Rawlins & Stephens,

Ore Grinder.

NO. 94,771. Patented Sept. 14. 1869.

Fig. 1.

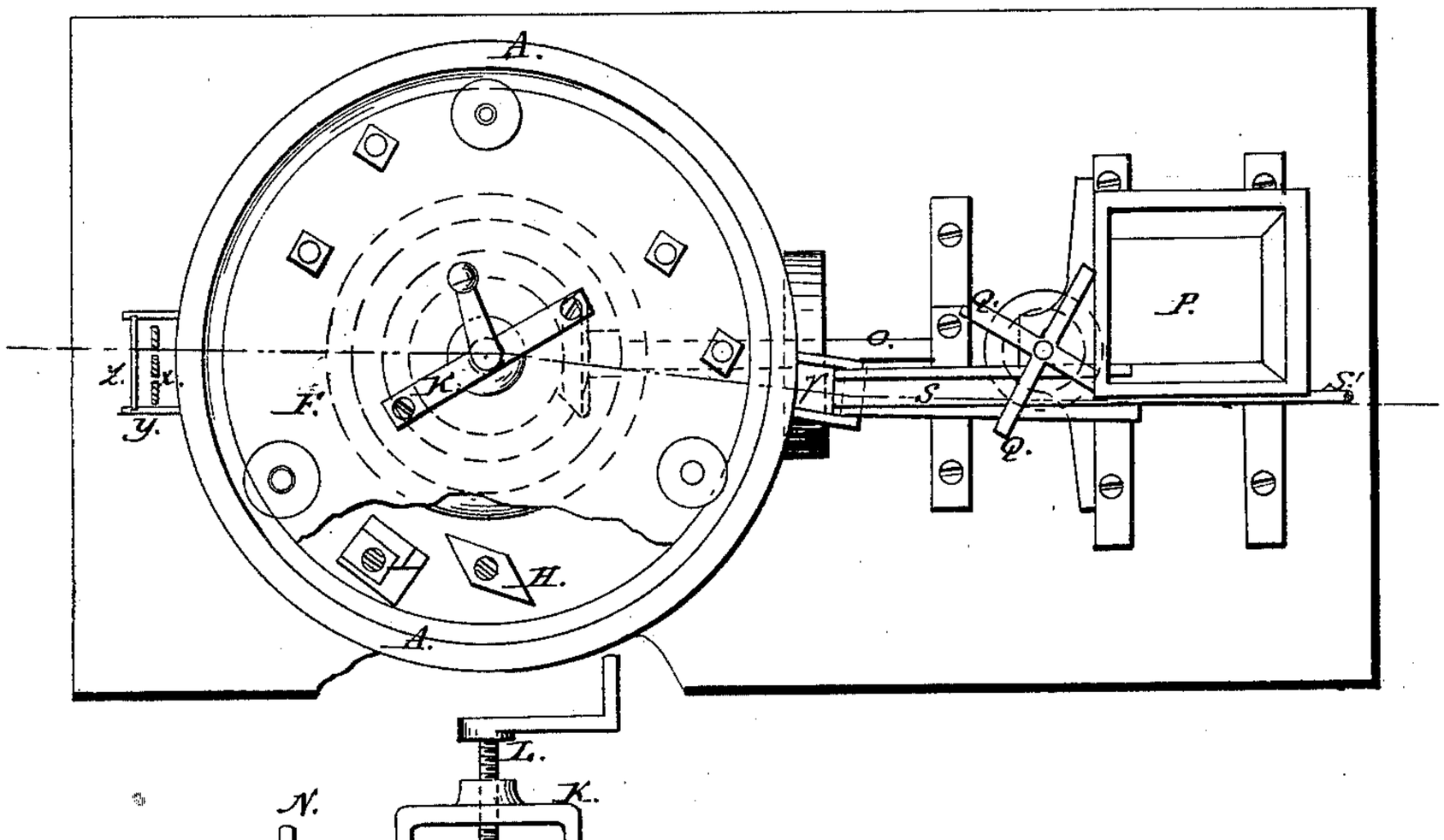
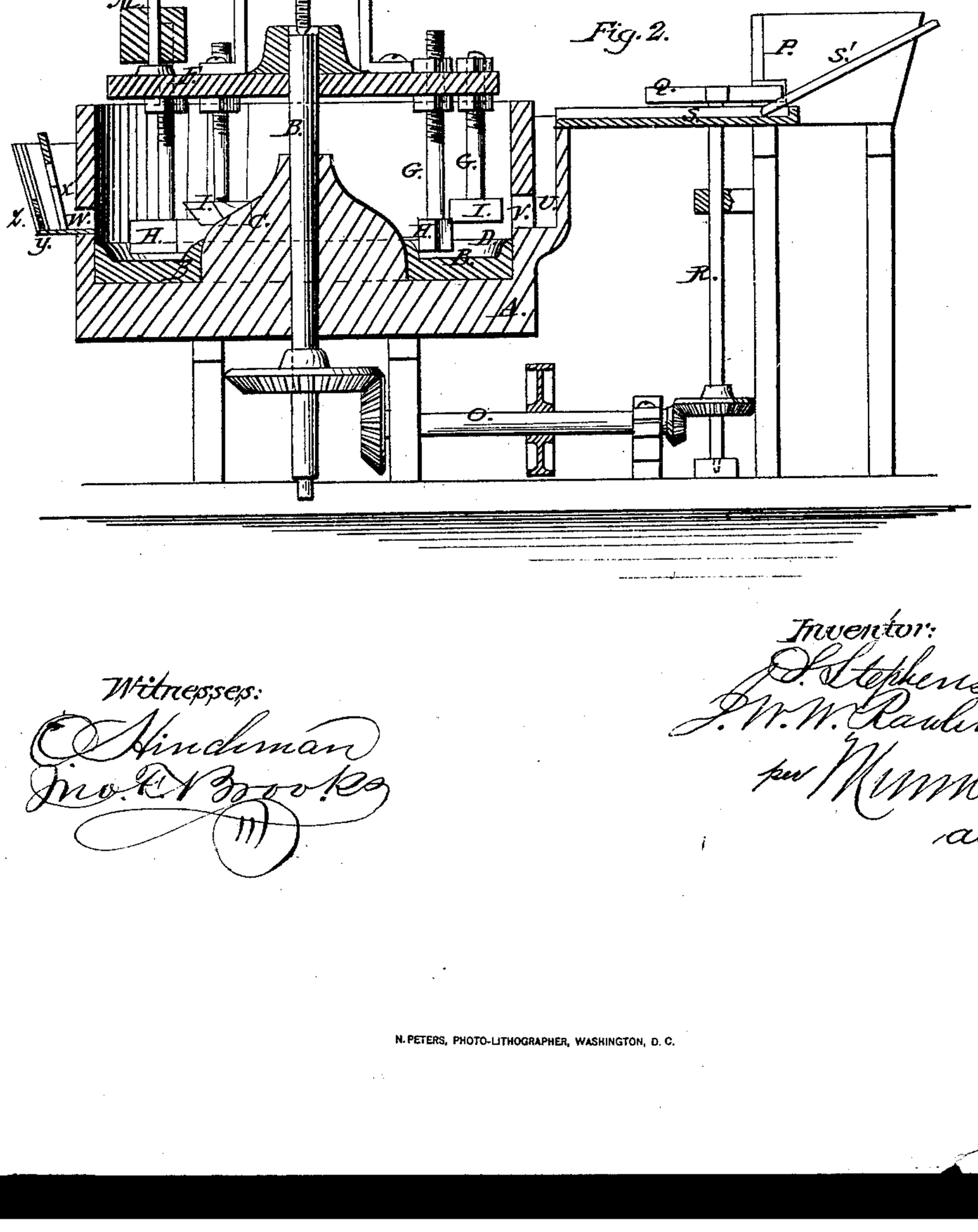


