

W. A. BURKE.
Dyeing Vat.

2 Sheets—Sheet 1.

No. 3,608.

Patented May 30, 1844.

Fig. 3.

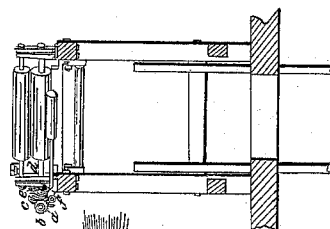
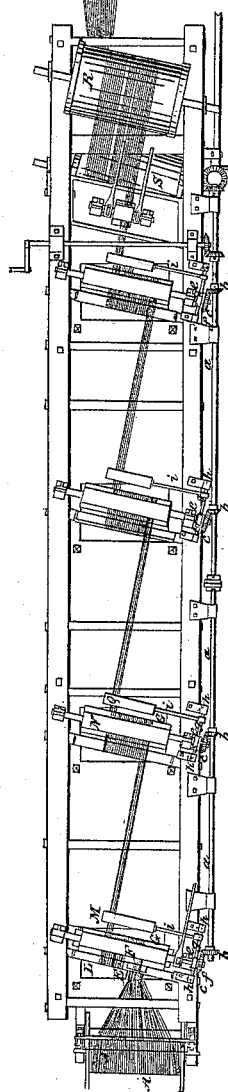


Fig. 4.



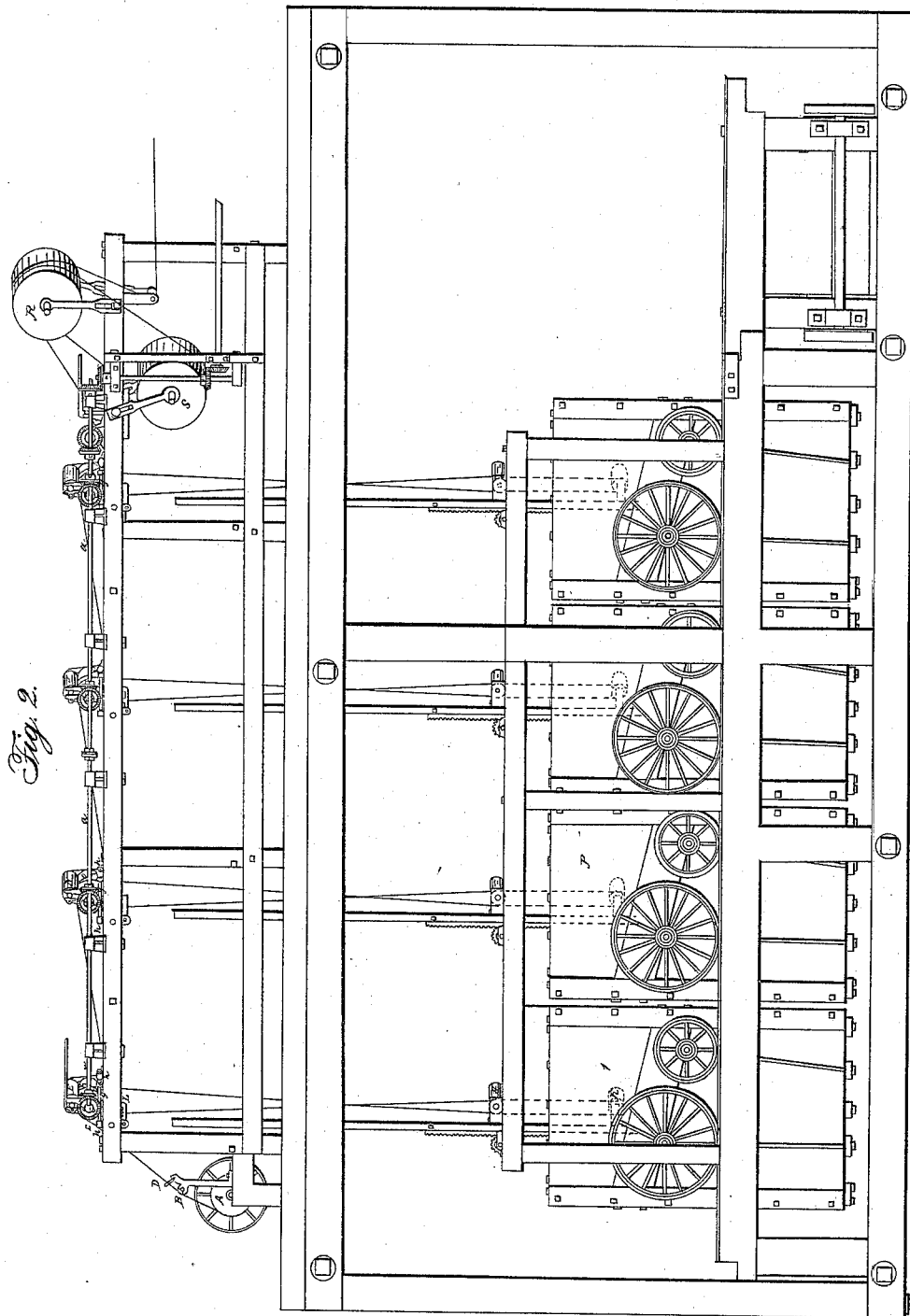
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

