

Oct. 24, 1944.

J. PARRA ET AL

2,361,233

DEAD WOOD SWEEP FOR AUTOMATIC BOWLING ALLEYS

Filed Feb. 19, 1943

3 Sheets-Sheet 1

Fig. 1

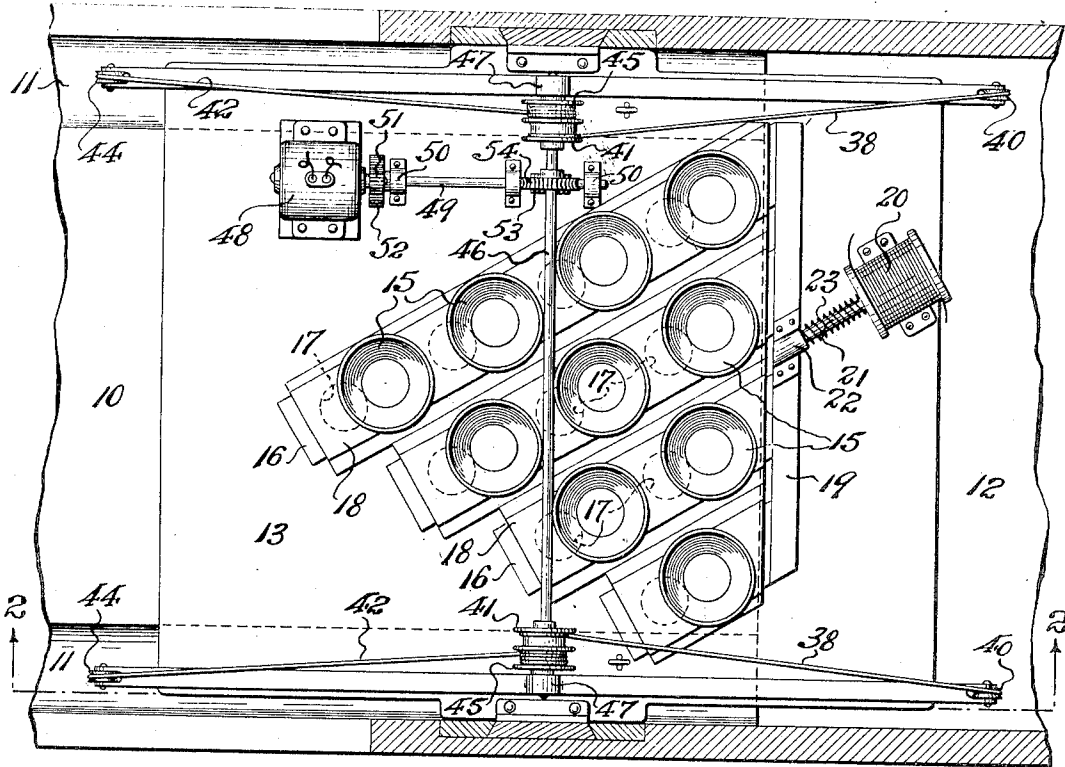
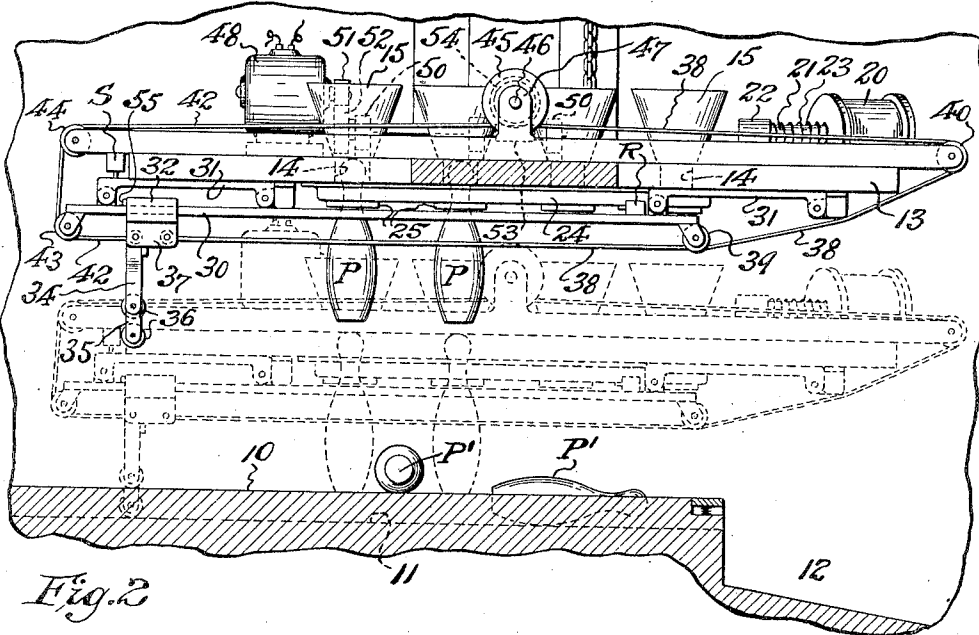


