Sept. 9, 1969 HIDEO TATIBANA 3,465,497

APPARATUS FOR FILLING A CASE WITH A NUMBER OF AMPULES

Filed Feb. 6, 1968 4 Sheets-Sheet 1

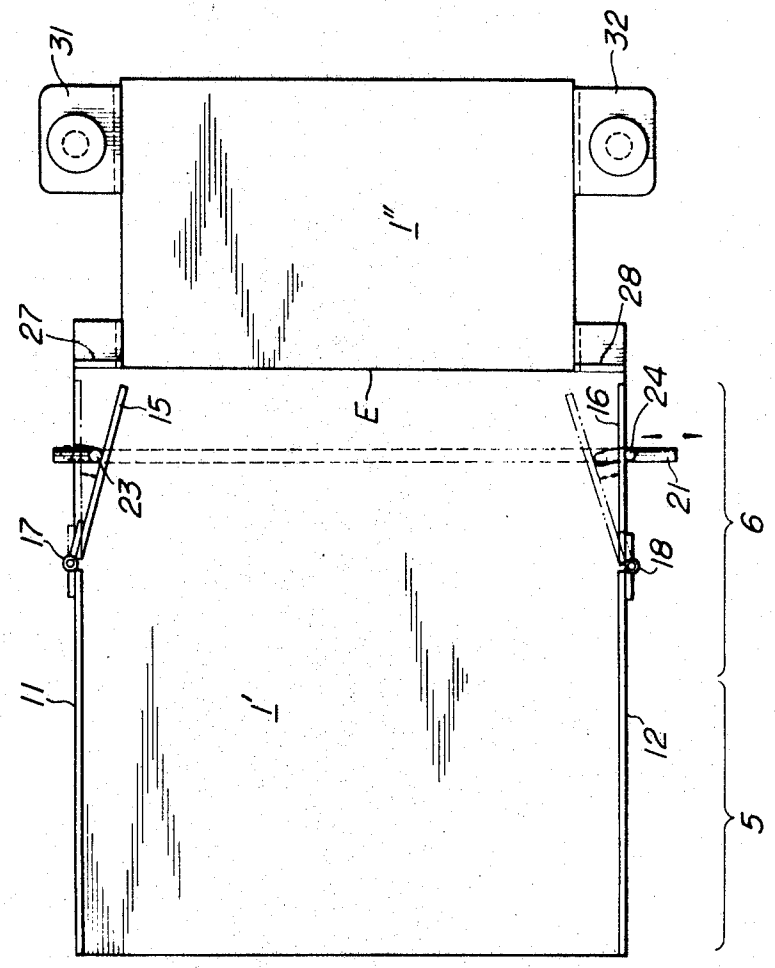

FIG. 1

INVENTOR

Hideo Tatibana

BY Lawrence W. Flocks

ATTORNEY

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FIG. 2

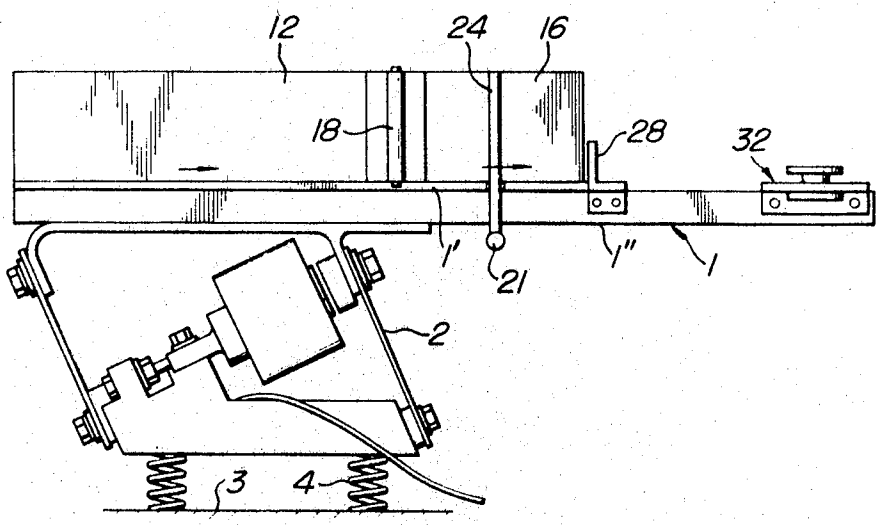


FIG. 5

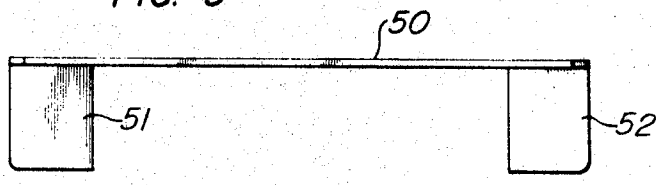
