

Sept. 1, 1959

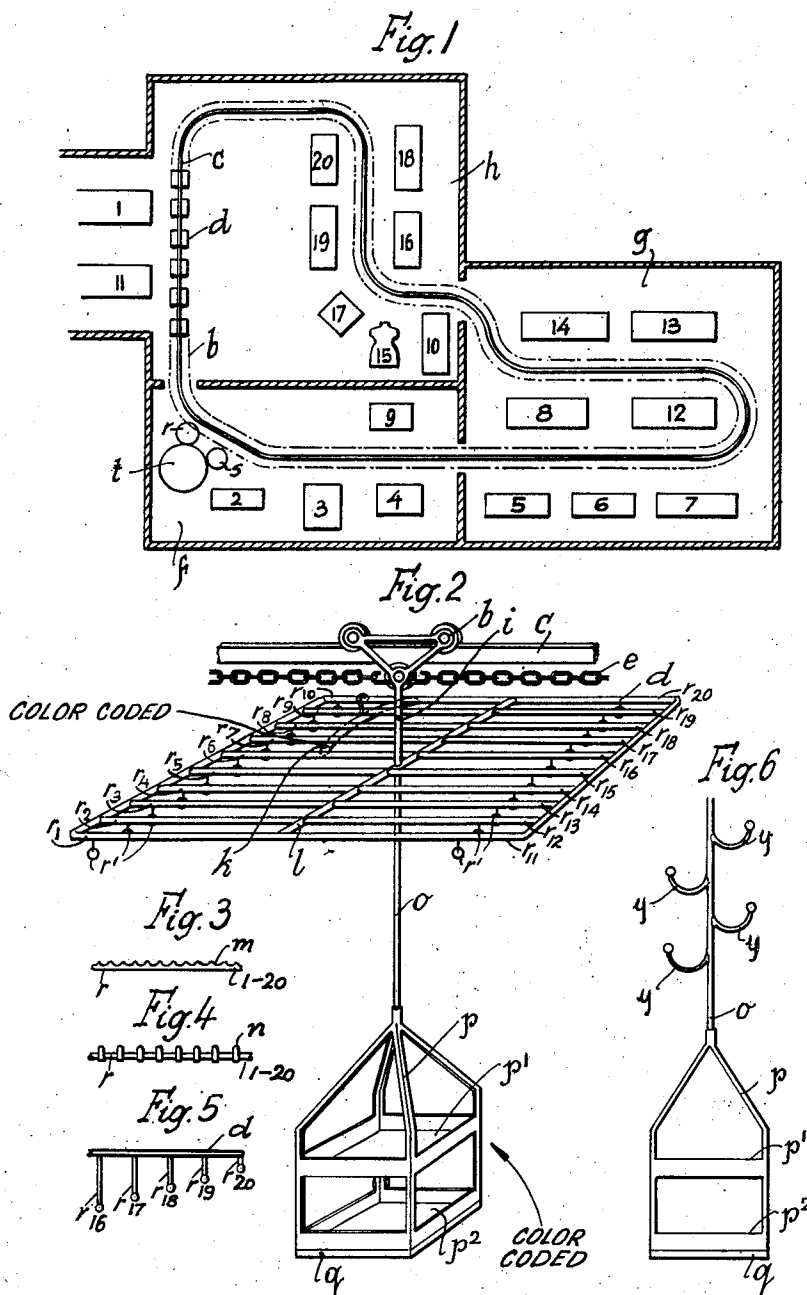
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2,902,138

CONVEYING SYSTEM FOR DRY CLEANING AND DYEING INSTALLATIONS

Filed Sept. 28, 1956

2 Sheets-Sheet 1



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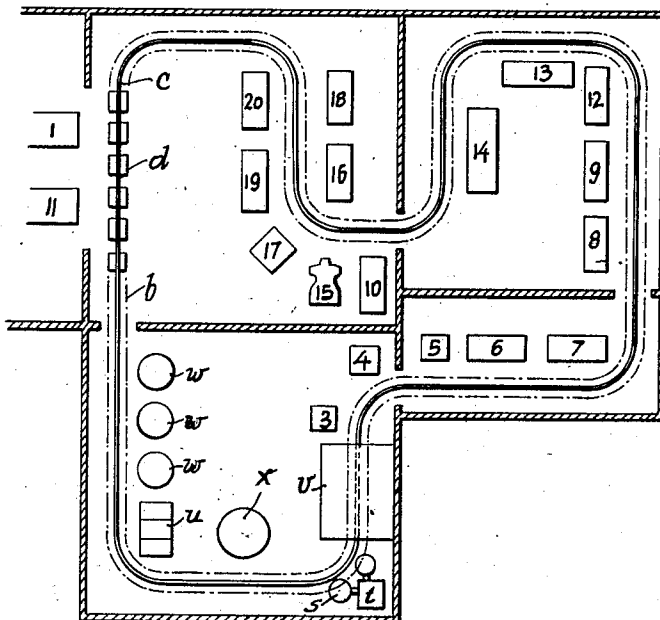
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Fig. 7



