May 10, 1949. J. F. MURPHY 2,469,886

PIN DISCHARGING MECHANISM FOR BOWLING ALLEYS

Original Filed April 13, 1943 2 Sheets-Sheet 1

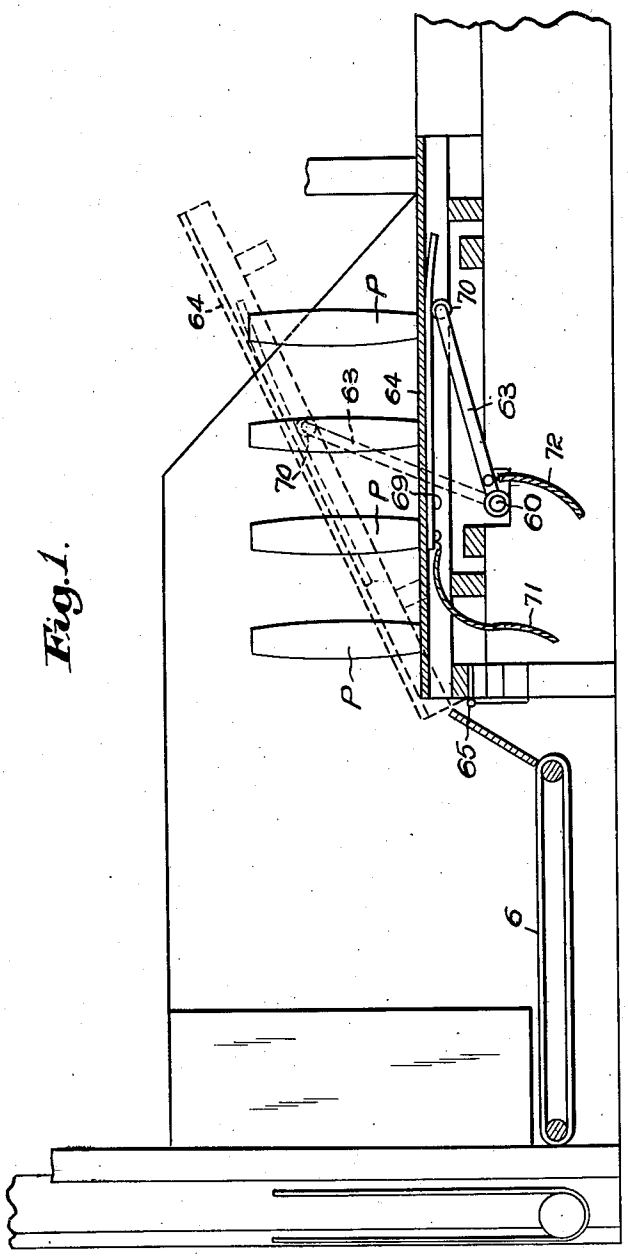


Fig. 1.

