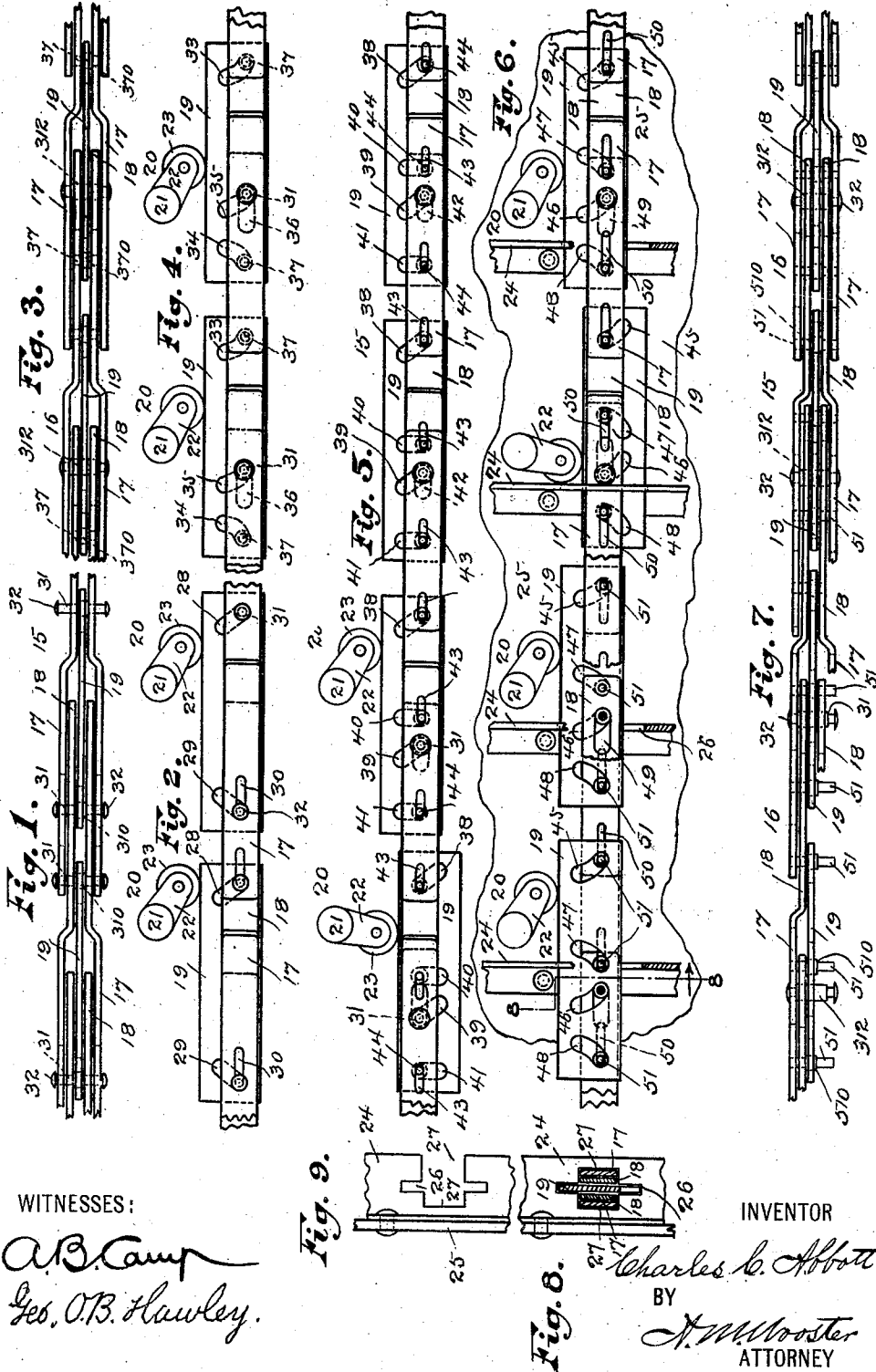


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INTERLOCKING MEMBER FOR VOTING MACHINES.
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900,905.

