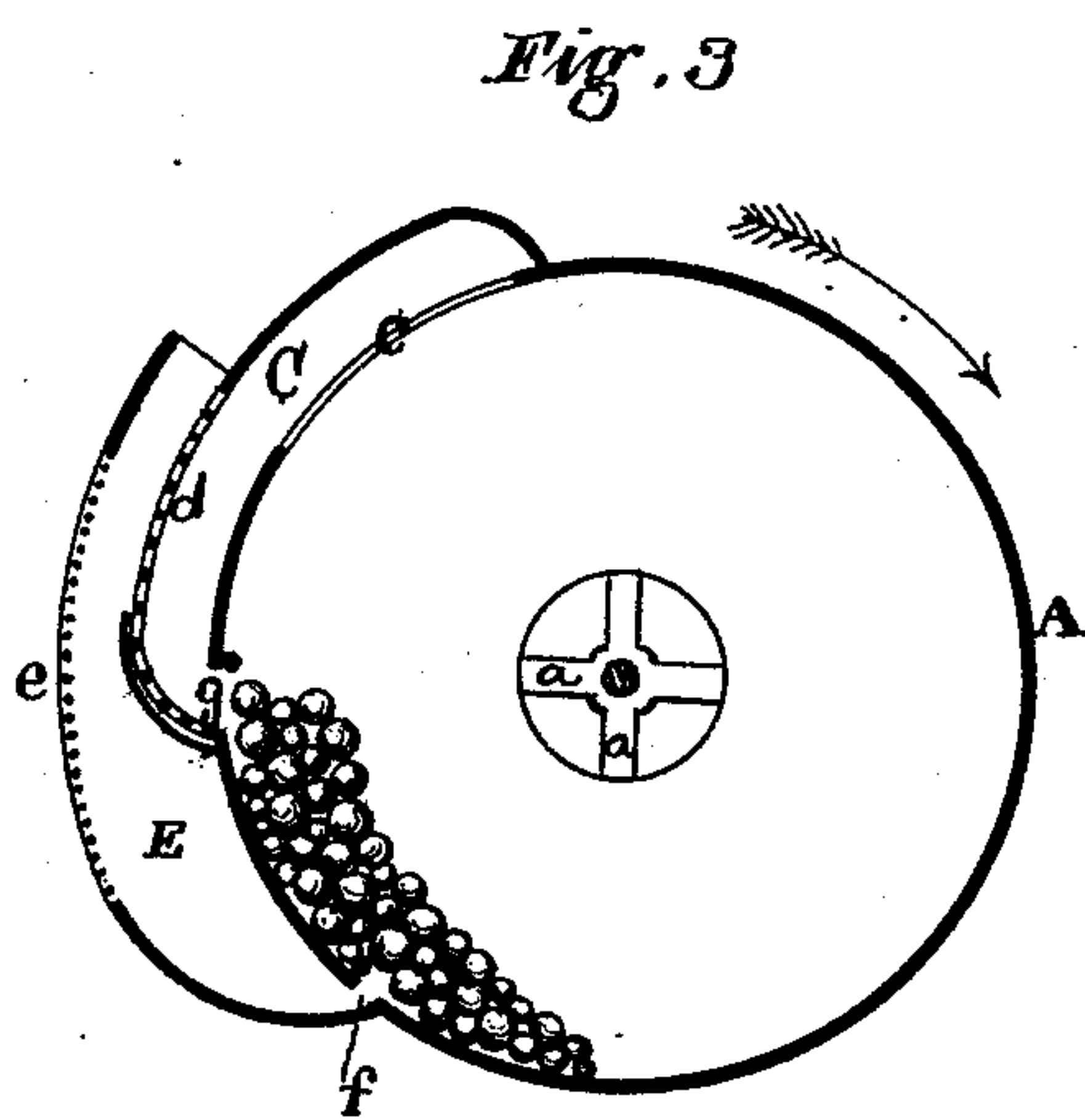
