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SORTING AND ASSEMBLY SYSTEM

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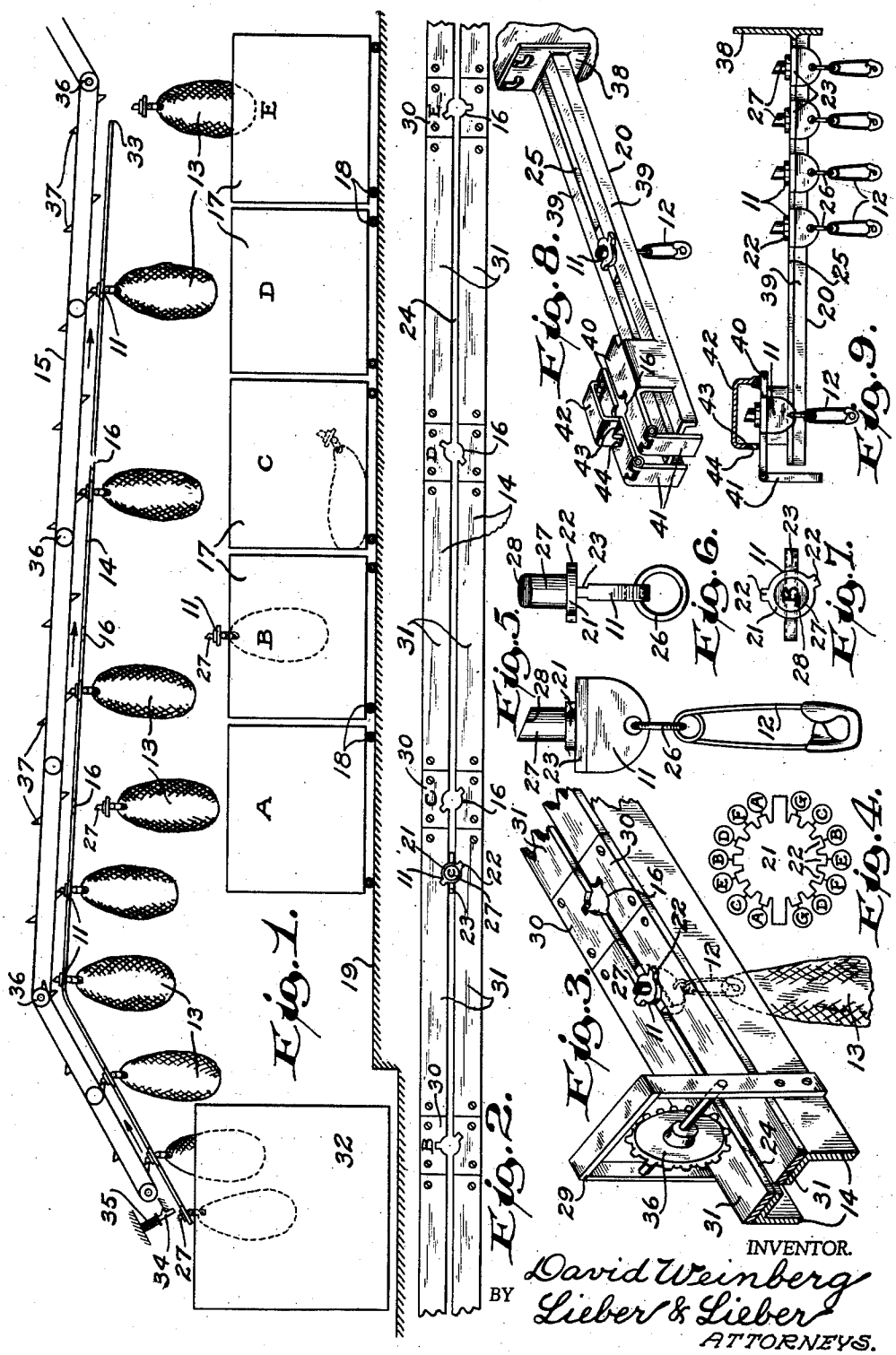


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

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SORTING AND ASSEMBLY SYSTEM

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4 Claims. (Cl. 209—80)

The present invention relates in general to improvements in systems for sorting and assembling various commodities, and relates more specifically to an improved apparatus for assorting and for subsequently gathering and dispersing the contents of a multiplicity of mixed containers such as bags, nets or other receptacles containing diverse articles.

Generally defined, an object of my present invention is to provide a new and useful system of sorting and identifying diverse commodities, and of subsequently assembling the commodities and dispersing them according to their initial identification.

