No. 819,999. PATENTED MAY 8, 1906.

M. J. JONES.

DRUG MIXER.

APPLICATION FILED APR. 12, 1905.

FIGURE 1.

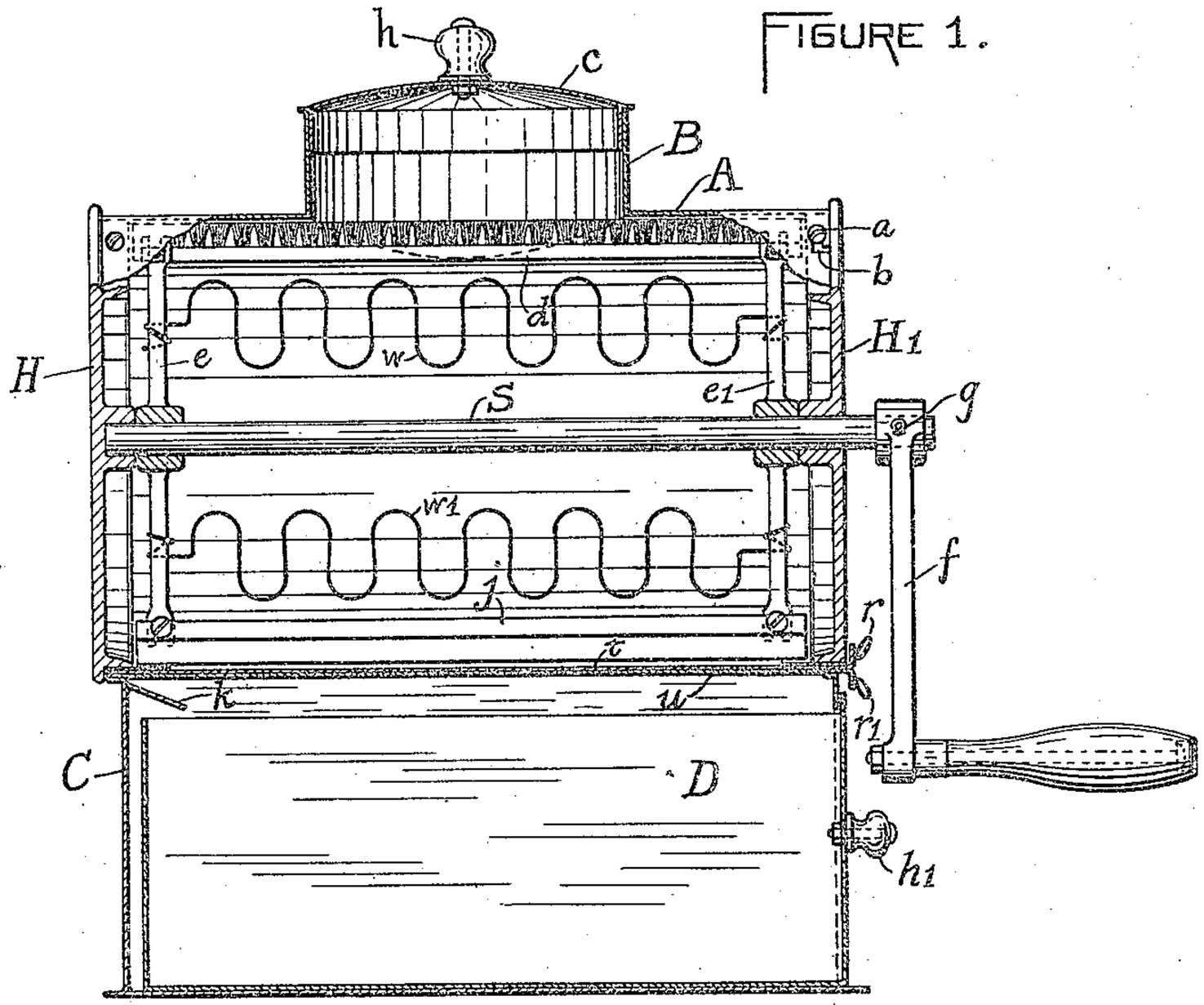


FIG. 2.

