

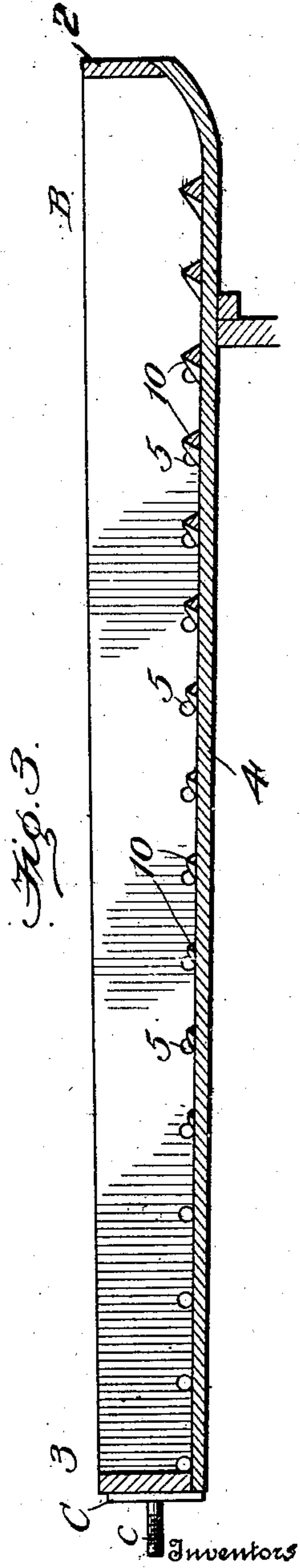
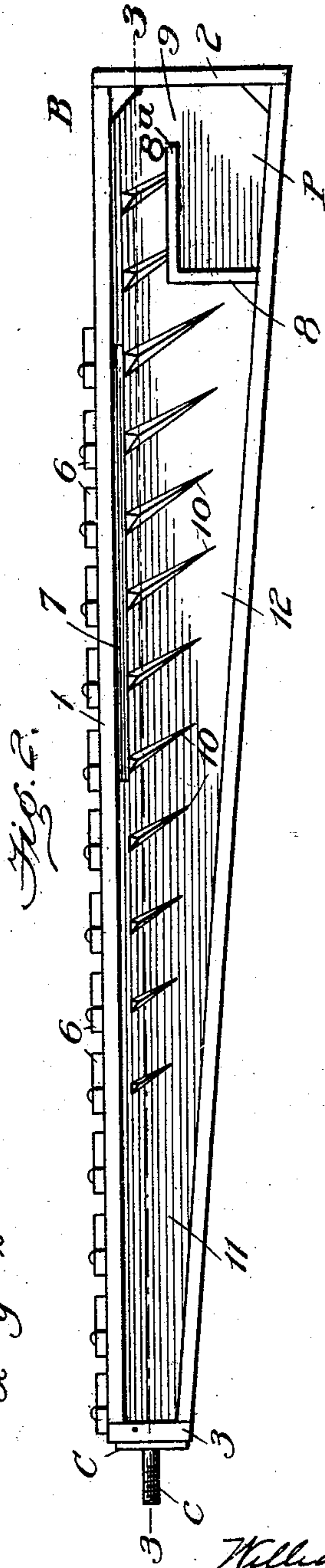
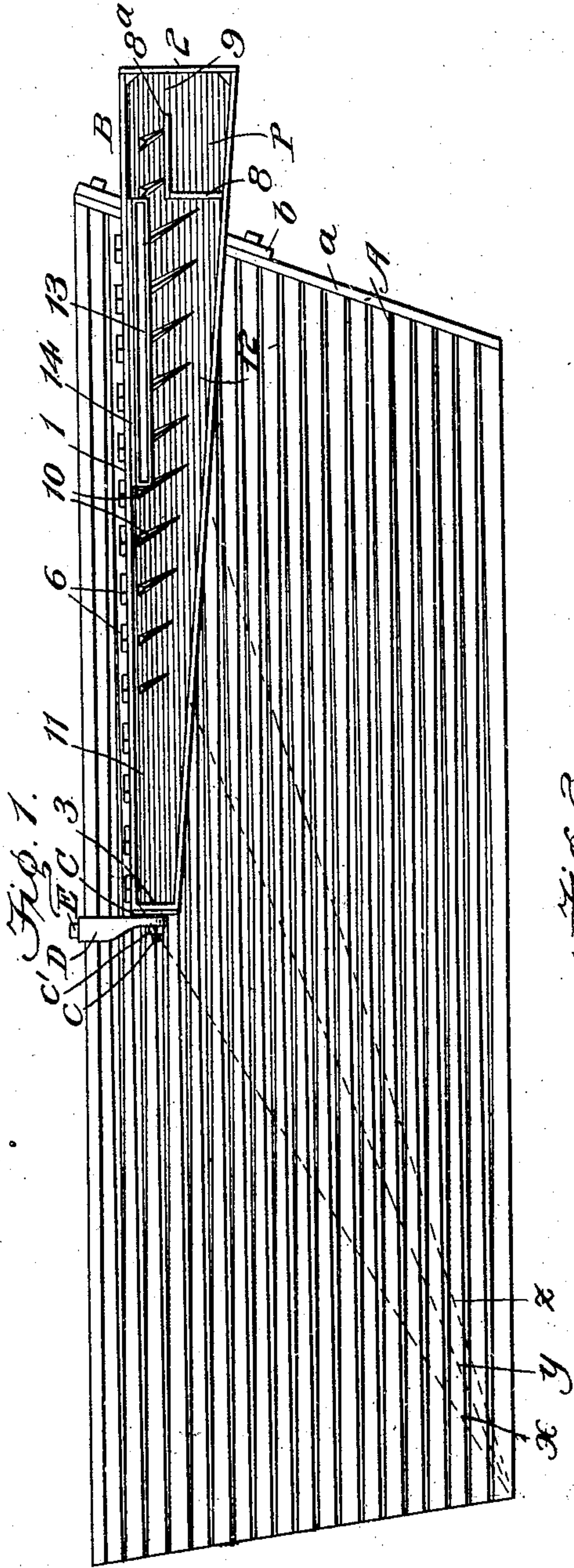
No. 869,293.

