

No. 814,832.

PATENTED MAR. 13, 1906.

G. COMMICHAU.
CRUSHING MILL.

APPLICATION FILED JUNE 17, 1905.

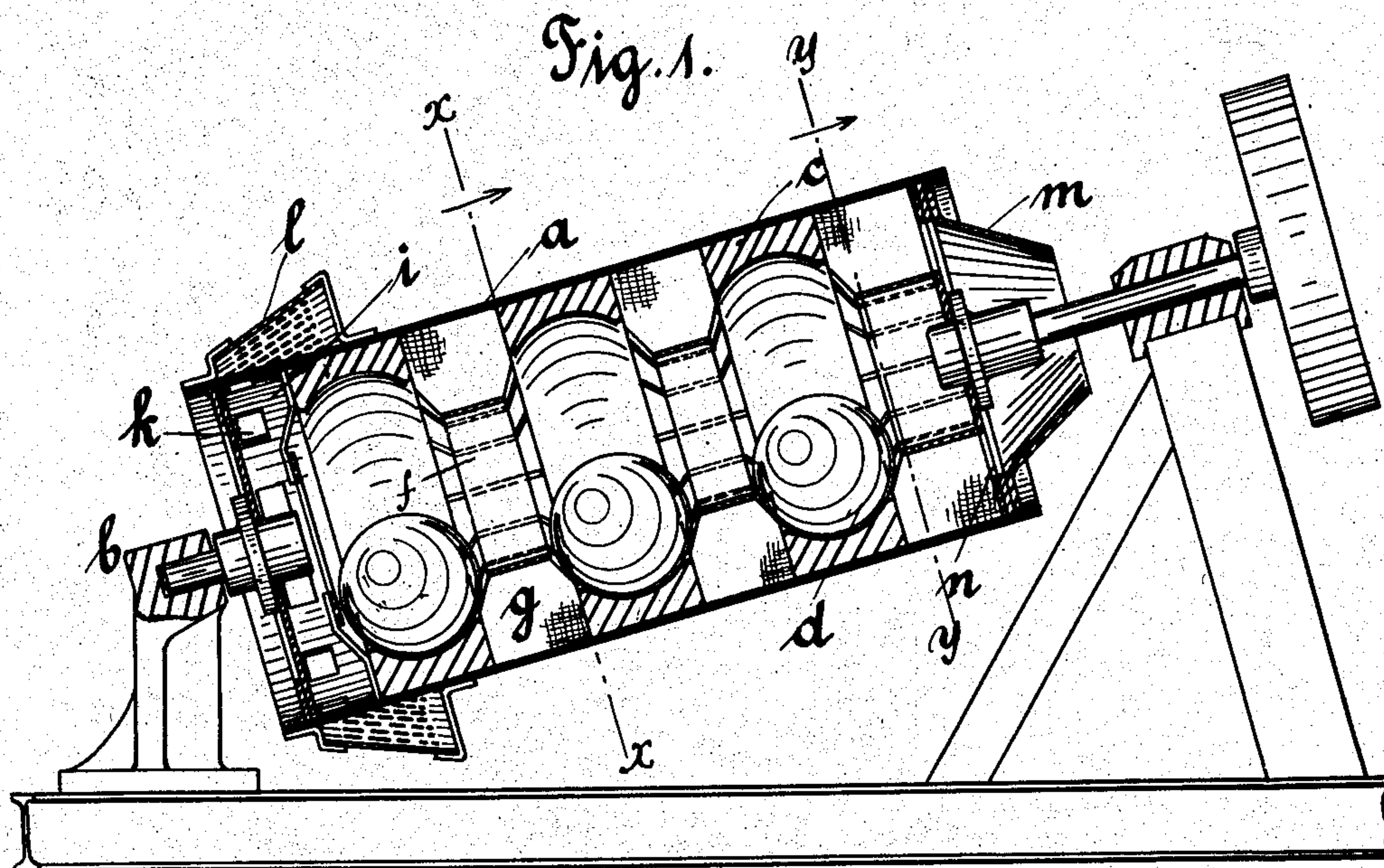


Fig. 2.

