

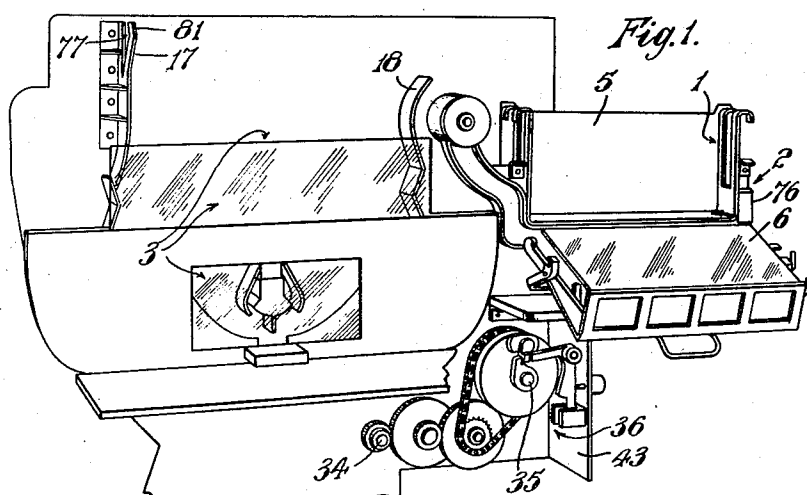
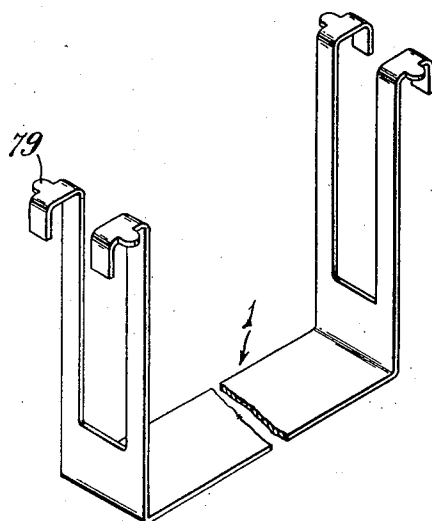
Aug. 5, 1952

D. W. MOLINS ET AL
CIGARETTE TRAY DUMPING DEVICE

2,605,909

Filed April 25, 1949

7 Sheets-Sheet 1



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CIGARETTE TRAY DUMPING DEVICE

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7 Sheets-Sheet 2

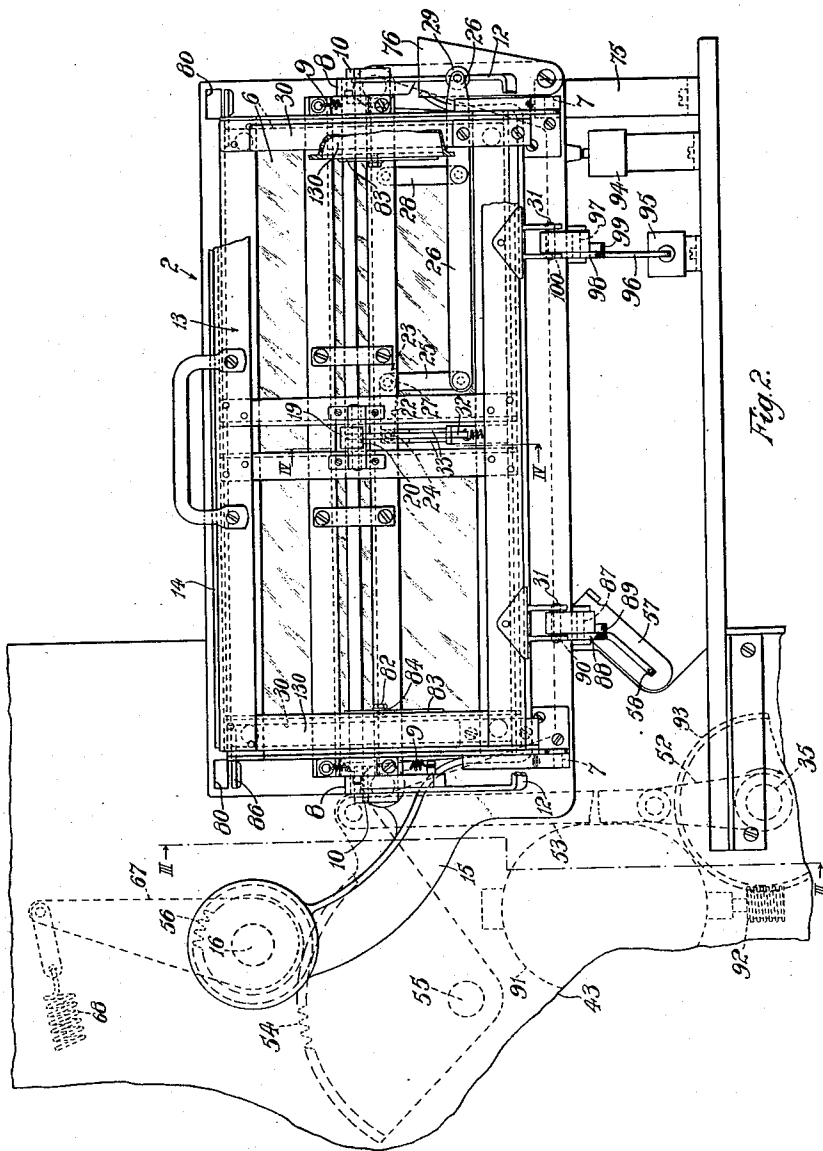


Fig. 2.

