3 Sheets—Sheet 1.

R. GEORGE.

MACHINE FOR SEPARATING AND CONCENTRATING ORES AND OTHER MATERIALS OF DIFFERENT SPECIFIC GRAVITIES.

No. 106,048. Patented Aug. 2, 1870.

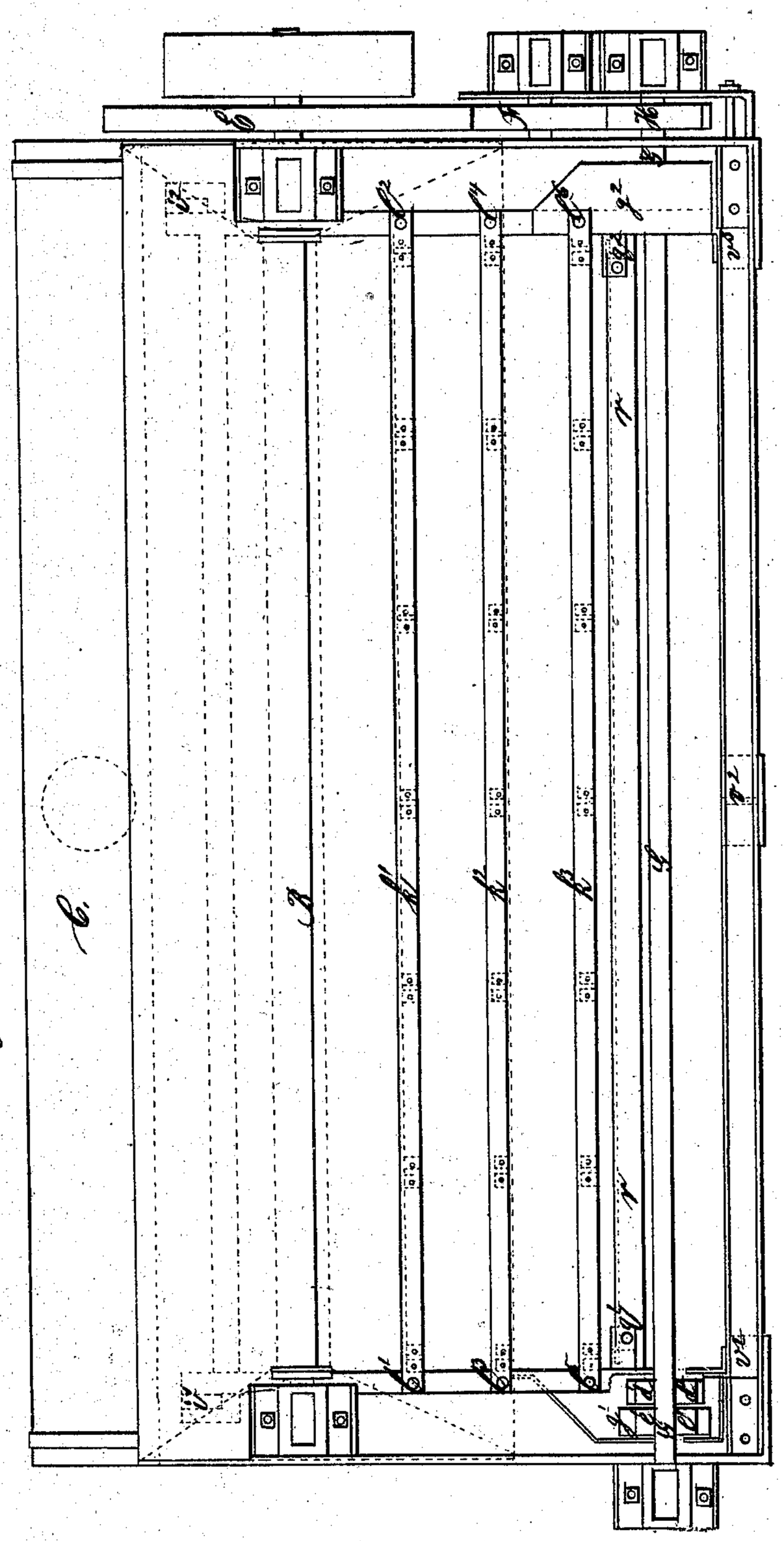

Fig. 1.

