H. P. DENISON.

APPARATUS FOR COLORING OR PRINTING THREAD.

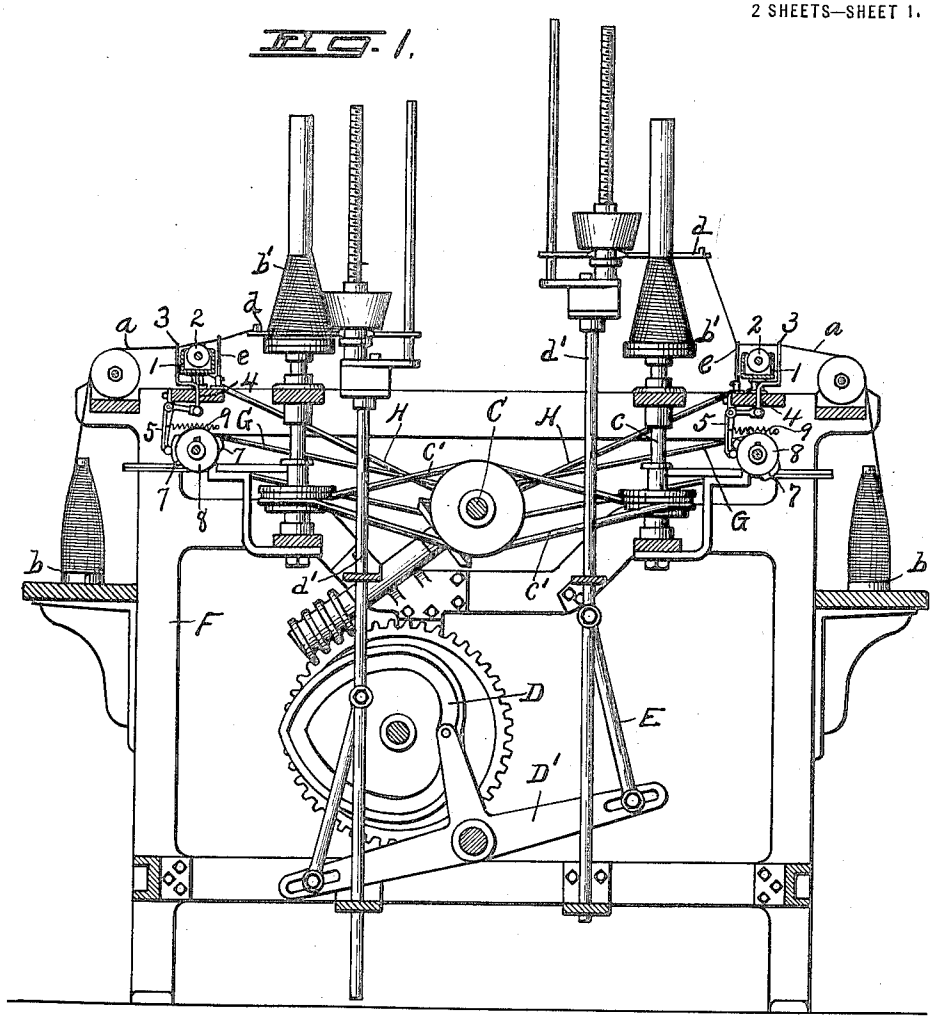
APPLICATION FILED FEB. 28, 1918.

1,384,940.

Patented July 19, 1921.

2 SHEETS—SHEET 1.

FIG. 1.



INVENTOR

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2 SHEETS—SHEET 2.

Fig. 2.

