

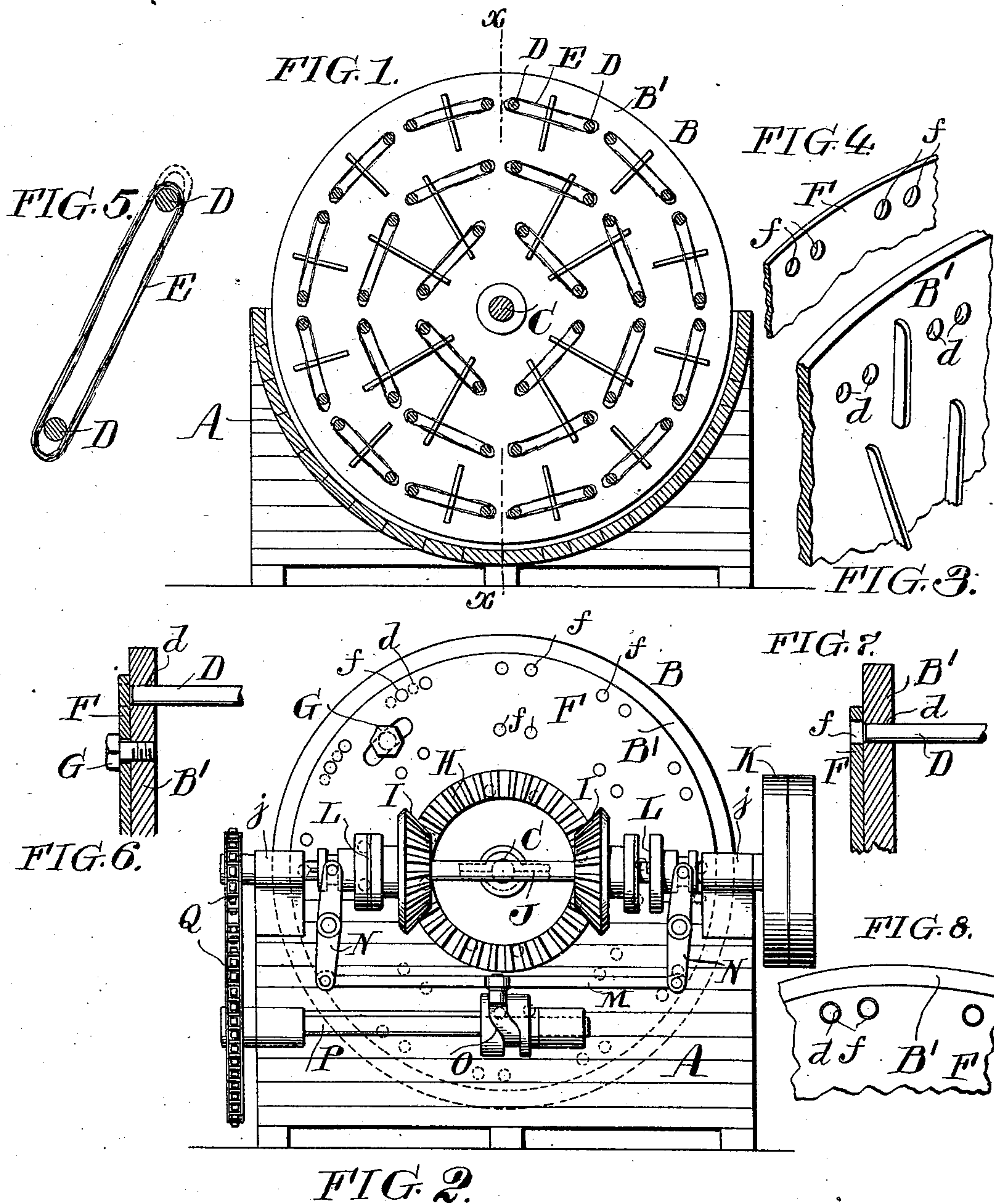
(No Model.)

2 Sheets—Sheet 1.

J. G. HASLAM.
YARN DYEING MACHINE.

No. 556,184.

