

The invention relates to a method for collecting and/or preparing for the recycling of articles which are delivered to a collecting device, and an apparatus for carrying out this method.

5 US-A-4492295 discloses an arrangement of the generic type. After the return and examination for admissibility of a container (e.g. metal tin) a deposit is paid and the container is destroyed.

10 The invention lies in the field of the recycling of materials and therefore in a field of endeavours which are undertaken today to reduce the strain on the environment. The endeavours consist, among other things, in separating materials which can be recycled from waste produced, to recondition the
15 materials again and in this way to prepare them for reuse.

An area in which enormous quantities of used materials are produced are packagings of all kinds and, included herein, metal packagings in particular, for
20 example, tins, aerosol cans and tins of all kinds. If one were successful in extracting substantial parts of these metal packagings from the waste and in supplying them for recycling, then, in this way, not only would a considerable preservation of the metal reserves of the
25 world be achieved, but a substantial reduction of the refuse to be processed would also be achieved.

However, it is essential to succeed in recovering these materials with as few costs as possible and to a large extent. It is therefore
30 necessary to be able, first of all, to collect the metal waste materials.

This is where the invention comes in, the underlying object of which is to further develop a method of the type described at the beginning in such a
35 way that each individual person is motivated to do his part for the collection and return of the materials and articles mentioned. This object is achieved in accordance with the invention in that a slot machine is associated with the collecting device and in that
40 through the return of the articles the actuation of the slot machine is enabled, whereby a chance to win is afforded with the return and with the actuation of the slot machine.

From US-A-1798416 an automatic selling
45 machine is known which additionally offers the purchaser a chance to win to promote the sale of goods during a purchase.

Because, in the method in accordance with the invention, the play instinct present in most people is
50 placed in the service of the return of articles, a solution to the collection of a used material is achieved which is favourable in terms of cost. Advantageously, in this respect, each article is given to a return point associated with the slot machine

whereupon a possibility for operating the slot machine is produced. Advantageously, the returned article is examined as to its form and its state before the chance to operate the slot machine is afforded.

5 The invention also comprises an apparatus for carrying out the method, the object of which consists in being able to carry out the method in an optimal manner. This object is achieved according to the invention in that at least one examining device is
10 associated with the slot machine at a feed point, which device observes the input of an article and after the examination supplies a signal with which the actuation of an actuation lever or switch to afford a chance to win is activated.

15 The invention is described in the following with reference to the drawings which show four exemplary embodiments of the apparatus according to the invention.

20 Figure 1 shows a schematically represented front view of an apparatus with a slot machine and a return apparatus, coupled thereto, for articles, for example tins,
25 Figure 2 shows a side view of the apparatus according to Figure 1,
30 Figure 3 shows a schematically represented front view of a further apparatus with a slot machine and a return apparatus, coupled thereto, for articles,
35 Figure 4 shows a side view, partially in section, of a part IV of the return apparatus according to Figure 1 in enlarged representation,
40 Figure 5 shows the part according to Figure 4 from direction V in Figure 4, whereby the deformation apparatus is omitted for a better overview,
45 Figure 6 shows a cutout VI of a part of the return apparatus in Figure 3 in enlarged representation,
50 Figure 7 shows a section of the cutout according to Figure 6 along the line VII - VII in Figure 6,
55 Figure 8 shows a schematically represented front view of a third apparatus with a slot machine for collecting batteries in the form of a wall box and
60 Figure 9 shows a schematically represented front view of a fourth apparatus for collecting tins and batteries in the form of a standing box.

 The apparatus represented in Figures 1 and 2 is accommodated in a schematically represented housing 1 and substantially comprises a slot machine 2, a return apparatus 3 and a collecting container 12, which

can be portable. The slot machine 2 is an embodiment which is known in many models and is provided with an actuation lever 4 with which the slot machine 2 is started (known under the name of one-arm-bandit or slot machine). In place of the actuation lever 4, to avoid damage, an electrically driven actuation can also be used which is initiated by an operating switch.

The return apparatus 3 has an input point 5, to which a tubular line 6 connects. The line 6 does not need to be a closed line but can also be constructed like a basket so that possible waste juice, which can flow out of the articles to be processed, cannot cause the articles to stick together.

At the end of the line 6 a press 7 is provided in which the returned articles are compressed and are thereby reduced in volume. Above the press 7 are arranged control means 8 which are operated by way of a mechanical power transmission 9 by the actuation lever 4. The mechanical power transmission 9 essentially comprises a flexible drive 10, for example a gear-chain drive, and a drive shaft 11 for the control means 8.