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7 Sheets-Sheet 3

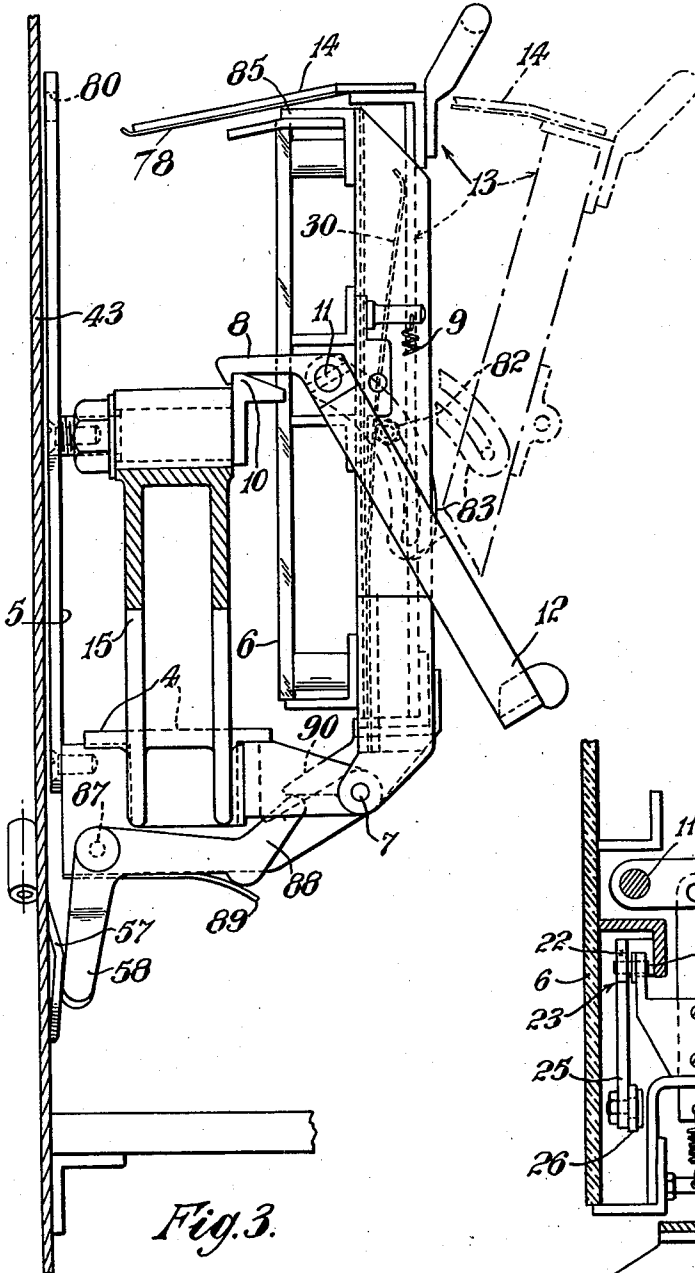


Fig. 3.

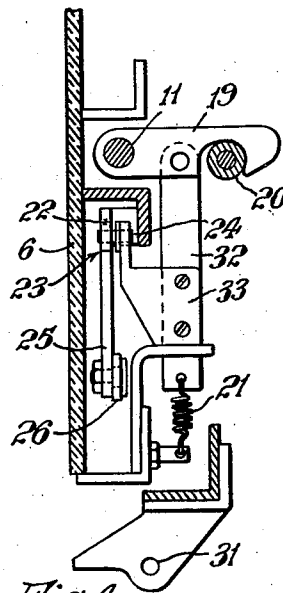


Fig. 4.

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7 Sheets-Sheet 4

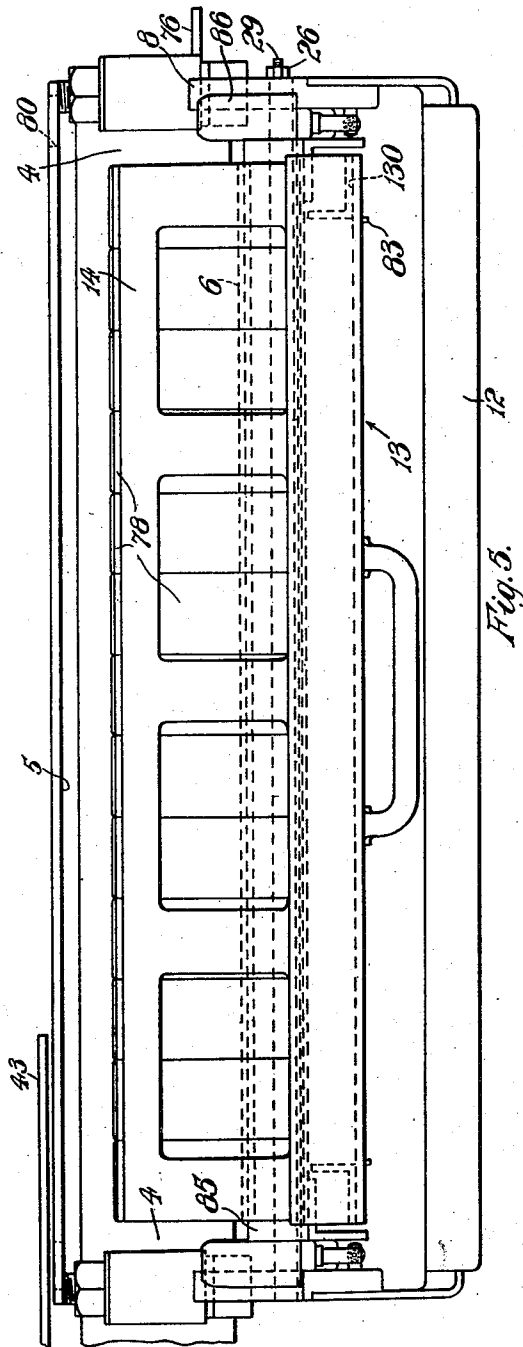


Fig. 3.

