

Feb. 18, 1969

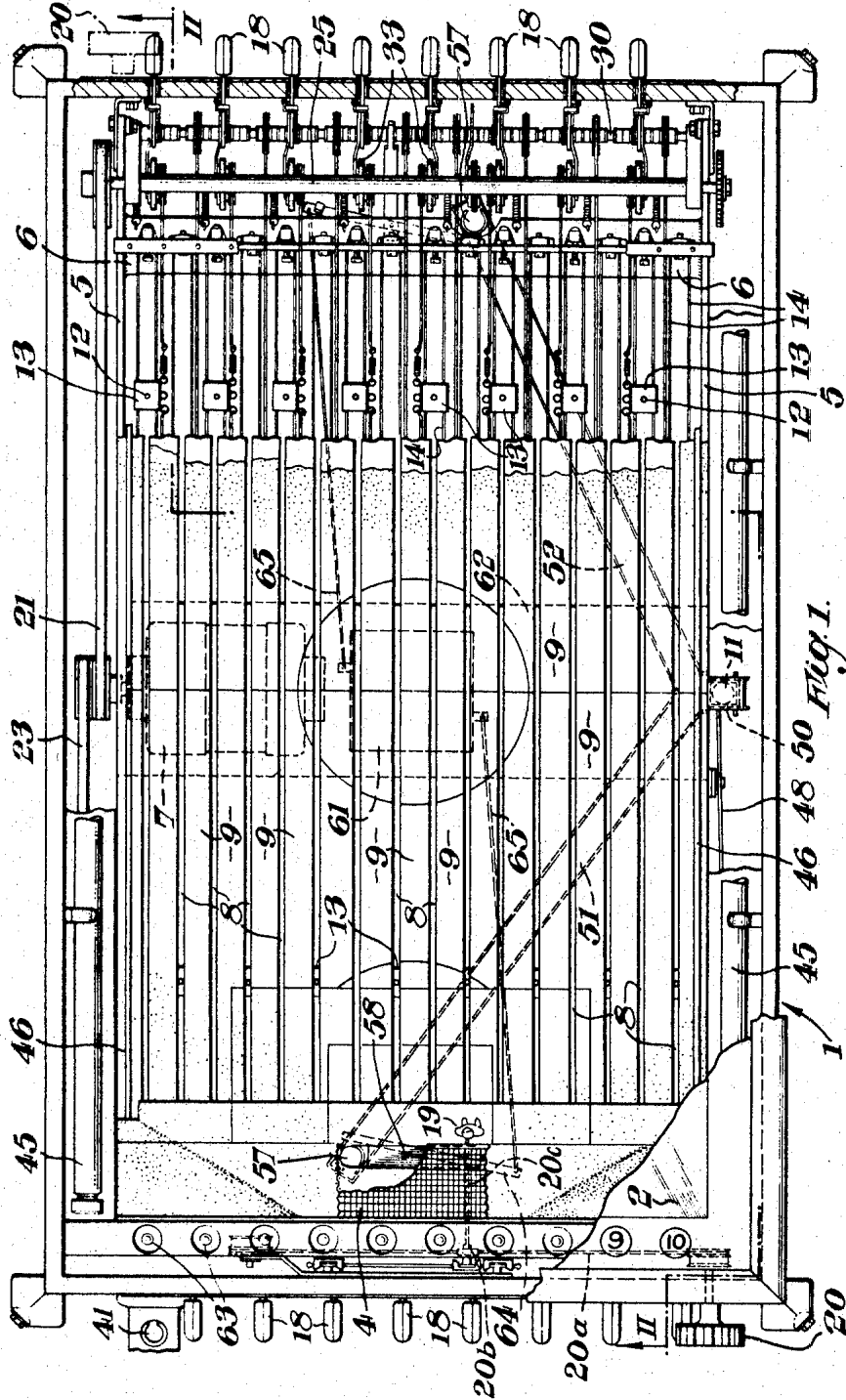
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3,428,316

