

No. 674,169.

Patented May 14, 1901.

J. KLEIN.  
ORE CLASSIFIER.

(Application filed Dec. 22, 1900.)

(No Model.)

Fig. 1.

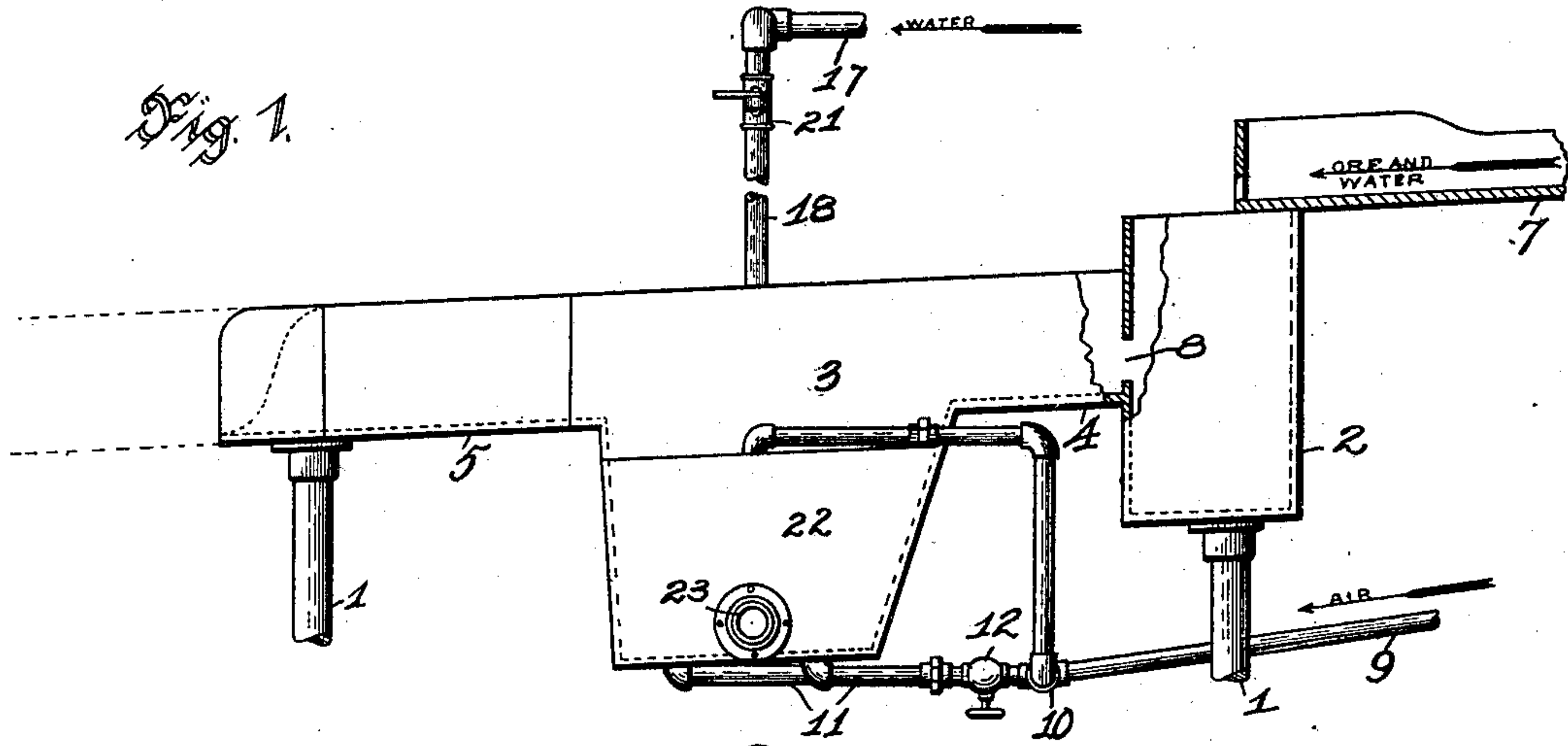


Fig. 2.

