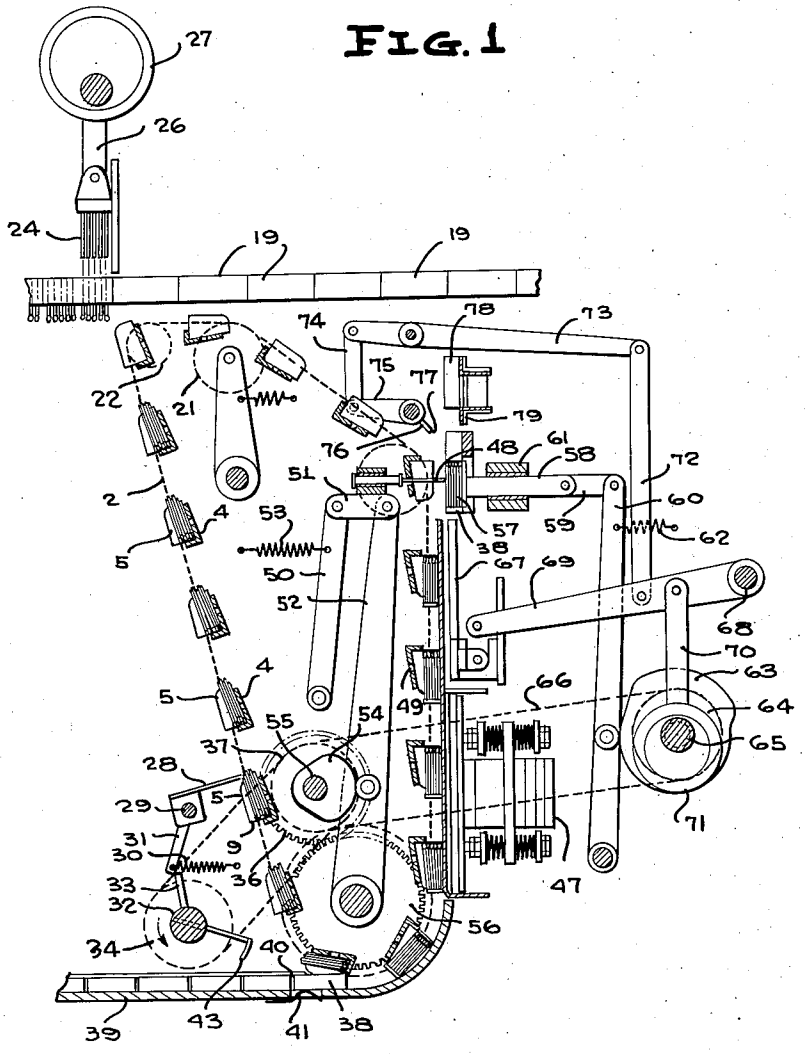
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METHOD AND AN APPARATUS FOR FILLING MATCH BOXES WITH MATCHES

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FIG. 1



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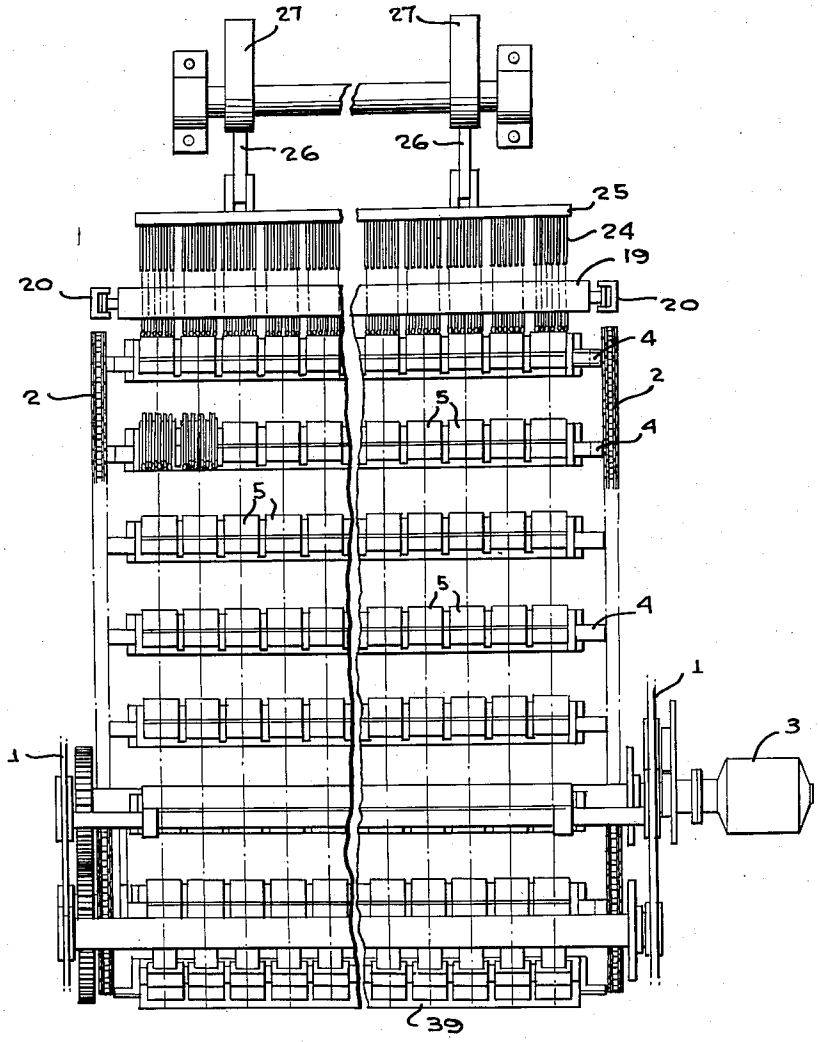
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METHOD AND AN APPARATUS FOR FILLING MATCH BOXES WITH MATCHES

