

July 31, 1934.

J. C. FERGUSON

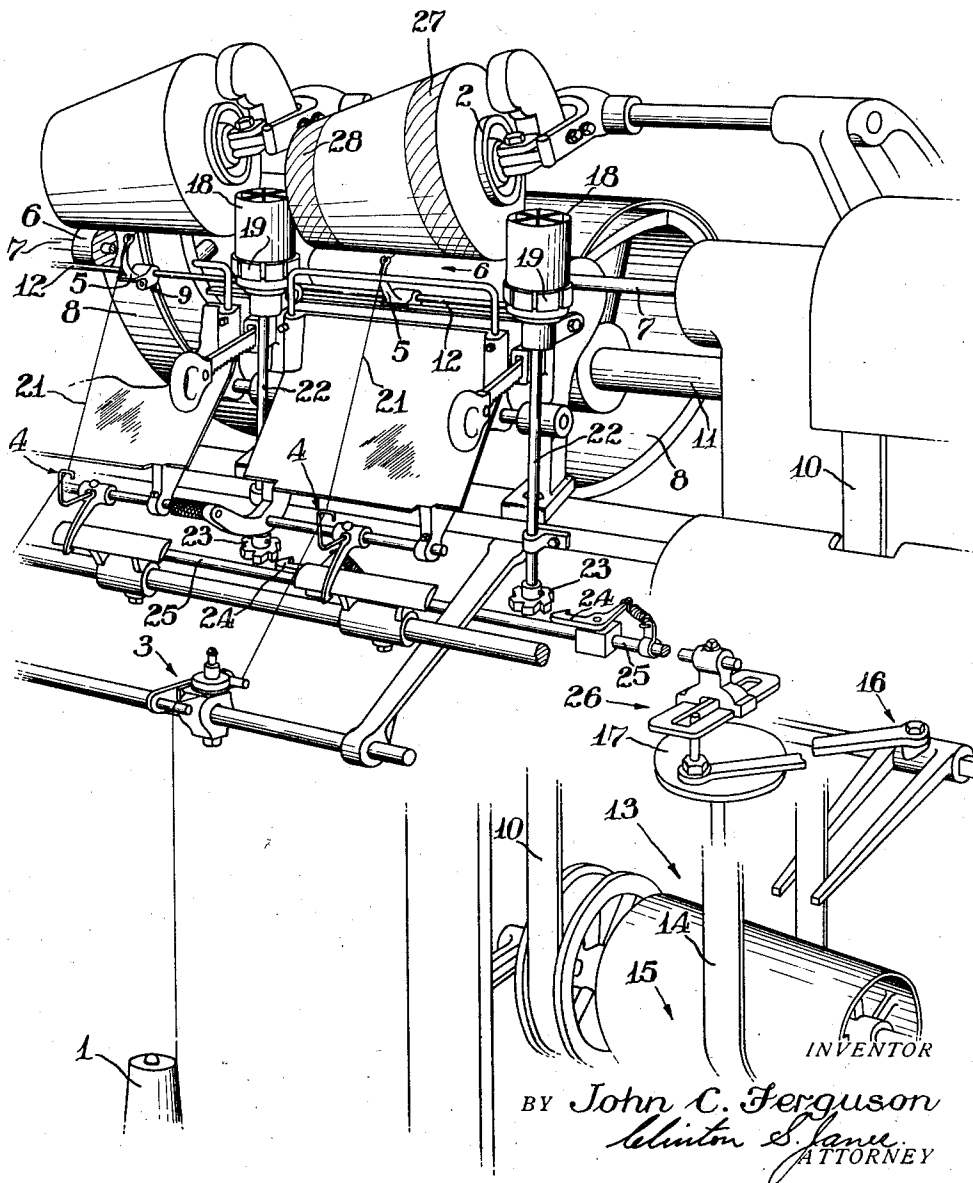
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METHOD AND APPARATUS FOR DYEING TEXTILE MATERIALS

