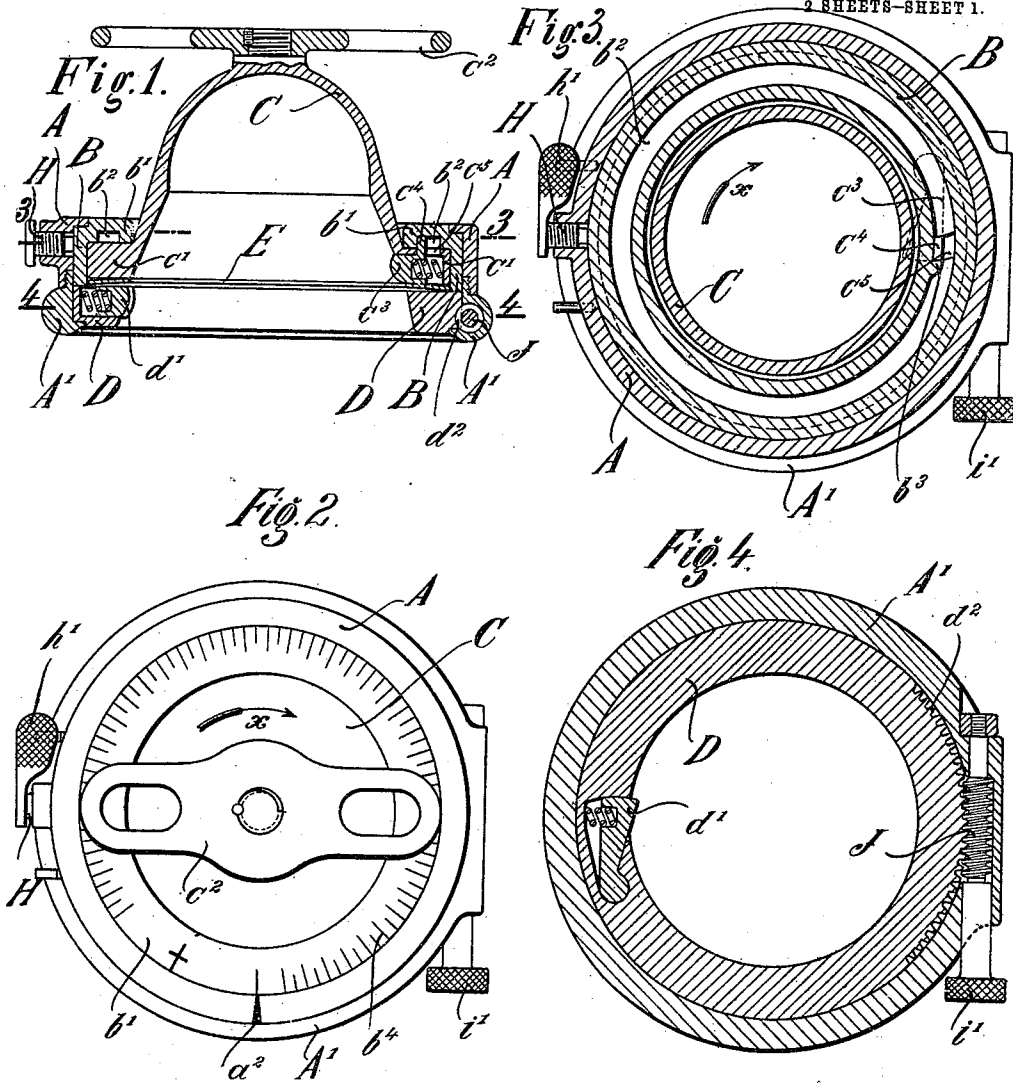


U. WILCK.
ADJUSTING DEVICE FOR FUSES.
APPLICATION FILED DEC. 14, 1907.

988.750.

Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 5.

