(No Model.)

# G. GOLL.

## TRITURATING MACHINE.

No. 386,703. Patented July 24, 1888.

Fig. 1

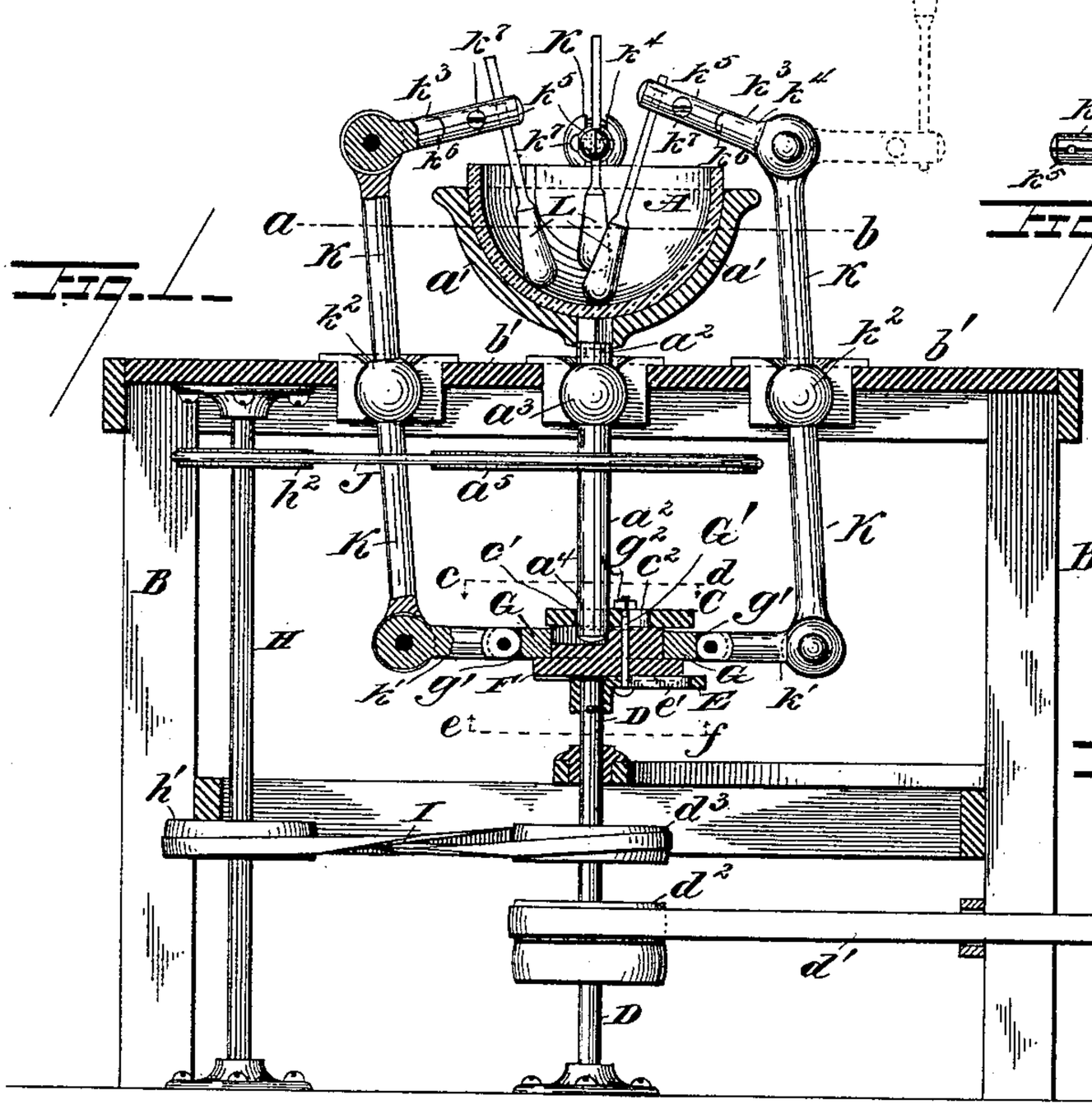



Fig. 5

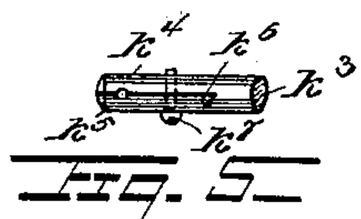



Fig. 6

