No. 742,385. PATENTED OCT. 27, 1903.

H. W. BLAISDELL.

MIXING APPARATUS.

APPLICATION FILED OCT. 14, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig 1

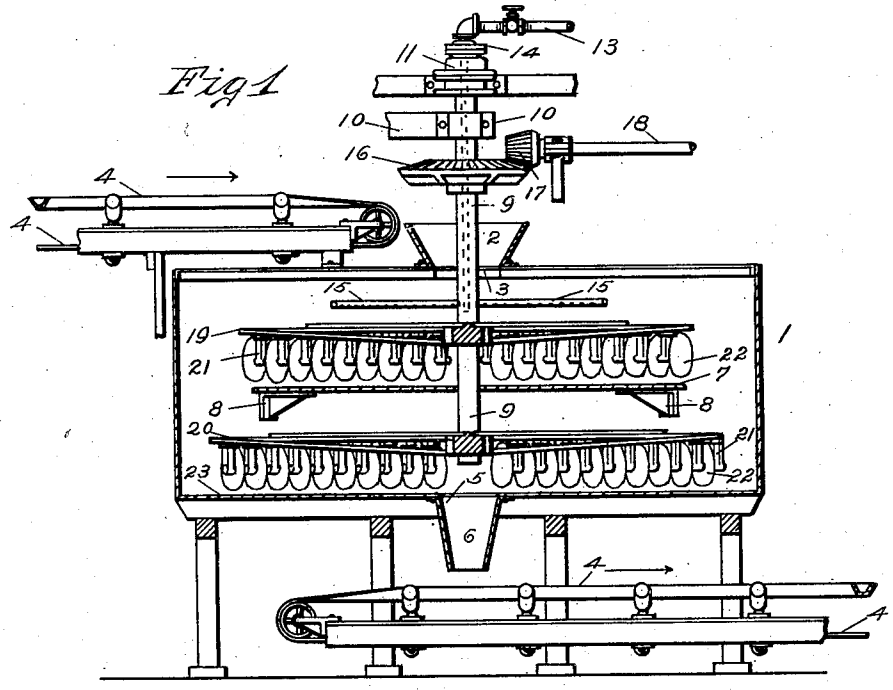
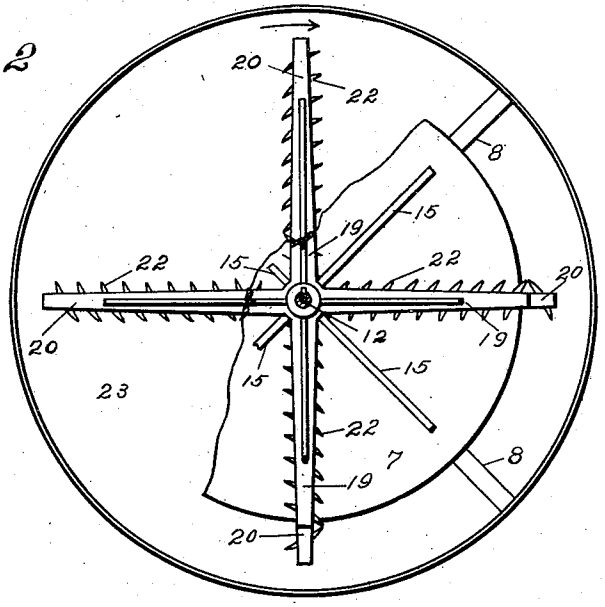



Fig 2




Witnesses
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Hiram W. Blaisdell
by
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig 3

