No. 650,097. Patented May 22, 1900.

M. J. E. ROTTER.

CRUSHING MILL.

(Application filed June 19, 1899.)

(No Model.) 2 Sheets—Sheet 1.

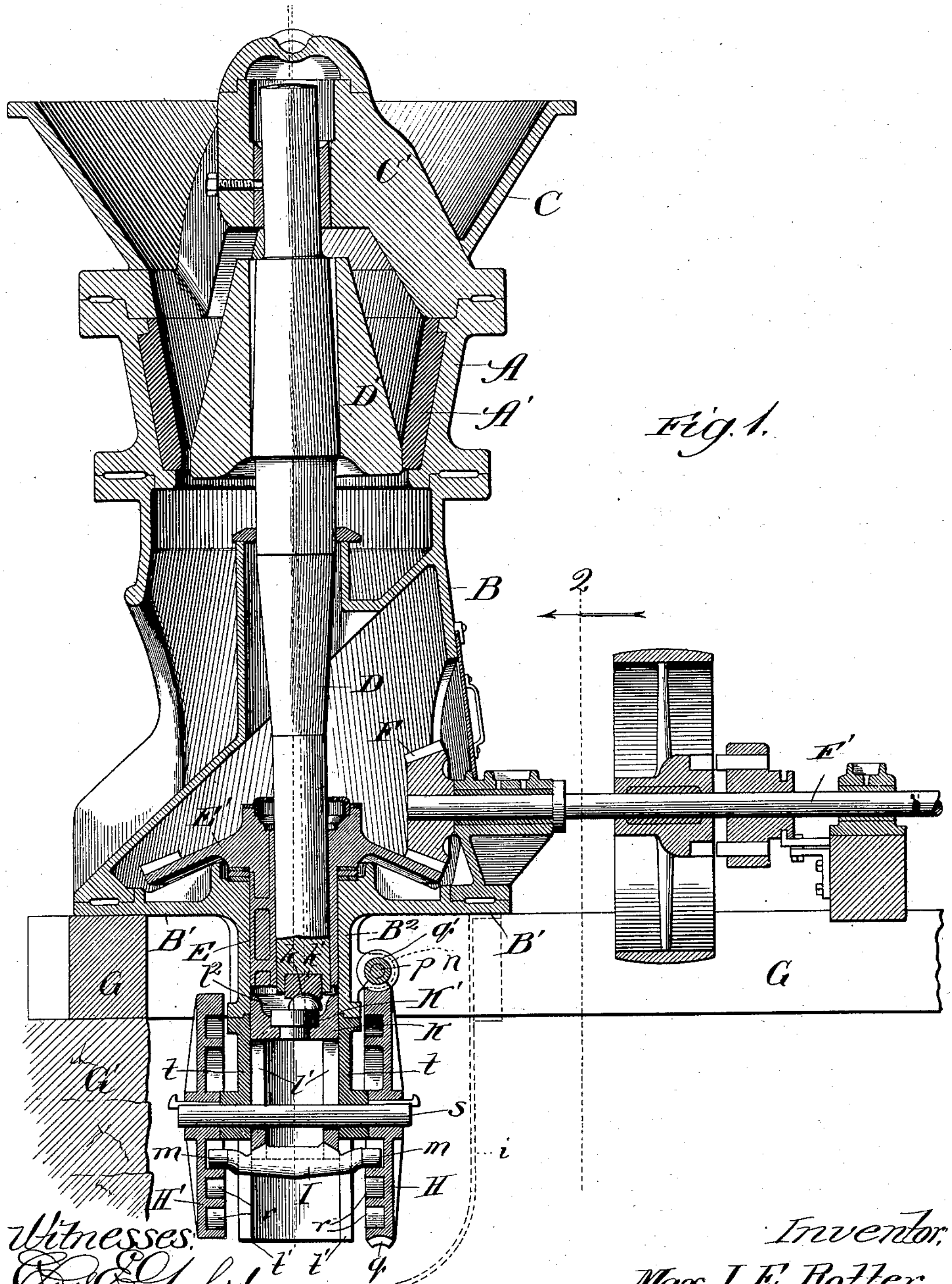


Fig. 1.

Witnesses.
Chas. E. Gaylord,
Lute S. Alter

Inventor.
Max J. E. Rotter,
By Dyrenforth & Dyrenforth,
Att'ys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 650,097. Patented May 22, 1900.

