F. B ABBOTT.

Ore Stamp.

No. 30,282. Patented Oct. 9, 1860.

Fig. 2.

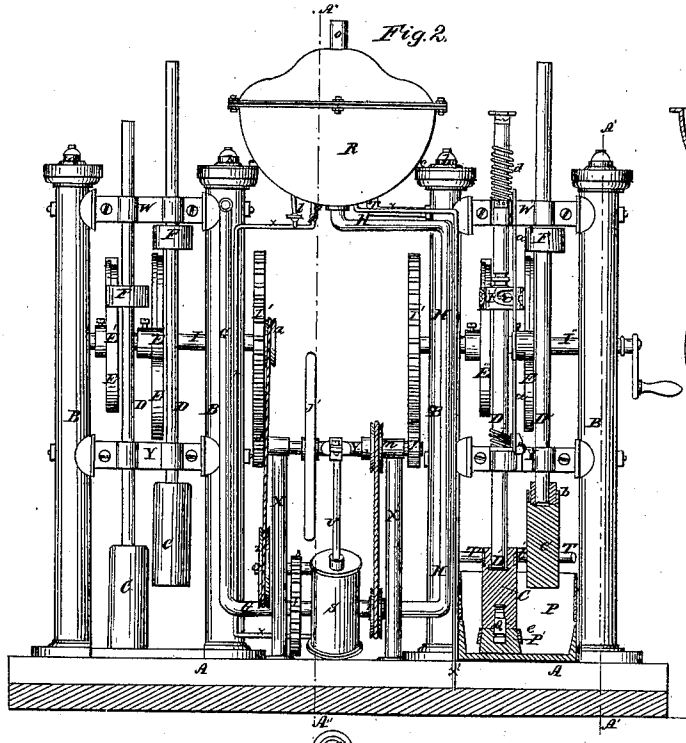


Fig. 3.

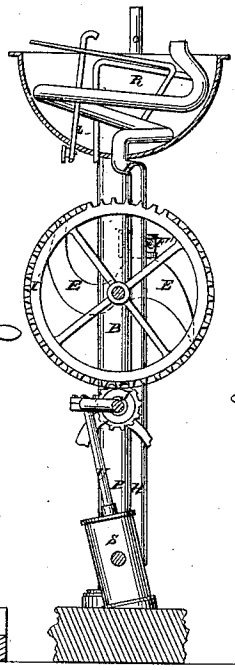


Fig. 4.

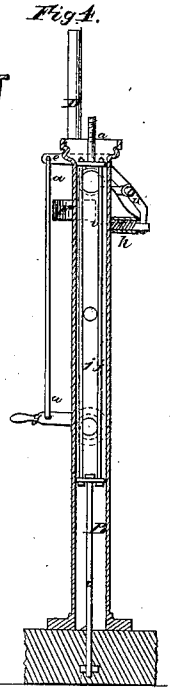


Fig. 1

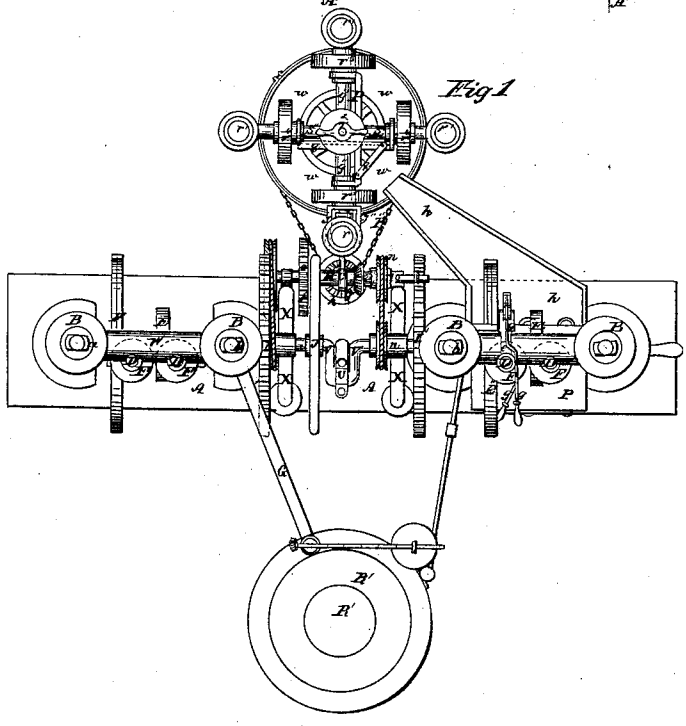
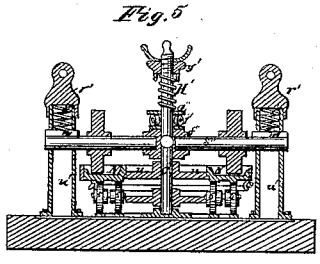


