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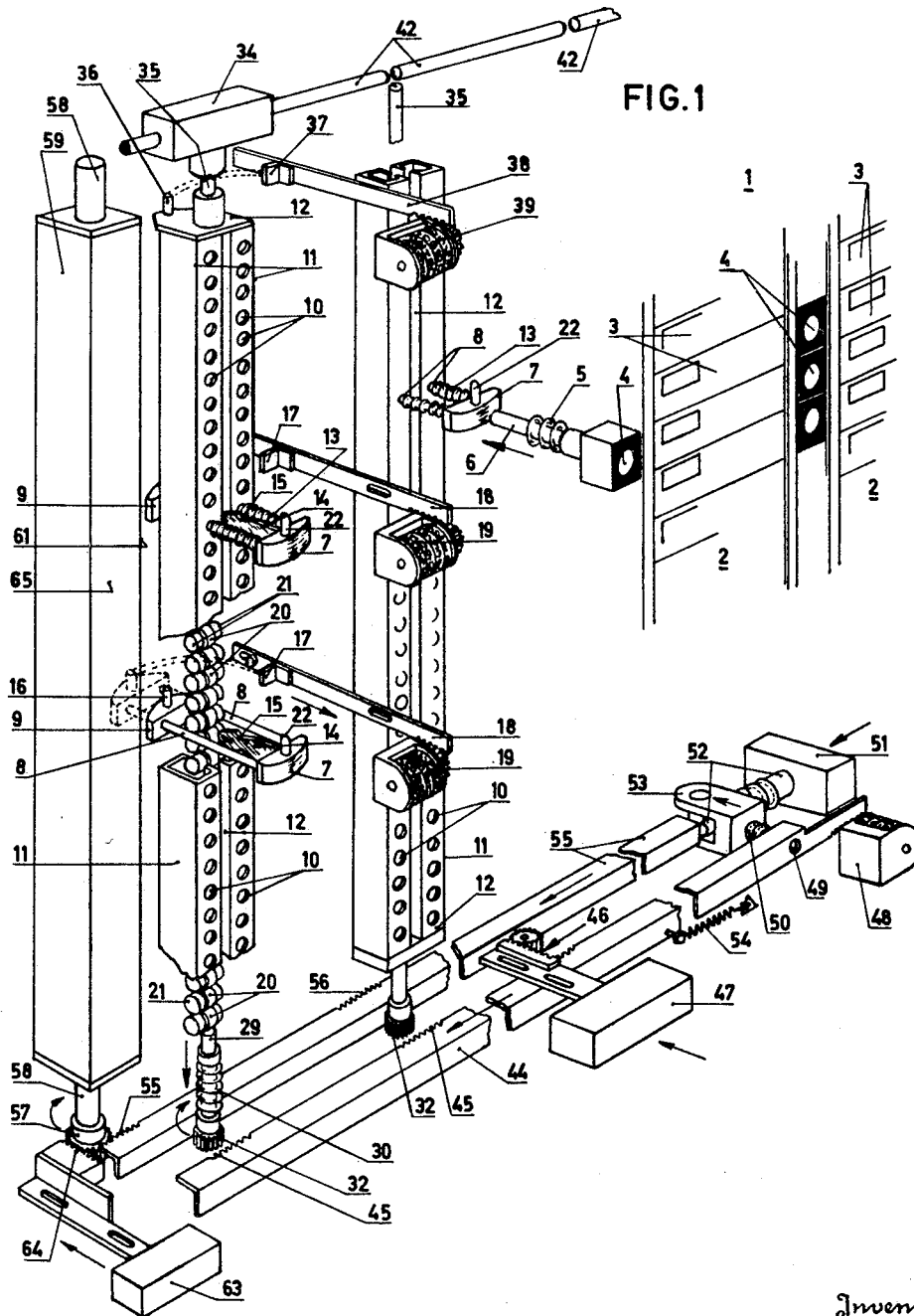
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3,502,263