Witnesses

Wm Martin

H C Johnson

Inventor

Robert George

3 Sheets—Sheet 2

R. GEORGE.

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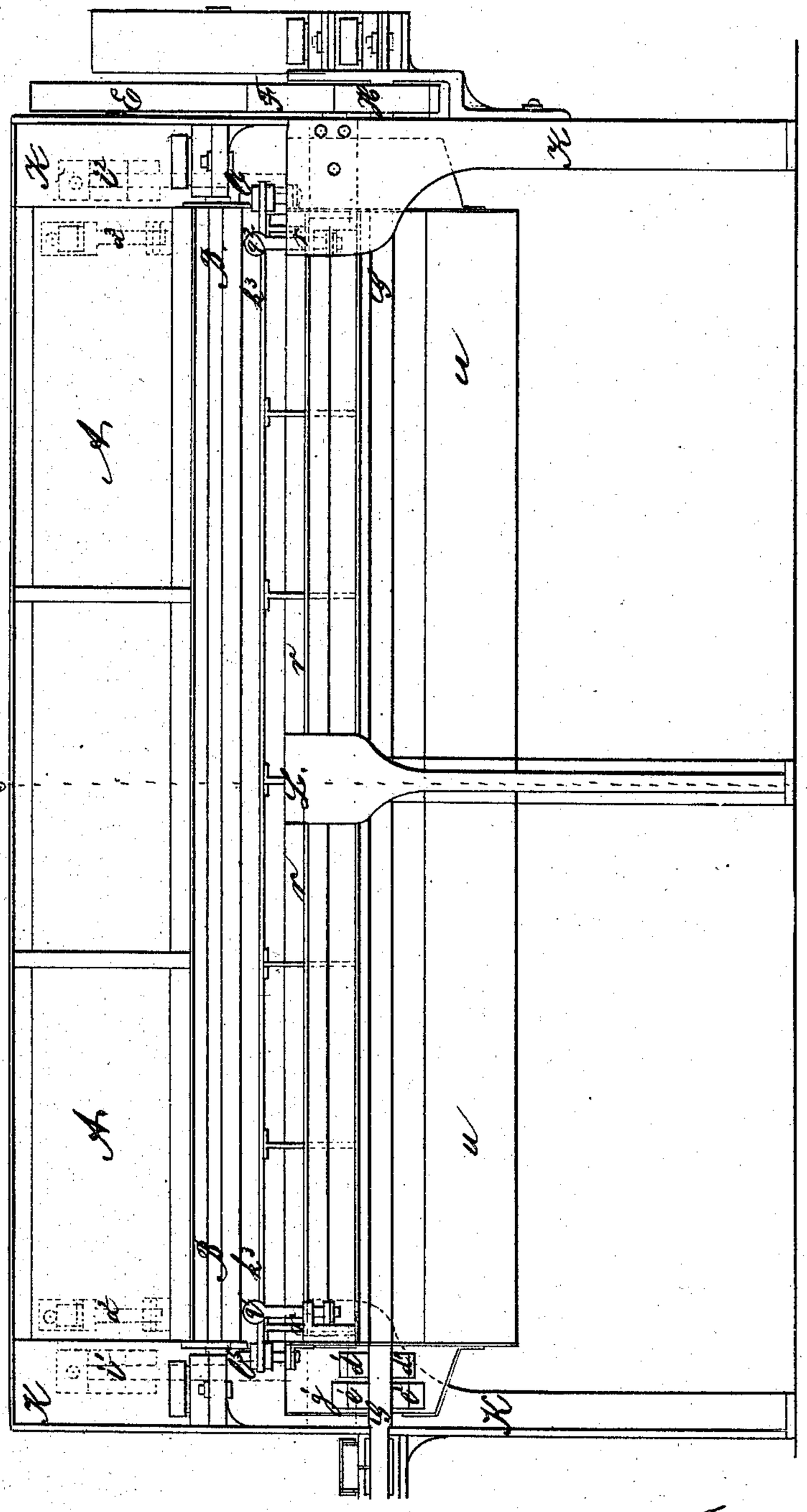
Fig. 1.



