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The invention relates to a conveyor system according to the preamble of claim 1.

5 A conveyor system of the kind mentioned above is known from DE-A-33 13 951. In this known conveyor system, the conveyor truck comprises a control device to which an authentication code is supplied at a sending station of the control device. The control device then
10 compares the authentication code with the blocking code and only actuates the releasing mechanism when these two codes conform with each other. This is a relatively complicated and costly way of locking the cover of the container since a means for producing and
15 supplying an authentication code is required at the sending station. The conveyor truck, itself, also requires a relatively complicated control device for comparing the blocking code with the authentication code.

20 The invention has the object of providing a conveyor system of the kind mentioned above, which enables a locking of the cover by simpler and less complicated means.

This object is achieved by the characterising features of claim 1. In order to lock the cover it is simply necessary to close it without special means being required at the sending station. The sending stations simply need to provide release actuators which may be of
30 an extremely simple construction and supply a release current to the releasing mechanism via the existing conductor rails for the driving current. It must simply be ensured that the releasing current has a voltage below the voltage of the driving current which prevents the drive motor from starting, and a switching circuit
35 is also provided, having a delay element to prevent attraction of the electromagnet of the releasing mechanism when there is a brief drop in the voltage of the driving current. The system according to the invention is thus noted for its extreme simplicity, and
40 there is no need for either a setting means at a sending station for entering a blocking code or a setting means at a receiving station for entering an authentication code and, finally, no control device is required in the conveyor truck for comparing the blocking code with the
45 authentication code.

Advantageous embodiments of the conveyor system are described in the claims 2 to 5.

50 Claim 2 describes an advantageous switching circuit for controlling the releasing mechanism which is particularly simple and economical to produce. According to claim 3, the blocking means for the driving current of the drive motor may also be integrated into the switching circuit of the releasing mechanism.

55 In order to prevent a conveyor truck from responding at each point of the conveyor system which has a release actuator, it may be advantageous to

construct the system according to claim 4. A release actuator may then only be activated if the code on the conveyor truck matches the code specific to the station to which the code reading apparatus is set.

5 The locking mechanism is, preferably, constructed according to claim 5, so that the cover may also be closed in the absence of a release current.

10 The invention is hereinafter more fully explained by way of example with reference to embodiments thereof illustrated in the drawings. Shown are:

Figure 1 a cross-section through a conveyor truck positioned at a station;

Figure 2 the locking mechanism in a view rotated by 90°;

15 Figure 3 a circuit diagram of the drive motor and the releasing mechanism.

Figure 1 shows, in cross-section, a station of a rail-linked conveyor system. The conveyor truck 2 has a container 6 closable by means of cover 4, said container being removably or fixedly connected to a chassis 8. This chassis comprises guiding or driving rollers 10 running on a rail 12 which has, for example, side sections 14, engaging over the rollers so that the conveyor truck 2 is reliably held in the rails at each position, including the overhead position. Conductor rails 16, 18 are arranged on the rail 12, current collectors 20, 22 for supplying the drive motor 24 engaging on said conductor rails. Guide strips 26, 28, 30 oriented in the driving direction are arranged on the one side of the container 6, coding elements 32, 34, 36 in the form of permanent magnets being displaceably guided in said guide strips. By means of said coding elements, it is possible to set various codes on the conveyor truck which may help, in particular, to define the destination of the conveyor truck or serve other aims. These codes set on the conveyor truck are read by means of code reading apparatuses 38 which are arranged over the entire length of the conveyor truck and serve various tasks, e.g. to control switches, releasing mechanisms etc.

40 As can be seen in Figures 1 and 2, the cover 4 has a circumferential shoulder 40, by means of which it is seated on the upper rim 42 of the container. A guard plate 44 which engages over the container 6 adjoins, on the outside, the shoulder 40. On one side of the container, the cover 4 is pivotally connected, by a hinge 46, with the container 6. A self-locking mechanism 48 is arranged on the opposite side in order to keep the cover 4 in the closed position and to prevent it from being opened without authorization.

