

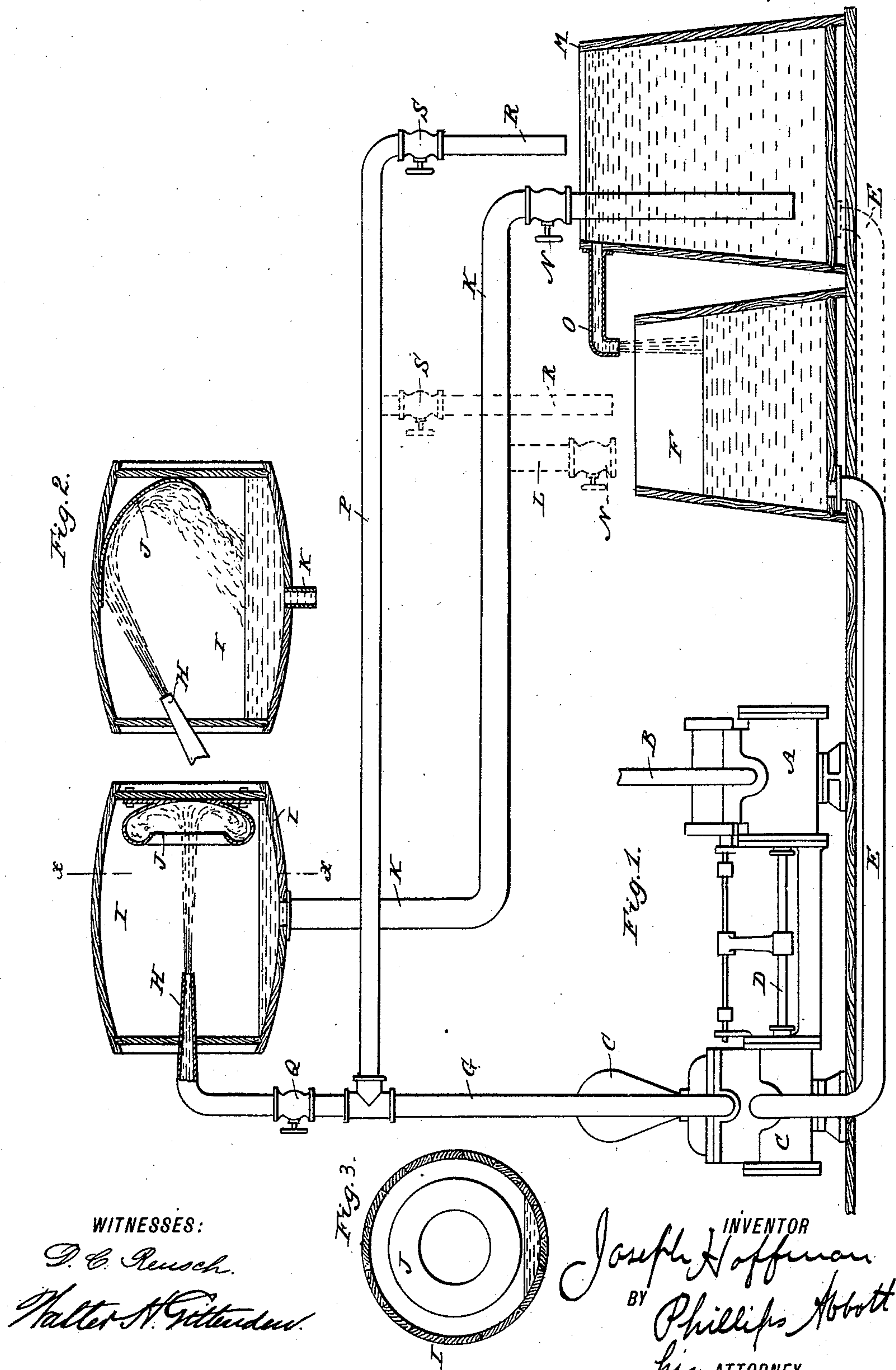
• (No Model.)

J. HOFFMAN.

## APPARATUS FOR GRINDING WET MATERIALS.

No. 429,625.

Patented June 10, 1890.





# UNITED STATES PATENT OFFICE.

JOSEPH HOFFMAN, OF HOBOKEN, NEW JERSEY.

## APPARATUS FOR GRINDING WET MATERIALS.

SPECIFICATION forming part of Letters Patent No. 429,625, dated June 10, 1890.

Application filed March 24, 1890. Serial No. 345,151. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH HOFFMAN, a citizen of the United States, and a resident of Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Apparatus for Grinding Wet Materials, of which the following is a specification.

My invention relates to a new and useful apparatus for grinding wet materials—such as paints, pigments, lead for pencils, and other analogous uses; and it consists in appliances whereby the material to be ground in combination with water, oil, or other liquid, is forcibly projected against the grinding-surface, whereby it is reduced by attrition. By means of my apparatus, also, I secure very efficient mixing of the material when it is desired to so mix it.

