Sept. 7, 1937. M. MEMELSDORFF 2,092,624

MULTIPLE BRUSH SELECTOR

Filed Oct. 16, 1935

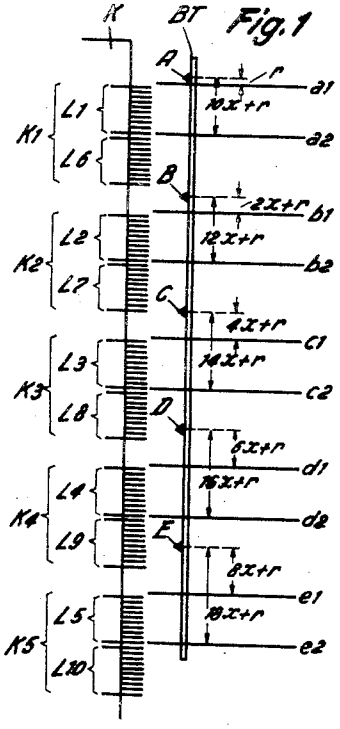



Fig. 1

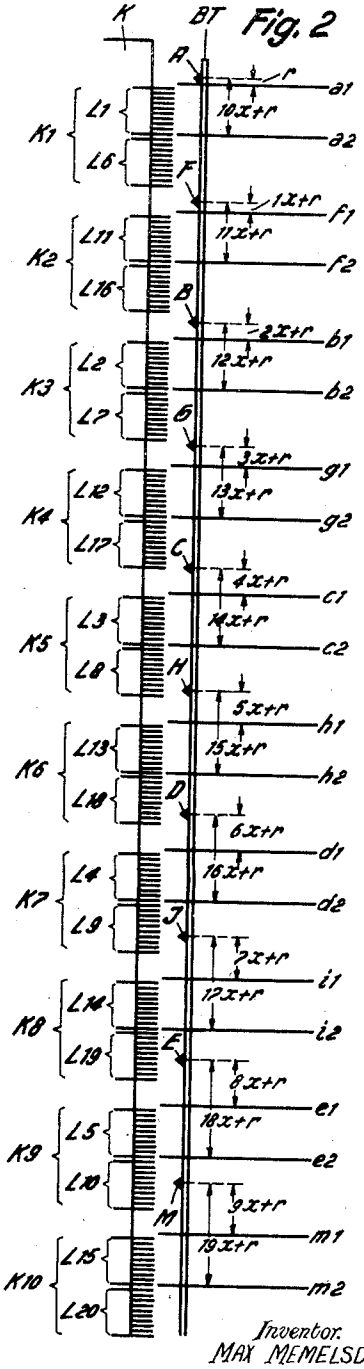



Fig. 2

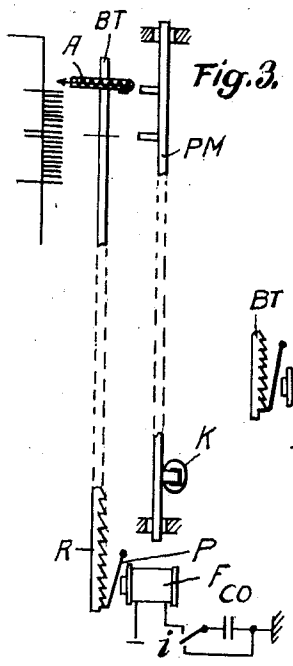



Fig. 3.

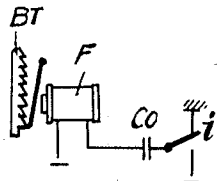



Fig. 4.

Inventor.
MAX MEMELSDORFF
By.
Gill & Jennings
Attorneys.

