

No. 671,389.

Patented Apr. 2, 1901.

M. SELIGSOHN.
METHOD OF TREATING ORES.

(Application filed Apr. 25, 1900.)

(No Model.)

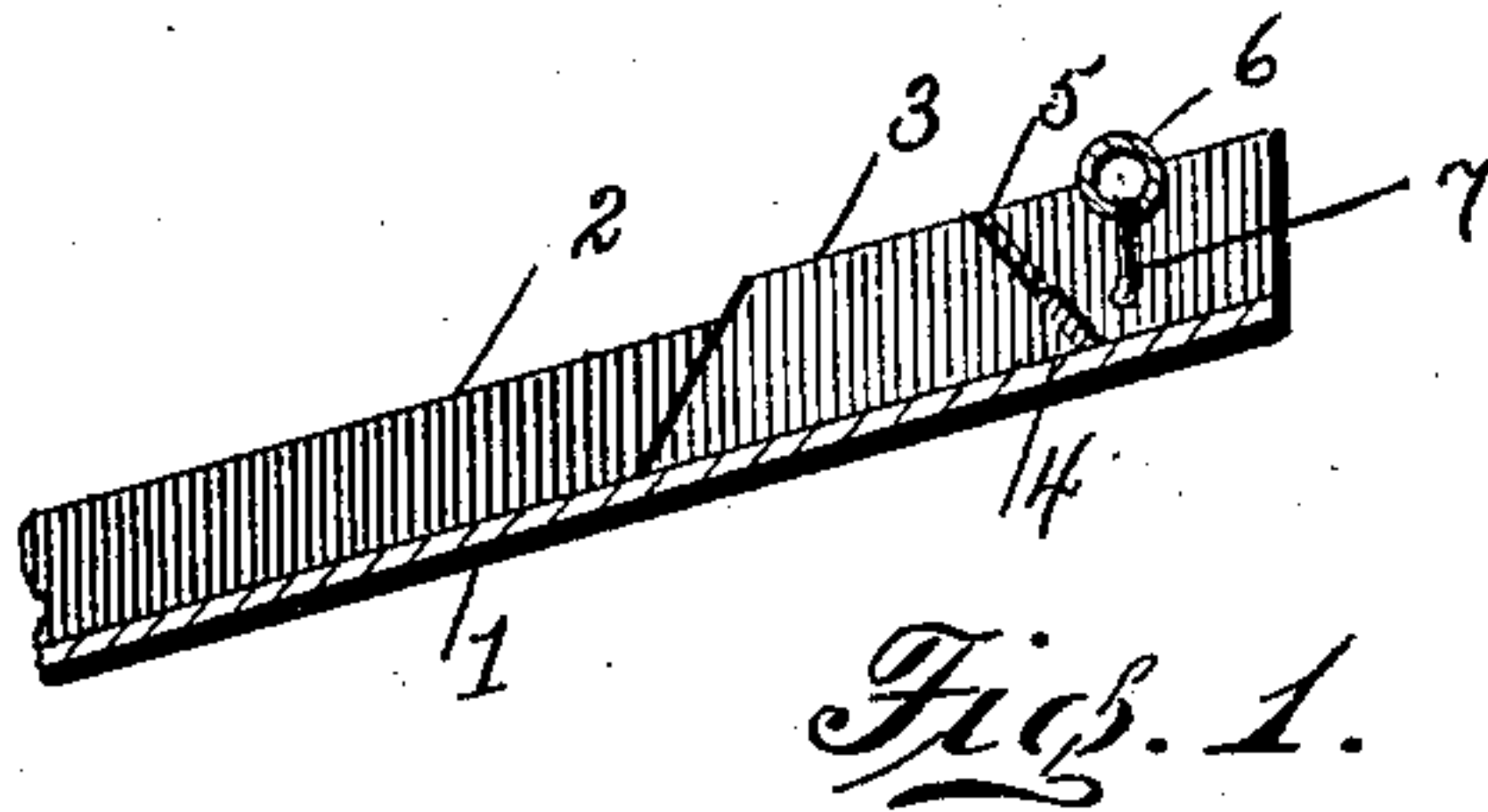


Fig. 2.