Patented Mar. 10, 1896.



WITNESSES:
Lemp Dwyer
H. L. Motherwell

INVENTOR:
John G. Haslam
By his atty *[Signature]*

(No Model.)

2 Sheets—Sheet 2.

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FIG. 9.

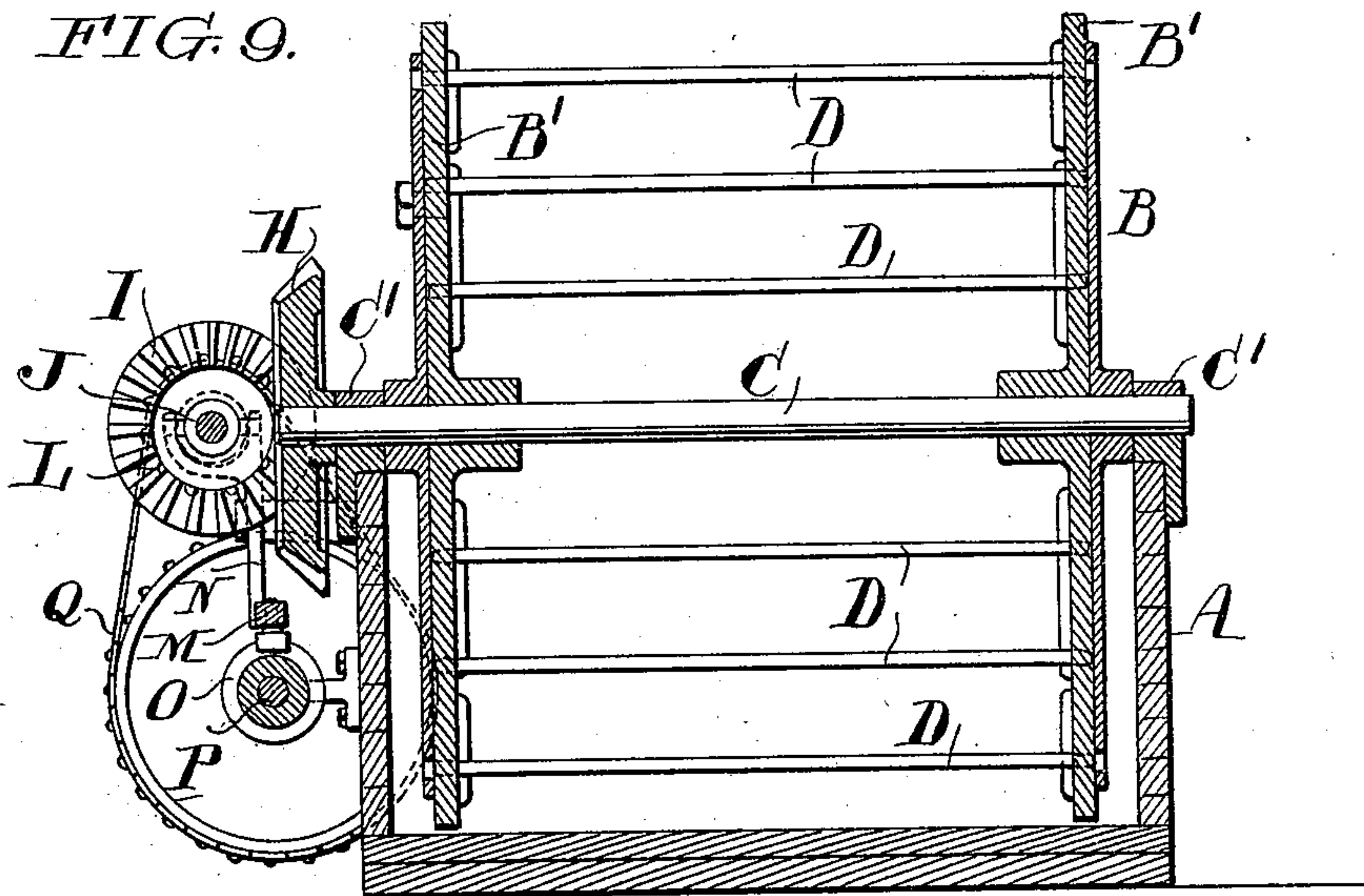


FIG. 11.

