

J. T. WOOD.
DYEING APPARATUS.
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1,151,916.

Patented Aug. 31, 1915.
2 SHEETS—SHEET 1.

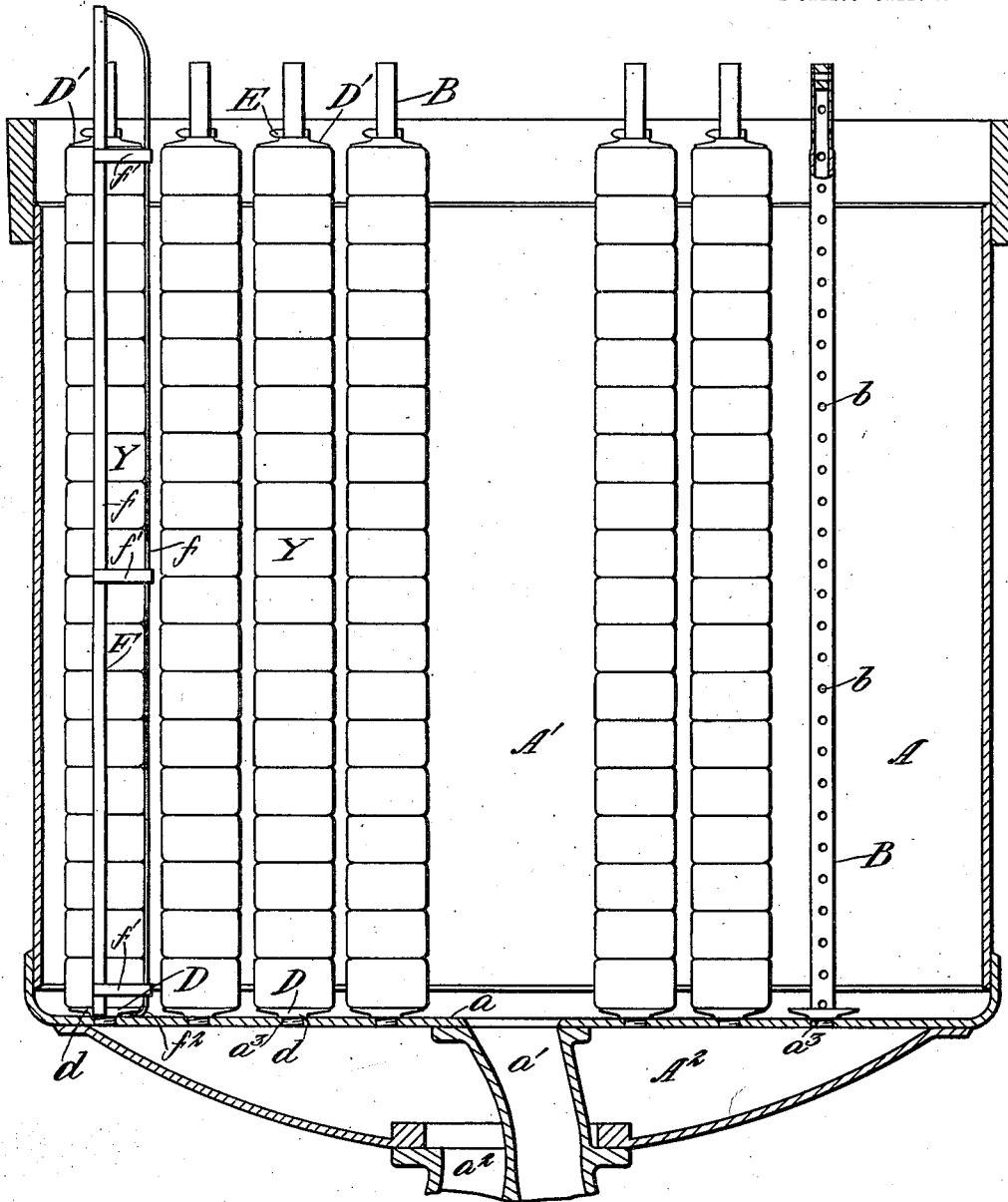


Fig. 1.

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2 SHEETS—SHEET 2.