Filed July 30, 1932

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Fig. 1



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Fig. 2

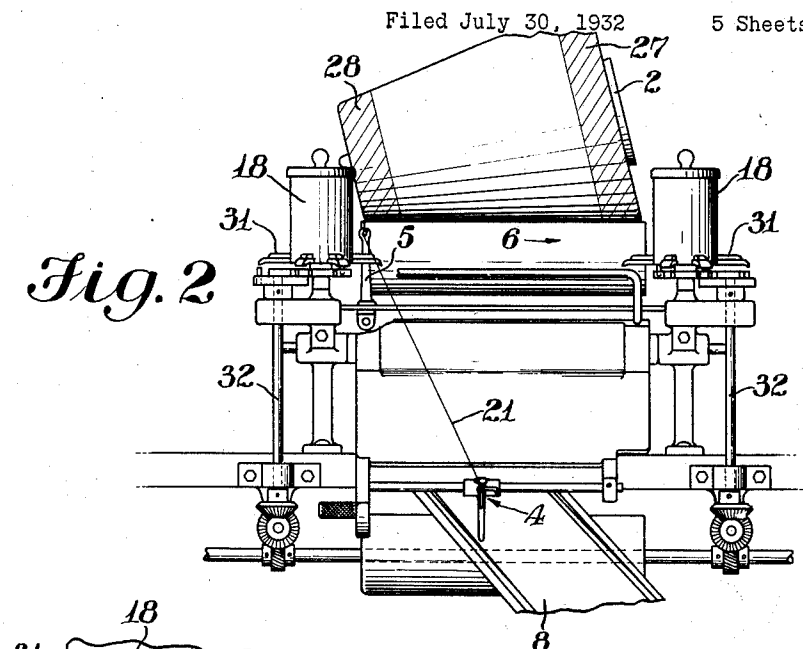
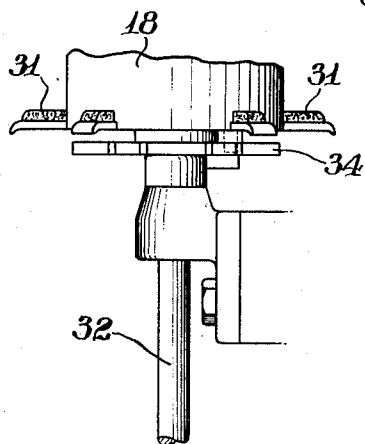


Fig. 4

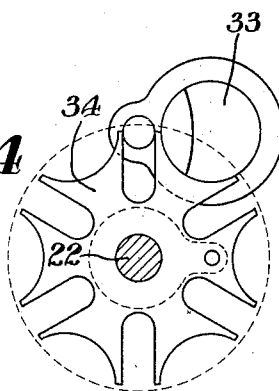
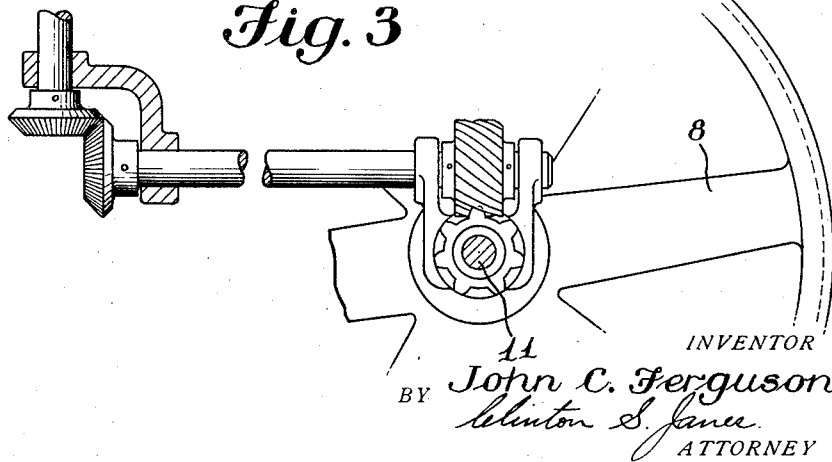


Fig. 3



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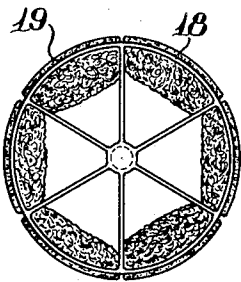


