(No Model.) 2 Sheets—Sheet 1.

J. A. TRENDEL.

AUTOMATIC LIGHTING AND EJECTING MATCH BOX.

No. 561,361. Patented June 2, 1896.

Fig. 1.

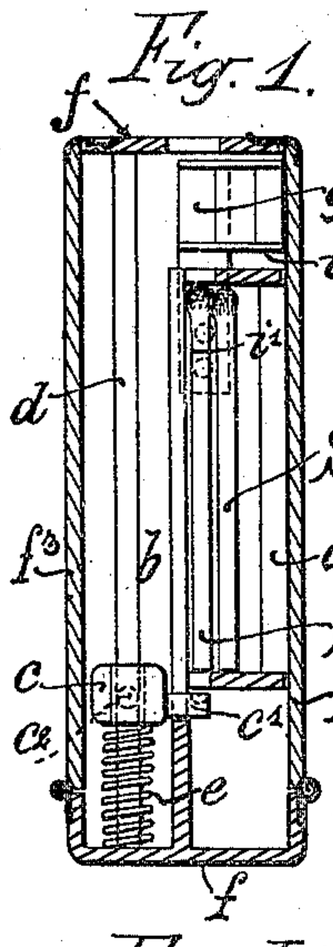


Fig. 2.

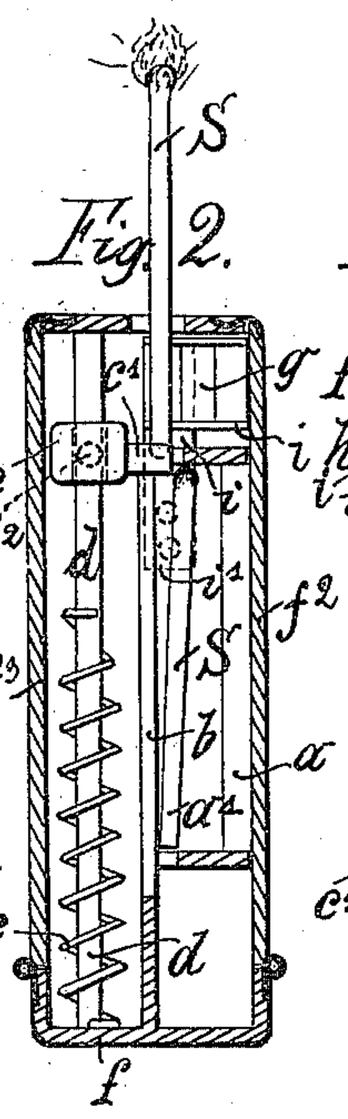


Fig. 3.

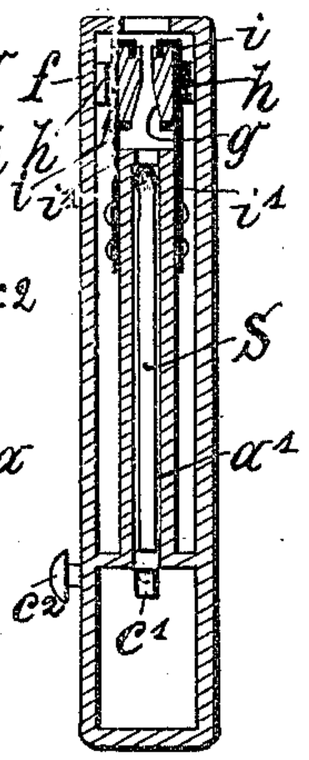


Fig. 5.

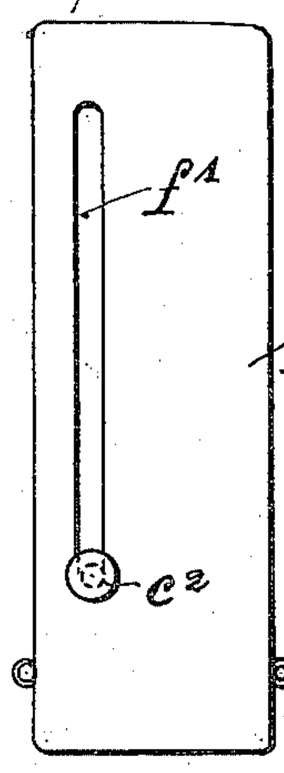


Fig. 6.

