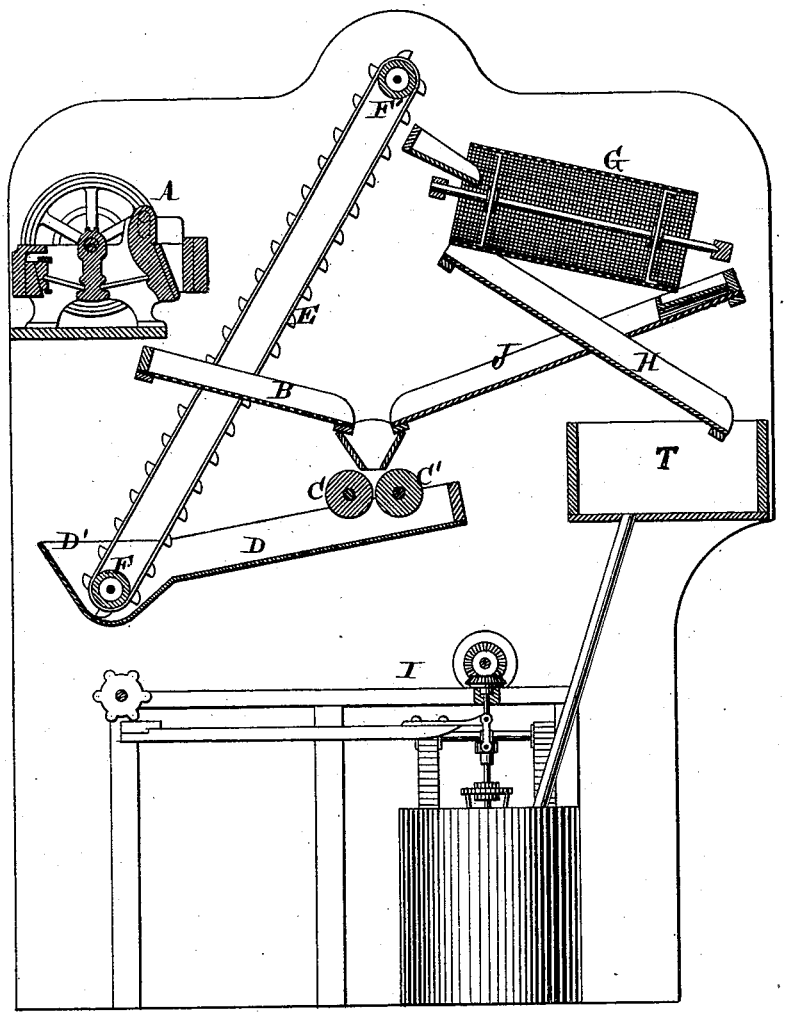
W. HOOPER.

APPARATUS FOR CRUSHING, GRINDING AND SEPARATING ORE.

No. 190,326. Patented May 1, 1877.



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UNITED STATES PATENT OFFICE.

WILLIAM HOOPER, OF TICONDEROGA, NEW YORK, ASSIGNOR TO NEW YORK ORE SEPARATOR COMPANY.

IMPROVEMENT IN APPARATUS FOR CRUSHING, GRINDING, AND SEPARATING ORE.

Specification forming part of Letters Patent No. **190,326**, dated May 1, 1877; application filed October 27, 1876.

To all whom it may concern:

Be it known that I, WILLIAM HOOPER, of Ticonderoga, in the county of Essex and State of New York, have invented a new and useful Improvement in Apparatus for Crushing, Grinding, and Separating Ore, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 represents a side elevation of my apparatus, partly in section.

Similar letters indicate corresponding parts.

My invention relates to an apparatus for treating ore preparatory to its being separated; and it consists in an ore-crusher, under which is arranged an inclined sieve, discharging at its lower end between two crushing-rollers, and which, as well as the rollers, is arranged above an inclined chute, which carries it to an elevator, discharging into a rotary sifter, which is open at both ends, and which is set on an inclined plane, while beneath the sifter is arranged a chute, carrying the fine ore to a bin, from which the chute leads to the separator.

The coarse particles which discharge through the end of the sifter are carried by a chute back to the crushing-rollers, all of which will be hereinafter set forth in detail.

In the drawing, the letter A designates an ore-crusher, which is, by preference, made in accordance with Letters Patent of the United States No. 20,542, granted to Eli W. Blake, and dated June 15, 1858.

Under said crusher A is arranged a sieve, B, which is inclined, as shown; and at the lower end of this sieve are located two crushing-rollers, C C′, such rollers being placed beneath the said lower end of the sieve, and being placed side by side in a horizontal plane. D designates a chute, situated below the crushing-rollers C C′. This chute D is inclined in an opposite direction to the sieve B, and leads into a well, D′, from which rises an elevator, E, consisting of an endless belt, carrying buckets, and which is stretched over rollers F F′. Contiguous to the upper part of the elevator E is arranged a sifter, G, in such a manner that a rotary motion can be given thereto. Said sifter G is open at both ends, and in the example shown it has an octagonal shape in cross-section; but it can be made round, or of any other desirable shape. Said sifter G, moreover, is arranged on an inclined plane, as shown. Under the said sifter is located a chute, H, which is inclined, and leads to a bin or reservoir, from which another chute leads to a suitable separator, I. From beneath the rear or lower end of the sifter G extends a chute, J, which is inclined in an opposite direction to the chute H, said chute J extending from the rear or lower end of the sifter to the crushing-rollers C C′.

The operation of my machine is as follows: The ore is fed into the crusher A, and thence falls on the sieve B, the fine particles going through the sieve, and falling into the well D′, while the coarse particles work their way down over the said sieve, and are conducted between the crushing-rollers C C′. By the action of the crushing-rollers C C′ said coarse particles are reduced mostly to the desired state of fineness, and they drop on the chute D, which leads to the well D′. From this well the ore is taken up by the buckets of the elevator E, and carried to the sifter G, the same being introduced to the said sifter by one of the open ends thereof; and if the sifter is rotated, the ore which is sufficiently fine passes through its meshes, and is received by the chute H, whence it is carried to the bin T. The ore which is too coarse to go through the meshes of the sifter G is discharged at the lower end thereof, and falls on the chute J, by which it is returned to the crushing-rollers C C′ to be recrushed. If desired, another set of crushing-rollers may be used for this purpose. The ore is then again passed into the well D′, and thence elevated to the sifter G. From the bin T the ore is carried over a suitable chute to the separating-machines, which are selected according to the nature of the ore.

This combination is applicable to ores of all descriptions.

If desired, suction-blowers may be applied to my apparatus, for the purpose of carrying off the dust.

By the peculiar combination of parts in my machine I am enabled to expedite the process of separating ore, and effect a considerable

economy in labor, inasmuch as by my combination three men are enabled to perform the same amount of work in twelve hours that it now takes ten men to do working twelve hours.

In carrying out my process, I use a crusher and rolls for reducing the ore in preference to stamps.

By the action of the stamps a large quantity of ore is ground up in a fine powder, which, when introduced into a blast-furnace, is mere waste. This disadvantage is avoided by the use of a crusher and of rolls.

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

The combination, in an apparatus for treating ore, of an ore-crusher, A, inclined sieve B, crushing-rollers C C′, inclined chute D, and well D′, elevator E, rotary sifter G, chutes H J, and separator I, the whole being constructed and operating substantially as described.

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Witnesses:

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