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1

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CONVEYING SYSTEM FOR DRY CLEANING AND DYEING INSTALLATIONS

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Application September 28, 1956, Serial No. 612,856

6 Claims. (Cl. 198—19)

This invention relates to a novel conveying system which is, in particular for conveying work pieces in dry cleaning and dyeing installations.

It is generally known in the art to employ various continuous conveying means in industrial assembly plants, for instance for motor cars, electronic apparatus etc. The individual pieces such as pieces of clothing, linen and the like, to be assembled to obtain the finished end product are conveyed in successive order to the various locations where the individual steps of the treatment or assembly operation are carried out.

However, in the known art, the problem of applying such conveying systems and constructions to dry cleaning and dyeing plants has not been solved in a satisfactory manner. The known conveying systems are not suitable for adaption to the peculiar functions and purposes of dry cleaning and dyeing installations. Thus, an attempt had been made to utilize the advantages of continuous conveyance in these installations, by transporting the work by overhead trackage to the storing room after the treatment of dry cleaning and/or dyeing has been terminated.

However, it is impossible to use these conveying systems between individual steps of the cleaning or dyeing operation proper. The main difficulty encountered when using the known constructions and methods of conveying systems, between the dry cleaning and dyeing steps may be explained by the fact that the work pieces to be treated are of extremely different size, shape, material, consistency and so forth and require a varying treatment adapted to the particular properties of the individual work pieces. For instance a single dry cleaning step may suffice in one case, while, depending on the nature of the stains etc., in the clothes, a second treatment with a specific chemical substance may be required. The necessity for such a secondary treatment may become apparent only after the first treatment had been applied and proven to be unsuccessful. A particular difficulty resides in the fact that one workpiece may require a longer time of treatment than the following one.

It is another general object of the invention to permit the combination of the different units in cleaning or dyeing plants to form a single coordinated operating unit.

It is a particular object of the invention to provide for an uninterrupted, continuous conveying system, in which the work pieces to be treated in cleaning and dyeing plants are transported to the respective locations of treatment in the consecutive order of the steps involved in the entire operation.

It is another object of the invention to provide for a continuous conveying system in dry cleaning and dyeing plants which systems assure a speedy transportation of the work pieces from one place of operation to the next following place of operation even where the different places of operation are located at a considerable distance from one another.

It is a further object of the invention to bring the work pieces to be treated in dry cleaning or dyeing plants to the respective places of operation making it unnecessary

2

for the workers performing a particular part of the treatment to leave the place of operation.

It is still another object of the invention to provide for a conveying system and method suitable for dry cleaning and dyeing plants transporting the work pieces to the workers in a systematic and orderly manner.

It is another object of the present invention to provide a conveying system which serves to convey the work pieces to the worker in such a manner that the particular treatment required for a specific workpiece can be easily recognized by the worker at a quick glance.

These objects as well as other particular advantages over the known art as set forth further below are accomplished by the following system of conveying work pieces:

A conventional overhead trackage which may be of any of the various kinds generally known in the art as, for instance, the bar type, the coburn type, the single or double I-beam track, the monorail type (see L.S. Marks: Mechanical Engineers Handbook, 5th ed., page 1356 ff.) and the like, and which is suitable for endless conveyance of articles is provided with a plurality of conveying frames or cases suspended from the overhead trackage and arranged at a certain distance from one another. The suspended conveyor frames are advanced by conventional traction means. Each of these conveying frames is provided with a plurality of racks, and each of the racks bears a distinctive mark, representing a determined individual step to be taken in the treatment of work pieces in cleaning or dyeing plants. The conveying frames each conveying a plurality of racks and the work pieces suspended from the latter are advanced by conventional traction means along the overhead trackage and thus reach in predetermined sequence every particular department and every single work station of the plant. The worker at each station immediately recognizes by a quick glance at the respective mark attached to each of the racks, which of the work pieces he must remove from the rack and treat in the manner assigned to his particular station. The worker, for instance at the sewing station, works on a certain piece and lets all other pieces destined for his station, pass by until he has finished the one workpiece. The workpieces which have passed his station while he was occupied with the aforesaid workpiece, are recirculated to his station and he takes up the next following one, in the order of urgency indicated, for instance, by a corresponding color of the hanger.

