

No. 778,236.

PATENTED DEC. 27, 1904.

J. W. FRIES.
MACHINE FOR DYEING, &c.
APPLICATION FILED JULY 27, 1904.

2 SHEETS—SHEET 1.

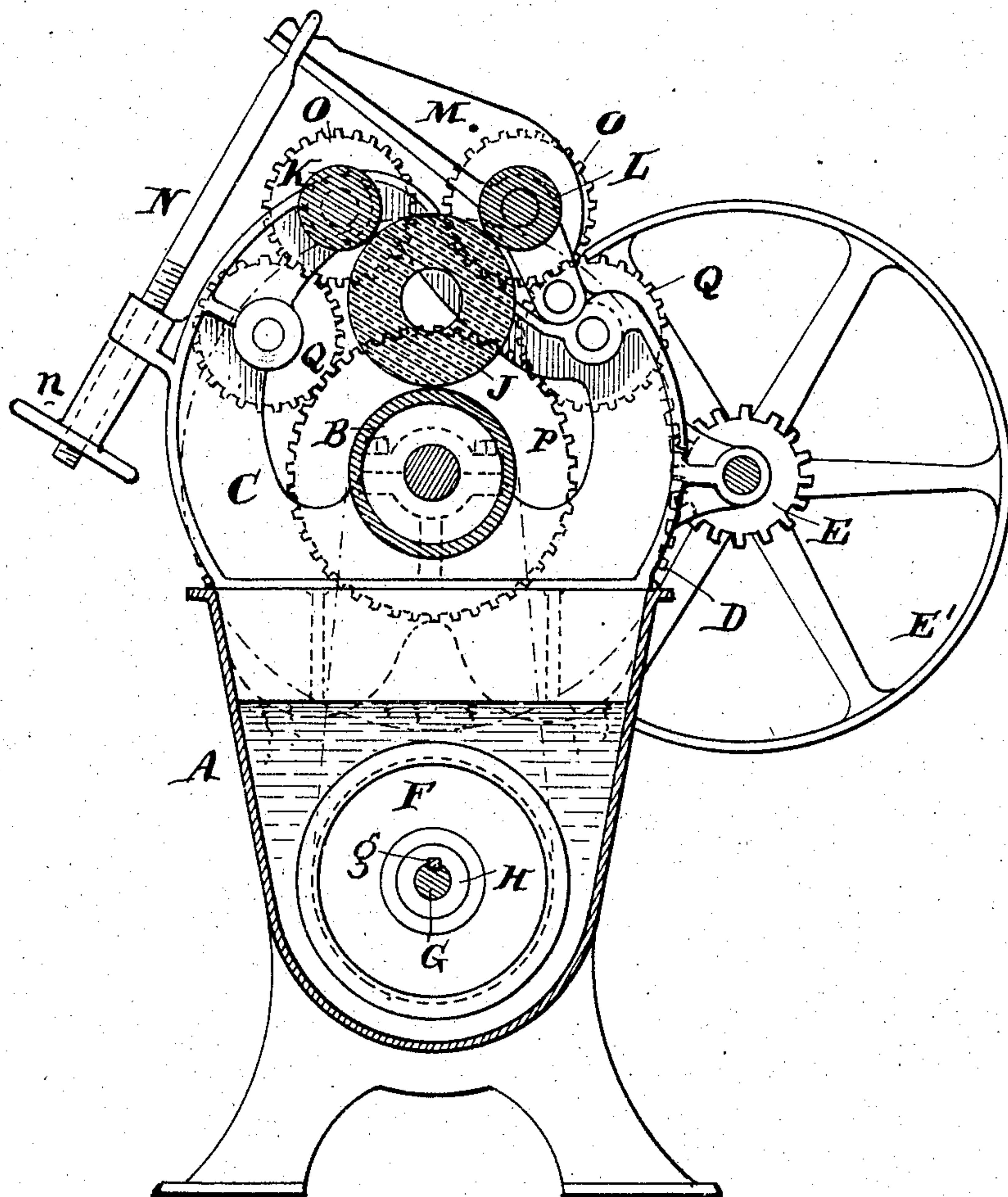


FIG. 1