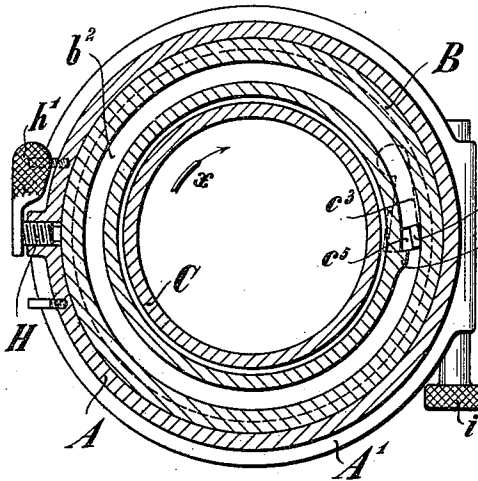


Fig. 6.

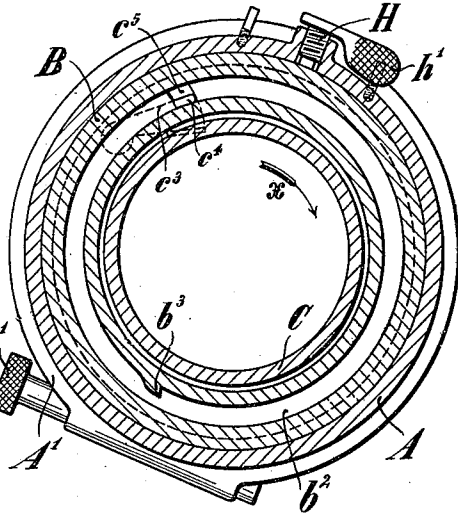


Fig. 7.

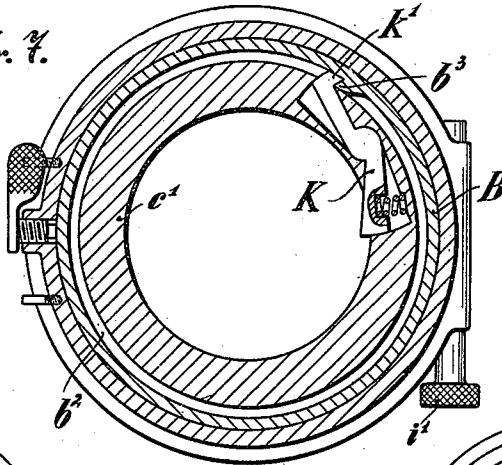


Fig. 8.

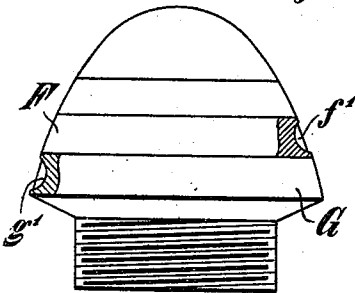
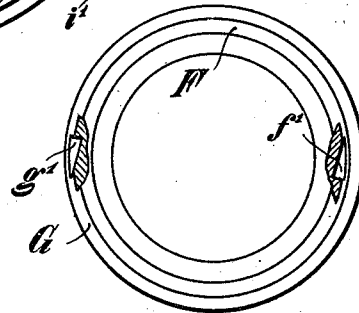


Fig. 9.



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ADJUSTING DEVICE FOR FUSES.

988,750.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed December 14, 1907. Serial No. 406,548.

To all whom it may concern:

Be it known that I, ULRICH WILCK, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Adjusting Devices for Fuses, of which the following is a specification.

In the devices now known for setting time fuses, those in the form of fuse-setting keys are constructed in such a manner that on setting the fuse the key must be brought into a predetermined angular position to the fuse in order to effect the engagement between the setting members of the key and the fuse. With those that are in the form of fuse-setting machines, this is not necessary but the machines are generally constructed in such a manner that at any rate two complete rotations of a setting member are required for setting the fuse.

