No. 684,314. Patented Oct. 8, 1901.

J. SCOBEY.

ORE SAMPLER.

(Application filed Feb. 25, 1901.)

(No Model.) 3 Sheets—Sheet 1.

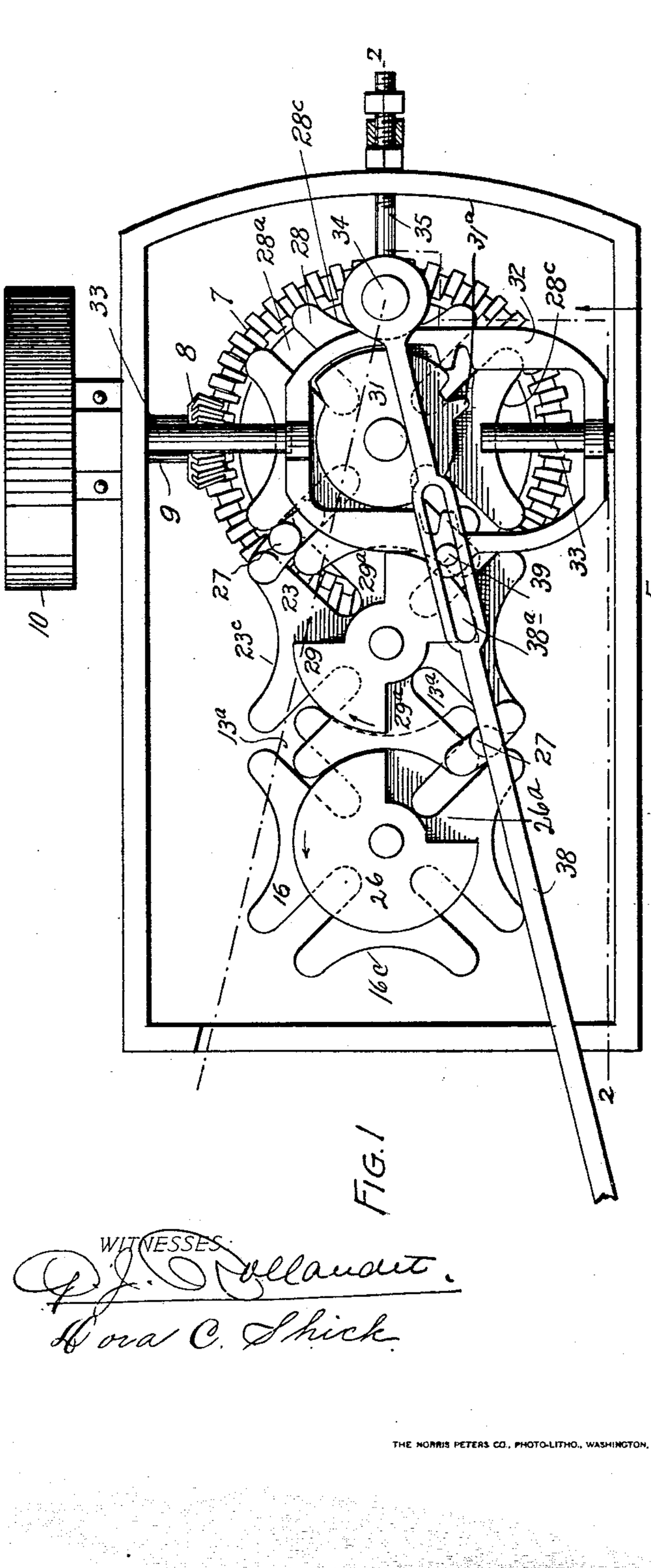


FIG. 1

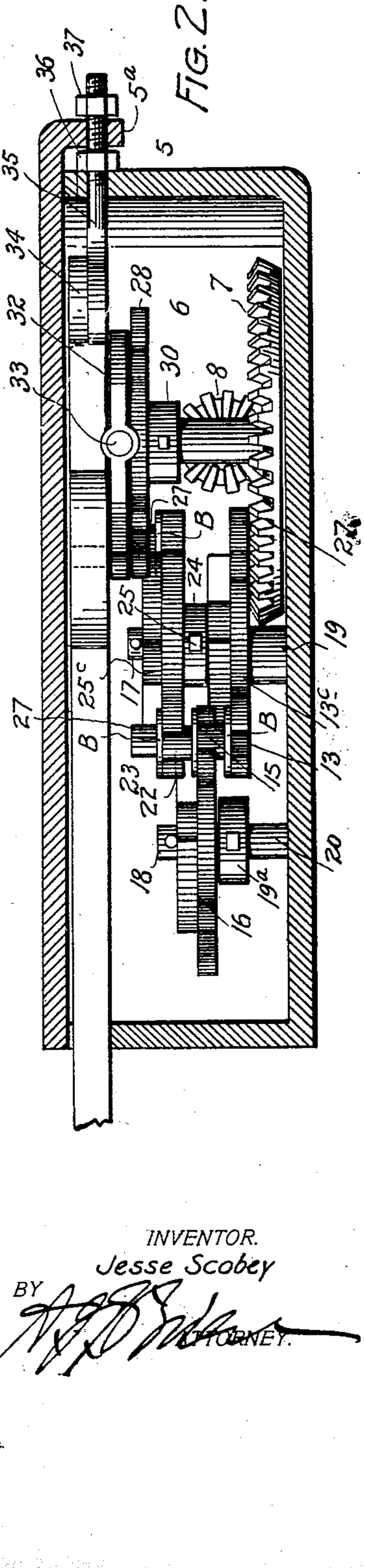


FIG. 2

WITNESSES:
P. J. Dillaudet.
Nora C. Shick

INVENTOR.
Jesse Scobey
BY
ATTORNEY.

