Aug. 3, 1948. G. H. GRUSS 2,446,176

TILTING ADJUSTMENT FOR RECIPROCATING CONCENTRATING TABLES

Filed June 19, 1945 2 Sheets-Sheet 1

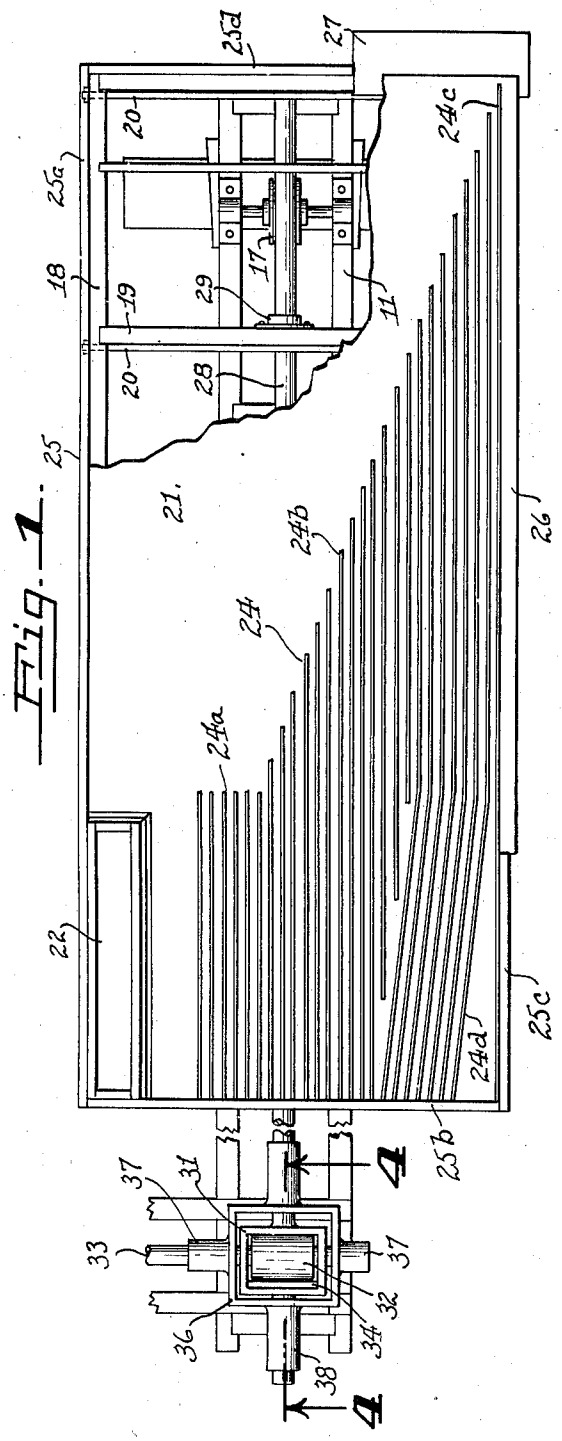


Fig. 1.

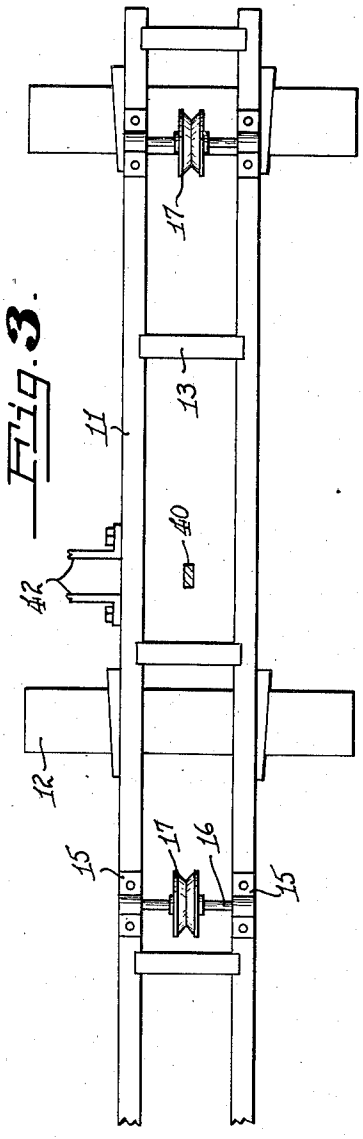


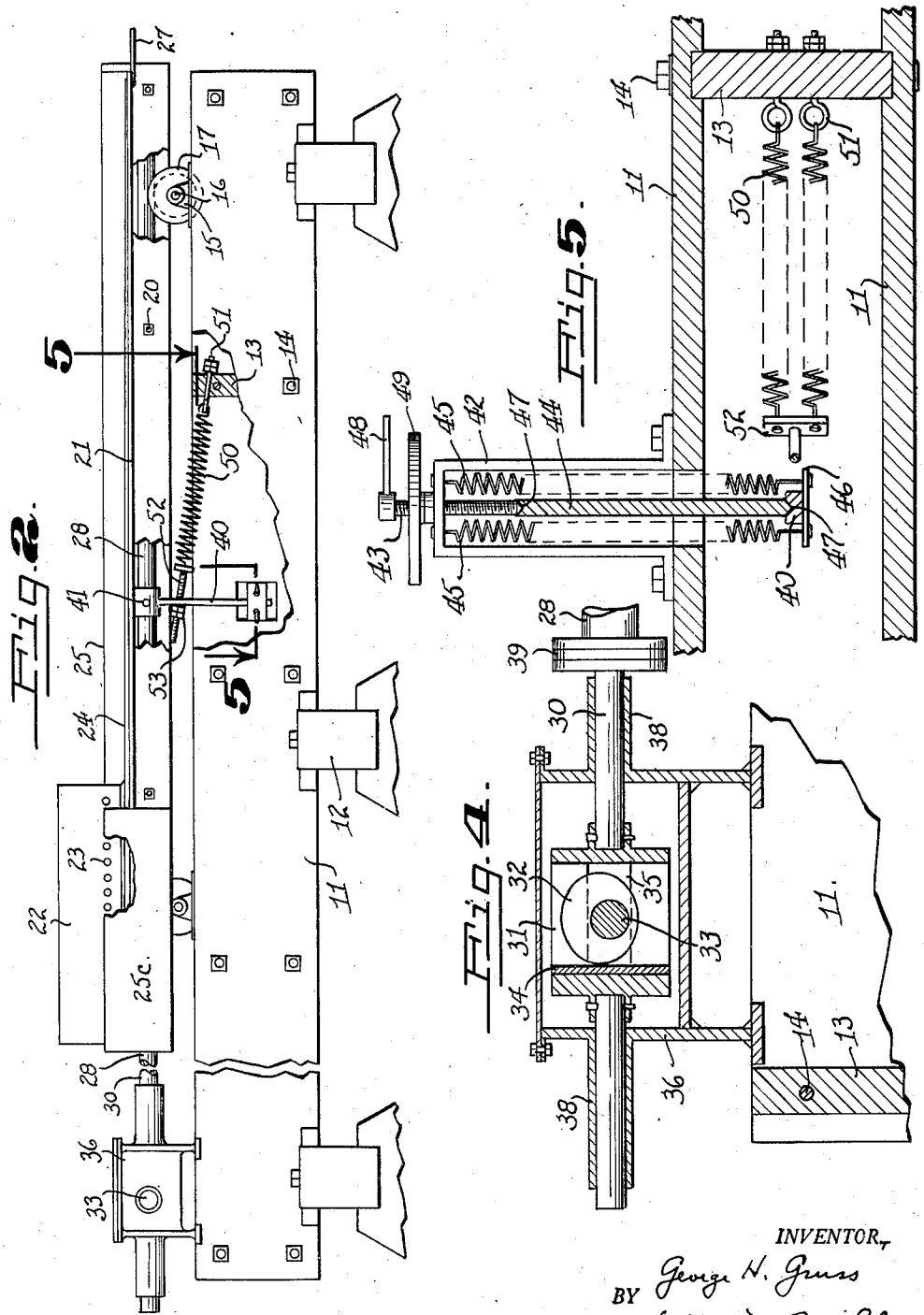
Fig. 3.

INVENTOR,
BY George H. Gruss
William D. Booth Jr.
ATTORNEY.

Aug. 3, 1948. G. H. GRUSS 2,446,176

TILTING ADJUSTMENT FOR RECIPROCATING CONCENTRATING TABLES

Filed June 19, 1945 2 Sheets-Sheet 2



Patented Aug. 3, 1948 2,446,176

UNITED STATES PATENT OFFICE

2,446,176

TILTING ADJUSTMENT FOR RECIPROCATING CONCENTRATING TABLES

George H. Gruss, San Francisco, Calif.

Application June 19, 1945, Serial No. 600,368

4 Claims. (Cl. 209—504)

1

The present invention relates to an ore concentrator of the vibrating or shaking table type.

The principal objects of the invention are to provide a construction which is both light and sufficiently sturdy to withstand the stresses imposed by the vibrating movement; to provide means for adjusting the inclination of the table to enable it to operate properly on different grades and types of ores; to provide an arrangement of riffles that will not clog with sand; and to provide a simple construction which can be made largely of wood. Other objects and advantages of the invention will become apparent from the following description, which should be read with the understanding that the form, construction and arrangement of the several parts may be varied, within the limits of the claims hereto appended, without departing from the spirit of the invention.

Fig. 1 of the accompanying drawings is a plan view of the complete concentrator, partly broken away.

Fig. 2 is a partly broken side elevation.

Fig. 3 is a plan view of a portion of the base frame.

Fig. 4 is a vertical section of the cam vibrating mechanism, taken on the line 4—4 of Fig. 1 enlarged.

Fig. 5 is a horizontal section of the tilt-adjusting means, taken on the line 5—5 of Fig. 2 and enlarged.

The fixed or base frame of the concentrator, best shown in Figs. 2 and 3, comprises a pair of parallel horizontal stringers 11 set on edge on transverse sills 12. Spacers 13 extend between the stringers 11 and are notched thereinto, as shown. Bolts 14 extend through the stringers and spacers to hold the frame together. The stringers 11 carry journals 15 for two transverse spindles 16, on which are mounted grooved wheels 17, the grooves of which are aligned longitudinally of the frame.

The shaking table comprises a rectangular frame, Figs. 1 and 2, having longitudinal side members 18 and transverse members 19 notched thereinto, held together by transverse rods or bolts 20, and a flat top sheet 21 secured to said frame members in any suitable manner. At one corner of the table is a distribution box 22 into which the crushed ore to be classified is fed by an appropriate chute (not shown). One side of said box has a row of discharge holes 23 spaced slightly above the table top, through which the ore is fed to the table. Any large particles which may be carried in with the crushed ore are caught in the box 22, and can be removed therefrom.

2

The surface of the table is provided with a series of riffles 24. The first few riffles 24*a*, opposite the distribution box 22, are short, extending from the left hand end of the table to a point slightly beyond the right hand end of said box. The succeeding riffles 24*b* are of progressively increasing length, the last one 24*c* extending the full length of the table. The last few riffles, viz: the longest ones, are inclined at their left hand ends for a portion of their length, as shown at 24*d*, but from there on they are straight and parallel with the longer sides of the table, as are all the other riffles.

The riffles are highest at their left hand ends, and taper downwardly toward their right hand ends. In actual practice they are about five sixteenths of an inch high at the left hand end and about one sixteenth of an inch at the right hand end.

The table is surrounded by a raised rim formed by flat wood strips 25 secured to the side and end frame members and extending a few inches above the top of the table. This rim extends for the full length of the back side of the table, as shown at 25*a*; for the full length of the left hand end, as at 25*b*; a short way along the front side as at 25*c*; and more than half way along the right hand end as at 25*d*. For the remainder of the length of the front side, the table top extends slightly over the front frame member to form a discharge lip 26 for the fines or lighter material, and at the front portion of the right hand end a discharge lip 27 for the heavier material is formed by a flat sheet inserted beneath the table top and extending beyond the end frame member.

A steel cylindrical tubular member 28 extends centrally the long way of the table, passing through the cross frame members 19 and being rigidly secured thereto by suitable collars, one of which is shown at 29. The member 28 rests upon the grooved rollers 17, thereby supporting the table and permitting it to have lengthwise shaking movement and also tilting movement, the latter for adjusting purposes as later explained.

The tubular member 28 extends beyond one end of the table and is connected by a rod 30 with a box-like cam following yoke 31, Figs. 1 and 4. A cam 32 mounted on a rotating shaft 33 operates within the yoke 31, and by contact with a bronze wear plate 34 in said yoke moves the table toward the left at each revolution of the cam. The return movement is caused by springs, later described. Slots 35 in the sides of the yoke 31 prevent it from turning by guiding it on the cam shaft. A lubricant containing housing 36 en-

closes the cam and yoke mechanism, and is provided with bearings 37 and 38 for the cam shaft and yoke rod respectively. A swivel joint connection 39 to provide for rotation of the backbone axially relative to the yoke rod or shaft 30 is inserted between the yoke rod 30 and the backbone member 28 of the table to permit the table to be tilted for adjustment, the yoke rod 30 and backbone 28 moving in unison longitudinally without free longitudinal relative movement therebetween, that is, they are connected relatively movably rotatively and fixedly for unison movement longitudinally free of lost motion therebetween.

The table is horizontal lengthwise, but is tilted slightly down toward the discharge side to cause the lighter material to flow over the riffles. The degree of inclination will depend upon the character of material being run. To provide adustment for such lateral inclination, and also to hold the table in such adjusted inclined position, the following mechanism is provided, as shown in Figs. 2 and 5. An arm 40 is fastened to the central tube 28 at 41 and extends downwardly therefrom between the base frame members 11. A bracket 42 extends out laterally from one of said frame members 11. An adjusting screw 43 is threaded through the outer end of said bracket. A push rod 44 extends through an aperture in the side frame member, between the screw 43 and the lower end of the arm 40. Tension springs 45 extend between the outer end of the bracket and to a cross piece 46 secured to the arm 40. The arm 40 is moved away from the bracket by turning in the adjusting screw 43, and is returned by the springs 45 when said screw is backed out. The ends of the push rod are fitted to the screw and the arm with conical or cup and ball joints as indicated at 47, so that said rod will not drop out and to provide flexibility to accommodate the reciprocating movement of the arm, lengthwise of the frame, with the shaking table to which it is attached. A lever 48 is provided for turning the screw 43, and a hand wheel 49 is threaded thereon to serve as a lock nut.

Springs 50 are provided for maintaining contact between the cam 32 and the wear plate 34 of its follower. Said springs are attached at one end by eye bolts 51 to a cross member 13 of the base frame, and at the other end to a yoke 52 whose threaded shaft extends through the upper portion of the arm 40 and is provided with adjusting and lock nuts 53. The springs 50 tend to pull the table toward the right, holding the follower in contact with the cam to prevent knocking or hammering.

The operation of the concentrator will be apparent from the foregoing description. With the cam 32 rotating, the table is given an endwise shaking movement, and is held at the desired lateral inclination by the tilt-adjusting mechanism 40 to 49. Crushed ore from a stamp mill is washed into the distribution box 22 with water, and flows out through the discharge holes 23 on to the top of the shaking table. The lateral inclination of said table causes the water and lighter material to flow over the riffles until it discharges from the side lip 26. The heavier material settles between the riffles and is advanced by the shaking motion toward the right hand end of the table, from which it discharges over the lip 27. The arrangement of the riffles, particularly the inclination of the forward ends 24*d* of the last few riffles, prevents the trouble-some clogging which frequently occurs at this region of shaking table concentrators of usual construction.

The construction of the shaking table, with its rigid back-bone member 28 resting on the grooved rollers 17, provides a firm and stable mounting and distributes the strains due to sudden acceleration and deceleration throughout the entire table, preventing undesirable lateral or vertical components of the shaking motion, and also permits quick and accurate adjustment of the lateral inclination to suit the particular ore being run.

The design of the entire structure lends itself to wood construction, with a minimum of presently scarce steel. The base frame is entirely wood. The table frame is wood except for the back-bone member 28. The table top can well be made of a single sheet of hard surfaced pressed wood or fiber, and the riffles can be wood strips cemented thereto.

I claim:

1. An ore concentrator comprising a base frame, longitudinally aligned grooved wheels rotatably mounted thereon with grooves in alignment relatively, a movable table mounted above said base frame, riffles on said table for classifying the ore passing thereover, a longitudinally directed backbone member beneath said table secured rigidly thereto, said back-bone member resting longitudinally reciprocably and axially rotatably movable in the grooves of the wheels of said base frame and thereby supporting said table, means for imparting longitudinal reciprocating movement to said back-bone member and said table in unison, and means for adjusting the rotative position of said back-bone member to vary the lateral inclination of said table.

2. An ore concentrator comprising an elongated base frame having longitudinally aligned grooved wheels rotatably mounted with grooves in alignment relatively, a movable table mounted above said base frame, riffles on said table for classifying the ore passing thereover, a longitudinally directed back-bone member beneath said table secured rigidly thereto, said back-bone member resting longitudinally reciprocably and axially rotatably movable in the grooves of the wheels of said base frame and thereby supporting said table, a cam mounted at one end of said base frame, a cam follower having longitudinally fixed connection with one end of said back-bone member whereby they move longitudinally in unison, said follower being adapted for contact with said cam, spring means connecting said back-bone member and said frame and arranged to hold said follower in contact with said cam, means for rotating said cam to impart longitudinal reciprocating movement to said back-bone member and said table, a swivel joint connection between the cam follower and the back-bone member, and means for adjusting the rotative position of said back-bone member to vary the lateral inclination of said table.

3. An ore concentrator comprising a base frame having longitudinally aligned grooved wheels rotatably mounted thereon with grooves in alignment relatively, a movable table mounted above said base frame, riffles on said table for classifying the ore passing thereover, a longitudinally directed back-bone member beneath said table secured rigidly thereto, said back-bone member resting longitudinally reciprocably and axially rotatably movable in the grooves of the wheels of said base frame and thereby support-

ing said table, means for imparting longitudinal reciprocating movement to said back-bone member and said table in unison, an arm secured to and extending downwardly from said back-bone member, and adjusting means connected with said arm and said base frame and arranged to swing said arm laterally to vary the lateral inclination of said table, said adjusting means having flexible connection with said arm to permit the longitudinal reciprocating movement of said arm, said means for imparting reciprocating movement and said back-bone member having fixed longitudinal connection therebetween whereby they move longitudinally in unison.

4. An ore concentrator comprising a base frame having longitudinally aligned grooved wheels, a movable table mounted above said base frame, riffles on said table for classifying the ore passing thereover, a longitudinally directed back-bone member beneath said table secured rigidly thereto, said back-bone member resting movably upon the wheels of said base frame and thereby supporting said table, means for imparting longitudinal reciprocating movement to said back-

bone member and said table, an arm secured to and extending downwardly from said back-bone member, a bracket extending laterally from said base frame, a laterally movable adjusting member mounted on said bracket, a push rod between said adjusting member and said arm whereby movement of said adjusting member swings said arm laterally to vary the lateral inclination of said table, and a spring connecting said arm with said bracket to hold said arm, said push rod, and said adjusting member in contact.

GEORGE H. GRUSS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
763,785	Overstrom	June 28, 1904
869,860	Shepard	Oct. 29, 1907
1,026,764	Overstrom	May 21, 1912
1,051,049	Wright	Jan. 21, 1913