WM. A. BURKE, OF MANCHESTER, NEW HAMPSHIRE, ASSIGNOR TO AMOSKEAG MANUFACTURING COMPANY.

MACHINERY FOR DYEING YARN.

Specification of Letters Patent No. 3,608, dated May 30, 1844.

To all whom it may concern:

Be it known that I, WILLIAM A. BURKE, of Manchester, in the county of Hillsborough and State of New Hampshire, have invented a new and useful improvement in machinery for dyeing, sizing, or impregnating woolen, cotton, or other yarn, thread, or fabric with a colored gelatinous or other liquid or a new and useful improvement in effecting in such machinery the passage of the yarn from one set of squeeze-rollers to another set and preventing the entanglement or injurious friction or rubbing together of its coils during such passage, and that the following description and accompanying drawings taken together constitute a full and exact specification of the construction and operation of my invention.

Figure 1, of the above mentioned drawings, denotes a top view, or plan of the upper part of a yarn dyeing apparatus. Fig. 2, is a side elevation of the same, together with the movable vats beneath it, and the railway and car connected with the vats, and used for the purpose of removing the vats and supplying fresh ones, whenever necessary during the process of dyeing.

The yarn to be dyed, is first warped or wound upon a beam or cylinder A, Figs. 1 and 2. From thence, it is passed partly around or over a guide roller or cylinder B, and afterward, through a reed D, as seen in Fig. 2; the said reed being in its length, equal to that of the beam, and having wires enough to separate the several threads of the warp from each other. After passing through the reed D, the threads of the warp are brought together, or are all converged toward a short reed E, and passed between the wires thereof. The warp thus contracted in width, is next passed between two squeeze rollers F, G, and from thence downward, in a vertical direction, or, so as to pass against the rear side of a guide roller H; thence, into the first vat I, and under the dipping roller K; thence, upward out of the vat and against the front side of the guide roller H, and the rear side of a guide roller L and that of the lower of the squeeze rollers; thence forward between the first pair of squeeze rollers and down again, into the vat; thence, out of the same, as before and against the rear side of the guide roller L, placed somewhat below, and in rear of, the squeeze rollers; thence, over the lower

squeeze roller; thence, under the roller or cylinder M, of a stop motion to be hereinafter described; and from thence is passed between another set of squeeze rollers N, O; from whence it is carried into, and out of the second vat P, and over the lower squeeze roller as many times as may be required, and in a similar manner to that heretofore described with respect to the first set of squeeze rollers and the first vat. From the second set of squeeze rollers, the band of yarn is carried under the roller Q, of a second stop motion, appended to the said squeeze rollers; and from thence, proceeds to the third set of squeeze rollers, and into and out of, the third vat; and so on throughout the series of squeeze and other rollers and vats; until it is finally received upon steam drying cylinders R, S, and conducted from thence, through suitable reeds, to an ordinary warping machine, by which, the threads are separated and rewarped upon a long beam.