Fig. 2

INVENTORS:
Joseph Parra & William White,
BY George D. Richards
ATTORNEY.

Oct. 24, 1944.

J. PARRA ET AL

2,361,233

DEAD WOOD SWEEP FOR AUTOMATIC BOWLING ALLEYS

Filed Feb. 19, 1943

3 Sheets-Sheet 3

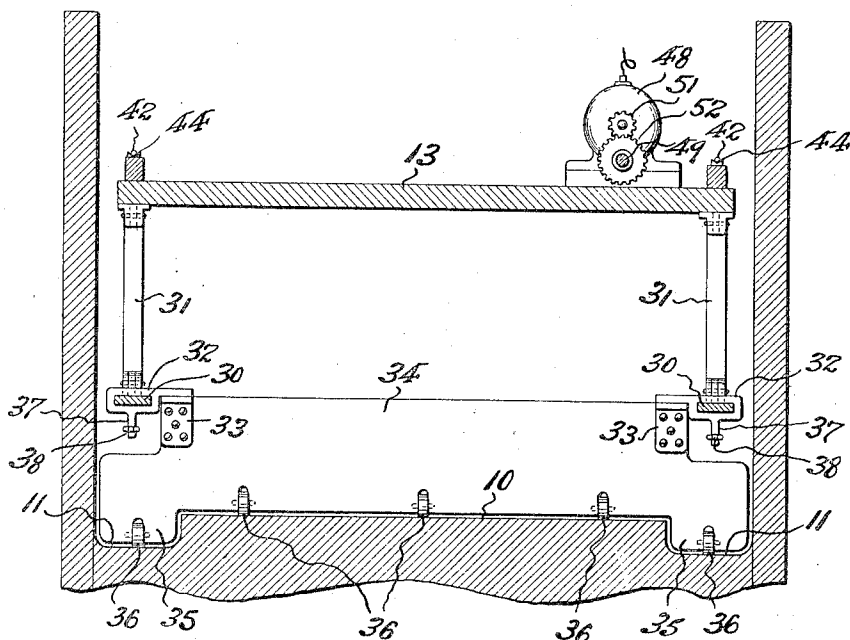


Fig. 5

INVENTORS:
Joseph Parra & William White,
BY *George D. Richards,*
ATTORNEY.

UNITED STATES PATENT OFFICE

2,361,233

DEADWOOD SWEEP FOR AUTOMATIC
BOWLING ALLEYS

Joseph Parra and William White, Newark, N. J.

Application February 19, 1943, Serial No. 476,396

7 Claims. (Cl. 273—43)

This invention relates to automatic pin handling apparatus for bowling alleys.

In the use of a bowling alley, any fallen pins or dead wood remaining on the alley or in its bordering gutters after play must be swept therefrom into the pit at the alley end, prior to resetting the pins; especially, in case any pins are left standing after bowling of a first ball, any fallen pins or dead wood must be removed prior to and so as not to interfere with the bowling of a second ball in an attempt to knock down all ten pins by the ordinarily maximum allowance of two balls per frame.

Having these requirements in view, it is an object of this invention to provide, for cooperation with a vertically reciprocable automatic pin handling and spotting means, a novel means for removing dead wood from the pin stand section and adjacent gutters of a bowling alley during use of the alley in play.

Another object of the invention is to provide a novel construction of movable dead wood sweep and supporting and guiding means therefor adapted to be coordinated in its operations with the operations of pin handling and spotting means, whereby the sweep is normally disposed in an out-of-service position during operative up and down movements of the pin handling and spotting means, but is dropped to an in-service position while the latter occupies a raised position.