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FIG. 2



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FIG. 3

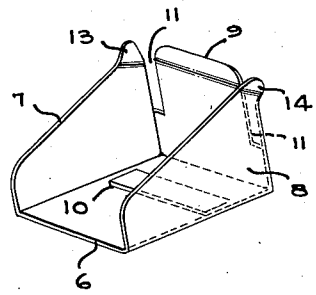


FIG. 4

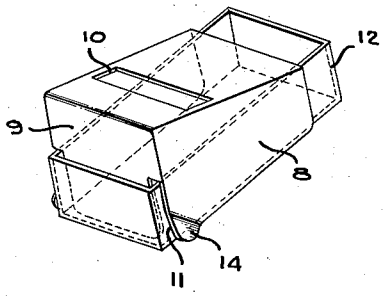


FIG. 5

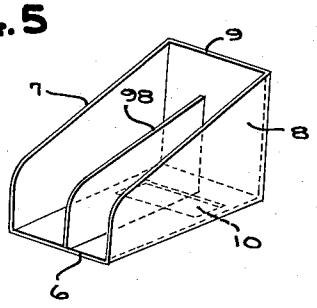


FIG. 6

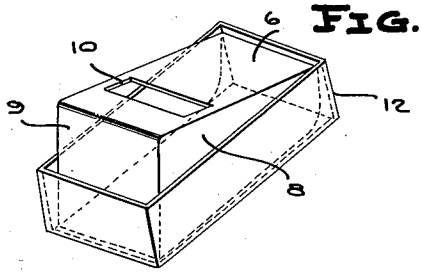


FIG. 7

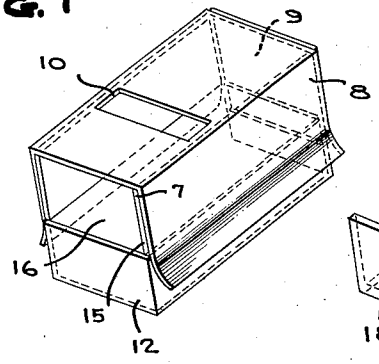
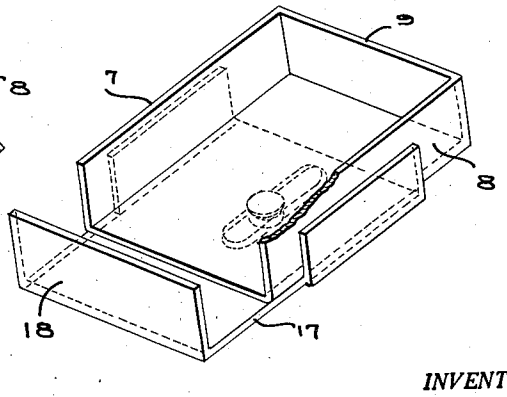


FIG. 8



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FIG. 9

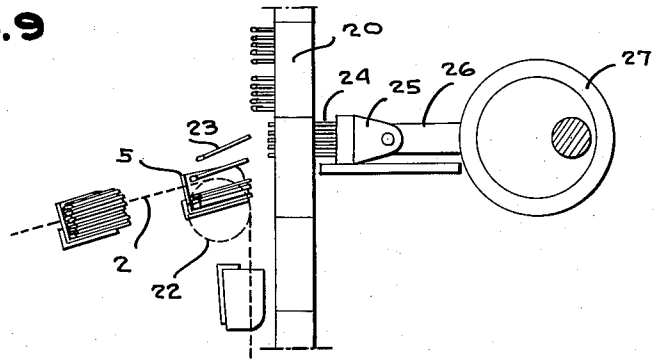


FIG. 10

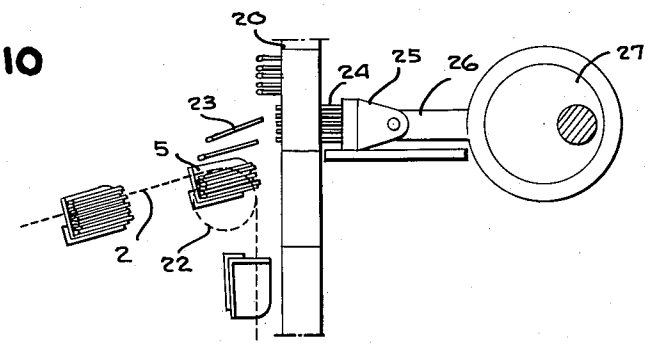
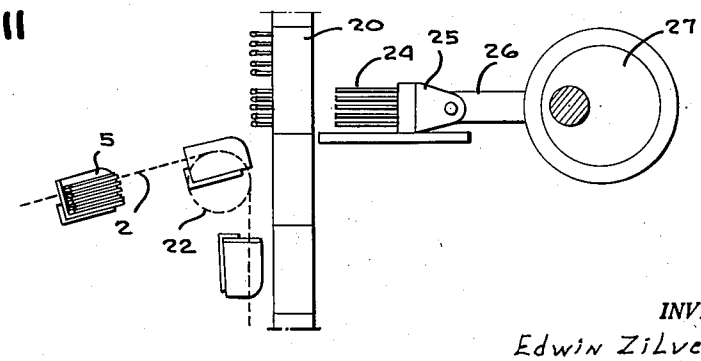


FIG. 11



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FIG. 12

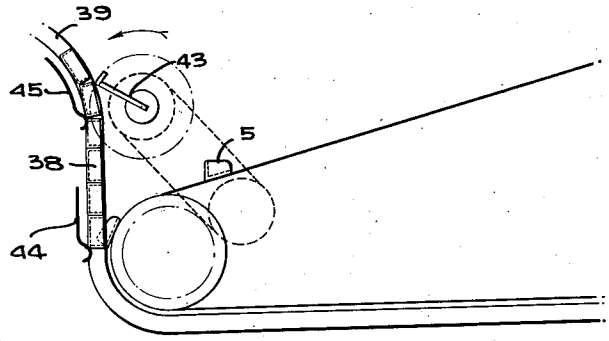


FIG. 13

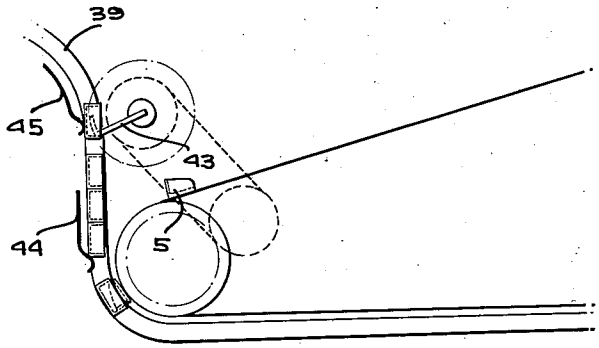
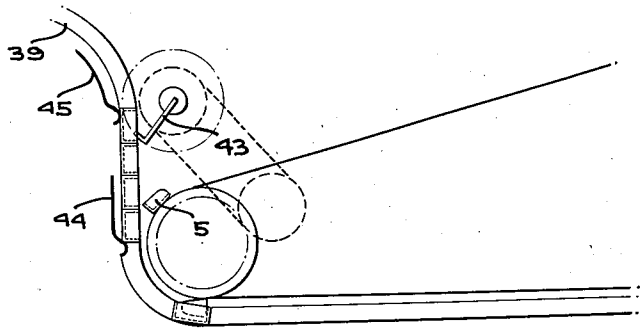