The present invention relates to a fuse setting device which, on setting the fuse, can be applied thereto in any angular position without requiring more than two revolutions of the setting member.

In the accompanying drawings the invention is shown applied to a fuse setting key.

Figure 1 is an axial section through one embodiment of the setting key; Fig. 2 is a top view of Fig. 1; Figs. 3 and 4 are sections on lines 3—3 and 4—4, Fig. 1, respectively, looking from above; Figs. 5 and 6 show the same section as Fig. 3, with some parts represented in positions different from those shown in Fig. 3; Fig. 7 shows a section corresponding to Fig. 3 of an embodiment slightly modified in construction; Fig. 8 is a side view, partly in section, of a burning time fuse; and Fig. 9 is a top view of Fig. 8 partly in section.

Reference will first be had to the embodiment of the key shown in Figs. 1 to 6. The housing of the setting key consists of two parts A A' (see especially Fig. 1) which are screwed together and in which two rings B D are rotatably arranged. A cap C, which carries a handle c^2 and has a flange c' engaging the ring B, can rotate relatively to the rings. The cap C and the rings B D are arranged coaxially and are secured against axial displacement. Between the opposing faces of the ring D and the flange c' is arranged an annular spring E which is formed somewhat on the order of a plate-spring and presses the flange c' of the cap C

against a flange b' on the ring B. The cap C and the ring D form the relatively adjustable setting members of the key, the cap C being adapted to be coupled to the rotatable ring F of the fuse and the ring D being adapted to be coupled to the fuse-base G. For that purpose, the ring D and the flange c' of the cap C have swingingly mounted therein spring-pressed latches d' (Figs. 1 and 4) and c^3 (Figs. 1 and 3) of known construction. In the rotatably adjustable composition ring F a notch f' is provided for the latch c^3 and in the fuse-base G a notch g' is provided for the latch d' . In the flange b' of the ring B is cut an annular groove b^2 which has its inner wall provided with a limiting stop b^3 (Fig. 3) for a stop c^4 arranged on the upper surface of the latch c^3 . The stop c^4 projects through an aperture c^5 (Figs. 1 and 3) in the flange c' . The stops b^3 c^4 are arranged in such a manner that, when the latch c^3 is in the effective position shown in the drawing, the stop c^4 can hit the stop b^3 when the cap C is turned relatively to the ring B in the direction of the arrow x (Figs. 2 and 3). On the other hand, the stops b^3 c^4 can pass by each other when the latch c^3 is in the ineffective position, that is to say when the latch is completely forced back into the recess provided therefor in the flange c' . The flange b' of the ring B has on its outer face a scale b^4 for the burning lengths to which corresponds a mark a^2 on the part A of the housing. The ring B can be secured in any angular position, relatively to the housing A A' through the medium of a clamping screw H which is arranged in the part A of the housing and has a thumb-piece h' . On a part of its circumference the ring D is provided with teeth d^2 (Figs. 1 and 4) with which engages a worm J which is journaled in the part A' of the housing and is provided with a hand-wheel j' . The worm gear J d^2 , which is self-locking, serves for adjustment of burning-length corrections which can be read on a scale on the lower face of the ring D by means of a mark provided on the part A' of the housing. The scale and the corresponding mark are not shown on the drawing.

On using the improved setting device the stop b^3 is first brought into the angular position relatively to the latch d' that corresponds to the desired burning length. For

