

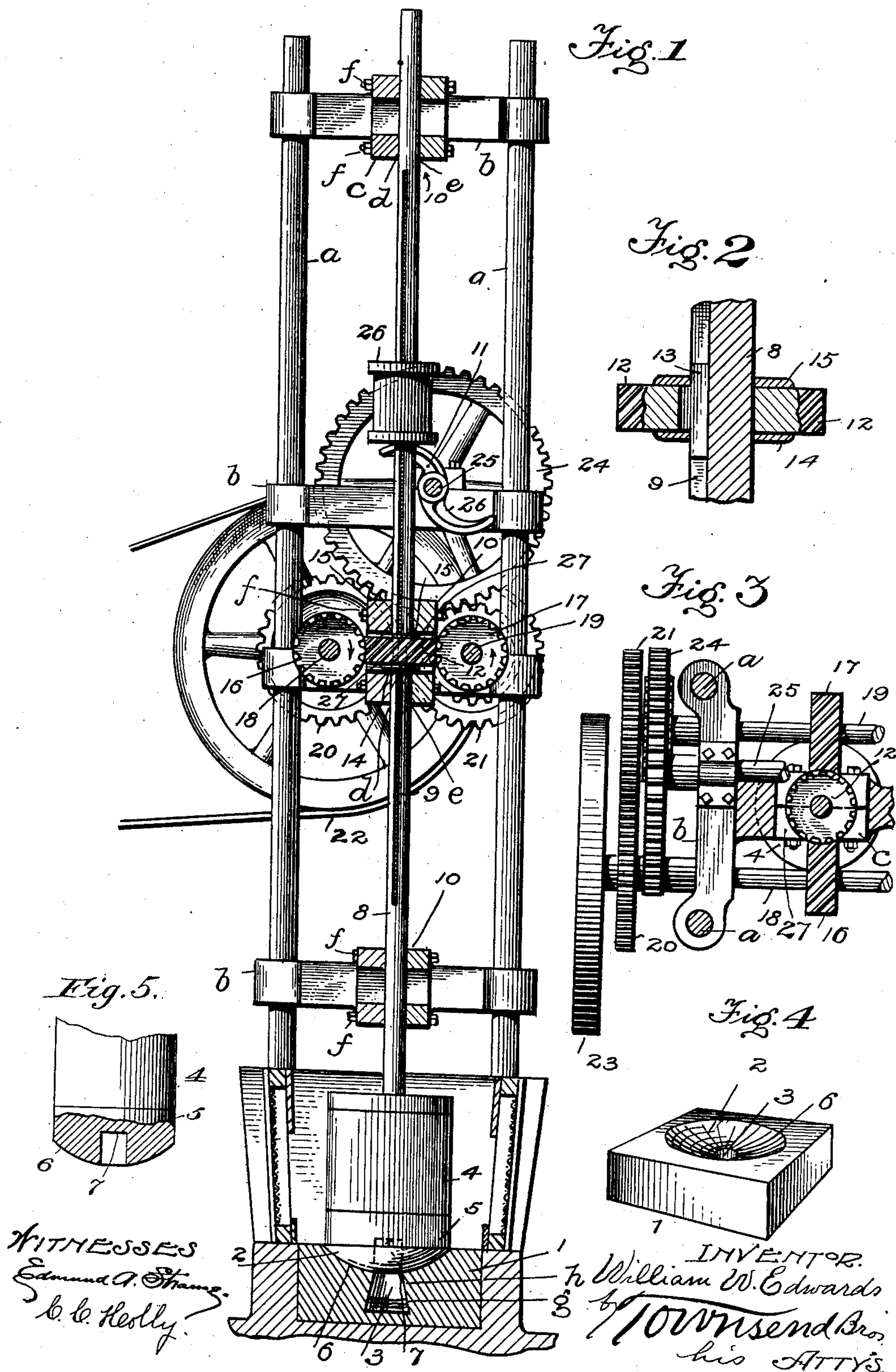
No. 829,702.

PATENTED AUG. 28, 1906.

W. W. EDWARDS.

STAMP MILL.

APPLICATION FILED JAN. 15, 1902. RENEWED JAN. 22, 1906.



UNITED STATES PATENT OFFICE.

WILLIAM W. EDWARDS, OF LOS ANGELES, CALIFORNIA.

