

W. CURTIS, JR.
 MANUFACTURE OF PAPER.

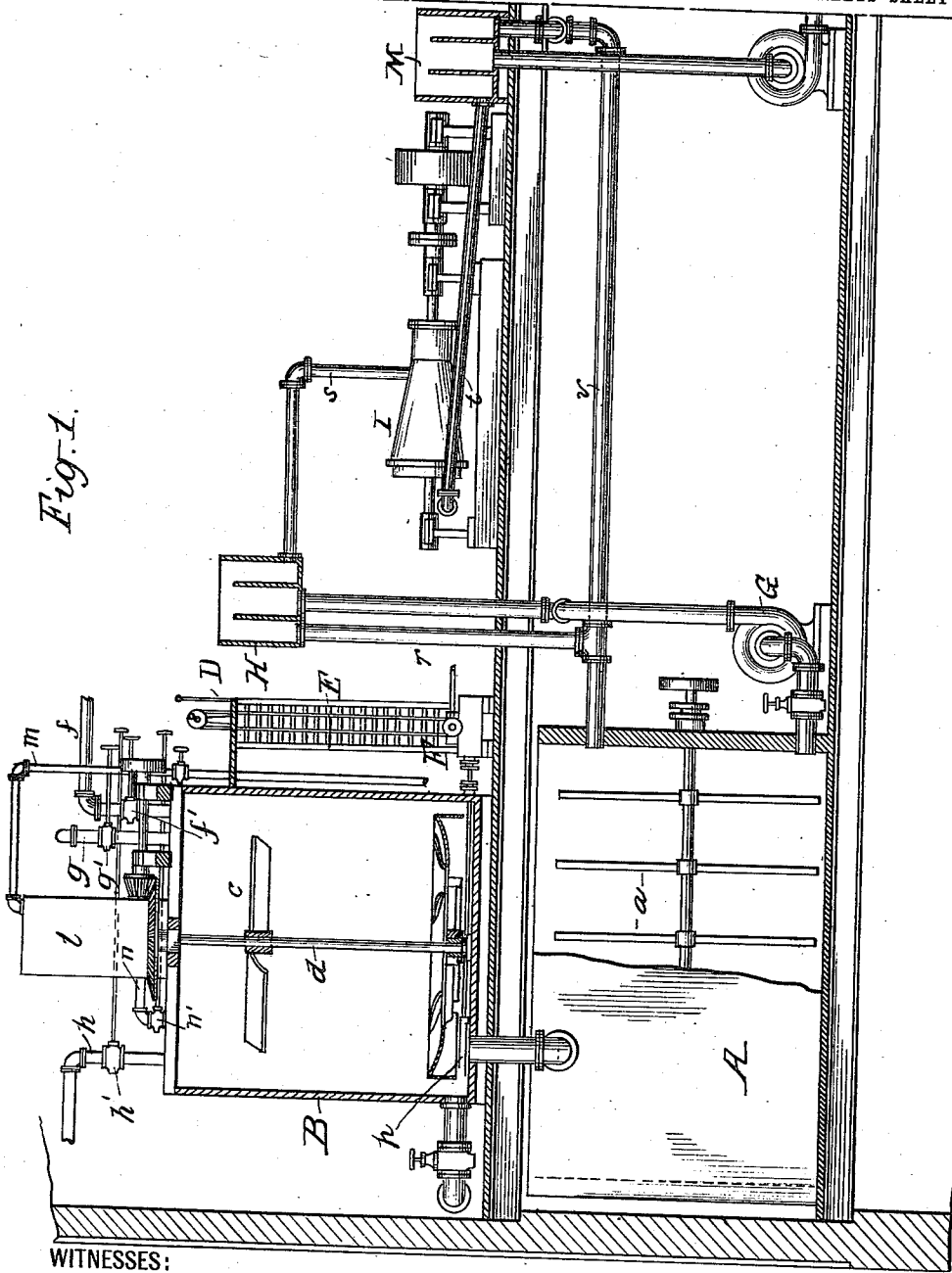
APPLICATION FILED JUNE 10, 1908. RENEWED FEB. 15, 1911.

1,001,822.

