

No. 773,818.

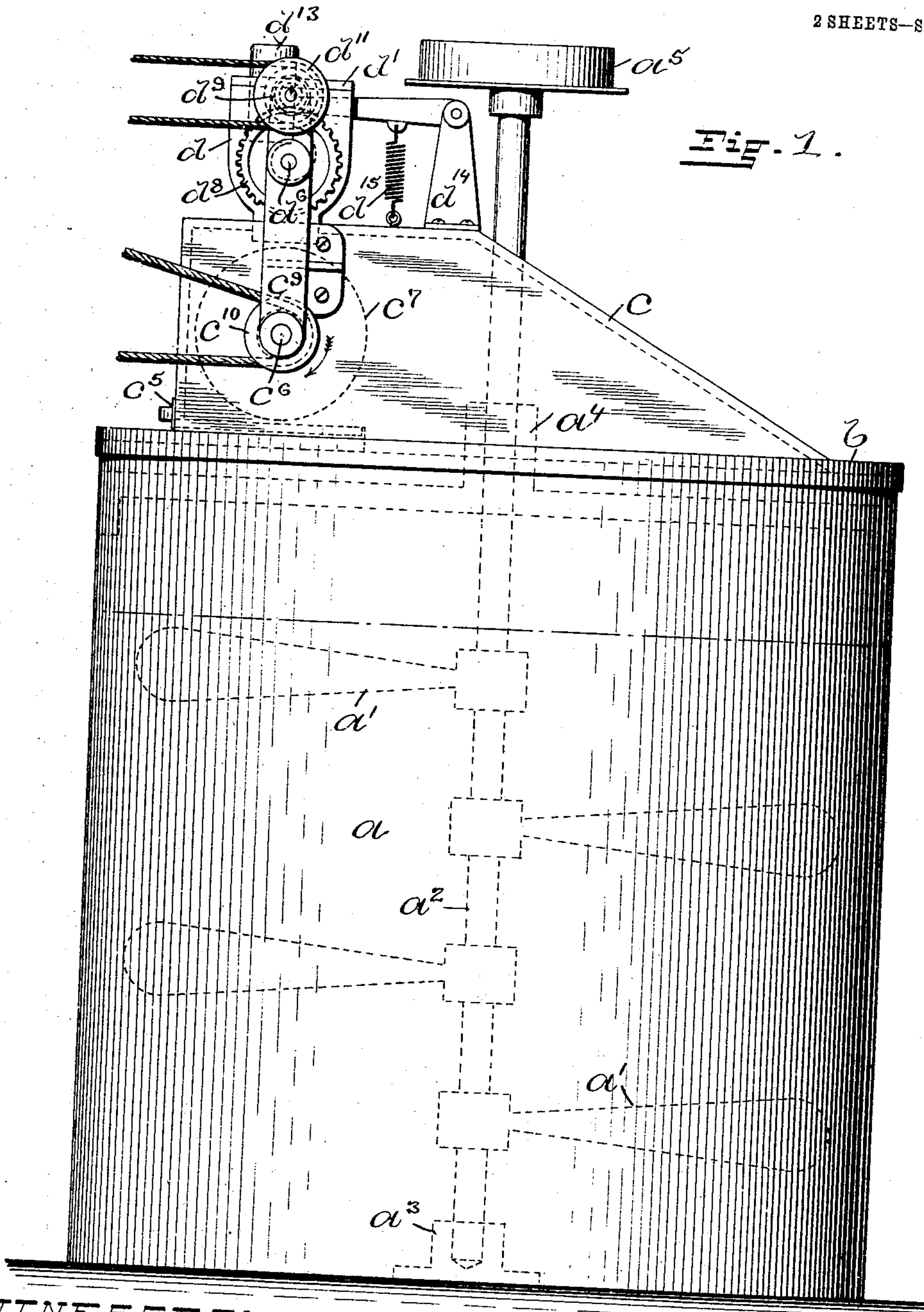
PATENTED NOV. 1, 1904.

S. A. SMITH.  
APPARATUS FOR DISTRIBUTING POWDERED MATERIAL TO LIQUIDS  
AND MIXING SAME THEREWITH.

APPLICATION FILED APR. 27, 1903.

