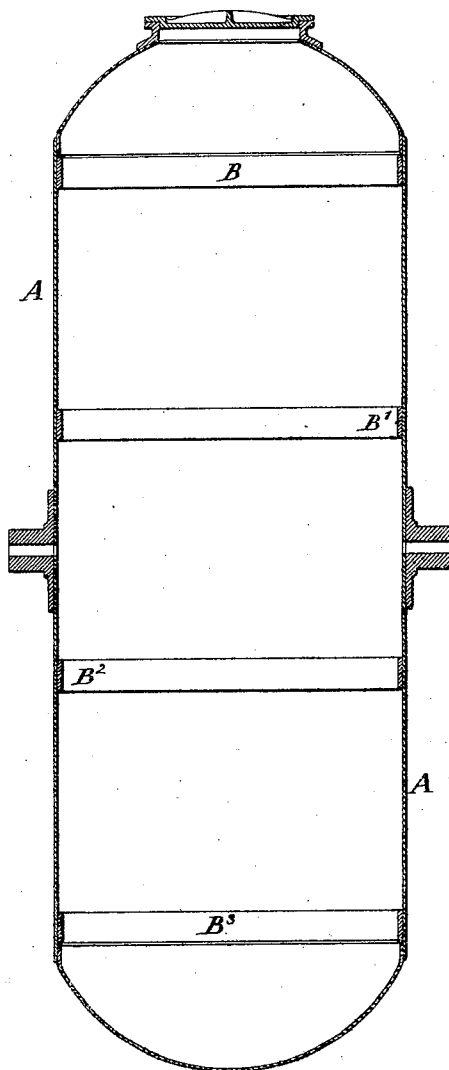


MORRIS L. KEEN.

Improvement in the Manufacture of Paper Pulp or Stock.

No. 119,465.

Patented Oct. 3, 1871.



11 9 6 3 0 1 2 3 4 5 6 7 Ft.

Witnesses,

Arnold Hoermann.

Campbell C. Livings

Inventor,

Morris L. Keen

by his attorney

T. S. Sisson

UNITED STATES PATENT OFFICE.

MORRIS L. KEEN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO SAMUEL A. WALSH, OF NEW YORK CITY.

IMPROVEMENT IN THE MANUFACTURE OF PAPER-PULP OR STOCK.

Specification forming part of Letters Patent No. 119,465, dated October 3, 1871.

To all whom it may concern:

Be it known that I, MORRIS L. KEEN, of Jersey City, county of Hudson, State of New Jersey, have invented an Improved Process for Making Paper-Stock or Pulp from wood, straw, cane, and other materials suitable for the production of paper-stock or pulp.

The shavings, chips, or cuttings of wood, plants, or paper-stock material are placed in a strong close boiler, preferably a rotary boiler, revolving on its short axis end over end, of form as described in my patent of July 25, 1871, No. 117,427. I have discovered that treatment of these materials with steam and water, without alkali, as described in previous patents issued to me, is liable to develop acids, which attack the iron of the boiler and injure both it and the paper-stock. The iron chemically dissolved from the interior of the boiler, becoming fixed in the paper-stock by the subsequent use of alkalies, leaves the paper-stock stained or dyed.

My present invention consists in so modifying the treatment as to avoid this evil. I have satisfied myself that the preparation of crude paper-stock should not be made in an iron boiler with pure water or steam, if said stock is intended to be subsequently treated for white paper, unless some provision is made to preserve the boiler from corrosion and the stock from the impregnation of iron. The more perfect the disintegration and pulping of crude materials and removal of interstitial matter by pure water or steam, the more porous and spongy the pulp becomes and the greater becomes the necessity for guarding against its impregnation and stain from iron.

My first mode of attaining this end is by electrical or galvanic means, which may be availed of in a cheap and convenient form for practical and permanent use. I find that the iron of the boiler may be electrically so conditioned as to prevent the action of acetic acid or pyroligneous acids, tannic acids or any other acids or acidulated extracts or spirits liberated during the treatment of paper-stock. Zinc, or zinc and tin, or other positive metals, may be introduced in the form of rings encircling the interior of the boiler at each end and at one or more intermediate points. I prefer to use it in the manner herein set forth and illustrated in the drawing hereto attached.

