July 17, 1956 J. ZUERCHER 2,755,089

BOWLING PIN SPOTTING MECHANISM

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FIG. 1

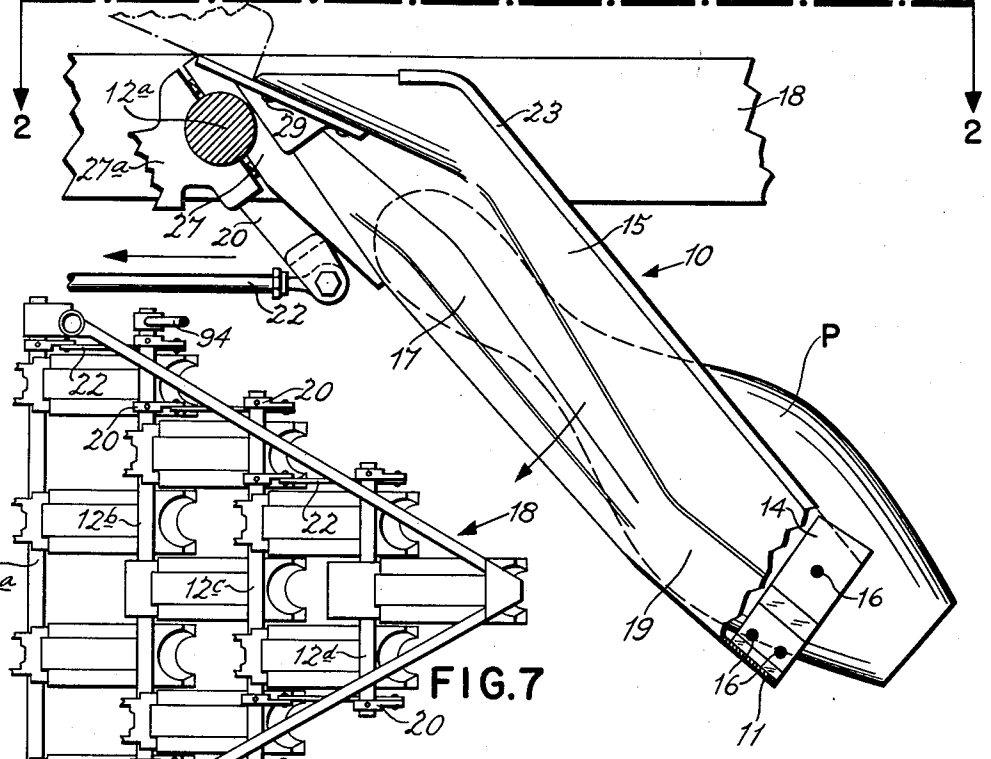
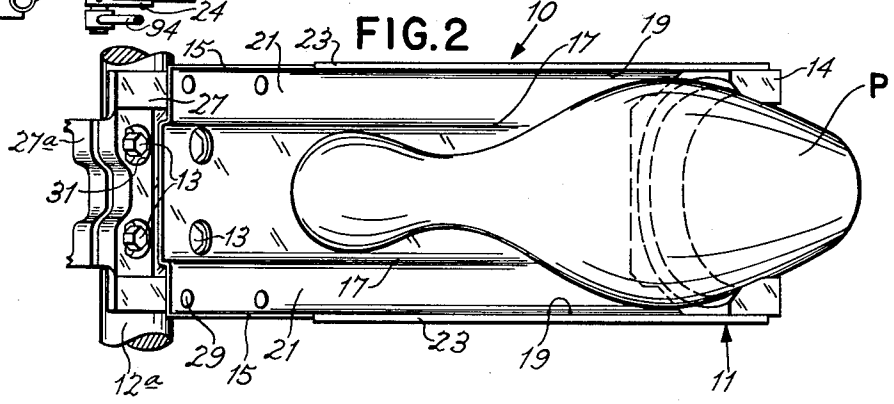


FIG. 7

FIG. 2



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BOWLING PIN SPOTTING MECHANISM

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FIG. 4

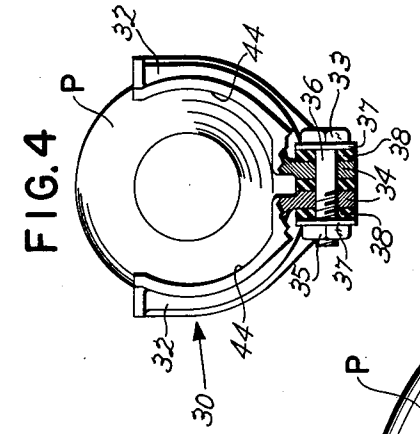


FIG. 3

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BOWLING PIN SPOTTING MECHANISM