NO MODEL.

2 SHEETS—SHEET 1



WITNESSES:

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Ada E. Fagely

INVENTOR:

Scott A. Smith  
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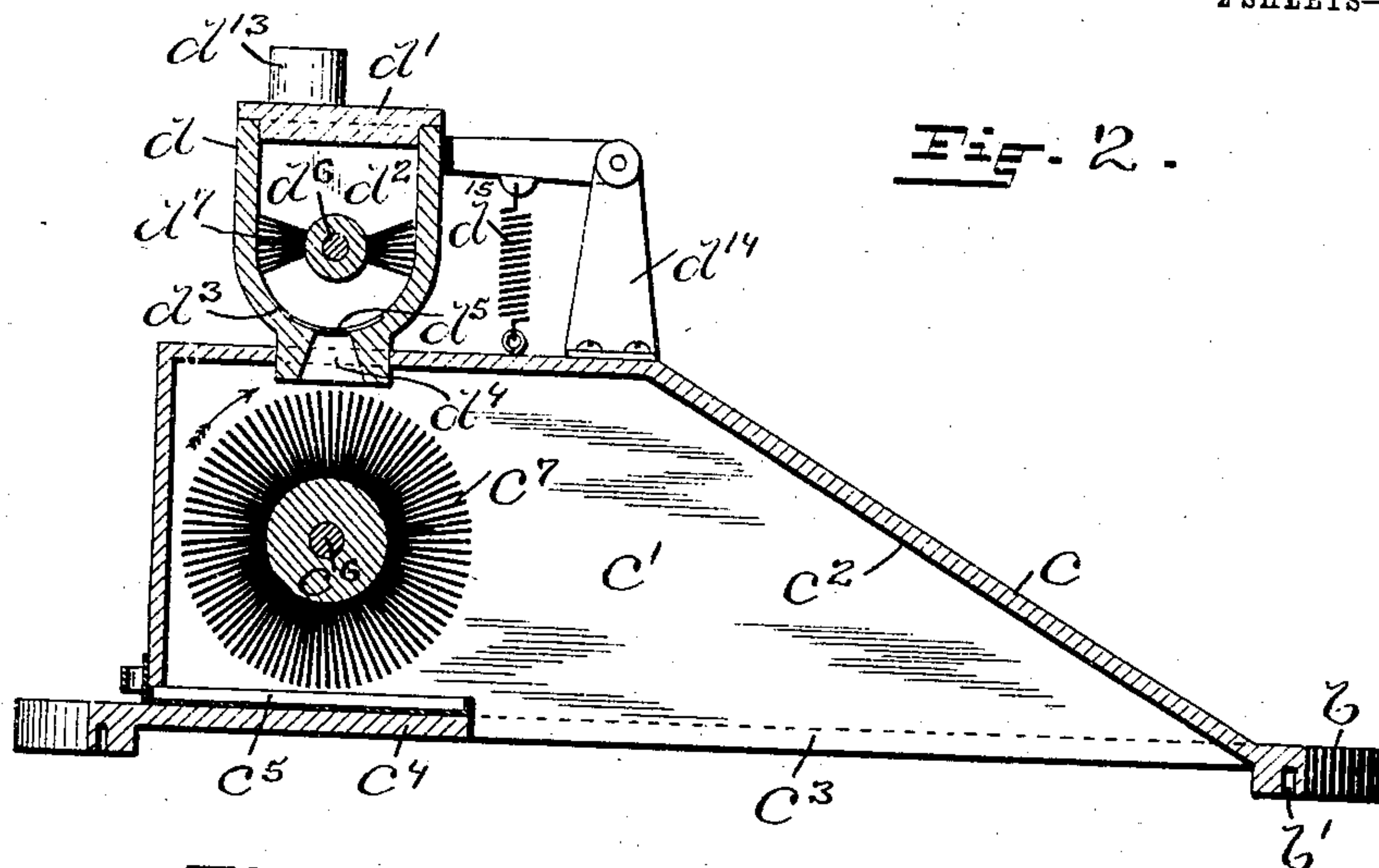


Fig. 2.

