

No. 662,685.

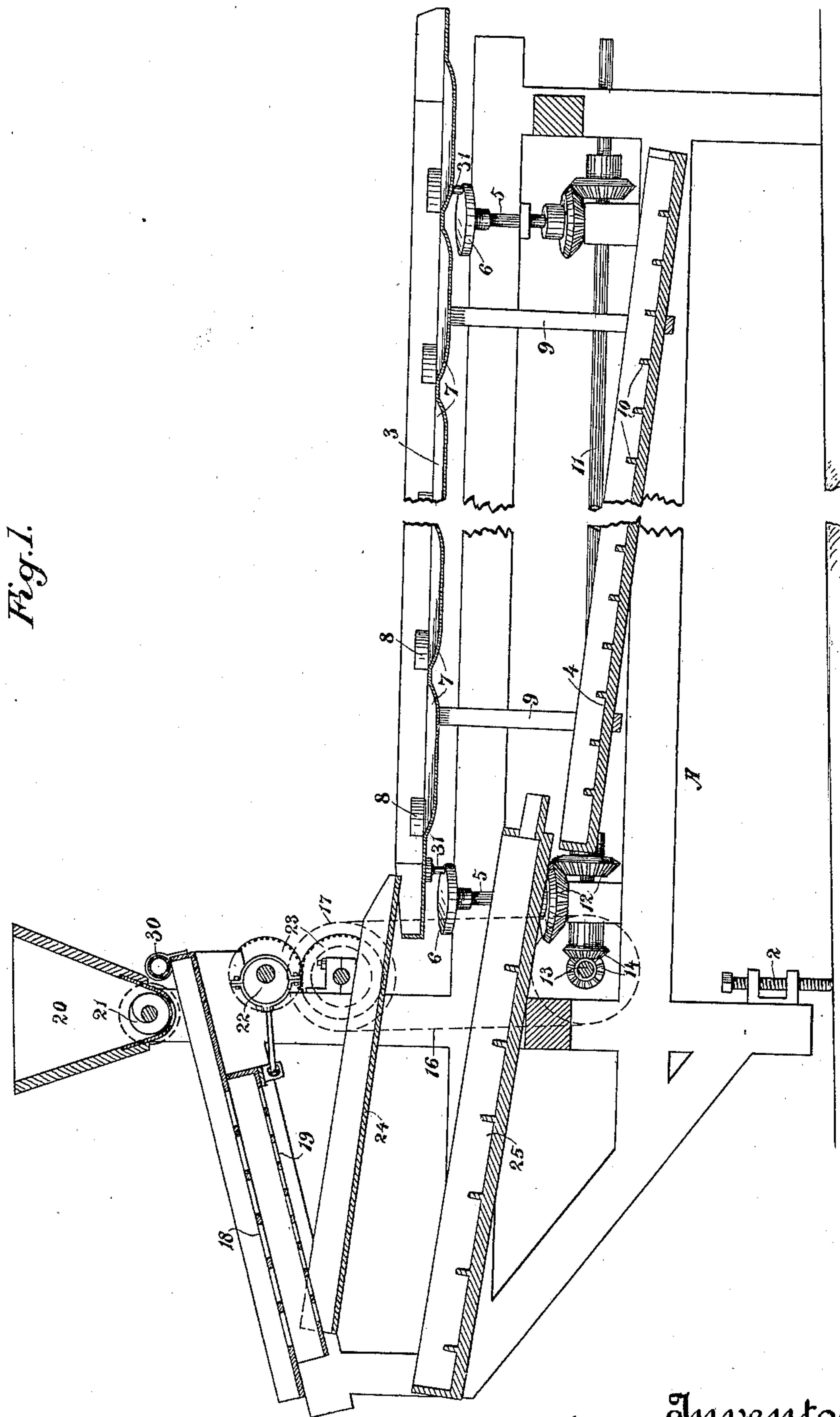
Patented Nov. 27, 1900.