Witnesses
Wm. Martin
W C Johnson

Inventor
Robert George

3 Sheets—Sheet 3

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Fig. II. Transverse Section, on the line x x

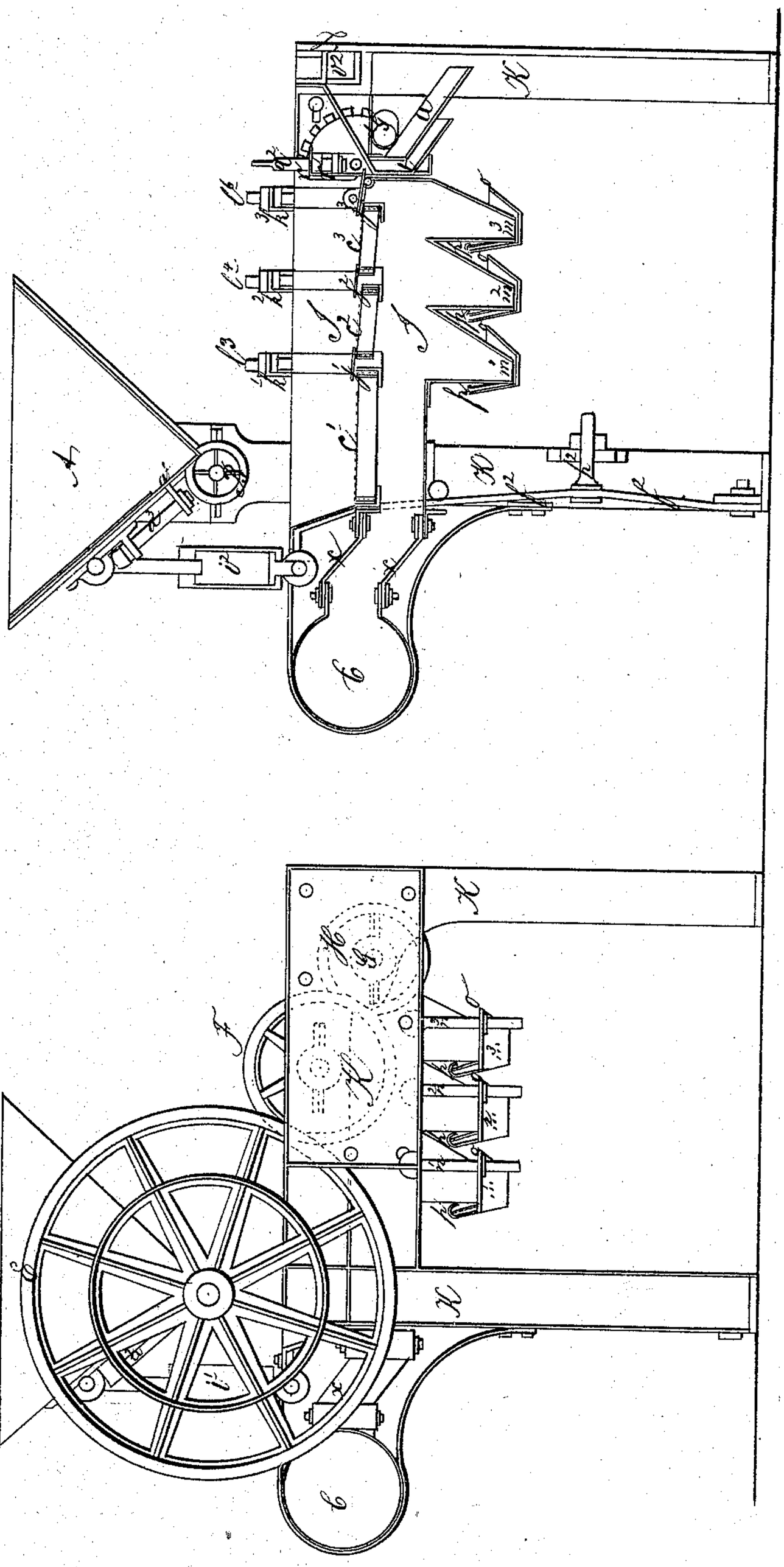

Figure III. Side-elevation

Witnesses
Wm. A. Austin
W. C. Johnson

Inventor
Robert George

United States Patent Office.

ROBERT GEORGE, OF DENVER CITY, COLORADO TERRITORY.

Letters Patent No. 106,048, *dated August* 2, 1870.

