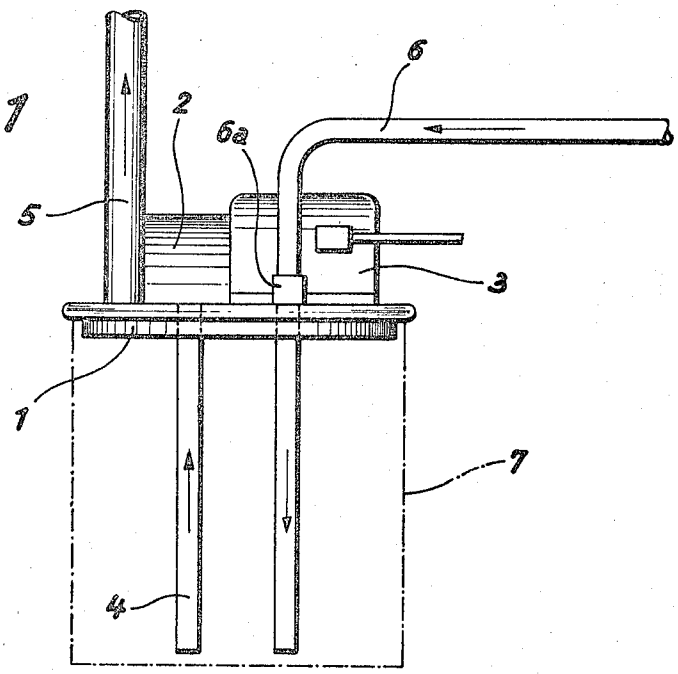
May 14, 1968 W. HESSELMANN 3,382,886

APPARATUS FOR CIRCULATING VISCOUS SUBSTANCES WITH CLEANING PROVISIONS

Filed Dec. 15, 1965

Fig. 1



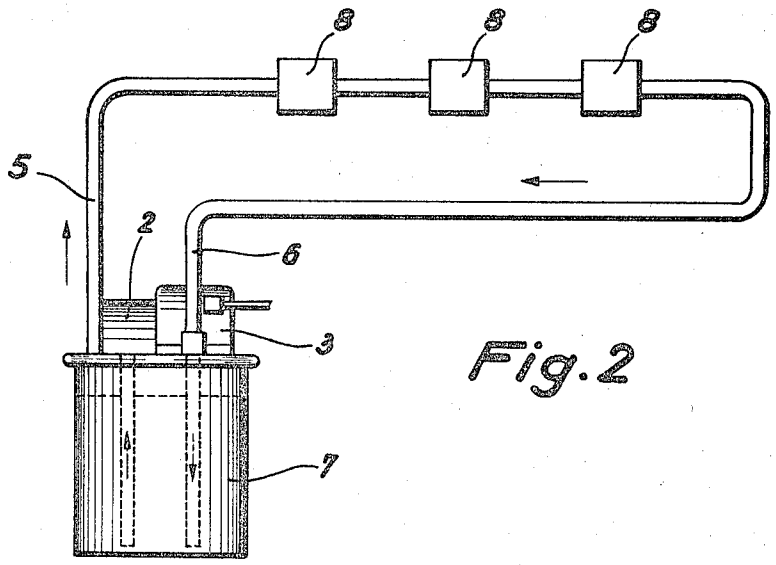


Fig. 2

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APPARATUS FOR CIRCULATING VISCOUS SUBSTANCES WITH CLEANING PROVISIONS

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The present invention relates to an apparatus for circulating liquid. More specifically, the invention relates to an apparatus for circulating liquid glue and similar viscous substances. Still more specifically, the present invention relates to an apparatus for circulating liquids in an endless path to and beyond a consumer device. The invention also relates to apparatus for cleaning such consumer device by circulating cleaning liquids thereto and therebeyond. The invention also relates to a method of circulating liquids in an endless path.