After the work piece has been duly treated in this station the operator places it into another cage onto the rack bearing the mark designating the station at which the next following step of treatment is to be carried out which step depends on what the individual work piece requires in the particular instance. The work piece is then passed on through the following stations and taken off for further treatment by the operator at the respective station indicated by the mark of the particular rack now bearing the work piece.

The distinct and novel features of the apparatus and the method of the present invention will be better comprehended and more fully understood by a detail description of the accompanying drawings showing a preferred embodiment of the invention, wherein:

Figure 1 is a schematical top view of an endless conveying installation passing through all stations of the plant wherein the individual steps of cleaning or dyeing are performed;

Figure 2 is a perspective view of a conveyor frame according to the invention suspended from an overhead track;

Figure 3 shows one embodiment of an individual rack in the coverage frame according to the invention;

Figure 4 shows another embodiment of a rack of the conveyor frame according to the invention;

3

Figure 5 shows still another embodiment of a rack of the conveyor frame according to the invention;

Figure 6 shows an embodiment of a rack for conveying hats and other work pieces not suited for suspension from a hanger;

Figure 7 shows a top view of the conveying system according to the invention adapted to the particular needs of a dyeing plant.

As illustrated in these figures, the transportation of the work pieces is effected by one or several endless conveying lines *b*. Each line *b* consists preferably of an overhead track or rail *c*, which carries a plurality of conveyor frames *d*. The conveyor frames are arranged at a certain distance from each other and are advanced by traction element *e* which is operated by a driving means *s* comprising for instance an electric motor *t*. Each conveyor frame *d* comprises a plurality of racks *r1* to *r20*. The frame is suspended from the overhead rail *c* by means of a conventional carriage *i*. At least one rack *r* is provided for each work station of the plant destined for one particular step of the cleaning or dyeing treatment. A specific mark or marker *r'* designates each of these stations and each of these markers is attached to at least one of the racks, thus indicating which is the next following step required in the treatment of the specific article suspended from this rack. In the conveying system adapted for use in a typical cleaning operation described by way of an example further below, there are provided twenty different racks, each of which bears a different clearly and easily distinguishable mark.

The racks *r1* to *r20* each consisting of a rod or rail rest with one end in the outer frame *d* and with the other end in separating bar 1 which subdivides the conveyor frame *d* into two halves. According to a preferred embodiment of my invention, the racks *r1* to *r20* are provided with restraining means, such as, for instance, recesses or grooves capable of assuring a satisfactory spaced with retaining means, such as, for instance, re-during transportation (see Figure 3). Instead of these recesses *m* the racks may also be equipped with stop bolts *n* (see Fig. 4), or with slidable stopping disks or adjusting rings, so that the pieces of clothing on the various clothes hangers rest suspended from the racks at a certain distance from one another. The same end is attained by attaching clamps or other holding means directly to the hangers or other similar work piece carriers.

The conveyor frames *d* form a kind of grid-like configuration. In its simplest embodiment a frame *d* may consist of a rectangular frame with a number of, for instance twenty, longitudinal rods *r*. If the number of steps to be performed and the number of corresponding work units in a cleaning or dyeing plant are extremely great the grids may of course be made larger and big enough to receive up to fifty racks and more, representing fifty different steps of the cleaning or dyeing treatment.

If the number of the different racks is large, it is preferable to arrange the racks in the conveyor frame *d* in a step-like manner at different levels (see Fig. 5). By means of this arrangement it is much easier to survey at a glance the different racks, while otherwise, it may be more difficult to pick out a certain rack from the entire group. Giving each rack a different color will also facilitate picking out a determined rack and checking whether a hanger is suspended therefrom.