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FIG.5

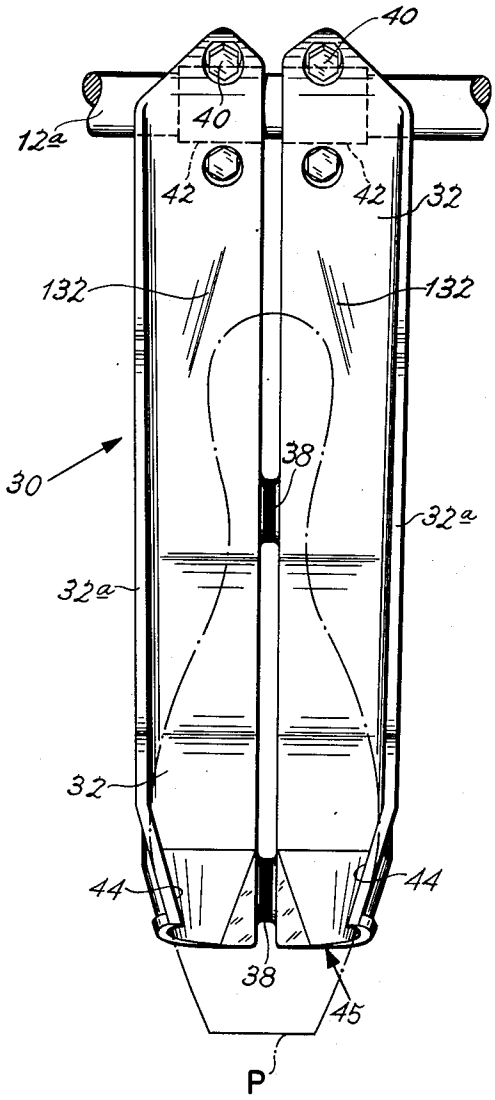
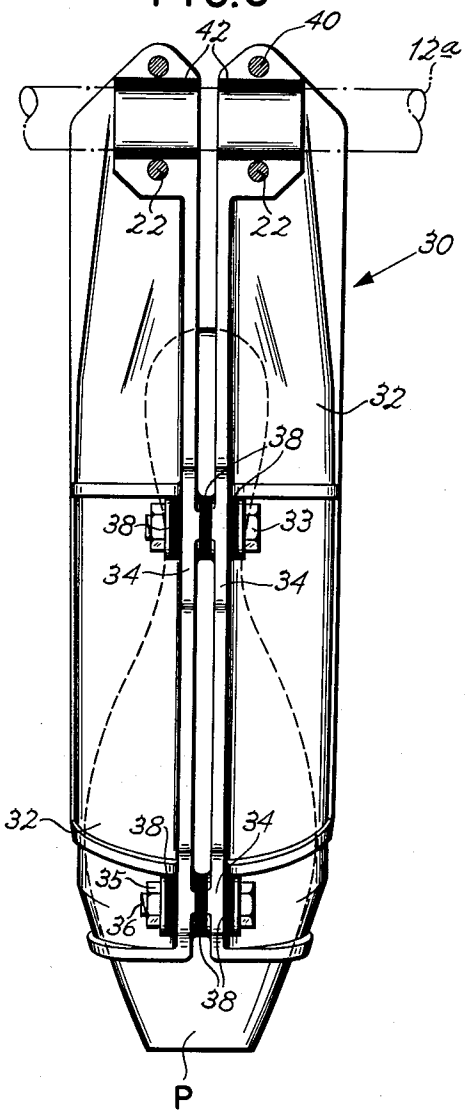


