N. H. FREEMAN.

CONCENTRATOR.

APPLICATION FILED JULY 6, 1907.

983,488.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 1.

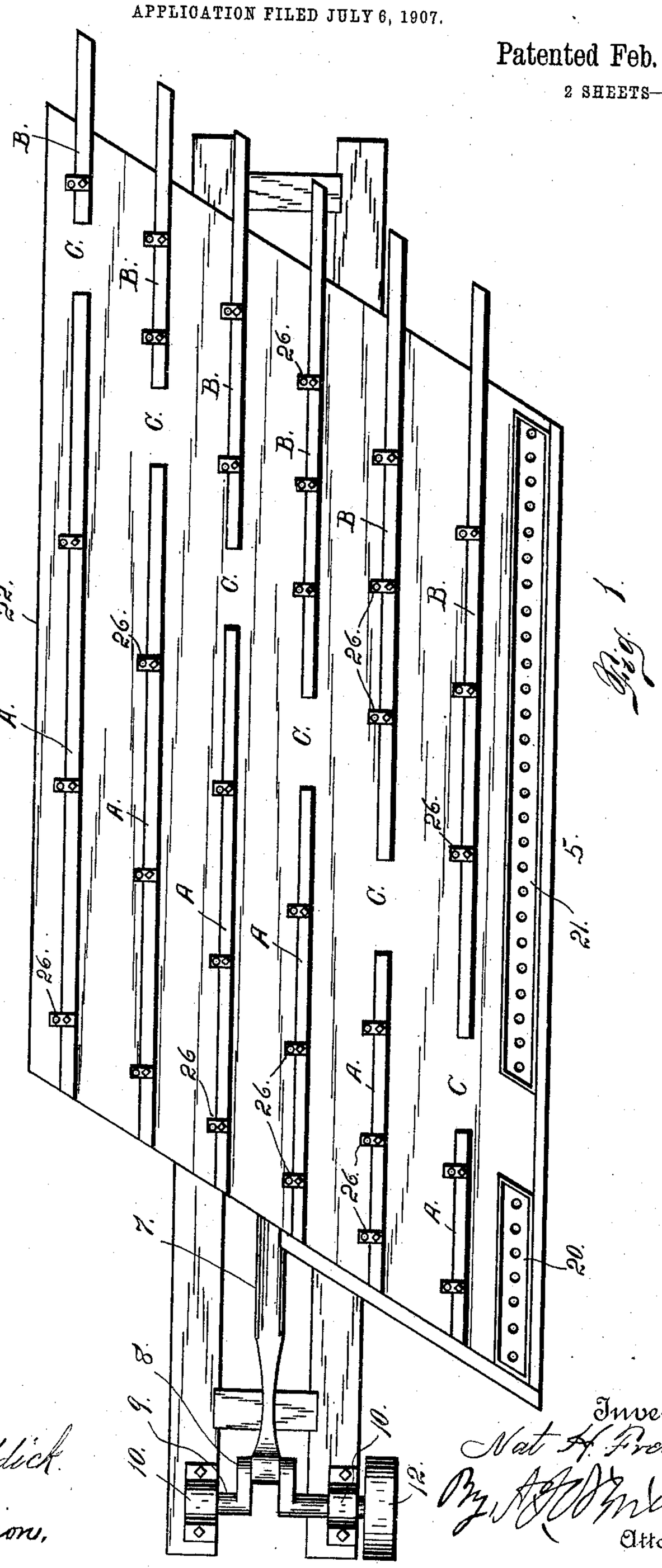

Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 5.

Fig. 6.