SELECTING MACHINE

Filed June 27, 1968

2 Sheets-Sheet 1



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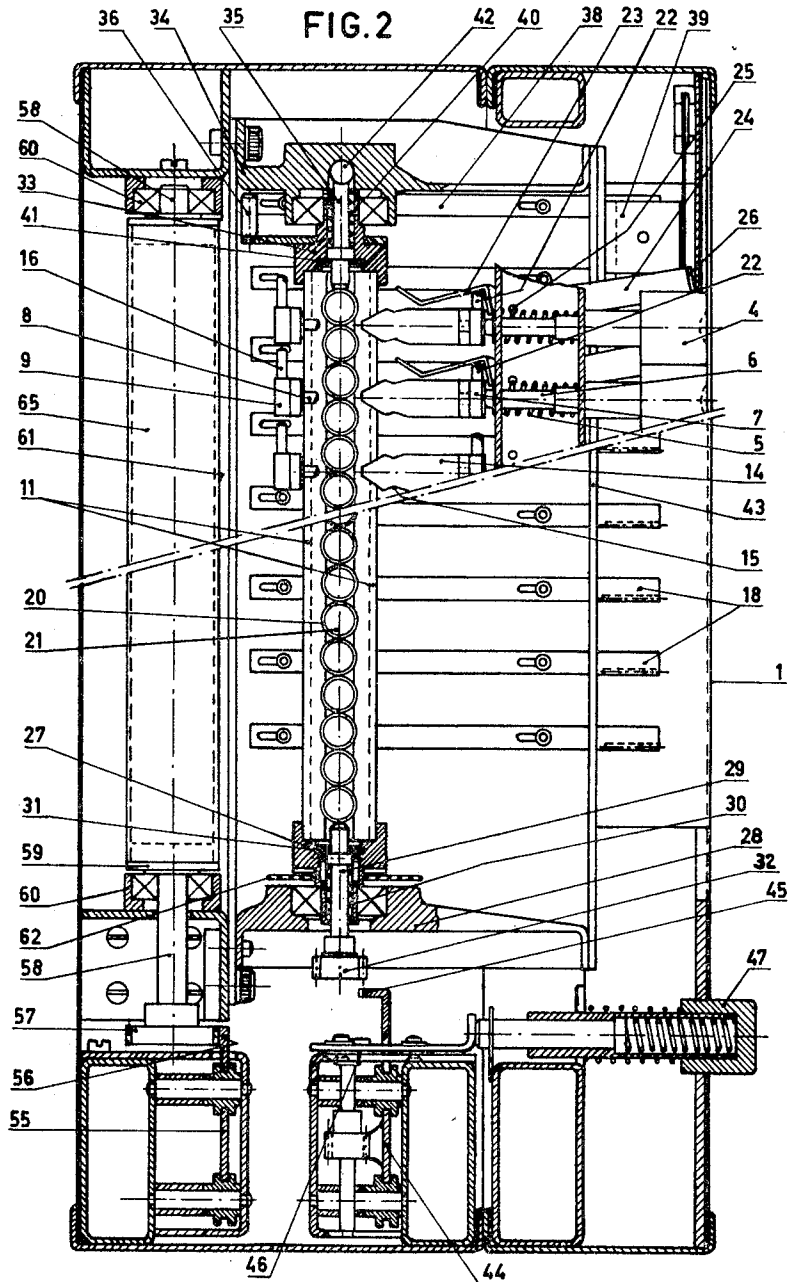
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10 Claims

ABSTRACT OF THE DISCLOSURE

A machine for selecting an element from a number of groups of elements and for the registration of a choice, and provided with a tableau with selector knobs, which are arranged in groups and represent elements, with behind each group a unit, provided with a rotatable shaft carrying plungers that can be activated and locked by a selector knob, and provided with counters upon which the selection of an element is recorded and with a recording device that with the aid of a rotating device the shafts turns from an actuation position to a position for the recording of a selection.

The invention relates to a machine for the selection of an element from a number of groups of elements and the numerical recording of them, in particular applicable at elections.

The known machines generally are provided with a tableau at which the elements to be selected are indicated in groups by a selector knob that represents each element. By operating one selector knob all other possibilities for selection are locked until a recording device connected to a totalizing counter has allowed the machine to mesh with a counter for the element selected and to a counter for the group to which the element selected belongs. Moreover those machines are provided with a rectifying device for wiping out a wrong selection before it is recorded and with a neutralizing device for putting the machine in a neutral position after recording has taken place.