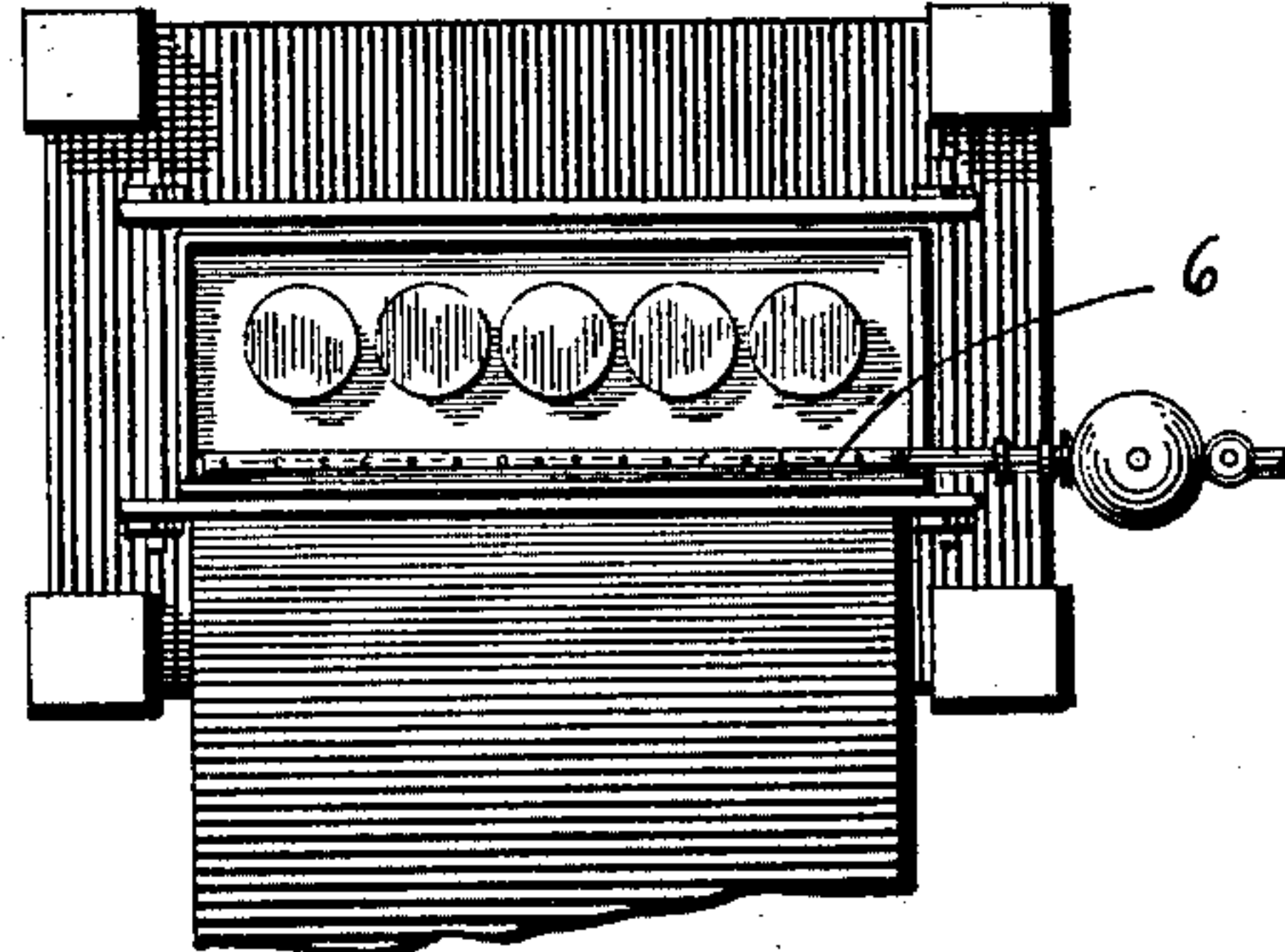


Fig. 3.