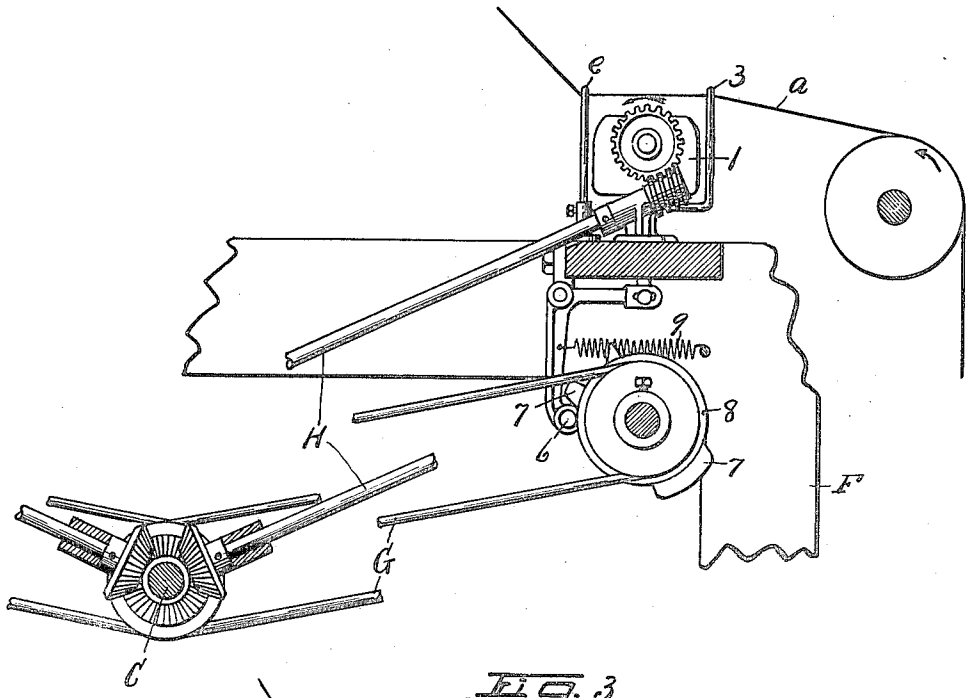
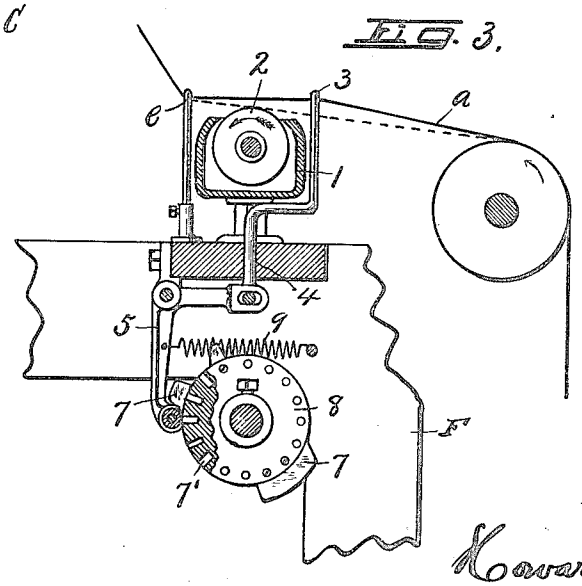


Fig. 3.



INVENTOR

Howard P. Denison

UNITED STATES PATENT OFFICE.

HOWARD P. DENISON, OF SYRACUSE, NEW YORK.

APPARATUS FOR COLORING OR PRINTING THREAD.

1,384,940. Specification of Letters Patent. Patented July 19, 1921.

Application filed February 28, 1918. Serial No. 219,710.

To all whom it may concern:

Be it known that I, HOWARD P. DENISON, a citizen of the United States of America, and resident of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Apparatus for Coloring or Printing Thread, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain Improvements in apparatus for coloring or printing threads, such as the weft or warp units preparatory to weaving the same into fabric.

I am aware that the intermittent printing or coloring of threads or yarn so that sections thereof will be colored and other sections uncolored is old in various prior patents such for example as the patents to:

Stephens and Green, No. 46,829, Mar. 14, 1865;

Stephens and Green, No. 57,592, Aug. 28, 1866;

Foster, No. 78,273, May 26, 1868;

Stokes, No. 590,245, Sept. 21, 1897;

Dratz, No. 627,329, June 29, 1899;

Morton, No. 834,396, Oct. 30, 1906;

Landenberger, No. 864,312, Aug. 27, 1907;

Sulzbach, No. 871,376, Nov. 19, 1907;

Zimmerman, No. 1,195,322, Aug. 22, 1916; and

German Patent No. 198,346,

and that in some of these patents, particularly those to Stokes No. 590,245 and Foster No. 78,273, the color is applied to the yarn while the latter is moving continuously or uninterruptedly or being transferred from one support to another so as to successively color sections of the yarn, leaving other sections thereof uncolored.