this purpose, the clamping screw H is released
 and by means of the handle c^2 the cap C
 is turned relatively to the housing A A', the
 turning of the cap preferably taking place
 5 in the direction of the arrow x (Figs. 2 and
 3). The ring B is carried along by the cap
 C by reason of the friction which the spring
 E causes between the flange c' of the cap C
 and the flange b' of the ring B. The adjust-
 10 ment of the ring B will therefore, also be
 effected by the turning movement of the cap
 C when the stop c^4 of the latch c^3 does not
 abut against the stop b^3 in the manner shown
 in Fig. 3, the latch c^3 being in its effective
 15 position prior to the placing of the setting
 key on the fuse. While the cap C and the
 ring B turn, the ring D remains at rest as it
 is prevented from turning relatively to the
 housing A A' by the worm gear J d^2 . The
 20 turning movement of the cap C is continued
 until the mark a^2 (Fig. 2) registers with the
 division of the scale b^4 which corresponds to
 the desired burning-length. The ring B is
 thereupon fixed in position relatively to the
 25 housing A A' by means of the clamping
 screw H. Any correction of the burning
 length that may be required is made by
 turning the worm J. The latch d' has then
 an angular distance from the stop b^3 that
 30 corresponds to the desired burning length.
 The operator then places the adjusted set-
 ting key on the fuse without paying any at-
 tention to how the latches c^3 d' are located
 relatively to the notches f' g' . After the set-
 35 ting key has been placed on the fuse none
 of the latches c^3 d' will therefore as a rule
 engage in the corresponding notches f' and
 g' in the fuse. In this case both of the
 latches are forced completely back in the re-
 40 cesses provided for them in the setting mem-
 bers C D against the action of the springs.
 The stop c^4 of the latch c^3 is then in such
 a position that it cannot cooperate with the
 stop b^3 (see Fig. 5). When the key has been
 45 placed on the fuse the cap C is rotated rela-
 tively to the fuse in the direction of the ar-
 row x through the medium of the handle c^2 ,
 the friction produced by the spring E caus-
 ing the ring B to be carried along by the cap
 50 C. The turning movement of the ring B
 is partaken of by the housing A A', which
 is coupled to the ring B by means of the
 clamping screw H, and by the setting mem-
 ber D which is held against rotation rela-
 55 tively to the part A' of the housing by the
 worm-gear J d^2 . During the first rotation
 of the cap C the latch d' must therefore en-
 ter into engagement with the corresponding
 notch g' in the fuse base G. As soon as this
 60 has taken place the setting member D, the
 housing A A' and the ring B remain sta-
 tionary. The latch c^3 must also enter into
 engagement with the corresponding notch f'
 during the first rotation of the cap C and it
 65 must do so also in the case it has not yet

reached its notch f' when the latch d' enters
 the notch g' . For example, the cap C can
 overcome the friction produced by the spring
 E between the flange c' of the cap and the
 flange b' of the ring B and can be further
 70 turned relatively to the ring B, the housing
 A A' and the ring D; furthermore as long
 as the latch c^3 has not entered the notch f'
 the stop c^4 is in such a position that it can-
 not hit the stop b^3 when the cap C is turned
 75 relatively to the ring B. The cap C, there-
 fore, cannot be prematurely fixed in position
 through abutment of the stops b^3 c^4 . After
 the latch c^3 has entered the notch f' the ad-
 justment of the composition ring F com-
 80 mences when the cap is turned farther in the
 above-mentioned direction. The turning
 movement of the cap C is continued until the
 stop c^4 hits the stop b^3 , the former having
 reached its effective position shown in Fig.
 85 6 relatively to the latter when the latch c^3
 entered the notch f' . From that moment
 the cap C is prevented from further rotation.
 The fuse has then obtained the desired ad-
 justment as the notches g' f' have now an
 90 angular distance from each other which
 corresponds to the angular distance of
 the latch d' from the stop b^3 . At the
 most two complete rotations of the cap
 C are required for setting the fuse as
 95 on the one hand both latches (c^3 d') must
 enter the corresponding notches in the fuse
 during one rotation of the cap and on the
 other hand there is required at the most one
 100 rotation of the cap from the time the latches
 have entered their notches to the moment the
 stop c^4 hits the stop b^3 . When the fuse has
 been set the setting key is removed from the
 fuse, the latches c^3 and d' automatically dis-
 105 engaging from the notches f' and g' in the
 known manner. It will easily be under-
 stood that the fuse obtains the desired ad-
 justment also when the setting key is placed
 on the fuse in such a manner that the latch
 110 c^3 enters into engagement with the notch f'
 before the latch d' passes into the notch g' ,
 or when, on placing the key on the fuse, one
 of the latches c^3 or d' enters the correspond-
 ing notch in the fuse or when both of the
 latches pass into the notches when the key
 115 is placed on the fuse. Also in these in-
 stances there is required at the most two
 complete rotations of the cap C for setting
 the fuse.