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7 Sheets-Sheet 5

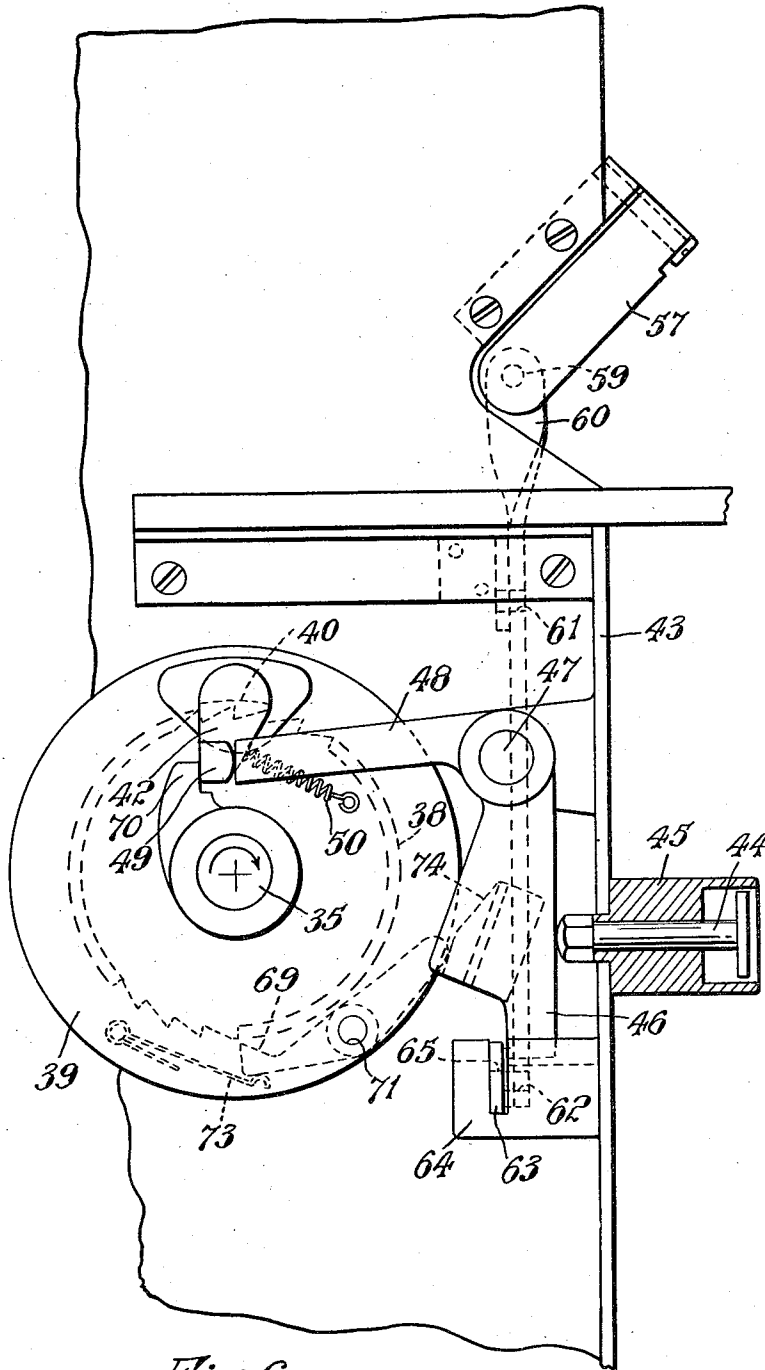


Fig. 6.

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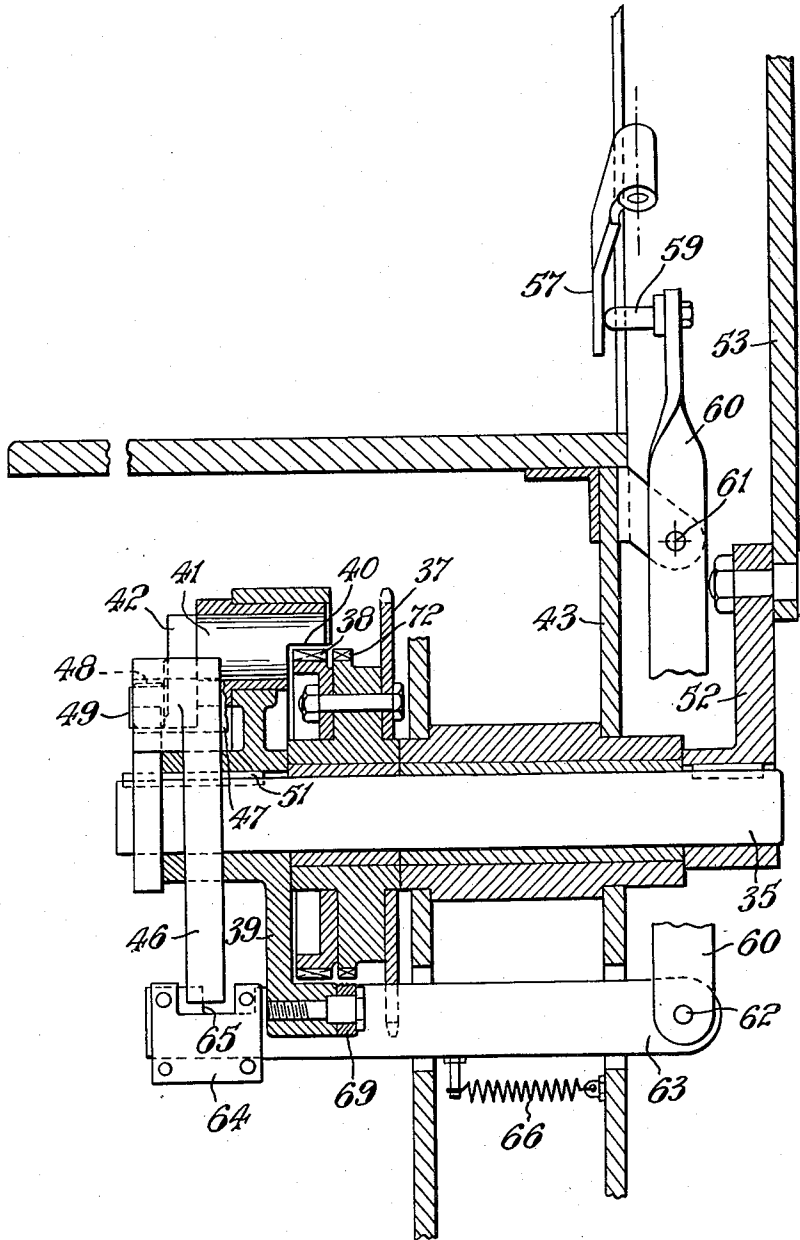


Fig. 7.