In laundries and other institutions wherein large quantities of diverse articles or commodities are handled daily, it is necessary in order to facilitate subsequent sorting and correct final distribution of some of the articles, to initially classify and identify each article or group of articles by means of a number, letter or some other designation, and to thereafter assemble the marked articles for final distribution. As an example of this procedure, in the larger commercial laundries, when so-called family laundry is received from the various sources or customers, each batch is first classified according to certain characteristics and placed into containers or so-called nets on a break-down table, and each net is provided with an identifying tag ordinarily attached to the closure safety pin for the bag-like net. If there are several nets containing the same kind of articles belonging to the same customer, the identifying tags of all of these net bags should bear the same identification, but the nets containing the goods of different kinds and belonging to other customers must bear different individual identifications. After this initial sorting and identification has been accomplished, the laundry laden and marked bag-like containers may be mixed with each other or separately treated, while being handled and subjected to washing, drying and other necessary operations, whereupon they must again be assembled or gathered and opened for removal and final dispersion of the goods.

In order to facilitate such identification and to insure accurate final assortment of such family laundry, it has heretofore been customary to utilize a tag system whereby each group of nets containing the same kind of goods belonging to a particular customer, is provided with similar metal tags each having notches or an opening therein of special configuration different from those of the tags of all other individual groups, and these tags have the safety pins permanently attached thereto and are also numbered so that each individual customer's laundry is initially marked or provided with tags which have been carefully recorded at the break-down zone. For example, one customer's laundry might be segregated into a dozen or more batches requiring as many separate net-like containers, but each net bearing the same kind of goods belonging to that particular customer, should be identified with an identical tag. After the washing and dehydrating operations are completed with this prior system, the relatively heavy laundry laden nets must be manually removed from the washers, driers or extractors, and assembled at the original break-down zone where the closure pins with the identifying tags attached thereto are removed and filed on hooks so formed that each hook can only accept tags having the same shaped notches or opening and number thereon. The assembled safety pins and tags can thereafter again be used in like manner in connection with subsequent batches of laundry, and while this prior system is fairly effective in the matter of insuring delivery of laundry to the proper customers, it is far from being fool-proof and entails considerable time and labor in transporting the loaded nets from place to place and in effecting final distribution of the laundry.

It is therefore a more specific object of my present improvement, to provide an improved apparatus for automatically, quickly and effectively assorting diverse commodity laden mixed containers, and for facilitating final assembly thereof at a predetermined locality.

Another specific object of the present invention is to provide an improved identification and handling system for batches of material such as family laundry or the like, wherein classification and transfer of the batches from one zone to another, may be effected with minimum effort and error.

Still another specific object of my invention is to provide a simplified mode of initially classifying and of subsequently segregating and assembling mixed articles in an accurate and expeditious manner, preferably with the aid of removable marking elements which are adapted to be used repeatedly for similar purposes.

A further specific object of this invention is to provide improved apparatus for facilitating the identification, sorting, and assembly of laundry filled nets or the like, and correct final dispersion of the confined goods to the initial sources

of supply, at minimum cost and with minimum attention and labor.

These and other specific objects and advantages of the invention will be apparent from the following detailed description.

A clear conception of the several steps involved in my new system, and of the construction and operation of one type of apparatus especially adapted for commercially carrying out the invention, may be had by referring to the drawing accompanying and forming a part of this specification wherein like reference characters designate the same or similar parts in the various views.

Fig. 1 is a diagram showing the improved automatic sorting system as applied to a typical laundry transferring and assorting installation;

Fig. 2 is an enlarged top view of a section of the lock-slot bearing guide rail, showing several lock-slots therein, and also showing a key coacting therewith;

Fig. 3 is a further enlarged fragmentary perspective view showing a portion of the guide rail, a typical hanger and sprocket support associated with the rail, and one of the lock-slot and key assemblages;

Fig. 4 is a diagram showing some of the combinations of lock-slots and keys which are obtainable with the improved sorting system;

Fig. 5 is a further enlarged side view of one of the key and safety pin assemblages;

Fig. 6 is a front view of the same key;

Fig. 7 is a top view of the key shown in Figs. 5 and 6;

Fig. 8 is a perspective view of a special rack or bracket for storing similar keys; and

Fig. 9 is a longitudinal central section through one of the special key storage brackets.

