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Kuchler

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[54] **DISCHARGE DEVICE FOR SLICING MACHINE**

[75] Inventor: **Fritz Kuchler,** Klagenfurt, Austria

[73] Assignee: **Brain Dust Patents Establishment,** Vaduz, Liechtenstein

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[52] **U.S. Cl.** **83/69,** 83/80, 83/88, 83/91, 83/94, 83/155.1, 83/161, 83/167, 83/400, 83/707

[51] **Int. Cl.** **B26d 4/46**

[58] **Field of Search** 83/88, 91, 94, 96, 155.1, 83/161, 167, 400, 707, 69, 80

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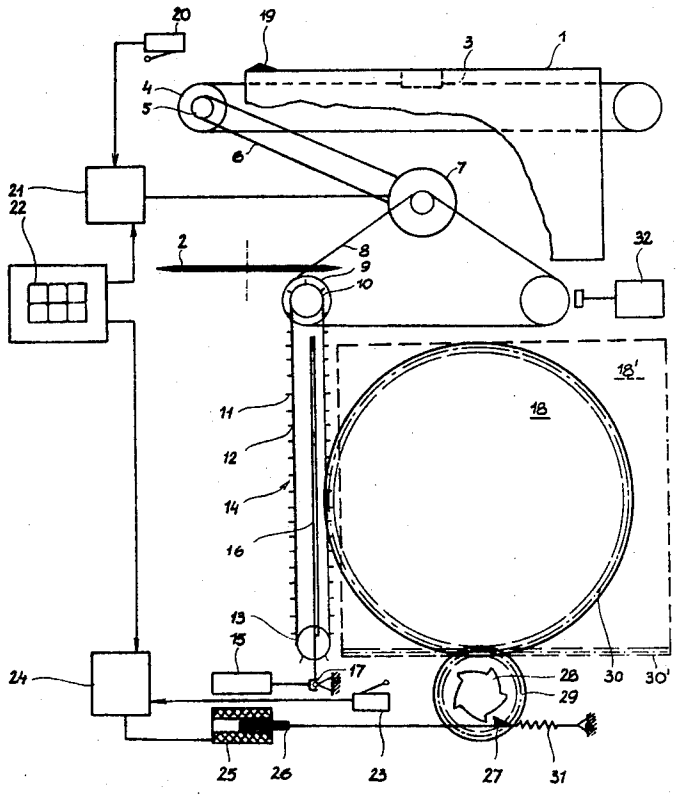
Primary Examiner—Frank T. Yost

Attorney, Agent, or Firm—Ernest G. Montague; Karl F. Ross; Herbert Dubno

[57] **ABSTRACT**

A discharge device for a slicing machine which comprises a feeding arrangement to receive a loaf of sausage or a like. A driven blade and a conveyor arrangement for the sliced goods are provided which are driven by the feeding arrangement, e.g., in the form of chain ties provided with spikes. A discharger, as well as a discharge platform, which may be moved gradually are arranged such that the conveyor arrangement, which is driven by a gear unit or a toothed belt drive, respectively, is coupled to an electromagnetic clutch, which is driven by an electric pulse control in dependence upon the position of the feeding arrangement, if necessary via another toothed belt drive or motor respectively, preferably an impulse-controlled stepping motor. The latter can be turned off after a predetermined number of revolutions. The discharge platform may be moved gradually in one direction by an electromagnetic drive with provisions for an electronic control, which drives the electromagnetic drive in dependence upon the movement of the discharge arm. Further a central switchboard is provided, where every button position corresponds to a control interval of electric pulse control for the clutch or the motor respectively and to a number of step impulses of the electronic control for the electromagnetic drive of the discharge platform.

