Feb. 6, 1945. A. HELFENSTEIN 2,369,050

PLANT FOR CLEANING ARTICLES SMEARED WITH OIL, GREASES, OR THE LIKE

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Fig. 1

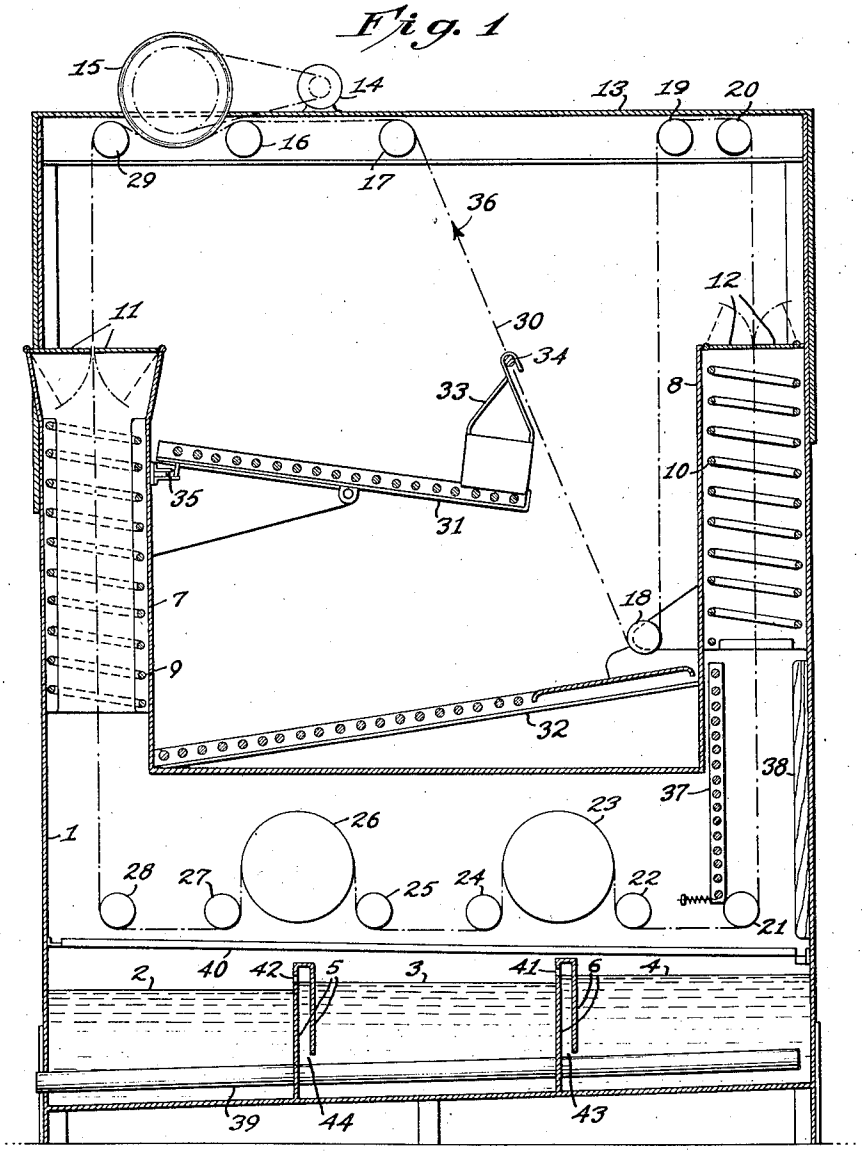
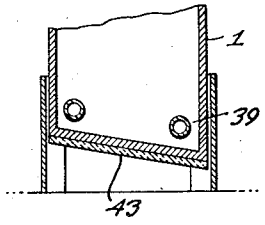


