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F. KEIPER.

VOTING MACHINE INTERLOCK.

APPLICATION FILED JULY 12, 1905.

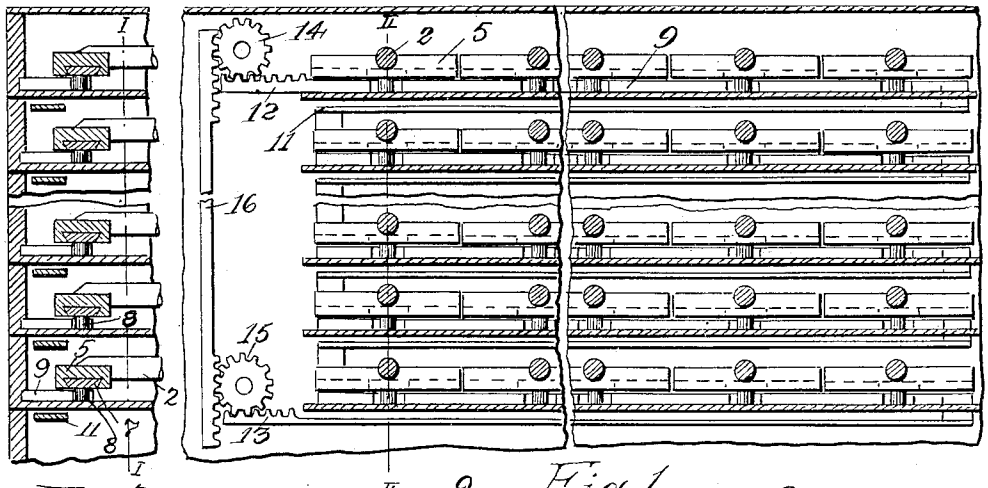


Fig. 2. Fig. 1.

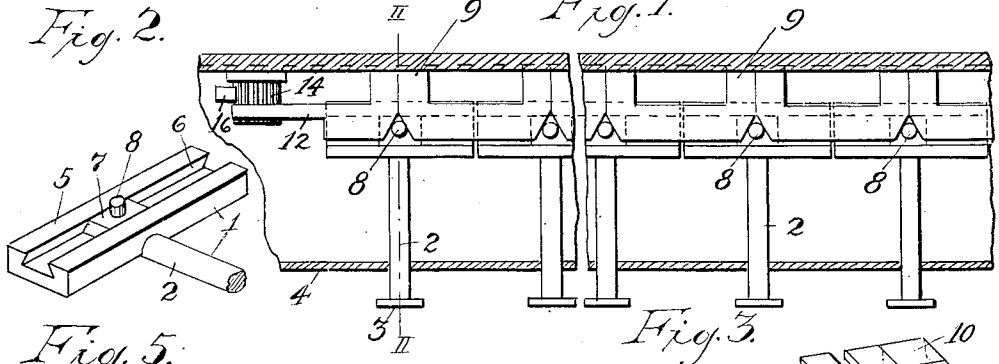


Fig. 5. Fig. 3.

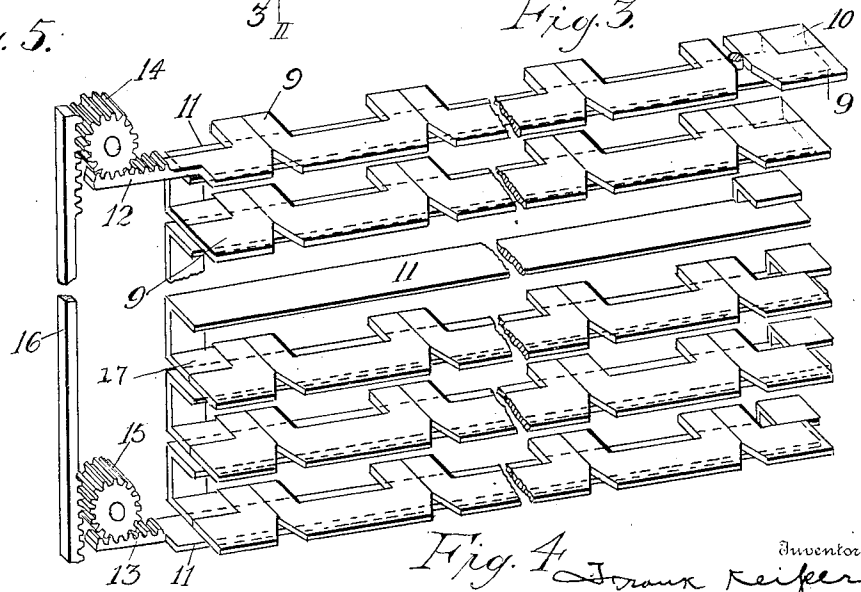


Fig. 4

Inventor
Frank Keiper

Witness
M. R. Seely
W. S. Boyd.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

FRANK KEIPER, OF ROCHESTER, NEW YORK.