18 Claims, 2 Drawing Figures



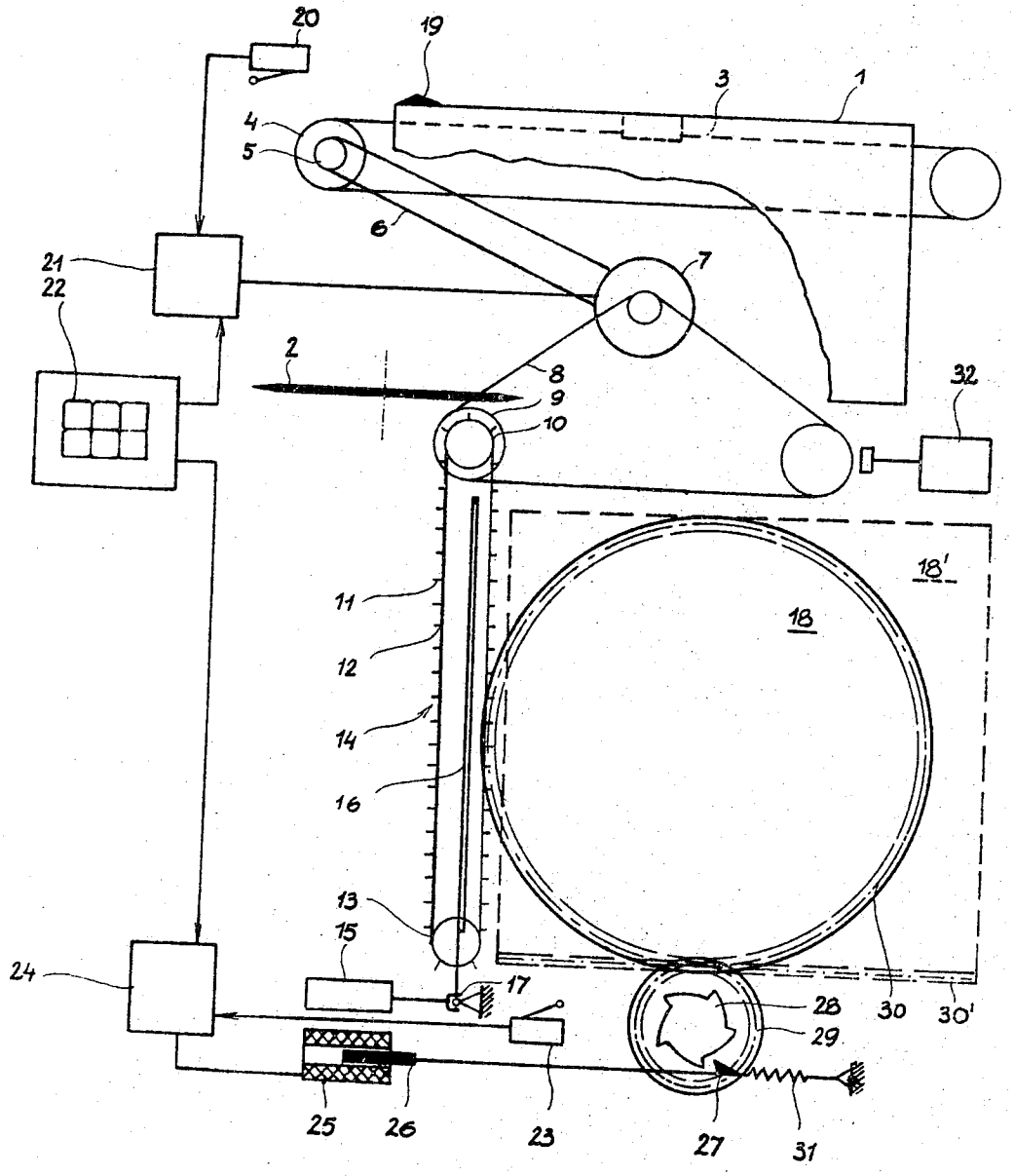

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Fig. 1

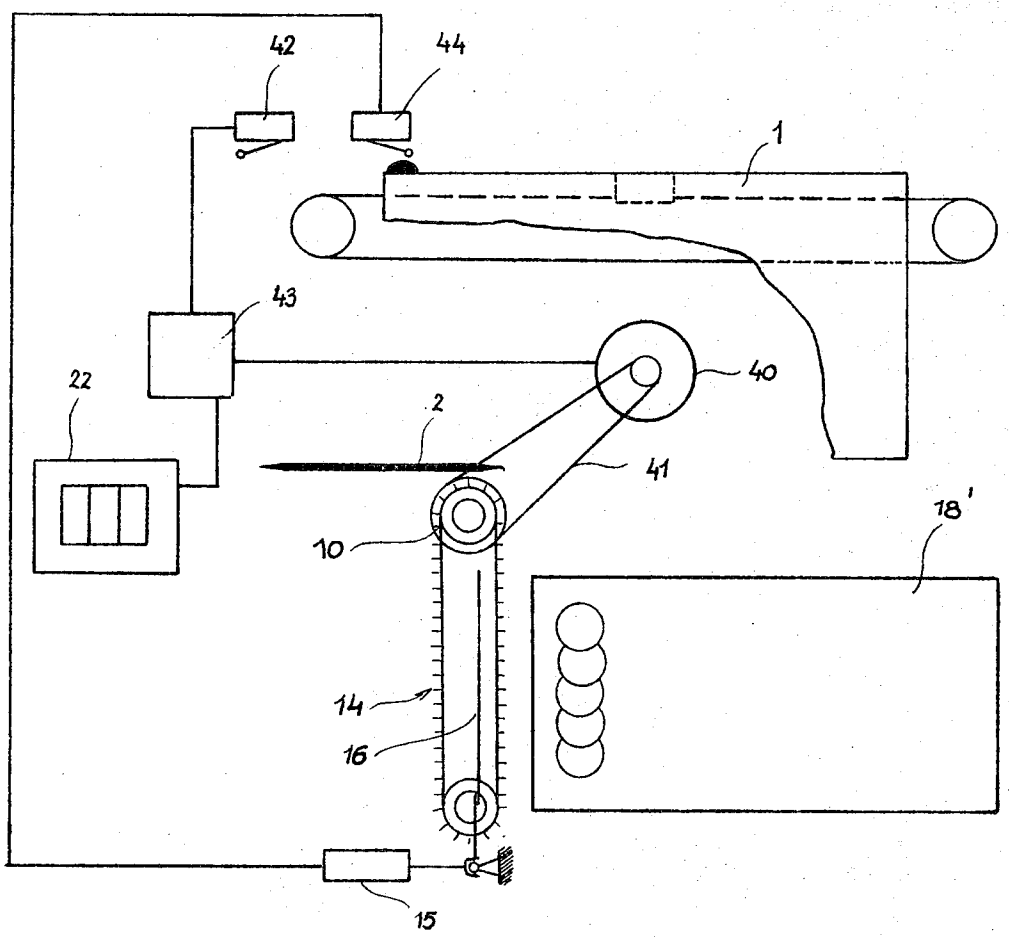

Fig. 2

DISCHARGE DEVICE FOR SLICING MACHINE

This invention relates to a discharge device for slicing machines consisting of a feeding arrangement to receive the loaf of sausage or alike, a driven blade, a conveyor arrangement for the sliced good, which is driven by the feeding arrangement, e.g., in the form of parallel overlying chain ties provided with spikes, and a discharger, as well as a discharge platform, which can be moved stepwise.

A slicing machine is known in the art, which is provided with an automatic discharge and very well suited for operation on the counter of a grocery store. Here the substance to be cut is put on the feeding arrangement, which performs cutting movements against a rotating knife blade. By means of a gear unit and free wheels and by using toothed belts, the movement of the feeding arrangement is conveyed to the conveyor arrangement, which consists of chain ties, extending horizontally and provided with spikes, and of a conveying cylinder. Every cut slice is now taken up by this arrangement and moved above the center of the discharge platform. When in this position, the discharge arm or beater, which is located between the chain ties, will flap forwards in the direction of the discharge platform, so removing the cut substance from the conveyor arrangement and depositing it on the discharge platform, on which there is suitably a stack of sandwich paper. In addition to adjusting the thickness of the slice, it is also possible to switch on the advance of the discharge platform. This results not in the usual stack of cut substance but in a shingled or fanned arrangement.

