

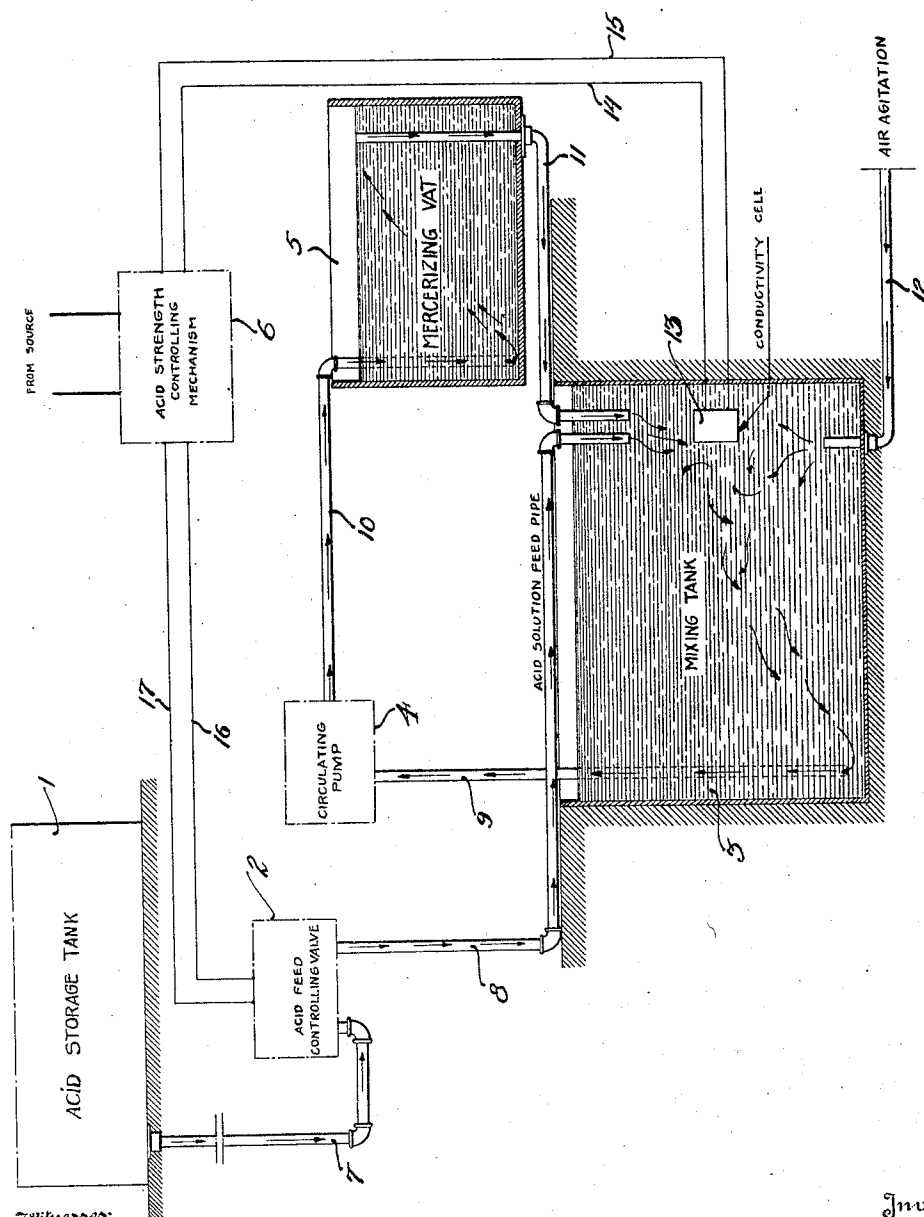
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L. A. STEAD

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ACID CIRCULATING SYSTEM FOR MERCERIZING YARN

Filed Aug. 1, 1924



Witnessed:

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UNITED STATES PATENT OFFICE.

LAWRENCE A. STEAD, OF CHESTER, PENNSYLVANIA.

ACID-CIRCULATING SYSTEM FOR MERCERIZING YARN.

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To all whom it may concern:

Be it known that I, LAWRENCE A. STEAD, a citizen of the United States, residing at Chester, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Acid-Circulating Systems for Mercerizing Yarn, of which the following is a specification.