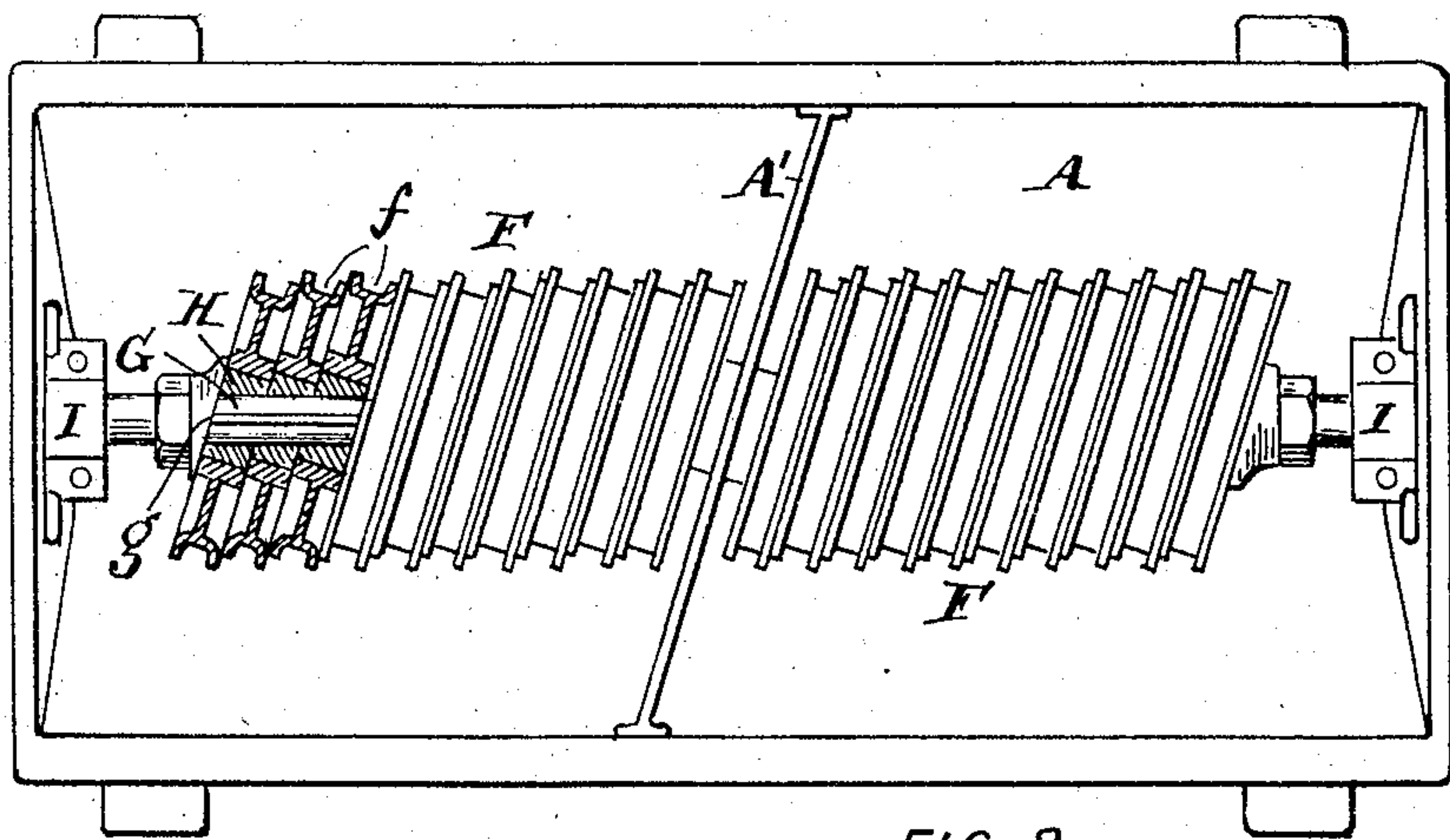
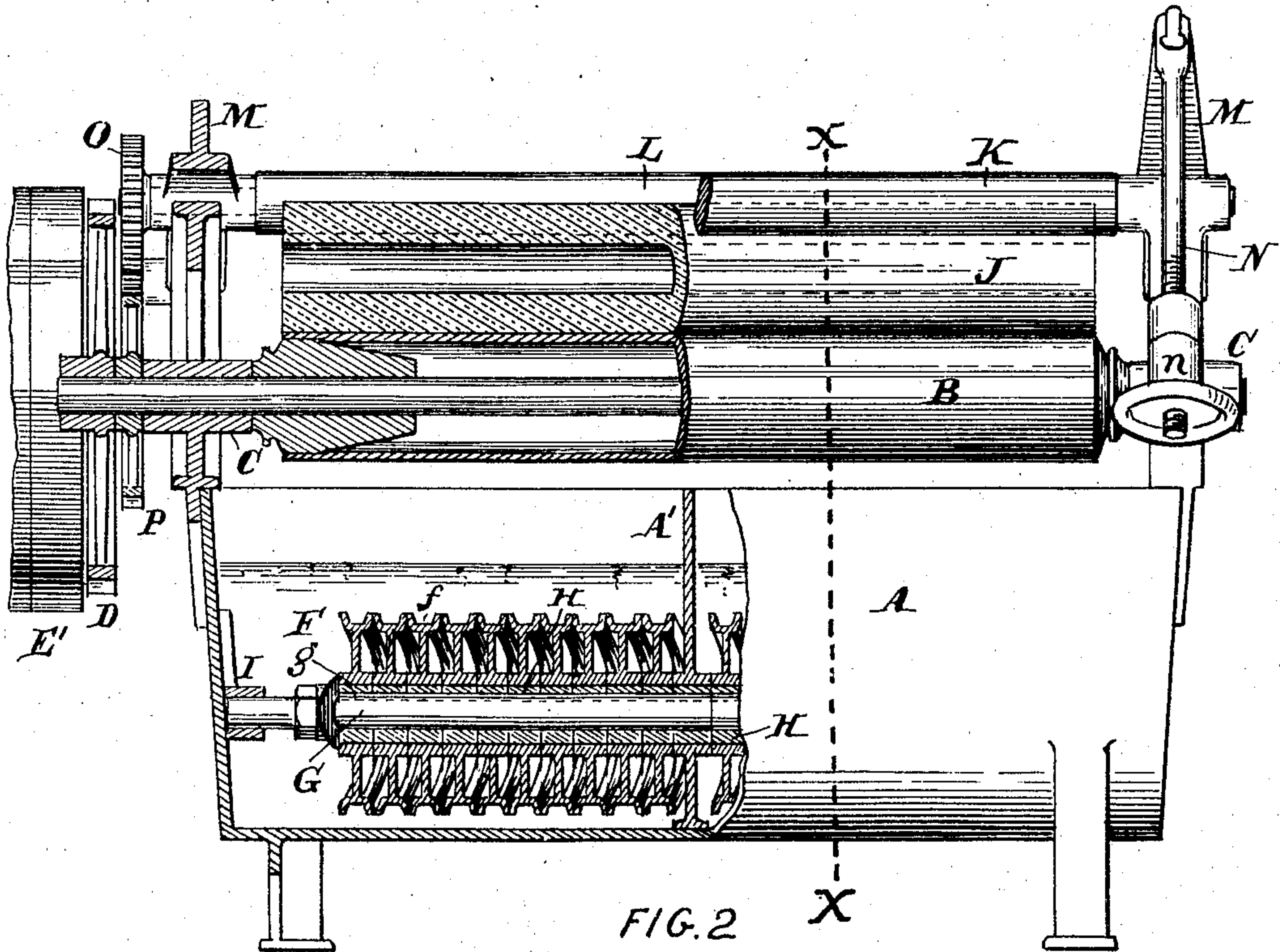
Attest
A. M. Kelly
M. J. Egan