Another object of this invention is to provide a novel construction of movable sweep and supporting and guiding means therefor, including a single actuating means adapted, in operation, to sequentially lower the supporting and guiding means to dispose the sweep in operative service relation to the alley and gutter surfaces, then to advance and retract the sweep in traversing relation to said surfaces, and thereafter to lift the supporting and guiding means back to normal initial raised position for disposing the sweep in out-of-service position.

A further object of the invention is to provide parallel lever suspended sweep guide means, and a transverse sweep slidably mounted on said guide means for forward and back alley traversing movements; said guide means being parallel to the alley surface, but, by virtue of its parallel lever suspension, being capable of up and down swinging movements adapted to raise and lower the sweep from and to its operative alley sweeping position.

Other objects of this invention, not at this time more particularly enumerated, will be understood

from the following detailed description of the same.

An illustrative embodiment of this invention is shown in the accompanying drawings, in which:

Fig. 1 is a plan view of a vertically reciprocable pin handling and spotting means as mounted above the pin stand section of a bowling alley, including the novel dead wood sweep means adapted to cooperate therewith; Fig. 2 is a longitudinal vertical sectional view taken on line 2—2 in Fig. 1 and showing the supporting and guiding means of the dead wood sweep up-swung to dispose the latter in out-of-service positions; Fig. 3 is a view similar to that of Fig. 2, but showing the supporting and guiding means of the dead wood sweep down-swung to dispose the latter in operative relation to the alley and gutter surfaces, and as disposed to begin its forward dead wood removing advance; Fig. 4 is a similar view but showing the sweep at the end of its dead wood removing advance, subject to retraction to normal initial position; and Fig. 5 is a fragmentary transverse vertical section, taken on line 5—5 in Fig. 3.

Similar characters of reference are employed in the above described views, to indicate corresponding parts.

In the drawings, the reference character 10 indicates the pin stand section of a bowling alley surface, 11 indicates the gutters bordering said alley section, and 12 the pit at which said alley section terminates.

Mounted above the alley, for vertical reciprocation toward and from the pin stand section 10 thereof, is a pin handling and spotting means. In an illustrative form thereof, as shown, said pin handling and spotting means comprises a platform 13 having pin drop openings 14 there-through, the grouping and spaced relation of which corresponds to the normal grouped positions of pins P when deposited and spotted on the pin stand section 10 of the bowling alley, ready for play. Supported by said platform 13, in axial alignment with the pin drop openings 14 thereof, are pin holder members, each comprising an up-standing receiving pocket element 15. Means are provided for opening and closing the bottoms of said receiving pocket elements 15 at proper times in accordance with operative movements of the pin handling and spotting means. Such means is provided by slidable shutter plates 16 intermediate the bottoms of said receiving pocket elements and the platform 13; said shutter plates having openings 17, adapted by movements of said shutter plates, to be slid into and out of registration with the pin drop openings 14. As illus-

tratively shown, said shutter plates 16 are aligned with rows of said pin drop openings 14 and associated receiving pocket elements 15 which are directed toward the rear end of the platform 13, and said shutter plates are slidably movable over the top surface of said platform, being guided by slideway guides 18 affixed to the latter. The rearward ends of said shutter plates are coupled together by a cross-bar 19 common thereto, so that all move together when actuated; properly timed operative movements being imparted thereto by suitable actuating means, such e. g. as the solenoid 20 mounted on the rear end portion of the platform 13, and the armature 21 of which is affixed by a suitable supporting connection 22 to the cross-bar 19. Said solenoid 20, when energized, retracts the armature 21, whereby to move said shutter plates 16 so as to register their openings 17 with and between the bottoms of the receiving pocket elements 15 and the pin drop openings 14 of the platform 13, which are aligned therewith, so that pins P carried by the former may drop downwardly therefrom and through the platform openings 14 for deposit in upstanding spotted position on the alley pin stand section 10, when the pin handling and spotting means is lowered to pin spotting position relative to said alley pin stand section. Suitably arranged spring means is provided for returning said shutter plates to closed position relative to said receiving pocket elements and their cooperating pin drop openings 14, when the solenoid is deenergized; such e. g. as the compression spring 23 mounted around the solenoid armature between the cross-bar connection thereto and the opposed end of the solenoid 20. It will be understood, that any other suitable actuating means may be optionally utilized to produce operative movements of the shutter plates 16.