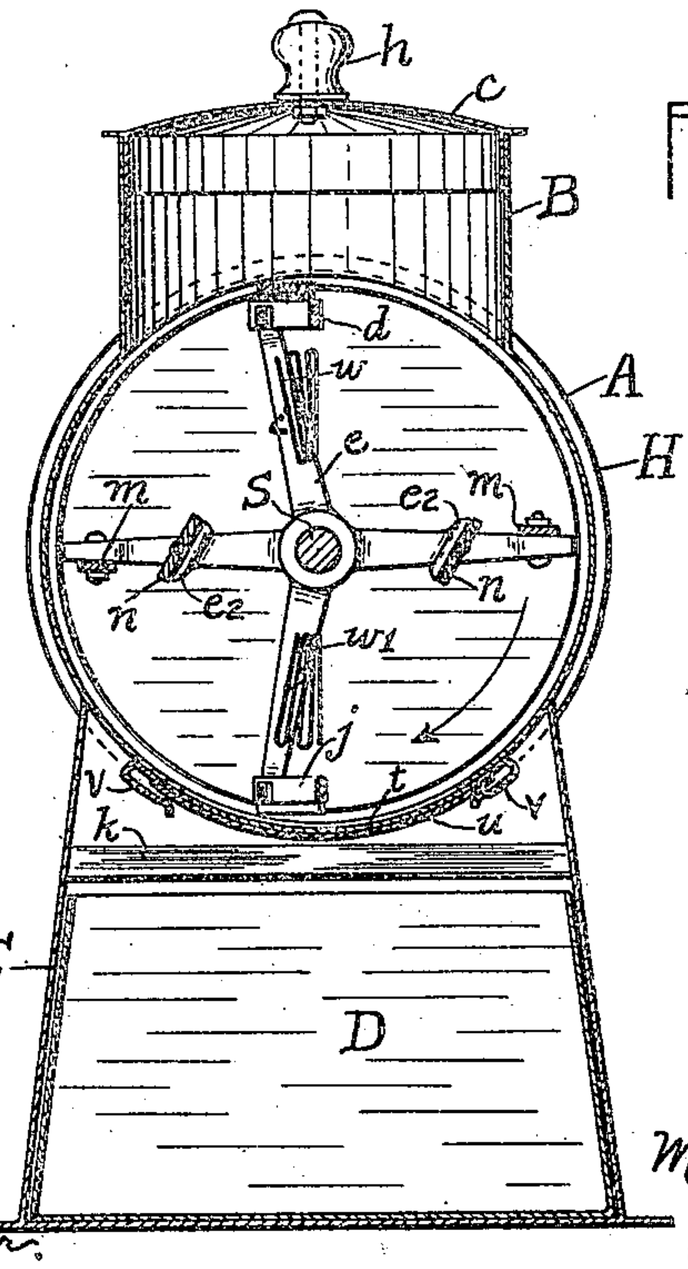


FIG. 3.

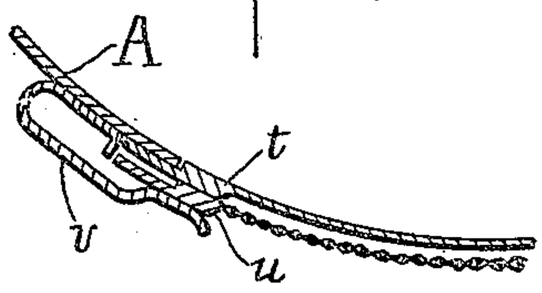
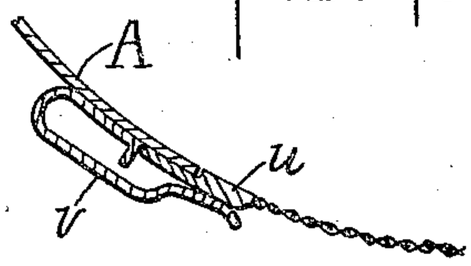


FIG. 4.



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DRUG-MIXER.

No. 819,999. Specification of Letters Patent. Patented May 8, 1906.

Application filed April 12, 1905. Serial No. 255,088.

To all whom it may concern:

Be it known that I, MARCENUS J. JONES, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a new and Improved Drug-Mixer, of which the following is a specification.

This invention relates to drug-mixers of that class in which a series of rotating arms are caused to act upon the drugs in the form of powder to thoroughly mix them and ultimately force them through a suitable screen into a receptacle beneath such screen.