FIG.6



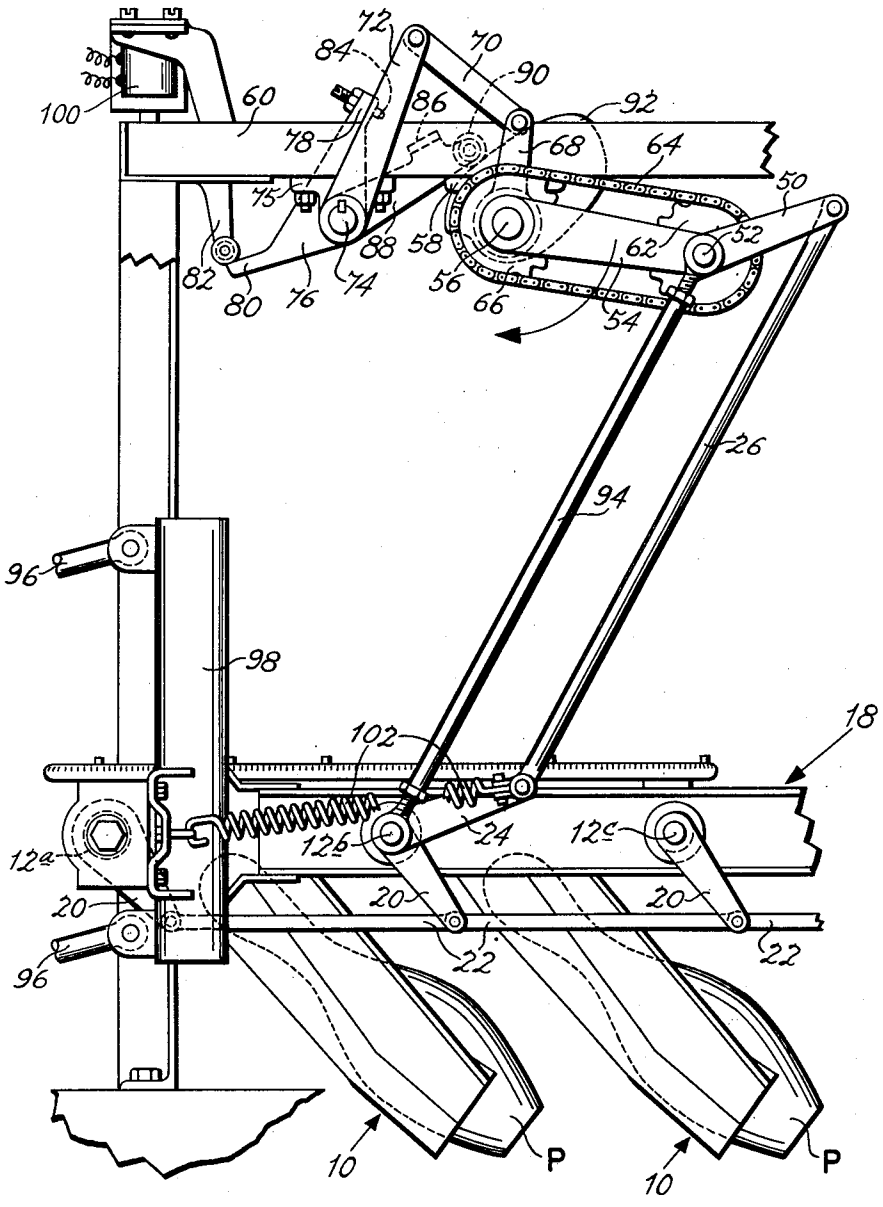
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BOWLING PIN SPOTTING MECHANISM

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FIG.8



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2,755,089

BOWLING PIN SPOTTING MECHANISM

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Application April 10, 1952, Serial No. 281,598

20 Claims. (Cl. 273—42)

This invention relates to bowling pinspotting machines, and more particularly to improvements in devices for spotting pins on the playing bed of a bowling alley.

Attempts have been made in the prior art to provide pin handling and spotting devices which would spot pins accurately upon a bowling alley. In the main, usually such devices have been complex in construction, could not be depended upon for setting accurately over long periods of use, and often proved to be noisy in operation.

The present invention overcomes the above noted disadvantages and provides a pin spotter having pin handling and spotting devices or cups which are relatively simple in construction and accurate in spotting. They also are much quieter in operation than those of the prior art because they are so constructed, arranged and operated that pins delivered thereto, slide downwardly into and come to rest in the spotting devices instead of dropping vertically thereinto. Furthermore, in the movement of the spotting devices from inclined receiving position to substantially vertical position, each pin carried in a spotting device is placed gently on its spotted position instead of being dropped thereonto, after which each device is moved away from its respective spotted pin and returned to inclined pin receiving and supporting position. A modified form of device constructed in accordance with the invention also results in further elimination of noise due to pins being delivered thereinto. This feature is particularly desirable in a pin spotting machine, and especially in automatic pin spotting machines where in an establishment using a large number of machines, it is highly desirable to eliminate noise and clatter, or to minimize it as much as possible.

According to the invention, the pin spotter is provided with the desired number of pin receiving and supporting devices or cups. Usually ten cups are provided and are so arranged on the pin spotter that pins will be spotted in triangular playing formation on the playing bed of a bowling alley. Each cup consists of an elongated, generally U-shaped trough-like member formed in such a manner as to accommodate a pin delivered thereinto for ready replacement on a bowling alley bed. A pin supported in a pin spotting device or cup made in accordance with the invention is held therein somewhat in the manner in which it would be held in a human hand if the latter were extended outwardly palm up. For this reason, my pin spotter device or cup is sometimes referred to herein as a "mechanical hand." Each cup or "mechanical hand" is so mounted on the spotter that a pin is readily delivered or slid thereinto when it is in receiving position. Each pin is supported in inclined position, until at the proper time, all "mechanical hands" are moved to substantially vertical position as the frame or table, on which the desired number of "mechanical hands" is mounted, moves toward spotting position relative to a bowling alley. When the bases of the pins rest in on-spot position on the alley bed as the result of the movement of the spotter to its lowermost position relative thereto, all ten devices are moved rearwardly away from the ten pins which are left spotted on the alley as the frame moves upwardly, whereupon the

"mechanical hands" or cup are returned to their inclined or receiving positions.