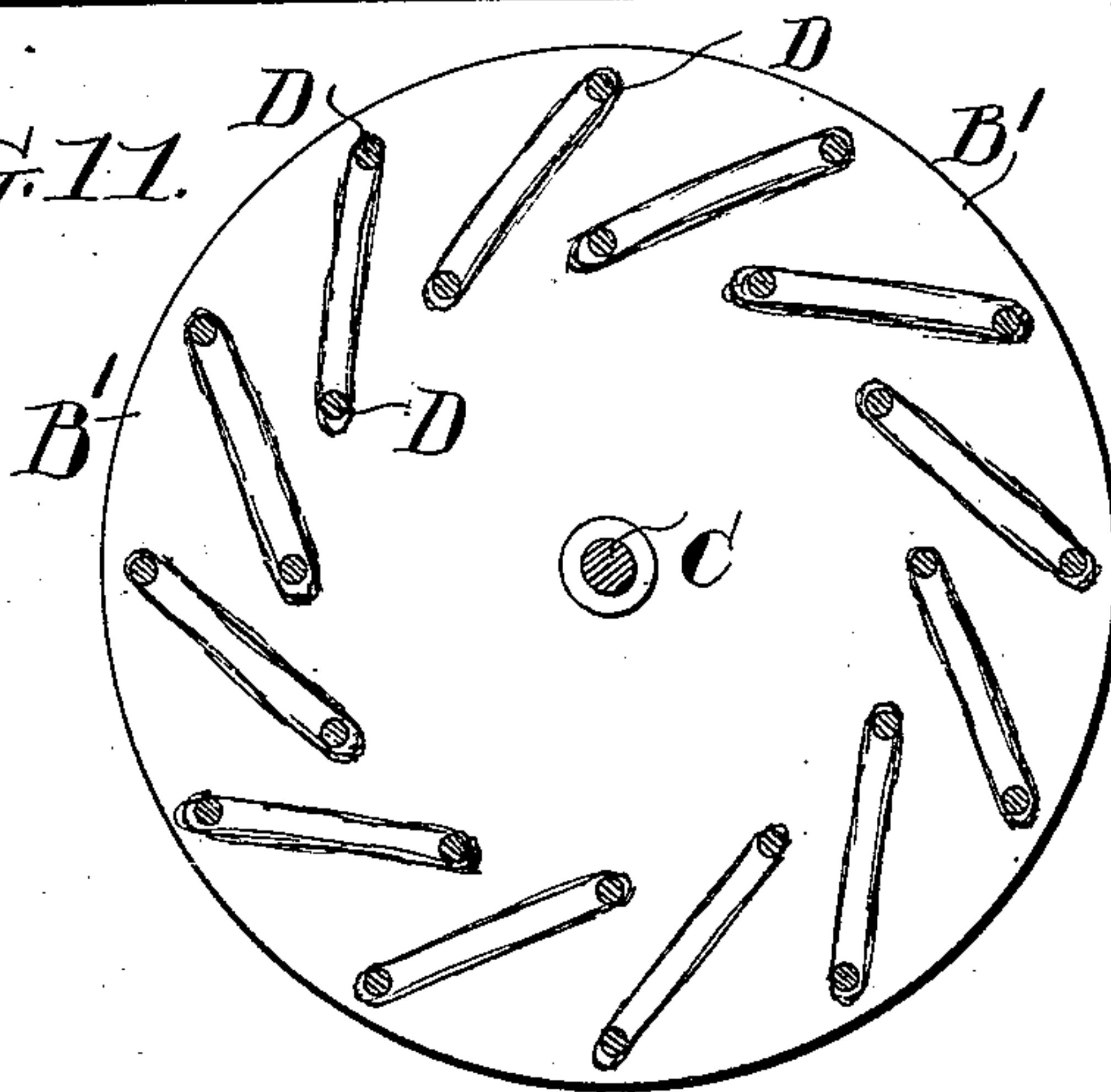


FIG. 10.

