No. 695,727. Patented Mar. 18, 1902.

J. HUSSONG.

DYEING APPARATUS.

(Application filed May 14, 1901.)

(No Model.) 3 Sheets—Sheet 1.

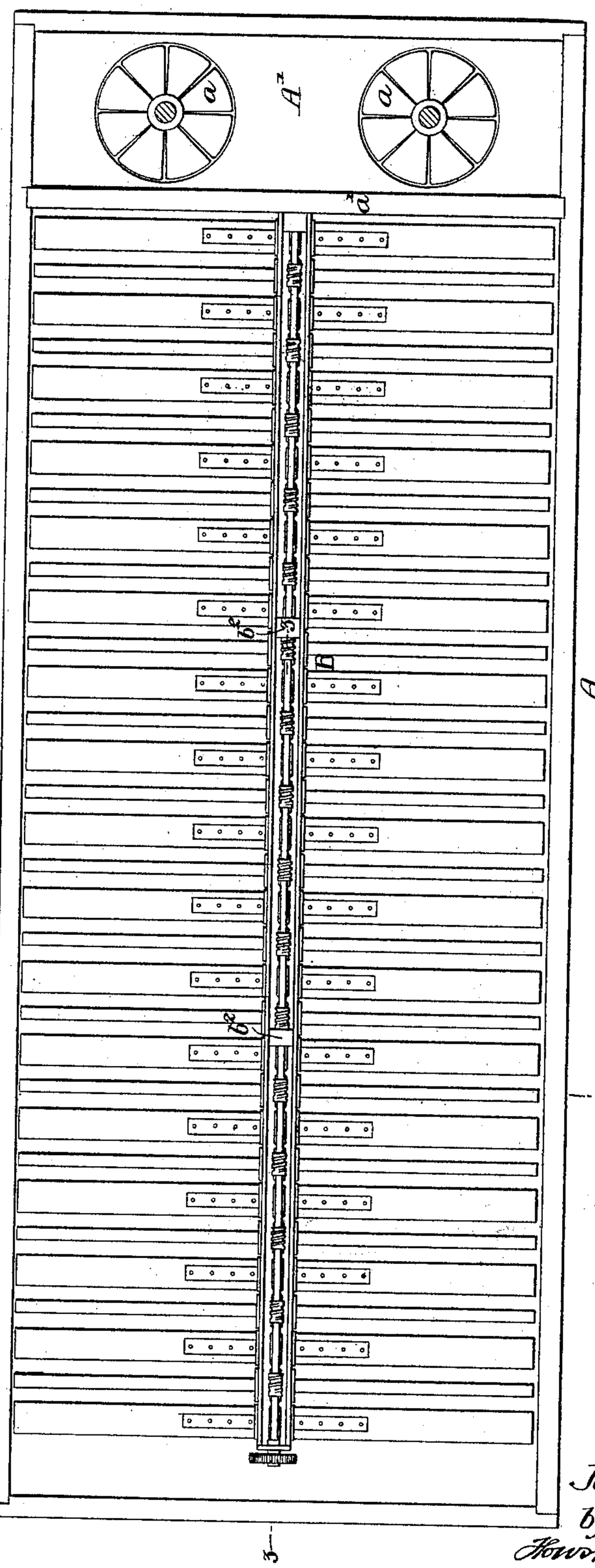

Fig. 1.

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3 Sheets—Sheet 2.

Fig. 2.

