A9 - Legal and Regulatory Analysis

Year: ___2025___ Semester: ___Spring_____ Team: __1___ Project:___Electronic Skee Ball___
Creation Date: ___3/25/2025_____ **Last Modified:** March 27, 2025
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Assignment Evaluation: See the Rubric in the Brightspace Assignment

1.0 Regulatory Analysis

This section analyzes the regulatory certifications required for our Electronic Skee Ball Machine and outlines the steps necessary to transition from prototype to a finished product. Based on our design, the primary regulatory certifications required are from the Federal Communications Commission (FCC) and the International Electrotechnical Commission (IEC).

International Electrotechnical Commission (IEC) Certification

IEC certification is necessary if we plan to sell the product internationally, as IEC standards are globally recognized. We would need IEC 60065:2014, titled "Audio, video and similar electronic apparatus - Safety requirements" [1]. Since our product uses a power supply and generates audio, this standard is applicable. Additionally, because the product is intended for public use in arcades or similar environments, compliance with IEC 60065 ensures it meets international safety requirements.
To obtain IEC certification, we would first:

1. Identify the specific certification required (in this case, IEC 60065:2014) [1].
2. Contact a relevant certification body.
3. Submit a formal application.
4. Undergo product testing to evaluate potential hazards such as electrical shock, fire risk, and thermal hazards, in accordance with the IEC testing procedures.
5. Once the product passes all required testing, the certification has been granted.

Federal Communications Commission (FCC) Certification

Our Electronic Skee Ball Machine would be classified as a Class B digital device under FCC Part 15. According to the FCC definition, a Class B device is "a digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public "[2]. While our product is designed to operate in arcades and other gaming areas(i.e., commercial settings), it can also be used in a residential setting, so Class B classification applies.
Since our device emits radio frequency (RF) through its digital components, making FCC certification necessary, Specifically:

- The DC motor qualifies as an incidental radiator, defined by the FCC as " a device that generates radio frequency energy during the course of its operation although the device is not intentionally designed to generate or emit radio frequency" [2].
- The STM32F091 microcontroller is classified as an unintentional radiator as it operates at frequencies greater than 9 KHz and uses digital techniques [2].

- Our product also includes peripheral devices such as a joystick, ultrasonic sensors, motors, and a speaker. The FCC defines a peripheral device as “an input/output unit of a system that feeds data into and/or receives data from the central processing unit of a digital device ”[2]. The joystick and ultrasonic sensors provide input data, while the motors and speakers act as output components.

To transition from prototype to finished product, the following steps must be taken for FCC compliance [3]:

- Determining the FCC rules that apply to the product (as discussed above).
- Identifying the correct equipment authorization procedure (e.g., verification, declaration of conformity, or certification).
- Performing compliance testing at an authorized testing laboratory.
- Obtaining approval documentation upon passing tests.
- Labeling the product with FCC identification and providing compliance information in the user manual.
- Once approved, the product can be manufactured, imported, and marketed.
- Any modification to an approved product may require retesting and reevaluation.

2.0 Legal Liability Analysis

2.1 Analysis of Patent 1

Patent Publication Number: US905941A

Patent Title: Game Apparatus

Patent Holder: Joseph Fourestier Simpson

Patent Filing Date: 11/12/1907

Abstract: This patent covers the original design for a Skee-Ball game apparatus [4]. It describes a game where a player rolls a ball up an inclined slope, causing it to “jump” off a ramp and into a scoring hole to earn points. Notably, the design includes an automatic scoring system. As the ball passes through one of the scoring holes, there is a lever which will activate a system of rods and levers that will count and change the score. Each respective hole will have its own respective lever. There is a secondary lever inside the mechanism to ensure there is reverse movement and ensuring accurate score keeping. The playing surface is constructed with a sloped triangular design, directing balls that may fall between the end of the board and the target into a collection area under the board. There is a clear path to the collection area always to prevent a blockage.

