April 23, 1935. S. E. GORDON 1,998,454

DIVIDING BARRIER FOR A GAME AND MEANS FOR CONTROLLING THE SAME

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Fig. 1.

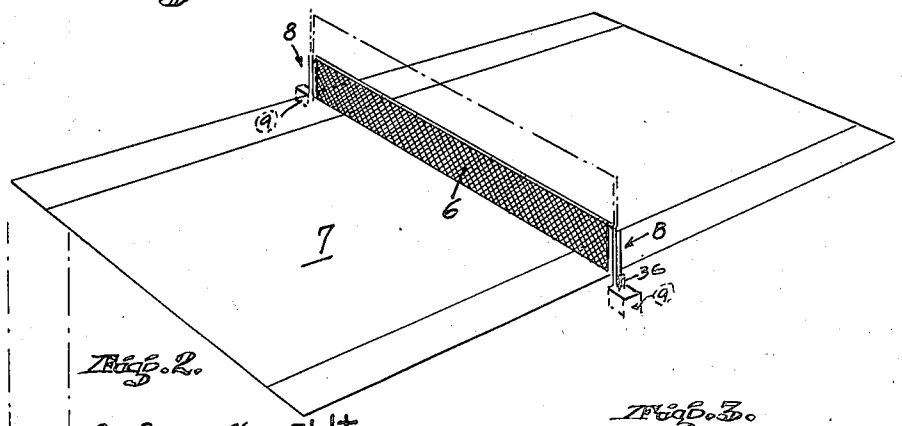

Fig. 2.

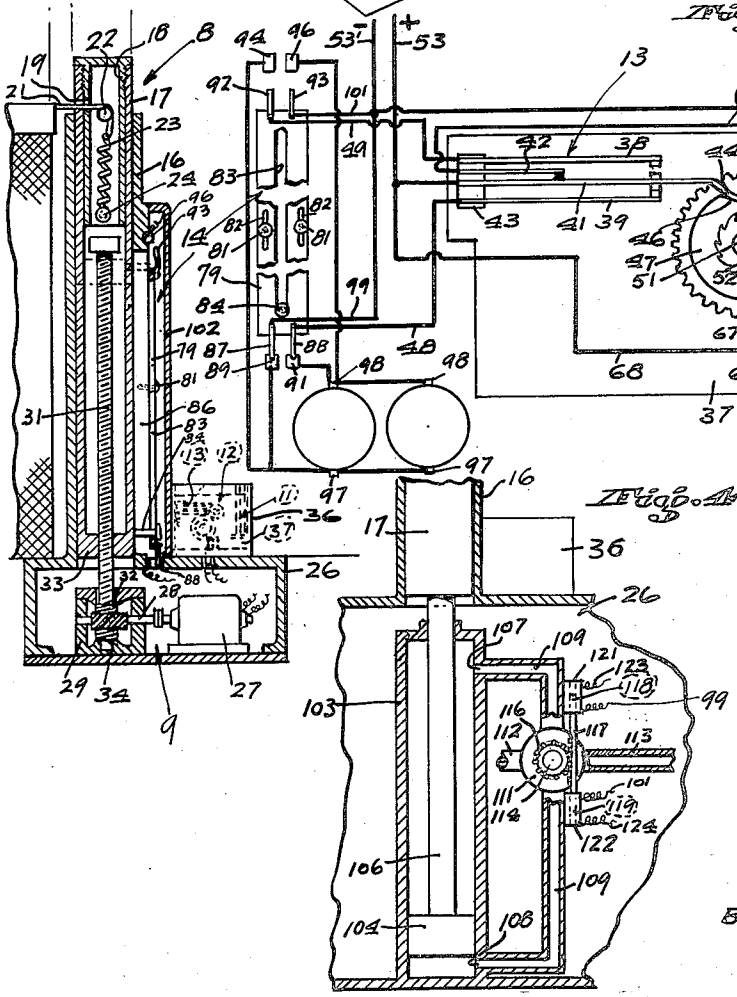

Fig. 3.