No. 684,314. Patented Oct. 8, 1901.

J. SCOBEY.

ORE SAMPLER.

(Application filed Feb. 25, 1901.)

(No Model.) 3 Sheets—Sheet 2.

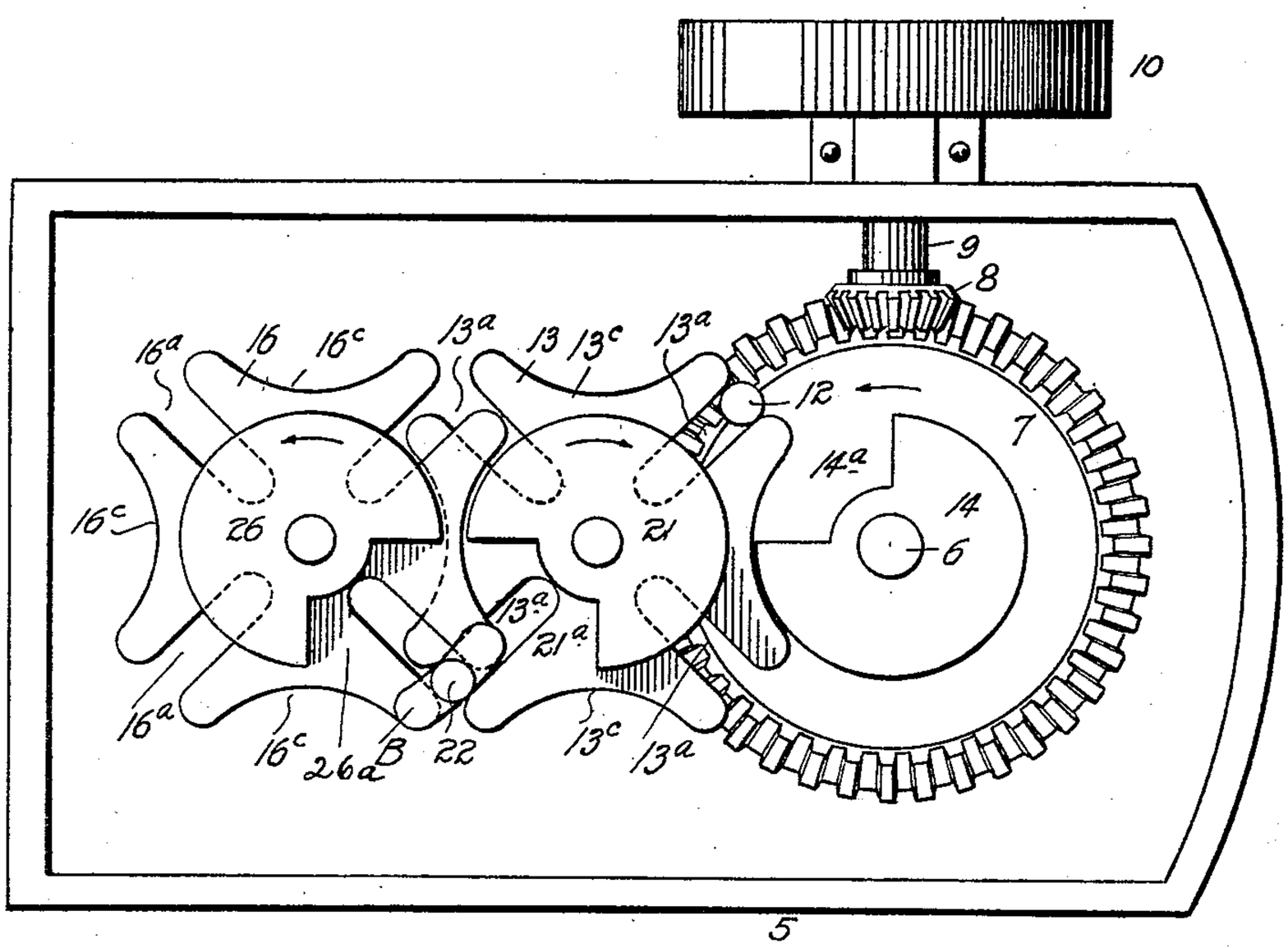


FIG. 3

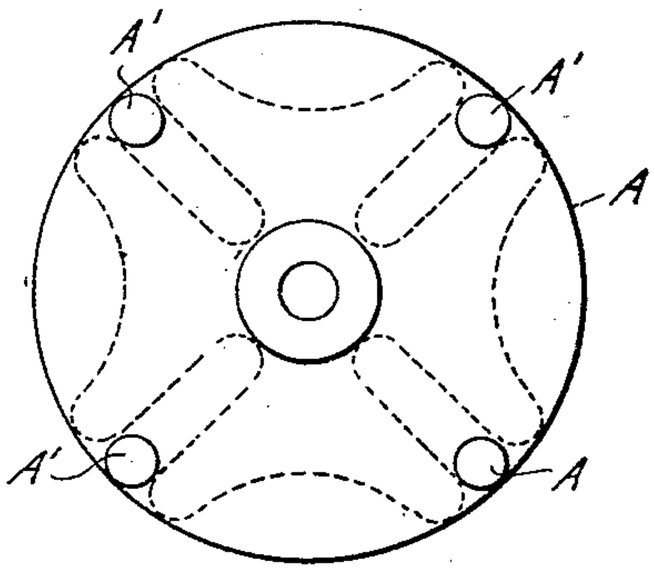


FIG. 4

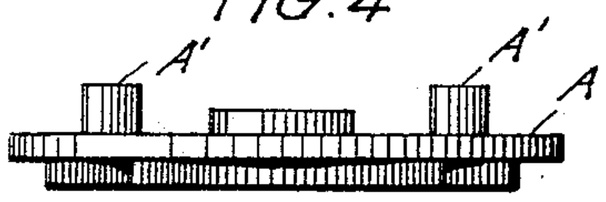
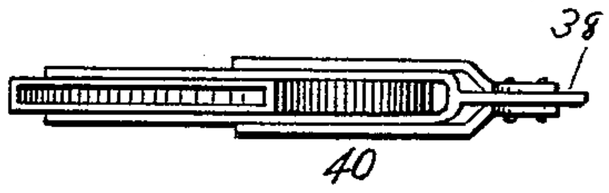


