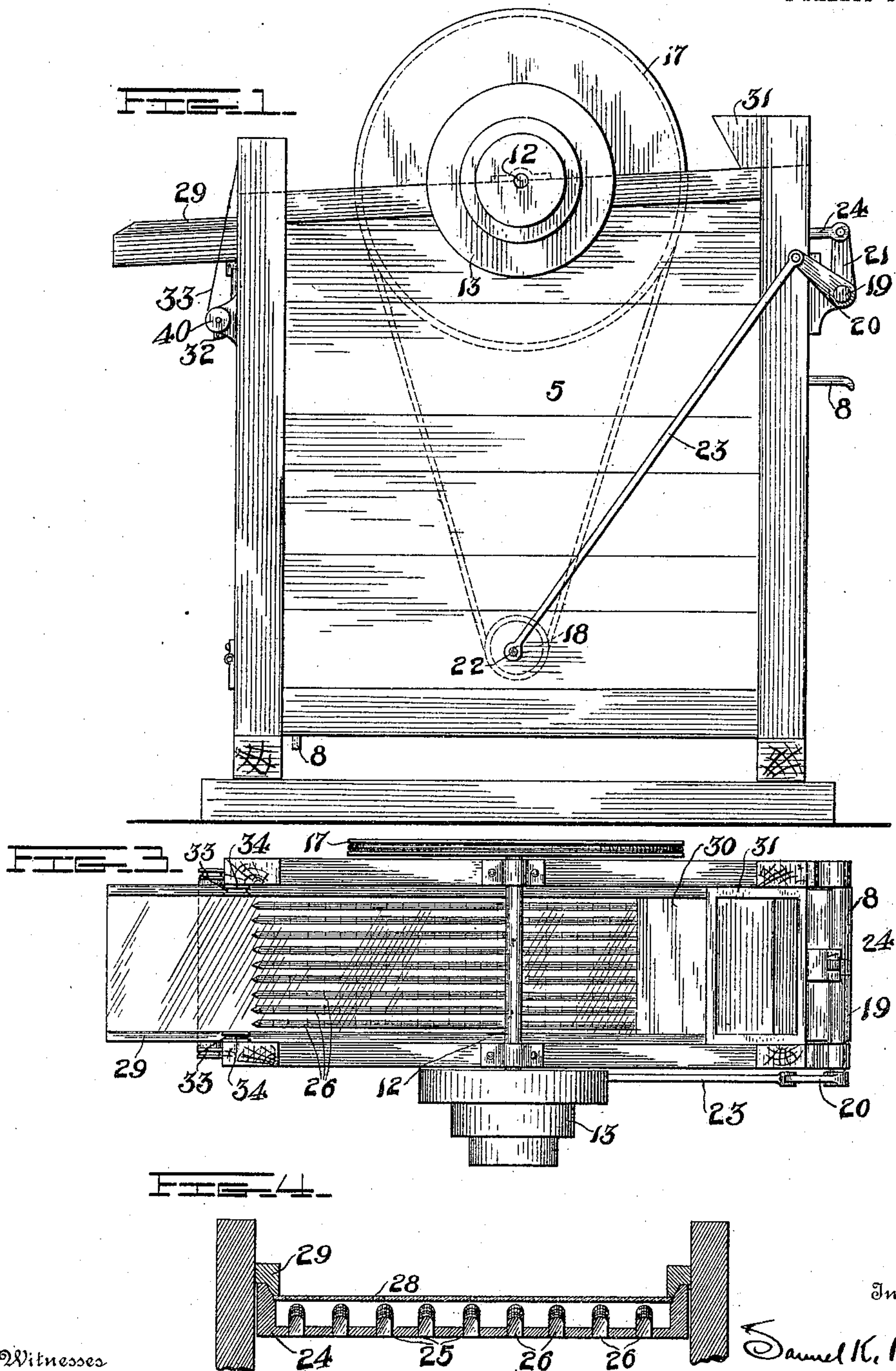


S. K. BEHREND.  
 DRY CONCENTRATOR.  
 APPLICATION FILED DEC. 18, 1906.

983,803.

Patented Feb. 7, 1911.

