

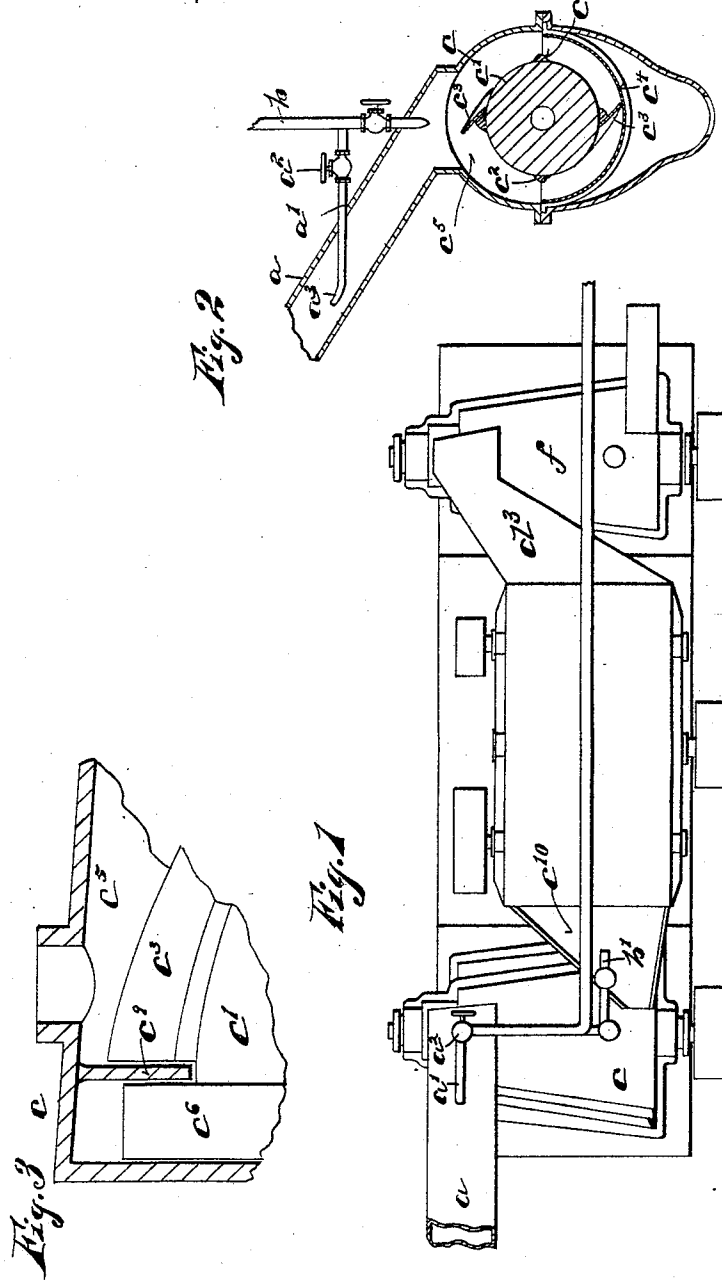
(No Model.)

2 Sheets—Sheet 1.

T. C. CADWGAN,  
PROCESS OF PREPARING PAPER STOCK.

No. 539,413.

Patented May 21, 1895.