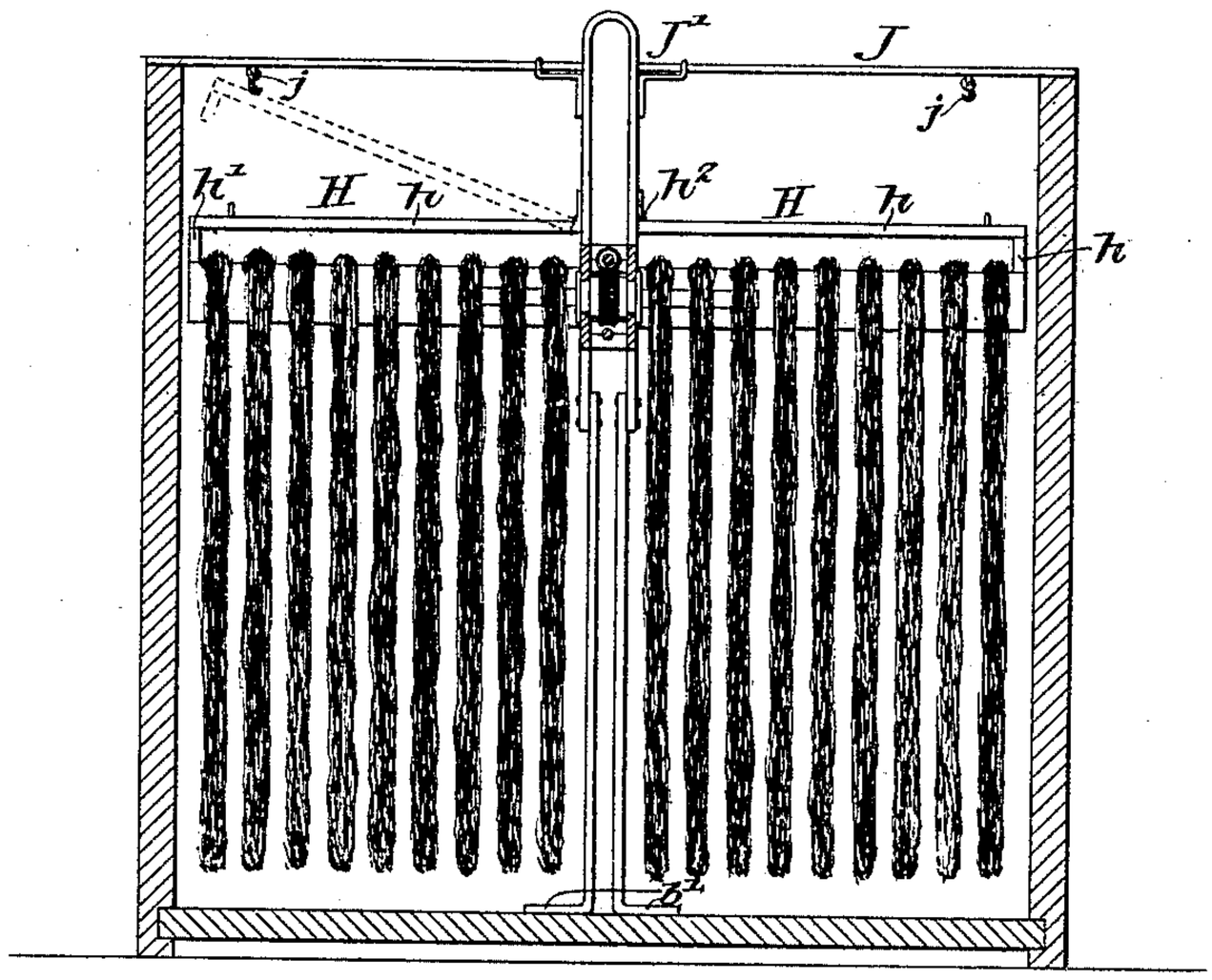
