

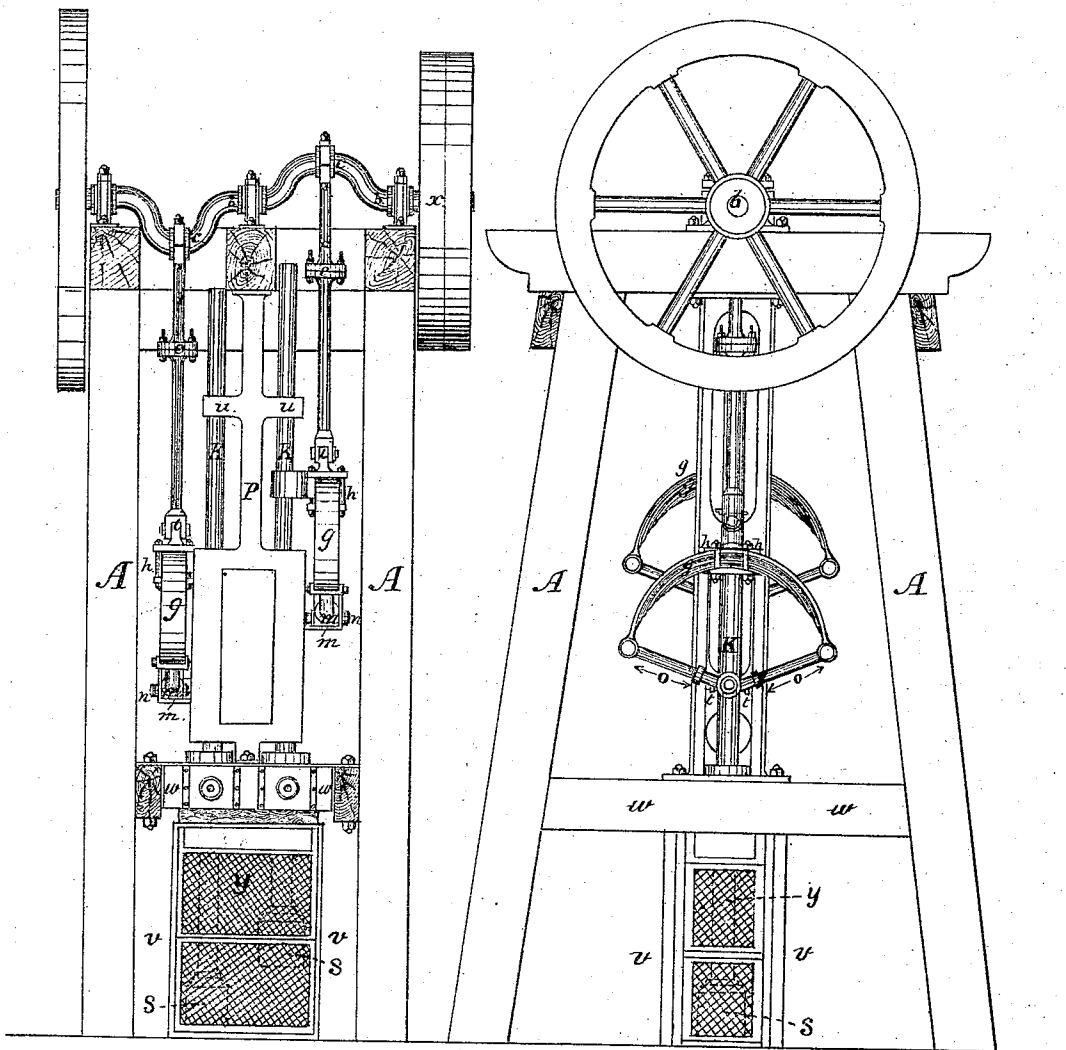
W., J. & S. WILLOUGHBY.
Machinery for Stamping Ores.

No. 153,029.

Patented July 14, 1874.

Fig 1.

Fig 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MACHINERY FOR STAMPING ORES.

Specification forming part of Letters Patent No. **153,029**, dated July 14, 1874; application filed
February 13, 1873.