FIG. 5.

FIG. 6.



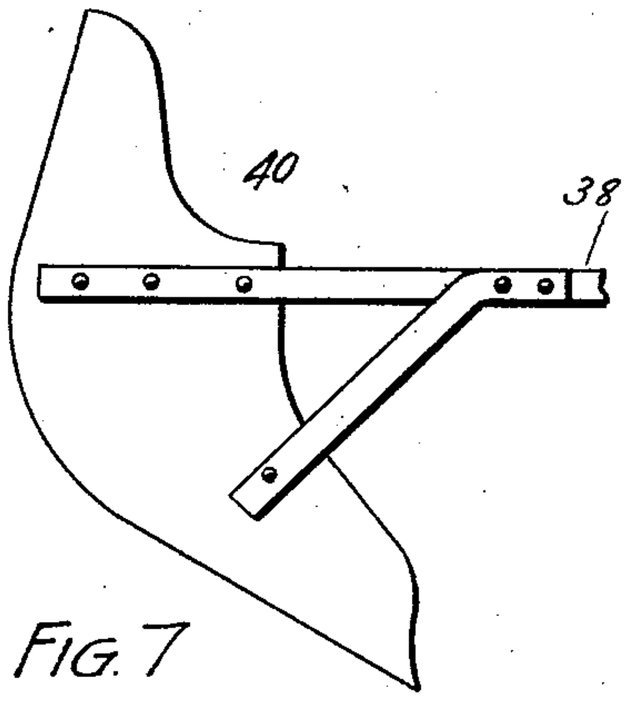


FIG. 7

WITNESSES:
P. J. O'Gara.
Dora C. Shick

INVENTOR.
Jesse Scobey
BY
A. D. Brake ATTORNEY.

No. 684,314. Patented Oct. 8, 1901.

J. SCOBEY.

ORE SAMPLER.

(Application filed Feb. 25, 1901.)

(No Model.) 3 Sheets—Sheet 3.