PATENTED OCT. 29, 1907.

W. L. & F. S. CARD.  
FEED BOX FOR ORE CONCENTRATORS.

APPLICATION FILED MAY 26, 1905.

2 SHEETS—SHEET 1.



Witnesses

Edwin L. Bradford  
J. P. Rutter

By

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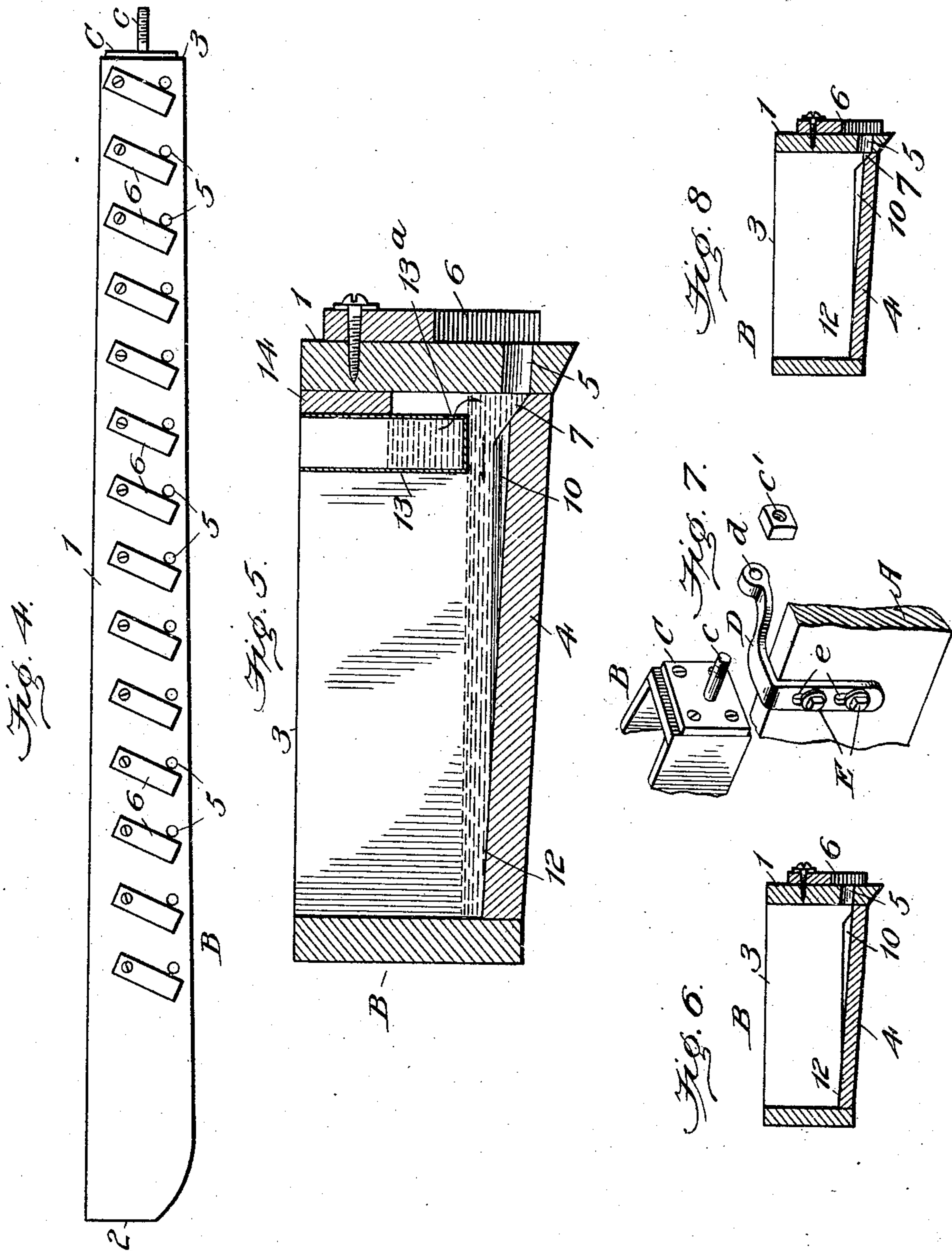
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2 SHEETS—SHEET 2.



