May 19, 1942. G. J. SCHMIDT 2,283,614

PIN SETTER UNIT

Filed June 21, 1940

FIG. 2

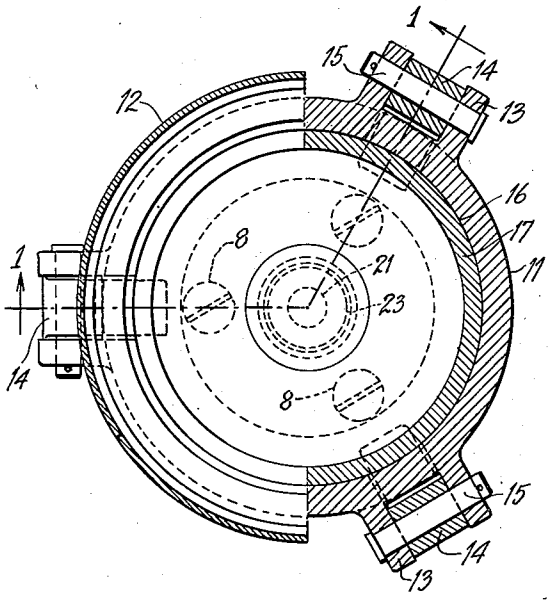


FIG. 3

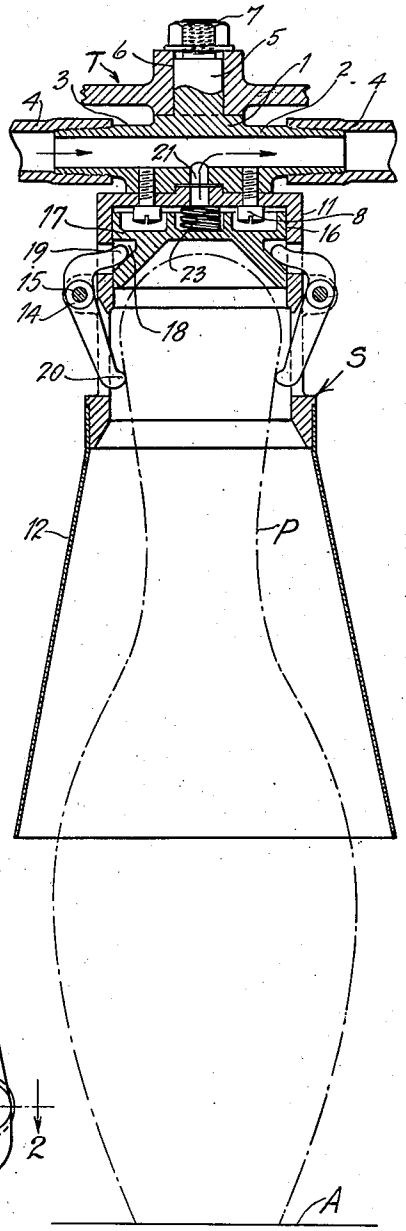
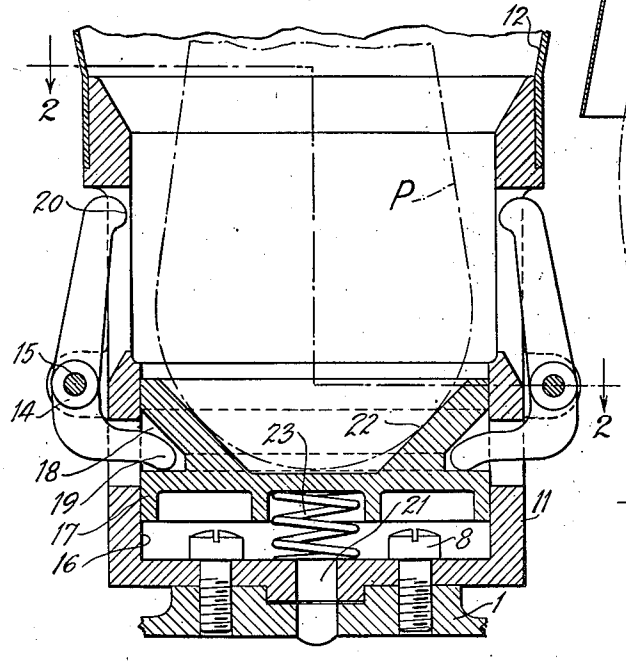


FIG. 1



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Patented May 19, 1942

2,283,614

UNITED STATES PATENT OFFICE

2,283,614

PIN SETTER UNIT

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Application June 21, 1940, Serial No. 341,658

16 Claims. (Cl. 294—88)

This invention relates to automatic bowling pin setting machines and more particularly to improvements in mechanism for setting and resetting pins on a bowling alley.