It is the aim of the present invention to provide a discharge device for a slicing machine which permits an even greater variety in depositing the cut substance, which, however, is simple in construction, small in its dimensions and easy to operate. In the discharge device mentioned above, this result is obtained by coupling the conveyor arrangement, which is driven by a gear unit or a toothed belt drive, to an electromagnetic clutch which is driven by an electric pulse control in dependence upon the position of the feeding arrangement, if necessary via another toothed belt drive or motor respectively, preferably an impulse-controlled stepping motor, which can be turned off after a predetermined number of revolutions, and by arranging for a discharge platform, which can be moved gradually in one direction by means of an electromagnetic drive with provisions for an electronic control, which drives the electromagnetic drive in dependence upon the movement of the discharge arm, as well as by further providing for a central switchboard, where every button position corresponds to a control interval of the electric impulse control for the clutch or the motor respectively, and to a number of step impulses of the electronic control for the electromagnetic drive of the discharge platform.

The impulse control with pre-selective impulse length operates the clutch or the motor respectively for a corresponding length of time. On account of this, the conveyor arrangement traverses paths of of different length, so that the cut substance is deposited in several places parallel to the conveying direction, which provides for a shingled distribution in one direction. If an electromagnetic drive can move the discharge platform at pre-determined advance intervals, this will result in a shingled arrangement in two directions.