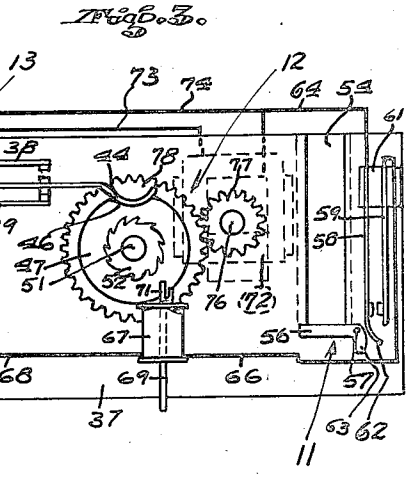

Fig. 4.

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DIVIDING BARRIER FOR A GAME AND MEANS FOR CONTROLLING THE SAME

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19 Claims. (Cl. 273—29)

This invention relates to a tennis net, or other barrier and means for controlling the same.

The primary object of the invention is to provide a dividing barrier for a court for playing a game such as a tennis net for a tennis court, which is adapted to prevent the playing of the game, and which can be moved into playing position across the court at will.

Particularly it is an object of the invention to provide a mechanism for moving a barrier on a court, such as a tennis net, into operative position for a predetermined period of time, at the expiration of which the barrier or tennis net is returned to inoperative position.

Another object of the invention is to provide a mechanism to bring a tennis net into playing position and to automatically return the same to inoperative position after a predetermined time of playing.

A still further object of the invention is to provide a coin controlled mechanism to bring a tennis net into playing position, and a timing mechanism adapted to cause the return of the net into inoperative position after a predetermined time of playing subsequent to the operation of the coin controlled mechanism.

In this specification and the annexed drawing, the invention is illustrated in the form considered to be the best, but it is to be understood that the invention is not limited to such form, because it may be embodied in other forms; and it is also to be understood that in and by the claims following the description, it is desired to cover the invention in whatsoever form it may be embodied.

The invention is clearly illustrated in the accompanying drawing, wherein

Figure 1 is a somewhat diagrammatic perspective view of a tennis court with a tennis net constructed and supported in accordance with my invention.

Figure 2 is a sectional view of a post for the tennis net and its connection to a reversible lifting mechanism.

Figure 3 is a diagrammatic view of the electrical coin control and timing control mechanism and its connection to the post-actuated circuit breaker and to the reversible lifting means, and

Figure 4 is a fragmental, sectional view of a post for the tennis net connected to an electrically controlled hydraulic lifting mechanism.

In carrying out my invention I make use of a barrier of the type suited for a game, for instance a tennis net 6 which extends across a field or court 7 on which the game is played. The ends of the barrier or net 6 are supported on adjustable supports or posts 8. Imbedded in the ground below each post 8 is a mechanism 9 so connected to the post that it is able to raise and lower the part of the post 8 to which the net 6 is attached thereby to raise and lower the net 6 into operative and inoperative positions. For instance when the device is used in connection with tennis the net 6 can be raised so that it is not suitable for playing the game, but it can be lowered into a playing position. In the event the net is used for playing so called volley ball the net 6 may be normally held in lowered position to prevent playing the game, but it can be raised and held in raised operative position for the game. If necessary the barrier in some cases may be made disappearing into a suitable recess in the ground and lifted out into playing position. The control mechanism for moving the barrier can be the same in all the above instances except the direction of its operation must be reverse to that shown in the herein embodiment.

The mechanism 9 is electrically controlled so that a coin control device 11 causes it to bring the barrier or net 6 into playing position, and a timing device 12 causes it to move the barrier or net 6 into inoperative position. The coin control device 11 and the timing device 12 actuate a circuit breaker mechanism 13, which latter is connected in series with another circuit breaker 14 actuated and tripped by the movement or adjustment of the post 8.

Both posts 8 and mechanisms 9 are of the same construction therefore a description of one, each at one end of the net, will suffice. Each post 8 includes a hollow standard 16 in which is slidably held a hollow net support 17. In the top of the net support 17 is secured a sleeve 18. Both the support 17 and the sleeve 18 are apertured at 19 and a line 21 extends from the top of the net 8 through said aperture and over a small pulley 22 inside the sleeve 18 so as to be connected by a coil spring 23 to a suitable anchor pin 24 in said sleeve 18. Thus the net 8 is resiliently supported at its ends inside of the respective posts 8. Each standard 16 is fixed on a casing 26 which latter is securely imbedded in the ground.