In a modified form of the invention, each pin spotter cup or "mechanical hand" is formed of two elongated parts, separated by resilient, shock and noise absorbing members and secured together by suitable means to provide an open generally U-shaped pin spotter cup.

The present invention constitutes a continuation in part of application, Serial Number 180,174, filed August 18, 1950, by Holloway et al., for Bowling Pin Spotting and Respotting Mechanism.

It is an object of the invention to provide an improved pin spotter having novel open trough-like pin holding and spotting devices for spotting pins on a bowling alley.

It is also an object of the invention to provide improved pin handling mechanisms, useful in spotting pins on an alley, which are simple in construction and in which pins can be delivered from a source of supply with a minimum of noise and clatter.

The invention is also characterized by the provision of an improved pin spotter having a plurality of triangularly arranged elongated bowling pin receiving, supporting and spotting devices substantially U-shape in cross section which accommodate and seat bowling pins deposited therein, and accurately spot such pins when the spotter is moved from receiving position to pin spotting position.

The invention also includes the provision of novel pin receiving, supporting and spotting units consisting of generally U-shaped elongated or trough-like members provided with pin seating means and also resilient mountings which are effective in reducing noise in use to a minimum.

With these and other objects not specifically mentioned in view, the invention consists in certain combinations and constructions which will be hereinafter fully described, 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:

Fig. 1 is a side elevation, partly in section, of a pin spotter unit embodying the invention shown in pin receiving and supporting position;

Fig. 2 is a plan view of the same, taken on line 2—2 of Fig. 1;

Fig. 3 is a side elevation of a modified form of pin spotter constructed in accordance with the invention shown in pin receiving and supporting position, and in spotting position;

Fig. 4 is an end elevation of the same, taken on line 4—4 of Fig. 3;

Fig. 5 is a plan view of the pin spotter unit shown in Fig. 3;

Fig. 6 is a bottom view of the same, taken on line 6—6 of Fig. 3, and

Fig. 7 is a plan view showing a pin spotter made in accordance with the invention provided with ten triangularly arranged pin spotting units mounted thereon.

Fig. 8 is a partial side elevation showing the pinspotter operating means.

A typical spotting device or cup 10 made in accordance with the invention includes an elongated generally U-shaped trough-like member or receptacle which preferably is greater in length than the length of a pin held therein for spotting. Cup 10 can be formed of sheet metal, wood, plastic, stiffened impregnated or plastic coated fabric or combinations of such materials or the like. In the device shown in Figures 1 and 2, it is formed of a single piece of metal, suitably shaped in known manner into a rigid structure which supports and spots a pin delivered thereinto in accurate playing arrangement on the bed of a bowling alley.

A bowling pin P, delivered from a distributing mechanism (not shown) of a bowling pin spotting machine

(not shown) into a spotting unit **10**, moves or slides along the bottom **11** of trough-like member **10** which is shaped to conform generally with the contour of a pin, and comes to rest thereon between spaced side walls **15** extending upwardly from bottom **11** with the tapered sides of the pin below its belly portion or section of maximum diameter resting upon and supported by a holding element **14** which may be formed integrally with cup **10** or attached thereto. As shown in Figures 1 and 2, element **14** is in the form of substantially a half ring or support suitably attached to bottom **11** at the free end of cup **10**, and to the inner surface of walls **15** thereof as by screws **16**. Half ring support **14** preferably is formed of a resilient plastic such as rubber, although metal or fiber, or other compositions may be used. Side walls **15**, as shown in Figures 1 and 2, preferably are shaped to function as guides for a pin P delivered to a cup **10**, and also to provide reinforcing pin positioning shoulders **17** and **19**, such that a pin P held in a cup **10** has its belly portion located between shoulders **19** and its head and neck portion between shoulders **17**. Walls **15** also preferably are formed with flanges **21** and a stiffening bead **23**, formed integrally with or attached thereto in any suitable manner. In this way a trough-like spotting member or receptacle **10** may be formed of relatively thin material and have sufficient rigidity to withstand hard usage, and accurate spotting of pins thereby is assured.

Since in the game of bowling, ten pins are placed on the alley in the familiar triangular pattern, ten spotter devices or cups **10** arranged in the same triangular pattern, are mounted on the pinspotter, designated generally **18**, which is located over the pin spotting area of a bowling alley. Spotter **18** is adapted to be moved to and from a bowling alley for the purpose of spotting a set of ten pins located in the spotter units of the pin supporting bed thereof.