In the embodiment shown in Fig. 7 the
 120 latch K, which is mounted in the flange c'
 of the cap C and which is adapted to en-
 gage in the notch f' of the rotatable compo-
 sition ring, is formed as a two-armed lever.
 That arm of the latch K which does not
 125 serve for engaging in the notch f' is pro-
 vided with a lateral stop k' which in the
 effective position of the latch K projects
 into the groove b^2 of the ring B and can co-
 operate with the stop b^3 on the ring B. The
 130

stop b^3 is located on the outer wall of the groove b^2 . The manipulation and mode of operation of the setting key are not changed by this arrangement.

5 The invention may of course also be applied to fuse setting machines.

It has been proposed to provide a fuse setting device, which like the present invention, comprises two members carrying stops 10 to limit relative rotation between them, and adapted to engage the fixed and movable parts of the fuse respectively, of which members, that engaging the fixed part of the fuse has its stop adjustable so as to vary its 15 angular position thereon, while that member which engages the rotating member of the fuse, has its stop arranged so as to assume the arresting position only when the member which carries it, has coupled with the adjustable member of the fuse; but the known 20 fuse setting devices of this kind are so arranged that in using them, special care must be taken to place the setting device upon the fuse in a particular angular position, and 25 this is troublesome and consumes time.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A fuse setting device comprising two 30 relatively movable fuse-setting members, devices on said setting members adapted to engage the respective members of the fuse, and an adjustable stop for predetermining the extent of adjustment of the fuse; said 35 stop adapted to cooperate with one of said devices and determine the extent of fuse adjustment when said device engages with its respective fuse member.

2. A fuse setting device comprising two 40 relatively rotatable fuse-setting members, a stop member for arresting the relative movement of said members, means for adjusting and fixing said stop member relatively to one of the setting members whereby to determine the extent of adjustment of the fuse, 45 and fuse engaging means carried by said setting members, one of which prevents the limiting engagement of the stop except when said fuse-engaging means is in position to 50 engage its fuse element.

3. A fuse setting device comprising two 55 relatively rotatable fuse-setting members, a stop member for limiting the relative movement of said members, means for approximately adjusting and fixing said stop member relatively to one of the setting members whereby to determine the extent of fuse adjustment, means for accurately effecting 60 said adjustment, and fuse engaging means carried by said fuse setting members, the fuse engaging means of one of said setting members controlling the limiting engagement of the stop when said fuse-engaging 65 means is in position to engage with its fuse element.

4. A fuse setting device comprising relatively rotatable fuse-setting members, a stop carried by one of said members for limiting the relative movement between the members, adjustable means for fixing said 70 stop relatively to the other member whereby to determine the extent of adjustment of the fuse, and a latch carried by the other member adapted to engage with said stop and hold said member, the action of said latch 75 being controlled by the engagement of the setting device with the fuse.

5. A fuse setting device comprising two 80 relatively rotatable setting members having means through which to engage the respective members of a fuse, and a stop having means for adjustably fixing it relatively to one setting member; the means through which the other setting member engages the 85 fuse comprising a latch carrying a part which moves into the path of the stop when the latch moves into engagement.

6. A fuse setting device comprising two 90 relatively movable fuse-engaging members, an adjustable stop member adapted to be set relatively to one of said members for limiting the relative movement between the members, means for adjusting said stop whereby to determine the extent of adjustment of the fuse, and a latch carried by the other setting 95 member adapted to cooperate with said stop and hold said member, the action of said latch being controlled by the engagement of the setting device with the fuse.