VOTING-MACHINE INTERLOCK.

No. 898,114. Specification of Letters Patent. Patented Sept. 8, 1908.

Application filed July 12, 1905, Serial No. 269,379.

To all whom it may concern:

Be it known that I, FRANK KEIPER, a citizen of the United States, and a resident of Rochester, in the county of Monroe, State of New York, have invented certain new and useful Improvements in Voting-Machine Interlocks, of which the following is a specification.

The object of my invention is to produce a new and improved interlock for voting machines, which will work with absolute accuracy and be capable of interlocking the largest groups of keys belonging to candidates all running for the same office to which a large number of candidates are to be elected.

A further object of my invention is to permit the voter to select any combination of keys up to the maximum number permitted by law to be voted by him for the candidates running for that office and to prevent him from voting more than the legal number, and to permit him to select these keys in any combination that he may desire and to secure this result with parts of the smallest and most compact size and theoretically and mathematically correct in their operation.

A further object is to give to every key or combination of keys its maximum possible efficiency irrespective of location.

In the accompanying drawings: Figure 1 represents a front elevation of the machine on the section line 1—1 in Fig. 2; Fig. 2 is a cross section on line 2—2 in Figs. 1 and 3; Fig. 3 is a plan view of the interlock of a single office line, such as the bottom line of Fig. 1 viewed from below; Fig. 4 is a perspective view of the interlocks of a plurality of office lines such as are shown in Fig. 1, the ends of said office lines being shown connected for moving interchangeably; Fig. 5 is a detail of the key with the sliding block and interlocking pin mounted thereon.

In the accompanying drawings and specification like reference numerals refer to like parts.

It will be understood that the counters operated by the keys as shown in the accompanying drawings may be driven in any preferred manner, such as is shown in the patent to James H. Dean, No. 636,730.

In the accompanying drawings: 1 indicates the voting key, having the stem 2 thereon bearing the head 3, by which it is operated by the voter's finger. This stem 2 extends through the casing 4 and inside of said casing has rigidly connected thereto a guide 5. This guide is as long or very nearly as long as the distance between centers that the keys are spaced apart. In this guide is cut a groove 6, in which groove slides a block 7. This block has a range of movement through the entire length of the guide and can be removed from either end thereof, although said guide may be closed at either or both ends after the block 7 has been inserted therein. On the block 7 is carried a pin 8. The pin is integral therewith, it being necessary to have its connection with the block and guide as rigid and firm as possible. Interlocking with the said pin 8 I provide a series of interlocking blocks 9, 9, said blocks having parallel sides, which come in direct abutment with each other, and which are beveled at the side presented towards the interlocking pins, so that when the two blocks come into abutment, these bevels form a **V** shaped recess, in which the interlocking pin 8 is engaged. These blocks 9 in a vertical machine may rest on the floors of the sections which contain them, and in a horizontal machine may rest in suitable guides or grooves in a bed plate provided for that purpose. At the right hand end of each series of blocks 9, 9 is provided a block 10 carried by the bar 11, the latter being **L**-shaped in cross section. This block 10 engages with the last block 9 to the right of the series shown in Fig. 3, and when said block 9 is moved to the right it carries the block 10 with it, which in turn carries the bar 11 in the same direction, which bar 11 is offset at its left hand end, as shown at 17, having a projection or bar which reaches down and engages with the first block 9 in the next series below it, this part of my invention being no different substantially from that shown in the patent to Dean above referred to. By means of these interlocking blocks and the projecting portions 17 on the bars 11 connecting the consecutive series of interlocking blocks, the interlocking effect in any one series may be communicated to all the rest. I may also provide that the end block 10 in each series be fastened by means of a pin or other device, for the purpose of separating the various office lines of the group so that they will not be inter-related, and so that by withdrawing which pins the office lines may be thrown together in a group.