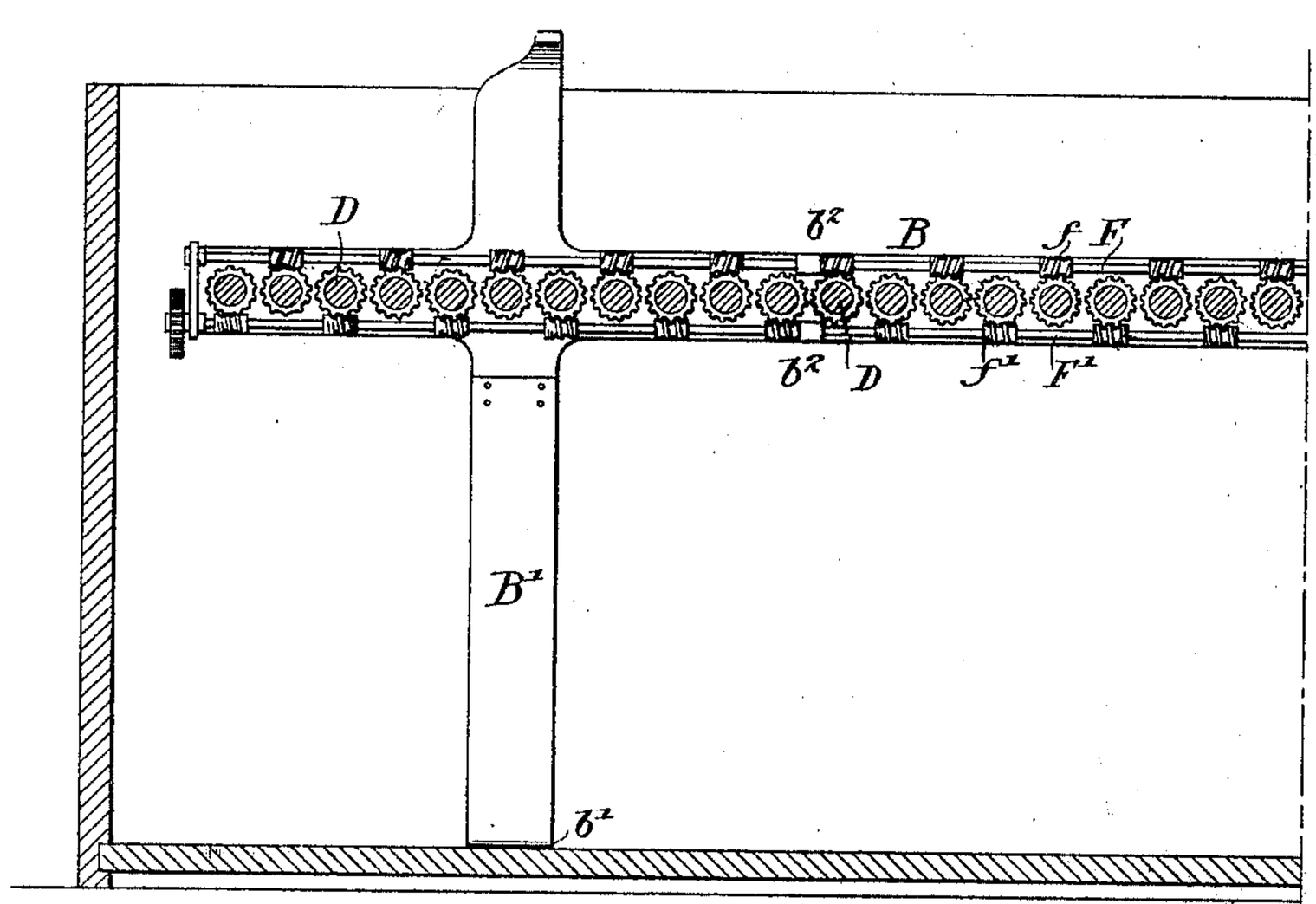