When the machines are mainly electrically operated there is a chance of their breaking down because of their dependence on a source of current, in case of variations in current supply or in making or breaking contact. Therefore machines are aimed at operating fully mechanically, and where the human hand is the only power source. This creates the problem that it must be possible for the machine to be operated by persons who have no skill whatsoever in this field and that in spite of that any use of the machine, no matter how incorrect, must lead to faultless recording of the selection desired. Further it must be impossible for any persons, whether or not being in good faith, to put the machine out of order or performing any other actions than e.g. provided for or permitted by law. Because it must be possible for the machine to be displaced frequently and to be used for varying numbers of elements and groups it must be stable and simply adjustable. It must be possible for parts of certain groups and elements to be placed into or put out of service without affecting the rest and preferably it must be possible for them to be assembled interchangeably, in order to remove problems of uneven wear. When they have been assembled the connections must be so simple and yet so accurate that during transport neither damage is done nor vibrating loose occurs and consequently the tolerable clearances must be well distributed.

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The invention aims at meeting these demands as much as possible and for that purpose the machine according to the invention is provided with for each group of elements a unit comprising a shaft rotatable around its central axis, in which for each element of the group has been provided a plunger that is actuated by the operation of a selector knob and is placed between two bodies of a column of bodies resting one above the other, which in the shaft have been guided movably in the direction of the central axis, the shifting of one plunger causing a movement of the bodies, which locks the shifting of all other plungers, and couples the shaft with a rotating device that is operated by the recording device, causing, when rotation takes place, a cam belonging to the actuated plunger to shift a counter for a selected element one digit and a cam of the shaft to shift a counter for the group of digit.

According to the invention preferably the coupling with the rotating device and the locking device of the plungers of other units have been provided at either end of the shaft in the shape of pins in the central axis of the shaft and which pins abut to the bodies.

Only the shaft of which the plunger has been actuated is coupled with the rotating device and for the rotation by the recording device far less energy is needed than if all units would be set into motion.

Locking the plungers of other elements of the group of a selected element is obtained by the fact that placing a plunger between two bodies moves the gaps between the other bodies out of reach of the other plungers, because the plungers are lying one above another at the same distance as the gaps between the bodies. Locking of the plungers of elements of other groups is obtained through slidable latch bars the partings of which are lying in the central axes of the shafts, so that when by shifting the bodies in one shaft a locking pin of that shaft is pushed between two latch bars the partings over the other shafts are shifted and the movements of pins of those shafts are locked, as well as the movements of the bodies abutting those pins. A selector knob needs only shift the bodies in a single group by means of the plunger and thereby with one locking pin the latch bars so that an operation requiring little energy is sufficient for a locking of all other possibilities for selection.

Because the shafts are rotatable around their axes is no fixed connection between the selector knobs in the tableau and the units. The counters are also assembled at a distance from the shafts without a direct connection with the latter and are only operated during a rotation. An undesired effect of the selector knobs on the counters by vibrations or thrusts and the other way round is impossible, because of this spatially separated arrangement of selector knobs, units and counters. Actually the shafts with their bearings are independent units easy to remove from the machine and to exchange, because the locking of the other shafts is looked after by pins lying in the central axes of the shafts, of which pins a close fitting is not difficult. Between the parts of the coupling with the recording device there is also a reasonable distance and in assembling and disassembling of the units consequently there are no problems as regards clearances.

In order to put the machine back in a neutral position after a recording a neutralizing device has been provided that according to the invention has been coupled with the rectifying device for wiping out a wrong selection before the recording. For that purpose according to the invention a rectifying knob and a neutralizing knob have been provided, operating independently of each other on a number of set-back bars corresponding to the number of units, which bars are rotatable around axes parallel to the central axes of the shafts and when rotating are pushed into the path of the cam belonging to an actuated

plunger, causing this plunger to be freed from the bodies in the shaft.

The characteristics of the invention are further elucidated below with the aid of a drawing that in

FIG. 1 gives the chief parts of the machine in perspective and in outline and in

FIG. 2 shows the combined vertical cross-sections of an embodiment of a machine according to the invention.

A tableau 1 is provided with a number of groups 2 of sign boards 3 with names of symbols of the elements. By the side of each sign board there is a selector knob 4 that can be pushed with a finger against the tension of a spring 5, causing a stem 6 of knob 4 to contact a yoke 7.

Each yoke 7 is assembled to two guiding pins 8, which by a counter yoke 9 of the same shape are connected to each other at the other side. Pins 8 bear horizontally slidable in apertures 10 of two slotted profiles 11 directed towards each other, which together form a vertical shaft 12.

