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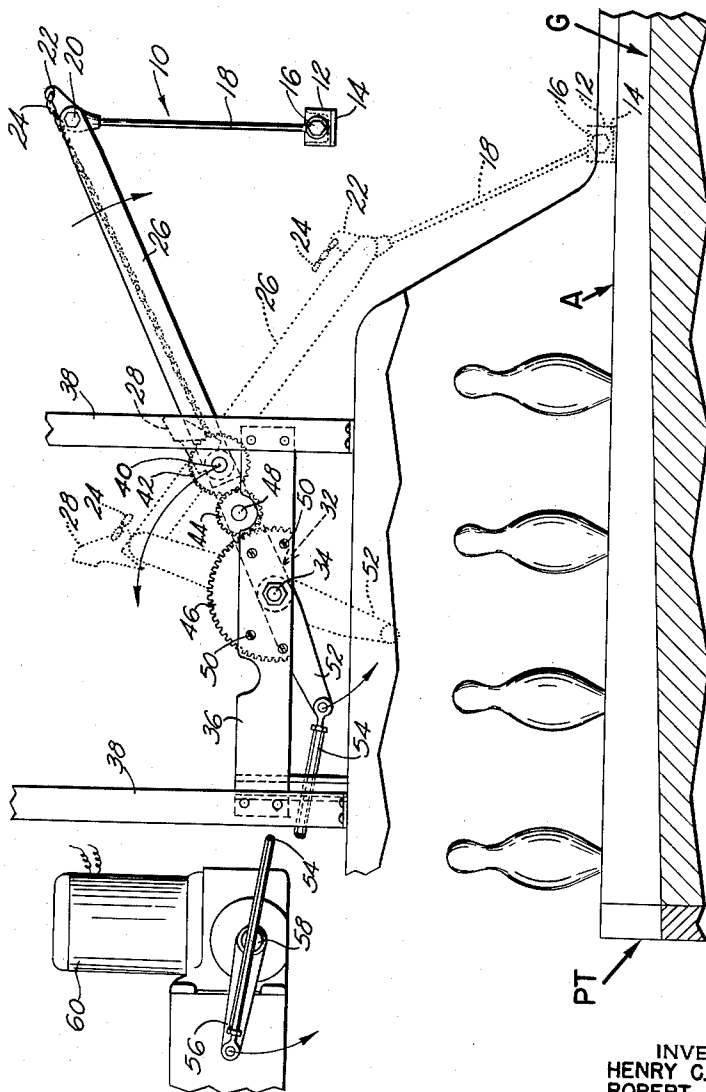
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BOWLING PIN SPOTTING MACHINE SWEEP MECHANISM