My apparatus may be constructed in various preferred forms, as will be shown hereinafter.

In the drawings, Figure 1 illustrates a view, partly in elevation and partly in vertical section, of one form of my apparatus. Fig. 2 shows a vertical section of a modified construction of the grinding-surface. Fig. 3 is an end section of the grinding-chamber, taken on the line *xx* of Fig. 1.

A is the steam-cylinder of any suitable pump, adapted to force liquids under pressure. It is provided with the usual steam-supply pipe B, and other parts which do not require description.

C is an ordinary pump operated by the piston-rod D of the engine.

E is a pipe which connects with a tank F at one end and with the pump C at the other, it being the induction-pipe for the pump.

G is the eduction-pipe, which extends upwardly or otherwise, as preferred, and terminates in a nozzle H, preferably made tapering, as shown, thus projecting the material to be ground with greater force. The nozzle opens within a chamber I, which may be of any suitable material, and opposite the nozzle is the grinder, or, as I will call it, the "target" J, securely fastened in place. In the form shown in Fig. 1 this target is dish-shaped, with the edges turned inwardly.

K is a pipe which leads from the grinding-chamber I to the tank F, as shown by dotted line L, or to the tank M, as preferred. This

pipe is provided with a valve N. The tank M has an overflow O into the tank F.

P is a pipe which connects with the pipe G below a valve Q in the pipe G. The pipe P discharges into the tank F or M, as the case may be, through outlet R. This pipe is provided with a valve S.

The operation of the apparatus as thus far described is as follows: The material to be ground is mixed with water, oil, or other suitable liquid, and is deposited in the tank F or M, as the case may be. I prefer to use two tanks, or, rather, to have two tanks embodied in the system, because then under certain circumstances the grinding process may be advantageously regulated—as, for instance, the material coming from the grinding-chamber may be first discharged into the tank M, and the upper portions only, which have been more thoroughly reduced, will overflow into the tank F, and if the pump draws only from the tank F there will be a regrinding of the more reduced parts affected. There may be, however, only one tank employed, and the pump draw directly from the bottom of the tank, as indicated by dotted lines. The pump being put in operation the material is drawn from the tank F or M, as the case may be, and is forcibly ejected through the pipe G and nozzle H against the target J within the grinding-chamber. The valve Q is of course open during this part of the operation, and the valve S in the pipe P is closed. Upon striking the target the material is deflected laterally, and the grinding of the material is effected by the attrition of the particles against themselves and also against the target, and the curled-over edges of the target continually return the material back upon itself, as it were, and meeting the jet coming from the nozzle is again dashed against the target. Thus some portion of it at least is subjected to the grinding action many times over before it finally escapes from within the target. When it does so escape, it drops into the lower part of the grinding-chamber and passes through the pipe K back again to the tank F or M, as the case may be, the valve N in the pipe K being of course open. Thus the material may be kept in circulation through the apparatus, going over and over again for as long a period as desired.



When it is desired to use my apparatus as a mixer for any purpose—as, for instance, upon starting it in the morning or after a period of idleness, as, for instance, over Sunday, or when it is desired to use it as a mixer of material generally—the valve Q will be closed and the valve S will be opened. The pump being now operated, it will be perceived that the material will pass through the pump by way of the pipes G and P, and escape at R back again into the tank F or M, as the case may be, under pressure. This process being kept up a sufficient time, circulating the material through the apparatus, it will become mixed in a most thorough manner.

In Fig. 2 I show an altered construction of the grinding-chamber and target. Instead of being dish-shaped, with inwardly-turned edges, it is a flat plate transversely having a curved surface and an inwardly-turned lower edge. It may be turned over, however, and have an upward presentation, if preferred, and the nozzle is so arranged as to project the material against the target at an angle. This form is superior for certain purposes, since the grinding action is rather more rotary than in the instance first described.

It will be obvious to those who are familiar with this art that many modifications may be made in the details of construction of my apparatus and still my invention be practically

employed. I therefore do not limit myself to the details as shown and described.

I claim—

1. The combination of a pump, a supply-tank, a grinding-chamber provided with a target, and a return-pipe to the tank, substantially as set forth.

2. The combination of a pump, a plurality of supply-tanks, a grinding-chamber provided with a target, and a return-pipe to one of the tanks, the pump drawing from some other tank, and a communication between the tanks, substantially as set forth.

3. The combination of a pump, a supply-tank, a grinding-chamber, a target, a return-pipe to the tank, and a mixing-pipe discharging into the tank connected with the pump, substantially as set forth.

4. The combination of a pump, a supply-tank, a grinding-chamber, a target within the grinding-chamber placed at an angle relative to the nozzle of the pump discharge-pipe, and a pipe for conducting the material back to the tank, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 21st day of March, A. D. 1890.

JOSEPH HOFFMAN.

Witnesses:

PHILLIPS ABBOTT,  
MARGARET E. PROCTOR.