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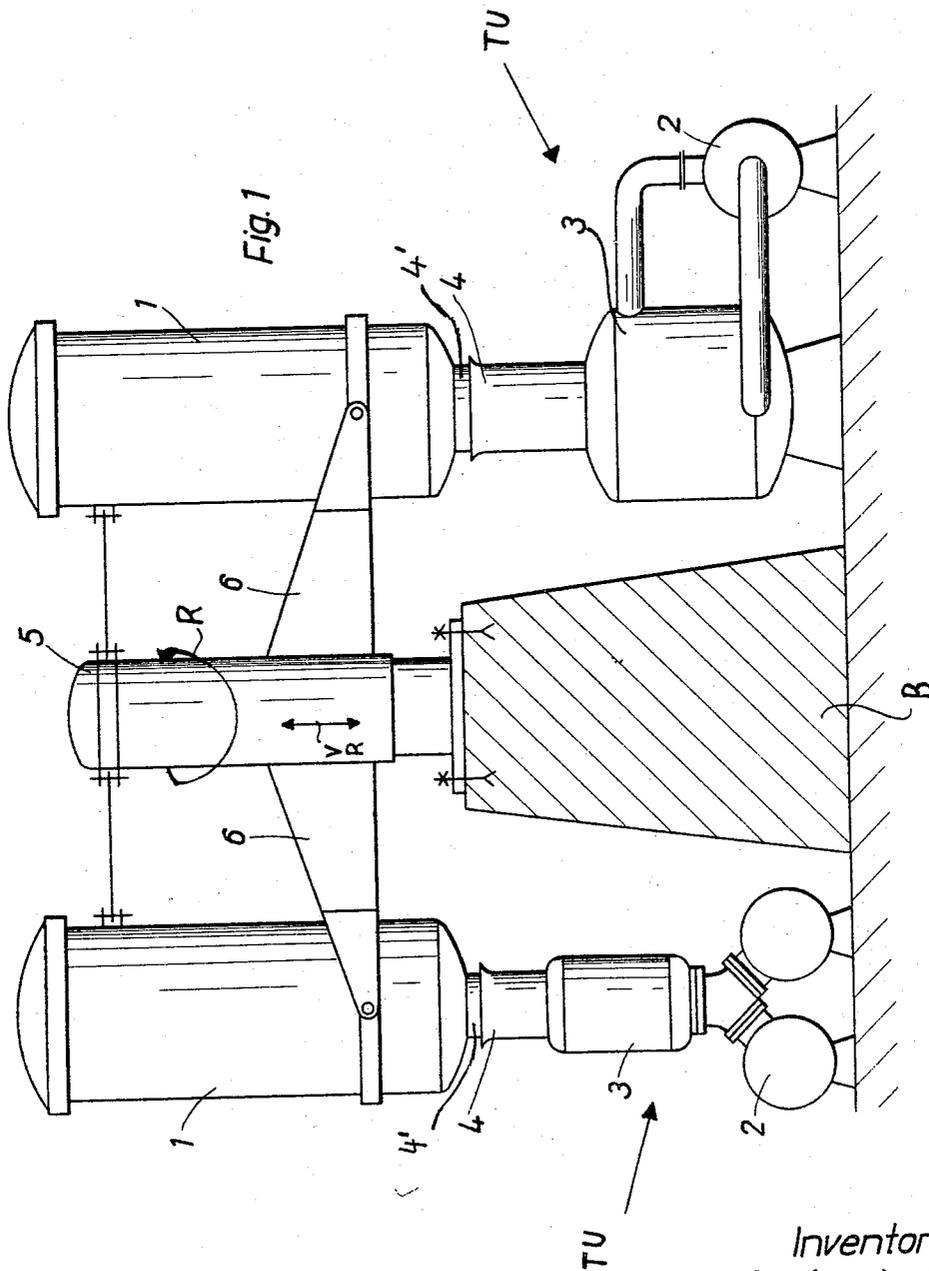
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3,397,557