Patented Aug. 29, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



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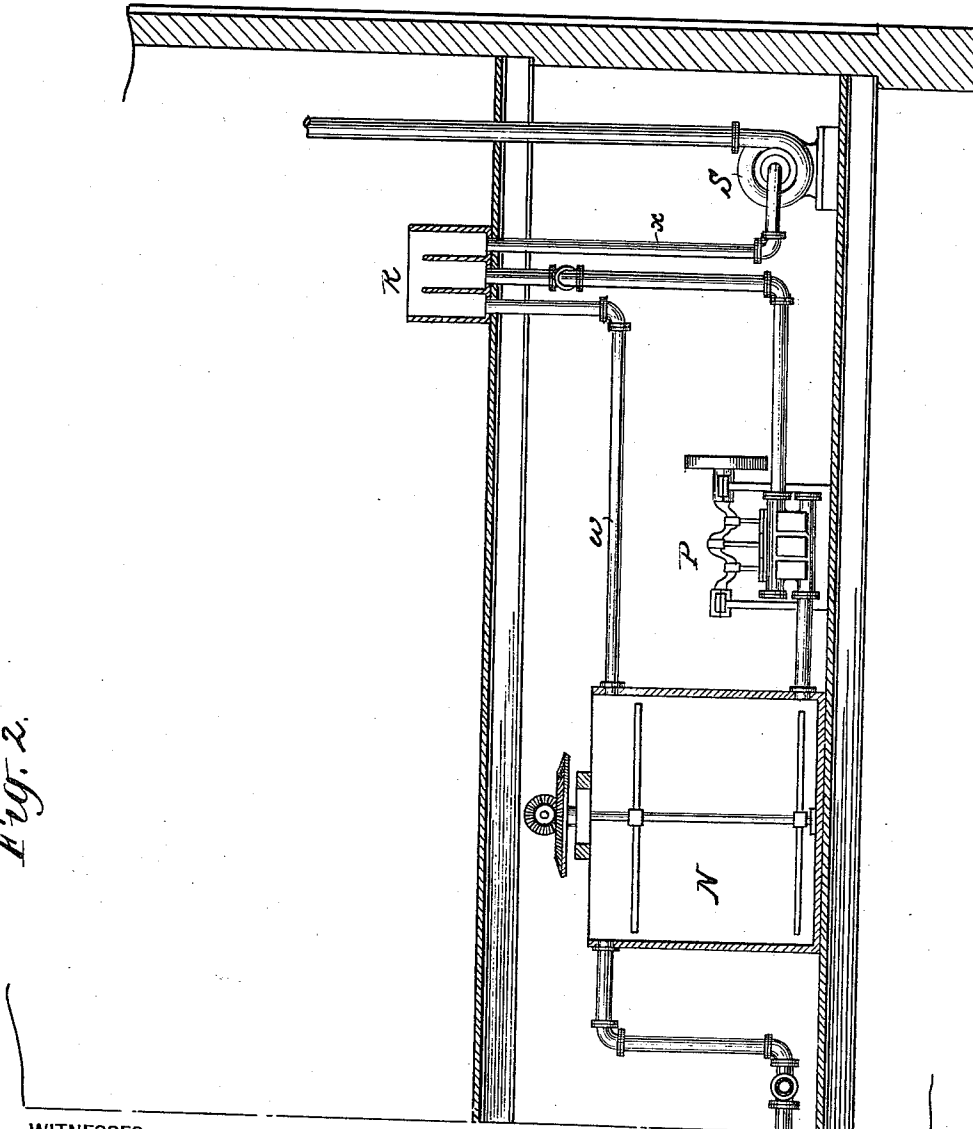
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4 SHEETS—SHEET 2.

Fig. 2.