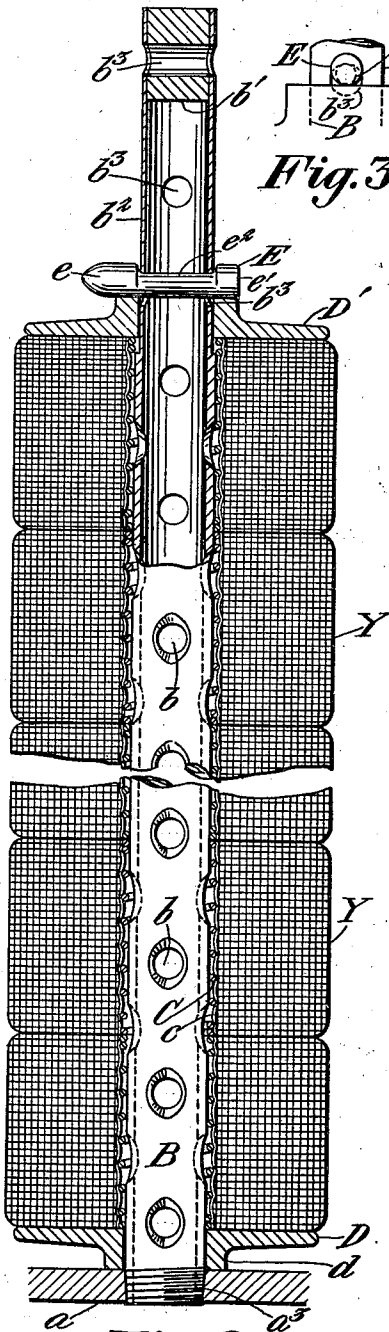


Fig. 2.

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Fig. 3.

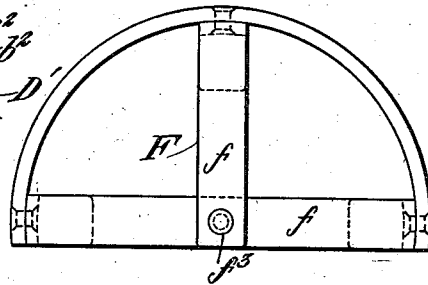


Fig. 5.

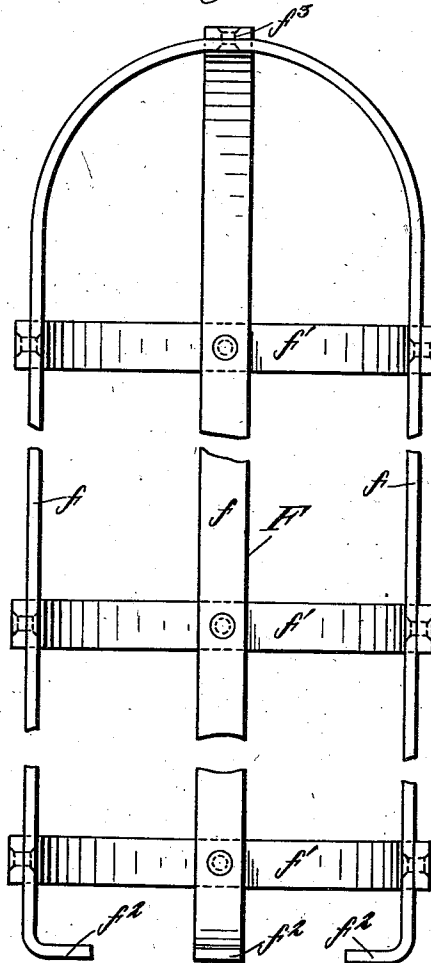


Fig. 4.

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UNITED STATES PATENT OFFICE.

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DYEING APPARATUS.

1,151,916.

Specification of Letters Patent. Patented Aug. 31, 1915.

Application filed February 24, 1914. Serial No. 820,609.

To all whom it may concern:

Be it known that I, JOHN T. WOOD, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Dyeing Apparatus, of which the following is a specification.

My invention relates to improvements in dyeing-apparatus for use in dyeing cops or packages of yarn and other textile materials.

The object of my improvement is to simplify the structure and increase the efficiency of the apparatus, and to render it more convenient and easy to operate.

The method and means for carrying out my improvements are fully described in the following specification illustrated by the accompanying drawings, in which like reference characters designate like parts.

In the drawings: Figure 1 is a vertical, sectional view of a dyeing-vessel or keir showing the arrangement of the perforated tubes or standpipes on which the yarn-packages are supported during the dyeing operation; Fig. 2 is an enlarged, detail view of one of the standpipes showing the method of assembling and compressing the yarn-packages thereon; Fig. 3 is a detail view of the means for holding the packages in place on the standpipes; Fig. 4 is an enlarged elevation of the lifter-device for use in removing the packages from the standpipes; and Fig. 5 is a plan view of the same.