50 The locking mechanism 48 has a latch 50, which is pivotally mounted on a pin 54 connected to a wall 52 of the container 6. The latch 50 is formed as a toggle lever, one lever 56 having a catch 58 which engages over a pin 60 in the locked position, said pin being secured to the guard plate 44 of the cover 4 and protruding

inside the container, by means of a recess 62 in the wall 52 of the container 6. A tension spring 66 is connected to the second lever 64 of the latch 50, said tension spring biasing the latch into the locking position as shown in Figure 1. The catch 58 has an inclined abutment surface 68 on which the pin 60 of the cover 4 engages, when the cover is closed, and which pushes the latch 50 out of the locked position, counter to the force of the tension spring 66, the latch thus being self-locking. Stops 70, 72 serve to limit the pivotal path of the latch 50.

A releasing mechanism 74 engages, moreover, on the latch 50, said releasing mechanism having an electromagnet 76 whose core is pivotally connected, by means of a coupling rod 80, with the lever 64 of the latch 50. The electromagnet 76 is connected, via a circuit 82, with a switching circuit 84 which is connected to the conductor rails 16, 18 and primarily serves to activate the electromagnet 76 and, in this embodiment, additionally to switch off the driving current for the drive motor 24, when a releasing current is applied. A driving current, e.g. a direct current having a voltage of 24V, is supplied to the conductor rails 16, 18 by a current source not shown in detail. A stationary release actuator 86, which supplies a releasing current to the conductor rails 16, 18 via circuits 88, serves to control the releasing mechanism 74. This releasing current has a voltage which is below the voltage of the driving current and may, for example, be a voltage of 7 V d.c.

The switching circuit 84 for processing the driving current for the drive motor and the releasing current for the releasing mechanism in this embodiment, is diagrammatically illustrated in greater detail in Figure 3. A current collector 20 is connected, directly via line 90, with the drive motor 24. A switch 94₂, controlled by a relay 94, is positioned in the line 92 connecting the current collector 22 with the driving motor. In the rest position, the switch 94₂ is open or establishes the connection with a short-circuit 96 in order to hold the drive motor, preferably excited by a permanent magnet, in the braking position. The switching circuit 84 is connected, via a bridge rectifier 98, to the lines 90, 92. The switching circuit 84 also forms a blocking means for the circuit of the drive motor and comprises the relay 94 connected by a zener diode 100, the zener diode being non-conductive of currents having a voltage below the voltage of the driving current so that the relay 94 is only activated at a current having the voltage of the driving current and only then can the switch 94₂ be closed and the drive motor 24 activated. The relay 94 remains in a rest position at a current having a voltage below the voltage of the driving current, as is the case with the releasing current. Parallel to the zener diode 100 and relay 94, another circuit 102 is provided, in

which the electromagnet 76 is positioned and which is connected by a further switch 94, of the relay 94. The switch 94, is closed in the rest position of the relay 94 so that, when a releasing current is present, the
5 electromagnet 76 is attracted thus releasing the latch 50. Parallel to the electromagnet 76, there may be a further electromagnet 76, of a further releasing mechanism for a further latch, as this is indicated by broken lines in Figure 3. The switching circuit 84
10 comprises, moreover, in the circuit 102, a delay element 104 to prevent attraction of the electromagnet 76 when there is a brief drop in the voltage of the driving current.

Figure 3 shows, moreover, the circuit diagram of a
15 release actuator 86 which is substantially formed by a current source 106 having a releasing voltage of 7 V d.c. In the example shown, the release actuator 86 also comprises a code reading apparatus 38, which largely
20 comprises reed switches 108, 110, 112, connected in series. These reed switches are fixedly attuned to a code specific to the station. Each reed switch responds to a coding element 32, 34, 36 arranged on the conveyor truck. It is only when the coding elements 32, 34, 36
25 are set to the code specific to the station, that all three reed switches 108, 110, 112 are able to close and the releasing actuator 86 is able to supply a releasing current to the conductor rails 16, 18. Simple applications normally dispense with the code reading
30 apparatus 38, so that a permanent releasing current is applied to the conductor rails 16, 18. The release actuator 86 may, optionally, comprise a switch, not shown in detail, by means of which the release actuator 86 may be activated either manually, and/or by other
35 switching elements not shown, as required.