It may also be preferred to suspend a conveyor basket *p* from the rod *o* of the conveyor frame *d*. The basket *p* illustrated in Figures 2 and 6 has several compartments *p1* and *p2*, each of which is suited for receiving and transporting work pieces such as hats, gloves, etc. which cannot easily be suspended from a hanger. According to a preferred embodiment of this part of my invention, the baskets *p* are loaded preferably in the center of their bottom with heavy plates *q*. If the balance of the basket

4

disturbed by the weight of work piece which may have been placed off the center of gravity of the conveyor basket, the balance of the latter is substantially restored by the weight *q* and the baskets are accordingly prevented from being inclined excessively to one side or from being tilted.

As has been mentioned above, the work pieces are either suspended on clothes hangers *k* or placed into conveyor baskets *p*. The clothes hangers *k* and the baskets *p* may also be color coded such as by being painted in different colors, each color representing, for example a particular day or some other data relevant to an efficient operation of a plant and requiring easy ascertainment by the workers or foremen of the plant. If, for instance, the colors represent particular days, it can at once be detected whether a particular operation has been performed on the same or a preceding day. The operation of the station performed at a given period, can thereby be directed, by giving priority to the backlog of work from preceding days, and an undue delay in processing particular work pieces is thereby avoided.

Instead of using clothes hangers, hooks *y* may be affixed to the rods *o* (Figure 6). These hooks *y* may serve as suspenders for sheets of cloth, coils of thread, ties, ribbons and the like.

Finally, the racks *r* may be so shaped as to directly carry certain work pieces to be conveyed instead of suspending therefrom additional work piece carriers such as hangers, baskets, hooks and the like.

As will be realized from the illustration shown in Figure 7, substantially the same system as the one just described for cleaning operations may be employed in dyeing plants. The conveying means *b* are equipped with suspension frames *d*; *w* represents dyeing kettles of the dyeing plants.

The installation just described makes it possible to employ a novel and unprecedented conveying method in a dyeing or cleaning plant. The operation of the apparatus according to this novel method of my invention will be better understood by an example of a typical cleaning plant. The same principles are of course applicable to all cleaning as well as to dyeing plants and it is to be understood that the following example is in no way to be considered as limiting the scope of application of my invention.

It shall be assumed that in addition to the two dispatching departments 1 and 11 a cleaning plant comprises the following work stations:

- 2 manual laundry
- 3 spot removal
- 4 wool dampening
- 5 pleating ironing
- 6 wool ironing
- 7 silk ironing
- 8 treatment of sleeve linings and vests
- 9 silk dampening
- 10 sewing
- 12 top coat pressing
- 13 coat pressing
- 14 slack pressing
- 15 dummy
- 16 rain coat ironing
- 17, 18, 19, 20 additional units.

The conveyor frames *d* and the corresponding racks *r1* to *r20* described above are guided by the overhead rail *c* through or past every single work station, and, of course, past the dispatching departments, in a continuous and endless motion, thus passing the rooms *f*, *g* and *h*. A work piece coming out of the dry cleaning machine is examined before subjecting it to the next step of treatment. If it is found that some stains still have not been removed completely, the work piece is hung onto the rack *r3*. It is then transported along the conveyor rail *c* until it reaches station 3 (spot removal). The

5

workers of this station immediately perceive the work piece hung onto rack 3 and note that a spot removal is to be effected on this piece. After due treatment at this station, the work piece is again examined as to the next necessary step of its treatment, and is accordingly hung on to the corresponding rack. If, for instance, a sewing operation has to follow the spot removal, the workers at station 3 hang the work piece on a clothes hanger *k*, and put this hanger on the rack *r*10. The worker employed at the sewing station of the plant 10 then recognizes at once, when the work piece passes his station 10 that he is to perform a sewing job on this piece, while the workers at the intermediate stations 4 to 9 will let the work piece suspended from rack *r*10 pass without taking it from the rack.

Essentially the same method is applied in dyeing plants.

After the dyeing step proper the work piece is subsequently conveyed to a rinsing installation *x* centrifuges *u* and eventually to drying rooms *v*. Thereafter, the work piece is transported just as in the case of the cleaning plant, to the various dispatching departments 1 and 11 and work stations 3 to 20.

