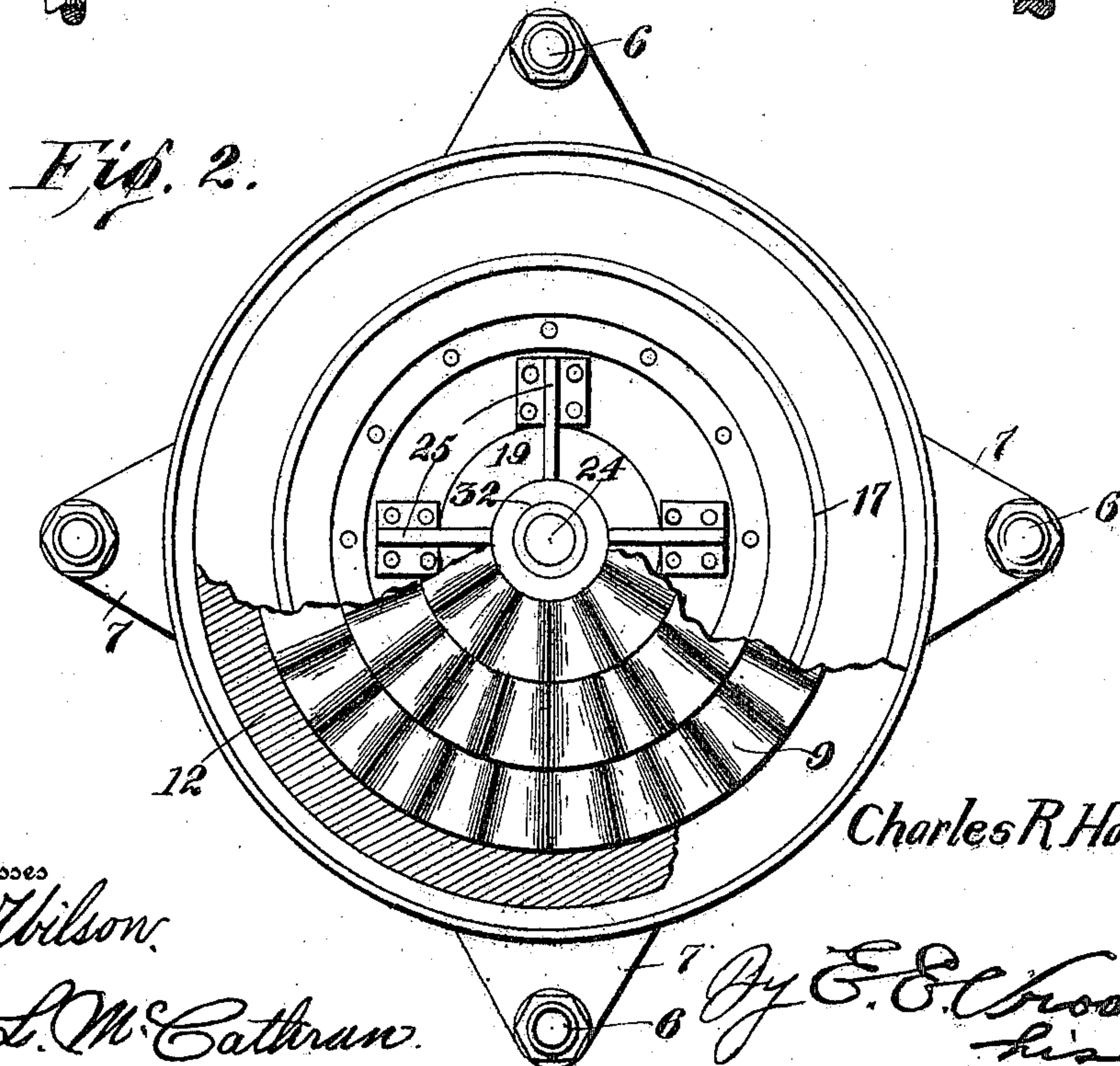
