

W. H. ALLEN.
PROCESS OF RECOVERING MATERIALS FROM WASTE.
APPLICATION FILED AUG. 3, 1908.

944,533.

Patented Dec. 28, 1909.

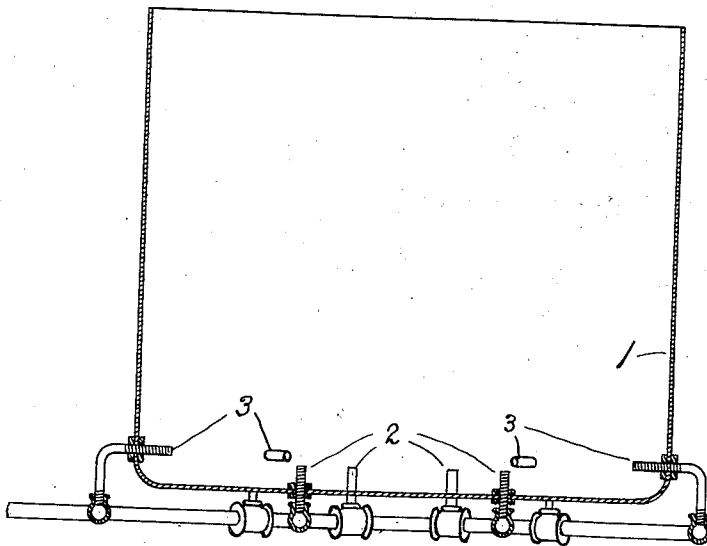


FIG. 1.

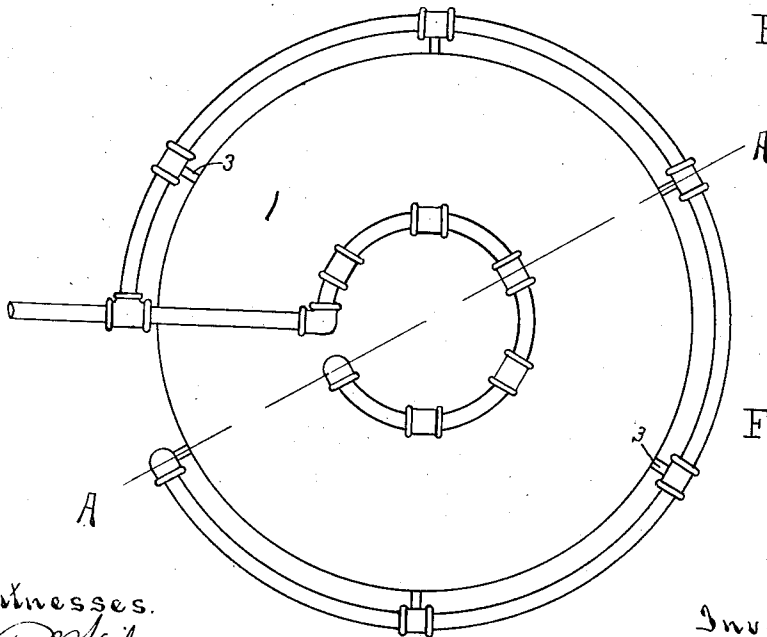


FIG. 2.

Witnesses.
A. M. Miles
O. M. Brown

Inventor.
William H. Allen.
by *Edward M. Page* atty.

UNITED STATES PATENT OFFICE.

WILLIAM H. ALLEN, OF DETROIT, MICHIGAN.

PROCESS OF RECOVERING MATERIALS FROM WASTE.

944,533.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed August 3, 1908. Serial No. 446,570.

To all whom it may concern:

Be it known that I, WILLIAM H. ALLEN, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Process for Recovering Materials from Waste, of which the following is a specification.

In the buffing and polishing of brass, copper, bronze and other metals, by means of emery, rouge, tripoli and other abrasive materials, wheels made from disks of cotton or other cloth secured together are employed. The abrasive grains and powders are held in a paste by soapy or other fats, sometimes molded in cakes or sticks, adapted to be held against the surfaces of the wheels until such surfaces become impregnated with the gritty fats. The wheels wear off rapidly and a smeary black substance accumulates, often at the rate of several pounds per wheel per day, which when the wheel is used on copper or copper castings has been found to consist of about 12 to 18% of metal, 20% of fats, 20% of cotton and the remainder of grit.

The object of this invention is to provide a process for recovering the substances of which this, at present, waste product is composed.

