Oct. 16, 1923. 1,470,712

P. E. DEMMLER

CLEANING APPARATUS

Filed June 17, 1918

Fig. 1.

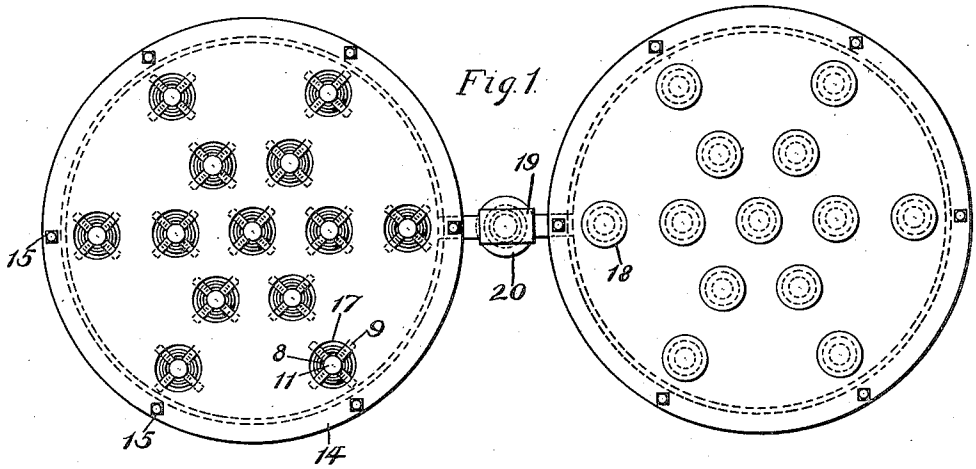


Fig. 2.

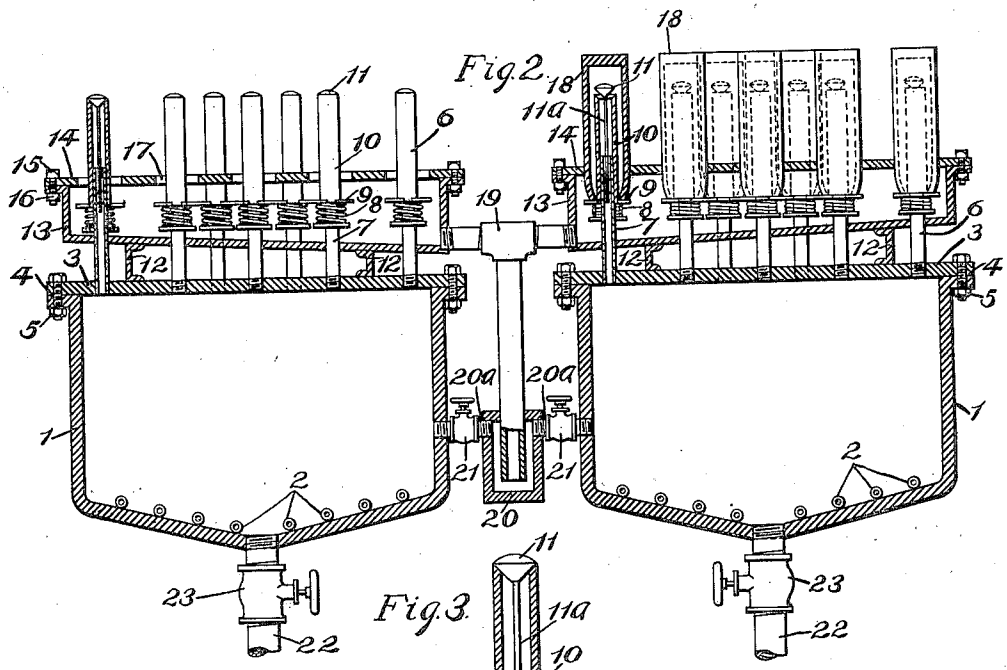
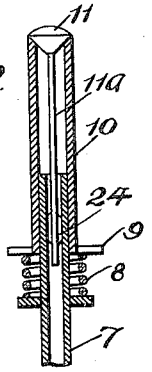


Fig. 3.



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UNITED STATES PATENT OFFICE.

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CLEANING APPARATUS.

Application filed June 17, 1918. Serial No. 240,559.

To all whom it may concern:

Be it known that I, PAUL E. DEMMLER, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cleaning Apparatus, of which the following is a specification.

My invention relates to cleaning apparatus for hollow articles in which a vaporized solvent is employed as the cleanser, and it has for an object the provision of a cleaning apparatus of the class described which shall be simple in construction and efficient and economical in operation.

My apparatus is designed to clean hollow articles, particularly shell casings, by bringing a vaporized solvent into contact with the surface to be cleaned, where it condenses and runs off, together with removed foreign matter, and is returned to a vaporizer to be used again. I provide also means whereby the solvents may be kept in a sufficiently purified state without discontinuing the operation of the apparatus.

In the accompanying drawings, Fig. 1 is a plan view of a cleaning apparatus embodying my invention, showing one part in operation; Fig. 2 is a side view, partly in elevation and partly in section, illustrating more clearly the disposition of the several elements; Fig. 3 is a vertical sectional view, on a larger scale, of a valved nozzle which may be used in apparatus embodying my invention.

In order to insure a clear and accurate understanding of my invention, reference may be had to the drawings in which is shown one form of apparatus embodying such invention.

