

[72] Inventors **Grigory Avramovich Radutsky**
Tbilissky pereulok, 3, kv. 8;
Rafail Efimovich Kheifets, Brest-Litovsky
prospekt 162, kv. 30, both of Kiev, U.S.S.R.
 [21] Appl. No. **839,260**
 [22] Filed **July 7, 1969**
 [45] Patented **June 1, 1971**

[56]

References Cited

UNITED STATES PATENTS

1,816,331	7/1931	Kruschwitz.....	209/125
2,984,353	5/1961	Slifer et al.....	209/125

Primary Examiner—Allen N. Knowles
 Attorney—Waters, Roditi, Schwartz & Nissen

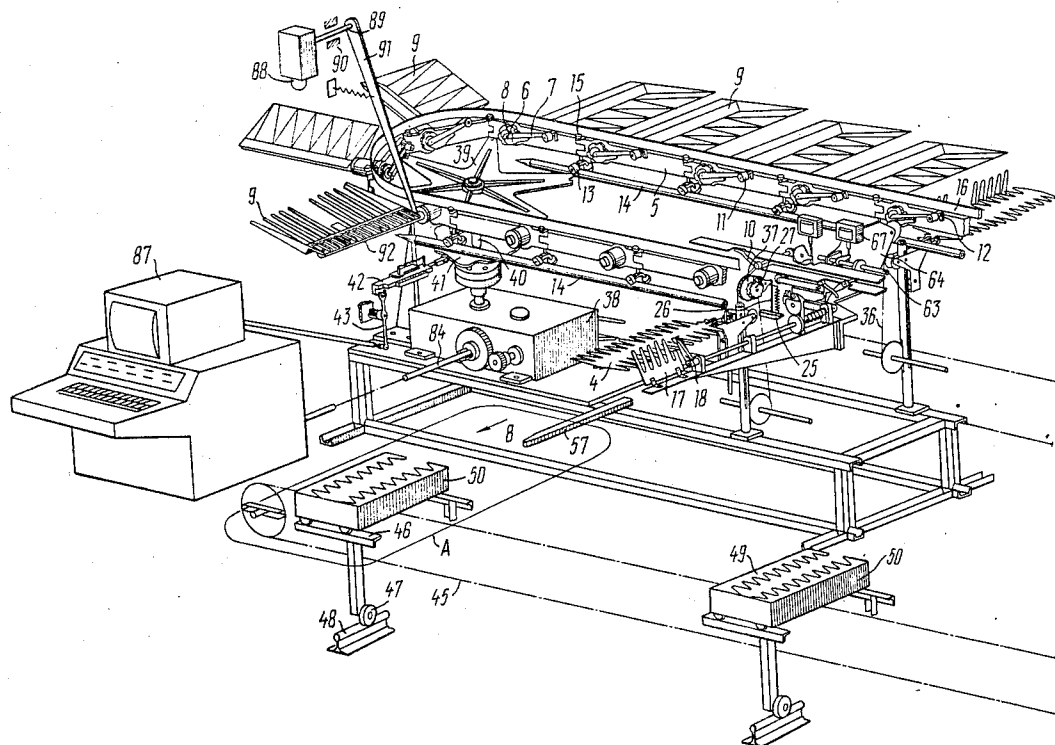
[54] **PLANTS FOR SORTING WASHING IN LAUNDRIES**
5 Claims, 10 Drawing Figs.

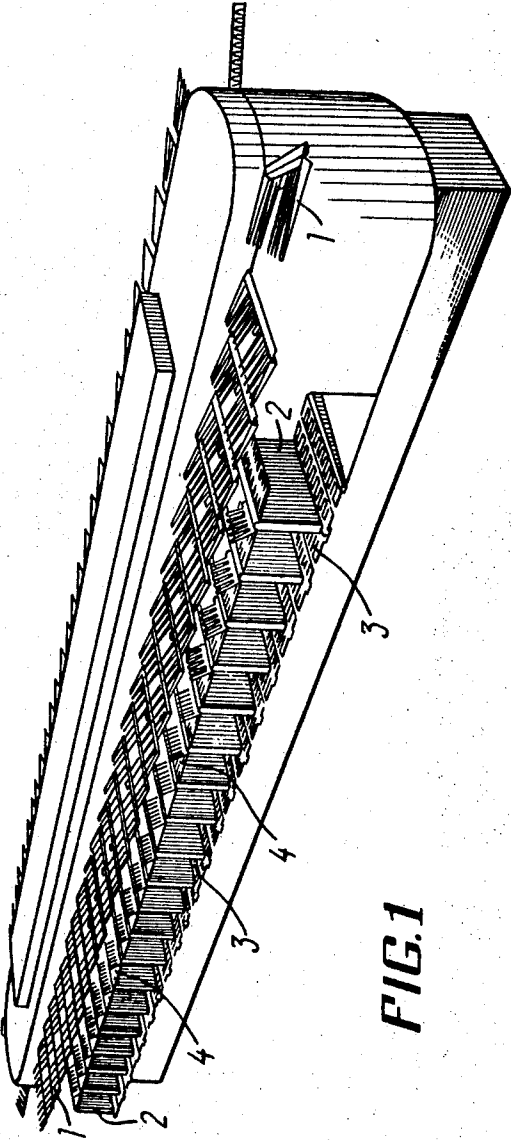
[52] U.S. Cl..... **209/73,**
209/125, 209/75