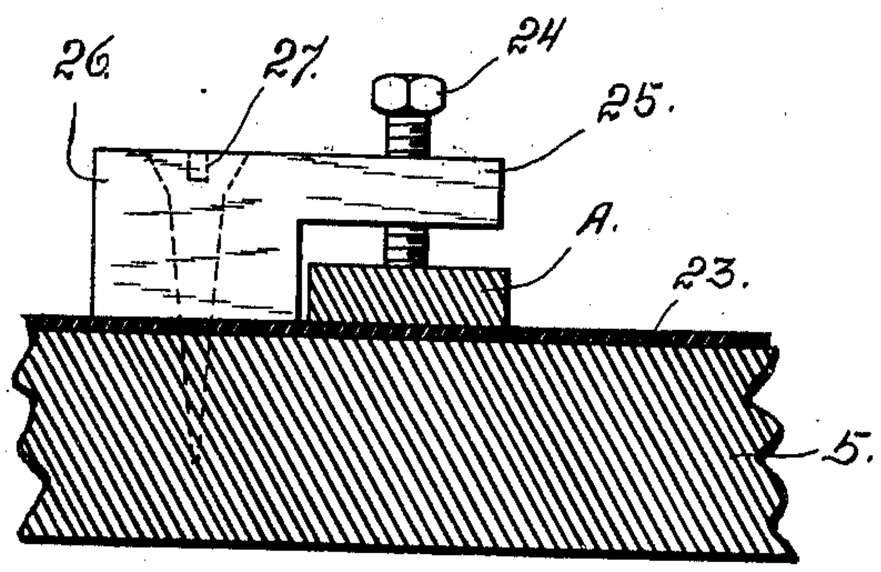

Fig. 3.

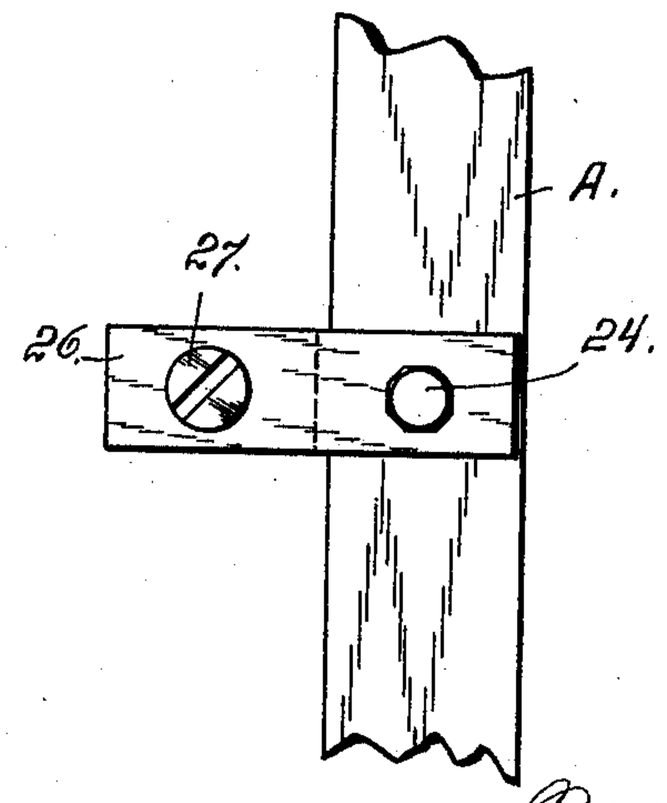

Fig. 4.