TEXTILE PROCESSING MACHINE

Filed Dec. 19, 1966

2 Sheets-Sheet 1



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Fig. 2

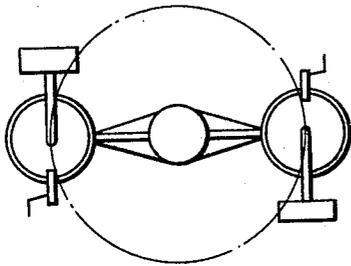


Fig. 3

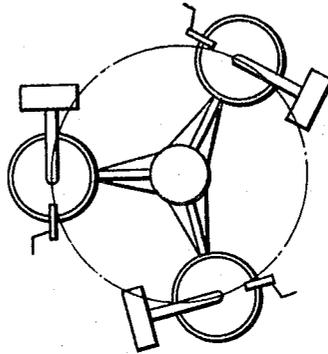


Fig. 4

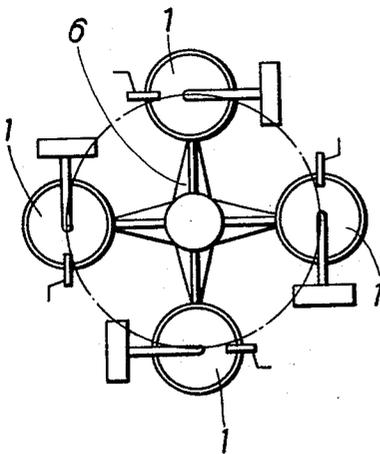
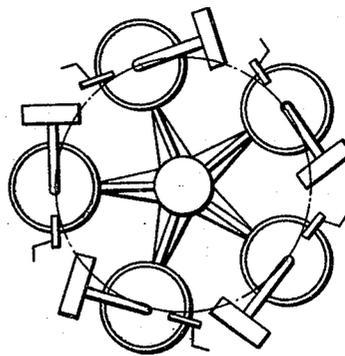


Fig. 5



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3,397,557

## TEXTILE PROCESSING MACHINE

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### ABSTRACT OF THE DISCLOSURE

A textile processing machine in which a rotary conveying and indexing device carries one or more containers in which goods to be given successive treatments are to be accommodated. The carrier transports each of these containers in a circular path to a plurality of treating units which are arranged angularly spaced along this path. The conveying and indexing device also successively raises and lowers the respective containers and each of the containers is provided with a male coupling member whereas each of the treating units is provided with a female coupling member, the arrangement being such that when a container is in registry with one of the treating units, it is lowered so that its male coupling member engages the female coupling member on the treating unit.

### BACKGROUND OF THE INVENTION

The present invention relates to textile processing machines in general, and in particular to an arrangement in such a processing machine whereby predetermined goods or commodities can undergo a series of successive treatments with a minimum of handling.

In the treatment of certain commodities, for instance in the textile industry in the treatment of textiles for dyeing, bleaching waterproofing and the like, it is known to move the material to be treated to several successively arranged apparatuses in each of which they undergo a treating step germane to the total processing the goods or materials are to undergo. For instance, a textile which is to be dyed is placed into a first apparatus for a preliminary treatment, subsequently moved to an apparatus in which it is dyed, from there into another apparatus to undergo a post-dyeing treatment, and finally to a fourth apparatus where it is dried. Thus, the textile must successively be removed from each of these apparatuses and transferred to the next apparatus. This is uneconomical in that it requires an excessive amount of handling and results in an unnecessary increase in the cost of manufacturing and selling the thus-treated material.

### SUMMARY OF THE INVENTION

It is thus a general object of the present invention to overcome these disadvantages set forth above with respect to the prior art.

A more specific object of the present invention is to provide a textile processing machine in which the various treatments which a textile is to undergo during its processing are carried out with a minimum of handling and with the least possible loss of time.

An additional object of the invention is to provide such a textile processing machine in which the material to be treated remains throughout the entire processing process in a single container and is therein subjected to all the various different treatments.

Yet a further object of the invention is to provide an apparatus of the general type outlined above which is simple and economical to construct, and which is highly reliable in its operation.