Patented Oct. 13, 1908.



WITNESSES:

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INTERLOCKING MEMBER FOR VOTING-MACHINES.

No. 900,905.

Specification of Letters Patent.

Patented Oct. 13, 1908.

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To all whom it may concern:

Be it known that I, CHARLES C. ABBOTT, a citizen of the United States, residing at Pittsfield, county of Berkshire, State of Massachusetts, have invented a new and useful Interlocking Member for Voting-Machines, of which the following is a specification.

This invention has for its object to provide an interlocking member for voting machines which shall be adapted to co-act with any voting member in a column or line of voting members in ordinary and independent voting, to prevent the casting of a vote for more than one candidate for any office and which shall be capable of adjustment in group voting to permit the casting of votes for a plurality of candidates for the same office; and the invention consists broadly in an interlocking member comprising side plates and cam plates movable obliquely relatively to the side plates, the cam plates and voting members corresponding and the movement of a cam plate by a voting member acting to contract the interlocking member longitudinally a certain predetermined amount.

In the accompanying drawing forming a part of this specification, similar reference characters indicate the same parts in the several figures.

Figures 1 and 2 are respectively a plan view and side elevation of a portion of an interlocking member illustrating one form in which I have carried the invention into effect; Figs. 3 and 4 are respectively a plan view and side elevation illustrating a second form in which I have carried the invention into effect; Fig. 5 a side elevation illustrating a third form in which I have carried the invention into effect; Fig. 6 a side elevation, partly broken away, illustrating a fourth form in which I have carried the invention into effect; Fig. 7 a plan view corresponding with Fig. 6; Fig. 8 a section on the line 8—8 in Fig. 6, looking in the direction of the arrow, the holding plate appearing in elevation; and Fig. 9 is an elevation illustrating a form of holding plate open at the side to permit the insertion of the locking member laterally.

15 denotes the interlocking member as a whole, 16 the side plates which comprise outer portions indicated by 17 and inner portions indicated by 18, and 19 the cam plates. The outer portions of the side plates lie parallel with each other, the inner portions parallel with each other and within the outer

portions of the next side plates, and the cam plates lie between the inner portions of the side plates. The side plates and the cam plates are provided with slots and said plates are operatively connected together by studs passing through the slots.

20 denotes voting members which may be of any ordinary or preferred construction. In the present instance I have shown voting members comprising shafts 21 having arms 22 extending therefrom which are adapted to bear upon the cam plates, said arms being provided with anti-friction rollers 23.

The interlocking member may be supported in any convenient manner, as for example by holding plates 24 which are shown as riveted to one of the plates of the machine as to a plate 25 which may be the front plate. The holding plates are provided with slots which are made long enough to permit the cam plates to be moved to either extreme of their movement. Upon opposite sides of slots 26 and communicating therewith are slots 27 which receive and support the side plates of the interlocking member, (see Fig. 8 in connection with Fig. 6). In Fig. 9 I have illustrated a form of holding plate in which the outer slot 27 extends from slot 26 outward to the edge of the plate so as to permit the interlocking member to be inserted from the side. This construction avoids threading the interlocking member through the holding plates. Both ends of each pair of side plates are at all times supported by holding plates.

In the first form, as illustrated in Figs. 1 and 2, the cam plates are provided near their ends with oblique straight slots. The slots at the right ends, indicated by 28, incline downward toward the right, and the slots at the left ends, indicated by 29, incline downward toward the left. The outer portions 17 of the side plates are each provided with two horizontal slots 30. 31 denotes studs which I term anchor studs for the reason that they pass through all of the plates, that is through the cam plates, the inner portions of one pair of side plates and the inclosing outer portions of another pair of side plates, and are anchored in one of the pairs of side plates. In the present instance these studs are anchored in the inner portions 18 of one pair of side plates. The mid-lengths of the anchor studs are preferably enlarged, as at 310, and engage an oblique straight slot at

