May 22, 1956 S. P. DOMENICO 2,746,069

APPARATUS FOR REMOVAL OF PAINT FROM BOWLING PINS

Filed April 29, 1953 2 Sheets-Sheet 1

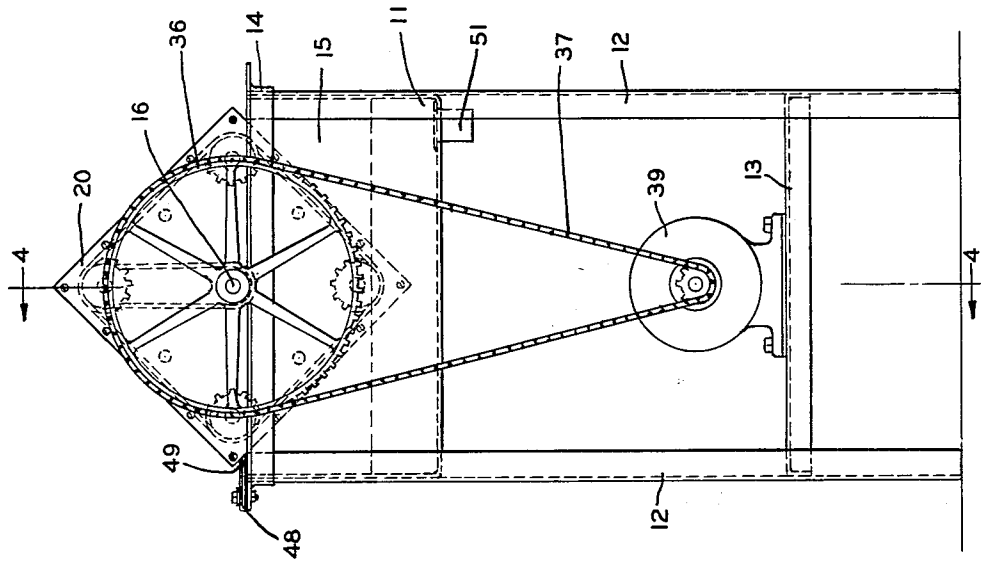