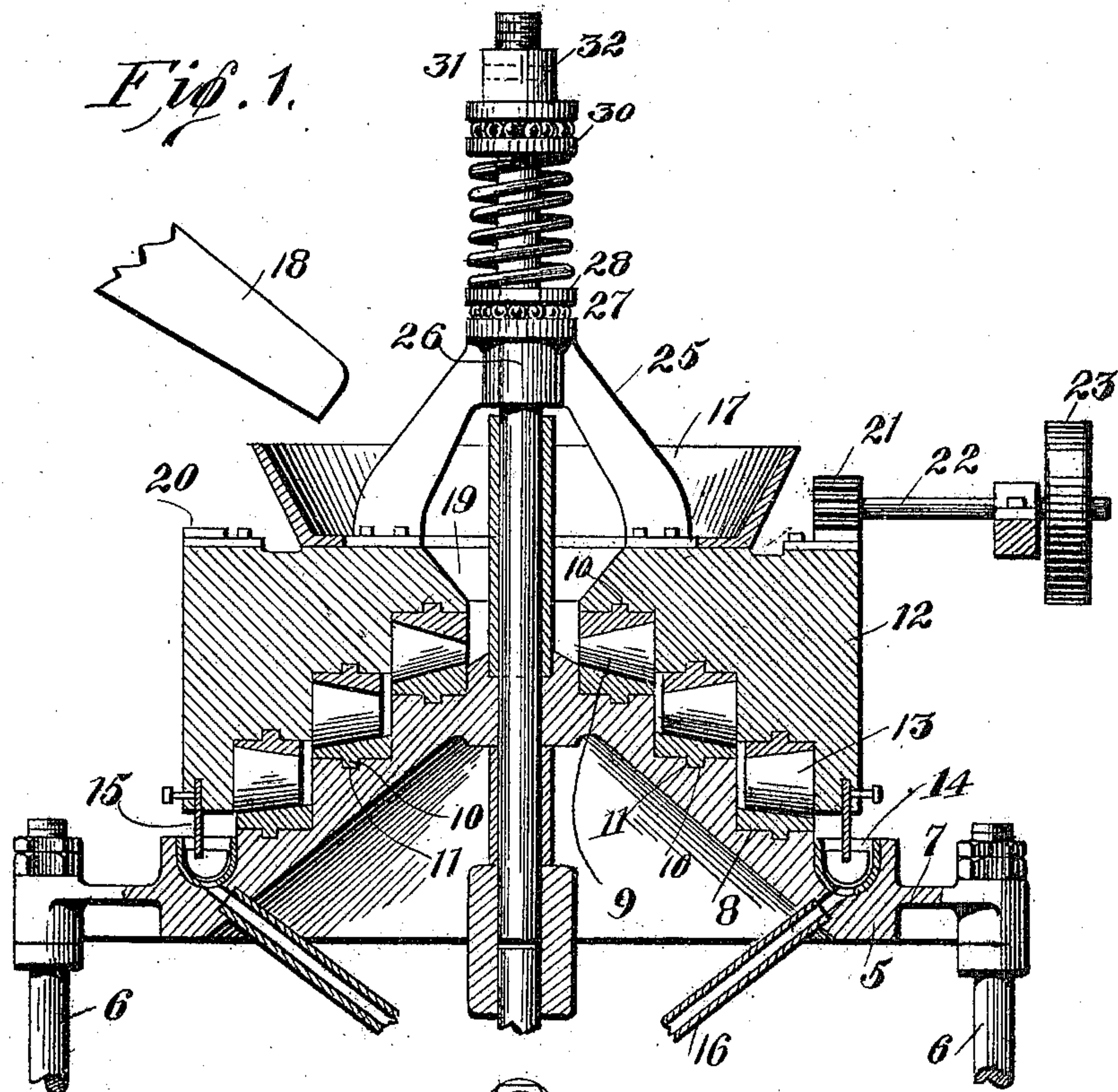


