United States Patent [19]

Sparowitz et al.

[11] **3,894,486**

[45] **July 15, 1975**

[54] **DEVICE FOR OBTAINING A SELECTABLE DEHYDRATING PRESSURE IN DEHYDRATING MACHINES**

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[73] Assignee: **Maschinenfabrik Andritz Aktiengesellschaft,** Austria

[22] Filed: **Aug. 13, 1973**

[21] Appl. No.: **387,961**

[52] **U.S. Cl.** **100/118;** 100/154; 162/273

[51] **Int. Cl.** **B30b 9/24;** B30b 5/04

[58] **Field of Search** 100/151–154, 100/118–120; 210/386, 401; 162/273, 301, 312, 313

[56] **References Cited**

UNITED STATES PATENTS

631,567	8/1899	Fowler	100/118
705,071	7/1902	Graham	100/154
1,869,987	8/1932	Van Den Burg	100/153
3,110,244	11/1963	Goodale	100/120
3,330,206	7/1967	Bechard	100/153
3,459,122	8/1969	Pastoor et al.	100/118

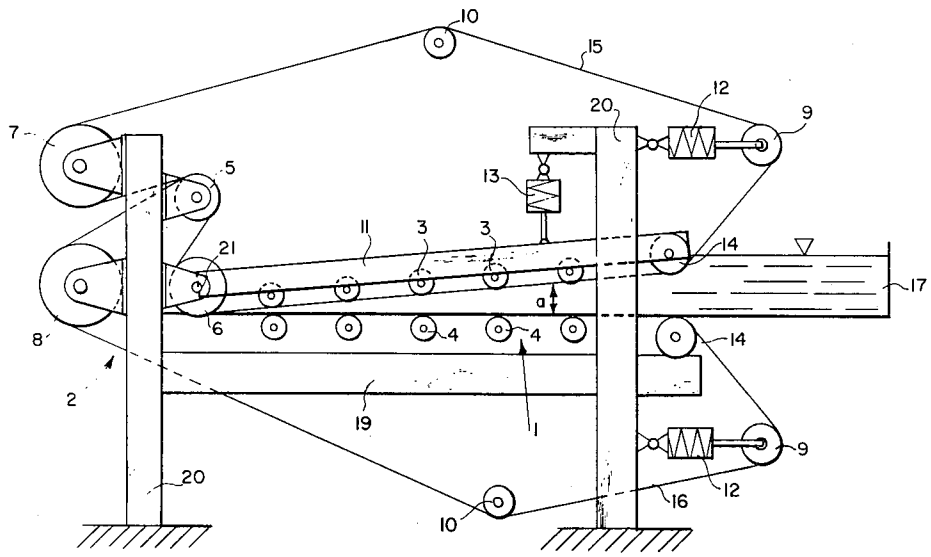
Primary Examiner—Peter Feldman

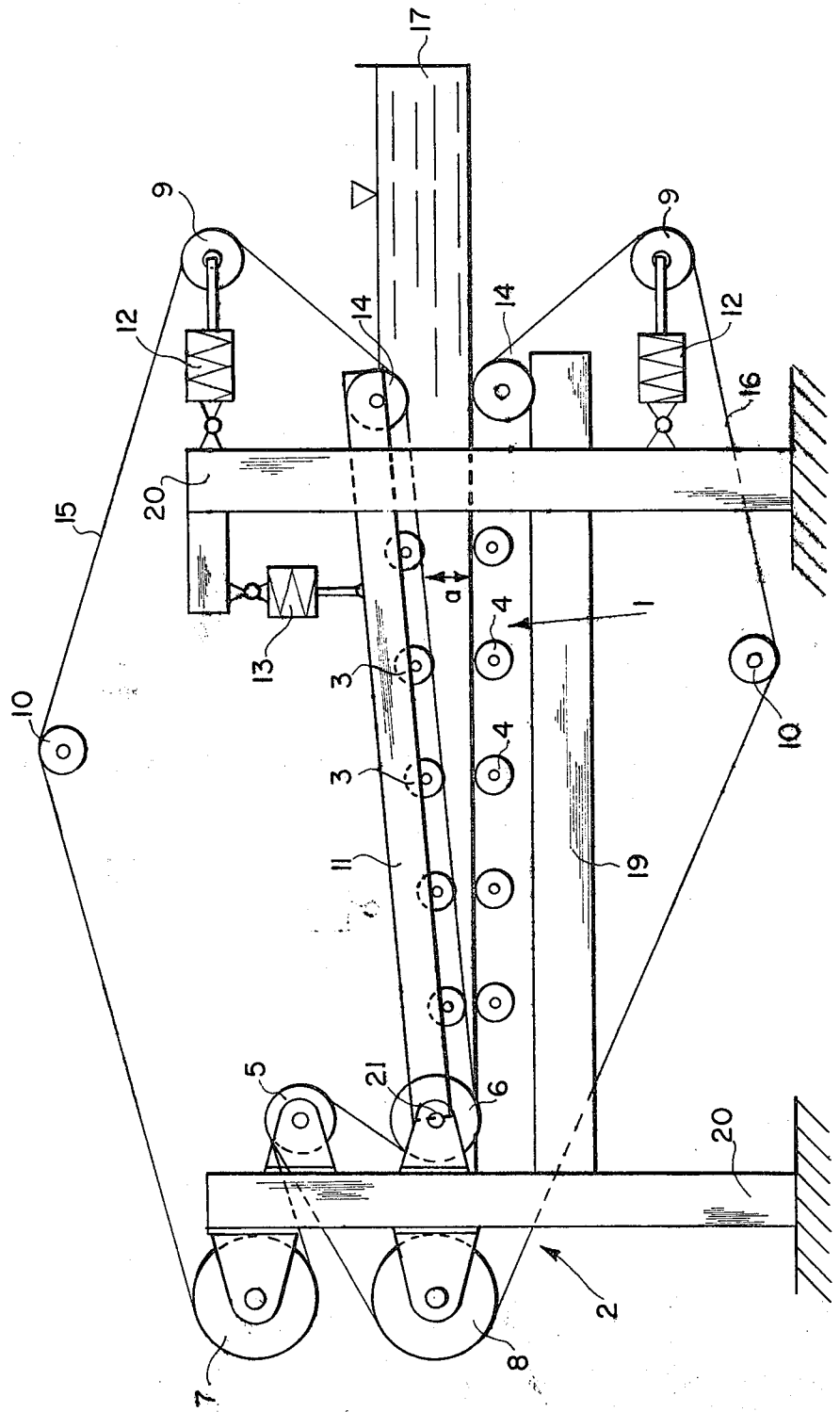
Attorney, Agent, or Firm—James E. Bryan

[57] **ABSTRACT**

This invention relates to an improvement in a dehydrating machine for the separation of solids from suspensions including a first group of rolls which in wedge position perform a preliminary dehydration and a second group of rolls which perform the main dehydration, said rolls being enclosed by upper and lower screen bands, the improvement comprising means whereby the tension of the screen bands may be varied, and means whereby the wedge angle may be varied.

3 Claims, 1 Drawing Figure

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DEVICE FOR OBTAINING A SELECTABLE DEHYDRATING PRESSURE IN DEHYDRATING MACHINES

The present invention relates to a device for obtaining a selectable dehydrating pressure during the separation of fibrous materials from suspensions in dehydrating or water-removing machines, particularly double-screen presses, comprising a plurality of rolls enclosed by an upper and a lower screen band. A first group of rolls, in a wedge position, executes or carries out a preliminary dehydration, and a further group of rolls executes or carries out the main dehydration.

It is known to separate solid substances from suspensions in dehydrating machines in which stationary screens in wedge shape are pressed against each other or the suspension is pressed with the aid of a screw or worm conveyor into the wedge gap of the dehydrating machine.

Known further in the art are so-called double screen presses including a plurality of pairs of rolls over which, in an upper portion, a screen band or belt is guided, and analogously also in the lower portion, wherein the suspension is compressed between the two screen bands or belts to such a degree that the water contained therein is squeezed out.