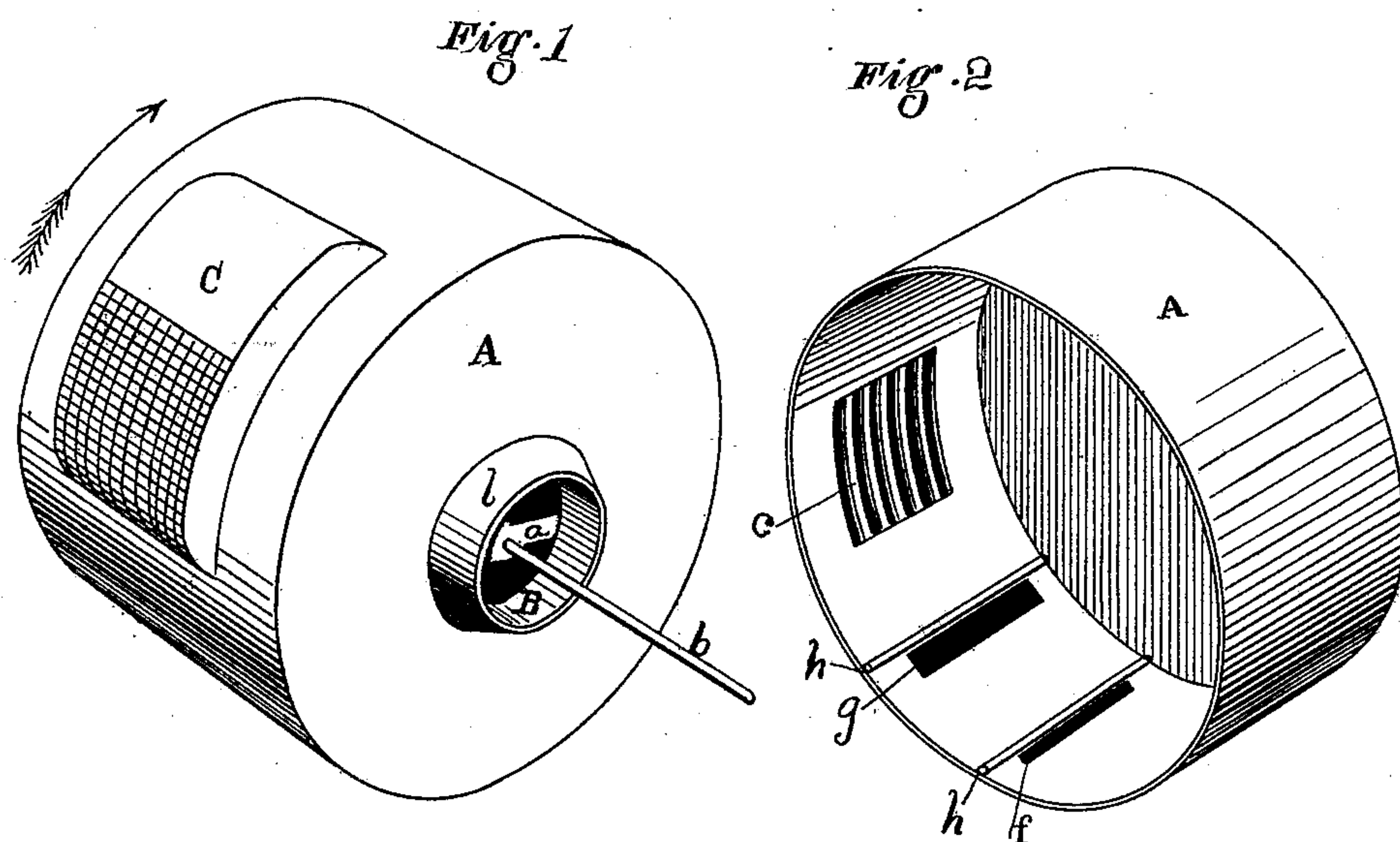


