April 9, 1935. W. VOSS 1,997,128

MATCH SAFE

Filed Nov. 11, 1932 2 Sheets-Sheet 1

Fig. 1

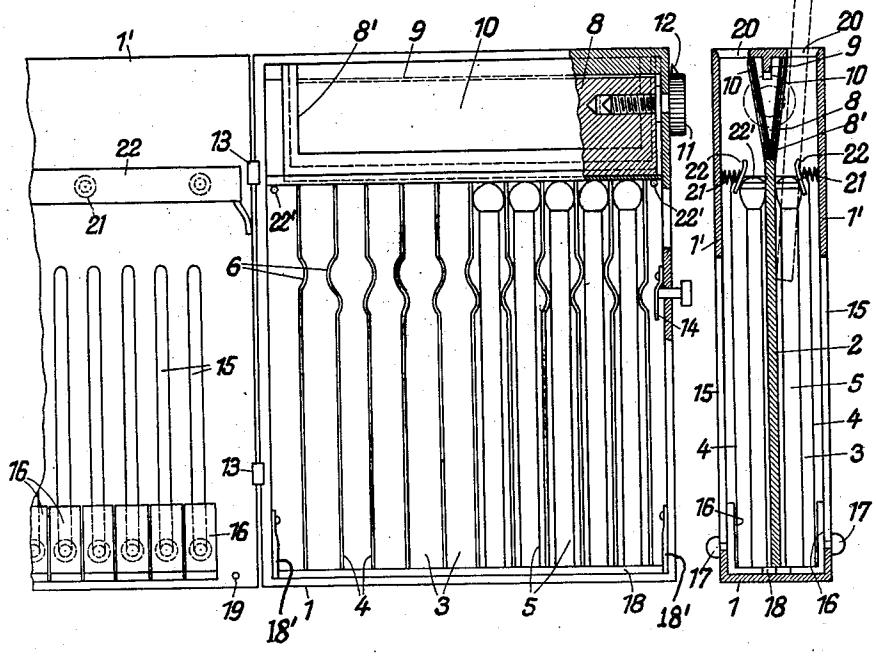



Fig. 2




Fig. 3

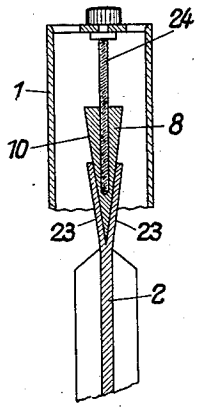
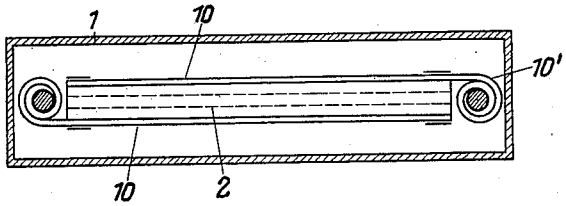



Fig. 4



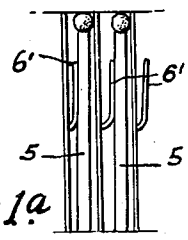




Fig. 1a

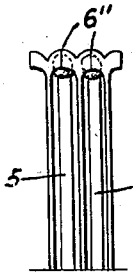



Fig. 1b.