In accordance with this and other objects of the invention, one aspect of my invention resides in the provision

of a textile processing machine, which includes a carrier means adapted to hold goods which are to undergo a series of successive treatments. I further provide conveying means which supports the carrier means and which includes indexing means. This indexing means is arranged for advancing the carrier means in an endless path. Also provided is a plurality of processing stations which comprise treating units arranged adjacent to spaced portions of the endless path, and each of the treating units is provided with a coupling element. A complementary coupling element is provided on the carrier means and the two elements together are adapted to automatically couple and uncouple the carrier means with the respective treating units when the indexing means advances the carrier means into and out of registry with the same.

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 drawing.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a somewhat schematic elevational view of one embodiment of an apparatus in accordance with the present invention; and

FIGS. 2-5 illustrate some of the possible modifications of the apparatus shown in FIG. 1.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail, and firstly FIG. 1 thereof, it will be seen that the textile processing machine shown there comprises in the illustrated embodiment two upright containers 1, these containers are each adapted to contain goods to be subjected to a series of successive treatments. Thus, if they contain a textile which is to be dyed, this textile will undergo a preliminary treatment, the actual dyeing process, a post-dyeing treatment, and finally it will be subjected to a drying process. The containers 1 are rigidly secured to a conveying and indexing device 5 which is carried by a base B. The arms 6 serve to connect the containers 1 with the indexing device 5 in a predetermined relationship relative to the latter.

The conveying and indexing device 5 is rotatable in the direction of the arrow R, and it is further vertically reciprocable in the direction of the double-headed arrow VR. Obviously, with the containers 1 rigidly secured to the device 5, all of the containers 1 will perform the identical motions, along with the conveying and indexing device 5.

By way of illustration two treating units are shown in FIG. 1, and are identified with reference numerals TU. Each of the treating units is assumed to comprise a pump 2 and a fluid supply device 3. Evidently, it is assumed that the two treating units TU shown in FIG. 1 are provided for the purpose of introducing into the interior of the respective containers 1 a fluid, either a liquid or a gas such as heated air. However, this is immaterial since the treating units can of course also comprise other component elements, depending on the treatment which the contents of the containers 1 are to undergo at the respective unit.

What is essential in connection with the invention is the fact that each of the treating units TU is provided with a female coupling member 4, whereas each of the containers 1 is provided with a male coupling member 4' which is receivable in the respective female coupling members 4.

In operation of the novel device, the conveying and

indexing device 5 will first move upwardly in one direction of the double-headed arrow VR, thereby removing the respective male coupling members 4' from the respective female coupling members 4. Thereupon, the device 5 will rotate through a distance calculated to bring each container 1 into registry with a treating unit TU next subsequent to the one from which it has just been disconnected. Now the device 5 moves downwardly, whereby the respective male coupling members 4' are introduced into the respective female coupling members 4. An operative connection now exists between the respective containers 1 and the treating units TU temporarily associated with the containers 1, and the contents of the containers 1 can undergo whatever treatment is next to be carried out in the chain of such treatments.

It will be evident that with this arrangement each container 1 will successively be coupled with each of the treating units TU so that the contents of each of the containers 1 will, if it is assumed that the contents are to be dyed, first be subjected to a preliminary treatment by connection with one of the treating units TU, thereupon be dyed by connection with the next following unit TU, subsequently be subjected to a post-dyeing treatment by the third unit TU and finally be dried by connection with the fourth unit TU. No handling of the contents of the containers 1 is necessary at all during this entire process so that no time is lost, labor is saved, the materials being processed are handled more gently, and the entire manufacturing process is accomplished more efficiently and more economically.

Preferably, the arrangement of the male coupling members 4' and the associated female coupling members 4 is such that, when the male coupling members 4' are introduced into the female coupling members 4, the resulting connection is fluid-tight even under pressure. Of course, depending on the type of treatment which is to be carried out, this may not be absolutely essential. It will also be evident that the rhythm of operation of the novel device will be governed by the longest time period required to carry out a processing step; in other words, the period of time required for each of the steps may be different and the longest period required will dictate the rhythm of operation.