one end of a cam plate and the outer ends thereof engage the horizontal slots 30 in the inclosing outer portions 17 of another pair of side plates. The outer ends of the anchor studs are preferably headed, as at 32, so as to retain the outer portions of the side plates securely in place, leaving the studs free, however, to slide in the horizontal slots. It will be noted that the right and left ends, respectively, of two cam plates are connected to the inner portions of each pair of side plates so that tilting of the cam plates is prevented. The operation of this form is as follows: It should be understood that the interlocking members are equally operative in any position in which they may be placed, it being wholly immaterial whether they are placed longitudinally, vertically or obliquely to the plane of the machine in which they are used. In the present instance, we will suppose that the right ends of the interlocking members are rigidly secured to some fixed portion of the machine (not shown), that the contraction of the members in use is from left to right and that the left ends of the members—that is the grouping ends—are attached to suitable carriers (not shown). The number of cam plates and voting members correspond. The voting members in Figs. 2 and 4 are shown in the normal or non-voting position, and the voting member at the left in Fig. 5 and the third voting member from the left in Fig. 6 are shown in the operative or voting position. The voting members are so set that they may be swung downward to and slightly past the vertical position so as to be self-retaining in the voting position. In this position they engage the corresponding holding plate which acts as a stop therefor. When a voting member is operated, the corresponding cam plate is forced obliquely downward and forward toward the right a distance equal to the pitch of oblique slot 28, and all portions of the interlocking member to the left of the operated cam plate are moved forward toward the right an additional distance equal to the pitch of oblique slot 29. This is owing to the fact that the inner portions of the pair of side plates corresponding with the operated cam plate must be moved forward the same distance that the cam plate moves plus the additional pitch of oblique slot 29, consequently all cam plates and side plates to the left of the operated cam plate must move forward twice the distance that the operated cam plate does. In other words, the operated cam plate moves forward the pitch of one slot and all side plates and cam plates to the left of the operated cam plate move forward, that is toward the right, a distance equal to the aggregate pitch of the two slots in the operated cam plate. The object of this construction is to enable me to get the required slack in the interlocking member for a voting opera-

tion with the least possible lateral movement of the cam plates, thereby effecting an important saving in space. It will be understood of course that all portions of an interlocking member to the right of an operated cam plate remain unaffected by the operation of voting. By causing an operated voting member to swing slightly past the vertical position, it is made self-retaining in that position and the interlocking member is left perfectly rigid so that no other voting member can be operated at all until the voting member previously operated has been moved by the voter back to its normal or non-voting position. For ordinary, straight, split and independent voting, the interlocking members are set to permit the actuation of one cam plate only in each interlocking member. In group voting, the interlocking members are set to permit the actuation of as many cam plates as there are candidates to be voted for in a group. For the purposes of this specification it is sufficient to describe the operation of the interlocking member where one candidate only for any office is to be voted for, it being understood of course that the operation of the interlocking member is the same if a plurality of candidates are to be voted for for the same office, the act of voting for additional candidates being a mere duplication of the act of voting for the first candidate. In setting up the machine to vote for a single candidate for an office, one voting member is operated, thereby placing one slack in the interlocking member which is then set so that no further slacks can be put therein, and consequently no further shortening thereof can take place. In setting up the machine for group voting, as many voting levers are operated and slacks put in the interlocking members as there are candidates to be voted for in the group, after which the interlocking members are set as before. In the second form, as illustrated in Figs. 3 and 4, the cam plates are provided near their right ends with oblique curved slots 33 extending downward toward the right, at their left ends with oblique curved slots 34 extending downward toward the left and intermediate said slots with oblique curved slots 35 extending downward toward the right. In this form there are no horizontal slots in the outer portions of the side plates, but I provide horizontal slots 36 in the inner portions of the side plates, (shown in dotted lines only). But one anchor stud 31 passes through each cam plate. This anchor stud is preferably enlarged centrally, as at 312, the enlarged portion engaging oblique curved slot 35 in the cam plate and the horizontal slots 36 in the inner portions 18 of the corresponding side plates. This stud is anchored in the inclosing outer portions 17 of another pair of side plates, the reduced ends of the studs passing through holes in the