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Fig. 5

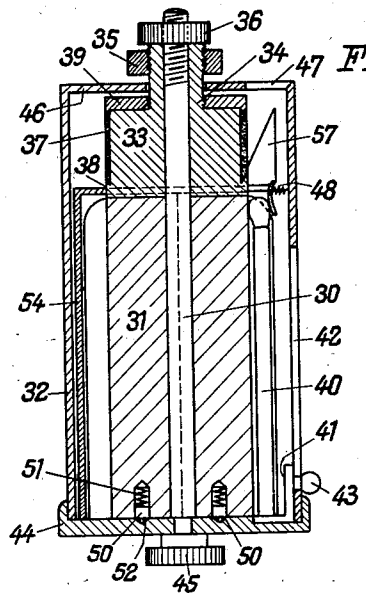



Fig. 7

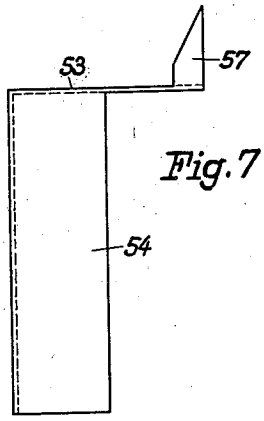



Fig. 8

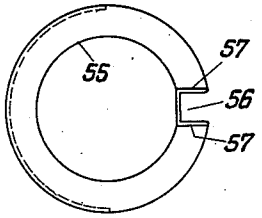



Fig. 6

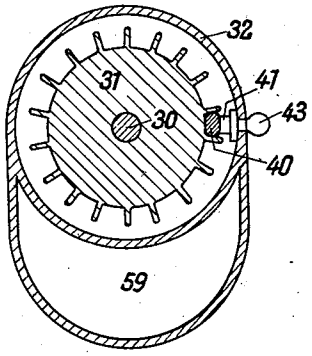



Fig. 9

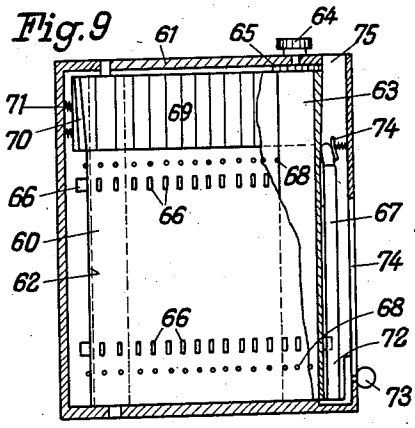



Fig. 11

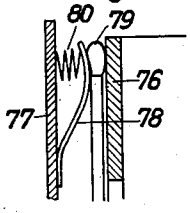



Fig. 12

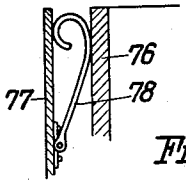
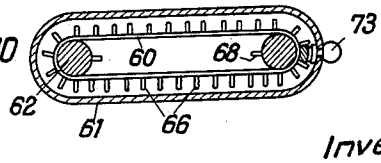



Fig. 10




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# UNITED STATES PATENT OFFICE

1,997,128

## MATCH SAFE

Walter Voss, Berlin-Neukolln, Germany

Application November 11, 1932, Serial No. 642,311
In Germany November 21, 1931

18 Claims. (Cl. 206—33.5)

The invention relates to a match safe in which the matches are each retained in one of a plurality of channels of a carrying body and are conducted out of the carrying body one at a time with the heads in advance by a slider, which movement slides the heads over a frictional surface and the matches thereby are lighted and brought in position of use. In the usual constructions of such match safes, all the matches are pushed out one after the other over one and the same frictional surface in front of which the matches are brought separately each one in its turn by revolving the carrying body. Therefore, this frictional surface is used in a rapid succession of lighting operations and, consequently, used up after a very short time so as to be inoperative. This rapid wear and tear of the frictional surface makes these match safes unsuitable for practical use and, for this reason, they are not found on the market.

According to the invention match safes of the type in which the matches are individually arranged in a carrier and pushed out by sliding action over a frictional surface, are improved by providing the frictional surface above the match carrier in such a manner that a predetermined portion of the frictional surface appertains to each chamber of the carrier and with each of the extraction channels of the diverse matches. In this way, an extremely advantageous utilization and a considerable prolongation of use of the frictional surface is obtained. Each of the matches comes in contact with a different portion of the frictional surface than the preceding match and, consequently, it is efficiently lighted. Therefore, the match safe constructed according to the invention is enabled to be used with one and the same fractional surface for a larger number of matches and is, thereby, a perfectly useful apparatus for practical employment.