Mounted on the underside of the platform 13 of the pin handling and spotting means, in co-operative relation to the pin drop openings 14 thereof, are picker devices for handling and resetting standing pins which remain on the alley pin stand section 10 after a first ball is bowled, whereby to permit removal of dead wood preparatory to bowling a second ball. These picker devices may be enclosed in a suitable housing 24 affixed to the underside of the platform 13, in connection with which are provided tubular discharge throats 25, through which the pins P pass for deposit upon the alley pin stand section 10. Said picker devices are not shown, but preferably comprise a construction and arrangement thereof such as disclosed in our prior United States Letters Patent No. 2,300,802, dated November 3, 1942; or the same may optionally be of any other known type.

The pin handling and spotting means is mounted in any convenient manner for vertical up and down movements from and toward the alley pin stand section 10. Initially said pin handling and spotting means is disposed in uplifted position to receive pins P into the closed pocket elements 15 from suitable delivery means, such e. g. as that disclosed in our co-pending application for United States Letters Patent Ser. No. 451,704, filed July 21, 1942.

The dead wood sweep means according to this invention, in an illustrative arrangement thereof as shown, is mounted on the pin handling and spotting means, and comprises a pair of laterally spaced, longitudinally extending guide or track bars 30, which straddle the area of the pin stand section which is occupied by the properly

grouped pins P when standing thereon ready for play. Said guide or track bars 30 are suspended from the underside of the platform 13 of the pin handling and spotting means by parallel carrier levers 31, which are pivotally interconnected to and between the respective end portions of said guide or track bars and said platform 13.

Mounted on each guide or track bar 30, to slide longitudinally forward and backward upon the same, intermediate the bar suspending carrier levers 31, are sweep carriage members 32. Affixed to and between said carriage members 32, by attachment brackets 33 or by any other suitable means, so as to be suspended therefrom in transverse relation to the alley pin stand section 10 and the gutters 11 bordering the same, is a sweep member 34 of suitable height. At its ends, said sweep member is provided with gutter sweep portions 35, the bottom margins of which are conformably shaped to fit the gutter contours. If desired, both the main body of the sweep member 34 and its gutter sweep portions 35 may be provided, at their lower free marginal portions, with suitably mounted and positioned traction rollers 36 adapted, during fallen pin removing operation of the sweep, to ride on the alley and gutter surfaces, in such manner as to prevent frictional resistance to operative travel of the sweep thereover.

The single means for raising and lowering the guide or track bars 30 and the sweep movably supported thereby, and for operatively propelling the sweep member, when lowered, forward and back in operative fallen pin removing relation to the alley and gutter surfaces, comprises a pull cable system and actuating means therefor which, in one and a preferable arrangement thereof as shown, is carried by the pin handling and spotting means.

Attached to the rearward end of a dependent anchoring or coupling connection 37, with which each sweep carriage member 32 is provided, is a propulsive cable 38. These cables 38 respectively extend rearwardly beneath the respective guide or track bars 30, and pass over guide pulleys 39 which are suitably mounted at and in downwardly offset relation to the rearward ends of said guide or track bars, passing thence upwardly over similar guide pulleys 40 which are suitably mounted at and in connection with the rear end of the platform 13 of the pin handling and spotting means. From the guide pulleys 40, said propulsive cables 37 extend forwardly over said platform 13 respectively to winding drum members 41 to which they are operatively attached.

Attached to the forward ends of the anchoring or coupling connections 37 of the sweep carriage members 32, are retractive cables 42. These cables 42 respectively extend forwardly beneath the respective guide or track bars 30, and pass over guide pulleys 43 which are suitably mounted at and in downwardly offset relation to the forward ends of said guide or track bars, passing thence upwardly over similar guide pulleys 44 which are suitably mounted at and in connection with the forward end of the platform 13 of the pin handling and spotting means. From said guide pulleys 44 said retractive cables 42 extend rearwardly over said platform 13 respectively to winding drum members 45 to which they are operatively attached.

The several winding drum members 41 and 45 are affixed, in suitably located positions, to a transverse shaft 46 by which the same are rotated; said shaft being journaled in and between

bearings 47, so as to extend above and across the platform 13 of the pin handling and spotting means intermediate the ends thereof. The relation of the propulsive cables 38 and retractive cables 42 to their respective winding drum members is such that, when said drums are rotated in one direction, e. g. in clockwise direction as shown, the propulsive cables will be reeled up on their drum members 41, while the retractive cables will be proportionately paid off from their drum members 45, and, conversely, when the winding drum members are rotated in the opposite direction, e. g. in anti-clockwise direction as shown, the propulsive cables will be paid off from their drum members 41, while the retractive cables will be reeled up on their drum members 45.

