

(No Model.)

W. H. HOWLAND.
Mining Riffle.

No. 236,498.

Patented Jan. 11, 1881.

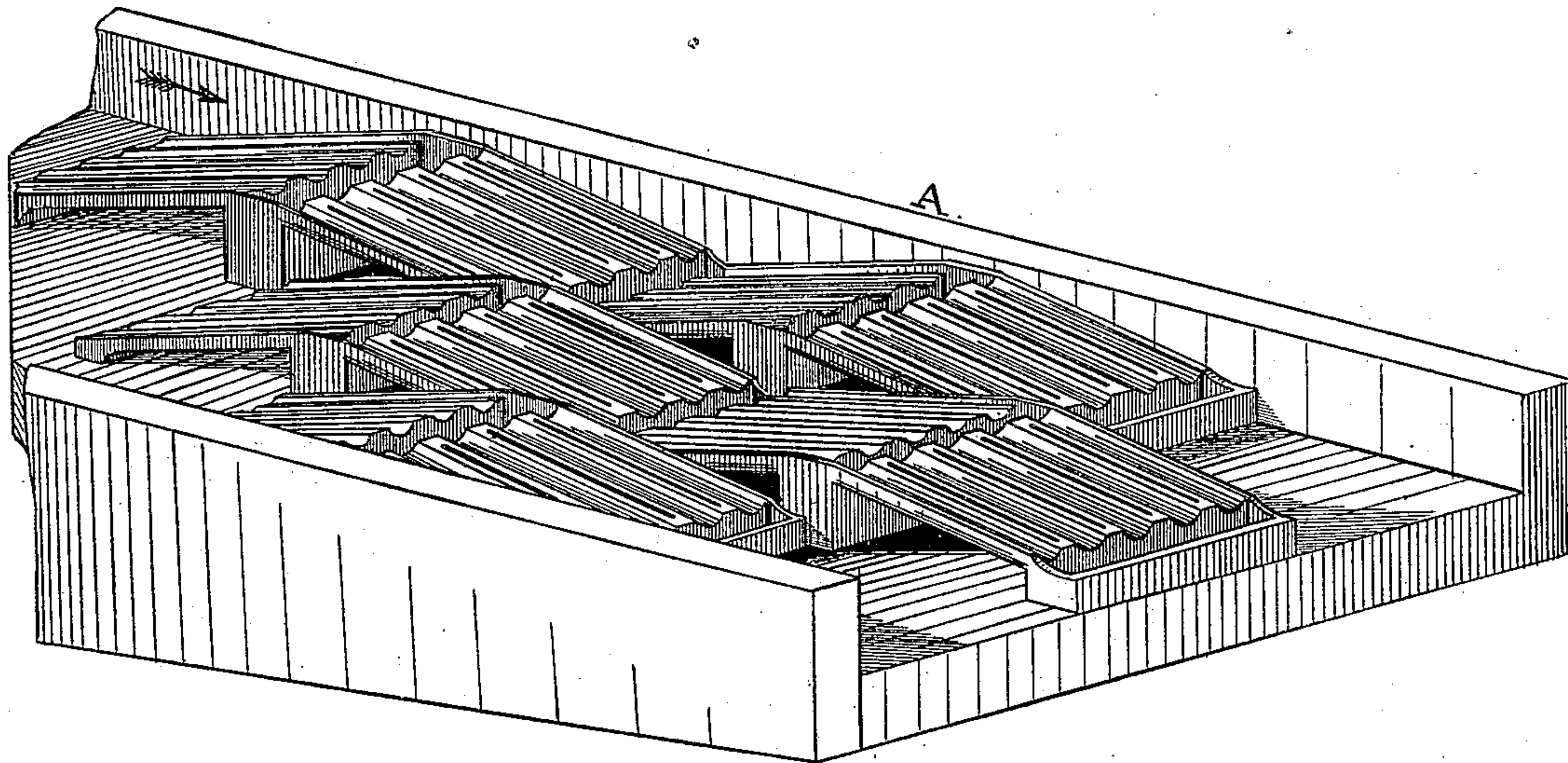


Fig. 1.