Witnesses  
Edwin L. Bradford  
J. P. Ritter

By

Inventors  
William L. Card  
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# UNITED STATES PATENT OFFICE.

WILLIAM L. CARD AND FRANK S. CARD, OF DENVER, COLORADO.

## FEED-BOX FOR ORE-CONCENTRATORS.

No. 869,293.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed May 26, 1905. Serial No. 262,416.

*To all whom it may concern:*

Be it known that we, WILLIAM L. CARD and FRANK S. CARD, citizens of the United States, residing at Denver, in the county of Denver and State of Colorado, have  
5 invented certain new and useful Improvements in Feed-Boxes for Ore-Concentrators; and we 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  
10 the same.

Our invention relates generally to the construction of pulp feed boxes for ore concentrators of the Rittinger type, wherein stratification and concentration of the pulp is effected on a laterally inclined table through  
15 the medium of a transverse flow of water and a longitudinal reciprocation of the table, and has for its objects the production of a feed-box adapted to progressively grade the size of the pulp particles, and to deliver the same to the table at regular intervals from the rear to  
20 wards the front thereof according to sizes, such feed-box being simple and efficient in construction and operation, durable, readily repaired, as well as easily understood and operated by unskilled labor.

For purposes of illustration, this device is herein described as a feed-box for a concentrator table of the Rittinger type; but, as a device of like construction may be used in conjunction with other types of concentrators and as an independent sizer to deliver various sizes of particles to different machines or tables of a  
25 series, it is to be understood that the invention is not limited to such specific use.

As is well known, high grade ores carrying free gold usually occur in small seams and such deposits of this character as have heretofore been discovered are now  
35 rapidly becoming exhausted, so that attention is being directed largely to the recovery of gold, platinum, silver, zinc, lead, copper, &c., from the comparatively inexhaustible deposits of low grade ore. In order that this may be profitably done, it is necessary that the best  
40 results be obtained from the concentrator table, which can only be effected when the pulp is progressively graded from its coarsest to its finest particles at the time it is fed to the table, and the distribution to the table is such that the required travel of any given particle shall  
45 be proportionate to its size and specific gravity; that is to say, the saving of values will largely depend upon which zone of the table a given size of pulp particle is deposited from the feed-box.

In carrying out our invention we construct a pulp  
50 feed-box for concentrators with a series of transverse riffles extending from the rear towards the front of the feed-box for substantially two-thirds or three-fourths the length thereof, more or less, whereby the coarser particles of the pulp are arrested and directed towards

the discharge orifices at a distance from the rear of the  
55 feed-box proportionate to the size of the particles, while the finer particles and slimes are carried to the front or plain portion of the feed-box and discharged upon the table well forward and near the feed side thereof, and such a construction embodies one feature of our inven-  
60 tion.

