

(No Model.)

R. D. GATES.

STONE BREAKING AND CRUSHING MACHINE.

No. 251,038.

Patented Dec. 20, 1881.

Fig 1.

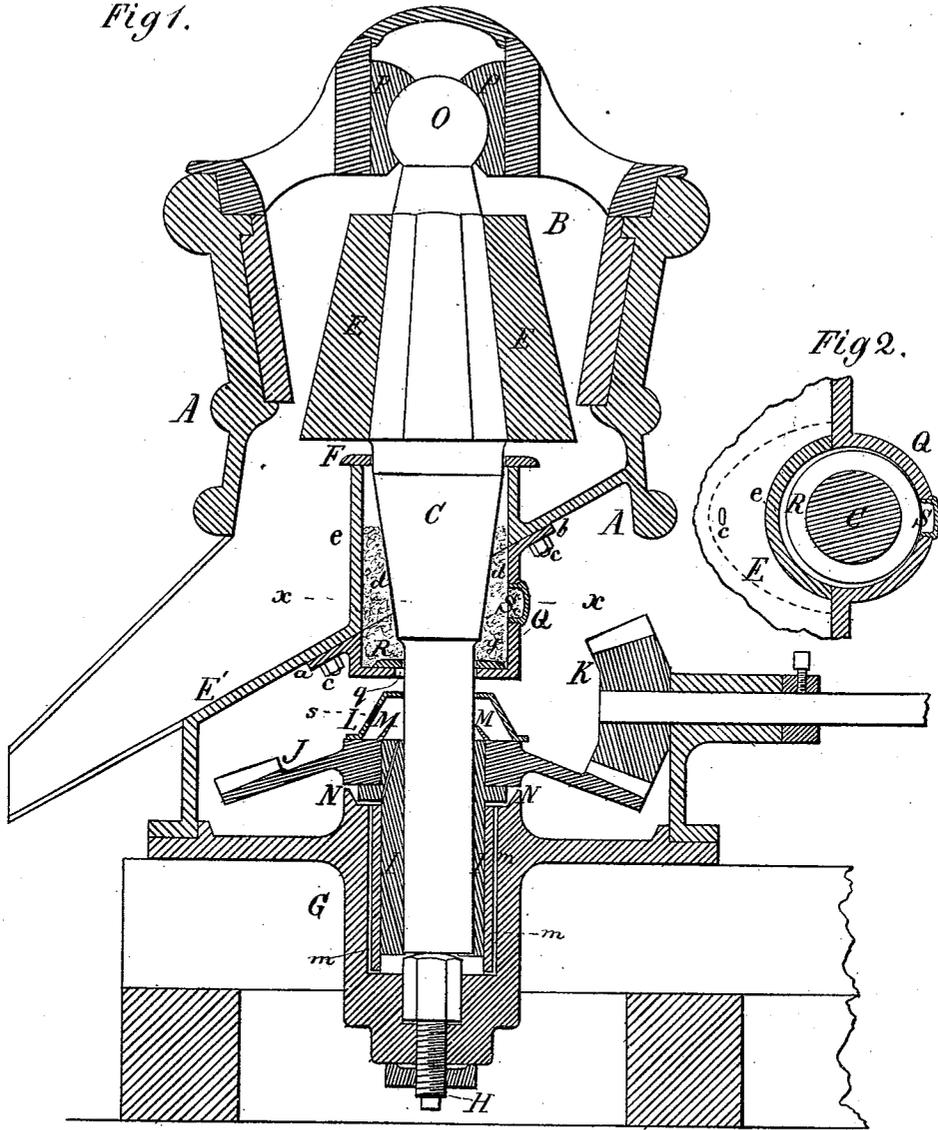


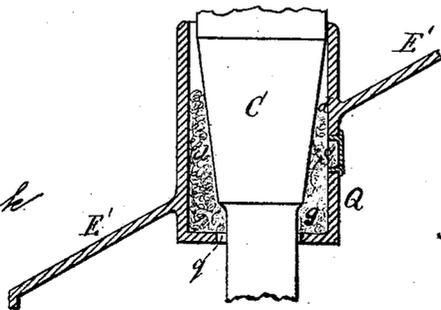
Fig 2.

Fig 3.

Witnesses:

Robt. L. Fenwick,

B. Carlyle Fenwick



Inventor:

Ryerson D. Gates
by his attys,
Massey Fenwick & Lawrence

UNITED STATES PATENT OFFICE.

RYERSON D. GATES, OF CHICAGO, ILLINOIS.

STONE BREAKING AND CRUSHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 251,038, dated December 20, 1881.

Application filed August 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, RYERSON D. GATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Stone Breaking and Crushing Machines, of which the following is a specification.

My invention relates especially to the stone breaking and crushing machine patented by P. W. Gates June 28, 1881, No. 243,545; but it may be used in connection with all other similar machines having a shaft with a crushing-head above the gearing, and an oil step bearing-box below said crushing-head; and the object of my invention is to trap and confine small particles of stone, dust, or dirt within a chamber provided with a sponge, cotton, or other analogous soft arresting material, whereby the passage of such dust or dirt down upon the gearing and into the oil step bearing-box is effectually prevented, and thus undue wear from friction upon the shaft and the gearing and bearing is avoided.