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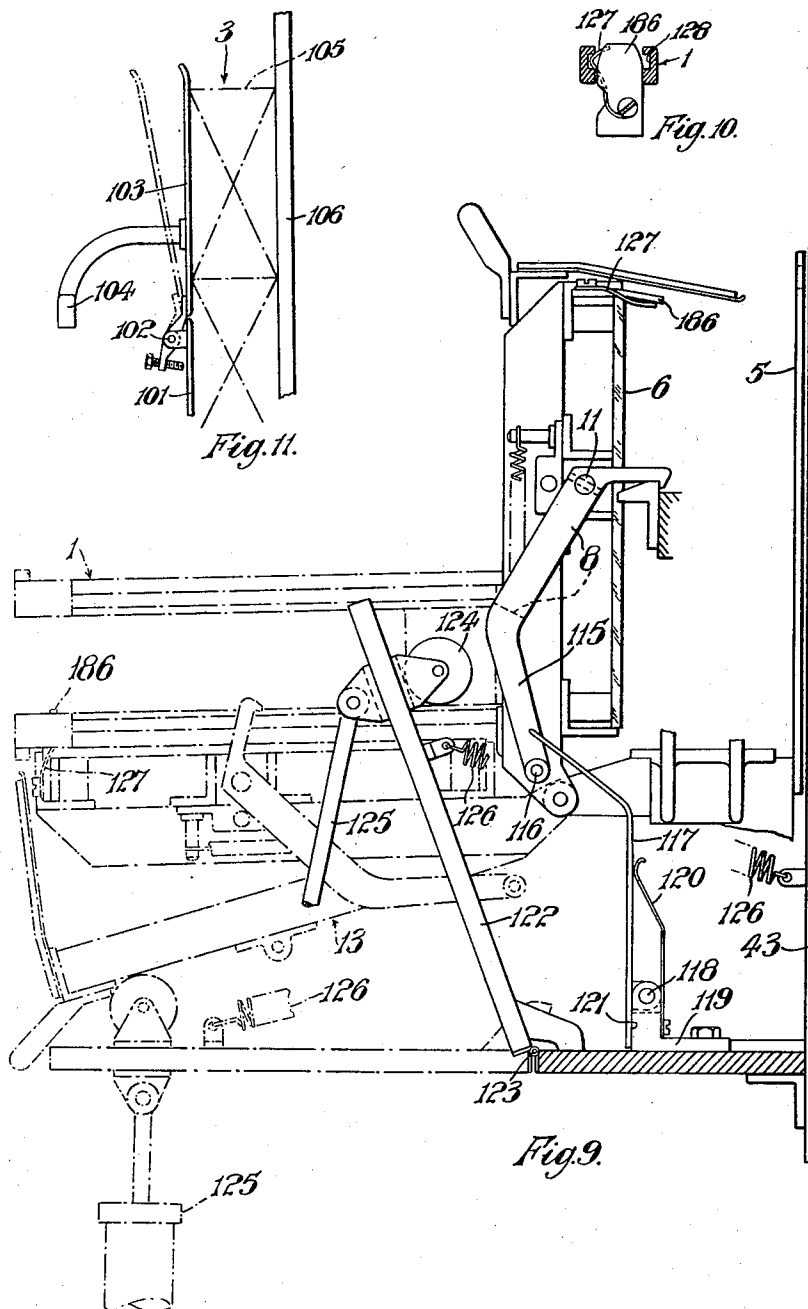
D. W. MOLINS ET AL

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CIGARETTE TRAY DUMPING DEVICE

Filed April 25, 1949

7 Sheets-Sheet 7



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UNITED STATES PATENT OFFICE

2,605,909

CIGARETTE TRAY DUMPING DEVICE

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Application April 25, 1949, Serial No. 89,502
In Great Britain May 4, 1948

13 Claims. (Cl. 214-1.1)

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This invention concerns improvements in or relating to the packing or handling of cigarettes or other rod shaped articles.

Apparatus constructed according to the invention may be advantageously employed in all suitable cases where cigarettes or other rod-like articles are to be transferred from a tray or the like into any kind of hopper or receptacle. For example, the apparatus may be used for transferring either cigarette lengths or lengths of filter rod material into a hopper or the like for manufacturing filter tip cigarettes, for example as described in British Patent Specification No. 430,742. In the following description the emphasis is on cigarettes, but it will be readily seen that the same general considerations apply to other rod shaped articles, though filter rods or "stubs," as they are often called, need not be handled so delicately as cigarettes. As the same general type of tray may be used for various articles the convenient term "cigarette tray" will be used throughout the specification.

Cigarettes issuing from a cigarette making machine are frequently collected in trays, from which they are subsequently transferred into the hopper of a cigarette packing machine. In some cases, for example, the cigarettes are placed in the trays by hand, and may be removed from a tray by means of a flexible lifting strip which is arranged to lie in the tray beneath the cigarettes and which has its ends free so that they can be grasped, and the flexible strip thus drawn tight around the stack of cigarettes in the tray, so that the cigarettes may thus be lifted out of the tray. A tray suitable for use in this way may consist of a simple open-sided metal structure having a flat bottom and upright end walls, the width of a tray being approximately equal to the length of a cigarette.

British Patent Specification No. 549,875, discloses apparatus for automatically collecting cigarettes in trays which are arranged to move beneath and past a filling station at which they are automatically filled with cigarettes. The trays in that case are of special construction and so designed that their contents can be discharged without the use of lifting strips.

It is an object of the invention to provide means whereby simple and inexpensive trays, which can if desired be filled automatically with cigarettes, may be employed in such a way that the cigarettes may be automatically discharged from the trays into the hopper of a packing machine, without the use of lifting strips.

According to the invention there is provided

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apparatus for discharging the contents of cigarette trays, comprising a charger adapted to receive and accommodate a filled tray and pivotally mounted adjacent a cigarette hopper or the like, closure means adapted to close said charger whereby the filled tray is enclosed and secured within the charger, means to invert the charger by swinging it about its pivot from the tray receiving or loading position to a discharging position above the hopper, said closure means including a removable part which supports the mass of cigarettes in the charger when the latter is in the discharging position and which can be withdrawn to permit the cigarettes to fall into the hopper.

The charger may comprise a fixed rear wall and the closure means may comprise a pivoted front wall having means to support a removable top wall which constitutes the said removable part. The said top wall may be slidable in slotted members carried by the said pivoted front wall.

Alternatively the removable top wall may be pivotally mounted for movement over and away from the top of the charger, that is, into and out of the closure position.

The charger may be swung about its pivot by mechanism set into operation by a press button or like control, the arrangement being such that the charger swings over to the discharging position and then returns to the tray receiving or loading position whereafter said mechanism ceases to operate until the button is pressed again.

The pivoted top wall may be held in its operative position by a latch which is tripped when the charger arrives at the discharging position whereupon the top wall moves on its pivots under the influence of a spring. Means may be provided for preventing the operation of the charger swinging mechanism to move the charger from the loading position until the top wall is latched in position.

The pivoted front wall of the charger may be held in the closed position by a latch and means may be provided for tripping the latch automatically as the charger returns to the loading position so that the front wall can swing about its pivots to a wide-open position, for example, a position where the wall is substantially horizontal.

Catches or the like may be provided on the pivoted front wall adapted to engage the tray and to carry it with the wall when the latter swings open about its pivots. This provision fa-

cilitates rapid operation of the charger when large quantities of cigarettes are being handled.