Inventor
John W. Fries
By his atty

[Signature]

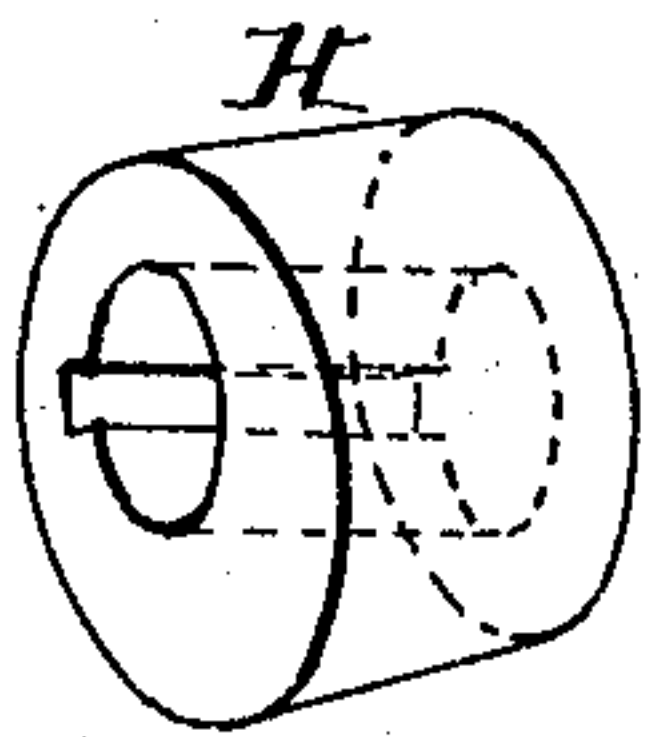
J. W. FRIES.
MACHINE FOR DYEING, &c.
APPLICATION FILED JULY 27, 1904.

2 SHEETS—SHEET 2.



Attest
R. M. Kelly
M. J. Egan.

FIG. 4



Inventor
John W. Fries
By his atty
[Signature]

UNITED STATES PATENT OFFICE.

JOHN W. FRIES, OF WINSTON SALEM, NORTH CAROLINA.

MACHINE FOR DYEING, &c.

SPECIFICATION forming part of Letters Patent No. 778,236, dated December 27, 1904.

Application filed July 27, 1904. Serial No. 218,436.

To all whom it may concern:

Be it known that I, JOHN W. FRIES, of Winston Salem, Forsyth county, State of North Carolina, have invented an Improvement in
5 Machines for Treating Yarn, of which the following is a specification.

My invention has reference to machines for treating yarn; and it consists of certain improvements which are fully set forth in the following specification and shown in the accom-
10 panying drawings, which form a part thereof.

The object of my invention is to provide a construction of machine which shall occupy small space and have capacity for successive
15 immersions and repeated squeezing during the treatment to insure full and uniform impregnation of the dye or other liquor preliminary to the subsequent drying operations with or without steaming.

My invention is especially useful in dyeing
20 yarns with indigo, which is soluble in alkaline solutions and which requires repeated dip-pings and squeezings to secure the proper body of coloring-matter. In the subsequent
25 treatment the soluble indigo is oxidized by exposure to the atmosphere and rendered insoluble by loss of a portion of its hydrogen.

My invention comprehends a vat provided
30 above the liquid-level with a rotating cylindrical roller and below the liquid-level within the vat a series of grooved wheels so journaled upon a transverse shaft as to revolve in parallel vertical planes oblique to the cylindrical roller, whereby the yarn in passing al-
35 ternately about the roller and grooved wheels will advance from one end of the vat toward the other end and at the same time be repeatedly dipped in or treated to the dye liquor in the vat.

