substances employed in the operation of dyeing in black and colors and also in finishing. In fact, the centrifugal pump F causes a continuous circulation of the products of the vats, while the hank-carriers J simultaneously dip their hanks vertically into the tanks, while they are themselves simultaneously revolved alternately to left and right, thus producing mechanically and automatically the ordinary opening movements and reciprocating movement employed in dyeing by the workman, who effects this operation by hand. It must also be pointed out that by the use of this machine or apparatus all the operations for treating hanks in dyeing or finishing—such as washing, mordanting, soap-



ing, treating with catechus, sumacs, dyeing, finishing, steaming, and the like—to which they are at present subjected may be success-  
 5 out necessitating the removal of the hanks simply by changing the substances in the vats. By this means a great saving in time and labor is obtained and a superior quality of yarn, thread, or the like is produced, be-  
 10 cause the threads thus treated are more open and the chemical reagents penetrate therein in a better and closer manner than has been hitherto obtained.

Instead of the hank-carriers J, hereinbefore  
 15 described, which revolve on themselves, I may employ a modification of construction, as shown in Fig. 6, which enables the reciprocatory motion to be increased, thus obtaining a greater agitation of the hanks in the  
 20 vats and thus increasing the penetration and the rapid action of the products of these tanks on the threads. For this object hollow sleeves A' are arranged on the pipes H, placed in the collecting-chest E, the said hollow sleeves re-  
 25 ceiving pipes H'. In this way the products passing through the pipes H penetrate into the sleeves A' and then into the pipes H', which are perforated with three series of small holes *r*, hereinbefore mentioned. These pipes  
 30 H' have at their ends two triangular plates *m' n'*, each provided with three holes, which receive three rods or tubes *r'*, of bamboo, glass, or ebonite, the whole forming the complete hank-carrier.

35 I may also employ in the said apparatus the modification of eccentric hank-carriers shown in Fig. 7, which by the insertion between the hank-carriers J of fixed perforated tubes H'', placed on the collecting-chest E,  
 40 permits of liquids or other products being simultaneously projected onto the outside as well as the interior of the hanks.

I declare that what I claim is—

1. In an apparatus for dyeing, softening,  
 45 steaming and finishing yarns, threads and the like the combination with a reciprocating tank or collecting-chest, of hank-carriers carried thereby, a hydraulic lift supporting said tank or collecting-chest and adapted to alter-  
 50 nately raise and lower the same through the medium of its plunger, substantially as described.

2. In an apparatus for dyeing, softening,  
 55 steaming and finishing yarns, threads and the like the combination with a reciprocating tank or collecting-chest, of hollow hank-carriers supported thereby, vats located adjacent

thereto, a hydraulic press adapted through the medium of its plunger to repeatedly move the hanks into and out of the vats, a pump  
 60 adapted to force the liquid contained in the vats into the movable tank or collecting-chest from whence it passes to the hollow hank-carriers and through them is forced into the hanks, substantially as described. 65

3. In an apparatus for dyeing, softening, steaming and finishing yarns, threads and the like the combination with a reciprocating tank or collecting-chest, of hank-carriers carried thereby, vats located adjacent thereto,  
 70 a hydraulic lift adapted through the medium of its plunger, to impart a vertical movement to the tank or collecting-chest, a pump returning constantly under pressure the contents of the vats into the center of the hanks  
 75 and means for imparting an intermittent, alternating rotary movement to the hank-carriers, substantially as described.

4. In an apparatus for dyeing, softening, steaming and finishing yarns, threads and  
 80 the like the combination with a reciprocating tank or collecting-chest, of eccentric hank-carriers carried thereby, vats located adjacent thereto, a hydraulic lift adapted through the medium of its plunger to impart a verti-  
 85 cal movement to the tank or collecting-chest to dip or agitate the hanks in the contents of the vats, a centrifugal pump adapted to force the contents of the vats through the eccentric hank-carriers in a subdivided form and  
 90 to spray it into the interior of the hanks, and means for imparting an intermittent alternating rotary movement to the hank-carriers, substantially as described.

5. In an apparatus for dyeing, softening,  
 95 steaming and finishing yarns, threads and the like the combination with a reciprocating tank or collecting-chest, of a hydraulic lift adapted to move the same vertically, eccentric hank-carriers carried by the collecting-  
 100 chest, means for imparting an intermittent alternating rotary movement to the same, and means for forcing simultaneously upon the interior and exterior of the hanks a finely-  
 105 divided spray of the bath or product employed, substantially as described.

In witness whereof I have hereunto signed my name, this 3d day of February, 1898, in the presence of two subscribing witnesses.

CÉSAR CORRON.

Witnesses:

XAVIER JANICOT,  
 JEAN GERMAIN.