FIG. 14



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FIG. 15

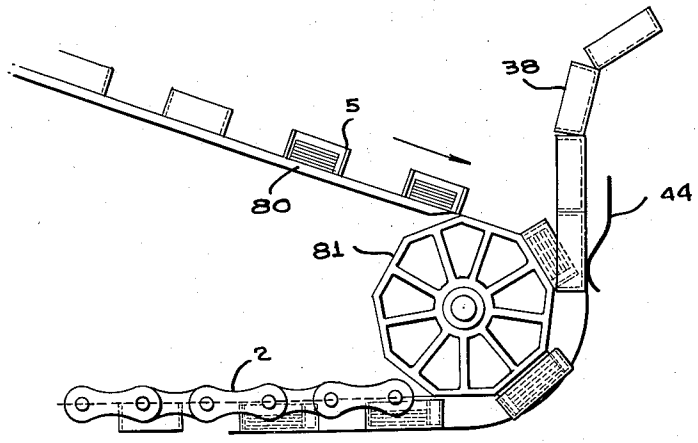
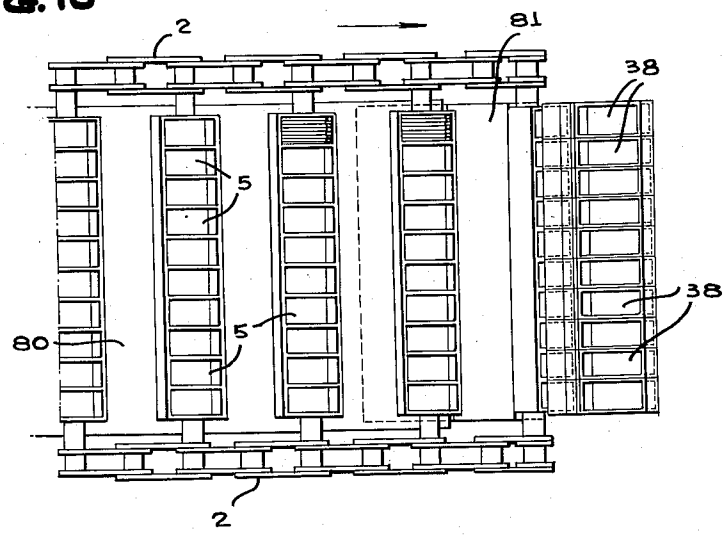


FIG. 16



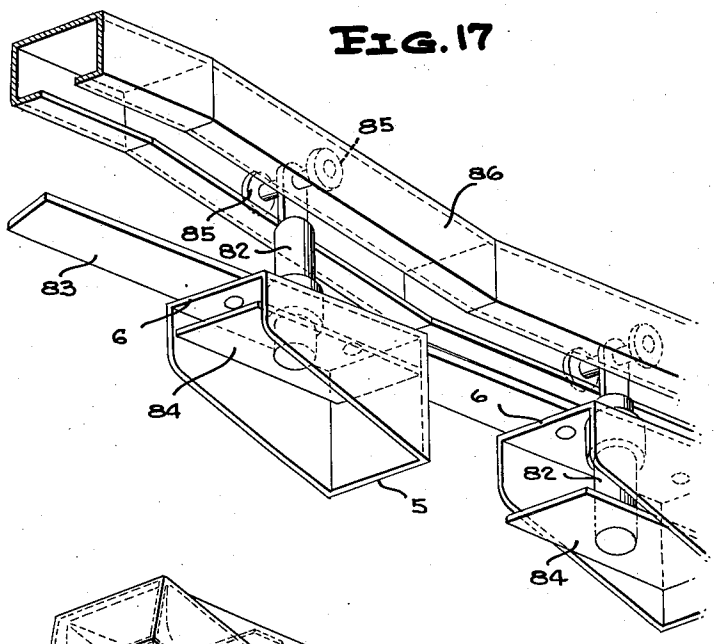
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FIG. 17