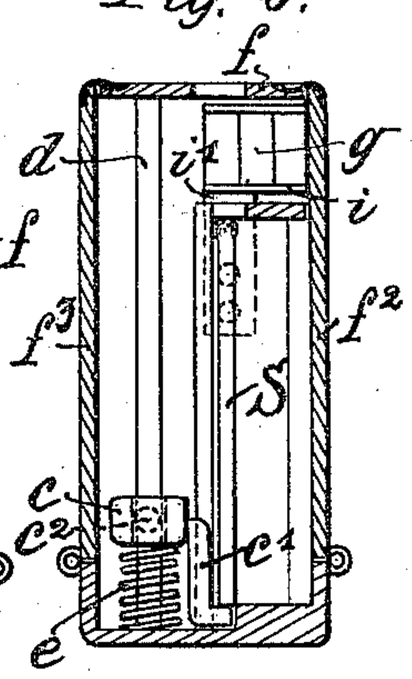


Fig. 4.

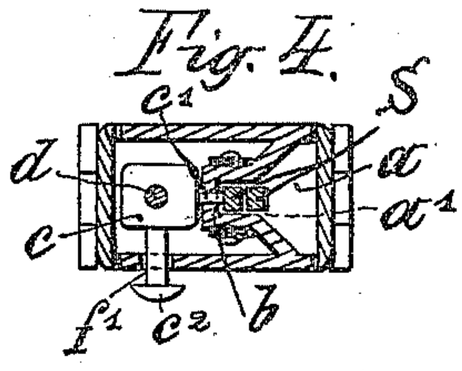


Fig. 7.

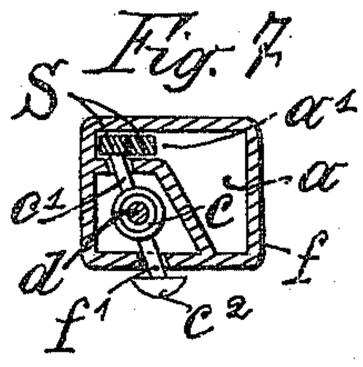


Fig. 8.

