(No Model.)

C. F. TAYLOR.

PROCESS OF AND APPARATUS FOR TREATING PAPER STOCK.

No. 307,237. Patented Oct. 28, 1884.

Fig. 1

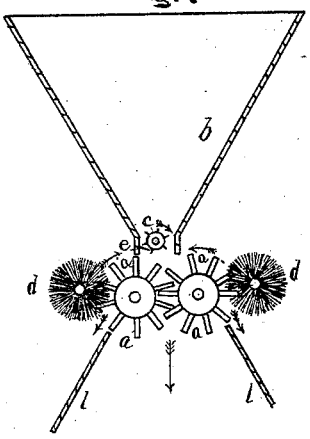


Fig. 2

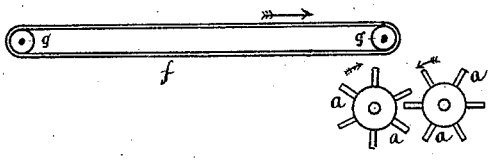


Fig. 3

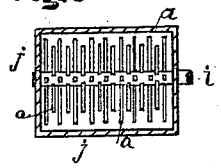
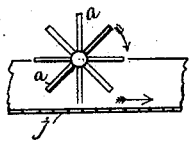


Fig. 4



Witnesses;
E B Barton
Geo. C. Kingsbury

Inventor;
Charles F Taylor
By Allen Webster
atty.

UNITED STATES PATENT OFFICE.

CHARLES F. TAYLOR, OF SPRINGFIELD, MASSACHUSETTS.

PROCESS OF AND APPARATUS FOR TREATING PAPER-STOCK.

SPECIFICATION forming part of Letters Patent No. 307,237, dated October 28, 1884.

Application filed December 18, 1882. Renewed March 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. TAYLOR, of Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in the Process or Method of Removing from Rags and Pulp Magnetic Substances in the Process of Paper-Manufacture, of which the following is a specification.

Heretofore objectionable matter in rags has been largely removed by hand, and in pulp by screens, perforated bottoms, &c. These, however, do not remove the small particles of iron and other like matter, which is very objectionable.

The object of my invention is to provide a method and means in the process of paper-manufacture to separate a large proportion of the small metallic substances and matter from the material, and thus prevent its being worked into the paper.

My invention consists in the application of one or more magnets to the material during the process of manufacture, whereby all magnetic matter may be caught and separated therefrom; and, further, it consists in the means adapted to apply the magnets.

In the accompanying drawings, in which similar letters of reference indicate like parts, Figures 1 and 2 are side views of an arrangement for the application of the magnets for use in cut rags, and Figs. 3 and 4 are views illustrating the application to pulp.

In the process of reducing rags to the desired degree of fineness and purity for the bleach-boiler, heretofore no means has been devised to separate small metallic substances from the rags. I find that a large percentage of the objectionable matter which it has heretofore been very difficult to remove is magnetic, or, in other words, is of such nature as will be attracted by a magnet. I therefore utilize this attractive property for the purpose of separating such substances from the rags.

It will readily be seen that very many mechanical contrivances may be devised with which the attractive force of magnets may be utilized for this purpose, and that there are many stages in the process of paper-manufacture where the magnetic force may be applied to accomplish the desired result, and that both permanent and electro magnets may be used. The best result is attained, in my opinion, by the application of the magnetic force in two stages—the first after the rags have been reduced to the size to which they are usually reduced before being placed in the bleach-boiler, and the second after the material has been reduced to pulp.

The method I deem the best, of applying and utilizing this power or force in the first instance, is to provide two sets of revolving magnets, *a*, as shown in Figs. 1 and 2, and to feed the cut rags between these magnet-rolls, they being so adjusted that all the material which passes is caused to come in contact with or in close proximity to the magnets, when, if there be any particles in the stock, either separated from or attached to the rags of the nature above described, they will be attached to the magnets and be carried by the revolving of the magnets away from the flow of clear material, and may be wiped from the magnets with any convenient appliance. A fixed or stationary magnet may, however, be used at this stage and a good result attained.

Fig. 1 illustrates a device consisting of a hopper, *b*, having a feed-wheel, *c*, arranged to feed the stock to the magnets *a*. The feed-wheel *c* is provided with pins which catch and feed the rags through the chute.

Fig. 2 illustrates a means of feeding the rags to the magnets upon an endless apron.

Figs. 3 and 4 illustrate the method of application to separate the objectionable matter which may have passed the first appliance from the stock after it has assumed the form of pulp. I prefer to apply the magnets to the pulp while it is passing through the sand-catcher. The flow is here slow and shallow, and by immersing the magnets at this point all or a large proportion of the magnetic matter is caught. I find that there is in much pulp a scaly matter, which apparently comes from the iron portion of the machinery with which the pulp comes in contact. The pulp is of such consistency that these small particles are held and do not fall to the bottom; neither can they be caught in screens. The best method of application is, in my opinion, to attach a series of magnets to an arbor and revolve them slowly in the sand-box in a direction against the flow of the pulp. The

magnets, being set near together, will thus aid in separating the globules of pulp which gather and hold the objectionable matter, aiding thus mechanically in freeing the pulp of the particles of foreign matter. The magnets should be cleaned once in about twenty-four hours. This may be done with any convenient contrivance. I prefer to use a brush properly adjusted to accomplish the desired result. The revolving magnets may, however, be used without a mechanical means to clean them—*i. e.*, may be cleaned as magnets have heretofore been—and I do not wish to be understood as limiting my use of revolving magnets to a combination of a cleaning device therewith.

I am aware that fixed or stationary magnets have heretofore been used to separate magnetic substances from pulp, and I make no claim to such application.

One advantage of a moving magnet over a fixed one is seen in the fact that some of the thicker portions of the pulp may become packed or lodged against the fixed magnet, and the flowing portion be thus turned aside and prevented coming in as close contact as it otherwise would, while with a moving magnet this objectionable feature is avoided. It will therefore be seen that a magnet adapted to move in the pulp will produce a better result than one which is stationary, and as, for instance, an oscillatory, perpendicular, horizontal, or other motion may be easily given the magnet, I do not confine myself to a revolving magnet.

Having, therefore, described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The process of separating magnetic substances from rags, consisting of attracting or catching the magnetic substances with one or more magnets and then removing the same, substantially as shown.

2. In a machine for preparing paper-stock, one or more magnets arranged and adapted to attract and hold magnetic substances and separate the same from rags, substantially as shown.

3. In a machine for dressing or preparing paper stock or pulp, one or more magnets adapted to revolve and attract and hold magnetic substances, in combination with means of feeding the material and a means of removing the attracted matter from the magnets, substantially as shown.

4. In the art of paper-manufacture, a moving magnet, substantially as and for the purposes described.

5. The method or process of separating magnetic particles from pulp, consisting of immersing one or more moving magnets therein.

CHAS. F. TAYLOR.

Witnesses:
ALLEN WEBSTER,
GEO. O. KINGSBURY.