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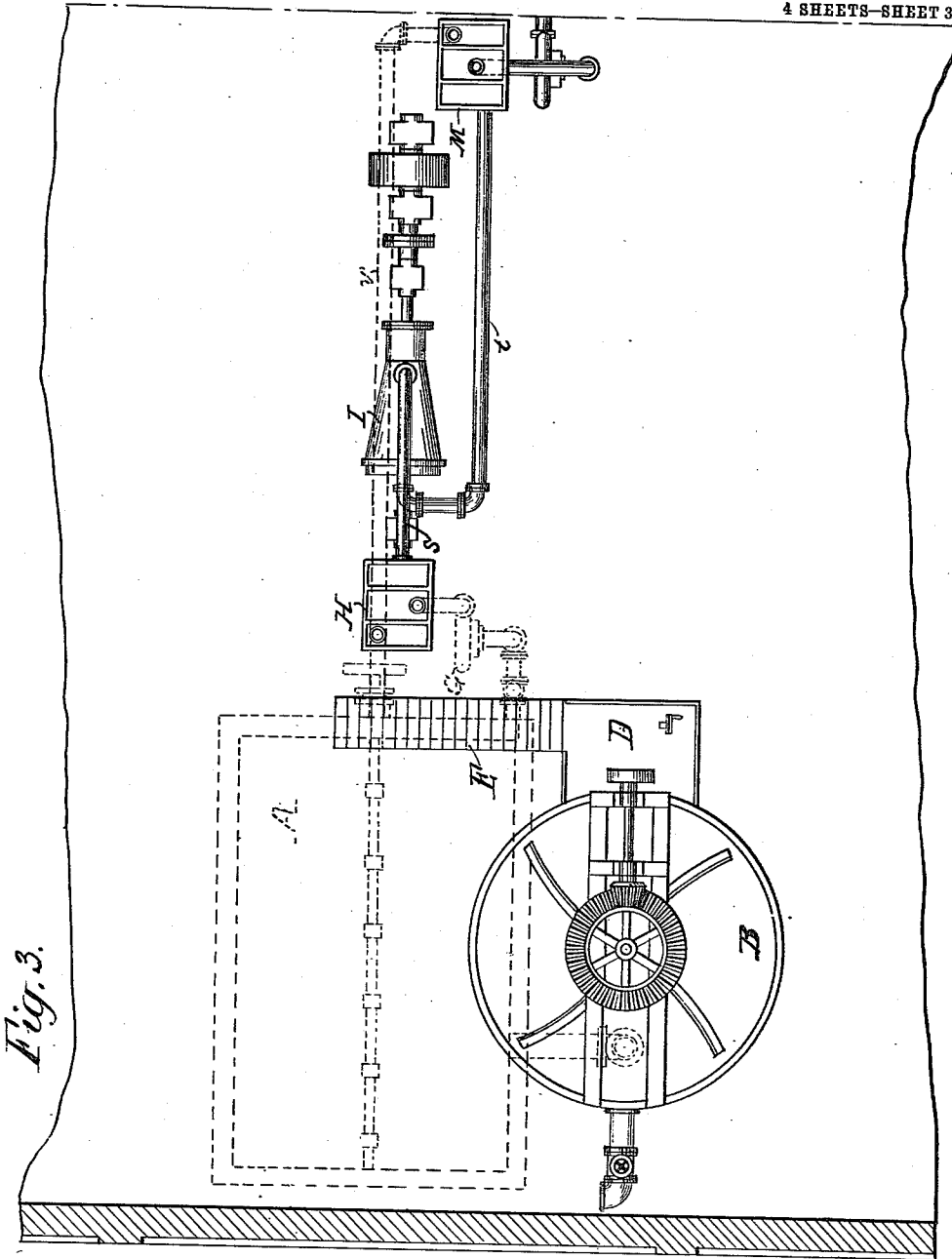


Fig. 3.