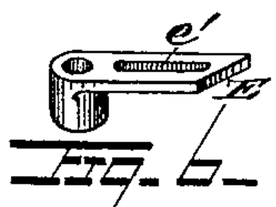



Fig. 2

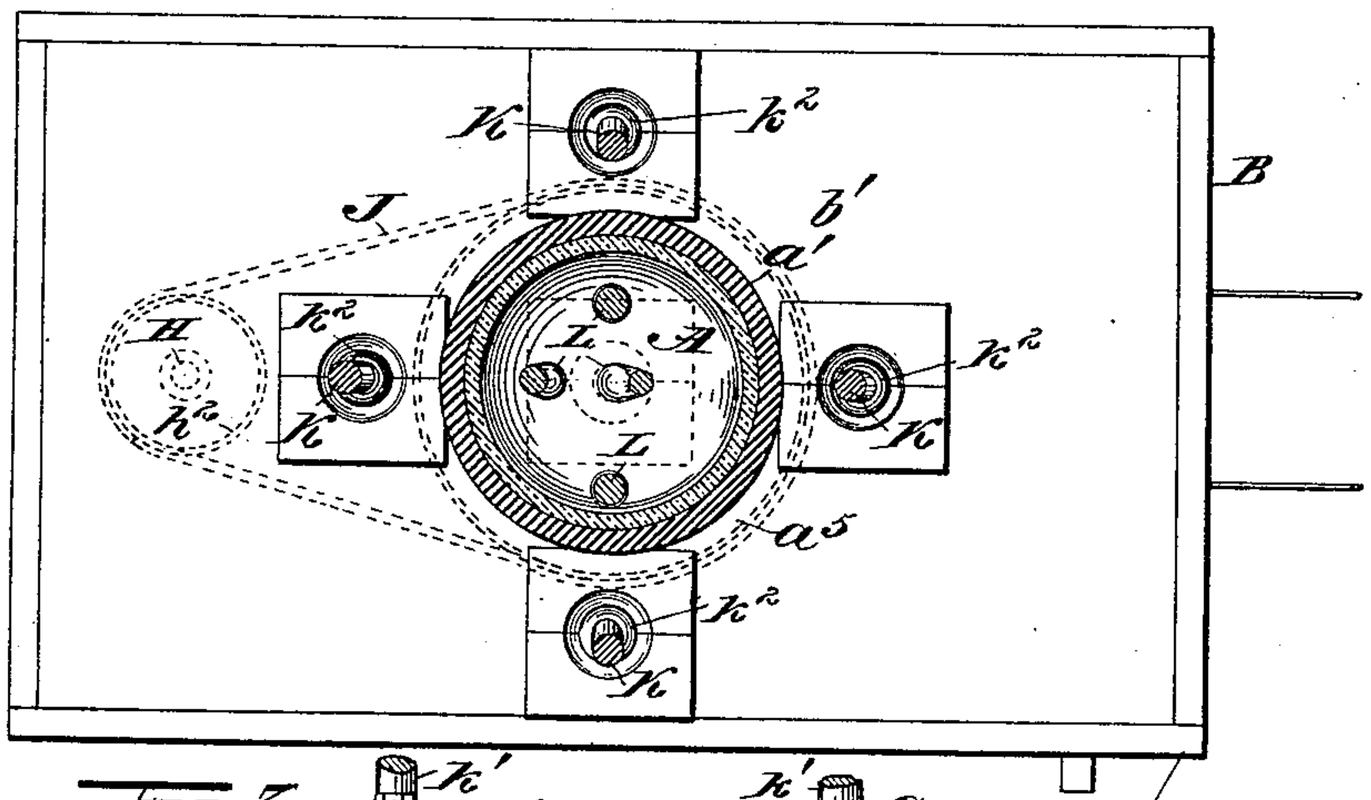



Fig. 3

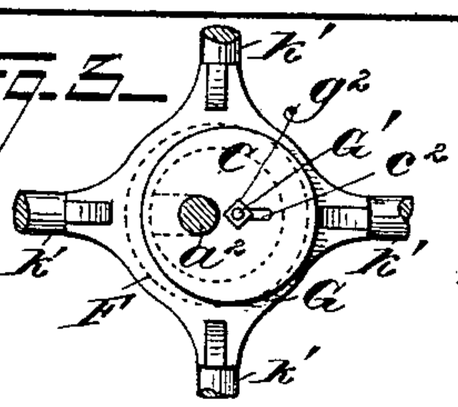
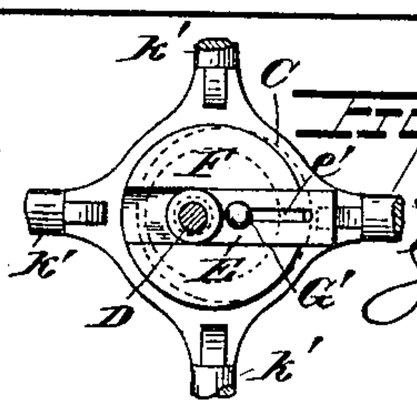



Fig. 4




WITNESSES:

Jno. Tolan.