Fig. 2

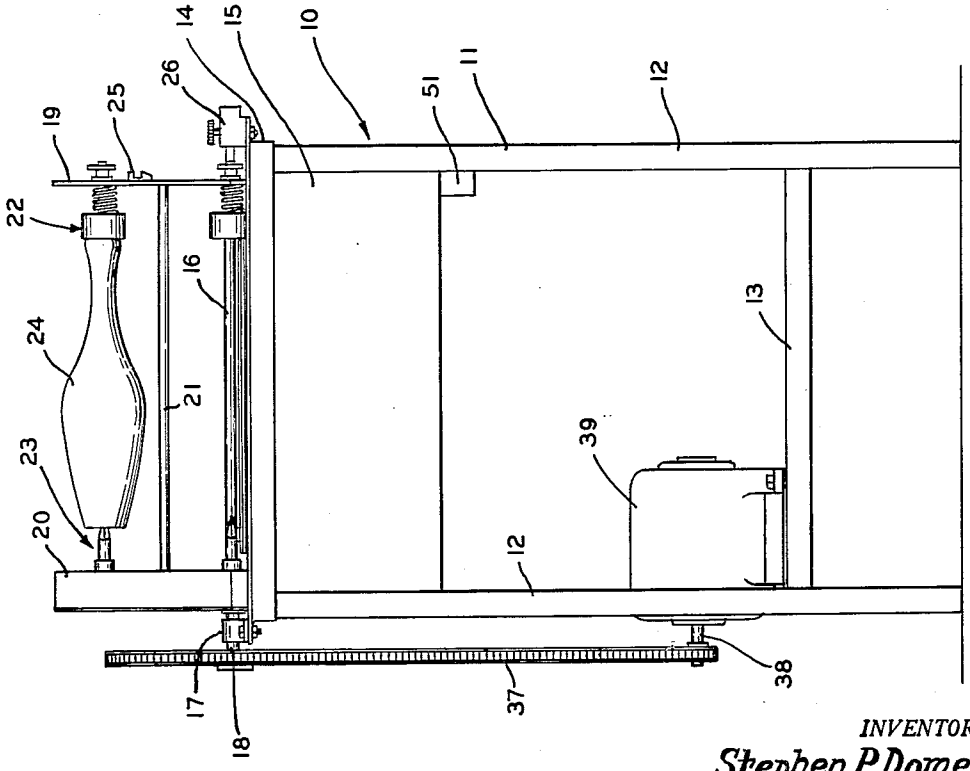


Fig. 1

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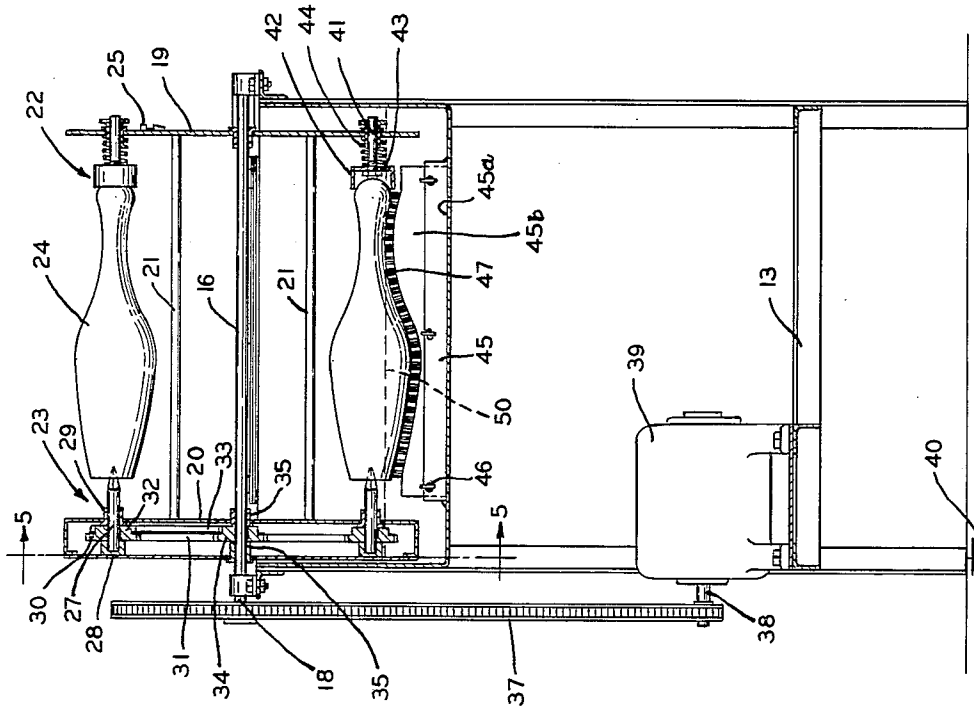