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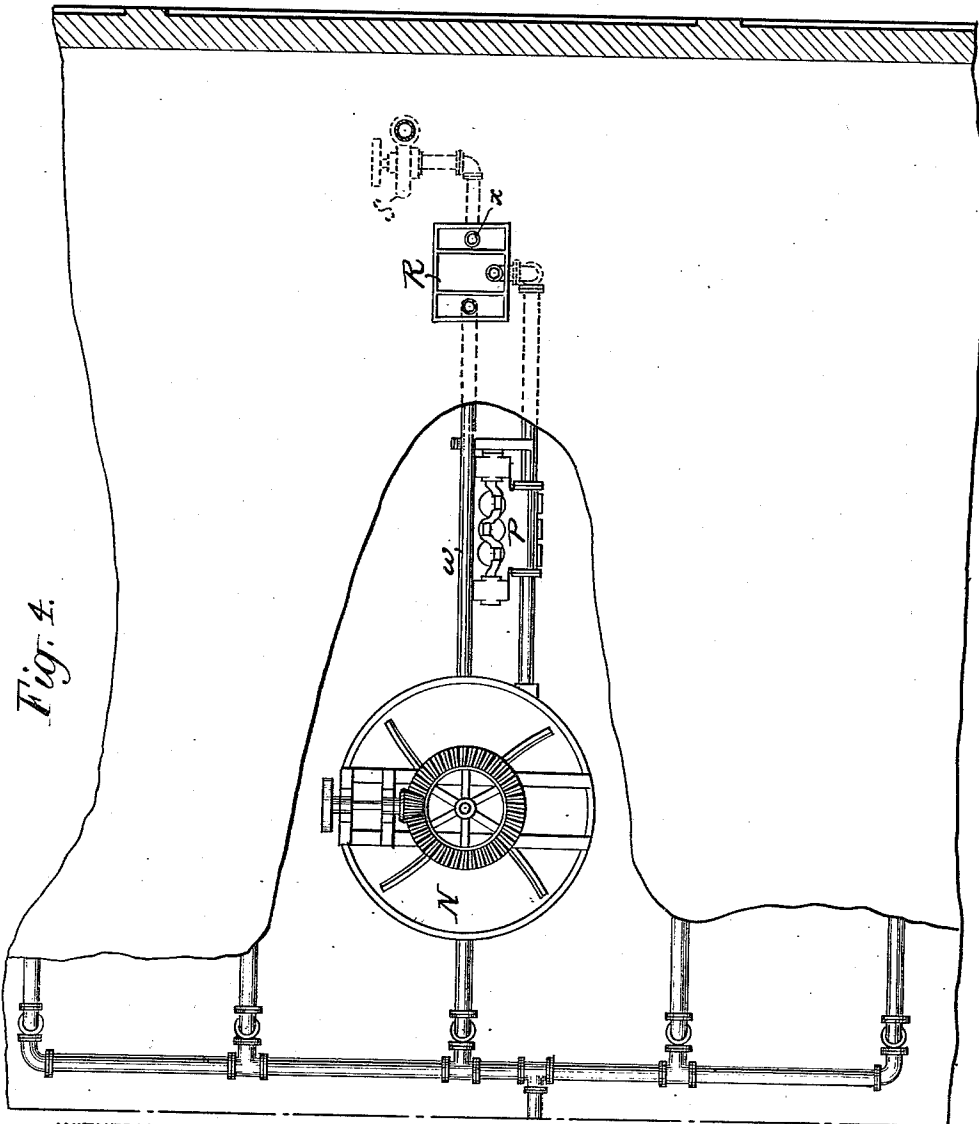
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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MANUFACTURE OF PAPER.

1,001,822.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WARREN CURTIS, JR., a citizen of the United States, residing at Palmer, county of Saratoga, State of New York, have invented certain new and useful Improvements in the Manufacture of Paper; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain new and useful improvements in the manufacture of paper, and is designed particularly to realize an important economy in the procedure at present practiced for supplying paper machines with the stock mixture, and, at the same time, to obtain practical uniformity in the quality of the paper produced. Newspaper stock is compounded by the admixture of wood pulp and sulfite pulp in varying proportions, according to the quality desired, together with other ingredients such as clay, size, colors, and the like, intimately admixed, and with as large a percentage of the white water from the paper machines as can be made available. In the paper making art, it is customary to make up the standard stock mixture from these constituents, by introducing the pulp into the usual beater engines, of shallow depth and relatively large surface area, and (after removing or otherwise rendering ineffective the beater knives) to cause the pulp to circulate in the elliptical trough of the beater-engine, under the influence of the propelling action of the beater engine drum. The mixture of wood pulp and sulfite pulp is thus brought into a comparatively slow circulation, and during its progress, the clay, size, color and the like, are added, with the final result that the materials are mixed with greater or less uniformity, depending upon the care, skill and attention of the attendant. The beater-engine, as thus employed, is but poorly adapted for mixing purposes. It does not operate with sufficient energy to effect a prompt and thorough intermingling of the ingredients, it is slow in its action, and, because of its shallow depth in comparison with its extent of surface, it is difficult for the attendant to accurately gage the proportions of the wood pulp and sulfite pulp admitted, so as to obtain in successive charges the same relative amounts with more

than approximate accuracy, and the uniform distribution throughout the mass of pulp of the remaining ingredients is but partially realized. Moreover, each beater engine, when thus employed, requires the attention of several operators, and, in view of the small capacity of the individual beater-engine, a number of them are required for supplying even a single paper machine of the modern type, so that, in a large paper mill, the beater engines employed for this purpose not only require the services of many operators, but occupy a very considerable floor space, and produce a succession of charges or batches which are individually not wholly homogeneous, and which vary among themselves in relative proportions, often within wide limits.

