

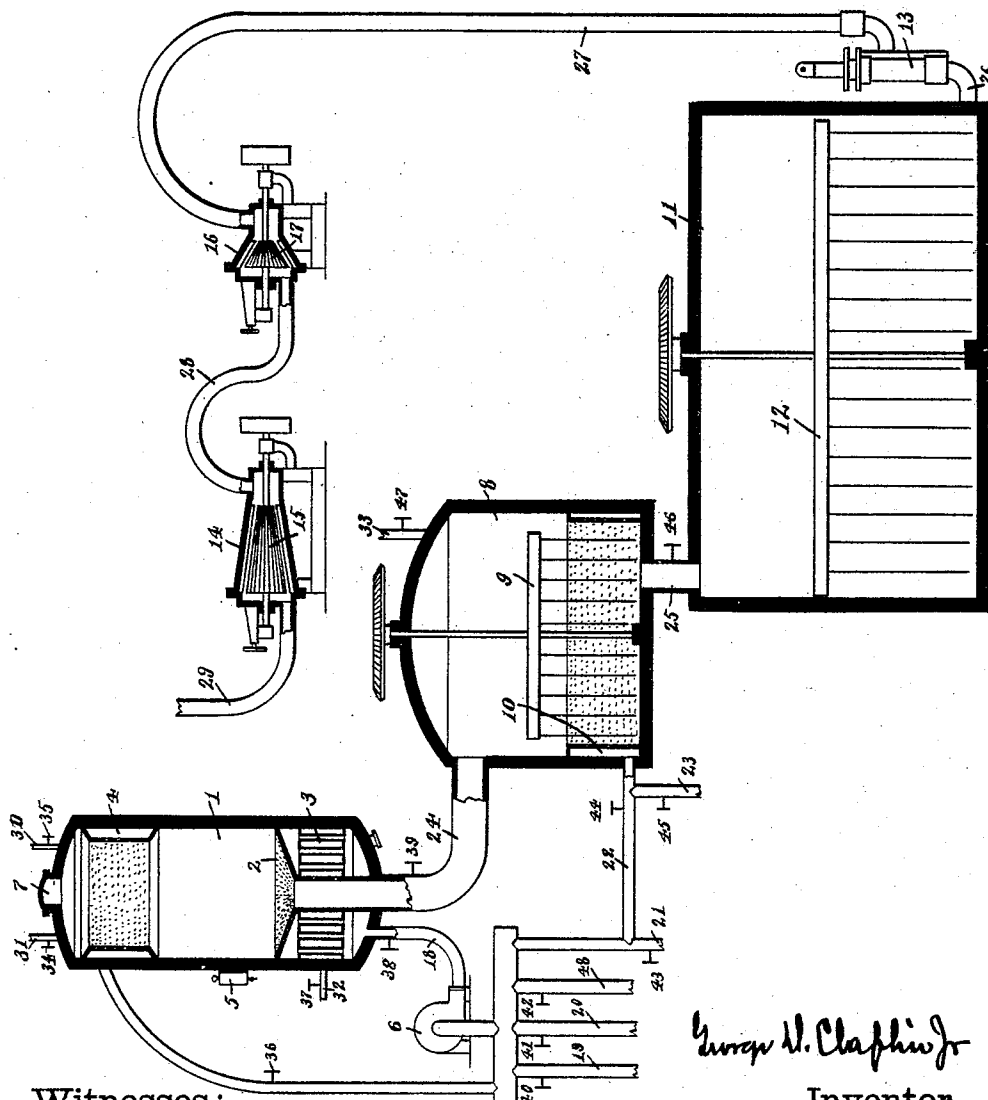
(No Model.)

G. D. CLAFLIN, Jr.

APPARATUS FOR THE CONTINUOUS PREPARATION OF PAPER STOCK.

No. 496,814.

Patented May 2, 1893.



Witnesses:

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE CONTINUOUS PREPARATION OF PAPER-STOCK.

SPECIFICATION forming part of Letters Patent No. 496,814, dated May 2, 1893.

Application filed July 10, 1890. Serial No. 358,339. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. CLAFLIN, Jr., of Cleveland, Cuyahoga county, Ohio, have invented certain new and useful Improvements in Apparatus for the Continuous Preparation of Paper-Stock, of which the following is a specification.

This invention pertains to apparatus for operating in a continuous manner to produce digested and disintegrated paper stock, as made from straw, wood, &c.

Digesters, as employed in modern paper making processes, are sometimes arranged to operate by an upward current of the digesting liquors, and sometimes by a downward current and sometimes by a current acting alternately up and down, and sometimes by horizontal currents, acting in either one direction or in alternate directions. It is immaterial in my improved organization which of these types of digesters is employed, but for purposes of exemplification I have chosen one of the simpler forms of digesters, operating by an upward current only.

My improvements will be readily understood from the following description taken in connection with the accompanying drawing which illustrates an apparatus exemplifying my improvements, the digester, tanks, crusher and Jordan engine appearing in vertical diagrammatical section.