My invention relates to an acid circulating system for mercerizing yarns. In mercerizing yarns the yarn is immersed in a caustic solution then treated in an acid solution to neutralize the caustic. To get the best results the acid in the mercerizing vats must be maintained at a practically constant strength. Neutralization reduces the strength of the acid and, as the work proceeds, more acid must be added from time to time. Sulphuric acid is generally used. The method heretofore in use has been to test the strength of the acid solution in the vats periodically and add acid sufficient to increase the strength of the solution in the vat to a point somewhat above that required. The acid is added by hoisting a container above the vat and allowing what is supposed to be a sufficient quantity to flow into the vat. After each day's operation the vat is drained and the acid solution run to waste. Under this method the strength of the acid is first of greater and then of less strength than is required. While a slight excess or deficiency of strength is permissible, the tendency is to wide variations due to uncertainty of control, and no considerable degree of precision can be attained with the most careful attention. The result tends to non-uniformity of product. Moreover the waste of acid is considerable.

The objects of my invention are to provide an automatic system which insures a constant circulation of acid; which automatically maintains the acid in the mercerizing vats at a strength which insures proper mercerization of the yarns; which avoids waste of acid, and which dispenses with the skilled attention and much of the labor required under the old method.

The drawing is a diagrammatic representation of mercerizing apparatus embodying my invention.

The apparatus includes an acid storage tank 1, designed to carry acid of commercial strength, a solenoid actuated acid feed-controlling valve 2, a mixing tank or well 3, a circulating pump 4, a mercerizing vat 5 and acid strength controlling mechanism 6.

The storage tank is connected with the feed-controlling valve by a pipe 7, the feed-controlling valve with the mixing tank by a pipe 8, the mixing tank with the circulating pump by a pipe 9, the circulating pump with the mercerizing vat by a pipe 10 and the mercerizing vat with the mixing tank by a pipe 11. An air pipe 12, designed for admission of air under pressure leads to the mixing tank. A conductivity cell 13 is disposed in the mixing tank and is electrically connected by leads 14 and 15 with the strength controlling mechanism which is electrically connected by leads 16 and 17 with the feed controlling valve.

The acid strength controlling mechanism and the feed controlling valve are preferably of the type disclosed in an application for acid strength maintaining apparatus filed of even date herewith by Frank H. Olden.

In operation, the delivery of strong acid from the storage tank through the feed controlling valve to the mixing tank is automatically controlled by the conductivity cell and the strength controlling mechanism. The circulating pump maintains a constant flow of acid solution from the mixing tank to the mercerizing vat, and the overflow pipe is constantly returning a like quantity of the acid solution from the mercerizing vat to the mixing tank.

Under the old system the waste of acid usually amounted to 12% or thereabout. With my system none of the acid goes to waste. The old method required constant and skilled attention. My system requires but incidental attention. Under the old method there was a serious lack of uniformity in the product. With my system the product is practically uniform.

While I have described my invention as taking a particular form, it will be understood that the various parts may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. An acid circulating system for mercerizing including a storage tank; a solenoid actuated feed-controlling valve; a pipe lead-

- ing from the storage tank to the valve; a mixing tank; a pipe leading from the valve to the mixing tank; a mercerizing unit; a pump adapted to draw acid from the mixing tank and deliver it to the mercerizing unit; an overflow pipe leading from the mercerizing unit to the mixing tank; a conductivity cell in the mixing tank, and means, controlled by the conductivity cell, for actuating the feed-controlling valve.
2. An acid circulating system for mercerizing including a storage tank; a solenoid actuated feed-controlling valve; a pipe leading from the storage tank to the valve whereby acid flows by gravity from the storage tank to the valve; a mixing tank; a pipe leading from the valve to the mixing tank whereby the acid flows by gravity to the mixing tank; a mercerizing unit; a pump adapted to draw acid solution from the mixing tank and deliver it to the mercerizing unit; an overflow pipe leading from the mercerizing unit to the mixing tank whereby acid solution flows by gravity from the mercerizing unit to the mixing tank; a conductivity cell in the mixing tank, and means, controlled by the conductivity cell, for actuating the feed-controlling valve.
- In testimony whereof I have signed my name to this specification.

LAWRENCE A. STEAD.