It is obvious, if each of the ends of the se-

ries of the interlocking blocks in a multi-candidate group be held by said pins, that the end blocks will be rigidly held in their initial position and only the intermediate blocks can move in response to the interlocking impulses. In such case, the interlocking pins 8 of the keys at the ends of the groups cannot pass nearer to the nearest ends of their respective office lines than the middle of the groove 6, in which the block 7 slides. In the keys in the middle of the multi-candidate group, said blocks will be free to slide throughout the whole length of the groove if the group be large enough. Thus, if the groove 6 be three inches long and the block 7 be one-half inch long, the block 7 can slide $2\frac{1}{2}$ inches from one end of the groove to the other and at all times maintain its complete connection with the groove in the key. If a displacement of the pin or wedge 8 be $\frac{1}{10}$ inch, it is obvious that said wedge can travel for 25 consecutive impulses along the groove and to this extent an interlock made of that type or pattern would be capable of being interchangeably used in groups up to and including 25 office lines.

In order to permit the end blocks of the group to move and limit the lost space in the interlock to a constant quantity so that only the prescribed number of wedges or pins can be introduced between the blocks, and no more, I connect the first end block of the first office line to the last end block of the last office line in the following manner:—Rigidly attached to the first block 9 in Fig. 4, is a rack bar 12, which may be of any desired length but which is shown short here for the purpose of not confusing the illustration. Connected to the lowest bar 11 is a similar rack 13, both of which racks are shown in Figs. 1, 3 and 4. Mounted on fixed pins and arranged to mesh with said racks 12 and 13 are pinions 14 and 15, which are rotated by said racks as said racks advance or recede. Connecting the two pinions 14 and 15 is a third rack bar 16, capable of transmitting the motion of one rack bar and its pinion to the other pinion and its rack bar. The effect of these connections is to connect the blocks of the interlocking system as a whole, so that when all the keys of a party are in voted position the vertical movement of the bar 16 will cause the interlocking blocks of all the office lines to move to the right, when the bar 16 is raised, and to the left when the bar 16 is lowered, the blocks and interlocking pins or wedges all maintaining their rigid abutment with each other during this motion. Thus when the bar 16 is raised, the rack 12 is drawn to the left, making room for the block 9 next thereto to follow it, in which direction it is positively pushed by the movement of the rack bar 13 and its bar 11 operating on the bottom office line of blocks, and pulling them in turn to the left, which motion is transmitted through all the series to the top one, making the top series move in unison with the bottom one. If the bar 16 is moved in the other direction, the blocks 9 in the top series are pushed to the right and they in turn push all the blocks of the other series to the right and the blocks in the bottom series are permitted to move to the right because the pinion 15 drives the rack 13 and its bar 11 in the same direction. Thus it will happen that when all of the keys that can be voted in the group are voted in the fewest number of office lines at the top of the group, the block 9 at the left hand end of the top office line is free to move to the left as far as it may be driven by the other blocks of said office line and the pins 8 voted in said office line and the block 7 in the key at the left hand end of said top office line will follow said blocks until it reaches the left hand end of its slot or groove 6, in which direction it can then go no further, and if the keys are voted in the fewest possible number of lines in the bottom of the group, the pin 8 and its block 7 in the key at the right hand end of the bottom office line will travel to the right to the end of groove 6 in its key, in which direction it can then go no further. It is obvious, however, if these end blocks were held rigidly by pins, that the block 7 could not travel toward the end of the group at all, because the end block of the group will not move in that direction, and that the range of movement of the sliding block 7 is limited to its movement in the other direction, because of which substantially only half of the number of keys can be voted at either end of the group as could be voted in the middle office lines of the group, or as could be voted anywhere in the group if my invention is used to permit it.

It is further to be noted that the pinions 14 and 15 are of double the width of either the rack bars 12, 13 and 16, so that one of said pinions can be in engagement with two rack bars traveling at right angles to each other and permit said rack bars to pass each other without interfering.

As shown in Fig. 4, the bars 11 are L-shaped, and each is provided on its right hand end with a part 10 adapted to engage one of the interlocking blocks 9, said part being parallel to the main portion of the bar 11 and connected thereto by a vertical web. Each of these bars 11 is provided at its left hand end with an offset portion 17. In a multi-candidate group a certain amount of lost motion must be allowed for between the parts 10 and the interlocking blocks 9, the amount of this lost motion being exactly proportioned to the number of candidates that each voter is allowed to vote for.