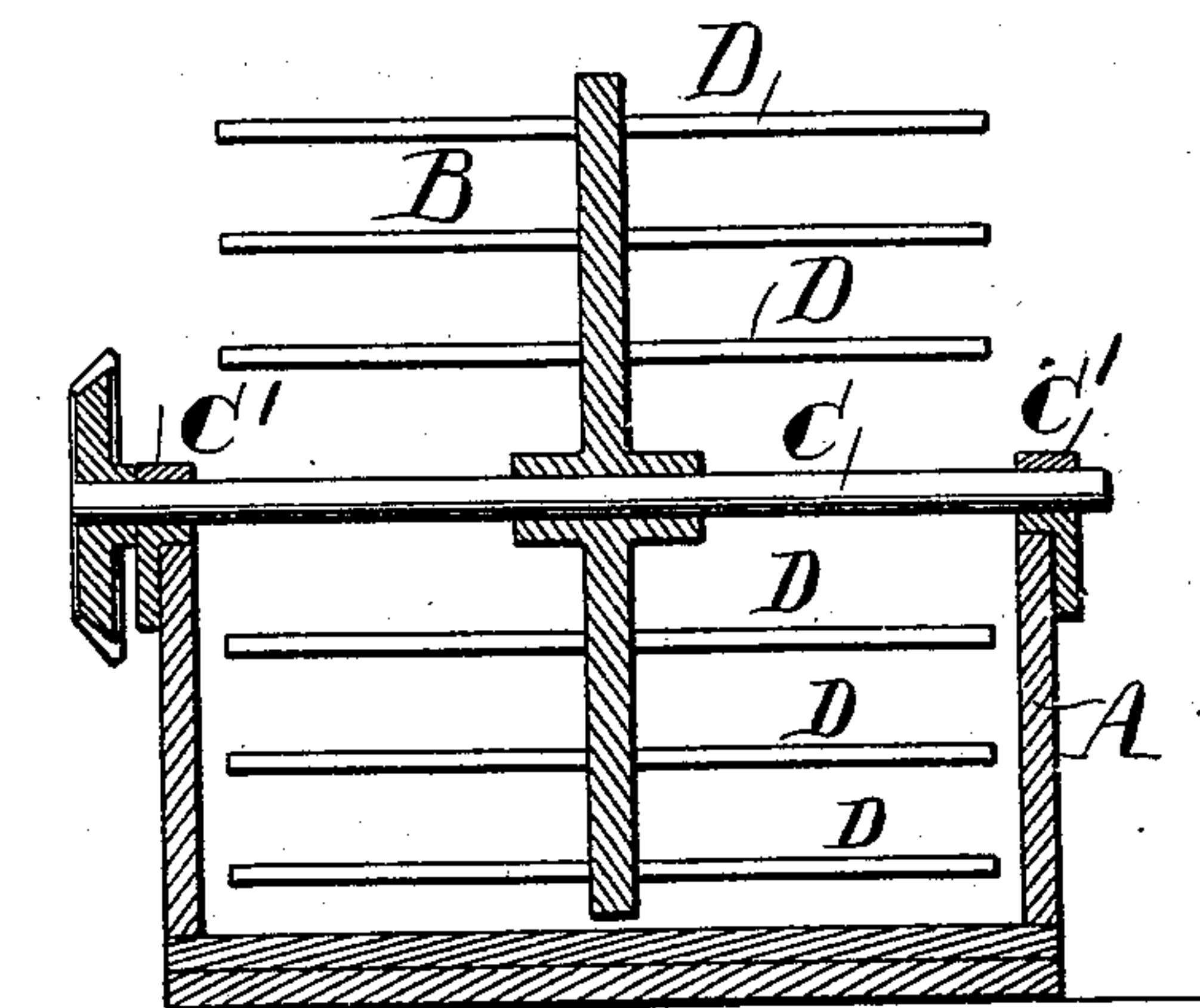