The purpose of my present invention is to suppress the use of these beater engines for mixing purposes, and to provide an organized procedure for the manufacture of newspaper, wherein the paper machines employed at the mill for producing a certain quality of output, can be supplied with stock of a practically uniform character, which will not vary materially during successive time periods. To this end, I substitute for the beater engines of small capacity and inefficient service, a source of practically uniform and thoroughly intermingled stock mixture, adapted to be efficiently operated by a single attendant, the necessary controlling valves for the admission of the several ingredients and for the discharge into the main stuff-chest of the mill of the mixed batch being within immediate proximity to each other so as to be operated by him with corresponding facility. This source of uniform supply is also of a capacity corresponding to the combined capacity of the beater engines for which it is substituted, and is provided with mixing devices of such an efficient character as to effect a practically homogeneous intermingling, not only of the two qualities of pulp employed, but also an equally complete and homogeneous admixture with the pulp, of the remaining ingredients. From this source of practically uniform stock mixture supply, is replenished, at intervals, the main stuff-chest of the mill, the said main stuff-chest being provided with an agitator, to prevent settling and stratification, and being of such capacity as to fully satisfy the demands of

the paper machines, during the intervals between the preparation of successive batches of the stock mixture and, in fact, being of such capacity as to maintain a relatively large permanent or dominant mass or pool of the stock mixture, for the purpose of rendering entirely inconsequential even such slight variations as might conceivably exist between successive batches from the source of mixture supply.

From the receiving reservoir or main stuff-chest, the stock is preferably passed through a plurality of jordans and thence to the individual stuff-chests of the several paper machines, wherein it is kept in agitation, and from which it is withdrawn by the usual measuring pumps, and is finally delivered to the screens of the paper machines.

In the accompanying drawings, Figure 1 represents diagrammatically and in elevation a part of the main elements of a system or organization of apparatus for putting my invention into practice; Fig. 2 represents a continuation of the view shown in Fig. 1; Figs. 3 and 4 represent corresponding plan views of the parts shown in Figs. 1 and 2, respectively.

Similar letters of reference indicate similar parts throughout the several views. Referring to the drawings, A indicates the main stuff-chest, which, in this instance, may be assumed as supplying say from two to five paper making machines of the usual size and capacity of output, for the production of newspaper. The main stuff-chest A is provided with an agitator *a* of any suitable character for preventing stratification and separation of the ingredients of the mixture.

In convenient proximity to the main stuff-chest A is located the preliminary mixing device, constituting the source of the practically uniform and homogeneous mixture. This preliminary mixing device consists of a tank B, provided with a rapidly rotating stirrer, preferably of the type wherein a downward, outward and inward movement or flow of the material is produced. The propelling agitator or stirrer is, in practice, revolved at a very high rate of speed, approximating about one thousand (1,000) feet of travel per minute at the periphery thereof, so as to cause the most intimate and thorough intermingling of the ingredients, and this mixing operation takes place with special completeness at the lower portion of the tank B, assisted by the preliminary action, if need be, of a number of blades *c* attached to the upper part of the shaft *d* of the stirrer and having a slight downward inclination.

The ground wood pulp is admitted through a conduit *f* provided with a cut-off valve *f'* and the sulfite pulp is admitted through a pipe *g* provided with a cut-off

valve *g'*. The white water conduit *h* coming from the paper machines is likewise provided with a cut-off valve *h'* and a receiving tank *l* for the clay mixture is supplied therewith from a suitable pipe *m*. The clay tank may likewise serve as a measuring vessel for accurately gaging the quantity of clay admitted into the batch and is provided with a discharge pipe *n* having a cut-off valve *n'* and leading into the tank B. The color, alum, sizing and the like, which are small in amount, may be conveniently added to the batch by hand, from pails or buckets provided for the purpose.

The general contour of the mixing tank B is preferably cylindrical, or of some other regular form, so as to permit the operator to judge accurately as to the relative proportions of the several ingredients added, by noting their effect in raising the level within the tank B as they are separately added thereto. The tank B, which is, in the usual practice, about fourteen (14) feet in height, and of the relative dimensions illustrated in the drawing, is provided with a platform D and with a stair E or other suitable means for reaching the platform, and the several cut-off valves are located in close proximity to each other, so as to be readily accessible to a single operator standing upon the platform. So, also, the discharge gate *p* for admitting the mixture into the stuff-chest A is preferably operated from the platform, through the intermediacy of a controlling lever which actuates a hydraulic or other cylinder F, whose movable piston is connected with the stem or rod of the gate.