Patented Sept. 7, 1937

2,092,624

# UNITED STATES PATENT OFFICE

2,092,624

## MULTIPLE BRUSH SELECTOR

Max Memelsdorff, Frankfort-on-the-Main, Germany

Application October 16, 1935, Serial No. 45,293
In Germany February 12, 1934

12 Claims. (Cl. 179—27.53)

Multiple brush selectors with mechanical brush selection and pure decimal group setting are known which can be set directly by decimal numerical current impulses. In these selectors a special set of brushes is associated with each group of 10 lines and the selection of the desired set of brushes is effected on the vernier principle. In the normal position of the brush carriage, the various sets of brushes are at different distances from the line groups associated with them and, indeed, each set of brushes is displaced from its line group by a number of switch steps which corresponds to the numbering of this line group. The brush carriage is set step by step by the current impulses sent out for selecting the line group and the associated sets of brushes so that at the end of this train of current impulses, it is only that set of brushes which corresponds to the associated line group which is at a distance of one switch step in front of the first contact of the contact bank of this line group, in which position, it can be mechanically prepared for making contact.

For reducing the number of sets of brushes, it is already known to provide a single set of brushes for two decimal line groups. These two line groups are, in this case, connected to a contact bank which can accommodate 20 lines. The devices for acting mechanically on a set of brushes so as to transfer it into the position in which it is ready for making contact are so arranged that the set of brushes can be so acted upon both at a distance of one switch step from the first contact of the contact bank and also at a distance of one switch step from the first contact of the second line group of this contact bank. Further, in these arrangements, the selection of the line groups and of the brush sets is effected on the vernier principle. If the selector has, for example, 10 sets of brushes and 20 groups of 10 lines each, then by means of a train of current impulses having not more than 10 current impulses, one of the brush sets can be brought into a position in which it is one switch step away from the first contact of the associated contact bank and in which it can be mechanically acted upon so as to be made ready for making contact. In order to reach the second line group in the contact bank, the brush carriage has then always to be stepped through at least 10 further steps which can be effected before the reception of the above mentioned train of current impulses or after they have done their work.

In a 100-point selector, five sets of brushes are provided. By means of a train of current impulses of not more than five current impulses, one of the sets of brushes is brought into a position in which it is one switch step in front of the first contact of the associated line group and in which it can be mechanically acted upon so as to be prepared for making contact. With a train of current impulses of from 6 to 10 current impulses, the sets of brushes are brought into positions in which they are 6 switch steps away from the first contact of the second line group of the desired contact bank. Here, a supplementary automatic movement of five switch steps has to be provided for in order to bring the desired set of brushes into the position in which it is only one step away from the first contact of the desired line group and in which it can be mechanically acted upon so as to be prepared for making contact.

The carrying out of this supplementary automatic movement of the brush set is in many cases troublesome because the time which is available for the switching operations which are effected between the various trains of current impulses is shortened. The invention solves the problem of avoiding the necessity for supplementary automatic movement of the brush carriage of the selector and, nevertheless, of providing the brush carriers with a number of sets of brushes which is only a fraction of the number of pure decimal line groups so that each set of brushes serves for the selection in several line groups. This is achieved, in accordance with the invention, by a modified form of the vernier principle.

According to the invention, the various groups of lines and the sets of brushes are so arranged that the brush carriage, for being set to the next line group in the numerical sequence in which the groups are arranged, must, at each selecting current impulse, be stepped through more than one step in order to transfer that set of brushes which is associated with the line group determined by the number of selecting current impulses into the position in which it can be mechanically acted upon so as to be prepared for making contact with this line group.

In order that the invention may be properly understood and be more readily carried into effect, two examples of construction in accordance therewith will now be described with reference to the accompanying drawing, in which:—

Figure 1 illustrates diagrammatically the contact bank and the brush carriage of a 100-point selector in accordance with the invention having 10 ten-line groups, and

Figure 2 illustrates diagrammatically the con-

tact bank and the brush carriage of a 200-point selector with 20 ten-line groups.

Figure 3 illustrates one method of controlling the brush carriage, and

Figure 4 illustrates an impulse doubling arrangement for use in connection with the invention.