If the match carrier is formed in a known manner, for instance, as a cylindrical body provided with channels for containing the diverse matches and being rotatable before an extraction slider common to all the matches, according to this invention the frictional surface is formed as a cylindrical or conical body corresponding to the match carrier and is rotated with this carrier so that a different portion of the frictional surface is brought before the slider with each match. When the channels containing the matches are arranged upon a movable endless band the frictional surface portions are also fixed to an endless band which is displaced simultaneously with the match carrying band before an extraction slider common to all the matches. If the match carrying body is arranged in fixed position, an individual extraction slider is provided for each of the channels containing the diverse matches, or a single slider common to all the matches may be brought before each of the carrier channels containing the matches. In order to securely hold the matches in position in the channels of the carrying body, the walls of these channels may be provided with resilient parts touching the matches and maintaining the slider in the elevated position.

The lighting capability and the systematic utilization of the frictional surface subdivided into diverse portions corresponding to the number of the matches of the carrier can be increased even more by several or all of these frictional surface portions being removable for replacement or cleaning. The duration of the use and of the satisfactory working of the whole frictional surface may be considerably augmented by providing for complete utilization of all portions of the frictional surface.

The accompanying drawings show by way of example several embodiments of the invention. Figures 1 and 2 represent in elevation and in section a match safe with a flat match carrying body. Figs. 1*a* and 1*b* are elevational views of a part of the device showing modified details. Figure 3 shows a frictional body movable in the direction of the extraction channels of the matches and Figure 4 shows a frictional body capable of being rolled up. Figures 5 and 6 represent in longitudinal section and in horizontal section respectively a match safe containing a cylindrical match carrier. Figures 7 and 8 show in side-view and in top-view respectively in detail a part of the device represented by Figures 5 and 6. Figures 9 and 10 show in longitudinal and in horizontal section respectively a match safe provided with an endless movable band carrying the matches. Figures 11 and 12 show two particular forms of a spring serving for pressing the matches against the frictional surface.

According to Figures 1 and 2 the flat safe or receptacle 1 formed for instance from sheet-metal contains a plate 2 provided on each of its two sides with several, for instance, ten channels 3 formed by the walls 4. Each of these channels 3 receives a single match 5 which is held in position by means of the elastic parts 6 of the walls 4 or by means of the elastic tongues 6' indicated in Figure 1*a*. The upper extremity of the plate 2 carries a wedge-formed body 8

which reposes with its lower horizontal border loosely upon the upper horizontal border of the plate 2 so that it can be displaced in the direction perpendicular to the channels 3. During this displacement it is guided by means of a tongue 9 projecting from the container 1 and engaging with a groove provided in the larger extremity of the body 8 and allowing this body 8 to be displaced along the tongue 9 perpendicularly to the channels 3. Each of the two oblique surfaces of the wedge body 8 carries a frame 8' open at the upper side and into which a frictional body 10 having the form of a strip or band or plate is inserted. These two frictional bodies 10 may be constituted by the two frictional walls of an ordinary match box after having been separated therefrom. An adjustable screw 11 serves for displacing the wedge-formed body 8 together with the frictional surfaces 10 transversely to the channels 3 of the match carrier 2. The amount of displacement is indicated by an index 12 fixed to the screw 11 and moving over a scale on the wall of the container 1. The displacement of the frictional bodies 10 may be effected also directly by hand without the aid of the screw 11 by displacing the one or the other of the two frictional bodies 10 relatively to the frame 8' and the wedge body 8.