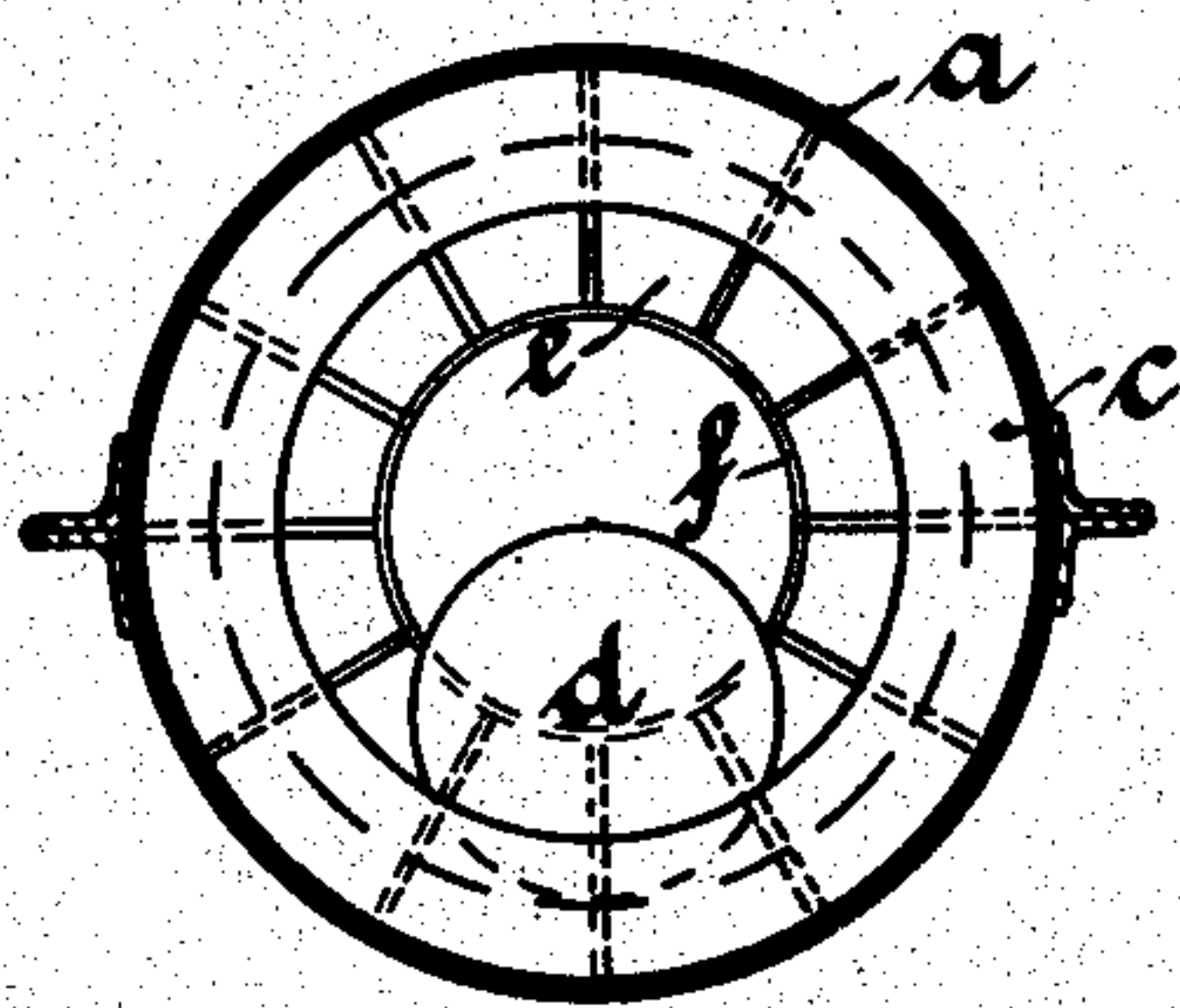