[51] Int. Cl..... **B07c 5/36**

[50] Field of Search..... **209/125,**
73, 74; 104/88; 214/11; 198/38

ABSTRACT: A plant for sorting washing in laundries, comprising a conveyor for sorting ironed washing and a bunker with compartments and movable shelves, in which the conveyor is made horizontal and closed and has one hauling chain fashioned as interhinged carriages equipped with comblike cantilever hangers mounted with a possibility of turning, the bunker having combs cooperating with the hangers, and washing level sensors.





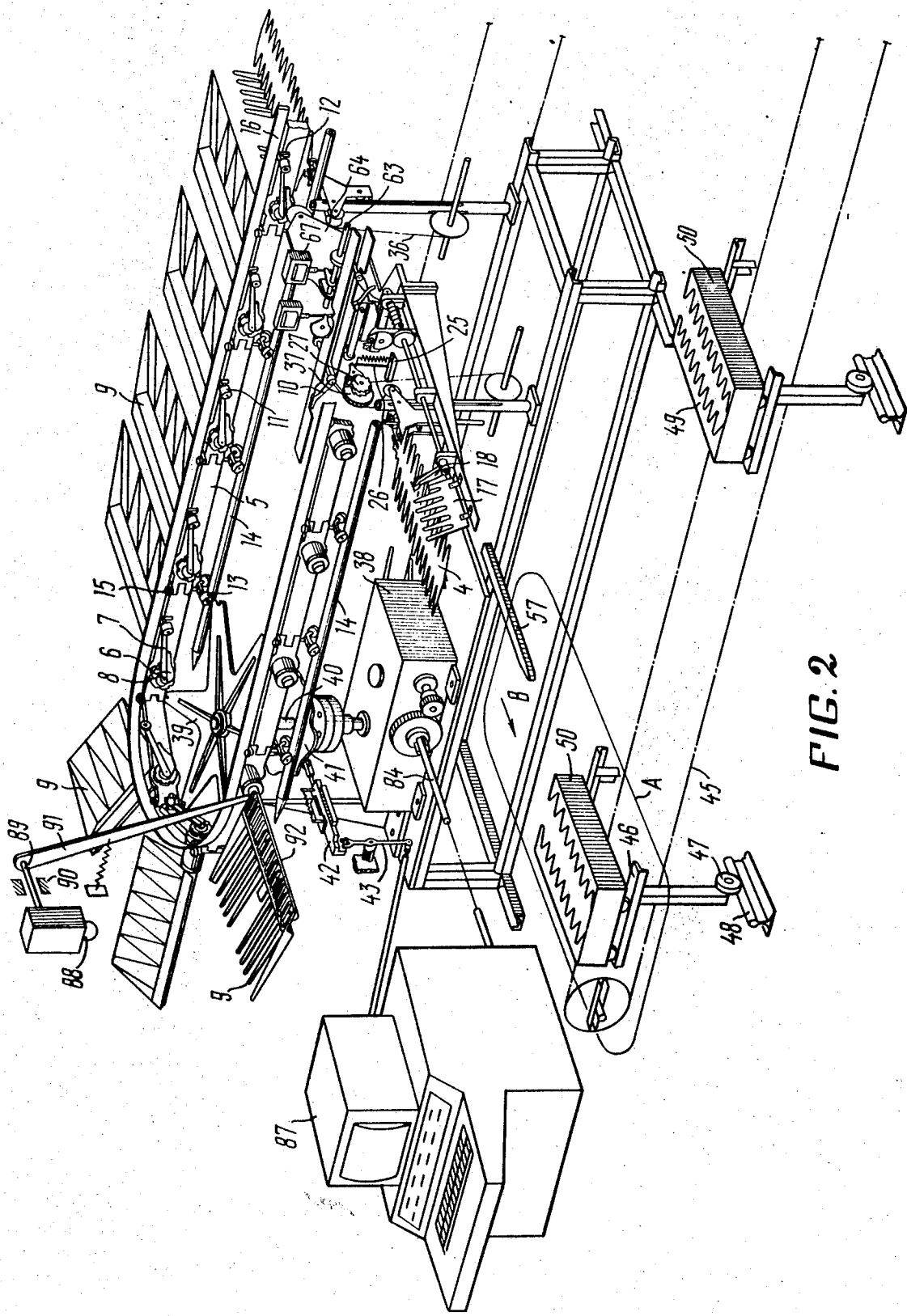
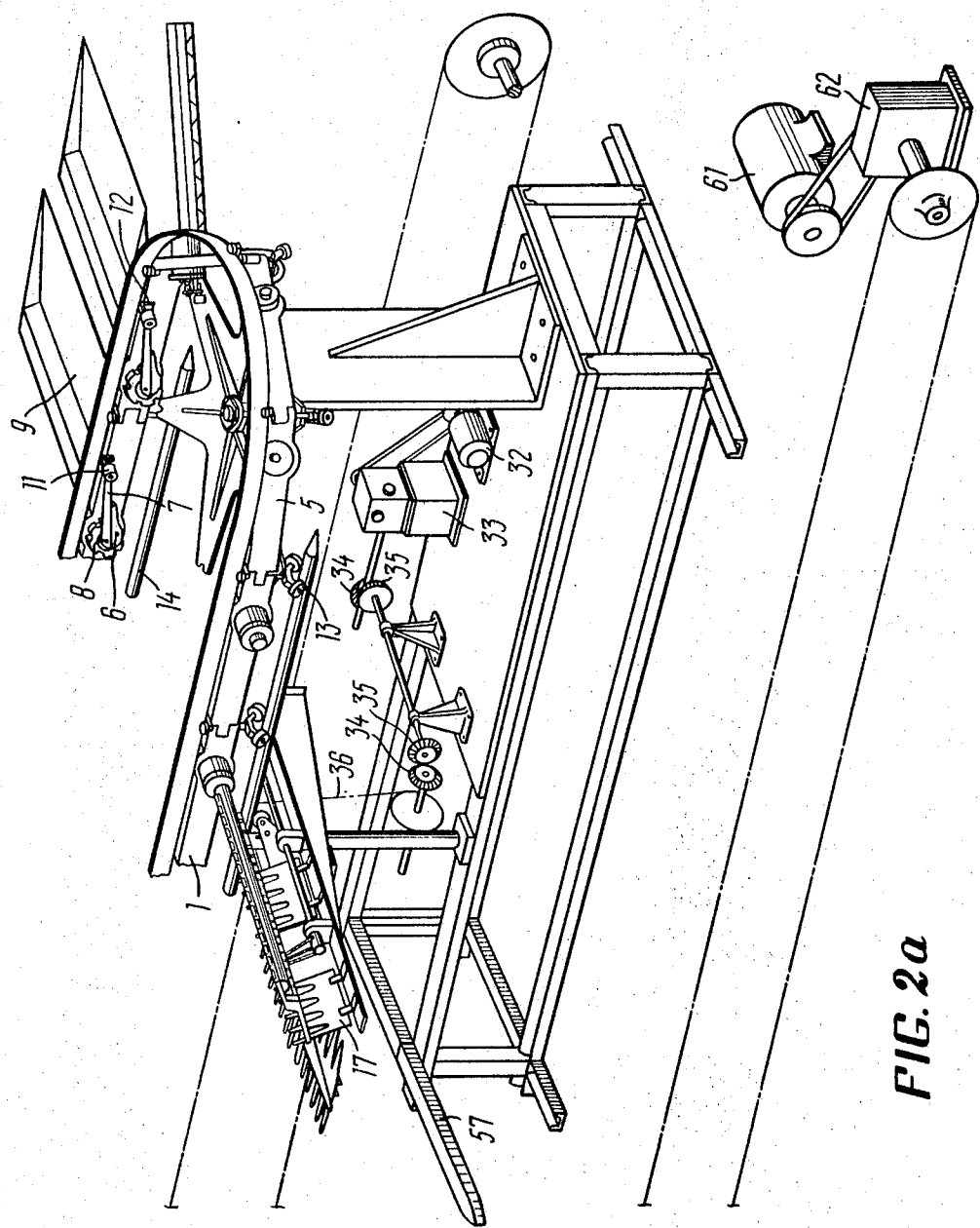
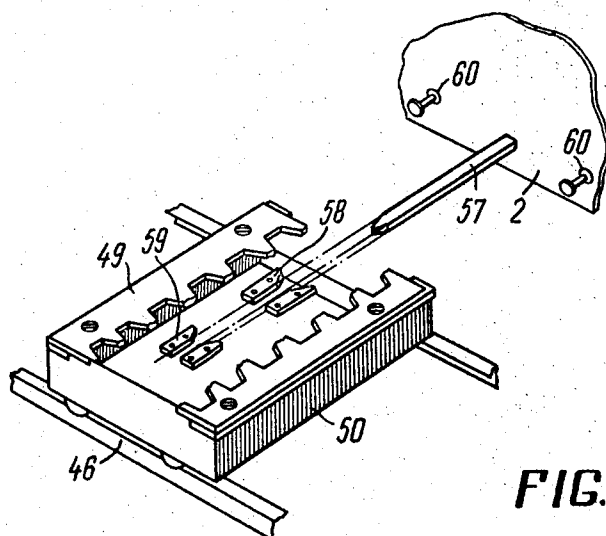
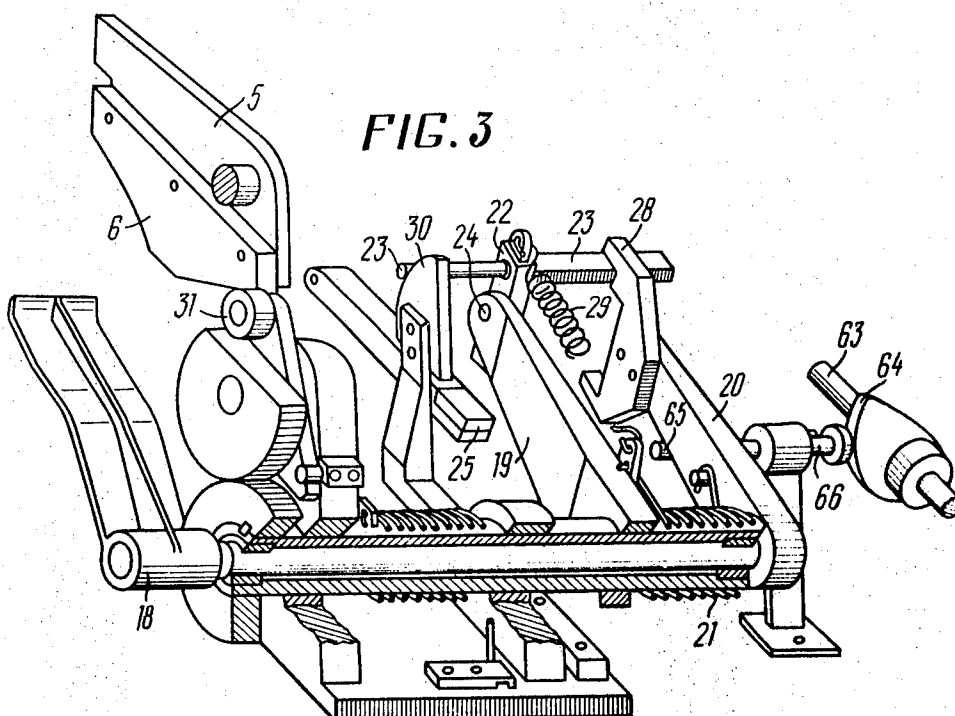