A printer is marked as 15 which prints out the game result. This can be, for example, a voucher or a lotto ticket or similar. In the collecting container 12 a further collecting container 13 is installed, into which fall inadmissible articles which have been pushed out of an ejection window 14 in the line 6. A linkage between the slot machine 2 and the return apparatus 3 is schematically represented at 16, by means of which the return apparatus 3 is initiated.

The apparatus 1 according to Figure 3 differs substantially from that according to Figures 1 and 2 only in that lifting magnets are used as control means. Lifting magnet 17 controls the supply brake, lifting magnet 18 an end stop and lifting magnet 19 a stop and the closure to the ejection window 14. Moreover, the same reference numerals signify the same parts in Figures 1, 2 and 3.

The part IV of Figure 1, represented enlarged in Figures 4 and 5, shows the lower part of the basket-like line 6, at the end of which a compression chamber 20 is arranged, the compression plate 21 of which is actuated by a crank gear 22, 23. The crankshaft 25 carries a bevel pinion 24 which engages with a bevel gear 26. A coupling 28 is arranged on the shaft 27 of the bevel gear 26, which coupling couples the drive shaft 11 of the mechanical power transmission 9 to the bevel-gear shaft 27. At the lower end of the line 6 two control discs 29, 30 are rotatably mounted, see Figure 5 also. The control discs 29, 30 are driven by the crankshaft 25 by way of a flexible drive 31, comprising the flexible element 32, for example a toothed belt, and two belt pulleys 33, 34 as well as a

clamping wheel 35.

By means of the control discs 29, 30 two control levers 36, 37 rotatably mounted on the line 6 are controlled, the levers being held by springs 38, 39 in touch contact with the control discs 29, 30. A stand 40 is provided for mounting the control discs 29, 30 of the crank gear 22, 23 of the flexible drive 31 and the bevel gears 24, 26, the stand substantially comprising square pipes. The ejection window 14 is also provided over the compression chamber 20. The former substantially comprises two quarter-circle, basket-like, swinging doors 41, the two pivot shafts 42 of which are mounted in two bearing brackets 43, the latter being fastened to the line 6. The swinging doors 41 are held closed by spring tension but are opened if the weight of the article does not lie within certain limits.

The function of the control levers 36, 37 proceeds as follows.

The control lever 36 with its head 45 is a brake, by means of which one prevents more than one article from being able to enter into the area over the compression chamber 20. The second control lever 37 with two sensor plates 46, 47 is pivoted out to release the article into the position illustrated in a broken manner, so that the article can fall into the compression chamber 20. A few sizes of articles, for example tins 48, 49, 50 are drawn schematically in the compression chamber 20, whereby all of the articles can be compressed in the compression chamber 20 to a small volume.

Through the actuation of the actuation lever 4 on the slot machine 2 the cycle is set in motion. The tin released by the control lever 26 above the compression chamber 20 arrives in the region of the sensor plates 46, 47, is examined there as to its weight, falls after release into the compression chamber 20 by means of the second control lever 37. Of course, the actuation lever 4 of the slot machine cannot be actuated until an article, for example a tin, is correctly fed into the return apparatus 3 and a block is thereby released.

Part VI in Figure 3 can be seen in Figure 6 on an enlarged scale. The three electrically actuated lifting magnets 17, 18, 19 control the process of the input of an article into the compression chamber as follows.

The lifting magnet 17 with the head 45 advances, i.e. an article is clamped and in this way the supply is prevented. After this, the lifting magnet 19 pulls back the higher-placed stop 46, so that an article lying under the clamped article becomes free. The closure of the ejection window 14 is in this respect closed. The article can be examined as to its

weight. If the weight of the article lies within the allowed limits, by means of the lifting magnet 18 the end stop 47 is pulled back so that the article can now slide into the compression chamber 20. In this
5 respect, the compression plate 21 has reached the outer dead centre, so that the compression chamber 20 is fully open. Subsequently, the compression process begins by means of the oppositely directed movement of the compression plate 21 against the floor of the
10 compression chamber 20. After the compression process has ended, the three lifting magnets are displaced in reversed sequence again into the resting state.

The movement of the lifting magnets 17, 18, 19 corresponds with the movement of the two control
15 levers 36, 37 in the construction according to Figures 1 and 2. In this respect, the lower lever 37 carries both stops 46, 47. However, they are of a different size, with the result that first of all the higher-placed stop 46, see Figure 7, is released and only then
20 is the lower-placed stop 47 released.

The construction of the ejection window 14 is constructed in Figures 6 and 7 the same as in Figures 4 and 5. The basket-like swinging doors 41 pivot about the pivot shaft 42, the doors being mounted in the
25 bearing bracket 43.

The apparatus represented in Figure 8 serves to return and collect batteries of various sizes. The apparatus has a housing 1 which is constructed as a wall box, containing all the elements of the apparatus.