Between yoke 7 and profiles 11 on pins 8 springs 13 have been provided which hold counter yoke 9 in contact with shaft 12 but are pushed when yoke 7 is moved towards the shaft by pushing a selector knob 4. Yoke 7 carries a pointed plunger 14 between pins 8, which fits in shaft 12 between profiles 11 and at top and bottom has been provided with nicks 15. Counter yoke 9 carries a vertical element cam 16. When yoke 7 has been shifted and shaft 12 is rotated around its central axis, element cam 16 can contact a stop 17 of a slide 18 that meshes with an element counter 19. In the machine behind each sign board 3 an element counter 19 has been provided that records how many times that element has been selected.

Between profiles 11 facing each other in shaft 12 a number of bodies of revolution 20 are resting one above another, of which studs 21 are guided into the slots of profiles 11 so that they are rotatable and movable in a vertical direction. In the normal position the point of a plunger 14 is always in front of the gap between two bodies 20. When a yoke 7 is moved plunger 14 is forced in between two bodies 20. The former forces the bodies apart, the lower one moving downwards and the upper one moving upwards until nicks 15 lie between the bodies and plunger 14 is held tight. Bodies 20 each have been shifted over half the distance between two nicks 15 and then the gaps between all other bodies in the shaft are no longer in front of the points of the remaining plungers 14. Meanwhile springs 13 have been tensioned and yoke 9 has been placed in the broken line position, so that element cam 16 is at great distance of the central axis of the shaft. The tension of springs 13 is, however, insufficient to force plunger 14 out between bodies 20 and to push back yoke 7. Spring 5 sees to it that selector knob 4 has returned to the starting position, so that there is no contact any longer between yoke 7 and stem 6. According to FIGURE 2, yoke 7 has been provided with an additional cam 22 upon which arm 23 of a lever 24 rests, which is rotatable about an axle 25 and carries a red flag 26. When yoke 7 has been moved by a selector knob 4 cam 22 trips arm 23 and red flag 26 appears in a window of sign board 3 by the side of knob 4. In this way on tableau 1 it is temporarily indicated which selector knob 4 has been pushed.

Shafts 12 are bearing in bearinghouses rotatable about a vertical central axis in which houses within the shaft studs vertically movable pins have been provided. A bottom shaft stud 27 is rotatable in a bearing house 28 and bodies 20 in shaft 12 rest upon a bottom pin 29 within that stud. That pin 29 is held up by a spring 30 against a stop 37 that determines the exact level of the gap between bodies 20 in front of the points of plungers 14. Bottom pin 29 is vertically movable within shaft 12, but not rotatable independent of shaft 12. If pin 29 is rotated with the aid of a coupling element 32 attached to the bottom part of it, shaft 12 turns through the same angle.

On top of shaft 12 there is a shaft stud 33 rotatable in a bearing house 34 and in the central axis of the latter there is a vertically movable locking pin 35, which rests upon bodies 20. At a distance of locking pin 35 shaft 12 carries a vertical group cam 36, which can tap against a stop 37 of a slide 38, which meshes with a group counter 39. For each group 2 in the machine a group counter has been provided, which records how many times the group has been chosen. When a selector knob 4 has been pushed and plunger 14 has been placed between two bodies 20, locking pin 35 is pushed upwards. Then all bodies 20 in this shaft have been moved in such a way that the gaps between these bodies do not lie any longer in front of the points of plungers 14 and this means that it is impossible to place in one group a second counter yoke 9 in the broken line position and to push a second selector knob 4.

According to FIG. 2 locking pin 35 rests upon a stop 41 under the tension of a spring 40, but when pin 35 is moved upwards it pushes two latch bars 42 sideways, the parting of which is over pin 35. A shifting of those bars 42 by the forcing in between of a pin 35 results in the partings between adjoining latch bars 42 also to be shifted and other latch pins 35 not to be movable upwards any longer. At either end of the row of latch bars 42 springs, corresponding with springs 30 and 40, have been provided for bringing back the bars in abutting position. The shifting also means that in other shafts 12 bodies 20 are no longer movable in a vertical direction and it has been made impossible for a plunger 14 to force itself in between bodies 20 of those shafts. The outcome of this locking system, therefore, is that for the entire tableau 1, due to selector knob 4 being pushed, is impossible to push any other selector knobs.

By moving one plunger 14 pin 29 has also been pushed down against the pressure of spring 30 and in doing so the coupling element 32 of this shaft 12 has been put downwards. Coupling elements 32 of all other shafts 12 remain in their original positions.