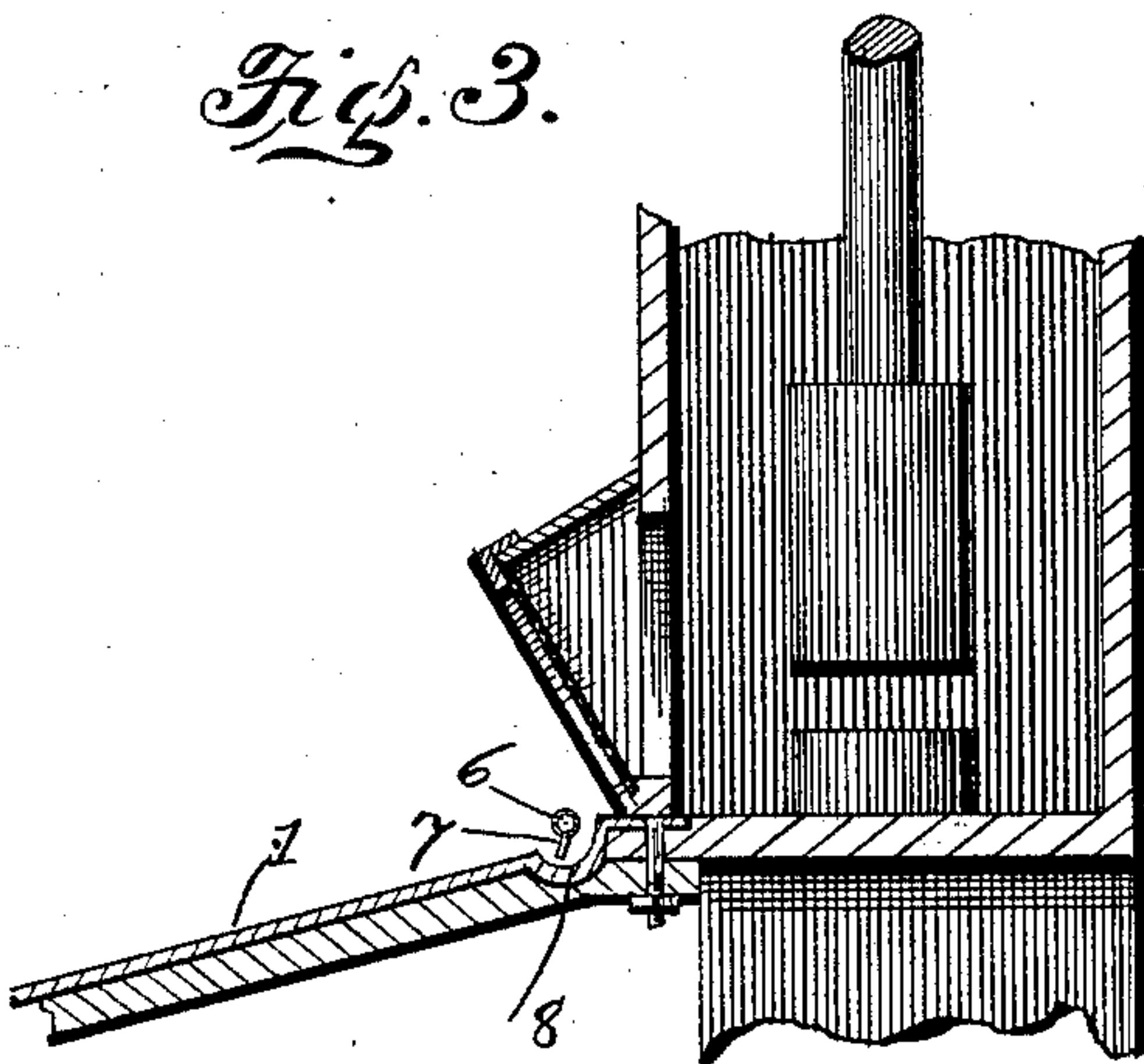