2 SHEETS—SHEET 1.



Witnesses

Clayton W. Patch  
 A. A. Hammond

By

Inventor

Samuel K. Behrend

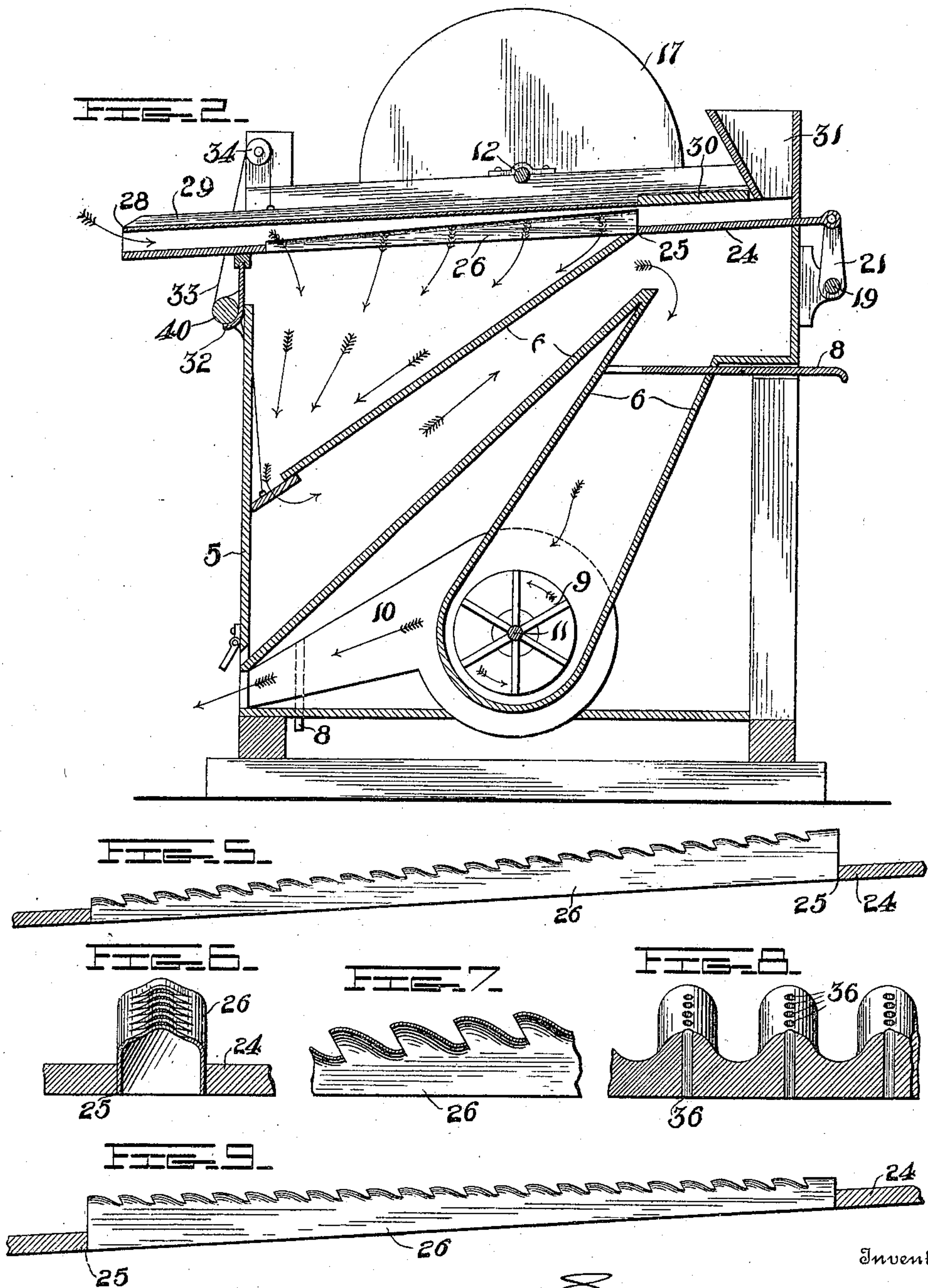
Charles E. Rogers  
 His Attorney

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2 SHEETS—SHEET 2.



Witnesses  
 Lloyd W. Patch  
 A. A. Hammond

Inventor  
 Samuel K. Behrend  
 By *Charles E. Hager*  
 Attorney



# UNITED STATES PATENT OFFICE.

SAMUEL K. BEHREND, OF DENVER, COLORADO.

## DRY CONCENTRATOR.

983,803.

Specification of Letters Patent.

Patented Feb. 7, 1911.

Application filed December 18, 1906. Serial No. 348,469.

*To all whom it may concern:*

Be it known that I, SAMUEL K. BEHREND, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Dry Concentrators, of which the following is a specification.

My invention relates to an improvement in dry concentrators, for ore separation, and the object of this invention is to provide means for effecting a more perfect and more economical separation of the values than has heretofore been obtained, and further to provide mechanism which will save values which hitherto have been lost.

With the foregoing objects in view, my invention consists in certain novel features of construction and combinations of parts which will be hereinafter described and pointed out in the claims.

In the accompanying drawings:—Figure 1 is a view in end elevation of my improved concentrator. Fig. 2 is a vertical, sectional view. Fig. 3 is a plan view. Fig. 4 is a fragmentary transverse section on an enlarged scale. Fig. 5 is a detail view of one form of riffle. Fig. 6 is an enlarged transverse section of one of these riffles. Fig. 7 is a fragmentary longitudinally sectional view of one of the riffles. Figs. 8 and 9 are views of modified forms of riffles, the former being fragmentary and in transverse section, and the latter in side elevation.

The numeral 5 designates the outer casing, which is provided with transversely inclined partitions 6, 6, whereby two chambers are formed, the upper of which is for the values, and the lower constituting a suction chamber, it having a fan 9 therein, which fan is mounted on a fan shaft 11, the function of the fan being to create suction, and the air thus drawn into the fan is discharged through chute 10. Valves 8, 8, are provided in the suction chamber and discharge chamber for regulating the amount of suction and discharge at this point to a nicety, but all being within the control of the operator. Various forms of valves 8, might be employed, but those shown are slide valves.

The numeral 12 indicates the main shaft, it having a step pulley 13, whereby different amounts of speed may be imparted to

it. This shaft is provided with a large sheave 17 adapted to receive a cable shown in dotted lines in Fig. 1, which extends to a smaller sheave 18, on the fan shaft 11. Shaft 11 is provided with an eccentric 22, from which an eccentric rod 23 extends to a crank 20 on the rock shaft 19. The shaft 19 is provided with an arm 21 at or near its center, the upper end of which is pivotally connected with the reciprocating table 24, which is preferably slightly inclined. The riffle portion of the table is preferably covered by means of plate glass 28 held in a frame 29, while its rear portion is covered with a board 30. The frame 29 is capable of adjustment by means of the cables 33, 33, which pass over pulley 34, 34, and a windlass 40, whereby the desired force of air current upward along the face of the table is regulated.

The numeral 31 illustrates the feed hopper and 32 represents a flexible air tight connection of leather, canvas or the like between the lower end of the table and the frame of the machine.

In general characteristics, the foregoing closely resembles the old Granger machine set forth in Letters Patent No. 269,848, January 2, 1883, and No. 386,741, July 24, 1888, although my present invention embodies certain features which the Granger patents did not disclose.

In addition to the construction heretofore described, the table 24 is provided with a plurality of longitudinal slots 25, and in these are secured my improved form of riffles 26, which may be variously constructed, although in Figs. 4, 5, 6, and 7, I have shown these riffles being composed of sheet metal, bent substantially as shown and preferably inclining forward, although they might incline in the opposite direction, by folding a strip of metal as illustrated and cutting through the fold to form orifices into and through which the values are sucked by the suction fan. In Fig. 8, a slightly different form is shown in which the riffles are made an integral part of the table, and through them the holes 36, 36, are bored or slotted with a saw, as desired.

From the foregoing it will be observed that one of the essential characteristics of my present invention resides in the fact that the openings through the table are of a non-



uniform height, and a very easy grade is provided for the lighter material to raise itself to the air exhaust with the result that it gives a more complete and perfect dressing  
5 to the ore.

In operation the material is fed into the hopper 31, and as the table reciprocates the heavier particles are carried toward the bottom of the table, and the suction operates  
10 to draw down through the air openings the lighter material or waste. The heavy material or concentrates, finds its way finally to the end of the table where it is discharged as a clean concentrate, into a hopper or spout  
15 (not shown) which leads off to its respective ore bin; the tailings also being led by a spout (not shown) out of the mill to the dump; the passage of the air for suction from the exhauster to the table is not intended in any  
20 way to carry the ore, but the waste, and all the valuable material will stay on the table and be discharged at the lower end, and not go through the hollow riffles. This table is particularly adapted to the working of  
25 what is known as a complex ore; such an ore as would carry lead, iron, zinc and silica, and by working such a product on the table and using a speed sufficient to draw off all material of a less specific gravity than lead,  
30 it would be drawn through and discharged as tailings, leaving the lead as a clean concentrate, then the tailings should then be run through a second machine under a slower speed, which would remove again the lighter  
35 materials, and leaving the iron as a concentrate, and the tailings from this operation would then again be run to a third machine under a slower speed, when the zinc would be removed as a clean concentrate and the  
40 tailings would be simply silica.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of my inven-  
45 tion, and hence I do not wish to limit myself

to the exact construction herein set forth, but:—

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

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1. In an ore concentrator, the combination with a suitable frame, of an inclined reciprocating table having a plurality of riffles thereon extending in the direction of the motion of the table, said riffles having an  
55 inclination with respect to the surface of the table, and provided with holes through which the waste is adapted to pass.

2. A riffle for ore concentrators of tapering thickness and having a uniform width  
60 throughout its length, and having orifices formed in its upper surface.

3. A riffle for ore concentrators having a series of passages therein extending throughout the length of the riffle, said passages  
65 at varying elevations, in relation to the bottom of the riffle.

4. The combination with a concentrator table and a plate arranged at a suitable distance above the table whereby an air space  
70 is left between the two, and means for creating suction through said space, of riffles located within said space and having passages formed therein at different elevations.

5. The combination with a concentrator  
75 table and a plate arranged at a suitable distance above the table whereby an air space is left between the two, and means for creating suction through said space, of riffles located within said space and having orifices  
80 formed therein at different elevations, said orifices all opening toward one end of the riffle.

In testimony whereof I have signed my name to this specification in the presence of  
85 two subscribing witnesses.

SAMUEL K. BEHREND.

Witnesses:

ELLA J. BURNS,  
IDA K. PENCE.