Fig. 6

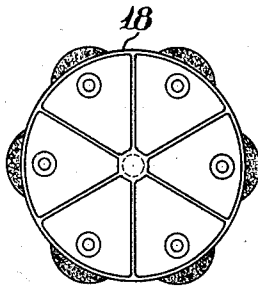


Fig. 8

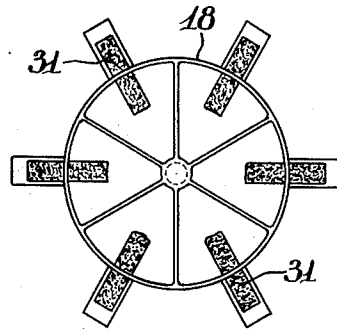


Fig. 10

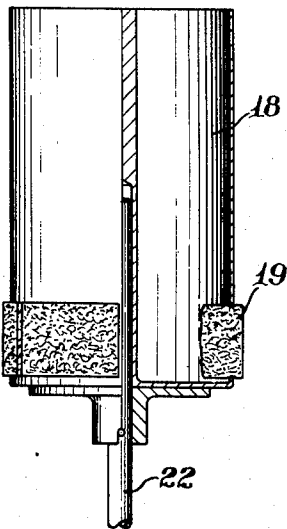


Fig. 5

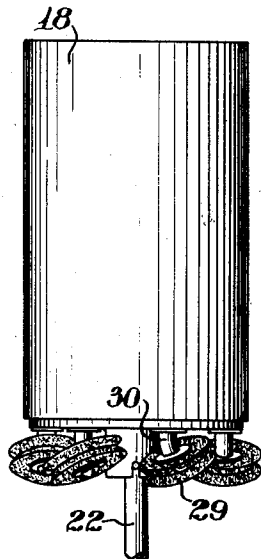


Fig. 7

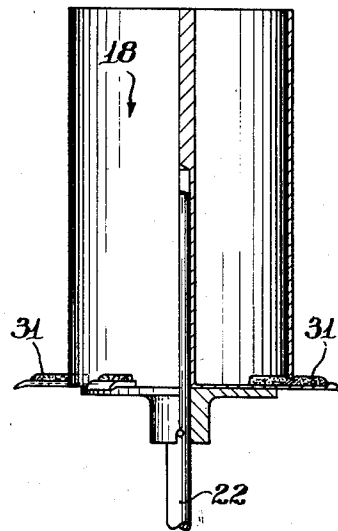


Fig. 9

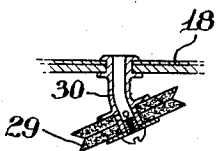


Fig. 11

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Fig. 12

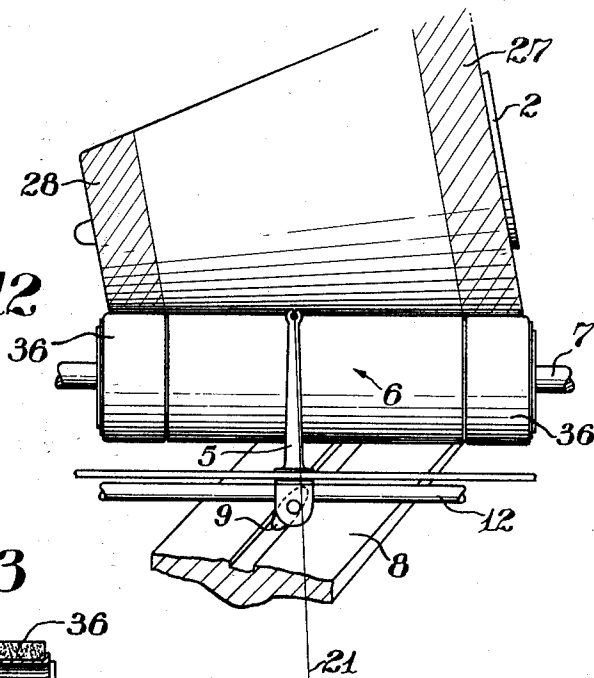