30 The return apparatus 3 comprises several openings 52 of differing sizes, corresponding with the format of the various batteries. The slot machine 2, as in the embodiments according to Figures 1 and 3, has a number of play rollers 53 and the actuation lever 4
35 as well as an output opening 54 through which a possible win or a winning print-out is delivered.

A battery-testing device 55 is arranged underneath the input openings 52 for the batteries. This apparatus tests the batteries as to whether
40 perhaps they can still be used or whether they have run out. If the battery can still be used a light signal 56 lights up, whereupon the battery is delivered into a removal container 57 from which it can be taken out again. However, if the battery has run out it is
45 branched off to a collecting container 58 in which the run-out batteries are collected.

In a simpler construction, only a single input opening 52 for the batteries need be provided. The battery-testing device 55 can also perhaps be
50 dispensed with. In this case, the light signal 56 and the removal container 57 are omitted. All the batteries are then collected in the collecting container 58.

The operation of the apparatus according to

Figure 8 takes place in the same manner as with the apparatus according to Figures 1 and 3. After the input of the article to be collected into the input opening 52 of the return apparatus 3 the examination of the same takes place with regard to its form and state. With a positive examination result the actuation lever 4 is activated, i.e. it is released for the actuation of the slot machine 2. The return of the article is for this purpose coupled with a possible chance to win in the slot machine 2. Here also, an actuation switch can be used in place of the actuation lever 4.

In Figure 9 a further apparatus is represented schematically, with which both batteries and tins can be collected. Here the apparatus is constructed as a standing box, portable on rollers 59, although the apparatus could of course also be constructed as a wall box. Like all apparatus already described, the apparatus comprises a return apparatus 3 and a slot machine 2 which are accommodated in the housing 1.

The return apparatus 3 has openings 52 of differing sizes for the return of different batteries. An opening 60 provides for the return of tins. Underneath the return opening 60 is provided an ejection opening 61, by means of which entered articles which do not correspond with the conditions of the apparatus with regard to form and state are extracted.

In the apparatus according to Figure 9 no press is provided, with which the entered tins can be made to have a smaller volume, but the installation of such a press is likewise possible.

The operation of the apparatus according to Figure 9 takes place in the same manner as with the apparatus according to Figure 8. The article to be collected is fed into the relevant opening 52 or 60, whereupon, by means of a testing device, the form and state of the article are examined. If the testing device establishes the correctness of the relevant article, the actuation lever 4 is activated. In this way the slot machine and perhaps also the press can be actuated.



Claims

1. Method for the collection and/or the preparation for recycling of articles which are delivered to a collecting device, characterized in that a slot machine is associated with the collecting device and in that through the return of the articles the actuation of the slot machine is enabled, whereby with the return and with the actuation of the slot machine a chance to win is afforded.
2. Method according to claim 1, characterized in that each article is fed in at a return point associated with the slot machine, whereupon a chance to operate the slot machine is given.
3. Method according to claim 1 or 2, characterized in that the article is tested as to its form and/or state before the operating chance is given.
4. Method according to one of claims 1 to 3, characterized in that through the operation of the slot machine the article is converted into a form capable of recycling, whereby this conversion is initiated through the operation of the slot machine.
5. Method according to claim 4, characterized in that through the operation of the slot machine the article is subjected to a volume reduction, for example through compression.
6. Apparatus for carrying out the method according to one of claims 1 to 5, having a feed point (5, 52, 60) with which there is associated at least one testing device (8, 17-19, 55) which observes the input of an article (48, 49, 50) and, after examining the same, supplies a signal, characterized in that the apparatus contains a slot machine (2) having an actuation lever or switch (4), the control of which is released upon the signal from the testing device (8, 17-19, 55) to afford a chance to win.
7. Apparatus according to claim 6, characterized in that the actuation lever (4) of the slot machine (2) is coupled by way of a mechanical power transmission (9) to a deformation apparatus (7) for the deformation of an article, whereby control means (21, 30, 36, 37; 17, 18, 19) are provided which admit each article into the deformation apparatus (7) for volume reduction.
8. Apparatus according to claim 7, characterized in that the deformation apparatus is a press (7), in which there is associated with the compression chamber (29) a dispensing arrangement which is controlled by control discs (29, 30) which are driven by way of the mechanical power transmission (9).
9. Apparatus according to claim 8, characterized in that a dispensing arrangement equipped with electrically actuated adjusting means (17, 18, 19) is associated with the deformation apparatus (7).



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10. Apparatus according to claim 8 or 9, characterized in that the dispensing arrangement has an upper brake block (45) which clamps the second-lowest article in each case, while the lowest article is
- 5 controlled by two sensors (46, 47) according to its size and weight, and upon establishment of the admissible values is released into the compression chamber.