While the invention has been shown and described herein as having special utility when applied for the purpose of sorting and assembling mixed laundry bearing nets in the laundry industry, it is not my desire or intent to thereby unnecessarily limit or restrict the scope or utility of the improvement, features of which are obviously more generally and advantageously applicable for other sorting and handling purposes. The term "key" as used herein is intended to include any body or tag having special configuration for classification purposes, and the term "lock-slot" is intended to include any notched or specially formed opening especially adapted to receive a key of like shape.

Referring to the drawing showing one embodiment of simple apparatus for effecting commercial exploitation of my improved sorting method, this apparatus comprises in general a multiplicity of keys 11 of special shape each having a large and sturdy safety pin 12 permanently secured thereto and cooperable with a bag or net 13 to effectively confine materials therein; an elongated longitudinally slotted guide element or rail 14 along which the keys 11 and suspended nets 13 are slidable by means of an endless chain conveyor 15 or the like as indicated in Fig. 1, and having a series of spaced lock-slots 16 therein as depicted in Fig. 2; a similar series of transportable receptacles 17 adapted to be disposed beneath the fixed lock-slots 16 of the rail 14, and having roller casters 18 for facilitating transportation thereof over the floor 19; and a number of longitudinally slotted key storage racks or brackets 20 of special construction as shown in Figs. 8 and 9, these brackets 20 being movable to any convenient place either near or remote from the rail 14, preferably near the break-down and sorting tables, not shown.

Each of the classifying keys 11 consists of a disk portion 21 having one or more lugs 22 projecting outwardly from its periphery; a rectilinear guide portion 23 adjoining the disk portion 21 and adapted to coact with the longitudinal slots 24, 25 respectively of the rail 14 and brackets 20; a ring 26 suspended from the guide portion 23 and serving as a means for attaching the safety pin 12; and a central upper projection 27 having an inclined top face 28 thereon. Each of these keys 11 has an identifying number letter or other mark thereon, and in the drawing letters A, B, C etc. have been used in order to avoid conflict with reference characters; and the lock-slots 16 are all of different configuration, and each of these slots is adapted to receive or pass only keys 11 having identical shape. In large establishments it is necessary to provide a great number of groups of keys 11 having different shapes, each group having several similarly marked keys of identically the same shape; and each rack or bracket 20 is adapted to receive and store only one group of keys 11 of a particular shape. The diagram of Fig. 4 illustrates some of the numerous combinations of radial lugs 22 which may be used in order to obtain keys 11 of different shapes, and by merely reversing the direction of inclination of the face 28 at the top of the projection 27, a second set of these combinations may be produced. The keys 11 may be formed in various manners and of any suitable material adapted to withstand high temperatures, and the corresponding lock-slots 16 should be adapted to permit the keys 11 to drop freely therethrough when the latter are advanced along the rail slot 24.

The transporting and guiding rail 14 may be formed of a pair of parallel angle irons having their horizontal flanges spaced apart to form the longitudinal slot 24, and these angle irons may be suspended from overhead structure by means of a series of inverted U-shaped supports 29 as shown in Fig. 3. The lock-slots 16 are preferably formed in plates 30 secured to the horizontal flanges of the rail 14 by means of screws, and the spaces between the slot plates 30 may be provided with intervening wear plates 31, see Figs. 2 and 3. The rail 14 may extend in any desired direction, and as illustrated diagrammatically in Fig. 1, this rail 14 has its open receiving end located near an extractor 32 and is thereafter abruptly upwardly inclined to a point located considerably above the floor 19, being subsequently horizontal or downwardly inclined toward its final and open delivery end 33 disposed above the receptacle 17E. The laundry laden containers 13 may thus be transported upwardly along the rail 14 from the extractor 32 to the highest portion of the transfer system, and from thence horizontally over the lock-slots 16 as indicated by the arrows; and in order to permit the keys 11 to enter the open receiving end of the rail slot 24 in only one position, a spring pressed upwardly movable slide 34 may be provided. The lower end of this slide 34 is so positioned relative to the adjacent portion of the rail 14, that the upper inclined faces 28 of the central projections 27 of the successive keys 11 will pass beneath the slide 34 only when these faces 28 are forwardly and downwardly inclined; and when thus properly positioned, the keys 11 may be pushed past the lower slide end and will lift the slide 34 against the spring 35 sufficiently to allow the key and its container net 13 to be ad-

vanced into the zone of action of the conveyor 15.