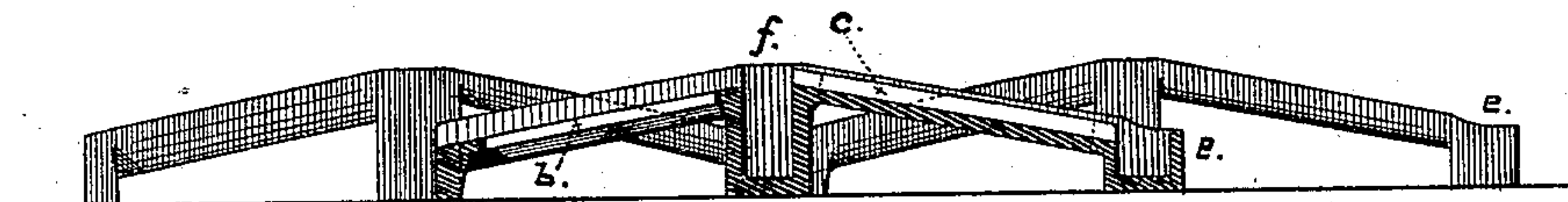


Fig. 2.

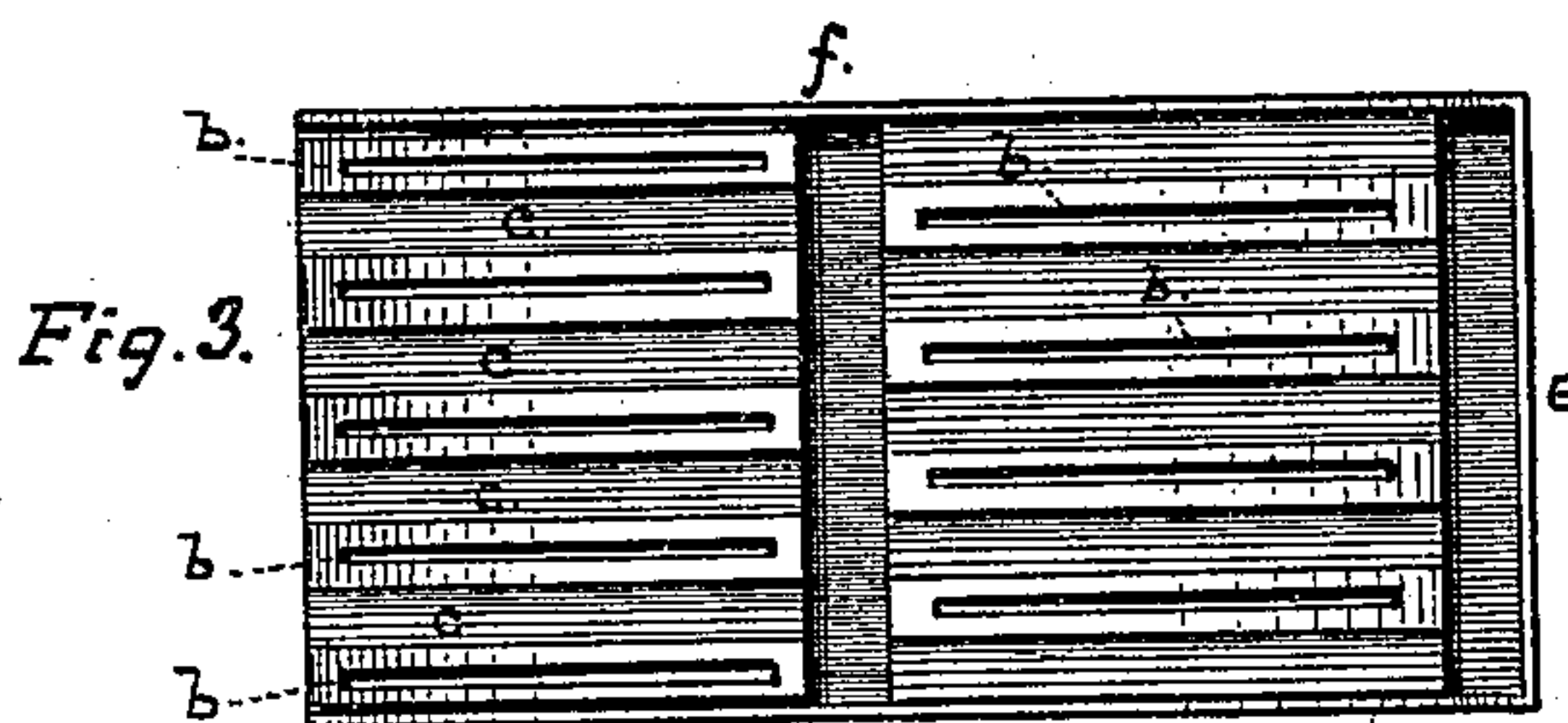


Fig. 3.