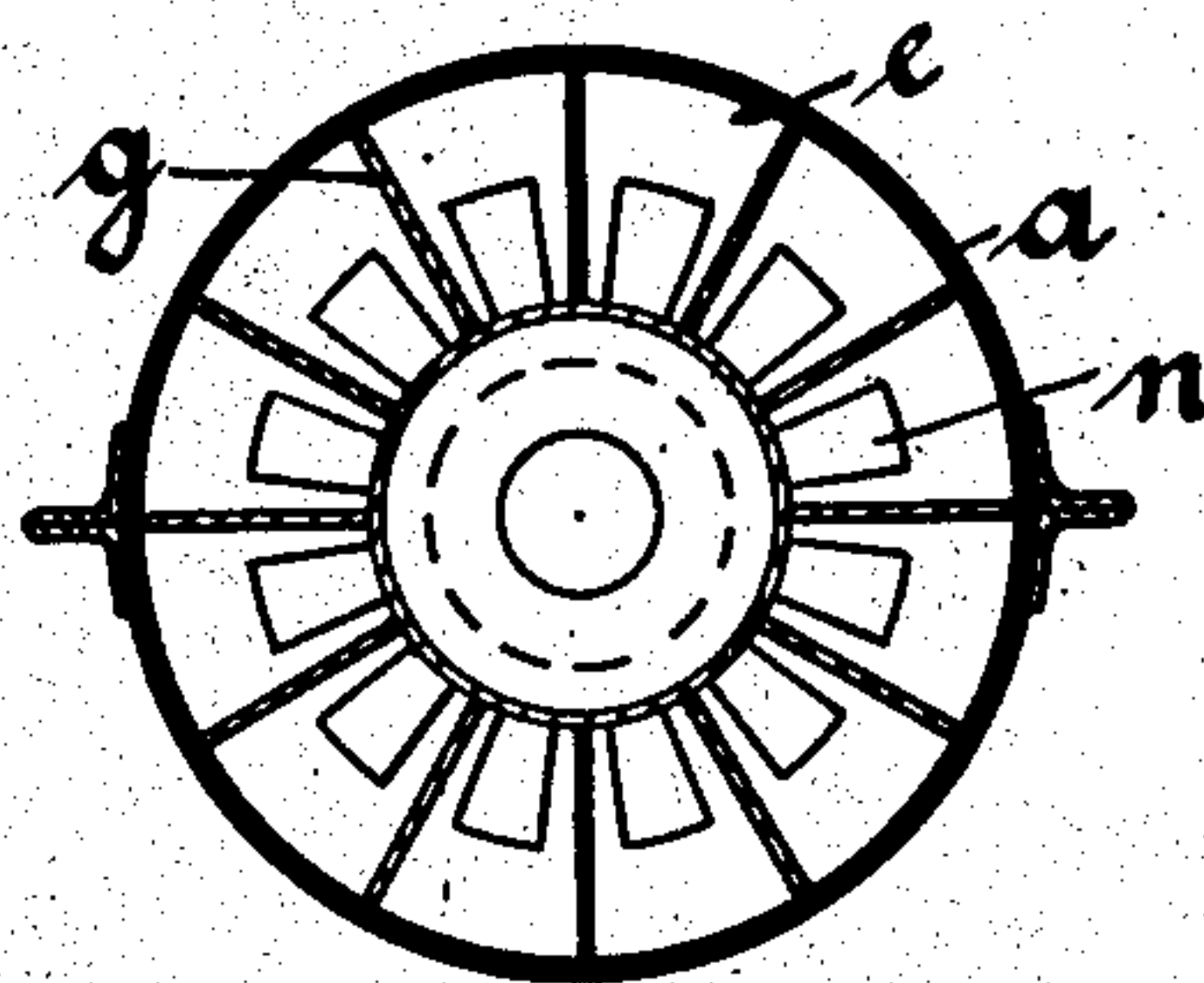