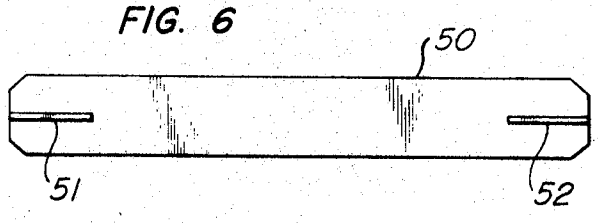


FIG. 6



INVENTOR

Hideo Tatibana

BY Kam W. Flocks

ATTORNEY

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APPARATUS FOR FILLING A CASE WITH A NUMBER OF AMPULES

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FIG. 3

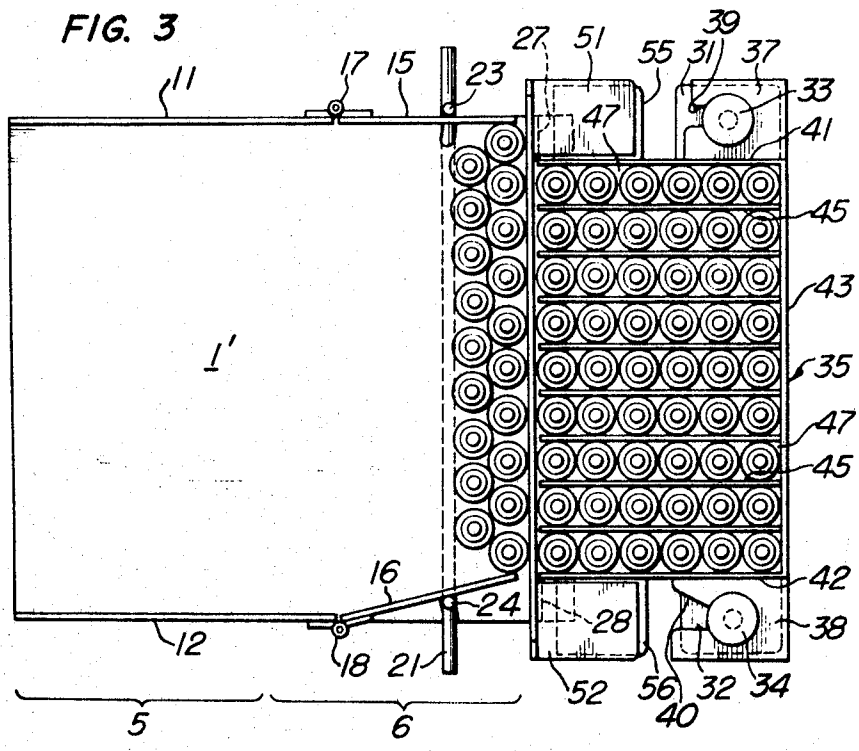
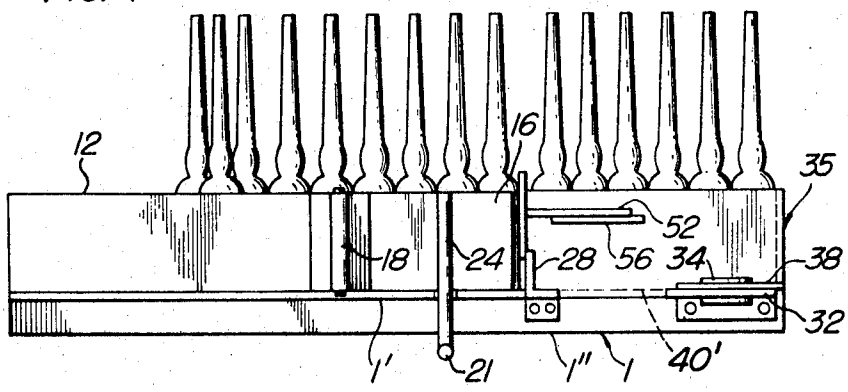