Fig. 3



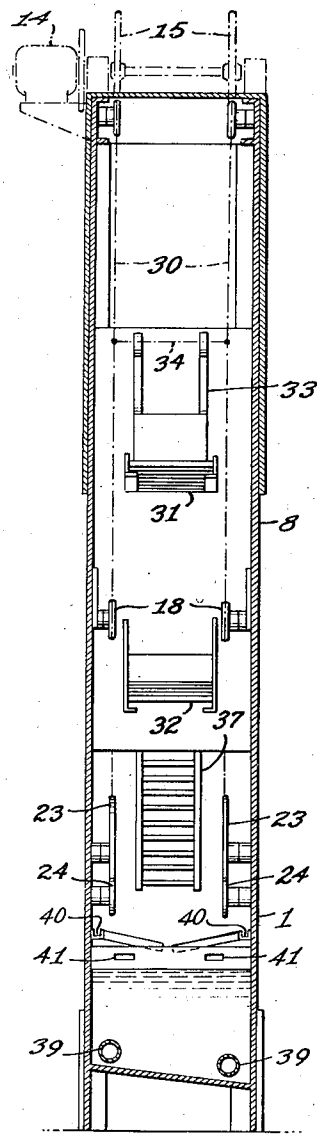
Inventor
ADAM HELFENSTEIN
By E. F. Wunderth
Attorney

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Fig. 2



Inventor
ADAM HELFENSTEIN

By E. F. Wenderoth

Attorney

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PLANT FOR CLEANING ARTICLES SMEARED WITH OIL, GREASES, OR THE LIKE

Adam Helfenstein, Aesch, near Basel, Switzerland, assignor to the Swiss firm of Fr. Sauter A. G. Fabrik elektr. Apparate, Basel, Switzerland

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In Switzerland March 18, 1942

5 Claims. (Cl. 202—170)

The present invention relates to a plant or installation for cleaning or deterging articles, particularly metal articles, smeared with oil, grease or like impurities, this plant belonging to the type wherein the articles to be deterged are conveyed in baskets guided one after the other by means of endless chains through baths made of several solvents, also through drying zones.

Plants for this purpose are already known comprising, inside the containers for the solvent and above the baths, cooling coils through which are led the articles to be cleaned after they have left at least the last bath, whereby the liquid solvent which evaporates off the articles being cleaned is caused to be precipitated. Other plants are also known wherein cooling devices are provided exclusively at the inlet and outlet of the container so as to the largest possible extent to prevent the solvent vapors from escaping whenever doors or valves are opened. Plants of the aforesaid first category present the disadvantage that the containers for the liquid solvent must have a great height so as to enable the cooling coils to be sufficiently efficacious, which implies the use of large quantities of material and gives the plant a considerable overall size. Plants of the aforesaid second category wherein the cooling devices are provided only at the inlet and outlet present the disadvantage that the cooling path is too short to enable the whole of the vapors to be precipitated, so that each opening movement of the doors involves a loss of solvent.

The primary object of the invention is to provide a novel or improved plant or installation pertaining to the aforesaid type but having such a new construction as to obviate the foregoing disadvantages, said construction being characterized notably by the provision of a pair of funnels above the container for the liquid solvents, said funnels being furnished with cooling means and fitted with hinged covers capable of being transiently opened by the passing of the baskets therethrough and spring-urged to closed position immediately after.

Another object of the invention is to provide an improved cleaning plant as aforesaid wherein the container for the solvent baths and the overhanging funnels are so co-related as to permit any quantity of solvent which settles on the inner walls of said funnels due to the cooling action to trickle down into the baths, thereby obviating a loss of solvent.

A further object of the invention is to provide an improved cleaning plant as aforesaid having an entirely automatic operation and requiring a minimum of attending labor and supervision, said operation being also automatically interruptable so as to permit transient stoppage of the articles being cleaned and evaporation of the solvent still adhering thereto.

With these and such other objects in view as will incidentally appear hereafter, the invention comprises the novel construction and combination of parts that will be now described in detail with reference to the accompanying diagrammatic drawings illustrating and exemplifying the same and forming a part of the present disclosure.

In the drawings:

Fig. 1 is a vertical section of the cleaning plant.

Fig. 2 is a vertical section thereof taken at right angles to Fig. 1.

Fig. 3 shows a detail of construction.