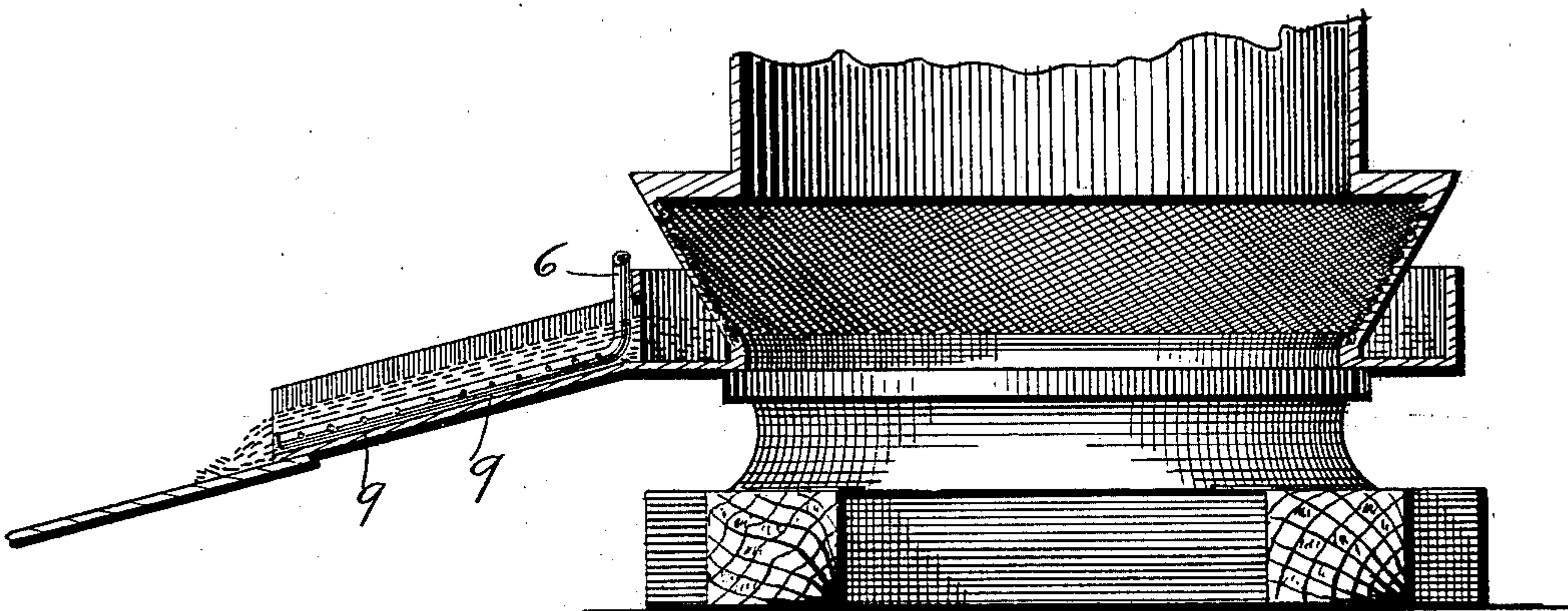