Each cup **10** is clamped to a horizontal shaft, such as **12***a*. Table **18** carries four such shafts, namely **12***a*, **12***b*, **12***c* and **12***d* on which are mounted four, three, two, and one spotting units or unit, respectively, the arrangement of which corresponds with the arrangement of the #1 to #10 spots on the alley bed (Fig. 7). Each shaft is provided with a suitable number of actuating arms **20** which by means of links or rods **22**, are connected in such a manner that when an oscillating motion is imparted to one shaft, all four shafts of the table **18** move at the same time and in the same direction. Therefore only shaft **12***b* is provided with an operating lever **24** (Figs. 7 and 8) which by means of a link **26**, is connected to an oscillating lever **50** (Fig. 8) which causes all receptacles **10** during spotting operation to move from an inclined pin receiving position to a vertical pin delivery or spotting position.

The mechanism for actuating levers **24** may be similar in construction and operation to that shown in the above referred to Holloway et al. application.

As illustrated in Figure 8, an oscillating lever **50** is mounted on a shaft **52** rotatably supported in the free end of arm **54** mounted on shaft **56** driven from a suitable source of power (not shown) and supported in bearing brackets **58** attached to horizontal members of the main frame **60** of the pin spotting machine. Shaft **56** may be driven intermittently by means of mechanism similar in construction and operation to that disclosed in copending application Serial No. 180,174, filed August 18, 1950. Secured to shaft **52** is a sprocket **62** which by means of an endless chain **64** is connected to a sprocket **66** loosely mounted on shaft **56**. The hub of sprocket **66** is provided with an arm **68**, the free end of which is connected by a link **70** to a lever **72** fixed to shaft **74** supported in a suitable bearing bracket **75** attached to one of the horizontal members of frame **60**. Also secured to shaft **74** is a control arm **76** which is provided with an actuating member **78** and a lock member **80**. When the latter is in engagement with a solenoid operated

control lever **82**, control arm **76** is rendered inactive and effects an arrest of all pin receptacles **10** in their inclined pin receiving position, shown in Figure 8. Actuating member **78** of control arm **76** carries at its free end an adjustable contact screw **84**, which when arm **76** is not in arrested position, engages with the contact surface **86** of cam lever **88** loosely mounted on shaft **74**. Cam lever **88** carries a cam follower **90** adapted to run on cam **92** secured to shaft **56**. Adjustable links **94** connect shaft **52** to table shaft **12***b*. By means of the mechanism described above, it will be clear that when shaft **56** is rotated, table **18** is moved to and from alley A in order to place bowling pins thereon. Table **18** is maintained substantially horizontal and parallel to the alley bed at all times by means of a plurality of stabilizing rods **96** attached at one end to vertical frame members **98** of table **18**. The other ends of rods **96** are pivotally attached to the stationary frame of the machine (not shown).

With the control arm **76** arrested by solenoid controlled lever **82**, as shown in Fig. 8, table **18** may be raised or lowered without any effect on the position of the spotting cups **10** carried thereby. However, at the proper time and when the spotting cups or receptacles **10** are filled with pins P, solenoid **100** is energized by suitable control mechanism (not shown). This causes lever **82** to move to the left, as viewed in Fig. 8, and to disengage from lock member **80** of control arm **76**, and due to the weight of pins P in receptacles **10**, contact screw **84** of the actuating member **78** of arm **76** is moved against the surface **86** of cam lever **88** and follows the motion of cam lever **88** controlled by cam **92**.

Since control arm **76** is keyed to the same shaft as lever **72**, the latter transmits this motion through link **70** and arm **68** to sprocket **66**, and through chain **64** rotates sprocket **62** on shaft **52**. Due to the fact that lever **50** is secured to shaft **52**, the latter through rod **26**, actuates arm **24** on shaft **12***b* which in turn through levers **20** and connecting rods **22**, actuates or rocks the other receptacle supporting shafts **12***a*, **12***c* and **12***d*. This operation results in the movement of all pin receptacles or cups **10** from their inclined pin receiving and supporting position to substantially vertical spotting position as table **18** is lowered and approaches the alley bed for spotting the several pins P thereon.

A tension and toggle spring **102** attached at one end to arm **24** and at the other end to a suitable bracket of table **18**, aids in balancing the weight of pins P in receptacles **10** when the latter are in inclined position, but causes a rapid and positive withdrawing action of receptacles **10** from pins P when they are placed in spotted positions on the alley, and also prevents swinging action which might knock down a pin thus spotted. As spotter **18** moves upwardly after pins P have been spotted, shafts **12***a*—**12***d* are rocked in the opposite direction, and all cups **10** are returned to their receiving positions, as shown in Figures 1, 7 and 8.