The operation of voting is as follows. Suppose, for example, that there are twenty-five voting keys and that each voter is allowed to

vote for five candidates. If he elects to vote a straight party ticket he will push in all the voting keys on the same line, the left hand line, for example. Each time he pushes in a voting key he spreads the interlocking blocks 9 in that line, always pushing the left hand one to the left. This carries with it the upper L-shaped bar 11, rotating the pinion 14, and thereby lifting the rack bar 17, which in turn rotates the pinion 15 and draws the rack bar 13 to the left. Every time a key is pushed in these motions are the result, the consequence being that as soon as five keys have been pushed in all the lost motion between the parts 10 and the interlocking blocks 9 is used up, and if the voter attempts to vote a sixth key he will be unable to do so because the interlocking blocks 9 will not yield for the reception of the pin 8. This result obtains no matter whether the keys operated by the voter are in the top row or in any other row, or partly in one row, or partly in another row, because the movement of any one of the twenty-five keys uses up one-fifth of the lost motion space, and no more, and the motion is transmitted from one end of the series to the other, that is to say through the various rows by means of the bars 11 having the projecting parts 10 and 16. An effective interlock is thus provided.

While I have thus described my invention, I wish it to be distinctly understood that I do not limit myself to the exact details shown in the drawing and described in the specification, as these might be varied without departing from the spirit of my invention.

Having thus described my invention, what I claim as new is as follows:—

1. In a voting machine, interlocking mechanism for multi-candidate voting comprising a plurality of groups of interlocking slides or wedge-blocks, connections between said groups to transmit the movement from one group to the next adjacent group, the two end blocks of said multi-candidate group being provided with rack teeth, and a limiting device consisting of pinions engaging therewith, and a rack bar engaging with said pinions movable independent of the frame of the machine and coupling said pinions and the end blocks together for simultaneous movement in either of two directions, whereby the spreading of the slides or wedge blocks may occur in both directions or in the direction of least resistance.

2. In a voting machine interlock, the combination of a plurality of series of interlocking blocks arranged in parallel series, with spacing devices for separating said blocks, the two end blocks at opposite ends of said interlock being provided with rack teeth, pinions engaging said rack teeth, a single rack bar engaging both of said pinions, by means of which said pinions and rack bar, the two end blocks at opposite ends of said interlock are connected for movement in unison, inclosing all of the blocks of the group between them.

3. In a voting machine interlock, the combination of a plurality of series of interlocking blocks, with spacing devices for separating said blocks, the two end blocks of opposite ends of said interlock being provided with racks, and being connected by means of pinions and a rack bar for movement in unison.

4. A combination in an interlocking mechanism of a plurality of series of interlocking blocks lying in parallel planes, all of said blocks being left free to move through a limited movement, with connections comprising three racks and two pinions extending between the end blocks of said plurality of series whereby the lost motion between said blocks is limited to a fixed amount.

5. In a voting machine interlock, the combination of keys and interlocking blocks, spacing devices carried by the keys and maintaining engagement with the blocks, said blocks being arranged in parallel series with connection between the series, the two outside end blocks of the parallel series being left free to move, with connections between them compelling coördination between them and fixing the interlocking space between them to a constant quantity, said connections comprising a series of racks and pinions.

6. In a voting machine interlock, a combination of interlocking blocks arranged in series, each series representing a single candidate group, means transmitting the motion of the blocks of one series to an adjacent series, means operable by the voter for moving said blocks, and compensating means reversibly movable as a whole located at and connected to one end of each of the outer members of all the series, whereby the lost motion permitted is kept at a constant quantity, said compensating means consisting of a series of racks and pinions.

7. In a voting machine interlock, a combination of a plurality of series of interlocking blocks, said series being arranged in parallel, with spacing devices for separating said blocks, the two end blocks at opposite ends of said interlock being provided with rack teeth, pinions engaging said rack teeth, a single rack bar extending transversely to said parallel series of interlocking blocks and engaging with both of said pinions, by means of which said pinions and rack bar, the two end blocks at opposite ends of said interlock are connected for movement in unison inclosing all of the blocks of the group between them.

8. In a voting machine interlock, the combination of a plurality of series of interlocking blocks, keys having grooves therein, a sliding block carried in the groove of and supported by each of said keys, and an inter-

locking spacing device carried by each of said sliding blocks, said spacing devices operating when moved forward with the keys to separate the two adjacent interlocking blocks, the two end interlocking blocks of opposite ends of said interlock being provided with racks, and being connected by means of pinions and a rack bar for movement in unison.

In testimony whereof I affixed my signature in presence of two witnesses this seventh day of July, 1905.

FRANK KEIPER.

Witnesses:
M. R. SEELY,
W. S. BOYD.