FIG. 4



INVENTOR

Hideo Tatibana

BY Karl W. Flocks

ATTORNEY

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APPARATUS FOR FILLING A CASE WITH A NUMBER OF AMPULES

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FIG. 7

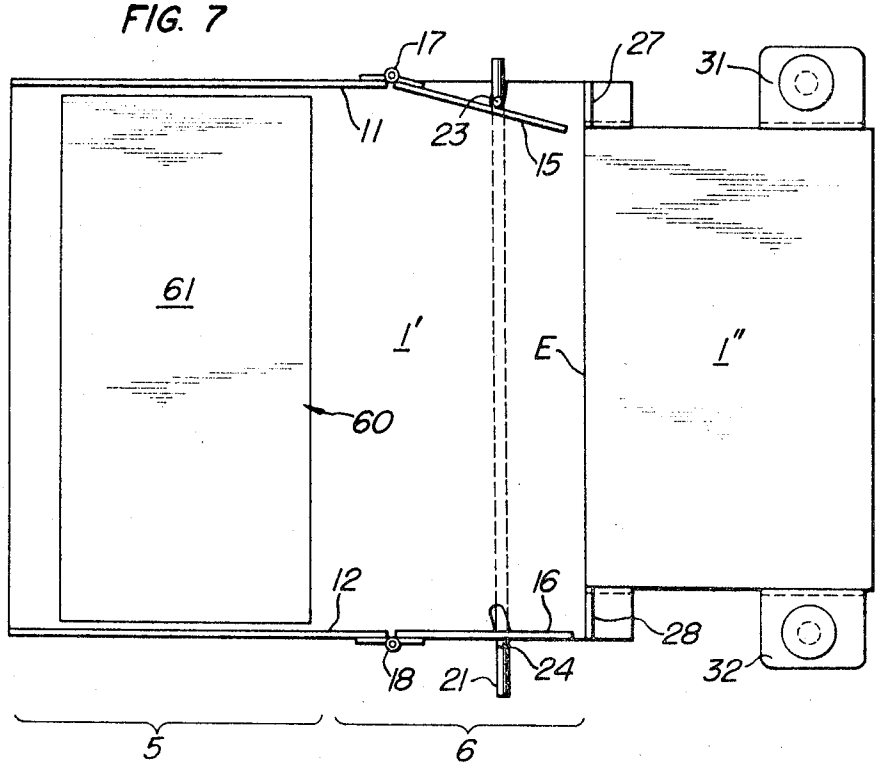
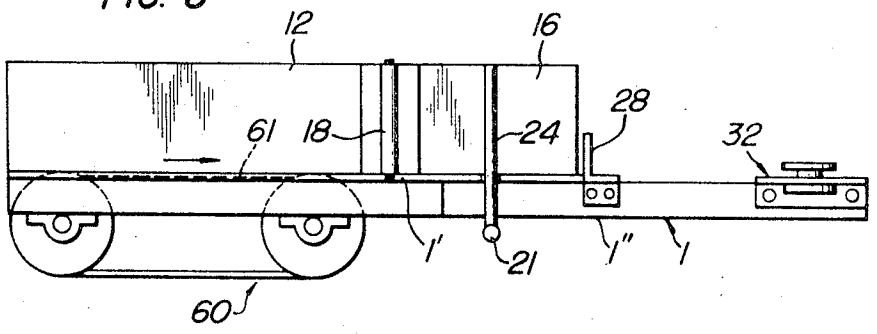


FIG. 8



INVENTOR

Hideo Tatibana

BY Kane W. Flocks

ATTORNEY

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3,465,497

APPARATUS FOR FILLING A CASE WITH A NUMBER OF AMPULES

Hideo Tatibana, 3–5 Nakano, 6-chome, Nakano-ku, Tokyo, Japan

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Claims priority, application Japan, Mar. 18, 1967, 42/16,964
Int. Cl. B65b 35/34
U.S. Cl. 53—246 1 Claim

ABSTRACT OF THE DISCLOSURE

The present apparatus is adapted to send automatically and smoothly a number of ampules which were fed and set upright at random places on an ampule supplying table, into an ampule receiving case which is located adjacent to the downstream end of said table. The table is provided with a pair of pivotally oscillatable wings adjacent the downstream end thereof in order that the ampules may enter automatically and smoothly into a plurality of channels formed within said case, without stagnating at the entrance thereof.

The ampules may be advanced on said ampule supplying table by means of an electromagnetic vibration means or a belt conveyor, said vibration means being secured to the bottom surface of said table, said belt conveyor being positioned within a hole which is made by cutting out square the portion of said table so that it may have its upper surface substantially flush with the upper surface of said table to form a portion of the ampule supplying table.

