

No. 671,867.

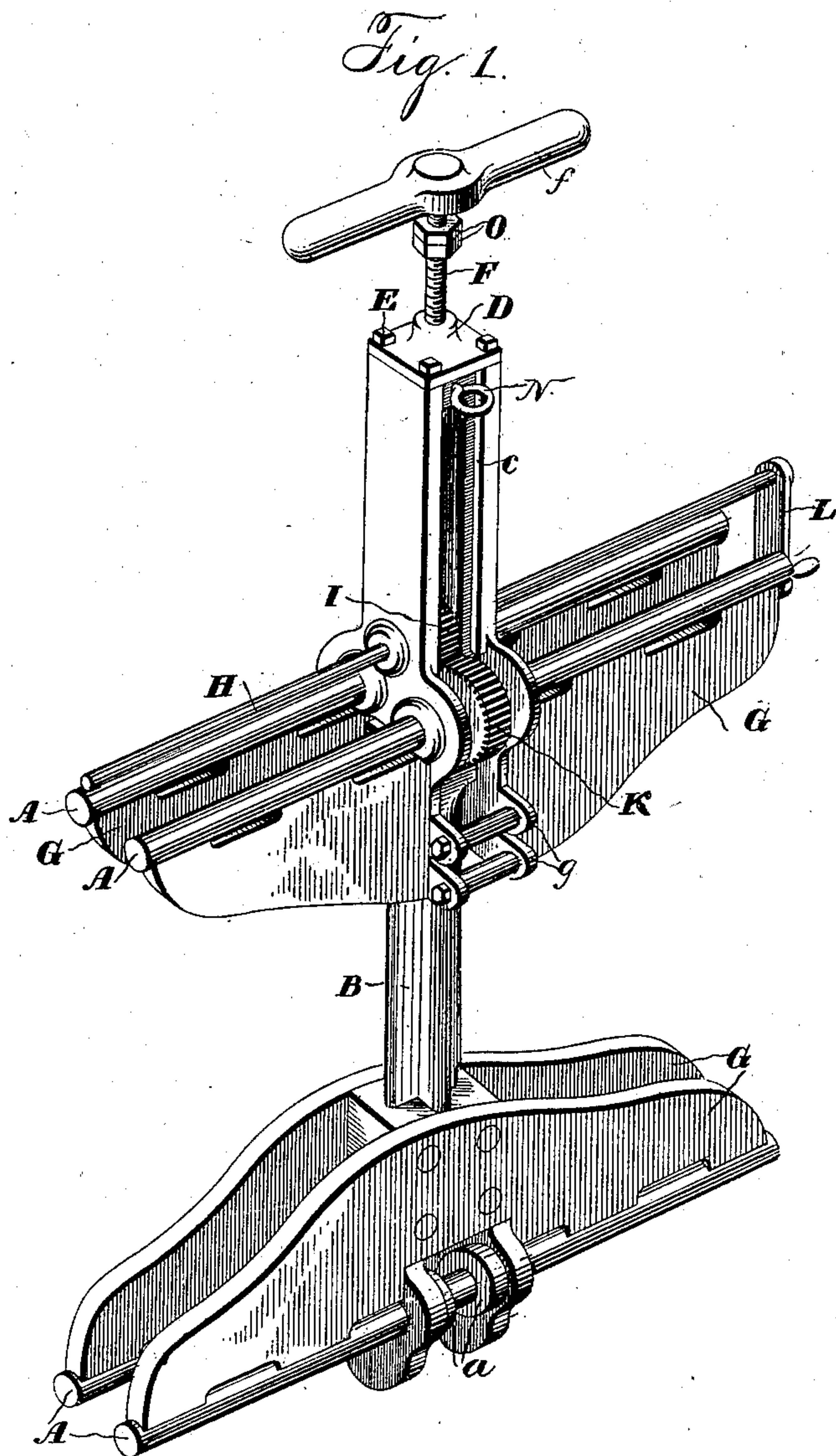
Patented Apr. 9, 1901.

