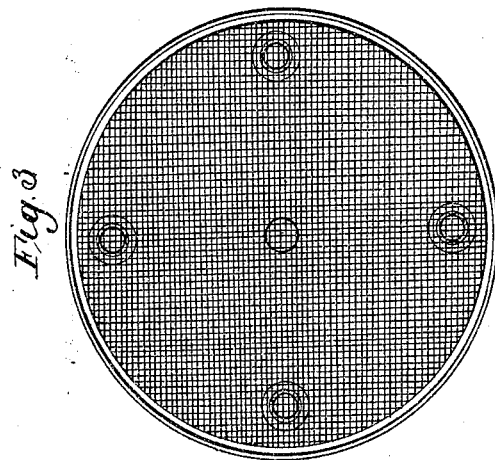
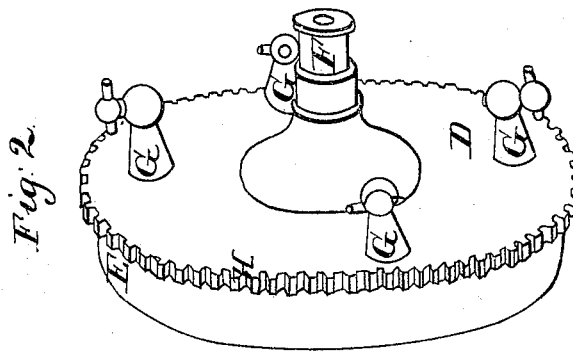
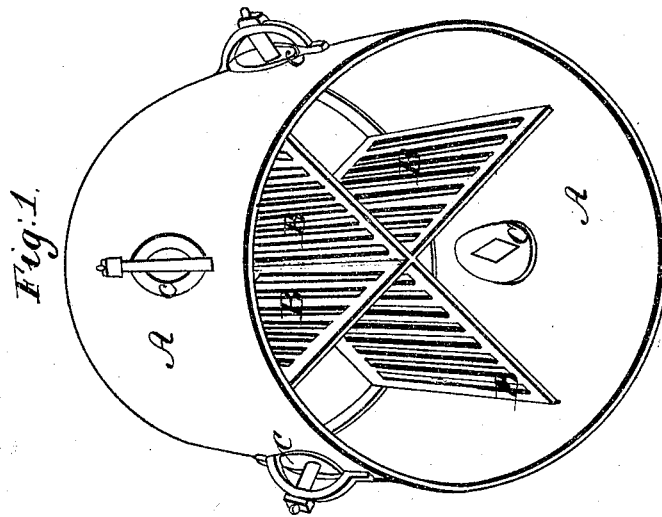


*G. Spafford.*  
*Pulp Washer.*

*N<sup>o</sup> 1,753. Patented Sept. 2, 1840.*



# UNITED STATES PATENT OFFICE.

GEO. SPOFFORD, OF WINDHAM, CONNECTICUT.

## MACHINE FOR BOILING AND WASHING RAGS FOR MANUFACTURING PAPER.

Specification forming part of Letters Patent No. 1,753, dated September 2, 1840; Reissued June 11, 1850, No. 171.

*To all whom it may concern:*

Be it known that I, GEORGE SPOFFORD, of Windham, in the county of Windham and State of Connecticut, have invented an Improved Boiler and Washer for Boiling and Washing Rags Preparatory to Their Being Made into Pulp for the Manufacture of Paper; and I do hereby declare that the following is a full and exact description thereof.

In my improved boiler and washer the rags are to be subjected alternately to the influence of high pressure steam and an alkaline liquid; said boiler being so constructed as to be capable of being made to revolve upon its axes, which are formed hollow, for the purpose of introducing steam from a separate, or ordinary steam engine boiler; and also of introducing water, or an alkaline solution, when desired for the purpose of washing the rags which have been boiled.

In the accompanying drawing, A, A, Figure 1, is the body of my cylindrical rag-boiler and washer one of its heads, Fig. 2, being removed for the purpose of showing its interior.

B, B, are partitions, formed of metallic bars, or grating, by which the interior is divided into four compartments, that are connected with each other by the openings through the grated partitions.

C, C, C, C, are man-holes, similar to those ordinarily made in steam engine boilers, there being one of these for each compartment; their main use being to admit and remove the rags to be acted upon; they are to be secured in the usual manner.

