April 12, 1932. J. A. DE CEW 1,853,849

METHOD AND MEANS FOR EXTRACTING AIR FROM PAPER STOCK

Filed July 7, 1930 2 Sheets-Sheet 1

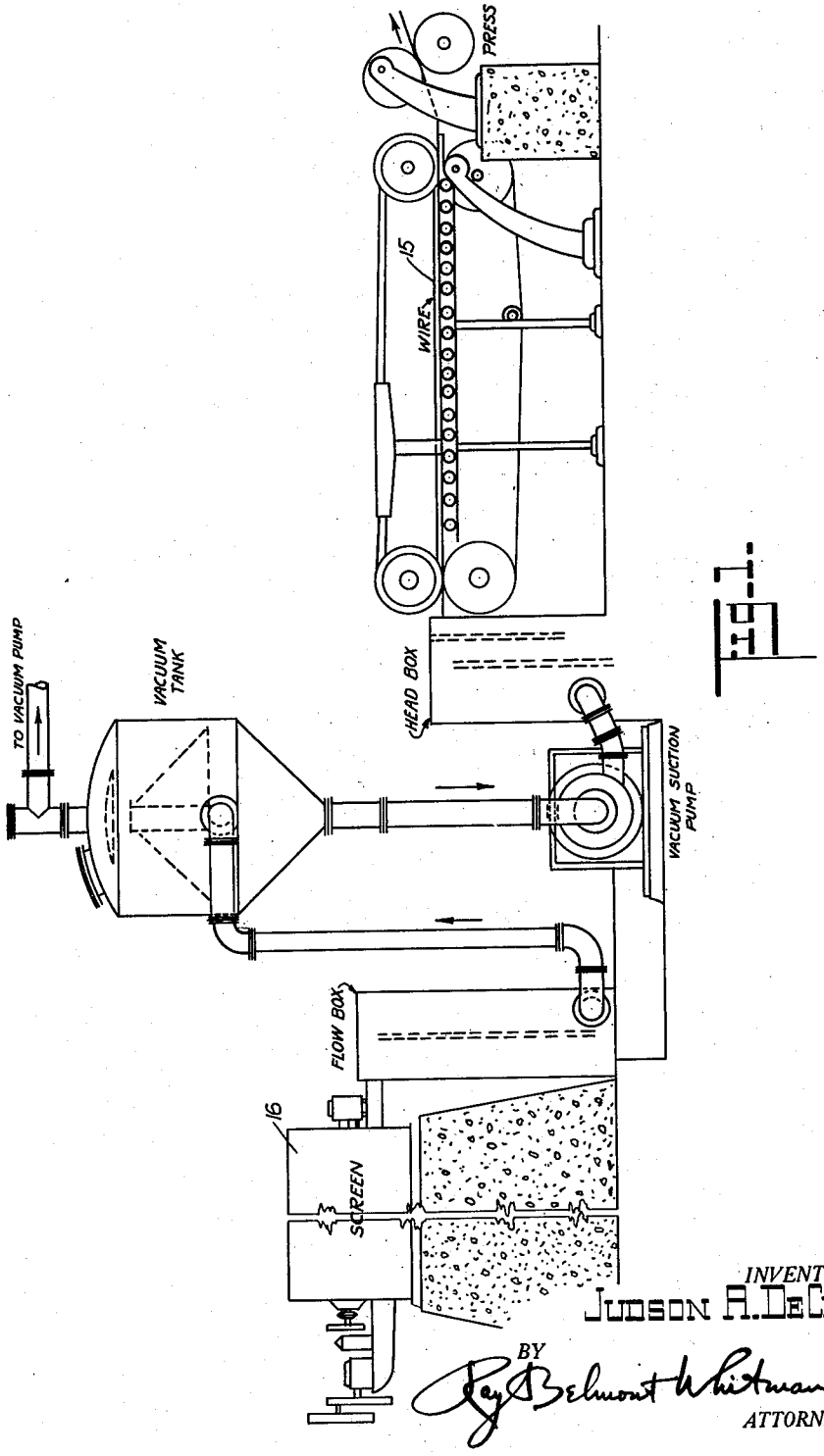

Fig. 1.