E. J. NELSON.
APPARATUS FOR MERCERIZING.

(Application filed Sept. 1, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
Frank P. Prindle.
Chas. J. Williamson

Inventor.
Edwin J. Nelson, by
Prindle and Russell, his Attys

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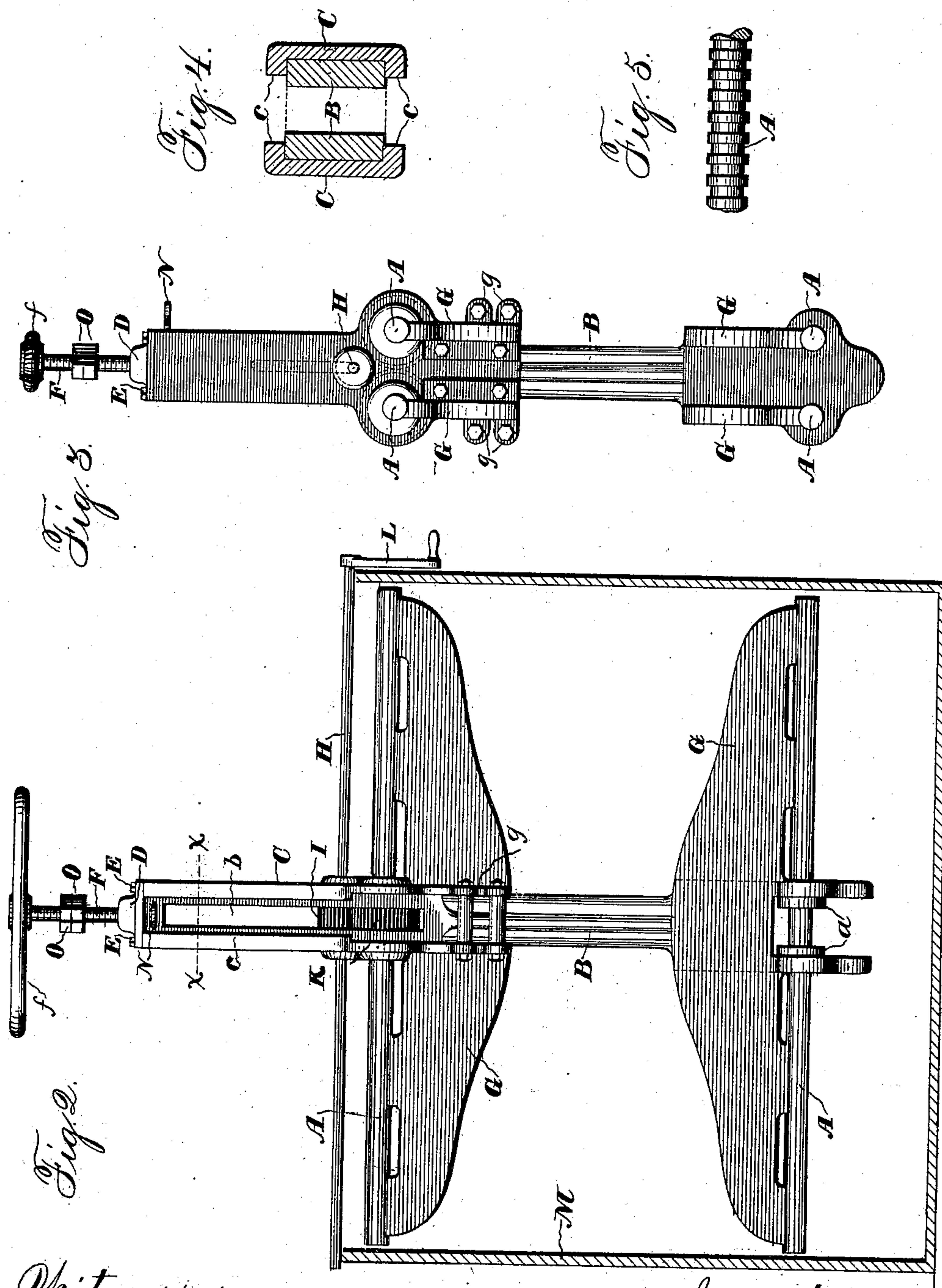
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UNITED STATES PATENT OFFICE.

EDWIN J. NELSON, OF MIDDLEVILLE, NEW YORK.

APPARATUS FOR MERCERIZING.

SPECIFICATION forming part of Letters Patent No. 671,867, dated April 9, 1901.

Application filed September 1, 1898. Serial No. 690,041. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. NELSON, of Middleville, in the county of Herkimer, and in the State of New York, have invented certain new and useful Improvements in Apparatus for Mercerizing Yarn; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my apparatus; Fig. 2, a side elevation thereof in position in a vat or tank, which is shown in section; Fig. 3, an end elevation of said apparatus; Fig. 4, a detail view in section on line *xx* of Fig. 2, and Fig. 5 a detail view of a portion of a skein-supporting shaft for producing a "random" or mottled effect in the dyed product.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to provide improved apparatus for mercerizing yarn which will insure that the yarn while being mercerized will undergo no accidental variations in tension, but that all portions alike will be subjected to uniform tension, and thus produce perfect results when dyed; and to this end said invention consists in the apparatus having the features of construction substantially as hereinafter specified.