I am also aware that it is very common to apply fluid substance, such as oil, through the medium of wicks or similar absorbents to yarn or similar threads while the latter is being transferred continuously or uninterruptedly from one cop or bobbin to another, as in the patent to Kilbourn No. 619,893, February 21, 1899.

The thread or yarn units to be printed or colored, as shown by these several prior patents, are usually fed longitudinally from one to another series of cops or bobbins so that intervening portions thereof will travel in parallelism in slightly spaced relation.

One of the objects is to apply the coloring matter to the traveling yarn or thread through the medium of an absorbent disk partially submerged in the coloring matter and having its contact side adapted to travel in the same direction as that of the yarn and to utilize the same disk or disks as agitators for keeping the coloring matter at a uniform consistency and color.

Another object is to reciprocate one of the yarn guides in such manner as to intermittently contact different sections thereof with the disk or other color-applying device without in any way interfering with the free travel of the yarn or its uniform laying upon the winding cop or bobbin.

Other objects and uses relating to the operation of the means for contacting the yarn with the color-applying member will be brought out in the following description.

In the drawings—

Figure 1 is a side elevation of duplicate thread-transferring mechanisms driven from the same source of power and a corresponding number of printing devices for printing the threads at intervals as they are transferred from one to the other of the coöperating cops or bobbins, the receptacles for the coloring matter being shown in section.

Fig. 2 is an enlarged elevation, partly in section, of the means for causing intermittent contact of different portions of the thread with the color-applying member as the thread is moved longitudinally.

Fig. 3 is a detail sectional view of the printing mechanism for one of the threads showing more particularly the color-applying member and the means for moving the thread into and out of contact therewith.

The intermittently operating printing device forming the subject-matter of my invention may be used in connection with any mechanism for transferring the yarn or thread units from one to the other of a pair of coöperative cops or bobbins, such for example as that shown in the patent to Kilbourn No. 619,893, Feb. 21, 1899, in which each thread or yarn unit as —*a*—, is transferred from one cop or bobbin —*b*— to another cop or bobbin —*b'*—, the latter being mounted on a rotary shaft —*c*— which is driven by a belt —*c'*— from a main driving shaft —C—, the yarn-transferring mechanism being duplicated on each side of the main supporting frame —F—.

Suitable means is also provided for properly laying the thread upon the bobbin —*b'*—, and for this purpose the yarn be-

fore passing to said bobbin is carried over a guide —*d*— which is mounted upon a vertically movable rod —*d'*—, the latter being reciprocated vertically by means of a cam —D—, a lever —D'— and a pitman —E—, Fig. 1.

The yarn or thread in transit from the cop —*a*— to the bobbin —*b'*— is caused to travel in a substantially horizontal plane through a stationary guide member —*e*— for conveniently positioning the yarn or thread to receive the coloring matter while in transit from one bobbin to the other.

The printing or coloring device comprises a reservoir —1— which is supported directly beneath the horizontal portion of the thread and contains a suitable quantity of the coloring matter in which is partially immersed a rotary color-applying member —2— having its upper side projecting through the top of the reservoir directly underneath the thread —*a*— and adapted to travel in the same direction as said thread when the latter is in contact therewith, the color-applying member —2— being preferably made of felt or equivalent absorbent, and is usually light so that its inertia may be instantly overcome when the moving thread is brought into such contact, thereby transferring the coloring matter to sections of the yarn as often and as long as the contact is continued.

Suitable means is provided for intermittently moving the portion of the yarn overlying the color-applying member —2— into and out of contact therewith for successively coloring portions of the yarn and leaving other portions uncolored, and for this purpose the thread is passed through a vertically reciprocating guide —3— which is slidable in a suitable way —4— in a part of the frame —F—, and has its lower end pivotally connected to one arm of a bell-crank lever —5—, the other arm of said lever having a bearing —6— adapted to be engaged by one or more cam projections —7— on the periphery of a rotary actuating member —8—, the latter being driven from a main driving shaft —C— through the medium of a belt —G—, as shown more clearly in Figs. 1 and 2.