BALL GAME APPARATUS INCLUDING A PLAYING AREA AND MOVABLE PIECES
SELECTIVELY MOVABLE ALONG SAID PLAYING AREA

Filed June 28, 1965

Sheet 1 of 6



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Sheet 2 of 6

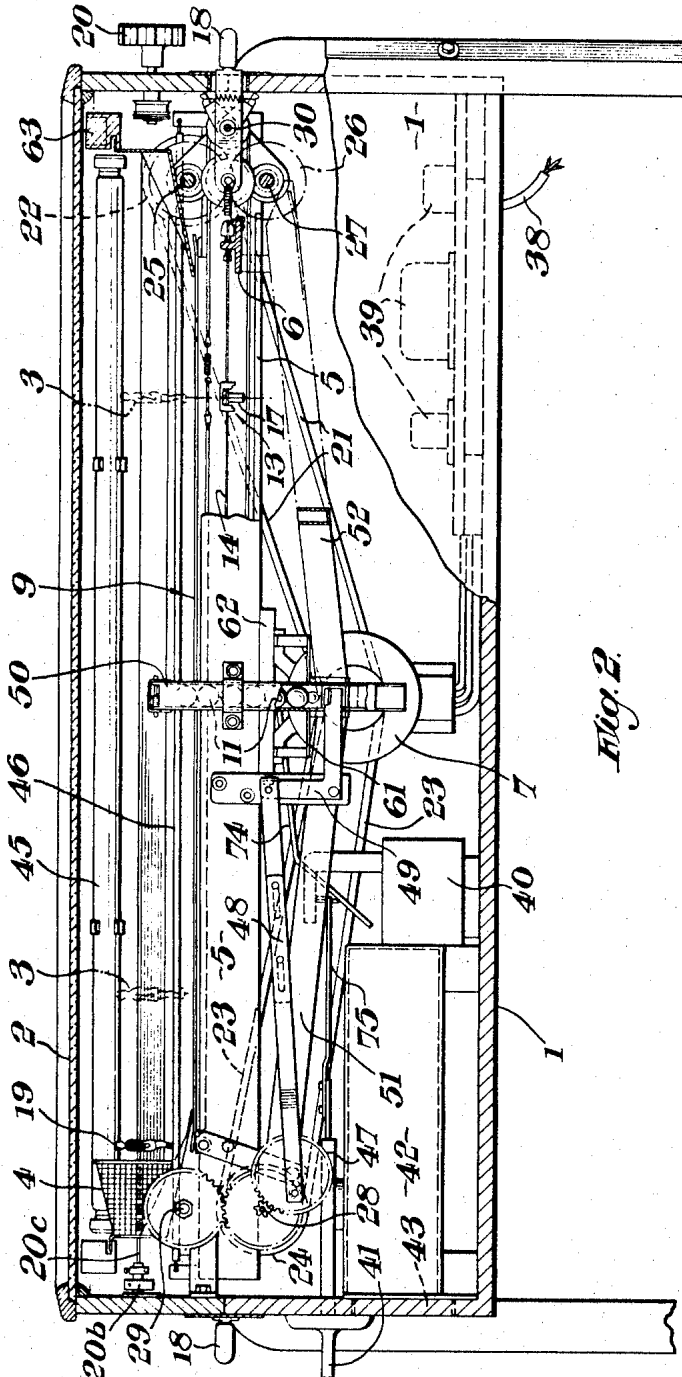


Fig. 2.

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Sheet 3 of 6

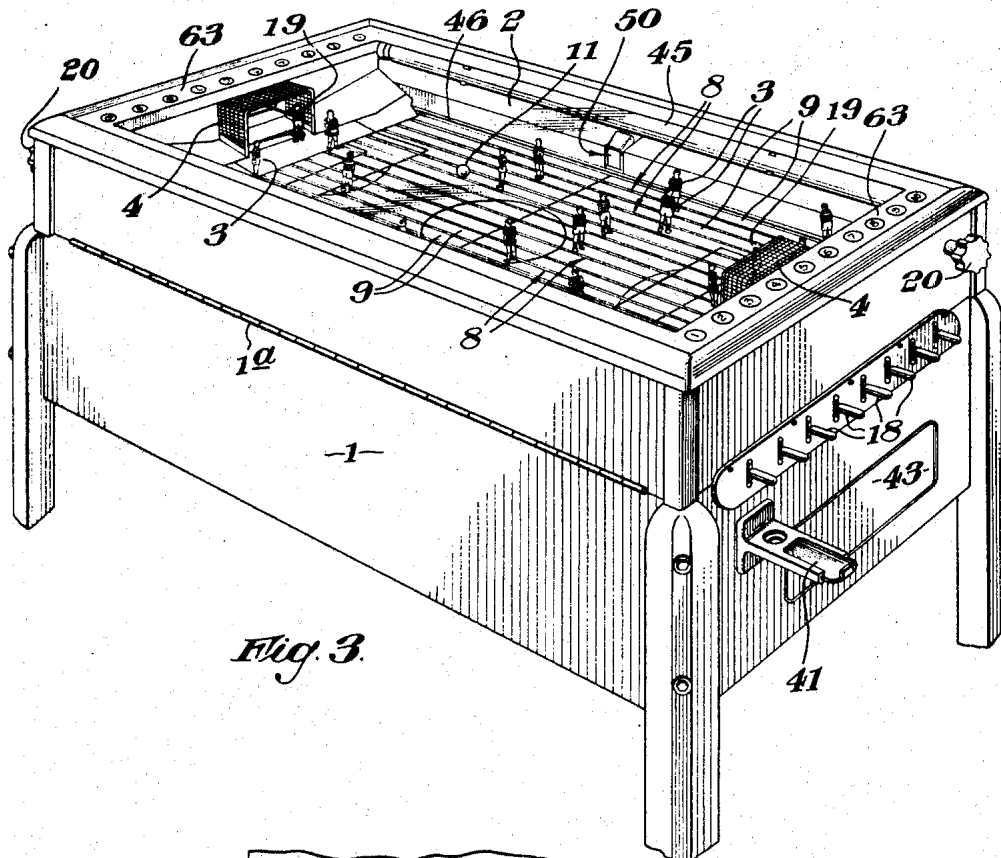


Fig. 3.