My invention comprises a process for treating the waste from buffing and polishing wheels, consisting of fats, grits, metal and fibrous material, by first agitating such waste product in water containing an alkali in solution so that the metals and grits will separate by gravity, removing the floating fibrous material, separating the metals from the grits, and recovering the fats.

My invention further consists in agitating the waste products from buffing and polishing wheels in a solution of alkali in water by means of jets of air or steam entering the receptacle containing the solution through the bottom or sides near the bottom, whereby the lighter textile materials are caused to rise to the surface while the heavy minerals and metals sink.

In the accompanying drawing, Figure 1 is a cross-section of a tank on line A—A of Fig. 2. Fig. 2 is a view of the bottom end of a tank showing the fittings.

Similar reference characters refer to like parts throughout the several views.

In carrying out this process for separating and recovering the various substances

forming the waste from polishing and buffing wheels, I employ a kettle or tank of any desired size, such as the tank 1 shown in the drawings, and provide inlets in the bottom for a number of small jets 2 for steam or compressed air. Similar jets 3 may be introduced at the sides next the bottom, the object being to insure a thorough agitation of the contents of the tank.

The tank is partially filled with water holding an alkali such as carbonate of soda, caustic soda, carbonate of potash or caustic potash in solution, the proportion of about five pounds of alkali to each hundred gallons of water being quite satisfactory. One hundred gallons of this solution is about the proper amount for one hundred pounds of waste containing 20 per cent. of fats. Upon being thoroughly agitated the alkali will combine with the free fatty acids, and if mineral or other oils are present, these will be emulsified, thereby breaking up the cohesive or binding material between the metals and minerals and the cotton or other textile fibers, the metals and grit settling to the bottom. The fibers float by reason of the upward current created by the air or steam jets and may be removed by means of hooks when the metals and grits are separated therefrom. The fibers may still contain oleates, stearates or palmitates of the non-alkaline metals due to the action of the fatty acids in the polishing paste used on the wheels acting on the finely divided metal removed in the polishing, also some metallic oxids and fine particles of metal. The fibers are placed in a bath containing about 10 per cent. of sulfuric or other suitable acid and an oxidizing agent such as nitric acid.

The same type of tank having agitator jets is preferred. The oleates, stearates and palmitates are converted into their respective acids; the metals and oxids into sulfates, any remaining grit falls to the bottom, the fatty acids being removed by skimming. The fibers are removed from the bath and rinsed in clear water, then placed in a weak solution of alkali, then again rinsed in clear water and dried when they may be baled. The metal and grit at the bottom of the first tank are removed and treated with acid or electrolysis to dissolve the metal. The grit is washed in clear water, graded for fineness, and molded into paste together with the proper fats and is again ready to be applied to buffing and polishing wheels.

The metal may be recovered as salts such as sulfates or the process may be continued and the metal recovered through electrolysis. The fats in the alkaline solution may be converted into marketable soap or be recovered by the addition of an acid, preferably sulfuric, sufficient to give a faintly acid reaction. This is then left until the liquid separates in two layers, the upper which contains the fatty acids, fats and mineral oils, (if any) is removed to another vessel. The fats are washed with hot water and may then be mixed with the grits, to form polishing pastes. The lower layer contains some valueless sulfates of the alkali metals and may be thrown away.

Having now explained my invention what I claim as new and desire to secure by Letters Patent is:—

1. The process of treating an intimate mixture of metal, mineral grit, fats and fibers to recover the substances separately, which consists in agitating the mixture in an alkaline solution to permit the metal and grit to separate from the fibers by gravity, removing the metal and grit and treating with acid to dissolve the metal and then removing the grit.

2. The process of treating an intimate mixture of metal, mineral grit, fats and fibers to recover the substances separately, which consists in agitating the mixture in an alkaline solution to permit the metal and grit to separate from the fibers by gravity, and then treating the fibers with a solution of acid.

3. The process of treating fibers associated with metal and fats with a solution of alkali sufficient to neutralize the fatty acids and then treating said fibers and metals with a solution of acid to separate the fibers.

4. The process of treating fibers associated with metal and fats with an alkaline agent to cause the separation of free fatty acids, then treating the fibers with acid and an oxidizing agent to remove oleates, stearates and palmitates of the non-alkaline metals.

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

WILLIAM H. ALLEN.

Witnesses:

ELIZABETH M. BROWN,
EDWARD N. PAGELSEN.