Fig. 5



AM. PHOTO-LITHO. CO. N.Y. (OSBORNE'S PROCESS.)

UNITED STATES PATENT OFFICE.

FRANCIS B. ABBOTT, OF ST. LOUIS, MISSOURI.

QUARTZ CRUSHER AND AMALGAMATOR.

Specification of Letters Patent No. 30,282, dated October 9, 1860.

To all whom it may concern:

Be it known that I, FRANCIS B. ABBOTT, of the city of St. Louis and State of Missouri, have invented a new and useful Machine for Crushing and Amalgamating Quartz; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 is a top view of my said machine, without the heater R; Fig. 2 a back elevation; Fig. 3 a section through A″; Fig. 4 a section through A′, and Fig. 5 a section on the line B′.

To enable others skilled in the arts to which my invention appertains to make and use the same I will proceed to describe the construction and operation, thereof.

Similar letters of reference represent corresponding parts of the different figures of the drawing annexed.

The frame of my improved machine for crushing and amalgamating quartz consists of a bed plate, shown in the drawing by A, and four upright columns, shown by B. The said columns are made hollow and are bolted to the bed plate by means of link bolts (shown by *i*, Fig. 4,) passed through the column, in the manner shown, and between each pair of columns, the braces Y, Y, and W, W, are fixed to secure the said columns to each other, and to serve as guides for the stamping rods. Between the two inside columns a frame X X is erected, and between this frame the cylinder S is arranged, in the frame, upon trunnions, so as to oscillate as an ordinary oscillating engine, and in the top of the said frames X X the crank shaft V is arranged and secured in suitable journal boxes made in the top of the said frame. To this crank shaft the piston rod V is connected in the ordinary manner—the whole engine being of the ordinary construction. On the out ends of the said crank shaft small pinions are fixed, shown by J′ J′ and so arranged as to mesh into the spur wheels I′ I′. These spur wheels are fixed on the inside ends of the shafts I I″, upon which are also fixed the lifting cams E E, E″ E the hubs of which are shown at E′ E′. These shafts have their bearing in the columns, through which they are made to pass in the manner shown.

Against the braces Y Y and W W, the stamping rods D, D, D, D, are arranged vertical in the manner shown, and they are secured in suitable journal boxes made on the said braces, so as to be allowed to work freely up and down.

The stampers are shown in the drawing by C. The manner of securing these stampers to their respective shafts is peculiar. The lower end of the shaft is first made with a collar on it as shown at D″. The body of the stampers is then cast with an open place in the side near the upper end, and with a groove in the said open space, so as to receive the collar and lower end of the shaft in the manner shown. After the stampers have been so made and the shaft so introduced there is a small piece of metal cast of such shape as to fit into the opening and around the collar and shaft, which being first placed in the said opening is secured there, by means of a band which is shrunk over the whole arrangement. The band is shown by *b*′, but the piece above referred to, is not shown, owing to the manner in which the section is taken but the arrangement is so simple that it cannot be misunderstood. The lower ends of these stampers I propose to face with chilled metal or steel, by casting the body C of the stamper with the pin Q in it, and then making a piece of chilled cast metal, or a piece of steel with a hole in it to fit over the pin Q, and so as to fit up close against the end of the stamper, where I propose to secure it by means of keys, driven through the lower block, and the groove *e*′ in the lower end of the pin, and then to prevent the pin, or key cotter, from working out I propose to shrink a band *f*′ around the stamper and over the head of the said key. These stampers are operated—that is to say, they are lifted—by the action of the cams E against the collars F, and they are allowed to fall, by force of gravity or the fall may be hastened and the force thereof increased, by the application of a spring to the upper end of the shaft in the manner shown at *d*.