Referring first to Fig. 1, A designates a cylindrical dyeing-vessel or keir which is similar in general respects to that shown and described in United States Patent No. 1,052,817 granted to John C. Hebden and Frederick H. Daniell, Feb. 11, 1913. The keir A is closed by a suitable cover, not here shown, and has its interior divided into two chambers or compartments A', A² by the horizontal diaphragm or false bottom a. Communicating with the upper chamber A' is a pipe a' and leading into the lower chamber A² is a pipe a². Through the means of the two pipes a', a² the dyeing liquor or other fluid is forced into one compartment and exhausted from the other in the manner well known and generally used in this art. The two compartments A', A² of the keir A are intercommunicating through the medium of a series of openings in the dia-

phragm or false bottom a, and the dye-liquor is forced either one way or the other through these openings by the usual arrangement of a centrifugal pump connected with the pipes a', a².

In the previous patent to Hebden and Daniell above referred to the means for supporting the yarn-packages or dye-cops in the keir consist of removable stringers adapted to be secured in the openings of the diaphragm or false bottom. In my present improvement I prefer to employ supports for the packages which are permanently fixed in place in the keir and to this end I make use of the vertical tubes or standpipes B, B, etc., screwed into the threaded holes a³ in the diaphragm or secured in any other suitable manner. Each standpipe B is perforated with suitable openings b, b, etc., for the egress of the dye-liquor, to allow the latter to be forced into the yarn-mass surrounding the pipe, and the upper end of the standpipe is closed by a plug or stopper b' to prevent escape of the liquor at this point, see Fig. 2.

In preparing the yarn or other material for the dyeing bath, according to the process for which my new apparatus is designed, it is preferably wound on longitudinally-contractible tubes to allow for the axial compression of the packages. The simplest and preferred form of tube for use in this practice consist of a helical coil of wire C, see Fig. 2, covered by a flexible sleeve c of reticulated fabric or any similar foraminous material. The coil C serves to keep the sleeve c distended in tubular form to support the wound cop in its original shape, while allowing its endwise contraction, and the dyeing liquor or other fluid can be readily forced through the meshes of the sleeve to permeate the yarn-mass surrounding it.

Referring to Fig. 1, the yarn-cops or packages Y are assembled on the standpipes B in multiple and then subjected to end pressure to compress the material and bring all portions of the yarn to a uniform density. At the bottom of each standpipe B is placed a loosely fitting flange D of substantially the same outside diameter as the package Y and formed with a hub d which raises it slightly from the upper surface of the diaphragm a. After the packages Y are all in place on the standpipe B, a second flange D' is placed against the end of the last package

and by forcing it down on the pipe the whole mass of yarn in the series of cops is brought under compression. This operation serves to press the individual packages Y tightly together at their ends to prevent escape of the liquor between them, and also acts to bring all parts of the yarn mass to a uniform density so that the liquor will permeate it more evenly. After the yarn has been compacted in this way it is necessary to maintain it under compression during the dyeing process, and to accomplish this the upper flange D' is secured in position on the pipe B as next described.

In the patent before referred to the arrangement for compressing and holding the yarn-packages on their supports or stringers consists essentially of means operated by screw-threaded nuts or levers adapted to be screwed down against the end flange. It has been determined in practice, however, that the yarn-cops can be compressed sufficiently by hand, without the use of mechanically operated means, and it is obvious that this method is preferable since it requires much less time. That is to say, it has been found practical to force the cops down on their supports or standpipes to compact the yarn by hand-pressure alone, and therefore the relatively slow operation of screwing down a hand-nut or wheel can be obviated. This results in a saving of considerable time in placing and removing the large number of cops in the keir and increases the production of the finished material. It is also desirable to effect a quick and easy method of holding the cops in place on the standpipes after they have been compressed, and to provide for this I have devised the ingenious arrangement of fastening-means shown in Figs. 2 and 3.

Referring to Fig. 2, the standpipe B is preferably turned down slightly at b^2 near its upper end to adapt it to an accurate fit in the bore of the flange D', and extending through this reduced portion is a series of transverse holes b^3 , b^3 , etc. The holes b^3 may be of any suitable number arranged at short distances apart and are adapted to receive the securing-means or lock-pin E for the flange D'. The pin E is formed with a pointed projectile-like end e of slightly less diameter than that of the holes b^3 and a head e' of the same size as its end e . The main body of the pin E is reduced in diameter throughout the greater portion of its length, and this reduced portion e^2 is made eccentric to the main axis of the pin, see Fig. 3. The method of operating this means for holding the yarn-cops under compression on the standpipe B is as follows: A sufficient number of cops Y are placed on the standpipe to reach clear to its upper end. The flange D' is then placed against the end of the last cop and forced downwardly on the pipe