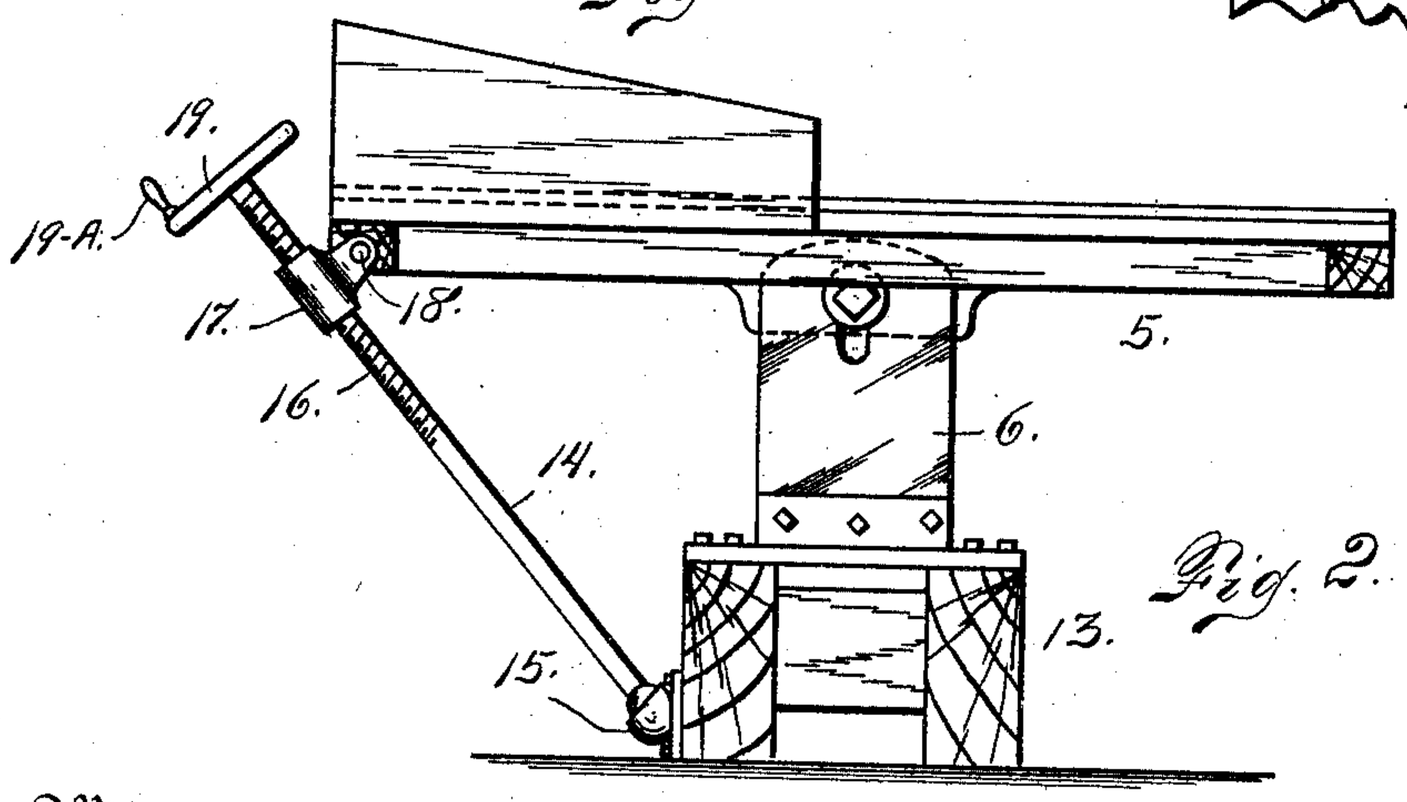

Fig. 2.

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UNITED STATES PATENT OFFICE.

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CONCENTRATOR.

983,488. Specification of Letters Patent. Patented Feb. 7, 1911.

Application filed July 6, 1907. Serial No. 382,546.

To all whom it may concern:

Be it known that I, NAT H. FREEMAN, a citizen of the United States, residing at Boulder, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Concentrators; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in concentrators of the class in which the concentrating surface is transversely inclined and subjected to a longitudinal vibratory movement for the purpose of stratifying the material upon the table and finally separating the values from the gangue, the gangue being discharged at the lower longitudinal edge of the table, while the concentrates or values are discharged at the rear extremity thereof or the extremity remote from the head, the latter being applied to the extremity where the material to be treated is delivered. In this class of concentrators the pulp containing the material to be treated is discharged upon the table at the upper side of the head extremity thereof; while wash water is delivered to the table also at the upper edge but rearwardly of the pulp discharge.

In my improved construction, the concentrating surface of the table is provided with adjustable interrupted riffles. In other words each riffle is composed of two members, there being a space between the two members of each riffle, the said spaces being arranged in a diagonal path commencing at a point near the upper edge and forward end of the table and extending diagonally thereacross, the opposite extremity of said path, being near the lower edge and near the rear extremity of the table. The rearwardly located members of the riffles diminish in length from the upper side of the table downwardly, that is to say the uppermost member of the rearwardly located member is longest, while the other riffles diminish in length downwardly, the lowermost of said members being the shortest. Hence the forward extremities of these rearwardly located members are arranged in a line extending diagonally across the table. The forwardly located members of the said riffles are arranged in the reverse order, that is to say the uppermost riffle is the shortest, the lowermost riffle the longest, while the other riffles increase in length from the uppermost to the lowermost. These forwardly located riffles extend from the head of the table rearwardly, their rearward extremities being arranged in a line extending diagonally across the table as hereinafter more fully explained in detail. By virtue of this riffle arrangement, a number of grades of concentrates may be discharged from the rear extremity of the table, since the space between each two of the rearwardly located riffles, may catch a different grade of concentrates. In other words by virtue of my improved construction the concentrate discharge at the rear extremity of the table may be classified into any desired number of grades.

By virtue of the longitudinal adjustability of the riffles of my improved construction, the interruption between the two members of each riffle may be located as desired between the forward and rear extremities of the table.