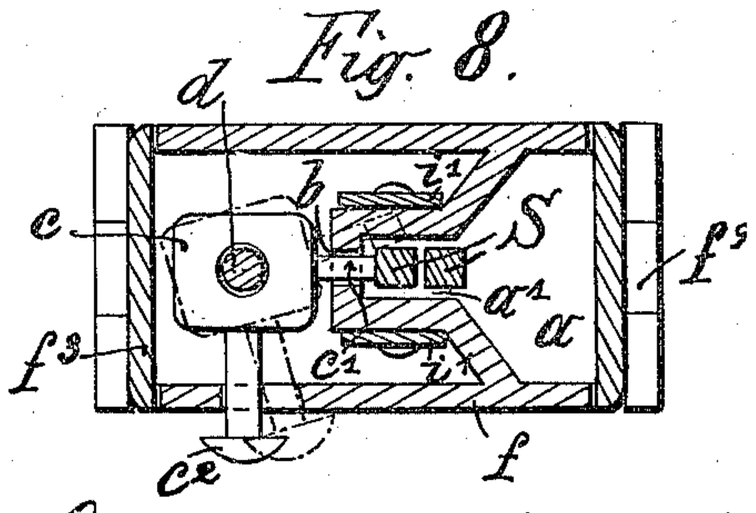
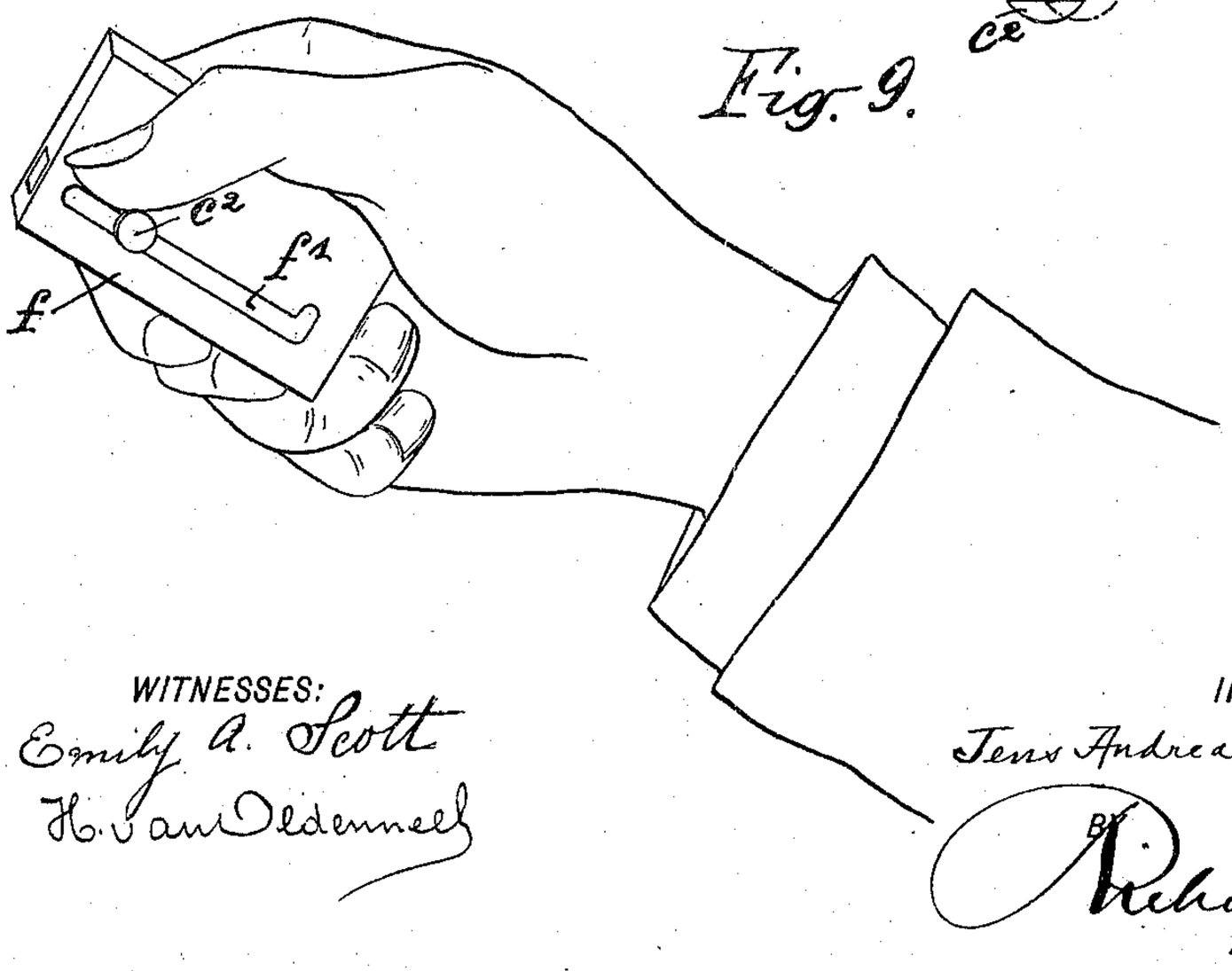


Fig. 9.



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(No Model.) 2 Sheets—Sheet 2.

J. A. TRENDEL.

AUTOMATIC LIGHTING AND EJECTING MATCH BOX.

No. 561,361. Patented June 2, 1896.

Fig. 10.

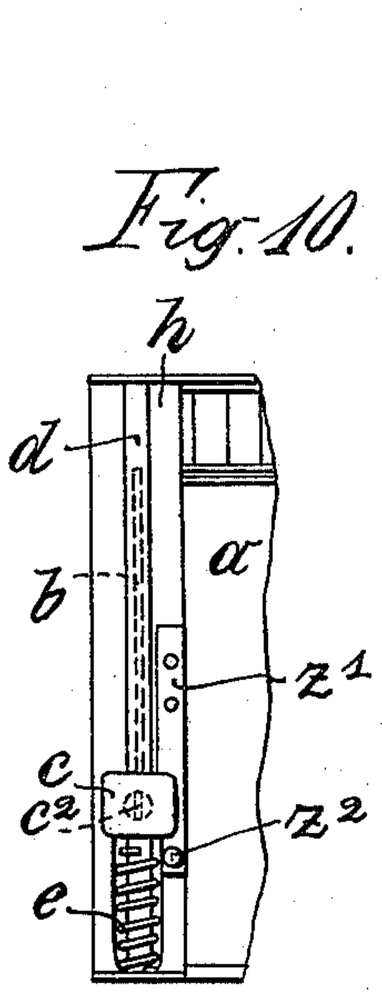


Fig. 11.