In the use of such mixers I have found that the usual brush and rubber for brushing the powder through the screen and for reducing the lumps do not alone operate satisfactorily to maintain a constant quantity or supply of the powder upon the fixed rubbing-surface. To overcome this difficulty, I have found it desirable to introduce a blade or series of blades set at such an angle as to force the powder or drug toward the fixed rubbing-surface, and to overcome any tendency on the part of these blades to produce a packing of the powder I have introduced alternately with them a series of cutting-blades for the purpose of dividing the mass of powder just before and after the passage thereover of the pressing-blades. The action of these blades tends to more thoroughly mix the powder in the mixer and results in a more efficient operation of the rubbing and brushing arms upon the fixed rubbing-surface. I have also found it important or quite necessary that the mixer shall be capable of being readily taken apart for the purpose of cleansing and washing, and I have also found that a cylindrical chamber answers admirably for a containing-chamber for the drugs and in which the revolving arms are arranged to work, and in order that the revolving blades and brushes may be readily removable I have found it desirable to make one end of the containing-cylinder removable with the series of revolving arms carried by a supporting-shaft, one end of which is arranged to revolve in a suitable bearing in a fixed head of the cylinder, while the other end revolves in and extends through a bearing in the removable head in order that such removable head and the series of revolving arms or blades may be removed from the cylinder together for the purpose of washing and cleansing. For securing the removable head in the cylinder I make use of a suitable locking device which can be readily disengaged.

It is of course necessary that there should be a screen at the bottom of the cylinder, through which the thoroughly-mixed powders may be forced or allowed to pass when they have become properly mixed, and to prevent the powders from passing through the screen before they have been properly mixed it has been customary to insert a cut-off or slide beneath the screen or sieve. Such an arrangement presents a difficulty in that the powder is continually forced through the screen against the cut-off beneath it and the continual action of the rotating blades with the brushes and rubbers against the screen in the process of mixing the powders results in an unnecessary wear upon the screen, while the forcing of the powder through the screen against the cut-off beneath it tends to displace the wires of the screen. To overcome these difficulties, I have devised an arrangement whereby the cut-off blade may be inserted above the screen. For this purpose the screen is supported upon yielding guides which may be forced downwardly to a sufficient extent to permit the insertion above them of the cut-off, and when the cut-off is removed the spring-supports for the screen force the same upwardly, so that it occupies practically the same position that the cut-off does when in place. The screen, it will of course be understood, is removable, so that different screens of different-size mesh may be used for the different powders to be reduced and mixed, while there need be but one cut-off blade. By the arrangement above noted the cut-off blade is caused to occupy such a position as to become practically a part of the surface of the retaining-cylinder in which the powder is held while being mixed and acted upon by the revolving blades and brushes.

The accompanying drawings, illustrating a drug-mixer in accordance with my invention, are as follows:

Figure 1 is a central longitudinal sectional view, and Fig. 2 is a central transverse sectional view, through the machine. Figs. 3 and 4 are enlarged transverse sectional views showing in detail the means used for holding the screen and cut-off blade in operative position.

As seen in the drawings, the mixing-machine consists, essentially, of a horizontal cy-

lindrical portion A, supported upon a base C, in which a drawer D is arranged to slide. The cylinder A has secured in its ends the heads H and H′, which carry bearings for the shaft S, which in turn carries the spiders *e* and *e′*, located just inside the heads H and H′, respectively. The arms of these spiders *e* and *e′* are slotted at their outer ends to receive the blades, which are secured to such arms by suitable bolts, as indicated. As seen in Figs. 1 and 2, on diametrically opposite sides of the shaft S a brush *d* and a rubbing-strip *j* are attached between the vertically-disposed arms *e* and *e′*, so as to project beyond the ends of these arms and engage the inside of the cylinder A. The brush, rubbing-strip, and supporting-arms are so proportioned and arranged that such brush and rubbing-strip are not parallel with the shaft S, but somewhat inclined to it, so that when such shaft is rotated by means of the crank *f*, secured thereto, the brush *d*, besides moving the contents of the cylinder A angularly, imparts a slight longitudinal motion in one direction to it, while the rubbing-strip *j*, besides moving such contents angularly, imparts to it a similar longitudinal motion in the other direction.

Between the horizontally-disposed arms *e* and *e′*, as seen in Fig. 2, and near their outer ends mixing-blades *m* are secured, and these blades tend to agitate and mix the contents of the cylinder A as they are moved through it. Between these same arms *e* and *e′* blades *n* are supported, preferably by pins carried by such blades extending into holes provided therefor in such arms. These blades *n* are prevented from turning anuglarly on such pins by shoulders e^2, formed on such arms *e* and *e′*, and are held in such a position that when such arms are rotated in the direction of the arrow shown in Fig. 2 such blades *n* will force the contents of the cylinder A outward and against the wall of the cylinder. Located between the vertically-disposed arms *e* and *e′* and between the shaft S and rubbing-strip *j* and brush *d* are seen beaters or cutting-blades *w* and *w′*, formed, preferably, of wires having their ends secured to such arms *e* and *e′*, as indicated. These beaters *w* and *w′* are so formed as to cut the contents of the cylinder in planes practically perpendicular to the shaft S. These beaters alternating with the blades *n* coöperate with such blades to thoroughly mix and pulverize the contents of the cylinder and prepare it to be discharged from such cylinder through the screen provided for that purpose.