According to one embodiment of the invention, the discharge platform has a tooth construction, which engages a pinion of the electromagnetic advancing drive. The solenoid receives impulses and its iron core advances the pinion and therefore also the discharge platform according to the number of impulses. According to another embodiment of the invention the discharge platform is of rectangular shape and can be moved in parallel guides towards and away from the conveyor arrangement. Furthermore, it is advantageous to embody the discharge platform in the shape of a disc support its center rotatably and to provide it with a toothed rim, which engages the pinion. Whereas the cut substance is arranged in shingles in two directions in the first embodiment, the latter embodiment provides a fanned and direct deposit on a round plate. In each case it is desirable to be able to replace the rectangular discharge platform by the disc-shaped discharge platform. This result may be obtained very easily, since both platforms are driven by the same pinion and the advance may be of the same length.

For the practical embodiment of the invention it is suitable to arrange for an adjustable electric impulse control to drive the clutch, e.g., a bistable multivibrator control. For practical purposes it is also of advantage to use magnetic controls for the construction of the electric circuit, which are located on a plate at distances from each other, and to provide a pivotal arm above the magnetic controls, which has a permanent magnet and is driven in dependence upon the advance of the feeding arrangement.

This device is simple in construction and its operation is without problems. By shifting the magnetic controls, the changes in the intervals may be effected most easily. In one embodiment of the invention, a toggle control can be provided for the electronic control, switches on the electromagnetic drive. In this connection the control intervals can be determined in each case by the loading and unloading of the condensors.

For the exact determination of the position of the cut substance prior to discharge on the discharge platform, it was found to be of advantage to provide an electric brake at the drive of the conveyor arrangement, which will become engaged electrically upon disengagement of the clutch. So it is impossible for the cut substance to travel beyond the desired point of discharge.

It is also suitable to provide preferably an electronic counting device, which counts the revolutions of the motor, in order to turn off the motor.

In the drawings embodiments of the object of the present invention are shown by way of example, of which FIG. 1 is a schematic representation of a slicing machine using an electromagnetic clutch having exchangeable discharge platforms, and FIG. 2 a slicing machine, whose conveyor arrangement is driven by means of an electric motor.

Feeding arrangement **1** can be moved to and fro in one direction in guides and can be operated manually or automatically in order to feed the substance to be cut to rotating blade **2.** Toothed belt **3** is connected to feeding arrangement **1,** which follows the forward and backward movement of the feed. Another roll **5** is connected to one of the two guide rolls **4** by means of a free-running driving collar. On account of this arrange-

ment, belt **6** running over roll **5** is driven intermittently in one direction. This rotary movement is led to belt **8** by means of electromagnetic clutch **7,** and from there by means of toothed belt wheel **9** to the conveying cylinder and chain wheels **10,** which are located above each other at even distances and provided with chain ties **12** having spikes **11.** The conveyor arrangement can also be embodied as a comb, which may be turned around one axis. Chain ties **12** pass over driven chain wheels **10** and over rolls **13.** As long as the electromagnetic clutch is engaged, the slice cut off by rotating blade **2** is taken up by spikes **11** and conveyed to the far end, near rolls **13,** by a cycle of movement of feeding arrangement **1** and chain ties **12,** which are driven by it. According to FIG. **2** the electromagnetic clutch driving the chain ties may be replaced by an electric motor. As soon as chain ties **12** come to a standstill, a micro control (not shown in the drawings) sends a control signal to drive **15** of discharger **16,** which is pivoted like a beater on arm **17** around an axis below the cut substance in the direction of disc-shaped discharge platform **18** or rectangular discharge platform **18'**, respectively.

Distributor **16** is embodied like a comb and located behind chain ties **12** so that the cut substance is held in a vertical position in front of distributor **16** by spikes **11** of chain ties **12.** At this movement, the distributor or beater takes the cut substance off the spikes and transports it to the platform, on which there is suitably a sheet of sandwich paper or a plate, respectively.

However, if magnetic clutch **7** is disengaged earlier, the cut substance is not moved all the way to the end of the chain ties. The cut substance is deposited a little earlier, e.g., in the middle of platform **18** or **18'**, respectively.