This locking mechanism may serve as the exclusive
and only locking mechanism of the cover or as a safety device additional to an existing closing mechanism of a conventional type or to a closing mechanism according to
40 DE-OS 34 11 43.

In contrast to the embodiment shown, the blocking
means for the circuit of the drive motor may not be part of the switching circuit of the releasing mechanism, but part of a switching circuit which monitors the exact
45 closure of the cover by means of a conventional closing mechanism, as described in CH-PS 528 388 and 607 976. The switch 94, illustrated in Figure 3 may then be actuated by a switching element of such a switching circuit.

List of Reference Numerals

	2	conveyor truck
5	4	cover
	6	container
	8	chassis
	10	roller
	12	rail
10	14	side section
	16	conductor rail
	18	conductor rail
	20	current collector
	22	current collector
15	24	drive motor
	26	guide strip
	28	guide strip
	30	guide strip
	32	coding elements
20	34	coding elements
	36	coding elements
	38	code reading apparatus
	40	shoulder
	42	container rim
25	44	guard plate
	46	hinge
	48	locking mechanism
	50	latch
	52	wall
30	54	pin on 52
	56	lever
	58	catch
	60	pin on 44
	62	recess
35	64	lever
	66	tension spring
	68	abutment surface
	70	stop
	72	stop
40	74	releasing mechanism
	76	electromagnet
	78	core
	80	coupling rod
	82	circuit
45	84	switching circuit
	86	release actuator
	88	circuit
	90	line of 20
	92	line of 22
50	94	relay
	94 ₁	switch
	94 ₂	switch
	96	short-circuit
	98	bridge rectifier
55	100	zener diode
	102	circuit

	104	delay element
	106	current source
	108	reed switch
	110	reed switch
5	112	reed switch



Claims

1. Conveyor system with rail-linked self-propelling conveyor trucks (2), each of which has a drive motor (24) supplied through conductor rails (16,18) and each of which is equipped with a container (6) closable by means of a cover (4), the cover (4) being lockable by means of a latch (50), biased into the locking position, of a locking mechanism (48) which comprises an electromagnetic releasing mechanism (74), a stationary release actuator (86) being mounted at each of a number of points on the conveyor system where release of the locking mechanism is intended, characterised in that the release actuator (86) is connectable to the releasing mechanism (74) in the conveyor truck by means of the conductor rails (16, 18) for the driving current, the voltage of a releasing current being less than the voltage of the driving current, and in the circuit (90,92) of the drive motor (24) a blocking means (100,94,94₂) is provided which prevents the drive motor (24) from starting when the current has a voltage below the voltage of the driving current, and a switching circuit (84) is also provided, having a delay element (104), to prevent attraction of the electromagnet (76) of the releasing mechanism (74) when there is a brief drop in the voltage of the driving current.
2. Conveyor system according to claim 1, characterised in that the switching circuit (84) of the releasing mechanism (74) has a bridge rectifier (98) connected to the conductor rails (16,18) and a relay (94) which is connected in series with a zener diode (100) to the bridge rectifier (98), the zener diode (100) being non-conductive of current having a voltage below the operational driving voltage, and the relay (94) having a switch (94₁) which in the rest position closes the circuit (102) of the releasing mechanism (74).
3. Conveyor system according to claims 1 and 2, characterised in that the switching circuit (84) of the releasing mechanism (74) contains the blocking means (100,94,94₂) for the drive motor (24), the relay (94) having a second switch (94₂) which in the rest position breaks the circuit (90,92) of the drive motor (24).
4. Conveyor system according to claim 1, characterised in that the release actuator (86) has a code reading apparatus (38) responding to a code specific to the station, preferably the destination code, on the conveyor truck (2), said apparatus activating the release actuator (86).
5. Conveyor system according to claim 1, characterised in that the locking mechanism (48) snaps in automatically when the cover (4) is closed.