In operation, the brush carriage BT is first of all lowered under the action of gravity when a set of brushes is to be set in the position in which it can be mechanically acted upon so as to be prepared for making the required contact and is then again lowered under the influence of gravity so that the prepared set of contacts can be brought opposite the desired contact. The stepping of the brush carriage which is thus effected is controlled by a magnet F which is intermittently energized under the influence of the received numerical current impulses. The current impulses influence an unillustrated impulse receiving magnet, the contact *i* of which, at each energization by an impulse, closes a circuit through the magnet F and the condenser Co. The condenser charging current which flows for a short time in this circuit energizes the magnet F. The armature P of the magnet F is in the form of a pawl which engages in the teeth of a rack R formed on the brush carriage BT. At each energization of the magnet F, the brush carriage is thus released for a fall through a limited distance, for example, through one switch step. When the selector is to be re-set, the brush carriage is again released so that it descends into its lowest position out of which it is then lifted into its highest (normal) position by means of a suitable lifting device.

For mechanically acting on a set of brushes to prepare it for making the desired contact, a special push member can be used which is intermittently actuated and, at each actuation, acts on a setting member associated with the set of brushes in such a way that the contact springs of the set of brushes are brought into the position in which the brushes are prepared for making contact. As a rule, a rotatable rod such as is shown at PM in Fig. 3 is provided for this purpose which runs parallel to the brush carriage and has fingers or lugs in the various positions in which the various sets of brushes can be prepared for making contact. When this rod is rotated under the influence of the magnet K, the setting member of a set of brushes is only engaged by a finger on the rod if the brush carriage has been lowered so as to bring that set of brushes exactly into the appropriate position.

Such a selector is described, for example, in United States Patent No. 1,895,265.

In Figure 1, a contact bank K is shown which comprises 10 groups of lines L1 to L10 each containing 10 lines. These groups of lines are connected two by two to different contact bank strips. Thus, in the example illustrated, the groups L1 and L6 are connected to the contact bank strip K1, the groups L2 and L7 to the contact bank strip K2 and so on. The brush carriage BT has five sets of brushes A, B, C, D, E which are indicated as solid black triangles. The set A serves for making connections to the lines of the groups L1 and L6 connected to the contact bank strip K1. Similarly, the set B serves for making connections to the lines of the groups L2 and L7 connected to the contact bank strip K2, and so on. The full lines *a1* and *a2* indicate the positions from which the brush set A can be transferred mechanically by means of the push member PM (Fig. 3) into a position in which it is ready for making the required contact. In the same way, the lines *b1* and *b2* indicate the corresponding positions for the set of brushes B, and so on.

The distances of the various sets of brushes A to E from the positions *a1* and *a2* to *e1* and *e2* in the normal position of the brush carrier BT are indicated in the drawing. These positions *a1*, *a2*, *b1*, *b2* and so on are separated by the length of one switch step from the first contact of the line groups L1, L6, L2, L7 and so on associated with them so that when a set of brushes has been transferred into the position in which it is prepared for making the desired contact, it comes to rest, when the brush carriage is switched through the next step, on the first contact of the line group associated with it.

In the normal position of the brush carrier BT, the brush set A is at a distance *r* from the position *a1*. The length of each switch step is *x* and, therefore, the various contacts in each group of lines are at a distance *x* from each other. *r* can be equal to *x* and is assumed to be so in the arrangement illustrated in Figure 1 but this is not necessarily the case. The relationship between *r* and *x* is quite immaterial because the invention is only concerned with the relationship between the various sets of brushes and the positions in which they can be prepared for making contact.