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FIG. 1



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FIG. 3

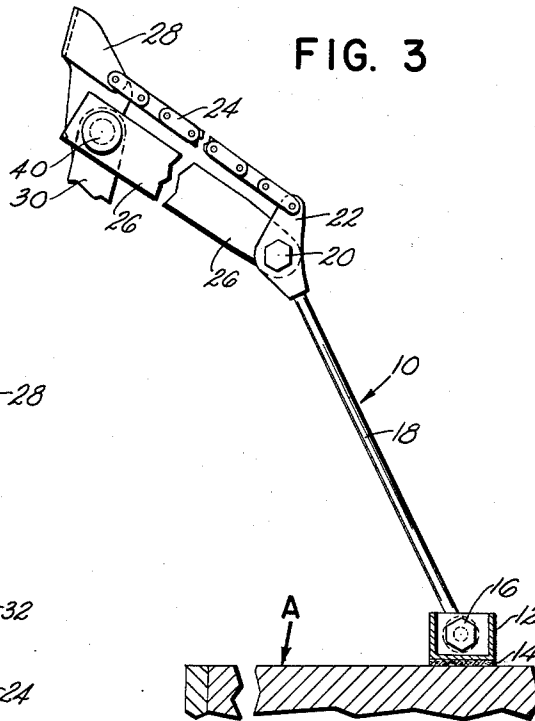
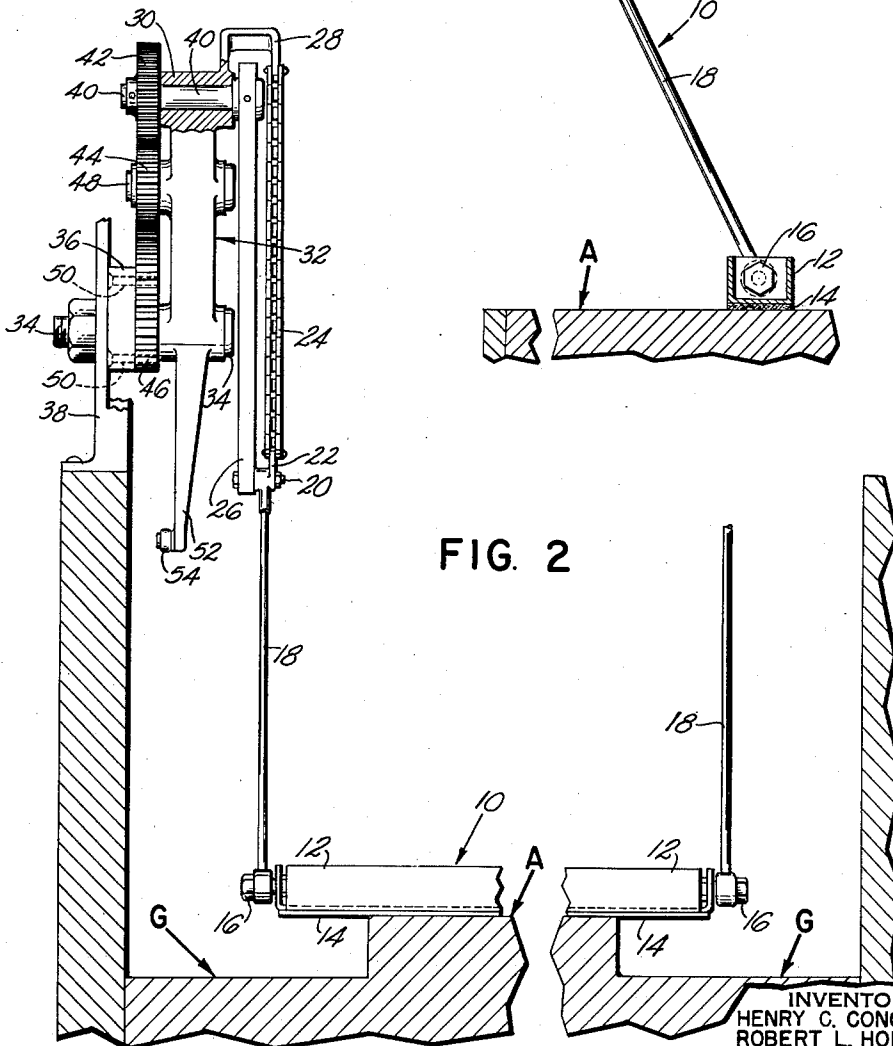


FIG. 2



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BOWLING PIN SPOTTING MACHINE SWEEP MECHANISM

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2 Claims. (Cl. 273-54)

This invention relates to a bowling pin spotting machine and particularly to an improved sweep mechanism for use with such machines which because of its construction is simple, lightweight, trackless and non-jamming in its operation.

Attempts have been made to provide a sweep mechanism for a bowling pin spotting machine which would be practically jam-proof in its operation, thereby eliminating costly repairs to the pin spotting machines. However, such prior art necessitated positive means to control the sweep mechanism, and employed tracks and guides for the sweep or its mechanism in its travel along the alley. Such positive controls resulted in sweep mechanisms that were complicated, heavy, bulky and expensive, both in initial cost and maintenance.

The present invention solves the problem of a jam-proof yet trackless sweep for bowling pin spotting machines. Thus it will be seen that a bowling pin spotting machine embodying the sweep mechanism disclosed in this invention can provide all the advantages of jam-proof operation, namely, elimination of costly jamming repairs to the machine and smoother, uninterrupted play to the bowlers.