Fig. 4

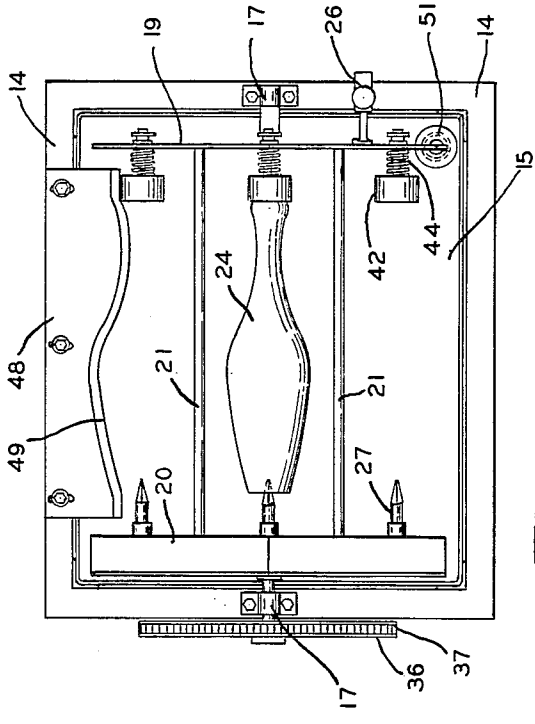


Fig. 3

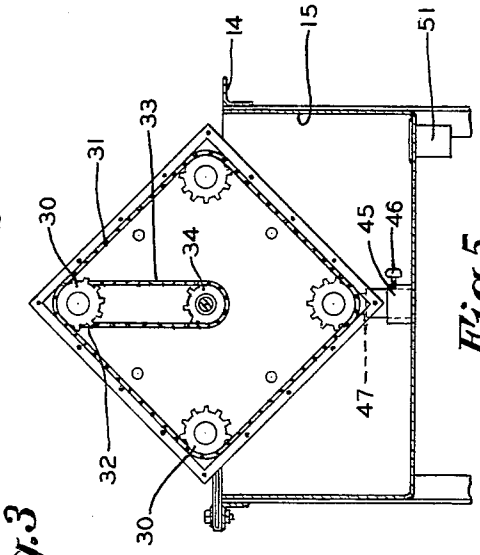


Fig. 5

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APPARATUS FOR REMOVAL OF PAINT FROM BOWLING PINS

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Application April 29, 1953, Serial No. 351,817

2 Claims. (Cl. 15—4)

This invention relates to a paint removal and apparatus and more particularly and specifically to apparatus for the automatic removal of paint from bowling pins and like objects.

The maintainance of bowling pins is a constant concern of bowling establishments and the costs incident to the maintainance of bowling pins in satisfactory and serviceable condition is a costly factor in the bowling alley business.

Bowling pins made in accordance with the regulatory standards established within the sport have an ascertainable life of service before either reconditioning or replacement becomes necessary.

Most bowling establishments maintain a schedule for the reconditioning of their pins based on periods of use measured either by the expiration of time or by the number of games or sets bowled.

In reconditioning bowling pins it is necessary to remove the paint and lacquer finish, and to smooth up the pin by removing dents, gouges and crush marks. The pins are then repainted and lacquered.

Heretofore, such reconditioning has been accomplished either by power sanding to remove the finish and smooth up the pin, or by manual paint removal with solvents followed by light sanding for surface finishing.

It has been found that power sanding operations are the quickest method of reconditioning, but such method has been found to be dangerous because of the highly inflammable characteristics of the paint and lacquer when subjected to the heat and friction of abrasion.

Further, it has been found that power sanding tends to remove too much of the pin material, and after two or three such reconditionings pins are no longer within the regulation requirements as to diameters and the like and must then be discarded.

The manual method of removing paint with solvents and manual brushing and scraping is a slow arduous task which is costly from a labor standpoint, and which also creates a hazard of fire by the ignition of such solvents as are normally used in these operations.

It is therefore a general object of the present invention to provide apparatus for the removal of the paint and lacquer finishes from bowling pins which substantially eliminates the numerous problems presented and disadvantages encountered in reconditioning bowling pins by prior known methods.

A primary object of the present invention resides in apparatus for the removal of paints and lacquers from bowling pins which is substantially automatic, which is fast and efficient, and which substantially reduces the hazards of fire and combustion.

Still another object of this invention is the provision of new and improved apparatus for the removal of paint, lacquer and the like from bowling pins which utilizes paint solvents for the removal of the paint whereby unnecessary reduction in pin diameters is avoided thus increasing the life of the pin by enabling several more reconditionings thereof than would otherwise be possible by certain prior known methods.

A further object of the present invention lies in the provision of new and improved apparatus for the removal of paint, lacquer, and the like from bowling pins for the purpose of reconditioning the pins which have, inherently, greatly increased safety factors over prior methods and apparatus.

Another object of this invention is the provision of apparatus for paint and lacquer removal from bowling pins and like objects which is substantially automatic thereby permitting the rapid and inexpensive operation thereof at a substantial savings in the costs incident to time and labor over prior apparatus.

Still another and important object of the present invention resides in the provision of apparatus for the removal of paint and lacquer from bowling pins wherein the cost of performance is retained at a minimum, nominal figure, and where the apparatus involved is of substantially simple, durable and inexpensive construction.

These and other objects and advantages apparent to those skilled in the art from the following description and claims may be obtained, the stated results achieved, and the described difficulties and problems overcome, by the devices, constructions, arrangements, combinations, subcombinations, parts, elements, discoveries and principles which comprise the present invention, the nature of which is set forth in the following general statement, a preferred embodiment of which—illustrative of the best modes in which applicant has contemplated applying the principles—are set forth in the following description and shown in the drawings, and which are particularly and distinctly pointed out and defined in the appended claims forming part hereof.

