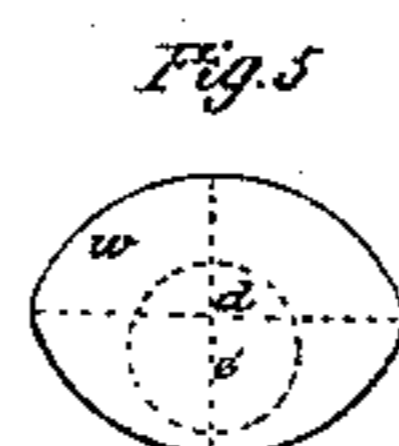
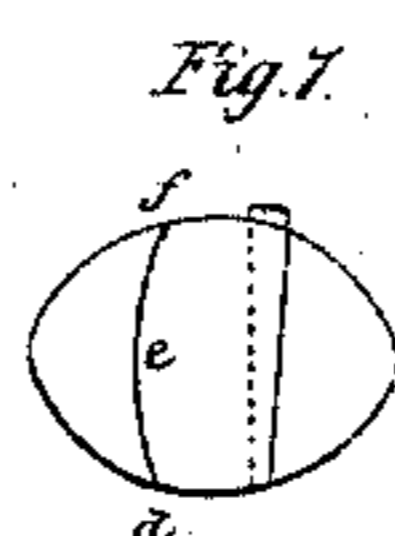
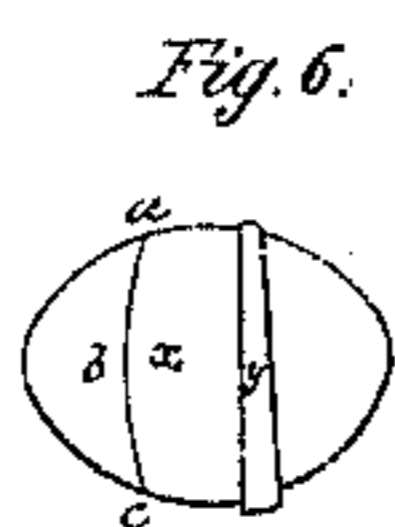
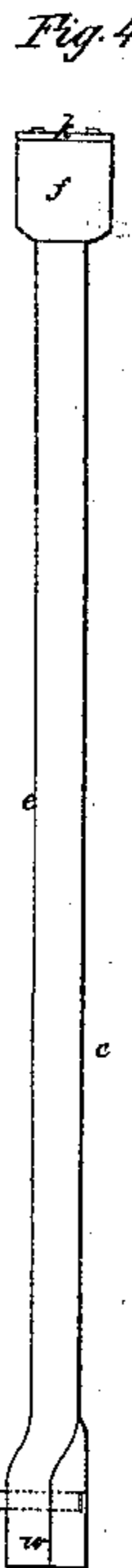
