April 14, 1931. E. D. JEFFERSON 1,800,639

METHOD AND APPARATUS FOR TREATING TEXTILES

Filed Dec. 20, 1928

Fig. 2

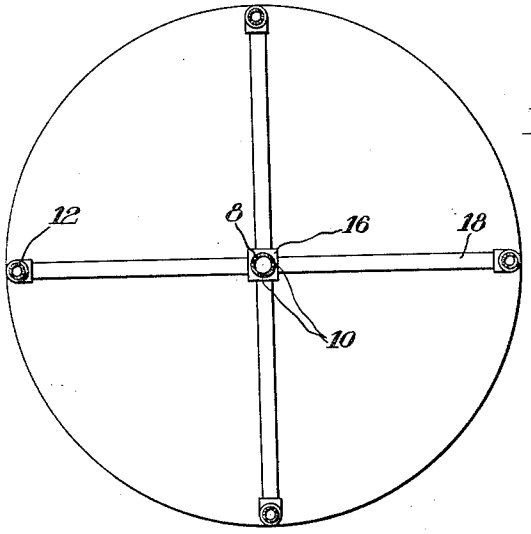
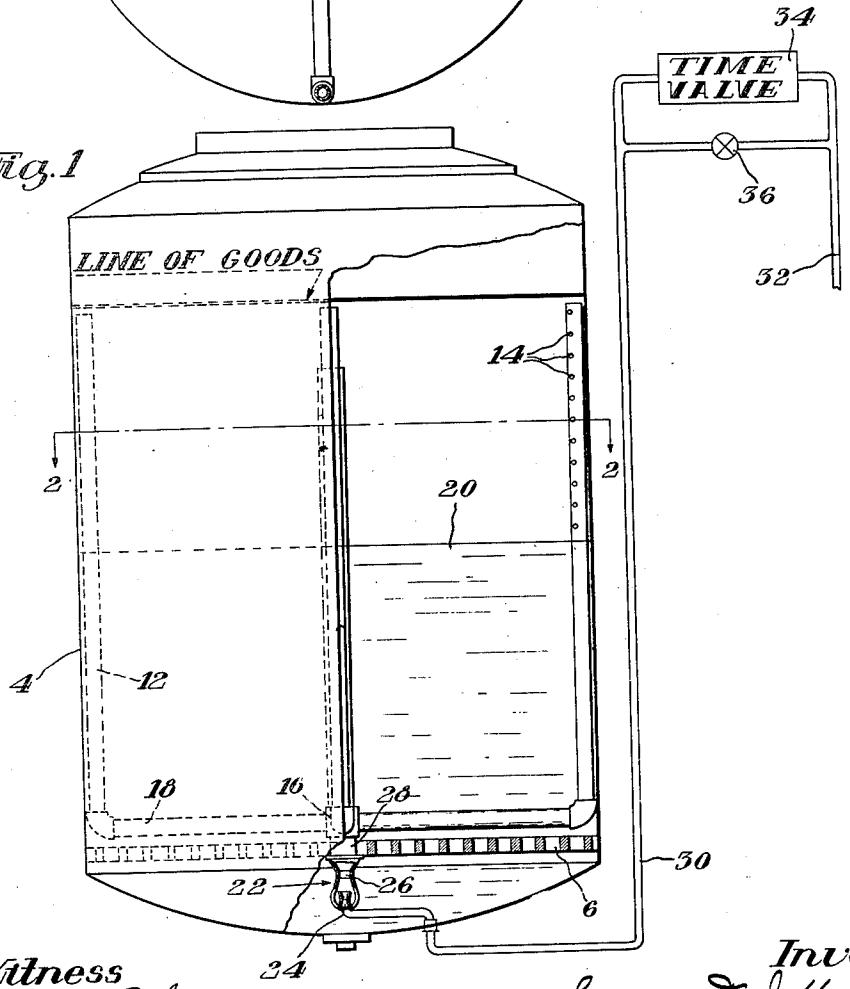


Fig. 1



Witness
George O. Rigby.

Inventor
Eugene D. Jefferson
by his Attorneys
Van Everen, Fish, Hildreth & Cary

Patented Apr. 14, 1931

1,800,639

UNITED STATES PATENT OFFICE

EUGENE D. JEFFERSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO RODNEY HUNT MACHINE COMPANY, OF ORANGE, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

METHOD AND APPARATUS FOR TREATING TEXTILES

Application filed December 20, 1928. Serial No. 327,454.

The present invention relates to methods and apparatus for treating textiles.

The object of the present invention is to provide a simple and economical method and apparatus for kier treatment of textile goods by which uniform action of the liquor on all parts of the goods is assured.

With this object in view, one feature of the invention consists in a method and apparatus by which the liquor is forced under pressure into all parts of the goods, both outwardly from the center thereof, and inwardly from the sides of the mass. The apparatus preferably comprises a kier having a perforated center pipe and a plurality of upstanding perforated pipes arranged uniformly around the inner wall of the kier. The tops of the pipes terminate below the level of the goods in order that the liquor streams may be caused to penetrate directly into the goods, thereby insuring a maximum effectiveness of the liquor.

Although the method and apparatus as above described are useful either with continuous or intermittent circulation of the liquor, the action has been found to be most uniform when intermittent sprays are employed. A further feature of the invention, therefore, contemplates intermittent circulation of the liquor outwardly from the center and inwardly from the sides of the mass of goods. According to this feature of the invention, the liquor is first forced with substantial uniformity throughout the mass of goods. The liquor spray is then shut off for a short period, and some time is allowed for the liquor to seep downwardly through the mass. With continuous operation, it is difficult to prevent building up of a considerable liquid pressure on top of the goods, which may result in compacting of the mass in the bottom of the kier. Such compacting is detrimental because it impedes uniform penetration of the liquor into the goods, and interposes non-uniform resistances which force the liquor to channel through or around the goods.