A rotary pump G is connected with the lower portion of the main stuff-chest A and lifts the stock to the flow-box H into the jordan I, the flow-box being provided with the usual over-flow return *r* to the main stuff-chest A and being provided with the pipe connection *s* leading to the jordan. In like manner, a second jordan, in line with the first, is supplied from the same pump through the intermediacy of its individual flow-box, as indicated in the plan view, Fig. 3.

From each jordan, the stock passes through a conduit *t* to a flow-box M provided with an over-flow *b* leading back to the main stuff-chest, and from each of these flow-boxes the stock is passed to the individual stuff-chest N of a paper machine, which stuff-chest is provided with an agitator, for preventing stratification of the mixture and for keeping the solid particles in suspension. A measuring plunger pump P lifts the stock from the individual stuff-chest N to the flow-box R having a return *w* and having a connection *x* which leads to the pump S. The pump S lifts the stock to the screen of the paper machine.

It is apparent from the foregoing description of the construction and arrangement of the system, and of the purposes or objects of the invention, that, by means thereof, a plurality of paper machines may be supplied with stock of practically identical quality and that this plurality of machines will, therefore, turn out a practically uniform product, not only during fractional periods of time, but for the entire operation of either or both machines, for however long an interval either or both may be kept at work.

The dominating mass of uniform stock present in the main stuff-chest and the practically absolute uniformity with which that stock is replenished from time to time from the large capacity mixing tank B renders inappreciable any slight variations that might conceivably exist between successive batches produced in the mixing tank B; so that a uniform product at all times can be relied upon, whatever the number of paper machines serve from the main stuff-chest, and a product wherein the ingredients are intermingled and incorporated with each other with substantial homogeneity. Moreover, where the stock is supplied to the main stuff-chest from a plurality of beater engine mixers the individual errors from each of the small batches are cumulative and are correspondingly multiplied in the stock; whereas, a like individual error in the charge of the tank B would be relatively insignificant and negligible and would not interfere in any appreciable way with the practical uniformity of the stock supply. Furthermore, in so far as the plant itself is concerned, the entire mixing operation is conducted, not only at a less initial cost of installation, and with a corresponding economy in floor space, but also the services of a great number of operators are dispensed with and the single mixer is manipulated by one operator with a degree of certainty and uniformity appropriate to the exceptional facilities available for use by him.

It will, of course, be understood that, if desired, an additional mixing tank B may be held in reserve to be substituted for temporary use should the tank B, for any reason, become disabled; or, where the mill is provided with a larger number of paper machines than can be supplied by a single main stuff chest, the entire arrangement illustrated in the drawings may be duplicated on the same, or on a larger scale.

So far as I am aware, it is new in the paper making art to supply a plurality of paper machines designed to give the same product, from individual stuff-chests, which in turn are supplied from a main stuff-chest, wherein there is preserved at all times a dominating mass or pool of the constant and unvarying quality desired, and which mass is replenished from time to time from a practically uniform source of supply, of such large volume that any possible minor variations between successive batches would be inappreciable in the main stuff-chest mixture.

Having thus described my invention, what I claim is:—

1. The method of producing a practically uniform quality of paper as the output of a plurality of paper-making machines, which consists in maintaining in the main stuff-chest of said machines a dominating pool or mass of mixed stock substantially uniform in character, replenishing said pool or mass at intervals from a substantially uniform source of supply of large volume, whereby any possible minor irregularities in the uniformity of said source of supply are compensated by the dominating pool in the main stuff-chest, and distributing the supplies to the stuff-chests of the individual paper machines from said main stuff-chest supply, in proportion to the respective output capacities of the paper machines; substantially as described.

2. The combination with a plurality of paper-making machines of the several individual stock or stuff-chests thereof, a main stuff-chest supplying the several individual stock or stuff-chests, and common to all of them, and a mixing tank for supplying the main stuff-chest, said mixing tank being provided with means for obtaining a substantially homogeneous mixture therein, and being of relatively large capacity, but less capacity than the main stuff-chest, so that the complete charge of the mixing device may be received at intervals into the said main stuff-chest and so that a dominating pool of substantially uniform quality may prevail in said chest; substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

WARREN CURTIS, JR.

Witnesses:

A. H. WHITE,
CHAS. D. BLANCHARD.