In bowling pin setting machines, one of the outstanding problems is that of properly handling bowling pins both when a set of pins, say ten or any other desired number, is to be located upon an alley in playing position or when after the throwing of a ball, pins are to be handled so that the alley may be cleared of "deadwood" or fallen pins, after which the playing can be resumed.

It is an object of my invention, therefore, to provide improved means for handling bowling pins and properly locating them on an alley bed.

In automatic bowling pin setting machines it is generally advisable to assemble a plurality of pins, either in a storage magazine or in other suitable arrangements, in order that a set of pins of the number required for playing may be transferred to the bed of the bowling alley. However, in some instances difficulty has been experienced in assuring that all of the devices which coact to transfer the required number of pins will operate positively on all of the selected pins and make it practically impossible for certain of the devices to fail to operate and thereby be ineffective in actually transferring pins to the alley. It is, therefore, a further object of my invention to provide pin handling mechanism wherein pins may be transferred from a storage magazine to the bed of a bowling alley and deposited thereon in proper arrangement in the required number without danger of failure on the part of the pin handling means to hold and transfer pins to the alley.

Another object of my invention is to provide means for gripping the head of a pin after it has been transferred from a delivery station for transportation to the bed of a bowling alley after the handle end of the pin reaches a guiding device which forms a part of each of the pin handling devices constituting my invention.

My invention also consists in the provision of a pin transfer table which can be moved from pin receiving to pin delivery position relative to the bed of a bowling alley and in which each pin is securely and positively held by mechanical means during its transfer.

A further object of my invention is to provide bowling pin handling devices for supporting bowling pins wherein the handle end of each bowling pin is guided to positively actuated pin holders which hold each pin securely while a set of pins is moved from pin receiving station to the alley bed, where the pins are automatically released thereby allowing the supporting means to be moved away from the alley bed leaving the pins properly supported thereon in playing arrangement.

It is an additional object of my invention to provide improved bowling pin handling devices, each device having fluid pressure operated gripping jaws arranged to engage and hold the handle ends of pins firmly when they are set or reset on an alley bed.

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 drawing, which forms a part of this specification, and in which like characters of reference indicate the same or like parts:

Figure 1 is a sectional elevation on line 1—1 of Figure 2 showing one of the devices constituting my invention in position to receive and grip a bowling pin;

Figure 2 is a sectional plan view on line 2—2 of Figure 1 showing the arrangement of the gripper jaws; and

Figure 3 is a sectional elevation showing the device in an inverted position with the gripper jaws gripping the neck of the pin about to be released and deposited on the alley.

The present invention relates generally to bowling pin setting machines of the type shown and described in co-pending application, Serial No. 260,901 for Bowling pin setter, filed by Rupert E. Rundell, March 10, 1939, although it may find useful application in other bowling pin setting machines wherein it is desired to transfer, set and reset bowling pins on the bed of a bowling alley.

In the type of machine shown in the aforementioned Rundell application there is provided a bowling pin handling mechanism utilizing a pin transferring unit provided with a plurality of bowling pin holders positioned in conventional playing arrangement, that is, in triangular formation, according to the usual manner of arranging pins on a bowling alley, although if desired, any other arrangement can be used. In handling pins, in a machine of the type above referred to, the desired number of pins forming a set or frame is transferred to the setters which in turn after movement of their supporting unit,

locate the pins carried thereby upon the alley in playing position.