FIG. 2





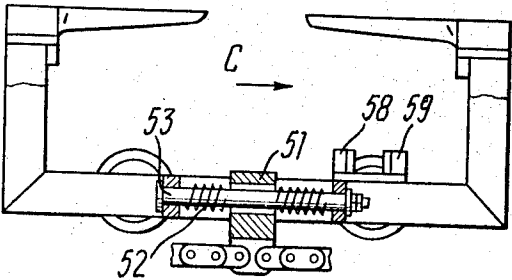


FIG. 5

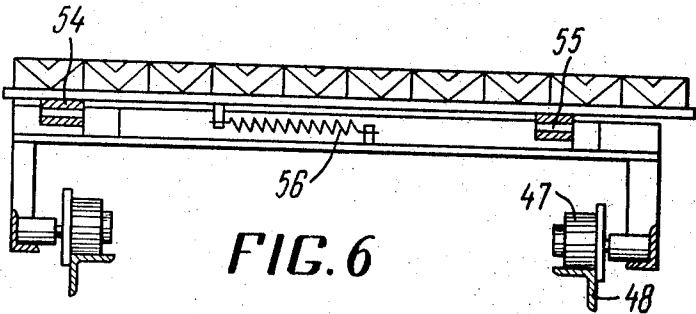
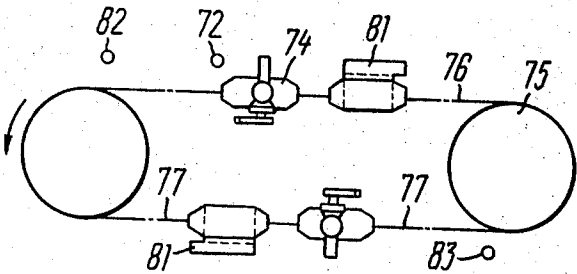