Fig. 3.

Fig. 4.

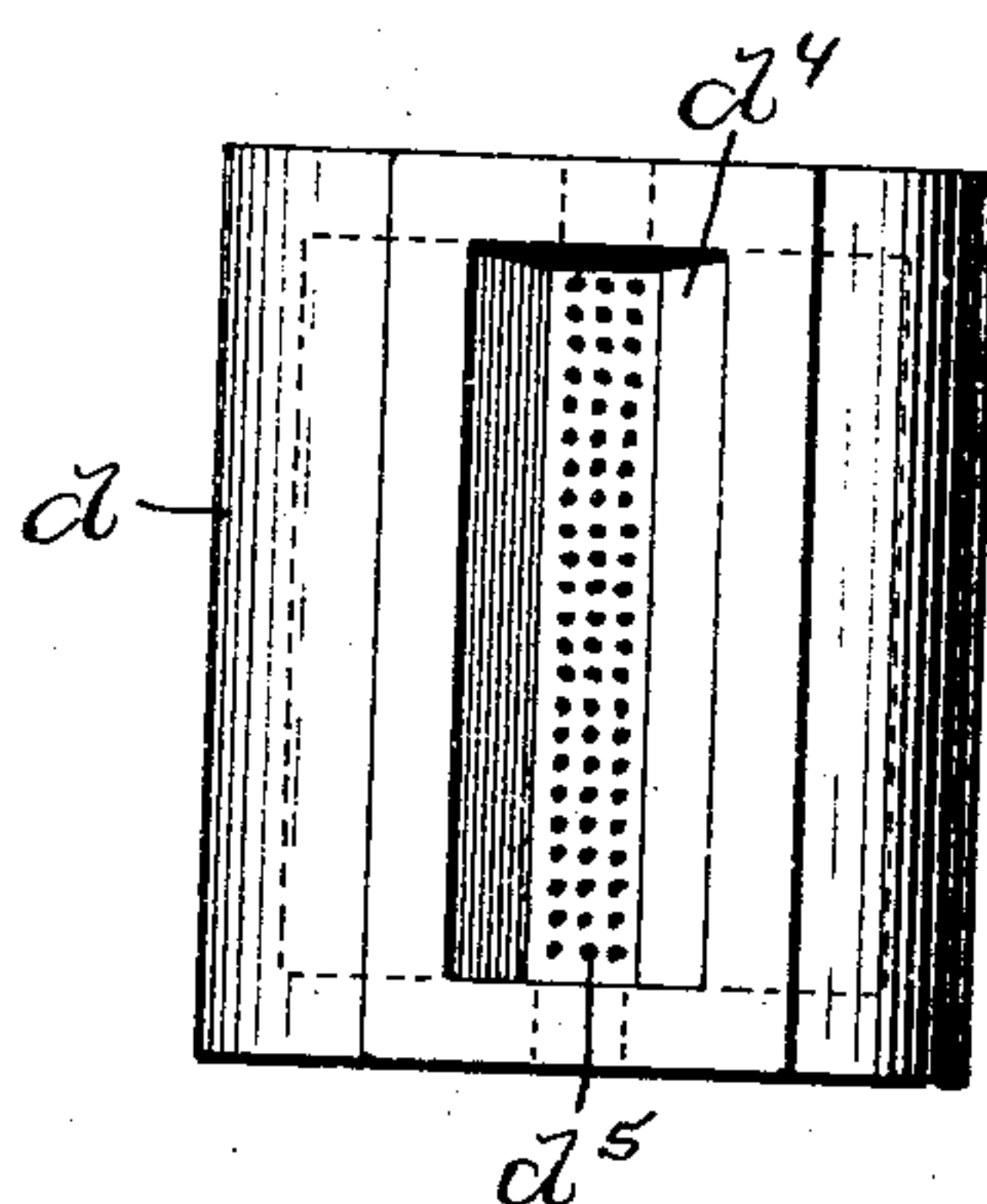