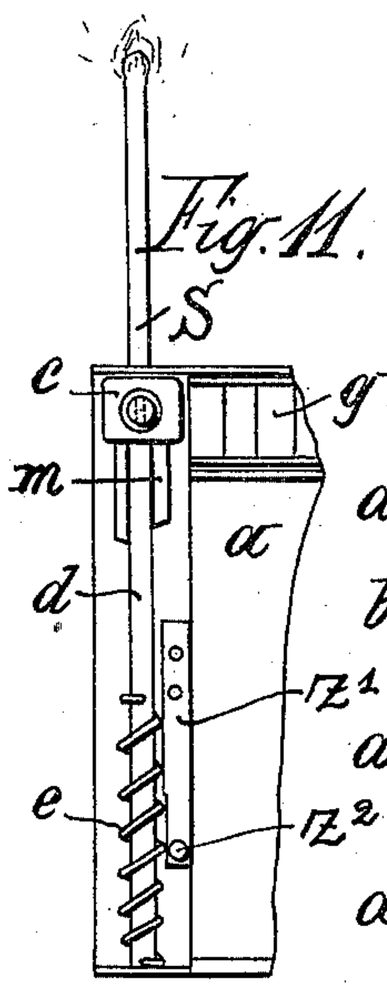


Fig. 12.

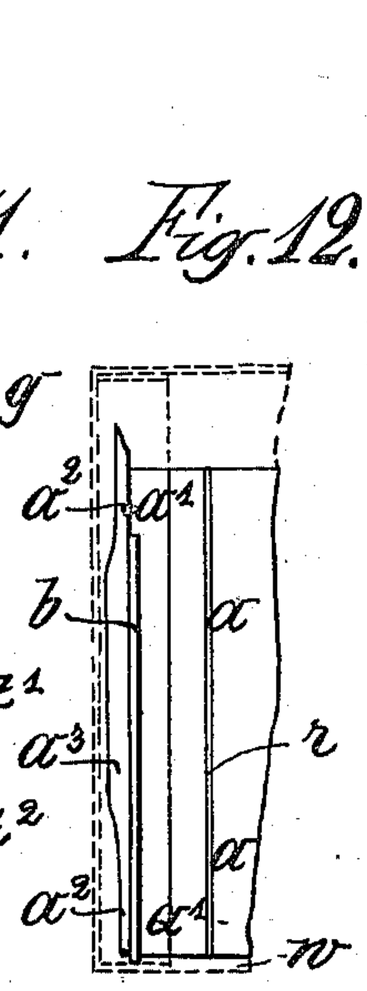


Fig. 13.

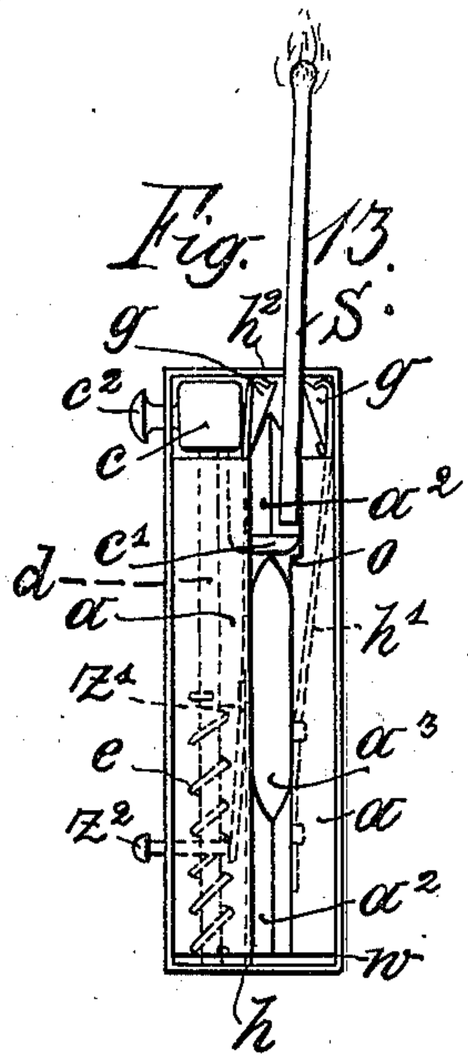


Fig. 14.