Witnesses:
John L. Boone
Wm. F. Clark

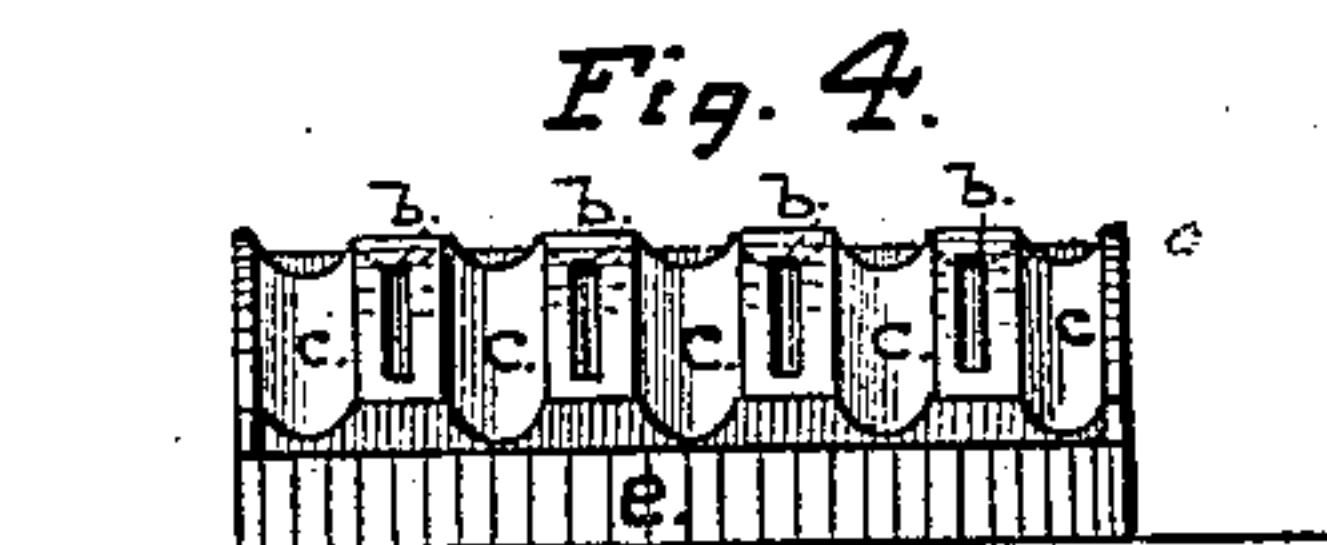


Fig. 4.

Inventor:
William H. Howland.
By his Atty.,
George T. Brown

UNITED STATES PATENT OFFICE.

WILLIAM H. HOWLAND, OF OAKLAND, CALIFORNIA.

MINING-RIFFLE.

SPECIFICATION forming part of Letters Patent No. 236,498, dated January 11, 1881.

Application filed May 31, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HOWLAND, of Oakland, county of Alameda, in the State of California, have invented an Improved Mining-Riffle; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to an improved device for saving gold and sulphurets, in sluices and flumes, in place of the riffle-bars and other obstructions heretofore in use for that purpose.

It consists of a peculiar cast-iron grating which is made in sections, so that it can be taken up in pieces when desired. Each section is made in the form of a ridge-roof, and its inclines are slotted or perforated throughout their length. The under side of each section is formed with obstructions for arresting the heavy particles, and a quicksilver-chamber is provided at each end of the section. The sections are placed in lengthwise upon the bottom of the sluice or flume in two or more rows, according to the width of the sluice, and the sections in one row overlap the sections in the next row, so as to form a broken undulating surface that will break up the current of water and direct it in various directions in such a manner that the heavy particles are caught and retained, all as hereinafter more fully described.

Referring to the accompanying drawings, Figure 1 is a perspective view of a portion of the flume or sluice with my improved riffles arranged therein. Fig. 2 is an elevation of several riffles, one being shown in section. Fig. 3 is a top view. Fig. 4 is an end elevation of one of the riffles.