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

Fig. 4.

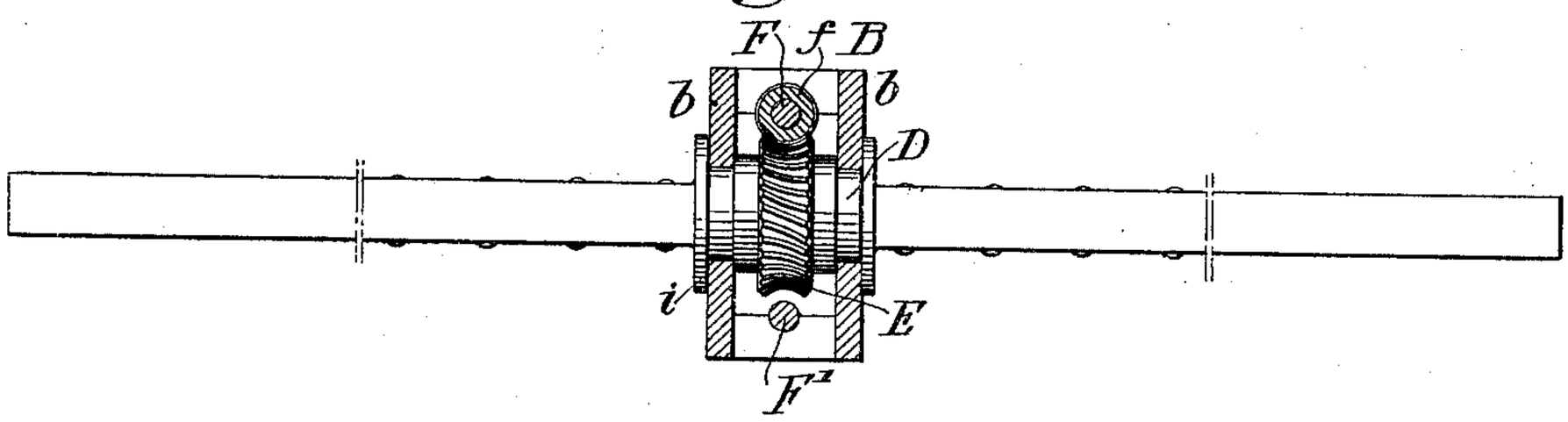


Fig. 5.

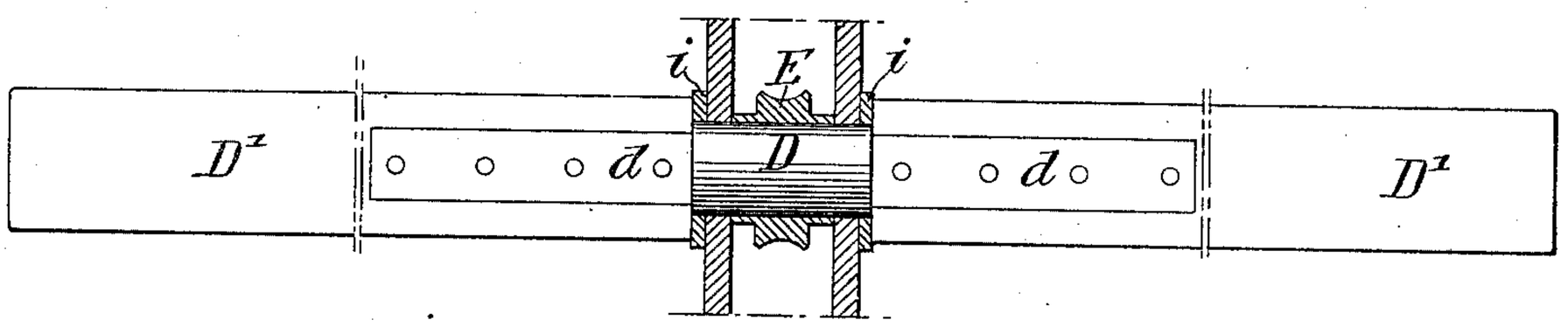


Fig. 6.