The nature of the apparatus constituting the present invention may be stated in general terms as preferably including a stand supporting a tank containing a paint solvent bath, spaced carriage elements mounted above said tank in laterally spaced relationship relative thereto and for revolution about a common axis into and out of said tank and the bath therein, one of said carriage elements consisting of an enclosed sealed housing, means on said carriage elements disposed in opposed relationship for rotatably supporting bowling pins therebetween whereby said pins will move into and out of said bath with said carriage elements, abrading means in said tank within said bath positioned to contact the entire longitudinal surfaces of bowling pins moving therethrough with said carriage elements, drive means within the enclosed housing of said last named carriage element operatively connected to the pin supporting means therein to rotate the same and to rotate said pin in its supported position between said carriage elements, cooperative lock means between one of said rotating carriage elements and stand whereby said elements may be selectively locked in a fixed position relative to said tank and bath, a shielded electric drive motor mounted on said stand remote to said tank, and means forming a drive connection between said sealed motor and the drive means within said enclosed carriage element, and means carried by said tank above said bath for wiping engagement with said rotating bowling pins as they move out of said bath.

By way of example, a preferred embodiment of the present invention is illustrated in the accompanying drawing forming part hereof wherein:

Figure 1 is a front elevation of the apparatus constituting a part of the present invention;

Fig. 2 is a side elevation of the apparatus as shown in Fig. 1;

Fig. 3 is a top plan view of the apparatus as shown in Fig. 1;

Fig. 4 is a vertical section taken on line 4—4, Fig. 2; and

Fig. 5 is a vertical section taken on line 5—5, Fig. 4.

Similar numerals refer to like parts throughout the various figures of the drawings.

Apparatus

Referring now to the accompanying drawings, the apparatus, constituting the present invention, is generally illustrated at **10** and preferably includes a framework stand **11** formed by four corner posts or leg members **12** interconnected by brace members **13** in the region of their lower ends and surrounded by a flanged trim member **14** at their upper extremities.

An open topped tank **15** is suspended within the framework of the stand downwardly from the trim member **15** and is adapted to contain a bath of paint solvent therein to a predetermined depth.

A shaft **16**, journaled in bearing members **17** supported in laterally opposed positions on the trim member **14**, is rotatably disposed laterally across the open top of the tank centrally thereof and extending at one end for a spaced distance therebeyond as at **18**. A pair of carriage elements **19** and **20** are mounted on their central axes, by means of bushings, on the shaft **16** for free rotation thereon in laterally spaced apart relationship within the confines of the side walls of the tank **15**.

The carriage elements **19** and **20** are of identical square configuration and are mounted in lateral coincidence on the shaft **16** and are rigidly fixed in said positions by tie bars **21** extending therebetween and secured thereto.

In addition to the tie bars, the carriage elements carry in oppositely disposed alignment therebetween bowling pin support members generally designated at **22** on carriage element **19** and at **23** on carriage element **20** which permit the horizontal suspension of bowling pins **24** on their longitudinal axis between these support members and between the carriage elements **19** and **20** for rotation therewith about the shaft **16** into and out of tank **15**.

A catch dog **25** is affixed to the outwardly disposed face of the carriage element **19** in a position to engage with a catch bolt **26** of a spring bolt type carried on the flanged trim member **14**, whereby the carriage elements **19** and **20** may be locked as a unit against their free rotation on shaft **16**, and they may be selectively released to permit their rotation through 360° whereupon said catch dog and bolt will again reach a point of interlocking engagement.

This foregoing rotation of the carriage elements **19** and **20** through 360° about the shaft **16** will cause bowling pins **24** suspended in spaced apart relationship between these elements to pass into and out of the tank **15** and into and out of the paint solvent bath therein for purposes to be hereinafter described.

Additionally, the carriage element **20** takes the form of a sealed housing enclosing a drive arrangement for imparting rotation to the bowling pin support means **23** carried thereby for imparting rotation to said bowling pins about their longitudinal axis while in their suspended position between the carriage elements **19** and **20**.