Having briefly outlined my improved construction, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a top plan view of my improved concentrating table, suitable means for imparting the longitudinal vibratory movement thereto being also illustrated. Fig. 2 is a rear end view of the table, showing the means for imparting the transverse inclination thereto. Fig. 3 is a sectional detail view illustrating the adjustability of the riffles, the parts being shown on a larger scale. Fig. 4 is a top plan view of the same. Figs. 5 and 6 are top and side views, respectively of one of the riffle sections still on a larger scale.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a concentrating table considered in its entirety. This table is suitably mounted to have a longitu-

dinal reciprocatory movement. It is preferably mounted upon flat springs 6 (see Fig. 2) which extend upwardly and permit a suitable degree of longitudinal oscillation, as the table is actuated by a pitman 7 connected with the crank 8 of a shaft 9 journaled in boxes 10. This shaft is provided with a fly wheel 12 which may be connected with any suitable power for operating the table. The springs 6 are mounted on a stationary support 13. To one side of this support is connected a rod 14 connected with a stationary support by a ball and socket joint 15. The upper portion of this rod is threaded as shown at 16 and engages a nut 17 made fast to the concentrating table as shown at 18. The upper extremity of the rod 14 is provided with a wheel 19 having a crank 19[A] to facilitate the manipulation of the rod for the purpose of adjusting the table transversely or regulating its transverse inclination.

Mounted at the head of the table and at the upper extremity thereof is a pulp box 20 whose bottom is perforated to allow the pulp to pass to the concentrating surface of the table. In the rear of the pulp box 20 is located a wash water trough 21 for supplying the necessary wash water to the table for effecting the separation of the gangue from the values or concentrates. The concentrating surface of the table is provided with a series of interrupted or divided riffles, that is to say each riffle consists of two sections A and B in longitudinal alinement. The section A is the forward section of each riffle, while the section B is the rearward section thereof. Between the members of each riffle is left a space C, the spaces C being diagonally arranged across the table from the head toward the foot. The sections or members A of the riffles increase in length from the uper part of the table downwardly, while the sections B diminish in length from the upper portion downwardly.

It will be understood that the portion of the table containing the pulp box 20, and the wash water trough 21, is highest, while the table is downwardly inclined toward its lower edge 22 where the gangue is discharged. The longitudinal adjustment of the riffle members may be effected in any suitable manner. As shown in the drawing (see Figs. 3 and 4), the upper surface of the table is provided with a sheet of rubber 23 upon which the riffle members are placed. I will assume in Figs. 3 and 4 the riffle member A is illustrated. The members A and B, however, are adjustable in the same manner so that the adjustability of one member need only be explained. Each riffle member is placed directly upon the rubber sheet 23, and is held in the desired position of adjustment by a set bolt 24 threaded in the overhanging member 25 of a block 26 secured to the table by a screw 27. By loosening the bolt 24, the riffle member may be moved longitudinally at will. By virtue of this adjustment the location of the interruptions C diagonally across the table in a transverse direction, may be regulated at will.

From the foregoing description the use and operation of my improved concentrating apparatus will be readily understood. Assuming that the transverse inclination of the table has been properly regulated and also that the riffle members have been longitudinally adjusted according to the material which it is desired to treat, the table is subjected to a longitudinal reciprocating movement, the pulp to be treated being simultaneously fed to the upper left hand corner of the table (see Fig. 1), while the wash water is delivered to the table from the trough 21 rearwardly located from the pulp box 20. Under the influence of the longitudinal vibration of the table, the gangue is caused to travel transversely downwardly over the riffle members, while the values or concentrates are caused to travel rearwardly on the table or from left to right referring to Fig. 1. During the operation of the mechanism, the uppermost riffle member B, will catch the heaviest concentrates, while the other members B in their order will catch different grades of concentrates, the concentrates caught by the various riffle members B, diminishing in gravity downwardly across the table. By virtue of this construction, each riffle catches a different grade of concentrates and all these grades or classifications are discharged at the rear extremity of the table. It is therefore evident that by the proper arrangement of the receptacles for the concentrates, there may be as many different grades or classifications as desired.

Having thus described my invention, what I claim is:

1. A transversely inclined longitudinally reciprocating concentrating table, provided with a series of longitudinally disposed riffles having interruptions intermediate their extremities, the said interruptions being arranged in a single path extending diagonally across the table from the head toward the foot and adjustable to regulate the width of the path, substantially as described.

2. A concentrating table provided with longitudinally disposed riffles provided with interruptions intermediate their extremities, the said riffle members being longitudinally adjustable and means for reciprocating the table for the purpose set forth.

3. A concentrating table provided with riffles having interruptions intermediate their extremities, the said riffle members being longitudinally adjustable, interruptions of the various riffles being diagonally arranged across the table from the head toward the foot, the uppermost interruption being nearest the head of the table, the lower interruption being farthest therefrom and means for reciprocating the table.

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

NAT H. FREEMAN.

Witnesses:

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A. J. O'BRIEN.