7. A fuse setting device comprising two 100 relatively movable fuse-setting members, an adjustable member having a stop for limiting the extent of relative movement between said members, means for adjusting said stop whereby to determine the extent of the fuse 105 adjustment, a latch on one of the fuse setting members whereby the same engages with the fuse, and a member on said latch adapted to cooperate with said stop and hold 110 said setting member, the action of said latch being controlled by the engagement of the member on the latch with its fuse element.

8. A fuse setting device comprising two 115 relatively rotatable setting members, a member having a stop for limiting the relative movement of said members, means carried by one setting member for adjusting and fixing the stop member relatively to the other setting member whereby to predetermine the extent of the fuse adjustment, 120 latches carried by the setting members whereby they are adapted to engage with the respective members of a fuse, and a member on one of said latches adapted to cooperate with said stop and control the fuse 125 adjustment of the device.

9. A fuse setting device comprising two 130 relatively rotatable setting members having spring actuated latches through which to engage the respective members of a fuse,

- and a stop member having frictional contact with one of said setting members, by which it is adapted to be set in a given angular relation with the other setting member, and means through which the other setting member engages the fuse comprising a latch carrying a part which moves into the path of the stop when the latch moves into engagement.
10. A fuse setting device comprising two relatively rotatable setting members provided with means for engaging the respective members of a fuse, a stop member for one of the setting members, said stop member mounted coaxially with the setting members and having frictional connection with one of said setting members, and a locking device for positively connecting the stop member with the other setting member whereby one setting member is adapted to drive the other.
11. A fuse setting device comprising two relatively rotatable members carrying means to couple them respectively with the fixed and movable parts of a fuse, limiting stops which engage to arrest the relative angular movement between said members, one of said stops having means for adjustment upon its carrying member, and one of said coupling means controlling the limiting engagement of the stops by its movement into coupling relation with its respective fuse member, said fuse setting device being adapted to receive the fuse members at different angular positions and to rotate thereon and cause coupling of its members with the parts of the fuse.
12. A fuse setting device comprising two relatively rotatable members provided with means to couple them with the fixed and rotatable parts of a fuse respectively, said device carrying stops which engage to limit the angular movement imparted to the rotatable part of the fuse; said fuse coupling members permitting the fuse setting members to receive the fuse in any relative angular position, said fuse setting members adapted to rotate thereon till a coupling means enters into engagement with the fixed part of the fuse; the stop carried by the setting member which couples with the fixed part of the fuse being adjustable thereon for determining the degree of adjustment of the fuse, and the stop carried by the setting member which couples with the rotatable part of the fuse being out of limiting position until its coupling member and the rotatable part of the fuse have become engaged.
13. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position, said members carrying means for coupling them to the fixed and rotatable parts of the fuse respectively, and cooperating stops on the setting members for limiting the relative rotation between said members; the stop on that member of the setting device which couples with the fixed member of the fuse being adjustable relatively to its carrying member whereby to determine the degree of adjustment of the fuse; the stop carried by the setting member which couples with the adjustable member of the fuse being normally out of the path of its cooperating stop when the setting device receives the fuse in any angular position other than that in which the adjustable fuse part becomes coupled with its respective setting member of the setting device, but adapted to move into the path thereof and engage therewith when the member which carries it becomes coupled with the fuse.
14. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position and carrying means for coupling them to the respective members of the fuse, a stop carried by one of the setting members, a member rotatable about the same axis as the setting members, a cooperating stop carried by said member, and means for adjusting and fixing said cooperating stop member relatively to the other of said setting members, one of said stops being movably mounted on its carrier and adapted to move into and out of the path of its cooperating stop, said movable stop lying out of the path of its cooperating stop when the setting device receives the fuse in any position other than that in which the adjustable fuse part becomes coupled with its respective setting member of the setting device, and being adapted to automatically move into the path of its cooperating stop when said setting member has reached the angular position in which it becomes coupled therewith.
15. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position and carrying means for coupling them to the respective members of the fuse, a stop carried by one of the setting members, a member rotatable about the same axis as the setting members, a cooperating stop carried by said member, and means for adjusting and fixing said stop members relatively to the other of said setting members, one of said stops being movably mounted on its carrier and normally held in a position in which it projects into the path of its cooperating stop, the means for coupling the adjustable fuse part to its respective setting member of the setting device comprising a spring-controlled latch adapted to engage a recess of the adjustable fuse part, which latch causes said movable stop to move out of the path of its cooperating stop when being forced into its ineffective position, as set forth.

16. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position and carrying means for
 5 coupling them to the respective members of the fuse, a member rotatable about the same axis as the setting members, a stop fixed on said member, means for adjusting and fixing said stop member relatively to that of
 10 the setting members which is adapted to engage the fixed part of the fuse; the means for coupling the other setting member with the adjustable fuse part comprising a spring-controlled latch adapted to engage a recess
 15 of the adjustable fuse part, and a stop on said latch which projects into the path of the first-named stop when the latch is in its effective position and which moves out of the path of said stop when the latch is forced in
 20 its ineffective position, as set forth.

17. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position and carrying means for
 25 coupling them to the respective members of the fuse, a member rotatable about the same axis as the setting members, a stop fixed on said member, and means for adjusting and fixing said stop member relatively to that
 30 of the setting members which is adapted to engage the fixed part of the fuse, the means for coupling the other setting member with the adjustable fuse part comprising a spring-controlled latch formed as a two-armed lever, one arm of which is adapted to engage
 35 a recess of the adjustable fuse-part and the other being formed with an arresting stop, said stop being adapted to project into the path of the first-named stop when the latch
 40 is in its effective position, and to move out of the path of said stop when the latch is forced into its ineffective position, as set forth.

18. A fuse setting device comprising two
 45 relatively rotatable setting members having frictional connection therebetween, said setting members being constructed to receive the fuse at any relative angular position and carrying means for coupling them to the
 50 respective members of the fuse, a stop carried by one of the setting members, a member rotatable about the same axis as the set-

ting members, a cooperating stop on said member, and means for adjusting and fixing
 55 said stop member relatively to the other of said setting members, one of said stops being movably mounted on its carrier and adapted to move into and out of the path of its cooperating stop, said movable stop lying out
 60 of the path of its cooperating stop when the setting device receives the fuse in a relative angular position different from that in which the adjustable fuse part becomes coupled with its respective setting member of
 65 the setting device, and being adapted to automatically move into the path of its cooperating stop when the setting member for the adjustable fuse-part has reached the angular position in which it becomes coupled therewith.
 70

19. A fuse setting device comprising two relatively rotatable setting members constructed to receive the fuse at any relative angular position and carrying means for
 75 coupling them to the respective members of the fuse, an annular frictional plate-spring interposed between the setting members, a stop carried by one of the setting members, a member rotatable about the same axis as
 80 the setting members, a cooperating stop on said member, and means for adjusting and fixing said stop member relatively to the other of said setting members, one of said stops being movably mounted on its carrier
 85 and adapted to move into and out of the path of its cooperating stop, said movable stop lying out of the path of its cooperating stop when the setting device receives the fuse in a relative angular position different from
 90 that in which the adjustable fuse part becomes coupled with its respective setting member of the setting device, and being adapted to automatically move into the path of its cooperating stop when the adjustable fuse part has reached the angular position in
 95 which it becomes coupled therewith.

The foregoing specification signed at Düsseldorf, Germany, this third day of October, 1907.

ULRICH WILCK.

In presence of—
 ALFRED POHLMAYER,
 M. ENGELS.