FIG. 6

FIG. 9



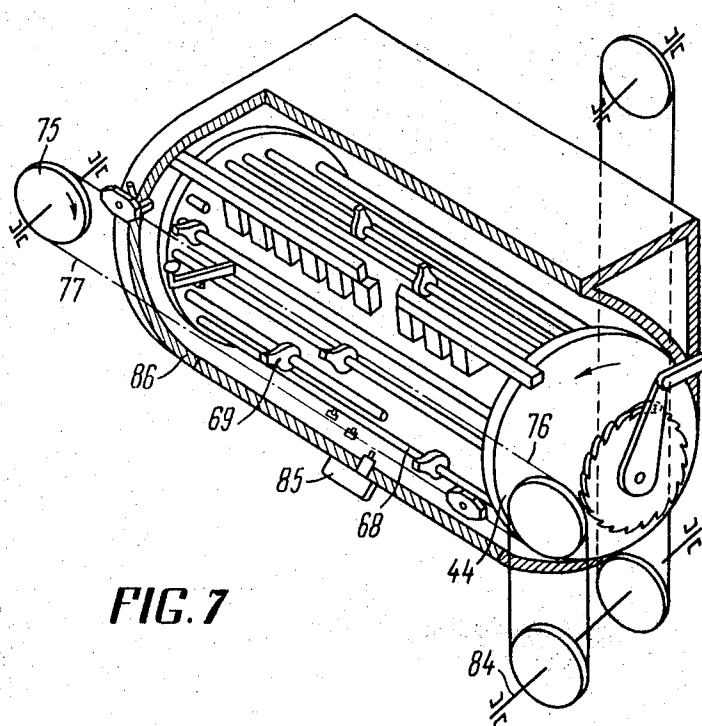


FIG. 7

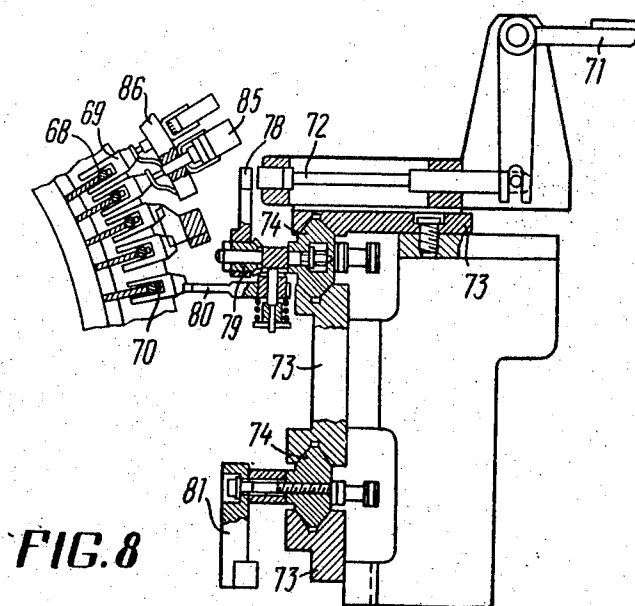


FIG. 8

PLANTS FOR SORTING WASHING IN LAUNDRIES

The present invention relates to laundry equipment and, more particularly, to plants for sorting washing.

The present invention can likewise be used for sorting flat piece articles, such as magazines, books, etc.

Known at present in the prior art are plants for sorting washing in laundries, which comprise a vertical closed conveyor with horizontal hangers, adapted for transporting ironed washing; a receiving bunker divided into compartments and having movable shelves; and a timer, the bunker being made two-level and the horizontal hangers being secured to the chains of the conveyor at two sides thereof. In these plants washing is taken off the hangers by impacts delivered by turnable combs secured on the bunker compartments.

The main disadvantage of the known plant lies in the fact that the provision of the vertical closed conveyor and the two-level bunker precludes the arrangement of this plant in a single automatic line with packing and storing machines. Besides, this plant is complex in design, inconvenient in operation and impairs the outer appearance of washing due to the deformation of the latter caused by impacts delivered by the turnable combs.