In carrying a band of yarn through a dyeing apparatus of the above kind, it becomes necessary in order to insure the threads being successfully or properly dyed, that some mechanism be adapted, by which it (the band of yarn) may be moved from one set of squeeze rollers to that immediately succeeding, and without any material strain thereon—such strain upon the fillet or band of yarn, being productive of injury to the dyeing process. In order to accomplish the same, I arrange and operate each set of squeeze rollers, so that the yarn shall be passed by, and between them, at a slower rate or speed than it does through the set immediately preceeding—and apply to each set of squeeze rollers a stop motion, which when the yarn extending between any two adjacent sets of squeeze rollers slackens, or becomes slackened, beyond a certain degree, shall arrest the progress or movement of the rear set of squeeze rollers, until the front set is enabled to take up the surplus yarn.

All the squeeze rollers are driven by one horizontal shaft *a* (Figs. 1, 2) which is revolved by any suitable mechanism connected with the driving power. This shaft has several beveled pinions *b, b, b, b, &c.*, affixed upon it, each of which, is so placed thereon, as to engage with one of several beveled wheels *c, c, c, c, &c.*, which are severally connected with, or arranged and slide upon, 110

the shafts *d*, *d*, *d*, *d*, &c, of the lower rollers of the various sets of squeeze rollers, as denoted in the drawings. Each of the beveled wheels *c*, *c*, *c*, *c*, &c., plays loosely upon its shaft, but when the said shaft is turned around by the beveled pinion of the shaft *a*, the beveled wheel is fixed to the shaft *d*, by an ordinary clutch *e*. The clutch is moved or slid upon the shaft *d*, by means of a fork or arm *f*, (see Fig. 3, which represents a vertical cross section of the upper part of the mechanism, taken between two adjacent sets of squeeze rollers), which projects vertically from a horizontal shaft *g*, suitably sustained and moving in bearings *h*, *h*, applied to the framework, and arranged as seen in Figs. 1, 2. The fork *f* is connected with the clutch in the manner in which such mechanism is usually arranged together. From each horizontal shaft *g*, a rod *i*, projects nearly or about horizontally at right angles, and has a heavy roller *M*, before mentioned, so fitted upon its other end, as to turn loosely thereupon. When the rod or arm *i*, and roller *M*, are depressed, they turn the shaft *g* in its bearings, and thereby slide the clutch *e* upon the shaft *d*, and when the depression reaches a certain extent, say at an angle of about five degrees below a horizontal plane, the clutch will be thrown out of engagement with the beveled wheel *c*, and will thus disengage the said wheel with the shaft *d*, and consequently permit it to be turned around by its beveled pinion, in such manner as to produce no movement of the shaft *d*; and thus arrest the movement of the set of squeeze rollers connected with the said shaft. As it was before mentioned that the yarn proceeding from one set of the squeeze rollers to the succeeding set, was passed directly underneath the roller *M*, of the rod *i*, it will be seen that the slackening of the said yarn, will cause the said roller to fall a little, and thus depress the rod *i*, so as to act upon the clutch, and slide it upon its shaft. Therefore, when the said slackening of the yarn reaches a certain extent, the clutch will have been moved so far upon the shaft, as to disengage the beveled wheel, with the shaft, and thus arrest the motion of the squeeze rollers.