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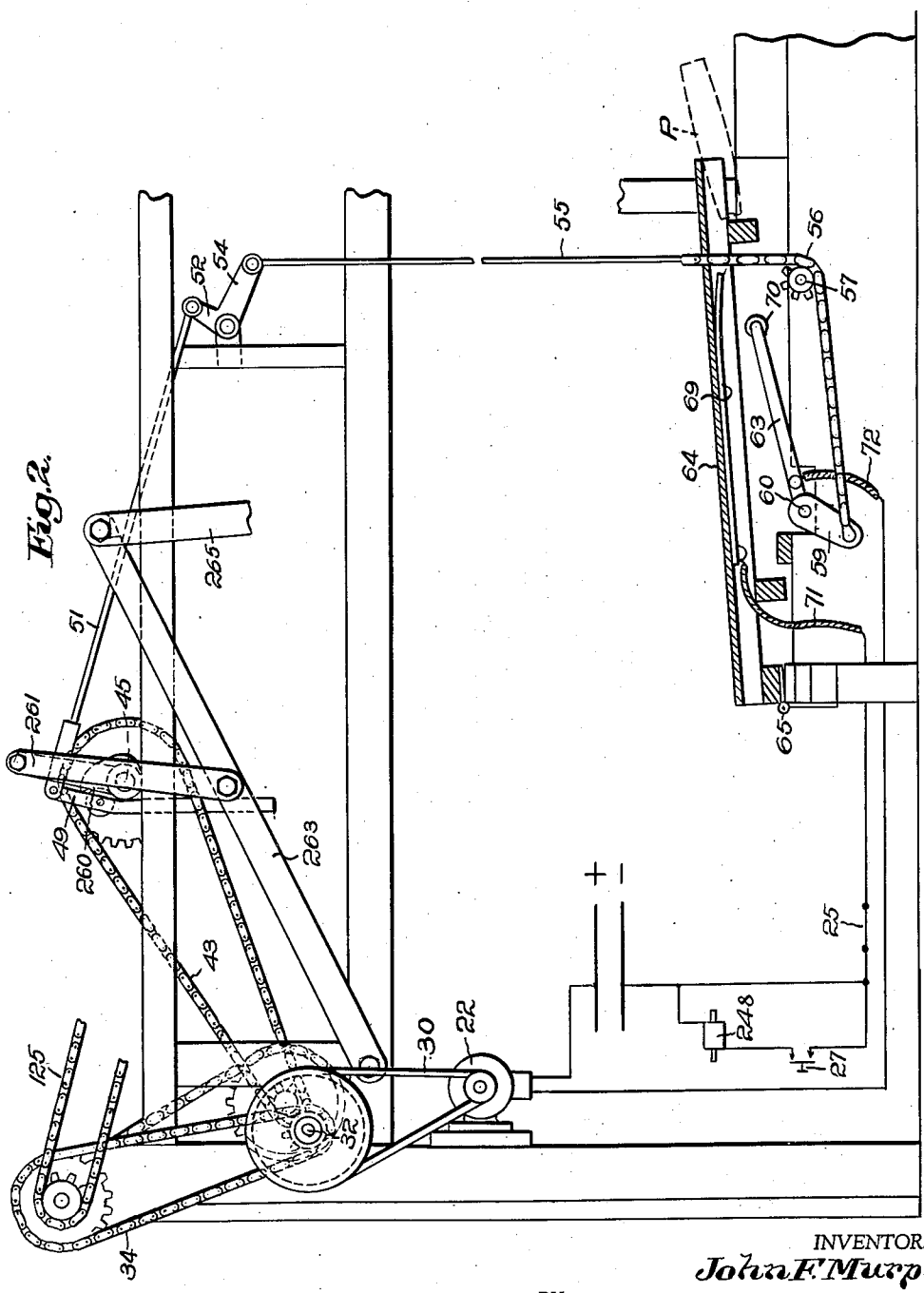
Emery, Booth, Townsend, Miller & Weidner
Attys.

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Fig. 2.



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2,469,886

PIN DISCHARGING MECHANISM FOR BOWLING ALLEYS

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Original application April 13, 1943, Serial No. 482,852. Divided and this application December 4, 1944, Serial No. 566,461

3 Claims. (Cl. 273—43)

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This invention relates to pin-handling machines for bowling alleys and more particularly to the mechanism which provides for discharging fallen pins and any pins left standing at the conclusion of a box from the alley to the pit. Under the requirements of the Patent Office this mechanism is made the subject of a separate patent, but it will be understood that it will ordinarily be utilized in connection with cooperating mechanisms, for collecting the pins from the pit and distributing them to a pin-setting mechanism by means of which they may be placed upon the alley for the continuance of the game, such as those described in my application Serial No. 482,852, filed April 13, 1943 (now Patent No. 2,450,249, issued September 28, 1948), of which the present application is a division. In the drawings, particularly Fig. 2, the presence of such cooperating mechanisms is indicated in a general way by a showing of some of the driving or actuating elements therefor.

Objects of my invention are to provide a simple and effective mechanism for the purpose indicated, means being provided to guard against troubles which might arise and properly protect it against improper functioning.

My invention will be well understood by reference to the following description taken in connection with the accompanying drawings, wherein—

Fig. 1 is a vertical longitudinal section through the rear portion of the alley with parts omitted and broken away for simplicity; and

Fig. 2 is a similar view with the parts in a different position such as might result from a misplaced pin, with parts omitted and the operating mechanism indicated in a general way together with portions of the driving mechanism which would operate other elements of a complete machine, these elements being omitted for clearness, reference being made to my parent application above referred to for a complete disclosure thereof wherein like parts are indicated by like numerals. In this figure parts of the electric wiring are diagrammatically shown.

Referring now to the drawings, the rear portion 64 of the alley on which the pins P are set up is a separate section, herein shown as hinged at 65 at its rear end and which may be tilted upwardly to the dotted line position shown in Fig. 1 to discharge any pins, upright or fallen, which remain thereon to the pit bottom 6 which herein is in the form of a conveyor belt, the upper run of which travels rearwardly or to the left in the figure and delivers the pins to an elevating mechanism from which ultimately they arrive at the setting mechanism proper. Referring to Fig. 2, the machine as a whole, including the alley section 64 just referred to, may take motion from an electric motor 22 driving through belt 30 a shaft 32 from which sprocket chains such as 34 and 125 drive the elevating means and the pin-distributing means as referred to in my parent application to which reference may be made, and from which the sprocket chain 43 through a suitable one-revolution clutch manually controlled from the head of the alley drives jack shaft 45 from which is operated through the cranks 260, links 261, rocker arms 263 and depending arms 265 the pin-setting mechanism proper, not herein shown. The jack shaft carries cams which rock at the desired time levers 49 from which actuating rods 51 extend to bell cranks 52, 54, to raise the depending rods 55 by which the floor section 64 is tilted upwardly in the manner now to be described. While the parts driven from shaft 45, as is indicated by reference thereto in the plural, would ordinarily be present at each side of the machine, I have thought it unnecessary to illustrate this in detail and it will be convenient in the following description to speak of the mechanisms operating on floor section 64 as if single.