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No. 829,702.

Specification of Letters Patent.

Patented Aug. 28, 1906.

Application filed January 15, 1902. Renewed January 22, 1906. Serial No. 297,219.

To all whom it may concern:

Be it known that I, WILLIAM W. EDWARDS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Stamp-Mills, of which the following is a specification.

An object of this invention is to provide superior means for rotating the stamp while the same is resting on the ore.

Another object is to avoid any tendency of the rotating stamp to turn on the ore as a pivot and at the same time to provide superior means for retaining the coarse gold, mercury, and amalgam.

The accompanying drawings illustrate my invention.

Figure 1 is a sectional elevation of a stamp-mill embodying my invention. The section is taken at right angles to the driving-shaft. Fig. 2 is a fragmental detail showing the connection between the stamp-shaft and the spiral gear-wheel which rotates the same. Fig. 3 is a fragmental plan of the stamp-mill. Parts are broken away for clearness of illustration. Fig. 4 is a view of the die removed. Fig. 5 is a fragmental view of the die with shoe partly in section.

In the drawings I have shown only one stamp; but it is to be understood that the mill may be furnished with any desired number of stamps.

1 designates a die furnished with a concavity 2 and having at its center a receptacle 3 below the grinding-face of the die and which is downwardly enlarged, as clearly shown in Fig. 1, for the purpose of receiving and holding the mercury, gold, and amalgam.

4 designates a stamp having a shoe 5 convex at its under side 6 and having a hole 7 at the center of its under face. The shaft 8 of said stamp is grooved longitudinally with a groove 9. 10 designates guides for said shaft. 11 designates the usual means for operating the stamp vertically.

12 designates a gear-wheel on the stamp-shaft 8.

13 is a key in the groove 9 and gear-wheel 12.

14 and 15 designate washers serving as means for holding the key in place in the gear-wheel.

16 and 17 designate gear-wheels on opposite sides of the first-named gear-wheel 12 and meshing therewith to rotate the stamp. Suitable means are provided for rotating said gear-wheels 16 and 17.

18 and 19 respectively designate the horizontal shafts on which the wheels 16 and 17 are respectively mounted.

20 and 21 designate gear-wheels on the shafts 18 and 19, respectively, which mesh with each other so that the two shafts are positively rotated simultaneously. The power will be applied to either of the shafts 18 or 19 by any suitable means.

A belt 22 may be applied to the fly-wheel 23 to drive the same or a pulley and fly-wheel (not shown) may be mounted on the shaft 19 and the same may be driven by a belt. (Not shown.)

24 designates the gear-wheel for driving the cam-shaft 25 to operate the tappet 26 in the usual way.

The above-described construction with horizontal driving-shafts located on each side of the stamp-shafts and connected thereto by spiral gears is extremely advantageous in driving a battery of stamps, as the same horizontal shafts will serve to drive all the stamps of the battery.

The frame of the stamp-mill may be formed of uprights *a* and the bars *b*, which form a portion of the guide for the stamp-shafts.

c designates a detachable section which is furnished with a way *d* to correspond with the way *e* in the bar *b* to form the vertical guides 10 for the stamp-shaft. The cross-bar and the detachable section or cap *c* are furnished with horizontal ways 27, in which the gear-wheel 12 turns. The cap or removable section *c* may be fastened to the cross bar *b* by bolts and nuts *f*.

The gear-wheels 12, 16, and 17 are spiral miter-gearing and the wheels 16 and 17 are mounted on opposite sides of the wheel 12 and are rotated to simultaneously drive the wheel 12, so that they cause the same to run perfectly true and allow the stamp-shaft 8 to slide therethrough without any binding action. When the shaft is rotated by a gear driven on one side only, such a lateral pressure results that the stamp is not allowed to drop freely and loses part of its force, enough under

some conditions to largely offset the advantage due to rotation. In order to get any advantage from rotation, it is necessary to provide for rotating the shaft without interfering with its vertical movement.

The stamp-mill is preferably geared to rotate the stamp three-fourths way round while the stamp is resting on the ore. The amount of rotation, however, may be varied within the judgment of the constructor. The holes 3 and 7 in the die and shoe, respectively, prevent any possibility of the ore at the center of the die acting as a pivot to keep the stamp from grinding the ore.