So it is possible to deposit the cut substance in a shingled manner or parallel to chain ties **12** by pre-selecting the point of disengagement of clutch **7** accordingly, without moving discharge platform **18** or **18'**, respectively. In case of a disc-shaped discharge platform it is suitable to deposit the cut substance along a diameter. First of all, the clutch is driven automatically by means of lug **19** on feeding arrangement **1** and micro control **20.** Secondly, a certain staggering in impulse intervals at impulse control **21** is pre-set by determining the pattern of depositing the cut substance (e.g., shingled closely or at greater distances or fanned) and by pushing the corresponding button on button selector **22.** With every backward movement of feeding arrangement **1** a delaying interval of the time staggering is called for by releasing micro control **20,** which will then disengage clutch **7** accordingly. Whenever there is only little difference in the time intervals from the releasing moment of micro control **20,** the cut substance is stacked or shingled closely in a line parallel to chain ties **12.** In case of longer time intervals the cut substance is shingled more loosely.

Still another mechanic-electric embodiment of the object of the present invention than the above arrangement, has been found successful. Here, a wedge is located on toothed belt **3** moving backward and forward, which inclines by means of an attached roll a lever with stationary rotating point in dependence upon the advance movement. This lever arm describes a circular arc in this manner and is provided with a permanent magnet at its end, which operates the magnetic control located below the pivoting range of the lever. By presetting a distribution pattern for the cut substance on the button selector, magnetic controls delayed at certain time intervals are energized so that only these magnetic controls pass on electric control signals to the magnetic clutch at time intervals, whenever the permanent magnet on the lever arm passes over them. The staggered points of disengagement for the clutch result in a shingled or fanned distribution pattern of the cut substance.

However, since it is suitable to shingle the cut substance not only in one direction but in two dimensions (x, y or λ, ϕ, respectively), so making use of the entire surface of the discharge platform, a control is provided, which makes it possible to advance the plate gradually. A micro control **23** is provided in the pivoting range of arm **17,** which transmits a starting signal to electronic arrangement **24.** The desired number of advances for ratchet wheel **28** is fed by pre-setting button selector **22** accordingly. Then, electronic arrangement **24** conveys a number of impulses, which is equal to the number of advances. This energizes magnet **25** temporarily and attracts iron core **26.** This movement against the action of spring **31** is conveyed to ratchet wheel **28** by means of ratchet **27,** which is connected securely to pinion **29.** Pinion **29** engages toothed rim **30** or toothed rack **30'**, respectively. The step-wise movement of ratchet wheel **28** and thus of pinion **29** caused by solenoid **25,** leads also to a rotation (ϕ) or shift (y), respectively, of the discharge platform.

When, e.g., two electric impulses are given by the electronic arrangement **24** after setting the button selector the, magnet **25** will attract twice, the ratchet will move ratchet wheel **28** by two positions, and the platform **18** with toothed rack **30** will be moved by two intervals on account of the rotation of pinion **29.** This would result in a loose shingling of the cut substance in the vertical direction to the conveyor arrangement **12.** Of course, a gear unit may be provided instead of the simple pinion **29,** which engages toothed rack **30,** so that the length of advance per impulse has a desired extent.

The following construction has been found desirable in place of the embodiment shown in FIG. **1** for reasons of clearness:
the solenoid rotates the axis of the free-running gear wheel by means of one-armed lever, which so can be driven intermittently in one direction. This gear wheel engages either directly or via another gear wheel toothed rack **30** of discharge platform **18** and moves the latter in accordance with the number of impulses.

Furthermore, brake **32** is provided, which determines exactly the advance of conveyor arrangement **12.** As soon as clutch **7** is disengaged, the brake interrupts, and this determines exactly the point, where the cut substance is taken off spikes **11** of conveyor arrangement **12.**

The discharge device can be programmed for various patterns. When inserting the disc-shaped discharge plate, the cut substance may, e.g., first be distributed in a full diameter ($2r$) each and then there may be a twist (ϕ). However, it is also possible to deposit the cut substance in concentric circles.

Analogous to the drive of conveyor arrangement **14** by means of magnetic clutch **7,** as it is shown in FIG. **1,** the drive of the conveyor arrangement according to FIG. **2,** is provided by means of an electric motor **40** an

a toothed belt drive **41,** which engages the pinion of the motor with chain wheel **10.**

The motor is put into operation by control **42,** which is actuated by the feeding arrangement, when it reaches the front end position after cutting off a slice from the substance. After a pre-set number of revolutions the motor is turned off by an electronic counting device **43,** which is set to this number of revolutions, so that the chain wheels stop at a pre-set point and the slice can be deposited on discharge platform **18'** in the desired place by beater **16.**

The impulses corresponding to the pre-set number of revolutions of the motor are fed to the counting device by means of impulse generator **22,** which is set by means of buttons. The counting device, which reads the revolutions of the motor, opens control **42,** which turns off the motor, as soon as the revolutions of the motor correspond to the fed impulses.