FIGS. 2-5 show embodiments of the invention in which two containers 1 are provided (FIG. 2), three containers (FIG. 3), four containers (FIG. 4) and, in FIG. 5, five such containers. Actually, the number of containers will be dictated by the specific requirements and of course by the number of treatment steps and the corresponding number of treating units.

Advantageously, there is at least one more container 1 provided than there are treating units TU, so as to eliminate the necessity for interrupting the rhythm of operation when the successive containers 1 are to be loaded or unloaded. Thus, it is preferred to provide a loading and unloading station which is included in the path, along with the treating units TU. Advantageously, also, the containers 1 are spaced equally distantly from one another and of course in that case the treating units TU and, if provided, the loading and unloading station, must also be equidistantly spaced.

It should also be pointed out that the coupling means consisting of the male and female coupling members 4' and 4 need not be precisely of the type shown herein, although this is preferred. For instance, it is conceivable that the male coupling member 4' could be inserted sideways into the respective female coupling members 4, so that the vertical reciprocation could be eliminated. This concept is also to be included in the protection sought herein.

Furthermore, if desired or necessary the male coupling member 4' can also be provided with self-locking valves or other closures which act to open when the respective male coupling members 4' are inserted into the female coupling members 4, and which conversely close to pre-

vent escape of treating material or goods being treated from the respective containers 1 when the male coupling members 4' are withdrawn from the respective female coupling members 4.

Neither the such self-locking arrangements, nor the hydraulic or electric devices suitable for rotating and reciprocating of the member 5 are shown herein since these are conventional and thoroughly known to those skilled in the art.

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 arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in a textile processing machine, 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 protected by Letters Patent is set forth in the appended claims:

1. In a textile processing machine, the combination of carrier means adapted to hold goods which are to undergo a series of successive treatments; conveying means supporting said carrier means and comprising indexing means arranged for advancing said carrier means in an endless path; a plurality of processing stations comprising treating units arranged adjacent to spaced portions of said endless path; and quick-operating coupling means, including a first coupling element provided on said carrier means and a complementary second coupling element provided on each of said treating units, arranged to automatically couple and uncouple said carrier means with the respective treating units when said indexing means advances said carrier means into and out of registry with the same.

2. A combination as defined in claim 1, wherein said indexing means comprises first displacing means for displacing said carrier means between a higher and a lower level, and second displacing means for advancing said carrier means in said endless path while the carrier means is on one of said levels.

3. A combination as defined in claim 2, wherein said first coupling element provided on said carrier means is arranged to automatically engage with a second coupling element provided on a respective treating unit in response to registry thereof with said carrier means and to movement of the latter from one to the other of said levels.

4. A combination as defined in claim 2, wherein said first coupling element provided on said carrier means is arranged to automatically engage with a second coupling element provided on a respective treating unit in response to registry thereof with said carrier means and to movement of the latter to said lower level.

5. A combination as defined in claim 3, wherein said carrier means is a container, wherein said first coupling element is a male coupling member, and wherein said second coupling elements are female coupling members.

6. A combination as defined in claim 2, wherein said container is arranged to one side of said indexing means; and further comprising connecting means rigidly connecting said container with said indexing means in predetermined relationship relative thereto.

7. A combination as defined in claim 3, wherein said processing stations are equidistantly spaced from one another, and wherein said carrier means comprises a plu-

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reality of equidistantly spaced carriers so arranged that respective ones of said carriers are moved into registry with successive ones of said treating units when being advanced by said indexing means.

8. A combination as defined in claim 7, wherein said indexing means is arranged to advance said carriers in said endless path simultaneously and stepwise through distances corresponding to the spacing between said processing stations.

9. A combination as defined in claim 9, wherein the number of carriers exceeds the number of treating units, and wherein at least one of said processing stations is a loading and unloading station, so that at least one of said carriers is in registry with said loading and unloading station when others of said carriers are in registry with respective ones of said treating units.

10. A combination as defined in claim 9, wherein the number of carriers exceeds the number of treating units by one.

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