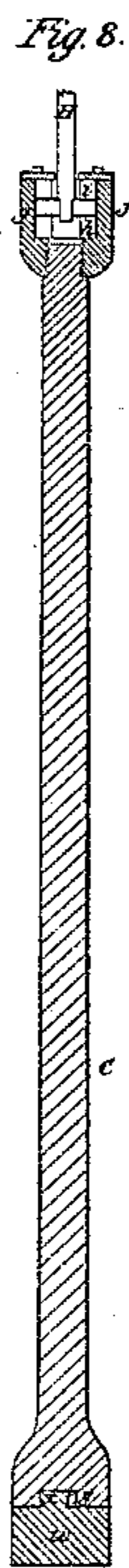
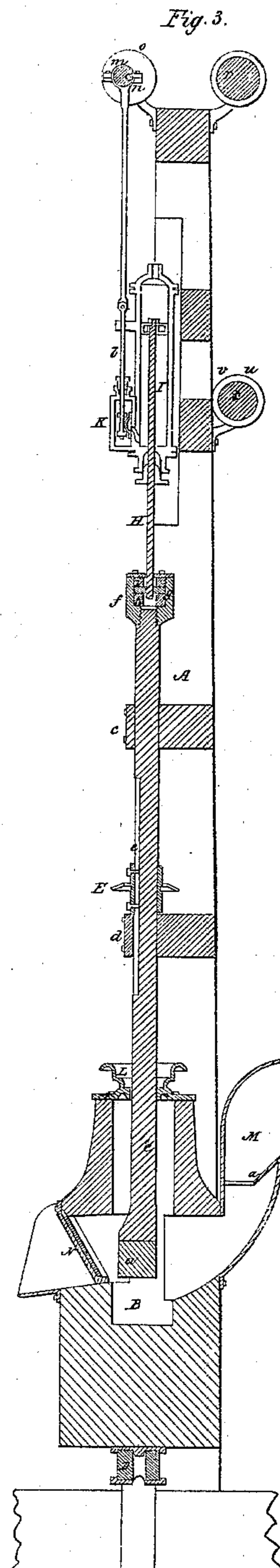
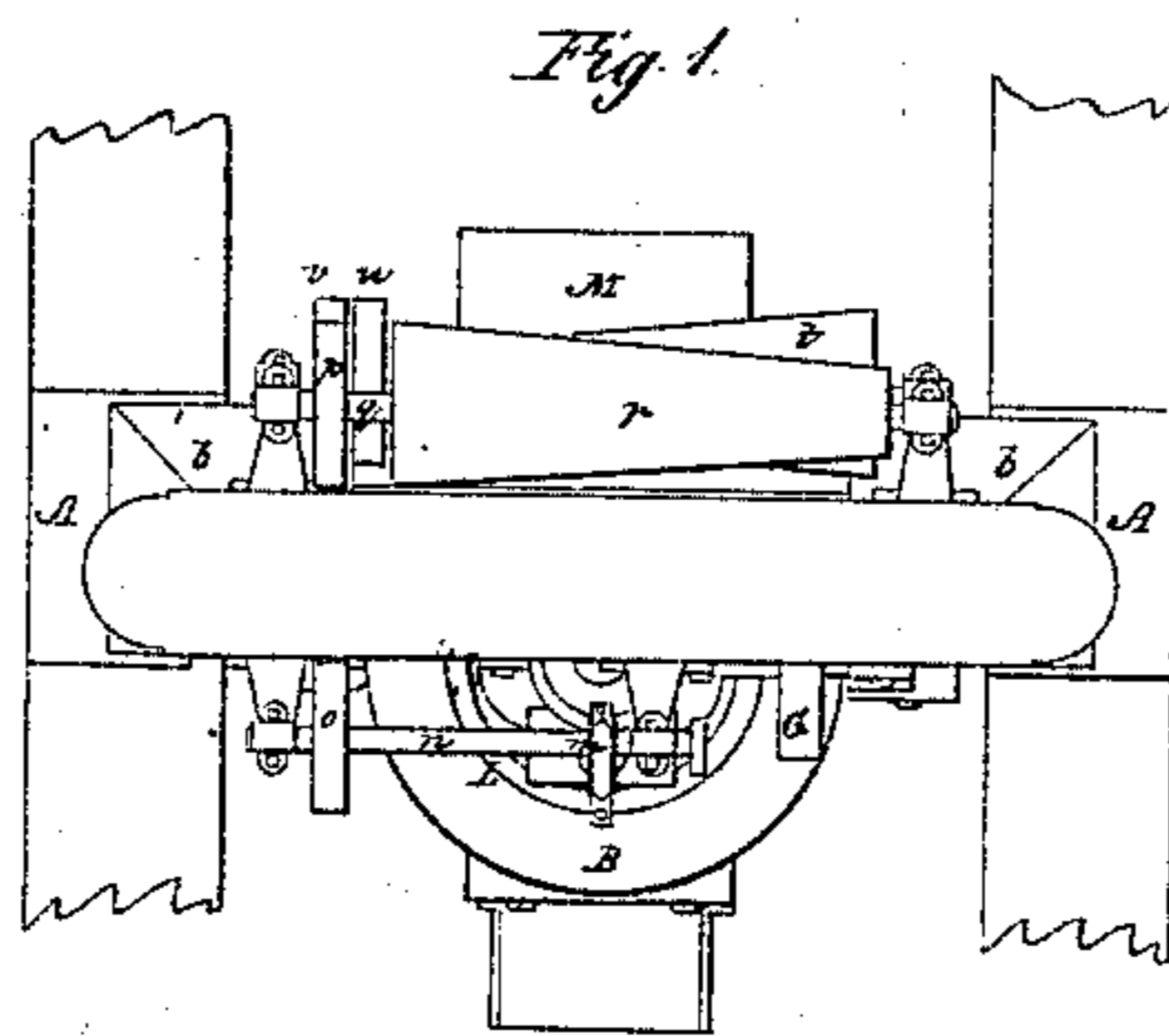
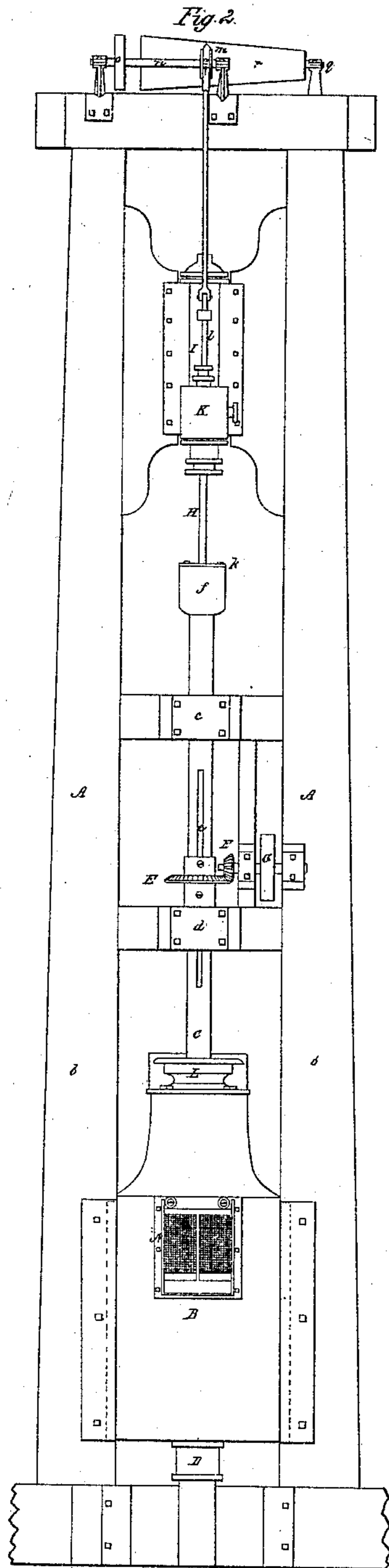