With reference to the modified spotter unit illustrated in Figures 3, 4, 5 and 6, cup **30** is of substantially the same shape and length as that shown in Figures 1 and 2. It consists of two suitably formed, elongated, generally L-shaped members **32**, each provided with suitable flanges **34** on its shorter leg. Bolts **36** are used to secure them together in such a way as to form an elongated open substantially U-shaped trough or receptable suitably shaped to receive bowling pins. The important feature of this split-type cup or "mechanical hand" is that between the clamping surfaces of flanges **34**, as well as between said flanges and the head and nut of each bolt **36**, is located a disc **38** of resilient material such as rubber or plastic which not only effects a resiliency between the two halves of the receptacle **30**, but also substantially decreases and deadens noise created during the pin receiving operation. Washers **37** located between the undersurface of nuts **35** and heads **33** of bolts **36**, respectively, prevent damage to discs **38** when nuts **35** are tightened on bolts **36**.

To further minimize and substantially prevent sound from traveling from cups 30 to other parts of the machine, the two halves 32 of each spotting device 30 are insulated from their respective operating and supporting shafts 12*a*—12*d*, to which each receptacle is clamped by bolts 40 by means of suitable rubber sleeves or bushings 42 (Figs. 3 and 6), thus rendering the delivery of the bowling pins to the spotter units as silent and noiseless as possible and marking an important step forward in pin spotting devices.

The lower or free end of each half 32 is tapered inwardly and so shaped that the ends of the combined two halves of each receptacle form a substantially conical seat 44, the tapered inner faces of which engage with and support a bowling pin located therein.

A bowling pin P delivered into a spotting cup 30 moves or slides downwardly along bottom portions 132 and comes to rest therein with the tapered sides of the pin above the butt end thereof resting against inwardly directed ring portion 45 at the end of the cup or "mechanical hand" 30 with the belly portion of the pin resting upon the curved bottom portion 134. A bead 32*a* formed along the upper edge portion of each half 32 adds stiffness and rigidity to each half 32. So also ribs 32*b* formed on each half 32 stiffen and strengthen these members.

The modified pin spotter devices are arranged in the same triangular fashion as shown in Fig. 7 and mounted on a vertically reciprocating spotting table 18. Devices 30 are supported for movement on their respective horizontal supporting shafts 12*a*, 12*b*, 12*c* and 12*d* which are interconnected by means of arms and rods 22 in the manner mentioned heretofore. As table 18 descends from its upper pin reeciving position towards alley bed A, the several cups 30 are swung from their inclined pin receiving and supporting position I shown in full lines in Figure 3 to a substantially vertical pin delivery position II shown in dotted lines with table 18 still descending after the bottoms of the pins in the ten cups 30 contact the alley bed to effect a disengagement of seats 44 of the receptacles from the spotted pins, shown in the case of a single pin cup 30 in the fragmentary dotted position III (Fig. 3). Each cup then swings away from its now spotted standing pin, as illustrated in the fragmentary dotted position IV, and table 18 then ascends to its pin receiving elevated position. During the upward travel of table 18 and after the ten cups or ten "mechanical hands" 30 have cleared the spotted pins, they all are moved back to their inclined pin receiving positions awaiting delivery of pins thereinto.

The upper end of each trough-like member or cup 10 is attached to a support bracket 27, as by rivets 29. Each bracket 27 is provided with holes 31 through which extend bolts 13 threaded into support bracket 27*a* of a respotting device (not shown). When bolts 13 are tightened in brackets 27, brackets 27 and 27*a* are securely clamped to their respective support shafts 12*a*, 12*b*, 12*c* and 12*d*, and the sets of spotting devices 10 and respotting units (not shown) are held thereby clamped to table 18. By means of the adjusting elements just described, it will be seen that the angular position of each spotting device 10 on its respective supporting shaft can be adjusted as described to secure accurate spotting. Furthermore, due to the fact that each hole 31 is slightly oversize with respect to the diameter of attaching bolts 13, provision is made for slight lateral adjustment of each spotter cup or device 10. In the modification shown in Figures 3 to 6 inclusive, the spotting cups 30 are secured to their respective supporting shafts by means of bolts 40 extending through holes, preferably oversize as compared with the diameters of bolts 40, which are threaded into support brackets 41, which support the pin respotting units (not shown). The manner of adjusting spotting devices 30 is therefore substantially the same as that employed in the case of the modification shown in Figures 1 and 2.

The invention above described may be varied in construction within the scope of the claims, for the particular embodiments selected to illustrate the invention are but a few of the possible concrete forms which my invention may assume. The invention, therefore, is not to be restricted to the precise details of the structures shown and described.

What I claim is:

1. A bowling pin spotting device comprising an elongated trough-like cup having a bottom surface conforming generally with the shape of a bowling pin seated thereon and spaced side walls extending upwardly beyond the center of a pin holding a pin located therein against substantial lateral movement, said cup being provided with means for engaging the lower belly portion of a pin located in said cup with the base end of said pin extending beyond an end of said cup for preventing substantial downward axial movement of said pin in said cup, a movable support adapted to move said cup from a pin receiving position to a substantially vertical pin holding and spotting position, and means adjustably securing said cup to said support, whereby the position of said cup may be adjusted to insure that a pin may be accurately spotted by said cup on the playing bed of a bowling alley.