Each control mechanism 9 includes a reversible electric motor 27 in the casing 26. A shaft 28 is journaled in a gear box 29 in said casing 26 and is suitably driven by the motor 27. A screw shaft 31 extends vertically from the gear box 29 upwardly into the standard 16. The lower end of the screw shaft 31 is journaled in the gear box 29 and has a shoulder 32 thereon so arranged as to prevent axial movement of the screw shaft 31.

The upper end of said screw shaft 31 is threadedly engaged in the thick bottom 33 of the hollow support 17. The support 17 is preferably of rectangular cross section so that it can not turn with the screw shaft 31. A suitable worm transmission 34 in the gear box 29 transmits rotation of the shaft 28 to the screw shaft 31 in either direction. When the screw shaft 31 is rotated by the mechanism 9 the bottom 33 of the support 17 acts as a traveling nut and moves the support 17 axially upwardly and downwardly in the standard 16 according to the direction in which the reversible motor 27 rotates.

The electrical control mechanism for both motors 27 is contained in box 36. The various units of the control are mounted on a suitable partition wall 37 in said box 36, as shown, somewhat diagrammatically, in Figure 3.

The main circuit breaker of the electrical control is the circuit breaker mechanism 13, which includes parallel contacts 38, 39, a resilient contact 41 between the contacts 38 and 39 adapted to alternately engage said contacts 38 and 39, and a shorter contact 42 above the resilient contact 41 and adapted to be engaged by the latter. All the said contacts 38, 39, 41 and 42 are held at adjacent ends thereof on an insulating block 43 on the wall 37. The free end of the resilient contact 41 terminates in a downwardly and then upwardly curved bow at 44 which rests in a curved notch 46 in the periphery of an actuating cam 47. The cam 47 is made of suitable insulating material. It is to be noted that when the bow 44 is nestled in the notch 46 then the resilient contact 41 engages the lower contact 39 which latter is connected by a wire 48 and through the circuit breaker 14, as hereinafter described, to each motor 27 so as to cause the same to turn the screw shaft 31 so as to raise the support 17 and net 6 therewith upwardly into a non-playing position. On the other hand when the cam 47 is turned so that the bow 44 is raised to the normal periphery of the cam 47 then the resilient contact 41 engages both the contacts 38 and 42. The contact 38 is connected by a wire 49 and through said circuit breaker 14, to another terminal of each motor 27 so that it reverses the rotation of said motor 27 and turns the screw shaft 31 in reverse direction to lower the support 17 and the net 6. The contact 42 is connected into the circuit of the timing device 12 to close said circuit at all times when the bow 44 of the resilient contact 41 is out of the notch 46.

The cam 47 is secured on a shaft 51 to be rotated therewith. On the shaft 51 is fixed a ratchet 52 to be acted upon by the coin control mechanism 11 so as to turn the cam 47 and close a circuit through the resilient contact 41 and the upper contacts 38 and 42, thereby to start the motor 27 so as to cause the lowering of the support 17 and the net 6, and also to start the timing device 12. It is to be noted that the resilient contact 41 is connected to a line 53 of an electric supply current.