In the mercerizing of yarn as commonly practiced by the placing of skeins of yarn on parallel rods or shafts the dyed product is faulty in that the appliances heretofore used have not been such as to keep all portions of the yarn under equal or uniform tension. Those portions of the yarn under the least tension, being least affected by the mercerizing fluid, will dye differently from the other portions, the result being that the fabric or goods made from the yarn will not be of uniform color. Again, it has been found that the best results in mercerizing are obtained by stretching the yarn before it is placed in the fluid and then while it is still submerged therein to increase its tension. It is apparent, therefore, that an apparatus to meet the conditions required for the securing of the best results must not only be such that inequality of tension will not exist, but also it must be capable of increasing the tension while the yarn is still submerged, and to be

entirely practical the apparatus must not be bulky or clumsy to handle or complex and it must permit the most easy and rapid placing of yarn upon and its removal from the supporting rods or shafts. My apparatus will be found to meet all the conditions thus noted as necessary to be met in a practical and successful machine, and I will now proceed to describe its construction and mode of operation.

The apparatus which I show comprises two pairs or sets of yarn-supporting shafts *A* and *A*, the lower shafts of the two sets being journaled in bearings at the lower end of a column or upright *B* and the upper shafts of the two sets being journaled in bearings in a slide *C*, that is mounted on the upright and capable of movement to permit the upper shafts to be moved toward and from the lower shafts. Preferably the lower end of the upright *B* is widened and bifurcated to afford an extended bearing for the lower shafts, and upon each of the latter, engaging the inner sides of the fork or bifurcation, are collars *a* and *a*, that hold the shafts from moving longitudinally.

The slide *C* is formed of two side plates that are connected at the top by a cap-plate *D* and at the bottom by bolts *E* and *E*, and upon the edge of each is a rib or flange *c*, that overlaps the side of the upright. A screw *F*, engaging a threaded opening in the cap-plate *D*, having a handle *f*, and bearing at its lower end against the top of the upright *B*, constitutes means for moving the slide *C* to raise the upper shafts *A* and *A*.

It will be observed that the shafts *A* and *A* are journaled by the upright and slide at their mid-lengths, so that they extend free on each side thereof, and that the support afforded by the upright and slide is comparatively short. It is desirable to have the ends of the shafts free, so as to readily permit the skeins of yarn to be placed upon and removed from the shafts without obstruction, and of course it is desirable to have the shafts as long as possible to enable them to hold a large quantity of yarn. Without the provision of means to prevent it, however, the strain to which the shafts are subjected by the shrinkage of the yarn when in the mercerizing fluid is such that the shafts bend or flex, and hence progressively from

their bearings outward to their ends the yarn is under gradually-diminishing tension. I have devised simple and entirely efficient means to prevent the bending of the shafts under this strain that keeps them in perfect parallelism, which means consists, in the case of each shaft, of an arm G, fastened, as the case may be, to the upright or slide that is placed to engage the unsupported part of the shaft on each side of its bearing, being, of course, on the side of the shaft toward which the strain tends to pull it. The arm may engage the shaft throughout the entire length of its unsupported part, or it may, as shown, engage it only at intervals near to or at its end.

In the case of the two lower shafts the two arms G and G for each shaft may be cast in a single piece, which is bolted at mid-length to the side of the upright B. Each arm for the upper shafts has at its inner end an inwardly-extended flange g, through which bolts pass to fasten it to the slide C. In thickness each arm G is sufficiently less than the diameter of the shaft to insure that the yarn will not touch the sides of the arm.

It will be observed in the case of the shafts that move with the slide, as well as those journaled by the upright, that the bracing-arms have a fixed relation to the shafts, which is not disturbed when the shafts are moved to tighten the yarn, and hence it is possible to change the tension of the yarn while it is submerged in the mercerizing fluid, which could not be done were there necessity for adjusting the braces, since the latter could only be done with the apparatus out of the fluid.