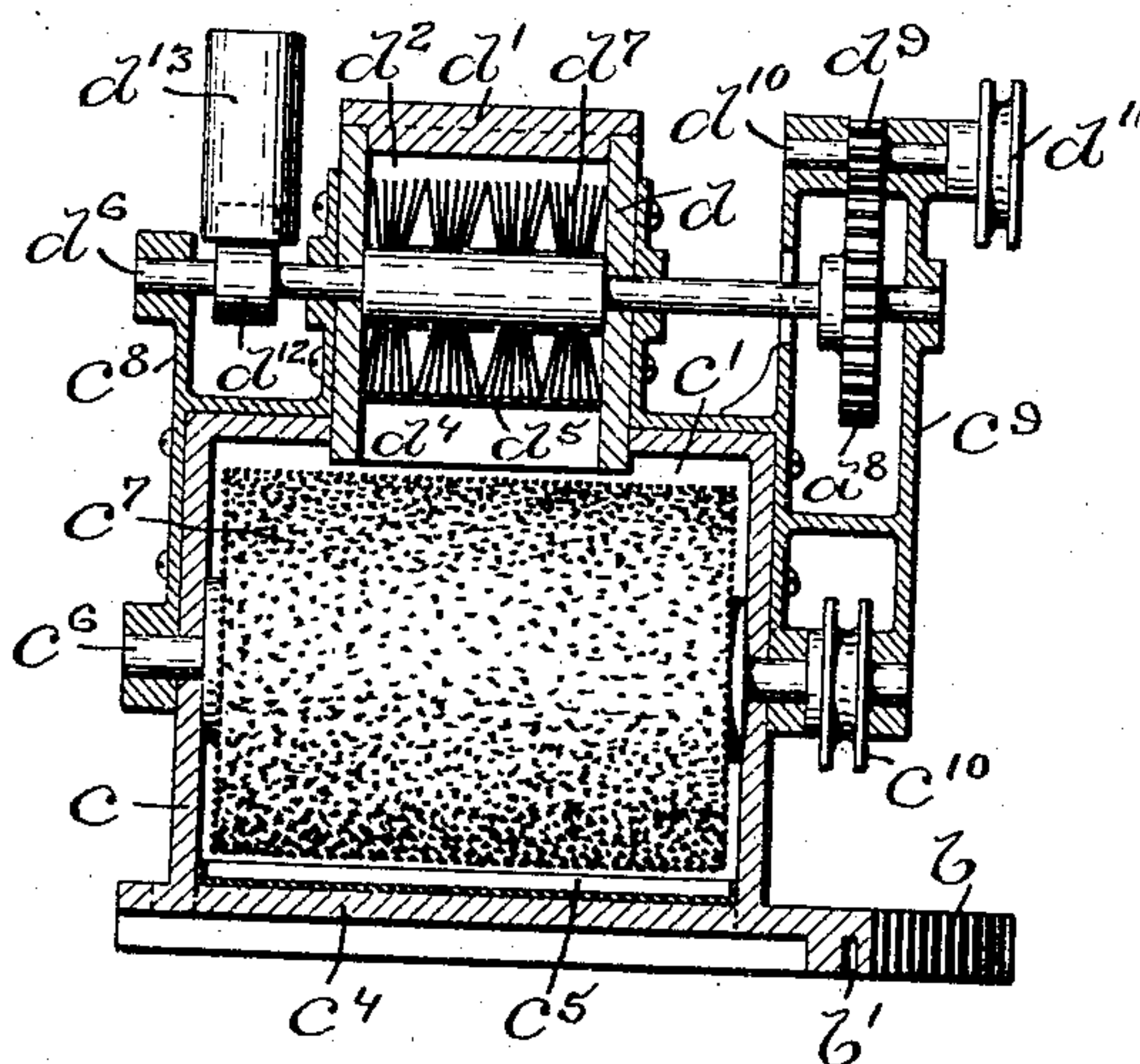