outer portions of the side plates and being headed. In addition to the single anchor stud for each cam plate I provide in this form additional studs which I term for convenience guide studs and which are indicated by 37. The mid-length of these studs is preferably enlarged as at 370, one stud engaging oblique curved slot 33 and the other oblique curved slot 34 in the cam plate. The ends of one stud engage the inner portions 18 of one pair of side plates and the ends of the other stud engage the inner portions 18 of another pair of side plates. The ends of the guide studs may be loose in the inner portions of the side plates so as to roll or not, as preferred. By making the oblique slots curved instead of straight, I provide that the greater portion of the movement of a cam plate shall be produced by the first portion of the movement of the voting member when the leverage is least; that is, I take up the greater portion of the slack in the interlocking member by the first portion of the movement of the voting member. In addition to producing the greatest movement of the cam plate at the start and with the least leverage on the voting lever, I avoid the possibility of the engagement of two counters (not shown) with one slack of the interlocking member by setting two voting members at the half voting position. In this form an operated cam plate in addition to its lateral movement is moved forward the pitch of oblique slot 33, and all side plates and cam plates to the left of the operated cam plate are moved forward additionally the pitch of oblique slot 34, as in the first form. In other words, all portions of the interlocking member to the left of an operated cam plate are moved forward a distance equal to the aggregate of the pitches of the right and left oblique slots in said cam plate.

In the third form, as illustrated in Fig. 5, this additional movement of the portion of the interlocking member to the left of the operated cam plate is dispensed with, all cam plates and side plates to the left of the operated cam plate moving forward the same distance only that the operated cam plate does. In this form, it is necessary to make the cam plates wide enough and the oblique slots long enough to secure all the slack necessary in the interlocking member through the pitch of one oblique slot, which may be either straight or curved. In order to retain the cam plate against the possibility of tilting, I have shown two oblique slots in each cam plate and have shown straight slots, it being immaterial so far as the principle of the invention is concerned whether the oblique slots are straight, as shown, or curved. 38 denotes an oblique slot at the right end of each cam plate, which is downwardly inclined toward the right; 39 an oblique slot at the left of slot 38 which is downwardly in-

clined toward the right; 40 a vertical slot intermediate slots 38 and 39, and 41 a vertical slot at the left end of the plate. The inner portions 18 of the corresponding side plates are provided with horizontal slots 42 and the inclosing outer portions 17 of the side plates are provided with three horizontal slots 43. But one anchor stud 31 is used which is provided with a central enlargement similar to enlargement 312 in Fig. 3. The anchor stud engages oblique slot 39 in the cam plate and the horizontal slots 42 in the inner portions 18 of the contiguous side plates and is anchored, *i. e.* riveted, in the inclosing outer portion 17 of another pair of side plates. Three guide studs, indicated by 44, are used in this form in connection with each cam plate. These guide studs are provided with enlarged central portions similar to central portions 370 in Fig. 3. The central portion of the guide stud at the right engages oblique slot 38 in the cam plate, passes through inner portions 18 of a pair of side plates and engages horizontal slots 43 in the rear ends of the inclosing outer portions 17 of a pair of side plates. The central portion of the next guide stud toward the left engages vertical slot 40 in the cam plate, passes through the inner portions 18 of contiguous side plates and engages horizontal slots 43 in the inclosing outer portions 17 of another pair of side plates. The central portion of the guide stud at the left engages vertical slot 41 in the cam plate, passes through inner portions 18 of the contiguous side plates and engages horizontal slots 43 in the inclosing outer portions 17 of another pair of side plates. The ends of the guide studs may be loose in the inner portions of the side plates so as to roll or not, as preferred. The operation of this form is the same as that of the first and second forms with the exception, as stated, that the movement of the portion of the interlocking member to the left of the operated cam plate is the same as the movement of the cam plate itself, not double the movement as in the other forms, for the reason that the oblique slots in the cam plate incline in the same direction so that no additional movement of the side plates and cam plates to the left of the operated cam plate is produced.