The bowling pin support means **23** take the form of support pins **27** which are rotatably seated and anchored in bearing members **28** within the housing to extend outwardly from the housing through sealed bushings **29** for a spaced distance toward the carriage element **19** and in alignment with the bowling pin support members **22** carried thereby.

The support pins **27** are provided with sprockets **30** keyed thereon within the housing, and the sprockets of all the support pins **27** projecting from the carriage element **20** are interconnected in drive engagement by a drive chain **31** which extends continuously about the outer peripheries of these support pin sprockets in order that rotation of one sprocket will cause driven rotation of all said sprockets.

In addition, one of said support pin members **27** is provided with an additional chain sprocket **32** which is interconnected by a drive chain **33** with a chain sprocket **34** keyed on that portion of the shaft **16** which extends through said enclosed housing and which is sealed at its points of entry by sealing bushings **35**. Hence, rotation of shaft **16** will cause driving movement of the chain **31** and thus rotation of the pin support members **27**.

The extended portion **18** of the shaft **16**, which overhangs the stand and tank, is provided with an enlarged sprocket wheel **36** keyed thereto and having drive chain connection, through the medium of a chain **37**, with the drive shaft **38** of a shielded electric motor **39**, which in turn is supported on the cross brace members **13** at the lower end of the stand. The shielded motor **39** is grounded as at **40** through one leg of the stand to reduce the accumulation of static therein.

The bowling pin support members **22** carried by the carriage element **19** include shoulder bolt members **41** fixedly secured in said carriage element to extend in opposed alignment therefrom toward the corresponding support pins **27** located on the carriage element **20**.

The shoulder bolts are provided at their innermost ends with a cup-shaped pin engagement member **42** which is secured to the end of the bolt by nut means **43**. A coil spring **44** surrounds that portion of each shoulder bolt **41** extending between the inner face of the carriage element **19** and the cup-shaped support members **42** whereby the shoulder bolts and cup support members may be retracted toward the carriage element **19** against the resilient tension of the springs **44**, and whereby they will return to their extended position under the tension of the spring when released.

The extended end of the shoulder bolts **41**, beyond the nut means **43** and within the confined area of the cup support means **42**, are provided with a dished radial end designed to serve as bearing surfaces for the rounded, headed ends of bowling pins **24** when the headed ends thereof are positioned against the shoulder bolts and loosely confined within the cup-shaped support members **42** as shown in Fig. 4.

Located within the tank is an open top box-like member **45** which is secured centrally in the bottom of the tank to extend laterally thereof. This member **45** is adapted to receive the backing member **45*a*** of a brush **45*b*** having bristles **47** of nylon, glass fiber or the like, and said brush backing member **45*a*** is secured in said box element **45** by means of a plurality of set screws **46**.

The bristles **47** of the brush member are designed longitudinally of the brush to assume the same general configuration as that of the longitudinal surface of a standard bowling pin, whereby the entire longitudinal surface of a bowling pin will be contacted by said brush when the bowling pin is moved to the lowermost position in the tank with rotation of the carriage elements **19** and **20**. This positioning is best illustrated in Fig. 4.

In addition to the brush means, a rubber wiper element **49** is adjustably fixed at what would normally be the back end of the trim member **14** of the stand, said wiping element including a U-shaped plate **48** adjustably fixed on the trim member **14** and in which is secured in extended position therefrom a wiper or squeegee member **49** having a wiping edge configuration corresponding to the contour of a bowling pin **24**, whereby the squeegee member or wiper will contact the bowling pin in its movement upwardly from the aforedescribed lowermost position in the tank to wipe therefrom paint, solvent and the like which the bowling pin has accumulated while in the bath.

Operation

In operation of the apparatus described, acetone or a like paint solvent solution is poured into the tank **15** to bring the liquid level thereof to a point sufficient to cover the upper ends of the bristle members **47** of the brush **45*b***, as generally indicated by the dotted line **50** in Fig. 4.