By means of the first impulse of a train of current impulses which is emitted for selection of one of the groups of lines, the brush carrier BT is lowered through the distance *r*. If this train of current impulses only contains a single current impulse, then at the end of the train, the set of brushes A is in the position *a1* but none of the other brush sets B to E is in any of the positions *b1* to *e1*. That is to say, it is only the set A which is in a position in which it can be prepared for making contact. If the push member PM is then actuated, its finger or lug which is associated with the position *a1* will engage with the setting member of the brush set A so that this set of brushes is transferred into the position in which it is ready for making contact. The other fingers or lugs of the push rod, however, cannot act on the setting members of the brush sets with which they are associated. The next train of current impulses serves for setting the prepared set of brushes A on to the contacts of the line group L1 and each current impulse causes the brush carriage to be lowered through one switch step *x*.

If a connection is to be made with the line group L4, then the first train of current impulses which acts on the brush carriage of the selector contains four current impulses. The first current impulse causes the brush carriage to be lowered through the distance *r*. The second and subsequent current impulses of this train each cause the carriage to be lowered not through a distance *x* but through a distance $2x$, that is to say, not through one but through two switch steps. At the end of the fourth current impulse, the brush carriage BT will, therefore, have been lowered through a distance $6x+r$, and the brush set D will be in the position *d1* in which it can be prepared for making contact.

If a connection is to be made to a line in the group L6, then the first train contains six current impulses. As the second and subsequent current impulses of this train each effects a switching of the brush carriage through two switch steps ($2x$), at the end of the sixth current impulse, the brush carriage will be at a distance

of $r+10x$ from the normal position. The brush set A will thus be brought into the position $a2$ in which, as in the position $a1$, it can be prepared for making contact. In this position, the brush set A is at a distance of one switch step from the first contact of the line group L6 so that by means of the impulses of the second train of current impulses through each of which the brush carriage BT is lowered through a single switch step $x$, the set of brushes A can be set on to any contact of the line group L6.

Similarly, when 10 current impulses are sent out in the first train, the brush carriage is stepped through a distance $18x+r$ so that the set of brushes E is brought into the position $e2$ in which it can be prepared for making contact with the contacts of the line group L10.

Owing to the fact that the brush carriage BT is stepped through two switch steps $2x$ by each of the second and subsequent current impulses of the first train which serves for the selection of the set of brushes and the line group, one of the sets of brushes A, B, C, D, E is directly stepped into the position in which it can be prepared for making contact with the appropriate first line group L1, L2, L3, L4 or L5 connected to the contact bank strips K1, K2, K3, K4, K5 or into the position in which it can be prepared for making contact with the appropriate second line group L6, L7, L8, L9, or L10 connected to those contact bank strips. No supplementary automatic stepping of the brush carriage BT is therefore necessary between the coming into operation of the train of current impulses for the brush selection and the train of current impulses for the line selection as is the case in the known arrangements.

The stepping of the brush carriage through two switch steps $2x$ on reception of a current impulse can be effected in a simple manner by connecting a contact controlling device to the brush carriage by means of which, in the 2nd, 4th, 6th, 8th, 10th, 12th, 14th, 16th and 18th positions of the brush carriage, that is to say, in the positions in which the brush carriage has been lowered through a distance of $2x$, $4x$, $6x$, $8x$, $10x$, $12x$, $14x$, $16x$, $18x$ out of the normal position, a circuit is closed which energizes the releasing magnet so that the brush carriage is released for movement through one further switch step $x$. Thus, for example, at the end of the second current impulse in the first train, the brush carriage is brought into the position in which, on the assumption that $r$ is equal to $x$, it is at a distance $2x$ (two switch steps) from the normal position; then, by means of the additional energization of the releasing magnet, the brush carriage is automatically stepped through one switch step $x$ so that it is now at a distance of $3x$ from the normal position which corresponds to the distance $2x+r$ illustrated in the drawing. This circuit closed by the contact device of the brush carriage must, of course, be opened after the current impulses of the first train have become effective because the brush carriage is to be stepped through a single switch step by the current impulses of the second train.