If desired, the underside of the sweep bar may be provided with a felt or like material. By means of this arrangement, the sweep, in its travel along the alley deck, will clean the alley of any dirt that may be lying in its path each time the sweep mechanism is actuated.

Due to the elimination of the track or guide mechanisms, the sweep can now be made of sufficient dimensions to clear any bowling pins that may be lying in the gutters adjacent to the alley deck. This will have the effect of eliminating any paddles or other sweep appendages that were heretofore necessary for the removal of fallen pins lying in the gutters, thereby making the sweep mechanism simpler, lighter and more economical. However, if desired, the gutters may also be provided with endless moving belts for removing unwanted pins lying in the gutters.

It is an object of this invention to provide a substantially jam-proof and trackless sweep.

The invention is characterized by a novel sweep mechanism for bowling pin spotting machines operative to move upwardly when it engages a fallen pin lying in its downward path of movement and wherein a pin so engaged by the sweep will be held and moved thereby rearwardly on the alley or gutter and delivered into the pit.

It is a further object of this invention to provide a novel sweep mechanism operative without positive means to control the action of the sweep mechanism during its travel along the alley deck.

The invention further contemplates the provision of a novel sweep mechanism wherein the sweep member bottom is provided with a fibrous or felt-like material which will clean the alley deck as the sweep member travels back and forth along the alley.

With these and other objects not specifically mentioned in view, the invention consists in certain combinations

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and constructions which will be described fully hereinafter, and then set forth in the claims hereunto appended.

In the accompanying drawings, which form a part of this specification and in which like characters of reference indicate the same or like parts:

Figure 1 is a side elevation of a preferred embodiment of the novel sweep and its operating means in conjunction with an automatic bowling pin setting machine.

Figure 2 is a partial front view of a preferred embodiment of the novel sweep in its operating position on a bowling alley.

Figure 3 is a side elevation of the sweep in its operative position.

Referring to the drawings which illustrate a preferred embodiment of the invention, the novel sweep mechanism is designated generally 10. Since the structure supporting and operating the sweep mechanism 10 at each side of alley A is identical in construction and operation, except for being located at opposite sides of alley A in order to obtain the desired parallel movement, it is considered only necessary to describe one, like parts bearing the same reference characters.

The sweep mechanism 10 consists of a generally horizontally positioned suitably shaped sweep member 12, such as a channel, as illustrated in Figs. 1 and 3. Sweep member 12 extends across the alley A and partially across gutters G (Fig. 2) and preferably is provided with a strip of felt or like material secured to the under or bottom side of said member. The ends of sweep member 12 are pivotally connected by studs 16 to the free ends of link members 18, which are pivotally connected by studs 20 to the free ends of sweep control arms 26. Control arms 26 may be similar in construction and operation to those disclosed in Zuercher application, Serial No. 575,548, filed April 2, 1956, now Patent 2,878,019.

The upper end of each link member 18 is provided with an actuating lug 22, the free end of which is connected by a chain 24 to a sweep member control lug 28 preferably formed integrally with and projecting from the free end of an arm 30 of a double lever 32 pivotally supported on a stud 34 held by a suitable cross member 36 attached to uprights 38. The free end of arm 30 rotatably supports a shaft 40 on one end of which is secured the sweep control arm 26. On the other end of shaft 40 is mounted a gear 42. The latter meshes with an intermediate gear 44 which in turn meshes with a gear sector 46. Gear 44 is rotatably supported by a stud shaft 48 held by arm 30, while gear sector 46 is secured to cross member 36 by means of screws 50. The double lever 32 is provided with another arm 52, the free end of which is connected by an adjustable rod or link 54 to crank arm 56 (Fig. 1), mounted on shaft 58 projecting from a suitable gear reduction motor 60. The operation of motor 60 is controlled by suitable control mechanism which may be similar in construction and operation to that shown and described in Dumas application Serial No. 226,359, filed May 15, 1951, now Patent 2,821,395. Since this control mechanism forms no specific part of the present invention, and is not essential to an understanding of the invention, further disclosure is omitted. However, it should be understood that shaft 58 extends almost all the way across the rear end of alley A and that it carries a crank arm 56 at each end. Each crank arm 56 actuates the sweep mechanism on its respective side of alley A.