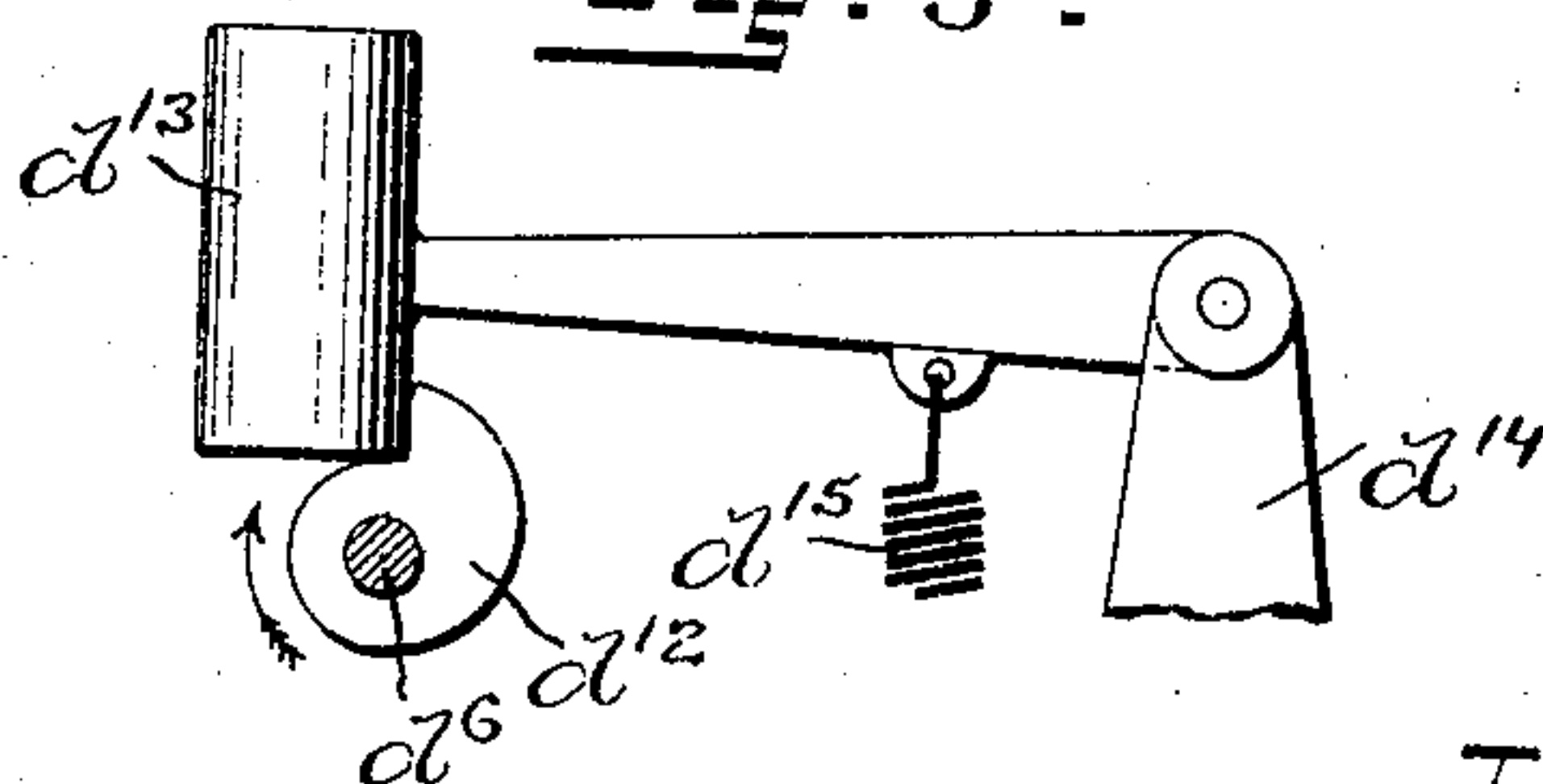