W. BRÜCKNER.
Ore Reducing and Pulverizing Apparatus.
No. 221,773. Patented Nov. 18, 1879.



Witnesses
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Frank A. Brooks

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UNITED STATES PATENT OFFICE.

WILLIAM BRÜCKNER, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ORE REDUCING AND PULVERIZING APPARATUS.

Specification forming part of Letters Patent No. **221,773**, dated November 18, 1879; application filed March 13, 1879.

To all whom it may concern:

Be it known that I, WILLIAM BRÜCKNER, of the city and county of San Francisco, and State of California, have invented a new and Improved Pulverizer, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to that class of ore-pulverizers in which the ore is placed in a drum or cylinder and crushed by metal balls passing over it as the drum revolves; and my improvement consists, first, in providing a pulverizing-barrel with a grate, said grate being connected with a conveyer so arranged along the circumference of the barrel that in every revolution of the latter the ore, after being ground between iron balls, passes through the grate out of the barrel into the conveyer, by means of which it is conducted over a screen, and the coarser ore which will not pass the screen is thence returned into the barrel.

Figure 1 of the drawings shows the grate and inlet. Fig. 2 shows the conveyer and screen. Fig. 3 is a section.

The barrel A is constructed of iron or steel, and is arranged to revolve on a shaft which passes through its center. On one side of the center of the barrel is the feed-opening B, across which is a spider, *a*, through which the shaft *b* passes, thus leaving a space around the shaft, through which the ore may be fed without the necessity of having hollow trunnions. The ore is led down and into the conical hopper or funnel *l*, around the feed-opening, by a pipe or other desirable means.

Inside of the barrel or cylinder are a number of metal balls, which, by being continually rolled over and over the ore, pulverize it to a great degree of fineness.

At any point on the periphery of the barrel is placed a man-hole plate having a series of steel grate-bars, *c*, arranged in such a position as to lie in planes transverse to the axis and parallel to the direction of the revolution, for the purpose of facilitating free discharge of the pulverized ore through the slots between the bars. By using a grate with vertical slots a better effect and freer discharge are produced

than by using a larger number of transverse bars and slots.

On the outer face of the barrel or cylinder is formed a chamber or conveyer, C, into which the ore passing through the grate-bars *c* enters. That part of the conveyer or chamber C immediately outside of the grate-bars is solid, so that the pulverized ore passing through said bars is carried along this part of the conveyer to the screens *d*, forming part of said conveyer, said screens forming the half of the conveyer farthest from the grate-bars. At the ends of the screens *d* is formed a slot or opening, *g*, through which that ore too coarse to pass through said screen *d* is returned to the interior of the barrel to be more finely reduced. Over this conveyer C and screen *d* is another chamber or conveyer, E, provided with a screen, *e*, said screen *e* being made with openings of a size to which it is desired the ore shall be ground. The ore passing through the screen of the under conveyer enters the chamber or conveyer E, and that which is ground fine enough passes out of the discharge-screen *e* into a suitable receptacle. That ore, however, which is not crushed fine enough to pass through this discharge-screen can again enter the barrel directly, without passing through the other conveyer, by means of the slot *f* at the end of the conveyer E.

The slots *f* and *g*, by which the ore too coarse to pass through the respective screens is returned to the barrel for regrinding, are both protected on their edges from the motion of the metal grinding-balls by bars *h*, of steel, placed on those sides of the openings over which the balls first pass as the drum or barrel is revolved.

The barrel is rotated in the direction indicated by the arrow, by which means the grate-bars or larger openings leading the ore into the conveyer reach the low point, where the ore passes out first, and the second and third size screens follow in succession, and the fine ore coming back through the slots *f* and *g* is returned immediately under the balls with less larger-sized ore over it than would otherwise be the case.

It will be seen from this construction that

the inside of my barrel or drum is made continuous and smooth, so that the action of the balls is not interfered with by any projections other than the bars across the slots, and a large grinding-surface is presented. The screens and conveyers are externally placed, and the two outer screens are liable to no wear from the crushing action of the balls, nor are they liable to wear from any large mass of ore passing over them which is altogether too coarse to pass through. The ore is first screened by the bars, then by the second-size screen in the first conveyer, and then again by the smallest discharge-screen, and in each case the ore too coarse to pass through the respective screens is immediately returned to be reground to the necessary fineness.

By making the grate-bars so that they lie in planes transverse to the axis and parallel to the direction of revolution of the drum, a better discharge is effected, since the ore does not pack against transverse bars, but slides on its course parallel with the direction of the bars and the slots, and passes out more easily. Thus for a given number of revolutions a greater discharge will be attained than would be the case were the bars placed transversely in the same given space.

I do not limit myself to the use of only one conveyer or one set of grate-bars or screens; but there may be more of them if the nature of the material to be treated so requires, and if the ore is of suitable character the second screen may be dispensed with.

It will be seen that I have only one discharge-opening when using only one set of screens, as shown in the drawings, and the discharge occurs at the time the discharge-screen is passing near the lowest point of its revolution. The pulverized ore is therefore discharged at the most convenient point, and not in all directions, as is the case with those barrels formed with screens around their whole circumference.

I do not claim conveyers which conduct the ore, after it has passed the screen, from the circumference of the barrel to its center; nor do I claim the combination of a pulverizing-barrel with screens protected by shields and constructed with hollow trunnions, because I am aware that these have been used before; but

What I do claim as new, and desire to secure by Letters Patent, is—

The continuous drum *A*, fitted to receive the crushing-balls, and provided with the grating *c* and opening *g*, as shown, in combination with the exterior conveyer, *C*, and screen *d*, substantially as described.

In witness whereof I have hereunto set my hand.

WILLIAM BRÜCKNER.

Witnesses:

CHARLES G. YALE,
FRANK A. BROOKS.