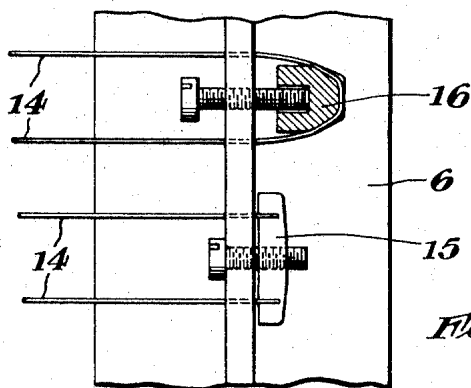


Fig. 4.

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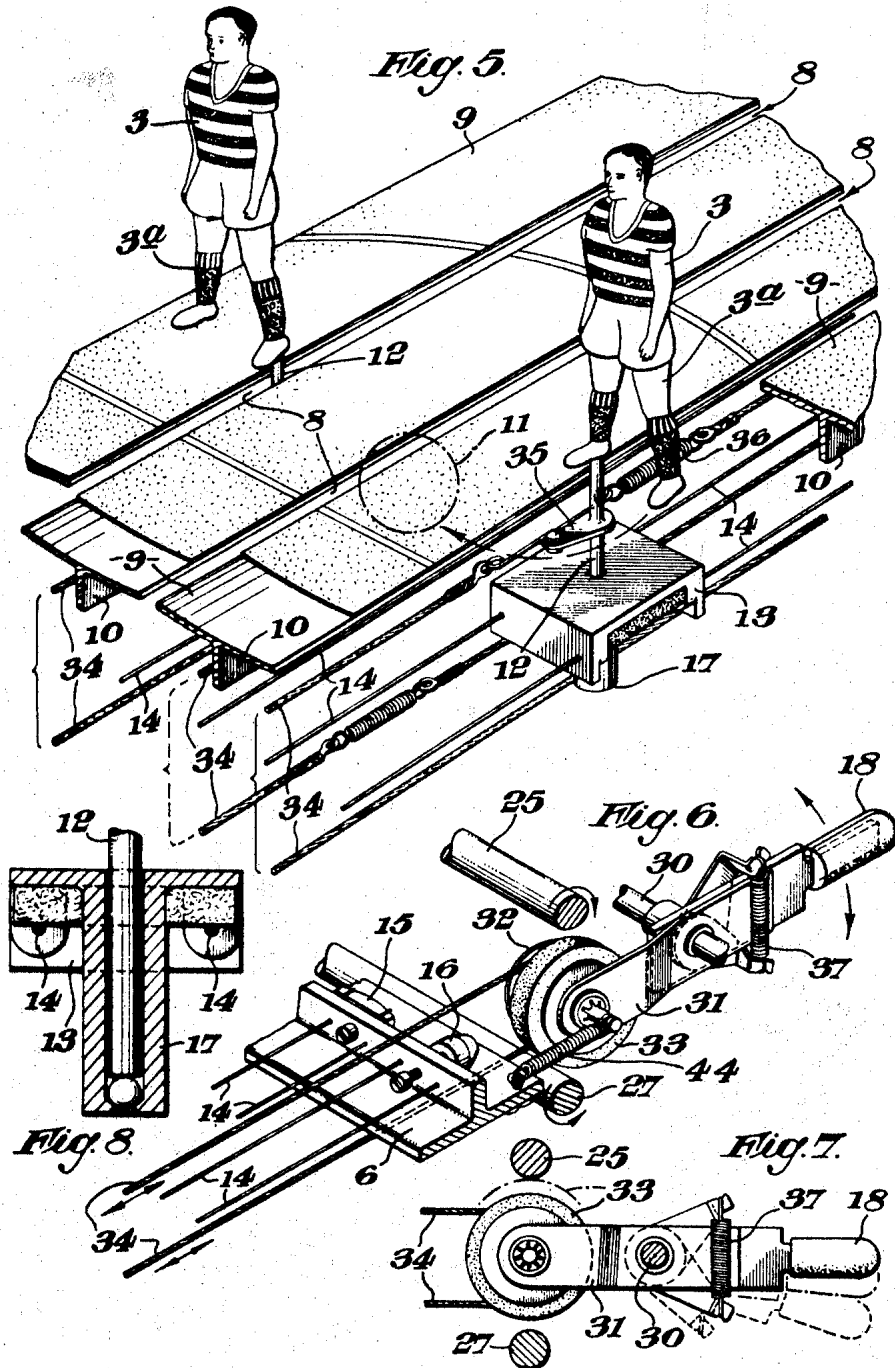
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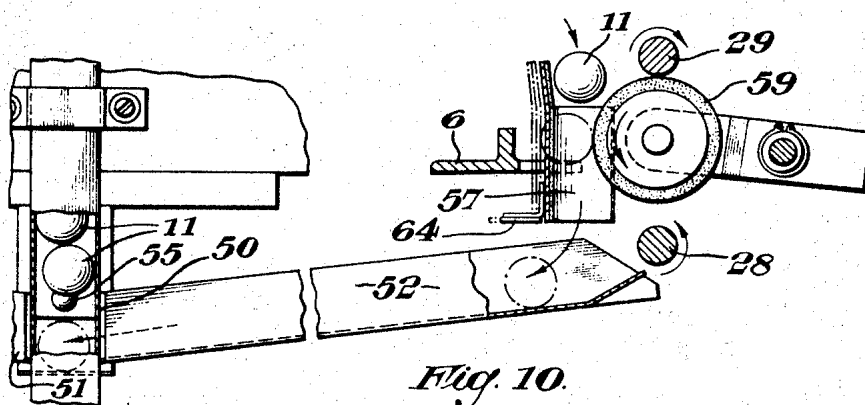
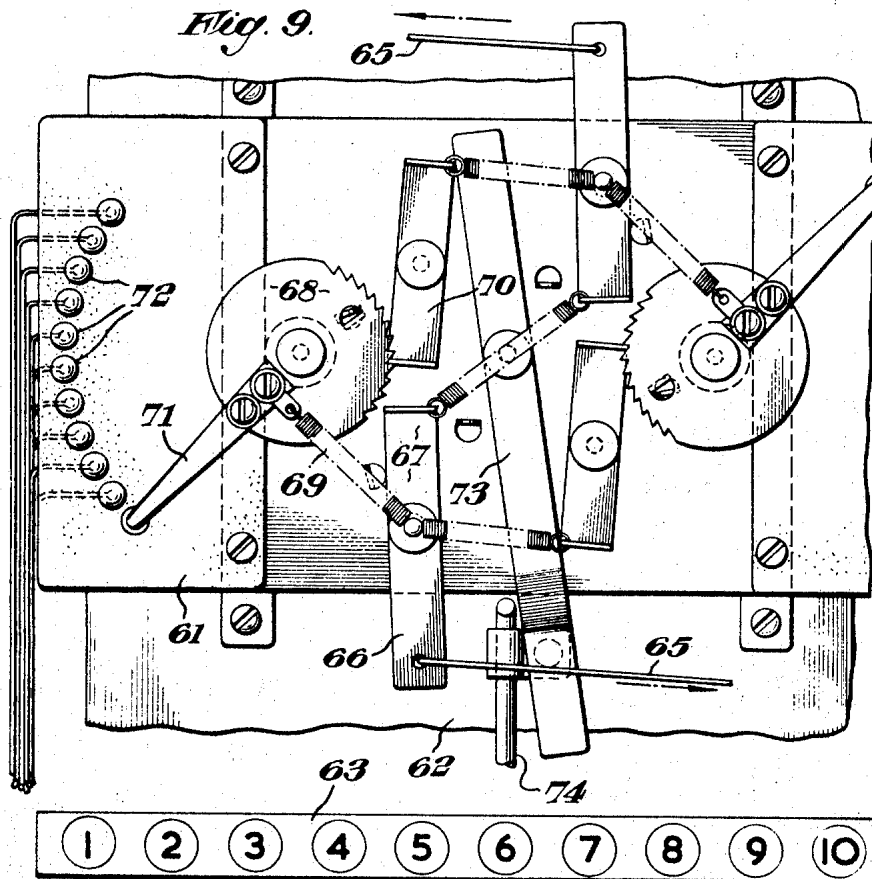
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Sheet 5 of 6



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BALL GAME APPARATUS INCLUDING A PLAYING AREA AND MOVABLE PIECES SELECTIVELY MOVABLE ALONG SAID PLAYING AREA

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1 Claim

ABSTRACT OF THE DISCLOSURE

A ball game apparatus includes a parallel slotted playing surface with playing pieces each on a stem extending up through a respective slot from a sliding carriage coupled to a respective endless cable trained over pulleys at opposite ends of the playing surface. One pulley of each pair is connected to a friction wheel on a lever which can be rocked by a player to engage the wheel with a selected one of a pair of oppositely rotating spaced shafts mounted in fixed bearings, to move the associated playing piece in either direction along its slot. A pair of these shafts are provided at each end of the playing surface and each pair is associated with all of the friction wheels at the associated playing surface end.