In the lower part of the cylinder A and longitudinally thereof an opening is formed, below which a slide or cut-off blade *t* and a screen *u* are arranged to be supported by suitable spring-guides *v*, extending nearly the whole length of the cylinder A. The detailed arrangement of such cut-off, screen, and guides is more clearly seen by reference to Figs. 3 and 4, such cut-off *t* and screen *u* being so conformed as to be practically a continuation of the inside surface of the cylinder A, whichever one of them may be held in the opening in the lower part of such cylinder by the spring-guides *v*. These guides *v* are so conformed at their ends as to permit the ready entry of the screen or the cut-off, either one alone or both the cut-off and the screen, the former above the latter, and to hold either the cut-off or the screen, as desired, securely in place against the operation of the mixing-blades in the cylinder A.

When the contents of the cylinder A have been thoroughly mixed and pulverized, the cut-off *t* is drawn out from above the screen *u* by means of the ring *r*, secured to such cut-off, and the guides *v* force the screen *u* into the position shown in Fig. 4. Then the shaft S is rotated, preferably in the direction indicated by the arrow in Fig. 2, and the combined action of the mixing-blades, rubbing-strip, and brush is to work the contents of the cylinder through the screen *u* and into the drawer D, contained in the lower supporting portion C of the machine. After the cylinder A has been emptied of its contents the mixed and sifted substances may be removed from the machine with the drawer D by means of its handle *h′*, and the screen *u* may then be pulled out of the machine by means of the ring *r′*, secured to such screen, in order to clean the same. An inclined shelf *k* is provided to direct the sifted substances over the rear end of the drawer D and prevent spilling into the compartment C.

The cylinder A has on top and near its middle a short upward extension B to facilitate putting the substances to be mixed into such cylinder A, and this extension B is arranged to be closed by a cover *c*, having a handle *h*.

The head H is secured in the end of the cylinder A by screws, so as to be not readily removable, while the head H′ is secured in the other end of such cylinder, as indicated in Fig. 1, by means of screws *a* engaging slots *b*, extending from the end of such cylinder first a short distance longitudinally of the same and then at right angles to such first direction and angularly in such cylinder for a sufficient distance to prevent such screws from entering the longitudinal portions of such slots *b* without first turning the head H′ angularly. Thus by using a number of screws *a* and slots *b* around the circumference of the head H′ such head when in position is securely held in place, and yet may be readily removed by first moving the same angularly and then longitudinally of the cylinder A, which removes from such cylinder the head H′, shaft S, spiders *e* and *e′*, and blades, &c., carried thereby. Then the crank *f* may be removed from the shaft S by drawing the spring-cotter *g*, and the head H′ may also be

removed from the shaft S to facilitate cleansing. The blades, &c., carried by the arms *e* and *e'* may also be removed, if desired, though this is seldom necessary. It will be understood, of course, that screens of different mesh may be used to meet requirements of different work.

In using my machine the substances to be mixed and sifted are put into the cylinder A through the extension B, care being first taken to see that the head H' is in place properly and that the cut-off *t* and the proper screen *u* are in proper position, the former above the latter. Then the cover *c* is put in place to prevent the dust from the substances being mixed flying out of the machine, and the crank *f* is rotated until the mixing has been effected. Then after placing the drawer D in position the cut-off *t* is withdrawn, and the crank *f* is rotated until the contents of the cylinder A have all been passed through the screen *u* into the drawer D, after which the mixed and sifted substances may be removed from the machine, which may then be taken apart and cleansed, as above described.

It will of course be understood that in mixing certain substances the process will be facilitated by alternately rotating the crank in first one direction and then the other; but in sifting the crank should preferably be rotated so that the blades *n* will force the substances to be sifted toward the screen.

What I claim is—

1. In a mixing and sifting machine, a receiving-case with rubbing and brushing arms operating therein, a screen for permitting the egress therethrough of the mixed product, a removable cut-off, and an elastic support for such screen operating normally to hold such removable cut-off in place above such screen to constitute practically a continuation of the wall of the receiving-case.

2. In a mixing and sifting machine, a receiving-case with rubbing and brushing arms operating therein, a removable screen for permitting the egress therethrough of the mixed product, a removable cut-off, and an elastic guide and support for such screen and such cut-off adapted to normally hold such screen in place to constitute practically a continuation of the wall of the receiving-case and also adapted to yield to permit the insertion of such cut-off and hold the same in place above the screen to constitute also when thus in place practically a continuation of the wall of the receiving-case.

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