Let A represent a section of a mining flume or sluice, through which auriferous material is carried by a stream of water. Upon the bottom of this sluice or flume I place the riffle-sections, (represented more distinctly at Figs. 2 and 3,) so that they will cover the bottom or floor of the sluice or flume to a greater or less extent of its length, according to the necessity of each case. The sections are placed in rows lengthwise upon the bottom of the sluice, and the sections in one row overlap or break joints with the sections of the adjoining row, as represented. Each section is made of cast-iron

in the form of a ridge-roof, and the incline on each side of the ridge or apex is provided with a number of parallel slots, *b*, extending its entire length. The slots on one side of the ridge alternate with the slots on the opposite side. The portion of metal *c* between each two slots is hollowed out on its upper surface, so as to form channels or grooves, so that the slots on one side will be in line with the grooves on the opposite side of the ridge. I prefer this construction, although the arrangement of the slots and grooves might be varied in a number of ways, all of which would be effective in a greater or less degree. At the bottom of each incline is a transverse shallow box, *e*, in which quicksilver is contained, and on which the end of the section rests. The grooves *c* lead directly into these boxes. A vertical partition, *f*, extends downward from the under side of the ridge or apex to the floor of the sluice, and may also be made hollow, like a box, and contain quicksilver, thus forming a riffle-bar or obstruction for arresting the heavy particles and supporting the middle of the section.

The sections are placed in longitudinal rows on the bottom of the sluice or flume, so that their ends abut against each other, two or more rows being used. The sections in one row overlap the sections in the adjoining row, so that the ends of the sections in one row come opposite the middle partition, *f*, of the adjoining row. The sections can be made of any desired size, and their width should be gaged so as to cover the entire width of the sluice. The current of water carrying the auriferous material will then strike the upper incline as it moves down the sluice, and a large portion will pass through the slots *b* into the chamber underneath, while the large particles and a portion of the fine particles will follow the grooves *c* up over the quicksilver in the hollow partition *f*, and thence across and through the slots on the opposite side or over onto the next section. The portion that passes through the slots into the first chamber underneath the section will be arrested by the partition or obstruction *f*, and an eddy will be formed, in which the heavy particles will settle, while the water and lighter portions pass out through the open side of the chamber and diagonally

across upon the first incline of the following section in the adjoining row, where the operation is repeated. The current is thus separated, broken, and directed from one section to the other, and from one row of sections to the other row throughout the entire length of the covered floor of the sluice. This produces a slow upper current and a quick-moving and broken under current, while the partitions *f* form eddies against which the heavy particles find lodgment. The effect of alternating the sections in the adjoining rows is to produce cross-currents, which prevents the sand and clay from packing and washes the sulphurets and heavy particles, so as to keep them in a clean condition.

The ridge shape of the sections and the sharp corners of the grooved bars *c* present a roughened surface to any large or heavy lumps that may be passing with the current, and serve to disintegrate and pulverize them, and thus liberate any particles of gold or sulphurets that may be carried by or in them. This feature renders this style of riffle especially valuable in hydraulic mining, as with the old style of riffle a large quantity of precious metals was lost by being thus inclosed in large particles of clay, and this has heretofore been so common that these large particles were known as "robbers," and various mechanical devices have been attempted for reducing them in the flume. This riffle, however, accomplishes the object by its grating action upon the lumps as they are moved forward by the force of the current. The free particles of gold are brought in contact with the mercury in the boxes over which they are compelled to pass, and are thus amalgamated and saved, and in case any quicksilver or amalgam should escape from

any of the boxes they will be caught in some of the succeeding sections with the sulphurets and other heavy particles.

This style of riffle can be used below batteries for catching the free gold, quicksilver, and amalgam, in which case I shall make them quite small.

In some instances the quicksilver-troughs and the grooves in the intermediate bars, *c*, might be dispensed with.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A mining-riffle composed of roof-shaped gridiron-sections placed in contact with each other on the bottom of the sluice.

2. A mining-riffle composed of roof-shaped sections *A*, each of which is provided with parallel longitudinal slots *b* and intermediate grooved bars, *c*, on each side of the apex, substantially as described.

3. The riffle-sections *A*, having the alternate longitudinal slots *b* and intermediate grooved bars, *c*, and having the partition *f*, said riffle-sections being provided with the transverse quicksilver-troughs *e*, substantially as above described.

4. A mining-riffle composed of a number of roof-shaped gridiron-sections, *A*, placed in longitudinal rows on the bottom of the sluice or flume, so as to be in contact with each other, the sections in adjoining rows overlapping each other, substantially as specified.

Witness my hand and seal this 24th day of April A. D. 1880.

WILLIAM H. HOWLAND. [L. S.]

In presence of—

WM. F. CLARK,

EDWARD E. OSBORN.