IMPROVEMENT IN MACHINE FOR SEPARATING AND CONCENTRATING ORES AND OTHER MATERIALS OF DIFFERENT SPECIFIC GRAVITIES.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, ROBERT GEORGE, of Denver City, in the county of Arapahoe and Territory of Colorado, have invented a new and useful Machine for Separating and Concentrating Materials of Different Specific Gravity, metals, rocks, alluvials, and any metallurgical and organic fossil substances contained in an admixture or natural strata, or in a chemical combination; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings making a part of this specification, in which—

Figure I, sheet 1, is a plan.

Figure II, sheet 2, is a front elevation.

Figure III, sheet 3, is a side elevation.

Figure IV, sheet 3, is a transverse section on the line A B.

Similar letters, in blue ink, refer to similar parts throughout the several elevations and sections.

The nature of my invention consists in the construction of a machine possessing the following properties, and designed—

First, to simplify the process of concentrating and separating all kinds of useful and valuable ores and mineral substances, during the process of dressing (separating) from rocky matters, and other injurious or extraneous substances, for the purpose of their subsequent metallurgical treatment.

Secondly, to save, unaided by any other apparatus or appliance whatsoever, all of the precious metals or other useful and valuable mineral substances undergoing the process of crushing and separation in stamp-mills, or any other grinding machinery, and prevent the great loss accruing by the use of the amalgamating apparatus of mercury and the other appliances heretofore used, to save and concentrate the useful and valuable minerals for their subsequent metallurgical treatment.

Thirdly, to save the precious metals contained in alluvials, or so-called dry placers.

Fourthly, to separate mineral coal, graphite clay, and minerals for paints, &c., from injurious and extraneous substances, as iron pyrites, slate, sand, &c.

To enable others skilled in the art to make and use my invention, I will proceed to describe the construction and operation of my machine.

The machine consists of two main parts, viz., the outside frame-work K and the separating-chamber I.

In order to charge the machine with materials to be separated, it is necessary to assort and classify them according to their size; if they consist of rocky matters in large lumps, they ought to be crushed either in jam-crushers, rollers, or stamps, and then passed through a series of seives, to render them fit for charging. When the materials to be separated are found in alluvials, as is frequently the case of the precious metals, in dry placers, &c., it will suffice to separate the larger rock or gravel by merely screening it.

The material thus assorted is charged into the hopper A, and spread evenly.

The damper a^1 is then opened, by the screws a^2 a^3, a sufficient width to fill the flutes of the roller B.

The motive power to work the machine may be applied either to the shaft of the roller B, or to the shaft G; in either case, the intermediate wheel F will transmit the motion from B to G, or G to B.

To the shaft G are fastened and attached the lifting-wheels d^1 and d^2, the cam-wheels e^1 and e^2, and the spur-wheel H.

The frame-work of the separating-chamber I rests on its front part on India-rubber cushions or metallic springs, marked v^1 v^2 v^3, which said cushions or springs are kept in position by boxes fastened to and supported by the front bar L, of the main frame-work K.

The rear part of the separating-chamber is suspended by the swivels i^1 i^2, attached to the main frame-work K.

When the machine is set in motion, the roller B, revolving, discharges the contents at about the center of the raised back of the separating-chamber I, whereby the same are evenly spread over the rear side of the sieve C, at the same time the separating-chamber I is lifted by the wheels d^1 d^2, which causes the charged materials to oscillate vertically on the sieves, while the cam-wheels e^1 e^2 move the separating-chamber horizontally backward, until the prolongations g^1 g^2 slide off from the engaged tooth of the wheels e^1 e^2, at which moment the springs f^1 f^2 reverse the motion of the separating-chamber I, and force it to the front bar L, producing thereby a horizontal concussion of the charged materials, which forces the same from sieve c^1 to sieve c^2 and c^3, in order to facilitate the forcing or sliding of the charged materials, more speedily toward the front of the machine. The separating-chamber I may be raised in the rear by the swivels i^1 i^2, in such a manner that the sieves c^1 c^2 c^3 will be placed on an incline toward the front of the machine.

The velocity of the stroke of the springs f^1 f^2 is regulated by the screws h^1 h^2.

The separating-chamber I is connected with the slotted pipe C by means of leather, rubber, or metallic packing x, sufficiently pliable, so as not to interfere with the oscillating and rising movements of the separating-chamber.

