

(No Model.)

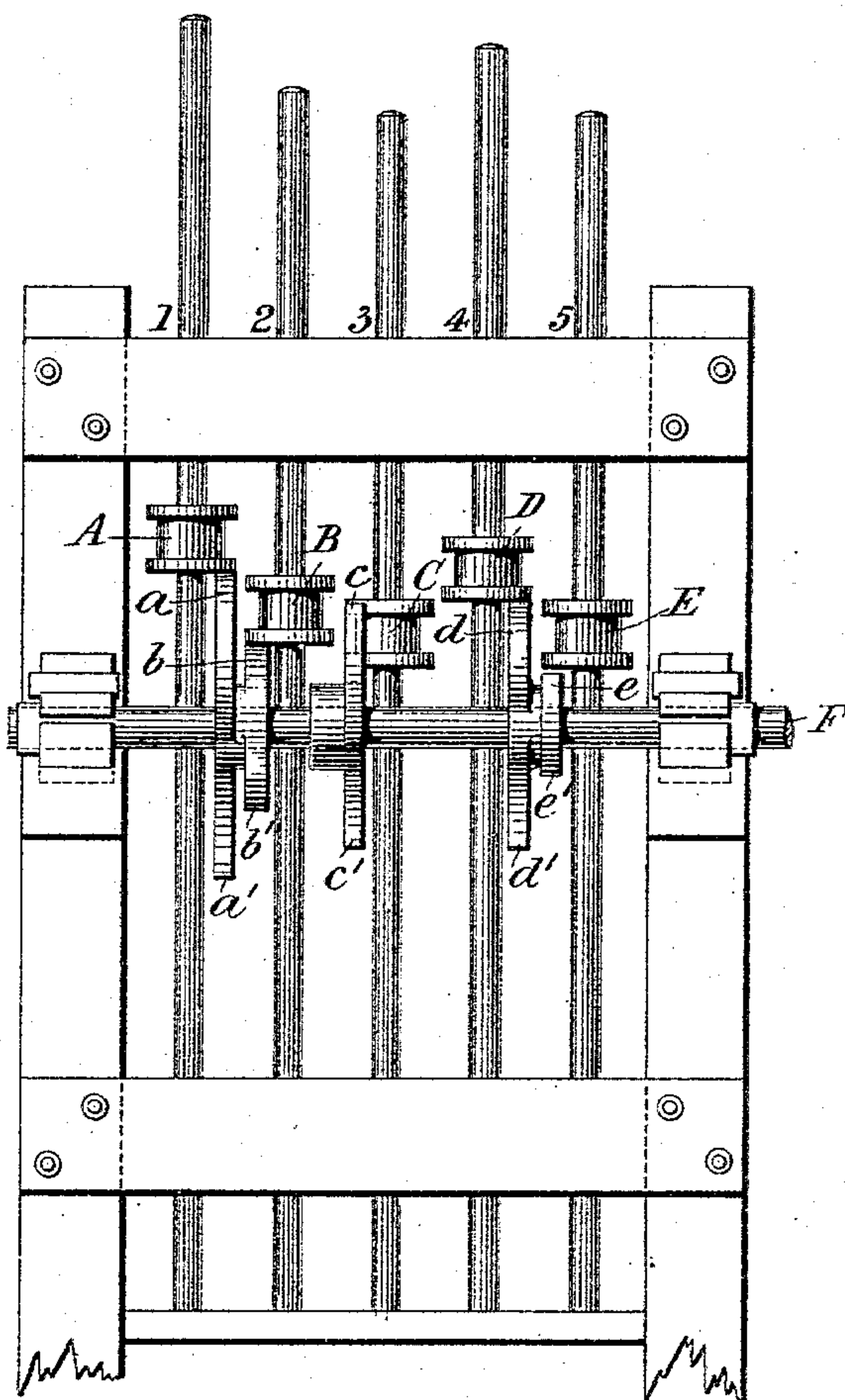
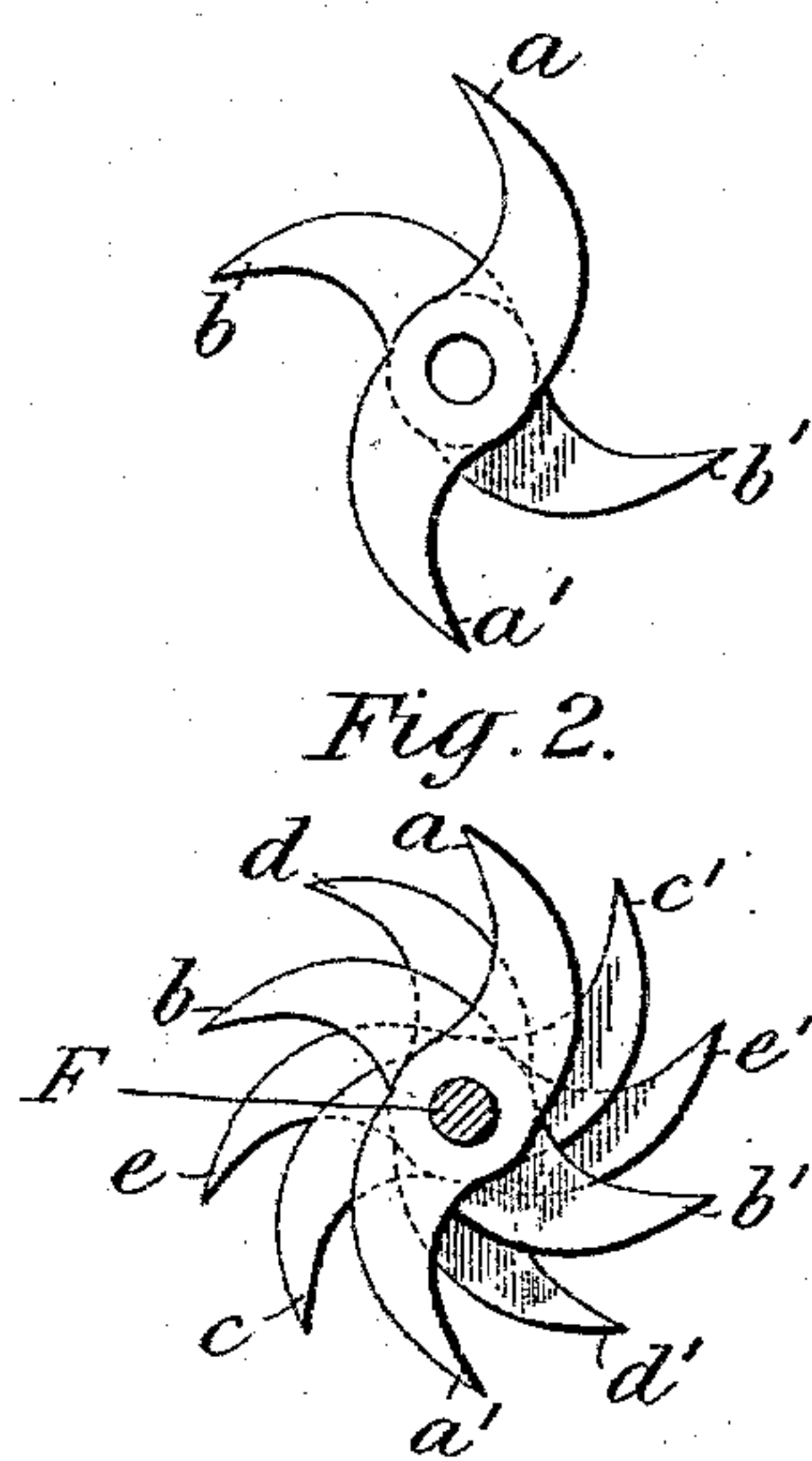
C. RALEIGH.
STAMP BATTERY.