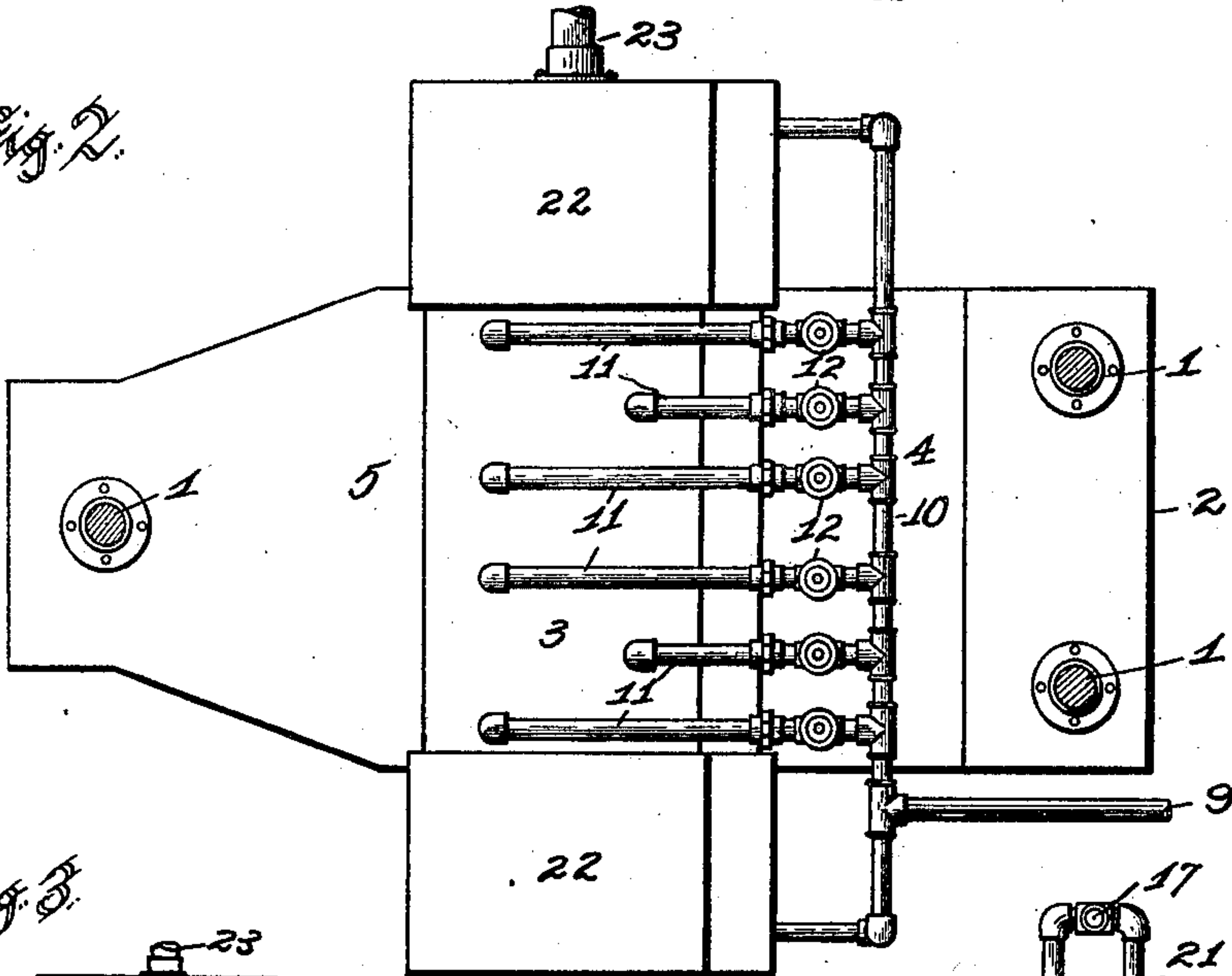


Fig. 3.

