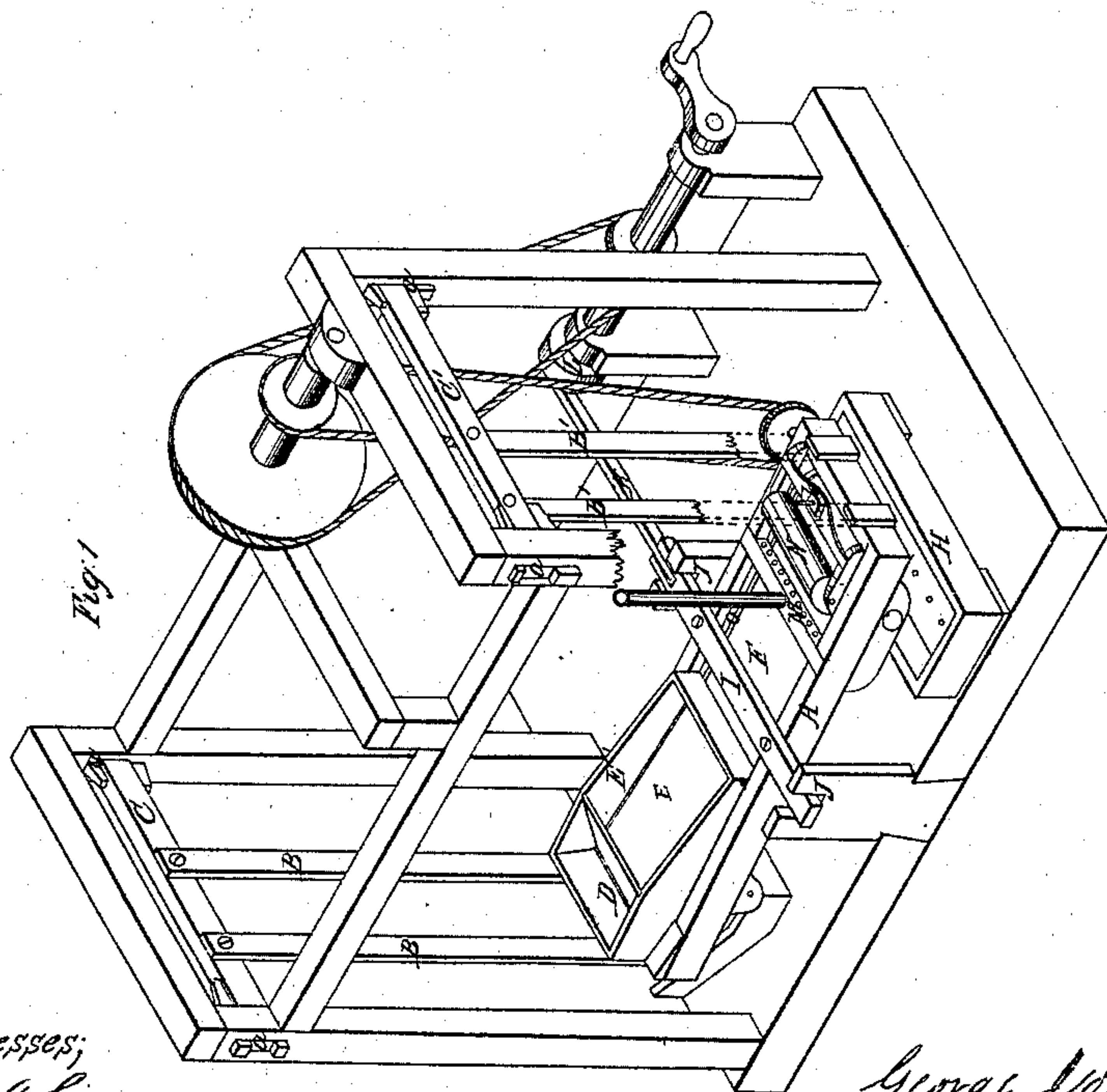