W. H. Baker Jr.

INVENTOR.

George Goll,

per Joshua Pusey.

Att'y.

# UNITED STATES PATENT OFFICE.

GEORGE GOLL, OF PHILADELPHIA, PENNSYLVANIA.

## TRITURATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 386,703, dated July 24, 1888.

Application filed October 28, 1887. Serial No. 253,589. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE GOLL, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Triturating-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, of which—

Figure 1 is a vertical longitudinal section. Fig. 2 is a full transverse section, as on line *a b*, Fig. 1. Figs. 3 and 4 are sections taken, respectively, on the lines *c d* and *e f*, Fig. 1. Fig. 5 is a detail of the pestle-sustaining arm. Fig. 6 is a view of crank-arm detached.

This invention has reference to certain improvements in that class of triturating-machines wherein a pestle or pestles are reciprocated within a rotating mortar. Such machines are illustrated in Letters Patent Nos. 266,756 and 296,816, granted to F. C. Boericke and myself, and dated October 31, 1882, and April 15, 1884, respectively.

The object of the present improvements is to so construct the machine that the movements of the mortar and pestles may be varied relatively, in order that the path traversed by said pestles within the mortar may be increased or diminished according to the amount of material being triturated or the capacity of the mortar.

The invention consists in the combination, with the mortar, of a cam adjustably secured to a driving-shaft and a pestle or pestles within said mortar, connected with and reciprocated by said cam, whereby, by suitably adjusting the latter, the path traversed by said pestle or pestles within the mortar may be varied as occasion may require.

The invention consists, also, in the combination, with the mortar and the pestles reciprocating therein, of a pivoted shaft or arm sustaining said mortar, and an adjustable rotating cam with which the end of said shaft is connected, whereby, by suitably adjusting said cam, the shaft may be inclined more or less, in order to increase or diminish the range of circular movement of the mortar, and thereby cause all the material in the latter to be positively acted upon by the said pestles, or permit the use of mortars of various capacities.

The invention consists, also, in certain details of construction and operation, which will be hereinafter fully described and be duly claimed.

Referring to the annexed drawings, A represents the usual mortar, which is contained within a bowl or other suitable support, $a'$, detachably secured to a vertical shaft or arm, $a^2$. This shaft is pivoted in the top $b'$ of the table or frame-work B by a ball and socket, $a^3$, whereby said shaft may be freely rotated while inclined at an angle. Its lower extremity, $a^4$, is connected with an adjustable disk or cam, C, as hereinafter explained.

D is a shaft directly in line vertically with the center of the mortar, and is driven from some suitable source of power by a belt, $d'$, passing around a pulley, $d^2$, on said shaft. On the upper end of the latter there is secured a longitudinally-slotted crank-arm, E, upon which rests an eccentric, F, passing loosely through a block, G, which is provided with one or more lateral arms, $g'$, preferably, but not necessarily, four in number. On the top of the eccentric F is a disk, C, having therein a circular hole, $c'$, and an elongated slot, $c^2$. The crank-arm E, eccentric F, and disk C are connected by means of a bolt, G', passing through said eccentric and the slots $e'$ $c^2$ in said crank-arm and disk, respectively, and which bolt is provided with a nut, $g^2$, at its upper end. The lower end of the pivoted arm or shaft $a^2$, which sustains the mortar A, extends into the hole $c'$ in the disk C.

Adjacent to the shaft D is another shaft, H, provided with two pulleys, $h'$ $h^2$, one of which pulleys, $h'$, is geared with a pulley, $d^3$, on said shaft D by a crossed belt, I, and the other pulley, $h^2$, is connected with a large pulley, $a^5$, on the arm $a^2$ by a belt, J.

With the arms $g'$, which extend from the block G, there are pivotally connected, by rods $k'$ or otherwise, the lower ends of vertical arms or levers K, which are pivoted in the top of the table B in the same manner as the arm or shaft $a^2$—that is, by ball-and-socket joints $k^2$. To the upper ends of the arms K there are pivoted arms $k^3$, which extend radially toward the mortar A, and have adjustably secured to their free ends the pestles L. In order that the latter may be readily adjustable vertically, I form the ends of said arms $k^3$ in two parts, $k^4$ $k^5$, and provide the same with interlocking

grooves or dovetails $k^6$ and set-screws $k^7$, whereby by properly turning said screws the pestles will be movable vertically and may be quickly set to and retained at the proper adjustment. The parts $k^4$ $k^5$ are made detachable, so that they may be separated in order to remove any material that might lodge between the same and prevent the pestles being firmly secured in place.