The present invention relates to an apparatus for filling a case with a number of ampules, and particularly to an apparatus adapted to send automatically and smoothly a number of ampules into an ampule receiving case having channels to accommodate the ampules in rows.

It is an object of the invention to send automatically and smoothly a number of ampules, which were successively supplied and set upright at random places on an ampule supplying table, into an ampule receiving case which is to be located adjacent to the downstream end of said table.

Another object of the invention is, by providing a pair of pivotally oscillatable wings adjacent the downstream end of said table, that the ampules may be sent automatically and smoothly into a plurality of channels formed within said ampule receiving case without stagnating at the entrance thereof.

According to the present invention, there is provided an apparatus for filling a case with a number of ampules, comprising a table plate and means for advancing the ampules, which are successively set upright at random places on said table plate, to the downstream direction thereof, so that the ampules may be sent into a plurality of channels which are defined by a plurality of partition walls mounted parallel to the flow direction of said advancing ampules within an ampule receiving case, said case being adapted to be located adjacent to the downstream end of said table plate, characterized by a pair of wings pivotably mounted on the downstream ends of a pair of side walls formed along the opposite edges of said table plate, and means for pivotally oscillating said wings simultaneously in the same directions.

The present invention will be made more apparent from the following description made in reference to the accompanying drawings which show some preferred embodiments thereof, and in which:

FIGS. 1 and 2 are a plan view and a side view, respectively, of an embodiment of the present apparatus,

FIGS. 3 and 4 are a plan view and a side view, respectively of the present apparatus as shown in FIGS. 1 and 2 in use, for explaining an ampule arranging operation.

FIGS. 5 and 6 are a plan view and a side view, respectively, of a partition plate for retaining ampules in a receiving case,

FIGS. 7 and 8 are a plan view and a side view, respectively, of another embodiment of the present apparatus.

In the drawings, FIGS. 1 and 2, an ampule table **1** comprises a table plate **1'**, and a base plate **1''**, and the table **1** may be supported at the bottom surface thereof by an electromagnetic vibration means **2**, which may be in turn securely fixed on base stand **3** through suitable spring means **4**.

The upstream portion of the table plate **1'** of said ampule table **1** serves as an ampule supplying section **5**, and the downstream portion thereof serves as an ampule arranging section **6**. A number of ampules are fed to and set upright at random places on said supplying section **5**. The ampules may be advanced on said table plate **1'** to the right of FIGS. 1 or 2 by means of an electromagnetic vibration means **2**, and the ampules are rectified in the arranging or rectifiying section **6** so that they can flow smoothy without stagnating there to the right of said section **6**. Lastly, as explained later in detail, the ampules are received in channels formed between side walls and a plurality of partition walls in a receiving case in regular order, said receiving case being adapted to be connected to the downstream portion of said rectifying section (see, for instance, FIG. 3).

The table plate **1'** of the ampule table **1** is provided with a pair of side walls **11**, **12** to prevent the ampules from dropping down from the sides of the table plate **1'**. The height of said walls is made comparable to that of the body portion of the ampule to be treated. Pivotal wings **15**, **16** are pivotably mounted on the downstream ends of said walls **11**, **12** by means of hinges **17**, **18**, respectively so that the pivotal wings may be supported in a plane normal to the upper surface of said table plate **1'** and the lower edges of these wings may move along the upper surface of said table plate **1'**. Said wings **15**, **16** are also functionally connected to a rod **21** extending transversely of said plate **1'** thereunder through a pair of upstanding pivoting pins **23**, **24**, respectively, which are suitably secured to said rod **21**. The lengthwise reciprocating motion of said rod **21** causes said pivotal wings **15**, **16** to pivot about said hinges **17**, **18**, respectively. Any suitable means may be used to reciprocate said rod **21**. The installation of said wings **15**, **16** on said rod **21** is preferably such that as shown in FIG. 1 when one of said wings is slightly pivoted toward the inward of said plate **1'**, the other wing is directed parallel to one of the longitudinal edges of said table plate **1'**.

The downstream edge E of said table plate **1'** is provided with a pair of check walls **27**, **28** on the opposite sides thereof for the purpose of preventing the ampules from dropping down from the table plate **1'**. It is preferable that the width of said check wall **27** or **28** is substantially equal to the displacement of the tip of the corresponding wing **15** or **16**.