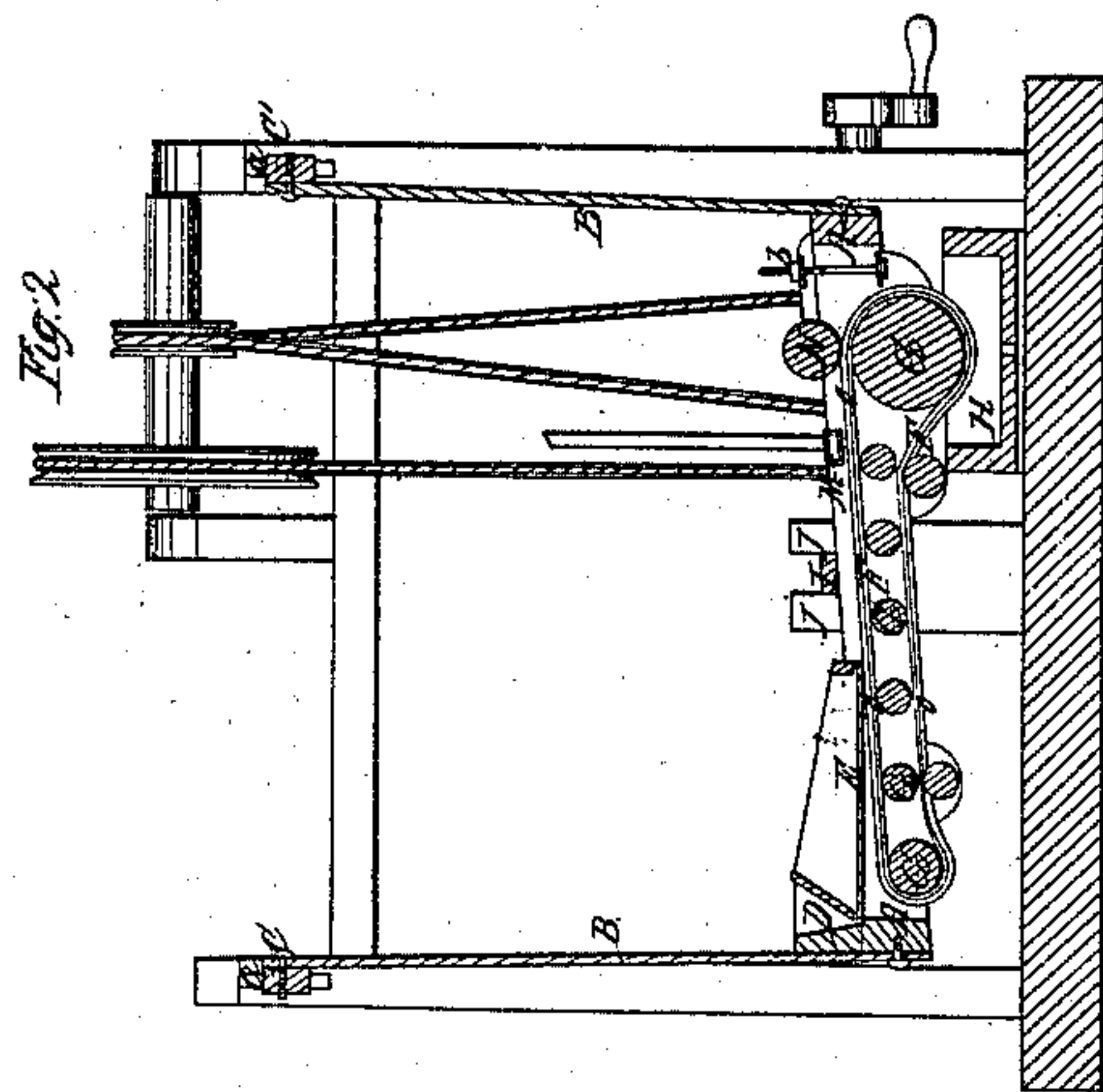