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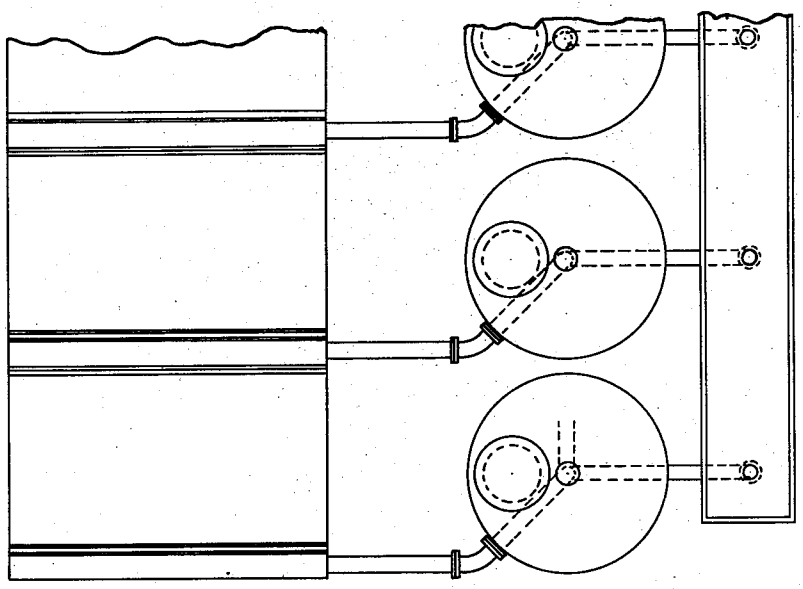

Fig. 2.

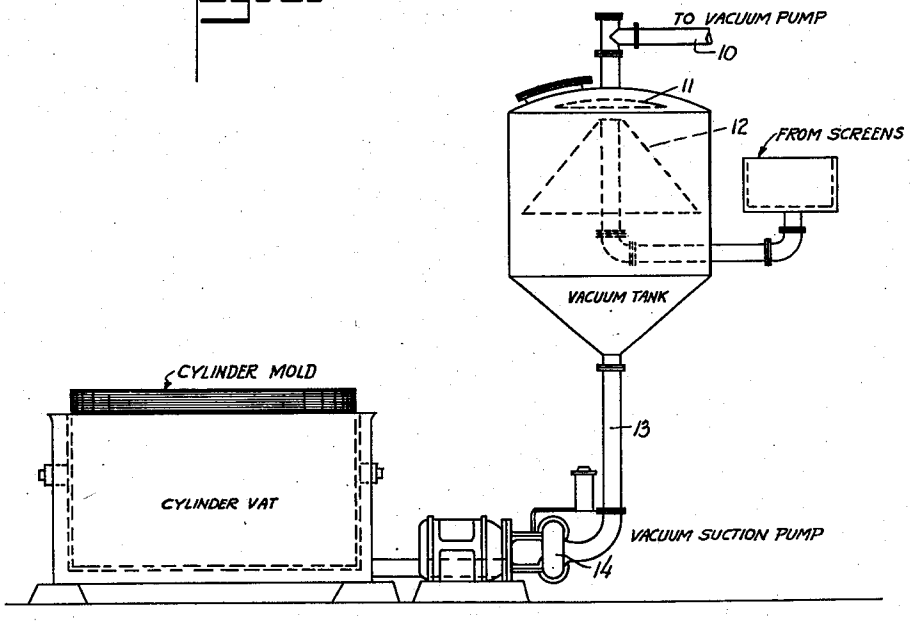

Fig. 3.

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UNITED STATES PATENT OFFICE

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METHOD AND MEANS FOR EXTRACTING AIR FROM PAPER STOCK

Application filed July 7, 1930. Serial No. 465,910.

This invention covers a method of extracting air or dissolved gases from paper stock at a specific point in its manufacture.

In applicant's Patent No. 1,704,728, issued March 12, 1929, the invention disclosed consists chiefly in the treatment of stock in a Jordan type machine while under a partial vacuum to accelerate hydration of the stock. At the same time the gases are extracted, and if the paper stock made by this process is used on a paper machine without being screened, then the frothing is eliminated by the jordaning operation.

I find, however, that even after the process described in my patent is fully carried out, that if the hydrate stock is diluted and passed through a paper machine screen before it goes to the wire, gases are put back into the stock by the screening operation so that the frothing condition is again produced.