C. R. HOTCHKISS.
ORE GRINDING MACHINE.
APPLICATION FILED JAN. 21, 1909.

964,024.

Patented July 12, 1910.



Witnesses
D. E. Wilson
Geo. L. McCallahan

Inventor
Charles R. Hotchkiss

E. E. Crooman
his Attorney

UNITED STATES PATENT OFFICE.

CHARLES R. HOTCHKISS, OF OAKLAND, CALIFORNIA, ASSIGNOR OF ONE-HALF TO
GEORGE S. MONTGOMERY, OF OAKLAND, CALIFORNIA.

ORE-GRINDING MACHINE.

964,024.

Specification of Letters Patent.

Patented July 12, 1910.

Original application filed October 17, 1908, Serial No. 458,222. Divided and this application filed January 21, 1909. Serial No. 473,431.

To all whom it may concern:

Be it known that I, CHARLES R. HOTCHKISS, citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Ore-Grinding Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to ore grinding machines adapted for use in conjunction with the amalgamator shown and described in my application for Letters Patent, Serial #458,222, filed Oct. 17, 1908, and of which
15 the present application is a division.

The object of the invention is to provide an improved device for more effectually reducing ores to the consistency of pulp or slimes, and provide for a novel trituration and separation of the gold or silver, which
20 is so frequently in a state of dissemination, in the ores.

To the accomplishment of the recited object and others coördinate therewith, the preferred embodiment of the invention resides in that construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings and embraced within the scope of the appended claim.

30 In said drawings:—Figure 1 is a vertical sectional elevation of the apparatus, and Fig. 2 is a top plan view thereof, a portion being broken away to more clearly show the arrangement of the rollers.

35 Like reference characters designate corresponding parts throughout the several views.

Referring more particularly to the drawings for a detailed description of my invention, the numeral 5 designates the lower grinding cone which is suitably supported upon the upper proximal ends of the standards 6 by the integrally formed, laterally projecting members 7. This grinding cone
45 5 is provided with a plurality of rows of grinding faces 8, arranged in stepped relation and equipped with an inclined bed plate 9, the latter having a medially arranged depending projection 10 which engages the complementary recess 11 in such
50 manner as to lock and preclude any lateral displacement of said bed plate with respect to the rollers, which will be presently described.

In conjunction with the aforesaid mechanism I employ an upper grinding cone 12, the same being correlative with the lower or subgrinding cone 5 and obviously having step-like faces and the bed plates. Intermediate the bed plates of the respective cones
60 are mounted a plurality of substantially frusto-conical shaped rollers 13, which are devised to assist in the trituration of the ores in a more effectual manner than the spherical ore crushers, which are at the present
65 time in common use in devices of this character. It will be noted in this connection that the upper bed-plates, as well as the rollers, below the top step are of less transverse extent than the corresponding elements contained within the topmost step
70 in order to form spaces for the passage of the ore from step to step.

Adjacent the edge of the upper surface of the lower cone 5 is an angular trough 14
75 in which works the adjustable scrapers 15 carried by the corresponding portion of the upper cone 12 and adapted to agitate the pulp which is precipitated in the trough and discharge the same through the converging
80 pipes 16 which empty into the hopper of the amalgamator, not shown.

A hopper 17 is seated on the upper surface of the cone 12 so as to be in communication with the ore feeding chute 18, and arranged
85 to deliver the material to the upper series of grinding rollers through a central opening 19 formed in said upper cone. The upper outer edge portion of said cone 12 is equipped with a circular, toothed track
90 with which a pinion 21 engages, said pinion being carried by a power shaft 22, having mounted thereon a pulley 23 which is connected with a suitable source of power, not
95 shown.

The upper cone 12 is loose on the shaft 24 and has a bracket 25 carrying a collar 26 surrounding the said shaft and presenting a full upper surface upon which a row of ball bearings 27 are seated, and said shaft
100 has a ball race 28 above said bearings, the flat upper surface of which forms a seat for the coil spring 29. The upper end of this spring abuts a similar ball race 30 which forms a seat for another series of
105 ball bearings 31, above which said shaft is threaded for the reception of the tension nut 32. It will be seen that by adjusting the

nut 32 on the shaft the desired pressure of the upper cone 12 upon the grinding rollers 13 may be had.

The operation of the device is as follows:
5 Ore is shot in through the chute 18 into the hopper 17, thence through the central opening 19 into the upper cone 12 into the grinding rollers 13, and after traversing the various series of stepped grinding sur-
10 faces, it is delivered in pulp form into the trough 14, it being understood, that the said upper cone has imparted thereto a rotary movement through the medium of the track 20 and pinion 21. The scrapers 15 carried
15 by the upper cone force the material through said trough and cause it to flow through the discharge pipes 16 and obviously into the amalgamator.

Having thus described the invention,
20 what is claimed as new, is:—

An ore grinding machine comprising a pair of nested cones, the upper cone being rotatable and the lower fixed, the meeting

faces of said cones being arranged in annu-
lar stepped formation, each upper and lower 25
step having a bed plate with an inclined surface, the upper bed plate being of less width than the lower bed plate, rows of annularly-arranged, frusto-conical grinding rollers located between said bed plates, the 30
several rows of rollers being contiguous to each other and each roller having its smaller end in alinement with the inner end of the upper bed plate whereby a vertical passage-
way is formed between each row of rollers 35
for the passage of the material being ground, and an annular trough located adjacent to and below the lowest row of rollers and provided with discharge outlets.

In testimony whereof I hereunto affix my 40
signature in presence of two witnesses.

CHARLES R. HOTCHKISS.

Witnesses:

H. C. SCHROEDER,
F. P. SCHROEDER.