Drive **15** of beater **16** is actuated by control **44,** which is operated by feeding arrangement **1** when moving away from blade **2** after cutting off a slice. Drive **15** operates an arm, which can be pivoted around a horizontal axis and is provided with a comb-like beater **16,** which reaches between the chain ties with its teeth in order to take off the slice from the spikes.

Whenever the motor is turned off after the same number of revolutions, the slices cut off subsequently will be put on top of each other in the form of a stack. However, it is also possible to arrange the slices on the discharge platform like shingles in one row, but turning off the motor, e.g., after eight, six, four and two revolutions. In order to be able to deposit further rows of such shingled slices, the discharge platform is moved gradually in the direction of the chain ties. This shift of the discharge platform can be effected analogous to FIG. **1.**

I claim:

1. A discharge device for a slicing machine, comprising

a movable feeding arrangement to receive goods to be sliced,

a driven cutter blade,

a conveyor means for receiving sliced good and operatively driven by said feeding arrangement,

a discharge platform,

a discharger means for releasing said sliced goods from said conveyor means onto said discharge platform

drive means for selectively releasably couplingly driving said conveyor means in dependency upon the position of said feeding arrangement,

pulse control means for actuating said drive means in dependency on the position of said feeding arrangement and programmable for continuing the actuation of said drive means only for a preselected control interval,

means for gradually moving in one direction said discharge platform

electronic control means for driving said gradual moving means a predetermined amount by a predetermined number of step impulses and in dependency upon the movement of said discharge means,

a central programmable switchboard having a plurality of buttons the position of which correspond to said preselected control interval for said pulse control means for said drive means and to said number of step impulses for said electronic control means for the electromagnetic drive of the discharge platform.

2. The discharge device, according to claim **1,** wherein

said discharge platform has a plurality of teeth,

a pinion contituting said means for gradually moving said platform and engaging said plurality of teeth.

3. The discharge device, as set forth in claim **2,** wherein

said discharge platform is of rectangular shape,

parallel guide means for said discharge platform in which the latter is movable towards and away from said conveyor.

4. The discharge device, as set forth in claim **2,** wherein

said discharge platform is of a disc-like shape having support means for movement of said platform about its center and is provided with a toothed rim which engages said pinion.

5. The discharge device, as set forth in claim **1,** wherein

said discharge platform is removably mounted on said device for exchange by another shaped platform.

6. The discharge device, as claimed in claim **1,** wherein

said pulse control is adjustable.

7. The discharge device, as set forth in claim **6,** wherein said pulse control is a bistable multivibrator control.

8. The discharge device, as set forth in claim **1,** further

a plate,

a plurality of magnetic controls disposed on said plate at distances from each other,

an arm having a permanent magnet pivoted above said magnetic controls in dependency upon the movement of said feeding arrangement.

9. The discharge device, as set forth in claim **1,** wherein

said electronic control means is a toggle control.

10. The discharge device, as set forth in claim **1,** further comprising

an electromagnetic brake means operatively connected to said drive means of the conveyor arrangement for operatively braking said conveyor means electrically upon release of said drive means from couplingly driving said conveyor means.

11. The discharge device, as set forth in claim **1,** wherein

said drive means for said conveyor means includes an electromagnetic clutch.

12. The discharge device, as set forth in claim **11,** wherein

said drive means further includes a toothed belt drive connected to said conveyor means and coupled to said electromagnetic clutch.

13. The discharge device, as set forth in claim **11,** wherein

said drive means further includes a gear means drive connected to said conveyor means and coupled to said electromagnetic clutch.

14. The discharge device, as set forth in claim **11,** wherein

said pulse control means is electrically connected to said electromagnetic clutch.

15. The discharge device, as set forth in claim **1,** wherein

said drive means for said conveyor means includes a motor.

16. The discharge device, as set forth in claim **15,**

said pulse control means is an electronic counting device means for turning off said motor and which counts the revolutions of said motor.

17. The discharge device, as set forth in claim **1,** wherein

said motor is an impulse controlled stepping motor which is switched off after a predetermined number of revolutions.

18. The discharge device, as set forth in claim **1,** wherein

said electronic control means includes an electromagnetic drive having an electronic driving control thereof.

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