No. 551,449.

Patented Dec. 17, 1895.

Fig. 1.

Fig. 3.



Witnesses:

F. J. Rapson.

P. Varnall.

Inventor:

Charles Raleigh

UNITED STATES PATENT OFFICE.

CHARLES RALEIGH, OF JOHANNESBURG, SOUTH AFRICAN REPUBLIC.

STAMP-BATTERY.

SPECIFICATION forming part of Letters Patent No. 551,449, dated December 17, 1895.

Application filed June 25, 1892. Serial No. 438,052. (No model.) Patented in England February 19, 1892, No. 3,289; in India April 5, 1892, No. 88; in Victoria April 6, 1892, No. 9,558; in New South Wales April 8, 1892, No. 3,693; in Queensland April 12, 1892, No. 2,048; in New Zealand April 22, 1892, No. 5,522, and in Canada July 27, 1892, No. 39,471.

To all whom it may concern:

Be it known that I, CHARLES RALEIGH, a subject of the Queen of Great Britain and Ireland, residing at Johannesburg, in the South African Republic, have invented new and useful Improvements in or Applicable to Stamp-Batteries, (in respect whereof I have obtained Letters Patent in Great Britain, No. 3,289, dated February 19, 1892; in India, No. 88, dated April 5, 1892; in Victoria, No. 9,558, dated April 6, 1892; in New South Wales, No. 3,693, dated April 8, 1892; in Queensland, No. 2,048, dated April 12, 1892; in New Zealand, No. 5,522, dated April 22, 1892, and in Canada, No. 39,471, dated July 27, 1892,) of which the following is a specification.

This invention relates to stamp-batteries for crushing gold ores and other substances; and it consists in certain improvements in the apparatus for working the stamps.

In the accompanying drawings, Figure 1 is a front elevation of the upper part of a stamp-battery constructed according to my invention. Fig. 2 is a side elevation of the cam-shaft and cams, Fig. 3 being a side elevation of one of the cams.