In applications in which a liquid, such as a glue or similar high-viscosity fluid, is circulated in an endless path toward and beyond a consumer device which withdraws the amount of liquid it requires for its proper operation, the liquids are generally supplied in a container from which they are removed for circulation in the endless path, and to which they are subsequently returned after having a portion removed by the consumer device. Devices of this type suffer from various drawbacks. The most basic of these is the fact that the liquids are usually supplied in separate containers in which they are transported to the apparatus, and from which they are removed to be then placed into a permanent storage container or tank which is associated with the apparatus, and which is periodically refilled from the transport containers. This is frequently a cumbersome operation, sometimes requires shut-down of the apparatus, and always necessitates additional labor and consequently additional expenses. Another disadvantage of such devices is the fact that, particularly if the liquid is a glue, the user device, that is the glue head, usually becomes clogged or encrusted with glue after a relatively short period of time. The machine must then be shut down and the encrustations removed before operation can again proceed. That part of the liquid, i.e., the glue, which has formed the encrustation on the glue head is then lost as waste.

It is therefore an object of the present invention to overcome the above-mentioned drawbacks of prior art devices.

A more specific object of the present invention is to provide an apparatus which will permit use of interchangeable containers so that the transport container, in which the liquid for the apparatus is supplied, will simultaneously serve as the storage container from which liquid is withdrawn into the apparatus.

Another object of the present invention is to provide an apparatus which will permit removal of encrustations which may have formed on the user device, that is the glue head, without requiring a complete shut-down of the machine and in a manner which will permit recovery of at least portions of the glue of which the encrustations consist.

Still a further object of the present invention is to provide a method of operating an apparatus in accordance with the aforementioned objects.

In accordance with one feature of the present invention I provide an apparatus for circulating liquids, particularly liquid glue and similar viscous substances. This apparatus may comprise a container of liquid having an opening, a cover detachably connected to said container so as to overlie said opening; a conduit connected to said cover and having a portion provided with an inlet and another portion provided with an outlet. The portions will both extend through the opening into the container when the cover overlies the opening. There is further provided

liquid-circulating means mounted on the cover and operatively connected with the conduit for circulating the liquid from the container through the conduit in the direction from the inlet toward the outlet. Finally, there is provided at least one consumer device which is arranged connected with the conduit intermediate the inlet and the outlet thereof.

The method mentioned above is directed towards a method of circulating liquid in an endless path from a receptacle toward and beyond a consumer device, and of returning at least a portion of such liquid to the receptacle. This method may comprise the steps of positioning a first receptacle containing a viscous liquid in the endless path so that the receptacle defines a portion of the path, circulating the viscous liquid in the endless path toward and beyond the consumer device, removing the first receptacle from the endless path and replacing it with a second receptacle containing another liquid, and circulating the other liquid in the endless path toward and beyond the consumer device whereby, if encrustations were formed on the consumer device by the viscous first liquid, and when the other liquid is a cleaning liquid, the encrustations are removed by circulation of the other liquid in the endless path.

It will be seen from what has been said heretofore that an apparatus in accordance with the present invention will permit the use of transport containers as a source of supply simply by removal of the customary light transport lid from a transport container containing the liquid in question, and the insertion of such container into the endless path. This eliminates the customary transfer of the liquid from the transport container into the permanent supply container built into or otherwise associated with the apparatus. Obviously, this is an advantage since it eliminates considerable labor. Another essential advantage of the apparatus, which latter advantageously comprises a lid to be placed on the transport container after the transport lid has been removed, resides in the fact that the apparatus can be used with an empty container, or more clearly expressed, with a container which has been filled with a different fluid for cleaning purposes, such as water or a suitable chemical capable of dissolving encrustations which may have formed on the user device, that is on the glue head. In this way the user device can be quickly and efficiently cleaned by circulating the cleaning liquid through the system, and thereby flushing the same. At the same time, a part of the glue which originally formed the encrustation will be recovered, since the cleaning liquid is of course recirculated back into the container, where the glue can be separated from the cleaning liquid.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a side elevation of a portion of the inventive apparatus; and

FIG. 2 is a side elevation of a complete inventive apparatus, including the portion shown in FIG. 1.