The collars F on the stamping shafts, I propose to make in semi-circular segments, and hold them together around the shaft, by making cavities in their peripheries to receive the nut and head of the bolt, in the manner shown by F′, and to secure the said collars to the shafts when constructed in this manner I propose to cut grooves in the shaft and corresponding ridges in the inside of the collar, so that when they are bolted

together the ridge on the inside of the collar will mesh in the groove in the shaft, which will thus prevent it from slipping. The advantage of this arrangement is that the collars can be taken off of the shaft, without taking the shaft out of its place, which is a very great advantage when large machines are used.

To stop one or more of the stampers whenever it may be desired I arrange a lever J, to the cross piece or brace Y and to it I attach the rod *a*, which reaches up and attaches to a second lever *u* at *e*, which has its fulcrum at *t*. The lower end of this lever *u* joins to the end of the bolt *v*, about which a coil spring is wound in the manner shown. (See Fig. 4.) Now if the shaft be up in the manner shown and it is desired to let it fall the lever J is depressed which draws back the bolt *v*, so as to detach it from under the collar, which allows the shaft to fall. The inside end of the said bolt is made square and the lower part thereof is beveled, so that when the collar strikes it from the lower side, it is thrown back, and when the shaft has raised high enough, the spring throws the bolt forward to catch the shaft and hold it up. To regulate the force of the blow of the stampers I coil a spring around the shaft just above the brace Y (as at *d'*), to this spring I attach the lever 4, (see Fig. 1), whereby I can draw the spring tight around the shaft, so as to make it fall lightly in the mortar. The mortar is shown by P the lower part of it may be made of cast iron and the upper part of boiler iron, with flanges turned around its lower edge, so as to bolt it to the lower part. The upper part is also perforated on one side, so that the water can drain through into the leader *n*, leading to the amalgamator.

The amalgamator consists of a revolving disk *u u*, with four revolving crushers working therein shown at *r*, *r*, *r*, *r*. The upper part of the said disk is grooved out, as shown at N, into which groove the crushers are made to work. The said disk is centered on the shaft O', and is made to rest upon friction rollers 5 and 6, which are also fixed into a frame centered on the shaft O'.

The crushers are arranged upon four shafts shown by S'' S'' S'' S'', the inside ends of which are fixed in the hub *f''* on the shaft O', and the outside ends of which are fixed in the columns *u' u'*, under a spring bearing whereby the crushers are made to press with more or less force upon the disk or crusher pan *w*. The bearing pieces are shown at *m' m'* and the springs by *r''*. The force of the spring on the bearing pieces is regulated by the screw tops *r'* over the top of the column, which is made hollow, as shown. The shafts S'', upon which the crushers are fixed are stationary, but the shaft O' revolves with the disk *w*, and, the frame into which are fixed the rollers 5, 5, and 6, 6, may be made to revolve or not as experience shall dictate. I propose to make them stationary and keep them under the disk opposite the crushing rollers.

Upon the upper end of the shaft O' there is a screw nut or collar fixed shown by Y' and under it a spring H' is arranged, to bear upon the collar A'', which is fixed to, and made to revolve with the shaft, and on the under side of this collar and to the hub thereof small friction rollers J' are arranged, which travel around on the upper end of the hub *f''*. The object of this arrangement of friction rollers, spring and nut on the shaft O', is to enable the attendant to press down the inside end of the shafts S'', so as to keep the one shaft on a line with the other. The whole of this amalgamator is set upon a plate which has a hub made in the center to receive the lower end of the shaft O' and ribs for the rollers 5, 5, and 6, 6, to travel upon, in the manner shown.