A plurality of bowling pins, preferably four in number in accordance with the preferred embodiment of the invention as illustrated and described herein, are placed in rotatably suspended positions between the four pairs of complementary bowling pin support elements **22** and **23** carried by the carriage elements **19** and **20** respectively. To affix the bowling pins in the suspended position, the cap support members **42** and the shoulder bolts **41** of the support members **22** are retracted against the tension of the coil springs **44**, the usual base openings in the bowling pins being inserted over the extended ends of the support pins **27** on carriage element **20**, and the headed ends of the bowling pins are positioned in alignment with the cap support members **42**, whereupon the cap support members and shoulder bolts **41** are released to bring the radial ends **43** of the shoulder bolts into a bearing surface support engagement against the heads of the pins and to loosely confine the heads of the pins within cap support members **42**.

When the bowling pins have been secured in their suspended positions, operation of the shielded motor **39** will cause rotation of the support pins **27** through the housed drive mechanism and rotation of the bowling pins about their longitudinal axes in their suspended positions between the carriage elements **19** and **20**.

The rotation of shaft **16**, upon operation of the motor **39**, will impart slight rotative torque to the carriage elements **19** and **20** tending to move them with said shaft to successively bring the bowling pins **24** into abrading contact with the brush **45***b* within the confines of the solvent bath. Rotation of the carriage elements may be implemented by manual means.

With rotation of the pins about their longitudinal axes in contact with the brush and within the confines of the pins will be readily loosened and removed, and further solvent bath, the usual lacquer and paint finishes of the rotation of the carriage element **19** and **20** as a single unit will successively bring the plural bowling pins into contact with the brush to loosen and remove their finish and subsequently with the squeegee or wiper member **49**, which in turn will resiliently wipe loose paint, lacquer and remaining solvent from the surface of the pin.

As each bowling pin has been treated for removal of its paint and lacquer, it may be quickly and readily removed for hand sanding and repainting and a new pin is mounted in its place for a subsequent operation of the removal apparatus.

It should be noted that the use of a sealed housing such as that which constitutes carriage element **20** substantially prevents likelihood of any fire or explosion resulting from sparks and the like developing in the chain drive mechanism and contacting the fumes and liquid of the paint solvent.

Further, the use of a shielded motor for the drive mechanism additionally reduces the hazards of fire resulting from combustion of the fumes and the like of the paint solvent used.

It is important to note that the support pins **27** and the shaft **16** are tightly sealed at those points where they extend into or out of the sealed housing for the purpose of insuring a tight seal and a maximum of safety preventing combustion of the paint solvent fumes.

Additionally, it is an obvious expedient to provide the tank with a drain means as at **51** to permit the emptying of the solvent bath materials when their effectiveness has been substantially reduced by continued use and when it is desired to empty the tank for any other purpose.

It is to be understood that the embodiments shown are only preferred illustrations of numerous possible modifications all of which are considered to be within the scope and spirit of the instant invention.

Numerous modifications could be made in the drive arrangement within the enclosed housing forming the carriage element **20**, and equally, it would be possible to substitute pulley and belt drive arrangements for the chain and sprocket arrangements shown.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention, the construction, the operation and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful constructions, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

I claim:

1. Apparatus for the removal of paint from bowling pins including, a paint solvent bath tank, spaced carriage elements mounted above said tank to revolve in and out of said bath, one of said elements consisting of an enclosed sealed housing, means for rotatably supporting bowling pins between said elements in spaced apart relationship whereby they will move successively into and out of said bath tank with revolution of said carriage elements, abrading means in said tank positioned to contact the surfaces of bowling pins moving therethrough, drive means within the enclosed carriage elements arranged to rotate the pin support means thereon, and power means for driving said enclosed drive means.

2. Apparatus for removal of paint from bowling pins including, a paint solvent bath tank, a shaft rotatably mounted horizontally above the bath level, power means for rotating the shaft, a pair of spaced carriage elements mounted in spaced relationship on said shaft for movement into and out of the bath, one of said elements including a sealed housing, means for rotatably supporting bowling pins between said elements and including support pins extending through the sealed housing in a fluid-tight manner, drive means within the sealed housing operatively connected between the shaft and the support pins, abrading means in said tank positioned to contact the surfaces of bowling pins moving therethrough, and wiper means externally of the bath positioned to engage the pin surface as it emerges from the bath.

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