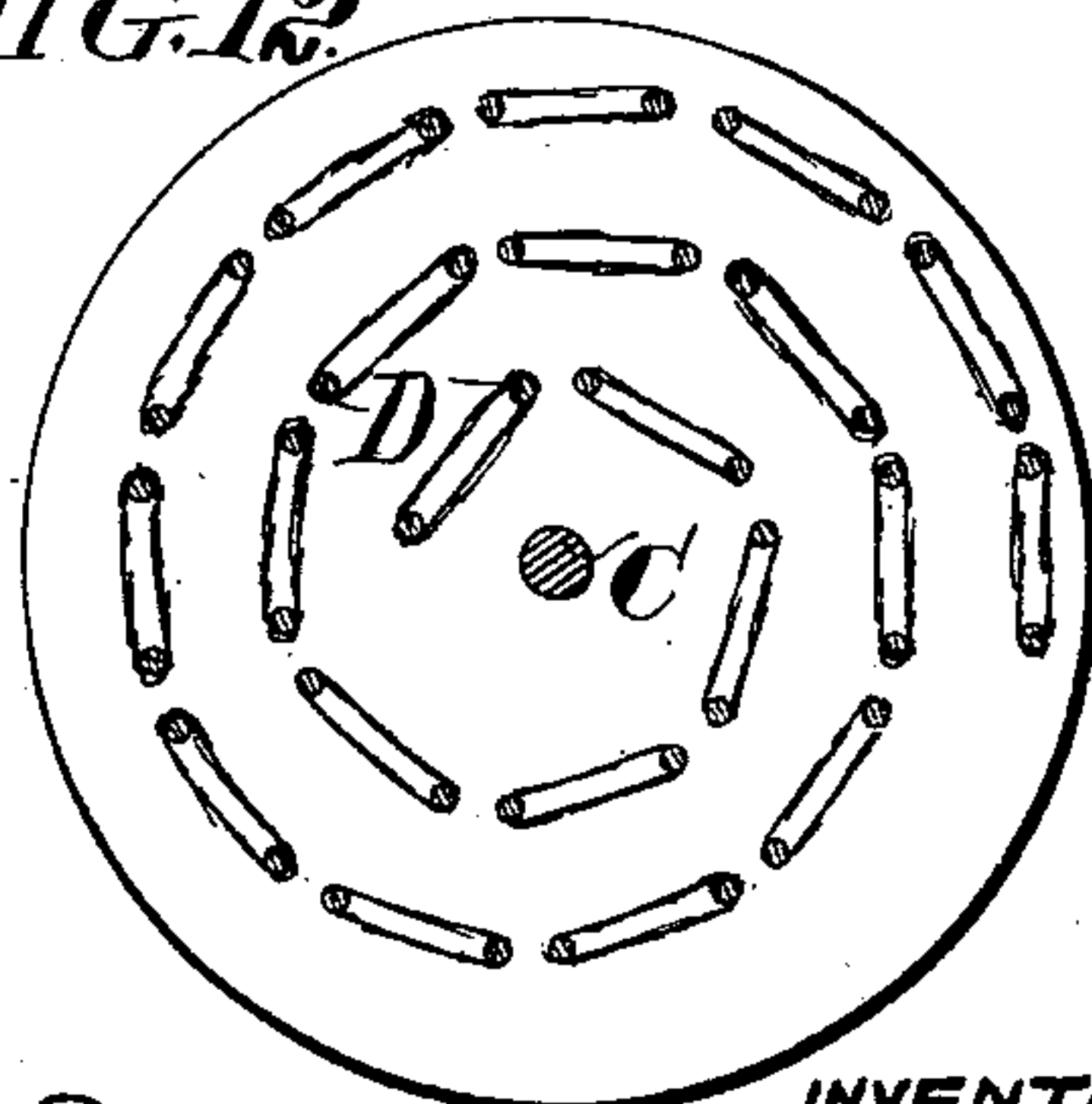