The coin control device 11 includes a coin chute 54 on the wall 37. The lower end of the chute 54 is covered by a lever 56 which latter is pivoted at one end thereof at 57. Outside the pivoted end of the lever 56 are the free ends of a pair of vertical contacts 58 and 59 which are mounted on an insulator 61 at their upper ends. The contacts 58 and 59 are resilient so as to be normally spaced apart. The end of the contact 58 has a bent extension 62 thereon engageable by an extension 63 on the pivoted end of the lever 56 when the lever 56 is swung downwardly. The contact 58 is suitably connected by means of a wire 64 to aline 53' of said electric supply current, and the contact 59 is connected by a wire 66 to a solenoid 67 which latter is then suitably connected by a wire 68 to the other line 53 of the said electric circuit. A core 69 in the solenoid 67 has a head 71 on its upper end adapted to engage and turn the ratchet 52. The core 69 normally drops downwardly by gravity and its head 71 rests on the top of the solenoid 67. However when a coin of suitable weight is dropped through chute 54 it swings the lever 56 downwardly, momentarily, just long enough to allow the escape of the coin from the chute 54. But the momentary swinging of the lever 56 causes the extension 63 to engage the contact extension 62 and force the contact 58 into engagement with the contact 59, thereby closing the circuit through the solenoid 67 and momentarily magnetizing the same. As the solenoid 67 is magnetized the core 69 is drawn upwardly so as to cause the head 71 to turn the ratchet 52. Then the lever 56 swings back to its position opening the solenoid circuit until another coin is dropped into the chute 54. As soon as the ratchet 52 is turned, in a contra clockwise direction viewing Figure 3, the bow 44 is forced out of the notch 46 to the periphery of the cam 47 closing the circuit through the contact 41 and contacts 38 and 42. In this manner every time a coin is dropped through the chute 54 motors 27 are operated to bring the support 17 and the net 6 down to playing position and the circuit of the timing device 12 is also closed through the contact 42 to operate said timing device 12.

The timing device 12 includes a synchronous motor 72, such as the so called Telechron motor. The motor 72 is connected by a wire 73 to the contact 42, and by another wire 74 to the line 53'. Thus when the resilient contact 41 is held in engagement with the contact 42 an electric circuit is formed through line 53, contacts 41 and 42, wire 73, through the motor 72, and wire 74 to line 53', causing the motor 72 to rotate a shaft 76 in contra clockwise direction viewing Figure 3. The shaft 76 is connected by suitable reduction gears 77 and 78 to the shaft 51 so as to drive the shaft 51 in a clockwise direction, viewing Figure 3, whenever the contacts 41 and 42 are held in engagement with each other by the cam 47. As soon as the cam 47 is rotated far enough to bring the notch 46 opposite to the bow 44 the contact 41 is disengaged from the contact 42 and the circuit through the motor 72 is broken stopping the same.

The tripping switch or circuit breaker 14 is arranged in series with the motors 27 and with the circuit breaker 13 so as to control the circuits of the respective motors 27 in accordance with the position of the supports 17. A plate 79 is slidably held on pins 81, on a side of the standard 16. The pins 81 extend through elongated guide slots 82. Along the longitudinal center line of the plate 79 extends a long slot 83 in which is slidable a tripping arm 84, which latter is extended from the support 17 adjacent the bottom of said support 17, and through a slot 86 in the side of the standard 16.

The plate 79 is made of insulating material. On the lower end of the plate 79 are spaced conducting strips 87 and 88, and opposite to said strips are spaced, fixed contacts 89 and 91. On the upper end of the plate 79 are spaced conduct-

ing strips 92 and 93, and opposite to the latter strips are fixed contacts 94 and 96. In the present illustration two terminals 97 and 98 are indicated on each motor 27 and the rotation of each motor 27 is reversed by reversing the connections to said terminals.

The conducting strip 87 is connected by a wire 99 to the line 53', and the strip 88 is connected by the said wire 48 to the lower contact 39 of the circuit breaker 13. The fixed contacts 89 and 91 are connected respectively to the terminals 97 and 98 of each motor 27.

At the upper end of the plate 79 the strip 92 is connected by the wire 49 to the upper contact 38 of the circuit breaker 13, and the other strip 93 is connected by a wire 101 to the line 53'. The upper fixed contacts 94 and 96 are connected by suitable wires respectively to the terminals 97 and 98 of each motor 27. The entire switch 14 is suitably inclosed in a housing 102 on the side of the standard 16.