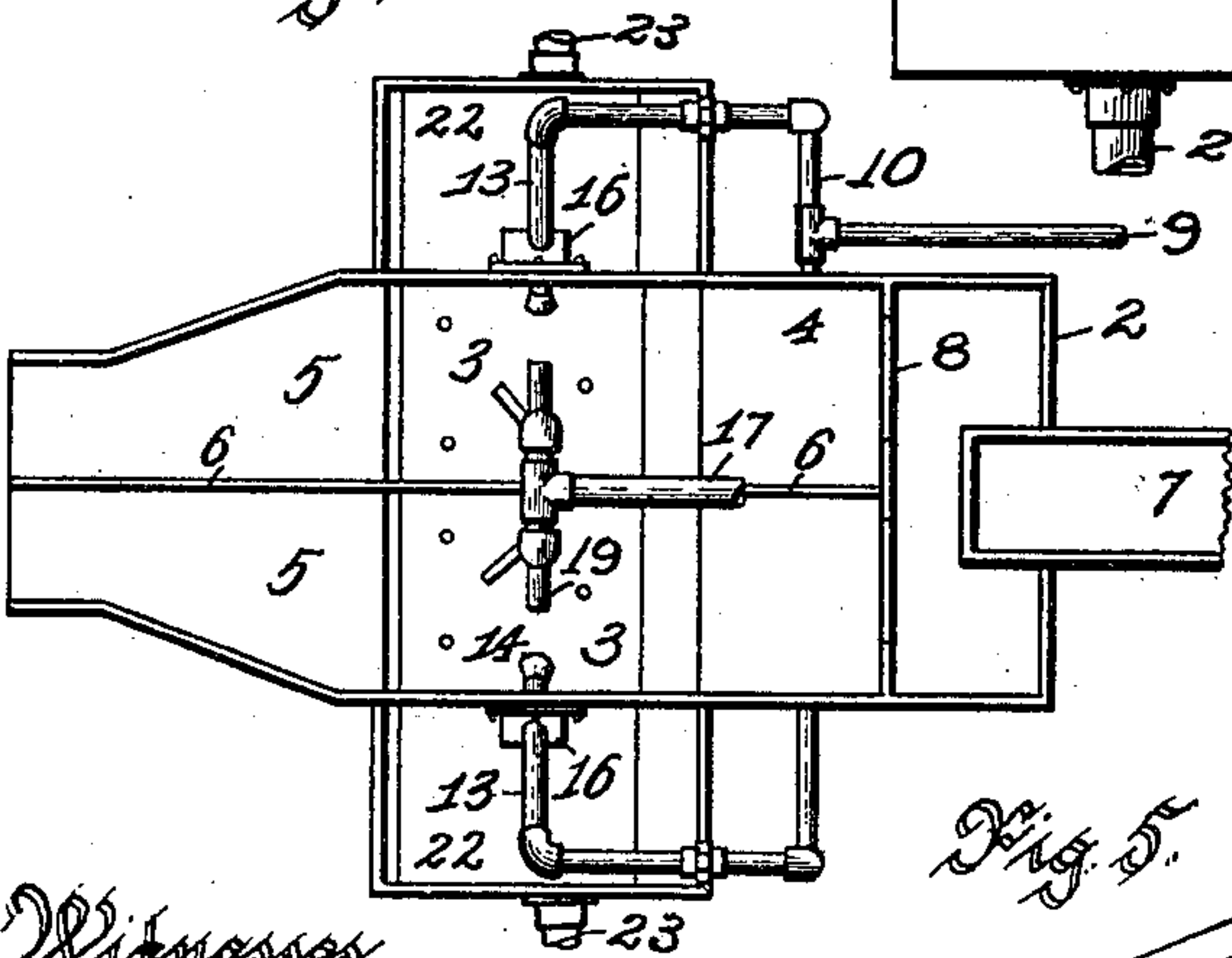


Fig. 4.