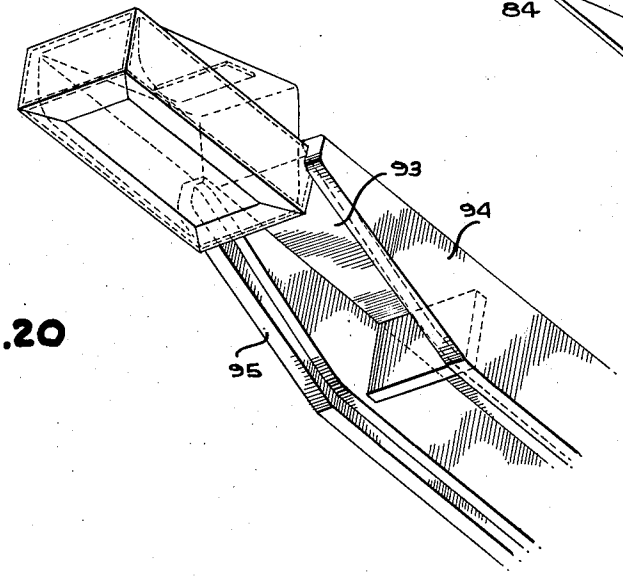


FIG. 20

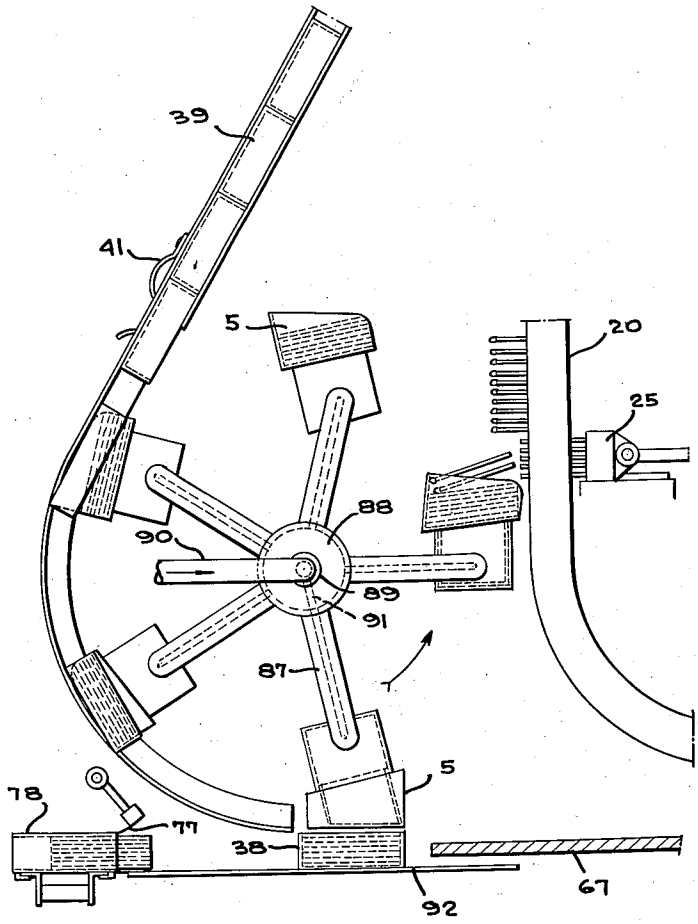
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FIG. 18



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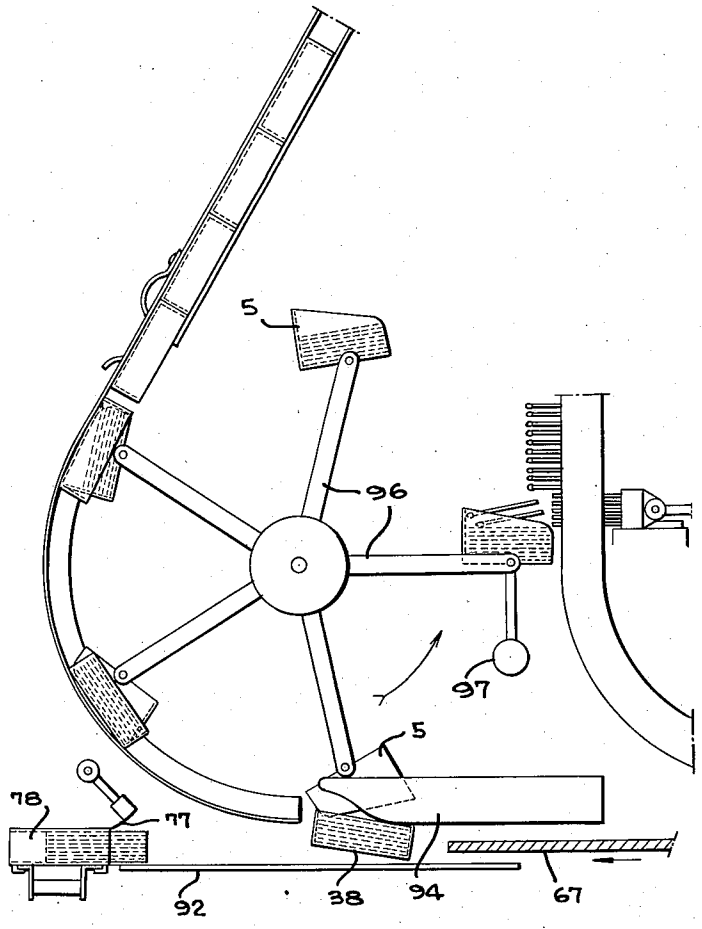
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FIG. 19



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United States Patent Office 2,966,768 Patented Jan. 3, 1961

2,966,768

METHOD AND AN APPARATUS FOR FILLING MATCH BOXES WITH MATCHES

Edwin Zilver, The Hague, Netherlands, assignor to N.V. Inland, Rotterdam, Netherlands, a corporation of the Netherlands

Filed Sept. 19, 1958, Ser. No. 762,152

Claims priority, application Netherlands Sept. 27, 1957

23 Claims. (Cl. 53—148)

This invention relates to a method for filling match boxes with matches and to an apparatus for performing said method.

Up to now the matches are transferred either from a container or from carrier bars themselves, into which the matches have been inserted, directly into the empty trays which gives rise to numerous difficulties, amongst others because the matches, when introduced into the trays, are not uniformly arranged therein which causes a great many stagnations.

This invention aims at avoiding these difficulties which is accomplished by the invention in that the matches are not directly introduced into the trays but are first transferred to an intermediate receiver means. This offers the possibility of first aligning the matches substantially parallel to each other prior to being introduced into the trays. These intermediate receiver means may be constructed in a manner suitable for this purpose since as regards the construction to be selected one is not bound anymore to all dimensions of the trays.

The method for filling match boxes according to the invention is characterized in that the matches are introduced in required numbers into intermediate receiver means, said filled intermediate receiver means being each supplied with an empty tray, whereupon the matches are transferred from said intermediate receiver means to the trays and said trays are removed from the intermediate receiver means and finally the filled trays are each provided with a slide.

It is evident that for performing said method many apparatuses may be designed which are adapted for partly automatic as well as for fully automatic operation.

A preferred embodiment of the apparatus for performing said method comprises according to the invention a plurality of rows of adjacent intermediate receiver means for matches, driving means for moving said rows of intermediate receiver means along a number of stations, said stations comprising at least one filling station in which each time a required amount of matches is introduced into each of the intermediate receiver means of a row of intermediate receiver means being in said station, a station in which the intermediate receiver means of a row are each supplied with a tray, as well as an ejecting or stripping station in which the filled trays are removed from a row of intermediate means and a station where the filled trays of a row are provided with a slide.

The intermediate receiver means according to the invention may be constructed in many ways. They may have a detached as well as a fixed bottom or they may be constructed without a bottom.

In case the intermediate receiver means have no bottom they are, at least over part of their path, in contact with a plate, a number of strips etc. The bottom, the plate, the strips etc. may be gradually or sharply bent or shaped in a similar way.