The mechanism described hereinabove is set into operation after each rolled ball has landed in the pit which in turn effects the starting of motor 60. The starting of sweep motor 60 causes shaft 58 and crank arms 56 to turn in the direction of the arrow shown in Fig. 1. Since each crank arm 56 is connected by rod 54 to arm 52 of double lever 32, the latter rotates about stud 34, thereby causing gears 44 and 42 to rotate due to the meshing

of gear 44 with the stationary gear sector 46. Since gear 42 is mounted on the same shaft 30 as sweep control arm 26, the rotation of gear 42 effects a downward movement of said control arm in the direction of the arrow shown in Fig. 1. The sweep member 12, as described heretofore, is suspended from control arm 26 by means of link member 18, and moves downwardly toward alley A. As the sweep member control lug 28 on arm 30 of double lever 32 moves upwardly, and the sweep control arm 26 moves downwardly, the lug 28 effects a pulling action upon chain 24 which is imparted to the actuating lug 22 which in turn causes link member 18 and the sweep member 12 suspended therefrom to move slightly upwardly and outwardly, so that when sweep member 12 reaches the alley A, link members 18 are not disposed perpendicularly below sweep control arms 26, but assume an angular or inclined position such as illustrated in dotted lines in Fig. 1. Upon continued rotation of crank arms 56, arms 52 of double levers 32 swing through a forward arc and thus cause the sweep member 12 to be pulled along the pin supporting deck towards the rear of the alley and thereby sweep all fallen and/or unwanted standing pins into the pit PT. After the sweep member 12 has reached the rear end of the alley A, the continued rotation of crank arms 56 through the connections described above, causes a backward swing of arms 52 of the double levers 32 and thus effects a reverse pull of sweep member 12 toward the front of alley A and ultimately up to its starting position above the alley A, as shown in Fig. 1. Due to the alley cleaning strip 14 with which the bottom side of the sweep member 12 is provided, the pin deck of the alley is not only cleared of unwanted pins because of the action of member 12, but also is swept clean of any dirt which might be on the alley bed.

It will be evident that with a sweep mechanism embodying this invention, if a fallen pin occupies a position on alley A directly in the path of sweep member 12 as it moves into operative position, no damage to any parts of the sweep or the machine can occur because the sweep member 12 is free to rotate about the studs 16 and also moves upwardly as link members 18 pivot about the studs 20 on control arms 26. Furthermore, because of this novel construction, no jamming or stalling of sweep motor 60 will occur. Also a pin occupying a posi-

tion as described above will be held by the weight of sweep member 12 and pulled rearwardly along alley A for delivery into the pit.

What we claim is:

1. Apparatus for sweeping bowling pins from the playing surface of a bowling alley into the pit thereof comprising a sweep member, elongated sweep supports, means pivotally connecting said supports to opposite sides of said sweep member, means mounting said sweep supports at opposite sides of said alley, including control arms for each of said sweep supports, means pivotally connecting a control arm to its associated sweep support, operating arms for each of said control arms, means for actuating said operating arms for moving said supports and said sweep member to and from operative position adjacent the playing surface of said alley and for pulling said sweep member along said alley to deposit bowling pins engaged thereby into said pit, a lug mounted on each of said supports and pivotally connected in common therewith to said control arms, a bracket mounted on each of said operating arms and a flexible member connecting each of said lugs to its associated bracket whereby, as said sweep member and supports are moved into operative position adjacent said alley, said flexible members are operative to pivot said supports and sweep member outwardly along said alley to increase the sweeping range of said sweep member.

2. The invention as defined in claim 1 wherein said means for actuating said operating arms includes a pair of links pivotally connected at one end to each of said operating arms, a pair of crank arms pivotally connected to the other end of said links and a power source for actuating said crank arms to move said sweep member to and from operative position adjacent the playing surface of said alley and back and forth therealong.

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