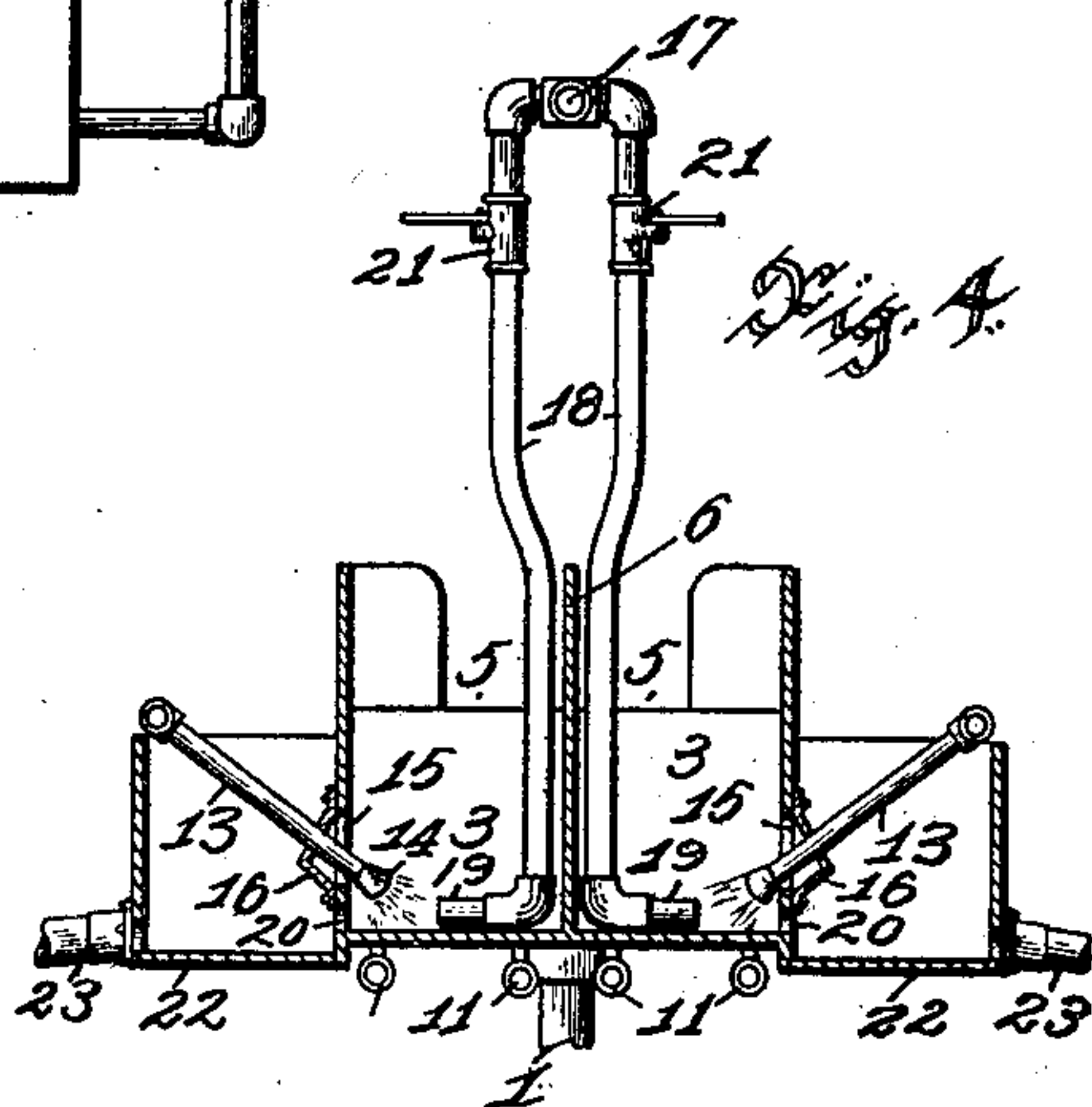
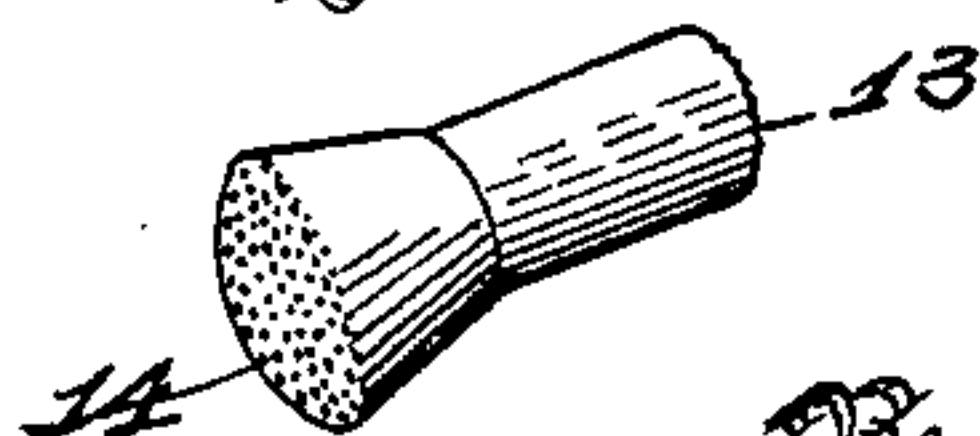


Fig. 5.



Witnesses  
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# UNITED STATES PATENT OFFICE.

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## ORE-CLASSIFIER.

SPECIFICATION forming part of Letters Patent No. 674,169, dated May 14, 1901.

Application filed December 22, 1900. Serial No. 40,827. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN KLEIN, of the city of Desloge, St. Francois county, State of Missouri, have invented certain new and useful  
5 Improvements in Ore-Classifiers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to ore-classifiers; and  
10 it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

The object of this invention is to provide an improved ore-classifier consisting of a hopper or chamber adapted to receive the mixture containing the ore and having means for  
15 agitating the mixture therein by the use of air and water and causing the sludge and lighter particles to be carried out through an overflow-trough, while the ore is forced out  
20 of the classifying-chamber into what may be termed the "classified-ore" chamber, whence it can be drawn off to any desired place or receptacle.