To all whom it may concern:

Be it known that we, WILLIAM WILLOUGHBY, JOSEPH WILLOUGHBY, and SAMUEL WILLOUGHBY, all of Plymouth, in the county of Devon, Great Britain, engineers, have invented certain Improvements in Machinery for Stamping Ores and other hard substances, of which the following is a specification:

Our invention relates to machines made use of for stamping ores; and the nature thereof consists in certain improvements in the details of the construction of the same, and novel combination of the parts thereof, hereinafter described.

Figures 1 and 2 represent the front and side elevations of the machine.

A is a strong frame, of either wood or iron, upon which is fixed a crank-shaft, *b*, having two or more throws or cranks, *c*, according to the number of stampers required, and which cranks or throws are so arranged that the rods *d*, and their attachments, carrying the stamp-heads *s*, shall balance each other for the purpose of lessening the power necessary to impart the requisite motion. The connecting-rods *d* are made so as to admit of their being lengthened or shortened at the joint *e*, according to the wearing away or renewal of the stamp-heads *s*, and are attached by bushes at the one end to the crank *c* on shaft *b*, and at the other end to the top of the spring *g*, by means of the saddle-piece *h*, in which is a joint, *i*, allowing the necessary motion for the swing of the connecting-rod *d*. This saddle-piece *h* also carries on its side a bushing, *i*, which, while working freely over the stamp-rod *k*, and allowing full liberty for the stroke of the spring *g*, prevents the said spring being moved from its vertical position. To the metal springs *g*, and in the center of the flexible straps, pieces or connections *o*, which may be of leather or other elastic material, are suspended the stamp-rods *k*, with their stamp-heads *s*, by means of a boss, *m*, and projecting pin *n*, to which boss *m* are guide-blocks *t*, which serve to keep the rods *k* in their true position, and having also, for this purpose, an additional bushing, *u*, fixed on the central frame-support *p*. These bearings and guides,

being placed above the coffer *v*, are thus free from the action of water and grit. A loose bushing is placed in the cross-piece *w* to protect the rod and guides from any sudden jar or shock, as will sometimes occur in stamping. The coffer *v* consists of a strong frame surrounding the stamp-heads *s*, and furnished with the necessary grating or sieves *y*, through which the ore stuff passes when sufficiently pulverized. The machine being set in motion by means of the pulley *x*, keyed on the shaft *b*, and the requisite speed being obtained, the stroke of the stamp-rod and head inside the coffer *v* will be about four times the throw of the cranks *c*. The ore stuff being shot in at the back of the coffer, and a sufficient quantity of water therewith, the pulverized stuff passes through the gratings into a trough, to be conveyed to ordinary buddles or other approved washing apparatus. A stream of water is also conveyed by a pipe down by the sides of the rods *k* through the bushing in cross-piece *w*, which serves for the double purpose of lubrication and washing. When, however, the machinery is intended for crushing dry, the water-supply is dispensed with, and in place of gratings or sieves to the coffer *v*, covers or flaps of suitable material are applied to the openings in the coffer in the usual way.

The stamp-heads and dies may be of any form, and the arrangement for working the same, by means of the metal spring and flexible connection, varied according to circumstances.

Several methods may be adopted for feeding these stamping-machines, among others that of setting the chute behind the coffer at such an angle as to allow the ore stuff to fall gradually toward the head of the stamps *s*, which, after being pulverized, is washed through the grating *y* by the stream of water before mentioned; or the same may be performed by a trough or cylinder, in which is placed an archimedean screw, driven from the crank-shaft *b*, of such pitch and diameter as will allow of the ore stuff being freely passed down; or, again, the ore stuff may be passed into a shaking chute, which is raised

or lowered to regulate the supply under the stamp-head.

We are aware that elastic connections between the actuating mechanism and the stamp-rod have heretofore been used. (See, for instance, the patent to Geo. F. Case, December 13, 1870.)

We claim and desire to secure by Letters Patent of the United States—

The curvilinear shaft *b*, having throws *c*, the connecting-rods *d*, provided with adjustable joints *e*, the saddle-pieces *h*, having joints *i* and bushings working freely over the stamp-

rod, the springs *g*, the strap-pieces *o*, the boss *m*, the rod *k*, provided with a projecting pin, *n*, the central support *p*, having bushings *n*, and the cross-piece *w*, provided with bushings.

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