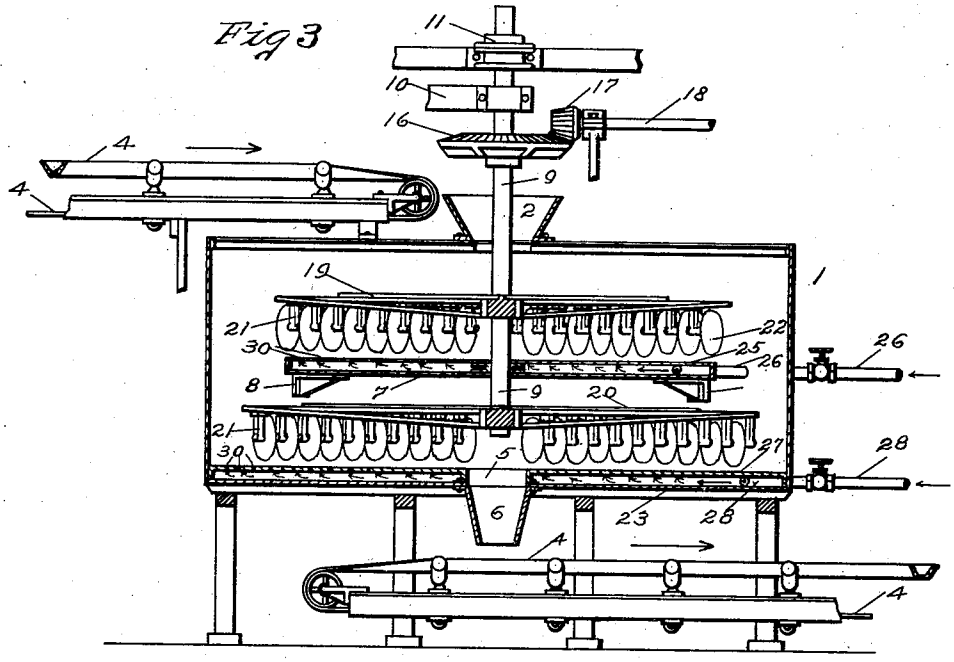
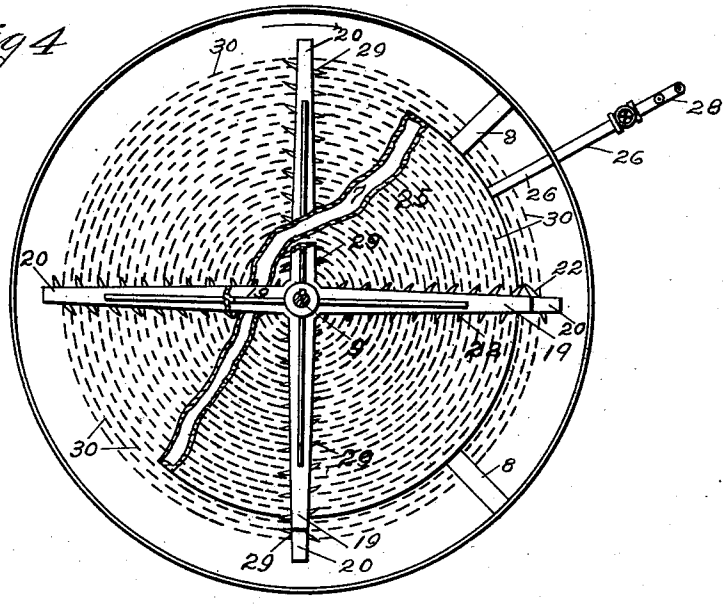



Fig 4




Witnesses

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No. 742,385. Patented October 27, 1903.

# UNITED STATES PATENT OFFICE.

HIRAM W. BLAISDELL, OF LOS ANGELES, CALIFORNIA.

## MIXING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 742,385, dated October 27, 1903.

Application filed October 14, 1902. Serial No. 127,292. (No model.)

*To all whom it may concern:*

Be it known that I, HIRAM W. BLAISDELL, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Mixing Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for mixing material, either for the purpose of moistening or drying the material treated; and one of the objects of the invention is to provide means of this general character which will be simple in construction and rapid and positive in operation.

It is also an object of this invention to provide a mixing apparatus which can be located within the line of travel of the material treated and which will operate so rapidly that the travel or progress of the material will not be retarded.

It is also an object of this invention to provide a mixing apparatus wherein the fluid is distributed uniformly and regularly throughout the entire surface of the material being mixed.

Another object of the invention is to introduce a drying fluid throughout the moist material while the same is being agitated or mixed to facilitate the drying of the material.

With these and other objects in view the invention consists, essentially, in the construction, combination, and arrangement of parts, substantially as more fully described in the following specification and as illustrated in the accompanying drawings, forming part of this application, in which—

Figure 1 is a sectional view of one form of mixing apparatus wherein dry material is treated with a liquid, parts thereof being shown in elevation. Fig. 2 is a top plan view of the same, showing parts broken away to facilitate illustration and with the parts above the tank or receptacle removed. Fig. 3 is a view similar to Fig. 1, illustrating a construction wherein a drying fluid is employed to treat moist material; and Fig. 4 is a top plan view of the apparatus illustrated in Fig. 3.

Similar characters of reference designate corresponding parts throughout the several views.