The pivoted top wall may comprise a series of flat springs or pressers adapted to move into contact with the cigarettes along the length of the charger to prevent displacement or rolling of the cigarettes as the charger swings over in its pivoting movement.

Apparatus according to the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a perspective view showing the general arrangement of the apparatus which, in this example, is used for supplying cigarettes to the hopper of a cigarette packing machine.

Figure 2 is a front elevation of a charger and its operating devices drawn to a larger scale and partly broken away at one end to show hidden parts.

Figure 3 is a sectional side elevation of Figure 2 on the line III—III, some parts being omitted.

Figure 4 is a section of part of Figure 2 on the line IV—IV.

Figure 5 is a top view of part of Figure 2.

Figure 6 is an enlarged view of part of Figure 1 showing details of a clutch device.

Figure 7 is a sectional end elevation of Figure 6, some parts being omitted.

Figure 8 is a perspective view of a cigarette tray, shown broken.

Figure 9 is a view generally similar to Figure 3 but looking at Figure 2 from the opposite end and showing certain modifications.

Figure 10 shows a plan of a part shown in Figure 9, said part constituting a tray-engaging catch.

Figure 11 is a small scale view of a device used for aligning cigarettes discharged into the hopper of Figure 1.

The apparatus is designed for use with trays of very simple and inexpensive construction, which are open-sided metal structures having flat bottoms and vertical end walls, the end walls having at their upper ends outwardly projecting abutments which serve as handles for lifting the tray.

In order to enable the trays to be used with automatic collecting mechanism such as that disclosed in British Patent Specification No. 549,875, by means of which trays are caused to move beneath a filling station at which they are filled with cigarettes issuing from a cigarette-making machine, the end walls are slotted or forked, as shown in Figure 8, to allow them to pass a downwardly extending guide which guides the cigarettes into the trays. The width of the slot in an end wall is, of course, less than the length of a cigarette.

The control of the charger movements may be effected either electrically or mechanically and both methods are shown in the drawings.

Referring now to the drawings, when a tray 1, Figure 1, has been filled with cigarettes, it is placed in a charger, generally indicated by the reference 2, which is designed to accommodate a tray and which is disposed adjacent a hopper, generally indicated by the reference 3, of a cigarette packing machine.

The charger has a base 4 on which the tray 1 can rest, and a rear wall 5 fixed to the base so as to cover one side of the stack of cigarettes in the tray. A front wall 6 is pivoted at 7 to the base so that it can be swung up to cover the other side of the stack of cigarettes and swung down, as explained more particularly later, to open the charger for receiving a filled tray. The pivoted

front wall is preferably made of transparent material so that the cigarettes can be seen. When the front wall is closed the ends of the cigarettes are all aligned, as the space between the front and rear walls is substantially the length of a cigarette. The front wall 6 is held in the closed position by fastening devices at each end of the charger, each device comprising a hook shaped latch 8 which, under the influence of a spring 9, snaps over a corresponding shaped part 10, fixed to a lug extending from the charger base 4, when the wall 6 is swung on its pivots 7 to close it. The latches 8 are fixed on a pivoted rod 11 and provided with a long stirrup shaped lever 12, shown broken in Figure 2, so that the fastening device may be unlatched with ease.

A framework, generally indicated by the reference 13, and of substantially rectangular shape is pivoted on pivots 31 on the same axis as the front wall pivots 7 and is located in advance of said wall. At its upper end the framework has an extension 14 which extends across the top of the charger and the filled tray carried therein so as to close the charger and prevent cigarettes from falling out when the charger is swung over towards the hopper. The extension forms a slightly acute (e. g. 80°) interior angle with the plane of the framework.

The charger is fixed to a lever 15 which is integral with the base 4 and pivoted at 16 so that the charger can swing about the lever pivot.

Side guides 17 and 18, Figure 1, are provided at the mouth of the packing machine hopper 3 and are arranged to extend outwardly to allow the charger to be swung into inverted position between them.

The rectangular framework 13 is held in the closed position, with its extension 14 covering the top of the charger, by a hook shaped latch 19 which is pivoted on the rod 11 to the front wall 6 and engages a roller or pin 20 on the framework 13. The latch is held in engaging position by a spring 21. One end of an arm 22 of a bell crank lever 23 is pivotally connected to the latch 19 at 24. For this purpose the latch 19 is provided with a pivoted plate 32 to which the spring 21 is connected and side plates 33 fixed to the plate and constituting a bracket provide a bearing for the pivot 24. The other arm 25 of the lever is pivoted at its end to a horizontal bar 26. The pivot 27 of the bell-crank lever is connected to the front wall 6 and a link 28 of the same length as the second arm 25 of the bell-crank lever is also coupled to the wall and the bar 26. An end of the bar provided with a roller 29 projects beyond the right hand end of the charger and if this roller is pressed endwise the latch 19 is raised to release the framework 13. Between the framework and the front wall there are provided bent leaf springs 30 which tend to swing the framework away from the wall, and thus as soon as the latch 19 is raised, the framework swings away from the wall. The extension 14 of the framework, which constitutes a removable part for supporting the cigarettes when the charger is inverted, has attached thereto a number of cigarette engaging leaf springs 78, see Figure 5, which extend from one end of the charger to the other and provide a number of pressing members which engage the upper row of cigarettes, as will be explained in more detail later.

Other details of the apparatus will be referred to in the following description of its operation.

When a filled tray 1 is placed in the charger

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and the latter is closed by swinging up the pivoted front wall 6 and the framework 13, the cigarettes within the charger are enclosed on all sides, and the tray is secured against movement. When the charger is swung about the pivot 16 and inverted over the hopper 3, it will be seen that the mass of cigarettes which formerly rested on the bottom of the tray are now supported by the extension 14 of the framework referred to above, which, in the discharging position, forms the base of the charger.

The tray 1 is shown more clearly in Figure 8, and it will be seen that at the top it has small lugs 79 which serve to space trays apart when they are supported on bars passing through the hooks, in order that trays may be conveyed about a factory. The lugs at the rear of the tray when it is positioned in the charger are also utilised to hold the tray in the charger when the latter is inverted and the extension 14 removed to allow the cigarettes to fall into the hopper 3. The lugs pass through holes or slots 80, Figure 2, in the rear wall 5 of the charger, and as the tray cannot fall out, except by a downward movement, which the lugs prevent, the tray is securely held. The tray is located lengthwise of the charger by guides 86, Figures 2 and 3, fixed to the front wall and which pass between the hooks of the tray.

