J. W. DOWLER, M. VAN B. WISKER & W. C. FERGUSON.

Quartz-Crushers.

No. 155,573. Patented Oct. 6, 1874.

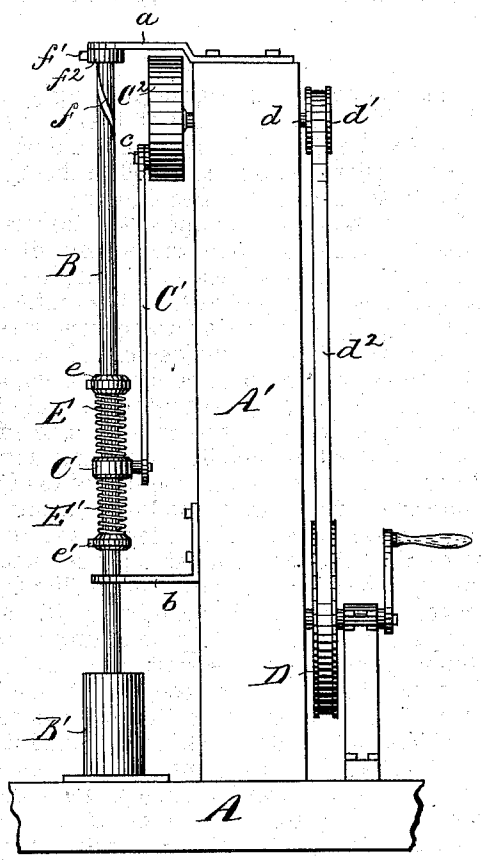

Fig. 1.

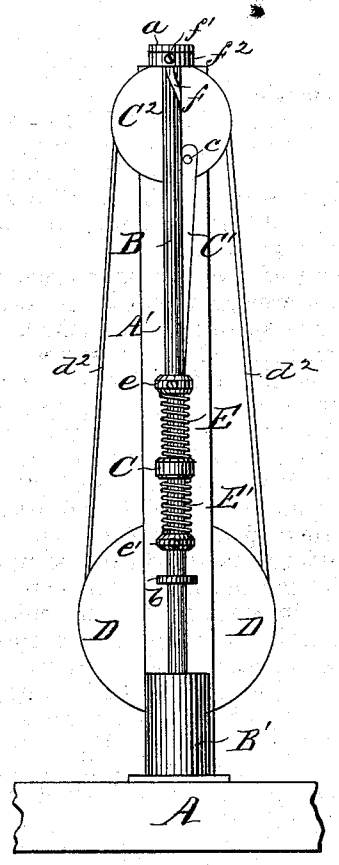

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPH W. DOWLER, MARTIN VAN BUREN WISKER, AND WILLIAM C. FERGUSON, OF ST. LOUIS, MISSOURI.

IMPROVEMENT IN QUARTZ-CRUSHERS.

Specification forming part of Letters Patent No. **155,573**, dated October 6, 1874; application filed August 6, 1874.

To all whom it may concern:

Be it known that we, JOSEPH W. DOWLER, MARTIN VAN BUREN WISKER, and WILLIAM C. FERGUSON, all of St. Louis, in the county of St. Louis and State of Missouri, have invented an Improved Quartz-Crusher, of which the following is a specification:

The object of this invention is to produce a stamping-mill or crusher that can be readily constructed and adapted for use, is simple and effective in operation, and otherwise possesses advantages of novelty and utility.

In our invention the reciprocating motion is imparted to stamping-rod by its pitman-connections to a crank, which is operated by any suitable power. The collar to which pitman connects with stamp-rod operates adjustably between two yielding or spring devices, and with which said rod is provided, the upper spring being for the purpose of imparting to stamper-rod in its descent an accumulated force and velocity, while the lower spring utilizes the recoil of stamper-rod and prevents any lost motion. The stamper-rod, at upper end, is spirally grooved, in which a collar-pin engages, so as to impart a spiral twist or grinding action to stamper-rod while it is being reciprocated, and all of which will now more fully be described.

Of the drawing, Figure 1 is a side elevation; Fig. 2, a front elevation.