Stamp-batteries or crushing-mills usually comprise a mortar-box containing a number of stamps (frequently five) which are lifted, rotated and dropped by an equal number of cams, either single or double armed, keyed on a revolving cam-shaft, the stamps all rotating in the same direction. The ore or substance to be crushed is fed in at the back of the stamps, and, in the process of being crushed, travels from the back to the front of the mortar-box. On account of the stamps all rotating in the same direction, the ore or other substance is driven toward one end of the mortar-box, its passage from the inlet to the outlet being thereby impeded. Owing to the same cause, the journals in which the stems work become worn unequally, and the end-thrust on the cam-shaft is in one direction only, instead of being alternately in each direction or counteracted.

In order to insure the ore or other substance remaining properly distributed in the mortar-box during the process of crushing, I make each stamp rotate in a direction op-

posite to that of one or both of the adjacent stamps in the same row.

Two separate double-armed cams may be placed between each outer pair of stamps, or a compound cam (consisting of two double-armed cams cast together side by side in one piece) which, when mounted between each outer pair of stamps, will cause those stamps to revolve in opposite directions, may be used; or compound and single cams may be employed.

The stems 1, 2, 3, 4 and 5 pertaining to the five stamps are each provided with one of the tappets A, B, C, D and E. The tappets A, B, D and E are each acted upon by compound cams having four arms, the tappet C being acted upon by a compound cam having two arms.

The action of the parts at each revolution of the cam-shaft F is as follows: The arm *a* of the compound cam *a b a' b'*, having imparted a rotary motion from right to left to the tappet A and raised it into the highest position, slides off that tappet and drops the first stamp. The arm *d* of the cam *d e d' e'*, having acted in like manner on the tappet D, then releases the fourth stamp. The arm *b* of the first-named cam, having turned the tappet B from left to right, then drops the second stamp. The arm *e* of the cam *d e d' e'*, having acted in the same way on the tappet E, drops the fifth stamp, whereupon the arm *c* of the cam *c c'* drops the third stamp. The arm *a'* then drops the first stamp and the arm *d'* the fourth stamp, both stamps turning from right to left. The arm *b'* then drops the second stamp and the arm *e'* the fifth stamp, both stamps turning from left to right, whereupon the arm *c'* drops the third stamp. Thus the order of fall is 1 4 2 5 3, and each stamp is dropped twice at every revolution of the cam-shaft F.

It will thus be seen that the direction of rotation of the first and fourth stamps is constantly from right to left, whereas that of the second and fifth stamps is constantly from left to right. The third stamp also turns from left to right; but a cam for acting on the right-hand side of the tappet C, which would consequently turn the third stamp from right

to left, may be substituted for the cam $c c'$, or two single cams acting alternately on opposite sides of the tappet C, which would consequently turn the third stamp first in one direction and then in the other, may, if preferred, be employed.

The cams and the arms of the cams may, however, be set to turn the tappet A from right to left, the tappet B from left to right, the tappet D from right to left, the tappet E from left to right, during one half-revolution, the tappets A and D being turned from left to right and the tappets B and E from right to left during the other half-revolution, the tappet C being turned in either or both directions.

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

1. In a stamp-battery or crushing mill, the combination, with two stamp-stems and tappets mounted thereon, of a double cam between the two stems for engaging with the tappets so as to lift, turn from right to left and drop one of the stems, and lift, turn from left to right and drop the other stem, whereby an even distribution in the mortar-box of the ore or substance to be crushed is maintained, substantially as herein set forth.

2. In a stamp-battery or crushing mill, the combination, with a series of stamp-stems 1, 2, 3, 4, 5 provided with tappets A, B, C, D, E, of a cam $a a' b b'$ between the stems 1 and 2 for engaging with the tappets A and B so as

to lift, turn from right to left and drop the stem 1 and lift, turn from left to right and drop the stem 2, a cam $c c'$ for engaging with the tappet C so as to lift, turn and drop the stem 3, and a cam $d d' e e'$ between the stems 4 and 5 for engaging with the tappets D and E so as to lift, turn from right to left and drop the stem 4 and lift, turn from left to right and drop the stem 5, whereby an even distribution in the mortar-box of the ore or substance to be crushed is maintained, substantially as herein set forth.

3. In a stamp-battery or crushing mill, the combination, with a series of vertical stamp-stems 1, 2, 3, 4, 5 provided with tappets A, B, C, D, E, of a horizontal cam-shaft F parallel with the row of stamp-stems and carrying a four-armed cam $a a' b b'$ between the stems 1 and 2, a two-armed cam $c c'$ at the side of the stem 3, and a four-armed cam $d d' e e'$ between the stems 4 and 5, the cams so acting on the tappets that some of the stamps are constantly turned in one direction and the remaining stamps constantly turned in the opposite direction, whereby an even distribution in the mortar-box of the ore or substance to be crushed is maintained, substantially as herein set forth.

CHARLES RALEIGH.

Witnesses:

F. J. RAPSON,

P. VARNALS.