The container 1 has its lower portion divided by means of partitions 5, 6 into three dipping chambers containing different solvent baths. Along two front sides of the container 1 are provided funnels 7, 8 which are cooled internally by means of refrigerating coils 9, 10. These funnels are closed at their upper ends by flaps or valves 11, 12 and become transiently opened by the passing of the conveying baskets which contain the articles to be cleaned. Above the funnels extends a frame 13 on which are supported an actuating motor 14 and endless chains which move about sprockets 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 and 29 in the direction shown by the arrow 36. Between the funnels 7, 8 are arranged carrier tables 31, 32 disposed in superimposed relation upon which are laid the baskets 33 containing the articles to be cleaned. The baskets which must be led through the container 1 are laid close to one another on the upper table 31 whence they are picked up and taken by a transverse bar 34 spanning the gap between the two chains 30, whereas the baskets which come out of the container 1 and are led up through the funnel 8 are automatically laid upon the table 32 whence they glide off downwardly.

35 designates an electric switch adapted to be automatically opened when there is no basket left on the table 31 so as to bring about through the medium of a time relay stoppage of the operation of the plant. Subject to baskets in the shape of drums revoluble about a horizontal axis and fitted with an outer toothed wheel being used, it becomes possible to cause them to rotate, after they have left the bath 4, by means of a rack 37 with which the said toothed wheel comes into meshing engagement, whereby should the articles to be

cleaned be hollow, the liquid solvent can flow out of them. 38 designates a guiding bar.

The baths of solvent liquids are heated by means of heating pipes 39 to a suitable temperature for cleaning purposes. The vapours which are precipitated in the funnels 7, 8 and against the walls of the container 1 are collected in slanting channels 40 and flow into the pure bath 4, whence a continuous overflow takes place into the baths 3 and 2. In order to preclude upper flow of the clean liquid solvent, the partitions are duplicated and so provided as to cause the least pure liquid solvent to be forced downwardly through apertures 43, 44.

The foregoing plant operates as follows:

The baskets containing the articles to be cleaned or deterged are laid upon the carrier table 31 along which they glide automatically downwardly towards the lower end of the table. Several baskets may be laid close to one another on this table. From this position the baskets are sequentially driven at time intervals by the conveying chains 30, i. e. by the transverse bars 34 and are moved over the sprockets 17, 16 and 29, whence they are introduced into the funnel 7. The flaps 11 are opened down by the passing baskets and urged back to closed position by springs. The baskets are afterwards guided over the sprockets 28, 27, 26, 25, 24, 23, 22 and 21 and dipped sequentially into the baths 2, 3, 4 whence they are led upwardly through the funnel 8. While passing through this funnel, the baskets open up the flaps 12 which afterwards are closed back by gravity. After having left the funnel 8, the baskets are moved over the sprockets 20, 19 and then laid on the table 32 along which they glide automatically in a downward direction, thereby leaving space for further baskets. The motor 14 is stopped automatically after a certain lapse of time by the switch 35 when there are no longer any baskets on the table 31. Conversely the motor 14 is again started as soon as a basket is laid on the upper table 31.

The individual baths may have different degrees of purity. The bath 2 in which a partial cleaning takes place is the least pure bath, while the bath 4 has the highest degree of purity. During the passing of the baskets through the funnel 8, the liquid solvent which adheres to the articles being deterged evaporates off and is precipitated on the cooled walls of the funnel. Where the articles to be cleaned are hollow so as to be fillable with liquid solvent, an advantage can be gained by using, as above stated, baskets in the shape of revoluble drums which are caused to rotate when leaving the batch 4 so as to expel the liquid solvent from the cleaned hollow articles.

The vapours generated by the hot liquid solvent settle on the walls of the container 1 and on the cooled walls of the funnels and collect in the channels 40 whence they trickle down into the bath 4. The other baths are fed as above described owing to the overflow which occurs through holes 41, 42 in the partitions. The operation of the plant may be such as to cause the baskets, after they have left the bath 4, to be stopped automatically and held motionless during a certain lapse of time so as to enable the liquid solvent which adheres to the cleaned articles to evaporate off.

In order to achieve a saving in the consumption of energy for heating the plant, an advantage will be gained by providing at the lower end of the container 1 a thermally insulating layer 43; see Fig. 3.