In the drawing 1 indicates a closed cooking or digesting vessel; 2, a drain floor therein; 3, tubular steam-drum in the base of the digester, for heating the liquids moving upwardly into the digester; 4, perforated lining in the upper portion of the digester; 5, sampler or tester; 6, circulating pump for causing movement of liquids through the digester; 7, charging door in top of digester; 8, washing-tank, of capacity exceeding that of the digester; 9, agitator therein; 10, perforated draining lining at the base of the washing tank; 11, storage tank, of capacity in excess of the washing tank; 12, agitator therein; 13, half-stuff-pump; 14, Jordan engine of usual construction; 15, the rotary cone thereof; 16, crusher, having the general construction of a Jordan engine but having its cone short and with very quick taper; 17, the rotary cone of the crusher; 18, injection pipe, from circulat-

ing pump to base of digester; 19, cold water pipe from source of cold water supply to suction of circulating pump; 20, hot water pipe, from source of hot water supply to suction of circulating pump; 21, alkali pipe, from source of supply of alkali liquor to suction of circulating pump; 22, wash-alkali pipe, communicating with base of washing tank, behind perforated lining, and with suction of circulating pump; 23, waste pipe, communicating with base of washing tank, behind perforated lining, and leading to sewer or other waste point; 24, blow pipe, from digester to washing tank; 25, pipe from washing tank to storage tank; 26, half-stuff-suction-pipe, from base of storage tank to suction of half-stuff-pump; 27, half stuff-discharge pipe, from discharge of half stuff-pump to inlet of crusher; 28, pipe from outlet of crusher to inlet of Jordan engine; 29, stuff-pipe, from outlet of Jordan engine to stuff-chest or other point of delivery of the paper stock; 30, waste steam pipe from top of digester to some point of waste steam escape of utilization; 31, bleaching gas pipe, from top of digester for discharging and saving the bleaching-gas; 32, steam pipe, admitting steam to the steam drum of the digester; 33, wash-water pipe, from source of water supply to washing tank; 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46 and 47, valves in the various pipes to permit of communication through those pipes being opened or closed; and 48, chlorine pipe from source of chlorine liquor supply to suction of circulating pump.

Assume all valves to be closed except those mentioned as being opened, and assume the digester as being charged with straw and closed. Valves 38 and 40 being opened, and the circulating pump being in motion, cold water will be forced into the base of the digester and up through the perforations in the drain floor thereof and through the stock, and out through the perforations from the upper lining 4. By closing valve 40 and opening valve 36, this cold water, withdrawn at the top of the digester may be circulated continuously upwardly through the stock. If valve 37 be opened, then steam will enter the steam drum and the water passing upwardly will become heated before it reaches the stock, and in the course of its circulation, will continuously

take up heat as it passes through the steam drum. Instead of using cold water hot water may be charged and circulated through the digester by opening valve 41 instead of valve 40.

5 By opening valve 43 instead of valve 40, alkaline liquor may be charged and circulated through the stock, and, by opening valve 42 instead of valve 40, chlorine liquor or other bleaching liquor may be charged and circulated through the stock, and by opening cock 10 44, instead of cock 40, the wash liquor from the washing tank may be charged and circulated through the stock in the digester. The digester will of course be provided with the

15 usual drainage pipes for drawing off liquors and settlings which are to be no longer circulated. Briefly the digester and its immediate connections exemplify an ordinary digesting apparatus which can be charged with

20 stock and be subjected to the action of washing waters, cooking waters, alkaline liquors, and bleaching liquors, all hot or cold. The result is a charge of digested paper stock. By opening valve 39 this digested stock may

25 be blown from the digester into the washing tank, and the digester may be again charged and the digesting process repeated with the new charge. The stock now held in the washing tank will drain its liquor through the perforated lining of the washing tank, and valve 30 44 being open that liquor may be charged to the digester, either while the stock is being put into the digester or after the digester is fully charged. The solvent powers of the

35 liquor discharged from the digester with the stock into the washing tank may thus be utilized. The agitator 9 being in motion, stirs up the stock in the washing tank and, valves 47 and 45 being opened washing water passes

40 through the stock during its agitation and the stock becomes thoroughly washed. When the

washing is completed the neutral stock is discharged into the storage tank, valve 46 being opened. The agitator 12 in the storage tank 45 frees the stock therein and this stock is taken by the half stuff-pump and forced into the crusher where it is subjected under pressure, to an initial grinding operation. The stock thus partially ground leaves the crusher under pressure and goes to the Jordan engine 50 which completes the grinding and discharges the stuff to the stuff-chest for continuous consumption in the paper making machine. This system of apparatus, thus dealing with the intermittent production of the digester, produces a continuous delivery of completely 55 prepared stuff, and without the necessity for re-handling of the stuff.

The duties of the crusher may be imposed upon the Jordan engine but not advantageously, it being highly desirable to employ the crusher for the preliminary stock grinding in order that the Jordan engine may have its duties confined exclusively to the finer reduction. 65

It is to be understood of course that the details of the apparatus are merely exemplifying in character.

I claim as my invention—

In an apparatus for the continuous preparation of paper stock, the combination, substantially as set forth, of a digesting and washing apparatus, and storage tank communicating therewith, a stock grinder, a conduit from the storage tank to the stock grinder, 75 and a pump for forcing the stock to the stock grinder.

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Witnesses:

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