If, at some station it should be discovered that a preceding treatment has not been done properly or has been omitted, all that is required when operating according to the method of the invention, is to place the work piece on the rack of that station at which the job has to be repeated, and let the work piece pass back to that station for execution of the omitted treatment. If a worker in the sewing unit number 10, for instance, notices that there are some stains left on a work piece, he simply puts the work piece on the rack *r*3 and the work piece is transported via the stations 11 to 20 and 1 to 2 to station 3, where it is taken off the rack again for proper removal of the stains. After this has been done, the work piece is hung onto the rack corresponding to what other steps have still to be performed in the treatment of this particular piece which is again conveyed through the following work station for still further treatment, or, if nothing further has to be done, to the packing and expedition station.

The installation and method of my invention thus enables the individual worker to dispatch the work piece from his station to any desired station in the plant and as often as this is deemed necessary. This can be done from the place where the worker is occupied, close to the overhead trackage and the passing conveyor; it is not necessary for the worker receiving and sending a work piece to leave his place. Much time and labor is thereby saved. The conveying system according to the invention also makes the distance between the various work units a matter of comparative irrelevancy. Time and space are easily bridged by the conveying system according to the invention. The time consumed by the conveying process is even utilized and affords a positive contribution to the treatment of the work pieces as the same are subjected to the drying effect of the air during the transportation. The slight wind engendered by the motion of the work pieces on the racks combined with the easy access of air to these work pieces hung upon the racks at a considerable distance from one another, all contribute to this drying effect.

It will be understood that this invention is susceptible to modification in order to adapt it to different usages and conditions, and, accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claims.

What I claim is:

1. In an endless and continuous conveying system comprising a number of work stations performing different steps of treatment; an endless overhead trackage leading past all of said stations successively; at least one conveying means comprising suspension means for suspending said conveying means from said overhead trackage; and a traction element adapted for continuously advancing

6

said conveying means along said overhead trackage; the improvement of said system wherein said conveying means comprise a frame fastened to said suspension means, a plurality of racks mounted in said frame and adapted for suspending clothes hangers therefrom, there being at least as many racks as there are work stations, markers attached to each of said racks and designating each rack as being destined for a particular work station performing an individual step of treatment, a central rod extending downwardly from said suspension means through said frame and a basket attached to the lower end of said rod, and at least one separating bar transversely attached to said racks in the plane of said frame and subdividing the latter.

2. In an endless and continuous conveying system comprising a number of work stations performing different steps of treatment; an endless overhead trackage leading past all of said stations successively; at least one conveying means comprising suspension means for suspending said conveying means from said overhead trackage; and a traction element adapted for continuously advancing said conveying means along said overhead trackage; the improvement of said system wherein said conveying means comprise a frame fastened to said suspension means, a plurality of racks mounted in said frame and adapted for suspending clothes hangers therefrom, there being at least as many racks as there are work stations, markers attached to each of said racks and designating each rack as being destined for a particular work station performing an individual step of treatment, a central rod extending downwardly from said suspension means through said frame and a basket attached to the lower end of said rod, hooks attached at different levels to said rod below said frame for suspending work pieces therefrom, and at least one separating bar transversely attached to said racks in the plane of said frame and subdividing the latter.

3. The improved system as described in claim 1, wherein clothes hangers in different colors are suspended from said racks, each color representing a relevant operational datum.

4. The improved system as described in claim 1, wherein there are a plurality of conveying means each having a basket attached to the lower end of the central rod of the respective conveying means, said baskets being subdivided into a plurality of compartments.

5. The improved system as described in claim 1, wherein there are a plurality of conveying means each having a basket attached to the lower end of the central rod of the respective conveying means and wherein there are clothes hangers suspended from the racks of the respective conveying means, said baskets and said clothes hangers being painted in different colors, each color representing a relevant operational datum.

6. In an endless and continuous conveying system comprising a number of work stations performing different steps of treatment; an endless overhead trackage leading past all of said stations successively; at least one conveying means comprising suspension means for suspending said conveying means from said overhead trackage; and a traction element adapted for continuously advancing said conveying means along said overhead trackage; the improvement of said system wherein said conveying means comprise a frame fastened to said suspension means, a plurality of racks mounted in said frame and adapted for suspending clothes hangers therefrom, there being at least as many racks as there are work stations, markers attached to each of said racks and designating each rack as being destined for a particular work station performing an individual step of treatment, at least one separating bar transversely attached to said racks in the plane of said frame and subdividing the latter, a basket suspended from said conveyor frame, said basket being suitable for receiving and transporting non-suspendable work pieces, and weights attached to the bottom of said basket, said weights

serving to maintain the balance of said basket even when the latter is eccentrically loaded with work pieces.

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