In the arrangement shown in Figure 1, the charger is operated by a one-revolution clutch device which is shown in detail in Figures 6 and 7. In Figure 1 a shaft 34, the mainshaft of the packing machine, is coupled by the gear-train shown to a crank shaft 35 by means of a clutch device, generally indicated by the reference 35. As will be seen from Figure 7, a sprocket wheel 37, which is the last member of the aforesaid gear train, is bolted to a ratchet wheel 38. Coaxial with the sprocket wheel and ratchet wheel is a clutch body 39 in which is pivoted a rocking pawl tooth 40 which has a cylindrical shank 41 which is journaled in a hole in the clutch body. At one end of the shank is the pawl tooth 40 and at the other end is a stop lever 42. It will be seen that if the pawl is moved in an anti-clockwise direction, Figure 6, it will engage the ratchet wheel 38 and as the latter is constantly running in the direction of the arrow, Figure 6, the pawl and clutch body will be rotated.

At the side of the frame 43 of the packing machine is a plunger 44 slidable in a bush 45 fixed to the frame. When the plunger is pressed, as one presses an electric switch, the plunger presses against an arm 46 of a bell-crank lever pivoted at 47. The other arm 48 of the bell crank lever is thereby moved out of the path of an abutment 49 on the pawl stop lever 42. The pawl 40 then swings anti-clockwise, under the action of a spring 50, and the clutch body starts to rotate, and as it is fixed by a key 51 to the crank shaft 35 the latter is rotated and a crank arm 52 fixed to the shaft drives a connecting rod 53.

Referring now to Figure 2, where the shaft 35, arm 52 and rod 53 are also shown but with the rod broken and the arm and shaft higher up than their true position, the upper end of the connecting rod is pivoted to a toothed quadrant 54 pivoted at 55 to the frame 43. The quadrant engages with a gear wheel 56, fixed to the shaft which forms the pivot 16 of the lever 15, and thus as the crank shaft rotates, the charger is swung to and fro, that is from the position shown in Figure 1, which is the tray receiving or loading position, to a discharging position over the hopper 3 and back again. After the crank shaft starts

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to rotate, the arm 48 will of course fall back to the position shown in Figure 6 as the pressure on the plunger 44 is relaxed, and when the clutch body has made one revolution the arm 48 will strike the abutment 49 and disengage the tooth 40 from the ratchet wheel 38. A collar having a lug 70 is fixed to the shaft 35 so that the lug forms a stop to locate the stop lever 42 in the disengaged position.

In order to prevent the clutch from being set into motion before the framework 13 of the charger has been closed there is provided a safety device partly shown in Figures 2 and 3 and also shown in Figures 6 and 7. This device comprises a pivoted lever 57 which is engaged by an arm 58, Figure 2, of a bell-crank lever pivoted on the charger at 87. The other arm 88 of the bell-crank lever is pressed upwards by a spring 89 and is engaged by a lug 90 fixed to the framework 13.

When the framework is latched, the lever 57 presses against a pin 59 fixed at one end of a double-armed lever 60 pivoted to the frame 43 at 61. The other end of the lever 60 is pivoted at 62 to a slidable bar 63 which is guided at its free end in a slotted block 64, also fixed to the frame 43. The bar 63 has a notch 65 in it of the same shape as a notch in the block 64 and when the two notches are aligned the arm 46 of the bell-crank lever can pass and the pivoting movement of the stop lever 42 to allow the pawl 40 to engage can take place. A spring 66 returns the bar 63 to the stop position when the pivoted lever 57 is free of the arm 58 on the charger, that is, when the framework 13 of the charger is unlatched.

As the loaded charger is a fairly heavy mass, provision is made for balancing it as far as possible about the axis of rotation 16. For this purpose an arm 67 fixed to the gear wheel 56 extends upwards, Figure 2, and to its end is attached a strong spring 68 whose other end (not shown) is anchored to the machine frame.

As the charger commences to swing upwards from the position shown in Figure 2, the spring assists the gearing. In due course, after the arm 67 has rotated through 90°, the centre of gravity of the moving mass passes over the axis 16 and thereafter the spring tends to resist the movement. In this way the load on the gearing is kept fairly uniform and a smooth movement results. Moreover, as will be seen from Figure 2, the crank is on a dead centre at each end of the movement, so that the charger starts to move slowly and finishes its movement slowly. Further the arrangement gives sufficient time for the cigarettes to discharge into the hopper 3 as there is scarcely any return movement of the charger for a considerable angle of crank movement.

As a further safeguard, in case the weight of the charger should drag the crank and clutch body in advance of the driving ratchet wheel 38, ratchet stop device is fitted, also shown in Figures 6 and 7.

The stop device comprises a further pawl 69 pivoted to the clutch body at 71 and urged towards engagement with a ratchet wheel 72 by a spring 73 but, in the position shown in Figure 6, temporarily held out of engagement by a cam face 74 on the arm 46 of the bell-crank lever.

As soon as the clutch body starts to move, the pawl 69 clears the cam face 74 and springs into engagement with the teeth of the ratchet wheel 72, long before there is any overrunning load due to the weight of the charger, and as the wheel 72 is fixed to the wheel 38 the pawl 69

locks the clutch body to the ratchet wheels so that overrun is impossible. The cam 74 trips the pawl 69 just before the end of the crank shaft revolution and the pawl is thus held out of engagement with the ratchet wheel 72 so as to avoid clicking in the intervals between crank-shaft operation.

In order to ensure that the clutch body 39 completes its revolution so as to restore the clutch parts to the position shown in Figure 6 and to secure effective restoration of the pawl tooth 40 to its completely disengaged position the clutch body is slightly unbalanced by being heavier at the right hand side of Figure 6. This may be done by a counter-weight at that side or by drilling at the opposite side. It has been found that with a well-balanced charger such as the one being described, there is not always sufficient impulse available to drive the clutch body the last small part of its movement, as the pawl 40 has to be tripped just before the end of a complete revolution, and if the body stops forthwith the pawl tooth is likely to be struck by the ratchet teeth on the wheel 33 which of course continues to move.