Referring to the drawing which shows a preferred form of my invention, S designates generally one of the bowling pin handling devices. It is to be understood that there is provided a plurality of devices S, usually ten, which are carried by a supporting table T in a manner similar to that set forth in the Rundell application, mentioned above. Each of the pin setting devices S is provided with a head 1 having projecting ducts 2 and 3, which are connected to a source of fluid pressure, such as a suction line 4 for operating the pin gripping mechanism described hereinafter. Head 1 is also provided with a stem 5 which fits in a bore 6 of table T supporting the several pin setting devices, and each device is made fast by a nut 7 screwed on a threaded portion of stem 6. Fastened to head 1, by means of screws 8 is a housing 11, which forms the base of the pin setter devices and mounts a pin guide 12. As shown in Figures 1, 2 and 3, housing 11 is provided with lugs 13 in which the gripping jaws 14 are fulcrumed on pins 15 for movement to and from pin gripping position.

The interior of housing 11 (Figures 1 and 2) has a cylindrical bore 16 in which moves a piston 17 provided with a peripheral groove 18 engaging the tail ends 19 of jaws 14 which have pin engaging portions 20 which may be rounded or otherwise shaped for best holding pins for transfer and holding. A port 21 formed in head 1 and housing 11 connects the housing to the fluid pressure ducts 2 and 3 of head 1 in order that suction may be conducted into the housing for operating the piston and hence the grippers.

In the usual operation of my improved pin handling devices, each device will be positioned as shown in Figure 1, that is, with the guide portions 12 positioned upward so that pins can be guided thereinto and come to rest against the tapered side walls 22 of piston 17 which tend to locate the head of the pin relative to the walls of the guide 12 and the grippers 14. Prior to the movement of the table T from pin receiving to pin delivery position, fluid pressure, such as suction, is inducted into ducts 3, through port 21 into bore 16 and piston 17 moves downwardly against the tension of spring 23 thereby causing tails 19 of levers 14 to be rocked to bring the gripping portions 20 thereof simultaneously into gripping engagement with the head of a pin P, thus holding a pin in the guide 12 for inverting and lowering of the table T in the manner described in the above mentioned Rundell copending application for positioning the pins on the alley A after which the suction is cut off in ducts 2 and 3 and the piston 16 urged by spring 23 moves away from the bottom of bore 12 causing the gripper jaws 14 to open up and release each pin P.

As shown in Figure 2, three jaws 14 have been found to give satisfactory results and hence because of their simultaneous action, caused by the engagement of tails 19 with groove 18, each has the same inward motion and the pin head is centralized in the pin setter for delivery to the alley bed A. If desired, a different number of jaws could be used with equal results.

The invention above described may be varied in construction within the scope of the claims, for the particular device, selected to illustrate the invention, is but one of many possible concrete embodiments of the same. It is not, therefore, to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. In a bowling pin setting machine, a device for holding the handle end of a bowling pin comprising means for locating the handle end of a pin in said device, a plurality of jaws movable into and out of pin gripping position with said handle end only, means for guiding said pin handle into position to be engaged by said jaws, and positively actuated means for operating said jaws to grip said located pin handle.

2. In a bowling pin setting machine having a table arranged to transfer pins to a bowling alley, a pin setting device mounted on said table and arranged to engage the handle end only of a bowling pin, said setting device comprising a member having means for locating said handle end of said pin in said device, a plurality of jaws movable by said member into and out of pin gripping position relative to said pin, and means for guiding said pin handle into position to be engaged by said jaws.

3. A device for handling bowling pins comprising a cylindrical housing, a movable support for said housing, a source of fluid pressure connected to said housing, a piston movable in said housing, a plurality of pin gripping jaws mounted on said housing, and connections between said jaws and piston for moving said jaws to grip the handle end of a pin whenever fluid is inducted through said duct into said housing.

4. A device for handling bowling pins comprising a cylindrical housing, a movable support for said housing, a source of suction connected to said housing, a piston movable in said housing, a plurality of pin gripping jaws mounted on said housing, connections between said jaws and pistons for moving said jaws to grip a pin whenever suction is inducted through said duct into said housing, and means for releasing said jaws when said suction is cut off.

5. In a bowling pin setting machine, a pin setter device comprising a housing having a cylindrical bore, a piston mounted for movement in said bore, jaw actuating means on said piston, a plurality of jaws spaced around said housing each of which jaws is provided with extensions engaging said means on said piston, and means for operating said piston in said bore to move said jaws into pin engaging position.