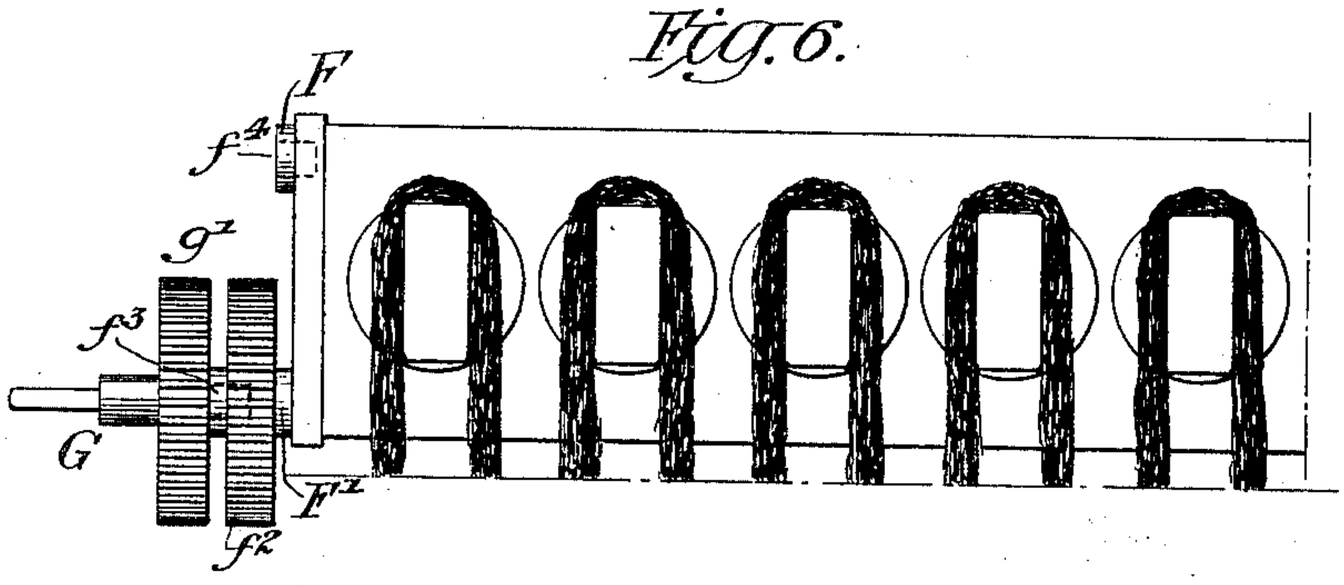
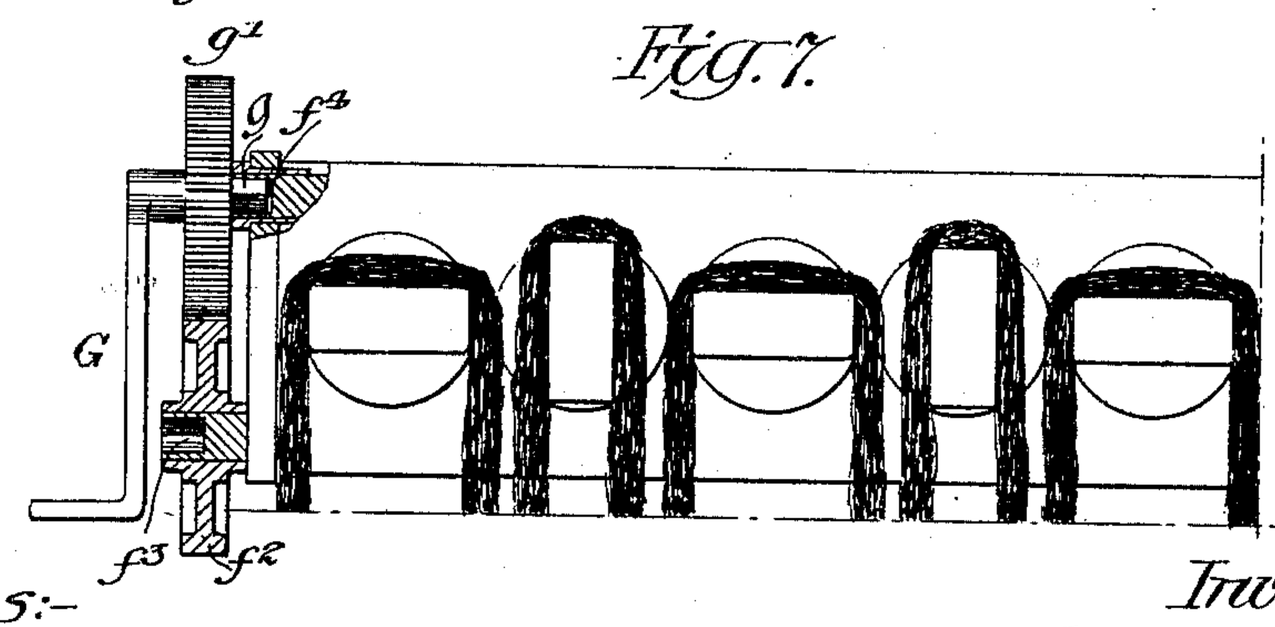


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOSEPH HUSSONG, OF CAMDEN, NEW JERSEY.

DYEING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 695,727, dated March 18, 1902.

Application filed May 14, 1901. Serial No. 60,184. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH HUSSONG, a citizen of the United States, and a resident of Camden, New Jersey, have invented certain Improvements in Dyeing Apparatus, of which the following is a specification.

The main object of my invention is to improve the construction of the yarn-carriers for dyeing-machines, so that the hanks of yarn can be supported on sticks arranged close together and can be turned without rubbing.

A further object of the invention is to so construct the machine that one set of sticks can be turned independent of another set.