The classifying-chamber may be of any desired size and may be divided into any number of compartments, the same principle being involved in any instance, such changes being merely of degree and not involving any  
30 new mode of operation. In the form shown I have divided the classifying chamber or hopper into two compartments which are identical in construction and arrangement. The mixture containing the ore is conveyed  
35 to these compartments in a steady stream by any preferred means, such as by a supply-trough, as shown in the drawings. Within the classifying chamber or hopper the mixture is thoroughly agitated by currents of air  
40 and water, whereby the sludge is raised and is carried out through an overflow-trough. The ore falls to the bottom of the hopper and is forced out through lateral openings into the classified-ore chambers, whence it may be  
45 conducted to any suitable receptacle.

In the drawings, Figure 1 is a side elevation showing my improved classifier. Fig. 2 is a view from below. Fig. 3 is a plan view. Fig. 4 is a transverse sectional view, and Fig.  
50 5 is a perspective view of one of the nozzles carried by certain of the air-pipes.

Referring to the drawings in detail, 1 denotes the vertical posts which support the classifier.

2 indicates a box or hopper into which the  
55 mixture is first conveyed and from which it passes into the classifying-hopper 3, connected thereto by a short inclined trough or passage 4. An overflow-trough 5 leads from the lower side of the hopper 3, the purpose of  
60 which is to receive the sludge which is discharged from the classifying-hopper and convey it to any place desired. The troughs 4 and 5 and the classifying-hopper 3 are divided by a partition 6, which forms two compartments within the classifying-hopper, to which  
65 I have above referred.

7 indicates a supply-trough by means of which the mixture is conveyed into the box or hopper 2. The side of the box or hopper  
70 2 adjacent to the trough 4 is provided with openings 8, through which the material passes into the said trough 4 and from there into the classifying-chamber. There is one of the openings 8 on each side of the partition 6, so  
75 that whenever it is desired to use only one compartment within the classifying-chamber the entire amount of the mixture may be conveyed thereto by closing the opening on the opposite side. After the material has passed  
80 into the classifying-chamber it is there agitated in order to separate the sludge and lighter particles from the ore, and the means by which this is done will now be described.

Leading from any suitable source of air-  
85 supply is an air-pipe 9, and connected thereto is a transverse pipe 10, which extends the full length of the classifying-chamber. A series of pipes 11 lead from the pipe 10 and have their ends extending through the bot-  
90 tom of the classifying-chamber, as shown in Fig. 2. These pipes 11 lead into the classifying-chamber at suitable distances from each other in order to thoroughly agitate the mixture therein and keep it in continual mo-  
95 tion. The pipes 11 are provided with valves 12, whereby the flow of air may be regulated and deflected to one side or the other.

Each end of the pipe 10 is extended upwardly and horizontally, as shown in Fig. 1,  
100 and each of the horizontal portions carries an extension 13, which projects through the sides



of the classifying-chamber and assists in agitating the mixture. The inner end of each of the extensions 13 is provided with a perforated end 14, through which the air is 5 sprayed.

The sides of the classifying-chamber are provided with enlarged openings 15, through which the pipes 13 extend, and the said openings 15 are closed by the hoods 16, fixed upon 10 the said pipes 13. The purpose of this arrangement is to facilitate the removal of the pipes 13 whenever desired, it only being necessary to detach the hoods 16 from the sides of the classifying-chamber in order to remove 15 the said pipes. The inner ends of the pipes 13 may be raised or lowered whenever desired by changing the positions of the hoods 16 on the sides of the classifying-chamber.

17 indicates a water-pipe provided with the 20 extensions 18, one of which is on each side of the partition 6. The lower ends of the extensions 18 are provided with horizontal projections 19, which are in alinement with openings 20 through the sides of the classifying- 25 chamber. The said extensions are also provided with valves 21, by which the flow of water may be regulated or caused to pass entirely through either one of the pipes.

As the mixture flows into the classifying- 30 chamber it is thoroughly agitated therein by the currents of air passing through the pipes 11 and 13, and the lighter particles and sludge are raised and flow out with the water through the overflow-trough 5. The ore being heavier 35 falls to the bottom and owing to the continual movement of the mixture eventually comes in the path of the stream of water emitting from the pipes 19 and is forced thereby through the openings 20 in the sides of 40 the classifying-chamber. The ore passing outwardly through the openings 20 is received into the classified-ore chambers 22 at each side of the classifying-chamber, from which it may be drawn off through pipes 23.