Also, one or more lateral walls of the intermediate receiver means may be lacking, the corresponding sides of the intermediate receiver means being moved along

fixedly arranged strips or rims. A preferred embodiment of said intermediate receiver means is characterized in that the or each intermediate receiver means has at least one front and two lateral walls, said lateral walls being so spaced apart that these may be brought substantially against the inner or outer sides of the lateral walls of a tray to be filled. These lateral and end walls preferably have at least a portion of greater height than the height of the upright walls of a tray. If desired there may be provided in the intermediate receiver means aligning partitions for the matches, said partitions extending parallel to the lateral walls. For the purpose of ejecting the filled trays the intermediate receiver means may have one or more openings or slots or they may be provided themselves with an ejector or stripping device. The intermediate receiver means may be so constructed as to enable a portion of the upright walls to engage the trays internally and/or externally.

For the purpose of propelling the intermediate receiver means chains, belts, arms and other conveying means known per se are used to which these intermediate receiver means may be fixedly or movably, for example pivotally, connected. Also, said intermediate receiver means may be moved over a table or board. In that case said table or board may serve as a bottom so that consequently the intermediate receiver means may be constructed without a bottom. Said table or board may, if desired, be subjected to vibration independent of the intermediate receiver means.

For feeding empty trays to the intermediate receiver means an embodiment of the apparatus according to the invention reveals that the device for feeding said empty trays may be provided with a lock, said device being, for example, constructed in a simple way as a number of adjacent sliding paths. Consequently a tray will always face in the correct way an intermediate receiver means entering said feeding device. These locks may be constructed in various ways. A simple device is for example obtained by using springs projecting into the paths of the lowermost empty boxes contained in the feeding device or clamping said lowermost boxes in their paths.

The invention will be explained below with reference to the accompanying drawings showing by way of non-restrictive example some embodiments of the apparatus according to the invention.

Fig. 1 shows a first embodiment of said apparatus in longitudinal section.

Fig. 2 shows a top plan view thereof.

Figs. 3–8 show in perspective some embodiments of the intermediate receiver means for the matches.

Figs. 9–11 show the filling station in three different stages with an intermediate receiver means which has entered said station.

Figs. 12–14 diagrammatically show three different stages of the station with a modified lock construction, in which the intermediate receiver means are each supplied with a tray.

Figs. 15 and 16 diagrammatically show in section and in top plan view part of another embodiment of the apparatus according to the invention.

Fig. 17 shows part of a third embodiment.

Figs. 18 and 19 diagrammatically show two other embodiments of the apparatus according to the invention.

Fig. 20 shows the stripping device on an enlarged scale.

The apparatus shown in Figs. 1 and 2 has a frame of which for clarity's sake in Fig. 2 only a portion designated by numeral 1 is shown. In said frame there are two endless chains 2 which are intermittently driven in a manner known per se according to the path shown in Fig. 1 by a motor 3 via a transmission as well as toothed wheels and sprockets. The chains 2 are interconnected

by spaced strips 4 to each of which a number of intermediate receiver means 5 are connected in closed juxtaposition so that the apparatus comprises a number of rows of intermediate receiver means.

The intermediate receiver means 5 in Figs. 1 and 2 are embodied according to any one of Figs. 3–6. As may be seen from Figs. 3 and 4 said intermediate receiver means comprise a bottom 6, to approximately trapezoidal upright walls 7 and 8 and an end wall 9. In the bottom 6 there is provided a slot 10 allowing an ejector to be passed through, said ejector being described hereinafter. In the embodiment shown in Figs. 3 and 4 the end wall 9 has two slots 11 of a length which is equal to or somewhat exceeds the height of the side walls of a tray 12 of a match box. At the open front end of the intermediate receiver means the height of the side walls is substantially equal to the height of the side walls of the tray. As is apparent from Figs. 3 and 4 the width of the intermediate receiver means has been so selected as to allow a portion of the end wall 9 to engage the tray at its inside and the lateral walls 7 and 8 to engage the tray at its outside. In the embodiment according to Figs. 5 and 6, in which no slots 11 have been provided in the end wall 9, the width of the intermediate receiver means is somewhat smaller than that of a tray so that part of the end wall as well as of the lateral walls may be brought into a tray 12. In order to achieve that the lateral walls of the receiver means may easily engage the lateral walls of the tray the corners 13, 14 of said means are bent slightly outwards.

It is evident that the intermediate receiver means may have numerous shapes. Fig. 5, for example, shows an embodiment of the intermediate receiver means in which partitions 98 are provided and extend parallel to the lateral upright walls for the purpose of better alignment of the matches. Fig. 7 for example shows an embodiment of an intermediate receiver means in which inside the lateral walls 7, 8 and the end wall 9 there is provided a wall 15. This wall 15 serves to prevent the matches from remaining on the rim of the tray situated in said intermediate receiver means. This wall 15 may be formed in a simple manner by providing in the intermediate receiver means an insert 16 so that the intermediate receiver means is partly double-walled. In this embodiment the lateral walls 7 and 8 are slightly bent outwards over their entire length. In the case of intermediate receiver means engaging the trays at the inner side the upright walls may be inclined inwards so that they may also be easily introduced into the trays.

Fig. 8 shows an intermediate receiver means provided with a slidable portion 17 having an upright wall 18. The matches are introduced into this receiver means when the latter is in the pulled-out position. After the intermediate receiver means has been supplied with a tray the portion 17 is brought into the pushed-in position, the ends of the matches in the intermediate receiver means assuming a position in one plane so that they may be easily transferred to the tray. In the case of this embodiment of the intermediate receiver means it is not necessary to provide the apparatus with special means for flushing match ends.

In the embodiment according to Figs. 1 and 2 the above-described rows of intermediate receiver means 5 are intermittently moved by chains 2 past a number of stations, the driving speed of said rows of intermediate means being adapted to the speed at which the carrier bars 19 provided with holes for receiving the matches are moving in a machine for manufacturing matches. Of this match making machine there is only shown, apart from a number of said carrier bars 19, the guideway 20 (Fig. 2) for said carrier bars.

In the embodiment shown in Figs. 1 and 2 these stations are formed by:

A filling station in which each time a required number of matches is transferred to each of the intermediate receiver means positioned in said station;

A station in which the ends of the matches contained in the intermediate receiver means are brought into substantially one plane;

A station in which the intermediate receiver means are each supplied with a tray;

A station in which the matches introduced into the trays are subjected to vibration;

An ejecting or filling station in which the filled trays are pushed or stripped off the intermediate receiver means and

A station in which the filled trays are provided with a slide.