A represents the boiler; B B¹ B² B³, the rings

of positive electric composition, shown by cross-sectional view.

Other methods of electrical preservation of iron boilers from action of acids named, and the preservation of paper-stock or pulp from impregnation or iron stain, by said electrical protection of iron, may answer nearly as well. Iron boilers so conditioned I propose in the remainder of the specification to term electrically protected.

Other means are available for working of my invention, which may be termed mechanical. One of the cheapest methods of mechanical protection is by plating the interior of the boiler with tin or any metal not liable to be affected by the acids generated in the process of producing paper-stock from crude materials. This is not, in my view, as reliable as the other mode, because of the liability of small portions of the surface of the iron to become exposed and induce mischief. I have not experimented with this plan, nor with an obviously available substitute—a boiler entirely of copper or other non-corrodible metal—but believe that my improvement in this treatment may be realized by these means, though in a less desirable manner. Either of these plans preserves the boiler from destruction by acids, and leaves the paper-stock or pulp in a pure condition, free from iron stains or rust, and in the best condition for future treatment with alkali and bleach to produce a pure white paper-stock at the lowest cost, and can be cheaply treated subsequently for white paper-stock or pulp by any of the present or other suitable methods. There are marked advantages attending the pulping or partial pulping of crude paper-stock without alkalies, but the considerable time of treatment required either at low or high temperature to remove the interstitial matter to produce the best pulp affords a prolonged time for acid action on the boiler and a thorough charging of the pores of the pulp with tannate or acetate of iron, which cannot easily be washed out prior to the alkaline treatment made subsequently. The stock or pulp so saturated with tannate or acetate of iron is stained by the precipitation of the iron in the stock during its subsequent treatment with alkali, and is most difficult to remove from the pulp. It entails a tedious scouring and washing process to even partially effect it, and is then attended with serious injury to the stock. In a word, no crude mate-

rials or plants intended for white paper-stock or pulp should be treated by pure water or steam in an iron boiler without provisions alluded to in this specification.

I have found that with the provisions alluded to, which I have termed electrically-protected boiler, or with a boiler internally plated or coated, or composed of metal or material not affected by acids liberated in the treatment of paper-stock by hot water or steam or vapor, a good crude paper-stock or pulp can be produced by treatment in a close vessel, with steam and water, from straw, cane, shavings of wood, flax tow, hemp tow, Manila hemp, jute, and all crude materials adapted for paper-stock. The stock under treatment should be thoroughly saturated with water. To obtain the best results, during the boiling and steaming all the interstitial liberated by this treatment may be washed out by percolation in a vertical boiler or blown out at bottom of boiler; or the material may be dumped out and squeezed or washed out prior to boiling said pulp in alkali. If the above treatment is made in the manner herein described and in the apparatus set forth, forty to sixty per cent. of the interstitial may be removed prior to the alkaline

treatment, and only eight to ten per cent. caustic alkali in solution to one hundred pounds raw material will be required for the production of a pure gray pulp that may be readily and cheaply bleached.

The time and temperature necessary for the alkaline treatment depend on the stock under treatment, and will vary from thirty minutes to five hours, and from 212° to 380° Fahrenheit, green succulent stock being easily reduced, while the dry and seasoned materials require more time and increased temperature.

I claim—

As an improvement in the treatment of paper-stock with vapor or water, or both, the protection of the boiler and the contained material from action on each other by the means herein described, or a substantial equivalent therefor, so as to avoid the corrosion of the boiler and the staining of the stock, as herein specified.

In testimony whereof I have hereunto set my name in presence of two subscribing witnesses.

MORRIS L. KEEN.

Witnesses:

THOMAS D. STETSON,
CAMPBELL C. LIVINGS.

(81)