In order that the fine metallic particles and slimes shall be discharged from the front end of the feed-box upon the upper forward portion of the table and to prevent their escape from the feed-box at or near its rear  
65 end, we form the feed-box bottom with a transverse inclination downward toward the discharge side of the feed-box and adjacent to said side render the inclination abrupt so as to form a narrow channel contiguous to the discharge orifices of the feed-box adapted to in-  
70 duce an accumulation of the coarser pulp and enable the fine metallics and slimes to be driven back from the discharge orifices by a suitable flow of water introduced into the feed box adjacent to the discharge orifices thereof, and such a construction embodies a second  
75 feature of our invention.

In order to arrest and guide the pulp particles towards the discharge side of the feed-box at gradually increasing distances from the rear end of the box proportional to the relative size and specific gravity of the  
80 particles, we preferably arrange the riffles at an acute angle to the discharge side of the feed-box and reduce the height of the riffles gradually from the rear to the front of the box, whereby the advance of the fine metallics and slimes towards the front end and plain por-  
85 tion of the box is facilitated, and such a construction embodies a third feature of our invention.

There are other, further, features of invention, all as will hereinafter more fully appear.

In the drawings accompanying this specification and  
90 forming part of the same, Figure 1 is a plan view of a feed-box for concentrators embodying our invention, showing in conjunction therewith one form of concentrator table with which it may be used. Fig. 2 is an enlarged plan view of the feed box, the water-box omitted.  
95 Fig. 3 is a longitudinal vertical section of the feed-box on the line 3—3 Fig. 2. Fig. 4 is an elevation of the feed-box showing the discharge orifices and adjustable buttons for closing the same. Fig. 5 is an enlarged transverse section of the feed box and included water  
100 box. Fig. 6 is a transverse section of the feed-box, the water-box being removed, and the channel contiguous to the discharge orifices being omitted. Fig. 7 is a segregated view of the means for supporting and adjusting the front end of the feed-box. Fig. 8 is a trans-  
105 verse section of the feed-box showing the channel at the end of the riffles and contiguous to the discharge orifices; the water-box omitted.



Like symbols refer to like parts wherever they occur.

We will now proceed to describe our invention more fully so that others skilled in the art to which it appertains may apply the same.

5 In the drawings, A indicates a concentrator table of any desired character with which the feed-box B embodying our invention may be employed.

10 Preferably the feed box is supported on the rear end of the table adjacent to the upper or feed side thereof by means of a suitable recess or notch in the end board *a* of the table, and a strip or cleat *b* secured to the bottom of the feed box and the rear end of said table, the rear end of the feed box being allowed to project a foot or more beyond the rear end of the table. The front end of the feed-box may be pivotally and adjustably supported from the table by means of a plate C bolted or otherwise secured to the front end of the feed-box, said plate having a stud-bolt *c* which passes through an eye *d* in a bracket D secured to the upper side of the table by means of bolts E which pass through elongated slots *e* in the bracket and are provided with suitable nuts. In order to retain the stud-bolt *c* in the eye *d* of the bracket it may be threaded and provided with a suitable nut *c'*, or other means therefor may be adopted.

25 The feed-box B is of tapering form being widest at its rear end, and preferably having its discharge side 1 straight or at right angles to its ends 2 and 3, its bottom 4 slightly inclined downwardly from its rear end towards its front end and also inclined transversely downward towards the discharge side.

30 The discharge side of the box is perforated at intervals on or adjacent to the inner bottom line to form the discharge orifices 5, and to the outside of the box substantially in line with said orifices are pivoted a series of buttons 6 by which any of the discharge orifices may be partially or completely closed at the will of the operator.

40 Within the feed-box and contiguous to the discharge side thereof, a channel 7 is formed in the bottom of the box to induce an accumulation of coarser pulp which will operate to hold back the finer metallics and slimes.

45 At the rear end of the feed-box B where it projects beyond the table, the partitions 8, 8<sup>a</sup> are inserted to form a chamber P which receives the pulp from the launder and distributes it through an opening such as 9 at the head of the feed-box on that side having the discharge orifices.