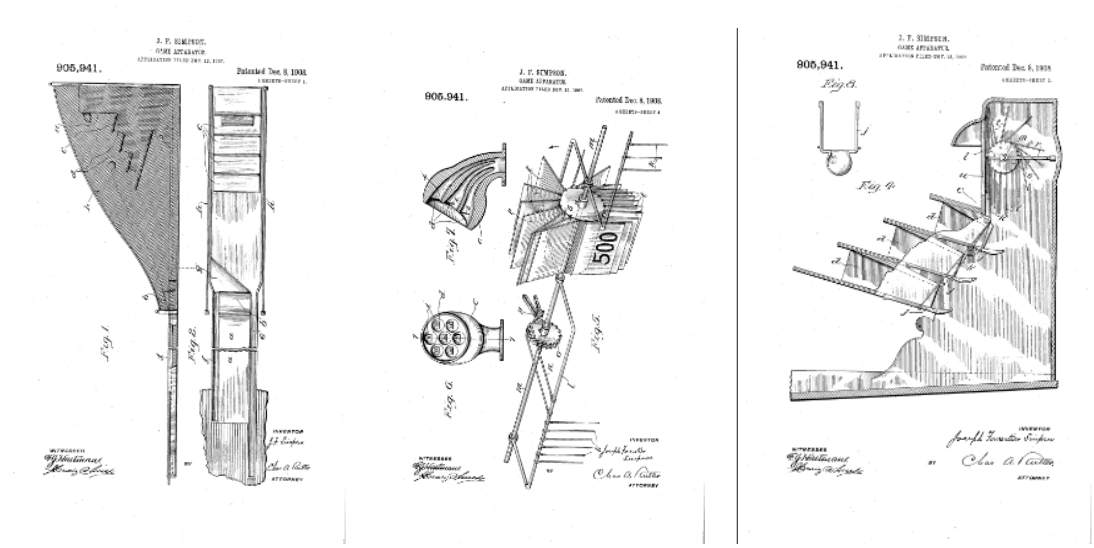


Figure 1: Game Apparatus Patent [4]

Key Patent Claims[4]:

1. “In a game apparatus, in combination, a board along which a projectile is adapted to travel, an apertured target at the rear of and above said board, and an obstruction upon said board, in front of and spaced from said target, adapted to cause said ball to leave said board and continue its flight towards said target in the air."
2. “In a game apparatus, in combination, a board along which a projectile is adapted to be rolled, an obstruction for projecting said projectile, an elevated apertured target at the rear of and spaced from said obstruction, pivoted levers arranged in said apertures adapted to be engaged and operated by the projectile after passing through said apertures, and an indicating device adapted to be operated by the movement of said levers."

Analysis of Patent Reliability:

This patent describes a mechanism that shares significant similarities with the functionality of our Electronic Skee Ball Machine, which also involves rolling a ball along a sloped surface and into a designated scoring area. However, there are key differences between this 1907 design and our modern implementation. While the original patent relies on manual ball rolling and mechanical scoring via levers and rods, our version of the game includes a much more intricate launching mechanism that propels the ball up the ramp by the push of a button. Additionally, our project utilizes ultrasonic sensors instead of physical levers to detect when a ball enters a scoring hole. For scoring display, our machine utilizes an LCD display rather than mechanical components. Another important distinction is that our project incorporates a speaker system that outputs sound when the ball is detected, a feature that the 1907 design lacks entirely.

In terms of potential patent infringement liability, we likely avoid literal infringement. Literal infringement occurs when the exact same functions are performed in exactly the same way, but our design diverges significantly by replacing mechanical processes with electrical systems. Our use of electronic components and sensors, as well as our launching mechanism, distinguishes our design from the purely mechanical process of the original patent.

However, under the doctrine of equivalents, there is a risk of infringement if our design is found to perform substantially the same function (scoring detection and display) in substantially the same way (ball propelled into scoring hole and triggering a scoring mechanism upon ball entry in

hole). While the process is different – incorporating ultrasonic sensors, a launching mechanism, an LCD display, and a speaker system instead of manual ball rolling and mechanical scoring – both systems ultimately achieve the same goal of detecting ball entry into a scoring ring and updating score. Further legal review would be needed to fully determine if our Electronic Skee Ball Machine differentiates from the patented design under the doctrine of equivalents.

2.2 Analysis of Patent 2

Patent Publication Number: US2724594A

Patent Title: Skee ball game apparatus

Patent Holder: Leslie B Anderson

Patent Filing Date: 07/24/1953

Abstract: The invention [5] is an enhanced game apparatus designed for a ball-rolling game, where the player rolls a ball along an alley, and the ball is propelled by a ramp at the alley's rear into a scoring pocket. As the player rolls the ball, it moves along the playing surface toward the ramp, which launches the ball upwards, typically hitting the scoring panel. If aimed correctly, the ball will pass through one of the scoring openings, registering a score on the display board. Once the score is recorded, the ball drops down a chute at the lower end, then rolls back toward the alley's front so that the player can retrieve the ball. Also this design is a foldable design to reduce volume for easy storage and transportation. Also the ball return mechanism is different with a chute that allows balls to be returned to the front of the alley after scoring, enhancing gameplay overall. Additionally, the scoring system is unique compared to traditional designs. Beneath each scoring hole, a series of trigger elements are strategically placed and connected to a register mechanism, ensuring accurate and immediate score tracking as each ball passes through the designated hole.

