(No Model.) 2 Sheets—Sheet 1.

E. A. D. GUICHARD.

PROCESS OF AND APPARATUS FOR BLEACHING WASTE PAPER, &c.

No. 307,390. Patented Oct. 28, 1884.

FIG. 2.

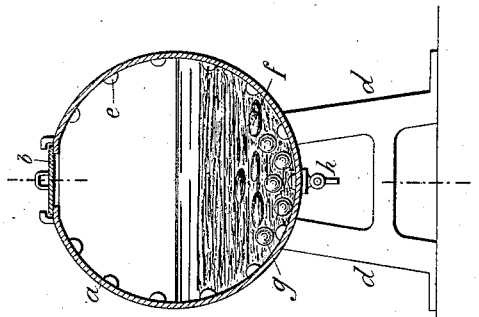


FIG. 4.

FIG. 1.

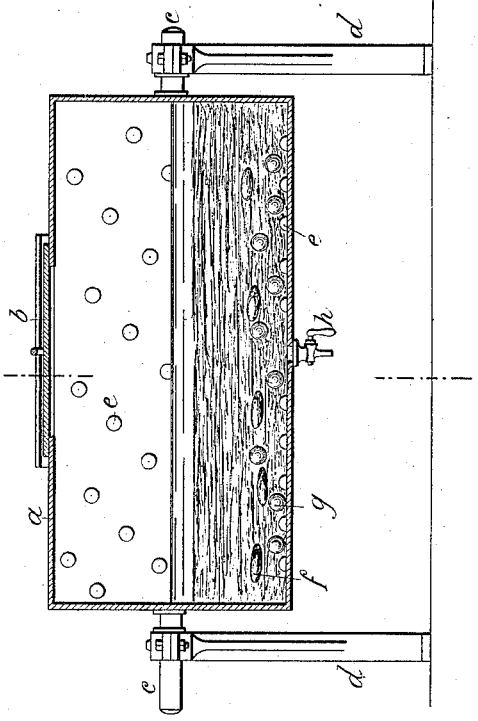
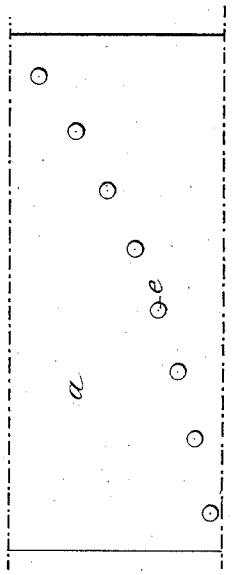


FIG. 3.



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(No Model.) 2 Sheets—Sheet 2.

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FIG. 5.

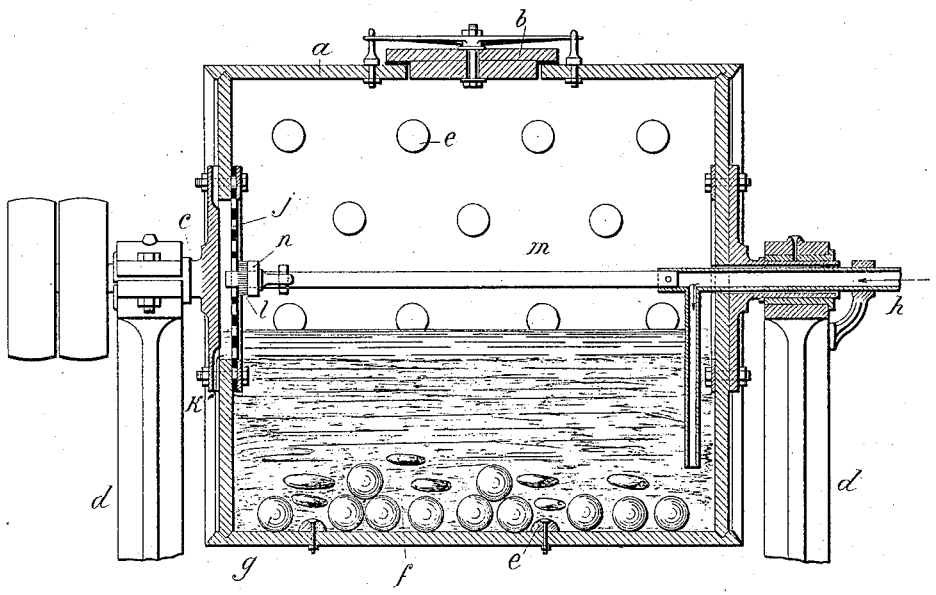
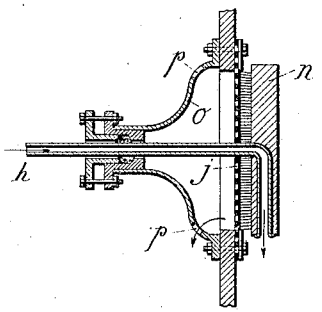


FIG. 6.



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UNITED STATES PATENT OFFICE.

EDOUARD AUGUSTE DÉSIRÉ GUICHARD, OF PARIS, FRANCE.

PROCESS OF AND APPARATUS FOR BLEACHING WASTE PAPER, &c.

SPECIFICATION forming part of Letters Patent No. 307,390, dated October 28, 1884.

Application filed October 1, 1884. (No model.)

To all whom it may concern:

Be it known that I, EDOUARD AUGUSTE DÉSIRÉ GUICHARD, of the city of Paris, France, have invented an Improved Process of and Apparatus for Bleaching Waste Paper, whether printed or written on, of which the following is a full, clear, and exact description.