In view of the overhang of the charger from its pivot, two devices are provided to counteract undue movement or vibration during operation. One is a bracket 75 fixed to the machine frame to stiffen the charger while it is being loaded and forming a reaction surface against which the shock of loading and closing by an operator may be taken without stress on the pivot and other parts. The second device is a plate 76 fixed to the free end of the charger which runs into a slot 77, Figure 1, in the guide 17, when the charger is inverted over the hopper. The plate 76 checks vibration due to the shock as the framework 13 snaps open about its pivots under the pressure of the springs 30, for as the charger comes into position over the hopper 3, the roller 29 on the end of the bar 26 is pressed by a cam face 81 on the guide 17 to release the latch 13 and allow the framework to spring open.

The extension 14, which constitutes a removable part of the closure means of the charger, supports the cigarettes when the charger is inverted until the framework 13 springs open, when the extension is removed from beneath the cigarettes. This removal is effected extremely quickly as the framework swings on its pivots under the influence of the bent leaf springs 30. Of course, when the extension is withdrawn, it carries with it the cigarette engaging leaf springs 70 so that the cigarettes are free to fall.

Because the extension is at an acute angle to the plane of the framework and, in consequence, to the planes of the charger walls, the cigarettes in the charger will fall slightly so that their front ends are lower than their rear ends. Thus as the extension is withdrawn and the rear ends start to fall before the front ends are free to do so, the angular tilt of the cigarettes before the extension moves helps to compensate for this difference in time between the falling of the rear and front ends of the cigarettes.

It will be observed, however, that even with this arrangement it is essential that the movement of the extension to uncover the cigarettes should be as rapid as possible, otherwise the ends of the cigarettes at the rear wall of the charger will begin to fall before the front ends are free to do so, and this may cause the cigarettes to fall askew.

Therefore the leaf springs 30 used are very

strong and the framework swings open very smartly. To reduce the shock as the framework finishes its opening movement, the open position of the framework is determined by pins 82 on the framework which move in slotted quadrants or links 83 pivoted to the front wall, and the pins comprise spring washers or the like 84 whereby there is sufficient friction between the pins and links to slow down the movement towards its end when the force of the leaf springs is nearly exhausted.

The cigarette engaging leaf springs 78 function in the following manner. The cigarette trays are filled evenly and to a uniform height by apparatus attached to a cigarette making machine, but in the subsequent handling, before the trays reach the charger, the level is likely to be disturbed. The operator roughly smooths the top of the cigarettes, but it is imperative that during the charger movement the cigarettes should be prevented as far as possible from moving about in the tray. With the cigarette engaging leaf springs mentioned, undue movement is prevented because each spring moves down into contact with the cigarettes beneath it as the framework closes, and the springs slip over a fixed angle 85, Figure 3, on the front wall until they are free of the bar and free to extend to their normal shape as far as the cigarettes will permit. Thus each inch or two of length of the tray is covered by an independent spring and all the cigarettes are restrained against movement.

Owing to the provision of the side guides 17 and 18 at the mouth of the hopper, between which the inverted charger is disposed when in the discharging position, it is possible to start returning the charger to its original position as soon as the extension of the framework is withdrawn, since any cigarettes which may leave the charger after the latter has started to move upwardly and away will be guided into the hopper by the said guides. Thus the crank drive mechanism previously described is quite satisfactory for the purpose.

As the cigarettes in the charger are aligned with the rear wall 5, and some clearance is necessary between the exterior face of this wall and the neighboring face of the hopper back wall when the charger is in the discharging position, it is necessary to shift the cigarettes backwards into contact with the said hopper wall after the charger has left the hopper. The necessary movement may be noted from Figure 3 as the face of the hopper wall is coincident with the face of the frame part marked 43. To facilitate said movement of the cigarettes the front wall of the hopper 3 may be constructed as shown in Figure 11. The lower part 101 of the front wall is fixed and to it there is pivoted at 102 a hinged wall 103. This normally stays in the chain-line position because of the weight of a handle 104, but when the charger has emptied a mass of cigarettes, represented by a chain-line rectangle 105, the pivoted wall is swung inward by the handle to the full-line position to move said cigarettes back into contact with the rear wall 106 of the hopper.

The charger returns to the receiving position with the framework 13 in the open position, and as the charger comes to rest, the pivoted front wall 6 may be opened by manipulation of the handle 12, the empty tray removed and a full one placed in the charger, and the operation can be repeated as soon as the front wall and frame-

work 13 are latched, when it is possible to press the plunger 44 to engage the clutch.

The manual operation of the stirrup 12, that is a mere pressing down on the bar, disengages the latches 8, and as the centre of gravity of the front wall structure is to the right (Figure 3) of the axis of the pivots 7 the wall falls open rapidly under the influence of gravity. Under some circumstances, however, for example when the device is on a high-speed packing machine, it is desirable to relieve the operator of the necessity of pressing the stirrup and lifting out the empty tray. An automatic opening device is illustrated in Figure 9, which shows only the essentials of the charger for the purpose of understanding the operation of said device. The charger is shown in full lines in the condition it is in when just about to move upwards, though the tray is omitted. The left hand latch 8 is shorter than in the previous case and is pinned to the rod 11. The right hand latch is also pinned to the rod and comprises a lever 115 having a fixed pin 116 at its free end. A striking bar or cam plate 117 is pivoted at 118 to a bracket 119 fixed to the machine frame. A spring 120 holds the cam plate against a stop surface 121. The cam plate is so shaped and positioned that as the charger returns to its initial position the pin 116 contacts with the upper face of the bar 117 and the latch lever 115 is caused to rotate on its axis, that is the rod 11 is rotated and both latches 8 are disengaged.

The front wall structure therefore turns on its pivots and falls down to a horizontal position as shown in chain-lines. The structure is rather heavy, and to avoid shock or injury to the parts a shock-absorbing device is provided to receive the structure. This device consists of a plate 122 pivoted at 123 and provided with rollers 124 each of which runs up the side members 130 of the framework 13 as the charger front wall turns on its pivots. The framework 13 is of course open as the charger returns to its initial position, and the rollers 124 are so disposed that the side members of the framework do not foul them but move smoothly into contact, though the rollers could be lower down than is shown without materially affecting the shock-absorbing action.

Beneath the plate is a dashpot device 125 only part of which is shown. This checks the falling movement of the structure and makes the movement gentle. A spring 126 connects the plate 122 to the frame 43 and draws the plate 122 back to its up position when the front wall is latched again. On the next movement of the charger to the discharging position the pin 116 turns the cam plate 117 about its pivot against the pressure of the spring 120.