By the cooperation of the switch 14 and the circuit breaker 13 the direction of the rotation of the motors 27, and their operation at the right time for moving the support 17 simultaneously is accomplished. The diagram in Figure 3 shows the electric circuit and controls in a position when the net 6 is in playing position but the predetermined time for playing expired. The cam 47 reached the position where the bow 44 nests in the notch 46 and the resilient contact 41 is in engagement with the lower contact 39. The net 6 in this lower position pushed the plate 79 downwardly so that the strips 87 and 88 are in engagement with the respective contacts 89 and 91. Hence the electric circuit is closed from the line 53 through the contacts 41 and 39, and wire 48 then through the strip 88 and contact 91 to the terminal 98 of each motor 27, then out through the other terminal 97 of the motor 27 and through the contact 89, strip 87, and wire 99 to line 53'. When the above circuit is formed the motors 27 are so rotated as to cause the supports 17 to be raised by the screw shafts 31. As the supports 17 move upwardly raising the net 6 into non-playing position, each tripping arm 84 travels with its respective support 17 and slides in the adjacent slot 83. By the time the supports 17 reach their uppermost positions the arms 84 also reach the upper ends of the respective slots 83 and push the respective plates 79 upwardly. Thus the lower strips 87 and 88 are disengaged from the lower contacts 89 and 91 and the upper strips 92 and 93 are engaged with the upper contacts 94 and 96 at the end of the upward stroke of the supports 17. Consequently the electric circuit of the motors 27 is broken at the lower ends of the plates 79 and the motors 27 are stopped. Inasmuch as the contact 41 is separated from the contact 42 the synchronous motor 72 is also inoperative. Thus the supports 17 and the net 6 are held in non-playing position.

The engagement of the upper strips 92 and 93 with the respective contacts 94 and 96 keeps the circuit ready for reverse rotation of the motor 27 as soon as the resilient contact 41 of the circuit breaker 13 is again engaged with the upper contact 38. In order to move the net 6 into playing position a coin of the desired denomination is inserted in the chute 54 to energize the solenoid 67, as heretofore described, thereby to cause the one stroke of the core 69 turning the ratchet 52, shaft 51 and cam 47 in a contra clockwise direction, viewing Figure 3. Thus the resilient contact 41 is raised by the cam 47 to engage the contacts 38 and 42. One of the electric circuits thus created is formed from line 53 through contacts 41 and 38, line 49, strip 92, fixed contact 94 to the terminal 97 of each motor 27, and from the other terminal 98 through fixed contact 96, strip 93 and wire 101 to line 53'. This is a reversed flow of electricity, compared with the first described circuit, and it causes the motors 27 to rotate oppositely to the first mentioned direction, thereby rotating the screw shafts 31 also in reverse to lower the respective supports 17 and the net 6 into playing position. At the end of the lower stroke of the supports 17 the plate 79 is shifted downwardly and is ready to operate the motors 27 to again lift the supports 17 as soon as the cam 47 is turned far enough to bring the notch 46 into registry with the bow 44 of the resilient contact 41. Until such time the circuit of the synchronous motor 72 remains closed so as to cause the slow rotation of the cam 47 in a clockwise direction, viewing Figure 3, as heretofore described. The number of suitable coins successively inserted into the chute 54 predetermines the distance of travel of the cam 47 before the supports 17 are raised.

The modified embodiment of my device shown in Figure 4 includes a cylinder 103 in which works a double action piston 104. A rod 106 connects the piston 104 to the bottom of a support 17 to raise and lower the same as the piston 104 is reciprocated. The cylinder 103 has a port 107 at its upper end and another port 108 at its lower end. The ports 107 and 108 are connected by conduits 109 to a suitable four way valve 111, which valve 111 also has a bypass 112 and an inlet 113 connected thereto. The inlet 113 conducts fluid under pressure to the valve 111. The valve 111 is of the usual rotary type and its shaft 114 has a gear 116 fixed thereon which latter is engaged by the teeth of a rack 117. The opposite ends of the rack 117 are formed into cores 118 and 119 moving respectively in solenoids 121 and 122. When the upper solenoid 121 is energized the upper core 118 is drawn thereinto moving the rack 117 upwardly to turn the gear 116 in a contra clockwise direction, viewing Figure 4. The stroke of the rack 117 is so adjusted that it causes a 90° turn of the gear 116 and of the shaft 114 and the valve 11 is so formed that a 99° turn in said contra clockwise direction connects the inlet 113 to the upper conduit 103 and to the port 107, and connects the lower port 108 and lower conduit 109 to the bypass 112. Thus fluid under pressure is admitted above the piston 104 and the fluid from below the piston 104 is bypassed causing the piston 104 to move downwardly lowering the support 17 and the net 6. A 90° turn of the gear 116 in clockwise direction viewing Figure 4, reverses the above connections so that fluid under pressure is admitted below the piston 104 and bypassed from above said piston thereby raising the piston 104 and the support 17.