The stepping of the brush carriage through two switch steps $2x$ by certain of the current impulses of the first train can also be effected through impulse doubling means known in themselves, for example by arranging the releasing magnet F for the brush carriage as shown in Fig. 4 in such a way that it can be actuated both in the charging and in the discharging circuit of a condenser Co. This circuit includes the contact $i$ of an impulse repeating relay so that the magnet is, for example, energized for a short time at the beginning of the current impulse in the charging circuit of the condenser and releases the brush carriage for a movement through one switch step $x$ and, at the end of the current impulse, is energized for a short time in the discharging circuit of the condenser so that the brush carriage is again released for movement through one switch step $x$. If the first switch step ($r$) is to be equal to $2x$, the impulse doubling means can be made effective for all the impulses of the first train. If, however, $r$ is to be equal to $x$, then the impulse doubling means must only come into operation after reception of the first impulse. The impulse doubling means can be brought into operation by an auxiliary relay which is energized on reception of the first impulse or by a contact controlling device connected to the brush carriage which is actuated when the carriage is stepped out of the normal position. The impulse doubling means must also be put out of operation after the current impulses of the first train have done their work so that the brush carrier can be switched through a single step by the current impulses of the second train.

The selector illustrated in Figure 2 has 10 sets of brushes A to M and 20 groups L1 to L20 each of 10 lines. The contact field K has 10 contact bank strips K1 to K10 each of which contains the contacts of two groups of 10 lines. The contact bank strips K1, K3, K5, K7, K9 have 10 groups of lines L1 to L10 forming a group of 100 lines connected to them in the same way as in the arrangement of Figure 1 and are associated with the brush sets A, B, C, D, E on the brush carriage. The distance of these brushes A, B, C, D, E from the positions $a1$, $b1$, $c1$, $d1$, $e1$ in which they can be prepared for making contact with the line groups L1, L2, L3, L4, L5 and the distances of these brush sets from the positions $a2$, $b2$, $c2$, $d2$, $e2$ in which they can be prepared for making contact with the line groups L6 to L10 are the same as in the arrangement of Figure 1.

The additional sets of brushes F, G, H, J, M which are provided for the line groups L11 to L20 of a second group of 100 lines are arranged between the brush sets A, B, C, D, E of the brush carrier so that on the brush carriage each brush set for the first group of 100 lines is followed by a brush set for the second group of 100 lines. Likewise, in the contact bank K, each of the strips K1, K3, K5, K7, K9 for the first group of 100 lines is followed by one of the strips K2, K4, K6, K8, K10 for the second group of 100 lines. The distances of the brush sets F, G, H, J, M from the positions $f1$, $f2$ . . . $m1$, $m2$ in which they can be prepared for making contact with the line groups L11, L16 . . . L15, L20 are greater by one switch step $x$ than the corresponding distances of the brush sets A, B, C, D, E from the positions $a1$, $a2$ . . . $e1$, $e2$. For the selection of one of the sets of brushes A to E the brush carriage BT is therefore stepped in exactly the same way as was described in connection with the arrangement of Figure 1 while for the selection of one of the brush sets F to M it is only necessary to switch through one further switch step.

This additional switch step thus determines whether a connection is to be made to the first or to the second group of 100 lines. This additional switching step can be made before the current impulses of the first train become effective. It can also be effected after the current impulses of the

first train have become effective but before actuation of the push member which transfers the sets of brushes into the position in which they are ready for making contact. It is a matter of purely personal choice whether the additional current impulse necessary for the additional switch step is sent out before or directly after the first train of current impulses.

Let it be assumed that the additional current impulse for the selection of the desired group of 100 lines is already sent out when the selector is seized. If the selector is seized and the current impulse has not been sent out, then this becomes apparent in that the first train of current impulses causes one of the sets of brushes A to E to be brought into the position *a1*, *a2* . . . *e1*, *e2* for the purpose of making a connection with one of the line groups L1 to L10 of the first group of 100 as was previously described in connection with Figure 1.