Fig. 4.



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METHOD OF TREATING ORES.

SPECIFICATION forming part of Letters Patent No. 671,389, dated April 2, 1901.

Application filed April 25, 1900. Serial No. 14,294. (No specimens.)

To all whom it may concern:

Be it known that I, MORRIS SELIGSOHN, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in the Methods of Treating Ores, of which the following is a specification.

My invention relates to an improvement in the method of treating ores.

The primary object is to increase the percentage of valuable metal extracted by amalgamation. This increase in amalgamation is caused principally by these facts, to wit: that the gases which pass into the pulp act upon the "rusty" gold and so alter it that it becomes subject to amalgamation. The gas also acts upon the amalgam upon the plate, so that it is kept clean and the amalgam maintained at the proper consistency, thus increasing to a variable extent the percentage of precious metals caught and amalgamated by the plates, which in most cases is considerable. It also saponifies any grease or oil that may be present in the pulp and clarifies or makes the pulp more amenable to amalgamation by its action upon the clay and matter in suspension and is efficacious in preventing the "sickening" or "flouring" of the mercury.

Hitherto a patent has been granted to B. F. House, No. 590,739, dated September 28, 1897, on a process of separating ores, of which I am part owner. In this patent ammoniated air, or air charged or impregnated with ammonia, is utilized to cause a separation of the precious metals from extraneous material—such, for example, as arsenic—in which it is sometimes incased, and also for the precipitation of ores which are held in suspension by the water or pulp passing from the stamp-mill or other source of supply. In that patent the air is passed through a receptacle containing ammonia and when thoroughly charged it is injected under pressure beneath the surface and as near the bottom of the pulp as possible in proximity to an amalgamating-plate, and by virtue of this upward discharge of ammoniated air through the material being treated the latter undergoes a physical change, resulting in the removal of the lighter

valueless material and the precipitation of the heavier values. My invention contemplates a similar procedure, although the air undergoes a different treatment in that it is charged or impregnated with chemicals which give it additional qualities and which results in increased efficiency. In consequence I attain an improvement in the physical condition of the elements used in the process, which improvement in the physical condition is effected by the use of these chemicals. I am aware that there are a number of processes which use chlorin and bromin in the extraction of certain elements from their ores—for example, the extraction of gold. These processes, however, are purely chemical ones—that is, all the gold contents in these ores are changed to a definite compound of gold with chlorin or bromin, which gold is subsequently recovered by the destruction of these chemical compounds. These processes completely alter the chemical condition of the gold. My present process alters the physical conditions of the elements hereinafter set forth.

The present process contemplates the use of chlorin gas or chlorin and bromin gas, or both, or, in fact, any other kindred gases which can produce the same results and effects required of these last-named gases, and in the preferred exemplification of my invention I propose to use ammoniated air in combination with one or both of said gases or other kindred gases which can produce the same or equivalent results.

When a solution of ammonia is mixed with a halogen, it is well known that there is, particularly under the influence of light and heat, a chemical reaction, yielding oxygen. When this reaction occurs in pulp, the oxygen comes in contact with the ore and amalgam in its nascent condition, when it is particularly efficacious in oxidizing impurities—*e. g.*, sulfids, &c., having a tendency to retard or prevent amalgamation or to sicken the mercury.

With the foregoing in view my invention consists in a process of treating ores consisting in introducing into the ore-pulp air impregnated with two or more chemicals adapted by their mutual reaction to promote amal-

gamation and prevent the sickening and flouring of the mercury.

While for the purpose of illustration and clearness merely I have shown and will hereinafter describe certain apparatus, yet my invention has nothing whatever to do with the appliances, as it is possible to use it in connection with a great variety of ore-milling machinery, the invention having to do altogether with the method or process and not in any sense the mechanism with which it may be advantageous to use or apply it.

In the accompanying drawings I have shown in Figure 1 a longitudinal sectional view of a plate or trough more or less inclined to facilitate the flow of pulp, with an amalgamating-plate and a pipe for introducing the impregnated or charged air at the lower surface of the pulp. In Fig. 2 I have indicated an arrangement by which the air is discharged inside of a stamp-battery. In Fig. 3 is illustrated a discharge into the flowing pulp outside of the stamp-battery as it discharges the pulp from the mortar. In Fig. 4 is illustrated an arrangement applied to the exterior of a Huntington mill.

As stated, a variety of other appliances might be illustrated, but the foregoing suffice to illustrate a few practical applications of the method or process in the art of ore treatment.

I will now proceed to briefly describe the several mechanical constructions illustrated, and first the one shown in Fig. 1. This figure is like Fig. 2 of the patent referred to, and consists of an inclined plate 1, having sides 2, with auxiliary pieces 3, standing in an upright position to prevent the pulp or water from flowing over the sides. In these auxiliary pieces 3 the grooves 5 5 are cut upon an incline opposite to that of plate 1, and in them an amalgamating-plate 4 is placed. The numeral 6 indicates the main for conducting the charged or impregnated air from the source of supply, and 7 7 are the branch pipes, which reach down into proximity to the surfaces of plates 1 and 4, and through them the impregnated or gaseous air issues into the lower strata of the pulp, through which it discharges through the mass and in contact with the amalgam on plate 4. During this discharge and passage any grease or oil that may be present in the pulp is saponified, and the pulp is clarified and made more amenable to amalgamation by the action of the gas upon the clay and matter in suspension; also, during this passage of the gas through the pulp it alters the physical condition of the mineral particles, and, furthermore, by its contact with the amalgamating-plate it is efficacious in preventing the sickening and flouring of the mercury thereon, thereby maintaining the amalgam in a clean condition and of the proper consistency, thus increasing to a variable extent the percentage of precious met-

als caught and amalgamated by the plate 4, which in most cases is considerable, and in this way not only are the values saved which would otherwise be lost, but also the amalgamating-plate is kept chemically clean and in the proper consistency, so that at all times it is able to perform its functions with the greatest possible efficiency.