Around the outside edge of the disk *w* I fix a strap or thin metal ring with a saw edge on its lower side to facilitate and cause the water to drop off all around the disk alike. The said ring or band is shown at *b''* Fig. 1. The crushing rollers have a reciprocating as well as a revolving motion, that is to say they move horizontally over the upper face of the disk, so as to more perfectly crush and amalgamate the matter in the groove N of said disk. The said crushers receive this motion through the agency of an eccentric *c''* fixed on the shaft M, which acts upon a kind of pitman J'', which is made to connect with the hub of one of the crushers as shown, and so that it can be disconnected from it at pleasure. Now when this eccentric is in motion it moves the crusher r^2 back and forth, which being connected to the crusher r^3 by the rod P', moves it also, and these two crushers being connected to the crushers r^4 r^4, by means of the lever *q* and the rod *q'*, moves them also, so that the motion of the eccentric moves at one and the same time, all of the crushers. The shaft M upon which the eccentric is fixed receives its motion from the cam-shaft, I through the agency of the pulley *z'* on the cam-shaft and the pulley *z* on the shaft 7, a band being led over the two pulleys for the purpose of conveying the motion from one to the other.

Upon the inside end of the shaft 7 upon which the wheel *z* is fixed a small pinion wheel 8 is fixed, which meshes into a larger pinion wheel *f* the hub of which, constitutes the shaft M, which is hollow, and made to revolve about the shaft, upon which the bevel wheel *e''*, also revolves. This wheel *e''* meshes into a corresponding bevel wheel Q, which is fixed to a chain wheel arranged

immediately below it, as shown by n'. From this chain wheel n' the chain P'' is carried around a chain wheel fixed to the under side of the disk, as shown by 9 Fig. 5, whereby the said disk receives its motion. The power is conveyed from the crank to the wheel e'' by means of a band which leads from the pulley m on the crank shaft to the pulley n, on the shaft j''. On the inside end of the hub of the pulley n a clutch is made to gear into a corresponding clutch made in the outside end of the hub of the wheel e'', the wheel, or rather the pulley n being arranged on its shaft so as to be moved to and fro, that is to say in and out of gear at pleasure, so that the motion of the amalgamator may be stopped without stopping the engine.

R' is a steam boiler with the ordinary mountings attached, and G is the steam pipe leading from the boiler to the engine, to supply it with steam.

H is the exhaust pipe leading from the engine to the heater R, fixed upon the upper end of the two inside columns, in the manner shown. The said exhaust pipe is coiled around in the lower part of the said heater and made to exhaust in the open space in the top thereof, from whence the steam escapes through the pipe O. The object in leading the exhaust pipe to the heater and coiling it therein, as above stated is to heat the water before it enters the boiler, and also to heat the water to be used in the mortar, during the operation of crushing.

The feed pipe whereby the water is pumped into the boiler is shown by H'. It leads from the force pump to the heater, in which it is coiled and from thence it leads to the boiler. From the upper part of the pipe H a branch pipe l is led to the heater, whereby the water is pumped therein, the said branch is provided with a cock whereby the flow of water to the heater is regulated. From the lower part of the heater, down alongside one of the inside columns, the pipe T leads to convey the hot water from the heater to the mortar, the said pipe being also provided with a cock, to regulate the flow of water therein. The leader n conveys the crushed matter from the mortar to the amalgamator, the said leader being arranged and secured in any convenient manner so as to fulfil the required function.

Having thus described the construction and operation of my machine for crushing quartz, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The use of the heater R in combination, with the boiler and crusher, when arranged in the manner described for the purpose specified.

2. Constructing arranging and operating the amalgamator, substantially in the manner described for the purpose specified.

3. Arranging the engine and boiler, with the crusher, and amalgamator, substantially in the manner described, for the purpose of economizing, in room, weight and cost of quartz crushing apparatuses.

FRANCIS B. ABBOTT.

Witnesses:
C. E. GRAY,
ROLEIN B. GRAY.