2. A bowling pin spotting device for use with a pin spotter comprising a bracket, an elongated generally U-shaped pin receiving and holding member attached to said bracket, said member having a bottom surface on which rests a portion of the head and the belly of a pin, and spaced side walls for confining said head and belly portions of said pin against substantial lateral movement; and said member having pin engaging and holding means partially encircling a portion of a pin for holding a pin resting on said bottom surface of said member with the base of said pin extending outwardly beyond the free end of said member against substantial axial movement; a support shaft, and means adjustably attaching said bracket to said shaft whereby a pin held only in said member may be accurately spotted on the playing bed of a bowling alley.

3. A bowling pin spotting device comprising an elongated trough-like cup, means for supporting said cup in an inclined pin receiving and holding position, pin holding means on said cup, mechanism for moving said cup with a pin held therein by said last-named means to a substantially vertical position for spotting on the playing bed of a bowling alley, said mechanism including means operative after a pin has been placed on said bed of said alley for moving said cup downwardly along said pin to release said pin from said holding means and then away from and clear of said pin.

4. A spotting device for a bowling pin spotting machine comprising an elongated open pin holding and supporting shell shaped to conform generally with the shape of a bowling pin, said shell consisting of two complementary members, means securing said members together to form said elongated shell, and an inwardly directed abutment on one end of each of said members adapted to partially loosely encircle the lower belly portion of a pin and secure said pin in said shell against axial movement for spotting on the playing bed of a bowling alley.

5. The invention defined in claim 4 including resilient spacing devices located between said members, and means attached to the end of said open shell remote from said abutment for supporting said shell in downwardly inclined pin receiving and supporting position with the butt end of a pin extending outwardly beyond said abutment, whereby when said butt end of said pin is seated on a bowling alley and said pin is standing thereon, said shell may be moved clear of said standing pin.

6. The invention defined in claim 4 wherein each of said members is provided with flanges having bores, resilient discs having bores positioned in axial alignment with said bores of said flanges and between said flanges, resilient discs having bores coaxially arranged with said bores in said flanges located on the outer faces of said

flanges, and wherein said securing means include bolts passing through said bores of said discs and flanges, and nuts on said bolts securing said members together in resilient assembled relationship.

7. A bowling pin spotter comprising a frame adapted to be moved to and from a pin spotting position relative to a bowling alley, a plurality of triangularly arranged elongated open trough-like members, each having a pin supporting bottom and spaced upstanding sides, mounted on said frame, said sides embracing the major portion of the periphery of the butt end of a pin located in said members, a movable support for each of said members, means attaching one end of each of said members to a support, pin holding abutment means on the other end of each of said members adapted to partially encircle the lower belly portion of a pin seated in said member and hold said pin against axial movement therein, and means for moving said frame and members to pin spotting position, including means for moving said members away from spotted pins to free said spotted pins from said members.

8. The invention defined in claim 7 wherein said abutment means comprise fibre half-ring elements, said elements having tapered pin engaging faces adapted to fit snugly about a major portion of the periphery of the butt end of said pin engaged thereby.

9. A bowling pin spotter comprising a frame adapted to be moved to and from an alley for spotting pins thereon, a plurality of elongated open pin receiving and supporting shells, each of said shells having a bottom surface and spaced upstanding side walls adapted to receive and support a pin located on said bottom surface between said spaced upstanding side walls, abutment means on said shell located adjacent one end and internally thereof for engaging the lower belly portion of a pin located in a shell, and securing said pin against sliding out of said shell; movable supports on said frame for said shells, mechanism for moving said frame and supports downwardly towards said alley and to travel said shells from a pin receiving position to a pin spotting position, and means operative subsequent to the delivery of said pins in spotted position on said alley for moving said frame to travel said shells downwardly along said spotted pins for releasing said pins from engagement with said abutment means and clear of said shells.

10. The invention defined in claim 7 wherein said members comprise two elementary generally L-shaped parts, and means securing said parts together to form said elongated open pin receiving and holding members.

11. A bowling pin spotting device comprising an elongated generally U-shaped pin holding member, said member having a bottom section on which the head and belly portions of a pin seated therein are adapted to rest, and spaced upstanding walls for confining said pin against substantial lateral movement, said member having means at one end for partially encircling the lower belly portion of a pin seated in said member with the base end of said pin extending beyond said one end of said member for preventing downward axial movement of said pin in said member, and means supporting said member for movement from a pin receiving and holding position to a pin holding and spotting position relative to the playing bed of a bowling alley.