In practice with machines of this class the impact of the ordinary die and shoe only partly pulverizes the ore, and the rotary motion is depended on to complete the pulverization. Those partly-crushed particles that are directly or nearly under the center of the shoe are not affected by the rotary movement of the shoe, and as long as they are not crushed they prevent further descent of the shoe, such as would be required to completely pulverize the ore. This action is well known in machines of this class and is known as "pivoting" of the stamp by the ore. The parts of the shoe which are farther removed from the center are alone effective in grinding, and it is apparent that if the shoe is held from descent by uncrushed particles at the center even this outer part of the die-surface is ineffective. My invention is directed to obviating this difficulty by removing the central parts of the die and shoe, so that there can be no obstruction offered by the ore to the descent of the shoe except at points where the rotary movement thereof is sufficient to grind away such obstruction. As the ore is stamped and ground the gold will work to the center and fall into the downwardly-enlarged receptacle 3, in which a suitable quantity of mercury *g* will be deposited. The overhanging walls *h* of the receptacle 3 prevent the mercury from working out of the receptacle, and the hole 7 in the center of the shoe serves, together with the receptacle 3, to form a chamber to receive the material which otherwise might pivot the shoe.

It will be understood that in practical operation there will be maintained in the receptacle 3 a suitable quantity of liquid mercury to absorb or amalgamate the precious metals and that the usual depth of ore and water will be above the die 1. As the stamp 4 descends its shoe 5 may force down into the receptacle some of the pieces of ore which otherwise might pivot the stamp, and the pieces of ore thus forced down into the receptacle may displace a portion of the mercury and cause such portion to flow up into the concavity 2 and into the interstices be-

tween the pieces of ore in such concavity beneath the stamp. When the stamp rises, thus removing the pressure from the ore particles or pieces in the receptacle, the mercury will flow down the floor of the concavity and into the receptacle, thus displacing from the receptacle the ore which had displaced the mercury. It will be understood that in case the charge of liquid mercury in the die is sufficient to fill the receptacle 3 all the rock or other portions of the ore which have less specific gravity than the mercury will be floated out of the receptacle by the mercury when the pressure of the stamp is removed and that when the ore has been crushed to the required fineness it will pass out through the screens in the usual way. The solid pieces of material that may enter the hole 7 will fall out as the stamp rises and all material after being crushed to the desired fineness will pass out through the screens in the usual way. The precious metals that fall into the mercury in pocket 3 become amalgamated and from time to time may be removed, fresh liquid mercury or quicksilver being supplied from time to time to take its place.

In practical operation the stamp is moved up and down and rotated, and the gold is scoured and kept bright thereby, so as to readily amalgamate.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A stamp-mill comprising a die having an open-topped downwardly-flaring receptacle in the center of its grinding-face adapted to receive and retain mercury, a stamp-shoe having a hole in the center of its grinding-face, means for vertically reciprocating said stamp-shoe, and means adapted and arranged to continuously rotate said shoe.

2. In a stamp-mill, a vertically-reciprocating stamp, means for lifting the stamp-shaft and allowing it to drop by gravity, a gear-wheel slidably engaging said shaft and adapted to rotate the stamp, horizontal shafts on opposite sides of said gear-wheel, and gear-wheels on said shafts meshing with the first-named gear-wheel to rotate the stamp.

3. The combination with a stamp-shaft, of a spiral gear-wheel mounted to turn the shaft, and slidably engaging therewith, horizontal shafts on opposite sides of said gear-wheel, and oppositely-arranged spiral gear-wheels on said horizontal shafts, meshing with the first-named gear-wheel to turn the same.

4. A stamp-mill comprising a frame having a cross-bar furnished with a vertical way for a stamp-shaft and a horizontal way for a gear-wheel, a section furnished with like ways for the shaft and gear-wheel, a stamp-shaft in said vertical ways having a keyway there-

in, a gear-wheel on the stamp-shaft in the
ways therefor; a key in said gear-wheel and
keyway, and washers on said shaft in said
gear-wheel way above and below said gear-
5 wheel to hold the key in the gear-wheel way.

In testimony whereof I have signed my
name to this specification, in the presence of

two subscribing witnesses, at Los Angeles,
California, this 8th day of January, 1902.

WILLIAM W. EDWARDS.

Witnesses:

JAMES R. TOWNSEND,
F. M. TOWNSEND.