Said base plate **1''** extends to the downstream direction of said table plate **1'** between two check walls **27**, **28** to support an ampule receiving case **35** thereon as will be explained hereinafter.

FIGS. 3 and 4 illustrate a state that the predetermined number of ampules are being received in said receiving case **35** mounted on the present apparatus shown in FIGS. 1 and 2. When the receiving case **35** is mounted on the base plate **1''** of the present apparatus, the locating of said case **35** on said base plate **1''** may be attained by the

engagement of clips **33, 34** mounted on a pair of horizontal lugs **31, 32**, respectively, secured to the opposite sides of the base plate **1''** near the downstream end thereof, with recesses **39, 40** formed in a pair of horizontal lugs **37, 38**, respectively, secured to the opposite sides of the receiving case **35** near the downstream end thereof. The receiving case **35** is shaped like a dustpan as defined by a bottom plate **40** and three side walls, i.e. a pair of longitudinal side walls **41, 42** and a transverse side wall or rear wall **43**, and the remaining side or front side is open so as to receive ampules which will be sent progressively into said case **35**. The receiving case **35** is also provided with a plurality of partition walls **45** which extend throughout substantially entire length of said case **35** in a parallel relationship to said longitudinal side walls **41, 42**. The partition walls **45** will define a plurality of ampule receiving channels **47** therebetween. The width between the longitudinal side walls **41, 42** is preferably defined substantially equal to the distance between the innermost positions of the tips of the pivotal wings **15, 16**.

In operation, when the present apparatus, fitted with the receiving case **35** with their bottoms in flush relation, as shown in FIG. 3 or 4, is subjected to vibration by the electromagnetic vibration means **2**, a number of ampules which were successively set upright at random places on the supplying section **5** of the table plate **1'** will be generally advanced downstream. These ampules will come into collision with the upstream ends of said partition walls **45** and will show a tendency to stagnate near said upstream ends. However, these ampules may be prevented from stagnating there as they are shaken from side to side by means of the pivotal wings **15, 16**, and the ampules will be readily sent into the ampule receiving channels **47** to fill up the receiving case **35** therewith.

Then, the vibration means **2** is stopped, and a partition plate **50** (FIGS. 5 and 6) may be inserted from above in contact relation with the upstream surfaces of the check walls **27, 28** to separate the ampules retained within the receiving case **35** from ones on the table plate **1'**. Thereupon, a pair of lugs **51, 52** formed on the opposite sides of said partition plate **50** at right angles thereto will abut on a pair of further lugs **55, 56**, respectively, which are also fixed horizontally on the outer surfaces of the opposite side walls **41, 42**, respectively, of the receiving case **35**. Thus, the receiving case **35** and the partition plate **50** are removed in a body together with the ampules loaded therein from the present apparatus with said stacked lugs **51, 55**; **52, 56** being respectively held together with both hands of an operator, and can be transferred to a succeeding processing station paying careful attention to prevent the ampules from dropping from the receiving case **35**.

The embodiment of FIGS. 7 and 8 is generally similar to that of FIGS. 1 and 2 except that a belt conveyor **60** is used in place of the electromagnetic vibration means **2**. In this embodiment, the upstream portion of the table plate **1'** or ampule supplying section is largely cut out square, and the belt conveyor **60** is positioned within a hole thus made so that it may have an upper surface **61** substantially flush with the upper surface of the table plate **1'**. The clearance between the cut-out hole and the contour of said upper surface **61** must be narrowed to the extent that the movement of ampules is not hindered.

While the present invention has been described in connection with particular embodiments, it is to be understood that various modifications and improvements can be made without departing from the spirit and scope of the invention.

What is claimed is:

1. An apparatus for filling a case with a number of ampules, comprising a table plate and means for advancing the ampules, which are successively set upright at random places on said table plate, to the downstream direction thereof, so that the ampules may be sent into a plurality of channels which are defined by a plurality of partition walls mounted parallel to the flow direction of said advancing ampules within an ampule receiving case, said case being located adjacent to the downstream end of said table plate, characterized by a pair of wings pivotably mounted on the downstream ends of a pair of side walls formed along the opposite edges of said table plate, and means for pivotally oscillating said wings simultaneously in the same directions.

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WAYNE A. MORSE, JR., Primary Examiner

U.S. Cl. X.R.

53—126, 150, 166, 236, 263; 93—37