In the accompanying drawings, Figure 1 shows a portion of a stone-breaking machine similar to the aforesaid P. W. Gates's patented machine, and with my improvement applied thereto. The view is a vertical longitudinal section through the center of the machine. Fig. 2 shows a detail horizontal section in the line *xx* of Fig. 1, and Fig. 3 is a detail vertical section of a modified form of construction of my machine.

A represents the frame of a stone-breaker; B, the concave or hopper; C, a gyrating shaft; E, the crusher-head; E', the diaphragm or chute of the frame, this latter being, as usual, formed with a tubular flange, *e*, on its upper side, as shown.

F is the loose dust-guard collar or ring, fitted loosely around the shaft C, and surmounting the tubular flange *e* in a manner to move back and forth on said flange, while the shaft gyrates and revolves within the bore of the collar or ring.

G is the oil step bearing-box. H is the adjustable screw thereof; I, an eccentric bearing for the lower end of the shaft C; J, a bevel-gear wheel attached fast to the eccentric bear-

ing I; and K is a bevel gear on the driving-shaft of the machine.

L is a circular collar, of tapering form, fitted loosely around the shaft C and resting loosely upon the bevel-wheel J. This collar is provided with a passage, *s*, over which a cover may be placed, and through the passage oil is supplied from an oil-can to the oil step-box. The collar L may be termed a "hood," as it also serves as a dust-guard.

M and N are guard-flanges, for preventing the waste of oil; and *m* are channels or passages for the circulation of oil through the step bearing-box G.

O is the ball on the upper end of the shaft C, and P is the adjustable bearing for said ball. This bearing, as usual, may be made of chilled metal, forming segments of a cylinder externally and of a hollow sphere internally.

The machine thus far described and shown is well known, and of itself forms no part of my invention.

With the machine as above described the dust-guard collar or ring F to a very great extent prevents the passage downward of fine particles of broken stone and dust; but owing to the bore of said collar or ring requiring to be made a full one thirty-second part of an inch larger in diameter than that part of the shaft which it encircles, in order to have it gyrate with the shaft without binding, the dust will sift down through the tubular flange *e* upon the gearing, and into the oil step bearing-box, and form, with the oil, a gritty mass, which soon wears out the gearing and bearing. To obviate this difficulty I provide a chamber, Q, of tubular form, on the under side of the diaphragm or chute E', as shown in the drawings. This chamber has an annular passage, *q*, in its bottom, and it is fully open at its top, and the diameter of this chamber is about the same as that of the one formed by the tubular flange *e*. The annular passage *q* is of a diameter greater than the lower end of the shaft C, in order that said shaft, which passes through this passage, may have freedom to gyrate.

Upon the bottom of the chamber Q an annular loose ring or collar, R, is placed, and through this ring or collar the lower and smaller end of the shaft C passes, as shown. The ring or

collar R is to serve a similar purpose as the ring or collar F, and its bore requires to be of larger diameter than that part of the shaft which it encircles, for reasons above stated with respect to the collar or ring F.

S is an opening, with a suitable cover or plug for closing it, in one side of the chamber Q. The chamber Q is provided with bolting-flanges *a b*, and by means of these flanges and bolts *c* it is firmly fastened to the under side of the diaphragm or chute E', and thus applied it forms, with the tubular flange *e*, a cylindrical chamber or trap, *d*, between the loose collars or rings F and R.

Through the opening S sponge, cotton-waste, or other soft trapping material is placed in the chamber *d*, and this material *g* serves as a means for arresting the dust which may filter down upon it between the shaft C and the collar or ring F, while the collar or ring R serves for preventing the passage downward of any loose dirt or stone-dust which may possibly sift down through the soft porous sponge, cotton-waste, cotton cloth, or other material which may be in use. When the sponge or other material becomes dirty it can be removed through the opening S, and new or clean material supplied in its place.

In Fig. 3 of the drawings I have shown a plan whereby the chamber Q can be cast upon the diaphragm or chute E', and also have shown that the collar or ring R may be dispensed with. In this construction, as well as in the plan shown by Fig. 1, should the collar or ring R not be used the sponge or other trapping material, *g*, is sustained upon the bottom of the chamber. I however prefer to use both collars or rings, inasmuch as the sponge might have a tendency to work down when the collar or ring R is not

used. I would also state that with my invention the use of the hood L may be dispensed with.

It is found to be a very important matter to provide a means for keeping dust and dirt out of the journal-bearing and gearing below the crusher-head. In fact the successful operation of stone breaking and crushing machines depends in a very great degree upon the same, and I believe my invention accomplishes that object.

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

1. The combination of the chamber Q, for containing suitable material for arresting stone and ore dust, with the diaphragm E' of the frame, and with shaft C, stone-crusher above the chamber, and a step-bearing below the chamber, substantially as and for the purpose described.

2. The chamber Q, provided with an opening in its side, and an annular opening, *g*, in its bottom, in combination with the diaphragm E', having tubular extension *e*, frame A, shaft C, loose collar or ring F, crusher above the chamber, and oil step-box below it, substantially as and for the purpose described.

3. The combination of the collar or ring R, trapping-chamber Q, collar or ring F, diaphragm or chute E', having tubular extension *e*, shaft C, with its crusher-head above the chamber, and the lower journal-bearing and gearing, substantially as and for the purpose described.

RYERSON D. GATES.

Witnesses:

G. VAN ZANDT,
GUST. NYQUIST.