My improvements also include, in combina-
40 tion with the above or equivalent means for treating the yarn, an elastic pressure-roller resting upon the cylindrical roller and adapted to squeeze the yarn as it passes about said
45 cylindrical roller and suitably rotated so as to remove all retarding friction upon the yarn.

My invention also embodies details of construction which, together with the above specified features, will be better understood by ref-
50 erence to the drawings, in which—

Figure 1 is a sectional side elevation of a dyeing-machine embodying my invention on line *x x* of Fig. 2. Fig. 2 is an elevation of same with part in section. Fig. 3 is a plan view of the vat and grooved guiding-wheels
55 and upper portion of the apparatus removed, and Fig. 4 is a perspective view of one of the bearing-disks.

A is the vat and contains within it a shaft G, carried in bearings or supports I, secured
60 within the vat. This shaft is stationary and has threaded upon it a series of bearing-disks H, having oblique holes to receive the shaft G and are furthermore provided with key-
65 ways to receive a longitudinal key or feather *g* of the shaft. In this manner the disks H are all caused to assume similar positions and lie in parallel planes oblique to the shaft and at the same time to remain stationary. Jour-
70 naled upon these bearing-disks H are a series of idler-wheels F, having grooved rims *f*. The obliquity of the disks produces a step construction, as shown in Fig. 3, and the pro-
75 jecting faces of the disks act as side bearings to hold the wheels F in position while freely revolving under the driving action of the trav-
80 eling yarn. If desired, one of these wheels F may be omitted and a division-plate A' introduced to divide the vat into two compartments, as shown in Fig. 3, and which would enable
85 the yarn to be subjected to two fluids while in the custody of the machine.

Journaled in upper housings at C C is a cylindrical roller B, of metal, which is driven
85 by gearing D E and band-wheel E'. This roller is located immediately above the shaft G and wheels F and so as to preferably be wholly clear of the fluid in the vat A. The
90 yarn passes alternately about the cylindrical roller B and the wheels F, being advanced by the obliquity of the wheels, as will be readily understood. As shown, the obliquity of the
95 wheels is such that two webs of yarn may be fed through the machine at the same time without tangling, and by varying the obliquity or the diameters of both of the wheels the yarn may be caused to pass over every
100 wheel or every third wheel, as designed. The grooves *f* of the wheels F are preferably formed with flat bottoms, and this, with the

roller B, causes the threads of the yarn web to lie flat or in ribbon form, so as to expose each thread to the fullest extent both to the liquid and squeezing process.

5 Arranged above the roller B is a tubular rubber roller J, which is flexible throughout and adapts itself readily to the requirements, passing over knots or lumps in the yarn at
10 other portions of the yarn. Pressure is applied to this tubular roller by two revolving rollers K L, arranged above it and respectively upon opposite sides of a vertical plane through its axial line. The roller K is jour-
15 naled in fixed bearings in the frame of the machine, while the roller L is journaled in hinged frames M, and thereby adjusted to or from the rollers J and B under the action of a screw-shaft N and hand-wheel nuts *n*. Any
20 other means of adjustment of the roller L may be employed in lieu of that shown. By the adjustment of roller L any degree of pressure desired may be put upon the tubular rubber roller J. To assist the roller J to revolve
25 with a speed commensurate with the roller B, I cause the rollers K L to rotate also at the same surface speed as the roller J, and this I accomplish by providing the said rollers K L with pinions O', which are geared to a spur-
30 gear P on the shaft of the roller B by intermediate gears Q. Any other form of gearing may be employed, if so preferred.

I have shown my apparatus in the form I have found excellently adapted for commercial use, and while I prefer the construction shown I do not confine myself to the details, as they may be modified without departing from the spirit of the invention.

40 Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for treating yarn to fluids, the combination of a vat, a cylindrical roller journaled in the upper portion of the vat, and
45 a series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the cylindrical roller.