M. J. E. ROTTER.

CRUSHING MILL.

(Application filed June 19, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

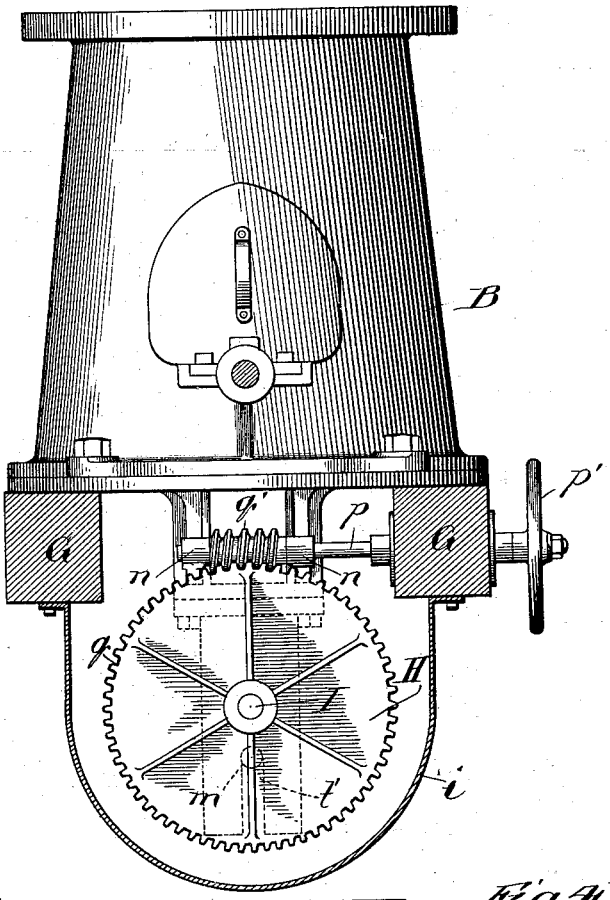


Fig. 3.

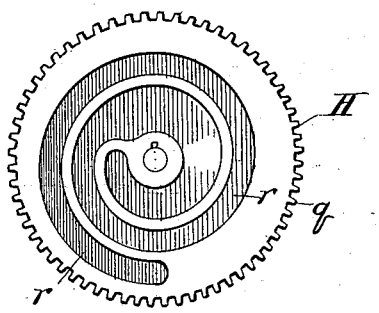
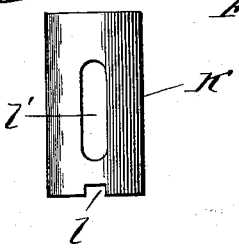


Fig. 4.



Witnesses:
Chas. E. Gaylord,
Luto D. Potter

Inventor.
Max J. E. Rotter,
By Dyrenforth & Dyrenforth,
Attys.

UNITED STATES PATENT OFFICE.

MAX J. E. ROTTER, OF CHICAGO, ILLINOIS.

CRUSHING-MILL.

SPECIFICATION forming part of Letters Patent No. 650,097, dated May 22, 1900.

Application filed June 19, 1899. Serial No. 721,137. (No model.)

To all whom it may concern:

Be it known that I, MAX J. E. ROTTER, a subject of the Queen of Great Britain, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Crushing-Mills, of which the following is a specification.

My invention relates more especially to improvements in the mechanism for adjusting the crusher-head of a crushing-mill with relation to the crusher-liners; and my object is to provide improved mechanism for this purpose of a particularly simple, durable, and compact construction and readily operative to vary as desired the pulverization of the ore.

In the drawings, Figure 1 is a broken vertical section of a crushing-mill employing a gyratory crusher-head and showing my improved adjusting mechanism at the lower end of a gyratory supporting bar or spindle which carries the crusher-head; Fig. 2, a section taken on line 2 in Fig. 1 and viewed in the direction of the arrow; Fig. 3, an inner face view of one of a pair of spiral cam-wheels, and Fig. 4 an end view of a slide-block.

The crushing-mill illustrated, excepting only those parts at the lower end, which form my improvements, is of well-known construction, involving a crushing-chamber A, having a removable liner A′ and supported upon a frame B. Surmounting the crushing-chamber are a feed-hopper C and tripodal bridge C′, forming a loose bearing for the upper end of a bar or spindle D, which supports the crusher-head D′.