Assuming, therefore, that the cellulose has been hydrated by the vacuum process and then finally screened, I have devised a method by which the gases can be extracted from the paper stock after the diluting and screening operation so that when it passes to the paper machine it will be absolutely free from the evolution of gases which cause froth on the wire.

This specific invention, therefore, is concerned with the use of a vacuum tank placed in conjunction with and operating as part of the paper machine between the screen and the forming wire.

Figure 1 shows diagrammatically the use of this apparatus and process on a Fourdrinier machine.

Figs. 2 and 3 show similarly the application of this process and apparatus on a cylinder machine. Fig. 2 is a top plan view, and Fig. 3 is a side elevational view. In this latter case it may be necessary to use one vacuum tank to each one or more cylinders.

The operation of the process is as follows:

The stock, which is diluted generally to a consistency of under 1 per cent solids, is drawn into the vacuum tank through the pipe 10 where it impinges against the plate 11 and falls over the cone 12. This tank is under a vacuum caused by drawing the air from the tank through the pipe 13.

As this diluted stock spreads out in films within the apparatus, the gases which are entrained and dissolved in the solution under atmospheric pressure, escape under the vacuum into which it enters and the liquid falls by gravity into the pump 14, from which it is pumped to the vat containing the cylinder mould.

This process differs from that which is specifically described in my Patent No. 1,704,728 inasmuch as it is ready for the paper machine. It, therefore, removes the froth, which is put back into the stock by the screens, even if it were formerly removed by vacuum Jordaning.

This process can be used independently of the specific claims covering the hydration methods described in the aforesaid patent, and an important purpose of this invention is to send the stock to the paper machine wire free from all gases so that it will more quickly form on the wire, and produce a denser sheet of paper and one with a better formation.

Fig. 1 illustrates the method of placing the vacuum tank between the paper machine wire 15 and the screen 16 so that the screened material first has the gases extracted and is then pumped to the head box supplying the stock to the machine.

This invention requires the introduction of a new piece of equipment in the paper machine itself and can be used in conjunction with the apparatus and process described in my Patent No. 1,704,728 to improve the final result.

In this process the vacuum is applied only to the diluted stock and is used to correct a condition produced by the paper machine itself for the paper machine screen may be considered as part of the wet end of the paper machine.

It is possible to operate this process by substituting for the vacuum tank, any type of vacuum pump that will extract the air from the liquid during the pumping operation, although I consider the above plan to be more efficient.

The invention consists in removing the air at any place after the final screening operation.

This invention can be used in connection with papers requiring no hydration and can be used quite independently of any Jordaning or beating treatment.

It is to be understood that the present disclosure is for the purpose of illustration only, and that the invention is not limited thereto. To those skilled in the art, many modifications of the invention will be readily apparent, and it will also be obvious to such skilled persons that part of the method and means may be used without other parts thereof, many such combinations of the parts readily suggesting themselves. Therefore, it should be, and is to be distinctly understood that for a definition of the limitations of the invention, reference must be had to the appended claims.

Having now described the invention, what is claimed as new and for which Letters Patent of the United States is desired, is:

1. The method of extracting air from paper stock which consists in passing the diluted material from the paper machine screen into a tank under vacuum and pumping it back to the paper machine flow box.

2. A method of eliminating froth from the paper machine, which consists in removing the air from the diluted stock from the paper machine screen by means of a vacuum.

3. A method of defrothing the paper stock that is forming a sheet of paper, which consists in passing this stock through a tank under partial vacuum attached to the paper machine between the screen and head-box.

4. A step in paper manufacture consisting of interrupting the flow of water and stock from the screen to the head-box and extracting the froth-forming air by exposing this fluid stock to a reduced pressure within a vacuum tank, and then returning it to the head-box.

5. A step in paper manufacture which consists in extracting air from the diluted paper stock by means of a partial vacuum, at a point between the paper machine screen and the forming wire of the machine.

6. A step in paper manufacture which consists in passing the diluted paper stock from the paper machine screen through a vacuum pump, and removing a portion of the dissolved gases.

7. A step in paper manufacture which consists in removing the gases that are incorporated into the paper stock by the paper machine screen by exposing the screened stock to a reduced pressure.

Signed at New York city in the county of New York and State of New York, this 1st day of July, A. D. 1930.

JUDSON A. DE CEW.