The fourth form, as illustrated in Figs. 6 and 7, is the preferred form. In this form each cam plate is provided with four oblique curved slots, two of which are inclined downward toward the right and two downward toward the left, one anchor stud 31 only being used for each cam plate, this for the reason that the strain upon the interlocking member is upon the anchor studs; consequently by using a minimum number of anchor studs I minimize the possibility of stretch of the interlocking member in use. 45 denotes an oblique curved slot downwardly inclined to-

ward the right at the right end of each cam plate; 46 an oblique curved slot to the left of slot 45, also downwardly inclined toward the right; 47 an oblique curved slot intermediate slots 45 and 46, which is downwardly inclined toward the left, and 48 an oblique curved slot at the left end of each cam plate, also downwardly inclined toward the left. 49 denotes horizontal slots in the inner portions 18 of the side plates, and 50 horizontal slots in the outer portions 17 of the side plates. The anchor studs 31 are provided with enlarged central portions 312, the same as in Fig. 3. These enlarged portions of the anchor studs engage slots 46 in the cam plates and slots 49 in the inner portions 18 of the contiguous side plates and are anchored, *i. e.* riveted, in the inclosing outer portions 17 of another pair of side plates, as at 32. 51 denotes guide studs having enlarged central portions 510 which engage slots 45, 46 and 48 in the cam plates, pass through the inner portions 18 of contiguous side plates and engage horizontal slots 50 in the inclosing outer portions 17 of another pair of side plates. The ends of the guide studs may be loose in the inner portions of the side plates so as to roll or not as preferred.

It will of course be understood that the special details of construction are not of the essence of the invention. For example, the slots in the cam plates need not all be oblique but a portion of them may be vertical. The oblique slots may be straight or curved, as preferred, but are preferably curved for the reason stated. The exact number of guide studs and anchor studs used in connection with each cam plate is likewise not essential, nor is it essential that the guide studs engage the outer portions of the side plates. I preferably, however, as in Figs. 6 and 7, provide each cam plate with four curved oblique slots, two inclined downward toward the right and two toward the left, provide one anchor stud for each cam plate and provide horizontal slots in the outer portions of the side plates to receive the ends of the guide studs. This construction gives the greatest ease and firmness of movement to the cam plates, insures parallelism of movement without regard to point of engagement of voting members with cam plates, and gives to the interlocking member as a whole the greatest degree of rigidity. That is to say, the slack or slacks may be placed in the member with the least exercise of power, the member as a whole will be firm and rigid, the greatest portion of the movement of the cam plate will be produced by the first portion of the movement of the corresponding voting member and the required amount of slack in the interlocking member will be produced by the least amount of lateral movement of the cam plate or plates; the reason being that all portions of the interlocking member to the

left of the operated cam plate will be moved forward double the distance that the operated cam plate moves forward, owing to the fact that all of the interlocking member to the left of the operated cam plate is moved forward the distance the cam plate is and an additional distance equal to the pitch of an oblique cam slot inclined downward toward the left. The duplication of cam slots produces ease and steadiness of movement but no additional movement.

It is not required in any of the forms that the longitudinal distance from center to center of the cam plates, in either the voting or non-voting position, correspond with the distance from center to center of the voting members as the cam plates operate perfectly when engaged out of center.

Having thus described my invention I claim:

1. An interlocking member comprising cam plates, side plates and stud and slot connections between said plates acting to shorten the member when a cam plate is moved laterally.

2. An interlocking member comprising cam plates having oblique slots, side plates having horizontal slots and studs engaging said slots, substantially as described, for the purpose specified.