Discussing now the drawing in detail, and firstly FIG. 1 thereof, it will be seen that the inventive apparatus comprises a lid-shaped member 1 to which there is secured a liquid-pump 2, which is known per se and need not be further described. The apparatus is further provided with a suction tube 4 and a pressure tube 5. Both of these tubes will of course be understood to be conduits in the broader sense of the word. The pump is driven by a motor 3 which is also mounted on the lid 1, and both the motor 3 and the mounting of pump 2 and

motor 3 are well known in the art and need not be discussed in detail. The complete lid including the pump 2, the motor 3, and the suction tube 4 and pressure tube 5 can be removed from a container 7, which in FIG. 1 is shown in dot-dash lines, and be placed on another similar container which may contain the same type of liquid as the original container, or which may contain another type of liquid. The lid 1 further has rigidly connected thereto a connecting nipple 6*a* which connects the trailing end 6 of the pressure pipe or conduit 5 with the return flow portion of the conduit which extends downwardly into the respective container 7.

The suction pipe 4, which also extends downwardly from the lid 1 and into the interior of the respective container 7, and the lowermost portion of the trailing end 6 of the pressure pipe 5 may be connected together by a web, so that these pipes are rigidly connected together.

It will be seen from FIG. 2 how a complete apparatus utilizing the present invention may be constituted. The container and lid with conduits and pump motor are the same as shown in FIG. 1. A series of user devices, such as glue applying heads 8 are connected to the pressure pipe 5 which, it will be clearly seen, forms an endless path through the intermediary of the container 7. When the motor 3 operates pump 2, liquid is withdrawn from the container 7 and circulated through the pressure pipe 5 past the glue heads 8. These glue heads withdraw the required amount of glue for their use, and the rest of the glue is recirculated back into the container 7. If, now, encrustations have formed or are beginning to form on the glue applicator heads 8, then operation of the device with glue may be temporarily discontinued, the glue container 7 removed, and a new container containing water or a suitable chemical solvent be substituted. This new liquid will then be recirculated through the system and will serve to dissolve such encrustations of glue as have formed on the glue applicator heads 8. Once the encrustations have been dissolved, the container with the solvent liquid will be removed and a new container of glue will be substituted so that normal operation of the device can continue. The solvent can then be processed to remove therefrom any glue which has been carried back into the container 7 during flushing of the apparatus.

It should be pointed out that various types of material are suitable for the pipes 5 and 6 and for the other components of the inventive device. Relative to the pipes 5 and 6 it is particularly preferred to constitute these of a transparent and preferably plastic material, so that the circulation of glue and also of the cleaning or flushing liquid may be readily observed by an operator who will thus determine when a change from one liquid to another is indicated. Use of a plastic material renders the pipes less susceptible to damage and permits the flexibility which is required for shifting the lid from one container 7 to another. Of course, it should be understood that, if desired, the containers can also be downwardly removed without any need for moving the lid.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of circulating apparatus, differing from the types described above.

While the invention has been illustrated and described as embodied in an apparatus for circulating liquids, it is not intended to be limited to the details shown, since

various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Apparatus for circulating liquids, particularly glue and similar viscous substances, comprising a container for a supply of liquid and having an opening; a cover detachably connected to said container so as to overlie said opening; a conduit having an inlet and an outlet connected to said cover, said inlet dipping into the supply of liquid when said cover overlies said opening; liquid-circulating means mounted on said cover for circulating said liquid from said container through said conduit in the direction from said inlet toward said outlet; and at least one consumer device for said liquid connected with said conduit intermediate said inlet and said outlet thereof.

2. Apparatus as defined in claim 1, wherein said liquid-circulating means comprises pump means mounted on said cover.

3. Apparatus as defined in claim 2, wherein said liquid-circulating means further comprises motor means mounted on said cover for actuating said pump means.

4. Apparatus as defined in claim 3, wherein said consumer device is a glue applicator head.

5. Apparatus as defined in claim 4, wherein said inlet and outlet are provided in end portions of said conduit and said opening is provided in the top of said container, and wherein both of said end portions depend downwardly from said cover by a distance slightly less than the height of said container.

6. Apparatus as defined in claim 5, wherein said end portions are transversely spaced from one another, and further comprising web means rigidly connecting said end portions together.

7. Apparatus as defined in claim 1, wherein said conduit is made from a transparent material.

8. Apparatus as defined in claim 7, wherein said material is a synthetic plastic material.

9. Apparatus as defined in claim 7; and further comprising additional ones of said consumer devices connected with said conduit.

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