G. JOHNSTON & E. G. SMITH.  
AMALGAMATOR AND CONCENTRATOR.

No. 66,499.

Patented July 9, 1867.



Witnesses,  
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By their Attys Dewey & Co



# United States Patent Office

GEORGE JOHNSTON AND EDWIN G. SMITH, OF AUBURN, CALIFORNIA.

*Letters Patent No. 66,499, dated July 9, 1867.*

## IMPROVED AMALGAMATOR AND CONCENTRATOR.

*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, GEORGE JOHNSTON and EDWIN G. SMITH, of Auburn, Placer county, State of California, have invented certain new and useful improvements in "Amalgamators and Concentrators;" and we do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use our said invention or improvements without further invention or experiment.

The nature of our invention is to provide an improved amalgamator and concentrator for saving gold, amalgam, quicksilver, sulphurets from sand, or the tailings or pulp from quartz-mills, where the specific gravity of the matter to be saved is greater than that of the quartz, sand, or pulp from quartz-mills.

This is accomplished by constructing a machine with a copper plate, an endless revolving apron, or belt composed of canvas or other material. The pulp, tailings, sand, or other material operated upon is discharged into the hopper, and by the adjustable slide distributed over the copper plate coated with quicksilver, where it is deprived of most of its gold, quicksilver, or amalgams, they attaching themselves to said copper-amalgamated plate. The sand, pulp, and water is then distributed over the canvas apron or belt, which revolves upward at an incline against the current. The shaking motion assists the gold, quicksilver, amalgam, sulphurets, or other heavy material, in settling on the belt or apron. By keeping the sand or pulp loose, the water carries off the quartz sand, while the gold, quicksilver, amalgam, sulphurets, from their greater specific gravity, settle on the apron, and are carried over the upper end of the machine and deposited in the box under it.

To more fully illustrate our invention, reference is had to the accompanying drawings, in which—

Figure 1 is an isometrical projection.

Figure 2, a side sectional elevation.

A is a frame of wood, supported at each end by the vibrating arms B and B', which are attached at their upper extremities to the cross-bars C and C'. The arms B' are made shorter than the arms B, so that the frame A has an inclination, which is rendered greater or less by moving the bars C and C' up or down in the slots a. At the lower end of the frame A is placed the receiving-hopper D, into which the pulverized ore is placed. The size of the discharge opening is varied by a movable slide. E is an amalgamated copper plate, over which the ore is distributed as it leaves the hopper, so that any free gold contained in it may be immediately taken up. At the lower end of the box E', containing the plate E, is a small transverse opening, through which the pulp or sand is discharged upon the revolving apron F. This apron moves up the incline over a series of supporting-rollers, G G, and around a larger one at the upper end, for the purpose of making it dip into the water in the tank H, to wash off the adhering particles, which sink to the bottom of the tank, thus leaving the blanket clean to pass around again. A cross-bar, I, is fastened across the middle of the frame A, and passes between the guides J. One end of this bar is connected by the rod K with a crank or other device on the wheel L, for the purpose of producing a constant shaking motion, to distribute and settle the heavier particles of the ore upon the apron or blanket, as well as to discharge it from the hopper and over the amalgamating plate. A rocking or percussive motion may be employed for the same purpose, but we think a shaking motion preferable. As the blanket moves slowly up the incline, the ore upon its surface is met by a stream of water which is discharged from the box M by a series of jets. These jets are placed so as to discharge toward the upper end of the blanket, and thus assist in carrying the ore over, while the water is kept from passing over with it by the roller N, whose pressure on the blanket or apron may be regulated by a tension-screw, b. This roller also serves to keep the blanket in place, so that it is not affected by the shaking motion. The water then runs down the incline, carrying with it all the lighter portions of the pulp, which are discharged from the lower end of the belt or apron in the form of tailings, while the valuable parts are carried over the upper end and left in the tank H. A thick strip of rubber or leather, O, is fastened to each end of the belt to keep the ore from being discharged from the sides.

By using our improved apparatus many important advantages are gained over simple revolving belts or aprons and shaking or percussion-tables. In ordinary revolving belts, when no shaking motion is used, the sand, sulphurets, and gold that are deposited upon the belt will become packed together, and the valuable portions so entangled with the sand as not to settle to the bottom. In such an event either much sand is carried over, or, if that is washed out by using more water, it will carry off much of the sulphurets, gold, and quick-

silver. This is all obviated by combining the revolving with the shaking motion, which has a tendency to loosen the sand and allow the heavier parts to settle to the bottom. A great advantage is also gained by causing the jets of water to be thrown in the direction of the motion of the belt; as they assist in carrying the sulphurets over, while the water, stopped by the roller N, returns gently and only carries off the lighter parts.

Having thus described our invention, we do not claim broadly a revolving belt; but what we do claim, and desire to secure by Letters Patent, is—

1. The revolving belt or apron F, with its raised edges O, having a shaking or rocking motion from side to side, substantially as and for the purpose described.

2. The amalgamating-plate E, in combination with the revolving shaking-belt or apron, substantially as and for the purpose described.

3. The box M, with its jets in the direction of the motion of the belt or apron, together with the roller N, substantially as and for the purpose described.

In witness whereof we have hereto set our hands and affixed our seals.

GEORGE JOHNSTON, [L. S.]  
E. G. SMITH. [L. S.]

Witnesses:

C. W. M. SMITH;  
GEO. H. STRONG.