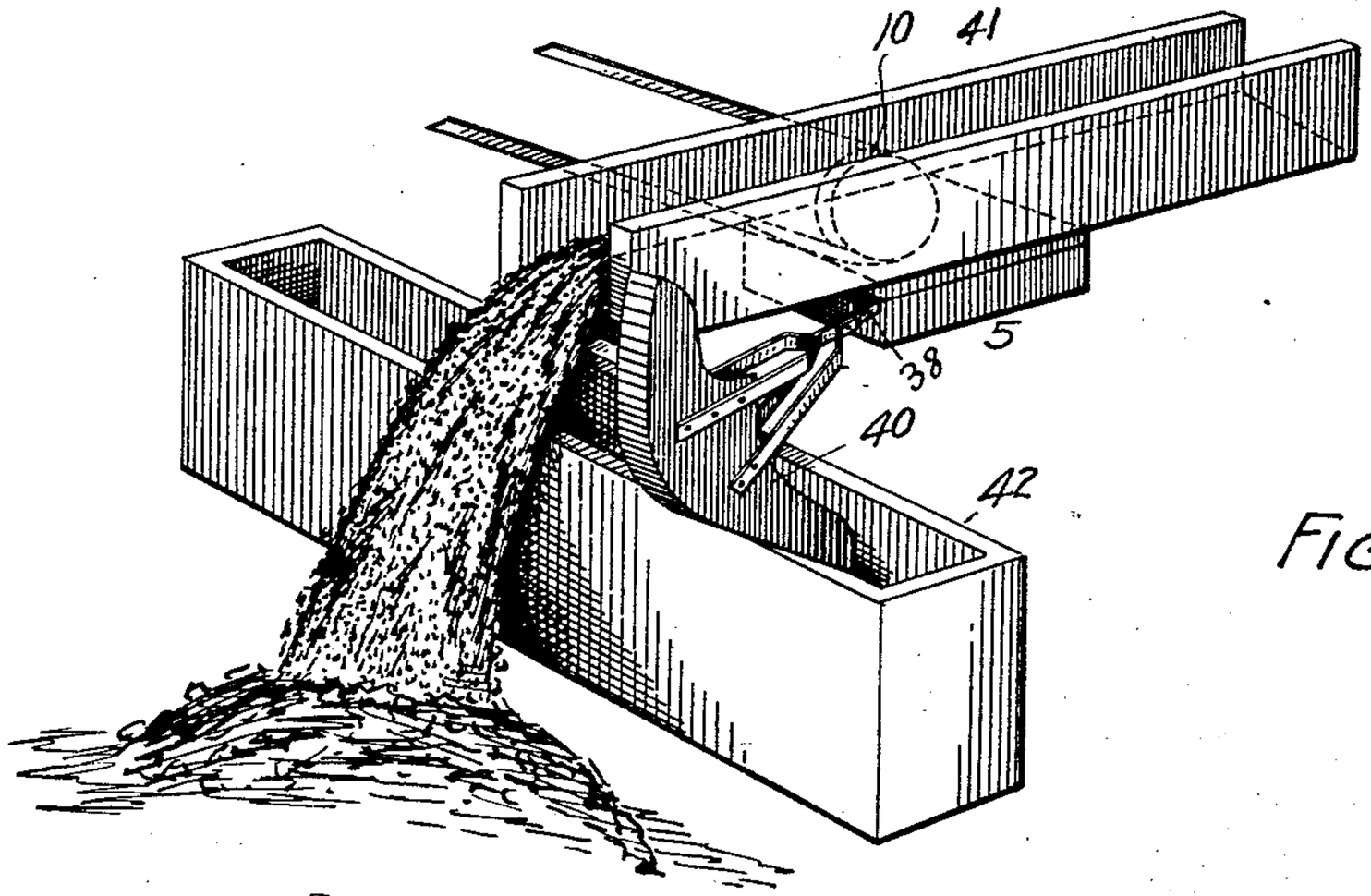


FIG. 8.

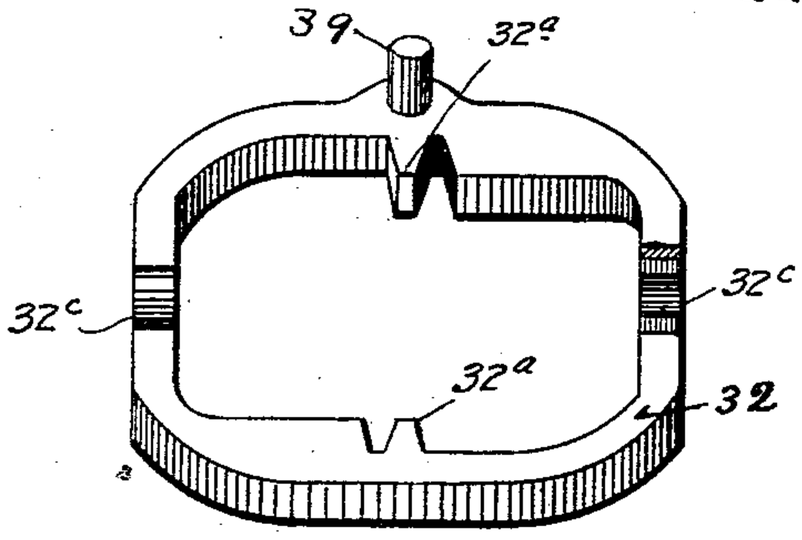


FIG. 9.

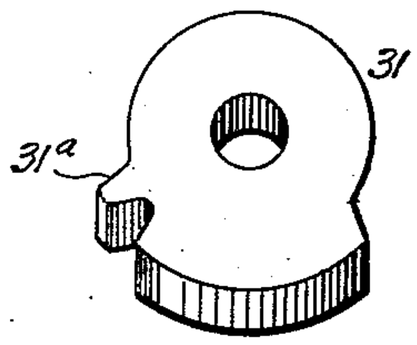


FIG. 10

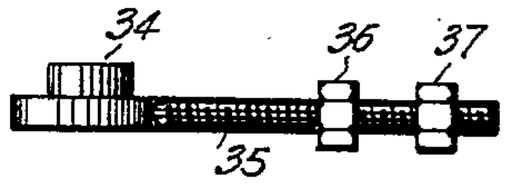


FIG. 11.

WITNESSES:
J. J. Ollendorf,
Dora C. Shick.

INVENTOR.
Jesse Scobey
BY
ATTORNEY.

UNITED STATES PATENT OFFICE.

JESSE SCOBEY, OF DENVER, COLORADO.

ORE-SAMPLER.

SPECIFICATION forming part of Letters Patent No. 684,314, dated October 8, 1901.

Application filed February 25, 1901. Serial No. 48,789. (No model.)