Fig. 13

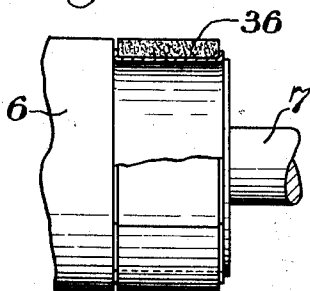
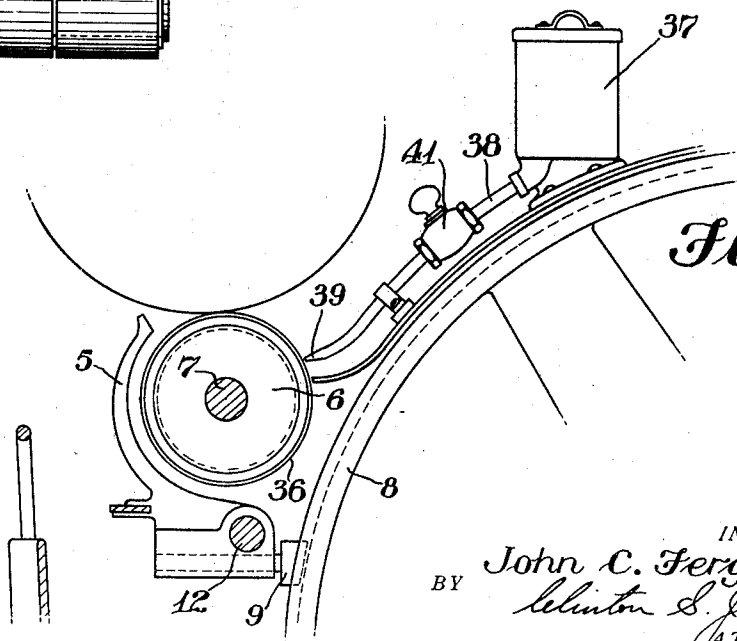


Fig. 14



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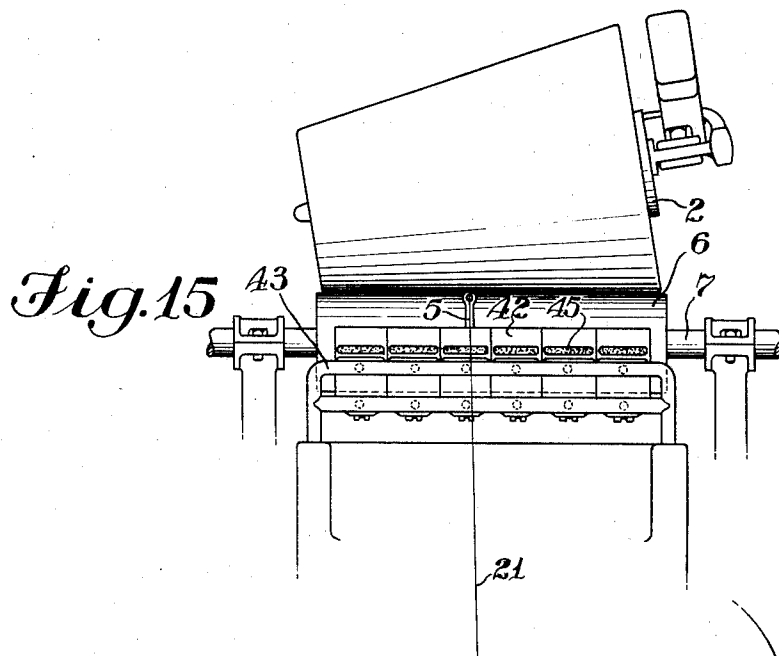
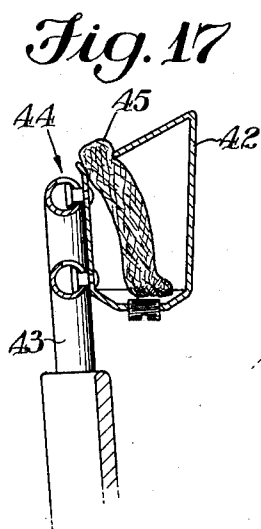
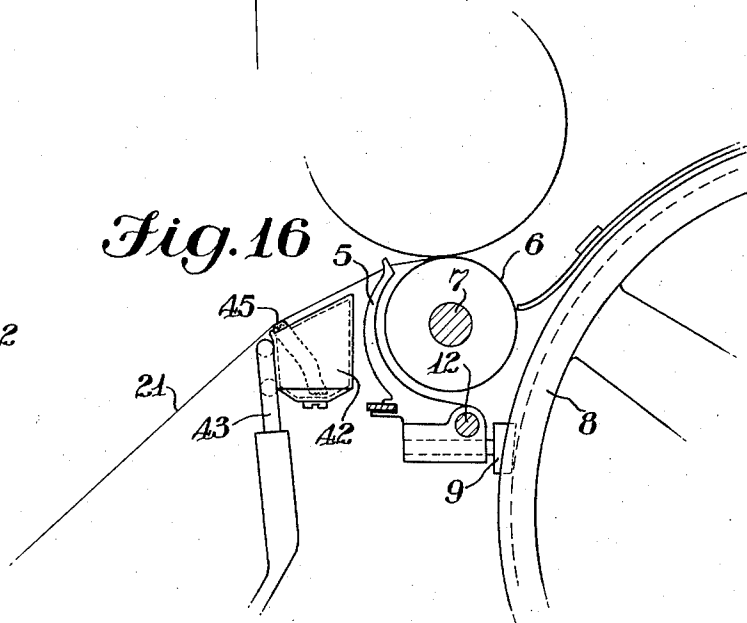
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METHOD AND APPARATUS FOR DYEING TEXTILE MATERIALS