Fig. 3.



Witnesses:
M. Peters.
Alfred Böhning.

Inventor:
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by Erich Peters, his atty.

UNITED STATES PATENT OFFICE.

GOTTHARD COMMICHAU, OF MAGDEBURG, GERMANY.

CRUSHING-MILL.

No. 814,832.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed June 17, 1905. Serial No. 285,851.

To all whom it may concern:

Be it known that I, GOTTHARD COMMICHAU, manufacturer, a subject of the King of Prussia, German Emperor, residing at 56 Braunschweigerstrasse, Magdeburg, Germany, have invented a new and useful Improvement in Crushing-Mills, of which the following is a specification.

The crushing-mills which work through concussion, as disintegrators, &c., have the disadvantage that they are subject to great wear and cause much noise. The crushing cylinders and mills, however, which work more quietly are subject to a one-sided wear and tear and seldom furnish enough finely-ground matter. Besides, they all cause much dust and to be able to produce a fixed amount are bound to be of a fixed size.

The crushing device according to the present invention is to do away with the above-mentioned disadvantages and in addition achieves a considerable saving of power in operation.

The device consists of a number of ring-like grinding-troughs, which are separated by peculiarly-working transporting devices and of which each holds a single crushing-ball. The grist is conducted into these troughs in such a way that the ball touches it where the weight of the ball is the greatest—i. e., only by its lower part. By this means the rubbing together of particles of the grist, which in the rule by necessity lies in high piles, is avoided, as well as the resistance offered to the ball by the particles of grist surrounding it. The balls of the present invention work continuously on a small quantity of grist introduced uninterruptedly and achieve, therefore, an increased effectiveness.

In the drawings the crushing device according to the invention is shown in Figure 1 in vertical section. Fig. 2 shows a transverse section on line *x x* through a part of the transporting device for the grist; Fig. 3, a transverse section on line *y y* through the upper cells.

The machine is in general similar to the well-known form of ball-mills with diagonally-lying cylinder, in which the grist during the crushing is gradually conducted from the higher-situated point of entrance to the lower point of exit.

The cylinder *a* is set into revolution by means of its diagonally-lying axis *b*. In the interior of the cylinder several ring-like troughs *c* for the balls are attached, in each of

which a single ball *d* of considerable weight rolls. As during the revolution of the cylinder, the balls always seek to remain at the lowest point of their troughs. They are set to rolling, which prevents a one-sided wearing off of the balls and keeps the same always round. Between every two of the trough-shaped grooves for the balls and above the first of these is arranged a transporting device for the grist, which is at the same time a charging device for the ball-trough lying below.

The transporting device consists of cells *e*, Fig. 2, standing radially, which are contiguous to the casing, have an inner casing *f*, and are open on both sides toward the upper and lower troughs for the balls.

As the grinding-troughs *c* form the side boundaries of the cells, the grist which has been crushed by one of the balls is pushed in part over the edge of the trough into the cells situated below, while that grist which remains lightly clinging to the trough as the same arises behind the ball, falling backward, drops down also into the open cells below, owing to the diagonal position of the cylinder. By this means the great disadvantage is removed that the fine grist falls back into the coarse grist of the same trough, and thereby reduces the effect of the weight of the ball on the coarse grist. In the lower part of the cylinder a collecting-place *i* as well as openings of discharge *k* are provided. The collecting-place is surrounded by a conical screen. On the more highly lying front wall of the cylinder a hopper *m* is provided, out of which the grist slips through openings *n* into the highest cells. Through the revolution of the cylinder the rising cells get over the groove lying downward; but each cell can only empty itself in coming nearly above the ball. The grist is in this way strewn in front of the ball, is crushed by the same, and shoves itself sidewise into the open cells lying below in the next carrying device. This process is repeated as often as there are grinding-troughs in the cylinder, after which the grist falls from the last trough into the collecting-place *i*, from here through the openings *k* outside on the conical screen *l*, from where it can be taken away for further treatment. Besides the advantages gained through its methods of operation, the most important advantage is still to be mentioned—viz., that the various models always necessary for the various kinds of work to be done are done

away with, as an increase or decrease of the number of grinding-grooves brings about a higher or lower degree of fineness of the product, by which a considerable saving in power is effected.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a crushing-mill the combination of an inclined cylinder, a series of inside trough-shaped rings in the interior of same, broad cells formed by radially-directed walls between the said rings, short inner cylinders concentric to the outer cylinder, joining the rear edges of the walls of the cells and forming openings in the same backward and forward, balls with respect to the breadth of the rings of a larger diameter, one running in each ring, all as described and for the purpose set forth.

2. In a crushing-mill the combination of an inclined cylinder, a series of inside trough-

shaped rings in the interior of same, broad cells formed by radially-directed walls between the said rings, short inner cylinders concentric to the outer cylinder, joining the rear edges of the walls of the cells and forming openings in the same backward and forward, balls of a diameter larger with respect to the breadth of said rings, one running in each ring, a hopper on the upper front wall having inlets, outlets round the lower end of the cylinder, a conical screen concentric with respect to the cylinder and flaring from its lower to its higher end, substantially as described and shown.

In witness whereof I have hereunto set my hand in presence of two witnesses.

GOTTHARD COMMICHAU.

Witnesses:

ERICH PETERS,
MARIE SCHNEIDER.