In order that the yarn may be passed by, and between each set of squeeze rollers, at a slower rate or speed than it is moved through the set immediately preceeding, the lower roller of each set of squeeze rollers, has a diameter given it, a very little less than that of the lower squeeze roller of the set immediately preceeding; that is to say, the lower roller of the first set, has a certain diameter; that of the second set, has a little smaller diameter; that of the third, a still smaller, and so on, throughout the series. Therefore although all of the said

squeeze rollers are revolved in the same time, the second set will not pass the band of yarn on, so fast as the first; nor the third, so fast as the second. Consequently, the yarn between each two adjacent sets of squeeze rollers, slackens, and thus permits the weighted arm *i*, to descend, and finally arrest the progress of its squeeze rollers, and so arrest them, until the succeeding set takes up the slackened yarn. The draft upon the yarn elevates the arm *i*, and thus throws the beveled wheel into engagement with the shaft *d*, and again turns the squeeze rollers. The yarn is thus moved through the apparatus without any injurious tension being produced thereon.

By reference to Figs. 1, 2 it will be seen, that all the squeeze rollers, guide, or carrying and other rollers, and steam cylinders, are placed in angular positions with respect to the general course of the yarn through the machine; or with respect to the framework of it; that is to say, their axes are all arranged in horizontal planes, and parallel to each other, but at acute and not right angles to a vertical plane passing longitudinally through the middle of the framework or centers of all the squeeze rollers; the same being as exhibited in the drawings. The object of the above arrangement of the rollers, is to enable the yarn to be passed two or more times into and out of the same vat, and at the same time, to allow the coils of yarn around the lower squeeze rollers, to pass by, without interfering with each other, or rubbing against each other, so as to produce injury, entanglement or unnecessary friction. The band of yarn being coiled or wound several times around the lower of the first set of squeeze rollers, and the dipping rollers of the first vat, is carried from the squeeze roller in a direction perpendicular to the axis of the said squeeze roller, to the lower squeeze roller of the succeeding set; which it meets at a point or part of the same, corresponding, or nearly corresponding with that on which or where it is first coiled on the first squeeze roller. The yarn is next coiled several times around the lower of the second set of squeeze rollers, and the dipping roller of the second vat, the coils being arranged upon the rollers side by side, or with a short space or distance between each, as represented in Fig. 1. Such an arrangement of the coils upon the second lower squeeze roller, and also upon the first lower squeeze roller, is kept up throughout the series of rollers and cylinders, and therefore, when the said rollers and cylinders are put in operation, the yarn will be uncoiled and recoiled without the coil rubbing against each other, so as to injure the yarn or be detrimental to the process of dyeing.

Instead of varying the diameters of the different lower squeeze rollers, they may be

all of the same size, and each succeeding set of squeeze rollers, driven at a little slower speed than the set immediately preceeding it.

I claim—

- 5 1. The method by which I am able to effect the passage of the yarn from one set of squeeze rollers to the other, throughout the series thereof, without its receiving, during the same, more tension than is necessary to
- 10 operate the "stop motion"; the same consisting in arranging and actuating each set of squeeze rollers, so that the yarn shall be passed by and between its rollers, at a slower rate, or speed, than it does through the set
- 15 immediately preceeding and applying a "stop motion" to the yarn and each set of squeeze rollers in the maner hereinabove set forth; so that the slackening of the said yarn, between each two sets of squeeze rollers,
- 20 shall throw the machinery, by which one set of said rollers is revolved, out of action, until the succeeding set is enabled to take up the surplus yarn.

2. Also, the method, by which the yarn (or coils thereof) is protected from entangle- 25 ment and friction, while passing and being wound several times around the various squeeze and dipping or other rollers and steam cylinders of the mechanism—viz: by arranging the said rollers and cylinders in 30 the angular positions with respect to the general course of the yarn through the machine, or with respect to the framework of the machine, as above described, and represented in the drawings—the whole of the 35 above mechanism being constructed and operating substantially as above described.

In testimony that the foregoing is a correct specification of my said invention I have hereto set my signature this 12th day 40 of April in the year eighteen hundred and forty four.

WILLIAM A. BURKE.

Witnesses:

JOSEPH KNOWLTON,

JOHN S. T. CUSHING.