I. P. CLARKE.
SEPARATOR AND AMALGAMATOR.

(Application filed Feb. 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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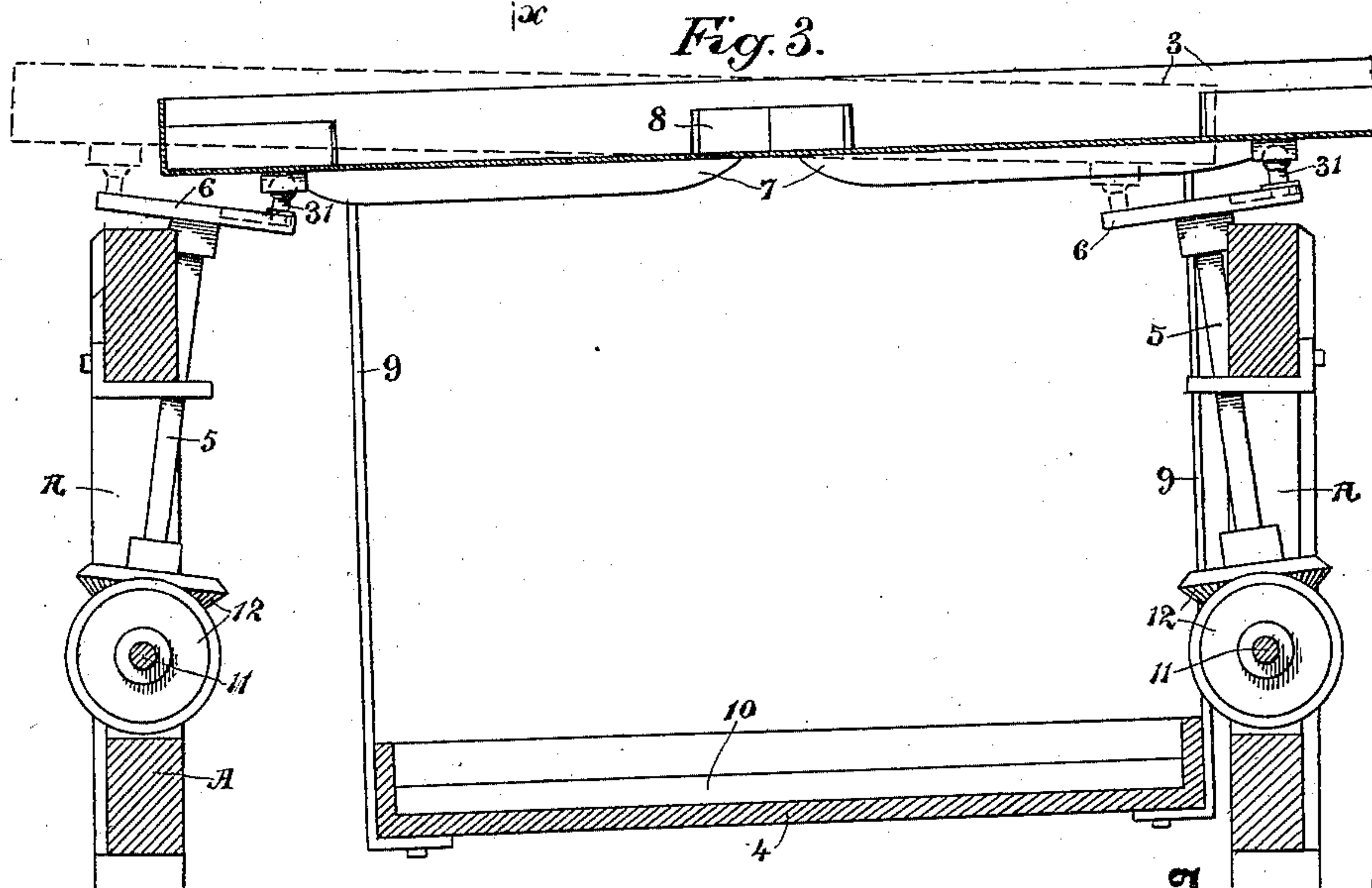
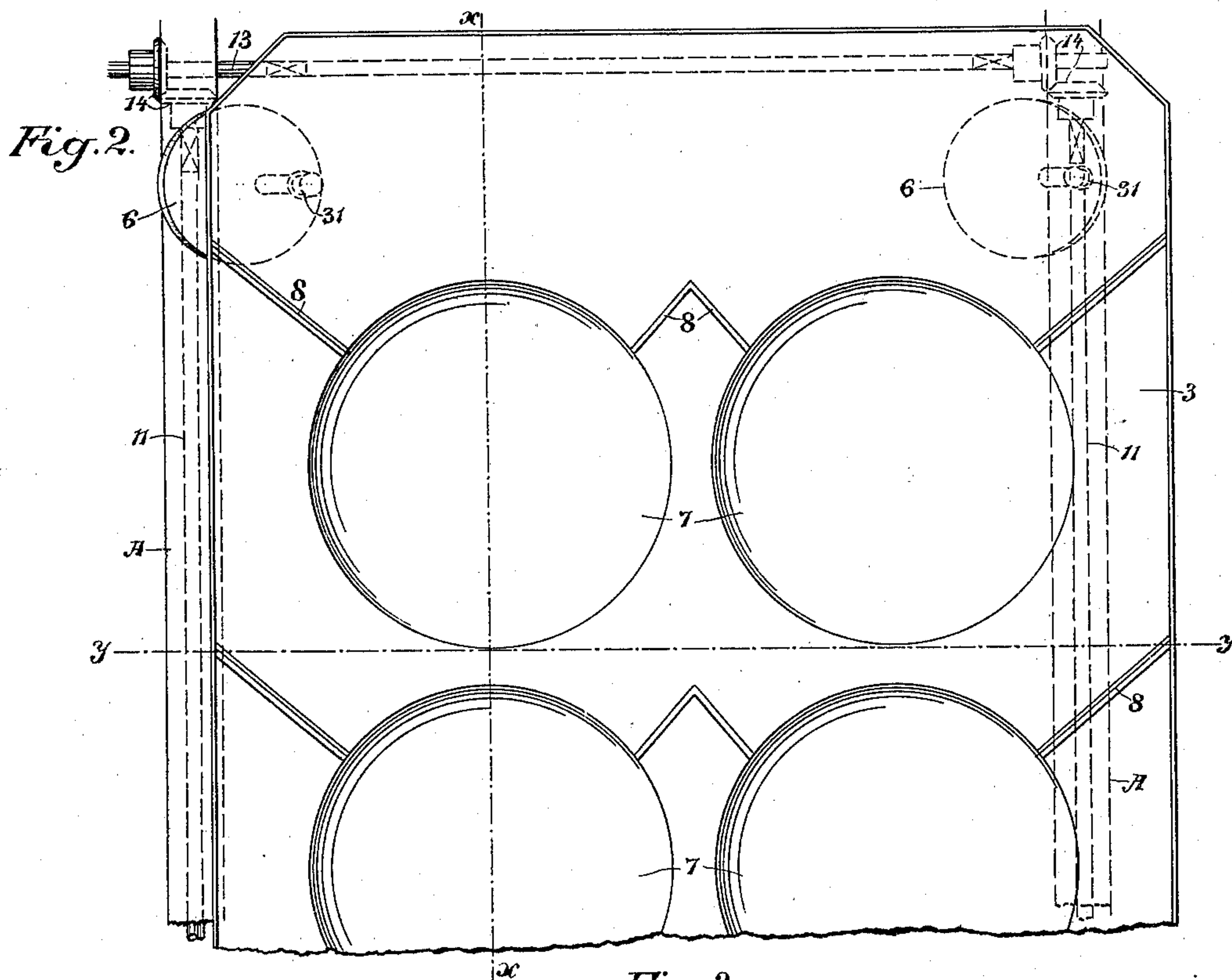
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