To all whom it may concern:

Be it known that I, JESSE SCOBEY, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Samplers; 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 characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ore-samplers, more especially designed for use in sampling tailings as they are discharged from ore-mills. It may, however, of course be employed in sampling the ore as it is delivered to the mill previous to treatment. My improved sampling mechanism imparts an oscillating movement to the bucket or receptacle, whereby the latter is made to pass quickly through the stream of pulp issuing from the launder at the tail of the mill. The mechanism may be so constructed or regulated that the intervals between strokes or movements of the bucket may be of any desired length. The mechanism is also positive and continuous in its operation and cannot fail to perform its function as long as the mill is in operation. Provision is also made for locking the bucket in position during the period of rest between strokes. This is an important feature, since the sampling must be done outside the mill, and the bucket is therefore exposed to the wind and other influences, which might result in its movement through the stream of pulp at irregular intervals were it not for this locking feature. Some ore-samplers heretofore used impart a continuous rotation or movement in a circular path to the bucket, causing the same to pass through the stream of pulp once during each revolution. In constructions of this class if the speed of the bucket's travel is increased in order to diminish the quantity of ore taken at each passage of the receptacle through the pulp stream the number of passages will be increased, and hence the quantity of pulp caught for sampling purposes will not be diminished. Moreover, since my apparatus imparts an oscillating movement to the bucket it requires less space for operation than if the movement of the bucket were in a circle. This is an advantageous feature in favor of my improved device.

The object of machines of this class is to catch as small a quantity of pulp as possible, providing the quantity caught fairly indicates the quality of material discharged as tailings during a given period of time—say twenty-four hours, for instance. Hence my object has been to provide mechanism capable of so manipulating the bucket or receptacle passing through the stream of pulp as to catch a small quantity of the tailings at regular predetermined intervals and which shall be positive and reliable in its action. My improved mechanism is capable of such adjustment that the speed of travel of the bucket through the ore stream may be increased without diminishing the interval between strokes, or the speed of the bucket's travel may be increased and the interval between the strokes lengthened at the same time, thus giving an unlimited range of adjustment.

My improved ore-sampler will now be described in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of the operating mechanism, the top of the casing being removed to disclose the parts within. Fig. 2 is a section taken on the line 2 2, Fig. 1, viewed in the direction of the arrow. Fig. 3 is a top view similar to Fig. 1 with a portion of the mechanism removed. Fig. 4 is a detail view of a modified form of gear or operating wheel. Fig. 5 is a side elevation of the same. Fig. 6 is a top view of the bucket or pulp-receptacle connected with the oscillating lever-arm of my improved mechanism. Fig. 7 is a side elevation of the same. Fig. 8 is a perspective view illustrating the apparatus in use and shown on a smaller scale. Fig. 9 is a perspective view of the yoke or reciprocating rack-bar. Fig. 10 is a perspective view of the mutilated gear or rotating device which reciprocates the yoke and locks the yoke in position. Fig. 11 is a detail view of the adjustable pivot or stud upon which the bucket-lever oscillates as a center or fulcrum.

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

Let the numeral 5 designate a casing, which incloses the operating parts of the mechanism. In this casing and near what I will term the "front extremity" of the machine is located a stationary vertical shaft 6. Journaled on or loosely engaging the lower extremity of this shaft is a gear 7, operated by a meshing beveled pinion 8, fast on a shaft 9, journaled in one side of the casing and protruding therefrom. To the protruding extremity of the shaft 9 is made fast a pulley 10, which may be connected with any suitable power for operating the mechanism.

The upper side of the gear 7 is provided with a pin, stud, or equivalent device 12, which as the gear rotates successively engages radial slots 13^a, formed in a wheel 13. The periphery or outer edge of the wheel 13 is provided with concavities 13^c, located between the outer extremities of the slots 13^a and curved to conform to the periphery of the mutilated disk 14, made fast to the center of the gear 7. The disk 14 is cut away, as shown at 14^a, on both sides of a radial line passing through the axial centers of the pin 12 and the shaft 6 to give the portion of the wheel 13 located on opposite sides of a slot 13^a room to turn when the slot is engaged and therefore actuated by the pin 12 of the gear 7. As shown in the drawings, the wheel 13 is provided with four slots 13^a, and as the gear 7 has only one pin or stud 12 the gear must rotate four times to impart one rotation to the wheel 13. By virtue of the construction described the curved portion of the disk 14 engages a curve 13^c of the wheel 13, except when the wheel 13 is in motion. Hence the wheel 13 is locked against turning, except when it is intended to move. If the gear 7 were provided with two pins 12 diametrically located, the wheel 13 would be turned once for every two revolutions of the gear 7, and there would be two spaces 14^a in the disk 14, while if the gear 7 were provided with four pins 12 located at equal intervals, or ninety degrees apart, the wheel 13 would rotate in unison with the gear, and there would be no necessity of a disk 14, since a pin of the gear would in that event always be in engagement with a slot of the wheel. The wheel 13 is located in a plane sufficiently higher than the plane of the gear 7 to allow the wheel to overlap the gear. As shown in the drawings, the wheel 13 is provided with a pin or stud 15, similar to the stud or pin 12 of the gear 7. This stud 15 successively engages four radial slots 16^a of a wheel 16, which is of substantially the same construction as the wheel 13, but located in a higher plane. The wheels 13 and 16 are journaled on shafts or spindles 17 and 18, respectively, and supported in their proper planes by collars 19 and 19^a. The collar 19^a is secured to its shaft by a set-bolt 20. The wheel 13 is provided with a cam or mutilated disk 21, which is broken away, as shown at 21^a, opposite the pin or stud 15 to allow the wheel 16 to turn when actuated by the pin 15. At all other times the wheel 16 is locked from turning by the engagement of the convex periphery of the disk 21 with the concave edges 16^c of the wheel.