This invention relates to an improved process and apparatus for bleaching waste paper, whether the same has been printed or written on. Waste printed and manuscript paper have never hitherto been bleached sufficiently to enable it to form a pulp suitable for the manufacture of white paper. This desirable result is obtained by the method of treatment of this invention, which is based on the employment of the apparatus hereinafter described, in which the waste paper is treated mechanically in presence of a bleaching-liquid composed of the ingredients hereinafter specified.

The machine, which is of very simple construction, is illustrated in the accompanying drawings, Figure 1 of which is a longitudinal section, and Fig. 2 a transverse section, of one arrangement. Fig. 3 shows the interior surface of the drum in the flat, while Fig. 4 is a section taken through the walls of the drum to show the studs fixed therein.

The machine consists, essentially, of wood drum *a*, of suitable dimensions, provided with an opening at which the paper and bleaching-liquids are introduced, which is closed by a wood cover, *b*, faced with india-rubber, so as to make a water-tight joint. The interior of the drum is studded with bosses *e*, as shown in Fig. 3. The drum is also provided with end journals, *c*, on which it is mounted in frames *d*, and with a cock, *h*, for running off the bleaching-liquid charged with printing-ink, &c.

The paper to be bleached, after being cut up, is placed in the cylinder, together with a number of large flat stones, flints or pebbles having rounded ends, or similar-shaped lumps of cast-iron or other material, the friction of which upon the paper, when the drum is set in motion, produces an effect similar to that of a brush. A number of balls or spheres of cast-iron, stone, marble, or other material are also placed inside the drum, which exert a continual pressure upon the paper for expressing the printing-ink from its cells, the balls or spheres acting in the manner of a pair of crushing-rollers, so as to reduce the raw material to a state of pulp. The two sets of flat pebbles and balls thus produce a simultaneous frictional and crushing action, while the studs or bosses *e*, with which the inner surface of the drum is provided, on being struck by the pebbles and balls, project them in all directions, and in this manner act upon the whole contents of the drum. The paper, whether printed or manuscript, is placed in the drum and immersed in the bleaching-liquid hereinafter specified, and the drum is revolved, either by hand or other power, and when the liquid is nearly black it is drawn off and replaced by a fresh supply, and the operation repeated until the matters are completely bleached. After this the pulp is introduced into a centrifugal hydro-extractor, in order to deprive it of any remaining traces of ink and produce cakes of half-stuff containing not more than from forty to fifty per cent. of water.

Any kind of bleaching-liquor may be employed in connection with this machine; but it is preferred to employ the following composition of this invention, on account of its efficacy and moderate price, which is an indispensable condition in the treatment of waste paper, as the expense must be kept as low as possible to render its utilization worth the outlay. These conditions are completely realized by the mode of treatment herein described in an apparatus which is both simple, cheap, and quick in action, and in which a cheap but powerful solvent is employed. This solvent consists of a mixture of turpentine, soap, and bleaching-fluid in varying proportions, according to the nature of the paper to be treated, the composition of the pulp, whether of rags, straw, wood, &c., the nature of the printing-ink, or the variety of kinds of printed papers, which usually contain more or less varnish. If the paper to be bleached is printed in strong ink, the proportion of spirits of turpentine should be increased, while if, on the contrary, it is printed in pale ink the proportions of bleaching-liquid and soap-suds should be increased. In the generality of cases the following proportions give good results: spirits of turpentine, two parts; bleaching-liquid, nine parts; soap-suds, nine parts.

The printed paper and manuscript-paper may either be treated separately or together, and in certain cases, if it is desired to treat manuscript-paper only for the purpose of obtaining a pulp of superior quality, the greasy marks are first removed by treating with spirits of turpentine, after which it is treated with bleaching-liquor and soap-suds. There may also be employed for the same purpose, in connection with the machine before described, a bath composed of hot or cold water and soap, to which may be added a quantity (more or less) of liquid ammonia and American potash or their equivalent.

The machine before described may be modified, as shown in sectional elevation in Fig. 5, in which the same letters of reference indicate the same parts as in the previous figures.

The improvement consists in fixing a grating or wire cover, *j*, over the discharge-orifice *k*, which is placed at one end of the drum, so as to allow of none but clear liquid passing out, and also prevent the choking of the outlet. The grating *k* is prevented from becoming clogged by the pulp or other matters by the brush *l*, which extends across the entire diameter of the grating, and is in continuous contact therewith, the said brush being fixed upon a rod, *m*, one end of which is supported in the hollow inlet-pipe *h*, at which the bleaching-liquid is introduced, the other end being fitted centrally in the grating *k*.

In Fig. 6 the rod *m* is dispensed with, and the inlet and outlet for the liquid is at the same end of the drum. For this purpose the inlet-pipe *h* is carried through the back *n* of the brush and is wholly inclosed thereby, so as to be protected from injury by the pebbles and balls striking against it. The liquid, after passing through the grating *j*, is received in a kind of chamber, *o*, bolted or otherwise attached to the drum, and escapes through the openings *p* in said chamber.

I reserve the right of applying the improvements either together or separately—that is to say, of employing the bleaching agent with any other description of apparatus, or of employing any other bleaching agent in connection with the improved apparatus.

I claim—

1. The herein-described process of bleaching waste printed or manuscript paper, in which a special bleaching agent is employed, in connection with apparatus consisting, essentially, of a revolving drum having projecting studs or bosses on its interior, and containing a number of flat pebbles and balls, as and for the purpose specified.

2. The apparatus shown in Figs. 5 and 6, provided with a wire grating, *j*, and stationary brush *l* in contact therewith, substantially as described, for the purpose specified.

The foregoing specification of my improved process and apparatus for bleaching waste paper, whether printed or written on, signed by me this 18th day of September, 1884.

EDOUARD AUGUSTE DÉSIRÉ GUICHARD.

Witnesses:

EDWARD P. MACLEAN,

ALBERT MOREAUX.