The system of a shaft 12 with bodies, plungers, yokes and cams forms a unit that with shaft studs 27 and 33 bears in bearings 28 and 34 and can easily be removed from the machine as one unit and exchanged. Only where locking pin 35 vertically fits between latch bars 42 accuracy is needed, but further there is a large distance with ample clearances between all other parts of the machine such as selector knobs and counters.

Counters 19 and 39 and slides 18 and 38 are mounted on a separate frame 43, in the machine which preferably is coupled with bearing houses 28 and 34. For the recording of the selection in the lower part of the machine a bar 44 has been provided, which bar has been provided with coupling slots 45, which can mesh with a lowered coupling element 32. By means of a transmission gear 46 bar 44 is connected with a recording knob 47, which is located at the front part of the machine under tableau 1. When that knob 47 is pushed, bar 44 is moved to the left and coupling element 32 of that shaft 12 in which a plunger 14 has been placed between two bodies 20 then meshes with coupling slots 45, so that shaft 12 turns one-quarter turn clockwise. This turning causes group cam 36 to be brought into contact with stop 37 and group counter 39 is shifted on digit. Simultaneously element cam 16 connected with shifted plunger 14 strikes stop 17 and this causes element counter 19 to be shifted one digit. At the rotation of shaft 12 by recording knob 47 cam 22 moves away from tripped arm 23 so that the latter slips back. This causes red flag 26 to be removed from behind the window as a signal that the choice has been secured.

The end of bar 44 meshes with a totalizing counter 48 at the side of the machine, which records how many times bar 44 has been moved. According to FIG. 2 in recording knob 47 a spring has been provided corresponding to spring 5 of selector knobs 4 so that after pushing the spring moves recording knob 47 back into the normal

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position independently of bar 44. In bar 44 an aperture 49 has been provided, in which pin 50 fits when the bar is moved to the left. At that moment there is not a single connection any longer between the interior of the machine and the selector knobs and the recording knob and then the machine is locked in the position desired by the voting person, both the selection of the element and the group of the element selected being secured irrevocably. Whereas selector knobs 4 are movable independently of plungers 14 and yokes 7, turned away with shafts 12, pushing selector knobs after recording knob 47 once has been pushed, is of no use any longer, nor is repeatedly pushing the recording knob of any use, because bar 44 has been locked with pin 50 independently of knob 47.

To put the machine in order for a following selection and to record the previous one as finished a neutralizing device has been provided. A neutralizing knob 51 provided at the side of the machine by the side of totalizing counter 48 carries a pin 52, which fits in a shackle 53 with which pin 50 has been connected. Whereas pin 52 has been bevelled, on pushing neutralizing knob 51 shackle 53 is pushed sideways and pin 50 is drawn out of hole 49. The released bar 44 is moved to the right by means of a spring 54 totalizing counter 48 being shifted one digit and the selection being recorded as finished. Then plunger 14 is still present between bodies 20 so that coupling element 32 of shaft 12 remains in contact with coupling slots 45 and bar 44 turns shaft 12 back over the same quarter-turn. Under the machine on the extension of pin 52 a counter bar 55 has been provided, which just as bar 44 has been provided with coupling slots 56. Counter bar 55 meshes with all its coupling slots 56 with pinions 57 that are connected with shafts 58 of vertical set-back bars 59. Behind each shaft 12 in the machine a prismatic setback bar has been installed, which is parallel to the central axis of the shaft and rotatable in the machine with its shaft 58 in bearings 60.

In the normal position set-back bars 59 allow a counter yoke 9 with its element cam 16, which yoke has been shifted backwards, to pass freely. When neutralizing knob 51 is pushed further and pin 50 has been drawn out of hole 49 the point of pin 52 contacts counter bar 55 and the latter turns all set-back bars 59 in such a way that a rib 61 is pushed into the path of a shifted counter yoke 9 with its element cam 16. By placing bar 44 to the right shaft 12 in the meantime has been turned backwards and during that turn rib 61 of set-back bar 59 pushes counter yoke 9 forward. Then nicks 15 of plunger 14 of yoke 7 belonging to it slip between bodies 20, which have been moved away from each other and springs 13 push yoke 7 further forward until counter yoke 9 lies against the back side of profiles 11 and is free from set-back bar 59. Thus all plungers 14 are ready in equidistant position for a next selection, for when shaft 12 turns back cams 22 on yokes 7 come again under arms 23 without moving levers 24 with flags 26.