The endless conveyor 15 may be of any suitable type, and as shown, this conveyor comprises several endless bands or chains coacting with sprockets 36 journalled in the rail supports 29, and having spaced cleats 37 mounted thereon. The chain conveyor 15 may be constantly driven from any convenient source of power, and the successive cleats 37 are adapted to engage the successive keys 11 and to slide the latter along the rail plates 30, 31 and slot 24 in an obvious manner. Whenever a key 11 of predetermined configuration is advanced to a position of vertical registry or alinement with a lock-slot 16 of like or corresponding shape, the key and its container or net 13 will drop by gravity into the corresponding receptacle 17 disposed beneath the rail 14; and if for any reason a key 11 should fail to connect with a slot 16, it will be carried over the rail end 33 and deposited into the receptacle 17E. The receptacles 17 after receiving their charges of containers 13, may be freely transported along the floor 19 preparatory to unloading, and in a laundry they would normally be transferred in proximity to the sorting tables where the key storage brackets 20 would also be disposed.

In order to insure proper classification and storage of the keys 11 after they are removed from the nets 13 at the sorting and laundry distributing tables, the racks or brackets 20 are preferably so formed that they can only receive similar keys. As depicted in Figs. 8 and 9, each of these brackets 20 may be formed of a pair of parallel angle irons or bars 39 having the elongated slot 25 therebetween, and also having one end rigidly secured to a supporting plate 38 adapted for removable attachment to a wall. A bifurcated gauge plate 40 having a lock-slot 16 of proper shape therein, is rigidly attached to and is disposed above the opposite free ends of the angle bars 39; and this gauge plate 40 carries a pair of depending front aprons 41 which are swingable away from the free ends of the bracket bars 39 so as to permit keys 11 to be freely withdrawn from the front open end of the slot 25 while preventing the keys 11 from being inserted within the slot 25 directly through this open end. The gauge plate 40 is furthermore provided with an upwardly swingable pivoted latch 42 having a lower edge 43 spanning the central slot 25, and a stop projection 44 coacting with the top surface of the gauge plate 40. The edge 43 of the latch 42 which spans the slot 25 is so positioned by the stop projection 44, that the inclined faces 28 of the projections 27 of the successive keys 11 can be admitted beneath the latch 42 only when these faces 28 are forwardly and downwardly inclined; and when properly positioned, the faces 28 will lift the latch 42 and the keys 11 may be brought into vertical alinement with the lock-slot 16 so as to cause the keys to drop onto the bars 39, after which they can be slid along the slot 25 toward the mounting plate 38 and stored, as shown in Fig. 9. In this manner the keys 11 may be segregated into groups of identically shaped keys, in readiness for subsequent use, and the brackets 20 may be mounted on other walls since they are removable and portable.

While the normal functioning of the improved sorting system should be clearly apparent from the foregoing detailed description of the construction and operation of the apparatus, a short review of the steps involved will be repeated. When the improved system is applied to sorting family laundry, dirty laundry is first delivered to the break-down tables where it is segregated into groups according to the type of treatment which it will withstand and also according to the customer to whom it belongs, and the sorted laundry is inserted within the nets 13 which are thereafter closed by the safety pins 12 to which the keys 11 are attached. The several nets 13 containing the same kind of laundry of a particular customer should all bear identical keys 11, and if there are eight nets containing similar goods belonging to a particular customer, all of the eight will bear either the marking A, B, C or D. After the dirty laundry has been thus broken down or classified and confined within the nets 13, these nets may be subjected to washing and drying operations in the usual manner and according to the specific characteristics of the goods. Assuming that the treating operations have been completed when the nets reach the extractor 32, the successive mixed containers may then be applied to the transporting rail 14 past the latch 34 and they will be subsequently slid along the rail 14 by the endless conveyor 15. This conveyor will first elevate the successive nets 13 to the highest point of the distributing system and will thereafter slide the keys 11 along the approximately horizontal portion of the rail 14 and over the lock-slots 16. As previously indicated, these lock-slots 16 will permit the laundry of each customer to drop into the receiving receptacles 17, and if there are several nets 13 containing like laundry of a single customer, all of these nets will drop into the same receptacle 17. The assembled receptacle 17 may thereafter be unloaded directly upon the break-down tables or transferred to these tables where the clean laundry may be removed from the nets 13 and finally dispersed, and the keys after being removed from the nets 13 may be applied to the racks or brackets 20 located near the tables, for subsequent use. In this manner the identification, sorting, and final assembly of the commodity laden containers or nets 13 may be quickly and accurately effected, and proper delivery of the laundry will always be assured.