A considerable advantage of the aforesaid plant resides in the saving in the consumption of solvents. The vapours from the liquid solvents settle almost completely on the walls of cooled funnels and cannot escape from the plant except in very small quantities during the periods when the flaps or covers of the funnels are open. The conveyance of the baskets by means of chains is so adjusted as to prevent the covers 11 and 12 from being opened simultaneously thereby precluding any draught through the funnels. The operation of the plant is entirely automatic that is to say the attendant in charge of its supervision merely lays the baskets on the table 31 and takes them off the table 32. Therefore, the attendant does not come into contact with the solvent vapours as is the case in other cleaning plants of this type.

What I claim is:

1. A plant for cleaning articles, particularly metal articles, smeared with oil, grease or like impurities, comprising a container for baths of impurity-removing solvents, endless conveyor chains having a portion of their stretch adjacent said container, driving means for said chains, article-receiving baskets hung on said chains, a pair of elongated funnels standing over said baths and traversed by the chains and baskets, cooling means associated with the funnels and substantially coextensive therewith, pivotable covers on said funnels, said covers being spring-urged to closed position and rockable to open position by the passing of the baskets, and a pair of carrier tables arranged exteriorly of said container and extending between the funnels and to such positions of adjacency with two sides of the chains that the latter can pick the baskets sequentially off one of the tables and drop them on the other table after they have travelled through the container.

2. A plant for cleaning articles, particularly metal articles, smeared with oil, grease or like impurities, comprising a container divided by vertical partitions into compartments for baths of impurity-removing solvents of different degrees of purity, endless conveyor chains having a portion of their stretch adjacent and over said container, driving means for said chains, article-receiving baskets hangable on said chains, a pair of funnels upstanding over said baths and traversed by the opposite sides of the chains and by the baskets driven thereby, cooling means in the funnels, covers on said funnels, said covers being spring-urged to closed position and capable of being opened by the passing of the baskets, and a pair of basket-carrying tables in superimposed relation exteriorly of said container and between the funnels.

3. A plant for cleaning articles, particularly metal articles, smeared with oil, grease or like impurities, comprising a container divided by vertical partitions having different heights into compartments for baths of impurity-removing solvents, the bath situated at the uppermost level having the highest degree of purity, endless conveyor chains having a portion of their stretch adjacent and over said container, driving means for said chains, article-receiving baskets hangable on said chains, a pair of elongated funnels upstanding over said container and traversed by the opposite runs of the chains and by the baskets driven thereby, cooling means in the funnels and substantially coextensive therewith, covers on said funnels, said covers being spring-urged to closed position and transiently openable by the passing of the baskets, a pair of basket-carrying tables in

superimposed relation exteriorly of said container and between the funnels, and solvent-collecting channels co-extensive to the container for gathering the condensed solvent and leading it to the bath having the highest degree of purity.

4. A plant for cleaning articles, particularly metal articles, smeared with oil, grease or like impurities, comprising a container for different baths of impurity-removing solvents, endless conveyor chains having a portion of their stretch along and over said container, driving means for said chains, said means including an electric motor and chain-engaging sprockets, article-receiving baskets removably hung to said chains, a pair of elongated funnels upstanding over said baths and traversed by the chains and baskets, cooling means in the funnels and substantially coextensive therewith, covers on the funnels spring-urged to closed position and capable of being opened by the passing of the baskets, a pair of superimposed spaced tables arranged exteriorly of said container and between the funnels for delivering the baskets to one side of the chains and receiving the baskets on their opposite side, and current switches associated with the upper table for stopping motion of the chains if no baskets rest thereon, said switches being also operable to hold the chains still for keeping the baskets in the baths and the drying zones outside the baths for any selected duration.

5. A plant for cleaning articles, particularly metal articles, smeared with oil, grease or like impurities, comprising a container having lagged walls for baths of impurity-removing solvents, means for heating said baths, endless conveyor chains having a portion of their stretch adjacent said container, driving means for said chains, article-receiving baskets adaptable to said chains, a pair of elongated funnels upstanding over said baths and traversed by the chains and baskets, cooling means in the funnels and substantially coextensive therewith, covers on said funnels, said covers being spring-urged to closed position and capable of being opened by the passing of the baskets, a pair of spaced superimposed basket-carrying tables arranged exteriorly of said container and spanning the gap between two sides of the chains moving in opposite directions, and switch means associated with one of said tables for stopping said driving means.

ADAM HELFENSTEIN.