45 I have shown and described a preferred arrangement of air and water pipes; but it is manifest that they may be arranged otherwise without deviating from the scope of my invention, and I do not desire to be limited 50 to the exact form shown and described, since the same principle will be involved in either case.

As shown, my improved classifier, consisting of the several hoppers or chambers, is 55 cast in one piece, except the hoods closing the openings through the sides of the classifying-chamber and which, as stated, are fixed upon the pipes 13. Thus by making a classifier entirely of metal and all in one piece a 60 very solid and firm machine is provided, which is absolutely devoid of all cracks and weaknesses of those machines which are in separable and independent pieces. No moisture can penetrate into the corners to rust or cause 65 disintegration of the adjacent parts, and from this it follows that the machine is greatly superior to those in which the sides and ends

are all in different sections. To those familiar with the industries in which machines of this class are used the above advantages will 70 appear as salient characteristics of the machine.

I claim—

1. An ore-classifier, consisting of a chamber or hopper adapted to receive the mixture 75 containing the ore and the sides and bottom of which are integral rendering it devoid of cracks or joints at the corners, and having openings through the sides thereof to permit the passage of the ore, classified-ore cham- 80 bers at the sides of the chamber or hopper to receive the ore which passes through the openings, air-pipes leading through the sides and bottom of the hopper, and water-pipes leading into the chamber or hopper and di- 85 rected toward the openings in the sides thereof so that when water is admitted through said pipes the ore will be driven through the openings into the classified-ore chambers.

2. An ore-classifier, consisting of a cham- 90 ber or hopper cast in one piece and devoid of cracks or joints and having ore-outlets through the sides thereof, the said chamber being adapted to receive the mixture containing the ore, air-pipes leading into the cham- 95 ber through the bottom thereof in order to agitate the mixture, water-pipes leading into the chamber and directed toward the openings in the sides thereof, means for receiving the ore when driven through the openings by 100 the currents of water, and a separate outlet for removing the sludge from the chamber.

3. An ore-classifier, comprising an integral metallic agitation-chamber adapted to receive the mixture containing the ore and having 105 lateral ore-outlets, classified-ore chambers for receiving the ore, water-pipes directed toward the ore-outlets to force the ore into the classified-ore chambers, an overflow-trough leading from the top of the agitation-chamber, air- 110 pipes leading through the bottom of the agitation-chamber, and air-pipes leading through the sides of the agitation-chamber.

4. In an ore-classifier, a hopper or chamber adapted to receive the mixture contain- 115 ing the ore, and having lateral ore-outlets, water-pipes directed toward said outlets to force the ore therethrough, classified-ore chambers for receiving the ore, an overflow-trough leading from the top of the hopper or 120 chamber, air-pipes leading vertically through the bottom of said hopper or chamber, and air-spraying pipes leading through the sides of the said hopper, substantially as specified.

5. An ore-classifier, consisting of a hopper 125 adapted to receive the mixture containing the ore and having lateral openings near the bottom, and an overflow-trough leading from the top thereof, classified-ore chambers for receiving the material which passes through the 130 lateral openings, water-pipes leading into the hopper and having extensions pointed toward the lateral openings, air-spraying pipes leading into the hopper and directed toward the



said extensions, and a series of air-pipes leading through the bottom of the chamber and spaced at suitable intervals, substantially as specified.

5 6. An ore-classifier, consisting of a hopper 2 having openings 8 through one side thereof, a trough leading from said hopper below the openings, a classifying-hopper 3 connected to said trough and having lateral openings, wa- 10 ter-pipes leading into said hopper 3 and directed toward the openings, classified-ore chambers for receiving the ore, air-pipes leading through the bottom of the classifying-hopper, and an overflow-trough 5 connected to 15 the upper side of the classifying-hopper, substantially as specified.

7. In an ore-classifier, an agitation-chamber, the sides and bottom of which are integral rendering it devoid of cracks or joints

at the corners and having openings through 20 the sides thereof, a feed-box, a connecting-trough integral with the feed-box and the said chamber, and devoid of cracks or joints at the points of connection, classified-ore cham- 25 bers integral with the agitation-chamber, water-pipes in the agitation-chamber and directed toward the openings in the sides thereof, air-pipes projecting through the sides of the agitation-chamber in opposition to the 30 water-pipes, and a series of air-pipes leading through the bottom of the said chamber, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN KLEIN.

Witnesses:

M. L. SCOTT,

A. C. JACKSON.