

No. 675,265.

Patented May 28, 1901.

A. C. CALKINS.
GYRATORY MULLER.

(Application filed July 14, 1900. Renewed Apr. 24, 1901.)

(No Model.)

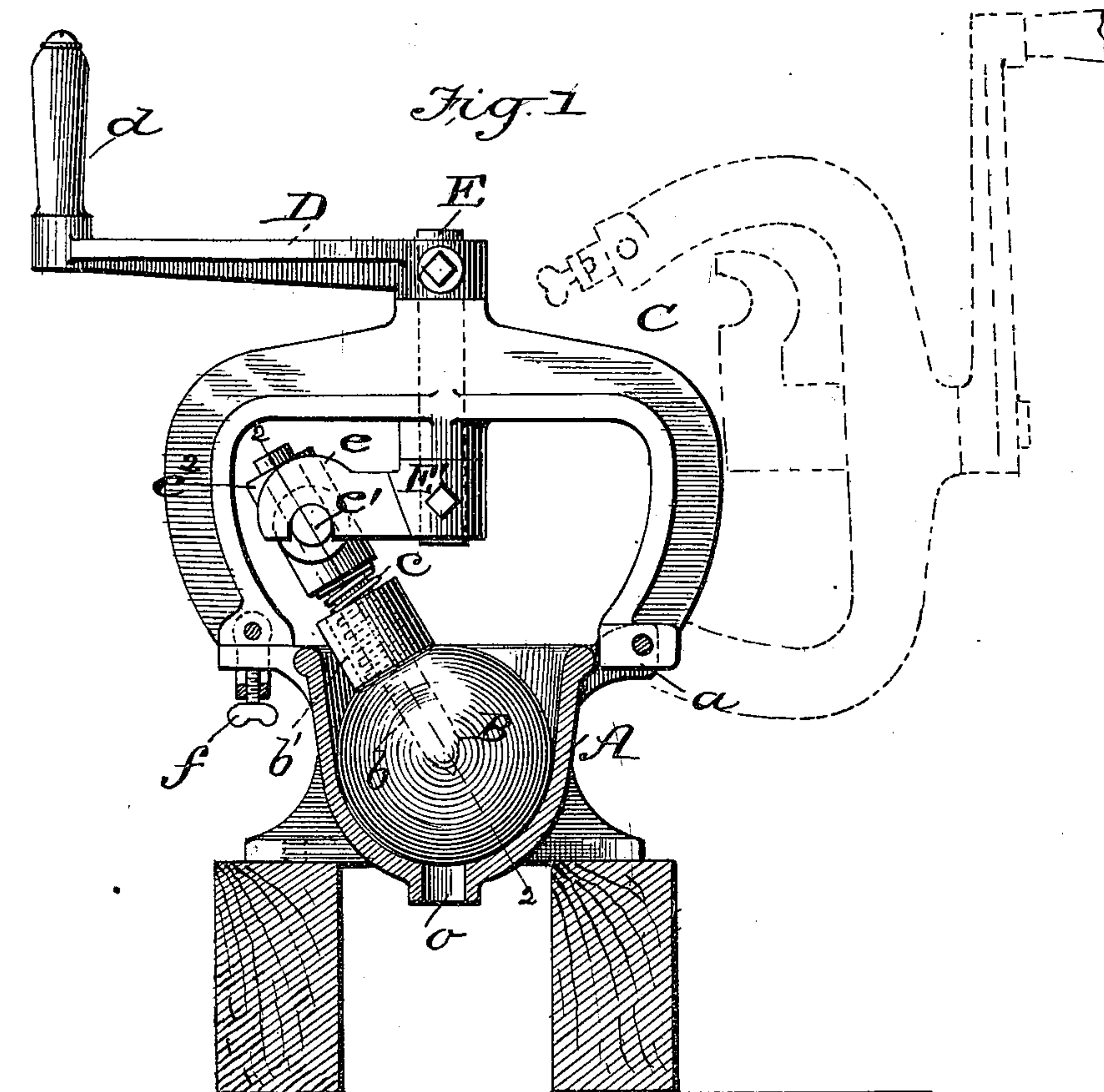
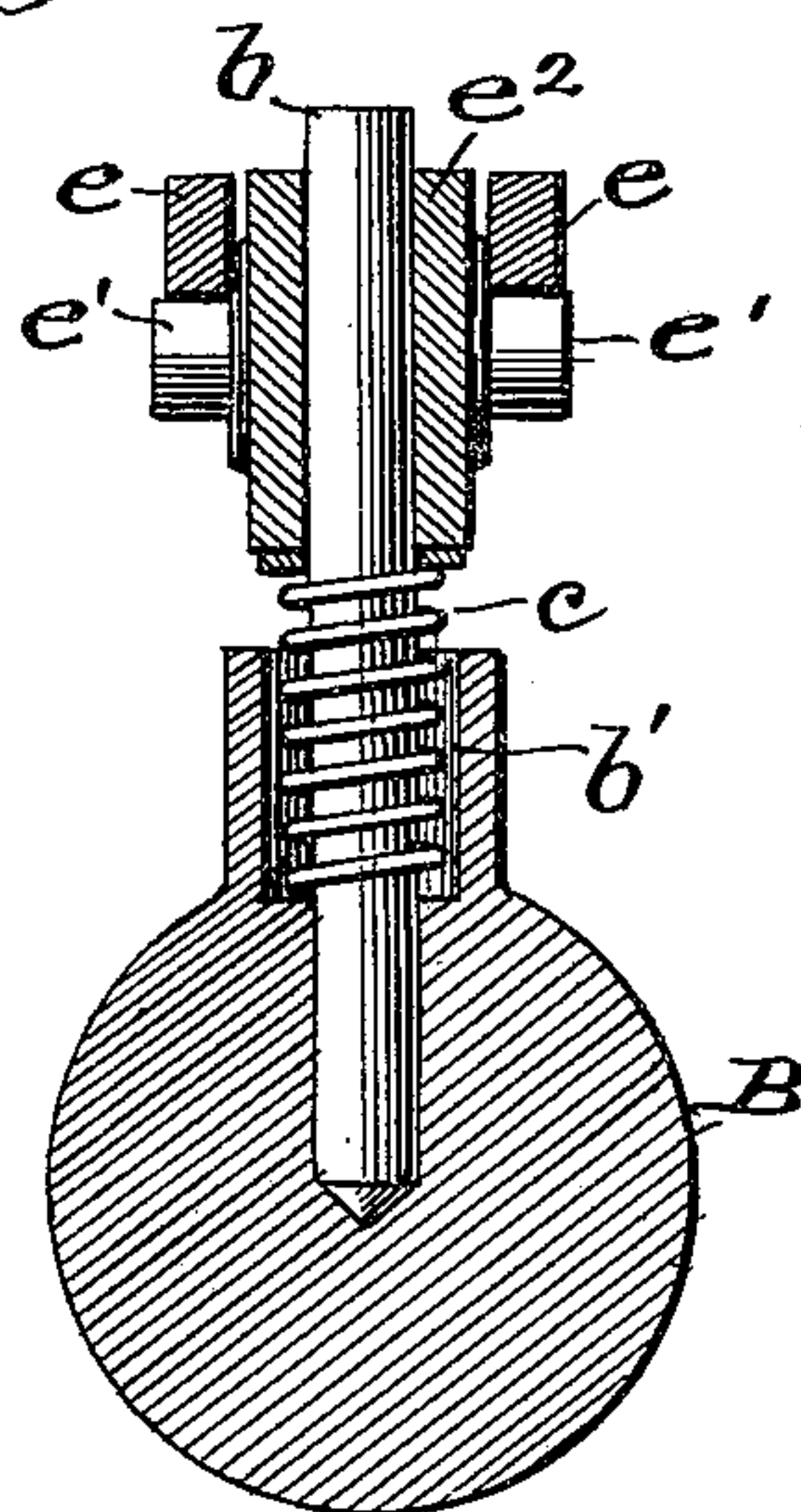