Background of the Invention

This invention relates to amusement apparatus of the type in which a loose ball, disc, roller or other piece (hereinafter referred to, for convenience, as a ball), is projected over a surface by means of movable pieces (e.g. figures of footballers) under competitive control, and wherein a ball-receiving receptacle is located at each end of the surface into one of which it is the object of each competitor to drive the ball by striking it through the medium of the movable pieces. The said invention has for its object to provide apparatus of the foregoing type in which the movable pieces are power-operated to move to and fro as and when a player operates a lever or equivalent applicable to a particular movable piece which has been selected for movement, such lever serving to connect the operating mechanism of the chosen piece to a main power drive. A further object according to a preferred embodiment of the invention is to cause the movable piece to rotate on a vertical axis through 180° each time its direction of movement is reversed.

According to the said invention, amusement apparatus for use by two competitive players comprises a horizontal playing area, two ball-receiving receptacles located respectively at opposite ends of the playing area, a plurality of slots in the surface of the playing area parallel to a line joining the centres of the said receptacles, and a movable piece disposed above each slot and carried on a movable supporting structure including a stem passing through the slot fixed to a slidable carriage beneath the playing area. The movable pieces are divided into two groups distinguished from one another such as by contrasting colours, and a play station for each player is associated with one of the said receptacles and with one group of movable pieces. Power-operated drive means is disposed under the playing area and associated with each play station, and includes two members rotatable in opposite directions and adapted selectively to engage a device for moving the individual carriages in either direction along their respective slots. A plurality of player-operated control members is disposed at each play station for controlling respectively the movable pieces in the group associated

with the station, each control member including means to engage drivingly a selected one of the rotatable members with the device for moving the carriage associated with the selected control member and thus to move the respective movable piece along its slot.

The movable pieces would usually be representations of footballers, hockey players, mounted polo players or the like, but they can be any suitable form of ballstriking device.

Each of the slidable carriages is mounted to move along any suitable sideway means such as a pair of parallel taut wires or rods passing through holes in the carriage, and the power-operated drive means (in one embodiment) is an endless flexible band, e.g. of nylon, to which the supporting structure of the movable piece is connected, said endless band passing around a pair of pulleys located respectively one at each end of the apparatus. Thus there would be a transverse line of co-axial pulleys at each end. Each pulley is mounted on the inner end of a two-armed pivoted lever, the outer end of which is the player-operated control member hereinbefore referred to, and each pulley is fixed co-axially to a friction wheel disposed between a pair of drive shafts, parallel to one another, and rotatably driven by an electric motor in opposite directions, said shafts constituting the aforesaid two members rotatable in opposite directions. Thus, by moving a selected control lever about its pivot, the friction wheel can be brought into engagement with one or other of the drive shafts, and the endless band caused to travel in one direction or the other, carrying the associated movable piece with it. Such a player-operated control and power-driving arrangement is duplicated for each of the play stations.

In order that the said invention may be clearly understood an embodiment thereof, applicable to the game of football, will be described by way of example, with the aid of the accompanying drawings wherein:

FIGURE 1 is a plan view of the embodiment with part of the playing area on the right broken away to show some of the mechanism underneath;

FIGURE 2 is a sectional elevation on the composite plane represented by the line II—II in FIGURE 1;

FIGURE 3 is a perspective view of the apparatus depicted in FIGURES 1 and 2;

FIGURE 4 is a detail referred to hereinafter;

FIGURE 5 is a pictorial view of a portion of the playing area seen in FIGURE 3, to a larger scale, showing two of the movable pieces and some associated mechanism;

FIGURE 6 shows one of a set of player-actuated levers each of which controls a movable piece;

FIGURE 7 is an elevation of the right-hand end of FIGURE 6;

FIGURE 8 shows in elevation the mounting of the stem (which supports the movable piece) in its carriage;

FIGURE 9 is an inverted plan of the goal-score indicating mechanism, and also the zeroising mechanism;

FIGURES 10 and 11 are respectively sectional elevation and plan of the mechanism associated with the ball-reception pocket located in each goal;

FIGURES 12, 13 and 14 are views of the ball stacking and issuing mechanism, FIGURE 12 being a view looking in the direction of arrows XII of FIGURE 13, and FIGURE 14 being a section on XIV—XIV of FIGURE 13.

Like numerals of reference indicate the same or corresponding parts throughout the several views.

The illustrated embodiment is for a coin-operated machine in which the insertion of a coin switches on an electric motor for operating the apparatus and also starts a time switch which automatically cuts out the motor after a predetermined period of play. It is to be understood, however, that the apparatus is not necessarily coin-operated, in which case a starting switch would be provided available freely to the two competitive players whereby

they could start up the motor and play quite freely without regard to time, and in this case no time switch would be included. Only in exceptional circumstances would such an apparatus, not coin-operated, be installed.