It is additionally known to provide means to enable one to perform the squeezing-out of the suspension in stages. For this purpose, such a dehydrating machine is subdivided into several dehydrating parts. The suspension arriving from the wet end first reaches the preliminary squeezing portion where it is transferred into the registering portion and will lastly in the main squeezing portion attain the desired degree of dehydration.

It also has been already proposed to provide for a means such that, with the progressive drying degree, the contact pressure is gradually increased so that at least a more finely, graduated dehydration is obtained. In this connection use is made of a so-called wedge portion in which the suspension is initially preliminarily dehydrated and thereupon passed or transferred into the main squeezing portion. In this case, the diameter of the respective rolls is in each case constantly decreased by a specific amount along the traveling direction of the screen so that the pressure on the suspension to be dehydrated will increase from one pair of rolls to the next toward the end. The wedge portion thus obtains a constantly set angle and the suspension will reach the wedge gap either via an additional pressure device, or by being poured into a slurry or pulp container, and by natural flow. The screen bands or belts enclosing the various rolls, i.e. the screen bands or belts of the upper and of the lower rolls, have a uniform tension so as to be able to maintain the contact pressure constant, at least theoretically.

These prior art dehydrating machines, however, all have the common disadvantage that with constant tension of the screen bands or belts, the drying content is not selectable. Thus, at no point is it possible to exert an influence upon the drying content within the machine. Even when a firmly set or adjusted wedge is employed in the preliminary portion, there will result an uneven or irregular weight per unit area as well as an uneven drying content. The absorption capacity of the suspension in the wedge portion is not constant, as tests have shown, so that also in this respect a means for a setting is desirable.

The object of the present invention is to provide a device for obtaining a selectable dehydrating pressure during the separation of solid substances from suspensions, which may be employed equally in the aforementioned dehydrating machines. It is intended that a selectable drying degree of the suspension be attained at all times. Furthermore, for further dehydration, a uniform weight per unit area is to be attained.