6. In a pin setter for a bowling pin setting machine, a housing having a cylindrical bore, a piston movable in said bore, said piston having a tapered pin engaging and locating face, and a plurality of jaws spaced about said housing and projectable therethrough for movement into engagement with the handle end of a bowling pin whenever fluid pressure is inducted into said housing.

7. In a pin setter for a bowling pin setting machine, a housing having a cylindrical bore, a piston movable in said bore, said piston having a tapered pin engaging and locating face, a plurality of jaws spaced about said housing and projectable therethrough for movement into engagement with the handle end of a bowling pin whenever fluid pressure is inducted into said housing, and a pin guide associated with said housing.

8. A bowling pin handling device for an automatic bowling pin setting machine comprising a cylindrical housing having a cylindrical bore, a piston having pin centralizing means movable in said housing, a plurality of pin holding members mounted on said housing and engaging said pis-

ton, and means for conducting suction into said housing to move said piston and swing said members into engagement with the centralized handle end of a pin.

9. In a bowling pin handling device for an automatic bowling pin setting machine, a cylindrical housing, a pin guide mounted on said housing, a plurality of pin gripping jaws provided with operating means mounted on said housing for movement into and out of engagement with the handle end of a pin, a piston movable in said housing and provided with a circumferential groove constructed and arranged to engage with said operating means, and means for conducting suction into said housing for reciprocating said piston to move said jaws into engagement with a bowling pin.

10. A bowling pin handling device for use with a bowling pin setter frame movable to and from pin receiving and pin delivery position on an alley bed comprising a movable frame, a suction head having ducts connected to a source of supply of suction forming a part of said head, a housing mounted on said head and connected to said source of suction supply, said housing having a cylindrical bore, a piston reciprocably mounted in said housing, and a pluraliay of pin gripping jaws mounted on said housing and constructed and arranged to be moved by said piston into pin gripping position whenever suction is inducted from said source of supply into said housing.

11. A bowling pin handling device for use with a bowling pin setter frame movable to and from pin receiving and pin delivery position on an alley bed comprising a movable frame, a suction head having ducts connected to a source of supply of suction forming a part of said head, a housing mounted on said head and connected to said source of suction supply, said housing having a cylindrical bore, a piston reciprocably mounted in said housing, a plurality of pin gripping jaws mounted on said housing and constructed and arranged to be moved by said piston into pin gripping position whenever suction is inducted from said source of supply into said housing, and resilient means for releasing said gripper jaws when suction is cut off in said housing.

12. A device for handling bowling pins in a bowling pin setting machine comprising a support, a movable actuating member carried by said support, a head end locating seat carried by said member, a plurality of jaws mounted on said support and connected with said member for gripping the head end of a located bowling pin, and means to move said member to open and close said jaws.

13. A pin handling device for a bowling pin setting machine comprising a support, a plurality of jaws mounted on said support, a movable actuating member carried by said support and arranged to move axially relative to said jaws, means associated with said member for locating a pin relative to said jaws, and means for moving said member to open and close said jaws for gripping a located bowling pin.

14. In a bowling pin setting machine, a device for holding the handle end of a bowling pin comprising a member for locating said handle end of said pin in said device, a plurality of jaws movable into and out of pin handle gripping position, means for guiding a pin handle into position to coact with said locating means for engagement in located position by said jaws, and means operative after a pin has been so located for actuating said member to cause said jaws to grip said handle end of said pin.

15. In a bowling pin setting machine, a pin setter device comprising a housing, a piston mounted for movement in said housing, jaw actuating means on said piston, a plurality of jaws spaced around said housing, said jaws having extensions projecting inwardly through openings in said housing into engagement with said actuating means on said piston, and means for moving said piston in said housing to move said jaws into pin engaging gripping position.

16. In a pin setter for a bowling pin setting machine, a housing having a bore, an actuating member movable in said bore, said member having a pin engaging and locating face, a plurality of jaws spaced about said housing provided with extensions projecting through said housing into engagement with said member, and means for operating said member to cause said jaws to engage the end of a pin.

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