As shown in FIGURES 1-3, the apparatus includes a rectangular cabinet 1 with a glass top 2 through which a number of movable pieces 3 representing footballers are visible on a horizontal playing area with a goal 4 at each end. This cabinet is horizontally divided into upper and lower parts hinged together at 1a more clearly seen in FIGURE 3. The upper portion is fitted with a rectangular metal chassis comprising L-section sides 5 and T-section ends 6, and this chassis supports, underneath the horizontal playing area, much of the mechanism, together with the electric motor 7, whereby ready access is obtainable to the mechanism and so forth by opening the top half of the cabinet about the hinge 1a. The playing area is formed with a plurality of slots 8 which are parallel to one another, and these slots are formed by using longitudinal strips 9 for the playing area. The playing area is marked, in this example, as a football field and all the slots are parallel with one another and to a line joining the centres of the goals 4.

As seen in FIGURE 5 the longitudinal strips 9 have a strengthening web 10 underneath and are slightly concave transversely on their respective horizontal surfaces so that a ball 11 propelled thereon will be given a more animated course and movement than by merely rolling over a flat surface.

Referring more particularly to FIGURE 5, the movable pieces 3 are disposed one above each slot 8 and carried on a movable supporting structure including a stem 12 passing through the slot and fixed to a slidable carriage 13. These carriages can slide along a slideway consisting of a pair of taut wires 14 which pass through holes in the carriage 13 and are fixed to the chassis ends 6 as seen more clearly in FIGURES 4 and 6. At one end they are firmly fixed, as seen by the fixture 15, and at the other end they are adjustably fixed as at 16. These methods of fixing alternate throughout the pairs of wires 14 at each end. The stem 12 is rotatable in the carriage 13, FIGURE 8, and the carriage has a downwardly depending socket member 17 receiving the stem 12 and this socket member 17 constitutes a stop when the carriage comes up against the chassis member 6 at either end.

There are, in the example, sixteen of the movable pieces 3 and sixteen slots 8 each of which has one of the movable pieces 3 erected immediately above it. These sixteen movable pieces are distributed over the playing area, one for each slot, and are divided into two groups distinguished from one another by different colours painted thereon. At each end of the cabinet 1 there is a play station, one for each player, and at each such position or station there are eight levers 18 projecting whereby the player can manipulate the drive to the movable pieces, and also operate the goalkeeper figure 19 to move transversely through the medium of a rotatable knob 20. The knob 20 moves an endless band 20a which carries clamping means 20b carrying a rod 20c supporting the goalkeeper 19, as seen at the left of FIG. 1. On reference to FIGURES 6 and 7 there is illustrated drive means associated with each lever 18 and, in playing, the player selects one particular lever 18 associated with the movable piece which he desires to move, in the particular slot 8. The operation of such player-operated control members 18 is hereinafter described.

Mounted on the chassis framework underneath the playing area is the electric motor 7 from which there is a belt drive 21 (see particularly FIGURE 2) passing in one direction (to the right of FIGURE 2) to an upper pulley 22, and a second belt drive 23 passing in the other direction (to the left of FIGURE 2) to a lower pulley 24. The upper pulley 22 on the right drives a rotatable cross shaft 25 and this is geared at 26 to drive a lower rotatable shaft 27. These two shafts rotate oppositely to one another. A similar arrangement is disposed at the other

end of the apparatus where the lower pulley 24 is belt driven and drives a lower shaft 28 geared to drive an upper shaft 29 in an opposite direction. The two pairs of shafts are set in motion when the motor is switched on and are continuously rotating during the whole game, one shaft of each pair rotating reversely to the other.