It is an object of the present invention to provide a plant for sorting washing, which would be simple in design and convenient in operation.

An important object of the present invention is to provide a plant for sorting washing, which would make it possible to build a single automatic line having packing and storing machines.

In the accomplishment of said and other objects of the invention in a plant for sorting washing, comprising a conveyor for transporting ironed washing, a receiving bunker with compartments and movable shelves and a timer, in accordance with the invention, the conveyor is made horizontal and closed and has a hauling chain fashioned as interhinged carriages carrying cams and equipped with comblike cantilever hangers capable of turning when the addressee-selecting arrows are actuated by a signal from the timer; provision is made for an element tracking marks made on the washing and connected with the cantilever hangers of the carriages; the bunker compartments are equipped with stops; the conveyor with the carriages is disposed along all the compartments and is capable of moving to a position under the bunker movable shelves for unloading the latter, the conveyor carriages being provided with combs aligned by a stop with the movable shelves the conveyor is thereunder, and the bunker being fashioned as a row of series-arranged compartments and being equipped with stationary combs cooperating with the comblike hangers in the course of the turn thereof, as well as with sensors of the level of washing supplying a signal for lowering the bunker movable shelves.

It is expedient to make the sensor of the level of washing as a feeler operatively connected to the cam of the carriage, and to supply the signal for lowering the movable shelves through the intermediary of a system of levers, one of the levers interacting with a cam plate and the other with the pawl of the ratchet gear lowering the movable shelf.

To unload the movable shelves during the alignment thereof with the combs of the carriages, the plant should be provided with a mechanism ensuring simultaneous lowering of the movable shelves.

It is expedient to make this mechanism as a cam shaft controlled by an electromagnet, the cams of the shaft cooperating with pushers which are pulled out into the zone of turning of a lever connected to the feeler of the sensor of the level of washing.

This design solution makes it possible to provide a plant which is simple in design, convenient in operation and can be easily assembled into a single automatic line having packing and storing machines.

The following description of an exemplary embodiment of the present invention is given with reference to the accompanying drawings, in which:

FIG. 1 shows a general view of the plant, according to the invention;

FIG. 2—ditto, without the shell;

FIG. 2a shows an end of the conveyor mechanism;

FIG. 3 is a level sensor and mechanism for lowering the shelves, according to the invention;

FIG. 4 shows point A in FIG. 2;

FIG. 5 is a view taken along arrow B of FIG. 2;

FIG. 6 is a view taken along arrow C of FIG. 5;

FIGS. 7, 8, 9 show the timer used in the proposed plant.

The plant for sorting washing comprises conveyor 1 (FIG. 1) for transporting ironed washing, receiving bunker 2 with compartments 3 and movable shelves 4, and a timer.

The conveyor is made horizontal and closed and has one hauling chain made as interhinged carriages 5 (FIG. 2), each carriage carrying cam 6 secured on lever 7 which is mounted on axle 8. Also mounted on the latter axle are comblike cantilever hangers 9 capable of turning when addressee arrow 10 is actuated by a signal from the timer. Secured on the lever 7 is roller 11 cooperating with the arrow 10. The position of the lever 7 is determined by a spring (not shown in the drawing), its turn being limited by stop 12. The carriage 5 is moved by rollers 13 along a guideway which is essentially tube 14, whereas rollers 15 envelop vertical guideway 16 made as a strip and provide for the vertical position of the chain.

The compartments 3 of the bunker 2 are successively disposed in a row along the conveyor 1 and are equipped with stationary combs 17 interacting with the hangers 9 during the turn thereof. The movable shelves 4 are made as combs and each of the compartments 3 has sensor 18 of the level of washing generating a signal for lowering the shelf 4. The sensor 18 (FIG. 3) is made as a feeler operatively connected to the cam 6 of the carriage 5, the signal for lowering the shelves 4 being supplied from the feeler through the intermediary of a system of levers 19, 20 interconnected by spring 21. The lever 19 is connected to pawl 22 provided with pin 23. The pawl 22 is mounted on axle 24, which is rigidly secured on lever 19 and connected through the intermediary of stop 25 and rod 26 (FIG. 2) with ratchet gear 27 lowering the shelf 4 of the bunker. The lever 20 (FIG. 3) is rigidly connected to the feeler 18 and carries cam plate 28, the pin 23 being pressed thereagainst by spring 29.

The level sensor returning after its actuation, the pawl 22 is brought back to its initial position by the cylindrical portion of the pin 23 and cam 30.

The lever 19 is rigidly connected to roller 31 cooperating with the cam 6.