No. 8,818.

PATENTED MAR. 23, 1852.

W. BALL.  
MACHINE FOR STAMPING ORE.



# UNITED STATES PATENT OFFICE.

WILLIAM BALL, OF CHICOPEE, MASSACHUSETTS.

## MACHINE FOR STAMPING ORES.

Specification of Letters Patent No. 8,818, dated March 23, 1852.

*To all whom it may concern:*

Be it known that I, WILLIAM BALL, of Chicopee, in the county of Hampden and State of Massachusetts, have invented an

5 Improved Machine for Stamping Auriferous or other Ores or Minerals; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, 10 letters, figures, and references thereof.

Of the said drawings Figure 1 denotes a top view of my said machine. Fig. 2 is a front elevation of it. Fig. 3 is a central, vertical and transverse section of it.

15 In the said drawings A represents the framework which supports the operative parts of my machine.

B is the crushing mortar or vessel for the reception of ore, and holding it while 20 it is pulverized by the stamper. This mortar has a bent hopper, spout M or conductor leading into it on its rear side and curved or shaped as seen in Fig. 3. Within the said hopper one or more inclined plates *a*, 25 are disposed as seen in Fig. 3, and are for the purpose of preventing the ore and water from being splashed or thrown out by the blows of the stamper, as when a current of water is thrown up the entrance spout it 30 will generally strike against the under side of the deflector, and by it be thrown back into the mortar.