If, on the other hand, a special current impulse is sent out when the selector is seized, then the brush carriage BT is lowered through one switch step *x* so that now the brush set F is at a distance *r* from the position *f1*. The distances of the brush sets F, G, H, J, M from the positions *f1*, *f2* . . . *m1*, *m2* associated with them are now the same as the distances separating the brush sets A to E from the positions *a1*, *a2* . . . *e1*, *e2* associated with them in the normal position of the brush carriage BT. The current impulses of the first train which is now emitted therefore causes the brush sets F to M to be selected in exactly the same way as were the brush sets A to E in the arrangement of Figure 1.

With the use of 10 sets of brushes and one contact bank which can accommodate two groups of 100 lines, the arrangement of brushes and sets of line groups in accordance with the invention thus allows each brush set to be directly transferred by the current impulses into the position in which it can be mechanically prepared for making contact with the contact of the desired group of lines without necessitating an additional automatic movement of the brush carriage through a special distance. For the selection of the second group of 100 lines or the second of the two groups of five sets of brushes, only one additional current impulse is necessary which displaces the brush carriage through one switch step and which can be sent out before or immediately following the current impulses of the first train.

The invention is also applicable to selectors for more than two "large groups" of 100 lines. In a 300-point selector, three times five sets of brushes are, of course, provided and the brush carriage is stepped through three switch steps by each of the current impulses of the first train which serve for the selection of the line group, while for selection of the "large group", the carriage is stepped through 0, 1 or 2 additional steps as the case may be; in a 400-point selector, four times five sets of brushes are provided and the brush carriage is stepped through four switch steps by each of the current impulses of the line group selecting train while for selection of the "large group", the carriage is stepped through 0, 1, 2 or 3 additional steps; and so on. Also, each set of brushes can be associated with more than two line groups, for example, three or four line groups. Thus, a 90-point selector could have three sets of brushes each associated with three groups of 10 lines, in which case the carriage would be stepped through three steps at each impulse of the group selecting train; similarly a 400-point selector could be provided with 10 sets of brushes each associated with four groups of 10 lines and the brush carriage be stepped four steps at a time by the line group selecting impulses.

I claim:—

1. A selector comprising a contact bank with a plurality of groups of contacts, a movable switch member with a plurality of brush sets co-operating with said contact groups, means comprising an actuating member for each brush set for preparing a brush set for making contact with a particular contact group and a driving device for obtaining a relative movement between said brush sets and said actuating members such that only by movements differing by more than one switch step is a brush set brought into register with its actuating member at a distance of one switch step from the first contact of the associated contact group, only one brush set being at any time in such a position.

2. A selector comprising a contact bank with a plurality of groups of contacts, a movable switch member with a plurality of brush sets each associated with a plurality of said contact groups, means comprising a plurality of actuating members for each brush set for preparing a brush set for making contact with a particular contact group and a driving device for obtaining a relative movement between said brush sets and said actuating members, said brush sets, said actuating members and said contact groups being so arranged that only by movements differing by more than one switch step is a brush set brought into register with one of its actuating members at a distance of one switch step from the first contact of a contact group, only one brush set being at any time in such position.

3. A selector comprising a contact bank with a plurality of contact groups, a movable switch member having a plurality of brush sets, each of said brush sets being associated with a plurality of contact groups, means comprising a plurality of actuating members for each brush set each associated with a contact group for preparing a brush set for making contact with a particular contact group and means for moving said switch member with said brush sets relatively to said actuating members and said contact field, only one of said actuating members being at any time in register with a set of brushes situated at a distance of one switch step from the first contact of a contact group and the various positions of the switch member in which at any time one of the said brush sets is in register with one of the actuating members differing from each other by a movement of the switch member through a plurality of switching steps.