From the foregoing description it will be apparent that my present invention provides an improved system for identifying, sorting, and of assembling commodity laden containers which comprises, initially classifying and marking each container with a key of definite shape when the container is being loaded, thereafter collecting the mixed loaded containers at a distribution zone after the commodity may have been treated, and finally conveying the containers in succession along a guide having lock-slots therein conforming in shape with certain of the various keys, so as to cause the keys to pass through correspondingly shaped lock-slots and to assemble the loaded containers into classes corresponding to the initial classification. While the improved system makes provision for utilizing the same keys which classify the nets 13, in order to store these keys 11 for subsequent use, this need not necessarily be the case as additional tags may be used for such storage purposes. The improved keys 11 and lock-slots 16 may be produced in various sizes and shapes, and may be attached to various kinds of containers other than laundry confining nets 13. The rails 14 may also be of diverse shapes and may extend

in various directions, but by initially automatically elevating the nets 13 and dropping the same by gravity into receptacles 17, manual handling and lifting of the containers is eliminated and the relatively heavy commodity laden nets 13 can be readily transported to any desired locality. The receptacles 17 need not be transportable, and may be fixed assembly bins on which the portable key receiving hooks 20 may be directly but removably mounted. The key storage hooks 20 may also be modified in various respects, but accurate classification of the keys 11 will be greatly facilitated by using the brackets 20 herein shown and described. Various other changes in the design and construction of parts may also be found desirable, but the improved system is obviously simple and reliable, and is adapted to be quickly installed in various institutions where accurate sorting and ultimate assembly of mixed commodity laden containers is desirable.

It should be understood that it is not desired to limit the present invention to the exact details of construction of the apparatus, herein shown and described, for various modifications within the scope of the claims may occur to persons skilled in the art.

I claim:

1. A laundry sorting system, comprising, a plurality of container suspension keys each having a flat horizontal approximately circular suspension plate provided with one or more formations radiating from the plate periphery and also having a depending positioning flange extending centrally across and beneath the circular plate, all keys of selected groups having the peripheral formations thereof identically located with respect to their positioning flanges and the peripheral formations of the different groups being differently located, a pair of laterally spaced guide rails along which said keys are transportable with said flanges thereof travelling flatwise within the separating space, said rails being provided with successive local openings formed to permit plates of predetermined shape to gravitate freely therethrough, and means for advancing said keys in spaced relation along said rails.

2. A laundry sorting system, comprising, a plurality of container suspension keys each having a flat horizontal approximately circular suspension plate provided with one or more formations radiating from the plate periphery and also having a depending positioning flange extending centrally across and beneath the circular plate, all keys of selected groups having the peripheral formations thereof identically located with respect to their positioning flanges and the peripheral formations of the different groups being differently located, a pair of laterally spaced guide rails along which said keys are transportable with said flanges thereof travelling flatwise within the separating space, said rails being provided with successive local openings formed to permit plates of predetermined shape to gravitate freely therethrough, means for advancing said keys in spaced relation along said rails, and a series of independent racks each formed for the reception of keys of only one of said groups.

3. A laundry sorting system, comprising, a plurality of bag suspension keys each having a flat horizontal circular suspension plate provided with one or more radiating peripheral projections and also having a depending positioning flange extending centrally across and beneath the circular plate and a central extension projecting upwardly therefrom, all keys of selected groups having the radial projections thereof identically located with respect to their positioning flanges and the peripheral projections of the different groups being differently located, a guide rail having an elongated slot along which said keys are transportable with the flanges thereof travelling flatwise within the slot, said rail being provided with successive local openings formed to permit keys of predetermined shape to gravitate freely therethrough, and means cooperable with said extensions for advancing said keys in equally spaced relation along said rail.

4. A laundry sorting system, comprising, a plurality of bag suspension keys each having a flat horizontal circular suspension plate provided with one or more radiating peripheral projections and also having a depending positioning flange extending centrally across and beneath the circular plate and a central extension projecting upwardly therefrom, all keys of selected groups having the radial projections thereof identically located with respect to their positioning flanges and the peripheral projections of the different groups being differently located, a guide rail having an elongated slot along which said keys are transportable with the flanges thereof travelling flatwise within the slot, said rail being provided with successive local openings formed to permit keys of predetermined shape to gravitate freely therethrough, means cooperable with said extensions for advancing said keys in equally spaced relation along said rail, and a plurality of independent racks each formed for the reception of keys of only one of said groups and also being formed to permit free endwise removal therefrom of keys stored on the rack.

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