The above-mentioned stations will be successively described.

In the filling station of which Figs. 9–11 show three different stages the chains 2 are so guided by sprockets 21 constructed as chain-tensioners and by guide wheels 22 as to cause the intermediate receiver means 5 to arrive in this filling station with their open side turned upwards. The sprockets 21 and 22 are arranged at such close distance to the guideways 20 for the carrier bars 19 that the matches 23 ejected from said bars must drop into the intermediate receiver means.

For the purpose of ejecting the matches from the carrier bars 19 there is provided an ejector 25 equipped with needles, said ejector being reciprocated by eccentrics 26, 27. The number of needles 24 has been so selected as to cause, at each stroke of the ejector 25, half the required number of matches to be transferred to the row of intermediate receiver means 5. After the first stroke of the ejector 25 (Fig. 9) the carrier bars 19 are moved over such a distance that again a filled carrier bar portion arrives in front of the ejector 25 which then performs its second stroke (Fig. 10) and consequently the second half of the required number of matches is transferred to each intermediate receiver means of the row. Fig. 11 shows the position of the ejector 25 in which the latter is ready to transfer the first half of the number of matches to a next row of intermediate receiver means. The filled row of intermediate receiver means 5 has moved out of the filling station and a following row of intermediate receiver means has entered the filling station.

After a row of intermediate receiver means 5 has been filled it is moved stepwise to the station in which the ends of the matches contained in said intermediate receiver means are flushed. For this purpose there is provided in this station a flushing device 28 in the form of a strip adapted to oscillate on a shaft 29. This flushing member has at least one arm 31 biased by a spring 30 which in the operating position of the flushing device (Fig. 1) is tensioned and may return said member to its initial position. The arm 31 is actuated by an arm 33 rotatably mounted on a shaft 32, said arm 33 being driven by a sprocket 34 over which a chain 35 passes which is driven by a sprocket 37 connected with a toothed wheel 36. This toothed wheel meshes with a gear wheel with interrupted gearing which serves to produce an intermittent movement. The arm 33 brings the flushing device 28 into its operative position in which said device pushes the heads of the matches contained in a row of intermediate receiver means flush against the end walls 9 of said intermediate receiver means. When the arm 33 releases the arm 31 the spring 30 brings the flushing device 28 again into its initial position outside the path of the intermediate receiver means 5.

The row of intermediate receiver means with flushed matches is thereupon moved to the station in which each intermediate receiver means is supplied with a tray 38. In this station the chains 2 are so guided as to cause the intermediate receiver means to turn over an angle of about 180°. The feeding device arranged in said station comprises a glide path 39 for feeding empty trays 38. This glide path is constructed in such a way that facing each of the rows of intermediate receiver means 5 entering the station there is always an empty tray in a

position enabling the corresponding intermediate receiver means 5 to grip the tray. For this purpose the front side 40 of said glide path is so shaped at its bottom—which is situated in the trajectory of the front of the intermediate receiver means—that part of the open top of said trays is not covered by said front side. Furthermore there is provided a lock in the form of a number of springs 41 holding the lowermost row of trays located in the glide path. When a row of intermediate receiver means enters this station the fronts of said intermediate receiver means will each engage a tray and will draw said tray through the lock 41. As may be seen from Fig. 1 the glide path has a portion 42 which is so curved that when the intermediate receiver means are moving on the trays are farther pressed onto the intermediate receiver means or the intermediate receiver means are farther pressed into the trays.

For the purpose of bringing a following row of trays into the lock there is provided on the shaft 32 of the sprocket 34 a pushing device 43 comprising a number of arms each having a sharply bent end. These arms engage one of the rows of trays and push said row of trays together with the underlying rows of trays downwards until the lowermost row of trays is held by the spring 41.

Figs. 12–14 show three different positions of the pushing device 43 with an embodiment of the glide path 39 in which the lock has a double construction and is formed by a first set of retaining springs 44 on which the lowermost row of trays is supported and a second set of holding or clamping springs 45 arranged above the first set. As is apparent from Fig. 12 the lowermost row of trays is engaged and taken along by the row of intermediate receiver means 5 entering this station. The trays located between both sets of springs 44 and 45 move downwards after the removal of the lowermost row of trays until they are supported by the springs 44. Said springs 44 are so curved as to make them move already towards their initial position before the lowermost row of trays has completely passed said springs 44. The row of trays held or clamped by the uppermost springs 45 are taken along by the pushing device 43 (see Fig. 12) and brought between the springs 44 and 45. This double construction of the lock presents the advantage that it prevents any damaged trays from dropping downwards.

After the row of intermediate receiver means supplied with trays has passed the curved portion 42 of the glide path 39, these trays arrive in reversed condition on a table 46 which is subjected to vibration by a vibrating device 47 so that consequently the matches are uniformly arranged in the trays 38.

At the end of the table 46 there is in the next station an ejecting or stripping device 48 adapted for upward and downward movement which passes through slots 49 in the strips 4 and through the slots 10 in the intermediate receiver means of the row of intermediate receiver means being at that moment in said station. The ejecting or stripping device 48 is suspended from a hingedly interconnected system of rods 50, 51, 52, said system being biased by a spring 53 urging the ejecting and stripping device 48 towards its initial position in which said device is outside said slots. The ends of the rods 50 and 52 are pivotally mounted in the apparatus. On the rod 52 there acts a cam 54 arranged on the shaft 55 on which the sprocket 37 is mounted so that said cam 54 actuates the ejecting or stripping device 48 in accordance with the displacement of the chains 2 and therefore of the rows of intermediate receiver means 5, since the sprocket 37 is mounted on the same shaft as the toothed wheel 36 meshing with the gear wheel 56 with interrupted gearing.