To automatically remove an empty tray from the charger base, the guides 86 previously described are modified as shown in Figures 9 and 10 where they are numbered 186 and then form extractors. They comprise bent springs 127 which, on the charger wall closing movement when the guides pass through the tray hooks, catch in a depression 128 in the tray member. Thus when the charger wall swings on its pivots and falls down to the horizontal as above described, the springs 127 drag the tray 1 with them as shown in chain-line in Figure 9, but the tray is easily removed by pulling as the springs slide along the depressions 128.

Charger loading with these modifications is performed as follows. As the charger returns to its loading position the framework 13 is

already open and the front wall automatically opens as described above and under control of the shock absorber falls until it is horizontal. The attendant can immediately put in a full tray and then remove the empty one with one hand while returning the front wall and closing the framework 13 with the other. This device considerably eases the work of the attendant when large quantities of cigarettes are being handled by the apparatus.

Normally the output of a packing machine is so great that the discharge of a tray has to be repeated at very short intervals (e. g. 45 seconds), but in some circumstances it might be desirable to provide detecting devices which set the charger mechanism into operation when the level of cigarettes in the hopper falls below a predetermined level so that the operator is free to attend to something else after loading the charger and closing the wall and framework.

In an alternative arrangement the charger is swung to and fro by an electric motor 91, Figure 2, which is geared by a worm 92 to a wormwheel 93 on the crank shaft 35. At the right hand side of the apparatus, Figure 2, there is located a switch 94 which is in series with the motor circuit, and this switch is engaged by an abutment on the charger frame so as to switch off the motor as the charger returns to the receiving position. A further switch 95 in parallel with the first switch is engaged by one arm 96 of a bell crank lever pivoted at 97 to the charger. The other arm 98 of the bell crank lever is pressed by a spring 99 and engaged by a lug 100 fixed to the framework 13. When the framework is latched, the switch is closed and the motor can start when a press button (not shown) is pressed. The control is thus similar to that employed with the one revolution clutch previously described.

In a simpler construction the removable top wall is arranged differently. Fixed to the top of the pivoted side wall of the charger are two slotted members, one at each end, which when the side wall is swung up lie horizontally across the top of the charger and are arranged to rest upon the outwardly projecting abutments on the end walls of the tray in the charger. Thus when the pivoted side wall is swung up as aforesaid and secured, the tray is secured between the base of the charger and the two slotted members and is thus held against movement. The top of the charger is closed by means of a removable part which consists of a slidable plate whose ends fit into the slots of the slotted members and which is thus held in position but can be withdrawn by sliding lengthwise of the charger. The charger is pivoted to the lever 15 instead of being integral therewith and sprung so that it can assume the correct position over the hopper for discharge of the cigarettes. It does not appear to be necessary to illustrate this simpler construction, as that fully described herein is very efficient and quicker in operation than the simple construction referred to.

What we claim as our invention and desire to secure by Letters Patent is:

1. Apparatus for discharging the contents of cigarette trays, comprising a charger adapted to receive and accommodate a filled tray and pivotally mounted adjacent a cigarette hopper or the like, closure means adapted to close said charger whereby the filled tray is enclosed and secured within the charger, means to invert the charger

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by swinging it about its pivot from the tray receiving or loading position to a discharging position above the hopper, said closure means including a removable part which supports the mass of cigarettes in the charger when the latter is in the discharging position and which can be withdrawn to permit the cigarettes to fall into the hopper.

2. Apparatus as claimed in claim 1 including mechanism for swinging the charger about its pivot, and manually operable control means for initiating operation of said mechanism to swing the charger from the loading to the discharging position and back to the loading position on each operation of said control means.

3. Apparatus as claimed in claim 2 comprising means for preventing the operation of the charger swinging mechanism to move the charger from the loading position until the top wall is in position.

4. Apparatus as claimed in claim 1, wherein the charger comprises a fixed rear wall and the closure means comprises a pivoted front wall and means for supporting a removable top wall constituting said removable part.

5. Apparatus as claimed in claim 4 wherein the pivoted front wall is held in the closed position by a latch and means is provided for automatically tripping the latch as the charger returns to the loading position so that the front wall can swing open, for example by gravity.

6. Apparatus as claimed in claim 4 comprising catches on the pivoted front wall adapted to engage the tray and to carry it with the wall when the latter swings open on return to the loading position.

7. Apparatus as claimed in claim 4 wherein the top wall is provided with a series of flat springs or pressers adapted to move into contact with the cigarettes along the length of the charger for the purpose described.

8. Apparatus as claimed in claim 1 including means pivotally mounting the removable top wall for movement over and away from the top of the charger, that is, into and out of the closure position.

9. Apparatus as claimed in claim 8 wherein the pivoted top wall is held in the closure position by a latch which is tripped when the charger arrives at the discharging position whereupon the

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top wall moves on its pivots under the influence of a spring.

10. Apparatus for discharging the contents of cigarette trays, comprising a charger adapted to receive and accommodate a filled tray and pivotally mounted adjacent a cigarette hopper or the like, closure means adapted to close said charger whereby the filled tray is enclosed and secured within the charger, means to invert the charger by swinging it about its pivot from the tray receiving or loading position to a cigarette discharging position above the hopper, said closure means including a movable part which supports the mass of cigarettes in the charger when the latter is in the discharging position and which can then be withdrawn to permit the cigarettes to fall from the charger, means operable to return the charger to the tray receiving position, and guides provided at the mouth of the hopper between which the charger is swung into the discharging position and arranged so as to direct cigarettes into the hopper from the charger as the latter is moving away from the hopper.

11. Apparatus as claimed in claim 10, wherein said guides comprise side guides at the mouth of the hopper, and a rear guide constituting an extension of the rear wall of the hopper, and movable means at the front of the hopper to position and align cigarettes against said rear guide.

12. Apparatus for discharging the contents of cigarette trays, comprising a charger adapted to receive and accommodate a filled tray and pivotally mounted adjacent a cigarette hopper or the like, closure means adapted to close said charger whereby the filled tray is enclosed and secured within the charger, and means to invert the charger by swinging it about its pivot from the tray receiving or loading position to a cigarette discharging position above the hopper.

13. Apparatus as claimed in claim 12 wherein the said means operable to return the charger to the tray receiving position are arranged to operate automatically to return the charger after the means to swing the charger about its pivot from the tray receiving position has brought the charger to the discharging position.

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No references cited.