This object is obtained, in accordance with the present invention, by virtue of the fact that the screen tension of the upper and/or of the lower screen band or belt is variable, and in that a constant sheet or web thickness at the end of the wedge portion is adjustable by means of a wedge angle displacement. In order to render it possible to carry out these displacing possibilities, the screen tension and the wedge angle are adjustable — according to a further embodiment of the present invention — with the aid of tension means known per se.

As a result, in the wedge portion a uniform weight per unit area or surface weight, and a uniform drying content of the sheet or web of material can be effected. The drying content in the main squeezing portion can be influenced by means of a variable tension of the screen band or belt. Hence, it is possible to realize with a small expenditure a fine setting of the drying content and a constant surface weight or weight per unit area.

One embodiment of the present invention will now be described hereinafter in further detail with reference to the accompanying drawing wherein:

The single FIGURE is a side view of a dehydrating machine.

The FIGURE schematically shows one view of a dehydrating machine. The upper frame **11** or the lower frame **19** is mounted as a wedge portion **1** within the support or stand **20,** which comprises a known arrangement of pairs of rolls. The roll pairs are made up of the lower rolls **4** and the upper rolls **3** which have a greater distance with respect to each other at the input point of the suspension than at the output point so that a wedge shape will result. The end of the wedge portion **1** adjoins the main squeezing portion **2.** The latter comprises a lower main squeezing roll **6** also mounted within the support **20,** and a main squeezing roll **5** mounted thereabove. This pair of rolls is arranged superimposed in order that a maximum enclosing angle be obtained. Arranged at the end of the upper main squeezing roll **5** at a certain distance in the vertical direction are the drive rollers **7** and **8.** They serve for driving the screen bands or belts **15** and **16** and additionally have the function of carrying out the reversal of the screen bands or belts **15** and **16** at the discharge end of the machine.

Mounted at the uppermost and the lowermost point of the machine are the carrying rolls **10.** At the input side there follow the reversing rolls **9** and the screen bands or belts **15** and **16** close the cycle via the input rolls **14** to the upper rolls **3** and the lower rolls **4** of the wedge portion **1.** Arranged directly ahead of the input rolls **14** is the slurry or pulp inlet **17** which comprises a container filled with the suspension to be dehydrated.

With the aid of the natural inflow, the suspension is passed between the screen bands or belts **15** and **16** at the narrow point of the input rolls **14,** which will thereupon gradually reach the wedge portion **1** by virtue of the synchronous rotary movement of the screen bands or belts **15** and **16.** The wedge portion **1** is set with a

specific angle a and consists of lower rolls **4** which are rigidly positioned within the lower frame **19.** In a movable part, namely the upper frame **11** which has a pivot point **21** approximately in proximity to the lower main rolls **6,** the other end is suspended at a wedge tension means **13** connected to the support **20,** so that according to the requirements the position of the entire upper frame **11** with the respective upper rolls **3** is variable about a specific amount or value of the angle a.

Furthermore, at the reversing rolls **9** further tension means **12** engage which are also connected to the support or stand **20.** They have the effect that the tensions of the upper and lower screens **15** and **16** are variable. Moreover, it is advantageous that the screen tension and the wedge angle a be adjustable in dependence upon the drying content in the slurry or pulp inlet **17** and/or in dependence upon the specific dehydration properties of the suspension. In addition thereto, it is possible to adjust the screen tension and the wedge angle independently of each other.

By means of this device, a selectable wedge angle a is provided so that the surface weight and the drying content in the wedge portion will be uniform, and so that particularly the sheet or web thickness at the end of the wedge portion remains constant, and/or is guided into the main squeezing portion with a constant thickness. Furthermore, by virtue of the use of the variable tension of the screen bands or belts the drying content is selectable also in the main squeezing portion so that a fine metering of the end product can be effectively achieved. This results in substantial advantages for the further processing of the sheet of material with the aid of simple means.

It will be obvious to those skilled in the art that many modifications may be made within the scope of the present invention without departing from the spirit thereof, and the invention includes all such modifications.

What is claimed is:

1. In a dehydrating machine for the separation of solids from a suspension including a first group of rolls which in wedge position perform a preliminary dehydration and a second group of rolls which perform the main dehydration, said rolls being enclosed by upper and lower screen bands,

the improvement comprising means whereby the tension of the screen bands may be continuously varied and means whereby the wedge angle may be continuously varied as a function of the specific dehydration properties of the suspension.

2. A dehydrating machine according to claim **1** in which said means for varying the tension of the screen bands are tension means mounted between said bands and the machine frame.

3. A dehydrating machine according to claim **1** in which said means for varying the wedge angle is tension means mounted between a support for upper rolls in said wedge portion, and the machine frame.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 3,894,486

DATED : July 15, 1975

INVENTOR(S) : Richard Sparowitz and Alois Wohlfarter

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Item [73] "Aktiengesellschaft" should read - - - Actiengesellschaft - - -.

Item [30] has been omitted and should read:

- - - Foreign Application Priority Data
August 28, 1972 Austria ..... 7383/72 - - -

Signed and Sealed this

sixteenth Day of *September 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks