O. H. FAIRCHILD.

ORE SAMPLER.

APPLICATION FILED JUNE 18, 1910.

1,001,129.

Patented Aug. 22, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

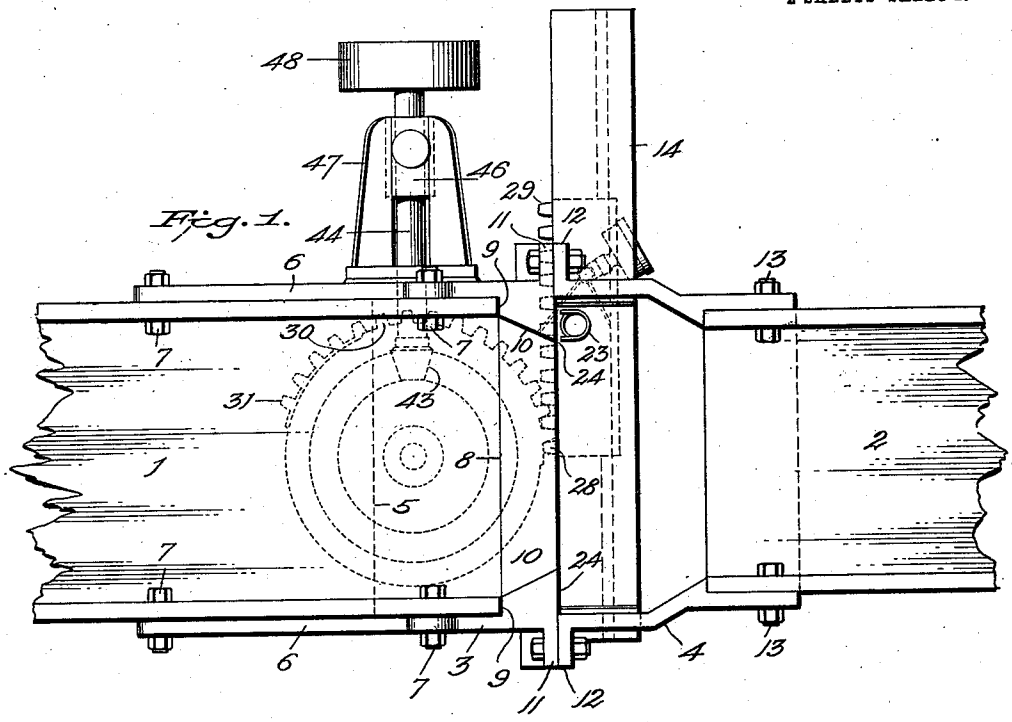

Fig. 2.

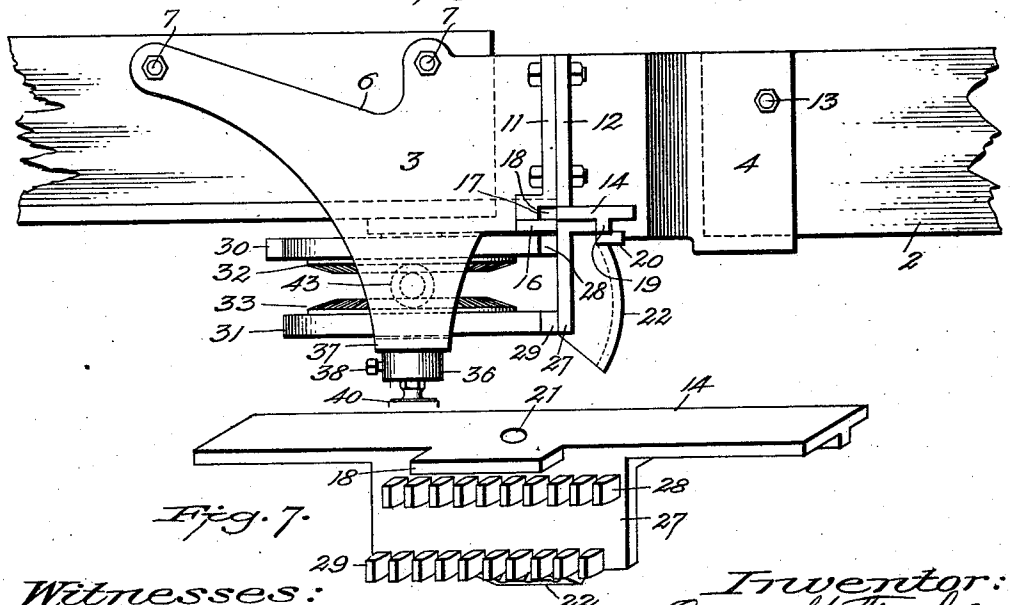

Fig. 7.

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2 SHEETS—SHEET 2.

Fig. 3.

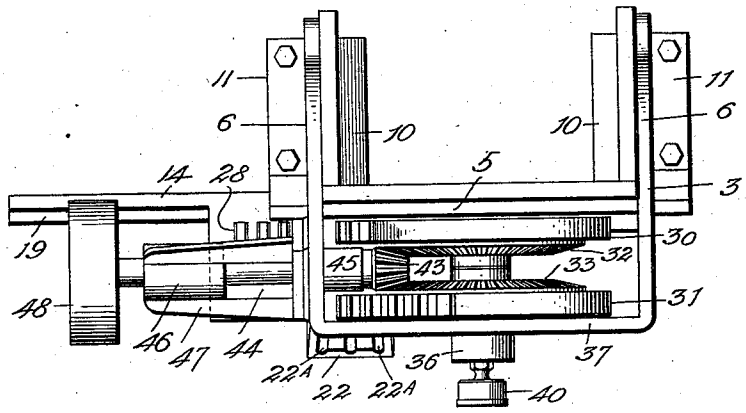


Fig. 5.

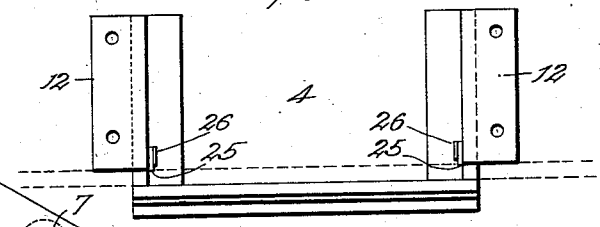
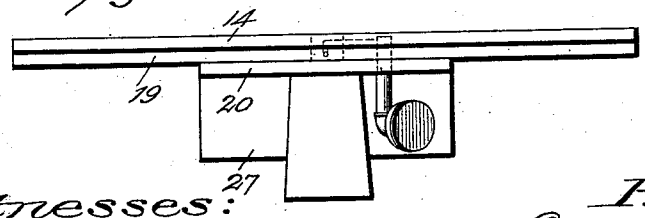


Fig. 4.

Fig. 6.



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ORE-SAMPLER.

1,001,129. Specification of Letters Patent. **Patented Aug. 22, 1911.**

Application filed June 18, 1910. Serial No. 567,610.

To all whom it may concern:

Be it known that I, OSCAR H. FAIRCHILD, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Ore-Sampler, of which the following is a specification.

My invention relates to improvements in ore samplers and the objects of my invention are: First—to provide a sampler in which a sample is taken transversely across a sliding stream of ore. Second—to provide a sampler in which the sample is split into two parts at each operative sample movement through the ore; and third—to provide a sampler that will distribute the reserved sampled product into two or more compartments. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of the improved sampler, a portion only of the chute being shown, the sampler being in a horizontal position, for the sake of clearer illustration. Fig. 2 is a side view thereof. Fig. 3 is a front view of the same looking in the direction in which the ore travels. Fig. 4 is a vertical, longitudinal, sectional view of the sampler, showing the same inclined at about the angle necessary in practical operation. Fig. 5 is a front view of the slide carrying section of the sampler frame. Fig. 6 is a rear view of the slide; and Fig. 7 is a perspective view of the slide looking at the front side thereof.

Similar letters of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1 designates the upper half of the ore chute of the improved sampler, and 2 the lower half thereof. This chute comprises a flat bottom or floor and opposite upright sides. This ore chute is adapted to be inclined at a suitable angle to the floor of an ore sampling mill, and the ore to be sampled is a finely crushed or pulverized ore which is fed into the top of the ore chute of the sampler and runs down the same and discharges into a suitable conveyer, by which it is conveyed into storage bins or to treatment for the extraction of its values. To this ore chute 1 I secure a sampling device, the object of which is to automatically catch a portion of the body or stream of ore and lead it through a discharge spout where it may be separated into two or more divisions, if desired, and collected into separate receptacles.

The sampler proper comprises two members or supports 3 and 4, which are secured respectively to the upper and lower halves of the chute. The member 3, which is secured to the upper part of the chute, comprises a platform 5 and sides 6, that extend from the opposite ends of the platform upwardly along the sides of the chute to which they are secured by bolts 7. The floor of the upper part of the ore chute rests on the platform 5 of the support 3 and transversely against a shoulder 8 formed by a step in the platform 5. The sides of the support 3, adjacent to their lower ends, are also stepped to form shoulders 9, against which the lower ends of the sides of the upper half of the chute 1 abut. From the shoulders 9 the inner faces of the sides of the support converge toward each other, as shown at 10, and these converging faces 10 are adapted to form a somewhat contracted channel for the ore immediately in front of the sampler spout. In order to form the shoulders 9 and the inclined faces 10 the sides from the shoulders downward are increased in thickness, as shown, and flanges 11 are formed at the extremities of the sides, which are bolted to flanges 12 on the support 4. The support 4 comprises upright sides, which are connected by a stepped bottom or platform, upon which the lower half of the chute rests, the sides of the chute being bolted to the sides of the support 4 by bolts 13. The floor or platform of the supporting frame 4 is on a lower plane than the platform of the supporting frame 3, and the sides of the supporting frame 4 extend beyond the upper end of the platform thereof, so that a space is left between the lower end of the platform of the support 3 and the upper end of the platform of the support 4, and a slide 14 is adapted to occupy this space and to have a reciprocating movement therein, as will presently be shown.

The bottom side of the lower portion of the platform of the supporting frame 3 is formed with two steps 15, as shown in Fig. 4, and a plate 16 is secured to the lowermost

step and extends out flush with the end of the platform. This plate and the upper step form a slideway 17, which is adapted to receive a slide flange 18 on the front edge of the slide 14. The rear edge of the slide 14 is adapted to overlap the adjacent edge of the platform of the supporting frame 4, and the said edge of the frame abuts against a guide rib 19 on the under side of the slide, the lower portion of which rib is provided with a projecting guide 20, which constitutes a guideway, as will be understood by reference to Figs. 4 and 6.

The slide 14 is provided with a threaded discharge aperture 21 that extends through it into a discharging and distributing hopper 22 that is formed on the under side of the slide, and a sampling spout 23 is screwed into the said aperture. The sampling spout is preferably made of a piece of tubing of suitable length, one end of which is threaded. A transverse slit is formed above the threads, and the tube is split from its opposite end to the slit, and the severed portions are then bent out so as to form a spout which in end view is U-shaped, as will be seen by reference to Fig. 1. The open side of the spout is arranged to face toward the downwardly moving stream of ore and continuously catch a portion of the ore flowing against it and guide it into the hopper 22, and it is made long enough to extend above the depth of any flowing stream of ore the chute will hold. The slide 14 is made long enough to permit this spout to travel across the width of the frame 3, which is narrowed slightly by the converging faces of the thickened ends of the sides of the said frame. The thickened lower ends of the supporting frame 3 form walls 24, behind which the spout may pass at the opposite ends of its reciprocal movements, and in order to prevent any possible leakage of ore between the upper surface of the slide and the openings in the sides of the frame 4 through which the slide passes I provide the side walls above the slide with pieces 25 of leather, rubber, felt or other suitable material, which are of a length corresponding to the width of the slide, and these strips are arranged to bear against the top of the slide. Metal strips 26 are placed over the strips 25, and the two strips are bolted to the sides of the supporting frame 4, as shown most clearly in Figs. 4 and 5.

The front edge of the slide 14 is formed with a plate 27 at right angles to the slide, which is provided with two parallel rows of gear teeth 28 and 29, which are positioned at a short distance apart and with the teeth of the top row extending beyond the teeth of the bottom row at one end and the teeth of the bottom row extending one tooth beyond the teeth of the top row at its opposite end. These two independent rows of gear teeth are adapted to be engaged alternately by the teeth of oppositely moving segment gears 30 and 31. To the opposing faces of the disk portions of these segment gears are secured beveled gears 32 and 33 by cap screws or other suitable means. The gears 30 and 31 are mounted on a shaft 34, which is journaled in bearings 35 and 36, one of which (35) is formed on the platform of the frame, and the other one of which (36) is formed below it on a cross bar 37 that extends from one side arm to the other below the frame and which is positioned at a sufficient distance from it to receive the hub portions of the spur gears 30 and 31 between them. A set screw 38 is threaded through the bearing 36 against the shaft, and prevents it from rotating in its bearings. An oil passage 39 is formed in the axial center of the shaft, the entrance of which is interiorly threaded to receive an oil cup 40, which is threadedly connected to it.

Oil passages 41 and 42 are drilled transversely through the shaft into the axial oil passage in positions to admit oil to the hubs of the gears.

The bevel gears are spaced far enough apart to receive between them a bevel toothed pinion 43, the teeth of which mesh with the teeth of both beveled gears. This bevel pinion is mounted on and secured to the end of a shaft 44, which is rotatably journaled in a journal bearing 45 formed in one side arm of the sampler frame 3 and also in a bearing 46 formed on the outer end of an extension bracket 47, which is bolted or otherwise secured to the adjacent side of the frame, with its shaft bearing in alinement with the bearing 45. The shaft 44 extends beyond the bracket bearing 46 far enough to receive a belt pulley 48, which is connected by a belt to a source of rotative power that rotates the shaft and the beveled pinion and causes the beveled pinion to rotate beveled gears in opposite directions.

The operation of my improved ore sampler is as follows: The crushed or pulverized ore is fed from crushers, rolls or Huntington or other mills directly to the ore chute of the sampler, or from bins in which it has been stored, and a stream of ore that will cover the floor portion of the chute is run through it. Rotative power is applied to the pulley 48, shaft 44 and bevel pinion 43, and the bevel gears 32 and 33 are rotated in opposite directions, and as these bevel gears form a part of the spur gears they are also rotated in opposite directions continuously, but as the peripheral surfaces of these disks are provided with a segmental portion of a gear and as these gear portions are arranged substantially opposite to each other, the two spur gears are in mesh with the teeth 28 and 29 of the slide 14 in alternate order; consequently when one segmental spur gear, for

instance, the spur gear 30 engages the teeth 28 the sliding reciprocating floor is moved in one direction, which movement causes the sampling spout 23 to travel from one wall 24 across the floor of the chute to the opposite wall, and when it arrives at this point the teeth of the segment leave the teeth 28 and the slide stops for a second or two, when the teeth of the gear 31 have turned to a point where they engage the teeth 29 of the slide and the slide commences its return movement across the chute into its corner behind the opposite wall 24, when this gear segment leaves the slide teeth and the spur gear 30 again engages the teeth 28 and starts the slide across the chute again. This reciprocal traveling movement of the slide is continued as long as ore flows through the chute and the sample spout being arranged with its open side toward the downwardly flowing ore catches within its curved recessed surface a portion of the ore as it moves at right angles to the flowing ore through it and the ore caught by the sampler spout flows from the spout into the distributer 22, from which it discharges into a receptacle or into two or three or more receptacles placed under its path of travel, as this distributer being a part of or attached to the sliding floor moves reciprocally with it across the width of the ore chute. The end wall of the distributer is provided with a plurality of distributing grooves 22^A, as shown. The ore in the chute after it passes the sample catching spout flows down the chute into the conveyer boot, from which it is conveyed to storage bins or to treatment for the extraction of its values.

My invention is simple, positive and sure in its action, not liable to get out of order and provides an accurate sampler of large daily tonnage capacity, and while I have illustrated the preferred construction and arrangement of my improved ore sampler, I do not wish to be limited to the construction and arrangement shown, as my invention contemplates broadly a sample catching spout traveling reciprocally across a flowing stream of ore or other material, from which it is desired to reserve samples for testing purposes to ascertain its values or other properties, and many changes might be made in the present construction and arrangement without departing from the spirit of my invention.

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

1. In a sampler, the combination of a sampler frame, comprising fixed side and floor portions, and a slide reciprocally mounted in said fixed floor portion provided with an aperture, a spout secured in said aperture and arranged to project vertically above it far enough to extend above any body of ore flowing through said sampler, a sample distributing hopper on the under side of said reciprocating floor surrounding the discharge aperture of said spout arranged to move with said slide, two independent and parallel toothed rack portions arranged on one side of said slide, a pair of segment gears rotatably mounted on said frame, each of which is arranged in operative meshing relation to one of said tooth racks, said segments having their gear toothed segments arranged diametrically opposite to each other and arranged to engage said toothed racks in alternate order, and means for rotating said segment gears at the same speed.

2. A sampler comprising a suitable frame provided with an ore feeding chute leading into it and an ore discharging chute leading from it, said sampler frame comprising stationary side and floor portions, said floor portions being provided with a slideway, a slide mounted in said slideway, a sample distributing hopper on the under side of said slide, a spout comprising a partial tubular portion secured in a hole in said slide, and arranged to extend above the slide far enough to stand above the depth of ore flowing through said sampler, said spout being arranged to face ore flowing through said sampler and guide it through said floor into said distributing hopper, a pair of toothed rack bars on the slide, a pair of combined toothed segments and beveled gears arranged to mesh with said rack bars, means including a beveled pinion for rotating said beveled and toothed segments in opposite directions, said segments being arranged to engage said toothed rack in alternate order and to reciprocate said moving floor so as to continuously move said spout reciprocally across said sampler.

3. In a sampler, the combination of the ore chute and the frame of the sampler, comprising a floor and side portions, a slide in said frame provided with a discharge aperture, an ore catching spout secured in said aperture and arranged to face ore flowing through said frame and chute and adapted to move between the sides of said frame, walls at the opposite sides of the frame, behind which the said spout is adapted to pass at the limit of each reciprocating movement, a hopper on the under side of said slide arranged to surround the discharge aperture of said slide and spout, said hopper being provided with a grooved and outwardly curved end member, a pair of parallel toothed racks on said slide and oppositely moving segment gears adapted to alternately engage said racks.

4. In a sampler as specified, a pair of supporting frames having apertured flanges and bolts which pass through said flanges to unite said frames, a chute secured to the end of each frame, a slide reciprocally mounted

between the opposing ends of the frame and having a discharge hole therein, and an open sided spout secured in said openings, means for reciprocating said slide and a projection on each side of the frame which momentarily cuts off the spout from the flowing ore at the end of each reciprocal movement of the slide.

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

OSCAR H. FAIRCHILD.

Witnesses:
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