The wheel 16 is provided with a pin 22, which successively engages four radial slots 23^a of a wheel 23, which is substantially of the same construction as the wheels 13 and 16 and located directly above the wheel 13, being journaled on the same shaft 17 and supported by a collar 24, made fast to the shaft by a set-bolt 25. The wheel 23 is in a higher plane than the wheel 16 and so arranged that its concave edges 23^c are engaged by the convex periphery of a cam-disk 26, fast on the upper surface of the wheel 16 and cut away, as shown at 26^a, to allow the wheel 23 to turn when actuated by the pin 22 of the wheel 16. The wheel 23 is provided with two pins 27, which are diametrically located and engage the radial slots 28^a of a wheel 28, which is substantially of the same construction as the wheels 13, 16, and 23. The wheel 23 is provided with a cam 29, which may be said to be formed from a disk cut away on two opposite sides, as shown at 29^a, to allow the wheel 28 to turn when actuated by the pins 27 of the wheel 23. The convex edges of the cam 29 are arranged to engage the concave edges 28^c of the wheel 28 and lock the latter against rotation, except when actuated by the pins 27 of the wheel 23. The wheel 28 is located directly above the gear 7, being supported in its elevated position by a collar 30. Its upper surface is provided with a mutilated gear 31, which, as shown in the drawings, is provided with a single tooth or cog 31^a, arranged as the wheel 28 is actuated to alternately engage the teeth 32^a of a yoke 32. There is a tooth 32^a, located on each side of the yoke, which is provided with an elongated opening to permit reciprocation, the gear 31 being located within said opening. The yoke is mounted on stationary spindles 33, secured to the sides of the casing 5 and engaging openings 32^c, formed in the extremities of the yoke, which moves back and forth upon the spindles as it is actuated by the gear 31.

To the front end of the casing is adjustably attached a pivot 34. This pivot is fast on a threaded stem 35, passing through a plain opening in the front end of the casing and a similar opening in a depending projection 5^a, formed on the top of the casing. Between the projection 5^a and the adjacent wall of the casing is located an adjusting-nut 36, applied to the stem of the pivot, while in front of said projection and applied to the said stem is a lock-nut 37.

A lever 38 is fulcrumed on the pivot 34 and slotted, as shown at 38^a, to receive a stud 39, formed on one side of the yoke. To the extremity of this lever, remote from the pivot 34, is attached the bucket or receptacle 40,

which by means of the mechanism heretofore described is made to oscillate in front of the discharge extremity of a launder 41. (See Fig. 8.)

The speed of travel of the catch-bucket may be regulated by adjusting the stem 35, whereby the pivot 34 is moved forward or back at will. If moved forward or toward the right, referring to Figs. 1 and 2, the bucket will be brought nearer the lever-actuating stud, and the distance of its travel at one stroke will be decreased. Hence its speed of travel for a given stroke of the yoke's movement will be diminished. On the other hand, if the pivot 34 be moved rearwardly or toward the left, referring to Figs. 1 and 2, the arc or sweep of the bucket's travel at each stroke will be increased, and as this stroke must be completed within a given time—namely, while the yoke, traveling at a given speed, is making a single stroke of predetermined length—the speed of the bucket's travel will be increased, and the time required to pass through the stream of pulp will consequently be diminished, and the amount of pulp caught by the bucket at a stroke or movement in one direction will therefore be diminished. This is important, since the smaller the quantity of pulp which it is practicable to catch at each sweep of the lever and bucket the smaller the quantity of tailings it will be necessary to handle in order to obtain the desired information and consequently the more satisfactory is a machine of this class.

From the foregoing description the operation of my improved machine will be readily understood. The pulley 10 being rotated by a suitable power, the shaft 9, the pinion 8, and the gear 7 are operated. For each revolution of the gear 7 (assuming that it is provided with a single pin 12) the wheel 13 will be given a quarter-turn, four revolutions of the gear being required to produce one rotation of the wheel. For the same reason four turns of the wheel 13 are required to give the wheel 16 a single rotation, four turns of the last-named wheel to impart a single turn to the wheel 23, two turns of the wheel 23 (since it has two pins 27) to impart a revolution to the wheel 28, and every time the last-named wheel makes a half-turn a stroke or movement in one direction is imparted to the yoke 32, the lever 8, and the bucket 40, while for a complete rotation of the wheel 28 and its gear 31 two strokes or a complete reciprocation is imparted to the yoke and a complete oscillation to the lever and bucket. Hence when the mechanism is constructed and arranged as shown in the drawings the gear 7 must revolve one hundred and twenty-eight times for every rotation of the wheel 28 and its gear 31, or sixty-four times for every stroke of the yoke or passage of the bucket through the stream of pulp issuing from the launder at the tail of the mill. It is evident that by using more pins on the wheels or by using less wheels, or by resorting to both of these expedients, the interval between the strokes or movements of the bucket may be diminished, while by using more wheels these intervals may be increased.

The manner of increasing the speed of the bucket's travel through the stream of pulp without diminishing the intervals between strokes has already been explained—namely, by moving the pivot 34 farther toward the left, referring to Figs. 1 and 2. This same result may be accomplished in another way—namely, by increasing the speed of the gear 7 and increasing the number of the wheels 13, 16, 23, and 28. It is evident that this increased motion of the mechanism will correspondingly increase the speed of the travel of the yoke, the lever, and the bucket, and consequently diminish the time of the bucket's passage through the stream of pulp. It is also evident that by correspondingly increasing the number of the wheels the time between the strokes will not be lessened. Hence it will be seen that my improved construction possesses an unlimited range of adjustment, since the speed of the bucket's travel may be increased without diminishing the time between strokes, or, if desired, the speed of the bucket's travel may be increased and the intervals between strokes prolonged at the same time. The reverse of this is also practicable, if for any reason it may be desired. It is also evident that both expedients heretofore explained for increasing the speed of the bucket's travel without diminishing the intervals between strokes may be simultaneously employed.