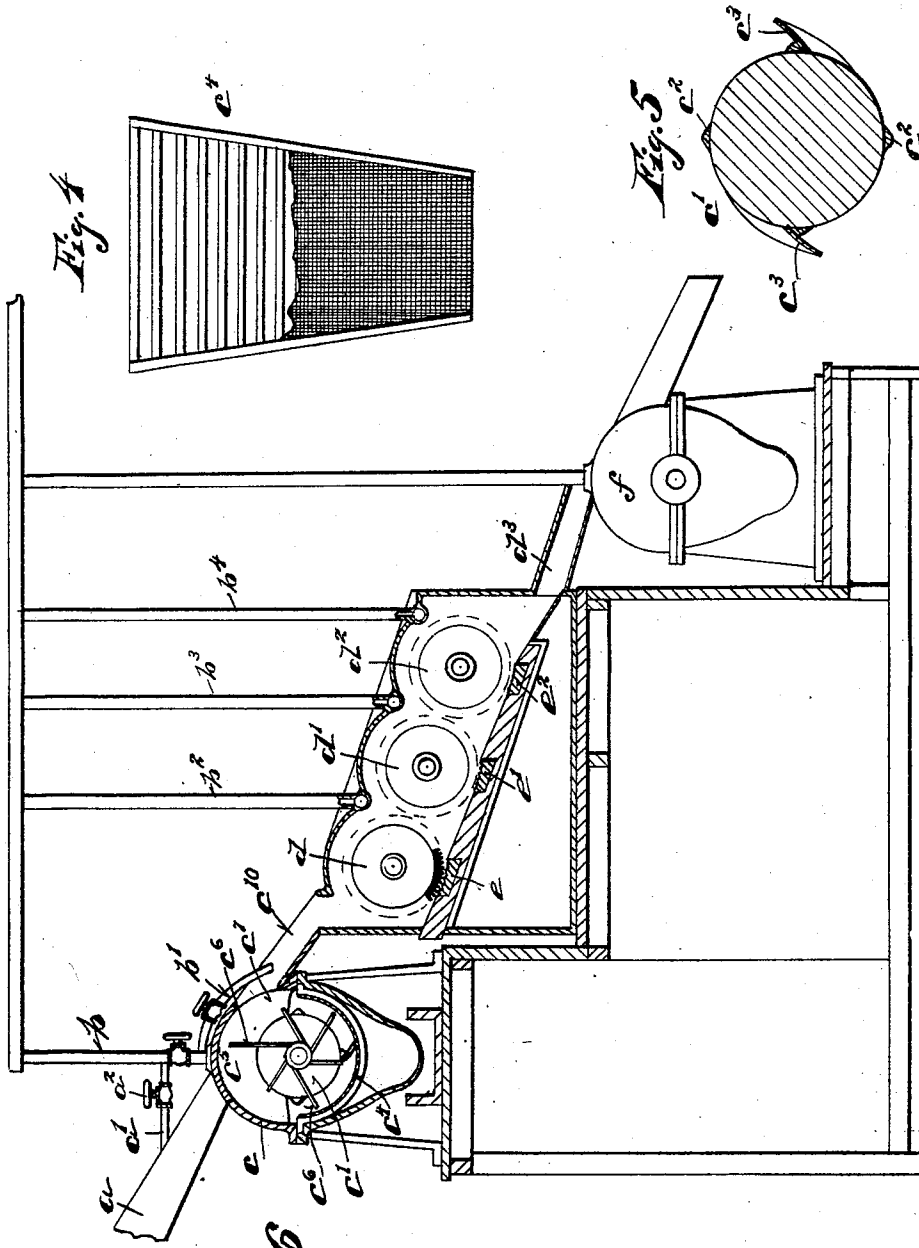
WITNESSES:  
*And Ernest*  
*Chas. J. Webb.*

INVENTOR  
*Thomas C. Cadwgan*  
BY *Wm. H. ...*  
ATTORNEYS

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WITNESSES:

*And Ernst*  
*Chas. J. Welch*

INVENTOR

*Thomas C. Cadogan*

BY

*John G. Shepherd*

ATTORNEYS

# UNITED STATES PATENT OFFICE.

THOMAS C. CADWGAN, OF ANDERSON, INDIANA, ASSIGNOR OF ONE-HALF TO  
THE O. S. KELLY COMPANY, OF SPRINGFIELD, OHIO.

## PROCESS OF PREPARING PAPER-STOCK.

SPECIFICATION forming part of Letters Patent No. 539,413, dated May 21, 1895.

Application filed September 11, 1894. Serial No. 522,767. (No specimens.)

*To all whom it may concern:*

Be it known that I, THOMAS C. CADWGAN, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Processes of Preparing Paper-Stock, of which the following is a specification.

My invention relates to improvements in methods employed for preparing paper stock; and the object of my invention is to provide a new process for preparing paper stock in which the operation of cleaning and preparing the stock is accomplished by means of a series of successive operations to which the stock is subjected in a subdivided state; the operation being a continuous one; the stock being by my improved process finished up complete ready for the refining process within the short period of time necessary for it to undergo the successive operations which make up the process.

Briefly stated, my improved process consists, first, in partially disintegrating or separating the stock into small quantities and in a continuous manner by the action of water; second, subjecting the stock thus separated to a rubbing or churning action in the water, and in separating the stock from the water so as to discharge the stock in the nature of pulp substantially free from water.

My process further consists in further disintegrating the stock and rewashing and re-separating it in the manner as will hereinafter more fully appear.

In carrying out my invention, I take the paper stock, that is, straw, rags, manila, &c., from any suitable source of supply after the same has passed through the bleaching tanks. In the condition in which it is thus found it is massed and tangled together and filled with lime, sand and other impurities. In this condition I pass it through a trough or conduit, and at suitable intervals in the passage through this trough or conduit, which is preferably by gravity, I subject the stock to the action of water discharged through small discharge openings with considerable force so as to separate and partially disintegrate the stock; the stock being retained in the trough or conduit and passing through the same by

gravity for further treatment. The trough or conduit is adapted to discharge into a suitable washing and separating device, which consists preferably of an outer casing inclosing a revolving rubber or beater having suitable ribs or wipers, which operate in connection with a screen to further disintegrate and wash the stock and separate it from the water in which it is contained. I then preferably subject the stock thus washed and partially disintegrated to the action of disintegrating rollers, after again mixing it with water, the operation of washing and separating being repeated to finish the product ready for the refining engine.