A is the bed of the machine. A′ is a suitable frame to support the mounted parts. B is the stamper-rod. This carries at its lower end the stamper B′ proper. The stamper-rod B reciprocates between the upper and lower guides or brackets *a b*, which are secured to frame A′. We provide the stamper-rod with a loose collar, C. This connects to lower end of a pitman, C^1, the upper end of which connects, at *c*, to crank C^2. (See figures.) The crank C^2 is firmly secured to one end of crank-shaft *d*, which has its journals operating in proper journal-bearings in the frame A′. The opposite end of crank-shaft carries a belt-wheel, d^1, which, by belting d^2, connects to driving belt-wheel D. The driving belt-wheel D is supported in proper bearings and frame, so as to operate its shaft by any suitable power. We further arrange above and below the collar C on the stamper-rod springs or yielding connections E E′. The upper end of E engages the collar *e*, while the lower end of E′ similarly engages a collar, *e′*, both said collars being secured to stamper-rod. (See figures.)

In case, now, the stamper-rod receives its upstroke to highest point, the pitman will also have raised to its highest point, and, in doing so, by means of the collar C acting on the upper spring, E, the same is forcibly compressed. As soon, therefore, as the descent of stamper takes place, the compressed spring E imparts its tension, force, or power to stamper-rod, thus increasing its velocity and causing it to effect a more powerful impelling crushing action. This done, and as soon as the upstroke of the stamper-rod takes place, the lower spring, E′, performs its function. This function is to utilize the recoil of the ascending stamper-rod and to impart, by means of the adjustable collar C, its derived force to pitman, facilitating its travel to highest point of crank preparatory to said pitman again causing the stamper to make its descent. Hence, as the recoil of stamper B′ takes place, it compresses the lower spring, E′, which said action of spring is transmitted to the collar C and its pitman C^1. As the power source operates the crank C^2 sufficiently over its dead-centers, the force of the compressed spring E′ is readily transmitted to pitman C^1, and assists same in making its upstroke, and thus the recoil of stamper is utilized, and no possible loss of motion can occur.

It will be noticed that as soon as the recoil takes place the upper spring, E, in no wise retards the action of the lower spring, E′, for the recoil takes place the whole length of stamper-rod, and the rigid collars *e e′*, moving along and upward with said stamper-rod, relieves said upper spring from its pressure during the recoil action.

In addition to the crushing action thus far produced, our object is further to produce the action of grinding and scouring the particles. We therefore provide the upper end of stamper-rod B with a spiral groove, *f*. (See figures.) In the groove *f* engages a pin, f^1, of the collar f^2, which is rigidly secured to the upper guide, *a*, as shown in the figures. When, therefore, the stamper-rod is reciprocated, there is, at

same time, consequently produced a spiral twist, owing to the engagement of pin *f* in the groove f^1. The spiral motion thus imparted at same time to the reciprocating action of stamper-rod produces the grinding action, which still further breaks the particles to a smaller degree than the action simply derived from crushing. Also, said grinding action scours and otherwise brightens and prepares the particles for a better process of amalgamation.

What we claim is—

1. A stamp-mill or crusher in which the stamper is reciprocated by pitman and crank connections, and in which the descent of stamper is increased in velocity by means of a spring, E, and its recoil utilized by a spring, E′, and, further, having a spiral motion derived by a pin, f^1, engaging a groove, *f*, to produce the grinding and scouring action, in the manner herein shown and described.

2. The combination of the spring E′, stamper-rod B, collar C, pitman C^1, crank C^2, to operate as herein shown and described.

3. The combination of the stamper-rod B′, springs E E′, collars *e e′* C, pitman C^1, crank C^2, to operate as and for the purpose herein shown and described.

4. The pin f^1, collar f^2, in combination with stamper-rod B, having groove *f*, to operate as and for the purpose set forth.

5. The combination of pin f^1, collar f^2, stamper-rod B, having groove *f*, the springs E E′, collar C, pitman C^1, and crank C^2, to operate as and for the purpose herein shown and described.

In testimony of said invention we have hereunto set our hands.

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