50 Commencing at the rear end of the feed box and extending transversely thereof at intervals for from two-thirds to three-fourths its length, according to the character of the pulp to be fed, the bottom of the feed-box is provided with riffles 10, which gradually decrease in height from the rear towards the front and finally terminate near the front end of the box leaving a plain surface 11 opposite the discharge orifices for the slimes.

55 The riffles which are arranged at an acute angle to the discharge side of the box so as to direct the coarser pulp against that side in its travel from the rear end to the front end of the box, do not extend entirely across the feed-box but terminate short of its sides so as to provide for the narrow channel 7 contiguous to the discharge orifices 5, and for an uninterrupted plain surface or channel 12 opposite thereto.

60 With the construction hereinbefore set forth a perforated water pipe with hose connection may be ar-

70 ranged to deliver water in fine streams within the box above and adjacent to the discharge orifices 5, but where water is abundant, or where the slimes carry high values, we prefer to provide a water box 13 extending one half the length of the feed-box, more or less, and supported by a distance piece 14 secured to the upper side board thereof, said water box being provided with a row of perforations 13<sup>a</sup> on its inner side near the bottom of the box which discharge water under pressure against the upper side board of the feed-box above the discharge orifices 5, whereby an inward current of water will be established, as indicated by the arrows Fig. 5, to thus hold back and prevent the egress of slimes at all points except at the front third or quarter of the feed-box. 80

The construction of the feed-box being substantially such as hereinbefore pointed out, its operation will be as follows: The feed-box B being secured to and reciprocating with the table, the pulp from the launder which is received in the compartment P at the rear end of the feed-box will pass from said compartment through opening 9 and travel towards the front end of the feed-box, tending to follow that side having the discharge orifices 5. Owing to the inclined bottom of the feed-box and the arrangement of the riffles, a constant agitation of the pulp is effected and the coarser and heavier particles on their way to the discharge orifices will seek and approach the discharge side of the feed-box near its rear end, or soon after escaping from the chamber P, while the progressively finer and lighter particles will be carried forward and will arrange themselves successively according to size and weight from the rear end of the feed-box to the front end thereof. The slimes being arrested by the coarser constituents which accumulate in the groove 7 contiguous to the discharge orifices, and being swept backward and towards the front end of the feed box by the water from a spray pipe or from water box 13, as the case may be, will be carried forward over the unriffled portion of the feed-box to the plain front end thereof, and be discharged therefrom high up and well towards the front of the table. 95

100 The dotted lines *x*, *y* and *z* of Fig. 1 of the drawings indicate the dividing lines of the zones of recovery on tables of the approved construction, and as by reason of the construction of our feed-box we are enabled to keep the slimes forward of and above the line *x*, the medium sizes forward of and above the line *y*, and the coarser constituents of the pulp above the line *z*, it is evident that a great saving of values will result. 115

Having thus described our invention, what we claim and desire to secure by Letters Patent is:

1. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a bottom inclined transversely downward towards the discharge side and being provided with riffles. 120

2. A feed-box for sizing pulp preliminary to concentration by a concentrator, the bottom of said box having a riffled area at the rear of the box and a plain or unriffled area at the front end of the box. 125

3. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a bottom inclined transversely downward towards the discharge side and having a riffled area at the rear end and a plain or unriffled area at the front end thereof. 130

4. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having riffles obliquely



- disposed with respect to the general direction of the length of the box and adapted to induce travel of the pulp towards the discharge side of said box.
- 5 5. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a bottom inclined transversely downward towards the discharge side and provided with riffles obliquely disposed with respect to the general direction of the length of said box to induce travel of the pulp towards the discharge side thereof.
  - 10 6. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined longitudinally thereof and inclined transversely downward towards the discharge side thereof.
  - 15 7. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a narrow channel adjacent to and parallel with the discharge side thereof.
  - 20 8. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined transversely downward towards and terminating in a narrow channel adjacent to the discharge side of the feed box.
  - 25 9. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined longitudinally thereof and being provided with a narrow channel adjacent to the discharge side of the feed box.
  - 30 10. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined longitudinally thereof and inclined transversely downward towards the discharge side of the box and being provided with a narrow channel adjacent to the discharge side of the box.
  - 35 11. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined transversely downward towards the discharge side thereof, a narrow channel adjacent to the discharge side of the box, and a series of transversely disposed riffles.
  - 40 12. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally and also inclined downwardly towards the discharge side thereof, said box having a series of transverse riffles and a narrow channel between the ends of the riffles and the discharge side of the feed-box.
  - 45 13. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally thereof, a narrow channel adjacent to the discharge side of the box, and a series of riffles arranged at an oblique angle to the channel and discharge side of the box.
  - 50 14. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally and inclined transversely downward towards the discharge side thereof, a narrow channel contiguous to the discharge side of the box, and a series of riffles arranged at an oblique angle to the channel and discharge side of the box.
  - 55 15. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally and inclined transversely downward towards the discharge side of the box, a narrow channel contiguous to the discharge side of the box, a riffled area at the rear end of the box, and a plain or unriffled area at the front end of the box.
  - 60 16. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined transversely downward towards the discharge side thereof, a narrow channel contiguous to the discharge side of the box, and a series of riffles arranged at an oblique angle to the channel and discharge side of the box.
  - 65 17. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally thereof, a narrow channel contiguous to the discharge side of the box, a riffled area at the rear end of the box, and a plain or unriffled area at the front end of the box, said riffles being obliquely disposed with respect to the general direction of the length of the box to induce travel of the pulp towards the discharge side of said box.
  - 70 18. A feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally and inclined transversely downward towards the discharge side of the box, a narrow channel contiguous to the discharge side of the box, a riffled area at the rear end of the box, and a plain area at the front end of the box, said riffles being obliquely disposed with respect to the general direction of the length of the box to induce travel of the pulp towards the discharge side of said box.
  - 75 19. In combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined downwardly towards the discharge side thereof and having a narrow channel contiguous to the discharge side, a perforated water box arranged over said narrow channel and adjacent to the discharge side of the feed box.
  - 80 20. In combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined longitudinally and provided with a narrow channel contiguous to the discharge side of the box, a perforated water-box arranged over said channel and adjacent to the discharge side of the box.
  - 85 21. In combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined downwardly towards the discharge side thereof, a narrow channel contiguous to the discharge side of the box, and riffles arranged at an oblique angle to the channel, of a perforated water-box arranged over said channel and contiguous to the discharge side of the feed box.
  - 90 22. In combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom inclined longitudinally and inclined transversely downward towards the discharge side thereof and being provided with a narrow channel contiguous to the discharge side and a series of riffles arranged at an oblique angle to said channel, of a perforated water-box arranged over said channel and adjacent to the discharge side of the feed-box.
  - 95 23. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a longitudinally extending riffle area and a longitudinally extending plain or unriffled area.
  - 100 24. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a longitudinally extending riffled area adjacent to the discharge side of the box and a longitudinally extending plain or unriffled area adjacent to the opposite side of the box.
  - 105 25. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a longitudinally extending riffled area, a longitudinally extending plain or unriffled area, and a plain or unriffled area at the front end of the said feed box.
  - 110 26. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having a longitudinally extending riffled area adjacent to the discharge side of the box, a longitudinally arranged plain or unriffled area adjacent to the opposite side of the box, and a plain or unriffled area at the front end of the said feed box.
  - 115 27. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box being provided with riffles and having a pulp receiving compartment opening into the main portion of the feed box adjacent to said riffles.
  - 120 28. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom provided with obliquely extending riffles which gradually decrease in height from the rear end to the front end of the box.
  - 125 29. A feed-box for sizing pulp preliminary to concentration by a concentrator, said box having its bottom provided with obliquely extending riffles arranged adjacent to the discharge side of said box, each of said riffles progressively decreasing in height from the rear towards the front of the said box.
  - 130 30. The combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, of means for supplying water thereto above and adjacent to the discharge side of the box.
  - 135 31. The combination with a feed-box for sizing pulp pre-
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liminary to concentration by a concentrator, said box having a narrow channel in its bottom contiguous to the discharge side thereof, of means for delivering water against the discharge side of the box above and adjacent to the  
5 discharge orifices thereof.

32. The combination with a feed-box for sizing pulp preliminary to concentration by a concentrator, said feed-box having its bottom inclined longitudinally and inclined transversely downward towards the discharge side thereof,

of means for adjusting the longitudinal inclination of said box. 10

In testimony whereof we affix our signatures, in presence of two subscribing witnesses.

WILLIAM L. CARD.  
FRANK S. CARD.

Witnesses:

EDWARD A. SPERRY,  
PHILO. P. BUSH.