2. In a machine for treating yarn to fluids, 50 the combination of a vat, a cylindrical roller journaled in the upper portion of the vat, a fixed shaft within the vat having a series of bearings arranged with cylindrical surfaces and whose axes are oblique to the shaft, and a
55 series of grooved wheels arranged within the vat and journaled upon the series of bearings so as to revolve in parallel planes at an angle to the axis of the cylindrical roller.

3. In a machine for treating yarn to fluids, 60 the combination of a vat, a cylindrical roller journaled in the upper portion of the vat, a series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the
65 cylindrical roller, a pressure-roller of elastic

material pressing upon the cylindrical roller, and means to adjust the pressure of said pressure-roller.

4. In a machine for treating yarn to fluids, the combination of a vat, a cylindrical roller 70 journaled in the upper portion of the vat, a series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the cylindrical roller, a pressure-roller of elastic 75 material pressing upon the cylindrical roller, means to rotate the pressure-roller, and means to adjust the pressure of said pressure-roller.

5. In a machine for treating yarn to fluids, the combination of a vat, a cylindrical roller 80 journaled in the upper portion of the vat, a series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the cylindrical roller, a tubular pressure-roller 85 made of elastic material pressing upon the cylindrical roller, means to rotate the pressure-roller, and means to adjust the pressure of said pressure-roller.

6. In a machine for treating yarn to fluids, 90 the combination of a vat, a cylindrical roller journaled in the upper portion of the vat, a series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the 95 cylindrical roller, a pressure-roller of elastic material pressing upon the cylindrical roller, means to adjust the pressure of said pressure-roller consisting of two rollers L K pressing upon it, and means for adjusting rollers L to 100 or from the cylindrical roller.

7. In a machine for treating yarn to fluids, the combination of a vat, a cylindrical roller journaled in the upper portion of the vat, a 105 series of independently-journaled grooved wheels arranged within the vat to revolve in parallel planes at an angle to the axis of the cylindrical roller, a pressure-roller of elastic material pressing upon the cylindrical roller, means to adjust the pressure of said pressure- 110 roller consisting of two rollers L K pressing upon it, means for adjusting rollers L to or from the cylindrical roller, and gearing between the cylindrical roller and the rollers L K whereby they all rotate at the same sur- 115 face speeds.

8. In a machine for treating yarn to fluids, a vat in combination with a shaft G therein having a key *g*, a series of oblique bearing- 120 disks H threaded upon the shaft and held against rotation, and grooved wheels F journaled upon the bearing-disks.

9. In a machine for treating yarn to fluids, a vat in combination with a shaft G therein having a key *g*, a series of oblique bearing- 125 disks H threaded upon the shaft and held against rotation, grooved wheels F journaled upon the bearing-disks, and means for guiding yarn successively around said wheels and through the liquid in the vat. 130

10. In a machine for treating yarn, the combination of a cylindrical roller over which the yarn is fed, a soft roller J rotating in contact with the cylindrical roller, and two rotating
5 rollers K L for holding the roller J against the cylindrical roller.

11. In a machine for treating yarn, the combination of a cylindrical roller over which the yarn is fed, a soft roller J rotating in contact
10 with the cylindrical roller, two rotating rollers K L for holding the roller J against the cylindrical roller, and means to adjust the space between the cylindrical roller and rollers K L to compress the soft roller J.

12. In a machine for treating yarn, the combination of a cylindrical roller over which the yarn is fed, a roller J of tubular rubber rotating in contact with the cylindrical roller,

and two rotating rollers K L for holding the roller J against the cylindrical roller. 20

13. In a machine for treating yarn, the combination of a cylindrical roller over which the yarn is fed, a hollow tubular rubber roller unsupported on its interior pressing upon the cylindrical roller and rotating with it, and means
25 pressing upon the outer surface of the rubber roller opposite to its line of contact with the cylindrical roller to vary the degree of pressure of the rubber roller upon the cylindrical roller. 30

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

JOHN W. FRIES.

Witnesses:

R. M. KELLY,
M. J. EYRE.