Having thus described the construction of the invention, I shall now explain its operation as follows: Motion is imparted through the belt $d'$ to the shaft D, thereby rotating the crank-arm E and the cam F thereon, which cam gives the block G and the arms or levers K, connected therewith, an eccentric rotary motion, which motion is consequently imparted to the pestles L within the mortar. The paths traversed by these pestles intersect each other, and thus thoroughly triturate the material. In order to vary the throw of said pestles within the mortar, as occasion may require, according to the amount of material being triturated, it is merely necessary to adjust the cam F on the crank-arm E. By unscrewing the nut $g^2$ on the bolt G' said cam may be readily set to the proper adjustment and be secured at the same by tightening said nut.

The pestles L, being vertically adjustable, as above described, may also be readily set so as to traverse different points within the mortar, as seen more clearly in Fig. 1, and as the arms $k^3$, to which said pestles are secured, are pivoted, any or all of said pestles may be readily thrown out of the mortar, if desired, as shown in dotted lines in Fig. 1.

The shaft H, which is rotated in a direction contrary to that of the shaft D by means of the crossed belt I, imparts its motion, through the belt J, to the arm $a^2$, thereby rotating the mortar sustained by said arm in a direction opposite to the motion of the pestles. Thus there is obtained a more efficient grinding action than if the mortar and pestles were rotated in the same direction.

In order that the rotating mortar may be given an independent circular movement and that the range thereof may be increased or diminished at pleasure, so as to still more effectually triturate the material therein, and also, if necessary, permit the use of a comparatively large mortar, it is merely necessary to move the cam or disk C laterally, which may be done by loosening the nut $g^2$ on the bolt G', and when the disk is properly adjusted tightening said nut. It will be seen that when the disk or cam is moved laterally the pivoted shaft or arm $a^2$ will be inclined, and of course an independent rotary motion will be imparted to the mortar.

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

1. In a triturating-machine, the combination of the frame, the mortar supported thereby, the shaft, as D, the cam adjustably connected therewith, the collar or block G, through which said cam passes, and the pestle-supporting arm or arms pivotally connected with said collar or block, together with means—such as the crank-arm, bolt, and nut—for adjustably connecting said cam with shaft D, substantially as described.

2. In a triturating-machine, the combination of the supporting-frame, the mortar, the shaft D, the slotted crank-arm thereon, the cam on said crank-arm, the collar or block through which said cam passes, the arms $k'$, pivoted to said block or collar, the pivoted arms or levers K, the arms $k^3$, pivoted to the latter, and the pestles secured in said arms $k^3$, together with the bolt passing through said cam and crank-arm, and the nut, substantially as described.

3. The combination, in a triturating-machine, of the frame or table, the shaft $a^2$, pivoted therein, the mortar supported by said shaft, the shaft D, the crank-arm thereon, the cam on said crank-arm, the collar or block G, in which said cam works, the pestle-supporting arm or arms pivotally connected with said collar or block, the laterally-adjustable disk C, which forms a step for the lower end of the shaft $a^2$, and means—such as the bolt G' and nut $g^2$—for laterally adjusting said disk, substantially as described.

4. The combination, in a triturating-machine, of the frame or table, the mortar, the shaft supporting said mortar, provided with the pulley $a^5$, the shaft D, its pulley $d^3$, the crank-arm, the cam secured thereon, the block or collar G, the pestle-supporting arms pivotally connected with said collar, the shaft H, its pulleys $h^8$ $h^2$, and the belts I and J, connecting said pulleys $d^3$ and $h'$ and $h^2$ and $a^5$, respectively, substantially as described.

5. In a triturating-machine, the combination of the frame or table, the mortar, the shaft $a^2$, pivoted in said frame or table and supporting said mortar, said shaft provided with the pulley $a^5$, the shaft D, its pulley $d^3$, the crank-arm on said shaft D, the cam on said crank-arm, the collar or block G, in which said cam works, the pestle-supporting arm or arms pivotally connected with said collar or block, the laterally-adjustable disk C, which forms a step for the lower end of the shaft $a^2$, means—such as the bolt G' and nut $g^2$—for laterally adjusting said disk, the shaft H, its pulleys $h^8$ $h^2$, and the belts I and J, connecting said pulleys $d^3$ and $h'$ and $h^2$ and $a^5$, respectively, substantially as described.

6. In a triturating-machine, the combination of the supporting-frame, the mortar, the pestles, the pivoted pestle-supporting arms, and the mechanism for actuating the same, the free ends of said arms being formed in two parts and provided with interlocking grooves or dovetails, substantially as described.

In testimony whereof I have hereunto affixed my signature this 22d day of October, A. D. 1887.

GEORGE GOLL.

Witnesses:
JNO. NOLAN,
GEO. W. REED.