FIG. 12.



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN G. HASLAM, OF PHILADELPHIA, PENNSYLVANIA.

YARN-DYEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,184, dated March 10, 1896.

Application filed September 7, 1894. Serial No. 522,334. (No model.)

To all whom it may concern:

Be it known that I, JOHN G. HASLAM, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Yarn-Dyeing Machines, of which the following is a specification.

My invention relates to yarn-dyeing machines; and it consists of certain improvements, which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

More particularly, my invention relates to that class of yarn-dyeing machines known as "rotary machines," in which the yarn-skeins are supported upon sticks carried by a rotary frame which is partially submerged in the liquor in the vat. By the rotation of the yarn-frame the skeins are carried into and out of the liquor in the vat. In machines of this character it has been necessary to employ means for intermittently turning the yarn-sticks upon their axes to shift the position of the skeins, and thereby to avoid the unevenness in dyeing which would result if the skeins remained immovable upon the sticks, because of the fact that the dye liquor could not freely penetrate the fibers of the yarn at the points of support. Not only does the employment of those devices for rotating the yarn-sticks render the machine more complicated and materially add to the cost, but such parts are always liable to get out of order and to cause entanglement and breakage of the threads.

It is the object of my invention to overcome this difficulty by rendering unnecessary the employment of devices for rotating the yarn-sticks to shift the positions of the skeins, while obtaining equal or superior dyeing results. This object I accomplish by so arranging the sticks which support the skeins that the rotation of the yarn-frame will automatically impart a movement to the skeins, which are loosely supported upon the sticks, and will cause the supported ends to move away from the sticks, so as to permit the liquor to freely penetrate the fibers. The yarn-frame is alternately rotated in opposite directions, so that this movement of the skeins upon the sticks will take place first in one direction and then in the other, thus moving the looped

portions of the skein alternately from contact with the sticks.

I shall now refer to the accompanying drawings for the purpose of more particularly describing my improvements.

Figure 1 is a transverse vertical sectional view of a rotary dyeing-machine embodying my improvements. Fig. 2 is a side elevation of the same, showing the driving mechanism. Fig. 3 is a perspective view of a portion of one of the stick-supporting disks of the yarn-frame. Fig. 4 is a similar view of a portion of the locking plate or piece for locking the yarn-sticks in the frame. Fig. 5 is an illustrative view of a skein and pair of supporting-sticks, showing the movement of the skein. Figs. 6 and 7 are sectional detail views of portions of the yarn-frame and locking-plate. Fig. 8 is a front view of a portion of the yarn-frame. Fig. 9 is a longitudinal vertical sectional view of the machine on the line $x x$ of Fig. 1. Fig. 10 is a similar view on a slightly smaller scale illustrating a modified construction. Figs. 11 and 12 are vertical sectional views of the yarn-frame of modified construction.

A is the dye-vat which may be of any convenient construction.

B is the rotary yarn-frame having a shaft C, which is journaled in suitable bearings C' in the vat, so as to partially submerge the yarn-frame B in the liquor.

D are the yarn-sticks which are carried by the yarn-frame and upon which the skeins E are supported.

In my preferred construction the yarn-frame B is composed of two disks or frames B' B', carried by the shaft C and provided with apertures or recesses d to receive the yarn-sticks D.

To permit the yarn-sticks D to be easily inserted in the frame and removed therefrom, I provide one of the disks or frames B' with recesses or sockets and the other with holes d . The sticks may be passed through the holes d , and after they have been supplied with the skeins the outer ends are thrust into the sockets while the other ends remain in the holes d . Suitable locking devices may be employed to hold the sticks against longitudinal movement and prevent

them falling from their supports. For this purpose I have shown a locking plate or disk F, arranged on the outer face of that disk B' which is provided with the holes *d*, and having a series of holes *f* registering with the holes *d*. The plate F may be turned so as to move the holes *f* away from the corresponding holes *d* in the frame B' and bring the solid face of the locking-plate over them. The holes *f* permit the sticks to be freely inserted in the frame and the plate F when turned locks the sticks in place. The locking-plate may be fastened open or closed by suitable locking devices, such as the slot and set-screw G shown.