The solenoids 121 and 122 are controlled by the aforedescribed electric controls except that only one strip is used at each end of the plate 79. Namely the lower fixed contact 89 is not used, but the lower fixed contact 91 is connected to a terminal 123 of the solenoid 121 and wire 99 is directly connected to the other terminal of the solenoid 121. At the upper end of the plate 79 the fixed contact 96 is not used, but the fixed contact 94 is connected to a terminal 124 of the

lower solenoid 122, and the wire 101 is directly connected to the other terminal of the lower solenoid 122. In this manner the operation of the solenoids 121 and 122 for controlling the valve 111 and the piston 104 is electrically controlled by the same coin controlled device 11, timing device 12, circuit breaker 13 and tripping switch 14 heretofore described in connection with the motors 27.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. The combination with a net used on a court for playing a game, of supporting elements for the net, means to move and hold the net in inoperative and operative positions respectively to prevent and allow the playing of the game, a coin controlled mechanism to actuate said means to render the net operative, and a timing mechanism to actuate said means to render the net inoperative.

2. The combination with a dividing barrier on a tennis court, of supporting elements for the barrier, means related to said elements to raise and lower said barrier at will, a coin controlled mechanism to actuate said means in one direction, to render the barrier operative, and a timing mechanism to actuate said means in the other direction thereby to render the barrier inoperative after a predetermined period.

3. The combination with a net on a court for playing a game of supporting elements for the net, means to alter the position of said supporting elements to hold the net in operative and in inoperative positions, a coin controlled mechanism to actuate said means for moving the supporting elements so as to hold the net in operative position, and a timing mechanism adapted to actuate said means after a predetermined period subsequently to the operation of the coin controlled mechanism to return the supporting elements and the net to inoperative position.

4. The combination with a net on a court for playing a game, and supporting elements for the net, of a reversible mechanism to move the supporting elements into operative and inoperative positions so as to render the net respectively operative and inoperative relatively to said court, and means to alternately actuate said mechanism in opposite directions.

5. The combination with a net on a court for playing a game, and supporting elements for the net, of a reversible mechanism to move the supporting elements into operative and inoperative positions so as to render the net respectively operative and inoperative relative to said court, means to alternately actuate said mechanism in opposite directions, and said actuating means including a coin controlled mechanism to actuate the reversible mechanism to render the net operative, and a timing mechanism to actuate the reversible mechanism after a predetermined period subsequent to the first actuation to render the net inoperative.

6. The combination with a dividing barrier on a court for playing a game and supporting elements for the barrier of a reversible electric motor, for each of said elements, means to connect each motor to the respective element to cause the motors to move the respective elements into operative and inoperative positions thereby to hold the barrier respectively in playing and in out of playing positions, as the motors are rotated in opposite directions.

7. The combination with a dividing barrier on a court for playing a game and suporting elements for the barrier of a reversible electric motor, for each of said elements, means to connect each motor to the respective element to cause the motors to move the respective elements into operative and inoperative positions thereby to hold the barrier respectively in playing and in out of playing positions, as the motors are rotated in opposite directions, a coin actuated mechanism to cause the motors to rotate in one direction to move the supporting elements and the barrier into playing position, and timing mechanism adapted to cause the motors to rotate in the opposite direction after a predetermined time subsequent to the first operation.

8. The combination with a barrier on a court for playing a game and supporting elements for said barrier, of hydraulic means to move said supporting elements and said barrier into operative and inoperative position, and means to alternately actuate said hydraulic means.

9. The combination with a barrier on a court for playing a game and supporting elements for said barrier, of hydraulic means to move said supporting elements and said barrier into operative and inoperative position, means to alternately actuate said hydraulic means, said actuating means including a coin controlled mechanism for actuation to cause the moving of the barrier into operative position, and a timing mechanism adapted to actuate said hydraulic means in the opposite direction.