To bring the shelves 4 back to their initial position prior to sorting a new batch of washing, the plant is equipped with electric motor 32 (FIG. 2), reducing gear 33, a system of bevel gears 34, 35 and chain drive 36 whose star wheel 37 is made as a one-turn coupling and is set on a shaft together with the ratchet wheel of the ratchet gear 27.

The carriages 5 are moved along all the compartments by an electric motor (not shown in the drawing) operating through reducing gear 38 and star wheel 39 set on shaft 40 which has cam plate 41 secured thereon and discretely turning drum 44 (FIG. 7) of the timer through levers 42 and 43.

The plant is provided with conveyor 45 having carriage 46 moved by rolls 47 along guideways 48 to a position under the movable shelves 4. The carriages 46 have combs 49, 50 which are aligned with the combs of the movable shelves 4 when the conveyor 45 is under the latter. The carriages 46 are capable of displacing along the axis of the conveyor 45, for which purpose they are secured to the chain of the conveyor 45 by means of link 51 (FIG. 5) and spring 52 secured on shaft 53 passing through the link 51.

Due to the employment of guideways 54 (FIG. 6), pins 55 and spring 56, the carriages 49, 50 are capable of displacing transversely relative to the direction of movement of the conveyor 45. The combs 49 should be aligned with combs of the shelves 4, which is accomplished with the aid of stops 57 (FIG. 4) secured on the compartments 3 of the bunker 2, two pairs

of catchers 58, 59 series arranged on the carriages 46, and adjusting screws 60 also secured on the bunker 2. The conveyor 45 is driven by electric motor 61 (FIG. 2) through reducing gear 62.

When reloading the washing onto the conveyor 45, there is actuated the mechanism for simultaneous lowering of the shelves 4, which mechanism consists of cam shaft 63, whose cams 64 interact with pushers 65 (FIG. 3) pressed by springs 66 and extendable into the zone of turn of the lever 20. The cam shaft 64 is turned by electric magnets 67 (FIG. 2) actuated by a signal from the timer.

The whole plant is controlled by a timer which comprises a memory system, an address point adjuster and readout elements. The memory system is essentially drum 44 (FIG. 7), i.e., a squirrel wheel with generatrices 68, mounting sliders 69 fixed by springs 70 (FIG. 8). The address point adjuster comprises: keys 71 with rods 72, guideways 73 and dogs 74 secured on conveyor 75 (FIG. 7) which performs its complete turn in the period of time during which the carriages 5 are displaced for two pitches. The conveyor 75 has two dogs 74 which are disposed in such a manner that one dog is positioned on driving strand 76 of the conveyor 75 and the other one on driven strand 77. The dog 74 sets the slider 69 (FIG. 8) in its operating position by means of lever 78 connected through the intermediary of bevel transmission 79 with lever 80, and by cam plate 81 bringing the rod 72 of the key 71 back to its initial position. Mounted at the end of the driving 76 and driven 77 strands are stationary stops 82 and 83, respectively. The stop 82 (FIG. 9) is used for disengaging the dog 74 and slider 69 in case an address is not preset, whereas the stop 83 serves for setting the slider 69 in the zero position. The conveyor 75 (FIG. 7) is driven by the reducing gear 38 through the intermediary of shaft 84. Readout elements 85 (FIG. 8) are secured on body 86 of the timer concentrically with respect to the generatrices of the drum 44 and are arranged in such a manner that each of them can be actuated at a time only by one slider 69 adjusted therefor.

Mounted on the body 86 of the timer is television set 87 (FIG. 2) whose transmitting camera 88 is secured on axle 89 mounted in bracket 90. Secured at the free end portion of the axle 89 is tracking element 91 cooperating with axle 92 of the cantilever hangers 9.

The plant functions as follows.

Every piece of washing provided with a special mark indicating the ordinal number of a client is laid on the hanger 9 of the conveyor 1. While passing the timer, the hanger 9 moves aside the tracking element 91 and, together therewith, the transmitting camera 88 of the television set 87, a result of which the operator sees the mark in the stationary position and, by pushing a respective key of the timer, directs the washing into an appropriate compartment 3 of the bunker 2. When so doing, the respective key 71 of the address point adjuster pushes forward the rod 72 and the latter enters the zone of movement of the dog 74 of the lever 78. The lever 80 displaces the slider 69 along the generatrix of the drum 44 and, when the lever 78 is thrust against the extended rod 72, it turns round its axis and, at the same time, turns by the bevel transmission 79 the lever 80, thus disengaging the latter from the slider 69. Thereupon, the cam 81, disposed behind the dog 74, returns the extended rod 72 and the key 71 in their initial positions. Hence, the address is preset. The hanger 9 approaching the predetermined compartment 3 of the bunker 2, the arrow 10 is actuated by the readout element 85 of the timer, and the lever 7 together with the roller 11 runs over the arrow to turn the hanger 9. The piece of the washing is set into motion, slides along the hanger, is acted upon by the stationary comb 17 and gets onto the movable shelf 4 of the predetermined compartment, the level of washing on the shelf being controlled by the feeler 18. As the washing is being stored, the feeler 18 is thrust against the upper piece of the washing, thus causing the mutual displacement of the levers 19 and 20. This displacement makes the pin 23 get off the projection of the cam plate 28, which results in the extension of the pawl 22.