Other suitable means may be employed for supporting and locking the sticks in place, as the particular construction of such devices is in no way material to the present invention. The sticks are suitably disposed in the frame B, and each pair of sticks which support the two ends of the skein are located apart a distance materially less than the length of the skein, so that while the loop or bend at one end of the skein is resting directly upon one of the sticks the loop or bend at the other end is out of contact. As movement is imparted to the rotary yarn-frame the skein drags through the liquor and at the rear end leaves the stick so that the liquor may freely permeate the fibers at that place. This movement or longitudinal shifting of the skein takes place alternately in opposite directions, so that at one time one loop or bend is free from the stick and at another time the other end. These movements of the skeins are clearly illustrated in Fig. 5 in the full and dotted lines.

To more effectively produce this longitudinal shifting of the skeins, I prefer to arrange the sticks so that the two sticks D which support the ends of the skeins are out of a radial line or plane of the rotary frame, so that the skeins in passing through the liquor will drag back in a direction opposite to the direction of rotation of the frame and will thus always be out of contact with the rearmost stick. By alternating the direction of rotation of the yarn-frame this movement of the skeins takes place alternately in opposite directions.

In Fig. 1 I have shown the yarn-sticks arranged in concentric circles with the skeins carried by the sticks in the same circle.

In Fig. 11 I have shown the skeins supported by inner and outer sets of sticks, and in Fig. 12 the sticks are arranged in spiral form. In each of these cases it will be observed that the pairs of sticks which support any skein are arranged in different radial planes.

For the purpose of alternating the direction of rotation of the yarn-frame suitable devices

may be employed. For this purpose I have shown the following devices: H is a bevel-gear on the end of the shaft C. I I are bevel-gears sleeved on a transverse counter-shaft J, which is journaled in suitable bearings *j* in the vat A and driven, as through the driving-wheel K. The bevel-gears I I are oppositely disposed and mesh with the bevel-gear H. L L are clutches keyed on the shaft J and arranged each to engage one of the bevel-gears I, and so that when either is in engagement with its bevel-gear the other is out of engagement. These clutches are shifted on the shaft J by means of sliding bar M connected with the clutches through levers N N and operated by a cam O on a counter-shaft P driven from the shaft J by suitable driving connections Q. When one bevel-gear I is fast to the shaft J through the operation of its clutch L, it drives the bevel-gear H and the shaft C and yarn-frame. The other bevel-gear I then turns freely on the shaft J. When the clutches are reversed and the other clutch L operates on the other bevel-gear I to make it fast to the shaft J, the bevel-gear H and the shaft C and yarn-frame will be rotated in the opposite direction and the other bevel-gear I will run loose. As these movements of the clutches L are controlled by the cam O, the alternation of the direction of rotation will take place automatically. Other suitable devices may be employed for alternating the direction of rotation of the yarn-frame.

The minor details of construction shown may be varied without departing from the invention.

What I claim as new, and desire to secure by Letters Patent, is—

In a yarn-skein-dyeing machine, a rotary yarn-frame having a series of yarn-supporting sticks, of which the sticks which support opposite ends of the skeins are arranged in different radial lines or planes of the rotary yarn-frame, and at a distance apart materially less than the length of the skein, in combination with means to rotate the yarn-frame, and mechanism acting on said means to reverse the direction of rotation of the yarn-frame at intervals, whereby the rotation of the yarn-frame in opposite directions will cause the two supported ends of the loosely-supported skeins to move out of contact with the yarn-sticks so that the dye liquor may permeate the fibers at said points of support.

In testimony of which invention I have hereunto set my hand.

JOHN G. HASLAM.

Witnesses:

R. M. HUNTER,

H. L. MOTHERWELL.