The lateral walls 1' of the container 1 are fixed to the plate 2 by means of hinges 13 so as to be enabled to be opened and a bolt 14 detachable by hand assures the closing position of the lateral walls 1'. The lateral walls 1' of the container have before each channel 3 of the match carrier 2 a slot 15 serving for guiding the extraction sliders 16 which can be moved by means of spherical knobs 17 situated on the outside of the container 1 and fixed to the sliders 16. If the lateral walls 1' of the container 1 are closed each of the twenty sliders touches the appertaining match 5 under its foot so that the matches repose upon the horizontal parts of the sliders as shown by Figure 2. On the contrary, when the lateral walls 1' are opened the matches 5 repose as shown by Figure 1 upon the two bars 18 arranged on the one and the other side respectively of lower end of the plate 2 transversely to the channels 3 and fixed elastically to the plate 2 each by means of two plate springs 18' attached at the one end to the small side walls of the container 1 and at the other end to the extremities of the appertaining horizontal bar 18. These bars 18 are pressed back by the pins 19 projecting as shown in Figure 1 from the lower part of the lateral walls when these walls are closed, so that the sliders 16 are enabled to occupy the place of the bars 18 under the matches 5 as shown by Figure 2 where the two bars 18 are pushed under the lower border of the plate 2. At the upper extremity, the container 1 has on both sides of the wedge body 8 orifices 20 extending over the whole length of the frictional surfaces 10 and permitting the pushing out of the matches 5.

Each of the two lateral container walls 1' carries on its inside by means of springs 21 a transverse bar 22 opposite to the upper end of the channels 3 and touching the distance pins 22' projecting from the plate 2 when the lateral walls 1' are closed as shown by Figure 2. This cross bar 22 presses the matches 5 when they are pushed out against the opposite frictional surface 10 so as to assure the lighting of the matches. The length of the distance pins 22' is chosen and the cross bar is formed so as to allow an easy passage of the match to be pushed out between the cross bar 22 and the opposite part of the frame 8'. Preferably, the length of the distance pins 22' is dimensioned not longer than the thickness of the matches. The cross bar 22 retains the matches which are not pushed out in the channels 3 and prevents the sparks of the lighted match from flashing across towards the other matches. Furthermore, the elastic cross bars 22 work as springs opening the hinged lateral container walls 1'. The protection of the unused matches against involuntary ignition by sparks ejected from the lighted match can be obtained also by providing the channel walls 4 at their upper ends with tongues or ears 6'' indicated in Figure 1b and covering partially or wholly the sides and the front of the match head.

In order to ignite a match 5, the slider 16 appertaining to this match is raised by means of its knob 17 following its slot 15 whereby the match 5 is moved over the oblique frictional surface 10 and is pushed out through the orifice 20 of the container 1. Each match when pushed out slides over a predetermined portion of the frictional surface 10 and this surface portion appertains only to this match. The pressure exerted by the elastic cross bar upon the match 5 produces the friction necessary for ignition so that the match is lighted when it leaves the container 1 from which it will then project ready for use as indicated by dotted lines in Figure 2.

The number of the unused matches can be seen through the slots 15 of the container wall 1'. Numerals for the slots may be provided upon the outer surface of the container walls 1'. The raised slider 16 is held in the elevated position by the action of the elastic means 6 until it is returned by hand to its original position.

When the different portions of the frictional surfaces 10 which lie in the channels of the individual matches 5 are worn out, the whole frictional surfaces 10 are displaced transversely to the channels 3 either by hand relatively to the frames 8' or by means of the screw 11 acting upon the wedge body 8 carrying the frames 8' and the frictional surfaces 10 so that these surface portions already used up are replaced by the adjacent frictional surface portions which are not yet used up and allow, therefore, the ignition of a further number of matches. Also these frictional surface portions, when used up, can be replaced by new strips by displacing once more the frictional surfaces 10 transversely to the channels 3 assuming that the parts of the frictional surfaces 10 lying between the direction of two adjacent channel walls 4 are large enough to permit this double replacement of used up surface strips.