Referring to the drawings, and particularly to the construction illustrated in Figs. 1 and 2 thereof, the reference character 1 designates a receptacle or tank wherein dry material is to be mixed with a liquid, which may be a cyanid solution employed before the material reaches the vats. The mixing receptacle or tank 1 may be of any size and construction and is preferably provided with a closed top and bottom, in the former whereof there is desirably located a hopper 2, communicating with an opening 3 in said top for the introduction of the material to be treated, which may be discharged into said hopper from the upper or loaded lead of an endless conveyer 4, of any preferred construction, and driven in any desired manner, substantially as illustrated in Fig. 1 of the drawings. The mixing receptacle or tank may be also provided with a bottom discharge-opening 5, with which communicates a chuteway 6 to discharge the mixed material upon the upper or loaded lead of another endless conveyer or another portion or section of the same endless conveyer 4 which conveys the mixed material to the vats for further treatment or to the place of depositing the same. The tank or mixing-receptacle 1 is preferably provided with a partial interior partition or platform 7, desirably of less diameter or size than the receptacle 1 and supported by brackets 8, so as to occupy a position approximately in the center of the tank and to receive the dry material entering the tank through the receiving-hopper 2 and to support such material while it is being sprayed with liquid as well as during the process of mixing the material and liquid, as hereinafter more fully explained. A shaft 9 may be provided with suitable bearings 10 and with a supporting-collar or other device 11, and the shaft 10 is preferably provided with a partial longitudinal bore 12, with which communicates a pipe 13, connected with the source of liquid-supply and having a movable water-tight connection 14 with said shaft in order that the liquid may be introduced thereinto during the revolution of the shaft, as will be readily understood. Formed on or connected with the shaft 9 are perforated sprinkling-arms or

like devices 15 in communication with the bore 12 of said shaft in order that the liquid passing through said shaft may be conveyed into said arms and be discharged therefrom through the perforations in said arms upon the dry material on the partition 7. By means of this construction the spraying of the material will be uniform and light—that is, the liquid will not be deposited at one point or place, but will be sprayed or discharged in small quantities throughout the entire surface of the material treated by the rotation of the arms 15, thereby obtaining the best possible results. Keyed upon the shaft 9 is a large beveled gear-wheel 16, with which meshes a beveled pinion 17 upon a drive-shaft 18, actuated by any suitable driving mechanism, (not shown,) or any other means may be employed to drive the shaft 9 that may be found desirable in practice. Mounted upon the shaft 9 above the partition or platform 7 are a plurality of arms 19, and below the same are mounted similar arms 20, and each of said sets of arms are provided with hangers or depending brackets 21, wherewith are revolubly connected concavo-convex disks 22, set at an angle to the arms carrying the same, Figs. 1 and 2, so as to progress or turn over the material upon the platform 7 and the bottom 23 of the tank 1 during the movement of the arms through the action of the shaft 9, supporting the same, and the disks 22 being set at different angles in relation to the sets of arms 19 and 20 the disks carried by the arms 19 will progress the material toward the periphery or edges of the partition 7 while the disks on the arms 20 will progress the material toward the discharge-openings 5 of the tank, as will be readily understood. The operation of this portion of the invention will be readily understood from the foregoing description when taken in connection with the accompanying drawings and the following explanation thereof. The dry and finely-crushed material, particularly mineral-bearing material, in the handling whereof the small but valuable particles are lost to a great extent, is discharged into the receiving-hopper 2 from the upper or loaded lead of the endless conveyer 4 and from said hopper falls upon the partition or platform 7, where it is sprayed with liquid from the rotating arms 15 and is acted upon or turned over by the disks 22, carried by the arms 19, actuated by the shaft 9, which is driven through the mediation of the gear-wheel 16, the pinion 17, and the drive-shaft 18, substantially as before explained. The action of the disks 22 upon the sprinkled material is such as to turn the same over or progress the same toward the periphery or edges of the partition or platform 7, over which the sprayed material falls upon the bottom 23 of the tank, where it is taken up or acted upon by the disks of the arms 20, which turn over or progress the material toward the center of the tank, where it falls through the discharge-chute 6 upon the upper or loaded lead of the conveyer 4, which transports the dampened and mixed material to the vats or to the place of deposit.

Adverting now particularly to Figs. 3 and 4 of the drawings, there is illustrated substantially the same apparatus as hereinbefore described with the exception that there is omitted therefrom the means of sprinkling the material and except that there is added means for aerating material. In this construction the platform 7 is then closed with a perforated plate 25, between which and the platform 7 enters a connection 26 for the introduction of air, steam, or other drying fluid introduced from any suitable source of supply and preferably under pressure, while the bottom 23 of the tank is preferably likewise inclosed with a perforated plate 27, and a supply connection 28 also communicates with the space between said plate and bottom and has suitable supply connection for introducing air or other fluid into said space, as before stated.

If found desirable in practice, the disks 22 on certain of the arms 20 may be changed as to their angle and direction, as shown at 29 in Fig. 4 of the drawings, and the object of this change is to turn the material back from its main direction one-half the distance by the disks of certain arms in order to effect a more thorough mixing of the material.