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UNITED STATES PATENT OFFICE

1,968,677

METHOD AND APPARATUS FOR DYEING
TEXTILE MATERIALSJohn C. Ferguson, Elmira Heights, N. Y., as-
signor to Eclipse Textile Devices, Inc., Elmira,
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Application July 30, 1932, Serial No. 627,060

9 Claims. (Cl. 8—17)

The present invention relates to a method and apparatus for dyeing predetermined portions of textile material such as thread, yarn and the like, and more particularly to a new and improved process and structure for dyeing predetermined portions of such material in a variety of pre-selected colors.

It is an object of the present invention to provide a novel device of the above character which primarily utilizes an existing manufacturing operation and apparatus for securing the new result.

Another object of the invention is the provision of such a device which is automatic in action and which requires substantially no additional supervision.

A further object is to provide such a device which is readily and accurately controllable to secure the desired results.

Another object is to provide such a device which allows a wide range of choice with respect to patterns and colors.

Another object is to provide such a device which requires the addition of only comparatively cheap and simple structure to the existing apparatus in order to carry out the dyeing operation.

Further objects and advantages will be apparent to those skilled in this art from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a perspective elevation of a portion of a standard type of winding machine incorporating one preferred form of the present invention;

Fig. 2 is a side elevation of a portion of such winding machine incorporating another embodiment of the present invention;

Fig. 3 is an enlarged detail of an indexing drive for dye containers according to the present invention;

Fig. 4 is a detail of the indexing mechanism shown in Fig. 3;

Fig. 5 is an enlarged elevation partly in section of a unified group of dye holders and dispensing devices of the character illustrated in Fig. 1;

Fig. 6 is a top plan view of Fig. 5;

Fig. 7 is a view similar to Fig. 5 illustrating another type of dispensing device;

Fig. 8 is a top plan view of Fig. 7;

Fig. 9 is an enlarged elevation partly in section of a unified group of dye holders and dispensing devices of the character illustrated in Fig. 2;

Fig. 10 is a top plan view of Fig. 9;

Fig. 11 is a sectional detail of a dispensing device as illustrated in Fig. 7;

Fig. 12 is a detail in elevation of another form of dye dispensing devices;

Fig. 13 is an enlarged detail partly in section of a dispensing device as illustrated in Fig. 12;

Fig. 14 illustrates a dye holder and one method of feeding dye to a dispensing device as illustrated in Fig. 12;

Fig. 15 illustrates another embodiment of the invention showing the use of a plurality of stationary dye holders and dispensing devices;

Fig. 16 is an end view of the structure shown in Fig. 15; and

Fig. 17 is a sectional view of a dye holder and dispensing device of the type shown in Fig. 15.

The winding machine illustrated in Fig. 1 includes primarily a plurality of yarn holders 1 carrying the packages of yarn to be dyed, a plurality of receiving yarn holders 2 on which the dyed yarn is to be wound in the usual package or cop, and means for rotating the yarn holders 2 to draw the yarn through tension devices 3, stop motions 4 and reciprocatory thread guides 5. The means for rotating the holders 2 includes driving rolls 6 mounted on and driven by a roll shaft 7, and the means for reciprocating the thread guides 5 includes cam wheels 8 arranged to cooperate with followers 9 on said thread guides and mounted on and driven by a cam shaft 11 whereby the thread guides 5 are caused to reciprocate on stationary guides 12 from end to end of the yarn holders 2.

The cam shaft 11 is driven at constant speed from a suitable source of power not illustrated and the roll shaft 7 is preferably driven by a belt 10 from the same source of power but is arranged to be accelerated and decelerated slightly at regular intervals by means of a building motion indicated generally at 13 and including a belt 14 driven from said source of power, a cone pulley 15 and shifting mechanism 16 for the belt 14 operated by a disc 17 driven at slow speed through suitable gearing from the source of power. The operation of the building motion is such that the yarn as it is received on the holders 2 does not pile up in ridges but is arranged to properly build up in suitable cops. It will be understood that the mechanism so far described is of a standard type and it is believed that further description thereof is accordingly unnecessary.