12. A bowling pin spotting device comprising an elongated open trough-like pin receiving and supporting shell having a pin supporting bottom and upstanding spaced side walls confining a pin seated on said bottom of said shell against substantial lateral movement therein, means mounting said shell in normal pin receiving and supporting position in a plane inclined downwardly from the horizontal, inwardly extending pin engaging and holding means on the end of said shell partially encircling the lower belly portion of a pin seated in said shell for holding a pin seated in said shell against downward axial movement relative thereto with the base end of said pin projecting outwardly beyond the end of said shell for placement on the playing bed of a bowling alley.

13. The invention defined in claim 12 wherein said pin engaging and holding means comprises a half-ring element.

14. A spotting device for a bowling pin spotting machine comprising an elongated open generally U-shaped pin shell shaped to conform generally with the shape of a bowling pin, movable means normally supporting said pin shell in an inclined pin receiving and supporting position, and means at the free end of said pin shell and projecting inwardly therefrom and partially encircling the belly portion of a pin above the base end thereof with the base end of the pin projecting outwardly beyond the end of said shell, said last-named means being operative to engage and hold said pin against downward or sliding movement out of said shell.

15. A bowling pin spotting device comprising a frame adapted to be moved to and from a bowling alley for spotting pins thereon, a plurality of elongated generally U-shaped pin holding and spotting members attached to said frame, each of said members having a bottom section on which the head and belly portions of a pin seated therein rest, inwardly tapered pin confining means adapted to partially encircle and hold said seated pin against sliding movement out of said member with the butt end of a pin projecting beyond the end of said member, and spaced walls for confining said pin against substantial lateral movement, means supporting said members in inclined pin receiving and holding position, and means operative when said frame has been moved to spotting position for moving said members to substantially vertical position to spot pins held in said members in playing arrangement on said bowling alley.

16. A bowling pin spotter comprising a frame adapted to be moved to and from a bowling alley for spotting pins in playing arrangement thereon, a plurality of elongated trough-like cups having one end attached to said frame mounted in substantially triangular arrangement on said frame, means for supporting said cups on said frame in inclined pin receiving and supporting position, each of said cups having means for engaging and holding a pin resting thereon and seated therein against axial movement out of said cup and with the butt end projecting beyond the other end of said cup, mechanism for moving said frame to pin spotting position above said alley and for moving all of said cups with pins held therein to a substantially vertical position for spotting on the playing bed of a bowling alley, said mechanism including means operative after a pin has been placed on said bed of said alley for moving said cups downwardly along pins spotted on said alley to release said pins from said holding means and then away from and clear of said pin, and for returning said frame and said cups to pin receiving position.

17. A bowling pin spotting device comprising an elongated completely open trough-like pin receiving and supporting cup, having a pin supporting bottom and upstanding spaced side walls confining a pin seated on said bottom against substantial lateral movement, means at one end of said cup mounting said cup for normal support in a plane inclined downwardly from the horizontal, said means including a shaft, resilient seating means for said cup on said shaft; and means on the free end of said cup for partially encircling the lower belly portion of a pin seated in said cup with the base of said pin extending beyond said last-named means for holding said pin seated in said cup against downward axial movement out of said cup for delivery by said cup onto a bowling alley.

18. A bowling pin spotter comprising a frame adapted to be moved to and from a bowling alley for spotting pins in playing arrangement thereon, a plurality of elongated trough-like cups carried in substantially triangular arrangement on said frame, rotatably supported shafts mounted in said frame, means connecting said cups to

said shafts, mechanism for moving said frame to pin spotting position above said alley and means for rocking said shafts supporting said cups with pins held therein to dispose said cups in substantially vertical pin spotting position relative to the bed of a bowling alley, means operative after pins have been placed on the bed of said alley for moving said frame towards said bed of said alley to travel said cups downwardly along said spotted pins and release said pins from said cups, means for moving said cups away from and clear of said spotted pins, and means for moving said frame upwardly to a position of rest above said bowling alley and including means for returning said cups to their pin receiving positions.

19. A bowling pin spotting device comprising an elongated open trough-like pin receiving and supporting shell having a pin supporting bottom and upstanding spaced side walls confining a pin seated on said bottom of said shell against substantial lateral movement therein, a movable support for said device, means mounting said shell on said support in normal pin receiving and supporting position in a plane inclined downwardly from the horizontal, and inwardly extending half-ring pin engaging

and holding means on the end of said shell partially encircling the lower belly portion of a pin seated in said shell for holding a pin seated in said shell against downward axial movement relative thereto with the base end of said pin projecting outwardly beyond the end of said shell for placement on the playing bed of a bowling alley.

20. The invention defined in claim 19 wherein said half-ring pin engaging and holding means is formed of fibre, said pin engaging and holding means having a tapered pin engaging face adapted to fit snugly about a major portion of the periphery of the butt end of said pin engaged thereby.

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