If the machine is charged with materials in a dry state, air is forced in under sieves c^1 c^2 c^3 by a bellows fan, or other blowing apparatus, connected with the

pipe C. The continuous oscillations of the materials on the sieves c^1 c^2 c^3 will facilitate the passing upward of the air through the charged materials, whereby the particles of greater specific gravity accumulate on the bottom of the sieves, while the lighter ones are raised to the surface of the agitated materials.

To separate the heavier particles from the overlying lighter ones, in a continuous manner, the sieve c^1 is overlapped by the metallic strip j^1, which said strip, at the same time, forms a rim over the edge of c^2; in like manner c^2 is overlapped by j^2, and c^3 by j^3. The overlaps j^1 j^2 j^3 are securely fastened to the bars k^1 k^2 k^3 which said bars k^1 k^2 k^3 are fastened and attached to the separating-chamber by the screws l^1 l^2, by means of which screws the said bars k^1 k^2 k^3 can be raised and lowered, thereby widening and narrowing the interstices formed by the strips j^1 j^2 j^3 and the sieves c^1 c^2 c^3, as may be required for the admission of the particles of greater specific gravity into the troughs of the separating-chamber, which said troughs, marked m^1 m^2 m^3, are provided with a movable and detached bottom, suspended scale-like, as seen by p', and which said bottom can be raised or depressed by means of the regulating-screws n^1 n^2, to such a degree as to form an orifice sufficient to allow the separated materials to make their exit at the edge o; while, in this manner, the valuable or heavier particles make their exit through the troughs m^1 m^2 m^3, as above described, the lighter or exhausted materials have to pass over the damper r. The latter is so constructed that it can be easily raised or lowered in a curvilinear manner, as the nature of materials on the sieves c^1 c^2 c^3 may require, for a perfect separation. If the damper r is raised by the regulating-screws q^1 q^2, with which it is provided, so far as to form a small interstice between it and the overlap j^3, through which the particles from the undermost of the materials sliding over the damper r can pass, this will afford the operator a criterion to determine whether all useful and valuable materials are exhausted and sieved or not. If there are any passing therethrough, the same will be saved by passing over the apron t, while the exhausted and extraneous materials are carried off over the apron u.

If the charge is in a wet state, as, for instance, the tailings from stamp-mills, water may be introduced, instead of air, or water and air together, in a similar manner as that stated for the introduction of air alone, through the pipe C.

The velocity of the fluted roller B for charging is calculated to be fifteen revolutions per minute, and, as the roller is provided with four flutes, with a depth of an inch each, and being six feet long, the capacity for charging will be 333.84 cubic inches per minute.

Supposing that the charge consists of common gold-bearing quartz or alluvial, the machine will separate eight tons and fourteen hundred pounds in one hour, or in ten hours, the gold contained in eighty-seven tons of quarts or alluvial, a capacity almost higher than practicable operation will require in any of the aforesaid cases. The applicability and utility of my machine are evident from the foregoing.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A machine for separating, concentrating, and saving the precious metals, and other valuable and useful minerals or fossil substances, as the same exist and are found, either in a crude state or artificially produced by chemical combinations or technical admixtures, arranged, constructed, and operated in the manner and for the purposes hereinbefore described and set forth.

2. The sieves c^1 c^2 c^3, together with their arrangements and connections to form the adjustable interstices.

3. The troughs m^1 m^2 m^3, with their movable and detached bottoms o.

4. The damper r, as arranged and described.

5. The lifting-wheels d^1 d^2, for causing the oscillation, and the cam-wheels e^1 e^2, to promote the discharge of the materials, together with their attachments and manner of operating.

6. The fluted roller B and the hopper A, together with their fastenings and manner of construction and application.

7. The cushions, being either India rubber or metallic spring, marked v^1 v^2 v^3, and the boxes, whereby they are secured and kept in position.

8. The slotted pipe C, with the leather, rubber, or metallic connections, which are sufficiently pliable to admit of the free and the unimpeded motion of the separating-chamber I, and its manner of attachment, as described and set forth.

9. The springs f^1 f^2, together with their appliances, mode of regulating, and manner of operation.

10. The swivels i^1 i^2, together with their application, as described and set forth.

In witness whereof I have hereunto set my hand and subscribed my name this 7th day of July, A. D. 1870.

ROBERT GEORGE.

Witnesses:
E. P. WEBER,
LOUIS SCHULZE.