In the accompanying drawings, Figure 1 is a plan view of a dyeing-machine, illustrating my invention, the slats or upper portion of the machine being removed. Fig. 2 is a transverse section on the line 2 2, Fig. 1. Fig. 3 is a longitudinal sectional view on the line 3 3, Fig. 1. Figs. 4 and 5 are enlarged detail views showing the construction of the sticks and the stick-supports, and Figs. 6 and 7 are diagram views showing the sticks in the two positions.

A is the vat in which the material to be dyed is placed. At one end of the vat in the present instance is a circulating-chamber A′, in which are circulating-wheels *a a*, driven in any suitable manner, and this chamber is separated from the main vat by a partition *a′*, stopping short of the bottom and top, so that the dye liquor will circulate through the vat over or under the partition and through the circulating-chamber. By this arrangement I need not traverse the yarn through the dye-vat.

The construction above described is fully set forth and claimed in the patent granted to me on the 6th day of November, 1900, No. 661,343.

It will be understood that my present invention can be used either with or without this circulating apparatus, as my improvement relates simply to the means for suspending the hanks of yarn within the vat.

B is a frame, consisting of two side members *b b*. This frame has two or more legs B′, having feet *b′*, which rest on the bottom of the vat in the present instance. The legs and feet are so proportioned as to support the frame and the yarn carried thereby, and may be vertically adjustable, if desired.

Mounted in the side members *b b* of the frame B is a series of shafts D, having projecting arms *d d*, to which are secured by rivets or other means the sticks D′. These sticks are made of a sufficient length to extend from the center of the vat to one side and are greater in width than in thickness, as illustrated in Figs. 4, 5, 6, and 7.

The use of wide flat sticks is preferred to other forms for many reasons; but they are objectionable owing to the fact that they cannot be placed close together, and these sticks have to be spaced far enough apart to allow them to be turned with the yarn. Consequently there is a certain amount of room wasted. The main object of my invention is to overcome this objection.

I mount on each of the shafts D a worm-wheel E and secure this worm-wheel rigidly to the shaft by a set-screw or key, as desired. The worm-wheel in the present instance fits snugly between the two side members *b b* of the frame B.

F F′ are two longitudinal shafts mounted in suitable bearings b^3 at intervals, and on the shaft F is a series of worms *f*, which mesh with the alternate worm-wheel E, and on the shaft F′ are worms *f′*, which mesh with the other worm-wheels E, so that when one of these shafts is turned the alternate shafts are turned, while the others remain stationary; but when the shafts are geared together then all the shafts turn.

On the end of the shaft F′ in the present instance is a gear-wheel f^2, which has a socket f^3, and in the end of the shaft F is a socket f^4.

G is a crank-handle having its end *g* shaped to fit either of the sockets f^3 or f^4, and carried by the crank G is a gear-wheel *g′*, which meshes with the wheel f^2 when the crank-handle is in the socket f^4, as shown in Fig. 7. When the crank-handle is mounted in the socket f^3, as in Fig. 6, then only the lower shaft and the sticks geared thereto are turned; but when the crank is in the socket f^4, as in Fig. 7, then both the shafts F F′ are turned as well as all the sticks. If, for instance, the sticks are mounted, as shown in Fig. 6, close together and the hanks of yarn are placed upon the sticks, as indicated in said figure,

the sticks cannot possibly turn in unison, as the yarn on one stick will bind against the yarn of an adjoining stick, and consequently in ordinary dyeing-machines of this type the sticks have to be placed a sufficient distance apart to give plenty of clearance between the hanks of yarn.

By my arrangement I am enabled to place the sticks close together, and when it is desired to turn the sticks so as to shift the yarn thereon I turn one shaft—say the lower shaft—so that the alternate sticks will be turned at right angles to the other sticks, as indicated in Fig. 7.

By taking the crank out of the socket f^3 of the shaft F′ and placing it in the socket f^4 of the shaft F, I gear the two shafts F F′ together by means of the gear-wheels f^2 and g'. Then the sticks can be turned readily, as one series of sticks is vertical when the alternate sticks are horizontal, as in Fig. 7. After the sticks are turned sufficiently to shift the yarn thereon the crank is then removed from the shaft F and placed in the socket of the shaft F′ and the alternate sticks moved to a vertical position again, as in Fig. 6. Therefore by this construction I can dye a greater amount of yarn in the vat than heretofore and without an additional amount of dye liquor.

