

United States Patent Office.

JOHN R. SMITH, OF CONNELLSVILLE, ASSIGNOR TO HIMSELF AND WILLIAM H. DENNISTON, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 68,248, dated August 27, 1867.

IMPROVED MACHINE FOR CRUSHING AND WASHING SAND.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN R. SMITH, of Conneltsville, in the county of Fayette, and State of Pennsylvania, have invented a new and useful Improvement in Crushing and Washing Sand; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, which drawing is a perspective view of my improved apparatus for crushing and washing sand, and to the letters of reference marked thereon.

The nature of my invention consists in the introduction of water into the crushing-pan of a rock or sand-crusher in such a way as to aid in the disintegration of the rock, and also so as to wash the sand clear of vegetable and earthy matter, and discharge it from the pan thoroughly pulverized and containing little or no deleterious foreign matter; and consists, further, in the construction and arrangement of devices by which these ends are accomplished.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The machinery which I employ is attached to any suitable framework A, and the crushers *b* and crushing-pan *a* are sustained by any suitable bed or foundation, B. The pan *a*, usually of cast iron, is of annular shape, and fitted either with an inner ring, *a'*, or otherwise, so that the sand in the pan *a* shall be kept from getting into the step in which works the shaft *d*, which, by the axle *c*, connecting the crushing-wheels *b*, causes them to rotate and revolve in the annular pan *a*. A slot in the shaft *d*, not shown in the drawing, through which passes the axle *c*, allows the crushers *b* to have so much vertical play as may be found necessary to their successful operation. The motion requisite to operate the crushers *b* is communicated through a crank, *e*, or band-wheel, *f*, by the shaft *f'* and bevel gear-wheels *g* to the shaft *d*, or by any other desirable arrangement of gearing in ordinary use. On the top of the frame A, or on other convenient support, and at such a height as to secure a good head of water, I place a water-tank, *h*. From this a pipe, *h*, opened and closed by a cock, *i*, leads down to the crushing-pan *a* and discharges a stream of water of any desirable size into the pan *a*. In the lower part of the pan, and opening outward, is a discharge-gate, *s*, from which the water and pulverized sand issue out on to the riddle or perforated plate *m*. Through this the water and sand pass into the trough *n*, where the water is drained off, carrying with it the impurities washed out of the sand, and the sand is left in condition for the market. Any lumps or pieces of rock which may escape from the pan not sufficiently crushed are discharged over the end of the riddle *m*.

While not limiting myself to any particular size or weight of machinery, or any single mode of operation, I will proceed to describe more especially that construction and operation which I find most feasible and best. The crushing-wheels *b* are of metal, and of sufficient weight to crush the rock, if rock sand be fed in, or to thoroughly pulverize and mix the sand, if it be fed in in a loose state. Any convenient mode of feeding may be employed. The crushers *b*, moving somewhat rapidly, impart to the water in the pan a motion in the same direction. As a current of water moving around thus aids materially in disintegrating the rock, and by its force more completely cleanses the sand, when pulverized, of its vegetable and earthy matter, and carries it out of the crushing-pan more rapidly, I secure these useful results more perfectly by so placing the lower end of the pipe *h* that it shall discharge its water in the direction of the motion of the crushers *b*. The crushers *b* and water then act together in pulverizing and scouring the sand, and the water carries off, either in solution or in a mechanical mixture, all or most of the obnoxious impurities. The outer side of the pan *a* is flanged or bevelled outwards, to provide room for the action of the crushers *b* and still keep the sand-rock or sandstone which is being crushed as perfectly as possible in the track of the crushers till completely pulverized.

With this arrangement I am able to crush and wash about forty tons of sand per day, of ten hours, whereas, by the devices previously in use, ten tons per day have been the usual product, and as sand in a state of or approaching to pure silex has become an important article of commerce, particularly in connection with manufactures, such increase in the facilities for preparing it are consequently of corresponding value.

The devices described are equally applicable to washing or scouring loose pulverized or "bank" sand, so called. Such sand, as well as the rock-sand or sandstone, contains more or less vegetable and impure earthy

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The devices described are equally applicable to washing or scouring loose pulverized or "bank" sand, so called. Such sand, as well as the rock-sand or sandstone, contains more or less vegetable and impure earthy

matter, which must be removed before the sand is fit for most manufacturing purposes. This is accomplished substantially in the manner above described.

I usually find one pipe, *h*, sufficient, but two or more may be used if desired, and they may discharge in any direction into the pan, except in a direction opposite to that of the crushers *b*. The water may be forced into the pan *a* by a force-pump or other convenient device for obtaining a pressure, instead of falling from a height, but such pressure is not indispensable. The water may be fed in in any convenient way, but I have found the way described to be the best.

The introduction of water into the crushing-pan is further advantageous in that it enables the crushers to do with ease and rapidity that which, with the sand or rock in a dry state, they would do with difficulty, if at all. The water keeps the sand distributed evenly over the bottom of the pan, so that it cannot accumulate or pile up in lumps in the path of the crushers, and, as fast as the sand or rock is thoroughly pulverized, it is washed out by the aperture or gate *s*, as above described.

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

1. The introduction of a stream or flow of water into the crushing-pan of a revolving sand, sand-rock, or sandstone crusher, to aid the crusher or crushers in disintegrating the rock, and to cleanse and discharge the pulverized sand, substantially in the manner and for the purposes hereinbefore set forth.

2. The rotating and revolving crushing-wheels *b*, in a sand-rock crusher, in combination with a crushing-pan, *a*, provided with a discharge-gate, *s*, and a water-supply pipe, *h*, or its equivalent, all constructed and operated substantially as and for the purposes above set forth.

In testimony whereof I, the said JOHN R. SMITH, have hereunto set my hand.

JOHN R. SMITH.

Witnesses:

A. S. NICHOLSON,
GEO. H. CHRISTY.