According to the present invention means are provided for intermittently applying to the yarn as it travels from one holder to the other coloring material of predetermined character according to a pre-selected sequence or pattern. As illustrated in Fig. 1, this means comprises unitary groups of dye containers and dispensing devices in the form of receptacles 18 (Fig. 5) provided

with wicks or pads 19 of suitable material adapted to be saturated by the dye within the receptacles, and arranged to be engaged by the reach 21 of the yarn as it is reciprocated by the guide 5 whereby the yarn is impregnated at intervals by the coloring material.

In order that the various dye dispensing devices may engage the yarn in sequence, they are arranged as here shown in the form of a cylinder fixed on a rotary shaft 22, and suitable indexing means for the shaft are provided to rotate the dispensing devices into operative position. As here shown, the indexing means is in the form of a ratchet 23 and a pawl 24 which is arranged to be actuated by a shaft 25 which is reciprocated by means of a scotch yoke connection 26 from the disk 17 of the building motion.

The groups of dye dispensing devices 18, 19 are preferably arranged to be engaged by the traveling yarns at both sides thereof so that one group may operate simultaneously on two yarns.

In the operation of this embodiment of the invention, the receptacles 18 having been filled with the desired dye colors, the operation of the winding machine in the usual manner causes such dye colors to be intermittently applied to the yarns as they are carried back and forth by the guides 5, the dyed portions of the yarns as they are wound on the holders 2 forming terminal bands as shown at 27 and 28, the color of the bands being changed periodically as the groups of dye dispensing devices are indexed by the operation of the building motion.

It will be understood that various forms of dispensing devices may be utilized, Figs. 7, 8 and 11 illustrating a form in which the engaging element is in the form of a pivotally mounted disc 29 of suitable material fed from the dye receptacles 18 as by means of hollow supporting members 30 and arranged to have rolling contact with the yarn. Figs. 9 and 10 illustrate another form in which the engaging elements 31 are arranged as flat surfaces angularly disposed.

In Figs. 2, 3 and 4 there is illustrated an embodiment of the invention incorporating indexing mechanism for the dye dispensing devices which is operated by the cam wheels 8 so as to be synchronized with the movement of the thread guides 5. As here shown the cam shaft 11 drives shafts 32 through suitable gearing of unit ratio. Shafts 32 are provided on their upper ends with pinwheels 33 arranged to engage star wheels 34 mounted on the shafts 22 on which the dye receptacles 18 are mounted, said wheels 33 and 34 being arranged to form a conventional type of Geneva movement whereby the shafts 22 are indexed once for each revolution of the cam shaft 11.

It will be understood that any suitable form of dye dispensing structure may be utilized with this embodiment of the invention, that illustrated being the type shown in detail in Figs. 9 and 10 of the drawings.

The operation of this embodiment of the invention is substantially similar to that first described with the exception that since the indexing of the dye dispensing devices is synchronous with the motion of the yarn guides, the adjacent spotted portions of the yarn will be of different colors.

In Figs. 12, 13 and 14 there is illustrated another embodiment of the invention in which the dye dispensing surfaces are arranged to have rolling contact with the yarn. As there shown, the driving rolls 6 are provided with one or more rings

36 of suitable absorbent material and means are provided for saturating these rings with coloring material here illustrated in the form of a corresponding number of dye receptacles 37 provided with conduits 38 terminating in nozzles 39 adjacent and above said rings 36, and having regulating valves 41 whereby the dye may be allowed to drip on the dispensing rings 36 at a suitable rate to maintain the saturation thereof.

It will be understood that any desired number of rings 36 may be arranged along the rolls 6, and may constitute the entire periphery thereof if so desired, and each ring may be provided with dye of any desired color. The rings are preferably mounted on the rolls 6 with suitable frictional engagement whereby the rings may be removed and interchanged to provide the desired pattern on the yarn.

During the operation of this embodiment of the invention, the yarn as it is wound upon the receiving holder is pressed against the dispensing rings 36 so as to be efficiently impregnated with the dye carried thereby, whereby the yarn is spotted in a predetermined manner as it is carried back and forth by the thread guide 5.