Suitable means is provided for reversibly driving the drum shaft 46 and the winding drums rotated thereby. An illustrative means for this purpose, as shown, comprises a reversible electric motor 48 which is mounted in suitable location upon the platform 13 of the pin handling and spotting means. A power shaft 49 is journaled in bearings 50 affixed to said platform 13, and said power shaft is driven by the motor 48 through transmission gearing, comprising a drive gear 51 on the motor armature shaft which meshes with a driven gear 52 affixed on said power shaft 49. The drum shaft 46 is preferably driven from said power shaft 49 by a worm and gear transmission, comprising a worm 53 on the power shaft 49 which meshes with a worm gear 54 on the drum shaft 46. Such power transmission means is of the reduction type easily designed to drive the winding drums at a desired selected to predetermined speed. It will be obvious, however, that the power source and transmission means are subject to variation, and may, if desired, comprise means and arrangements other than those thus illustratively described.

When the sweep means is disposed in normal out-of-service position, the guide or track bars 30 and their parallel carrier levers 31 are up-swung about the fulcrums of the latter, so as to be up-lifted or collapsed to lie beneath and contiguous to the underside of the platform 13 of the pin handling and spotting means. The sweep means is retained in such up-lifted out-of-service position during vertically reciprocable operative movements of the pin handling and spotting means.

After a ball is bowled down the alley in play, so that standing pins are felled thereby, suitable electrical control means (not shown) are provided for effecting operations of the sweep means and the pin handling and spotting means, whereby any fallen pins P' remaining on the alley and gutter surfaces may be swept off therefrom and into the pit 12. If any pins P remain standing after the first ball is bowled, the pin handling and spotting means is first caused to descend to the position shown by broken lines in Fig. 2, whereby to engage such standing pins by its picker devices, and thereupon to rise again so as to lift said standing pins away from and suspend the same above the alley surface, as shown by full lines in Fig. 2, pending operation of the sweep means for removal of fallen pins or dead wood. During such operations of the pin handling and spotting means, the sweep means is retained in the described up-lifted out-of-service position, so as not to interfere with said operations of the pin handling and spotting means.

As soon as the pin handling and spotting means

regains its normal up-raised position, through suitable electrical control and timing means (not shown), the motor 48 is energized, whereby to first drive the shaft 46 and winding drums 41—45 in clockwise direction, thereby reeling up the propulsive cables 38 and proportionately paying off the retraction cables 42. As the propulsive cables 38 exert their draft and the retractive cables 42 relax their draft, the parallel lever suspended guide or track bars 30 and the sweep member 34 carried thereby, under gravitation of their weight, first swing downward to service position, thus lowering the sweep member 34 and its gutter sweep portions 35 into operative relation to the alley and gutter surfaces (see Fig. 3). Thereafter, under continuing draft of the propulsive cables 38, the carriage members 32 are caused to slide rearwardly on their supporting guide or track bars 30, thereby causing the sweep member to traverse the alley and gutter surfaces so as to engage any fallen pins P' lying thereon, and thereupon sweep the same rearwardly therefrom and into the pit 12 (see Fig. 4). As the sweep member 34 completes its rearward pin sweeping movement, suitable electrical control means, schematically shown in part and indicated by the reference character R, will be engaged, the same being operative to reverse the rotation of the motor 48. As the motor 48 reverses, the shaft 46 and winding drums 41—45 will thereupon be driven in anti-clockwise direction, whereby to cause the retractive cables 42 to exert draft and the propulsive cables 38 to relax draft, and thus cause the carriage members 32 to slide forwardly along their supporting guide or track bars 30, thus returning the sweep member to its initial starting position. Such return movement is arrested by abutment of the carriage members 32 against positioning stops 55. As the return movement of the carriage members and sweep members is arrested by the stops 55, continuing draft of the retractive cables 42 swings upwardly the guide or track bars 30 and the sweep member carried thereby back to initial up-lifted out-of-service position. When the sweep means thus resumes its out-of-service position, suitable electrical control means, schematically shown in part and indicated by the reference character S, will be engaged, as e. g. by an up-swung carrier lever 31, the same being operative to stop the motor 48.