A stamper C is placed within the mortar and operated by the action of gravity and 35 the power of a steam engine as will be hereinafter described. The mortar rests on one or more very strong springs D made of india rubber or other proper material, and it is so held or supported within the up- 40 rights or posts *b*, *b*, of the frame A as to be capable of a free vertical play or movement on its supporting springs.

The stamper consists of a very heavy metallic bar or rod which is made to play 45 up and down vertically in bearings as seen at *c*, *d*, and through the eye of a bevel gear E, from which projections extend into a long groove *e* made in the stamper so as to cause the stamper not only to revolve with 50 the bevel gear, but to be able to rise or fall independently of it. This bevel gear is rotated by means of a bevel pinion F, fixed on the shaft of a pulley G, the said pulley being turned by a band proceeding from 55 any driving drum or power. The upper

end of the stamper is connected to the piston rod H of a steam cylinder I. The connection is made by means of a circular head *f* fixed on the rod H and inserted within 60 a cylindrical cavity *g* formed down in the upper end of the stamper. Under and above the head *f* is an india rubber or other proper spring *h*, or *i*, the whole being covered by a cap plate *k* which is confined on 65 the top of the stamper by screws.

The valve chest of the steam cylinder is seen at K. It receives steam from a steam generator in any proper way, and should 70 have its induction and eduction steam passages so arranged, and its valve operated as to cause the piston to be elevated by the pressure of the steam and depressed by the 75 gravitating power of the stamper and piston. The valve rod *l* is worked by an eccentric *m*, fixed on a shaft *n* arranged as seen in the drawings. On the said shaft there 80 is fastened a pulley *o*, around which and another pulley *p* fixed on a shaft *q* an endless belt passes. A cone drum *r* is also fixed on the shaft *q* and receives its motion from 85 a belt which is driven by another cone drum *t* that has upon its shaft a fast pulley *u* and a loose pulley *v*, the main driving belt being made to run on either of the latter 90 pulleys as occasion may require. By such mechanism the speed or vertical movements of the steam valve and the piston are produced and rendered faster or slower as may be desirable.

From the above it will be seen that as the 90 stamper rod plays up and down through its lower bearing *d* and the stamper operates within the mortar while the latter is made to contain ore and water, much grit or 95 earthy particles are liable to collect on the stamper rod and wear its bearing. In the stampers of machines in general use, this is a very serious difficulty, and in order to prevent it in my machine I surround the 100 stamper rod with a basin or cup L, which is made to rest on and be fastened to the top of the mortar, the stamper rod playing freely through the basin or through a hole in its bottom somewhat larger in diameter than 105 that of the rod. And I cause a stream of water to flow into the said basin and from thence to pass down through the hole in its bottom and around the stamper rod and into the mortar, so as to wash off from the 110 stamper rod any silicious or earthy particles

which by collecting on it would be carried up into the bearing and wear it and the rod, while the rod is in motion.

Water and auriferous ore are introduced into the mortar through the spout or hopper M. The stream of water after filling the mortar to the extent required passes off through the grating N, placed in the front of the upper part of the mortar. This grating or grate has an inclined position given to it as seen in the drawings, and its meshes or interstices are made of a size such as will retain within the mortar any ore that may not be sufficiently pulverized. It is inclined in the manner shown in Fig. 3 instead of being placed upright as it is in other stamping machines for the purpose of preventing any particles or pieces of rock from being thrown through it as is often the case when the upright grates are used. When the mortar is charged with ore the top of the charge is generally up to a level with, or may be a little above the bottom of the grate. Under these circumstances a downward blow of the stamper on the mass will often cause pieces of rock or ore to be projected laterally and horizontally or thereabouts with great force, often such as will throw them entirely through the grate and thus spoil it and require a new one to be inserted. By arranging the grate in the inclined manner as represented in the drawings, pieces of rock when so thrown against it will be deflected by means of its inclined surface and will thereby not act on such surface with a power sufficient to enable them to pass through or injure the grate. They will be thrown upward from the grate and back into the mortar.