D, Fig. 2, is one of the boiler heads, which is to be secured in place in the ordinary way; it is represented as having a rim E, which may be ten, or twelve, inches deep, more or less, and is to reach to the partitions B, B, in the boiler and washer; at the inner end of this rim there is a strong, reticulated wire, or other grating, as shown at Fig. 3, which grating, when the head is in place, forms one end of the four compartments into which the boiler is divided. (I usually make this grating of No. 14 wire.)

F is one of the hollow gudgeons upon which the boiler is to revolve, there being a similar gudgeon at the opposite end.

G, G, are cocks, of which there may be one to each compartment, for the purpose of drawing off the contained liquid.

H, H, are cogs on the head of the boiler, into which cogs a pinion may mesh, for the purpose of causing it to revolve; motion may be communicated to it from any suitable part of the gearing of the engine.

The boiler and washer may vary in its dimensions, but that which I have constructed, and which answers well, is ten feet in length and four feet in diameter, and is made sufficiently strong to bear a pressure of a hundred pounds, or more, to the square inch. One of this size will hold, as a proper charge, about 1,300 lbs. of rags, and to these should be added about 100 gallons of alkaline ley, say, potash, or sode, and water, lime water, &c.

When the boiling is to be effected, the boiler is to be made to revolve at the rate of about five times in a minute; steam of a pressure of from 50 to 100 lbs. per square inch being admitted; and the boiling is to be continued for a length of time which will differ according to the nature of the stock; say from twelve to twenty four hours, more or less. After the rags have been sufficiently boiled in this way, they may be washed in the same machine, water being admitted, and drawn off, at proper intervals for that purpose. But I usually employ a separate machine for washing, which I make of wood, constructing it in a form and manner generally similar to those of my rag boiler and washer, as by this means the boiler may be continuously used for boiling only, and a quantity of stock be prepared in it sufficient for a large establishment. I prefer to make my washing cylinder, when used separately, shorter, but of greater diameter than the above described boiler; say six feet long and seven feet in diameter. It is made to revolve on gudgeons, and I divide the interior into four, or any other preferred number of, compartments by means of partitions, which may be of wood, consisting of open rails, or bars, covered with coarse wire. Each of these compartments has an opening into it, like a man-hole, closed by a stopper, which may be removed at pleasure.

About four hundred pounds of boiled rags will be a sufficient charge for this machine. Provision must, of course, be made for admitting and drawing off the water; and in using it about twenty four revolutions in a minute will be a proper speed to be given to it; it is to be driven in the manner

of the boiler; which it so closely resembles, as will be manifest from the foregoing description, that I have not deemed it necessary to represent it in a drawing, as this  
5 would have been little else than a repetition of the boiler.

By the aid of this apparatus what in the old way of proceeding is a most troublesome and offensive operation, is performed with  
10 great facility.

In the process of boiling as ordinarily followed heretofore, the rags are put into tubs, or vessels of wood, containing, say one thousand pounds, and are covered with an  
15 alkaline liquor; steam is introduced through tubes inserted below a false bottom, and, a cover being fitted on, the rags are boiled from 12 to 24 hours; they are then put into the machine and beaten up into pulp, during, and by, which operation they are  
20 washed; but in this way a very large portion of the material is wasted. When the rags are to be gas bleached, they are beaten into half stuff in the machine, are removed  
25 thence, gas bleached, and returned to the machine; still requiring a troublesome manipulation, and subjecting the manufacturer to a very heavy loss of material.

By my process of boiling under heavy  
30 steam pressure, or at a high temperature, the vegetable oil, and other injurious matters which are removable by the conjoint action of high steam and a highly heated

alkaline solution, are more effectually and rapidly removed than has heretofore been  
35 effected; stock of an inferior quality is rendered fit for making paper much superior to that for which it can be used when boiled and treated in the ordinary way; the washing is more rapidly and perfectly per-  
40 formed, and being effected before it is put into the machine, the great loss resulting from the ordinary process is entirely prevented.

Having thus fully described the nature of  
45 the apparatus used by me for boiling and for washing rags for the manufacture of paper, and having also described the mode of using it, and briefly set forth the benefits derived therefrom, what I claim as consti-  
50 tuting my invention, and desire to secure by Letters Patent, is—

The construction and use of a cylindrical, revolving boiler and washer the interior of which is divided into four, or any other con-  
55 venient number of compartments by grated partitions, within which the rags are to be subjected to the action of high steam and of an alkaline solution, in the manner, and for the purpose, herein set forth, the whole  
60 being constructed and operating substantially in the manner described.

GEORGE SPOFFORD.

Witnesses:

THOMAS GRAY,  
SAML. BINGHAM.