Reverting to FIGURES 6 and 7, it will be seen that each lever 18 is a two-armed lever pivoted on the common cross shaft 30, and on the inner arm 31 there is carried a pulley 32 to which is fixedly attached a friction wheel 33. An endless band of nylon cord or the like 34 is passed around the pulley 32 and extends along the apparatus underneath the particular slot 8, with the runs in a vertical plane, on to another pulley mounted at the opposite end of the apparatus. This endless band 34, as seen in FIGURE 5, is attached to a radial arm 35 extending fixedly from the stem 12, and thus movement of the endless band 34 can pull on the arm 35 and thus tug along the slidable carriage 13 together with its movable piece 3. In so doing, it turns the stem 12 through an angle which also turns the movable piece 3 to face the direction in which the piece is being pulled. The direction of movement of the endless band 34 is determined by the direction of rotation of the pulley 32 with its friction wheel 33. Accordingly if the lever 18 is moved upwardly, the wheel 33 will engage the lower rotatable shaft 27 for rotation in one direction, but if the lever is depressed so as to raise the friction wheel 33 into engagement with the upper shaft 25, then the direction of movement of the endless band 34 will be reversed so that the movable piece 3 travels in an opposite direction. The reversed pull on the endless band 34 results in pulling the radial arm 35 in the reverse direction thus turning the stem 12 and also turning the movable piece 3. If the carriage 13 is allowed to travel to its fullest extent in any direction, then the carriage socket 17 will abut one or the other of the chassis end frames 6 and the appropriate shaft 25 or 27 will slip idly on the friction wheel 33. It will be appreciated that, when a reverse movement is given to the endless band 34, the movable piece 3 will turn through approximately 180° to face the way in which it is being towed. Should the piece 3 be halted in any intermediate position throughout the length of a slot, the tension applied to a spring 36 interposed in the band 34 will ease so that the spring in relaxing exerts a slight counter-pull on the radial arm 35 which imparts a small rotational movement on the stem 12. There is another tension spring equivalent to 36 in another part of the endless band 34. These springs are not necessary for a simple form of the invention but serves to provide a slight rotational movement to the pieces 3 when the respective levers 18 are moved between upper and lower positions. To guard against strain when the levers 18 are heavily forced upwards or downwards, these levers are made in two parts which are held rigidly in alignment, for all normal pressures, by a spring arrangement 37 whereby the lever can "break" when undue pressure is applied so as to save damaging force of the friction wheel 33 against one of the rotatable shafts 25 or 27. The complete lever 18, 31 returns to the central non-drive position under the power of a weak tension spring 44. The foregoing construction and arrangement applies to the levers 18 of both playing stations.

In FIGURE 2, there is shown an electric mains lead 38, leading through a transformer and other necessary electrical components 39 to the electric motor 7 and to a time switch 40 through switches controlled by the slide mechanism of the coin insertion device 41, and to the illumination of goal-score indicators which are hereinafter described, and to a pair of strip lighting lamps 45. The time switch 40 will have been set to provide a requisite delay before it switches off the motor 7. The item having the reference numeral 42 in FIGURE 2 is a coin box which receives coins from the coin insertion device 41, and which is accessible through the door 43 seen in FIGURE 3. A springy boundary wire 46

(FIGURES 12 and 13 particularly) surrounds the playing area.

The movable pieces 3 are each provided with a projection (FIGURE 5) which, in the example, is shown as an extended leg 3a, whereby a kicking motion is imparted to the piece during its partial rotation.

The method of supplying a ball on top of the playing area, and of supplying another ball to replace one which, after playing, has been successfully directed into a goal 4, will be described with reference particularly to FIGURES 10-14. It has been already described how the shafts 25, 27, 28 and 29 are continuously rotating during a play session. It will be seen in FIGURE 2 that the shaft 28 will be continuously driving a gear wheel 47 which has a connecting rod 48 which is continuously operating a bell crank lever 49. This bell crank lever 49 will be seen enlarged in FIGURE 13, and one arm, thereof is pivotally connected to the connecting rod 48. Thus, the lower arm of the bell crank lever as seen in FIGURE 13 is continuously operating between the high position illustrated in solid lines and the low position shown in dotted lines. The end of this lower arm oscillates in a slot formed in a ball-delivery tube 50 so that when a ball rolling down one of the chutes 51 or 52 enters the delivery tube 50 the lower arm of the bell crank lever 49 will lift it up to the position shown in FIGURES 13 and 14. The end of the bell crank lever 49 which works in a slot 53 in the tube 50 has a short inclined platform 54 which picks up an entering ball and lifts it to the position indicated in FIGURES 13 and 14 where it is temporarily held by a ball 55 yieldably mounted at the foot of the ball-delivery tube 50.

There will be seen, particularly in FIGURE 13, a stack of balls 11, the upper one of which will be discharged when the bell crank arm 49 rises. The top of the tube 50 has a pivoted lid 56 (FIGURE 13) which is lifted against spring pressure to allow a ball to roll over the top of the stack in the tube 50 on to the playing area as shown in FIGURE 12.

The balls 11 are fed into the lower end of the tube 50 each time a goal is scored, when they run into a receptacle 57 with the aid of a transverse inclined groove 58 as indicated in FIGURES 1 and 10. While the apparatus is in operation there is a friction wheel 59 (FIGURE 10) continuously driven by one of the driving shafts such as 29 indicated in FIGURE 10—an equivalent arrangement being made at the other end of the apparatus corresponding to the goal 4 thereat. Thus when a ball 11 drops into the top of the receptacle 57 as indicated in FIGURE 10, the friction wheel 59 will force it downwards into the receptacle 57 at the same time pushing this back against spring action as indicated in FIGURES 10 and 11 in broken lines. The receptacle is of C-shape section as more clearly seen in FIGURE 11. The ball falls through the receptacle 57 and runs into its appropriate chute 51 or 52, the lower ends of which, as seen in FIGURE 14, terminate alongside the ball-delivery tube 50 so that the ball can run into the tube 50 through a slot 60 when the arm of the bell crank lever 49 happens to be in a low position. The rise of the end 54 of the bell crank 49 pushes the newly received ball up above the retaining ball 55 as seen in FIGURE 14 and should the ball-delivery tube 50 be full (see FIGURE 12) the topmost ball 11 will be fed on to the playing area.

