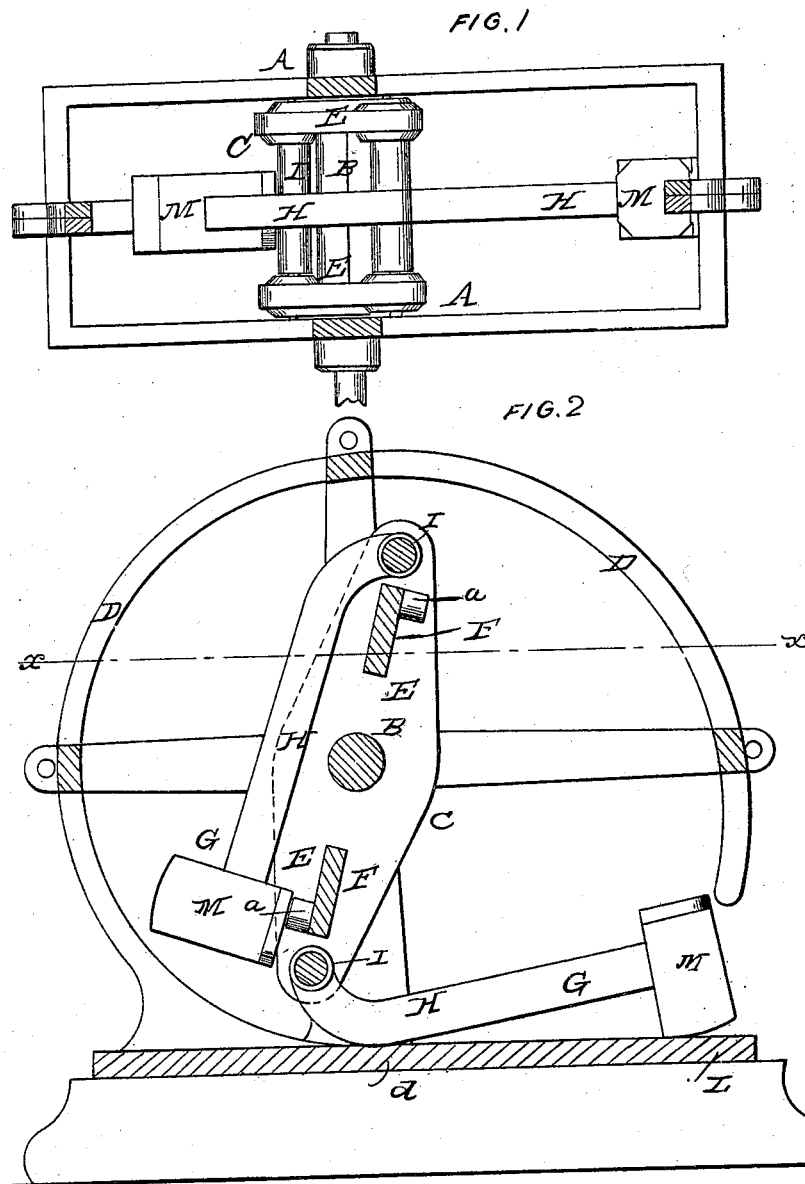


A. RIX.  
 Forging Apparatus.

No. 52,447.

Patented Feb. 6, 1866.



WITNESSES  
*J. M. Livingston*  
*Wm. Brewin*

INVENTOR  
*A. Rix*  
 Per *Munn & Co*  
*Attys*

# UNITED STATES PATENT OFFICE.

ALFRED RIX, OF SAN FRANCISCO, CALIFORNIA.

## IMPROVEMENT IN FORGING APPARATUS.

Specification forming part of Letters Patent No. 52,447, dated February 6, 1866.

*To all whom it may concern:*

Be it known that I, ALFRED RIX, of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Revolving Hammer; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan or top view, and Fig. 2 a central longitudinal vertical section, of the frame-work in which the hammers revolve.

One of the distinguishing and principal features of my invention consists in attaching hammers to a vertically-revolving arm or its equivalent device in such a manner that while the tail end of the handle of each hammer is attached by a joint to the arm at a point on one side of a circle about the axis of revolution, the back stop of the hammer, as well as the hammer-head itself, when against the stop, will be in advance of, but near to, the opposite point of the same circle. This arrangement allows the hammer to strike a natural hammer blow, and admits of their being gradually withdrawn from the anvil-block and easily guided while in motion.

In order to enable other persons skilled in the art to which my invention appertains to construct and use the same, I will proceed to describe it in connection with the drawings, and to do this the more clearly, and at the same time to furnish an example of its application to useful purposes, I will describe it for the crushing of metallic ores.

In the journal-boxes of the frame A rests the horizontal transverse shaft B, which may be driven by a pulley and belt or in any other proper manner. To the shaft is rigidly fastened the double arm C, made of any desired length, but a little less than the diameter of the circular-shaped portion D of the frame A, described from the center of the said shaft.