IRA P. CLARKE, OF ALAMEDA, CALIFORNIA.

SEPARATOR AND AMALGAMATOR.

SPECIFICATION forming part of Letters Patent No. 662,685, dated November 27, 1900.

Application filed February 28, 1900 Serial No. 6,833. (No model.)

To all whom it may concern:

Be it known that I, IRA P. CLARKE, a citizen of the United States, residing at Alameda, county of Alameda, State of California, have
5 invented an Improvement in Separators and Amalgamators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus for
10 separating coarse and fine pulverized material containing valuable metals with the object of reducing the bulk of the ore-carrying sand to the smallest degree and to then deliver the graded materials upon separate
15 amalgamating tables or surfaces.

It consists of the parts and the constructions and combinations of parts which I will hereinafter describe and claim.

Figure 1 is a longitudinal section through
20 the machine on line *x x* of Fig. 2. Fig. 2 is a plan view of part of the machine. Fig. 3 is a transverse section of the same on line *y y* of Fig. 2.

One of the objects of my invention is to
25 provide for a peculiar rotary and tilting or oscillating motion which can be applied mechanically to the apparatus, so as to produce a movement similar to that which is effected in panning by hand and which is acknowl-
30 edged to be the best method of separating heavier and lighter grades of material or for amalgamating with gold which may be contained in such material.

As shown in the present case, my apparatus consists of a frame A of suitable size and construction having regulating-screws or equivalent devices, as shown at 2, by which the grade of the table may be altered to suit the character of the material being worked
40 thereon by either raising or depressing one end or tilting the table so as to increase or decrease its inclination from one end toward the other. Upon this frame one or more tables or sluices, as 3 and 4, are supported, so
45 that the peculiar motion previously described can be applied to them.

5 are inclined shafts journaled in the frame and having upon their upper ends disks or supports 6, which, being fixed to the upper
50 ends of the shafts at right angles thereto, stand at an inclination. As here shown, there are four of these disks, two upon each side

of the frame, and the table 3 is supported upon these disks by means of pins 31, which are eccentrically disposed upon the disks, 55 and when the disks are turned these pins move around the center of rotation like cranks and carry the table 3, which is connected with them in the same manner by reason of the inclination of the shafts toward 60 each other. This rotary movement is also accompanied by a rising-and-falling movement of opposite sides of the table, the amount of which depends upon the length of stroke of the pins and the angle of inclination of the shafts. Thus when the shafts are 65 turned in unison by suitable connecting mechanism the whole of the table or surface 3 will be caused to move with a circular motion having an amplitude equal to the di- 70 ameter of the circle in which the cranks move, and as to the table, whatever may be its size, every portion of it will be moving in a small circle governed by the throw of the cranks. As the same time, by reason of the incline of 75 the shafts and the surfaces of the disks which carry the crank-pins, the table will be subjected to a rocking oscillatory movement similar to the movement of a spinning-top as it rolls about its point of support when not standing in a perfectly vertical line. 80

In the present case I have shown the table 3 as having a series of depressions or pans 7 made in it, and the table being of considerable length and width I have shown two 85 lengths of these depressions, so that by reason of the inclination of the table any material delivered upon the upper end and flowing down the table will fall successively into these depressions, where it will be caused to 90 move around and around until the lighter portion escapes over the lower edge and passes on to the next, while the heavier portion will sink to the bottom.

In order to direct the material so that it 95 will pass through all the pans, I have shown angular or inclined wings or guides 8, fixed upon the table in such a manner that material not flowing in the line of the depressions will be directed into them as it arrives. 100

By using amalgamated plates or placing mercury in the depressions it will be seen that any gold which may be mixed with sand or other gangue will be continuously moved

around and around in the depressions and will sink to the bottom, where it will be brought into contact with the mercury or amalgamated surface and retained, while the amalgamation of sand and lighter material will gradually flow over the edges of the depressions and be eventually discharged at the lower end of the table, as described.

In the present case I have shown a second table or sluice 4, which is suspended from the upper table by hangers 9, so that it partakes of the movement of the upper table, produced by the inclined shafts and crank-disks, as before described. This suspended table 4 is here shown in the form of a sluice having transverse riffle-bars 10, and the riffles thus formed may contain mercury or the surface may be amalgamated or it may serve simply to retain the heavier portions and separate them from the lighter ones.

Motion is communicated to the vertical shafts and disks by means of shafts 11, journaled upon the frame A, and bevel-gears 12, through which motion is communicated simultaneously to all the shafts and from them to the vertically-inclined shafts and disks. As here shown, a shaft 13 is journaled across the upper end of the frame and has pinions 14 fixed upon it which engage corresponding pinions upon the longitudinal shafts 11 and transmit motion to them, and they in turn transmit motion through the bevel-gears 12 to the inclined disk-actuating shafts. Upon the end of the shaft 13 is a sprocket or other driving wheel, and a chain 16, passing around this and a power-wheel 17, forms a medium of communication, it being understood that belts or gears might be substituted therefor.