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The rod 55 acts on a chain 56 trained about the guide sprocket 57 to operate through arm 59 a rock shaft 60 from which extends forwardly the arm 63 having a roll 70 at the end thereof for a running on the bottom of the alley section 64. When the cam draws upwardly on the rod 55 in proper timed relation to the operation of the machine, the arm 63 will be swung counterclockwise, viewing Fig. 1, raising the alley section 64 to the dotted line position and causing any pins thereon to slide off into the pit, this action taking place in a brief portion of the rotation of the jack shaft 45, the pin-setting mechanism proper operating when the alley section has returned to the full line position.

It will be noted that the engagement of the alley section with the rolls 70 on the ends of the arms 63 is by what is known as force closure, that is, it rests under gravity on the arms in the normal position of the parts, but if downward movement of the alley section is arrested as illustrated in Fig. 2, the arms have lost motion relatively thereto and can and will move downwardly so that the rolls 70 move away from the alley section 64. It may happen that a pin is displaced on the alley forwardly of the section 64, overlapping the same yet with its center of grav-

ity forward of the same so that it remains on the alley after the alley section has been tilted up with a portion projecting in the path of the section **64** as it is lowered, this being illustrated in Fig. 2. The operating mechanism for the alley section can continue in its cycle without being harmed by virtue of the force closure connection of the parts referred to, and provision is made whereby such continued motion will stop the drive of the machine so that the other parts will not function with the floor section out of position. On the contrary, the machine will stop in its cycle and the pin P may be removed by hand and operation of the machine resumed.

For this purpose the lower portion of the alley section **64** is provided with a metallic contact **69** on which the roller **70** normally moves during the normal operation of the machine in the full line and dotted line positions of Fig. 1 and intermediate positions. The part **69** forms an electric contact connected by lead **71** through main switch **25** to one side of the electric line from which the motor **22** is energized, and the roller **70** acts as a brush cooperating with this circuit, being connected by lead **72** through motor **22** with the opposite side of the line, as diagrammatically illustrated in Fig. 2. In other words, the contact **69** and brush **70** function as a switch in the circuit of the motor **22**. Now if the floor is jammed in raised position as illustrated in Fig. 2, brush **70** retreats from contact **69**, breaks the motor circuit and stops the operation of the jack shaft **45** and in the example shown the other mechanisms of the complete machine. On the removal of the pin the floor section sinks under gravity and restores the circuit. In Fig. 2 I have diagrammatically illustrated a branch circuit containing the press button **27** constituting a control switch for the solenoid **248** which operates the one-revolution clutch which controls jack shaft **45**, all as more fully described in my application above referred to. The position of the parts shown diagrammatically is without verisimilitude as regards their position in the mechanical organization of the machine, the switch **25** and button **27**, for instance, ordinarily being arranged at the head of the alley and the solenoid **248** adjacent the shaft **45**.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, as is in fact clear in several matters from the description itself. Reference is to be had to the appended claims to indicate

those principles of the invention exemplified by the particular embodiment described and which I desire to secure by Letters Patent.

I claim:

1. In a machine of the class described, an alley floor section for supporting standing pins hinged at its rear end and means to raise the same to an elevated and rearwardly sloping position to discharge pins thereon to the pit comprising a lifting member with which said section is engaged by force closure and an electric drive the circuit of which comprises contacts on said section and lifting member respectively and which are closed together when the two are in normal engagement, whereby if the section is jammed in raised position, drive of the machine will be intermitted through motion of the member relative to the section.

2. In a machine of the class described, an alley floor section for supporting standing pins hinged at its rear end and means to raise the same to an elevated and rearwardly sloping position to discharge pins thereon to the pit comprising a lifting member normally engaging said section but capable of lost motion downward and away from the same and an electric drive the circuit of which comprises contacts on said section and lifting member respectively and which are closed together when the two are in normal engagement, whereby if the section is jammed in raised position, drive of the machine will be intermitted through motion of the member relative to the section.

3. In a machine of the class described, an alley floor section for supporting standing pins hinged at its rear edge, a pivoted lever underlying the same having an end sliding along the bottom thereof as said end is moved upwardly and the forward end of the section correspondingly raised, the section and lever having a force closed connection permitting the downward movement of the former to be forcibly interrupted while the downward movement of the latter continues, a jack shaft carrying a cam, and a link driven thereby having a connector to said lever to swing the same.

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