4. A selector comprising a contact bank with a plurality of contact groups, a movable switch member having a plurality of brush sets co-operating with said contact groups, each of said brush sets being associated with a plurality of said contact groups, means comprising a plurality of actuating members for each brush set for preparing a brush set for making contact with a particular contact group, a driving device for obtaining a relative stepping movement between said brush sets and said actuating members and means for the reception of selecting impulses and for controlling said driving device, said brush sets, said actuating members and said contact groups being so arranged that only in positions distant from each other by the equivalent of a plurality of switch steps is a brush set brought

into register with one of its actuating members at a distance of one switch step from the first contact of a contact group and only one brush set being at any time in such a position.

5. A selector comprising a contact bank with a plurality of contact groups, a movable switch member having a plurality of brush sets, each of said brush sets being associated with a plurality of contact groups, means comprising a plurality of actuating members for each brush set, each associated with a contact group for preparing a brush set for making contact with a particular contact group, a driving device for obtaining a stepping movement of said switch member with said brush sets relatively to said actuating members and said contact bank, means for controlling said driving device under the influence of the selecting impulses and contacts actuated by said switch member for controlling said driving device for the carrying out of additional switch steps, only one of said actuating members being at any time in register with a set of brushes at a distance of one switch step from the first contact of one of said groups of contacts and the various positions of the switch member in which at any time one of the sets of brushes is in registration with one of its actuating members being attainable by movements of the switch member differing by a plurality of switch steps.

6. A selector comprising a contact bank with a plurality of groups of contacts, a movable switch member with a plurality of brush sets each associated with a plurality of said contact groups, means comprising a plurality of actuating members for each set of brushes for preparing a brush set for making contact with a particular contact group, a driving device for obtaining a relative stepping movement between said sets of brushes and said actuating members, means for the reception of selecting impulses, means for the multiplication of each selecting impulse, said means controlling the driving device for carrying out a plurality of switching steps on reception of a selecting impulse, said brush sets, said actuating members and said contact groups being so arranged that only in positions attainable by movements of the switch member differing by a plurality of steps is a brush set brought into registration with one of its actuating members at a distance of one switch step from the first contact of a contact group, only one brush set being at any time in such position.

7. A selector comprising a contact bank with a plurality of contact bank strips and with a plurality of contact groups, a movable switch member with a number of brush sets corresponding to half the number of contact groups, said contact groups being arranged in pairs associated with a single brush set and with the groups in each pair arranged directly one after the other in a contact bank strip, means comprising two actuating members for each brush set for preparing a brush set for making contact with a particular contact group, a driving device for obtaining a step by step movement of the switching member with the brush sets relatively to said actuating members and said contact groups, means for the reception of selecting impulses, means for controlling the driving device for the stepping of the switch member through two switching steps on reception of each of the second and subsequent of said selecting impulses, only one of said actuating members being at any time in register with a set of brushes at a distance of one switch step from the first contact of a contact group, the various positions of the switching member in which one of said brush sets is in register with one of its actuating members being attainable by movements of the switch member through distances differing by two switch steps.

8. A selector comprising a contact bank with five contact bank strips and with ten contact groups each of ten contacts, a movable switch member with five sets of brushes, said contact groups being arranged in pairs associated with a single set of brushes and with the groups in each pair arranged directly one after the other in a contact bank strip, each of said contact bank strips comprising 20 contacts, means for preparing a brush set for making contact with a particular group of contacts, said means having two actuating members for each set of brushes, a driving device for obtaining a step by step movement of said switch member with the brush sets relatively to the actuating members and the contact groups, means for the reception of selecting current impulses, means for controlling the driving device for the stepping of said switch member relatively to said actuating members through two switch steps at a time on reception of at least some of said current impulses, the first of said brush sets being distant, in the normal position of the selector, to the extent of two switch steps from the first contact of the contact field strip associated with it, the remaining brush sets being arranged in the normal position of said switch member, at distances from the first contact of the contact field strips associated with them of differing from each other by two switch steps.