10. The combination with a dividing barrier on a tennis court, and reversible means to raise and lower said barrier, of an electrical controlling mechanism to operate said reversible means in opposite directions, comprising a circuit breaker mechanism operated in conjunction with the movement of the barrier to connect an electric circuit in one direction through said reversible means throughout the entire movement of the barrier in one direction and to connect the electric circuit in a reverse direction upon the completion of said movement and throughout the entire movement of the barrier in the reverse direction, a timing mechanism being operative when the barrier is in playing position, another circuit breaker mechanism connected in series with the first circuit breaker and said controlling mechanism, and means actuated by the timing mechanism to normally close the circuit of the second circuit breaker into said reverse direction, and to close the circuit of the second circuit breaker in the other direction when the timing mechanism is operated.

11. The combination with a dividing barrier on a tennis court, and reversible means to raise and lower said barrier, of an electrical controlling mechanism to operate said reversible means in opposite directions, comprising a circuit breaker mechanism operated in conjunction with the movement of the barrier to connect an electric circuit in one direction through said reversible means throughout the entire movement of the barrier in one direction and to connect the electric circuit in a reverse direction upon the completion of said movement and throughout the entire movement of the barrier in the reverse direction, a timing mechanism being operative when the barrier is in playing position, another circuit breaker mechanism connected in series with the first circuit breaker and said controlling mechanism, and means actuated by the timing mechanism to normally close the circuit of the second circuit breaker into said reverse direction, and to close the circuit of the second circuit breaker in

the other direction when the timing mechanism is operated, and a circuit breaker to render the said timing mechanism active for a predetermined period being adapted to be operated by a coin deposited in a part of said control mechanism.

12. An automatic net support for tennis courts comprising, in combination with the posts on which the net is secured, a support for each post, means to adjustably hold the posts on the respective supports, and automatic means to raise and lower the posts on their respective supports so as to carry the net into inoperative and operative positions.

13. An automatic net support for tennis courts comprising, in combination with the posts on which the net is secured, a support for each post, means to adjustably hold the posts on the respective supports, and automatic means to raise and lower the posts on their respective supports so as to carry the net into inoperative and operative positions, and means to render the post raising means inoperative for a predetermined period.

14. An automatic net support for tennis courts comprising, in combination with the posts on which the net is secured, a support for each post, means to adjustably hold the posts on the respective supports, and automatic means to raise and lower the posts on their respective supports so as to carry the net into inoperative and operative positions, and a control mechanism for said automatic means being adapted to be rendered operative by the depositing of a coin in a part of said mechanism.

15. An automatic net support for tennis courts comprising, in combination with the posts on which the net is secured, a support for each post, means to adjustably hold the posts on the respective supports, and automatic means to raise and lower the posts on their respective supports so as to carry the net into inoperative and operative positions, means to render the post raising means inoperative for a predetermined period, and a control mechanism for said automatic means and for said second means being adapted to be rendered operative by the depositing of a coin into a part of the mechanism when the posts are raised.

16. An automatic net support for a tennis court comprising post supporting elements, posts adjustably held in the respective supporting elements, said net being secured to said posts, and a motor-actuated mechanism for shifting the posts into operative and inoperative positions.

17. An automatic net support for a tennis court comprising, post supporting elements, posts adjustably held in the respective supporting elements, said net being secured to said posts, and a motor-actuated mechanism for shifting the posts into operative and inoperative positions, and a control mechanism to hold the posts and the net in operative position for a predetermined period.

18. An automatic net support for a tennis court comprising, post supporting elements, posts adjustably held in the respective supporting elements, said net being secured to said posts, and hydraulically actuated mechanism for shifting the posts to move the net into operative and inoperative positions relatively to the tennis court.

19. An automatic net support for a tennis court comprising, post supporting elements, posts adjustably held in the respective supporting elements, said net being secured to said posts, and hydraulically actuated mechanism for shifting the posts to move the net into operative and inoperative positions relatively to the tennis court, and a control mechanism for said hydraulically actuated mechanism to hold the same fixed in a position corresponding to the operative position of the net for a predetermined period.

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