When the ejecting or stripping device 48 moves downwards through the slots of the strip 4 and the intermediate receiver means 5, the trays in said intermediate receiver means with the matches contained in said trays

are pressed onto a table or strip 57 adapted for upward and downward movement, said table or strip being arranged in the station where the filled trays are provided with a slide. The table or strip 57 is actuated by a system of rods 58, 59, 60 of which rod 58 is guided in a guide 61. The rod 60 is pulled by a spring 62 against a cam 63 mounted on the shaft 65 provided with a sprocket 64. Said sprocket is driven by a chain 66 which has been passed around a sprocket mounted on the shaft 55. When the table or strip 57 is brought into its lower position the filled trays 38 are facing with one front a pusher means 67 adapted to be reciprocated by a rod 69 pivotally mounted on a rod 68. The rod 69 is hingedly connected to a rod 70 which is actuated by an eccentric 71 mounted on the shaft 65. The rod 69 is also connected to a rod 72 of a rod system 72, 73, 74, 75 adapted to rotate a number of thin resilient strips 77 fixed to one or more arms 76 rotatably mounted on a shaft so as to cause each of said strips to enter a slide 78 before the pusher means 67 with its forward stroke pushes the trays into said slide, said strips being withdrawn again from the slides after the trays have been pushed by the pusher means 67 completely or partly into the slides. In this manner, the strips 77 force matches which may stick out of the trays into said trays and prevent the matches from colliding against the front top edge of the slides, as shown in Figures 18 and 19. After the trays have been inserted into the slides the latter are each time moved so far on the feeding path 79 as to position again empty slides in front of the pusher means 67. This pusher means may be equipped with as many legs as there are intermediate receiver means in a row.

In the embodiment partly shown in Figs. 15 and 16 the intermediate receiver means 5 have no bottom. These are pushed by the chains 2 over a plate or a number of strips 80, said plate extending from the filling station (not shown) up to a polygonal intermittently rotating drum 81. Said drum is arranged in the station in which the intermediate receiver means are supplied with an empty tray 38. The curved portion of the feeding path provided with a lock 44 for the trays is so constructed as to prevent said trays from falling off the intermediate receiver means during the reversing movement. The remaining portion of the apapratus (not shown) may be constructed in the same manner as described with reference to the apparatus according to Figs. 1 and 2.

Fig. 17 shows an ejecting or stripping station of the apapratus in which each intermediate receiver means 5 itself is provided with an ejecting or stripping device 82. This ejector passes through a hole in the bottom 6 of said intermediate receiver means. The intermediate receiver means are fixed to a steel perforated driving belt 83. To the end of the ejector 82 projecting into the intermediate receiver means there is fixed a small plate 84, the other end of the ejector 82 being eqiupped with rollers 85 running in a profiled rail 86. As may be seen from this figure the distance between the steel belt 83 and the rail 86 is in the ejecting station smaller than in the other portion shown in the drawing. Consequently the plate 84 is pushed by the ejector 82 out of the interemediate receiver means 5 so that the filled tray is pushed off the intermediate receiver means and enters the station where the filled trays are provided with a slide.

Fig. 18 shows an embodiment in which a number of rows of intermediate receiver means 5 are pivotally connected to the ends of a number of arms 87 provided in star-like arrangement. These arms 87 are fixed to a hollow cylinder 88 rotating around a hollow cylinder 89 to which through a tube 90 compressed air is supplied. In the cylinder 89 there is a slot 91 which in the ejecting or stripping station is faced by one of the arms 87 so that compressed air enters the correspond-

ing intermediate receiver means 5 and consequently the filled trays 38 are pushed off the intermediate receiver means 5. Said filled trays arrive on a stationary table 92 in front of a pusher means 67 which pushes them into a slide 78. The other stations may be constructed in the manner as described with reference to Figs. 1 and 2.

The embodiment shown in Figs. 19 and 20 differs from that of Figure 18 in that instead of compressed air for removing the trays 38 from the intermediate receiver means 5 a fixed stripping device 93 is provided comprising two parallel strips 94, 95 having chamfered front ends, said strips being so spaced apart that they may grip an intermediate receiver means 5 so that, when the intermediate receiver means 5 are turned, the filled trays are stripped off said intermediate receiver means and arrive on a fixed table facing the pusher means. It is clear that the arms 96 may be solid and may, if desired, be replaced for example by circular plates. The intermediate receiver means 5 may be provided with a counterweight 97 so that it is achieved that the bottoms of said intermediate means, when the latter are not in a station where they are guided, will assume a horizontal position. This embodiment may for the rest be constructed in the same way as described with reference to Figs. 1 and 2.

It is obvious that the invention is not restricted to the embodiments of the apparatus or the intermediate receiver means according to the invention as described in the preceding text and shown in the accompanying drawings but that these may be modified in many ways without departing from the scope of the invention. For example, as shown in Fig. 5, the intermediate receiver means may be provided with at least one aligning partition for the matches introduced into said intermediate receiver means, said partition extending parallel to the lateral walls of the intermediate receiver means. It is obvious that when using such aligning partitions these partitions and/or ejecting means should be constructed so as to permit the filled trays to be removed from the intermediate receiver means with the aid of said partitions and/or ejecting means. For this purpose, when using for example ejectors, one or more slots may be provided in said ejectors. Also, the ejector portion may comprise two or more spaced parts. If desired the aligning partitions may also have slots for receiving the corresponding ejector parts. Furthermore the trays may also be provided with slides partly slid thereon when said trays are on the intermediate receiver means.

I claim:

1. An apparatus for filling match boxes with matches, comprising a plurality of rows of adjacent intermediate receiver means for matches, a plurality of stations, conveying means for intermittently moving said rows of intermediate receiver means past the stations, said stations comprising at least one filling station in which each time a predetermined number of matches is introduced into each of the intermediate receiver means of a row of intermediate receiver means being in said station, a station for supplying each of the filled receiver means of a row with an empty tray, a station for removing the trays from said intermediate means when the matches contained in said intermediate means are transferred to said trays and a station for providing each of the filled trays of a row with a slide, each intermediate receiver means comprising one upright front and two upright lateral walls, said front wall being constructed to be brought into engagement with the inner side of the front wall of a tray to be filled by the movement of said intermediate receiver means past said tray supply station and said lateral walls being so spaced apart that a tray to be filled may be brought substantially against one of the sides of said lateral walls.

2. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means has a bottom, said bottom having an opening, an ejector for ejecting the filled tray passing through said opening in the bottom, the end of said ejector being provided with a plate-like portion lying in said intermediate receiver means.

3. An apparatus for filling match boxes with matches according to claim 1, characterized in that the upright walls of said intermediate receiver means are provided with slots of such a width that into each of them an upright wall of a tray may be introduced.

4. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means has a bottom, an ejector for ejecting the filled tray passing through said bottom, the end of the ejector being provided with a plate-like portion lying in said intermediate receiver means, and the upright walls of the intermediate receiver means being provided with slots of such a width, that into each of them an upright wall of a tray may be introduced.

5. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means comprises a displaceable element having an upright portion, said intermediate receiver means having an open side, said upright portion facing the open side and being displaceable in a direction towards and from said open side.

6. An apparatus for filling match boxes with matches according to claim 1, characterized in that at least the front wall of each intermediate receiver means has a portion of greater height than the height of the upright walls of a tray to be filled therewith.

7. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means has a bottom, an ejector for ejecting the filled tray passing through said bottom, the end of the ejector being provided with a plate-like portion lying in said intermediate receiver means, the upright walls of the intermediate receiver means being provided with slots of such a width, that into each of them an upright wall of a tray may be introduced, at least the front wall of the intermediate receiver means having a portion of greater height than the height of the upright walls of a tray to be filled therewith.

8. An apparatus for filling match boxes with matches according to claim 1, characterized in that the intermediate receiving means includes a bottom and that at least a portion of the upright walls of said intermediate receiver means is inclined with respect to the bottom.

9. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means has a bottom, an ejector for ejecting the filled tray passing through said bottom, the end of the ejector being provided with a plate-like portion lying in said intermediate receiver means, the intermediate receiver means having its upright walls provided with slots of such a width, that into each of them an upright wall of a tray may be introduced, at least a portion of the upright walls of said intermediate receiver means being inclined with respect to the bottom.

10. An apparatus for filling match boxes with matches according to claim 1, characterized in that the intermediate receiver means are provided with partitions extending parallel to their lateral upright walls.

11. An apparatus for filling match boxes with matches according to claim 1, characterized in that each intermediate receiver means has a bottom, an ejector for ejecting the filled tray passing through said bottom, the end of the ejector being provided with a plate-like portion lying in said intermediate receiver means, the intermediate receiver means having its upright walls provided with slots of such a width, that into each of them an upright wall of a tray may be introduced, at least the front wall of the intermediate receiver means having a portion of greater height than the height of the upright walls of a tray to be filled therewith, the intermediate receiver

means being provided with partitions extending parallel to their lateral upright walls.

12. An apparatus for filling match boxes with matches according to claim 1, characterized in that the intermediate receiver means are arranged over a plate-like means serving as a bottom plate for said intermediate receiver means before they are provided with a tray.

13. An apparatus according to claim 1, characterized in that in the station in which the intermediate receiver means are supplied with a tray there is arranged a device for feeding empty trays comprising a lock consisting of a number of springs corresponding to the number of intermediate receiver means, each time allowing only a number of trays corresponding to said number of intermediate receiver means to pass said lock, said trays being gripped and pulled through said lock by the front upright walls of the intermediate receiver means.

14. An apparatus according to claim 1, characterized in that at the station in which the intermediate receiver means are supplied with an empty tray, there is arranged a feeding device comprising a guideway for the empty trays to be gripped by the intermediate receiver means, said guideway being curved according to the reversing portion of the path of the conveying means.

15. An apparatus according to claim 1, characterized in that in the station in which the intermediate receiver means are supplied with a tray there is arranged a device for feeding empty trays comprising a lock consisting of a number of springs corresponding to the number of intermediate receiver means, each time allowing only a number of trays corresponding to said number of intermediate receiver means to pass said lock, said trays being gripped and pulled through said lock by the front walls of the intermediate receiver means, a driving device comprising a rotary pushing means with a number of arms, said arms each time pushing a row of empty trays into the lock when a preceding row of empty trays is pulled through said lock by a row of intermediate receiver means.

16. An apparatus according to claim 1, characterized in that in the station in which the intermediate receiver means are supplied with a tray there is arranged a device for feeding empty trays comprising a guideway for the empty trays, said guideway being curved according to the reversing portion of the path of the conveying means, a lock consisting of a number of springs corresponding to the number of intermediate receiver means, each time allowing only a number of trays corresponding to said number of intermediate receiver means to pass said lock, said trays being gripped and pulled through said lock by the front walls of the intermediate receiver means, a driving device comprising a rotary pushing means with a number of arms, said arms each time pushing a row of empty trays into the lock when a preceding row of empty trays is pulled through said lock by a row of intermediate receiver means.

17. An apparatus according to claim 1, characterized in that in the station in which the intermediate receiver means are supplied by a tray there is arranged a device for feeding empty trays which comprises a lock consisting of a number of springs corresponding to the number of intermediate receiver means, each time allowing only a number of trays corresponding to said number of intermediate receiver means to pass said lock, said trays being gripped and pulled through said lock by the front upright walls of the intermediate receiver means, the lock retaining the empty trays contained in the feeding device following the empty trays gripped by the intermediate receiver means.

18. An apparatus according to claim 1, characterized in that in the ejection station there is provided an ejector which removes the filled trays from the intermediate receiver means and moves said trays out of the path of said intermediate receiver means.

19. An apparatus according to claim 1, characterized in that in the ejection station there is provided a stripper which removes the filled trays from the intermediate receiver means and moves said trays out of the path of the intermediate receiver means.

20. An apparatus according to claim 1, characterized in that in the ejection station there is provided an ejector which removes the filled trays from the intermediate receiver means and moves said trays out of the path of said intermediate receiver means, said ejection station further comprising a table movable upwards and downwards, said table supporting the filled trays when removed from the intermediate receiver means and being in its lowermost position substantially in one plane with a feeding path for slides in the station for providing the filled trays of a row with slides.

21. An apparatus according to claim 1, characterized in that the station for providing the filled trays with slides comprises a curved resilient strip for each of the slides of a row and a driving device for said strips bringing said strips partly into the slides, located in the path of said strips before the trays are pushed into the slides and moving said resilient strips out of the slides after the filled trays have been pushed at least partly into said slides.

22. An apparatus according to claim 1, characterized in that in the ejection station there is provided a stripper which removes the filled trays from the intermediate receiver means and moves said trays out of the path of said intermediate receiver means, said stripper comprising a plurality of parallel strips arranged at a distance from each other substantially equal to the width of an intermediate receiver means, each of said strips being tapered towards its front end.

23. An apparatus according to claim 1, characterized in that between the filling station and the station in which each intermediate receiver means is supplied with an empty match box there is provided a flushing device which brings the match ends substantially into one plane, said flushing device comprising one flapper for each intermediate receiver means engaging the match ends through an open end of the intermediate receiver means.

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