9. A selector comprising a contact bank having a plurality of groups of contacts, each group of contacts being provided with a plurality of sub-groups of contacts, a movable switch member having a plurality of groups of brush sets, each group of said brush sets being associated with one group of contacts, each of said brush sets being associated with a plurality of said sub-groups of contacts, means for preparing said brush sets for making contact with a particular sub-group of contacts, said means having a plurality of actuating members for each brush set and each of said actuating members being associated with a sub-group of contacts, a driving device for obtaining a relative movement between said switch member and said actuating members, said brush sets of the various groups of brush sets, said actuating members and said sub-groups of contacts of the various groups of contacts being so arranged that only in the various positions attainable by movements of the switch member differing by a plurality of switch steps is a brush set brought into register with one of its actuating members at a distance of one switch step from the first contact of a sub-group of contacts, the distances of the brush sets of one group from their actuating members in the normal position of the selector differing from the distances of the brush sets of another group from the actuating members associated with said brush sets.

10. A selector comprising a contact bank having a plurality of contact groups, each contact group being provided with a plurality of sub-groups of contacts, a movable switch member having a plurality of groups of brush sets, each group of said brush sets being associated with one contact group, each of said brush sets being associated with a plurality of said sub-groups of contacts, means for preparing said brush sets for making contact with a particular sub-group of

contacts, said means having a plurality of actuating members for each brush set and each of said actuating members being associated with a sub-group of contacts, a driving device for obtaining a relative movement between said switch member and said actuating members, means for the reception of selecting impulses, means for controlling the driving device for effecting said relative movement through a plurality of switch steps on reception of at least some of said selecting impulses and means for controlling the driving device for the selection among the individual groups of brush sets and contacts.

11. A selector comprising a contact bank having a plurality of contact groups, each contact group being provided with a plurality of sub-groups of contacts, a movable switch member having a plurality of groups of brush sets, each group of said brush sets being associated with one contact group and each of said brush sets being associated with a plurality of said sub-groups of contacts, means for preparing said brush sets for making contact with a particular sub-group of contacts, said means having a plurality of actuating members for each brush set and each of said actuating members being associated with a sub-group of contacts, a driving device for obtaining a step-by-step movement of said switch member relatively to said actuating members and said contact bank, one of said actuating members being in registration at any time with only a single set of brushes at a distance of one switching step from the first contact of a sub-group, the various positions of the switch member in which the brush sets of the same group of brush sets are in register with one of its actuating members being attainable by movements of the switch member differing by a plurality of switching steps and the various positions in which the brush sets of the various groups of brush sets are in register with their actuating members being attainable by movements of the switch member through a number of switching steps corresponding to the number of groups, impulse operated means adapted to cause said driving device to effect said step-by-step movement through a number of switch steps corresponding to the number of groups of brush sets and impulse operated means adapted to cause said driving device to effect said step-by-step movement through a plurality of switching steps at a time.

12. A selector comprising a contact bank with ten contact bank strips and two groups of 100 contacts, each group consisting of ten sub-groups and ten contacts, said sub-groups being arranged in pairs with one sub-group behind the other in a contact bank strip, each contact bank strip of the two contact groups being arranged one after another, a movable switch member with two groups each of five sets of brushes, each of said sets of brushes being associated with said contact bank strip, the distances of the individual brush sets of each group from the first contact of the associated contact bank strip always increasing by the distance of two switch steps of the switch member, the distances of the brush sets of the two groups from the first contacts of the associated contact bank strips being different by one switching step, a driving device for the switch member for obtaining a step-by-step movement relatively to the contact bank strip, impulse operated means for controlling the driving device for carrying out one switch step for the selection between two groups of brush sets and contacts and impulse operated means for controlling the driving device for stepping through two switch steps on reception of each impulse.

MAX MEMELSDORFF.