Fig. 5.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

SCOTT A. SMITH, OF PROVIDENCE, RHODE ISLAND.

APPARATUS FOR DISTRIBUTING POWDERED MATERIAL TO LIQUIDS AND MIXING SAME THEREWITH.

SPECIFICATION forming part of Letters Patent No. 773,818, dated November 1, 1904.

Application filed April 27, 1903. Serial No. 154,543. (No model.)

*To all whom it may concern:*

Be it known that I, SCOTT A. SMITH, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Apparatus for Distributing Powdered Material to Liquids and Mixing the Same Therewith, of which the following is a specification.

This invention has reference to an improvement in an apparatus for mixing liquids, and more particularly to an improvement in mechanism for mixing impalpable powders with liquids. In an apparatus for this purpose as heretofore constructed the minute atoms of the impalpable powder would adhere and prevent a uniform mixing of the powder with the liquid.

The admixture of powdered antimony or powdered material containing antimony with oils to form certain lubricating-oils has been very difficult, owing to the fact that the particles of powdered material would adhere and prevent a uniform mixture of the powder with the oil. I have found that by agitating the oil violently and supplying the powder in a cloud or spray the oil at once absorbs the powdered material and is more uniformly impregnated therewith.

The object of my invention is to prevent the cohesion of the atoms of powder in the liquid by delivering the powder to the liquid in the form of a spray or cloud of minute atoms of powder, which falling onto the liquid is mixed with it by stirring or agitating the liquid. By this method the impalpable powder is thoroughly mixed and incorporated with the liquid so intimately that separation or precipitation is avoided.

My invention consists in the peculiar and novel construction of an apparatus having a hollow cylindrical body for the liquid, with means for stirring or agitating the liquid, and a cover on which is a casing supporting a hopper for the powder and the mechanism for delivering the impalpable powder from the hopper to the liquid in the form of a cloud of minute atoms of powder, as will be more fully set forth hereinafter.

Figure 1 is a side view of the apparatus,

showing the hollow cylindrical body, the casing on the cover supporting the hopper for the powder, and the mechanism for delivering the powder to the liquid in the body of the apparatus, the beaters for stirring the liquid being shown in broken lines. Fig. 2 is a sectional view taken lengthwise through the casing and the cover, showing the hopper and the removable brushes for delivering the powder from the hopper to the liquid through the open bottom of the casing. Fig. 3 is a transverse sectional view taken through Fig. 2 on a line with the brush-shafts. Fig. 4 is an enlarged detail view of the hopper looking at the under side, and Fig. 5 is an enlarged detail view of the spring-pressed hammer for jarring the hopper and its operating-cam on the upper brush-shaft.

In the drawings, *a* indicates the hollow cylindrical body for the liquid; *b*, the cover; *c*, the casing on the cover, and *d* the hopper for the powder. The liquid in the body *a* is stirred or agitated by the beaters *a'* on the perpendicular shaft *a''*, rotating in the bearings *a'''* and *a''''*, by the pulley *a''''''*. The cover *b*, with the groove *b'* fitting the open end of the body *a*, is divided centrally into two parts, one half of which has the casing *c* with the powder-delivering mechanism. The casing *c* forms the inclosed chamber *c'* with the inclined face *c''*, and the opening *c'''* in the bottom *c''''* extends through the cover *b*. The bottom *c''''* under the hopper *d* forms a shelf to support the removable shallow pan *c''''''*. Extending transversely through the chamber *c'* over the pan *c''''''* is the lower brush-shaft *c''''''''*, carrying the circular brush *c''''''''''*. This shaft is supported in bearing in the frames *c''''''''''* and *c''''''''''''*, secured to the casing *c*, and has the pulley *c''''''''''''''* for revolving the brush in the direction of the arrow, as shown in Fig. 2.

Secured on the casing *c* over the circular brush *c''''''''''* by the frames *c''''''''''* and *c''''''''''''* is the hopper *d* for the powder. The hopper *d* has the cover *d'* and is shaped to form the chamber *d''*, with the semicircular bottom *d'''* having the outlet-opening *d''''* covered with the perforated tin *d''''''*.

Extending through the hopper *d* is the upper brush-shaft *d''*, supported in bearings in



the frames  $c^8$  and  $c^9$  and carrying the brush  $d^7$  in the hopper, the gear  $d^8$  in the frame  $c^9$  meshing with the pinion  $d^9$  on the shaft  $d^{10}$ , supported in bearings in the frame  $c^9$  and having the pulley  $d^{11}$ . On the end of the brush-shaft  $d^6$  in the frame  $c^8$  is the cam  $d^{12}$ , operating to lift and release the spring-pressed hammer  $d^{13}$  (pivotally secured to the casing  $c$  by the support  $d^{14}$ ) against the tension of the spring  $d^{15}$ , attached to the arm of the hammer and to the casing.