Fig. 4 denotes a side view of the stamper and its rod. Fig. 5 is a bottom view of it. Fig. 6 is a top view of the stamper or stamper head as it is sometimes termed. Fig. 7 is a bottom view of the stamper rod. Fig. 8 is a section through the stamper head, rod and key. Fig. 9 is another side view of the stamper and its rod showing the end of the wedge key.

The stamper head *w*, is fastened to its rod by means of a dovetail connection *x* and a wedge key *v*. One side of the dovetail instead of being straight like the other or that against which the wedge key is forced, is made curved to the arc of a circle as seen at *a, b, c*, in Fig. 6, the adjacent side of the recess in which the dovetail is placed being similarly curved as seen at *d, e, f*, in Fig. 7. When the stamper head is put in place and the key driven up, the curved edges of the dovetail surfaces not only allow them to slide upon each other for the express purpose of allowing the opposite or straight side of the dovetail *x* to turn either way and thereby form a universal dovetail connection whereby any imperfection in the rough

cast iron dovetail *x* will not prevent the key *y* from bringing it to bear firmly on three parts of the two sides on the straight side to adjust itself to the key for a firm and equal bearing, but they prevent it from moving laterally out of place. The wedge key is driven into the connection on that side of the stamper head which is nearest to the side of the mortar, the side of the mortar serving to keep the key in place. The lower part of the stamper is made so as to have a larger stamping surface on one side of the vertical axis of the rod than there is on the other; that is to say, the center *d'* of the stamping surface is arranged at a distance from the axis *e'* of the rod, see Fig. 5. This as the stamp rod is rotated causes the lower end of the stamp to continually strike in a fresh place on the ore or charge, and prevents it from packing in the mortar as is constantly the case where a cylindrical stamp is used. It also exposes a fresh quantity to each blow and enables each blow by its concussion to loosen the particles of that part of the charge on which it does not directly act. I am aware that a rock drill is rotated so as to gradually cut around the surface removed by it. Such an instrument is not used for the purpose, as is the stamper about described, the object of the former being to cut away a surface while that of the latter is to crack or break up a body or mass lying between it and a bed or bottom of a mortar. The operations of the two belong to entirely different arts, and the instrument that would suffice for the one would by no means be practically useful in the other. The effect of my improved stamping apparatus in comparison with that kind in general use has been found to be such that with ten horse power applied to one stamper I have been able to do about double the work that is done with twenty four stamps and seventy five horse power, and now being used at the Teherian gold mine in Fluvanna county, Virginia.

The improved mode of connecting the stamper head to its rod is of great convenience and advantage as it enables the stamper head to always keep itself in adjustment however irregular it may wear on its bottom, and thereby prevents it from accidents which are constantly occurring to the stamper heads as usually made and applied. It will not answer, nor forms no part of my improvement to make the sides of the dovetail connection obtuse angular in shape instead of arcs of a circle. They must be arcs of a circle to produce the effect desired.

What I claim as my improvement is as follows:

1. I claim the combination of the washing basin of contrivance L, with the stamp rod and its bearing so as to operate in manner and for the purpose as specified.

2. I also claim the deflective plate in the entrance spout or hopper as combined with the same and the mortar and stamper and used for the purpose as specified.

5 3. I also claim the improvement in the stamp head, or the making of it with a greater stamping surface on one side of its axis of rotation than it is on the other; the same being for the purpose of preventing  
10 packing of the charge as specified.

4. The mode of applying the stamp head

to the stamp rod, viz., by means of the circular arcs or curves of the sides of the universal dovetail connection with the wedge key as described.

In testimony whereof I have hereto set my signature this third day of November, A. D. 1851.

WM. BALL.

Witnesses:

PHILANDER H. STREET,  
WM. WHEELER.

15