E is a sleeve integral with a beveled gear-wheel E′ and rotating in a bearing B^2 in a bed-plate B′ at the lower end of the frame B. The center of rotation of the sleeve E is in vertical line with the center of the crushing-chamber A, and the spindle D along its lower end portion passes loosely through an eccentric opening in the sleeve, whereby in the rotation of the latter, effected through the beveled pinion F and drive-shaft F′, the spindle and crusher-head are given a gyratory motion. The mill is mounted upon beams G, which rest on a suitable foundation G′.

Suspended from the part B^2 of the bed-plate B′ is a cylindrical casting *t*, having bearings for a rotary cross-shaft *s*.

H H′ are wheels keyed or otherwise rigidly secured upon opposite ends of the shaft *s* beyond the casting *t* and provided on their inner faces with coincident spiral cams or cam-grooves *r*. The wheel H is provided, circumferentially, with worm-teeth *q*, which mesh with a worm *q*′ on a shaft *p*. The shaft *p* is journaled in brackets *n* and passes through a bearing in one of the beams G, beyond which it is provided with a hand-wheel *p*′.

I is a bridge-piece or yoke provided at opposite ends with antifriction-rollers *m*, extending, respectively, into the cam-grooves *r* of the wheels H H′. The casting *t* forms a guide or way for a cylindrical vertically-sliding block K, provided at its lower end at opposite sides with notches *l*, which fit over the upper surface of the yoke I. In opposite sides of the block, which is hollow, are vertically-elongated openings *l*′, through which the shaft *s* passes, and on the upper end of the block is a hardened disk K′, upon which slides, eccentrically, a hardened button *k*. Set into the lower end of the spindle D is a hardened bearing block or toe *k*′, recessed on its under side to fit over the button *k*. The yoke I may extend through vertical slots *t*′ in the casting *t* and be guided thereby. The top of the block K is shaped like an oil-cup l^2, so that the button will slide in a bath of oil. If desired, a housing or casing *i* may be provided for the mechanism, as indicated in Fig. 2. The yoke I and sliding block K form the support for the spindle D, and in the gyration of the latter the button *k* slides on the disk K′. The wheels H H′ and their connection-shaft form a cam device (actuated by turning the wheel *p*′) upon which the yoke I rests at its rollers *m*. Turning of the wheels and shaft causes the coincident cams *r* to raise or lower the yoke equally at its opposite ends to move the block K and spindle D, with the crusher-head D′, up or down. Thus owing to the oppositely-flaring shapes of the crusher-head and crusher-chamber the product of the mill may be graded by turning the hand-wheel *p*′. This construction of raising and lowering mechanism for the crusher-head is par-

ticularly simple, durable, and easy to operate. The mechanism occupies but little space below the structure, which in itself is an advantage, because it limits the amount of excavation necessary when the mill is set up.

While I prefer to construct my improvements throughout as shown and described, they may be variously modified in the matter of details of construction without departing from the spirit of my invention as defined by the claims.

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

1. In a crushing-mill, the combination with the crusher-head and its movable support, of raising and lowering mechanism for the said head, comprising wheels provided on their inner faces with coincident spiral cams upon which the support rests, and means for turning said wheels simultaneously, substantially as described.

2. In a crushing-mill, the combination with the crusher-head and its supporting-spindle, of raising and lowering mechanism for the said head, comprising a vertically-sliding block upon which the spindle is gyratively mounted at its lower end, a yoke supporting said block, a shaft, wheels rigidly connected to said shaft provided on their adjacent faces with spiral cams engaging the opposite end portions of said yoke, and worm and worm-wheel rotating means for said shaft, substantially as and for the purpose set forth.

3. In a crushing-mill, the combination with the crusher-head and its supporting-spindle, of raising and lowering mechanism for the said head, comprising a vertically-sliding block upon which the spindle is gyratively mounted at its lower end, a yoke supporting said block, a shaft, wheels rigid upon said shaft provided with coincident spiral cams engaging said yoke, worm-teeth on one of said wheels, a worm engaging the worm-teeth, and an operating-handle for the worm, all constructed and arranged to operate substantially as and for the purpose set forth.

MAX J. E. ROTTER.

In presence of—
EDW. S. BATEMAN,
R. T. SPENCER.