Instead of or in addition to the transverse displacement of the frictional surface 10 or its carrier 8, a displacement of these bodies in the sliding direction of the matches 5 or in the opposite direction may also be effected. To this end, according to Figure 3, the wedge body 8 carrying the two frictional surfaces 10 is inserted between two resilient walls 23 formed for instance from sheet-metal and fixed to the upper extremity of the match carrier 2. The body 8 can be progressively drawn out from the two walls 23 directly by hand or by means of the screw 24 which is rotatable but not axially movable in the container 1 so as to allow the utilization of the frictional surfaces 10 in two or more steps.

The frictional bodies 10 may possess, as shown in Figure 4, also the form of a band longer than

the length of the match carrier 2. The ends 10' of this band exceeding the length of the plate 2 are rolled up in storage spaces of the container 1 beside the plate 2 and become unwound to the necessary extent for renovating the used up portion of the frictional band. The frictional strips or bands may be fixed to the carrier also by means of an adhesive substance or by means of an adhesive plaster. In order to obtain an easy and gradual transference of the matches from the channels of the match carrier on to the frictional surface, a lath or rail for instance of metal may be arranged between the match carrier and the frictional surface so that the matches meet this rail or lath first, before riding on to the friction surface. In the embodiment of the invention shown in Figures 1 and 2 this metallic lath is constituted by the lower border of the frame 8, which performs this function of realizing a continual passage for the matches from the channels to the friction surface. Furthermore, the frictional body may be covered by such a lath in part, for instance, for half of its breadth and, when its uncovered half is used up, this half may be placed under the covering lath by overturning the frictional body so as to present the other unused up half to the ejected matches. Thus in the device shown in Figure 3 the friction surfaces 10, when their uncovered parts are worn out, can be drawn out from the resilient walls 23 and be turned round and, then, the worn parts can be pushed under the walls 23 so as to be covered, the other parts being used until they also wear out.

According to Figures 5 and 6 the axle 30 of the cylindrical fluted match carrier 31 which is rotatably held in the cylindrical container 32 carries a likewise cylindrical roller 33 loosely mounted upon this axle and provided at its upper end with a sleeve 34 having an outer thread. The nut 35 screwed on the thread of the sleeve 34 serves for displacing the roller 33 relatively to the cylindrical match carrier 31 whilst the nut 36 screwed on the upper end of the axle 30 is used for pressing the roller 33 after its displacement to the cylindrical match carrier so as to couple the roller with the match carrier. The roller 33 is enclosed by the frictional body 37 formed as a band and the outer cylindrical surface lies in the direction of the channels of the matches. The band 37 is held between a lower dovetail-flange 38 of the roller 33 and an upper disk 39 screwed upon the sleeve 34 and therefore, it is constrained to rotate with the roller 33 and thus with the match carrier 31.

According to Figures 5 and 6 a single slider 41 is provided for which is guided in a slot 42 in the container 32 and can be displaced by means of the knob 43 situated on the outside of the container and attached to the slider 41. The bottom 44 of the container 32 which can be unscrewed from the container prevents the matches 40 from falling out of the container and, when unscrewed, permits insertion of the matches in the grooves of the cylindrical carrier 31. The cover 46 of the container 32 has an orifice 47 through which the matches are ejected by means of the slider 41. The match which is pushed out is pressed against the frictional body 37 by the spring 48 acting by means of a little curved plate upon the match so as to produce the friction necessary for ignition. By rotating the cylindrical match carrier 31 by means of the turning handle 45 a fresh groove of the carrier 31 together with the match 40 contained therein and at the same time a fresh portion of the frictional surface 37 are brought into the moving path of the slider 41. When these diverse frictional surface portions have been used up, the nut 36 is unscrewed and the roller 33 is rotated by means of the nut 35 to a small angle relatively to the cylindrical match carrier 31 and, then, coupled again with the carrier 31 by tightening up the nut 36. Consequently wholly or partly renewed portions of the frictional surface 37 appertain to the individual grooves of the cylindrical match carrier 31, and, when having used up these frictional surface portions also, the frictional body 37 may be displaced once more by means of the roller 33 relatively to the cylindrical match carrier 31 so as to again change the frictional surface strips serving for igniting.