until the cops are compressed as much as required. If desired, more cops can be added from time to time to increase the compression and render the mass still more dense. After the proper compression is arrived at, the lock-pin E is inserted through any one of the holes b^3 , according to the position of the flange D'. When released by the operator the flange D' will then react against the pin E and force it into the position shown in Figs. 2 and 3. This serves to carry the body e^2 of the pin into engagement with the side of the hole b^3 in such manner that the end e and head e' will prevent displacement of the pin until the pressure of the flange D' is removed. In this way the flange D' is held in position by the pin E against the end of the package or cop Y and the pin, in turn, is held in place in the hole b^3 by the pressure of the flange. When it is desired to remove the cops from the standpipes, after the dyeing operation is finished, it is only necessary to bear down on the flange D' to release its pressure on the pin E and the latter can then be easily withdrawn from the hole b^3 .

For facilitating the removal of the yarn-cops or packages from the keir I have devised a novel form of crate-like lifter F illustrated in Figs. 4 and 5 of the drawings. This consists of the longitudinal rods or bars f , f preferably three in number, connected together by the semicircular strap-pieces f' , f' , etc. The lower ends of the longitudinal members f are bent inwardly to provide the hook-like fingers or prongs f^2 , f^2 and the upper ends are arched over and riveted together at f^3 to form a sort of bail or handle. The straps f' are riveted to the members f at any suitable distance apart to reinforce and hold the structure together, and are adapted to partly encircle the cops Y when the prongs f^2 are hooked under the lower flange D. Referring to Fig. 1, it will be observed that the manner of operating the lifter-device consists simply in grasping it at the top and hooking the prongs f^2 under the edge of the flange D, while carrying the members f into position alongside the column of packages Y. The whole series of packages on one standpipe can then be lifted out of the keir without necessitating the handling of each individual cop. By tilting the lifter to one side the packages can be dumped into the box or other receptacle provided for them.

If desired a plurality of lifter-devices can be provided for each apparatus in accordance with the number of standpipes arranged within the keir. In this way a separate lifter-device is available for each column of yarn-cops, and when the latter are set in place on the standpipes the lifters will remain standing in the keir, as shown in Fig. 1, serving as a sort of cage or sup-

port for the cops and providing for lifting them out of the keir more expeditiously.

That is to say, with a separate lifter-device provided for each standpipe considerable
5 time will be saved in placing the cops within the keir and in removing them therefrom, because several columns of the yarn-packages can be handled at a time, and, furthermore, no delay is occasioned in replacing the
10 lifter-device in position after removing one set of cops.

It will be seen that the improvements above described serve as a simple and convenient means for holding the cops under
15 compression on the standpipes in the keir and for removing them therefrom at the completion of the dyeing operation; and thus by providing for greater facility in handling the material a more economical
20 operation and increased production of the whole apparatus is assured.

Various modifications might be made in the form and construction of the parts of my improved device without departing from
25 the spirit or scope of the invention;

Therefore, without limiting myself to the exact embodiment shown and described, what I claim is:—

1. In a dyeing-apparatus, the combination
30 with a perforated, tubular holder adapted to receive a plurality of dye-cops or yarn-packages strung along its length, of a flange fitted to slide on the holder and adapted to be pressed against the end cop, and a locking-
35 device for the flange consisting of a pin having its main body portion of less diameter than its ends and formed eccentric thereto, said pin adapted to be inserted

through a transverse hole in the holder and to be locked therein by the pressure of the
40 flange against its side.

2. In a dyeing-apparatus, the combination with a perforated standpipe closed at one end, of yarn-cops supported on longitudinally contractible tubes adapted to be strung
45 on to the standpipe, an end flange for applying pressure against the end package to compress all of the packages, and a lock-pin for the flange adapted to be inserted through a hole in the standpipe, said pin formed with
50 a laterally recessed body portion adapted to engage one side of the hole under the action of the pressure of the flange to secure the pin in position in the hole.

3. In a dyeing-apparatus, the combination
55 with a closed keir, of a plurality of perforated standpipes arranged vertically in the keir and adapted to receive the series of yarn-packages, flanges fitted to the standpipes and adapted to abut the opposite ends
60 of the series of packages, and a locking-device for holding the end flange in place on the standpipe consisting of a pin formed with enlarged ends and a body portion of reduced diameter arranged eccentric to the
65 main axis of the pin, said pin adapted to be inserted through a transverse hole in the standpipe and to be locked therein by the pressure of the flange against its side.

In testimony whereof I affix my signature
70 in presence of two witnesses.

JOHN T. WOOD.

Witnesses:

HERBERT K. ALLARD,
GEO. A. WHITE, JR.