The operation of the sweep means having been completed, the pin handling and spotting means, through the timing and control action of suitable means (not shown), will again descend to re-spot the lifted pins ready for bowling of a second ball.

It will be understood, that, in the event all the standing pins are knocked down by the first bowled ball, the coordinated operations of the pin handling and spotting means and the sweep means will function to remove any dead wood remaining on the alley and gutter surfaces, prior to accumulation and re-setting of the pins for continued play.

Although the sweep means has been shown and described as carried by the platform 13 of the pin handling and spotting means, and while this is preferable, it is not absolutely essential since, the same could be stationarily supported with the pin handling and spotting means in movable relation thereto.

We are aware that various changes could be made in the construction and arrangement of the mechanisms and parts thereof which comprise the dead wood sweep means above described, without departing from the spirit of our

invention and within the scope thereof as defined by the following claims. It is therefore intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. Dead wood sweep means for bowling alleys comprising a pair of parallel lever suspended guide bars arranged parallel to the alley and gutter surfaces and laterally spaced to straddle the pin stand section of said alley, carriage members slidably mounted on said guide bars for back and forth movement along the same, a transverse sweep member affixed to and between and dependent from said carriage members, said guide bars being adapted to be swung about the fulcrums of the parallel levers by which they are suspended so that the same and the sweep member carried thereby may be raised to an out-of-service position and lowered to a service position relative to the alley and gutter surfaces, and actuating means adapted to sequentially lower said guide bars and sweep member, then move the sweep member back and forth along the lowered guide bars, and thereafter raise the guide bars and sweep member back to out-of-service position, said latter means comprising propulsive cables attached to said carriage members to extend in one direction therefrom, retractive cables attached to said carriage members to extend in the opposite direction therefrom, and winding drum means for said cables, the relation of said cables to said winding drum means being such that when said propulsive cables are reeled up on the drum means the retractive cables will be proportionately paid off therefrom and vice versa.

2. Dead wood sweep means for bowling alleys comprising a pair of parallel lever suspended guide bars arranged parallel to the alley and gutter surfaces and laterally spaced to straddle the pin stand section of said alley, carriage members slidably mounted on said guide bars for back and forth movement along the same, a transverse sweep member affixed to and between and dependent from said carriage members, said guide bars being adapted to be swung about the fulcrums of the parallel levers by which they are suspended so that the same and the sweep member carried thereby may be raised to an out-of-service position and lowered to a service position relative to the alley and gutter surfaces, and actuating means adapted to sequentially lower said guide bars and sweep member, then move the sweep member back and forth along the lowered guide bars, and thereafter raise the guide bars and sweep member back to out-of-service position, said latter means comprising propulsive cables attached to said carriage members to extend in one direction therefrom, winding drum means to which said propulsive cables extend, means to guide said propulsive cables for operative movement between said carriage member and winding drum means, retractive cables attached to said carriage members to extend in the opposite direction therefrom, second winding drum means to which said retractive cables extend, means to guide said retractive cables for operative movement between said carriage members and said second winding drum means, the relation of said cables to their respective winding drum means being such that when said propulsive cables are reeled up the retractive cables will be proportionately paid out and vice versa, and means common to said winding drum means for

rotating the same including a reversible power drive therefor.

3. The combination with a vertically reciprocable pin handling and spotting means having picker means for lifting standing pins away from the alley surface, of dead wood sweep means comprising guide bars arranged parallel to the alley and gutter surfaces and laterally spaced to straddle the pin stand section of the alley, parallel levers pivotally dependent from the underside of said pin handling and spotting means by which said guide bars are supported, carriage members slidably mounted on said guide bars for back and forth movement along the same, a transverse sweep member affixed to and between and dependent from said carriage members, said guide bars being adapted to be swung about the fulcrums of the parallel levers whereby the same and the sweep member carried thereby may be raised and lowered relative to the underside of said pin handling and spotting means from and to service position relative to the alley and gutter surfaces, and actuating means adapted to sequentially lower said guide bars and sweep member to service position, then move the sweep member back and forth along the lowered guide bars, and thereafter raise the guide bars and sweep member back to out-of-service position.