3. An interlocking member comprising cam plates each having an oblique slot inclined downward toward the right and an oblique slot inclined downward toward the left, side plates having horizontal slots and studs engaging said slots, substantially as described, for the purpose specified.

4. An interlocking member comprising cam plates each having an oblique curved slot inclined downward toward the right and an oblique curved slot inclined downward toward the left, side plates having horizontal slots, and studs engaging said slots and acting to shorten the member when a cam plate is moved laterally.

5. An interlocking member comprising cam plates each having at the right end an oblique slot inclined downward toward the right and at the left end an oblique slot inclined downward toward the left, side plates having horizontal slots and studs engaging said slots and acting to move a cam plate forward when it is forced laterally and to move all cam plates and side plates to the left of the operated cam plate forward twice the distance that the operated cam plate is moved forward.

6. An interlocking member comprising cam plates each having at the right end an oblique slot inclined downward toward the right, toward the left an oblique slot inclined downward toward the left, toward the left again an oblique slot inclined downward toward the right, and at the left end an oblique slot inclined downward toward the left, side

plates having horizontal slots and studs engaging said slots, substantially as described, for the purpose specified.

7. An interlocking member comprising 5 cam plates having oblique slots and adapted to be acted upon by voting members, side plates consisting of inner portions and outer portions, the outer portions of one pair of side plates inclosing the inner portions of a 10 contiguous pair of side plates and one pair of said plates having horizontal slots, and studs engaging the inclined slots in the cam plates, passing through horizontal slots in one pair of side plates and anchored in the other pair 15 of side plates.

8. The combination with voting members, of an interlocking member comprising cam plates which are engaged by the voting members and are provided with right and 20 left downwardly inclined curved slots, side plates having horizontal slots and studs engaging said slots and acting when a cam plate is moved laterally by a voting member to move it forward also, the greater portion 25 of the movement of the cam plate being produced by the first portion of the movement of the voting member.

9. The combination with voting members, of an interlocking member comprising cam 30 plates which are engaged by the voting members and are provided with right and left downwardly inclined slots, side plates having horizontal slots and studs engaging said slots and acting when a cam plate is moved laterally by a voting member to move it forward 35 also and to move all cam plates and side plates to the left of the operated cam plate forward an additional distance equal to the pitch of the left inclined slot in the operated 40 cam plate.

10. The combination with voting members and slotted holding plates, of an interlocking member supported by the holding plates and comprising cam plates having oblique slots,

side plates having horizontal slots, and studs 45 engaging said slots.

11. The combination with voting members and holding plates having slots 26 and on opposite sides thereof slots 27, of an interlocking member comprising cam plates having 50 oblique slots and movable laterally in slots 26, side plates supported in slots 27 and having horizontal slots, and studs engaging the slots in the plates.

12. An interlocking member comprising 55 cam plates having oblique slots and side plates consisting of inner and outer portions, the inner portions inclosing the cam plates and being inclosed by the outer portions of other side plates, the outer portions of said 60 side plates having horizontal slots and studs engaging the slots in the cam plates and outer portions of the side plates and passing through the inner portions of the side plates.

13. An interlocking member comprising 65 cam plates having oblique slots and side plates consisting of inner and outer portions, the inner portions inclosing the cam plates and being inclosed by the outer portions of other side plates, the inner portion of each 70 side plate having a horizontal slot and the outer portions of the side plates having a plurality of horizontal slots, anchor studs engaging an oblique slot in each cam plate and the horizontal slots in the inner portions of 75 the side plates and anchored in the outer portions of other side plates, and guide studs engaging other oblique slots in the cam plates, passing through the inner portions of the side plates and engaging horizontal slots in the 80 outer portions of other side plates.

In testimony whereof I affix my signature, in presence of two witnesses.

CHARLES C. ABBOTT.

Witnesses:

ARTHUR B. CAMP,
GEO. O. B. HAWLEY.