Fig. 2



WITNESSES:

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GYRATORY MULLER.

SPECIFICATION forming part of Letters Patent No. 675,265, dated May 28, 1901.

Application filed July 14, 1900. Renewed April 24, 1901. Serial No. 57,275. (No model.)

To all whom it may concern:

Be it known that I, ALBERT CHAMPLIN CALKINS, of Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Improvement in Gyra-
5 tory Mullers, of which the following is a specification.

My invention is in the nature of an improved pulverizing and grinding device designed chiefly for pulverizing ore samples for the use of assayers, but applicable to other
10 uses. It belongs to that class of devices known as "gyratory" mullers, in which a heavy ball having an obliquely-arranged axis
15 is connected to the horizontal crank-arm of a vertical shaft and is rotated with a gyratory action in a subjacent urn by the rotation of said shaft and a horizontal crank-arm. My invention is designed to provide a simple,
20 practical, and easily operated device of this kind which can be readily opened or disconnected and reconnected to accommodate the conditions of its use by the assayer; and to
25 this end it consists in the peculiar construction and arrangement of parts operating on the general principle set forth, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a side elevation, partly in section; and Fig. 2 is a section on line 2 2.

The device consists of an iron urn or bowl A, having an opening or discharge-outlet *o* in the bottom. Rigidly secured over the top of the urn is a heavy bail-shaped frame C.
35 This frame is hinged to one edge of the urn at *a* and secured at the opposite edge of the urn by a thumb-bolt *f*. This frame is to support in the center vertical line of the urn a shaft E, which has at the top of the hoop an
40 arm D and handle *d* for rotating the shaft, and the shaft has at its lower end where it emerges through the frame a right-angular crank-arm E'. An iron ball B, into which is rigidly secured a piece or shaft *b*, is fitted to
45 the urn, so that the contour of the ball conforms to the shape of the bottom of the urn. The ball-shaft *b* is connected to the end of the crank E' of the rotating shaft in a manner permitting easy and quick detachability,
50 as follows: Said crank has at its end bifurcated hook-shaped grappling ends *e*, which

clutch pins *e'* *e'* on a box *e*², which is loosely fitted to the shaft in the ball. Tight engagement between ball and urn is made by means of a coil-spring *c* around the shaft *b* in the
55 ball, which coil-spring enters a recess in the neck *b'* of the ball and presses against the ball at its bottom end and against the box *e*² on the shaft of the ball at its upper end. The formation of the ball with a neck *b'* extending
60 up and around the shaft and inclosing the helical spring not only makes a seat for the spring, but makes a protecting wall or guard for the same, which prevents particles of ore from fouling and obstructing the action of
65 said spring.

By turning the handle of the machine the ball rotates and gyrates simultaneously. The crushed ore from an ore-crusher or rock-breaker is fed into the urn, and as the ball is
70 rotated and gyrated the ore is ground to powder and is discharged through the hole *o* in the bottom of the urn.

The hinge *a* and thumb-bolt *f* of the bail-shaped frame are to allow clearing of the machine, which may be done by loosening the
75 thumb-bolt and tipping over the bail, as shown in dotted lines, which movement will disconnect the grappling-hooks *e e* of the rotating shaft from the box *e*² on the ball-shaft. 80

I do not claim, broadly, a gyrating ball working in an urn by the rotation of a vertical shaft bearing a crank-arm, as I am aware that these general features have been heretofore employed. The distinguishing features
85 of novelty in my invention are the hinged bail-shaped frame, in combination with the open grappling-hooks of the rotating shaft, by which the parts may be quickly opened and separated, and the special construction
90 and arrangement of the spring-seated ball and its associated parts.

By means of the construction herein shown and described the parts are very readily detached and reattached, allowing rapid cleaning
95 of the machine after finishing one laboratory sample and preparatory to grinding another. The only adjustment necessary is to simply release and turn back the bail, the bifurcated and hook-shaped crank-arm separating from the pins of the box by the act of
100 turning back the bail. My construction also

relies for grinding upon spring tension, which may be adjusted to as great pressure as desired, it being practically impossible in a small machine to get weight enough in the ball to effect the pulverizing of the ore.

In constructing my machine all the wearing-faces may be of hardened steel and may be made in detachable sections to permit replacing when worn.

10 In the operation of the device the ball has a peculiar motion. The gyratory actions or revolutions of the upper end of the ball-shaft is in the direction of the revolution of the vertical shaft; but the ball itself in rolling
15 around the urn has by frictional engagement with its walls a reverse rotation, which causes the ball-shaft to turn freely in its clutch-box.

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

1. In a gyratory muller, the combination with a subjacent urn, and a grinding-ball arranged therein and having a shaft; of a bail-
25 shaped frame hinged upon one side and provided with detachable locking devices on the opposite side, a vertical shaft having a central bearing in said bail-shaped frame and provided with a crank-arm on its lower end
30 having a bifurcated hooked end, and a box having a central bearing for the ball-shaft and opposite pins adapted to be received into the hooked ends of the crank-arm, forming a detachable connection for the ball which is
35 released by the simple turning of the bail-

shaped frame on its hinge substantially as described.

2. In a gyratory muller, the combination of a grinding-ball having a shaft and a recessed neck formed on the ball and extending up and surrounding the shaft, a sliding box on said shaft having clutch devices for connecting it to its actuating-shaft, and a helical spring surrounding the ball-shaft and seated at one end in the recess of its neck
45 portion and at the other end bearing against the box substantially as and for the purpose described.

3. A gyratory muller comprising an urn with a hole in its bottom, a grinding-ball
50 closely fitting the urn and having a recessed neck portion with a shaft in the center of the same, a helical spring surrounding the shaft, and seated at its lower end in the recess of the ball's neck, a sliding box on said shaft
55 having opposite pins, a bail-shaped frame arranged above the urn and bearing a vertical shaft arranged in a bearing in the frame centrally above the urn, said shaft having at its lower end a crank-arm with a bifurcated
60 hook-shaped clutch embracing the pins of the sliding box substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of
65 two subscribing witnesses.

ALBERT C. CALKINS.

Witnesses:

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