4. The combination with a vertically reciprocable pin handling and spotting means having picker means for lifting standing pins away from the alley surface, of dead wood sweep means comprising guide bars arranged parallel to the alley and gutter surfaces and laterally spaced to straddle the pin stand section of the alley, parallel levers pivotally dependent from the underside of said pin handling and spotting means by which said guide bars are supported, carriage members slidably mounted on said guide bars for back and forth movement along the same, a transverse sweep member affixed to and between and dependent from said carriage members, said guide bars being adapted to be swung about the fulcrums of the parallel levers whereby the same and the sweep member carried thereby may be raised and lowered relative to the underside of said pin handling and spotting means from and to service positions relative to the alley and gutter surfaces, and actuating means adapted to sequentially lower said guide bars and sweep member to service position, then move the sweep member back and forth along the lowered guide bars, and thereafter raise the guide bars and sweep member back to out-of-service position, said latter means comprising propulsive cables attached to said carriage members to extend in one direction therefrom, retractive cables attached to said carriage members to extend in the opposite direction therefrom, and winding drum means for said cables, said winding drum means being mounted on the top of said pin handling and spotting means, the relation of said cables to said winding drum means being such that when said propulsive cables are reeled up on the drum means the retractive cables will be proportionately paid off therefrom and vice versa.

5. The combination with a vertically reciprocable pin handling and spotting means having picker means for lifting standing pins away from the alley surface, of dead wood sweep means comprising guide bars arranged parallel to the alley and gutter surfaces and laterally spaced to straddle the pin stand section of the alley, parallel levers pivotally dependent from the underside of said pin handling and spotting means by which

said guide bars are supported, carriage members slidably mounted on said guide bars for back and forth movement along the same, a transverse sweep member affixed to and between and dependent from said carriage members, said guide bars being adapted to be swung about the fulcrums of the parallel levers whereby the same and the sweep member carried thereby may be raised and lowered relative to the underside of said pin handling and spotting means from and to service position relative to the alley and gutter surfaces, and actuating means adapted to sequentially lower said guide bars and sweep member to service position, then move the sweep member back and forth along the lowered guide bars, and thereafter raise the guide bars and sweep member back to out-of-service position, said latter means comprising propulsive cables attached to said carriage members to extend in one direction therefrom, retractive cables attached to said carriage members to extend in the opposite direction therefrom, winding drum means for said propulsive and retractive cables, said winding drum means being mounted on the top of said pin handling and spotting means, means to guide said respective propulsive and retractive cables for operative movements between said carriage members and winding drum means, the relation of said cables to said winding drum means being such that when said propulsive cables are reeled up the retractive cables will be proportionately paid out and vice versa, and means also carried by said pin handling and spotting means for rotating said winding drum means including a reversible power drive therefor.

6. The combination with a vertically reciprocable pin handling and spotting means having picker means for lifting standing pins away from the alley surface, of dead wood sweep means comprising a movable sweep device, guide means for said sweep device, parallel lever means pivotally dependent from the underside of said pin handling and spotting means by which said guide means is supported so that the same and the

sweep device carried thereby may be raised and lowered relative to the underside of said pin handling and spotting means from and to service position relative to the alley and gutter surfaces, and actuating means also mounted on said pin handling and spotting means adapted to sequentially lower said guide means and sweep device from out-of-service to service position, then move said sweep device back and forth along the lowered guide means, and thereafter raise said guide means and sweep device back to out-of-service position.

7. The combination with a vertically reciprocable pin handling and spotting means having picker means for lifting standing pins away from the alley surface, of dead wood sweep means comprising a movable sweep device, guide means for said sweep device, parallel lever means pivotally dependent from the underside of said pin handling and spotting means by which said guide means is supported so that the same and the sweep device carried thereby may be raised and lowered relative to the underside of said pin handling and spotting means from and to service position relative to the alley and gutter surfaces, and actuating means also mounted on said pin handling and spotting means adapted to sequentially lower said guide means and sweep device from out-of-service to service position, then move said sweep device back and forth along the lowered guide means, and thereafter raise said guide means and sweep device back to out-of-service position, said actuating means comprising propulsive cable means extending from said sweep device in one direction, retractive cable means extending from said sweep device in the opposite direction, and winding drum means for said cable means, the relation of said respective cable means to said winding drum means being such that when said propulsive cable means is reeled up the retractive cable means will be proportionately paid out and vice versa.

JOSEPH PARRA.
WILLIAM WHITE.