Fig. 2.



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United States Patent Office.

JOSEPH W. V. RAWLINS AND SAMUEL STEPHENS, OF HOUGHTON MICHIGAN.

Letters Patent No. 94,771, *dated September* 14, 1869.

IMPROVEMENT IN ORE-GRINDERS.

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

To all whom it may concern:

Be it known that we, JOSEPH W. V. RAWLINS and SAMUEL STEPHENS, of Houghton, in the county of Houghton, and State of Michigan, have invented a new and improved Ore-Grinder; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

The object of this invention is to provide a simple and efficient machine for grinding ores.

It consists of an arrangement of crushers or grinders, suspended adjustably from a revolving plate, so as to project into a tub or mortar, into which the ore is fed in a peculiar way, all as hereinafter more fully specified.

Figure 1 represents a plan view of our improved grinding-mechanism, with a part of the top broken away, and

Figure 2 represents a sectional elevation, taken on the line *x x* of fig. 1.

Similar letters of reference indicate corresponding parts.

A represents a tub or mortar, which may be made of wood, metal, or other substance, and provided with a detachable metallic bottom, B, preferably made of chilled cast-iron.

We prefer, also, to elevate the permanent bottom of the tub at the centre, as at C, and make a central opening in the detachable bottom to fit the said elevation, and we make curved flanges, D, both at the inner and outer margins of the said bottoms on the upper face.

Through the centre of the mortar rises a vertical revolving shaft, E, whereon is adjustably supported at the top, a strong circular plate or disk, F, and from this are suspended, on rigid but adjustable arms, G, two sets of crushers, H I; the one, I, formed so as to ride over the large lumps and crush them down, while the other set, H, is provided with sharp vertical edges, and arranged to wedge the ore on each side against the walls of the tub, also to split and crush those pieces against which the points strike. They are pointed at both ends, and may be turned to present either end to the front.

This plate F is fitted over the top of the shaft E, by a central hole, and is provided with a yoke, through which an adjusting screw, L, works upon the top of the shaft to adjust the plate up or down.

The rods G, which support the crushers, are provided with adjusting nuts above and below the plate F, for adjusting them.

The plate F is designed to be loaded with weights, M, according to the quality of the work in hand, and the weights may be supported on vertical pins, N.

The shaft E and plate F are operated by power applied at the bottom, from a driving-shaft, O.

For feeding, the broken ore is placed in an elevated hopper, P, having an opening in one side, above the bottom, through which revolving feeding-arms, Q, project as they swing around on a revolving shaft, R, also operated by the shaft O, and scrape out the lumps in the desired quantities into the feeding-trough S, through which the water used in the mortar to soften the ore is also fed from the spout S.

The water carries the ore through the said spout S, which terminates in a vertical passage, V, in the side of the tub, opening laterally into the said tub at V, under the crusher I.

W represents the discharge-passage, in front of which magnets, X, are suspended in a spout, Y, having adjustable gates, Z, to regulate the height of water in the mortar.

The magnets are designed to separate the iron from the crushed ore as it passes off with the water.

Having thus described our invention—

We claim as new, and desire to secure by Letters Patent—

1. The combination, with the mortar A, having the detachable bottom B, of the revolving crushers H I, suspended adjustably from the revolving shaft E, when arranged substantially as specified.

2. The arrangement of the hopper P, spouts S and and S′, feeding-arms Q, and mortar A, all substantially as specified.

3. The combination, with the mortar and crushers, of the weights M, detachably connected to the plate F, all substantially as specified.

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