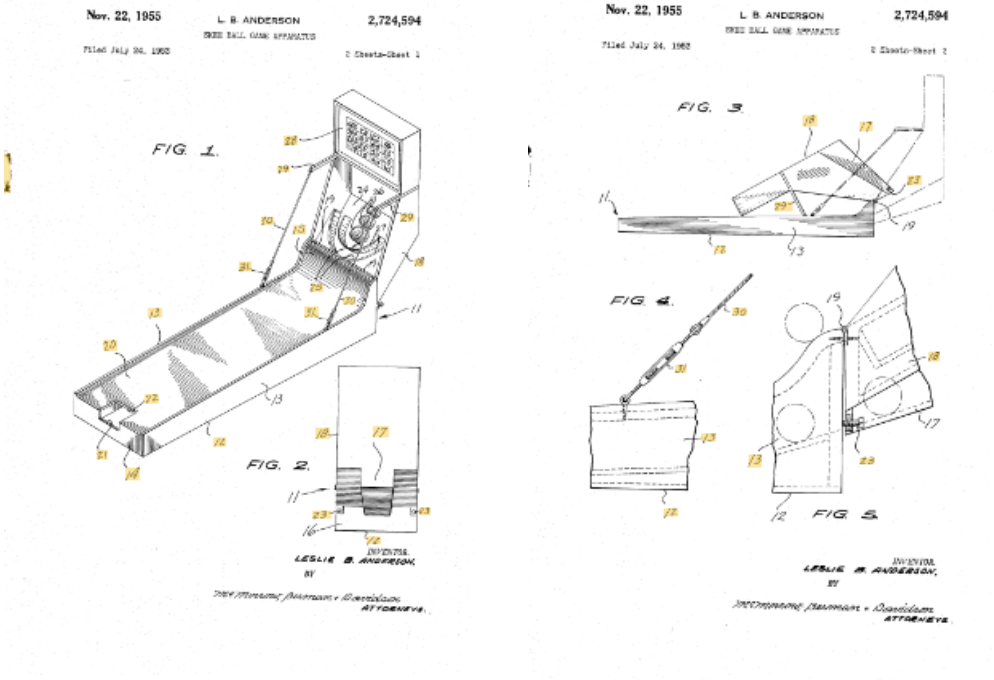


Figure 2: Skee Ball Game Apparatus Patent [5]

Patent Claims:

1. “In a game of the character described, an elongated alley adapted for rolling of a ball therealong, said alley including a ramp at one end inclined for directing a ball rolled along the alley upwardly into free flight otf said end, said end having a vertical end wall formed with an aperture intermediate opposite sides of the alley, the alley having a return space opening at one end through said apertures and extending to the other end of the alley below the surface on which said ball is rolled; a scoring wall hingedly connected at one end to one end of the ramp for swinging movement about an axis extending transversely of the alley between one position in which said wall is folded to an in-operative location overlying the alley inwardly from said one end, and another position in which the scoring wall is disposed beyond said one end of the alley and is inclined across the path traveled by a ball in free flight, for striking of the scoring wall by said ball, said scoring wall having a row of apertures through any of which said ball will gravitate, said row of apertures being aligned longitudinally and centrally of the alley, achute secured to the underside of said scoring wall in alignment with and in communicat-ion with said. row of apertures of the scoring wall, said chute being inclined correspondingly to the wall in the second named extreme position of the wall, the chute havinga lower end abutting against said vertical end wall of the alley in said second named extreme position of the scoring wall, ,said end of the chute communicating with the aperture of the alley end wall to provide a continuous passageinclined from the horizontal extending within said alley and chute in the operatively disposed position of the scoring wall.” [5].