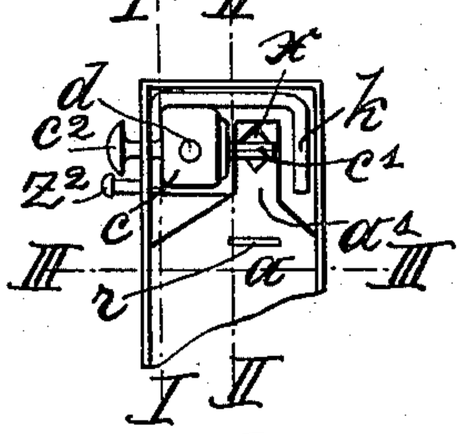


Fig. 15.

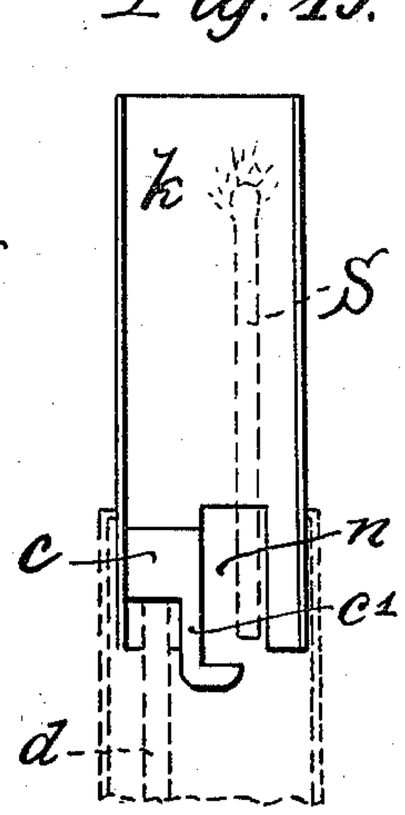


Fig. 16.

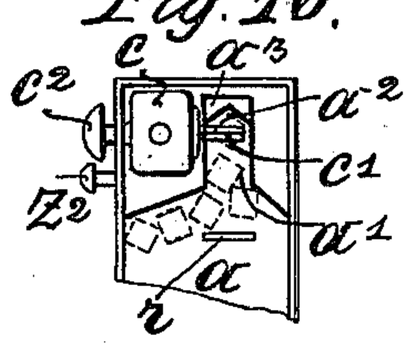


Fig. 17.

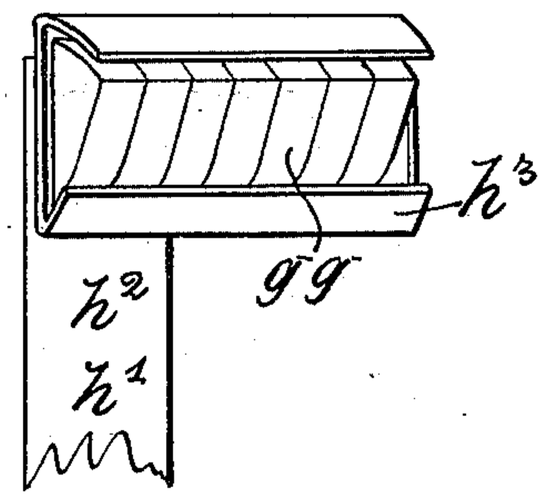
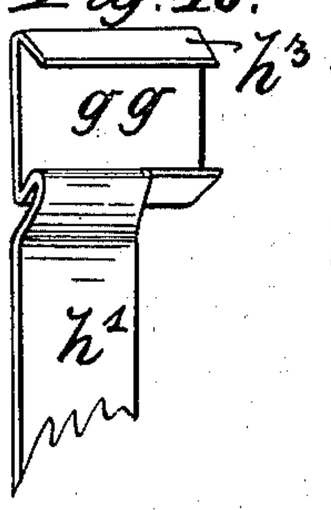


Fig. 18.



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UNITED STATES PATENT OFFICE.

JENS ANDREAS TRENDEL, OF BERLIN, GERMANY.

AUTOMATIC LIGHTING AND EJECTING MATCH-BOX.

SPECIFICATION forming part of Letters Patent No. 561,361, dated June 2, 1896.