Pivoted to the frame B are two slat-sections H H, one slat-section extending over the sticks on one side of the frame B and the other section extending over the sticks on the opposite side. The slats h of these sections are spaced a given distance apart, and the slats are arranged directly above the spaces between the sticks. The object of this arrangement is to insure the circulation of the liquor over the portion of the yarn resting directly on the stick, so that all portions of the yarn are properly dyed. Each of the slat-sections has flanges h' at each side, which rest directly upon the sticks when on end, as in Fig. 2, so as to prevent the yarn from working off the sticks.

At the point where each stick D′ projects from the frame B, I provide a washer i, which rests in the present instance between the end of the stick and its shaft D and keeps the yarn away from the frame when the stick is turned, and thus preventing the yarn being caught between the stick and the frame.

The slat-frames H H are pivoted at h^2 to the frame B and can be held up in the position shown by dotted lines in Fig. 2 by means a hook j on a bar J, supported by a bracket J′ on the extension of the frame B, when it is desired to remove the hanks of yarn from the sticks.

After the yarn is dyed the frame can be removed by means of a crane or blocks and tackle, the hooks engaging the extensions of the frame B. The frame, with the yarn, can be moved vertically out of the liquid and supported on suitable cross-bars above the vat and the liquor allowed to drip from the yarn.

The frame B is preferably supported in the vat A by means of the bars J, resting upon the upper edges of the vat. The legs B′ are mainly for the purpose of supporting the yarn-frame when the frame is out of the vat. The legs then rest on cross-bars on the vat, so as to allow the liquor to drip from the yarn into the vat.

I claim as my invention—

1. The combination of a dye-vat, a frame mounted therein, a series of sticks carried by said frame and upon which yarn is mounted, with mechanism connected to the sticks and constructed to move certain of said sticks independently of the others, substantially as described.

2. The combination of a dye-vat, sticks carrying the yarn to be dyed, means for supporting said sticks and mechanism connected to the sticks constructed to move certain of said sticks independently of the others, said mechanism being capable of adjustment so as to allow of all the sticks being moved at will, substantially as described.

3. The combination of a dye-vat, a frame, a series of sticks mounted on said frame, a worm-wheel on each stick, two longitudinal driving-shafts, a series of worms on each shaft the worms of one shaft meshing with the worm-wheels on the alternate sticks, and the worms on the other driving-shaft meshing with the other worm-wheels, substantially as described.

4. The combination of a dye-vat, a frame, a series of sticks mounted on said frame, a worm-wheel on each stick, two longitudinal driving-shafts, a series of worms on each shaft, the worm of one shaft meshing with the worm-wheels on the alternate sticks, and the worms on the other driving-shaft meshing with the other worm-wheels, and a socket in each shaft, one shaft having a gear-wheel, and a crank having a portion arranged to enter either of the sockets and carrying a gear-wheel, substantially as described.

5. The combination of a dye-vat, a frame, a series of shafts carried by said frame, sticks secured to each end of said shaft, a worm-wheel on each shaft, two longitudinal driving-shafts, one above and one below the series of stick-shafts, worms on the driving-shafts, the worms of one shaft meshing with the worm-wheels on the alternate stick-shafts, and the worms of the other driving-shaft meshing with the worm-wheels on the other shafts, substantially as described.

6. The combination of a vat, a frame, yarn-sticks carried by said frame, means for turning said sticks, slat-frames mounted above the yarn-sticks, the slats of said frame being situated over the spaces between the sticks, said slat-frames being hinged so as to be raised clear of the sticks, substantially as and for the purpose set forth.

7. The combination of a vat, a frame, yarn-sticks carried by said frame, means for turning said yarn-sticks, a slat-frame mounted above the sticks, said slat-frame having a

flange resting against the outer ends of the yarn-sticks, substantially as described.

8. The combination of a dye-vat, a frame mounted in the vat, a series of dye-sticks extending from each side of the frame, slat-frames mounted above each set of sticks and pivoted to the said central frame, brackets, rods extending from the brackets, and means for attaching the free ends of the slat-frames to the rods so that they will be clear of the sticks, substantially as described.

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

JOSEPH HUSSONG.

Witnesses:

WILL. A. BARR,

JOS. H. KLEIN.