2. “In a game of the character described, an elongated alley adapted for rollingof a ball therealong, said alley including a ramp at one end inclined for directing a ball rolled along the alley upwardly into free flight off said end, said end having a vertical end wall formed with an aperture intermediate opposite sides of the alley, the alley having a return space opening at one end through said apertures and extending to the other end of the alley below the surface on which said ball is rolled; a scoring wall hingedly connected at one end to one end of the ramp for swinging movement about an axis extending transversely of the alley between one position in which said wall is folded to an inoperative location overlying the alley inwardly from said one end, and another position in which the scoring wall is disposed beyond said one end of the alley and is inclined across the path traveled by a ball in free flight, for striking of the scoring wall by said ball, said scoring wall having a row of apertures through any of which said ball will gravitate, and row of apertures being aligned longitudinally and centrally of the alley, a chute secured to :the underside of said scoring wall in alignment with and in communication with said row of apertures of the scoring wall, said chute being inclined correspondingly to the wall in the second named extreme position of the wall, the chute having a lower end abutting against said vertical end wall of the alley in said second named extreme position of the scoring wall, said end of the chute communicating with the aperture of the alley end 'wall to provide a continuous passage inclined from the horizontal extending within said alley and chute in the operatively disposed position of the scoring wall, said scoring wall including an end wall disposed adjacent said end wall of the alley in the second named extreme position:of the, scoring wall, said end wall of the scoring wall projecting laterally beyond opposite sides of the chute, and screws threaded in the last named end wall against the alley end wall at locations spaced from the hinge axis of the scoring wall, for swingably adjusting the scoring wall about said axis, to selected positions of inclination relative to the ramp” [5].

Analysis of Patent Reliability:

This patent describes a skee ball mechanism that shares several similarities with the functionality of our Electronic Skee Ball Machine, including the rolling of a ball along an inclined alley, a ramp to launch the ball, and a scoring panel with multiple openings that register a score when a ball enters. However, there are several notable differences between the 1953 design and our modern implementation. The user has to propel the ball themselves up the ramp, whereas our version utilizes a launching mechanism. In the original patent, scoring is triggered using a mechanical lever system that is placed beneath each scoring hole. When the ball passes through a hole, it physically activates a trigger element connected to a register mechanism that updates the score-indicating board. In contrast, our project uses ultrasonic sensors to detect ball entry into a scoring hole, and upon detection updates the LCD display. Additionally, the patented design allows for their version to be collapsable, ultimately easily transportable, whereas our version is not designed to be adjustable. The ball return system in both designs rely on gravity, however the patented design relies on a chute that is connected to the scoring wall, whereas our version just utilizes gravity and a designated lane for the ball to roll on (avoiding electronic components). Also, our design includes a speaker system that will play sound when the ball is detected, whereas this feature is absent in the patent.

In terms of potential patent infringement liability, we likely avoid infringement as our design replaces nearly all of the mechanical components with electronic components. Literal infringement requires that the exact same functions are performed in the exact same way, whereas our machine clearly differs.

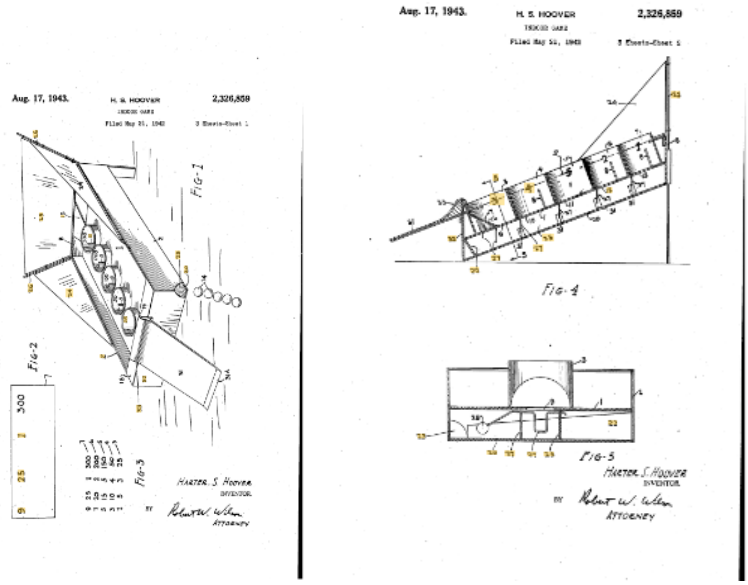
Under the doctrine of equivalents, there is a possibility of similarity, since both systems perform the same overall function of detecting a ball going through a scoring hole and updating the score. However, our version's use of ultrasonic sensors, launching mechanism, and software-dive interfaces distinctly contrasts the mechanical use of mechanical levers and register boards displayed in the patented design. Further legal review would be needed to fully determine if our version of skee ball differentiates from the patented version.