Application filed January 8, 1895. Serial No. 534,188. (No model.) Patented in Belgium September 15, 1894, No. 111,567, and in Italy September 27, 1894, No. 37,116/484.

To all whom it may concern:

Be it known that I, JENS ANDREAS TRENDEL, a subject of the German Emperor, residing at Berlin, Kingdom of Prussia, German Empire, have invented a certain new and useful Improved Automatic Lighting and Ejecting Match-Box, of which the following is a specification.

The invention has been patented in Belgium, No. 111,567, dated September 15, 1894, and in Italy, No. 37,116/484, dated September 27, 1894.

My invention includes, in a match-box in which the matches are ejected therefrom in ignited condition, a guide-rod in the case having a block movable thereon and carrying a striking-pin, said casing having a channel for the matches, and a guide provided with a bellied portion for curved matches.

It includes also features of construction and arrangement hereinafter described, and particularly pointed out in the claims.

In the drawings, Figure 1 is a longitudinal section showing one portion of the movable parts. Fig. 2 is a similar view with the parts in a different position. Fig. 3 is a similar view a quarter-turn from Fig. 1. Fig. 4 is a transverse section through the device; Fig. 5, a side view. Fig. 6 is a view like Fig. 1, but of a modification. Fig. 7 is a cross-section of a modified form of casing. Fig. 8 is an enlarged view of the parts shown in Fig. 4. Fig. 9 shows how the device may be worked with one hand. Fig. 10 is a detail of a longitudinal section on line I I of Fig. 14. Fig. 11 is a similar view with the parts in a different position. Fig. 12 is a detail view of the parts on line II II of Fig. 14. Fig. 13 is a detail view on line III III of Fig. 14. Fig. 14 is a plan view of a part of a modified form of apparatus with the end or cover of the casing removed. Fig. 15 is a detail view of the shield, showing part of the casing in dotted lines and a lighted match. Fig. 16 is a detail plan view of Fig. 13 with the cover removed. Figs. 17 and 18 are detail views of modified forms of the holder for the frictional surfaces.

The case *f* has a cavity for the matches terminating in a channel *a'* longitudinally of the casing and of such shape that several matches may lie in it. Through a slot *b*, formed in the partition-wall of the cavity *a*, and its channel *a'* a tappet *c'* extends to engage the lower end of the first match of the series, as shown in Fig. 1, where the tappet lies just under the end of the first match. The tappet is on a sliding block *c* or striking-pin movable on a rod *d*, fixed at its ends to the top and bottom of the casing. A spring *e* on the rod forces the block, with the tappet, outward, when the block is free to move. The block may be held with the spring compressed by the stem of the knob c^2, which when the knob is turned aside enters a notch at the lower end of the slot *f'*, as shown in Figs. 8 and 9. By simply turning the knob c^2 so that the stem is thrust into the main part of the slot *f'* the spring exerts its force and throws the block *c*, with the tappet and match, into the position shown in Fig. 2. In this movement the head of the match is thrust violently between the friction-surfaces *g g*, held in the frames, having extensions *i'* secured to the partition-wall of the casing, as shown in Fig. 3. The match is not thrown from the casing, but the spring *e* is so graduated in strength that after the head of the match is ignited the spring gradually expends its force and the stem of the match simply hangs within the casing. A short spring is used in order to secure this result, the striking pin or block *c* in the latter part of its movement operating by its own momentum only and leaving the spring entirely.

The friction-pieces *g* are held by frames or holders *i*, Fig. 3, having the extensions *i'*, as before stated, secured to the partition in the casing. The frames are pressed by springs *h*. (Indicated in Fig. 3.) The casing *f* has sides f^2 f^3, which may be opened so that access may be had to the interior of the casing and so that the frictional pieces may be renewed at will.

The length of the casing may be reduced by making the channel *a'* and chamber *a*, which are of the same length as the match, reach to the bottom of the casing, and the whole casing is equal in length to the match, to which is added sufficient space to receive the fric-

tion-plates, as in Fig. 6. In this form the block *c* lies alongside the match, while the tappet or striker *c'* extends downward therefrom.

The other parts are similar in all respects to the form shown in Fig. 1.