A visible indication of goals scored is operated by the mechanism seen in FIGURE 9. This is mounted on a board 61 carried by a cross beam 62 (also shown in FIGURES 1 and 2), FIGURE 9 being an inverted plan looking upwards from underneath the board 61. This mechanism is located in the middle of the apparatus and serves to switch on, successively in numerical order, one of a bank 63 of electric lamps each time a goal is scored. There is a bank 63 at each end of the apparatus (located as shown in FIGURE 3 and on the left of FIGURE 1) applicable to its particular goal 4, and the mechanism

serves to operate both banks 63, according to which goal 4 has received a ball. The lamps illuminate consecutive numbers allowing for a total of ten goals. In FIGURE 9 a row of such numbers is shown, for convenience, associated with the mechanism.

As seen in FIGURE 11 the ball-receiving receptacle 57, when moved back by the friction wheel 59 pushing on a ball which has scored a goal, operates a two-armed lever 64 which pulls a link 65. The remote end of this link 65 is seen in FIGURE 9. There are of course two such links 65, one for each goal, and the movement of the lower link 65 of one goal 4, and the work performed thereby will be traced, it being understood that the upper link 65 operates similarly for the other goal 4.

When a goal is scored the link 65 pulls a pawl lever 66 whereby the pawl end 67 advances a ratchet wheel 68 one tooth against the force of a tension spring 69. The ratchet wheel is normally held firm by the spring 69 which forces the teeth against a detent 70. A radial switch arm 71, carried fixedly by the ratchet wheel 68, advances over the contact studs 72 which energise the bank of indicator lamps 63, one at a time as the arm 71 passes from one to the other. The step-by-step rotation of the ratchet wheel 68 causes the tension spring 69 to extend and thus apply more power tending to return the ratchet wheel 68 to the starting position illustrated. A zeroising two-armed lever 73 is provided to restore this mechanism to its starting position ready for a new game, and this lever 73 is actuated by a rod 74 adapted to move the lever slightly anticlockwise, and thus release the detent 70, permitting the ratchet wheel to return to the illustrated position under the force of spring 69. The rod 74 is moved by the slide mechanism of the coin-insertion device 41 through a push-bar 75 (FIGURE 2). It will be appreciated that, whereas the apparatus described above requires the use of only one electric motor, it is equally possible, as an alternative embodiment, to employ two motors each associated with a respective power operated drive means.

I claim:

1. Amusement apparatus, for use by two competitive players, comprising, in combination, means forming a horizontal playing area; two ball-receiving receptacles each located at a respective opposite end of said playing area; a plurality of slots extending in the surface of the playing area substantially parallel to a line joining the centers of said receptacles; a plurality of movable pieces each disposed above a respective slot and carried on a movable supporting structure including a stem passing through the associated slot and fixed to a respective slidable carriage positioned beneath said playing area; the movable pieces being divided into two groups distinguishable from each other; a play station for each player, each associated with a respective one of the receptacles and with a respective group of movable pieces; two power-operated drive means each associated with a respective play station and operable to move the carriages of the respective group, with their movable pieces, in either direction along said playing area, said power-operated drive means being disposed beneath said playing area; each power-operated drive means including two parallel spaced elongated shafts rotatable in fixed bearings in opposite directions; a plurality of player-operated control members at each station and corresponding in number to the number of movable pieces in the associated group controlled thereat, said player-operated control members being individually operable to engage a selected one of the two spaced rotatable shafts at the respective station with a device for moving the carriage associated with the individually operated control member, and thus to move the respective movable piece along its associated slot; each player-operated control member comprising a two-arm pivoted lever having an outer arm, for manipulation by the player to rock the lever, and an inner arm; the device for moving each carriage comprising a respective friction wheel rotatably mounted on the inner arm of the asso-

7

ciated two-arm lever and positioned between said two spaced rotatable shafts to be selectively brought, by the rocking of the pivotal lever, into driven contact with a selected one of the two spaced rotatable shafts at the respective playing station; a respective pulley fixedly secured to rotate with each friction wheel; and a respective taut endless band extending around each pulley and along the apparatus beneath the associated slot and over a respective pulley at the far end of the slot; each endless band being connected to the associated movable supporting structure which includes the associated slidable carriage.

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