The lower arm of the bell-crank lever —5— is yieldingly held in engagement with the actuating member —8— and its cam projections —7— by means of a spring —9— which also effects the raising of the guide member —3— to move the thread out of contact with the color-applying member —2—.

The cam projections —7— may be of the same or different circumferential lengths and are removably inserted in sockets —7'— in the periphery of the actuating member —8— so that they may be changed at will to vary the period of contact between the thread and color-applying member —2— and thereby vary the length or lengths of the colored section or sections of the thread.

If desired, the shaft carrying the disk or disks —2— may be rotated in the direction indicated by the arrow, Figs. 2 and 3, through the medium of the shaft —H— having gear connection with the main driving shaft —C— and additional gear connection with the shaft which carries the disk —2—, as shown more clearly in Figs. 1 and 2, although it is evident that any other well-known means may be employed for transmitting motion from the main driving shaft to the disk-supporting shaft.

The bobbin —*b'*— is driven at a constant speed by the devices shown, and its speed approximates that of the shaft C. However, by reason of the tapered shape of the bobbin, the speed of the traveling yarn is constantly varying from a maximum at the large diameter end of the bobbins to a minimum at the opposite end.

It is further apparent that by the devices and connections shown, the member —2— is driven at a relatively low surface speed as compared with the speed of the traveling yarn and that the speed of said member is substantially constant, resulting necessarily in a wiping movement of the rapidly traveling yarn across the surface of the member —2—, which, as illustrated, travels at a different, and in this instance, a considerably lower speed.

The disks —2— travel in the coloring fluid in the reservoir —1— and in addition to their function of applying color to the yarn, also serve to agitate the fluid and to thereby keep it at a uniform consistency and color.

It is evident, however, that the disks may remain stationary or modified in form to serve as color-applying wicks to be used with or without any of the well-known form of agitators in combination with any form of yarn guide which is capable of moving portions of the yarn into and out of contact with the color-applying member and, therefore, I do not wish to limit my invention to the use of rotary disks, nor to any specific means for operating the reciprocatory guide through which the yarn travels.

What I claim is:

1. In an apparatus for coloring yarn, thread or the like, means for moving the yarn longitudinally, a rotary absorbent member adjacent the yarn, means for applying die to said rotary member, and means for intermittently causing the yarn to wipe across the periphery of said rotary member, without interrupting the longitudinal movement of said yarn.

2. In a device for printing or coloring

yarn, the combination of a reservoir containing coloring matter, a rotary disk dipping into the reservoir, means for moving the thread or yarn lengthwise of the periphery across the disk, a guide through which the yarn passes, and cam-operated means for reciprocating said guide to move the adjacent portion of the yarn into and out of contact with the periphery of the disk.

3. In an apparatus for coloring yarn, thread or the like means for moving the yarn in the direction of its length, a rotary dye applying member adjacent the yarn, means for applying dye to said dye applying member, means for intermittently moving the yarn laterally into contact with said dye applying member without interrupting the lengthwise movement of the yarn, whereby the yarn is intermittently caused to wipe across the periphery of said member.

4. In a yarn-coloring device, the combination with means for feeding the yarn lengthwise from one support to another, a color-applying member adjacent a portion of the yarn between said supports, a guide for the traveling yarn adjacent the color-applying member, and means for reciprocating said guide to move adjacent portions of the yarn into and out of contact with the color-applying member, said means including a cam and a bell-crank lever operated thereby.

5. In combination with yarn-feeding means, a color-applying member adjacent the line of travel of the yarn, a reciprocatory guide through which the yarn travels, a bell-crank lever for operating the guide, and a cam for operating the bell-crank lever.

In witness whereof I have hereunto set my hand this 22nd day of February, 1918.

HOWARD P. DENISON.

Witnesses:
ALICE M. CANNON,
LUCILLE L. PENO.