In Figs. 15, 16 and 17 there is illustrated an embodiment of the invention in which the dye dispensing devices comprise receptacles 42 mounted on the thread bars 43 as by means of detachable connections 44, and provided with suitable dispensing elements such as wicks or felts 45 which are arranged in the path of the yarn as it is reciprocated by the guide 5. The receptacles 42 are readily removable and interchangeable whereby the character and sequence of the coloring applied to the yarn may be readily varied as desired.

In the operation of this embodiment of the invention, the yarns will be wiped across the terminal surfaces of the dispensing elements 45 as they are carried back and forth by the thread guide 5 whereby the yarn will be periodically impregnated with the various colors in accordance with the pre-arranged sequence.

It will be noted that there is here provided a method and apparatus for spotting yarn in any desired combination and sequence of colors which accomplishes the objects above set forth in an efficient and reliable manner. Moreover, although certain embodiments of the invention have been described and illustrated in detail, it will be understood that other embodiments are possible and that various changes may be made in the design and arrangement of the parts without departing from the spirit of the invention as defined in the claims appended hereto.

What is claimed is:

1. A method of spot dyeing yarn or the like in a plurality of colors comprising drawing a continuous length thereof past a plurality of laterally arranged dye dispensing devices, vibrating the said yarn laterally so as to cause it to engage said devices and become impregnated with said colors in sequence, and shifting said dispensing devices so as to present a preselected arrangement of colors thereto.

2. A method of spot dyeing yarn or the like in a plurality of colors comprising drawing a continuous length thereof past a plurality of laterally arranged dye dispensing devices vibrating the said yarn laterally so as to cause it to engage said devices and become impregnated with said colors in sequence and shifting said dispensing devices in synchronism with the vibrations of the yarn so as

to present a preselected arrangement of colors thereto.

3. In a winding and dyeing machine, a plurality of rotatable holders, means to transfer thread, yarn or the like from one holder thereof to another, a plurality of dye dispensing devices arranged laterally adjacent said yarn, means to vibrate said yarn into engagement with said dye dispensing devices alternately, and means to position said dye dispensing devices so as to engage said yarn in sequence.

4. A winding and dyeing machine for yarn and the like including a receiving package, means for revolving said package to wind the yarn thereon, reciprocating means for guiding the yarn onto the package and a plurality of dye dispensing elements arranged to present surfaces wet with dye adjacent the yarns as it is wound on the package, and means to move said surfaces of the dye dispensing elements into operative position in sequence, said guiding means being arranged to move the yarn into periodic engagement therewith.

5. A winding and dyeing machine for yarn and the like including a receiving package, means for revolving said package to wind the yarn thereon, reciprocating means for guiding the yarn onto the package, a plurality of dye dispensing elements arranged to present surfaces wet with dye adjacent the yarn as it is wound on the package, and means operative in synchronism with said guiding means for moving said surfaces of the dye dispensing elements into operative position in sequence, said guiding means being arranged to move the yarn into engagement with said surfaces.

6. A multi-color yarn spotting machine including a plurality of pivotally mounted dye holders

having dye dispensing surfaces, means for drawing the yarn past said surfaces, means for reciprocating said yarn laterally into and out of contact with said surfaces and means for indexing said holders in synchronism with the reciprocation of the yarn to present said dispensing surfaces to the yarn in sequence.

7. A multi-color yarn spotting machine including a plurality of pivotally mounted dye holders having dye dispensing surfaces, means for causing the yarn to periodically engage said surfaces, and means for indexing said holders to present the dispensing surfaces thereof to the yarn in sequence.

8. A multi-color yarn spotting machine including a plurality of pivotally mounted dye holders having dye dispensing surfaces, means for causing the yarn to periodically engage said surfaces, and means for indexing said holders in synchronism with such periodic movement of the yarn to present the dispensing surfaces thereof to the yarn in sequence.

9. A winding and dyeing machine for yarn and the like including a receiving package, means for revolving said package to wind the yarn thereon, reciprocating means for guiding the yarn onto the package in timed relation to the rotation of the package, building means for periodically varying the timed relation between the guiding means and the winding means, a rotatable dye holder arranged to present surfaces wet with dye in position to intermittently engage the yarn as moved by said guide and means operated by said building means for periodically indexing the dye holder to present different dye surfaces to the yarn.

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75	150