Through the tension of spring 30 pin 29 after the slipping away of plunger 14 moves upwards up against stop 31 and rising coupling element 32 ends contacting coupling slots 45 of bar 44. At the same time under the influence of spring 40 locking pin 35 is falling from in between latch bars 42 and these move back until their partings are lying over locking pins 35 again. Thereafter set-back bars 59 turn back to their normal positions and in this way the machine has been put fully in order for a next selection and its recording on the various counters.

In the machine final stops and springs have been provided that prevent the parts like the shafts and the set-back bars from turning otherwise than is desirable and e.g. on shafts 12 at shaft studs 27 stabilizing springs 62 have been mounted, which more or less lead back and hold these shafts against the final stops. The tension

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in these springs, however, is not so high that movement over a normal range is seriously impeded. The possibility is not ruled out, however, that a wrong selection takes place and a person changes his mind and wants to select again. This is only possible, if the recording device has not yet been set in operation, for knob 47 brings about a definite recording of the selection that is irrevocable, because with that knob 47 the connection of knobs 4 and knob 47 itself with the interior of the machine is interrupted.

When only one selector knob 4 has been pushed and the remainder of the selector knobs have been locked it must be possible for a rectification of the original state to take place and for that purpose a rectifying device has been provided. Under tableau 1 at the left side a rectifying knob 63 has been provided pushing of which results in a rack 64 movable with that knob meshing with pinion 57 of the first set-back bar 59. Whereas set-back bars 59 with pinions 57 are permanently coupled together through coupling slots 56 in counter bar 55 all set-back bars 59 are moved simultaneously. On pushing rectifying knob 63 turns all planes 65 of set-back bars 59 forward that lie in front of rib 61 and pushes back a counter yoke 9 moved by a selector knob 4. Then yoke 7 is put back in neutral position with plunger 14 outside bodies 20 without shafts 12 having been set in rotation or counters 19, 39 or 48 having been set in motion. At the same time flag 26 of the wrong selection is removed from behind the window and a new selection can take place after the set-back bars have returned to their normal positions.

When a new selection has been made and the right selector knob 4 has been pushed this selection can be recorded with recording knob 47. Neutralizing knob 51 and rectifying knob 63 both operate independently of each other on the same parts viz. set-back bars 59 and counter bar 55 that bring plungers 14 back in their neutral positions.

When the machine is used for elections selector knobs 4, rectifying knob 63 and recording knob 47 at the front side of the machine are operated by the voter. The element counters and the group counters are covered by a screen behind tableau 1, which screen has not been drawn, so that the next voter no more than the polling-station can see in which way the previous voter voted and so the ballot remains a secret. Only when tableau 1 has been removed or the screen has been shifted at the end of the election counters 19 and 39 can be read. As soon as the voter has left the machine neutralizing knob 51 at the side of the machine is pushed by an election official, as a result of which the serial number of the selection is recorded on totalizing counter 48 and the election procedure has been finished whereafter a next voter is allowed to vote. At the first pushing of knob 51 the locking of bar 44 by pin 50 is immediately lifted. When that bar has moved back and counter 48 has been shifted one digit, aperture 49 is beyond pin 50 and consequently repeatedly pushing of neutralizing knob 51 does not affect the result any more.

At elections it is possible that a voter does not find a suitable candidate. A recording of the presence of the voter at the machine is desirable and is obtained if he only pushes recording knob 47. In that case not a single coupling element 32 is brought into contact with coupling slots 45 and no turning of a shaft 12 with the subsequent shifting of counters 19 and 39 takes place. When bar 44 moved by the pushed knob 47 returns counter 48, however, is moved, indeed and thus the voter has been recorded. The polling-station can always tell from the open totalizing counter whether a voter took part in the election and how many voters operated the machine.

It is clear that as regards the construction, e.g. of the coupling elements and pinions 32 and 57 and mechanism 46 other forms can be applied, provided these lead to

the same result viz that the movements of recording knob 47, neutralizing knob 51 and rectifying knob 63 are rightly transferred to shafts 12 and set-back bars 59. Moreover everywhere springs may be provided to prevent overloading and to bring back the various parts in the right positions if necessary.

It is also possible to provide latch bars 42 at the bottom part of the machine under or by the side of the bars 44 and 55. Then locking takes place with an extension of bottom pin 29 that can be pushed between latch bars lying below. At the upper side locking pin 35 with spring 40 and stop 41 must be maintained, however, in order to enable the movement of bodies 20.