Other features of the invention consist in certain novel features of construction and modes of operation hereinafter described and particularly defined in the claims.

In the accompanying drawings, Fig. 1 is a sectional elevation of a kier constructed according to the present invention, and Fig. 2 is a section on the line 2—2, Fig. 1.

The illustrated apparatus comprises a kier consisting of the usual sheet metal vessel 4 and having the usual grates 6 upon which the goods are plaited. Received in the kier is a center pipe 8 provided with perforations 10 in approximately the upper half of its length. A plurality of outer pipes 12 are provided adjacent to the inner wall of the kier, four of such pipes being shown in the drawings. As shown in Fig. 2, each of these pipes 12 is provided with perforations 14 which are arranged to direct streams of liquor into the goods. The center pipe is connected into a fitting 16, which is supported directly above the grates, and the outer pipes 12 are radially connected into the fitting 16 by horizontal pipes 18. As shown in Fig. 1, the outer perforated pipes 12 are slightly longer than the center pipe, and all of them preferably terminate below the line of the goods in order that none of the liquor may be sprayed into the air space above the goods. The liquor line, which is the level which the liquor will assume when the kier is not in operation, is somewhat below the cloth line, as indicated at 20.

In order to force streams of liquor through the perforated pipes, an inspirator, indicated generally at 22, is placed in the liquor space below the grates. The inspirator comprises a constricted steam nozzle 24, above which is mounted the mixing chamber 26, the latter being connected by a pipe 28 with the fitting 16. The nozzle 24 is connected with a steam line 30. Steam is admitted to the steam line 30 from a supply 32 through a time valve 34. This time valve may be of the type described in the Jefferson Patent No. 1,482,795, dated February 5, 1924, and is employed for the purpose of intermittently introducing steam into the inspirator in order to force the liquor at intervals through the perforated pipes into the goods. The time valve is by-passed by a manually controlled valve 36, which is employed upon starting of the process to warm up the kier prior to placing the kier

under the automatic operation of the time valve.

In operation, the goods are plaited in the usual manner to approximately the level indicated, namely, just above the tops of the outer pipes 12. The treating liquor is then admitted to an intermediate level, as indicated by the line 20. Steam is then admitted by opening the valve 36, thus forcing liquor continuously through the pipes and into the goods until predetermined conditions of liquor temperature or pressure in the kier have been established. The valve 36 is then closed, and the time valve 34 is placed in operation.

As described in the prior patent above referred to, the time valve operates to force steam intermittently through the inspirator, thereby directing streams of liquor intermittently through the goods. In the intervals when the time valve is closed, the liquor which has been forced through the goods outwardly from the center and inwardly from the sides is permitted to seep downwardly through the mass, being eventually collected in the liquor space below the grates. Although the kier may be operated continuously, if desired, by eliminating the time valve 34, the provision for seepage which is brought about by the intermittent operation constitutes an important feature because it makes for a highly uniform treatment. With continuous operation, the possibility arises that the liquor may become nearly exhausted from the bottom of the kier, and may concentrate on the upper portion of the goods so that its pressure may unduly compact the goods in the bottom of the kier and force the liquor to make channels for its return to the liquor space. According to the preferred mode of operation, therefore, the time valve is so operated that it introduces intermittent liquor sprays of a duration of about one minute each, with seepage intervals of approximately one-half minute.

Although the invention has been described with the use of steam for forcing the liquor into the goods, it will be understood any gas or vapor may be used for this purpose, or any other means of circulation, such as a pump, may be employed. For example, compressed air may be employed, but steam is to be preferred not only because the required pressure may be obtained more economically, but also because the steam constitutes the medium for heating the liquor. Moreover, the steam, on being cooled by the liquor, condenses and therefore does not contribute to an undue rise of pressure in the kier. The condensate increases the volume of liquor, but inasmuch as the volume of steam required for operation of the kier is small, the increase in volume is not great during any single treatment.

The present invention is of particular value for bleaching treatments where peroxide bleaches are employed. Inasmuch as the pipes 8 and 12 terminate below the level of the goods, the peroxide has its greatest effectiveness because of its immediate contact with the textile material. In this respect, the invention is to be contrasted with the overhead spray apparatus, wherein the bleach is liable to lose some of its valuable oxygen content in the air space above the goods.

Having thus described the invention, what is claimed is:

1. The method for kier treatment of textiles which consists in intermittently directing streams of liquor both from the center of the goods outwardly and from the sides inwardly, and permitting seepage of the liquor downwardly through the goods in the intervals between sprays.

2. The method for kier treatment of textiles which consists in intermittently directing streams of liquor both from the center of the goods outwardly and from the sides inwardly, permitting seepage of the liquor downwardly through the goods in the intervals between sprays, collecting the liquor which seeps through the goods, and re-circulating the collected liquor intermittently through the goods from the center and sides of the mass.

3. A kier comprising a vessel, a liquor collecting space in the bottom of the kier, a perforated center pipe and perforated outer pipes arranged around the inside wall of the vessel for respectively directing streams of liquor outwardly from the center and inwardly from the sides of the mass of goods, an inspirator for forcing liquor from the liquor space into the pipes, and means for intermittently operating the inspirator whereby the liquor is first forced into the goods and then allowed to seep downwardly therethrough.

4. A kier comprising a vessel, a perforated center pipe in the vessel, perforated outer pipes arranged around the wall of the vessel, a liquor collecting space in the bottom of the vessel, the center and outer pipes being connected together above the liquor collecting space, and means for supplying liquor from the liquor collecting space to all of the pipes simultaneously.

In testimony whereof I have signed my name to this specification.

EUGENE D. JEFFERSON.