As shown in Figs. 4 and 5 of the drawings, the slotted wheel is provided with a circular plate A, occupying a plane above its slotted lower portion and upon which the pins A′ are mounted. These pins A′ correspond to the pins or projections 15, 22, and 27 of the slotted wheels 13, 16, and 23. In Fig. 4 four pins A′ are shown, one being located above the outer extremity of each slot. A wheel of this construction—that is, with four pins—would impart a corresponding movement to its companion wheel for every movement of its own. The pins 15, 22, and 27 of the slotted wheels (shown in Figs. 1, 2, and 3) are each mounted on a bridge B, located above the outer extremity of one of the slots of the wheel and above the plane of an actuating-pin of another wheel entering the slot. This bridge is attached to or formed integral with the wheel at the outer extremity of the slot. (See Fig. 2.) It is believed that the form of construction having the continuous plate A is preferable, as it gives great strength to the slotted wheel. The other form is shown in Figs. 1, 2, and 3 to avoid confusion of parts. It must be understood, however, that I do not limit the invention to any special form of construction for supporting the pins on the slotted wheels.

The device 40, termed a "bucket" or "receptacle" in the specification, is, more properly speaking, a diverting device, since the

pulp caught by it while passing through the stream issuing from the launder 41 is merely diverted from the pulp current and discharged or directed into a trough or settling-tank 42, so located that normally the entire pulp stream would pass over it. (See Fig. 8 of the drawings.)

The operation of the machine is as follows: The shaft 9 is rotated by applying power to the pulley 10 through the instrumentality of a belt 10^a. (See Fig. 8.) The movement of the shaft operates the gear 7, since the pinion on the shaft meshes with the gear. As the gear rotates its pin 12 successively engages the slots 13^a of the wheel 13 and imparts an intermittent movement to the latter. The pin 15 of the wheel 13 in turn successively engages the slots of the wheel 16 and imparts an intermittent movement to the latter. The pin 22 engages the slots of the wheel 23 and imparts an intermittent movement to the last-named wheel. The pins 27 of the wheel 23 engage the slots of the wheel 28 and operate the last-named wheel intermittently. The movement of the wheel 28 operates the mutilated gear 31, which in turn imparts an intermittent reciprocation to the yoke 32, whose pin 39 engages the slot of the lever 38 and imparts an intermittent oscillation to the device 40, which is thereby caused to pass back and forth through the stream of pulp issuing from the launder 31.

Having thus described my invention, what I claim is—

1. The combination with a device adapted to remove a portion of the stream of material to be sampled, of a lever connected therewith, an adjustable fulcrum for the lever, and a yoke mounted to reciprocate, and provided with a projection passing through a slot formed in the lever.

2. The combination with a casing, of a lever fulcrumed therein, a yoke mounted to reciprocate in the casing and provided with a tooth or cog on opposite sides of an elongated opening, a mutilated gear mounted in the opening of the yoke, and arranged to operate the latter, and means for actuating the gear intermittently.

3. The combination with a casing, of a lever fulcrumed therein, a yoke mounted to reciprocate in the casing, and provided with a tooth or cog on opposite sides of an elongated opening, a mutilated gear mounted in the opening of the yoke and arranged to operate the latter, a wheel to which the gear is made fast, and means for imparting an intermittent movement to the wheel.

4. The combination with a casing, of a lever fulcrumed therein, a yoke mounted to reciprocate in the casing and toothed or cogged on opposite sides, a gear located in an elongated opening in the yoke and provided with a tooth adapted to engage the teeth or cogs of the yoke and reciprocate the latter, a wheel on which the gear is mounted and another wheel adapted to rotate continuously in proximity to the wheel having the gear, and a suitable connection between the two wheels whereby an intermittent movement is imparted to the wheel carrying the gear.

5. The combination with a relatively stationary frame, of a lever fulcrumed therein, a yoke mounted to reciprocate on the frame and provided with an interior tooth or cog on opposite sides of an elongated opening, a mutilated gear arranged to operate in the opening of the yoke to reciprocate the latter, a wheel upon which the mutilated gear is mounted, said wheel being provided with a number of radial slots, another wheel capable of continuous rotation, located in proximity to the slotted wheel, and provided with a projection adapted to successively engage the slots of the slotted wheel and impart an intermittent movement to the latter.

6. The combination with a device adapted to remove a portion of the stream of material to be sampled and a relatively stationary frame, of a lever fulcrumed in the frame and connected with said device, a wheel, a yoke mounted to reciprocate and connected with the lever to oscillate the latter, a gear for operating the yoke, a wheel upon which the gear is mounted, a second wheel mounted in proximity to the first wheel, and a suitable connection between the two wheels whereby the rotation of the second wheel imparts an intermittent movement to the first wheel, and means for automatically locking the intermittently-turning wheel, against movement during its inactive intervals.