The channel *a'* is arranged centrally of the casing in Fig. 1; but in Fig. 7 it is to one side, a diagonal partition being used in this instance. In all the forms described the knob c^2 extends substantially at right angles in relation to the plane of the channel in which the matches move, and by this arrangement the device can be operated by one hand, as in Fig. 9, the thumb operating upon the knob c^2, while the casing is held in the palm of the hand grasped by the fingers, and in releasing the device the knob may be pushed by the thumb-nail from the lateral notch into the main part of the slot *f'*.

In Figs. 10 to 14, which illustrate a modified form of device, a catch or holder Z' is employed for retaining the block *c*, with the spring, in position for ejecting a match. The stop consists of a spring-plate, which is secured at one end to the casing, the other or free end being controlled by a knob z^2. In this form also, and as shown in Fig. 11 particularly, the striking-pin has an elongation *m* of proper width to afford a good lateral bearing, and this elongation slides on the wall of the casing opposite the knob by which the block *c* is operated. This piece serves to guide the block and to resist the strain due to the lateral pressure of the thumb on the operating-knob.

As shown in Figs. 12, 13, 14, and 16, the channel *a'* for the matches has parallel walls from the point of entrance from the chamber *a*. The bottom of this channel is formed V-shaped, as shown in Fig. 16, and, furthermore, this bottom has a bellied portion a^3 in its middle portion. The enlargement of the channel *a'* thus provided allows a curved match to be thrown out, as space is thus provided in which the curved match may lie. A lateral extension *o* in the channel *a'* near its top, as shown in Fig. 13, provides for matches having extra-large heads. A shield-rod *r* extends longitudinally of the casing, Figs. 12, 14, and 16, in the chamber *a* and in front of the entrance to the channel *a'*, so that the mass of matches in the chamber *a* will be supported and prevented from crowding into the channel *a'*.

In order to shield the lighted match from the wind, a shield *k* of right-angular cross-sectional shape is secured to and carried by the block *c*, Figs. 14 and 15, so that when the match is forced out and is ignited the shield will also be in outward position to lie close to the same and protect it from the wind. An opening *n* in the lower part of the shield comes opposite the holders for the frictional surfaces *g g*, so that access may be had thereto for removing said frictional pieces.

In Fig. 17 the holder h^3 for the friction-pieces *g g* consists of a head portion having a dovetail recess to receive the pieces *g g* and the spring-arms h^2, the head-piece being soldered or otherwise secured to the spring-arms. Fig. 18 is a similar view showing the head portion and arms formed in one piece.

What I claim, and desire to secure by Letters Patent, is—

1. In combination, the casing, the guide-rod *d*, the block *c* movable thereon, the striking-pin carried by the block, the channel *a'* and the guide a^2 having a bellied portion a^3 for curved matches, said guide being arranged at the base of the channel *a'*, substantially as described.

2. In combination, the casing, the guide-rod *d* extending from the top to the bottom thereof and secured to said casing, the striking-pin, the block *c* carrying the same and moving on the rod, the channel *a'* for the matches to direct them to the striking-pin and the shield *k* carried by the block *c* and having one side open to receive the matches from the channel *a'* said shield moving with the striking-pin at each operation, said block *c* having a depending arm *m* with a striking-pin to engage the match at the lower end of the shield substantially as described.

3. In combination, the casing, the guide-rod *d*, the block *c* movable thereon, the striking-pin carried by the block the friction-surfaces *g*, *g*, and the shield *k* carried by the block *c* said shield having an opening *n* at its lower end to expose the friction-surfaces when said shield is raised, substantially as described.

4. In combination in a match-box, the casing, the channel for the matches, the guide-rod *d*, the block *c* movable thereon, the spring pressing on the block, the pin *c'* to engage the match arranged in a plane below the block *c* and the depending arm *m* from the block carrying the pin *c'* at its lower end, said arm extending down alongside the spring to the lower end of the match to bear also against a part of the casing in guiding the block, substantially as described.

5. In combination, the casing, the rod *d* therein, the sliding block carrying the tappet or striking-pin and the spring for forcing the block along the rod said spring being, when extended, of such length as to be entirely free with the sliding block before the block completes its movement whereby the block will be acting by its momentum in the latter part of its movement, substantially as described.

Signed at Berlin, Kingdom of Prussia, German Empire, this 19th day of December, 1894.

JENS ANDREAS TRENDEL.

Witnesses:
PAUL KANTER,
KARL PLERVE.