2.3 Analysis of Patent 3
Patent Publication Number: US2326859A
Patent Title: Indoor game

Patent Holder: Harter S Hoover

Patent Filing Date: 05/21/1942

Abstract: This game design [6] is quite similar to Skee-Ball, yet it varies in several ways. While it maintains the concept of rings and propelling balls to "jump" into a hole, this design is more compact and easier to store. In addition, the scoring mechanism is different, featuring a bell system where each hole triggers a bell with a distinct pitch, indicating the score based on the sound. The mechanism for adding points is also unique, since it turns each ring 90 degrees, a new series of scoring numerals appear, allowing for variation in scoring. Finally, the ball return system is different as well. After a ball is propelled into one of the rings or it misses one of them, the ball rolls beneath the playing surface in a guided path. It falls into a chute that leads the ball to the player at the front of the game. This eliminates the need for manual ball collection.



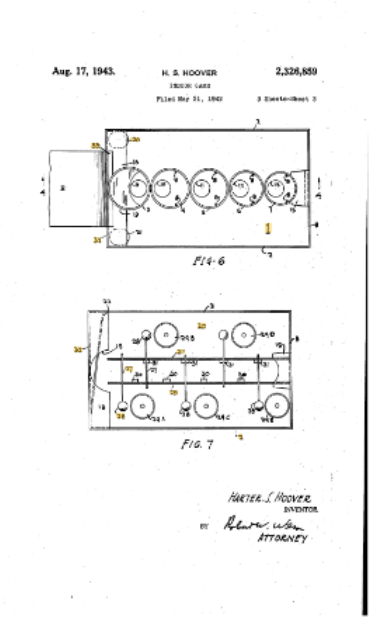


Figure 3: Indoor Game Patent [6]

Patent Claim: "In a ball game apparatus comprising in combination a plurality of rings of substantial height arranged in longitudinal succession on an inclined board; surrounding by walls lower than ring height, holding elements for said rings comprising boards at said front and rear walls, each notched and thereby engaging upper portions of the front and rear rings, respectively, a supplemental holder for the front ring comprising a lunette of less area than is defined by the ring and over which the ring rotably fits, is attached to the inclined board and having an upper surface inclined oppositely to the board, and a ball escape opening through the board where the lunette surface joins the board surface [6]".

Analysis of Patent Reliability:
This patent describes a game similar to our Electronic Skee Ball Machine, as it also involves the propulsion of a ball towards elevated scoring rings and includes a scoring system, however, it also differs substantially. In the patented version, when a ball enters a scoring ring, a bell is triggered in a mechanical bell-system, that bell will produce a unique tone based on the scoring ring. In contrast, our design utilizes ultrasonic sensors positioned under each scoring hole to detect a ball, which will then update the score on an LCD display. Additionally, our system will play a sound through a speaker when the user gets a point, however, the sound is the same for each scoring hole rather than a unique tone for each scoring hole. Also, the patented version includes a rotating score mechanism, where each ring can turn 90 degrees to reveal a new set of scoring numerals, allowing score variation. Our version assigns fixed point values to each hole, and all score tracking is done through software and displayed on the LCD display. In addition, our system utilizes a motorized launching mechanism, allowing the user to propel using a button, whereas the patented version requires manual ball rolling. Also, the two designs differ in layout, since our machine features a longer, less steep ramp, and the scoring holes are spread across a wider scoring area. The patented version uses a more compact apparatus with a steeper incline and its scoring rings are aligned in a row.

In terms of literal infringement, our design does not reproduce any of the key mechanical or structural aspects of the patented version. Features such as rotating scoring rings, mechanical bell-scoring system, and manual ball propulsion are not present in the Electronic Skee Ball Machine. Instead, our design replaces the mechanical components with electronic components – motorized launching mechanism, speaker system, ultrasonic sensors, LCD display.
Under the doctrine of equivalents, the Electronic Skee Ball Machine and the patented version are fundamentally different. The patented version relies on a manual interact and bell-based scoring system, whereas our version utilizes a launching mechanism and a LCD display to visualize the score. In addition, our version does not utilize point changing throughout the game, and overall has a lot of differences in comparison to the patented version. Hence, the Electronic Skee Ball Machine is distinct from the patented version.

3.0 Sources Cited:

[6] IEC 60065:2014, “Audio, video and similar electronic apparatus - Safety requirements,” IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components. Available:

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[2] “Radio frequency devices,” Electronic Code of Federal Regulations, Title 47, Part 15. Available:

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[6]Hoover, H. S. (1942). Indoor game. Available :

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