The two side pieces, E E, of the arm are rigidly connected by the cross-pieces F F. In each cross-piece F is inserted a cylindrical or other suitable shaped plug or stop, *a*, or in any other proper manner attached thereto, each of which forms a back stop for the hammers G G, hung in each end of the arm C by their handle H, by means of an elbow-joint, I. From these

joints all dirt can be excluded by winding a strip of blanket or other proper material about them, and securing it by winding over it a coiled spring or other elastic band, or in any other suitable way. These joint-pins are riveted sufficiently to prevent their turning in the arm, but are loose in the hub of the hammer-handle, so as to allow it to freely turn thereon, and can be oiled through any suitable aperture made in the handle-hub to permit oil or other lubricating medium to be used.

There may be a bend in either the handle of the hammer or the arm C to which they are hung, in order to allow the full force of the hammer to strike the die-block L; but I deem it best to have the bend in the handle, so that its elbow-joint may be as far as possible from the die-block when the blow is struck.

The hammers are attached to the arm with such a length of handle that when they are kept upon their stops and revolved their outer extremities will coincide, or nearly so, with the arc of the circular-shaped frame before referred to.

To the outer or free end of each handle is secured a hammer-shoe, M, in any proper manner to permit it to be removed and easily replaced by a new one when it has become light from being worn and thus useless.

The anvil-block L, I intend to make of a solid block of iron or other suitable material, of a weight proportionate to that of the hammers, or, in other words, of the common anvil and sledge hammer, and into the upper part of the anvil-block the die is to be fitted, made of sufficient strength that it will not be broken by the hammers, and of a width equal to or slightly exceeding that of the hammers.

In the revolving of the hammer-arm about its center shaft the tendency of the hammers to fly out while in motion, in obedience to the centrifugal force thus imparted thereto, is prevented by the circular-shaped frame hereinbefore referred to, which frame extends from the rear end, *d*, of the die-block backward, in line with the face of the die, to the point directly under the shaft, and thence backward and upward, in the line described by the hammers in their revolution, to its highest point, or somewhat beyond, as plainly seen in section in Fig. 2 of the drawings.

The ore, to be crushed in the same state as when introduced to ordinary stamp-mills, is fed

to the die-block at the proper times through any suitable arrangement of feed devices, when, as the hammer-arm is revolved in the direction represented by a red arrow in the drawings, the hammer-heads in turn are brought down upon the same, crushing it, while, as the arm continues its revolution, each hammer is drawn over the face of the die-block, thus also producing a grinding effect upon the ore, which also by this means is drawn off the die-block, from which it can pass through any suitable delivery-spout to a sifting arrangement, or to any other devices to the action of which it may be deemed desirable to then subject it.

The feed of the ore to the anvil-block should be at all times during the stamping operation sufficiently liberal, so as not to allow the hammers to come directly in contact with the die.

From the above description it is obvious that the intensity of the blow given by the hammers to the ore can be varied in many ways—as, for instance, first, by increasing or diminishing the speed with which their common arm is revolved; second, by increasing or decreasing their weight; and, third, by increasing or decreasing the distance at which the stops are placed from the point in the circle opposite to the elbow-joint and lengthening or shortening the handles accordingly, and if this distance is sufficiently increased three or four hammers instead of two may be used; but there will result increased centrifugal force and a proportional increased pressure and wear of the hammers on the die and guide, more power will also be required to run it, and the strain on many parts of the machine will be greater.

The purposes to which my hammers can be applied are many and various, and can be used in almost all cases where any considerable number of successive blows are required, as in crushing ores and other substances, and also in forging, pounding hides and leather, &c., slight alterations, perhaps, being required either in the form, material, and proportions

of the machine itself, in order to adapt it to its respective uses, and perhaps, also, the precise manner described of sustaining the hammers will also be required to be changed, but the principle of operation in all cases will be the same.

Among the many advantages of my improved revolving hammer may be here mentioned that the recoil and consequent jar, strain, and wear of the joints and bearings is almost entirely avoided; that the hammer is drawn slowly from the die; that the velocity and the weight of the hammers may be proportioned to suit the effect desired, that a natural hammer-blow is produced, and the hammers can be easily controlled and guided.

I wish it distinctly understood that the chief feature of my invention is not dependent on the specific apparatus herein described, for it may be carried into effect by various other arrangements, and depends simply on the relative arrangement of the axis of rotation of the arm, the pivotal point of the hammer's handle, and the back stop of the hammer, as described.

I do not claim, broadly, the use of revolving hammers; but

What I do claim is—

1. Connecting the handle of the hammer to the arm or its equivalent, and so adjusting the length of said handle and arranging the several parts that the hammer, when retracted, shall rest upon a support fixed upon the opposite end or intermediate portion of the arm, or its equivalent, which lies within or nearly within the plane projected of the axis of movement of the hammer and the axis of rotation of the arm, substantially as described.

2. The guide D, constructed and used substantially in the manner and for the purpose specified.

ALFRED RIX.

Witnesses:

HUGH LOGAN,  
GEORGE D. SYMONDS.