In order to obtain an increased security against sparking over from the lighted match to the adjacent unlighted matches, there is arranged above the rotatable match carrier a screen 53 shown in detail in Figures 7 and 8. This screen 53 is attached to a semi-cylinder 54 by means of which it reposes upon the bottom of the container 32. The roller 33 passes freely through a central orifice 55 of the screen 53 whilst the lateral groove 56 permits the passage of the match to be pushed out. The lateral upstanding lugs 57 assure in combination with the screen 53 the desired spark protection. Furthermore, the cylindrical match carrier 31—see Figure 5—contains at its lower end pins 50 which are pressed by springs 51 in the grooves 52 provided in the container cover 44 so as to assure the exact and infallible positioning of the individual matches 40 relatively to the slider 41 when the cylindrical carrier is displaced by means of the turning handle 45. For carrying more matches for refilling, the container 32 may be supplemented by an annexed chamber 59.

Figures 9 and 10 shown an embodiment having an endless metallic band 60 serving as a match carrier which is guided by means of two rollers 62, 63 rotatably held in the wall of the container 61. The roller 63 can be rotated by means of a turning handle 64 situated on the outside of the container and a ratchet wheel 65 serves for securing the actual position of the roller 63 and the endless band 60. The band 60 is subdivided by the projections 66 into several channels each containing a match 67. The roller 63 drives the band 60 by means of the pins 68 which project from the surface of the roller 63 and engage with holes of the band 60. The permanent frictional body 69 arranged at the upper end of the endless band 60 is composed of a plurality of portions each appertaining to a match channel of the band 60 and forming an endless band movable with the metallic band 60. A mechanically or chemically active cleansing means 70, for instance a rasp or a wool pad saturated with benzene is pressed by springs 71 against the frictional band 69 so as to clean it from the deposits due to the striking of the matches thereon and to keep it always in perfect condition. The slider 72 which is displaced along the slot 74' of the container 61 by means of the knob 73 serves for pushing out the matches 67 through the orifice 75. During this displacement, the matches are pressed against the frictional band 69 by the spring 74 and thereby ignited.

If the little quantity of fine glass dust contained in the heads of the matches is to be used for cleaning the permanent frictional body from the injurious deposits, according to Figure 11, the container wall 77 carries an elastic curved tongue 78 pressing the match head 79 during its dis-

placement against the permanent frictional body 76. A spring 80 fixed to the container wall 77 and acting in a direction transverse to the tongue 78 upon the upper tongue end presses the match head 79 strongly against the frictional body 76 up to the upper end of this body whereby the glass dust content of the match head 79 becomes operative as cleaning means for the frictional body. The spring 80 may be replaced also by a rubber cushion or another elastic means. As shown in Figure 12, the elastic tongue 78 may be pivotally connected at its lower end to the container wall 77 and bent over at its upper end towards this wall.

The outer surface of the container walls may be utilized for applying advertising or other indications by any known method. For instance, in the match safe shown in Figures 1 and 2, the bars between the slots of the two lateral container walls may be provided with the numerals and words of an almanac. Also in other details the invention can be realized in a manner different from the examples of the drawings.

I claim:

1. A match safe comprising in combination a container, a match carrier situated in said container and provided with a series of channels each receiving a single match, means for pushing out the matches one after the other from said container and a frictional body arranged in said container above said match carrier and extending over all the channels of said match carrier so that a certain separate portion of the frictional body appertains to each of the channels of the matches.

2. A match safe comprising in combination a cylindrical container, a rotatable cylindrical match carrier situated in said container and provided with a series of channels each receiving a single match, a single slider serving for pushing out the matches one after the other from said container and guided in a slot of the container wall and a frictional body having a revolution surface and being arranged rotatably in said container above said cylindrical match carrier so as to present a separate frictional surface portion to each of the channels of the diverse matches.