The pawl 22 displaces the stop 25 which through the rod 26 causes actuation of the ratchet gear 27. The shelf 4 with the washing moves down under gravity for one pitch. As the washing is being stored in them, the movable shelves 4 of all the compartments of the bunker go down in a manner analogous to the aforescribed one. Since clients may have different amounts of washing, the movable shelves in the compartments are set at different levels. Then, a signal is given for starting the motor 61 which actuates the coupling longitudinally displacing the conveyor 45 with the carriages 46 until they (within the limit of one pitch) are prepositioned in front of the stops 57. Thereupon, the coupling effecting the conveyor longitudinal displacement is cut off, and the coupling displacing the conveyor 45 into the zone of removing the washing, disposed under the shelves 4, is switched on, whereby the carriage 46 is precisely positioned by the catchers 58, 59 cooperating with the stops 57, under the shelves 4, and the combs 49, 50, owing to their cooperation with the screws 60, are positioned precisely in the gaps between the combs of the shelves 4. Then, a signal is given for actuating the electric magnets 67 which, by turning the cams 64, introduce the pusher 65 into the zone of the lever 20. All the arrows 10 are actuated simultaneously with the electromagnet 67, whereas the introduction of the pusher 65 during the motion of the conveyor 1 into the zone of turning of the lever 20 results in simultaneous lowering of all the shelves 4 in the bunker compartments precisely in the same way as it takes place owing to the cooperation of the sensor 18 with the washing when the bunker is filled up. When passing between the combs 49, 50 of the carriage 46, the movable shelves 4 leave the washing thereon, whereupon the conveyor 45 is retracted from the recharging zone to transport the washing for further operations (packing, storing). With the conveyor retracted, the motor 32 is started to raise the shelves 4 through the kinematic pair 33—36 to their extreme upper position, the ratchet gear 27 being cut off by means of the star wheel coupling 37. The plant is ready to sort a new batch of washing.

Thus, the aforescribed plant effects automatic sorting of washing and makes it possible to build a single line having packing and storing machines.

What we claim is:

1. A plant for sorting washing in laundries, comprising a closed horizontal conveyor for transporting ironed washing, said conveyor having one hauling chain made as interhinged carriages; a timer; cams mounted on said carriages; comblike cantilever hangers disposed on said carriages, said hangers mounted capably of turning when addressee-selecting arrows disposed on the conveyor are actuated by a signal from said timer; a receiving bunker fashioned as a row of series-arranged compartments; movable shelves positioned in said bunker and intended for stacking washing thereon; stationary combs likewise positioned in said bunker, said combs interacting with said comblike hangers during the turn thereof; sensors of the level of washing disposed in the bunker and generating signals for lowering the movable shelves of the bunker.

2. A plant according to claim 1, in which the level sensor is made as a feeler kinematically connected to the carriage cam, and the signal for lowering the movable shelves is delivered through the intermediary of a system of levers, one of the levers interacting with a cam plate and the other with the pawl of a ratchet gear adapted for lowering the movable shelf.

3. A plant according to claim 1, in which provision is made for an element tracking a mark on the washing, said element being connected to the cantilever hangers of the carriages, the compartments of the bunker are equipped with stops, a conveyor with carriages is disposed along all the compartments of the bunker and is mounted in such a manner that it is capable of moving to a position under the bunker movable shelves to unload the latter, the conveyor carriages having combs which, with the conveyor positioned under the movable shelves, are aligned with the latter.

5

6

4. A plant according to claim 3, in which to unload the movable shelves in the course of the alignment thereof with the carriage combs, provision is made of a mechanism for simultaneous lowering of the movable shelves.

5. A plant according to claim 4, in which the mechanism for simultaneous lowering of the movable shelves is essentially a

cam shaft controlled by an electromagnet, the cams of the shaft interacting with pushers extendable into the zone of turning of a lever connected to the feeler of the sensor of the level of washing.

10

15

20

25

30

35

40

45

50

55

60

65

70

75