In the accompanying drawings, which illustrate the devices and means for carrying out my improved process, Figure 1 is a plan-view of a device adapted to carry out my invention. Figs. 2 and 3 are sectional views in detail of portions of the same. Fig. 4 is a plan view in detail of the supporting-screen. Fig. 5 is a sectional view of the beater or rubber in detail. Fig. 6 is an elevation, partly in section, of the apparatus shown in Fig. 1.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, *a* represents a trough or conduit through which the stock is discharged by gravity and in which it is subjected to the action of water discharged under pressure through suitable nozzles *a'* from a water pipe *b*. Any suitable number of the discharge nozzles *a'* may be employed, each being provided with a regulating valve *a<sup>2</sup>* to control the quantity of water discharged through the same, and each being preferably provided with a nozzle *a<sup>3</sup>* to direct the water against the stock in the opposite direction from which the stock descends so that it is broken up and partially disintegrated by the action of the water thereon. Any number of these nozzles and discharge pipes may be employed to accomplish the necessary separation of the stock. The effect of the water is to break up the lumpy mass and mix it to a certain extent with the water so that it will flow in a continuous and substantially uniform stream. The water and stock thus intimately mixed together are carried into an outer casing *c*, of a substantially cylindrical shape in

cross-section but tapered in its length, the conduit  $a$  being adapted to discharge into the small end thereof. In this casing  $c$  is a revolving beater or rubber  $c'$ , having a series of ribs  $c^2$  and wipers  $c^3$ . The wipers  $c^3$  are preferably formed of leather, or other flexible material, and are adapted to project from the tapered cylindrical rubber or beater  $c'$  so as to contact with a screen  $c^4$ , which constitutes the bottom of the casing, and which is formed in cross-section on the arc of a circle from the center of said rubber or beater. The upper part of the casing  $c$ , however, is formed eccentric to the rubber or beater so that an enlarged space  $c^5$  is provided above the rubber or beater to form a reservoir in which the stock is churned to thoroughly mix and further disintegrate the same before it is carried to the screen and eventually discharged at the end. The revolving beater is provided at the enlarged end with a series of blades or paddles  $c^6$ , by which the stock is lifted and discharged through an opening  $c^7$  in the form of a pulp and separated from the water, which passes through the screen  $c^4$  and out at the bottom of the casing into a suitable discharge trough provided for the purpose. The outer casing is provided near the large end with a partition  $c^8$ , which extends from the top downwardly and formed to fit the revolving cone or beater; this partition being formed in the upper part of the casing only and serving to prevent the passage of the stock direct to the lifting blades or paddles  $c^6$ ; the stock being thus retained in the washing chamber  $c^5$  until it is gradually carried by the ribs and wipers downwardly and along the screen, whence it is conveyed to said lifting blades or paddles; the wipers or ribs on the revolving cylinder being formed slightly spiral for this purpose. The stock thus partly disintegrated and washed and free from the water in which it has been treated, is discharged through the opening  $c^7$ , and passes into a suitable trough or conduit  $c^{10}$ , where it is again subjected to the action of a stream of water discharged from a suitable pipe or nozzle  $b'$  from the water pipe  $b$ . The stock is carried by the action of the water and with the same into a suitable casing, where it is subjected to the action of a series of disintegrating rolls  $d d' d^2$ , which are preferably ribbed or corrugated on their outer peripheries and adapted to operate in connection with opposing concaves  $e e' e^2$ . An additional quantity of water is supplied between

each disintegrating operation through suitable pipes  $b^2 b^3 b^4$ , the stock being finally discharged through a suitable discharge opening  $d^3$ , into a second washing device  $f$ , formed substantially the same as the one previously described, except that a screen of smaller mesh is preferably provided to prevent the disintegrated stock from passing through the same. From this final rubbing and washing process the stock is discharged, thoroughly prepared and washed for the refining engines.

If desired, the last process may be dispensed with, though this operation will generally be found desirable after the stock is thoroughly disintegrated by the action of the rolls, as described.

It will be seen from the above description that I provide a process for finishing paper stock which is continuous, the stock being thoroughly prepared in a short time and in any desired quantity by varying the capacity of the apparatus employed for carrying out the said process. The stock being subdivided is treated more uniformly than by the processes heretofore devised, and as each particle is brought under the influence of the respective operations, a most perfect system of stock preparation is provided.

Having thus described my invention, I claim—

1. The process of preparing paper stock which consists in, first, breaking and separating the stock by the action of water under pressure; second, washing the stock by a rubbing process in the water by which it is first treated, and then screening the stock from the water and discharging it substantially free from the water, substantially as specified.

2. The process of preparing paper stock which consists in first breaking and separating the stock by the action of water, rubbing and screening the stock so as to separate it from the water, then disintegrating the stock by successive grinding or tearing operations while subjected to the action of water, and finally separating the stock from the water by rubbing the same in contact with a screen, substantially as specified.

In testimony whereof I have hereunto set my hand this 24th day of July, A. D. 1894.

THOMAS C. CADWGAN.

Witnesses:

J. A. TODD,

L. H. PURSELL.