3. A match safe comprising in combination a container, an endless band movably mounted in said container and provided with channels each receiving a single match, a slider serving for pushing out the matches one after the other from said container and a frictional body movable with said endless band and formed also as an endless band and arranged in said container above said first-named endless band so as to present a separate frictional surface portion to each of the channels of the diverse matches.

4. A match safe comprising in combination a container, a match carrier fixedly arranged in this container and provided with channels each receiving a single match, a series of sliders each appertaining to one of the channels of said match carrier and serving for pushing out one of the matches from said container and a frictional body arranged in said container above said match carrier so as to present a separate frictional surface portion to each of the channels of the diverse matches.

5. A match safe according to claim 1 in which the frictional surface is held in guiding means and can be displaced relatively to the channels of the matches so as to bring fresh sections of these portions in the ejection path of the matches.

6. A match safe according to claim 1 characterized by the fact that the frictional body is held interchangeably in guiding means and can be displaced in the direction of the match axes.

7. A match safe according to claim 2 characterized by the fact that the frictional body is interchangeably held in a roller which is removably fixed to the axle of the cylindrical match carrier by means of a nut coupling up, when tightened, the match carrier and the friction body, but permitting when unscrewed the rotation of the friction body relatively to the match carrier.

8. A match safe according to claim 1 characterized by the fact that above the channels of the match carrier there are arranged means for holding the igniting wall of an ordinary match box constituting the friction body offering to each match a certain separate portion of its friction surface.

9. A match safe according to claim 1 characterized by the fact that above the match carrier there is arranged a plate covering a part of the friction body which is pushed under this plate so as to be enabled to be drawn out therefrom and to be overturned and to be pushed with its other part under the covering plate.

10. A match safe according to claim 1 in which between the frictional body and the match carrier is arranged a bar over which the heads of the matches slide before touching the frictional body and which assures a gradual transference without shock of the matches from the channels of the match carrier on to the friction body.

11. A match safe according to claim 1 characterized by the fact that opposite to the frictional body there is arranged an elastic cross bar being pressed by springs against the upper ends of the matches so as to retain the unused matches in the match carrier and which is formed as a screen preventing a passage of sparks from the lighted match to the unused matches.

12. A match safe according to claim 1 characterized by the fact that in the ejection path of the matches opposite to their heads there is arranged a cross bar which is acted on by springs so as to be pressed against the individual matches during their ejection, this cross bar having a surface inclined towards the matches and touching them, whilst the match carrier is provided with projecting pins spacing the cross bar from the match carrier and having an operative length corresponding to the thickness of the matches.

13. A match safe according to claim 2 in which above the match carrier there is arranged a cylindrical screen which has a slot allowing the vertical displacement of the slider and two upstanding lugs beside this slot preventing the passage of sparks from the lighted to an adjacent match.

14. A match safe according to claim 1 in which the match carrier is provided with elastic parts which assure the position of the matches in the channels of the match carrier and hold the used sliders in the elevated position.

15. A match safe according to claim 1 in which at the upper end of the match carrier elastic tongues are provided which cover at least partly the heads of the matches so as to prevent sparking over from a lighted match to an adjacent match.

16. A match safe according to claim 2 in which pins and grooves are provided for in the rotatable match carrier and in the container wall respectively, these pins engaging the grooves under the action of springs, the grooves being uni-

formly distributed over the match carrier in a number corresponding to the number of the carrier channels and at a distance corresponding to the distance of these channels.

17. A match safe according to claim 1 in which the container is provided with a hinged wall capable of being opened and closed for filling the match carrier and provided at its lower end with projecting pins, whilst at the lower end of the match carrier there is arranged opposite to these pins a bar upon which, when the hinged wall is opened the feet of the matches repose and which is attached to the match carrier by means of springs allowing the pins of the hinged wall to press back the bar when this wall is closed.

18. A match safe according to claim 1, in which the friction body is held interchangeably in guiding means and capable of being displaced in a direction perpendicular to the match axes.

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