The only difference between the constructions shown in Figs. 2 and 3 is that in the former the discharge pipe or main 6, with its branch jets 7 7, is located inside of the mortar, so that the discharge of gas or impregnated air takes place in the pulp as it is being crushed by the stamps, whereas in Fig. 3 the discharge pipe or main is located just outside of the stamp-battery, where it passes into the pulp as it leaves the latter. In the latter constructions the discharge takes place in a small shallow transversely-disposed trough or gutter 8, by preference, as better results are attained in that way.

Passing now to Fig. 4, the preferred construction is to employ a pipe or main 6, which extends around the exterior of the Huntington or a similar mill. This pipe is located as near the bottom of the trough as is practicable, and in lieu of the jets heretofore shown and described the pipe is filled with a plurality of perforations 9 9, through which the gas is discharged.

It will be understood, of course, that the mode of charging or impregnating the air and the means of supplying it under the required pressure are no part of the present invention and do not need detailed description, as it is merely necessary that it be fed into the lower end of a receptacle containing the different chemicals or chemical, through which it rises and from which it is conveyed to the pulp in a charged or impregnated condition.

The chlorin and bromin as well, when used, may be prepared in lead-lined tanks by any of the methods usually employed for their production—for instance, chlorin—by mixing salt, sulfuric acid, and manganese dioxid and warming the whole, or it may be generated by adding sulfuric acid (H_2SO_4) to chlorid of lime. The various gases are united in a larger-sized galvanized-iron cylinder, and pressure for forcing the gases generated into the main cylinder may be created by a Root blower or other means. All this, however, is subject to variation and is no part of my invention.

The action of the gaseous air is substantially the same in each of the constructions described, and therefore it is not necessary to repeat what has been said in connection with the description of the form shown in Fig. 1. Obviously, the results would differ more or less with the different ores treated and different chemicals used. In fact, the reason why I desire this latitude (in the selection of these chemicals) is because certain chemicals or combinations of chemicals appli-

cable to the treatment of certain ores may not work as advantageously as other chemical combinations with other ores, and it is the purpose of my invention to provide a
5 process which will give the best results with the greatest number and widest range of ores to be treated and one which at the same time will act upon the amalgam on the plate so as to keep it clean and of proper consistency to
10 do uniform and successful service. In short, it has the twofold effect of operating upon the material treated and the element—the quicksilver or mercury—used in the process of treating these ores.

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

1. The process of amalgamation consisting in introducing into the ore-pulp, air impreg-
20 nated with two or more chemicals adapted by their mutual reaction to promote amalgamation and prevent the sickening of the mercury, substantially as described.

2. The process of treating ores consisting
25 in introducing into wet pulp air impregnated

with chemicals which by their mutual reaction in solution produce free oxygen.

3. The process of treating ores consisting in introducing into wet pulp, air impregnated with ammonia and a halogen gas. 30

4. The herein-described process of treating ores which consists in bringing ammoniated air in combination with chlorin gas into the presence of wet ore-pulp.

5. The herein-described process of treating
35 ores which consists in admitting ammoniated air in combination with chlorin gas below the surface of wet ore-pulp and discharging it upward therethrough.

6. The herein-described process of treating
40 ores which consists in bringing ammoniated air, bromin and chlorin gas into the presence of wet ore-pulp.

In testimony whereof I have signed my name to this specification in the presence of
45 two subscribing witnesses.

MORRIS SELIGSOHN.

Witnesses:

FRANK E. NEWTON,
RALPH S. WARFIELD.