For revolving the shafts A and A, so that all parts of the skein of yarn will be subjected to the action of the mercerizing fluid, I employ a shaft H, journaled above and parallel with the upper shafts A and A, which at its longitudinal center has a pinion I, which meshes with gear K on each of the upper shafts A. For the accommodation of the pinion and gears the upright B has a slot b, which vertically has such size as to permit the travel of said pinion and gears when the slide C is moved. The upright is also slotted in line with the shaft H for a like reason. At one end of the shaft H is a crank L for revolving it by hand but of course provision may be made for operating it by power, if desired. Said shaft is made so much longer than the shafts A and A that it will engage the top of the opposite sides of the vat or tank M, and thus serve as a stop to limit the descent of the apparatus in the fluid in the vat and as a support for the apparatus when in the vat. By gearing the shaft H to the upper shafts A and A, as described, said shaft H is so much higher than the latter and so the portions of the yarn upon them that said shafts A and A can be kept submerged in the fluid in the vat while the shafts are being revolved. The yarn in passing around the lower shafts will revolve them.

On the side of the upright B, near its top,

there is a ring or eye N for attaching a rope for raising and lowering the apparatus from and into the vat.

For mercerizing to produce uniformity of color when the yarn is dyed the shafts A and A are perfectly smooth, as shown in Figs. 1 and 2; but for the purpose of producing fabric having a random or mottled effect shafts may be employed having transverse corrugations, as shown in Fig. 4. As this form of shaft will result in different portions of the yarn being subjected to unequal tension, it follows that such variations in the mercerizing will result as to be manifested in the dyeing by different shades of color, which when the yarn is made into fabric will produce the effect desired.

The manner of using my apparatus is as follows: The skeins of yarn being looped over the upper and lower shafts A and A of each set and placed under the desired preliminary tension by moving the slide C upward on the upright B by means of the screw F, the apparatus by means of a rope attached to the eye N is lowered into the vat until the shaft H rests upon the sides thereof. By revolving the shaft H the yarn in contact with the shafts A and A is rotated thereon, and by merely manipulating the single screw F the necessary increase of tension may be given the yarn. The treatment being finished, the screw F is loosened, so that when the lifting-rope attached to the eye N is raised the upright B will be lifted until it strikes either the screw or the cap-plate D, thus relaxing the yarn, so that it can easily be taken from the shafts, and then the entire apparatus is raised out of the vat.

To enable the obtaining of uniform tension each time the apparatus is used without the necessity for careful measurement of the distance the slide is moved by the screw, a stop is employed, which may consist of a pair of nuts O and O upon the screw, that are adjusted to such position thereon that the top of the slide will strike and be stopped when it has been moved to produce the required tension.

Having thus described my invention, what I claim is—

1. The combination of parallel shafts, supports for said shafts, one of which is movable relative to the other, so that said shafts may be moved toward and from each other, and braces supporting the shafts on their sides that are toward each other, which have a fixed relation to their respective shafts, so that change in the positions of said shafts may be made without changing the relation of the braces to their respective shafts, substantially as and for the purpose specified.

2. The combination of parallel shafts, supports journaling said shafts intermediate their ends, so that skeins of yarn may be passed over said ends, upon the shafts, one of which supports is movable relative to the other, to enable the shafts to be moved toward and from each other, and an arm ex-

tending from each shaft-support, to or substantially to the free end of each shaft, which engages the shaft only on the side that is toward the other shaft, substantially as and for the purpose described.

5 3. The combination of an upright, a shaft or shafts mounted at its lower end, a slide upon the other end of the upright composed of connected side plates that have portions
10 overlapping the sides of the upright, a shaft or shafts mounted on said slide, and means for moving the slide relative to the upright, comprising a screw that engages a threaded opening in one part and has a bearing on the
15 other part, substantially as and for the purpose described.

20 4. The combination of an upright, a shaft or shafts mounted at its lower end, and projecting at each side thereof, a brace-arm for the projecting portion of each shaft, attached to the upright and engaging the shaft at its upper side only, reaching to, or substantially to its free end, a slide upon the upper end of

the upright, a shaft or shafts mounted on said slide and projecting at each side thereof, 25 a brace-arm for the projecting portion of each shaft, attached to the slide and engaging the shaft at its under side only, reaching to or substantially to its free end, and means for moving the slide relative to the upright, substantially as and for the purpose shown. 30

5. The combination of two sets of parallel, skein-receiving shafts, bearings therefor, a gear-wheel on one shaft of each set, an operating-shaft above, parallel with and longer than 35 the shafts having the gear-wheels, and geared to the latter, and a vat or tank, upon the sides of which said operating-shaft rests, substantially as and for the purpose described.

In testimony that I claim the foregoing I 40 have hereunto set my hand this 25th day of August, 1898.

EDWIN J. NELSON.

Witnesses:

JOHN F. MUMFORD,
E. J. SPELLMAN.