In the operation of my improved apparatus for mixing impalpable powders with liquids the cylindrical body  $a$  is filled with the liquid to the height desired and the hopper  $d$  is partly filled with the powder. The circular brush  $c^7$  is revolved at a high rate of speed in the direction of the arrow by the pulley  $c^{10}$ , and the brush  $d^7$  in the hopper is revolved at a low rate of speed by the pulley  $d^{11}$ . The revolving of the brush  $d^7$  in the hopper sweeps the powder over and through the perforated tin, where it drops through the opening  $d^4$  onto the revolving brush  $c^7$  and is thrown by the centrifugal force of the brush through the opening  $c^3$ , assisted by the inclined face  $c^2$ , onto the liquid in the body of the apparatus in the form of a spray or cloud of minute atoms of powder, where it is mixed with the liquid by the revolving beaters  $a' a'$ . The vibrations of the spring-pressed hammer  $d^3$  jars the hopper  $d$  and prevents filling or clogging of the perforations in the bottom of the hopper over the outlet-opening  $d^4$ , and the removable shallow pan  $c^5$  under the brush  $c^7$  collects any excess of powder not thrown by the brush.

By the use of my improved apparatus cohesion of the minute atoms of powder is prevented, the powder is more thoroughly incorporated with the liquid and held in suspension, and precipitation of the powder in the liquid is avoided indefinitely.

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

1. In an apparatus of the nature described, the combination with a tank and means for agitating the liquid contained in the tank, of a casing, a brush supported in the casing, a hopper supported on the casing, a brush supported in the hopper, and means for revolving the brush in the casing and the hopper, as described.

2. In an apparatus of the nature described,

the combination with a tank and means for agitating the liquid contained in the tank, of a casing, a brush supported in the casing, a hopper provided with a perforated bottom and supported on the casing, a brush supported in the hopper, means for vibrating the hopper, and means for revolving the brush in the casing and the brush in the hopper, as described.

3. An apparatus for mixing an impalpable powder with a liquid, consisting of a hollow cylindrical body for the liquid, having a cover with a casing supporting a hopper for the powder and an opening over the liquid, a revolving circular brush in the casing, a revolving brush in the hopper, a perforated outlet-opening in the hopper over the brush in the casing, means for revolving the brushes to deliver the powder from the hopper to the liquid in the form of a spray or cloud of minute atoms of powder, and means for mixing the powder with the liquid, for the purpose as described.

4. In an apparatus for mixing an impalpable powder with a liquid, the combination with a covered tank for the liquid, having means for stirring or agitating the liquid, of the casing  $c$  on the cover forming the inclosed chamber  $c'$ , having the opening  $c^3$ , the bottom  $c^4$  supporting the pan  $c^5$ , and the inclined face  $c^2$ , the lower brush-shaft  $c^6$  with the circular brush  $c^7$  and the pulley  $c^{10}$  supported in bearings in the frames  $c^8$  and  $c^9$ , the hopper  $d$  secured on the casing  $c$  by the frames  $c^8$  and  $c^9$  and having the cover  $d'$ , the chamber  $d^2$ , the semicircular bottom  $d^3$  and the outlet-opening  $d^4$  covered with the perforated tin  $d^5$ , the upper brush-shaft  $d^6$  supported in bearings in the frames  $c^8$  and  $c^9$  and having the brush  $d^7$ , the gear  $d^8$  meshing with the pinion  $d^9$  on the shaft  $d^{10}$  having the pulley  $d^{11}$ , the cam  $d^{12}$  on the upper brush-shaft  $d^6$  operating to lift and release the spring-pressed hammer  $d^{13}$  pivotally secured to the casing  $c$  by the support  $d^{14}$  and the spring  $d^{15}$  attached to the arm of the hammer and to the casing  $c$ , all for the purpose as described.

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

SCOTT A. SMITH.

Witnesses:

B. S. WEBSTER,  
J. A. MILLER, Jr.