My invention consists broadly of a vaporizer having valved nozzles leading therefrom, means for returning condensed vapor to the vaporizer from the article being cleaned and means for cleaning the vaporizer without discontinuing the operation of the apparatus. A preferred form, however, of my invention, as shown in the drawings, includes a plurality of closed solvent containers or vaporizers and related parts, together with the additional elements necessary for the operation of an apparatus in accordance with my invention. The several vaporizers and the accompanying parts of each being identical, a description of one of the vaporizers and its accompanying parts will clearly disclose the construction of my apparatus.

Referring to the drawings, 1 is a vaporizer or solvent container which has heating pipes 2 suitably disposed therein. A cover 3 is fastened to the vaporizer 1 by bolts 4 and nuts 5 or other suitable means, the cover having threaded openings to receive the valved nozzles 6. Each of the nozzles 6 includes a conduit 7 to serve as a passage for the vapor from the vaporizer 1 to a movable sleeve 10 which has projecting supports 9 for the hollow articles 18 to be cleaned. The supports 9 of each sleeve 10 rest upon a helical spring 8 which surrounds the conduit 7 and is suitably supported, at its lower end, to normally hold the sleeve 10 in contact with the stationary member or valve 11 on a stem 11*a* which is carried by a spider 24 disposed in the conduit 7, the contact between the sleeve 10 and the member 11 being of the nature of a valve against its seat, the sleeve serving as a movable seat for the stationary member or valve 11.

Brackets 12, resting on the cover 3 of the vaporizer 1, support a drip pan 13 operatively disposed with respect to the nozzles 6. The drip pan has a cover 14 suitably fastened thereto, as by bolts 15 and nuts 16, and provided with openings 17 which permit articles, such as shell casings 18, being placed about the nozzles.

When two or more vaporizers are used, as shown in the drawings, a conduit 19, having branches leading from the respective drip pans, enters a trap 20 and projects below pipes 20*a* leading therefrom to the vaporizers. The trap 20 therefore provides a liquid seal to prevent any generated vapor from escaping through the return passage for the condensed vapor. The pipes 20*a* that connect the trap and the vaporizers have valves 21 to govern the flow through them. Pipes 22, which are threaded into the bottom of the vaporizers, have valves 23, which may be opened to drain the vaporizers.

In operating an apparatus embodying my invention, a volatile solvent is poured into the vaporizers containing the heating units, which may be a series of pipes heated by exhaust steam, this method of heating being

desirable because of its cheapness. The vapor rising from the heated solvent enters the valved nozzles leading from the vaporizers and is trapped therein because the nozzle valves are normally seated. When the articles to be cleaned are placed about the nozzles and on the supports extending therefrom, the springs, which normally hold the valves to their seats, are compressed to unseat the valves and thus permit the vapor to escape into the articles to be cleaned. The drip pan covers have their openings so formed as to permit the articles being placed over the nozzles to engage and open the valves before they engage, and are supported by, the pan covers to cooperate therewith to form substantially air-tight chambers. The hot vapor, coming in contact with the cooler surfaces of the articles being cleaned, condenses and flows down the sides of the articles, thereby cleansing and heating the surfaces so that they will immediately become dry when removed from the apparatus. The condensed vapor flows into the drip pans 13 disposed beneath the nozzles and is conducted to the trap 20 and from the trap to the vaporizers. The trap 20 serves to maintain the same level of solvent in the vaporizers or containers as well as to prevent any vapor escaping from the containers through the return passage.

Where the apparatus consists of several vaporizers connected to the trap by pipes having valves, the return flow of condensed vapor may be cut off from any selected vaporizer. Under these circumstances, the solvent in the vaporizer thus cut off will be vaporized and return to other vaporizers of the apparatus, leaving deposits of sediment in the vaporizer which may be removed, after which the vaporizer may be put back into service by opening the valve which was used to isolate it.

Various solvents, such as gasoline, benzol, solvent naptha and alcohol, may be used, the particular solvent to be used depending upon the nature of the foreign material to be removed thereby.

It is obvious that minor changes may be made in the construction of an apparatus embodying my invention without departing from the spirit of the invention and I desire, therefore, that no limitations shall be imposed except such as are indicated in the appended claims.

I claim as my invention:

1. A cleaning apparatus for hollow articles comprising a plurality of vaporizers, a plurality of nozzles leading therefrom, means for supporting articles when positioned about the nozzles and means for returning condensed vapor escaping from the articles being cleaned to any selected vaporizer.

2. A cleaning apparatus for hollow articles comprising a plurality of vaporizers, a plurality of nozzles leading therefrom, means for returning condensed vapor to any selected vaporizer and means for independently draining the vaporizers.

3. A cleaning apparatus for hollow articles comprising a plurality of vaporizers, a plurality of nozzles leading therefrom, means for supporting articles when positioned about the nozzles, a branched conduit for returning condensed vapor to the several vaporizers and valves in the branches of the conduit.

4. A cleaning apparatus for hollow articles comprising a plurality of vaporizers, a plurality of nozzles leading therefrom, means for supporting articles positioned about the nozzles and means for returning condensed vapor escaping from the articles being cleaned to any selected vaporizer, said means comprising a liquid sealed trap having conduits leading therefrom to the vaporizers and valves in the conduits.

In testimony whereof, I have hereunto subscribed my name this 24th day of May, 1918.

PAUL E. DEMMLER.