It stands to reason that the accuracy with which the parts of a unit are manufactured is of great importance but they may be mass-produced from special materials just like bodies 20 which preferably have been constructed in the shape of rollers and thus yield little friction and wear. Latch bars 42 can be constructed in the shape of rollers or balls. In this connection in addition to the partings above pins 35 partings on the boundaries between the units are also possible, which are advantageous in case of assembly or exchange.

The great advantage of the machine described lies in the fact, that with every selection and its recording only those parts are brought into contact with others that are essential for the selection of the element and of the group, whereas the remaining shafts with the parts of the groups that are not selected, attached to them are not coupled with the recording device and remain at a great distance from counters.

This does not only make it possible for the life of the parts concerned to be considerably longer than when at every selection and recording all parts would be brought into contact with each other, but at the same time that shaking or vibrating do not cause false movements.

This construction moreover has the advantage, that with a tableau provided with e.g. twenty units, these units are easily exchangeable or in case of the use of only five of the twenty units the fifteen units not in use can easily be removed. When a certain unit is being put out of use frame 43 that belongs to it can also be removed, with the counters and if necessary set-back bar 59, too.

What is claimed is:

1. A machine for the selection of an element from a number of groups of elements and the numerical recording of them, in particular applicable at elections, which machine has been provided with a tableau at which the elements to be selected are indicated in groups by a selector knob that represents each element, all other possibilities for selection being locked by operating one selector knob until a recording device connected to a totalizing counter has allowed the machine to mesh with a counter for an element selected and with a counter for the group to which the element selected belongs, while a rectifying device has been provided for wiping out a wrong selection before this selection has been recorded, and a neutralizing device for putting the machine in a neutral position after recording has taken place, wherein the machine has been provided with for each group of elements a unit comprising a shaft rotatable around its central axis, in which for each element of the group has been provided a plunger, which is actuated by the operation of a selector knob and is placed between two bodies of a column of bodies rest-

ing one above the other, which in the shaft have been guided movably, in the direction of the central axis the shifting of one plunger causing the movement of the bodies, which locks the shifting of all other plungers, couples the shaft with a rotating device that is operated by the recording device, causing, when rotation takes place, a cam belonging to the actuated plunger to shift a counter for a selected element one digit and a cam of the shaft to shift a counter for the group one digit.

2. A machine according to claim 1, wherein the coupling with the rotating device and the locking device of the plungers of other units have been provided at either end of the shafts in the shape of pins in the central axis of the shaft and which pins abut to the bodies.

3. A machine according to claim 2, wherein the rotating device and the locking device are lying at either end of the shafts.

4. A machine according to claim 1, wherein the shifting of the bodies in shafts different from those in which a plunger has been actuated, has been locked by the shifting of latch bars the partings of which are lying in the central axes of the shafts.

5. A machine according to claim 2, wherein a unit including one of its pins in the central axis of the shaft can be removed from the machine.

6. A machine according to claim 1, wherein in a neutral position of the machine the counters for the elements and for the group and the units are installed at such a distance from each other that those counters only can be shifted, after a rotation of a shaft beyond reach of the selector knobs.

7. A machine according to claim 1, wherein the rotating device is formed by a bar movable with the recording device, which bar is connectable with one of the units only, by means of a coupling element that has been shifted by an actuated plunger via the bodies and a pin in the central axis of a shaft.

8. A machine according to claim 1, wherein a neutralizing device has been provided that is connected with a rectifying device.

9. A machine according to claim 8, wherein the rectifying device and the neutralizing device operate on a number of set-back bars corresponding to the number of units, which set-back bars are rotatable around axes parallel to the central axes of the shafts and which bars when rotating are brought into the path of the cam belonging to an actuated plunger, causing this plunger to be pushed out between the bodies in the shaft.

10. A machine according to claim 9, wherein the neutralizing device meshes with the rotating device that is operated by the recording device, causing a shaft to be rotated back before a set-back bar has been brought into the path of a cam.

References Cited

UNITED STATES PATENTS

3,168,240	2/1965	O'Neal	235—54
3,212,703	10/1965	Swanson	235—54

FOREIGN PATENTS

523,954	4/1931	Germany.
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STEPHEN J. TOMSKY, Primary Examiner

U.S. Cl. X.R.

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