In the construction illustrated in Figs. 3 and 4 of the drawings the material is conveyed to and from the mixing tank or receptacle 1 substantially as before explained; but in this case the material is discharged into the tank in a moist or wet state or condition, and the object is to quickly and thoroughly remove the moisture from the material while not interfering with the transportation of the material, and this is accomplished by discharging the moist material upon the perforated plate 25, where it is subjected to the jets or currents of air or drying fluid which are forced up through the slits or perforations 30 in said plate, while the moist or wet material is being progressed over said plate by the action of the disks 22 toward the periphery or edges of the plate, while constantly subjected to the action of the numerous jets or currents of air or drying fluid passing up through the perforated plate 25, as will be readily understood. From the perforated or slotted plate 25 the material falls upon the perforated or slotted plate 27, where it is again subjected to the action of the drying fluid or agent as before, and is also progressed across or over the latter plate toward the discharging-chute 6, from whence it passes upon the endless conveyer to the place of deposit.

This invention is not limited or confined to the employment of water or cyanid solution or to the employment of air or steam, as any other fluids may be used for these purposes, nor is the invention limited to the specific

construction, combination, and arrangement of parts herein shown and described, and the right is reserved to make all such changes in and modifications of the same as come within the spirit and scope of this invention.

I claim—

1. A mixing apparatus provided with a mixing-receptacle having a partial interior partition or platform, arms above said platform and the bottom of the receptacle, concavo-convex disks carried by said arms to progress the material over said platform and bottom and means for operating said arms.

2. A mixing apparatus provided with a receptacle having a partial interior partition or platform, arms mounted above said platform and the bottom of said receptacle, concavo-convex disks carried by said arms to progress the material toward the periphery of the platform and toward the center of the bottom, means for operating said arms and a device for spraying the material treated.

3. A mixing apparatus provided with a mixing-receptacle having a partial partition or platform, arms above said platform in the bottom of the receptacle, revoluble concavo-convex disks carried by said arms to progress the material treated to and from the center of said platform and bottom respectively and means for operating said arms.

4. A mixing apparatus provided with a mixing-receptacle having a partial interior partition or platform, arms above said platform and the bottom of the receptacle, means for actuating said arms, concavo-convex disks arranged at an angle to said arms to progress the material from and to the center of said platform and bottom respectively, a revoluble spraying device and connection between the latter and source of supply.

5. A mixing apparatus provided with a mixing-receptacle, a shaft carrying rotary mixing devices within the receptacle, spraying-arms connected with said shaft, means for supplying a liquid to said arms and mechanism for rotating said shaft.

6. A mixing apparatus provided with a mixing-receptacle, a shaft carrying mixing devices within said receptacle, spraying-arms above said devices receiving the supply of liquid through said shaft and moving therewith to uniformly distribute the liquid and mechanism for rotating said shaft.

7. A mixing apparatus provided with a mixing-receptacle, a shaft having a hollow portion and carrying mixing devices within said receptacle, mechanism for rotating the shaft, and perforated spraying-arms connected with said shaft above said devices and receiving a liquid therefrom.

8. A mixing apparatus provided with a mixing-receptacle having a partial interior partition or platform, a shaft extending into said receptacle and having a hollow portion connected with the source of liquid-supply, sprinkling devices carried by said shaft and receiving liquid therethrough, arms upon said shaft above said partition and the bottom of the receptacle, mixing devices carried by said arms to progress the material from and to the center of said platform and bottom respectively and mechanism for rotating said shaft.

9. A mixing apparatus provided with a mixing-receptacle having a partition or platform, a shaft extending into said receptacle having a hollow portion for the admission of liquid, sprinkling-arms carried by said shaft and receiving liquid therefrom, arms upon said shaft, concavo-convex disks upon said arms to progress the material and mechanism for rotating the shaft.

10. A mixing apparatus provided with a mixing-receptacle having a partial interior partition or platform, a shaft extending into said receptacle and having a hollow portion connected with the source of liquid-supply, perforated sprinkling-arms carried by said shaft and receiving liquid therefrom, arms upon said shaft, revoluble disks carried by said arms to progress the material and mechanism for rotating the shaft.

11. A mixing apparatus provided with a mixing-receptacle having a platform, arms above the platform and the bottom of the receptacle, means for actuating said arms and devices carried by said arms and arranged at an angle thereto constructed to progress the material from and to the center of said platform and bottom respectively.

12. A mixing apparatus provided with a mixing-receptacle having a platform, arms above said platform and the bottom of the receptacle, means for actuating said arms and concavo-convex disks arranged at an angle to said arms, constructed to progress material from and to the said platform and the bottom respectively.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, in the county of Los Angeles and State of California, this 3d day of October, 1902.

HIRAM W. BLAISDELL.

Witnesses:

J. W. KEMP,

L. B. ALDERETE.