7. The combination with a device adapted to remove a portion of the stream of material to be sampled, of a lever connected therewith, a yoke mounted to reciprocate and connected with the lever to operate the same, a device for reciprocating the yoke, and means for imparting an intermittent movement to the yoke-reciprocating device.

8. In an ore-sampler the combination with a device adapted to remove a portion of the stream of material to be sampled, of a lever connected therewith, a wheel provided with a projection and arranged to rotate continuously, mounted in proximity to the rotating wheel, and provided with slots which the projection of the rotating wheel is adapted to successively engage, whereby an intermittent movement is imparted to the slotted wheel, and a suitable connection between the slotted wheel and the lever for imparting an intermittent movement to the latter.

9. The combination with a device adapted to remove or divert a portion of the stream of pulp to be sampled, when passed therethrough, of a lever suitably fulcrumed and connected with said device, a wheel adapted to rotate continuously, a number of other wheels, one of which is moved intermittently by the rotary wheel, while this intermittently-moving wheel imparts an intermittent movement to the next wheel and so on, there being a plurality of intermittently-moving wheels,

and a suitable connection between one of the intermittently-moving wheels, and the lever, for imparting an intermittent movement to the latter.

10. The combination with a device adapted to remove or divert a portion of the stream of material to be sampled, when passed therethrough, of a lever suitably fulcrumed, a wheel adapted to rotate continuously, a number of other wheels, one of which is moved intermittently by the rotary wheel, while this intermittently-moving wheel imparts an intermittent movement to the next wheel and so on with a plurality of intermittently-moving wheels, means for automatically locking each intermittently-moving wheel during its normally inactive intervals, and a suitable connection between one of the intermittently-moving wheels and the lever for imparting an intermittent movement to the latter.

11. The combination with a device adapted to remove or divert a portion of the stream of material to be sampled, of a lever suitably fulcrumed and connected with said device, a wheel adapted to rotate continuously, a number of other wheels, one of which is moved intermittently by the rotary wheel, while this intermittently-moving wheel imparts an intermittent movement to the next wheel and so on throughout the series of wheels, means connected with the actuating-wheel of each intermittently-moving wheel, for locking the latter against movement during its normally inactive intervals, and a suitable connection between one of the intermittently-moving wheels and the lever for imparting an intermittent movement to the latter.

12. The combination with a device adapted to remove or divert a portion of the stream of material to be sampled, when passed therethrough, of a lever suitably fulcrumed, a wheel adapted to rotate continuously, a number of other wheels, one of which is moved intermittently by the rotary wheel, while this intermittently-moving wheel imparts a corresponding movement to the next wheel and so on with any suitable number of wheels, each intermittently-moving wheel having a concavity in its edge, and its corresponding actuating-wheel having a device provided with a convex curve adapted to engage said concavity, whereby each intermittently-moving wheel is locked against movement during its normally inactive intervals.

13. The combination with a device or bucket adapted to remove or divert a portion of the stream of material to be sampled when passed therethrough, of a lever, a wheel adapted to rotate continuously, a number of other wheels each provided with a number of slots, the rotary wheel having a projection adapted to successively engage the slots of one of the other wheels which is thereby intermittently moved, and this intermittently-moving wheel having a projection adapted in turn to engage successively the slots of the next wheel and impart an intermittent movement thereto, and so on with any suitable number of slotted wheels, and a suitable connection between the last intermittently-moving wheel of the series, and the lever for imparting an intermittent movement to the latter.

14. The combination with a bucket or device adapted to remove or divert a portion of the material to be sampled as it is passed therethrough, of a lever connected with said device, a wheel adapted to rotate continuously, a number of other wheels each provided with a number of slots, the rotary wheel having a projection adapted to successively engage the slots of one of the other wheels, which is thereby intermittently moved, and this intermittently-moving wheel having a projection adapted in turn, to engage successively the slots of the next wheel and impart an intermittent movement thereto and so on with any suitable number of slotted wheels, a gear mounted on the last intermittently-moving wheel of the series, or the one more remote in order of operation from the rotary wheel, and provided with a tooth or cog, a yoke having an elongated opening in which said gear is located, the yoke having a tooth or cog on opposite sides of its opening, which is engaged by the tooth or cog of the gear as the latter is actuated, whereby the yoke is reciprocated, and a suitable connection between the yoke and the lever whereby the latter is operated by the former.

15. The combination with a device adapted to remove or divert a portion of the material to be sampled as it is moved through the stream of said material, a lever connected with said device and suitably fulcrumed, a gear arranged to rotate continuously and provided with a projection, a wheel provided with slots which are successively engaged by the projection of the gear, whereby an intermittent movement is imparted to the wheel, another slotted wheel, a projection on the first slotted wheel, adapted to engage the slots of the next wheel in the series and so on for any number of slotted wheels, each in turn being intermittently actuated by its coöperating or companion wheel, a yoke having a cog or tooth on opposite sides of an elongated opening, a mutilated gear mounted on the last intermittently-moving wheel of the series, or the one most remote in order of operation from the rotary gear, a mutilated gear being located in the yoke-opening, and arranged to reciprocate the yoke, a projection being mounted on the yoke and arranged to engage a slot with which the lever is provided, whereby the lever is oscillated by the movement of the yoke.

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

JESSE SCOBEY.

Witnesses:
DORA C. SHICK,
MARY C. LAMB.