In order to separate the material which is delivered upon the two tables or surfaces 3 and 4, I have shown a mechanism consisting of movable or shaking screens 18 and 19. The uppermost of these screens has a coarser mesh than the lower one, and material is delivered upon this upper screen by any suitable or desired means. I have shown a hopper 20, mounted above the uppermost screen, having holes through the bottom and a screw or worm 21 journaled longitudinally in the bottom of the hopper and revoluble by connection with some movable part of the machine, so that the screw being revolved and material being delivered into the hopper it will be stirred and moved along, so as to be distributed through the holes in the bottom of the hopper and fall upon the upper screen 18. These screens are given a shaking movement either transversely or longitudinally by means of an eccentric or cam, as at 22, mounted upon a shaft which is driven by gearing 23 or equivalent connection with the main driving-shaft. An eccentric-rod connects with the screen-frames, which are supported at an inclination and are slidable upon the top of the main frame, so that by this shaking movement the material falling upon the upper screen will be continuously moved over the holes or open-

ings in the screen and that portion which is sufficiently fine will pass through this screen and fall upon the one below. The larger stones and material which it is not desired to have remain in this apparatus passes down over the lower end of the upper screen and is discharged. The finer sand or material which falls through the upper screen also passes through the lower screen and falls upon an inclined chute or table 24, by which this fine material is delivered upon the upper table 3. Any material which is too coarse to pass through this screen moving over its surface, which is inclined in the opposite direction to the chute 24, will pass behind the upper end of 24 and will fall into the upper end of a chute 25, which eventually delivers it upon the upper end of the oscillating or swinging table 4. This table or chute 25 may also have transverse ribs or riffles to further separate the material and retain portions of it in the riffles thus constructed.

It will be understood that either a longitudinal or transverse movement may be given to the screens 18 and 19. I do not limit myself to either of these movements, but desire to use whatever proves most satisfactory for the purpose.

A suitable supply of water is furnished to mix with the material when desired by means of a pipe 30, extending across the upper part of the apparatus and having spray or other openings through which the water can be discharged and mixed with the pulp or sand.

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

1. An apparatus for separating or concentrating material and amalgamating gold and silver, consisting of one or more tables over which the material to be acted upon is caused to pass, shafts having their upper ends inclined toward each other, and crank-pins carried thereby and connected with the tables whereby a gyratory motion of the table is produced.

2. An apparatus for separating gold and heavy material from lighter gangue consisting of an inclined table having depressions or pockets upon its surface, shafts journaled on a supporting-frame having the upper ends of those upon opposite sides inclined toward each other, crank pins or disks carried thereby and forming supports with which the table is connected, mechanism for rotating the shafts whereby an oscillating gyratory motion of the table is produced.

3. An apparatus for separating gold and valuable material from its gangue consisting of an inclined table having depressions or pockets formed in its surface, means for supplying material upon the upper end of the table, guides or wings by which the material is converted into the depressions during its movement down the table, inclined shafts journaled upon opposite sides of the frame with their upper ends approaching each other

having crank pins or disks which form connection with and support for the table, and mechanism for rotating the shafts whereby an oscillating and gyratory motion of the table-surface is produced.

4. An apparatus for separating gold from its gangue consisting of superposed tables having depressions and riffles over which the material passes, said tables being connected so as to move in unison, shafts journaled upon the frame at each side of the tables, those upon one side inclining toward those upon the other and having crank pins or disks upon the upper ends which form connections with the uppermost table, mechanism whereby the shafts are rotated and a gyratory and oscillating motion of both tables is produced.

5. An apparatus for separating gold from its gangue consisting of superposed tables, means including convergent shafts and crank-pins carried thereby and connected with the tables whereby the latter are given an oscillatory and gyratory movement, chutes through which material is delivered upon both tables and shaking-screens located above the chutes adapted to separate and grade the material and deliver it independently into the chutes.

6. In an apparatus for recovering gold from its gangue, superposed screens, the upper one having a coarser mesh than the one below, means for supplying material to be separated upon the uppermost screen, means for producing a shaking movement of the screens, whereby material too coarse to pass the upper screen will be discharged over the rear end, the second-grade material will be discharged over the rear end of the lower screen, and the third grade will pass through said lower screen, an inclined chute into which the second-grade material is delivered, a similar chute into which the third grade is delivered and superposed gyratory oscillating pans and mechanism including convergent shafts and crank-pins carried thereby and engaging the pans by which the pans are actuated, said pans being so disposed that the finer material is delivered into the uppermost, and the second grade into the lowermost.

In witness whereof I have hereunto set my hand.

IRA P. CLARKE.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.